



# FCC CO-LOCATION RADIO TEST REPORT

FCC ID : ZMOL860GL16LL  
Equipment : LTE Module  
Brand Name : Fibocom Wireless Inc.  
Model Name : L860-GL-16  
Applicant : Fibocom Wireless Inc.  
1101, Tower A, Building 6, Shenzhen  
International, Innovation Valley, Dashi 1st Rd,  
Nanshan, Shenzhen, China  
Manufacturer : LCFC (Hefei) Electronics Technology Co., Ltd.  
No. 3188-1, Yungu Road (Hefei Export  
Processing Zone), Hefei Economics &  
Technology Development Area, Anhui, CHINA  
Standard : FCC 47 CFR Part 2, 27

Equipment: Fibocom L860-GL-16 tested inside of Lenovo Notebook Computer.

The product was received on Sep. 07, 2021 and testing was started from Sep. 17, 2021 and completed on Sep. 28, 2021. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

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

*Louis Wu*

Approved by: Louis Wu

**Sporton International Inc. EMC & Wireless Communications Laboratory**



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## History of this test report

| Report No. | Version | Description                                                     | Issued Date   |
|------------|---------|-----------------------------------------------------------------|---------------|
| FG190338G  | 01      | Initial issue of report                                         | Oct. 25, 2021 |
| FG190338G  | 02      | 1. Add WLAN Module information<br>2. Revise title in appendix A | Dec. 15, 2021 |
|            |         |                                                                 |               |
|            |         |                                                                 |               |
|            |         |                                                                 |               |
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|            |         |                                                                 |               |
|            |         |                                                                 |               |
|            |         |                                                                 |               |

## Summary of Test Result

| Report Clause | Ref Std. Clause          | Test Items                              | Result (PASS/FAIL) | Remark                                     |
|---------------|--------------------------|-----------------------------------------|--------------------|--------------------------------------------|
| 3.2           | §2.1053<br>§27.53 (a)(4) | Radiated Spurious Emission<br>(Band 30) | Pass               | Under limit<br>11.42 dB at<br>9234.000 MHz |
|               | §2.1051<br>§27.53 (m)(4) | Radiated Spurious Emission<br>(Band 41) |                    |                                            |

**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:** Sheng Kuo

**Report Producer:** Ruby Zou

# 1 General Description

## 1.1 Product Feature of Equipment Under Test

| Product Feature                 |                       |
|---------------------------------|-----------------------|
| Equipment                       | LTE Module            |
| Brand Name                      | Fibocom Wireless Inc. |
| Model Name                      | L860-GL-16            |
| FCC ID                          | ZMOL860GL16LL         |
| Sample 1                        | EUT with Host 1       |
| Sample 2                        | EUT with Host 2       |
| EUT supports Radios application | WCDMA/HSPA/LTE/GNSS   |
| EUT Stage                       | Production Unit       |

**Remark:**

1. The above EUT's information was declared by manufacturer.
2. Equipment: Fibocom L860-GL-16 tested inside of Lenovo Notebook Computer.

The product was installed into Notebook Computer (Brand Name: Lenovo, Model Name: TP00129B, and the host information was recorded in the following table.

| Host Information       |                                           |
|------------------------|-------------------------------------------|
| Host 1                 | Host with Amphenol Antenna                |
| Host 2                 | Host with Novocomms/JYT Antenna           |
| Integrated WLAN Module | Brand Name: Intel<br>Model Name: AX211D2W |

| WWAN Antenna Information |              |                 |                |                                          |
|--------------------------|--------------|-----------------|----------------|------------------------------------------|
| Main Antenna             | Manufacturer | Amphenol        | Peak gain(dBi) | LTE Band 30 : 0.97<br>LTE Band 41 : 1.87 |
|                          | Part number  | TKC116-16-000-C | Type           | PIFA                                     |
|                          | Manufacturer | Novocomms/JYT   | Peak gain(dBi) | LTE Band 30 : 0.08<br>LTE Band 41 : 1.83 |
|                          | Part number  | JYAAE0150HR     | Type           | PIFA                                     |

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

## 1.2 Product Specification of Equipment Under Test

| Product Specification subjective to this standard |                                                                                |
|---------------------------------------------------|--------------------------------------------------------------------------------|
| Tx Frequency                                      | LTE Band 30 : 2307.5 MHz ~ 2312.5 MHz<br>LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz |
| Rx Frequency                                      | LTE Band 30 : 2352.5 MHz ~ 2357.5 MHz<br>LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz |
| Bandwidth                                         | LTE Band 30 : 5MHz / 10MHz<br>LTE Band 41 : 5MHz / 10MHz / 15MHz / 20MHz       |
| Type of Modulation                                | QPSK / 16QAM / 64QAM                                                           |

### 1.3 Modification of EUT

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

### 1.4 Testing Location

|                    |                                                                     |
|--------------------|---------------------------------------------------------------------|
| Test Site          | Sporton International Inc. EMC & Wireless Communications Laboratory |
| Test Site Location | No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan       |
| Test Site No.      | <b>Sporton Site No.</b>                                             |
|                    | 03CH07-HY                                                           |
| Test Engineer      | Jesse Wang and Stan Hsieh                                           |
| Temperature        | 22.6~25.8℃                                                          |
| Relative Humidity  | 48.9~53.6%                                                          |

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

FCC Designation No.: TW1190

### 1.5 Applicable Standards

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

- ♦ ANSI C63.26-2015
- ♦ ANSI / TIA-603-E
- ♦ FCC 47 CFR Part 2, 27
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ 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.

**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.

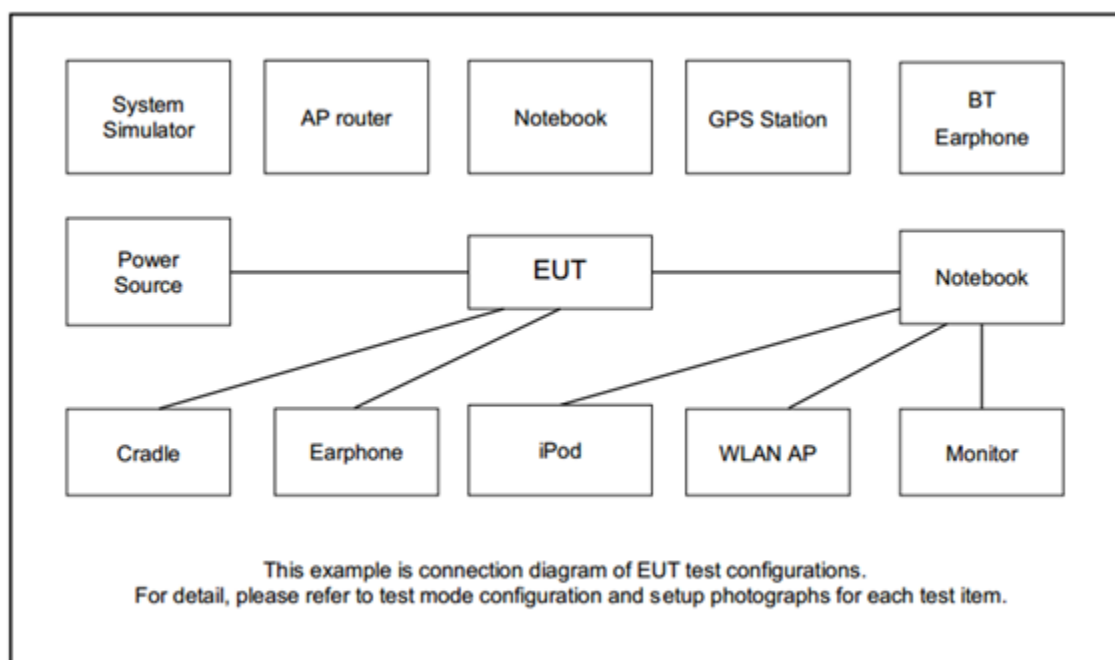
## 2 Test Configuration of Equipment Under Test

### 2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

| Test Items                 | Band                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Bandwidth (MHz) |   |   |    |    |    | Modulation |       |       | RB # |      |      | Test Channel |   |   |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---|---|----|----|----|------------|-------|-------|------|------|------|--------------|---|---|
|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1.4             | 3 | 5 | 10 | 15 | 20 | QPSK       | 16QAM | 64QAM | 1    | Half | Full | L            | M | H |
| Radiated Spurious Emission | 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -               | - | v | v  | -  | -  | v          |       |       | v    |      |      | v            | v | v |
|                            | 41                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -               | - |   |    |    | v  | v          |       |       | v    |      |      | v            | v | v |
| Remark                     | <ol style="list-style-type: none"> <li>The mark "v" means that this configuration is chosen for testing</li> <li>The mark "-" means that this bandwidth is not supported.</li> <li>The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.</li> <li>During the Radiated Spurious Emission test, the EUT turn on the WLAN functions simultaneously.</li> <li>For Radiated Test Cases, the tests were performed with Battery (L20C4P71) and Sample 1.</li> </ol> |                 |   |   |    |    |    |            |       |       |      |      |      |              |   |   |

### 2.2 Connection Diagram of Test System



### 2.3 Support Unit used in test configuration and system

| Item | Equipment        | Brand Name | Model No. | FCC ID       | Data Cable        | Power Cord        |
|------|------------------|------------|-----------|--------------|-------------------|-------------------|
| 1.   | System Simulator | Anritsu    | MT8821C   | N/A          | N/A               | Unshielded, 1.8 m |
| 2.   | iPod Earphone    | Apple      | N/A       | Verification | Unshielded, 1.0 m | N/A               |

## 2.4 Frequency List of Low/Middle/High Channels

| LTE Band 30 Channel and Frequency List |                        |        |        |         |
|----------------------------------------|------------------------|--------|--------|---------|
| BW [MHz]                               | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 10                                     | Channel                | -      | 27710  | -       |
|                                        | Frequency              | -      | 2310   | -       |
| 5                                      | Channel                | 27685  | 27710  | 27735   |
|                                        | Frequency              | 2307.5 | 2310   | 2312.5  |
| LTE Band 41 Channel and Frequency List |                        |        |        |         |
| BW [MHz]                               | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 20                                     | Channel                | 39750  | 40620  | 41490   |
|                                        | Frequency              | 2506.0 | 2593.0 | 2680.0  |

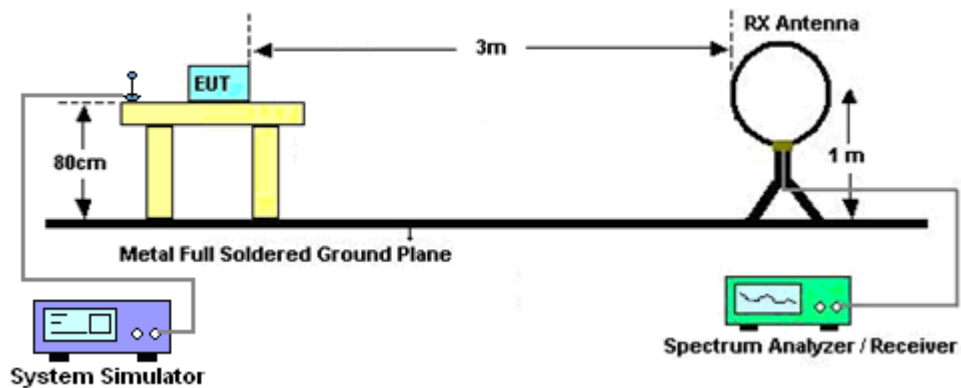
### 3 Radiated Test Items

#### 3.1 Measuring Instruments

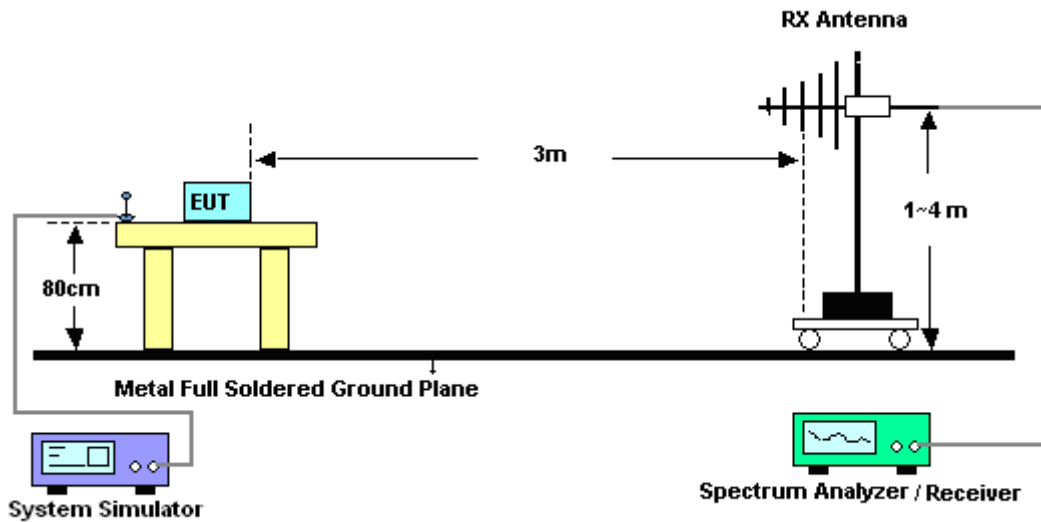
See list of measuring instruments of this test report.

##### 3.1.1 Test Setup

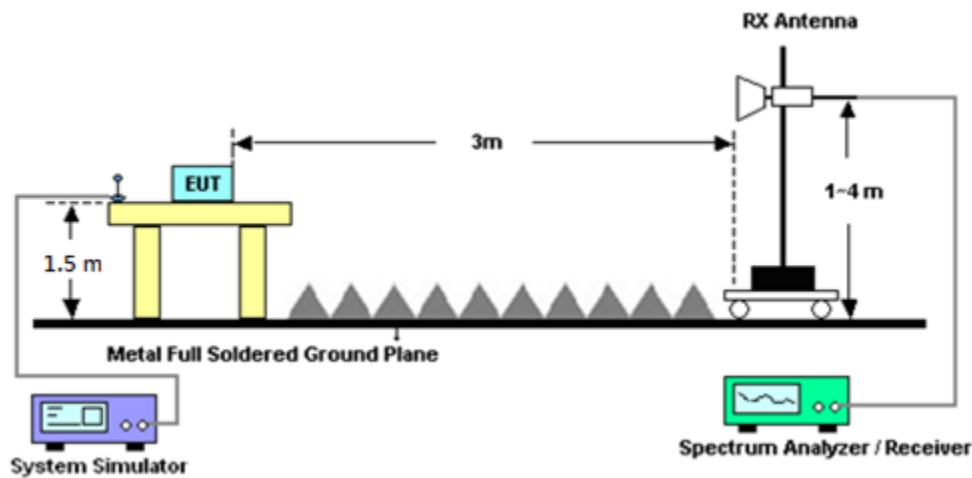
For radiated test below 30MHz



For radiated test from 30MHz to 1GHz



For radiated emissions above 1GHz



### 3.1.2 Test Result of Radiated Test

Please refer to Appendix A.

**Note:**

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

There is 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.

## 3.2 Radiated Spurious Emission Measurement

### 3.2.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E.

For LTE Band 30

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $70 + 10 \log (P)$  dB.

For LTE Band 41

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $55 + 10 \log (P)$  dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

### 3.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

For LTE Band 30

The limit line is derived from  $70 + 10\log(P)$ dB below the transmitter power P(Watts)  
 $= P(W) - [70 + 10\log(P)] \text{ (dB)}$   
 $= [30 + 10\log(P)] \text{ (dBm)} - [70 + 10\log(P)] \text{ (dB)}$   
 $= -40\text{dBm}.$

For LTE Band 41

The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)

$\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$

$\text{ERP (dBm)} = \text{EIRP} - 2.15$



## 4 List of Measuring Equipment

| Instrument                | Brand Name      | Model No.                  | Serial No.         | Characteristics      | Calibration Date | Test Date                       | Due Date      | Remark                   |
|---------------------------|-----------------|----------------------------|--------------------|----------------------|------------------|---------------------------------|---------------|--------------------------|
| Bilog Antenna             | TESEQ           | CBL 6111D & 00800N1D01N-06 | 35419 & 03         | 30MHz~1GHz           | Apr. 28, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Apr. 27, 2022 | Radiation<br>(03CH07-HY) |
| Double Ridge Horn Antenna | ESCO            | 3117                       | 00075962           | 1GHz ~ 18GHz         | Dec. 01, 2020    | Sep. 17, 2021~<br>Sep. 28, 2021 | Nov. 30, 2021 | Radiation<br>(03CH07-HY) |
| Preamplifier              | MITEQ           | AMF-7D-0010 1800-30-10P    | 1590075            | 1GHz~18GHz           | Apr. 22, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Apr. 21, 2022 | Radiation<br>(03CH07-HY) |
| Preamplifier              | COM-POWER       | PA-103A                    | 161241             | 10MHz~1GHz           | May 18, 2021     | Sep. 17, 2021~<br>Sep. 28, 2021 | May 17, 2022  | Radiation<br>(03CH07-HY) |
| Preamplifier              | Agilent         | 8449B                      | 3008A02362         | 1GHz~26.5GHz         | Oct. 31, 2020    | Sep. 17, 2021~<br>Sep. 28, 2021 | Oct. 30, 2021 | Radiation<br>(03CH07-HY) |
| Preamplifier              | EMEC            | EM18G40G                   | 0600789            | 18-40GHz             | Jul. 23, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Jul. 22, 2022 | Radiation<br>(03CH07-HY) |
| Spectrum Analyzer         | Agilent         | N9030A                     | MY52350276         | 3Hz~44GHz            | Jul. 22, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Jul. 21, 2022 | Radiation<br>(03CH07-HY) |
| RF Cable                  | HUBER + SUHNER  | SUCOFLEX 104               | MY15682-4          | 30MHz to 18GHz       | Feb. 24, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Feb. 23, 2022 | Radiation<br>(03CH07-HY) |
| RF Cable                  | HUBER + SUHNER  | SUCOFLEX 104               | MY24971-4          | 9kHz to 18GHz        | Feb. 24, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Feb. 23, 2022 | Radiation<br>(03CH07-HY) |
| RF Cable                  | HUBER + SUHNER  | SUCOFLEX 104               | MY28655-4          | 9kHz to 18GHz        | Feb. 24, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Feb. 23, 2022 | Radiation<br>(03CH07-HY) |
| RF Cable                  | HUBER + SUHNER  | SUCOFLEX 102               | MY2858/2,80 1606/2 | 18GHz~40GHz          | Feb. 24, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Feb. 23, 2022 | Radiation<br>(03CH07-HY) |
| RF Cable                  | HUBER + SUHNER  | SUCOFLEX 126               | 532078/126E        | 30MHz~18GHz          | Sep. 17, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Sep. 16, 2022 | Radiation<br>(03CH07-HY) |
| RF Cable                  | HUBER + SUHNER  | SUCOFLEX 102               | 801606/2           | 9KHz ~ 40GHz         | Apr. 03, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Apr. 02, 2022 | Radiation<br>(03CH07-HY) |
| Controller                | EMEC            | EM1000                     | N/A                | Control Ant Mast     | Apr. 28, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Apr. 27, 2022 | Radiation<br>(03CH07-HY) |
| Controller                | MF              | MF-7802                    | N/A                | Control Turn table   | N/A              | Sep. 17, 2021~<br>Sep. 28, 2021 | N/A           | Radiation<br>(03CH07-HY) |
| Antenna Mast              | EMEC            | AM-BS-4500E                | N/A                | Boresight mast 1M~4M | Apr. 28, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Apr. 27, 2022 | Radiation<br>(03CH07-HY) |
| Turn Table                | ChainTek        | Chaintek 3000              | N/A                | 0~360 Degree         | N/A              | Sep. 17, 2021~<br>Sep. 28, 2021 | N/A           | Radiation<br>(03CH07-HY) |
| Software                  | Audix           | E3 6.2009-8-24             | N/A                | N/A                  | N/A              | Sep. 17, 2021~<br>Sep. 28, 2021 | N/A           | Radiation<br>(03CH07-HY) |
| USB Data Logger           | TECPEL          | TR-32                      | HE17XB2495         | N/A                  | Mar. 09, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Mar. 08, 2022 | Radiation<br>(03CH07-HY) |
| Horn Antenna              | EMCO            | 3117                       | 00143261           | 1GHz~18GHz           | Jan. 26, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Jan. 25, 2022 | Radiation<br>(03CH07-HY) |
| SHF-EHF Horn Antenna      | SCHWARZBECK     | BBHA 9170                  | BBHA9170251        | 18GHz~40GHz          | Dec. 02, 2020    | Sep. 17, 2021~<br>Sep. 28, 2021 | Dec. 01, 2021 | Radiation<br>(03CH07-HY) |
| Signal Generator          | Rohde & Schwarz | SMF100A                    | 101107             | 100kHz~40GHz         | Dec. 04, 2020    | Sep. 17, 2021~<br>Sep. 28, 2021 | Dec. 03, 2021 | Radiation<br>(03CH07-HY) |
| Loop Antenna              | Rohde & Schwarz | HFH2-Z2                    | 100315             | 9 kHz~30 MHz         | Jan. 04, 2021    | Sep. 17, 2021~<br>Sep. 28, 2021 | Jan. 03, 2022 | Radiation<br>(03CH07-HY) |

## 5 Uncertainty of Evaluation

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

|                                                                         |         |
|-------------------------------------------------------------------------|---------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 3.16 dB |
|-------------------------------------------------------------------------|---------|

### Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

|                                                                         |         |
|-------------------------------------------------------------------------|---------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 3.71 dB |
|-------------------------------------------------------------------------|---------|

### Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

|                                                                         |         |
|-------------------------------------------------------------------------|---------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 4.16 dB |
|-------------------------------------------------------------------------|---------|

## Appendix A. Test Results of Radiated Test

### LTE Band 30 + WLAN 802.11ax HE20 CH07 MIMO <Chain A+B> + Bluetooth Tx

| LTE Band 30 / 5MHz / QPSK |                      |                 |                  |                         |                         |                          |                            |                             |                       |
|---------------------------|----------------------|-----------------|------------------|-------------------------|-------------------------|--------------------------|----------------------------|-----------------------------|-----------------------|
| Channel                   | Frequency<br>( MHz ) | EIRP<br>( dBm ) | Limit<br>( dBm ) | Over<br>Limit<br>( dB ) | SPA<br>Reading<br>(dBm) | S.G.<br>Power<br>( dBm ) | TX Cable<br>loss<br>( dB ) | TX Antenna<br>Gain<br>(dBi) | Polarization<br>(H/V) |
| Lowest                    | 4608                 | -57.35          | -40              | -17.35                  | -80.07                  | -64.15                   | 2.11                       | 8.92                        | H                     |
|                           | 6912                 | -54.88          | -40              | -14.88                  | -81.83                  | -62.96                   | 2.62                       | 10.69                       | H                     |
|                           | 9216                 | -52.21          | -40              | -12.21                  | -82.16                  | -62.29                   | 2.53                       | 12.61                       | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           | 4608                 | -56.84          | -40              | -16.84                  | -79.57                  | -63.64                   | 2.11                       | 8.92                        | V                     |
|                           | 6912                 | -54.94          | -40              | -14.94                  | -81.74                  | -63.02                   | 2.62                       | 10.69                       | V                     |
|                           | 9216                 | -52.01          | -40              | -12.01                  | -82.42                  | -62.09                   | 2.53                       | 12.61                       | V                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
| Middle                    | 4614                 | -56.25          | -40              | -16.25                  | -79.04                  | -63.06                   | 2.11                       | 8.93                        | H                     |
|                           | 6924                 | -55.19          | -40              | -15.19                  | -82.03                  | -63.28                   | 2.62                       | 10.71                       | H                     |
|                           | 9234                 | -52.22          | -40              | -12.22                  | -82.27                  | -62.29                   | 2.53                       | 12.61                       | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           | 4614                 | -56.32          | -40              | -16.32                  | -79.11                  | -63.13                   | 2.11                       | 8.93                        | V                     |
|                           | 6924                 | -54.96          | -40              | -14.96                  | -81.86                  | -63.05                   | 2.62                       | 10.71                       | V                     |
|                           | 9234                 | -51.42          | -40              | -11.42                  | -82.01                  | -61.49                   | 2.53                       | 12.61                       | V                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | V                     |



| LTE Band 30 / 5MHz / QPSK |                      |                 |                  |                         |                         |                          |                            |                             |                       |
|---------------------------|----------------------|-----------------|------------------|-------------------------|-------------------------|--------------------------|----------------------------|-----------------------------|-----------------------|
| Channel                   | Frequency<br>( MHz ) | EIRP<br>( dBm ) | Limit<br>( dBm ) | Over<br>Limit<br>( dB ) | SPA<br>Reading<br>(dBm) | S.G.<br>Power<br>( dBm ) | TX Cable<br>loss<br>( dB ) | TX Antenna<br>Gain<br>(dBi) | Polarization<br>(H/V) |
| Highest                   | 4620                 | -57.17          | -40              | -17.17                  | -79.88                  | -63.99                   | 2.12                       | 8.94                        | H                     |
|                           | 6930                 | -54.88          | -40              | -14.88                  | -81.88                  | -62.98                   | 2.61                       | 10.72                       | H                     |
|                           | 9234                 | -52.01          | -40              | -12.01                  | -82.15                  | -62.08                   | 2.53                       | 12.61                       | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                           | 4620                 | -56.43          | -40              | -16.43                  | -79.23                  | -63.25                   | 2.12                       | 8.94                        | V                     |
|                           | 6930                 | -54.77          | -40              | -14.77                  | -81.67                  | -62.87                   | 2.61                       | 10.72                       | V                     |
|                           | 9234                 | -51.71          | -40              | -11.71                  | -82.25                  | -61.78                   | 2.53                       | 12.61                       | V                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                           |                      |                 |                  |                         |                         |                          |                            |                             | V                     |

**Remark:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



| LTE Band 30 / 10MHz / QPSK |                      |                 |                  |                         |                         |                          |                            |                             |                       |
|----------------------------|----------------------|-----------------|------------------|-------------------------|-------------------------|--------------------------|----------------------------|-----------------------------|-----------------------|
| Channel                    | Frequency<br>( MHz ) | EIRP<br>( dBm ) | Limit<br>( dBm ) | Over<br>Limit<br>( dB ) | SPA<br>Reading<br>(dBm) | S.G.<br>Power<br>( dBm ) | TX Cable<br>loss<br>( dB ) | TX Antenna<br>Gain<br>(dBi) | Polarization<br>(H/V) |
| Middle                     | 4608                 | -57.84          | -40              | -17.84                  | -80.56                  | -64.64                   | 2.11                       | 8.92                        | H                     |
|                            | 6912                 | -55.18          | -40              | -15.18                  | -82.03                  | -63.26                   | 2.62                       | 10.69                       | H                     |
|                            | 9216                 | -51.81          | -40              | -11.81                  | -81.86                  | -61.89                   | 2.53                       | 12.61                       | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            | 4608                 | -57.57          | -40              | -17.57                  | -80.3                   | -64.37                   | 2.11                       | 8.92                        | V                     |
|                            | 6912                 | -54.84          | -40              | -14.84                  | -81.79                  | -62.92                   | 2.62                       | 10.69                       | V                     |
|                            | 9216                 | -51.69          | -40              | -11.69                  | -82.09                  | -61.77                   | 2.53                       | 12.61                       | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |

**Remark:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



## LTE Band 41(HPUE) + WLAN 802.11ax HE20 CH100 MIMO &lt;Chain A+B&gt; + Bluetooth Tx

| LTE Band 41 / 20MHz / QPSK |                      |                 |                  |                         |                         |                          |                            |                             |                       |
|----------------------------|----------------------|-----------------|------------------|-------------------------|-------------------------|--------------------------|----------------------------|-----------------------------|-----------------------|
| Channel                    | Frequency<br>( MHz ) | EIRP<br>( dBm ) | Limit<br>( dBm ) | Over<br>Limit<br>( dB ) | SPA<br>Reading<br>(dBm) | S.G.<br>Power<br>( dBm ) | TX Cable<br>loss<br>( dB ) | TX Antenna<br>Gain<br>(dBi) | Polarization<br>(H/V) |
| Lowest                     | 4992                 | -55.11          | -25              | -30.11                  | -78.92                  | -62.46                   | 2.33                       | 9.68                        | H                     |
|                            | 7488                 | -54.05          | -25              | -29.05                  | -81.34                  | -63.39                   | 2.43                       | 11.78                       | H                     |
|                            | 9990                 | -51.05          | -25              | -26.05                  | -82.55                  | -60.56                   | 2.69                       | 12.21                       | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            | 4992                 | -53.03          | -25              | -28.03                  | -76.6                   | -60.38                   | 2.33                       | 9.68                        | V                     |
|                            | 7488                 | -54.43          | -25              | -29.43                  | -81.89                  | -63.77                   | 2.43                       | 11.78                       | V                     |
|                            | 9990                 | -51.24          | -25              | -26.24                  | -82.54                  | -60.75                   | 2.69                       | 12.21                       | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
| Middle                     | 5166                 | -55.46          | -25              | -30.46                  | -79.9                   | -62.73                   | 2.43                       | 9.70                        | H                     |
|                            | 7752                 | -53.91          | -25              | -28.91                  | -81.71                  | -63.51                   | 2.35                       | 11.95                       | H                     |
|                            | 10332                | -50.41          | -25              | -25.41                  | -82.77                  | -60.05                   | 2.69                       | 12.33                       | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            | 5166                 | -54.51          | -25              | -29.51                  | -78.78                  | -61.78                   | 2.43                       | 9.70                        | V                     |
|                            | 7752                 | -53.23          | -25              | -28.23                  | -81.25                  | -62.83                   | 2.35                       | 11.95                       | V                     |
|                            | 10332                | -49.88          | -25              | -24.88                  | -82.11                  | -59.52                   | 2.69                       | 12.33                       | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |



| LTE Band 41 / 20MHz / QPSK |                      |                 |                  |                         |                         |                          |                            |                             |                       |
|----------------------------|----------------------|-----------------|------------------|-------------------------|-------------------------|--------------------------|----------------------------|-----------------------------|-----------------------|
| Channel                    | Frequency<br>( MHz ) | EIRP<br>( dBm ) | Limit<br>( dBm ) | Over<br>Limit<br>( dB ) | SPA<br>Reading<br>(dBm) | S.G.<br>Power<br>( dBm ) | TX Cable<br>loss<br>( dB ) | TX Antenna<br>Gain<br>(dBi) | Polarization<br>(H/V) |
| Highest                    | 5340                 | -54.84          | -25              | -29.84                  | -79.84                  | -62.01                   | 2.53                       | 9.70                        | H                     |
|                            | 8010                 | -53.32          | -25              | -28.32                  | -81.79                  | -63.16                   | 2.27                       | 12.11                       | H                     |
|                            | 10674                | -49.39          | -25              | -24.39                  | -82.72                  | -59.13                   | 2.69                       | 12.43                       | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | H                     |
|                            | 5340                 | -52.47          | -25              | -27.47                  | -77.38                  | -59.64                   | 2.53                       | 9.70                        | V                     |
|                            | 8010                 | -52.34          | -25              | -27.34                  | -81.22                  | -62.18                   | 2.27                       | 12.11                       | V                     |
|                            | 10674                | -49.61          | -25              | -24.61                  | -82.75                  | -59.35                   | 2.69                       | 12.43                       | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |
|                            |                      |                 |                  |                         |                         |                          |                            |                             | V                     |

**Remark:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line.