Certificate #6613.01

# VARIANT FCC TEST REPORT

# (PART 90)

| | |
|---|---|
| Applicant: | NORDIC SEMICONDUCTOR ASA |
| Address: | Otto Nielsens Vei 12, 7052 Trondheim, Norway |

| | |
|---|---|
| Manufacturer or Supplier | NORDIC SEMICONDUCTOR ASA |
| Address | Otto Nielsens Vei 12, 7052 Trondheim, Norway y |
| Product | Cellular IoT module |
| Brand Name | nRF91 |
| Model Name | nRF9151 |
| FCC ID | 2ANPO00NRF9151 |
| Date of tests | Apr. 12, 2024 ~ Jul. 02, 2024 |

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

☒ **FCC Part 90, Subpart R, S** ☒ **ANSI/TIA/EIA-603- D**
☒ **FCC Part 2** ☒ **ANSI/TIA/EIA-603-E** ☒ **ANSI C63.26-2015**

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

| Prepared by Hanwen Xu<br>Engineer / Mobile Department | Approved by Peibo Sun<br>Manager / Mobile Department |
|---|---|
| Date: Jul. 02, 2024 | Date: Jul. 02, 2024 |

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# TABLE OF CONTENTS

## 5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB 61

# RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|---|---|---|
| 77535RRF.004 | Original release | Mar. 21, 24 |
| PSU-QSU2404090210RF05 | Based on the original report (Report No.: 77535RRF.004, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151). The firm wares are all the same, just different SW name and change Power class from PC3 to PC5. The new sample verify RSE worse case and conducted power. So this report only replaces the conducted power and RSE data. other test data refer to the original report. | Jun. 14, 2024 |
| PSU-QSU2404090210RF05 | Updated antenna gains and EIRP.<br>Verify RSE the data is better than the original, so the data is not replaced. | Jul. 02, 2024 |

# 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 90 & Part 2 | | | |
|---|---|---|---|
| **STANDARD SECTION** | **TEST TYPE AND LIMIT** | **RESULT** | **TEST LAB*** |
| §2.1046<br>§90.635(b) | Conducted Output Power | PASS | A |
| §2.1055<br>§90.213 | Frequency Stability | See Note | - |
| §2.1049<br>§90.209 | Occupied Bandwidth | See Note | - |
| §2.1051<br>§90.691(a) | Emission Masks | See Note | - |
| §2.1051<br>§90.691(a) | Conducted Spurious Emissions | See Note | - |
| §2.1053<br>§90.691 | Radiated Spurious Emissions | PASS | A |

**Note:** Refer to the original source report (Report No.: 77535RRF.004, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151).

***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**

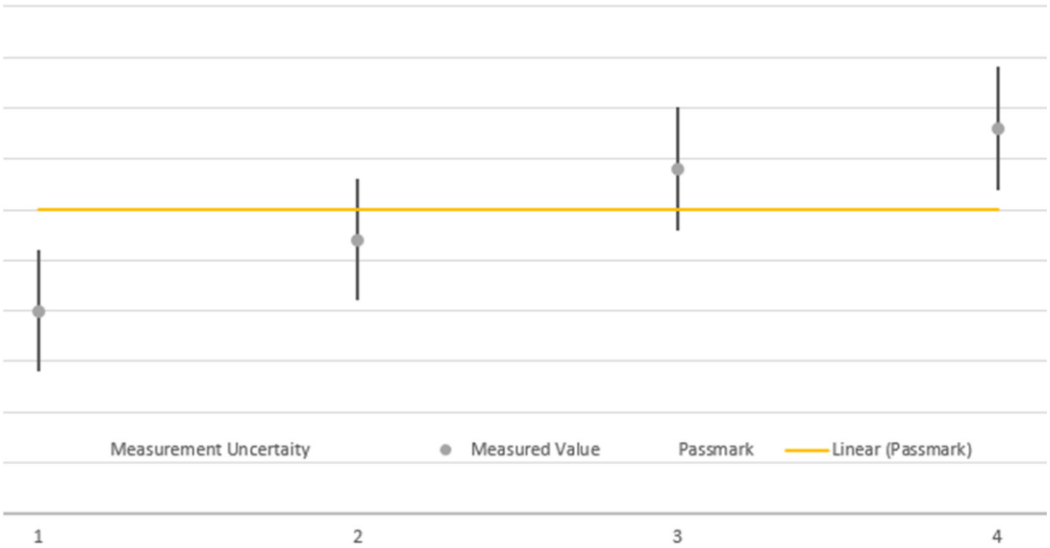
The FCC Site Registration No. is 434559; The Designation No. is CN1325.

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

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




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 | Mar.29,24 | Mar.28,26 |
| Signal Generator | R&S | SMB100A | 182185 | Mar.29,24 | Mar.28,26 |
| 3m Fully-anechoic Chamber | TDK | 9m*6m*6m | HRSW-SZ-EMC-01Chamber | Nov.25,22 | Nov.24,25 |
| 3m Semi-anechoic Chamber | TDK | 9m*6m*6m | HRSW-SZ-EMC-02Chamber | Nov.25,22 | Nov.24,25 |
| EMI TEST Receiver | R&S | ESR26 | 101734 | Mar.28,24 | Mar.27,26 |
| EMI TEST Receiver | R&S | ESW44 | 101973 | Mar.28,24 | Mar.27,26 |
| Bilog Antenna | SCHWARZBECK | VULB 9163 | 1264 | Dec.26,23 | Dec.25,25 |
| Horn Antenna | ETS-LINDGREN | 3117 | 227836 | Aug.22,22 | Aug.21,24 |
| 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.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 |
| 6DB attenuator | Tonscend Technology Co., Ltd | N/A | 23062787 | 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.27,24 | Apr.26,25 |
| CABLE | R&S | W12.14 | N/A | Apr.27,24 | Apr.26,25 |
| CABLE | R&S | J12J103539-00-1 | SEP-03-20-069 | Apr.27,24 | Apr.26,25 |
| CABLE | R&S | J12J103539-00-1 | SEP-03-20-070 | Apr.27,24 | Apr.26,25 |
| Temperature Chamber | votsch | VT4002 | 58566078100050 | May.31,22 | May.30,24 |
| Temperature Chamber | votsch | VT4002 | 58566078100050 | May.30,24 | May.29,26 |

**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

| | | |
|---|---|---|
| **PRODUCT*** | Cellular IoT module | |
| **BRAND NAME*** | nRF91 | |
| **MODEL NAME*** | nRF9151 | |
| **NOMINAL VOLTAGE*** | EUT 3.7Vdc | |
| **MODULATION TECHNOLOGY** | **CAT-M1/ NB-IOT :LTE** | BPSK, QPSK, 16QAM |
| **FREQUENCY RANGE CAT-M1** | **LTE Band 26 (Channel Bandwidth: 1.4MHz)** | 814.7MHz ~ 823.3MHz |
| | **LTE Band 26 (Channel Bandwidth: 3MHz)** | 815.5MHz ~ 822.5MHz |
| | **LTE Band 26 (Channel Bandwidth: 5MHz)** | 816.5MHz ~ 821.5MHz |
| | **LTE Band 26 (Channel Bandwidth: 10MHz)** | 819MHz |
| **FREQUENCY RANGE NB-IOT** | **LTE Band 26 (Sub-carrier Spacing: 3.75/15KHz)** | 814.2MHz ~ 823.8MHz |
| **EMISSION DESIGNATOR CAT-M1** | **LTE Band 26 (Channel Bandwidth: 1.4MHz)** | QPSK: 1M10G7D |
| | | 16QAM: 0M95W7D |
| **EMISSION DESIGNATOR NB-IOT** | **LTE Band 26 (Sub-carrier Spacing: 3.75KHz)** | BPSK: 60K4G7D |
| | | QPSK: 64K3W7D |
| | **LTE Band 26 (Sub-carrier Spacing: 15KHz)** | BPSK: 125K6G7D |
| | | QPSK: 189K2W7D |
| **MAX. EIRP POWER CAT-M1** | **LTE Band 26 (Channel Bandwidth: 1.4MHz)** | 480.84mW |
| | **LTE Band 26 (Channel Bandwidth: 3MHz)** | 481.95mW |
| | **LTE Band 26 (Channel Bandwidth: 5MHz)** | 484.17mW |
| | **LTE Band 26 (Channel Bandwidth: 10MHz)** | 485.29mW |
| **MAX. EIRP POWER NB-IOT** | **LTE Band 26 (Sub-carrier Spacing: 3.75KHz)** | 495.45mW |
| | **LTE Band 26 (Sub-carrier Spacing: 15KHz)** | 500.03mW |
| **ANTENNA TYPE*** | FR4 Embedded LTE Antenna | |
| **ANTENNA GAIN*** | 7.1 dBi for LTE Band 26 | |
| **HW VERSION*** | nRF9151 LACA AA | |
| **SW VERSION*** | mfw_nRF91x1_2.0.1 | |

| | |
|---|---|
| **I/O PORTS*** | Refer to user's manual |
| CABLE SUPPLIED* | N/A |
| **EXTREME TEMPERATURE*** | -40-85 ℃ |
| **EXTREME VOLTAGE*** | 3.0V - 5.5V |

**NOTE**:

1. ***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.

2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
3. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

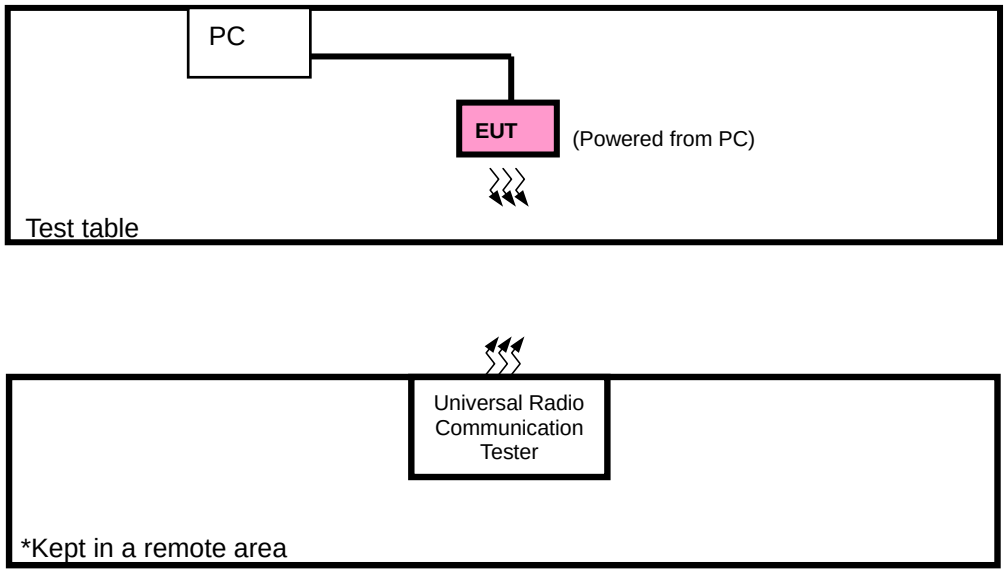
| MODULATION MODE | TX FUNCTION |
|---|---|
| **LTE** | 1TX/1RX |

4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
5. Antenna gain and EUT conducted cable loss are provided by the customer, and the laboratory will record the results based on these items that involve these two parameters.

## 2.2 CONFIGURATION OF SYSTEM UNDER TEST

**FOR RADIATION EMISSION TEST**

**FOR RADIATION EMISSION**



## 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 | USB Cable | RF Murata cable for Cellular IoT | MXHS83QE3000 | N/A | N/A |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|---|---|
| 1 | N/A |

## 2.4 DESCRIPTION OF TEST MODES

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

| EUT CONFIGURE MODE | DESCRIPTION |
|---|---|
| **A** | **EUT + USB Cable with LTE link** |

**CAT-M1 LTE BAND 26 MODE**

| EUT CONFIGURE MODE | TEST ITEM | AVAILABLE CHANNEL | TESTED CHANNEL | CHANNEL BANDWIDTH | MODULATION | MODE |
|---|---|---|---|---|---|---|
| A | ERP | 26697 to 26783 | 26697, 26740, 26783 | 1.4MHz | QPSK,16QAM | 1 RB / 0 RB Offset |
| | | 26705 to 26775 | 26705, 26740, 26775 | 3MHz | QPSK,16QAM | 1 RB / 0 RB Offset |
| | | 26715 to 26765 | 26715, 26740, 26765 | 5MHz | QPSK,16QAM | 1 RB / 0 RB Offset |
| | | 26740 | 26740 | 10MHz | QPSK,16QAM | 1 RB / 0 RB Offset |
| A | RADIATED EMISSION | 26697 to 26783 | 26740 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | | 26705 to 26775 | 26705, 26740, 26775 | 3MHz | QPSK | 1 RB / 0 RB Offset |
| | | 26715 to 26765 | 26740 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 26740 | 26740 | 10MHz | 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 26 MODE**

| EUT CONFIGURE MODE | TEST ITEM | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION | MODE |
|---|---|---|---|---|---|
| A | ERP | 26692 to 26788 | 26697, 26740, 26783 | BPSK,QPSK | 1 RB / 0 RB Offset |
| A | RADIATED EMISSION | 26692 to 26788 | 26740 | 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 | 24deg. C, 60%RH | DC 3.7V By PC | Hanwen Xu |
| RADIATED EMISSION | 23deg. C, 70%RH | DC 3.7V By PC | Hanwen Xu |

## 2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 90**

**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

Per FCC Part 90.635(a)(b)

The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

### 3.1.2 TEST PROCEDURES

**EIRP / ERP 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 determing the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

ERP or EIRP = $P_{Meas} + G_T – L_C$

Where:

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

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

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

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

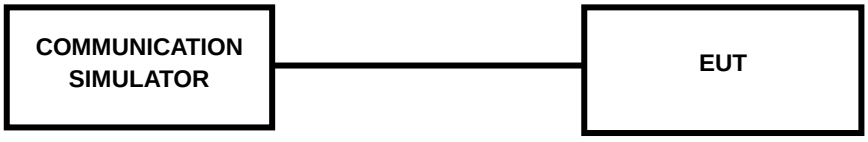
$L_C$ = signal attenuation in the connecting cable between the transmitter and antenna, in dB

**CONDUCTED POWER MEASUREMENT:**

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

## 3.1.3 TEST SETUP

**CONDUCTED POWER MEASUREMENT:**




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

## 3.1.4 TEST RESULTS

**CONDUCTED OUTPUT POWER (dBm)**

**CAT-M**

LTE Band 26

| Band/BW | Modulation | RB Size | RB Offset | Low CHG 26697 | Mid CH 26740 | High CH 26783 |
|---|---|---|---|---|---|---|
| | | | | Frequency 814.7 MHz | Frequency 819 MHz | Frequency 823.3 MHz |
| 26/ 1.4 | QPSK | 1 | 0 | 19.49 | 19.48 | 19.46 |
| | | 1 | 5 | 19.52 | 19.36 | 19.54 |
| | | 3 | 0 | 19.55 | 19.54 | 19.53 |
| | | 3 | 3 | 19.46 | 19.52 | 19.44 |
| | | 6 | 0 | 19.39 | 19.43 | 19.48 |
| | 16QAM | 1 | 0 | 19.60 | 19.61 | 19.58 |
| | | 1 | 5 | 19.70 | 19.71 | 19.67 |
| | | 3 | 0 | 19.59 | 19.54 | 19.55 |
| | | 3 | 3 | 19.69 | 19.59 | 19.54 |
| | | 6 | 0 | 19.53 | 19.72 | 19.55 |

| Band/BW | Modulation | RB Size | RB Offset | Low CHG 26705 | Mid CH 26740 | High CH 26775 |
|---|---|---|---|---|---|---|
| | | | | Frequency 815.5 MHz | Frequency 819 MHz | Frequency 822.5 MHz |
| 26/ 3 | QPSK | 1 | 0 | 19.46 | 19.46 | 19.38 |
| | | 1 | 5 | 19.43 | 19.48 | 19.46 |
| | | 3 | 0 | 19.60 | 19.54 | 19.53 |
| | | 3 | 3 | 19.48 | 19.53 | 19.45 |
| | | 6 | 0 | 19.49 | 19.51 | 19.57 |
| | 16QAM | 1 | 0 | 19.68 | 19.65 | 19.65 |
| | | 1 | 5 | 19.73 | 19.71 | 19.66 |
| | | 3 | 0 | 19.58 | 19.60 | 19.52 |
| | | 3 | 3 | 19.63 | 19.58 | 19.43 |
| | | 6 | 0 | 19.58 | 19.61 | 19.67 |

| Band/BW | Modulation | RB Size | RB Offset | Low CHG 26715 | Mid CH 26740 | High CH 26765 |
|---|---|---|---|---|---|---|
| | | | | Frequency 816.5 MHz | Frequency 819 MHz | Frequency 821.5 MHz |
| 26/ 5 | QPSK | 1 | 0 | 19.43 | 19.49 | 19.38 |
| | | 1 | 5 | 19.53 | 19.40 | 19.46 |
| | | 3 | 0 | 19.60 | 19.53 | 19.58 |
| | | 3 | 3 | 19.45 | 19.56 | 19.46 |
| | | 6 | 0 | 19.47 | 19.54 | 19.46 |
| | 16QAM | 1 | 0 | 19.74 | 19.66 | 19.62 |
| | | 1 | 5 | 19.75 | 19.68 | 19.70 |
| | | 3 | 0 | 19.56 | 19.47 | 19.51 |
| | | 3 | 3 | 19.72 | 19.59 | 19.42 |
| | | 6 | 0 | 19.59 | 19.63 | 19.57 |

| Band/BW | Modulation | RB Size | RB Offset | / | Mid CH 26740 | / |
|---|---|---|---|---|---|---|
| | | | | / | Frequency 819 MHz | / |
| 26/ 10 | QPSK | 1 | 0 | / | 19.54 | / |
| | | 1 | 5 | / | 19.44 | / |
| | | 3 | 0 | / | 19.46 | / |
| | | 3 | 3 | / | 19.47 | / |
| | | 6 | 0 | / | 19.52 | / |
| | 16QAM | 1 | 0 | / | 19.65 | / |
| | | 1 | 5 | / | 19.76 | / |
| | | 3 | 0 | / | 19.47 | / |
| | | 3 | 3 | / | 19.60 | / |
| | | 6 | 0 | / | 19.63 | / |

**NB-IOT**

| LTE Band 26_Part90S | | | | | | |
|---|---|---|---|---|---|---|
| Sub-carrier Spacing (KHz) | Modulation | RB Size | RB Offset | Low | Mid | High |
| | | Channel | | 26692 | 26740 | 26788 |
| | | Frequence (MHz) | | 814.2 | 819 | 823.8 |
| 3.75 | BPSK | 1 | 0 | 19.84 | 19.74 | 19.72 |
| | | 1 | 47 | 19.78 | 19.66 | 19.65 |
| | QPSK | 1 | 0 | 19.85 | 19.79 | 19.70 |
| | | 1 | 47 | 19.77 | 19.66 | 19.74 |
| 12 | BPSK | 1 | 0 | **19.89** | 19.67 | 19.75 |
| | | 1 | 11 | 19.66 | 19.53 | 19.61 |
| | QPSK | 1 | 0 | 19.67 | 19.54 | 19.64 |
| | | 1 | 11 | 19.65 | 19.52 | 19.61 |
| | | 12 | 0 | 17.62 | 17.58 | 17.54 |

**ERP**

**CAT-M**

**LTE BAND 26**

**CHANNEL BANDWIDTH: 1.4MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 26697 | 814.7 | 19.55 | 7.1 | 26.65 | 462.38 | 100 |
| 26740 | 819 | 19.54 | 7.1 | 26.64 | 461.32 | 100 |
| 26783 | 823.3 | 19.54 | 7.1 | 26.64 | 461.32 | 100 |

**CHANNEL BANDWIDTH: 1.4MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 26697 | 814.7 | 19.7 | 7.1 | 26.8 | 478.63 | 100 |
| 26740 | 819 | 19.72 | 7.1 | 26.82 | 480.84 | 100 |
| 26783 | 823.3 | 19.67 | 7.1 | 26.77 | 475.34 | 100 |

**CHANNEL BANDWIDTH: 3MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 26705 | 815.5 | 19.6 | 7.1 | 26.7 | 467.74 | 100 |
| 26740 | 819 | 19.54 | 7.1 | 26.64 | 461.32 | 100 |
| 26775 | 822.5 | 19.57 | 7.1 | 26.67 | 464.52 | 100 |

**CHANNEL BANDWIDTH: 3MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 26705 | 815.5 | 19.73 | 7.1 | 26.83 | 481.95 | 100 |
| 26740 | 819 | 19.71 | 7.1 | 26.81 | 479.73 | 100 |
| 26775 | 822.5 | 19.67 | 7.1 | 26.77 | 475.34 | 100 |

**CHANNEL BANDWIDTH: 5MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 26715 | 816.5 | 19.6 | 7.1 | 26.7 | 467.74 | 100 |
| 26740 | 819 | 19.56 | 7.1 | 26.66 | 463.45 | 100 |
| 26765 | 821.5 | 19.58 | 7.1 | 26.68 | 465.59 | 100 |

**CHANNEL BANDWIDTH: 5MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 26715 | 816.5 | 19.75 | 7.1 | 26.85 | 484.17 | 100 |
| 26740 | 819 | 19.68 | 7.1 | 26.78 | 476.43 | 100 |
| 26765 | 821.5 | 19.7 | 7.1 | 26.8 | 478.63 | 100 |

**CHANNEL BANDWIDTH: 10MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| - | - | - | - | - | - | - |
| 26740 | 819 | 19.54 | 7.1 | 26.64 | 461.32 | 100 |
| - | - | - | - | - | - | - |

**CHANNEL BANDWIDTH: 10MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| - | - | - | - | - | - | - |
| 26740 | 819 | 19.76 | 7.1 | 26.86 | 485.29 | 100 |
| - | - | - | - | - | - | - |

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

## NB-IOT

### LTE B26 3.75KHz

**CHANNEL BANDWIDTH: BPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 26692 | 814.2 | 19.84 | 7.1 | 26.94 | 494.31 | 100 |
| 26740 | 819 | 19.74 | 7.1 | 26.84 | 483.06 | 100 |
| 26788 | 823.8 | 19.72 | 7.1 | 26.82 | 480.84 | 100 |

**CHANNEL BANDWIDTH: QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 26692 | 814.2 | 19.85 | 7.1 | 26.95 | 495.45 | 100 |
| 26740 | 819 | 19.79 | 7.1 | 26.89 | 488.65 | 100 |
| 26788 | 823.8 | 19.74 | 7.1 | 26.84 | 483.06 | 100 |

### LTE B26 15KHz

**CHANNEL BANDWIDTH: BPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 26692 | 814.2 | 19.89 | 7.1 | 26.99 | 500.03 | 100 |
| 26740 | 819 | 19.67 | 7.1 | 26.77 | 475.34 | 100 |
| 26788 | 823.8 | 19.75 | 7.1 | 26.85 | 484.17 | 100 |

**CHANNEL BANDWIDTH: QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 26692 | 814.2 | 19.67 | 7.1 | 26.77 | 475.34 | 100 |
| 26740 | 819 | 19.54 | 7.1 | 26.64 | 461.32 | 100 |
| 26788 | 823.8 | 19.64 | 7.1 | 26.74 | 472.06 | 100 |

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

## 3.2 FREQUENCY STABILITY MEASUREMENT

### 3.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked

### 3.2.2 TEST PROCEDURE

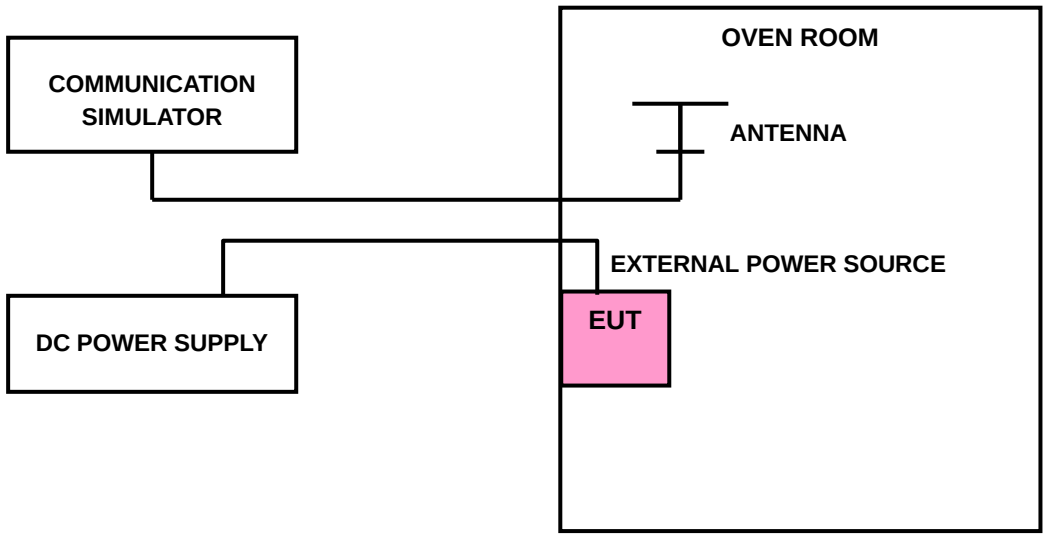
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. 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.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

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

### 3.2.3 TEST SETUP



### 3.2.4 TEST RESULTS

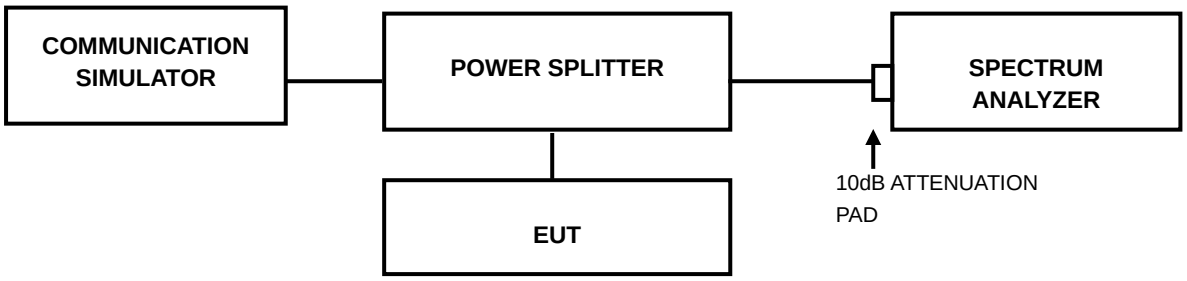
Refer to the original source report (Report No.: 77535RRF.004, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151).

## 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

a. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

b. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

## 3.3.4 TEST RESULTS

Refer to the original source report (Report No.: 77535RRF.004, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151).

## 3.4 EMISSION MASK MEASUREMENT

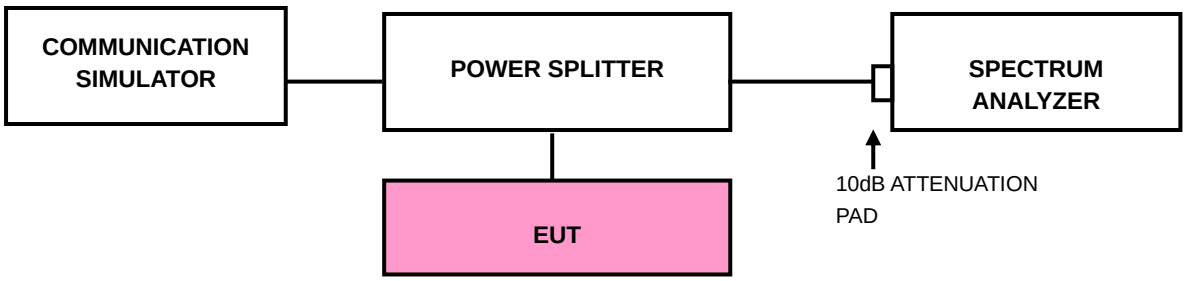
### 3.4.1 LIMITS OF EMISSION MASK MEASUREMENT

LTE Band26:

According to FCC part 90.691 shall be tested the emission mask. For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

### 3.4.2 TEST SETUP



### 3.4.3 TEST PROCEDURES

a) Connect the transmitter to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.

b) Tune the analyzer to the nominal center frequency of the emission bandwidth (EBW).

c) Set the resolution bandwidth (RBW) ≧ 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.

d) Beyond the 1MHz band from the band edge, RBW=1MHz was used.

e) Set the video bandwidth (VBW) to ≧3 x RBW.

f) Select the average power (RMS) display detector.

g) Set the number of measurement points to ≧ 1001.

h) Use auto-coupled sweep time.

i) Perform the measurement over an interval of time when the transmission is continuous and at its maximum power level.

j) The RF fundamental frequency should be excluded against the limit line in the operating frequency band and use RBW is 10KHz or 100KHz.

k) Record the max trace plot into the test report.

### 3.4.4 TEST RESULTS

Refer to the original source report (Report No.: 77535RRF.004, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151).

## 3.5 CONDUCTED SPURIOUS EMISSIONS

### 3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

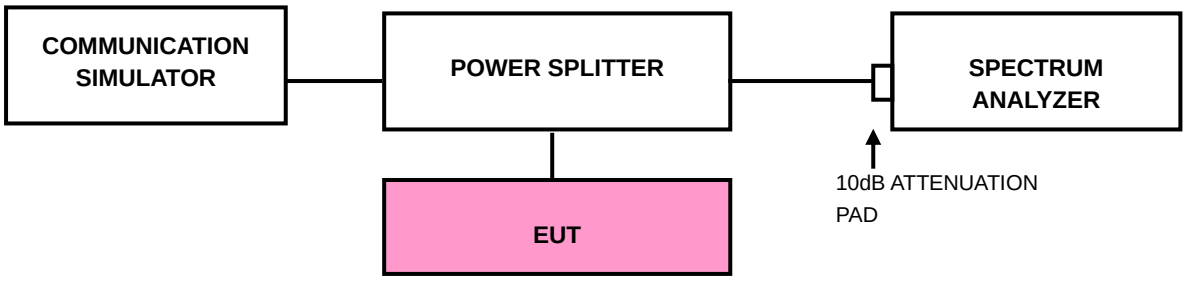
(1)The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm

### 3.5.2 TEST PROCEDURE

a. The EUT makes a phone call to the communication simulator. All measurements were done at middle operational frequency range.

b. Measuring frequency range is from 9kHz up to a frequency including its 10$^{th}$ harmonic. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

### 3.5.3 TEST SETUP



### 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.

Refer to the original source report (Report No.: 77535RRF.004, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151).

## 3.6 RADIATED EMISSION MEASUREMENT

### 3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

(1)The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm

### 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. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

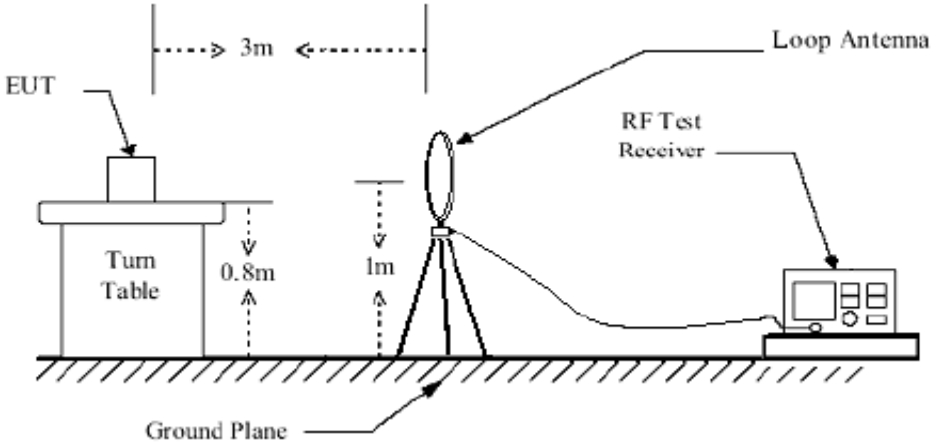
**NOTE:** The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

### 3.6.3 DEVIATION FROM TEST STANDARD

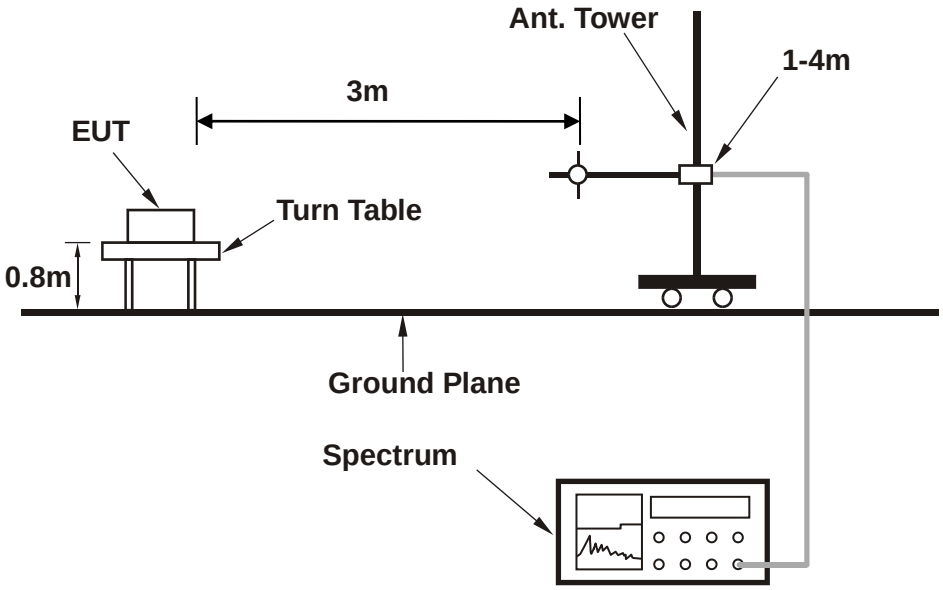
No deviation

## 3.6.4 TEST SETUP

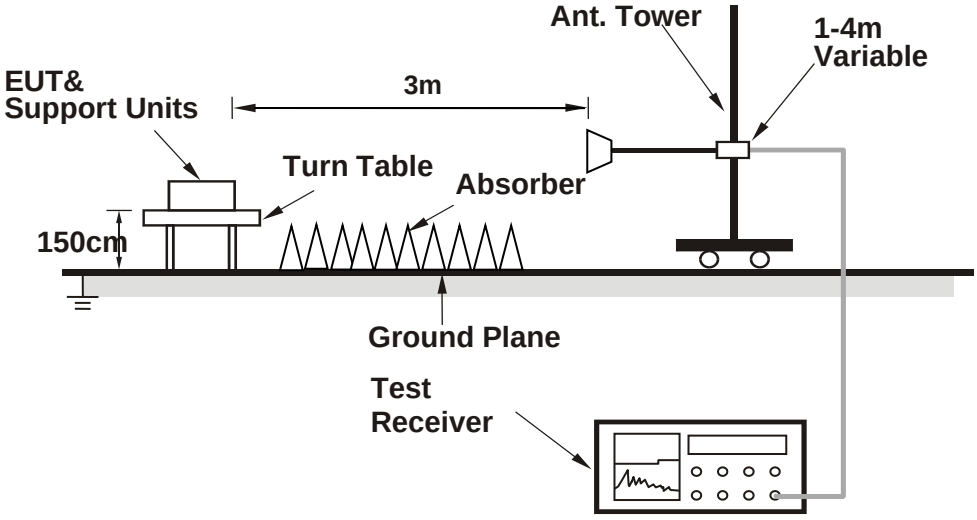
**<Below 30MHz>**




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



**< Frequency Range above 1GHz >**




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

## 3.6.5 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**

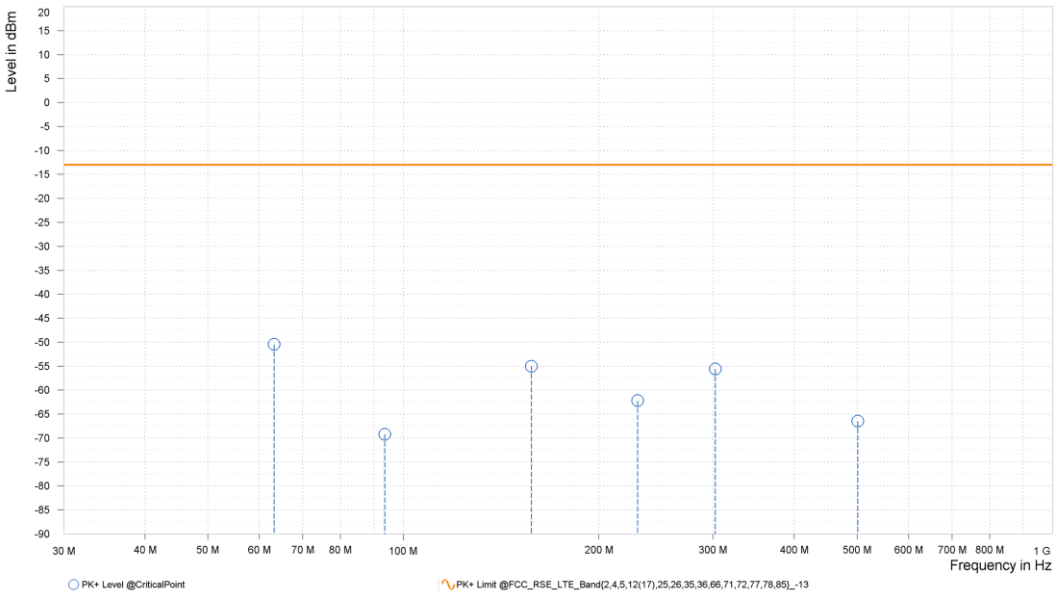
**30 MHz – 1GHz data:**

**CAT-M1 LTE Band 26:**

**CHANNEL BANDWIDTH:3MHz / QPSK**

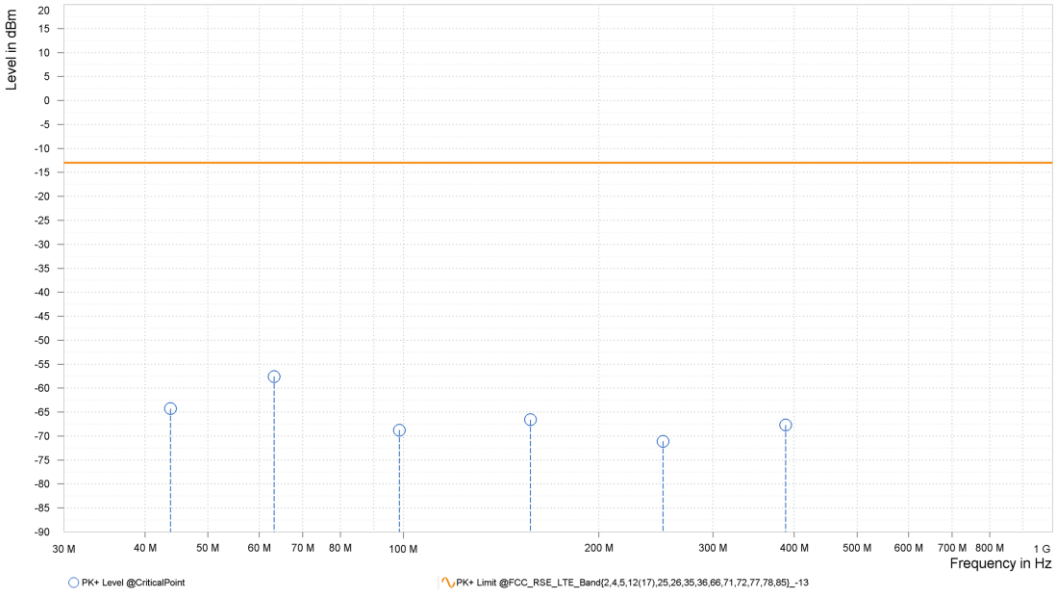
| | | | |
|---|---|---|---|
| **MODE** | TX channel 26705 | **FREQUENCY RANGE** | Below 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Hanwen Xu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 63.250 | -50.46 | -13.00 | 37.46 | 1.87 | H | 354.2 | 2.00 |
| 1 | 93.650 | -69.20 | -13.00 | 56.20 | -1.21 | H | 359 | 2.00 |
| 1 | 157.400 | -55.02 | -13.00 | 42.02 | -4.87 | H | 359 | 2.00 |
| 1 | 229.550 | -62.18 | -13.00 | 49.18 | 2.15 | H | 5.8 | 1.00 |
| 1 | 302.250 | -55.58 | -13.00 | 42.58 | 5.45 | H | 5.8 | 1.00 |
| 2 | 501.333 | -66.47 | -13.00 | 53.47 | 7.29 | H | 359 | 2.00 |



| MODE | TX channel 26705 | FREQUENCY RANGE | Below 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/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 | 43.800 | -64.27 | -13.00 | 51.27 | 5.59 | V | 155 | 1.00 |
| 1 | 63.250 | -57.59 | -13.00 | 44.59 | 0.09 | V | 64.1 | 2.00 |
| 1 | 98.650 | -68.77 | -13.00 | 55.77 | 4.92 | V | 359 | 2.00 |
| 1 | 156.900 | -66.58 | -13.00 | 53.58 | -2.14 | V | 186 | 2.00 |
| 1 | 251.100 | -71.09 | -13.00 | 58.09 | 3.64 | V | 359 | 1.00 |
| 1 | 388.050 | -67.69 | -13.00 | 54.69 | 7.12 | V | 5.1 | 1.00 |



**ABOVE 1GHz**

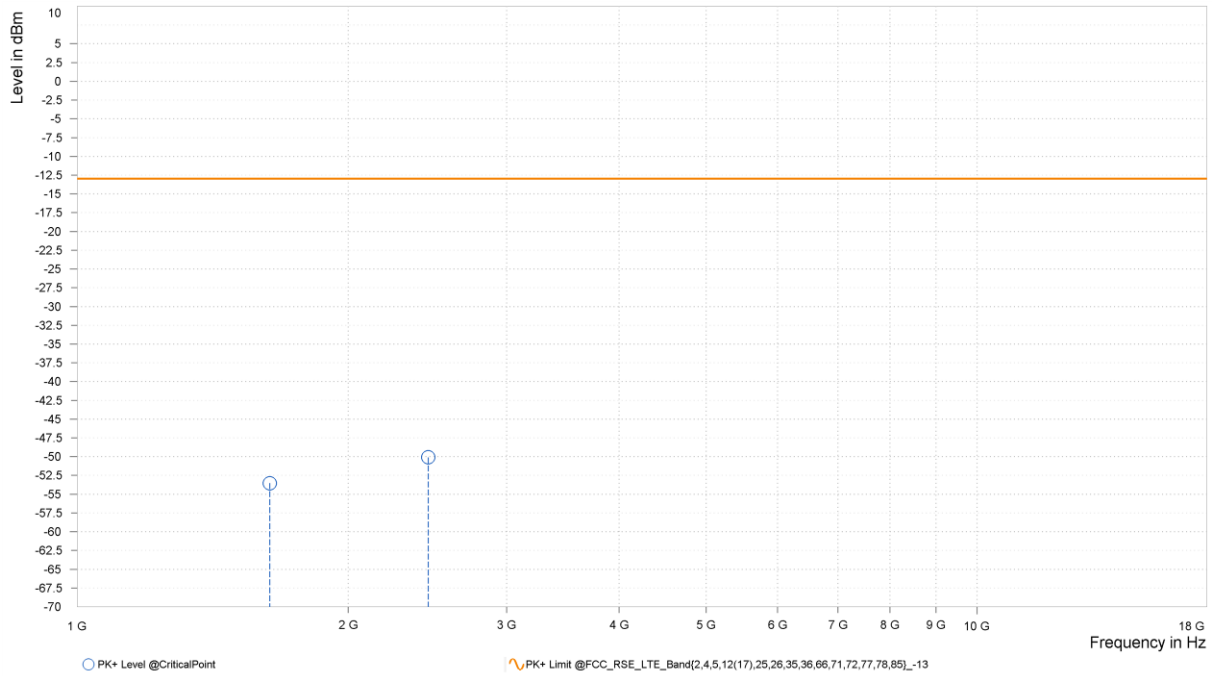
**Note:** For higher frequency, the emission is too low to be detected.

**LTE BAND 26**

**CHANNEL BANDWIDTH: 1.4MHz / QPSK**

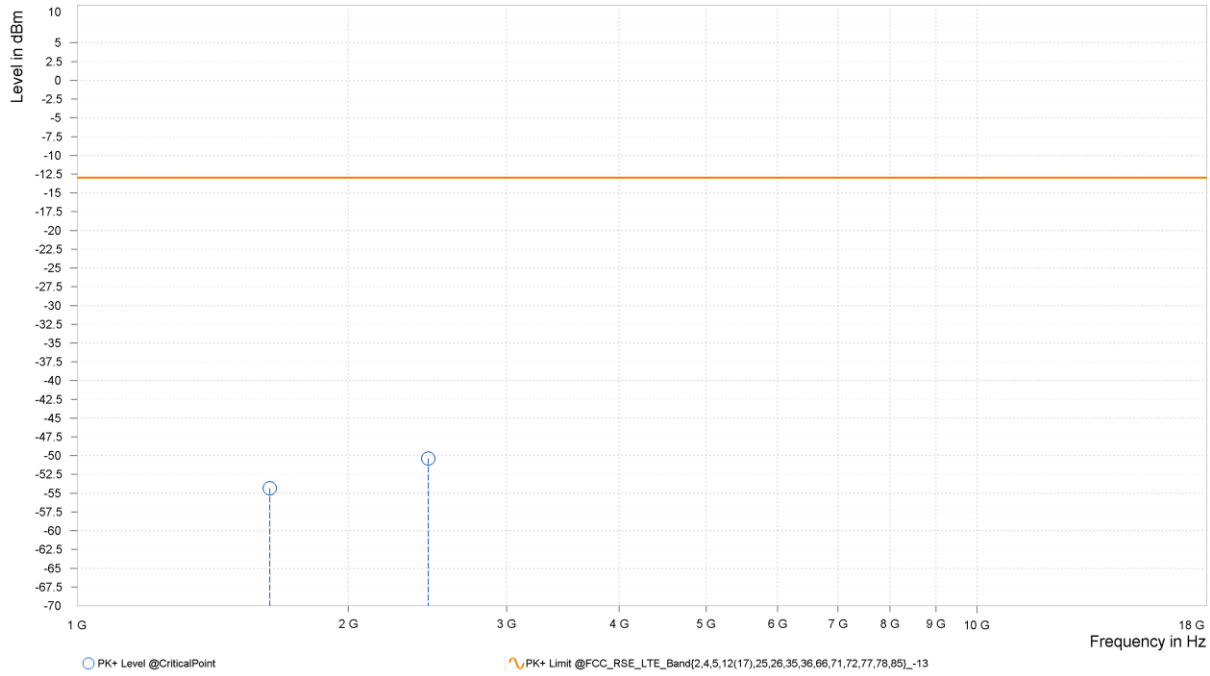
| | | | |
|---|---|---|---|
| **MODE** | TX channel 26697 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Hanwen Xu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,636.740 | -53.54 | -13.00 | 40.54 | 6.39 | H | 353.5 | 2.00 |
| 1 | 2,455.110 | -50.08 | -13.00 | 37.08 | 12.51 | H | 0.9 | 2.00 |



| MODE | TX channel 26697 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/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 | 1,636.740 | -54.35 | -13.00 | 41.35 | 6.01 | V | 359 | 2.00 |
| 1 | 2,455.110 | -50.37 | -13.00 | 37.37 | 12.28 | V | 5.1 | 1.00 |

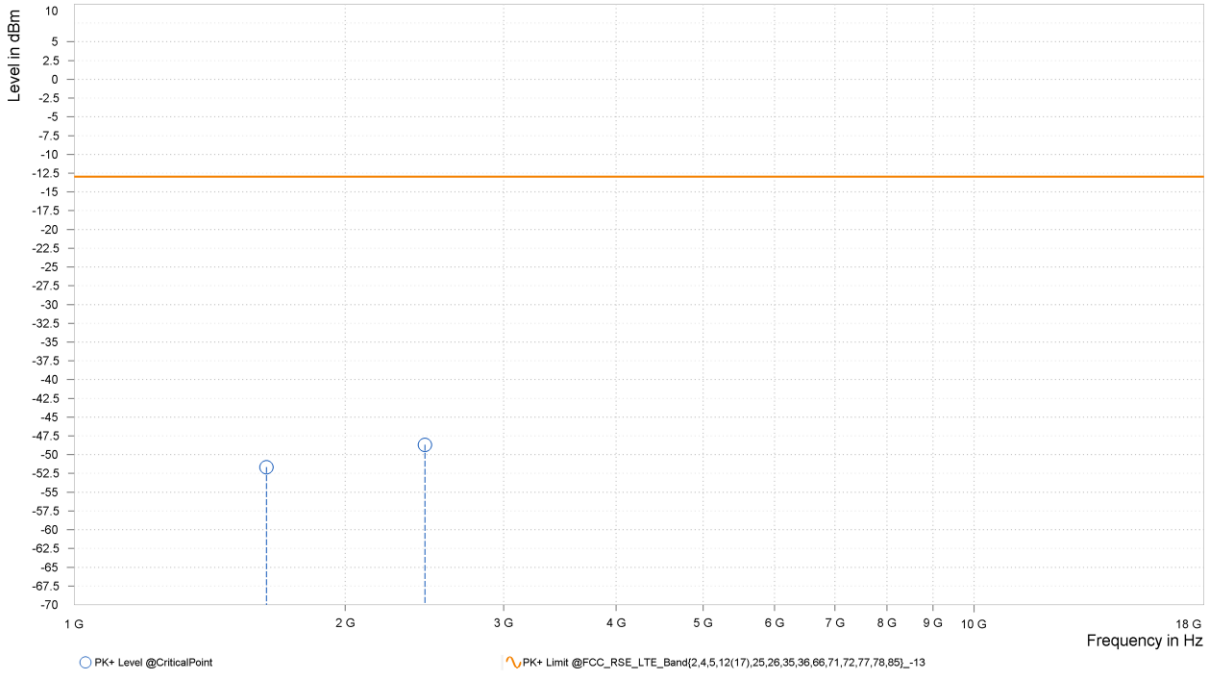


**CHANNEL BANDWIDTH: 3MHz / QPSK**

**CH26705**

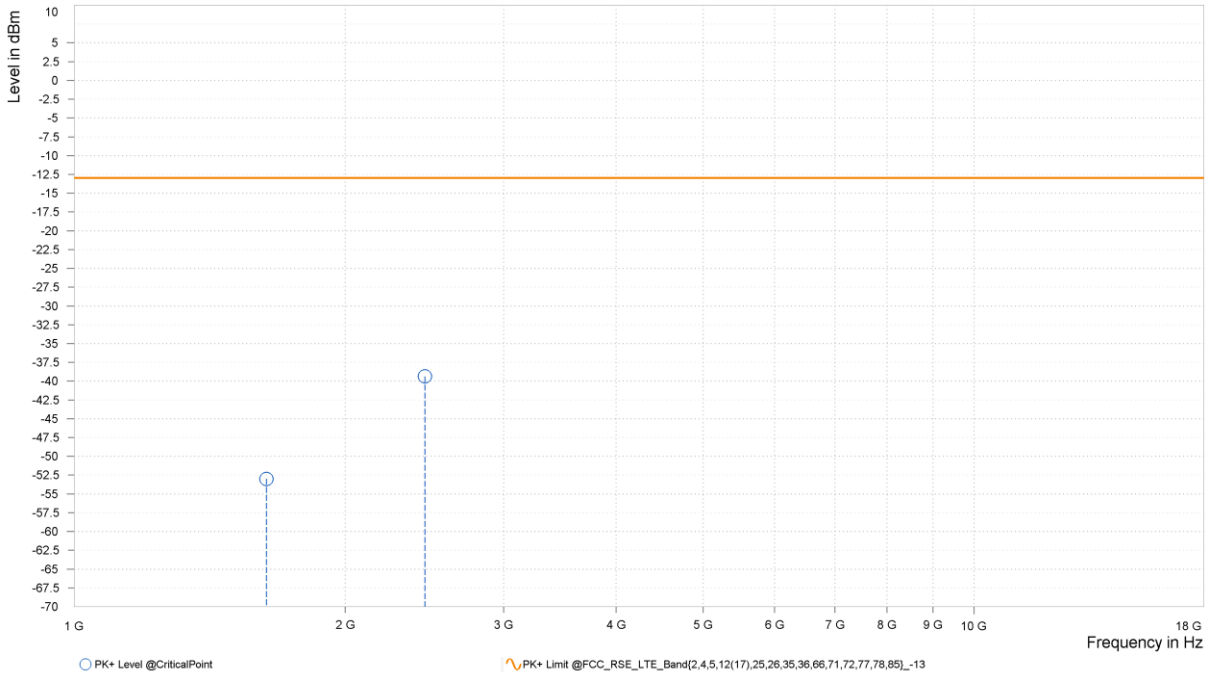
| | | | |
|---|---|---|---|
| **MODE** | TX channel 26705 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Hanwen Xu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,635.300 | -51.67 | -13.00 | 38.67 | 6.34 | H | 359 | 2.00 |
| 1 | 2,452.950 | -48.69 | -13.00 | 35.69 | 12.52 | H | 359 | 2.00 |



| MODE | TX channel 26705 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Hanwen Xu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

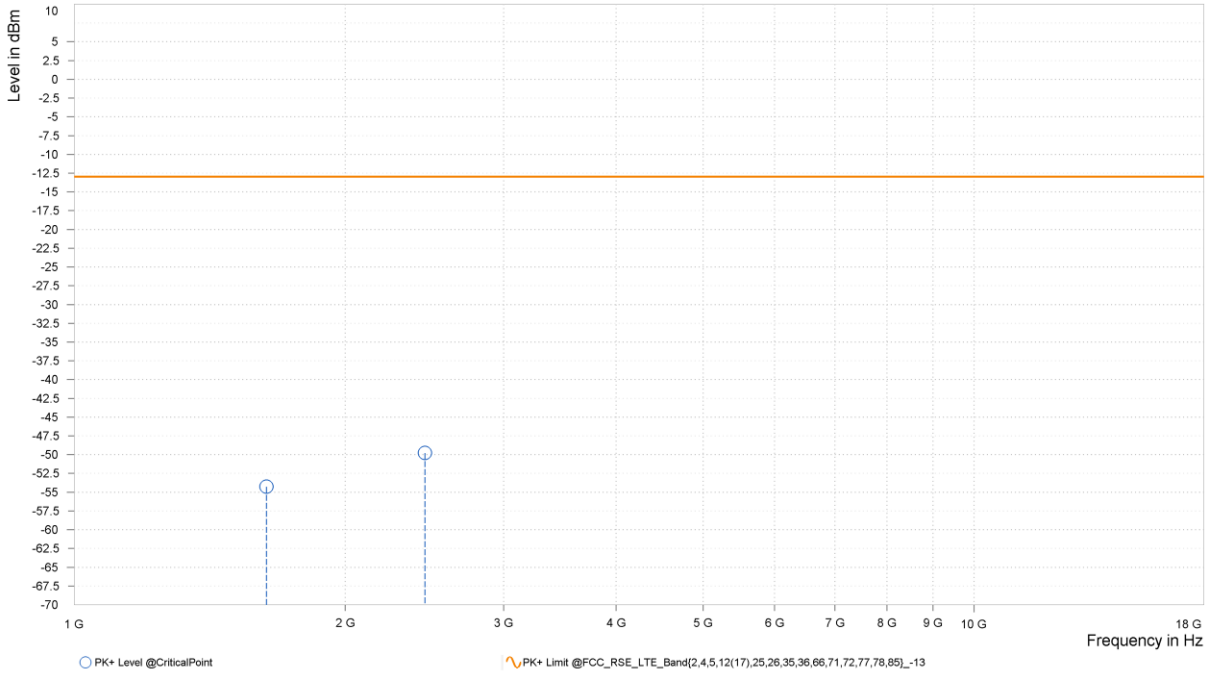
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,635.300 | -52.99 | -13.00 | 39.99 | 5.97 | V | 5.2 | 1.00 |
| 1 | 2,452.950 | -39.37 | -13.00 | 26.37 | 12.30 | V | 5.2 | 1.00 |



**CH 26740**

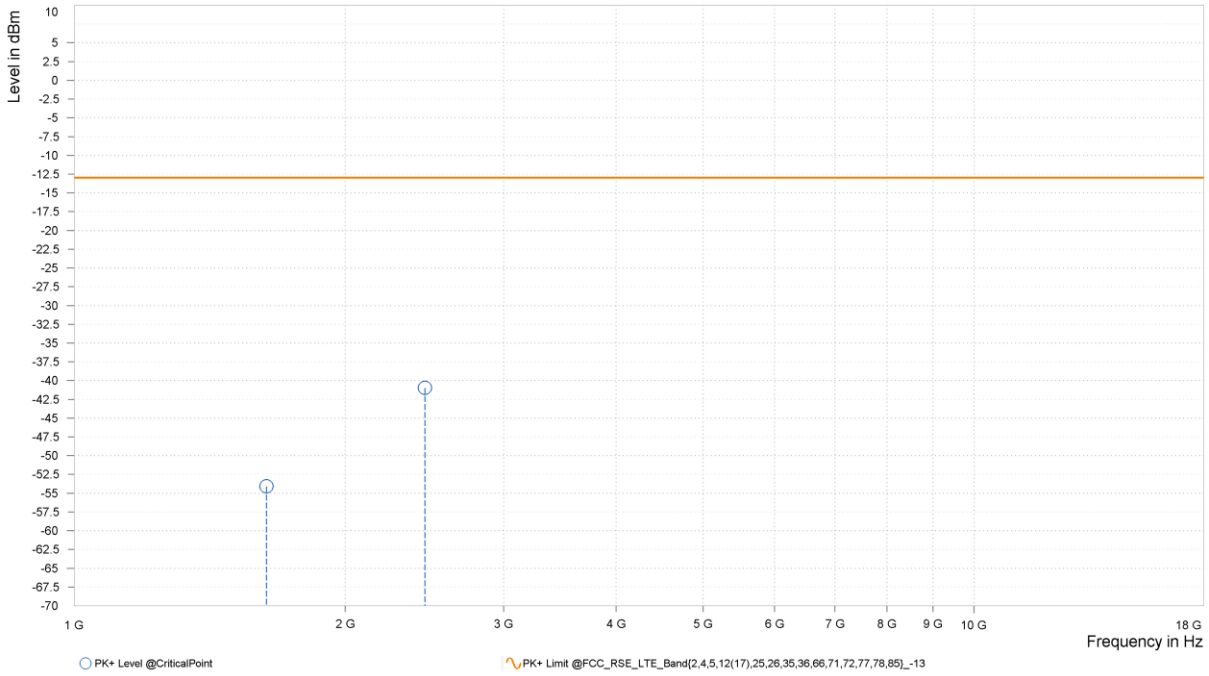
| MODE | TX channel 26740 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Hanwen Xu | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,635.300 | -54.28 | -13.00 | 41.28 | 6.34 | H | 1 | 1.00 |
| 1 | 2,452.950 | -49.77 | -13.00 | 36.77 | 12.52 | H | 354.9 | 2.00 |



| MODE | TX channel 26740 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Hanwen Xu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

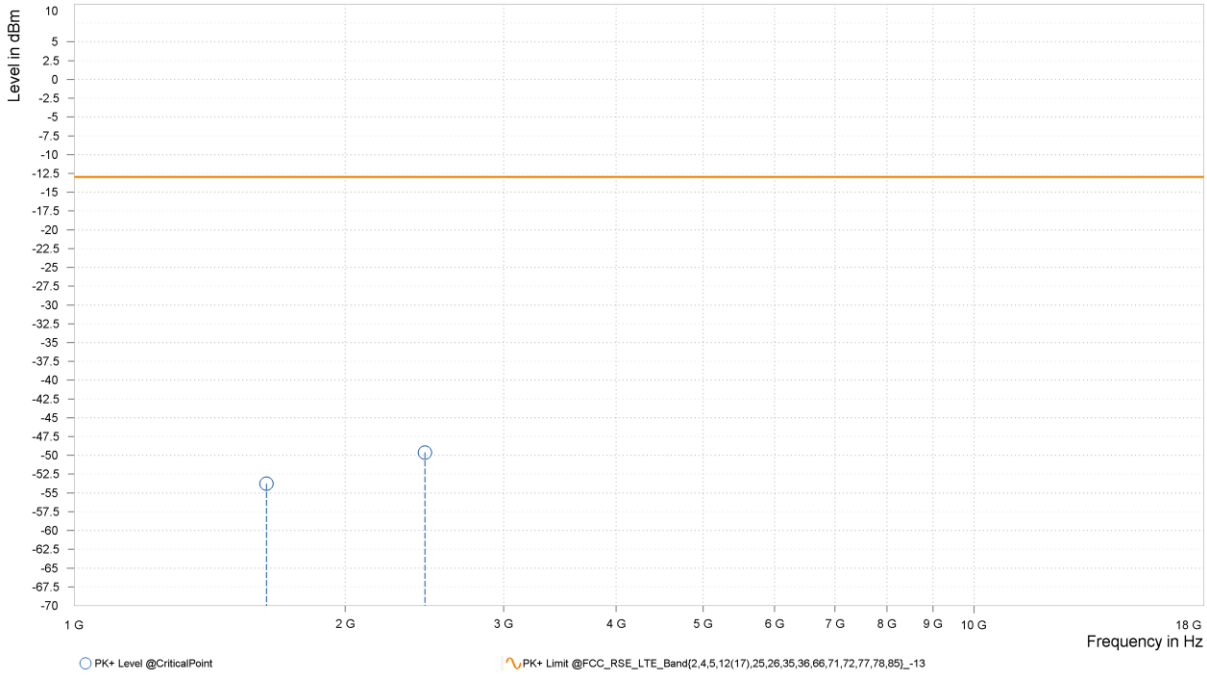
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,635.300 | -54.09 | -13.00 | 41.09 | 5.97 | V | 354.9 | 2.00 |
| 1 | 2,452.950 | -40.96 | -13.00 | 27.96 | 12.30 | V | 358.7 | 1.00 |



**CH 26775**

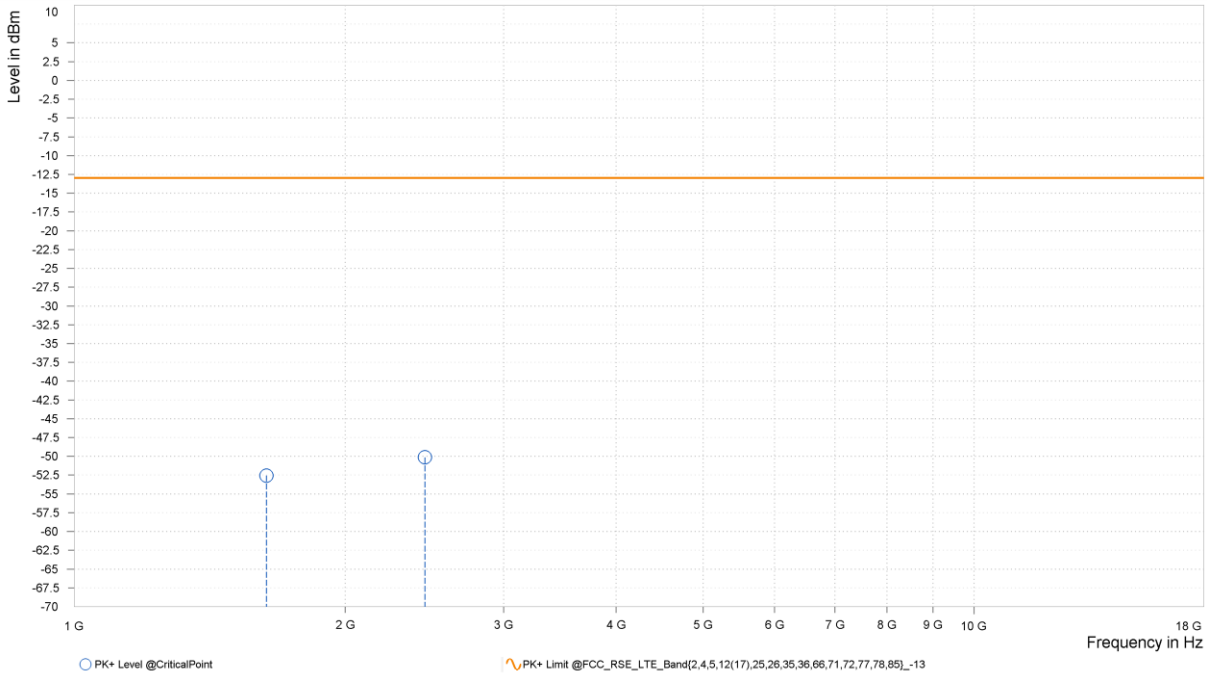
| MODE | TX channel 26775 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Hanwen Xu | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,635.300 | -53.78 | -13.00 | 40.78 | 6.34 | H | 359.1 | 1.00 |
| 1 | 2,452.950 | -49.61 | -13.00 | 36.61 | 12.52 | H | 359.1 | 1.00 |



| MODE | TX channel 26775 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Hanwen Xu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

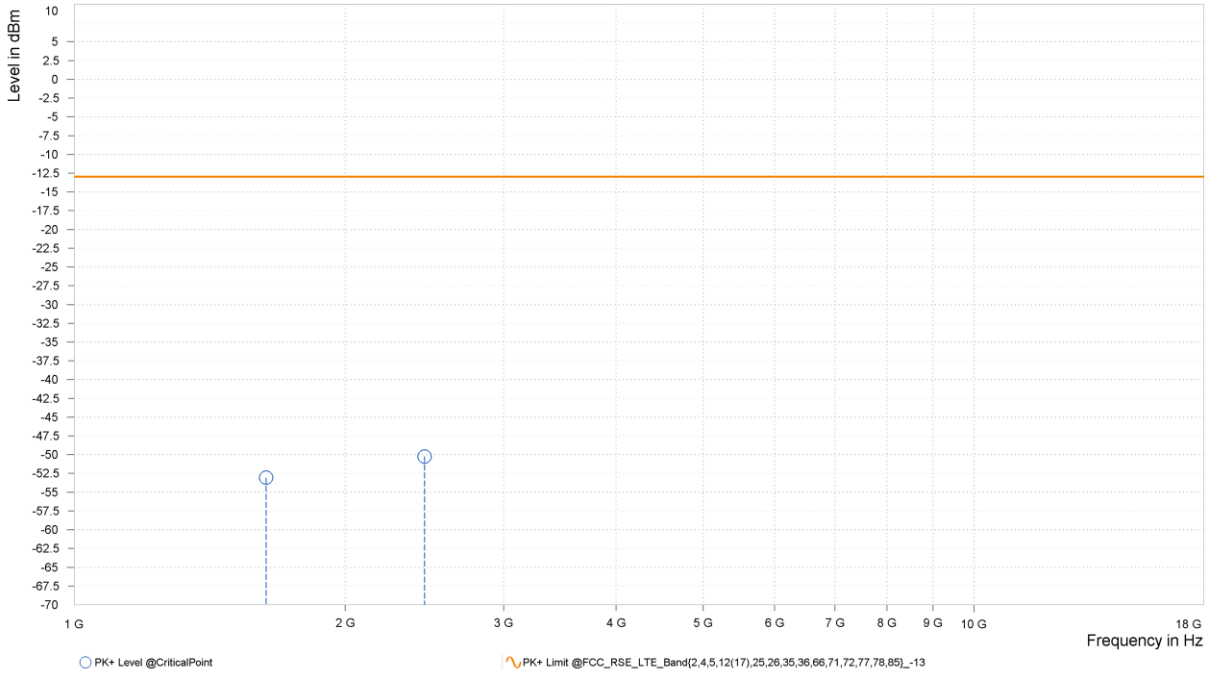
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,635.300 | -52.55 | -13.00 | 39.55 | 5.97 | V | 4.5 | 1.00 |
| 1 | 2,452.950 | -50.14 | -13.00 | 37.14 | 12.30 | V | 4.5 | 1.00 |



**CHANNEL BANDWIDTH: 5MHz / QPSK**

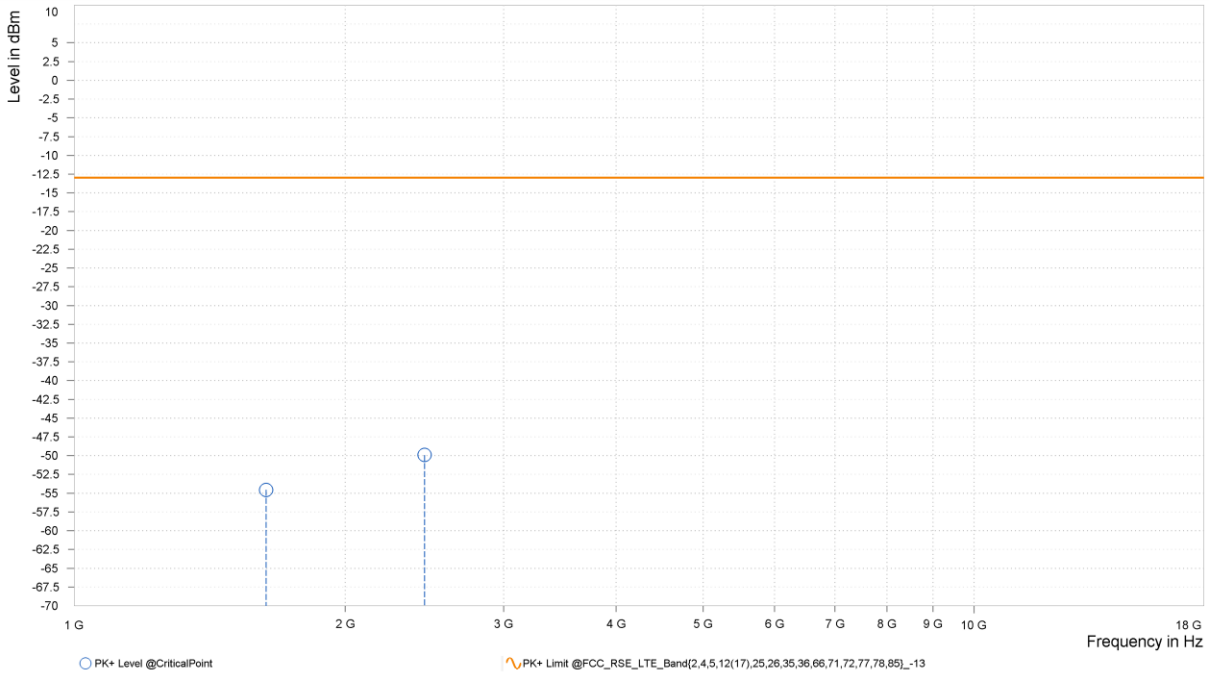
| | | | |
|---|---|---|---|
| **MODE** | TX channel 26740 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Hanwen Xu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,633.500 | -53.08 | -13.00 | 40.08 | 6.25 | H | 1.4 | 2.00 |
| 1 | 2,450.250 | -50.24 | -13.00 | 37.24 | 12.54 | H | 239.8 | 1.00 |



| MODE | TX channel 26740 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Hanwen Xu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

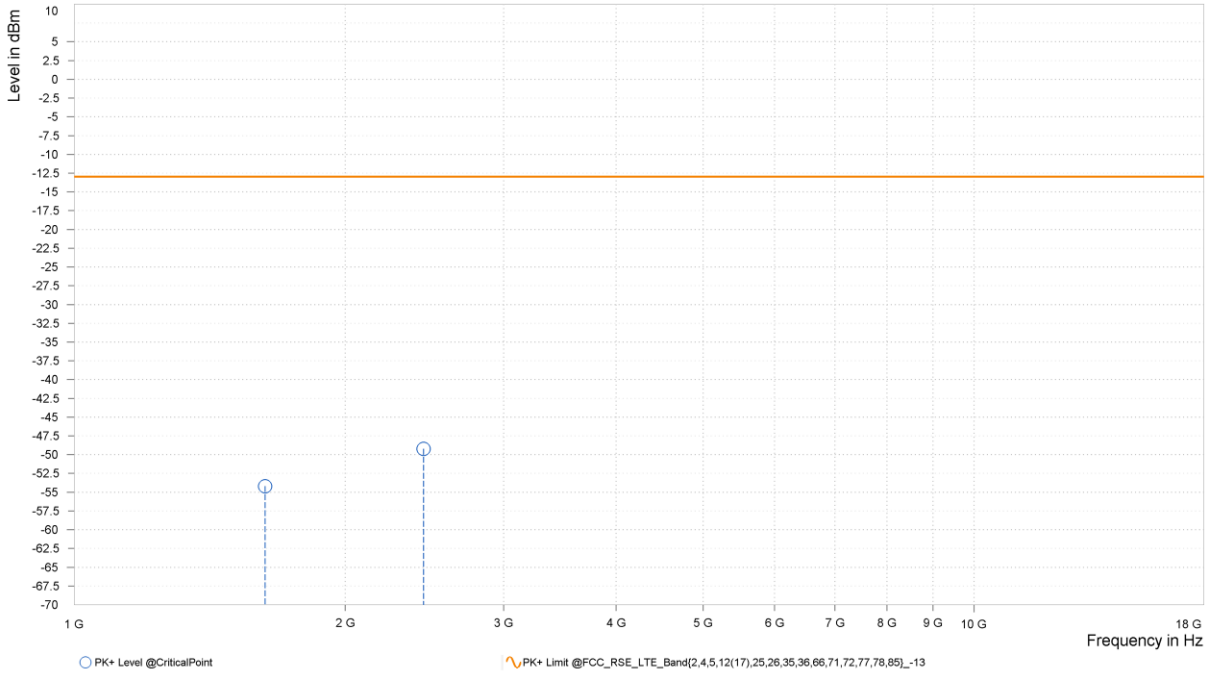
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,633.500 | -54.56 | -13.00 | 41.56 | 5.90 | V | 0.9 | 2.00 |
| 1 | 2,450.250 | -49.90 | -13.00 | 36.90 | 12.33 | V | 5.1 | 1.00 |



**CHANNEL BANDWIDTH: 10MHz / QPSK**

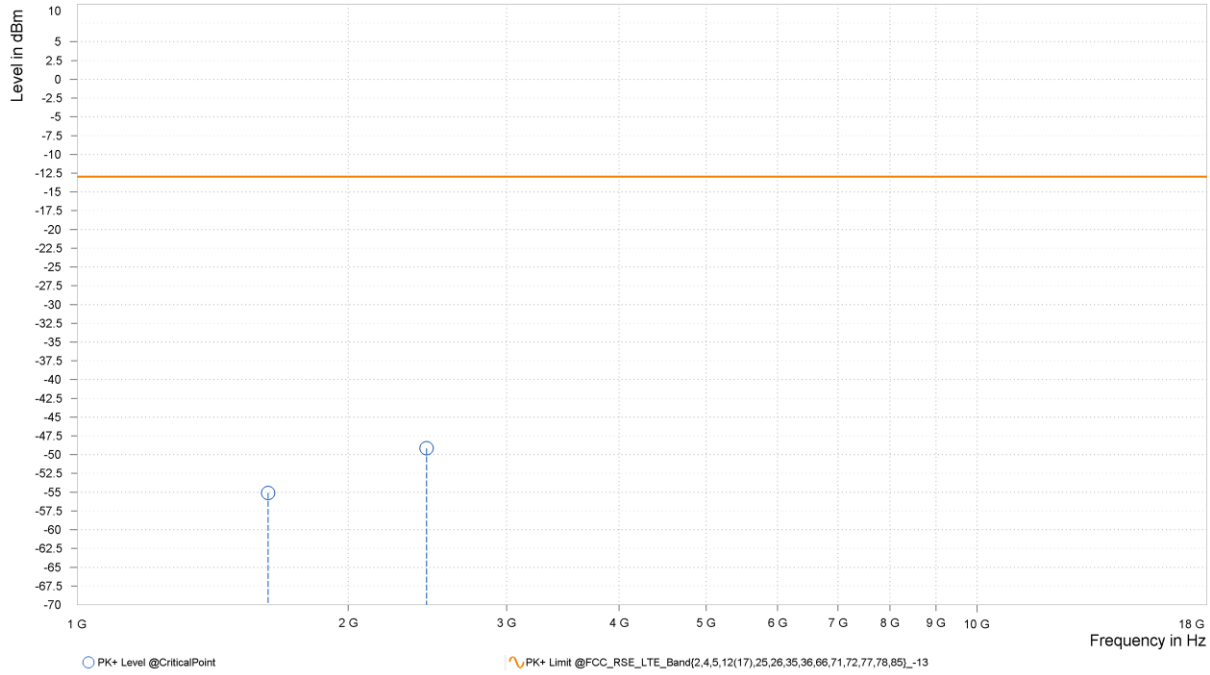
| | | | |
|---|---|---|---|
| **MODE** | TX channel 26740 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Hanwen Xu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,629.000 | -54.20 | -13.00 | 41.20 | 6.09 | H | 336.5 | 1.00 |
| 1 | 2,443.500 | -49.22 | -13.00 | 36.22 | 12.57 | H | 336.5 | 1.00 |



| MODE | TX channel 26740 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Hanwen Xu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

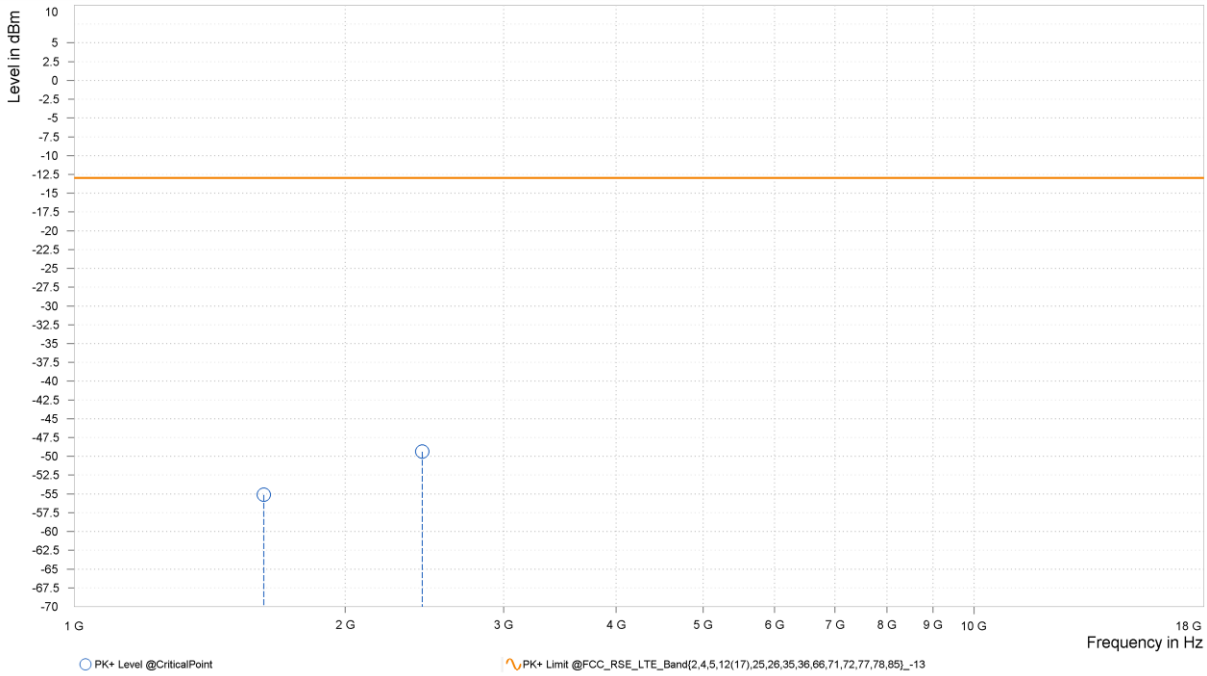
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,629.000 | -55.10 | -13.00 | 42.10 | 5.80 | V | 5.1 | 1.00 |
| 1 | 2,443.500 | -49.16 | -13.00 | 36.16 | 12.40 | V | 358.6 | 1.00 |



**CHANNEL BANDWIDTH: 15MHz / QPSK**

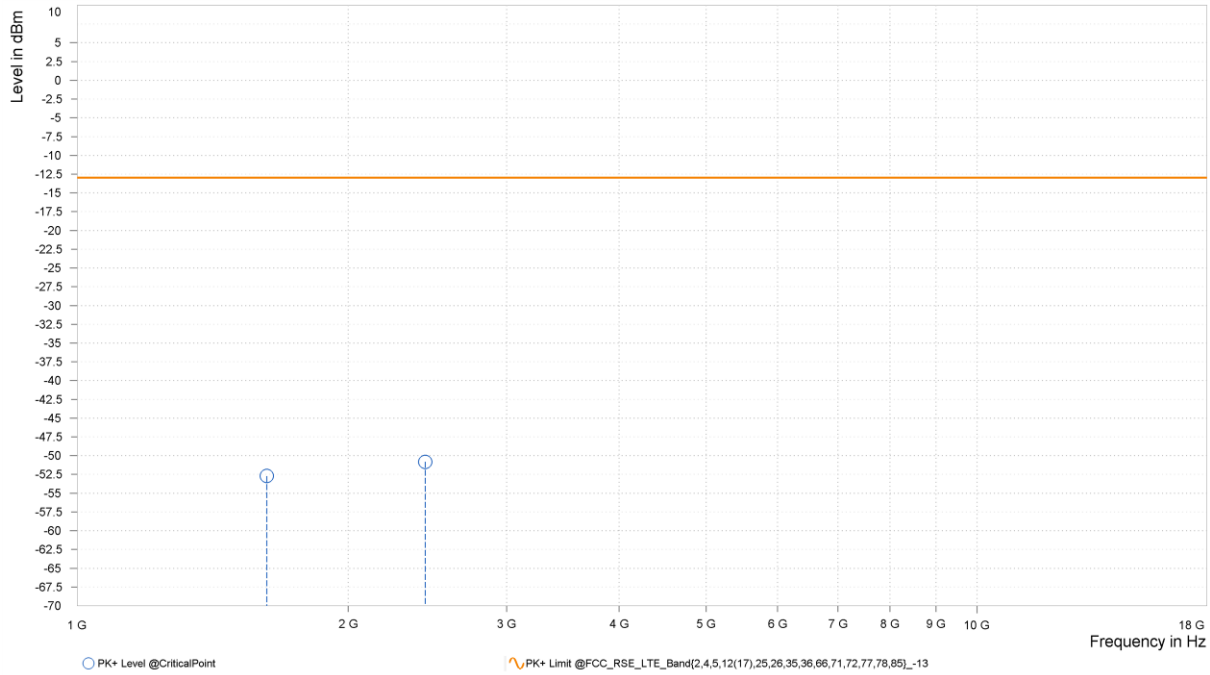
| | | | |
|---|---|---|---|
| **MODE** | TX channel 26740 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Hanwen Xu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,624.500 | -55.12 | -13.00 | 42.12 | 5.93 | H | 359 | 2.00 |
| 1 | 2,436.750 | -49.39 | -13.00 | 36.39 | 12.61 | H | 247 | 1.00 |



| MODE | TX channel 26740 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/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 | 1,624.500 | -52.71 | -13.00 | 39.71 | 5.69 | V | 355 | 2.00 |
| 1 | 2,436.750 | -50.82 | -13.00 | 37.82 | 12.47 | V | 355 | 2.00 |



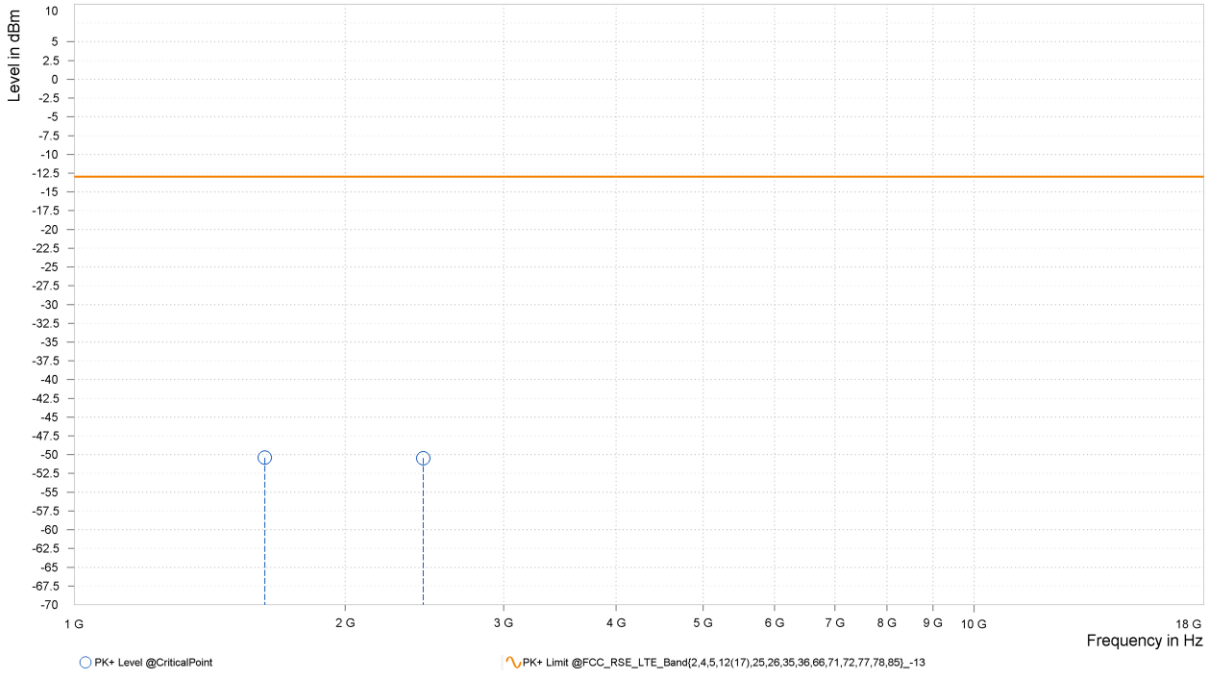
**NB-IOT LTE Band 26:**

**CHANNEL BANDWIDTH: QPSK**

**CH26692**

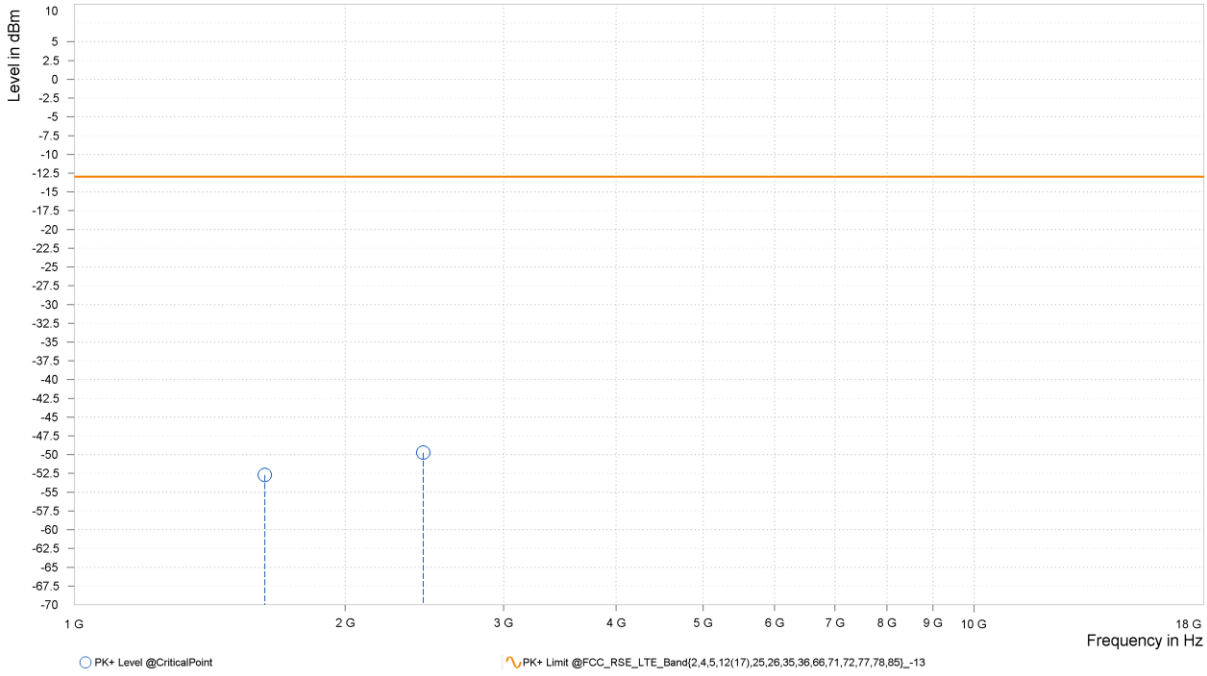
| | | | |
|---|---|---|---|
| **MODE** | TX channel 26692 | **FREQUENCY RANGE** | Below 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Hanwen Xu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,628.200 | -50.41 | -13.00 | 37.41 | 6.05 | H | 224.2 | 1.00 |
| 1 | 2,442.300 | -50.47 | -13.00 | 37.47 | 12.58 | H | 353.5 | 2.00 |



| MODE | TX channel 26692 | FREQUENCY RANGE | Below 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Hanwen Xu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

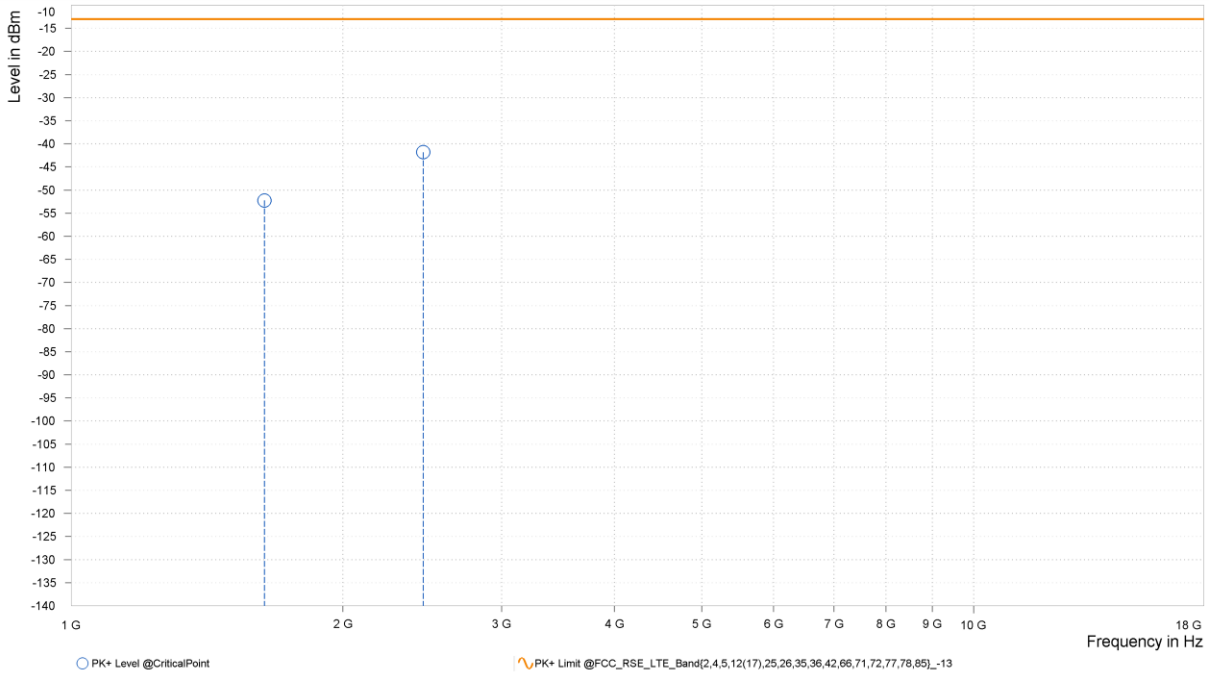
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,628.200 | -52.71 | -13.00 | 39.71 | 5.77 | V | 357 | 1.00 |
| 1 | 2,442.300 | -49.73 | -13.00 | 36.73 | 12.41 | V | 357 | 1.00 |



**CH 26740**

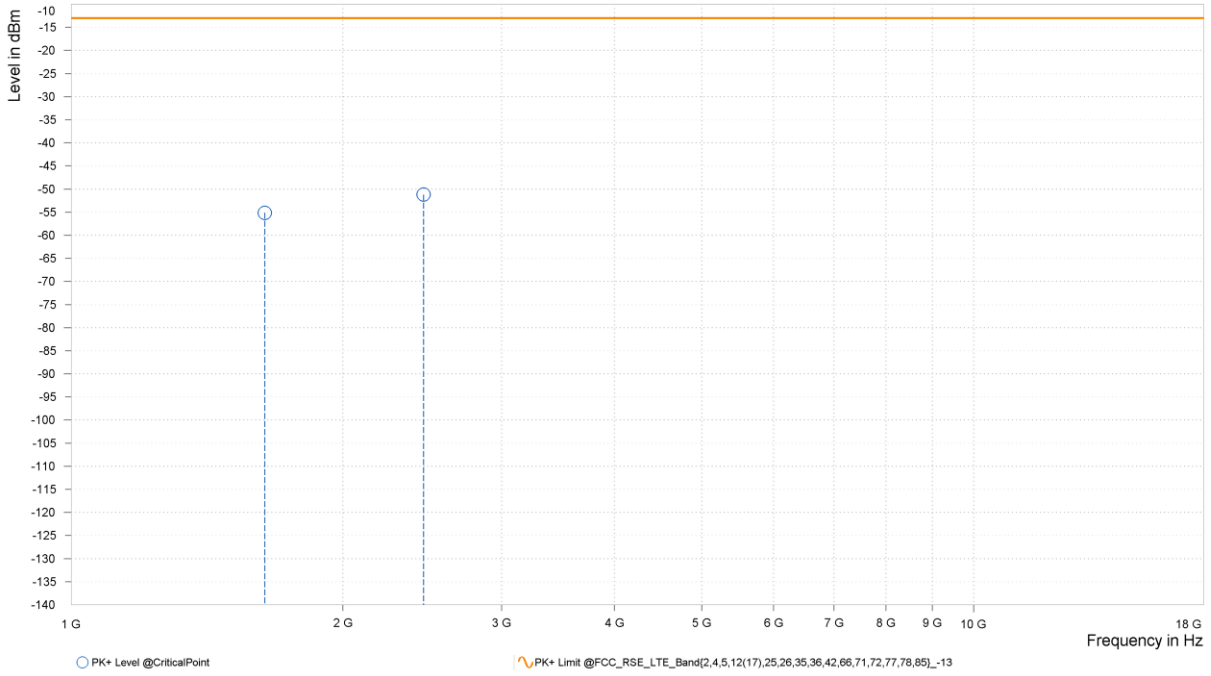
| MODE | TX channel 26740 | FREQUENCY RANGE | Below 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Hanwen Xu | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,637.500 | -52.24 | -13.00 | 39.24 | 13.66 | H | 0.9 | 2.00 |
| 3 | 2,454.500 | -41.82 | -13.00 | 28.82 | 19.41 | H | 333.9 | 1.00 |



| MODE | TX channel 26740 | FREQUENCY RANGE | Below 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Hanwen Xu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

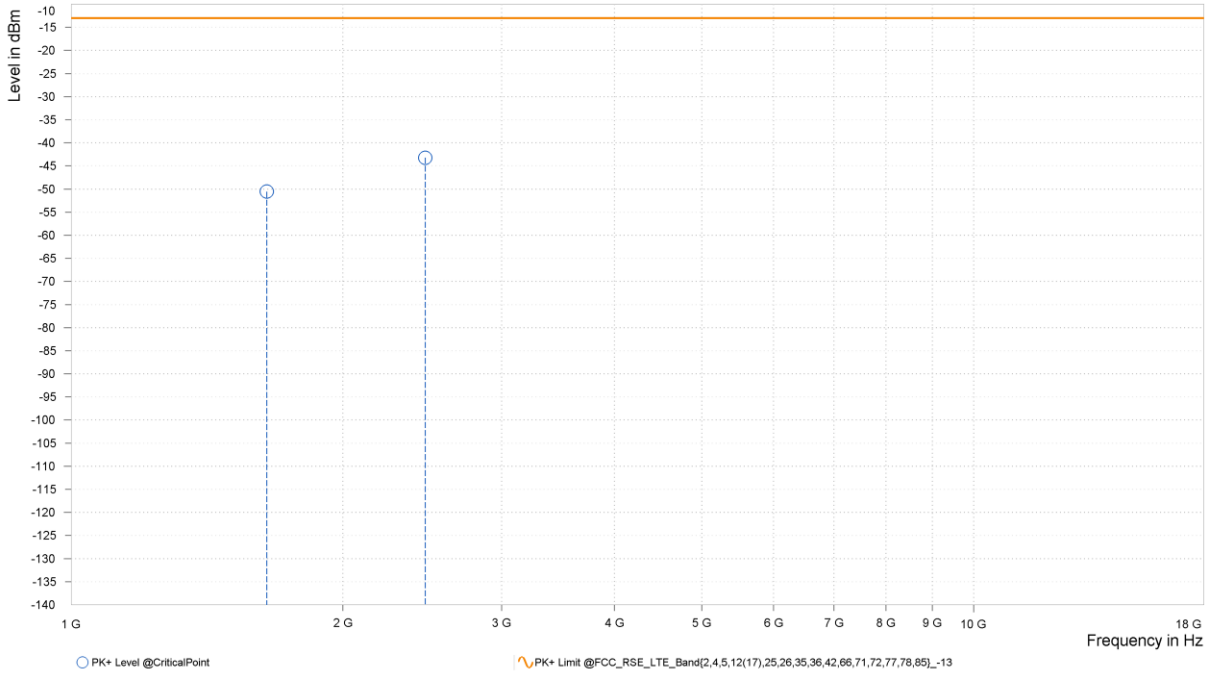
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,638.000 | -55.16 | -13.00 | 42.16 | 13.69 | V | 359 | 2.00 |
| 3 | 2,457.000 | -51.20 | -13.00 | 38.20 | 19.40 | V | 236.2 | 1.00 |



**CH 26788**

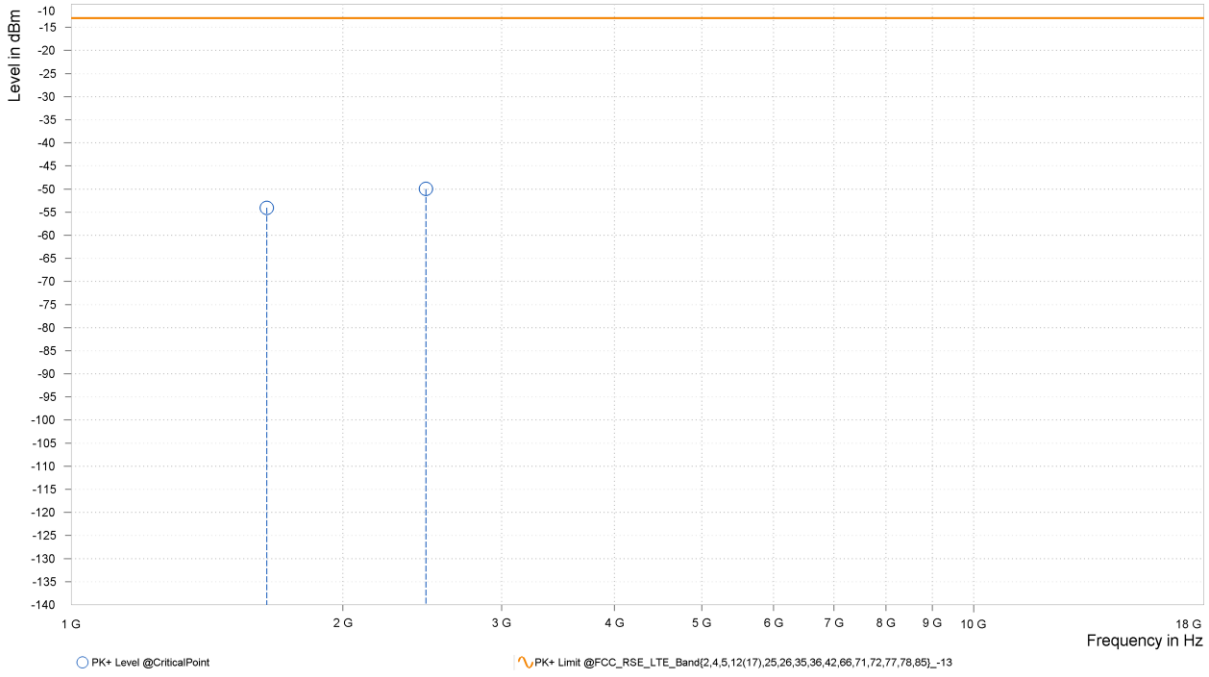
| MODE | TX channel 26788 | FREQUENCY RANGE | Below 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Hanwen Xu | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,647.500 | -50.57 | -13.00 | 37.57 | 14.01 | H | 358.8 | 1.00 |
| 3 | 2,468.500 | -43.22 | -13.00 | 30.22 | 19.18 | H | 176.8 | 2.00 |



| MODE | TX channel 26788 | FREQUENCY RANGE | Below 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/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 | 1,647.600 | -54.08 | -13.00 | 41.08 | 13.66 | V | 359.1 | 1.00 |
| 3 | 2,471.400 | -50.00 | -13.00 | 37.00 | 19.50 | V | 120.9 | 2.00 |

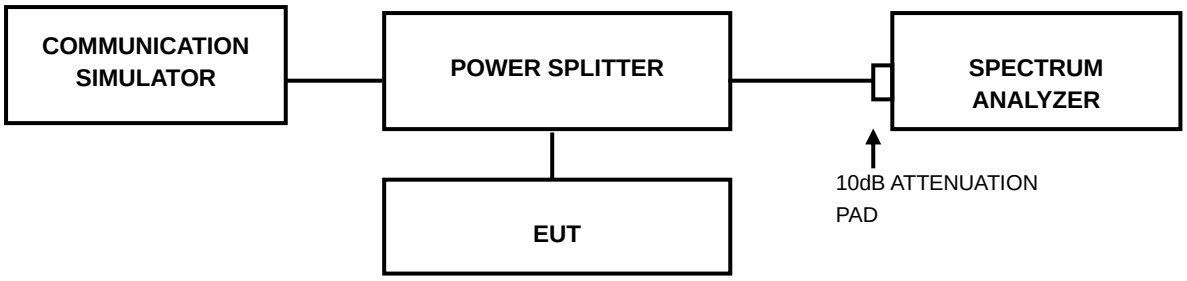


## 3.7 PEAK TO AVERAGE RATIO

### 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 ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

## 3.7.4 TEST RESULTS

Refer to the original source report (Report No.: 77535RRF.004, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151).

# 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.

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.

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

**Suzhou EMC/RF Lab**:
Tel: +86 (0557) 368 1008

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

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

**--END--**