

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

**Test Report No.** : OT-201-RWD-025  
**AGR No** : A19DA-181  
**Applicant** : Sinjimoru Co.,Ltd  
**Address** : #321 DMC Hi-tech Industrial Center, Seongam-ro 330, Mapo-gu, Seoul, Korea  
**Manufacturer** : Sinjimoru Co.,Ltd  
**Address** : #321 DMC Hi-tech Industrial Center, Seongam-ro 330, Mapo-gu, Seoul, Korea  
**Type of Equipment** : Smartphone Wireless Charger  
**FCC ID.** : 2AVNTSOG-WIRE-BAL  
**Model Name** : SOG\_WIRE\_BAL\_BK\_SJM  
**Multiple Model Name** : N/A  
**Serial number** : N/A  
**Total page of Report** : 32 pages (including this page)  
**Date of Incoming** : December 11, 2019  
**Date of issue** : January 21, 2020

## SUMMARY

The equipment complies with the regulation; **FCC CFR47 Part 15 Subpart C Section 15.207 and 15.209**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by: \_\_\_\_\_

Ha-Ram Lee / Manager  
ONETECH Corp.

Approved by: \_\_\_\_\_

Jae-Ho Lee / General Manager  
ONETECH Corp.

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**Revision History**

| Issue Report No. | Issued Date      | Revisions       | Effect Section |
|------------------|------------------|-----------------|----------------|
| OT-201-RWD-025   | January 21, 2020 | Initial Release | All            |
|                  |                  |                 |                |
|                  |                  |                 |                |

## 1. VERIFICATION OF COMPLIANCE

APPLICANT : Sinjimoru Co.,Ltd  
 ADDRESS : #321 DMC Hi-tech Industrial Center, Seongam-ro 330, Mapo-gu, Seoul, Korea  
 CONTACT PERSON : HANDAE LIM / Assistant Supervisor  
 TELEPHONE NO : +82-10-8557-4662  
 FCC ID : 2AVNTSOG-WIRE-BAL  
 MODEL NAME : SOG\_WIRE\_BAL\_BK\_SJM  
 BRAND NAME : Sinjimoru Co.,Ltd  
 SERIAL NUMBER : N/A  
 DATE : January 21, 2020

|                                                          |                                                            |
|----------------------------------------------------------|------------------------------------------------------------|
| EQUIPMENT CLASS                                          | <b>DCD – Part 15 Low Power Transmitter Below 1 705 kHz</b> |
| KIND OF EQUIPMENT                                        | Smartphone Wireless Charger                                |
| THIS REPORT CONCERNS                                     | Original Grant                                             |
| MEASUREMENT PROCEDURES                                   | ANSI C63.10: 2013                                          |
| TYPE OF EQUIPMENT TESTED                                 | Pre-Production                                             |
| KIND OF EQUIPMENT<br>AUTHORIZATION REQUESTED             | Certification                                              |
| EQUIPMENT WILL BE OPERATED<br>UNDER FCC&IC RULES PART(S) | FCC CFR47 Part 15 Subpart C Section 15.207 and 15.209      |
| MODIFICATIONS ON THE EQUIPMENT<br>TO ACHIEVE COMPLIANCE  | No                                                         |
| FINAL TEST WAS CONDUCTED ON                              | 3 m, Semi Anechoic Chamber                                 |

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. The equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

## 2. TEST SUMMARY

### 2.1 Test items and results

| SECTION           | TEST ITEMS                                                             | RESULTS              |
|-------------------|------------------------------------------------------------------------|----------------------|
| 15.209, 15.209(a) | Radiated emission, Spurious Emission and Field Strength of Fundamental | Met the Limit / PASS |
| 2.1049            | 20 dB Bandwidth                                                        | Met the Limit / PASS |
| 15.207            | Transmitter AC Power Line Conducted Emission                           | Met the Limit / PASS |

### 2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

### 2.3 Related Submittal(s) / Grant(s)

Original submittal only

### 2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC CFR47 Part 15 Subpart C Section 15.207 and 15.209, 2.1049.

### 2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.10: 2013 at a distance of 3 m from EUT to the antenna.

### 2.6 Test Facility

The ONETECH Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 301-14, Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862 Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-4112/ C-4617/ G-666/ T-1842

ISED (Innovation, Science and Economic Development Canada) – Registration No. Site# 3736A-3

-. Site Accreditation:

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

### 3. GENERAL INFORMATION

#### 3.1 Product Description

The Sinjimoru Co.,Ltd, Model: SOG\_WIRE\_BAL\_BK\_SJM (referred to as the EUT in this report) is a Smartphone Wireless Charger. Product specification information described herein was obtained from product data sheet or user's manual.

|                       |                    |
|-----------------------|--------------------|
| DEVICE TYPE           | Wireless Charger   |
| OPERATING FREQUENCY   | 111 kHz ~ 205 kHz  |
| RATED RF OUTPUT POWER | 62.1 dB $\mu$ V/m  |
| ANTENNA TYPE          | Coil Antenna       |
| MODULATION            | ASK                |
| RATED SUPPLY VOLTAGE  | DC 5.0 V, DC 9.0 V |

#### 3.2 Alternative type(s)/model(s); also covered by this test report.

-. None

### 4. EUT MODIFICATIONS

-. None

## 5. SYSTEM TEST CONFIGURATION

### 5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

| DEVICE TYPE | MANUFACTURER | MODEL/PART NUMBER | FCC ID |
|-------------|--------------|-------------------|--------|
| Main Board  | N/A          | N/A               | N/A    |

### 5.2 Peripheral equipment

| Model     | Manufacturer | Description  | Connected to |
|-----------|--------------|--------------|--------------|
| N/A       | N/A          | DUMMY load   | N/A          |
| Galaxy S9 | Samsung      | Mobile Phone | N/A          |

### 5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting is programmed.

For final testing, the EUT was set at Max. load (111 kHz), Mid. load (145 kHz), and Min. load (180 kHz) for 5V.

The EUT was set at Max. load (117 kHz), Mid. load (144 kHz), and Min. load (180 kHz) for 9V.

To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XY” axis.

| Mode                       | Charging current | Description     |
|----------------------------|------------------|-----------------|
| Charging Mode<br>With load | 1 000 mA         | Using Max. load |
|                            | 500 mA           | Using Mid. load |
|                            | 100 mA           | Using Min. load |

## 5.4 Configuration of Test System

**Line Conducted Test** : The EUT was tested in a charging mode. The EUT was connected to USB and the power of USB was connected to Adapter. All supporting equipment were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2009 7.3.3 to determine the worse operating conditions.

**Radiated Emission Test** : Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 m Semi Anechoic Chamber.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

## 5.5 Antenna Requirement

According to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### Antenna Construction:

The antenna of the EUT is a Coil Antenna on the main board in the EUT, so no consideration of replacement by the user.

## 6. PRELIMINARY TEST

### 6.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating modes were investigated

| Operation Mode    | The Worse operating condition (Please check one only) |
|-------------------|-------------------------------------------------------|
| Transmitting Mode | X                                                     |

### 6.2 General Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

| Operation Mode    | The Worse operating condition (Please check one only) |
|-------------------|-------------------------------------------------------|
| Transmitting Mode | X                                                     |

## 7. 20 dB BANDWIDTH

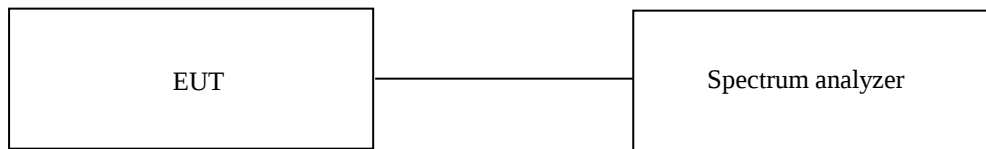
### 7.1 Operating environment

Temperature : 22 °C  
Relative humidity : 51 % R.H.

### 7.2 Test set-up

- Span = approximately 2 to 3 times the 20 dB bandwidth, RBW = greater than 1 % of the 20 dB bandwidth, VBW = RBW, Sweep = auto, Detector = peak, Trace = max hold.
- The marker-to-peak function to set the mark to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level.

The marker-delta reading at this point is 20 dB bandwidth of the emission.

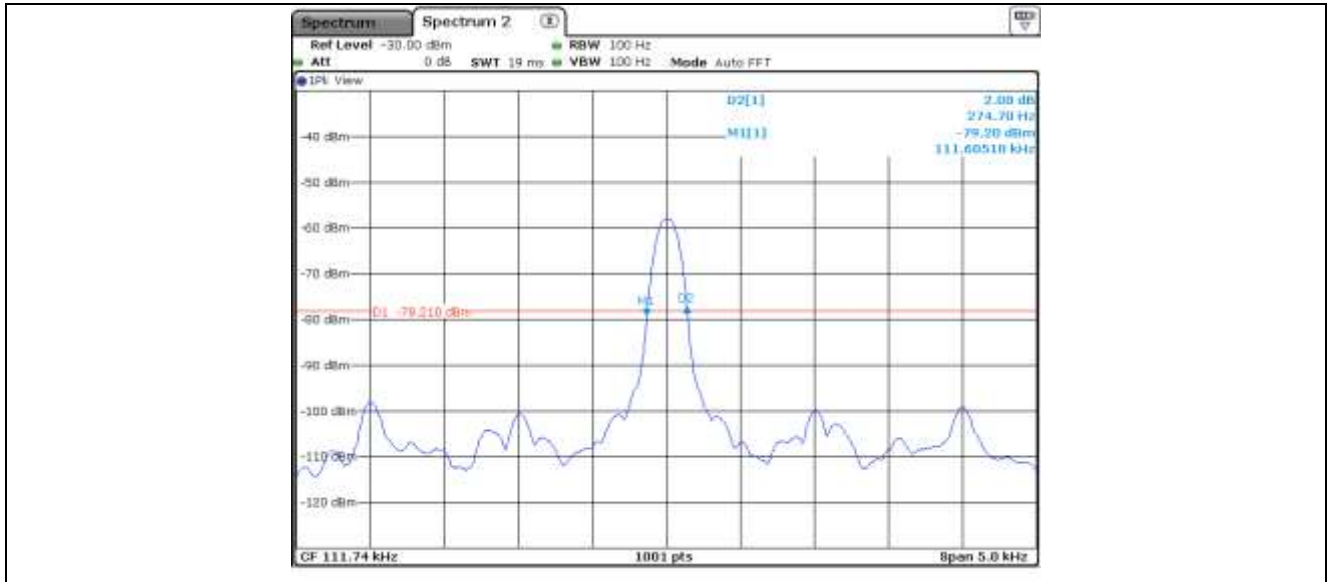


### 7.3 Test data for 5V

Test Date : December 24, 2019

Frequency : 111.74 kHz

20 dB Bandwidth : 274.70 Hz



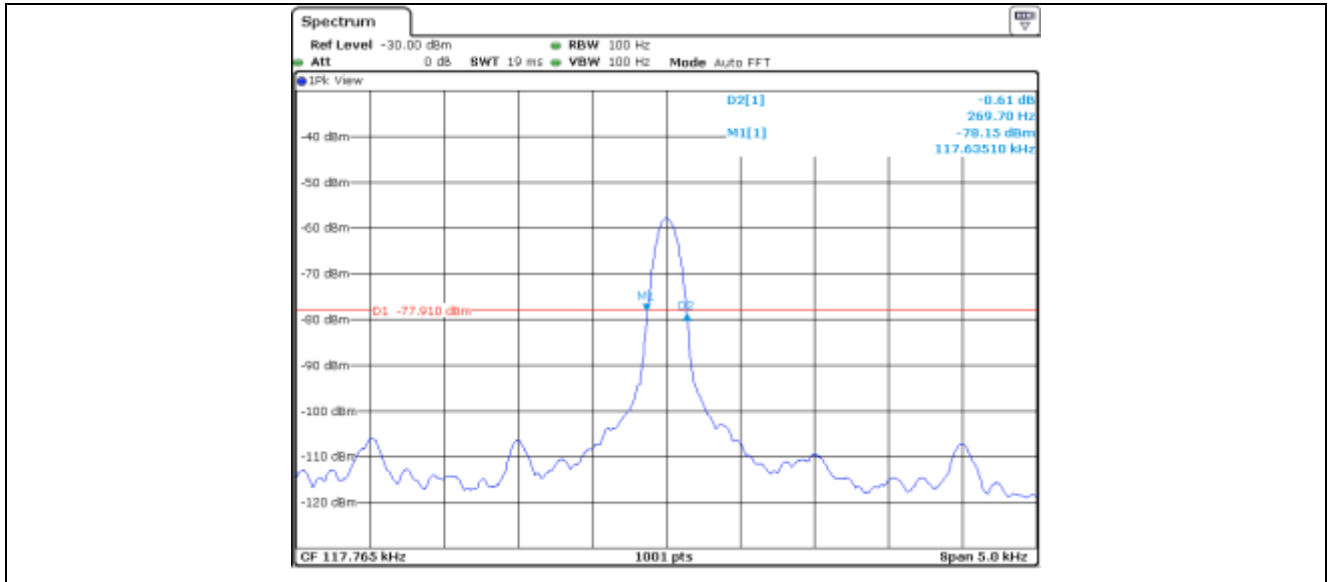

Tested by: Sieon Lee / Assistant Manager

## 7.4 Test data for 9V

-. Test Date : December 24, 2019

Frequency : 117.76 kHz

20 dB Bandwidth : 269.70 Hz




Tested by: Sieon Lee / Assistant Manager

## 8. Spurious Emission Test

### 8.1 Regulation

According to §15.209(a), for an intentional device, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following values:

| Frequency [MHz] | Field strength<br>[μ V/m] | Field strength<br>[dBμ V/m] | Measurement distance<br>[m] |
|-----------------|---------------------------|-----------------------------|-----------------------------|
| 0.009 ~ 0.490   | 2 400 / F (kHz)           | 48.52 ~ 13.80               | 300                         |
| 0.490 ~ 1.705   | 24 000 / F (kHz)          | 33.8 ~ 22.97                | 30                          |
| 1.705 ~ 30      | 30                        | 29.50                       | 30                          |
| 30 ~ 88         | *100                      | 40.00                       | 3                           |
| 88 ~ 216        | *150                      | 43.52                       | 3                           |
| 216 ~ 960       | *200                      | 46.02                       | 3                           |
| Above 960       | 500                       | 53.98                       | 3                           |

\*Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 ~ 72 MHz, 76 ~ 88 MHz, 174 ~ 216 MHz or 470 ~ 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

### 8.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30 kHz to 1 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 ms in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

### 8.3 Test data for Using Max load (1 000 mA) (5V)

#### 8.3.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 51 % R.H.

Temperature: 22 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : Smartphone Wireless Charger

Date: December 24, 2019

Operating Condition : Transmitting Mode

| Frequency (MHz) | Detector | Ant. Pol. (H/V) | Reading (dBμV) | Ant. Factor (dB/m) | Cable Loss | Emission Level at 3m (dBμV/m) | Emission Level at 300m (dBμV/m) | Limit at 300m (dBμV/m) | Margin (dB) |
|-----------------|----------|-----------------|----------------|--------------------|------------|-------------------------------|---------------------------------|------------------------|-------------|
| 0.038           | QP       | H               | 25.2           | 19.4               | 0.0        | 44.6                          | -35.4                           | 36                     | 71.4        |
| *0.111          | QP       | H               | 62.1           | 19.4               | 0.1        | 81.6                          | 1.6                             | 26.7                   | 25.1        |
| 0.210           | QP       | H               | 29.8           | 19.4               | 0.1        | 49.3                          | -30.7                           | 21.2                   | 51.9        |
| 0.329           | QP       | H               | 35.4           | 19.4               | 0.1        | 54.9                          | -25.1                           | 17.3                   | 42.4        |

| Frequency (MHz) | Detector | Ant. Pol. (H/V) | Reading (dBμV) | Ant. Factor (dB/m) | Cable Loss | Emission Level at 3m (dBμV/m) | Emission Level at 30m (dBμV/m) | Limit at 30m (dBμV/m) | Margin (dB) |
|-----------------|----------|-----------------|----------------|--------------------|------------|-------------------------------|--------------------------------|-----------------------|-------------|
| 0.538           | QP       | H               | 29.2           | 19.3               | 0.1        | 48.6                          | 8.6                            | 33                    | 24.4        |
| 0.777           | QP       | H               | 22.1           | 19.3               | 0.1        | 41.5                          | 1.5                            | 29.8                  | 28.3        |

-. Remark: "H" Horizontal, "V" Vertical

-. "\*" Means Fundamental frequency

-. Emission Level at 3m [dB μ V/m] = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level at 300m [dBμV/m] – Limit at 300m [dBμV/m]

= Emission Level at 300m [dBμV/m] – Limit at 30m [dBμV/m]

-. Emission Level at 300m [dBμV/m] = Emission Level at 3m [dBμV/m] - 40log (300/3), 80 dB for up to 0.49 MHz

-. Emission Level at 30m [dBμV/m] = Emission Level at 3m [dBμV/m] - 40log (30/3), 40 dB for above 0.49 MHz, Below 30 MHz



Tested by: Sieon Lee / Assistant Manager

### 8.3.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 51 % R.H. Temperature: 22 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

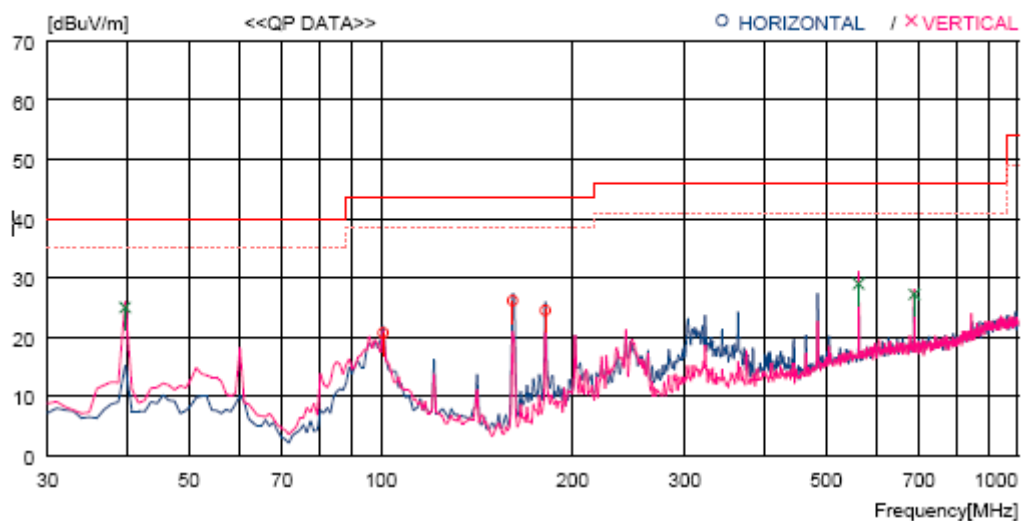
Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : Smartphone Wireless Charger

Date: December 24, 2019

Operating Condition : Transmitting Mode



| No.                    | FREQ<br>[MHz] | READING<br>QP<br>[dBuV] | ANT<br>FACTOR<br>[dB] | LOSS<br>[dB] | GAIN<br>[dB] | RESULT<br>[dBuV/m] | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] | ANTENNA<br>[cm] | TABLE<br>[DEG] |
|------------------------|---------------|-------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- |               |                         |                       |              |              |                    |                   |                |                 |                |
| 1                      | 100.810       | 40.0                    | 12.5                  | 0.9          | 32.7         | 20.7               | 43.5              | 22.8           | 300             | 359            |
| 2                      | 160.950       | 48.6                    | 8.9                   | 1.2          | 32.6         | 26.1               | 43.5              | 17.4           | 200             | 0              |
| 3                      | 181.320       | 45.8                    | 10.0                  | 1.3          | 32.6         | 24.5               | 43.5              | 19.0           | 200             | 0              |
| ----- Vertical -----   |               |                         |                       |              |              |                    |                   |                |                 |                |
| 4                      | 39.700        | 42.6                    | 14.6                  | 0.5          | 32.7         | 25.0               | 40.0              | 15.0           | 100             | 0              |
| 5                      | 562.529       | 40.1                    | 19.6                  | 2.3          | 33.0         | 29.0               | 46.0              | 17.0           | 100             | 0              |
| 6                      | 687.655       | 36.9                    | 20.7                  | 2.5          | 32.9         | 27.2               | 46.0              | 18.8           | 200             | 30             |



Tested by: Sion Lee / Assistant Manager

## 8.4 Test data for Using Max load (1 000 mA) (9V)

### 8.4.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 51 % R.H.

Temperature: 22 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : Smartphone Wireless Charger

Date: December 24, 2019

Operating Condition : Transmitting Mode

| Frequency (MHz) | Detector | Ant. Pol. (H/V) | Reading (dBμV) | Ant. Factor (dB/m) | Cable Loss | Emission Level at 3m (dBμV/m) | Emission Level at 300m (dBμV/m) | Limit at 300m (dBμV/m) | Margin (dB) |
|-----------------|----------|-----------------|----------------|--------------------|------------|-------------------------------|---------------------------------|------------------------|-------------|
| 0.038           | QP       | H               | 25.3           | 19.4               | 0.0        | 44.7                          | -35.3                           | 36.0                   | 71.3        |
| *0.117          | QP       | H               | 59.8           | 19.4               | 0.1        | 79.3                          | -0.7                            | 26.2                   | 26.9        |
| 0.210           | QP       | H               | 27.5           | 19.4               | 0.1        | 47.0                          | -33.0                           | 21.2                   | 54.2        |
| 0.329           | QP       | H               | 37.2           | 19.4               | 0.1        | 56.7                          | -23.3                           | 17.3                   | 40.6        |

| Frequency (MHz) | Detector | Ant. Pol. (H/V) | Reading (dBμV) | Ant. Factor (dB/m) | Cable Loss | Emission Level at 3m (dBμV/m) | Emission Level at 30m (dBμV/m) | Limit at 30m (dBμV/m) | Margin (dB) |
|-----------------|----------|-----------------|----------------|--------------------|------------|-------------------------------|--------------------------------|-----------------------|-------------|
| 0.568           | QP       | H               | 28.0           | 19.3               | 0.1        | 47.4                          | 7.4                            | 32.5                  | 25.1        |
| 0.807           | QP       | H               | 23.1           | 19.3               | 0.1        | 42.5                          | 2.5                            | 29.5                  | 27.0        |

-. Remark: "H" Horizontal, "V" Vertical

-. "\*" Means Fundamental frequency

-. Emission Level at 3m [dB μ V/m] = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level at 300m [dBμV/m] – Limit at 300m [dBμV/m]

= Emission Level at 300m [dBμV/m] – Limit at 30m [dBμV/m]

-. Emission Level at 300m [dBμV/m] = Emission Level at 3m [dBμV/m] - 40log (300/3), 80 dB for up to 0.49 MHz

-. Emission Level at 30m [dBμV/m] = Emission Level at 3m [dBμV/m] - 40log (30/3), 40 dB for above 0.49 MHz, Below 30 MHz



Tested by: Sieon Lee / Assistant Manager

## 8.4.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 51 % R.H.

Temperature: 22 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

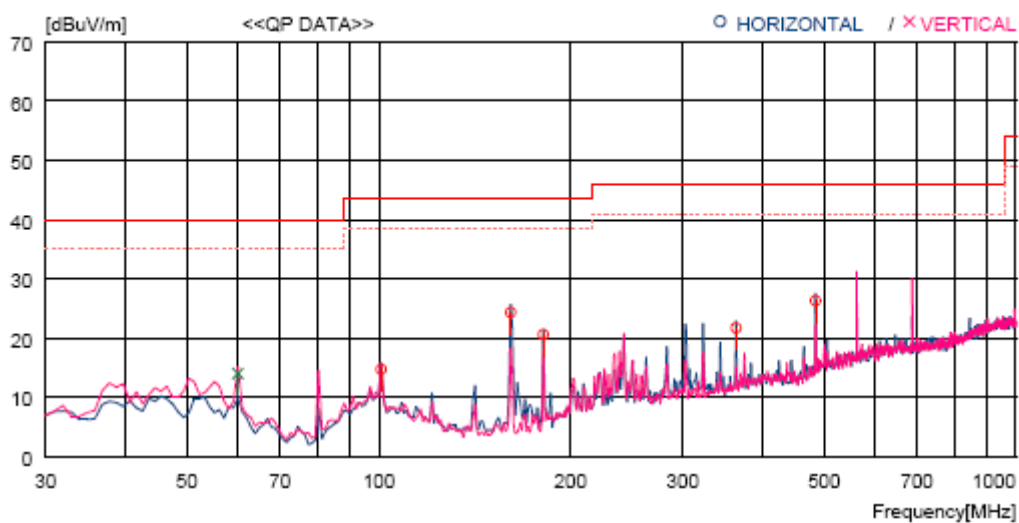
Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : Smartphone Wireless Charger

Date: December 24, 2019

Operating Condition : Transmitting Mode



| No.                    | FREQ    | READING | ANT    | LOSS | GAIN | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|---------|---------|--------|------|------|----------|----------|--------|---------|-------|
|                        | [MHz]   | [dBuV]  | FACTOR | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |         |         |        |      |      |          |          |        |         |       |
| 1                      | 100.810 | 34.0    | 12.5   | 0.9  | 32.7 | 14.7     | 43.5     | 28.8   | 300     | 359   |
| 2                      | 160.950 | 46.8    | 8.9    | 1.2  | 32.6 | 24.3     | 43.5     | 19.2   | 200     | 264   |
| 3                      | 181.320 | 41.9    | 10.0   | 1.3  | 32.6 | 20.6     | 43.5     | 22.9   | 200     | 0     |
| 4                      | 363.680 | 37.6    | 14.9   | 1.9  | 32.7 | 21.7     | 46.0     | 24.3   | 100     | 238   |
| 5                      | 484.931 | 39.4    | 17.7   | 2.1  | 32.9 | 26.3     | 46.0     | 19.7   | 100     | 359   |
| ----- Vertical -----   |         |         |        |      |      |          |          |        |         |       |
| 6                      | 60.070  | 33.0    | 13.0   | 0.7  | 32.7 | 14.0     | 40.0     | 26.0   | 100     | 0     |



Tested by: Sieon Lee / Assistant Manager

## 8.5 Test data for Using Mid. load (500 mA) (5V)

### 8.5.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 51 % R.H.

Temperature: 22 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : Smartphone Wireless Charger

Date: December 24, 2019

Operating Condition : Transmitting Mode

| Frequency (MHz) | Detector | Ant. Pol. (H/V) | Reading (dBμV) | Ant. Factor (dB/m) | Cable Loss | Emission Level at 3m (dBμV/m) | Emission Level at 300m (dBμV/m) | Limit at 300m (dBμV/m) | Margin (dB) |
|-----------------|----------|-----------------|----------------|--------------------|------------|-------------------------------|---------------------------------|------------------------|-------------|
| 0.038           | QP       | H               | 25.3           | 19.4               | 0.0        | 44.7                          | -35.3                           | 36.0                   | 71.3        |
| 0.115           | QP       | H               | 22.0           | 19.4               | 0.1        | 41.5                          | -38.5                           | 26.4                   | 64.9        |
| *0.145          | QP       | H               | 56.1           | 19.4               | 0.1        | 75.6                          | -4.4                            | 24.4                   | 28.8        |
| 0.419           | QP       | H               | 34.1           | 19.4               | 0.1        | 53.6                          | -26.4                           | 15.2                   | 41.6        |

| Frequency (MHz) | Detector | Ant. Pol. (H/V) | Reading (dBμV) | Ant. Factor (dB/m) | Cable Loss | Emission Level at 3m (dBμV/m) | Emission Level at 30m (dBμV/m) | Limit at 30m (dBμV/m) | Margin (dB) |
|-----------------|----------|-----------------|----------------|--------------------|------------|-------------------------------|--------------------------------|-----------------------|-------------|
| 0.717           | QP       | H               | 27.8           | 19.3               | 0.1        | 47.2                          | 7.2                            | 30.5                  | 23.3        |
| 0.986           | QP       | H               | 19.4           | 19.3               | 0.1        | 38.8                          | -1.2                           | 27.7                  | 28.9        |

-. Remark: "H" Horizontal, "V" Vertical

-. "\*" Means Fundamental frequency

-. Emission Level at 3m [dB μ V/m] = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level at 300m [dBμV/m] – Limit at 300m [dBμV/m]

= Emission Level at 300m [dBμV/m] – Limit at 30m [dBμV/m]

-. Emission Level at 300m [dBμV/m] = Emission Level at 3m [dBμV/m] - 40log (300/3), 80 dB for up to 0.49 MHz

-. Emission Level at 30m [dBμV/m] = Emission Level at 3m [dBμV/m] - 40log (30/3), 40 dB for above 0.49 MHz, Below 30 MHz



Tested by: Sieon Lee / Assistant Manager

## 8.5.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 51 % R.H.

Temperature: 22 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

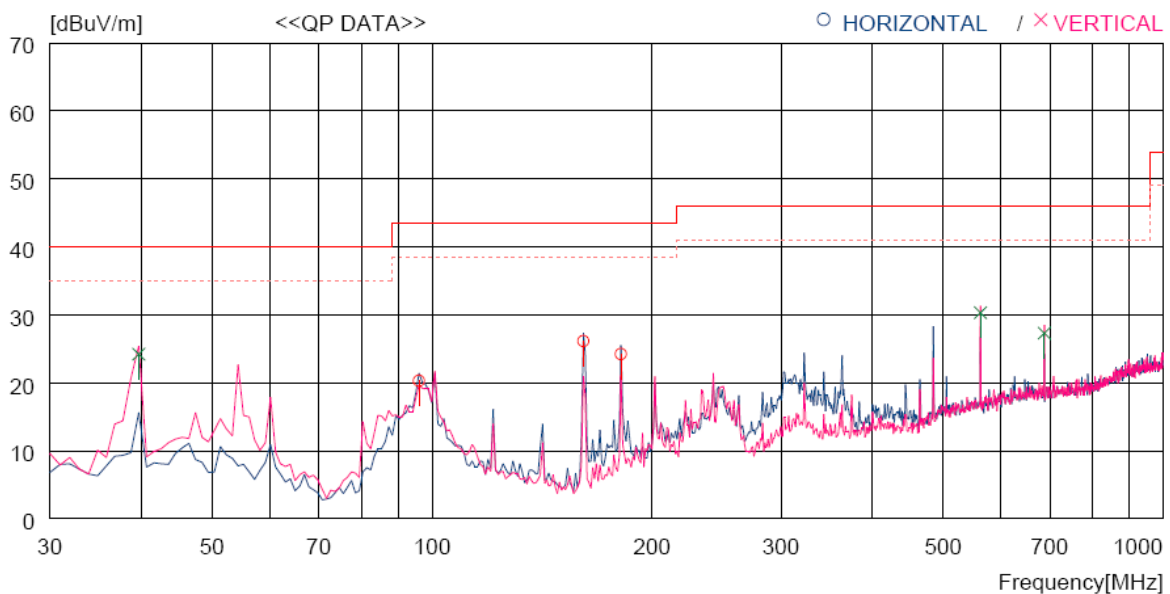
Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : Smartphone Wireless Charger

Date: December 24, 2019

Operating Condition : Transmitting Mode



| No.                    | FREQ    | READING | ANT    | LOSS | GAIN | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|---------|---------|--------|------|------|----------|----------|--------|---------|-------|
|                        | [MHz]   | [dBuV]  | FACTOR | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |         |         |        |      |      |          |          |        |         |       |
| 1                      | 95.960  | 40.0    | 12.1   | 0.9  | 32.7 | 20.3     | 43.5     | 23.2   | 300     | 359   |
| 2                      | 160.950 | 48.6    | 8.9    | 1.2  | 32.6 | 26.1     | 43.5     | 17.4   | 300     | 359   |
| 3                      | 181.320 | 45.5    | 10.0   | 1.3  | 32.6 | 24.2     | 43.5     | 19.3   | 200     | 0     |
| ----- Vertical -----   |         |         |        |      |      |          |          |        |         |       |
| 4                      | 39.700  | 41.8    | 14.6   | 0.5  | 32.7 | 24.2     | 40.0     | 15.8   | 100     | 168   |
| 5                      | 562.529 | 41.4    | 19.6   | 2.3  | 33.0 | 30.3     | 46.0     | 15.7   | 100     | 0     |
| 6                      | 687.655 | 37.0    | 20.7   | 2.5  | 32.9 | 27.3     | 46.0     | 18.7   | 200     | 359   |



Tested by: Sieon Lee / Assistant Manager

## 8.6 Test data for Using Mid. load (500 mA) (9V)

### 8.6.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 51 % R.H.

Temperature: 22 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : Smartphone Wireless Charger

Date: December 24, 2019

Operating Condition : Transmitting Mode

| Frequency (MHz) | Detector | Ant. Pol. (H/V) | Reading (dBμV) | Ant. Factor (dB/m) | Cable Loss | Emission Level at 3m (dBμV/m) | Emission Level at 300m (dBμV/m) | Limit at 300m (dBμV/m) | Margin (dB) |
|-----------------|----------|-----------------|----------------|--------------------|------------|-------------------------------|---------------------------------|------------------------|-------------|
| 0.038           | QP       | H               | 25.0           | 19.4               | 0.0        | 44.4                          | -35.6                           | 36.0                   | 71.6        |
| 0.115           | QP       | H               | 21.2           | 19.4               | 0.1        | 40.7                          | -39.3                           | 26.4                   | 65.7        |
| *0.144          | QP       | H               | 56.1           | 19.4               | 0.1        | 75.6                          | -4.4                            | 24.4                   | 28.8        |
| 0.419           | QP       | H               | 33.8           | 19.4               | 0.1        | 53.3                          | -26.7                           | 15.2                   | 41.9        |

| Frequency (MHz) | Detector | Ant. Pol. (H/V) | Reading (dBμV) | Ant. Factor (dB/m) | Cable Loss | Emission Level at 3m (dBμV/m) | Emission Level at 30m (dBμV/m) | Limit at 30m (dBμV/m) | Margin (dB) |
|-----------------|----------|-----------------|----------------|--------------------|------------|-------------------------------|--------------------------------|-----------------------|-------------|
| 0.717           | QP       | H               | 28.0           | 19.3               | 0.1        | 47.4                          | 7.4                            | 30.5                  | 23.1        |
| 0.986           | QP       | H               | 19.3           | 19.3               | 0.1        | 38.7                          | -1.3                           | 27.7                  | 29.0        |

-. Remark: "H" Horizontal, "V" Vertical

-. "\*" Means Fundamental frequency

-. Emission Level at 3m [dB μ V/m] = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level at 300m [dBμV/m] – Limit at 300m [dBμV/m]

= Emission Level at 300m [dBμV/m] – Limit at 30m [dBμV/m]

-. Emission Level at 300m [dBμV/m] = Emission Level at 3m [dBμV/m] - 40log (300/3), 80 dB for up to 0.49 MHz

-. Emission Level at 30m [dBμV/m] = Emission Level at 3m [dBμV/m] - 40log (30/3), 40 dB for above 0.49 MHz, Below 30 MHz



Tested by: Sieon Lee / Assistant Manager

## 8.6.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 51 % R.H.

Temperature: 22 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

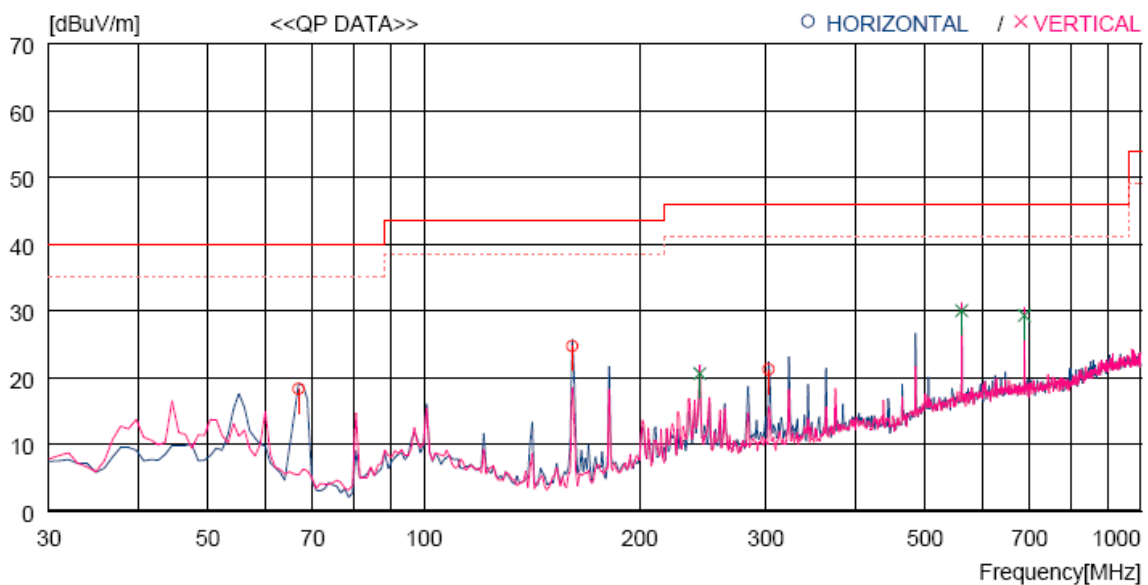
Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : Smartphone Wireless Charger

Date: December 24, 2019

Operating Condition : Transmitting Mode



| No.                    | FREQ    | READING | ANT    | LOSS | GAIN | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|---------|---------|--------|------|------|----------|----------|--------|---------|-------|
|                        | [MHz]   | [dBuV]  | FACTOR | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |         |         |        |      |      |          |          |        |         |       |
| 1                      | 66.860  | 40.0    | 10.3   | 0.7  | 32.7 | 18.3     | 40.0     | 21.7   | 100     | 359   |
| 2                      | 160.950 | 47.2    | 8.9    | 1.2  | 32.6 | 24.7     | 43.5     | 18.8   | 200     | 260   |
| 3                      | 302.570 | 38.4    | 13.8   | 1.7  | 32.7 | 21.2     | 46.0     | 24.8   | 100     | 359   |
| ----- Vertical -----   |         |         |        |      |      |          |          |        |         |       |
| 4                      | 242.430 | 39.2    | 12.5   | 1.5  | 32.6 | 20.6     | 46.0     | 25.4   | 100     | 0     |
| 5                      | 562.529 | 41.1    | 19.6   | 2.3  | 33.0 | 30.0     | 46.0     | 16.0   | 100     | 0     |
| 6                      | 687.655 | 39.0    | 20.7   | 2.5  | 32.9 | 29.3     | 46.0     | 16.7   | 200     | 359   |



Tested by: Sieon Lee / Assistant Manager

## 8.7 Test data for Using Min. load (100 mA) (5V)

### 8.7.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 51 % R.H.

Temperature: 22 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : Smartphone Wireless Charger

Date: December 24, 2019

Operating Condition : Transmitting Mode

| Frequency (MHz) | Detector | Ant. Pol. (H/V) | Reading (dBμV) | Ant. Factor (dB/m) | Cable Loss | Emission Level at 3m (dBμV/m) | Emission Level at 300m (dBμV/m) | Limit at 300m (dBμV/m) | Margin (dB) |
|-----------------|----------|-----------------|----------------|--------------------|------------|-------------------------------|---------------------------------|------------------------|-------------|
| 0.038           | QP       | H               | 25.6           | 19.4               | 0.0        | 45.0                          | -35.0                           | 36.0                   | 71.0        |
| 0.115           | QP       | H               | 21.8           | 19.4               | 0.1        | 41.3                          | -38.7                           | 26.4                   | 65.1        |
| *0.180          | QP       | H               | 48.6           | 19.4               | 0.1        | 68.1                          | -11.9                           | 22.5                   | 34.4        |
| 0.389           | QP       | H               | 19.0           | 19.4               | 0.1        | 38.5                          | -41.5                           | 15.8                   | 57.3        |

| Frequency (MHz) | Detector | Ant. Pol. (H/V) | Reading (dBμV) | Ant. Factor (dB/m) | Cable Loss | Emission Level at 3m (dBμV/m) | Emission Level at 30m (dBμV/m) | Limit at 30m (dBμV/m) | Margin (dB) |
|-----------------|----------|-----------------|----------------|--------------------|------------|-------------------------------|--------------------------------|-----------------------|-------------|
| 0.568           | QP       | H               | 28.7           | 19.3               | 0.1        | 48.1                          | 8.1                            | 32.5                  | 24.4        |
| 0.956           | QP       | H               | 16.0           | 19.3               | 0.1        | 35.4                          | -4.6                           | 28.0                  | 32.6        |

-. Remark: "H" Horizontal, "V" Vertical

-. "\*" Means Fundamental frequency

-. Emission Level at 3m [dB μ V/m] = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level at 300m [dBμV/m] – Limit at 300m [dBμV/m]

= Emission Level at 300m [dBμV/m] – Limit at 30m [dBμV/m]

-. Emission Level at 300m [dBμV/m] = Emission Level at 3m [dBμV/m] - 40log (300/3), 80 dB for up to 0.49 MHz

-. Emission Level at 30m [dBμV/m] = Emission Level at 3m [dBμV/m] - 40log (30/3), 40 dB for above 0.49 MHz, Below 30 MHz



Tested by: Sieon Lee / Assistant Manager

## 8.7.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 51 % R.H.

Temperature: 22 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

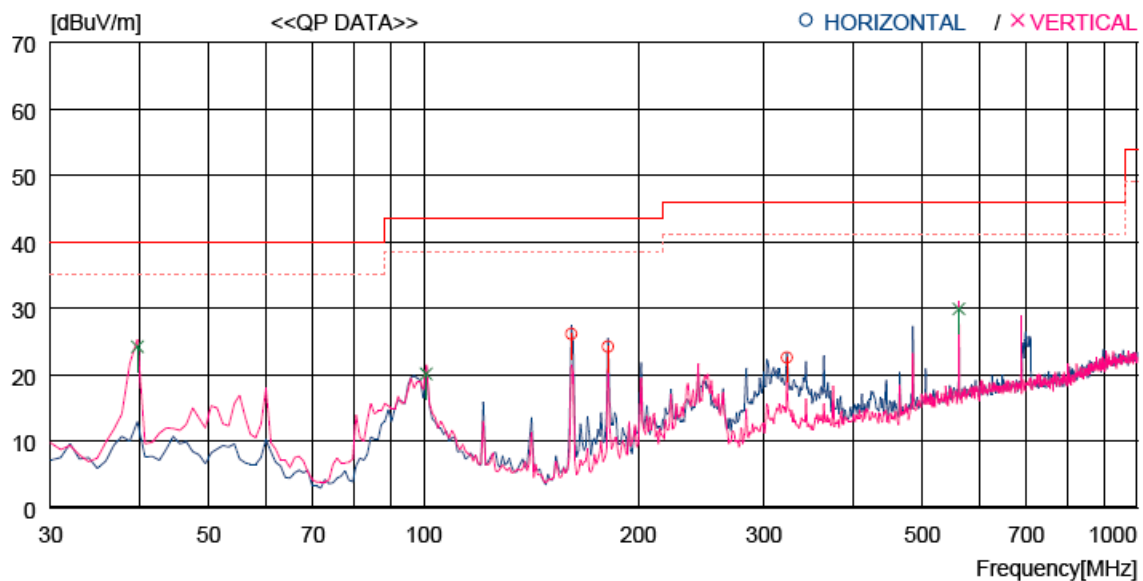
Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : Smartphone Wireless Charger

Date: December 24, 2019

Operating Condition : Transmitting Mode



| No.                    | FREQ    | READING | ANT    | LOSS | GAIN | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|---------|---------|--------|------|------|----------|----------|--------|---------|-------|
|                        | [MHz]   | [dBuV]  | FACTOR | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |         |         |        |      |      |          |          |        |         |       |
| 1                      | 160.950 | 48.6    | 8.9    | 1.2  | 32.6 | 26.1     | 43.5     | 17.4   | 200     | 265   |
| 2                      | 181.320 | 45.5    | 10.0   | 1.3  | 32.6 | 24.2     | 43.5     | 19.3   | 200     | 290   |
| 3                      | 322.940 | 39.6    | 14.0   | 1.7  | 32.7 | 22.6     | 46.0     | 23.4   | 100     | 359   |
| ----- Vertical -----   |         |         |        |      |      |          |          |        |         |       |
| 4                      | 39.700  | 41.8    | 14.6   | 0.5  | 32.7 | 24.2     | 40.0     | 15.8   | 100     | 161   |
| 5                      | 100.810 | 39.4    | 12.5   | 0.9  | 32.7 | 20.1     | 43.5     | 23.4   | 200     | 359   |
| 6                      | 562.529 | 41.0    | 19.6   | 2.3  | 33.0 | 29.9     | 46.0     | 16.1   | 100     | 58    |



Tested by: Sieon Lee / Assistant Manager

## 8.8 Test data for Using Min. load (100 mA) (9V)

### 8.8.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 51 % R.H.

Temperature: 22 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : Smartphone Wireless Charger

Date: December 24, 2019

Operating Condition : Transmitting Mode

| Frequency (MHz) | Detector | Ant. Pol. (H/V) | Reading (dBμV) | Ant. Factor (dB/m) | Cable Loss | Emission Level at 3m (dBμV/m) | Emission Level at 300m (dBμV/m) | Limit at 300m (dBμV/m) | Margin (dB) |
|-----------------|----------|-----------------|----------------|--------------------|------------|-------------------------------|---------------------------------|------------------------|-------------|
| 0.038           | QP       | H               | 26.1           | 19.4               | 0.0        | 45.5                          | -34.5                           | 36.0                   | 70.5        |
| 0.115           | QP       | H               | 23.0           | 19.4               | 0.1        | 42.5                          | -37.5                           | 26.4                   | 63.9        |
| *0.180          | QP       | H               | 49.9           | 19.4               | 0.1        | 69.4                          | -10.6                           | 22.5                   | 33.1        |
| 0.359           | QP       | H               | 20.0           | 19.4               | 0.1        | 39.5                          | -40.5                           | 16.5                   | 57.0        |

| Frequency (MHz) | Detector | Ant. Pol. (H/V) | Reading (dBμV) | Ant. Factor (dB/m) | Cable Loss | Emission Level at 3m (dBμV/m) | Emission Level at 300m (dBμV/m) | Limit at 300m (dBμV/m) | Margin (dB) |
|-----------------|----------|-----------------|----------------|--------------------|------------|-------------------------------|---------------------------------|------------------------|-------------|
| 0.538           | QP       | H               | 30.1           | 19.3               | 0.1        | 49.5                          | 9.5                             | 33.0                   | 23.5        |
| 0.926           | QP       | H               | 16.5           | 19.3               | 0.1        | 35.9                          | -4.1                            | 28.3                   | 32.4        |

-. Remark: "H" Horizontal, "V" Vertical

-. "\*" Means Fundamental frequency

-. Emission Level at 3m [dB μ V/m] = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level at 300m [dBμV/m] – Limit at 300m [dBμV/m]

= Emission Level at 300m [dBμV/m] – Limit at 30m [dBμV/m]

-. Emission Level at 300m [dBμV/m] = Emission Level at 3m [dBμV/m] - 40log (300/3), 80 dB for up to 0.49 MHz

-. Emission Level at 30m [dBμV/m] = Emission Level at 3m [dBμV/m] - 40log (30/3), 40 dB for above 0.49 MHz, Below 30 MHz



Tested by: Sieon Lee / Assistant Manager

## 8.8.2 Spurious Radiated Emission Below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 51 % R.H.

Temperature: 22 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

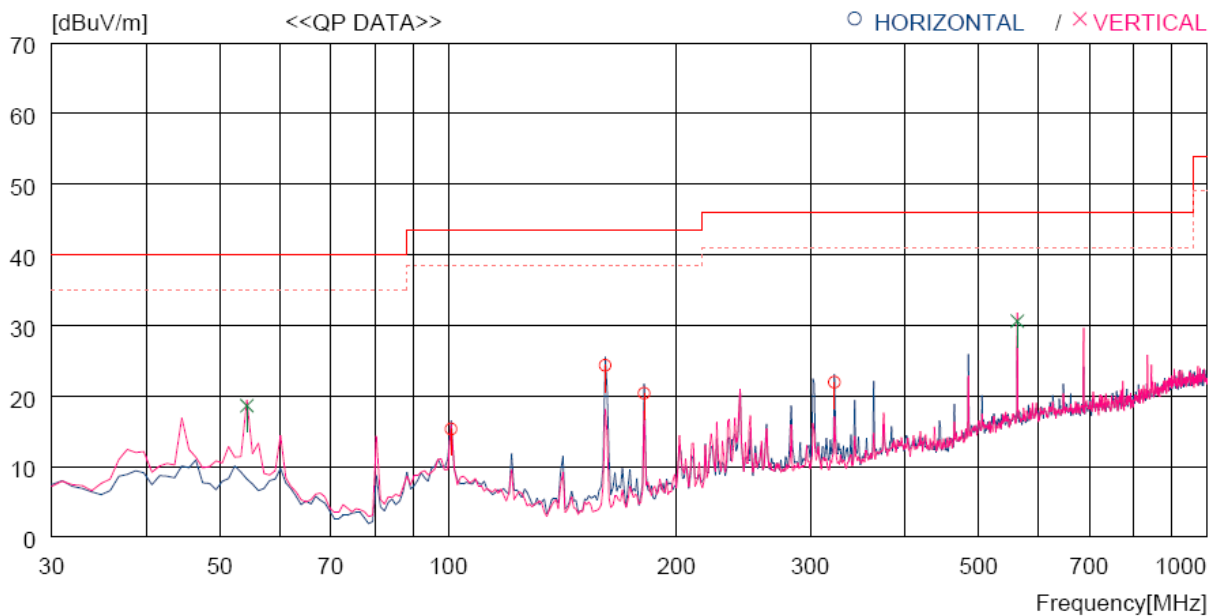
Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : Smartphone Wireless Charger

Date: December 24, 2019

Operating Condition : Transmitting Mode



| No.                    | FREQ    | READING | ANT    | LOSS | GAIN | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|---------|---------|--------|------|------|----------|----------|--------|---------|-------|
|                        | [MHz]   | [dBuV]  | FACTOR | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |         |         |        |      |      |          |          |        |         |       |
| 1                      | 100.810 | 34.6    | 12.5   | 0.9  | 32.7 | 15.3     | 43.5     | 28.2   | 400     | 0     |
| 2                      | 160.950 | 46.8    | 8.9    | 1.2  | 32.6 | 24.3     | 43.5     | 19.2   | 200     | 0     |
| 3                      | 181.320 | 41.7    | 10.0   | 1.3  | 32.6 | 20.4     | 43.5     | 23.1   | 200     | 0     |
| 4                      | 322.940 | 38.9    | 14.0   | 1.7  | 32.7 | 21.9     | 46.0     | 24.1   | 100     | 291   |
| ----- Vertical -----   |         |         |        |      |      |          |          |        |         |       |
| 5                      | 54.250  | 37.0    | 13.7   | 0.6  | 32.7 | 18.6     | 40.0     | 21.4   | 100     | 209   |
| 6                      | 562.529 | 41.7    | 19.6   | 2.3  | 33.0 | 30.6     | 46.0     | 15.4   | 100     | 54    |



Tested by: Sieon Lee / Assistant Manager

## 9. CONDUCTED EMISSION TEST

### 9.1 Operating environment

Temperature : 24 °C  
Relative humidity : 48 % R.H

### 9.2 Test set-up

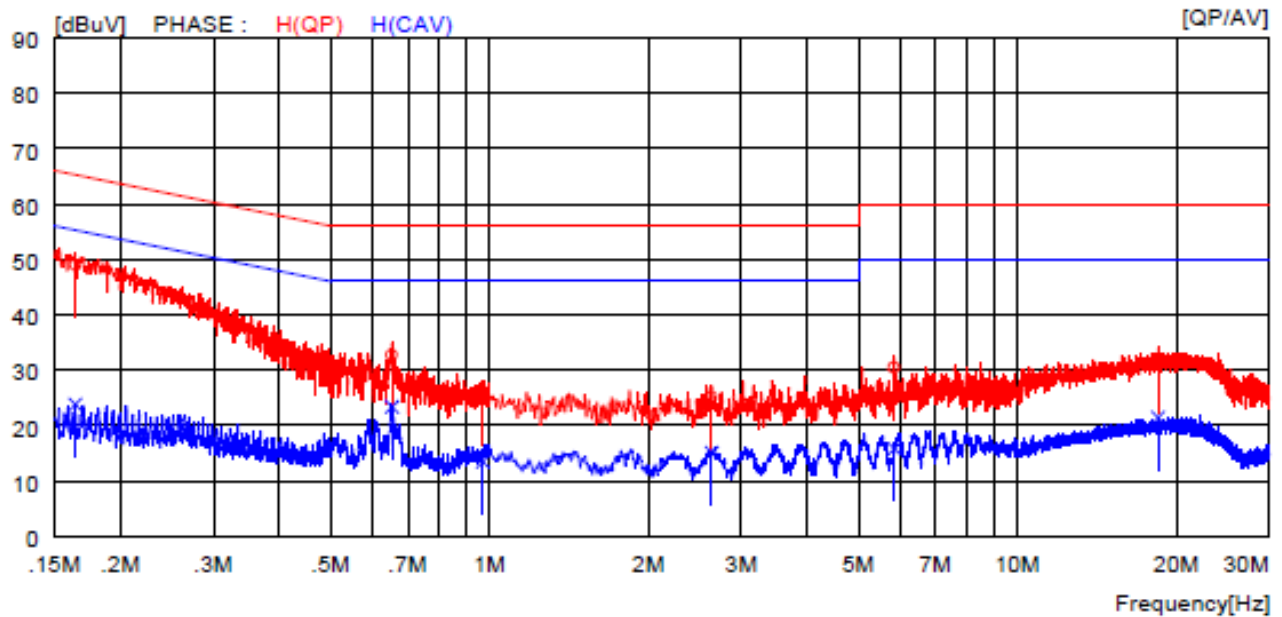
The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a 50  $\Omega$  / 50  $\mu$ H + 5  $\Omega$  Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

### 9.3 Test equipment used

All test equipment used is calibrated on a regular basis.

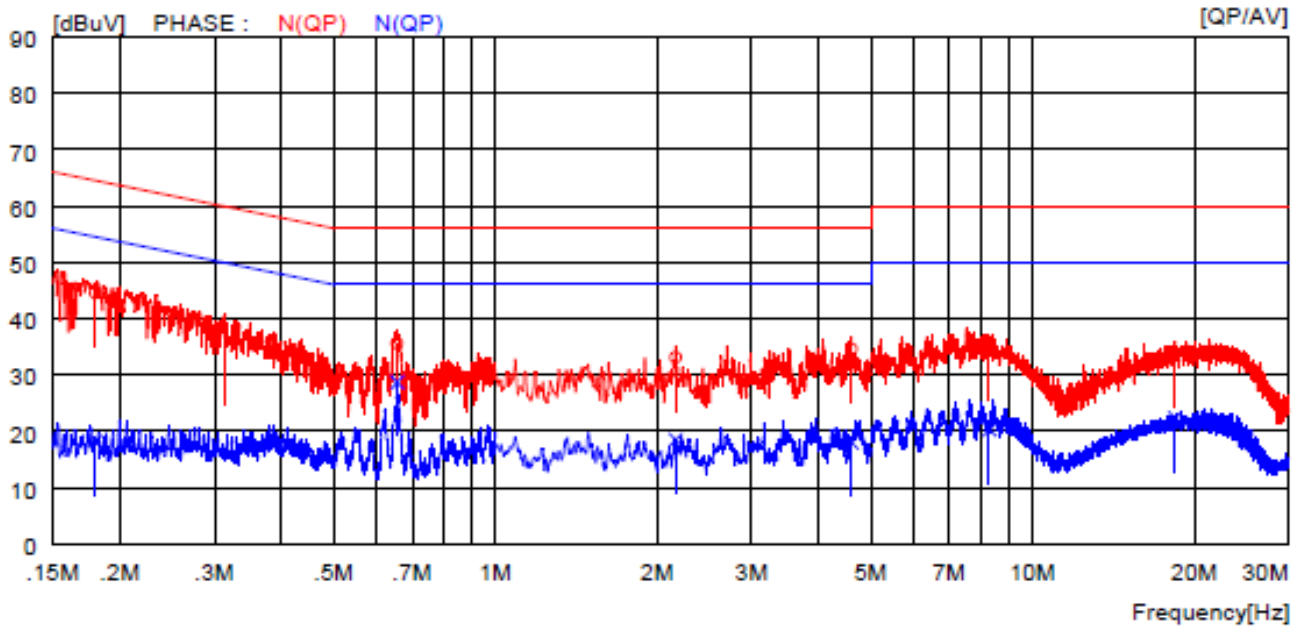
## 9.4 Test data for 5V

-. Test Date : January 03, 2020  
 -. Resolution bandwidth : 9 kHz  
 -. Frequency range : 0.15 MHz ~ 30 MHz  
 -. Tested Line : HOT LINE



| NO | FREQ<br>[MHz] | READING      |              | C. FACTOR<br>[dB] | RESULT       |              | LIMIT        |              | MARGIN       |              | PHASE   |
|----|---------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
|    |               | QP<br>[dBuV] | AV<br>[dBuV] |                   | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] |         |
| 1  | 0.16400       | 39.0         | ----         | 10.0              | 49.0         | ----         | 65.3         | ----         | 16.3         | ----         | H (QP)  |
| 2  | 0.65300       | 22.7         | ----         | 10.0              | 32.7         | ----         | 56.0         | ----         | 23.3         | ----         | H (QP)  |
| 3  | 0.97000       | 16.1         | ----         | 10.0              | 26.1         | ----         | 56.0         | ----         | 29.9         | ----         | H (QP)  |
| 4  | 2.63600       | 15.0         | ----         | 10.1              | 25.1         | ----         | 56.0         | ----         | 30.9         | ----         | H (QP)  |
| 5  | 5.84000       | 20.3         | ----         | 10.2              | 30.5         | ----         | 60.0         | ----         | 29.5         | ----         | H (QP)  |
| 6  | 18.47000      | 21.1         | ----         | 10.7              | 31.8         | ----         | 60.0         | ----         | 28.2         | ----         | H (QP)  |
| 7  | 0.16400       | ----         | 13.8         | 10.0              | ----         | 23.8         | ----         | 55.3         | ----         | 31.5         | H (CAV) |
| 8  | 0.65300       | ----         | 13.4         | 10.0              | ----         | 23.4         | ----         | 46.0         | ----         | 22.6         | H (CAV) |
| 9  | 0.97000       | ----         | 3.5          | 10.0              | ----         | 13.5         | ----         | 46.0         | ----         | 32.5         | H (CAV) |
| 10 | 2.63600       | ----         | 5.0          | 10.1              | ----         | 15.1         | ----         | 46.0         | ----         | 30.9         | H (CAV) |
| 11 | 5.84000       | ----         | 5.6          | 10.2              | ----         | 15.8         | ----         | 50.0         | ----         | 34.2         | H (CAV) |
| 12 | 18.47000      | ----         | 10.7         | 10.7              | ----         | 21.4         | ----         | 50.0         | ----         | 28.6         | H (CAV) |

-. Tested Line : NEUTRAL LINE



| NO | FREQ<br>[MHz] | READING      |              | C.FACTOR<br>[dB] | RESULT       |              | LIMIT        |              | MARGIN       |              | PHASE  |
|----|---------------|--------------|--------------|------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------|
|    |               | QP<br>[dBuV] | AV<br>[dBuV] |                  | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] |        |
| 1  | 0.18000       | 34.5         | ----         | 10.0             | 44.5         | ----         | 64.5         | ----         | 20.0         | ----         | N(QP)  |
| 2  | 0.65600       | 25.6         | ----         | 10.0             | 35.6         | ----         | 56.0         | ----         | 20.4         | ----         | N(QP)  |
| 3  | 2.16400       | 23.0         | ----         | 10.1             | 33.1         | ----         | 56.0         | ----         | 22.9         | ----         | N(QP)  |
| 4  | 4.60400       | 24.4         | ----         | 10.1             | 34.5         | ----         | 56.0         | ----         | 21.5         | ----         | N(QP)  |
| 5  | 8.30500       | 24.7         | ----         | 10.2             | 34.9         | ----         | 60.0         | ----         | 25.1         | ----         | N(QP)  |
| 6  | 18.41000      | 23.0         | ----         | 10.7             | 33.7         | ----         | 60.0         | ----         | 26.3         | ----         | N(QP)  |
| 7  | 0.18000       | ----         | 8.2          | 10.0             | ----         | 18.2         | ----         | 54.5         | ----         | 36.3         | N(CAV) |
| 8  | 0.65600       | ----         | 18.7         | 10.0             | ----         | 28.7         | ----         | 46.0         | ----         | 17.3         | N(CAV) |
| 9  | 2.16400       | ----         | 8.4          | 10.1             | ----         | 18.5         | ----         | 46.0         | ----         | 27.5         | N(CAV) |
| 10 | 4.60400       | ----         | 7.9          | 10.1             | ----         | 18.0         | ----         | 46.0         | ----         | 28.0         | N(CAV) |
| 11 | 8.30500       | ----         | 10.1         | 10.2             | ----         | 20.3         | ----         | 50.0         | ----         | 29.7         | N(CAV) |
| 12 | 18.41000      | ----         | 11.6         | 10.7             | ----         | 22.3         | ----         | 50.0         | ----         | 27.7         | N(CAV) |

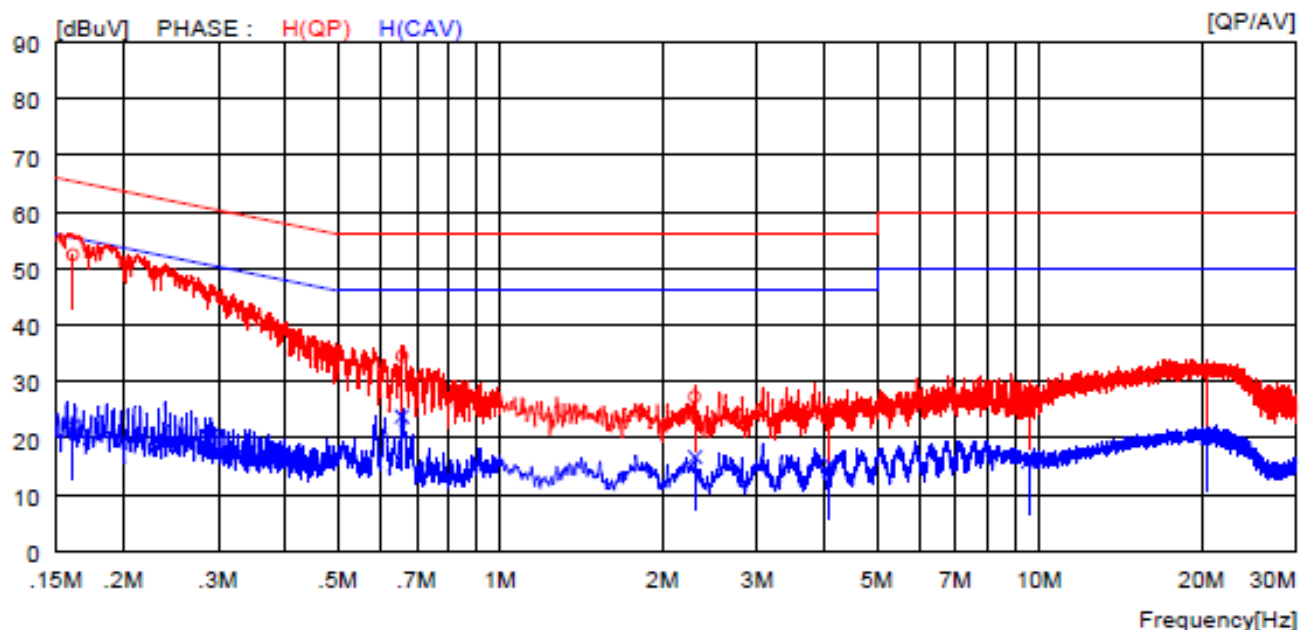
Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

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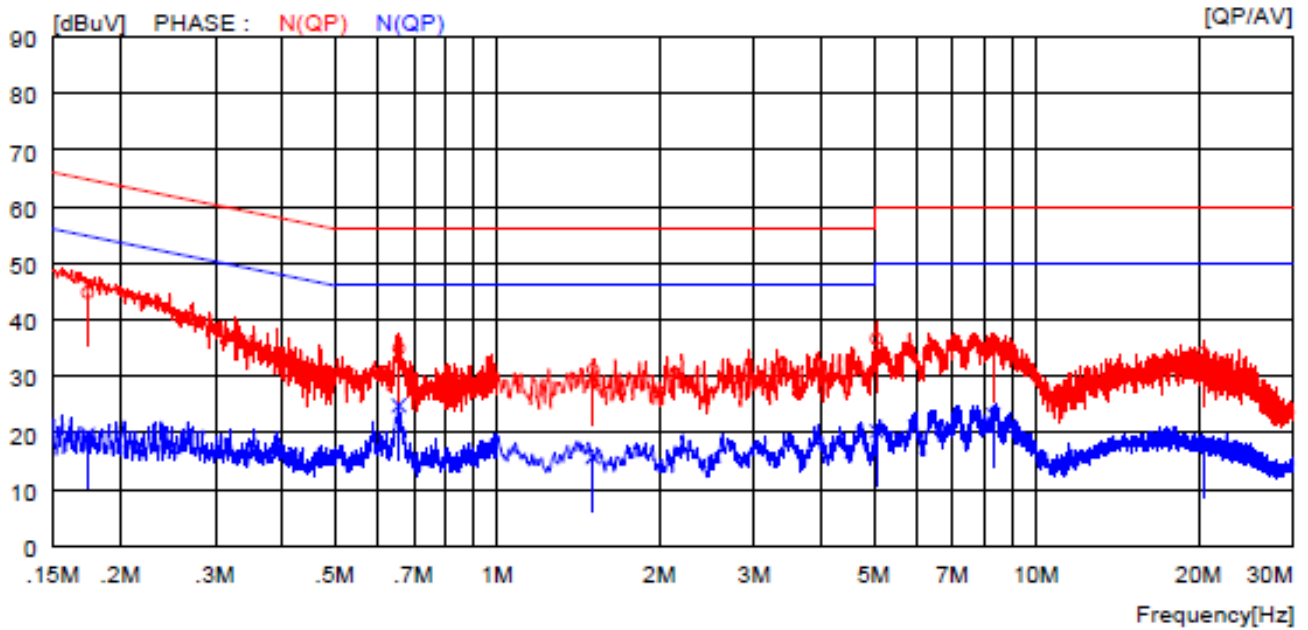
## 9.5 Test data for 9V

- . Test Date : January 03, 2020
- . Resolution bandwidth : 9 kHz
- . Frequency range : 0.15 MHz ~ 30 MHz
- . Tested Line : HOT LINE



| NO | FREQ<br>[MHz] | READING      |              | C. FACTOR<br>[dB] | RESULT       |              | LIMIT        |              | MARGIN       |              | PHASE   |
|----|---------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
|    |               | QP<br>[dBuV] | AV<br>[dBuV] |                   | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] |         |
| 1  | 0.16100       | 42.4         | ----         | 10.0              | 52.4         | ----         | 65.4         | ----         | 13.0         | ----         | H (QP)  |
| 2  | 0.65700       | 24.4         | ----         | 10.0              | 34.4         | ----         | 56.0         | ----         | 21.6         | ----         | H (QP)  |
| 3  | 2.29600       | 17.2         | ----         | 10.1              | 27.3         | ----         | 56.0         | ----         | 28.7         | ----         | H (QP)  |
| 4  | 4.08000       | 15.0         | ----         | 10.1              | 25.1         | ----         | 56.0         | ----         | 30.9         | ----         | H (QP)  |
| 5  | 9.54000       | 17.5         | ----         | 10.3              | 27.8         | ----         | 60.0         | ----         | 32.2         | ----         | H (QP)  |
| 6  | 20.41000      | 21.0         | ----         | 10.7              | 31.7         | ----         | 60.0         | ----         | 28.3         | ----         | H (QP)  |
| 7  | 0.16100       | ----         | 12.2         | 10.0              | ----         | 22.2         | ----         | 55.4         | ----         | 33.2         | H (CAV) |
| 8  | 0.65700       | ----         | 13.8         | 10.0              | ----         | 23.8         | ----         | 46.0         | ----         | 22.2         | H (CAV) |
| 9  | 2.29600       | ----         | 6.5          | 10.1              | ----         | 16.6         | ----         | 46.0         | ----         | 29.4         | H (CAV) |
| 10 | 4.08000       | ----         | 5.2          | 10.1              | ----         | 15.3         | ----         | 46.0         | ----         | 30.7         | H (CAV) |
| 11 | 9.54000       | ----         | 5.5          | 10.3              | ----         | 15.8         | ----         | 50.0         | ----         | 34.2         | H (CAV) |
| 12 | 20.41000      | ----         | 9.4          | 10.7              | ----         | 20.1         | ----         | 50.0         | ----         | 29.9         | H (CAV) |

-, Tested Line : NEUTRAL LINE



| NO | FREQ<br>[MHz] | READING      |              | C. FACTOR<br>[dB] | RESULT       |              | LIMIT        |              | MARGIN       |              | PHASE   |
|----|---------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
|    |               | QP<br>[dBuV] | AV<br>[dBuV] |                   | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] |         |
| 1  | 0.17400       | 34.8         | ----         | 10.0              | 44.8         | ----         | 64.8         | ----         | 20.0         | ----         | N (QP)  |
| 2  | 0.65700       | 24.9         | ----         | 10.0              | 34.9         | ----         | 56.0         | ----         | 21.1         | ----         | N (QP)  |
| 3  | 1.50400       | 21.0         | ----         | 10.1              | 31.1         | ----         | 56.0         | ----         | 24.9         | ----         | N (QP)  |
| 4  | 5.05500       | 26.4         | ----         | 10.2              | 36.6         | ----         | 60.0         | ----         | 23.4         | ----         | N (QP)  |
| 5  | 8.32000       | 24.9         | ----         | 10.2              | 35.1         | ----         | 60.0         | ----         | 24.9         | ----         | N (QP)  |
| 6  | 20.42000      | 23.4         | ----         | 10.7              | 34.1         | ----         | 60.0         | ----         | 25.9         | ----         | N (QP)  |
| 7  | 0.17400       | ----         | 9.7          | 10.0              | ----         | 19.7         | ----         | 54.8         | ----         | 35.1         | N (CAV) |
| 8  | 0.65700       | ----         | 14.8         | 10.0              | ----         | 24.8         | ----         | 46.0         | ----         | 21.2         | N (CAV) |
| 9  | 1.50400       | ----         | 5.6          | 10.1              | ----         | 15.7         | ----         | 46.0         | ----         | 30.3         | N (CAV) |
| 10 | 5.05500       | ----         | 10.1         | 10.2              | ----         | 20.3         | ----         | 50.0         | ----         | 29.7         | N (CAV) |
| 11 | 8.32000       | ----         | 13.1         | 10.2              | ----         | 23.3         | ----         | 50.0         | ----         | 26.7         | N (CAV) |
| 12 | 20.42000      | ----         | 7.3          | 10.7              | ----         | 18.0         | ----         | 50.0         | ----         | 32.0         | N (CAV) |

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

Tested by: Sieon Lee / Assistant Manager

## 10. LIST OF TEST EQUIPMENT

| No. | EQUIPMENTS                    | MFR.                    | MODEL            | SER. NO.              | LAST CAL      | DUE CAL   | USE |
|-----|-------------------------------|-------------------------|------------------|-----------------------|---------------|-----------|-----|
| 1   | Spectrum analyzer             | R/S                     | FSV30            | 101199                | Mar. 11, 2019 | One Year  | ■   |
| 2   | Test receiver                 | R/S                     | ESCI             | 101420                | Mar. 28, 2019 | One Year  | ■   |
| 3   | Amplifier                     | Sonoma<br>Instrument    | 310N             | 392756                | Oct. 16, 2019 | One Year  | ■   |
| 4   | TRILOG Broadband<br>Antenna   | Schwarzbeck             | VULB9163         | 9163-225              | Sep. 17, 2018 | Two Year  | ■   |
| 5   | Controller                    | Innco Systems<br>GmbH   | CO3000           | 1026/40960617/P       | N/A           | N/A       | ■   |
| 6   | Turn Table                    | Innco Systems<br>GmbH   | DT2000-2t        | 930611                | N/A           | N/A       | ■   |
| 7   | LISN                          | Schwarzbeck             | NSLK8126         | 8126-404              | Mar. 19, 2019 | One Year  | ■   |
|     |                               | Schwarzbeck             | NSLK8128         | 8128-216              | Mar. 20, 2019 | One Year  | ■   |
| 8   | AMN                           | EMCO                    | 3825/2           | 9109-1867             | Mar. 27, 2019 | One Year  | ■   |
| 9   | Antenna Master                | Innco Systems<br>GmbH   | MA-4640-<br>XPET | MA4640/652/43100318/P | N/A           | N/A       | ■   |
| 10  | Loop Antenna                  | Schwarzbeck             | FMZB 1513        | 1513-235              | May. 13, 2018 | Two Years | ■   |
| 11  | Environmental Test<br>Chamber | ESPEC                   | PSL-2KP          | 14009407              | Feb. 22, 2019 | One Year  | ■   |
| 12  | DC Power Supply               | LG Precision<br>Co.,Ltd | GP-4303D         | 5071069               | Jan. 10, 2019 | One Year  | ■   |