

# FCC Radio Test Report

## FCC ID: XMR2020EM160RGL2

**Report No.** : BTL-FCCP-5-2311T077  
**Equipment** : LTE-A Cat 16 M.2 Module  
**Model Name** : EM160R-GL  
**Brand Name** : Quectel  
**Applicant** : Quectel Wireless Solutions Company Limited  
**Address** : Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

**Radio Function** : LTE Band 26

**FCC Rule Part(s)** : FCC CFR Title 47, Part 90, Subpart S

**Date of Receipt** : 2023/12/5  
**Date of Test** : 2023/12/25 ~ 2024/1/12  
**Issued Date** : 2024/1/30

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

**Prepared by** :   
Jerry Chuang, Supervisor

**Approved by** :   
Peter Chen, Manager

**BTL Inc.**

No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan

Tel: +886-2-2657-3299 Fax: +886-2-2657-3331 Web: www.newbtl.com Service mail: btl\_qa@newbtl.com

**Declaration**

**BTL** represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

**BTL's** reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

**BTL's** laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

**BTL** is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

**Limitation**

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

**CONTENTS**

|            |  |    |
|------------|--|----|
| 1          | SUMMARY OF TEST RESULTS                                  | 5  |
| 1.1        | REFERENCE TEST GUIDANCE                                  | 6  |
| 1.2        | TEST FACILITY  | 6  |
| 1.3        | MEASUREMENT UNCERTAINTY                                  | 6  |
| 1.4        | TEST ENVIRONMENT CONDITIONS                              | 6  |
| 2          | GENERAL INFORMATION                                      | 7  |
| 2.1        | DESCRIPTION OF EUT                                       | 7  |
| 2.2        | TEST MODES   | 9  |
| 2.3        | BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED | 10 |
| 2.4        | SUPPORT UNITS  | 10 |
| 3          | EFFECTIVE RADIATED POWER MEASUREMENT                     | 11 |
| 3.1        | LIMIT  | 11 |
| 3.2        | TEST PROCEDURE   | 11 |
| 3.3        | DEVIATION FROM TEST STANDARD                             | 11 |
| 3.4        | TEST SETUP   | 11 |
| 3.5        | EUT OPERATING CONDITIONS                                 | 11 |
| 3.6        | TEST RESULT  | 11 |
| 4          | RADIATED SPURIOUS EMISSIONS MEASUREMENT                  | 12 |
| 4.1        | LIMIT  | 12 |
| 4.2        | TEST PROCEDURE   | 12 |
| 4.3        | DEVIATION FROM TEST STANDARD                             | 12 |
| 4.4        | TEST SETUP   | 13 |
| 4.5        | EUT OPERATING CONDITIONS                                 | 13 |
| 4.6        | TEST RESULT  | 13 |
| 5          | LIST OF MEASURING EQUIPMENTS                             | 14 |
| 6          | EUT TEST PHOTO   | 15 |
| 7          | EUT PHOTOS   | 15 |
| APPENDIX A | EFFECTIVE RADIATED POWER                                 | 16 |
| APPENDIX B | RADIATED SPURIOUS EMISSIONS                              | 22 |

**REVISION HISTORY**

| Report No.          | Version | Description      | Issued Date | Note  |
|---------------------|---------|------------------|-------------|-------|
| BTL-FCCP-5-2311T077 | R00     | Original Report. | 2024/1/30   | Valid |

## 1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards.

| Standard(s) Section  | Description                 | Test Result | Judgement | Remark |
|----------------------|-----------------------------|-------------|-----------|--------|
| 2.1046<br>90.635 (b) | Effective Radiated Power    | APPENDIX A  | Pass      | -----  |
| 2.1053<br>90.691     | Radiated Spurious Emissions | APPENDIX B  | Pass      | -----  |

**NOTE:**

- (1) "N/A" denotes test is not applicable in this Test Report.
- (2) The report format version is TP.1.1.1.
- (3) This test report is issued for the RF module (FCCID: XMR2020EM160RGL2) to be incorporated to the host device (Model number: TP00157A), Product name: Notebook Computer).  
Since the RF module has been certificated, after evaluation, above test items were criticized and reconfirmed in this report.
- (4) After spot check, this revision does not change original radio parameters.

### 1.1 REFERENCE TEST GUIDANCE

ANSI C63.26-2015  
 ANSI/TIA-603-E-2016  
 FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

### 1.2 TEST FACILITY

The test locations stated below are under the TAF Accreditation Number 0659.

The test location(s) used to collect the test data in this report are:  
 No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan  
 (FCC DN: TW0659)

- C05                       SR10                       SR11

No. 72, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan  
 (FCC DN: TW0659)

- C06                       CB21                       CB22

### 1.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k = 2$ , providing a level of confidence of approximately **95 %**. The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2  $U_{cispr}$  requirement.

A. Radiated emissions test :

| Test Site | Measurement Frequency Range | U,(dB) |
|-----------|-----------------------------|--------|
| CB21      | 0.03 GHz ~ 0.2 GHz          | 4.17   |
|           | 0.2 GHz ~ 1 GHz             | 4.72   |
|           | 1 GHz ~ 6 GHz               | 5.21   |
|           | 6 GHz ~ 18 GHz              | 5.51   |
|           | 18 GHz ~ 26 GHz             | 3.69   |
|           | 26 GHz ~ 40 GHz             | 4.23   |

NOTE:

Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

### 1.4 TEST ENVIRONMENT CONDITIONS

| Test Item                   | Environment Condition | Test Voltage | Tested by    |
|-----------------------------|-----------------------|--------------|--------------|
| Effective Radiated Power    | 23.2 °C, 45 %         | AC 120V      | Jerry Chuang |
| Radiated Spurious Emissions | Refer to data         | AC 120V      | Kevin Zhen   |

## 2 GENERAL INFORMATION

### 2.1 DESCRIPTION OF EUT

|                         |   |                    |                    |       |
|-------------------------|---|--------------------|--------------------|-------|
| Equipment               | LTE-A Cat 16 M.2 Module   |                    |                    |       |
| Model Name              | EM160R-GL   |                    |                    |       |
| Brand Name              | Quectel   |                    |                    |       |
| Model Difference        | N/A   |                    |                    |       |
| Power Source            | Supplied from host system.  |                    |                    |       |
| Power Rating            | 3.1 ~4.1Vdc, typical 3.7Vdc   |                    |                    |       |
| Host device information |   |                    |                    |       |
| Equipment               | Notebook Computer   |                    |                    |       |
| Model Name              | TP00157A  |                    |                    |       |
| Brand Name              | Lenovo  |                    |                    |       |
| Model Difference        | N/A   |                    |                    |       |
| Power Source            | DC voltage supplied from External Power Supply.<br>(Lenovo/ ADL135YSDC3A)   |                    |                    |       |
| Power Rating            | I/P: 100-240V~ 2.5A 50-60Hz<br>O/P: 20.0VDC 6.75A 135.0W / 19.95VDC 5.0A / 15.0VDC 3.0A / 9.0VDC 3.0A / 5.0VDC 3.0A 15.0W |                    |                    |       |
| WIFI+BT Module          | Intel® Wi-Fi 6E AX211 / AX211D2W  |                    |                    |       |
| WWAN Module             | Quectel / EM160R-GL   |                    |                    |       |
| Operation Frequency     | Band  | UL Frequency (MHz) | DL Frequency (MHz) |       |
|                         | LTE 26  | 814 ~ 824          | 859 ~ 869          |       |
| Maximum ERP             | LTE 26  | 1.4                | QPSK               | 0.086 |
|                         |   |                    | 16QAM              | 0.074 |
|                         |   |                    | 64QAM              | 0.073 |
|                         |   | 3                  | QPSK               | 0.087 |
|                         |   |                    | 16QAM              | 0.074 |
|                         |   |                    | 64QAM              | 0.074 |
|                         |   | 5                  | QPSK               | 0.089 |
|                         |   |                    | 16QAM              | 0.075 |
|                         |   |                    | 64QAM              | 0.075 |
|                         |   | 10                 | QPSK               | 0.090 |
|                         |   |                    | 16QAM              | 0.076 |
|                         |   |                    | 64QAM              | 0.076 |
|                         |   | 15                 | QPSK               | 0.094 |
|                         |   |                    | 16QAM              | 0.094 |
|                         |   |                    | 64QAM              | 0.074 |
| Test Model              | EM160R-GL   |                    |                    |       |
| Sample Status           | Engineering Sample  |                    |                    |       |
| EUT Modification(s)     | N/A   |                    |                    |       |

**NOTE:**

- (1) The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

## (2) Table for Filed Antenna:

| Antenna | Manufacture  | Parts Number | Type | Connector | Gain (dBi) | Note        |
|---------|--------------|--------------|------|-----------|------------|-------------|
| Main    | Luxshare-ICT | DC330023020  | PIFA | I-PEX     | -1.78      | LTE Band 26 |
| Aux     | Luxshare-ICT | DC330023030  | PIFA | I-PEX     | -          | RX only     |

| Antenna | Manufacture | Parts Number | Type | Connector | Gain (dBi) | Note        |
|---------|-------------|--------------|------|-----------|------------|-------------|
| Main    | SPEEDWIRE   | DC330023120  | PIFA | I-PEX     | -1.56      | LTE Band 26 |
| Aux     | SPEEDWIRE   | DC330023130  | PIFA | I-PEX     | -          | RX only     |

- (3) The above Antenna information are derived from the antenna data sheet provided by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.



## 2.2 TEST MODES

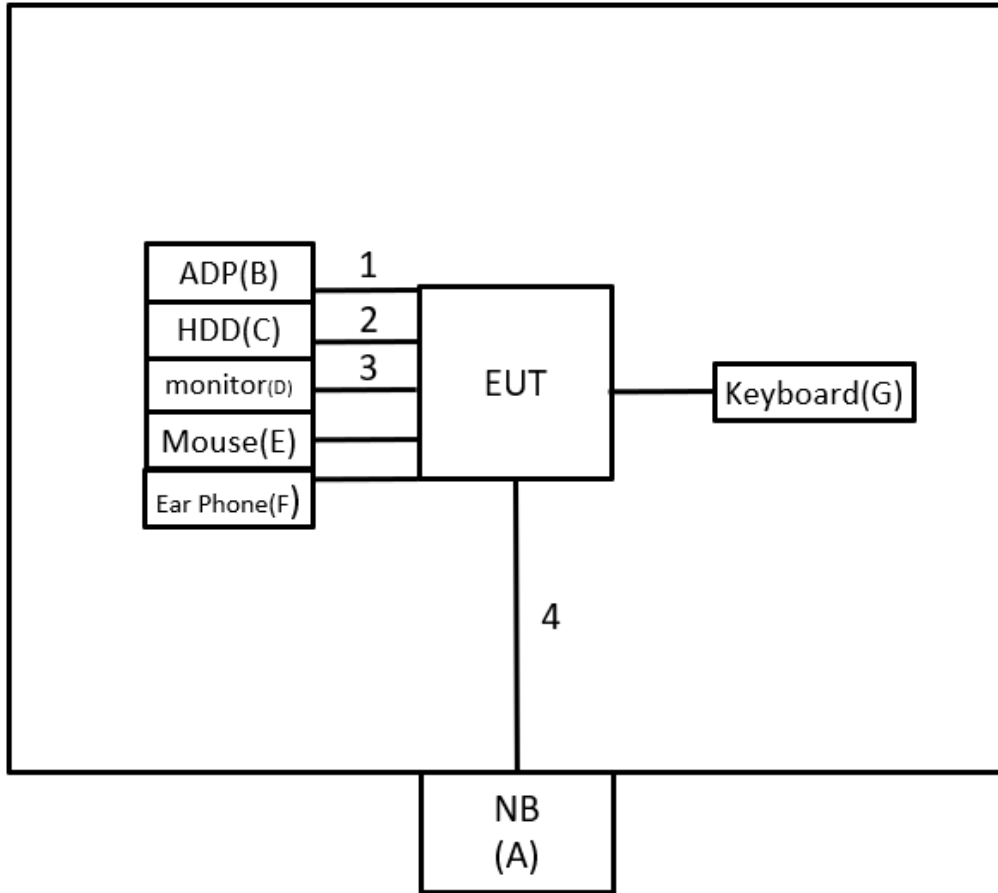
| Test Items                             | Band        | Test Mode           | Note |
|--|-------------|---------------------|------|
| Effective Radiated Power               | LTE Band 26 | Refer to APPENDIX A | -    |
| Radiated Spurious Emissions (Below 1G) | LTE Band 26 | TX Mode (CH 26740)  | -    |
| Radiated Spurious Emissions (Above 1G) | LTE Band 26 | TX Mode (CH 26740)  | -    |

**NOTE:**

- (1) All X, Y and Z axes are evaluated, but only the worst case (X axis) is recorded.
- (2) For Radiated Spurious Emissions both QPSK, 16QAM and 64QAM are evaluated, but only the worst case (QPSK) is recorded.

### 2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 2.4.



### 2.4 SUPPORT UNITS

| Item | Equipment      | Brand  | Model No.        | Series No.                  | Remarks                     |
|------|----------------|--------|------------------|-----------------------------|-----------------------------|
| A    | NB             | HP     | TPN-1119         | N/A                         | Furnished by test lab.      |
| B    | ADP            | Lenovo | ADL135YSDC3<br>A | N/A                         | Supplied by test requester. |
| C    | USB 2.5" HDD   | TOSIBA | XS700            | 483B60M9KQSS                | Furnished by test lab.      |
| D    | 27" 4K Monitor | DELL   | U2720Q           | CN-083VF-WSL0<br>0-0B7-332L | Furnished by test lab.      |
| E    | Mouse          | Lenovo | SM-8823          | N/A                         | Furnished by test lab.      |
| F    | Ear Phone      | HTC    | N/A              | N/A                         | Furnished by test lab.      |
| G    | Keyboard       | Bloody | KB-8             | N/A                         | Furnished by test lab.      |

| Item | Shielded | Ferrite Core | Length | Cable Type             | Remarks                     |
|------|----------|--------------|--------|------------------------|-----------------------------|
| 1    | N/A      | N/A          | 0.9m   | Power Cord             | Supplied by test requester. |
| 2    | N/A      | N/A          | 1m     | Type C to USB<br>Cable | Furnished by test lab.      |
| 3    | N/A      | N/A          | 1.8m   | HDMI                   | Furnished by test lab.      |
| 4    | N/A      | N/A          | 10m    | RJ45 Cable             | Furnished by test lab.      |

### 3 EFFECTIVE RADIATED POWER MEASUREMENT

#### 3.1 LIMIT

Mobile / Portable station are limited to 100 watts e.r.p.

#### 3.2 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 5.8.

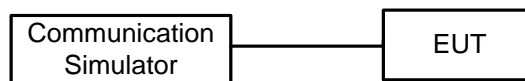
- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value " of step a. Record the power level of S.G
- c.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn.}$
- d. ERP can be calculated form EIRP by subtracting the gain of dipole,  $ERP = EIPR - 2.15\text{dBi.}$
- e. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

#### 3.3 DEVIATION FROM TEST STANDARD

No deviation.

#### 3.4 TEST SETUP

Conducted Measurement:



#### 3.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

#### 3.6 TEST RESULT

Please refer to the APPENDIX A.

## 4 RADIATED SPURIOUS EMISSIONS MEASUREMENT

### 4.1 LIMIT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to -13dBm.

NOTE:

- (1) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.
- (2) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor  
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)  
 Margin Level = Measurement Value - Limit Value

Calculation example:

| Reading Level<br>(dBm) |   | Correct Factor<br>(dB/m) |   | Measurement Value<br>(dBm) |
|------------------------|---|--------------------------|---|----------------------------|
| -50.43                 | + | -2.11                    | = | -52.54                     |

| Measurement Value<br>(dBm) |   | Limit Value<br>(dBm) |   | Margin Level<br>(dB) |
|----------------------------|---|----------------------|---|----------------------|
| -52.54                     | - | -13                  | = | -39.54               |

### 4.2 TEST PROCEDURE

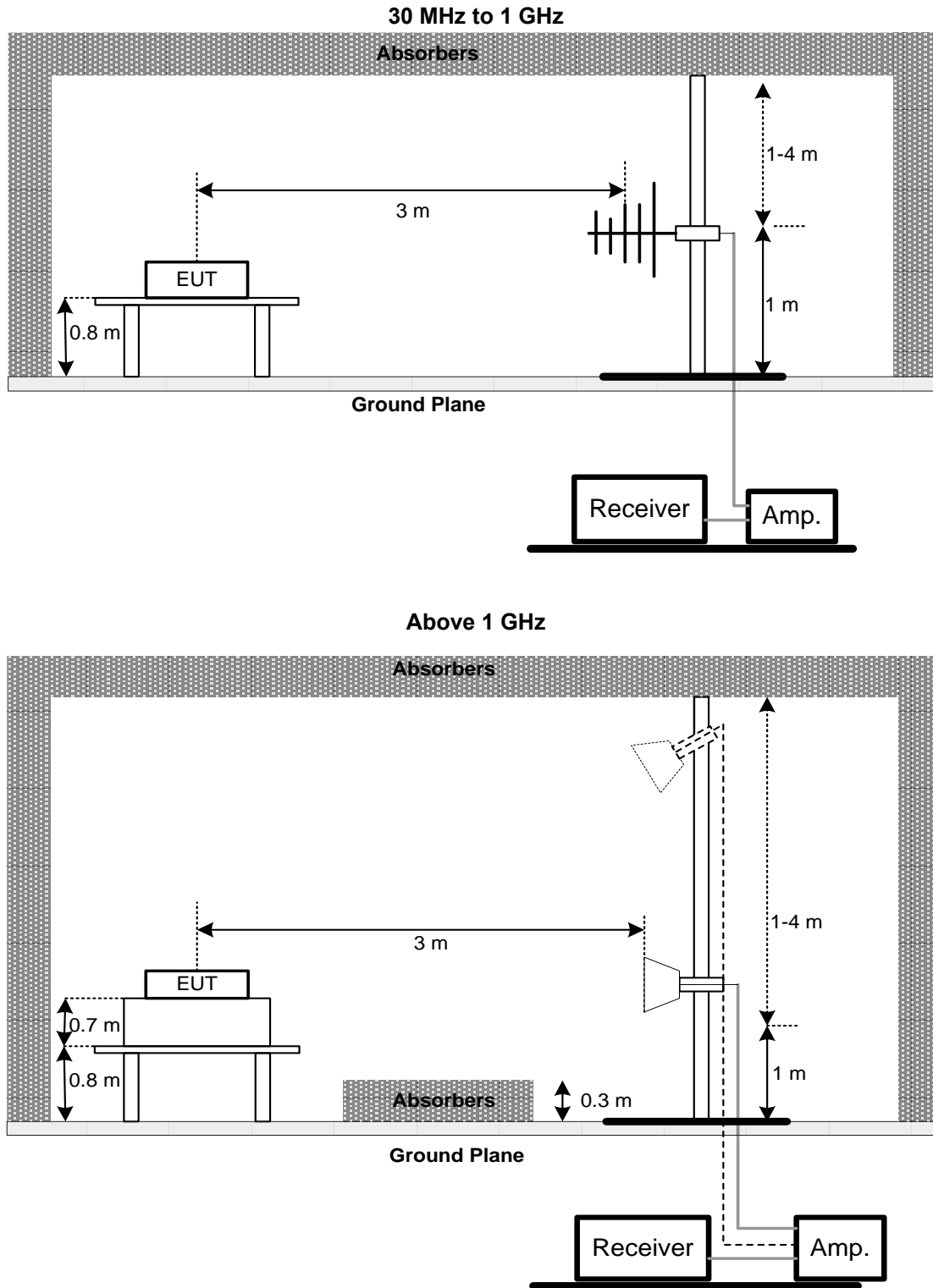
The testing follows FCC KDB 971168 v03r01 Section 6.2.

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value " of step a. Record the power level of S.G
- c.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ .
- d. ERP can be calculated form EIRP by subtracting the gain of dipole,  $ERP = EIPR - 2.15\text{dBi}$ .
- e. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

### 4.3 DEVIATION FROM TEST STANDARD

No deviation.

## 4.4 TEST SETUP



## 4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

## 4.6 TEST RESULT

Please refer to the APPENDIX B.

## 5 LIST OF MEASURING EQUIPMENTS

| Effective Radiated Power |                                  |              |          |            |                 |                  |
|--------------------------|----------------------------------|--------------|----------|------------|-----------------|------------------|
| Item                     | Kind of Equipment                | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1                        | WIRELESS COMMUNICATION TEST SET  | Agilent      | E5515C   | GB47390193 | 2023/7/4        | 2024/7/3         |
| 2                        | Radio Communication Test Station | ANRITSU      | MT8821C  | 6262044728 | 2023/11/22      | 2024/11/21       |

| Radiated Emissions |                                  |              |                             |             |                 |                  |
|--------------------|----------------------------------|--------------|-----------------------------|-------------|-----------------|------------------|
| Item               | Kind of Equipment                | Manufacturer | Type No.                    | Serial No.  | Calibrated Date | Calibrated Until |
| 1                  | Preamplifier                     | EMCI         | EMC330N                     | 980850      | 2023/9/6        | 2024/9/5         |
| 2                  | Preamplifier                     | EMCI         | EMC118A45SE                 | 980819      | 2023/3/7        | 2024/3/6         |
| 3                  | Pre-Amplifier                    | EMCI         | EMC184045SE                 | 980907      | 2023/9/21       | 2024/9/20        |
| 4                  | Test Cable                       | EMCI         | EMC104-SM-1000              | 180809      | 2023/7/10       | 2024/7/9         |
| 5                  | Test Cable                       | EMCI         | EMC104-SM-SM-3000           | 220322      | 2023/3/14       | 2024/3/13        |
| 6                  | Test Cable                       | EMCI         | EMC104-SM-SM-7000           | 220324      | 2023/3/14       | 2024/3/13        |
| 7                  | EXA Signal Analyzer              | keysight     | N9020B                      | MY57120120  | 2023/2/24       | 2024/2/23        |
| 8                  | Horn Antenna                     | RFSPIN       | DRH18-E                     | 211202A18EN | 2023/5/12       | 2024/5/11        |
| 9                  | Horn Ant                         | Schwarzbeck  | BBHA 9170D                  | 1136        | 2023/5/12       | 2024/5/11        |
| 10                 | Log-bicon Antenna                | Schwarzbeck  | VULB9168                    | 1369        | 2023/5/9        | 2024/5/8         |
| 11                 | 6dB Attenuator                   | EMCI         | EMCI-N-6-06                 | AT-06001    | 2023/5/9        | 2024/5/8         |
| 12                 | Test Cable                       | EMCI         | EMC101G-KM-KM-3000          | 220329      | 2023/3/14       | 2024/3/13        |
| 13                 | Test Cable                       | EMCI         | EMC102-KM-KM-1000           | 220327      | 2023/3/14       | 2024/3/13        |
| 14                 | Measurement Software             | EZ           | EZ EMC (Version NB-03A1-01) | N/A         | N/A             | N/A              |
| 15                 | WIRELESS COMMUNICATION TEST SET  | Agilent      | E5515C                      | GB47390193  | 2023/7/4        | 2024/7/3         |
| 16                 | Radio Communication Test Station | ANRITSU      | MT8821C                     | 6262044728  | 2023/11/22      | 2024/11/21       |

Remark: "N/A" denotes no model name, no serial no. or no calibration specified.  
All calibration period of equipment list is one year.

**6 EUT TEST PHOTO**

Please refer to document Appendix No.: TP-2311T077-FCCP-1 (APPENDIX-TEST PHOTOS).

**7 EUT PHOTOS**

Please refer to document Appendix No.: EP-2311T077-1 (APPENDIX-EUT PHOTOS).

## APPENDIX A EFFECTIVE RADIATED POWER



**LTE Band 26 Power:**

| Band | BW (MHz) | Channel | Frequency (MHz) | Mode  | UL RB Allocation | UL RB Offset | MPR | Average power (dBm) | ERP power (dBm) | ERP power (W) |
|------|----------|---------|-----------------|-------|------------------|--------------|-----|---------------------|-----------------|---------------|
| 26   | 1.4      | 26697   | 814.7           | QPSK  | 1                | 0            | 0   | 23.05               | 19.34           | 0.086         |
|      |          |         |                 |       | 1                | 2            | 0   | 22.78               | 19.07           | 0.081         |
|      |          |         |                 |       | 1                | 5            | 0   | 23.01               | 19.30           | 0.085         |
|      |          |         |                 |       | 6                | 0            | 1   | 22.65               | 18.94           | 0.078         |
|      |          |         |                 | 16QAM | 1                | 0            | 1   | 22.07               | 18.36           | 0.069         |
|      |          |         |                 |       | 1                | 2            | 1   | 22.22               | 18.51           | 0.071         |
|      |          |         |                 |       | 1                | 5            | 1   | 22.36               | 18.65           | 0.073         |
|      |          |         |                 |       | 6                | 0            | 2   | 20.95               | 17.24           | 0.053         |
|      |          |         |                 | 64QAM | 1                | 0            | 1   | 21.95               | 18.24           | 0.067         |
|      |          |         |                 |       | 1                | 2            | 1   | 22.21               | 18.50           | 0.071         |
|      |          |         |                 |       | 1                | 5            | 1   | 22.32               | 18.61           | 0.073         |
|      |          |         |                 |       | 6                | 0            | 2   | 20.61               | 16.90           | 0.049         |
|      |          | 26740   | 819.0           | QPSK  | 1                | 0            | 0   | 23.03               | 19.32           | 0.086         |
|      |          |         |                 |       | 1                | 2            | 0   | 22.79               | 19.08           | 0.081         |
|      |          |         |                 |       | 1                | 5            | 0   | 23.03               | 19.32           | 0.086         |
|      |          |         |                 |       | 6                | 0            | 1   | 22.61               | 18.90           | 0.078         |
|      |          |         |                 | 16QAM | 1                | 0            | 1   | 22.07               | 18.36           | 0.069         |
|      |          |         |                 |       | 1                | 2            | 1   | 22.28               | 18.57           | 0.072         |
|      |          |         |                 |       | 1                | 5            | 1   | 22.35               | 18.64           | 0.073         |
|      |          |         |                 |       | 6                | 0            | 2   | 20.96               | 17.25           | 0.053         |
|      |          |         |                 | 64QAM | 1                | 0            | 1   | 21.99               | 18.28           | 0.067         |
|      |          |         |                 |       | 1                | 2            | 1   | 22.20               | 18.49           | 0.071         |
|      |          |         |                 |       | 1                | 5            | 1   | 22.31               | 18.60           | 0.072         |
|      |          |         |                 |       | 6                | 0            | 2   | 20.63               | 16.92           | 0.049         |
|      |          | 26783   | 823.3           | QPSK  | 1                | 0            | 0   | 23.01               | 19.30           | 0.085         |
|      |          |         |                 |       | 1                | 2            | 0   | 22.80               | 19.09           | 0.081         |
|      |          |         |                 |       | 1                | 5            | 0   | 23.05               | 19.34           | 0.086         |
|      |          |         |                 |       | 6                | 0            | 1   | 22.62               | 18.91           | 0.078         |
|      |          |         |                 | 16QAM | 1                | 0            | 1   | 22.08               | 18.37           | 0.069         |
|      |          |         |                 |       | 1                | 2            | 1   | 22.26               | 18.55           | 0.072         |
|      |          |         |                 |       | 1                | 5            | 1   | 22.38               | 18.67           | 0.074         |
|      |          |         |                 |       | 6                | 0            | 2   | 20.92               | 17.21           | 0.053         |
|      |          |         |                 | 64QAM | 1                | 0            | 1   | 21.95               | 18.24           | 0.067         |
|      |          |         |                 |       | 1                | 2            | 1   | 22.19               | 18.48           | 0.070         |
|      |          |         |                 |       | 1                | 5            | 1   | 22.32               | 18.61           | 0.073         |
|      |          |         |                 |       | 6                | 0            | 2   | 20.62               | 16.91           | 0.049         |

**NOTE:**

(1) EIRP = Average power + Antenna gain.

(2) ERP = EIRP - 2.15.

 (3)  $P(W) = 1 W \cdot 10^{(P(dBm) / 10) / 1000}$

| Band | BW (MHz) | Channel | Frequency (MHz) | Mode  | UL RB Allocation | UL RB Offset | MPR   | Average power (dBm) | ERP power (dBm) | ERP power (W) |       |       |       |
|------|----------|---------|-----------------|-------|------------------|--------------|-------|---------------------|-----------------|---------------|-------|-------|-------|
| 26   | 3        | 26705   | 815.5           | QPSK  | 1                | 0            | 0     | 23.10               | 19.39           | 0.087         |       |       |       |
|      |          |         |                 |       | 1                | 7            | 0     | 22.85               | 19.14           | 0.082         |       |       |       |
|      |          |         |                 |       | 1                | 14           | 0     | 23.08               | 19.37           | 0.086         |       |       |       |
|      |          |         |                 | 16QAM | 15               | 0            | 1     | 22.71               | 19.00           | 0.079         |       |       |       |
|      |          |         |                 |       | 1                | 0            | 1     | 22.13               | 18.42           | 0.070         |       |       |       |
|      |          |         |                 |       | 1                | 7            | 1     | 22.28               | 18.57           | 0.072         |       |       |       |
|      |          |         |                 | 64QAM | 1                | 14           | 1     | 22.41               | 18.70           | 0.074         |       |       |       |
|      |          |         |                 |       | 15               | 0            | 2     | 21.02               | 17.31           | 0.054         |       |       |       |
|      |          |         |                 |       | 1                | 0            | 1     | 22.02               | 18.31           | 0.068         |       |       |       |
|      |          |         |                 | 26740 | 819.0            | QPSK         | 819.0 | 1                   | 0               | 0             | 23.08 | 19.37 | 0.086 |
|      |          |         |                 |       |                  |              |       | 1                   | 7               | 0             | 22.83 | 19.12 | 0.082 |
|      |          |         |                 |       |                  |              |       | 1                   | 14              | 0             | 23.10 | 19.39 | 0.087 |
|      |          | 16QAM   | 15              |       |                  | 0            | 1     | 22.67               | 18.96           | 0.079         |       |       |       |
|      |          |         | r               |       |                  | 0            | 1     | 22.15               | 18.44           | 0.070         |       |       |       |
|      |          |         | 1               |       |                  | 7            | 1     | 22.32               | 18.61           | 0.073         |       |       |       |
|      |          | 64QAM   | 1               |       |                  | 14           | 1     | 22.42               | 18.71           | 0.074         |       |       |       |
|      |          |         | 15              |       |                  | 0            | 2     | 21.03               | 17.32           | 0.054         |       |       |       |
|      |          |         | 1               |       |                  | 0            | 1     | 22.04               | 18.33           | 0.068         |       |       |       |
|      |          | 26775   | 822.5           |       |                  | QPSK         | 822.5 | 1                   | 7               | 1             | 22.28 | 18.57 | 0.072 |
|      |          |         |                 |       |                  |              |       | 1                   | 14              | 1             | 22.38 | 18.67 | 0.074 |
|      |          |         |                 |       |                  |              |       | 15                  | 0               | 2             | 20.70 | 16.99 | 0.050 |
|      |          |         |                 | 16QAM | 1                | 0            | 0     | 23.07               | 19.36           | 0.086         |       |       |       |
|      |          |         |                 |       | 1                | 7            | 0     | 22.85               | 19.14           | 0.082         |       |       |       |
|      |          |         |                 |       | 1                | 14           | 0     | 23.12               | 19.41           | 0.087         |       |       |       |
|      |          |         |                 | 64QAM | 15               | 0            | 1     | 22.69               | 18.98           | 0.079         |       |       |       |
|      |          |         |                 |       | 1                | 0            | 1     | 22.14               | 18.43           | 0.070         |       |       |       |
|      |          |         |                 |       | 1                | 7            | 1     | 22.34               | 18.63           | 0.073         |       |       |       |
|      |          |         |                 | 26775 | 822.5            | 16QAM        | 822.5 | 1                   | 14              | 1             | 22.43 | 18.72 | 0.074 |
|      |          |         |                 |       |                  |              |       | 15                  | 0               | 2             | 21.00 | 17.29 | 0.054 |
|      |          |         |                 |       |                  |              |       | 1                   | 0               | 1             | 22.00 | 18.29 | 0.067 |
|      |          | 64QAM   | 1               |       |                  | 7            | 1     | 22.26               | 18.55           | 0.072         |       |       |       |
|      |          |         | 1               |       |                  | 14           | 1     | 22.39               | 18.68           | 0.074         |       |       |       |
|      |          |         | 15              |       |                  | 0            | 2     | 20.67               | 16.96           | 0.050         |       |       |       |

**NOTE:**

(1) EIRP = Average power + Antenna gain.

(2) ERP = EIRP - 2.15.

 (3)  $P(W) = 1 W \cdot 10^{(P(dBm) / 10)} / 1000$

| Band | BW (MHz) | Channel | Frequency (MHz) | Mode  | UL RB Allocation | UL RB Offset | MPR | Average power (dBm) | ERP power (dBm) | ERP power (W) |
|------|----------|---------|-----------------|-------|------------------|--------------|-----|---------------------|-----------------|---------------|
| 26   | 5        | 26715   | 816.5           | QPSK  | 1                | 0            | 0   | 23.16               | 19.45           | 0.088         |
|      |          |         |                 |       | 1                | 12           | 0   | 22.91               | 19.20           | 0.083         |
|      |          |         |                 |       | 1                | 24           | 0   | 23.15               | 19.44           | 0.088         |
|      |          |         |                 |       | 25               | 0            | 1   | 22.77               | 19.06           | 0.081         |
|      |          |         |                 | 16QAM | 1                | 0            | 1   | 22.18               | 18.47           | 0.070         |
|      |          |         |                 |       | 1                | 12           | 1   | 22.36               | 18.65           | 0.073         |
|      |          |         |                 |       | 1                | 24           | 1   | 22.47               | 18.76           | 0.075         |
|      |          |         |                 |       | 25               | 0            | 2   | 21.08               | 17.37           | 0.055         |
|      |          |         |                 | 64QAM | 1                | 0            | 1   | 22.09               | 18.38           | 0.069         |
|      |          |         |                 |       | 1                | 12           | 1   | 22.34               | 18.63           | 0.073         |
|      |          |         |                 |       | 1                | 24           | 1   | 22.45               | 18.74           | 0.075         |
|      |          |         |                 |       | 25               | 0            | 2   | 20.75               | 17.04           | 0.051         |
|      |          | 26740   | 819.0           | QPSK  | 1                | 0            | 0   | 23.14               | 19.43           | 0.088         |
|      |          |         |                 |       | 1                | 12           | 0   | 22.90               | 19.19           | 0.083         |
|      |          |         |                 |       | 1                | 24           | 0   | 23.17               | 19.46           | 0.088         |
|      |          |         |                 |       | 25               | 0            | 1   | 22.74               | 19.03           | 0.080         |
|      |          |         |                 | 16QAM | 1                | 0            | 1   | 22.20               | 18.49           | 0.071         |
|      |          |         |                 |       | 1                | 12           | 1   | 22.38               | 18.67           | 0.074         |
|      |          |         |                 |       | 1                | 24           | 1   | 22.48               | 18.77           | 0.075         |
|      |          |         |                 |       | 25               | 0            | 2   | 21.10               | 17.39           | 0.055         |
|      |          |         |                 | 64QAM | 1                | 0            | 1   | 22.09               | 18.38           | 0.069         |
|      |          |         |                 |       | 1                | 12           | 1   | 22.33               | 18.62           | 0.073         |
|      |          |         |                 |       | 1                | 24           | 1   | 22.44               | 18.73           | 0.075         |
|      |          |         |                 |       | 25               | 0            | 2   | 20.75               | 17.04           | 0.051         |
|      |          | 26765   | 821.5           | QPSK  | 1                | 0            | 0   | 23.13               | 19.42           | 0.087         |
|      |          |         |                 |       | 1                | 12           | 0   | 22.93               | 19.22           | 0.084         |
|      |          |         |                 |       | 1                | 24           | 0   | 23.18               | 19.47           | 0.089         |
|      |          |         |                 |       | 25               | 0            | 1   | 22.74               | 19.03           | 0.080         |
|      |          |         |                 | 16QAM | 1                | 0            | 1   | 22.20               | 18.49           | 0.071         |
|      |          |         |                 |       | 1                | 12           | 1   | 22.39               | 18.68           | 0.074         |
|      |          |         |                 |       | 1                | 24           | 1   | 22.48               | 18.77           | 0.075         |
|      |          |         |                 |       | 25               | 0            | 2   | 21.08               | 17.37           | 0.055         |
|      |          |         |                 | 64QAM | 1                | 0            | 1   | 22.08               | 18.37           | 0.069         |
|      |          |         |                 |       | 1                | 12           | 1   | 22.33               | 18.62           | 0.073         |
|      |          |         |                 |       | 1                | 24           | 1   | 22.43               | 18.72           | 0.074         |
|      |          |         |                 |       | 25               | 0            | 2   | 20.73               | 17.02           | 0.050         |

**NOTE:**

(1) EIRP = Average power + Antenna gain.

(2) ERP = EIRP - 2.15.

 (3)  $P(W) = 1 W \cdot 10^{(P(dBm) / 10)} / 1000$

| Band | BW (MHz) | Channel | Frequency (MHz) | Mode  | UL RB Allocation | UL RB Offset | MPR | Average power (dBm) | ERP power (dBm) | ERP power (W) |
|------|----------|---------|-----------------|-------|------------------|--------------|-----|---------------------|-----------------|---------------|
| 26   | 10       | 26740   | 819.0           | QPSK  | 1                | 0            | 0   | 23.20               | 19.49           | 0.089         |
|      |          |         |                 |       | 1                | 24           | 0   | 22.97               | 19.26           | 0.084         |
|      |          |         |                 |       | 1                | 49           | 0   | 23.23               | 19.52           | 0.090         |
|      |          |         |                 |       | 50               | 0            | 1   | 22.81               | 19.10           | 0.081         |
|      |          |         |                 | 16QAM | 1                | 0            | 1   | 22.24               | 18.53           | 0.071         |
|      |          |         |                 |       | 1                | 24           | 1   | 22.43               | 18.72           | 0.074         |
|      |          |         |                 |       | 1                | 49           | 1   | 22.54               | 18.83           | 0.076         |
|      |          |         |                 |       | 50               | 0            | 2   | 21.15               | 17.44           | 0.055         |
|      |          |         |                 | 64QAM | 1                | 0            | 1   | 22.15               | 18.44           | 0.070         |
|      |          |         |                 |       | 1                | 24           | 1   | 22.40               | 18.69           | 0.074         |
|      |          |         |                 |       | 1                | 49           | 1   | 22.49               | 18.78           | 0.076         |
|      |          |         |                 |       | 50               | 0            | 2   | 20.81               | 17.10           | 0.051         |

**NOTE:**

(1) EIRP = Average power + Antenna gain.

(2) ERP = EIRP - 2.15.

 (3)  $P(W) = 1 W \cdot 10^{(P(dBm) / 10) / 1000}$

| Band | BW (MHz) | Channel | Frequency (MHz) | Mode  | UL RB Allocation | UL RB Offset | MPR | Average power (dBm) | ERP power (dBm) | ERP power (W) |
|------|----------|---------|-----------------|-------|------------------|--------------|-----|---------------------|-----------------|---------------|
| 26   | 15       | 26765   | 821.5           | QPSK  | 1                | 0            | 0   | 23.43               | 19.72           | 0.094         |
|      |          |         |                 |       | 1                | 36           | 0   | 23.18               | 19.47           | 0.089         |
|      |          |         |                 |       | 1                | 74           | 0   | 23.28               | 19.57           | 0.091         |
|      |          |         |                 |       | 75               | 0            | 1   | 23.12               | 19.41           | 0.087         |
|      |          |         |                 | 16QAM | 1                | 0            | 1   | 23.46               | 19.75           | 0.094         |
|      |          |         |                 |       | 1                | 36           | 1   | 22.38               | 18.67           | 0.074         |
|      |          |         |                 |       | 1                | 74           | 1   | 23.42               | 19.71           | 0.094         |
|      |          |         |                 |       | 75               | 0            | 2   | 20.73               | 17.02           | 0.050         |
|      |          |         |                 | 64QAM | 1                | 0            | 1   | 22.38               | 18.67           | 0.074         |
|      |          |         |                 |       | 1                | 36           | 1   | 22.37               | 18.66           | 0.073         |
|      |          |         |                 |       | 1                | 74           | 1   | 22.31               | 18.60           | 0.072         |
|      |          |         |                 |       | 75               | 0            | 2   | 21.13               | 17.42           | 0.055         |

**NOTE:**

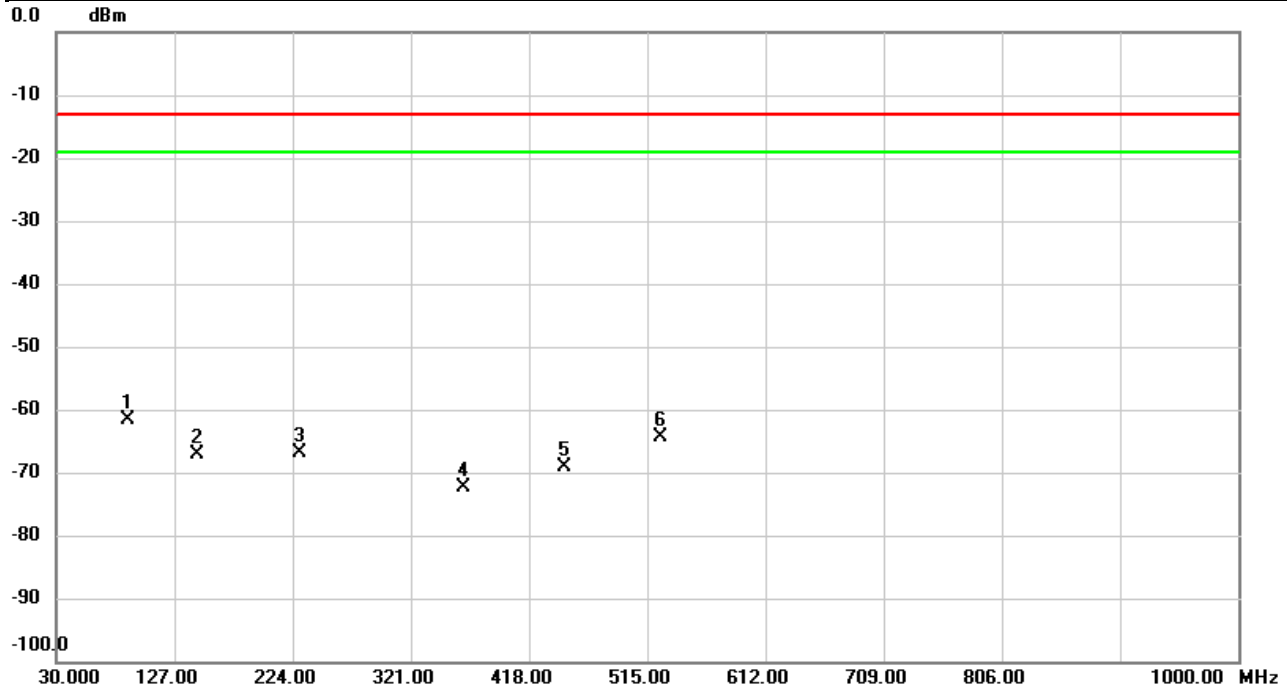
(1) EIRP = Average power + Antenna gain.

(2) ERP = EIRP - 2.15.

 (3)  $P(W) = 1 W \cdot 10^{(P(dBm) / 10) / 1000}$

## **APPENDIX B    RADIATED SPURIOUS EMISSIONS**

|              |             |              |            |
|--------------|-------------|--------------|------------|
| Test Mode    | LTE Band 26 | Test Date    | 2023/12/26 |
| Test Channel | CH26740     | Polarization | Vertical   |
| Temp         | 21°C        | Hum.         | 59%        |

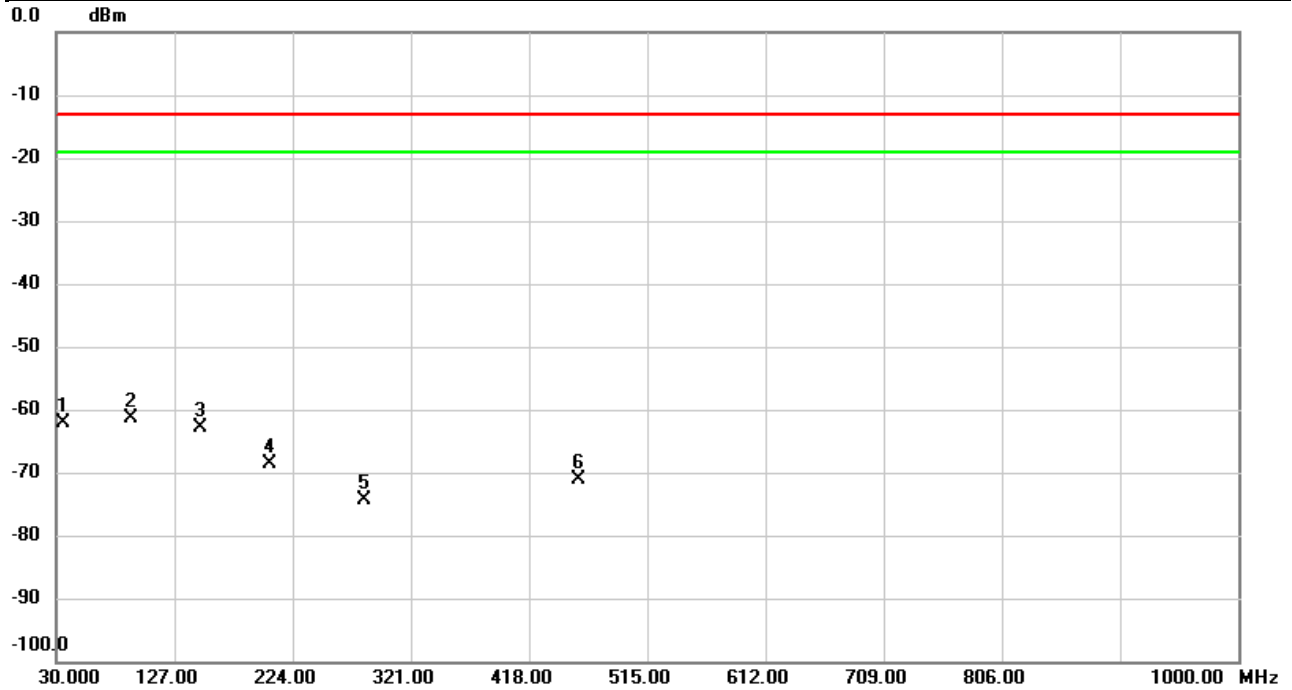


| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBm | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBm | Limit<br>dBm | Over<br>dB | Detector | Comment |
|-----|-----|--------------|-------------------------|-------------------------|-------------------------|--------------|------------|----------|---------|
| 1   | *   | 88.9760      | -58.17                  | -3.47                   | -61.64                  | -13.00       | -48.64     | peak     |         |
| 2   |     | 145.6887     | -66.26                  | -0.83                   | -67.09                  | -13.00       | -54.09     | peak     |         |
| 3   |     | 229.6260     | -66.20                  | -0.66                   | -66.86                  | -13.00       | -53.86     | peak     |         |
| 4   |     | 364.9733     | -71.90                  | -0.48                   | -72.38                  | -13.00       | -59.38     | peak     |         |
| 5   |     | 447.1323     | -69.89                  | 0.72                    | -69.17                  | -13.00       | -56.17     | peak     |         |
| 6   |     | 525.8640     | -67.92                  | 3.59                    | -64.33                  | -13.00       | -51.33     | peak     |         |

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

|              |             |              |            |
|--------------|-------------|--------------|------------|
| Test Mode    | LTE Band 26 | Test Date    | 2023/12/26 |
| Test Channel | CH26740     | Polarization | Horizontal |
| Temp         | 21°C        | Hum.         | 59%        |



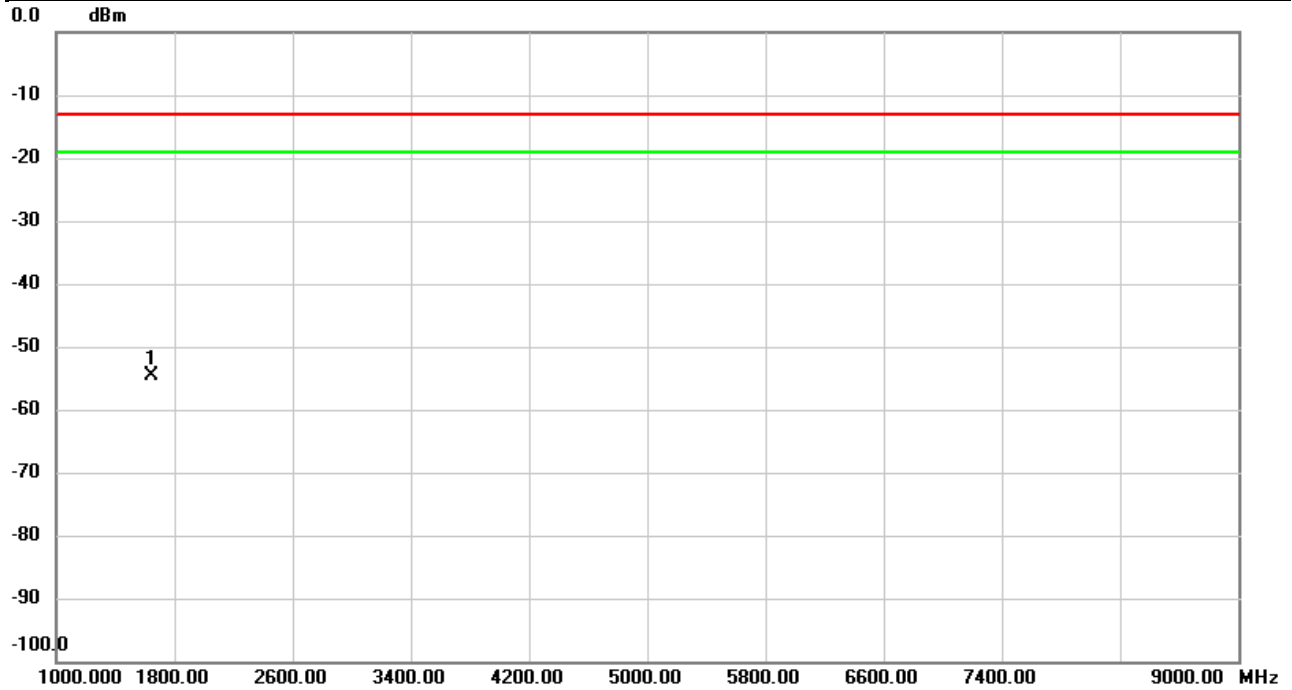
| No. | Mk. | Freq. (MHz) | Reading Level (dBm) | Correct Factor (dB) | Measurement (dBm) | Limit (dBm) | Over (dB) | Detector | Comment |
|-----|-----|-------------|---------------------|---------------------|-------------------|-------------|-----------|----------|---------|
| 1   |     | 36.0787     | -66.56              | 4.38                | -62.18            | -13.00      | -49.18    | peak     |         |
| 2   | *   | 90.7867     | -55.25              | -6.15               | -61.40            | -13.00      | -48.40    | peak     |         |
| 3   |     | 147.8550    | -59.33              | -3.47               | -62.80            | -13.00      | -49.80    | peak     |         |
| 4   |     | 205.0850    | -61.28              | -7.32               | -68.60            | -13.00      | -55.60    | peak     |         |
| 5   |     | 282.6527    | -69.68              | -4.61               | -74.29            | -13.00      | -61.29    | peak     |         |
| 6   |     | 458.9987    | -71.29              | 0.21                | -71.08            | -13.00      | -58.08    | peak     |         |

**REMARKS:**

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.



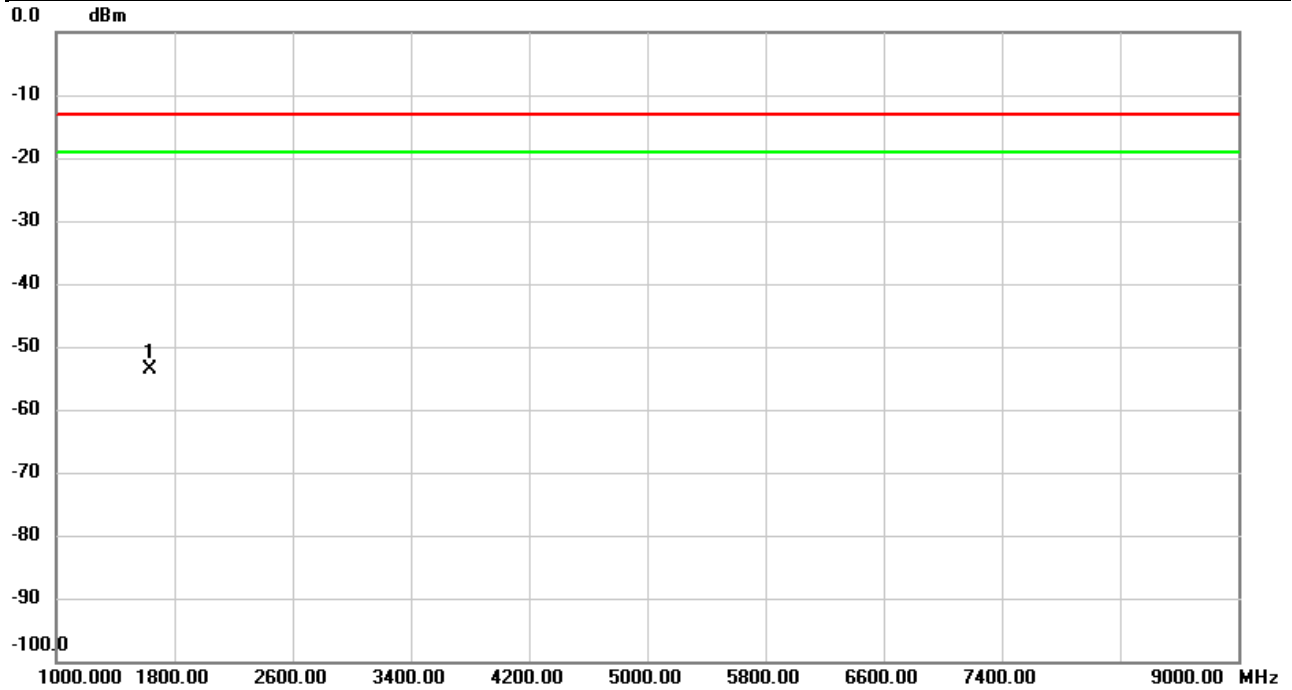
|              |             |              |            |
|--------------|-------------|--------------|------------|
| Test Mode    | LTE Band 26 | Test Date    | 2023/12/25 |
| Test Channel | CH26740     | Polarization | Vertical   |
| Temp         | 21°C        | Hum.         | 58%        |



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Over   | Detector | Comment |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz      | dBm           | dB             | dBm         | dBm    | dB     |          |         |
| 1   | *   | 1646.133 | -60.16        | 5.56           | -54.60      | -13.00 | -41.60 | peak     |         |

REMARKS:  
 (1) Measurement Value = Reading Level + Correct Factor.  
 (2) Margin Level = Measurement Value - Limit Value.

|              |             |              |            |
|--------------|-------------|--------------|------------|
| Test Mode    | LTE Band 26 | Test Date    | 2023/12/25 |
| Test Channel | CH26740     | Polarization | Horizontal |
| Temp         | 21°C        | Hum.         | 58%        |



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Over   | Detector | Comment |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz      | dBm           | dB             | dBm         | dBm    | dB     |          |         |
| 1   | *   | 1630.133 | -58.87        | 5.29           | -53.58      | -13.00 | -40.58 | peak     |         |

REMARKS:  
 (1) Measurement Value = Reading Level + Correct Factor.  
 (2) Margin Level = Measurement Value - Limit Value.

**End of Test Report**