



Test Report No.: RF180205W003-6

# FCC TEST REPORT

## (PART 27)

|            |                                                                                             |
|------------|---------------------------------------------------------------------------------------------|
| Applicant: | Gosuncn Technology Group Co., Ltd.                                                          |
| Address:   | 6F, 2819 KaiChuang Blvd., Science Town, Huangpu District, Guangzhou City, Guangdong, China. |

|                           |                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------|
| Manufacturer or Supplier: | Gosuncn Technology Group Co., Ltd.                                                          |
| Address:                  | 6F, 2819 KaiChuang Blvd., Science Town, Huangpu District, Guangzhou City, Guangdong, China. |
| Product:                  | LTE OBDII Hotspot                                                                           |
| Brand Name:               | GOSUNCN                                                                                     |
| Model Name:               | GD500                                                                                       |
| FCC ID:                   | 2APNR-GD500                                                                                 |
| Date of tests:            | Aug. 01, 2018 ~ Aug. 22, 2018                                                               |

The tests have been carried out according to the requirements of the following standard:

☒ FCC Part 27, Subpart C, N    ☒ ANSI/TIA/EIA-603- D  
☒ FCC Part 2                      ☒ ANSI/TIA/EIA-603-E    ☒ ANSI C63.26-2015

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

|                                                                                     |                                                                                       |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Prepared by Roger Li<br>Engineer / Mobile Department                                | Approved by Sam Tung<br>Manager / Mobile Department                                   |
|  |  |
| Date: Aug. 23, 2018                                                                 | Date: Aug. 23, 2018                                                                   |

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## RELEASE CONTROL RECORD

| ISSUE NO.      | REASON FOR CHANGE | DATE ISSUED   |
|----------------|-------------------|---------------|
| RF180205W003-6 | Original release  | Aug. 23, 2018 |



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## 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 27 & Part 2 |                              |        |                                                                                   |           |
|----------------------------------------|------------------------------|--------|-----------------------------------------------------------------------------------|-----------|
| STANDARD SECTION                       | TEST TYPE AND LIMIT          | RESULT | REMARK                                                                            | TEST LAB* |
| 2.1046<br>27.50(c)(10)                 | Maximum Peak Output Power    | PASS   | Meet the requirement of limit.                                                    | B         |
| 2.1055<br>27.54                        | Frequency Stability          | PASS   | Meet the requirement of limit.                                                    | A         |
| 2.1049<br>27.53(g)                     | Occupied Bandwidth           | PASS   | Meet the requirement of limit.                                                    | A         |
| 27.50(d)(5)                            | Peak to average ratio        | PASS   | Meet the requirement of limit.                                                    | A         |
| 27.53(g)                               | Band Edge Measurements       | PASS   | Meet the requirement of limit.                                                    | A         |
| 2.1051<br>27.53(g)                     | Conducted Spurious Emissions | PASS   | Meet the requirement of limit.                                                    | A         |
| 2.1053<br>27.53(g)                     | Radiated Spurious Emissions  | PASS   | Meet the requirement of limit.<br>Minimum passing margin is -23.75dB at 32.43MHz. | B         |

### \*Test Lab Information Reference

#### Lab A:

BV 7Layers Communications Technology (Shenzhen) Co. Ltd

#### Lab Address:

No.B102, Dazu Chuangxin Mansion, North of Beihuan Avenue, North Area, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, China

**Accredited Test Lab Cert 3939.01**

#### Lab B:

Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

#### Lab Address:

No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.

**FCC Registration/Designation Number: 788550/TW0003**

## 1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| MEASUREMENT         | FREQUENCY     | UNCERTAINTY |
|---------------------|---------------|-------------|
| Conducted emissions | 9kHz~30MHz    | 2.66dB      |
| Radiated emissions  | 9KHz ~ 30MHz  | 2.68dB      |
|                     | 30MHz ~ 1GMHz | 3.26dB      |
|                     | 1GHz ~ 18GHz  | 4.48dB      |
|                     | 18GHz ~ 40GHz | 4.12dB      |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 1.2 TEST SITE AND INSTRUMENTS

| Equipment                                   | Manufacturer | Model No.                           | Serial No.                      | Last Cal.  | Next Cal.  |
|---------------------------------------------|--------------|-------------------------------------|---------------------------------|------------|------------|
| MXE EMI Receiver                            | KEYSIGHT     | N9038A-544                          | MY54450026                      | Mar. 16,18 | Mar. 15,19 |
| EXA Signal Analyzer                         | KEYSIGHT     | N9010A-526                          | MY54510322                      | Mar. 16,18 | Mar. 15,19 |
| Bilog Antenna 1                             | ETS-LINDGREN | 3143B                               | 00161964                        | Nov. 26,16 | Nov. 25,18 |
| Bilog Antenna 2                             | ETS-LINDGREN | 3143B                               | 00161965                        | Nov. 26,16 | Nov. 25,18 |
| Horn Antenna 1                              | ETS-LINDGREN | 3117                                | 00168728                        | Nov. 26,16 | Nov. 25,18 |
| Horn Antenna 2                              | ETS-LINDGREN | 3117                                | 00168692                        | Nov. 26,16 | Nov. 25,18 |
| Loop antenna                                | Daze         | ZN30900A                            | 0708                            | Nov. 20,17 | Nov. 19,18 |
| Horn Antenna<br>(18GHz-40GHz)               | N/A          | QWH-SL-18-40<br>-K-SG/QMS-00<br>361 | 15433                           | Dec. 16,16 | Dec. 15,18 |
| Radio<br>Communication<br>Analyzer          | ANRITSU      | MT8820C                             | 6201465426                      | Mar. 02,18 | Mar. 01,19 |
| Signal Pre-Amplifier                        | EMSI         | EMC 9135                            | 980249                          | Jul. 09,18 | Jul. 08,19 |
| Signal Pre-Amplifier                        | EMSI         | EMC 012645B                         | 980257                          | Jul. 09,18 | Jul. 08,19 |
| Signal Pre-Amplifier                        | EMSI         | EMC 184045B                         | 980259                          | Jul. 09,18 | Jul. 08,19 |
| 3m Semi-anechoic<br>Chamber                 | ETS-LINDGREN | 9m*6m*6m                            | Euroshieldpn-<br>CT0001143-1216 | Apr. 21,18 | Apr. 20,19 |
| Test Software                               | E3           | V 9.160323                          | N/A                             | N/A        | N/A        |
| Test Software                               | ADT          | ADT_Radiated<br>V7.6.15.9.2         | N/A                             | N/A        | N/A        |
| 10dB Attenuator                             | JFW/USA      | 50HF-010-SM<br>A                    | 1505                            | Jul. 09,18 | Jul. 08,19 |
| Power Meter                                 | Anritsu      | ML2495A                             | 1506002                         | Mar. 02,18 | Mar. 01,19 |
| Power Sensor                                | Anritsu      | MA2411B                             | 1339352                         | Mar. 16,18 | Mar. 15,19 |
| Humid & Temp<br>Programmable Tester         | Juyi         | ITH-120-45-CP<br>-AR                | IAA1504-001                     | Jul. 09,18 | Jul. 08,19 |
| MXG Analog<br>Microwave<br>Signal Generator | KEYSIGHT     | N5183A                              | MY50143024                      | Mar. 13,18 | Mar. 12,19 |

- NOTE:**
1. The calibration interval of the above test instruments is 12 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
  2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.
  3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
  4. The FCC Site Registration No. is 525120.



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- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
  3. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.
  4. The FCC Site Registration No. is 788550.

## 2 GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

|                              |                                                                  |                     |
|------------------------------|------------------------------------------------------------------|---------------------|
| <b>PRODUCT</b>               | LTE OBDII Hotspot                                                |                     |
| <b>MODEL NAME</b>            | GD500                                                            |                     |
| <b>POWER SUPPLY</b>          | 12/24Vdc (adapter or host equipment)<br>3.7Vdc (Li-ion, battery) |                     |
| <b>MODULATION TECHNOLOGY</b> | LTE                                                              | QPSK, 16QAM         |
| <b>FREQUENCY RANGE</b>       | LTE Band 71<br>Channel Bandwidth: 5MHz                           | 665.5MHz ~ 695.5MHz |
|                              | LTE Band 71<br>Channel Bandwidth: 10MHz                          | 668MHz ~ 693MHz     |
|                              | LTE Band 71<br>Channel Bandwidth: 15MHz                          | 670.5MHz ~ 690.5MHz |
|                              | LTE Band 71<br>Channel Bandwidth: 20MHz                          | 673MHz ~ 688MHz     |
| <b>EMISSION DESIGNATOR</b>   | LTE Band 71<br>Channel Bandwidth: 5MHz                           | QPSK: 4M49G7D       |
|                              |                                                                  | 16QAM: 4M47W7D      |
|                              | LTE Band 71<br>Channel Bandwidth: 10MHz                          | QPSK: 8M94G7D       |
|                              |                                                                  | 16QAM: 8M93W7D      |
|                              | LTE Band 71<br>Channel Bandwidth: 15MHz                          | QPSK: 13M4G7D       |
|                              |                                                                  | 16QAM: 13M4W7D      |
| <b>MAX. ERP/EIRP POWER</b>   | LTE Band 71<br>Channel Bandwidth: 5MHz                           | 190mW               |
|                              |                                                                  | 228mW               |
|                              | LTE Band 71<br>Channel Bandwidth: 15MHz                          | 242mW               |
|                              |                                                                  | 248mW               |
| <b>ANTENNA TYPE</b>          | Fixed Internal Antenna with -0.2dBi                              |                     |
| <b>HW VERSION</b>            | SD6500.H03                                                       |                     |
| <b>SW VERSION</b>            | EN_SD6500V1.0.0B01                                               |                     |
| <b>ACCESSORY DEVICE</b>      | Refer to note as below                                           |                     |
| <b>DATA CABLE</b>            | N/A                                                              |                     |



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**NOTE:**

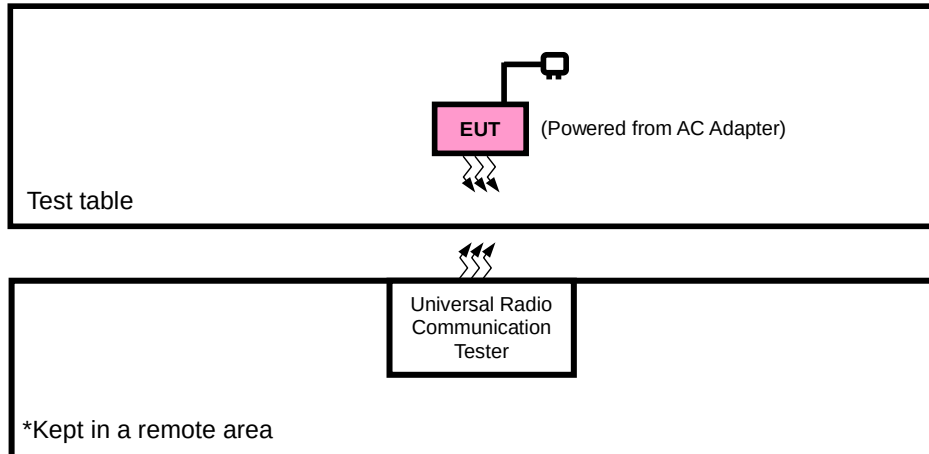
1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. There were two configurations for this project:

| EUT   | Configurations  |
|-------|-----------------|
| EUT 1 | SIM             |
| EUT 2 | E-SIM + Battery |

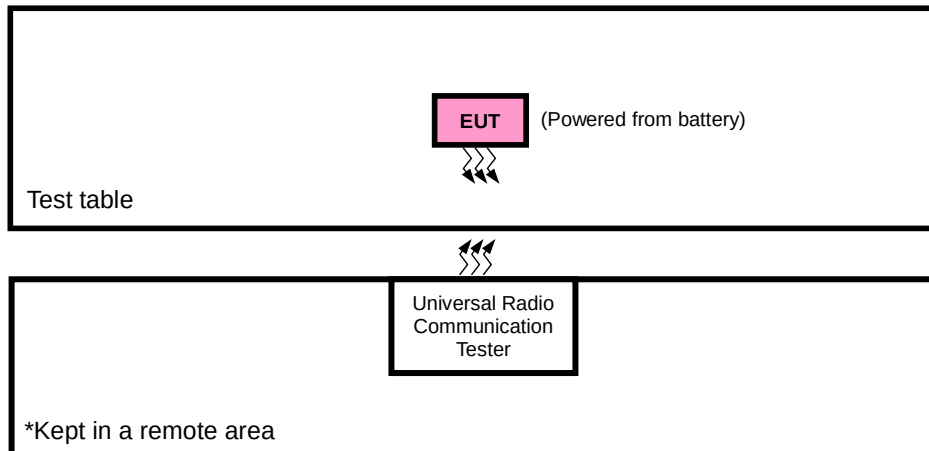
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

## 2.2 CONFIGURATION OF SYSTEM UNDER TEST

### FOR RADIATION EMISSION TEST



### FOR CONDUCTED & E.I.R.P TEST



## 2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT   | BRAND    | MODEL NO. | SERIAL NO. | FCC ID |
|-----|-----------|----------|-----------|------------|--------|
| 1   | DC source | LONG WEI | PS-6403D  | 010934269  | N/A    |
| 2   | PC        | HP       | A6608CN   | 3CR83825X3 | N/A    |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|-----------------------------------------------------|
| 1   | DC Line: Unshielded, Detachable 1.0m                |
| 2   | AC Line: Unshielded, Detachable 1.5m                |

**NOTE:**

1. All power cords of the above support units are non shielded (1.8m).

## 2.4 DESCRIPTION OF TEST MODES

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case in ERP/EIRP and radiated emission was found when positioned on X-plane for LTE. Following channel(s) was (were) selected for the final test as listed below:

| EUT<br>CONFIGURE<br>MODE | DESCRIPTION                               |
|--------------------------|-------------------------------------------|
| A                        | EUT + Adapter + USB Cable + with LTE link |
| B                        | EUT + Battery with LTE link               |

**LTE BAND 71**

| EUT<br>CONFIGURE<br>MODE | TEST ITEM                   | AVAILABLE<br>CHANNEL | TESTED CHANNEL            | CHANNEL<br>BANDWIDTH | MODULATION  | MODE                |
|--------------------------|-----------------------------|----------------------|---------------------------|----------------------|-------------|---------------------|
| B                        | EIRP                        | 133147 to 133447     | 133147, 133297,<br>133447 | 5MHz                 | QPSK, 16QAM | 1 RB / 0 RB Offset  |
|                          |                             | 133172 to 133422     | 133172, 133297,<br>133422 | 10MHz                | QPSK, 16QAM | 1 RB / 0 RB Offset  |
|                          |                             | 133197 to 133397     | 133197, 133297,<br>133397 | 15MHz                | QPSK, 16QAM | 1 RB / 0 RB Offset  |
|                          |                             | 133222 to 133372     | 133222, 133297,<br>133372 | 20MHz                | QPSK, 16QAM | 1 RB / 0 RB Offset  |
| B                        | FREQUENCY<br>STABILITY      | 133147 to 133447     | 133147 133447             | 5MHz                 | QPSK        | 1 RB / 0 RB Offset  |
|                          |                             | 133172 to 133422     | 133172 133422             | 10MHz                | QPSK        | 1 RB / 0 RB Offset  |
|                          |                             | 133197 to 133397     | 133197 133397             | 15MHz                | QPSK        | 1 RB / 0 RB Offset  |
|                          |                             | 133222 to 133372     | 133222 133372             | 20MHz                | QPSK        | 1 RB / 0 RB Offset  |
| B                        | OCCUPIED<br>BANDWIDTH       | 133147 to 133447     | 133147, 133297,<br>133447 | 5MHz                 | QPSK, 16QAM | 6 RB / 0 RB Offset  |
|                          |                             | 133172 to 133422     | 133172, 133297,<br>133422 | 10MHz                | QPSK, 16QAM | 15 RB / 0 RB Offset |
|                          |                             | 133197 to 133397     | 133197, 133297,<br>133397 | 15MHz                | QPSK, 16QAM | 25 RB / 0 RB Offset |
|                          |                             | 133222 to 133372     | 133222, 133297,<br>133372 | 20MHz                | QPSK, 16QAM | 50 RB / 0 RB Offset |
| B                        | PEAK TO<br>AVERAGE<br>RATIO | 133147 to 133447     | 133147, 133297,<br>133447 | 5MHz                 | QPSK, 16QAM | 1 RB / 0 RB Offset  |
|                          |                             | 133172 to 133422     | 133172, 133297,<br>133422 | 10MHz                | QPSK, 16QAM | 1 RB / 0 RB Offset  |
|                          |                             | 133197 to 133397     | 133197, 133297,<br>133397 | 15MHz                | QPSK, 16QAM | 1 RB / 0 RB Offset  |
|                          |                             | 133222 to 133372     | 133222, 133297,<br>133372 | 20MHz                | QPSK, 16QAM | 1 RB / 0 RB Offset  |
| B                        | BAND EDGE                   | 133147 to 133447     | 133147                    | 5MHz                 | QPSK        | 1 RB / 0 RB Offset  |
|                          |                             |                      |                           |                      |             | 6 RB / 0 RB Offset  |
|                          |                             | 133172 to 133422     | 133447                    | 5MHz                 | QPSK        | 1 RB / 5 RB Offset  |
|                          |                             |                      |                           |                      |             | 6 RB / 0 RB Offset  |
|                          |                             | 133197 to 133397     | 133172                    | 10MHz                | QPSK        | 1 RB / 0 RB Offset  |
|                          |                             |                      |                           |                      |             | 15 RB / 0 RB Offset |
|                          |                             | 133222 to 133372     | 1334227                   | 10MHz                | QPSK        | 1 RB / 14 RB Offset |
|                          |                             |                      |                           |                      |             | 15 RB / 0 RB Offset |
|                          |                             | 133197 to 133397     | 133197                    | 15MHz                | QPSK        | 1 RB / 0 RB Offset  |
|                          |                             |                      |                           |                      |             | 25 RB / 0 RB Offset |
|                          |                             | 133222 to 133372     | 133397                    | 15MHz                | QPSK        | 1 RB / 24 RB Offset |
|                          |                             |                      |                           |                      |             | 25 RB / 0 RB Offset |
|                          |                             | 133222 to 133372     | 133222                    | 20MHz                | QPSK        | 1 RB / 0 RB Offset  |
|                          |                             |                      |                           |                      |             | 50 RB / 0 RB Offset |
|                          |                             | 133222 to 133372     | 133372                    | 20MHz                | QPSK        | 1 RB / 49 RB Offset |
|                          |                             |                      |                           |                      |             | 50 RB / 0 RB Offset |



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|   |                          |                  |                           |       |      |                    |
|---|--------------------------|------------------|---------------------------|-------|------|--------------------|
| B | CONDCUDET<br>ED EMISSION | 133147 to 133447 | 133147, 133297,<br>133447 | 5MHz  | QPSK | 1 RB / 0 RB Offset |
|   |                          | 133172 to 133422 | 133172, 133297,<br>133422 | 10MHz | QPSK | 1 RB / 0 RB Offset |
|   |                          | 133197 to 133397 | 133197, 133297,<br>133397 | 15MHz | QPSK | 1 RB / 0 RB Offset |
|   |                          | 133222 to 133372 | 133222, 133297,<br>133372 | 20MHz | QPSK | 1 RB / 0 RB Offset |
| A | RADIATED<br>EMISSION     | 131979 to 132665 | 133147, 133297,<br>133447 | 5MHz  | QPSK | 1 RB / 0 RB Offset |
|   |                          | 133172 to 133442 | 133172, 133297,<br>133442 | 20MHz | QPSK | 1 RB / 0 RB Offset |

**Note:** This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

## **TEST CONDITION:**

| TEST ITEM                | ENVIRONMENTAL CONDITIONS | INPUT POWER         | TESTED BY  |
|--------------------------|--------------------------|---------------------|------------|
| EIRP(ERP)                | 24deg. C, 60%RH          | DC 12V from adaptor | Getaz Yang |
| FREQUENCY STABILITY      | 24deg. C, 61%RH          | DC 12V from adaptor | Bert Ma    |
| OCCUPIED BANDWIDTH       | 24deg. C, 61%RH          | DC 12V from adaptor | Bert Ma    |
| PEAK TO AVERAGE RATIO    | 24deg. C, 61%RH          | DC 12V from adaptor | Bert Ma    |
| BAND EDGE                | 24deg. C, 61%RH          | DC 12V from adaptor | Bert Ma    |
| CONDCUDET<br>ED EMISSION | 24deg. C, 61%RH          | DC 12V from adaptor | Bert Ma    |
| RADIATED EMISSION        | 24deg. C, 60%RH          | DC 12V from adaptor | Getaz Yang |



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## 2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 27**

**KDB 971168 D01 Power Meas License Digital Systems v03r01**

**ANSI/TIA/EIA-603-D**

**ANSI/TIA/EIA-603-E**

**ANSI C63.26-2015**

**NOTE:** All test items have been performed and recorded as per the above standards.

### 3 TEST TYPES AND RESULTS

#### 3.1 OUTPUT POWER MEASUREMENT

##### 3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP

##### 3.1.2 TEST PROCEDURES

###### EIRP / ERP MEASUREMENT:

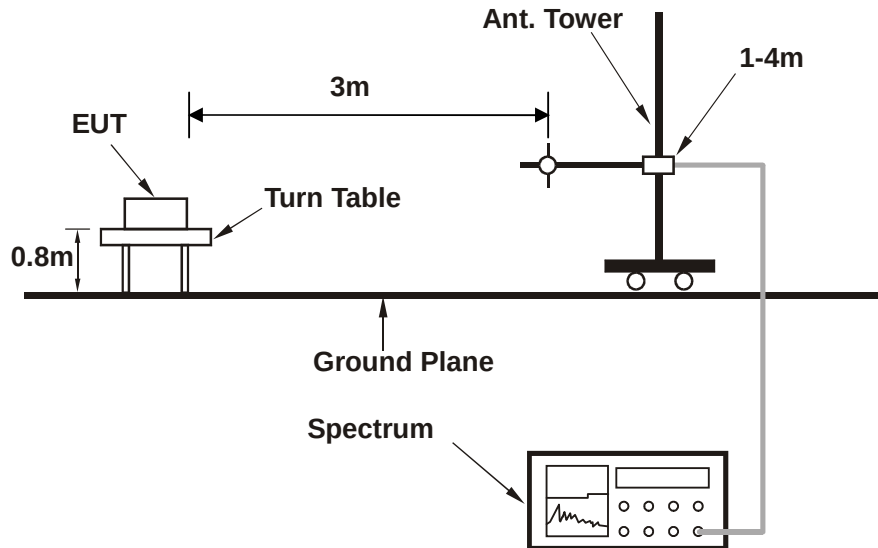
- a. The EUT was set up for the maximum power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range). RBW and VBW is 10MHz for LTE.
- b. E.I.R.P power measurement. In the semi-anechoic 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.
- c. 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
- d.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$
- e.  $E.R.P = E.I.R.P - 2.15 \text{ dB}$

###### CONDUCTED POWER MEASUREMENT:

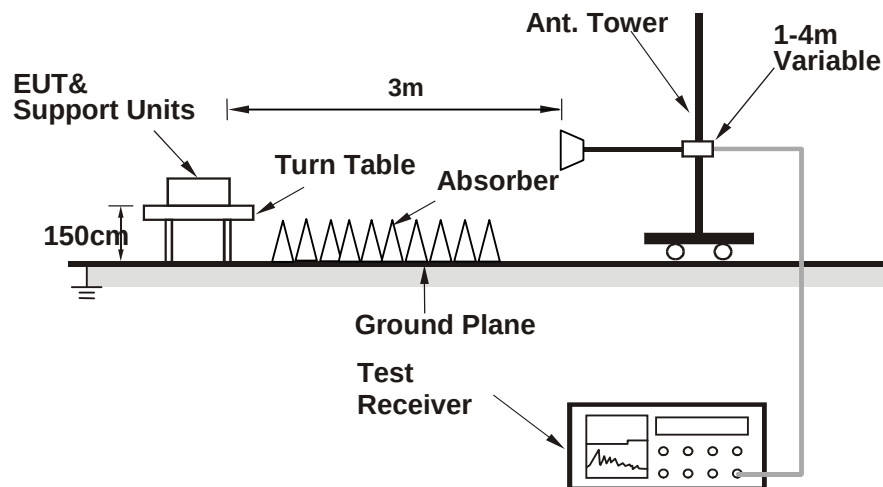
- a. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.
- b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

### 3.1.3 TEST SETUP

#### ERP MEASUREMENT:

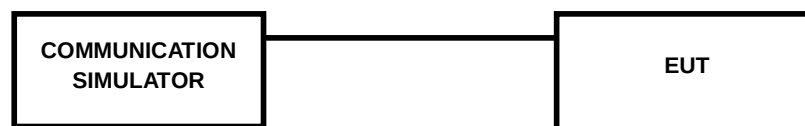


#### EIRP MEASUREMENT:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### CONDUCTED POWER MEASUREMENT:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 3.1.4 TEST RESULTS

#### AVERAGE CONDUCTED OUTPUT POWER (dBm)

| LTE Band 71 |            |         |           |                        |                        |                        |     |
|-------------|------------|---------|-----------|------------------------|------------------------|------------------------|-----|
| BW          | Modulation | RB Size | RB Offset | Low CH<br>133147       | Mid CH<br>133297       | High CH<br>133447      | MPR |
|             |            |         |           | Frequency<br>665.5 MHz | Frequency<br>680.5 MHz | Frequency<br>695.5 MHz |     |
| 5 MHz       | QPSK       | 1       | 0         | 23.99                  | 24.05                  | 24.02                  | 0   |
|             |            | 1       | 12        | 23.79                  | 23.85                  | 23.82                  | 0   |
|             |            | 1       | 24        | 23.73                  | 23.79                  | 23.76                  | 0   |
|             |            | 12      | 0         | 22.77                  | 22.83                  | 22.80                  | 1   |
|             |            | 12      | 6         | 22.68                  | 22.74                  | 22.71                  | 1   |
|             |            | 12      | 13        | 22.63                  | 22.69                  | 22.66                  | 1   |
|             |            | 25      | 0         | 22.68                  | 22.74                  | 22.71                  | 1   |
|             | 16QAM      | 1       | 0         | 23.29                  | 23.35                  | 23.32                  | 1   |
|             |            | 1       | 12        | 23.25                  | 23.31                  | 23.28                  | 1   |
|             |            | 1       | 24        | 23.21                  | 23.27                  | 23.24                  | 1   |
|             |            | 12      | 0         | 22.19                  | 22.25                  | 22.22                  | 2   |
|             |            | 12      | 6         | 22.25                  | 22.31                  | 22.28                  | 2   |
|             |            | 12      | 13        | 22.22                  | 22.28                  | 22.25                  | 2   |
|             |            | 25      | 0         | 22.16                  | 22.22                  | 22.19                  | 2   |
| BW          | Modulation | RB Size | RB Offset | Low CH<br>133172       | Mid CH<br>133297       | High CH<br>133442      | MPR |
|             |            |         |           | Frequency<br>668 MHz   | Frequency<br>680.5 MHz | Frequency<br>693 MHz   |     |
| 10 MHz      | QPSK       | 1       | 0         | 24.01                  | 24.07                  | 24.04                  | 0   |
|             |            | 1       | 24        | 23.81                  | 23.87                  | 23.84                  | 0   |
|             |            | 1       | 49        | 23.75                  | 23.81                  | 23.78                  | 0   |
|             |            | 25      | 0         | 22.79                  | 22.85                  | 22.82                  | 1   |
|             |            | 25      | 12        | 22.70                  | 22.76                  | 22.73                  | 1   |
|             |            | 25      | 25        | 22.65                  | 22.71                  | 22.68                  | 1   |
|             |            | 50      | 0         | 22.70                  | 22.76                  | 22.73                  | 1   |
|             | 16QAM      | 1       | 0         | 23.31                  | 23.37                  | 23.34                  | 1   |
|             |            | 1       | 24        | 23.27                  | 23.33                  | 23.30                  | 1   |
|             |            | 1       | 49        | 23.23                  | 23.29                  | 23.26                  | 1   |
|             |            | 25      | 0         | 22.21                  | 22.27                  | 22.24                  | 2   |
|             |            | 25      | 12        | 22.27                  | 22.33                  | 22.30                  | 2   |
|             |            | 25      | 25        | 22.24                  | 22.30                  | 22.27                  | 2   |
|             |            | 50      | 0         | 22.18                  | 22.24                  | 22.21                  | 2   |

| LTE Band 71 |            |         |           |                        |                        |                        |     |
|-------------|------------|---------|-----------|------------------------|------------------------|------------------------|-----|
| BW          | Modulation | RB Size | RB Offset | Low CH<br>133197       | Mid CH<br>133297       | High CH<br>133397      | MPR |
|             |            |         |           | Frequency<br>670.5 MHz | Frequency<br>680.5 MHz | Frequency<br>690.5 MHz |     |
| 15 MHz      | QPSK       | 1       | 0         | 24.04                  | 24.10                  | 24.07                  | 0   |
|             |            | 1       | 37        | 23.84                  | 23.90                  | 23.87                  | 0   |
|             |            | 1       | 74        | 23.78                  | 23.84                  | 23.81                  | 0   |
|             |            | 36      | 0         | 22.82                  | 22.88                  | 22.85                  | 1   |
|             |            | 36      | 19        | 22.73                  | 22.79                  | 22.76                  | 1   |
|             |            | 36      | 39        | 22.68                  | 22.74                  | 22.71                  | 1   |
|             |            | 75      | 0         | 22.73                  | 22.79                  | 22.76                  | 1   |
|             | 16QAM      | 1       | 0         | 23.34                  | 23.40                  | 23.37                  | 1   |
|             |            | 1       | 37        | 23.30                  | 23.36                  | 23.33                  | 1   |
|             |            | 1       | 74        | 23.26                  | 23.32                  | 23.29                  | 1   |
|             |            | 36      | 0         | 22.24                  | 22.30                  | 22.27                  | 2   |
|             |            | 36      | 19        | 22.30                  | 22.36                  | 22.33                  | 2   |
|             |            | 36      | 39        | 22.27                  | 22.33                  | 22.30                  | 2   |
|             |            | 75      | 0         | 22.21                  | 22.27                  | 22.24                  | 2   |
| BW          | Modulation | RB Size | RB Offset | Low CH<br>133222       | Mid CH<br>133297       | High CH<br>133372      | MPR |
|             |            |         |           | Frequency<br>673 MHz   | Frequency<br>680.5 MHz | Frequency<br>688 MHz   |     |
| 20 MHz      | QPSK       | 1       | 0         | 24.09                  | 24.15                  | 24.12                  | 0   |
|             |            | 1       | 50        | 23.89                  | 23.95                  | 23.92                  | 0   |
|             |            | 1       | 99        | 23.83                  | 23.89                  | 23.86                  | 0   |
|             |            | 50      | 0         | 22.87                  | 22.93                  | 22.90                  | 1   |
|             |            | 50      | 25        | 22.78                  | 22.84                  | 22.81                  | 1   |
|             |            | 50      | 50        | 22.73                  | 22.79                  | 22.76                  | 1   |
|             |            | 100     | 0         | 22.78                  | 22.84                  | 22.81                  | 1   |
|             | 16QAM      | 1       | 0         | 23.39                  | 23.45                  | 23.42                  | 1   |
|             |            | 1       | 50        | 23.35                  | 23.41                  | 23.38                  | 1   |
|             |            | 1       | 99        | 23.31                  | 23.37                  | 23.34                  | 1   |
|             |            | 50      | 0         | 22.29                  | 22.35                  | 22.32                  | 2   |
|             |            | 50      | 25        | 22.35                  | 22.41                  | 22.38                  | 2   |
|             |            | 50      | 50        | 22.32                  | 22.38                  | 22.35                  | 2   |
|             |            | 100     | 0         | 22.26                  | 22.32                  | 22.29                  | 2   |



Test Report No.: RF180523W002-7

## EIRP

### LTE BAND 71

#### CHANNEL BANDWIDTH: 5MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW)      | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 133147  | 665.5           | -5.43         | 30.36                 | 22.78     | <b>189.67</b> | H                  | 3         |
| 133297  | 680.5           | -5.35         | 30.17                 | 22.67     | 184.93        | H                  | 3         |
| 133447  | 695.5           | -5.57         | 30.17                 | 22.45     | 175.79        | H                  | 3         |
| 133147  | 665.5           | -13.07        | 32.03                 | 16.81     | 47.97         | V                  | 3         |
| 133297  | 680.5           | -13.22        | 31.98                 | 16.61     | 45.81         | V                  | 3         |
| 133447  | 695.5           | -13.48        | 32.06                 | 16.43     | 43.95         | V                  | 3         |

#### CHANNEL BANDWIDTH: 5MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 133147  | 665.5           | -6.46         | 30.36                 | 21.75     | 149.62   | H                  | 3         |
| 133297  | 680.5           | -6.42         | 30.17                 | 21.60     | 144.54   | H                  | 3         |
| 133447  | 695.5           | -6.58         | 30.17                 | 21.44     | 139.32   | H                  | 3         |
| 133147  | 665.5           | -14.08        | 32.03                 | 15.80     | 38.02    | V                  | 3         |
| 133297  | 680.5           | -14.24        | 31.98                 | 15.59     | 36.22    | V                  | 3         |
| 133447  | 695.5           | -14.54        | 32.06                 | 15.37     | 34.43    | V                  | 3         |

### LTE BAND 71

#### CHANNEL BANDWIDTH: 10MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW)      | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 133172  | 668             | -4.44         | 30.17                 | 23.58     | <b>228.03</b> | H                  | 3         |
| 133297  | 680.5           | -4.63         | 30.17                 | 23.39     | 218.27        | H                  | 3         |
| 133442  | 693             | -4.83         | 30.18                 | 23.20     | 208.93        | H                  | 3         |
| 133172  | 668             | -12.14        | 31.96                 | 17.67     | 58.48         | V                  | 3         |
| 133297  | 680.5           | -12.33        | 31.98                 | 17.50     | 56.23         | V                  | 3         |
| 133442  | 693             | -12.72        | 32.03                 | 17.16     | 52.00         | V                  | 3         |



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**CHANNEL BANDWIDTH: 10MHz 16QAM**

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 133172  | 668             | -5.50         | 30.17                 | 22.52     | 178.65   | H                  | 3         |
| 133297  | 680.5           | -5.67         | 30.17                 | 22.35     | 171.79   | H                  | 3         |
| 133442  | 693             | -5.84         | 30.18                 | 22.19     | 165.58   | H                  | 3         |
| 133172  | 668             | -13.19        | 31.96                 | 16.62     | 45.92    | V                  | 3         |
| 133297  | 680.5           | -13.42        | 31.98                 | 16.41     | 43.75    | V                  | 3         |
| 133442  | 693             | -13.75        | 32.03                 | 16.13     | 41.02    | V                  | 3         |

**LTE BAND 71**

**CHANNEL BANDWIDTH: 15MHz QPSK**

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW)      | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 133197  | 670.5           | -4.19         | 30.17                 | 23.83     | <b>241.55</b> | H                  | 3         |
| 133297  | 680.5           | -4.42         | 30.17                 | 23.60     | 229.09        | H                  | 3         |
| 133397  | 690.5           | -4.61         | 30.18                 | 23.42     | 219.79        | H                  | 3         |
| 133197  | 670.5           | -11.98        | 31.96                 | 17.83     | 60.67         | V                  | 3         |
| 133297  | 680.5           | -12.18        | 31.98                 | 17.65     | 58.21         | V                  | 3         |
| 133397  | 690.5           | -12.48        | 32.03                 | 17.40     | 54.95         | V                  | 3         |

**CHANNEL BANDWIDTH: 15MHz 16QAM**

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 133197  | 670.5           | -5.25         | 30.17                 | 22.77     | 189.23   | H                  | 3         |
| 133297  | 680.5           | -5.46         | 30.17                 | 22.56     | 180.30   | H                  | 3         |
| 133397  | 690.5           | -5.70         | 30.18                 | 22.33     | 171.00   | H                  | 3         |
| 133197  | 670.5           | -12.99        | 31.96                 | 16.82     | 48.08    | V                  | 3         |
| 133297  | 680.5           | -13.24        | 31.98                 | 16.59     | 45.60    | V                  | 3         |
| 133397  | 690.5           | -13.53        | 32.03                 | 16.35     | 43.15    | V                  | 3         |



Test Report No.: RF180523W002-7

#### LTE BAND 71

#### CHANNEL BANDWIDTH: 20MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW)      | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 133222  | 673             | -4.08         | 30.17                 | 23.94     | <b>247.74</b> | H                  | 3         |
| 133297  | 680.5           | -4.28         | 30.17                 | 23.74     | 236.59        | H                  | 3         |
| 133372  | 688             | -4.48         | 30.18                 | 23.55     | 226.46        | H                  | 3         |
| 133222  | 673             | -11.87        | 31.96                 | 17.94     | 62.23         | V                  | 3         |
| 133297  | 680.5           | -12.11        | 31.98                 | 17.72     | 59.16         | V                  | 3         |
| 133372  | 688             | -12.33        | 32.03                 | 17.55     | 56.89         | V                  | 3         |

#### CHANNEL BANDWIDTH: 20MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 133222  | 673             | -5.14         | 30.17                 | 22.88     | 194.09   | H                  | 3         |
| 133297  | 680.5           | -5.33         | 30.17                 | 22.69     | 185.78   | H                  | 3         |
| 133372  | 688             | -5.56         | 30.18                 | 22.47     | 176.60   | H                  | 3         |
| 133222  | 673             | -12.91        | 31.96                 | 16.90     | 48.98    | V                  | 3         |
| 133297  | 680.5           | -13.15        | 31.98                 | 16.68     | 46.56    | V                  | 3         |
| 133372  | 688             | -13.40        | 32.03                 | 16.48     | 44.46    | V                  | 3         |

**REMARKS:** 1. EIRP Output Power (dBm) = SPA LVL (dBm) + Correction Factor (dB).  
2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss

Note: EIRP Power Test was performed by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**

## 3.2 FREQUENCY STABILITY MEASUREMENT

### 3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

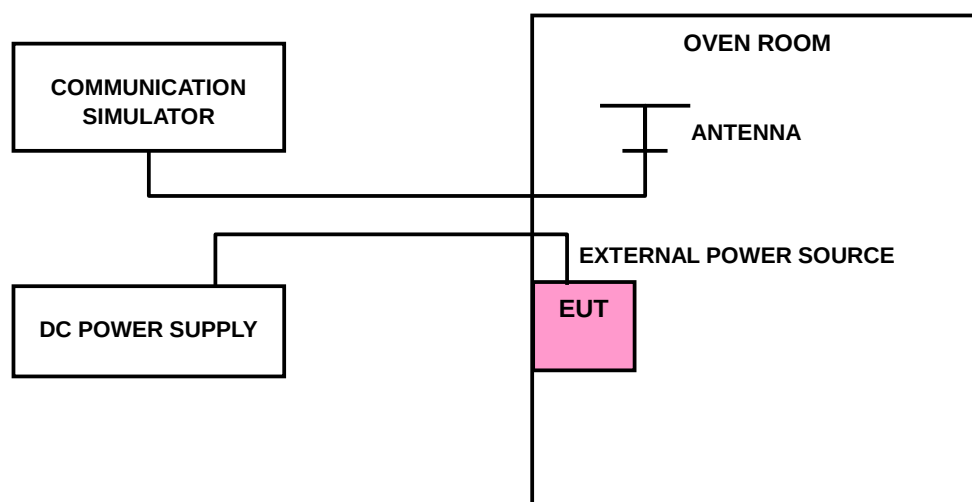
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### 3.2.2 TEST PROCEDURE

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

**NOTE:** The frequency error was recorded frequency error from the communication simulator.

### 3.2.3 TEST SETUP



### 3.2.4 TEST RESULTS

#### LTE BAND 71

##### FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | 5MHz                  |              | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
|                 | FREQUENCY ERROR (ppm) |              |             |
|                 | Low Channel           | High Channel |             |
| 12/24           | 0.0005                | 0.0005       | 2.5         |
| 9               | -0.0007               | -0.0006      | 2.5         |
| 32              | 0.0005                | 0.0005       | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 9Vdc to 32Vdc.

##### FREQUENCY ERROR vs. TEMPERATURE.

| TEMP. (°C) | 5MHz                  |              | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
|            | FREQUENCY ERROR (ppm) |              |             |
|            | Low Channel           | High Channel |             |
| -30        | -0.0038               | -0.0038      | 2.5         |
| -20        | -0.0033               | -0.0034      | 2.5         |
| -10        | -0.0029               | -0.0029      | 2.5         |
| 0          | -0.0027               | -0.0027      | 2.5         |
| 10         | -0.0021               | -0.0021      | 2.5         |
| 20         | -0.0017               | -0.0017      | 2.5         |
| 30         | -0.0013               | -0.0013      | 2.5         |
| 40         | -0.0008               | -0.0008      | 2.5         |
| 50         | -0.0003               | -0.0003      | 2.5         |

#### FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | 10MHz                 |              | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
|                 | FREQUENCY ERROR (ppm) |              |             |
|                 | Low Channel           | High Channel |             |
| 12/24           | 0.0006                | 0.0006       | 2.5         |
| 9               | -0.0006               | -0.0007      | 2.5         |
| 32              | 0.0006                | 0.0005       | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 9Vdc to 32Vdc.

#### FREQUENCY ERROR vs. TEMPERATURE.

| TEMP. (°C) | 10MHz                 |              | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
|            | FREQUENCY ERROR (ppm) |              |             |
|            | Low Channel           | High Channel |             |
| -30        | -0.0039               | -0.0040      | 2.5         |
| -20        | -0.0034               | -0.0034      | 2.5         |
| -10        | -0.0025               | -0.0026      | 2.5         |
| 0          | -0.0021               | -0.0021      | 2.5         |
| 10         | -0.0019               | -0.0019      | 2.5         |
| 20         | -0.0013               | -0.0013      | 2.5         |
| 30         | -0.0011               | -0.0011      | 2.5         |
| 40         | -0.0006               | -0.0006      | 2.5         |
| 50         | -0.0004               | -0.0004      | 2.5         |

#### FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | 15MHz                 |              | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
|                 | FREQUENCY ERROR (ppm) |              |             |
|                 | Low Channel           | High Channel |             |
| 12/24           | 0.0006                | 0.0006       | 2.5         |
| 9               | -0.0007               | -0.0006      | 2.5         |
| 32              | 0.0005                | 0.0005       | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 9Vdc to 32Vdc.

#### FREQUENCY ERROR vs. TEMPERATURE.

| TEMP. (°C) | 15MHz                 |              | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
|            | FREQUENCY ERROR (ppm) |              |             |
|            | Low Channel           | High Channel |             |
| -30        | -0.0041               | -0.0041      | 2.5         |
| -20        | -0.0038               | -0.0039      | 2.5         |
| -10        | -0.0030               | -0.0030      | 2.5         |
| 0          | -0.0026               | -0.0026      | 2.5         |
| 10         | -0.0021               | -0.0021      | 2.5         |
| 20         | -0.0017               | -0.0017      | 2.5         |
| 30         | -0.0011               | -0.0011      | 2.5         |
| 40         | -0.0006               | -0.0006      | 2.5         |
| 50         | -0.0001               | -0.0001      | 2.5         |

#### FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | 20MHz                 |              | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
|                 | FREQUENCY ERROR (ppm) |              |             |
|                 | Low Channel           | High Channel |             |
| 12/24           | 0.0006                | 0.0005       | 2.5         |
| 9               | -0.0005               | -0.0006      | 2.5         |
| 32              | 0.0005                | 0.0005       | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 9Vdc to 32Vdc.

#### FREQUENCY ERROR vs. TEMPERATURE.

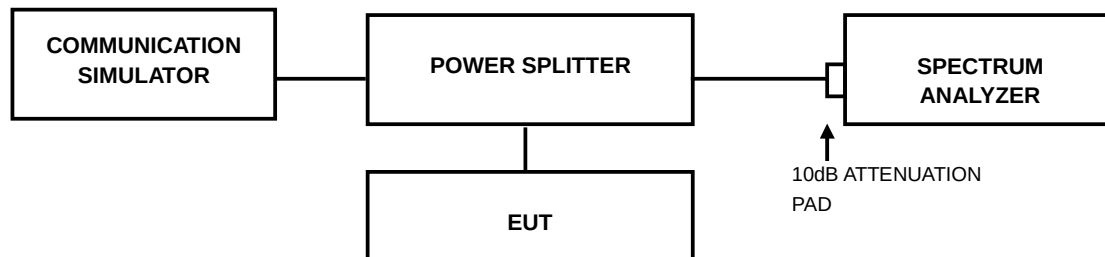
| TEMP. (°C) | 20MHz                 |              | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
|            | FREQUENCY ERROR (ppm) |              |             |
|            | Low Channel           | High Channel |             |
| -30        | -0.0042               | -0.0043      | 2.5         |
| -20        | -0.0038               | -0.0038      | 2.5         |
| -10        | -0.0032               | -0.0033      | 2.5         |
| 0          | -0.0030               | -0.0031      | 2.5         |
| 10         | -0.0021               | -0.0021      | 2.5         |
| 20         | -0.0017               | -0.0018      | 2.5         |
| 30         | -0.0013               | -0.0013      | 2.5         |
| 40         | -0.0011               | -0.0011      | 2.5         |
| 50         | -0.0003               | -0.0003      | 2.5         |

### 3.3 OCCUPIED BANDWIDTH MEASUREMENT

#### 3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

#### 3.3.2 TEST SETUP



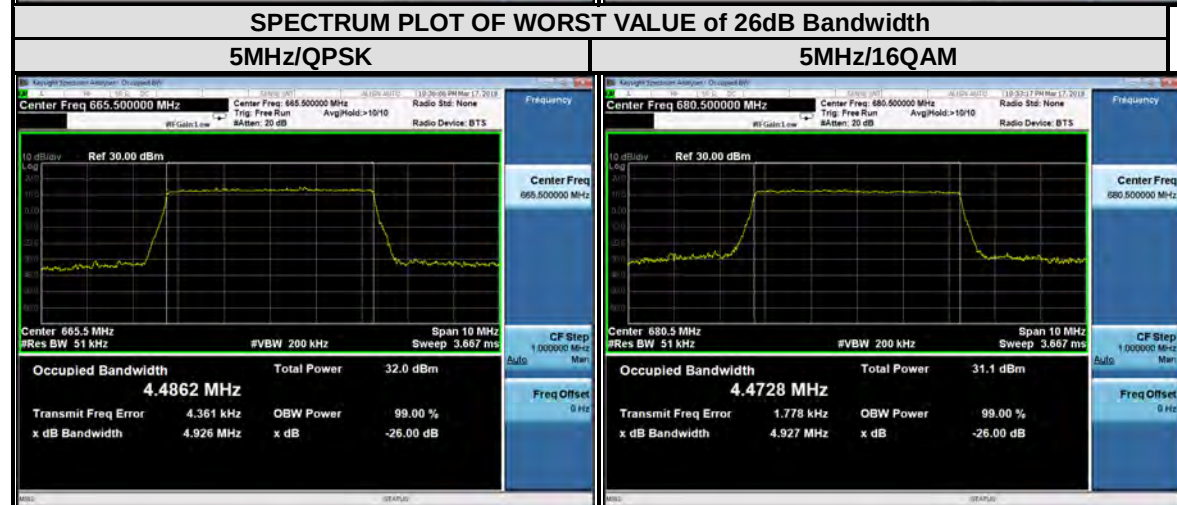
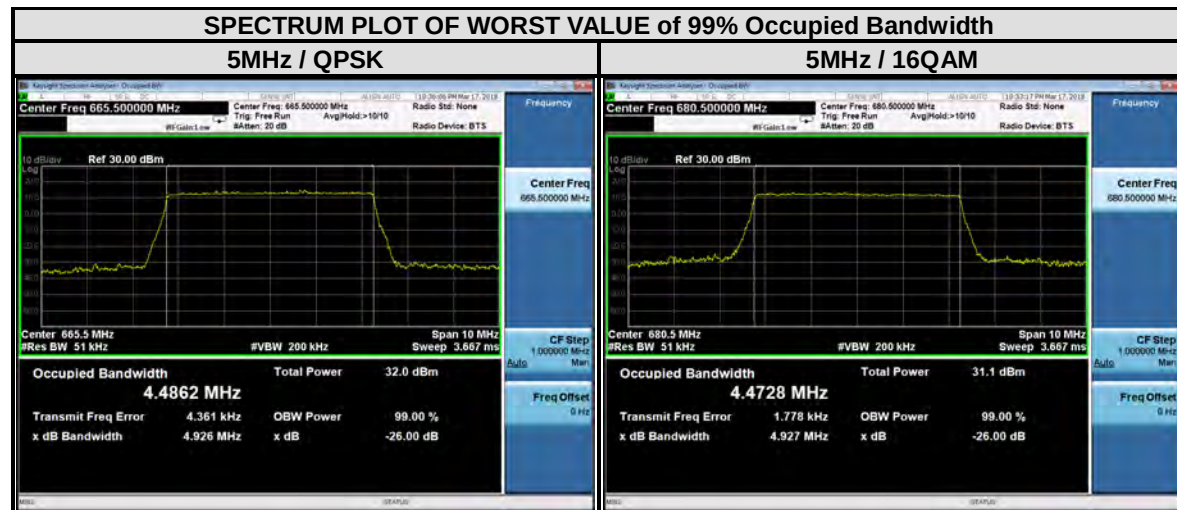
#### 3.3.3 TEST PROCEDURES

- The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

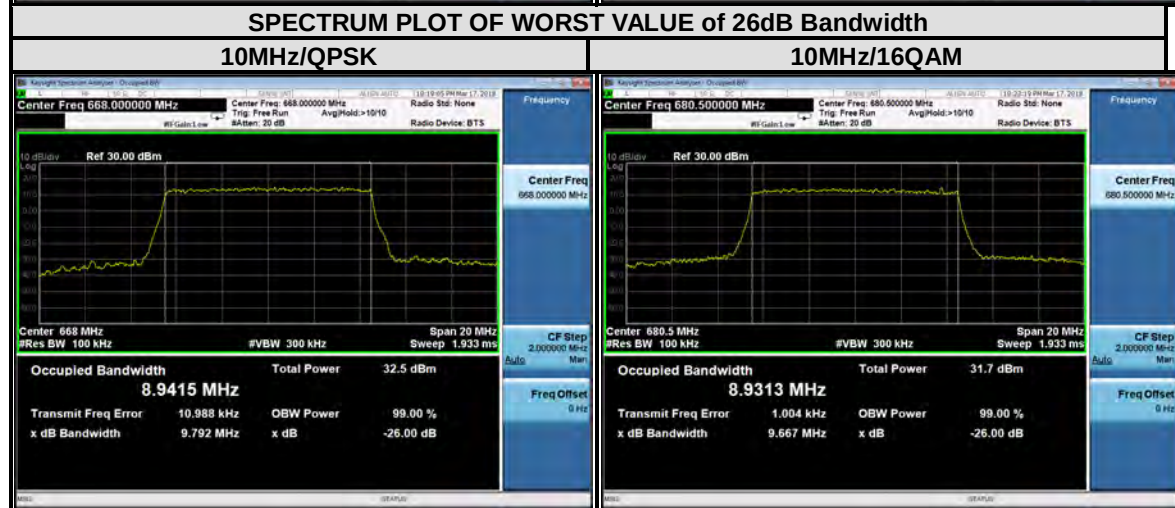
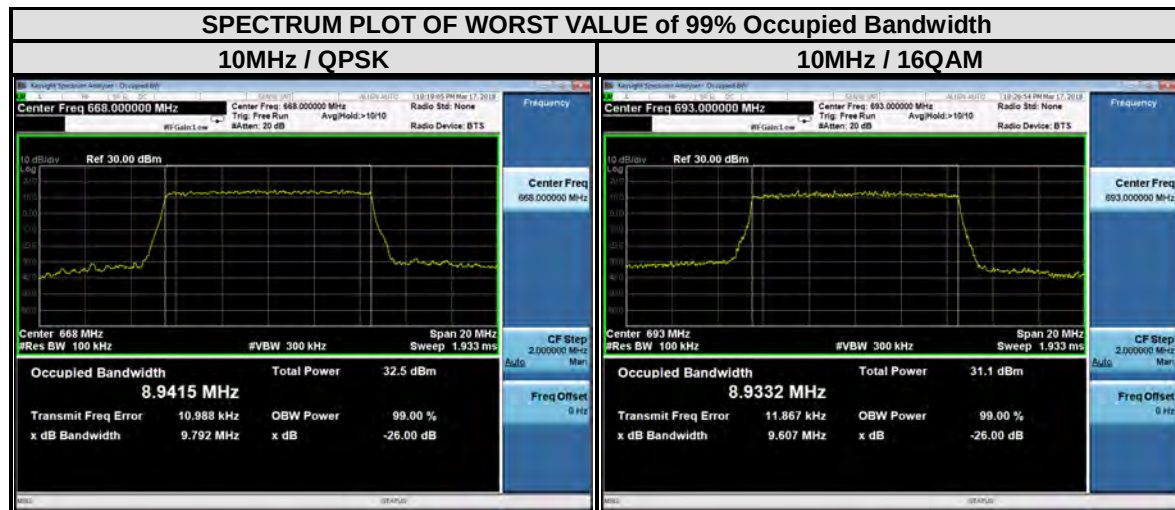
### 3.3.4 TEST RESULTS

#### LTE BAND 71

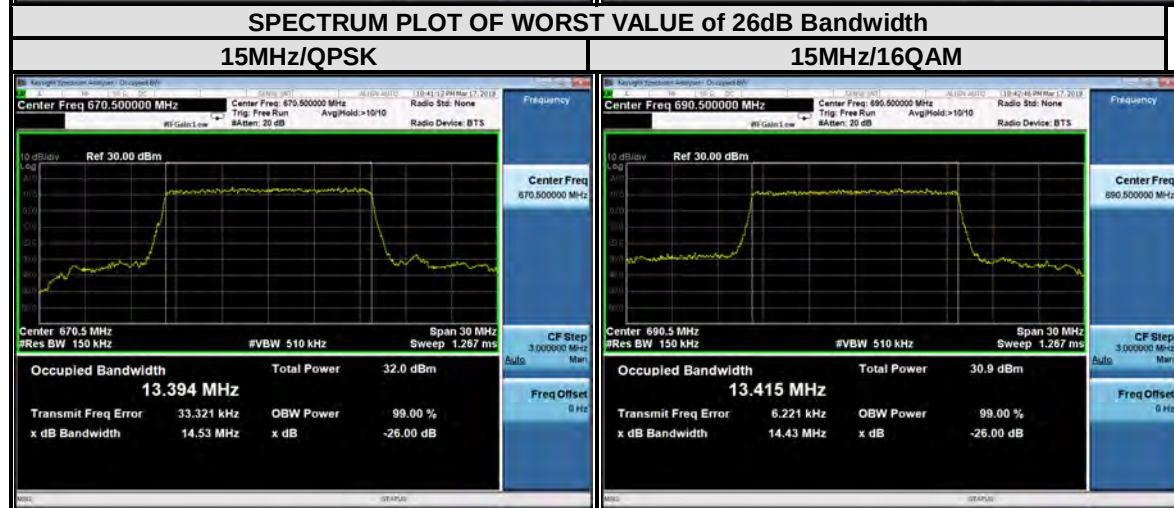
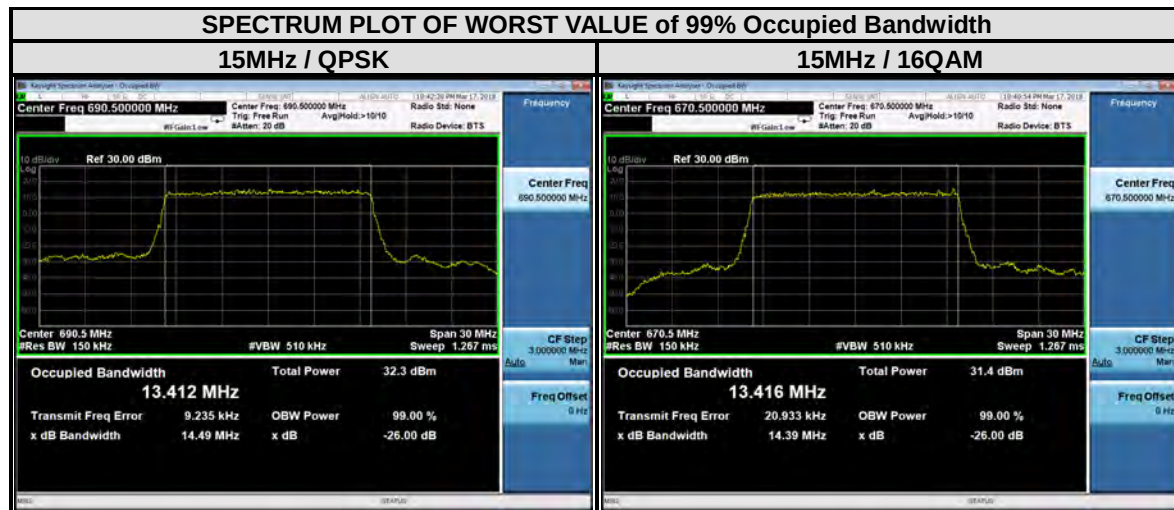
| Channel Bandwidth : 5MHz |                 |                              |       |         |                 |                      |       |
|--------------------------|-----------------|------------------------------|-------|---------|-----------------|----------------------|-------|
| Channel                  | Frequency (MHz) | 99% Occupied bandwidth (MHz) |       | Channel | Frequency (MHz) | 26dB bandwidth (MHz) |       |
|                          |                 | QPSK                         | 16QAM |         |                 | QPSK                 | 16QAM |
| 133147                   | 665.5           | 4.49                         | 4.46  | 133147  | 665.5           | 4.93                 | 4.88  |
| 133297                   | 680.5           | 4.46                         | 4.47  | 133297  | 680.5           | 4.92                 | 4.93  |
| 133447                   | 695.5           | 4.48                         | 4.46  | 133447  | 695.5           | 4.90                 | 4.88  |



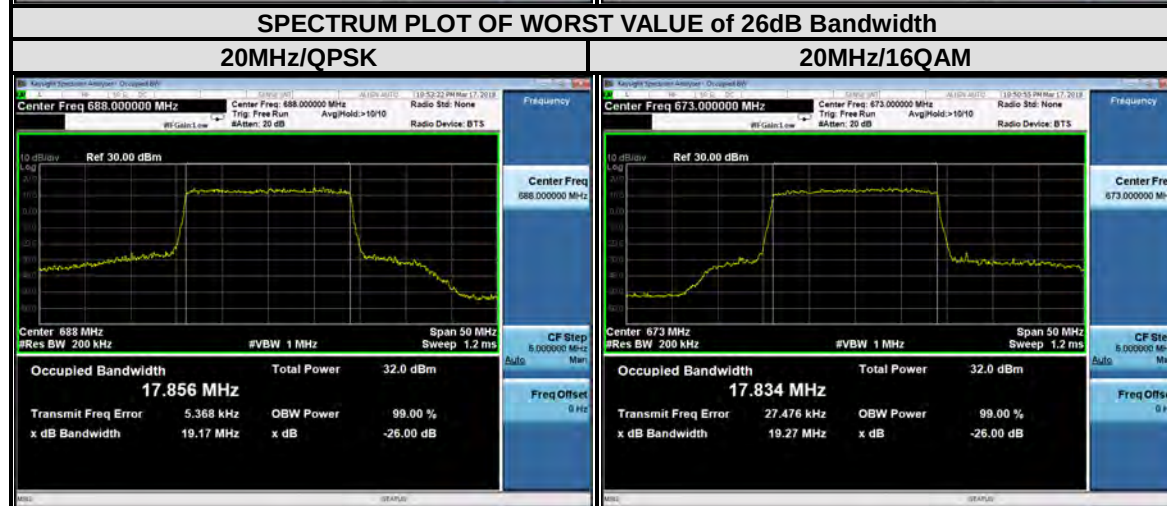
| Channel Bandwidth : 10MHz |                 |                              |       |         |                 |                      |       |
|---------------------------|-----------------|------------------------------|-------|---------|-----------------|----------------------|-------|
| Channel                   | Frequency (MHz) | 99% Occupied bandwidth (MHz) |       | Channel | Frequency (MHz) | 26dB bandwidth (MHz) |       |
|                           |                 | QPSK                         | 16QAM |         |                 | QPSK                 | 16QAM |
| 133172                    | 1715            | 8.94                         | 8.92  | 133172  | 1715            | 9.79                 | 9.60  |
| 133297                    | 680.5           | 8.94                         | 8.93  | 133297  | 680.5           | 9.76                 | 9.67  |
| 133442                    | 1775            | 8.91                         | 8.93  | 133442  | 1775            | 9.66                 | 9.61  |



| Channel Bandwidth : 15MHz |                 |                              |       |         |                 |                      |       |
|---------------------------|-----------------|------------------------------|-------|---------|-----------------|----------------------|-------|
| Channel                   | Frequency (MHz) | 99% Occupied bandwidth (MHz) |       | Channel | Frequency (MHz) | 26dB bandwidth (MHz) |       |
|                           |                 | QPSK                         | 16QAM |         |                 | QPSK                 | 16QAM |
| 133197                    | 670.5           | 13.39                        | 13.42 | 133197  | 670.5           | 14.53                | 14.39 |
| 133297                    | 680.5           | 13.36                        | 13.38 | 133297  | 680.5           | 14.32                | 14.40 |
| 133397                    | 690.5           | 13.41                        | 13.42 | 133397  | 690.5           | 14.49                | 14.43 |



| Channel Bandwidth : 20MHz |                 |                              |       |         |                 |                      |       |
|---------------------------|-----------------|------------------------------|-------|---------|-----------------|----------------------|-------|
| Channel                   | Frequency (MHz) | 99% Occupied bandwidth (MHz) |       | Channel | Frequency (MHz) | 26dB bandwidth (MHz) |       |
|                           |                 | QPSK                         | 16QAM |         |                 | QPSK                 | 16QAM |
| 133222                    | 1720            | 17.81                        | 17.83 | 133222  | 1720            | 18.92                | 19.27 |
| 133297                    | 680.5           | 17.86                        | 17.85 | 133297  | 680.5           | 19.05                | 19.17 |
| 133372                    | 1770            | 17.86                        | 17.91 | 133372  | 1770            | 19.17                | 19.24 |

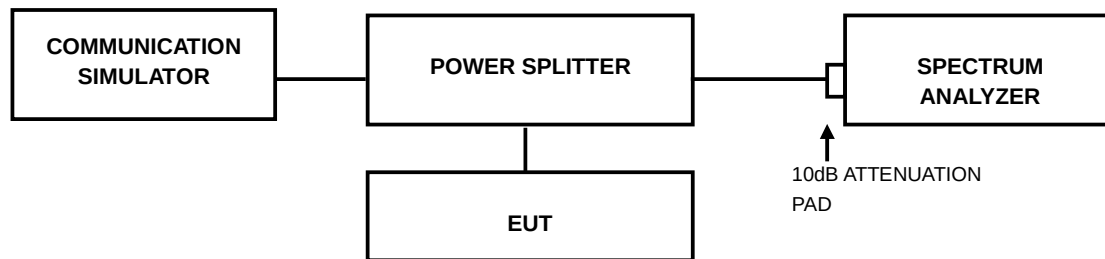


### 3.4 PEAK TO AVERAGE RATIO

#### 3.4.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

#### 3.4.2 TEST SETUP



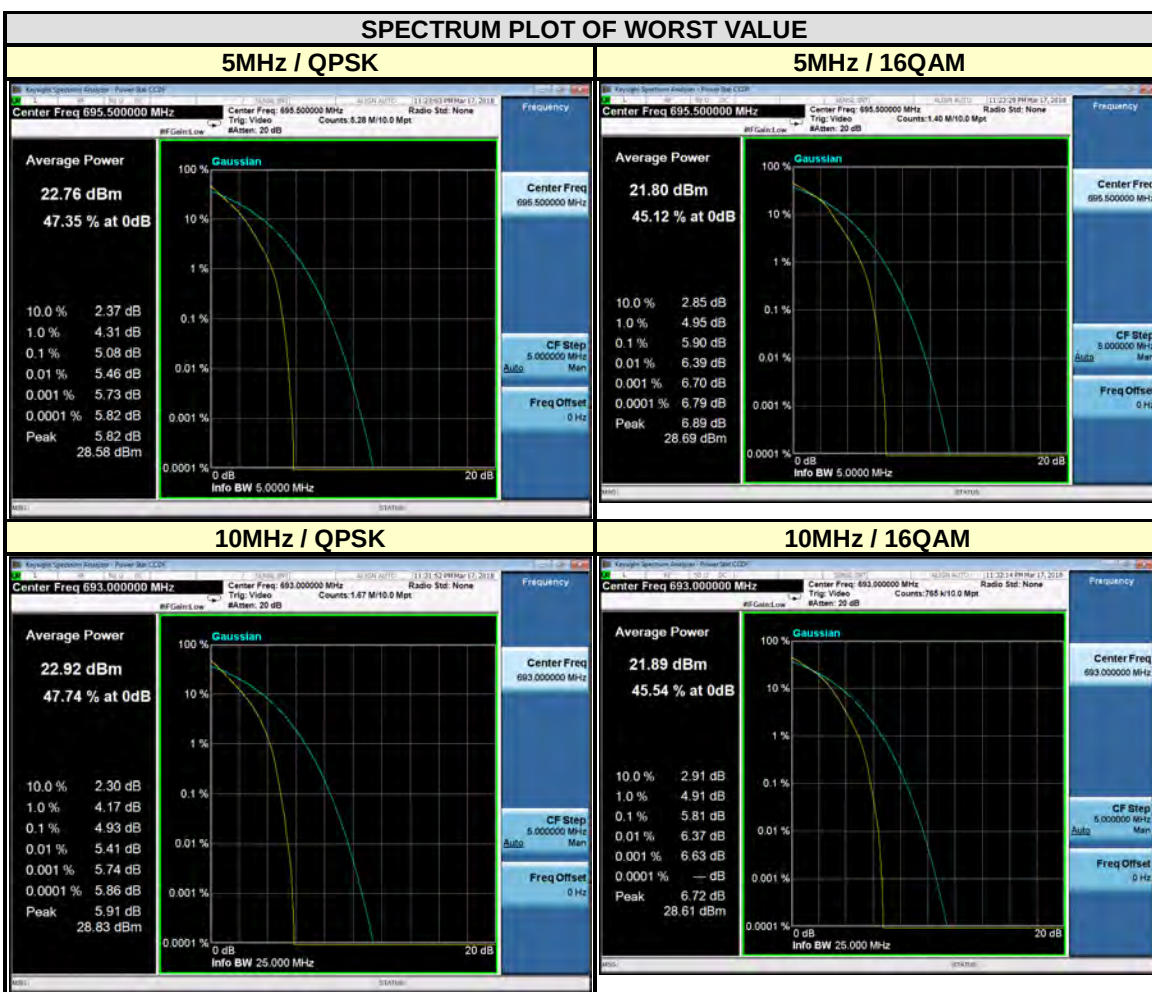
#### 3.4.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

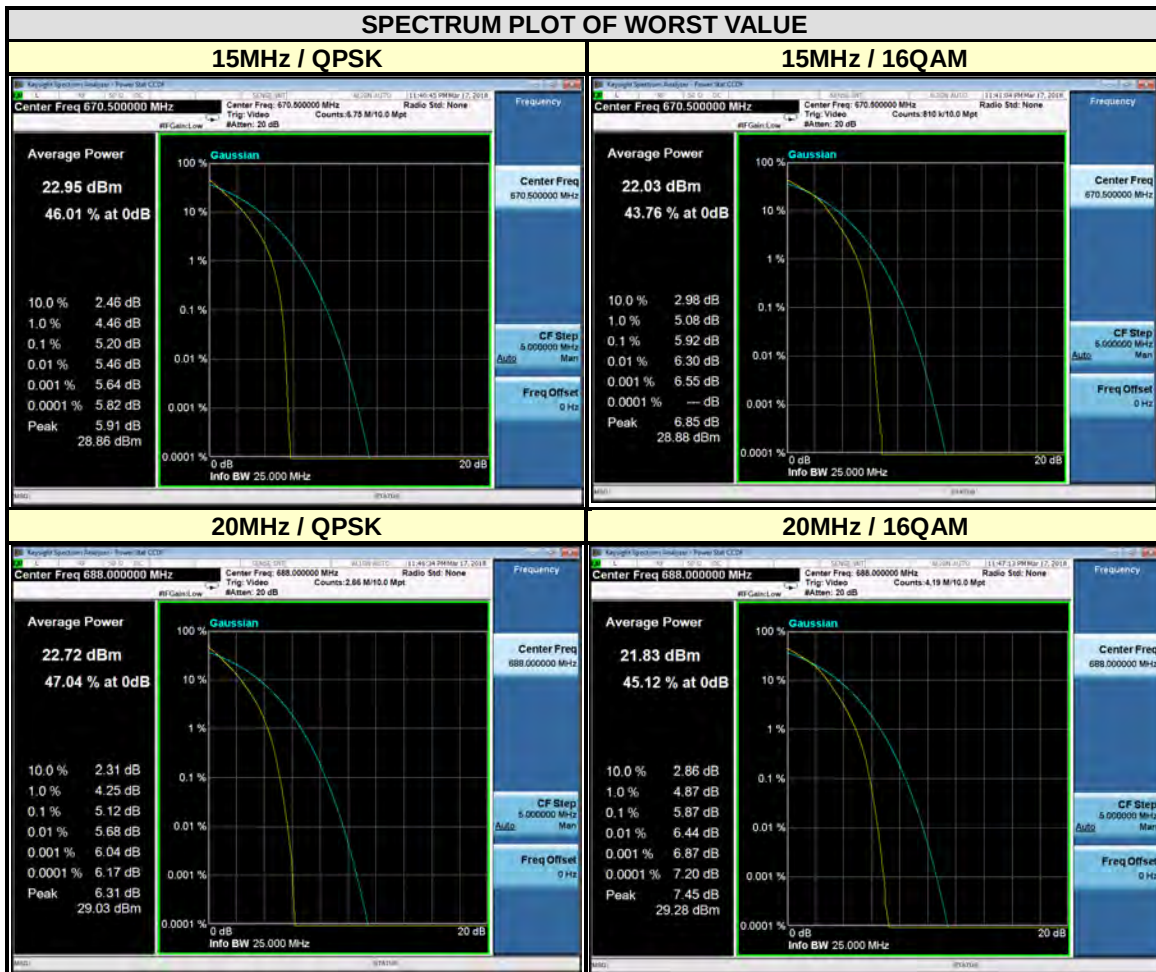
### 3.4.4 TEST RESULTS

#### LTE BAND 71

| CHANNEL BANDWIDTH: 5MHz |                 |                            |       | CHANNEL BANDWIDTH: 10MHz |                 |                            |       |
|-------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| CHANNEL                 | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |       | CHANNEL                  | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |       |
|                         |                 | QPSK                       | 16QAM |                          |                 | QPSK                       | 16QAM |
| 133147                  | 665.5           | 4.96                       | 5.79  | 133172                   | 1715            | 4.91                       | 5.75  |
| 133297                  | 680.5           | 4.86                       | 5.65  | 133297                   | 680.5           | 4.66                       | 5.55  |
| 133447                  | 695.5           | 5.08                       | 5.90  | 133442                   | 1775            | 4.93                       | 5.81  |



| CHANNEL BANDWIDTH: 15MHz |                 |                            |       | CHANNEL BANDWIDTH: 20MHz |                 |                            |       |
|--------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| CHANNEL                  | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |       | CHANNEL                  | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |       |
|                          |                 | QPSK                       | 16QAM |                          |                 | QPSK                       | 16QAM |
| 133197                   | 670.5           | 5.20                       | 5.92  | 133222                   | 1720            | 4.92                       | 5.79  |
| 133297                   | 680.5           | 4.94                       | 5.73  | 133297                   | 680.5           | 4.96                       | 5.78  |
| 133397                   | 690.5           | 5.08                       | 5.84  | 133372                   | 1770            | 5.12                       | 5.87  |



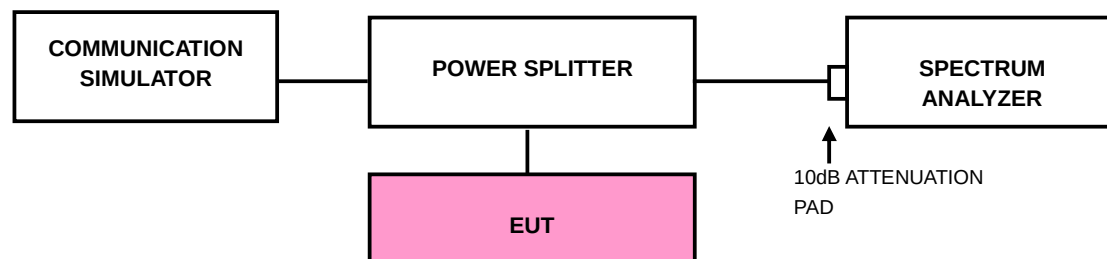
### 3.5 BAND EDGE MEASUREMENT

#### 3.5.1 LIMITS OF BAND EDGE MEASUREMENT

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

#### 3.5.2 TEST SETUP

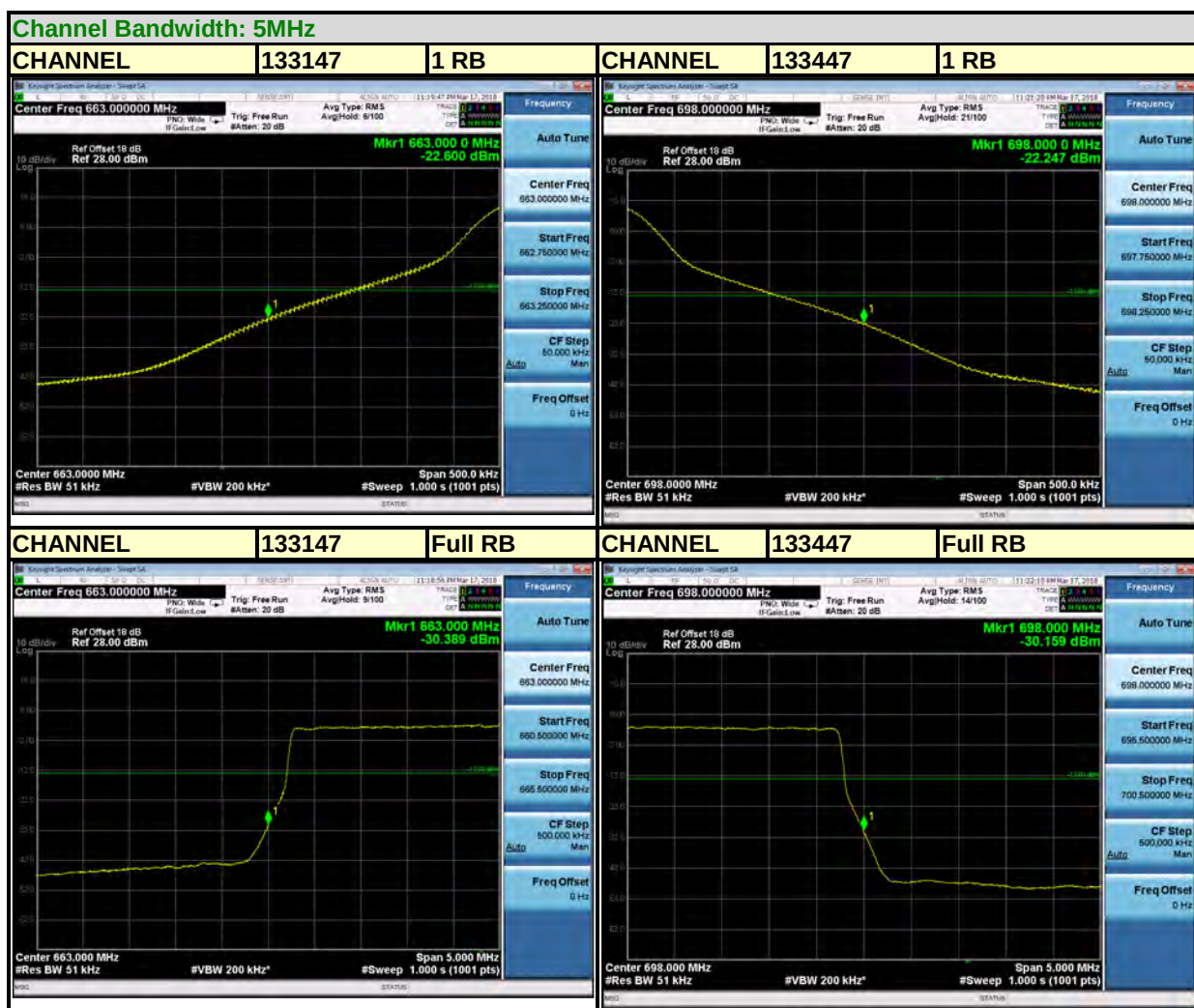


### 3.5.3 TEST PROCEDURES

- a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
- b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- c. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 50kHz and VBW of the spectrum is 200kHz. (LTE bandwidth 5MHz)
- d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz. (LTE bandwidth 10MHz)
- e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 1MHz. (LTE bandwidth 15MHz)
- f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 1MHz. (LTE bandwidth 20MHz)
- g. Record the max trace plot into the test report.

### 3.5.4 TEST RESULTS

#### LTE BAND 71





Test Report No.: RF180523W002-7

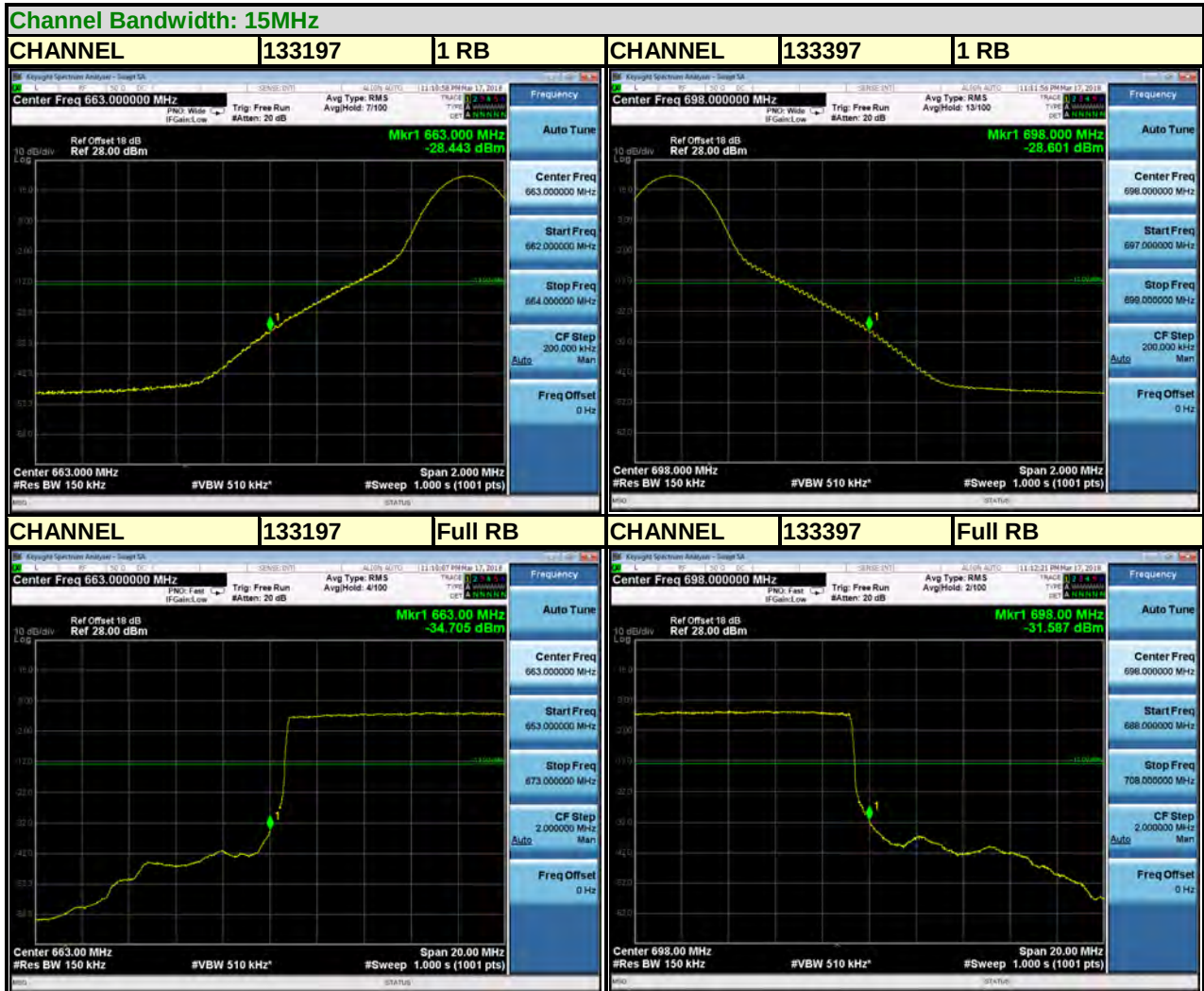
## LTE BAND 71





Test Report No.: RF180523W002-7

## LTE BAND 71





Test Report No.: RF180523W002-7

## LTE BAND 71



### 3.6 CONDUCTED SPURIOUS EMISSIONS

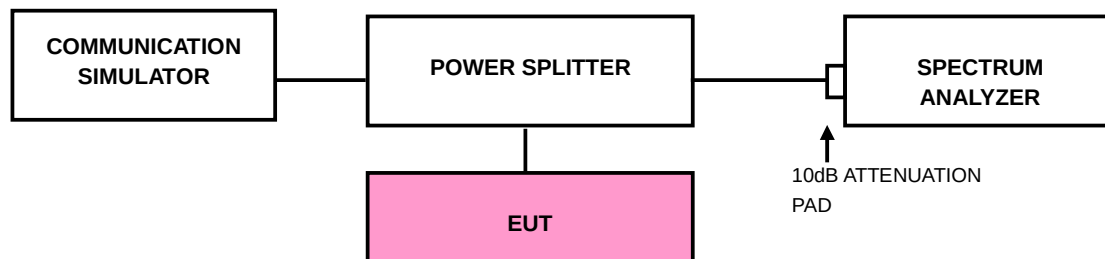
#### 3.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB. The limit of emission equal to  $-13\text{dBm}$

#### 3.6.2 TEST PROCEDURE

- a. The EUT makes a phone call to the communication simulator. All measurements were done at middle operational frequency range.
- b. Measuring frequency range is from 30 MHz to 6.96GHz for LTE Band 71. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

#### 3.6.3 TEST SETUP





Test Report No.: RF180523W002-7

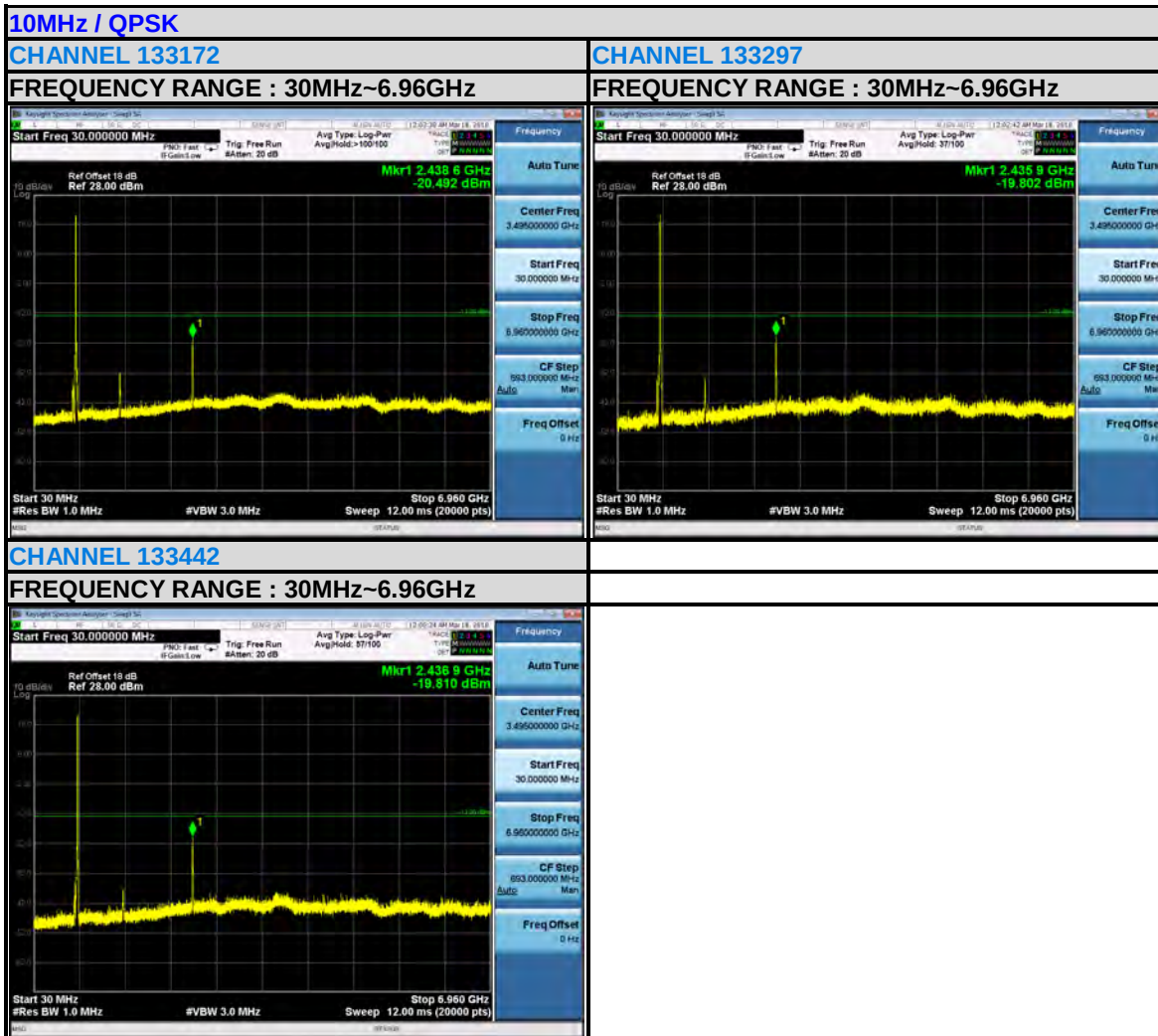
### 3.6.4 TEST RESULTS

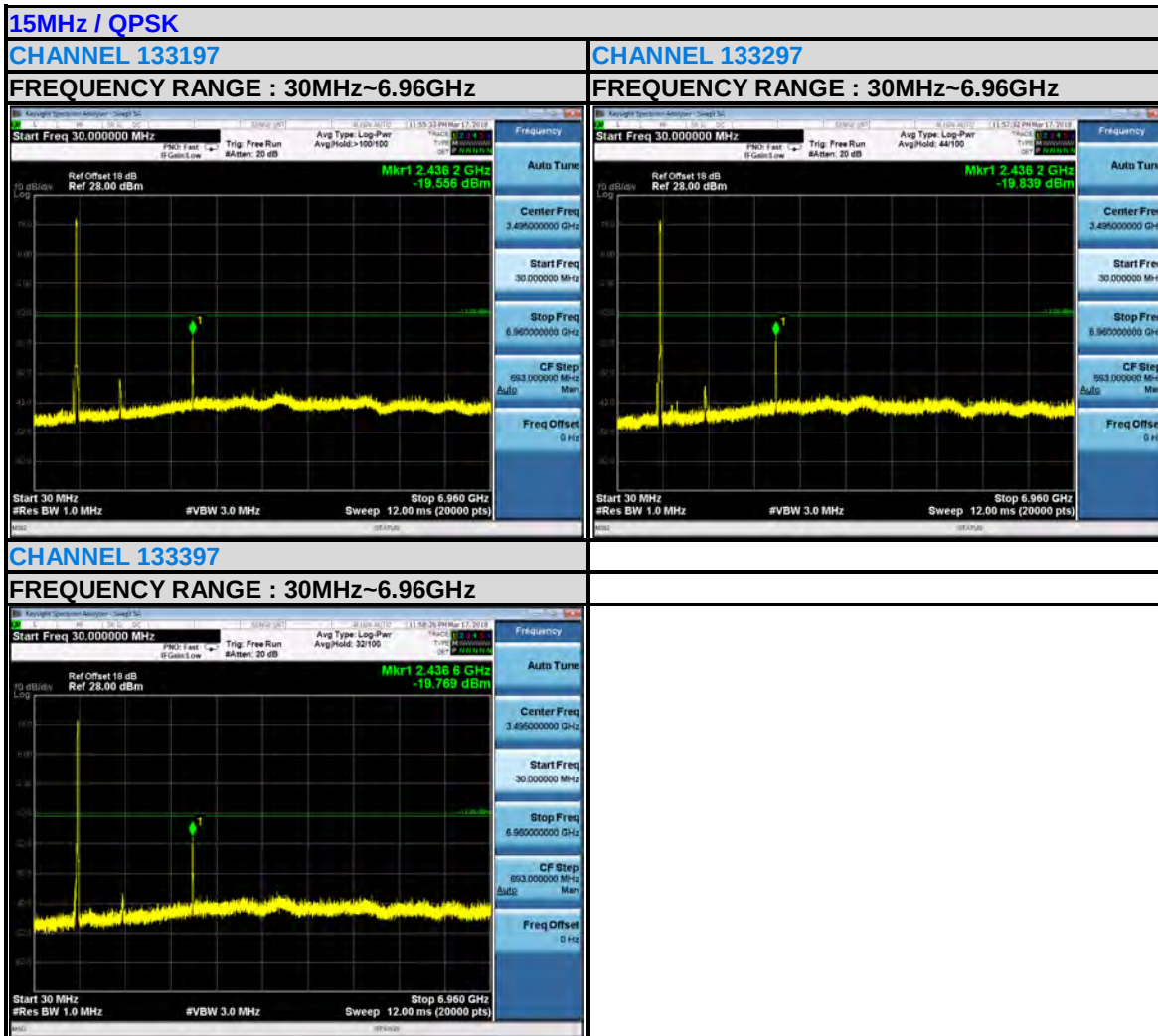
#### LTE BAND 71

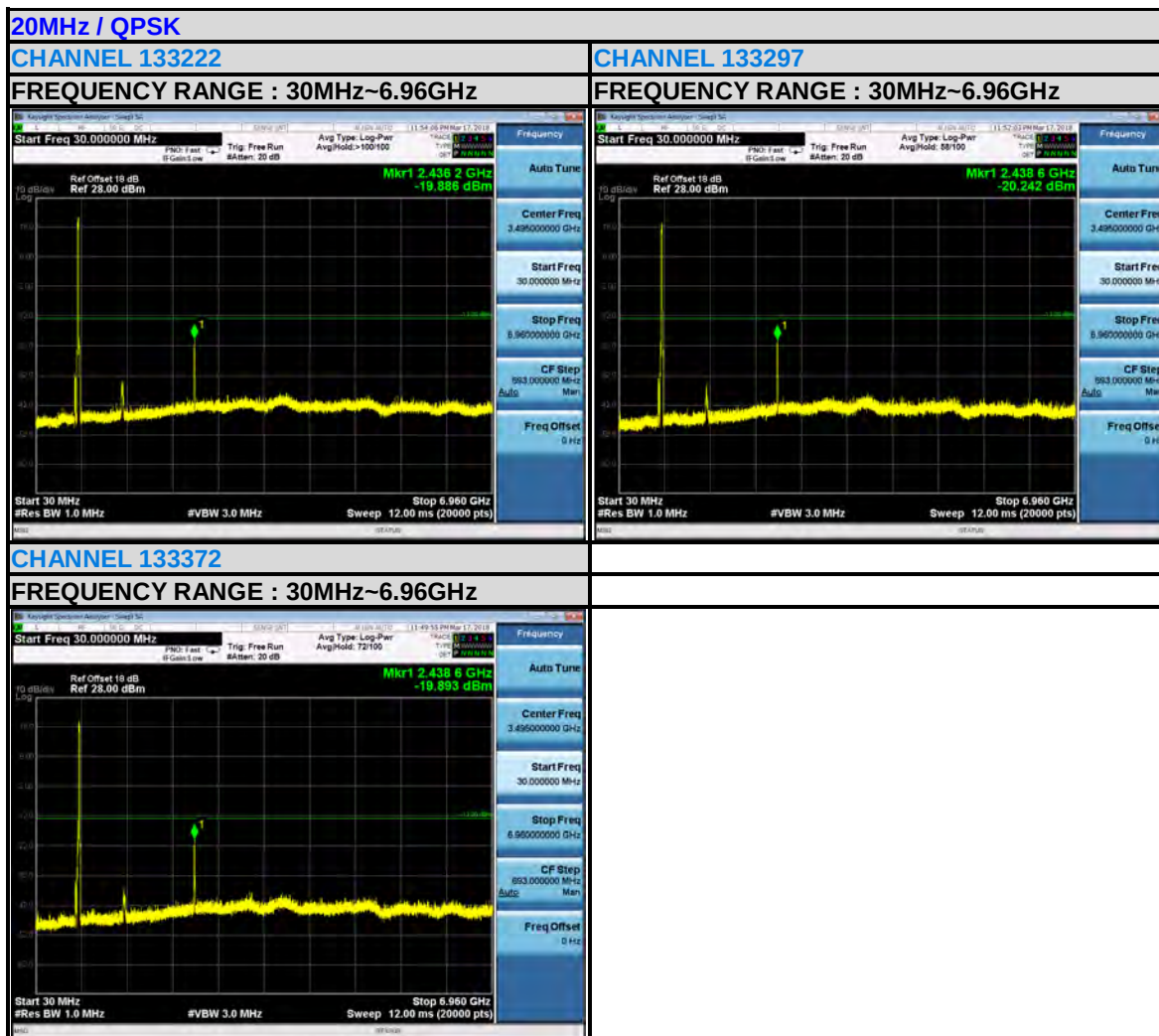




Test Report No.: RF180523W002-7







### 3.7 RADIATED EMISSION MEASUREMENT

#### 3.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB. The limit of emission equal to  $-13\text{dBm}$

#### 3.7.2 TEST PROCEDURES

- 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.  $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  
 $\text{E.R.P power} = \text{E.I.P.R power} - 2.15\text{dBi}.$

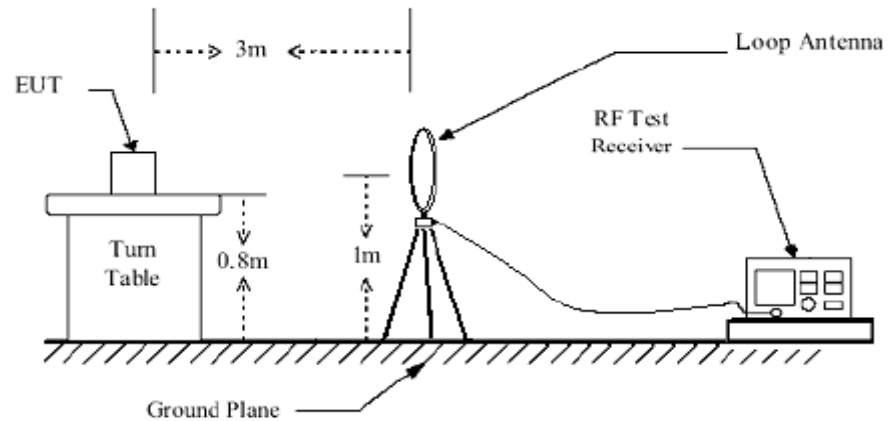
**NOTE:** The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

#### 3.7.3 DEVIATION FROM TEST STANDARD

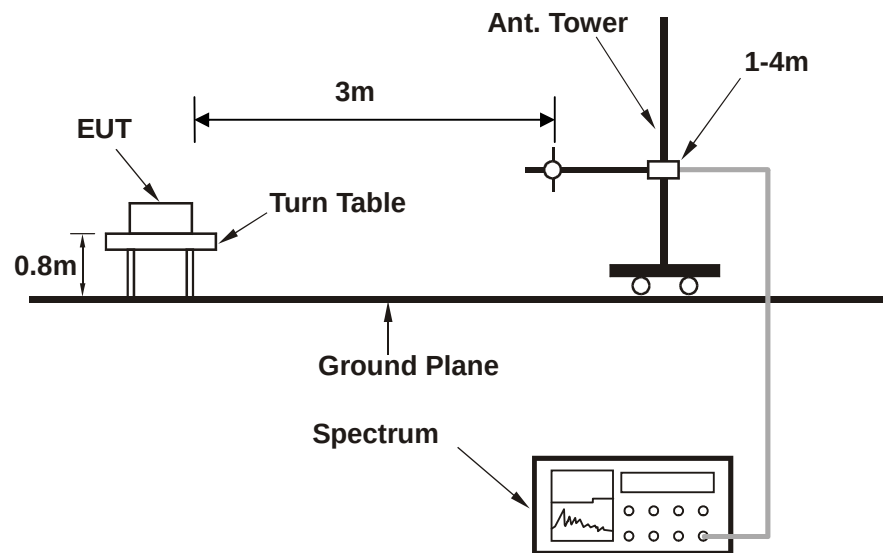
No deviation

### 3.7.4 TEST SETUP

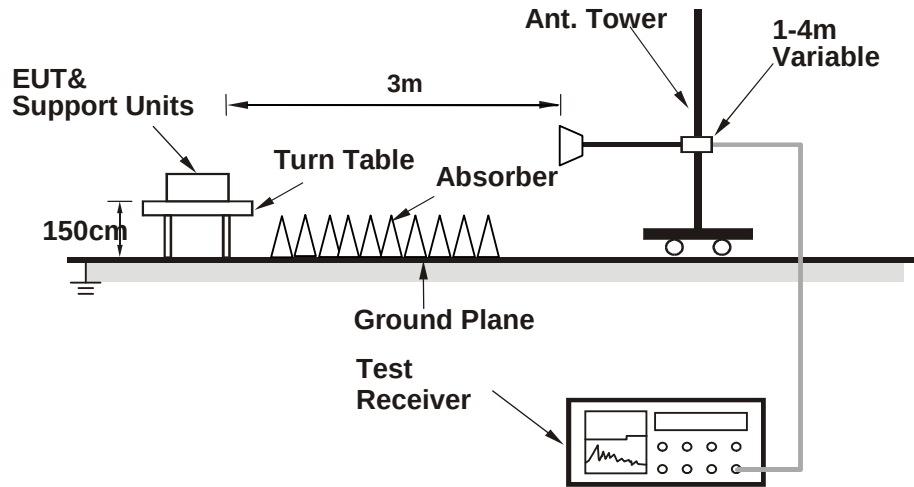
#### <Below 30MHz>



#### < Frequency Range 30MHz~1GHz >



< Frequency Range above 1GHz >



For the actual test configuration, please refer to the attached file (Test Setup Photo).



Test Report No.: RF180523W002-7

### 3.7.5 TEST RESULTS

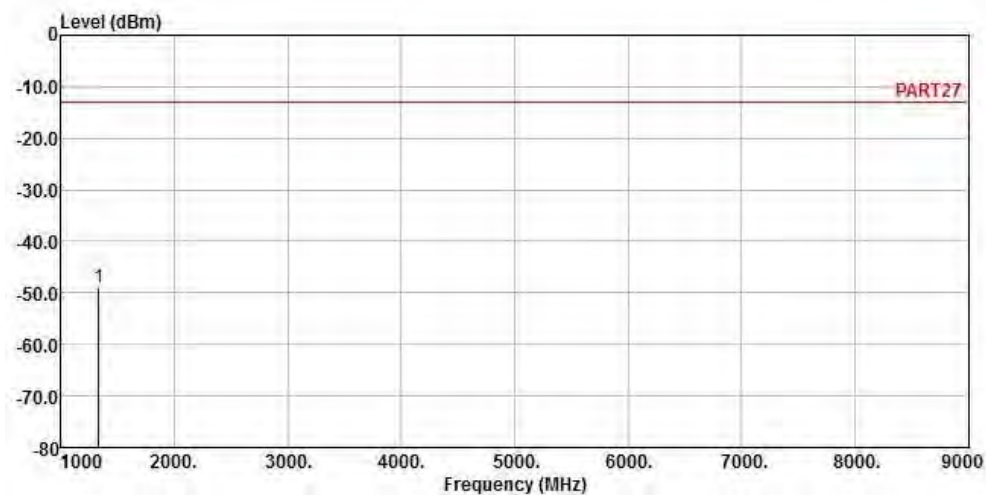
LTE BAND 71

CHANNEL BANDWIDTH: 5MHz / QPSK

GH133147

|                                                     |                   |                 |                    |
|-----------------------------------------------------|-------------------|-----------------|--------------------|
| MODE                                                | TX channel 133147 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH   | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Getaz Yang        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                   |                 |                    |

| Freq | Level   | Read   | Limit  | Over   |        |             |
|------|---------|--------|--------|--------|--------|-------------|
| MHz  | dBm     | Level  | Line   | Limit  | Factor | Remark      |
|      |         | dBm    | dBm    | dB     | dB     |             |
| 1 pp | 1331.00 | -49.12 | -37.02 | -13.00 | -36.12 | -12.10 Peak |

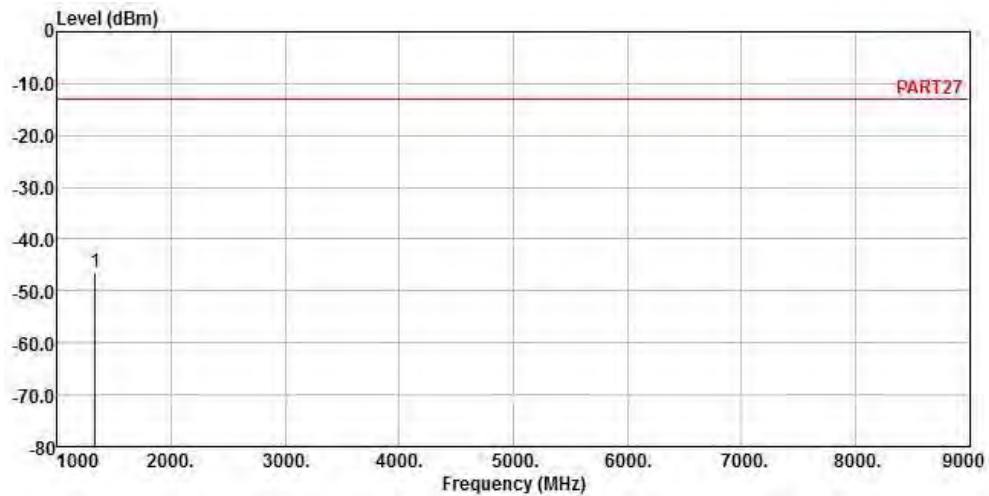




Test Report No.: RF180523W002-7

|                                                   |                   |                 |                    |
|---------------------------------------------------|-------------------|-----------------|--------------------|
| MODE                                              | TX channel 133147 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH   | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Getaz Yang        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                   |                 |                    |

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1 pp | 1331.00 | -46.41 | -34.31     | -13.00     | -33.41     | -12.10 | Peak   |



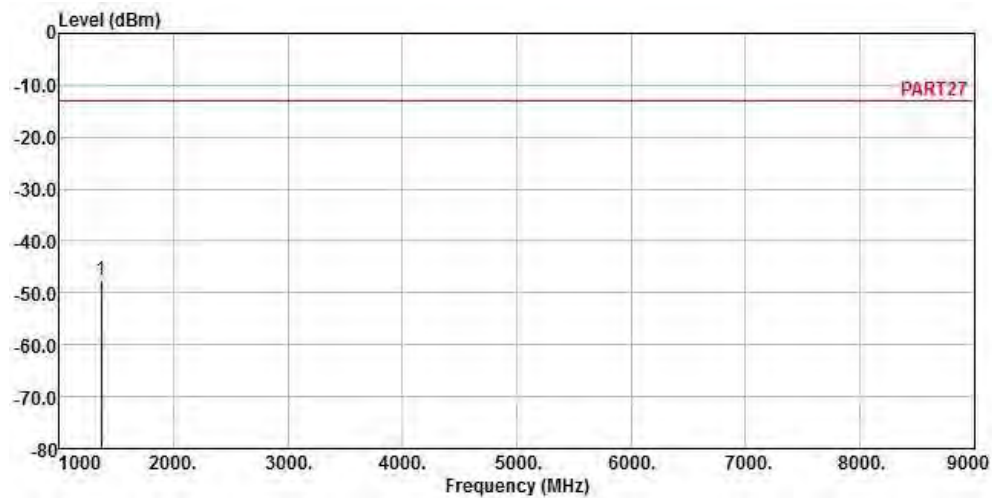


Test Report No.: RF180523W002-7

**GH133297**

|                                                     |                   |                 |                    |
|-----------------------------------------------------|-------------------|-----------------|--------------------|
| MODE                                                | TX channel 133297 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH   | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Getaz Yang        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                   |                 |                    |

| Freq | Level   | Read   | Limit  | Over   |        |             |
|------|---------|--------|--------|--------|--------|-------------|
| MHz  | dBm     | Level  | Line   | Limit  | Factor | Remark      |
| 1 pp | 1361.00 | -47.63 | -35.65 | -13.00 | -34.63 | -11.98 Peak |

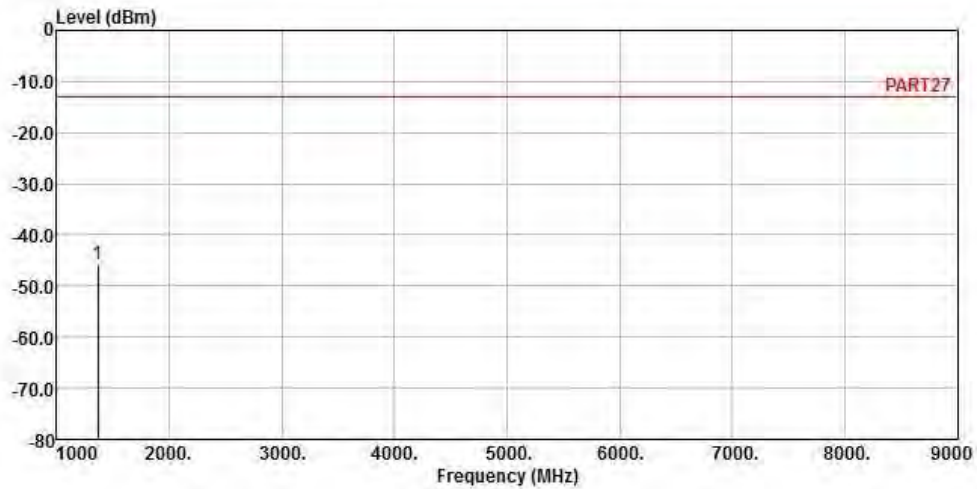




Test Report No.: RF180523W002-7

|                                                   |                   |                 |                    |
|---------------------------------------------------|-------------------|-----------------|--------------------|
| MODE                                              | TX channel 133297 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH   | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Getaz Yang        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                   |                 |                    |

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1 pp | 1361.00 | -45.63 | -33.65     | -13.00     | -32.63     | -11.98 | Peak   |



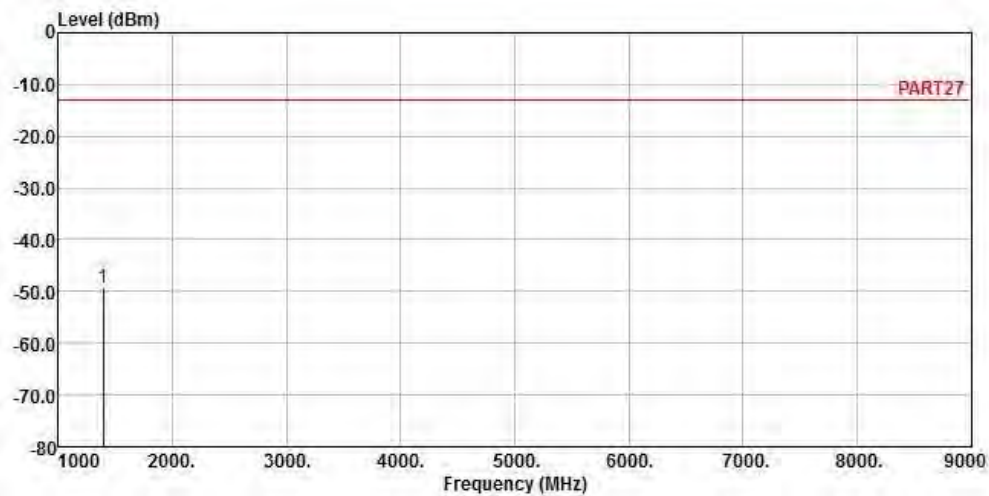


Test Report No.: RF180523W002-7

**GH133447**

|                                                     |                   |                 |                    |
|-----------------------------------------------------|-------------------|-----------------|--------------------|
| MODE                                                | TX channel 133447 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH   | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Getaz Yang        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                   |                 |                    |

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1 pp | 1391.00 | -49.19 | -37.31     | -13.00     | -36.19     | -11.88 | Peak   |

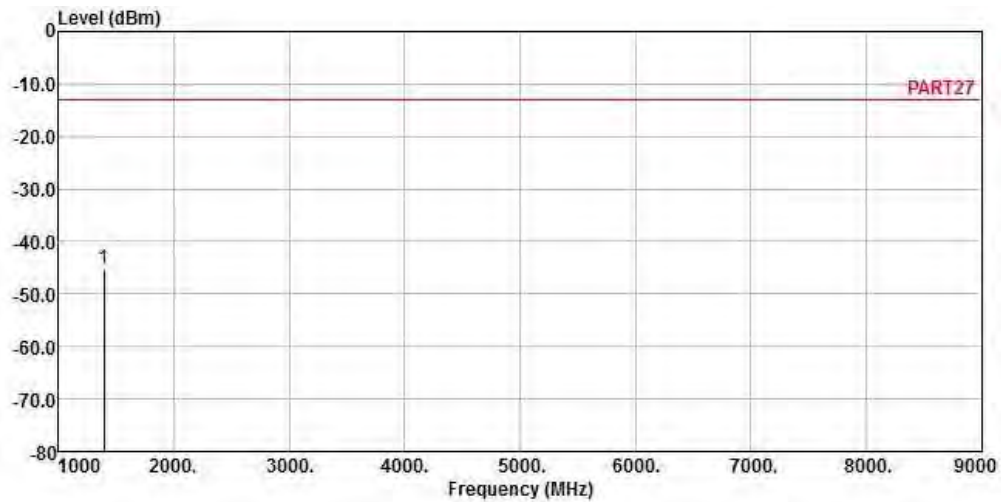




Test Report No.: RF180523W002-7

|                                                   |                   |                 |                    |
|---------------------------------------------------|-------------------|-----------------|--------------------|
| MODE                                              | TX channel 133447 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH   | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Getaz Yang        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                   |                 |                    |

|      |         |        | Read   | Limit  | Over   |        |        |
|------|---------|--------|--------|--------|--------|--------|--------|
| Freq | Level   | Level  | Level  | Line   | Limit  | Factor | Remark |
| MHz  | dBm     | dBm    | dBm    | dBm    | dB     | dB     |        |
| 1 pp | 1391.00 | -45.07 | -33.19 | -13.00 | -32.07 | -11.88 | Peak   |





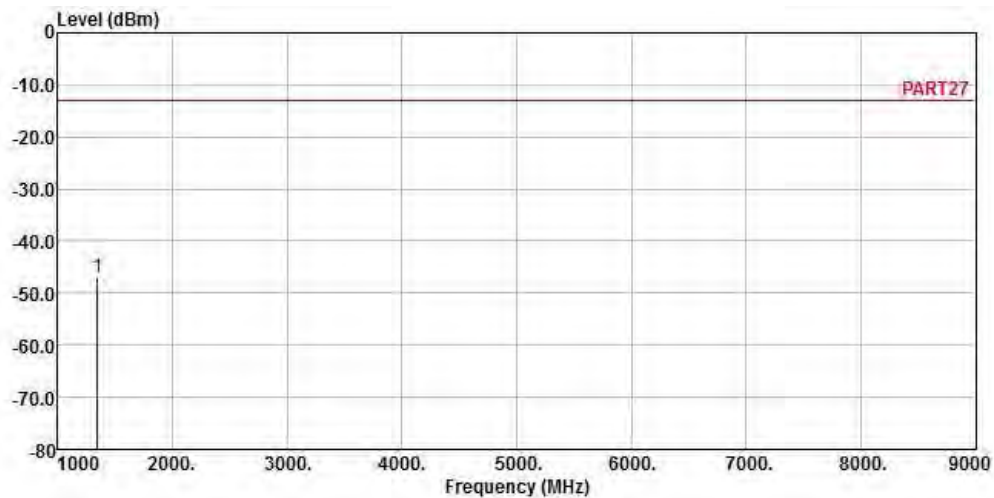
Test Report No.: RF180523W002-7

CHANNEL BANDWIDTH: 20MHz / QPSK

CH133222

|                                                     |                   |                 |                    |
|-----------------------------------------------------|-------------------|-----------------|--------------------|
| MODE                                                | TX channel 133222 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH   | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Getaz Yang        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                   |                 |                    |

| Freq | Level   | Read   | Limit  | Over   |        |             |
|------|---------|--------|--------|--------|--------|-------------|
| MHz  | dBm     | Level  | Line   | Limit  | Factor | Remark      |
|      |         | dBm    | dBm    | dB     | dB     |             |
| 1 pp | 1346.00 | -46.93 | -34.89 | -13.00 | -33.93 | -12.04 Peak |

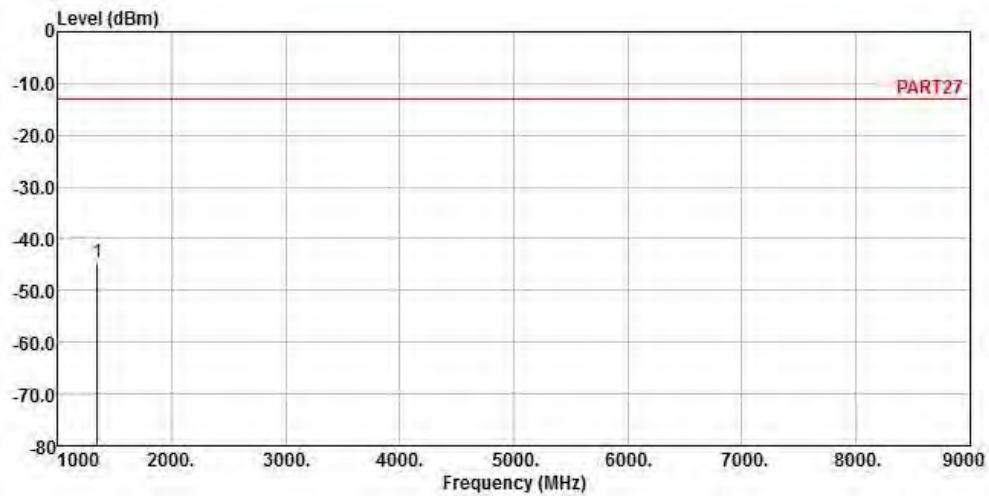




Test Report No.: RF180523W002-7

|                                                   |                   |                 |                    |
|---------------------------------------------------|-------------------|-----------------|--------------------|
| MODE                                              | TX channel 133222 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH   | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Getaz Yang        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                   |                 |                    |

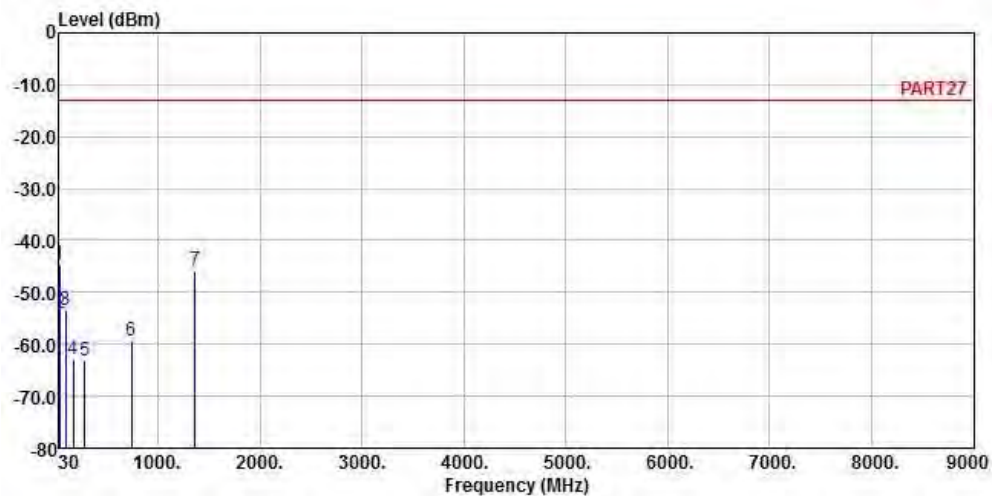
|   | Freq | Level   | Read Level | Limit Line | Over Limit | Factor | Remark      |
|---|------|---------|------------|------------|------------|--------|-------------|
|   | MHz  | dBm     | dBm        | dBm        | dB         | dB     |             |
| 1 | pp   | 1346.00 | -44.45     | -32.41     | -13.00     | -31.45 | -12.04 Peak |



CH133297

|                                                     |                   |                 |                    |
|-----------------------------------------------------|-------------------|-----------------|--------------------|
| MODE                                                | TX channel 133297 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH   | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Getaz Yang        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                   |                 |                    |

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1 pp | 30.00   | -44.52 | -44.90     | -13.00     | -31.52     | 0.38   | Peak   |
| 2    | 43.50   | -54.14 | -52.67     | -13.00     | -41.14     | -1.47  | Peak   |
| 3    | 91.29   | -53.29 | -42.24     | -13.00     | -40.29     | -11.05 | Peak   |
| 4    | 168.24  | -62.73 | -57.27     | -13.00     | -49.73     | -5.46  | Peak   |
| 5    | 281.10  | -63.08 | -56.45     | -13.00     | -50.08     | -6.63  | Peak   |
| 6    | 741.00  | -59.48 | -60.19     | -13.00     | -46.48     | 0.71   | Peak   |
| 7    | 1361.00 | -45.89 | -33.91     | -13.00     | -32.89     | -11.98 | Peak   |

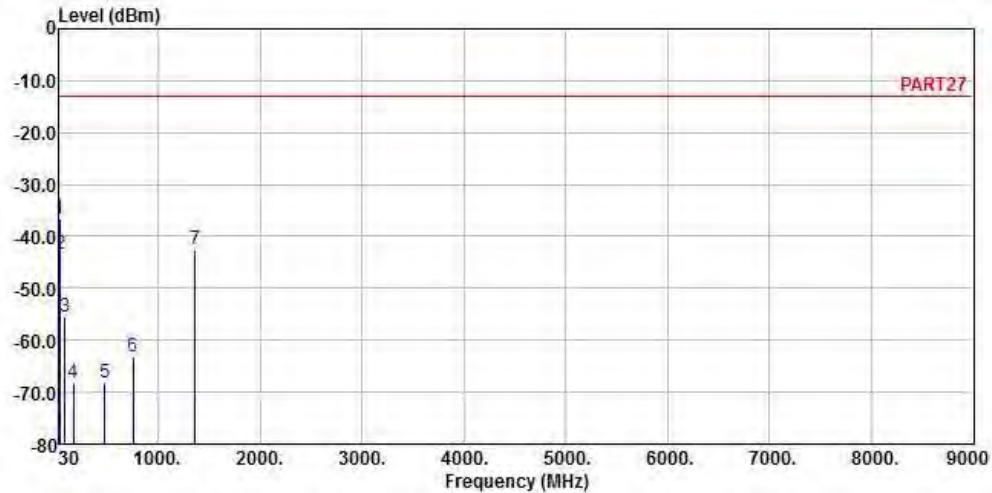




Test Report No.: RF180523W002-7

|                                                   |                   |                 |                    |
|---------------------------------------------------|-------------------|-----------------|--------------------|
| MODE                                              | TX channel 133297 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH   | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Getaz Yang        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                   |                 |                    |

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1 pp | 32.43   | -36.75 | -35.66     | -13.00     | -23.75     | -1.09  | Peak   |
| 2    | 43.50   | -43.47 | -42.00     | -13.00     | -30.47     | -1.47  | Peak   |
| 3    | 84.81   | -55.37 | -44.37     | -13.00     | -42.37     | -11.00 | Peak   |
| 4    | 169.86  | -68.21 | -62.68     | -13.00     | -55.21     | -5.53  | Peak   |
| 5    | 473.60  | -68.33 | -63.21     | -13.00     | -55.33     | -5.12  | Peak   |
| 6    | 754.30  | -63.06 | -63.93     | -13.00     | -50.06     | 0.87   | Peak   |
| 7    | 1361.00 | -42.51 | -30.53     | -13.00     | -29.51     | -11.98 | Peak   |



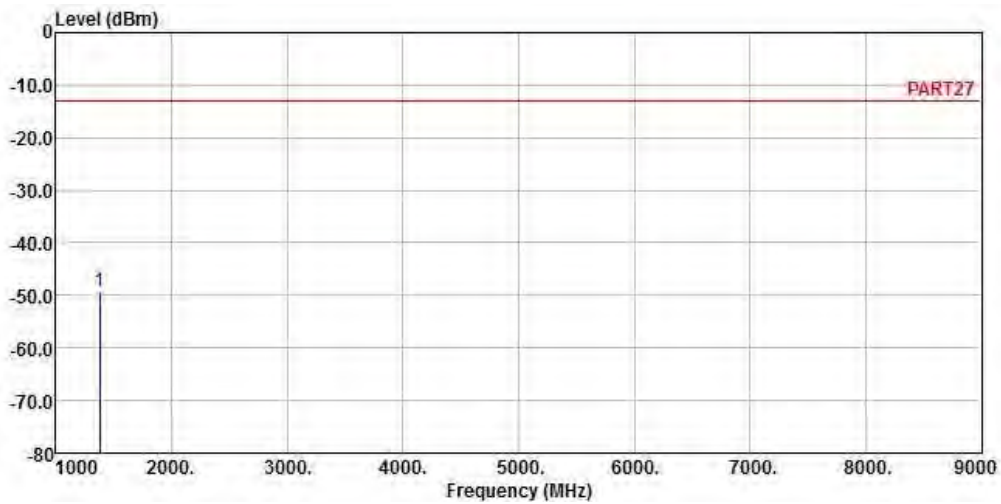


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# CH133372

|                                                     |                   |                 |                    |
|-----------------------------------------------------|-------------------|-----------------|--------------------|
| MODE                                                | TX channel 133372 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH   | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Getaz Yang        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                   |                 |                    |

|      |         | Read   | Limit  | Over   |        |             |
|------|---------|--------|--------|--------|--------|-------------|
| Freq | Level   | Level  | Line   | Limit  | Factor | Remark      |
| MHz  | dBm     | dBm    | dBm    | dB     | dB     |             |
| 1 pp | 1376.00 | -49.18 | -37.26 | -13.00 | -36.18 | -11.92 Peak |

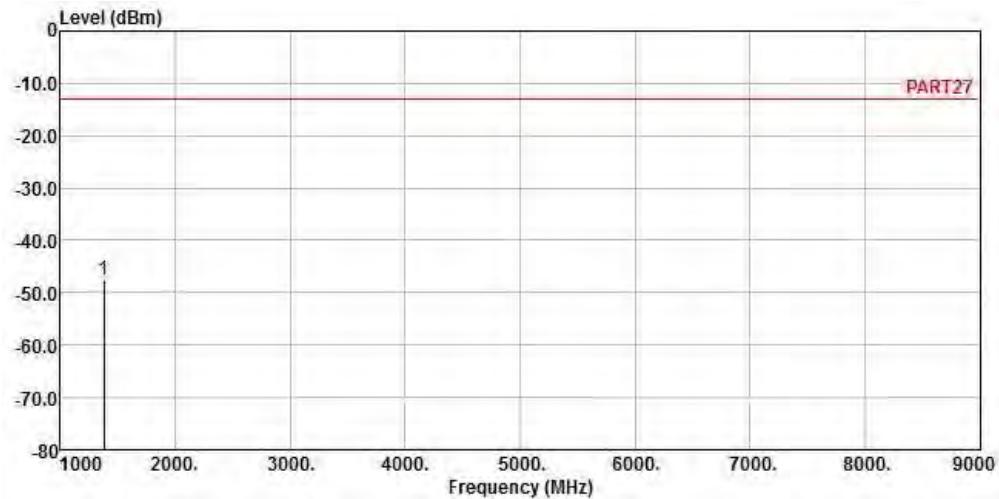




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|                                                   |                   |                 |                    |
|---------------------------------------------------|-------------------|-----------------|--------------------|
| MODE                                              | TX channel 133372 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH   | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Getaz Yang        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                   |                 |                    |

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm    | dBm        | dBm        | dB         | dB     |        |
| 1 pp | 1376.00 | -47.53 | -35.61     | -13.00     | -34.53     | -11.92 | Peak   |



Note: Radiated Spurious Emissions Test was performed by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**



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#### 4 INFORMATION ON THE TESTING LABORATORIES

We, BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO. LTD., were founded in 2015 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

The address and road map of all our labs can be found in our web site also.



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## 5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---