

# FCC TEST REPORT

## (PART 24)

|            |                                                               |
|------------|---------------------------------------------------------------|
| Applicant: | Telit Communications S.p.A.                                   |
| Address:   | Via Stazione di Prosecco 5/b – 34010 Sgonico, Trieste – Italy |

|                           |                                                               |
|---------------------------|---------------------------------------------------------------|
| Manufacturer or Supplier: | Telit Communications S.p.A.                                   |
| Address:                  | Via Stazione di Prosecco 5/b – 34010 Sgonico, Trieste – Italy |
| Product:                  | ME310M1-W2 / ME310M1-W1                                       |
| Brand Name:               | Telit Cinterion                                               |
| Model Name:               | ME310M1-W2 / ME310M1-W1                                       |
| FCC ID                    | RI7ME310M1WX                                                  |
| Date of tests             | Feb. 18, 2024 ~ Apr. 26, 2024                                 |

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

☒ **FCC PART 24, Subpart E** ☒ **FCC PART 2**  
☒ **ANSI/TIA/EIA-603-D** ☒ **ANSI/TIA/EIA-603-E** ☒ **ANSI C63.26-2015**

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

|                                                                                     |                                                                                       |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Prepared by Hanwen Xu<br>Engineer / Mobile Department                               | Approved by Peibo Sun<br>Manager / Mobile Department                                  |
|  |  |
| Date: Apr. 26, 2024                                                                 | Date: Apr. 26, 2024                                                                   |

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## RELEASE CONTROL RECORD

| ISSUE NO.          | REASON FOR CHANGE | DATE ISSUED   |
|--------------------|-------------------|---------------|
| W7L-240204W001RF02 | Original release  | Apr. 26, 2024 |

## 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 24 & Part 2 |                                     |            |           |
|----------------------------------------|-------------------------------------|------------|-----------|
| STANDARD SECTION                       | TEST TYPE                           | RESULT     | Test lab* |
| §2.1046                                | Coducted Output Power               | Compliance | A         |
| §24.232(c)                             | Equivalent Isotropic Radiated Power | Compliance | A         |
| §2.1055<br>§24.235                     | Frequency Stability                 | Compliance | A         |
| §2.1049                                | Occupied Bandwidth                  | Compliance | A         |
| §24.232(d)                             | Peak to average ratio*              | Compliance | A         |
| §24.238(a)(b)                          | Band Edge Measurements              | Compliance | A         |
| §2.1051<br>§24.238(a)(b)               | Conducted Spurious Emissions        | Compliance | A         |
| §2.1053<br>§24.238(a)(b)               | Radiated Spurious Emissions         | Compliance | A         |

\* Refer to KDB 971168 D01 Power Meas License Digital Systems v03r01.

### Note:

The differences between LTE NB-IoT/Cat-M1 modules ME310M1-W1 (FCC ID:RI7ME310M1WX) HW 0.0 and ME310M1-W2 (FCC ID: RI7ME310M1W2) HW0.0 are as shown in the following list. Testing has been run on parent product ME310M1-W2 and the worst cases of power and RSE have been verified also on ME310M1-W1 variant. Only the worst-case data (ME310M1-W2) have been reported.

| Model                                    | ME310M1-W1 HW0.0       | ME310M1-W2 HW0.0      |
|------------------------------------------|------------------------|-----------------------|
| The PSRAM section (U403/R402/R402/C402)  | NOT-mounted            | Mounted               |
| The FLASH dimensions and capacity (U401) | (Small dimensions) 8MB | (Big dimensions) 16MB |

### \*Test Lab Information Reference

#### Lab A:

Huarui 7Layers High Technology (Suzhou) Co., Ltd.

#### Lab Address:

Tower N, Innovation Center, 88 Zhuyi Road, High-tech District, Suzhou City, Anhui Province

Accredited Test Lab Cert 6613.01

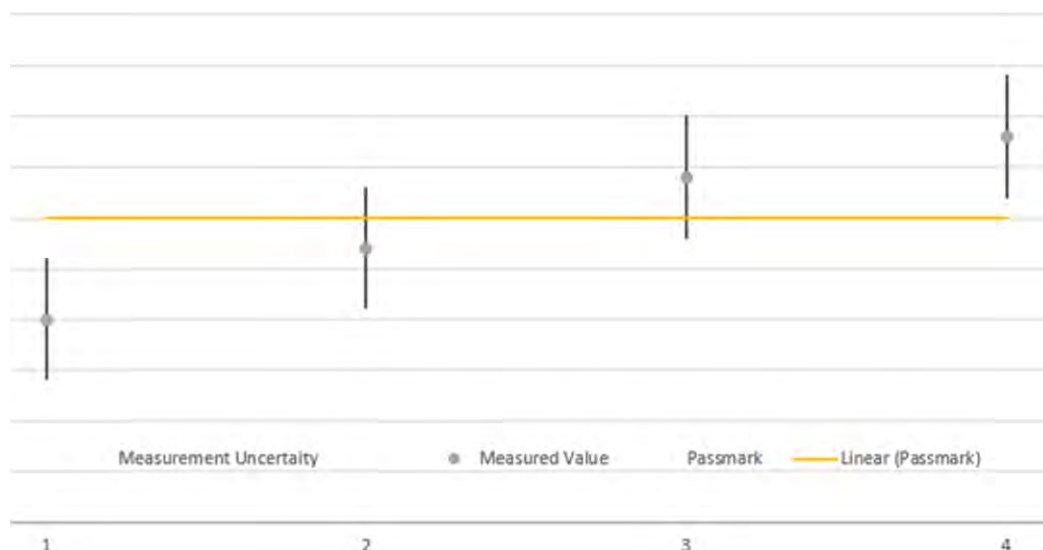
The FCC Site Registration No. is 434559; The Designation No. is CN1325.

## 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           |
|--------------------------------------------------|-----------------------|
| Frequency Stability                              | $\pm 76.97\text{Hz}$  |
| Radiated emissions (9KHz~30MHz)                  | $\pm 2.68\text{dB}$   |
| Radiated emissions & Radiated Power (30MHz~1GHz) | $\pm 4.98\text{dB}$   |
| Radiated emissions & Radiated Power (1GHz ~6GHz) | $\pm 4.70\text{dB}$   |
| Radiated emissions (6GHz ~18GHz)                 | $\pm 4.60\text{dB}$   |
| Radiated emissions (18GHz ~40GHz)                | $\pm 4.12\text{dB}$   |
| Conducted emissions                              | $\pm 4.01\text{dB}$   |
| Occupied Channel Bandwidth                       | $\pm 43.58\text{KHz}$ |
| Conducted Output power                           | $\pm 2.06\text{dB}$   |
| Band Edge Measurements                           | $\pm 4.70\text{dB}$   |
| Peak to average ratio                            | $\pm 0.76\text{dB}$   |

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



The verdicts in this test report are given according the above diagram:

| Case | Measured Value  | Uncertainty Range | Verdict |
|------|-----------------|-------------------|---------|
| 1    | below pass mark | below pass mark   | Passed  |
| 2    | below pass mark | within pass mark  | Passed  |
| 3    | above pass mark | within pass mark  | Failed  |
| 4    | above pass mark | above pass mark   | Failed  |

That means, the laboratory applies, as decision rule (see ISO/IEC 17025:2017), the so-called shared risk principle.

**1.2 TEST SITE AND INSTRUMENTS**

| Equipment                          | Manufacturer            | Model No.        | Serial No.             | Last Cal. | Next Cal. |
|------------------------------------|-------------------------|------------------|------------------------|-----------|-----------|
| Pre-Amplifier                      | R&S                     | SCU18F1          | 100815                 | Aug.30,22 | Aug.29,24 |
| Pre-Amplifier                      | R&S                     | SCU08F1          | 101028                 | Sep.16,22 | Sep.15,24 |
| Vector Signal Generator            | R&S                     | SMBV100B         | 102176                 | Feb.15,24 | Feb.14,26 |
| Signal Generator                   | R&S                     | SMB100A          | 182185                 | Feb.15,24 | Feb.14,26 |
| 3m Fully-anechoic Chamber          | TDK                     | 9m*6m*6m         | HRSW-SZ-EM C-01Chamber | Nov.25,22 | Nov.24,25 |
| 3m Semi-anechoic Chamber           | TDK                     | 9m*6m*6m         | HRSW-SZ-EM C-02Chamber | Nov.25,22 | Nov.24,25 |
| EMI TEST Receiver                  | R&S                     | ESR26            | 101734                 | Feb.25,22 | Feb.24,24 |
| EMI TEST Receiver                  | R&S                     | ESR26            | 101734                 | Feb.24,24 | Feb.23,26 |
| EMI TEST Receiver                  | R&S                     | ESW44            | 101973                 | Feb.25,22 | Feb.24,24 |
| EMI TEST Receiver                  | R&S                     | ESW44            | 101973                 | Feb.24,24 | Feb.23,26 |
| Bilog Antenna                      | SCHWARZBECK             | VULB 9163        | 1264                   | Feb.28,22 | Feb.27,24 |
| Bilog Antenna                      | SCHWARZBECK             | VULB 9163        | 1264                   | Feb.27,24 | Feb.26,26 |
| Horn Antenna                       | ETS-LINDGREN            | 3117             | 227836                 | Aug.22,22 | Aug.21,24 |
| Horn Antenna (18GHz-40GHz)         | Steatite Q-par Antennas | QMS 00880        | 23486                  | Feb.23,22 | Feb.22,24 |
| Horn Antenna (18GHz-40GHz)         | Steatite Q-par Antennas | QMS 00880        | 23486                  | Feb.22,24 | Feb.21,26 |
| Horn Antenna                       | Steatite Q-par Antennas | QMS 00208        | 23485                  | Aug.22,22 | Aug.21,24 |
| Loop Antenna                       | SCHWARZ                 | HFH2-Z2/Z2E      | 100976                 | Feb.23,22 | Feb.22,24 |
| Loop Antenna                       | SCHWARZ                 | HFH2-Z2/Z2E      | 100976                 | Feb.22,24 | Feb.21,26 |
| WIDEBANDRADIO COMMUNICATION TESTER | R&S                     | CMW500           | 169399                 | Jun.27,22 | Jun.26,24 |
| Test Software                      | EMC32                   | EMC32            | N/A                    | N/A       | N/A       |
| Test Software                      | ELEKTRA                 | ELEKTRA4.32      | N/A                    | N/A       | N/A       |
| Open Switch and Control Unit       | R&S                     | OSP220           | 101964                 | Oct.01,22 | Sep.30,24 |
| DC Source                          | HYELEC                  | HY3010B          | 551016                 | Aug.31,22 | Aug.30,24 |
| Hygrothermograph                   | DELI                    | 20210528         | SZ014                  | Sep.06,22 | Sep.05,24 |
| PC                                 | LENOVO                  | E14              | HRSW0024               | N/A       | N/A       |
| TMC-AMI18843A(CABLE)               | R&S                     | HF290-NMNM-7.00M | N/A                    | N/A       | N/A       |
| TMC-AMI18843A(CABLE)               | R&S                     | HF290-NMNM-4.00M | N/A                    | N/A       | N/A       |
| CABLE                              | R&S                     | W13.02           | N/A                    | Apr.28,23 | Apr.27,24 |
| CABLE                              | R&S                     | W12.14           | N/A                    | Apr.28,23 | Apr.27,24 |
| CABLE                              | R&S                     | J12J103539-00-1  | SEP-03-20-069          | Apr.28,23 | Apr.27,24 |
| CABLE                              | R&S                     | J12J103539-00-1  | SEP-03-20-070          | Apr.28,23 | Apr.27,24 |
| Temperature Chamber                | votsch                  | VT4002           | 58566078100050         | May.31,22 | May.30,24 |



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- NOTE:**
1. The calibration interval of the above test instruments is 12/24/36 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 434559; The Designation No. is CN1325.



## 2 GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

|                                   |                                                     |                       |
|-----------------------------------|-----------------------------------------------------|-----------------------|
| <b>PRODUCT*</b>                   | ME310M1-W2 / ME310M1-W1                             |                       |
| <b>BRAND NAME*</b>                | Telit Cinterion                                     |                       |
| <b>MODEL NAME*</b>                | ME310M1-W2 / ME310M1-W1                             |                       |
| <b>NOMINAL VOLTAGE*</b>           | EUT 3.8Vdc                                          |                       |
| <b>MODULATION TYPE</b>            | CAT-M / NB-IOT :LTE                                 | BPSK, QPSK, 16QAM     |
| <b>FREQUENCY RANGE<br/>CAT-M</b>  | LTE Band 2<br>Channel Bandwidth: 1.4MHz             | 1850.7MHz ~ 1909.3MHz |
|                                   | LTE Band 2<br>Channel Bandwidth: 3MHz               | 1851.5MHz ~ 1908.5MHz |
|                                   | LTE Band 2<br>Channel Bandwidth: 5MHz               | 1852.5MHz ~ 1907.5MHz |
|                                   | LTE Band 2<br>Channel Bandwidth: 10MHz              | 1855.0MHz ~ 1905.0MHz |
|                                   | LTE Band 2<br>Channel Bandwidth: 15MHz              | 1857.5MHz ~ 1902.5MHz |
|                                   | LTE Band 2<br>Channel Bandwidth: 20MHz              | 1860.0MHz ~ 1900.0MHz |
|                                   | LTE Band 25<br>Channel Bandwidth: 1.4MHz            | 1850.7MHz ~ 1914.3MHz |
|                                   | LTE Band 25<br>Channel Bandwidth: 3MHz              | 1851.5MHz ~ 1913.5MHz |
|                                   | LTE Band 25<br>Channel Bandwidth: 5MHz              | 1852.5MHz ~ 1912.5MHz |
|                                   | LTE Band 25<br>Channel Bandwidth: 10MHz             | 1855.0MHz ~ 1910.0MHz |
|                                   | LTE Band 25<br>Channel Bandwidth: 15MHz             | 1857.5MHz ~ 1907.5MHz |
|                                   | LTE Band 25<br>Channel Bandwidth: 20MHz             | 1860.0MHz ~ 1905.0MHz |
| <b>FREQUENCY RANGE<br/>NB-IOT</b> | LTE Band 2<br>(Sub-carrier Spacing:<br>3.75/15KHz)  | 1850.7MHz ~ 1909.3MHz |
|                                   | LTE Band 25<br>(Sub-carrier Spacing:<br>3.75/15KHz) | 1851.5MHz ~ 1908.5MHz |
| <b>MAX. ERP POWER<br/>CAM-T</b>   | LTE Band 2<br>Channel Bandwidth: 1.4MHz             | 335.74mW              |
|                                   | LTE Band 2<br>Channel Bandwidth: 3MHz               | 336.51mW              |



|                                     |                                                  |                                 |
|-------------------------------------|--------------------------------------------------|---------------------------------|
|                                     | LTE Band 2<br>Channel Bandwidth: 5MHz            | 334.97mW                        |
|                                     | LTE Band 2<br>Channel Bandwidth: 10MHz           | 337.29mW                        |
|                                     | LTE Band 2<br>Channel Bandwidth: 15MHz           | 336.51mW                        |
|                                     | LTE Band 2<br>Channel Bandwidth: 20MHz           | 339.63mW                        |
|                                     | LTE Band 25<br>Channel Bandwidth: 1.4MHz         | 338.06mW                        |
|                                     | LTE Band 25<br>Channel Bandwidth: 3MHz           | 336.51mW                        |
|                                     | LTE Band 25<br>Channel Bandwidth: 5MHz           | 333.43mW                        |
|                                     | LTE Band 25<br>Channel Bandwidth: 10MHz          | 336.51mW                        |
|                                     | LTE Band 25<br>Channel Bandwidth: 15MHz          | 334.97mW                        |
|                                     | LTE Band 25<br>Channel Bandwidth: 20MHz          | 338.06mW                        |
| MAX. ERP POWER<br>NB-IOT            | LTE Band 2<br>(Sub-carrier Spacing:<br>3.75KHz)  | 328.1mW                         |
|                                     | LTE Band 2<br>(Sub-carrier Spacing:<br>15KHz)    | 325.84mW                        |
|                                     | LTE Band 25<br>(Sub-carrier Spacing:<br>3.75KHz) | 322.11mW                        |
|                                     | LTE Band 25<br>(Sub-carrier Spacing:<br>15KHz)   | 325.84mW                        |
| EMISSION<br>DESIGNATOR GGN<br>CAT-M | LTE Band 25<br>Channel Bandwidth: 1.4MHz         | QPSK: 1M09G7D<br>16QAM: 1M08W7D |
|                                     | LTE Band 25<br>Channel Bandwidth: 3MHz           | QPSK: 1M08G7D<br>16QAM: 1M08W7D |
|                                     | LTE Band 25<br>Channel Bandwidth: 5MHz           | QPSK: 1M09G7D<br>16QAM: 1M08W7D |
|                                     | LTE Band 25<br>Channel Bandwidth: 10MHz          | QPSK: 1M08G7D<br>16QAM: 1M08W7D |
|                                     | LTE Band 25<br>Channel Bandwidth: 15MHz          | QPSK: 1M09G7D<br>16QAM: 1M08W7D |
|                                     | LTE Band 25                                      | QPSK: 1M09G7D                   |
|                                     |                                                  |                                 |
|                                     |                                                  |                                 |



|                                                |                                                           |                |
|------------------------------------------------|-----------------------------------------------------------|----------------|
|                                                | <b>Channel Bandwidth: 20MHz</b>                           | 16QAM: 1M09W7D |
| <b>EMISSION<br/>DESIGNATOR GOGN<br/>NB-IOT</b> | <b>LTE Band 25<br/>(Sub-carrier Spacing:<br/>3.75KHz)</b> | BPSK: 44K51G7D |
|                                                |                                                           | QPSK: 49K27W7D |
|                                                | <b>LTE Band 25<br/>(Sub-carrier Spacing:<br/>15KHz)</b>   | BPSK: 120K6G7D |
|                                                |                                                           | QPSK: 190K6W7D |
| <b>ANTENNA TYPE*</b>                           | 1/4 1 Antenna with 2.14dBi for LTE B2/ LTE B25            |                |
| <b>HW VERSION*</b>                             | 0.0                                                       |                |
| <b>SW VERSION*</b>                             | ME310M1-W2: M0U.100001/ME310M1-W1: M0U.000001             |                |
| <b>I/O PORTS*</b>                              | Refer to user's manual                                    |                |
| <b>CABLE SUPPLIED*</b>                         | N/A                                                       |                |
| <b>EXTREME<br/>TEMPERATURE*</b>                | -40-85 °C                                                 |                |
| <b>EXTREME VOLTAGE*</b>                        | 2.5V - 4.5V                                               |                |

**NOTE:**

- \*Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, Test Lab is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.
- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

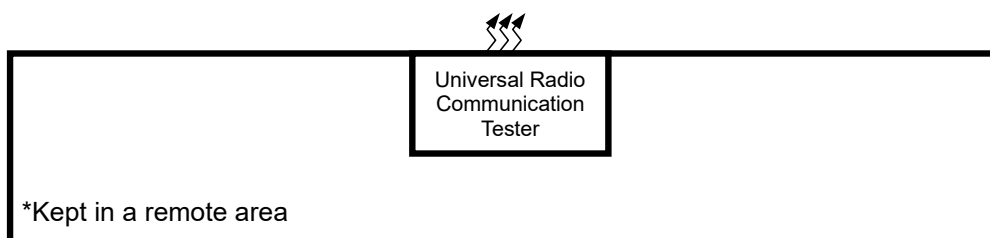
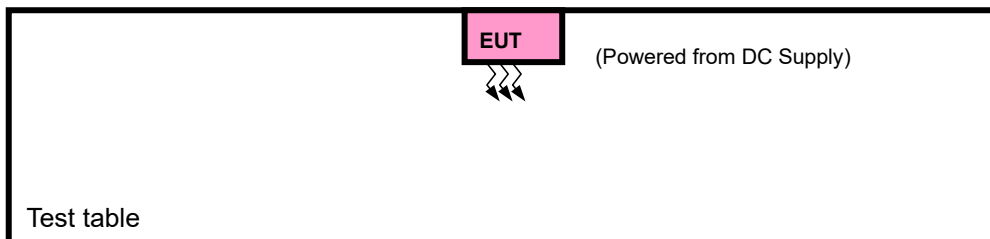
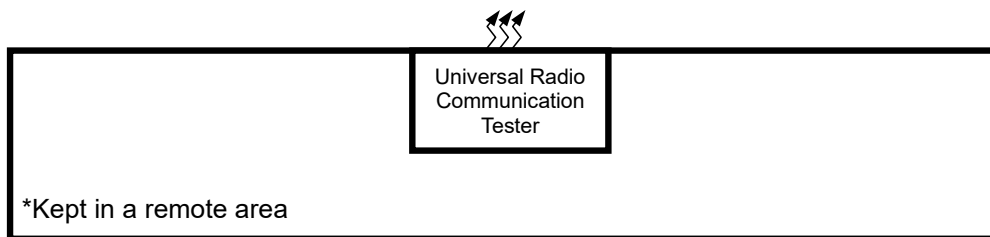
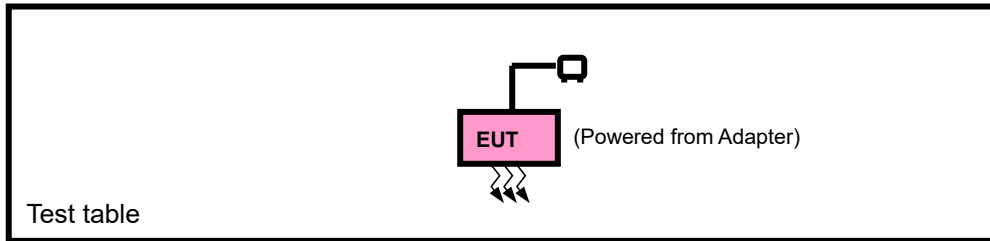
| MODULATION MODE | TX FUNCTION |
|-----------------|-------------|
| LTE             | 1TX/1RX     |

- 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





## 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   | Laptop    | Lenovo | ThinkPad E14 | HRSW00024  | N/A    |
| 2   | DC Source | HYELEC | HY3010B      | 551016     | N/A    |
| 3   | Adapter   | N/A    | N/A          | N/A        | N/A    |

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

## 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 in EIRP and radiated emission was found when positioned on X-plane for GSM/EDGE/ 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 + DC Source with LTE link           |

## LTE BAND 2 MODE

| EUT CONFIGURE MODE | TEST ITEM | AVAILABLE CHANNEL | TESTED CHANNEL      | CHANNEL BANDWIDTH | MODULATION | MODE               |
|--------------------|-----------|-------------------|---------------------|-------------------|------------|--------------------|
| A                  | EIRP      | 18607 to 19193    | 18607, 18900, 19193 | 1.4MHz            | QPSK,16QAM | 1 RB / 0 RB Offset |
|                    |           | 18615 to 19185    | 18615, 18900, 19185 | 3MHz              | QPSK,16QAM | 1 RB / 0 RB Offset |
|                    |           | 18625 to 19175    | 18625, 18900, 19175 | 5MHz              | QPSK,16QAM | 1 RB / 0 RB Offset |
|                    |           | 18650 to 19150    | 18650, 18900, 19150 | 10MHz             | QPSK,16QAM | 1 RB / 0 RB Offset |
|                    |           | 18675 to 19125    | 18675, 18900, 19125 | 15MHz             | QPSK,16QAM | 1 RB / 0 RB Offset |
|                    |           | 18700 to 19100    | 18700, 18900, 19100 | 20MHz             | QPSK,16QAM | 1 RB / 0 RB Offset |
| B<br>NB-IOT        | ERP       | 18602 to 19198    | 18602, 20525, 19198 | 3.75KHz           | BPSK,QPSK  | 1 RB / 0 RB Offset |
|                    |           | 18602 to 19198    | 18602, 20525, 19198 | 15KHz             | BPSK,QPSK  | 1 RB / 0 RB Offset |

**Note:** 1.This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

2. LTE Band 2 are covered by LTE Band 25, Because it is a subset of LTE Band 25 with the same output power and supported bandwidths, So the conducted test data and RSE test data please refer to LTE Band 25

**CAM-T LTE BAND 25 MODE**

| EUT CONFIGURE MODE | TEST ITEM             | AVAILABLE CHANNEL | TESTED CHANNEL      | CHANNEL BANDWIDTH | MODULATION        | MODE                                       |
|--------------------|-----------------------|-------------------|---------------------|-------------------|-------------------|--------------------------------------------|
| A                  | EIRP                  | 26047 to 26683    | 26047, 26365, 26683 | 1.4MHz            | QPSK,16QAM, 64QAM | 1 RB / 0 RB Offset                         |
|                    |                       | 26055 to 26675    | 26055, 26365, 26675 | 3MHz              | QPSK,16QAM, 64QAM | 1 RB / 0 RB Offset                         |
|                    |                       | 26065 to 26665    | 26065, 26365, 26665 | 5MHz              | QPSK,16QAM, 64QAM | 1 RB / 0 RB Offset                         |
|                    |                       | 26090 to 26640    | 26090, 26365 26640  | 10MHz             | QPSK,16QAM, 64QAM | 1 RB / 0 RB Offset                         |
|                    |                       | 26115 to 26615    | 26115, 26365, 26615 | 15MHz             | QPSK,16QAM, 64QAM | 1 RB / 0 RB Offset                         |
|                    |                       | 26140 to 26590    | 26140, 26365, 26590 | 20MHz             | QPSK,16QAM, 64QAM | 1 RB / 0 RB Offset                         |
| B                  | FREQUENCY STABILITY   | 26140 to 26590    | 26140, 26365, 26590 | 20MHz             | QPSK,16QAM, 64QAM | 100 RB / 0 RB Offset                       |
| A                  | OCCUPIED BANDWIDTH    | 26047 to 26683    | 26047, 26365, 26683 | 1.4MHz            | QPSK,16QAM, 64QAM | 6 RB / 0 RB Offset                         |
|                    |                       | 26055 to 26675    | 26055, 26365, 26675 | 3MHz              | QPSK,16QAM, 64QAM | 15 RB / 0 RB Offset                        |
|                    |                       | 26065 to 26665    | 26065, 26365, 26665 | 5MHz              | QPSK,16QAM, 64QAM | 25 RB / 0 RB Offset                        |
|                    |                       | 26090 to 26640    | 26090, 26365 26640  | 10MHz             | QPSK,16QAM, 64QAM | 50 RB / 0 RB Offset                        |
|                    |                       | 26115 to 26615    | 26115, 26365, 26615 | 15MHz             | QPSK,16QAM, 64QAM | 75 RB / 0 RB Offset                        |
|                    |                       | 26140 to 26590    | 26140, 26365, 26590 | 20MHz             | QPSK,16QAM, 64QAM | 100 RB / 0 RB Offset                       |
| A                  | PEAK TO AVERAGE RATIO | 26140 to 26590    | 26140, 26365, 26590 | 20MHz             | QPSK,16QAM, 64QAM | 1 RB / 0 RB Offset<br>100 RB / 0 RB Offset |
| A                  | BAND EDGE             | 26047 to 26683    | 26047               | 1.4MHz            | QPSK,16QAM, 64QAM | 1 RB / 0 RB Offset<br>6 RB / 0 RB Offset   |
|                    |                       |                   | 26683               | 1.4MHz            | QPSK,16QAM, 64QAM | 1 RB / 5 RB Offset<br>6 RB / 0 RB Offset   |
|                    |                       | 26055 to 26675    | 26055               | 3MHz              | QPSK,16QAM, 64QAM | 1 RB / 0 RB Offset<br>15 RB / 0 RB Offset  |
|                    |                       |                   | 26675               | 3MHz              | QPSK,16QAM, 64QAM | 1 RB / 14 RB Offset<br>15 RB / 0 RB Offset |
|                    |                       | 26065 to 26665    | 26065               | 5MHz              | QPSK,16QAM, 64QAM | 1 RB / 0 RB Offset<br>25 RB / 0 RB Offset  |
|                    |                       |                   | 26665               | 5MHz              | QPSK,16QAM, 64QAM | 1 RB / 24 RB Offset<br>25 RB / 0 RB Offset |
|                    |                       | 26090 to 26640    | 26090               | 10MHz             | QPSK,16QAM, 64QAM | 1 RB / 0 RB Offset<br>50 RB / 0 RB Offset  |
|                    |                       |                   | 26640               | 10MHz             | QPSK,16QAM, 64QAM | 1 RB / 49 RB Offset<br>50 RB / 0 RB Offset |
|                    |                       | 26115 to 26615    | 26115               | 15MHz             | QPSK,16QAM, 64QAM | 1 RB / 0 RB Offset<br>75 RB / 0 RB Offset  |
|                    |                       |                   | 26615               | 15MHz             | QPSK,16QAM, 64QAM | 1 RB / 74 RB Offset<br>75 RB / 0 RB Offset |



**BUREAU  
VERITAS**

**Test Report No.: W7L-240204W001RF02**

|   |                     |                |                     |        |                    |                      |
|---|---------------------|----------------|---------------------|--------|--------------------|----------------------|
|   |                     | 26140 to 26590 | 26140               | 20MHz  | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset   |
|   |                     |                | 26590               | 20MHz  | QPSK, 16QAM, 64QAM | 100 RB / 0 RB Offset |
| A | CONDCUETED EMISSION | 26047 to 26683 | 26047, 26365, 26683 | 1.4MHz | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset   |
|   |                     | 26055 to 26675 | 26055, 26365, 26675 | 3MHz   | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset   |
|   |                     | 26065 to 26665 | 26065, 26365, 26665 | 5MHz   | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset   |
|   |                     | 26090 to 26640 | 26090, 26365 26640  | 10MHz  | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset   |
|   |                     | 26115 to 26615 | 26115, 26365, 26615 | 15MHz  | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset   |
|   |                     | 26140 to 26590 | 26140, 26365, 26590 | 20MHz  | QPSK, 16QAM, 64QAM | 1 RB / 0 RB Offset   |
| A | RADIATED EMISSION   | 26047 to 26683 | 26365               | 1.4MHz | QPSK               | 1 RB / 0 RB Offset   |
|   |                     | 26055 to 26675 | 26365               | 3MHz   | QPSK               | 1 RB / 0 RB Offset   |
|   |                     | 26065 to 26665 | 26365               | 5MHz   | QPSK               | 1 RB / 0 RB Offset   |
|   |                     | 26090 to 26640 | 26090, 26365, 26640 | 10MHz  | QPSK               | 1 RB / 0 RB Offset   |
|   |                     | 26115 to 26615 | 26365               | 15MHz  | QPSK               | 1 RB / 0 RB Offset   |
|   |                     | 26140 to 26590 | 26365               | 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.

**NB-IOT LTE BAND 25 MODE**

| EUT CONFIGURE MODE | TEST ITEM             | AVAILABLE CHANNEL | TESTED CHANNEL      | MODULATION | MODE                                       |
|--------------------|-----------------------|-------------------|---------------------|------------|--------------------------------------------|
| A                  | ERP                   | 26042 to 26688    | 26042, 26365, 26688 | BPSK, QPSK | 1 RB / 0 RB Offset                         |
| B                  | FREQUENCY STABILITY   | 26365             | 26365               | BPSK, QPSK | 50 RB / 0 RB Offset                        |
| A                  | OCCUPIED BANDWIDTH    | 26042 to 26688    | 26042, 26365, 26688 | BPSK, QPSK | 6 RB / 0 RB Offset                         |
|                    |                       | 26365             | 26365               | BPSK, QPSK | 50 RB / 0 RB Offset                        |
| A                  | PEAK TO AVERAGE RATIO | 26365             | 26365               | BPSK, QPSK | 1 RB / 0 RB Offset<br>50 RB / 0 RB Offset  |
| A                  | BAND EDGE             | 26042 to 26688    | 26042               | BPSK, QPSK | 1 RB / 0 RB Offset<br>6 RB / 0 RB Offset   |
|                    |                       |                   | 26688               | BPSK, QPSK | 1 RB / 5 RB Offset<br>6 RB / 0 RB Offset   |
|                    |                       | 26365             | 26365               | BPSK, QPSK | 1 RB / 0 RB Offset<br>50 RB / 0 RB Offset  |
|                    |                       |                   |                     | BPSK, QPSK | 1 RB / 49 RB Offset<br>50 RB / 0 RB Offset |
|                    |                       |                   | 26365               | BPSK, QPSK | 1 RB / 0 RB Offset<br>50 RB / 0 RB Offset  |
|                    |                       |                   |                     | BPSK, QPSK | 1 RB / 0 RB Offset<br>50 RB / 0 RB Offset  |
| A                  | CONDUCTED EMISSION    | 26042 to 26688    | 26042, 26365, 26688 | BPSK, QPSK | 1 RB / 0 RB Offset                         |
|                    |                       | 26365             | 26365               | BPSK, QPSK | 1 RB / 0 RB Offset                         |
| A                  | RADIATED EMISSION     | 26042 to 26688    | 26042, 26365, 26688 | QPSK       | 1 RB / 0 RB Offset                         |
|                    |                       | 26365             | 26365               | 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 |
|-----------------------|--------------------------|----------------------------------|-----------|
| ERP                   | 23deg. C, 70%RH          | DC 4.5V By Adapter               | Hanwen Xu |
| FREQUENCY STABILITY   | 23deg. C, 70%RH          | DC 2.5V/ 3.8V/ 4.5V By DC Source | Hanwen Xu |
| OCCUPIED BANDWIDTH    | 23deg. C, 70%RH          | DC 4.5V By Adapter               | Hanwen Xu |
| BAND EDGE             | 23deg. C, 70%RH          | DC 4.5V By Adapter               | Hanwen Xu |
| CONDUCTED EMISSION    | 23deg. C, 70%RH          | DC 4.5V By Adapter               | Hanwen Xu |
| RADIATED EMISSION     | 23deg. C, 70%RH          | DC 4.5V By Adapter               | Hanwen Xu |
| PEAK TO AVERAGE RATIO | 23deg. C, 70%RH          | DC 4.5V By Adapter               | Hanwen Xu |

## **2.5 EUT OPERATING CONDITIONS**

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

## **2.6 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 24**

**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

Mobile and portable stations are limited to 2 watts EIRP.

#### 3.1.2 TEST PROCEDURES

##### EIRP MEASUREMENT:

Per KDB 971168 D01 Power Meas License Digital Systems v03r01 or subclause 5.2.5.5 of ANSI C63.26-2015, the relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_T - L_C$$

Where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively

(expressed in the same units as  $P_{\text{Meas}}$ , typically dBW or dBm);

$P_{\text{Meas}}$  = measured transmitter output power or PSD, in dBm or dBW;

$G_T$  = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

$L_C$  = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

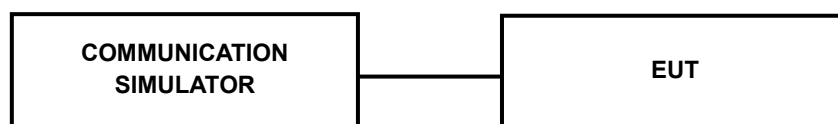
##### CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with WCDMA link data modulation and link up with simulator. 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:**

**CONDUCTED POWER MEASUREMENT:**



### 3.1.4 TEST RESULTS

**CONDUCTED OUTPUT POWER (dBm) :**

**CAM-T**

**LTE BAND 2**

| Band/BW | Modulation | RB<br>Size | RB<br>Offset | Low CH 18607            | Mid CH 18900          | High CH 19193           |
|---------|------------|------------|--------------|-------------------------|-----------------------|-------------------------|
|         |            |            |              | Frequency<br>1850.7 MHz | Frequency<br>1880 MHz | Frequency<br>1909.3 MHz |
| 2/ 1.4  | QPSK       | 1          | 0            | 22.79                   | 22.95                 | 22.91                   |
|         |            | 1          | 5            | 22.82                   | 23.00                 | 22.92                   |
|         |            | 3          | 0            | 22.88                   | 22.96                 | 23.05                   |
|         |            | 3          | 3            | 22.88                   | 23.00                 | 23.12                   |
|         |            | 6          | 0            | 22.93                   | 22.98                 | 23.04                   |
|         | 16QAM      | 1          | 0            | 22.74                   | 22.70                 | 22.74                   |
|         |            | 1          | 5            | 22.73                   | 22.89                 | 22.89                   |
|         |            | 3          | 0            | 22.82                   | 22.92                 | 22.95                   |
|         |            | 3          | 3            | 22.95                   | 23.01                 | 22.94                   |
|         |            | 6          | 0            | 22.96                   | 22.94                 | 22.98                   |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 18615         | Mid CH 18900       | High CH 19185        |
|---------|------------|---------|-----------|----------------------|--------------------|----------------------|
|         |            |         |           | Frequency 1851.5 MHz | Frequency 1880 MHz | Frequency 1908.5 MHz |
| 2/ 3    | QPSK       | 1       | 0         | 22.89                | 22.95              | 22.93                |
|         |            | 1       | 5         | 22.73                | 23.01              | 22.96                |
|         |            | 3       | 0         | 22.82                | 23.05              | 23.01                |
|         |            | 3       | 3         | 22.96                | 23.13              | 23.08                |
|         |            | 6       | 0         | 22.93                | 23.07              | 23.10                |
|         | 16QAM      | 1       | 0         | 22.78                | 22.83              | 22.75                |
|         |            | 1       | 5         | 22.71                | 22.90              | 22.80                |
|         |            | 3       | 0         | 22.69                | 22.89              | 22.90                |
|         |            | 3       | 3         | 22.91                | 23.02              | 22.90                |
|         |            | 6       | 0         | 22.96                | 22.97              | 22.96                |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 18625         | Mid CH 18900       | High CH 19175        |
|---------|------------|---------|-----------|----------------------|--------------------|----------------------|
|         |            |         |           | Frequency 1852.5 MHz | Frequency 1880 MHz | Frequency 1907.5 MHz |
| 2/ 5    | QPSK       | 1       | 0         | 22.82                | 22.83              | 22.98                |
|         |            | 1       | 5         | 22.72                | 22.90              | 22.94                |
|         |            | 3       | 0         | 22.85                | 22.98              | 23.07                |
|         |            | 3       | 3         | 22.90                | 23.08              | 23.06                |
|         |            | 6       | 0         | 22.87                | 23.11              | 23.06                |
|         | 16QAM      | 1       | 0         | 22.73                | 22.74              | 22.83                |
|         |            | 1       | 5         | 22.72                | 22.89              | 22.87                |
|         |            | 3       | 0         | 22.69                | 22.89              | 22.87                |
|         |            | 3       | 3         | 22.91                | 22.96              | 22.89                |
|         |            | 6       | 0         | 22.90                | 23.01              | 22.98                |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 18650       | Mid CH 18900       | High CH 19150      |
|---------|------------|---------|-----------|--------------------|--------------------|--------------------|
|         |            |         |           | Frequency 1855 MHz | Frequency 1880 MHz | Frequency 1905 MHz |
| 2/ 10   | QPSK       | 1       | 0         | 22.86              | 22.84              | 22.97              |
|         |            | 1       | 5         | 22.85              | 22.87              | 22.98              |
|         |            | 3       | 0         | 22.81              | 23.06              | 23.10              |
|         |            | 3       | 3         | 22.93              | 23.05              | 23.00              |
|         |            | 6       | 0         | 22.93              | 23.11              | 23.14              |
|         | 16QAM      | 1       | 0         | 22.71              | 22.76              | 22.78              |
|         |            | 1       | 5         | 22.71              | 22.96              | 22.83              |
|         |            | 3       | 0         | 22.79              | 22.80              | 22.91              |
|         |            | 3       | 3         | 22.85              | 23.01              | 22.95              |
|         |            | 6       | 0         | 22.90              | 23.01              | 22.95              |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 18675         | Mid CH 18900       | High CH 19125        |
|---------|------------|---------|-----------|----------------------|--------------------|----------------------|
|         |            |         |           | Frequency 1857.5 MHz | Frequency 1880 MHz | Frequency 1902.5 MHz |
| 2/ 15   | QPSK       | 1       | 0         | 22.90                | 22.90              | 22.94                |
|         |            | 1       | 5         | 22.77                | 22.90              | 23.02                |
|         |            | 3       | 0         | 22.86                | 22.99              | 22.98                |
|         |            | 3       | 3         | 22.94                | 23.13              | 23.01                |
|         |            | 6       | 0         | 22.95                | 22.98              | 23.13                |
|         | 16QAM      | 1       | 0         | 22.80                | 22.84              | 22.83                |
|         |            | 1       | 5         | 22.65                | 22.91              | 22.78                |
|         |            | 3       | 0         | 22.77                | 22.85              | 22.97                |
|         |            | 3       | 3         | 22.83                | 23.05              | 22.85                |
|         |            | 6       | 0         | 22.91                | 23.01              | 23.06                |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 18700       | Mid CH 18900       | High CH 19100      |
|---------|------------|---------|-----------|--------------------|--------------------|--------------------|
|         |            |         |           | Frequency 1860 MHz | Frequency 1880 MHz | Frequency 1900 MHz |
| 2/ 20   | QPSK       | 1       | 0         | 22.93              | 22.98              | 23.01              |
|         |            | 1       | 5         | 22.86              | 23.02              | 23.06              |
|         |            | 3       | 0         | 22.94              | 23.09              | 23.11              |
|         |            | 3       | 3         | 22.98              | 23.15              | 23.13              |
|         |            | 6       | 0         | 23.02              | 23.13              | 23.17              |
|         | 16QAM      | 1       | 0         | 22.83              | 22.85              | 22.87              |
|         |            | 1       | 5         | 22.80              | 23.00              | 22.91              |
|         |            | 3       | 0         | 22.84              | 22.95              | 23.01              |
|         |            | 3       | 3         | 22.97              | 23.08              | 22.98              |
|         |            | 6       | 0         | 22.98              | 23.09              | 23.07              |

#### **LTE BAND 25**

| Band/BW | Modulation | RB Size | RB Offset | Low CH 26047         | Mid CH 26365         | High CH 26683        |
|---------|------------|---------|-----------|----------------------|----------------------|----------------------|
|         |            |         |           | Frequency 1850.7 MHz | Frequency 1882.5 MHz | Frequency 1914.3 MHz |
| 25/ 1.4 | QPSK       | 1       | 0         | 22.81                | 22.89                | 23.00                |
|         |            | 1       | 5         | 22.74                | 22.97                | 22.97                |
|         |            | 3       | 0         | 22.79                | 23.15                | 23.06                |
|         |            | 3       | 3         | 22.82                | 22.98                | 22.98                |
|         |            | 6       | 0         | 22.91                | 23.03                | 23.00                |
|         | 16QAM      | 1       | 0         | 22.68                | 22.86                | 22.81                |
|         |            | 1       | 5         | 22.53                | 22.90                | 23.00                |
|         |            | 3       | 0         | 22.79                | 22.99                | 22.98                |
|         |            | 3       | 3         | 22.71                | 23.07                | 23.00                |
|         |            | 6       | 0         | 22.96                | 23.03                | 23.00                |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 26055         | Mid CH 26365         | High CH 26675        |
|---------|------------|---------|-----------|----------------------|----------------------|----------------------|
|         |            |         |           | Frequency 1851.5 MHz | Frequency 1882.5 MHz | Frequency 1913.5 MHz |
| 25/ 3   | QPSK       | 1       | 0         | 22.86                | 23.01                | 22.97                |
|         |            | 1       | 5         | 22.76                | 23.02                | 22.94                |
|         |            | 3       | 0         | 22.83                | 23.04                | 23.01                |
|         |            | 3       | 3         | 22.92                | 23.01                | 23.06                |
|         |            | 6       | 0         | 22.90                | 23.12                | 23.13                |
|         | 16QAM      | 1       | 0         | 22.62                | 22.99                | 22.91                |
|         |            | 1       | 5         | 22.57                | 22.86                | 22.92                |
|         |            | 3       | 0         | 22.80                | 22.93                | 22.94                |
|         |            | 3       | 3         | 22.77                | 22.96                | 23.02                |
|         |            | 6       | 0         | 22.97                | 23.03                | 22.99                |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 26065         | Mid CH 26365         | High CH 26665        |
|---------|------------|---------|-----------|----------------------|----------------------|----------------------|
|         |            |         |           | Frequency 1852.5 MHz | Frequency 1882.5 MHz | Frequency 1912.5 MHz |
| 25/ 5   | QPSK       | 1       | 0         | 22.88                | 22.98                | 22.94                |
|         |            | 1       | 5         | 22.78                | 22.99                | 23.01                |
|         |            | 3       | 0         | 22.83                | 23.06                | 23.07                |
|         |            | 3       | 3         | 22.85                | 23.08                | 23.09                |
|         |            | 6       | 0         | 22.98                | 23.02                | 23.07                |
|         | 16QAM      | 1       | 0         | 22.64                | 22.94                | 22.86                |
|         |            | 1       | 5         | 22.58                | 22.95                | 22.87                |
|         |            | 3       | 0         | 22.88                | 22.96                | 22.99                |
|         |            | 3       | 3         | 22.75                | 23.02                | 23.01                |
|         |            | 6       | 0         | 22.96                | 23.04                | 23.07                |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 26090       | Mid CH 26365         | High CH 26640      |
|---------|------------|---------|-----------|--------------------|----------------------|--------------------|
|         |            |         |           | Frequency 1855 MHz | Frequency 1882.5 MHz | Frequency 1910 MHz |
| 25/ 10  | QPSK       | 1       | 0         | 22.80              | 22.95                | 22.97              |
|         |            | 1       | 5         | 22.72              | 23.00                | 23.02              |
|         |            | 3       | 0         | 22.84              | 23.06                | 22.94              |
|         |            | 3       | 3         | 22.85              | 23.06                | 23.05              |
|         |            | 6       | 0         | 22.87              | 23.10                | 23.13              |
|         | 16QAM      | 1       | 0         | 22.70              | 22.96                | 22.89              |
|         |            | 1       | 5         | 22.63              | 22.91                | 22.92              |
|         |            | 3       | 0         | 22.87              | 22.95                | 22.92              |
|         |            | 3       | 3         | 22.70              | 23.00                | 22.91              |
|         |            | 6       | 0         | 22.99              | 23.00                | 22.97              |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 26115         | Mid CH 26365         | High CH 26615        |
|---------|------------|---------|-----------|----------------------|----------------------|----------------------|
|         |            |         |           | Frequency 1857.5 MHz | Frequency 1882.5 MHz | Frequency 1907.5 MHz |
| 25/ 15  | QPSK       | 1       | 0         | 22.81                | 22.88                | 22.90                |
|         |            | 1       | 5         | 22.80                | 23.02                | 22.93                |
|         |            | 3       | 0         | 22.92                | 23.01                | 22.95                |
|         |            | 3       | 3         | 22.93                | 23.11                | 23.03                |
|         |            | 6       | 0         | 22.97                | 23.09                | 23.08                |
|         | 16QAM      | 1       | 0         | 22.62                | 22.99                | 22.84                |
|         |            | 1       | 5         | 22.63                | 22.87                | 23.01                |
|         |            | 3       | 0         | 22.82                | 22.96                | 22.96                |
|         |            | 3       | 3         | 22.83                | 23.07                | 23.02                |
|         |            | 6       | 0         | 22.96                | 22.97                | 22.95                |



| Band/BW | Modulation | RB Size | RB Offset | Low CH 26140       | Mid CH 26365         | High CH 26590      |
|---------|------------|---------|-----------|--------------------|----------------------|--------------------|
|         |            |         |           | Frequency 1860 MHz | Frequency 1882.5 MHz | Frequency 1905 MHz |
| 25/ 20  | QPSK       | 1       | 0         | 22.92              | 23.03                | 23.05              |
|         |            | 1       | 5         | 22.82              | 23.12                | 23.07              |
|         |            | 3       | 0         | 22.94              | 23.16                | 23.09              |
|         |            | 3       | 3         | 22.96              | 23.12                | 23.13              |
|         |            | 6       | 0         | 23.02              | 23.17                | 23.15              |
|         | 16QAM      | 1       | 0         | 22.77              | 23.00                | 22.96              |
|         |            | 1       | 5         | 22.68              | 22.97                | 23.02              |
|         |            | 3       | 0         | 22.91              | 23.02                | 23.00              |
|         |            | 3       | 3         | 22.85              | 23.08                | 23.05              |
|         |            | 6       | 0         | 23.01              | 23.05                | 23.09              |

# N-IOT

| LTE Band 2                      |            |                 |           |        |              |        |
|---------------------------------|------------|-----------------|-----------|--------|--------------|--------|
| Sub-carrier<br>Spacing<br>(KHz) | Modulation | RB Size         | RB Offset | Low    | Mid          | High   |
|                                 |            | Channel         |           | 18602  | 18900        | 19198  |
|                                 |            | Frequency (MHz) |           | 1850.2 | 1880         | 1909.8 |
| 3.75                            | BPSK       | 1               | 0         | 22.68  | 22.92        | 22.89  |
|                                 |            | 1               | 47        | 22.74  | <b>23.02</b> | 22.91  |
|                                 | QPSK       | 1               | 0         | 22.64  | 23.01        | 22.88  |
|                                 |            | 1               | 47        | 22.71  | 22.99        | 22.90  |
| 15                              | BPSK       | 1               | 0         | 22.69  | 22.98        | 22.91  |
|                                 |            | 1               | 11        | 22.57  | 22.91        | 22.88  |
|                                 | QPSK       | 1               | 0         | 22.65  | 22.90        | 22.87  |
|                                 |            | 1               | 11        | 22.64  | 22.99        | 22.90  |
|                                 |            | 12              | 0         | 21.49  | 21.86        | 21.73  |

| LTE Band 25                     |            |                 |           |        |              |        |
|---------------------------------|------------|-----------------|-----------|--------|--------------|--------|
| Sub-carrier<br>Spacing<br>(KHz) | Modulation | RB Size         | RB Offset | Low    | Mid          | High   |
|                                 |            | Channel         |           | 26042  | 26365        | 26688  |
|                                 |            | Frequency (MHz) |           | 1850.2 | 1882.5       | 1914.8 |
| 3.75                            | BPSK       | 1               | 0         | 22.61  | 22.87        | 22.85  |
|                                 |            | 1               | 47        | 22.62  | 22.89        | 22.88  |
|                                 | QPSK       | 1               | 0         | 22.59  | 22.94        | 22.89  |
|                                 |            | 1               | 47        | 22.60  | 22.93        | 22.90  |
| 15                              | BPSK       | 1               | 0         | 22.68  | 22.98        | 22.85  |
|                                 |            | 1               | 11        | 22.58  | 22.99        | 22.78  |
|                                 | QPSK       | 1               | 0         | 22.59  | <b>23.01</b> | 22.79  |
|                                 |            | 1               | 11        | 22.58  | 22.99        | 22.78  |
|                                 |            | 12              | 0         | 21.42  | 21.78        | 21.64  |



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Test Report No.: W7L-240204W001RF02

**EIRP POWER (dBm)**

## LTE BAND 2

### CHANNEL BANDWIDTH: 1.4MHz QPSK

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 18607   | 1850.7          | 22.93                 | 2.14                                | 25.07      | 321.37    | 2         |
| 18900   | 1880            | 23                    | 2.14                                | 25.14      | 326.59    | 2         |
| 19193   | 1909.3          | 23.12                 | 2.14                                | 25.26      | 335.74    | 2         |

### CHANNEL BANDWIDTH: 1.4MHz 16QAM

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 18607   | 1850.7          | 22.96                 | 2.14                                | 25.1       | 323.59    | 2         |
| 18900   | 1880            | 23.01                 | 2.14                                | 25.15      | 327.34    | 2         |
| 19193   | 1909.3          | 22.98                 | 2.14                                | 25.12      | 325.09    | 2         |

### CHANNEL BANDWIDTH: 3MHz QPSK

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 18615   | 1851.5          | 22.96                 | 2.14                                | 25.1       | 323.59    | 2         |
| 18900   | 1880            | 23.13                 | 2.14                                | 25.27      | 336.51    | 2         |
| 19185   | 1908.5          | 23.1                  | 2.14                                | 25.24      | 334.2     | 2         |

### CHANNEL BANDWIDTH: 3MHz 16QAM

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 18615   | 1851.5          | 22.96                 | 2.14                                | 25.1       | 323.59    | 2         |
| 18900   | 1880            | 23.02                 | 2.14                                | 25.16      | 328.1     | 2         |
| 19185   | 1908.5          | 22.96                 | 2.14                                | 25.1       | 323.59    | 2         |



**CHANNEL BANDWIDTH: 5MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T-L<sub>C</sub></sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-----------------------------------|------------|-----------|-----------|
| 18625   | 1852.5          | 22.9                  | 2.14                              | 25.04      | 319.15    | 2         |
| 18900   | 1880            | 23.11                 | 2.14                              | 25.25      | 334.97    | 2         |
| 19175   | 1907.5          | 23.07                 | 2.14                              | 25.21      | 331.89    | 2         |

**CHANNEL BANDWIDTH: 5MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T-L<sub>C</sub></sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-----------------------------------|------------|-----------|-----------|
| 18625   | 1852.5          | 22.91                 | 2.14                              | 25.05      | 319.89    | 2         |
| 18900   | 1880            | 23.01                 | 2.14                              | 25.15      | 327.34    | 2         |
| 19175   | 1907.5          | 22.98                 | 2.14                              | 25.12      | 325.09    | 2         |

**CHANNEL BANDWIDTH: 10MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T-L<sub>C</sub></sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-----------------------------------|------------|-----------|-----------|
| 18650   | 1855            | 22.93                 | 2.14                              | 25.07      | 321.37    | 2         |
| 18900   | 1880            | 23.11                 | 2.14                              | 25.25      | 334.97    | 2         |
| 19150   | 1905            | 23.14                 | 2.14                              | 25.28      | 337.29    | 2         |

**CHANNEL BANDWIDTH: 10MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T-L<sub>C</sub></sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-----------------------------------|------------|-----------|-----------|
| 18650   | 1855            | 22.9                  | 2.14                              | 25.04      | 319.15    | 2         |
| 18900   | 1880            | 23.01                 | 2.14                              | 25.15      | 327.34    | 2         |
| 19150   | 1905            | 22.95                 | 2.14                              | 25.09      | 322.85    | 2         |



**CHANNEL BANDWIDTH: 15MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 18675   | 1857.5          | 22.95                 | 2.14                                | 25.09      | 322.85    | 2         |
| 18900   | 1880            | 23.13                 | 2.14                                | 25.27      | 336.51    | 2         |
| 19125   | 1902.5          | 23.13                 | 2.14                                | 25.27      | 336.51    | 2         |

**CHANNEL BANDWIDTH: 15MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 18675   | 1857.5          | 22.91                 | 2.14                                | 25.05      | 319.89    | 2         |
| 18900   | 1880            | 23.05                 | 2.14                                | 25.19      | 330.37    | 2         |
| 19125   | 1902.5          | 23.06                 | 2.14                                | 25.2       | 331.13    | 2         |

**CHANNEL BANDWIDTH: 20MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 18700   | 1860            | 23.02                 | 2.14                                | 25.16      | 328.1     | 2         |
| 18900   | 1880            | 23.15                 | 2.14                                | 25.29      | 338.06    | 2         |
| 19100   | 1900            | 23.17                 | 2.14                                | 25.31      | 339.63    | 2         |

**CHANNEL BANDWIDTH: 20MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 18700   | 1860            | 22.98                 | 2.14                                | 25.12      | 325.09    | 2         |
| 18900   | 1880            | 23.09                 | 2.14                                | 25.23      | 333.43    | 2         |
| 19100   | 1900            | 23.07                 | 2.14                                | 25.21      | 331.89    | 2         |



## LTE BAND 25

## CHANNEL BANDWIDTH: 1.4MHz QPSK

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T-LC</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|------------------------|------------|-----------|-----------|
| 26047   | 1850.7          | 22.91                 | 2.14                   | 25.05      | 319.89    | 2         |
| 26365   | 1882.5          | 23.15                 | 2.14                   | 25.29      | 338.06    | 2         |
| 26683   | 1914.3          | 23.06                 | 2.14                   | 25.2       | 331.13    | 2         |

## CHANNEL BANDWIDTH: 1.4MHz 16QAM

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T-LC</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|------------------------|------------|-----------|-----------|
| 26047   | 1850.7          | 22.96                 | 2.14                   | 25.1       | 323.59    | 2         |
| 26365   | 1882.5          | 23.07                 | 2.14                   | 25.21      | 331.89    | 2         |
| 26683   | 1914.3          | 23                    | 2.14                   | 25.14      | 326.59    | 2         |

## CHANNEL BANDWIDTH: 3MHz QPSK

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T-LC</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|------------------------|------------|-----------|-----------|
| 26055   | 1851.5          | 22.92                 | 2.14                   | 25.06      | 320.63    | 2         |
| 26365   | 1882.5          | 23.12                 | 2.14                   | 25.26      | 335.74    | 2         |
| 26675   | 1913.5          | 23.13                 | 2.14                   | 25.27      | 336.51    | 2         |

## CHANNEL BANDWIDTH: 3MHz 16QAM

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T-LC</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|------------------------|------------|-----------|-----------|
| 26055   | 1851.5          | 22.97                 | 2.14                   | 25.11      | 324.34    | 2         |
| 26365   | 1882.5          | 23.03                 | 2.14                   | 25.17      | 328.85    | 2         |
| 26675   | 1913.5          | 23.02                 | 2.14                   | 25.16      | 328.1     | 2         |

**CHANNEL BANDWIDTH: 5MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 26065   | 1852.5          | 22.98                 | 2.14                                | 25.12      | 325.09    | 2         |
| 26365   | 1882.5          | 23.08                 | 2.14                                | 25.22      | 332.66    | 2         |
| 26665   | 1912.5          | 23.09                 | 2.14                                | 25.23      | 333.43    | 2         |

**CHANNEL BANDWIDTH: 5MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 26065   | 1852.5          | 22.96                 | 2.14                                | 25.1       | 323.59    | 2         |
| 26365   | 1882.5          | 23.04                 | 2.14                                | 25.18      | 329.61    | 2         |
| 26665   | 1912.5          | 23.07                 | 2.14                                | 25.21      | 331.89    | 2         |

**CHANNEL BANDWIDTH: 10MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 26090   | 1855            | 22.87                 | 2.14                                | 25.01      | 316.96    | 2         |
| 26365   | 1882.5          | 23.1                  | 2.14                                | 25.24      | 334.2     | 2         |
| 26640   | 1910            | 23.13                 | 2.14                                | 25.27      | 336.51    | 2         |

**CHANNEL BANDWIDTH: 10MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 26090   | 1855            | 22.99                 | 2.14                                | 25.13      | 325.84    | 2         |
| 26365   | 1882.5          | 23                    | 2.14                                | 25.14      | 326.59    | 2         |
| 26640   | 1910            | 22.97                 | 2.14                                | 25.11      | 324.34    | 2         |

**CHANNEL BANDWIDTH: 15MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 26115   | 1857.5          | 22.97                 | 2.14                                | 25.11      | 324.34    | 2         |
| 26365   | 1882.5          | 23.11                 | 2.14                                | 25.25      | 334.97    | 2         |
| 26615   | 1907.5          | 23.08                 | 2.14                                | 25.22      | 332.66    | 2         |

**CHANNEL BANDWIDTH: 15MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 26115   | 1857.5          | 22.96                 | 2.14                                | 25.1       | 323.59    | 2         |
| 26365   | 1882.5          | 23.07                 | 2.14                                | 25.21      | 331.89    | 2         |
| 26615   | 1907.5          | 23.02                 | 2.14                                | 25.16      | 328.1     | 2         |

**CHANNEL BANDWIDTH: 20MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 26140   | 1860            | 23.02                 | 2.14                                | 25.16      | 328.1     | 2         |
| 26365   | 1882.5          | 23.17                 | 2.14                                | 25.31      | 339.63    | 2         |
| 26590   | 1905            | 23.15                 | 2.14                                | 25.29      | 338.06    | 2         |

**CHANNEL BANDWIDTH: 20MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | EIRP (dBm) | EIRP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|------------|-----------|-----------|
| 26140   | 1860            | 23.01                 | 2.14                                | 25.15      | 327.34    | 2         |
| 26365   | 1882.5          | 23.08                 | 2.14                                | 25.22      | 332.66    | 2         |
| 26590   | 1905            | 23.09                 | 2.14                                | 25.23      | 333.43    | 2         |

**REMARKS:** ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).





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Test Report No.: W7L-240204W001RF02

## NB-IOT

### LTE B2 3.75KHz

#### CHANNEL BANDWIDTH: BPSK

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|-----------|----------|-----------|
| 18602   | 1850.2          | 22.74                 | 2.14                                | 24.88     | 307.61   | 2         |
| 18900   | 1880            | 23.02                 | 2.14                                | 25.16     | 328.1    | 2         |
| 19198   | 1909.8          | 22.91                 | 2.14                                | 25.05     | 319.89   | 2         |

#### CHANNEL BANDWIDTH: QPSK

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|-----------|----------|-----------|
| 18602   | 1850.2          | 22.71                 | 2.14                                | 24.85     | 305.49   | 2         |
| 18900   | 1880            | 23.01                 | 2.14                                | 25.15     | 327.34   | 2         |
| 19198   | 1909.8          | 22.9                  | 2.14                                | 25.04     | 319.15   | 2         |

### LTE B2 15KHz

#### CHANNEL BANDWIDTH: BPSK

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|-----------|----------|-----------|
| 18602   | 1850.2          | 22.69                 | 2.14                                | 24.83     | 304.09   | 2         |
| 18900   | 1880            | 22.98                 | 2.14                                | 25.12     | 325.09   | 2         |
| 19198   | 1909.8          | 22.91                 | 2.14                                | 25.05     | 319.89   | 2         |

#### CHANNEL BANDWIDTH: QPSK

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|-----------|----------|-----------|
| 18602   | 1850.2          | 22.65                 | 2.14                                | 24.79     | 301.3    | 2         |
| 18900   | 1880            | 22.99                 | 2.14                                | 25.13     | 325.84   | 2         |
| 19198   | 1909.8          | 22.9                  | 2.14                                | 25.04     | 319.15   | 2         |

**REMARKS:** ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).

**NB-IOT**

**LTE B25 3.75KHz**

**CHANNEL BANDWIDTH: BPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|-----------|----------|-----------|
| 26042   | 1850.2          | 22.62                 | 2.14                                | 24.76     | 299.23   | 2         |
| 26365   | 1882.5          | 22.89                 | 2.14                                | 25.03     | 318.42   | 2         |
| 26688   | 1914.8          | 22.88                 | 2.14                                | 25.02     | 317.69   | 2         |

**CHANNEL BANDWIDTH: QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|-----------|----------|-----------|
| 26042   | 1850.2          | 22.6                  | 2.14                                | 24.74     | 297.85   | 2         |
| 26365   | 1882.5          | 22.94                 | 2.14                                | 25.08     | 322.11   | 2         |
| 26688   | 1914.8          | 22.9                  | 2.14                                | 25.04     | 319.15   | 2         |

**LTE B25 15KHz**

**CHANNEL BANDWIDTH: BPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|-----------|----------|-----------|
| 26042   | 1850.2          | 22.68                 | 2.14                                | 24.82     | 303.39   | 2         |
| 26365   | 1882.5          | 22.99                 | 2.14                                | 25.13     | 325.84   | 2         |
| 26688   | 1914.8          | 22.85                 | 2.14                                | 24.99     | 315.5    | 2         |

**CHANNEL BANDWIDTH: QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | G <sub>T</sub> -L <sub>C</sub> (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---------|-----------------|-----------------------|-------------------------------------|-----------|----------|-----------|
| 26042   | 1850.2          | 22.59                 | 2.14                                | 24.73     | 297.17   | 2         |
| 26365   | 1882.5          | 23.01                 | 2.14                                | 25.15     | 327.34   | 2         |
| 26688   | 1914.8          | 22.79                 | 2.14                                | 24.93     | 311.17   | 2         |

**REMARKS:** ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).



### 3.2 FREQUENCY STABILITY MEASUREMENT

#### 3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

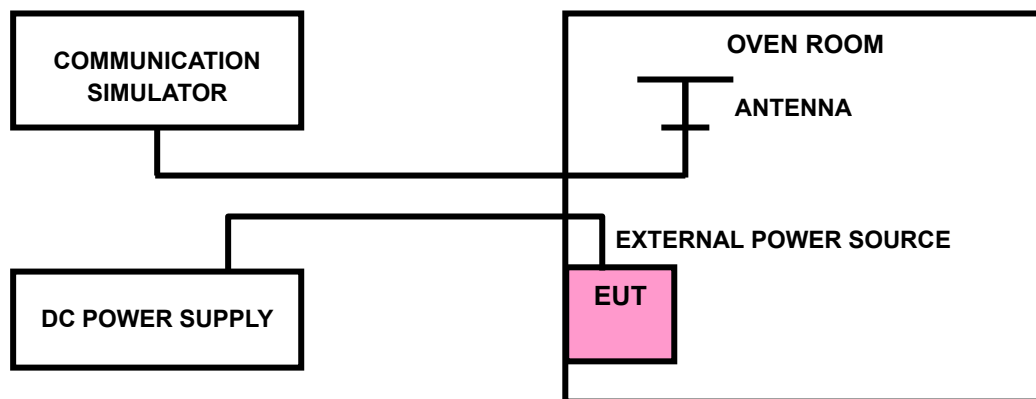
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

#### 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





**Test Report No.: W7L-240204W001RF02**

### 3.2.4 TEST RESULTS

Please Refer to Appendix Of this test report.

Note: VL = Low voltage(2.5V); VN/NV = Normal voltage(3.8V); VH = High voltage(4.5V);  
NT = Normal temperature (25°C)

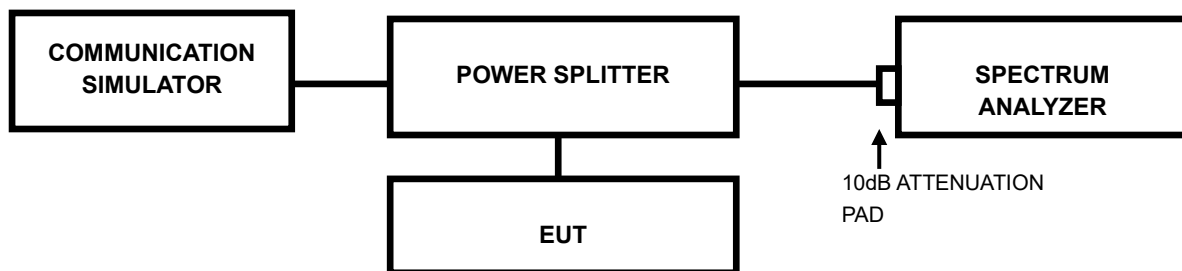


### 3.3 OCCUPIED BANDWIDTH MEASUREMENT

#### 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.



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### 3.3.4 TEST RESULTS

Please Refer to Appendix Of this test report.

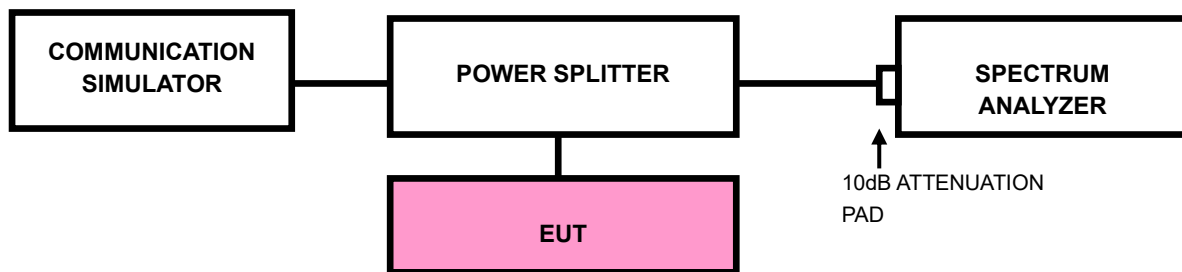


### 3.4 BAND EDGE MEASUREMENTC

#### 3.4.1 LIMITS OF BAND EDGE MEASUREMENT

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

#### 3.4.2 TEST SETUP



### 3.4.3 TEST PROCEDURES

- a) All measurements were done at low and high operational frequency range
- b) Connect the transmitter to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.
- c) Tune the analyzer to the nominal center frequency of the emission bandwidth (EBW)
- d) .Set the resolution bandwidth (RBW)  $\geq 1\%$  EBW in the 1MHz band immediately outside and adjacent to the band edge.
- e) Beyond the 1MHz band from the band edge, RBW=1MHz was used.
- f) Set the video bandwidth (VBW) to  $\geq 3 \times$  RBW.
- g) Select the average power (RMS) display detector.
- h) Set the number of measurement points to  $\geq 1001$ .
- i) Use auto-coupled sweep time.
- j) Perform the measurement over an interval of time when the transmission is continuous and at its maximum power level.
- k) The RF fundamental frequency should be excluded against the limit line in the operating frequency band and use RBW is 10KHz or 100KHz.
- l) Record the max trace plot into the test report.





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#### 3.4.4. TEST RESULTS

Please Refer to Appendix Of this test report.



### 3.5 CONDUCTED SPURIOUS EMISSIONS

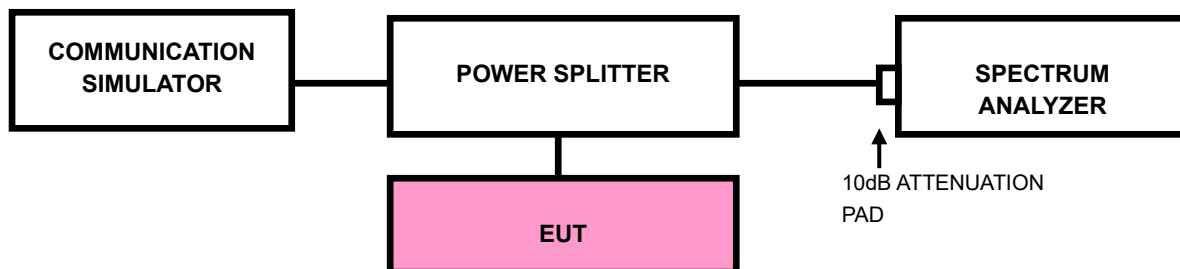
#### 3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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

#### 3.5.2 TEST PROCEDURE

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 30MHz up to a frequency including its 10<sup>th</sup> harmonic. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

#### 3.5.3 TEST SETUP





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### 3.5.4 TEST RESULTS

NOTE : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

Please Refer to Appendix Of this test report.

### 3.6 RADIATED EMISSION MEASUREMENT

#### 3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

#### 3.6.2 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.  $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$

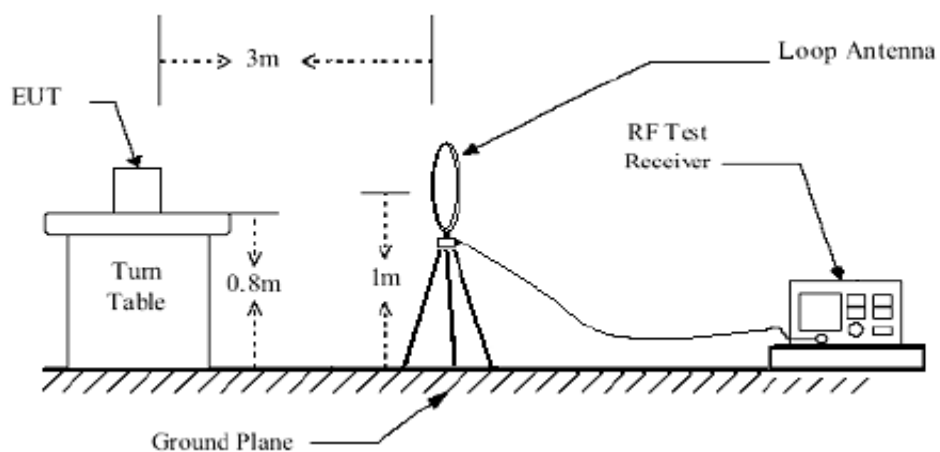
**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

#### 3.6.3 DEVIATION FROM TEST STANDARD

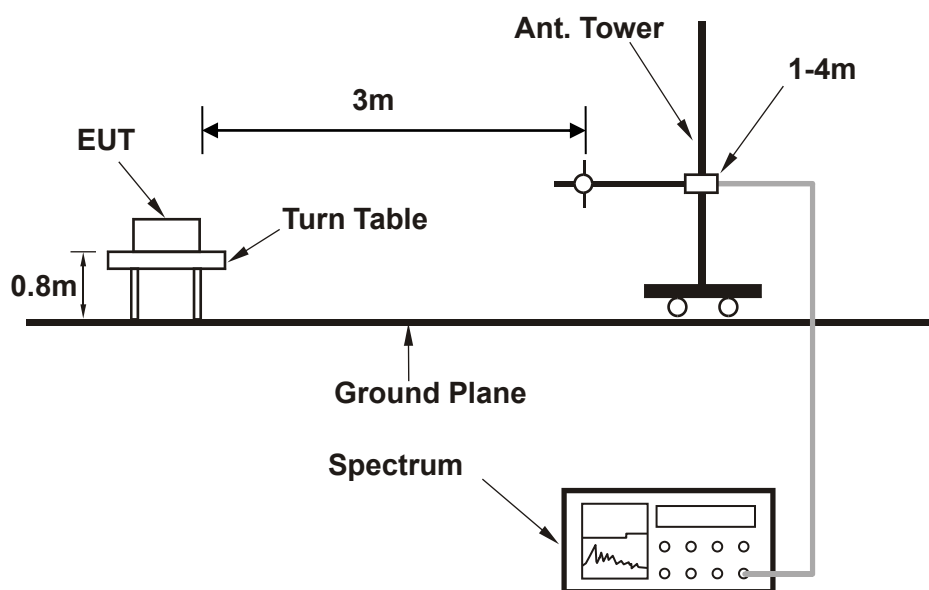
No deviation

### 3.6.4 TEST SETUP

#### < Frequency Range below 30MHz >



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

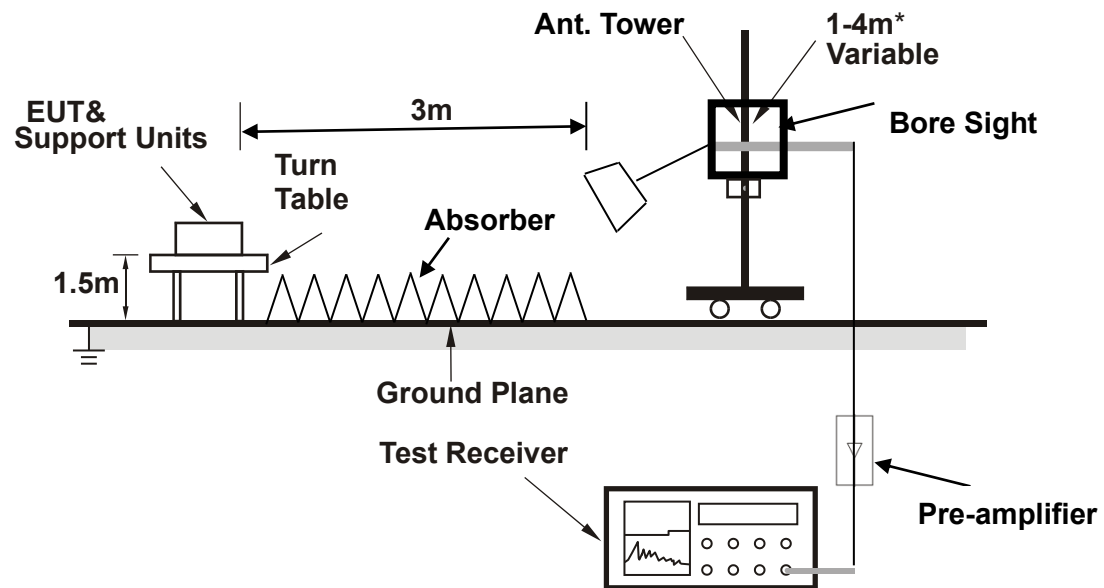




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Test Report No.: W7L-240204W001RF02

<Frequency Range above 1GHz>



**Note:** Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

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



## 3.6.5 TEST RESULTS

NOTE : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

## BELOW 1GHz WORST-CASE DATA

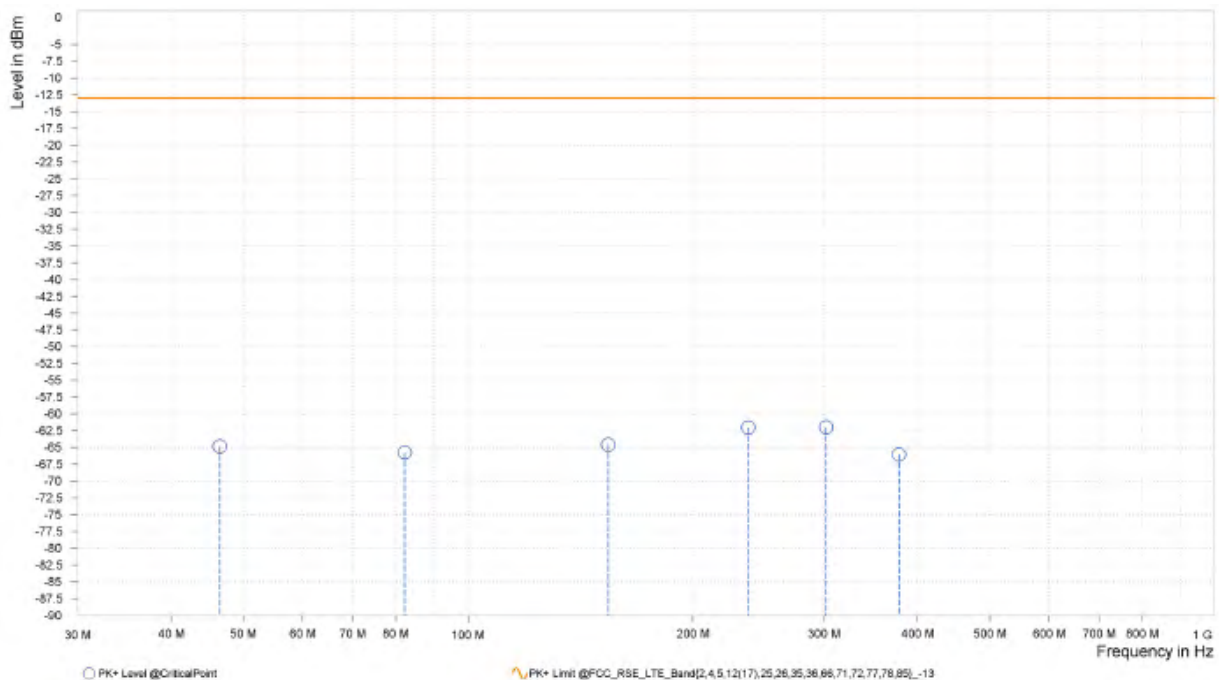
30 MHz – 1GHz data:

NB-IOT LTE Band25:

CHANNEL BANDWIDTH: QPSK

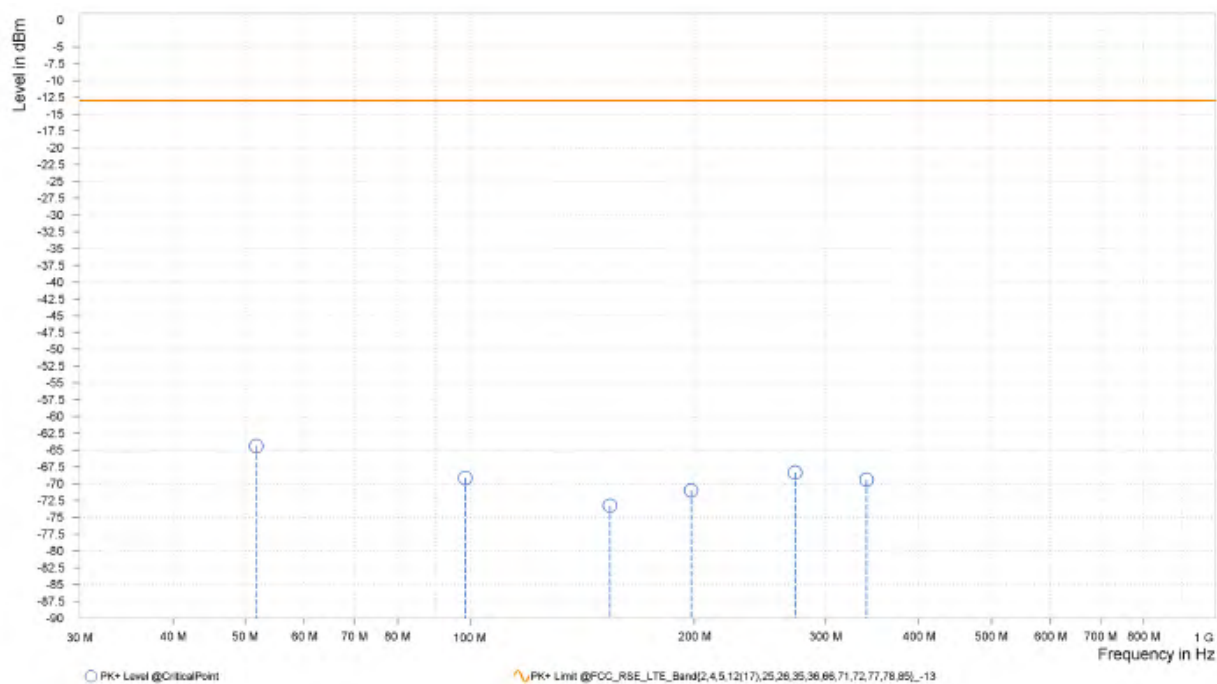
|                                                     |                  |                 |               |
|-----------------------------------------------------|------------------|-----------------|---------------|
| MODE                                                | TX channel 26688 | FREQUENCY RANGE | Below 1000MHz |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                           | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 1  | 46.500          | -64.84          | -13.00          | 51.84           | 2.98            | H            | 236.2         | 1.00               |
| 1  | 82.300          | -65.74          | -13.00          | 52.74           | -3.44           | H            | 135.8         | 1.00               |
| 1  | 154.000         | -64.57          | -13.00          | 51.57           | -5.49           | H            | 123.8         | 2.00               |
| 1  | 237.400         | -62.05          | -13.00          | 49.05           | 2.46            | H            | 236.2         | 1.00               |
| 1  | 301.650         | -62.00          | -13.00          | 49.00           | 5.43            | H            | 236.2         | 1.00               |
| 1  | 377.850         | -66.03          | -13.00          | 53.03           | 6.94            | H            | 225.5         | 2.00               |



|                                                   |                  |                 |               |
|---------------------------------------------------|------------------|-----------------|---------------|
| MODE                                              | TX channel 26688 | FREQUENCY RANGE | Below 1000MHz |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                         | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 1  | 51.750          | -64.36          | -13.00          | 51.36           | 5.29            | V            | 133.4         | 1.00               |
| 1  | 98.650          | -69.15          | -13.00          | 56.15           | 4.92            | V            | 359           | 2.00               |
| 1  | 154.150         | -73.24          | -13.00          | 60.24           | -2.42           | V            | 4.5           | 1.00               |
| 1  | 198.000         | -70.98          | -13.00          | 57.98           | 1.59            | V            | 236.2         | 1.00               |
| 1  | 272.800         | -68.31          | -13.00          | 55.31           | 2.89            | V            | 236.2         | 1.00               |
| 1  | 340.250         | -69.40          | -13.00          | 56.40           | 5.72            | V            | 183.7         | 2.00               |







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Test Report No.: W7L-240204W001RF02

## ABOVE 1GHz DATA

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

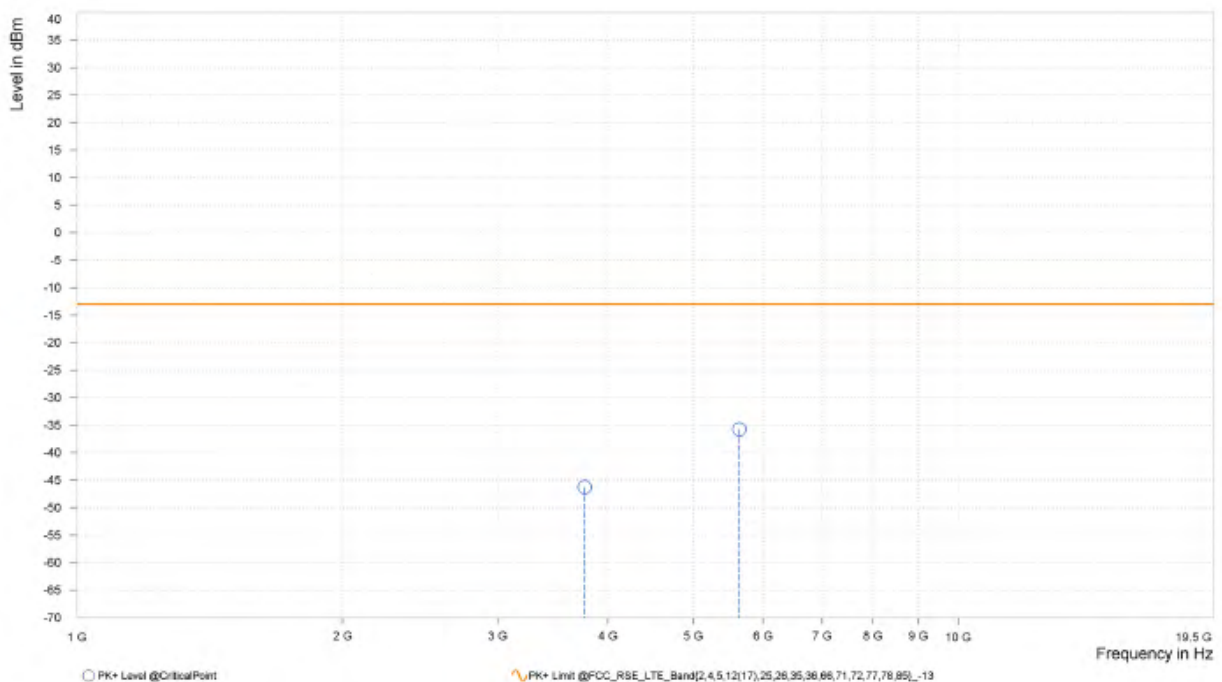
## WORST-CASE DATA

CAT-M LTE Band 25

CHANNEL BANDWIDTH: 1.4MHz / QPSK

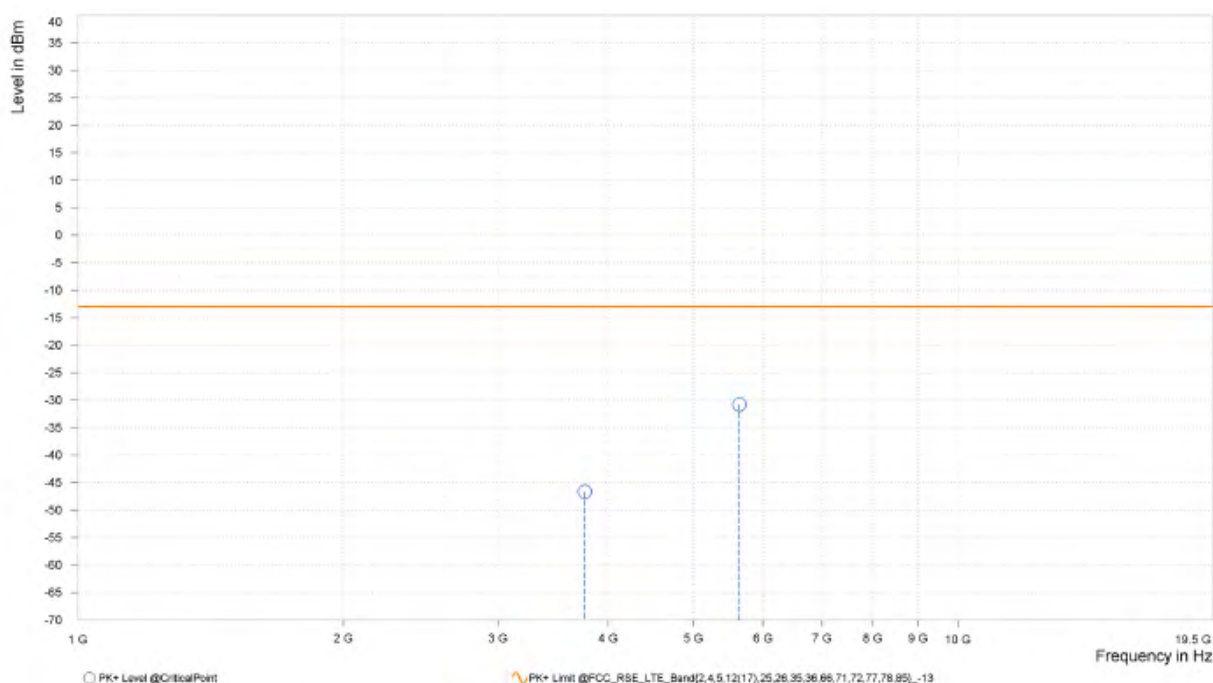
|                                                     |                  |                 |               |
|-----------------------------------------------------|------------------|-----------------|---------------|
| MODE                                                | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                           | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,763.740       | -46.28          | -13.00          | 33.28           | 15.48           | H            | 1             | 2.00               |
| 2  | 5,642.000       | -35.74          | -13.00          | 22.74           | 18.58           | H            | 327.1         | 1.00               |



|                                                   |                  |                 |               |
|---------------------------------------------------|------------------|-----------------|---------------|
| MODE                                              | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                         | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,763.740       | -46.63          | -13.00          | 33.63           | 15.16           | V            | 359           | 2.00               |
| 2  | 5,642.500       | -30.80          | -13.00          | 17.80           | 18.32           | V            | 50.9          | 2.00               |





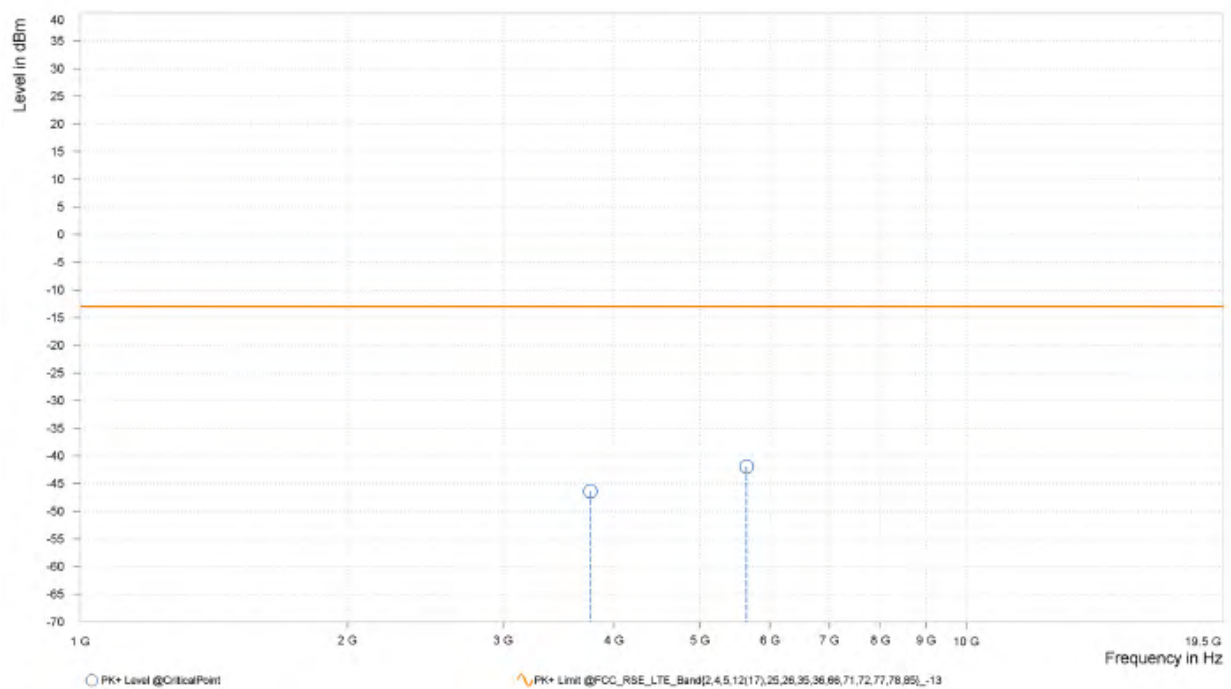
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Test Report No.: W7L-240204W001RF02

CHANNEL BANDWIDTH: 3MHz / QPSK

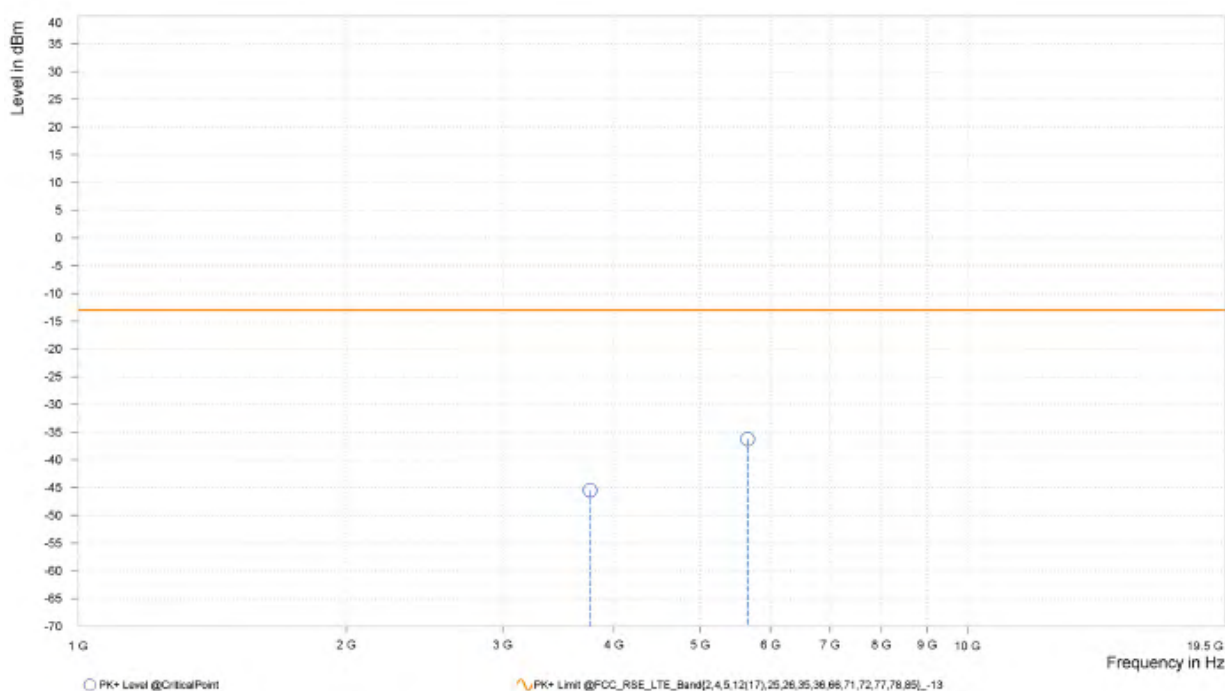
|                                                     |                  |                 |               |
|-----------------------------------------------------|------------------|-----------------|---------------|
| MODE                                                | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                           | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,762.300       | -46.38          | -13.00          | 33.38           | 15.47           | H            | 359           | 2.00               |
| 2  | 5,643.450       | -41.91          | -13.00          | 28.91           | 18.59           | H            | 359.1         | 1.00               |



|                                                   |                  |                 |               |
|---------------------------------------------------|------------------|-----------------|---------------|
| MODE                                              | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                         | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,762.300       | -45.49          | -13.00          | 32.49           | 15.16           | V            | 359           | 2.00               |
| 2  | 5,654.000       | -36.27          | -13.00          | 23.27           | 18.38           | V            | 304.4         | 1.00               |

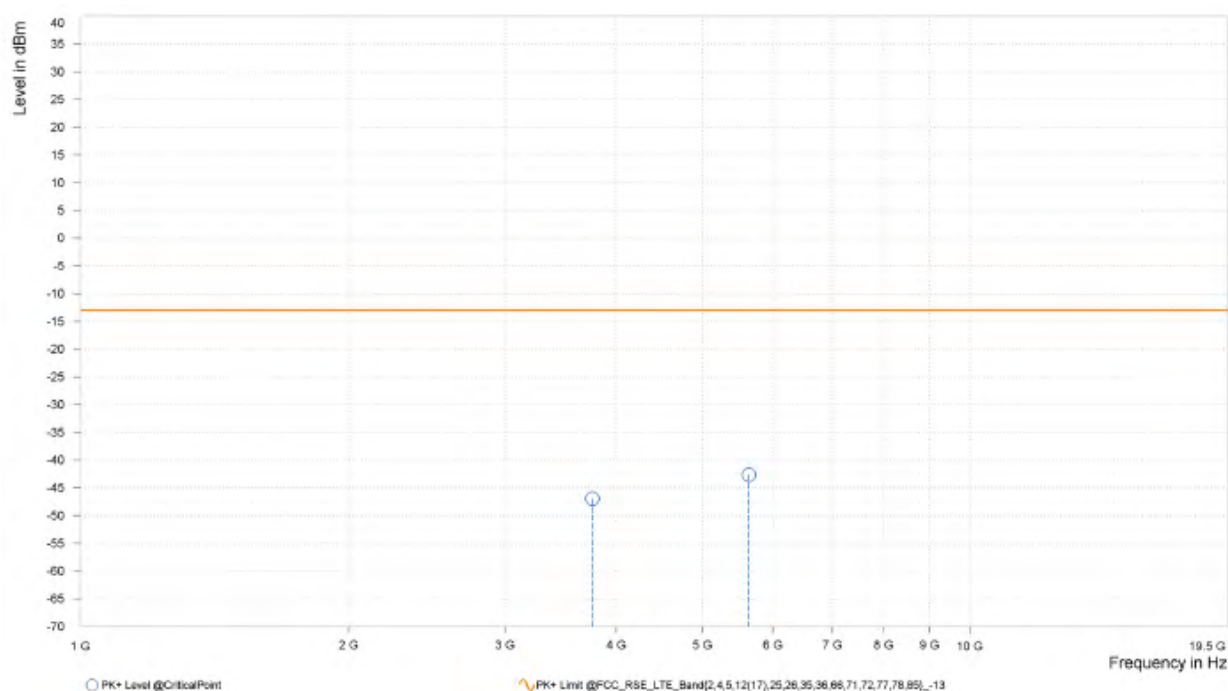


CHANNEL BANDWIDTH: 5MHz / QPSK

CH26365

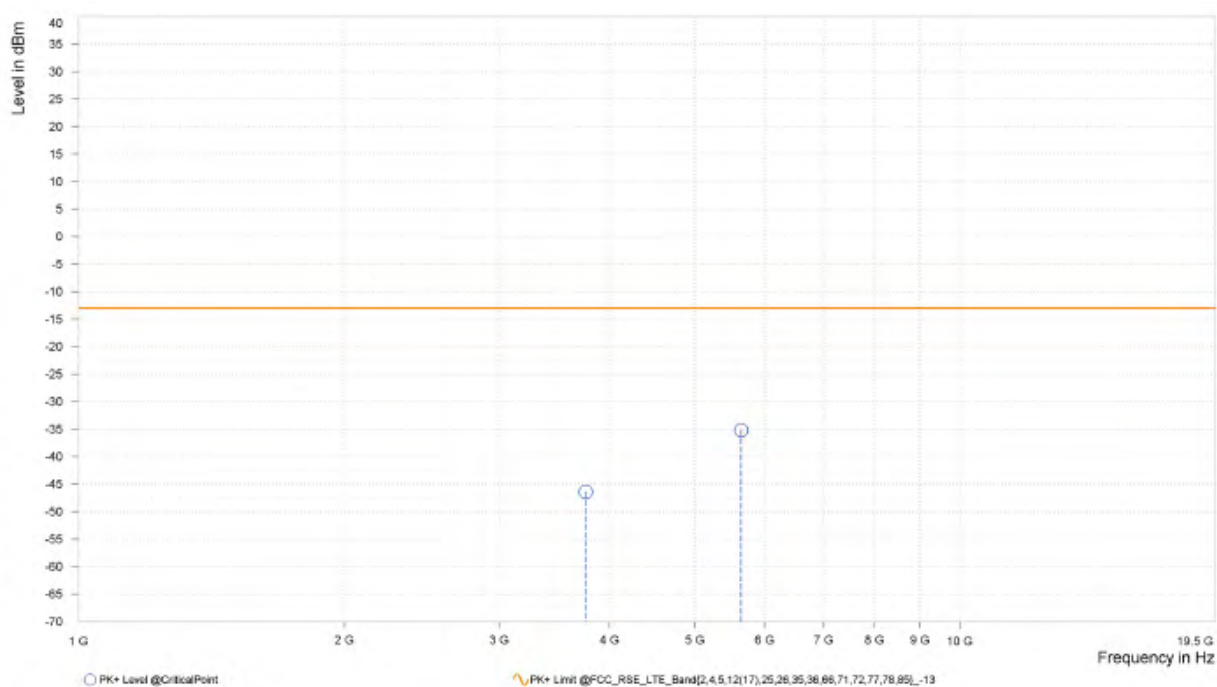
|                                                     |                  |                 |               |
|-----------------------------------------------------|------------------|-----------------|---------------|
| MODE                                                | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                           | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,760.500       | -46.92          | -13.00          | 33.92           | 15.45           | H            | 266           | 2.00               |
| 2  | 5,640.750       | -42.66          | -13.00          | 29.66           | 18.58           | H            | 359           | 2.00               |



|                                                   |                  |                 |               |
|---------------------------------------------------|------------------|-----------------|---------------|
| MODE                                              | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                         | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,760.500       | -46.38          | -13.00          | 33.38           | 15.14           | V            | 0.9           | 2.00               |
| 2  | 5,643.500       | -35.19          | -13.00          | 22.19           | 18.33           | V            | 359           | 1.00               |

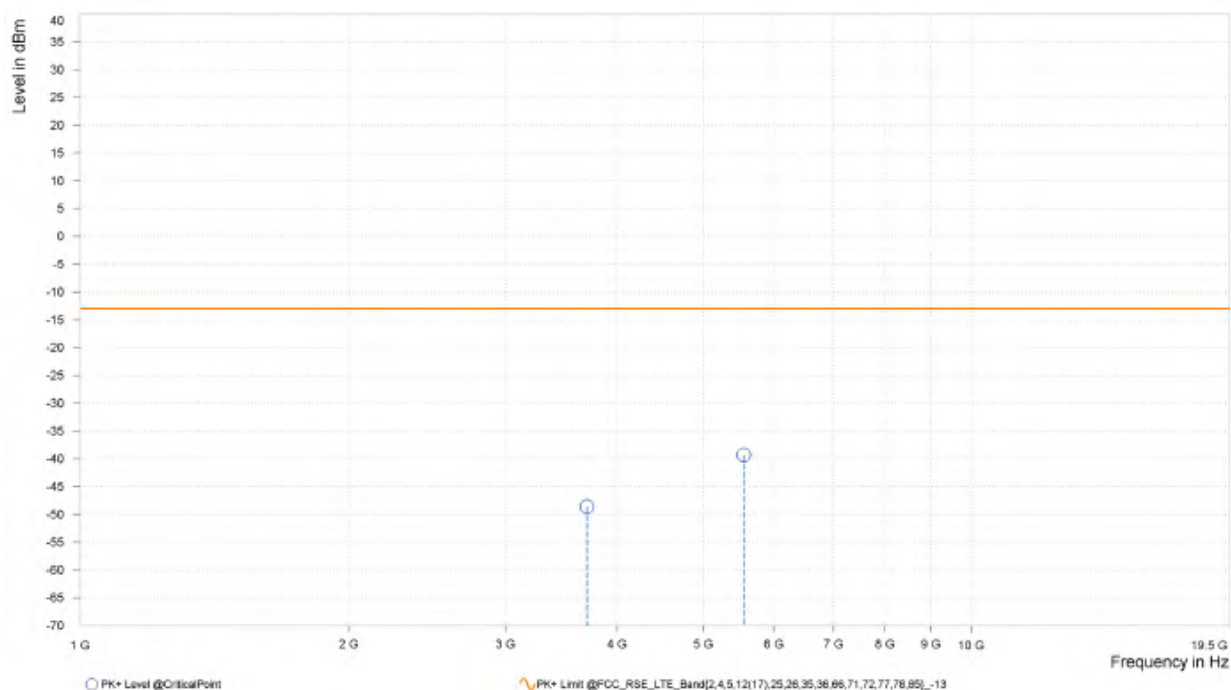


CHANNEL BANDWIDTH: 10MHz / QPSK

CH26090

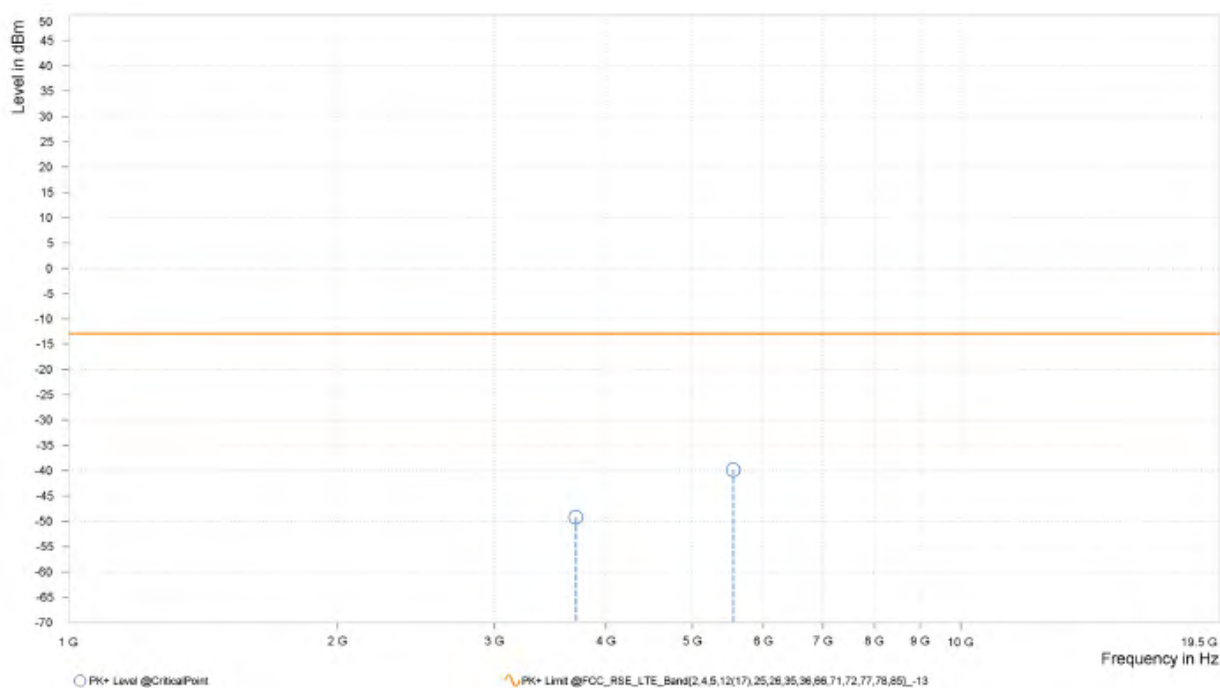
|                                                     |                  |                 |               |
|-----------------------------------------------------|------------------|-----------------|---------------|
| MODE                                                | TX channel 26090 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                           | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,701.000       | -48.61          | -13.00          | 35.61           | 14.88           | H            | 1             | 1.00               |
| 2  | 5,554.000       | -39.32          | -13.00          | 26.32           | 18.31           | H            | 273.3         | 1.00               |



|                                                   |                  |                 |               |
|---------------------------------------------------|------------------|-----------------|---------------|
| MODE                                              | TX channel 26090 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                         | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |               |

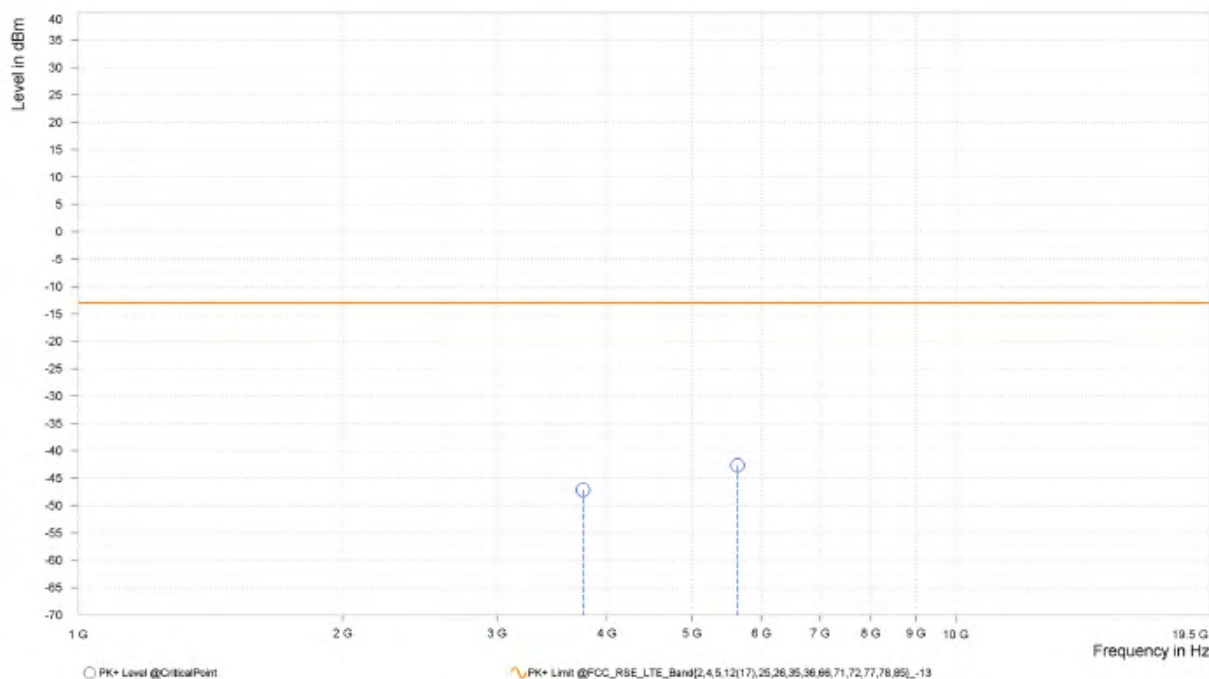
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,701.000       | -49.21          | -13.00          | 36.21           | 14.70           | V            | 91.7          | 1.00               |
| 2  | 5,554.500       | -39.83          | -13.00          | 26.83           | 18.06           | V            | 1             | 2.00               |





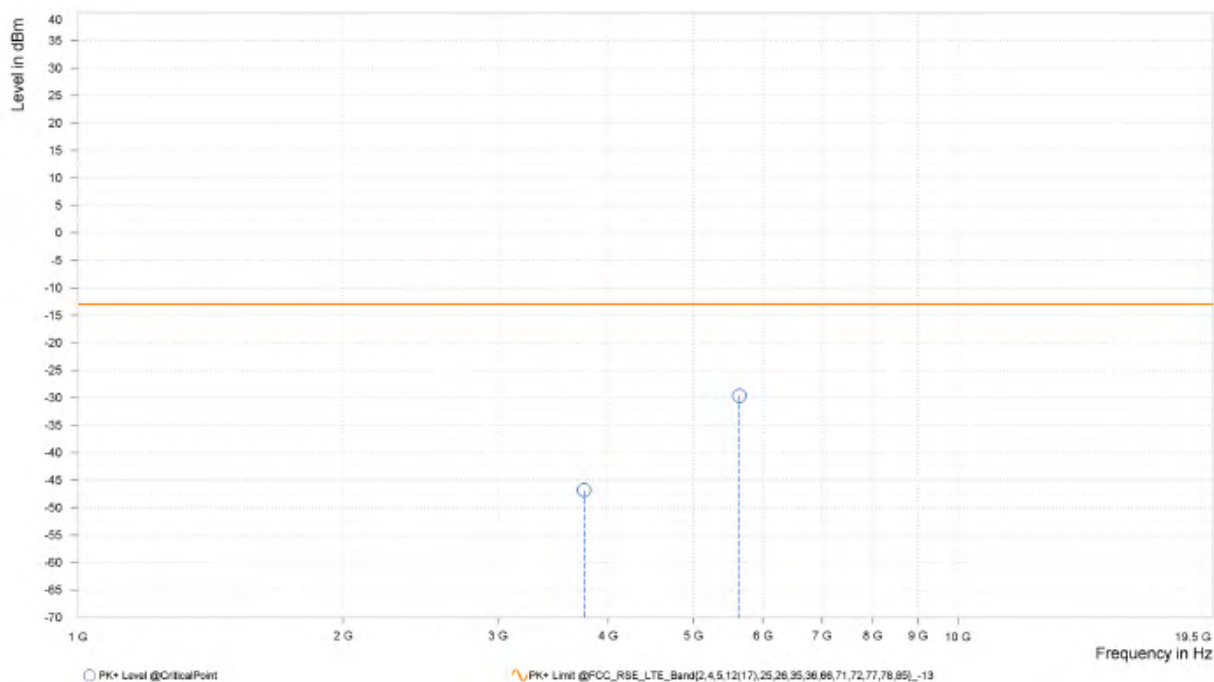
|                                                     |                  |                 |               |
|-----------------------------------------------------|------------------|-----------------|---------------|
| MODE                                                | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                           | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3.756.000       | -47.15          | -13.00          | 34.15           | 15.40           | H            | 1             | 2.00               |
| 2  | 5.634.000       | -42.69          | -13.00          | 29.69           | 18.54           | H            | 94            | 1.00               |



|                                                   |                  |                 |               |
|---------------------------------------------------|------------------|-----------------|---------------|
| MODE                                              | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                         | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,756.000       | -46.85          | -13.00          | 33.85           | 15.10           | V            | 0.9           | 2.00               |
| 2  | 5,642.500       | -29.63          | -13.00          | 16.63           | 18.32           | V            | 359           | 2.00               |





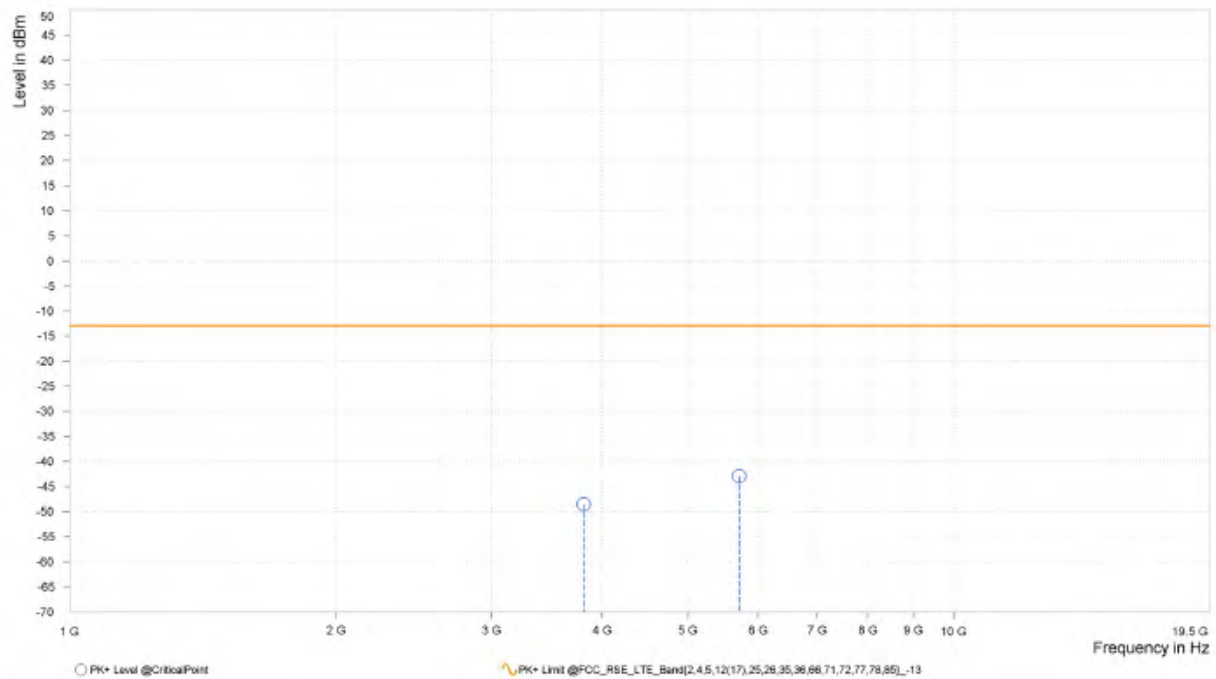
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Test Report No.: W7L-240204W001RF02

CH26640

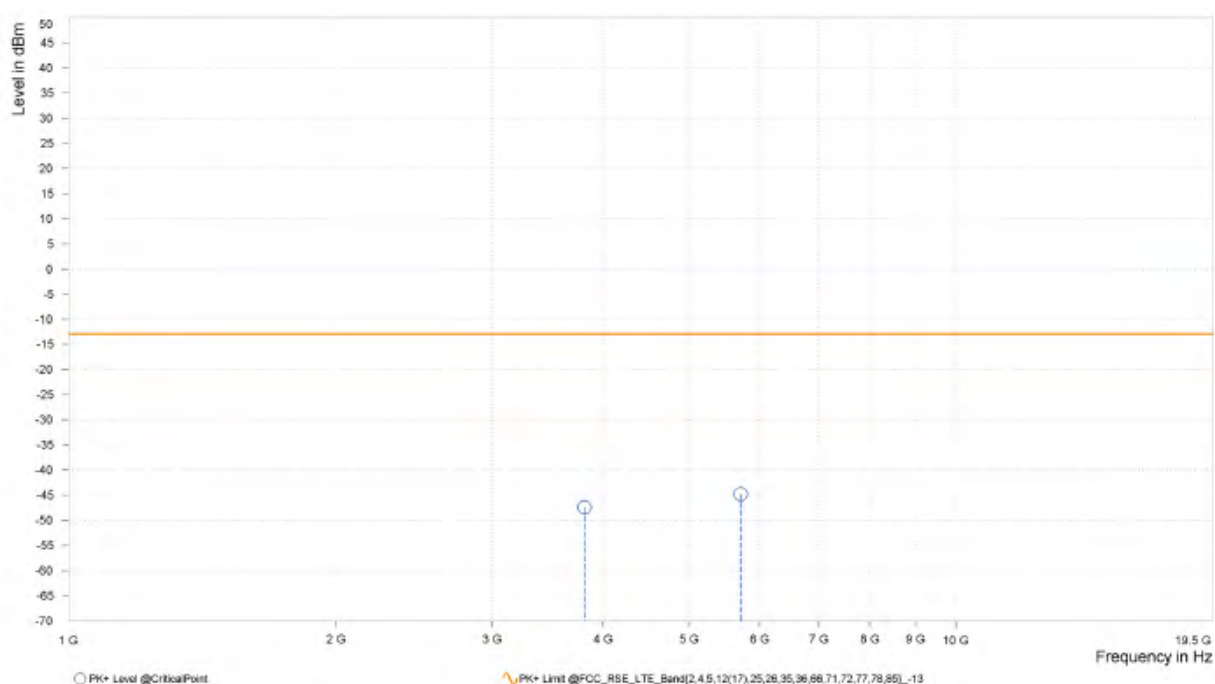
|                                                     |                  |                 |               |
|-----------------------------------------------------|------------------|-----------------|---------------|
| MODE                                                | TX channel 26640 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                           | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,811.000       | -48.52          | -13.00          | 35.52           | 15.84           | H            | 359           | 2.00               |
| 2  | 5,716.500       | -42.93          | -13.00          | 29.93           | 18.93           | H            | 359           | 2.00               |



|                                                   |                  |                 |               |
|---------------------------------------------------|------------------|-----------------|---------------|
| MODE                                              | TX channel 26640 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                         | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |               |

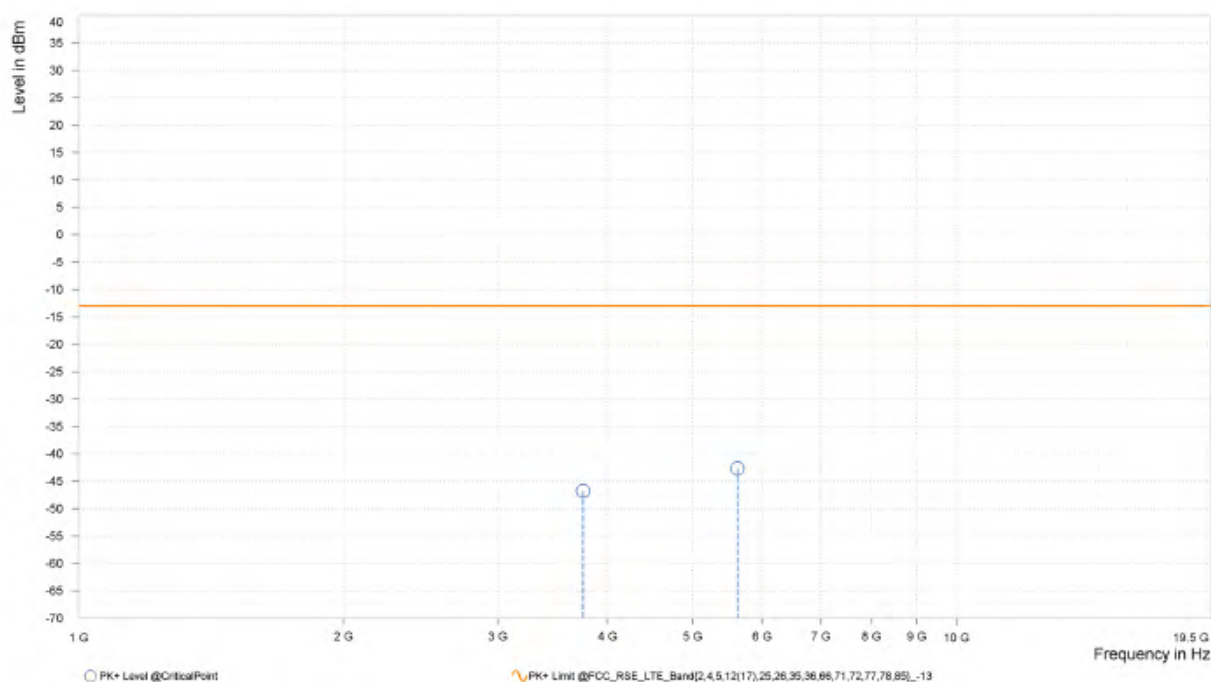
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,811.000       | -47.40          | -13.00          | 34.40           | 15.54           | V            | 359           | 2.00               |
| 2  | 5,716.500       | -44.76          | -13.00          | 31.76           | 18.67           | V            | 1             | 1.00               |



CHANNEL BANDWIDTH: 15MHz / QPSK

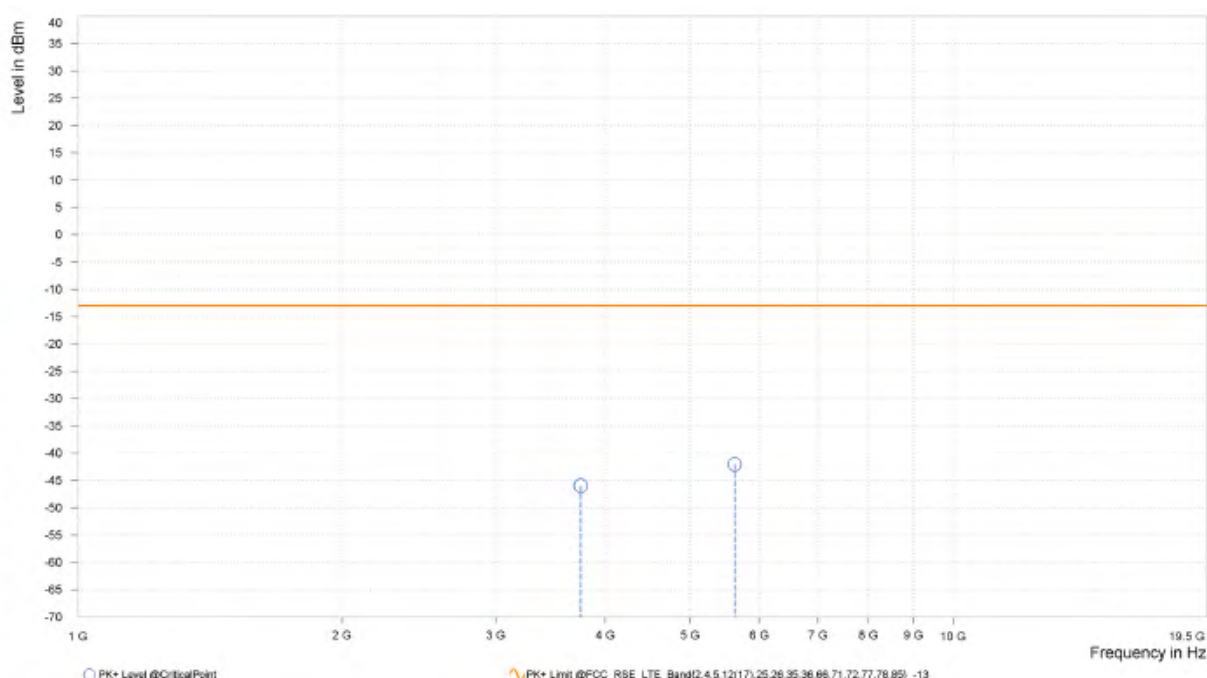
|                                                     |                  |                 |               |
|-----------------------------------------------------|------------------|-----------------|---------------|
| MODE                                                | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                           | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,751.500       | -46.78          | -13.00          | 33.78           | 15.35           | H            | 359           | 2.00               |
| 2  | 5,627.250       | -42.68          | -13.00          | 29.68           | 18.50           | H            | 359           | 2.00               |



|                                                   |                  |                 |               |
|---------------------------------------------------|------------------|-----------------|---------------|
| MODE                                              | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                         | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |               |

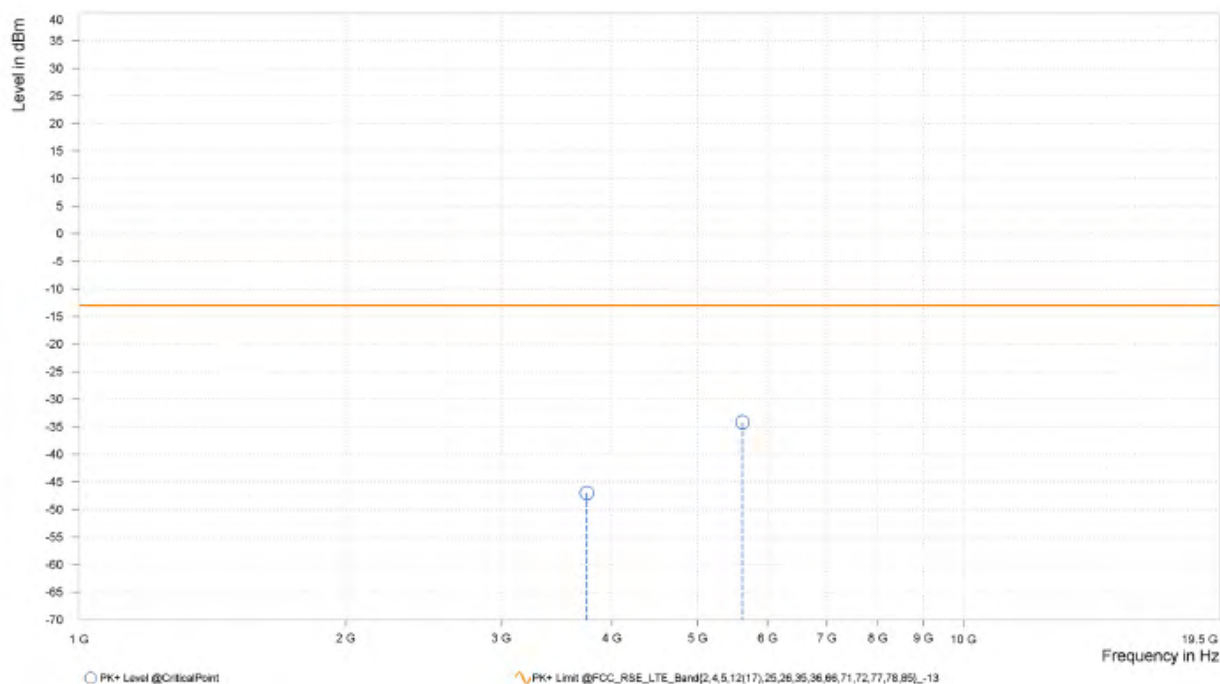
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,751.500       | -45.96          | -13.00          | 32.96           | 15.05           | V            | 0.9           | 2.00               |
| 2  | 5,627.250       | -42.04          | -13.00          | 29.04           | 18.24           | V            | 80.8          | 2.00               |



CHANNEL BANDWIDTH: 20MHz / QPSK

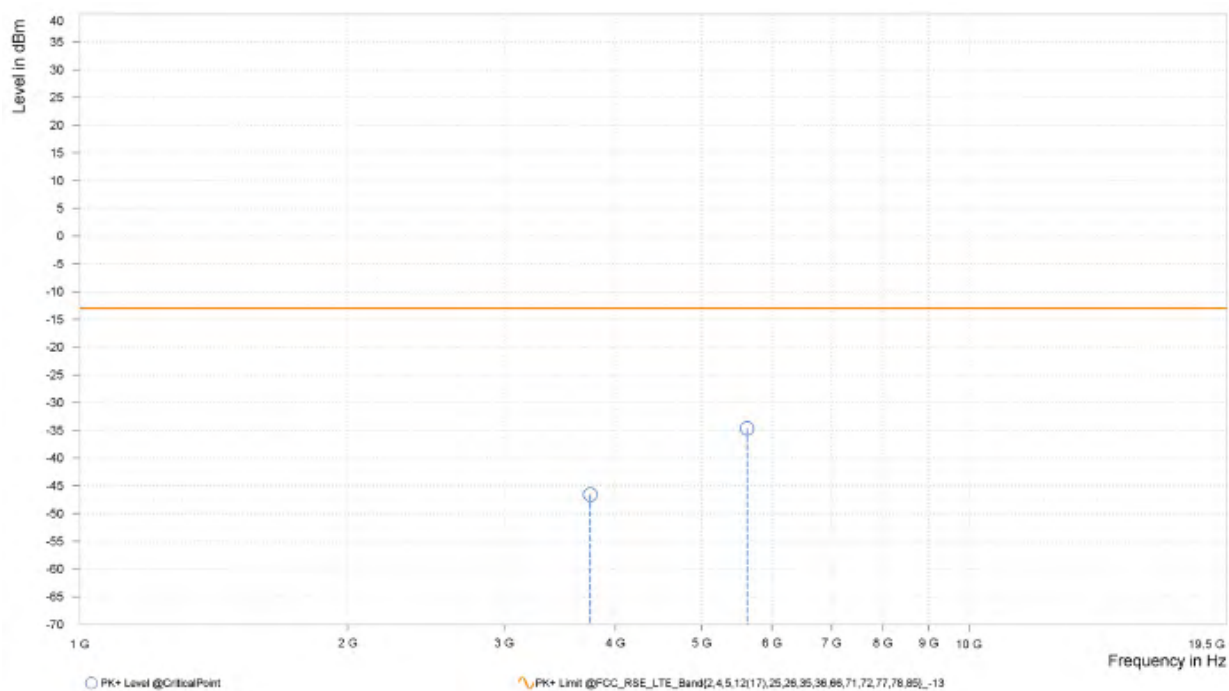
|                                                     |                  |                 |               |
|-----------------------------------------------------|------------------|-----------------|---------------|
| MODE                                                | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                           | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,747.000       | -46.98          | -13.00          | 33.98           | 15.29           | H            | 0.9           | 2.00               |
| 2  | 5,623.000       | -34.19          | -13.00          | 21.19           | 18.48           | H            | 79.6          | 2.00               |



|                                                   |                  |                 |               |
|---------------------------------------------------|------------------|-----------------|---------------|
| MODE                                              | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                         | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,747.000       | -46.57          | -13.00          | 33.57           | 15.01           | V            | 359.1         | 1.00               |
| 2  | 5,624.500       | -34.66          | -13.00          | 21.66           | 18.23           | V            | 359           | 2.00               |



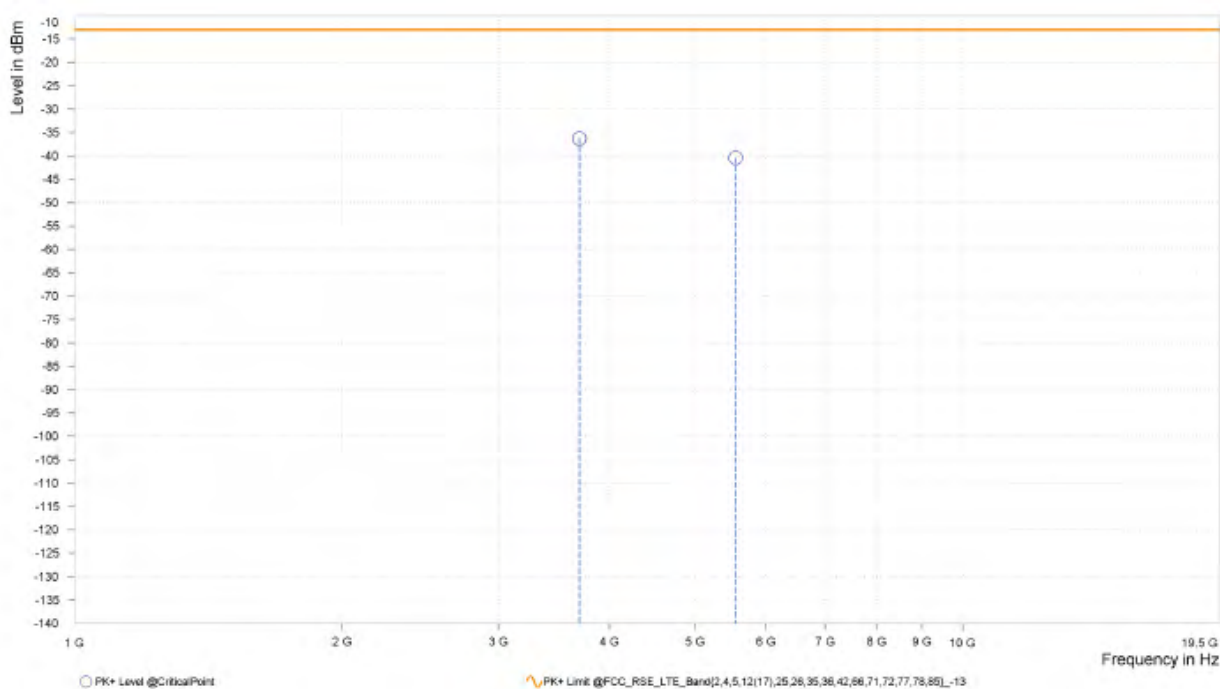


NB-IOT LTE Band 25

CHANNEL BANDWIDTH: QPSK

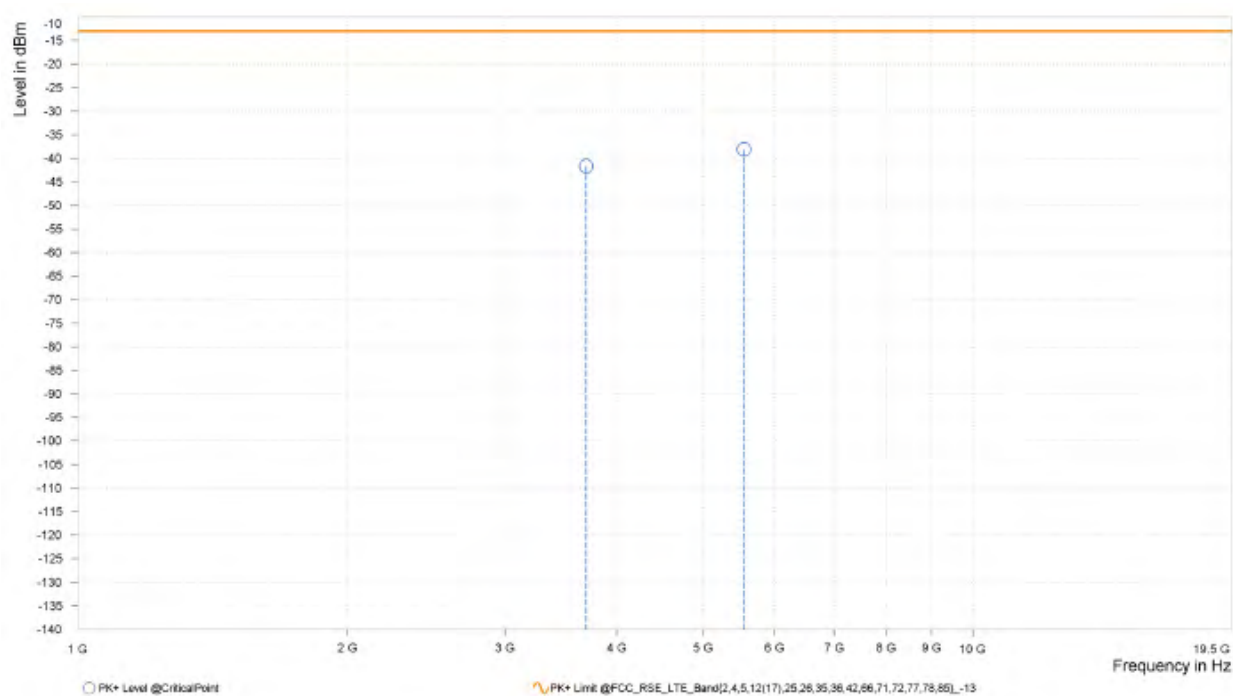
|                                                     |                  |                 |               |
|-----------------------------------------------------|------------------|-----------------|---------------|
| MODE                                                | TX channel 26042 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                           | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 4  | 3,701.000       | -36.27          | -13.00          | 23.27           | 30.20           | H            | 40.2          | 2.00               |
| 4  | 5,550.000       | -40.42          | -13.00          | 27.42           | 33.46           | H            | 1             | 1.00               |



|                                                   |                  |                 |               |
|---------------------------------------------------|------------------|-----------------|---------------|
| MODE                                              | TX channel 26042 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                         | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 4  | 3,700.000       | -41.68          | -13.00          | 28.68           | 30.80           | V            | 359           | 2.00               |
| 4  | 5,550.000       | -38.12          | -13.00          | 25.12           | 34.15           | V            | 206.6         | 2.00               |





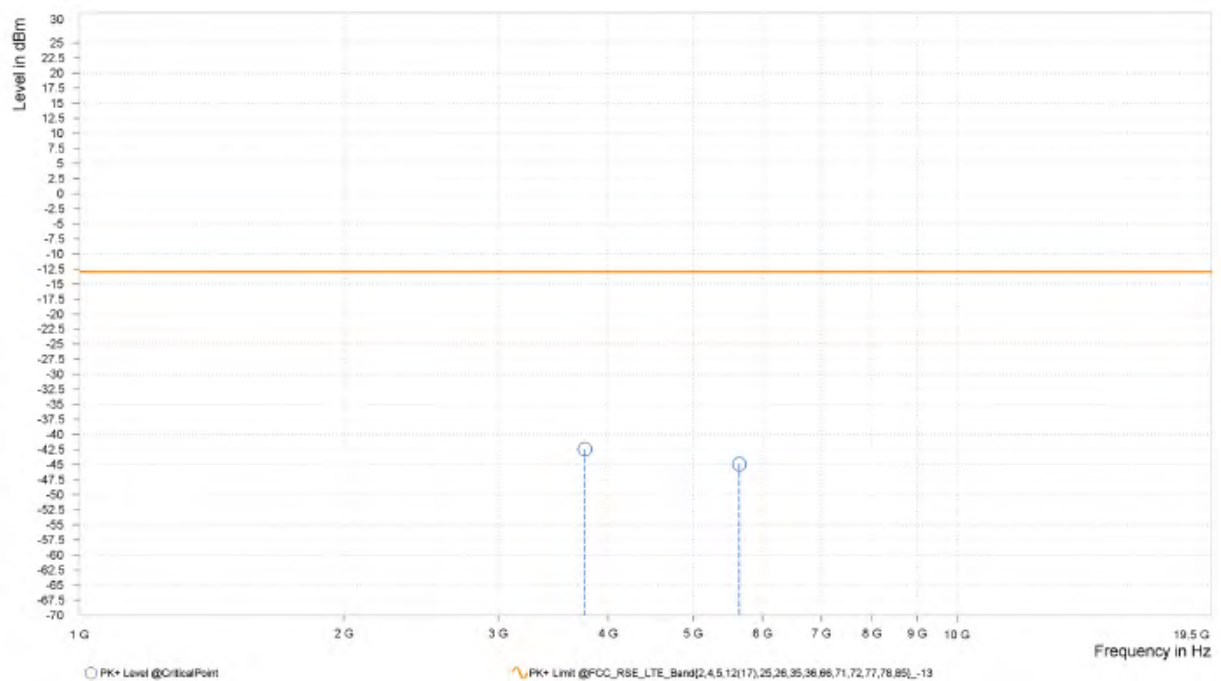
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CHANNEL BANDWIDTH: QPSK

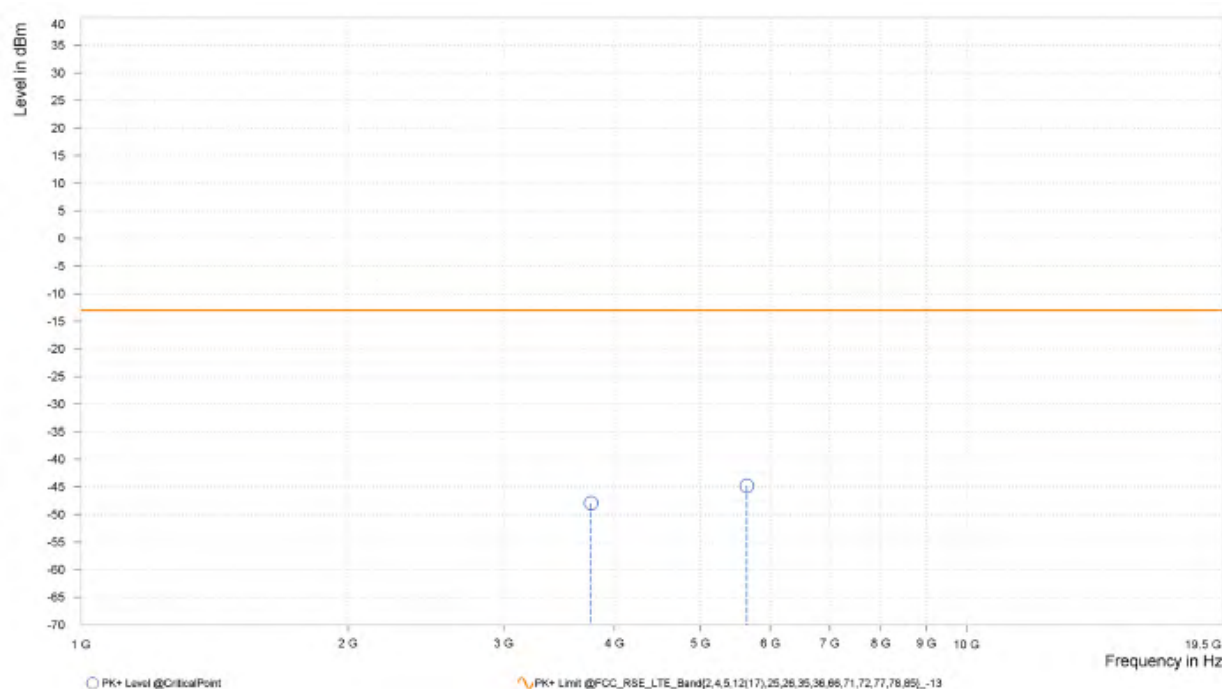
|                                                     |                  |                 |               |
|-----------------------------------------------------|------------------|-----------------|---------------|
| MODE                                                | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                           | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,765.000       | -42.44          | -13.00          | 29.44           | 15.50           | H            | 279.3         | 1.00               |
| 2  | 5,647.500       | -44.93          | -13.00          | 31.93           | 18.61           | H            | 1             | 2.00               |



|                                                   |                  |                 |               |
|---------------------------------------------------|------------------|-----------------|---------------|
| MODE                                              | TX channel 26365 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                         | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 2  | 3,765.000       | -47.94          | -13.00          | 34.94           | 15.18           | V            | 359           | 2.00               |
| 2  | 5,647.500       | -44.80          | -13.00          | 31.80           | 18.35           | V            | 267.2         | 2.00               |

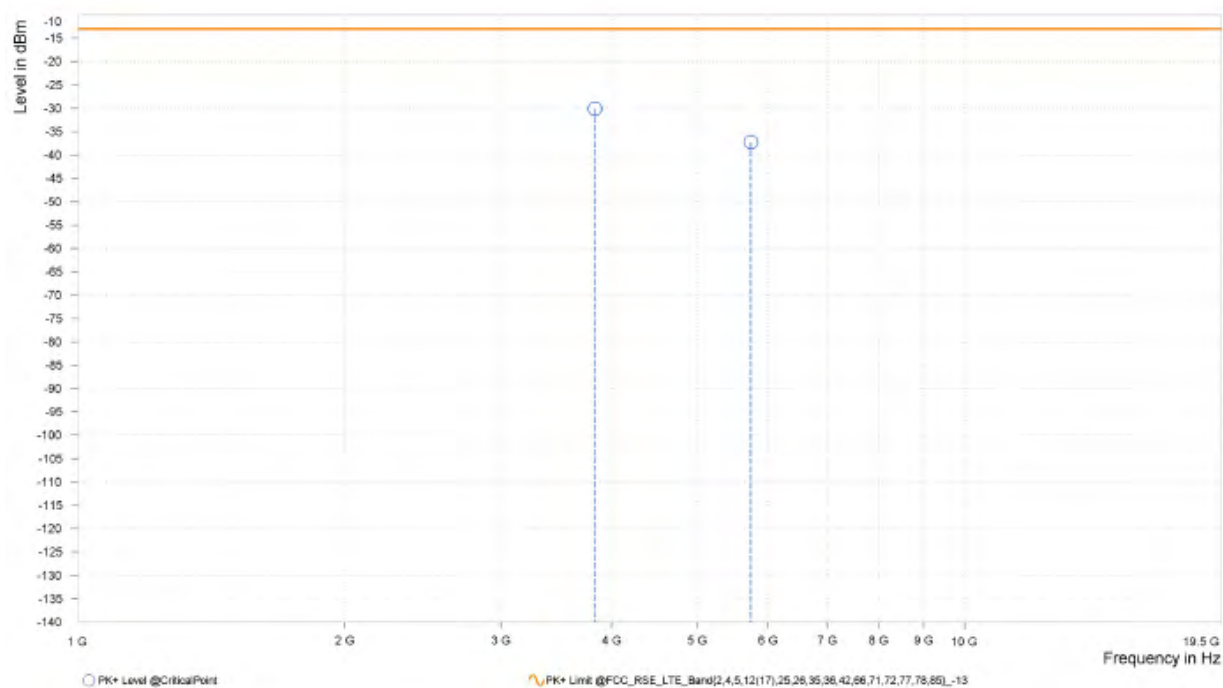


CHANNEL BANDWIDTH: QPSK

CH 26688

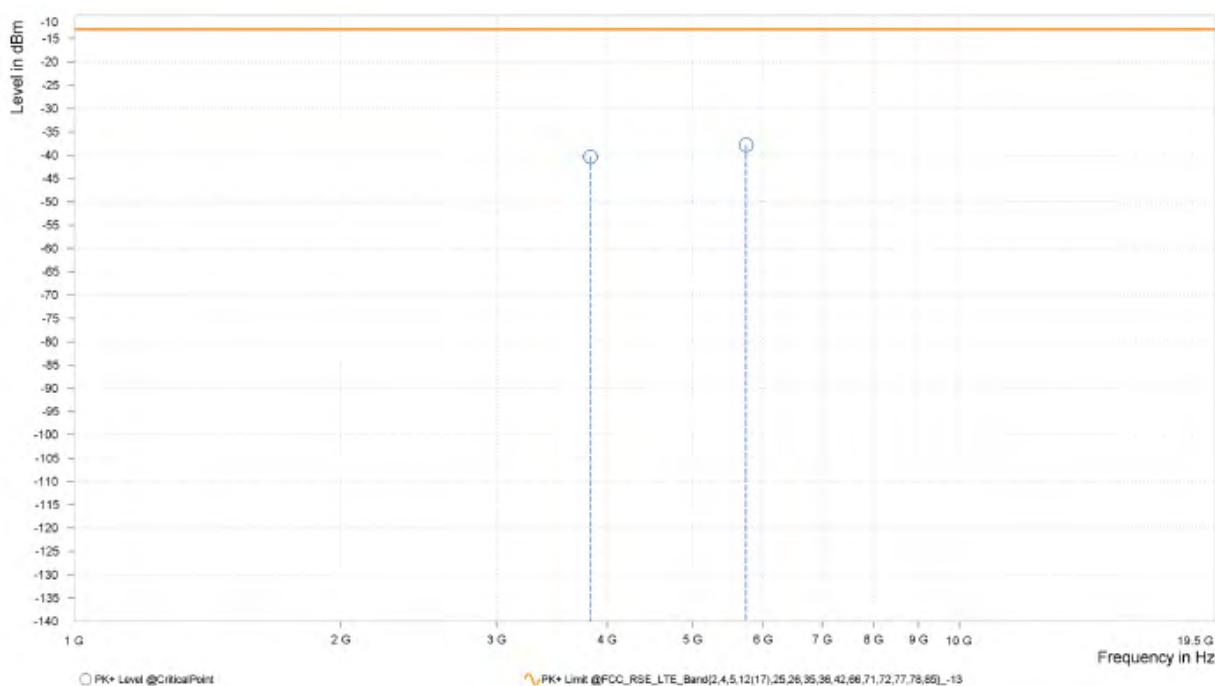
|                                                     |                  |                 |               |
|-----------------------------------------------------|------------------|-----------------|---------------|
| MODE                                                | TX channel 26688 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                            | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                           | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 4  | 3,829.800       | -30.09          | -13.00          | 17.09           | 31.26           | H            | 41.5          | 2.00               |
| 4  | 5,744.700       | -37.25          | -13.00          | 24.25           | 34.14           | H            | 41.5          | 2.00               |



|                                                   |                  |                 |               |
|---------------------------------------------------|------------------|-----------------|---------------|
| MODE                                              | TX channel 26688 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS                          | 23deg. C, 70%RH  | INPUT POWER     | 120Vac 60HZ   |
| TESTED BY                                         | Hanwen Xu        |                 |               |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |               |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|----|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|---------------|--------------------|
| 4  | 3,829.800       | -40.33          | -13.00          | 27.33           | 31.61           | V            | 206.5         | 2.00               |
| 4  | 5,744.700       | -37.85          | -13.00          | 24.85           | 34.61           | V            | 52.3          | 2.00               |

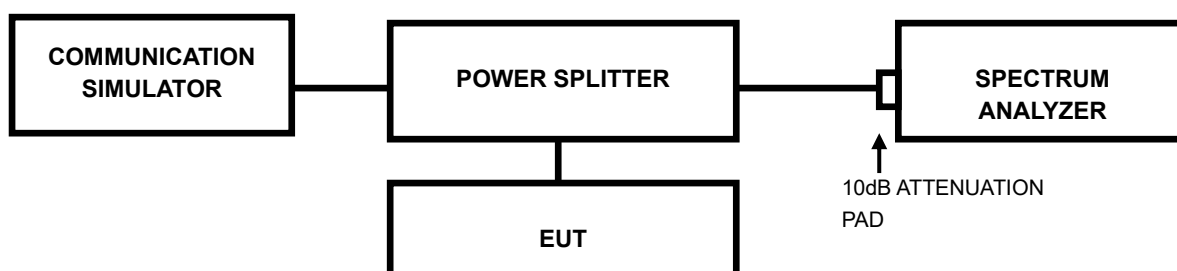


### 3.7 PEAK TO AVERAGE RATIO

#### 3.7.1 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

#### 3.7.2 TEST SETUP



#### 3.7.3 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%.



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### 3.7.4 TEST RESULTS

Please Refer to Appendix Of this test report.





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## 4 INFORMATION ON THE TESTING LABORATORIES

We, Huarui 7layers High Technology (Suzhou) Co., Ltd. ,were founded in 2020 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:

**Suzhou EMC/RF Lab:**

Tel: +86 (0557) 368 1008



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## **5 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.

## 6 Appendix

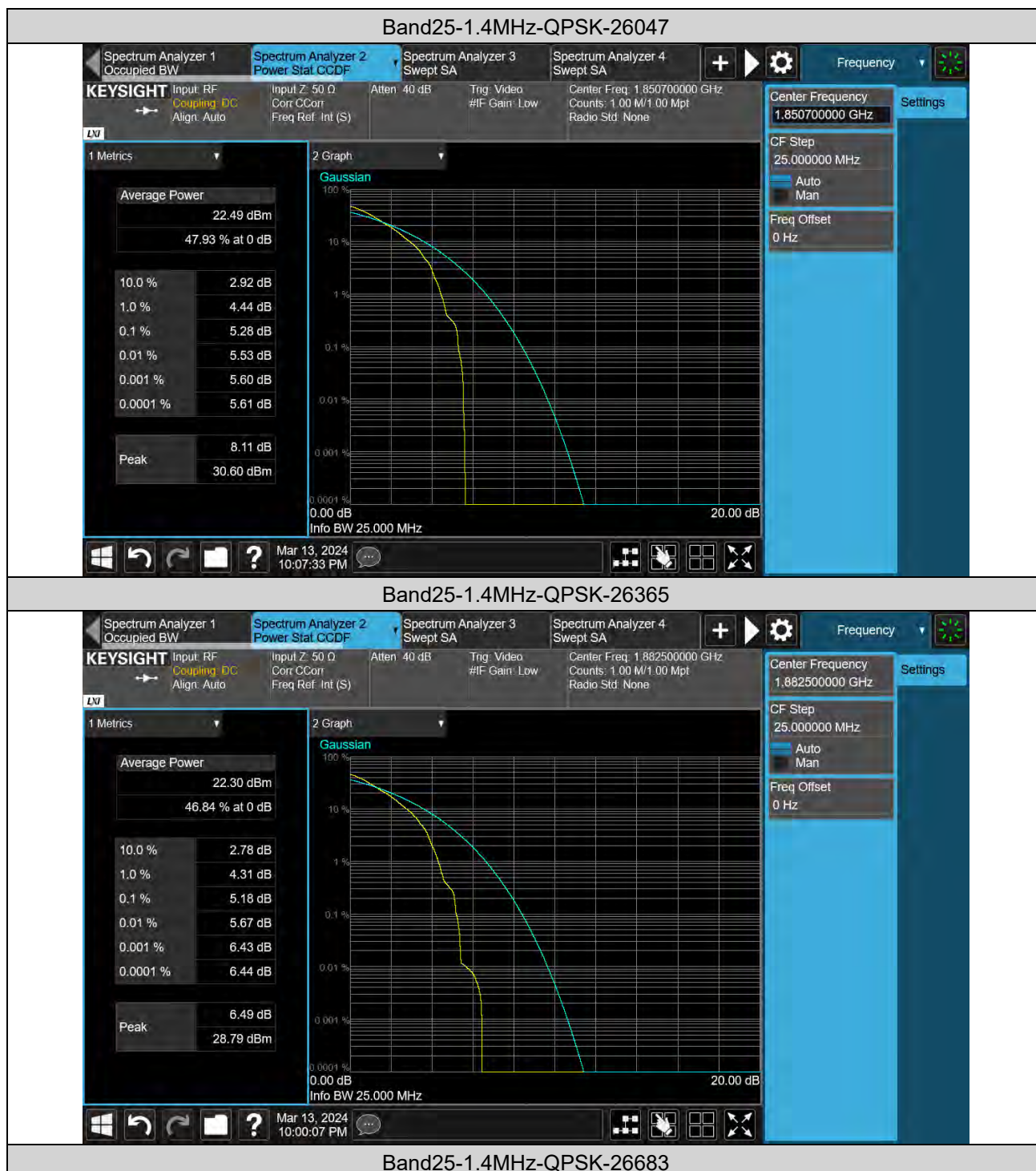
### CAT-M: LTE BAND25(INCLUDING LTE BAND2)

#### PEAK-TO-AVERAGE RATIO(CCDF)

##### Test Result

| Band   | Bandwidth | Modulation | Channel | Result(dB) | Limit(dB) | Verdict |
|--------|-----------|------------|---------|------------|-----------|---------|
| Band25 | 1.4MHz    | QPSK       | 26047   | 5.28       | 13        | PASS    |
| Band25 | 1.4MHz    | QPSK       | 26365   | 5.18       | 13        | PASS    |
| Band25 | 1.4MHz    | QPSK       | 26683   | 4.72       | 13        | PASS    |
| Band25 | 1.4MHz    | 16QAM      | 26047   | 6.24       | 13        | PASS    |
| Band25 | 1.4MHz    | 16QAM      | 26365   | 6.51       | 13        | PASS    |
| Band25 | 1.4MHz    | 16QAM      | 26683   | 6.35       | 13        | PASS    |
| Band25 | 3MHz      | QPSK       | 26055   | 4.81       | 13        | PASS    |
| Band25 | 3MHz      | QPSK       | 26365   | 5.75       | 13        | PASS    |
| Band25 | 3MHz      | QPSK       | 26675   | 4.71       | 13        | PASS    |
| Band25 | 3MHz      | 16QAM      | 26055   | 6.33       | 13        | PASS    |
| Band25 | 3MHz      | 16QAM      | 26365   | 6.60       | 13        | PASS    |
| Band25 | 3MHz      | 16QAM      | 26675   | 6.47       | 13        | PASS    |
| Band25 | 5MHz      | QPSK       | 26065   | 7.21       | 13        | PASS    |
| Band25 | 5MHz      | QPSK       | 26365   | 6.71       | 13        | PASS    |
| Band25 | 5MHz      | QPSK       | 26665   | 5.47       | 13        | PASS    |
| Band25 | 5MHz      | 16QAM      | 26065   | 6.16       | 13        | PASS    |
| Band25 | 5MHz      | 16QAM      | 26365   | 7.43       | 13        | PASS    |
| Band25 | 5MHz      | 16QAM      | 26665   | 7.00       | 13        | PASS    |
| Band25 | 10MHz     | QPSK       | 26090   | 5.60       | 13        | PASS    |
| Band25 | 10MHz     | QPSK       | 26365   | 5.33       | 13        | PASS    |
| Band25 | 10MHz     | QPSK       | 26640   | 5.60       | 13        | PASS    |
| Band25 | 10MHz     | 16QAM      | 26090   | 6.13       | 13        | PASS    |
| Band25 | 10MHz     | 16QAM      | 26365   | 6.54       | 13        | PASS    |
| Band25 | 10MHz     | 16QAM      | 26640   | 6.34       | 13        | PASS    |
| Band25 | 15MHz     | QPSK       | 26115   | 5.75       | 13        | PASS    |
| Band25 | 15MHz     | QPSK       | 26365   | 5.75       | 13        | PASS    |
| Band25 | 15MHz     | QPSK       | 26615   | 5.71       | 13        | PASS    |
| Band25 | 15MHz     | 16QAM      | 26115   | 6.42       | 13        | PASS    |
| Band25 | 15MHz     | 16QAM      | 26365   | 6.43       | 13        | PASS    |
| Band25 | 15MHz     | 16QAM      | 26615   | 6.33       | 13        | PASS    |
| Band25 | 20MHz     | QPSK       | 26140   | 5.70       | 13        | PASS    |
| Band25 | 20MHz     | QPSK       | 26365   | 5.98       | 13        | PASS    |
| Band25 | 20MHz     | QPSK       | 26590   | 5.74       | 13        | PASS    |
| Band25 | 20MHz     | 16QAM      | 26140   | 6.17       | 13        | PASS    |
| Band25 | 20MHz     | 16QAM      | 26365   | 6.43       | 13        | PASS    |
| Band25 | 20MHz     | 16QAM      | 26590   | 6.45       | 13        | PASS    |

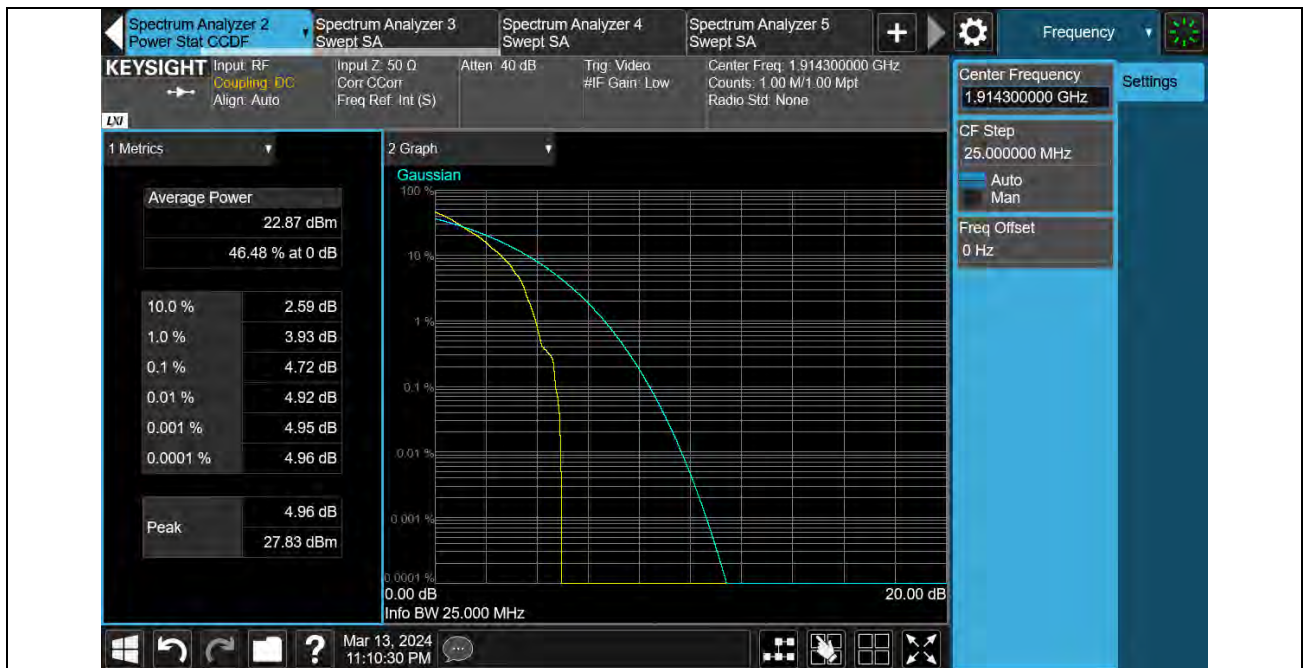
## Test Graphs





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Test Report No.: W7L-240204W001RF02



Band25-1.4MHz-16QAM-26047



Band25-1.4MHz-16QAM-26365





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Test Report No.: W7L-240204W001RF02



Band25-1.4MHz-16QAM-26683

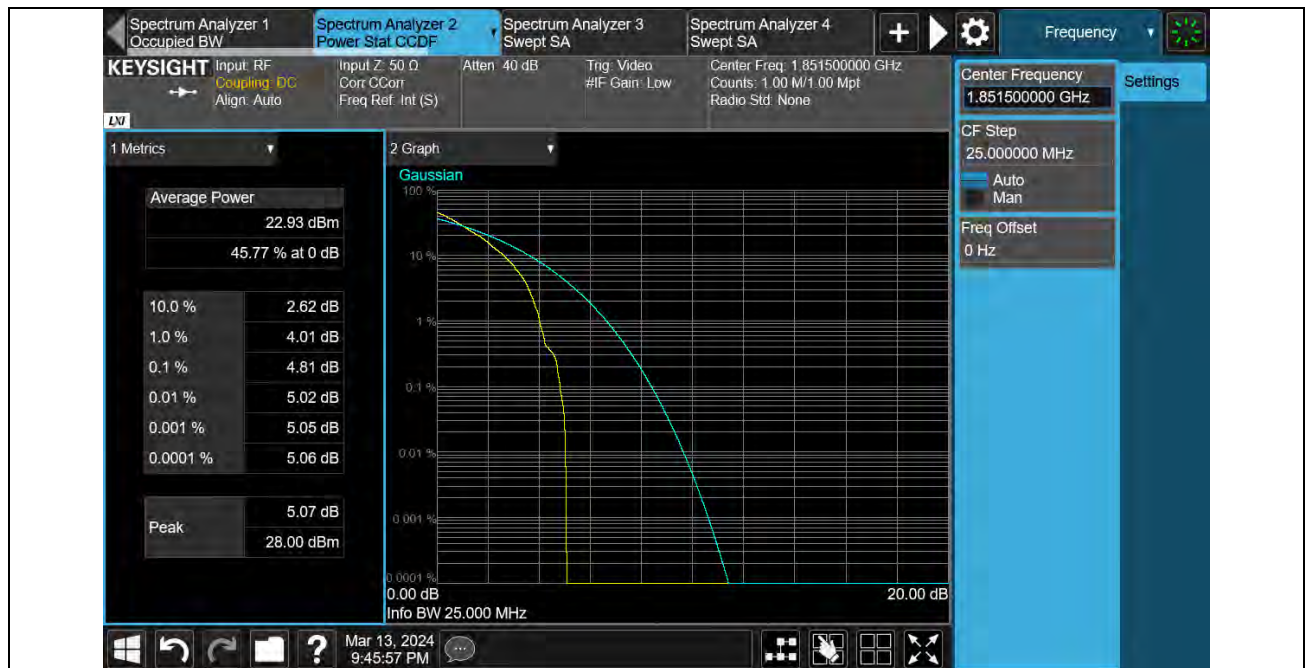


Band25-3MHz-QPSK-26055

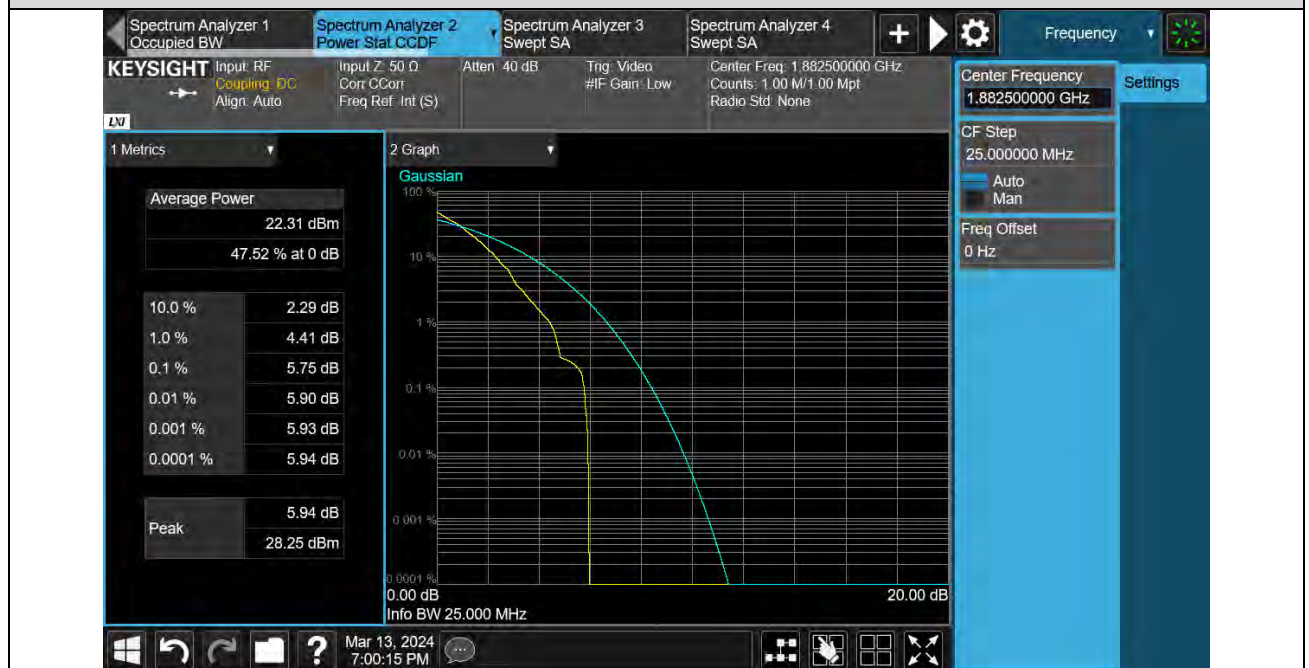


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Test Report No.: W7L-240204W001RF02



Band25-3MHz-QPSK-26365

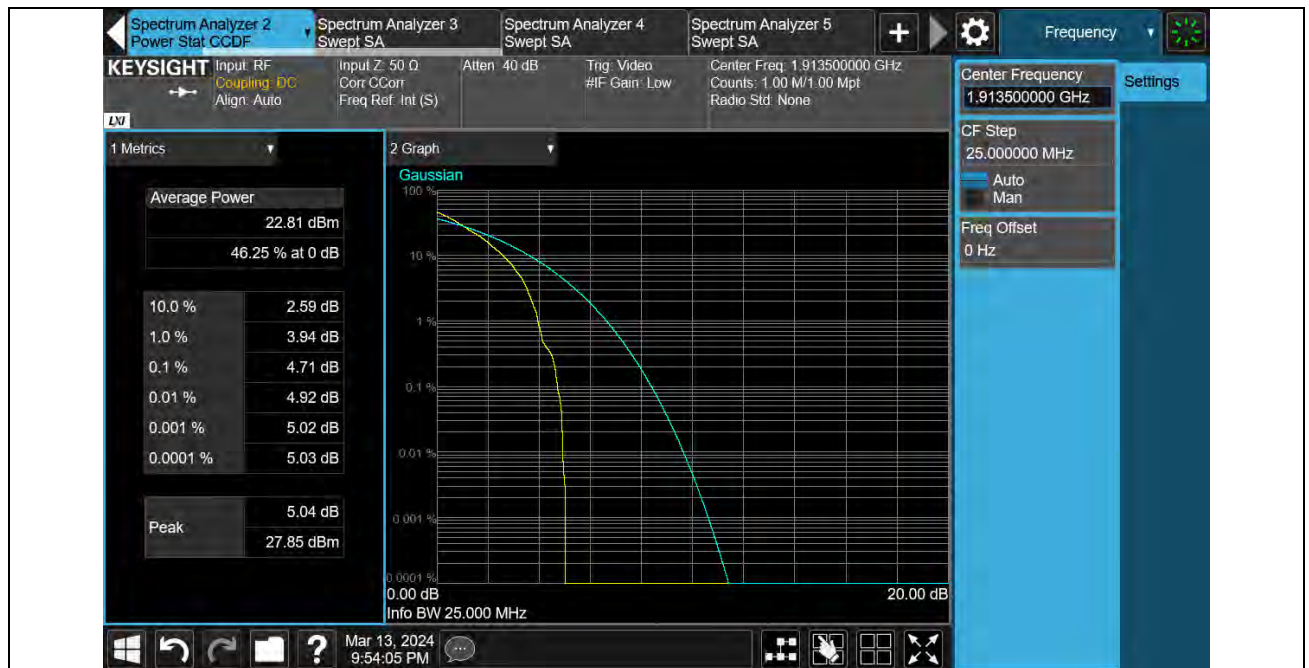


Band25-3MHz-QPSK-26675



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Band25-3MHz-16QAM-26055



Band25-3MHz-16QAM-26365





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Test Report No.: W7L-240204W001RF02



Band25-3MHz-16QAM-26675



Band25-5MHz-QPSK-26065

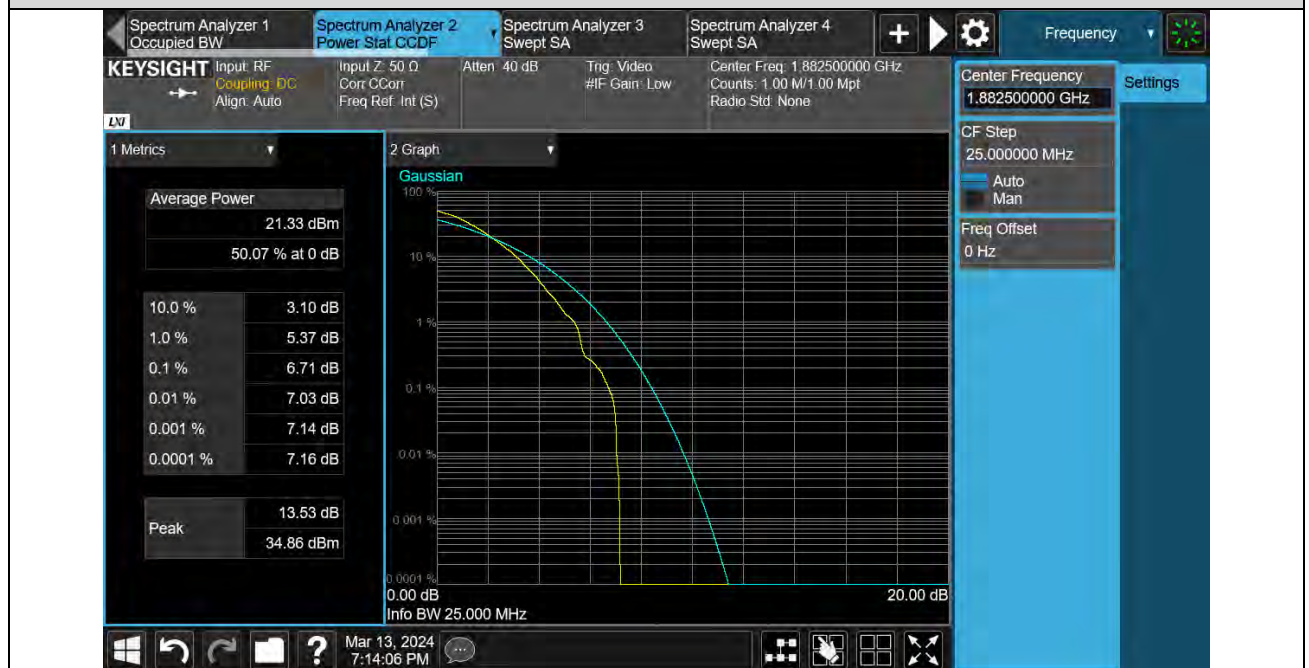


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Test Report No.: W7L-240204W001RF02



Band25-5MHz-QPSK-26365



Band25-5MHz-QPSK-26665



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Test Report No.: W7L-240204W001RF02



Band25-5MHz-16QAM-26065



Band25-5MHz-16QAM-26365





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Test Report No.: W7L-240204W001RF02



Band25-5MHz-16QAM-26665

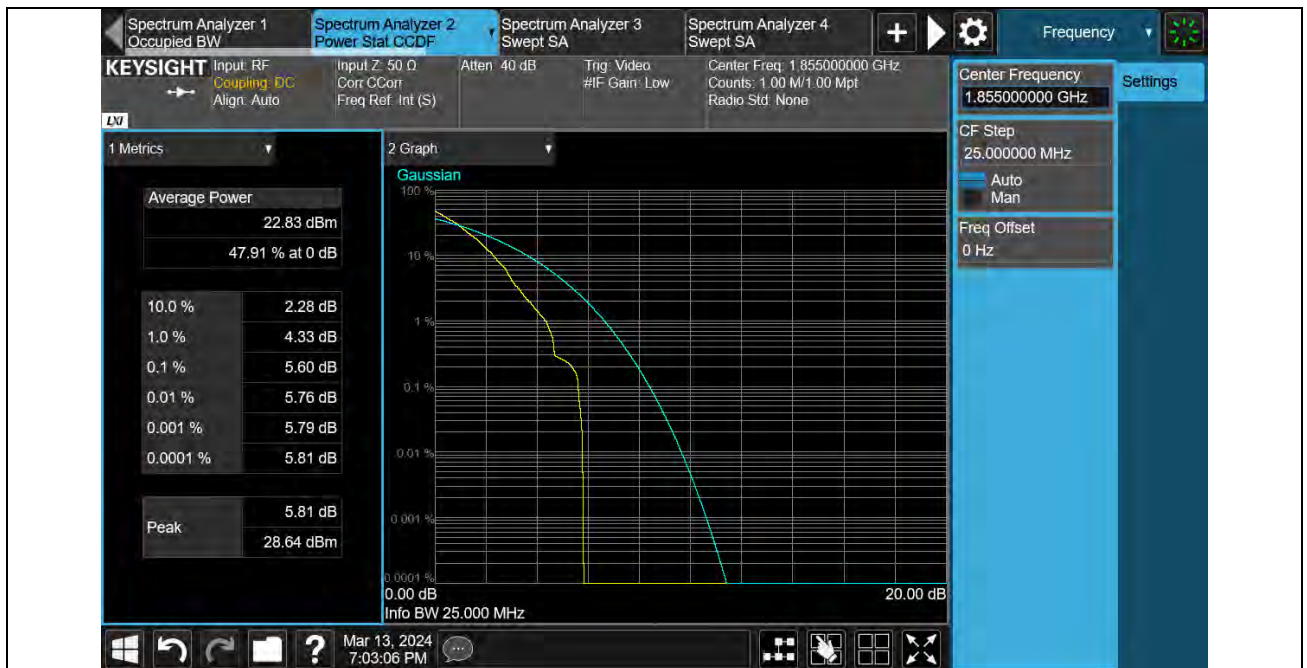


Band25-10MHz-QPSK-26090

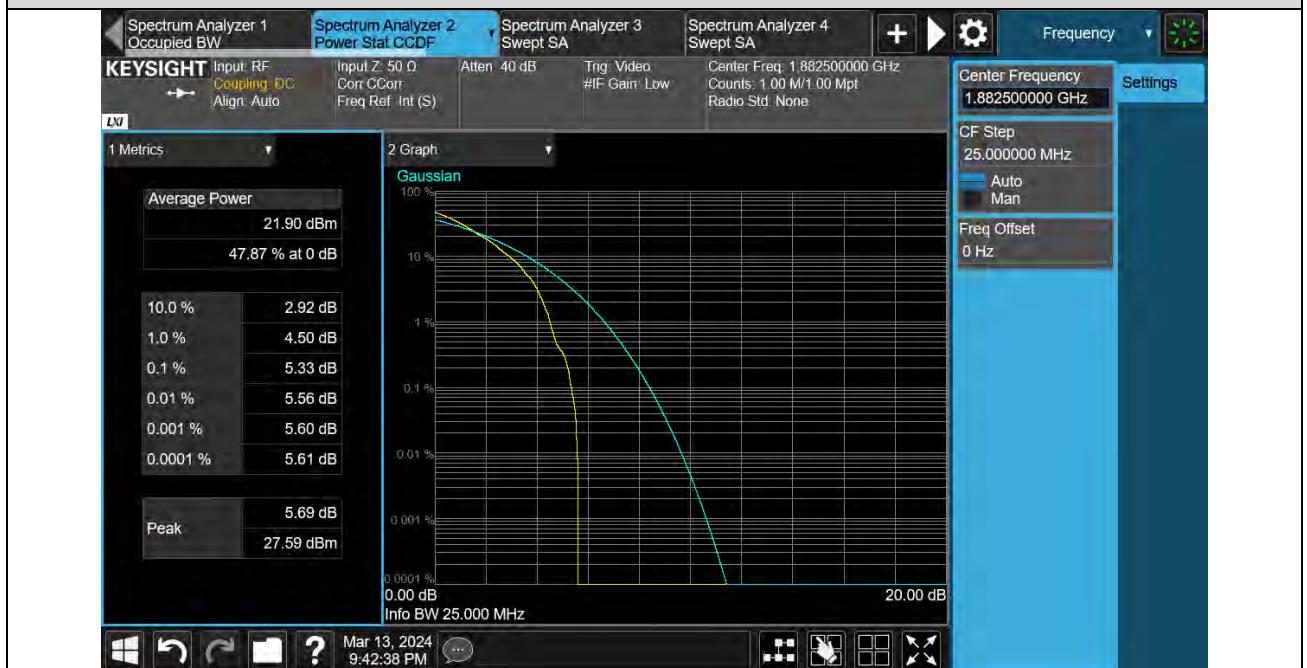


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Test Report No.: W7L-240204W001RF02



Band25-10MHz-QPSK-26365

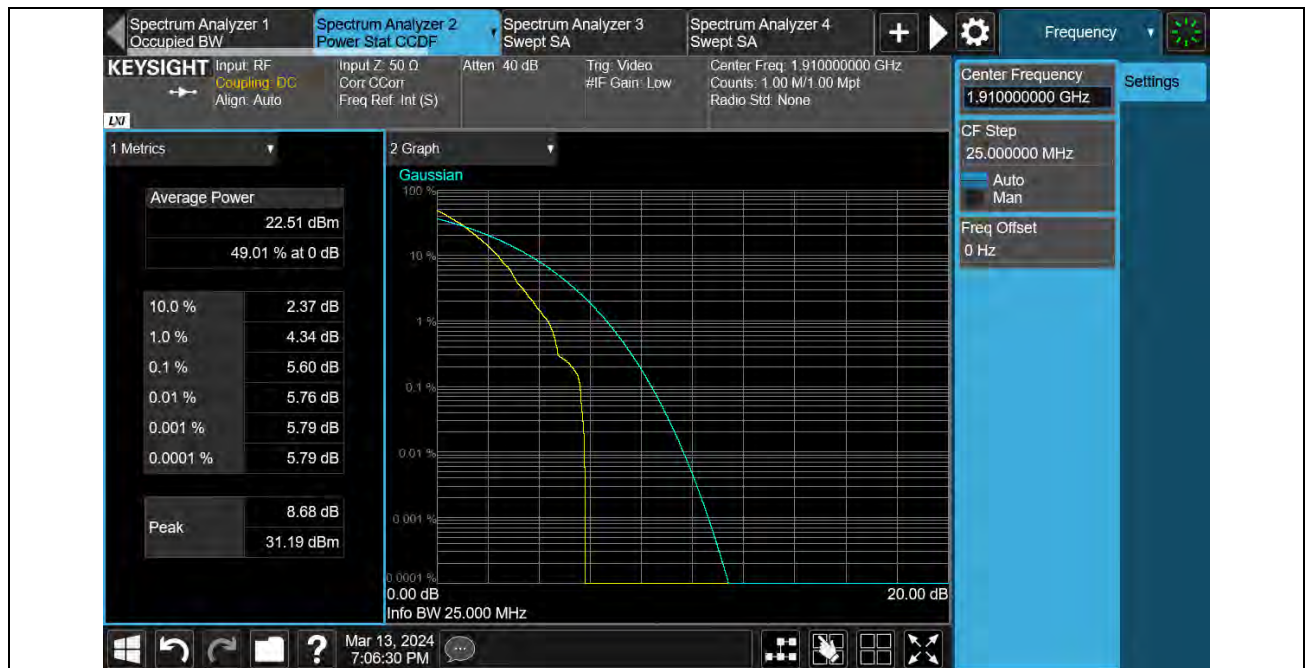


Band25-10MHz-QPSK-26640



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Test Report No.: W7L-240204W001RF02



Band25-10MHz-16QAM-26090



Band25-10MHz-16QAM-26365





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Test Report No.: W7L-240204W001RF02



Band25-10MHz-16QAM-26640



Band25-15MHz-QPSK-26115

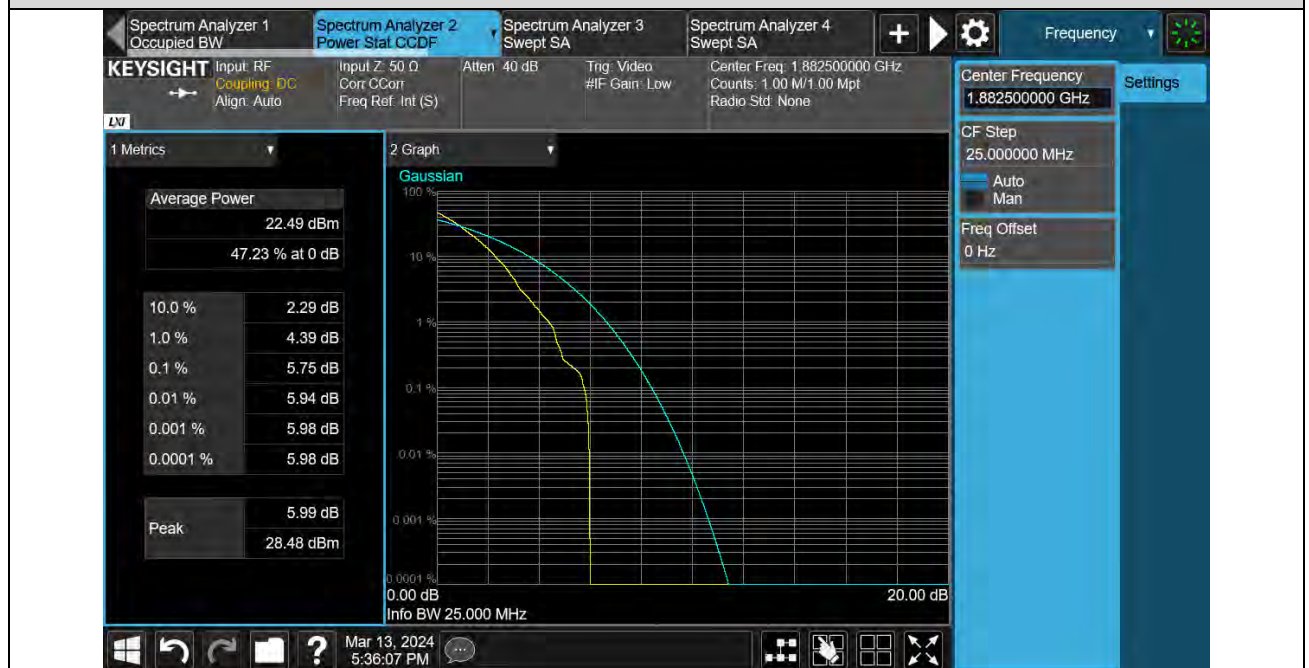


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Test Report No.: W7L-240204W001RF02



Band25-15MHz-QPSK-26365



Band25-15MHz-QPSK-26615



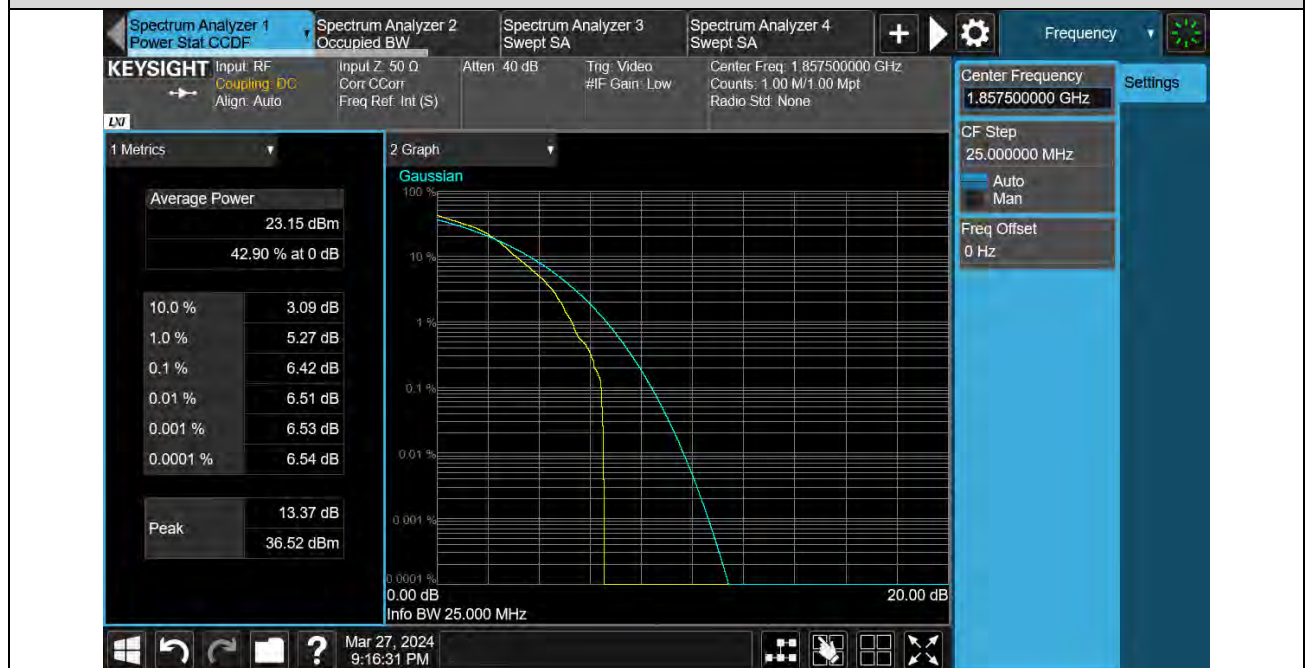


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Test Report No.: W7L-240204W001RF02



Band25-15MHz-16QAM-26115

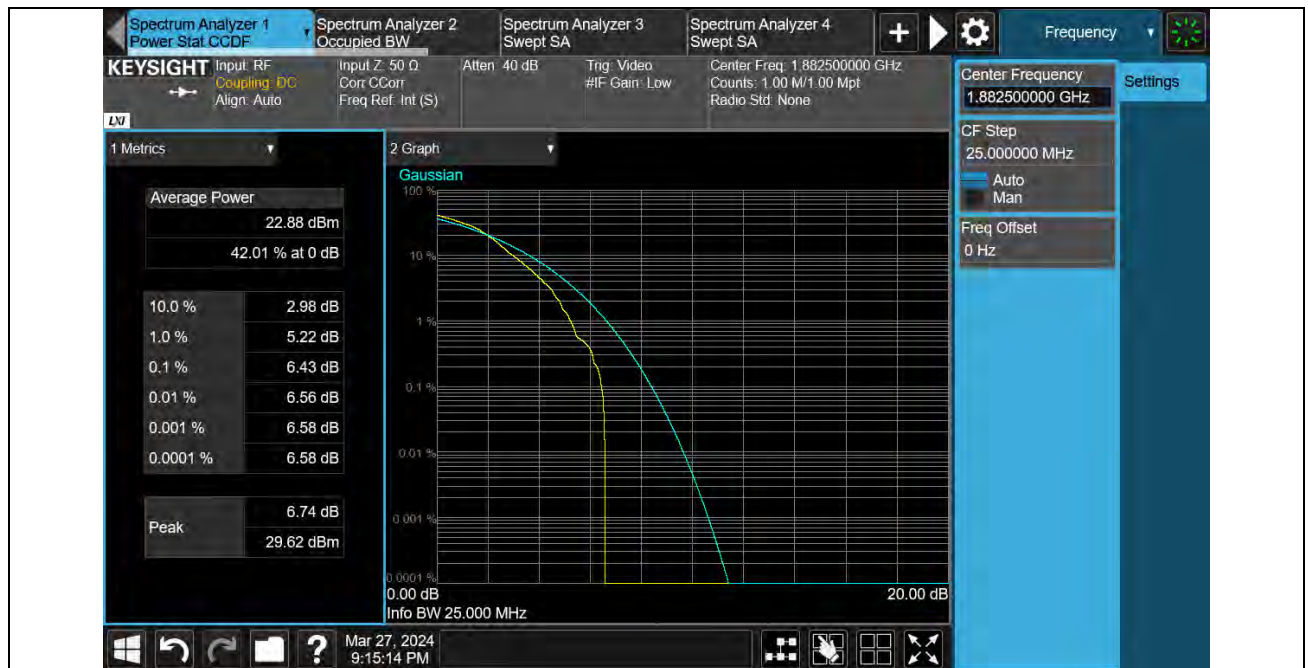


Band25-15MHz-16QAM-26365

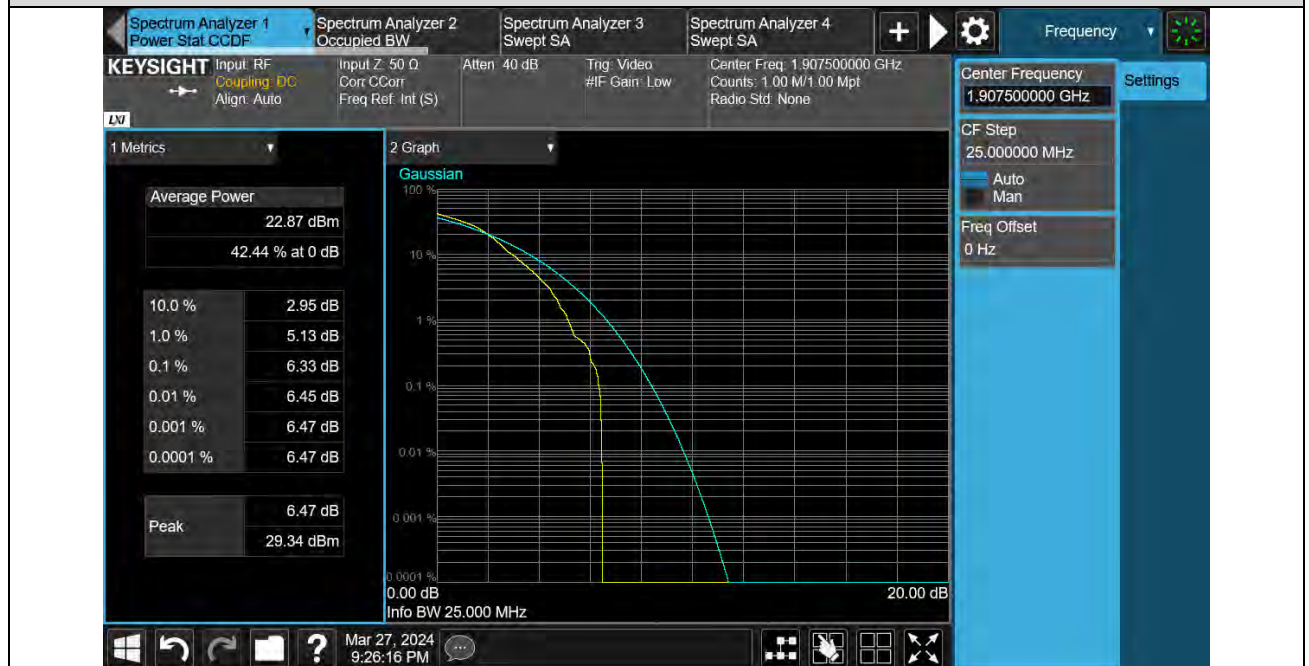


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Test Report No.: W7L-240204W001RF02



Band25-15MHz-16QAM-26615

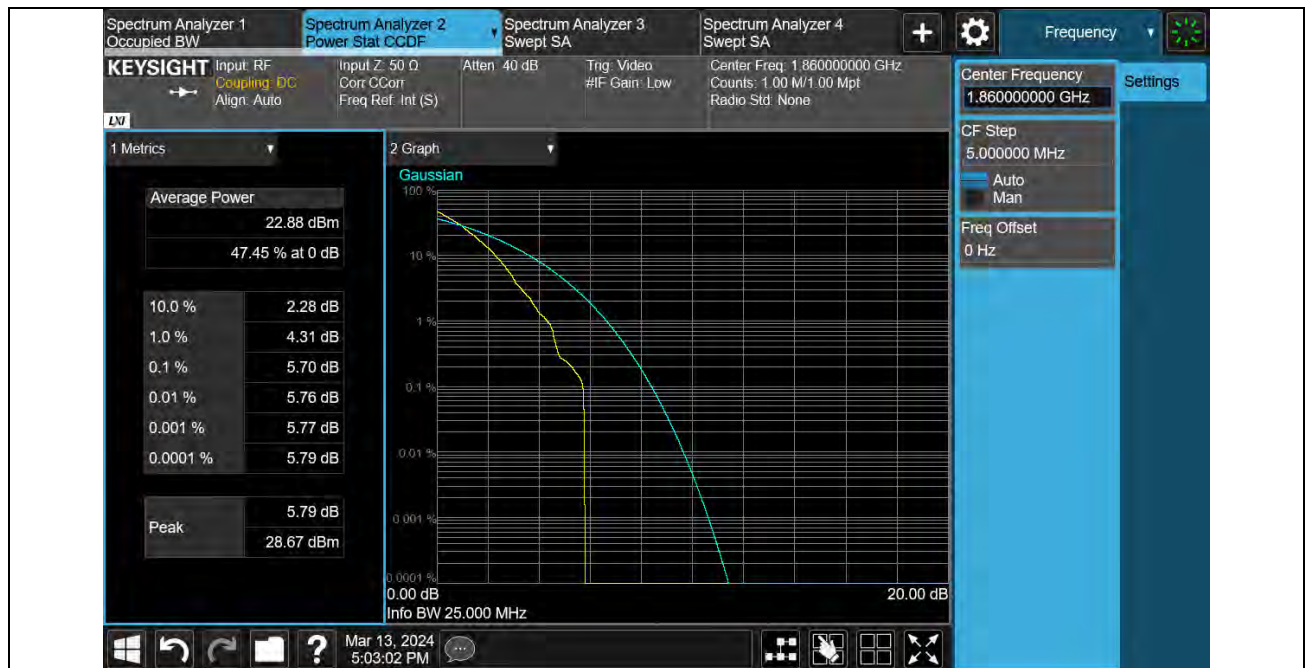


Band25-20MHz-QPSK-26140

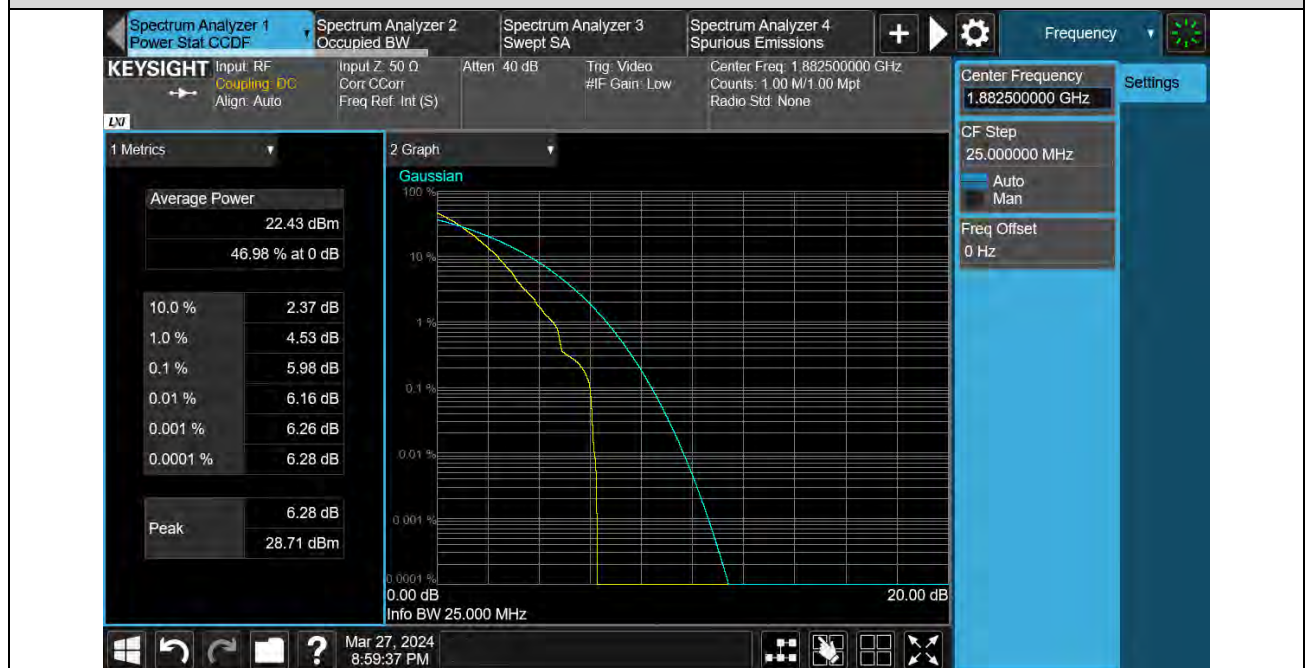


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Test Report No.: W7L-240204W001RF02



Band25-20MHz-QPSK-26365



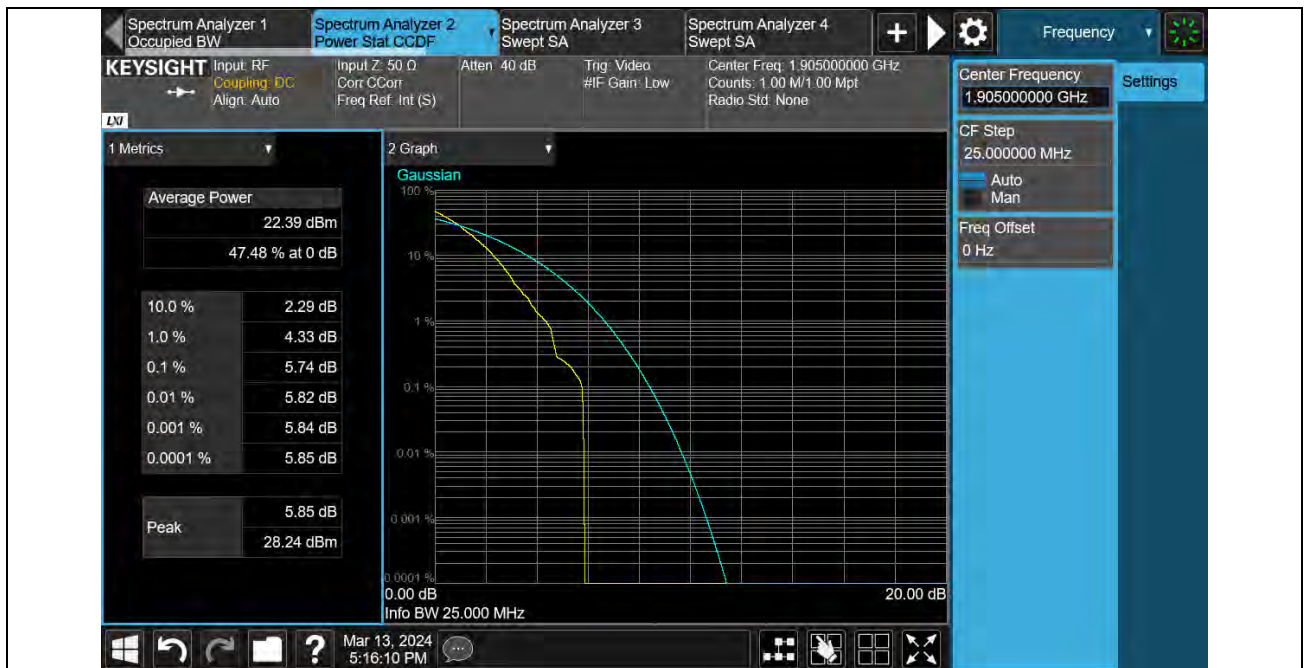
Band25-20MHz-QPSK-26590



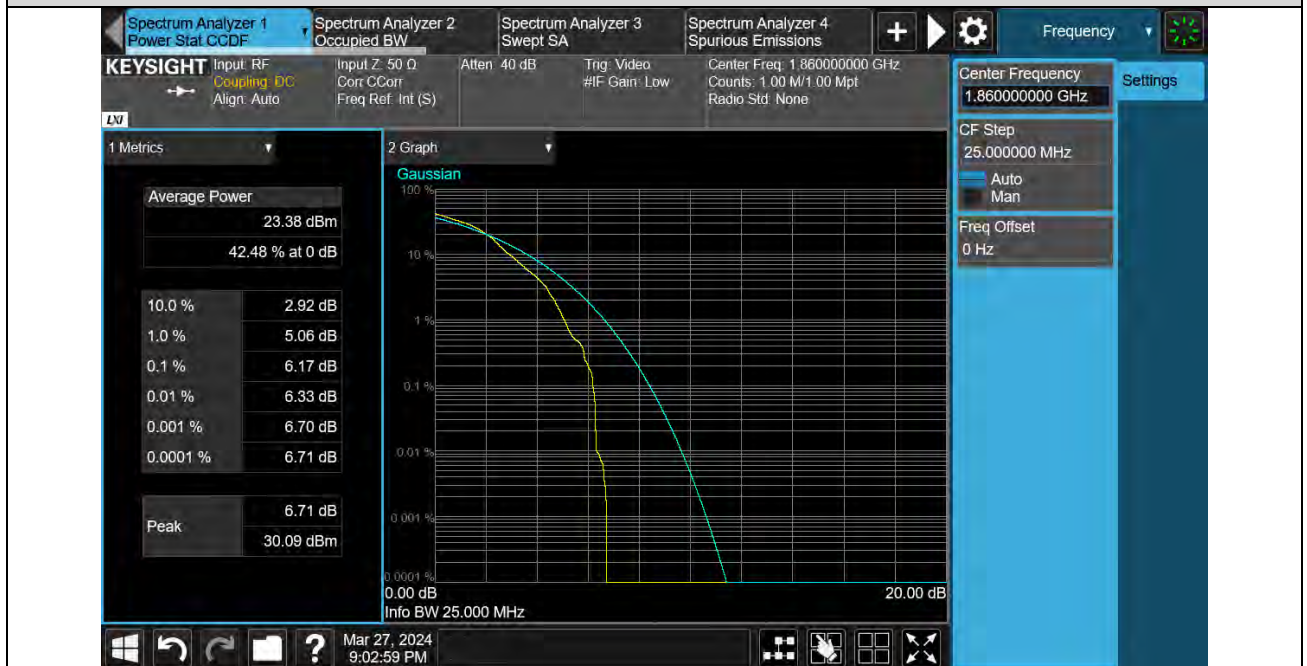


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VERITAS

Test Report No.: W7L-240204W001RF02



Band25-20MHz-16QAM-26140



Band25-20MHz-16QAM-26365



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Band25-20MHz-16QAM-26590



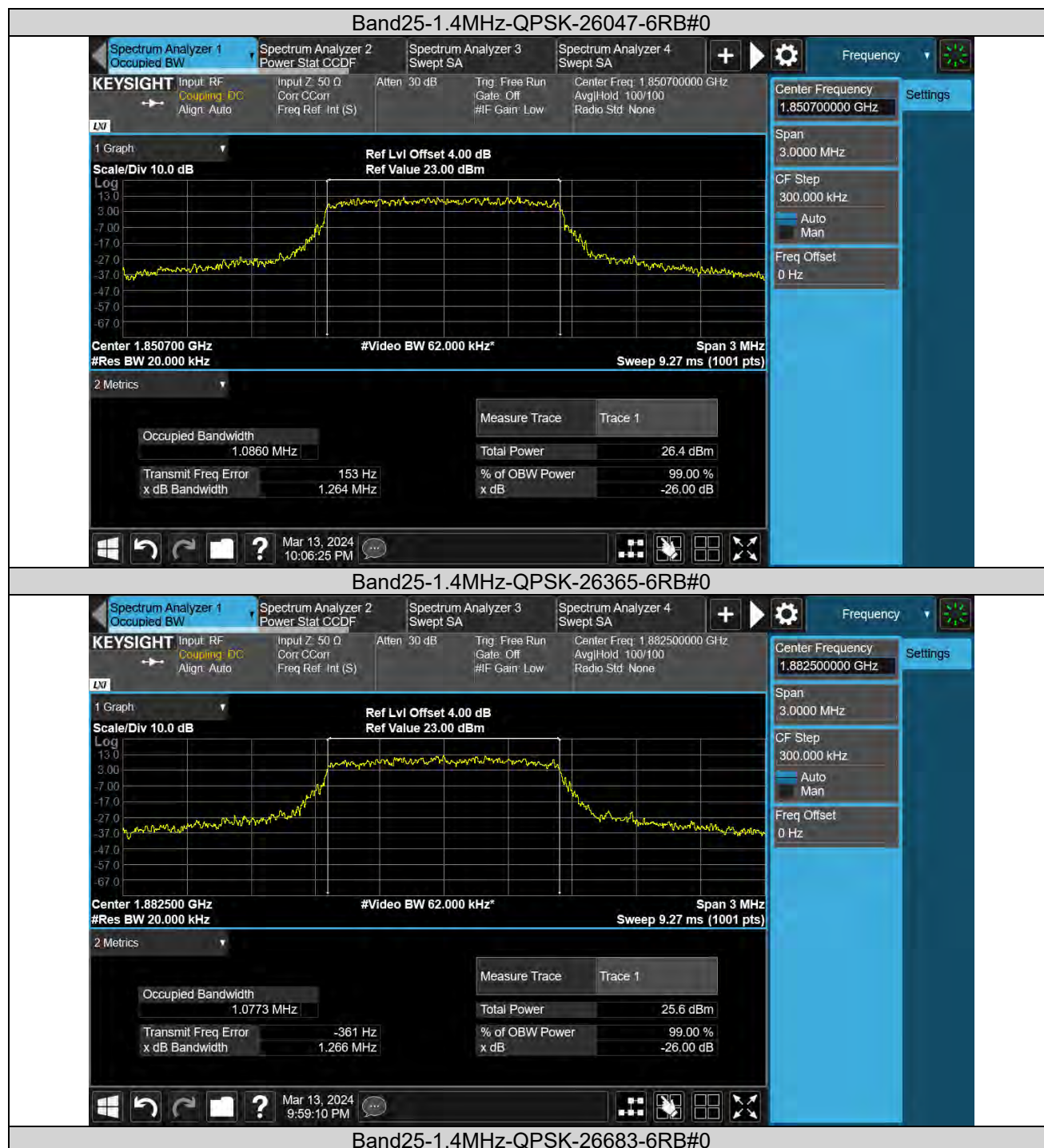
## 26DB BANDWIDTH AND OCCUPIED BANDWIDTH

### Test Result

| Band   | Bandwidth | Modulation | Channel | RB Configuration | Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) | Verdict |
|--------|-----------|------------|---------|------------------|--------------------------|----------------------|---------|
| Band25 | 1.4MHz    | QPSK       | 26047   | 6RB#0            | 1.0860                   | 1.264                | PASS    |
| Band25 | 1.4MHz    | QPSK       | 26365   | 6RB#0            | 1.0773                   | 1.266                | PASS    |
| Band25 | 1.4MHz    | QPSK       | 26683   | 6RB#0            | 1.0738                   | 1.246                | PASS    |
| Band25 | 1.4MHz    | 16QAM      | 26047   | 6RB#0            | 1.0757                   | 1.251                | PASS    |
| Band25 | 1.4MHz    | 16QAM      | 26365   | 6RB#0            | 1.0715                   | 1.256                | PASS    |
| Band25 | 1.4MHz    | 16QAM      | 26683   | 6RB#0            | 1.0706                   | 1.278                | PASS    |
| Band25 | 3MHz      | QPSK       | 26055   | 6RB#0            | 1.0793                   | 1.274                | PASS    |
| Band25 | 3MHz      | QPSK       | 26365   | 6RB#0            | 1.0763                   | 1.273                | PASS    |
| Band25 | 3MHz      | QPSK       | 26675   | 6RB#0            | 1.0771                   | 1.263                | PASS    |
| Band25 | 3MHz      | 16QAM      | 26055   | 6RB#0            | 1.0807                   | 1.256                | PASS    |
| Band25 | 3MHz      | 16QAM      | 26365   | 6RB#0            | 1.0742                   | 1.277                | PASS    |
| Band25 | 3MHz      | 16QAM      | 26675   | 6RB#0            | 1.0711                   | 1.269                | PASS    |
| Band25 | 5MHz      | QPSK       | 26065   | 6RB#0            | 1.0816                   | 1.261                | PASS    |
| Band25 | 5MHz      | QPSK       | 26365   | 6RB#0            | 1.0786                   | 1.272                | PASS    |
| Band25 | 5MHz      | QPSK       | 26665   | 6RB#0            | 1.0863                   | 1.264                | PASS    |
| Band25 | 5MHz      | 16QAM      | 26065   | 6RB#0            | 1.0780                   | 1.287                | PASS    |
| Band25 | 5MHz      | 16QAM      | 26365   | 6RB#0            | 1.0794                   | 1.281                | PASS    |
| Band25 | 5MHz      | 16QAM      | 26665   | 6RB#0            | 1.0757                   | 1.274                | PASS    |
| Band25 | 10MHz     | QPSK       | 26090   | 6RB#0            | 1.0780                   | 1.271                | PASS    |
| Band25 | 10MHz     | QPSK       | 26365   | 6RB#0            | 1.0766                   | 1.262                | PASS    |
| Band25 | 10MHz     | QPSK       | 26640   | 6RB#0            | 1.0725                   | 1.266                | PASS    |
| Band25 | 10MHz     | 16QAM      | 26090   | 6RB#0            | 1.0737                   | 1.286                | PASS    |
| Band25 | 10MHz     | 16QAM      | 26365   | 6RB#0            | 1.0763                   | 1.288                | PASS    |
| Band25 | 10MHz     | 16QAM      | 26640   | 6RB#0            | 1.0795                   | 1.266                | PASS    |
| Band25 | 15MHz     | QPSK       | 26115   | 6RB#0            | 1.0854                   | 1.254                | PASS    |
| Band25 | 15MHz     | QPSK       | 26365   | 6RB#0            | 1.0747                   | 1.259                | PASS    |
| Band25 | 15MHz     | QPSK       | 26615   | 6RB#0            | 1.0890                   | 1.272                | PASS    |
| Band25 | 15MHz     | 16QAM      | 26115   | 6RB#0            | 1.0831                   | 1.258                | PASS    |
| Band25 | 15MHz     | 16QAM      | 26365   | 6RB#0            | 1.0805                   | 1.267                | PASS    |
| Band25 | 15MHz     | 16QAM      | 26615   | 6RB#0            | 1.0782                   | 1.293                | PASS    |
| Band25 | 20MHz     | QPSK       | 26140   | 6RB#0            | 1.0899                   | 1.262                | PASS    |
| Band25 | 20MHz     | QPSK       | 26365   | 6RB#0            | 1.0785                   | 1.273                | PASS    |
| Band25 | 20MHz     | QPSK       | 26590   | 6RB#0            | 1.0800                   | 1.281                | PASS    |
| Band25 | 20MHz     | 16QAM      | 26140   | 6RB#0            | 1.0897                   | 1.272                | PASS    |
| Band25 | 20MHz     | 16QAM      | 26365   | 6RB#0            | 1.0767                   | 1.273                | PASS    |
| Band25 | 20MHz     | 16QAM      | 26590   | 6RB#0            | 1.0762                   | 1.269                | PASS    |



## Test Graphs

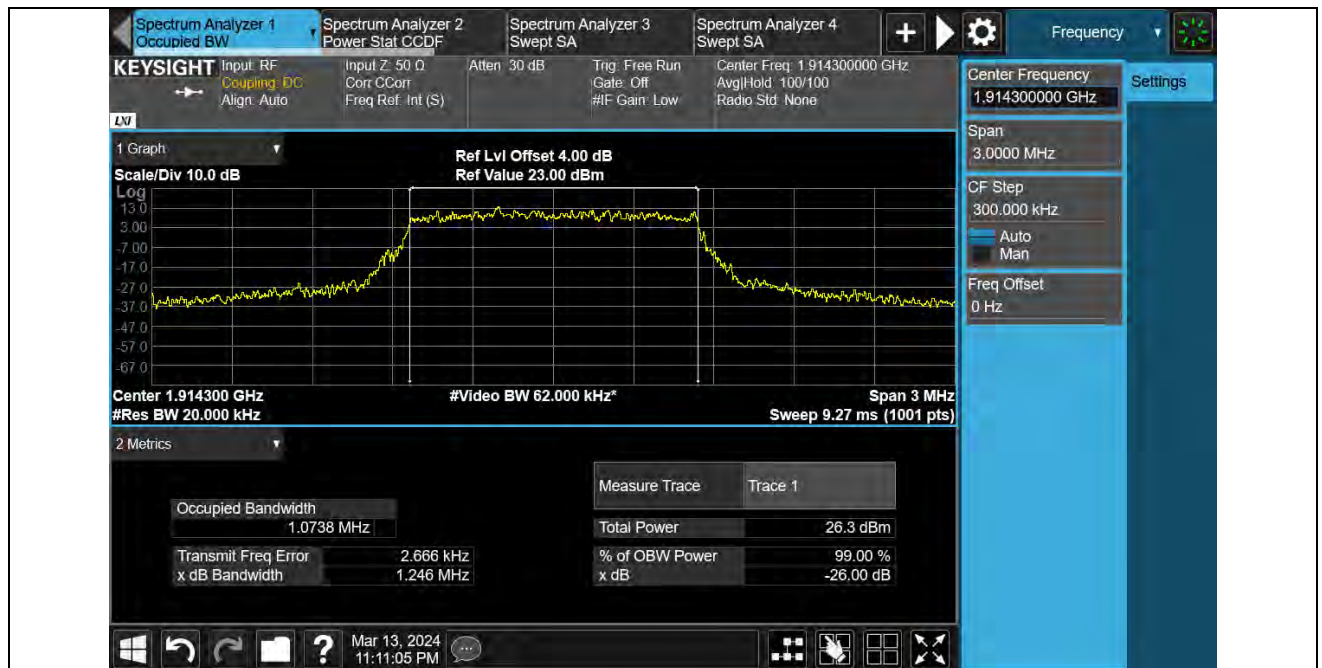






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Band25-1.4MHz-16QAM-26047-6RB#0

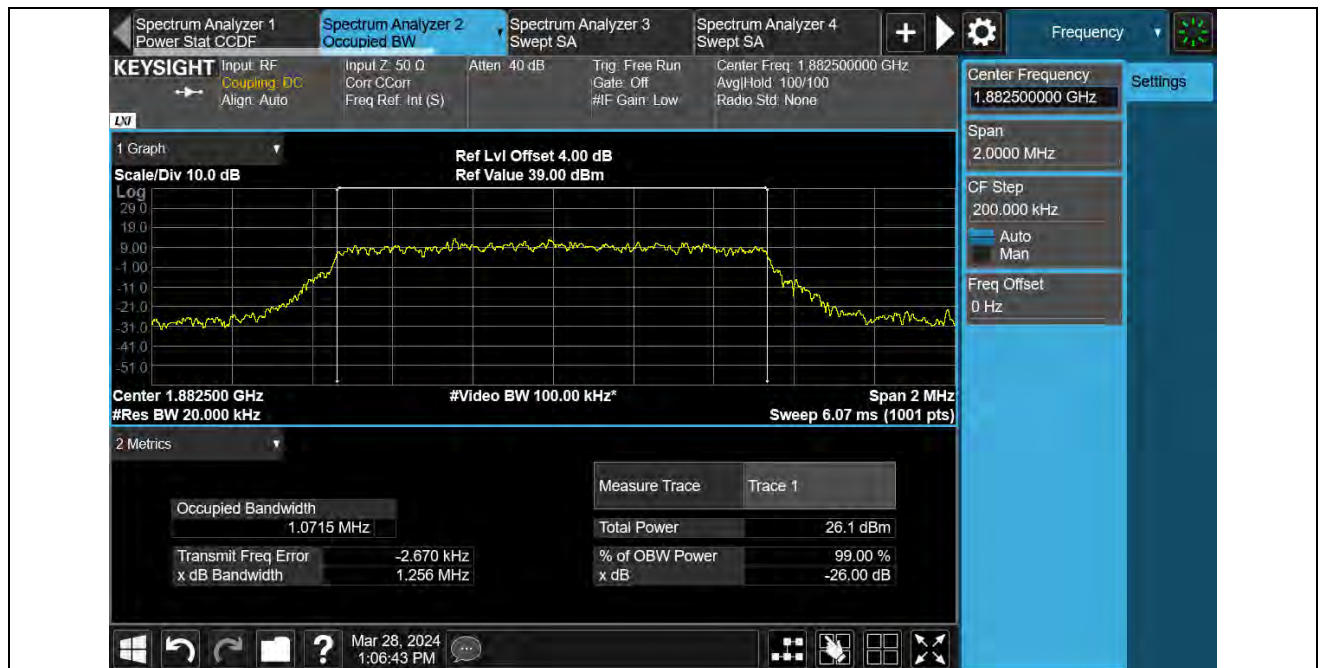


Band25-1.4MHz-16QAM-26365-6RB#0

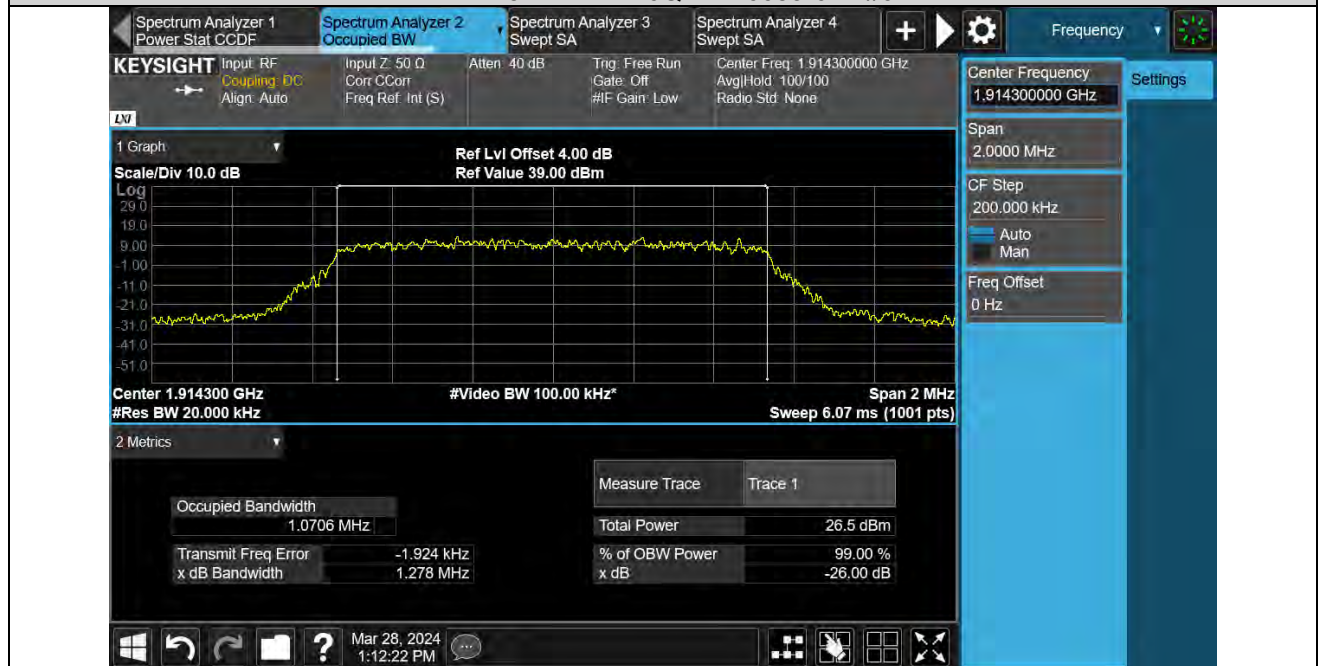


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Band25-1.4MHz-16QAM-26683-6RB#0



Band25-3MHz-QPSK-26055-6RB#0



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Band25-3MHz-QPSK-26365-6RB#0



Band25-3MHz-QPSK-26675-6RB#0



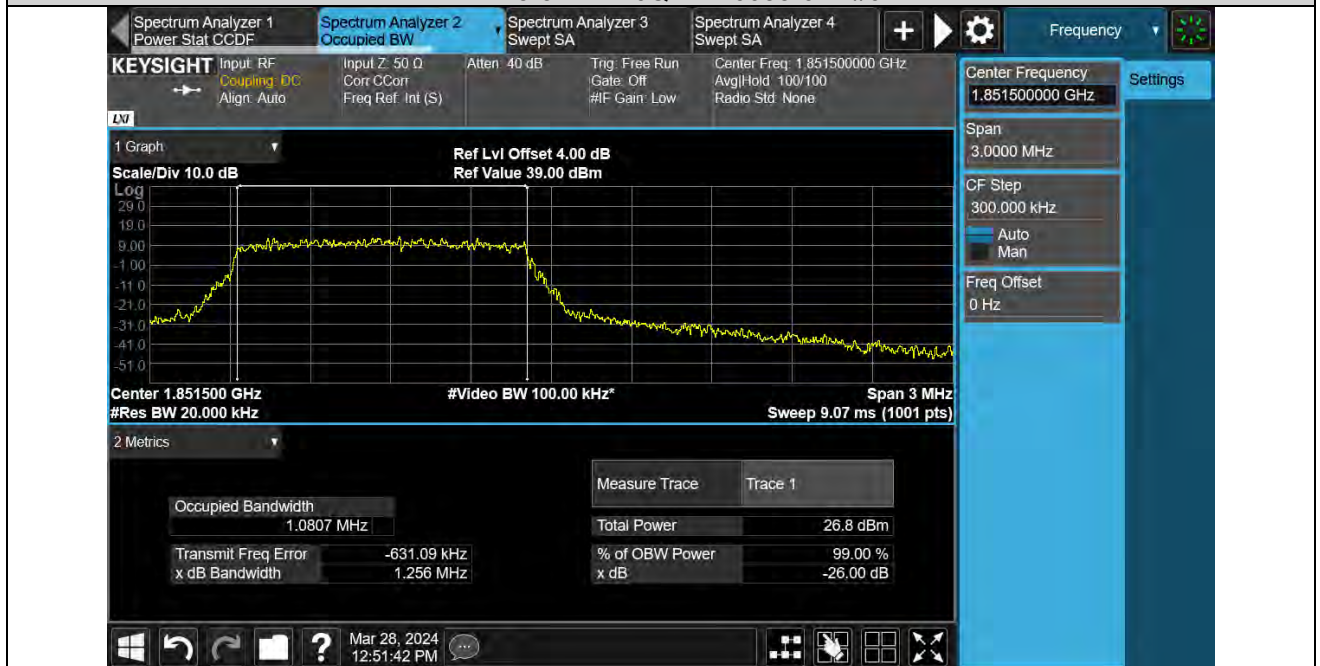


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Band25-3MHz-16QAM-26055-6RB#0



Band25-3MHz-16QAM-26365-6RB#0



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Test Report No.: W7L-240204W001RF02



Band25-3MHz-16QAM-26675-6RB#0



Band25-5MHz-QPSK-26065-6RB#0