



FCC ID: 2AWUU6053201  
Report No.: TMTN2110000501NR

Page: 1 / 54  
Rev.: 03

## FCC 47 CFR PART 15 SUBPART C AND ANSI C63.10: 2013

### TEST REPORT

For

Wireless Water Leak Sensor

Model: BR35-HW



Brand:

Verkada

Issued for

Verkada Inc

405 E. 4th Ave., San Mateo, California, United States, 94401

Issued by

Compliance Certification Services Inc.

Tainan Lab.

No.8, Jiucengling, Xinhua Dist.,  
Tainan City, Taiwan

Issued Date: December 17, 2021

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### REVISION HISTORY

| Rev. | Issue Date        | Revisions                     | Effect Page            | Revised By |
|------|-------------------|-------------------------------|------------------------|------------|
| 00   | November 22, 2021 | Initial Issue                 | ALL                    | Gina Lin   |
| 01   | December 01, 2021 | See the following note rev.01 | ALL                    | Gina Lin   |
| 02   | December 15, 2021 | See the following note rev.02 | Page 22<br>Page 30, 31 | Gina Lin   |
| 03   | December 17, 2021 | See the following note rev.03 | Page 17, 25            | Gina Lin   |

**Note:**

- ✧ *Rev.01 Issue Date: December 01, 2021*  
*Revise Typo.*  
*Update Test Data of 6db Bandwidth & Conducted Spurious Emission.*
- ✧ *Rev.02 Issue Date: December 15, 2021*  
*Update Calculation formula of Duty Factor.*  
*Update Test Data of Conducted Spurious Emission.*
- ✧ *Rev.03 Issue Date: December 17, 2021*  
*Update Test Procedure.*



Report No.: TMTN2110000501NR

Page: 3 / 54  
Rev.: 03


## **TABLE OF CONTENTS**

|   |           |
|---|-----------|
| <b>1. TEST REPORT CERTIFICATION .....</b>             | <b>4</b>  |
| <b>2. EUT DESCRIPTION .....</b>                       | <b>5</b>  |
| <b>3. DESCRIPTION OF TEST MODES .....</b>             | <b>6</b>  |
| <b>4. TEST METHODOLOGY .....</b>                      | <b>8</b>  |
| <b>5. FACILITIES AND ACCREDITATIONS.....</b>          | <b>8</b>  |
| 5.1 FACILITIES.....                                   | 8         |
| 5.2 EQUIPMENT.....                                    | 8         |
| 5.3 LABORATORY ACCREDITATIONS LISTINGS .....          | 8         |
| 5.4 TABLE OF ACCREDITATIONS AND LISTINGS.....         | 9         |
| 5.5 MEASUREMENT EQUIPMENT USED.....                   | 10        |
| <b>6. CALIBRATION AND UNCERTAINTY.....</b>            | <b>11</b> |
| 6.1 MEASURING INSTRUMENT CALIBRATION.....             | 11        |
| 6.2 MEASUREMENT UNCERTAINTY .....                     | 11        |
| <b>7. SETUP OF EQUIPMENT UNDER TEST .....</b>         | <b>12</b> |
| 7.1 SETUP CONFIGURATION OF EUT.....                   | 12        |
| 7.2 SUPPORT EQUIPMENT .....                           | 12        |
| 7.3 EUT OPERATING CONDITION .....                     | 12        |
| <b>8. APPLICABLE LIMITS AND TEST RESULTS.....</b>     | <b>13</b> |
| 8.1 6dB BANDWIDTH.....                                | 13        |
| 8.2 MAXIMUM PEAK OUTPUT POWER.....                    | 17        |
| 8.3 DUTY CYCLE .....                                  | 21        |
| 8.4 POWER SPECTRAL DENSITY .....                      | 25        |
| 8.5 CONDUCTED SPURIOUS EMISSION.....                  | 29        |
| 8.6 RADIATED EMISSIONS .....                          | 36        |
| 8.6.1 TRANSMITTER RADIATED SUPURIOUS EMSSIONS.....    | 36        |
| 8.6.2 WORST-CASE RADIATED EMISSION BELOW 1 GHZ .....  | 40        |
| 8.6.3 TRANSMITTER RADIATED EMISSION ABOVE 1 GHZ ..... | 42        |
| 8.7 POWERLINE CONDUCTED EMISSIONS .....               | 48        |
| <b>9. ANTENNA REQUIREMENT .....</b>                   | <b>50</b> |
| 9.1 STANDARD APPLICABLE .....                         | 50        |
| 9.2 ANTENNA CONNECTED CONSTRUCTION .....              | 50        |
| <b>APPENDIX I SETUP PHOTOS .....</b>                  | <b>51</b> |

## 1. TEST REPORT CERTIFICATION

**Applicant** : Verkada Inc  
405 E. 4th Ave., San Mateo, California, United States,  
94401

**Manufacturer** : Vision Automobile Electronics Industrial Co Ltd.  
No.78, Gongye 3rd Rd., Technology Industrial Park,  
Tainan , Taiwan , 70955

**Equipment Under Test** : Wireless Water Leak Sensor  
**Model** : BR35-HW  
**Brand** : 

**Date of Test** : October 22, 2021 ~ October 26, 2021

| APPLICABLE STANDARD                            |                         |
|--|-------------------------|
| STANDARD                                       | TEST RESULT             |
| FCC Part 15 Subpart C AND<br>ANSI C63.10: 2013 | No non-compliance noted |

| Statements of Conformity  |
|---|
| Determining compliance shall be based on the results of the compliance measurement,<br>not taking into account measurement instrumentation uncertainty. |


| FCC Standard Section | Report Section | Test Item                     | Result |
|----------------------|----------------|-------------------------------|--------|
| 15.247(a)            | 8.1            | 6dB BANDWIDTH                 | Pass   |
| 15.247(b)            | 8.2            | MAXIMUM PEAK OUTPUT POWER     | Pass   |
| -                    | 8.3            | DUTY CYCLE                    | -      |
| 15.247(e)            | 8.4            | POWER SPECTRAL DENSITY        | Pass   |
| 15.247(d)            | 8.5            | CONDUCTED SPURIOUS EMISSION   | Pass   |
| 15.205(a)            | 8.6            | RADIATED EMISSIONS            | Pass   |
| 15.207(a)            | 8.7            | POWERLINE CONDUCTED EMISSIONS | N/A    |

Approved by:



**Eric Huang**  
Section Manager

## 2. EUT DESCRIPTION

|                        |  |
|------------------------|--|
| Product Name           | Wireless Water Leak Sensor   |
| Model                  | BR35-HW  |
| Brand                  | <br>Verkada |
| Received Date          | October 21, 2021   |
| Frequency Range        | 915.0MHz ~915.7MHz   |
| Transmit Power         | 3.81dBm (2.40mW)   |
| Channel Spacing        | 0.35 MHz   |
| Channel Number         | 3 Channels   |
| Transmit Data Rate     | 80kbps   |
| Type of Modulation     | OQPSK  |
| Antenna Type           | Type: Wire Antenna<br>Model: BR35<br>Manufacturer: N/A<br>Gain: -2.93 dBi                    |
| Power Rating           | 3Vdc (Powered from battery)  |
| MCU CHIP Brand /Model  | MCP6541T-I/ Microchip  |
| RF Module Brand /Model | EFR32MG13/ Silicon Labs  |
| Software Version       | Rev.0  |
| Firmware Version       | 1.100  |
| Temperature Range      | -20°C ~ +60°C  |
| Reported Date          | November 08, 2021  |

**REMARK:**

1. The sample (**BR35-HW**) selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **2AWUU6053201**, filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.
3. For more details, please refer to the User's manual of the EUT.

### 3. DESCRIPTION OF TEST MODES

The EUT is a Wireless Water Leak Sensor .

The RF chipset is manufactured by Silicon Labs.

The antenna peak gain -2.93 dBi (highest gain) were chosen for full testing.

There are three channels have been tested as following :

| Channel | Frequency (MHz) |
|---------|-----------------|
| Low     | 915             |
| Middle  | 915.35          |
| High    | 915.7           |

#### Radiated Emission Test (Below 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| Tested Channel | Modulation Technology | Modulation Type |
|----------------|-----------------------|-----------------|
| Low, Mid, High | OFDM                  | OQPSK           |

#### Radiated Emission Test (Above 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| Tested Channel | Modulation Technology | Modulation Type |
|----------------|-----------------------|-----------------|
| Low, Mid, High | OFDM                  | OQPSK           |

### **Bandedge Measurement :**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| Tested Channel | Modulation Technology | Modulation Type |
|----------------|-----------------------|-----------------|
| Low, Mid, High | OFDM                  | OQPSK           |

### **Antenna Port Conducted Measurement :**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| Tested Channel | Modulation Technology | Modulation Type |
|----------------|-----------------------|-----------------|
| Low, Mid, High | OFDM                  | OQPSK           |



Report No.: TMTN2110000501NR

Page: 8 / 54  
Rev.: 03

## 4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10 and FCC CFR 47 15.207, 15.209 and 15.247.

## 5. FACILITIES AND ACCREDITATIONS

### 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at No.8, Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

### 5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 5.3 LABORATORY ACCREDITATIONS LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by Taiwan Accreditation Foundation for the specific scope of accreditation under Lab Code: 1109 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by TAF or any agency of the Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: TW1109).





Report No.: TMTN2110000501NR

Page: 9 / 54  
Rev.: 03

## 5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

|               |     |
|---------------|-----|
| <b>Taiwan</b> | TAF |
|---------------|-----|

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

|                |                          |
|----------------|--------------------------|
| <b>Canada</b>  | Industry Canada (TW1109) |
| <b>Germany</b> | TUV NORD                 |
| <b>Taiwan</b>  | BSMI                     |
| <b>USA</b>     | FCC                      |

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>

**5.5 MEASUREMENT EQUIPMENT USED****For §8.6**

| Chamber 966 Room (Radiation Test) |   |                |                      |                  |                 |
|-----------------------------------|---|----------------|----------------------|------------------|-----------------|
| Name of Equipment                 | Manufacturer                            | Model          | Serial Number        | Calibration Date | Calibration Due |
| Active Loop Antenna               | ETS-LINDREN                             | 6502           | 8905-2356            | 09/06/2021       | 09/05/2023      |
| Bilog Antenna With 6dB Attenuator | SUNOL SCIENCES & EMCI                   | JB1 & N-6-06   | A070506-1 & AT-N0681 | 10/07/2021       | 10/06/2022      |
| Cable                             | Suhner                                  | SUCOFLEX104PEA | 20520/4PEA&O6        | 01/29/2021       | 01/28/2022      |
| Double Ridged Guide Horn Antenna  | ETS-LINDGREN                            | 3116           | 00078900             | 03/30/2021       | 03/29/2022      |
| EMI Test Receiver                 | R&S                                     | ESCI           | 100960               | 02/05/2021       | 02/04/2022      |
| Horn Antenna                      | Com-Power                               | AH-118         | 071032               | 05/04/2021       | 05/03/2022      |
| MXA Signal Analyzer               | KEYSIGHT                                | N9020A         | MY56060171           | 08/23/2021       | 08/22/2022      |
| Pre-Amplifier                     | EMCI                                    | EMC012645      | 980098               | 01/29/2021       | 01/28/2022      |
| Pre-Amplifier                     | HP                                      | 8447F          | 2443A01683           | 01/19/2021       | 01/18/2022      |
| Pre-Amplifier                     | Com-Power                               | PAM-840A       | 461378               | 07/05/2021       | 07/04/2022      |
| Type N coaxial cable              | Suhner                                  | CHA9513        | 6                    | 01/19/2021       | 01/18/2022      |
| Notch Filter                      | MICRO-TRONICS                           | BRM50702-01    | 018                  | N.C.R            | N.C.R           |
| Software                          | Excel(ccs-o6-2020 v1.1) , e3(v6.101222) |                |                      |                  |                 |

**For §8.1~8.5**

| Chamber 966 Room (Conducted Test) |                         |              |               |                  |                 |
|-----------------------------------|-------------------------|--------------|---------------|------------------|-----------------|
| Name of Equipment                 | Manufacturer            | Model        | Serial Number | Calibration Date | Calibration Due |
| EXA Spectrum Analyzer             | KEYSIGHT                | N9020A       | MY56060171    | 08/23/2021       | 08/22/2022      |
| Power Meter                       | Anritsu                 | ML2487A      | 6K00003888    | 05/18/2021       | 05/17/2023      |
| Power Sensor                      | Anritsu                 | MA2491A      | 033265        | 05/18/2021       | 05/17/2023      |
| SMA Cable + 10dB Attenuator       | CCS                     | SMA+10dB ATT | SMA/10dB      | 01/29/2021       | 01/28/2022      |
| Software                          | Excel(ccs-o6-2020 v1.1) |              |               |                  |                 |

**For §8.7**

| Conducted Emission room #1 |              |       |               |                  |                 |
|----------------------------|--------------|-------|---------------|------------------|-----------------|
| Name of Equipment          | Manufacturer | Model | Serial Number | Calibration Date | Calibration Due |
| -                          | -            | -     | -             | -                |                 |
| -                          | -            | -     | -             | -                |                 |
| -                          | -            | -     | -             | -                |                 |
| Test S/W                   | -            |       |               |                  |                 |

## 6. CALIBRATION AND UNCERTAINTY

### 6.1 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 recognized national standards.

### 6.2 MEASUREMENT UNCERTAINTY

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

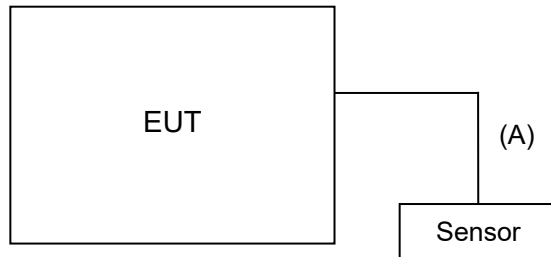
| PARAMETER  | UNCERTAINTY            |
|--|------------------------|
| Radiated Emission, 30 to 200 MHz<br>Test Site : OATS-6   | $\pm 3.3456\text{dB}$  |
| Radiated Emission, 200 to 1000 MHz<br>Test Site : OATS-6 | $\pm 2.6828\text{dB}$  |
| Radiated Emission, 1 to 8 GHz                            | $\pm 2.6485\text{dB}$  |
| Radiated Emission, 8 to 18 GHz                           | $\pm 2.6852\text{dB}$  |
| Radiated Emission, 18 to 26.5 GHz                        | $\pm 2.6485\text{dB}$  |
| Radiated Emission, 26 to 40 GHz                          | $\pm 3.0295\text{dB}$  |
| Power Line Conducted Emission                            | $\pm 1.91\text{dB}$    |
| Band Width   | 136.49kHz              |
| Peak Output Power MU                                     | $\pm 1.904\text{dB}$   |
| Band Edge MU   | $\pm 0.302\text{dBuV}$ |
| Channel Separation MU                                    | 361.69Hz               |
| Duty Cycle MU  | 0.064ms                |
| Frequency Stability MU                                   | 0.223kHz               |

Uncertainty figures are valid to a confidence level of 95%, K=2

## 7. SETUP OF EQUIPMENT UNDER TEST

### 7.1 SETUP CONFIGURATION OF EUT

#### FOR RF TEST



### 7.2 SUPPORT EQUIPMENT

#### RF test

| No. | Product | Manufacturer | Model No. | Certify No. | Signal cable |
|-----|---------|--------------|-----------|-------------|--------------|
| 1   | N/A     | N/A          | N/A       | N/A         | N/A          |

| No. | Signal cable description |                         |
|-----|--------------------------|-------------------------|
| A   | Sensor                   | Unshielded, 2.1m, 1pcs. |

#### REMARK:

1. All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

### 7.3 EUT OPERATING CONDITION

#### RF Setup

1. Set up a whole system as the setup diagram.
2. Turn on power.

## 8. APPLICABLE LIMITS AND TEST RESULTS

### 8.1 6dB BANDWIDTH

#### LIMIT

§ 15.247(a) (2) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

#### TEST SETUP



#### TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Report No.: TMTN2110000501NR

Page: 14 / 54  
Rev.: 03

## **TEST RESULTS**

No non-compliance noted.

|                            |             |                  |            |
|----------------------------|-------------|------------------|------------|
| <b>Model Name</b>          | BR35-HW     | <b>Test By</b>   | Ted Huang  |
| <b>Temp &amp; Humidity</b> | 26.5°C, 45% | <b>Test Date</b> | 2021/10/26 |

### **TX mode**

| <b>Channel</b> | <b>Channel Frequency (MHz)</b> | <b>6dB Bandwidth (kHz)</b> | <b>Minimum Limit (kHz)</b> | <b>Pass / Fail</b> |
|----------------|--------------------------------|----------------------------|----------------------------|--------------------|
| Low            | 915                            | 512                        | 500                        | PASS               |
| Middle         | 915.35                         | 518                        | 500                        | PASS               |
| High           | 915.7                          | 512                        | 500                        | PASS               |

**NOTE :**

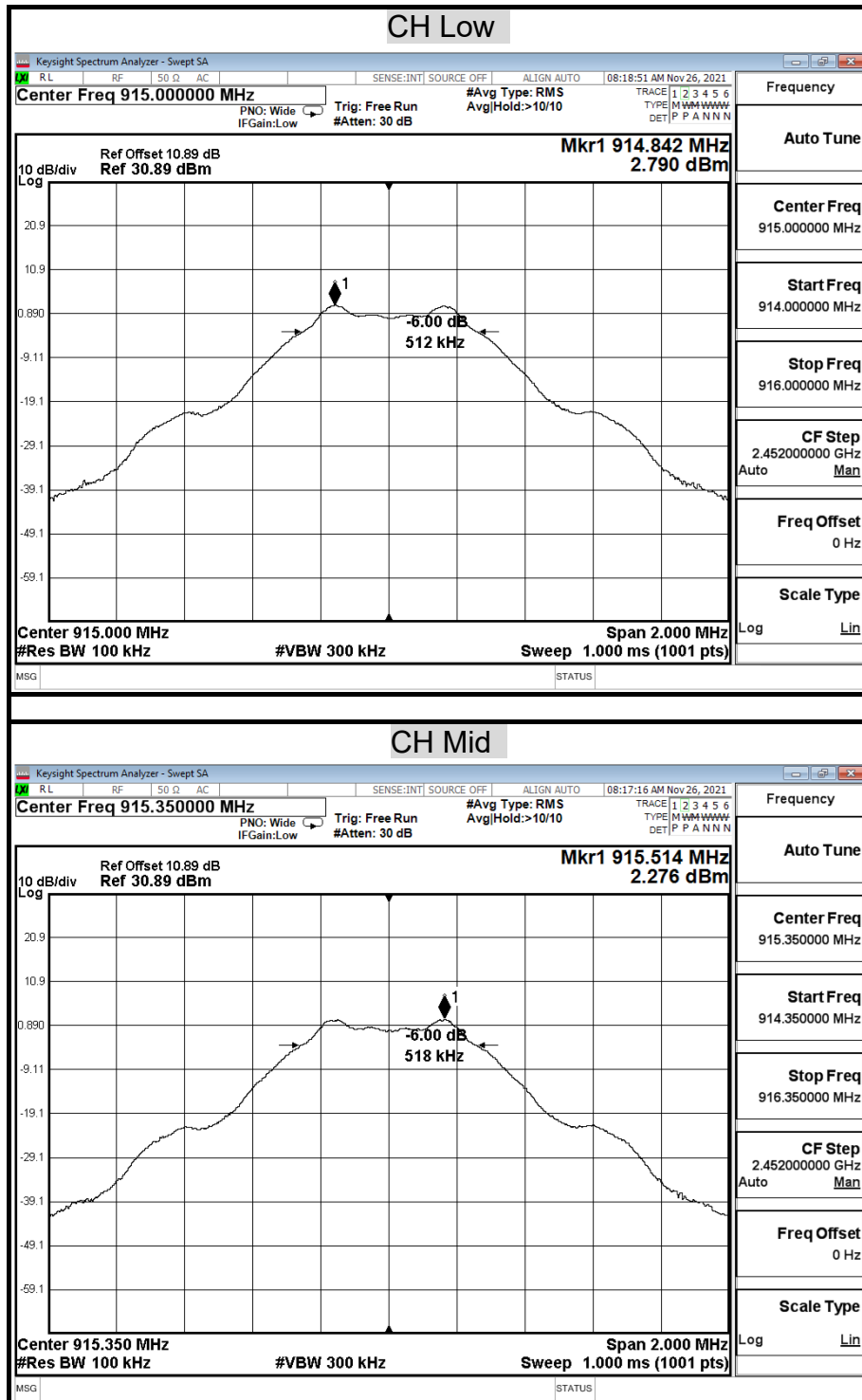
1. At final test to get the worst-case emission at 80kbps long.
2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.



Report No.: TMTN2110000501NR

Page: 15 / 54  
Rev.: 03

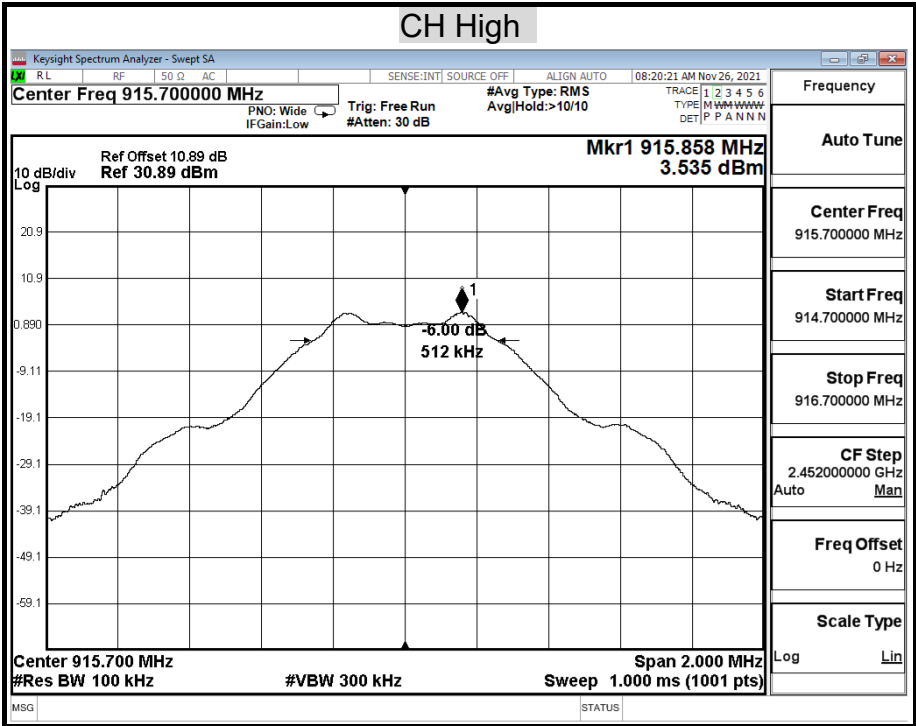
### 6dB BANDWIDTH





Report No.: TMTN2110000501NR

Page: 16 / 54  
Rev.: 03





## 8.2 MAXIMUM PEAK OUTPUT POWER

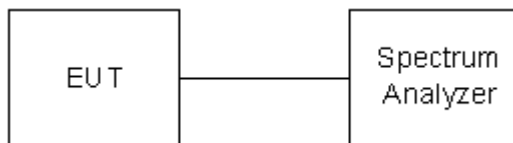
### LIMIT

§ 15.247(b) The maximum peak output power of the intentional radiator shall not exceed the following :

§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands : 1 watt.

§ 15.247(b) (4) Except as shown in paragraphs (c) of this section , if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2), and (b)(3) of this section , as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### TEST SETUP



### TEST PROCEDURE

The tests were performed in accordance with KDB 558074 D01 v05r02 8.3.1.

#### **11.9.1.1(ANSI C63.10) Measurement Procedure PK2:**

- a) Set the RBW  $\geq$  DTS bandwidth.
- b) Set VBW  $\geq$   $[3 \times \text{RBW}]$ .
- c) Set span  $\geq$   $[3 \times \text{RBW}]$ .
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

## TEST RESULTS

No non-compliance noted

|                 |             |           |            |
|-----------------|-------------|-----------|------------|
| Model Name      | BR35-HW     | Test By   | Ted Huang  |
| Temp & Humidity | 26.5°C, 45% | Test Date | 2021/10/26 |

### TX mode

| Channel | Channel Frequency (MHz) | Peak Power (dBm) | Peak Power Limit (dBm) | Pass / Fail |
|---------|-------------------------|------------------|------------------------|-------------|
| Low     | 915                     | 2.06             | 30.00                  | PASS        |
| Middle  | 915.35                  | 3.81             | 30.00                  | PASS        |
| High    | 915.7                   | 1.94             | 30.00                  | PASS        |

- NOTE :**
1. At final test to get the worst-case emission at 80kbps long.
  2. The cable assembly insertion loss of 10.89dB (including 10 dB pad and 0.89 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.

## Average Power Data

### TX mode

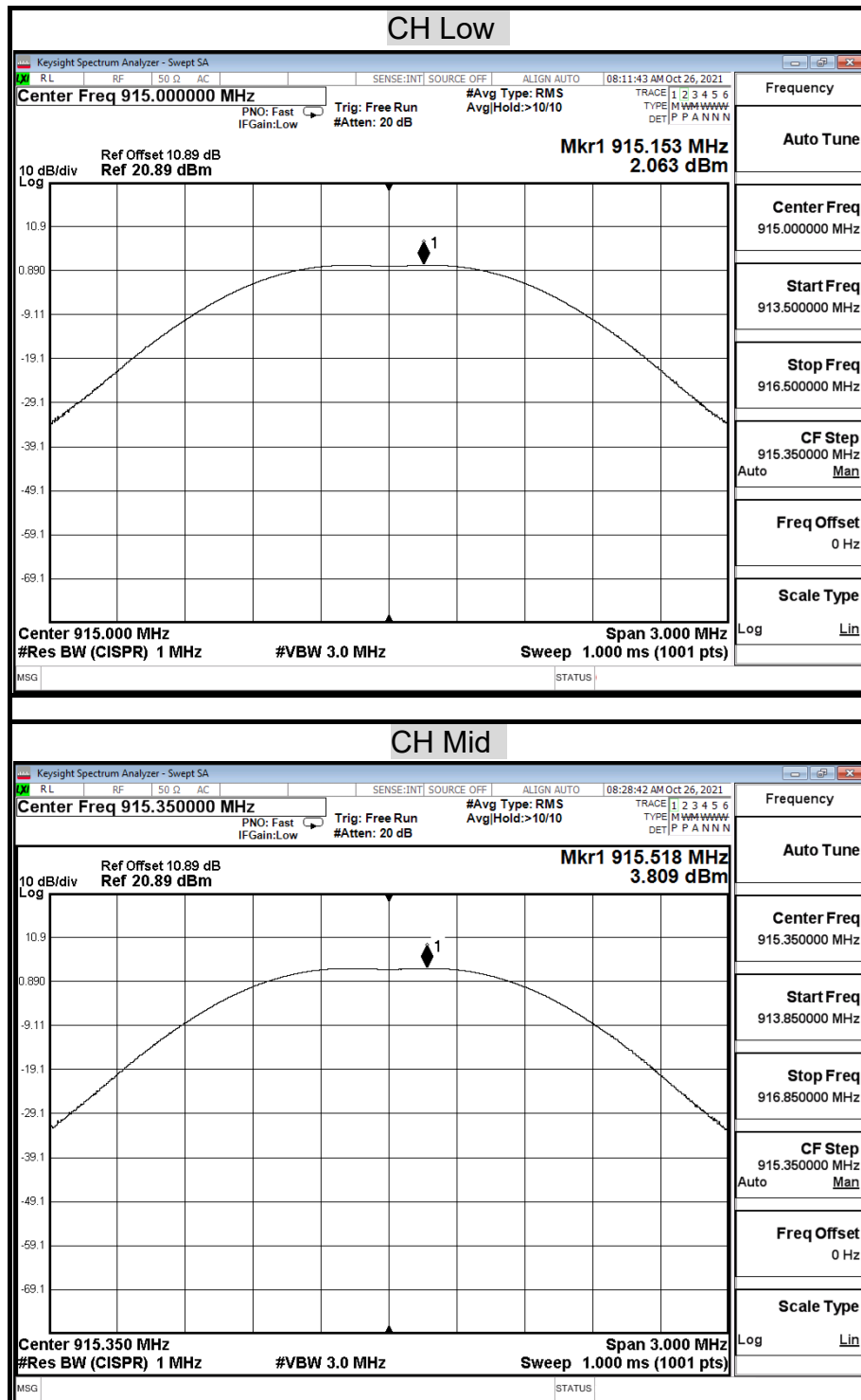
| Channel | Channel Frequency (MHz) | Average Power (dBm) |
|---------|-------------------------|---------------------|
| Low     | 915                     | 1.32                |
| Middle  | 915.35                  | 3.21                |
| High    | 915.7                   | 1.04                |



Report No.: TMTN2110000501NR

Page: 19 / 54  
Rev.: 03

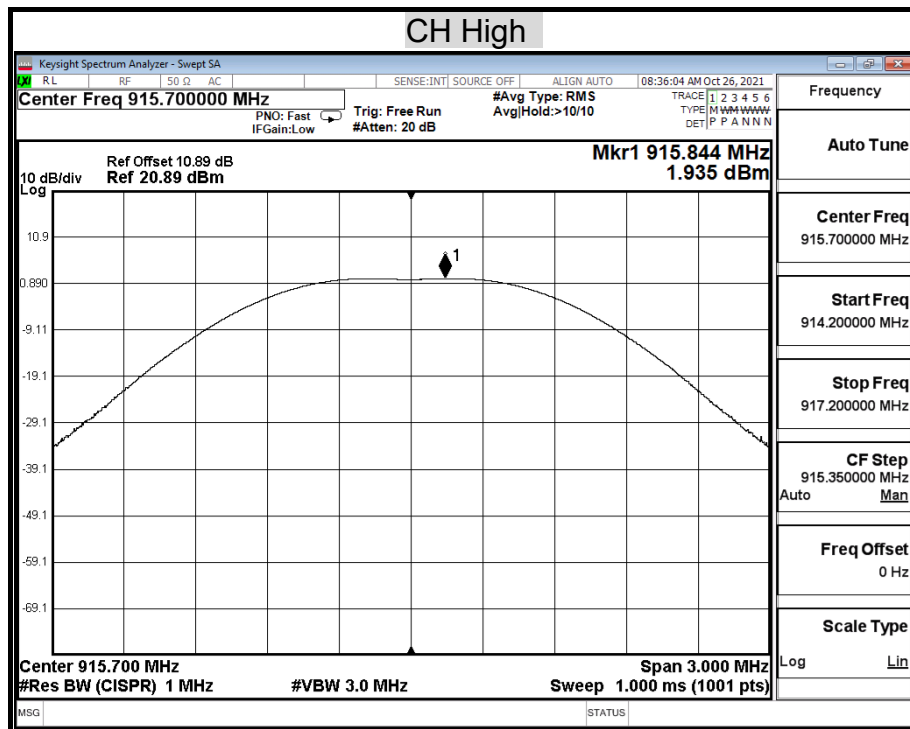
### MAXIMUM PEAK OUTPUT POWER





Report No.: TMTN2110000501NR

Page: 20 / 54  
Rev.: 03



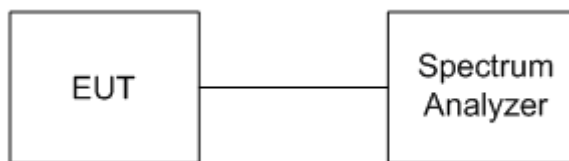
## 8.3 DUTY CYCLE

### LIMIT

Nil (No dedicated limit specified in the Rules)

### TEST EQUIPMENTS

### TEST SETUP



### TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set  $RBW \geq OBW$  if possible; otherwise, set RBW to the largest available value. Set  $VBW \geq RBW$ . Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are  $> 50/T$  and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if  $T \leq 16.7$  microseconds.)



Report No.: TMTN2110000501NR

Page: 22 / 54  
Rev.: 03

## **TEST RESULTS**

No non-compliance noted.

## **TEST DATA**

|                            |             |                  |            |
|----------------------------|-------------|------------------|------------|
| <b>Model Name</b>          | BR35-HW     | <b>Test By</b>   | Ted Huang  |
| <b>Temp &amp; Humidity</b> | 26.5°C, 45% | <b>Test Date</b> | 2021/10/26 |

|      | us   | Times | Ton  | Total Ton time(ms) |
|------|------|-------|------|--------------------|
| Ton1 | 5900 | 1     | 5900 |                    |
| Ton2 |      | 0     | 0    |                    |
| Ton3 |      |       | 0    | 5.9                |
| TP   |      |       |      | 100                |

|              |        |
|--------------|--------|
| Ton          | 5.9    |
| TP(Ton+Toff) | 100    |
| Duty Cycle   | 0.059  |
| Duty Factor  | -24.58 |

Duty Factor = 20log(Duty Cycle)

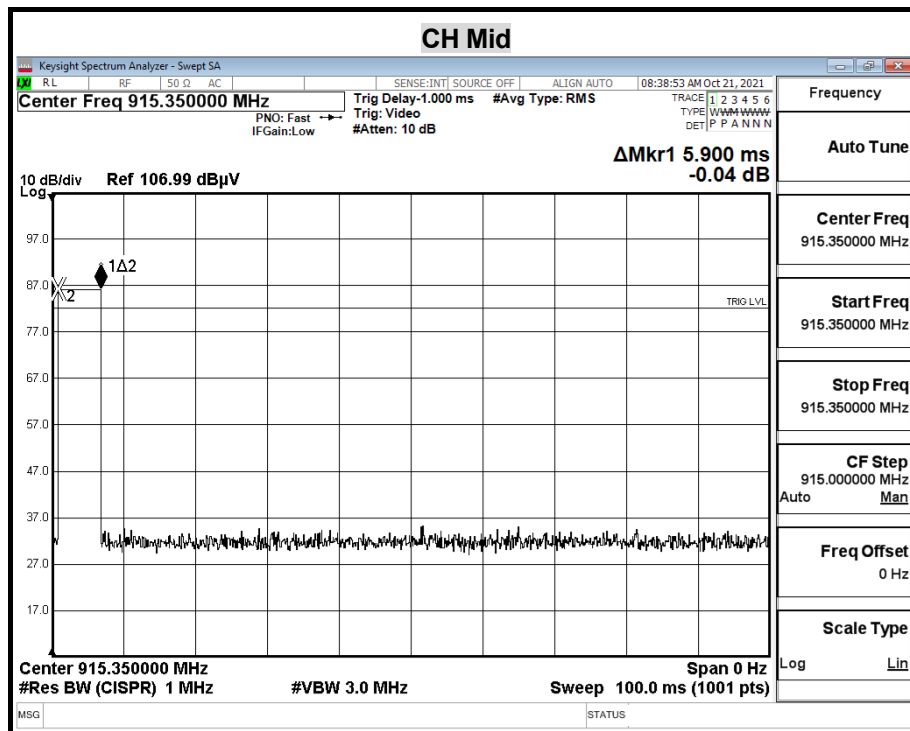
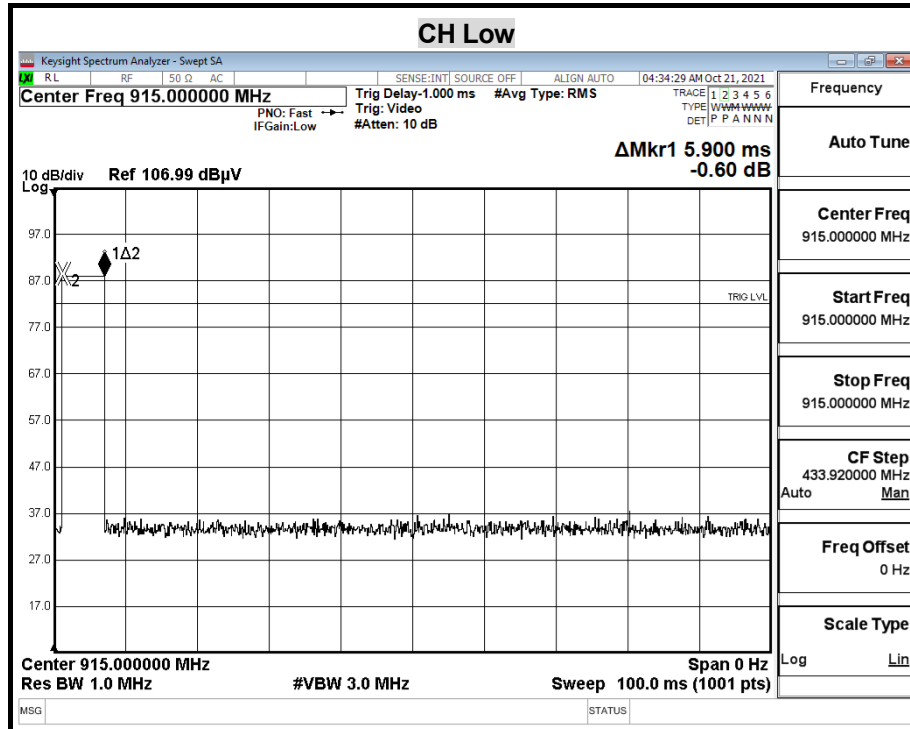


Report No.: TMTN2110000501NR

Page: 23 / 54  
Rev.: 03

## TEST PLOT

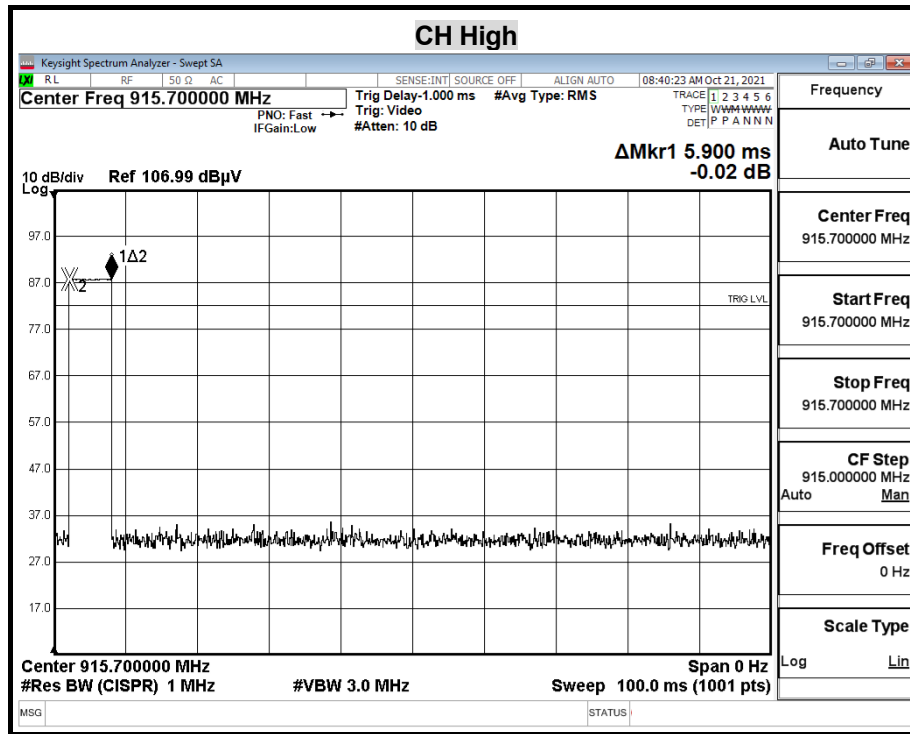
### Plot





Report No.: TMTN2110000501NR

Page: 24 / 54  
Rev.: 03





## 8.4 POWER SPECTRAL DENSITY

### LIMIT

§ 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### TEST SETUP



### TEST PROCEDURE

The tests were performed in accordance with KDB 558074 D01 v05r02 8.4.

#### **11.10.2 (ANSI C63.10) Measurement Procedure PKPSD:**

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the *DTS bandwidth*.
3. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
4. Set the VBW  $\geq 3 \times \text{RBW}$ .
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



Report No.: TMTN2110000501NR

Page: 26 / 54  
Rev.: 03

## **TEST RESULTS**

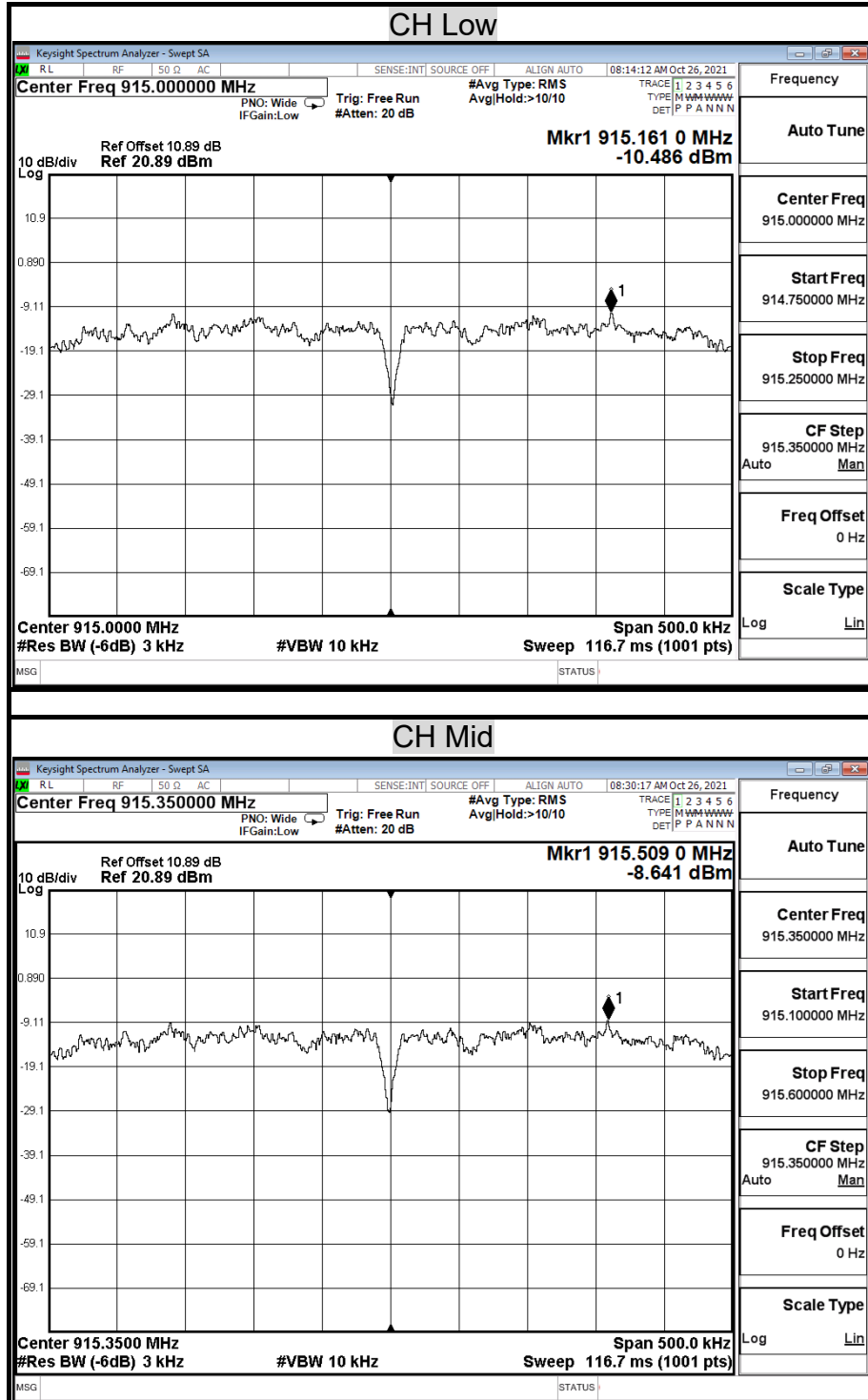
|                            |              |                  |            |
|----------------------------|--------------|------------------|------------|
| <b>Model Name</b>          | BR35-HW      | <b>Test By</b>   | Ted Huang  |
| <b>Temp &amp; Humidity</b> | 26.5°C , 45% | <b>Test Date</b> | 2021/10/26 |

### **TX mode**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>PPSD/3kHz<br/>(dBm)</b> | <b>Limit<br/>(dBm)</b> | <b>Margin<br/>(dB)</b> | <b>Pass / Fail</b> |
|----------------|----------------------------|----------------------------|------------------------|------------------------|--------------------|
| Low            | 915                        | -10.49                     | 8.00                   | -18.49                 | PASS               |
| Middle         | 915.35                     | -8.64                      | 8.00                   | -16.64                 | PASS               |
| High           | 915.7                      | -9.68                      | 8.00                   | -17.68                 | PASS               |

**NOTE :** 1. At final test to get the worst-case emission at 80kbps long.  
2. The cable assembly insertion loss of 10.89dB (including 10 dB pad and 0.89 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

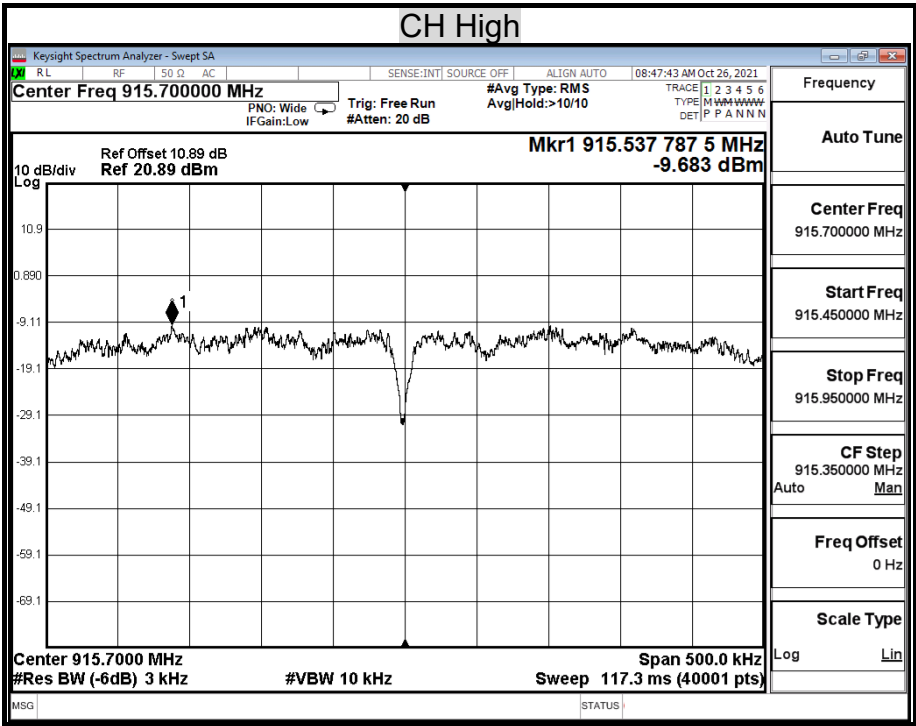
## POWER SPECTRAL DENSITY ( TX MODE)





Report No.: TMTN2110000501NR

Page: 28 / 54  
Rev.: 03

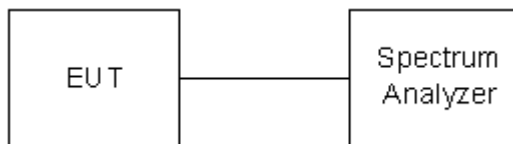


## 8.5 CONDUCTED SPURIOUS EMISSION

### LIMITS

§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the and that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

### TEST SETUP



### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

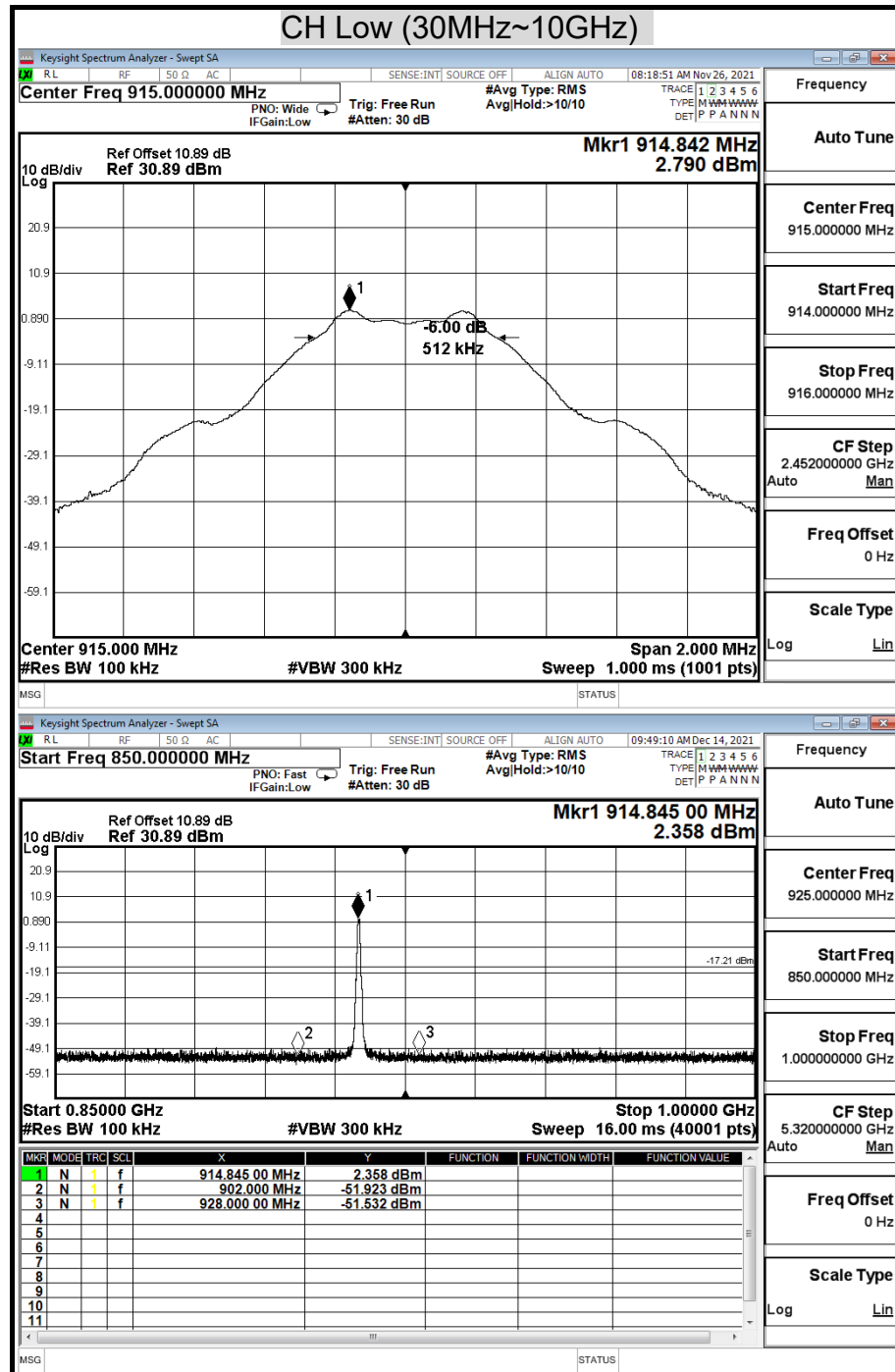
The spectrum from 30 MHz to 10 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 900MHz band.

Report No.: TMTN2110000501NR  
**TEST RESULTS**

Page: 30 / 54  
 Rev.: 03

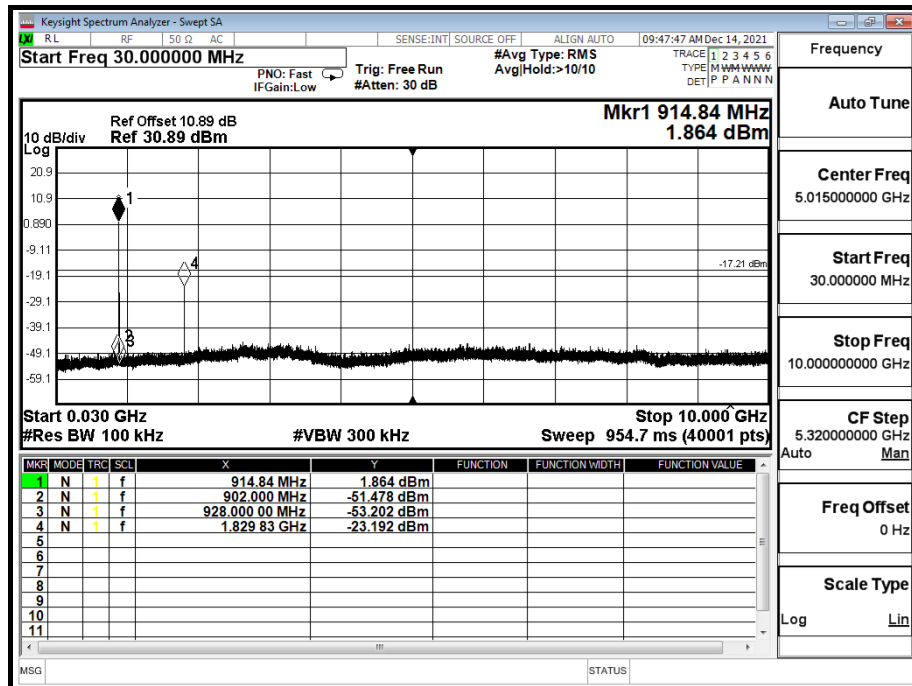
## OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

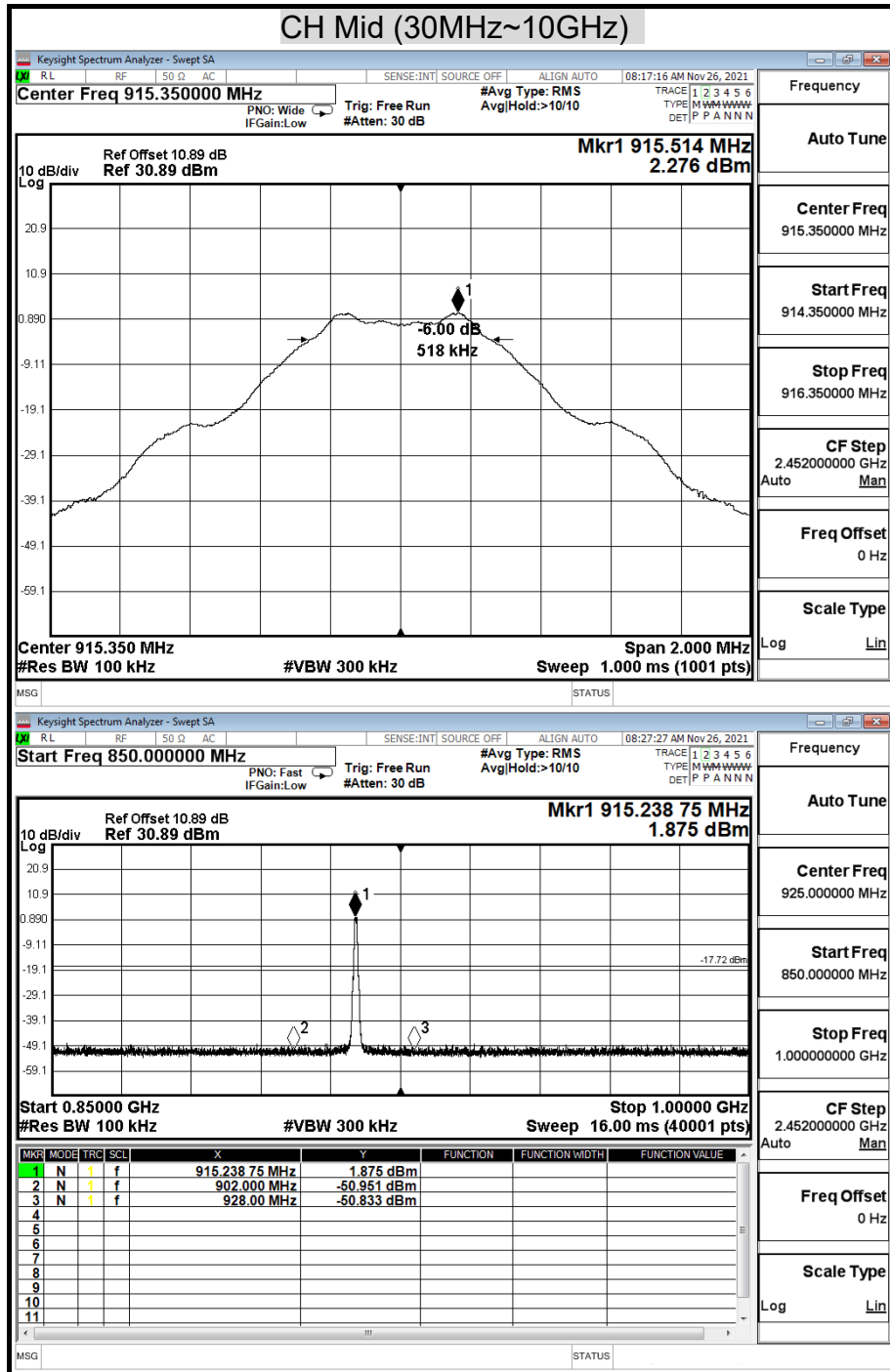
|                 |             |           |            |
|-----------------|-------------|-----------|------------|
| Model Name      | BR35-HW     | Test By   | Ted Huang  |
| Temp & Humidity | 26.5°C, 45% | Test Date | 2021/10/26 |





Report No.: TMTN2110000501NR



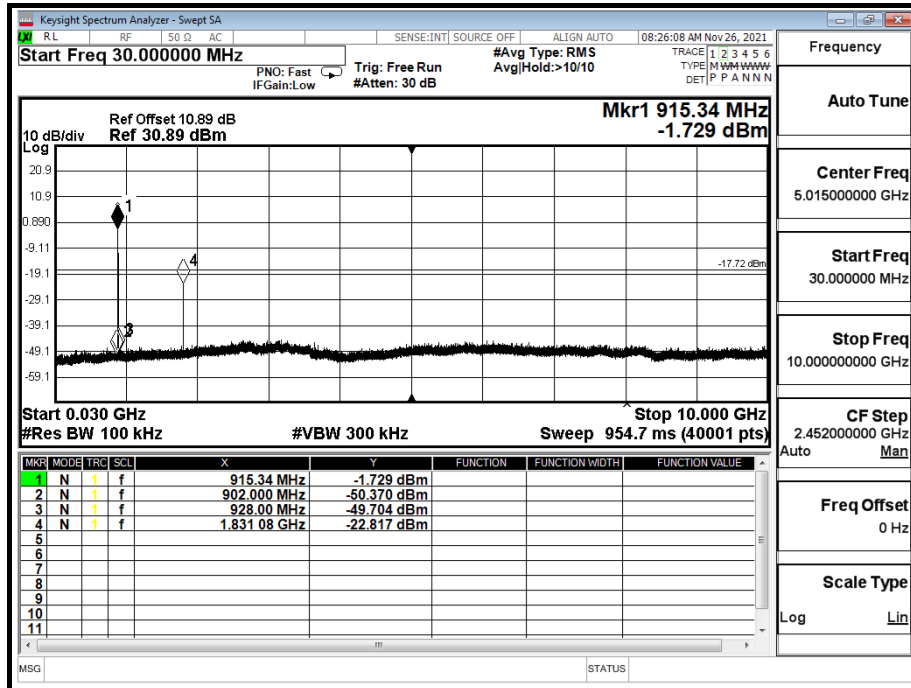


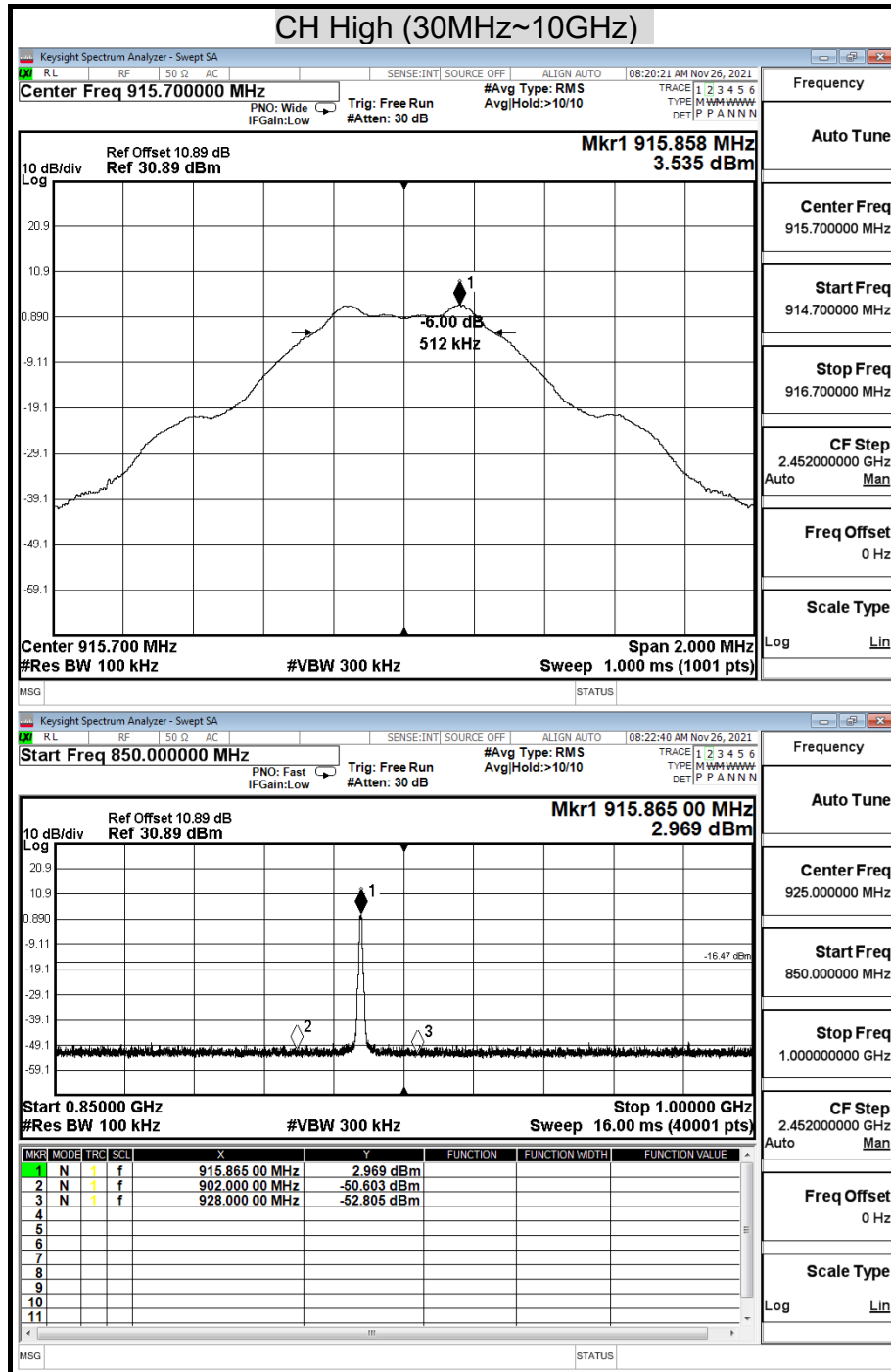




Report No.: TMTN2110000501NR

Page: 33 / 54  
Rev.: 03

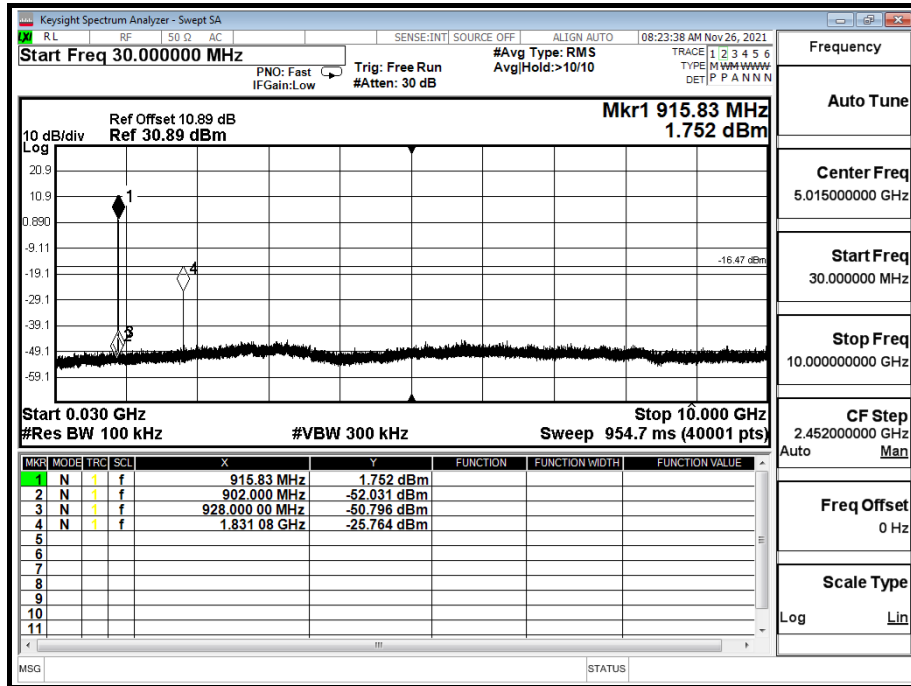






Report No.: TMTN2110000501NR

Page: 35 / 54  
Rev.: 03



## 8.6 RADIATED EMISSIONS

### 8.6.1 TRANSMITTER RADIATED SUPURIOUS EMSSIONS

#### LIMITS

§ 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| 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         | 2655 - 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 - 3338   | 36.43 - 36.5     |
| 12.57675 - 12.57725        | 322 - 335.4           | 3600 - 4400     | ( <sup>2</sup> ) |
| 13.36 - 13.41              |                       |                 |                  |

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

**Report No.:** TMTN2110000501NR

§ 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

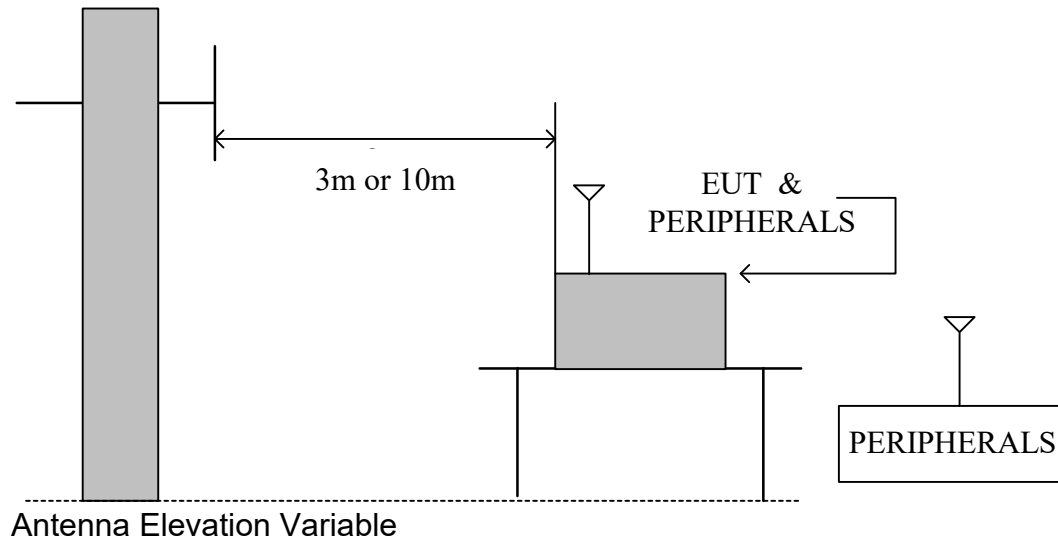
| Frequency<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance<br>(meters) |
|--------------------|--------------------------------------|----------------------------------|
| 30 - 88            | 100 **                               | 3                                |
| 88 - 216           | 150 **                               | 3                                |
| 216 - 960          | 200 **                               | 3                                |
| Above 960          | 500                                  | 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.

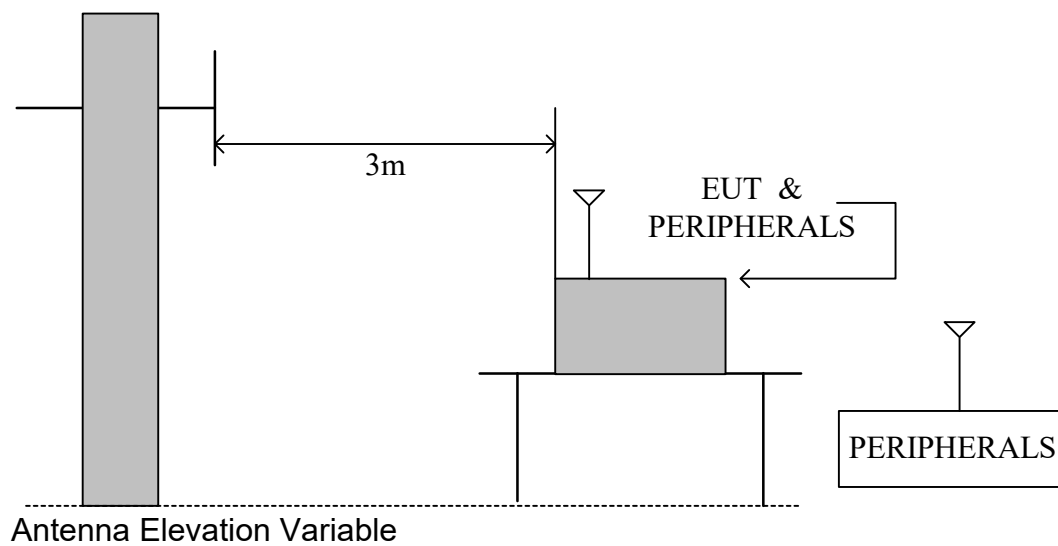
§ 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

### **TEST SETUP**

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 to 1GHz.



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



**TEST PROCEDURE**

- a. The EUT was placed on the top of a rotating table 0.8/1.5 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. While measuring the radiated emission below 1GHz, the EUT was set 3/10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- g. The tests were performed in accordance with KDB 558074 D01 v05r02.

**NOTE :**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. Average value=Peak value + Duty factor.
4. No emission is found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)

**TEST RESULTS**

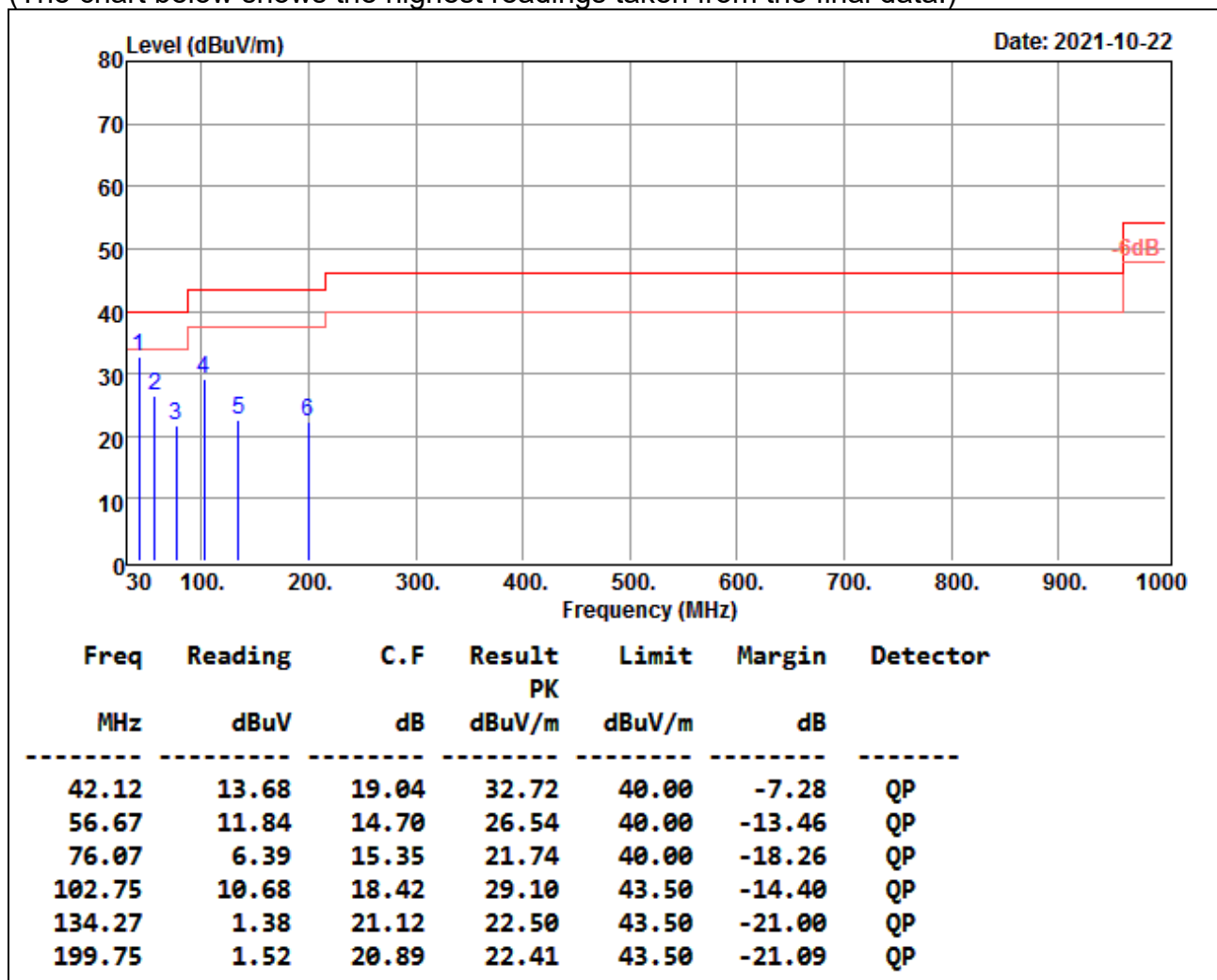
No non-compliance noted.

## 8.6.2 WORST-CASE RADIATED EMISSION BELOW 1 GHz

|              |                            |                |            |
|--------------|----------------------------|----------------|------------|
| Product Name | Wireless Water Leak Sensor | Test Date      | 2021/10/22 |
| Model        | BR35-HW                    | Test By        | Ted Huang  |
| Test Mode    | TX                         | TEMP& Humidity | 26.5°C/56% |

## Horizontal

(The chart below shows the highest readings taken from the final data.)



## Remark:

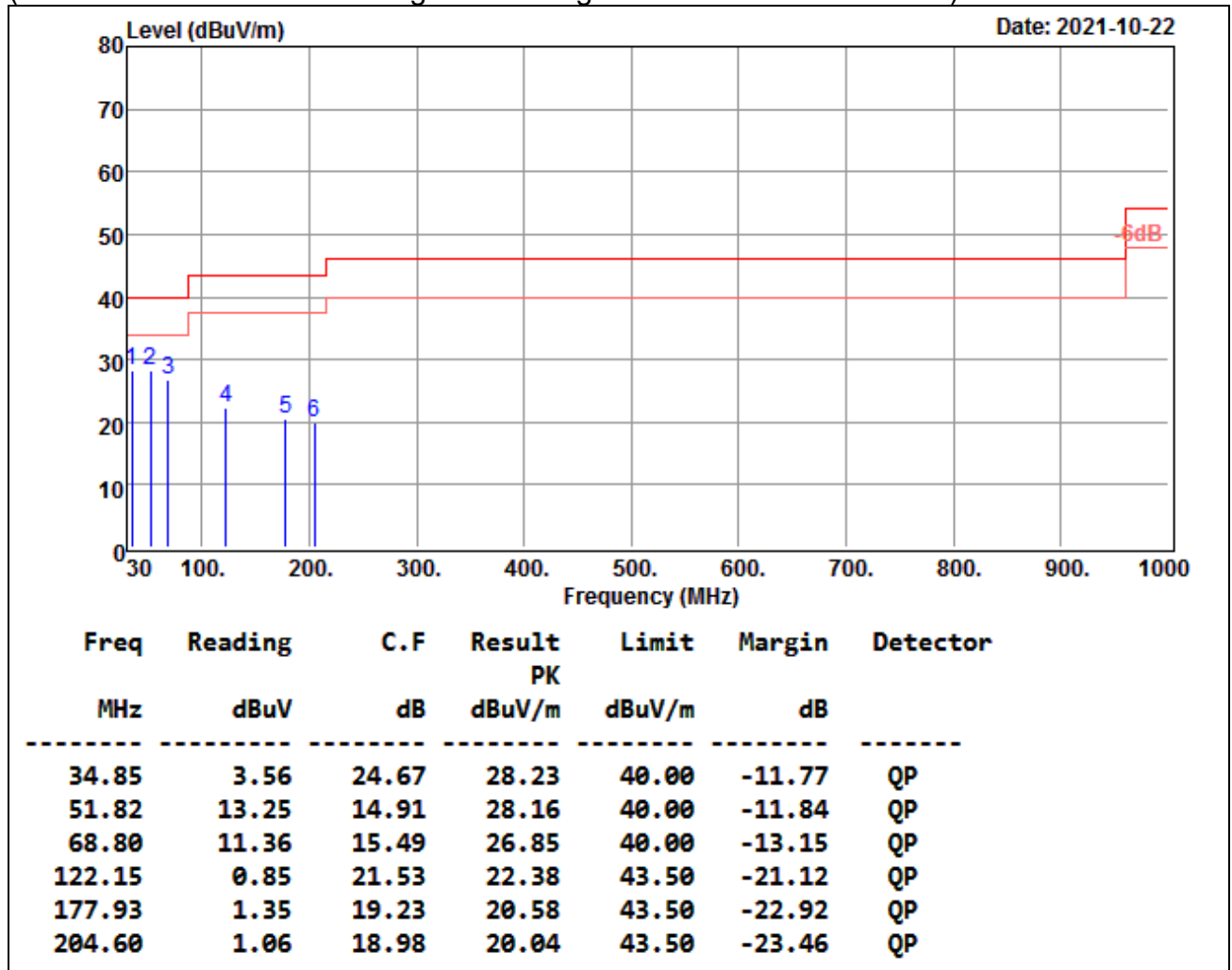
1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Emission at 3m Level=Meter Reading +Antenna Factor +Cable Loss  
Margin= Emission at 3m Level -Limits
6. That the limit for signals below 1GHz is a QP limit and peak readings are below the QP limit.
7. The fundamental signal is not shown in the test data because measurements at fundamental frequency are shown separately and were ignored during the 30 – 1000 MHz scan.



|                     |                            |                           |            |
|---------------------|----------------------------|---------------------------|------------|
| <b>Product Name</b> | Wireless Water Leak Sensor | <b>Test Date</b>          | 2021/10/22 |
| <b>Model</b>        | BR35-HW                    | <b>Test By</b>            | Ted Huang  |
| <b>Test Mode</b>    | TX                         | <b>TEMP&amp; Humidity</b> | 26.5°C/56% |

**Vertical**

(The chart below shows the highest readings taken from the final data.)

**Remark:**

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Emission at 3m Level=Meter Reading +Antenna Factor +Cable Loss  
Margin= Emission at 3m Level -Limits
6. That the limit for signals below 1GHz is a QP limit and peak readings are below the QP limit.
7. The fundamental signal is not shown in the test data because measurements at fundamental frequency are shown separately and were ignored during the 30 – 1000 MHz scan.

### 8.6.3 TRANSMITTER RADIATED EMISSION ABOVE 1 GHz

|                     |                            |                           |            |
|---------------------|----------------------------|---------------------------|------------|
| <b>Product Name</b> | Wireless Water Leak Sensor | <b>Test Date</b>          | 2021/10/26 |
| <b>Model</b>        | BR35-HW                    | <b>Test By</b>            | Ted Huang  |
| <b>Test Mode</b>    | TX (CH Low)                | <b>TEMP&amp; Humidity</b> | 26.5℃, 45% |

| TX mode / CH Low |         |        |            | Measurement Distance at 3m |        |          |          | Horizontal polarity |         |
|------------------|---------|--------|------------|----------------------------|--------|----------|----------|---------------------|---------|
| Freq.            | Reading | AF     | Cable Loss | Pre-amp                    | Filter | Level    | Limit    | Margin              | Mark    |
| (MHz)            | (dBμV)  | (dB/m) | (dB)       | (dB)                       | (dB)   | (dBμV/m) | (dBμV/m) | (dB)                | (P/Q/A) |
| 1829.68          | 86.85   | 29.24  | 3.50       | 44.29                      | 0.80   | 76.10    | 84.32    | -8.22               | P       |
| 1829.68          | -       | -      | -          | -                          | -      | 51.52    | 64.32    | -12.80              | A       |
| * 2745.53        | 71.21   | 30.15  | 4.12       | 43.49                      | 0.87   | 62.85    | 74.00    | -11.15              | P       |
| * 2745.53        | -       | -      | -          | -                          | -      | 38.27    | 54.00    | -15.73              | A       |
| * 3659.41        | 72.49   | 30.59  | 4.67       | 42.89                      | 0.27   | 65.14    | 74.00    | -8.86               | P       |
| * 3659.41        | -       | -      | -          | -                          | -      | 40.55    | 54.00    | -13.45              | A       |
| * 4575.85        | 62.49   | 32.34  | 5.29       | 42.63                      | 0.20   | 57.69    | 74.00    | -16.31              | P       |
| * 4575.85        | -       | -      | -          | -                          | -      | 33.11    | 54.00    | -20.89              | A       |
| 5488.88          | 64.49   | 33.90  | 5.86       | 42.67                      | 0.40   | 61.97    | 74.00    | -12.03              | P       |
| 5488.88          | -       | -      | -          | -                          | -      | 37.39    | 54.00    | -16.61              | A       |
| 6406.45          | 59.35   | 35.31  | 6.19       | 42.73                      | 0.24   | 58.35    | 74.00    | -15.65              | P       |
| 6406.45          | -       | -      | -          | -                          | -      | 33.77    | 54.00    | -20.23              | A       |
| * 7318.68        | 55.04   | 39.11  | 6.59       | 42.29                      | 0.27   | 58.72    | 74.00    | -15.28              | P       |
| * 7318.68        | -       | -      | -          | -                          | -      | 34.14    | 54.00    | -19.86              | A       |
| * 8236.55        | 57.01   | 38.76  | 6.77       | 41.08                      | 0.28   | 61.74    | 74.00    | -12.26              | P       |
| * 8236.55        | -       | -      | -          | -                          | -      | 37.16    | 54.00    | -16.84              | A       |

| TX mode / CH Low |         |        |            | Measurement Distance at 3m |        |          |          | Vertical polarity |         |
|------------------|---------|--------|------------|----------------------------|--------|----------|----------|-------------------|---------|
| Freq.            | Reading | AF     | Cable Loss | Pre-amp                    | Filter | Level    | Limit    | Margin            | Mark    |
| (MHz)            | (dBμV)  | (dB/m) | (dB)       | (dB)                       | (dB)   | (dBμV/m) | (dBμV/m) | (dB)              | (P/Q/A) |
| 1829.68          | 81.74   | 29.24  | 3.50       | 44.29                      | 0.80   | 70.99    | 75.66    | -4.67             | P       |
| 1829.68          | -       | -      | -          | -                          | -      | 46.41    | 55.66    | -9.25             | A       |
| * 2745.57        | 61.52   | 30.15  | 4.12       | 43.49                      | 0.87   | 53.16    | 74.00    | -20.84            | P       |
| * 2745.57        | -       | -      | -          | -                          | -      | 28.58    | 54.00    | -25.42            | A       |
| * 3659.22        | 69.59   | 30.59  | 4.67       | 42.89                      | 0.27   | 62.23    | 74.00    | -11.77            | P       |
| * 3659.22        | -       | -      | -          | -                          | -      | 37.65    | 54.00    | -16.35            | A       |
| * 4575.71        | 60.78   | 32.34  | 5.29       | 42.63                      | 0.20   | 55.98    | 74.00    | -18.02            | P       |
| * 4575.71        | -       | -      | -          | -                          | -      | 31.40    | 54.00    | -22.60            | A       |
| 5489.20          | 63.36   | 33.90  | 5.86       | 42.67                      | 0.40   | 60.85    | 74.00    | -13.15            | P       |
| 5489.20          | -       | -      | -          | -                          | -      | 36.27    | 54.00    | -17.73            | A       |
| 6406.24          | 56.65   | 35.31  | 6.19       | 42.73                      | 0.24   | 55.66    | 74.00    | -18.34            | P       |

Report No.: TMTN2110000501NR

|   |         |       |       |      |       |      |       |       |        |   |
|---|---------|-------|-------|------|-------|------|-------|-------|--------|---|
|   | 6406.24 | -     | -     | -    | -     | -    | 31.07 | 54.00 | -22.93 | A |
| * | 7318.44 | 54.99 | 39.11 | 6.59 | 42.29 | 0.27 | 58.67 | 74.00 | -15.33 | P |
| * | 7318.44 | -     | -     | -    | -     | -    | 34.08 | 54.00 | -19.92 | A |
| * | 8236.36 | 55.39 | 38.76 | 6.77 | 41.08 | 0.28 | 60.13 | 74.00 | -13.87 | P |
| * | 8236.36 | -     | -     | -    | -     | -    | 35.54 | 54.00 | -18.46 | A |

## REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High pass-1G Filter Insertion Loss.
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz.
3. Average level=Peak level + Duty factor
4. The result basic equation calculation is as follow:  

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter}, \text{Margin} = \text{Level-Limit}$$
5. The other emission levels were 20dB below the limit
6. The test limit distance is 3m limit.
7. \*=Restricted bands of operation

|                     |                            |                           |             |
|---------------------|----------------------------|---------------------------|-------------|
| <b>Product Name</b> | Wireless Water Leak Sensor | <b>Test Date</b>          | 2021/10/26  |
| <b>Model</b>        | BR35-HW                    | <b>Test By</b>            | Ted Huang   |
| <b>Test Mode</b>    | TX (CH Middle)             | <b>TEMP&amp; Humidity</b> | 26.5°C, 45% |

| TX mode / CH Middle |         |        |            | Measurement Distance at 3m |        |          |          | Horizontal polarity |         |
|---------------------|---------|--------|------------|----------------------------|--------|----------|----------|---------------------|---------|
| Freq.               | Reading | AF     | Cable Loss | Pre-amp                    | Filter | Level    | Limit    | Margin              | Mark    |
| (MHz)               | (dBμV)  | (dB/m) | (dB)       | (dB)                       | (dB)   | (dBμV/m) | (dBμV/m) | (dB)                | (P/Q/A) |
| 1831.12             | 83.11   | 29.25  | 3.50       | 44.29                      | 0.81   | 72.37    | 87.00    | -14.63              | P       |
| 1831.12             | -       | -      | -          | -                          | -      | 47.79    | 67.00    | -19.21              | A       |
| * 2746.60           | 70.08   | 30.15  | 4.12       | 43.49                      | 0.87   | 61.72    | 74.00    | -12.28              | P       |
| * 2746.60           | -       | -      | -          | -                          | -      | 37.13    | 54.00    | -16.87              | A       |
| * 3660.81           | 72.64   | 30.59  | 4.67       | 42.89                      | 0.27   | 65.28    | 74.00    | -8.72               | P       |
| * 3660.81           | -       | -      | -          | -                          | -      | 40.70    | 54.00    | -13.30              | A       |
| * 4577.68           | 62.17   | 32.35  | 5.29       | 42.63                      | 0.20   | 57.37    | 74.00    | -16.63              | P       |
| * 4577.68           | -       | -      | -          | -                          | -      | 32.79    | 54.00    | -21.21              | A       |
| 5492.99             | 64.75   | 33.90  | 5.87       | 42.67                      | 0.40   | 62.24    | 74.00    | -11.76              | P       |
| 5492.99             | -       | -      | -          | -                          | -      | 37.66    | 54.00    | -16.34              | A       |
| 6406.44             | 58.65   | 35.31  | 6.19       | 42.73                      | 0.24   | 57.66    | 74.00    | -16.34              | P       |
| 6406.44             | -       | -      | -          | -                          | -      | 33.08    | 54.00    | -20.92              | A       |
| * 7321.56           | 59.11   | 39.12  | 6.59       | 42.29                      | 0.27   | 62.80    | 74.00    | -11.20              | P       |
| * 7321.56           | -       | -      | -          | -                          | -      | 38.22    | 54.00    | -15.78              | A       |
| * 8239.40           | 52.96   | 38.76  | 6.77       | 41.08                      | 0.28   | 57.69    | 74.00    | -16.31              | P       |
| * 8239.40           | -       | -      | -          | -                          | -      | 33.11    | 54.00    | -20.89              | A       |

| TX mode / CH Middle |         |        |            | Measurement Distance at 3m |        |          |          | Vertical polarity |         |
|---------------------|---------|--------|------------|----------------------------|--------|----------|----------|-------------------|---------|
| Freq.               | Reading | AF     | Cable Loss | Pre-amp                    | Filter | Level    | Limit    | Margin            | Mark    |
| (MHz)               | (dBμV)  | (dB/m) | (dB)       | (dB)                       | (dB)   | (dBμV/m) | (dBμV/m) | (dB)              | (P/Q/A) |
| 1830.92             | 80.34   | 29.25  | 3.50       | 44.29                      | 0.81   | 69.61    | 77.14    | -7.53             | P       |
| 1830.92             | -       | -      | -          | -                          | -      | 45.02    | 57.14    | -12.12            | A       |
| * 2746.58           | 64.91   | 30.15  | 4.12       | 43.49                      | 0.87   | 56.55    | 74.00    | -17.45            | P       |
| * 2746.58           | -       | -      | -          | -                          | -      | 31.97    | 54.00    | -22.03            | A       |
| * 3660.73           | 66.28   | 30.59  | 4.67       | 42.89                      | 0.27   | 58.93    | 74.00    | -15.07            | P       |
| * 3660.73           | -       | -      | -          | -                          | -      | 34.34    | 54.00    | -19.66            | A       |
| * 4577.50           | 60.24   | 32.35  | 5.29       | 42.63                      | 0.20   | 55.44    | 74.00    | -18.56            | P       |
| * 4577.50           | -       | -      | -          | -                          | -      | 30.86    | 54.00    | -23.14            | A       |
| 5490.92             | 60.58   | 33.90  | 5.87       | 42.67                      | 0.40   | 58.06    | 74.00    | -15.94            | P       |
| 5490.92             | -       | -      | -          | -                          | -      | 33.48    | 54.00    | -20.52            | A       |
| 6408.58             | 57.17   | 35.32  | 6.19       | 42.73                      | 0.24   | 56.19    | 74.00    | -17.81            | P       |
| 6408.58             | -       | -      | -          | -                          | -      | 31.60    | 54.00    | -22.40            | A       |

Report No.: TMTN2110000501NR

|   |         |       |       |      |       |      |       |       |        |   |
|---|---------|-------|-------|------|-------|------|-------|-------|--------|---|
| * | 7321.64 | 55.51 | 39.12 | 6.59 | 42.29 | 0.27 | 59.21 | 74.00 | -14.79 | P |
| * | 7321.64 | -     | -     | -    | -     | -    | 34.63 | 54.00 | -19.37 | A |
| * | 8239.15 | 53.24 | 38.76 | 6.77 | 41.08 | 0.28 | 57.97 | 74.00 | -16.03 | P |
| * | 8239.15 | -     | -     | -    | -     | -    | 33.39 | 54.00 | -20.61 | A |

## REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High pass-1G Filter Insertion Loss.
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz.
3. Average level=Peak level + Duty factor
4. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
5. The other emission levels were 20dB below the limit
6. The test limit distance is 3m limit.
7. \*=Restricted bands of operation

|                     |                            |                           |             |
|---------------------|----------------------------|---------------------------|-------------|
| <b>Product Name</b> | Wireless Water Leak Sensor | <b>Test Date</b>          | 2021/10/26  |
| <b>Model</b>        | BR35-HW                    | <b>Test By</b>            | Ted Huang   |
| <b>Test Mode</b>    | TX (CH High)               | <b>TEMP&amp; Humidity</b> | 26.5°C, 45% |

| TX mode / CH High |         |        |            | Measurement Distance at 3m |        |          |          | Horizontal polarity |         |
|-------------------|---------|--------|------------|----------------------------|--------|----------|----------|---------------------|---------|
| Freq.             | Reading | AF     | Cable Loss | Pre-amp                    | Filter | Level    | Limit    | Margin              | Mark    |
| (MHz)             | (dBμV)  | (dB/m) | (dB)       | (dB)                       | (dB)   | (dBμV/m) | (dBμV/m) | (dB)                | (P/Q/A) |
| 1831.09           | 86.04   | 29.25  | 3.50       | 44.29                      | 0.81   | 75.30    | 88.31    | -13.01              | P       |
| 1831.09           | -       | -      | -          | -                          | -      | 50.72    | 68.31    | -17.59              | A       |
| * 2746.59         | 72.73   | 30.15  | 4.12       | 43.49                      | 0.87   | 64.38    | 74.00    | -9.62               | P       |
| * 2746.59         | -       | -      | -          | -                          | -      | 39.79    | 54.00    | -14.21              | A       |
| * 3662.15         | 74.80   | 30.59  | 4.67       | 42.89                      | 0.27   | 67.45    | 74.00    | -6.55               | P       |
| * 3662.15         | -       | -      | -          | -                          | -      | 42.87    | 54.00    | -11.13              | A       |
| * 4577.50         | 61.24   | 32.35  | 5.29       | 42.63                      | 0.20   | 56.45    | 74.00    | -17.55              | P       |
| * 4577.50         | -       | -      | -          | -                          | -      | 31.86    | 54.00    | -22.14              | A       |
| 5495.16           | 65.68   | 33.90  | 5.87       | 42.67                      | 0.40   | 63.18    | 74.00    | -10.82              | P       |
| 5495.16           | -       | -      | -          | -                          | -      | 38.59    | 54.00    | -15.41              | A       |
| 6410.85           | 59.46   | 35.32  | 6.19       | 42.73                      | 0.24   | 58.47    | 74.00    | -15.53              | P       |
| 6410.85           | -       | -      | -          | -                          | -      | 33.89    | 54.00    | -20.11              | A       |
| * 7324.03         | 56.70   | 39.13  | 6.59       | 42.28                      | 0.27   | 60.40    | 74.00    | -13.60              | P       |
| * 7324.03         | -       | -      | -          | -                          | -      | 35.82    | 54.00    | -18.18              | A       |
| * 8242.52         | 54.16   | 38.76  | 6.77       | 41.07                      | 0.28   | 58.89    | 74.00    | -15.11              | P       |
| * 8242.52         | -       | -      | -          | -                          | -      | 34.31    | 54.00    | -19.69              | A       |

| TX mode / CH High |         |        |            | Measurement Distance at 3m |        |          |          | Vertical polarity |         |
|-------------------|---------|--------|------------|----------------------------|--------|----------|----------|-------------------|---------|
| Freq.             | Reading | AF     | Cable Loss | Pre-amp                    | Filter | Level    | Limit    | Margin            | Mark    |
| (MHz)             | (dBμV)  | (dB/m) | (dB)       | (dB)                       | (dB)   | (dBμV/m) | (dBμV/m) | (dB)              | (P/Q/A) |
| 1831.76           | 84.52   | 29.25  | 3.50       | 44.29                      | 0.81   | 73.79    | 80.10    | -6.31             | P       |
| 1831.76           | -       | -      | -          | -                          | -      | 49.21    | 60.10    | -10.89            | A       |
| * 2747.63         | 66.24   | 30.15  | 4.12       | 43.49                      | 0.87   | 57.88    | 74.00    | -16.12            | P       |
| * 2747.63         | -       | -      | -          | -                          | -      | 33.30    | 54.00    | -20.70            | A       |
| * 3662.17         | 68.61   | 30.59  | 4.67       | 42.89                      | 0.27   | 61.26    | 74.00    | -12.74            | P       |
| * 3662.17         | -       | -      | -          | -                          | -      | 36.68    | 54.00    | -17.32            | A       |
| * 4579.29         | 60.51   | 32.35  | 5.29       | 42.63                      | 0.20   | 55.72    | 74.00    | -18.28            | P       |
| * 4579.29         | -       | -      | -          | -                          | -      | 31.13    | 54.00    | -22.87            | A       |
| 5493.17           | 61.01   | 33.90  | 5.87       | 42.67                      | 0.40   | 58.50    | 74.00    | -15.50            | P       |
| 5493.17           | -       | -      | -          | -                          | -      | 33.92    | 54.00    | -20.08            | A       |
| 6408.79           | 57.34   | 35.32  | 6.19       | 42.73                      | 0.24   | 56.35    | 74.00    | -17.65            | P       |
| 6408.79           | -       | -      | -          | -                          | -      | 31.77    | 54.00    | -22.23            | A       |

Report No.: TMTN2110000501NR

|   |         |       |       |      |       |      |       |       |        |   |
|---|---------|-------|-------|------|-------|------|-------|-------|--------|---|
| * | 7324.00 | 54.58 | 39.13 | 6.59 | 42.28 | 0.27 | 58.29 | 74.00 | -15.71 | P |
| * | 7324.00 | -     | -     | -    | -     | -    | 33.71 | 54.00 | -20.29 | A |
| * | 8239.62 | 54.64 | 38.76 | 6.77 | 41.08 | 0.28 | 59.37 | 74.00 | -14.63 | P |
| * | 8239.62 | -     | -     | -    | -     | -    | 34.79 | 54.00 | -19.21 | A |

## REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High pass-1G Filter Insertion Loss.
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz.
3. Average level=Peak level + Duty factor
4. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
5. The other emission levels were 20dB below the limit
6. The test limit distance is 3m limit.
7. \*=Restricted bands of operation

## 8.7 POWERLINE CONDUCTED EMISSIONS

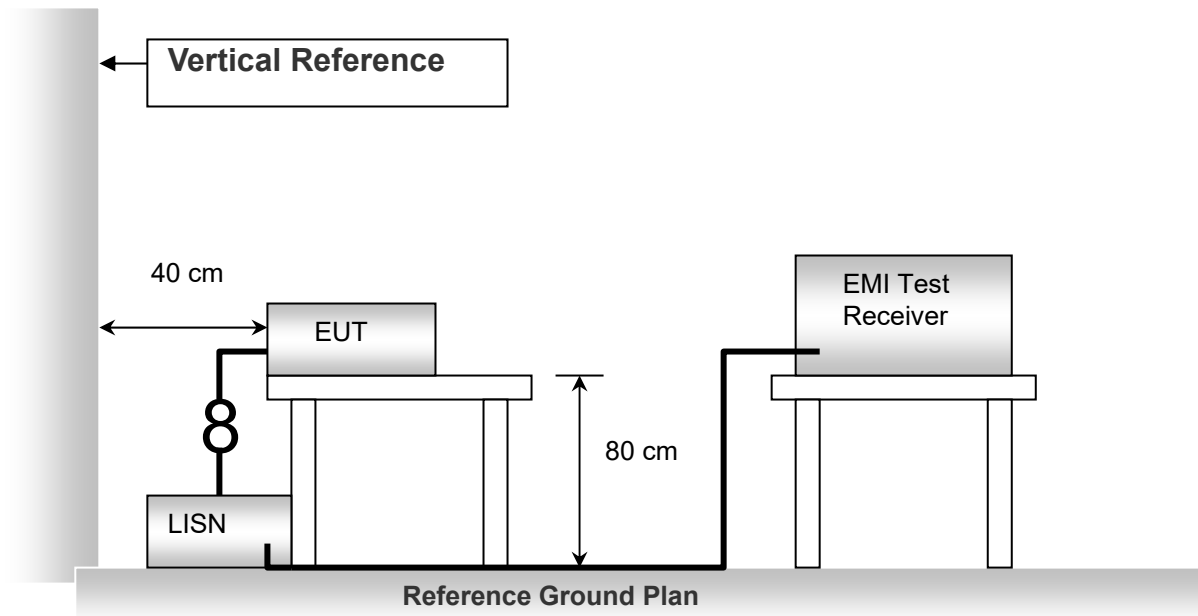
### LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

| Frequency of Emission (MHz) | Conducted limit (dB $\mu$ v) |          |
|-----------------------------|------------------------------|----------|
|                             | Quasi-peak                   | Average  |
| 0.15 - 0.5                  | 66 to 56                     | 56 to 46 |
| 0.5 - 5                     | 56                           | 46       |
| 5 - 30                      | 60                           | 50       |



**TEST SETUP****TEST PROCEDURE**

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80cm above the horizontal ground plane. The EUT IS CONFIGURED IN ACCORDANCE WITH ANSI C63.10.

The resolution bandwidth is set to 9 kHz for both quasi-peak detection and average detection measurements.

Line conducted data is recorded for both NEUTRAL and LINE.

**TEST RESULTS**

No non-compliance noted.

※ This EUT is not connected to AC Source directly. Not applicable for this test.



Report No.: TMTN2110000501NR

Page: 50 / 54  
Rev.: 03

## 9. ANTENNA REQUIREMENT

### 9.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR 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.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 9.2 ANTENNA CONNECTED CONSTRUCTION

Type: Wire Antenna  
Model: BR35  
Manufacturer: N/A  
Gain: -2.93 dBi

**=== END of Report ===**