



## **SAR EVALUATION REPORT**

**FCC 47 CFR § 2.1093  
IEEE Std 1528-2013**

*For*

**GSM/WCDMA/LTE Tablet + Bluetooth & DTS/UNII a/b/g/n/ac & ANT+**

**FCC ID: A3LSMT715C  
Model Name: SM-T715C**

**Report Number: 15K20542-S1C  
Issue Date: 6/2/2015**

*Prepared for*

**SAMSUNG ELECTRONICS CO., LTD.  
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,  
GYEONGGI-DO, 443-742, KOREA**

*Prepared by*

**UL Korea, Ltd. Suwon Laboratory  
218 Maeyeong-ro, Yeongtong-gu,  
Suwon-si, Gyeonggi-do, 443-823, Korea  
TEL: (031) 337-9902  
FAX: (031) 213-5433**



**ACCREDITED**

**TL-637**

**Revision History**

| Rev. | Date      | Revisions                                                                                                                                                                                                                                                                                                               | Revised By  |
|------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| --   | 5/24/2015 | Initial Issue                                                                                                                                                                                                                                                                                                           | Justin Park |
| A    | 5/24/2015 | 1. Revise footer                                                                                                                                                                                                                                                                                                        | Justin Park |
| B    | 5/26/2015 | 1. Updated Appendixes A, D, E, F<br>2. Sec 6.1., 6.2. : Updated Table<br>3. Sec 6.3., 6.5., 9.2 : Updated the correct data<br>5. Sec 7.1. : Updated SAR Test Exclusion Calculations for WLAN<br>6. Sec 9.6., 10.8. : Updated Bluetooth Output Power & SAR Data<br>7. Sec 10.9., 10.10. : Added Wi-Fi Area Scan Max. SAR | Justin Park |
| C    | 6/2/2015  | 1. Sec 12. : Updated Simultaneous Transmission SAR Analysis<br>2. Sec 10., 12.. : Added Wi-Fi MIMO Data                                                                                                                                                                                                                 | Justin Park |

## Table of Contents

|            |                                                                  |           |
|------------|------------------------------------------------------------------|-----------|
| <b>1.</b>  | <b>Attestation of Test Results .....</b>                         | <b>5</b>  |
| <b>2.</b>  | <b>Test Specification, Methods and Procedures.....</b>           | <b>6</b>  |
| <b>3.</b>  | <b>Facilities and Accreditation .....</b>                        | <b>6</b>  |
| <b>4.</b>  | <b>SAR Measurement System &amp; Test Equipment .....</b>         | <b>7</b>  |
| 4.1.       | SAR Measurement System.....                                      | 7         |
| 4.2.       | SAR Scan Procedures.....                                         | 8         |
| 4.3.       | Test Equipment.....                                              | 10        |
| <b>5.</b>  | <b>Measurement Uncertainty.....</b>                              | <b>10</b> |
| <b>6.</b>  | <b>Device Under Test (DUT) Information .....</b>                 | <b>11</b> |
| 6.1.       | DUT Description .....                                            | 11        |
| 6.2.       | Wireless Technologies.....                                       | 11        |
| 6.3.       | Nominal and Maximum Output Power.....                            | 12        |
| 6.4.       | General LTE SAR Test and Reporting Considerations.....           | 13        |
| 6.5.       | LTE (TDD) Considerations.....                                    | 14        |
| 6.6.       | Power Reduction by Proximity Sensing .....                       | 15        |
| 6.6.1.     | Proximity Sensor Triggering Distance (KDB 616217 §6.2) .....     | 15        |
| 6.6.2.     | Proximity Sensor Coverage (KDB 616217 §6.3) .....                | 27        |
| 6.6.3.     | Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4).....    | 27        |
| <b>7.</b>  | <b>RF Exposure Conditions (Test Configurations) .....</b>        | <b>28</b> |
| 7.1.       | Standalone SAR Test Exclusion Considerations.....                | 28        |
| 7.2.       | Required Test Configurations .....                               | 33        |
| <b>8.</b>  | <b>Dielectric Property Measurements &amp; System Check .....</b> | <b>34</b> |
| 8.1.       | Dielectric Property Measurements .....                           | 34        |
| 8.2.       | System Check.....                                                | 38        |
| <b>9.</b>  | <b>Conducted Output Power Measurements.....</b>                  | <b>42</b> |
| 9.1.       | GSM .....                                                        | 42        |
| 9.2.       | W-CDMA .....                                                     | 44        |
| 9.3.       | LTE.....                                                         | 49        |
| 9.4.       | Wi-Fi 2.4GHz (DTS Band) .....                                    | 52        |
| 9.5.       | Wi-Fi 5GHz (U-NII Bands).....                                    | 53        |
| 9.6.       | Bluetooth .....                                                  | 57        |
| <b>10.</b> | <b>Measured and Reported (Scaled) SAR Results.....</b>           | <b>58</b> |
| 10.1.      | GSM850.....                                                      | 61        |

|                   |                                                     |           |
|-------------------|-----------------------------------------------------|-----------|
| 10.2.             | GSM1900 .....                                       | 61        |
| 10.3.             | W-CDMA Band V .....                                 | 62        |
| 10.4.             | W-CDMA Band II.....                                 | 62        |
| 10.5.             | LTE Band 41 (20MHz Bandwidth) .....                 | 63        |
| 10.6.             | Wi-Fi (DTS Band).....                               | 64        |
| 10.7.             | Wi-Fi (U-NII Band).....                             | 65        |
| 10.8.             | Bluetooth.....                                      | 66        |
| <b>11.</b>        | <b>SAR Measurement Variability.....</b>             | <b>67</b> |
| <b>12.</b>        | <b>Simultaneous Transmission SAR Analysis.....</b>  | <b>68</b> |
| 12.1.             | Sum of the SAR for GSM850 & Wi-Fi & BT .....        | 71        |
| 12.2.             | Sum of the SAR for GSM1900 & Wi-Fi & BT .....       | 72        |
| 12.3.             | Sum of the SAR for WCDMA Band V & Wi-Fi & BT.....   | 73        |
| 12.4.             | Sum of the SAR for WCDMA Band II & Wi-Fi & BT ..... | 74        |
| 12.5.             | Sum of the SAR for LTE Band 41 & Wi-Fi & BT .....   | 75        |
| <b>Appendixes</b> | <b>.....</b>                                        | <b>82</b> |
| A_15K20542-S1_SAR | Photos & Ant. Locations .....                       | 82        |
| B_15K20542-S1_SAR | Highest Test Plots .....                            | 82        |
| C_15K20542-S1_SAR | System Check Plots.....                             | 82        |
| D_15K20542-S1_SAR | Tissue Ingredients.....                             | 82        |
| E_15K20542-S1_SAR | Probe Cal. Certificates .....                       | 82        |
| F_15K20542-S1_SAR | Dipole Cal. Certificates .....                      | 82        |

## 1. Attestation of Test Results

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                                                                                   |                                                                                      |              |                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------|-----------------|
| Applicant Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      | SAMSUNG ELECTRONICS CO.,LTD.                                                      |                                                                                      |              |                 |
| FCC ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      | A3LSMT715C                                                                        |                                                                                      |              |                 |
| Model Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      | SM-T715C                                                                          |                                                                                      |              |                 |
| Applicable Standards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      | FCC 47 CFR § 2.1093<br>Published RF exposure KDB procedures<br>IEEE Std 1528-2013 |                                                                                      |              |                 |
| <b>SAR Limits (W/Kg)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                                                                                   |                                                                                      |              |                 |
| Exposure Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      | Peak spatial-average(1g of tissue)                                                |                                                                                      |              |                 |
| General population /<br>Uncontrolled exposure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      | 1.6                                                                               |                                                                                      |              |                 |
| <b>The Highest Reported SAR (W/kg)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                                                                                   |                                                                                      |              |                 |
| <b>RF Exposure Conditions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      | <b>Equipment Class</b>                                                            |                                                                                      |              |                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      | <b>Licensed</b>                                                                   | <b>DTS</b>                                                                           | <b>U-NII</b> | <b>DSS (BT)</b> |
| Head                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      | 0.570                                                                             | 0.272                                                                                | 0.097        | N/A             |
| Body                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      | 1.098                                                                             | 0.746                                                                                | 1.049        | 0.234           |
| Simultaneous TX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Head | 0.842                                                                             | 0.842                                                                                | 0.667        | N/A             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Body | 1.517                                                                             | 1.517                                                                                | 1.500        | 1.517           |
| Date Tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      | 4/11/2015 to 5/28/2015                                                            |                                                                                      |              |                 |
| Test Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      | Pass                                                                              |                                                                                      |              |                 |
| <p><b>Note:</b> The Wi-Fi (DTS/U-NII) and Bluetooth SAR measurement results from the original filling can be found in SAR test report 15K20515-S1D, FCC ID A3LSMT715. The WLAN/BT antennas and surrounding circuitry is the same between these two units, and tune up power targets are identical for WLAN/BT operations. Therefore, SAR data for WLAN/BT from the original filling was used for this model. Spot checks for WLAN/BT were performed to ensure that the SAR measurements for both devices are the same.</p>                                                                                                |      |                                                                                   |                                                                                      |              |                 |
| <p>UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p>                                                                                             |      |                                                                                   |                                                                                      |              |                 |
| <p><b>Note:</b> The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.</p> |      |                                                                                   |                                                                                      |              |                 |
| Approved & Released By:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                                                                                   | Prepared By:                                                                         |              |                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                                                                                   |  |              |                 |
| JiHo Choi<br>Operations Manager<br>UL Korea, Ltd Suwon Laboratory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                                                                                   | Justin Park<br>Engineer<br>UL Korea, Ltd Suwon Laboratory                            |              |                 |

## 2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE STD 1528-2013, the following FCC Published RF exposure [KDB](#) procedures:

- 248227 D01 802.11 Wi-Fi SAR v02
- 447498 D01 General RF Exposure Guidance v05r02
- 447498 D03 Supplement C Cross-Reference v01
- 616217 D04 SAR for laptop and tablets v01r01
- 648474 D04 Handset SAR v01r02
- 690783 D01 SAR Listings on Grants v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03
- 865664 D02 RF Exposure Reporting v01r01
- 941225 D01 3G SAR Procedures v03
- 941225 D05 SAR for LTE Devices v02r03
- 941225 D06 Hotspot Mode v02

## 3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at

|            |
|------------|
| Suwon      |
| SAR 1 Room |
| SAR 2 Room |
| SAR 3 Room |

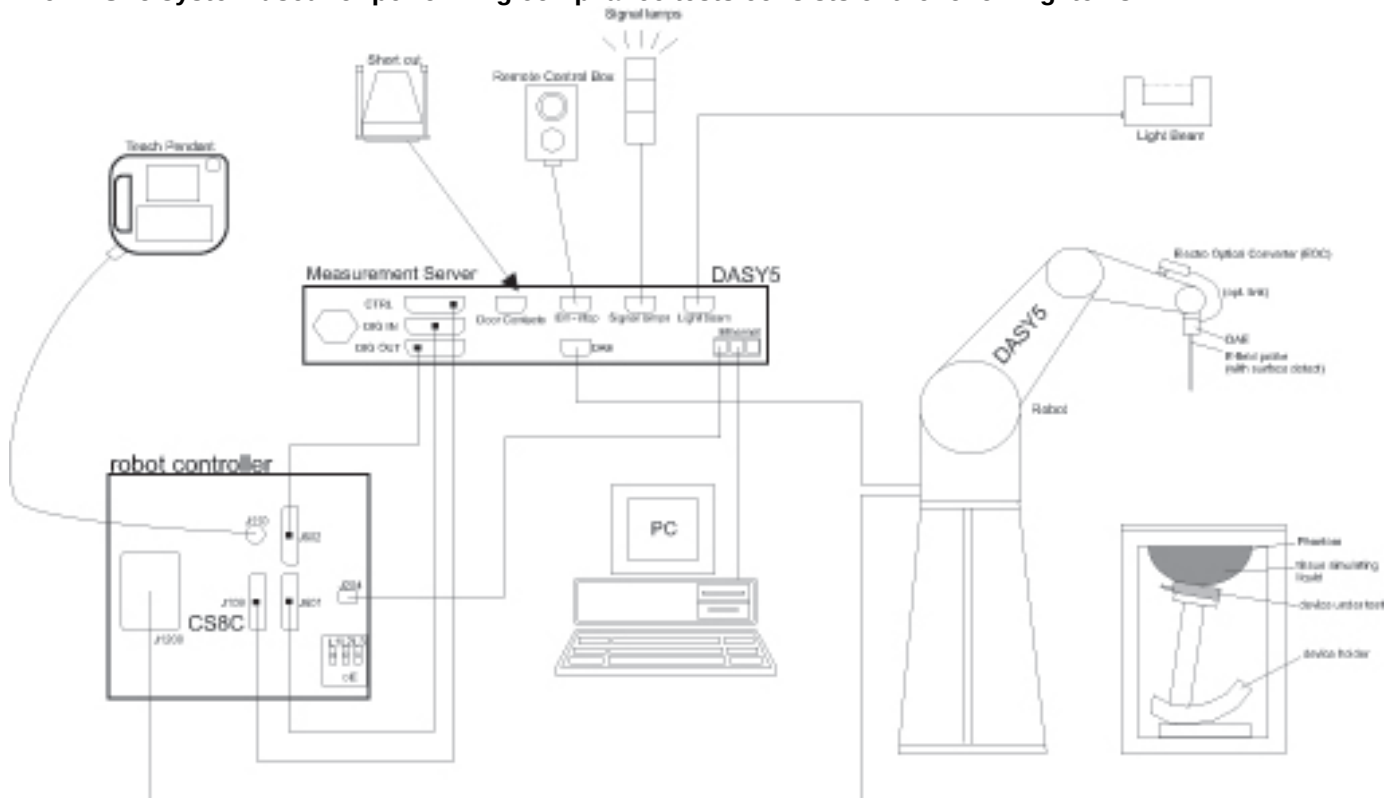
UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637.

The full scope of accreditation can be viewed at <http://www.iasonline.org/PDF/TL/TL-637.pdf>.

## 4. SAR Measurement System & Test Equipment

### 4.1. SAR Measurement System

The DASY5 system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

## 4.2. SAR Scan Procedures

### Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

### Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

|                                                                                                        | $\leq 3$ GHz                                                                                                                                                                                                                                                           | $> 3$ GHz                                              |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface | $5 \pm 1$ mm                                                                                                                                                                                                                                                           | $\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm     |
| Maximum probe angle from probe axis to phantom surface normal at the measurement location              | $30^\circ \pm 1^\circ$                                                                                                                                                                                                                                                 | $20^\circ \pm 1^\circ$                                 |
| Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$                 | $\leq 2$ GHz: $\leq 15$ mm<br>$2 - 3$ GHz: $\leq 12$ mm                                                                                                                                                                                                                | $3 - 4$ GHz: $\leq 12$ mm<br>$4 - 6$ GHz: $\leq 10$ mm |
|                                                                                                        | When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device. |                                                        |

**Step 3: Zoom Scan**

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

|                                                                                                                                                                                                                                                                                                             |                                           |                                                                                             | $\leq 3$ GHz                                         | $> 3$ GHz                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------------------|
| Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$                                                                                                                                                                                                                      |                                           |                                                                                             | $\leq 2$ GHz: $\leq 8$ mm<br>2 – 3 GHz: $\leq 5$ mm* | 3 – 4 GHz: $\leq 5$ mm*<br>4 – 6 GHz: $\leq 4$ mm*                            |
| Maximum zoom scan spatial resolution, normal to phantom surface                                                                                                                                                                                                                                             | uniform grid: $\Delta z_{\text{Zoom}}(n)$ |                                                                                             | $\leq 5$ mm                                          | 3 – 4 GHz: $\leq 4$ mm<br>4 – 5 GHz: $\leq 3$ mm<br>5 – 6 GHz: $\leq 2$ mm    |
|                                                                                                                                                                                                                                                                                                             | graded grid                               | $\Delta z_{\text{Zoom}}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface | $\leq 4$ mm                                          | 3 – 4 GHz: $\leq 3$ mm<br>4 – 5 GHz: $\leq 2.5$ mm<br>5 – 6 GHz: $\leq 2$ mm  |
|                                                                                                                                                                                                                                                                                                             |                                           | $\Delta z_{\text{Zoom}}(n>1)$ : between subsequent points                                   | $\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$         |                                                                               |
| Minimum zoom scan volume                                                                                                                                                                                                                                                                                    | x, y, z                                   |                                                                                             | $\geq 30$ mm                                         | 3 – 4 GHz: $\geq 28$ mm<br>4 – 5 GHz: $\geq 25$ mm<br>5 – 6 GHz: $\geq 22$ mm |
| Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.                                                                                                                                                           |                                           |                                                                                             |                                                      |                                                                               |
| * When zoom scan is required and the <i>reported</i> SAR from the area scan based <i>1-g SAR estimation</i> procedures of KDB 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz. |                                           |                                                                                             |                                                      |                                                                               |

**Step 4: Power drift measurement**

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

**Step 5: Z-Scan (FCC only)**

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not be larger than the step size in Z-direction.

### 4.3. Test Equipment

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards.

#### Dielectric Property Measurements

| Name of Equipment      | Manufacturer | Type/Model    | Serial No.    | Cal. Due Date |
|------------------------|--------------|---------------|---------------|---------------|
| Network Analyzer       | Agilent      | E5071C        | MY46522054    | 9-23-2015     |
| Dielectronic Probe kit | SPEAG        | DAK-3.5       | 1196          | 8-5-2015      |
| Dielectronic Probe kit | SPEAG        | DAK-3.5 Short | SM DAK 200 BA | N/A           |
| Thermometer            | LKM          | DTM3000       | 3424          | 11-13-2015    |

#### System Check

| Name of Equipment                    | Manufacturer | Type/Model            | Serial No. | Cal. Due Date |
|--------------------------------------|--------------|-----------------------|------------|---------------|
| MXG Analog Signal Generator          | Agilent      | N5181A                | MY50145882 | 9-23-2015     |
| Power Sensor                         | Agilent      | U2000A                | MY54260010 | 9-23-2015     |
| Power Sensor                         | Agilent      | U2000A                | MY54260007 | 9-23-2015     |
| Power Amplifier                      | EXODUS       | 1410025-AMP2027-10003 | 10003      | 11-7-2015     |
| Directional Coupler                  | Agilent      | 772D                  | MY52180193 | 9-22-2015     |
| Directional Coupler                  | Agilent      | 778D                  | MY52180432 | 9-22-2015     |
| Low Pass Filter                      | MICROLAB     | LA-15N                | 03943      | 11-4-2015     |
| Low Pass Filter                      | FILTRON      | L14012FL              | 1410003S   | 11-4-2015     |
| Low Pass Filter                      | MICROLAB     | LA-60N                | 03942      | 11-5-2015     |
| Attenuator                           | Agilent      | 8491B/003             | MY39269292 | 9-22-2015     |
| Attenuator                           | Agilent      | 8491B/010             | MY39269315 | 9-22-2015     |
| Attenuator                           | Agilent      | 8491B/020             | MY39269298 | 9-22-2015     |
| E-Field Probe (SAR 1)                | SPEAG        | EX3DV4                | 7330       | 2-12-2016     |
| E-Field Probe (SAR 2)                | SPEAG        | EX3DV4                | 7313       | 8-27-2015     |
| E-Field Probe (SAR 3)                | SPEAG        | EX3DV4                | 7314       | 8-27-2015     |
| E-Field Probe (SAR 3)                | SPEAG        | EX3DV4                | 7323       | 12-5-2015     |
| Data Acquisition Electronics (SAR 1) | SPEAG        | DAE4                  | 1468       | 1-12-2016     |
| Data Acquisition Electronics (SAR 2) | SPEAG        | DAE4                  | 1447       | 8-25-2015     |
| Data Acquisition Electronics (SAR 3) | SPEAG        | DAE4                  | 1446       | 8-27-2015     |
| System Validation Dipole             | SPEAG        | D835V2                | 4d174      | 8-13-2015     |
| System Validation Dipole             | SPEAG        | D1900V2               | 5d190      | 8-12-2015     |
| System Validation Dipole             | SPEAG        | D1900V2               | 5d199      | 2-6-2016      |
| System Validation Dipole             | SPEAG        | D2450V2               | 939        | 8-11-2015     |
| System Validation Dipole             | SPEAG        | D2600V2               | 1097       | 11-27-2015    |
| System Validation Dipole             | SPEAG        | D5GHzV2               | 1184       | 8-22-2015     |
| Thermometer (SAR 1)                  | Lutron       | MHB-382SD             | AH.53049   | 11-18-2015    |
| Thermometer (SAR 2)                  | Lutron       | MHB-382SD             | AH.50215   | 11-18-2015    |
| Thermometer (SAR 3)                  | Lutron       | MHB-382SD             | AH.50213   | 11-18-2015    |

#### Others

| Name of Equipment      | Manufacturer | Type/Model | Serial No.  | Cal. Due Date |
|------------------------|--------------|------------|-------------|---------------|
| Base Station Simulator | R & S        | CMW500     | 150313      | 8-13-2015     |
| Base Station Simulator | R & S        | CMW500     | 150314      | 8-13-2015     |
| Bluetooth Tester       | TESCOM       | TC-3000C   | 3000C000546 | 11-17-2015    |

### 5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

## 6. Device Under Test (DUT) Information

### 6.1. DUT Description

|                           |                                                                                                                                                                                                                                              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Device Dimension          | Overall (Length x Width): 198.2 mm x 134.5 mm<br>Overall Diagonal: 230 mm<br>Display Diagonal: 203.5 mm                                                                                                                                      |
| Back Cover                | <input checked="" type="checkbox"/> The rechargeable battery is not user accessible.                                                                                                                                                         |
| Battery Options           | <input checked="" type="checkbox"/> The rechargeable battery is not user accessible.                                                                                                                                                         |
| Wireless Router (Hotspot) | Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices.<br><input checked="" type="checkbox"/> Mobile Hotspot (Wi-Fi 2.4 GHz)<br><input type="checkbox"/> Mobile Hotspot (Wi-Fi 5 GHz) |
| Wi-Fi Direct              | Wi-Fi Direct enabled devices transfer data directly between each other<br><input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 2.4 GHz)<br><input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 5 GHz)                                 |

### 6.2. Wireless Technologies

| Wireless technologies | Frequency bands                                                                                                     | Operating mode                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                  | Duty Cycle used for SAR testing                                                              |
|-----------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| GSM                   | 850<br>1900                                                                                                         | Voice (GMSK)<br>GPRS (GMSK)<br>EGPRS (8PSK)                                                                                                                                                                                                                  | GPRS Multi-Slot Class:<br><input type="checkbox"/> Class 8 - 1 Up, 4 Down<br><input type="checkbox"/> Class 10 - 2 Up, 4 Down<br><input type="checkbox"/> Class 12 - 4 Up, 4 Down<br><input checked="" type="checkbox"/> Class 33 - 4 Up, 5 Down | GSM Voice: 12.5%<br>(E)GPRS: 1 Slot: 12.5%<br>2 Slots: 25%<br>3 Slots: 37.5%<br>4 Slots: 50% |
|                       |                                                                                                                     | <input checked="" type="checkbox"/> Class B = GPRS connection interrupted during a GSM call, automatically resumed at end of call.<br>Does this device support DTM (Dual Transfer Mode)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |                                                                                                                                                                                                                                                  |                                                                                              |
| W-CDMA (UMTS)         | Band II<br>Band V                                                                                                   | UMTS Rel. 99 (Voice & Data)<br>HSDPA (Rel. 5)<br>HSUPA (Rel. 6)<br>DC-HSDPA (Rel. 8)                                                                                                                                                                         |                                                                                                                                                                                                                                                  | 100%                                                                                         |
| LTE                   | Band 41                                                                                                             | QPSK<br>16QAM                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                  | 63.6%(TDD)                                                                                   |
|                       |                                                                                                                     | Does this device support SV-LTE (1xRTT-LTE)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                                                                                                                             |                                                                                                                                                                                                                                                  |                                                                                              |
| Wi-Fi                 | 2.4 GHz                                                                                                             | 802.11b<br>802.11g<br>802.11n (HT20)                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                  | 100%                                                                                         |
|                       | 5 GHz                                                                                                               | 802.11a<br>802.11n (HT20)<br>802.11n (HT40)<br>802.11ac (VHT20)<br>802.11ac (VHT40)<br>802.11ac (VHT80)                                                                                                                                                      |                                                                                                                                                                                                                                                  | 100%                                                                                         |
|                       | Does this device support bands 5.60 ~ 5.65 GHz? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                  |                                                                                              |
|                       | Does this device support Band gap channel? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No      |                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                  |                                                                                              |
| Bluetooth             | 2.4 GHz                                                                                                             | Version 4.1 LE                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                  | 77.5% (DH5)                                                                                  |

### 6.3. Nominal and Maximum Output Power

KDB 447498 sec.4.1.(3) at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit

| Upper limit (dB): -1.5 ~ 0.5 |                | Max. RF Output Power (dBm) |                              | Reduce RF Output Power (dBm) |                              |
|------------------------------|----------------|----------------------------|------------------------------|------------------------------|------------------------------|
| RF Air interface             | Mode           | Target                     | Max. tune-up tolerance limit | Target                       | Max. tune-up tolerance limit |
| GSM850                       | Voice          | 32.5                       | <b>33.0</b>                  | 26.0                         | <b>26.5</b>                  |
|                              | GPRS 1 slot    | 32.5                       | <b>33.0</b>                  | 26.0                         | <b>26.5</b>                  |
|                              | GPRS 2 slots   | 31.0                       | <b>31.5</b>                  | 24.0                         | <b>24.5</b>                  |
|                              | GPRS 3 slots   | 29.0                       | <b>29.5</b>                  | 22.0                         | <b>22.5</b>                  |
|                              | GPRS 4 slots   | 27.0                       | <b>27.5</b>                  | 20.0                         | <b>20.5</b>                  |
|                              | EGPRS 1 slot   | 27.0                       | <b>27.5</b>                  | 19.5                         | <b>20.0</b>                  |
|                              | EGPRS 2 slots  | 25.0                       | <b>25.5</b>                  | 17.5                         | <b>18.0</b>                  |
|                              | EGPRS 3 slots  | 24.0                       | <b>24.5</b>                  | 16.0                         | <b>16.5</b>                  |
|                              | EGPRS 4 slots  | 22.5                       | <b>23.0</b>                  | 14.5                         | <b>15.0</b>                  |
| GSM1900                      | Voice          | 29.5                       | <b>30.0</b>                  | 24.5                         | <b>25.0</b>                  |
|                              | GPRS 1 slot    | 29.5                       | <b>30.0</b>                  | 24.5                         | <b>25.0</b>                  |
|                              | GPRS 2 slots   | 28.0                       | <b>28.5</b>                  | 22.5                         | <b>23.0</b>                  |
|                              | GPRS 3 slots   | 26.2                       | <b>26.7</b>                  | 20.5                         | <b>21.0</b>                  |
|                              | GPRS 4 slots   | 24.5                       | <b>25.0</b>                  | 18.3                         | <b>18.8</b>                  |
|                              | EGPRS 1 slot   | 26.0                       | <b>26.5</b>                  | 20.5                         | <b>21.0</b>                  |
|                              | EGPRS 2 slots  | 24.5                       | <b>25.0</b>                  | 19.0                         | <b>19.5</b>                  |
|                              | EGPRS 3 slots  | 23.5                       | <b>24.0</b>                  | 17.4                         | <b>17.9</b>                  |
|                              | EGPRS 4 slots  | 22.0                       | <b>22.5</b>                  | 15.9                         | <b>16.4</b>                  |
| W-CDMA Band V                | R99            | 22.5                       | <b>23.0</b>                  | 16.5                         | <b>17.0</b>                  |
|                              | HSDPA          | 22.5                       | <b>23.0</b>                  | 16.5                         | <b>17.0</b>                  |
|                              | HSUPA          | 22.5                       | <b>23.0</b>                  | 16.5                         | <b>17.0</b>                  |
|                              | DC-HSDPA       | 22.5                       | <b>23.0</b>                  | 16.5                         | <b>17.0</b>                  |
| W-CDMA Band II               | R99            | 22.5                       | <b>23.0</b>                  | 15.5                         | <b>16.0</b>                  |
|                              | HSDPA          | 22.5                       | <b>23.0</b>                  | 15.5                         | <b>16.0</b>                  |
|                              | HSUPA          | 22.5                       | <b>23.0</b>                  | 15.5                         | <b>16.0</b>                  |
|                              | DC-HSDPA       | 22.5                       | <b>23.0</b>                  | 15.5                         | <b>16.0</b>                  |
| LTE Band 41                  | QPSK, 16QAM    | 23.5                       | <b>24.0</b>                  | 14.5                         | <b>15.0</b>                  |
| Upper limit (dB): ~ 0.5      |                | Max. RF Output Power (dBm) |                              | Reduce RF Output Power (dBm) |                              |
| RF Air interface             | Mode           | Main, Sub Ant              |                              | Main, Sub Ant                |                              |
|                              |                | Target                     | Max. tune-up tolerance limit | Target                       | Max. tune-up tolerance limit |
| WiFi 2.4 GHz                 | 802.11b        | 16.0                       | <b>16.5</b>                  | 11.0                         | <b>11.5</b>                  |
|                              | 802.11g        | 13.0                       | <b>13.5</b>                  | 11.0                         | <b>11.5</b>                  |
|                              | 802.11n HT20   | 13.0                       | <b>13.5</b>                  | 11.0                         | <b>11.5</b>                  |
| WiFi 5 GHz                   | 802.11a        | 12.0                       | <b>12.5</b>                  | 7.0                          | <b>7.5</b>                   |
|                              | 802.11n HT20   | 12.0                       | <b>12.5</b>                  | 7.0                          | <b>7.5</b>                   |
|                              | 802.11n HT40   | 11.0                       | <b>11.5</b>                  | 7.0                          | <b>7.5</b>                   |
|                              | 802.11ac VHT20 | 11.0                       | <b>11.5</b>                  | 7.0                          | <b>7.5</b>                   |
|                              | 802.11ac VHT40 | 11.0                       | <b>11.5</b>                  | 7.0                          | <b>7.5</b>                   |
|                              | 802.11ac VHT80 | 10.0                       | <b>10.5</b>                  | 7.0                          | <b>7.5</b>                   |
| Bluetooth                    |                | 9.2                        | <b>9.7</b>                   | N/A                          |                              |
| Bluetooth LE                 |                | 5.0                        | <b>5.5</b>                   | N/A                          |                              |

## 6.4. General LTE SAR Test and Reporting Considerations

| Item                                                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                  |                  |                |                  |        |          |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------|----------------|------------------|--------|----------|------------|-------------------------------------------------|--|--|--|--|--|----------|---------|---------|-------|--------|--------|--------|------|-----|-----|-----|------|------|------|-----|--------|-----|-----|-----|------|------|------|-----|--------|-----|-----|-----|------|------|------|-----|
| Frequency range, Channel Bandwidth, Numbers and Frequencies | Band 41                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Frequency range: 2555 – 2655 MHz |                  |                |                  |        |          |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
|                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Channel Bandwidth                |                  |                |                  |        |          |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
|                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 20 MHz                           | 15 MHz           | 10 MHz         | 5 MHz            | 3 MHz  | 1.4 MHz  |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
|                                                             | Low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 40340<br>/2565                   | 40315/<br>2562.5 | 40290/<br>2560 | 40265/<br>2557.5 |        |          |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
|                                                             | Mid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 40620/<br>2593                   | 40620/<br>2593   | 40620/<br>2593 | 40620/<br>2593   |        |          |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
|                                                             | High                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 41140/<br>2645                   | 41165/<br>2647.5 | 41190/<br>2650 | 41215/<br>2652.5 |        |          |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
| LTE transmitter and antenna implementation                  | LTE has one (1) TX/RX antennas and one (1) RX antennas<br>Refer to Appendix A...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                  |                  |                |                  |        |          |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
| Maximum power reduction (MPR)                               | <p><b>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</b></p> <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr> <tr> <th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr> </thead> <tbody> <tr> <td>QPSK</td><td>&gt; 5</td><td>&gt; 4</td><td>&gt; 8</td><td>&gt; 12</td><td>&gt; 16</td><td>&gt; 18</td><td>≤ 1</td></tr> <tr> <td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr> <tr> <td>16 QAM</td><td>&gt; 5</td><td>&gt; 4</td><td>&gt; 8</td><td>&gt; 12</td><td>&gt; 16</td><td>&gt; 18</td><td>≤ 2</td></tr> </tbody> </table> <p>MPR Built-in by design<br/>A-MPR (additional MPR) was disabled during SAR testing</p> |                                  |                  |                |                  |        |          | Modulation | Channel bandwidth / Transmission bandwidth (RB) |  |  |  |  |  | MPR (dB) | 1.4 MHz | 3.0 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | QPSK | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 1 | 16 QAM | ≤ 5 | ≤ 4 | ≤ 8 | ≤ 12 | ≤ 16 | ≤ 18 | ≤ 1 | 16 QAM | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 2 |
| Modulation                                                  | Channel bandwidth / Transmission bandwidth (RB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |                  |                |                  |        | MPR (dB) |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
|                                                             | 1.4 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0 MHz                          | 5 MHz            | 10 MHz         | 15 MHz           | 20 MHz |          |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
| QPSK                                                        | > 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | > 4                              | > 8              | > 12           | > 16             | > 18   | ≤ 1      |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
| 16 QAM                                                      | ≤ 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ≤ 4                              | ≤ 8              | ≤ 12           | ≤ 16             | ≤ 18   | ≤ 1      |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
| 16 QAM                                                      | > 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | > 4                              | > 8              | > 12           | > 16             | > 18   | ≤ 2      |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
| Power reduction                                             | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                  |                  |                |                  |        |          |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |
| Spectrum plots for RB configurations                        | A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |                  |                |                  |        |          |            |                                                 |  |  |  |  |  |          |         |         |       |        |        |        |      |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |        |     |     |     |      |      |      |     |

## 6.5. LTE (TDD) Considerations

According to KDB 941225 D05 SAR for LTE Devices v02r03, for Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7.

LTE TDD Band 41 supports 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

| Special subframe configuration | Normal cyclic prefix in downlink |                                |                                  | Extended cyclic prefix in downlink |                                |                                  |
|--------------------------------|----------------------------------|--------------------------------|----------------------------------|------------------------------------|--------------------------------|----------------------------------|
|                                | DwPTS                            | UpPTS                          |                                  | DwPTS                              | UpPTS                          |                                  |
|                                |                                  | Normal cyclic prefix in uplink | Extended cyclic prefix in uplink |                                    | Normal cyclic prefix in uplink | Extended cyclic prefix in uplink |
| 0                              | $6592 \cdot T_s$                 | $2192 \cdot T_s$               | $2560 \cdot T_s$                 | $7680 \cdot T_s$                   | $2192 \cdot T_s$               | $2560 \cdot T_s$                 |
| 1                              | $19760 \cdot T_s$                |                                |                                  | $20480 \cdot T_s$                  |                                |                                  |
| 2                              | $21952 \cdot T_s$                |                                |                                  | $23040 \cdot T_s$                  |                                |                                  |
| 3                              | $24144 \cdot T_s$                |                                |                                  | $25600 \cdot T_s$                  |                                |                                  |
| 4                              | $26336 \cdot T_s$                | $4384 \cdot T_s$               | $5120 \cdot T_s$                 | $7680 \cdot T_s$                   | $4384 \cdot T_s$               | $5120 \cdot T_s$                 |
| 5                              | $6592 \cdot T_s$                 |                                |                                  | $20480 \cdot T_s$                  |                                |                                  |
| 6                              | $19760 \cdot T_s$                |                                |                                  | $23040 \cdot T_s$                  |                                |                                  |
| 7                              | $21952 \cdot T_s$                |                                |                                  | $12800 \cdot T_s$                  |                                |                                  |
| 8                              | $24144 \cdot T_s$                |                                |                                  | -                                  | -                              | -                                |
| 9                              | $13168 \cdot T_s$                |                                |                                  | -                                  | -                              | -                                |

### Calculated Duty Cycle

| Uplink-Downlink Configuration | Downlink-to-Uplink Switch-point Periodicity | Subframe Number |   |   |   |   |   |   |   |   |   | Calculated Duty Cycle (%) |
|-------------------------------|---------------------------------------------|-----------------|---|---|---|---|---|---|---|---|---|---------------------------|
|                               |                                             | 0               | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                           |
| 0                             | 5 ms                                        | D               | S | U | U | U | D | S | U | U | U | 63.33                     |
| 1                             | 5 ms                                        | D               | S | U | U | D | D | S | U | U | D | 43.33                     |
| 2                             | 5 ms                                        | D               | S | U | D | D | D | S | U | D | D | 23.33                     |
| 3                             | 10 ms                                       | D               | S | U | U | U | D | D | D | D | D | 31.67                     |
| 4                             | 10 ms                                       | D               | S | U | U | D | D | D | D | D | D | 21.67                     |
| 5                             | 10 ms                                       | D               | S | U | D | D | D | D | D | D | D | 11.67                     |
| 6                             | 5 ms                                        | D               | S | U | U | U | D | S | U | U | D | 53.33                     |

Calculated Duty Cycle = Extended cyclic prefix in uplink  $\times (T_s) \times \#$  of S +  $\#$  of U

Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:

Calculated Duty Cycle =  $5120 \times [1/(15000 \times 2048)] \times 2 + 6 \text{ ms} = 63.33\%$

where

$T_s = 1/(15000 \times 2048)$  seconds

## 6.6. Power Reduction by Proximity Sensing

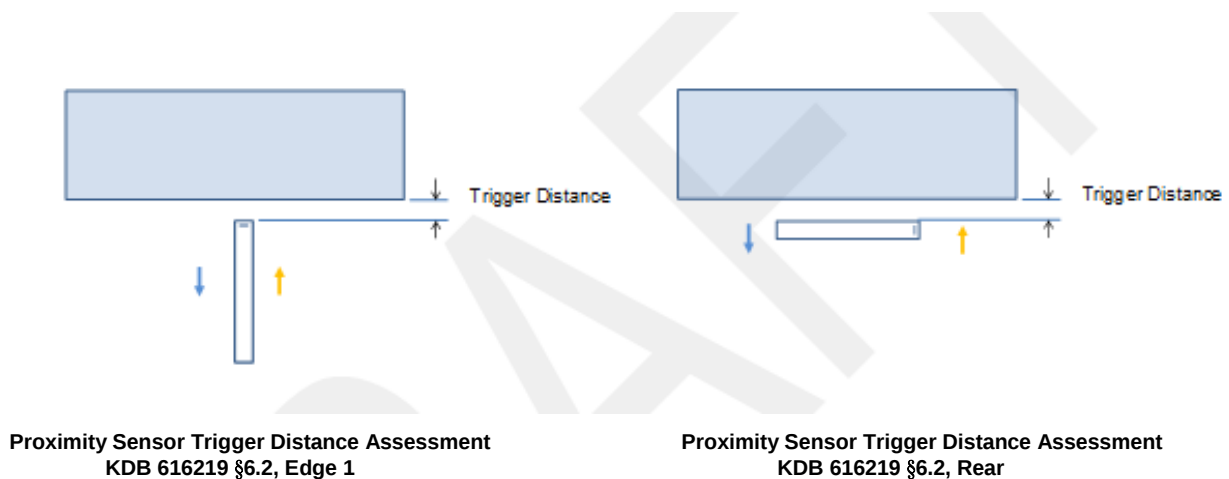
### 6.6.1. Proximity Sensor Triggering Distance (KDB 616217 §6.2)

Edge 1 of the DUT was placed directly below the flat phantom. The DUT was moved toward the phantom in accordance with the steps outlined in KDB 616217 §6.2 to determine the trigger distance for enabling power reduction. The DUT was moved away from the phantom to determine the trigger distance for resuming full power.

The measurement was then repeated for the Rear surface.

The DUT featured a visual indicator on its display that showed the status of the proximity sensor (Triggered or not triggered). This was used to determine the status of the sensor during the proximity sensor assessment as monitoring the output power directly was not practical without affecting the measurement.

It was confirmed separately that the output power was altered according to the proximity sensor status indication. This was achieved by observing the proximity sensor status at the same time as monitoring the conducted power. Section 9 contains both the full and reduced conducted power measurements.



#### LEGEND

- Direction of DUT travel for determination of power reduction triggering point
- Direction of DUT travel for determination of full power resumption triggering point

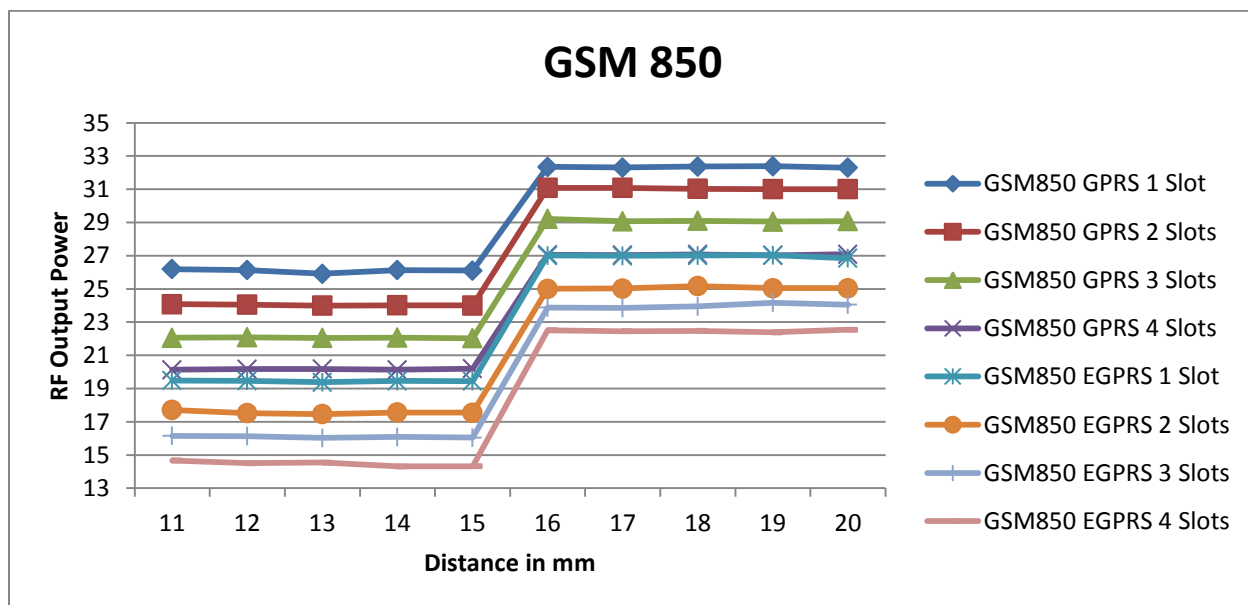
### Summary of Trigger Distances

| Tissue<br>simulating<br>liquid | Trigger distance - Edge 1   |                        | Trigger distance - Rear     |                        | Trigger distance - Front    |                        |
|--------------------------------|-----------------------------|------------------------|-----------------------------|------------------------|-----------------------------|------------------------|
|                                | Moving<br>toward<br>phantom | Moving from<br>phantom | Moving<br>toward<br>phantom | Moving from<br>phantom | Moving<br>toward<br>phantom | Moving from<br>phantom |
| 850 muscle                     | 15 mm                       | 15 mm                  | 15 mm                       | 15 mm                  | 13 mm                       | 13 mm                  |
| 1900 muscle                    | 15 mm                       | 15 mm                  | 15 mm                       | 15 mm                  | 13 mm                       | 13 mm                  |
| 2600 muscle                    | 15 mm                       | 15 mm                  | 15 mm                       | 15 mm                  | 13 mm                       | 13 mm                  |
| 2450 muscle                    | N/A                         | N/A                    | 10 mm                       | 10 mm                  | N/A                         | N/A                    |
| 5000 muscle                    | N/A                         | N/A                    | 10 mm                       | 10 mm                  | N/A                         | N/A                    |

**Proximity Sensor Triggering Distance Measurement Results****GSM850**

Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

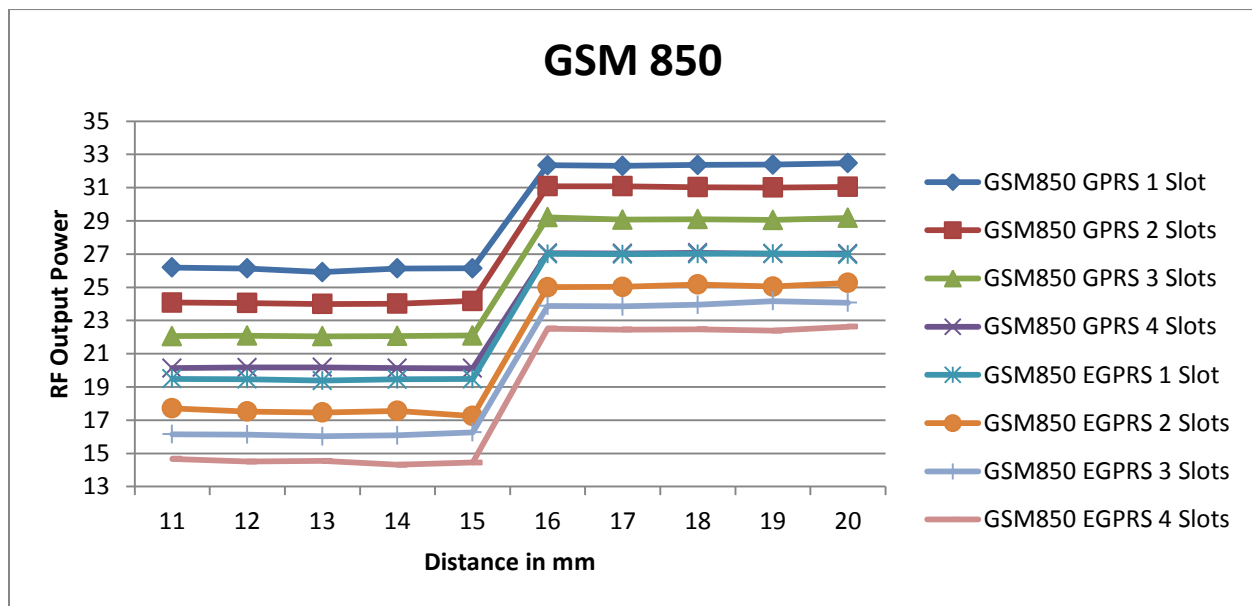
| Distance to DUT vs. Output Power in dBm |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Distance (mm)                           | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
| GSM 850 (Voice)                         | 26.2 | 25.9 | 25.8 | 26.1 | 26.2 | 32.2 | 32.3 | 32.4 | 32.3 | 32.2 |
| GSM850 GPRS 1 Slot                      | 26.2 | 26.1 | 25.9 | 26.1 | 26.1 | 32.4 | 32.3 | 32.4 | 32.4 | 32.3 |
| GSM850 GPRS 2 Slots                     | 24.1 | 24.1 | 24.0 | 24.0 | 24.0 | 31.1 | 31.1 | 31.0 | 31.0 | 31.0 |
| GSM850 GPRS 3 Slots                     | 22.1 | 22.1 | 22.1 | 22.1 | 22.0 | 29.2 | 29.1 | 29.1 | 29.1 | 29.1 |
| GSM850 GPRS 4 Slots                     | 20.1 | 20.2 | 20.2 | 20.1 | 20.2 | 27.1 | 27.0 | 27.1 | 27.0 | 27.1 |
| GSM850 EGPRS 1 Slot                     | 19.5 | 19.5 | 19.4 | 19.5 | 19.5 | 27.0 | 27.0 | 27.0 | 27.0 | 26.9 |
| GSM850 EGPRS 2 Slots                    | 17.7 | 17.5 | 17.5 | 17.6 | 17.6 | 25.0 | 25.0 | 25.2 | 25.1 | 25.1 |
| GSM850 EGPRS 3 Slots                    | 16.2 | 16.1 | 16.0 | 16.1 | 16.1 | 23.9 | 23.9 | 24.0 | 24.2 | 24.1 |
| GSM850 EGPRS 4 Slots                    | 14.7 | 14.5 | 14.6 | 14.3 | 14.3 | 22.5 | 22.5 | 22.5 | 22.4 | 22.5 |



**GSM850**

Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

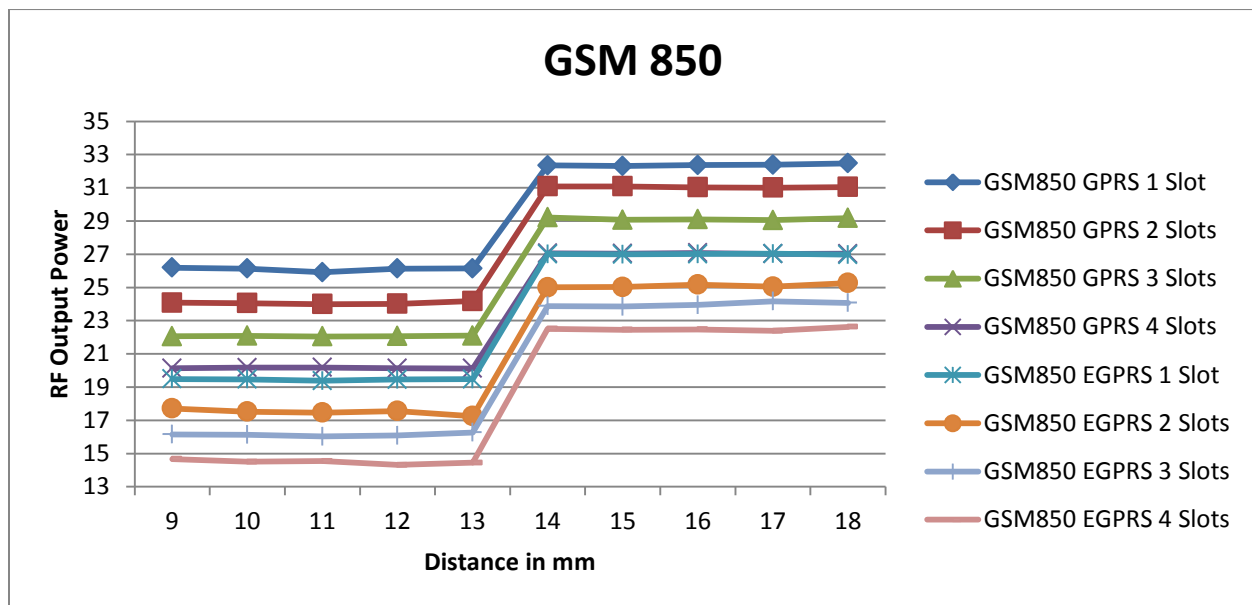
| Distance to DUT vs. Output Power in dBm |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Distance (mm)                           | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
| GSM 850 (Voice)                         | 26.2 | 25.9 | 25.8 | 26.1 | 26.2 | 32.2 | 32.3 | 32.4 | 32.3 | 32.5 |
| GSM850 GPRS 1 Slot                      | 26.2 | 26.1 | 25.9 | 26.1 | 26.1 | 32.4 | 32.3 | 32.4 | 32.4 | 32.5 |
| GSM850 GPRS 2 Slots                     | 24.1 | 24.1 | 24.0 | 24.0 | 24.2 | 31.1 | 31.1 | 31.0 | 31.0 | 31.1 |
| GSM850 GPRS 3 Slots                     | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 29.2 | 29.1 | 29.1 | 29.1 | 29.2 |
| GSM850 GPRS 4 Slots                     | 20.1 | 20.2 | 20.2 | 20.1 | 20.1 | 27.1 | 27.0 | 27.1 | 27.0 | 27.0 |
| GSM850 EGPRS 1 Slot                     | 19.5 | 19.5 | 19.4 | 19.5 | 19.5 | 27.0 | 27.0 | 27.0 | 27.0 | 27.0 |
| GSM850 EGPRS 2 Slots                    | 17.7 | 17.5 | 17.5 | 17.6 | 17.3 | 25.0 | 25.0 | 25.2 | 25.1 | 25.3 |
| GSM850 EGPRS 3 Slots                    | 16.2 | 16.1 | 16.0 | 16.1 | 16.3 | 23.9 | 23.9 | 24.0 | 24.2 | 24.1 |
| GSM850 EGPRS 4 Slots                    | 14.7 | 14.5 | 14.6 | 14.3 | 14.5 | 22.5 | 22.5 | 22.5 | 22.4 | 22.6 |



**GSM850**

Front, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

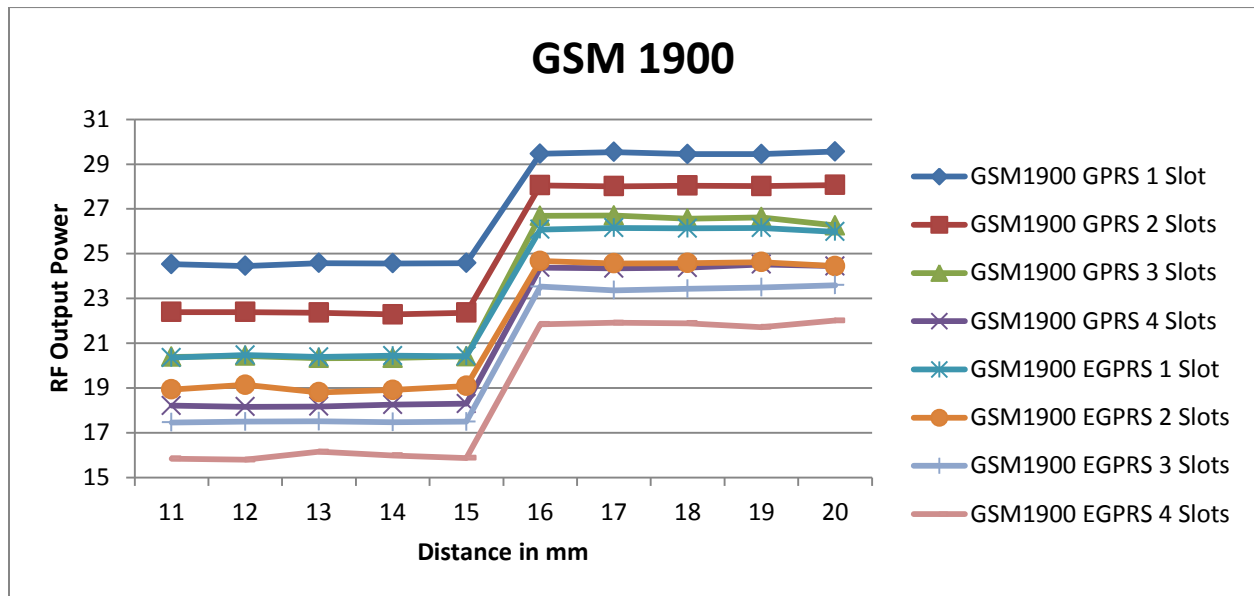
| Distance to DUT vs. Output Power in dBm |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Distance (mm)                           | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   |
| GSM 850 (Voice)                         | 26.2 | 25.9 | 25.8 | 26.1 | 26.2 | 32.2 | 32.3 | 32.4 | 32.3 | 32.5 |
| GSM850 GPRS 1 Slot                      | 26.2 | 26.1 | 25.9 | 26.1 | 26.1 | 32.4 | 32.3 | 32.4 | 32.4 | 32.5 |
| GSM850 GPRS 2 Slots                     | 24.1 | 24.1 | 24.0 | 24.0 | 24.2 | 31.1 | 31.1 | 31.0 | 31.0 | 31.1 |
| GSM850 GPRS 3 Slots                     | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 29.2 | 29.1 | 29.1 | 29.1 | 29.2 |
| GSM850 GPRS 4 Slots                     | 20.1 | 20.2 | 20.2 | 20.1 | 20.1 | 27.1 | 27.0 | 27.1 | 27.0 | 27.0 |
| GSM850 EGPRS 1 Slot                     | 19.5 | 19.5 | 19.4 | 19.5 | 19.5 | 27.0 | 27.0 | 27.0 | 27.0 | 27.0 |
| GSM850 EGPRS 2 Slots                    | 17.7 | 17.5 | 17.5 | 17.6 | 17.3 | 25.0 | 25.0 | 25.2 | 25.1 | 25.3 |
| GSM850 EGPRS 3 Slots                    | 16.2 | 16.1 | 16.0 | 16.1 | 16.3 | 23.9 | 23.9 | 24.0 | 24.2 | 24.1 |
| GSM850 EGPRS 4 Slots                    | 14.7 | 14.5 | 14.6 | 14.3 | 14.5 | 22.5 | 22.5 | 22.5 | 22.4 | 22.6 |



**GSM1900**

Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

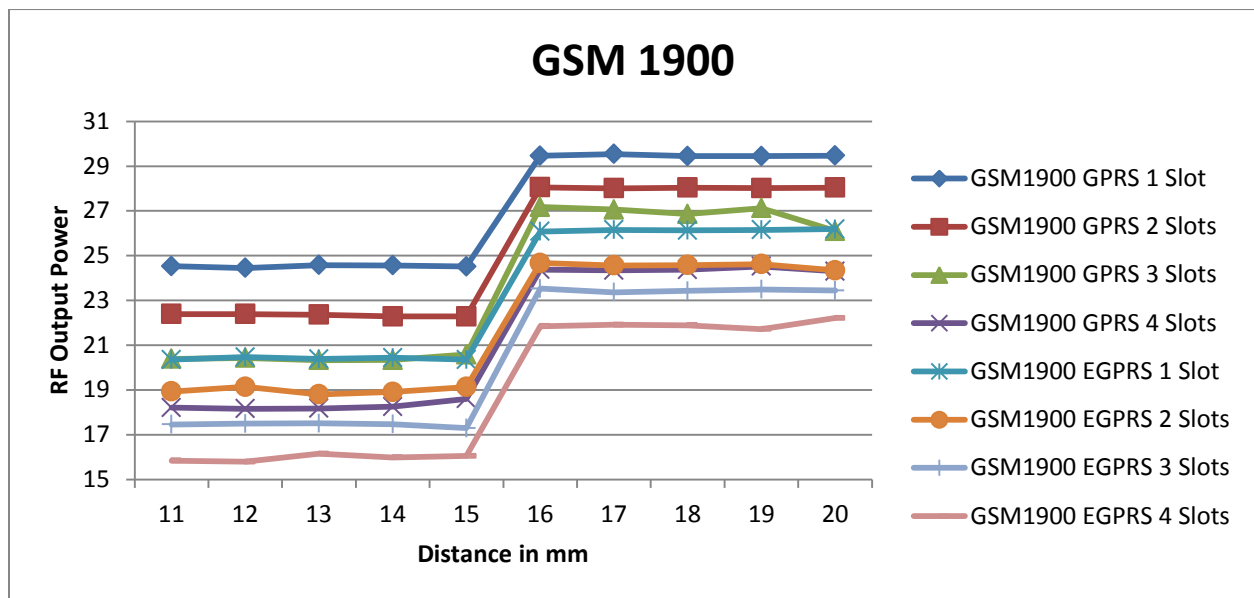
| Distance to DUT vs. Output Power in dBm |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Distance (mm)                           | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
| GSM1900 (Voice)                         | 24.5 | 24.4 | 24.5 | 24.4 | 24.4 | 29.4 | 29.7 | 29.5 | 29.6 | 29.6 |
| GSM1900 GPRS 1 Slot                     | 24.5 | 24.5 | 24.6 | 24.6 | 24.6 | 29.5 | 29.5 | 29.5 | 29.5 | 29.6 |
| GSM1900 GPRS 2 Slots                    | 22.4 | 22.4 | 22.4 | 22.3 | 22.4 | 28.1 | 28.0 | 28.0 | 28.0 | 28.1 |
| GSM1900 GPRS 3 Slots                    | 20.4 | 20.4 | 20.3 | 20.3 | 20.4 | 26.7 | 26.7 | 26.6 | 26.6 | 26.3 |
| GSM1900 GPRS 4 Slots                    | 18.2 | 18.2 | 18.2 | 18.3 | 18.3 | 24.4 | 24.3 | 24.4 | 24.5 | 24.4 |
| GSM1900 EGPRS 1 Slot                    | 20.4 | 20.5 | 20.4 | 20.4 | 20.4 | 26.1 | 26.2 | 26.1 | 26.2 | 26.0 |
| GSM1900 EGPRS 2 Slots                   | 18.9 | 19.1 | 18.8 | 18.9 | 19.1 | 24.7 | 24.6 | 24.6 | 24.6 | 24.4 |
| GSM1900 EGPRS 3 Slots                   | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 23.5 | 23.4 | 23.4 | 23.5 | 23.6 |
| GSM1900 EGPRS 4 Slots                   | 15.8 | 15.8 | 16.2 | 16.0 | 15.9 | 21.9 | 21.9 | 21.9 | 21.7 | 22.0 |



**GSM1900**

Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

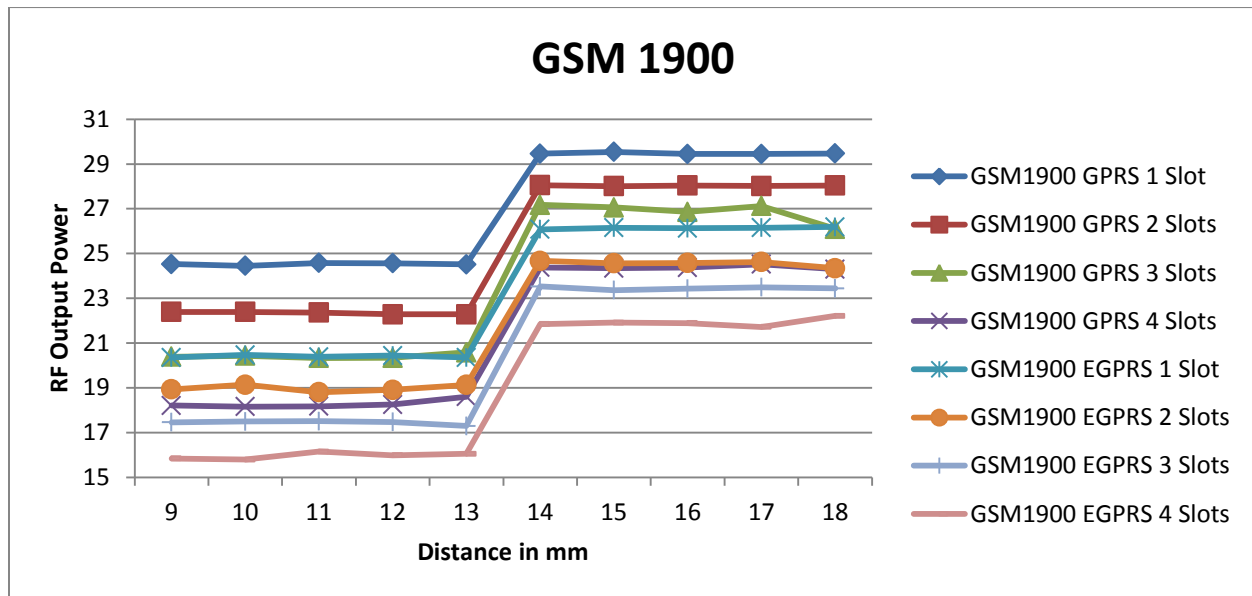
| Distance to DUT vs. Output Power in dBm |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Distance (mm)                           | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
| GSM1900 (Voice)                         | 24.5 | 24.4 | 24.5 | 24.4 | 24.5 | 29.4 | 29.7 | 29.5 | 29.6 | 29.2 |
| GSM1900 GPRS 1 Slot                     | 24.5 | 24.5 | 24.6 | 24.6 | 24.5 | 29.5 | 29.5 | 29.5 | 29.5 | 29.5 |
| GSM1900 GPRS 2 Slots                    | 22.4 | 22.4 | 22.4 | 22.3 | 22.3 | 28.1 | 28.0 | 28.0 | 28.0 | 28.0 |
| GSM1900 GPRS 3 Slots                    | 20.4 | 20.4 | 20.3 | 20.3 | 20.6 | 27.2 | 27.1 | 26.9 | 27.1 | 26.1 |
| GSM1900 GPRS 4 Slots                    | 18.2 | 18.2 | 18.2 | 18.3 | 18.6 | 24.4 | 24.3 | 24.4 | 24.5 | 24.3 |
| GSM1900 EGPRS 1 Slot                    | 20.4 | 20.5 | 20.4 | 20.4 | 20.4 | 26.1 | 26.2 | 26.1 | 26.2 | 26.2 |
| GSM1900 EGPRS 2 Slots                   | 18.9 | 19.1 | 18.8 | 18.9 | 19.1 | 24.7 | 24.6 | 24.6 | 24.6 | 24.3 |
| GSM1900 EGPRS 3 Slots                   | 17.5 | 17.5 | 17.5 | 17.5 | 17.3 | 23.5 | 23.4 | 23.4 | 23.5 | 23.4 |
| GSM1900 EGPRS 4 Slots                   | 15.8 | 15.8 | 16.2 | 16.0 | 16.1 | 21.9 | 21.9 | 21.9 | 21.7 | 22.2 |



**GSM1900**

Front, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

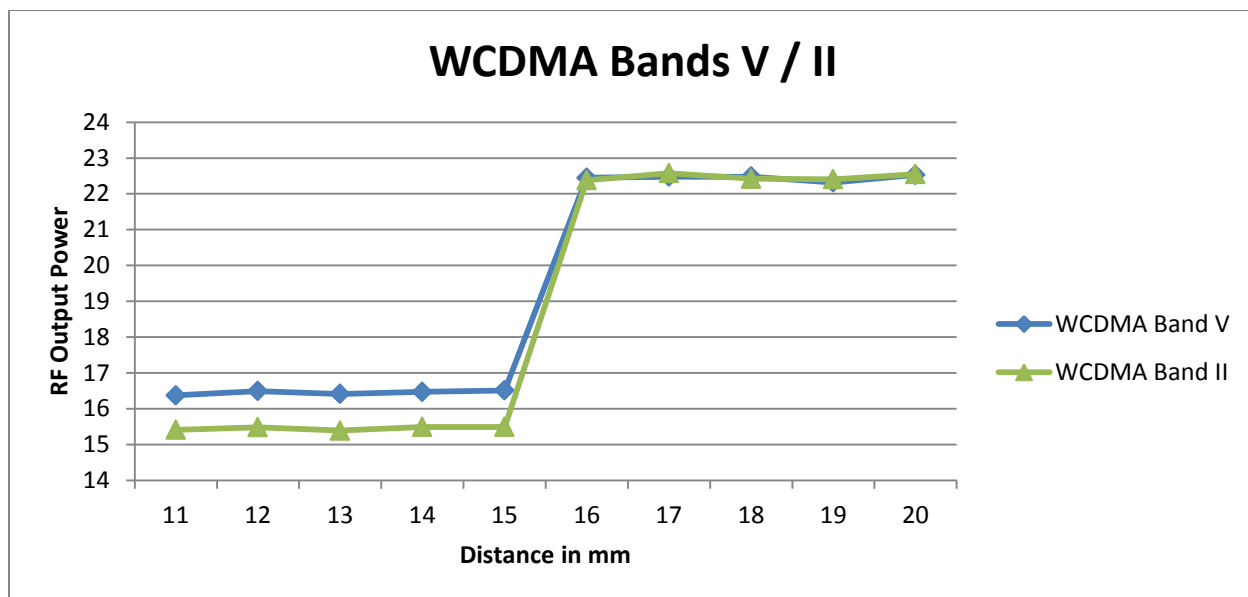
| Distance to DUT vs. Output Power in dBm |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Distance (mm)                           | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   |
| GSM1900 (Voice)                         | 24.5 | 24.4 | 24.5 | 24.4 | 24.5 | 29.4 | 29.7 | 29.5 | 29.6 | 29.2 |
| GSM1900 GPRS 1 Slot                     | 24.5 | 24.5 | 24.6 | 24.6 | 24.5 | 29.5 | 29.5 | 29.5 | 29.5 | 29.5 |
| GSM1900 GPRS 2 Slots                    | 22.4 | 22.4 | 22.4 | 22.3 | 22.3 | 28.1 | 28.0 | 28.0 | 28.0 | 28.0 |
| GSM1900 GPRS 3 Slots                    | 20.4 | 20.4 | 20.3 | 20.3 | 20.6 | 27.2 | 27.1 | 26.9 | 27.1 | 26.1 |
| GSM1900 GPRS 4 Slots                    | 18.2 | 18.2 | 18.2 | 18.3 | 18.6 | 24.4 | 24.3 | 24.4 | 24.5 | 24.3 |
| GSM1900 EGPRS 1 Slot                    | 20.4 | 20.5 | 20.4 | 20.4 | 20.4 | 26.1 | 26.2 | 26.1 | 26.2 | 26.2 |
| GSM1900 EGPRS 2 Slots                   | 18.9 | 19.1 | 18.8 | 18.9 | 19.1 | 24.7 | 24.6 | 24.6 | 24.6 | 24.3 |
| GSM1900 EGPRS 3 Slots                   | 17.5 | 17.5 | 17.5 | 17.5 | 17.3 | 23.5 | 23.4 | 23.4 | 23.5 | 23.4 |
| GSM1900 EGPRS 4 Slots                   | 15.8 | 15.8 | 16.2 | 16.0 | 16.1 | 21.9 | 21.9 | 21.9 | 21.7 | 22.2 |



**WCDMA Bands V & II**

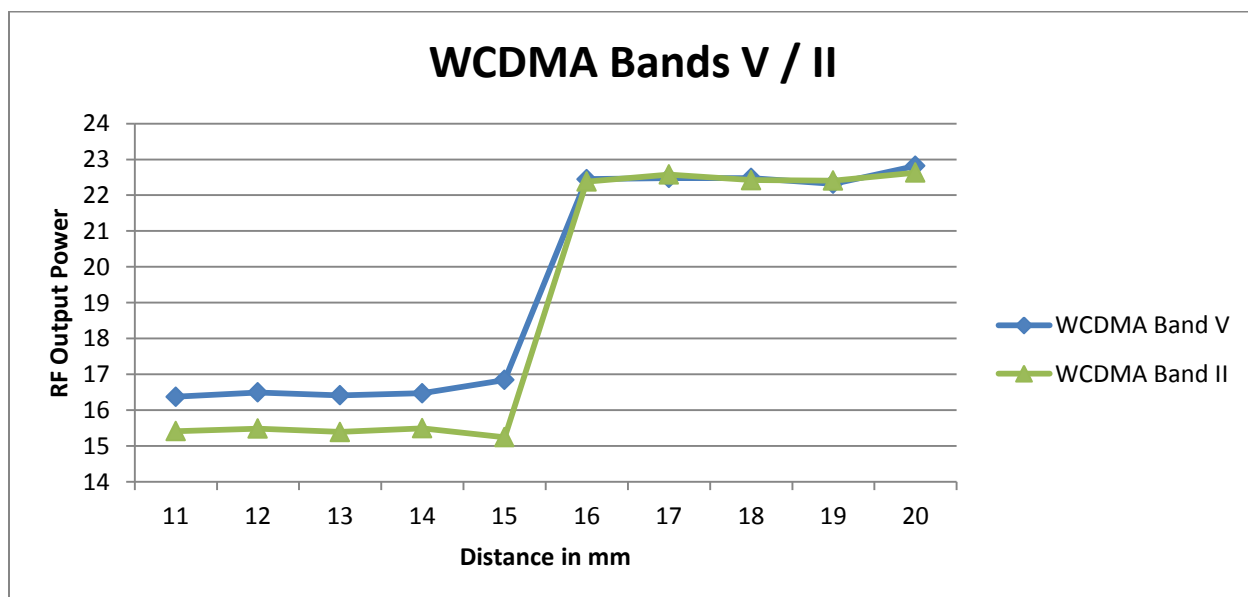
Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

| Distance to DUT vs. Output Power in dBm |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Distance (mm)                           | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
| WCDMA Band V                            | 16.4 | 16.5 | 16.4 | 16.5 | 16.5 | 22.5 | 22.5 | 22.5 | 22.3 | 22.5 |
| WCDMA Band II                           | 15.4 | 15.5 | 15.4 | 15.5 | 15.5 | 22.4 | 22.6 | 22.4 | 22.4 | 22.6 |

**WCDMA Bands V & II**

Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

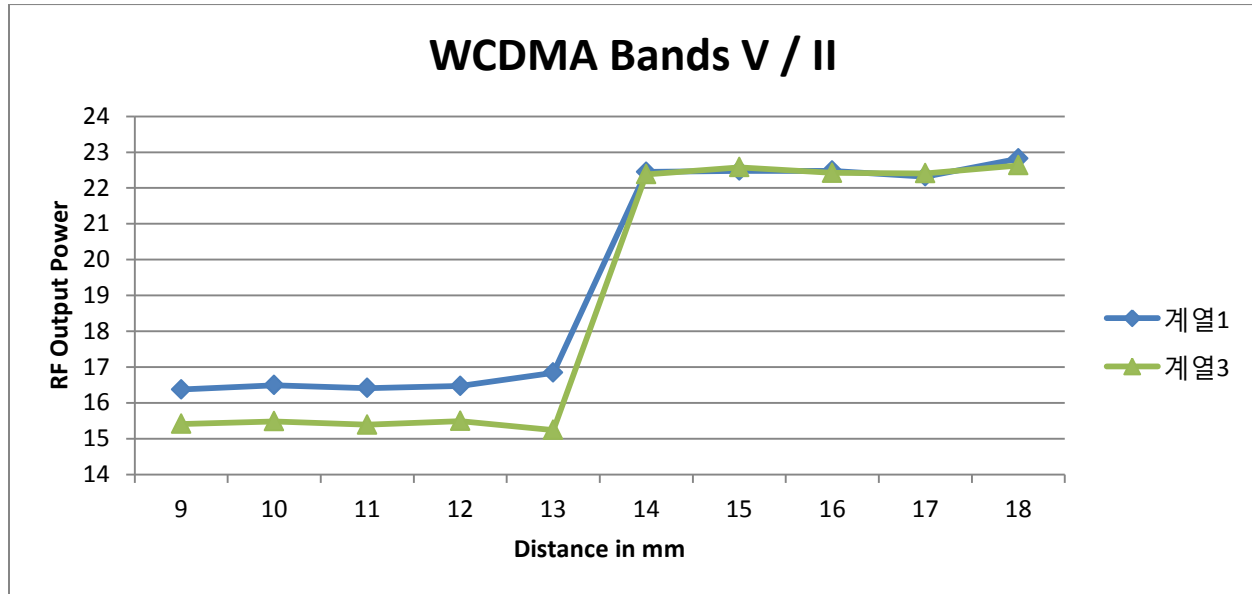
| Distance to DUT vs. Output Power in dBm |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Distance (mm)                           | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
| WCDMA Band V                            | 16.4 | 16.5 | 16.4 | 16.5 | 16.8 | 22.5 | 22.5 | 22.5 | 22.3 | 22.8 |
| WCDMA Band II                           | 15.4 | 15.5 | 15.4 | 15.5 | 15.2 | 22.4 | 22.6 | 22.4 | 22.4 | 22.6 |



**WCDMA Bands V & II**

Front, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

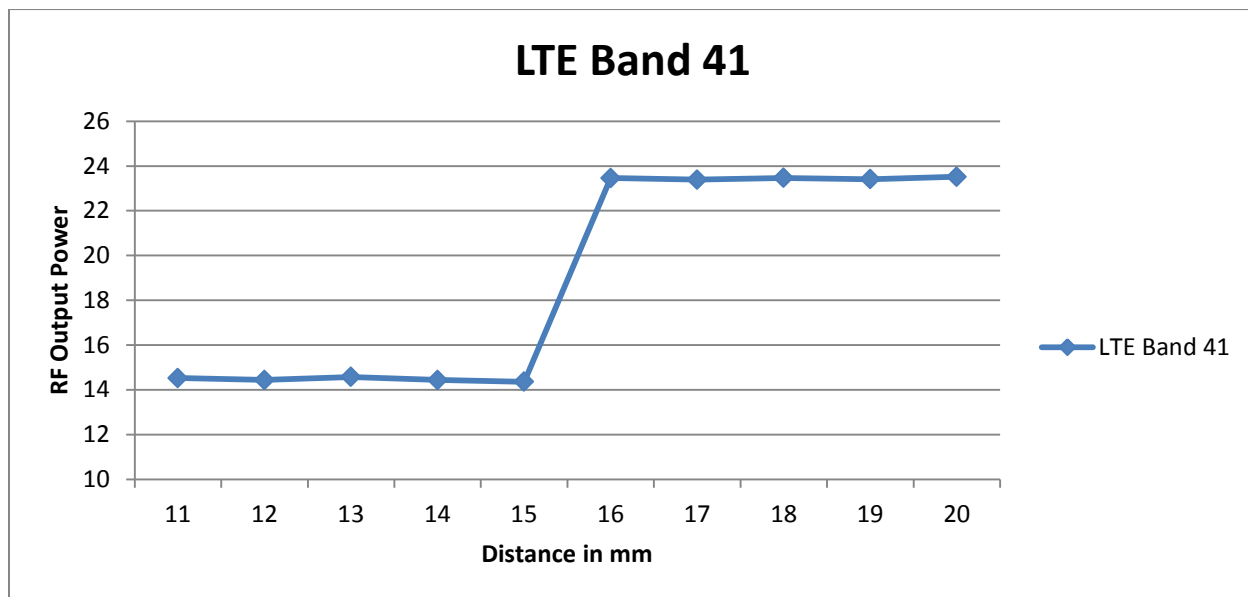
| Distance to DUT vs. Output Power in dBm |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Distance (mm)                           | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   |
| WCDMA Band V                            | 16.4 | 16.5 | 16.4 | 16.5 | 16.8 | 22.5 | 22.5 | 22.5 | 22.3 | 22.8 |
| WCDMA Band II                           | 15.4 | 15.5 | 15.4 | 15.5 | 15.2 | 22.4 | 22.6 | 22.4 | 22.4 | 22.6 |



**LTE Band 41**

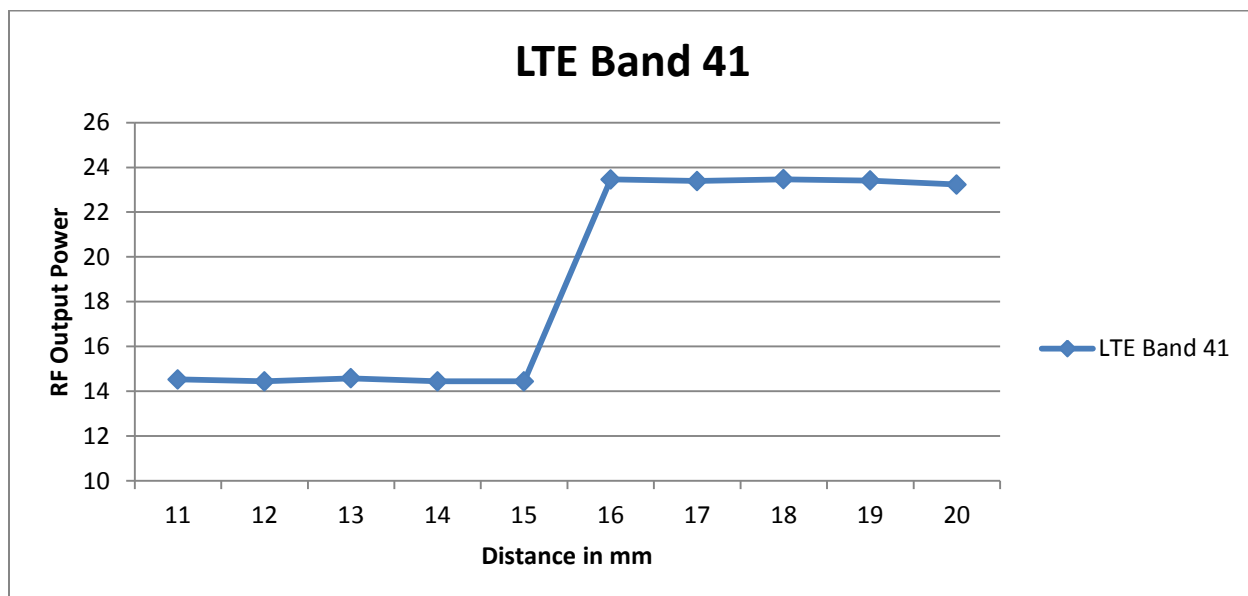
Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

| Distance to DUT vs. Output Power in dBm |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Distance (mm)                           | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
| LTE Band 41                             | 14.5 | 14.4 | 14.6 | 14.4 | 14.4 | 23.5 | 23.4 | 23.5 | 23.4 | 23.5 |

**LTE Band 41**

Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

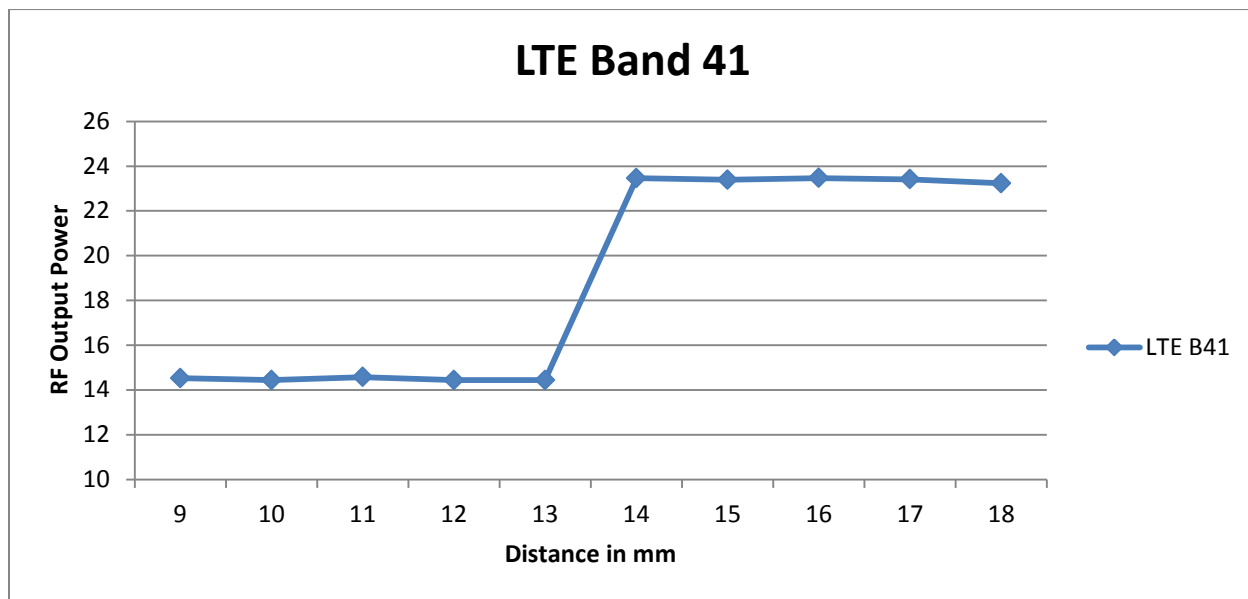
| Distance to DUT vs. Output Power in dBm |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Distance (mm)                           | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
| LTE Band 41                             | 14.5 | 14.4 | 14.6 | 14.4 | 14.4 | 23.5 | 23.4 | 23.5 | 23.4 | 23.2 |



**LTE Band 41**

Front, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

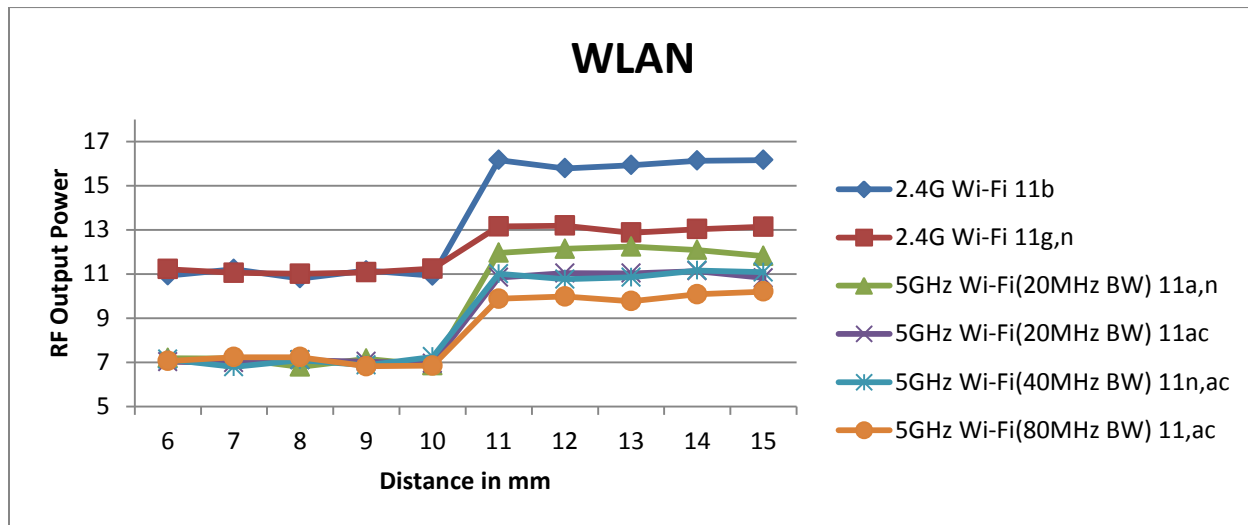
| Distance to DUT vs. Output Power in dBm |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Distance (mm)                           | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   |
| LTE B41                                 | 14.5 | 14.4 | 14.6 | 14.4 | 14.4 | 23.5 | 23.4 | 23.5 | 23.4 | 23.2 |



**Wi-Fi 2.4GHz and 5GHz**

Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

| Distance                    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|
| 2.4G Wi-Fi 11b              | 10.9 | 11.2 | 10.8 | 11.2 | 10.9 | 16.2 | 15.8 | 15.9 | 16.1 | 16.2 |
| 2.4G Wi-Fi 11g,n            | 11.2 | 11.1 | 11.0 | 11.1 | 11.2 | 13.2 | 13.2 | 12.9 | 13.0 | 13.1 |
| 5GHz Wi-Fi(20MHz BW) 11a,n  | 7.2  | 7.2  | 6.8  | 7.2  | 6.9  | 12.0 | 12.1 | 12.2 | 12.1 | 11.8 |
| 5GHz Wi-Fi(20MHz BW) 11ac   | 7.0  | 7.0  | 7.1  | 7.0  | 7.0  | 10.8 | 11.0 | 11.0 | 11.1 | 10.8 |
| 5GHz Wi-Fi(40MHz BW) 11n,ac | 7.1  | 6.8  | 7.1  | 6.9  | 7.3  | 11.0 | 10.8 | 10.9 | 11.2 | 11.1 |
| 5GHz Wi-Fi(80MHz BW) 11,ac  | 7.1  | 7.2  | 7.2  | 6.8  | 6.9  | 9.9  | 10.0 | 9.8  | 10.1 | 10.2 |



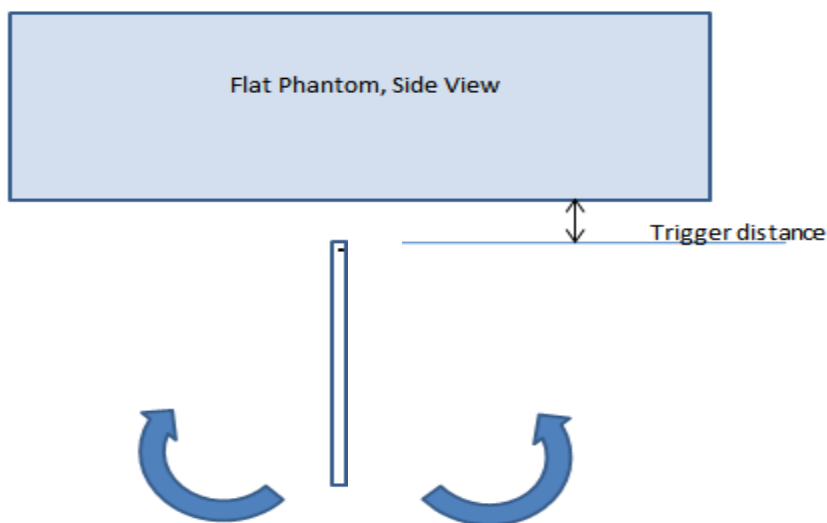
### 6.6.2. Proximity Sensor Coverage (KDB 616217 §6.3)

As there is no spatial offset between the antenna and the proximity sensor element, proximity sensor coverage did not need to be assessed.

### 6.6.3. Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Edge 1 parallel to the base of the flat phantom for each band.

The EUT was rotated about Edge 1 for angles up to  $\pm 45^\circ$ . If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated. This procedure was repeated until the power remained reduced for all angles up to  $\pm 45^\circ$ .



Proximity sensor tilt angle assessment (Edge 1) KDB 616217 §6.4

#### Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering for Edge 1

| Band (MHz) | Minimum trigger distance measured according to KDB 616217 §6.2 | Minimum distance at which power reduction was maintained over $\pm 45^\circ$ | Power reduction status |      |      |      |      |    |     |     |     |     |     |
|------------|----------------------------------------------------------------|------------------------------------------------------------------------------|------------------------|------|------|------|------|----|-----|-----|-----|-----|-----|
|            |                                                                |                                                                              | -45°                   | -40° | -30° | -20° | -10° | 0° | 10° | 20° | 30° | 40° | 45° |
| 850        | 15 mm                                                          | 15 mm                                                                        | On                     | On   | On   | On   | On   | On | On  | On  | On  | On  | On  |
| 1900       | 15 mm                                                          | 15 mm                                                                        | On                     | On   | On   | On   | On   | On | On  | On  | On  | On  | On  |
| 2600       | 15 mm                                                          | 15 mm                                                                        | On                     | On   | On   | On   | On   | On | On  | On  | On  | On  | On  |

## 7. RF Exposure Conditions (Test Configurations)

Refer to “SAR Photos and Ant locations” Appendix for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

### 7.1. Standalone SAR Test Exclusion Considerations

Since the *Dedicated Host Approach* is applied, the standalone SAR test exclusion procedure in KDB 447498 § 4.3.1 is applied in conjunction with KDB 616217 § 4.3 to determine the minimum test separation distance:

- When the separation distance from the antenna to an adjacent edge is  $\leq 5$  mm, a distance of 5 mm is applied to determine SAR test exclusion.
- When the separation distance from the antenna to an adjacent edge is  $> 5$  mm, the actual antenna-to-edge separation distance is applied to determine SAR test exclusion.

### SAR Test Exclusion Calculations for WWAN

#### Antennas < 50mm to adjacent edges

| Antenna                             | Tx Interface | Frequency (MHz) | Output Power |     | Separation Distances (mm) |        |        |        |        |       | Calculated Threshold Value |                   |                   |         |                   |       |
|-------------------------------------|--------------|-----------------|--------------|-----|---------------------------|--------|--------|--------|--------|-------|----------------------------|-------------------|-------------------|---------|-------------------|-------|
|                                     |              |                 | dBm          | mW  | Rear                      | Edge 1 | Edge 2 | Edge 3 | Edge 4 | Front | Rear                       | Edge 1            | Edge 2            | Edge 3  | Edge 4            | Front |
| Full Power, Proximity Sensor Off    |              |                 |              |     |                           |        |        |        |        |       |                            |                   |                   |         |                   |       |
| Cellular                            | GPRS 3 Slots | 848.8           | 29.50        | 334 | 0                         | 0      | 37     | 194.2  | 34     |       | 61.5<br>-MEASURE-          | 61.5<br>-MEASURE- | 8.3<br>-MEASURE-  | > 50 mm | 9.1<br>-MEASURE-  |       |
| Cellular                            | GPRS 3 Slots | 1909.8          | 26.70        | 175 | 0                         | 0      | 37     | 194.2  | 34     |       | 48.4<br>-MEASURE-          | 48.4<br>-MEASURE- | 6.5<br>-MEASURE-  | > 50 mm | 7.1<br>-MEASURE-  |       |
| Cellular                            | W-CDMA 5     | 846.6           | 23.00        | 200 | 0                         | 0      | 37     | 194.2  | 34     |       | 36.8<br>-MEASURE-          | 36.8<br>-MEASURE- | 5<br>-MEASURE-    | > 50 mm | 5.4<br>-MEASURE-  |       |
| Cellular                            | W-CDMA 2     | 1907.6          | 23.00        | 200 | 0                         | 0      | 37     | 194.2  | 34     |       | 55.2<br>-MEASURE-          | 55.2<br>-MEASURE- | 7.5<br>-MEASURE-  | > 50 mm | 8.1<br>-MEASURE-  |       |
| Cellular                            | LTE Band 41  | 2680            | 24.00        | 251 | 0                         | 0      | 37     | 194.2  | 34     |       | 82.2<br>-MEASURE-          | 82.2<br>-MEASURE- | 11.1<br>-MEASURE- | > 50 mm | 12.1<br>-MEASURE- |       |
| Power Back-off, Proximity Sensor On |              |                 |              |     |                           |        |        |        |        |       |                            |                   |                   |         |                   |       |
| Cellular                            | GPRS 2 Slots | 848.8           | 24.50        | 70  | 0                         | 0      |        |        |        |       | 12.9<br>-MEASURE-          | 12.9<br>-MEASURE- |                   |         |                   |       |
| Cellular                            | GPRS 2 Slots | 1909.8          | 23.00        | 50  | 0                         | 0      |        |        |        |       | 13.8<br>-MEASURE-          | 13.8<br>-MEASURE- |                   |         |                   |       |
| Cellular                            | W-CDMA 5     | 846.6           | 17.00        | 50  | 0                         | 0      |        |        |        |       | 9.2<br>-MEASURE-           | 9.2<br>-MEASURE-  |                   |         |                   |       |
| Cellular                            | W-CDMA 2     | 1907.6          | 16.00        | 40  | 0                         | 0      |        |        |        |       | 11<br>-MEASURE-            | 11<br>-MEASURE-   |                   |         |                   |       |
| Cellular                            | LTE Band 41  | 2680            | 15.00        | 32  | 0                         | 0      |        |        |        |       | 10.5<br>-MEASURE-          | 10.5<br>-MEASURE- |                   |         |                   |       |

#### Note(s):

- According to KDB 447498, if the calculated threshold value is  $>3$  then SAR testing is required.

#### Antennas > 50mm to adjacent edges

| Antenna                             | Tx Interface | Frequency (MHz) | Output Power |     | Separation Distances (mm) |        |        |        |        |       | Calculated Threshold Value |         |         |                       |         |       |
|-------------------------------------|--------------|-----------------|--------------|-----|---------------------------|--------|--------|--------|--------|-------|----------------------------|---------|---------|-----------------------|---------|-------|
|                                     |              |                 | dBm          | mW  | Rear                      | Edge 1 | Edge 2 | Edge 3 | Edge 4 | Front | Rear                       | Edge 1  | Edge 2  | Edge 3                | Edge 4  | Front |
| Full Power, Proximity Sensor Off    |              |                 |              |     |                           |        |        |        |        |       |                            |         |         |                       |         |       |
| Cellular                            | GPRS 3 Slots | 848.8           | 29.50        | 334 | 0                         | 0      | 37     | 194.2  | 34     |       | < 50 mm                    | < 50 mm | < 50 mm | 978.8 mW<br>-EXEMPT-  | < 50 mm |       |
| Cellular                            | GPRS 3 Slots | 1909.8          | 26.70        | 175 | 0                         | 0      | 37     | 194.2  | 34     |       | < 50 mm                    | < 50 mm | < 50 mm | 1550.5 mW<br>-EXEMPT- | < 50 mm |       |
| Cellular                            | W-CDMA 5     | 846.6           | 23.00        | 200 | 0                         | 0      | 37     | 194.2  | 34     |       | < 50 mm                    | < 50 mm | < 50 mm | 976.9 mW<br>-EXEMPT-  | < 50 mm |       |
| Cellular                            | W-CDMA 2     | 1907.6          | 23.00        | 200 | 0                         | 0      | 37     | 194.2  | 34     |       | < 50 mm                    | < 50 mm | < 50 mm | 1550.6 mW<br>-EXEMPT- | < 50 mm |       |
| Cellular                            | LTE Band 41  | 2680            | 24.00        | 251 | 0                         | 0      | 37     | 194.2  | 34     |       | < 50 mm                    | < 50 mm | < 50 mm | 1533.6 mW<br>-EXEMPT- | < 50 mm |       |
| Power Back-off, Proximity Sensor On |              |                 |              |     |                           |        |        |        |        |       |                            |         |         |                       |         |       |
| Cellular                            | GPRS 2 Slots | 848.8           | 24.50        | 70  | 0                         | 0      |        |        |        |       | < 50 mm                    | < 50 mm |         |                       |         |       |
| Cellular                            | GPRS 2 Slots | 1909.8          | 23.00        | 50  | 0                         | 0      |        |        |        |       | < 50 mm                    | < 50 mm |         |                       |         |       |
| Cellular                            | W-CDMA 5     | 846.6           | 17.00        | 50  | 0                         | 0      |        |        |        |       | < 50 mm                    | < 50 mm |         |                       |         |       |
| Cellular                            | W-CDMA 2     | 1907.6          | 16.00        | 40  | 0                         | 0      |        |        |        |       | < 50 mm                    | < 50 mm |         |                       |         |       |
| Cellular                            | LTE Band 41  | 2680            | 15.00        | 32  | 0                         | 0      |        |        |        |       | < 50 mm                    | < 50 mm |         |                       |         |       |

#### Note(s):

- According to KDB 447498, if the calculated Power threshold is less than the output power then SAR testing is required.

**SAR Test Exclusion Calculations for WLAN**

Antennas &lt; 50mm to adjacent edges

SISO

| Antenna                         | Tx Interface                     | Frequency (MHz)                  | Output Power |    | Separation Distances (mm) |        |        |        |        |       | Calculated Threshold Value |         |          |           |           |       |
|---------------------------------|----------------------------------|----------------------------------|--------------|----|---------------------------|--------|--------|--------|--------|-------|----------------------------|---------|----------|-----------|-----------|-------|
|                                 |                                  |                                  | dBm          | mW | Rear                      | Edge 1 | Edge 2 | Edge 3 | Edge 4 | Front | Rear                       | Edge 1  | Edge 2   | Edge 3    | Edge 4    | Front |
| Ant 1                           | Full Power, Proximity Sensor Off |                                  |              |    |                           |        |        |        |        |       |                            |         |          |           |           |       |
|                                 | Wi-Fi 2.4 GHz                    | 2462                             | 16.50        | 45 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | 14.1                       | > 50 mm | 2.4      | 7.8       | > 50 mm   |       |
|                                 | Wi-Fi 5.2 GHz                    | 5240                             | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE-                  | > 50 mm | -EXEMPT- | -MEASURE- | > 50 mm   |       |
|                                 | Wi-Fi 5.3 GHz                    | 5320                             | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE-                  | > 50 mm | -EXEMPT- | -MEASURE- | > 50 mm   |       |
|                                 | Wi-Fi 5.5 GHz                    | 5700                             | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE-                  | > 50 mm | -EXEMPT- | -MEASURE- | > 50 mm   |       |
|                                 | Wi-Fi 5.8 GHz                    | 5825                             | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE-                  | > 50 mm | -EXEMPT- | -MEASURE- | > 50 mm   |       |
|                                 | Bluetooth                        | 2480                             | 9.70         | 9  | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE-                  | > 50 mm | -EXEMPT- | -EXEMPT-  | > 50 mm   |       |
|                                 | Full Power, Proximity Sensor On  |                                  |              |    |                           |        |        |        |        |       |                            |         |          |           |           |       |
|                                 | Wi-Fi 2.4 GHz                    | 2462                             | 11.50        | 14 | 0.3                       |        |        |        |        |       | 4.4                        |         |          |           |           |       |
|                                 | Wi-Fi 5.2 GHz                    | 5240                             | 7.50         | 6  | 0.3                       |        |        |        |        |       | -MEASURE-                  |         |          |           |           |       |
|                                 | Wi-Fi 5.3 GHz                    | 5320                             | 7.50         | 6  | 0.3                       |        |        |        |        |       | 2.7                        |         |          |           |           |       |
|                                 | Wi-Fi 5.5 GHz                    | 5700                             | 7.50         | 6  | 0.3                       |        |        |        |        |       | -EXEMPT-                   |         |          |           |           |       |
|                                 | Wi-Fi 5.8 GHz                    | 5825                             | 7.50         | 6  | 0.3                       |        |        |        |        |       | 2.8                        |         |          |           |           |       |
|                                 | Ant 2                            | Full Power, Proximity Sensor Off |              |    |                           |        |        |        |        |       |                            |         |          |           |           |       |
| Wi-Fi 2.4 GHz                   |                                  | 2462                             | 16.50        | 45 | 0.3                       | 149    | 84     | 17     | 11     |       | 14.1                       | > 50 mm | > 50 mm  | 4.2       | 6.4       |       |
| Wi-Fi 5.2 GHz                   |                                  | 5240                             | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE-                  | > 50 mm | > 50 mm  | -MEASURE- | -MEASURE- |       |
| Wi-Fi 5.3 GHz                   |                                  | 5320                             | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE-                  | > 50 mm | > 50 mm  | -EXEMPT-  | -MEASURE- |       |
| Wi-Fi 5.5 GHz                   |                                  | 5700                             | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE-                  | > 50 mm | > 50 mm  | -EXEMPT-  | -MEASURE- |       |
| Wi-Fi 5.8 GHz                   |                                  | 5825                             | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE-                  | > 50 mm | > 50 mm  | -EXEMPT-  | -MEASURE- |       |
| Full Power, Proximity Sensor On |                                  |                                  |              |    |                           |        |        |        |        |       |                            |         |          |           |           |       |
| Wi-Fi 2.4 GHz                   |                                  | 2462                             | 11.50        | 14 | 0.3                       |        |        |        |        |       | 4.4                        |         |          |           |           |       |
| Wi-Fi 5.2 GHz                   |                                  | 5240                             | 7.50         | 6  | 0.3                       |        |        |        |        |       | -MEASURE-                  |         |          |           |           |       |
| Wi-Fi 5.3 GHz                   |                                  | 5320                             | 7.50         | 6  | 0.3                       |        |        |        |        |       | 2.7                        |         |          |           |           |       |
| Wi-Fi 5.5 GHz                   |                                  | 5700                             | 7.50         | 6  | 0.3                       |        |        |        |        |       | -EXEMPT-                   |         |          |           |           |       |
| Wi-Fi 5.8 GHz                   |                                  | 5825                             | 7.50         | 6  | 0.3                       |        |        |        |        |       | 2.8                        |         |          |           |           |       |

## MIMO

| Antenna       | Tx Interface                     | Frequency (MHz) | Output Power |     | Separation Distances (mm) |        |        |        |        |                 | Calculated Threshold Value |         |                 |                  |                  |       |
|---------------|----------------------------------|-----------------|--------------|-----|---------------------------|--------|--------|--------|--------|-----------------|----------------------------|---------|-----------------|------------------|------------------|-------|
|               |                                  |                 | dBm          | mW  | Rear                      | Edge 1 | Edge 2 | Edge 3 | Edge 4 | Front           | Rear                       | Edge 1  | Edge 2          | Edge 3           | Edge 4           | Front |
| Ant 1         | Full Power, Proximity Sensor Off |                 |              |     |                           |        |        |        |        |                 |                            |         |                 |                  |                  |       |
|               | Wi-Fi 2.4 GHz                    | 2462            | 13.50        | 22  | 0.3                       | 180.2  | 30     | 9      | 91.5   |                 | 6.9<br>-MEASURE-           | > 50 mm | 1.2<br>-EXEMPT- | 3.8<br>-MEASURE- | > 50 mm          |       |
|               | Wi-Fi 5.2 GHz                    | 5240            | 12.50        | 18  | 0.3                       | 180.2  | 30     | 9      | 91.5   |                 | 8.2<br>-MEASURE-           | > 50 mm | 1.4<br>-EXEMPT- | 4.6<br>-MEASURE- | > 50 mm          |       |
|               | Wi-Fi 5.3 GHz                    | 5320            | 12.50        | 18  | 0.3                       | 180.2  | 30     | 9      | 91.5   |                 | 8.3<br>-MEASURE-           | > 50 mm | 1.4<br>-EXEMPT- | 4.6<br>-MEASURE- | > 50 mm          |       |
|               | Wi-Fi 5.5 GHz                    | 5700            | 12.50        | 18  | 0.3                       | 180.2  | 30     | 9      | 91.5   |                 | 8.6<br>-MEASURE-           | > 50 mm | 1.4<br>-EXEMPT- | 4.8<br>-MEASURE- | > 50 mm          |       |
|               | Wi-Fi 5.8 GHz                    | 5825            | 12.50        | 18  | 0.3                       | 180.2  | 30     | 9      | 91.5   |                 | 8.7<br>-MEASURE-           | > 50 mm | 1.4<br>-EXEMPT- | 4.8<br>-MEASURE- | > 50 mm          |       |
|               | Full Power, Proximity Sensor On  |                 |              |     |                           |        |        |        |        |                 |                            |         |                 |                  |                  |       |
|               | Wi-Fi 2.4 GHz                    | 2462            | 11.50        | 14  | 0.3                       |        |        |        |        |                 | 4.4<br>-MEASURE-           |         |                 |                  |                  |       |
|               | Wi-Fi 5.2 GHz                    | 5240            | 7.50         | 6   | 0.3                       |        |        |        |        |                 | 2.7<br>-EXEMPT-            |         |                 |                  |                  |       |
|               | Wi-Fi 5.3 GHz                    | 5320            | 7.50         | 6   | 0.3                       |        |        |        |        |                 | 2.8<br>-EXEMPT-            |         |                 |                  |                  |       |
|               | Wi-Fi 5.5 GHz                    | 5700            | 7.50         | 6   | 0.3                       |        |        |        |        |                 | 2.9<br>-EXEMPT-            |         |                 |                  |                  |       |
| Wi-Fi 5.8 GHz | 5825                             | 7.50            | 6            | 0.3 |                           |        |        |        |        | 2.9<br>-EXEMPT- |                            |         |                 |                  |                  |       |
| Ant 2         | Full Power, Proximity Sensor Off |                 |              |     |                           |        |        |        |        |                 |                            |         |                 |                  |                  |       |
|               | Wi-Fi 2.4 GHz                    | 2462            | 13.50        | 22  | 0.3                       | 149    | 84     | 17     | 11     |                 | 6.9<br>-MEASURE-           | > 50 mm | > 50 mm         | 2<br>-EXEMPT-    | 3.1<br>-MEASURE- |       |
|               | Wi-Fi 5.2 GHz                    | 5240            | 12.50        | 18  | 0.3                       | 149    | 84     | 17     | 11     |                 | 8.2<br>-MEASURE-           | > 50 mm | > 50 mm         | 2.4<br>-EXEMPT-  | 3.7<br>-MEASURE- |       |
|               | Wi-Fi 5.3 GHz                    | 5320            | 12.50        | 18  | 0.3                       | 149    | 84     | 17     | 11     |                 | 8.3<br>-MEASURE-           | > 50 mm | > 50 mm         | 2.4<br>-EXEMPT-  | 3.8<br>-MEASURE- |       |
|               | Wi-Fi 5.5 GHz                    | 5700            | 12.50        | 18  | 0.3                       | 149    | 84     | 17     | 11     |                 | 8.6<br>-MEASURE-           | > 50 mm | > 50 mm         | 2.5<br>-EXEMPT-  | 3.9<br>-MEASURE- |       |
|               | Wi-Fi 5.8 GHz                    | 5825            | 12.50        | 18  | 0.3                       | 149    | 84     | 17     | 11     |                 | 8.7<br>-MEASURE-           | > 50 mm | > 50 mm         | 2.6<br>-EXEMPT-  | 3.9<br>-MEASURE- |       |
|               | Full Power, Proximity Sensor On  |                 |              |     |                           |        |        |        |        |                 |                            |         |                 |                  |                  |       |
|               | Wi-Fi 2.4 GHz                    | 2462            | 11.50        | 14  | 0.3                       |        |        |        |        |                 | 4.4<br>-MEASURE-           |         |                 |                  |                  |       |
|               | Wi-Fi 5.2 GHz                    | 5240            | 7.50         | 6   | 0.3                       |        |        |        |        |                 | 2.7<br>-EXEMPT-            |         |                 |                  |                  |       |
|               | Wi-Fi 5.3 GHz                    | 5320            | 7.50         | 6   | 0.3                       |        |        |        |        |                 | 2.8<br>-EXEMPT-            |         |                 |                  |                  |       |
|               | Wi-Fi 5.5 GHz                    | 5700            | 7.50         | 6   | 0.3                       |        |        |        |        |                 | 2.9<br>-EXEMPT-            |         |                 |                  |                  |       |
|               | Wi-Fi 5.8 GHz                    | 5825            | 7.50         | 6   | 0.3                       |        |        |        |        |                 | 2.9<br>-EXEMPT-            |         |                 |                  |                  |       |

## Note(s):

- According to KDB 447498, if the calculated threshold value is >3 then SAR testing is required.

Antennas &gt; 50mm to adjacent edges

SISO

| Antenna | Tx Interface                     | Frequency (MHz) | Output Power |    | Separation Distances (mm) |        |        |        |        |       | Calculated Threshold Value |                       |                      |         |                      |       |
|---------|----------------------------------|-----------------|--------------|----|---------------------------|--------|--------|--------|--------|-------|----------------------------|-----------------------|----------------------|---------|----------------------|-------|
|         |                                  |                 | dBm          | mW | Rear                      | Edge 1 | Edge 2 | Edge 3 | Edge 4 | Front | Rear                       | Edge 1                | Edge 2               | Edge 3  | Edge 4               | Front |
| Ant 1   | Full Power, Proximity Sensor Off |                 |              |    |                           |        |        |        |        |       |                            |                       |                      |         |                      |       |
|         | Wi-Fi 2.4 GHz                    | 2462            | 16.50        | 45 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | < 50 mm                    | 1397.6 mW<br>-EXEMPT- | < 50 mm              | < 50 mm | 510.6 mW<br>-EXEMPT- |       |
|         | Wi-Fi 5.2 GHz                    | 5240            | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | < 50 mm                    | 1367.5 mW<br>-EXEMPT- | < 50 mm              | < 50 mm | 480.5 mW<br>-EXEMPT- |       |
|         | Wi-Fi 5.3 GHz                    | 5320            | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | < 50 mm                    | 1367 mW<br>-EXEMPT-   | < 50 mm              | < 50 mm | 480 mW<br>-EXEMPT-   |       |
|         | Wi-Fi 5.5 GHz                    | 5700            | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | < 50 mm                    | 1364.8 mW<br>-EXEMPT- | < 50 mm              | < 50 mm | 477.8 mW<br>-EXEMPT- |       |
|         | Wi-Fi 5.8 GHz                    | 5825            | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | < 50 mm                    | 1364.2 mW<br>-EXEMPT- | < 50 mm              | < 50 mm | 477.2 mW<br>-EXEMPT- |       |
|         | Bluetooth                        | 2480            | 9.70         | 9  | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | < 50 mm                    | 1397.3 mW<br>-EXEMPT- | < 50 mm              | < 50 mm | 510.3 mW<br>-EXEMPT- |       |
|         | Full Power, Proximity Sensor On  |                 |              |    |                           |        |        |        |        |       |                            |                       |                      |         |                      |       |
|         | Wi-Fi 2.4 GHz                    | 2462            | 11.50        | 14 | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|         | Wi-Fi 5.2 GHz                    | 5240            | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|         | Wi-Fi 5.3 GHz                    | 5320            | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|         | Wi-Fi 5.5 GHz                    | 5700            | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|         | Wi-Fi 5.8 GHz                    | 5825            | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
| Ant 2   | Full Power, Proximity Sensor Off |                 |              |    |                           |        |        |        |        |       |                            |                       |                      |         |                      |       |
|         | Wi-Fi 2.4 GHz                    | 2462            | 16.50        | 45 | 0.3                       | 149    | 84     | 17     | 11     |       | < 50 mm                    | 1085.6 mW<br>-EXEMPT- | 435.6 mW<br>-EXEMPT- | < 50 mm | < 50 mm              |       |
|         | Wi-Fi 5.2 GHz                    | 5240            | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | < 50 mm                    | 1055.5 mW<br>-EXEMPT- | 405.5 mW<br>-EXEMPT- | < 50 mm | < 50 mm              |       |
|         | Wi-Fi 5.3 GHz                    | 5320            | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | < 50 mm                    | 1055 mW<br>-EXEMPT-   | 405 mW<br>-EXEMPT-   | < 50 mm | < 50 mm              |       |
|         | Wi-Fi 5.5 GHz                    | 5700            | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | < 50 mm                    | 1052.8 mW<br>-EXEMPT- | 402.8 mW<br>-EXEMPT- | < 50 mm | < 50 mm              |       |
|         | Wi-Fi 5.8 GHz                    | 5825            | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | < 50 mm                    | 1052.2 mW<br>-EXEMPT- | 402.2 mW<br>-EXEMPT- | < 50 mm | < 50 mm              |       |
|         | Full Power, Proximity Sensor On  |                 |              |    |                           |        |        |        |        |       |                            |                       |                      |         |                      |       |
|         | Wi-Fi 2.4 GHz                    | 2462            | 11.50        | 14 | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|         | Wi-Fi 5.2 GHz                    | 5240            | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|         | Wi-Fi 5.3 GHz                    | 5320            | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|         | Wi-Fi 5.5 GHz                    | 5700            | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|         | Wi-Fi 5.8 GHz                    | 5825            | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |

## MIMO

| Antenn<br>a | Tx<br>Interface                  | Frequency<br>(MHz) | Output Power |    | Separation Distances (mm) |        |        |        |        |       | Calculated Threshold Value |                       |                      |         |                      |       |
|-------------|----------------------------------|--------------------|--------------|----|---------------------------|--------|--------|--------|--------|-------|----------------------------|-----------------------|----------------------|---------|----------------------|-------|
|             |                                  |                    | dBm          | mW | Rear                      | Edge 1 | Edge 2 | Edge 3 | Edge 4 | Front | Rear                       | Edge 1                | Edge 2               | Edge 3  | Edge 4               | Front |
| Ant 1       | Full Power, Proximity Sensor Off |                    |              |    |                           |        |        |        |        |       |                            |                       |                      |         |                      |       |
|             | Wi-Fi 2.4 GHz                    | 2462               | 13.50        | 22 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | < 50 mm                    | 1397.6 mW<br>-EXEMPT- | < 50 mm              | < 50 mm | 510.6 mW<br>-EXEMPT- |       |
|             | Wi-Fi 5.2 GHz                    | 5240               | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | < 50 mm                    | 1367.5 mW<br>-EXEMPT- | < 50 mm              | < 50 mm | 480.5 mW<br>-EXEMPT- |       |
|             | Wi-Fi 5.3 GHz                    | 5320               | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | < 50 mm                    | 1367 mW<br>-EXEMPT-   | < 50 mm              | < 50 mm | 480 mW<br>-EXEMPT-   |       |
|             | Wi-Fi 5.5 GHz                    | 5700               | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | < 50 mm                    | 1364.8 mW<br>-EXEMPT- | < 50 mm              | < 50 mm | 477.8 mW<br>-EXEMPT- |       |
|             | Wi-Fi 5.8 GHz                    | 5825               | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | < 50 mm                    | 1364.2 mW<br>-EXEMPT- | < 50 mm              | < 50 mm | 477.2 mW<br>-EXEMPT- |       |
|             | Full Power, Proximity Sensor On  |                    |              |    |                           |        |        |        |        |       |                            |                       |                      |         |                      |       |
|             | Wi-Fi 2.4 GHz                    | 2462               | 11.50        | 14 | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|             | Wi-Fi 5.2 GHz                    | 5240               | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|             | Wi-Fi 5.3 GHz                    | 5320               | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|             | Wi-Fi 5.5 GHz                    | 5700               | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|             | Wi-Fi 5.8 GHz                    | 5825               | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
| Ant 2       | Full Power, Proximity Sensor Off |                    |              |    |                           |        |        |        |        |       |                            |                       |                      |         |                      |       |
|             | Wi-Fi 2.4 GHz                    | 2462               | 13.50        | 22 | 0.3                       | 149    | 84     | 17     | 11     |       | < 50 mm                    | 1085.6 mW<br>-EXEMPT- | 435.6 mW<br>-EXEMPT- | < 50 mm | < 50 mm              |       |
|             | Wi-Fi 5.2 GHz                    | 5240               | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | < 50 mm                    | 1055.5 mW<br>-EXEMPT- | 405.5 mW<br>-EXEMPT- | < 50 mm | < 50 mm              |       |
|             | Wi-Fi 5.3 GHz                    | 5320               | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | < 50 mm                    | 1055 mW<br>-EXEMPT-   | 405 mW<br>-EXEMPT-   | < 50 mm | < 50 mm              |       |
|             | Wi-Fi 5.5 GHz                    | 5700               | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | < 50 mm                    | 1052.8 mW<br>-EXEMPT- | 402.8 mW<br>-EXEMPT- | < 50 mm | < 50 mm              |       |
|             | Wi-Fi 5.8 GHz                    | 5825               | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | < 50 mm                    | 1052.2 mW<br>-EXEMPT- | 402.2 mW<br>-EXEMPT- | < 50 mm | < 50 mm              |       |
|             | Full Power, Proximity Sensor On  |                    |              |    |                           |        |        |        |        |       |                            |                       |                      |         |                      |       |
|             | Wi-Fi 2.4 GHz                    | 2462               | 11.50        | 14 | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|             | Wi-Fi 5.2 GHz                    | 5240               | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|             | Wi-Fi 5.3 GHz                    | 5320               | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|             | Wi-Fi 5.5 GHz                    | 5700               | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |
|             | Wi-Fi 5.8 GHz                    | 5825               | 7.50         | 6  | 0.3                       |        |        |        |        |       | < 50 mm                    |                       |                      |         |                      |       |

## Note(s):

- According to KDB 447498, if the calculated Power threshold is less than the output power then SAR testing is required.

## 7.2. Required Test Configurations

The table below identifies the standalone test configurations required for this device according to the findings in Section 7.1:

| Test Configurations            | Pwr<br>Back-off | Rear | Edge 1     | Edge 2        | Edge 3        | Edge 4      |
|--------------------------------|-----------------|------|------------|---------------|---------------|-------------|
|                                |                 |      | (Top Edge) | (Right Edge ) | (Bottom Edge) | (Left Edge) |
| GSM850                         | OFF             | Yes  | Yes        | Yes           | No            | Yes         |
|                                | ON              | Yes  | Yes        | No            | No            | No          |
| GSM1900                        | OFF             | Yes  | Yes        | Yes           | No            | Yes         |
|                                | ON              | Yes  | Yes        | No            | No            | No          |
| W-CDMA Band 2                  | OFF             | Yes  | Yes        | Yes           | No            | Yes         |
|                                | ON              | Yes  | Yes        | No            | No            | No          |
| W-CDMA Band 5                  | OFF             | Yes  | Yes        | Yes           | No            | Yes         |
|                                | ON              | Yes  | Yes        | No            | No            | No          |
| LTE Band 41                    | OFF             | Yes  | Yes        | Yes           | No            | Yes         |
|                                | ON              | Yes  | Yes        | No            | No            | No          |
| Wi-Fi 2.4 GHz SISO (Antenna 1) | OFF             | Yes  | No         | No            | Yes           | No          |
|                                | ON              | Yes  | No         | No            | No            | No          |
| Wi-Fi 2.4 GHz SISO (Antenna 2) | OFF             | Yes  | No         | No            | Yes           | Yes         |
|                                | ON              | Yes  | No         | No            | No            | No          |
| Wi-Fi 2.4 GHz MIMO             | OFF             | Yes  | No         | No            | Yes           | Yes         |
|                                | ON              | Yes  | No         | No            | No            | No          |
| Wi-Fi 5 GHz SISO (Antenna 1)   | OFF             | Yes  | No         | No            | Yes           | No          |
|                                | ON              | No   | No         | No            | No            | No          |
| Wi-Fi 5 GHz SISO (Antenna 2)   | OFF             | Yes  | No         | No            | No            | Yes         |
|                                | ON              | No   | No         | No            | No            | No          |
| Wi-Fi 5 GHz MIMO               | OFF             | Yes  | No         | No            | Yes           | Yes         |
|                                | ON              | No   | No         | No            | No            | No          |
| Bluetooth                      | OFF             | No   | No         | No            | No            | No          |

### Note(s):

1. Yes = Testing is required.
2. No = Testing is not required.

## 8. Dielectric Property Measurements & System Check

### 8.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within  $\pm 2^\circ\text{C}$  of the temperature when the tissue parameters are characterized.

The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

#### Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

| Target Frequency (MHz) | Head         |                | Body         |                |
|------------------------|--------------|----------------|--------------|----------------|
|                        | $\epsilon_r$ | $\sigma$ (S/m) | $\epsilon_r$ | $\sigma$ (S/m) |
| 150                    | 52.3         | 0.76           | 61.9         | 0.80           |
| 300                    | 45.3         | 0.87           | 58.2         | 0.92           |
| 450                    | 43.5         | 0.87           | 56.7         | 0.94           |
| 835                    | 41.5         | 0.90           | 55.2         | 0.97           |
| 900                    | 41.5         | 0.97           | 55.0         | 1.05           |
| 915                    | 41.5         | 0.98           | 55.0         | 1.06           |
| 1450                   | 40.5         | 1.20           | 54.0         | 1.30           |
| 1610                   | 40.3         | 1.29           | 53.8         | 1.40           |
| 1800 – 2000            | 40.0         | 1.40           | 53.3         | 1.52           |
| 2450                   | 39.2         | 1.80           | 52.7         | 1.95           |
| 3000                   | 38.5         | 2.40           | 52.0         | 2.73           |
| 5000                   | 36.2         | 4.45           | 49.3         | 5.07           |
| 5100                   | 36.1         | 4.55           | 49.1         | 5.18           |
| 5200                   | 36.0         | 4.66           | 49.0         | 5.30           |
| 5300                   | 35.9         | 4.76           | 48.9         | 5.42           |
| 5400                   | 35.8         | 4.86           | 48.7         | 5.53           |
| 5500                   | 35.6         | 4.96           | 48.6         | 5.65           |
| 5600                   | 35.5         | 5.07           | 48.5         | 5.77           |
| 5700                   | 35.4         | 5.17           | 48.3         | 5.88           |
| 5800                   | 35.3         | 5.27           | 48.2         | 6.00           |

#### IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

**Dielectric Property Measurements Results:****SAR 1 Room**

| Date      | Freq. (MHz) | Liquid Parameters |                                         | Measured                                | Target | Delta (%) | Limit ±(%) |   |
|-----------|-------------|-------------------|-----------------------------------------|-----------------------------------------|--------|-----------|------------|---|
| 4-20-2015 | Head 2450   | e'                | 38.0900                                 | Relative Permittivity ( $\epsilon_r$ ): | 38.09  | 39.20     | -2.83      | 5 |
|           |             | e"                | 13.5500                                 | Conductivity ( $\sigma$ ):              | 1.85   | 1.80      | 2.55       | 5 |
|           | Head 2410   | e'                | 38.2600                                 | Relative Permittivity ( $\epsilon_r$ ): | 38.26  | 39.28     | -2.59      | 5 |
|           |             | e"                | 13.4800                                 | Conductivity ( $\sigma$ ):              | 1.81   | 1.76      | 2.61       | 5 |
|           | Head 2475   | e'                | 37.9900                                 | Relative Permittivity ( $\epsilon_r$ ): | 37.99  | 39.17     | -3.01      | 5 |
|           |             | e"                | 13.6300                                 | Conductivity ( $\sigma$ ):              | 1.88   | 1.83      | 2.67       | 5 |
| 4-20-2015 | Body 2450   | e'                | 50.6400                                 | Relative Permittivity ( $\epsilon_r$ ): | 50.64  | 52.70     | -3.91      | 5 |
|           |             | e"                | 14.8900                                 | Conductivity ( $\sigma$ ):              | 2.03   | 1.95      | 4.02       | 5 |
|           | Body 2410   | e'                | 50.7900                                 | Relative Permittivity ( $\epsilon_r$ ): | 50.79  | 52.76     | -3.73      | 5 |
|           |             | e"                | 14.8200                                 | Conductivity ( $\sigma$ ):              | 1.99   | 1.91      | 4.11       | 5 |
|           | Body 2475   | e'                | 50.5600                                 | Relative Permittivity ( $\epsilon_r$ ): | 50.56  | 52.67     | -4.00      | 5 |
|           |             | e"                | 14.9900                                 | Conductivity ( $\sigma$ ):              | 2.06   | 1.99      | 3.92       | 5 |
| 4-21-2015 | Head 5180   | e'                | 34.7900                                 | Relative Permittivity ( $\epsilon_r$ ): | 34.79  | 36.01     | -3.40      | 5 |
|           |             | e"                | 15.3800                                 | Conductivity ( $\sigma$ ):              | 4.43   | 4.63      | -4.33      | 5 |
|           | Head 5200   | e'                | 34.7500                                 | Relative Permittivity ( $\epsilon_r$ ): | 34.75  | 35.99     | -3.45      | 5 |
|           |             | e"                | 15.3900                                 | Conductivity ( $\sigma$ ):              | 4.45   | 4.65      | -4.33      | 5 |
|           | Head 5600   | e'                | 34.2400                                 | Relative Permittivity ( $\epsilon_r$ ): | 34.24  | 35.53     | -3.64      | 5 |
|           |             | e"                | 15.5700                                 | Conductivity ( $\sigma$ ):              | 4.85   | 5.06      | -4.19      | 5 |
|           | Head 5800   | e'                | 33.9500                                 | Relative Permittivity ( $\epsilon_r$ ): | 33.95  | 35.30     | -3.82      | 5 |
|           |             | e"                | 15.6400                                 | Conductivity ( $\sigma$ ):              | 5.04   | 5.27      | -4.29      | 5 |
|           | Head 5825   | e'                | 33.9300                                 | Relative Permittivity ( $\epsilon_r$ ): | 33.93  | 35.30     | -3.88      | 5 |
|           |             | e"                | 15.6700                                 | Conductivity ( $\sigma$ ):              | 5.08   | 5.27      | -3.69      | 5 |
| 4-22-2015 | Body 5180   | e'                | 48.0500                                 | Relative Permittivity ( $\epsilon_r$ ): | 48.05  | 49.05     | -2.03      | 5 |
|           |             | e"                | 18.3100                                 | Conductivity ( $\sigma$ ):              | 5.27   | 5.27      | 0.04       | 5 |
|           | Body 5200   | e'                | 48.0100                                 | Relative Permittivity ( $\epsilon_r$ ): | 48.01  | 49.02     | -2.06      | 5 |
|           |             | e"                | 18.3500                                 | Conductivity ( $\sigma$ ):              | 5.31   | 5.29      | 0.21       | 5 |
|           | Body 5600   | e'                | 47.4200                                 | Relative Permittivity ( $\epsilon_r$ ): | 47.42  | 48.48     | -2.18      | 5 |
|           |             | e"                | 18.6500                                 | Conductivity ( $\sigma$ ):              | 5.81   | 5.76      | 0.80       | 5 |
|           | Body 5800   | e'                | 47.1600                                 | Relative Permittivity ( $\epsilon_r$ ): | 47.16  | 48.20     | -2.16      | 5 |
|           |             | e"                | 18.8900                                 | Conductivity ( $\sigma$ ):              | 6.09   | 6.00      | 1.53       | 5 |
|           | Body 5825   | e'                | 47.0800                                 | Relative Permittivity ( $\epsilon_r$ ): | 47.08  | 48.20     | -2.32      | 5 |
|           |             | e"                | 18.8700                                 | Conductivity ( $\sigma$ ):              | 6.11   | 6.00      | 1.86       | 5 |
| 4-28-2015 | Body 5180   | e'                | 48.3600                                 | Relative Permittivity ( $\epsilon_r$ ): | 48.36  | 49.05     | -1.40      | 5 |
|           |             | e"                | 18.8700                                 | Conductivity ( $\sigma$ ):              | 5.44   | 5.27      | 3.10       | 5 |
|           | Body 5200   | e'                | 48.3100                                 | Relative Permittivity ( $\epsilon_r$ ): | 48.31  | 49.02     | -1.45      | 5 |
|           |             | e"                | 18.9000                                 | Conductivity ( $\sigma$ ):              | 5.46   | 5.29      | 3.21       | 5 |
|           | Body 5600   | e'                | 47.5600                                 | Relative Permittivity ( $\epsilon_r$ ): | 47.56  | 48.48     | -1.89      | 5 |
|           |             | e"                | 19.2400                                 | Conductivity ( $\sigma$ ):              | 5.99   | 5.76      | 3.99       | 5 |
|           | Body 5800   | e'                | 47.1700                                 | Relative Permittivity ( $\epsilon_r$ ): | 47.17  | 48.20     | -2.14      | 5 |
|           |             | e"                | 19.4000                                 | Conductivity ( $\sigma$ ):              | 6.26   | 6.00      | 4.27       | 5 |
| Body 5825 | e'          | 47.1300           | Relative Permittivity ( $\epsilon_r$ ): | 47.13                                   | 48.20  | -2.22     | 5          |   |
|           | e"          | 19.4500           | Conductivity ( $\sigma$ ):              | 6.30                                    | 6.00   | 4.99      | 5          |   |

**SAR 1 Room(Continued)**

| Date      | Freq. (MHz) | Liquid Parameters |         |                                         | Measured | Target | Delta (%) | Limit ±(%) |
|-----------|-------------|-------------------|---------|-----------------------------------------|----------|--------|-----------|------------|
| 5-26-2015 | Body 5180   | e'                | 48.5100 | Relative Permittivity ( $\epsilon_r$ ): | 48.51    | 49.05  | -1.09     | 5          |
|           |             | e''               | 18.7100 | Conductivity ( $\sigma$ ):              | 5.39     | 5.27   | 2.23      | 5          |
|           | Body 5200   | e'                | 48.4600 | Relative Permittivity ( $\epsilon_r$ ): | 48.46    | 49.02  | -1.14     | 5          |
|           |             | e''               | 18.7300 | Conductivity ( $\sigma$ ):              | 5.42     | 5.29   | 2.28      | 5          |
|           | Body 5600   | e'                | 47.7800 | Relative Permittivity ( $\epsilon_r$ ): | 47.78    | 48.48  | -1.44     | 5          |
|           |             | e''               | 19.1300 | Conductivity ( $\sigma$ ):              | 5.96     | 5.76   | 3.40      | 5          |
|           | Body 5800   | e'                | 47.4500 | Relative Permittivity ( $\epsilon_r$ ): | 47.45    | 48.20  | -1.56     | 5          |
|           |             | e''               | 19.3300 | Conductivity ( $\sigma$ ):              | 6.23     | 6.00   | 3.90      | 5          |
|           | Body 5825   | e'                | 47.4100 | Relative Permittivity ( $\epsilon_r$ ): | 47.41    | 48.20  | -1.64     | 5          |
|           |             | e''               | 19.3600 | Conductivity ( $\sigma$ ):              | 6.27     | 6.00   | 4.51      | 5          |
| 5-27-2015 | Head 5180   | e'                | 36.9100 | Relative Permittivity ( $\epsilon_r$ ): | 36.91    | 36.01  | 2.49      | 5          |
|           |             | e''               | 15.9900 | Conductivity ( $\sigma$ ):              | 4.61     | 4.63   | -0.54     | 5          |
|           | Head 5200   | e'                | 36.8700 | Relative Permittivity ( $\epsilon_r$ ): | 36.87    | 35.99  | 2.44      | 5          |
|           |             | e''               | 16.0000 | Conductivity ( $\sigma$ ):              | 4.63     | 4.65   | -0.53     | 5          |
|           | Head 5600   | e'                | 36.3100 | Relative Permittivity ( $\epsilon_r$ ): | 36.31    | 35.53  | 2.18      | 5          |
|           |             | e''               | 16.1500 | Conductivity ( $\sigma$ ):              | 5.03     | 5.06   | -0.62     | 5          |
|           | Head 5800   | e'                | 36.0300 | Relative Permittivity ( $\epsilon_r$ ): | 36.03    | 35.30  | 2.07      | 5          |
|           |             | e''               | 16.2300 | Conductivity ( $\sigma$ ):              | 5.23     | 5.27   | -0.68     | 5          |
|           | Head 5825   | e'                | 35.9900 | Relative Permittivity ( $\epsilon_r$ ): | 35.99    | 35.30  | 1.95      | 5          |
|           |             | e''               | 16.2500 | Conductivity ( $\sigma$ ):              | 5.26     | 5.27   | -0.13     | 5          |

**SAR 2 Room**

| Date      | Freq. (MHz) | Liquid Parameters |         |                                         | Measured | Target | Delta (%) | Limit ±(%) |
|-----------|-------------|-------------------|---------|-----------------------------------------|----------|--------|-----------|------------|
| 4-27-2015 | Head 1900   | e'                | 38.8300 | Relative Permittivity ( $\epsilon_r$ ): | 38.83    | 40.00  | -2.93     | 5          |
|           |             | e"                | 13.8000 | Conductivity ( $\sigma$ ):              | 1.46     | 1.40   | 4.14      | 5          |
|           | Head 1850   | e'                | 39.2000 | Relative Permittivity ( $\epsilon_r$ ): | 39.20    | 40.00  | -2.00     | 5          |
|           |             | e"                | 13.7500 | Conductivity ( $\sigma$ ):              | 1.41     | 1.40   | 1.03      | 5          |
|           | Head 1910   | e'                | 38.8100 | Relative Permittivity ( $\epsilon_r$ ): | 38.81    | 40.00  | -2.97     | 5          |
|           |             | e"                | 13.8200 | Conductivity ( $\sigma$ ):              | 1.47     | 1.40   | 4.84      | 5          |
| 4-29-2015 | Body 835    | e'                | 53.1100 | Relative Permittivity ( $\epsilon_r$ ): | 53.11    | 55.20  | -3.79     | 5          |
|           |             | e"                | 21.5300 | Conductivity ( $\sigma$ ):              | 1.00     | 0.97   | 3.05      | 5          |
|           | Body 820    | e'                | 53.2100 | Relative Permittivity ( $\epsilon_r$ ): | 53.21    | 55.28  | -3.74     | 5          |
|           |             | e"                | 21.6000 | Conductivity ( $\sigma$ ):              | 0.98     | 0.97   | 1.69      | 5          |
|           | Body 850    | e'                | 52.9800 | Relative Permittivity ( $\epsilon_r$ ): | 52.98    | 55.16  | -3.95     | 5          |
|           |             | e"                | 21.4900 | Conductivity ( $\sigma$ ):              | 1.02     | 0.99   | 2.89      | 5          |
| 4-30-2015 | Head 1900   | e'                | 38.0900 | Relative Permittivity ( $\epsilon_r$ ): | 38.09    | 40.00  | -4.77     | 5          |
|           |             | e"                | 13.5100 | Conductivity ( $\sigma$ ):              | 1.43     | 1.40   | 1.95      | 5          |
|           | Head 1850   | e'                | 38.2400 | Relative Permittivity ( $\epsilon_r$ ): | 38.24    | 40.00  | -4.40     | 5          |
|           |             | e"                | 13.4800 | Conductivity ( $\sigma$ ):              | 1.39     | 1.40   | -0.95     | 5          |
|           | Head 1910   | e'                | 38.0600 | Relative Permittivity ( $\epsilon_r$ ): | 38.06    | 40.00  | -4.85     | 5          |
|           |             | e"                | 13.5200 | Conductivity ( $\sigma$ ):              | 1.44     | 1.40   | 2.56      | 5          |
| 5-1-2014  | Body 1900   | e'                | 52.8500 | Relative Permittivity ( $\epsilon_r$ ): | 52.85    | 53.30  | -0.84     | 5          |
|           |             | e"                | 14.2200 | Conductivity ( $\sigma$ ):              | 1.50     | 1.52   | -1.17     | 5          |
|           | Body 1850   | e'                | 53.0000 | Relative Permittivity ( $\epsilon_r$ ): | 53.00    | 53.30  | -0.56     | 5          |
|           |             | e"                | 14.1400 | Conductivity ( $\sigma$ ):              | 1.45     | 1.52   | -4.31     | 5          |
|           | Body 1910   | e'                | 52.8200 | Relative Permittivity ( $\epsilon_r$ ): | 52.82    | 53.30  | -0.90     | 5          |
|           |             | e"                | 14.2300 | Conductivity ( $\sigma$ ):              | 1.51     | 1.52   | -0.58     | 5          |
| 5-26-2015 | Body 5180   | e'                | 47.1800 | Relative Permittivity ( $\epsilon_r$ ): | 47.18    | 49.05  | -3.81     | 5          |
|           |             | e"                | 18.6000 | Conductivity ( $\sigma$ ):              | 5.36     | 5.27   | 1.63      | 5          |
|           | Body 5200   | e'                | 47.1700 | Relative Permittivity ( $\epsilon_r$ ): | 47.17    | 49.02  | -3.77     | 5          |
|           |             | e"                | 18.6100 | Conductivity ( $\sigma$ ):              | 5.38     | 5.29   | 1.63      | 5          |
|           | Body 5600   | e'                | 46.4600 | Relative Permittivity ( $\epsilon_r$ ): | 46.46    | 48.48  | -4.16     | 5          |
|           |             | e"                | 18.8700 | Conductivity ( $\sigma$ ):              | 5.88     | 5.76   | 1.99      | 5          |
|           | Body 5800   | e'                | 46.2300 | Relative Permittivity ( $\epsilon_r$ ): | 46.23    | 48.20  | -4.09     | 5          |
|           |             | e"                | 19.1200 | Conductivity ( $\sigma$ ):              | 6.17     | 6.00   | 2.77      | 5          |
|           | Body 5825   | e'                | 46.1500 | Relative Permittivity ( $\epsilon_r$ ): | 46.15    | 48.20  | -4.25     | 5          |
|           |             | e"                | 19.0900 | Conductivity ( $\sigma$ ):              | 6.18     | 6.00   | 3.05      | 5          |

**SAR 3 Room**

| Date      | Freq. (MHz) | Liquid Parameters |         |                                         | Measured | Target | Delta (%) | Limit ±(%) |
|-----------|-------------|-------------------|---------|-----------------------------------------|----------|--------|-----------|------------|
| 4-29-2014 | Body 1900   | e'                | 54.7500 | Relative Permittivity ( $\epsilon_r$ ): | 54.75    | 53.30  | 2.72      | 5          |
|           |             | e"                | 15.0200 | Conductivity ( $\sigma$ ):              | 1.59     | 1.52   | 4.39      | 5          |
|           | Body 1850   | e'                | 54.3100 | Relative Permittivity ( $\epsilon_r$ ): | 54.31    | 53.30  | 1.89      | 5          |
|           |             | e"                | 15.0000 | Conductivity ( $\sigma$ ):              | 1.54     | 1.52   | 1.51      | 5          |
|           | Body 1910   | e'                | 54.7500 | Relative Permittivity ( $\epsilon_r$ ): | 54.75    | 53.30  | 2.72      | 5          |
|           |             | e"                | 15.0200 | Conductivity ( $\sigma$ ):              | 1.60     | 1.52   | 4.94      | 5          |
| 4-29-2015 | Head 835    | e'                | 42.0900 | Relative Permittivity ( $\epsilon_r$ ): | 42.09    | 41.50  | 1.42      | 5          |
|           |             | e"                | 19.6800 | Conductivity ( $\sigma$ ):              | 0.91     | 0.90   | 1.52      | 5          |
|           | Head 820    | e'                | 42.2500 | Relative Permittivity ( $\epsilon_r$ ): | 42.25    | 41.60  | 1.56      | 5          |
|           |             | e"                | 19.7200 | Conductivity ( $\sigma$ ):              | 0.90     | 0.90   | 0.07      | 5          |
|           | Head 850    | e'                | 41.9700 | Relative Permittivity ( $\epsilon_r$ ): | 41.97    | 41.50  | 1.13      | 5          |
|           |             | e"                | 19.6600 | Conductivity ( $\sigma$ ):              | 0.93     | 0.92   | 1.55      | 5          |
| 5-6-2015  | Head 835    | e'                | 40.5000 | Relative Permittivity ( $\epsilon_r$ ): | 40.50    | 41.50  | -2.41     | 5          |
|           |             | e"                | 19.4000 | Conductivity ( $\sigma$ ):              | 0.90     | 0.90   | 0.08      | 5          |
|           | Head 820    | e'                | 40.6900 | Relative Permittivity ( $\epsilon_r$ ): | 40.69    | 41.60  | -2.19     | 5          |
|           |             | e"                | 19.4200 | Conductivity ( $\sigma$ ):              | 0.89     | 0.90   | -1.45     | 5          |
|           | Head 850    | e'                | 40.3100 | Relative Permittivity ( $\epsilon_r$ ): | 40.31    | 41.50  | -2.87     | 5          |
|           |             | e"                | 19.3600 | Conductivity ( $\sigma$ ):              | 0.92     | 0.92   | 0.00      | 5          |
| 5-6-2015  | Body 2600   | e'                | 50.8100 | Relative Permittivity ( $\epsilon_r$ ): | 50.81    | 52.51  | -3.24     | 5          |
|           |             | e"                | 15.1500 | Conductivity ( $\sigma$ ):              | 2.19     | 2.16   | 1.36      | 5          |
|           | Body 2500   | e'                | 51.1400 | Relative Permittivity ( $\epsilon_r$ ): | 51.14    | 52.64  | -2.84     | 5          |
|           |             | e"                | 14.8900 | Conductivity ( $\sigma$ ):              | 2.07     | 2.02   | 2.45      | 5          |
|           | Body 2700   | e'                | 50.5000 | Relative Permittivity ( $\epsilon_r$ ): | 50.50    | 52.38  | -3.60     | 5          |
|           |             | e"                | 15.3500 | Conductivity ( $\sigma$ ):              | 2.30     | 2.30   | 0.14      | 5          |
| 5-10-2015 | Body 2600   | e'                | 51.3300 | Relative Permittivity ( $\epsilon_r$ ): | 51.33    | 52.51  | -2.25     | 5          |
|           |             | e"                | 15.1700 | Conductivity ( $\sigma$ ):              | 2.19     | 2.16   | 1.49      | 5          |
|           | Body 2500   | e'                | 51.6200 | Relative Permittivity ( $\epsilon_r$ ): | 51.62    | 52.64  | -1.93     | 5          |
|           |             | e"                | 14.9400 | Conductivity ( $\sigma$ ):              | 2.08     | 2.02   | 2.80      | 5          |
|           | Body 2700   | e'                | 51.0400 | Relative Permittivity ( $\epsilon_r$ ): | 51.04    | 52.38  | -2.57     | 5          |
|           |             | e"                | 15.3800 | Conductivity ( $\sigma$ ):              | 2.31     | 2.30   | 0.33      | 5          |
| 5-10-2015 | Head 2600   | e'                | 39.4300 | Relative Permittivity ( $\epsilon_r$ ): | 39.43    | 39.01  | 1.07      | 5          |
|           |             | e"                | 14.1300 | Conductivity ( $\sigma$ ):              | 2.04     | 1.96   | 4.11      | 5          |
|           | Head 2500   | e'                | 39.7900 | Relative Permittivity ( $\epsilon_r$ ): | 39.79    | 39.14  | 1.67      | 5          |
|           |             | e"                | 13.8900 | Conductivity ( $\sigma$ ):              | 1.93     | 1.85   | 4.14      | 5          |
|           | Head 2700   | e'                | 39.0700 | Relative Permittivity ( $\epsilon_r$ ): | 39.07    | 38.88  | 0.48      | 5          |
|           |             | e"                | 14.3400 | Conductivity ( $\sigma$ ):              | 2.15     | 2.07   | 3.99      | 5          |
| 5-26-2015 | Body 2450   | e'                | 52.0600 | Relative Permittivity ( $\epsilon_r$ ): | 52.06    | 52.70  | -1.21     | 5          |
|           |             | e"                | 14.5600 | Conductivity ( $\sigma$ ):              | 1.98     | 1.95   | 1.72      | 5          |
|           | Body 2410   | e'                | 52.2100 | Relative Permittivity ( $\epsilon_r$ ): | 52.21    | 52.76  | -1.04     | 5          |
|           |             | e"                | 14.4300 | Conductivity ( $\sigma$ ):              | 1.93     | 1.91   | 1.37      | 5          |
|           | Body 2475   | e'                | 51.9800 | Relative Permittivity ( $\epsilon_r$ ): | 51.98    | 52.67  | -1.31     | 5          |
|           |             | e"                | 14.6700 | Conductivity ( $\sigma$ ):              | 2.02     | 1.99   | 1.70      | 5          |
| 5-27-2015 | Head 2450   | e'                | 38.8900 | Relative Permittivity ( $\epsilon_r$ ): | 38.89    | 39.20  | -0.79     | 5          |
|           |             | e"                | 13.8500 | Conductivity ( $\sigma$ ):              | 1.89     | 1.80   | 4.82      | 5          |
|           | Head 2410   | e'                | 39.0400 | Relative Permittivity ( $\epsilon_r$ ): | 39.04    | 39.28  | -0.61     | 5          |
|           |             | e"                | 13.7200 | Conductivity ( $\sigma$ ):              | 1.84     | 1.76   | 4.44      | 5          |
|           | Head 2475   | e'                | 38.7900 | Relative Permittivity ( $\epsilon_r$ ): | 38.79    | 39.17  | -0.97     | 5          |
|           |             | e"                | 13.9200 | Conductivity ( $\sigma$ ):              | 1.92     | 1.83   | 4.85      | 5          |

## 8.2. System Check

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

### System Performance Check Measurement Conditions:

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness:  $2.0 \pm 0.2$  mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be  $\geq 15.0$  cm for SAR measurements  $\leq 3$  GHz and  $\geq 10.0$  cm for measurements  $> 3$  GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.  
For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm.  
For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

**Reference Target SAR Values**

The reference SAR values can be obtained from the calibration certificate of system validation dipoles

| System Dipole | Serial No. | Cal. Date  | Freq. (MHz) | Target SAR Values (W/kg) |       |       |
|---------------|------------|------------|-------------|--------------------------|-------|-------|
|               |            |            |             | 1g/10g                   | Head  | Body  |
| D835V2        | 4d174      | 8-13-2014  | 835         | 1g                       | 9.32  | 9.62  |
|               |            |            |             | 10g                      | 6.09  | 6.37  |
| D1900V2       | 5d190      | 8-12-2014  | 1900        | 1g                       | 40.2  | 40.4  |
|               |            |            |             | 10g                      | 21.0  | 21.3  |
| D1900V2       | 5d199      | 2-6-2015   | 1900        | 1g                       | 41    | 40.6  |
|               |            |            |             | 10g                      | 21.4  | 21.6  |
| D2600V2       | 1097       | 11-27-2014 | 2600        | 1g                       | 56.50 | 57.3  |
|               |            |            |             | 10g                      | 25.40 | 25.50 |
| D2450V2       | 939        | 8-11-2014  | 2450        | 1g                       | 52.1  | 51.4  |
|               |            |            |             | 10g                      | 24.2  | 24    |
| D5GHzV2       | 1184       | 8-22-2014  | 5200        | 1g                       | 79.5  | 77.1  |
|               |            |            |             | 10g                      | 22.7  | 21.5  |
|               |            |            | 5600        | 1g                       | 83.3  | 82.7  |
|               |            |            |             | 10g                      | 23.5  | 22.8  |
|               |            |            | 5800        | 1g                       | 79.2  | 76.9  |
|               |            |            |             | 10g                      | 22.4  | 21.3  |

**System Check Results**

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target.

**SAR 1 Room**

| Date Tested | System Dipole  |          | T.S. Liquid |     | Measured Results    |                  | Target (Ref. Value) | Delta ±10 % | Plot No. |
|-------------|----------------|----------|-------------|-----|---------------------|------------------|---------------------|-------------|----------|
|             | Type           | Serial # |             |     | Zoom Scan to 100 mW | Normalize to 1 W |                     |             |          |
| 4-20-2015   | D2450V2        | 939      | Head        | 1g  | 5.36                | 53.60            | 52.1                | 2.88        | 1,2      |
|             |                |          |             | 10g | 2.46                | 24.60            | 24.20               | 1.65        |          |
| 4-20-2015   | D2450V2        | 939      | Body        | 1g  | 5.40                | 54.00            | 51.4                | 5.06        |          |
|             |                |          |             | 10g | 2.47                | 24.70            | 24.00               | 2.92        |          |
| 4-21-2015   | D5GhzV2 (5200) | 1184     | Head        | 1g  | 7.57                | 75.70            | 79.5                | -4.78       |          |
|             |                |          |             | 10g | 2.18                | 21.80            | 22.7                | -3.96       |          |
| 4-21-2015   | D5GhzV2 (5600) | 1184     | Head        | 1g  | 7.80                | 78.00            | 83.3                | -6.36       |          |
|             |                |          |             | 10g | 2.22                | 22.20            | 23.5                | -5.53       |          |
| 4-21-2015   | D5GhzV2 (5800) | 1184     | Head        | 1g  | 7.54                | 75.40            | 79.2                | -4.80       |          |
|             |                |          |             | 10g | 2.15                | 21.50            | 22.4                | -4.02       |          |
| 4-22-2015   | D5GhzV2 (5200) | 1184     | Body        | 1g  | 7.84                | 78.40            | 77.1                | 1.69        |          |
|             |                |          |             | 10g | 2.23                | 22.30            | 21.5                | 3.72        |          |
| 4-22-2015   | D5GhzV2 (5600) | 1184     | Body        | 1g  | 8.22                | 82.20            | 82.7                | -0.60       |          |
|             |                |          |             | 10g | 2.31                | 23.10            | 22.8                | 1.32        |          |
| 4-22-2015   | D5GhzV2 (5800) | 1184     | Body        | 1g  | 7.42                | 74.20            | 76.9                | -3.51       |          |
|             |                |          |             | 10g | 2.10                | 21.00            | 21.3                | -1.41       |          |
| 4-28-2015   | D5GhzV2 (5200) | 1184     | Body        | 1g  | 7.50                | 75.00            | 77.1                | -2.72       |          |
|             |                |          |             | 10g | 2.12                | 21.20            | 21.5                | -1.40       |          |
| 4-28-2015   | D5GhzV2 (5600) | 1184     | Body        | 1g  | 7.89                | 78.90            | 82.7                | -4.59       |          |
|             |                |          |             | 10g | 2.20                | 22.00            | 22.8                | -3.51       |          |
| 4-28-2015   | D5GhzV2 (5800) | 1184     | Body        | 1g  | 7.32                | 73.20            | 76.9                | -4.81       | 3,4      |
|             |                |          |             | 10g | 2.03                | 20.30            | 21.3                | -4.69       |          |
| 5-26-2015   | D5GhzV2 (5200) | 1184     | Body        | 1g  | 8.11                | 81.10            | 77.1                | 5.19        |          |
|             |                |          |             | 10g | 2.34                | 23.40            | 21.5                | 8.84        |          |
| 5-26-2015   | D5GhzV2 (5600) | 1184     | Body        | 1g  | 8.72                | 87.20            | 82.7                | 5.44        |          |
|             |                |          |             | 10g | 2.48                | 24.80            | 22.8                | 8.77        |          |
| 5-26-2015   | D5GhzV2 (5800) | 1184     | Body        | 1g  | 7.89                | 78.90            | 76.9                | 2.60        |          |
|             |                |          |             | 10g | 2.25                | 22.50            | 21.3                | 5.63        |          |
| 5-27-2015   | D5GhzV2 (5200) | 1184     | Head        | 1g  | 7.94                | 79.40            | 79.5                | -0.13       |          |
|             |                |          |             | 10g | 2.32                | 23.20            | 22.7                | 2.20        |          |
| 5-27-2015   | D5GhzV2 (5600) | 1184     | Head        | 1g  | 8.20                | 82.00            | 83.3                | -1.56       |          |
|             |                |          |             | 10g | 2.39                | 23.90            | 23.5                | 1.70        |          |
| 5-27-2015   | D5GhzV2 (5800) | 1184     | Head        | 1g  | 8.13                | 81.30            | 79.2                | 2.65        |          |
|             |                |          |             | 10g | 2.35                | 23.50            | 22.4                | 4.91        |          |

**SAR 2 Room**

| Date Tested | System Dipole  |          | T.S. Liquid |     | Measured Results    |                  | Target (Ref. Value) | Delta ±10 % | Plot No. |
|-------------|----------------|----------|-------------|-----|---------------------|------------------|---------------------|-------------|----------|
|             | Type           | Serial # |             |     | Zoom Scan to 100 mW | Normalize to 1 W |                     |             |          |
| 4-27-2015   | D1900V2        | 5d199    | Head        | 1g  | 4.06                | 40.60            | 41                  | -0.98       |          |
|             |                |          |             | 10g | 2.10                | 21.00            | 21.40               | -1.87       |          |
| 4-29-2015   | D835V2         | 4d174    | Body        | 1g  | 1.03                | 10.30            | 9.62                | 7.07        |          |
|             |                |          |             | 10g | 0.68                | 6.78             | 6.37                | 6.44        |          |
| 4-30-2015   | D1900V2        | 5d199    | Head        | 1g  | 3.97                | 39.70            | 41.00               | -3.17       | 5, 6     |
|             |                |          |             | 10g | 2.04                | 20.40            | 21.40               | -4.67       |          |
| 5-1-2015    | D1900V2        | 5d199    | Body        | 1g  | 4.04                | 40.40            | 40.6                | -0.49       |          |
|             |                |          |             | 10g | 2.13                | 21.30            | 21.60               | -1.39       |          |
| 5-26-2015   | D5GhzV2 (5200) | 1184     | Body        | 1g  | 8.18                | 81.80            | 77.1                | 6.10        |          |
|             |                |          |             | 10g | 2.29                | 22.90            | 21.5                | 6.51        |          |
| 5-26-2015   | D5GhzV2 (5600) | 1184     | Body        | 1g  | 7.85                | 78.50            | 82.7                | -5.08       |          |
|             |                |          |             | 10g | 2.16                | 21.60            | 22.8                | -5.26       |          |
| 5-26-2015   | D5GhzV2 (5800) | 1184     | Body        | 1g  | 7.92                | 79.20            | 76.9                | 2.99        |          |
|             |                |          |             | 10g | 2.19                | 21.90            | 21.3                | 2.82        |          |

**SAR 3 Room**

| Date Tested | System Dipole |          | T.S.<br>Liquid |     | Measured Results       |                     | Target<br>(Ref. Value) | Delta<br>±10 % | Plot<br>No. |
|-------------|---------------|----------|----------------|-----|------------------------|---------------------|------------------------|----------------|-------------|
|             | Type          | Serial # |                |     | Zoom Scan to<br>100 mW | Normalize<br>to 1 W |                        |                |             |
| 4-29-2015   | D1900V2       | 5d199    | Body           | 1g  | 4.14                   | 41.40               | 40.6                   | 1.97           |             |
|             |               |          |                | 10g | 2.13                   | 21.30               | 21.60                  | -1.39          |             |
| 4-29-2015   | D835V2        | 4d174    | Head           | 1g  | 1.00                   | 10.00               | 9.32                   | 7.30           | 7, 8        |
|             |               |          |                | 10g | 0.66                   | 6.58                | 6.09                   | 8.05           |             |
| 5-6-2015    | D835V2        | 4d174    | Head           | 1g  | 0.99                   | 9.93                | 9.32                   | 6.55           |             |
|             |               |          |                | 10g | 0.65                   | 6.53                | 6.09                   | 7.22           |             |
| 5-6-2015    | D2600V2       | 1097     | Body           | 1g  | 5.67                   | 56.70               | 57.3                   | -1.05          |             |
|             |               |          |                | 10g | 2.49                   | 24.90               | 25.50                  | -2.35          |             |
| 5-10-2015   | D2600V2       | 1097     | Body           | 1g  | 5.62                   | 56.20               | 57.3                   | -1.92          | 9, 10       |
|             |               |          |                | 10g | 2.49                   | 24.90               | 25.50                  | -2.53          |             |
| 5-10-2015   | D2600V2       | 1097     | Head           | 1g  | 5.91                   | 59.10               | 56.50                  | 4.60           |             |
|             |               |          |                | 10g | 2.62                   | 26.20               | 25.40                  | 3.15           |             |
| 5-26-2015   | D2450V2       | 939      | Body           | 1g  | 5.30                   | 53.00               | 51.40                  | 3.11           |             |
|             |               |          |                | 10g | 2.44                   | 24.40               | 24.00                  | 1.67           |             |
| 5-27-2015   | D2450V2       | 939      | Head           | 1g  | 5.72                   | 57.20               | 52.10                  | 9.79           |             |
|             |               |          |                | 10g | 2.64                   | 26.40               | 24.20                  | 9.09           |             |

## 9. Conducted Output Power Measurements

### 9.1. GSM

#### GSM850 Measured Results

| Band | Mode         | Coding Scheme | Time Slots | Ch No. | Freq. (MHz) | Max. Pwr    |             | Reduced Pwr |             |
|------|--------------|---------------|------------|--------|-------------|-------------|-------------|-------------|-------------|
|      |              |               |            |        |             | Burst (dBm) | Frame (dBm) | Burst (dBm) | Frame (dBm) |
| 850  | GSM (Voice)  | CS1           | 1          | 128    | 824.2       | 32.4        | 23.3        | 26.2        | 17.1        |
|      |              |               |            | 190    | 836.6       | 32.3        | 23.3        | 26.1        | 17.1        |
|      |              |               |            | 251    | 848.8       | 32.3        | 23.3        | 26.3        | 17.2        |
|      | GPRS (GMSK)  | CS1           | 1          | 128    | 824.2       | 32.3        | 23.3        | 26.2        | 17.2        |
|      |              |               |            | 190    | 836.6       | 32.3        | 23.3        | 26.1        | 17.1        |
|      |              |               |            | 251    | 848.8       | 32.4        | 23.3        | 26.3        | 17.3        |
|      |              |               | 2          | 128    | 824.2       | 30.7        | 24.7        | 24.1        | 18.1        |
|      |              |               |            | 190    | 836.6       | 30.6        | 24.6        | 24.0        | 18.0        |
|      |              |               |            | 251    | 848.8       | 31.0        | 24.9        | 24.2        | 18.2        |
|      |              |               | 3          | 128    | 824.2       | 29.1        | 24.9        | 21.7        | 17.5        |
|      |              |               |            | 190    | 836.6       | 29.0        | 24.8        | 21.8        | 17.6        |
|      |              |               |            | 251    | 848.8       | 29.2        | 24.9        | 21.8        | 17.6        |
|      |              |               | 4          | 128    | 824.2       | 26.8        | 23.8        | 19.9        | 16.8        |
|      |              |               |            | 190    | 836.6       | 26.8        | 23.8        | 19.9        | 16.9        |
|      |              |               |            | 251    | 848.8       | 26.9        | 23.9        | 19.9        | 16.9        |
|      | EGPRS (8PSK) | MCS5          | 1          | 128    | 824.2       | 26.8        | 17.8        | 19.5        | 10.5        |
|      |              |               |            | 190    | 836.6       | 26.7        | 17.7        | 19.5        | 10.4        |
|      |              |               |            | 251    | 848.8       | 26.9        | 17.9        | 19.7        | 10.6        |
|      |              |               | 2          | 128    | 824.2       | 25.2        | 19.2        | 17.9        | 11.9        |
|      |              |               |            | 190    | 836.6       | 25.2        | 19.1        | 17.9        | 11.8        |
|      |              |               |            | 251    | 848.8       | 25.3        | 19.3        | 18.0        | 12.0        |
|      |              |               | 3          | 128    | 824.2       | 24.3        | 20.0        | 16.2        | 11.9        |
|      |              |               |            | 190    | 836.6       | 24.2        | 19.9        | 16.1        | 11.9        |
|      |              |               |            | 251    | 848.8       | 24.4        | 20.1        | 16.3        | 12.0        |
|      |              |               | 4          | 128    | 824.2       | 22.4        | 19.4        | 14.6        | 11.6        |
|      |              |               |            | 190    | 836.6       | 22.3        | 19.3        | 14.6        | 11.6        |
|      |              |               |            | 251    | 848.8       | 22.5        | 19.5        | 14.8        | 11.8        |

#### Notes:

The worst-case configuration and mode for SAR testing is determined to be as follows:

- Standalone: GMSK (GPRS) mode with 3 time slots for Max power and 2 time slots for Reduced power, based on the output power measurements above
- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

**GSM1900 Measured Results**

| Band | Mode         | Coding Scheme | Time Slots | Ch No. | Freq. (MHz) | Max. Pwr    |             | Reduced Pwr |             |
|------|--------------|---------------|------------|--------|-------------|-------------|-------------|-------------|-------------|
|      |              |               |            |        |             | Burst (dBm) | Frame (dBm) | Burst (dBm) | Frame (dBm) |
| 1900 | GSM (Voice)  | CS1           | 1          | 512    | 1850.2      | 29.2        | 20.2        | 24.3        | 15.2        |
|      |              |               |            | 661    | 1880.0      | 29.3        | 20.2        | 24.4        | 15.4        |
|      |              |               |            | 810    | 1909.8      | 29.2        | 20.2        | 24.3        | 15.3        |
|      | GPRS (GMSK)  | CS1           | 1          | 512    | 1850.2      | 29.3        | 20.2        | 24.2        | 15.2        |
|      |              |               |            | 661    | 1880.0      | 29.3        | 20.3        | 24.4        | 15.4        |
|      |              |               |            | 810    | 1909.8      | 29.3        | 20.3        | 24.3        | 15.3        |
|      |              |               | 2          | 512    | 1850.2      | 27.8        | 21.8        | 22.1        | 16.1        |
|      |              |               |            | 661    | 1880.0      | 28.0        | 22.0        | 22.3        | 16.3        |
|      |              |               |            | 810    | 1909.8      | 27.8        | 21.8        | 22.5        | 16.4        |
|      |              |               | 3          | 512    | 1850.2      | 26.0        | 21.8        | 20.1        | 15.8        |
|      |              |               |            | 661    | 1880.0      | 26.2        | 21.9        | 20.2        | 16.0        |
|      |              |               |            | 810    | 1909.8      | 26.3        | 22.0        | 20.3        | 16.1        |
|      |              |               | 4          | 512    | 1850.2      | 24.0        | 21.0        | 17.9        | 14.9        |
|      |              |               |            | 661    | 1880.0      | 24.2        | 21.1        | 18.1        | 15.1        |
|      |              |               |            | 810    | 1909.8      | 24.3        | 21.3        | 18.2        | 15.2        |
|      | EGPRS (8PSK) | MCS5          | 1          | 512    | 1850.2      | 26.2        | 17.1        | 20.6        | 11.6        |
|      |              |               |            | 661    | 1880.0      | 26.3        | 17.3        | 20.7        | 11.7        |
|      |              |               |            | 810    | 1909.8      | 26.4        | 17.3        | 20.9        | 11.8        |
|      |              |               | 2          | 512    | 1850.2      | 24.8        | 18.8        | 18.9        | 12.9        |
|      |              |               |            | 661    | 1880.0      | 24.9        | 18.8        | 19.1        | 13.0        |
|      |              |               |            | 810    | 1909.8      | 25.0        | 19.0        | 19.2        | 13.2        |
|      |              |               | 3          | 512    | 1850.2      | 23.8        | 19.5        | 17.4        | 13.1        |
|      |              |               |            | 661    | 1880.0      | 23.9        | 19.7        | 17.5        | 13.2        |
|      |              |               |            | 810    | 1909.8      | 24.0        | 19.7        | 17.6        | 13.3        |
|      |              |               | 4          | 512    | 1850.2      | 22.1        | 19.1        | 15.5        | 12.5        |
|      |              |               |            | 661    | 1880.0      | 22.3        | 19.3        | 15.6        | 12.6        |
|      |              |               |            | 810    | 1909.8      | 22.4        | 19.4        | 15.7        | 12.7        |

**Notes:**

The worst-case configuration and mode for SAR testing is determined to be as follows:

- Standalone: GMSK (GPRS) mode with 3 time slots for Max power and 2 time slots for Reduced power, based on the output power measurements above
- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

## 9.2. W-CDMA

### Release 99 Setup Procedures used to establish the test signals

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

| Mode                   | Subtest                 | Rel99        |
|------------------------|-------------------------|--------------|
| WCDMA General Settings | Loopback Mode           | Test Mode 2  |
|                        | Rel99 RMC               | 12.2kbps RMC |
|                        | Power Control Algorithm | Algorithm2   |
|                        | $\beta_c/\beta_d$       | 8/15         |

### HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests were completed according to Release 7 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

|                         | Mode                                 | HSDPA        | HSDPA | HSDPA | HSDPA |
|-------------------------|--------------------------------------|--------------|-------|-------|-------|
|                         | Subtest                              | 1            | 2     | 3     | 4     |
| W-CDMA General Settings | Loopback Mode                        | Test Mode 1  |       |       |       |
|                         | Rel99 RMC                            | 12.2kbps RMC |       |       |       |
|                         | HSDPA FRC                            | H-Set 1      |       |       |       |
|                         | Power Control Algorithm              | Algorithm 2  |       |       |       |
|                         | $\beta_c$                            | 2/15         | 11/15 | 15/15 | 15/15 |
|                         | $\beta_d$                            | 15/15        | 15/15 | 8/15  | 4/15  |
|                         | Bd (SF)                              | 64           |       |       |       |
|                         | $\beta_c/\beta_d$                    | 2/15         | 11/15 | 15/8  | 15/4  |
|                         | $\beta_{hs}$                         | 4/15         | 24/15 | 30/15 | 30/15 |
|                         | MPR (dB)                             | 0            | 0     | 0.5   | 0.5   |
| HSDPA Specific Settings | $D_{ACK}$                            | 8            |       |       |       |
|                         | $D_{NAK}$                            | 8            |       |       |       |
|                         | DCQI                                 | 8            |       |       |       |
|                         | Ack-Nack repetition factor           | 3            |       |       |       |
|                         | CQI Feedback (Table 5.2B.4)          | 4ms          |       |       |       |
|                         | CQI Repetition Factor (Table 5.2B.4) | 2            |       |       |       |
|                         | $A_{hs}=\beta_{hs}/\beta_c$          | 30/15        |       |       |       |

**HSPA (HSDPA & HSUPA) Setup Procedures used to establish the test signals**

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

|                               | Mode                                 | HSPA          |       |       |       |             |
|-------------------------------|--------------------------------------|---------------|-------|-------|-------|-------------|
|                               | Subtest                              | 1             | 2     | 3     | 4     | 5           |
| WCDMA<br>General<br>Settings  | Loopback Mode                        | Test Mode 1   |       |       |       |             |
|                               | Rel99 RMC                            | 12.2 kbps RMC |       |       |       |             |
|                               | HSDPA FRC                            | H-Set 1       |       |       |       |             |
|                               | HSUPA Test                           | HSPA          |       |       |       |             |
|                               | Power Control Algorithm              | Algorithm 2   |       |       |       | Algorithm 1 |
|                               | $\beta_c$                            | 11/15         | 6/15  | 15/15 | 2/15  | 15/15       |
|                               | $\beta_d$                            | 15/15         | 15/15 | 9/15  | 15/15 | 0           |
|                               | $\beta_{ec}$                         | 209/225       | 12/15 | 30/15 | 2/15  | 5/15        |
|                               | $\beta_c/\beta_d$                    | 11/15         | 6/15  | 15/9  | 2/15  | 15/1        |
|                               | $\beta_{hs}$                         | 22/15         | 12/15 | 30/15 | 4/15  | 5/15        |
|                               | $\beta_{ed}$                         | 1309/225      | 94/75 | 47/15 | 56/75 | 47/15       |
| HSDPA<br>Specific<br>Settings | CM (dB)                              | 1             | 3     | 2     | 3     | 1           |
|                               | MPR (dB)                             | 0             | 2     | 1     | 2     | 0           |
|                               | DACK                                 | 8             |       |       |       | 0           |
|                               | DNAK                                 | 8             |       |       |       | 0           |
|                               | DCQI                                 | 8             |       |       |       | 0           |
|                               | Ack-Nack repetition factor           | 3             |       |       |       |             |
|                               | CQI Feedback (Table 5.2B.4)          | 4ms           |       |       |       |             |
| HSUPA<br>Specific<br>Settings | CQI Repetition Factor (Table 5.2B.4) | 2             |       |       |       |             |
|                               | $A_{hs} = \beta_{hs}/\beta_c$        | 30/15         |       |       |       |             |
|                               | E-DPDCH                              | 6             | 8     | 8     | 5     | 7           |
|                               | DHARQ                                | 0             | 0     | 0     | 0     | 0           |
|                               | AG Index                             | 20            | 12    | 15    | 17    | 21          |
|                               | ETFCI (from 34.121 Table C.11.1.3)   | 75            | 67    | 92    | 71    | 81          |
|                               | Associated Max UL Data Rate kbps     | 242.1         | 174.9 | 482.8 | 205.8 | 308.9       |
|                               | Reference E-TFCIs                    | 5             | 5     | 2     | 5     | 1           |
|                               | Reference E-TFCI                     | 11            | 11    | 11    | 11    | 67          |
|                               | Reference E-TFCI PO                  | 4             | 4     | 4     | 4     | 18          |
|                               | Reference E-TFCI                     | 67            | 67    | 92    | 67    | 67          |
|                               | Reference E-TFCI PO                  | 18            | 18    | 18    | 18    | 18          |
|                               | Reference E-TFCI                     | 71            | 71    | 71    | 71    | 71          |
|                               | Reference E-TFCI PO                  | 23            | 23    | 23    | 23    | 23          |
|                               | Reference E-TFCI                     | 75            | 75    | 75    | 75    | 75          |
|                               | Reference E-TFCI PO                  | 26            | 26    | 26    | 26    | 26          |
|                               | Reference E-TFCI                     | 81            | 81    | 81    | 81    | 81          |
|                               | Reference E-TFCI PO                  | 27            | 27    | 27    | 27    | 27          |
|                               | Maximum Channelization Codes         | 2xSF2         |       |       |       | SF4         |

**DC-HSDPA Setup Procedures used to establish the test signals**

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

**Table E.5.0: Levels for HSDPA connection setup**

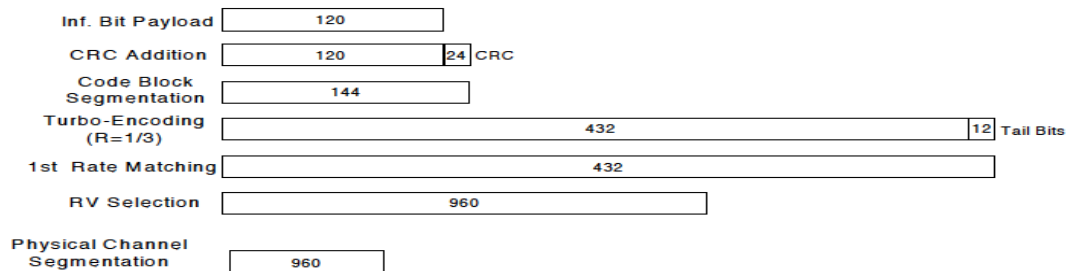
| Parameter<br>During Connection setup | Unit | Value |
|--------------------------------------|------|-------|
| P-CPICH_Ec/Ior                       | dB   | -10   |
| P-CCPCH and SCH_Ec/Ior               | dB   | -12   |
| PICH_Ec/Ior                          | dB   | -15   |
| HS-PDSCH                             | dB   | off   |
| HS-SCCH_1                            | dB   | off   |
| DPCH_Ec/Ior                          | dB   | -5    |
| OCNS_Ec/Ior                          | dB   | -3.1  |

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

**Table C.8.1.12: Fixed Reference Channel H-Set 12**

| Parameter                                                                                                                                              | Unit       | Value |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------|
| Nominal Avg. Inf. Bit Rate                                                                                                                             | kbps       | 60    |
| Inter-TTI Distance                                                                                                                                     | TTI's      | 1     |
| Number of HARQ Processes                                                                                                                               | Proces ses | 6     |
| Information Bit Payload ( $N_{INF}$ )                                                                                                                  | Bits       | 120   |
| Number Code Blocks                                                                                                                                     | Blocks     | 1     |
| Binary Channel Bits Per TTI                                                                                                                            | Bits       | 960   |
| Total Available SML's in UE                                                                                                                            | SML's      | 19200 |
| Number of SML's per HARQ Proc.                                                                                                                         | SML's      | 3200  |
| Coding Rate                                                                                                                                            |            | 0.15  |
| Number of Physical Channel Codes                                                                                                                       | Codes      | 1     |
| Modulation                                                                                                                                             |            | QPSK  |
| Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.               |            |       |
| Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used. |            |       |

**Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)**

The following 4 Sub-tests for HSDPA were completed according to Release 8 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

|                         | Mode                                   | HSDPA        | HSDPA | HSDPA | HSDPA |
|-------------------------|----------------------------------------|--------------|-------|-------|-------|
|                         | Subtest                                | 1            | 2     | 3     | 4     |
| WCDMA General Settings  | Loopback Mode                          | Test Mode 1  |       |       |       |
|                         | Rel99 RMC                              | 12.2kbps RMC |       |       |       |
|                         | HSDPA FRC                              | H-Set 1      |       |       |       |
|                         | Power Control Algorithm                | Algorithm2   |       |       |       |
|                         | $\beta_c$                              | 2/15         | 11/15 | 15/15 | 15/15 |
|                         | $\beta_d$                              | 15/15        | 15/15 | 8/15  | 4/15  |
|                         | $\beta_d$ (SF)                         | 64           |       |       |       |
|                         | $\beta_c/\beta_d$                      | 2/15         | 11/15 | 15/8  | 15/4  |
|                         | $\beta_{hs}$                           | 4/15         | 24/15 | 30/15 | 30/15 |
| HSDPA Specific Settings | MPR (dB)                               | 0            | 0     | 0.5   | 0.5   |
|                         | DACK                                   | 8            |       |       |       |
|                         | DNAK                                   | 8            |       |       |       |
|                         | DCQI                                   | 8            |       |       |       |
|                         | Ack-Nack Repetition factor             | 3            |       |       |       |
|                         | CQI Feedback                           | 4ms          |       |       |       |
|                         | CQI Repetition Factor                  | 2            |       |       |       |
|                         | A <sub>hs</sub> = $\beta_{hs}/\beta_c$ | 30/15        |       |       |       |

**WCDMA Band V Measured Results**

| Band          | Mode    |                | UL Ch No. | Freq. (MHz) | MPR (dB) | Max. Pwr (dBm) | MPR (dB) | Reduced Pwr (dBm) |
|---------------|---------|----------------|-----------|-------------|----------|----------------|----------|-------------------|
| W-CDMA Band V | Rel 99  | RMC, 12.2 kbps | 4132      | 826.4       | N/A      | 22.6           | N/A      | 16.7              |
|               |         |                | 4183      | 836.6       | N/A      | 22.6           | N/A      | 16.7              |
|               |         |                | 4233      | 846.6       | N/A      | 22.5           | N/A      | 16.6              |
|               | HSDPA   | Subtest 1      | 4132      | 826.4       | 0        | 22.8           | 0        | 16.6              |
|               |         |                | 4183      | 836.6       | 0        | 22.8           | 0        | 16.8              |
|               |         |                | 4233      | 846.6       | 0        | 22.6           | 0        | 16.6              |
|               |         | Subtest 2      | 4132      | 826.4       | 0        | 21.9           | 0        | 16.3              |
|               |         |                | 4183      | 836.6       | 0        | 22.2           | 0        | 16.7              |
|               |         |                | 4233      | 846.6       | 0        | 21.7           | 0        | 16.2              |
|               |         | Subtest 3      | 4132      | 826.4       | 0.5      | 21.2           | 0        | 16.3              |
|               |         |                | 4183      | 836.6       | 0.5      | 22.3           | 0        | 16.6              |
|               |         |                | 4233      | 846.6       | 0.5      | 21.8           | 0        | 16.2              |
|               |         | Subtest 4      | 4132      | 826.4       | 0.5      | 21.1           | 0        | 16.3              |
|               |         |                | 4183      | 836.6       | 0.5      | 21.4           | 0        | 16.6              |
|               |         |                | 4233      | 846.6       | 0.5      | 20.9           | 0        | 16.2              |
|               | HSUPA   | Subtest 1      | 4132      | 826.4       | 0        | 21.6           | 0        | 16.1              |
|               |         |                | 4183      | 836.6       | 0        | 22.3           | 0        | 16.4              |
|               |         |                | 4233      | 846.6       | 0        | 21.8           | 0        | 15.9              |
|               |         | Subtest 2      | 4132      | 826.4       | 2        | 20.2           | 0        | 16.6              |
|               |         |                | 4183      | 836.6       | 2        | 20.4           | 0        | 16.9              |
|               |         |                | 4233      | 846.6       | 2        | 20.0           | 0        | 16.4              |
|               |         | Subtest 3      | 4132      | 826.4       | 1        | 20.6           | 0        | 15.9              |
|               |         |                | 4183      | 836.6       | 1        | 21.3           | 0        | 16.1              |
|               |         |                | 4233      | 846.6       | 1        | 20.9           | 0        | 15.7              |
|               |         | Subtest 4      | 4132      | 826.4       | 2        | 19.7           | 0        | 16.6              |
|               |         |                | 4183      | 836.6       | 2        | 20.4           | 0        | 16.8              |
|               |         |                | 4233      | 846.6       | 2        | 20.0           | 0        | 16.4              |
|               |         | Subtest 5      | 4132      | 826.4       | 0        | 22.8           | 0        | 16.6              |
|               |         |                | 4183      | 836.6       | 0        | 23.0           | 0        | 16.9              |
|               |         |                | 4233      | 846.6       | 0        | 22.6           | 0        | 16.5              |
|               | DC-HSPA | Subtest 1      | 4132      | 826.4       | 0        | 22.7           | 0        | 16.6              |
|               |         |                | 4183      | 836.6       | 0        | 22.8           | 0        | 16.6              |
|               |         |                | 4233      | 846.6       | 0        | 22.5           | 0        | 16.5              |
|               |         | Subtest 2      | 4132      | 826.4       | 0        | 21.9           | 0        | 16.7              |
|               |         |                | 4183      | 836.6       | 0        | 22.2           | 0        | 16.8              |
|               |         |                | 4233      | 846.6       | 0        | 21.8           | 0        | 16.6              |
|               |         | Subtest 3      | 4132      | 826.4       | 0.5      | 21.3           | 0        | 16.7              |
|               |         |                | 4183      | 836.6       | 0.5      | 22.3           | 0        | 16.8              |
|               |         |                | 4233      | 846.6       | 0.5      | 21.8           | 0        | 16.6              |
|               |         | Subtest 4      | 4132      | 826.4       | 0.5      | 21.1           | 0        | 16.8              |
|               |         |                | 4183      | 836.6       | 0.5      | 21.4           | 0        | 16.7              |
|               |         |                | 4233      | 846.6       | 0.5      | 20.9           | 0        | 16.6              |

**W-CDMA Band II Measured Results**

| Band           | Mode    |                | UL Ch No. | Freq. (MHz) | MPR (dB) | Max. Pwr (dBm) | MPR (dB) | Reduced Pwr (dBm) |
|----------------|---------|----------------|-----------|-------------|----------|----------------|----------|-------------------|
| W-CDMA Band II | Rel 99  | RMC, 12.2 kbps | 9262      | 1852.4      | N/A      | 22.9           | N/A      | 15.9              |
|                |         |                | 9400      | 1880.0      | N/A      | 23.0           | N/A      | 16.0              |
|                |         |                | 9538      | 1907.6      | N/A      | 23.0           | N/A      | 16.0              |
|                | HSDPA   | Subtest 1      | 9262      | 1852.4      | 0        | 23.0           | 0        | 15.9              |
|                |         |                | 9400      | 1880.0      | 0        | 23.0           | 0        | 16.0              |
|                |         |                | 9538      | 1907.6      | 0        | 22.7           | 0        | 16.0              |
|                |         | Subtest 2      | 9262      | 1852.4      | 0        | 22.4           | 0        | 16.0              |
|                |         |                | 9400      | 1880.0      | 0        | 22.5           | 0        | 16.0              |
|                |         |                | 9538      | 1907.6      | 0        | 22.0           | 0        | 15.9              |
|                |         | Subtest 3      | 9262      | 1852.4      | 0.5      | 21.7           | 0        | 16.0              |
|                |         |                | 9400      | 1880.0      | 0.5      | 22.5           | 0        | 16.0              |
|                |         |                | 9538      | 1907.6      | 0.5      | 22.0           | 0        | 16.0              |
|                |         | Subtest 4      | 9262      | 1852.4      | 0.5      | 21.7           | 0        | 16.0              |
|                |         |                | 9400      | 1880.0      | 0.5      | 21.8           | 0        | 16.0              |
|                |         |                | 9538      | 1907.6      | 0.5      | 21.3           | 0        | 15.9              |
|                | HSUPA   | Subtest 1      | 9262      | 1852.4      | 0        | 22.0           | 0        | 15.2              |
|                |         |                | 9400      | 1880.0      | 0        | 22.6           | 0        | 15.4              |
|                |         |                | 9538      | 1907.6      | 0        | 22.1           | 0        | 15.2              |
|                |         | Subtest 2      | 9262      | 1852.4      | 2        | 20.5           | 0        | 15.8              |
|                |         |                | 9400      | 1880.0      | 2        | 20.7           | 0        | 15.8              |
|                |         |                | 9538      | 1907.6      | 2        | 20.3           | 0        | 15.7              |
|                |         | Subtest 3      | 9262      | 1852.4      | 1        | 21.0           | 0        | 15.9              |
|                |         |                | 9400      | 1880.0      | 1        | 21.6           | 0        | 16.0              |
|                |         |                | 9538      | 1907.6      | 1        | 21.1           | 0        | 15.8              |
|                |         | Subtest 4      | 9262      | 1852.4      | 2        | 20.0           | 0        | 15.7              |
|                |         |                | 9400      | 1880.0      | 2        | 20.7           | 0        | 15.8              |
|                |         |                | 9538      | 1907.6      | 2        | 20.2           | 0        | 15.6              |
|                |         | Subtest 5      | 9262      | 1852.4      | 0        | 23.0           | 0        | 16.0              |
|                |         |                | 9400      | 1880.0      | 0        | 23.0           | 0        | 16.0              |
|                |         |                | 9538      | 1907.6      | 0        | 22.6           | 0        | 16.0              |
|                | DC-HSPA | Subtest 1      | 9262      | 1852.4      | 0        | 23.0           | 0        | 16.0              |
|                |         |                | 9400      | 1880.0      | 0        | 23.0           | 0        | 16.0              |
|                |         |                | 9538      | 1907.6      | 0        | 22.7           | 0        | 16.0              |
|                |         | Subtest 2      | 9262      | 1852.4      | 0        | 22.4           | 0        | 16.0              |
|                |         |                | 9400      | 1880.0      | 0        | 22.6           | 0        | 16.0              |
|                |         |                | 9538      | 1907.6      | 0        | 22.1           | 0        | 15.9              |
|                |         | Subtest 3      | 9262      | 1852.4      | 0.5      | 21.7           | 0        | 15.9              |
|                |         |                | 9400      | 1880.0      | 0.5      | 22.5           | 0        | 16.0              |
|                |         |                | 9538      | 1907.6      | 0.5      | 22.0           | 0        | 15.9              |
|                |         | Subtest 4      | 9262      | 1852.4      | 0.5      | 21.5           | 0        | 15.8              |
|                |         |                | 9400      | 1880.0      | 0.5      | 21.7           | 0        | 15.9              |
|                |         |                | 9538      | 1907.6      | 0.5      | 21.2           | 0        | 15.7              |

### 9.3. LTE

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3**

| Modulation | Channel bandwidth / Transmission bandwidth (RB) |         |       |        |        |        | MPR (dB) |
|------------|-------------------------------------------------|---------|-------|--------|--------|--------|----------|
|            | 1.4 MHz                                         | 3.0 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |          |
| QPSK       | > 5                                             | > 4     | > 8   | > 12   | > 16   | > 18   | ≤ 1      |
| 16 QAM     | ≤ 5                                             | ≤ 4     | ≤ 8   | ≤ 12   | ≤ 16   | ≤ 18   | ≤ 1      |
| 64 QAM     | > 5                                             | > 4     | > 8   | > 12   | > 16   | > 18   | ≤ 2      |

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of "NS\_01".

**Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)**

| Network Signalling value | Requirements (sub-clause) | E-UTRA Band              | Channel bandwidth (MHz) | Resources Blocks ( $N_{RB}$ ) | A-MPR (dB)    |
|--------------------------|---------------------------|--------------------------|-------------------------|-------------------------------|---------------|
| NS_01                    | 6.6.2.1.1                 | Table 5.5-1              | 1.4, 3, 5, 10, 15, 20   | Table 5.6-1                   | NA            |
| NS_03                    | 6.6.2.2.1                 | 2, 4, 10, 23, 25, 35, 36 | 3                       | >5                            | ≤ 1           |
|                          |                           |                          | 5                       | >6                            | ≤ 1           |
|                          |                           |                          | 10                      | >6                            | ≤ 1           |
|                          |                           |                          | 15                      | >8                            | ≤ 1           |
|                          |                           |                          | 20                      | >10                           | ≤ 1           |
| NS_04                    | 6.6.2.2.2                 | 41                       | 5                       | >6                            | ≤ 1           |
|                          |                           |                          | 10, 15, 20              | See Table 6.2.4-4             |               |
| NS_05                    | 6.6.3.3.1                 | 1                        | 10,15,20                | ≥ 50                          | ≤ 1           |
| NS_06                    | 6.6.2.2.3                 | 12, 13, 14, 17           | 1.4, 3, 5, 10           | Table 5.6-1                   | n/a           |
| NS_07                    | 6.6.2.2.3                 | 13                       | 10                      | Table 6.2.4-2                 | Table 6.2.4-2 |
|                          | 6.6.3.3.2                 |                          |                         |                               |               |
| NS_08                    | 6.6.3.3.3                 | 19                       | 10, 15                  | > 44                          | ≤ 3           |
| NS_09                    | 6.6.3.3.4                 | 21                       | 10, 15                  | > 40                          | ≤ 1           |
|                          |                           |                          |                         | > 55                          | ≤ 2           |
| NS_10                    |                           | 20                       | 15, 20                  | Table 6.2.4-3                 | Table 6.2.4-3 |
| NS_11                    | 6.6.2.2.1                 | 23 <sup>1</sup>          | 1.4, 3, 5, 10           | Table 6.2.4-5                 | Table 6.2.4-5 |
| ..                       |                           |                          |                         |                               |               |
| NS_32                    | -                         | -                        | -                       | -                             | -             |

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

**LTE Band 41 Measured Results**

| Band        | BW (MHz) | Mode  | RB Allocation | RB offset | Target MPR | Avg Pwr (dBm) |          |            | Target MPR | Avg Pwr (dBm) |          |            |
|-------------|----------|-------|---------------|-----------|------------|---------------|----------|------------|------------|---------------|----------|------------|
|             |          |       |               |           |            | 2565 MHz      | 2593 MHz | 2645 MHz   |            | 2565 MHz      | 2593 MHz | 2645 MHz   |
| LTE Band 41 | 20       | QPSK  | 1             | 0         | 0          | 23.26         | 23.64    | 22.55      | 0          | 14.15         | 14.49    | 14.75      |
|             |          |       | 1             | 49        | 0          | 23.18         | 23.53    | 23.87      | 0          | 14.15         | 14.48    | 14.82      |
|             |          |       | 1             | 99        | 0          | 23.07         | 23.58    | 23.83      | 0          | 14.05         | 14.36    | 14.66      |
|             |          |       | 50            | 0         | 1          | 21.96         | 22.51    | 22.63      | 0          | 14.03         | 14.55    | 14.68      |
|             |          |       | 50            | 24        | 1          | 21.98         | 22.39    | 22.68      | 0          | 14.04         | 14.44    | 14.70      |
|             |          |       | 50            | 50        | 1          | 21.97         | 22.47    | 22.56      | 0          | 14.03         | 14.44    | 14.68      |
|             |          |       | 100           | 0         | 1          | 21.95         | 22.41    | 22.65      | 0          | 14.04         | 14.52    | 14.77      |
|             |          | 16QAM | 1             | 0         | 1          | 22.29         | 22.79    | 22.85      | 0          | 13.98         | 14.80    | 14.61      |
|             |          |       | 1             | 49        | 1          | 22.27         | 22.81    | 22.91      | 0          | 14.11         | 14.73    | 14.49      |
|             |          |       | 1             | 99        | 1          | 22.31         | 22.75    | 22.72      | 0          | 13.87         | 14.43    | 14.68      |
|             |          |       | 50            | 0         | 2          | 20.92         | 21.35    | 21.61      | 0          | 14.13         | 14.42    | 14.69      |
|             |          |       | 50            | 24        | 2          | 20.86         | 21.28    | 21.63      | 0          | 14.03         | 14.43    | 14.70      |
|             |          |       | 50            | 50        | 2          | 20.87         | 21.26    | 21.49      | 0          | 14.05         | 14.43    | 14.67      |
|             |          |       | 100           | 0         | 2          | 21.00         | 21.31    | 21.58      | 0          | 14.12         | 14.41    | 14.64      |
| Band        | BW (MHz) | Mode  | RB Allocation | RB offset | Target MPR | Avg Pwr (dBm) |          |            | Target MPR | Avg Pwr (dBm) |          |            |
|             |          |       |               |           |            | 2562.5 MHz    | 2593 MHz | 2647.5 MHz |            | 2562.5 MHz    | 2593 MHz | 2647.5 MHz |
| LTE Band 41 | 15       | QPSK  | 1             | 0         | 0          | 23.14         | 23.63    | 23.81      | 0          | 14.17         | 14.58    | 14.87      |
|             |          |       | 1             | 37        | 0          | 23.16         | 23.55    | 23.83      | 0          | 14.15         | 14.50    | 14.82      |
|             |          |       | 1             | 74        | 0          | 23.14         | 23.55    | 23.63      | 0          | 14.10         | 14.60    | 14.81      |
|             |          |       | 36            | 0         | 1          | 21.94         | 22.43    | 22.70      | 0          | 14.05         | 14.51    | 14.75      |
|             |          |       | 36            | 20        | 1          | 21.85         | 22.47    | 22.74      | 0          | 13.98         | 14.55    | 14.75      |
|             |          |       | 36            | 39        | 1          | 21.95         | 22.45    | 22.65      | 0          | 14.03         | 14.51    | 14.71      |
|             |          |       | 75            | 0         | 1          | 21.95         | 22.40    | 22.59      | 0          | 14.07         | 14.49    | 14.68      |
|             |          | 16QAM | 1             | 0         | 1          | 22.35         | 22.43    | 23.00      | 0          | 13.88         | 14.15    | 14.90      |
|             |          |       | 1             | 37        | 1          | 22.30         | 22.48    | 22.83      | 0          | 13.99         | 14.43    | 14.91      |
|             |          |       | 1             | 74        | 1          | 21.94         | 22.12    | 22.97      | 0          | 14.03         | 14.37    | 14.87      |
|             |          |       | 36            | 0         | 2          | 20.99         | 21.48    | 21.60      | 0          | 14.01         | 14.40    | 14.76      |
|             |          |       | 36            | 20        | 2          | 20.92         | 21.39    | 21.66      | 0          | 13.99         | 14.44    | 14.77      |
|             |          |       | 36            | 39        | 2          | 20.92         | 21.36    | 21.60      | 0          | 13.98         | 14.40    | 14.78      |
|             |          |       | 75            | 0         | 2          | 20.88         | 21.32    | 21.59      | 0          | 14.06         | 14.41    | 14.67      |
| Band        | BW (MHz) | Mode  | RB Allocation | RB offset | Target MPR | Avg Pwr (dBm) |          |            | Target MPR | Avg Pwr (dBm) |          |            |
|             |          |       |               |           |            | 2560 MHz      | 2593 MHz | 2650 MHz   |            | 2560 MHz      | 2593 MHz | 2650 MHz   |
| LTE Band 41 | 10       | QPSK  | 1             | 0         | 0          | 23.12         | 23.63    | 23.75      | 0          | 14.14         | 14.48    | 14.77      |
|             |          |       | 1             | 25        | 0          | 23.03         | 23.58    | 23.69      | 0          | 14.02         | 14.44    | 14.70      |
|             |          |       | 1             | 49        | 0          | 23.09         | 23.53    | 23.69      | 0          | 14.06         | 14.37    | 14.73      |
|             |          |       | 25            | 0         | 1          | 21.94         | 22.36    | 22.64      | 0          | 14.02         | 14.43    | 14.68      |
|             |          |       | 25            | 12        | 1          | 21.91         | 22.47    | 22.62      | 0          | 14.00         | 14.45    | 14.76      |
|             |          |       | 25            | 25        | 1          | 21.86         | 22.50    | 22.56      | 0          | 14.00         | 14.39    | 14.63      |
|             |          |       | 50            | 0         | 1          | 21.89         | 22.39    | 22.58      | 0          | 13.99         | 14.35    | 14.62      |
|             |          | 16QAM | 1             | 0         | 1          | 22.00         | 22.22    | 22.77      | 0          | 14.13         | 14.07    | 14.90      |
|             |          |       | 1             | 25        | 1          | 21.95         | 22.15    | 22.76      | 0          | 14.18         | 14.33    | 14.90      |
|             |          |       | 1             | 49        | 1          | 21.99         | 22.13    | 22.71      | 0          | 14.08         | 14.24    | 14.80      |
|             |          |       | 25            | 0         | 2          | 20.90         | 21.33    | 21.63      | 0          | 13.91         | 14.49    | 14.68      |
|             |          |       | 25            | 12        | 2          | 20.88         | 21.44    | 21.63      | 0          | 13.98         | 14.42    | 14.75      |
|             |          |       | 25            | 25        | 2          | 20.84         | 21.38    | 21.59      | 0          | 13.87         | 14.46    | 14.63      |
|             |          |       | 50            | 0         | 2          | 20.90         | 21.36    | 21.57      | 0          | 14.00         | 14.40    | 14.65      |

**LTE Band 41 Measured Results (continued)**

| Band           | BW<br>(MHz) | Mode  | RB<br>Allocation | RB<br>offset | Target<br>MPR | Avg Pwr (dBm) |          |            | Target<br>MPR | Avg Pwr (dBm) |          |            |
|----------------|-------------|-------|------------------|--------------|---------------|---------------|----------|------------|---------------|---------------|----------|------------|
|                |             |       |                  |              |               | 2557.5 MHz    | 2593 MHz | 2652.5 MHz |               | 2552.5 MHz    | 2593 MHz | 2652.5 MHz |
| LTE<br>Band 41 | 5           | QPSK  | 1                | 0            | 0             | 23.23         | 23.66    | 23.74      | 0             | 14.18         | 14.72    | 14.67      |
|                |             |       | 1                | 12           | 0             | 23.13         | 23.60    | 23.76      | 0             | 14.14         | 14.65    | 14.64      |
|                |             |       | 1                | 24           | 0             | 23.27         | 23.59    | 23.71      | 0             | 14.31         | 14.63    | 14.64      |
|                |             |       | 12               | 0            | 1             | 22.06         | 22.36    | 22.59      | 0             | 14.15         | 14.38    | 14.61      |
|                |             |       | 12               | 7            | 1             | 22.07         | 22.42    | 22.53      | 0             | 14.11         | 14.44    | 14.55      |
|                |             |       | 12               | 13           | 1             | 22.08         | 22.46    | 22.50      | 0             | 14.15         | 14.43    | 14.54      |
|                |             |       | 25               | 0            | 1             | 21.97         | 22.37    | 22.57      | 0             | 14.10         | 14.42    | 14.59      |
|                |             | 16QAM | 1                | 0            | 1             | 22.28         | 22.57    | 22.75      | 0             | 14.11         | 14.48    | 14.98      |
|                |             |       | 1                | 12           | 1             | 22.16         | 22.54    | 22.75      | 0             | 14.05         | 14.36    | 14.66      |
|                |             |       | 1                | 24           | 1             | 22.18         | 22.64    | 22.71      | 0             | 14.02         | 14.52    | 14.93      |
|                |             |       | 12               | 0            | 2             | 21.00         | 21.32    | 21.47      | 0             | 14.03         | 14.43    | 14.58      |
|                |             |       | 12               | 7            | 2             | 20.93         | 21.40    | 21.43      | 0             | 13.99         | 14.49    | 14.52      |
|                |             |       | 12               | 13           | 2             | 20.94         | 21.38    | 21.41      | 0             | 14.04         | 14.46    | 14.50      |
|                |             |       | 25               | 0            | 2             | 20.99         | 21.48    | 21.47      | 0             | 14.04         | 14.43    | 14.60      |

## 9.4. Wi-Fi 2.4GHz (DTS Band)

### SISO

| Antenna      | Band (GHz) | Mode           | Data Rate | Ch # | Freq. (MHz) | Max Pwr.      |                        |                   | Reduced Pwr.  |                        |                   |
|--------------|------------|----------------|-----------|------|-------------|---------------|------------------------|-------------------|---------------|------------------------|-------------------|
|              |            |                |           |      |             | Avg Pwr (dBm) | Max Output Power (dBm) | SAR Test (Yes/No) | Avg Pwr (dBm) | Max Output Power (dBm) | SAR Test (Yes/No) |
| SISO Chain 0 | 2.4        | 802.11b        | 1 Mbps    | 1    | 2412        | 16.0          | 16.5                   | Yes               | 11.0          | 11.5                   | Yes               |
|              |            |                |           | 6    | 2437        | 16.5          |                        |                   | 11.5          |                        |                   |
|              |            |                |           | 11   | 2462        | 16.5          |                        |                   | 11.0          |                        |                   |
|              |            | 802.11g        | 6 Mbps    | 1    | 2412        | Not Required  | 13.5                   | No                | 11.3          | 11.5                   | No                |
|              |            |                |           | 6    | 2437        |               |                        |                   | 11.0          |                        |                   |
|              |            |                |           | 11   | 2462        |               |                        |                   | 11.0          |                        |                   |
|              |            | 802.11n (HT20) | 6.5 Mbps  | 1    | 2412        | Not Required  | 13.5                   | No                | 11.1          | 11.5                   | No                |
|              |            |                |           | 6    | 2437        |               |                        |                   | 10.5          |                        |                   |
|              |            |                |           | 11   | 2462        |               |                        |                   | 11.3          |                        |                   |
| SISO Chain 1 | 2.4        | 802.11b        | 1 Mbps    | 1    | 2412        | 15.9          | 16.5                   | Yes               | 11.2          | 11.5                   | Yes               |
|              |            |                |           | 6    | 2437        | 16.5          |                        |                   | 11.5          |                        |                   |
|              |            |                |           | 11   | 2462        | 16.0          |                        |                   | 11.3          |                        |                   |
|              |            | 802.11g        | 6 Mbps    | 1    | 2412        | Not Required  | 13.5                   | No                | 10.5          | 11.5                   | No                |
|              |            |                |           | 6    | 2437        |               |                        |                   | 10.5          |                        |                   |
|              |            |                |           | 11   | 2462        |               |                        |                   | 10.7          |                        |                   |
|              |            | 802.11n (HT20) | 6.5 Mbps  | 1    | 2412        | Not Required  | 13.5                   | No                | 10.5          | 11.5                   | No                |
|              |            |                |           | 6    | 2437        |               |                        |                   | 10.3          |                        |                   |
|              |            |                |           | 11   | 2462        |               |                        |                   | 10.5          |                        |                   |

### MIMO

| Antenna      | Band (GHz) | Mode           | Data Rate | Ch # | Freq. (MHz) | Max Pwr.      |                        |                   | Reduced Pwr.  |                        |                   |
|--------------|------------|----------------|-----------|------|-------------|---------------|------------------------|-------------------|---------------|------------------------|-------------------|
|              |            |                |           |      |             | Avg Pwr (dBm) | Max Output Power (dBm) | SAR Test (Yes/No) | Avg Pwr (dBm) | Max Output Power (dBm) | SAR Test (Yes/No) |
| MIMO Chain 0 | 2.4        | 802.11n (HT20) | 6.5 Mbps  | 1    | 2412        | 13.2          | 13.5                   | Yes               | 10.9          | 11.5                   | Yes               |
|              |            |                |           | 6    | 2437        | 13.5          |                        |                   | 10.3          |                        |                   |
|              |            |                |           | 11   | 2462        | 13.2          |                        |                   | 11.3          |                        |                   |
| MIMO Chain 1 | 2.4        | 802.11n (HT20) | 6.5 Mbps  | 1    | 2412        | 13.1          | 13.5                   | Yes               | 10.4          | 11.5                   | Yes               |
|              |            |                |           | 6    | 2437        | 13.3          |                        |                   | 10.1          |                        |                   |
|              |            |                |           | 11   | 2462        | 12.6          |                        |                   | 11.0          |                        |                   |

### Note(s):

- Output Power and SAR is not required for 802.11g/n HT20 channels when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg.

## 9.5. Wi-Fi 5GHz (U-NII Bands)

### SISO Antenna 1

| Antenna       | Band<br>(GHz)     | Mode                | Data Rate | Ch #      | Freq.<br>(MHz) | Max Pwr.         |                           |                      | Reduce Pwr       |                           |                      |
|---------------|-------------------|---------------------|-----------|-----------|----------------|------------------|---------------------------|----------------------|------------------|---------------------------|----------------------|
|               |                   |                     |           |           |                | Avg Pwr<br>(dBm) | Max Output<br>Power (dBm) | SAR Test<br>(Yes/No) | Avg Pwr<br>(dBm) | Max Output<br>Power (dBm) | SAR Test<br>(Yes/No) |
| SISO<br>Ant 1 | 5.3<br>(U-NII 2A) | 802.11a             | 6 Mbps    | 52        | 5260           | 12.1             | 12.5                      | Yes                  | Not Required     | 7.5                       | No                   |
|               |                   |                     |           | 56        | 5280           | 12.4             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 60        | 5300           | 12.4             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 64        | 5320           | 12.4             |                           |                      |                  |                           |                      |
|               |                   | 802.11n<br>(HT20)   | 6.5 Mbps  | 52        | 5260           | 12.1             | 12.5                      | No                   |                  | 7.5                       | No                   |
|               |                   |                     |           | 56        | 5280           | 12.2             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 60        | 5300           | 12.1             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 64        | 5320           | 12.3             |                           |                      |                  |                           |                      |
|               |                   | 802.11n<br>(HT40)   | 13.5 Mbps | 54 ~ 62   | 5270 ~ 5310    | Not Required     | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT20) | 6.5 Mbps  | 52 ~ 64   | 5260 ~ 5320    |                  | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT40) | 13.5 Mbps | 54 ~ 62   | 5270 ~ 5310    |                  | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT80) | 29.3 Mbps | 58        | 5290           |                  | 10.5                      | No                   |                  | 7.5                       | 7.5                  |
|               | 5.5<br>(U-NII 2C) | 802.11a             | 6 Mbps    | 100       | 5500           | 12.0             | 12.5                      | Yes                  | Not Required     | 7.5                       | No                   |
|               |                   |                     |           | 104       | 5520           | 12.3             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 108       | 5540           | 12.4             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 112       | 5560           | 12.4             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 116       | 5580           | 12.5             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 132       | 5660           | 12.4             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 136       | 5680           | 12.4             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 140       | 5700           | 12.2             |                           |                      |                  |                           |                      |
|               |                   | 802.11n<br>(HT20)   | 6.5 Mbps  | 100       | 5500           | 12.1             | 12.5                      | No                   |                  | 7.5                       | No                   |
|               |                   |                     |           | 104       | 5520           | 12.4             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 108       | 5540           | 12.3             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 112       | 5560           | 12.5             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 116       | 5580           | 12.2             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 132       | 5660           | 12.2             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 136       | 5680           | 12.3             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 140       | 5700           | 12.2             |                           |                      |                  |                           |                      |
|               |                   | 802.11n<br>(HT40)   | 13.5 Mbps | 102 ~ 134 | 5510 ~ 5670    | Not Required     | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT20) | 6.5 Mbps  | 100 ~ 140 | 5500 ~ 5700    |                  | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT40) | 13.5 Mbps | 102 ~ 134 | 5510 ~ 5670    |                  | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT80) | 29.3 Mbps | 106       | 5530           |                  | 10.5                      | No                   |                  | 7.5                       | 7.5                  |
|               | 5.8<br>(U-NII 3)  | 802.11a             | 6 Mbps    | 149       | 5745           | 12.3             | 12.5                      | Yes                  | Not Required     | 7.5                       | No                   |
|               |                   |                     |           | 153       | 5765           | 12.4             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 157       | 5785           | 12.5             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 161       | 5805           | 12.4             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 165       | 5825           | 12.2             |                           |                      |                  |                           |                      |
|               |                   | 802.11n<br>(HT20)   | 6.5 Mbps  | 149       | 5745           | 12.2             | 12.5                      | No                   |                  | 7.5                       | No                   |
|               |                   |                     |           | 153       | 5765           | 12.3             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 157       | 5785           | 12.4             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 161       | 5805           | 12.3             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 165       | 5825           | 12.4             |                           |                      |                  |                           |                      |
|               |                   | 802.11n<br>(HT40)   | 13.5 Mbps | 151 ~ 159 | 5755 ~ 5795    | Not Required     | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT20) | 6.5 Mbps  | 149 ~ 165 | 5745 ~ 5825    |                  | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT40) | 13.5 Mbps | 151 ~ 159 | 5755 ~ 5795    |                  | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT80) | 29.3 Mbps | 155       | 5775           |                  | 10.5                      | No                   |                  | 7.3                       | 7.5                  |

**SISO Antenna 2**

| Antenna       | Band<br>(GHz)     | Mode                | Data Rate | Ch #              | Freq.<br>(MHz) | Max Pwr.         |                           |                      | Reduce Pwr       |                           |                      |
|---------------|-------------------|---------------------|-----------|-------------------|----------------|------------------|---------------------------|----------------------|------------------|---------------------------|----------------------|
|               |                   |                     |           |                   |                | Avg Pwr<br>(dBm) | Max Output<br>Power (dBm) | SAR Test<br>(Yes/No) | Avg Pwr<br>(dBm) | Max Output<br>Power (dBm) | SAR Test<br>(Yes/No) |
| SISO<br>Ant 1 | 5.3<br>(U-NII 2A) | 802.11a             | 6 Mbps    | 52                | 5260           | 12.1             | 12.5                      | Yes                  | Not Required     | 7.5                       | No                   |
|               |                   |                     |           | 56                | 5280           | 12.3             | 12.5                      |                      |                  |                           |                      |
|               |                   |                     |           | 60                | 5300           | 12.4             | 12.5                      |                      |                  |                           |                      |
|               |                   |                     |           | 64                | 5320           | 12.4             | 12.5                      |                      |                  |                           |                      |
|               |                   | 802.11n<br>(HT20)   | 6.5 Mbps  | 52                | 5260           | 12.1             | 12.5                      | No                   |                  | 7.5                       | No                   |
|               |                   |                     |           | 56                | 5280           | 12.1             | 12.5                      |                      |                  |                           |                      |
|               |                   |                     |           | 60                | 5300           | 12.0             | 12.5                      |                      |                  |                           |                      |
|               |                   |                     |           | 64                | 5320           | 12.0             | 12.5                      |                      |                  |                           |                      |
|               |                   | 802.11n<br>(HT40)   | 13.5 Mbps | 54 ~ 62           | 5270 ~ 5310    | Not Required     | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT20) | 6.5 Mbps  | 52 ~ 64           | 5260 ~ 5320    |                  | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT40) | 13.5 Mbps | 54 ~ 62           | 5270 ~ 5310    |                  | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT80) | 29.3 Mbps | 58                | 5290           |                  | 10.5                      | No                   |                  | 7.5                       | 7.5                  |
|               | 5.5<br>(U-NII 2C) | 802.11a             | 6 Mbps    | 100               | 5500           | 12.3             | 12.5                      | Yes                  | Not Required     | 7.5                       | No                   |
|               |                   |                     |           | 104               | 5520           | 12.4             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 108               | 5540           | 12.3             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 112               | 5560           | 12.3             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 116               | 5580           | 12.5             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 132               | 5660           | 12.5             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 136               | 5680           | 12.3             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 140               | 5700           | 12.3             |                           |                      |                  |                           |                      |
|               |                   | 802.11n<br>(HT20)   | 6.5 Mbps  | 100               | 5500           | 12.2             | 12.5                      | No                   |                  | 7.5                       | No                   |
|               |                   |                     |           | 104               | 5520           | 12.0             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 108               | 5540           | 12.0             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 112               | 5560           | 12.1             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 116               | 5580           | 12.3             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 132               | 5660           | 12.2             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 136               | 5680           | 12.4             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 140               | 5700           | 12.2             |                           |                      |                  |                           |                      |
|               |                   | 802.11n<br>(HT40)   | 13.5 Mbps | 102 ~ 134         | 5510 ~ 5670    | Not Required     | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT20) | 6.5 Mbps  | 100 ~ 140         | 5500 ~ 5700    |                  | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT40) | 13.5 Mbps | 102 ~ 134         | 5510 ~ 5670    |                  | 11.5                      | No                   |                  | 7.5                       | No                   |
|               |                   | 802.11ac<br>(VHT80) | 29.3 Mbps | 106               | 5530           |                  | 10.5                      | No                   |                  | 7.5                       | 7.5                  |
|               | 5.8<br>(U-NII 3)  | 802.11a             | 6 Mbps    | 149               | 5745           | 12.4             | 12.5                      | Yes                  | Not Required     | 7.5                       | No                   |
|               |                   |                     |           | 153               | 5765           | 12.5             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 157               | 5785           | 12.5             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 161               | 5805           | 12.4             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 165               | 5825           | 12.2             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 149               | 5745           | 12.1             |                           |                      |                  |                           |                      |
|               |                   | 802.11n<br>(HT20)   | 6.5 Mbps  | 153               | 5765           | 12.2             | 12.5                      | No                   |                  | 7.5                       | No                   |
|               |                   |                     |           | 157               | 5785           | 12.1             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 161               | 5805           | 12.1             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 165               | 5825           | 12.2             |                           |                      |                  |                           |                      |
|               |                   |                     |           | 802.11n<br>(HT40) | 13.5 Mbps      | 151 ~ 159        |                           |                      |                  |                           |                      |
|               |                   | 802.11ac<br>(VHT20) | 6.5 Mbps  | 149 ~ 165         | 5745 ~ 5825    | 11.5             | No                        | 7.5                  |                  | No                        |                      |
|               |                   | 802.11ac<br>(VHT40) | 13.5 Mbps | 151 ~ 159         | 5755 ~ 5795    | 11.5             | No                        | 7.5                  |                  | No                        |                      |
|               |                   | 802.11ac<br>(VHT80) | 29.3 Mbps | 155               | 5775           | 10.5             | No                        | 7.5                  |                  | 7.5                       | Yes                  |

**MIMO Antenna 1**

| Antenna    | Band (GHz)     | Mode             | Data Rate | Ch #      | Freq. (MHz) | Max Pwr.      |                        |                   | Reduce Pwr    |                        |                   |
|------------|----------------|------------------|-----------|-----------|-------------|---------------|------------------------|-------------------|---------------|------------------------|-------------------|
|            |                |                  |           |           |             | Avg Pwr (dBm) | Max Output Power (dBm) | SAR Test (Yes/No) | Avg Pwr (dBm) | Max Output Power (dBm) | SAR Test (Yes/No) |
| MIMO Ant 1 | 5.3 (U-NII 2A) | 802.11n (HT20)   | 6.5 Mbps  | 52        | 5260        | 12.3          | 12.5                   | Yes               | Not Required  | 7.5                    | No                |
|            |                |                  |           | 56        | 5280        | 12.1          | 12.5                   |                   |               |                        |                   |
|            |                |                  |           | 60        | 5300        | 12.2          | 12.5                   |                   |               |                        |                   |
|            |                |                  |           | 64        | 5320        | 12.2          | 12.5                   |                   |               |                        |                   |
|            |                | 802.11n (HT40)   | 13.5 Mbps | 54 ~ 62   | 5270 ~ 5310 | Not Required  | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT20) | 6.5 Mbps  | 52 ~ 64   | 5260 ~ 5320 |               | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT40) | 13.5 Mbps | 54 ~ 62   | 5270 ~ 5310 |               | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT80) | 29.3 Mbps | 58        | 5290        |               | 10.5                   | No                | 7.0           | 7.5                    | Yes               |
|            | 5.5 (U-NII 2C) | 802.11n (HT20)   | 6.5 Mbps  | 100       | 5500        | 12.5          | 12.5                   | Yes               | Not Required  | 7.5                    | No                |
|            |                |                  |           | 104       | 5520        | 12.3          |                        |                   |               |                        |                   |
|            |                |                  |           | 108       | 5540        | 12.4          |                        |                   |               |                        |                   |
|            |                |                  |           | 112       | 5560        | 12.2          |                        |                   |               |                        |                   |
|            |                |                  |           | 116       | 5580        | 12.1          |                        |                   |               |                        |                   |
|            |                |                  |           | 132       | 5660        | 12.2          |                        |                   |               |                        |                   |
|            |                |                  |           | 136       | 5680        | 12.1          |                        |                   |               |                        |                   |
|            |                |                  |           | 140       | 5700        | 12.2          |                        |                   |               |                        |                   |
|            |                | 802.11n (HT40)   | 13.5 Mbps | 102 ~ 134 | 5510 ~ 5670 | Not Required  | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT20) | 6.5 Mbps  | 100 ~ 140 | 5500 ~ 5700 |               | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT40) | 13.5 Mbps | 102 ~ 134 | 5510 ~ 5670 |               | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT80) | 29.3 Mbps | 106       | 5530        |               | 10.5                   | No                | 7.3           | 7.5                    | Yes               |
|            | 5.8 (U-NII 3)  | 802.11n (HT20)   | 6.5 Mbps  | 149       | 5745        | 12.1          | 12.5                   | Yes               | Not Required  | 7.5                    | No                |
|            |                |                  |           | 153       | 5765        | 12.1          |                        |                   |               |                        |                   |
|            |                |                  |           | 157       | 5785        | 12.1          |                        |                   |               |                        |                   |
|            |                |                  |           | 161       | 5805        | 12.2          |                        |                   |               |                        |                   |
|            |                |                  |           | 165       | 5825        | 12.2          |                        |                   |               |                        |                   |
|            |                | 802.11n (HT40)   | 13.5 Mbps | 151 ~ 159 | 5755 ~ 5795 | Not Required  | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT20) | 6.5 Mbps  | 149 ~ 165 | 5745 ~ 5825 |               | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT40) | 13.5 Mbps | 151 ~ 159 | 5755 ~ 5795 |               | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT80) | 29.3 Mbps | 155       | 5775        |               | 10.5                   | No                | 7.5           | 7.5                    | Yes               |

**MIMO Antenna 2**

| Antenna    | Band (GHz)     | Mode             | Data Rate | Ch #      | Freq. (MHz) | Max Pwr.      |                        |                   | Reduce Pwr    |                        |                   |
|------------|----------------|------------------|-----------|-----------|-------------|---------------|------------------------|-------------------|---------------|------------------------|-------------------|
|            |                |                  |           |           |             | Avg Pwr (dBm) | Max Output Power (dBm) | SAR Test (Yes/No) | Avg Pwr (dBm) | Max Output Power (dBm) | SAR Test (Yes/No) |
| MIMO Ant 2 | 5.3 (U-NII 2A) | 802.11n (HT20)   | 6.5 Mbps  | 52        | 5260        | 12.3          | 12.5                   | Yes               | Not Required  | 7.5                    | No                |
|            |                |                  |           | 56        | 5280        | 12.1          | 12.5                   |                   |               |                        |                   |
|            |                |                  |           | 60        | 5300        | 12.4          | 12.5                   |                   |               |                        |                   |
|            |                |                  |           | 64        | 5320        | 12.2          | 12.5                   |                   |               |                        |                   |
|            |                | 802.11n (HT40)   | 13.5 Mbps | 54 ~ 62   | 5270 ~ 5310 | Not Required  | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT20) | 6.5 Mbps  | 52 ~ 64   | 5260 ~ 5320 |               | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT40) | 13.5 Mbps | 54 ~ 62   | 5270 ~ 5310 |               | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT80) | 29.3 Mbps | 58        | 5290        |               | 10.5                   | No                | 5.6           | 7.5                    | Yes               |
|            | 5.5 (U-NII 2C) | 802.11n (HT20)   | 6.5 Mbps  | 100       | 5500        | 12.4          | 12.5                   | Yes               | Not Required  | 7.5                    | No                |
|            |                |                  |           | 104       | 5520        | 12.2          |                        |                   |               |                        |                   |
|            |                |                  |           | 108       | 5540        | 12.1          |                        |                   |               |                        |                   |
|            |                |                  |           | 112       | 5560        | 12.2          |                        |                   |               |                        |                   |
|            |                |                  |           | 116       | 5580        | 12.2          |                        |                   |               |                        |                   |
|            |                |                  |           | 132       | 5660        | 12.4          |                        |                   |               |                        |                   |
|            |                |                  |           | 136       | 5680        | 12.2          |                        |                   |               |                        |                   |
|            |                |                  |           | 140       | 5700        | 12.1          |                        |                   |               |                        |                   |
|            |                | 802.11n (HT40)   | 13.5 Mbps | 102 ~ 134 | 5510 ~ 5670 | Not Required  | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT20) | 6.5 Mbps  | 100 ~ 140 | 5500 ~ 5700 |               | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT40) | 13.5 Mbps | 102 ~ 134 | 5510 ~ 5670 |               | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT80) | 29.3 Mbps | 106       | 5530        |               | 10.5                   | No                | 6.5           | 7.5                    | Yes               |
|            | 5.8 (U-NII 3)  | 802.11n (HT20)   | 6.5 Mbps  | 149       | 5745        | 12.2          | 12.5                   | Yes               | Not Required  | 7.5                    | No                |
|            |                |                  |           | 153       | 5765        | 12.1          |                        |                   |               |                        |                   |
|            |                |                  |           | 157       | 5785        | 12.1          |                        |                   |               |                        |                   |
|            |                |                  |           | 161       | 5805        | 12.1          |                        |                   |               |                        |                   |
|            |                |                  |           | 165       | 5825        | 12.3          |                        |                   |               |                        |                   |
|            |                | 802.11n (HT40)   | 13.5 Mbps | 151 ~ 159 | 5755 ~ 5795 | Not Required  | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT20) | 6.5 Mbps  | 149 ~ 165 | 5745 ~ 5825 |               | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT40) | 13.5 Mbps | 151 ~ 159 | 5755 ~ 5795 |               | 11.5                   | No                |               | 7.5                    | No                |
|            |                | 802.11ac (VHT80) | 29.3 Mbps | 155       | 5775        |               | 10.5                   | No                | 6.7           | 7.5                    | Yes               |

**Note(s):**

- Output Power and SAR measurement is not required for 802.11n/ac (V)HT20/(V)HT40/VHT80 channels when the specified tune-up tolerances for 802.11n/ac (V)HT20/(V)HT40/VHT80 are lower than 802.11a by more than ½ dB and the measured SAR is  $\leq 1.2$  W/Kg.
- When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n then ac) is selected.
- When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest reported SAR for UNII band 2A is
  - $\leq 1.2$  W/kg, SAR is not required for UNII band I
  - $> 1.2$  W/kg, both bands should be tested independently for SAR.

## 9.6. Bluetooth

| Band (GHz) | Mode                      | Ch # | Freq. (MHz) | Avg Pwr (dBm) | Avg Pwr (mW) |
|------------|---------------------------|------|-------------|---------------|--------------|
| 2.4        | V3.0 + BDR, GFSK          | 0    | 2402        | 7.67          | 5.85         |
|            |                           | 39   | 2441        | 9.70          | 9.33         |
|            |                           | 78   | 2480        | 7.69          | 5.88         |
|            | V3.0 + EDR, $\pi/4$ DQPSK | 0    | 2402        | 4.14          | 2.59         |
|            |                           | 39   | 2441        | 5.61          | 3.64         |
|            |                           | 78   | 2480        | 3.28          | 2.13         |
|            | V3.0 + EDR, 8-DPSK        | 0    | 2402        | 4.25          | 2.66         |
|            |                           | 39   | 2441        | 5.74          | 3.75         |
|            |                           | 78   | 2480        | 3.48          | 2.23         |
|            | V4.0 LE, GFSK             | 0    | 2402        | 2.44          | 1.75         |
|            |                           | 19   | 2440        | 4.87          | 3.07         |
|            |                           | 39   | 2480        | 3.52          | 2.25         |

## 10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

### KDB 447498 D01 General RF Exposure Guidance:

Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

- $\leq 0.8$  W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz
- $\leq 0.6$  W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
- $\leq 0.4$  W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  MHz

### KDB 648474 D04 Handset SAR:

With headset attached, when the reported SAR for body-worn accessory, measured without a headset connected to the handset, is  $> 1.2$  W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

The normal tablet procedures in KDB 616217 are required when the over diagonal dimension of the device is  $> 20.0$  cm. Hotspot mode SAR is not required when normal tablet procedures are applied. Extremity 10-g SAR is also not required for the front (top) surface of large form factor full size tablets. The more conservative tablet SAR results can be used to support the 10-g extremity SAR for phablet mode.

### KDB 941225 D01 SAR test for 3G devices:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is  $\leq \frac{1}{4}$  dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is  $\leq 1.2$  W/kg, SAR measurement is not required for the secondary mode

### KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
- When the reported SAR is  $> 0.8$  W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
- Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are  $> 0.8$  W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation  $< 1.45$  W/kg.
- Testing for 16-QAM modulation is not required because the reported SAR for QPSK is  $< 1.45$  W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
- Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is  $< 1.45$  W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

### KDB 248227 D01 SAR meas for 802.11 v02:

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

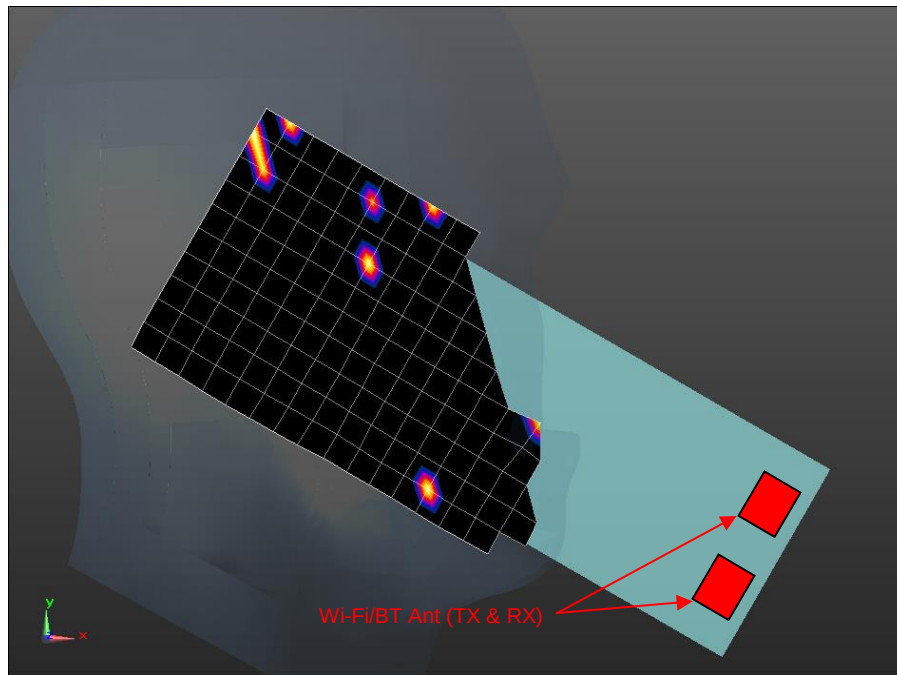
The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the initial test position(s) by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The initial test position(s) is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the reported SAR for the initial test position is:

- $\leq 0.4$  W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- $> 0.4$  W/kg, SAR is repeated using the same wireless mode test configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the reported SAR is  $\leq 0.8$  W/kg or all required test positions are tested.
  - For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
  - When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is  $> 0.8$  W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is  $\leq 1.2$  W/kg or all required test channels are considered.
  - The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.
- When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is  $\leq 1.2$  W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.
- When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is  $\leq 1.2$  W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.

To determine the initial test position, Area Scans were performed to determine the position with the *Maximum Value of SAR (measured)*. The position that produced the highest *Maximum Value of SAR* is considered the worst case position; thus used as the initial test position.

**Justification for using Flat Phantom Measuring Head SAR**

Due to the EUT with antenna located near the bottom and lower side edges near the mouth and jaw regions. The following head SAR plot is provided to show the measurements with truncated SAR distributions in the head measured with the SAM Phantom.



The following procedure was applied (KDB 648474 D04 Handset SAR):

- The phone was positioned with a separation distance of <4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell.
- While maintaining this distance at the ERP location of the phone, the low (bottom) edge of the phone is lowered from the phantom to establish the same separation distance at the peak SAR location identified by the truncated partial SAR distribution measured with the SAM phantom.
- The distance from the peak SAR location to the phone should be determined by the straight line passing perpendicularly through the phantom surface.

**10.1. GSM850**

| RF Exposure Conditions | Mode         | Pwr Back Off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Power (dBm)   |       | 1-g SAR (W/kg) |        | Plot No. |
|------------------------|--------------|--------------|------------|---------------|-------|-------------|---------------|-------|----------------|--------|----------|
|                        |              |              |            |               |       |             | Tune-up limit | Meas. | Meas.          | Scaled |          |
| Head                   | Voice        | On           | 0          | Left Touch    | 190   | 836.6       | 26.5          | 26.1  | 0.210          | 0.230  |          |
|                        |              |              |            | Left Tilt     | 190   | 836.6       | 26.5          | 26.1  | 0.194          | 0.213  |          |
|                        |              |              |            | Right Touch   | 190   | 836.6       | 26.5          | 26.1  | 0.236          | 0.259  |          |
|                        |              |              |            | Right Tilt    | 190   | 836.6       | 26.5          | 26.1  | 0.203          | 0.223  |          |
| Head VoIP              | GPRS 2 Slots | On           | 0          | Left Touch    | 190   | 836.6       | 24.5          | 24.0  | 0.258          | 0.289  |          |
|                        |              |              |            | Left Tilt     | 190   | 836.6       | 24.5          | 24.0  | 0.245          | 0.275  |          |
|                        |              |              |            | Right Touch   | 190   | 836.6       | 24.5          | 24.0  | 0.283          | 0.318  | 1        |
|                        |              |              |            | Right Tilt    | 190   | 836.6       | 24.5          | 24.0  | 0.278          | 0.312  |          |
| Body                   | GPRS 2 Slots | On           | 0          | Rear          | 190   | 836.6       | 24.5          | 24.0  | 0.599          | 0.672  |          |
|                        |              |              |            | Edge 1        | 128   | 824.2       | 24.5          | 24.1  | 0.895          | 0.981  | 2        |
|                        |              |              |            |               | 190   | 836.6       | 24.5          | 24.0  | 0.867          | 0.973  |          |
|                        |              |              |            |               | 251   | 848.8       | 24.5          | 24.2  | 0.795          | 0.852  |          |
|                        | GPRS 3 Slots | Off          | 14         | Rear          | 190   | 836.6       | 29.5          | 29.0  | 0.389          | 0.436  |          |
|                        |              |              | 14         | Edge 1        | 190   | 836.6       | 29.5          | 29.0  | 0.467          | 0.524  |          |
|                        |              |              | 0          | Edge 2        | 190   | 836.6       | 29.5          | 29.0  | 0.077          | 0.087  |          |
|                        |              |              | 0          | Edge 4        | 190   | 836.6       | 29.5          | 29.0  | 0.335          | 0.376  |          |

**10.2. GSM1900**

| RF Exposure Conditions | Mode         | Pwr Back Off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Power (dBm)   |       | 1-g SAR (W/kg) |        | Plot No. |
|------------------------|--------------|--------------|------------|---------------|-------|-------------|---------------|-------|----------------|--------|----------|
|                        |              |              |            |               |       |             | Tune-up limit | Meas. | Meas.          | Scaled |          |
| Head                   | Voice        | On           | 0          | Left Touch    | 661   | 1880.0      | 25.0          | 24.4  | 0.225          | 0.258  |          |
|                        |              |              |            | Left Tilt     | 661   | 1880.0      | 25.0          | 24.4  | 0.260          | 0.299  |          |
|                        |              |              |            | Right Touch   | 661   | 1880.0      | 25.0          | 24.4  | 0.404          | 0.464  |          |
|                        |              |              |            | Right Tilt    | 661   | 1880.0      | 25.0          | 24.4  | 0.388          | 0.445  |          |
| Head VoIP              | GPRS 2 Slots | On           | 0          | Left Touch    | 661   | 1880.0      | 23.0          | 22.3  | 0.271          | 0.318  |          |
|                        |              |              |            | Left Tilt     | 661   | 1880.0      | 23.0          | 22.3  | 0.324          | 0.381  |          |
|                        |              |              |            | Right Touch   | 661   | 1880.0      | 23.0          | 22.3  | 0.485          | 0.570  | 3        |
|                        |              |              |            | Right Tilt    | 661   | 1880.0      | 23.0          | 22.3  | 0.470          | 0.552  |          |
| Body                   | GPRS 2 Slots | On           | 0          | Rear          | 661   | 1880.0      | 23.0          | 22.3  | 0.598          | 0.703  |          |
|                        |              |              |            | Edge 1        | 661   | 1880.0      | 23.0          | 22.3  | 0.671          | 0.788  |          |
|                        | GPRS 3 Slots | Off          | 14         | Rear          | 661   | 1880.0      | 26.7          | 26.2  | 0.252          | 0.283  |          |
|                        |              |              | 14         | Edge 1        | 661   | 1880.0      | 26.7          | 26.2  | 0.453          | 0.508  |          |
|                        |              |              | 0          | Edge 2        | 661   | 1880.0      | 26.7          | 26.2  | 0.090          | 0.101  |          |
|                        |              |              | 0          | Edge 4        | 512   | 1850.2      | 26.7          | 26.0  | 0.798          | 0.938  |          |
|                        |              |              |            |               | 661   | 1880.0      | 26.7          | 26.2  | 0.887          | 0.995  |          |
|                        |              |              |            |               | 810   | 1909.8      | 26.7          | 26.3  | 0.942          | 1.033  | 4        |

**10.3. W-CDMA Band V**

| RF Exposure Conditions | Mode       | Pwr back Off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Power (dBm)   |       | 1-g SAR (W/kg) |        | Plot No. |
|------------------------|------------|--------------|------------|---------------|-------|-------------|---------------|-------|----------------|--------|----------|
|                        |            |              |            |               |       |             | Tune-up limit | Meas. | Meas.          | Scaled |          |
| Head                   | Rel 99 RMC | On           | 0          | Left Touch    | 4183  | 836.6       | 17.0          | 16.7  | 0.164          | 0.176  | 5        |
|                        |            |              |            | Left Tilt     | 4183  | 836.6       | 17.0          | 16.7  | 0.138          | 0.148  |          |
|                        |            |              |            | Right Touch   | 4183  | 836.6       | 17.0          | 16.7  | 0.186          | 0.199  |          |
|                        |            |              |            | Right Tilt    | 4183  | 836.6       | 17.0          | 16.7  | 0.172          | 0.184  |          |
| Body                   | Rel 99 RMC | On           | 0          | Rear          | 4183  | 836.6       | 17.0          | 16.7  | 0.410          | 0.439  | 6        |
|                        |            |              |            | Edge 1        | 4183  | 836.6       | 17.0          | 16.7  | 0.551          | 0.590  |          |
|                        |            | Off          | 14         | Rear          | 4183  | 836.6       | 23.0          | 22.6  | 0.186          | 0.204  |          |
|                        |            |              | 14         | Edge 1        | 4183  | 836.6       | 23.0          | 22.6  | 0.204          | 0.224  |          |
|                        |            |              | 0          | Edge 2        | 4183  | 836.6       | 23.0          | 22.6  | 0.036          | 0.040  |          |
|                        |            |              | 0          | Edge 4        | 4183  | 836.6       | 23.0          | 22.6  | 0.305          | 0.334  |          |

**10.4. W-CDMA Band II**

| RF Exposure Conditions | Mode       | Pwr Back Off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Power (dBm)   |       | 1-g SAR (W/kg) |        | Plot No. |
|------------------------|------------|--------------|------------|---------------|-------|-------------|---------------|-------|----------------|--------|----------|
|                        |            |              |            |               |       |             | Tune-up limit | Meas. | Meas.          | Scaled |          |
| Head                   | Rel 99 RMC | On           | 0          | Left Touch    | 9400  | 1880.0      | 16.0          | 16.0  | 0.263          | 0.263  | 7        |
|                        |            |              |            | Left Tilt     | 9400  | 1880.0      | 16.0          | 16.0  | 0.301          | 0.301  |          |
|                        |            |              |            | Right Touch   | 9400  | 1880.0      | 16.0          | 16.0  | 0.468          | 0.468  |          |
|                        |            |              |            | Right Tilt    | 9400  | 1880.0      | 16.0          | 16.0  | 0.464          | 0.464  |          |
| Body                   | Rel 99 RMC | On           | 0          | Rear          | 9400  | 1880.0      | 16.0          | 16.0  | 0.659          | 0.659  |          |
|                        |            |              |            | Edge 1        | 9400  | 1880.0      | 16.0          | 16.0  | 0.670          | 0.670  |          |
|                        |            | Off          | 14         | Rear          | 9400  | 1880.0      | 23.0          | 23.0  | 0.326          | 0.326  |          |
|                        |            |              | 14         | Edge 1        | 9400  | 1880.0      | 23.0          | 23.0  | 0.584          | 0.584  |          |
|                        |            |              | 0          | Edge 2        | 9400  | 1880.0      | 23.0          | 23.0  | 0.113          | 0.113  |          |
|                        |            |              | 0          | Edge 4        | 9262  | 1852.4      | 23.0          | 22.9  | 0.866          | 0.886  |          |
|                        |            |              |            |               | 9400  | 1880.0      | 23.0          | 23.0  | 0.989          | 0.989  |          |
|                        |            |              |            |               | 9538  | 1907.6      | 23.0          | 23.0  | 1.080          | 1.080  |          |

**10.5. LTE Band 41 (20MHz Bandwidth)**

| RF Exposure Conditions | Mode | Pwr Back Off | Dist. (mm) | Test Position    | Ch #. | Freq. (MHz) | RB Allocation | RB offset | Power (dBm)   |       | 1-g SAR (W/kg) |        | Plot No. |
|------------------------|------|--------------|------------|------------------|-------|-------------|---------------|-----------|---------------|-------|----------------|--------|----------|
|                        |      |              |            |                  |       |             |               |           | Tune-up limit | Meas. | Meas.          | Scaled |          |
| Head                   | QPSK | On           | 0          | Left Touch       | 40620 | 2593.0      | 1             | 0         | 15.0          | 14.5  | 0.240          | 0.270  | 9        |
|                        |      |              |            |                  |       |             | 50            | 0         | 15.0          | 14.6  | 0.246          | 0.273  |          |
|                        |      |              |            | Left Tilt (15°)  | 40620 | 2593.0      | 1             | 0         | 15.0          | 14.5  | 0.150          | 0.169  |          |
|                        |      |              |            |                  |       |             | 50            | 0         | 15.0          | 14.6  | 0.155          | 0.172  |          |
|                        |      |              |            | Right Touch      | 40620 | 2593.0      | 1             | 0         | 15.0          | 14.5  | 0.039          | 0.044  |          |
|                        |      |              |            |                  |       |             | 50            | 0         | 15.0          | 14.6  | 0.038          | 0.042  |          |
|                        |      |              |            | Right Tilt (15°) | 40620 | 2593.0      | 1             | 0         | 15.0          | 14.5  | 0.042          | 0.048  |          |
|                        |      |              |            |                  |       |             | 50            | 0         | 15.0          | 14.6  | 0.045          | 0.050  |          |
| Body                   | QPSK | On           | 0          | Rear             | 40340 | 2565.0      | 1             | 0         | 15.0          | 14.2  | 0.878          | 1.068  | 10       |
|                        |      |              |            |                  |       |             | 50            | 0         | 15.0          | 14.0  | 0.878          | 1.098  |          |
|                        |      |              |            |                  |       |             | 100           | 0         | 15.0          | 14.0  | 0.869          | 1.084  |          |
|                        |      |              |            |                  | 40620 | 2593.0      | 1             | 0         | 15.0          | 14.5  | 0.863          | 0.971  |          |
|                        |      |              |            |                  |       |             | 50            | 0         | 15.0          | 14.6  | 0.762          | 0.845  |          |
|                        |      |              |            |                  |       |             | 100           | 0         | 15.0          | 14.5  | 0.914          | 1.021  |          |
|                        |      |              |            |                  | 41140 | 2645.0      | 1             | 0         | 15.0          | 14.8  | 0.785          | 0.832  |          |
|                        |      |              |            |                  |       |             | 50            | 0         | 15.0          | 14.7  | 0.841          | 0.905  |          |
|                        |      |              |            |                  |       |             | 100           | 0         | 15.0          | 14.8  | 0.822          | 0.867  |          |
|                        | QPSK | On           | 0          | Edge 1           | 40620 | 2593.0      | 1             | 0         | 15.0          | 14.5  | 0.176          | 0.198  |          |
|                        |      |              |            |                  |       |             | 50            | 0         | 15.0          | 14.6  | 0.188          | 0.209  |          |
|                        | QPSK | Off          | 14         | Rear             | 40620 | 2593.0      | 1             | 0         | 24.0          | 23.6  | 0.274          | 0.298  |          |
|                        |      |              |            |                  |       |             | 50            | 0         | 23.0          | 22.5  | 0.223          | 0.250  |          |
|                        | QPSK | Off          | 14         | Edge 1           | 40620 | 2593.0      | 1             | 0         | 24.0          | 23.6  | 0.060          | 0.065  |          |
|                        |      |              |            |                  |       |             | 50            | 0         | 23.0          | 22.5  | 0.046          | 0.052  |          |
|                        |      |              | 0          | Edge 2           | 40620 | 2593.0      | 1             | 0         | 24.0          | 23.6  | 0.624          | 0.678  |          |
|                        |      |              |            |                  |       |             | 50            | 0         | 23.0          | 22.5  | 0.482          | 0.540  |          |
|                        |      |              | 0          | Edge 4           | 40620 | 2593.0      | 1             | 0         | 24.0          | 23.6  | 0.023          | 0.025  |          |
|                        |      |              |            |                  |       |             | 50            | 0         | 23.0          | 22.5  | 0.018          | 0.020  |          |

## 10.6. Wi-Fi (DTS Band)

| Frequency Band | Mode    | Antenna   | RF Exposure Conditions | Pwr Back-off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Area Scan Max. SAR (W/kg) | Power (dBm)   |       | 1-g SAR (W/kg) |        | Plot No. |
|----------------|---------|-----------|------------------------|--------------|------------|---------------|-------|-------------|---------------------------|---------------|-------|----------------|--------|----------|
|                |         |           |                        |              |            |               |       |             |                           | Tune-up limit | Meas. | Meas.          | Scaled |          |
| 2.4GHz         | 802.11b | SISO Main | Head                   | Off          | 10         | Flat          | 6     | 2437.0      | 0.340                     | 16.5          | 16.5  | 0.272          | 0.272  | 11       |
|                |         |           | Body                   | Off          | 9          | Rear          | 6     | 2437.0      | 0.434                     | 16.5          | 16.5  | 0.346          | 0.346  |          |
|                |         |           |                        |              | 0          | Edge 3        | 6     | 2437.0      | 0.207                     | 16.5          | 16.5  |                |        |          |
|                |         |           |                        | On           | 0          | Rear          | 6     | 2437.0      | 0.823                     | 11.5          | 11.5  | 0.746          | 0.746  | 12       |
|                |         | SISO Sub  | Head                   | Off          | 10         | Flat          | 6     | 2437.0      | 0.037                     | 16.5          | 16.5  | 0.031          | 0.031  |          |
|                |         |           | Body                   | Off          | 9          | Rear          | 6     | 2437.0      | 0.055                     | 16.5          | 16.5  | 0.052          | 0.052  |          |
|                |         |           |                        |              | 0          | Edge 3        | 6     | 2437.0      | 0.028                     | 16.5          | 16.5  |                |        |          |
|                |         |           |                        |              | 0          | Edge 4        | 6     | 2437.0      | 0.038                     | 16.5          | 16.5  |                |        |          |
|                |         |           | Body                   | On           | 0          | Rear          | 6     | 2437.0      | 0.175                     | 11.5          | 11.5  | 0.185          | 0.185  |          |
|                | 802.11n | MIMO Main | Head                   | Off          | 10         | Flat          | 6     | 2437.0      | 0.082                     | 13.5          | 13.5  | 0.070          | 0.070  |          |
|                |         |           | Body                   | Off          | 9          | Rear          | 6     | 2437.0      | 0.112                     | 13.5          | 13.5  | 0.096          | 0.096  |          |
|                |         |           |                        |              | 0          | Edge 3        | 6     | 2437.0      | 0.093                     | 13.5          | 13.5  |                |        |          |
|                |         |           |                        | On           | 0          | Rear          | 11    | 2462.0      | 0.658                     | 11.5          | 11.3  | 0.514          | 0.538  |          |
|                |         | MIMO Sub  | Head                   | Off          | 10         | Flat          | 6     | 2437.0      | 0.082                     | 13.5          | 13.3  | 0.037          | 0.038  |          |
|                |         |           | Body                   | Off          | 9          | Rear          | 6     | 2437.0      | 0.115                     | 13.5          | 13.3  | 0.028          | 0.029  |          |
|                |         |           |                        |              | 0          | Edge 4        | 6     | 2437.0      | 0.028                     | 13.5          | 13.3  |                |        |          |
|                |         |           |                        | On           | 0          | Rear          | 11    | 2462.0      | 0.658                     | 11.5          | 11.0  | 0.175          | 0.196  |          |

### Note(s):

1. Highest reported SAR is  $\leq 0.4$  W/kg. Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is  $> 0.4$  W/kg. Due to the highest reported SAR for this test position, other test positions in Head exposure condition were evaluated until a SAR  $\leq 0.8$  W/kg was reported.
3. Testing for a second channel was required because the reported SAR for this test position was  $>0.8$  W/kg.
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.
5. All Wi-Fi (DTS Band) SAR data- used in this report were taken from SAR report 15K20515-S1D, submitted under FCC ID A3LSMT715. Both models share identical antennas and output power. Spot checks were performed on model SM-T715C to ensure SAR values were the same between both models

**10.7. Wi-Fi (U-NII Band)**

| Frequency Band   | Mode             | Antenna   | RF Exposure Conditions | Pwr Back-off | Dist. (mm) | Test Position | Ch #.  | Freq. (MHz) | Area Scan Max. SAR (W/kg) | Power (dBm)   |        | 1-g SAR (W/kg) |        | Plot No. |  |  |  |
|------------------|------------------|-----------|------------------------|--------------|------------|---------------|--------|-------------|---------------------------|---------------|--------|----------------|--------|----------|--|--|--|
|                  |                  |           |                        |              |            |               |        |             |                           | Tune-up limit | Meas.  | Meas.          | Scaled |          |  |  |  |
| 5.3 GHz U-NII 2A | 802.11a          | SISO Main | Head                   | Off          | 10         | Flat          | 60     | 5300.0      | 0.125                     | 12.5          | 12.4   | 0.095          | 0.097  | 13       |  |  |  |
|                  |                  |           | Body                   | Off          | 9          | Rear          | 60     | 5300.0      | 0.301                     | 12.5          | 12.4   | 0.171          | 0.175  |          |  |  |  |
|                  |                  |           |                        |              | 0          | Edge 3        | 60     | 5300.0      | 0.228                     | 12.5          | 12.4   |                |        |          |  |  |  |
|                  | 802.11ac (VHT80) |           | On                     | 0            | Rear       | 58            | 5290.0 | 1.120       | 7.5                       | 7.5           | 0.797  | 0.797          |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
|                  | 802.11a          | SISO Sub  | Head                   | Off          | 10         | Flat          | 60     | 5300.0      | <0.001                    | 12.5          | 12.4   | <0.001         | <0.001 |          |  |  |  |
|                  |                  |           | Body                   | Off          | 9          | Rear          | 60     | 5300.0      | 0.007                     | 12.5          | 12.4   | 0.001          | 0.001  |          |  |  |  |
|                  |                  |           |                        |              | 0          | Edge 4        | 60     | 5300.0      | 0.009                     | 12.5          | 12.4   |                |        |          |  |  |  |
|                  | 802.11ac (VHT80) |           | On                     | 0            | Rear       | 58            | 5290.0 | 0.083       | 7.5                       | 7.5           | 0.037  | 0.037          |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
|                  | 802.11n          | MIMO Main | Head                   | Off          | 10         | Flat          | 52     | 5260.0      | 0.127                     | 12.5          | 12.3   | 0.071          | 0.075  |          |  |  |  |
|                  |                  |           | Body                   | Off          | 9          | Rear          | 52     | 5260.0      | 0.210                     | 12.5          | 12.3   | 0.154          | 0.161  |          |  |  |  |
|                  |                  |           |                        |              | 0          | Edge 3        | 52     | 5260.0      | 0.270                     | 12.5          | 12.3   | 0.149          | 0.156  |          |  |  |  |
|                  | 802.11ac (VHT80) |           | On                     | 0            | Rear       | 58            | 5290.0 | 1.010       | 7.5                       | 7.0           | 0.935  | 1.049          | 14     |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
| 802.11n          | MIMO Sub         | Head      | Off                    | 10           | Flat       | 52            | 5260.0 | 0.127       | 12.5                      | 12.3          | <0.001 | <0.001         |        |          |  |  |  |
|                  |                  | Body      | Off                    | 9            | Rear       | 52            | 5260.0 | 0.210       | 12.5                      | 12.3          | 0.034  | 0.035          |        |          |  |  |  |
|                  |                  |           |                        | 0            | Edge 4     | 52            | 5260.0 | 0.060       | 12.5                      | 12.3          |        |                |        |          |  |  |  |
| 802.11ac (VHT80) |                  | On        | 0                      | Rear         | 58         | 5290.0        | 1.010  | 7.5         | 5.6                       | 0.068         | 0.106  |                |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
| Frequency Band   | Mode             | Antenna   | RF Exposure Conditions | Pwr Back-off | Dist. (mm) | Test Position | Ch #.  | Freq. (MHz) | Area Scan Max. SAR (W/kg) | Power (dBm)   |        | 1-g SAR (W/kg) |        | Plot No. |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           | Tune-up limit | Meas.  | Meas.          | Scaled |          |  |  |  |
| 5.5 GHz U-NII 2C | 802.11a          | SISO Main | Head                   | Off          | 10         | Flat          | 116    | 5580.0      | 0.127                     | 12.5          | 12.5   | 0.097          | 0.097  | 15       |  |  |  |
|                  |                  |           | Body                   | Off          | 9          | Rear          | 116    | 5580.0      | 0.415                     | 12.5          | 12.5   | 0.274          | 0.274  |          |  |  |  |
|                  |                  |           |                        |              | 0          | Edge 3        | 116    | 5580.0      | 0.196                     | 12.5          | 12.5   |                |        |          |  |  |  |
|                  | 802.11ac (VHT80) |           | On                     | 0            | Rear       | 106           | 5530.0 | 1.100       | 7.5                       | 7.5           | 0.735  | 0.735          |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
|                  | 802.11a          | SISO Sub  | Head                   | Off          | 10         | Flat          | 116    | 5580.0      | <0.001                    | 12.5          | 12.5   | <0.001         | <0.001 |          |  |  |  |
|                  |                  |           | Body                   | Off          | 9          | Rear          | 116    | 5580.0      | 0.041                     | 12.5          | 12.5   | 0.031          | 0.031  |          |  |  |  |
|                  |                  |           |                        |              | 0          | Edge 4        | 116    | 5580.0      | 0.014                     | 12.5          | 12.5   |                |        |          |  |  |  |
|                  | 802.11ac (VHT80) |           | On                     | 0            | Rear       | 106           | 5530.0 | 0.146       | 7.5                       | 7.5           | 0.073  | 0.073          |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
|                  | 802.11n          | MIMO Main | Head                   | Off          | 10         | Flat          | 100    | 5500.0      | 0.052                     | 12.5          | 12.5   | 0.034          | 0.034  |          |  |  |  |
|                  |                  |           | Body                   | Off          | 9          | Rear          | 100    | 5500.0      | 0.490                     | 12.5          | 12.5   | 0.305          | 0.305  |          |  |  |  |
|                  |                  |           |                        |              | 0          | Edge 3        | 100    | 5500.0      | 0.180                     | 12.5          | 12.5   |                |        |          |  |  |  |
|                  | 802.11ac (VHT80) |           | On                     | 0            | Rear       | 106           | 5530.0 | 1.624       | 7.5                       | 7.3           | 0.963  | 1.008          | 16     |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
| 802.11n          | MIMO Sub         | Head      | Off                    | 10           | Flat       | 100           | 5500.0 | 0.052       | 12.5                      | 12.4          | 0.022  | 0.023          |        |          |  |  |  |
|                  |                  | Body      | Off                    | 9            | Rear       | 100           | 5500.0 | 0.490       | 12.5                      | 12.4          | 0.033  | 0.034          |        |          |  |  |  |
|                  |                  |           |                        | 0            | Edge 4     | 100           | 5500.0 | 0.130       | 12.5                      | 12.4          |        |                |        |          |  |  |  |
| 802.11ac (VHT80) |                  | On        | 0                      | Rear         | 106        | 5530.0        | 1.624  | 7.5         | 6.5                       | 0.057         | 0.072  |                |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |
|                  |                  |           |                        |              |            |               |        |             |                           |               |        |                |        |          |  |  |  |

| Frequency Band   | Mode             | Antenna   | RF Exposure Conditions | Pwr Back-off | Dist. (mm) | Test Position | Ch #.  | Freq. (MHz) | Area Scan Max. SAR (W/kg) | Power (dBm)   |        | 1-g SAR (W/kg) |        | Plot No. |       |
|------------------|------------------|-----------|------------------------|--------------|------------|---------------|--------|-------------|---------------------------|---------------|--------|----------------|--------|----------|-------|
|                  |                  |           |                        |              |            |               |        |             |                           | Tune-up limit | Meas.  | Meas.          | Scaled |          |       |
| 5.8 GHz U-NII 3  | 802.11a          | SISO Main | Head                   | Off          | 10         | Flat          | 157    | 5785.0      | 0.065                     | 12.5          | 12.5   | 0.034          | 0.034  |          |       |
|                  |                  |           | Body                   | Off          | 9          | Rear          | 157    | 5785.0      | 0.390                     | 12.5          | 12.5   | 0.221          | 0.221  |          |       |
|                  |                  |           |                        | 0            | Edge 3     | 157           | 5785.0 | 0.209       | 12.5                      | 12.5          |        |                |        |          |       |
|                  | 802.11ac (VHT80) |           | On                     | 0            | Rear       | 155           | 5775.0 | 0.762       | 7.5                       | 7.3           | 0.730  | 0.764          | 17     |          |       |
|                  |                  |           | SISO Sub               | Head         | Off        | 10            | Flat   | 157         | 5785.0                    | <0.001        | 12.5   | 12.5           | <0.001 | <0.001   |       |
|                  | Body             |           |                        | Off          | 9          | Rear          | 157    | 5785.0      | 0.010                     | 12.5          | 12.5   | <0.001         | <0.001 |          |       |
|                  |                  | 0         |                        | Edge 4       | 157        | 5785.0        | 0.012  | 12.5        | 12.5                      | <0.001        | <0.001 |                |        |          |       |
|                  | 802.11ac (VHT80) | On        |                        | 0            | Rear       | 155           | 5775.0 | 0.033       | 7.5                       | 7.5           | 0.020  | 0.020          |        |          |       |
|                  |                  | 802.11n   |                        | MIMO Main    | Head       | Off           | 10     | Flat        | 165                       | 5825.0        | 0.057  | 12.5           | 12.2   | 0.048    | 0.051 |
|                  | Body             |           |                        |              | Off        | 9             | Rear   | 165         | 5825.0                    | 0.260         | 12.5   | 12.2           | 0.154  | 0.165    |       |
|                  |                  |           | 0                      |              | Edge 3     | 165           | 5825.0 | 0.200       | 12.5                      | 12.2          | <0.001 | <0.001         |        |          |       |
|                  | 802.11ac (VHT80) | On        | 0                      |              | Rear       | 155           | 5775.0 | 0.925       | 7.5                       | 7.5           | 0.592  | 0.592          |        |          |       |
|                  |                  | 802.11n   | MIMO Sub               |              | Head       | Off           | 10     | Flat        | 165                       | 5825.0        | 0.057  | 12.5           | 12.3   | 0.022    | 0.023 |
|                  | Body             |           |                        |              | Off        | 9             | Rear   | 165         | 5825.0                    | 0.260         | 12.5   | 12.3           | 0.015  | 0.016    |       |
|                  |                  |           |                        | 0            | Edge 4     | 165           | 5825.0 | 0.030       | 12.5                      | 12.3          |        |                |        |          |       |
| 802.11ac (VHT80) | On               | 0         |                        | Rear         | 155        | 5775.0        | 0.925  | 7.5         | 6.7                       | 0.054         | 0.065  |                |        |          |       |

**Note(s):**

1. Highest reported SAR is  $\leq 0.4$  W/kg. Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is  $> 0.4$  W/kg. Due to the highest reported SAR for this test position, other test positions in Head exposure condition were evaluated until a SAR  $\leq 0.8$  W/kg was reported.
3. Testing for a second channel was required because the reported SAR for this test position was  $> 0.8$  W/kg.
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.
5. All Wi-Fi (U-NII Band) SAR data- used in this report were taken from SAR report 15K20515-S1D, submitted under FCC ID A3LSMT715. Both models share identical antennas and output power. Spot checks were performed on model SM-T715C to ensure SAR values were the same between both models

**10.8. Bluetooth**

| Frequency Band | Mode | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Power (dBm)   |       | 1-g SAR (W/kg) |        | Plot No. |
|----------------|------|------------|---------------|-------|-------------|---------------|-------|----------------|--------|----------|
|                |      |            |               |       |             | Tune-up limit | Meas. | Meas.          | Scaled |          |
| 2.4 GHz        | GFSK | 0          | Rear          | 39    | 2441.0      | 9.7           | 9.7   | 0.234          | 0.234  | 19       |

**Note(s):**

All Bluetooth SAR data- used in this report were taken from SAR report 15K20515-S1D, submitted under FCC ID A3LSMT715. Both models share identical antennas and output power. Spot checks were performed on model SM-T715C to ensure SAR values were the same between both models

## 11. SAR Measurement Variability

In accordance with published RF Exposure KDB 865664 D01 SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

- 1) Repeated measurement is not required when the original highest measured SAR is  $< 0.80$  W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is  $\geq 0.80$  W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is  $> 1.20$  or when the original or repeated measurement is  $\geq 1.45$  W/kg (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .

| Frequency Band (MHz) | Air Interface      | RF Exposure Conditions | Test Position | Repeated SAR (Yes/No) | Highest Measured SAR (W/kg) | Repeated Measured SAR (W/kg) | Largest to Smallest SAR Ratio |
|----------------------|--------------------|------------------------|---------------|-----------------------|-----------------------------|------------------------------|-------------------------------|
| 850                  | GSM 850            | Standalone             | Edge 1        | Yes                   | 0.895                       | 0.887                        | 1.01                          |
|                      | WCDMA Band V       | Standalone             | Edge 1        | No                    | 0.551                       | N/A                          | N/A                           |
| 1900                 | GSM 1900           | Standalone             | Edge 1        | No                    | 0.942                       | N/A                          | N/A                           |
|                      | WCDMA Band II      | Standalone             | Edge 4        | Yes                   | 1.08                        | 1.04                         | 1.04                          |
| 2400                 | Wi-Fi 802.11b/g/n  | Standalone             | Rear          | No                    | 0.746                       | N/A                          | N/A                           |
|                      | Bluetooth          | Standalone             | Rear          | No                    | 0.234                       | N/A                          | N/A                           |
| 2600                 | LTE Band 41        | Standalone             | Edge 1        | Yes                   | 0.914                       | 0.884                        | 1.03                          |
| 5300                 | Wi-Fi 802.11a/n/ac | Standalone             | Rear          | Yes                   | 0.935                       | 0.873                        | 1.07                          |
| 5500                 | Wi-Fi 802.11a/n/ac | Standalone             | Rear          | Yes                   | 0.963                       | 0.914                        | 1.05                          |
| 5800                 | Wi-Fi 802.11a/n/ac | Standalone             | Rear          | No                    | 0.73                        | N/A                          | N/A                           |

### Note(s):

Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not  $> 1.20$ .

## 12. Simultaneous Transmission SAR Analysis

KDB 447498 D01 General RF Exposure Guidance introduces a new formula for calculating the SAR to Peak Location Ratio (SPLSR) between pairs of simultaneously transmitting antennas:

$$SPLSR = (SAR_1 + SAR_2)^{1.5} / Ri$$

Where:

**SAR<sub>1</sub>** is the highest measured or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

**SAR<sub>2</sub>** is the highest measured or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

**Ri** is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of  $[(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2]$

In order for a pair of simultaneous transmitting antennas with the sum of 1-g SAR > 1.6 W/kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:

$$(SAR_1 + SAR_2)^{1.5} / Ri < 0.04$$

### Simultaneous Transmission Condition

| RF Exposure Condition                                             | Item | Capable Transmit Configurations |   |       |   |    |
|-------------------------------------------------------------------|------|---------------------------------|---|-------|---|----|
| Standalone                                                        | 1    | GSM(GPRS/EDGE)                  | + | DTS   |   |    |
|                                                                   | 2    | GSM(GPRS/EDGE)                  | + | U-NII |   |    |
|                                                                   | 3    | GSM(GPRS/EDGE)                  | + | BT    |   |    |
|                                                                   | 4    | GSM(GPRS/EDGE)                  | + | DTS   | + | BT |
|                                                                   | 5    | GSM(GPRS/EDGE)                  | + | U-NII | + | BT |
|                                                                   | 6    | W-CDMA                          | + | DTS   |   |    |
|                                                                   | 7    | W-CDMA                          | + | U-NII |   |    |
|                                                                   | 8    | W-CDMA                          | + | BT    |   |    |
|                                                                   | 9    | W-CDMA                          | + | DTS   | + | BT |
|                                                                   | 10   | W-CDMA                          | + | U-NII | + | BT |
|                                                                   | 11   | LTE                             | + | DTS   |   |    |
|                                                                   | 12   | LTE                             | + | U-NII |   |    |
|                                                                   | 13   | LTE                             | + | BT    |   |    |
|                                                                   | 14   | LTE                             | + | DTS   | + | BT |
|                                                                   | 15   | LTE                             | + | U-NII | + | BT |
| Notes:                                                            |      |                                 |   |       |   |    |
| 1. DTS support Hotspot and Wi-Fi Direct                           |      |                                 |   |       |   |    |
| 2. Only U-NII support Wi-Fi Direct                                |      |                                 |   |       |   |    |
| 3. GPRS/EDGE, W-CDMA and LTE support Hotspot.                     |      |                                 |   |       |   |    |
| 4. VoIP is supported in GPRS/EDGE, W-CDMA and LTE.                |      |                                 |   |       |   |    |
| 5. DTS Radio can transmit simultaneously w ith Bluetooth Radio.   |      |                                 |   |       |   |    |
| 6. U-NII Radio can transmit simultaneously w ith Bluetooth Radio. |      |                                 |   |       |   |    |

## Estimated SAR for Simultaneous Transmission SAR Analysis

### Considerations for SAR estimation

- When standalone SAR test exclusion applies, standalone SAR must also be estimated to determine simultaneous transmission SAR test exclusion.
- Dedicated Host Approach criteria for SAR test exclusion is likewise applied to SAR estimation, with certain distinctions between test exclusion and SAR estimation:
  - When the separation distance from the antenna to an adjacent edge is  $\leq 5$  mm, a distance of 5 mm is applied for SAR estimation; this is the same between test exclusion and SAR estimation calculations.
  - When the separation distance from the antenna to an adjacent edge is  $> 5$  mm but  $\leq 50$  mm, the actual antenna-to-edge separation distance is applied for SAR estimation.
  - When the minimum test separation distance is  $> 50$  mm, the estimated SAR value is 0.4 W/kg
- Please refer to Estimated SAR Tables to see which test positions are inherently compliant as they consist of only estimated SAR values for all applicable transmitters and consequently will always have sum of SAR values  $< 1.2$  W/kg. Simultaneous transmission SAR analysis was therefore not performed for these test positions.

### Estimated SAR for WWAN

| Antenna                             | Tx Interface | Frequency (MHz) | Output Power |     | Separation Distances (mm) |        |        |        |        |       | Estimated 1-g SAR Value (W/kg) |          |          |        |          |       |
|-------------------------------------|--------------|-----------------|--------------|-----|---------------------------|--------|--------|--------|--------|-------|--------------------------------|----------|----------|--------|----------|-------|
|                                     |              |                 | dBm          | mW  | Rear                      | Edge 1 | Edge 2 | Edge 3 | Edge 4 | Front | Rear                           | Edge 1   | Edge 2   | Edge 3 | Edge 4   | Front |
| Full Power, Proximity Sensor Off    |              |                 |              |     |                           |        |        |        |        |       |                                |          |          |        |          |       |
| Cellular                            | GPRS 3 Slots | 848.8           | 29.50        | 334 | 0                         | 0      | 37     | 194.2  | 34     |       | -MEASURE                       | -MEASURE | -MEASURE | 0.400  | -MEASURE |       |
| Cellular                            | GPRS 3 Slots | 1909.8          | 26.70        | 175 | 0                         | 0      | 37     | 194.2  | 34     |       | -MEASURE                       | -MEASURE | -MEASURE | 0.400  | -MEASURE |       |
| Cellular                            | W-CDMA 5     | 846.6           | 23.00        | 200 | 0                         | 0      | 37     | 194.2  | 34     |       | -MEASURE                       | -MEASURE | -MEASURE | 0.400  | -MEASURE |       |
| Cellular                            | W-CDMA 2     | 1907.6          | 23.00        | 200 | 0                         | 0      | 37     | 194.2  | 34     |       | -MEASURE                       | -MEASURE | -MEASURE | 0.400  | -MEASURE |       |
| Cellular                            | LTE Band 41  | 2680            | 24.00        | 251 | 0                         | 0      | 37     | 194.2  | 34     |       | -MEASURE                       | -MEASURE | -MEASURE | 0.400  | -MEASURE |       |
| Power Back-off, Proximity Sensor On |              |                 |              |     |                           |        |        |        |        |       |                                |          |          |        |          |       |
| Cellular                            | GPRS 2 Slots | 848.8           | 24.50        | 70  | 0                         | 0      | 37     | 194.2  | 34     |       | -MEASURE                       | -MEASURE | 0.232    | 0.400  | 0.253    |       |
| Cellular                            | GPRS 2 Slots | 1909.8          | 23.00        | 50  | 0                         | 0      | 37     | 194.2  | 34     |       | -MEASURE                       | -MEASURE | 0.249    | 0.400  | 0.271    |       |
| Cellular                            | W-CDMA 5     | 846.6           | 17.00        | 50  | 0                         | 0      | 37     | 194.2  | 34     |       | -MEASURE                       | -MEASURE | 0.166    | 0.400  | 0.180    |       |
| Cellular                            | W-CDMA 2     | 1907.6          | 16.00        | 40  | 0                         | 0      | 37     | 194.2  | 34     |       | -MEASURE                       | -MEASURE | 0.199    | 0.400  | 0.217    |       |
| Cellular                            | LTE Band 41  | 2680            | 15.00        | 32  | 0                         | 0      | 37     | 194.2  | 34     |       | -MEASURE                       | -MEASURE | 0.189    | 0.400  | 0.205    |       |

### Estimated SAR for WLAN

#### SISO (Antenna 1)

| Tx Interface                        | Frequency (MHz) | Output Power |    | Separation Distances (mm) |        |        |        |        |       | Estimated 1-g SAR Value (W/kg) |        |        |          |        |       |
|-------------------------------------|-----------------|--------------|----|---------------------------|--------|--------|--------|--------|-------|--------------------------------|--------|--------|----------|--------|-------|
|                                     |                 | dBm          | mW | Rear                      | Edge 1 | Edge 2 | Edge 3 | Edge 4 | Front | Rear                           | Edge 1 | Edge 2 | Edge 3   | Edge 4 | Front |
| Full Power, Proximity Sensor Off    |                 |              |    |                           |        |        |        |        |       |                                |        |        |          |        |       |
| Wi-Fi 2.4 GHz                       | 2462            | 16.50        | 45 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE                       | 0.400  | 0.314  | -MEASURE | 0.400  |       |
| Wi-Fi 5.2 GHz                       | 5240            | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE                       | 0.400  | 0.183  | -MEASURE | 0.400  |       |
| Wi-Fi 5.3 GHz                       | 5320            | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE                       | 0.400  | 0.185  | -MEASURE | 0.400  |       |
| Wi-Fi 5.5 GHz                       | 5700            | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE                       | 0.400  | 0.191  | -MEASURE | 0.400  |       |
| Wi-Fi 5.8 GHz                       | 5825            | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE                       | 0.400  | 0.193  | -MEASURE | 0.400  |       |
| Bluetooth                           | 2480            | 9.70         | 9  | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | 0.378                          | 0.400  | 0.063  | 0.210    | 0.400  |       |
| Power Back-off, Proximity Sensor On |                 |              |    |                           |        |        |        |        |       |                                |        |        |          |        |       |
| Wi-Fi 2.4 GHz                       | 2462            | 11.50        | 14 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE                       | 0.400  | 0.098  | 0.325    | 0.400  |       |
| Wi-Fi 5.2 GHz                       | 5240            | 7.50         | 6  | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | 0.366                          | 0.400  | 0.061  | 0.203    | 0.400  |       |
| Wi-Fi 5.3 GHz                       | 5320            | 7.50         | 6  | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | 0.369                          | 0.400  | 0.062  | 0.205    | 0.400  |       |
| Wi-Fi 5.5 GHz                       | 5700            | 7.50         | 6  | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | 0.382                          | 0.400  | 0.064  | 0.212    | 0.400  |       |
| Wi-Fi 5.8 GHz                       | 5825            | 7.50         | 6  | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | 0.386                          | 0.400  | 0.064  | 0.215    | 0.400  |       |

#### SISO (Antenna 2)

| Tx Interface                        | Frequency (MHz) | Output Power |    | Separation Distances (mm) |        |        |        |        |       | Estimated 1-g SAR Value (W/kg) |        |        |          |          |       |
|-------------------------------------|-----------------|--------------|----|---------------------------|--------|--------|--------|--------|-------|--------------------------------|--------|--------|----------|----------|-------|
|                                     |                 | dBm          | mW | Rear                      | Edge 1 | Edge 2 | Edge 3 | Edge 4 | Front | Rear                           | Edge 1 | Edge 2 | Edge 3   | Edge 4   | Front |
| Full Power, Proximity Sensor Off    |                 |              |    |                           |        |        |        |        |       |                                |        |        |          |          |       |
| Wi-Fi 2.4 GHz                       | 2462            | 16.50        | 45 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE                       | 0.400  | 0.400  | -MEASURE | -MEASURE |       |
| Wi-Fi 5.2 GHz                       | 5240            | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE                       | 0.400  | 0.400  | 0.323    | -MEASURE |       |
| Wi-Fi 5.3 GHz                       | 5320            | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE                       | 0.400  | 0.400  | 0.326    | -MEASURE |       |
| Wi-Fi 5.5 GHz                       | 5700            | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE                       | 0.400  | 0.400  | 0.337    | -MEASURE |       |
| Wi-Fi 5.8 GHz                       | 5825            | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE                       | 0.400  | 0.400  | 0.341    | -MEASURE |       |
| Power Back-off, Proximity Sensor On |                 |              |    |                           |        |        |        |        |       |                                |        |        |          |          |       |
| Wi-Fi 2.4 GHz                       | 2462            | 11.50        | 14 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE                       | 0.400  | 0.400  | 0.172    | 0.266    |       |
| Wi-Fi 5.2 GHz                       | 5240            | 7.50         | 6  | 0.3                       | 149    | 84     | 17     | 11     |       | 0.366                          | 0.400  | 0.400  | 0.108    | 0.166    |       |
| Wi-Fi 5.3 GHz                       | 5320            | 7.50         | 6  | 0.3                       | 149    | 84     | 17     | 11     |       | 0.369                          | 0.400  | 0.400  | 0.109    | 0.168    |       |
| Wi-Fi 5.5 GHz                       | 5700            | 7.50         | 6  | 0.3                       | 149    | 84     | 17     | 11     |       | 0.382                          | 0.400  | 0.400  | 0.112    | 0.174    |       |
| Wi-Fi 5.8 GHz                       | 5825            | 7.50         | 6  | 0.3                       | 149    | 84     | 17     | 11     |       | 0.386                          | 0.400  | 0.400  | 0.114    | 0.176    |       |

**MIMO (Main)**

| Tx Interface                        | Frequency (MHz) | Output Power |    | Separation Distances (mm) |        |        |        |        |       | Estimated 1-g SAR Value (W/kg) |        |        |          |        |       |
|-------------------------------------|-----------------|--------------|----|---------------------------|--------|--------|--------|--------|-------|--------------------------------|--------|--------|----------|--------|-------|
|                                     |                 | dBm          | mW | Rear                      | Edge 1 | Edge 2 | Edge 3 | Edge 4 | Front | Rear                           | Edge 1 | Edge 2 | Edge 3   | Edge 4 | Front |
| Full Power, Proximity Sensor Off    |                 |              |    |                           |        |        |        |        |       |                                |        |        |          |        |       |
| Wi-Fi 2.4 GHz                       | 2462            | 13.50        | 22 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE                       | 0.400  | 0.153  | -MEASURE | 0.400  |       |
| Wi-Fi 5.2 GHz                       | 5240            | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE                       | 0.400  | 0.183  | -MEASURE | 0.400  |       |
| Wi-Fi 5.3 GHz                       | 5320            | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE                       | 0.400  | 0.185  | -MEASURE | 0.400  |       |
| Wi-Fi 5.5 GHz                       | 5700            | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE                       | 0.400  | 0.191  | -MEASURE | 0.400  |       |
| Wi-Fi 5.8 GHz                       | 5825            | 12.50        | 18 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE                       | 0.400  | 0.193  | -MEASURE | 0.400  |       |
| Power Back-off, Proximity Sensor On |                 |              |    |                           |        |        |        |        |       |                                |        |        |          |        |       |
| Wi-Fi 2.4 GHz                       | 2462            | 11.50        | 14 | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | -MEASURE                       | 0.400  | 0.098  | 0.325    | 0.400  |       |
| Wi-Fi 5.2 GHz                       | 5240            | 7.50         | 6  | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | 0.366                          | 0.400  | 0.061  | 0.203    | 0.400  |       |
| Wi-Fi 5.3 GHz                       | 5320            | 7.50         | 6  | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | 0.369                          | 0.400  | 0.062  | 0.205    | 0.400  |       |
| Wi-Fi 5.5 GHz                       | 5700            | 7.50         | 6  | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | 0.382                          | 0.400  | 0.064  | 0.212    | 0.400  |       |
| Wi-Fi 5.8 GHz                       | 5825            | 7.50         | 6  | 0.3                       | 180.2  | 30     | 9      | 91.5   |       | 0.386                          | 0.400  | 0.064  | 0.215    | 0.400  |       |

**MIMO (Sub)**

| Tx Interface                        | Frequency (MHz) | Output Power |    | Separation Distances (mm) |        |        |        |        |       | Estimated 1-g SAR Value (W/kg) |        |        |        |          |       |
|-------------------------------------|-----------------|--------------|----|---------------------------|--------|--------|--------|--------|-------|--------------------------------|--------|--------|--------|----------|-------|
|                                     |                 | dBm          | mW | Rear                      | Edge 1 | Edge 2 | Edge 3 | Edge 4 | Front | Rear                           | Edge 1 | Edge 2 | Edge 3 | Edge 4   | Front |
| Full Power, Proximity Sensor Off    |                 |              |    |                           |        |        |        |        |       |                                |        |        |        |          |       |
| Wi-Fi 2.4 GHz                       | 2462            | 13.50        | 22 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE                       | 0.400  | 0.400  | 0.271  | -MEASURE |       |
| Wi-Fi 5.2 GHz                       | 5240            | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE                       | 0.400  | 0.400  | 0.323  | -MEASURE |       |
| Wi-Fi 5.3 GHz                       | 5320            | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE                       | 0.400  | 0.400  | 0.326  | -MEASURE |       |
| Wi-Fi 5.5 GHz                       | 5700            | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE                       | 0.400  | 0.400  | 0.337  | -MEASURE |       |
| Wi-Fi 5.8 GHz                       | 5825            | 12.50        | 18 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE                       | 0.400  | 0.400  | 0.341  | -MEASURE |       |
| Power Back-off, Proximity Sensor On |                 |              |    |                           |        |        |        |        |       |                                |        |        |        |          |       |
| Wi-Fi 2.4 GHz                       | 2462            | 11.50        | 14 | 0.3                       | 149    | 84     | 17     | 11     |       | -MEASURE                       | 0.400  | 0.400  | 0.172  | 0.266    |       |
| Wi-Fi 5.2 GHz                       | 5240            | 7.50         | 6  | 0.3                       | 149    | 84     | 17     | 11     |       | 0.366                          | 0.400  | 0.400  | 0.108  | 0.166    |       |
| Wi-Fi 5.3 GHz                       | 5320            | 7.50         | 6  | 0.3                       | 149    | 84     | 17     | 11     |       | 0.369                          | 0.400  | 0.400  | 0.109  | 0.168    |       |
| Wi-Fi 5.5 GHz                       | 5700            | 7.50         | 6  | 0.3                       | 149    | 84     | 17     | 11     |       | 0.382                          | 0.400  | 0.400  | 0.112  | 0.174    |       |
| Wi-Fi 5.8 GHz                       | 5825            | 7.50         | 6  | 0.3                       | 149    | 84     | 17     | 11     |       | 0.386                          | 0.400  | 0.400  | 0.114  | 0.176    |       |

**12.1. Sum of the SAR for GSM850 & Wi-Fi & BT****SISO (Wi-Fi Main Antenna)**

| RF Exposure conditions | Test Position | ①     | ②              | ③                | ④             | ① + ②            |                 | ① + ③            |                 | ① + ④            |                 |
|------------------------|---------------|-------|----------------|------------------|---------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|
|                        |               | WWAN  | DTS (Main Ant) | U-NII (Main Ant) | BT (Main Ant) | WWAN + DTS       |                 | WWAN + U-NII     |                 | WWAN + BT        |                 |
|                        |               |       |                |                  |               | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) |
| Head                   | Left Touch    | 0.289 | 0.272          | 0.097            |               | 0.561            | No              | 0.386            | No              |                  |                 |
|                        | Left Tilt     | 0.275 | 0.272          | 0.097            |               | 0.547            | No              | 0.372            | No              |                  |                 |
|                        | Right Touch   | 0.318 | 0.272          | 0.097            |               | 0.590            | No              | 0.415            | No              |                  |                 |
|                        | Right Tilt    | 0.312 | 0.272          | 0.097            |               | 0.584            | No              | 0.409            | No              |                  |                 |
| Body                   | Rear          | 0.672 | 0.746          | 0.797            | 0.234         | 1.418            | No              | 1.469            | No              | 0.906            | No              |

**SISO (Wi-Fi Sub Antenna)**

| RF Exposure conditions | Test Position | ①     | ②             | ③               | ④             | ① + ②            |                 | ① + ③            |                 | ① + ② + ④        |                 | ① + ③ + ④         |                 |
|------------------------|---------------|-------|---------------|-----------------|---------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|-------------------|-----------------|
|                        |               | WWAN  | DTS (Sub Ant) | U-NII (Sub Ant) | BT (Main Ant) | WWAN + DTS       |                 | WWAN + U-NII     |                 | WWAN + DTS + BT  |                 | WWAN + U-NII + BT |                 |
|                        |               |       |               |                 |               | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) | Σ 1-g SAR (mW/g)  | SPLSR (Yes/ No) |
| Head                   | Left Touch    | 0.289 | 0.031         | 0.001           |               | 0.320            | No              | 0.290            | No              |                  |                 |                   |                 |
|                        | Left Tilt     | 0.275 | 0.031         | 0.001           |               | 0.306            | No              | 0.276            | No              |                  |                 |                   |                 |
|                        | Right Touch   | 0.318 | 0.031         | 0.001           |               | 0.349            | No              | 0.319            | No              |                  |                 |                   |                 |
|                        | Right Tilt    | 0.312 | 0.031         | 0.001           |               | 0.343            | No              | 0.313            | No              |                  |                 |                   |                 |
| Body                   | Rear          | 0.672 | 0.185         | 0.073           | 0.234         | 0.857            | No              | 0.745            | No              | 1.091            | No              | 0.979             | No              |

**MIMO**

| RF Exposure conditions | Test Position | ①     | ②                      | ① + ②            |                 |
|------------------------|---------------|-------|------------------------|------------------|-----------------|
|                        |               | WWAN  | U-NII (Main + Sub Ant) | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) |
| Body                   | Rear          | 0.672 | 1.049                  | 1.721            | Yes             |

**SAR to Peak Location Separation Ratio (SPLSR)**

| Test Position | Worst-case combination |                          | Σ 1-g SAR (mW/g) |       | Calculated distance (mm) | SPLSR (≤ 0.04) | Volume Scan (Yes/ No) | Figure |
|---------------|------------------------|--------------------------|------------------|-------|--------------------------|----------------|-----------------------|--------|
|               | ① WWAN                 | ② U-NII (Main + Sub Ant) |                  |       |                          |                |                       |        |
| Rear          | 0.672                  | 1.049                    | ① + ②            | 1.721 | 181.5                    | 0.012          | No                    | 1      |

**Note(s):**

All Wi-Fi and Bluetooth SAR values (measured or estimated) used in this report were taken from SAR report 15K20515-S1D, submitted under FCC ID A3LSMT715

## 12.2. Sum of the SAR for GSM1900 & Wi-Fi & BT

### SISO (Wi-Fi Main Antenna)

| RF Exposure conditions | Test Position | ①     | ②              | ③                | ④             | ① + ②            |                 | ① + ③            |                 | ① + ④            |                 |
|------------------------|---------------|-------|----------------|------------------|---------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|
|                        |               | WWAN  | DTS (Main Ant) | U-NII (Main Ant) | BT (Main Ant) | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) |
| Head                   | Left Touch    | 0.318 | 0.272          | 0.097            |               | 0.590            | No              | 0.415            | No              |                  |                 |
|                        | Left Tilt     | 0.381 | 0.272          | 0.097            |               | 0.653            | No              | 0.478            | No              |                  |                 |
|                        | Right Touch   | 0.570 | 0.272          | 0.097            |               | 0.842            | No              | 0.667            | No              |                  |                 |
|                        | Right Tilt    | 0.552 | 0.272          | 0.097            |               | 0.824            | No              | 0.649            | No              |                  |                 |
| Body                   | Rear          | 0.703 | 0.746          | 0.797            | 0.234         | 1.449            | No              | 1.500            | No              | 0.937            | No              |

### SISO (Wi-Fi Sub Antenna)

| RF Exposure conditions | Test Position | ①     | ②             | ③               | ④             | ① + ②            |                 | ① + ③            |                 | ① + ② + ④        |                 | ① + ③ + ④        |                 |
|------------------------|---------------|-------|---------------|-----------------|---------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|
|                        |               | WWAN  | DTS (Sub Ant) | U-NII (Sub Ant) | BT (Main Ant) | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) |
| Head                   | Left Touch    | 0.318 | 0.031         | 0.001           |               | 0.349            | No              | 0.319            | No              |                  |                 |                  |                 |
|                        | Left Tilt     | 0.381 | 0.031         | 0.001           |               | 0.412            | No              | 0.382            | No              |                  |                 |                  |                 |
|                        | Right Touch   | 0.570 | 0.031         | 0.001           |               | 0.601            | No              | 0.571            | No              |                  |                 |                  |                 |
|                        | Right Tilt    | 0.552 | 0.031         | 0.001           |               | 0.583            | No              | 0.553            | No              |                  |                 |                  |                 |
| Body                   | Rear          | 0.703 | 0.185         | 0.073           | 0.234         | 0.888            | No              | 0.776            | No              | 1.122            | No              | 1.010            | No              |

### MIMO

| RF Exposure conditions | Test Position | ①     | ②                      | ① + ②            |                 |
|------------------------|---------------|-------|------------------------|------------------|-----------------|
|                        |               | WWAN  | U-NII (Main + Sub Ant) | Σ 1-g SAR (mW/g) | SPLSR (Yes/ No) |
| Body                   | Rear          | 0.703 | 1.049                  | 1.752            | Yes             |

### SAR to Peak Location Separation Ratio (SPLSR)

| Test Position | Worst-case combination |                          | Σ 1-g SAR (mW/g) |       | Calculated distance (mm) | SPLSR (≤ 0.04) | Volume Scan (Yes/ No) | Figure |
|---------------|------------------------|--------------------------|------------------|-------|--------------------------|----------------|-----------------------|--------|
|               | ① WWAN                 | ② U-NII (Main + Sub Ant) |                  |       |                          |                |                       |        |
| Rear          | 0.703                  | 1.049                    | ① + ②            | 1.752 | 184.7                    | 0.013          | No                    | 2      |

### Note(s):

All Wi-Fi and Bluetooth SAR values (measured or estimated) used in this report were taken from SAR report 15K20515-S1D, submitted under FCC ID A3LSMT715

## 12.3. Sum of the SAR for WCDMA Band V & Wi-Fi & BT

### SISO (Wi-Fi Main Antenna)

| RF Exposure conditions | Test Position | ①<br>WWAN | ②<br>DTS<br>(Main Ant) | ③<br>U-NII<br>(Main Ant) | ④<br>BT<br>(Main Ant) | ① + ②<br>WWAN + DTS |                    | ① + ③<br>WWAN + U-NII |                    | ① + ④<br>WWAN + BT  |                    |
|------------------------|---------------|-----------|------------------------|--------------------------|-----------------------|---------------------|--------------------|-----------------------|--------------------|---------------------|--------------------|
|                        |               |           |                        |                          |                       | Σ 1-g SAR<br>(mW/g) | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g)   | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g) | SPLSR<br>(Yes/ No) |
| Head                   | Left Touch    | 0.176     | 0.272                  | 0.097                    |                       | 0.448               | No                 | 0.273                 | No                 |                     |                    |
|                        | Left Tilt     | 0.148     | 0.272                  | 0.097                    |                       | 0.420               | No                 | 0.245                 | No                 |                     |                    |
|                        | Right Touch   | 0.199     | 0.272                  | 0.097                    |                       | 0.471               | No                 | 0.296                 | No                 |                     |                    |
|                        | Right Tilt    | 0.184     | 0.272                  | 0.097                    |                       | 0.456               | No                 | 0.281                 | No                 |                     |                    |
| Body                   | Rear          | 0.439     | 0.746                  | 0.797                    | 0.234                 | 1.185               | No                 | 1.236                 | No                 | 0.673               | No                 |

### SISO (Wi-Fi Sub Antenna)

| RF Exposure conditions | Test Position | ①<br>WWAN | ②<br>DTS<br>(Sub Ant) | ③<br>U-NII<br>(Sub Ant) | ④<br>BT<br>(Main Ant) | ① + ②<br>WWAN + DTS |                    | ① + ③<br>WWAN + U-NII |                    | ① + ② + ④<br>WWAN + DTS + BT |                    | ① + ③ + ④<br>WWAN + U-NII + BT |                    |
|------------------------|---------------|-----------|-----------------------|-------------------------|-----------------------|---------------------|--------------------|-----------------------|--------------------|------------------------------|--------------------|--------------------------------|--------------------|
|                        |               |           |                       |                         |                       | Σ 1-g SAR<br>(mW/g) | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g)   | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g)          | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g)            | SPLSR<br>(Yes/ No) |
| Head                   | Left Touch    | 0.176     | 0.031                 | 0.001                   |                       | 0.207               | No                 | 0.177                 | No                 |                              |                    |                                |                    |
|                        | Left Tilt     | 0.148     | 0.031                 | 0.001                   |                       | 0.179               | No                 | 0.149                 | No                 |                              |                    |                                |                    |
|                        | Right Touch   | 0.199     | 0.031                 | 0.001                   |                       | 0.230               | No                 | 0.200                 | No                 |                              |                    |                                |                    |
|                        | Right Tilt    | 0.184     | 0.031                 | 0.001                   |                       | 0.215               | No                 | 0.185                 | No                 |                              |                    |                                |                    |
| Body                   | Rear          | 0.439     | 0.185                 | 0.073                   | 0.234                 | 0.624               | No                 | 0.512                 | No                 | 0.858                        | No                 | 0.746                          | No                 |

### MIMO

| RF Exposure conditions | Test Position | ①<br>WWAN | ②<br>U-NII<br>(Main + Sub Ant) | ① + ②<br>WWAN + U-NII (Main + Sub Ant) |                    |
|------------------------|---------------|-----------|--------------------------------|----------------------------------------|--------------------|
|                        |               |           |                                | Σ 1-g SAR<br>(mW/g)                    | SPLSR<br>(Yes/ No) |
| Body                   | Rear          | 0.439     | 1.049                          | 1.488                                  | No                 |

### Note(s):

All Wi-Fi and Bluetooth SAR values (measured or estimated) used in this report were taken from SAR report 15K20515-S1D, submitted under FCC ID A3LSMT715

## 12.4. Sum of the SAR for WCDMA Band II & Wi-Fi & BT

### SISO (Wi-Fi Main Antenna)

| RF Exposure conditions | Test Position | ①<br>WWAN | ②<br>DTS<br>(Main Ant) | ③<br>U-NII<br>(Main Ant) | ④<br>BT<br>(Main Ant) | ① + ②<br>WWAN + DTS |                    | ① + ③<br>WWAN + U-NII |                    | ① + ④<br>WWAN + BT  |                    |
|------------------------|---------------|-----------|------------------------|--------------------------|-----------------------|---------------------|--------------------|-----------------------|--------------------|---------------------|--------------------|
|                        |               |           |                        |                          |                       | Σ 1-g SAR<br>(mW/g) | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g)   | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g) | SPLSR<br>(Yes/ No) |
| Head                   | Left Touch    | 0.263     | 0.272                  | 0.097                    |                       | 0.535               | No                 | 0.360                 | No                 |                     |                    |
|                        | Left Tilt     | 0.301     | 0.272                  | 0.097                    |                       | 0.573               | No                 | 0.398                 | No                 |                     |                    |
|                        | Right Touch   | 0.468     | 0.272                  | 0.097                    |                       | 0.740               | No                 | 0.565                 | No                 |                     |                    |
|                        | Right Tilt    | 0.464     | 0.272                  | 0.097                    |                       | 0.736               | No                 | 0.561                 | No                 |                     |                    |
| Body                   | Rear          | 0.659     | 0.746                  | 0.797                    | 0.203                 | 1.405               | No                 | 1.456                 | No                 | 0.862               | No                 |

### SISO (Wi-Fi Sub Antenna)

| RF Exposure conditions | Test Position | ①<br>WWAN | ②<br>DTS<br>(Sub Ant) | ③<br>U-NII<br>(Sub Ant) | ④<br>BT<br>(Main Ant) | ① + ②<br>WWAN + DTS |                    | ① + ③<br>WWAN + U-NII |                    | ① + ② + ④<br>WWAN + DTS + BT |                    | ① + ③ + ④<br>WWAN + U-NII + BT |                    |
|------------------------|---------------|-----------|-----------------------|-------------------------|-----------------------|---------------------|--------------------|-----------------------|--------------------|------------------------------|--------------------|--------------------------------|--------------------|
|                        |               |           |                       |                         |                       | Σ 1-g SAR<br>(mW/g) | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g)   | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g)          | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g)            | SPLSR<br>(Yes/ No) |
| Head                   | Left Touch    | 0.263     | 0.031                 | 0.001                   |                       | 0.294               | No                 | 0.264                 | No                 |                              |                    |                                |                    |
|                        | Left Tilt     | 0.301     | 0.031                 | 0.001                   |                       | 0.332               | No                 | 0.302                 | No                 |                              |                    |                                |                    |
|                        | Right Touch   | 0.468     | 0.031                 | 0.001                   |                       | 0.499               | No                 | 0.469                 | No                 |                              |                    |                                |                    |
|                        | Right Tilt    | 0.464     | 0.031                 | 0.001                   |                       | 0.495               | No                 | 0.465                 | No                 |                              |                    |                                |                    |
| Body                   | Rear          | 0.659     | 0.185                 | 0.073                   | 0.234                 | 0.844               | No                 | 0.732                 | No                 | 1.078                        | No                 | 0.966                          | No                 |

### MIMO

| RF Exposure conditions | Test Position | ①<br>WWAN | ②<br>U-NII<br>(Main + Sub Ant) | ① + ②<br>WWAN + U-NII (Main + Sub Ant) |                    |
|------------------------|---------------|-----------|--------------------------------|----------------------------------------|--------------------|
|                        |               |           |                                | Σ 1-g SAR<br>(mW/g)                    | SPLSR<br>(Yes/ No) |
| Body                   | Rear          | 0.659     | 1.049                          | 1.708                                  | Yes                |

### SAR to Peak Location Separation Ratio (SPLSR)

| Test Position | Worst-case combination |                                | Σ 1-g SAR<br>(mW/g) |       | Calculated<br>distance<br>(mm) | SPLSR<br>(≤ 0.04) | Volume<br>Scan<br>(Yes/ No) | Figure |
|---------------|------------------------|--------------------------------|---------------------|-------|--------------------------------|-------------------|-----------------------------|--------|
|               | ①<br>WWAN              | ②<br>U-NII<br>(Main + Sub Ant) |                     |       |                                |                   |                             |        |
| Rear          | 0.659                  | 1.049                          | ① + ②               | 1.708 | 180.0                          | 0.012             | No                          | 3      |

### Note(s):

All Wi-Fi and Bluetooth SAR values (measured or estimated) used in this report were taken from SAR report 15K20515-S1D, submitted under FCC ID A3LSMT715

## 12.5. Sum of the SAR for LTE Band 41 & Wi-Fi & BT

### SISO (Wi-Fi Main Antenna)

| RF Exposure conditions | Test Position | ①<br>WWAN | ②<br>DTS<br>(Main Ant) | ③<br>U-NII<br>(Main Ant) | ④<br>BT<br>(Main Ant) | ① + ②<br>WWAN + DTS |                    | ① + ③<br>WWAN + U-NII |                    | ① + ④<br>WWAN + BT  |                    |
|------------------------|---------------|-----------|------------------------|--------------------------|-----------------------|---------------------|--------------------|-----------------------|--------------------|---------------------|--------------------|
|                        |               |           |                        |                          |                       | Σ 1-g SAR<br>(mW/g) | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g)   | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g) | SPLSR<br>(Yes/ No) |
| Head                   | Left Touch    | 0.273     | 0.272                  | 0.097                    |                       | 0.545               | No                 | 0.370                 | No                 |                     |                    |
|                        | Left Tilt     | 0.172     | 0.272                  | 0.097                    |                       | 0.444               | No                 | 0.269                 | No                 |                     |                    |
|                        | Right Touch   | 0.044     | 0.272                  | 0.097                    |                       | 0.316               | No                 | 0.141                 | No                 |                     |                    |
|                        | Right Tilt    | 0.050     | 0.272                  | 0.097                    |                       | 0.322               | No                 | 0.147                 | No                 |                     |                    |
| Body                   | Rear          | 1.098     | 0.746                  | 0.797                    | 0.234                 | 1.844               | Yes                | 1.895                 | Yes                | 1.332               | No                 |

### SISO (Wi-Fi Sub Antenna)

| RF Exposure conditions | Test Position | ①<br>WWAN | ②<br>DTS<br>(Sub Ant) | ③<br>U-NII<br>(Sub Ant) | ④<br>BT<br>(Main Ant) | ① + ②<br>WWAN + DTS |                    | ① + ③<br>WWAN + U-NII |                    | ① + ② + ④<br>WWAN + DTS + BT |                    | ① + ③ + ④<br>WWAN + U-NII + BT |                    |
|------------------------|---------------|-----------|-----------------------|-------------------------|-----------------------|---------------------|--------------------|-----------------------|--------------------|------------------------------|--------------------|--------------------------------|--------------------|
|                        |               |           |                       |                         |                       | Σ 1-g SAR<br>(mW/g) | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g)   | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g)          | SPLSR<br>(Yes/ No) | Σ 1-g SAR<br>(mW/g)            | SPLSR<br>(Yes/ No) |
| Head                   | Left Touch    | 0.273     | 0.031                 | 0.001                   |                       | 0.304               | No                 | 0.274                 | No                 |                              |                    |                                |                    |
|                        | Left Tilt     | 0.172     | 0.031                 | 0.001                   |                       | 0.203               | No                 | 0.173                 | No                 |                              |                    |                                |                    |
|                        | Right Touch   | 0.044     | 0.031                 | 0.001                   |                       | 0.075               | No                 | 0.045                 | No                 |                              |                    |                                |                    |
|                        | Right Tilt    | 0.050     | 0.031                 | 0.001                   |                       | 0.081               | No                 | 0.051                 | No                 |                              |                    |                                |                    |
| Body                   | Rear          | 1.098     | 0.185                 | 0.073                   | 0.234                 | 1.283               | No                 | 1.171                 | No                 | 1.517                        | No                 | 1.405                          | No                 |

### MIMO

| RF Exposure conditions | Test Position | ①<br>WWAN | ②<br>U-NII<br>(Main + Sub Ant) | ① + ②<br>WWAN + U-NII (Main + Sub Ant) |                    |
|------------------------|---------------|-----------|--------------------------------|----------------------------------------|--------------------|
|                        |               |           |                                | Σ 1-g SAR<br>(mW/g)                    | SPLSR<br>(Yes/ No) |
| Body                   | Rear          | 1.098     | 1.049                          | 2.147                                  | Yes                |

### SAR to Peak Location Separation Ratio (SPLSR)

| Test Position | Worst-case combination |                        |                          |                       | Σ 1-g SAR<br>(mW/g) |       | Calculated distance<br>(mm) | SPLSR<br>(≤ 0.04) | Volume Scan<br>(Yes/ No) | Figure |
|---------------|------------------------|------------------------|--------------------------|-----------------------|---------------------|-------|-----------------------------|-------------------|--------------------------|--------|
|               | ①<br>WWAN              | ②<br>DTS<br>(Main Ant) | ③<br>U-NII<br>(Main Ant) | ④<br>BT<br>(Main Ant) | ① + ②               | ① + ③ |                             |                   |                          |        |
| Rear          | 1.098                  | 0.746                  |                          |                       |                     | 1.844 | 176.1                       | 0.014             | No                       | 4      |
| Rear          | 1.098                  |                        | 0.797                    |                       |                     | 1.895 | 174.6                       | 0.015             | No                       | 5      |

| Test Position | Worst-case combination |                                | Σ 1-g SAR<br>(mW/g) |       | Calculated distance<br>(mm) | SPLSR<br>(≤ 0.04) | Volume Scan<br>(Yes/ No) | Figure |
|---------------|------------------------|--------------------------------|---------------------|-------|-----------------------------|-------------------|--------------------------|--------|
|               | ①<br>WWAN              | ②<br>U-NII<br>(Main + Sub Ant) | ① + ②               | 2.147 |                             |                   |                          |        |
| Rear          | 1.098                  | 1.049                          |                     |       | 174.3                       | 0.018             | No                       | 6      |

### Note(s):

All Wi-Fi and Bluetooth SAR values (measured or estimated) used in this report were taken from SAR report 15K20515-S1D, submitted under FCC ID A3LSMT715

Figure (1)

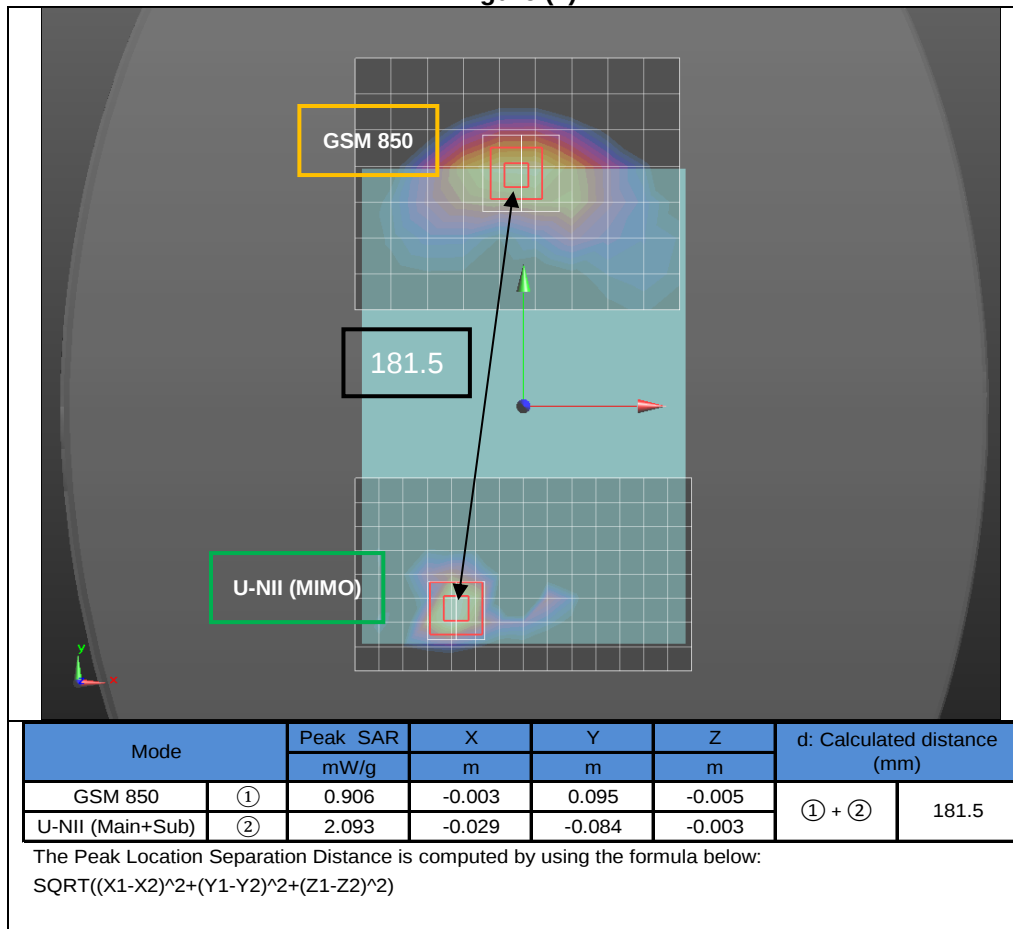


Figure (2)

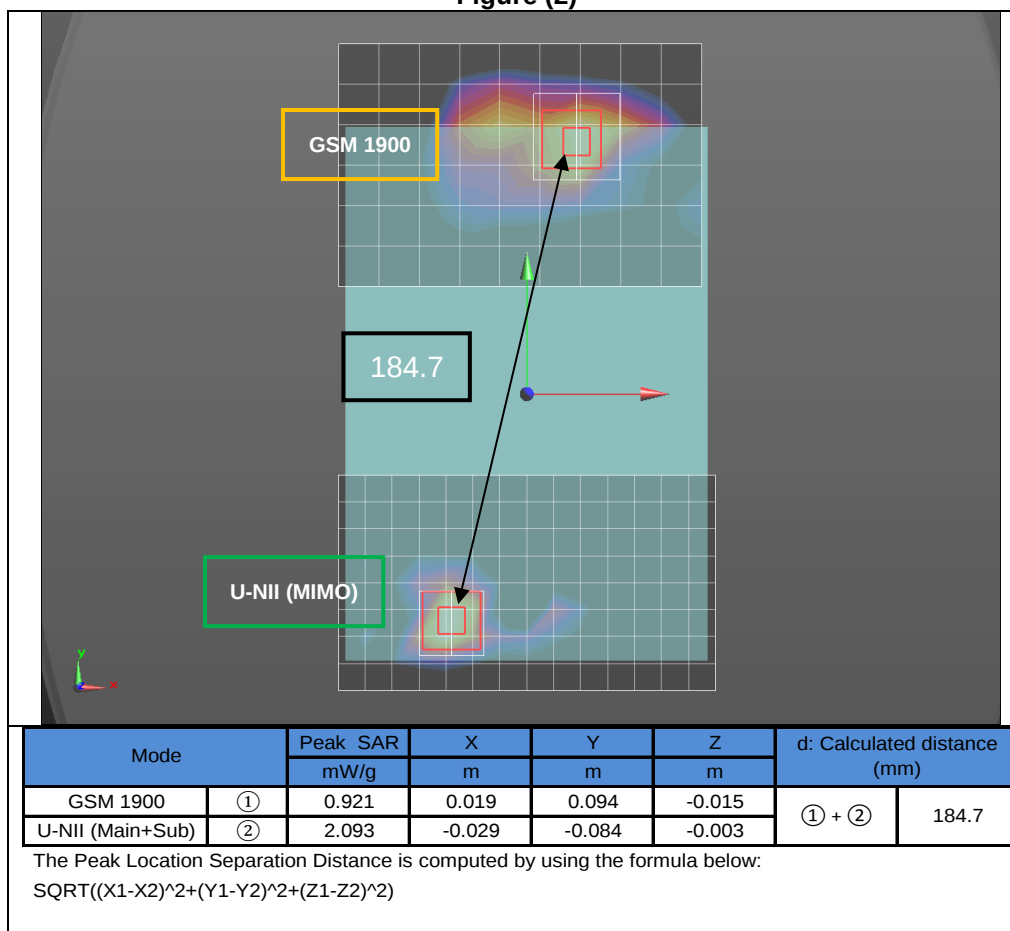


Figure (3)

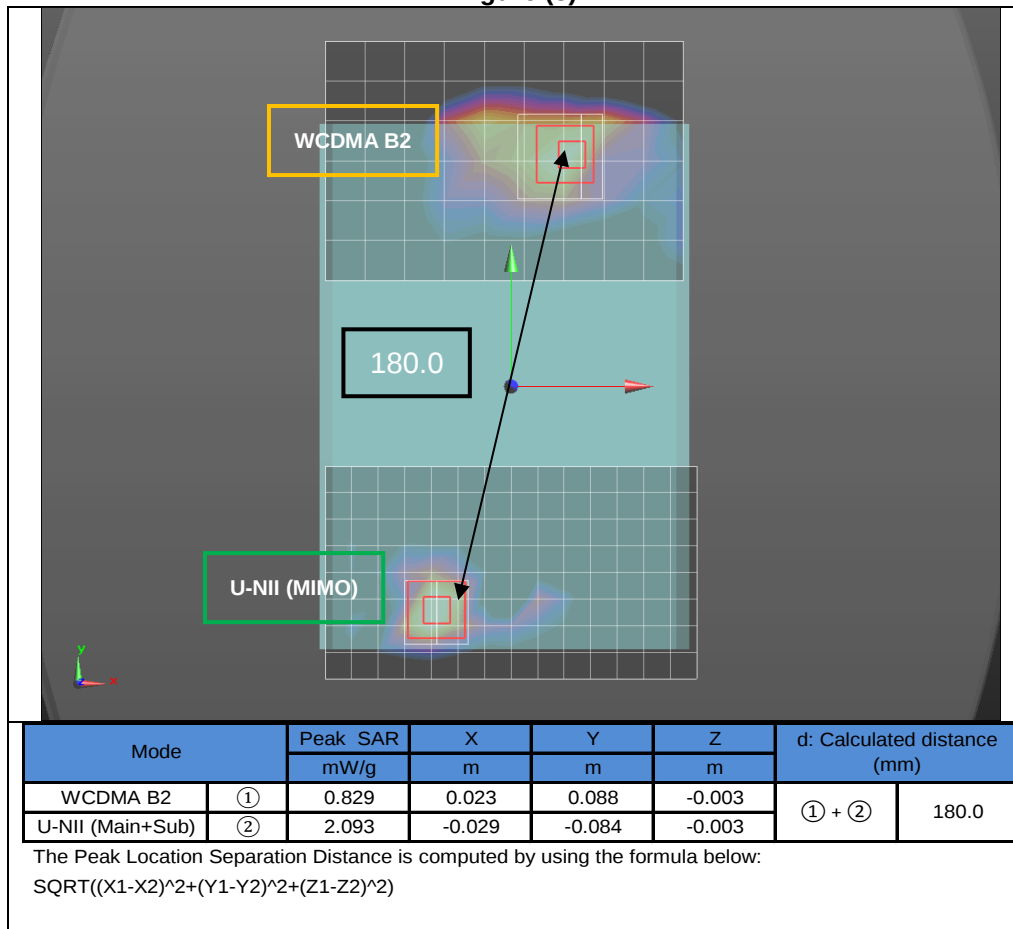


Figure (4)

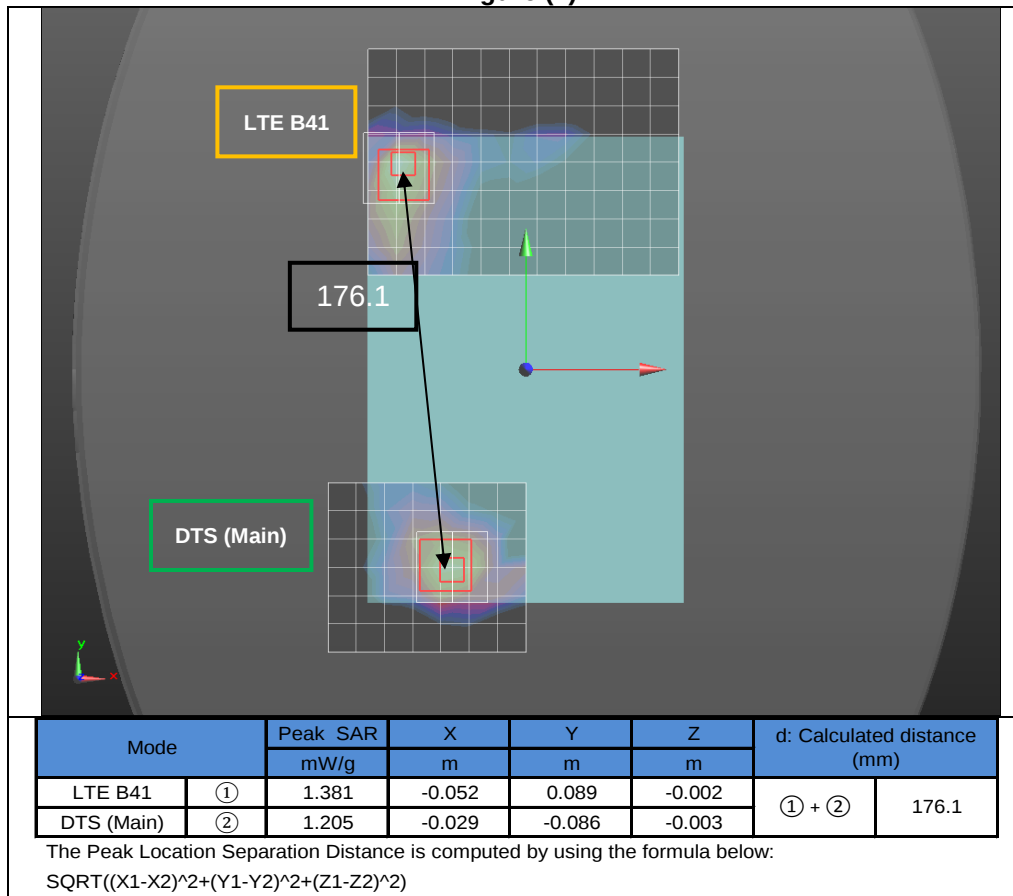


Figure (5)

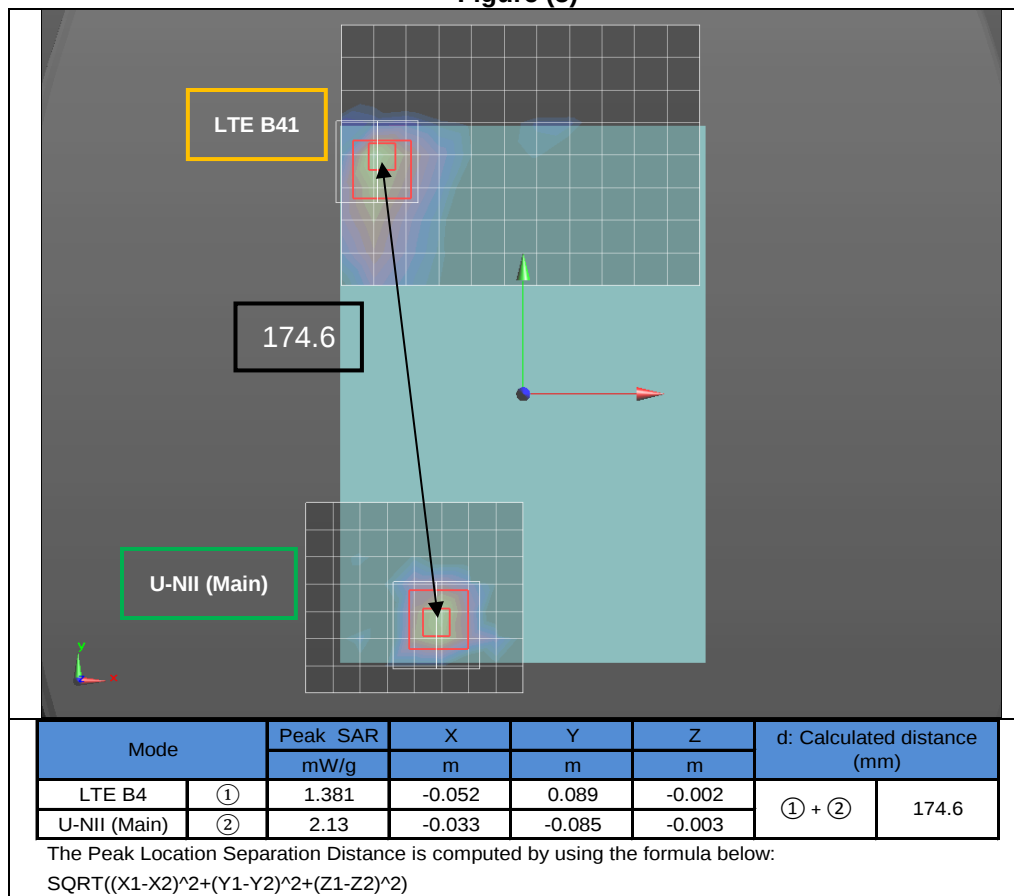
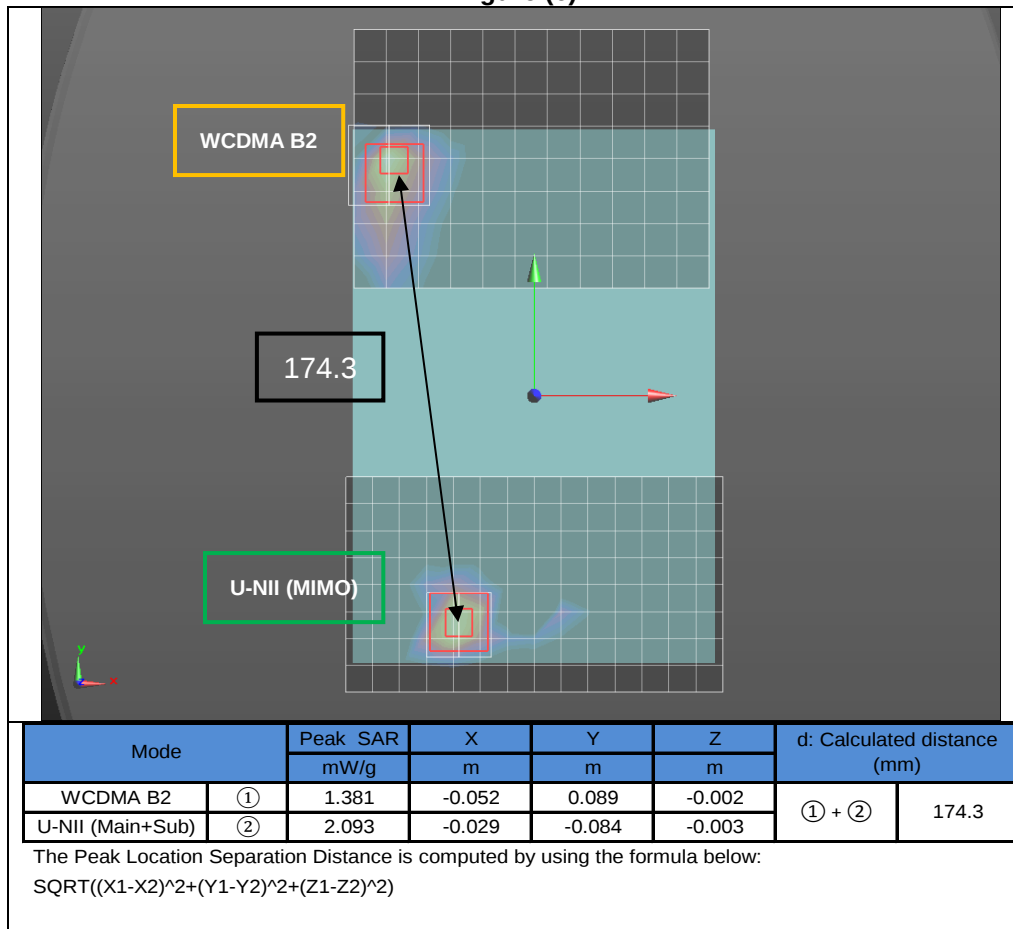


Figure (6)

**Conclusion:**

Simultaneous transmission SAR measurement (Volume Scan) is not required because either the sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

## **Appendixes**

**Refer to separated files for the following appendixes.**

**A\_15K20542-S1\_SAR Photos & Ant. Locations**

**B\_15K20542-S1\_SAR Highest Test Plots**

**C\_15K20542-S1\_SAR System Check Plots**

**D\_15K20542-S1\_SAR Tissue Ingredients**

**E\_15K20542-S1\_SAR Probe Cal. Certificates**

**F\_15K20542-S1\_SAR Dipole Cal. Certificates**

**END OF REPORT**