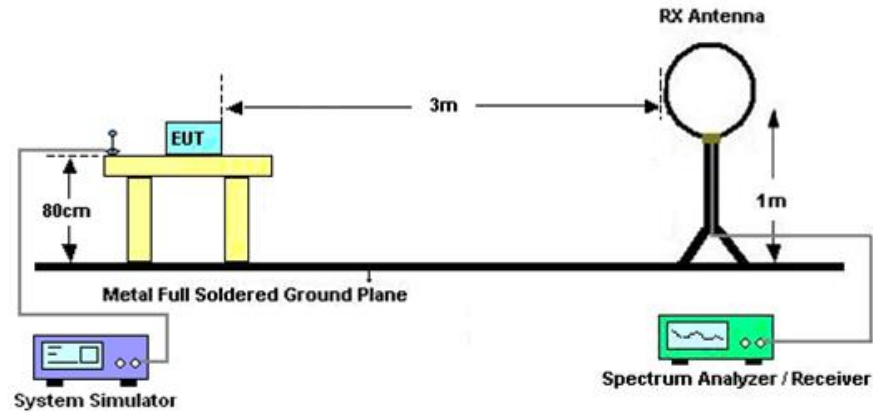
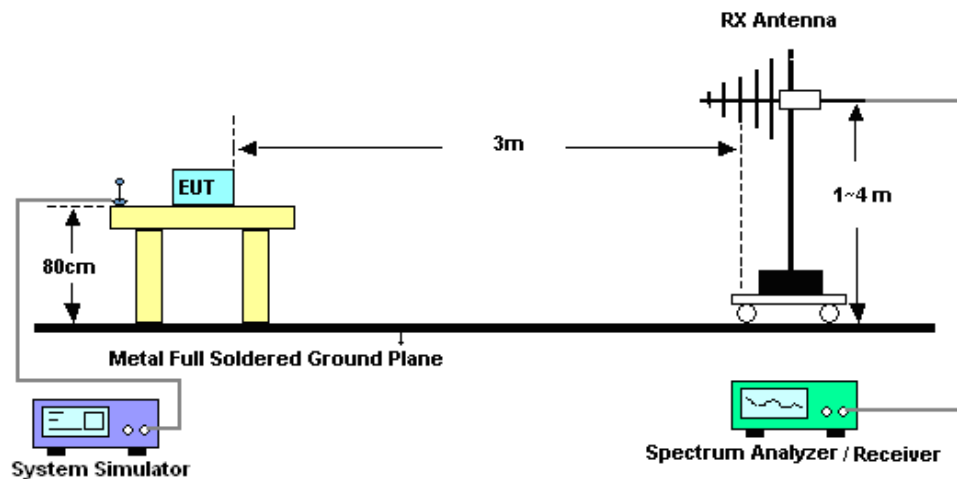


### 3.8.4 Test Setup

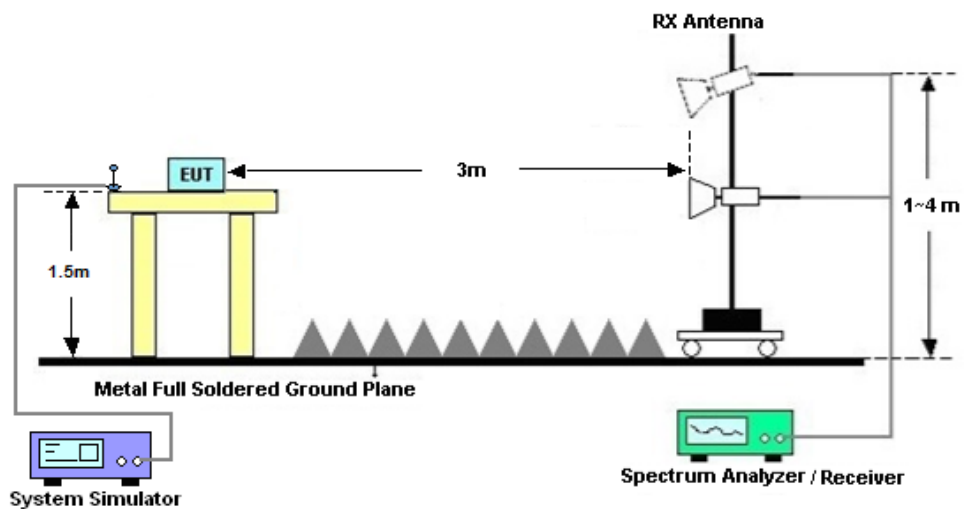
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





### **3.8.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)**

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

### **3.8.6 Test Result of Radiated Spurious at Band Edges**

Please refer to Appendix C.

### **3.8.7 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)**

Please refer to Appendix C.

### **3.8.8 Duty cycle correction factor for average measurement**

Please refer to Appendix D.

### 3.9 AC Conducted Emission Measurement

#### 3.9.1 Limit of AC Conducted Emission

For equipment 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.

| 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        |

\*Decreases with the logarithm of the frequency.

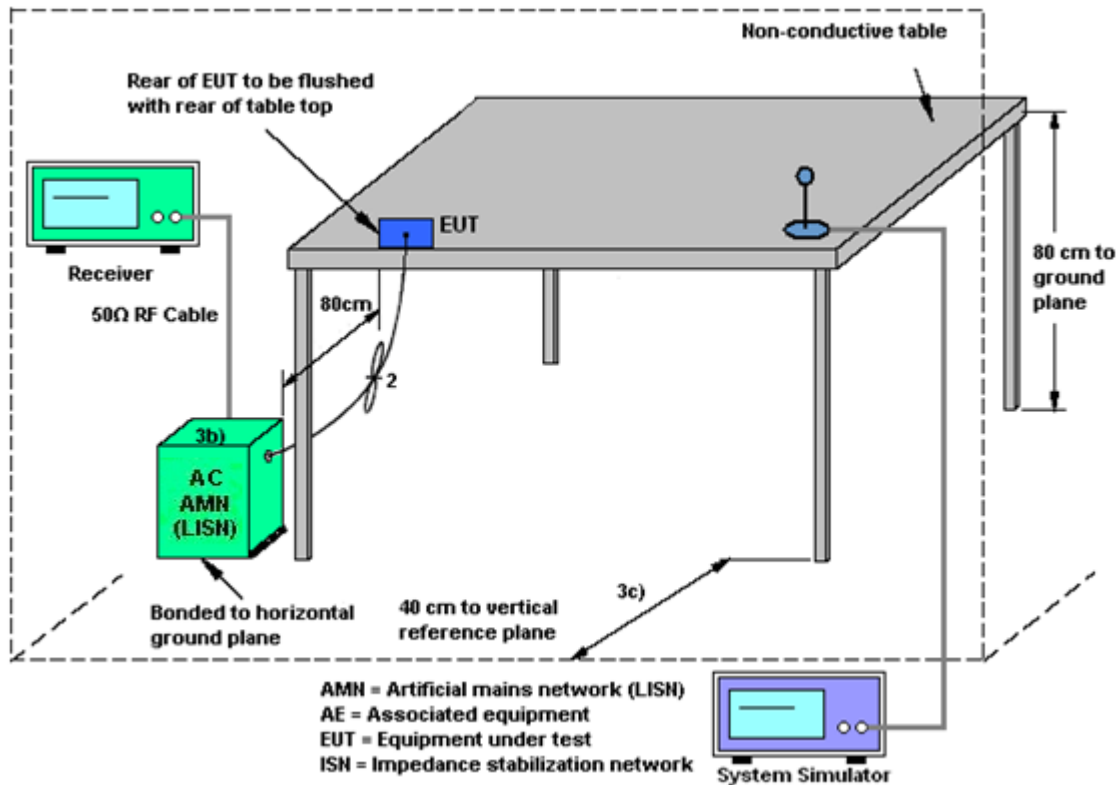
#### 3.9.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.9.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

### 3.9.4 Test Setup



### 3.9.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



### **3.10 Antenna Requirements**

#### **3.10.1 Standard Applicable**

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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 rule.

#### **3.10.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.

#### **3.10.3 Antenna Gain**

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



## 4 List of Measuring Equipment

| Instrument                        | Manufacturer | Model No.                | Serial No.   | Characteristics | Calibration Date | Test Date                   | Due Date      | Remark                |
|-----------------------------------|--------------|--------------------------|--------------|-----------------|------------------|-----------------------------|---------------|-----------------------|
| Spectrum Analyzer                 | R&S          | FSV40                    | 101078       | 10Hz~40GHz      | Apr. 07, 2022    | Nov. 15, 2022~Dec. 03, 2022 | Apr. 08, 2023 | Conducted (TH01-SZ)   |
| Pulse Power Sensor                | Anritsu      | MA2411B                  | 1339473      | 30MHz~40GHz     | Dec. 28, 2021    | Nov. 15, 2022~Dec. 03, 2022 | Dec. 27, 2022 | Conducted (TH01-SZ)   |
| Power Meter                       | Anritsu      | ML2495A                  | 1542004      | 50MHz Bandwidth | Dec. 28, 2021    | Nov. 15, 2022~Dec. 03, 2022 | Dec. 27, 2022 | Conducted (TH01-SZ)   |
| EMI Test Receiver&SA              | Agilent      | N9038A                   | MY52260185   | 20Hz~26.5GHz    | Dec. 27, 2021    | Nov. 23, 2022               | Dec. 26, 2022 | Radiation (03CH01-SZ) |
| EXA Spectrum Analyzer             | KEYSIGHT     | N9010A                   | MY55150213   | 10Hz~44GHz      | Jul. 07, 2022    | Nov. 23, 2022               | Jul. 06, 2023 | Radiation (03CH01-SZ) |
| Loop Antenna                      | R&S          | HFH2-Z2                  | 100354       | 9kHz~30MHz      | Jul. 28, 2022    | Nov. 23, 2022               | Jun. 27, 2023 | Radiation (03CH01-SZ) |
| Bilog Antenna                     | TeseQ        | CBL6112D                 | 35407        | 30MHz~2GHz      | Sep. 28, 2022    | Nov. 23, 2022               | Sep. 27, 2023 | Radiation (03CH01-SZ) |
| Double Ridge Horn Antenna         | ETS-Lindgren | 3117                     | 00119436     | 1GHz~18GHz      | Jul. 07, 2022    | Nov. 23, 2022               | Jul. 06, 2023 | Radiation (03CH01-SZ) |
| SHF-EHF Horn                      | com-power    | AH-840                   | 101071       | 18GHz~40GHz     | Apr. 10, 2022    | Nov. 23, 2022               | Apr. 09, 2023 | Radiation (03CH01-SZ) |
| LF Amplifier                      | Burgeon      | BPA-530                  | 102209       | 0.01~3000Mhz    | Apr. 06, 2022    | Nov. 23, 2022               | Apr. 05, 2023 | Radiation (03CH01-SZ) |
| HF Amplifier                      | MITEQ        | AMF-7D-00101800-30-10P-R | 1943528      | 1GHz~18GHz      | Oct. 19, 2022    | Nov. 23, 2022               | Oct. 18, 2023 | Radiation (03CH01-SZ) |
| HF Amplifier                      | KEYSIGHT     | 83017A                   | MY53270105   | 0.5GHz~26.5GHz  | Oct. 19, 2022    | Nov. 23, 2022               | Oct. 18, 2023 | Radiation (03CH01-SZ) |
| HF Amplifier                      | MITEQ        | TTA1840-35-HG            | 1871923      | 18GHz~40GHz     | Jul. 06, 2022    | Nov. 23, 2022               | Jul. 05, 2023 | Radiation (03CH01-SZ) |
| AC Power Source                   | Chroma       | 61601                    | 616010001985 | N/A             | Nov. 10, 2022    | Nov. 23, 2022               | Nov. 09, 2023 | Radiation (03CH01-SZ) |
| Turn Table                        | EM           | EM1000                   | N/A          | 0~360 degree    | NCR              | Nov. 23, 2022               | NCR           | Radiation (03CH01-SZ) |
| Antenna Mast                      | EM           | EM1000                   | N/A          | 1 m~4 m         | NCR              | Nov. 23, 2022               | NCR           | Radiation (03CH01-SZ) |
| EMI Receiver                      | R&S          | ESR7                     | 101630       | 9kHz~7GHz;      | Jul. 07, 2022    | Nov. 16, 2022               | Jul. 06, 2023 | Conduction (CO01-SZ)  |
| AC LISN                           | R&S          | ENV216                   | 100063       | 9kHz~30MHz      | Sep. 15, 2022    | Nov. 16, 2022               | Sep. 14, 2023 | Conduction (CO01-SZ)  |
| AC LISN (for auxiliary equipment) | EMCO         | 3816/2SH                 | 00103892     | 9kHz~30MHz      | Oct. 17, 2022    | Nov. 16, 2022               | Oct. 16, 2023 | Conduction (CO01-SZ)  |
| AC Power Source                   | Chroma       | 61602                    | 616020000891 | 100Vac~250Vac   | Jul. 07, 2022    | Nov. 16, 2022               | Jul. 06, 2023 | Conduction (CO01-SZ)  |

NCR: No Calibration Required

## 5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

### Uncertainty of Conducted Measurement

| Test Item                  | Uncertainty   |
|----------------------------|---------------|
| Conducted Power            | $\pm 1.34$ dB |
| Conducted Emissions        | $\pm 1.34$ dB |
| Occupied Channel Bandwidth | $\pm 0.13$ %  |

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

|                                                                          |       |
|--------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ ) | 2.2dB |
|--------------------------------------------------------------------------|-------|

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

|                                                                          |       |
|--------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ ) | 4.2dB |
|--------------------------------------------------------------------------|-------|

### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

|                                                                          |       |
|--------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ ) | 5.0dB |
|--------------------------------------------------------------------------|-------|

### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

|                                                                          |       |
|--------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ ) | 4.3dB |
|--------------------------------------------------------------------------|-------|

----- THE END -----



## **Appendix A. Conducted Test Results**

|                |                      |                    |       |    |
|----------------|----------------------|--------------------|-------|----|
| Test Engineer: | Chen Ran             | Temperature:       | 24~26 | °C |
| Test Date:     | 2022/11/15~2022/12/3 | Relative Humidity: | 50~53 | %  |

**TEST RESULTS DATA****20dB and 99% Occupied Bandwidth and Hopping Channel Separation**

| Mod. | Data Rate | NTX | CH. | Freq. (MHz) | 20db BW (MHz) | 99% Bandwidth (MHz) | Hopping Channel Separation Measurement (MHz) | Hopping Channel Separation Measurement Limit (MHz) | Pass/Fail |
|------|-----------|-----|-----|-------------|---------------|---------------------|----------------------------------------------|----------------------------------------------------|-----------|
| DH   | 1Mbps     | 1   | 0   | 2402        | 0.860         | 0.764               | 1.003                                        | 0.5731                                             | Pass      |
| DH   | 1Mbps     | 1   | 39  | 2441        | 0.857         | 0.761               | 0.999                                        | 0.5711                                             | Pass      |
| DH   | 1Mbps     | 1   | 78  | 2480        | 0.860         | 0.764               | 0.999                                        | 0.5731                                             | Pass      |
| 2DH  | 2Mbps     | 1   | 0   | 2402        | 1.250         | 1.143               | 1.003                                        | 0.8336                                             | Pass      |
| 2DH  | 2Mbps     | 1   | 39  | 2441        | 1.250         | 1.140               | 0.999                                        | 0.8336                                             | Pass      |
| 2DH  | 2Mbps     | 1   | 78  | 2480        | 1.250         | 1.143               | 0.999                                        | 0.8336                                             | Pass      |
| 3DH  | 3Mbps     | 1   | 0   | 2402        | 1.259         | 1.146               | 0.999                                        | 0.8393                                             | Pass      |
| 3DH  | 3Mbps     | 1   | 39  | 2441        | 1.255         | 1.143               | 1.003                                        | 0.8365                                             | Pass      |
| 3DH  | 3Mbps     | 1   | 78  | 2480        | 1.259         | 1.146               | 0.920                                        | 0.8393                                             | Pass      |

**TEST RESULTS DATA****Dwell Time**

| Mod.  | Hopping Channel Number Rate | Hops Over Occupancy Time(hops) | Package Transfer Time (msec) | Dwell Time (sec) | Limits (sec) | Pass/Fail |
|-------|-----------------------------|--------------------------------|------------------------------|------------------|--------------|-----------|
| Nomal | 79                          | 106.67                         | 2.8913                       | 0.31             | 0.4          | Pass      |
| AFH   | 20                          | 53.33                          | 2.8913                       | 0.15             | 0.4          | Pass      |

**TEST RESULTS DATA****Peak Power Table**

| DH   | CH. | NTX | Peak Power (dBm) | Power Limit (dBm) | Test Result |
|------|-----|-----|------------------|-------------------|-------------|
| DH5  | 0   | 1   | 7.60             | 20.97             | Pass        |
|      | 39  | 1   | 8.20             | 20.97             | Pass        |
|      | 78  | 1   | <b>8.40</b>      | 20.97             | Pass        |
| 2DH5 | 0   | 1   | 7.00             | 20.97             | Pass        |
|      | 39  | 1   | 7.40             | 20.97             | Pass        |
|      | 78  | 1   | <b>7.70</b>      | 20.97             | Pass        |
| 3DH5 | 0   | 1   | 7.10             | 20.97             | Pass        |
|      | 39  | 1   | 7.60             | 20.97             | Pass        |
|      | 78  | 1   | <b>7.80</b>      | 20.97             | Pass        |

**TEST RESULTS DATA****Average Power Table  
(Reporting Only)**

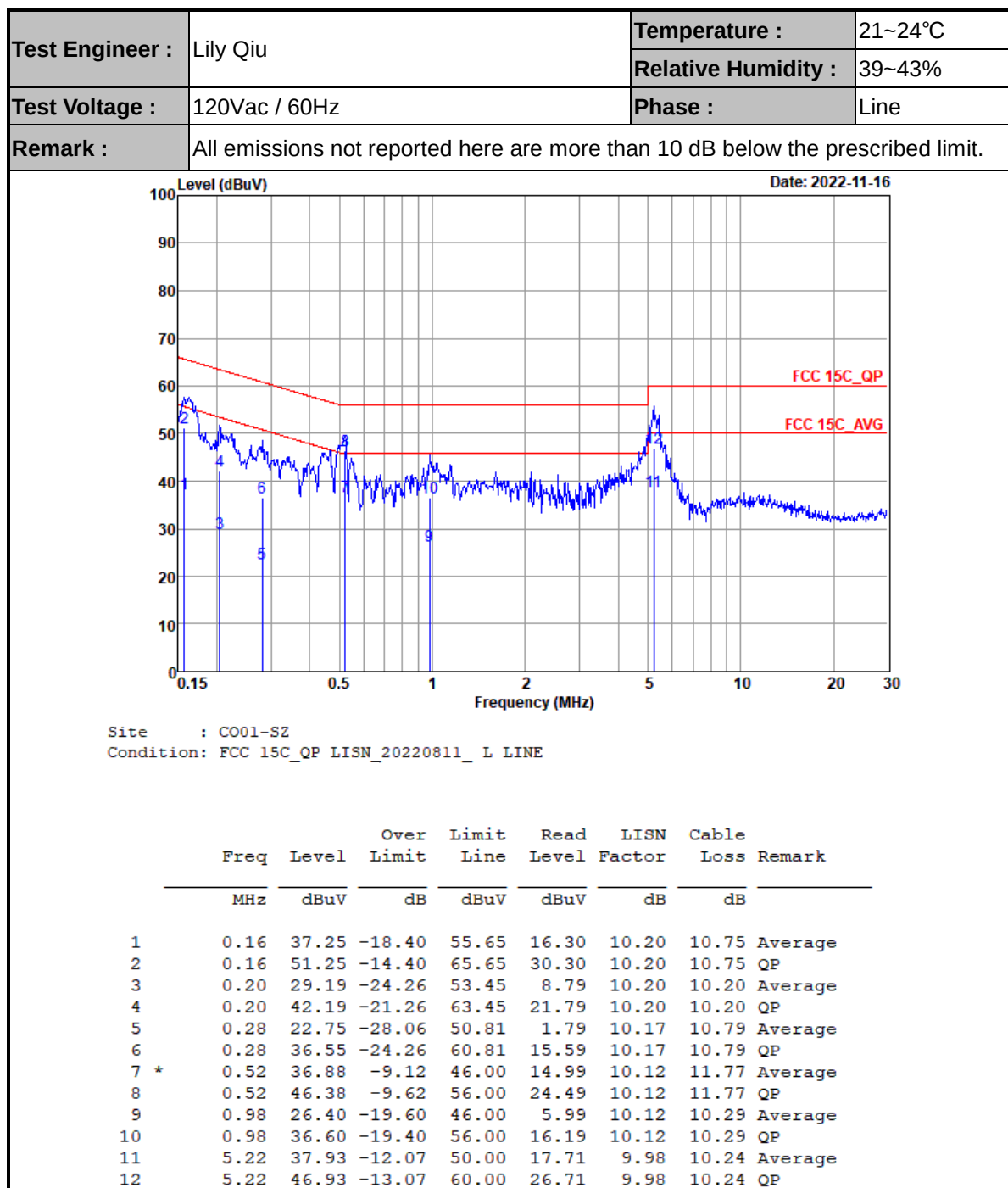
| DH   | CH. | NTX | Average Power (dBm) | Duty Factor (dB) |
|------|-----|-----|---------------------|------------------|
| DH5  | 0   | 1   | 6.90                | 1.14             |
|      | 39  | 1   | 7.30                | 1.14             |
|      | 78  | 1   | <b>7.40</b>         | 1.14             |
| 2DH5 | 0   | 1   | 4.50                | 1.14             |
|      | 39  | 1   | 4.80                | 1.14             |
|      | 78  | 1   | <b>5.10</b>         | 1.14             |
| 3DH5 | 0   | 1   | 4.50                | 1.16             |
|      | 39  | 1   | 4.80                | 1.16             |
|      | 78  | 1   | <b>5.10</b>         | 1.16             |

**TEST RESULTS DATA****Number of Hopping Frequency**

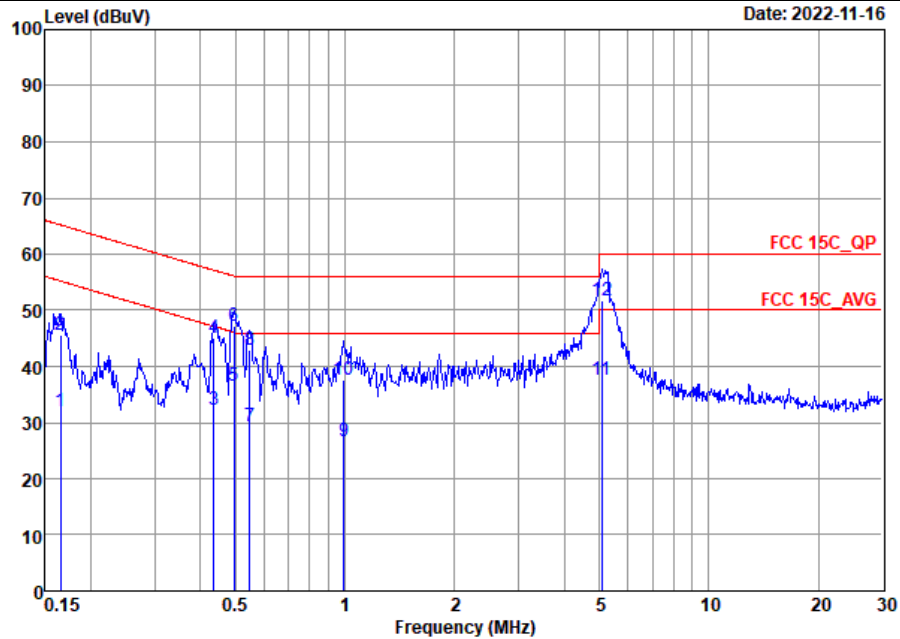
| Number of Hopping (Channel) | Adaptive Frequency Hopping (Channel) | Limits (Channel) | Pass/Fail |
|-----------------------------|--------------------------------------|------------------|-----------|
| 79                          | 20                                   | > 15             | Pass      |



## Appendix B. AC Conducted Emission Test Results



|                        |                                                                                 |                            |         |
|------------------------|---------------------------------------------------------------------------------|----------------------------|---------|
| <b>Test Engineer :</b> | Lily Qiu                                                                        | <b>Temperature :</b>       | 21~24°C |
|                        |                                                                                 | <b>Relative Humidity :</b> | 39~43%  |
| <b>Test Voltage :</b>  | 120Vac / 60Hz                                                                   | <b>Phase :</b>             | Neutral |
| <b>Remark :</b>        | All emissions not reported here are more than 10 dB below the prescribed limit. |                            |         |



Site : CO01-SZ  
Condition: FCC 15C\_QP LISN\_20220811\_ N NEUTRAL

|      | Freq | Level | Over   | Limit | Read  | LISN   | Cable |         |
|------|------|-------|--------|-------|-------|--------|-------|---------|
|      | MHz  | dBuV  | Limit  | Line  | Level | Factor | Loss  | Remark  |
|      |      |       | dB     | dBuV  | dBuV  | dB     | dB    |         |
| 1    | 0.17 | 32.02 | -23.19 | 55.21 | 11.10 | 10.31  | 10.61 | Average |
| 2    | 0.17 | 45.72 | -19.49 | 65.21 | 24.80 | 10.31  | 10.61 | QP      |
| 3    | 0.44 | 32.19 | -14.96 | 47.15 | 10.40 | 10.19  | 11.60 | Average |
| 4    | 0.44 | 45.09 | -12.06 | 57.15 | 23.30 | 10.19  | 11.60 | QP      |
| 5    | 0.49 | 36.53 | -9.57  | 46.10 | 14.50 | 10.19  | 11.84 | Average |
| 6    | 0.49 | 47.23 | -8.87  | 56.10 | 25.20 | 10.19  | 11.84 | QP      |
| 7    | 0.55 | 29.27 | -16.73 | 46.00 | 7.41  | 10.21  | 11.65 | Average |
| 8    | 0.55 | 43.07 | -12.93 | 56.00 | 21.21 | 10.21  | 11.65 | QP      |
| 9    | 0.99 | 26.56 | -19.44 | 46.00 | 6.10  | 10.21  | 10.25 | Average |
| 10   | 0.99 | 37.56 | -18.44 | 56.00 | 17.10 | 10.21  | 10.25 | QP      |
| 11   | 5.08 | 37.57 | -12.43 | 50.00 | 17.21 | 10.12  | 10.24 | Average |
| 12 * | 5.08 | 51.67 | -8.33  | 60.00 | 31.31 | 10.12  | 10.24 | QP      |

Note:

- Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
- Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)



## Appendix C. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

| BT                     | Note                                                                                        | Frequency | Level      | Margin | Limit<br>Line | Read<br>Level | Antenna<br>Factor | Path<br>Loss | Preamp<br>Factor | Ant<br>Pos | Table<br>Pos | Peak<br>Avg. | Pol.    |
|------------------------|---------------------------------------------------------------------------------------------|-----------|------------|--------|---------------|---------------|-------------------|--------------|------------------|------------|--------------|--------------|---------|
|                        |                                                                                             | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m )    | ( dBμV )      | ( dB/m )          | ( dB )       | ( dB )           | ( cm )     | ( deg )      | ( P/A )      | ( H/V ) |
| BT<br>CH00<br>2402MHz  |                                                                                             | 2349.27   | 47.74      | -26.26 | 74            | 40.58         | 32.17             | 7.69         | 32.7             | 100        | 239          | P            | H       |
|                        |                                                                                             | 2349.27   | 22.95      | -31.05 | 54            | -             | -                 | -            | -                | -          | -            | A            | H       |
|                        | *                                                                                           | 2402      | 101.49     | -      | -             | 94.11         | 32.28             | 7.8          | 32.7             | 100        | 239          | P            | H       |
|                        | *                                                                                           | 2402      | 76.7       | -      | -             | -             | -                 | -            | -                | -          | -            | A            | H       |
|                        |                                                                                             | 2353.575  | 48.14      | -25.86 | 74            | 40.97         | 32.18             | 7.69         | 32.7             | 100        | 247          | P            | V       |
|                        |                                                                                             | 2353.575  | 23.35      | -30.65 | 54            | -             | -                 | -            | -                |            |              | A            | V       |
|                        | *                                                                                           | 2402      | 105.1      | -      | -             | 97.72         | 32.28             | 7.8          | 32.7             | 100        | 247          | P            | V       |
|                        | *                                                                                           | 2402      | 80.31      | -      | -             | -             | -                 | -            | -                | -          | -            | A            | V       |
| BT<br>CH 78<br>2480MHz | *                                                                                           | 2480      | 99.43      | -      | -             | 91.79         | 32.46             | 7.88         | 32.7             | 100        | 228          | P            | H       |
|                        | *                                                                                           | 2480      | 74.64      | -      | -             | -             | -                 | -            | -                | -          | -            | A            | H       |
|                        |                                                                                             | 2497      | 48.05      | -25.95 | 74            | 40.38         | 32.49             | 7.88         | 32.7             | 100        | 228          | P            | H       |
|                        |                                                                                             | 2497      | 23.26      | -30.74 | 54            | -             | -                 | -            | -                | -          | -            | A            | H       |
|                        | *                                                                                           | 2480      | 102.84     | -      | -             | 95.2          | 32.46             | 7.88         | 32.7             | 138        | 256          | P            | V       |
|                        | *                                                                                           | 2480      | 78.05      | -      | -             | -             | -                 | -            | -                | -          | -            | A            | V       |
|                        |                                                                                             | 2486.04   | 48         | -26    | 74            | 40.35         | 32.47             | 7.88         | 32.7             | 138        | 256          | P            | V       |
|                        |                                                                                             | 2486.04   | 23.21      | -30.79 | 54            | -             | -                 | -            | -                | -          | -            | A            | V       |
| Remark                 | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |           |            |        |               |               |                   |              |                  |            |              |              |         |



## 2.4GHz 2400~2483.5MHz

## BT (Harmonic @ 3m)

| BT                     | Note                                                                                        | Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Margin<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB/m ) | Path<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Peak<br>Avg.<br>( P/A ) | Pol.<br>( H/V ) |
|------------------------|---------------------------------------------------------------------------------------------|----------------------|---------------------|------------------|-----------------------------|---------------------------|-------------------------------|------------------------|----------------------------|----------------------|-------------------------|-------------------------|-----------------|
| BT<br>CH 00<br>2402MHz |                                                                                             | 4804                 | 44.72               | -29.28           | 74                          | 50.97                     | 34.82                         | 11.08                  | 52.15                      | -                    | -                       | P                       | H               |
|                        |                                                                                             | 4804                 | 19.93               | -34.07           | 54                          | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|                        |                                                                                             | 4804                 | 45.61               | -28.39           | 74                          | 51.86                     | 34.82                         | 11.08                  | 52.15                      | -                    | -                       | P                       | V               |
|                        |                                                                                             | 4804                 | 20.82               | -33.18           | 54                          | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
| BT<br>CH 39<br>2441MHz |                                                                                             | 4882                 | 43.06               | -30.94           | 74                          | 49.2                      | 34.85                         | 11.11                  | 52.1                       | -                    | -                       | P                       | H               |
|                        |                                                                                             | 4882                 | 18.27               | -35.73           | 54                          | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|                        |                                                                                             | 7323                 | 47.14               | -26.86           | 74                          | 49.5                      | 36.33                         | 13.08                  | 51.77                      | -                    | -                       | P                       | H               |
|                        |                                                                                             | 7323                 | 22.35               | -31.65           | 54                          | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|                        |                                                                                             | 4882                 | 43.62               | -30.38           | 74                          | 49.76                     | 34.85                         | 11.11                  | 52.1                       | -                    | -                       | P                       | V               |
|                        |                                                                                             | 4882                 | 18.83               | -35.17           | 54                          | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|                        |                                                                                             | 7323                 | 47.53               | -26.47           | 74                          | 49.89                     | 36.33                         | 13.08                  | 51.77                      | -                    | -                       | P                       | V               |
|                        |                                                                                             | 7323                 | 22.74               | -31.26           | 54                          | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
| BT<br>CH 78<br>2480MHz |                                                                                             | 4960                 | 43.88               | -30.12           | 74                          | 49.89                     | 34.88                         | 11.14                  | 52.03                      | -                    | -                       | P                       | H               |
|                        |                                                                                             | 4960                 | 19.09               | -34.91           | 54                          | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|                        |                                                                                             | 7440                 | 46.04               | -27.96           | 74                          | 48.32                     | 36.38                         | 12.99                  | 51.65                      | -                    | -                       | P                       | H               |
|                        |                                                                                             | 7440                 | 21.25               | -32.75           | 54                          | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|                        |                                                                                             | 4960                 | 44.77               | -29.23           | 74                          | 50.78                     | 34.88                         | 11.14                  | 52.03                      | -                    | -                       | P                       | V               |
|                        |                                                                                             | 4960                 | 19.98               | -34.02           | 54                          | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|                        |                                                                                             | 7440                 | 46.63               | -27.37           | 74                          | 48.91                     | 36.38                         | 12.99                  | 51.65                      | -                    | -                       | P                       | V               |
|                        |                                                                                             | 7440                 | 21.84               | -32.16           | 54                          | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
| Remark                 | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |                      |                     |                  |                             |                           |                               |                        |                            |                      |                         |                         |                 |



## Emission below 1GHz

## 2.4GHz BT (LF)

| BT                 | Note                                                                       | Frequency | Level      | Margin | Limit      | Read   | Antenna  | Path   | Preamp | Ant    | Table   | Peak  | Pol.  |
|--------------------|----------------------------------------------------------------------------|-----------|------------|--------|------------|--------|----------|--------|--------|--------|---------|-------|-------|
|                    |                                                                            |           |            |        | Line       | Level  | Factor   | Loss   | Factor | Pos    | Pos     | Avg.  |       |
|                    |                                                                            | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | (dBμV) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| 2.4GHz<br>BT<br>LF |                                                                            | 49.4      | 21.23      | -18.77 | 40         | 34.96  | 19.63    | 1.63   | 34.99  | -      | -       | P     | H     |
|                    |                                                                            | 94.02     | 23.39      | -20.11 | 43.5       | 41.97  | 14.18    | 2.04   | 34.8   | -      | -       | P     | H     |
|                    |                                                                            | 292.87    | 31.42      | -14.58 | 46         | 43.94  | 18.91    | 3.18   | 34.61  | -      | -       | P     | H     |
|                    |                                                                            | 373.38    | 24.19      | -21.81 | 46         | 34.58  | 20.78    | 3.38   | 34.55  | -      | -       | P     | H     |
|                    |                                                                            | 632.37    | 25.79      | -20.21 | 46         | 30.5   | 26.19    | 3.64   | 34.54  | -      | -       | P     | H     |
|                    |                                                                            | 819.58    | 28.55      | -17.45 | 46         | 30.24  | 28.22    | 4.39   | 34.3   | -      | -       | P     | H     |
|                    |                                                                            | 48.43     | 33.53      | -6.47  | 40         | 47.26  | 19.62    | 1.63   | 34.98  | -      | -       | P     | V     |
|                    |                                                                            | 87.23     | 34.23      | -5.77  | 40         | 52.94  | 14.09    | 1.97   | 34.77  | -      | -       | P     | V     |
|                    |                                                                            | 174.53    | 20.57      | -22.93 | 43.5       | 35.29  | 17.51    | 2.47   | 34.7   | -      | -       | P     | V     |
|                    |                                                                            | 298.69    | 27.66      | -18.34 | 46         | 39.96  | 19.09    | 3.21   | 34.6   | -      | -       | P     | V     |
|                    |                                                                            | 484.93    | 24.09      | -21.91 | 46         | 32.01  | 23.17    | 3.41   | 34.5   | -      | -       | P     | V     |
|                    |                                                                            | 702.21    | 27.95      | -18.05 | 46         | 31.49  | 27.12    | 3.74   | 34.4   | -      | -       | P     | V     |
| Remark             | 1. No other spurious found.<br>2. All results are PASS against limit line. |           |            |        |            |        |          |        |        |        |         |       |       |



**Note symbol**

|     |                                                                                                                                                          |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| *   | <b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency. |
| !   | Test result is <b>Margin</b> line.                                                                                                                       |
| P/A | <b>P</b> eak or <b>A</b> verage                                                                                                                          |
| H/V | <b>H</b> orizontal or <b>V</b> ertical                                                                                                                   |



A calculation example for radiated spurious emission is shown as below:

| BT                     | Note | Frequency | Level      | Margin | Limit      | Read     | Antenna  | Path   | Preamp | Ant    | Table   | Peak    | Pol.    |
|------------------------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
|                        |      |           |            |        | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |
|                        |      | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |
| BT<br>CH 00<br>2402MHz |      | 2390      | 55.45      | -18.55 | 74         | 54.51    | 32.22    | 4.58   | 35.86  | 103    | 308     | P       | H       |
|                        |      | 2390      | 43.54      | -10.46 | 54         | 42.6     | 32.22    | 4.58   | 35.86  | 103    | 308     | A       | H       |

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)

2. Level(dBμV/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

3. Margin (dB) = Level(dBμV/m) – Limit Line(dBμV/m)

#### For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Margin (dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

#### For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Margin (dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

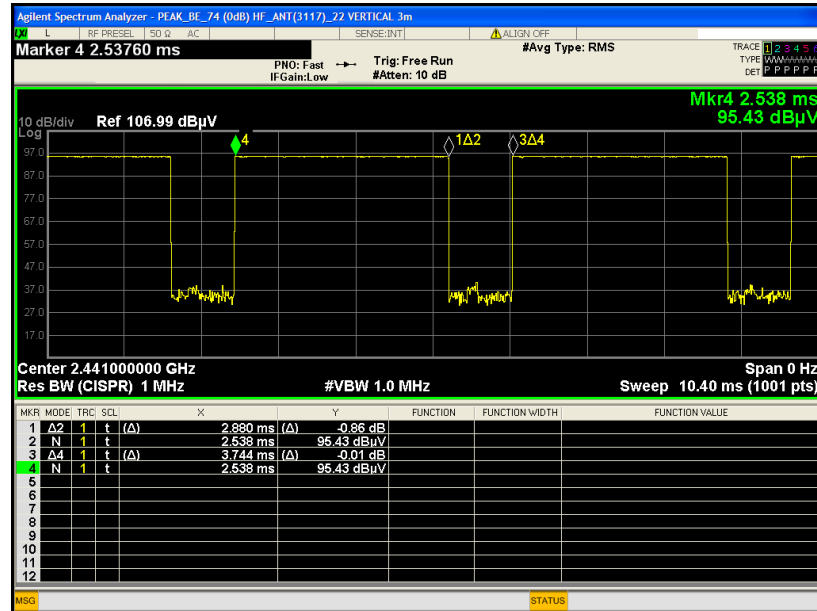
= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

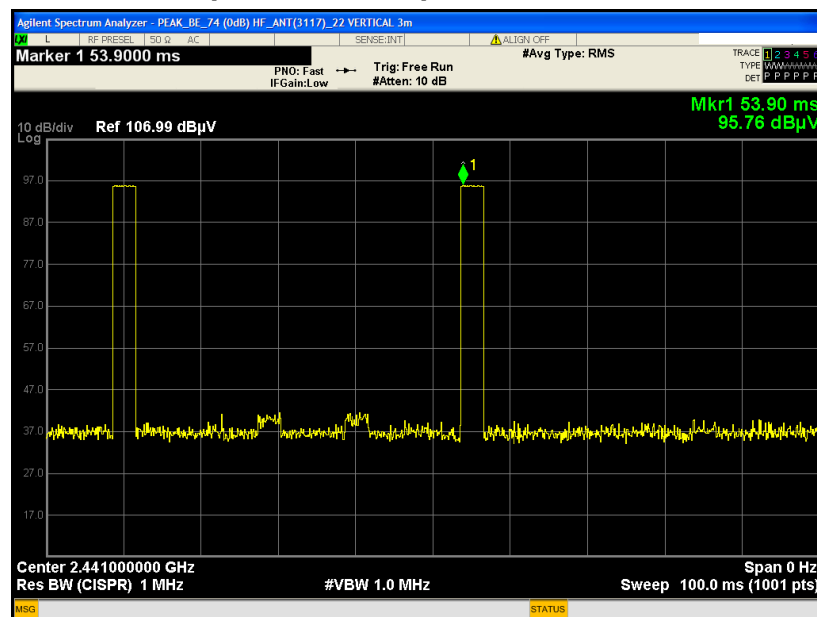
Both peak and average measured complies with the limit line, so test result is “PASS”.

## Appendix D. Duty Cycle Plots

### DH5 on time (One Pulse) Plot on Channel 78



### DH5 on time (Count Pulses) Plot on Channel 78



#### Note:

1. Worst case Duty cycle = on time/100 milliseconds =  $2 * 2.88 / 100 = 5.76 \%$
2. Worst case Duty cycle correction factor =  $20 * \log(\text{Duty cycle}) = -24.79 \text{ dB}$
3. DH5 has the highest duty cycle worst case and is reported.