

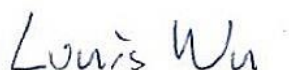


# FCC CO-LOCATION RADIO TEST REPORT

FCC ID : 2AFZZ122G  
Equipment : Mobile Phone  
Brand Name : Xiaomi  
Model Name : 2201122G  
Applicant : Xiaomi Communications Co., Ltd.  
#019, 9th Floor, Building 6, 33 Xi'erqi Middle  
Road, Haidian District, Beijing, China, 100085  
Manufacturer : Xiaomi Communications Co., Ltd.  
#019, 9th Floor, Building 6, 33 Xi'erqi Middle  
Road, Haidian District, Beijing, China, 100085  
Standard : FCC Part 15 Subpart E §15.407

The product was received on Nov. 15, 2021 and testing was performed from Dec. 04, 2021 and completed on Dec. 17, 2021. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.



Approved by: Louis Wu

**Sporton International Inc. Wensan Laboratory**

No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)



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## History of this test report

| Report No. | Version | Description             | Issued Date   |
|------------|---------|-------------------------|---------------|
| FR1N1013E  | 01      | Initial issue of report | Dec. 21, 2021 |
|            |         |                         |               |
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## Summary of Test Result

| Report Clause | Ref Std. Clause     | Test Items          | Result (PASS/FAIL) | Remark                              |
|---------------|---------------------|---------------------|--------------------|-------------------------------------|
| 3.1           | 15.407(b)           | Unwanted Emissions  | Pass               | Under limit 3.25 dB at 2500.000 MHz |
| 3.2           | 15.203<br>15.407(a) | Antenna Requirement | Pass               | -                                   |

**Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

**Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

**Reviewed by: Keven Cheng**

**Report Producer: Celery Wei**

# 1 General Description

## 1.1 Product Feature of Equipment Under Test

GSM/WCDMA/LTE/5G NR, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n/ax, Wi-Fi 5GHz 802.11a/n/ac/ax, Wi-Fi 6GHz 802.11ax, NFC, GNSS and WPC/WPT.

| Product Feature |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sample 1        | EMMC 12G + 256GB                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Sample 2        | EMMC 8G + 256GB                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Antenna Type    | <b>WWAN:</b> PIFA Antenna<br><b>WLAN 2.4GHz:</b><br><Ant. 17>: PIFA Antenna<br><Ant. 18>: PIFA Antenna<br><b>WLAN 5GHz:</b><br><Ant. 16>: PIFA Antenna<br><Ant. 18>: PIFA Antenna<br><b>WLAN 6GHz:</b><br><Ant. 16>: PIFA Antenna<br><Ant. 18>: PIFA Antenna<br><b>Bluetooth:</b><br><Ant. 17>: PIFA Antenna<br><Ant. 18>: PIFA Antenna<br><b>GPS/Glonass/BDS/Galileo/SBAS/QZSS :</b> PIFA Antenna<br><b>NFC:</b> Planar Antenna<br><b>WPC/WPT:</b> Coil Antenna |

| Antenna information               |                 |                                    |
|-----------------------------------|-----------------|------------------------------------|
| 2400 MHz ~ 2483.5 MHz (Bluetooth) | Peak Gain (dBi) | <Ant. 17>: -4.4<br><Ant. 18>: -2.0 |
| 2400 MHz ~ 2483.5 MHz (WLAN)      | Peak Gain (dBi) | <Ant. 17>: -4.4<br><Ant. 18>: -2.0 |
| 5250 MHz ~ 5350 MHz               | Peak Gain (dBi) | <Ant. 16>: -1.5<br><Ant. 18>: -4.5 |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

## 1.2 Modification of EUT

No modifications are made to the EUT during all test items.

### 1.3 Testing Location

|                    |                                                                                                                                                  |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Site          | Sporton International Inc. Wensan Laboratory                                                                                                     |
| Test Site Location | No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist.,<br>Taoyuan City 333010, Taiwan (R.O.C.)<br>TEL: +886-3-327-0868<br>FAX: +886-3-327-0855 |
| Test Site No.      | <b>Sporton Site No.</b><br>03CH20-HY                                                                                                             |

**Note:** The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW3786

### 1.4 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ ANSI C63.10-2013

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.

## 2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and find X plane as worst plane.

### 2.1 Carrier Frequency and Channel

| 2400-2483.5 MHz<br>Bluetooth |             | 2400-2483.5 MHz<br>802.11ax HE20 |             | 5250~5350 MHz<br>802.11ac VHT40 |             |
|------------------------------|-------------|----------------------------------|-------------|---------------------------------|-------------|
| Channel                      | Freq. (MHz) | Channel                          | Freq. (MHz) | Channel                         | Freq. (MHz) |
| 78                           | 2480        | 11                               | 2462        | 62                              | 5310        |

### 2.2 Test Mode

The final test modes consider the modulation and the worst data rates as shown in the table below.

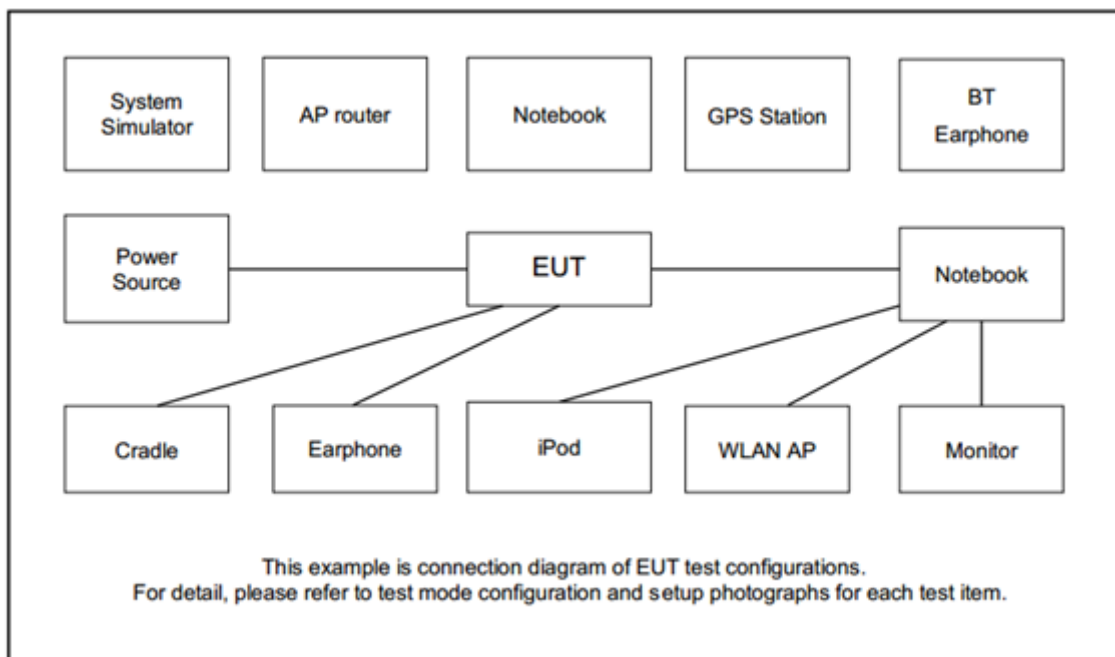
#### <Co-Location>

| Modulation                                                                                                              | Data Rate           |
|-------------------------------------------------------------------------------------------------------------------------|---------------------|
| 2.4GHz 802.11ax HE20 (Partial RU26/8) for MIMO <Ant. 17 + 18><br>5GHz 802.11ac VHT40 for <MIMO Ant. 16+18> + LTE Band 7 | MCS0 + MCS0 + QPSK  |
| Bluetooth for Ant. 17 +<br>5GHz 802.11ac VHT40 for <MIMO Ant. 16+18> + LTE Band 7                                       | 1Mbps + MCS0 + QPSK |
| Bluetooth for Ant. 18 +<br>5GHz 802.11ac VHT40 for <MIMO Ant. 16+18> + LTE Band 7                                       | 1Mbps + MCS0 + QPSK |

#### Remark:

1. For Radiated Test Cases, the tests were performed with USB Cable 1 and Sample 1.
2. During the Radiated Spurious Emission test, the EUT turn on the WWAN functions simultaneously, the WWAN mode selected the frequency band with the closest transmission frequency and used the WLAN worst case output power.

## 2.3 Connection Diagram of Test System



## 2.4 Support Unit used in test configuration and system

| Item | Equipment              | Brand Name | Model Name   | FCC ID  | Data Cable | Power Cord                                                 |
|------|------------------------|------------|--------------|---------|------------|------------------------------------------------------------|
| 1.   | Notebook               | DELL       | Latitude5310 | FCC DoC | N/A        | AC I/P:<br>Unshielded, 1.2 m<br>DC O/P:<br>Shielded, 1.8 m |
| 2.   | Bluetooth Base Station | R&S        | CBT32        | N/A     | N/A        | Unshielded, 1.8 m                                          |
| 3.   | System Simulator       | R&S        | MT8821C      | N/A     | N/A        | Unshielded, 1.8 m                                          |

## 2.5 EUT Operation Test Setup

For Bluetooth test items, utility "QRCT Version 4.0.00158.0" was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to contact with base station to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

For WLAN test items, EUT (SW: SKQ1.211006.001) get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

For WLAN Partial RU test items, utility "QSPR Version 5.0-00188" was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

### 3 Test Result

#### 3.1 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

##### <Limit of Unwanted Emissions>

- (1) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table:

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

**Note:** The following formula is used to convert the EIRP to field strength.

$$E = \frac{1000000\sqrt{30P}}{3} \text{ } \mu\text{V/m, where P is the eirp (Watts)}$$

| EIRP (dBm) | Field Strength at 3m (dBμV/m) |
|------------|-------------------------------|
| - 27       | 68.3                          |

- (2) KDB789033 D02 v02r01 G)2)c)

(i) Sections 15.407(b)(1-3) specifies the unwanted emissions limit for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.

(ii) Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are based on the use of a peak detector.

##### 3.1.1 Measuring Instruments

See list of measuring equipment of this test report.



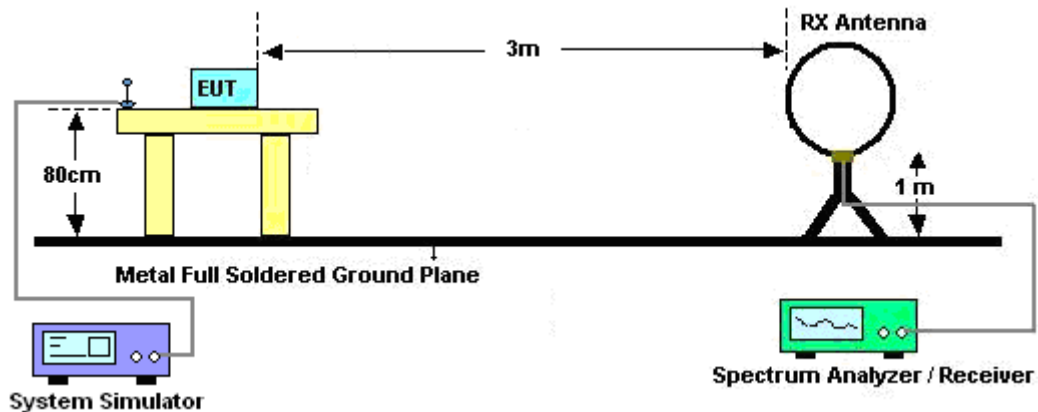
### 3.1.2 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.  
Section G) Unwanted emissions measurement.
  - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
    - RBW = 120 kHz
    - VBW = 300 kHz
    - Detector = Peak
    - Trace mode = max hold
  - (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
    - RBW = 1 MHz
    - VBW  $\geq$  3 MHz
    - Detector = Peak
    - Sweep time = auto
    - Trace mode = max hold
  - (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
    - RBW = 1 MHz
    - VBW = 10 Hz, when duty cycle is no less than 98 percent.
    - VBW  $\geq$  1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
3. The EUT is set 3 meters away from the receiving antenna which is mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT is arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.

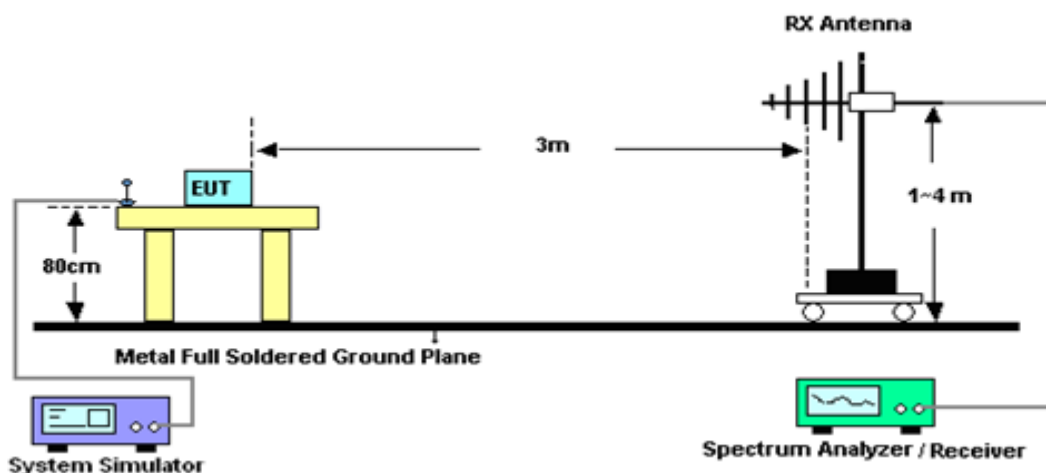
7. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-”.
8. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-”.

### 3.1.3 Test Setup

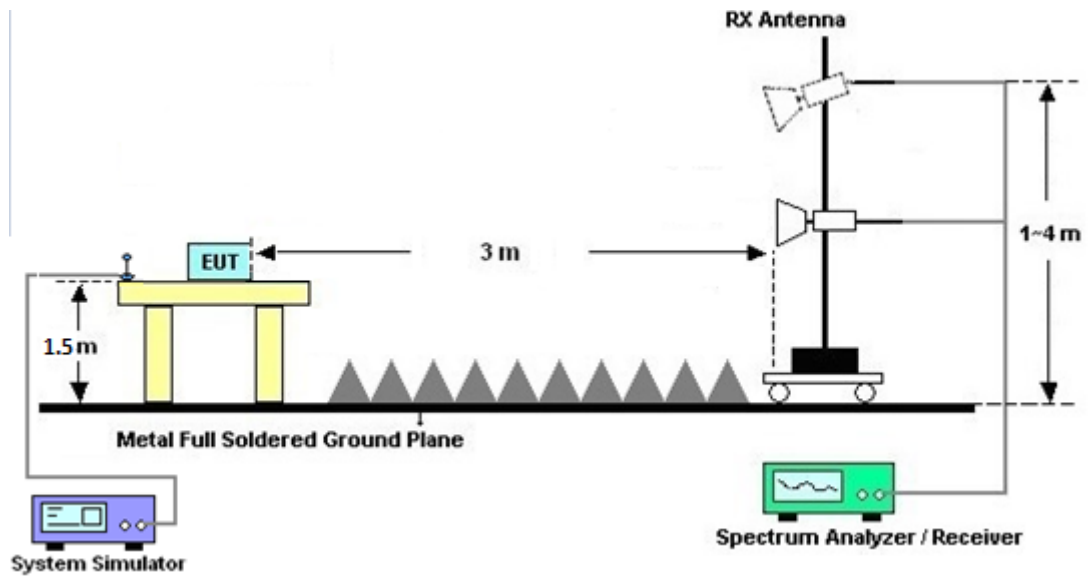
For radiated emissions below 30MHz



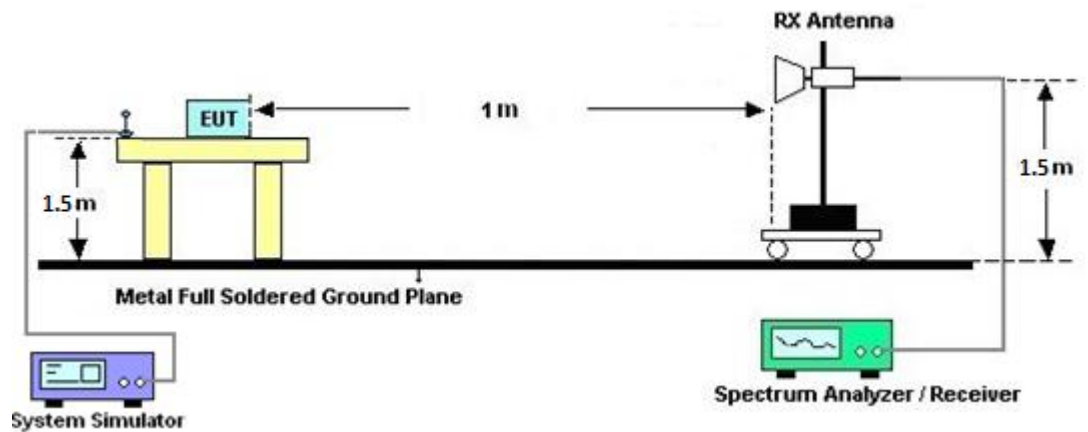
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



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

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

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

**3.1.5 Test Result of Radiated Spurious at Band Edges**

Please refer to Appendix A and B.

**3.1.6 Duty Cycle**

Please refer to Appendix C.

**3.1.7 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)**

Please refer to Appendix A and B.



## **3.2 Antenna Requirements**

### **3.2.1 Standard Applicable**

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **3.2.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.

### **3.2.3 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              | Brand Name      | Model No.                           | Serial No.                         | Characteristics                  | Calibration Date | Test Date                       | Due Date      | Remark                   |
|-------------------------|-----------------|-------------------------------------|------------------------------------|----------------------------------|------------------|---------------------------------|---------------|--------------------------|
| EMI Test Receiver       | Keysight        | N9010B                              | MY60241055                         | 10Hz~44GHz                       | Jul. 12, 2021    | Dec. 04, 2021~<br>Dec. 17, 2021 | Jul. 11, 2022 | Radiation<br>(03CH20-HY) |
| Preamplifier            | COM-POWER       | PAM-103                             | 18020201                           | 1MHz-1000MHz                     | Jan. 04, 2021    | Dec. 04, 2021~<br>Dec. 17, 2021 | Jan. 03, 2022 | Radiation<br>(03CH20-HY) |
| Amplifier               | EMCI            | EMC118A45SE                         | 980792                             | N/A                              | Nov. 15, 2021    | Dec. 04, 2021~<br>Dec. 17, 2021 | Nov. 14, 2022 | Radiation<br>(03CH20-HY) |
| Preamplifier            | EMEC            | EM18G40G                            | 060801                             | 18GHz~40GHz                      | Jun. 22, 2021    | Dec. 04, 2021~<br>Dec. 17, 2021 | Jun. 21, 2022 | Radiation<br>(03CH20-HY) |
| Loop Antenna            | Rohde & Schwarz | HFH2-Z2                             | 100315                             | 9 kHz~30 MHz                     | Jan. 04, 2021    | Dec. 04, 2021~<br>Dec. 17, 2021 | Jan. 03, 2022 | Radiation<br>(03CH20-HY) |
| Bilog Antenna           | TESEQ           | CBL<br>6111D&00802<br>N1D01N-06     | 55606 &<br>08                      | 30MHz~1GHz                       | Oct. 17, 2021    | Dec. 04, 2021~<br>Dec. 17, 2021 | Oct. 16, 2022 | Radiation<br>(03CH20-HY) |
| Horn Antenna            | SCHWARZBECK     | BBHA 9120 D                         | 9120D-022<br>94                    | 1GHz~18GHz                       | Jun. 23, 2021    | Dec. 04, 2021~<br>Dec. 17, 2021 | Jun. 22, 2022 | Radiation<br>(03CH20-HY) |
| SHF-EHF Horn Antenna    | SCHWARZBECK     | BBHA9170                            | 00991                              | 18GHz-40GHz                      | May 12, 2021     | Dec. 04, 2021~<br>Dec. 17, 2021 | May 11, 2022  | Radiation<br>(03CH20-HY) |
| Hygrometer              | TECPEL          | DTM-303B                            | TP200728                           | N/A                              | Mar. 09, 2021    | Dec. 04, 2021~<br>Dec. 17, 2021 | Mar. 08, 2022 | Radiation<br>(03CH20-HY) |
| RF Cable                | HUBER + SUHNER  | SUCOFLEX<br>102                     | 519229/2,8<br>04015/2,80<br>4027/2 | N/A                              | Jan. 20, 2021    | Dec. 04, 2021~<br>Dec. 17, 2021 | Jan. 19, 2022 | Radiation<br>(03CH20-HY) |
| 1.53GHz Low Pass Filter | Wainwright      | WLK4-1000-1<br>530-8000-40S<br>S    | SN27                               | N/A                              | May 25, 2021     | Dec. 04, 2021~<br>Dec. 17, 2021 | May 24, 2022  | Radiation<br>(03CH20-HY) |
| Filter                  | Wainwright      | WHKX12-270<br>0-3000-18000<br>-60ST | SN8                                | N/A                              | Mar. 26, 2021    | Dec. 04, 2021~<br>Dec. 17, 2021 | Mar. 25, 2022 | Radiation<br>(03CH20-HY) |
| Filter                  | Wainwright      | WHKX8-6090<br>-7000-18000-<br>40SS  | SN99                               | N/A                              | Nov. 04, 2021    | Dec. 04, 2021~<br>Dec. 17, 2021 | Nov. 03, 2022 | Radiation<br>(03CH20-HY) |
| Software                | Audix           | E3<br>6.2009-8-24                   | RK-00215<br>6                      | N/A                              | N/A              | Dec. 04, 2021~<br>Dec. 17, 2021 | N/A           | Radiation<br>(03CH20-HY) |
| Antenna Mast            | EMEC            | AM-BS-4500-<br>B                    | N/A                                | 1m~4m                            | N/A              | Dec. 04, 2021~<br>Dec. 17, 2021 | N/A           | Radiation<br>(03CH20-HY) |
| Turn Table              | EMEC            | TT2000                              | N/A                                | 0~360 Degree                     | N/A              | Dec. 04, 2021~<br>Dec. 17, 2021 | N/A           | Radiation<br>(03CH20-HY) |
| Controller              | EMEC            | EM1000                              | N/A                                | Control Turn<br>table & Ant Mast | N/A              | Dec. 04, 2021~<br>Dec. 17, 2021 | N/A           | Radiation<br>(03CH20-HY) |



## 5 Uncertainty of Evaluation

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

|                                                                             |        |
|-----------------------------------------------------------------------------|--------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2U_c(y)$ ) | 5.9 dB |
|-----------------------------------------------------------------------------|--------|

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

|                                                                             |        |
|-----------------------------------------------------------------------------|--------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2U_c(y)$ ) | 5.2 dB |
|-----------------------------------------------------------------------------|--------|

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

|                                                                             |        |
|-----------------------------------------------------------------------------|--------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2U_c(y)$ ) | 5.7 dB |
|-----------------------------------------------------------------------------|--------|



## Appendix A. Radiated Spurious Emission

|                 |                                  |                     |         |
|-----------------|----------------------------------|---------------------|---------|
| Test Engineer : | Bill Chang, JC Liang and Nick Yu | Temperature :       | 18~20°C |
|                 |                                  | Relative Humidity : | 65~68%  |

MIMO <Ant. 17+18> WLAN 2.4GHz 802.11ax HE20 (Partial RU26/8) CH11 + MIMO <Ant. 16+18>  
WLAN 5GHz 802.11ac VHT40 CH62 + LTE Band 7

2.4GHz 2400~2483.5MHz

MIMO <Ant. 17+18> WLAN 2.4G 802.11ax HE20 (Partial RU26/8) CH11 (Band Edge @ 3m)

| WIFI<br>ANT<br>17+18                                 | Note | Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<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 ) | CHain<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Peak<br>Avg.<br>( P/A ) | Pol.<br>( H/V ) |
|------------------------------------------------------|------|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|------------------------|----------------------------|------------------------|-------------------------|-------------------------|-----------------|
| 802.11ax<br>HE20<br>Partial 26/8<br>CH 11<br>2462MHz | *    | 2462                 | 118.9               | -                       | -                           | 109.1                     | 27.55                         | 8.52                   | 36.3                       | 100                    | 58                      | P                       | H               |
|                                                      | *    | 2462                 | 110.55              | -                       | -                           | 100.75                    | 27.55                         | 8.52                   | 36.3                       | 100                    | 58                      | A                       | H               |
|                                                      |      | 2483.6               | 67.5                | -6.5                    | 74                          | 57.59                     | 27.63                         | 8.56                   | 36.31                      | 100                    | 58                      | P                       | H               |
|                                                      |      | 2500                 | 50.75               | -3.25                   | 54                          | 40.75                     | 27.7                          | 8.59                   | 36.32                      | 100                    | 58                      | A                       | H               |
|                                                      |      |                      |                     |                         |                             |                           |                               |                        |                            |                        |                         | P                       | H               |
|                                                      |      |                      |                     |                         |                             |                           |                               |                        |                            |                        |                         | A                       | H               |
|                                                      | *    | 2462                 | 114.36              | -                       | -                           | 104.56                    | 27.55                         | 8.52                   | 36.3                       | 384                    | 292                     | P                       | V               |
|                                                      | *    | 2462                 | 106.85              | -                       | -                           | 97.05                     | 27.55                         | 8.52                   | 36.3                       | 384                    | 292                     | A                       | V               |
|                                                      |      | 2483.76              | 65.33               | -8.67                   | 74                          | 55.41                     | 27.64                         | 8.56                   | 36.31                      | 384                    | 292                     | P                       | V               |
|                                                      |      | 2500                 | 44.39               | -9.61                   | 54                          | 34.39                     | 27.7                          | 8.59                   | 36.32                      | 384                    | 292                     | A                       | V               |
|                                                      |      |                      |                     |                         |                             |                           |                               |                        |                            |                        |                         | P                       | V               |
|                                                      |      |                      |                     |                         |                             |                           |                               |                        |                            |                        |                         | A                       | V               |

**Band 2 - 5250~5350MHz****MIMO <Ant. 16+18> WIFI 802.11ac VHT40 (Band Edge @ 3m)**

| WIFI                                                              | Note | Frequency | Level      | Over   | Limit      | Read   | Antenna  | Path   | Preamp | CHain  | Table   | Peak  | Pol.  |
|-------------------------------------------------------------------|------|-----------|------------|--------|------------|--------|----------|--------|--------|--------|---------|-------|-------|
| ANT                                                               |      |           |            | Limit  | Line       | Level  | Factor   | Loss   | Factor | Pos    | Pos     | Avg.  |       |
| 16+18                                                             |      | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | (dBμV) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| <b>802.11ac</b><br><b>VHT40</b><br><b>CH 62</b><br><b>5310MHz</b> |      | 5077.52   | 50.71      | -23.29 | 74         | 42.9   | 33.06    | 12.47  | 37.72  | 100    | 301     | P     | H     |
|                                                                   |      | 5010.2    | 42.08      | -11.92 | 54         | 34.3   | 33.08    | 12.39  | 37.69  | 100    | 301     | A     | H     |
|                                                                   | *    | 5310      | 109.13     | -      | -          | 101.26 | 32.94    | 12.73  | 37.8   | 100    | 301     | P     | H     |
|                                                                   | *    | 5310      | 101.04     | -      | -          | 93.17  | 32.94    | 12.73  | 37.8   | 100    | 301     | A     | H     |
|                                                                   |      | 5350.08   | 56.19      | -17.81 | 74         | 48.54  | 32.7     | 12.77  | 37.82  | 100    | 301     | P     | H     |
|                                                                   |      | 5351.04   | 49.18      | -4.82  | 54         | 41.53  | 32.7     | 12.77  | 37.82  | 100    | 301     | A     | H     |
|                                                                   |      | 5004.08   | 49.49      | -24.51 | 74         | 41.71  | 33.09    | 12.38  | 37.69  | 319    | 259     | P     | V     |
|                                                                   |      | 5012.92   | 39.92      | -14.08 | 54         | 32.14  | 33.07    | 12.4   | 37.69  | 319    | 259     | A     | V     |
|                                                                   | *    | 5310      | 106.68     | -      | -          | 98.81  | 32.94    | 12.73  | 37.8   | 319    | 259     | P     | V     |
|                                                                   | *    | 5310      | 97.99      | -      | -          | 90.12  | 32.94    | 12.73  | 37.8   | 319    | 259     | A     | V     |
|                                                                   |      | 5351.04   | 56.44      | -17.56 | 74         | 48.79  | 32.7     | 12.77  | 37.82  | 319    | 259     | P     | V     |
|                                                                   |      | 5351.04   | 48.73      | -5.27  | 54         | 41.08  | 32.7     | 12.77  | 37.82  | 319    | 259     | A     | V     |



**MIMO <Ant. 17+18> WLAN 2.4GHz 802.11ax HE20 (Partial RU26/8) CH11 + MIMO <Ant. 16+18>  
WLAN 5GHz 802.11ac VHT40 CH62 + LTE Band 7  
(Harmonic @ 3m)**

| WIFI ANT                                                                                                                                                       | Note | Frequency | Level      | Over Limit | Limit Line | Read Level | Antenna Factor | Path Loss | Preamp Factor | CHain Pos | Table Pos | Peak Avg. | Pol.  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|------------|------------|------------|------------|----------------|-----------|---------------|-----------|-----------|-----------|-------|
| 17+18/<br>16+18                                                                                                                                                |      | ( MHz )   | ( dBμV/m ) | ( dB )     | ( dBμV/m ) | ( dBμV )   | ( dB/m )       | ( dB )    | ( dB )        | ( cm )    | ( deg )   | (P/A)     | (H/V) |
| <b>802. 11ax<br/>(Partial<br/>RU26/8)<br/>CH11<br/>2462MHz<br/>+<br/>802.11ac<br/>VHT40<br/>CH 62<br/>5310MHz<br/>+<br/>LTE Band 7<br/>CH21100<br/>2535MHz</b> |      | 4874      | 45.91      | -28.09     | 74         | 38.68      | 32.54          | 12.29     | 37.6          | -         | -         | P         | H     |
|                                                                                                                                                                |      | 7311      | 47.32      | -26.68     | 74         | 33.07      | 36.78          | 16        | 38.53         | -         | -         | P         | H     |
|                                                                                                                                                                |      | 10620     | 49.07      | -24.93     | 74         | 33.31      | 38.82          | 18.66     | 41.72         | 100       | 285       | P         | H     |
|                                                                                                                                                                |      | 10620     | 40.34      | -13.66     | 54         | 24.58      | 38.82          | 18.66     | 41.72         | 100       | 285       | A         | H     |
|                                                                                                                                                                |      | 15930     | 50.22      | -23.78     | 74         | 33.73      | 37.46          | 23.44     | 44.41         | 114       | 317       | P         | H     |
|                                                                                                                                                                |      | 15930     | 41.62      | -12.38     | 54         | 25.13      | 37.46          | 23.44     | 44.41         | 114       | 317       | A         | H     |
|                                                                                                                                                                |      |           |            |            |            |            |                |           |               |           |           |           | H     |
|                                                                                                                                                                |      |           |            |            |            |            |                |           |               |           |           |           | H     |
|                                                                                                                                                                |      | 4874      | 44.87      | -29.13     | 74         | 37.64      | 32.54          | 12.29     | 37.6          | -         | -         | P         | V     |
|                                                                                                                                                                |      | 7311      | 47.58      | -26.42     | 74         | 33.33      | 36.78          | 16        | 38.53         | -         | -         | P         | V     |
|                                                                                                                                                                |      | 10620     | 48.44      | -25.56     | 74         | 32.68      | 38.82          | 18.66     | 41.72         | 325       | 34        | P         | V     |
|                                                                                                                                                                |      | 10620     | 40.31      | -13.69     | 54         | 24.55      | 38.82          | 18.66     | 41.72         | 325       | 34        | A         | V     |
|                                                                                                                                                                |      | 15930     | 50.19      | -23.81     | 74         | 33.7       | 37.46          | 23.44     | 44.41         | 368       | 28        | P         | V     |
|                                                                                                                                                                |      | 15930     | 41.71      | -12.29     | 54         | 25.22      | 37.46          | 23.44     | 44.41         | 368       | 28        | A         | V     |
|                                                                                                                                                                |      |           |            |            |            |            |                |           |               |           |           |           | V     |
|                                                                                                                                                                |      |           |            |            |            |            |                |           |               |           |           |           | V     |

**Ant. 17\_BT\_Tx\_CH78 + MIMO <Ant. 16+18> WLAN 5GHz 802.11ac VHT40 CH62 + LTE Band 7****2.4GHz 2400~2483.5MHz****Ant. 17\_BT\_CH78 (Band Edge @ 3m)**

| BT ANT                 | Note | Frequency | Level      | Over Limit | Limit Line | Read Level | Antenna Factor | Path Loss | Preamp Factor | CHain Pos | Table Pos | Peak Avg. | Pol.    |
|------------------------|------|-----------|------------|------------|------------|------------|----------------|-----------|---------------|-----------|-----------|-----------|---------|
| 17                     |      | ( MHz )   | ( dBμV/m ) | ( dB )     | ( dBμV/m ) | ( dBμV )   | ( dB/m )       | ( dB )    | ( dB )        | ( cm )    | ( deg )   | ( P/A )   | ( H/V ) |
| BT<br>CH 78<br>2480MHz | *    | 2480      | 104.81     | -          | -          | 104.95     | 27.62          | 8.55      | 36.31         | 351       | 245       | P         | H       |
|                        | *    | 2480      | 80.02      | -          | -          | -          | -              | -         | -             | -         | -         | A         | H       |
|                        |      | 2499.64   | 66.5       | -7.5       | 74         | 66.54      | 27.7           | 8.58      | 36.32         | 351       | 245       | P         | H       |
|                        |      | 2499.64   | 41.71      | -12.29     | 54         | -          | -              | -         | -             | -         | -         | A         | H       |
|                        |      |           |            |            |            |            |                |           |               |           |           |           | H       |
|                        |      |           |            |            |            |            |                |           |               |           |           |           | H       |
|                        | *    | 2480      | 103.02     | -          | -          | 103.16     | 27.62          | 8.55      | 36.31         | 374       | 279       | P         | V       |
|                        | *    | 2480      | 78.23      | -          | -          | -          | -              | -         | -             | -         | -         | A         | V       |
|                        |      | 2496.56   | 53.2       | -20.8      | 74         | 53.25      | 27.69          | 8.58      | 36.32         | 374       | 279       | P         | V       |
|                        |      | 2496.56   | 28.41      | -25.59     | 54         | -          | -              | -         | -             | -         | -         | A         | V       |
|                        |      |           |            |            |            |            |                |           |               |           |           |           | V       |
|                        |      |           |            |            |            |            |                |           |               |           |           |           | V       |



## Band 2 - 5250~5350MHz

## MIMO &lt;Ant. 16+18&gt; WIFI 802.11ac VHT40 (Band Edge @ 3m)

| WIFI                                  | Note | Frequency | Level      | Over   | Limit      | Read   | Antenna  | Path   | Preamp | CHain  | Table   | Peak  | Pol.  |
|---------------------------------------|------|-----------|------------|--------|------------|--------|----------|--------|--------|--------|---------|-------|-------|
| ANT                                   |      |           |            | Limit  | Line       | Level  | Factor   | Loss   | Factor | Pos    | Pos     | Avg.  |       |
| 16+18                                 |      | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | (dBμV) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| 802.11ac<br>VHT40<br>CH 62<br>5310MHz |      | 5076.84   | 47.91      | -26.09 | 74         | 40.11  | 33.05    | 12.47  | 37.72  | 100    | 300     | P     | H     |
|                                       |      | 5086.02   | 38.9       | -15.1  | 54         | 31.07  | 33.07    | 12.48  | 37.72  | 100    | 300     | A     | H     |
|                                       | *    | 5310      | 105.16     | -      | -          | 97.29  | 32.94    | 12.73  | 37.8   | 100    | 300     | P     | H     |
|                                       | *    | 5310      | 97.1       | -      | -          | 89.23  | 32.94    | 12.73  | 37.8   | 100    | 300     | A     | H     |
|                                       |      | 5350.56   | 49.74      | -24.26 | 74         | 42.09  | 32.7     | 12.77  | 37.82  | 100    | 300     | P     | H     |
|                                       |      | 5350.32   | 41.69      | -12.31 | 54         | 34.04  | 32.7     | 12.77  | 37.82  | 100    | 300     | A     | H     |
|                                       |      | 5074.46   | 49.88      | -24.12 | 74         | 42.08  | 33.05    | 12.47  | 37.72  | 318    | 252     | P     | V     |
|                                       |      | 5081.26   | 42.21      | -11.79 | 54         | 34.39  | 33.06    | 12.48  | 37.72  | 318    | 252     | A     | V     |
|                                       | *    | 5310      | 106.85     | -      | -          | 98.98  | 32.94    | 12.73  | 37.8   | 318    | 252     | P     | V     |
|                                       | *    | 5310      | 98.25      | -      | -          | 90.38  | 32.94    | 12.73  | 37.8   | 318    | 252     | A     | V     |
|                                       |      | 5355.12   | 49.97      | -24.03 | 74         | 42.29  | 32.72    | 12.78  | 37.82  | 318    | 252     | P     | V     |
|                                       |      | 5350.08   | 43.3       | -10.7  | 54         | 35.65  | 32.7     | 12.77  | 37.82  | 318    | 252     | A     | V     |



Ant. 17\_BT\_Tx\_CH78 + MIMO &lt;Ant. 16+18&gt; WLAN 5GHz 802.11ac VHT40 CH62 + LTE Band 7

(Harmonic @ 3m)

| BT+WIFI                                                                                                         | Note | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Path   | Preamp | CHain  | Table   | Peak  | Pol.  |
|-----------------------------------------------------------------------------------------------------------------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|-------|-------|
| ANT                                                                                                             |      |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.  |       |
| 17/16+18                                                                                                        |      | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| BT_Tx<br>CH78<br>2480MHz<br>+<br>802.11ac<br>VHT40<br>CH 62<br>5310MHz<br>+<br>LTE Band 7<br>CH21100<br>2535MHz |      | 4960      | 47.71      | -26.29 | 74         | 40       | 33.02    | 12.35  | 37.66  |        |         | P     | H     |
|                                                                                                                 |      | 4960      | 22.92      | -31.08 | 54         | -        | -        | -      | -      | -      | -       | A     | H     |
|                                                                                                                 |      | 7440      | 47.19      | -26.81 | 74         | 33.65    | 36.22    | 15.95  | 38.63  |        |         | P     | H     |
|                                                                                                                 |      | 7440      | 22.4       | -31.6  | 54         | -        | -        | -      | -      | -      | -       | A     | H     |
|                                                                                                                 |      | 10620     | 49.09      | -24.91 | 74         | 33.33    | 38.82    | 18.66  | 41.72  | 100    | 326     | P     | H     |
|                                                                                                                 |      | 10620     | 41.07      | -12.93 | 54         | 25.31    | 38.82    | 18.66  | 41.72  | 100    | 326     | A     | H     |
|                                                                                                                 |      | 15930     | 50.21      | -23.79 | 74         | 33.72    | 37.46    | 23.44  | 44.41  | 102    | 325     | P     | H     |
|                                                                                                                 |      | 15930     | 42.16      | -11.84 | 54         | 25.67    | 37.46    | 23.44  | 44.41  | 102    | 325     | A     | H     |
|                                                                                                                 |      | 4960      | 46.98      | -27.02 | 74         | 39.27    | 33.02    | 12.35  | 37.66  |        |         | P     | V     |
|                                                                                                                 |      | 4960      | 22.19      | -31.81 | 54         | -        | -        | -      | -      | -      | -       | A     | V     |
|                                                                                                                 |      | 7440      | 46.56      | -27.44 | 74         | 33.02    | 36.22    | 15.95  | 38.63  |        |         | P     | V     |
|                                                                                                                 |      | 7440      | 21.77      | -32.23 | 54         | -        | -        | -      | -      | -      | -       | A     | V     |
|                                                                                                                 |      | 10620     | 49.8       | -24.2  | 74         | 34.04    | 38.82    | 18.66  | 41.72  | 328    | 257     | P     | V     |
|                                                                                                                 |      | 10620     | 41.1       | -12.9  | 54         | 25.34    | 38.82    | 18.66  | 41.72  | 328    | 257     | A     | V     |
|                                                                                                                 |      | 15930     | 50.55      | -23.45 | 74         | 34.06    | 37.46    | 23.44  | 44.41  | 333    | 311     | P     | V     |
|                                                                                                                 |      | 15930     | 42.07      | -11.93 | 54         | 25.58    | 37.46    | 23.44  | 44.41  | 333    | 311     | A     | V     |

**Ant. 18\_BT\_Tx\_CH78 + MIMO <Ant. 16+18> WLAN 5G 802.11ac VHT40 CH62 + LTE Band 7****2.4GHz 2400~2483.5MHz****Ant. 18\_BT (Band Edge @ 3m)**

| BT<br>ANT<br>18        | Note | Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<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 ) | CHain<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Peak<br>Avg.<br>( P/A ) | Pol.<br>( H/V ) |
|------------------------|------|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|------------------------|----------------------------|------------------------|-------------------------|-------------------------|-----------------|
| BT<br>CH 78<br>2480MHz | *    | 2480                 | 110.1               | -                       | -                           | 110.24                    | 27.62                         | 8.55                   | 36.31                      | 101                    | 285                     | P                       | H               |
|                        | *    | 2480                 | 85.34               | -                       | -                           | -                         | -                             | -                      | -                          | -                      | -                       | A                       | H               |
|                        |      | 2495.28              | 61.98               | -12.02                  | 74                          | 62.04                     | 27.68                         | 8.58                   | 36.32                      | 101                    | 285                     | P                       | H               |
|                        |      | 2495.28              | 37.22               | -16.78                  | 54                          | -                         | -                             | -                      | -                          | -                      | -                       | A                       | H               |
|                        |      |                      |                     |                         |                             |                           |                               |                        |                            |                        |                         |                         | H               |
|                        |      |                      |                     |                         |                             |                           |                               |                        |                            |                        |                         |                         | H               |
|                        | *    | 2480                 | 106.63              | -                       | -                           | 106.77                    | 27.62                         | 8.55                   | 36.31                      | 390                    | 274                     | P                       | V               |
|                        | *    | 2480                 | 81.87               | -                       | -                           | -                         | -                             | -                      | -                          | -                      | -                       | A                       | V               |
|                        |      | 2496.96              | 56.27               | -17.73                  | 74                          | 56.32                     | 27.69                         | 8.58                   | 36.32                      | 390                    | 274                     | P                       | V               |
|                        |      | 2496.96              | 31.51               | -22.49                  | 54                          | -                         | -                             | -                      | -                          | -                      | -                       | A                       | V               |
|                        |      |                      |                     |                         |                             |                           |                               |                        |                            |                        |                         |                         | V               |
|                        |      |                      |                     |                         |                             |                           |                               |                        |                            |                        |                         |                         | V               |

**Band 2 - 5250~5350MHz****<Ant. 16+18> WLAN 5G WIFI 802.11ac VHT40 (Band Edge @ 3m)**

| WIFI                                                              | Note | Frequency | Level      | Over   | Limit      | Read   | Antenna  | Path   | Preamp | CHain  | Table   | Peak  | Pol.  |
|-------------------------------------------------------------------|------|-----------|------------|--------|------------|--------|----------|--------|--------|--------|---------|-------|-------|
| ANT                                                               |      |           |            | Limit  | Line       | Level  | Factor   | Loss   | Factor | Pos    | Pos     | Avg.  |       |
| 16+18                                                             |      | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | (dBμV) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| <b>802.11ac</b><br><b>VHT40</b><br><b>CH 62</b><br><b>5310MHz</b> |      | 5014.28   | 55.37      | -18.63 | 74         | 47.6   | 33.07    | 12.4   | 37.7   | 100    | 298     | P     | H     |
|                                                                   |      | 5020.74   | 44.55      | -9.45  | 54         | 36.79  | 33.06    | 12.4   | 37.7   | 100    | 298     | A     | H     |
|                                                                   | *    | 5310      | 107.99     | 39.79  | 68.2       | 100.12 | 32.94    | 12.73  | 37.8   | 100    | 298     | P     | H     |
|                                                                   | *    | 5310      | 99.09      | 45.09  | 54         | 91.22  | 32.94    | 12.73  | 37.8   | 100    | 298     | A     | H     |
|                                                                   |      | 5350.8    | 55.12      | -18.88 | 74         | 47.47  | 32.7     | 12.77  | 37.82  | 100    | 298     | P     | H     |
|                                                                   |      | 5355.36   | 45.05      | -8.95  | 54         | 37.37  | 32.72    | 12.78  | 37.82  | 100    | 298     | A     | H     |
|                                                                   |      | 5023.46   | 49.79      | -24.21 | 74         | 42.03  | 33.05    | 12.41  | 37.7   | 390    | 242     | P     | V     |
|                                                                   |      | 5084.66   | 39.42      | -14.58 | 54         | 31.59  | 33.07    | 12.48  | 37.72  | 390    | 242     | A     | V     |
|                                                                   | *    | 5310      | 106.55     | 38.35  | 68.2       | 98.68  | 32.94    | 12.73  | 37.8   | 390    | 242     | P     | V     |
|                                                                   | *    | 5310      | 98.45      | 44.45  | 54         | 90.58  | 32.94    | 12.73  | 37.8   | 390    | 242     | A     | V     |
|                                                                   |      | 5351.04   | 53.62      | -20.38 | 74         | 45.97  | 32.7     | 12.77  | 37.82  | 390    | 242     | P     | V     |
|                                                                   |      | 5350.08   | 44.22      | -9.78  | 54         | 36.57  | 32.7     | 12.77  | 37.82  | 390    | 242     | A     | V     |



## Ant. 18\_BT\_CH78 + MIMO &lt;Ant. 17+18&gt; WLAN 5G 802.11ac VHT40 CH62 + LTE Band 7

(Harmonic @ 3m)

| BT+WIFI                                                                                                         | Note | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Path   | Preamp | CHain  | Table   | Peak  | Pol.  |
|-----------------------------------------------------------------------------------------------------------------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|-------|-------|
| ANT                                                                                                             |      |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.  |       |
| 18/16+18                                                                                                        |      | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| BT_Tx<br>CH78<br>2480MHz<br>+<br>802.11ac<br>VHT40<br>CH 62<br>5310MHz<br>+<br>LTE Band 7<br>CH21100<br>2535MHz |      | 4960      | 47.66      | -26.34 | 74         | 39.95    | 33.02    | 12.35  | 37.66  | -      | -       | P     | H     |
|                                                                                                                 |      | 4960      | 22.9       | -31.1  | 54         | -        | -        | -      | -      | -      | -       | A     | H     |
|                                                                                                                 |      | 7440      | 46.9       | -27.1  | 74         | 33.36    | 36.22    | 15.95  | 38.63  | -      | -       | P     | H     |
|                                                                                                                 |      | 7440      | 22.14      | -31.86 | 54         | -        | -        | -      | -      | -      | -       | A     | H     |
|                                                                                                                 |      | 10620     | 48.58      | -25.42 | 74         | 32.82    | 38.82    | 18.66  | 41.72  | 100    | 358     | P     | H     |
|                                                                                                                 |      | 10620     | 40.87      | -13.13 | 54         | 25.11    | 38.82    | 18.66  | 41.72  | 100    | 358     | A     | H     |
|                                                                                                                 |      | 15930     | 49.72      | -24.28 | 74         | 33.23    | 37.46    | 23.44  | 44.41  | 115    | 325     | P     | H     |
|                                                                                                                 |      | 15930     | 41.66      | -12.34 | 54         | 25.17    | 37.46    | 23.44  | 44.41  | 115    | 325     | A     | H     |
|                                                                                                                 |      | 4960      | 46.68      | -27.32 | 74         | 38.97    | 33.02    | 12.35  | 37.66  | -      | -       | P     | V     |
|                                                                                                                 |      | 4960      | 21.92      | -32.08 | 54         | -        | -        | -      | -      | -      | -       | A     | V     |
|                                                                                                                 |      | 7440      | 46.89      | -27.11 | 74         | 33.35    | 36.22    | 15.95  | 38.63  | -      | -       | P     | V     |
|                                                                                                                 |      | 7440      | 22.13      | -31.87 | 54         | -        | -        | -      | -      | -      | -       | A     | V     |
|                                                                                                                 |      | 10620     | 49.12      | -24.88 | 74         | 33.36    | 38.82    | 18.66  | 41.72  | 325    | 28      | P     | V     |
|                                                                                                                 |      | 10620     | 41.07      | -12.93 | 54         | 25.31    | 38.82    | 18.66  | 41.72  | 325    | 28      | A     | V     |
|                                                                                                                 |      | 15930     | 51.27      | -22.73 | 74         | 34.78    | 37.46    | 23.44  | 44.41  | 381    | 138     | P     | V     |
|                                                                                                                 |      | 15930     | 41.77      | -12.23 | 54         | 25.28    | 37.46    | 23.44  | 44.41  | 381    | 138     | A     | V     |

## Emission below 1GHz

**MIMO <Ant. 17+18> WLAN 2.4GHz 802.11ax HE20 (Partial RU26/8) CH11 + MIMO <Ant. 16+18>**

**WLAN 5GHz 802.11ac VHT40 CH62 + LTE Band 7**

**(LF)**

[illegible]

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

| WIFI<br>CHain.   | Note | Frequency | Level      | Over<br>Limit | Limit<br>Line | Read<br>Level | Antenna<br>Factor | Path<br>Loss | Preamp<br>Factor | CHain<br>Pos | Table<br>Pos | Peak<br>Avg. | Pol.    |
|------------------|------|-----------|------------|---------------|---------------|---------------|-------------------|--------------|------------------|--------------|--------------|--------------|---------|
| Simultaneously   |      | ( MHz )   | ( dBμV/m ) | ( dB )        | ( dBμV/m )    | ( dBμV )      | ( dB/m )          | ( dB )       | ( dB )           | ( cm )       | ( deg )      | ( P/A )      | ( H/V ) |
| 802.11b<br>CH 01 |      | 2390      | 55.45      | -18.55        | 74            | 54.51         | 32.22             | 4.58         | 35.86            | 103          | 308          | P            | H       |
| 2412MHz          |      | 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. Over Limit(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. Over Limit(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. Over Limit(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 B. Radiated Spurious Emission Plots

|                        |                                  |                            |         |
|------------------------|----------------------------------|----------------------------|---------|
| <b>Test Engineer :</b> | Bill Chang, JC Liang and Nick Yu | <b>Temperature :</b>       | 18~20°C |
|                        |                                  | <b>Relative Humidity :</b> | 65~68%  |

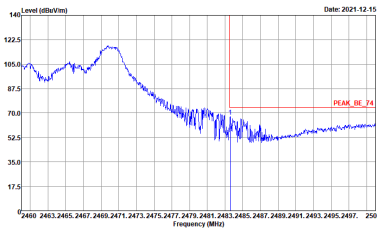
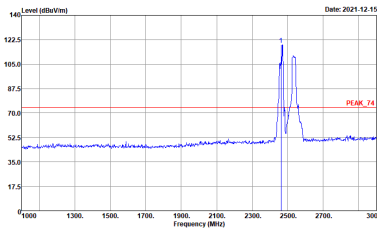
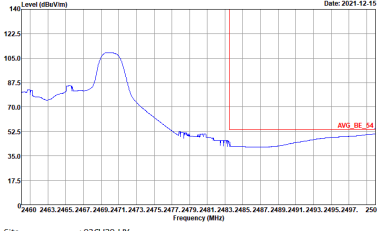
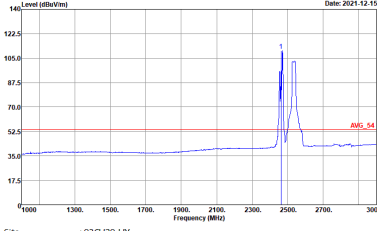
### Note symbol

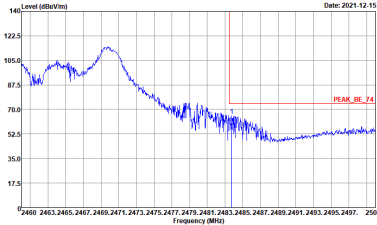
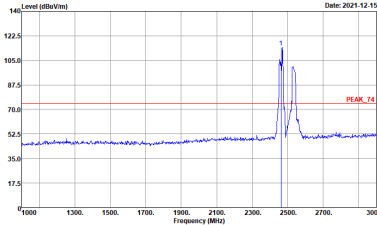
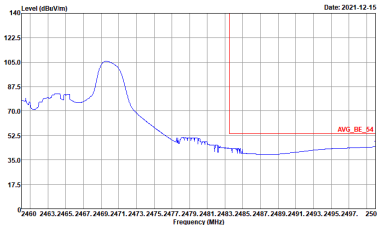
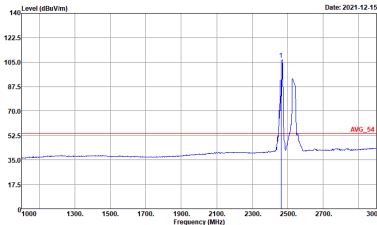
|    |                       |
|----|-----------------------|
| -L | Low channel location  |
| -R | High channel location |

**MIMO <Ant. 17+18> WLAN 2.4GHz 802.11ax HE20 (Partial RU26/8) CH11 + MIMO <Ant. 16+18>  
WLAN 5GHz 802.11ac VHT40 CH62 + LTE Band 7**

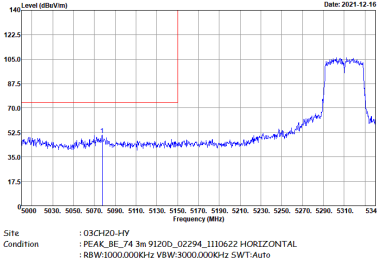
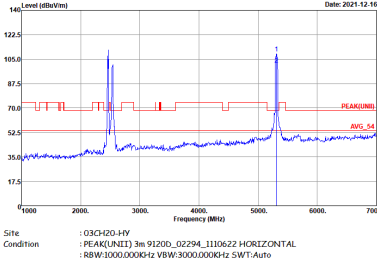
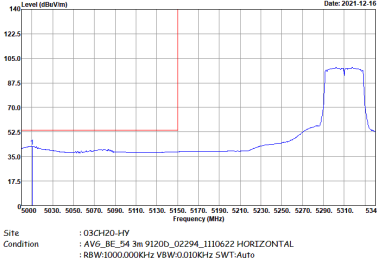
**2.4GHz 2400~2483.5MHz**

**MIMO <Ant. 17+18> WLAN 2.4G 802.11ax HE20 (Partial RU26/8) CH11 (Band Edge @ 3m)**

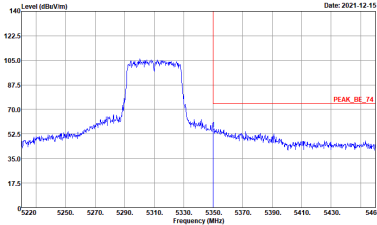
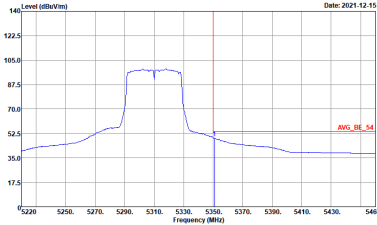
| WIFI        | 2.4GHz 2400~2483.5MHz Band Edge @ 3m                                                                                                                                                                                  |                                                                                                                                                                                                                     |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANT         | 802.11ax HE20 Partial RU26/8 CH11 2462MHz                                                                                                                                                                             |                                                                                                                                                                                                                     |
| 17+18       | Horizontal                                                                                                                                                                                                            | Fundamental                                                                                                                                                                                                         |
| <b>Peak</b> |  <p>Site : 03CH20-HY<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH20-HY<br/>Condition : PEAK_74 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
|             |  <p>Site : 03CH20-HY<br/>Condition : AVG_BE_54 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>   |  <p>Site : 03CH20-HY<br/>Condition : AVG_54 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>   |
| <b>Avg.</b> |                                                                                                                                                                                                                       |                                                                                                                                                                                                                     |

| WIFI  | 2.4GHz 2400~2483.5MHz Band Edge @ 3m                                                                                                                                                                                |                                                                                                                                                                                                                   |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANT   | 802.11ax HE20 Partial RU26 8CH11 2462MHz                                                                                                                                                                            |                                                                                                                                                                                                                   |
| 17+18 | Vertical                                                                                                                                                                                                            | Fundamental                                                                                                                                                                                                       |
| Peak  |  <p>Site : 03CH20-HY<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH20-HY<br/>Condition : PEAK_74 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg.  |  <p>Site : 03CH20-HY<br/>Condition : AVG_BE_54 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>    |  <p>Site : 03CH20-HY<br/>Condition : AVG_54 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>    |

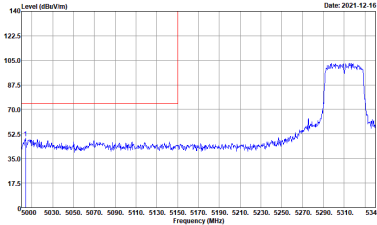
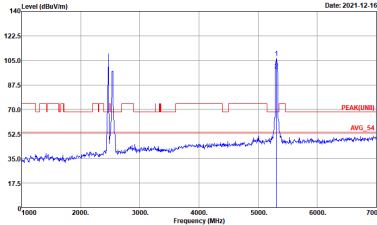
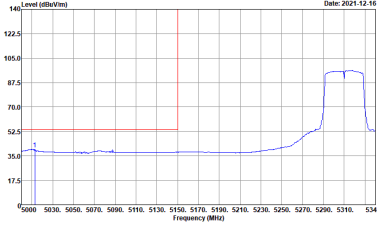
**Band 2 - 5250~5350MHz**
**MIMO <Ant. 16+18> WIFI 802.11ac VHT40 (Band Edge @ 3m)**

| WIFI  | Band 2 5250~5350MHz Band Edge @ 3m                                                  |                                                                                    |
|-------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| ANT   | 802.11ac VHT40 CH62 5310MHz - L                                                     |                                                                                    |
| 16+18 | Horizontal                                                                          | Fundamental                                                                        |
| Peak  |    |  |
| Avg.  |  | Left blank                                                                         |

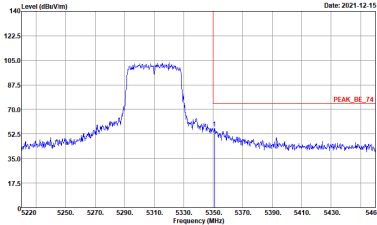
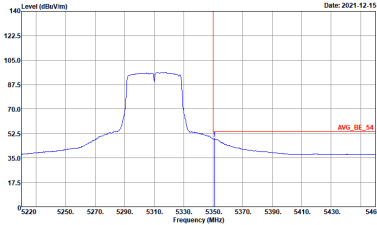


| WIFI  | Band 2 5250~5350MHz Band Edge @ 3m                                                                                                                                                                                     |             |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| ANT   | 802.11ac VHT40 CH62 5310MHz - R                                                                                                                                                                                        |             |
| 16+18 | Horizontal                                                                                                                                                                                                             | Fundamental |
| Peak  |  <p>Site : 03CH20-14V<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.0000Hz VBW:3000.0000Hz SWT:Auto</p> | Left blank  |
| Avg.  |  <p>Site : 03CH20-14V<br/>Condition : AVG_BE_54 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.0000Hz VBW:10000Hz SWT:Auto</p>    | Left blank  |

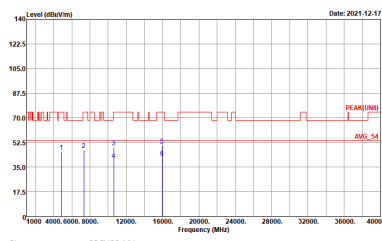
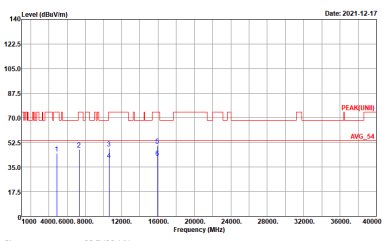


| WIFI  | Band 2 5250~5350MHz Band Edge @ 3m                                                                                                                                                                                   |                                                                                                                                                                                                                       |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANT   | 802.11ac VHT40 CH62 5310MHz - L                                                                                                                                                                                      |                                                                                                                                                                                                                       |
| 16+18 | Vertical                                                                                                                                                                                                             | Fundamental                                                                                                                                                                                                           |
| Peak  |  <p>Site : 03CH20-14V<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH20-14V<br/>Condition : PEAK(UNIT) 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg.  |  <p>Site : 03CH20-14V<br/>Condition : AVG_BE_54 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>  | Left blank                                                                                                                                                                                                            |

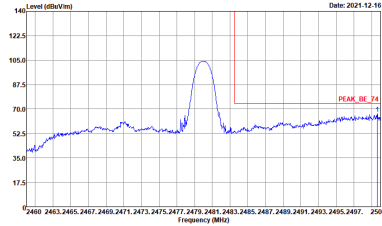
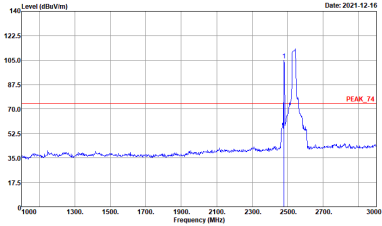


| WIFI  | Band 2 5250~5350MHz Band Edge @ 3m                                                                                                                                                                                     |             |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| ANT   | 802.11ac VHT40 CH62 5310MHz - R                                                                                                                                                                                        |             |
| 16+18 | Vertical                                                                                                                                                                                                               | Fundamental |
| Peak  |  <p>Site : 03CH20-14V<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.0000kHz VBW:3000.0000kHz SWT:Auto</p> | Left blank  |
| Avg.  |  <p>Site : 03CH20-14V<br/>Condition : AVG_BE_54 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.0000kHz VBW:10.0000kHz SWT:Auto</p>  | Left blank  |

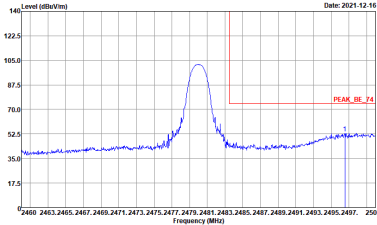
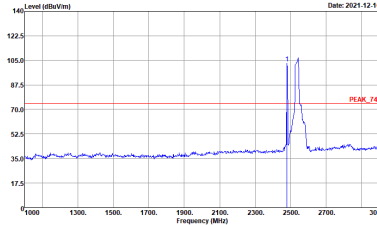
**MIMO <Ant. 17+18> WLAN 2.4GHz 802.11ax HE20 (Partial RU26/8) CH11 + MIMO <Ant. 16+18>**  
**WLAN 5GHz 802.11ac VHT40 CH62 + LTE Band 7**  
**(Harmonic @ 3m)**

| ANT                            | <b>WLAN 2.4G 802.11 ax20(Partial RU26/8)_Tx_Ch11+</b><br><b>WLAN 5G 802.11ac(40)_Tx_Ch62 + LTE Band 7</b>                                                                                             |                                                                                                                                                                                                      |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 17+18/<br>16+18                | Horizontal                                                                                                                                                                                            | Vertical                                                                                                                                                                                             |
| <b>Peak</b><br><br><b>Avg.</b> |  <p>           Site : 03CH20-HY<br/>           Condition : PEAK(UNIT) 3m 91200_02294_1110622 HORIZONTAL         </p> |  <p>           Site : 03CH20-HY<br/>           Condition : PEAK(UNIT) 3m 91200_02294_1110622 VERTICAL         </p> |

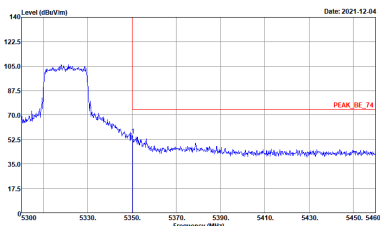
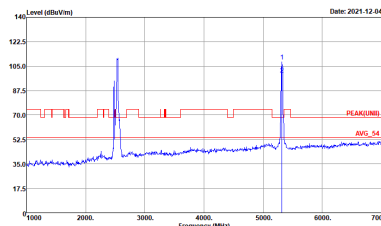
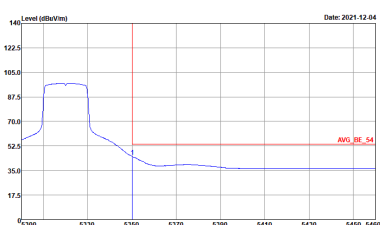
**Ant. 17\_BT\_Tx\_CH78 + MIMO <Ant. 16+18> WLAN 5GHz 802.11ac VHT40 CH62 + LTE Band 7**
**2.4GHz 2400~2483.5MHz**
**Ant. 17\_BT\_CH78 (Band Edge @ 3m)**

| BT   | 2.4GHz 2400~2483.5MHz Band Edge @ 3m                                                                                                                                                                                  |                                                                                                                                                                                                                     |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANT  | BT CH78 2480MHz                                                                                                                                                                                                       |                                                                                                                                                                                                                     |
| 17   | Horizontal                                                                                                                                                                                                            | Fundamental                                                                                                                                                                                                         |
| Peak |  <p>Site : 03CH20-HY<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.0000Hz VBW:3000.0000Hz SWT:Auto</p> |  <p>Site : 03CH20-HY<br/>Condition : PEAK_74 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.0000Hz VBW:3000.0000Hz SWT:Auto</p> |

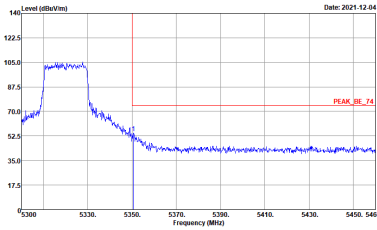
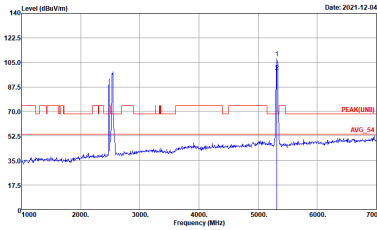
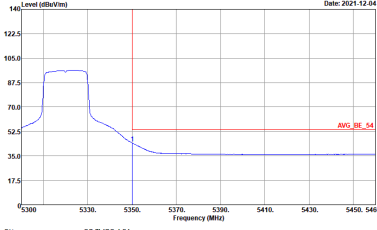


| BT   | 2.4GHz 2400~2483.5MHz Band Edge @ 3m                                                                                                                                                                                           |                                                                                                                                                                                                                              |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANT  | BT CH78 2480MHz                                                                                                                                                                                                                |                                                                                                                                                                                                                              |
| 17   | Vertical                                                                                                                                                                                                                       | Fundamental                                                                                                                                                                                                                  |
| Peak | <div><p>Site : 03C100-11V<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000kHz VSW:3000.000kHz SWT:Auto</p></div> | <div><p>Site : 03C100-11V<br/>Condition : PEAK_74 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000kHz VSW:3000.000kHz SWT:Auto</p></div> |

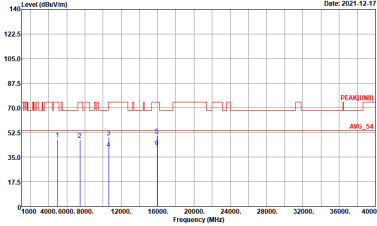
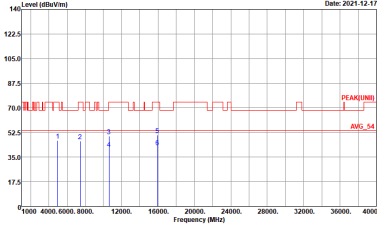
**Band 2 - 5250~5350MHz**
**MIMO <Ant. 16+18> WIFI 802.11ac VHT40 (Band Edge @ 3m)**

| WIFI        | Band 2 5250~5350MHz Band Edge @ 3m                                                                                                                                                                                     |                                                                                                                                                                                                                        |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANT         | 802.11ac VHT40 CH62 5310MHz                                                                                                                                                                                            |                                                                                                                                                                                                                        |
| 16+18       | Horizontal                                                                                                                                                                                                             | Fundamental                                                                                                                                                                                                            |
| <b>Peak</b> |  <p>Site : 03CH20-HY<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>  |  <p>Site : 03CH20-HY<br/>Condition : PEAK(FUND) 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
|             |  <p>Site : 03CH20-HY<br/>Condition : AVG_BE_54 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> | <b>Left blank</b>                                                                                                                                                                                                      |
| <b>Avg.</b> |                                                                                                                                                                                                                        |                                                                                                                                                                                                                        |



| WIFI  | Band 2 5250~5350MHz Band Edge @ 3m                                                                                                                                                                                    |                                                                                                                                                                                                                       |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANT   | 8802.11ac VHT40CH62 53100MHz                                                                                                                                                                                          |                                                                                                                                                                                                                       |
| 16+18 | Vertical                                                                                                                                                                                                              | Fundamental                                                                                                                                                                                                           |
| Peak  |  <p>Site : 03CH20-14V<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>  |  <p>Site : 03CH20-14V<br/>Condition : PEAK(UNIT) 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg.  |  <p>Site : 03CH20-14V<br/>Condition : AVG_BE_54 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> | Left blank                                                                                                                                                                                                            |

**Ant. 17\_BT\_Tx\_CH78 + MIMO <Ant. 16+18> WLAN 5GHz 802.11ac VHT40 CH62 + LTE Band 7**
**(Harmonic @ 3m)**

| ANT          | BT_Tx_Ch78+ WLAN 5G 802.11ac(40)_Tx_Ch62+<br>LTE_B7_BW:20MHzCH21100                                                                                                    |                                                                                                                                                                       |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 17/<br>16+18 | Horizontal                                                                                                                                                             | Vertical                                                                                                                                                              |
| Peak<br>Avg. |  <p>Site : 03CH20-HY<br/>Condition : PEAK(UNIT) 3m 91200_02294_1110622 HORIZONTAL</p> |  <p>Site : 03CH20-HY<br/>Condition : PEAK(UNIT) 3m 91200_02294_1110622 VERTICAL</p> |



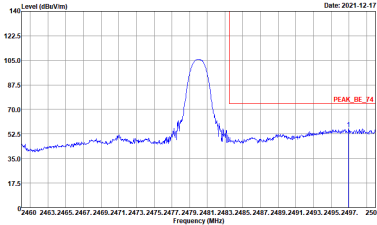
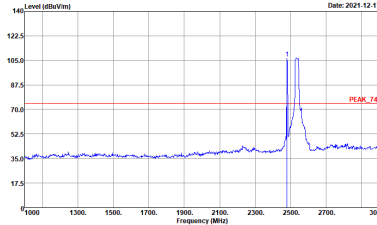
Ant. 18\_BT\_Tx\_CH78 + MIMO <Ant. 16+18> WLAN 5G 802.11ac VHT40 CH62 + LTE Band 7

2.4GHz 2400~2483.5MHz

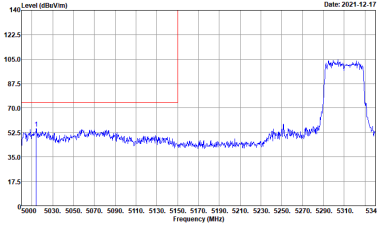
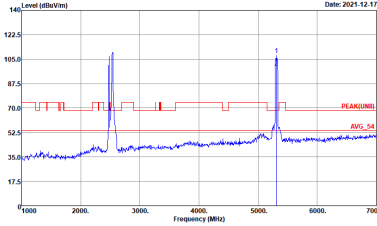
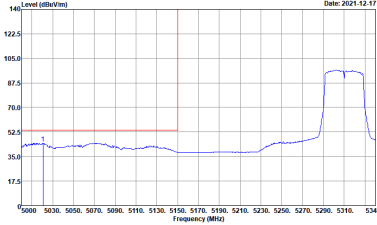
Ant. 18\_BT (Band Edge @ 3m)

| BT   | 2.4GHz 2400~2483.5MHz Band Edge @ 3m                                                                                                |                                                                                                                                  |
|------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| ANT  | BT CH78 2480MHz                                                                                                                     |                                                                                                                                  |
| 18   | Horizontal                                                                                                                          | Fundamental                                                                                                                      |
| Peak | <p>Site : 03CH20-HY<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> | <p>Site : 03CH20-HY<br/>Condition : PEAK_74 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |

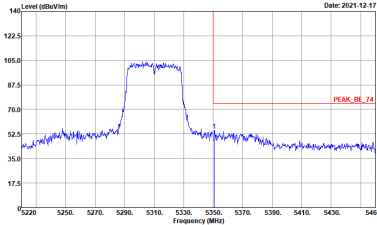
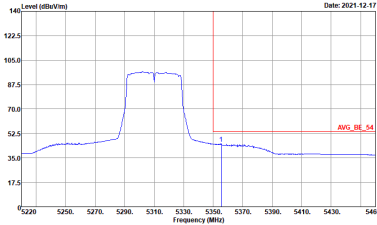


| BT   | 2.4GHz 2400~2483.5MHz Band Edge @ 3m                                                                                                                                                                                           |                                                                                                                                                                                                                              |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANT  | BT CH78 2480MHz                                                                                                                                                                                                                |                                                                                                                                                                                                                              |
| 18   | Vertical                                                                                                                                                                                                                       | Fundamental                                                                                                                                                                                                                  |
| Peak | <div><p>Site : 03C100-11V<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000KHz VSW:3000.000KHz SWT:Auto</p></div> | <div><p>Site : 03C100-11V<br/>Condition : PEAK_F4 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.000KHz VSW:3000.000KHz SWT:Auto</p></div> |

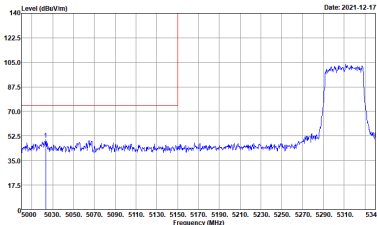
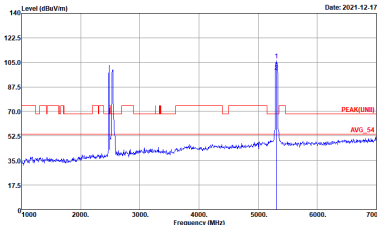
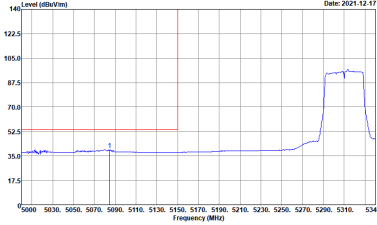
**Band 2 - 5250~5350MHz**
**<Ant. 16+18> WLAN 5G WIFI 802.11ac VHT40 (Band Edge @ 3m)**

| WIFI  | Band 2 5250~5350MHz Band Edge @ 3m                                                                                                                                                                                     |                                                                                                                                                                                                                        |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANT   | 802.11ac VHT40 CH62 5310MHz -L                                                                                                                                                                                         |                                                                                                                                                                                                                        |
| 16+18 | Horizontal                                                                                                                                                                                                             | Fundamental                                                                                                                                                                                                            |
| Peak  |  <p>Site : 03CH20-HY<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>  |  <p>Site : 03CH20-HY<br/>Condition : PEAK(FUND) 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg.  |  <p>Site : 03CH20-HY<br/>Condition : AVG_BE_54 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> | Left blank                                                                                                                                                                                                             |

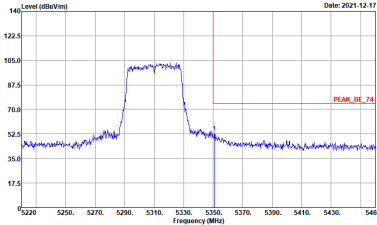
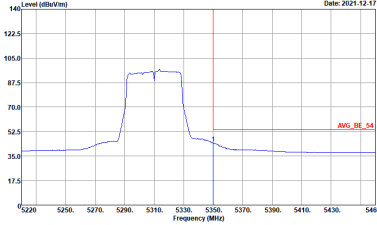


| WIFI  | Band 2 5250~5350MHz Band Edge @ 3m                                                                                                                                                                                     |             |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| ANT   | 802.11ac VHT40 CH62 5310 MHz -R                                                                                                                                                                                        |             |
| 16+18 | Horizontal                                                                                                                                                                                                             | Fundamental |
| Peak  |  <p>Site : 03CH20-14V<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.0000Hz VBW:3000.0000Hz SWT:Auto</p> | Left blank  |
| Avg.  |  <p>Site : 03CH20-14V<br/>Condition : AVG_BE_54 3m 91200_02294_1110622 HORIZONTAL<br/>: RBW:1000.0000Hz VBW:10.0000Hz SWT:Auto</p>  | Left blank  |

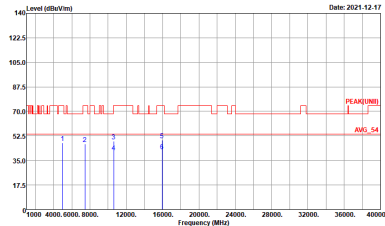
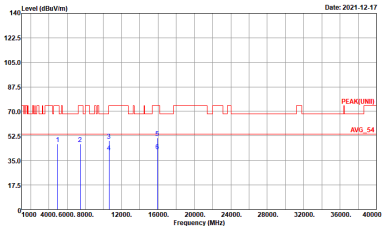


| WIFI  | Band 2 5250~5350MHz Band Edge @ 3m                                                                                                                                                                                                     |                                                                                                                                                                                                                                        |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANT   | 802.11ac VHT40 CH62 5310 MHz - L                                                                                                                                                                                                       |                                                                                                                                                                                                                                        |
| 16+18 | Vertical                                                                                                                                                                                                                               | Fundamental                                                                                                                                                                                                                            |
| Peak  |  <p>Site: 03CH20-14V<br/>Condition: PEAK_BE_74 3m 91200_02294_1110622 VERTICAL<br/>RBW:1000.000kHz VBW:3000.000kHz SWT:Auto<br/>Date: 2021-12-17</p>  |  <p>Site: 03CH20-14V<br/>Condition: PEAK(UNIT) 3m 91200_02294_1110622 VERTICAL<br/>RBW:1000.000kHz VBW:3000.000kHz SWT:Auto<br/>Date: 2021-12-17</p> |
| Avg.  |  <p>Site: 03CH20-14V<br/>Condition: AVG_BE_54 3m 91200_02294_1110622 VERTICAL<br/>RBW:1000.000kHz VBW:1000.000kHz SWT:Auto<br/>Date: 2021-12-17</p> | Left blank                                                                                                                                                                                                                             |



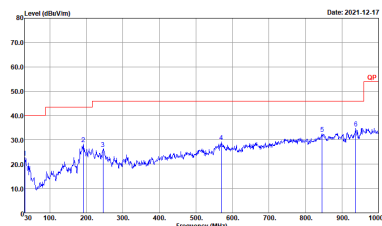
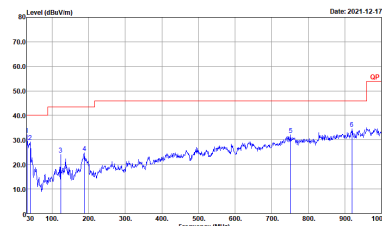
| WIFI  | Band 2 5250~5350MHz Band Edge @ 3m                                                                                                                                                                                                                                                                                                                                                                  |             |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| ANT   | 802.11ac VHT40 CH62 5310 MHz -R                                                                                                                                                                                                                                                                                                                                                                     |             |
| 16+18 | Horizontal                                                                                                                                                                                                                                                                                                                                                                                          | Fundamental |
| Peak  |  <p>Site : 03CH20-HY<br/>Condition : PEAK_BE_74 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.0000Hz VBW:3000.0000Hz SWT:Auto</p>                                                                                                                                                                                 | Left blank  |
| Avg.  |  <p>Site : 03CH20-HY<br/>Condition : AVG_BE_54 3m 91200_02294_1110622 VERTICAL<br/>: RBW:1000.0000Hz VBW:0.0100Hz SWT:Auto<br/>Detector : Peak<br/>Project : IN0013<br/>Ant 2 : BT_Tx_Ch78<br/>Setting : Default<br/>Ant 1+2 : 11ac(40)_Tx_Ch62<br/>Setting : 17<br/>WWAN : LTE B7 CH21100 BW20M QPSK 100R80</p> | Left blank  |

**Ant. 18\_BT\_CH78 + MIMO <Ant. 16+18> WLAN 5G 802.11ac VHT40 CH62 + LTE Band 7**  
**(Harmonic @ 3m)**

| ANT                            | BT_Tx_Ch78+ WLAN 5G 802.11ac(40)_Tx_Ch62 + LTE Band 7                                                                                                                  |                                                                                                                                                                       |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18/<br>16+18                   | Horizontal                                                                                                                                                             | Vertical                                                                                                                                                              |
| <b>Peak</b><br><br><b>Avg.</b> |  <p>Site : 03CH20-HY<br/> Condition : PEAK(UNL) 3m 9120D_02294_1110622 HORIZONTAL</p> |  <p>Site : 03CH20-HY<br/> Condition : PEAK(UNL) 3m 9120D_02294_1110622 VERTICAL</p> |

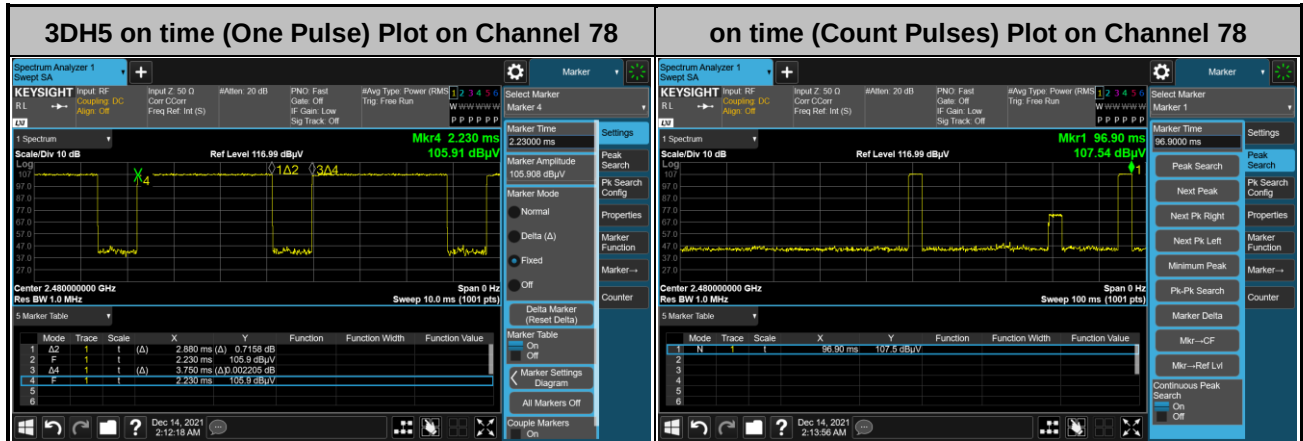
**Emission below 1GHz**

**MIMO <Ant. 17+18> WLAN 2.4GHz 802.11ax HE20 (Partial RU26/8) CH11 + MIMO <Ant. 16+18>**  
**WLAN 5GHz 802.11ac VHT40 CH62 + LTE Band 7**  
**(LF)**

| ANT              | WLAN 2.4G 802.11 ax20(Partial RU26/8)_Tx_Ch11+ WLAN 5G<br>802.11ac(40)_Tx_Ch62 + LTE Band 7                                                                        |                                                                                                                                                                   |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 17+18 /<br>16+18 | Horizontal                                                                                                                                                         | Vertical                                                                                                                                                          |
| QP /<br>Peak     |  <p>Site : 03CH20-HY<br/>Condition : QP 3m LF_55606&amp;08_1101017 HORIZONTAL</p> |  <p>Site : 03CH20-HY<br/>Condition : QP 3m LF_55606&amp;08_1101017 VERTICAL</p> |

## Appendix C. Duty Cycle Plots

<Ant. 17>



**Note:**

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

### Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the on time period to have DH5 packet completing one hopping sequence is

$$2.883 \text{ ms} \times 20 \text{ channels} = 57.7 \text{ ms}$$

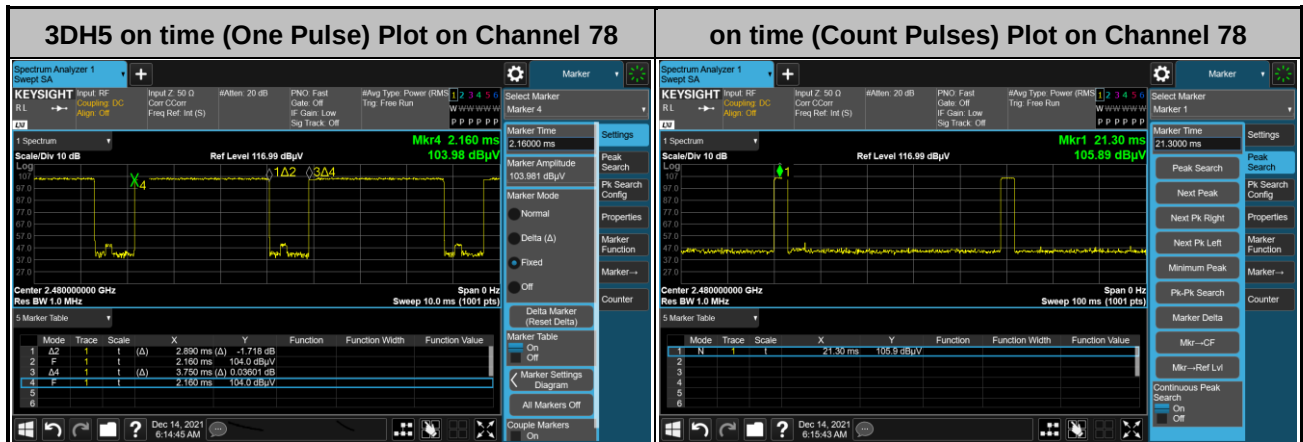
There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period.  $[100 \text{ ms} / 57.7 \text{ ms}] = 2 \text{ hops}$

Thus, the maximum possible ON time:

$$2.883 \text{ ms} \times 2 = 5.77 \text{ ms}$$

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

$$20 \times \log(5.77 \text{ ms}/100 \text{ ms}) = -24.78 \text{ dB}$$

**<Ant. 18>**

**Note:**

1. Worst case Duty cycle = on time/100 milliseconds =  $2 \times 2.89 / 100 = 5.78 \%$
2. Worst case Duty cycle correction factor =  $20 \times \log(\text{Duty cycle}) = -24.76 \text{ dB}$
3. **3DH5** has the highest duty cycle worst case and is reported.

**Duty Cycle Correction Factor Consideration for AFH mode:**

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the on time period to have DH5 packet completing one hopping sequence is

$$2.89 \text{ ms} \times 20 \text{ channels} = 57.8 \text{ ms}$$

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period.  $[100 \text{ ms} / 57.8 \text{ ms}] = 2 \text{ hops}$

Thus, the maximum possible ON time:

$$2.89 \text{ ms} \times 2 = 5.78 \text{ ms}$$

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

$$20 \times \log(5.78 \text{ ms}/100 \text{ ms}) = -24.76 \text{ dB}$$



| Antenna | Band                        | Duty Cycle(%) | T(us) | 1/T(kHz) | VBW Setting |
|---------|-----------------------------|---------------|-------|----------|-------------|
| 17+18   | 2.4GHz 802.11ax HE20 26 RU  | 100.00        | -     | -        | 10Hz        |
| 16+18   | 5GHz 802.11ac VHT40 Full RU | 100.00        | -     | -        | 10Hz        |

**MIMO <Ant. 17+18>****MIMO <Ant. 16+18>**