



SAR EVALUATION REPORT

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

For
GSM/WCDMA/LTE Tablet + Bluetooth, DTS/UNII a/b/g/n & ANT+

**FCC ID: A3LSMT355
Model Name: SM-T355**

**Report Number: 15I19901-S1
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Date	Revisions	Revised By
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Table of Contents

1.	Attestation of Test Results	5
2.	Test Specification, Methods and Procedures.....	6
3.	Facilities and Accreditation	6
4.	SAR Measurement System & Test Equipment	7
4.1.	SAR Measurement System.....	7
4.2.	SAR Scan Procedures.....	8
4.3.	Test Equipment.....	10
5.	Measurement Uncertainty.....	11
6.	Device Under Test (DUT) Information	12
6.1.	DUT Description	12
6.2.	Wireless Technologies.....	13
6.3.	Nominal and Maximum Output Power.....	14
6.4.	General LTE SAR Test and Reporting Considerations.....	15
6.5.	Power Reduction by Proximity Sensing	16
6.5.1.	Proximity Sensor Triggering Distance (KDB 616217 §6.2).....	16
6.5.2.	Proximity Sensor Triggering Distance Measurement Results.....	17
6.5.3.	Proximity Sensor Coverage (KDB 616217 §6.3)	30
6.5.4.	Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4).....	30
7.	RF Exposure Conditions (Test Configurations)	31
7.1.	Standalone SAR Test Exclusion Considerations.....	31
7.2.	Required Test Configurations	33
8.	Dielectric Property Measurements & System Check	34
8.1.	Dielectric Property Measurements	34
8.2.	System Check.....	38
9.	Conducted Output Power Measurements.....	41
9.1.	GSM	41
9.2.	W-CDMA	43
9.3.	LTE.....	48
9.4.	Wi-Fi 2.4GHz	50
9.5.	Wi-Fi 5GHz.....	51
9.6.	Bluetooth	52
10.	Measured and Reported (Scaled) SAR Results.....	53
10.1.	GSM850.....	55

10.2.	GSM1900	55
10.3.	W-CDMA Band V	56
10.4.	W-CDMA Band II.....	56
10.5.	LTE Band 5 (10MHz Bandwidth)	57
10.6.	Wi-Fi (DTS Band).....	57
10.7.	Wi-Fi (U-NII Band).....	58
10.8.	Bluetooth.....	58
11.	SAR Measurement Variability.....	59
12.	Simultaneous Transmission SAR Analysis.....	60
12.1.	Sum of the SAR for GSM850 & Wi-Fi & BT	61
12.2.	Sum of the SAR for GSM1900 & Wi-Fi & BT	61
12.3.	Sum of the SAR for WCDMA Band V & Wi-Fi & BT.....	61
12.4.	Sum of the SAR for WCDMA Band II & Wi-Fi & BT	62
12.5.	Sum of the SAR for LTE Band 5 & Wi-Fi & BT	62
Appendixes		65
A_15I19901v0	SAR Photos & Ant. Locations	65
B_15I19901v0	SAR System Check Plots	65
C_15I19901v0	SAR Highest Test Plots	65
D_15I19901v0	SAR Tissue Ingredients.....	65
E_15I19901v0	SAR Probe Cal. Certificates.....	65
F_15I19901v0	SAR Dipole Cal. Certificates	65

1. Attestation of Test Results

Applicant Name	SAMSUNG ELECTRONICS CO., LTD.				
FCC ID	A3LSMT355				
Model Name	SM-T355				
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013				
SAR Limits (W/Kg)					
Exposure Category	Peak spatial-average(1g of tissue)				
General population / Uncontrolled exposure	1.6				
The Highest Reported SAR (W/kg)					
RF Exposure Conditions		Equipment Class			
		Licensed	DTS	U-NII	DSS (BT)
Head		0.254	0.519	0.503	N/A
Body		1.082	0.545	0.654	0.009
Simultaneous Tx	Head	0.735	0.688	0.735	N/A
	Body	1.493	1.384	1.493	N/A
Date Tested		2/2/2015 to 2/13/2015			
Test Results		Pass			
UL Verification Services Inc. 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 Verification Services Inc. 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. Note: 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.					
Approved & Released By:			Prepared By:		
					
Bobby Bayani Senior Engineer UL Verification Services Inc.			Chakrit Thammanavarat Laboratory Engineer UL Verification Services Inc.		

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 SAR meas for 802.11 v02
- 447498 D01 General RF Exposure Guidance v05r02
- 447498 D03 Supplement C Cross-Reference
- 616217 D04 SAR for laptop and tablets v01r01
- 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

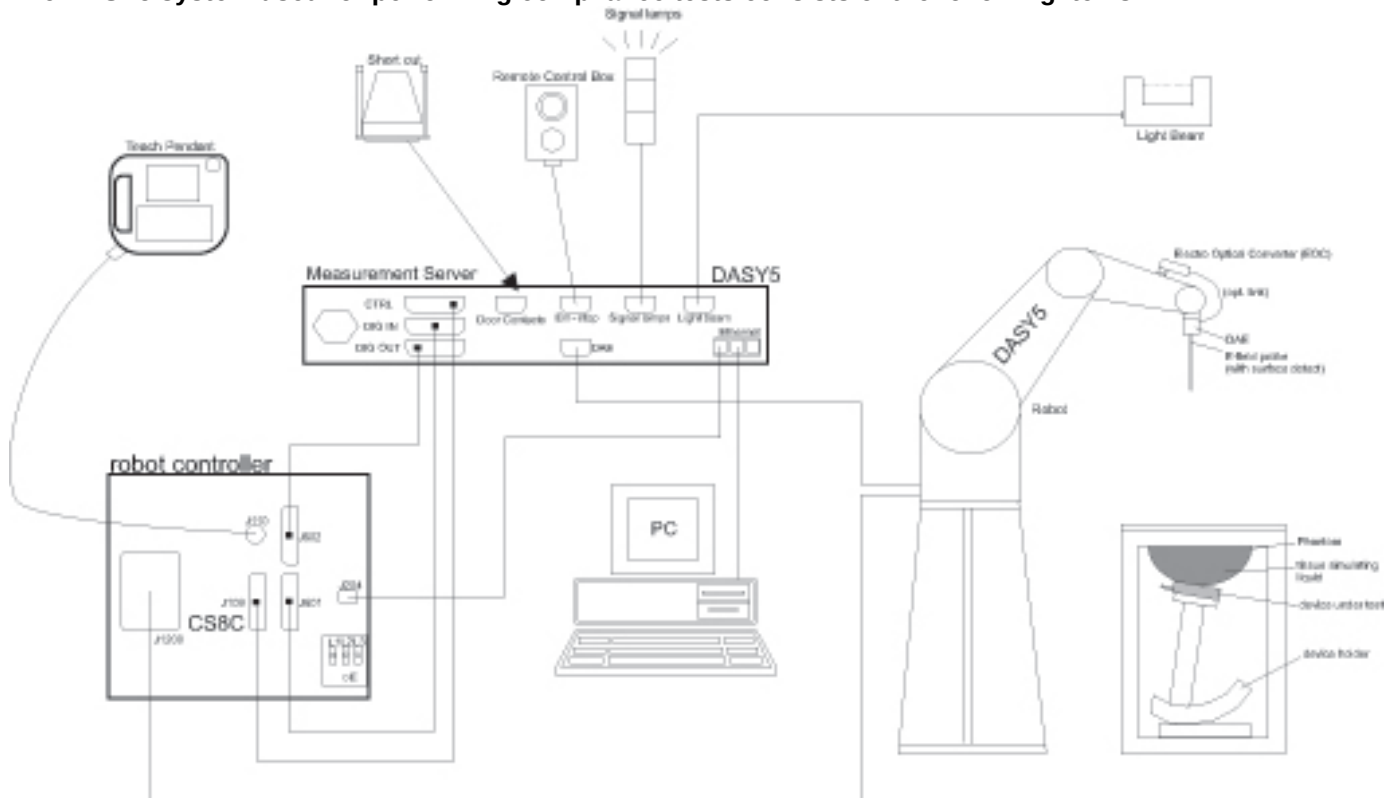
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	
SAR Lab G	
SAR Lab H	

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

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

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 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: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$	≤ 2 GHz: ≤ 15 mm $2 - 3$ GHz: ≤ 12 mm	$3 - 4$ GHz: ≤ 12 mm $4 - 6$ GHz: ≤ 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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 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		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ 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 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 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	8753ES	MY40001647	7/17/2015
Dielectronic Probe kit	SPEAG	DAK-3.5	1087	11/11/2015
Dielectronic Probe kit	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Traceable Calibration Control Co.	4242	122529162	10/8/2015

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	HP	8665B	3744A01084	5/20/2015
Power Meter	Agilent	N1912A	MY53040016	5/5/2015
Power Sensor	Agilent	E9323A	MY53070005	5/1/2015
Power Sensor	Agilent	E9323A	MY53070009	5/28/2015
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Directional coupler	Werlatone	C8060-102	2149	N/A
DC Power Supply	AMETEK	XT 15-4	1319A02778	N/A
E-Field Probe (SAR Lab A)	SPEAG	EX3DV4	3772	2/26/2015
E-Field Probe (SAR Lab A)	SPEAG	EX3DV4	3901	1/27/2016
E-Field Probe (SAR Lab E)	SPEAG	EX3DV4	3989	4/15/2015
E-Field Probe (SAR Lab G)	SPEAG	EX3DV4	3990	4/15/2015
Data Acquisition Electronics (SAR Lab A)	SPEAG	DAE4	1433	4/14/2015
Data Acquisition Electronics (SAR Lab E)	SPEAG	DAE4	1357	2/17/2015
Data Acquisition Electronics (SAR Lab G)	SPEAG	DAE3	1434	4/14/2015
System Validation Dipole	SPEAG	D835V2	4d117	5/16/2015
System Validation Dipole	SPEAG	D1900V2	5d140	4/23/2015
System Validation Dipole	SPEAG	D2450V2	706	5/20/2015
System Validation Dipole	SPEAG	D2450V2	899	9/10/2015
System Validation Dipole	SPEAG	D5GHzV2	1138	9/18/2015

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Agilent	N1911A	MY53060016	8/3/2014
Power Sensor	Agilent	E9323A	MY53070003	5/1/2015
Base Station Simulator	R & S	CMW500	124594-HX	7/2/2014

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

GSM/WCDMA/LTE Tablet + Bluetooth, DTS/UNII a/b/g/n & ANT+	
Device Dimension	Overall (Length x Width): 209 mm x 139 mm Overall Diagonal: 242 mm Display Diagonal: 205 mm
Battery Back Cover	☒ The rechargeable battery is not user accessible.
Battery Options	☒ 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. ☒ Mobile Hotspot (Wi-Fi 2.4 GHz) ☐ Mobile Hotspot (Wi-Fi 5 GHz)
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other ☒ Wi-Fi Direct (Wi-Fi 2.4 GHz) ☒ 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 1900	Voice (GMSK) GPRS (GMSK) EGPRS (8PSK)	GPRS Multi-Slot Class: ☐ Class 8 - One Up ☐ Class 10 - Two Up ☐ Class 12 - Four Up ☒ Class 33 - Four Up	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	Does this device support DTM (Dual Transfer Mode)? ☐ Yes ☒ No			
W-CDMA (UMTS)	Band II Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6) DC-HSDPA (Rel. 8)		100%
LTE (FDD)	Band 5	QPSK 16QAM (Rel. 9) ☒ Does not support Carrier Aggregation (CA).		100%
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		100%
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40)		100%
	Does this device support TDWR (Terminal Doppler Weather Radar)? ☐ Yes ☒ No			
Does this device support Band gap channel? ☐ Yes ☒ No				
Bluetooth	2.4 GHz	Version 1.2 Version 2.0 + EDR Version 2.1 + EDR Version 3.0 + HS Version 4.0 LE		77.52% (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)		Reduced RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit	Target	Max. tune-up tolerance limit
GSM850	Voice	32.5	33.0	28.5	29.0
	GPRS 1 slot	32.5	33.0	28.5	29.0
	GPRS 2 slots	31.0	31.5	25.5	26.0
	GPRS 3 slots	29.5	30.0	24.5	25.0
	GPRS 4 slots	28.0	28.5	22.5	23.0
	EGPRS 1 slot	27.0	27.5	26.0	26.5
	EGPRS 2 slots	25.5	26.0	26.0	26.5
	EGPRS 3 slots	23.5	24.0	24.0	24.5
	EGPRS 4 slots	22.0	22.5	23.0	23.5
GSM1900	Voice	29.5	30.0	21.5	22.0
	GPRS 1 slot	29.5	30.0	21.5	22.0
	GPRS 2 slots	28.0	28.5	19.0	19.5
	GPRS 3 slots	26.5	27.0	16.5	17.0
	GPRS 4 slots	25.0	25.5	15.5	16.0
	EGPRS 1 slot	25.5	26.0	21.0	21.5
	EGPRS 2 slots	24.5	25.0	18.0	18.5
	EGPRS 3 slots	23.0	23.5	16.0	16.5
	EGPRS 4 slots	21.5	22.0	15.0	15.5
W-CDMA Band V	R99	22.5	23.0	17.5	18.0
	HSDPA	22.5	23.0	17.5	18.0
	HSUPA	22.5	23.0	17.5	18.0
	DC-HSDPA	22.5	23.0	17.5	18.0
W-CDMA Band II	R99	22.5	23.0	12.0	12.5
	HSDPA	22.5	23.0	12.0	12.5
	HSUPA	22.5	23.0	12.0	12.5
	DC-HSDPA	22.5	23.0	12.0	12.5
LTE Band 5	QPSK	22.5	23.0	20.0	20.5

Upper limit (dB): 0.5		Max. RF Output Power (dBm)		Reduced RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit	Target	Max. tune-up tolerance limit
WiFi 2.4 GHz	802.11b	16.0	16.5	11.0	11.5
	802.11g	13.0	13.5	11.0	11.5
	802.11n HT20	12.0	12.5	11.0	11.5
WiFi 5 GHz	802.11a	11.0	11.5	6.0	6.5
	802.11n HT20	11.0	11.5	6.0	6.5
	802.11n HT40	9.0	9.5	6.0	6.5
Bluetooth		10.0	10.5	N/A	
Bluetooth LE		0.5	1.0	N/A	

6.4. General LTE SAR Test and Reporting Considerations

General LTE SAR Test and Reporting Considerations

Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 5	Frequency range: 824 - 849 MHz																																											
		Channel Bandwidth																																											
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																						
	Low			20450/ 829	20425/ 826.5	20415/ 825.5	20407/ 824.7																																						
	Mid			20525/ 836.5	20525/ 836.5	20525/ 836.5	20525/ 836.5																																						
	High			20600/ 844	20625/ 846.5	20635/ 847.5	20643/ 848.3																																						
LTE transmitter and antenna implementation	LTE has one (1) TX/RX antennas and one (1) RX antennas Refer to Appendix A...																																												
Maximum power reduction (MPR)	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3 <table> <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> <tr> <td>QPSK</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>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr> <tr> <td>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr> </table> MPR Built-in by design A-MPR (additional MPR) was disabled during SAR testing							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
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																																						
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. Power Reduction by Proximity Sensing

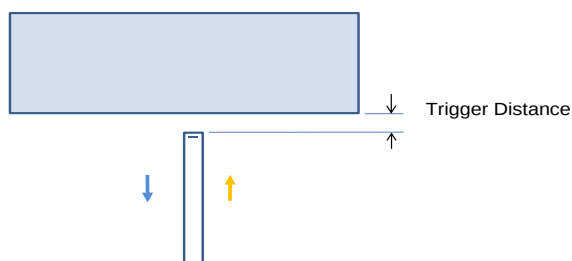
6.5.1. Proximity Sensor Triggering Distance (KDB 616217 §6.2)

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.

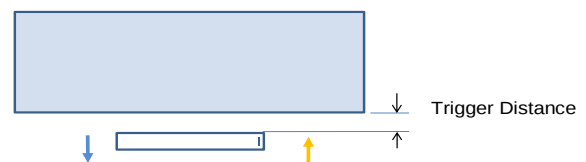
The measurement was then repeated for the Rear surface.

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.



Proximity Sensor Trigger Distance Assessment
KDB 616217 §6.2, **Edge 1**



Proximity Sensor Trigger Distance Assessment
KDB 616217 §6.2, **Rear**

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 for WWAN

Tissue simulating liquid	Trigger distance - Rear		Trigger distance – Edge 2		Trigger distance – Edge 3	
	Moving toward phantom	Moving from phantom	Moving from phantom	Moving toward phantom	Moving from phantom	Moving toward phantom
850 muscle	17mm	17mm	2mm	2mm	13mm	13mm
1900 muscle	17mm	17mm	2mm	2mm	13mm	13mm

Summary of Trigger Distances for Wi-Fi

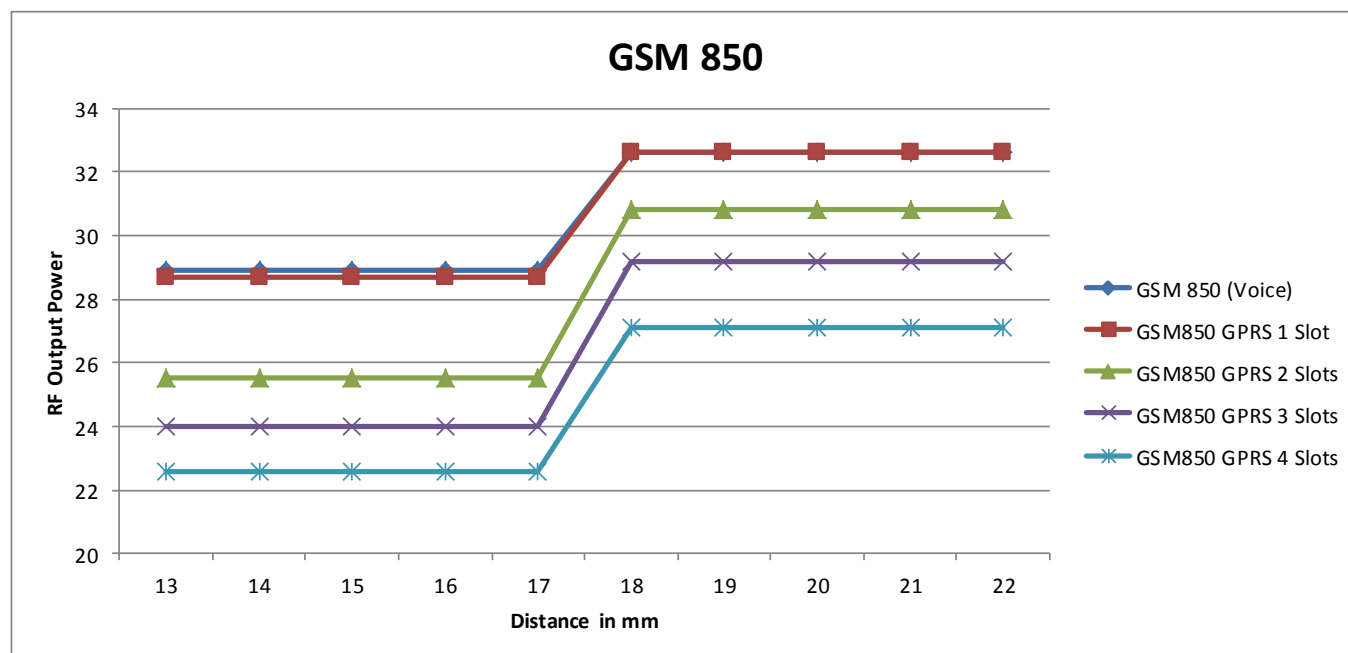
Tissue simulating liquid	Trigger distance - Rear		Trigger distance – Edge 1	
	Moving toward phantom	Moving from phantom	Moving from phantom	Moving toward phantom
2450 muscle	13mm	13mm	11mm	11mm
5000 muscle	13mm	13mm	11mm	11mm

6.5.2. Proximity Sensor Triggering Distance Measurement Results

GSM850

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

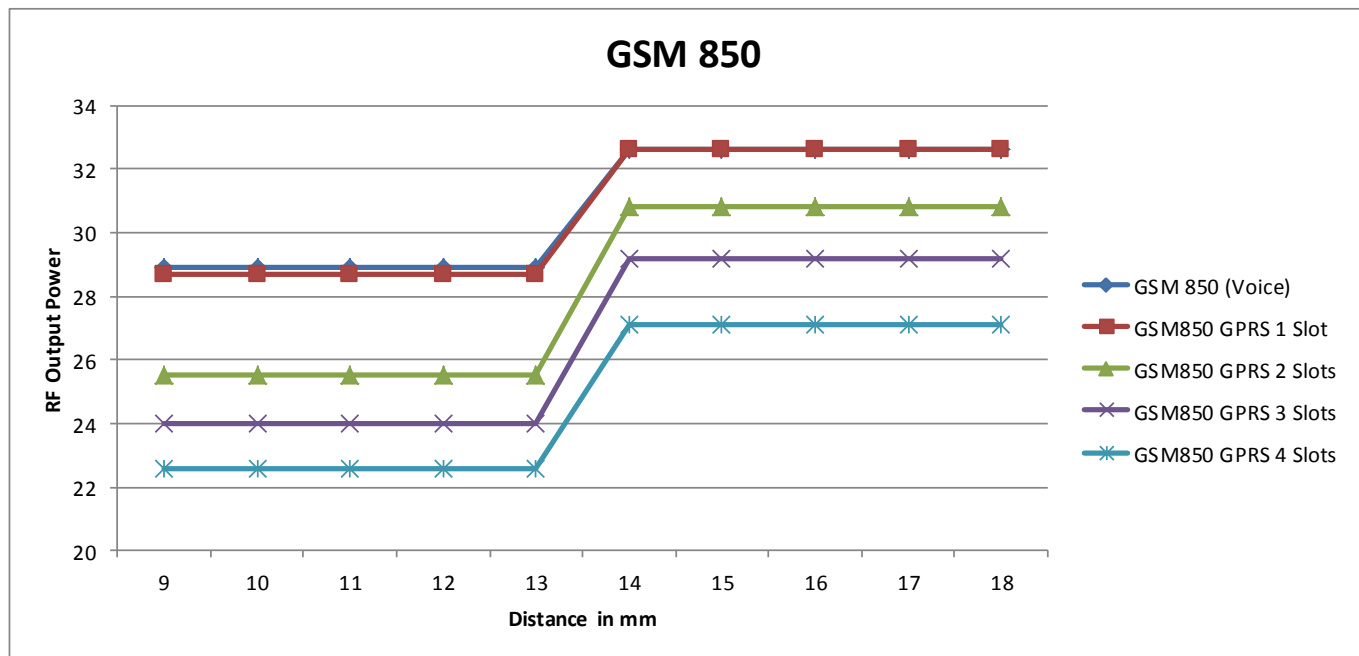
Distance to DUT vs. Output Power in dBm										
Distance (mm)	13	14	15	16	17	18	19	20	21	22
GSM 850 (Voice)	28.9	28.9	28.9	28.9	28.9	32.6	32.6	32.6	32.6	32.6
GSM850 GPRS 1 Slot	28.7	28.7	28.7	28.7	28.7	32.6	32.6	32.6	32.6	32.6
GSM850 GPRS 2 Slots	25.5	25.5	25.5	25.5	25.5	30.8	30.8	30.8	30.8	30.8
GSM850 GPRS 3 Slots	24.0	24.0	24.0	24.0	24.0	29.2	29.2	29.2	29.2	29.2
GSM850 GPRS 4 Slots	22.6	22.6	22.6	22.6	22.6	27.1	27.1	27.1	27.1	27.1



GSM850

Edge 2, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

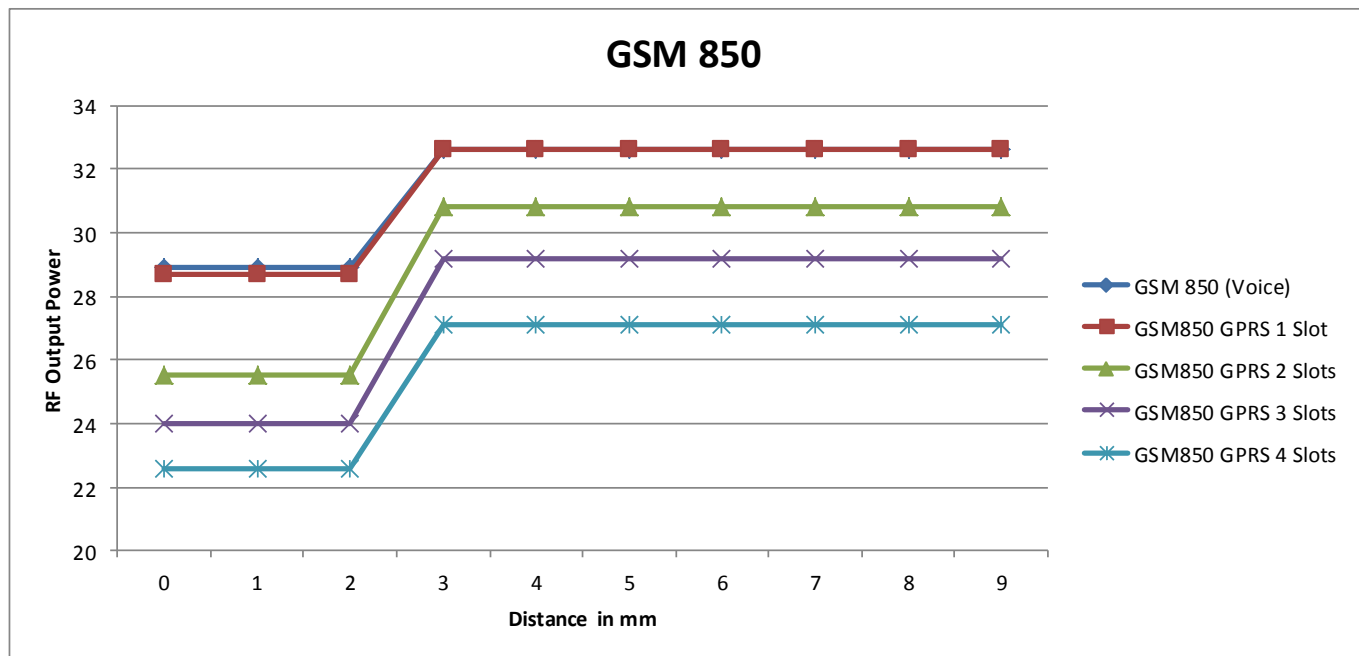
Distance to DUT vs. Output Power in dBm										
Distance (mm)	9	10	11	12	13	14	15	16	17	18
GSM 850 (Voice)	28.9	28.9	28.9	28.9	28.9	32.6	32.6	32.6	32.6	32.6
GSM850 GPRS 1 Slot	28.7	28.7	28.7	28.7	28.7	32.6	32.6	32.6	32.6	32.6
GSM850 GPRS 2 Slots	25.5	25.5	25.5	25.5	25.5	30.8	30.8	30.8	30.8	30.8
GSM850 GPRS 3 Slots	24.0	24.0	24.0	24.0	24.0	29.2	29.2	29.2	29.2	29.2
GSM850 GPRS 4 Slots	22.6	22.6	22.6	22.6	22.6	27.1	27.1	27.1	27.1	27.1



GSM850

Edge 3, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

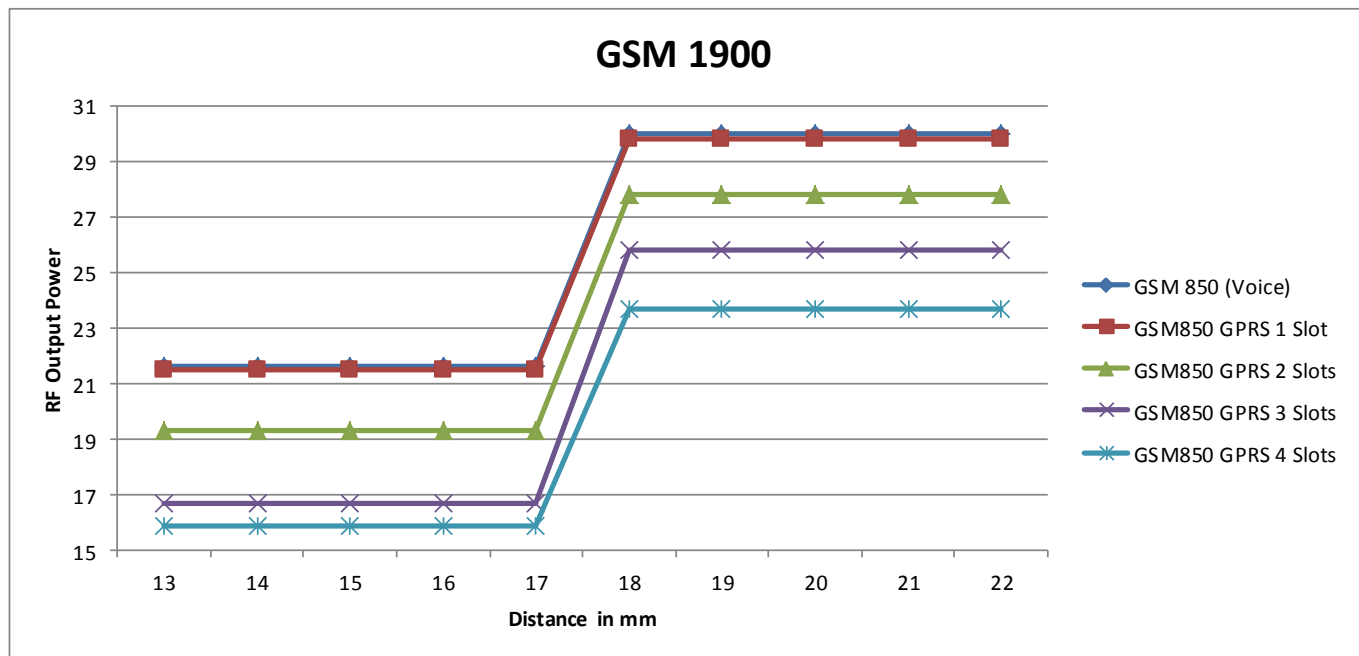
Distance to DUT vs. Output Power in dBm										
Distance (mm)	0	1	2	3	4	5	6	7	8	9
GSM 850 (Voice)	28.9	28.9	28.9	32.6	32.6	32.6	32.6	32.6	32.6	32.6
GSM850 GPRS 1 Slot	28.7	28.7	28.7	32.6	32.6	32.6	32.6	32.6	32.6	32.6
GSM850 GPRS 2 Slots	25.5	25.5	25.5	30.8	30.8	30.8	30.8	30.8	30.8	30.8
GSM850 GPRS 3 Slots	24.0	24.0	24.0	29.2	29.2	29.2	29.2	29.2	29.2	29.2
GSM850 GPRS 4 Slots	22.6	22.6	22.6	27.1	27.1	27.1	27.1	27.1	27.1	27.1



GSM1900

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

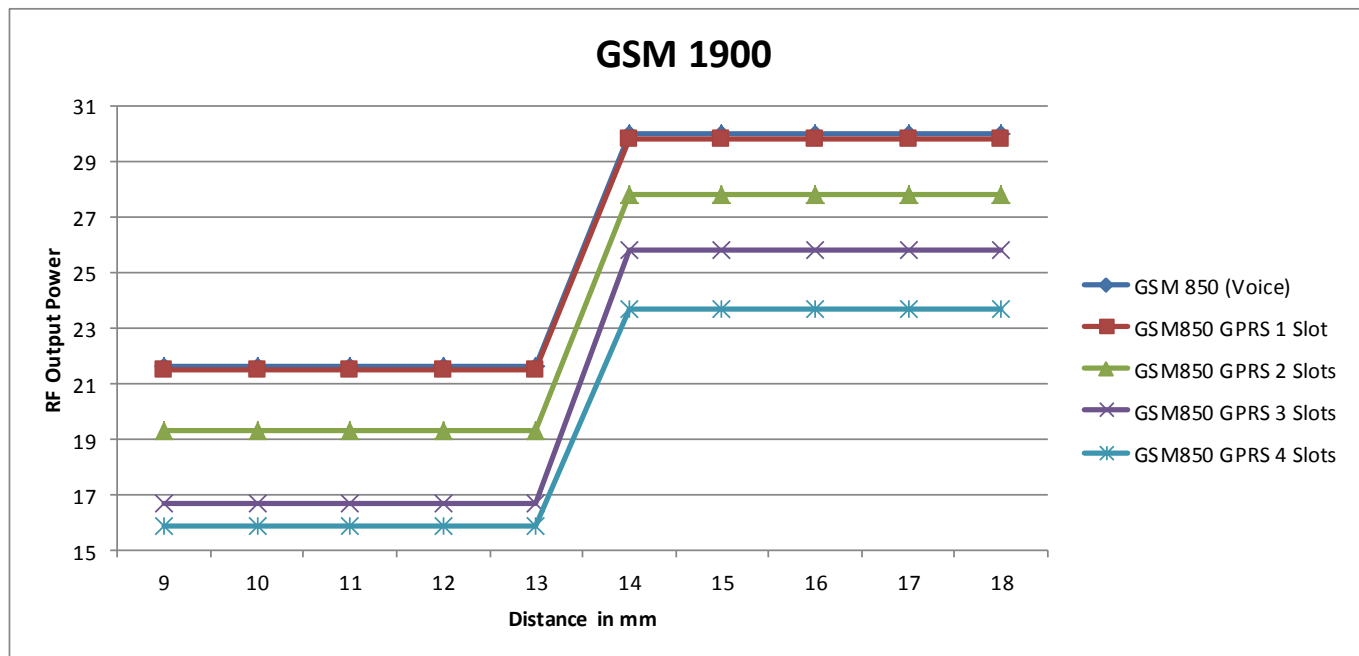
Distance to DUT vs. Output Power in dBm										
Distance (mm)	13	14	15	16	17	18	19	20	21	22
GSM 850 (Voice)	21.6	21.6	21.6	21.6	21.6	30.0	30.0	30.0	30.0	30.0
GSM850 GPRS 1 Slot	21.5	21.5	21.5	21.5	21.5	29.8	29.8	29.8	29.8	29.8
GSM850 GPRS 2 Slots	19.3	19.3	19.3	19.3	19.3	27.8	27.8	27.8	27.8	27.8
GSM850 GPRS 3 Slots	16.7	16.7	16.7	16.7	16.7	25.8	25.8	25.8	25.8	25.8
GSM850 GPRS 4 Slots	15.9	15.9	15.9	15.9	15.9	23.7	23.7	23.7	23.7	23.7



GSM1900

Edge 2, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

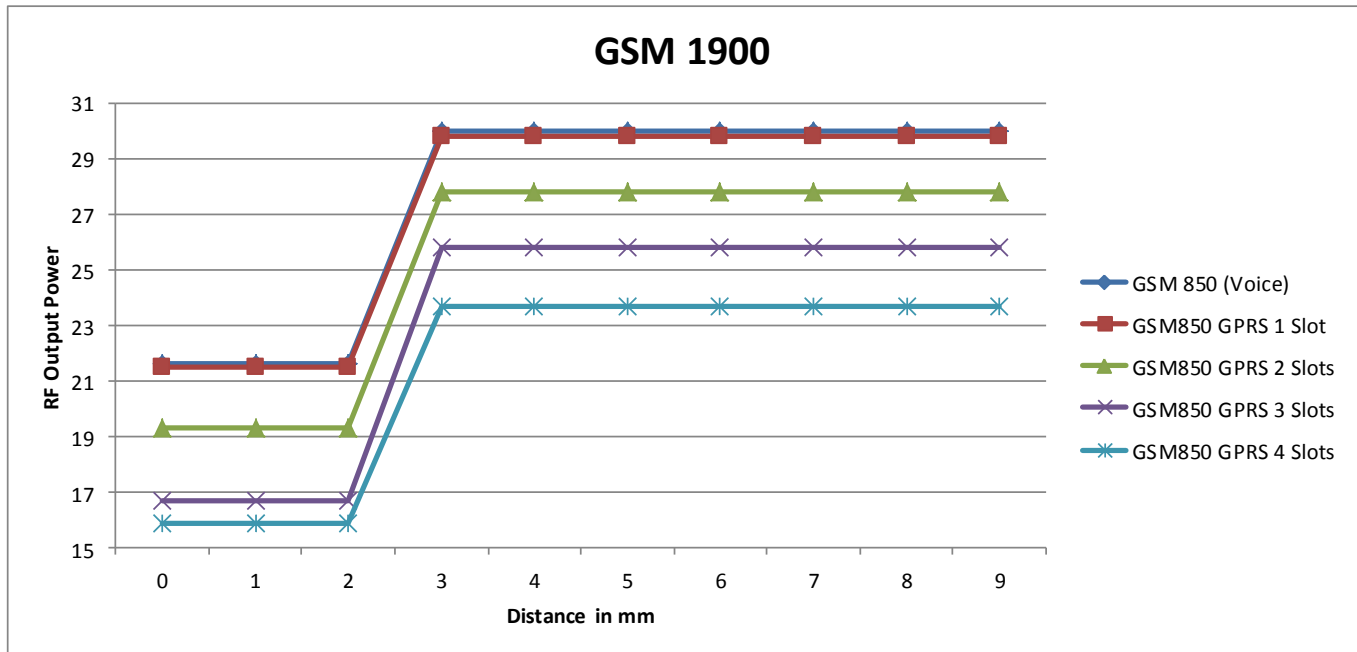
Distance to DUT vs. Output Power in dBm										
Distance (mm)	9	10	11	12	13	14	15	16	17	18
GSM 850 (Voice)	21.6	21.6	21.6	21.6	21.6	30.0	30.0	30.0	30.0	30.0
GSM850 GPRS 1 Slot	21.5	21.5	21.5	21.5	21.5	29.8	29.8	29.8	29.8	29.8
GSM850 GPRS 2 Slots	19.3	19.3	19.3	19.3	19.3	27.8	27.8	27.8	27.8	27.8
GSM850 GPRS 3 Slots	16.7	16.7	16.7	16.7	16.7	25.8	25.8	25.8	25.8	25.8
GSM850 GPRS 4 Slots	15.9	15.9	15.9	15.9	15.9	23.7	23.7	23.7	23.7	23.7



GSM1900

Edge 3, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

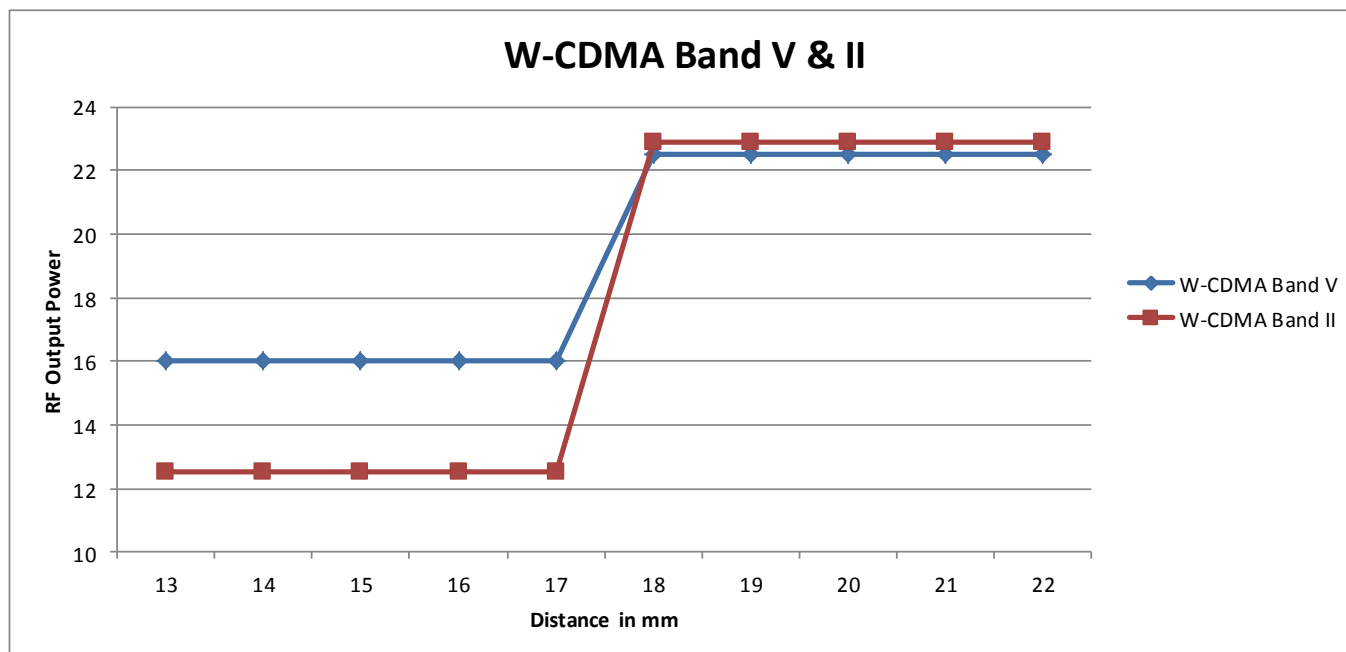
Distance to DUT vs. Output Power in dBm										
Distance (mm)	0	1	2	3	4	5	6	7	8	9
GSM 850 (Voice)	21.6	21.6	21.6	30.0	30.0	30.0	30.0	30.0	30.0	30.0
GSM850 GPRS 1 Slot	21.5	21.5	21.5	29.8	29.8	29.8	29.8	29.8	29.8	29.8
GSM850 GPRS 2 Slots	19.3	19.3	19.3	27.8	27.8	27.8	27.8	27.8	27.8	27.8
GSM850 GPRS 3 Slots	16.7	16.7	16.7	25.8	25.8	25.8	25.8	25.8	25.8	25.8
GSM850 GPRS 4 Slots	15.9	15.9	15.9	23.7	23.7	23.7	23.7	23.7	23.7	23.7



W-CDMA Band V & II

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

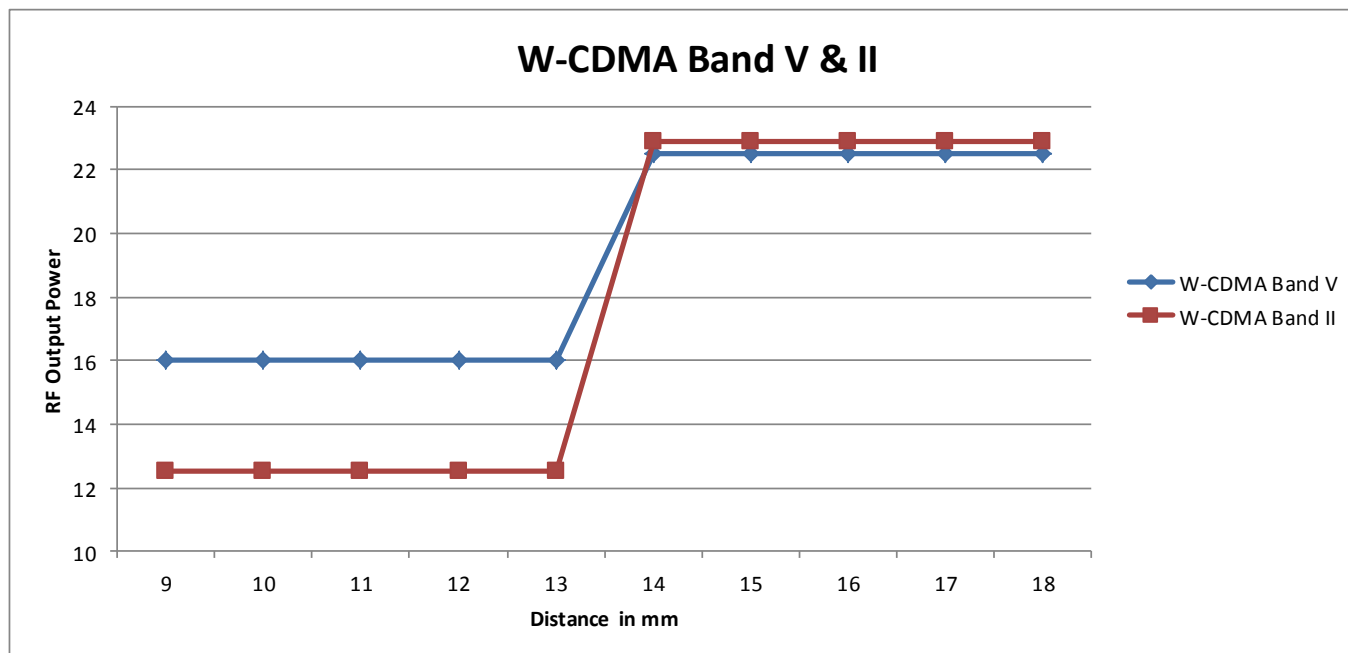
Distance to DUT vs. Output Power in dBm										
Distance (mm)	13	14	15	16	17	18	19	20	21	22
W-CDMA Band V	16.0	16.0	16.0	16.0	16.0	22.5	22.5	22.5	22.5	22.5
W-CDMA Band II	12.5	12.5	12.5	12.5	12.5	22.9	22.9	22.9	22.9	22.9



W-CDMA Band V & II

Edge 2, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

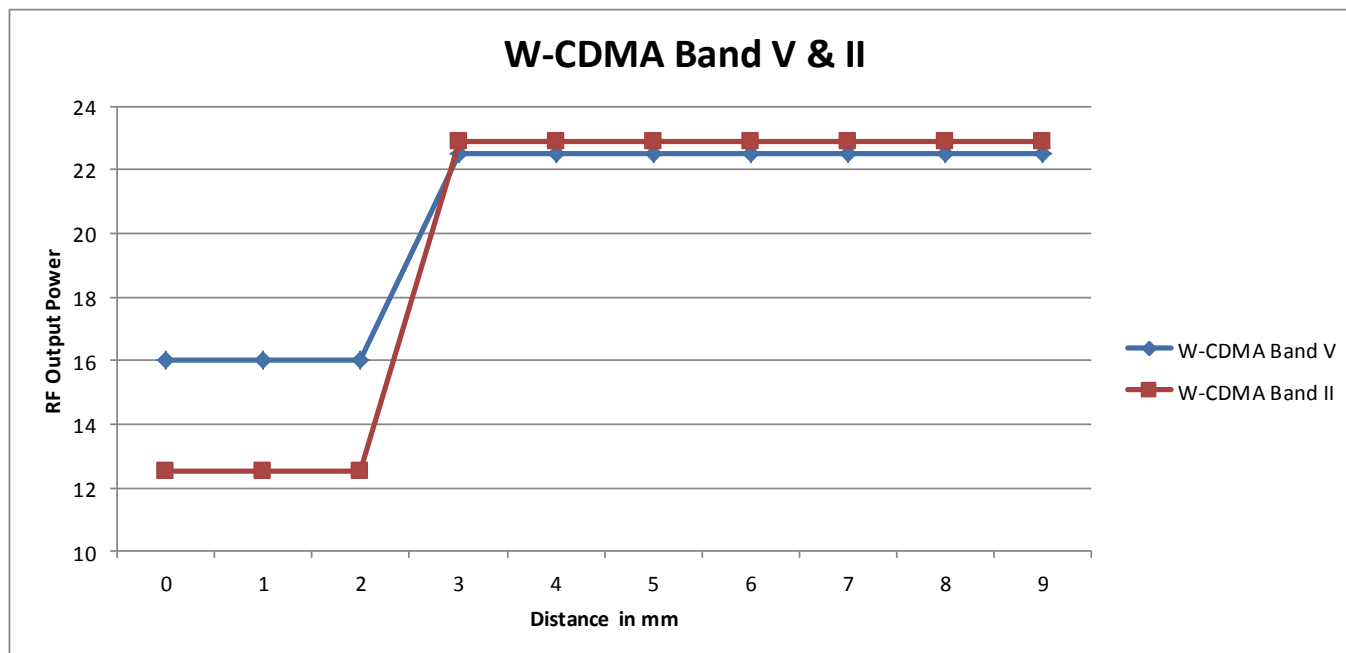
Distance to DUT vs. Output Power in dBm										
Distance (mm)	9	10	11	12	13	14	15	16	17	18
W-CDMA Band V	16.0	16.0	16.0	16.0	16.0	22.5	22.5	22.5	22.5	22.5
W-CDMA Band II	12.5	12.5	12.5	12.5	12.5	22.9	22.9	22.9	22.9	22.9



W-CDMA Band V & II

Edge 3, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

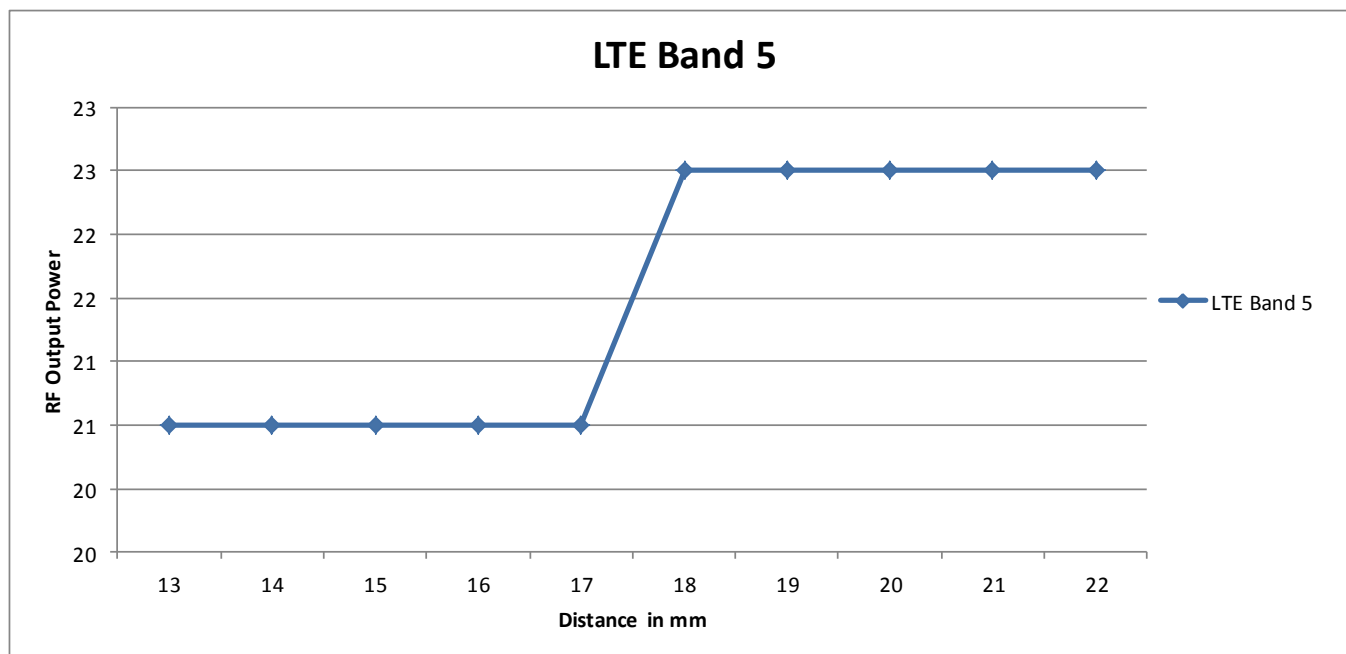
Distance to DUT vs. Output Power in dBm										
Distance (mm)	0	1	2	3	4	5	6	7	8	9
W-CDMA Band V	16.0	16.0	16.0	22.5	22.5	22.5	22.5	22.5	22.5	22.5
W-CDMA Band II	12.5	12.5	12.5	22.9	22.9	22.9	22.9	22.9	22.9	22.9



LTE Band 5

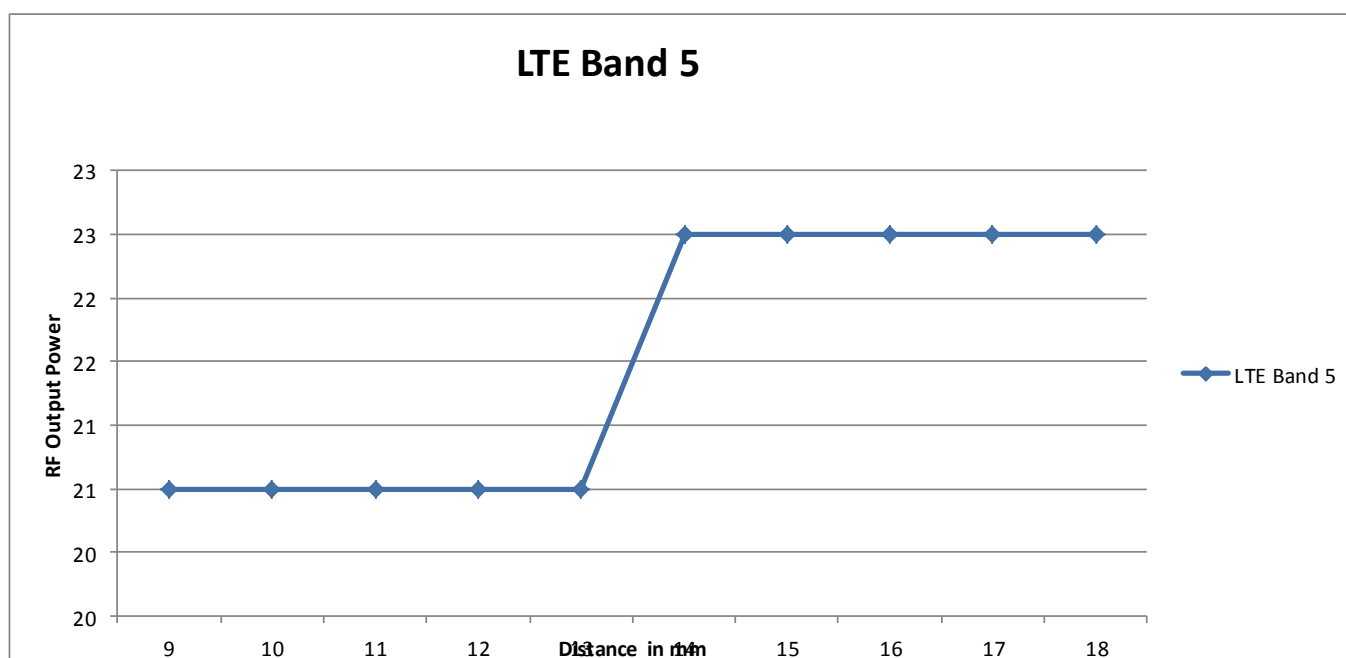
Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	13	14	15	16	17	18	19	20	21	22
LTE Band 5	20.5	20.5	20.5	20.5	20.5	22.5	22.5	22.5	22.5	22.5



Edge 2, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

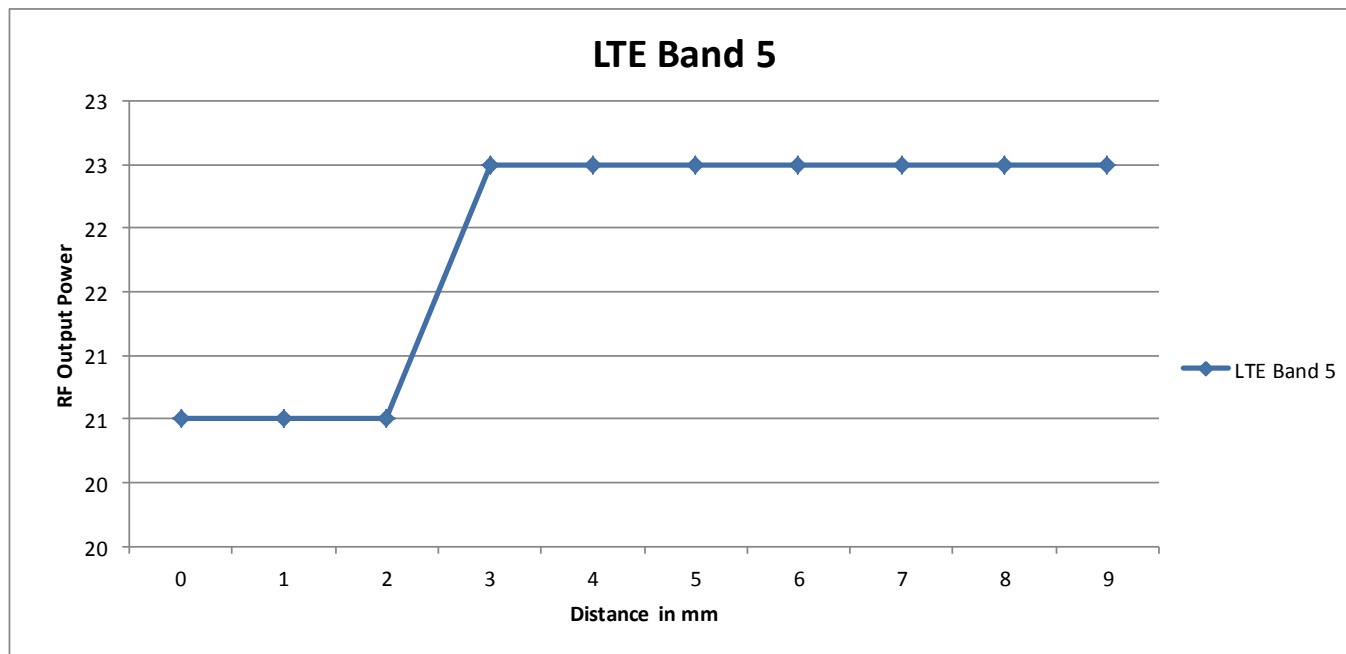
Distance to DUT vs. Output Power in dBm										
Distance (mm)	9	10	11	12	13	14	15	16	17	18
LTE Band 5	20.5	20.5	20.5	20.5	20.5	22.5	22.5	22.5	22.5	22.5



LTE Band 5

Edge 3, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

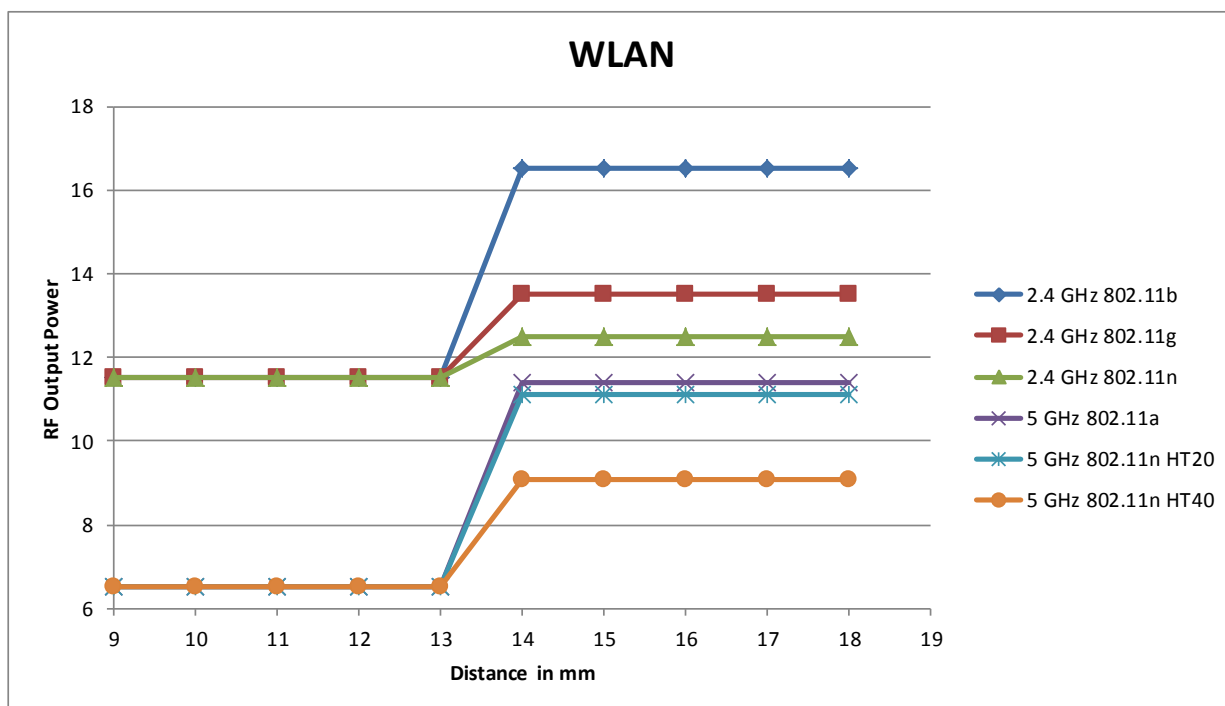
Distance to DUT vs. Output Power in dBm										
Distance (mm)	0	1	2	3	4	5	6	7	8	9
LTE Band 5	20.5	20.5	20.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5



Wi-Fi 2.4GHz and 5GHz

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

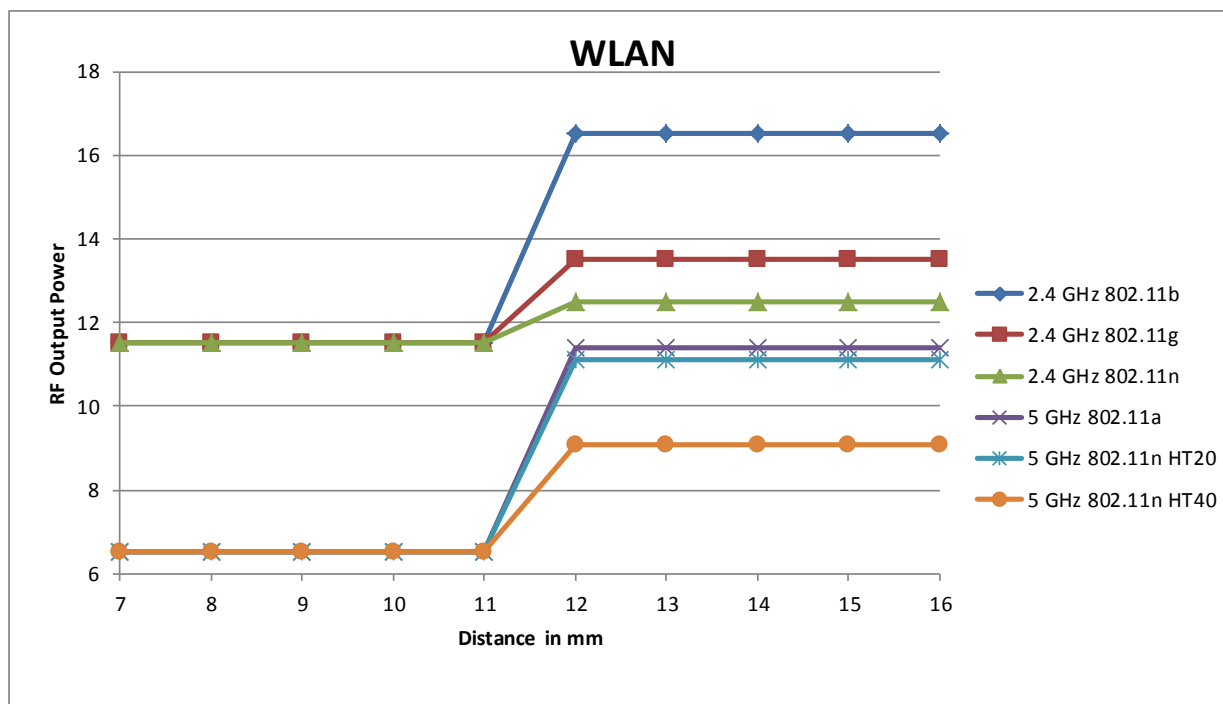
Distance to DUT vs. Output Power in dBm										
Distance	9	10	11	12	13	14	15	16	17	18
2.4 GHz 802.11b	11.50	11.50	11.50	11.50	11.50	16.50	16.50	16.50	16.50	16.50
2.4 GHz 802.11g	11.50	11.50	11.50	11.50	11.50	13.50	13.50	13.50	13.50	13.50
2.4 GHz 802.11n	11.50	11.50	11.50	11.50	11.50	12.50	12.50	12.50	12.50	12.50
5 GHz 802.11a	6.50	6.50	6.50	6.50	6.50	11.40	11.40	11.40	11.40	11.40
5 GHz 802.11n HT20	6.50	6.50	6.50	6.50	6.50	11.10	11.10	11.10	11.10	11.10
5 GHz 802.11n HT40	6.50	6.50	6.50	6.50	6.50	9.10	9.10	9.10	9.10	9.10



Wi-Fi 2.4GHz and 5GHz

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

Distance to DUT vs. Output Power in dBm										
Distance	7	8	9	10	11	12	13	14	15	16
2.4 GHz 802.11b	11.50	11.50	11.50	11.50	11.50	16.50	16.50	16.50	16.50	16.50
2.4 GHz 802.11g	11.50	11.50	11.50	11.50	11.50	13.50	13.50	13.50	13.50	13.50
2.4 GHz 802.11n	11.50	11.50	11.50	11.50	11.50	12.50	12.50	12.50	12.50	12.50
5 GHz 802.11a	6.50	6.50	6.50	6.50	6.50	11.40	11.40	11.40	11.40	11.40
5 GHz 802.11n HT20	6.50	6.50	6.50	6.50	6.50	11.10	11.10	11.10	11.10	11.10
5 GHz 802.11n HT40	6.50	6.50	6.50	6.50	6.50	9.10	9.10	9.10	9.10	9.10



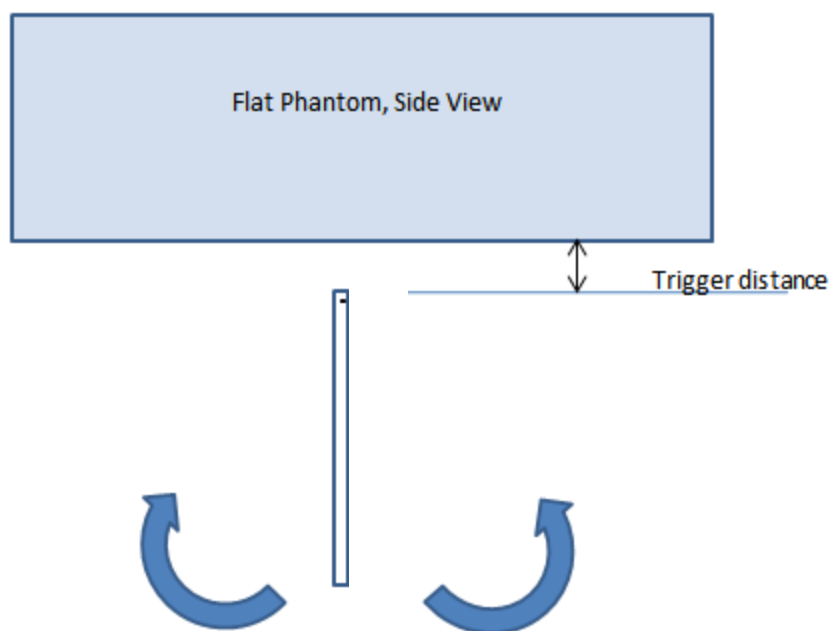
6.5.3. Proximity Sensor Coverage (KDB 616217 §6.3)

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

6.5.4. 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	2 mm	2 mm	On	On	On	On	On	On	On	On	On	On	On
1900	2 mm	2 mm	On	On	On	On	On	On	On	On	On	On	On
2400	2 mm	2 mm	On	On	On	On	On	On	On	On	On	On	On
5000	2 mm	2 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.

The EUT implements the power reduction scheme for SAR compliance, for specific device configuration and orientations, as described below. The complete description of the implementation and functionality is provided in the “Operational Description of Power Reduction” exhibit.

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 ≤ 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																
Cellular	GPRS 2 Slots	824.2	30.00	250	16	195	6	12	93		14.2 -MEASURE-	> 50 mm	37.8 -MEASURE-	18.9 -MEASURE-	> 50 mm	
Cellular	GPRS 2 Slots	1909.8	28.00	158	16	195	6	12	93		13.6 -MEASURE-	> 50 mm	36.4 -MEASURE-	18.2 -MEASURE-	> 50 mm	
Cellular	W-CDMA V	836.6	23.00	200	16	195	6	12	93		11.4 -MEASURE-	> 50 mm	30.5 -MEASURE-	15.2 -MEASURE-	> 50 mm	
Cellular	W-CDMA II	1907.6	23.00	200	16	195	6	12	93		17.3 -MEASURE-	> 50 mm	46 -MEASURE-	23 -MEASURE-	> 50 mm	
Cellular	LTE Band 5	844	23.00	200	16	195	6	12	93		11.5 -MEASURE-	> 50 mm	30.6 -MEASURE-	15.3 -MEASURE-	> 50 mm	
Power Back Off																
Cellular	GPRS 3 Slots	848.8	25.00	119	5	195	5	5	91		219 -MEASURE-	> 50 mm	219 -MEASURE-	219 -MEASURE-	> 50 mm	
Cellular	GPRS 4 Slots	1909.8	19.50	45	5	195	5	5	91		12.4 -MEASURE-	> 50 mm	12.4 -MEASURE-	12.4 -MEASURE-	> 50 mm	
Cellular	W-CDMA V	846.6	18.00	63	5	195	5	5	91		11.6 -MEASURE-	> 50 mm	11.6 -MEASURE-	11.6 -MEASURE-	> 50 mm	
Cellular	W-CDMA II	1907.6	12.50	18	5	195	5	5	91		5 -MEASURE-	> 50 mm	5 -MEASURE-	5 -MEASURE-	> 50 mm	
Cellular	LTE Band 5	844	20.50	112	5	195	5	5	91		20.6 -MEASURE-	> 50 mm	20.6 -MEASURE-	20.6 -MEASURE-	> 50 mm	

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																
Cellular	GPRS 2 Slots	824.2	30.00	250	16	195	6	12	93		< 50 mm	962 mW -EXEMPT-	< 50 mm	< 50 mm	4015 mW -EXEMPT-	
Cellular	GPRS 2 Slots	1909.8	28.00	158	16	195	6	12	93		< 50 mm	1558.5 mW -EXEMPT-	< 50 mm	< 50 mm	538.5 mW -EXEMPT-	
Cellular	W-CDMA V	836.6	23.00	200	16	195	6	12	93		< 50 mm	972.7 mW -EXEMPT-	< 50 mm	< 50 mm	403.8 mW -EXEMPT-	
Cellular	W-CDMA II	1907.6	23.00	200	16	195	6	12	93		< 50 mm	1558.6 mW -EXEMPT-	< 50 mm	< 50 mm	538.6 mW -EXEMPT-	
Cellular	LTE Band 5	844	23.00	200	16	195	6	12	93		< 50 mm	979.1 mW -EXEMPT-	< 50 mm	< 50 mm	405.2 mW -EXEMPT-	
Power Back Off																
Cellular	GPRS 3 Slots	848.8	25.00	119	5	195	5	5	91		< 50 mm	983.3 mW -EXEMPT-	< 50 mm	< 50 mm	394.8 mW -EXEMPT-	
Cellular	GPRS 4 Slots	1909.8	19.50	45	5	195	5	5	91		< 50 mm	1558.5 mW -EXEMPT-	< 50 mm	< 50 mm	538.5 mW -EXEMPT-	
Cellular	W-CDMA V	846.6	18.00	63	5	195	5	5	91		< 50 mm	981.4 mW -EXEMPT-	< 50 mm	< 50 mm	394.4 mW -EXEMPT-	
Cellular	W-CDMA II	1907.6	12.50	18	5	195	5	5	91		< 50 mm	1558.6 mW -EXEMPT-	< 50 mm	< 50 mm	538.6 mW -EXEMPT-	
Cellular	LTE Band 5	844	20.50	112	5	195	5	5	91		< 50 mm	979.1 mW -EXEMPT-	< 50 mm	< 50 mm	394 mW -EXEMPT-	

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 < 50mm to adjacent edges**

Tx Interface	Frequency (M Hz)	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															
Wi-Fi 2.4 GHz	2462	16.50	45	12	22	14.5	190	98		5.9 -MEASURE-	3.2 -MEASURE-	4.7 -MEASURE-	> 50 mm	> 50 mm	
Wi-Fi 5.2 GHz	5180	11.50	14	12	22	14.5	190	98		2.7 -EXEMPT-	1.4 -EXEMPT-	2.1 -EXEMPT-	> 50 mm	> 50 mm	
Wi-Fi 5.3 GHz	5260	11.50	14	12	22	14.5	190	98		2.7 -EXEMPT-	1.5 -EXEMPT-	2.1 -EXEMPT-	> 50 mm	> 50 mm	
Wi-Fi 5.5 GHz	5580	11.50	14	12	22	14.5	190	98		2.8 -EXEMPT-	1.5 -EXEMPT-	2.2 -EXEMPT-	> 50 mm	> 50 mm	
Wi-Fi 5.8 GHz	5825	11.50	14	12	22	14.5	190	98		2.8 -EXEMPT-	1.5 -EXEMPT-	2.3 -EXEMPT-	> 50 mm	> 50 mm	
Bluetooth	2480	10.50	11	5	12	14.5	190	98		3.5 -MEASURE-	1.4 -EXEMPT-	1.2 -EXEMPT-	> 50 mm	> 50 mm	
Power Back Off															
Wi-Fi 2.4 GHz	2462	11.50	14	5	12					4.4 -MEASURE-	1.8 -EXEMPT-				
Wi-Fi 5.2 GHz	5180	6.50	4	5	12					1.8 -EXEMPT-	0.8 -EXEMPT-				
Wi-Fi 5.3 GHz	5260	6.50	4	5	12					1.8 -EXEMPT-	0.8 -EXEMPT-				
Wi-Fi 5.5 GHz	5580	6.50	4	5	12					1.9 -EXEMPT-	0.8 -EXEMPT-				
Wi-Fi 5.8 GHz	5825	6.50	4	5	12					1.9 -EXEMPT-	0.8 -EXEMPT-				

Note(s):

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

Antennas > 50mm to adjacent edges

Tx Interface	Frequency (M Hz)	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															
Wi-Fi 2.4 GHz	2462	16.50	45	12	22	14.5	190	98		< 50 mm	< 50 mm	< 50 mm	1495.6 mW -EXEMPT-	575.6 mW -EXEMPT-	
Wi-Fi 5.2 GHz	5180	11.50	14	12	22	14.5	190	98		< 50 mm	< 50 mm	< 50 mm	1465.9 mW -EXEMPT-	545.9 mW -EXEMPT-	
Wi-Fi 5.3 GHz	5260	11.50	14	12	22	14.5	190	98		< 50 mm	< 50 mm	< 50 mm	1465.4 mW -EXEMPT-	545.4 mW -EXEMPT-	
Wi-Fi 5.5 GHz	5580	11.50	14	12	22	14.5	190	98		< 50 mm	< 50 mm	< 50 mm	1463.5 mW -EXEMPT-	543.5 mW -EXEMPT-	
Wi-Fi 5.8 GHz	5825	11.50	14	12	22	14.5	190	98		< 50 mm	< 50 mm	< 50 mm	1462.2 mW -EXEMPT-	542.2 mW -EXEMPT-	
Bluetooth	2480	10.50	11	5	12	14.5	190	98		< 50 mm	< 50 mm	< 50 mm	1495.3 mW -EXEMPT-	575.3 mW -EXEMPT-	
Power Back Off															
Wi-Fi 2.4 GHz	2462	11.50	14	5	12					< 50 mm	< 50 mm				
Wi-Fi 5.2 GHz	5180	6.50	4	5	12					< 50 mm	< 50 mm				
Wi-Fi 5.3 GHz	5260	6.50	4	5	12					< 50 mm	< 50 mm				
Wi-Fi 5.5 GHz	5580	6.50	4	5	12					< 50 mm	< 50 mm				
Wi-Fi 5.8 GHz	5825	6.50	4	5	12					< 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.

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	Rear	Edge 1	Edge 2	Edge 3	Edge 4
		(Top Edge)	(Right Edge)	(Bottom Edge)	(Left Edge)
GSM850 Full Pow er	Yes	No	Yes	Yes	No
GSM850 w / Pow er Reduction	Yes	No	Yes	Yes	No
GSM1900 Full Pow er	Yes	No	Yes	Yes	No
GSM1900 w / Pow er Reduction	Yes	No	Yes	Yes	No
W-CDMA Band 2 Full Pow er	Yes	No	Yes	Yes	No
W-CDMA Band 2 w / Pow er Reduction	Yes	No	Yes	Yes	No
W-CDMA Band 5 Full Pow er	Yes	No	Yes	Yes	No
W-CDMA Band 5 w / Pow er Reduction	Yes	No	Yes	Yes	No
LTE Band 5 Full Pow er	Yes	No	Yes	Yes	No
LTE Band 5 w / Pow er Reduction	Yes	No	Yes	Yes	No
Wi-Fi 2.4 GHz Full Pow er	Yes	Yes	Yes	No	No
Wi-Fi 2.4 GHz w / Pow er Reduction	Yes	No	No	No	No
Wi-Fi 5 GHz Full Pow er	No	No	No	No	No
Wi-Fi 5 GHz w / Pow er Reduction	No	No	No	No	No
Bluetooth	Yes	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	
	ϵ_r	σ (S/m)	ϵ_r	σ (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 Lab A**

Date tested	Freq. (MHz)		Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)
2/5/2015	Body 5180	e'	47.7100	Relative Permittivity (ε _r):	47.71	49.05	-2.73	5
		e"	18.0900	Conductivity (σ):	5.21	5.27	-1.16	5
	Body 5200	e'	47.6200	Relative Permittivity (ε _r):	47.62	49.02	-2.86	5
		e"	18.1100	Conductivity (σ):	5.24	5.29	-1.10	5
	Body 5600	e'	46.5800	Relative Permittivity (ε _r):	46.58	48.48	-3.91	5
		e"	18.6000	Conductivity (σ):	5.79	5.76	0.53	5
	Body 5800	e'	46.3900	Relative Permittivity (ε _r):	46.39	48.20	-3.76	5
		e"	18.6900	Conductivity (σ):	6.03	6.00	0.46	5
	Body 5825	e'	46.2500	Relative Permittivity (ε _r):	46.25	48.20	-4.05	5
		e"	18.7600	Conductivity (σ):	6.08	6.00	1.27	5
2/7/2015	Head 5180	e'	36.0900	Relative Permittivity (ε _r):	36.09	36.01	0.21	5
		e"	15.5500	Conductivity (σ):	4.48	4.63	-3.28	5
	Head 5200	e'	36.0600	Relative Permittivity (ε _r):	36.06	35.99	0.19	5
		e"	15.5500	Conductivity (σ):	4.50	4.65	-3.33	5
	Head 5600	e'	35.5400	Relative Permittivity (ε _r):	35.54	35.53	0.02	5
		e"	15.7100	Conductivity (σ):	4.89	5.06	-3.33	5
	Head 5800	e'	35.3200	Relative Permittivity (ε _r):	35.32	35.30	0.06	5
		e"	15.8000	Conductivity (σ):	5.10	5.27	-3.31	5
	Head 5825	e'	35.2700	Relative Permittivity (ε _r):	35.27	35.30	-0.08	5
		e"	15.8400	Conductivity (σ):	5.13	5.27	-2.65	5
2/7/2015	Head 2450	e'	37.7800	Relative Permittivity (ε _r):	37.78	39.20	-3.62	5
		e"	13.6200	Conductivity (σ):	1.86	1.80	3.08	5
	Head 2410	e'	37.8000	Relative Permittivity (ε _r):	37.80	39.28	-3.77	5
		e"	13.5000	Conductivity (σ):	1.81	1.76	2.76	5
	Head 2475	e'	37.6700	Relative Permittivity (ε _r):	37.67	39.17	-3.83	5
		e"	13.6000	Conductivity (σ):	1.87	1.83	2.44	5
2/7/2015	Body 2450	e'	51.0500	Relative Permittivity (ε _r):	51.05	52.70	-3.13	5
		e"	15.0200	Conductivity (σ):	2.05	1.95	4.93	5
	Body 2410	e'	51.2300	Relative Permittivity (ε _r):	51.23	52.76	-2.90	5
		e"	14.7200	Conductivity (σ):	1.97	1.91	3.41	5
	Body 2475	e'	51.0300	Relative Permittivity (ε _r):	51.03	52.67	-3.11	5
		e"	15.0900	Conductivity (σ):	2.08	1.99	4.61	5
2/9/2015	Head 2450	e'	38.3600	Relative Permittivity (ε _r):	38.36	39.20	-2.14	5
		e"	13.2900	Conductivity (σ):	1.81	1.80	0.58	5
	Head 2410	e'	38.5300	Relative Permittivity (ε _r):	38.53	39.28	-1.91	5
		e"	13.0100	Conductivity (σ):	1.74	1.76	-0.97	5
	Head 2475	e'	38.3200	Relative Permittivity (ε _r):	38.32	39.17	-2.17	5
		e"	13.3600	Conductivity (σ):	1.84	1.83	0.63	5
2/9/2015	Body 2450	e'	50.7900	Relative Permittivity (ε _r):	50.79	52.70	-3.62	5
		e"	14.8400	Conductivity (σ):	2.02	1.95	3.67	5
	Body 2410	e'	50.8900	Relative Permittivity (ε _r):	50.89	52.76	-3.54	5
		e"	14.5900	Conductivity (σ):	1.96	1.91	2.50	5
	Body 2475	e'	50.7900	Relative Permittivity (ε _r):	50.79	52.67	-3.57	5
		e"	14.8600	Conductivity (σ):	2.04	1.99	3.02	5

SAR Lab A

Date tested	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
2/9/2015	Head 5180	e'	36.7200	Relative Permittivity (ϵ_r):	36.72	36.01	1.96	5
		e"	15.3000	Conductivity (σ):	4.41	4.63	-4.83	5
	Head 5200	e'	36.7300	Relative Permittivity (ϵ_r):	36.73	35.99	2.06	5
		e"	15.3400	Conductivity (σ):	4.44	4.65	-4.64	5
	Head 5600	e'	36.3200	Relative Permittivity (ϵ_r):	36.32	35.53	2.21	5
		e"	15.5700	Conductivity (σ):	4.85	5.06	-4.19	5
	Head 5800	e'	36.0900	Relative Permittivity (ϵ_r):	36.09	35.30	2.24	5
		e"	15.7000	Conductivity (σ):	5.06	5.27	-3.92	5
	Head 5825	e'	36.0700	Relative Permittivity (ϵ_r):	36.07	35.30	2.18	5
		e"	15.7600	Conductivity (σ):	5.10	5.27	-3.14	5
2/9/2015	Body 5180	e'	48.2400	Relative Permittivity (ϵ_r):	48.24	49.05	-1.64	5
		e"	18.6000	Conductivity (σ):	5.36	5.27	1.63	5
	Body 5200	e'	48.2400	Relative Permittivity (ϵ_r):	48.24	49.02	-1.59	5
		e"	18.6900	Conductivity (σ):	5.40	5.29	2.06	5
	Body 5600	e'	47.7000	Relative Permittivity (ϵ_r):	47.70	48.48	-1.60	5
		e"	19.0900	Conductivity (σ):	5.94	5.76	3.18	5
	Body 5800	e'	47.4700	Relative Permittivity (ϵ_r):	47.47	48.20	-1.51	5
		e"	19.2400	Conductivity (σ):	6.20	6.00	3.41	5
	Body 5825	e'	47.4100	Relative Permittivity (ϵ_r):	47.41	48.20	-1.64	5
		e"	19.2800	Conductivity (σ):	6.24	6.00	4.08	5
2/12/2015	Body 5180	e'	47.5000	Relative Permittivity (ϵ_r):	47.50	49.05	-3.15	5
		e"	17.9700	Conductivity (σ):	5.18	5.27	-1.81	5
	Body 5200	e'	47.5400	Relative Permittivity (ϵ_r):	47.54	49.02	-3.02	5
		e"	17.9700	Conductivity (σ):	5.20	5.29	-1.87	5
	Body 5600	e'	46.8200	Relative Permittivity (ϵ_r):	46.82	48.48	-3.42	5
		e"	18.6700	Conductivity (σ):	5.81	5.76	0.91	5
	Body 5800	e'	46.7500	Relative Permittivity (ϵ_r):	46.75	48.20	-3.01	5
		e"	19.1400	Conductivity (σ):	6.17	6.00	2.88	5
	Body 5825	e'	46.9100	Relative Permittivity (ϵ_r):	46.91	48.20	-2.68	5
		e"	19.3700	Conductivity (σ):	6.27	6.00	4.56	5
2/13/2015	Body 2450	e'	51.0100	Relative Permittivity (ϵ_r):	51.01	52.70	-3.21	5
		e"	14.3100	Conductivity (σ):	1.95	1.95	-0.03	5
	Body 2410	e'	51.1600	Relative Permittivity (ϵ_r):	51.16	52.76	-3.03	5
		e"	14.2300	Conductivity (σ):	1.91	1.91	-0.03	5
	Body 2475	e'	50.9300	Relative Permittivity (ϵ_r):	50.93	52.67	-3.30	5
		e"	14.3500	Conductivity (σ):	1.97	1.99	-0.52	5
2/13/2015	Body 2450	e'	51.0100	Relative Permittivity (ϵ_r):	51.01	52.70	-3.21	5
		e"	14.3100	Conductivity (σ):	1.95	1.95	-0.03	5
	Body 2410	e'	51.1600	Relative Permittivity (ϵ_r):	51.16	52.76	-3.03	5
		e"	14.2300	Conductivity (σ):	1.91	1.91	-0.03	5
	Body 2475	e'	50.9300	Relative Permittivity (ϵ_r):	50.93	52.67	-3.30	5
		e"	14.3500	Conductivity (σ):	1.97	1.99	-0.52	5

SAR Lab E

Date tested	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
2/10/2015	Head 5180	e'	36.9100	Relative Permittivity (ϵ_r):	36.91	36.01	2.49	5
		e"	15.5600	Conductivity (σ):	4.48	4.63	-3.21	5
	Head 5200	e'	36.8700	Relative Permittivity (ϵ_r):	36.87	35.99	2.44	5
		e"	15.5400	Conductivity (σ):	4.49	4.65	-3.39	5
	Head 5600	e'	36.3400	Relative Permittivity (ϵ_r):	36.34	35.53	2.27	5
		e"	15.7500	Conductivity (σ):	4.90	5.06	-3.08	5
	Head 5800	e'	36.0500	Relative Permittivity (ϵ_r):	36.05	35.30	2.12	5
		e"	15.8800	Conductivity (σ):	5.12	5.27	-2.82	5
	Head 5825	e'	36.0300	Relative Permittivity (ϵ_r):	36.03	35.30	2.07	5
		e"	15.9100	Conductivity (σ):	5.15	5.27	-2.22	5

SAR Lab G

Date tested	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
2/2/2015	Head 1900	e'	39.0300	Relative Permittivity (ϵ_r):	39.03	40.00	-2.43	5
		e''	13.5500	Conductivity (σ):	1.43	1.40	2.25	5
	Head 1850	e'	39.4000	Relative Permittivity (ϵ_r):	39.40	40.00	-1.50	5
		e''	13.2300	Conductivity (σ):	1.36	1.40	-2.79	5
	Head 1910	e'	38.9600	Relative Permittivity (ϵ_r):	38.96	40.00	-2.60	5
		e''	13.6300	Conductivity (σ):	1.45	1.40	3.40	5
2/2/2014	Body 1900	e'	52.7400	Relative Permittivity (ϵ_r):	52.74	53.30	-1.05	5
		e''	14.7400	Conductivity (σ):	1.56	1.52	2.45	5
	Body 1850	e'	52.2700	Relative Permittivity (ϵ_r):	52.27	53.30	-1.93	5
		e''	14.5100	Conductivity (σ):	1.49	1.52	-1.80	5
	Body 1910	e'	52.8800	Relative Permittivity (ϵ_r):	52.88	53.30	-0.79	5
		e''	14.6400	Conductivity (σ):	1.55	1.52	2.29	5
2/4/2015	Body 835	e'	53.0600	Relative Permittivity (ϵ_r):	53.06	55.20	-3.88	5
		e''	20.9700	Conductivity (σ):	0.97	0.97	0.37	5
	Body 820	e'	53.2000	Relative Permittivity (ϵ_r):	53.20	55.28	-3.76	5
		e''	21.1100	Conductivity (σ):	0.96	0.97	-0.62	5
	Body 850	e'	53.0200	Relative Permittivity (ϵ_r):	53.02	55.16	-3.87	5
		e''	20.9700	Conductivity (σ):	0.99	0.99	0.40	5
2/6/2015	Head 835	e'	41.4700	Relative Permittivity (ϵ_r):	41.47	41.50	-0.07	5
		e''	19.9600	Conductivity (σ):	0.93	0.90	2.97	5
	Head 820	e'	41.6600	Relative Permittivity (ϵ_r):	41.66	41.60	0.14	5
		e''	20.0500	Conductivity (σ):	0.91	0.90	1.75	5
	Head 850	e'	41.2600	Relative Permittivity (ϵ_r):	41.26	41.50	-0.58	5
		e''	19.8900	Conductivity (σ):	0.94	0.92	2.74	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	4d117	5/16/2014	835	1g	9.23	9.61
				10g	5.98	6.31
D1900V2	5d140	4/23/2014	1900	1g	40.1	40.2
				10g	21.0	21.3
D2450V2	706	5/20/2014	2450	1g	53.0	50.2
				10g	24.5	23.4
D2450V2	899	9/10/2014	2450	1g	52.3	50.5
				10g	24.3	23.5
D5GHzV2	1138	9/18/2014	5200	1g	81.4	75.4
				10g	23.3	21.0
		9/18/2014	5600	1g	85.1	81.9
				10g	24.2	22.6
		9/18/2014	5800	1g	80.6	75.2
				10g	23.0	20.8

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 Lab A

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			
2/5/2015	D5GHzV2 (5.2 GHz)	1138	Body	1g	6.97	69.7	75.4	-7.56	
				10g	1.96	19.6	21.0	-6.67	
2/5/2015	D5GHzV2 (5.6 GHz)	1138	Body	1g	7.90	79.0	81.9	-3.54	
				10g	2.18	21.8	22.6	-3.54	
2/5/2015	D5GHzV2 (5.8 GHz)	1138	Body	1g	8.03	80.3	75.2	6.78	
				10g	2.23	22.3	20.8	7.21	
2/7/2015	D2450V2	899	Head	1g	4.86	48.6	52.3	-7.07	1,2
				10g	2.23	22.3	24.3	-8.23	
2/9/2015	D2450V2	899	Body	1g	5.36	53.6	50.5	6.14	
				10g	2.45	24.5	23.5	4.26	
2/9/2015	D5GHzV2 (5.2 GHz)	1138	Head	1g	8.09	80.9	81.4	-0.61	
				10g	2.33	23.3	23.3	0.00	
2/9/2015	D5GHzV2 (5.6 GHz)	1138	Head	1g	7.94	79.4	85.1	-6.70	
				10g	2.23	22.3	24.2	-7.85	
2/9/2015	D5GHzV2 (5.8 GHz)	1138	Head	1g	7.84	78.4	80.6	-2.73	
				10g	2.23	22.3	23.0	-3.04	
2/9/2015	D5GHzV2 (5.2 GHz)	1138	Body	1g	7.38	73.8	75.4	-2.12	
				10g	2.19	21.9	21.0	4.29	
2/9/2015	D5GHzV2 (5.6 GHz)	1138	Body	1g	8.13	81.3	81.9	-0.73	
				10g	2.24	22.4	22.6	-0.88	
2/9/2015	D5GHzV2 (5.8 GHz)	1138	Body	1g	6.95	69.5	75.2	-7.58	3,4
				10g	1.93	19.3	20.8	-7.21	
2/12/2015	D5GHzV2 (5.2 GHz)	1138	Body	1g	7.66	76.6	75.4	1.59	
				10g	2.14	21.4	21.0	1.90	
2/12/2015	D5GHzV2 (5.6 GHz)	1138	Body	1g	8.19	81.9	81.9	0.00	
				10g	2.26	22.6	22.6	0.00	
2/12/2015	D5GHzV2 (5.8 GHz)	1138	Body	1g	7.72	77.2	75.2	2.66	
				10g	2.13	21.3	20.8	2.40	
2/13/2015	D2450V2	706	Body	1g	5.14	51.4	50.2	2.39	5,6
				10g	2.36	23.6	23.4	0.85	

SAR Lab E

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			
2/10/2015	D5GHzV2 (5.2GHz)	1138	Head	1g	8.45	84.5	81.40	3.81	7,8
				10g	2.44	24.4	23.30	4.72	

SAR Lab G

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			
2/2/2015	D1900V2	5d140	Head	1g	4.09	40.9	40.1	2.00
				10g	2.11	21.1	21.0	0.48
2/2/2015	D1900V2	5d140	Body	1g	4.28	42.8	40.2	6.47
				10g	2.25	22.5	21.3	5.63
2/4/2015	D835V2	4d117	Body	1g	0.944	9.44	9.61	-1.77
				10g	0.621	6.21	6.31	-1.58
2/6/2015	D835V2	4d117	Head	1g	0.920	9.20	9.23	-0.33
				10g	0.600	6.00	5.98	0.33

9. Conducted Output Power Measurements

9.1. GSM

GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max. Power		with Pwr Back-off	
						Burst Pwr (dBm)	Frame Pwr (dBm)	Burst Pwr (dBm)	Frame Pwr (dBm)
850	GSM (Voice)	CS1	1	128	824.2	32.5	23.5	28.9	19.9
				190	836.6	32.6	23.6	28.5	19.5
				251	848.8	32.6	23.6	28.5	19.5
	GPRS (GMSK)	CS1	1	128	824.2	32.5	23.5	28.6	19.6
				190	836.6	32.6	23.6	28.5	19.5
				251	848.8	32.6	23.6	28.5	19.5
			2	128	824.2	30.8	24.8	25.3	19.3
				190	836.6	30.6	24.6	25.5	19.5
				251	848.8	30.6	24.6	25.3	19.3
			3	128	824.2	29.2	24.9	24.0	19.7
				190	836.6	29.0	24.7	23.9	19.6
				251	848.8	29.1	24.8	24.0	19.7
			4	128	824.2	27.0	24.0	22.5	19.5
				190	836.6	26.8	23.8	22.6	19.6
				251	848.8	27.1	24.1	22.5	19.5
	EGPRS (8PSK)	MCS5	1	128	824.2	27.0	18.0	26.5	17.5
				190	836.6	27.0	18.0	26.5	17.5
				251	848.8	27.0	18.0	26.5	17.5
			2	128	824.2	25.0	19.0	25.5	19.5
				190	836.6	25.0	19.0	25.5	19.5
				251	848.8	25.0	19.0	25.5	19.5
			3	128	824.2	23.0	18.7	23.8	19.5
				190	836.6	23.0	18.7	23.8	19.5
				251	848.8	23.0	18.7	23.8	19.5
			4	128	824.2	21.7	18.7	22.5	19.5
				190	836.6	21.7	18.7	22.5	19.5
				251	848.8	21.5	18.5	22.5	19.5

Notes:

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

- Head & Body-worn Accessory: GMSK Voice Mode
- Hotspot mode: GMSK (GPRS) mode with 3 time slots for Max power and 3 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. Power		with Pwr Back-off	
						Burst Pwr (dBm)	Frame Pwr (dBm)	Burst Pwr (dBm)	Frame Pwr (dBm)
1900	GSM (Voice)	CS1	1	512	1850.2	30.0	21.0	21.6	12.6
				661	1880.0	29.6	20.6	21.5	12.5
				810	1909.8	29.8	20.8	21.5	12.5
	GPRS (GMSK)	CS1	1	512	1850.2	29.8	20.8	21.5	12.5
				661	1880.0	29.6	20.6	21.5	12.5
				810	1909.8	29.8	20.8	21.5	12.5
			2	512	1850.2	27.8	21.8	19.0	13.0
				661	1880.0	27.6	21.6	19.0	13.0
				810	1909.8	27.8	21.8	19.3	13.3
			3	512	1850.2	25.8	21.5	16.4	12.1
				661	1880.0	25.6	21.3	16.4	12.1
				810	1909.8	25.8	21.5	16.7	12.4
			4	512	1850.2	23.6	20.6	15.9	12.9
				661	1880.0	23.6	20.6	15.7	12.7
				810	1909.8	23.7	20.7	15.9	12.9
	EGPRS (8PSK)	MCS5	1	512	1850.2	25.0	16.0	21.0	12.0
				661	1880.0	25.3	16.3	21.0	12.0
				810	1909.8	25.5	16.5	21.0	12.0
			2	512	1850.2	24.0	18.0	18.3	12.3
				661	1880.0	24.0	18.0	18.2	12.2
				810	1909.8	24.2	18.2	18.4	12.4
			3	512	1850.2	22.6	18.3	16.3	12.0
				661	1880.0	22.5	18.2	16.5	12.2
				810	1909.8	22.6	18.3	16.4	12.1
			4	512	1850.2	20.9	17.9	15.4	12.4
				661	1880.0	20.8	17.8	15.3	12.3
				810	1909.8	21.0	18.0	15.5	12.5

Notes:

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

- Head & Body-worn Accessory: GMSK Voice Mode
- Hotspot mode: GMSK (GPRS) mode with 2 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
	β_c/β_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			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	11/15	15/8	15/4
	β_{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 General 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
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	15/1
	β_{hs}	22/15	12/15	30/15	4/15	5/15
	β_{ed}	1309/225	94/75	47/15	56/75	47/15
HSDPA Specific 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 Specific Settings	CQI Repetition Factor (Table 5.2B.4)	2				
	$A_{hs} = \beta_{hs}/\beta_c$	30/15				
	E-DPDCCCH	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

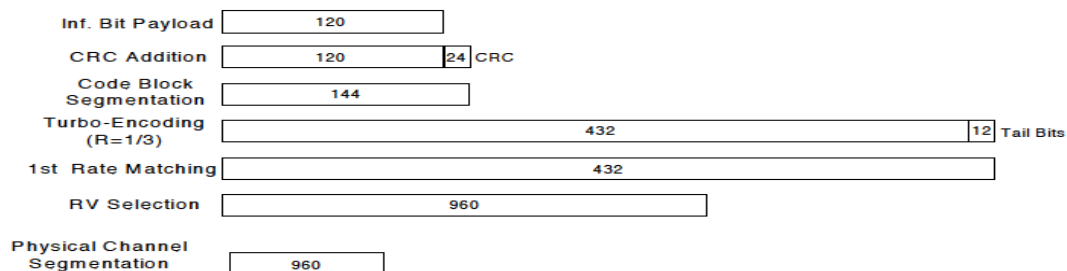
Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

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			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c/β_d	2/15	11/15	15/8	15/4
	β_{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			
	$A_{hs} = \beta_{hs}/\beta_c$	30/15			

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., CAT 6 Rel 6. Therefore, the RF conducted power is not measured.

Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)	
					Max	Pwr Back-off
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	22.8	12.5
			9400	1880.0	22.8	12.5
			9538	1907.6	22.9	12.5
	HSDPA	Subtest 1	9262	1852.4	22.7	12.0
			9400	1880.0	22.8	12.0
			9538	1907.6	22.7	12.0
		Subtest 2	9262	1852.4	21.3	10.5
			9400	1880.0	21.6	10.5
			9538	1907.6	21.4	10.5
		Subtest 3	9262	1852.4	21.1	10.5
			9400	1880.0	21.2	10.5
			9538	1907.6	21.2	10.5
		Subtest 4	9262	1852.4	21.2	10.5
			9400	1880.0	21.2	10.5
			9538	1907.6	21.3	10.5
	HSUPA	Subtest 1	9262	1852.4	21.5	12.0
			9400	1880.0	22.1	12.0
			9538	1907.6	21.4	11.9
		Subtest 2	9262	1852.4	21.3	10.6
			9400	1880.0	21.2	10.5
			9538	1907.6	21.4	10.5
		Subtest 3	9262	1852.4	21.3	12.0
			9400	1880.0	21.3	12.0
			9538	1907.6	21.2	12.0
		Subtest 4	9262	1852.4	21.2	12.0
			9400	1880.0	21.5	12.0
			9538	1907.6	21.3	12.0
		Subtest 5	9262	1852.4	21.3	12.0
			9400	1880.0	21.3	12.0
			9538	1907.6	21.2	12.0
	DC-HSPA	Subtest 1	9262	1852.4	22.0	12.0
			9400	1880.0	22.1	12.0
			9538	1907.6	22.0	11.9
		Subtest 2	9262	1852.4	21.5	12.0
			9400	1880.0	21.5	12.0
			9538	1907.6	21.5	12.0
		Subtest 3	9262	1852.4	21.5	12.0
			9400	1880.0	21.5	12.0
			9538	1907.6	21.5	12.0
		Subtest 4	9262	1852.4	21.5	12.0
			9400	1880.0	21.5	12.0
			9538	1907.6	21.3	12.0

Band	Mode		UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)	
					Max	Pwr Back-off
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	22.5	16.0
			4183	836.6	22.5	16.0
			4233	846.6	22.4	16.0
	HSDPA	Subtest 1	4132	826.4	22.5	16.0
			4183	836.6	22.5	16.0
			4233	846.6	22.5	16.0
		Subtest 2	4132	826.4	22.3	16.0
			4183	836.6	22.4	16.0
			4233	846.6	22.3	16.0
		Subtest 3	4132	826.4	21.1	16.0
			4183	836.6	21.1	16.0
			4233	846.6	21.0	16.0
		Subtest 4	4132	826.4	21.1	16.0
			4183	836.6	21.1	16.0
			4233	846.6	21.0	16.0
	HSUPA	Subtest 1	4132	826.4	21.9	16.0
			4183	836.6	21.8	16.0
			4233	846.6	21.8	16.0
		Subtest 2	4132	826.4	21.9	16.0
			4183	836.6	21.9	16.0
			4233	846.6	21.8	16.0
		Subtest 3	4132	826.4	21.9	16.0
			4183	836.6	21.8	16.0
			4233	846.6	21.8	16.0
		Subtest 4	4132	826.4	21.9	16.0
			4183	836.6	21.8	16.0
			4233	846.6	21.8	16.0
		Subtest 5	4132	826.4	21.9	16.0
			4183	836.6	21.8	16.0
			4233	846.6	21.7	16.0
	DC-HSPA	Subtest 1	4132	826.4	22.0	16.0
			4183	836.6	21.8	16.0
			4233	846.6	21.8	16.0
		Subtest 2	4132	826.4	22.0	16.0
			4183	836.6	21.9	16.0
			4233	846.6	21.8	16.0
		Subtest 3	4132	826.4	22.0	16.0
			4183	836.6	21.8	16.0
			4233	846.6	21.8	16.0
		Subtest 4	4132	826.4	22.0	16.0
			4183	836.6	21.8	16.0
			4233	846.6	21.8	16.0

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 Signaling 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 ¹	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 5 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)					
							Max. Power			with Pwr Back-off		
							829 MHz	836.5 MHz	844 MHz	829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0	0	22.5	22.5	22.5	20.5	20.5	20.5
			1	25	0	0	22.4	22.5	22.5	20.4	20.5	20.4
			1	49	0	0	22.5	22.5	22.5	20.5	20.5	20.2
			25	0	1	1	21.5	21.5	21.5	19.4	19.4	19.3
			25	12	1	1	21.5	21.4	21.5	19.3	19.3	19.3
			25	25	1	1	21.5	21.4	21.4	19.2	19.3	19.2
		16QAM	50	0	1	1	21.5	21.5	21.5	19.3	19.4	19.3
			1	0	1	1	21.5	21.4	21.5	19.5	19.5	19.5
			1	25	1	1	21.5	21.5	21.5	19.5	19.3	19.5
			1	49	1	1	21.5	21.5	21.5	19.5	19.3	19.5
			25	0	2	2	20.5	20.5	20.5	18.3	18.3	18.3
			25	12	2	2	20.5	20.5	20.5	18.3	18.2	18.2
			25	25	2	2	20.5	20.4	20.5	18.3	18.2	18.2
			50	0	2	2	20.5	20.5	20.5	18.1	18.2	18.2
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)					
							Max. Power			with Pwr Back-off		
							826.5 MHz	836.5 MHz	846.5 MHz	826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	0	22.5	22.4	22.4	20.2	20.2	20.2
			1	12	0	0	22.5	22.4	22.5	20.2	20.1	20.2
			1	24	0	0	22.5	22.4	22.4	20.2	20.1	20.3
			12	0	1	1	21.5	21.4	21.5	19.2	19.2	19.2
			12	7	1	1	21.4	21.5	21.4	19.2	19.3	19.1
			12	13	1	1	21.5	21.4	21.5	19.2	19.2	19.2
		16QAM	25	0	1	1	21.5	21.5	21.5	19.2	19.2	19.1
			1	0	1	1	21.0	21.5	21.5	19.1	19.3	19.3
			1	12	1	1	21.5	21.2	21.5	19.2	19.1	19.5
			1	24	1	1	21.5	21.5	21.5	19.1	19.2	19.2
			12	0	2	2	20.5	20.5	20.5	18.0	18.1	18.1
			12	7	2	2	20.5	20.5	20.5	18.2	18.2	18.1
			12	13	2	2	20.5	20.4	20.5	18.1	18.3	18.0
			25	0	2	2	20.5	20.5	20.4	18.3	18.4	18.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)					
							Max. Power			with Pwr Back-off		
							825.5 MHz	836.5 MHz	847.5 MHz	825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	0	22.4	22.5	22.4	20.3	20.3	20.2
			1	8	0	0	22.3	22.5	22.4	20.2	20.2	20.2
			1	14	0	0	22.3	22.5	22.3	20.4	20.1	20.3
			8	0	1	1	21.4	21.4	21.4	19.2	19.3	19.3
			8	4	1	1	21.4	21.4	21.4	19.2	19.2	19.2
			8	7	1	1	21.5	21.4	21.5	19.2	19.3	19.1
		16QAM	15	0	1	1	21.5	21.4	21.4	19.2	19.2	19.2
			1	0	1	1	21.5	21.5	21.0	19.5	19.4	19.0
			1	8	1	1	21.5	21.5	21.2	19.4	19.4	19.2
			1	14	1	1	21.5	21.5	21.2	19.5	19.5	19.1
			8	0	2	2	20.5	20.5	20.3	18.0	18.2	18.0
			8	4	2	2	20.5	20.5	20.3	18.1	18.3	18.0
			8	7	2	2	20.5	20.3	20.2	18.2	18.4	17.9
			15	0	2	2	20.5	20.5	20.3	18.1	18.2	18.0
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)					
							Max. Power			with Pwr Back-off		
							824.7 MHz	836.5 MHz	848.3 MHz	824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	0	22.4	22.4	22.5	20.2	20.3	20.3
			1	3	0	0	22.5	22.5	22.5	20.2	20.1	20.2
			1	5	0	0	22.5	22.5	22.5	20.2	20.2	20.2
			3	0	0	0	22.3	22.4	22.5	20.1	20.4	20.2
			3	1	0	0	22.5	22.5	22.5	20.3	20.2	20.1
			3	3	0	0	22.5	22.4	22.5	20.2	20.3	20.1
		16QAM	6	0	1	1	21.5	21.5	21.5	19.1	19.2	19.1
			1	0	1	1	21.5	21.5	20.7	19.2	19.4	19.3
			1	3	1	1	21.5	21.5	21.4	19.3	19.3	19.4
			1	5	1	1	21.5	21.5	21.3	19.5	19.4	19.5
			3	0	1	1	21.2	21.2	21.0	19.2	19.5	19.3
			3	1	1	1	21.2	21.5	21.3	19.2	19.4	19.5
			3	3	1	1	21.2	21.2	21.1	19.3	19.3	19.4
			6	0	2	2	20.4	20.5	20.5	18.5	18.4	18.1

9.4. Wi-Fi 2.4GHz

Max Power

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Note(s)
2.4	802.11b	1 Mbps	1	2412	16.0	16.5	Yes	
			6	2437	16.5			
			11	2462	16.5			
	802.11g	6 Mbps	1	2412	Not Required	13.5	No	1
			6	2437				
			11	2462				
	802.11n (HT20)	MCS0	1	2412		12.5	No	1
			6	2437				
			11	2462				

With Power Back-Off

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Note(s)
2.4	802.11b	1 Mbps	1	2412	11.4	11.5	Yes	
			6	2437	11.5			
			11	2462	11.5			
	802.11g	6 Mbps	1	2412	Not Required	11.5	No	1
			6	2437				
			11	2462				
	802.11n (HT20)	MCS0	1	2412		11.5	No	1
			6	2437				
			11	2462				

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 ≤ 1.2 W/kg.

9.5. Wi-Fi 5GHz

Max Power

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Note(s)
5.2 (U-NII 1)	802.11a	6 Mbps	36	5180	11.0	11.5	No	3
			40	5200	11.0			
			44	5220	11.0			
			48	5240	11.0			
	802.11n (HT20)	6.5 Mbps	36	5180	11.0	11.5	No	3
			40	5200	10.9			
			44	5220	10.9			
			48	5240	10.3			
	802.11n (HT40)	13.5 Mbps	38-46	5190 - 5230	Not Required	9.5	No	1
5.3 (U-NII 2A)	802.11a	6 Mbps	52	5260	11.4	11.5	Yes	
			56	5280	11.2			
			60	5300	11.2			
			64	5320	11.2			
	802.11n (HT20)	6.5 Mbps	52	5260	11.0	11.5	No	2
			56	5280	10.9			
			60	5300	10.9			
			64	5320	10.6			
	802.11n (HT40)	13.5 Mbps	54-62	5270 - 5310	Not Required	9.5	No	1
5.5 (U-NII 2C)	802.11a	6 Mbps	100	5500	11.3	11.5	Yes	
			116	5580	11.4			
			124	5620	Not Supported			
			140	5700	11.2			
	802.11n (HT20)	6.5 Mbps	100	5500	11.1	11.5	No	2
			116	5580	11.2			
			124	5620	11.1			
			140	5700	11.2			
	802.11n (HT40)	13.5 Mbps	102-134	5510-5670	Not Required	9.5	No	1
5.8 (U-NII 3)	802.11a	6 Mbps	149	5745	11.2	11.5	Yes	
			157	5785	11.5			
			165	5825	11.3			
	802.11n (HT20)	6.5 Mbps	149	5745	11.0	11.5	No	2
			157	5785	11.0			
			165	5825	11.1			
	802.11n (HT40)	13.5 Mbps	151-159	5755-5795	Not Required	9.5	No	1

Note(s):

- Output Power and SAR is not required for 802.11n HT20/HT40 channels when the specified tune-up tolerances for 802.11n HT20/HT40 are lower than 802.11a by more than ½ dB and the measured SAR is ≤ 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
 - ≤ 1.2 W/kg, SAR is not required for UNII band I
 - > 1.2 W/kg, both bands should be tested independently for SAR.

With Power Back-Off

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Note(s)
5.2 (U-NII 1)	802.11a	6 Mbps	36-48	5180-5240	Not Required	6.5	No	2
	802.11n (HT20)	6.5 Mbps	36-48	5180 - 5240		6.5	No	1
	802.11n (HT40)	13.5 Mbps	38	5190	6.1	6.5	Yes	1
			46	5230	6.0			
5.3 (U-NII 2A)	802.11a	6 Mbps	52-64	5260-5320	Not required	6.5	No	
	802.11n (HT20)	6.5 Mbps	52-64	5260 - 5320		6.5	No	1
	802.11n (HT40)	13.5 Mbps	54	5270	6.5	6.5	Yes	1
			62	5310	6.3			
5.5 (U-NII 2C)	802.11a	6 Mbps	100-140	5500-5700	Not Required	6.5	No	
	802.11n (HT20)	6.5 Mbps	100-140	5500-5700		6.5	No	1
	802.11n (HT40)	13.5 Mbps	102	5510	6.0	6.5	Yes	1
			110	5550	6.5			
			118	5590	6.5			
5.8 (U-NII 3)	802.11a	6 Mbps	149-165	5745-5825	Not Required	6.5	No	
	802.11n (HT20)	6.5 Mbps	149-165	5745-5825		6.5	No	1
	802.11n (HT40)	13.5 Mbps	151	5755	6.5	6.5	Yes	1
			159	5795	6.5			

Note(s):

- Output Power and SAR is not required for 802.11a and 802.11n HT20 channels because the specified tune-up tolerances for 802.11a and 802.11n HT20 are lower than or equal to 802.11n HT40 and the measured SAR is ≤ 1.2 W/Kg.
- 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
 - ≤ 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)
2.4	V3.0 + EDR, GFSK	0	2402	9.2
		39	2441	8.6
		78	2480	9.1
	V3.0 + EDR, $\pi/4$ DQPSK	0	2402	8.2
		39	2441	7.6
		78	2480	7.8
	V3.0 + EDR, 8-DPSK	0	2402	8.2
		39	2441	7.6
		78	2480	7.8
	V4.0 LE, GFSK	0	2402	1.0
		19	2440	0.3
		39	2480	0.7

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:

- ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
- ≤ 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
- ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

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 ≤ 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:

- ≤ 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 ≤ 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 ≤ 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 ≤ 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 ≤ 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.

10.1. GSM850

RF Exposure Conditions	Mode	Pwr Back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
Head	Voice	Off	0	Left Touch	190	836.6	33.0	32.6	0.095	0.104	0.076	0.084	
				Left Tilt	190	836.6	33.0	32.6	0.140	0.154	0.102	0.112	
				Right Touch	190	836.6	33.0	32.6	0.093	0.102	0.075	0.082	
				Right Tilt	190	836.6	33.0	32.6	0.131	0.144	0.099	0.108	
Head VoIP	GPRS 3 Slots	Off	0	Left Touch	190	836.6	30.0	29.0	0.134	0.169	0.108	0.136	
				Left Tilt	190	836.6	30.0	29.0	0.202	0.254	0.146	0.184	1
				Right Touch	190	836.6	30.0	29.0	0.131	0.165	0.105	0.132	
				Right Tilt	190	836.6	30.0	29.0	0.184	0.232	0.139	0.175	
Body	Voice	Off	16	Rear	190	836.6	33.0	32.6	0.369	0.405	0.189	0.207	
	16		Rear	190	836.6	30.0	29.0	0.337	0.424	0.163	0.205		
	1		Edge 2	190	836.6	30.0	29.0	0.332	0.418	0.207	0.261		
	12		Edge 3	190	836.6	30.0	29.0	0.238	0.300	0.141	0.178		
	Voice	On	0	Rear	190	836.6	29.0	28.5	0.317	0.356	0.221	0.248	
	0		Rear	190	836.6	25.0	23.9	0.481	0.620	0.334	0.430		
	0		Edge 2	190	836.6	25.0	23.9	0.584	0.752	0.369	0.475	2	
	0		Edge 3	190	836.6	25.0	23.9	0.353	0.455	0.246	0.317		

10.2. GSM1900

RF Exposure Conditions	Mode	Pwr Back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
Head	Voice	Off	0	Left Touch	661	1880.0	30.0	29.5	0.030	0.034	0.020	0.022	
				Left Tilt	661	1880.0	30.0	29.5	0.034	0.038	0.022	0.024	
				Right Touch	661	1880.0	30.0	29.5	0.066	0.074	0.043	0.048	
				Right Tilt	661	1880.0	30.0	29.5	0.031	0.034	0.018	0.020	
Head VoIP	GPRS 2 Slots	Off	0	Left Touch	661	1880.0	28.5	27.6	0.043	0.053	0.028	0.035	
				Left Tilt	661	1880.0	28.5	27.6	0.040	0.049	0.026	0.032	
				Right Touch	661	1880.0	28.5	27.6	0.077	0.094	0.050	0.062	3
				Right Tilt	661	1880.0	28.5	27.6	0.043	0.053	0.050	0.062	
Body	Voice	Off	16	Rear	661	1880.0	30.0	29.5	0.329	0.369	0.189	0.212	
	GPRS 2 Slots		16	Rear	661	1880.0	28.5	27.6	0.447	0.550	0.255	0.314	
			1	Edge 2	661	1880.0	28.5	27.6	0.326	0.401	0.178	0.219	
			12	Edge 3	661	1880.0	28.5	27.6	0.538	0.662	0.306	0.376	
	Voice	On	0	Rear	512	1850.2	22.0	21.6	0.854	0.936	0.389	0.427	
			0		661	1880.0	22.0	21.5	0.869	0.975	0.391	0.439	
			0		810	1909.8	22.0	21.5	0.958	1.075	0.425	0.477	
	GPRS 2 Slots		0	Rear	512	1850.2	19.5	19.0	0.939	1.054	0.427	0.479	
			0		661	1880.0	19.5	19.0	0.964	1.082	0.435	0.488	4
			0		810	1909.8	19.5	19.3	1.030	1.079	0.455	0.476	
			0	Edge 2	661	1880.0	19.5	19.0	0.078	0.088	0.041	0.046	
			0	Edge 3	661	1880.0	19.5	19.0	0.441	0.495	0.192	0.215	

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)		10-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
Head	Rel.99 RMC	Off	0	Left Touch	4183	836.6	23.0	22.5	0.078	0.088	0.064	0.071	5
				Left Tilt	4183	836.6	23.0	22.5	0.117	0.131	0.086	0.096	
				Right Touch	4183	836.6	23.0	22.5	0.078	0.087	0.062	0.069	
				Right Tilt	4183	836.6	23.0	22.5	0.108	0.121	0.081	0.091	
Body	Rel.99 RMC	Off	16	Rear	4183	836.6	23.0	22.5	0.284	0.319	0.197	0.221	6
			1	Edge 2	4183	836.6	23.0	22.5	0.310	0.348	0.197	0.221	
			12	Edge 3	4183	836.6	23.0	22.5	0.225	0.252	0.157	0.176	
	Rel.99 RMC	On	0	Rear	4183	836.6	18.0	16.0	0.277	0.439	0.128	0.203	
				Edge 2	4183	836.6	18.0	16.0	0.097	0.154	0.060	0.095	
				Edge 3	4183	836.6	18.0	16.0	0.148	0.235	0.089	0.140	

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)		10-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
Head	Rel.99 RMC	Off	0	Left Touch	9400	1880.0	23.0	22.8	0.068	0.071	0.046	0.048	7
				Left Tilt	9400	1880.0	23.0	22.8	0.067	0.070	0.044	0.046	
				Right Touch	9400	1880.0	23.0	22.8	0.113	0.118	0.074	0.078	
				Right Tilt	9400	1880.0	23.0	22.8	0.054	0.056	0.033	0.034	
Body	Rel.99 RMC	Off	16	Rear	9400	1880.0	23.0	22.8	0.685	0.717	0.392	0.410	8
			1	Edge 2	9400	1880.0	23.0	22.8	0.519	0.543	0.283	0.296	
			12	Edge 3	9400	1880.0	23.0	22.8	0.755	0.791	0.436	0.457	
	Rel.99 RMC	On	0	Rear	9400	1880.0	12.5	12.5	0.720	0.720	0.318	0.318	
				Edge 2	9400	1880.0	12.5	12.5	0.065	0.065	0.033	0.033	
				Edge 3	9400	1880.0	12.5	12.5	0.425	0.425	0.186	0.186	

10.5. LTE Band 5 (10MHz 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)		10-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
Head	QPSK	Off	0	Left Touch	20525	836.5	1	0	23.0	22.5	0.069	0.077	0.057	0.064	9
							25	0	22.0	21.5	0.048	0.054	0.038	0.042	
				Left Tilt	20525	836.5	1	0	23.0	22.5	0.116	0.130	0.084	0.095	
							25	0	22.0	21.5	0.089	0.100	0.065	0.073	
				Right Touch	20525	836.5	1	0	23.0	22.5	0.084	0.094	0.066	0.074	
							25	0	22.0	21.5	0.061	0.068	0.048	0.054	
				Right Tilt	20525	836.5	1	0	23.0	22.5	0.120	0.135	0.087	0.098	
							25	0	22.0	21.5	0.091	0.102	0.067	0.075	
				Rear	20525	836.5	1	0	23.0	22.5	0.260	0.292	0.179	0.201	
							25	0	22.0	21.5	0.191	0.214	0.132	0.148	
Body	QPSK	Off	16	Edge 2	20525	836.5	1	0	23.0	22.5	0.302	0.339	0.187	0.210	10
			1				25	0	22.0	21.5	0.219	0.246	0.140	0.157	
			12	Edge 3	20525	836.5	1	0	23.0	22.5	0.167	0.187	0.119	0.134	
							25	0	22.0	21.5	0.123	0.138	0.088	0.098	
		On	0	Rear	20450	829.0	1	0	20.5	20.5	0.804	0.804	0.386	0.386	
					20525	836.6	1	0	20.5	20.5	0.819	0.819	0.390	0.390	
					20600	844.0	1	0	20.5	20.5	0.839	0.839	0.392	0.392	
				Edge 2	20525	836.5	1	0	20.5	20.5	0.301	0.301	0.187	0.187	
							25	0	19.5	19.4	0.229	0.234	0.143	0.146	
				Edge 3	20525	836.5	1	0	20.5	20.5	0.329	0.329	0.166	0.166	
							25	0	19.5	19.4	0.269	0.275	0.136	0.139	

10.6. Wi-Fi (DTS Band)

RF Exposure Conditions	Frequency Band	Mode	Pwr Back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Notes	Plot No.
									Tune-up limit	Meas.	Meas.	Scaled		
Head	2.4GHz	802.11b 1 Mbps	Off	0	Left Touch	6	2437	0.538	16.5	16.5	0.519	0.519	2	11
					Left Tilt	6	2437	0.388	16.5	16.5	0.399	0.399		
					Right Touch	6	2437	0.108	16.5	16.5				
					Right Tilt	6	2437	0.101	16.5	16.5				
Body			Off	12	Rear	6	2437	0.073	16.5	16.5				
				10	Edge 1	6	2437	0.120	16.5	16.5	0.087	0.087	1	
				0	Edge 2	6	2437	0.072	16.5	16.5				
			On	0	Rear	6	2437	0.599	11.5	11.5	0.545	0.545	2	12
					Edge 1	6	2437	0.075	11.5	11.5	0.075	0.075		

Note(s):

- Highest reported SAR is ≤ 0.4 W/kg. Therefore, further SAR measurements within this exposure condition are not required.
- Highest reported SAR is > 0.4 W/kg. Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 W/kg was reported.
- Testing for a second channel was required because the reported SAR for this test position was > 0.8 W/kg.
- Additional testing required in order satisfying FCC simultaneous transmission limit criteria.

10.7. Wi-Fi (U-NII Band)

RF Exposure Conditions	Frequency Band	Mode	Pwr Back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Notes	Plot No.
									Tune-up limit	Meas.	Meas.	Scaled		
Head	5.3 GHz U-NII 2A	802.11a 6 Mbps	Off	0	Left Touch	52	5260	0.447	11.5	11.4				
					Left Tilt	52	5260	0.583	11.5	11.4				
					Right Touch	52	5260	0.804	11.5	11.4	0.424	0.434		
					Right Tilt	52	5260	0.878	11.5	11.4	0.492	0.503	2	13
Body		802.11a 6 Mbps	Off	12	Rear	52	5260	0.330	11.5	11.4				
				10	Edge 1	52	5260	0.398	11.5	11.4	0.213	0.218	1	
				0	Edge 2	52	5260	0.070	11.5	11.4				
		802.11n HT40	On	0	Rear	54	5270	0.789	6.5	6.5	0.654	0.654	2	14
					Edge 1	54	5270	0.505	6.5	6.5	0.250	0.250		
RF Exposure Conditions	Frequency Band	Mode	Pwr Back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Notes	Plot No.
									Tune-up limit	Meas.	Meas.	Scaled		
Head	5.5 GHz U-NII 2C	802.11a 6 Mbps	Off	0	Left Touch	116	5580	0.509	11.5	11.4				
					Left Tilt	116	5580	0.594	11.5	11.4				
					Right Touch	116	5580	0.712	11.5	11.4	0.448	0.458		
					Right Tilt	116	5580	0.813	11.5	11.4	0.480	0.491	2	15
Body		802.11a 6 Mbps	Off	12	Rear	116	5580	0.693	11.5	11.4	0.437	0.447		
				10	Edge 1	116	5580	1.000	11.5	11.4	0.576	0.589	2	16
				0	Edge 2	116	5580	0.253	11.5	11.4				
		802.11n HT40	On	0	Rear	110	5550	0.747	6.5	6.5	0.540	0.540	2	
					Edge 1	110	5550	0.568	6.5	6.5	0.215	0.215		
RF Exposure Conditions	Frequency Band	Mode	Pwr Back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Notes	Plot No.
									Tune-up limit	Meas.	Meas.	Scaled		
Head	5.8 GHz U-NII 3	802.11a 6 Mbps	Off	0	Left Touch	157	5785	0.556	11.5	11.5				
					Left Tilt	157	5785	0.713	11.5	11.5	0.384	0.384		
					Right Touch	157	5785	0.668	11.5	11.5				
					Right Tilt	157	5785	0.803	11.5	11.5	0.463	0.463	2	17
Body		802.11a 6 Mbps	Off	12	Rear	157	5785	0.371	11.5	11.5				
				10	Edge 1	157	5785	0.728	11.5	11.5	0.393	0.393	1	
				0	Edge 2	157	5785	0.285	11.5	11.5				
		802.11n HT40	On	0	Rear	159	5795	0.896	6.5	6.5	0.627	0.627	2	18
					Edge 1	159	5795	0.568	6.5	6.5	0.215	0.215		

Note(s):

1. Highest reported SAR is ≤ 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 this exposure condition were evaluated until a SAR ≤ 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.

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	0	2402.0	10.5	8.6	0.006	0.009	19

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 ≥ 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 ≥ 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 ≥ 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 2	No	0.584	N/A	N/A
	WCDMA Band V	Standalone	Edge 2	No	0.310	N/A	N/A
	LTE Band 5	Standalone	Rear	Yes	0.839	0.802	1.05
1900	GSM 1900	Standalone	Rear	Yes	1.03	1.01	1.02
	WCDMA Band II	Standalone	Rear	No	0.755	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Standalone	Rear	No	0.545	N/A	N/A
	Bluetooth	Standalone	Rear	No	0.006	N/A	N/A
5300	Wi-Fi 802.11a/n	Standalone	Rear	No	0.654	N/A	N/A
5500	Wi-Fi 802.11a/n	Standalone	Edge 1	No	0.576	N/A	N/A
5800	Wi-Fi 802.11a/n	Standalone	Rear	No	0.627	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

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations			
Standalone	1	GSM(GPRS/EDGE)	+	Wi-Fi 2.4 GHz	
	2	GSM(GPRS/EDGE)	+	Wi-Fi 5 GHz	
	3	GSM(GPRS/EDGE)	+	BT	
	4	GSM(GPRS/EDGE)	+	Wi-Fi 5 GHz	+ BT
	5	W-CDMA	+	Wi-Fi 2.4 GHz	
	6	W-CDMA	+	Wi-Fi 5 GHz	
	7	W-CDMA	+	BT	
	8	W-CDMA	+	Wi-Fi 5 GHz	+ BT
	9	LTE	+	Wi-Fi 2.4 GHz	
	10	LTE	+	Wi-Fi 5 GHz	
	11	LTE	+	BT	
	12	LTE	+	Wi-Fi 5 GHz	+ BT

Notes:

1. Wi-Fi only 2.4GHz supports Hotspot.
2. GPRS/EDGE, W-CDMA, and LTE support Hotspot.
3. VoIP is supported in GPRS/EDGE, W-CDMA, and LTE.
4. Wi-Fi 2.4 GHz Radio cannot transmit simultaneously with Bluetooth Radio.
5. Wi-Fi 5 GHz Radio can transmit simultaneously with Bluetooth Radio.

12.1. Sum of the SAR for GSM850 & Wi-Fi & BT

RF Exposure conditions	① WWAN	② DSSS	③ U-NII	④ BT	①+② WWAN+DSSS		①+③ WWAN + U-NII		①+④ WWAN + BT	
					Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)
Left Touch	0.169	0.519	0.503		0.688	No	0.672	No		
Left Tilt	0.254	0.399	0.384		0.653	No	0.638	No		
Right Touch	0.165	0.519	0.458		0.684	No	0.623	No		
Right Tilt	0.232	0.519	0.503		0.751	No	0.735	No		
Rear	0.620	0.545	0.654	0.009	1.165	No	1.274	No	0.629	No
Edge 1		0.075	0.589							
Edge 2	0.752	0.545	0.654		1.297	No	1.406	No		
Edge 3	0.455	0.545	0.654		1.000	No	1.109	No		
Edge 4		0.545	0.654							

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

RF Exposure conditions	① WWAN	② DSSS	③ U-NII	④ BT	①+② WWAN+DSSS		①+③ WWAN + U-NII		①+④ WWAN + BT	
					Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)
Left Touch	0.053	0.519	0.503		0.572	No	0.556	No		
Left Tilt	0.049	0.399	0.384		0.448	No	0.433	No		
Right Touch	0.094	0.519	0.458		0.613	No	0.552	No		
Right Tilt	0.053	0.519	0.503		0.572	No	0.556	No		
Rear	1.082	0.545	0.654	0.009	1.627	Yes	1.736	Yes	1.091	No
Edge 1		0.075	0.589							
Edge 2	0.401	0.545	0.654		0.946	No	1.055	No		
Edge 3	0.662	0.545	0.654		1.207	No	1.316	No		
Edge 4		0.545	0.654							

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 DSSS					
Rear	1.082	0.545	① + ②	1.627	0.011	No	1

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	③ U-NII					
Rear	1.082	0.654	① + ③	1.736	0.012	No	2

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

RF Exposure conditions	① WWAN	② DSSS	③ U-NII	④ BT	①+② WWAN+DSSS		①+③ WWAN + U-NII		①+④ WWAN + BT	
					Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)
Left Touch	0.088	0.519	0.503		0.607	No	0.591	No		
Left Tilt	0.131	0.399	0.384		0.530	No	0.515	No		
Right Touch	0.087	0.519	0.458		0.606	No	0.545	No		
Right Tilt	0.121	0.519	0.503		0.640	No	0.624	No		
Rear	0.439	0.545	0.654	0.009	0.984	No	1.093	No	0.448	No
Edge 1		0.075	0.589							
Edge 2	0.348	0.545	0.654		0.893	No	1.002	No		
Edge 3	0.252	0.545	0.654		0.797	No	0.906	No		
Edge 4		0.545	0.654							

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

RF Exposure conditions	① WWAN	② DSSS	③ U-NII	④ BT	①+② WWAN+DSSS		①+③ WWAN + U-NII		①+④ WWAN + BT	
					Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)
Left Touch	0.071	0.519	0.503		0.590	No	0.574	No		
Left Tilt	0.070	0.399	0.384		0.469	No	0.454	No		
Right Touch	0.118	0.519	0.458		0.637	No	0.576	No		
Right Tilt	0.056	0.519	0.503		0.575	No	0.559	No		
Rear	0.720	0.545	0.654	0.009	1265	No	1374	No	0.729	No
Edge 1		0.075	0.589							
Edge 2	0.543	0.545	0.654		1088	No	1197	No		
Edge 3	0.791	0.545	0.654		1336	No	1445	No		
Edge 4		0.545	0.654							

12.5. Sum of the SAR for LTE Band 5 & Wi-Fi & BT

RF Exposure conditions	① WWAN	② DSSS	③ U-NII	④ BT	①+② WWAN+DSSS		①+③ WWAN + U-NII		①+④ WWAN + BT	
					Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)
Left Touch	0.077	0.519	0.503		0.596	No	0.580	No		
Left Tilt	0.130	0.399	0.384		0.529	No	0.514	No		
Right Touch	0.094	0.519	0.458		0.613	No	0.552	No		
Right Tilt	0.135	0.519	0.503		0.654	No	0.638	No		
Rear	0.839	0.545	0.654	0.009	1384	No	1493	No	0.848	No
Edge 1		0.075	0.589							
Edge 2	0.339	0.545	0.654		0.884	No	0.993	No		
Edge 3	0.329	0.545	0.654		0.874	No	0.983	No		
Edge 4		0.545	0.654							

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.

Figure (1)

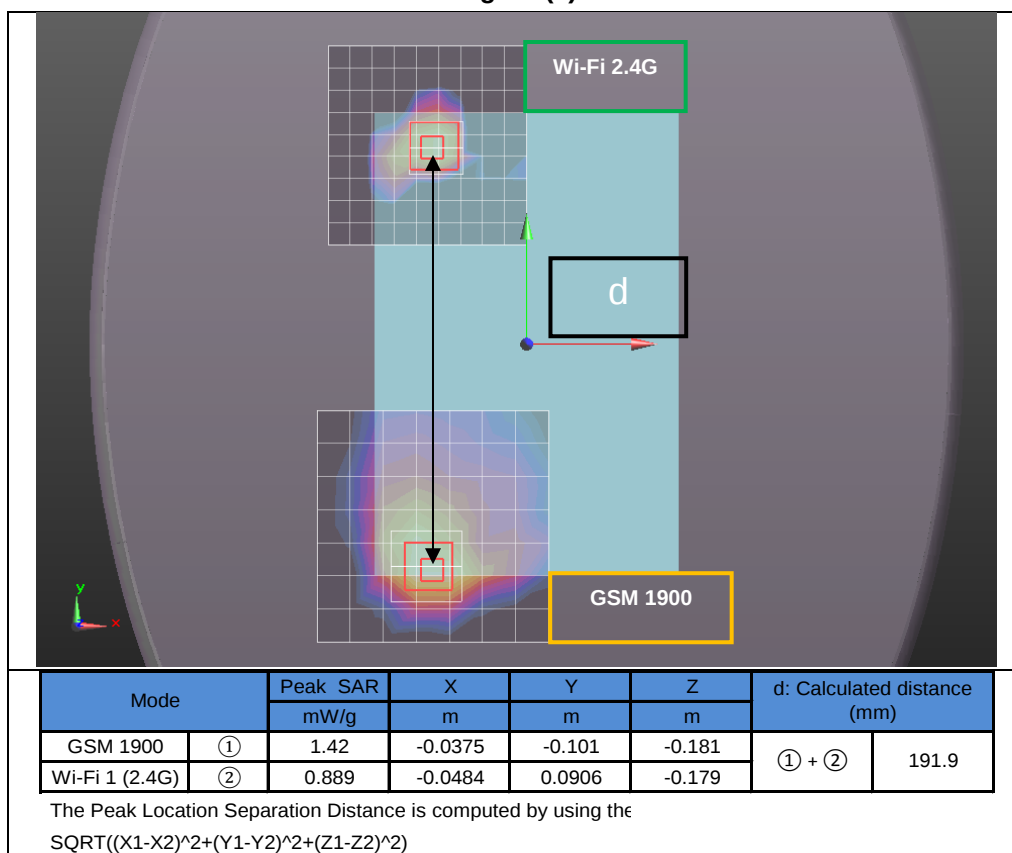
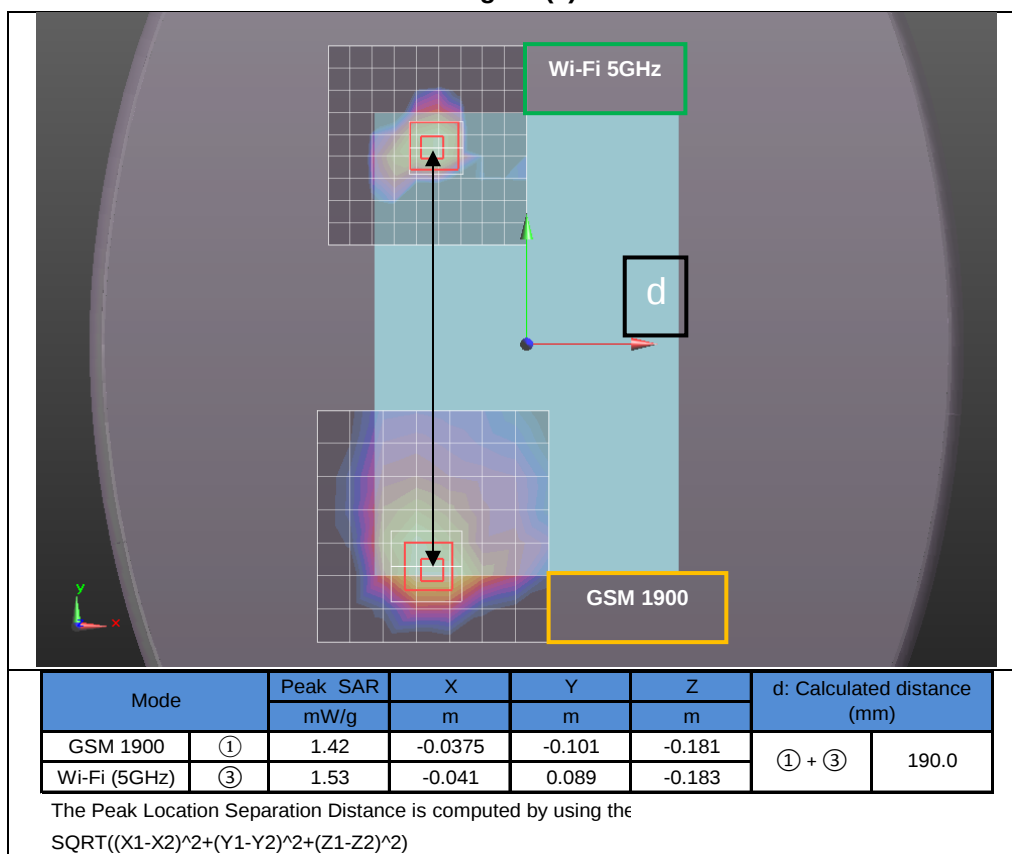


Figure (2)



Appendixes

Refer to separated files for the following appendixes.

A_15I19901v0 SAR Photos & Ant. Locations

B_15I19901v0 SAR System Check Plots

C_15I19901v0 SAR Highest Test Plots

D_15I19901v0 SAR Tissue Ingredients

E_15I19901v0 SAR Probe Cal. Certificates

F_15I19901v0 SAR Dipole Cal. Certificates

END OF REPORT