



# FCC 47 CFR PART 15 SUBPART C ISED RSS-210 ISSUE 10

# **CERTIFICATION TEST REPORT**

For

Car Wireless Charger

**MODEL NUMBER: CHG-WIRELESS 4.0** 

REPORT NUMBER: 4791002373-RF-5

ISSUE DATE: March 12, 2024

FCC ID: 2AEQT-KMDC66CH0

IC: 26055-KMDC66CH0

### Prepared for

Huizhou Desay SV Automotive Co., Ltd.
No.103, Hechang 5th Road West, Zhongkai National Hi-tech Industrial
Development Zone, Huizhou, Guangdong, P.R. China

Prepared by

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch

Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, 523808, People's Republic of China

> Tel: +86 769 22038881 Fax: +86 769 33244054 Website: www.ul.com

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# **Revision History**

| Rev. | Issue Date     | Revisions     | Revised By |
|------|----------------|---------------|------------|
| V0   | March 12, 2024 | Initial Issue |            |



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| Summary of Test Results |   |   |              |  |  |
|-------------------------|---|---|--------------|--|--|
| Clause                  | Test Items  | FCC Rules   | Test Results |  |  |
| 1                       | Transmitter 99% Emission<br>Bandwidth / 20dB Bandwidth            | Part 15.215 (c)<br>RSS-Gen 6.7  | PASS         |  |  |
| 2                       | Transmitter Frequency Stability (Temperature & Voltage Variation) | CFR 47 FCC §15.225(e)<br>ISED RSS-Gen Clause 6.11<br>ISED RSS-210 Annex B.6                             | PASS         |  |  |
| 3                       | Fundamental Field Strength  | CFR 47 FCC §5.225(a)(b)(c)(d)<br>ISED RSS-Gen Clause 6.12<br>ISED RSS-210 Annex B.6                     | PASS         |  |  |
| 4                       | Radiated Emissions  | CFR 47 FCC§15.209(a)<br>CFR 47 FCC§15.225(d)<br>ISED RSS-Gen Clause 6.13<br>ISED RSS-210 Annex B.6      | PASS         |  |  |
| 5                       | Band Edge Radiated<br>Emissions                                   | CFR 47 FCC §15.209(a)<br>CFR 47 FCC §15.225(c)(d)<br>ISED RSS-Gen Clause 6.13<br>ISED RSS-210 Annex B.6 | PASS         |  |  |
| 6                       | Antenna Requirement   | CFR 47 FCC §15.203  | Pass         |  |  |

Note 1: This test report is only published to and used by the applicant, and it is not for evidence purpose in China.

Note 2: The measurement result for the sample received is <Pass> according to < CFR 47 FCC PART 15 SUBPART C and ISED RSS-210 ISSUE 10> when <Accuracy Method> decision rule is applied.



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1. ATTESTATION OF TEST RESULTS

**Applicant Information** 

Company Name: Huizhou Desay SV Automotive Co., Ltd.

Address: No.103, Hechang 5th Road West, Zhongkai National Hi-tech

Industrial Development Zone, Huizhou, Guangdong, P.R. China

**Manufacturer Information** 

Company Name: Huizhou Desay SV Automotive Co., Ltd.

Address: No.103, Hechang 5th Road West, Zhongkai National Hi-tech

Industrial Development Zone, Huizhou, Guangdong, P.R. China

**EUT Information** 

EUT Name: Car Wireless Charger Model: CHG-WIRELESS 4.0

Brand: /

Sample Received Date: February 27, 2024

Sample Status: Normal Sample ID: 6999389

Date of Tested: February 27, 2024 to March 15, 2024

| APPLICABLE STANDARDS         |      |  |  |  |
|------------------------------|------|--|--|--|
| STANDARD TEST RESULTS        |      |  |  |  |
| CFR 47 FCC PART 15 SUBPART C | PASS |  |  |  |
| ISED RSS-210 Issue 10        | PASS |  |  |  |
| ISED RSS-GEN Issue 5         | PASS |  |  |  |

| Prepared By:            | Checked By:             |
|-------------------------|-------------------------|
| Danny Grany             | kelo. Thurs             |
| Denny Huang             | Kebo Zhang              |
| Senior Project Engineer | Senior Project Engineer |

Approved By:

Stephen Guo

**Operations Manager** 



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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 414788 D01 Radiated Test Site v01r01, FCC CFR 47 Part 2, FCC CFR 47 Part 15 and ANSI C63.10-2013, ISED RSS-210 Issue 10 and RSS-GEN Issue 5.

# 3. FACILITIES AND ACCREDITATION

|                              | A2LA (Certificate No.: 4102.01) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.   |
|------------------------------|---|
|                              | FCC (FCC Designation No.: CN1187)   |
|                              | UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Delcaration of Conformity (DoC) and Certification rules  |
|                              | ISED (Company No.: 21320)   |
| Accreditation<br>Certificate | UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046.  |
|                              | VCCI (Registration No.: G-20192, R-20202, C-20153 and T-20155)  UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793.  Facility Name: Chamber D, the VCCI registration No. is G-20192 and C-20153  Shielding Room B, the VCCI registration No. is C-20153 and T-20155 |

#### Note 1:

All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, 523808, People's Republic of China.

#### Note 2:

The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

#### Note 3:

For below 30 MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30 MHz had been correlated to measurements performed on an OFS.



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# 4. CALIBRATION AND UNCERTAINTY

#### 4.1. **MEASURING INSTRUMENT CALIBRATION**

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognize national standards.

#### 4.2. **MEASUREMENT UNCERTAINTY**

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| Test Item   | Uncertainty             |
|---|-------------------------|
| Conduction emission   | 3.62 dB                 |
| Radiation Emission test (include Fundamental emission) (9KHz-30MHz) | 2.2 dB                  |
| Radiation Emission test (include Fundamental emission) (30MHz-1GHz) | 4.00 dB                 |
| Radiation Emission test   | 5.78 dB (1 GHz-18 GHz)  |
| (1GHz to 26GHz) (include Fundamental emission)                      | 5.23 dB (18 GHz-26 GHz) |

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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# 5. EQUIPMENT UNDER TEST

#### **DESCRIPTION OF EUT** 5.1.

| EUT Name            | Car Wireless Charger |
|---------------------|----------------------|
| Model               | CHG-WIRELESS 4.0     |
| Operation Frequency | 13.56 MHz            |
| Modulation          | ASK                  |
| Ratings             | DC 12 V              |

#### 5.2. **MAXIMUM FIELD STRENGTH**

| Frequency (MHz) | Maximum Peak field strength (dBμV/m) |  |
|-----------------|--------------------------------------|--|
| 13.56           | 57.55                                |  |

# 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

| Frequency (MHz) | Antenna Type | Antenna Gain (dBi) |  |
|-----------------|--------------|--------------------|--|
| 13.56           | Coil antenna | 0                  |  |



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# **DESCRIPTION OF TEST SETUP**

# **SUPPORT EQUIPMENT**

| Item | Equipment | Brand Name | Model Name | Remarks |
|------|-----------|------------|------------|---------|
| 1    | Laptop    | Lenovo     | T430       | /       |

# I/O CABLES

| Cable No | Port | Connector Type | Cable Type | Cable Length(m) | Remarks |
|----------|------|----------------|------------|-----------------|---------|
| 1        | /    | /              | /          | /               | /       |

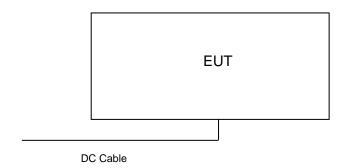
# **ACCESSORIES**

| Item | Accessory | Brand<br>Name | Model Name | Description |
|------|-----------|---------------|------------|-------------|
| /    | /         | /             | /          | /           |

# **TEST SETUP**

The EUT can work in engineering mode with a software through a laptop.

# **SETUP DIAGRAM FOR TESTS**





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# 5.5. MEASURING INSTRUMENT AND SOFTWARE USED

| Radiated Emissions             |                |   |                   |              |              |  |
|--------------------------------|----------------|---|-------------------|--------------|--------------|--|
| Equipment                      | Manufacturer   | Model No.                                       | Serial No.        | Last Cal.    | Due Date     |  |
| MXE EMI<br>Receiver            | KESIGHT        | N9038A  | MY56400036        | Oct.12, 2023 | Oct.11, 2024 |  |
| Hybrid Log<br>Periodic Antenna | TDK            | HLP-3003C                                       | 130959            | Aug.02, 2021 | Aug.01, 2024 |  |
| Preamplifier                   | HP             | 8447D   | 2944A09099        | Oct.12, 2023 | Oct.11, 2024 |  |
| Loop antenna                   | Schwarzbeck    | 1519B   | 80000             | Dec.14, 2021 | Dec.13, 2024 |  |
| Preamplifier                   | TDK            | PA-02-001-<br>3000                              | TRS-302-<br>00050 | Oct.12, 2023 | Oct.11, 2024 |  |
| Band Reject<br>Filter          | Wainwright     | WRCJV8-<br>2350-2400-<br>2483.5-<br>2533.5-40SS | 4                 | Oct.12, 2023 | Oct.11, 2024 |  |
| Software                       |                |   |                   |              |              |  |
| Γ                              | Description    |   | Manufacturer      | Name         | Version      |  |
| Test Software                  | for Radiated E | missions  | Farad             | EZ-EMC       | Ver. UL-3A1  |  |

| Other Instruments      |              |           |            |              |              |  |
|------------------------|--------------|-----------|------------|--------------|--------------|--|
| Equipment              | Manufacturer | Model No. | Serial No. | Last Cal.    | Next Cal.    |  |
| PXA Signal<br>Analyzer | Keysight     | N9030A    | MY55410512 | Oct.12, 2023 | Oct.11, 2024 |  |

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# 6. ANTENNA PORT TEST RESULTS

# 6.1. 99% & 20dB BANDWIDTH

### **LIMITS**

| FCC Part15 (15.247) Subpart C<br>ISED RSS-Gen |                         |                              |  |  |  |
|---|-------------------------|------------------------------|--|--|--|
| Section Test Item Limit                       |                         |                              |  |  |  |
| ANSI C63.10 Section 6.9.2                     | 20dB% Bandwidth         | For reporting purposes only. |  |  |  |
| ISED RSS-Gen Clause 6.7<br>Issue 5            | 99 % Occupied Bandwidth | For reporting purposes only. |  |  |  |

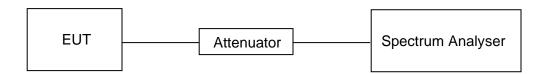
#### TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1 kHz. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

Note: Because the measured signal is CW or CW-like adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

The type of band for the signal is narrowband.

### **TEST SETUP**



### **TEST ENVIRONMENT**

| Temperature         | 22.4 °C | Relative Humidity | 60%     |
|---------------------|---------|-------------------|---------|
| Atmosphere Pressure | 101 kPa | Test Voltage      | DC 12 V |



### **RESULTS**

| Frequency<br>(MHz) | 99% Occupied Bandwidth (kHz) | 20dB Bandwidth<br>(kHz) |
|--------------------|------------------------------|-------------------------|
| 13.56              | 735.23                       | 431.3                   |

# 99% Occupied Bandwidth &20dB Bandwidth



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### 6.2. TRANSMITTER FREQUENCY STABILITY

### **LIMITS**

CFR 47 FCC §15.225(e) ISED RSS-210 Annex B B.5

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

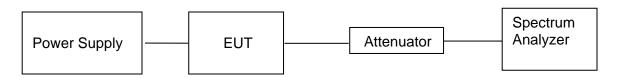
#### **TEST PROCEDURE**

Connect the UUT to the spectrum analyser and use the following settings:

| Center Frequency | The center frequency of the channel under test               |  |  |
|------------------|--|--|--|
| Detector         | PEAK   |  |  |
| RBW              | 10KHz  |  |  |
| VBW              | ≥3 × RBW   |  |  |
| Span             | Encompass the entire emissions bandwidth (EBW) of the signal |  |  |
| Trace            | Max hold   |  |  |
| Sweep time       | Auto   |  |  |

Allow the trace to stabilize, find the peak value of the power envelope and record the frequency, then calculated the frequency drift.

#### **TEST SETUP**



#### **TEST ENVIRONMENT**

| Temperature         | 22.4 °C | Relative Humidity | 60%     |
|---------------------|---------|-------------------|---------|
| Atmosphere Pressure | 101 kPa | Test Voltage      | DC 12 V |



# **TEST RESULTS**

Maximum frequency error of the EUT with variations in ambient temperature

|                         | Time after Start-up |           |           |            |  |
|-------------------------|---------------------|-----------|-----------|------------|--|
| Temperature (°C)        | 0 minutes           | 2 minutes | 5 minutes | 10 minutes |  |
| -20                     | 13.5609             | 13.5604   | 13.5602   | 13.5600    |  |
| -10                     | 13.5611             | 13.5609   | 13.5610   | 13.5610    |  |
| 0                       | 13.5609             | 13.5607   | 13.5602   | 13.5604    |  |
| 10                      | 13.5606             | 13.5604   | 13.5607   | 13.5607    |  |
| 20                      | 13.5609             | 13.5610   | 13.5611   | 13.5607    |  |
| 30                      | 13.5611             | 13.5600   | 13.5604   | 13.5603    |  |
| 40                      | 13.5601             | 13.5603   | 13.5607   | 13.5605    |  |
| 50                      | 13.5611             | 13.5602   | 13.5604   | 13.5603    |  |
| Maximum frequency error | 0.0080%             | 0.0074%   | 0.0078%   | 0.0072%    |  |
| Limit                   | 0.01%               |           |           |            |  |
| Result                  | Pass                | Pass      | Pass      | Pass       |  |

Maximum frequency error of the EUT with variations in nominal operating voltage at an ambient 20 degrees C temperature.

|                         | Time after Start-up |           |           |            |
|-------------------------|---------------------|-----------|-----------|------------|
| Supply Voltage          | 0 minutes           | 2 minutes | 5 minutes | 10 minutes |
| DC 3.33 V               | 13.5604             | 13.5601   | 13.5602   | 13.5608    |
| DC 3.70 V               | 13.5607             | 13.5608   | 13.5609   | 13.5611    |
| DC 4.07 V               | 13.5604             | 13.5603   | 13.5603   | 13.5602    |
| Maximum frequency error | 0.052%              | 0.0061%   | 0.0070%   | 0.0078%    |
| Limit                   | 0.01%               |           |           |            |
| Result                  | Pass                | Pass      | Pass      | Pass       |



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7. RADIATED EMISSION TEST RESULTS

# **LIMITS**

# Fundamental field strength

| FCC Reference:         | Part 15.225(a)(b)(c)(d) & 15.209(a)             |  |  |
|------------------------|---|--|--|
| ISED Canada Reference: | RSS-Gen 6.13 & RSS-210 B.6 & RSS-GEN Clause 8.9 |  |  |
| Test Method Used:      | ANSI C63.10 Sections 6.3, 6.4 and 6.5           |  |  |

| Frequency<br>(MHz)          | Field Strength (uV/m) | Field Strength (dBuV/m) | Measured Distance<br>(Meters) |
|-----------------------------|-----------------------|-------------------------|-------------------------------|
| 13.553-13.567               | 15848                 | 84                      | 30                            |
| 13.410-13.553/13.567-13.710 | 334                   | 50.47                   | 30                            |
| 13.110-13.410/13.710-14.010 | 106                   | 40.51                   | 30                            |

| Frequency<br>(MHz)          | Field Strength (uV/m) | Field Strength (dBuV/m) | Measured Distance<br>(Meters) |
|-----------------------------|-----------------------|-------------------------|-------------------------------|
| 13.553-13.567               | 15848                 | 104                     | 3                             |
| 13.410-13.553/13.567-13.710 | 334                   | 70.47                   | 3                             |
| 13.110-13.410/13.710-14.010 | 106                   | 60.51                   | 3                             |

### Note(s):

2. The limit is specified at a test distance of 30 meters. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40dB/decade).

<sup>1.</sup> The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.



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Radiation Disturbance Test Limit for FCC (Class B) (9KHz-1GHz)

| Frequency<br>(MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|--------------------|-----------------------------------|-------------------------------|
| 0.009~0.490        | 2400/F(KHz)                       | \                             |
|                    | \ /                               | 300                           |
| 0.490~1.705        | 24000/F(KHz)                      | 30                            |
| 1.705~30.0         | 30                                | 30                            |
| 30~88              | 100                               | 3                             |
| 88~216             | 150                               | 3                             |
| 216~960            | 200                               | 3                             |
| 960~1000           | 500                               | 3                             |

#### Note:

- (1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).
- (2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30MHz.

Restricted bands of operation

| MHz                      | MHz                 | MHz           | GHz              |
|--------------------------|---------------------|---------------|------------------|
| 0.090-0.110              | 16.42-16.423        | 399.9-410     | 4.5-5.15         |
| <sup>1</sup> 0.495-0.505 | 16.69475-16.69525   | 608-614       | 5.35-5.46        |
| 2.1735-2.1905            | 16.80425-16.80475   | 960-1240      | 7.25-7.75        |
| 4.125-4.128              | 25.5-25.67          | 1300-1427     | 8.025-8.5        |
| 4.17725-4.17775          | 37.5-38.25          | 1435-1626.5   | 9.0-9.2          |
| 4.20725-4.20775          | 73-74.6             | 1645.5-1646.5 | 9.3-9.5          |
| 6.215-6.218              | 74.8-75.2           | 1660-1710     | 10.6-12.7        |
| 6.26775-6.26825          | 108-121.94          | 1718.8-1722.2 | 13.25-13.4       |
| 6.31175-6.31225          | 123-138             | 2200-2300     | 14.47-14.5       |
| 8.291-8.294              | 149.9-150.05        | 2310-2390     | 15.35-16.2       |
| 8.362-8.366              | 156.52475-156.52525 | 2483.5-2500   | 17.7-21.4        |
| 8.37625-8.38675          | 156.7-156.9         | 2690-2900     | 22.01-23.12      |
| 8.41425-8.41475          | 162.0125-167.17     | 3260-3267     | 23.6-24.0        |
| 12.29-12.293             | 167.72-173.2        | 3332-3339     | 31.2-31.8        |
| 12.51975-12.52025        | 240-285             | 3345.8-3358   | 36.43-36.5       |
| 12.57675-12.57725        | 322-335.4           | 3600-4400     | ( <sup>2</sup> ) |
| 13.36-13.41              |                     |               |                  |

Note: <sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz. <sup>2</sup>Above 38.6c



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# **TEST SETUP AND PROCEDURE**

Below 30 MHz

The setting of the spectrum analyzer

| RBW   | 200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz) |
|-------|--|
| VBW   | 200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz) |
| Sweep | Auto   |

- 1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.4.
- 2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.
- 3. The EUT was placed on a turntable with 80 cm above ground.
- 4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1 m height antenna tower.
- 5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.
- 6. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak and average detector mode remeasured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak and average detector and reported.
- 7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KDB 414788.
- 8. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of  $377\Omega$ . For example, the measurement frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to Y-51.5 = Z dBuA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.



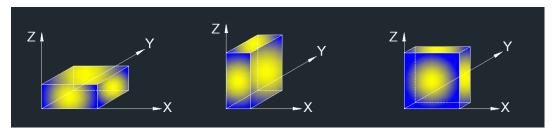
#### Below 1 GHz and above 30 MHz

### The setting of the spectrum analyzer

| RBW      | 120 kHz  |
|----------|----------|
| VBW      | 300 kHz  |
| Sweep    | Auto     |
| Detector | Peak/QP  |
| Trace    | Max hold |

- 1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.5.
- 2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 3. The EUT was placed on a turntable with 80 cm above ground.
- 4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
- 5. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

### X axis, Y axis, Z axis positions:



Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

Note 2: The EUT was fully exercised with external accessories during the test. In the case of multiple accessory external ports, an external accessory shall be connected to one of each type of port.



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# **TEST ENVIRONMENT**

| Temperature         | 22.6 °C | Relative Humidity | 57%     |
|---------------------|---------|-------------------|---------|
| Atmosphere Pressure | 101 kPa | Test Voltage      | DC 12 V |

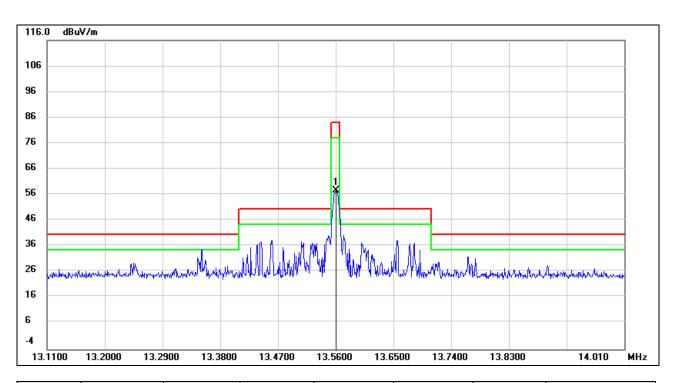
# **RESULTS**



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# 7.1. FIELD STRENGTH OF INTENTIONAL EMISSIONS

# FIELD STRENGTH OF INTENTIONAL EMISSIONS (LOOP ANTENNA FACE ON TO THE EUT)



| No. | Frequency | Reading | Correct | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|---------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | (dB/m)  | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 13.5609   | 65.19   | -7.64   | 57.55    | 84.00    | -26.45 | peak   |

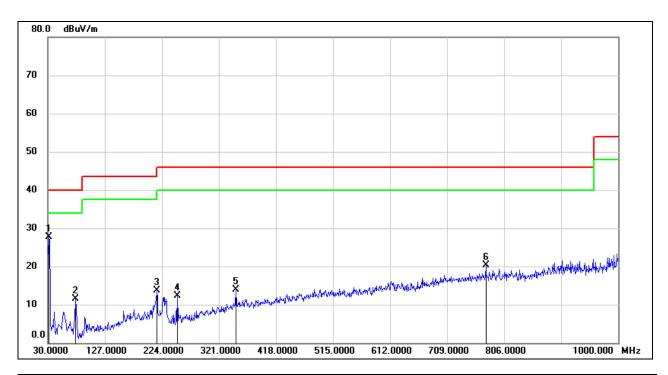
Note: 1. Result Level = Read Level + Correct Factor.

- 2. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.
- 3. Test was performed at 3 m distance, but the convert factor had been added to the test data to meet the 30 m limit.



# 7.2. SPURIOUS EMISSIONS BELOW 1GHz AND ABOVE 30MHz

# **SPURIOUS EMISSIONS (HORIZONTAL)**



| No. | Frequency | Reading | Correct | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|---------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | (dB/m)  | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 31.9400   | 45.73   | -17.99  | 27.74    | 40.00    | -12.26 | QP     |
| 2   | 77.5300   | 32.40   | -20.84  | 11.56    | 40.00    | -28.44 | QP     |
| 3   | 215.2700  | 30.23   | -16.60  | 13.63    | 43.50    | -29.87 | QP     |
| 4   | 250.1900  | 30.65   | -18.35  | 12.30    | 46.00    | -33.70 | QP     |
| 5   | 350.1000  | 26.34   | -12.49  | 13.85    | 46.00    | -32.15 | QP     |
| 6   | 774.9600  | 26.74   | -6.39   | 20.35    | 46.00    | -25.65 | QP     |

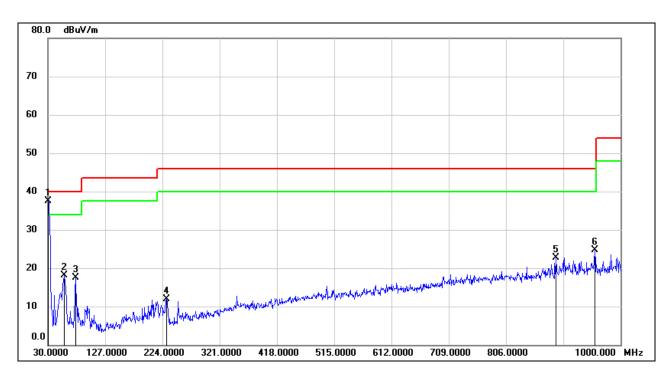
#### Note:

- 1. Result Level = Read Level + Correct Factor.
- 2. If the peak values are less than the QP limit, the QP result is deemed to comply with QP limit.
- 3. All modes have been tested, but only the worst data was recorded in the report.



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# **HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)**



| No. | Frequency | Reading | Correct | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|---------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | (dB/m)  | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 30.9700   | 55.29   | -17.84  | 37.45    | 40.00    | -2.55  | QP     |
| 2   | 58.1300   | 37.87   | -19.82  | 18.05    | 40.00    | -21.95 | QP     |
| 3   | 76.5600   | 38.25   | -20.76  | 17.49    | 40.00    | -22.51 | QP     |
| 4   | 230.7900  | 29.15   | -17.33  | 11.82    | 46.00    | -34.18 | QP     |
| 5   | 890.3900  | 27.51   | -4.73   | 22.78    | 46.00    | -23.22 | QP     |
| 6   | 956.3500  | 29.24   | -4.45   | 24.79    | 46.00    | -21.21 | QP     |

#### Note:

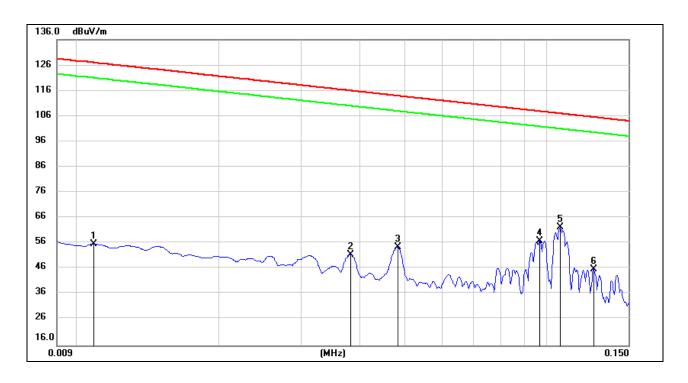
- 1. Result Level = Read Level + Correct Factor.
- 2. If the peak values are less than the QP limit, the QP result is deemed to comply with QP limit.
- 3. All modes have been tested, but only the worst data was recorded in the report.

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# 7.3. SPURIOUS EMISSIONS BELOW 30MHz

# SPURIOUS EMISSIONS (LOOP ANTENNA FACE ON TO THE EUT)

### 9 kHz ~ 150 kHz



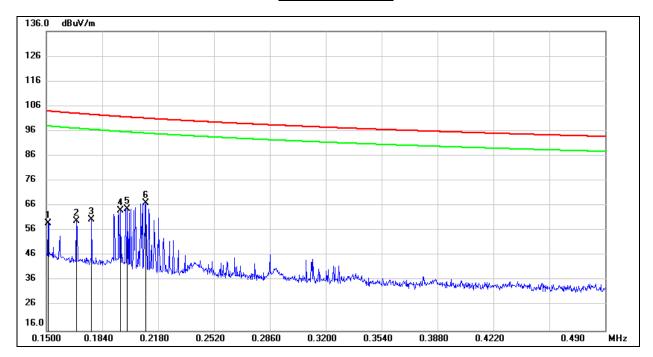
| No. | Frequency | Reading | Correct | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|---------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | (dB/m)  | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 0.0108    | 63.52   | -7.82   | 55.70    | 126.93   | -71.23 | peak   |
| 2   | 0.0383    | 60.00   | -8.32   | 51.68    | 115.94   | -64.26 | peak   |
| 3   | 0.0481    | 63.08   | -8.53   | 54.55    | 113.96   | -59.41 | peak   |
| 4   | 0.0967    | 65.28   | -8.40   | 56.88    | 107.89   | -51.01 | peak   |
| 5   | 0.1071    | 70.84   | -8.56   | 62.28    | 107.01   | -44.73 | peak   |
| 6   | 0.1265    | 54.57   | -8.78   | 45.79    | 105.57   | -59.78 | peak   |

Note: 1. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

- 2. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.
- 3. Test was performed at 3 m distance, but the convert factor had been added to the test data to meet the 300 m limit.

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# 150 kHz ~ 490 kHz

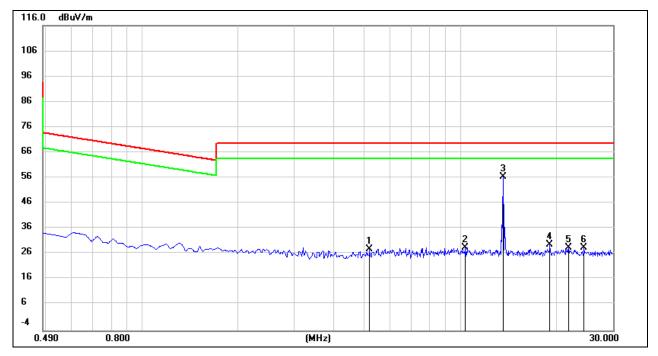


| No. | Frequency | Reading | Correct | Result   | Limit    | Margin | Remark |
|-----|-----------|---------|---------|----------|----------|--------|--------|
|     | (MHz)     | (dBuV)  | (dB/m)  | (dBuV/m) | (dBuV/m) | (dB)   |        |
| 1   | 0.1510    | 68.24   | -9.09   | 59.15    | 104.02   | -44.87 | peak   |
| 2   | 0.1684    | 68.99   | -9.07   | 59.92    | 103.08   | -43.16 | peak   |
| 3   | 0.1775    | 69.58   | -9.06   | 60.52    | 102.62   | -42.10 | peak   |
| 4   | 0.1952    | 73.16   | -9.04   | 64.12    | 101.79   | -37.67 | peak   |
| 5   | 0.1993    | 73.92   | -9.04   | 64.88    | 101.61   | -36.73 | peak   |
| 6   | 0.2105    | 76.26   | -9.04   | 67.22    | 101.14   | -33.92 | peak   |

Note: 1. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

- 2. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.
- 3. Test was performed at 3 m distance, but the convert factor had been added to the test data to meet the 300 m limit.

# 490 kHz ~ 30 MHz



| No. | Frequency | Reading | Correct | Result   | Limit    | Margin | Remark      |
|-----|-----------|---------|---------|----------|----------|--------|-------------|
|     | (MHz)     | (dBuV)  | (dB/m)  | (dBuV/m) | (dBuV/m) | (dB)   |             |
| 1   | 5.1820    | 36.60   | -8.69   | 27.91    | 69.54    | -41.63 | peak        |
| 2   | 10.3463   | 36.36   | -7.67   | 28.69    | 69.54    | -40.85 | peak        |
| 3   | 13.5629   | 64.07   | -7.64   | 56.43    | /        | /      | Fundamental |
| 4   | 19.0223   | 36.94   | -7.30   | 29.64    | 69.54    | -39.90 | peak        |
| 5   | 21.7667   | 35.82   | -7.12   | 28.70    | 69.54    | -40.84 | peak        |
| 6   | 24.3931   | 35.58   | -7.04   | 28.54    | 69.54    | -41.00 | peak        |

Note: 1. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

- 2. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.
  - 3. About the Fundamental emission test result please refer to section 7.1.
- 4. Test was performed at 3 m distance, but the convert factor had been added to the test data to meet the 30 m limit.



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# 8. ANTENNA REQUIREMENTS

# **APPLICABLE REQUIREMENTS**

Please refer to FCC §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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

**END OF REPORT** 

| RESULTS  |   |  |  |
|----------|---|--|--|
| Complies |   |  |  |
|          |   |  |  |
|          |   |  |  |
|          |   |  |  |
|          |   |  |  |
|          |   |  |  |
|          |   |  |  |
|          | • |  |  |