

FCC TEST REPORT

(PART 27)



| | |
|------------|---|
| Applicant: | HMD Global Oy |
| Address: | Bertel Jungin aukio 9, 02600 Espoo, Finland |

| | |
|---------------------------|---|
| Manufacturer or Supplier: | HMD Global Oy |
| Address: | Bertel Jungin aukio 9, 02600 Espoo, Finland |
| Product: | GSM/WCDMA/LTE Mobile Phone |
| Brand Name: | Nokia |
| Model Name: | TA-1127 |
| FCC ID: | 2AJOTTA-1127 |
| Date of tests: | Dec. 19, 2018 ~ Jan. 15, 2019 |

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

- ☒ **FCC Part 27, Subpart C, M**
☒ **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 Engineer / Mobile Department | Approved by Sam Tung Manager / Mobile Department |
|  |  |
| Date: Jan. 18, 2019 | Date: Jan. 18, 2019 |

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**BUREAU
VERITAS**

Test Report No.: RF180928W004-7

| | | |
|----------|---|-----------|
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Test Report No.: RF180928W004-7

RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|----------------|---|---------------|
| RF180928W002-7 | Original release | Jan. 16, 2019 |
| RF180928W004-7 | Based on the original report changing model name & FCC ID and disable one SIM card. All the data is copies from the original report RF180928W002-7. | Jan. 18, 2019 |

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 |
| 2.1046 27.50(h)(2) | Equivalent Isotropically Radiated Power | PASS | Meet the requirement of limit. |
| 2.1055 27.54 | Frequency Stability | PASS | Meet the requirement of limit. |
| 2.1049 27.53(m)(6) | Occupied Bandwidth | PASS | Meet the requirement of limit. |
| 27.50(d)(5) | Peak to average ratio | PASS | Meet the requirement of limit. |
| 2.1051 27.53(m)(4)(6) | Band Edge Measurements | PASS | Meet the requirement of limit. |
| 2.1051 27.53(m)(4)(6) | Conducted Spurious Emissions | PASS | Meet the requirement of limit. |
| 2.1053 27.53(m)(4)(6) | Radiated Spurious Emissions | PASS | Meet the requirement of limit. Minimum passing margin is -12.58dB at 41.05MHz. |

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 | UNCERTAINTY |
|----------------------------|-------------|
| Maximum Peak Output Power | ±1dB |
| Frequency Stability | ±39.27Hz |
| Radiated emissions | ±4.48dB |
| Conducted emissions | ±2 dB |
| Occupied Channel Bandwidth | ±21.7KHz |
| Band Edge Measurements | ±4.48dB |
| Peak to average ratio | ±0.76dB |

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 | Mar. 15,18 | Mar. 14,19 |
| Bilog Antenna 2 | ETS-LINDGREN | 3143B | 00161965 | Mar. 15,18 | Mar. 14,19 |
| Horn Antenna 1 | ETS-LINDGREN | 3117 | 00168728 | Mar. 15,18 | Mar. 14,19 |
| Horn Antenna 2 | ETS-LINDGREN | 3117 | 00168692 | Nov. 30, 18 | Nov. 29, 19 |
| Loop antenna | Daze | ZN30900A | 0708 | Oct. 23,18 | Oct. 22, 19 |
| Horn Antenna (18GHz-40GHz) | N/A | QWH-SL-18-40 -K-SG/QMS-00 361 | 15433 | Nov. 21, 18 | Nov. 20, 19 |
| Radio Communication 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 Chamber | ETS-LINDGREN | 9m*6m*6m | Euroshieldpn- 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 _V7.6.15.9.2 | N/A | N/A | N/A |
| 10dB Attenuator | JFW/USA | 50HF-010-SM 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 Programmable Tester | Juyi | ITH-120-45-CP -AR | IAA1504-001 | Jul. 09,18 | Jul. 08,19 |
| MXG Analog Microvave 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; The Designation No. is CN1171.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

| | | |
|------------------------------|---|---------------------------------|
| PRODUCT | GSM/WCDMA/LTE Mobile Phone | |
| BRAND NAME | Nokia | |
| MODEL NAME | TA-1127 | |
| POWER SUPPLY | 5.0Vdc (adapter or host equipment) 3.85Vdc (Li-ion, battery) | |
| MODULATION TECHNOLOGY | LTE Band 7 | QPSK, 16QAM |
| FREQUENCY RANGE | LTE Band 7 Channel Bandwidth: 5MHz | 2502.5MHz ~ 2567.5MHz |
| | LTE Band 7 Channel Bandwidth: 10MHz | 2505MHz ~ 2565MHz |
| | LTE Band 7 Channel Bandwidth: 15MHz | 2507.5MHz ~ 2562.5MHz |
| | LTE Band 7 Channel Bandwidth: 20MHz | 2510MHz ~ 2560MHz |
| EMISSION DESIGNATOR | LTE Band 7 Channel Bandwidth: 5MHz | QPSK: 4M48G7D 16QAM: 4M47W7D |
| | LTE Band 7 Channel Bandwidth: 10MHz | QPSK: 8M95G7D 16QAM: 8M92W7D |
| | LTE Band 7 Channel Bandwidth: 15MHz | QPSK: 13M4G7D 16QAM: 13M4W7D |
| | LTE Band 7 Channel Bandwidth: 20MHz | QPSK: 17M9G7D 16QAM: 17M9W7D |
| | LTE Band 7 Channel Bandwidth: 5MHz | 342mW |
| | LTE Band 7 Channel Bandwidth: 10MHz | 359mW |
| | LTE Band 7 Channel Bandwidth: 15MHz | 343mW |
| | LTE Band 7 Channel Bandwidth: 20MHz | 307mW |
| MAX. EIRP POWER | | |
| ANTENNA TYPE | Fixed Internal Antenna with 2.27dBi | |
| HW VERSION | HW0242 | |
| SW VERSION | 000C_0_310 | |
| I/O PORTS | Refer to user's manual | |
| DATA CABLE | USB cable: non-shielded, detachable, 1.0m Earphone cable: non-shielded, detachable, 1.5m | |

NOTE:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

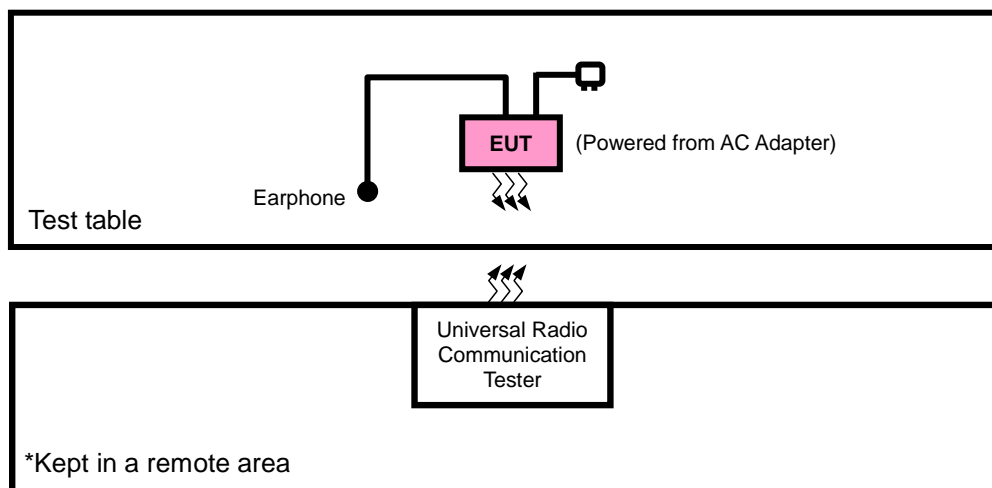
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

List of Accessories:

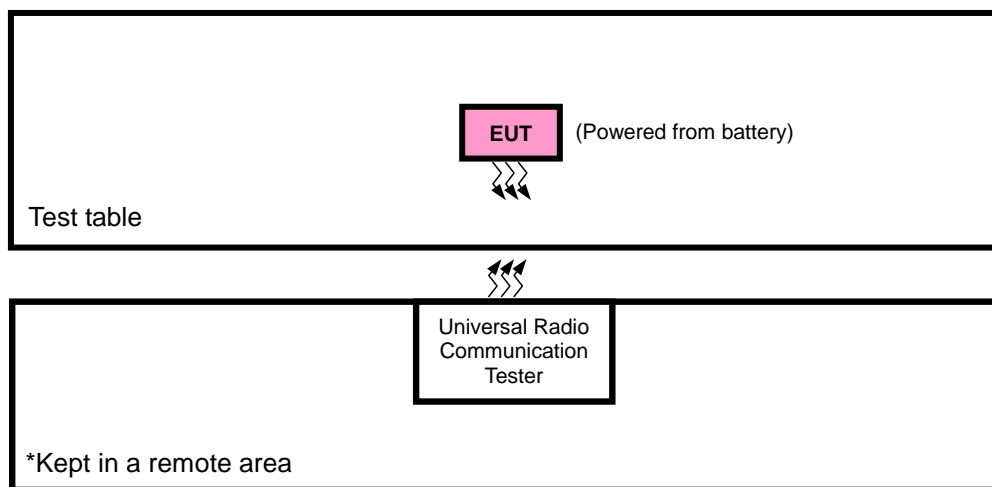
| ACCESSORIES | BRAND | MODEL | MANUFACTURER | SPECIFICATION |
|--------------|--------|----------------|------------------------------------|---|
| AC Adapter 1 | Aohai | AD-5WU(US) | DONGGUAN AOHAITECHNOLOGY CO., LTD. | I/P: 100-240Vac, 150mA O/P: 5Vdc, 1A |
| AC Adapter 2 | DVE | AD-5WU(US) | Dee Van Enterprise Co., LTD. | I/P: 100-240Vac, 150mA O/P: 5Vdc, 1A |
| Battery | Lishen | HE365 | - | Rating: 3.85Vdc,2500mAh |
| Earphone | Nokia | WH-108 | OBO | 1.5m non-shielded cable w/o core |
| USB Cable 1 | Nokia | CA-10W | Shenglan Technology Co., Ltd | 1.0m non-shielded cable w/o core |
| USB Cable 2 | Nokia | MICRO USB 5V2A | RongTaiFeng Technology Co.,Ltd | 1.0m non-shielded cable w/o core |

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

2.4 TEST ITEM AND TEST CONFIGURATION

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 was found when positioned on Y-plane for EIRP and X-axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

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

LTE BAND 7

| EUT CONFIGURE MODE | TEST ITEM | AVAILABLE CHANNEL | TESTED CHANNEL | CHANNEL BANDWIDTH | MODULATION | MODE |
|--------------------|-----------------------|-------------------|---------------------|-------------------|-------------|----------------------|
| B | EIRP | 20775 to 21425 | 20775, 21100, 21425 | 5MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 20800 to 21400 | 20800, 21100, 21400 | 10MHz | QPSK, 16QAM | 1 RB / 0RB Offset |
| | | 20825 to 21375 | 20825, 21100, 21375 | 15MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 20850 to 21350 | 20850, 21100, 21350 | 20MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| B | FREQUENCY STABILITY | 20775 to 21425 | 20775, 21425 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20800 to 21400 | 20800, 21400 | 10MHz | QPSK | 1 RB / 0RB Offset |
| | | 20825 to 21375 | 20825, 21375 | 15MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20850 to 21350 | 20850, 21350 | 20MHz | QPSK | 1 RB / 0 RB Offset |
| B | OCCUPIED BANDWIDTH | 20775 to 21425 | 20775, 21100, 21425 | 5MHz | QPSK, 16QAM | 25 RB / 0 RB Offset |
| | | 20800 to 21400 | 20800, 21100, 21400 | 10MHz | QPSK, 16QAM | 50 RB / 0 RB Offset |
| | | 20825 to 21375 | 20825, 21100, 21375 | 15MHz | QPSK, 16QAM | 75 RB / 0 RB Offset |
| | | 20850 to 21350 | 20850, 21100, 21350 | 20MHz | QPSK, 16QAM | 100 RB / 0 RB Offset |
| B | PEAK TO AVERAGE RATIO | 20775 to 21425 | 20775, 21100, 21425 | 5MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 20800 to 21400 | 20800, 21100, 21400 | 10MHz | QPSK, 16QAM | 1 RB / 0RB Offset |
| | | 20825 to 21375 | 20825, 21100, 21375 | 15MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 20850 to 21350 | 20850, 21100, 21350 | 20MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| B | BAND EDGE | 20775 to 21425 | 20775 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | | 25 RB / 0 RB Offset |
| | | | 21425 | 5MHz | QPSK | 1 RB / 24 RB Offset |
| | | | | | | 25 RB / 0 RB Offset |
| | | 20800 to 21400 | 20800 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | | 50 RB / 0 RB Offset |
| | | | 21400 | 10MHz | QPSK | 1 RB / 49 RB Offset |
| | | | | | | 50 RB / 0 RB Offset |
| | | 20825 to 21375 | 20825 | 15MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | | 75 RB / 0 RB Offset |
| | | | 21375 | 15MHz | QPSK | 1 RB / 74 RB Offset |
| | | | | | | 75 RB / 0 RB Offset |
| B | CONDCUETED EMISSION | 20775 to 21425 | 20775, 21100, 21425 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20800 to 21400 | 20800, 21100, 21400 | 10MHz | QPSK | 1 RB / 0RB Offset |
| | | 20825 to 21375 | 20825, 21100, 21375 | 15MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20850 to 21350 | 20850, 21100, 21350 | 20MHz | QPSK | 1 RB / 0 RB Offset |
| A | RADIATED EMISSION | 20775 to 21425 | 21100 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20800 to 21400 | 20800, 21100, 21400 | 10MHz | QPSK | 1 RB / 0RB Offset |
| | | 20825 to 21375 | 21100 | 15MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20850 to 21350 | 21100 | 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 | 24deg. C, 60%RH | 3.85Vdc from Battery | Rose Ma |
| FREQUENCY STABILITY | 24deg. C, 61%RH | DC 3.6V/3.9V/4.2V | Rain Wang |
| OCCUPIED BANDWIDTH | 24deg. C, 61%RH | 3.85Vdc from Battery | Rain Wang |
| PEAK TO AVERAGE RATIO | 24deg. C, 61%RH | 3.85Vdc from Battery | Rain Wang |
| BAND EDGE | 24deg. C, 61%RH | 3.85Vdc from Battery | Rain Wang |
| CONDUCTED EMISSION | 24deg. C, 61%RH | 3.85Vdc from Battery | Rain Wang |
| RADIATED EMISSION | 24deg. C, 60%RH | 5Vdc from adapter | Rose Ma |

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

The radiated peak output power shall be according to the specific rule Part 27.50(h)(2) that “User stations are limited to 2 watts” and 27.50(i) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

3.1.2 TEST PROCEDURES

EIRP MEASUREMENT:

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 10MHz for LTE mode.
- b. 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.
- 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 b. Record the power level of S.G.
- d. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$

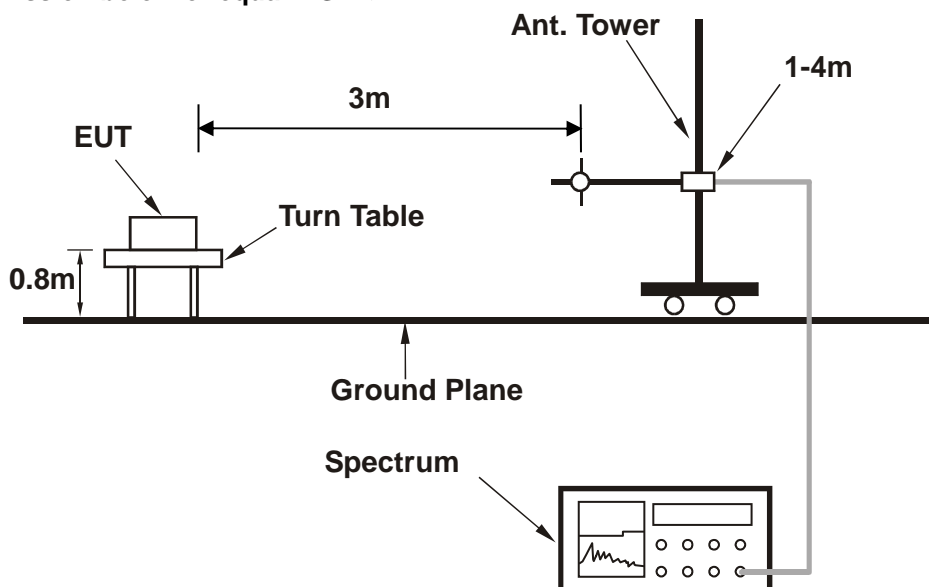
CONDUCTED POWER MEASUREMENT:

- 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.

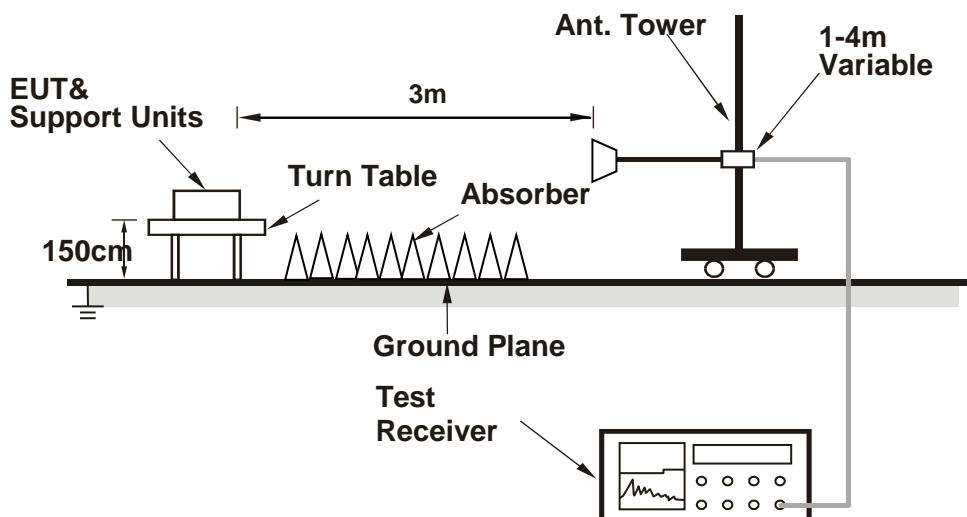
3.1.3 TEST SETUP

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>

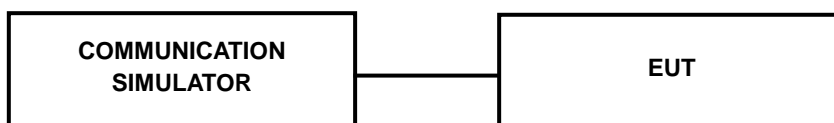


<Radiated Emission above 1 GHz>



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

CONDUCTED POWER MEASUREMENT:



3.1.4 TEST RESULTS

AVERAGE CONDUCTED OUTPUT POWER (dBm)

| LTE Band 7 | | | | | | | |
|------------|------------|---------|-----------|-------------------------|-----------------------|-------------------------|-----|
| BW | Modulation | RB Size | RB Offset | Low CH 20775 | Mid CH 21100 | High CH 21425 | MPR |
| | | | | Frequency 2502.5 MHz | Frequency 2535 MHz | Frequency 2567.5 MHz | |
| 5 MHz | QPSK | 1 | 0 | 22.24 | 22.40 | 22.42 | 0 |
| | | 1 | 12 | 22.63 | 22.79 | 22.81 | 0 |
| | | 1 | 24 | 22.28 | 22.44 | 22.46 | 0 |
| | | 12 | 0 | 21.55 | 21.71 | 21.73 | 1 |
| | | 12 | 6 | 21.61 | 21.77 | 21.79 | 1 |
| | | 12 | 13 | 21.56 | 21.72 | 21.74 | 1 |
| | | 25 | 0 | 21.56 | 21.72 | 21.74 | 1 |
| | 16QAM | 1 | 0 | 21.45 | 21.61 | 21.63 | 1 |
| | | 1 | 12 | 21.82 | 21.98 | 22.00 | 1 |
| | | 1 | 24 | 21.47 | 21.63 | 21.65 | 1 |
| | | 12 | 0 | 20.52 | 20.68 | 20.70 | 2 |
| | | 12 | 6 | 20.56 | 20.72 | 20.74 | 2 |
| | | 12 | 13 | 20.48 | 20.64 | 20.66 | 2 |
| | | 25 | 0 | 20.51 | 20.67 | 20.69 | 2 |
| BW | Modulation | RB Size | RB Offset | Low CH 20800 | Mid CH 21100 | High CH 21400 | MPR |
| | | | | Frequency 2505 MHz | Frequency 2535 MHz | Frequency 2565 MHz | |
| 10 MHz | QPSK | 1 | 0 | 22.28 | 22.44 | 22.46 | 0 |
| | | 1 | 24 | 22.67 | 22.83 | 22.85 | 0 |
| | | 1 | 49 | 22.32 | 22.48 | 22.50 | 0 |
| | | 25 | 0 | 21.59 | 21.75 | 21.77 | 1 |
| | | 25 | 12 | 21.65 | 21.81 | 21.83 | 1 |
| | | 25 | 25 | 21.60 | 21.76 | 21.78 | 1 |
| | | 50 | 0 | 21.60 | 21.76 | 21.78 | 1 |
| | 16QAM | 1 | 0 | 21.49 | 21.65 | 21.67 | 1 |
| | | 1 | 24 | 21.86 | 22.02 | 22.04 | 1 |
| | | 1 | 49 | 21.51 | 21.67 | 21.69 | 1 |
| | | 25 | 0 | 20.56 | 20.72 | 20.74 | 2 |
| | | 25 | 12 | 20.60 | 20.76 | 20.78 | 2 |
| | | 25 | 25 | 20.52 | 20.68 | 20.70 | 2 |
| | | 50 | 0 | 20.55 | 20.71 | 20.73 | 2 |

| LTE Band 7 | | | | | | | |
|------------|------------|---------|-----------|-------------------------|-----------------------|-------------------------|-----|
| BW | Modulation | RB Size | RB Offset | Low CH 20825 | Mid CH 21100 | High CH 21375 | MPR |
| | | | | Frequency 2507.5 MHz | Frequency 2535 MHz | Frequency 2562.5 MHz | |
| 15 MHz | QPSK | 1 | 0 | 22.34 | 22.50 | 22.52 | 0 |
| | | 1 | 37 | 22.73 | 22.89 | 22.91 | 0 |
| | | 1 | 74 | 22.38 | 22.54 | 22.56 | 0 |
| | | 36 | 0 | 21.65 | 21.81 | 21.83 | 1 |
| | | 36 | 19 | 21.71 | 21.87 | 21.89 | 1 |
| | | 36 | 39 | 21.66 | 21.82 | 21.84 | 1 |
| | | 75 | 0 | 21.66 | 21.82 | 21.84 | 1 |
| | 16QAM | 1 | 0 | 21.55 | 21.71 | 21.73 | 1 |
| | | 1 | 37 | 21.92 | 22.08 | 22.10 | 1 |
| | | 1 | 74 | 21.57 | 21.73 | 21.75 | 1 |
| | | 36 | 0 | 20.62 | 20.78 | 20.80 | 2 |
| | | 36 | 19 | 20.66 | 20.82 | 20.84 | 2 |
| | | 36 | 39 | 20.58 | 20.74 | 20.76 | 2 |
| | | 75 | 0 | 20.61 | 20.77 | 20.79 | 2 |
| BW | Modulation | RB Size | RB Offset | Low CH 20850 | Mid CH 21100 | High CH 21350 | MPR |
| | | | | Frequency 2510 MHz | Frequency 2535 MHz | Frequency 2560 MHz | |
| 20 MHz | QPSK | 1 | 0 | 22.37 | 22.53 | 22.55 | 0 |
| | | 1 | 50 | 22.76 | 22.92 | 22.94 | 0 |
| | | 1 | 99 | 22.41 | 22.57 | 22.59 | 0 |
| | | 50 | 0 | 21.68 | 21.84 | 21.86 | 1 |
| | | 50 | 25 | 21.74 | 21.90 | 21.92 | 1 |
| | | 50 | 50 | 21.69 | 21.85 | 21.87 | 1 |
| | | 100 | 0 | 21.69 | 21.85 | 21.87 | 1 |
| | 16QAM | 1 | 0 | 21.58 | 21.74 | 21.76 | 1 |
| | | 1 | 50 | 21.95 | 22.11 | 22.13 | 1 |
| | | 1 | 99 | 21.60 | 21.76 | 21.78 | 1 |
| | | 50 | 0 | 20.65 | 20.81 | 20.83 | 2 |
| | | 50 | 25 | 20.69 | 20.85 | 20.87 | 2 |
| | | 50 | 50 | 20.61 | 20.77 | 20.79 | 2 |
| | | 100 | 0 | 20.64 | 20.80 | 20.82 | 2 |

EIRP

LTE BAND 7

CHANNEL BANDWIDTH: 5MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | Limit (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 20775 | 2502.5 | -21.18 | 45.65 | 24.47 | 279.77 | H | 2 |
| 21100 | 2535.0 | -20.70 | 46.04 | 25.34 | 341.59 | H | 2 |
| 21425 | 2567.5 | -20.64 | 45.87 | 25.23 | 333.12 | H | 2 |
| 20775 | 2502.5 | -26.45 | 47.03 | 20.58 | 114.24 | V | 2 |
| 21100 | 2535.0 | -26.55 | 46.57 | 20.02 | 100.46 | V | 2 |
| 21425 | 2567.5 | -26.81 | 46.98 | 20.17 | 103.99 | V | 2 |

CHANNEL BANDWIDTH: 5MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | Limit (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 20775 | 2502.5 | -22.01 | 45.65 | 23.64 | 231.10 | H | 2 |
| 21100 | 2535.0 | -21.72 | 46.04 | 24.32 | 270.08 | H | 2 |
| 21425 | 2567.5 | -23.17 | 45.87 | 22.70 | 186.04 | H | 2 |
| 20775 | 2502.5 | -27.28 | 47.03 | 19.75 | 94.36 | V | 2 |
| 21100 | 2535.0 | -27.57 | 46.57 | 19.00 | 79.43 | V | 2 |
| 21425 | 2567.5 | -27.91 | 46.98 | 19.07 | 80.72 | V | 2 |

CHANNEL BANDWIDTH: 10MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | Limit (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 20800 | 2505.0 | -20.99 | 45.65 | 24.66 | 292.35 | H | 2 |
| 21100 | 2535.0 | -20.64 | 46.04 | 25.40 | 346.34 | H | 2 |
| 21400 | 2565.0 | -20.51 | 46.07 | 25.56 | 359.34 | H | 2 |
| 20800 | 2505.0 | -26.26 | 47.18 | 20.92 | 123.48 | V | 2 |
| 21100 | 2535.0 | -26.49 | 46.57 | 20.08 | 101.86 | V | 2 |
| 21400 | 2565.0 | -26.68 | 47.06 | 20.38 | 109.24 | V | 2 |

CHANNEL BANDWIDTH: 10MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | Limit (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 20800 | 2505.0 | -22.14 | 45.65 | 23.51 | 224.34 | H | 2 |
| 21100 | 2535.0 | -21.74 | 46.04 | 24.30 | 268.84 | H | 2 |
| 21400 | 2565.0 | -23.10 | 46.07 | 22.97 | 197.92 | H | 2 |
| 20800 | 2505.0 | -27.41 | 47.18 | 19.77 | 94.75 | V | 2 |
| 21100 | 2535.0 | -27.59 | 46.57 | 18.98 | 79.07 | V | 2 |
| 21400 | 2565.0 | -27.84 | 47.06 | 19.22 | 83.64 | V | 2 |

CHANNEL BANDWIDTH: 15MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | Limit (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 20825 | 2507.5 | -21.00 | 45.63 | 24.63 | 290.60 | H | 2 |
| 21100 | 2535.0 | -20.71 | 46.04 | 25.33 | 340.80 | H | 2 |
| 21375 | 2562.5 | -20.58 | 45.94 | 25.36 | 343.40 | H | 2 |
| 20825 | 2507.5 | -26.27 | 47.39 | 21.12 | 129.39 | V | 2 |
| 21100 | 2535.0 | -26.56 | 46.57 | 20.01 | 100.23 | V | 2 |
| 21375 | 2562.5 | -26.75 | 47.00 | 20.25 | 105.90 | V | 2 |

CHANNEL BANDWIDTH: 15MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | Limit (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 20825 | 2507.5 | -21.86 | 45.63 | 23.77 | 238.40 | H | 2 |
| 21100 | 2535.0 | -21.58 | 46.04 | 24.46 | 278.93 | H | 2 |
| 21375 | 2562.5 | -22.86 | 45.94 | 23.08 | 203.14 | H | 2 |
| 20825 | 2507.5 | -27.13 | 47.39 | 20.26 | 106.15 | V | 2 |
| 21100 | 2535.0 | -27.43 | 46.57 | 19.14 | 82.04 | V | 2 |
| 21375 | 2562.5 | -27.60 | 47.00 | 19.40 | 87.08 | V | 2 |

CHANNEL BANDWIDTH: 20MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | Limit (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 20850 | 2510.0 | -21.58 | 45.80 | 24.22 | 264.18 | H | 2 |
| 21100 | 2535.0 | -21.16 | 46.04 | 24.88 | 307.26 | H | 2 |
| 21350 | 2560.0 | -22.59 | 45.83 | 23.24 | 211.01 | H | 2 |
| 20850 | 2510.0 | -26.85 | 47.21 | 20.36 | 108.64 | V | 2 |
| 21100 | 2535.0 | -27.01 | 46.57 | 19.56 | 90.28 | V | 2 |
| 21350 | 2560.0 | -27.33 | 47.07 | 19.74 | 94.17 | V | 2 |

CHANNEL BANDWIDTH: 20MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | Limit (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 20850 | 2510.0 | -22.51 | 45.80 | 23.29 | 213.26 | H | 2 |
| 21100 | 2535.0 | -22.23 | 46.04 | 23.81 | 240.16 | H | 2 |
| 21350 | 2560.0 | -23.42 | 45.83 | 22.41 | 174.30 | H | 2 |
| 20850 | 2510.0 | -27.78 | 47.21 | 19.43 | 87.70 | V | 2 |
| 21100 | 2535.0 | -28.08 | 46.57 | 18.49 | 70.57 | V | 2 |
| 21350 | 2560.0 | -28.16 | 47.07 | 18.91 | 77.79 | V | 2 |

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

3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

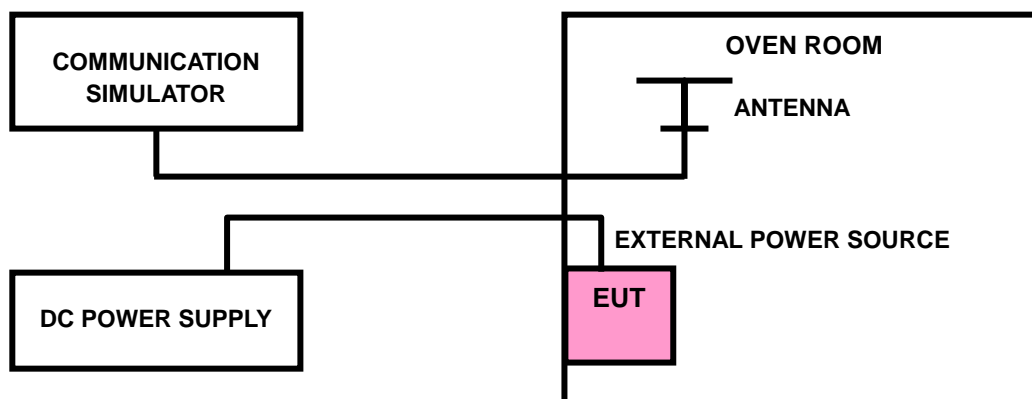
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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 7

FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | 5MHz | | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
| | FREQUENCY ERROR (ppm) | | |
| | Low Channel | High Channel | |
| 3.9 | 0.0005 | 0.0005 | 2.5 |
| 3.6 | -0.0007 | -0.0006 | 2.5 |
| 4.2 | 0.0005 | 0.0005 | 2.5 |

NOTE: The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.2Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

| TEMP. (°C) | 5MHz | | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
| | FREQUENCY ERROR (ppm) | | |
| | Low Channel | High Channel | |
| -30 | -0.0037 | -0.0037 | 2.5 |
| -20 | -0.0032 | -0.0033 | 2.5 |
| -10 | -0.0029 | 0.0030 | 2.5 |
| 0 | -0.0025 | -0.0026 | 2.5 |
| 10 | -0.0021 | -0.0023 | 2.5 |
| 20 | -0.0017 | -0.0018 | 2.5 |
| 30 | -0.0013 | -0.0013 | 2.5 |
| 40 | -0.0007 | -0.0008 | 2.5 |
| 50 | -0.0002 | -0.0002 | 2.5 |

FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | 10MHz | | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
| | FREQUENCY ERROR (ppm) | | |
| | Low Channel | High Channel | |
| 3.9 | 0.0006 | 0.0006 | 2.5 |
| 3.6 | -0.0006 | -0.0007 | 2.5 |
| 4.2 | 0.0007 | 0.0005 | 2.5 |

NOTE: The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.2Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

| TEMP. (°C) | 10MHz | | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
| | FREQUENCY ERROR (ppm) | | |
| | Low Channel | High Channel | |
| -30 | -0.0039 | -0.0039 | 2.5 |
| -20 | -0.0035 | -0.0036 | 2.5 |
| -10 | -0.0027 | -0.0027 | 2.5 |
| 0 | -0.0021 | -0.0020 | 2.5 |
| 10 | -0.0018 | -0.0018 | 2.5 |
| 20 | -0.0015 | -0.0015 | 2.5 |
| 30 | -0.0009 | -0.0008 | 2.5 |
| 40 | -0.0008 | -0.0007 | 2.5 |
| 50 | -0.0004 | -0.0003 | 2.5 |

FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | 15MHz | | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
| | FREQUENCY ERROR (ppm) | | |
| | Low Channel | High Channel | |
| 3.9 | 0.0006 | 0.0005 | 2.5 |
| 3.6 | -0.0007 | -0.0006 | 2.5 |
| 4.2 | 0.0006 | 0.0005 | 2.5 |

NOTE: The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.2Vdc.

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 | -0.0038 | 2.5 |
| -10 | -0.0029 | -0.0030 | 2.5 |
| 0 | -0.0027 | -0.0027 | 2.5 |
| 10 | -0.0021 | -0.0021 | 2.5 |
| 20 | -0.0017 | -0.0017 | 2.5 |
| 30 | -0.0009 | -0.0009 | 2.5 |
| 40 | -0.0005 | -0.0005 | 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 | |
| 3.9 | 0.0005 | 0.0005 | 2.5 |
| 3.6 | -0.0005 | -0.0007 | 2.5 |
| 4.2 | 0.0004 | 0.0005 | 2.5 |

NOTE: The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.2Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

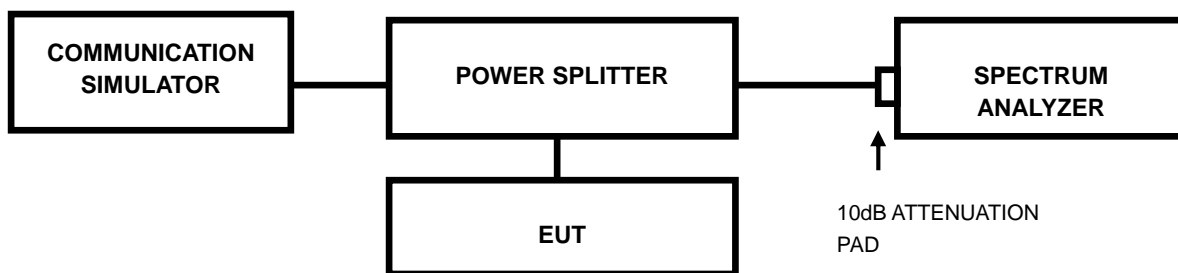
| TEMP. (°C) | 20MHz | | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
| | FREQUENCY ERROR (ppm) | | |
| | Low Channel | High Channel | |
| -30 | -0.0041 | -0.0040 | 2.5 |
| -20 | -0.0039 | -0.0040 | 2.5 |
| -10 | -0.0035 | -0.0034 | 2.5 |
| 0 | -0.0030 | -0.0029 | 2.5 |
| 10 | -0.0021 | -0.0021 | 2.5 |
| 20 | -0.0018 | -0.0018 | 2.5 |
| 30 | -0.0013 | -0.0014 | 2.5 |
| 40 | -0.0009 | -0.0009 | 2.5 |
| 50 | -0.0002 | -0.0002 | 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

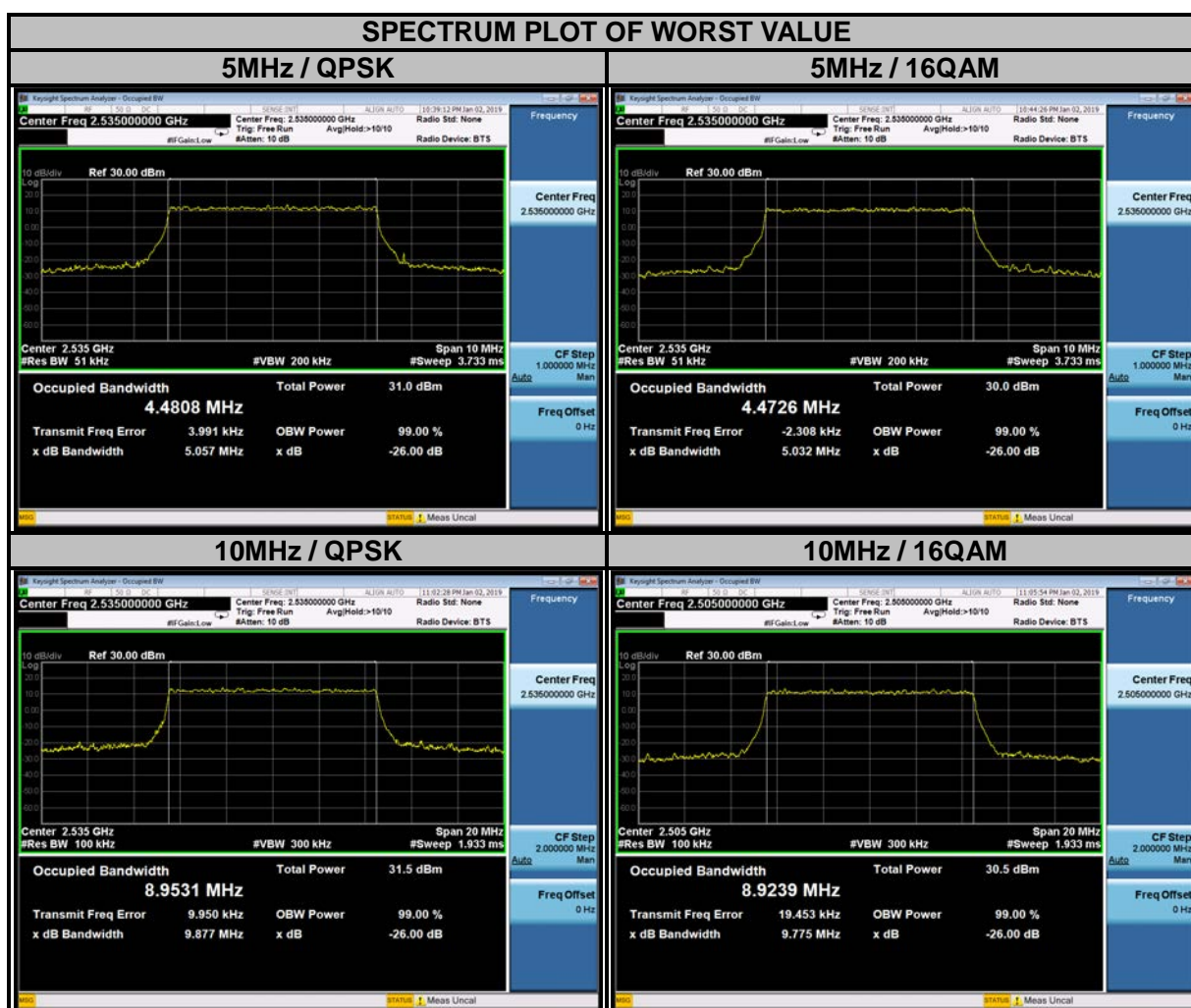


3.3.3 TEST PROCEDURES

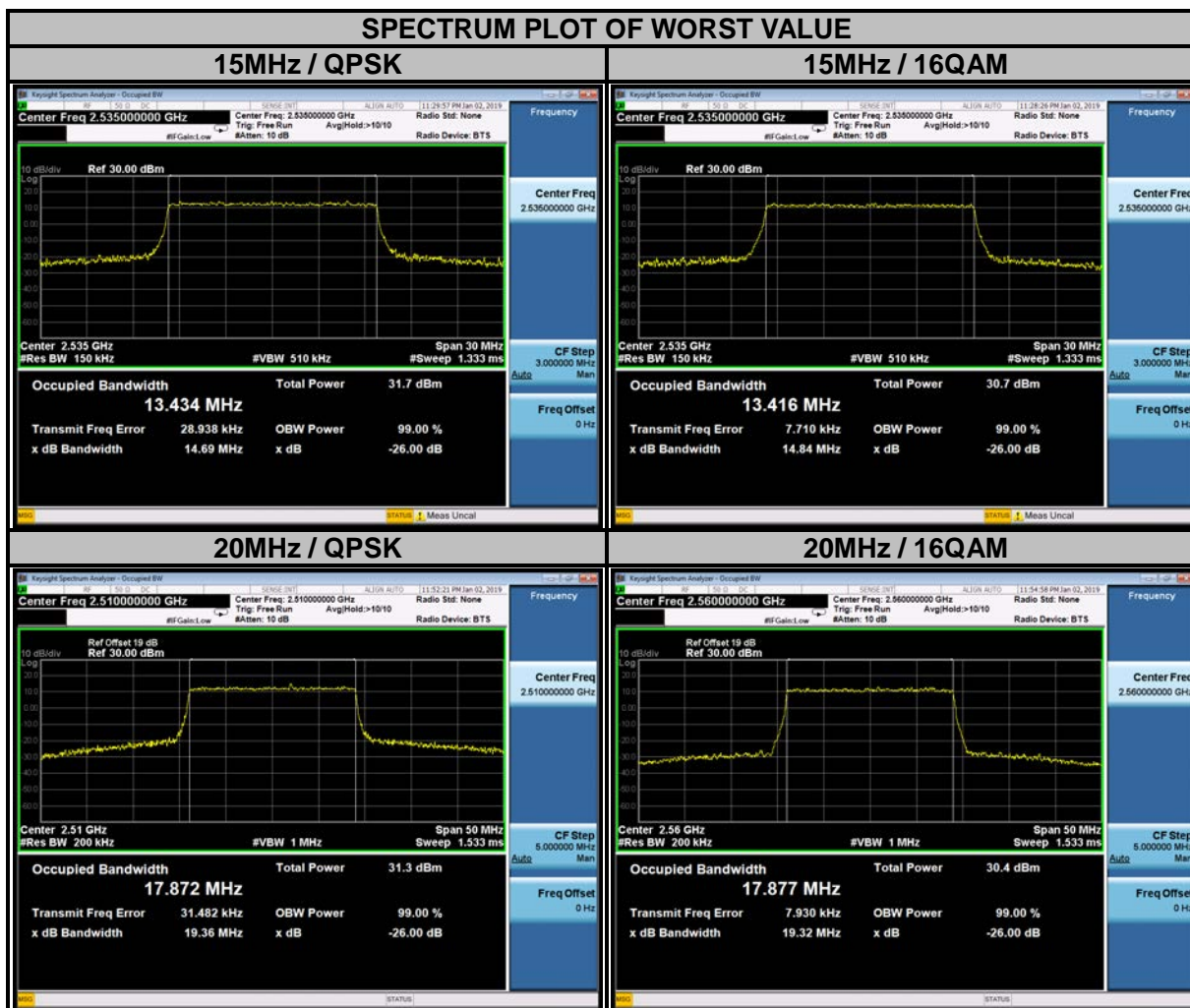
- The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

3.3.4 TEST RESULTS

| LTE BAND 7 | | | | | | | |
|-------------------------|-----------------|------------------------------|-------|--------------------------|-----------------|------------------------------|-------|
| CHANNEL BANDWIDTH: 5MHz | | | | CHANNEL BANDWIDTH: 10MHz | | | |
| CHANNEL | FREQUENCY (MHz) | 99% OCCUPIED BANDWIDTH (MHz) | | CHANNEL | FREQUENCY (MHz) | 99% OCCUPIED BANDWIDTH (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20775 | 2502.5 | 4.47 | 4.47 | 20800 | 2505 | 8.95 | 8.92 |
| 21100 | 2535 | 4.48 | 4.47 | 21100 | 2535 | 8.95 | 8.92 |
| 21425 | 2567.5 | 4.47 | 4.47 | 21400 | 2565 | 8.95 | 8.92 |



| LTE BAND 7 | | | | | | | |
|--------------------------|-----------------|------------------------------|-------|--------------------------|-----------------|------------------------------|-------|
| CHANNEL BANDWIDTH: 15MHz | | | | CHANNEL BANDWIDTH: 20MHz | | | |
| CHANNEL | FREQUENCY (MHz) | 99% OCCUPIED BANDWIDTH (MHz) | | CHANNEL | FREQUENCY (MHz) | 99% OCCUPIED BANDWIDTH (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20825 | 2507.5 | 13.43 | 13.41 | 20850 | 2510 | 17.87 | 17.87 |
| 21100 | 2535 | 13.43 | 13.42 | 21100 | 2535 | 17.85 | 17.87 |
| 21375 | 2562.5 | 13.43 | 13.41 | 21350 | 2560 | 17.86 | 17.88 |

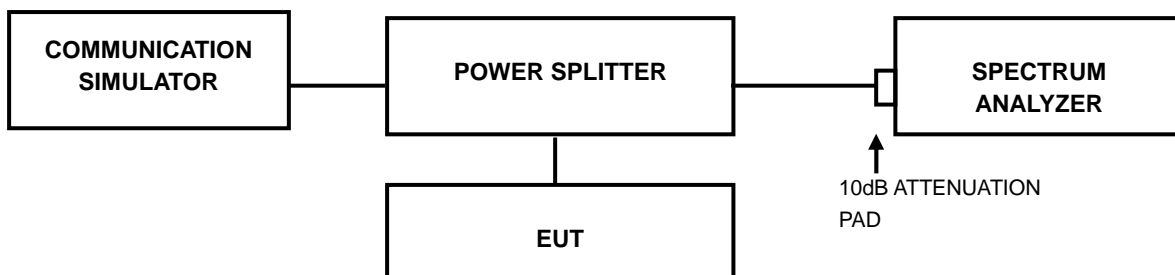


3.4 PEAK TO AVERAGE RATIO

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



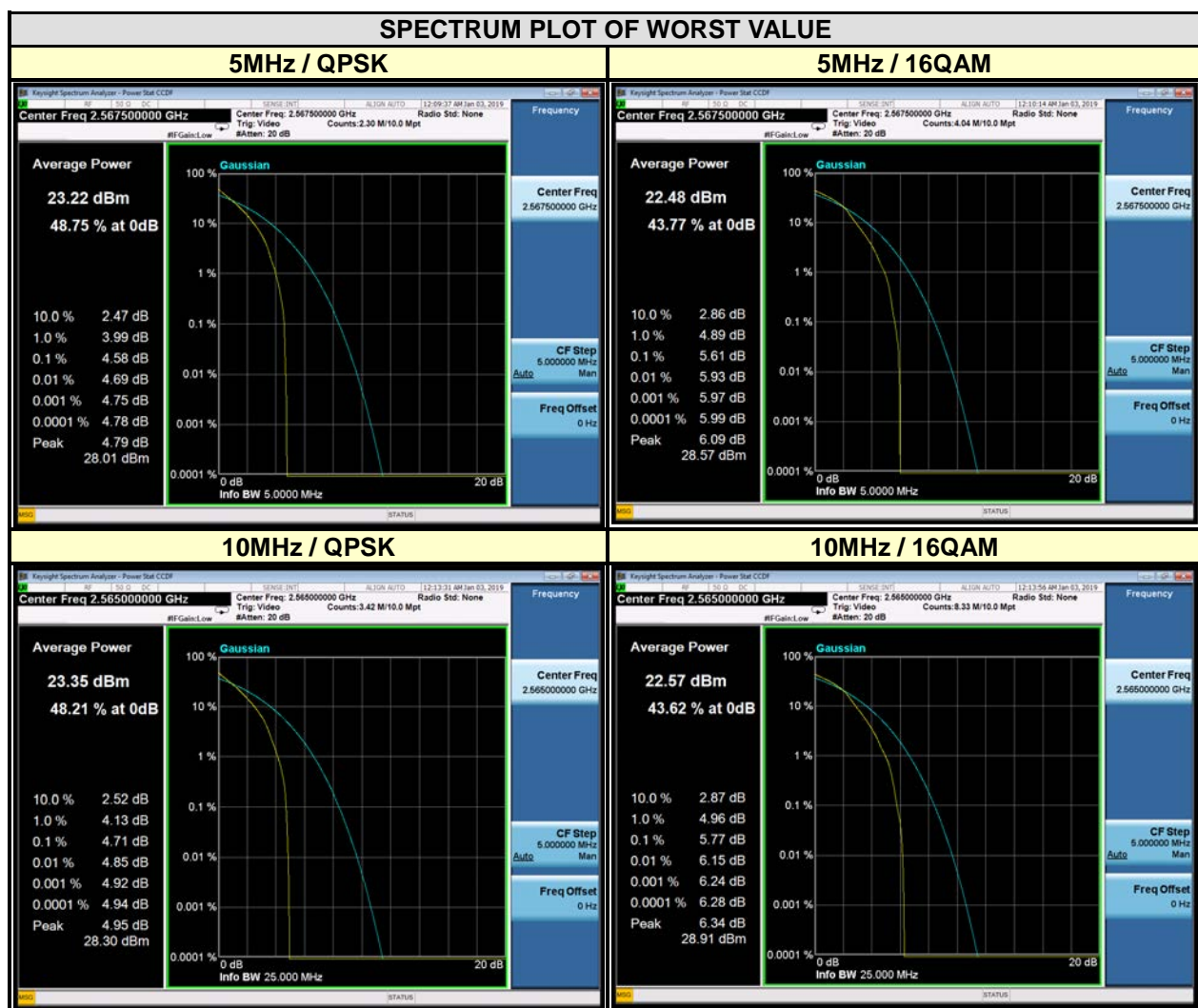
3.4.3 TEST PROCEDURES

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 7

| 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 |
| 20775 | 2502.5 | 4.29 | 5.33 | 20800 | 2505 | 4.16 | 5.45 |
| 21100 | 2535 | 4.19 | 5.22 | 21100 | 2535 | 4.26 | 5.26 |
| 21425 | 2567.5 | 4.58 | 5.61 | 21400 | 2565 | 4.71 | 5.77 |



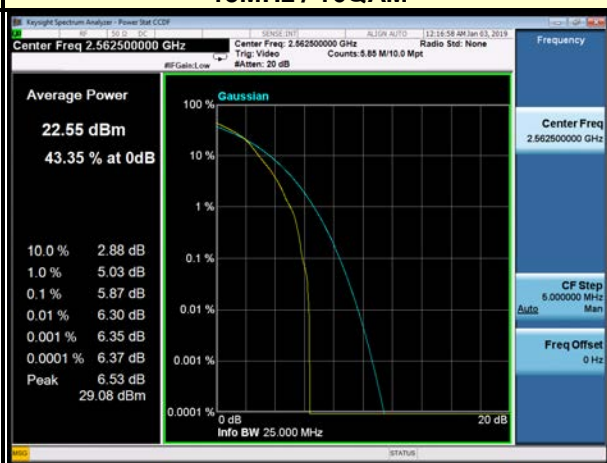
| CHANNEL BANDWIDTH: 15MHz | | | | CHANNEL BANDWIDTH: 20MHz | | | |
|--------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | | CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20825 | 2507.5 | 4.34 | 5.35 | 20850 | 2510 | 4.46 | 5.26 |
| 21100 | 2535 | 4.33 | 5.39 | 21100 | 2535 | 4.60 | 5.69 |
| 21375 | 2562.5 | 4.84 | 5.87 | 21350 | 2560 | 4.96 | 5.27 |

SPECTRUM PLOT OF WORST VALUE

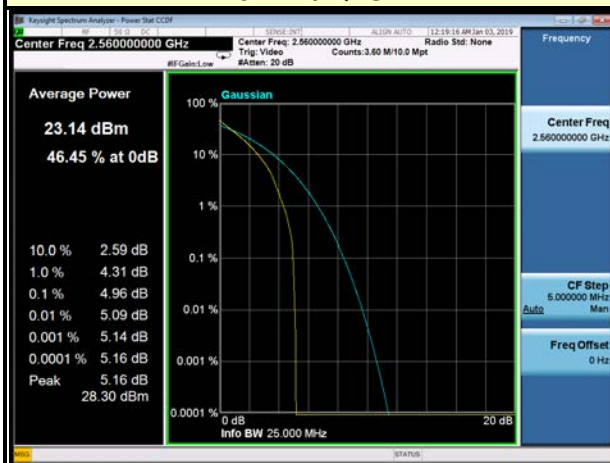
15MHz / QPSK



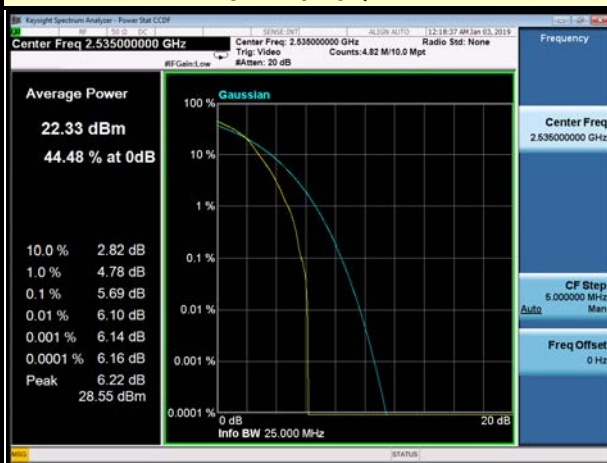
15MHz / 16QAM



20MHz / QPSK



20MHz / 16QAM

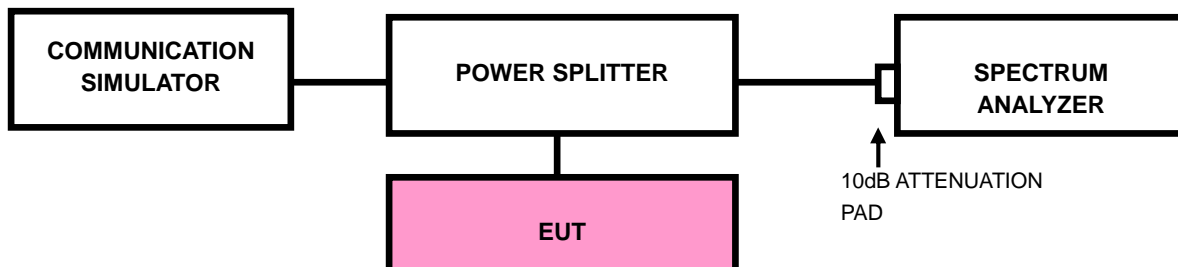


3.5 BAND EDGE MEASUREMENT

3.5.1 LIMITS OF BAND EDGE MEASUREMENT

According to FCC 27.53(m)(4) specified that For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. For mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed.

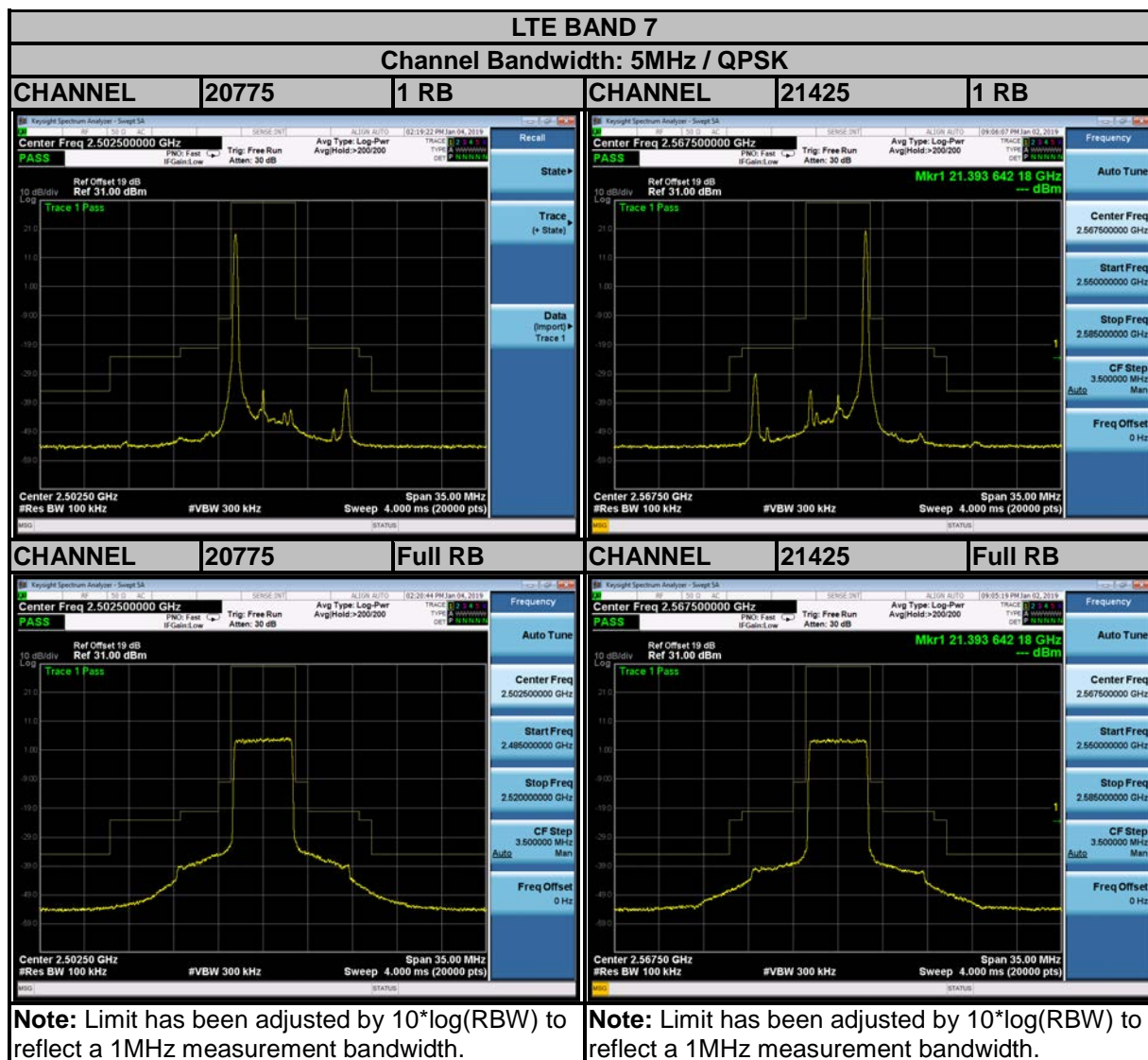
3.5.2 TEST SETUP

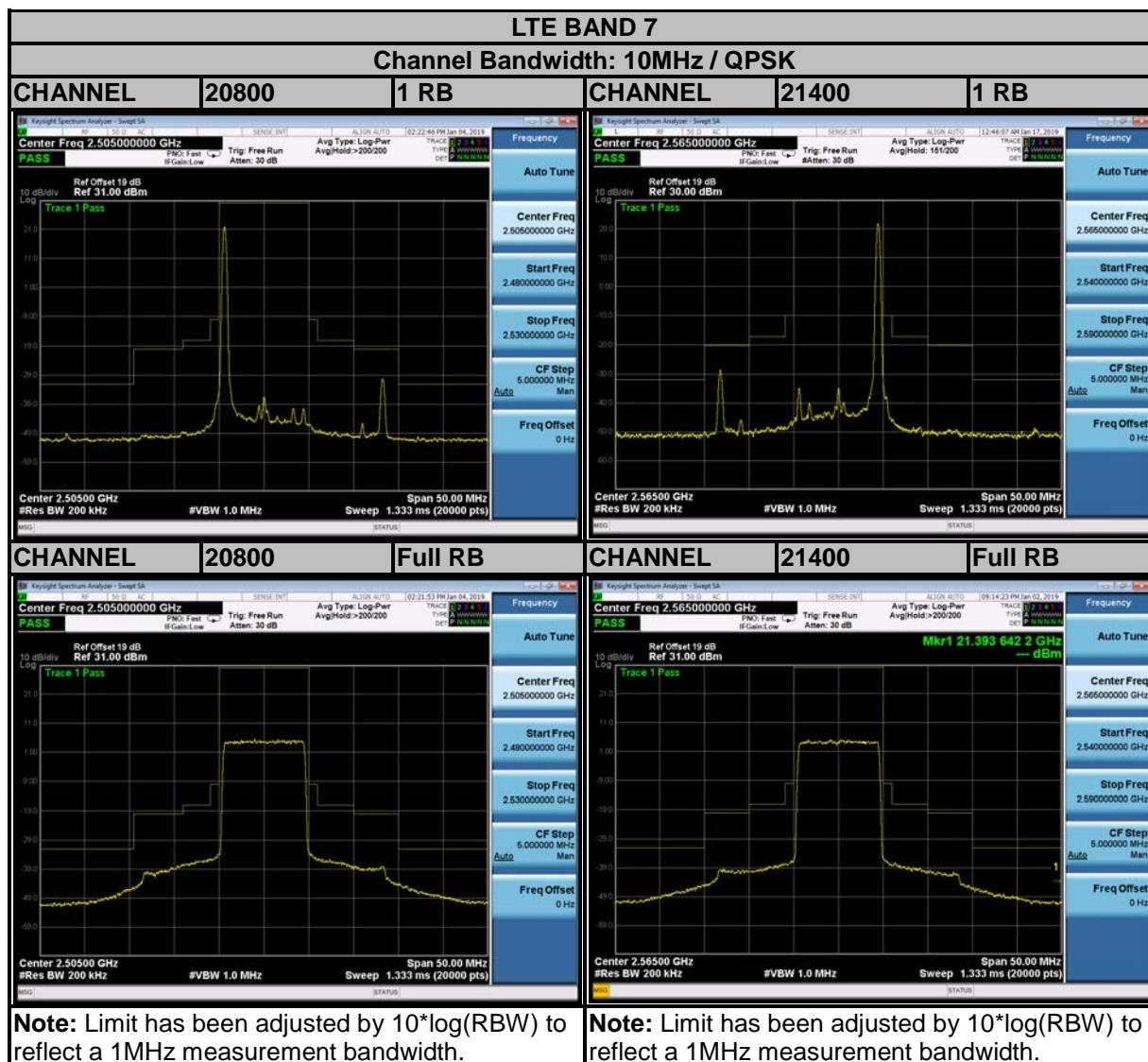


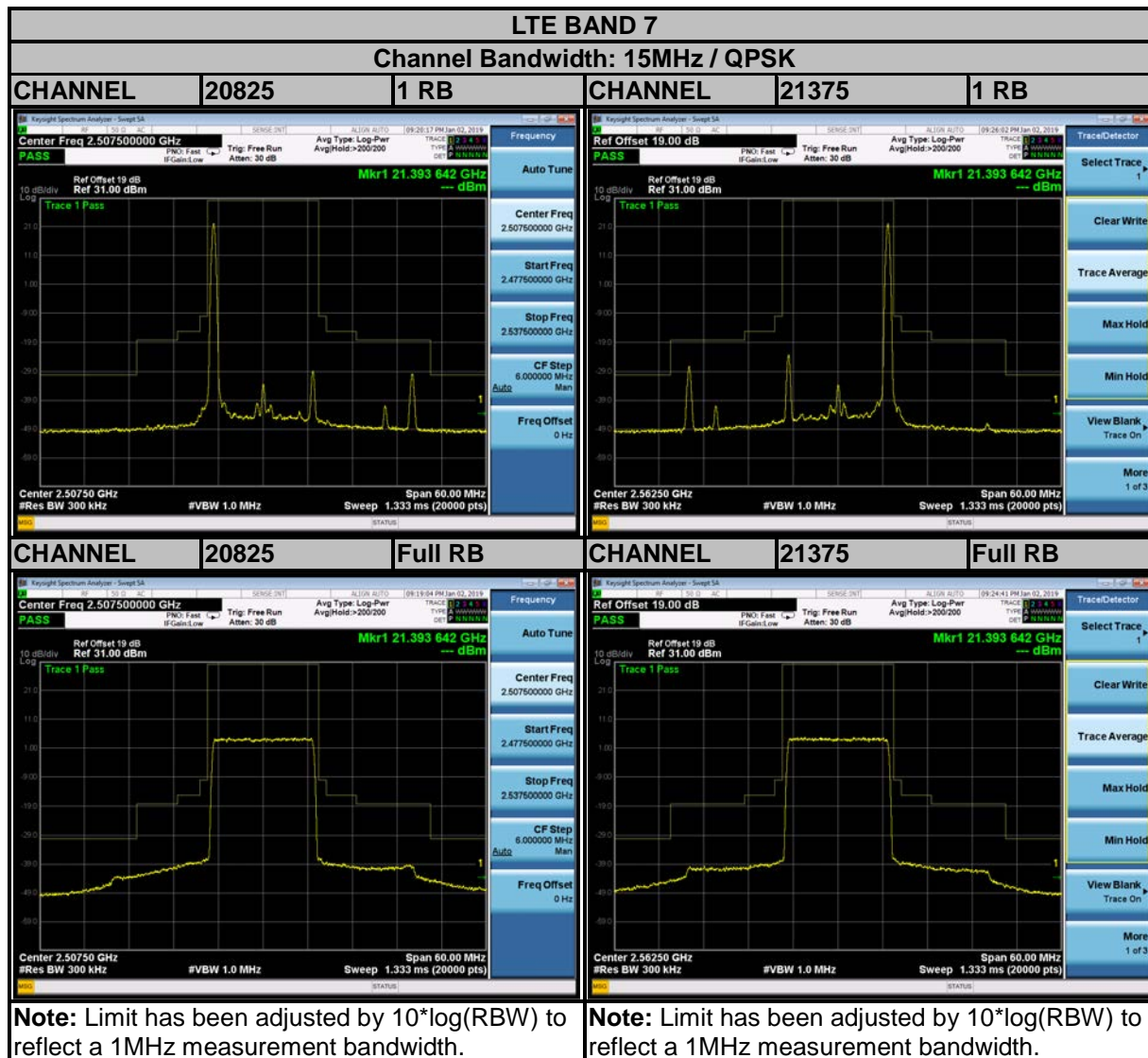
3.5.3 TEST PROCEDURES

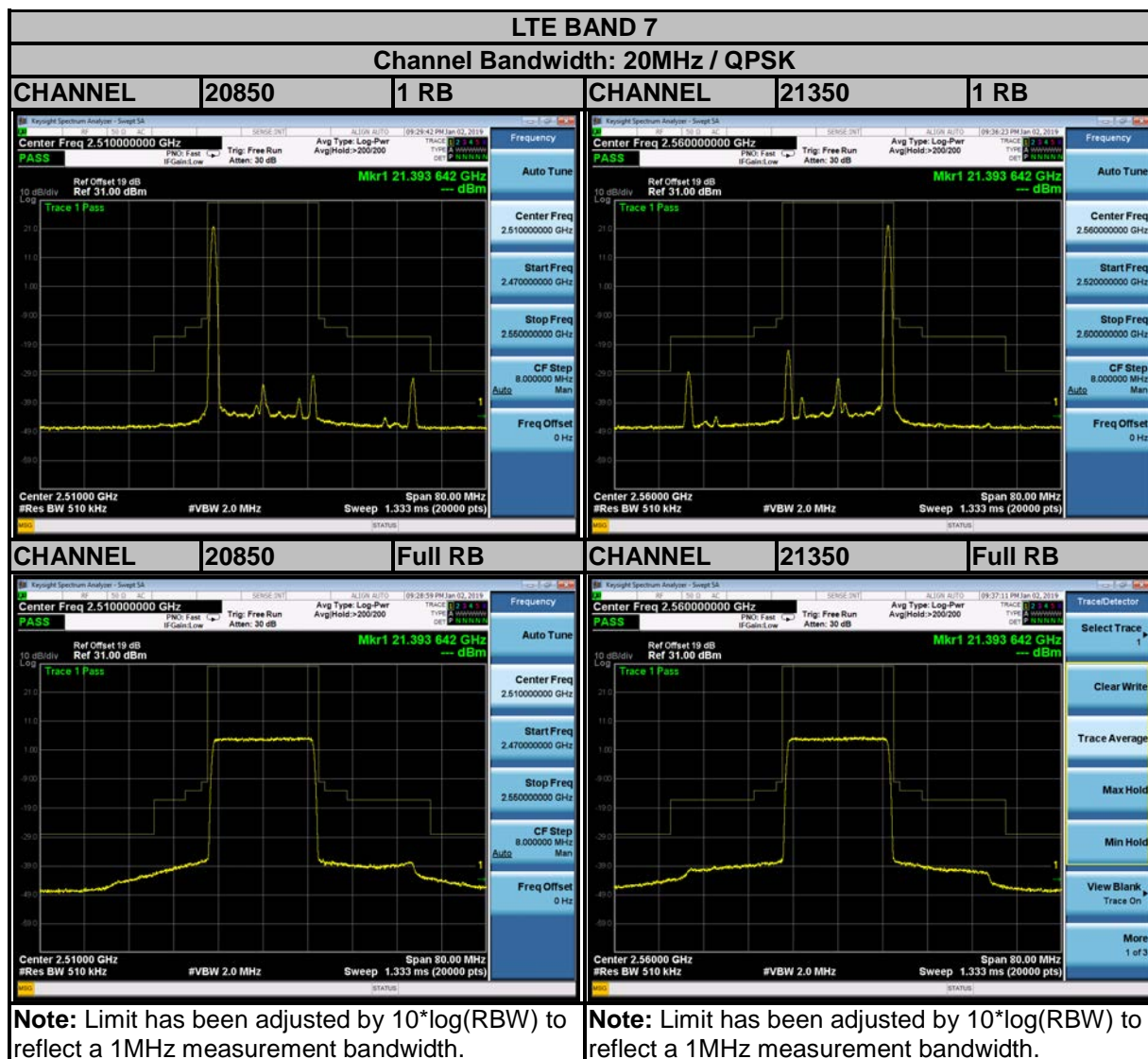
- a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
- b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- c. The center frequency of spectrum is the band edge frequency and span is 35MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz (Channel bandwidth 5MHz).
- d. The center frequency of spectrum is the band edge frequency and span is 50MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 1MHz (Channel bandwidth 10MHz).
- e. The center frequency of spectrum is the band edge frequency and span is 60MHz. RBW of the spectrum is 300kHz and VBW of the spectrum is 1MHz (Channel bandwidth 15MHz).
- f. The center frequency of spectrum is the band edge frequency and span is 80MHz. RBW of the spectrum is 500kHz and VBW of the spectrum is 2MHz (Channel bandwidth 20MHz).
- g. Record the max trace plot into the test report.

3.5.4 TEST RESULTS









3.6 CONDUCTED SPURIOUS EMISSIONS

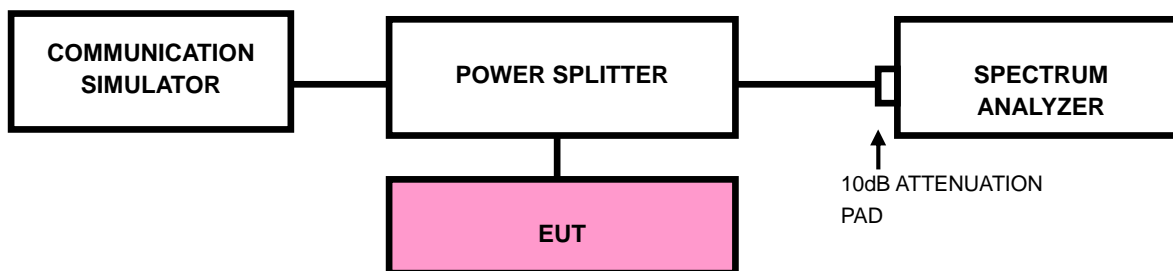
3.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $55 + 10 \log_{10}(P)$ dB. The limit of emission is equal to -25dBm.

3.6.2 TEST PROCEDURE

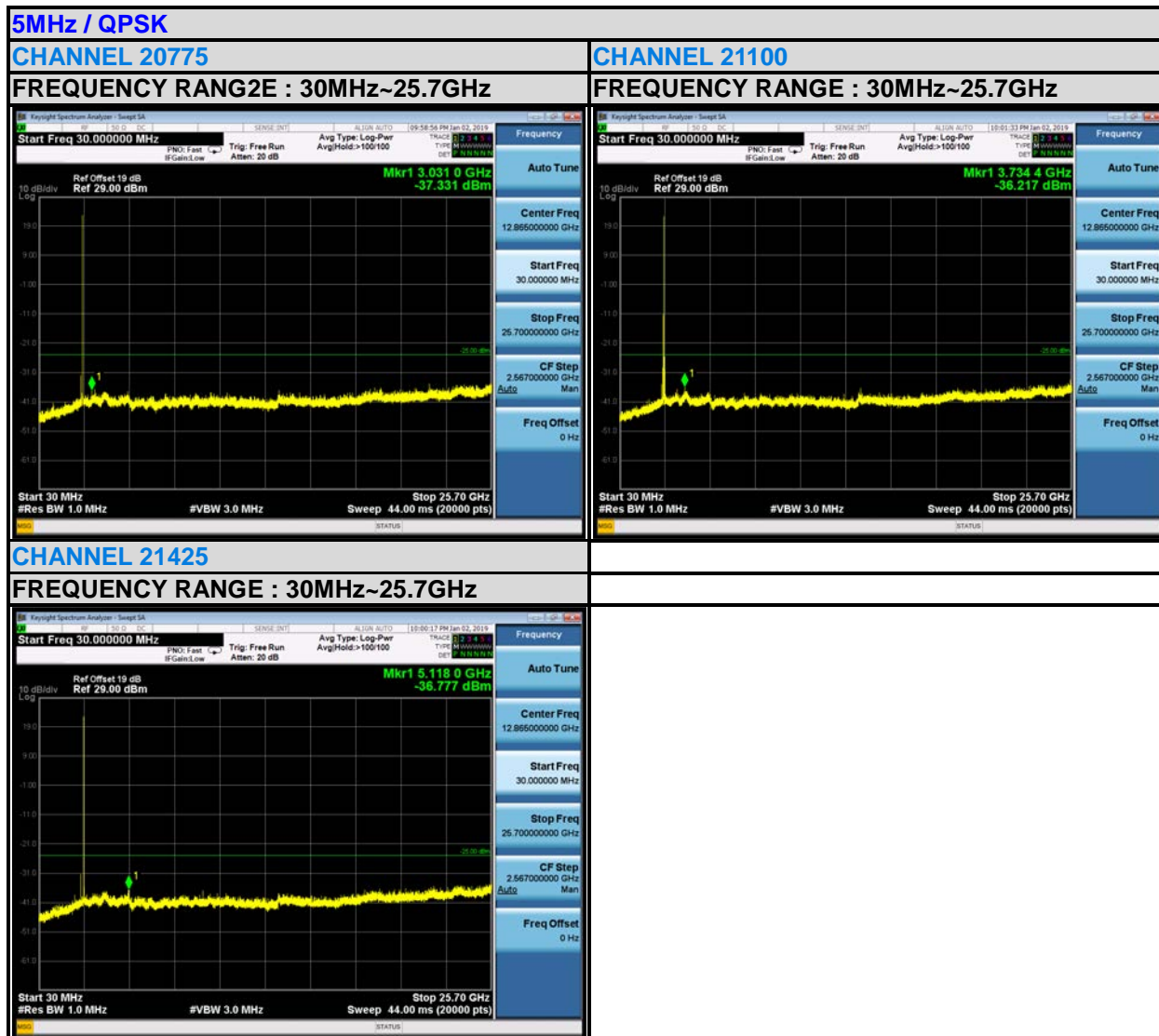
- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- b. Measuring frequency range is from 30MHz to 26GHz for LTE Band 7. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

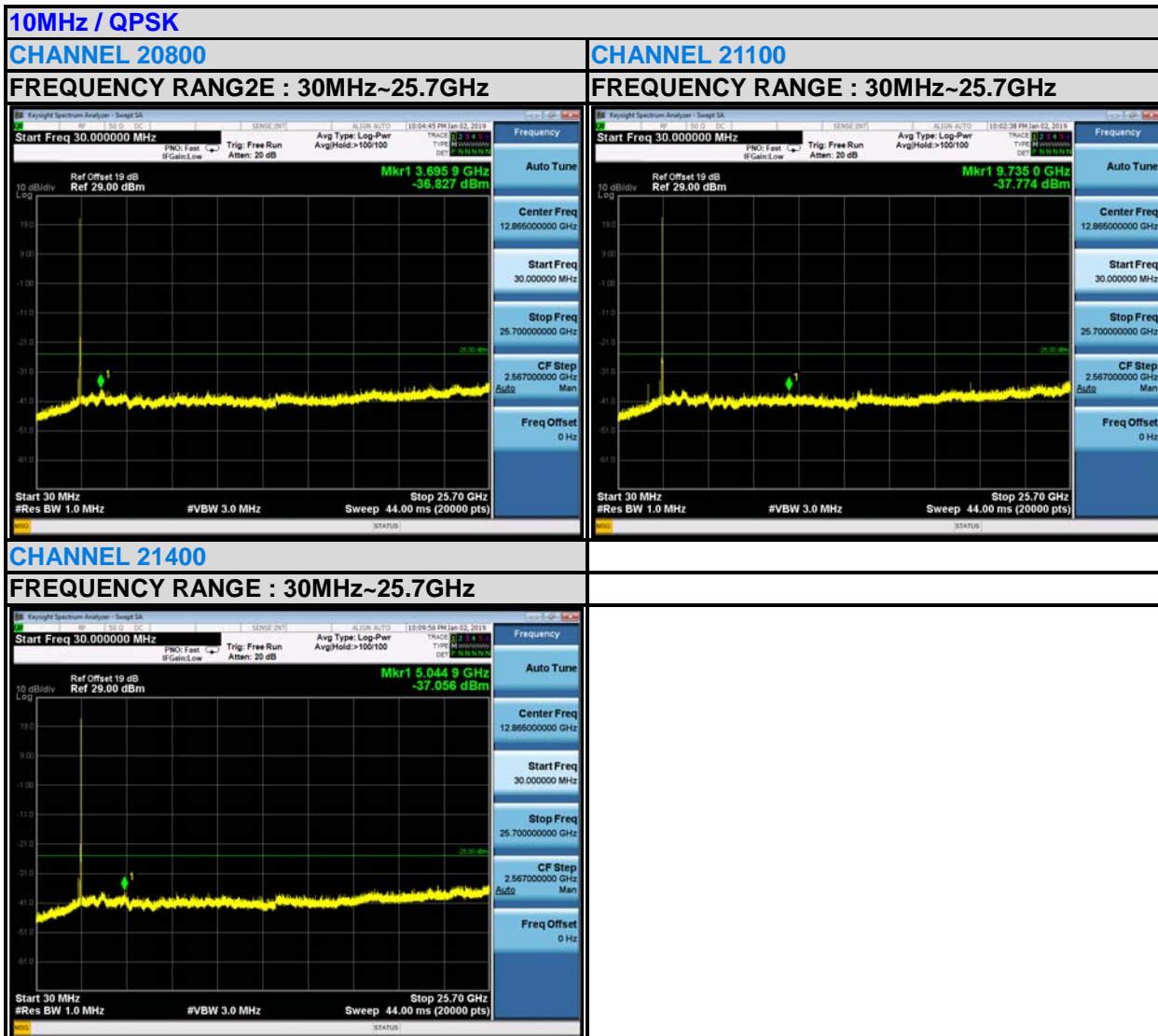
3.6.3 TEST SETUP



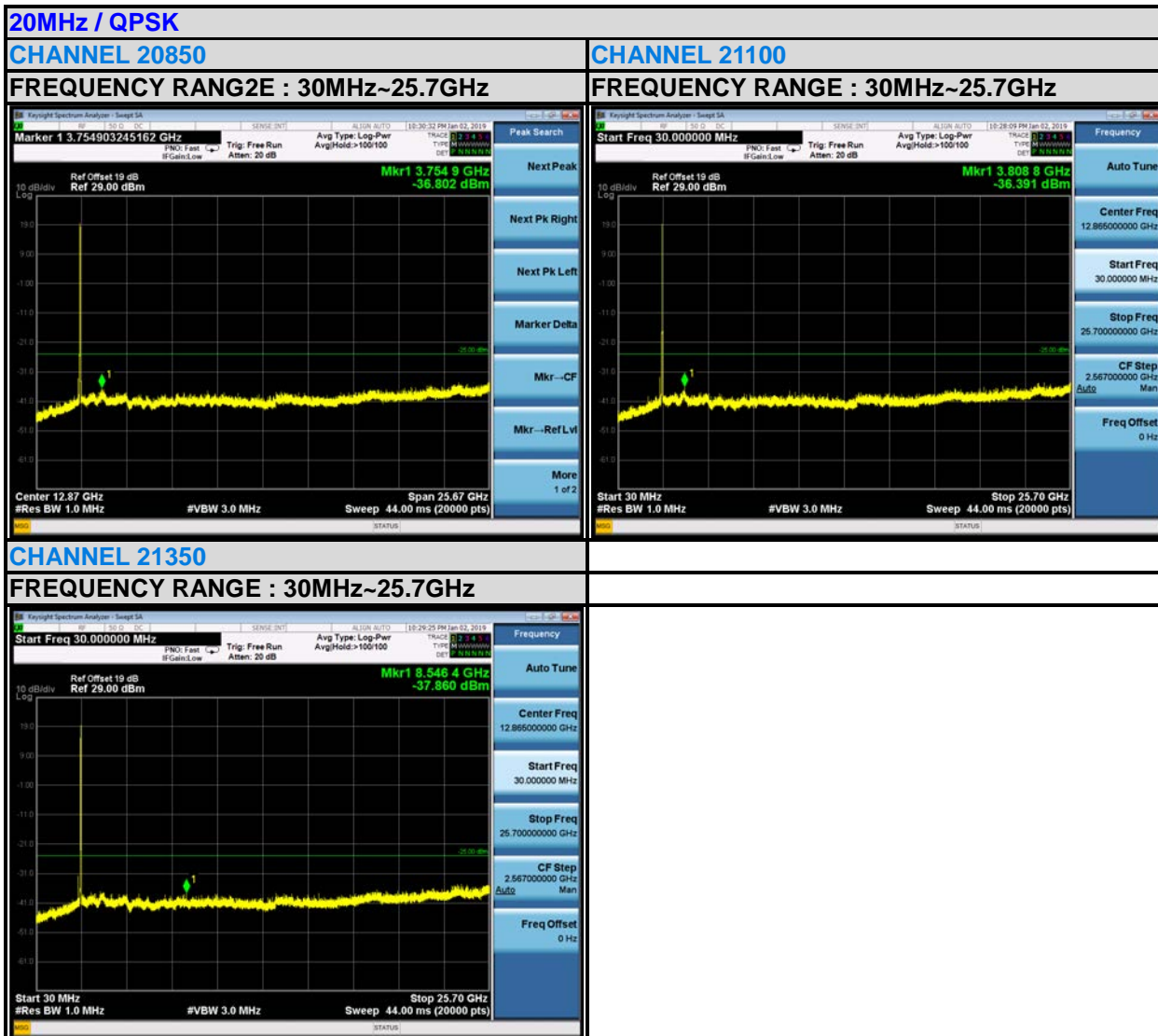
3.6.4 TEST RESULTS

LTE BAND 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 $55 + 10 \log_{10}(P)$ dB. The limit of emission is equal to -25dBm.

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

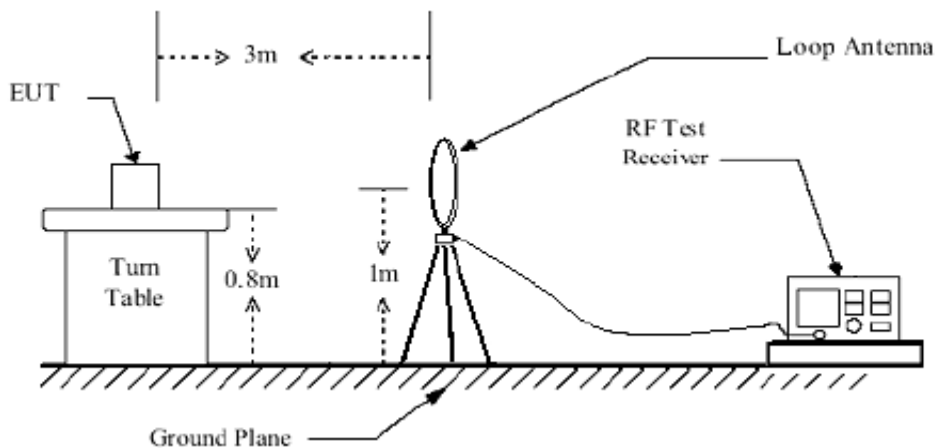
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.7.3 DEVIATION FROM TEST STANDARD

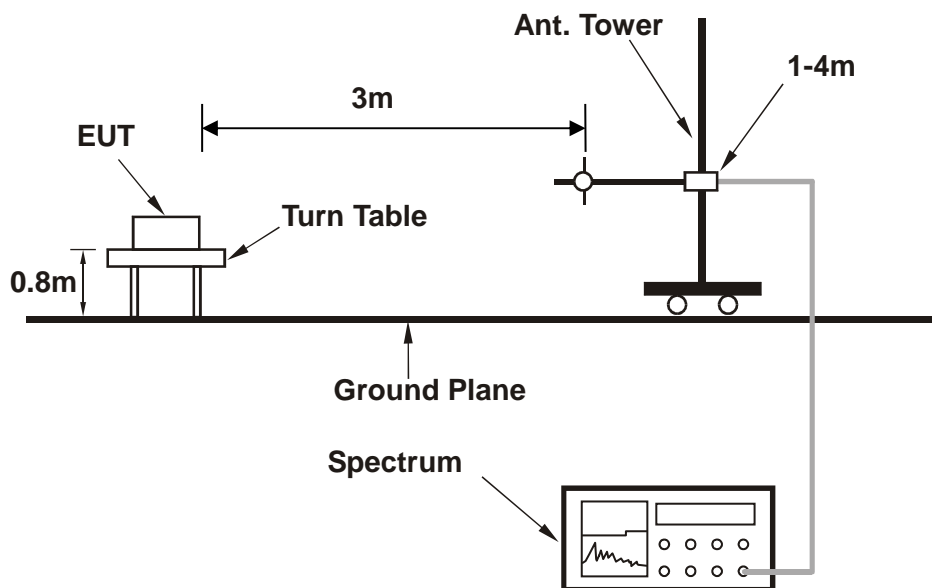
No deviation

3.7.4 TEST SETUP

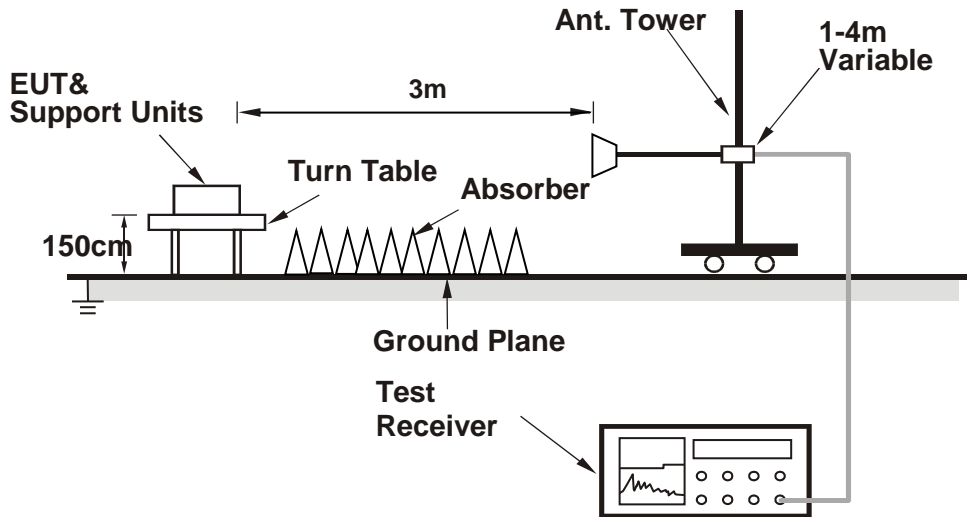
<Below 30MHz>



< Frequency Range 30MHz~1GHz >



< Frequency Range above 1GHz >



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

3.7.5 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

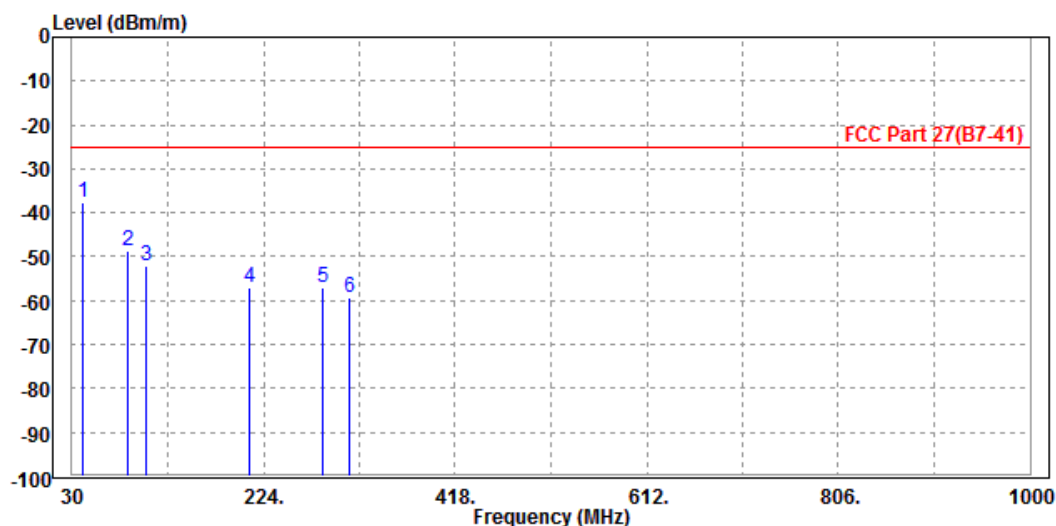
9 KHz – 30 MHz data: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

30 MHz – 1GHz data:

LTE Band 7:

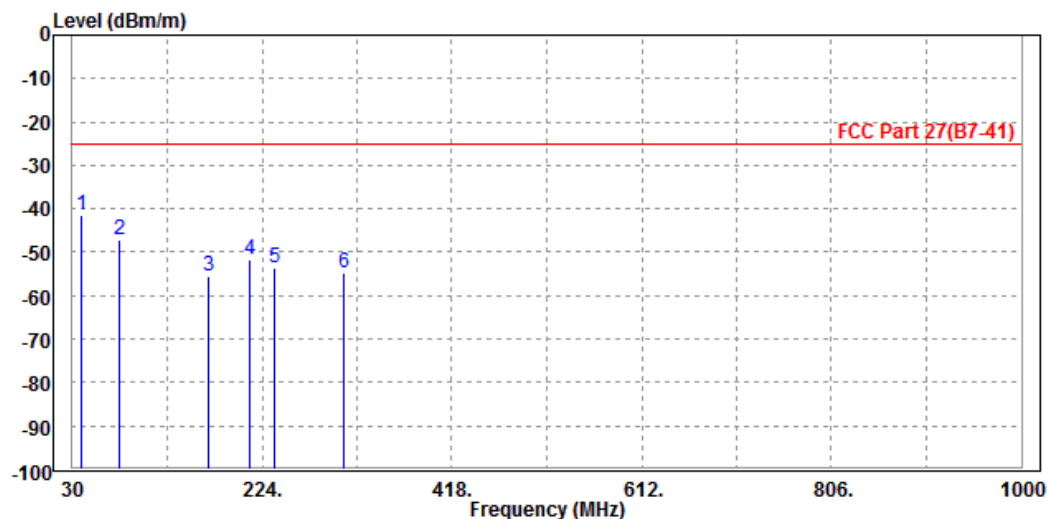
| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 21100 | FREQUENCY RANGE | Below 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|------|---------|------------|------------|------------|--------|-------------|------------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | PP | 41.050 | -37.58 | -48.72 | -25.00 | -12.58 | 11.14 Peak | Horizontal |
| 2 | | 86.220 | -48.75 | -40.23 | -25.00 | -23.75 | -8.52 Peak | Horizontal |
| 3 | | 104.780 | -52.18 | -40.03 | -25.00 | -27.18 | -12.15 Peak | Horizontal |
| 4 | | 210.280 | -57.22 | -40.18 | -25.00 | -32.22 | -17.04 Peak | Horizontal |
| 5 | | 283.920 | -57.18 | -42.58 | -25.00 | -32.18 | -14.60 Peak | Horizontal |
| 6 | | 310.740 | -59.46 | -46.01 | -25.00 | -34.46 | -13.45 Peak | Horizontal |



| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 21100 | FREQUENCY RANGE | Below 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|---------|--------|------------|------------|------------|--------|--------|-----------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 PP | 38.960 | -41.40 | -40.11 | -25.00 | -16.40 | -1.29 | Peak | Vertical |
| 2 | 78.690 | -47.12 | -36.18 | -25.00 | -22.12 | -10.94 | Peak | Vertical |
| 3 | 169.560 | -55.48 | -41.22 | -25.00 | -30.48 | -14.26 | Peak | Vertical |
| 4 | 212.080 | -51.90 | -41.05 | -25.00 | -26.90 | -10.85 | Peak | Vertical |
| 5 | 236.790 | -53.65 | -42.36 | -25.00 | -28.65 | -11.29 | Peak | Vertical |
| 6 | 306.940 | -54.79 | -43.52 | -25.00 | -29.79 | -11.27 | Peak | Vertical |



ABOVE 1GHz

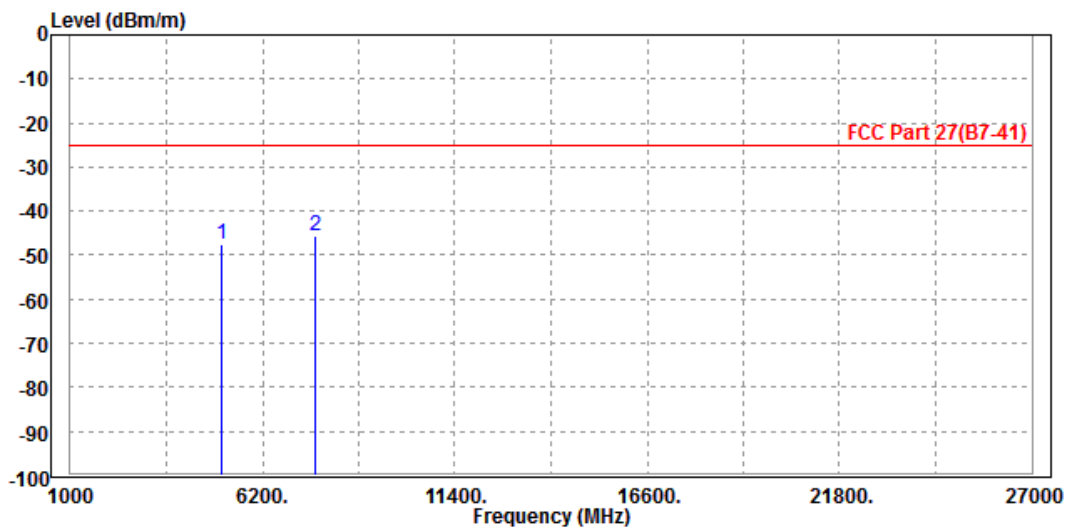
Note: For higher frequency, the emission is too low to be detected.

LTE Band 7

CHANNEL BANDWIDTH: 5MHz / QPSK

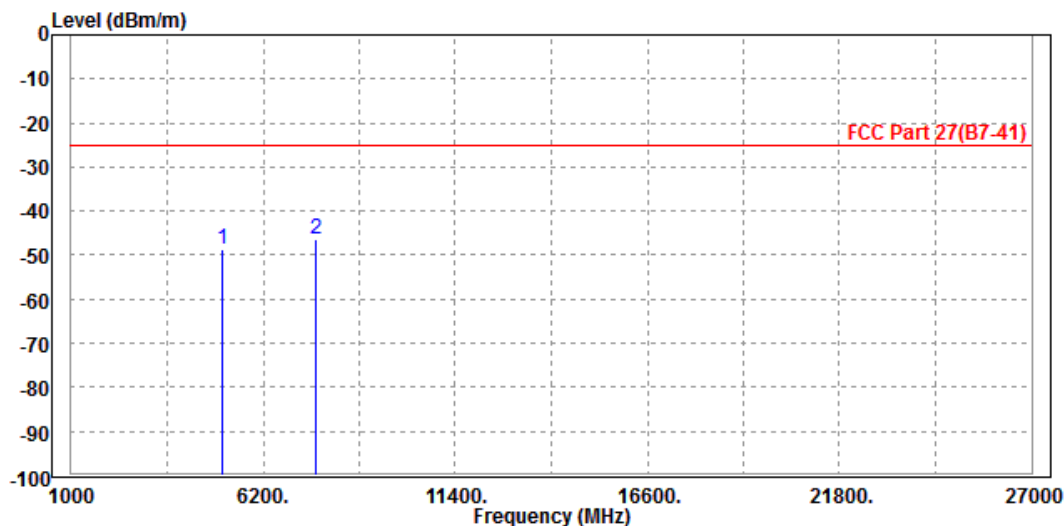
| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 21100 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|------------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 5082.000 | -47.47 | -55.94 | -25.00 | -22.47 | 8.47 | Peak | Horizontal |
| 2 PP | 7605.000 | -45.71 | -59.19 | -25.00 | -20.71 | 13.48 | Peak | Horizontal |



| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 21100 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|---------------|---------------|---------------|--------|--------|-----------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 5082.000 | -48.76 | -56.75 | -25.00 | -23.76 | 7.99 | Peak | Vertical |
| 2 PP | 7605.000 | -46.53 | -59.52 | -25.00 | -21.53 | 12.99 | Peak | Vertical |

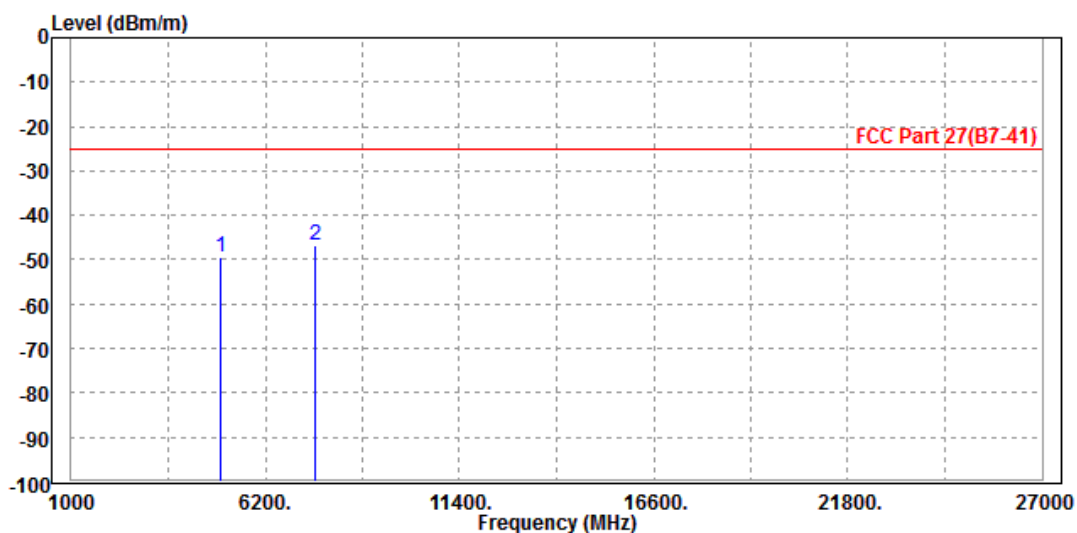


CHANNEL BANDWIDTH: 10MHz / QPSK

CH 20800

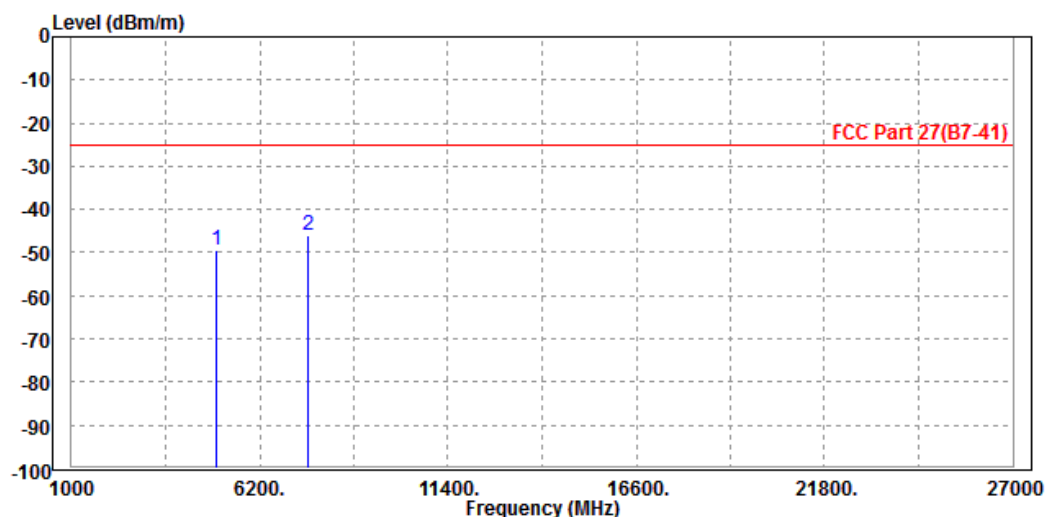
| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 20800 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|------------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 5004.000 | -49.57 | -57.95 | -25.00 | -24.57 | 8.38 | Peak | Horizontal |
| 2 PP | 7515.000 | -46.62 | -59.97 | -25.00 | -21.62 | 13.35 | Peak | Horizontal |



| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 20800 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

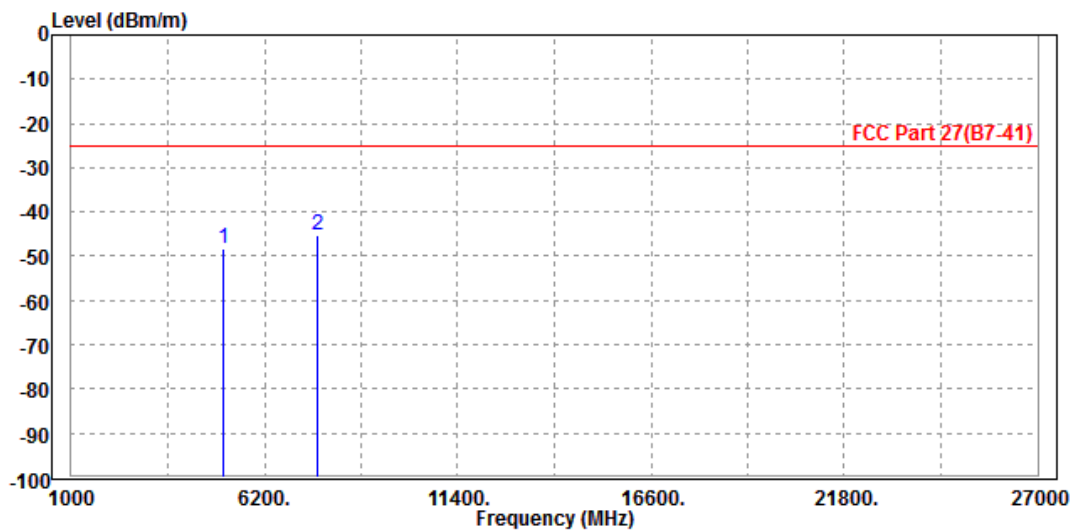
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|-------------|--------|------------|------------|------------|--------|--------|-----------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 5004.000 | -49.48 | -57.47 | -25.00 | -24.48 | 7.99 | Peak | Vertical |
| 2 | PP 7515.000 | -45.86 | -58.69 | -25.00 | -20.86 | 12.83 | Peak | Vertical |



CH 21100

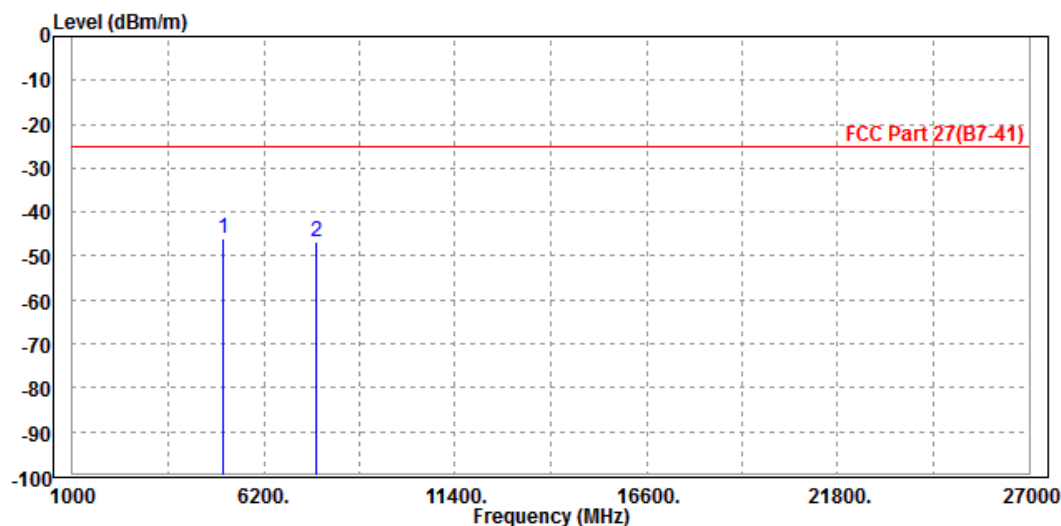
| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 21100 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|------------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 5082.000 | -48.44 | -56.91 | -25.00 | -23.44 | 8.47 | Peak | Horizontal |
| 2 PP | 7605.000 | -45.12 | -58.60 | -25.00 | -20.12 | 13.48 | Peak | Horizontal |



| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 21100 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

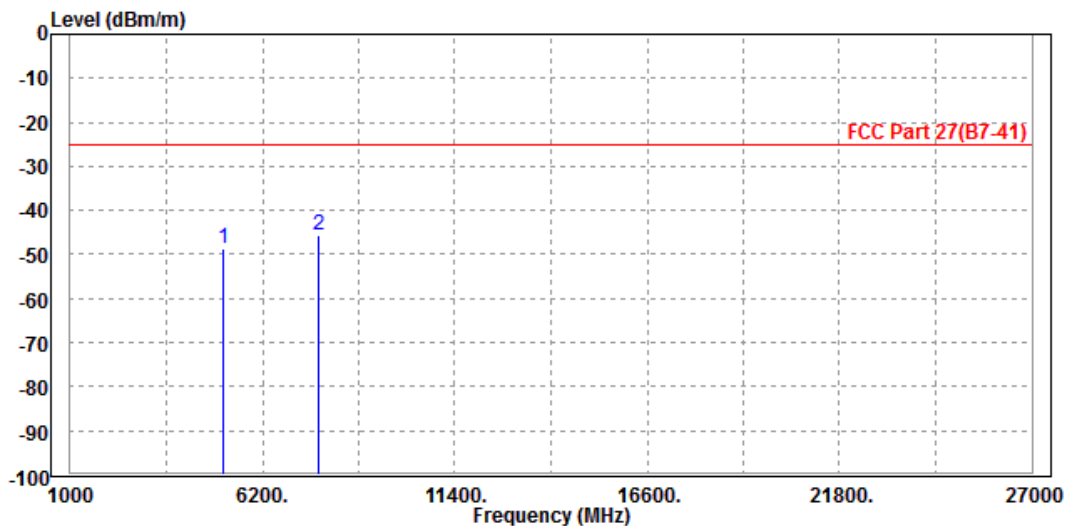
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|-------------|--------|---------------|---------------|---------------|--------|--------|-----------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | PP 5082.000 | -46.09 | -54.08 | -25.00 | -21.09 | 7.99 | Peak | Vertical |
| 2 | 7605.000 | -46.64 | -59.63 | -25.00 | -21.64 | 12.99 | Peak | Vertical |



CH 21400

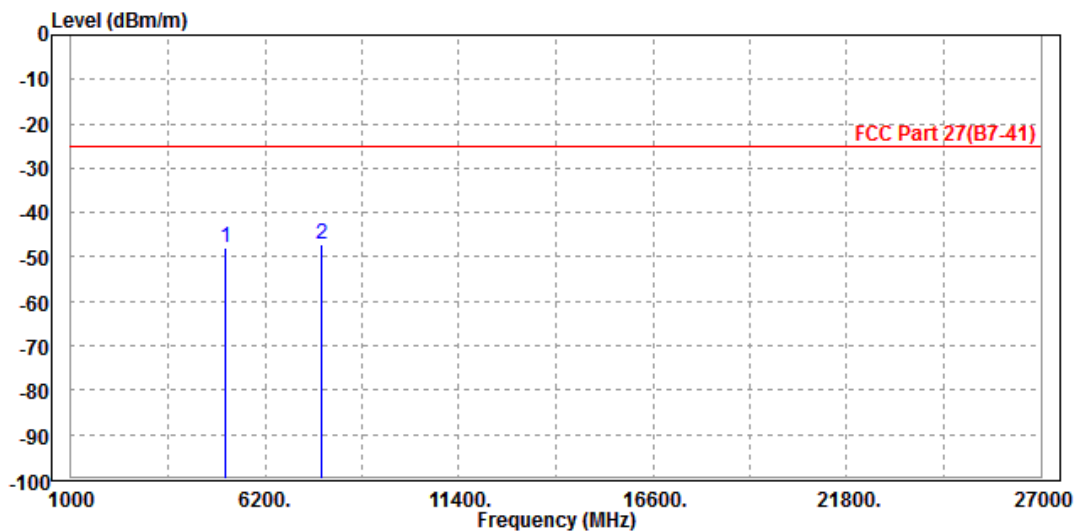
| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 21400 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|------------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 5134.000 | -48.68 | -57.21 | -25.00 | -23.68 | 8.53 | Peak | Horizontal |
| 2 PP | 7695.000 | -45.81 | -59.42 | -25.00 | -20.81 | 13.61 | Peak | Horizontal |



| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 21400 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

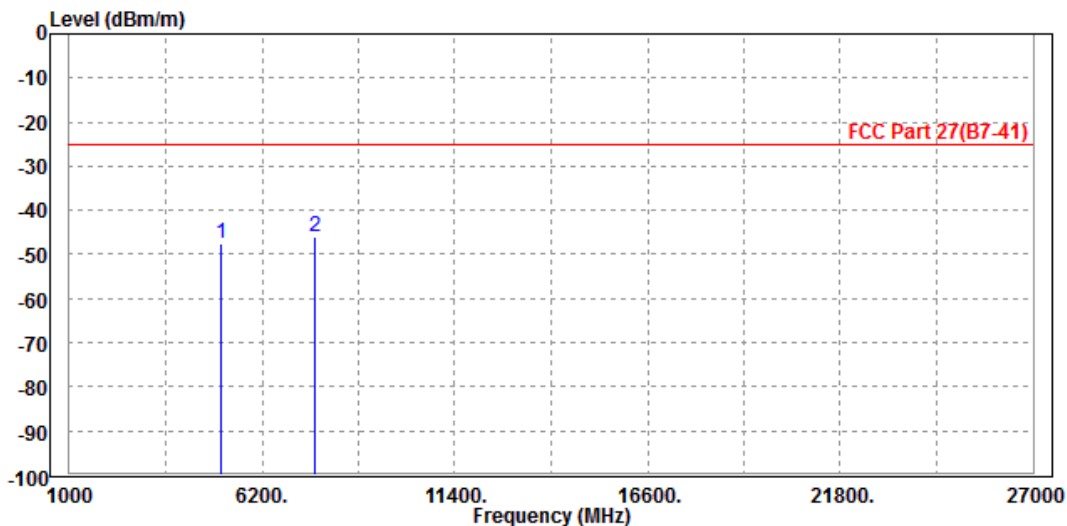
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|---------------|---------------|---------------|--------|--------|-----------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 5134.000 | -48.03 | -56.02 | -25.00 | -23.03 | 7.99 | Peak | Vertical |
| 2 PP | 7695.000 | -47.16 | -60.31 | -25.00 | -22.16 | 13.15 | Peak | Vertical |



CHANNEL BANDWIDTH: 15MHz / QPSK

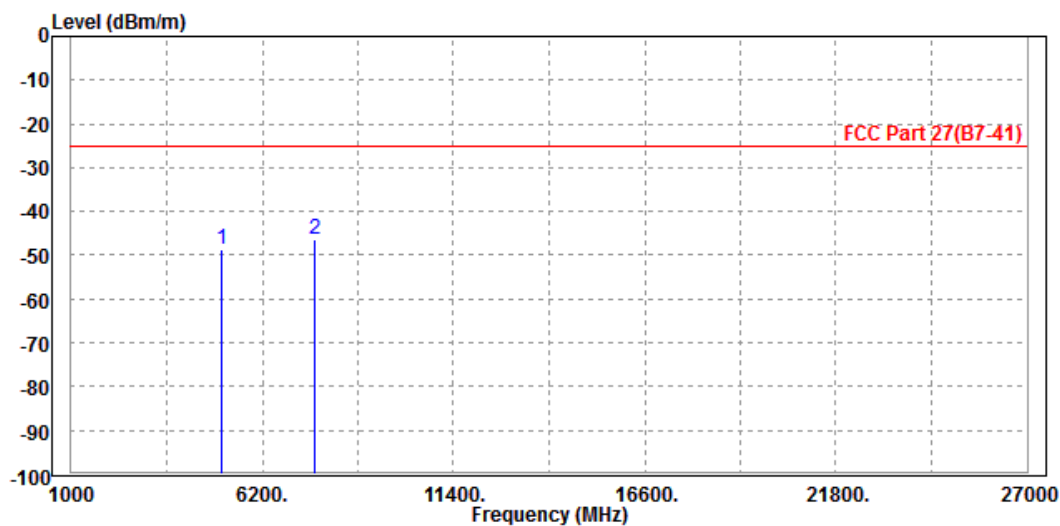
| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 21100 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|------------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 5082.000 | -47.64 | -56.11 | -25.00 | -22.64 | 8.47 | Peak | Horizontal |
| 2 PP | 7605.000 | -46.13 | -59.61 | -25.00 | -21.13 | 13.48 | Peak | Horizontal |



| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 21100 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

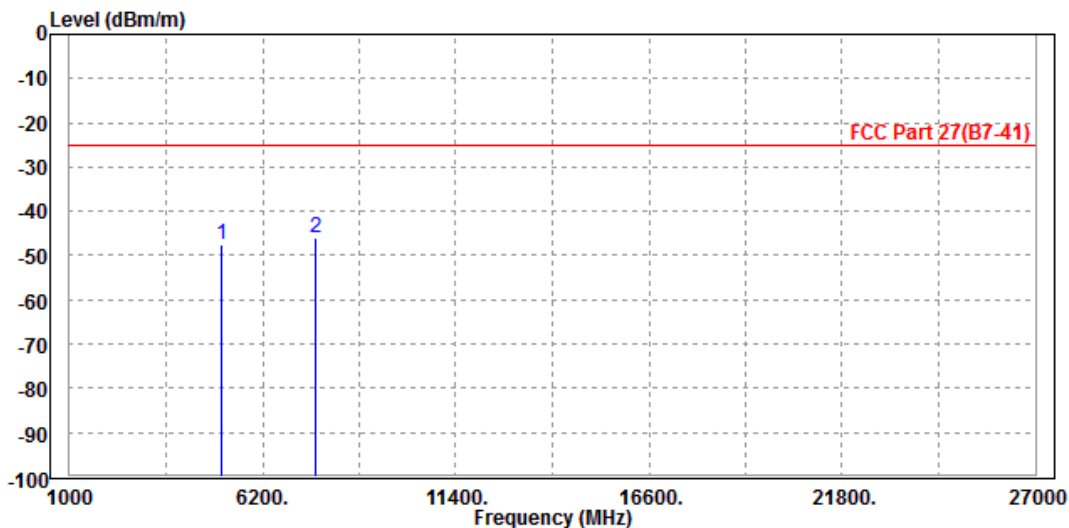
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|-----------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 5082.000 | -48.72 | -56.71 | -25.00 | -23.72 | 7.99 | Peak | Vertical |
| 2 PP | 7605.000 | -46.56 | -59.55 | -25.00 | -21.56 | 12.99 | Peak | Vertical |



CHANNEL BANDWIDTH: 20MHz / QPSK

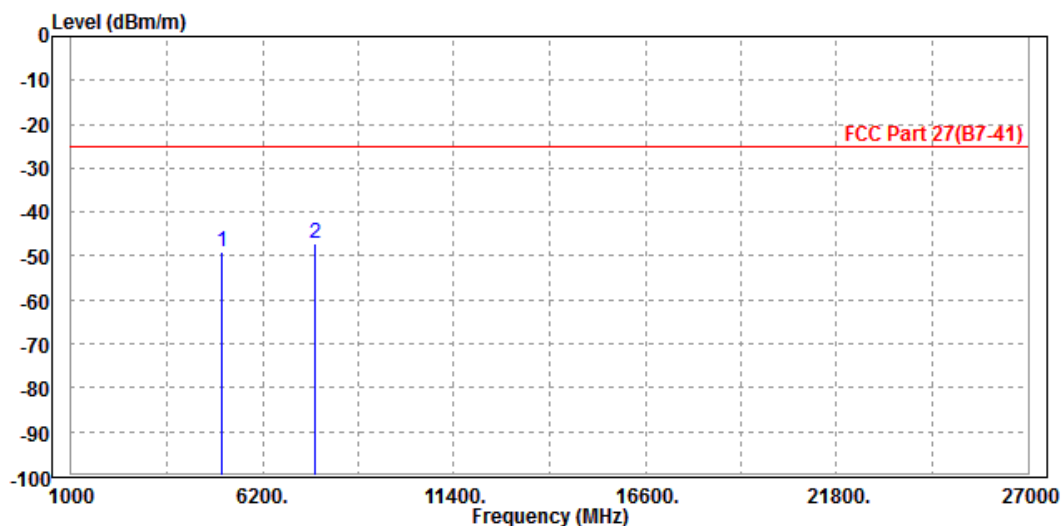
| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 21100 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|------------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 5082.000 | -47.62 | -56.09 | -25.00 | -22.62 | 8.47 | Peak | Horizontal |
| 2 PP | 7605.000 | -46.02 | -59.50 | -25.00 | -21.02 | 13.48 | Peak | Horizontal |



| | | | |
|---|------------------|-----------------|--------------------|
| MODE | TX channel 21100 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Rose Ma | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|-----------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 5082.000 | -48.91 | -56.90 | -25.00 | -23.91 | 7.99 | Peak | Vertical |
| 2 PP | 7605.000 | -46.96 | -59.95 | -25.00 | -21.96 | 12.99 | Peak | Vertical |





Test Report No.: RF180928W004-7

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:

Shenzhen EMC/RF Lab:

Tel: +86-755-88696566

Fax: +86-755-88696577

Email: customerservice.dg@cn.bureauveritas.com

Web Site: www.adt.com.tw

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



Test Report No.: RF180928W004-7

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

No any modifications are made to the EUT by the lab during the test.

---END---