Certificate #6613.01

# FCC TEST REPORT

# (PART 22)

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

| | |
|---|---|
| Manufacturer or Supplier: | HMD Global Oy |
| Address: | Bertel Jungin aukio 9, 02600 Espoo, Finland |
| Product: | Mobile phone |
| Brand Name: | NOKIA |
| Model Name: | TA-1541 |
| FCC ID: | 2AJOTTA-1541 |
| Date of tests: | Sep. 04, 2023 ~ Sep. 12, 2023 |

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

☒ **FCC PART 22, Subpart H** ☒ **FCC Part 2**
☒ **ANSI/TIA/EIA-603-D** ☒ **ANSI C63.26-2015**
☒ **ANSI/TIA/EIA-603-E**

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

| Prepared by Chao Wu<br>Engineer / Mobile Department | Approved by Peibo Sun<br>Manager / Mobile Department |
|---|---|
| Chao Wu<br>Date: Sep. 12, 2023 | Sun Peibo<br>Date: Sep. 12, 2023 |

*This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/ and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.*

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# RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|---|---|---|
| W7L-P23010004-2RF01 | Original release | Feb. 23, 2023 |
| PSU-QSU2309010210RF01 | Based on the original product adding 2G PA second supply. The FX5196 add 2nd supply FX5596Y, raw material of Wafer and the printing model have changes. The IC design has not changed and there is no impact on BT and WIFI, other has not changed. This report verify the GSM850,EDGE850 and replace the test result. | Sep. 12, 2023 |

# 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 22 & Part 2 | | | |
|---|---|---|---|
| **STANDARD SECTION** | **TEST TYPE** | **RESULT** | **Test lab*** |
| §2.1046 | Conducted Output Power | Compliance | A |
| §22.913 (a)(5) | Effective Radiated Power | Compliance | A |
| §2.1055<br>§22.355 | Frequency Stability | Compliance | A |
| §2.1049 | Occupied Bandwidth | Compliance | A |
| §22.913 (d) | Peak to average ratio* | Compliance | A |
| §22.917(a) | Band Edge Measurements | Compliance | A |
| §2.1051<br>§22.917(a) | Conducted Spurious Emissions | Compliance | A |
| §2.1053<br>§22.917(a) | Radiated Spurious Emissions | Compliance | A |

**NOTE:**

1. This report refers to the data of W7L-P23010004-1RF01(model:TA-1536, FCC ID: 2AJOTTA-1536), the difference of TA-1536 and TA-1541 is TA-1541 change model name, TA-1536 is dual card, TA-1541 is single card, and functions are realized through softwareIn. The test data of this report is copied from the report W7L-P23010004-1RF01(model:TA-1536, FCC ID: 2AJOTTA-1536).
2. Based on the original product adding 2G PA second supply. The FX5196 add 2nd supply FX5596Y, raw material of Wafer and the printing model have changes. The IC design has not changed and there is no impact on BT and WIFI, other has not changed. This report verify the GSM850,EDGE850 and replace the test result.

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

***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 (30MHz~1GMHz) | ±4.98dB |
| Radiated emissions (1GMHz ~6GMHz) | ±4.70dB |
| Radiated emissions (6GMHz ~18GMHz) | ±4.60dB |
| Radiated emissions (18GMHz ~40GMHz) | ±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.

## 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.16,22 | Feb.15,24 |
| Signal Generator | R&S | SMB100A | 182185 | Feb.16,22 | Feb.15,24 |
| 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 | Feb.25,22 | Feb.24,24 |
| EMI TEST Receiver | R&S | ESW44 | 101973 | Feb.25,22 | Feb.24,24 |
| Bilog Antenna | SCHWARZBECK | VULB 9163 | 1264 | Feb.28,22 | Feb.27,24 |
| 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 | 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 |
| 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 | Oct.27,23 |
| CABLE | R&S | W12.14 | N/A | Apr.28,23 | Oct.27,23 |
| CABLE | R&S | J12J103539-00-1 | SEP-03-20-069 | Apr.28,23 | Oct.27,23 |
| CABLE | R&S | J12J103539-00-1 | SEP-03-20-070 | Apr.28,23 | Oct.27,23 |
| Temperature Chamber | votsch | VT4002 | 58566078100050 | May.31,22 | May.30,24 |

**NOTE:** 1. The calibration interval of the above test instruments is 6 months or 24 months or 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.

# 2 GENERAL INFORMATION

## 2.1 GENERAL DESCRIPTION OF EUT

| | | |
|---|---|---|
| **PRODUCT*** | Mobile phone | |
| **BRAND NAME*** | NOKIA | |
| **MODEL NAME*** | TA-1541 | |
| **NOMINAL VOLTAGE*** | 5.0Vdc(adapter)<br>3.85Vdc (Li-ion, battery) | |
| **MODULATION TYPE** | **GSM/EDGE** | GMSK,8PSK |
| | **WCDMA** | HSDPA/HSUPA/DC-HSDPA /HSPA+ |
| | **LTE** | QPSK/16QAM/64QAM |
| **FREQUENCY RANGE** | **GSM/EDGE** | 824.2MHz ~ 848.8MHz |
| | **WCDMA** | 826.4MHz ~ 846.6MHz |
| | **LTE Band 5 (Channel Bandwidth: 1.4MHz)** | 824.7MHz ~ 848.3MHz |
| | **LTE Band 5 (Channel Bandwidth: 3MHz)** | 825.5MHz ~ 847.5MHz |
| | **LTE Band 5 (Channel Bandwidth: 5MHz)** | 826.5MHz ~ 846.5MHz |
| | **LTE Band 5 (Channel Bandwidth: 10MHz)** | 829MHz ~ 844MHz |
| **MAX. ERP POWER** | **GSM** | 653.13mW |
| | **EDGE** | 124.17mW |
| | **WCDMA** | 106.91mW |
| | **LTE Band 5 (Channel Bandwidth: 1.4MHz)** | 99.08mW |
| | **LTE Band 5 (Channel Bandwidth: 3MHz)** | 98.17mW |
| | **LTE Band 5 (Channel Bandwidth: 5MHz)** | 99.31mW |
| | **LTE Band 5 (Channel Bandwidth: 10MHz)** | 99.77mW |
| **EMISSION DESIGNATORGOGN*** | **GSM** | 244KGXW |
| | **EDGE** | 239KG7W |
| | **WCDMA** | 4M15F9W |
| | **LTE Band 5 (Channel Bandwidth: 1.4MHz)** | QPSK: 1M10G7D |
| | | 16QAM: 1M10W7D |
| | | 64QAM: 1M09W7D |
| | **LTE Band 5 (Channel Bandwidth: 3MHz)** | QPSK: 2M78G7D |
| | | 16QAM: 2M74W7D |
| | | 64QAM: 2M77W7D |

| | | |
|---|---|---|
| | **LTE Band 5 (Channel Bandwidth: 5MHz)** | QPSK: 4M65G7D |
| | | 16QAM: 4M66W7D |
| | | 64QAM: 4M52W7D |
| | **LTE Band 5 (Channel Bandwidth: 10MHz)** | QPSK: 9M06G7D |
| | | 16QAM: 9M00W7D |
| | | 64QAM: 9M06W7D |
| **ANTENNA TYPE*** | Fixed Internal Antenna with -1.3dBi gain for GSM850/ WCDMA V/ LTE B5 | |
| **HW VERSION*** | SPR_S63Q0 | |
| **SW VERSION*** | 00WW_0_090 | |
| **I/O PORTS*** | Refer to user's manual | |
| **CABLE SUPPLIED*** | USB cable1: non-shielded cable, with w/o ferrite core, 1 meter<br>USB cable2: non-shielded cable, with w/o ferrite core, 1 meter<br>USB cable3: non-shielded cable, with w/o ferrite core, 1 meter<br>Earphone: non-shielded cable, with w/o ferrite core, 1.2 meter | |
| **EXTREME TEMPERATURE*** | -20-60 ℃ | |
| **EXTREME VOLTAGE*** | EUT 3.4V - EUT 4.4V | |

**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 |
|---|---|
| **GSM/EDGE** | 1TX/1RX |
| **WCDMA** | 1TX/1RX |
| **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. The product of TA-1541(FCC ID: 2AJOTTA-1541) have version and components manufacturer from a second supplier. The first version is 090, the second one is 103, only the version changes, and the RF parameters do not change, components manufacturer with following changes as below:

| NO. | Change Description | | specificatons | first supplier | specificatons | second supplier |
|---|---|---|---|---|---|---|
| 1 | PCBA | 64GB EMMC | FEMDNN064G-A3A56 BWCTARV11X64G | Longsys | FEMDNN064G-A3A56 BWCTARV11X64G | Biwin |
| 2 | | 2GB LPDDR | FLXC2002G-N2 BWMZEX32H2A-16G-X | Longsys | FLXC2002G-N2 BWMZEX32H2A-16G-X | Biwin |
| 3 | | 3GB LPDDR | FLXC4003G-50 BWMEXX32H2A-24Gb-X | Longsys | FLXC4003G-50 BWMEXX32H2A-24Gb-X | Biwin |

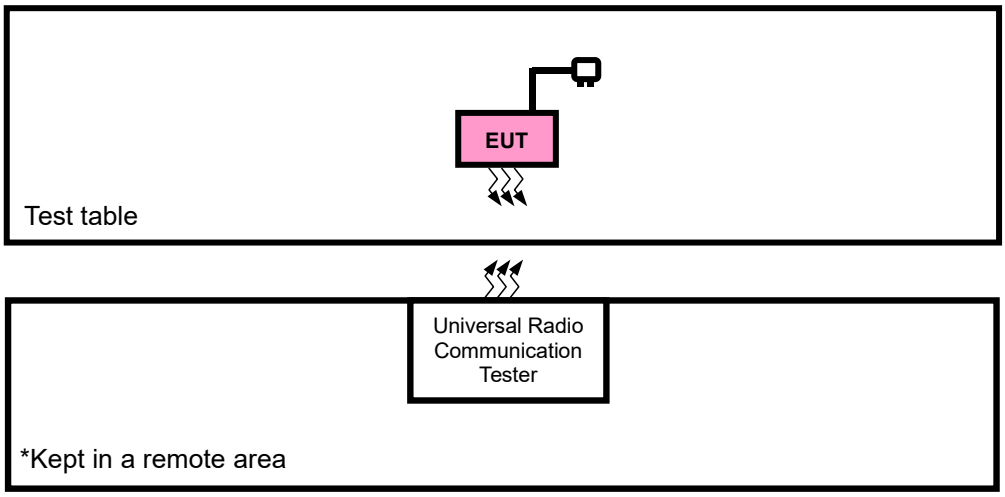
| | | | | | | |
|---|---|---|---|---|---|---|
| 4 | | 4GB LPDDR | FLXC2004G-30 BWMZCX32H2A-32G-X | Longsys | FLXC2004G-30 BWMZCX32H2A-32G-X | Biwin |
| 5 | | PCB | / | KINGSHINE | / | WUZHU |
| 6 | LCM | LCD | 6.517 HKC，360min,400typ, 2.5D | TCL | 6.517 BOE（B8），360min,400typ, 2.5D | Lian Chuang |
| 7 | Front camera | Camera | 8M FF COM | Lian Heyingxiang | 8M FF COM | Shijia |
| 8 | Rear camera | Camera | 13M-AF COB | Lian Heyingxiang | 13M-AF COB | Ruicheng |
| 9 | Macro CAM | Camera | 2M FF | Shijia | 2M FF | Lian Heying xiang |
| 10 | fingerprint | module | Back fingerprint | Hedayuan | Back fingerprint | Sanyingxin |
| 11 | Speaker | | 1712 1W | Dong Sheng | 1712 1W | Xin Rongda |
| 12 | Vibrator | | 1027 FPC | Kai Long | 1027 FPC | Chao Yin |
| 13 | Receiver | | 0809 | Dong Sheng | 0809 | Xin Rongda |
| 14 | FPC | | / | Lante | / | Kaihongxing |
| 15 | Battery | | 5000MAH | Gaoyuan | 5000MAH | Feng Hua |
| 16 | Data cable | | 2A typeC | Yuwei | 2A typeC | Juwei |

6. **List of Accessory:**

| ACCESSORIES | BRAND | MANUFACTURER | MODEL | SPECIFICATION |
|---|---|---|---|---|
| LCD Panel 1 | HKC | MianYang HKC Optoelectronics Technology Co., Ltd. | QM065HS03-1 | 6.517 |
| LCD Panel 2 | BOE | BOE | BV065WBQ-L1B | 6.517 |
| Battery 1 | Nokia | Guangdong Fenghua New Energy Co.,Ltd. | WT510 | Capacity：3.85 Vdc, 4900mAh |
| Battery 2 | Nokia | HUNAN GAOYUAN BATTERY Co., Ltd. | WT510 | Capacity：3.85 Vdc, 4900mAh |
| AC Adapter | Nokia | SHENZHEN BAIJUNDA ELECTRONICS.,LTD | AD-010U | I/P: 100-240Vac, 0.35A, O/P: 5.0Vdc, 2.0A |
| Earphone | Juwei Electronics Co., LTD | Juwei Electronics Co., LTD | JWEP1252-H21H | Signal Line, 1.2meter |
| USB Cable 1 | Juwei Electronics Co., LTD | Juwei Electronics Co., LTD | JWUB1536-H21H | Signal Line, 1.0meter |
| USB Cable 2 | Yu Wei | Dongguan Yuwei Electronic Technology Co., Ltd. | CH2212TC | Signal Line, 1.0meter |
| USB Cable 3 | Sai bao | Saibao (Jiangxi) Industrial Co., Ltd | SHM1-A003A | Signal Line, 1.0meter |

## 2.2 CONFIGURATION OF SYSTEM UNDER 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 | N/A | N/A | N/A | N/A | N/A |

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

## 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 ERP and radiated emission was found when positioned on X-plane for GSM /WCDMA/ LTE. Following channel(s) was (were) selected for the final test as listed below:

| EUT CONFIGURE MODE | DESCRIPTION |
|---|---|
| A | EUT + Adapter + GSM/WCDMA/LTE |
| B | EUT + DC source with GSM or WCDMA or LTE link |

## GSM MODE

| EUT CONFIGURE MODE | TEST ITEM | AVAILABLE CHANNEL | TESTED CHANNEL | MODE |
|---|---|---|---|---|
| A | ERP | 128 to 251 | 128, 190, 251 | GSM, EDGE |
| B | FREQUENCY STABILITY | 128 to 251 | 128, 190, 251 | GSM, EDGE |
| A | OCCUPIED BANDWIDTH | 128 to 251 | 128, 190, 251 | GSM, EDGE |
| A | BAND EDGE | 128 to 251 | 128, 251 | GSM, EDGE |
| A | CONDCUDETED EMISSION | 128 to 251 | 128, 190, 251 | GSM, EDGE |
| A | RADIATED EMISSION | 128 to 251 | 128, 190, 251 | GSM, EDGE |
| A | PEAK TO AVERAGE RATIO | 128 to 251 | 128, 190, 251 | GSM, EDGE |

## WCDMA MODE

| EUT CONFIGURE MODE | TEST ITEM | AVAILABLE CHANNEL | TESTED CHANNEL | MODE |
|---|---|---|---|---|
| A | ERP | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| B | FREQUENCY STABILITY | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| A | OCCUPIED BANDWIDTH | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| A | BAND EDGE | 4132 to 4233 | 4132, 4233 | WCDMA |
| A | CONDCUDETED EMISSION | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| A | RADIATED EMISSION | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| A | PEAK TO AVERAGE RATIO | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |

## LTE BAND 5 MODE

| EUT CONFIGURE MODE | TEST ITEM | Available Channel | Tested Channel | Channel bandwidth | modulation | mode |
|---|---|---|---|---|---|---|
| A | ERP | 20407 to 20643 | 20407, 20525, 20643 | 1.4MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset |
| | | 20415 to 20635 | 20415, 20525, 20635 | 3MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset |
| | | 20425 to 20625 | 20425, 20525, 20625 | 5MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset |
| | | 20450 to 20600 | 20450, 20525, 20600 | 10MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset |
| B | FREQUENCY STABILITY | 20407 to 20643 | 20407, 20525, 20643 | 1.4MHz | QPSK,16QAM，64QAM | Full RB / 0 RB Offset |
| | | 20415 to 20635 | 20415, 20525, 20635 | 3MHz | QPSK,16QAM，64QAM | Full RB / 0 RB Offset |
| | | 20425 to 20625 | 20425, 20525, 20625 | 5MHz | QPSK,16QAM，64QAM | Full RB / 0 RB Offset |
| | | 20450 to 20600 | 20450, 20525, 20600 | 10MHz | QPSK,16QAM，64QAM | Full RB / 0 RB Offset |
| A | OCCUPIED BANDWIDTH | 20407 to 20643 | 20407, 20525, 20643 | 1.4MHz | QPSK,16QAM，64QAM | Full RB / 0 RB Offset |
| | | 20415 to 20635 | 20415, 20525, 20635 | 3MHz | QPSK,16QAM，64QAM | Full RB / 0 RB Offset |
| | | 20425 to 20625 | 20425, 20525, 20625 | 5MHz | QPSK,16QAM，64QAM | Full RB / 0 RB Offset |
| | | 20450 to 20600 | 20450, 20525, 20600 | 10MHz | QPSK,16QAM，64QAM | Full RB / 0 RB Offset |
| A | BAND EDGE | 20407 to 20643 | 20407 | 1.4 MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset |
| | | | | | | Full RB / 0 RB Offset |
| | | 20407 to 20643 | 20643 | 1.4 MHz | QPSK,16QAM，64QAM | 1 RB / 5 RB Offset |
| | | | | | | Full RB / 0 RB Offset |
| | | 20415 to 20635 | 20415 | 3 MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset |
| | | | | | | Full RB / 0 RB Offset |
| | | 20415 to 20635 | 20635 | 3 MHz | QPSK,16QAM，64QAM | 1 RB / 14 RB Offset |
| | | | | | | Full RB / 0 RB Offset |
| | | 20425 to 20625 | 20425 | 5MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset |
| | | | | | | Full RB / 0 RB Offset |
| | | 20425 to 20625 | 20625 | 5MHz | QPSK,16QAM，64QAM | 1 RB / 24 RB Offset |
| | | | | | | Full RB / 0 RB Offset |
| | | 20450 to 20600 | 20450 | 10MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset |
| | | | | | | Full RB / 0 RB Offset |
| | | 20450 to 20600 | 20600 | 10MHz | QPSK,16QAM，64QAM | 1 RB / 49 RB Offset |
| | | | | | | Full RB / 0 RB Offset |

| | | | | | | |
|---|---|---|---|---|---|---|
| A | CONDCUDETED EMISSION | 20407 to 20643 | 20407, 20525, 20643 | 1.4MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset |
| | | 20415 to 20635 | 20415, 20525, 20635 | 3MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset |
| | | 20425 to 20625 | 20425, 20525, 20625 | 5MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset |
| | | 20450 to 20600 | 20450, 20525, 20600 | 10MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset |
| A | RADIATED EMISSION | 20407 to 20643 | 20425,20525, 20625 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20415 to 20635 | 20525 | 3MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20425 to 20625 | 20525 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20450 to 20600 | 20525 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| A | PEAK TO AVERAGE RATIO | 20407 to 20643 | 20407, 20525, 20643 | 1.4MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset<br>Full RB / 0 RB Offset |
| | | 20415 to 20635 | 20415, 20525, 20635 | 3MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset<br>Full RB / 0 RB Offset |
| | | 20425 to 20625 | 20425, 20525, 20625 | 5MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset<br>Full RB / 0 RB Offset |
| | | 20450 to 20600 | 20450, 20525, 20600 | 10MHz | QPSK,16QAM，64QAM | 1 RB / 0 RB Offset<br>Full 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 5.0V By Adapter | Chao Wu |
| FREQUENCY STABILITY | 23deg. C, 70%RH | DC 5.0V By Adapter | Chao Wu |
| OCCUPIED BANDWIDTH | 23deg. C, 70%RH | DC 5.0V By Adapter | Chao Wu |
| BAND EDGE | 23deg. C, 70%RH | DC 5.0V By Adapter | Chao Wu |
| CONDCUDETED EMISSION | 23deg. C, 70%RH | DC 5.0V By Adapter | Chao Wu |
| RADIATED EMISSION | 23deg. C, 70%RH | DC 5.0V By Adapter | Chao Wu/Jace Hu |
| PEAK TO AVERAGE RATIO | 23deg. C, 70%RH | DC 5.0V By Adapter | Chao Wu |

## 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 22**

**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 / Portable station are limited to 7 watts e.r.p.

### 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.

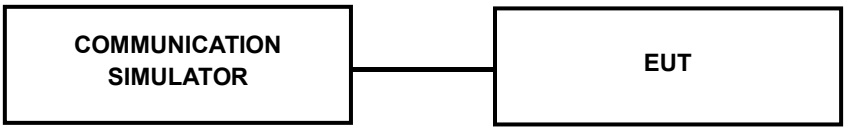
**CONDUCTED POWER MEASUREMENT:**

The EUT was set up for the maximum power with GSM/WCDMA/LTE 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)**

| Band | GSM850 | | | Max. Tune-up Power |
|---|---|---|---|---|
| Channel | 128 | 190 | 251 | |
| Frequency | 824.2 | 836.6 | 848.8 | |
| GSM | **31.60** | 31.58 | 31.53 | 32.50 |
| GPRS 1Tx Slot | 31.47 | 31.42 | 31.37 | 32.50 |
| GPRS 2Tx Slot | 29.82 | 29.75 | 29.66 | 30.50 |
| GPRS 3Tx Slot | 28.18 | 28.08 | 27.95 | 29.00 |
| GPRS 4Tx Slot | 26.17 | 26.06 | 25.90 | 27.00 |
| EDGE 1Tx Slot | 24.39 | 24.16 | 24.01 | 25.50 |
| EDGE 2Tx Slot | 22.92 | 22.69 | 22.51 | 23.50 |
| EDGE 3Tx Slot | 19.74 | 19.64 | 19.10 | 20.50 |
| EDGE 4Tx Slot | 16.41 | 16.52 | 16.34 | 17.50 |

| Band | WCDMA V | | | Max. Tune-up Power |
|---|---|---|---|---|
| Channel | 4132 | 4182 | 4233 | |
| Frequency | 826.4 | 836.4 | 846.6 | |
| RMC 12.2K | 23.73 | 23.70 | **23.74** | 24.50 |
| HSDPA Subtest-1 | 23.15 | 23.16 | 23.12 | 24.00 |
| HSDPA Subtest-2 | 23.14 | 23.15 | 23.11 | 24.00 |
| HSDPA Subtest-3 | 22.63 | 22.64 | 22.60 | 23.50 |
| HSDPA Subtest-4 | 22.62 | 22.63 | 22.59 | 23.50 |
| DC-HSDPA Subtest-1 | 22.87 | 22.90 | 22.84 | 24.00 |
| DC-HSDPA Subtest-2 | 22.86 | 22.89 | 22.83 | 24.00 |
| DC-HSDPA Subtest-3 | 22.44 | 22.38 | 22.34 | 23.50 |
| DC-HSDPA Subtest-4 | 22.43 | 22.37 | 22.33 | 23.50 |
| HSUPA Subtest-1 | 23.11 | 23.12 | 23.08 | 24.00 |
| HSUPA Subtest-2 | 22.10 | 22.11 | 22.07 | 22.50 |
| HSUPA Subtest-3 | 22.58 | 22.60 | 22.56 | 23.50 |
| HSUPA Subtest-4 | 22.07 | 22.09 | 22.05 | 22.50 |
| HSUPA Subtest-5 | 23.06 | 23.08 | 23.04 | 24.00 |
| HSPA+ Subtest-1 | 21.62 | 21.65 | 21.61 | 22.50 |

**LTE Band 5**

| Band/BW | Modulation | RB Size | RB Offset | Low CH 20407 | Mid CH 20525 | High CH 20643 |
|---|---|---|---|---|---|---|
| | | | | Frequency 824.7 MHz | Frequency 836.5 MHz | Frequency 848.3 MHz |
| 5/ 1.4 | QPSK | 1 | 0 | 23.21 | 23.19 | 22.97 |
| | | 1 | 2 | 23.41 | 23.28 | 23.13 |
| | | 1 | 5 | 23.29 | 23.20 | 23.09 |
| | | 3 | 0 | 23.02 | 22.98 | 23.16 |
| | | 3 | 1 | 23.05 | 23.10 | 23.09 |
| | | 3 | 3 | 23.17 | 23.08 | 23.13 |
| | | 6 | 0 | 22.16 | 22.03 | 22.14 |
| | 16QAM | 1 | 0 | 22.26 | 22.40 | 22.47 |
| | | 1 | 2 | 22.44 | 22.29 | 22.52 |
| | | 1 | 5 | 22.63 | 22.29 | 22.51 |
| | | 3 | 0 | 22.35 | 22.28 | 22.07 |
| | | 3 | 1 | 22.23 | 22.41 | 22.11 |
| | | 3 | 3 | 22.33 | 22.41 | 22.21 |
| | | 6 | 0 | 21.04 | 21.14 | 21.12 |
| | 64QAM | 1 | 0 | 21.64 | 21.11 | 21.11 |
| | | 1 | 2 | 21.75 | 21.13 | 21.46 |
| | | 1 | 5 | 21.67 | 21.49 | 21.36 |
| | | 3 | 0 | 21.58 | 21.41 | 21.01 |
| | | 3 | 1 | 21.29 | 21.56 | 21.49 |
| | | 3 | 3 | 21.31 | 21.22 | 21.17 |
| | | 6 | 0 | 20.37 | 20.11 | 20.64 |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 20415 | Mid CH 20525 | High CH 20635 |
|---|---|---|---|---|---|---|
| | | | | Frequency 825.5 MHz | Frequency 836.5 MHz | Frequency 847.5 MHz |
| 5/ 3 | QPSK | 1 | 0 | 23.23 | 23.21 | 22.96 |
| | | 1 | 7 | 23.37 | 23.29 | 23.13 |
| | | 1 | 14 | 23.25 | 23.20 | 23.09 |
| | | 8 | 0 | 22.01 | 22.01 | 22.16 |
| | | 8 | 3 | 21.98 | 22.10 | 22.11 |
| | | 8 | 7 | 22.14 | 22.15 | 22.17 |
| | | 15 | 0 | 22.13 | 22.04 | 22.08 |
| | 16QAM | 1 | 0 | 22.23 | 22.46 | 22.50 |
| | | 1 | 7 | 22.41 | 22.32 | 22.50 |
| | | 1 | 14 | 22.66 | 22.29 | 22.51 |
| | | 8 | 0 | 21.31 | 21.29 | 21.07 |
| | | 8 | 3 | 21.28 | 21.36 | 21.14 |
| | | 8 | 7 | 21.35 | 21.39 | 21.17 |
| | | 15 | 0 | 21.04 | 21.08 | 21.15 |
| | 64QAM | 1 | 0 | 21.70 | 21.14 | 21.05 |
| | | 1 | 7 | 21.78 | 21.07 | 21.45 |
| | | 1 | 14 | 21.68 | 21.51 | 21.36 |
| | | 8 | 0 | 20.61 | 20.45 | 20.02 |
| | | 8 | 3 | 20.33 | 20.50 | 20.54 |
| | | 8 | 7 | 20.28 | 20.26 | 20.13 |
| | | 15 | 0 | 20.39 | 20.08 | 20.68 |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 20425 | Mid CH 20525 | High CH 20625 |
|---|---|---|---|---|---|---|
| | | | | Frequency 826.5 MHz | Frequency 836.5 MHz | Frequency 846.5 MHz |
| 5/ 5 | QPSK | 1 | 0 | 23.24 | 23.16 | 22.97 |
| | | 1 | 12 | 23.42 | 23.26 | 23.13 |
| | | 1 | 24 | 23.26 | 23.19 | 23.13 |
| | | 12 | 0 | 22.04 | 22.01 | 22.13 |
| | | 12 | 6 | 21.98 | 22.11 | 22.12 |
| | | 12 | 13 | 22.18 | 22.11 | 22.18 |
| | | 25 | 0 | 22.11 | 22.07 | 22.11 |
| | 16QAM | 1 | 0 | 22.24 | 22.42 | 22.50 |
| | | 1 | 12 | 22.38 | 22.35 | 22.49 |
| | | 1 | 24 | 22.66 | 22.29 | 22.50 |
| | | 12 | 0 | 21.31 | 21.27 | 21.04 |
| | | 12 | 6 | 21.25 | 21.40 | 21.10 |
| | | 12 | 13 | 21.30 | 21.41 | 21.20 |
| | | 25 | 0 | 21.04 | 21.09 | 21.12 |
| | 64QAM | 1 | 0 | 21.64 | 21.11 | 21.11 |
| | | 1 | 12 | 21.75 | 21.13 | 21.45 |
| | | 1 | 24 | 21.61 | 21.56 | 21.36 |
| | | 12 | 0 | 20.62 | 20.42 | 20.01 |
| | | 12 | 6 | 20.27 | 20.57 | 20.53 |
| | | 12 | 13 | 20.32 | 20.25 | 20.10 |
| | | 25 | 0 | 20.35 | 20.14 | 20.66 |

| Band/BW | Modulation | RB Size | RB Offset | Low CH 20450 | Mid CH 20525 | High CH 20600 |
|---|---|---|---|---|---|---|
| | | | | Frequency 829 MHz | Frequency 836.5 MHz | Frequency 844 MHz |
| 5/ 10 | QPSK | 1 | 0 | 23.29 | 23.23 | 23.02 |
| | | 1 | 24 | **23.44** | 23.34 | 23.15 |
| | | 1 | 49 | 23.31 | 23.27 | 23.14 |
| | | 25 | 0 | 22.08 | 22.06 | 22.18 |
| | | 25 | 12 | 22.06 | 22.12 | 22.17 |
| | | 25 | 25 | 22.22 | 22.16 | 22.19 |
| | | 50 | 0 | 22.17 | 22.09 | 22.16 |
| | 16QAM | 1 | 0 | 22.31 | 22.47 | 22.52 |
| | | 1 | 24 | 22.46 | 22.37 | 22.54 |
| | | 1 | 49 | 22.68 | 22.37 | 22.52 |
| | | 25 | 0 | 21.39 | 21.33 | 21.12 |
| | | 25 | 12 | 21.31 | 21.42 | 21.16 |
| | | 25 | 25 | 21.37 | 21.46 | 21.22 |
| | | 50 | 0 | 21.10 | 21.16 | 21.17 |
| | 64QAM | 1 | 0 | 21.71 | 21.16 | 21.13 |
| | | 1 | 24 | 21.83 | 21.15 | 21.51 |
| | | 1 | 49 | 21.69 | 21.57 | 21.38 |
| | | 25 | 0 | 20.66 | 20.47 | 20.09 |
| | | 25 | 12 | 20.35 | 20.58 | 20.55 |
| | | 25 | 25 | 20.36 | 20.30 | 20.18 |
| | | 50 | 0 | 20.41 | 20.16 | 20.69 |

**ERP POWER (dBm)**

**GSM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 128 | 824.2 | 31.6 | -1.3 | 28.15 | 653.13 | 7 |
| 190 | 836.6 | 31.58 | -1.3 | 28.13 | 650.13 | 7 |
| 251 | 848.8 | 31.53 | -1.3 | 28.08 | 642.69 | 7 |

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

**EDGE**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 128 | 824.2 | 24.39 | -1.3 | 20.94 | 124.17 | 7 |
| 190 | 836.6 | 24.16 | -1.3 | 20.71 | 117.76 | 7 |
| 251 | 848.8 | 24.01 | -1.3 | 20.56 | 113.76 | 7 |

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

**WCDMA**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 4132 | 826.4 | 23.73 | -1.3 | 20.28 | 106.66 | 7 |
| 4182 | 836.4 | 23.7 | -1.3 | 20.25 | 105.93 | 7 |
| 4233 | 846.6 | 23.74 | -1.3 | 20.29 | 106.91 | 7 |

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

**LTE BAND 5**

**CHANNEL BANDWIDTH: 1.4MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 20407 | 824.7 | 23.41 | -1.3 | 19.96 | 99.08 | 7 |
| 20525 | 836.5 | 23.28 | -1.3 | 19.83 | 96.16 | 7 |
| 20643 | 848.3 | 23.16 | -1.3 | 19.71 | 93.54 | 7 |

**CHANNEL BANDWIDTH: 1.4MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 20407 | 824.7 | 22.63 | -1.3 | 19.18 | 82.79 | 7 |
| 20525 | 836.5 | 22.41 | -1.3 | 18.96 | 78.7 | 7 |
| 20643 | 848.3 | 22.52 | -1.3 | 19.07 | 80.72 | 7 |

**CHANNEL BANDWIDTH: 1.4MHz 64QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 20407 | 824.7 | 21.75 | -1.3 | 18.3 | 67.61 | 7 |
| 20525 | 836.5 | 21.56 | -1.3 | 18.11 | 64.71 | 7 |
| 20643 | 848.3 | 21.49 | -1.3 | 18.04 | 63.68 | 7 |

**CHANNEL BANDWIDTH: 3MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 20415 | 825.5 | 23.37 | -1.3 | 19.92 | 98.17 | 7 |
| 20525 | 836.5 | 23.29 | -1.3 | 19.84 | 96.38 | 7 |
| 20635 | 847.5 | 23.13 | -1.3 | 19.68 | 92.9 | 7 |

**CHANNEL BANDWIDTH: 3MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 20415 | 825.5 | 22.66 | -1.3 | 19.21 | 83.37 | 7 |
| 20525 | 836.5 | 22.46 | -1.3 | 19.01 | 79.62 | 7 |
| 20635 | 847.5 | 22.51 | -1.3 | 19.06 | 80.54 | 7 |

**CHANNEL BANDWIDTH: 3MHz 64QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 20415 | 825.5 | 21.78 | -1.3 | 18.33 | 68.08 | 7 |
| 20525 | 836.5 | 21.51 | -1.3 | 18.06 | 63.97 | 7 |
| 20635 | 847.5 | 21.45 | -1.3 | 18 | 63.1 | 7 |

**CHANNEL BANDWIDTH: 5MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 20425 | 826.5 | 23.42 | -1.3 | 19.97 | 99.31 | 7 |
| 20525 | 836.5 | 23.26 | -1.3 | 19.81 | 95.72 | 7 |
| 20625 | 846.5 | 23.13 | -1.3 | 19.68 | 92.9 | 7 |

**CHANNEL BANDWIDTH: 5MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 20425 | 826.5 | 22.66 | -1.3 | 19.21 | 83.37 | 7 |
| 20525 | 836.5 | 22.42 | -1.3 | 18.97 | 78.89 | 7 |
| 20625 | 846.5 | 22.5 | -1.3 | 19.05 | 80.35 | 7 |

**CHANNEL BANDWIDTH: 5MHz 64QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 20425 | 826.5 | 21.75 | -1.3 | 18.3 | 67.61 | 7 |
| 20525 | 836.5 | 21.56 | -1.3 | 18.11 | 64.71 | 7 |
| 20625 | 846.5 | 21.45 | -1.3 | 18 | 63.1 | 7 |

**CHANNEL BANDWIDTH: 10MHz QPSK**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 20450 | 829 | 23.44 | -1.3 | 19.99 | 99.77 | 7 |
| 20525 | 836.5 | 23.34 | -1.3 | 19.89 | 97.5 | 7 |
| 20600 | 844 | 23.15 | -1.3 | 19.7 | 93.33 | 7 |

**CHANNEL BANDWIDTH: 10MHz 16QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 20450 | 829 | 22.68 | -1.3 | 19.23 | 83.75 | 7 |
| 20525 | 836.5 | 22.47 | -1.3 | 19.02 | 79.8 | 7 |
| 20600 | 844 | 22.54 | -1.3 | 19.09 | 81.1 | 7 |

**CHANNEL BANDWIDTH: 10MHz 64QAM**

| Channel | Frequency (MHz) | Conducted Power (dBm) | $G_T$-$L_C$ (dB) | ERP (dBm) | ERP (mW) | Limit (W) |
|---|---|---|---|---|---|---|
| 20450 | 829 | 21.83 | -1.3 | 18.38 | 68.87 | 7 |
| 20525 | 836.5 | 21.57 | -1.3 | 18.12 | 64.86 | 7 |
| 20600 | 844 | 21.51 | -1.3 | 18.06 | 63.97 | 7 |

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

## 3.2 FREQUENCY STABILITY MEASUREMENT

### 3.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

### 3.2.2 TEST PROCEDURE

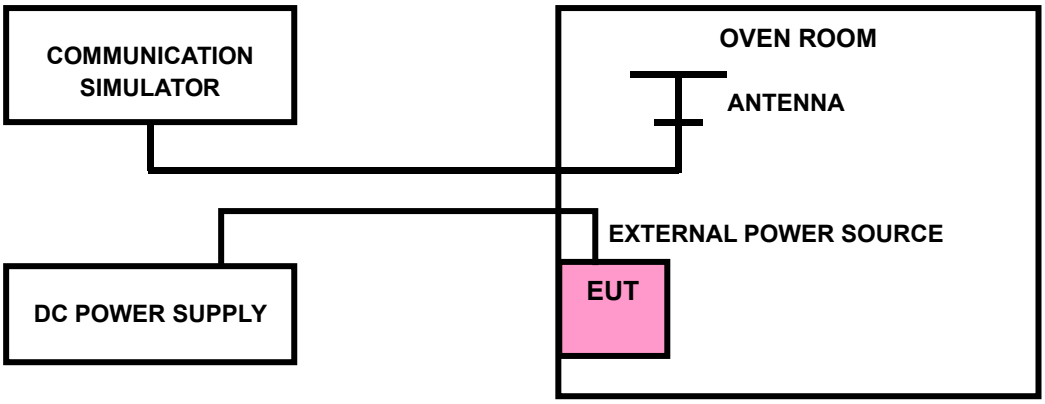
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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

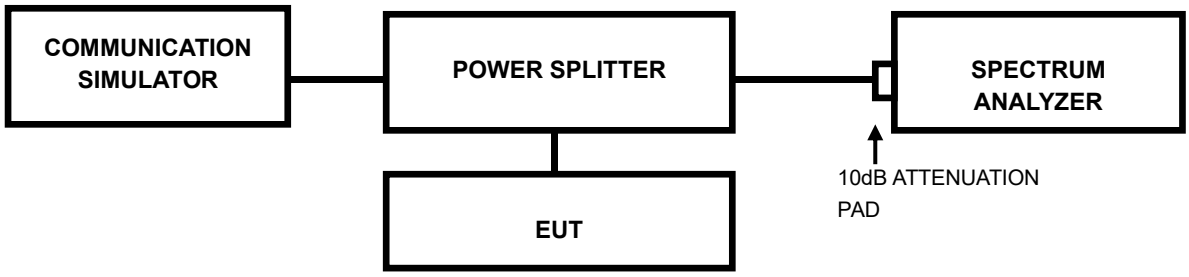
Please Refer to Appendix Of this test report.

## 3.3 OCCUPIED BANDWIDTH MEASUREMENT

### 3.3.1 TEST PROCEDURES

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

### 3.3.2 TEST SETUP



### 3.3.3 TEST RESULTS

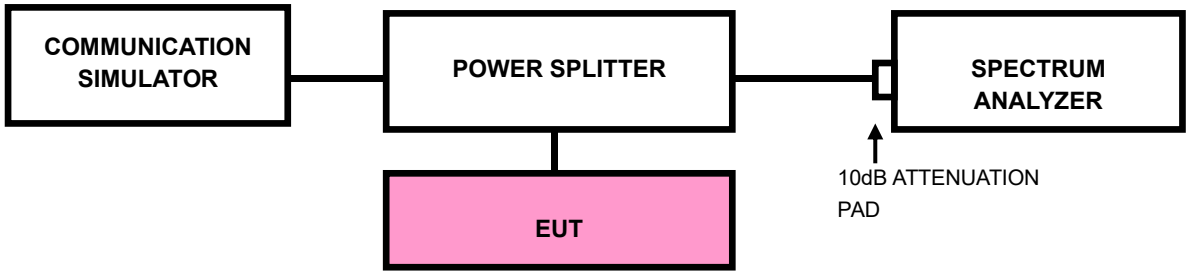
Please Refer to Appendix Of this test report.

## 3.4 BAND EDGE MEASUREMENT

### 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) ≧ 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 ≧3 x RBW.

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

h) Set the number of measurement points to ≧ 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.

### 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

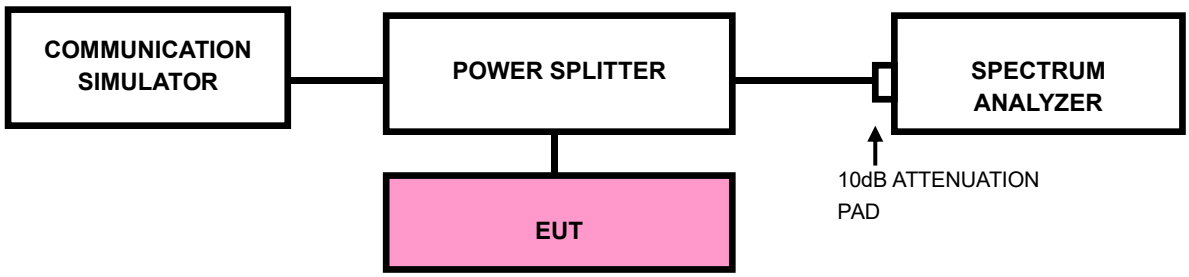
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

### 3.5.2 TEST PROCEDURE

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

b. Measuring frequency range is from 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.

### 3.5.1 TEST SETUP




### 3.5.2 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 –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.

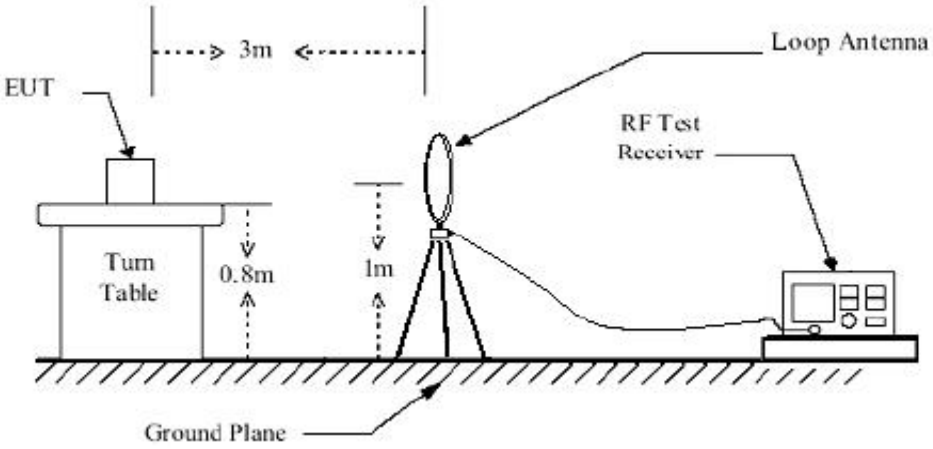
**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

### 3.6.3 DEVIATION FROM TEST STANDARD

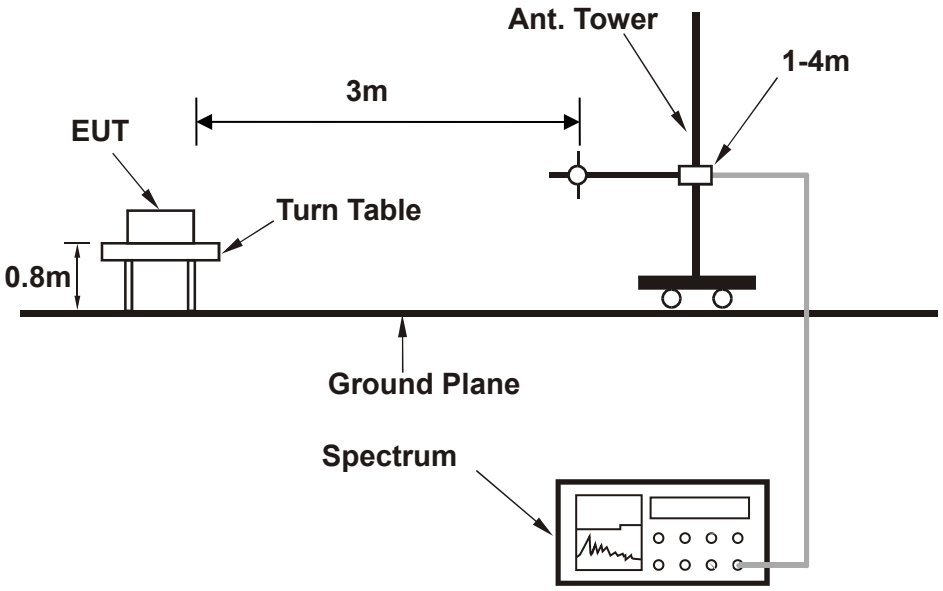
No deviation

### 3.6.4 TEST SETUP

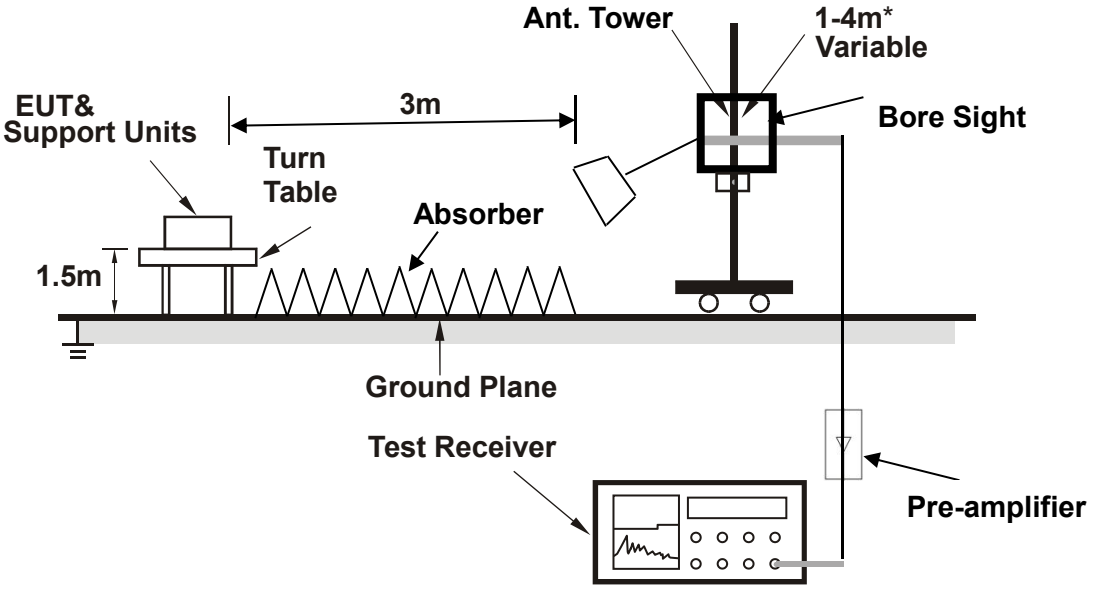
**< Frequency Range below 30MHz >**




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



**<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**

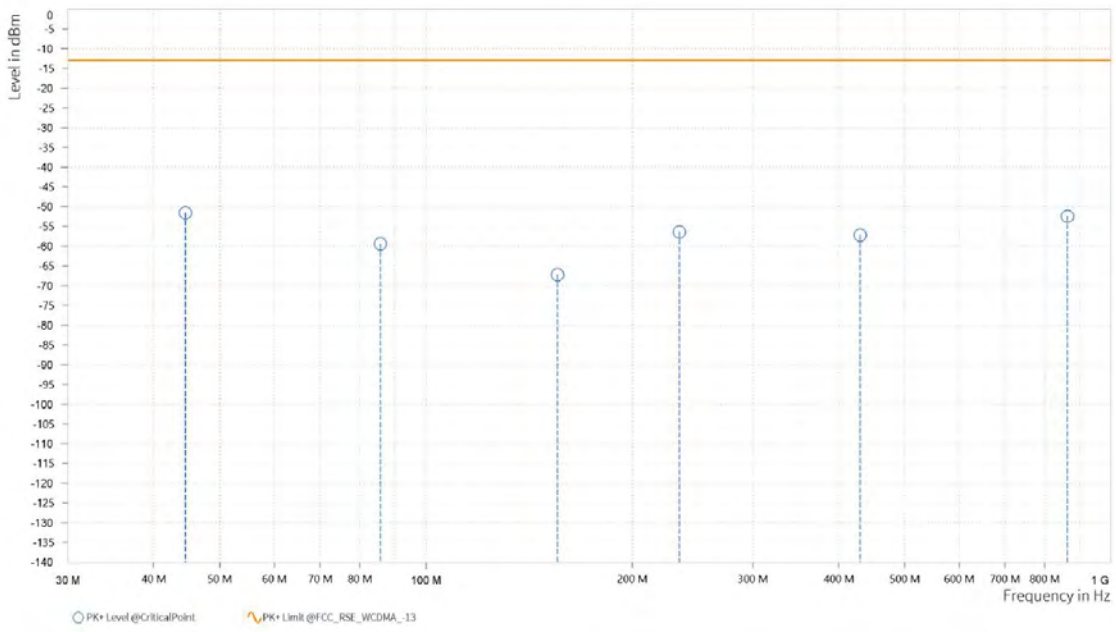
**30 MHz – 1GHz data:**

**GSM 850**

**CHANNEL BANDWIDTH: 128 ~ 251**

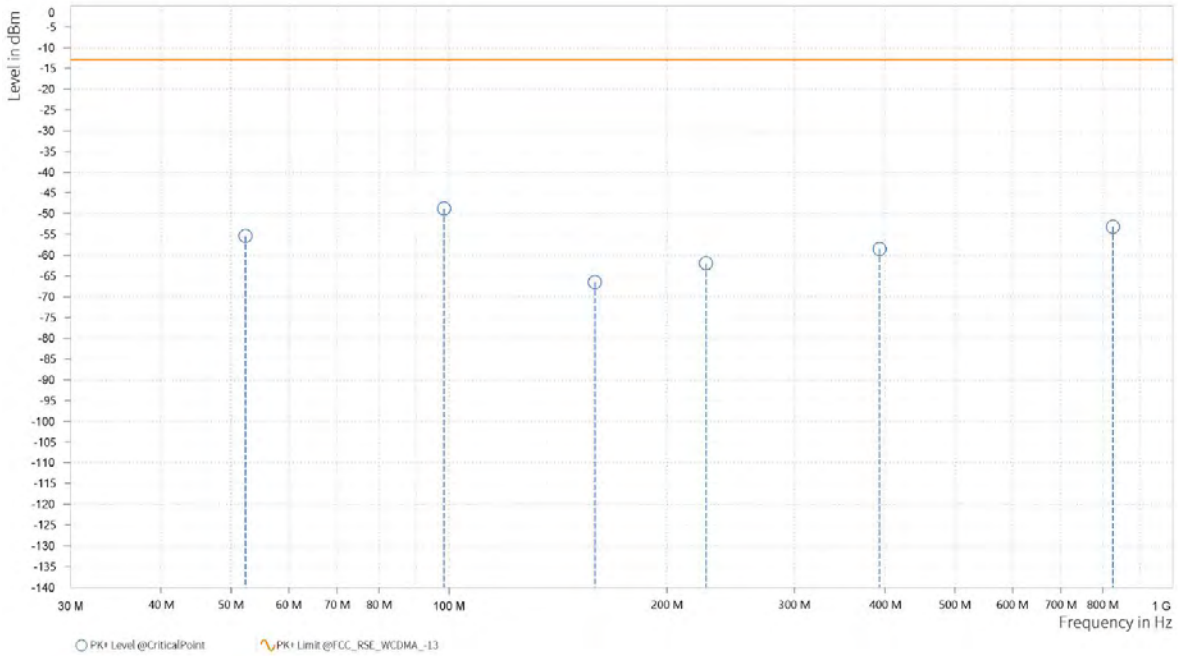
| **MODE** | TX channel 251 | **FREQUENCY RANGE** | Below 1000MHz |
|---|---|---|---|
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Jace Hu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 44.550 | -51.53 | -13.00 | 38.53 | 5.72 | H | 305.3 | 2 |
| 1 | 85.775 | -59.40 | -13.00 | 46.40 | -5.52 | H | 151.1 | 2 |
| 1 | 155.615 | -67.15 | -13.00 | 54.15 | -6.86 | H | 101 | 2 |
| 1 | 234.185 | -56.37 | -13.00 | 43.37 | 9.11 | H | 101 | 2 |
| 1 | 430.125 | -57.16 | -13.00 | 44.16 | 8.24 | H | 305.3 | 2 |
| 1 | 863.715 | -52.39 | -13.00 | 39.39 | 13.63 | H | 203.8 | 2 |



| MODE | TX channel 251 | FREQUENCY RANGE | Below 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Jace Hu | | |
| 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 | 52.310 | -55.38 | -13.00 | 42.38 | 0.30 | V | 51.9 | 2 |
| 1 | 98.385 | -48.84 | -13.00 | 35.84 | 11.61 | V | 51.9 | 2 |
| 1 | 159.010 | -66.45 | -13.00 | 53.45 | -4.40 | V | 359.1 | 2 |
| 1 | 226.425 | -61.98 | -13.00 | 48.98 | 0.72 | V | 106.9 | 2 |
| 1 | 393.265 | -58.49 | -13.00 | 45.49 | 6.42 | V | 106.9 | 2 |
| 1 | 825.885 | -53.16 | -13.00 | 40.16 | 11.04 | V | 359.1 | 2 |



**ABOVE 1GHz DATA**

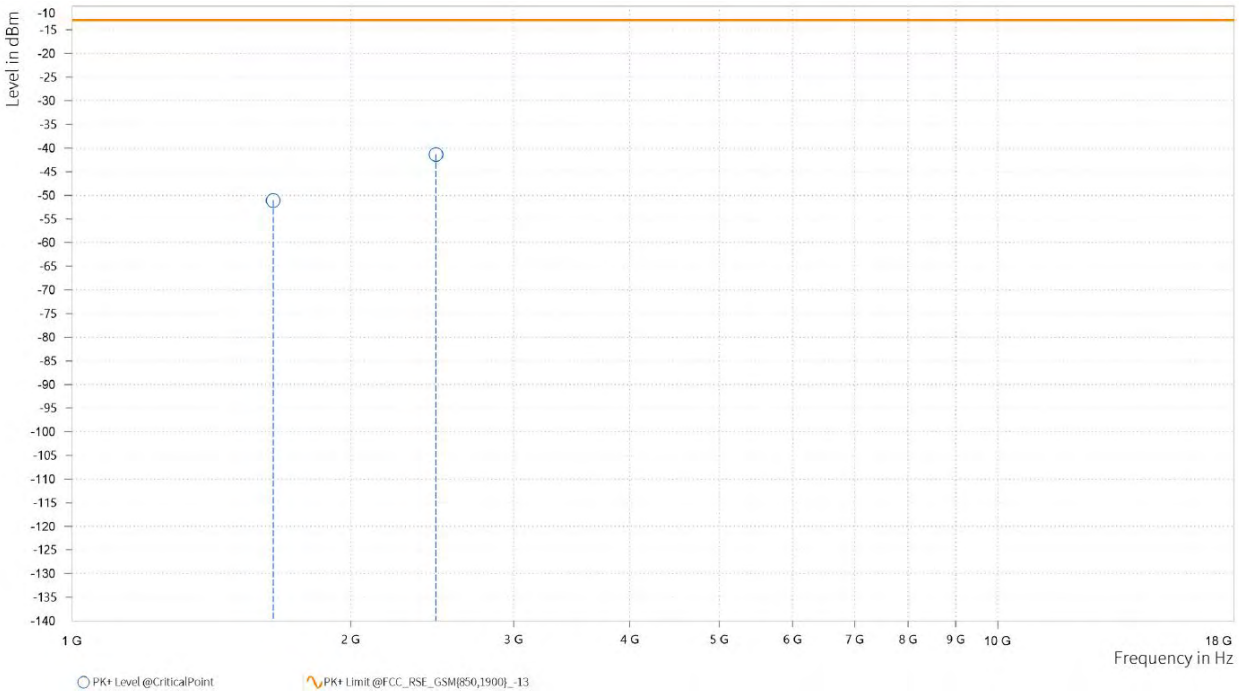
**Note:** For higher frequency, the emission is too low to be detected.

**GSM 850**

**CH 128:**

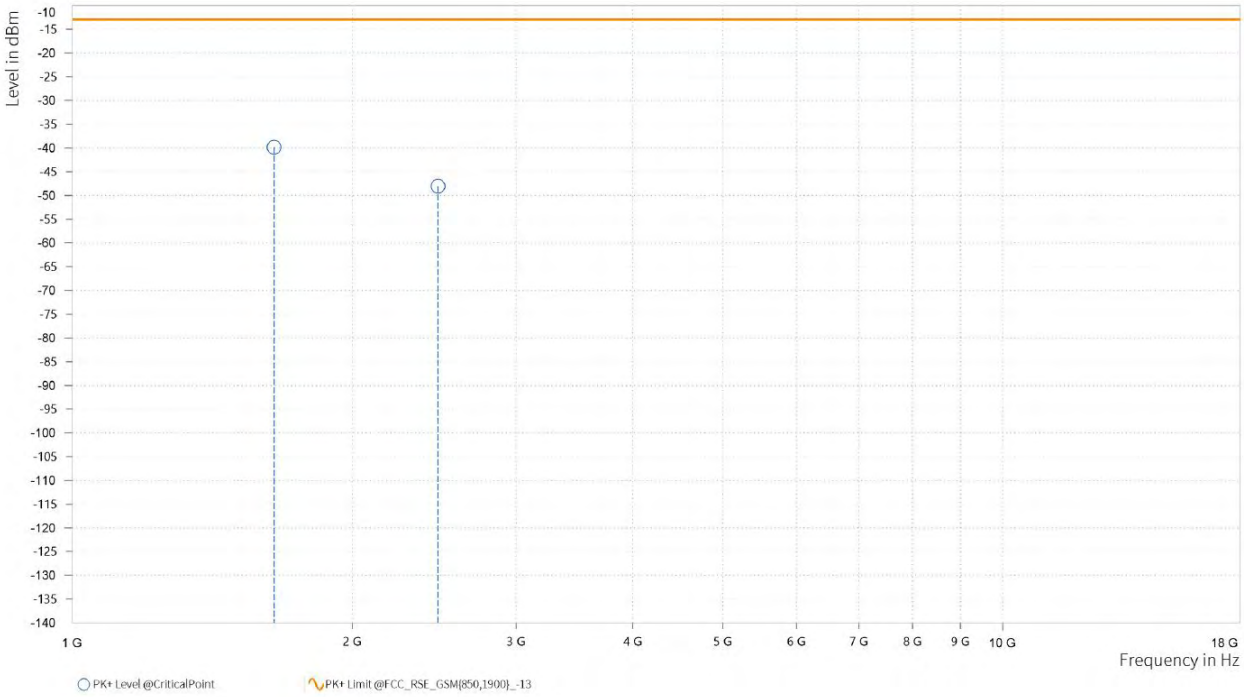
| | | | |
|---|---|---|---|
| **MODE** | TX channel 128 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Jace Hu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,649.000 | -51.08 | -13.00 | 38.08 | 17.48 | H | 272.2 | 2 |
| 3 | 2,472.500 | -41.34 | -13.00 | 28.34 | 22.42 | H | 164.3 | 1 |



| MODE | TX channel 128 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Jace Hu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

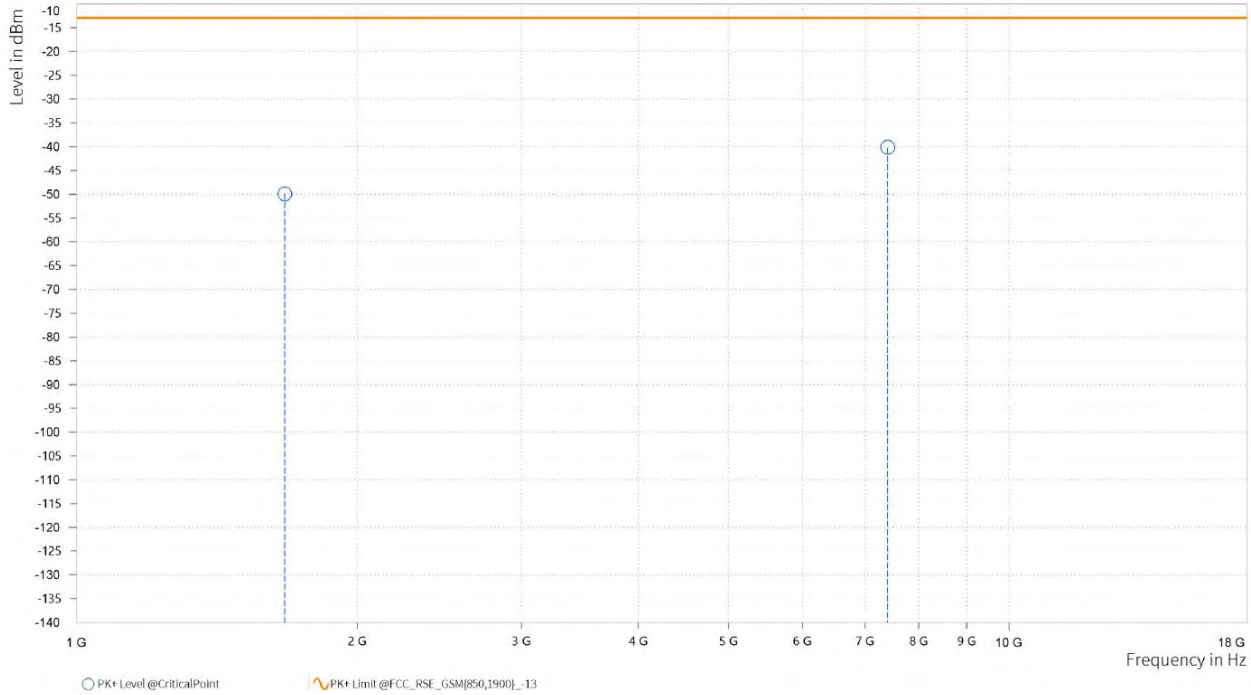
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,648.000 | -39.85 | -13.00 | 26.85 | 17.05 | V | 359.1 | 1 |
| 3 | 2,472.000 | -48.03 | -13.00 | 35.03 | 22.66 | V | 191.8 | 1 |



**CH 190:**

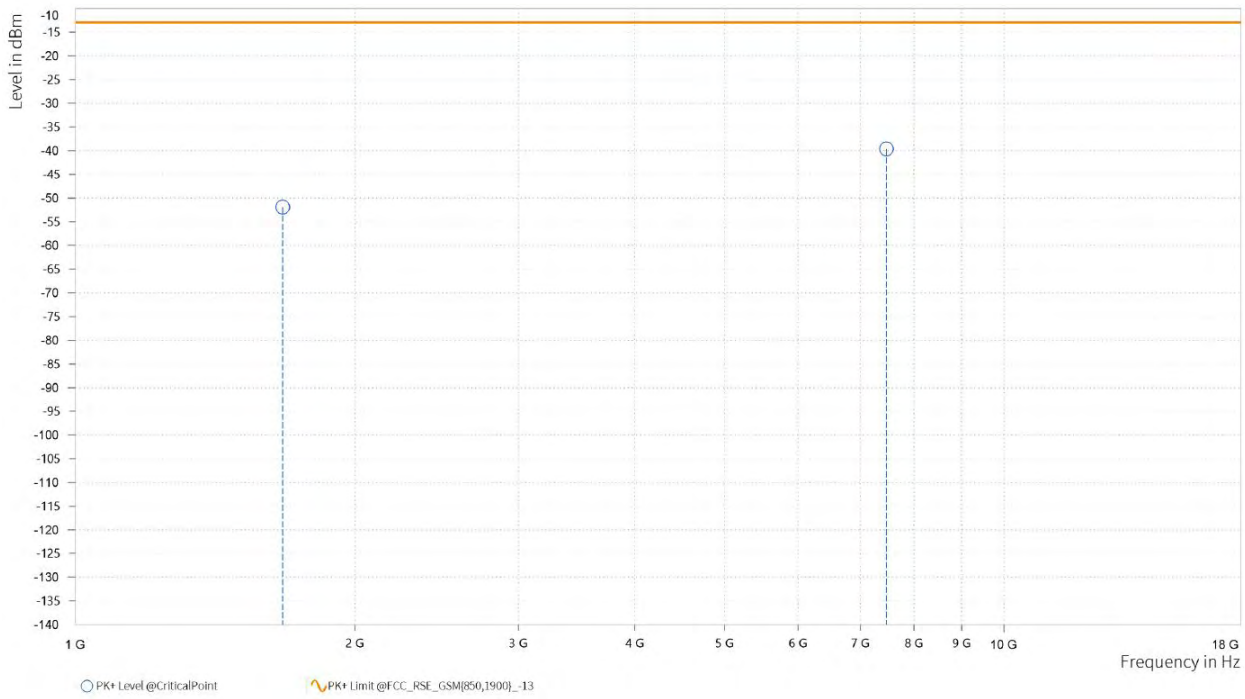
| | | | |
|---|---|---|---|
| **MODE** | TX channel 190 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Jace Hu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,671.500 | -49.94 | -13.00 | 36.94 | 18.23 | H | 271 | 2 |
| 4 | 7,404.500 | -40.15 | -13.00 | 27.15 | 29.65 | H | 359.1 | 1 |



| MODE | TX channel 190 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Jace Hu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

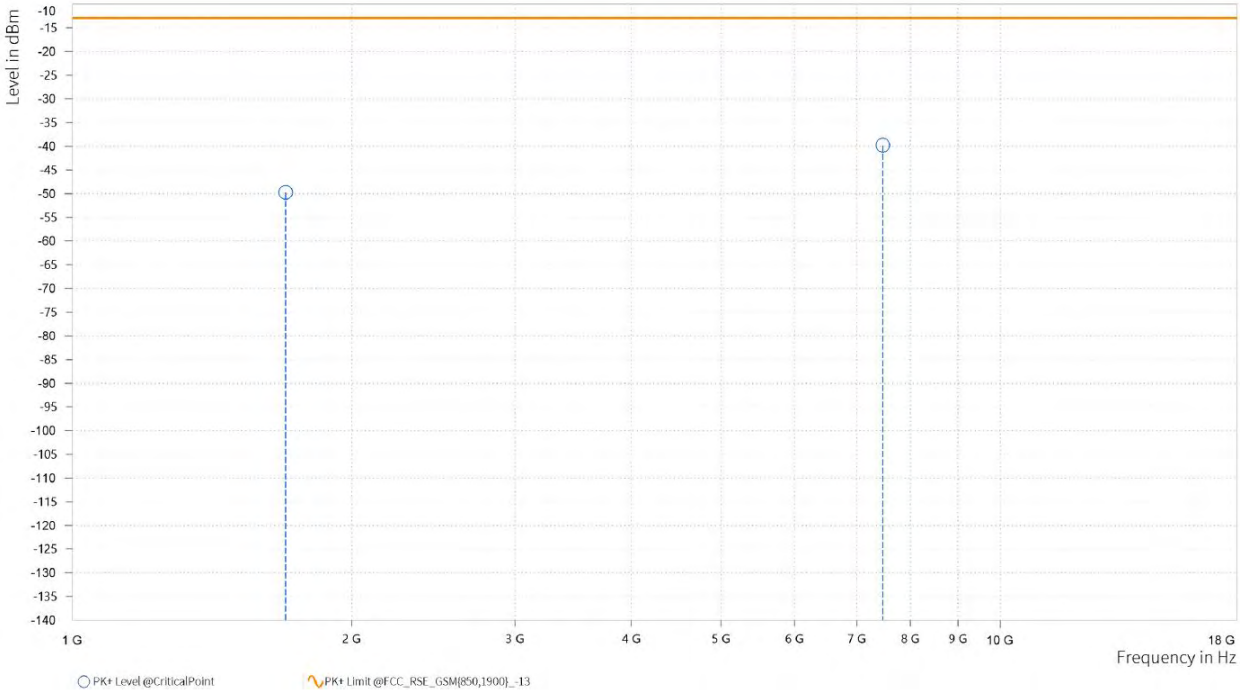
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,672.000 | -51.91 | -13.00 | 38.91 | 17.13 | V | 1.6 | 2 |
| 4 | 7,470.000 | -39.64 | -13.00 | 26.64 | 29.06 | V | 122.8 | 2 |



**CH 251:**

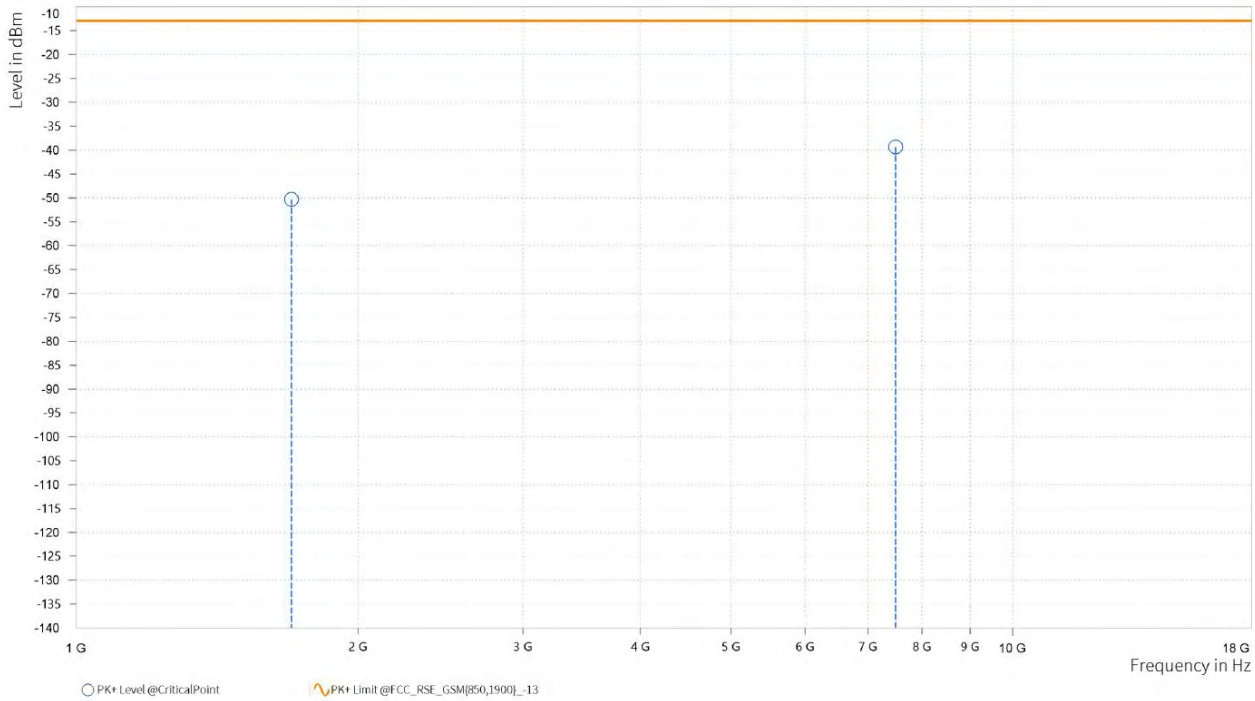
| | | | |
|---|---|---|---|
| **MODE** | TX channel 251 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Jace Hu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,697.000 | -49.74 | -13.00 | 36.74 | 18.62 | H | 1.4 | 2 |
| 4 | 7,471.000 | -39.78 | -13.00 | 26.78 | 29.06 | H | 359.1 | 1 |



| MODE | TX channel 251 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Jace Hu | | |
| 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 | 1,697.000 | -50.28 | -13.00 | 37.28 | 17.82 | V | 87.8 | 1 |
| 4 | 7,497.000 | -39.35 | -13.00 | 26.35 | 29.10 | V | 117.9 | 2 |

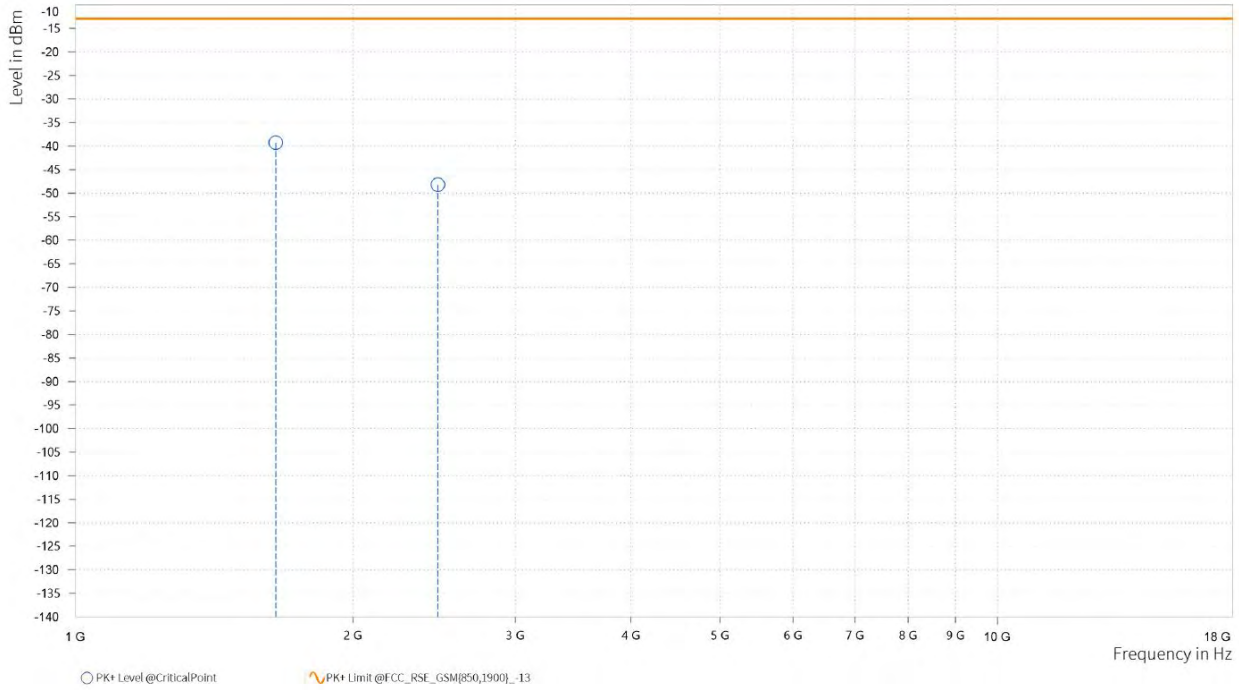


**EDGE 850:**

**CH 128:**

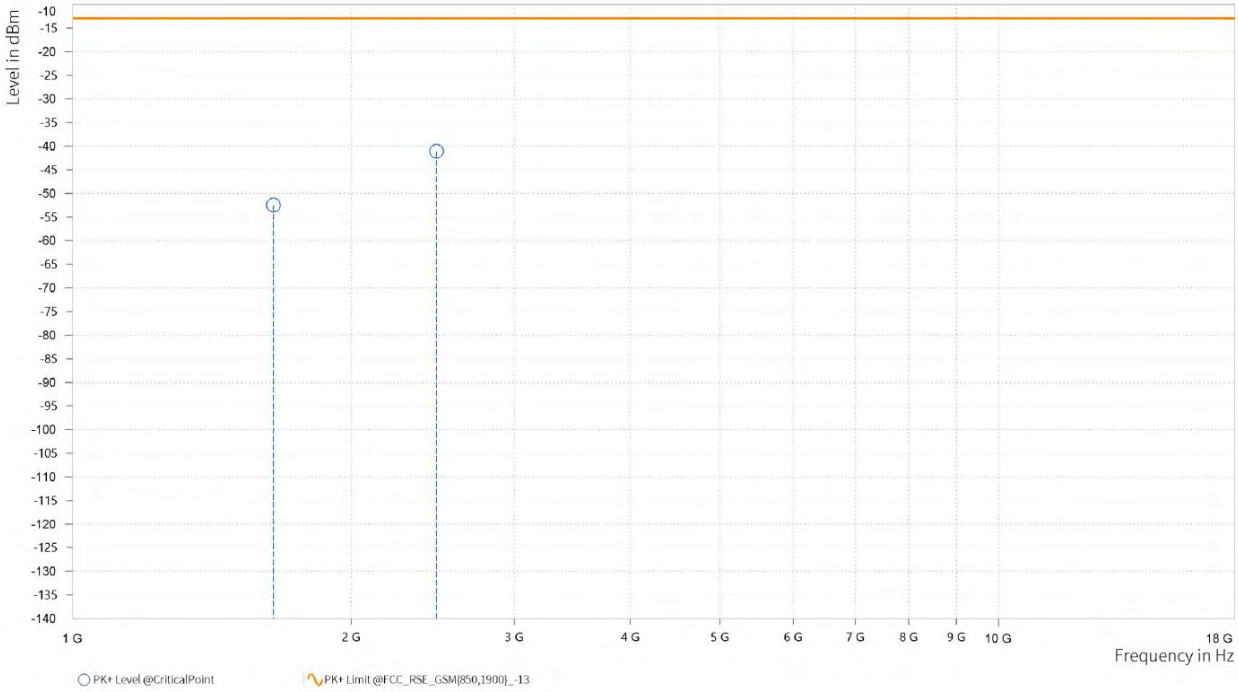
| | | | |
|---|---|---|---|
| **MODE** | TX channel 128 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Jace Hu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,648.500 | -39.29 | -13.00 | 26.29 | 17.46 | H | 90.2 | 1 |
| 3 | 2,472.000 | -48.23 | -13.00 | 35.23 | 22.41 | H | 1 | 2 |



| MODE | TX channel 128 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Jace Hu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

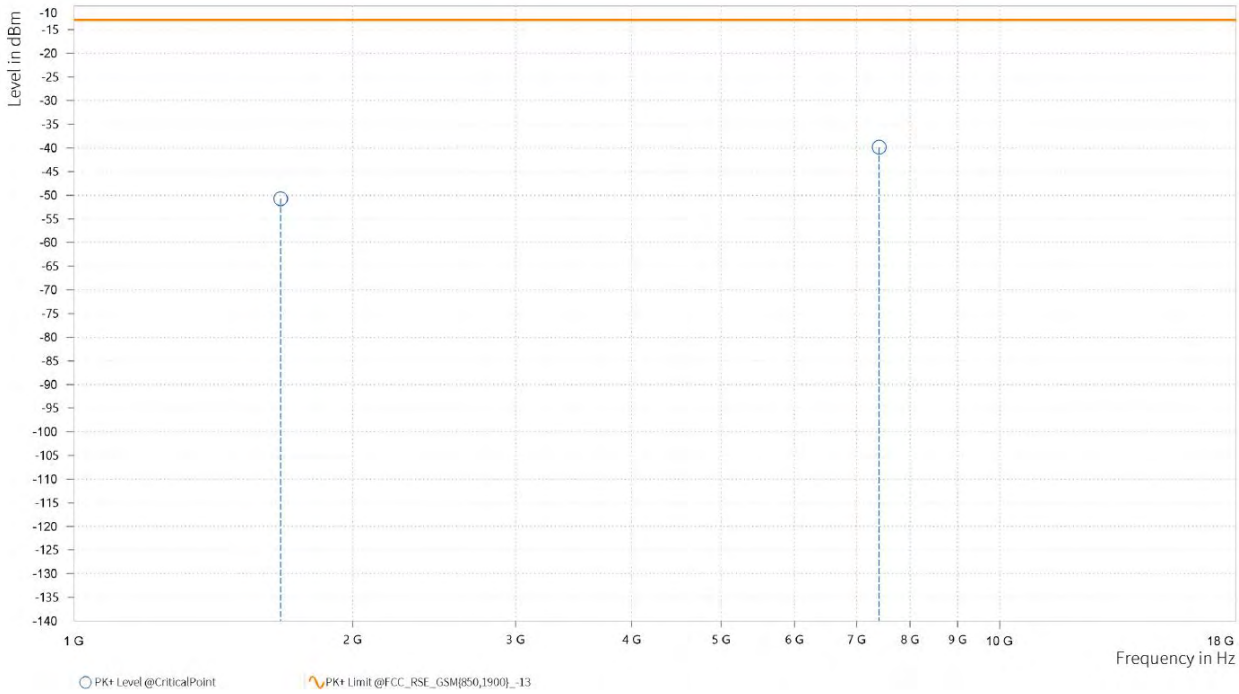
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,648.000 | -52.51 | -13.00 | 39.51 | 17.05 | V | 359.1 | 1 |
| 3 | 2,472.000 | -41.12 | -13.00 | 28.12 | 22.66 | V | 0.9 | 2 |



**CH 190:**

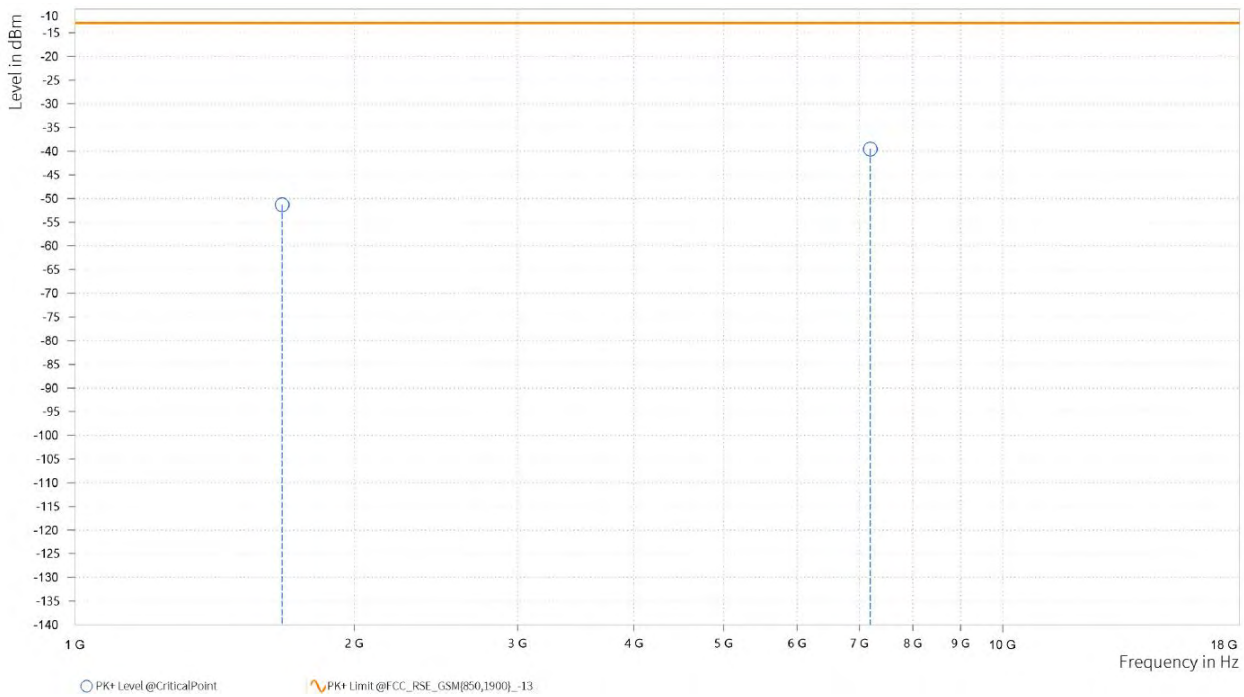
| | | | |
|---|---|---|---|
| **MODE** | TX channel 190 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Jace Hu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,672.000 | -50.73 | -13.00 | 37.73 | 18.24 | H | 359 | 2 |
| 4 | 7,405.500 | -39.87 | -13.00 | 26.87 | 29.66 | H | 0.9 | 2 |



| MODE | TX channel 190 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Jace Hu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

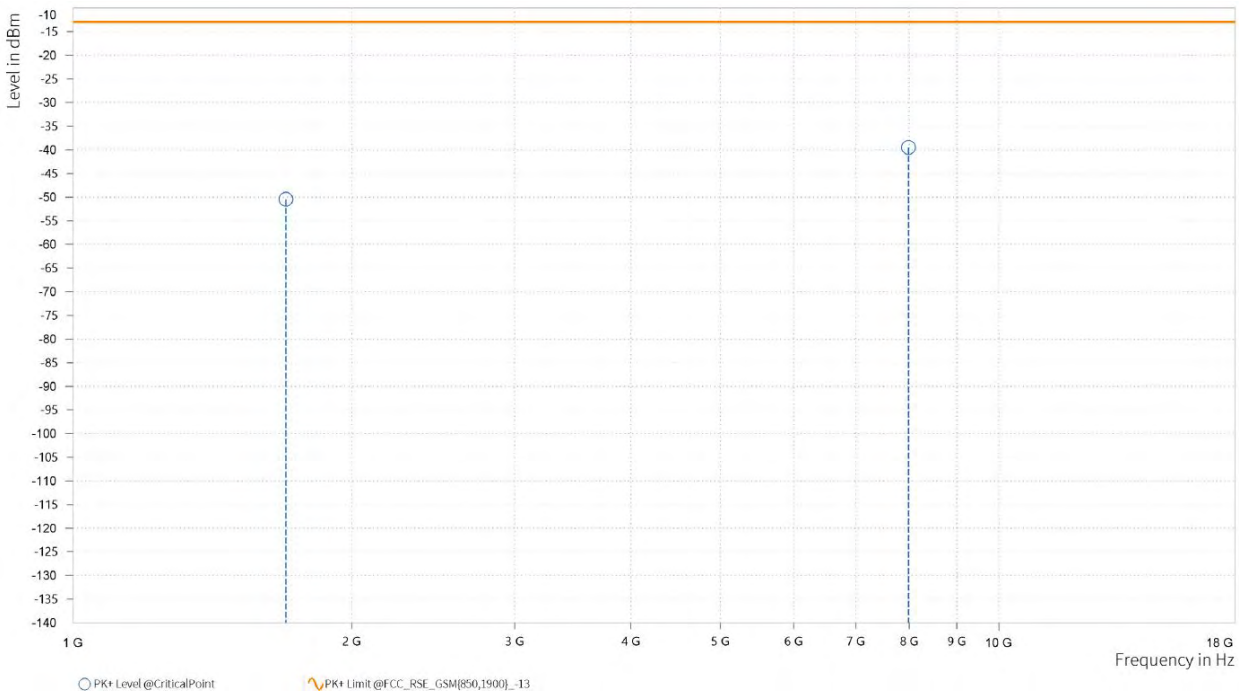
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,672.000 | -51.31 | -13.00 | 38.31 | 17.13 | V | 1.4 | 2 |
| 4 | 7,195.000 | -39.54 | -13.00 | 26.54 | 29.25 | V | 120.3 | 2 |



**CH 251:**

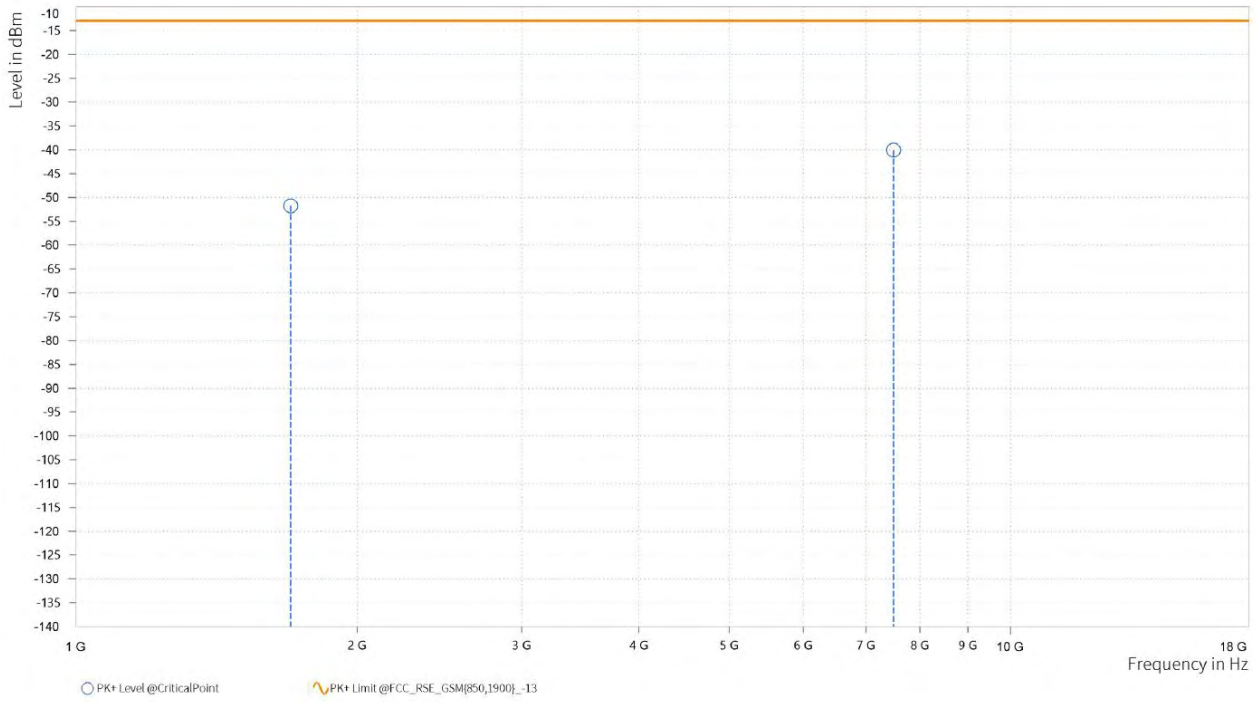
| | | | |
|---|---|---|---|
| **MODE** | TX channel 251 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Jace Hu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,697.000 | -50.48 | -13.00 | 37.48 | 18.62 | H | 358.6 | 1 |
| 4 | 7,981.500 | -39.51 | -13.00 | 26.51 | 30.14 | H | 359 | 1 |



| MODE | TX channel 251 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Jace Hu | | |
| 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 | 1,697.000 | -51.74 | -13.00 | 38.74 | 17.82 | V | 359.1 | 1 |
| 4 | 7,493.500 | -40.08 | -13.00 | 27.08 | 29.05 | V | 1 | 1 |

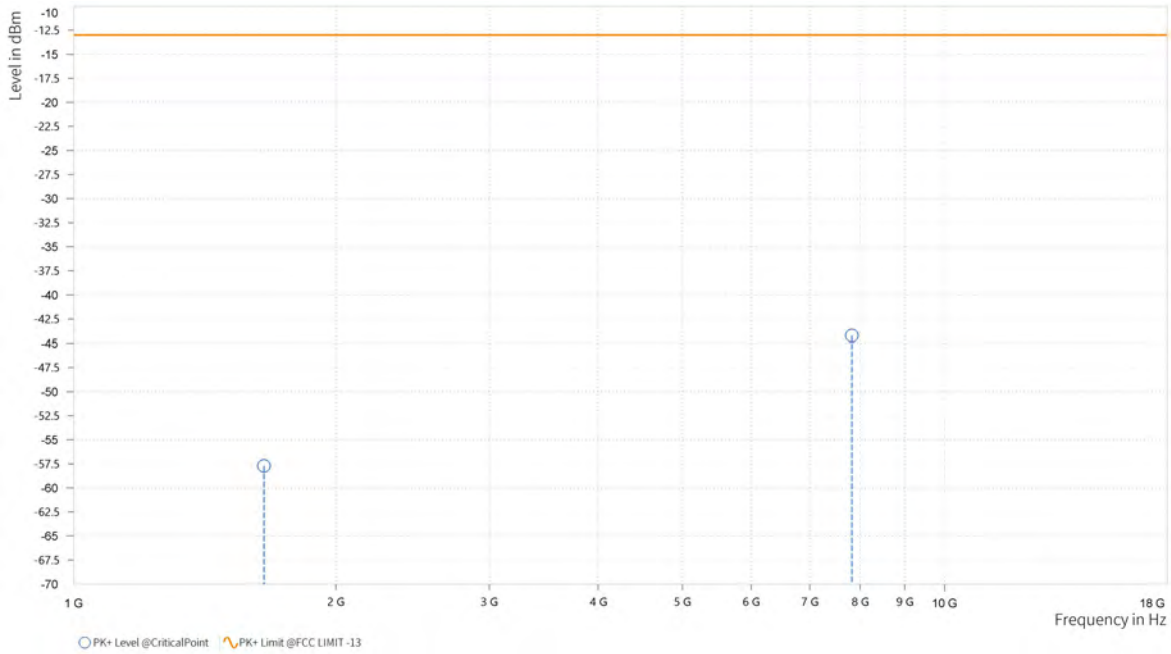


**WCDMA Band V:**

**CH 4132:**

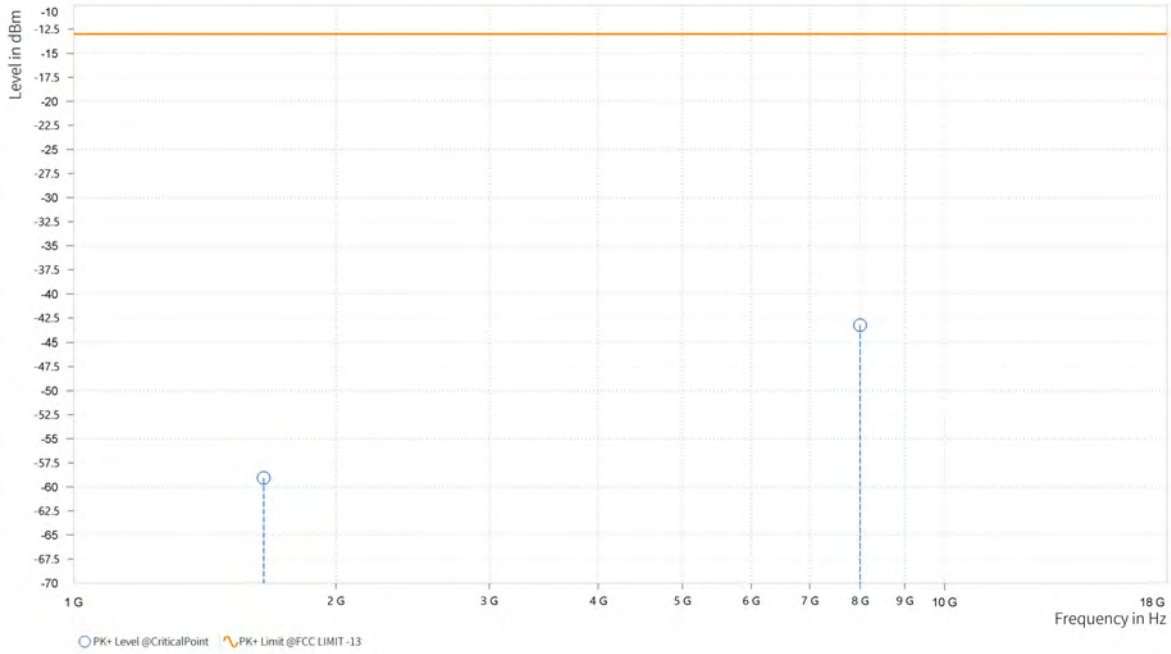
| MODE | TX channel 4132 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Chao Wu | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,653.500 | -57.70 | -13.00 | 44.70 | 14.54 | H | 297 | 2 |
| 5 | 7,828.000 | -44.22 | -13.00 | 31.22 | 32.96 | H | 1 | 1 |



| MODE | TX channel 4132 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Chao Wu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

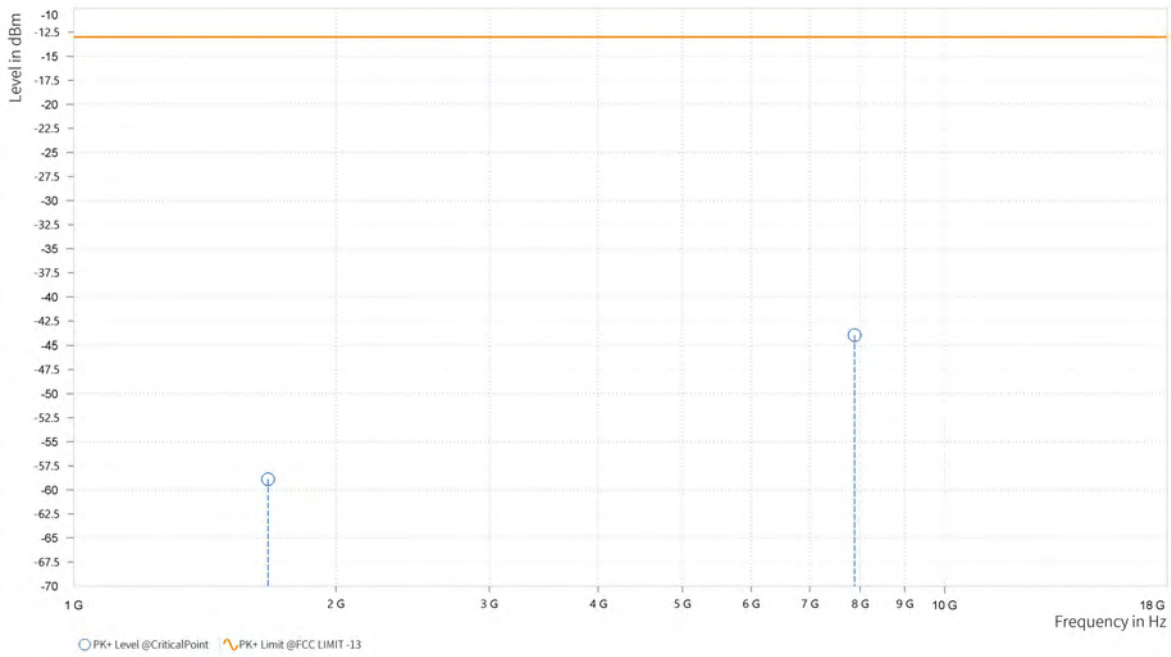
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,653.000 | -59.06 | -13.00 | 46.06 | 14.48 | V | 294.7 | 2 |
| 5 | 7,999.500 | -43.25 | -13.00 | 30.25 | 33.35 | V | 87.8 | 2 |



**CH 4182:**

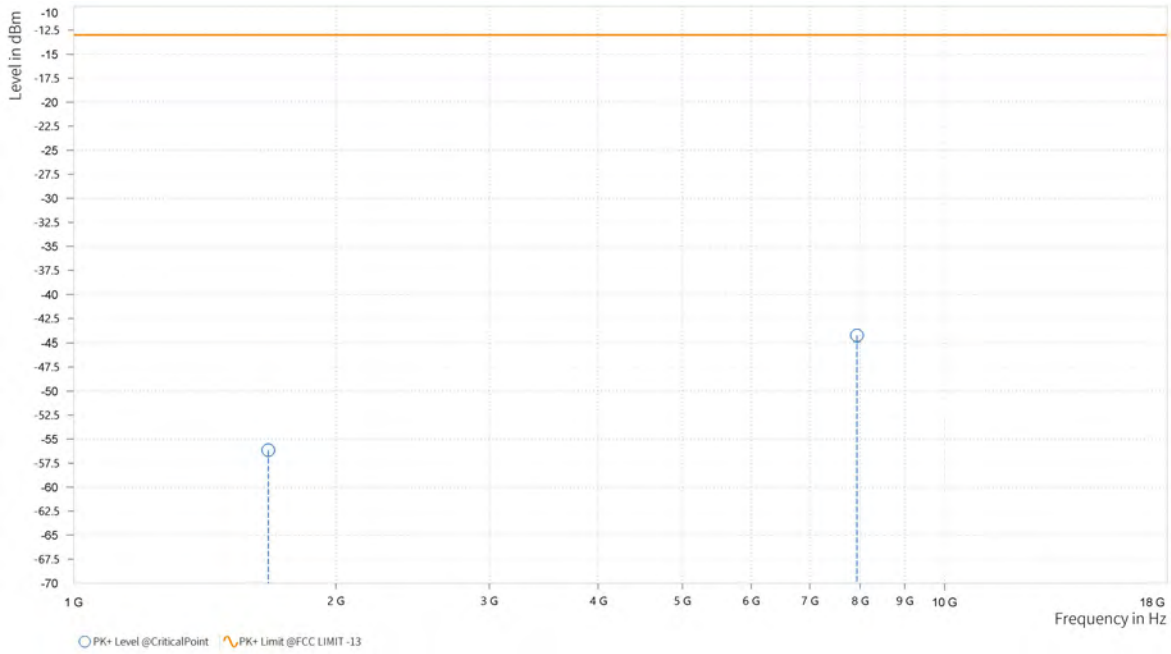
| | | | |
|---|---|---|---|
| **MODE** | TX channel 4182 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Chao Wu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,672.000 | -58.89 | -13.00 | 45.89 | 15.06 | H | 1 | 1 |
| 5 | 7,882.000 | -43.99 | -13.00 | 30.99 | 33.00 | H | 359.1 | 1 |



| MODE | TX channel 4182 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Chao Wu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

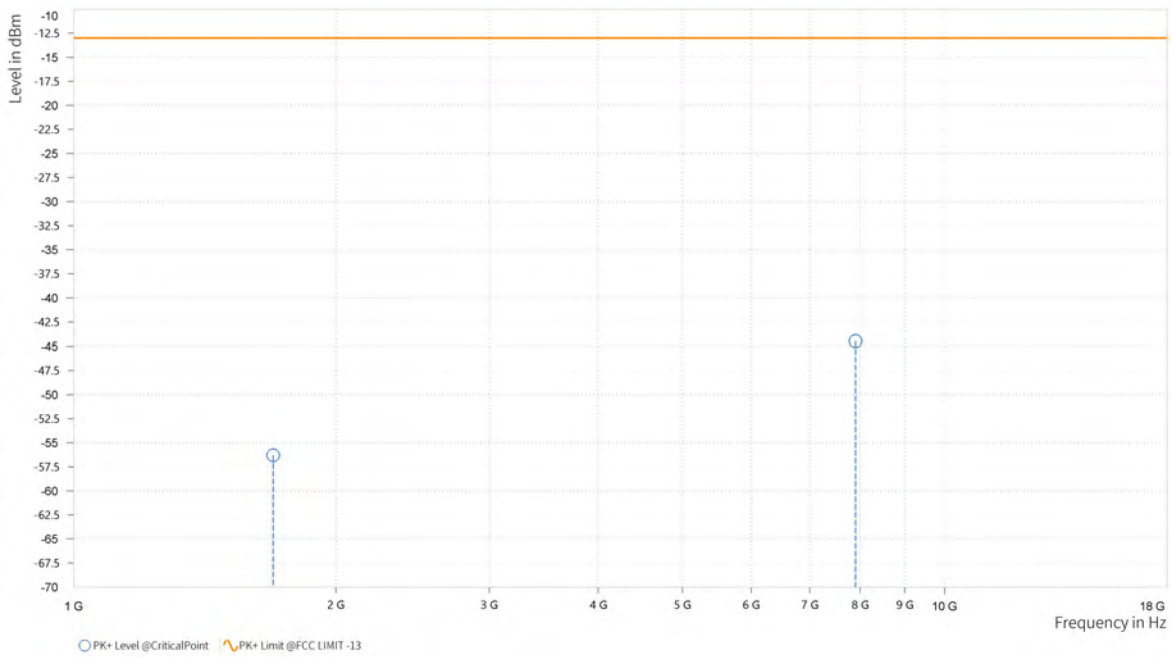
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,672.500 | -56.15 | -13.00 | 43.15 | 15.10 | V | 359.1 | 1 |
| 5 | 7,930.000 | -44.28 | -13.00 | 31.28 | 33.16 | V | 267.4 | 1 |



**CH 4233:**

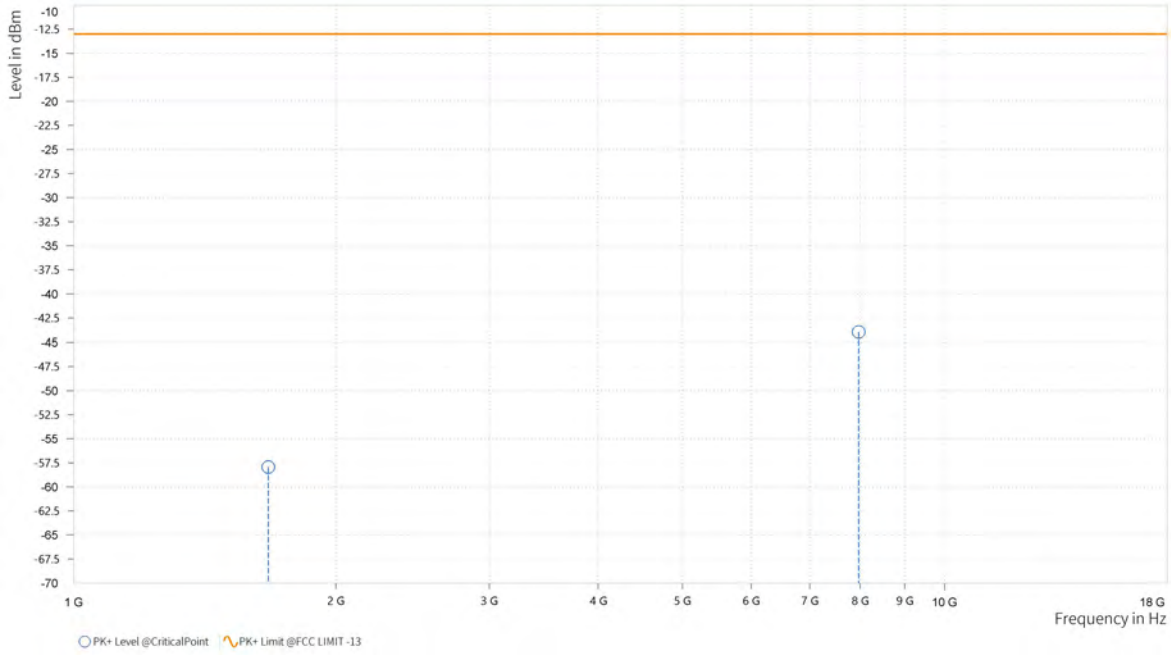
| MODE | TX channel 4233 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Chao Wu | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,694.000 | -56.31 | -13.00 | 43.31 | 15.40 | H | 297 | 2 |
| 5 | 7,900.000 | -44.46 | -13.00 | 31.46 | 33.01 | H | 359 | 2 |



| MODE | TX channel 4233 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Chao Wu | | |
| 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 | 1,672.500 | -57.94 | -13.00 | 44.94 | 15.10 | V | 1 | 2 |
| 5 | 7,967.000 | -43.96 | -13.00 | 30.96 | 33.26 | V | 1 | 1 |



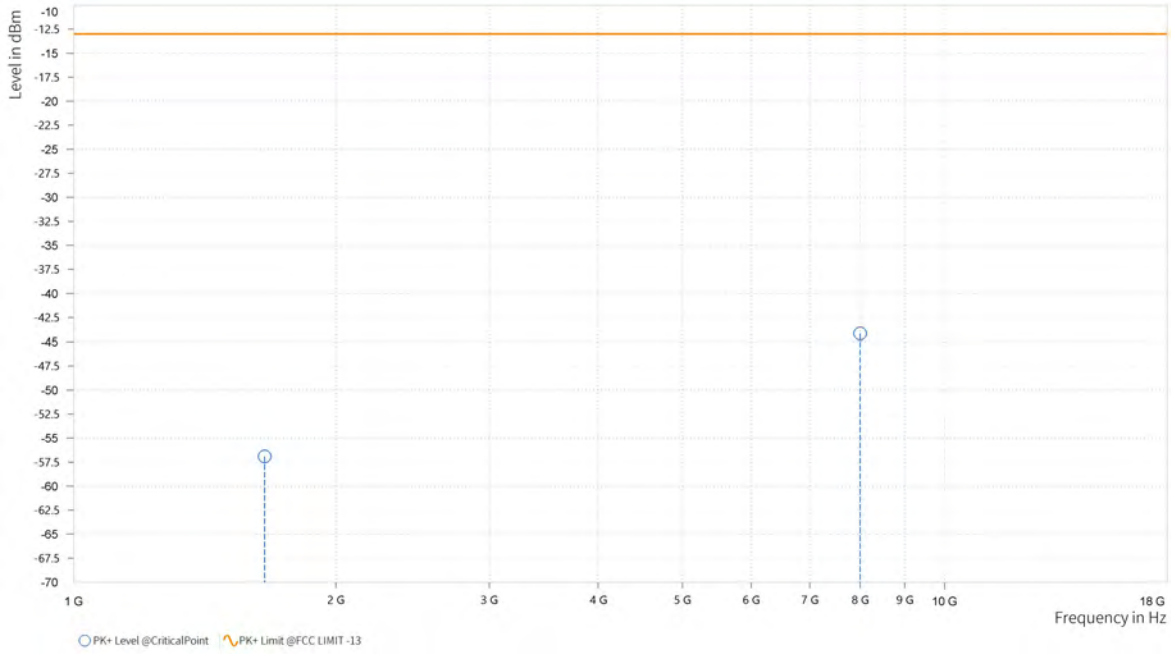
**LTE Band 5**

**CHANNEL BANDWIDTH: 1.4MHz / QPSK**

**CH 20407：**

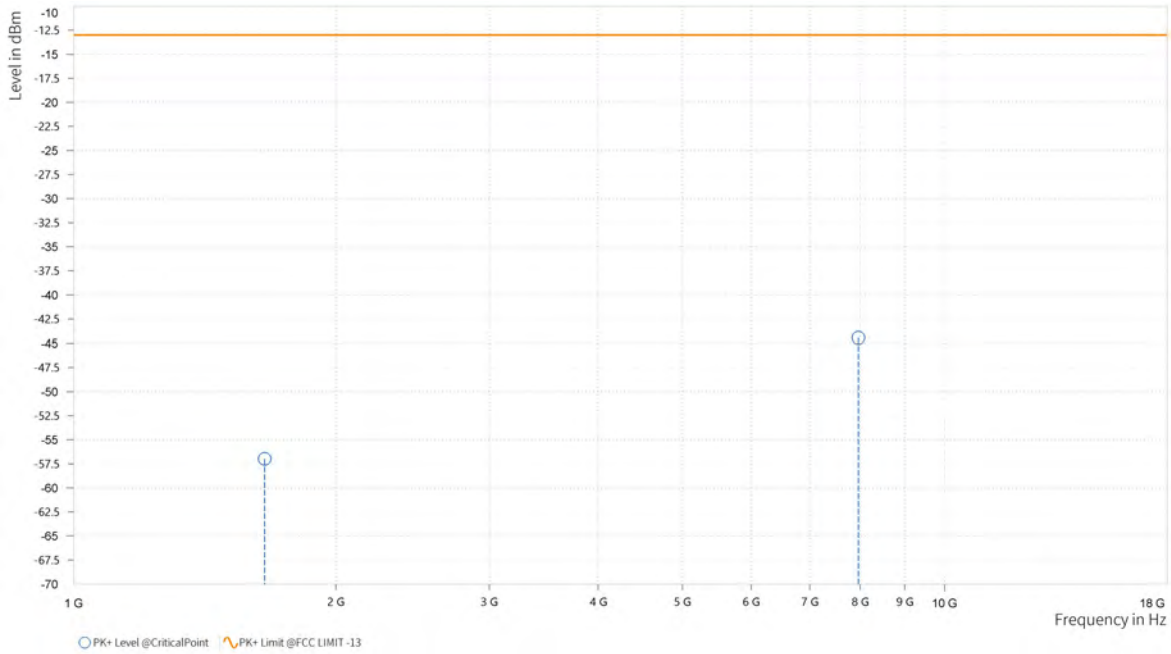
| | | | |
|---|---|---|---|
| **MODE** | TX channel 20407 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Chao Wu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,657.000 | -56.90 | -13.00 | 43.90 | 14.70 | H | 297.1 | 2 |
| 5 | 8,000.000 | -44.16 | -13.00 | 31.16 | 33.16 | H | 1 | 2 |



| MODE | TX channel 20407 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Chao Wu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

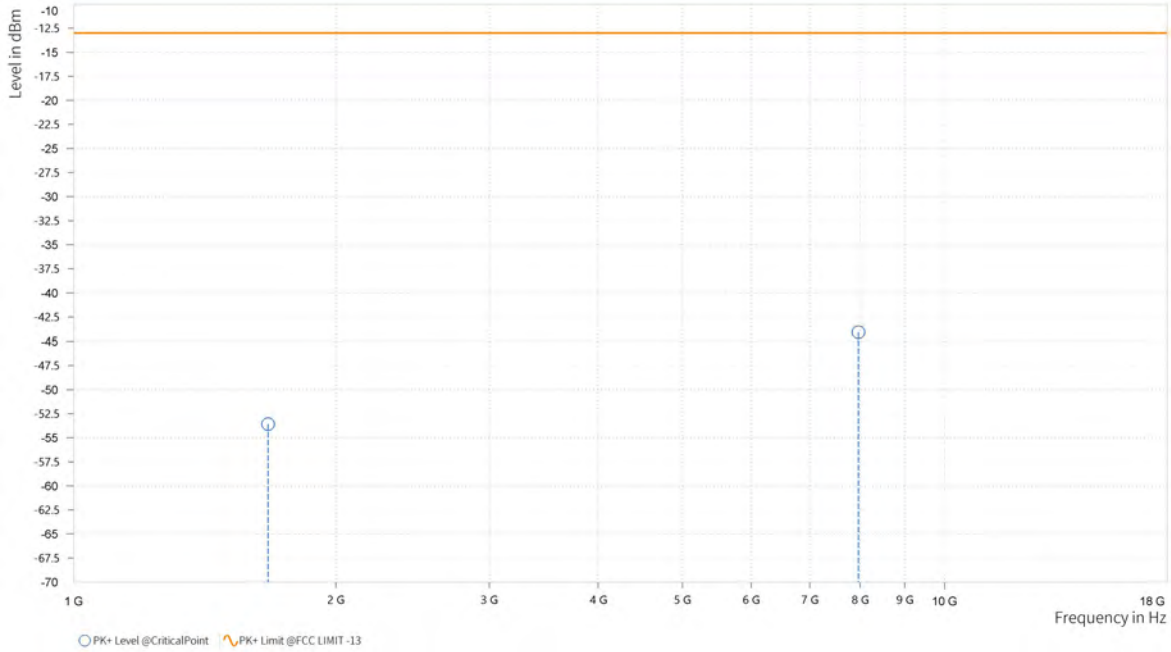
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,657.000 | -56.98 | -13.00 | 43.98 | 14.68 | V | 1 | 1 |
| 5 | 7,960.000 | -44.45 | -13.00 | 31.45 | 33.24 | V | 0.9 | 2 |



**CH 20525:**

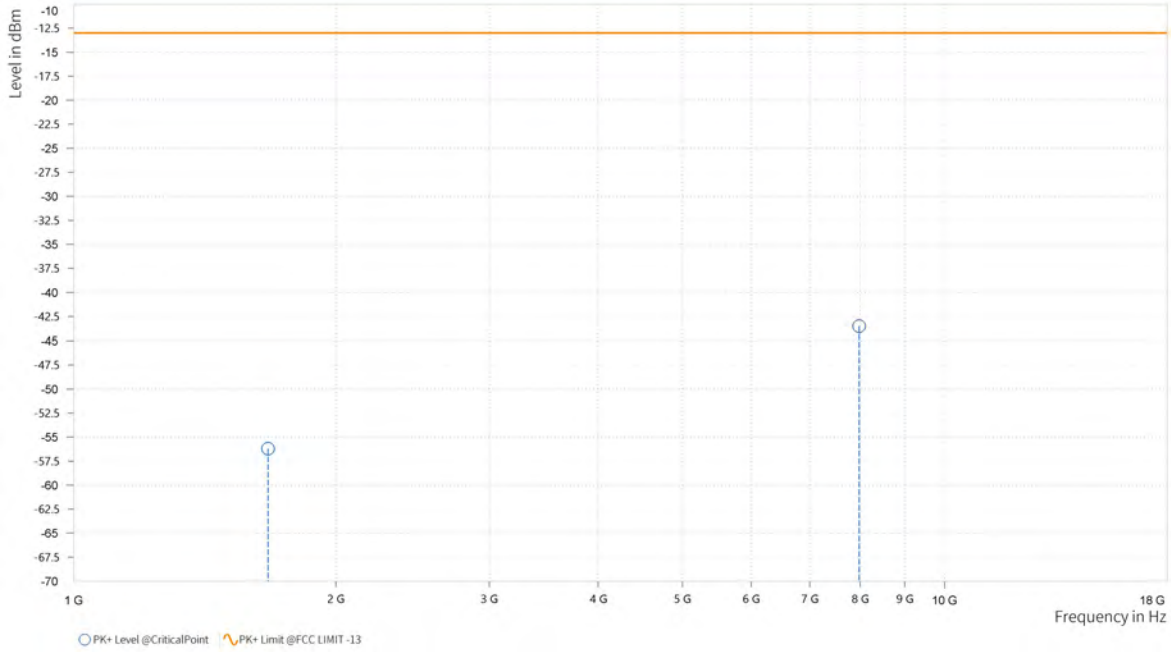
| MODE | TX channel 20525 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Chao Wu | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,672.000 | -53.59 | -13.00 | 40.59 | 15.06 | H | 65.3 | 1 |
| 5 | 7,960.000 | -44.10 | -13.00 | 31.10 | 32.98 | H | 84.3 | 2 |



| MODE | TX channel 20525 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Chao Wu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

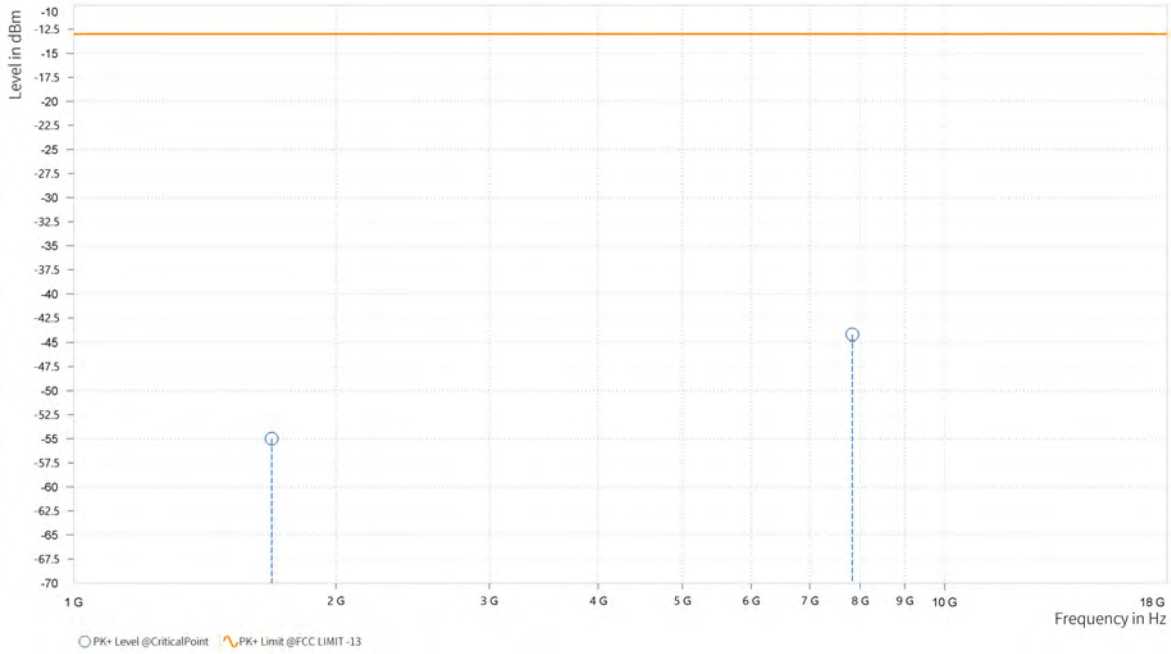
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,672.000 | -56.20 | -13.00 | 43.20 | 15.09 | V | 0.9 | 2 |
| 5 | 7,978.000 | -43.51 | -13.00 | 30.51 | 33.29 | V | 278.1 | 1 |



**CH 20643：**

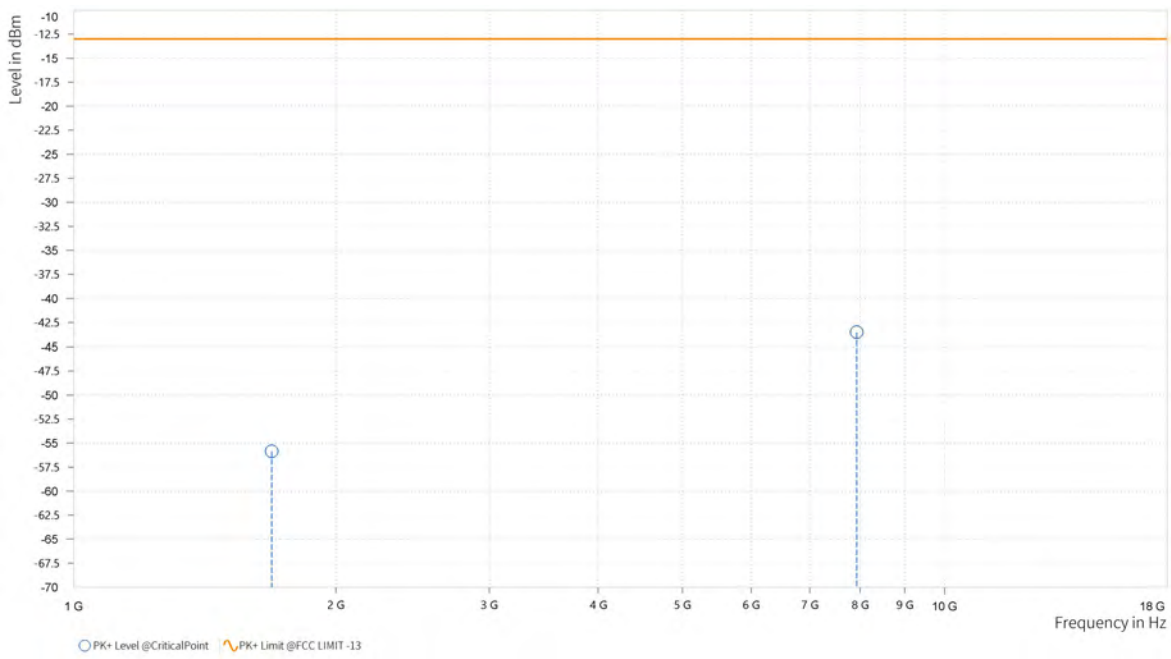
| | | | |
|---|---|---|---|
| **MODE** | TX channel 20643 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Chao Wu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,687.500 | -55.00 | -13.00 | 42.00 | 15.23 | H | 297 | 2 |
| 5 | 7,833.500 | -44.22 | -13.00 | 31.22 | 32.96 | H | 359 | 2 |



| MODE | TX channel 20643 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Chao Wu | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

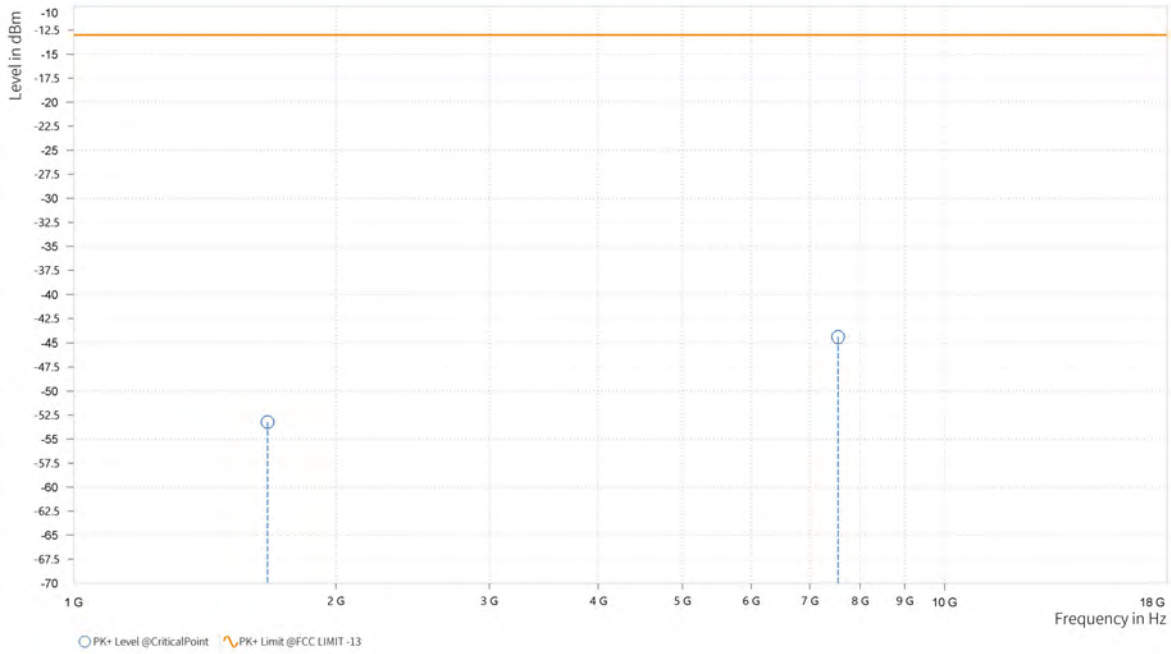
| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,687.500 | -55.85 | -13.00 | 42.85 | 15.68 | V | 64.1 | 1 |
| 5 | 7,926.500 | -43.52 | -13.00 | 30.52 | 33.15 | V | 359 | 2 |



**CHANNEL BANDWIDTH: 3MHz / QPSK**

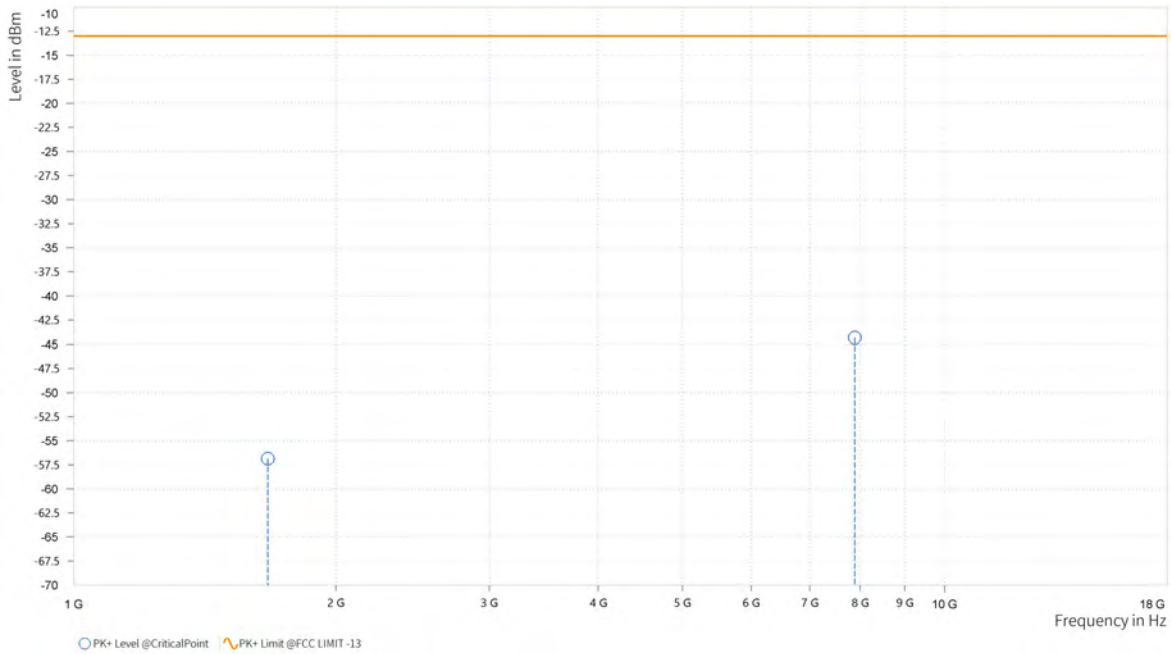
| | | | |
|---|---|---|---|
| **MODE** | TX channel 20525 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Chao Wu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,670.000 | -53.22 | -13.00 | 40.22 | 15.01 | H | 64.1 | 1 |
| 5 | 7,546.000 | -44.41 | -13.00 | 31.41 | 32.08 | H | 81.9 | 2 |



| MODE | TX channel 20525 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Chao Wu | | |
| 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 | 1,670.500 | -56.86 | -13.00 | 43.86 | 15.05 | V | 359 | 2 |
| 5 | 7,888.500 | -44.34 | -13.00 | 31.34 | 33.04 | V | 83.1 | 2 |

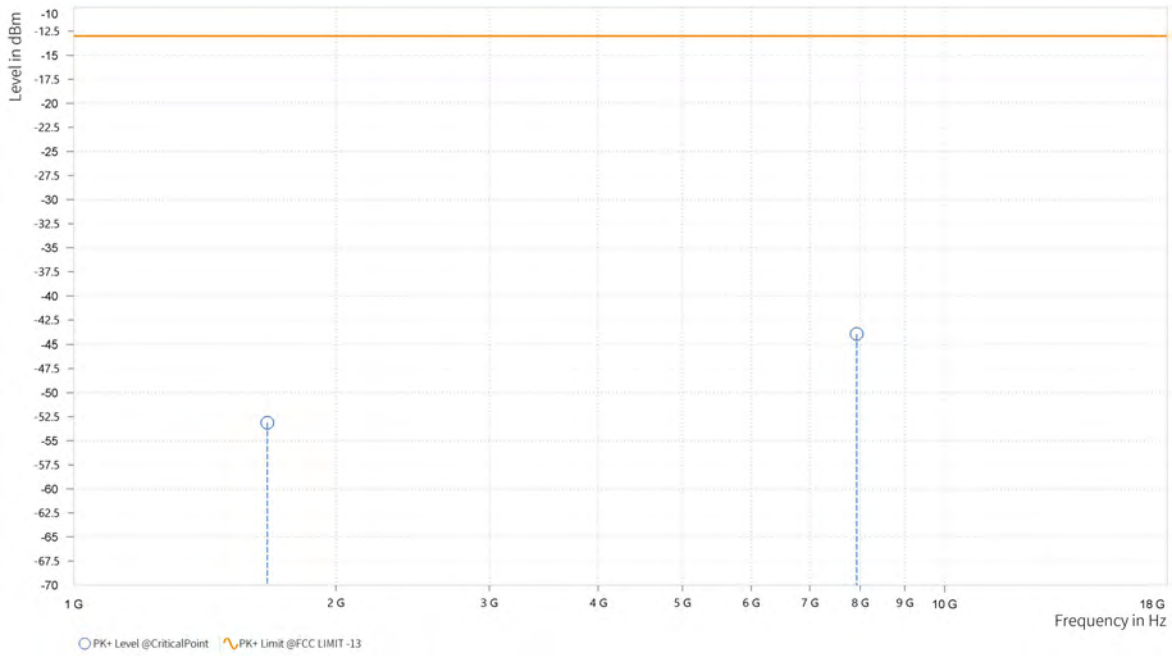


**CHANNEL BANDWIDTH: 5MHz / QPSK**

**CH 20525**

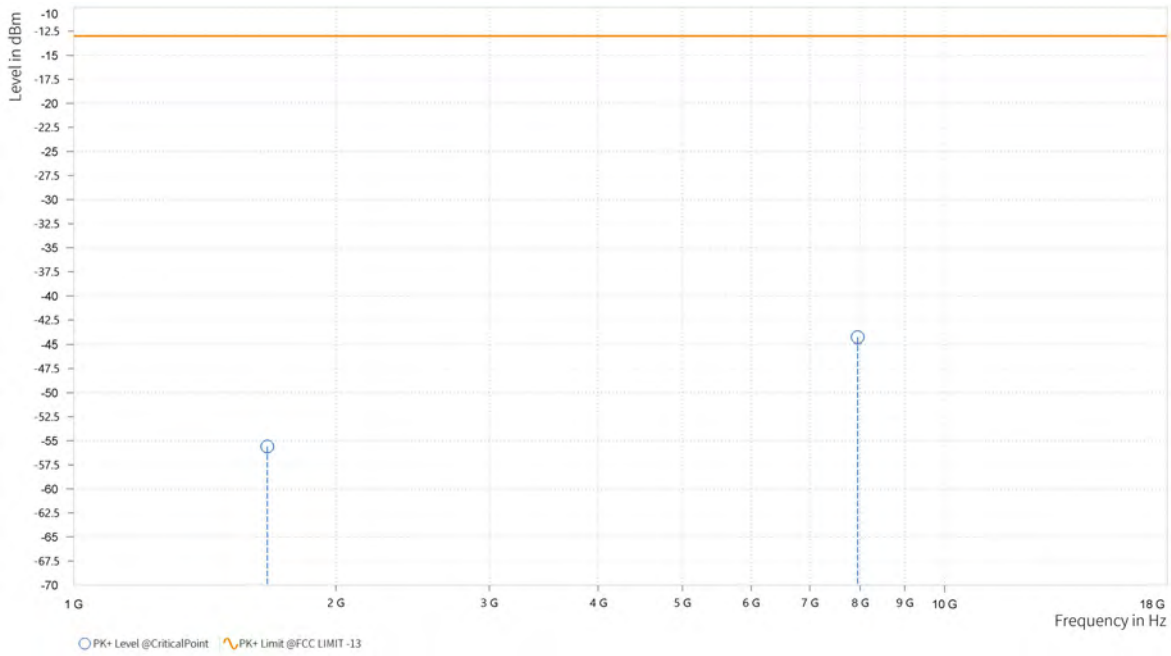
| | | | |
|---|---|---|---|
| **MODE** | TX channel 20525 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Chao Wu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,668.500 | -53.14 | -13.00 | 40.14 | 14.98 | H | 65.3 | 1 |
| 5 | 7,927.000 | -43.98 | -13.00 | 30.98 | 33.00 | H | 359 | 1 |



| MODE | TX channel 20525 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Chao Wu | | |
| 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 | 1,668.500 | -55.60 | -13.00 | 42.60 | 15.00 | V | 0.9 | 2 |
| 5 | 7,944.500 | -44.28 | -13.00 | 31.28 | 33.20 | V | 1 | 1 |

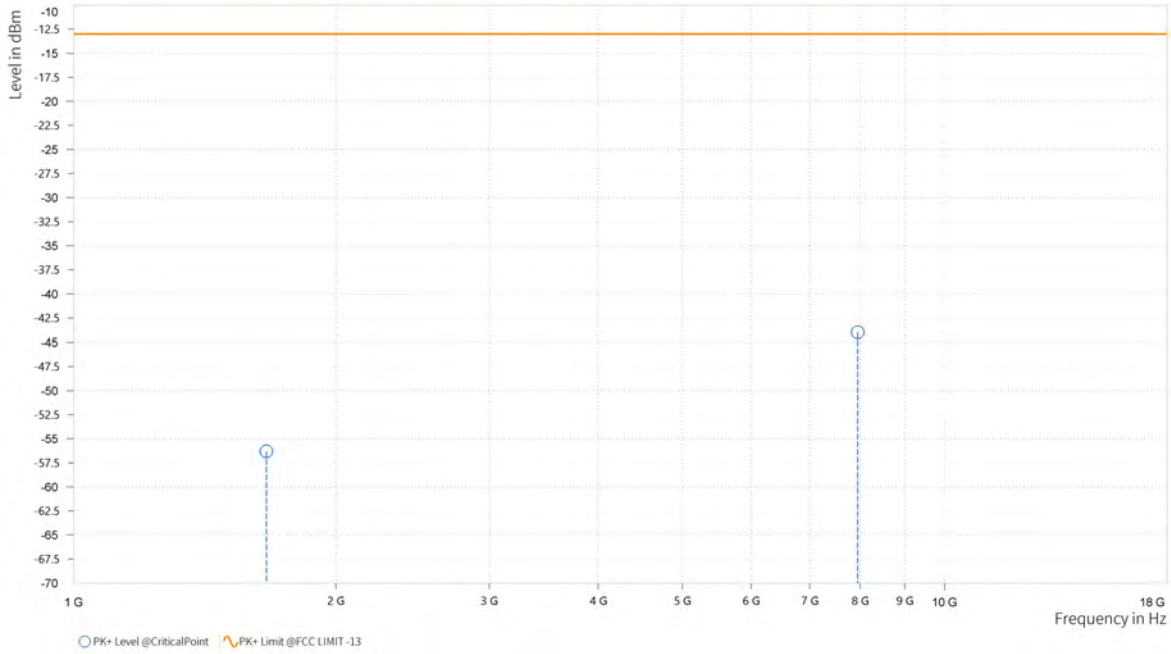


**CHANNEL BANDWIDTH: 10MHz / QPSK**

**CH 20525**

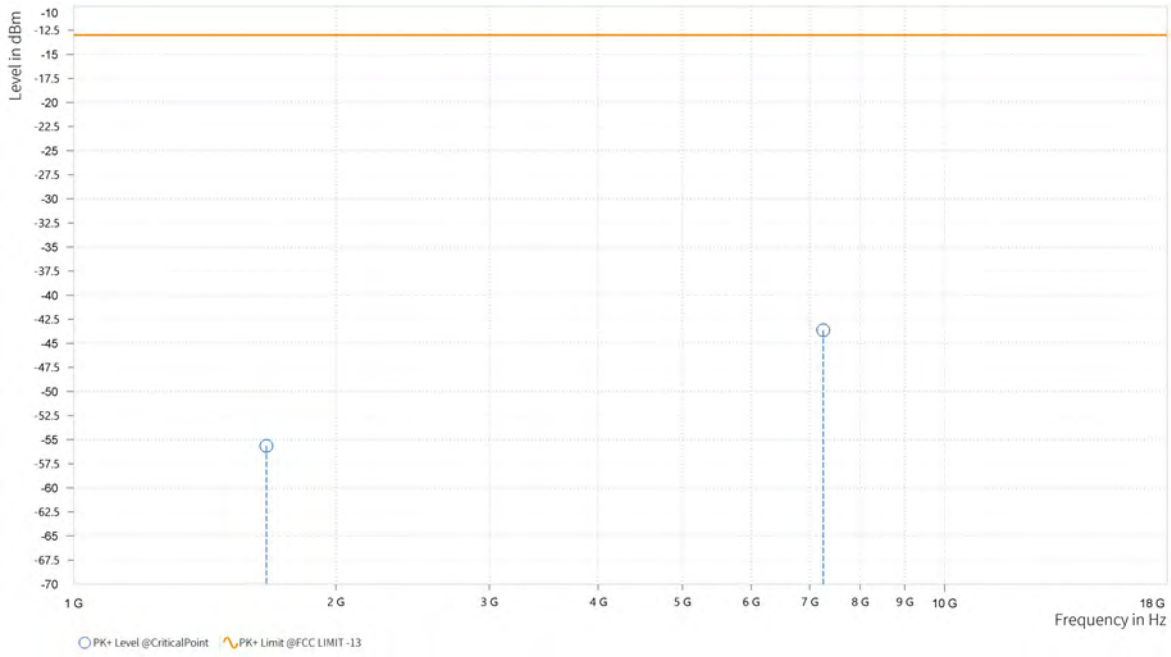
| | | | |
|---|---|---|---|
| **MODE** | TX channel 20525 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 23deg. C, 70%RH | **INPUT POWER** | AC 120V/60HZ |
| **TESTED BY** | Chao Wu | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| Rg | Frequency [MHz] | PK+ Level [dBm] | PK+ Limit [dBm] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 2 | 1,664.500 | -56.31 | -13.00 | 43.31 | 14.89 | H | 295.9 | 2 |
| 5 | 7,947.000 | -43.99 | -13.00 | 30.99 | 32.99 | H | 1 | 1 |



| MODE | TX channel 20525 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 23deg. C, 70%RH | INPUT POWER | AC 120V/60HZ |
| TESTED BY | Chao Wu | | |
| 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 | 1,664.000 | -55.65 | -13.00 | 42.65 | 14.89 | V | 0.9 | 2 |
| 5 | 7,257.500 | -43.63 | -13.00 | 30.63 | 31.84 | V | 84.3 | 2 |

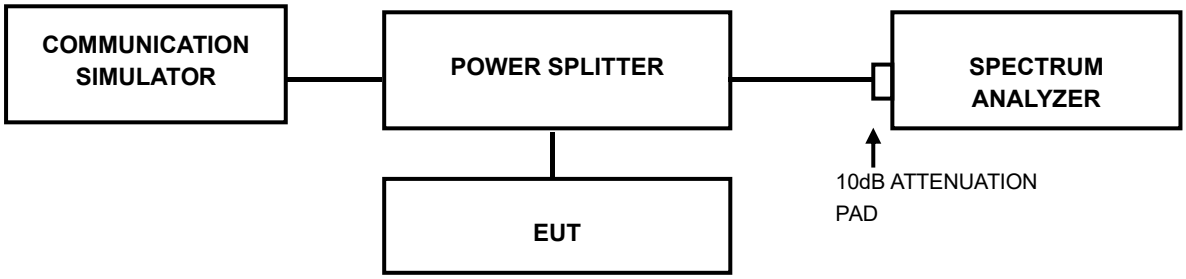


## 3.7 PEAK TO AVERAGE RATIO

### 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

Please Refer to Appendix Of this test report.

# 4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

# 5 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

# 6 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.

# 7 APPENDIX:

## GSM850

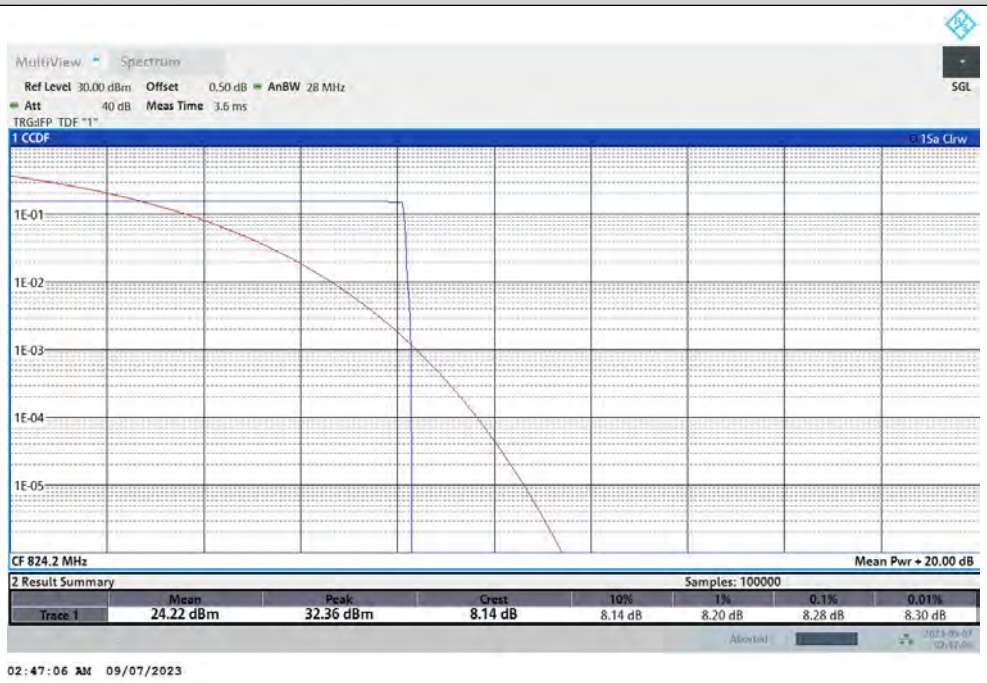
## PEAK-TO-AVERAGE RATIO(CCDF)

### Test Result

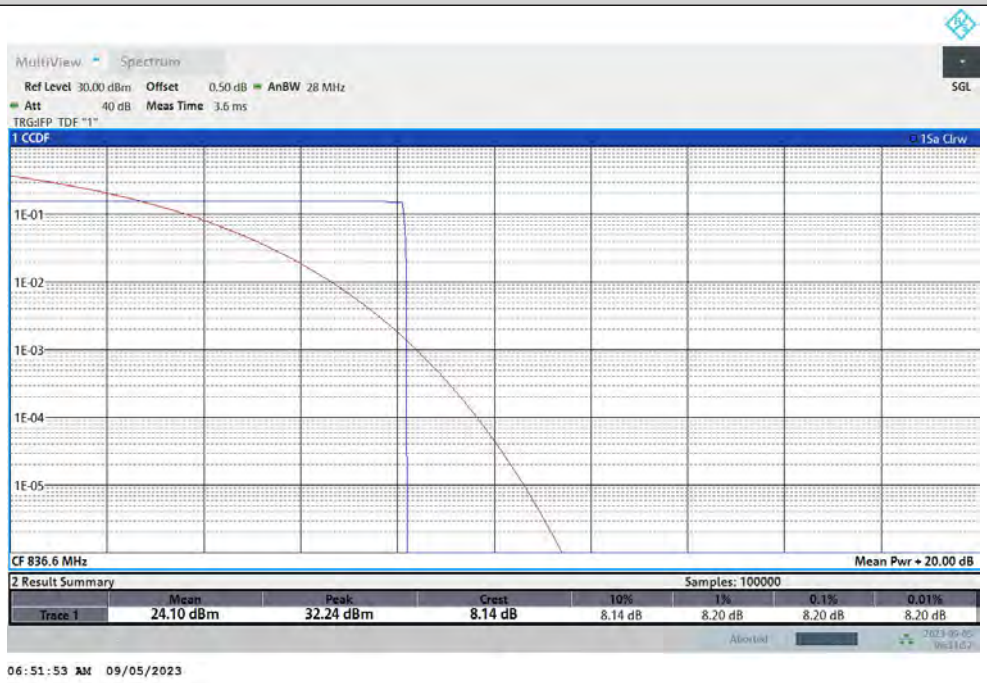
| Band | Channel | Result(dB) | Limit(dB) | Verdict |
|---|---|---|---|---|
| GSM850 | 128 | 8.28 | 13 | PASS |
| GSM850 | 189 | 8.20 | 13 | PASS |
| GSM850 | 251 | 8.20 | 13 | PASS |
| EGPRS850 | 128 | 11.26 | 13 | PASS |
| EGPRS850 | 189 | 11.34 | 13 | PASS |
| EGPRS850 | 251 | 11.66 | 13 | PASS |

## Test Graphs

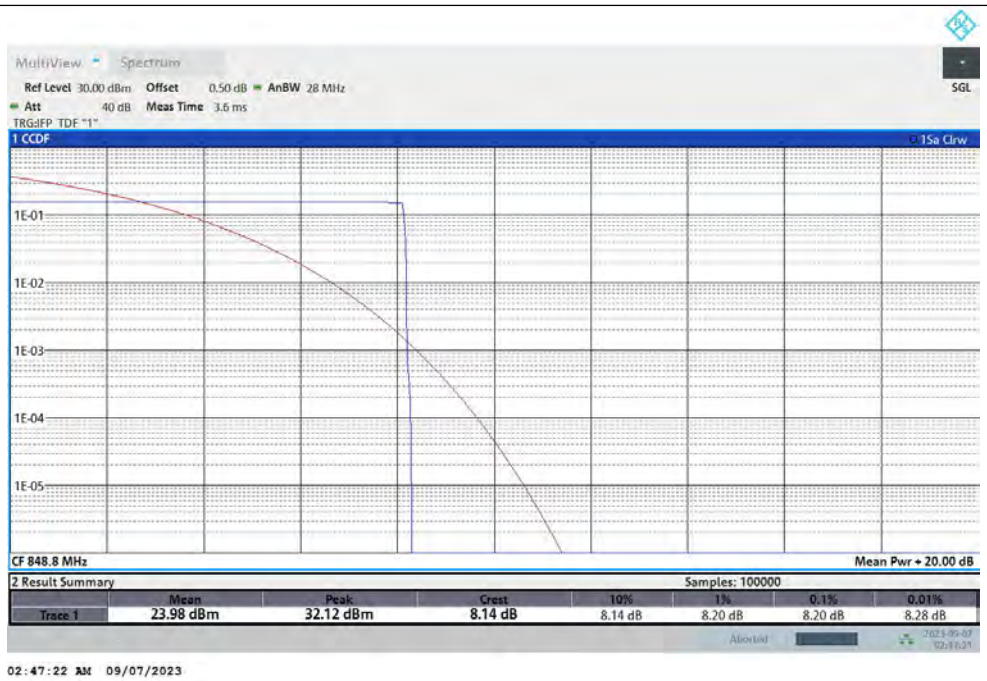
GSM850-128



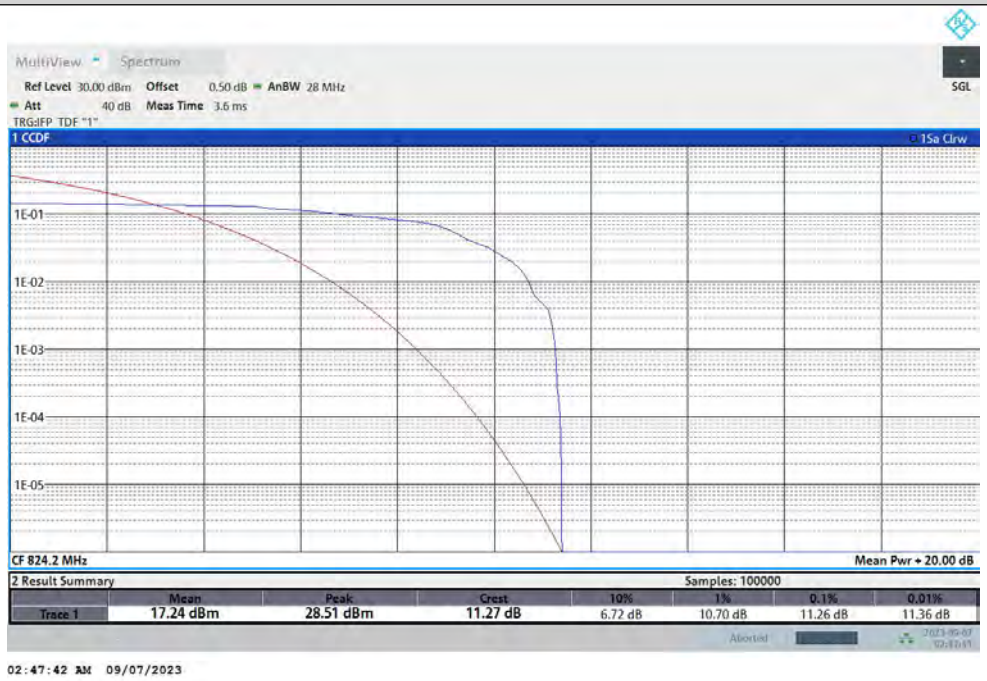

GSM850-189



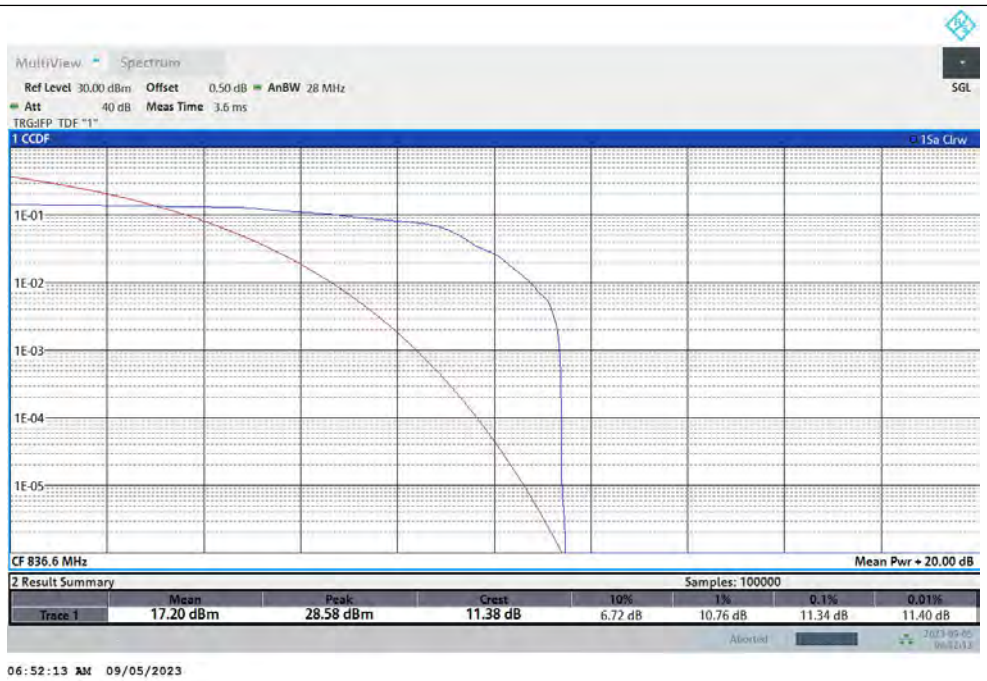

GSM850-251



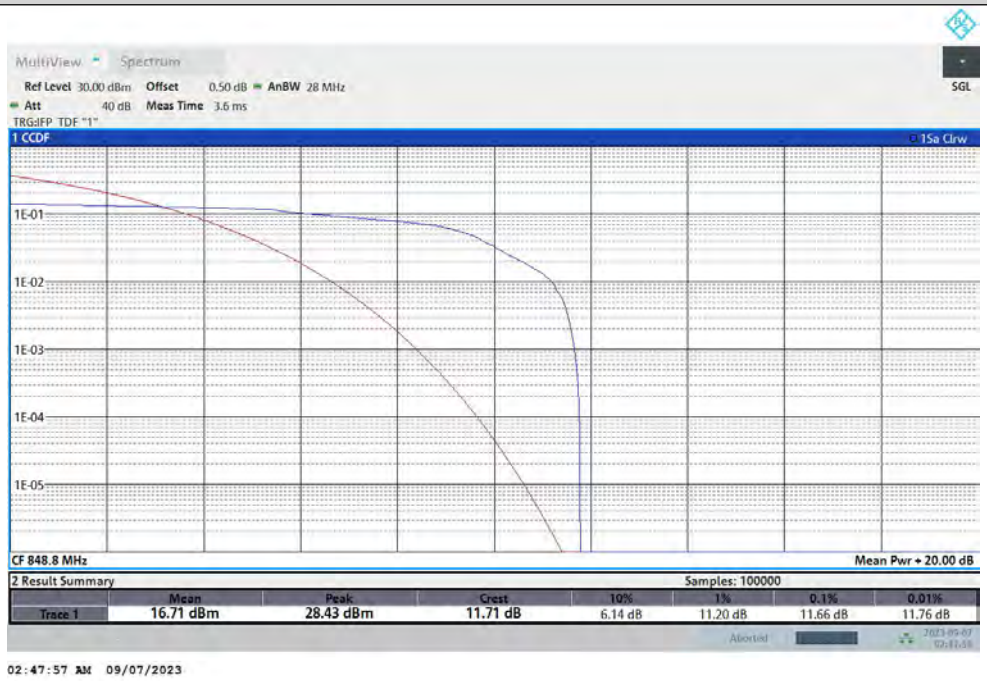

EGPRS850-128




EGPRS850-189




EGPRS850-251



## 26DB BANDWIDTH AND OCCUPIED BANDWIDTH

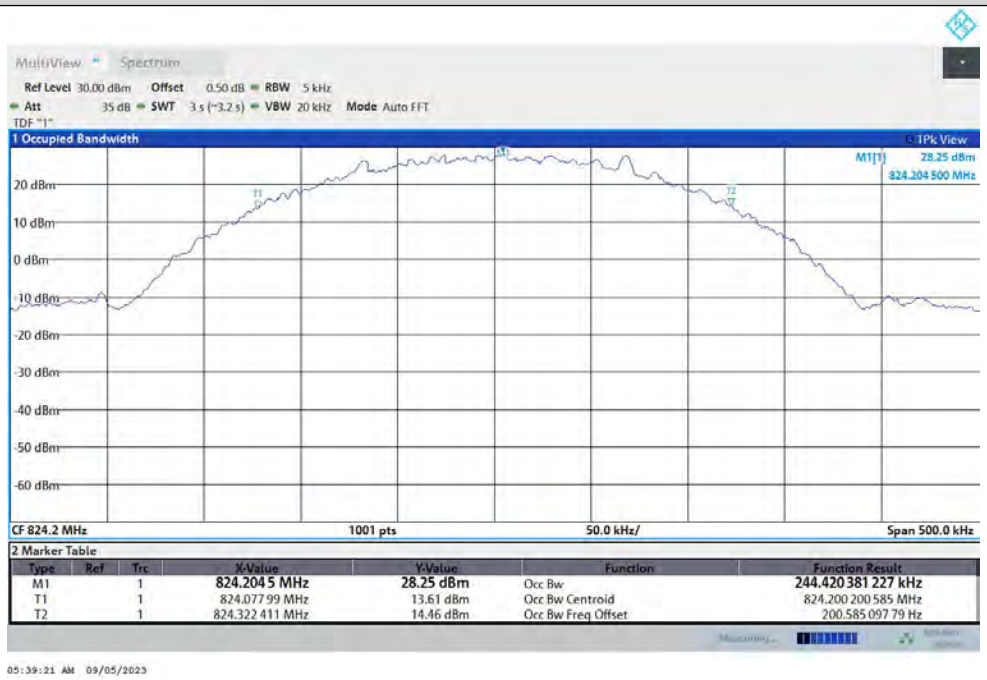
### Test Result

| Band | Channel | Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|---|
| GSM850 | 128 | 244.420 | 318.680 | --- | PASS |
| GSM850 | 189 | 244.497 | 316.680 | --- | PASS |
| GSM850 | 251 | 244.071 | 317.180 | --- | PASS |
| EGPRS850 | 128 | 238.993 | 311.190 | --- | PASS |
| EGPRS850 | 189 | 238.400 | 309.190 | --- | PASS |
| EGPRS850 | 251 | 239.262 | 310.690 | --- | PASS |

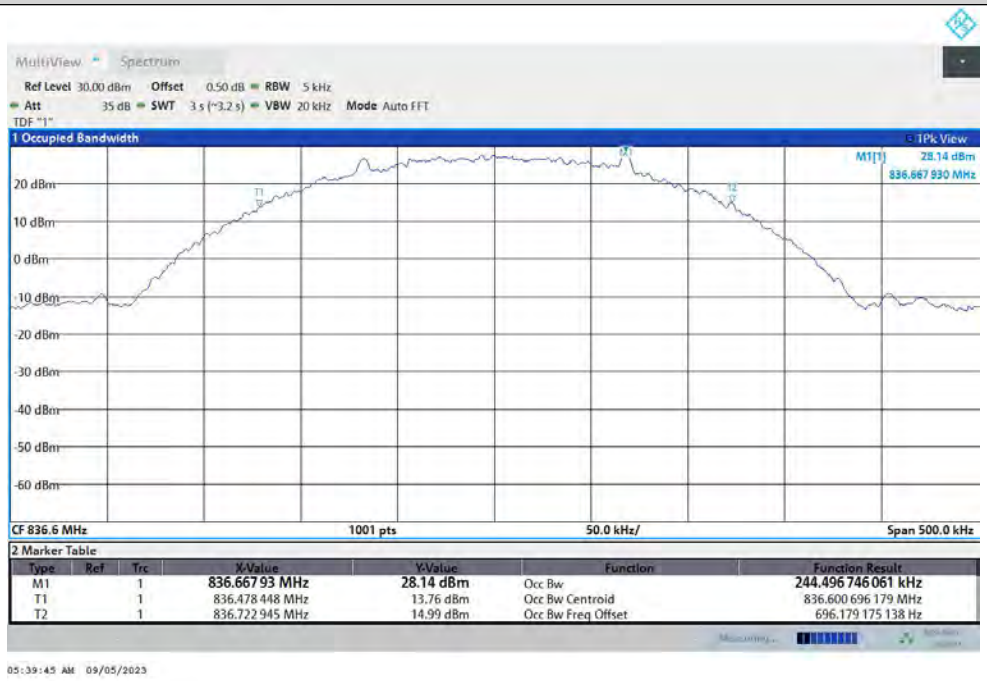
## Test Graphs

### Occupied Bandwidth

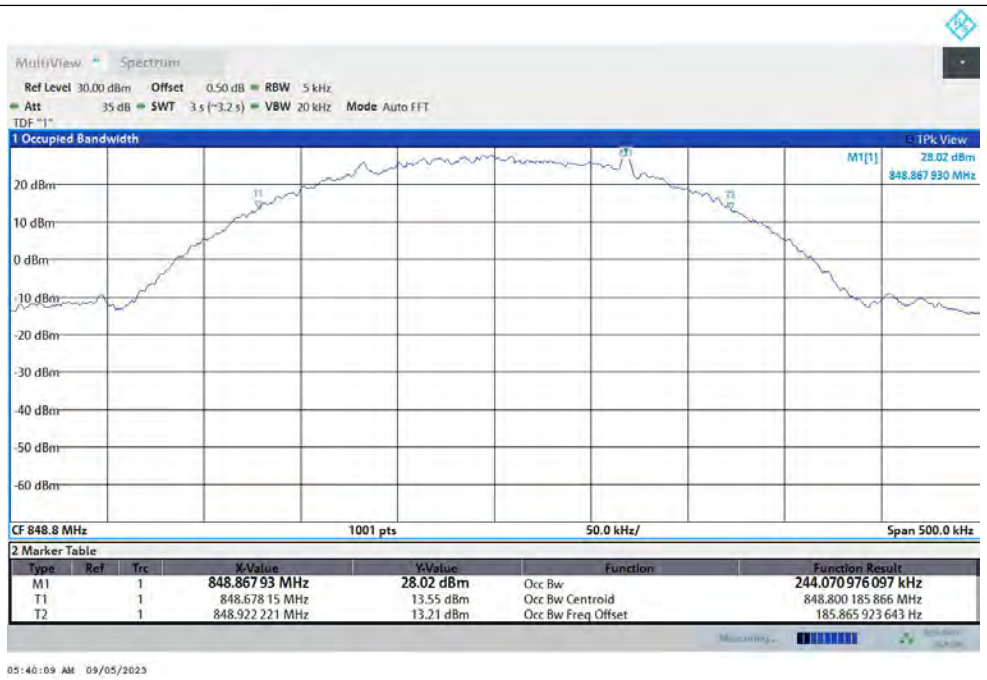
GSM850-128



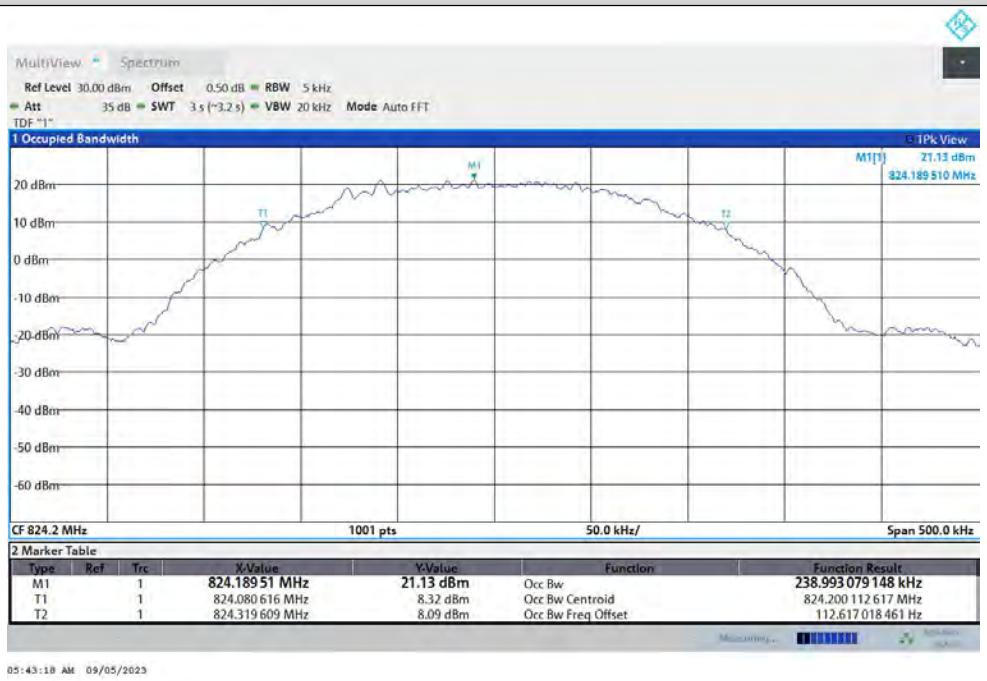

GSM850-189



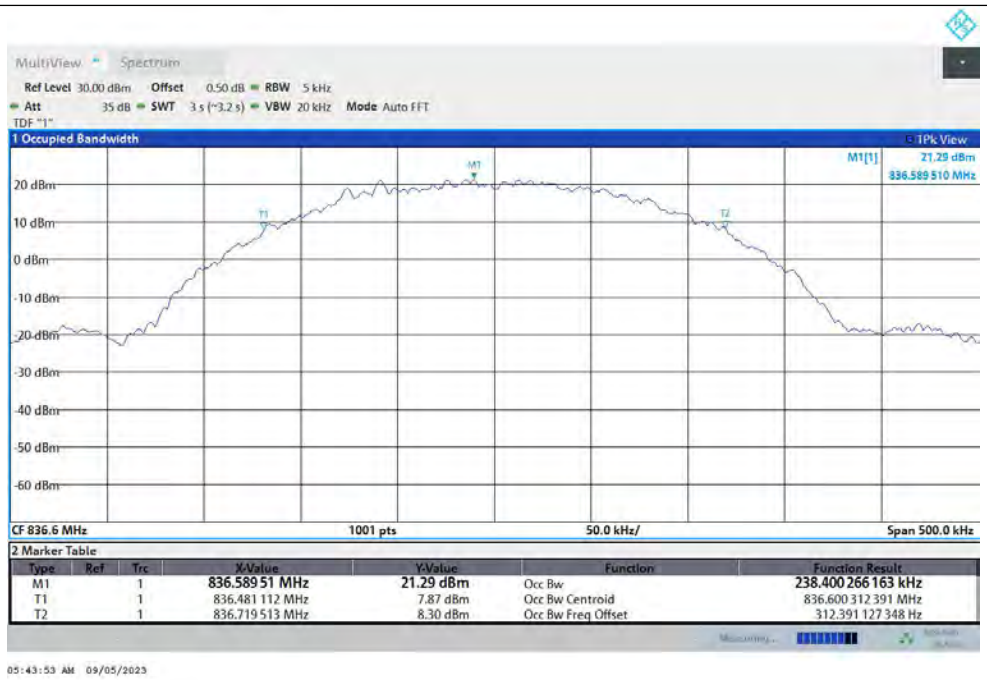

GSM850-251



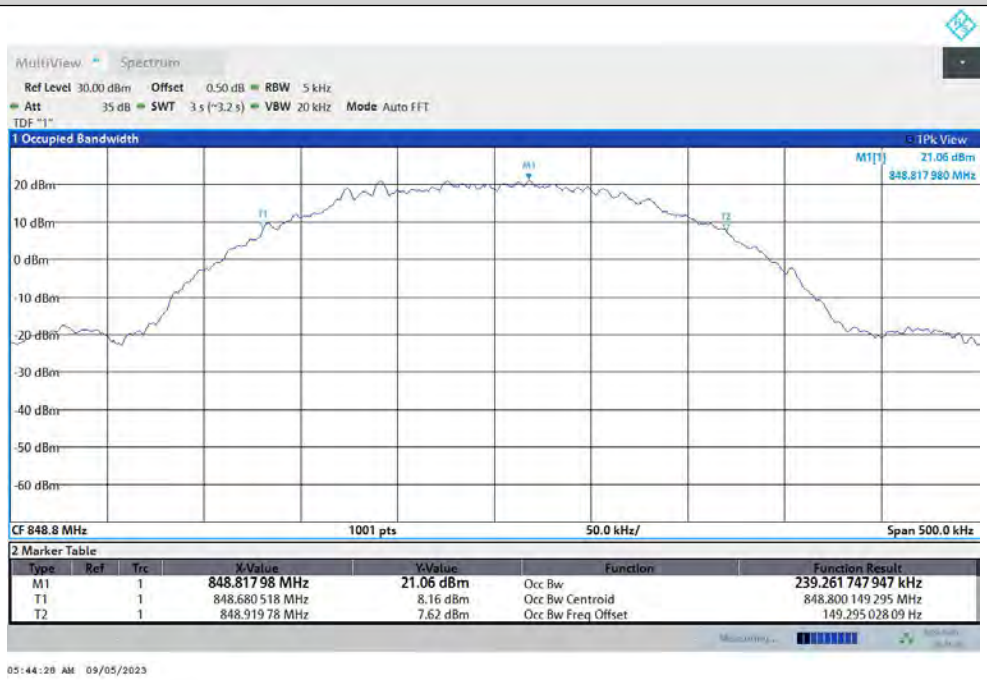

EGPRS850-128




EGPRS850-189

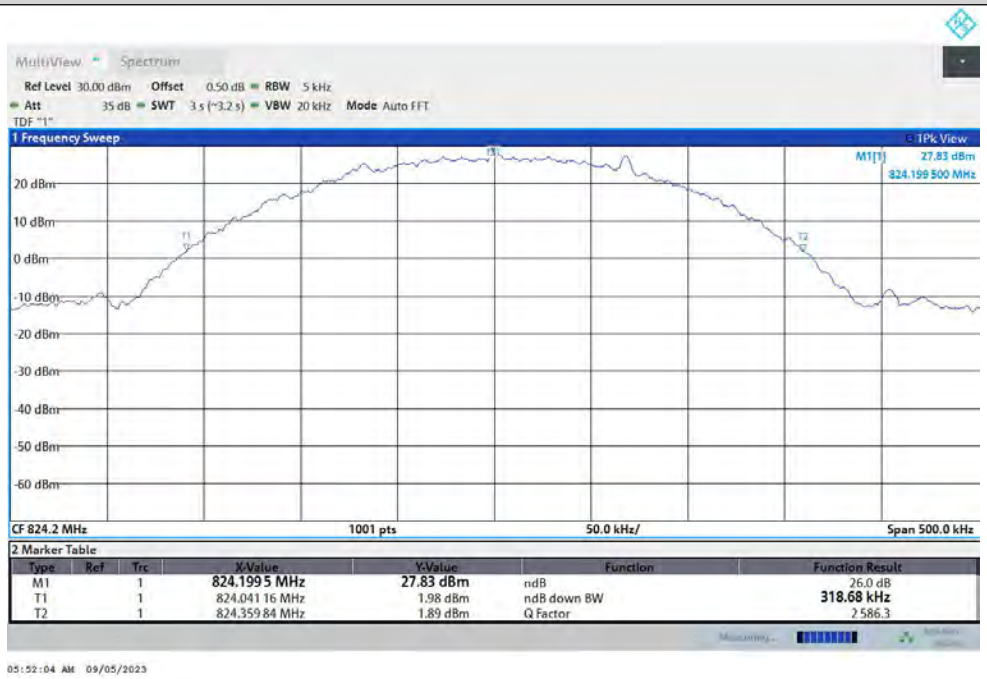



EGPRS850-251

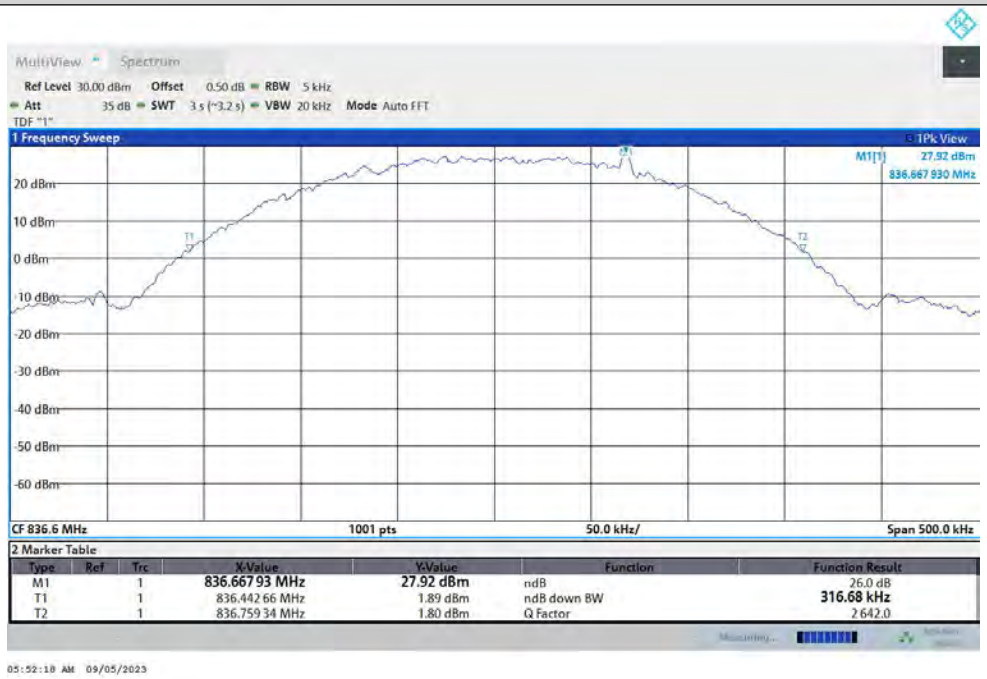



## 26dB Bandwidth

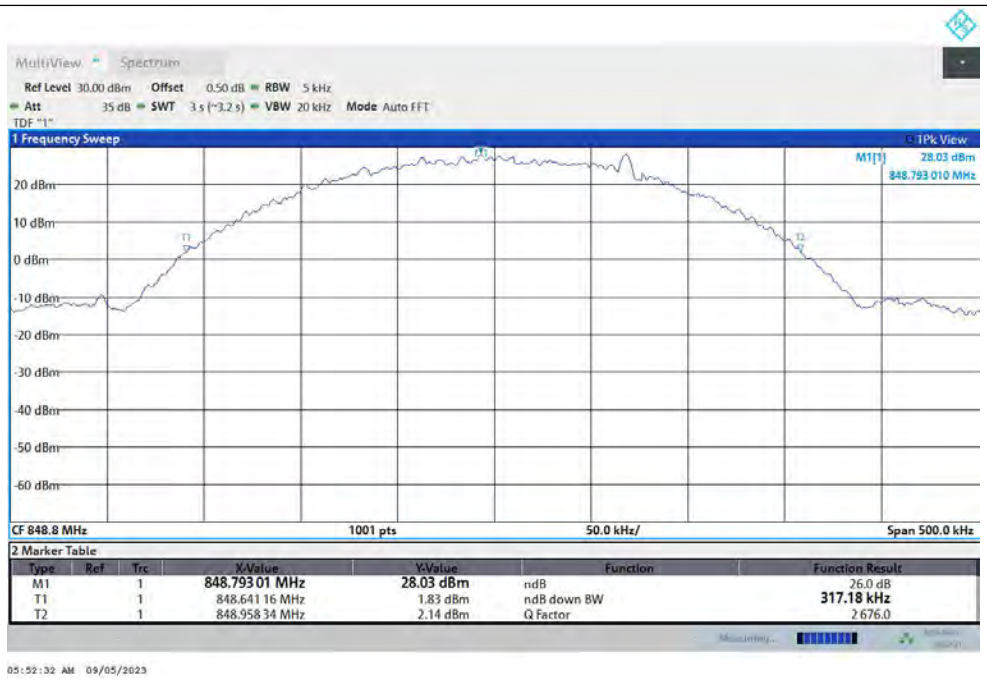
GSM850-128



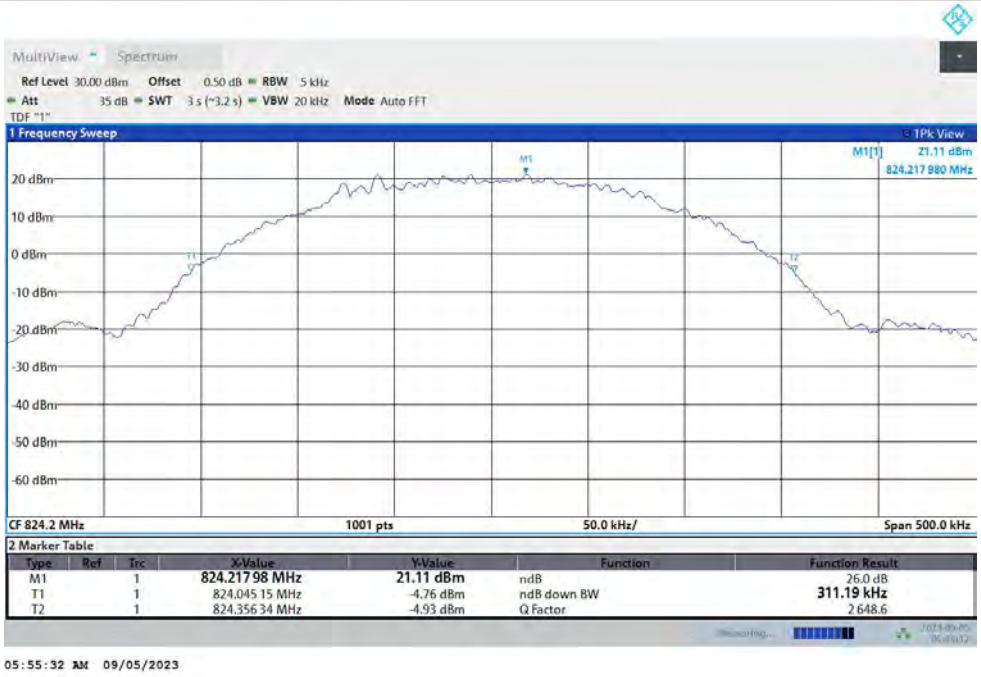

GSM850-189



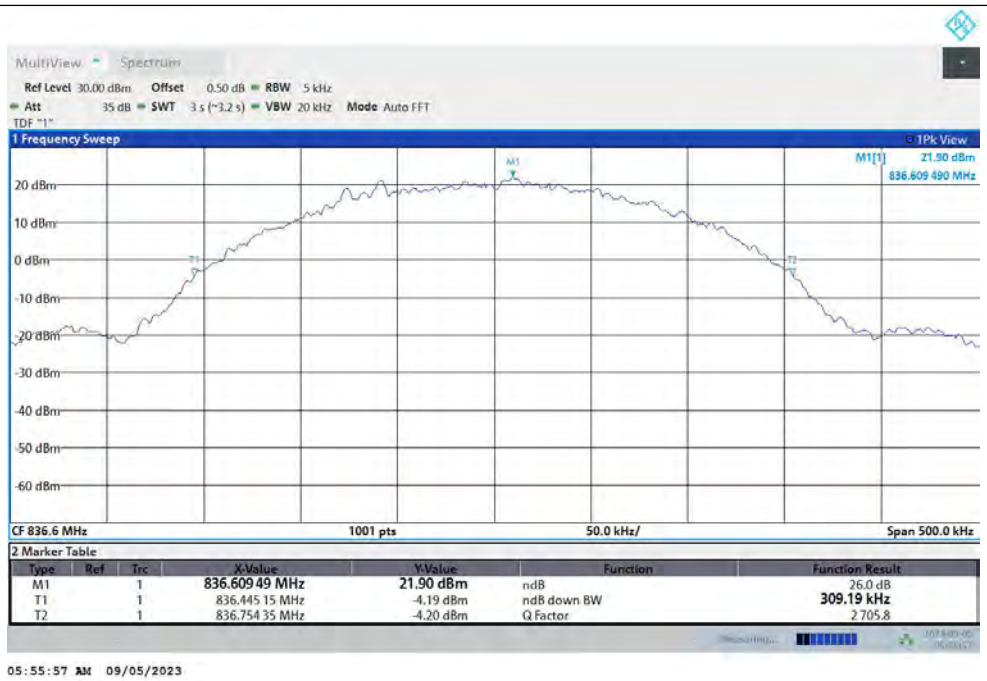

GSM850-251



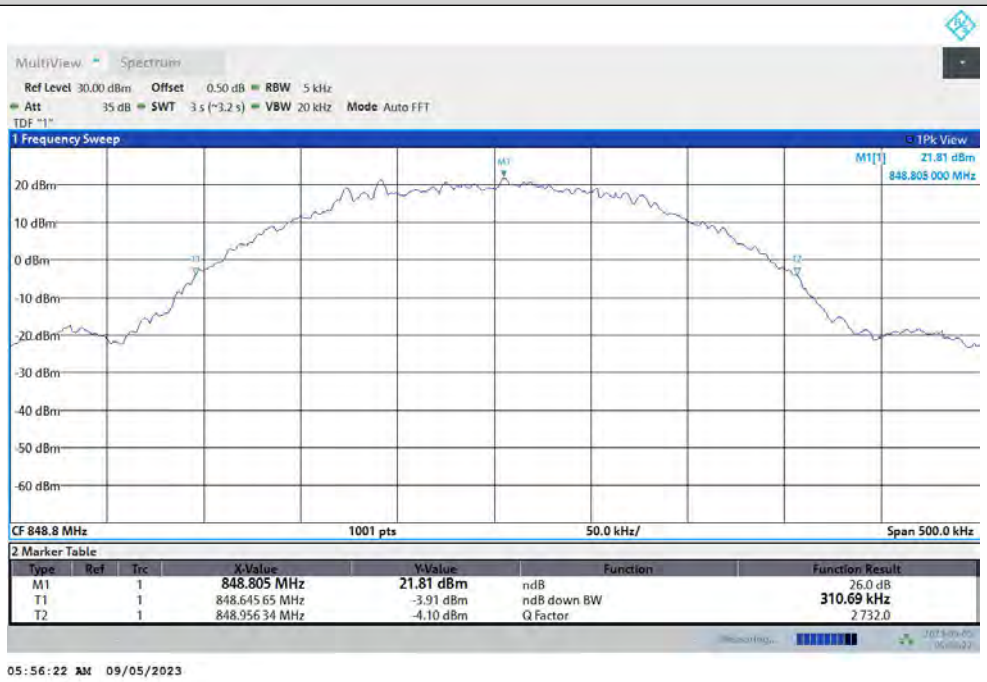

EGPRS850-128




EGPRS850-189




EGPRS850-251



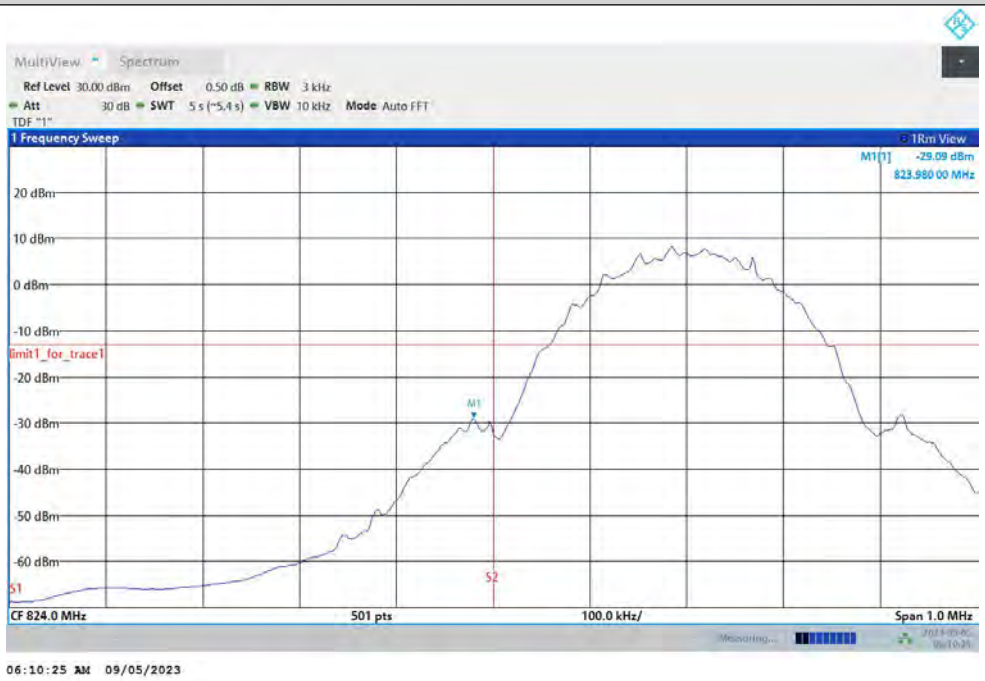
## BAND EDGE

### Test Result

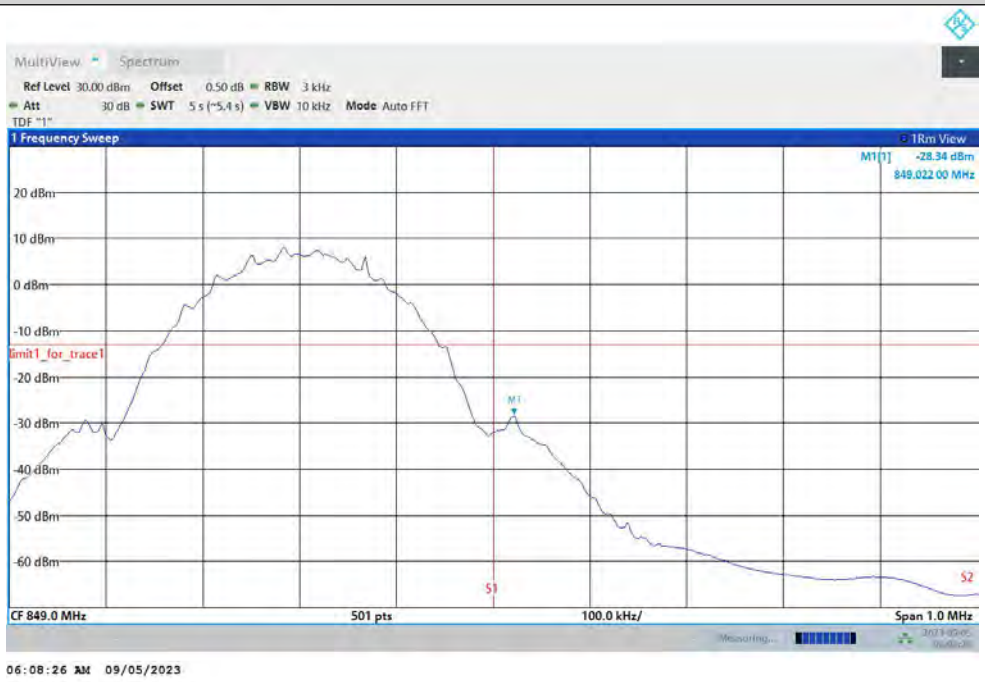
| Band | Channel | Freq (MHz) | Result (dBm) | Limit(dBm) | Verdict |
|---|---|---|---|---|---|
| GSM850 | 128 | See Graph | See Graph | -13 | PASS |
| GSM850 | 251 | See Graph | See Graph | -13 | PASS |
| EGPRS850 | 128 | See Graph | See Graph | -13 | PASS |
| EGPRS850 | 251 | See Graph | See Graph | -13 | PASS |

## Test Graphs

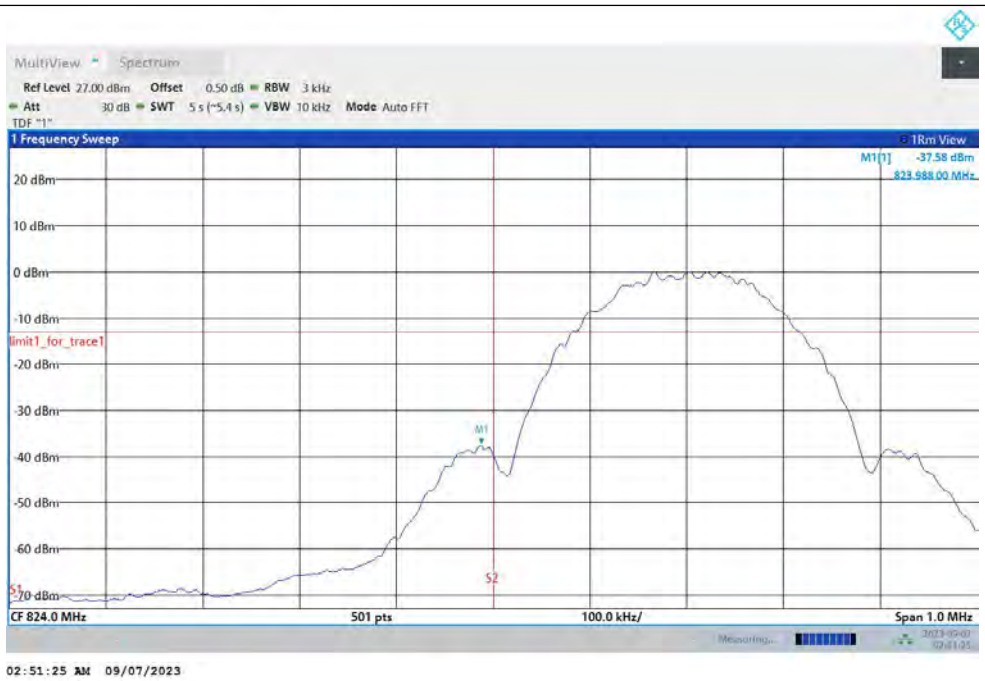
GSM850-128



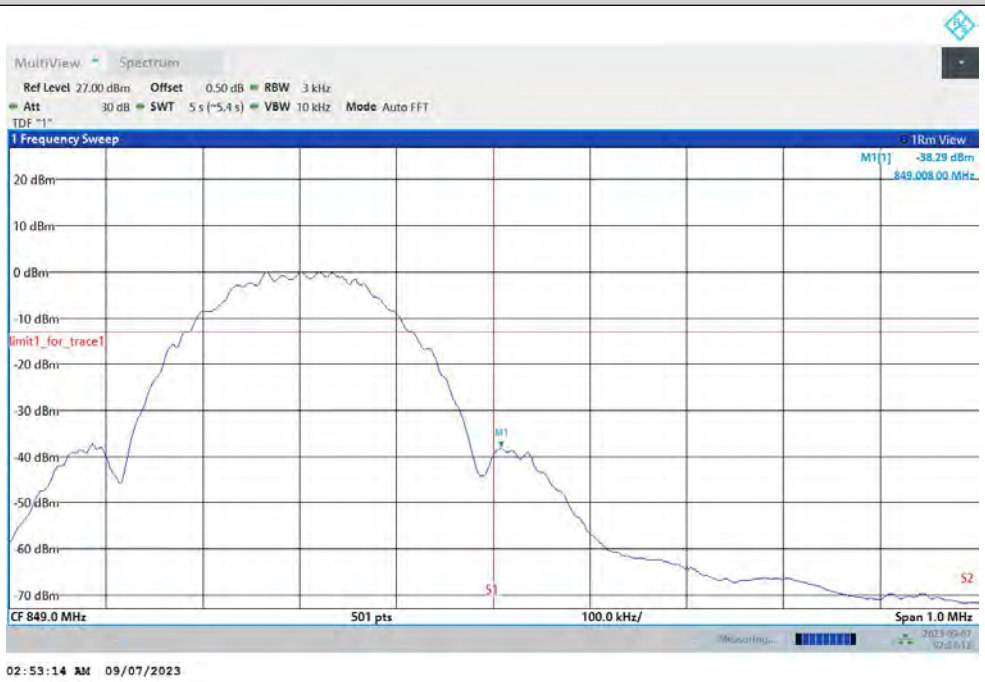

GSM850-251




EGPRS850-128




EGPRS850-251



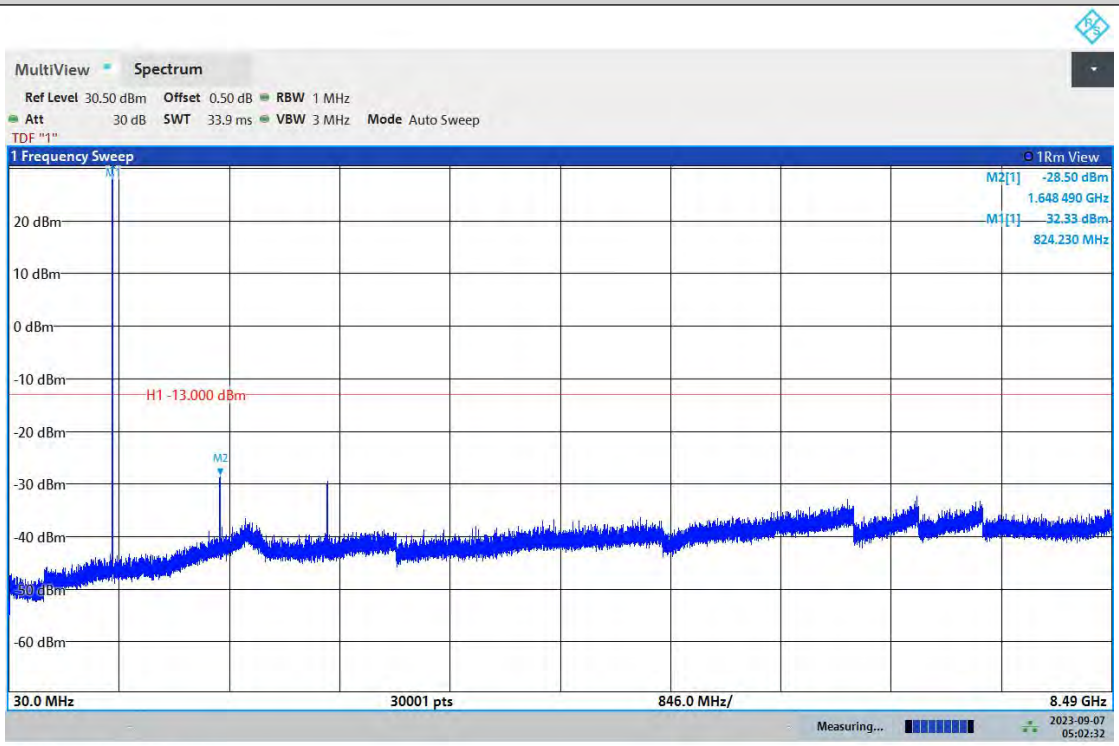
## CONDUCTED SPURIOUS EMISSION

### Test Result

| Band | Channel | Frequency Range(MHz) | Max.Freq. (MHz) | Result (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| GSM850 | 128 | 30~8490MHz | See Graph | See Graph | -13 | PASS |
| GSM850 | 189 | 30~8490MHz | See Graph | See Graph | -13 | PASS |
| GSM850 | 251 | 30~8490MHz | See Graph | See Graph | -13 | PASS |
| EGPRS850 | 128 | 30~8490MHz | See Graph | See Graph | -13 | PASS |
| EGPRS850 | 189 | 30~8490MHz | See Graph | See Graph | -13 | PASS |
| EGPRS850 | 251 | 30~8490MHz | See Graph | See Graph | -13 | PASS |

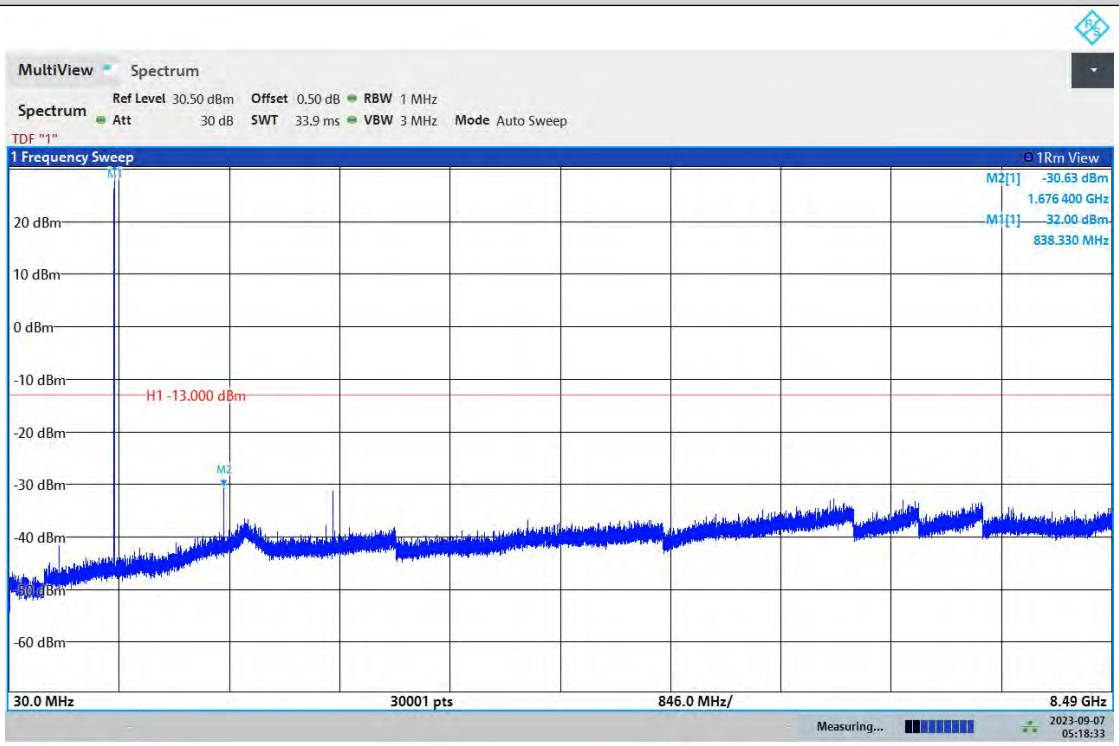
## Test Graphs

GSM850-128-30~8490MHz



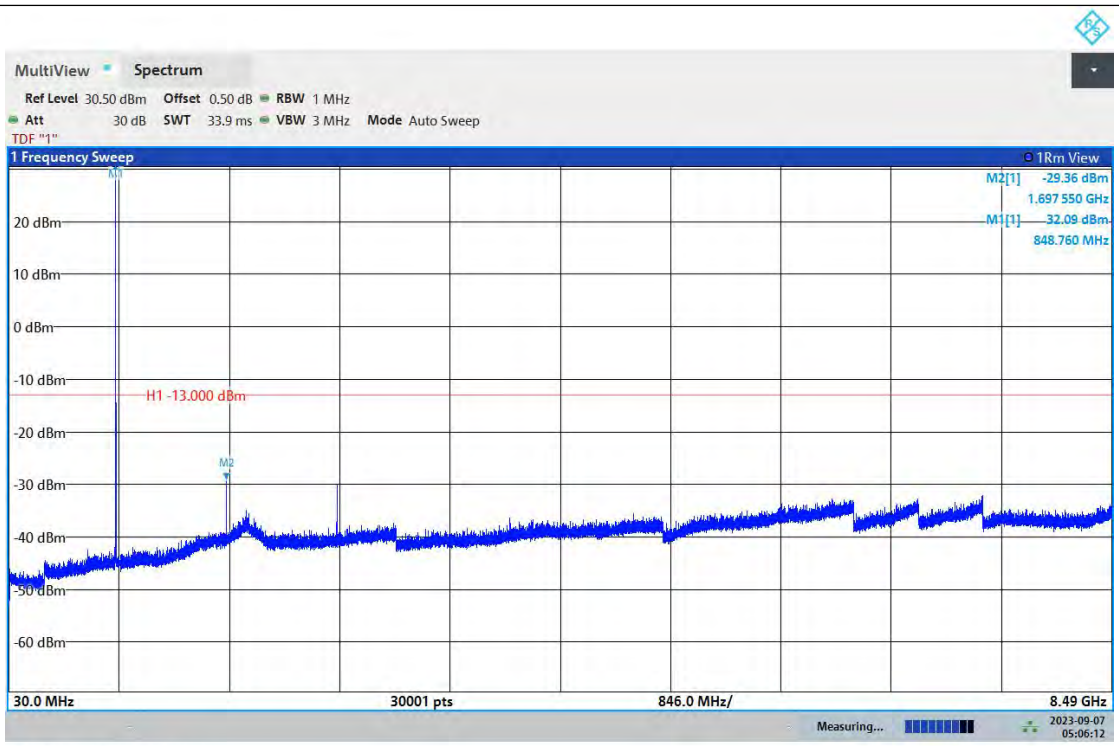

05:02:32 AM 09/07/2023

GSM850-189-30~8490MHz



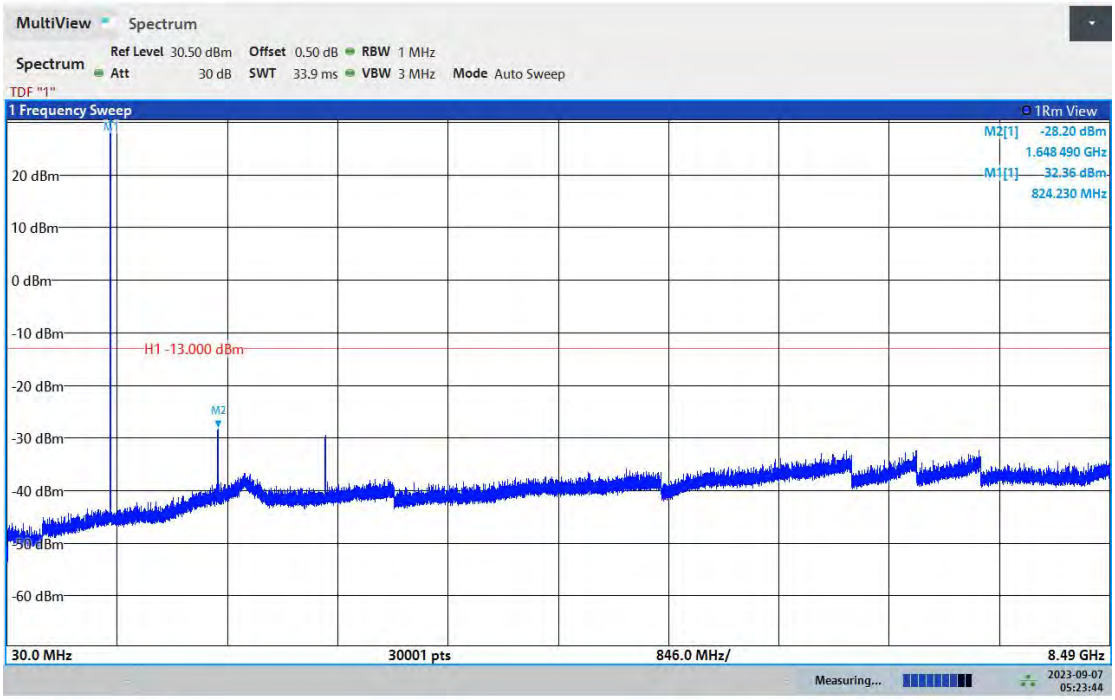

05:18:34 AM 09/07/2023

GSM850-251-30~8490MHz



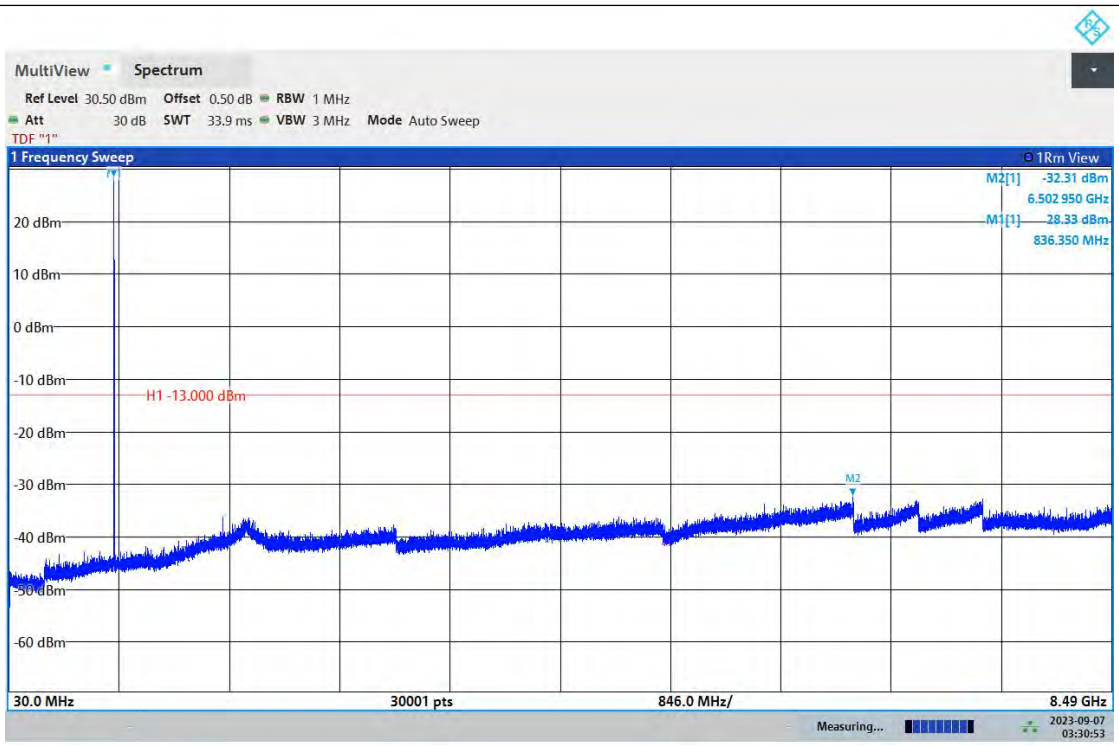

05:06:13 AM 09/07/2023

EGPRS850-128-30~8490MHz



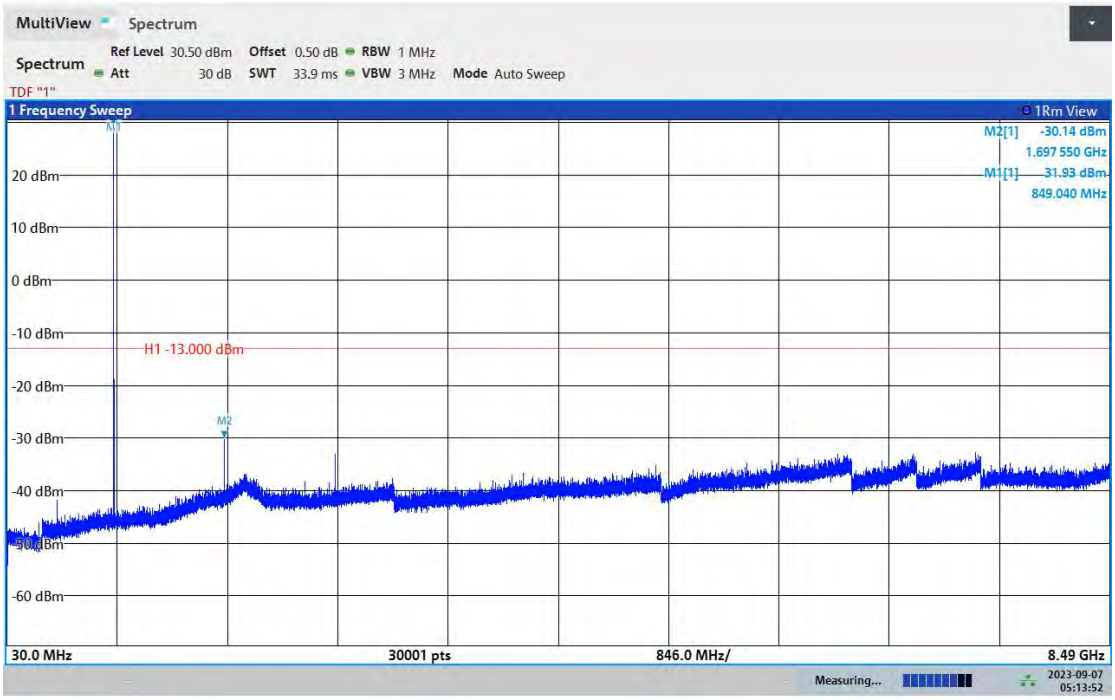

05:23:44 AM 09/07/2023

EGPRS850-189-30~8490MHz




03:30:53 AM 09/07/2023

EGPRS850-251-30~8490MHz




05:13:52 AM 09/07/2023

## FREQUENCY STABILITY

### Test Result

| Voltage | | | | | | | |
|---|---|---|---|---|---|---|---|
| Band | Channel | Voltage [Vdc] | Temperature (℃) | Deviation (Hz) | Deviation (ppm) | Limit (ppm) | Verdict |
| GSM850 | 128 | VL | NT | 3.2 | 0.003883 | ±2.5 | PASS |
| GSM850 | 128 | VN | NT | 6.78 | 0.008226 | ±2.5 | PASS |
| GSM850 | 128 | VH | NT | 6.47 | 0.007850 | ±2.5 | PASS |
| GSM850 | 189 | VL | NT | 7.8 | 0.009326 | ±2.5 | PASS |
| GSM850 | 189 | VN | NT | -8.56 | -0.010234 | ±2.5 | PASS |
| GSM850 | 189 | VH | NT | -1.92 | -0.002296 | ±2.5 | PASS |
| GSM850 | 251 | VL | NT | -6.9 | -0.008129 | ±2.5 | PASS |
| GSM850 | 251 | VN | NT | 4.94 | 0.005820 | ±2.5 | PASS |
| GSM850 | 251 | VH | NT | -5.94 | -0.006998 | ±2.5 | PASS |
| EGPRS850 | 128 | VL | NT | -9.88 | -0.011987 | ±2.5 | PASS |
| EGPRS850 | 128 | VN | NT | -7.77 | -0.009427 | ±2.5 | PASS |
| EGPRS850 | 128 | VH | NT | 3.83 | 0.004647 | ±2.5 | PASS |
| EGPRS850 | 189 | VL | NT | 3.39 | 0.004053 | ±2.5 | PASS |
| EGPRS850 | 189 | VN | NT | -2.79 | -0.003336 | ±2.5 | PASS |
| EGPRS850 | 189 | VH | NT | 6.67 | 0.007975 | ±2.5 | PASS |
| EGPRS850 | 251 | VL | NT | 2.92 | 0.003440 | ±2.5 | PASS |
| EGPRS850 | 251 | VN | NT | 3.14 | 0.003699 | ±2.5 | PASS |
| EGPRS850 | 251 | VH | NT | 2.15 | 0.002533 | ±2.5 | PASS |

| Temperature | | | | | | | |
|---|---|---|---|---|---|---|---|
| Band | Channel | Voltage [Vdc] | Temperature (℃) | Deviation (Hz) | Deviation (ppm) | Limit (ppm) | Verdict |
| GSM850 | 128 | NV | -30 | 7.36 | 0.008930 | ±2.5 | PASS |
| GSM850 | 128 | NV | -20 | 0.76 | 0.000922 | ±2.5 | PASS |
| GSM850 | 128 | NV | -10 | 4.73 | 0.005739 | ±2.5 | PASS |
| GSM850 | 128 | NV | 0 | -2.07 | -0.002512 | ±2.5 | PASS |
| GSM850 | 128 | NV | 10 | -4.26 | -0.005169 | ±2.5 | PASS |
| GSM850 | 128 | NV | 20 | 3.64 | 0.004416 | ±2.5 | PASS |
| GSM850 | 128 | NV | 30 | 1.85 | 0.002245 | ±2.5 | PASS |
| GSM850 | 128 | NV | 40 | -2.54 | -0.003082 | ±2.5 | PASS |
| GSM850 | 128 | NV | 50 | -7.29 | -0.008845 | ±2.5 | PASS |
| GSM850 | 189 | NV | -30 | 6.77 | 0.008094 | ±2.5 | PASS |
| GSM850 | 189 | NV | -20 | -4.33 | -0.005177 | ±2.5 | PASS |
| GSM850 | 189 | NV | -10 | 9.36 | 0.011191 | ±2.5 | PASS |
| GSM850 | 189 | NV | 0 | 2.32 | 0.002774 | ±2.5 | PASS |
| GSM850 | 189 | NV | 10 | -3.25 | -0.003886 | ±2.5 | PASS |
| GSM850 | 189 | NV | 20 | -7.49 | -0.008955 | ±2.5 | PASS |
| GSM850 | 189 | NV | 30 | -1.36 | -0.001626 | ±2.5 | PASS |
| GSM850 | 189 | NV | 40 | 5.26 | 0.006289 | ±2.5 | PASS |
| GSM850 | 189 | NV | 50 | -1.5 | -0.001793 | ±2.5 | PASS |
| GSM850 | 251 | NV | -30 | -5.01 | -0.005902 | ±2.5 | PASS |
| GSM850 | 251 | NV | -20 | -9.98 | -0.011758 | ±2.5 | PASS |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| GSM850 | 251 | NV | -10 | 6.38 | 0.007516 | ±2.5 | PASS |
| GSM850 | 251 | NV | 0 | 3.85 | 0.004536 | ±2.5 | PASS |
| GSM850 | 251 | NV | 10 | -4.4 | -0.005184 | ±2.5 | PASS |
| GSM850 | 251 | NV | 20 | -1.38 | -0.001626 | ±2.5 | PASS |
| GSM850 | 251 | NV | 30 | 9.26 | 0.010910 | ±2.5 | PASS |
| GSM850 | 251 | NV | 40 | 2.01 | 0.002368 | ±2.5 | PASS |
| GSM850 | 251 | NV | 50 | -0.45 | -0.000530 | ±2.5 | PASS |
| EGPRS850 | 128 | NV | -30 | 0.37 | 0.000200 | ±2.5 | PASS |
| EGPRS850 | 128 | NV | -20 | 3.81 | 0.002059 | ±2.5 | PASS |
| EGPRS850 | 128 | NV | -10 | 2.19 | 0.001184 | ±2.5 | PASS |
| EGPRS850 | 128 | NV | 0 | 0.84 | 0.000454 | ±2.5 | PASS |
| EGPRS850 | 128 | NV | 10 | -1.24 | -0.000670 | ±2.5 | PASS |
| EGPRS850 | 128 | NV | 20 | -1.83 | -0.000989 | ±2.5 | PASS |
| EGPRS850 | 128 | NV | 30 | 2.61 | 0.001411 | ±2.5 | PASS |
| EGPRS850 | 189 | NV | 40 | -7.43 | -0.004016 | ±2.5 | PASS |
| EGPRS850 | 189 | NV | 50 | 9.62 | 0.005199 | ±2.5 | PASS |
| EGPRS850 | 189 | NV | -30 | -1.15 | -0.000612 | ±2.5 | PASS |
| EGPRS850 | 189 | NV | -20 | -2.92 | -0.001553 | ±2.5 | PASS |
| EGPRS850 | 189 | NV | -10 | -7.35 | -0.003910 | ±2.5 | PASS |
| EGPRS850 | 189 | NV | 0 | -2.92 | -0.001553 | ±2.5 | PASS |
| EGPRS850 | 189 | NV | 10 | -7.66 | -0.004074 | ±2.5 | PASS |
| EGPRS850 | 189 | NV | 20 | 7.22 | 0.003840 | ±2.5 | PASS |
| EGPRS850 | 189 | NV | 30 | -6.43 | -0.003420 | ±2.5 | PASS |
| EGPRS850 | 189 | NV | 40 | 5.17 | 0.002750 | ±2.5 | PASS |
| EGPRS850 | 189 | NV | 50 | -4.45 | -0.002367 | ±2.5 | PASS |
| EGPRS850 | 251 | NV | -30 | 2.39 | 0.001251 | ±2.5 | PASS |
| EGPRS850 | 251 | NV | -20 | 4.52 | 0.002367 | ±2.5 | PASS |
| EGPRS850 | 251 | NV | -10 | -5.64 | -0.002953 | ±2.5 | PASS |
| EGPRS850 | 251 | NV | 0 | -3.82 | -0.002000 | ±2.5 | PASS |
| EGPRS850 | 251 | NV | 10 | -5.78 | -0.003026 | ±2.5 | PASS |
| EGPRS850 | 251 | NV | 20 | 2.94 | 0.001539 | ±2.5 | PASS |
| EGPRS850 | 251 | NV | 30 | -0.44 | -0.000230 | ±2.5 | PASS |
| EGPRS850 | 251 | NV | 40 | 8.44 | 0.004419 | ±2.5 | PASS |
| EGPRS850 | 251 | NV | 50 | -8.16 | -0.004273 | ±2.5 | PASS |

## WCDMA V

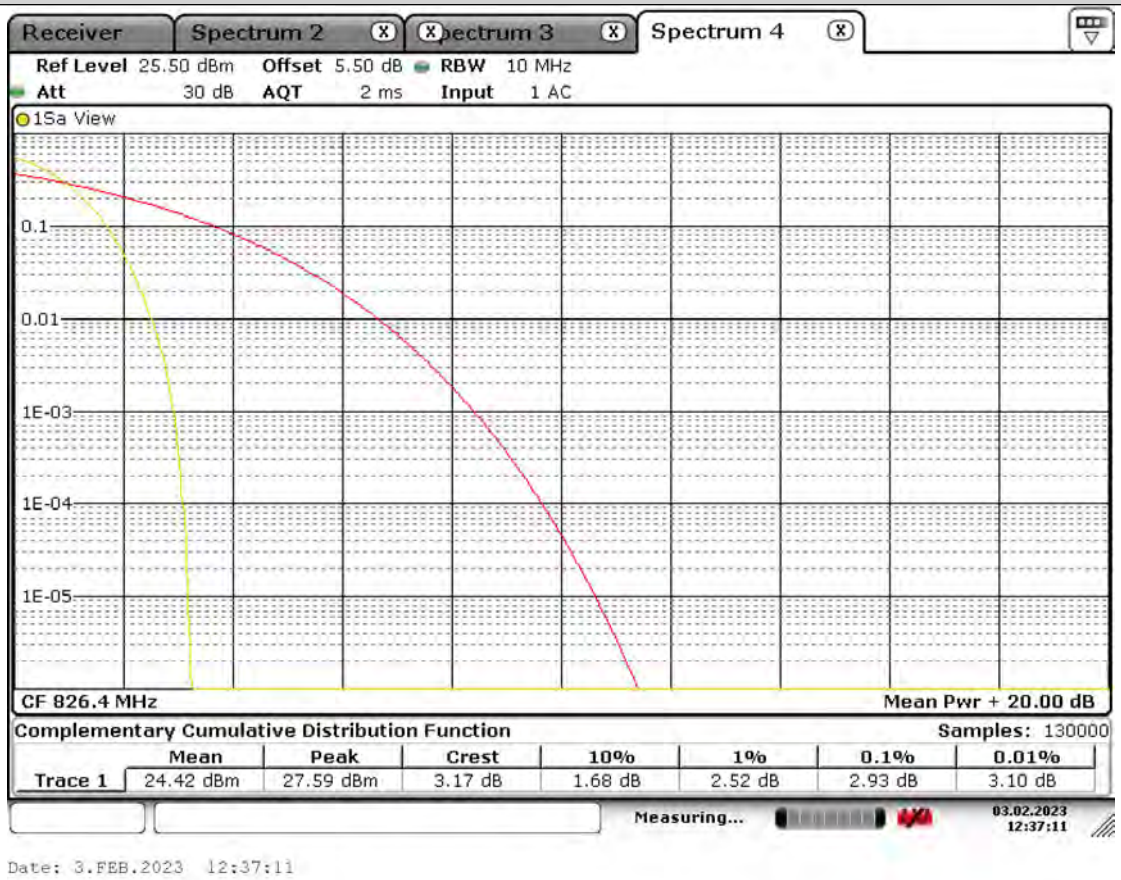
## PEAK-TO-AVERAGE RATIO

### Test Result

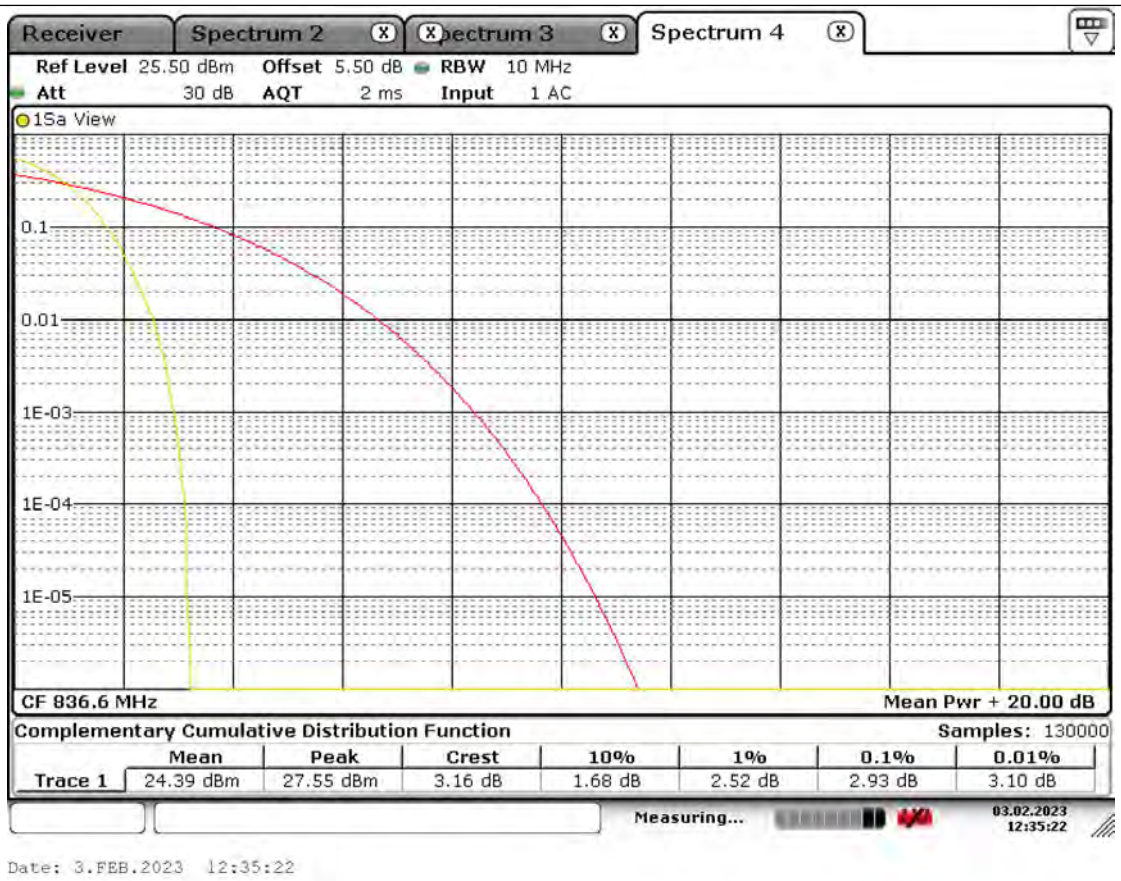
| Band | Channel | Peak-to-Average Ratio(dB) | Limit(dBm) | Verdict |
|---|---|---|---|---|
| Band5 | 4132 | 2.93 | 13 | PASS |
| Band5 | 4182 | 2.93 | 13 | PASS |
| Band5 | 4233 | 2.87 | 13 | PASS |

## Test Graphs

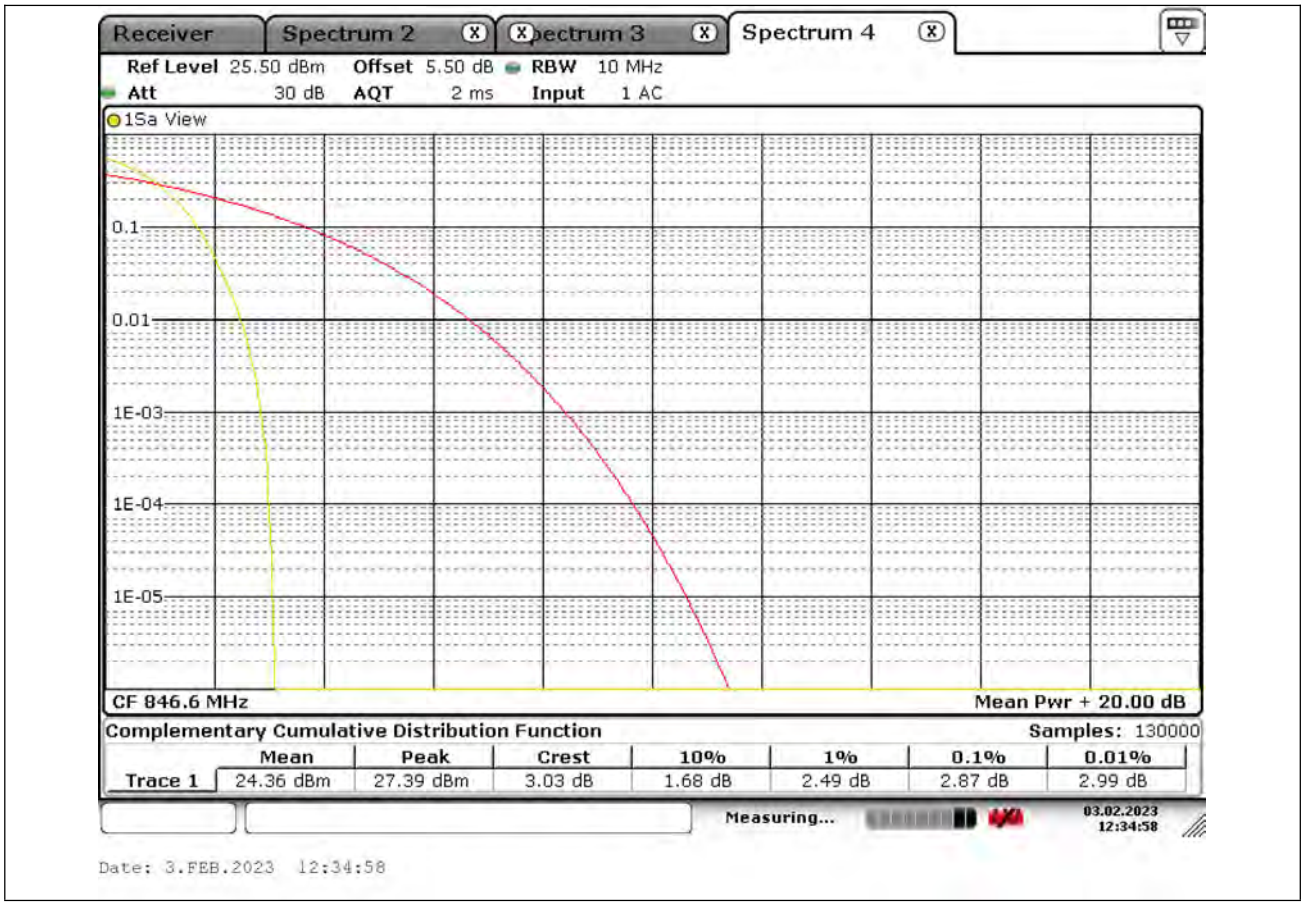
Band5-4132




Band5-4182


Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 25.50 dBm Offset 5.50 dB RBW 10 MHz
Att 30 dB AQT 2 ms Input 1 AC
1Sa View
0.1
0.01
1E-03
1E-04
1E-05
CF 836.6 MHz
Mean Pwr + 20.00 dB
Complementary Cumulative Distribution Function
Samples: 130000
Mean Peak Crest 10% 1% 0.1% 0.01%
Trace 1 24.39 dBm 27.55 dBm 3.16 dB 1.68 dB 2.52 dB 2.93 dB 3.10 dB
Measuring...
03.02.2023
12:35:22
Date: 3.FEB.2023 12:35:22

Band5-4233


Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 25.50 dBm Offset 5.50 dB RBW 10 MHz
Att 30 dB AQT 2 ms Input 1 AC
1Sa View
0.1
0.01
1E-03
1E-04
1E-05
CF 846.6 MHz
Mean Pwr + 20.00 dB
Complementary Cumulative Distribution Function
Samples: 130000
Mean Peak Crest 10% 1% 0.1% 0.01%
Trace 1 24.36 dBm 27.39 dBm 3.03 dB 1.68 dB 2.49 dB 2.87 dB 2.99 dB
Measuring...
03.02.2023
12:34:58
Date: 3.FEB.2023 12:34:58

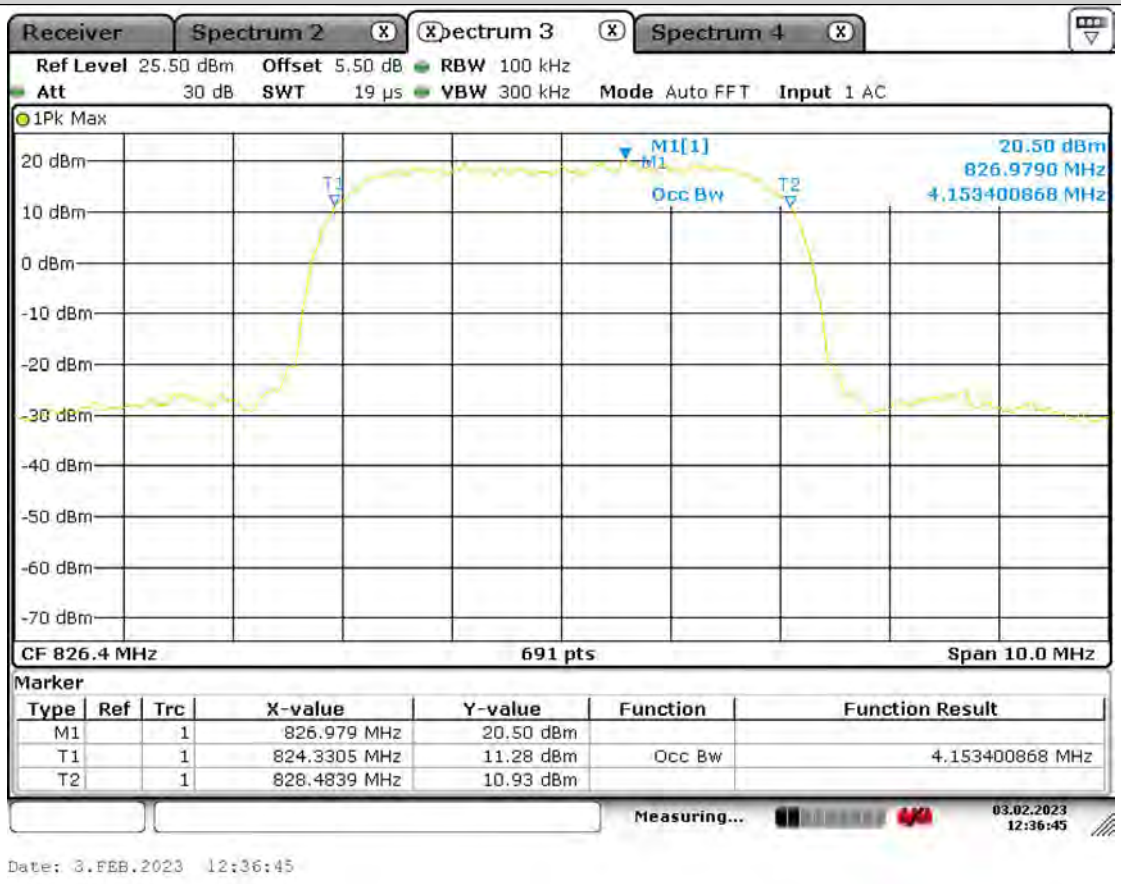
## 26DB BANDWIDTH AND OCCUPIED BANDWIDTH

### Test Result

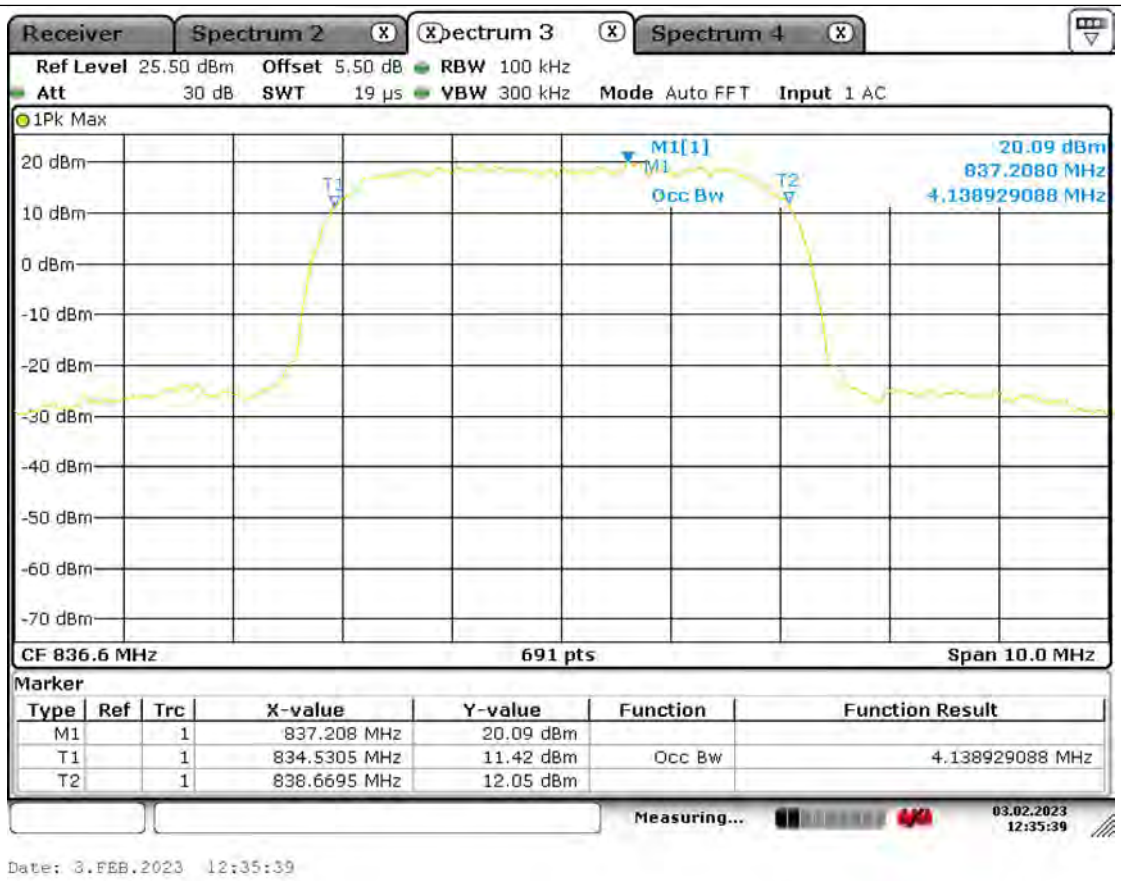
| Band | Channel | Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) | Limit(kHz) | Verdict |
|---|---|---|---|---|---|
| Band5 | 4132 | 4.153 | 4.674 | --- | PASS |
| Band5 | 4182 | 4.139 | 4.674 | --- | PASS |
| Band5 | 4233 | 4.139 | 4.689 | --- | PASS |

## Test Graphs Occupied Bandwidth

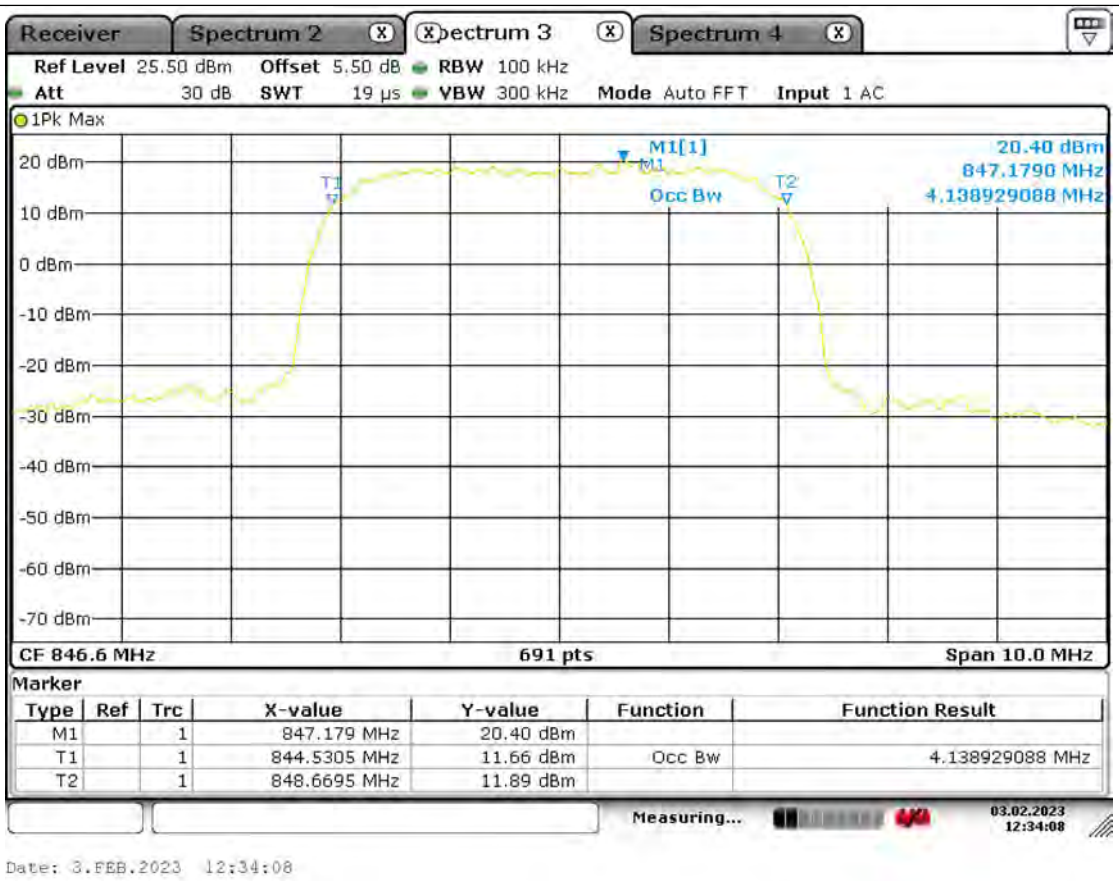
Band5-4132




Band5-4182

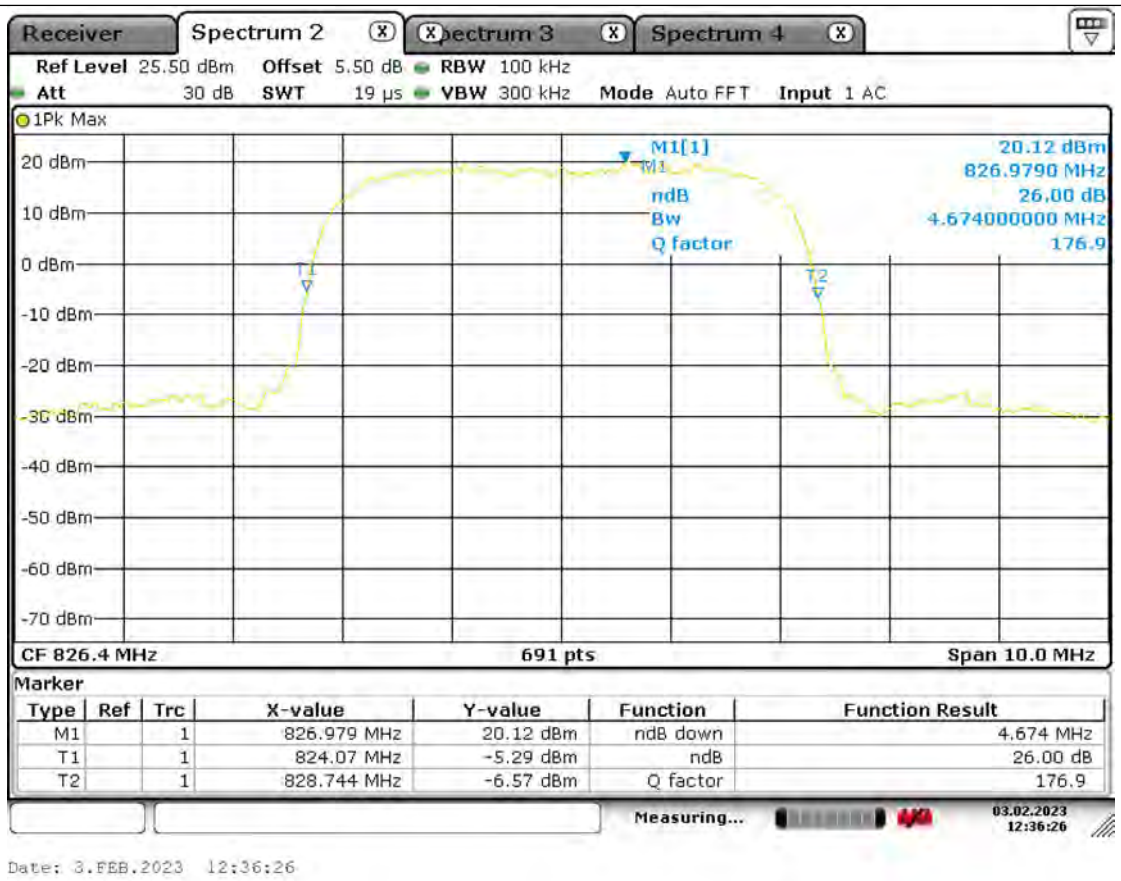

Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 25.50 dBm Offset 5.50 dB RBW 100 kHz
Att 30 dB SWT 19 µs VBW 300 kHz Mode Auto FFT Input 1 AC
1Pk Max
M1[1]
20.09 dBm
837.2080 MHz
4.138929088 MHz
Occ Bw
T1
T2
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 836.6 MHz
691 pts
Span 10.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 837.208 MHz 20.09 dBm
T1 1 834.5305 MHz 11.42 dBm Occ Bw 4.138929088 MHz
T2 1 838.6695 MHz 12.05 dBm
Measuring...
03.02.2023
12:35:39
Date: 3.FEB.2023 12:35:39

Band5-4233

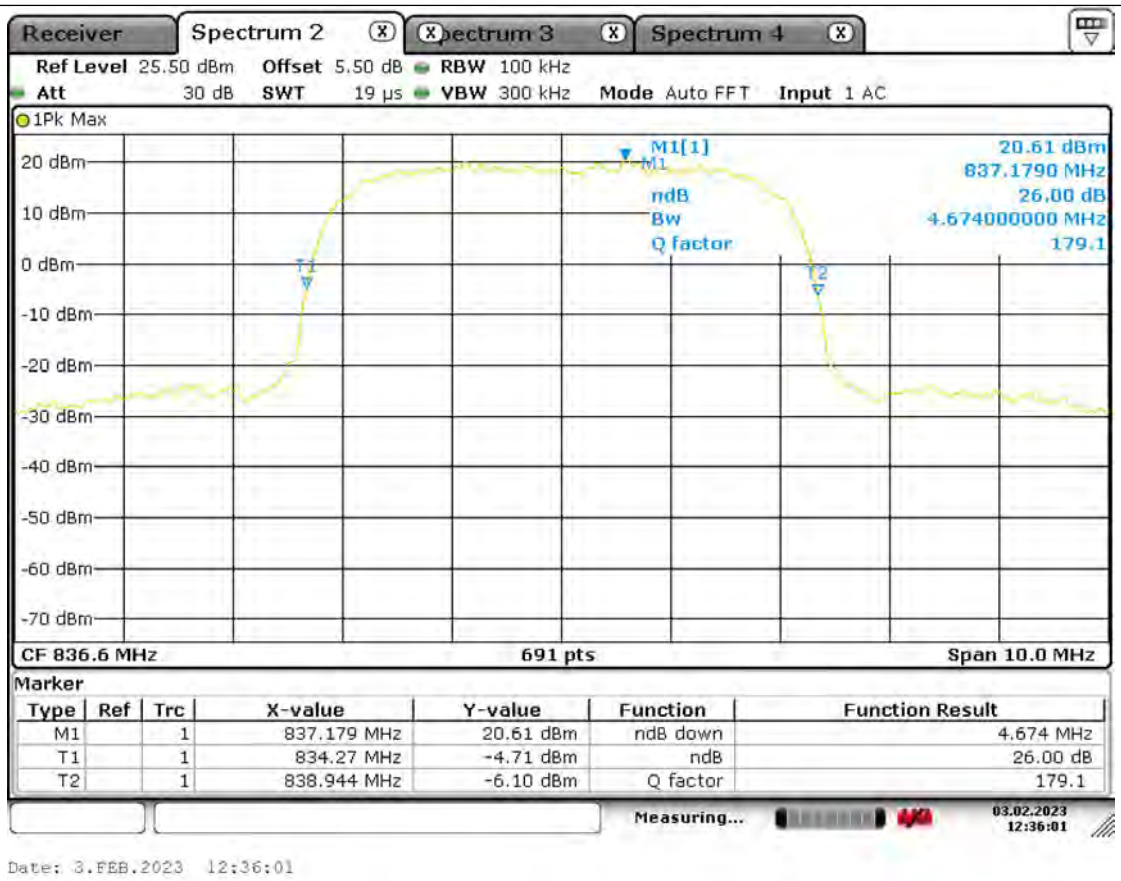



26dB Bandwidth

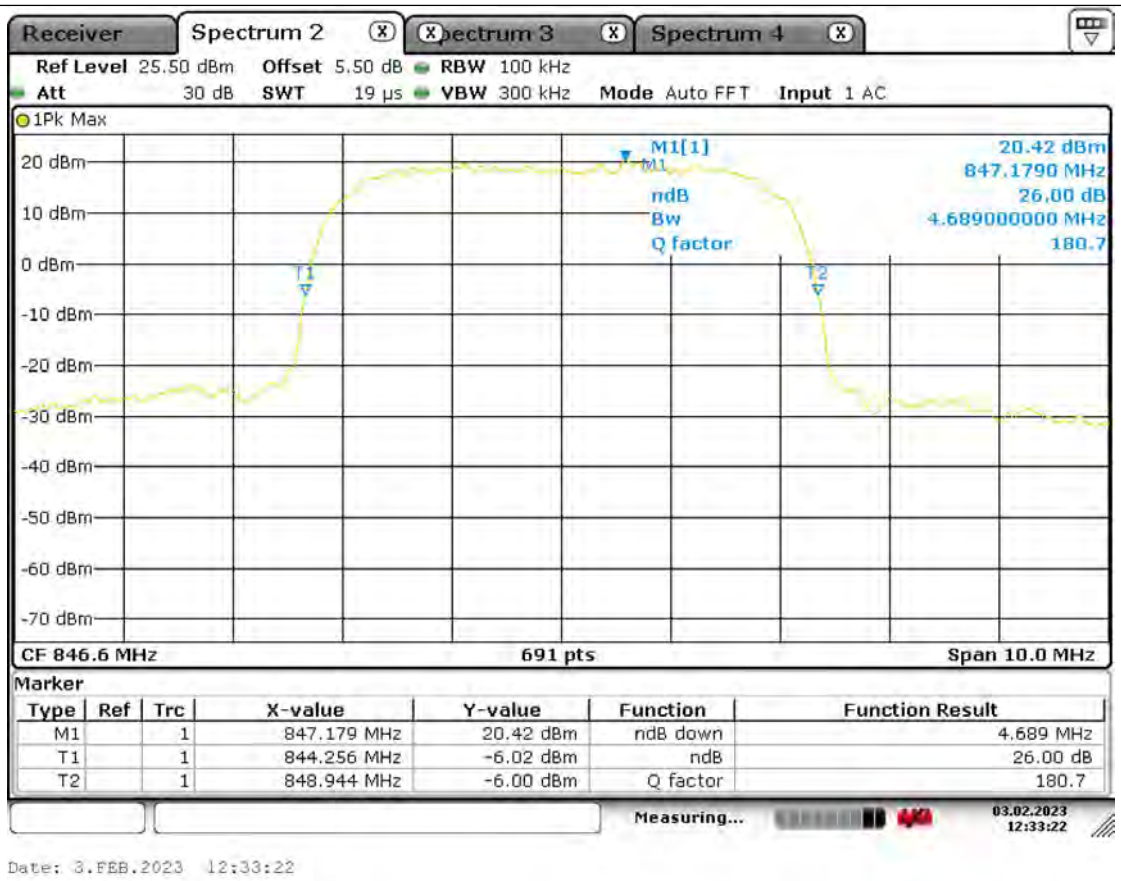
| Band5-4132 |
|---|


Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 25.50 dBm Offset 5.50 dB RBW 100 kHz
Att 30 dB SWT 19 µs VBW 300 kHz Mode Auto FFT Input 1 AC
1Pk Max
M1[1] 20.12 dBm
826.9790 MHz
ndB 26.00 dB
Bw 4.674000000 MHz
Q factor 176.9
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
T1
T2
CF 826.4 MHz
691 pts
Span 10.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 826.979 MHz 20.12 dBm ndB down 4.674 MHz
T1 1 824.07 MHz -5.29 dBm ndB 26.00 dB
T2 1 828.744 MHz -6.57 dBm Q factor 176.9
Measuring...
03.02.2023
12:36:26
Date: 3.FEB.2023 12:36:26

Band5-4182


Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 25.50 dBm Offset 5.50 dB RBW 100 kHz
Att 30 dB SWT 19 µs VBW 300 kHz Mode Auto FFT Input 1 AC
1Pk Max
M1[1] 20.61 dBm
837.1790 MHz
ndB 26.00 dB
Bw 4.674000000 MHz
Q factor 179.1
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
T1
T2
CF 836.6 MHz
691 pts
Span 10.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 837.179 MHz 20.61 dBm ndB down 4.674 MHz
T1 1 834.27 MHz -4.71 dBm ndB 26.00 dB
T2 1 838.944 MHz -6.10 dBm Q factor 179.1
Measuring...
03.02.2023
12:36:01
Date: 3.FEB.2023 12:36:01

Band5-4233


Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 25.50 dBm Offset 5.50 dB RBW 100 kHz
Att 30 dB SWT 19 µs VBW 300 kHz Mode Auto FFT Input 1 AC
1Pk Max
M1[1]
20.42 dBm
847.1790 MHz
ndB 26.00 dB
Bw 4.689000000 MHz
Q factor 180.7
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
T1
T2
CF 846.6 MHz
691 pts
Span 10.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 847.179 MHz 20.42 dBm ndB down 4.689 MHz
T1 1 844.256 MHz -6.02 dBm ndB 26.00 dB
T2 1 848.944 MHz -6.00 dBm Q factor 180.7
Measuring...
03.02.2023
12:33:22
Date: 3.FEB.2023 12:33:22

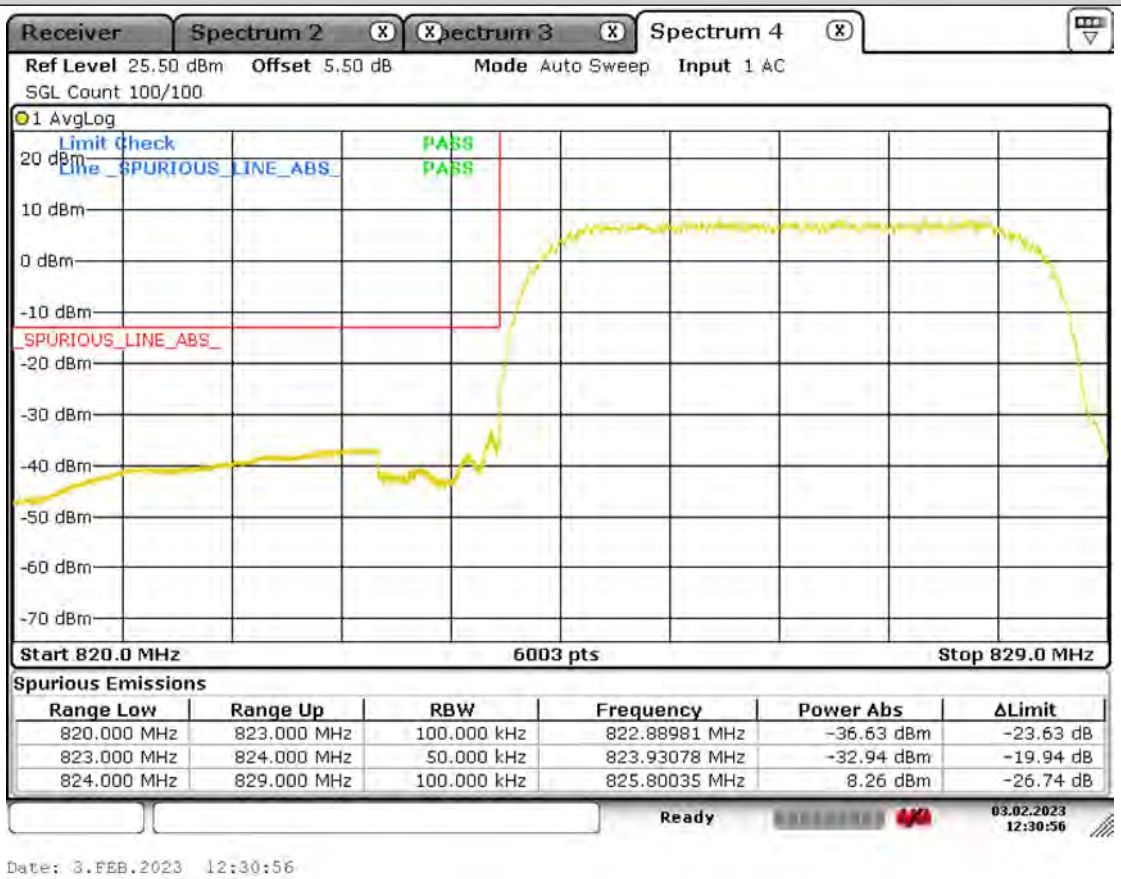
## BAND EDGE

### Test Result

| Band | Channel | Frequency (MHz) | Result (dBm) | Limit(dBm) | Verdict |
|---|---|---|---|---|---|
| Band5 | 4132 | 823.93078 | -32.94 | -13 | PASS |
| Band5 | 4233 | 849.07021 | -35.26 | -13 | PASS |

## Test Graphs

Band5-4132




Band5-4233

Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 844.000 MHz | 849.000 MHz | 100.000 kHz | 847.83683 MHz | 8.27 dBm | -26.73 dB |
| 849.000 MHz | 850.000 MHz | 50.000 kHz | 849.07021 MHz | -35.26 dBm | -22.26 dB |
| 850.000 MHz | 855.000 MHz | 100.000 kHz | 850.11119 MHz | -38.06 dBm | -25.06 dB |

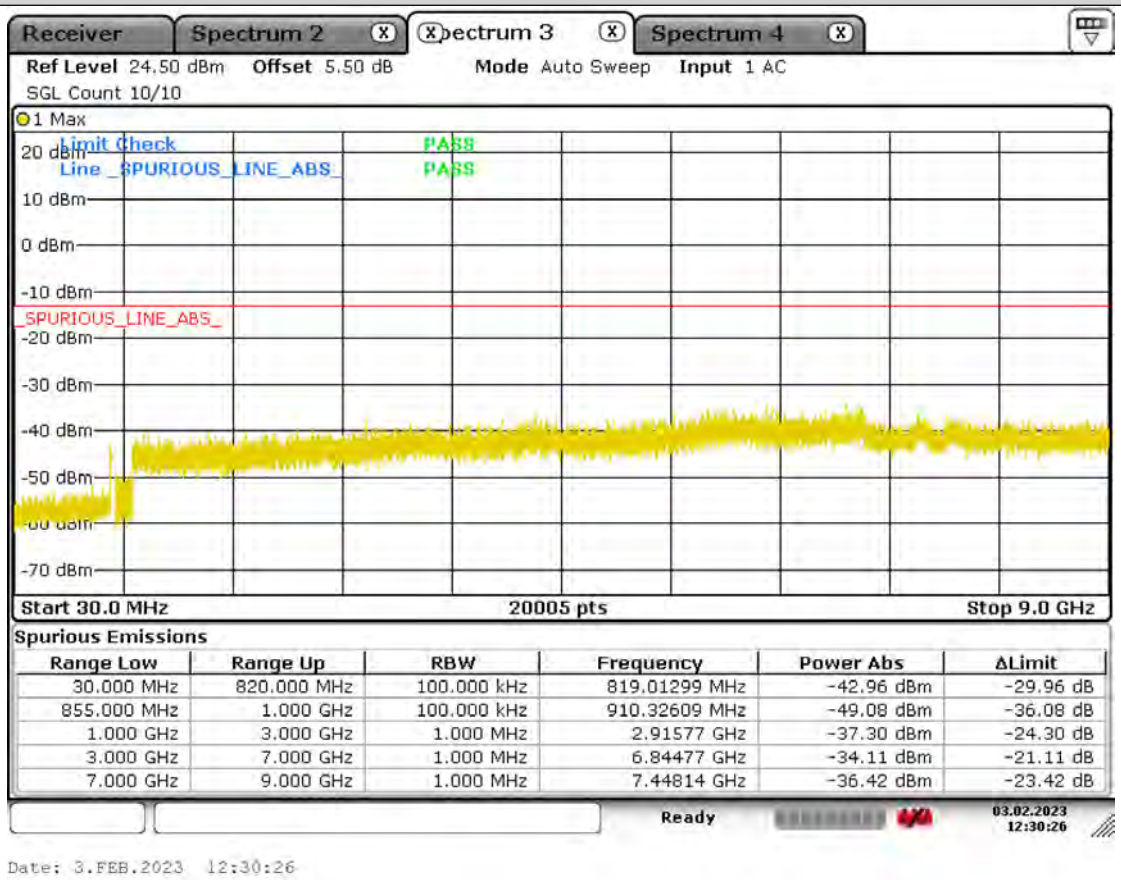
## CONDUCTED SPURIOUS EMISSION

### Test Result

| Band | Channel | Frequency Range (Mhz) | Frequency (dBm) | Result (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| Band5 | 4132 | 30~1000MHz | 819.01299 | -42.96 | -13 | PASS |
| Band5 | 4132 | 1000~9000MHz | 6844.77 | -34.11 | -13 | PASS |
| Band5 | 4182 | 30~1000MHz | 976.7029 | -49.75 | -13 | PASS |
| Band5 | 4182 | 1000~9000MHz | 5879.89 | -34.76 | -13 | PASS |
| Band5 | 4233 | 30~1000MHz | 855.32609 | -44.73 | -13 | PASS |
| Band5 | 4233 | 1000~9000MHz | 6128.36 | -34.76 | -13 | PASS |

## Test Graphs

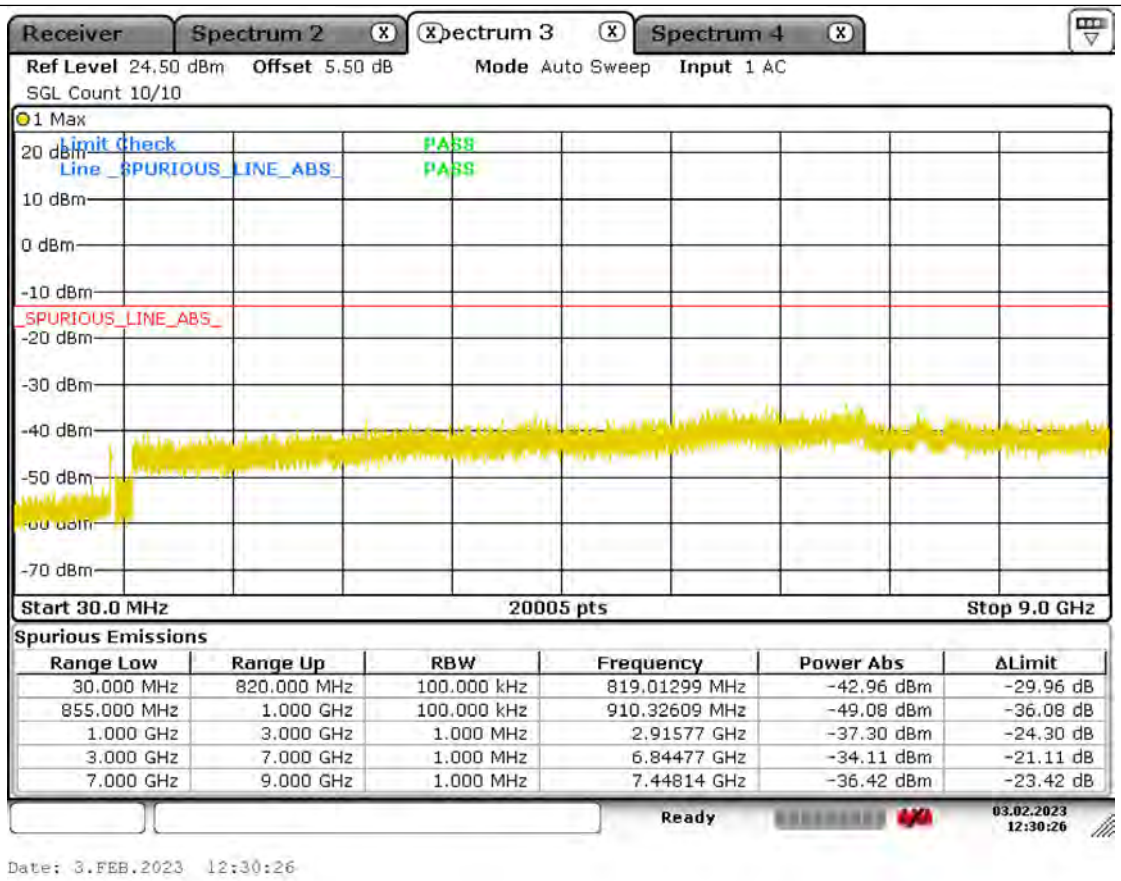
Band5-4132-30~1000MHz




Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 820.000 MHz | 100.000 kHz | 819.01299 MHz | -42.96 dBm | -29.96 dB |
| 855.000 MHz | 1.000 GHz | 100.000 kHz | 910.32609 MHz | -49.08 dBm | -36.08 dB |
| 1.000 GHz | 3.000 GHz | 1.000 MHz | 2.91577 GHz | -37.30 dBm | -24.30 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.84477 GHz | -34.11 dBm | -21.11 dB |
| 7.000 GHz | 9.000 GHz | 1.000 MHz | 7.44814 GHz | -36.42 dBm | -23.42 dB |

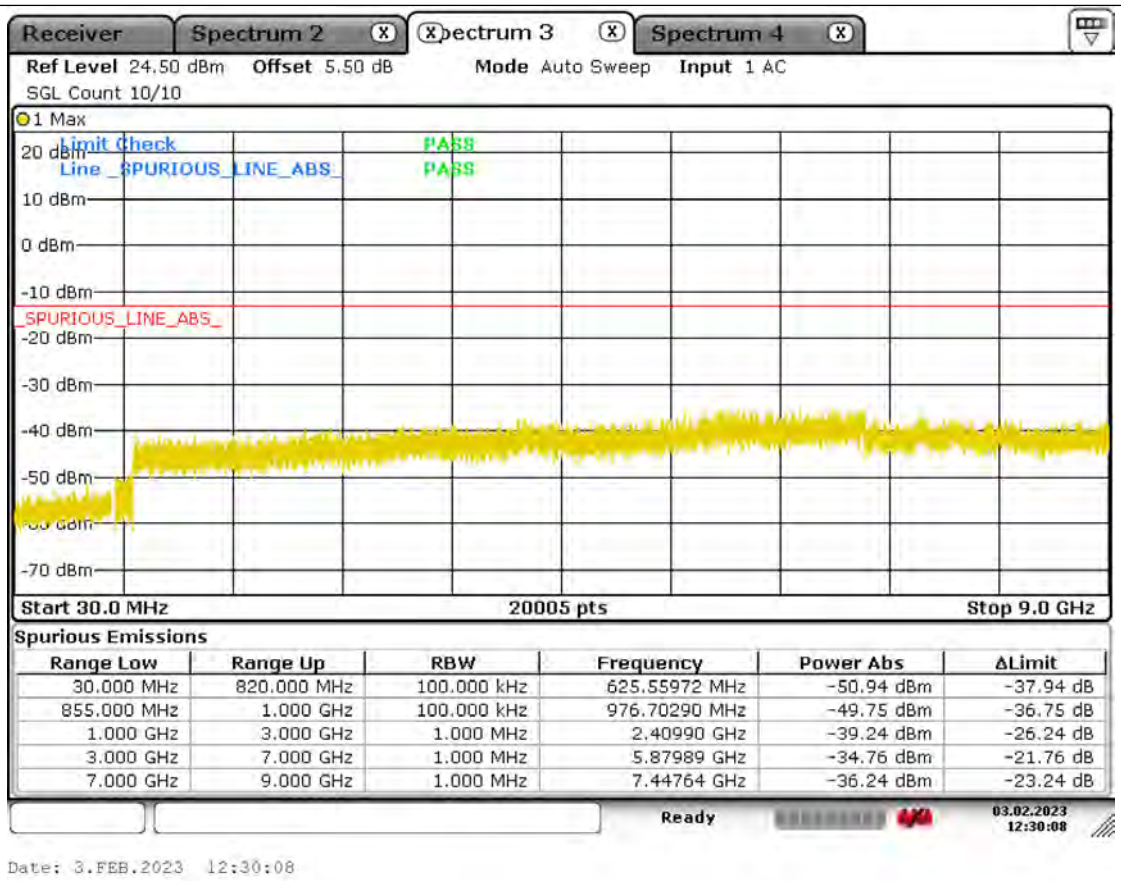
Band5-4132-1000~9000MHz




Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 820.000 MHz | 100.000 kHz | 819.01299 MHz | -42.96 dBm | -29.96 dB |
| 855.000 MHz | 1.000 GHz | 100.000 kHz | 910.32609 MHz | -49.08 dBm | -36.08 dB |
| 1.000 GHz | 3.000 GHz | 1.000 MHz | 2.91577 GHz | -37.30 dBm | -24.30 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.84477 GHz | -34.11 dBm | -21.11 dB |
| 7.000 GHz | 9.000 GHz | 1.000 MHz | 7.44814 GHz | -36.42 dBm | -23.42 dB |

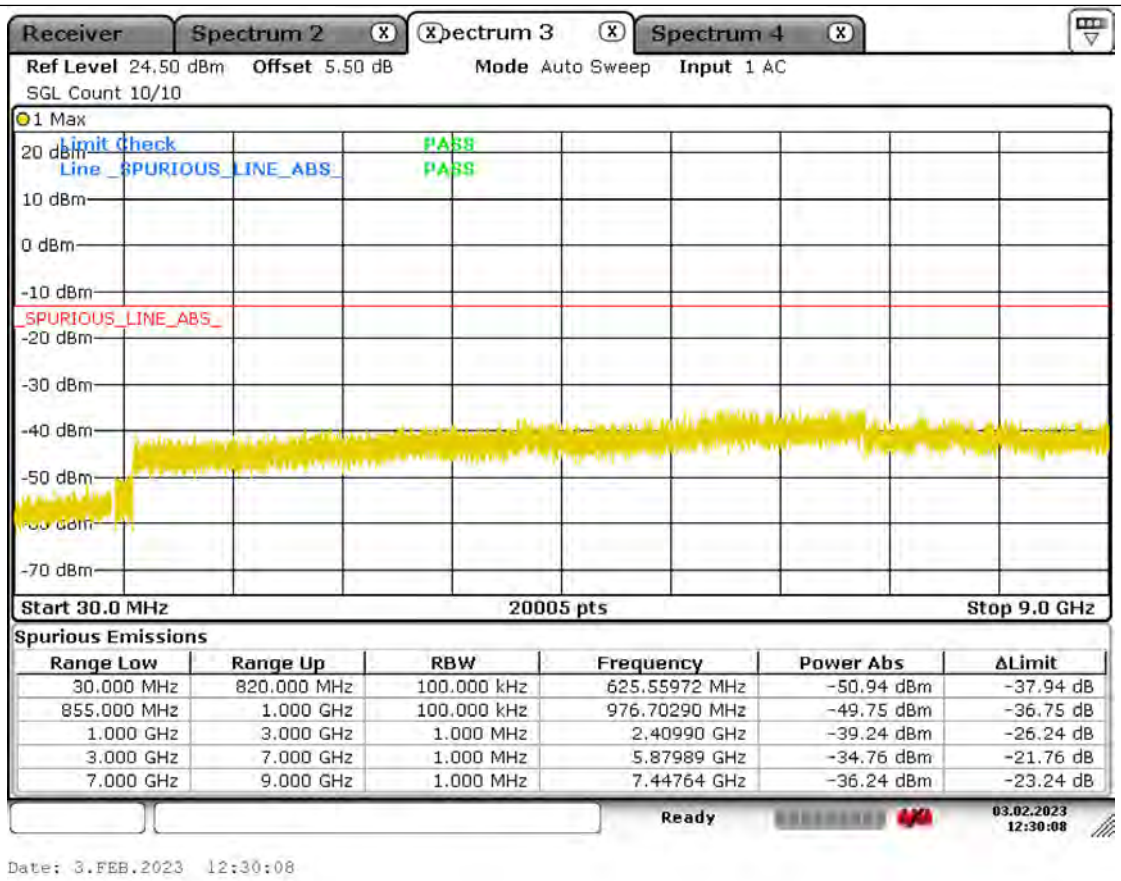
Band5-4182-30~1000MHz




Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 820.000 MHz | 100.000 kHz | 625.55972 MHz | -50.94 dBm | -37.94 dB |
| 855.000 MHz | 1.000 GHz | 100.000 kHz | 976.70290 MHz | -49.75 dBm | -36.75 dB |
| 1.000 GHz | 3.000 GHz | 1.000 MHz | 2.40990 GHz | -39.24 dBm | -26.24 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 5.87989 GHz | -34.76 dBm | -21.76 dB |
| 7.000 GHz | 9.000 GHz | 1.000 MHz | 7.44764 GHz | -36.24 dBm | -23.24 dB |

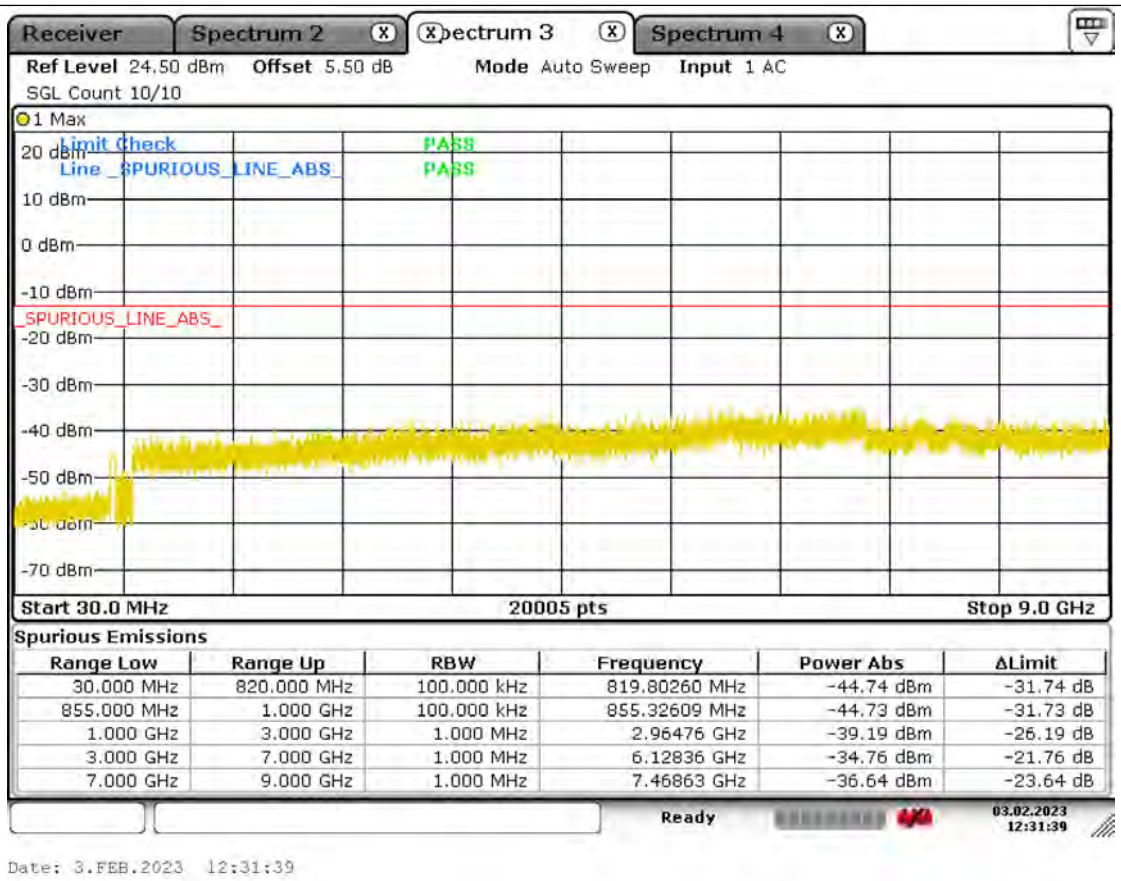
Band5-4182-1000~9000MHz




Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 820.000 MHz | 100.000 kHz | 625.55972 MHz | -50.94 dBm | -37.94 dB |
| 855.000 MHz | 1.000 GHz | 100.000 kHz | 976.70290 MHz | -49.75 dBm | -36.75 dB |
| 1.000 GHz | 3.000 GHz | 1.000 MHz | 2.40990 GHz | -39.24 dBm | -26.24 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 5.87989 GHz | -34.76 dBm | -21.76 dB |
| 7.000 GHz | 9.000 GHz | 1.000 MHz | 7.44764 GHz | -36.24 dBm | -23.24 dB |

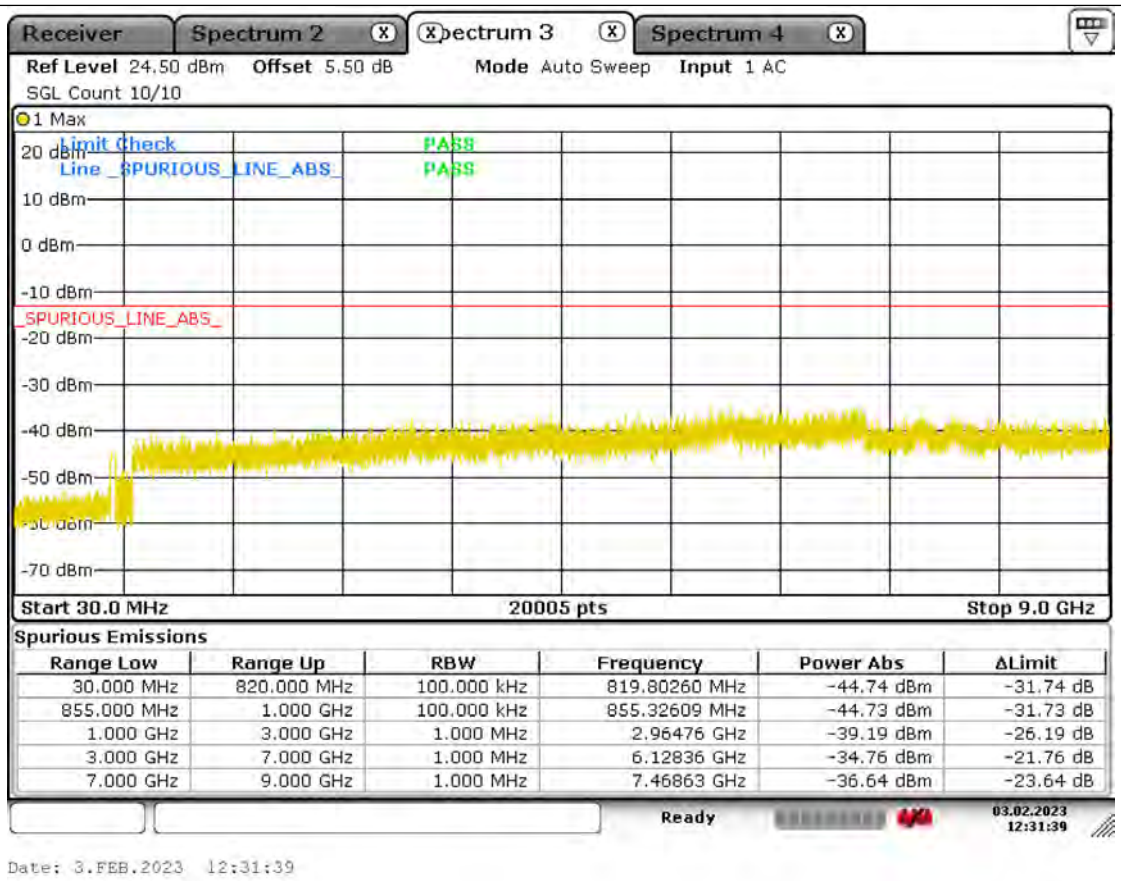
Band5-4233-30~1000MHz




Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 820.000 MHz | 100.000 kHz | 819.80260 MHz | -44.74 dBm | -31.74 dB |
| 855.000 MHz | 1.000 GHz | 100.000 kHz | 855.32609 MHz | -44.73 dBm | -31.73 dB |
| 1.000 GHz | 3.000 GHz | 1.000 MHz | 2.96476 GHz | -39.19 dBm | -26.19 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.12836 GHz | -34.76 dBm | -21.76 dB |
| 7.000 GHz | 9.000 GHz | 1.000 MHz | 7.46863 GHz | -36.64 dBm | -23.64 dB |

Band5-4233-1000~9000MHz




Spurious Emissions

| Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit |
|---|---|---|---|---|---|
| 30.000 MHz | 820.000 MHz | 100.000 kHz | 819.80260 MHz | -44.74 dBm | -31.74 dB |
| 855.000 MHz | 1.000 GHz | 100.000 kHz | 855.32609 MHz | -44.73 dBm | -31.73 dB |
| 1.000 GHz | 3.000 GHz | 1.000 MHz | 2.96476 GHz | -39.19 dBm | -26.19 dB |
| 3.000 GHz | 7.000 GHz | 1.000 MHz | 6.12836 GHz | -34.76 dBm | -21.76 dB |
| 7.000 GHz | 9.000 GHz | 1.000 MHz | 7.46863 GHz | -36.64 dBm | -23.64 dB |

## FREQUENCY STABILITY

### Test Result

| Voltage | | | | | | | |
|---|---|---|---|---|---|---|---|
| Band | Channel | Voltage (Vdc) | Temperature (℃) | Deviation (Hz) | Deviation (ppm) | Limit (ppm) | Verdict |
| Band5 | 4132 | VL | NT | -6.64 | -0.008035 | ±2.5 | PASS |
| Band5 | 4132 | VN | NT | 9.51 | 0.011508 | ±2.5 | PASS |
| Band5 | 4132 | VH | NT | -7.52 | -0.009100 | ±2.5 | PASS |
| Band5 | 4182 | VL | NT | 9.77 | 0.011678 | ±2.5 | PASS |
| Band5 | 4182 | VN | NT | 0.18 | 0.000215 | ±2.5 | PASS |
| Band5 | 4182 | VH | NT | -4.06 | -0.004853 | ±2.5 | PASS |
| Band5 | 4233 | VL | NT | 1.13 | 0.001335 | ±2.5 | PASS |
| Band5 | 4233 | VN | NT | -2.29 | -0.002705 | ±2.5 | PASS |
| Band5 | 4233 | VH | NT | 9.75 | 0.011517 | ±2.5 | PASS |

| Temperature | | | | | | | |
|---|---|---|---|---|---|---|---|
| Band | Channel | Voltage (Vdc) | Temperature (℃) | Deviation (Hz) | Deviation (ppm) | Limit (ppm) | Verdict |
| Band5 | 826.4 | NV | -30 | 4.45 | 0.005385 | ±2.5 | PASS |
| Band5 | 826.4 | NV | -20 | -1.08 | -0.001307 | ±2.5 | PASS |
| Band5 | 826.4 | NV | 0 | 1.8 | 0.002178 | ±2.5 | PASS |
| Band5 | 826.4 | NV | 10 | 2.51 | 0.003037 | ±2.5 | PASS |
| Band5 | 826.4 | NV | 20 | -9.86 | -0.011931 | ±2.5 | PASS |
| Band5 | 826.4 | NV | 30 | 4.34 | 0.005252 | ±2.5 | PASS |
| Band5 | 826.4 | NV | 40 | 1.1 | 0.001331 | ±2.5 | PASS |
| Band5 | 826.4 | NV | 50 | 7.51 | 0.009088 | ±2.5 | PASS |
| Band5 | 836.6 | NV | -30 | -7.12 | -0.008511 | ±2.5 | PASS |
| Band5 | 836.6 | NV | -20 | -9.85 | -0.011774 | ±2.5 | PASS |
| Band5 | 836.6 | NV | 0 | 9.48 | 0.011332 | ±2.5 | PASS |
| Band5 | 836.6 | NV | 10 | 7.78 | 0.009300 | ±2.5 | PASS |
| Band5 | 836.6 | NV | 20 | 0.92 | 0.001100 | ±2.5 | PASS |
| Band5 | 836.6 | NV | 30 | -3.7 | -0.004423 | ±2.5 | PASS |
| Band5 | 836.6 | NV | 40 | -3.26 | -0.003897 | ±2.5 | PASS |
| Band5 | 836.6 | NV | 50 | -4.51 | -0.005391 | ±2.5 | PASS |
| Band5 | 846.6 | NV | -30 | 4.52 | 0.005339 | ±2.5 | PASS |
| Band5 | 846.6 | NV | -20 | 4.89 | 0.005776 | ±2.5 | PASS |
| Band5 | 846.6 | NV | 0 | -3.6 | -0.004252 | ±2.5 | PASS |
| Band5 | 846.6 | NV | 10 | -4.59 | -0.005422 | ±2.5 | PASS |
| Band5 | 846.6 | NV | 20 | 2.32 | 0.002740 | ±2.5 | PASS |
| Band5 | 846.6 | NV | 30 | 8.11 | 0.009579 | ±2.5 | PASS |
| Band5 | 846.6 | NV | 40 | -0.12 | -0.000142 | ±2.5 | PASS |
| Band5 | 846.6 | NV | 50 | -6.29 | -0.007430 | ±2.5 | PASS |

## LTE BAND5

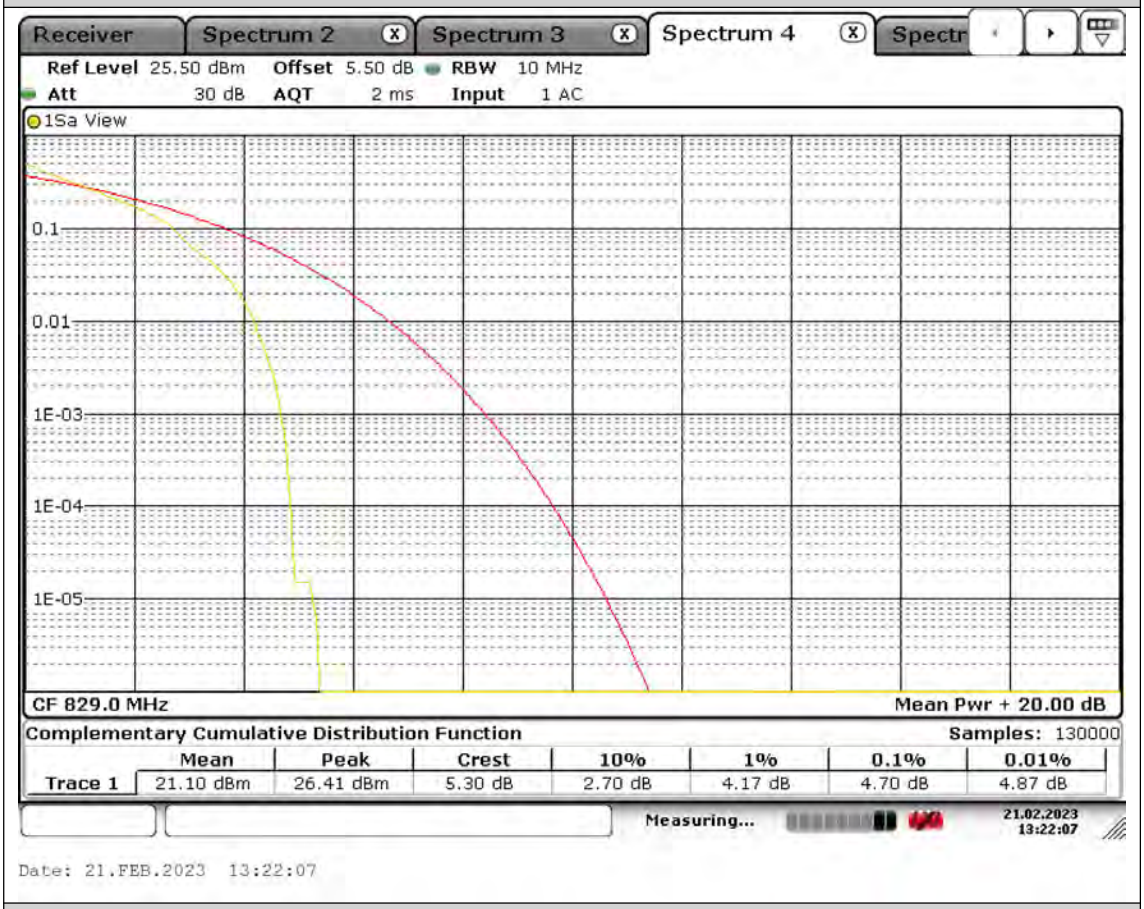
## PEAK-TO-AVERAGE RATIO(CCDF)

### Test Result

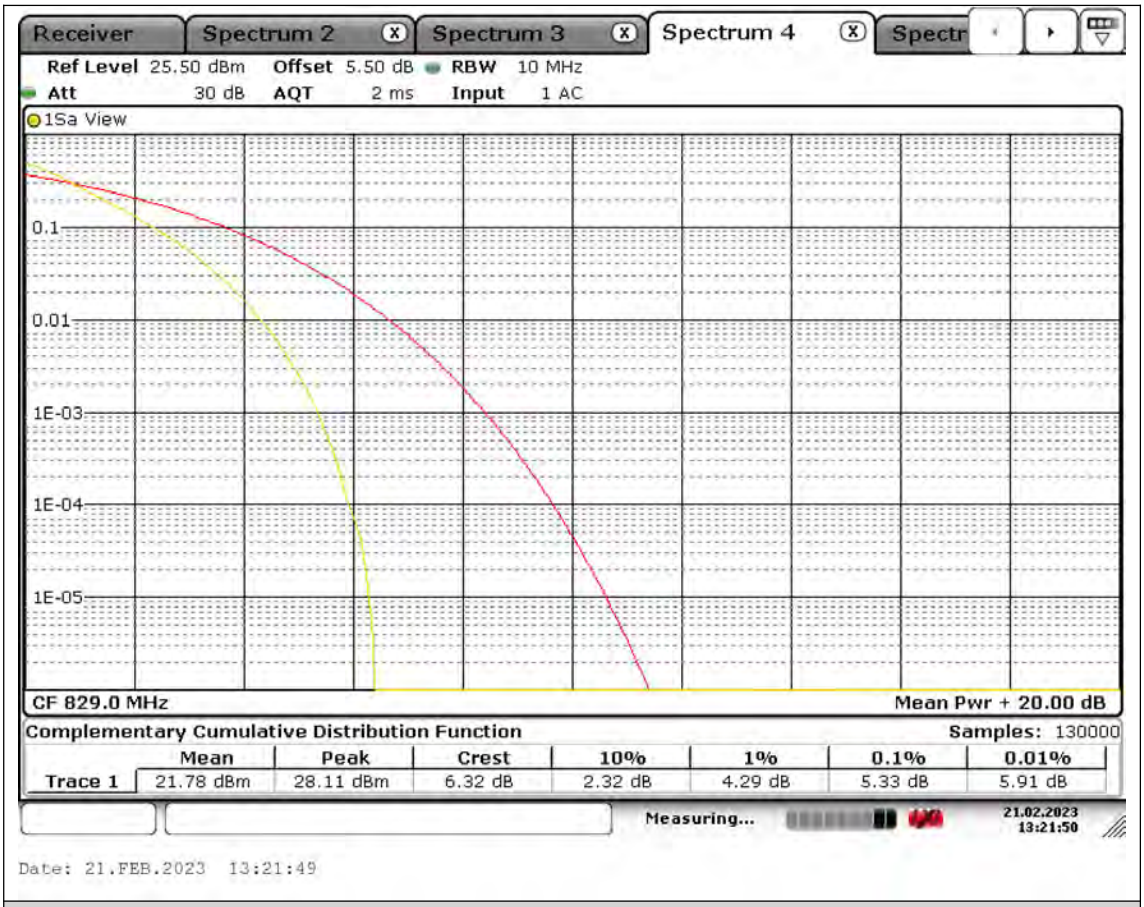
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Band5 | 10MHz | QPSK | 20450 | 1RB#0 | 4.70 | 13 | PASS |
| Band5 | 10MHz | QPSK | 20450 | 50RB#0 | 5.33 | 13 | PASS |
| Band5 | 10MHz | QPSK | 20525 | 1RB#0 | 5.04 | 13 | PASS |
| Band5 | 10MHz | QPSK | 20525 | 50RB#0 | 5.74 | 13 | PASS |
| Band5 | 10MHz | QPSK | 20600 | 1RB#0 | 4.93 | 13 | PASS |
| Band5 | 10MHz | QPSK | 20600 | 50RB#0 | 5.16 | 13 | PASS |
| Band5 | 10MHz | 16QAM | 20450 | 1RB#0 | 5.48 | 13 | PASS |
| Band5 | 10MHz | 16QAM | 20450 | 50RB#0 | 6.35 | 13 | PASS |
| Band5 | 10MHz | 16QAM | 20525 | 1RB#0 | 5.94 | 13 | PASS |
| Band5 | 10MHz | 16QAM | 20525 | 50RB#0 | 6.75 | 13 | PASS |
| Band5 | 10MHz | 16QAM | 20600 | 1RB#0 | 5.45 | 13 | PASS |
| Band5 | 10MHz | 16QAM | 20600 | 50RB#0 | 6.06 | 13 | PASS |
| Band5 | 10MHz | 64QAM | 20450 | 1RB#0 | 6.12 | 13 | PASS |
| Band5 | 10MHz | 64QAM | 20450 | 50RB#0 | 6.49 | 13 | PASS |
| Band5 | 10MHz | 64QAM | 20525 | 1RB#0 | 6.23 | 13 | PASS |
| Band5 | 10MHz | 64QAM | 20525 | 50RB#0 | 6.43 | 13 | PASS |
| Band5 | 10MHz | 64QAM | 20600 | 1RB#0 | 6.29 | 13 | PASS |
| Band5 | 10MHz | 64QAM | 20600 | 50RB#0 | 6.35 | 13 | PASS |

## Test Graphs

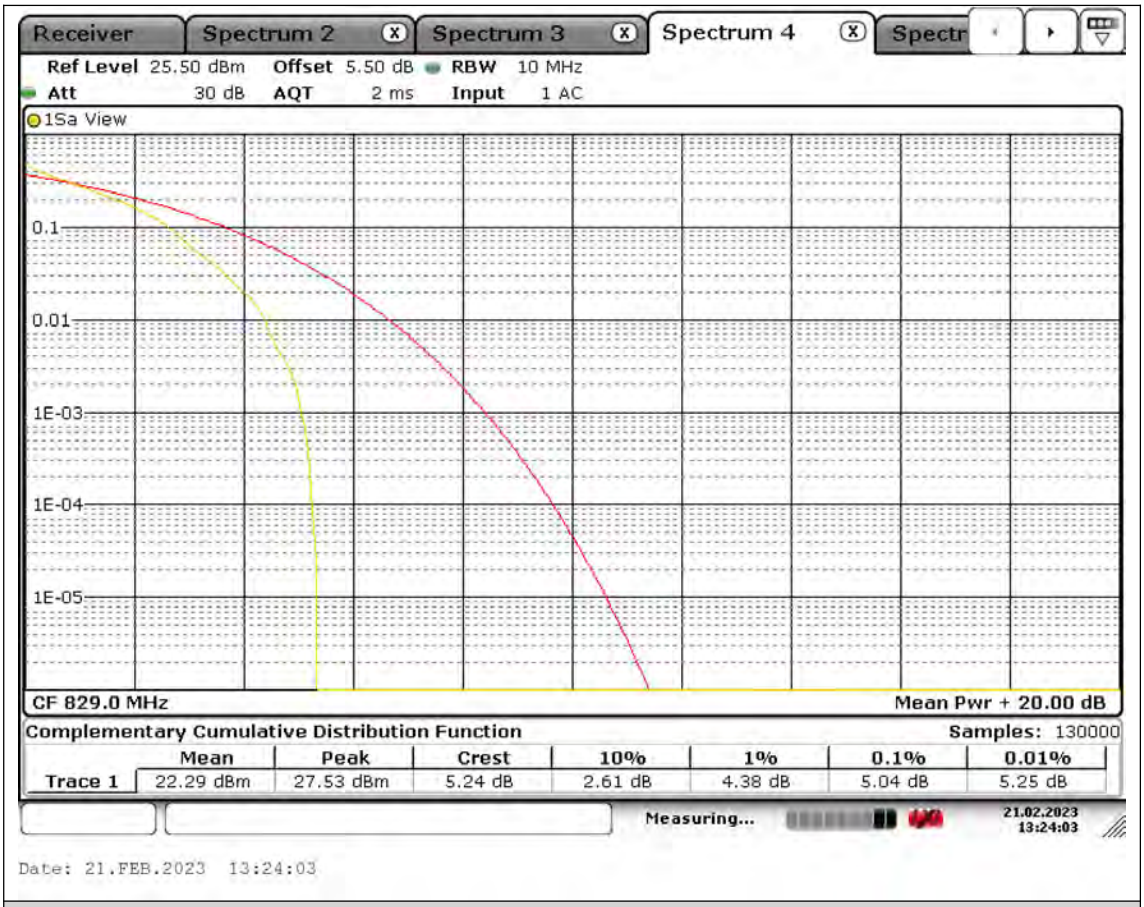
Band5-10MHz-QPSK-20450-1RB#0



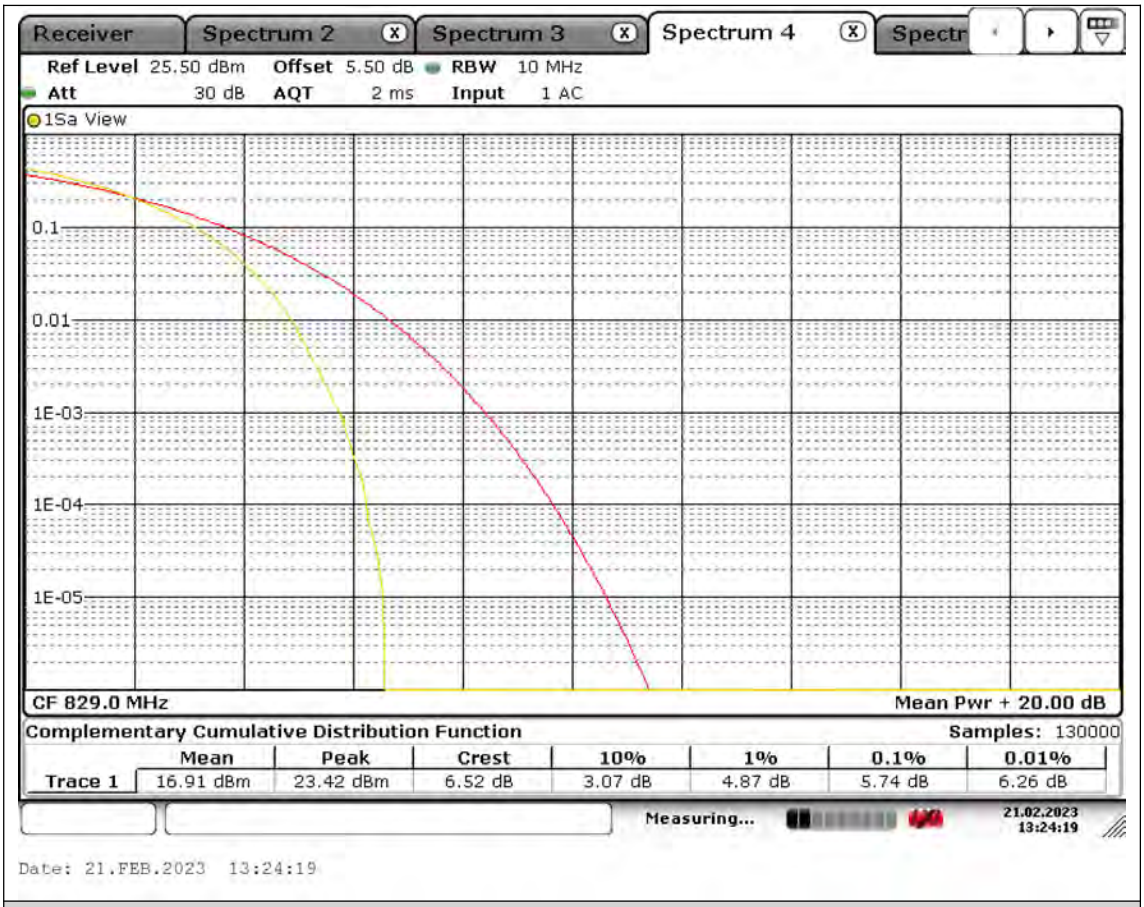

Band5-10MHz-QPSK-20450-50RB#0



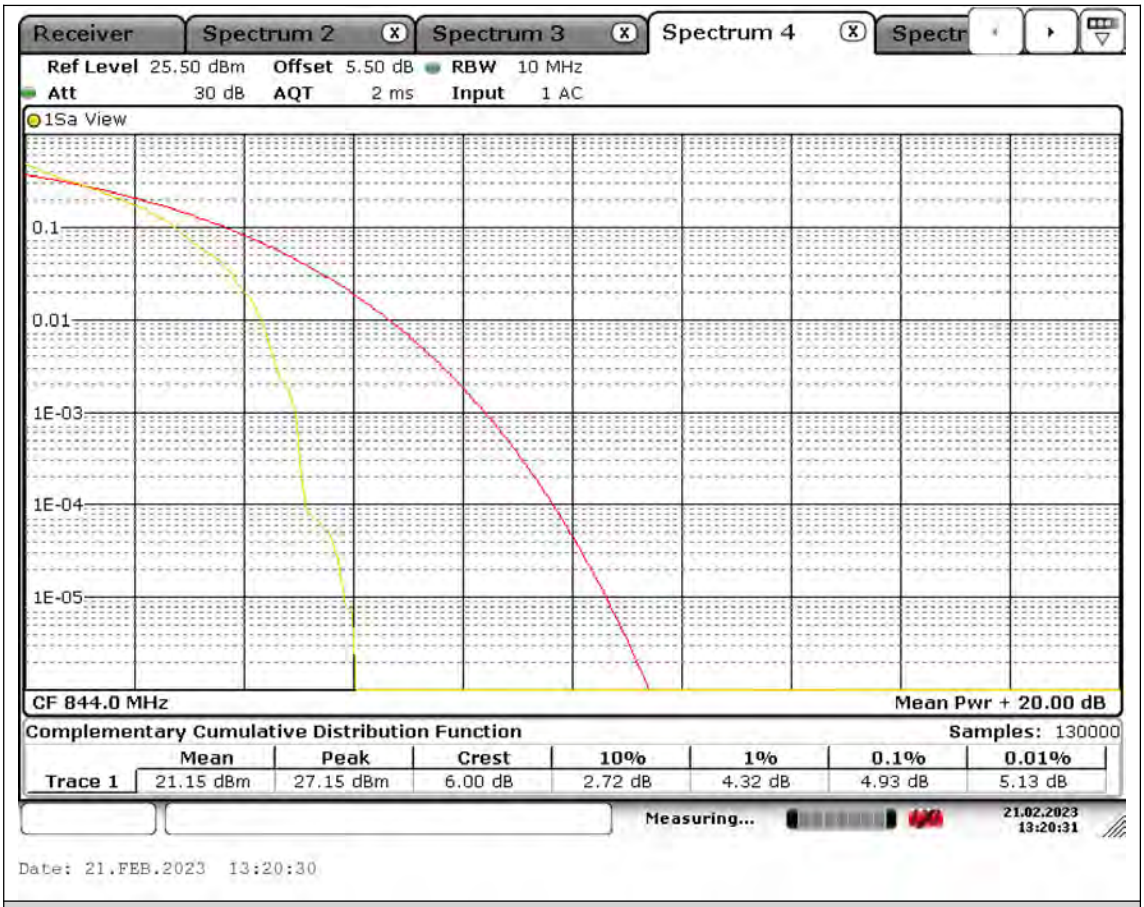

Band5-10MHz-QPSK-20525-1RB#0



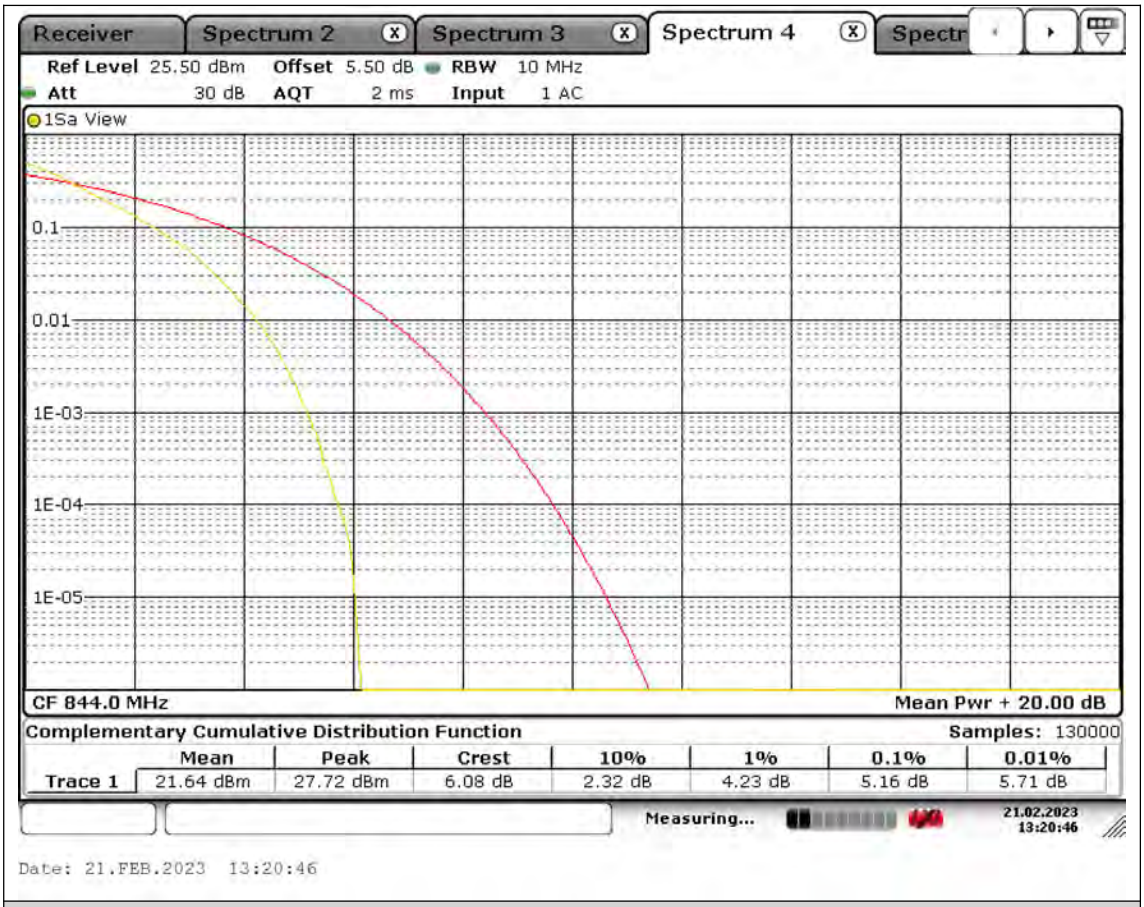

Band5-10MHz-QPSK-20525-50RB#0



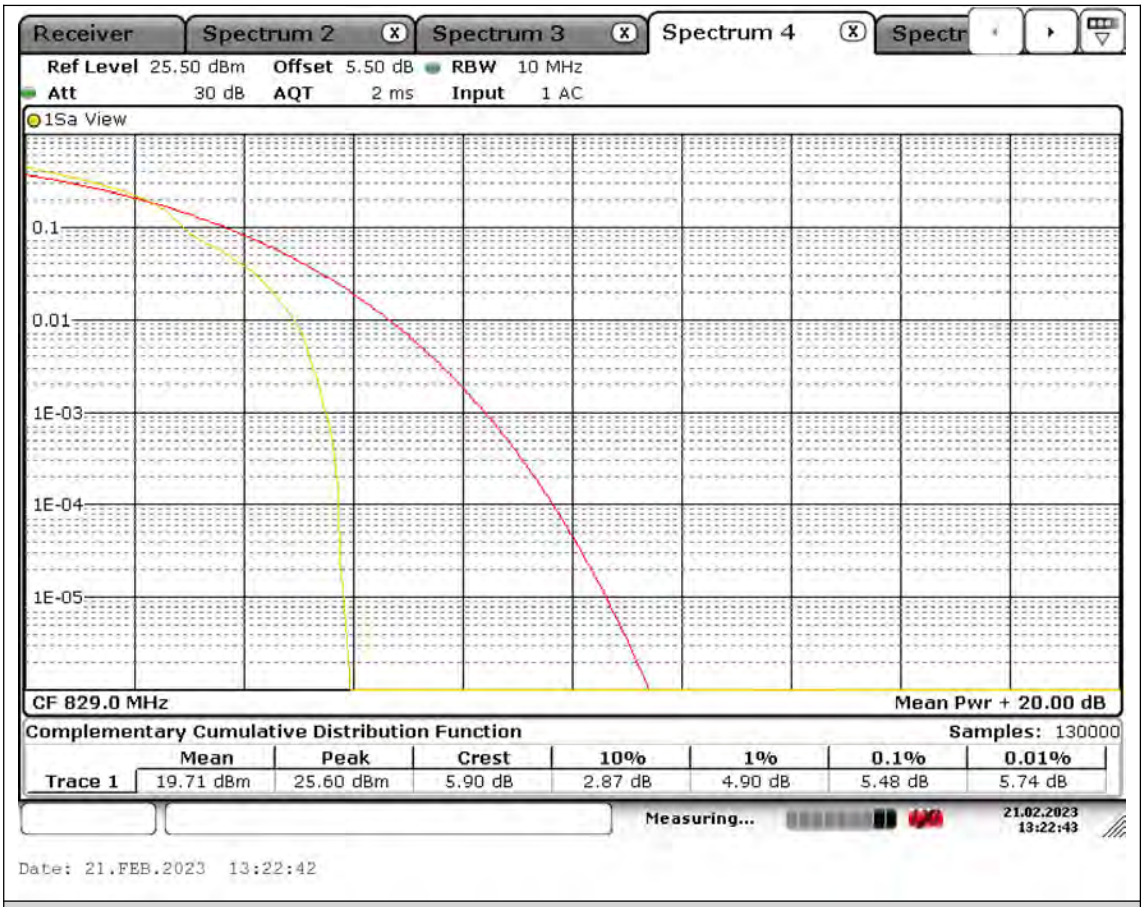

Band5-10MHz-QPSK-20600-1RB#0



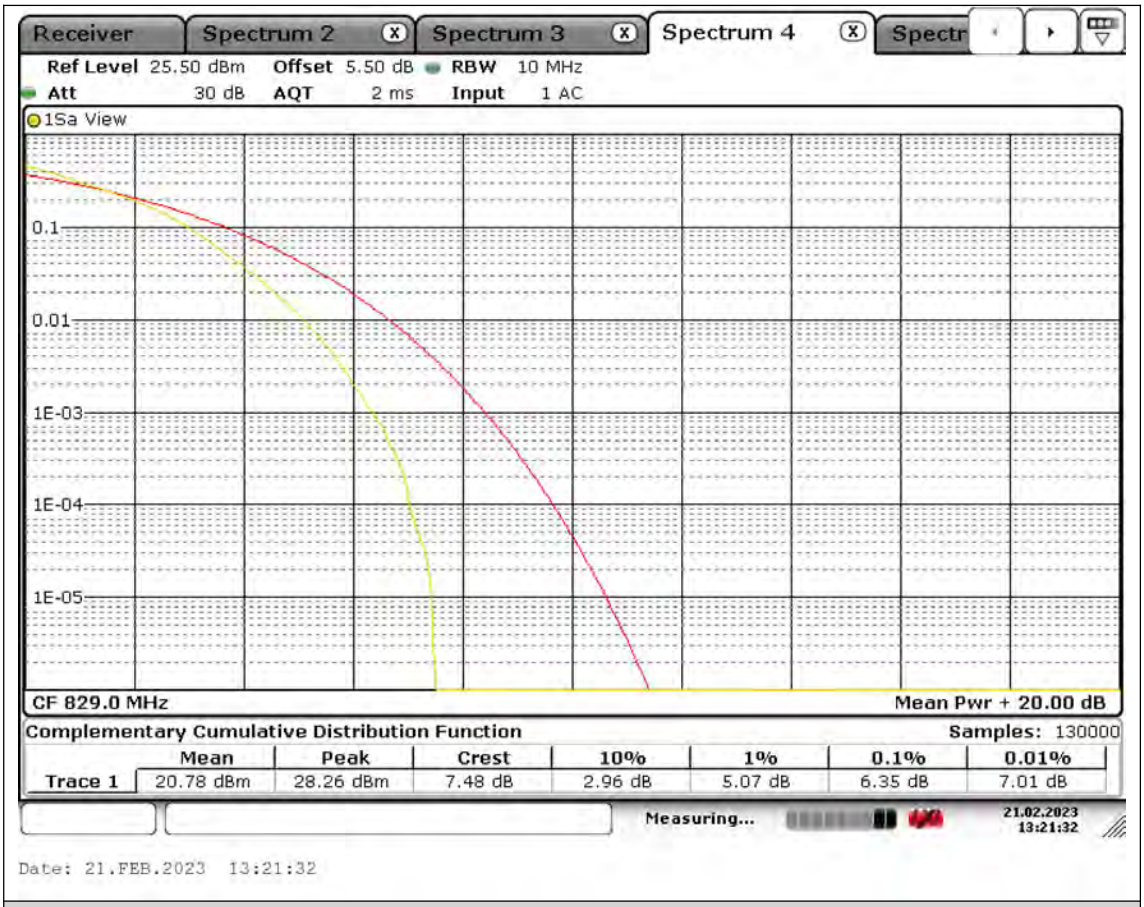

Band5-10MHz-QPSK-20600-50RB#0



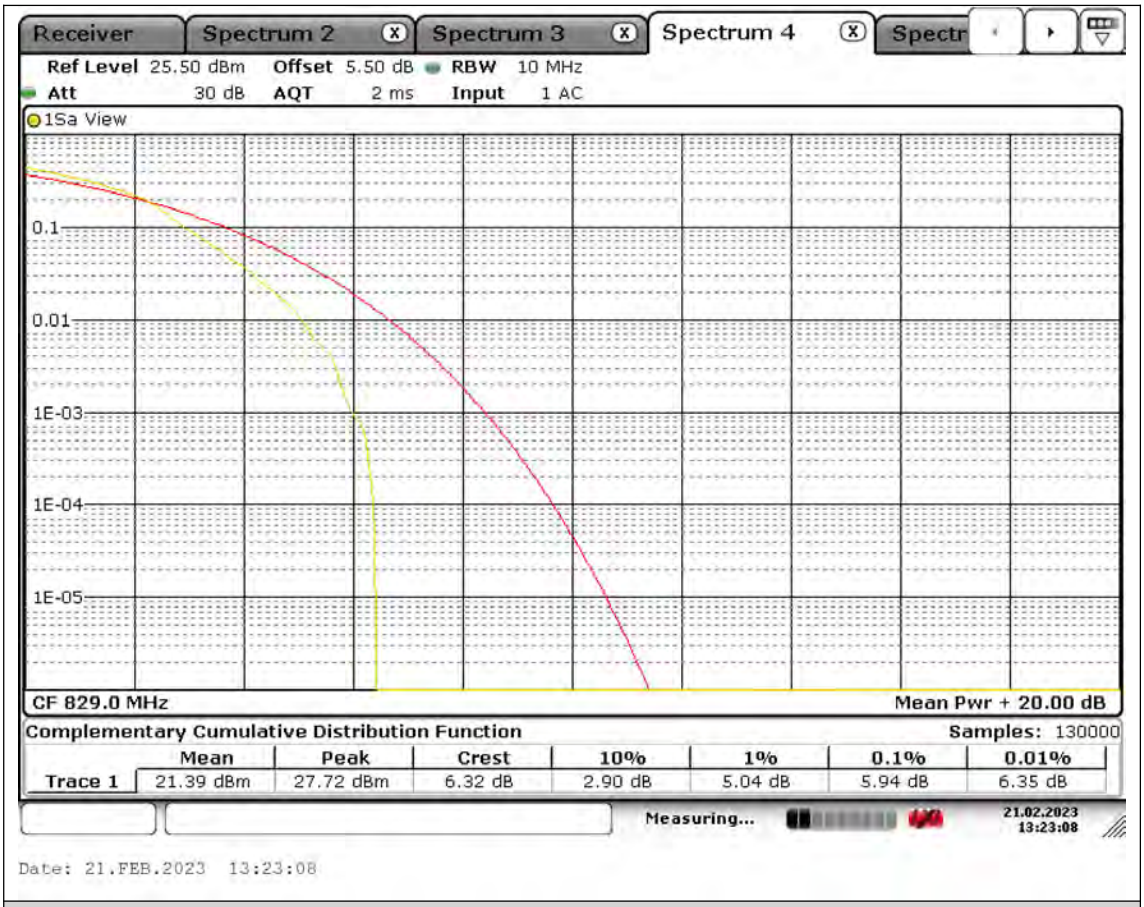

Band5-10MHz-16QAM-20450-1RB#0




Band5-10MHz-16QAM-20450-50RB#0




Band5-10MHz-16QAM-20525-1RB#0

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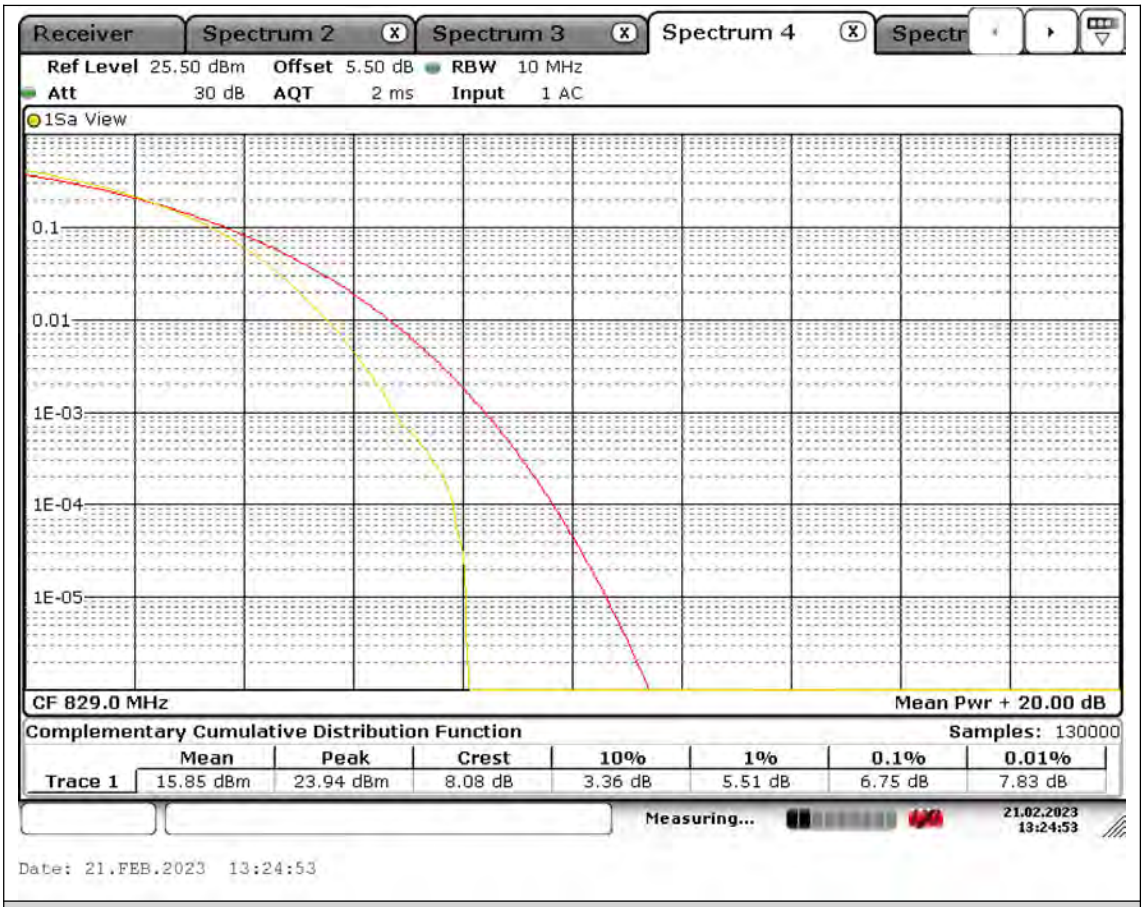


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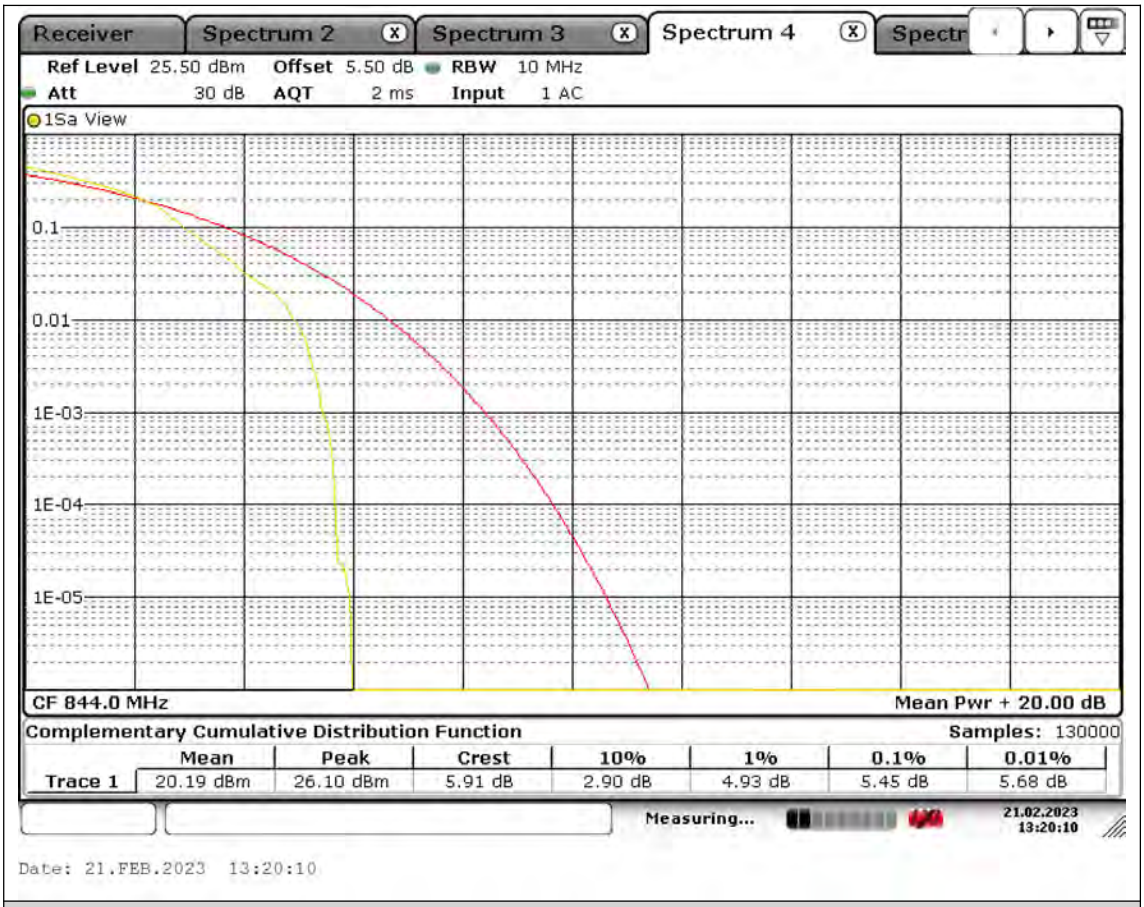


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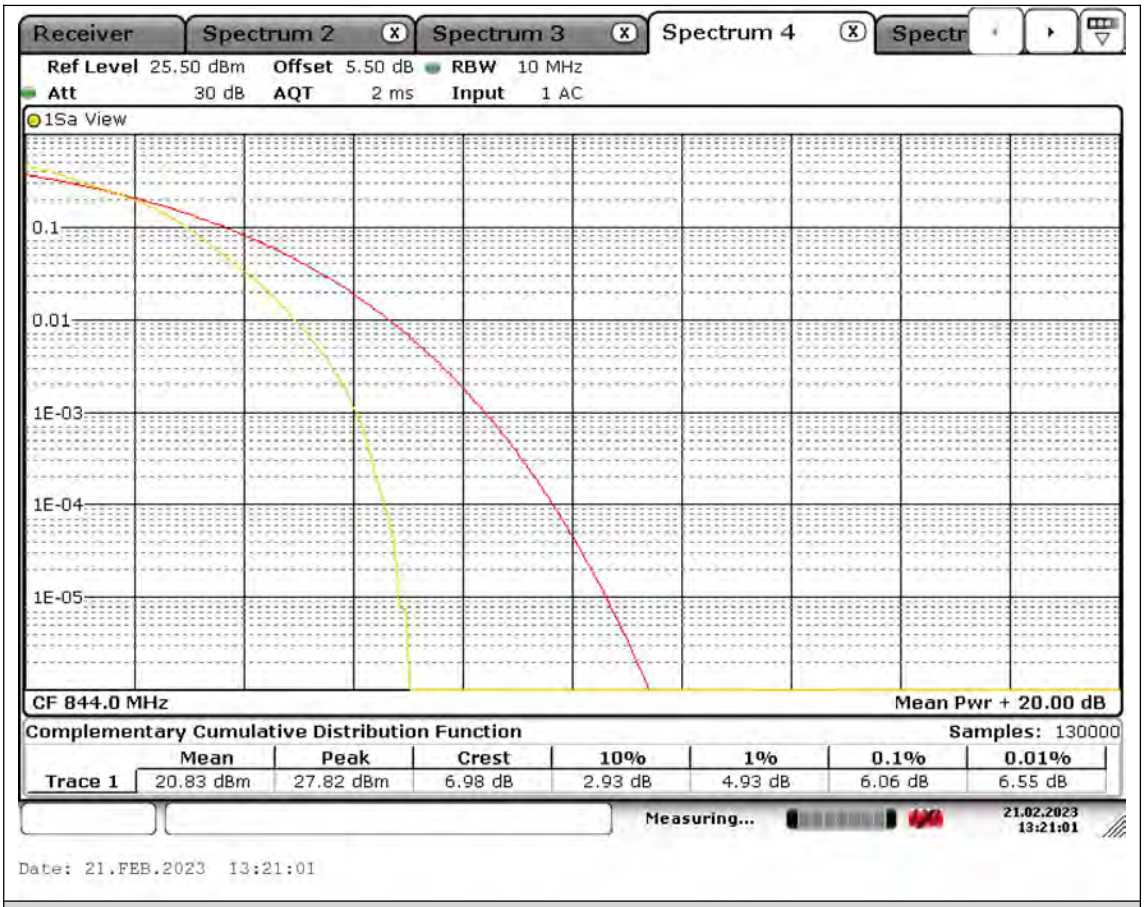


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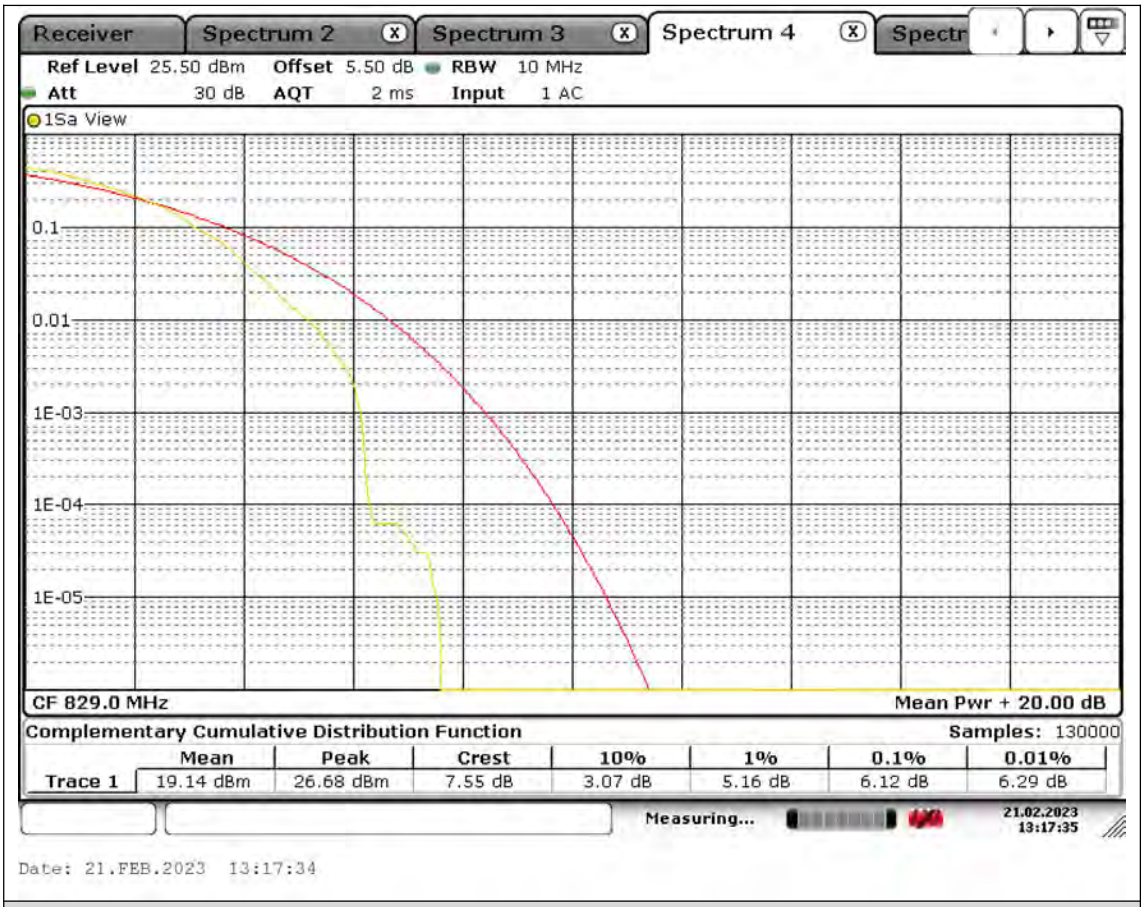


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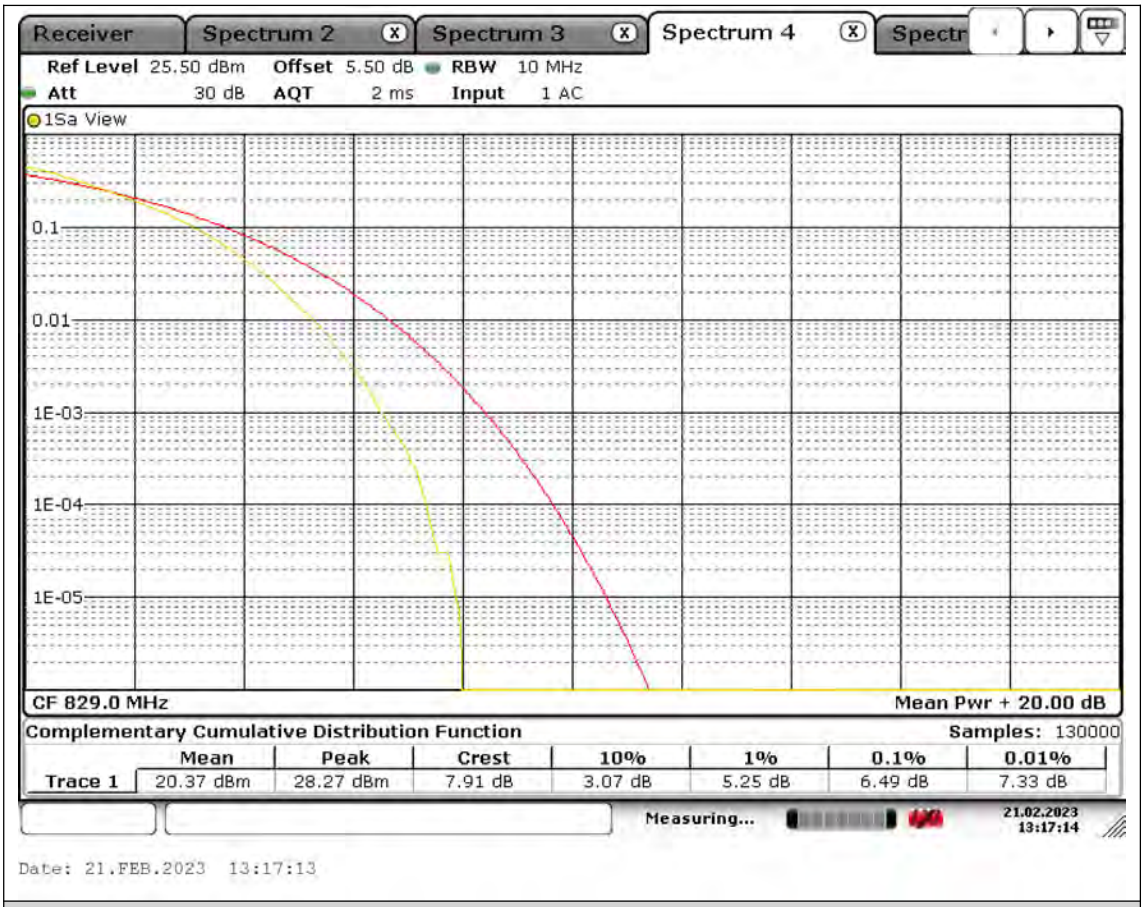


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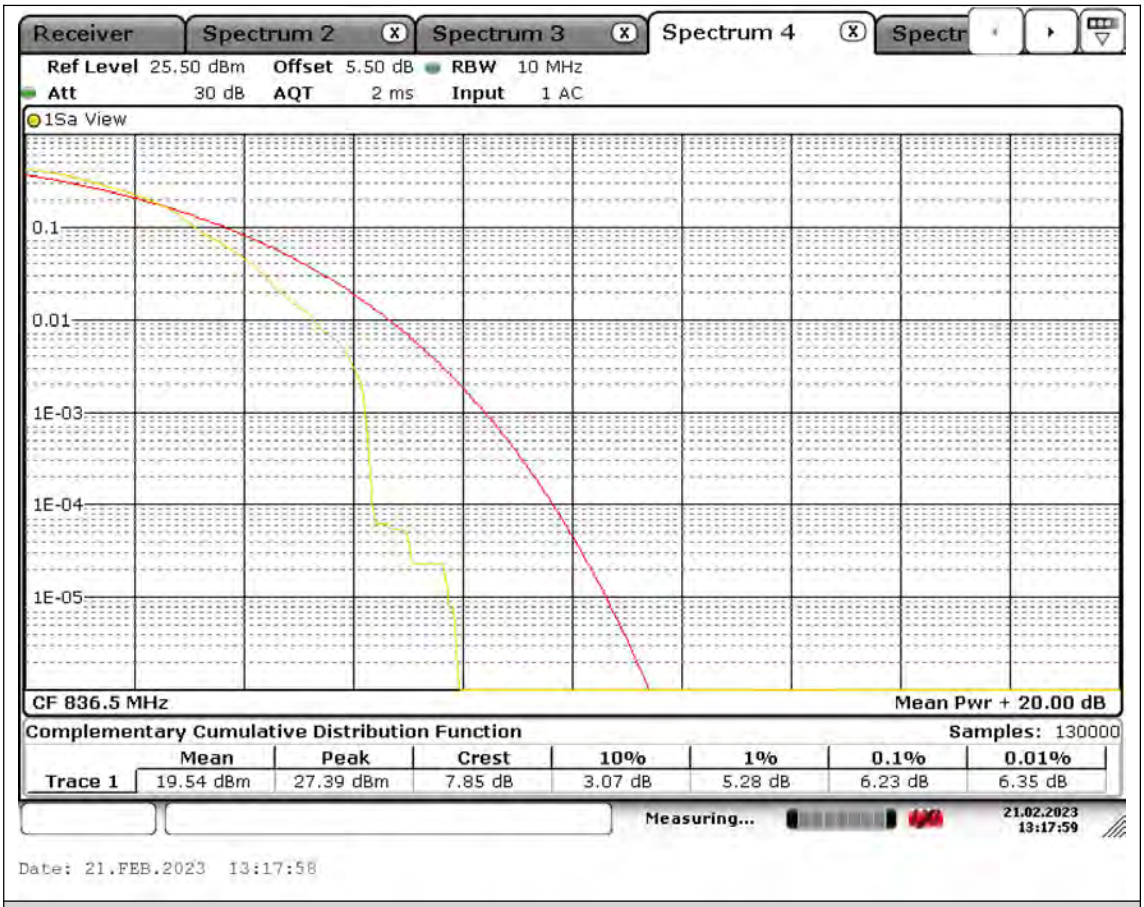


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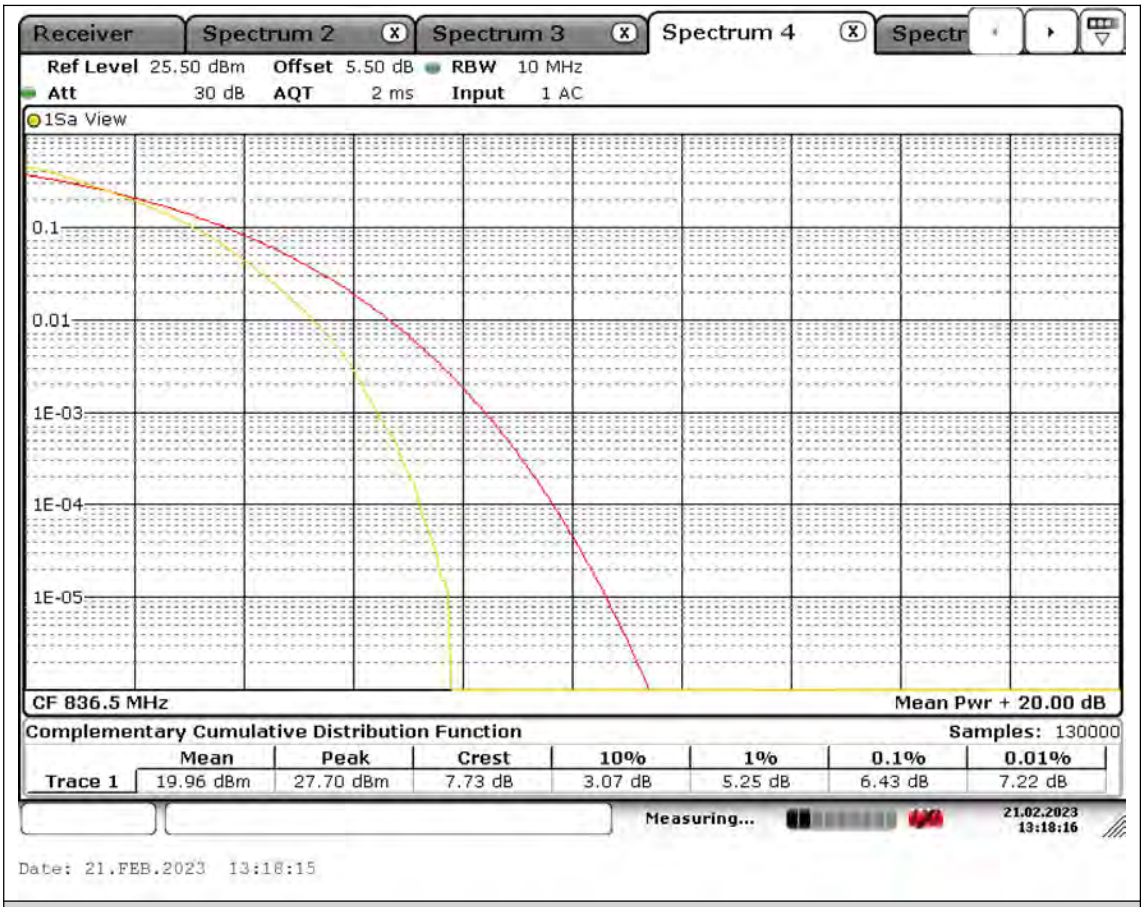


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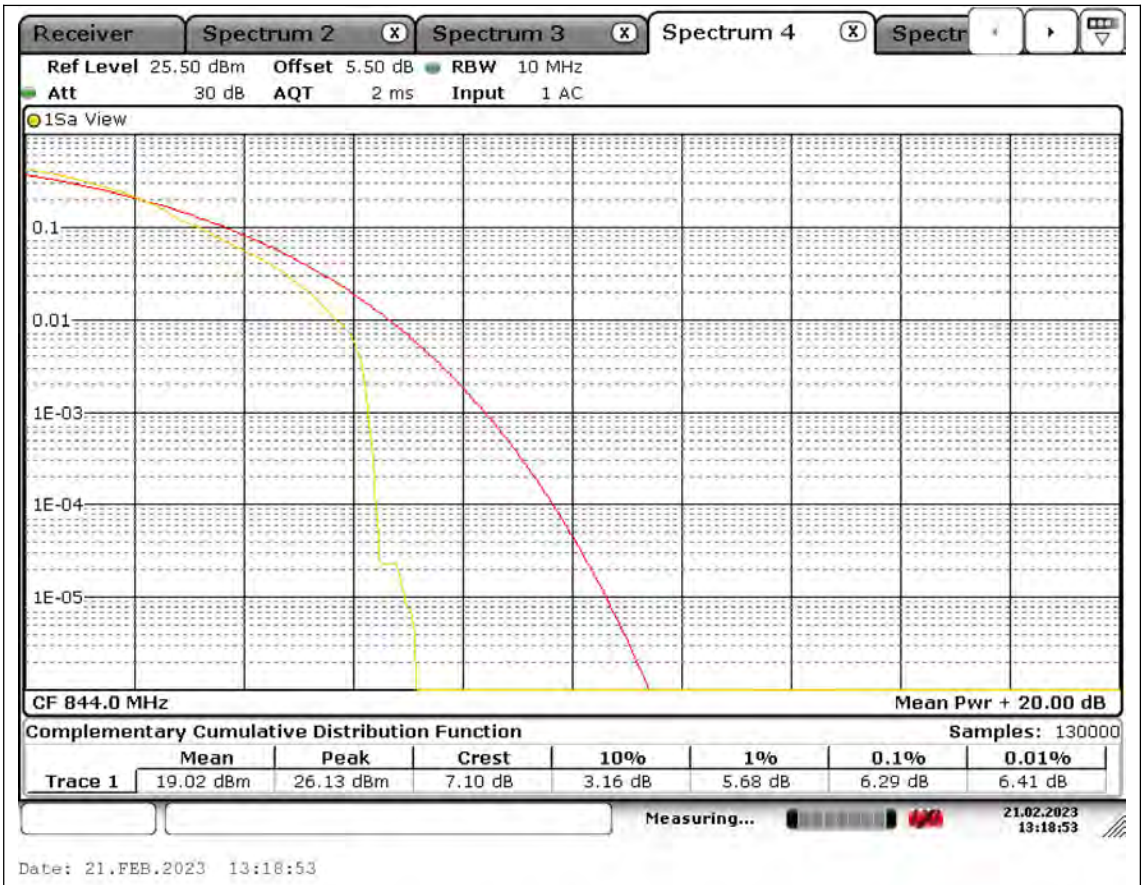
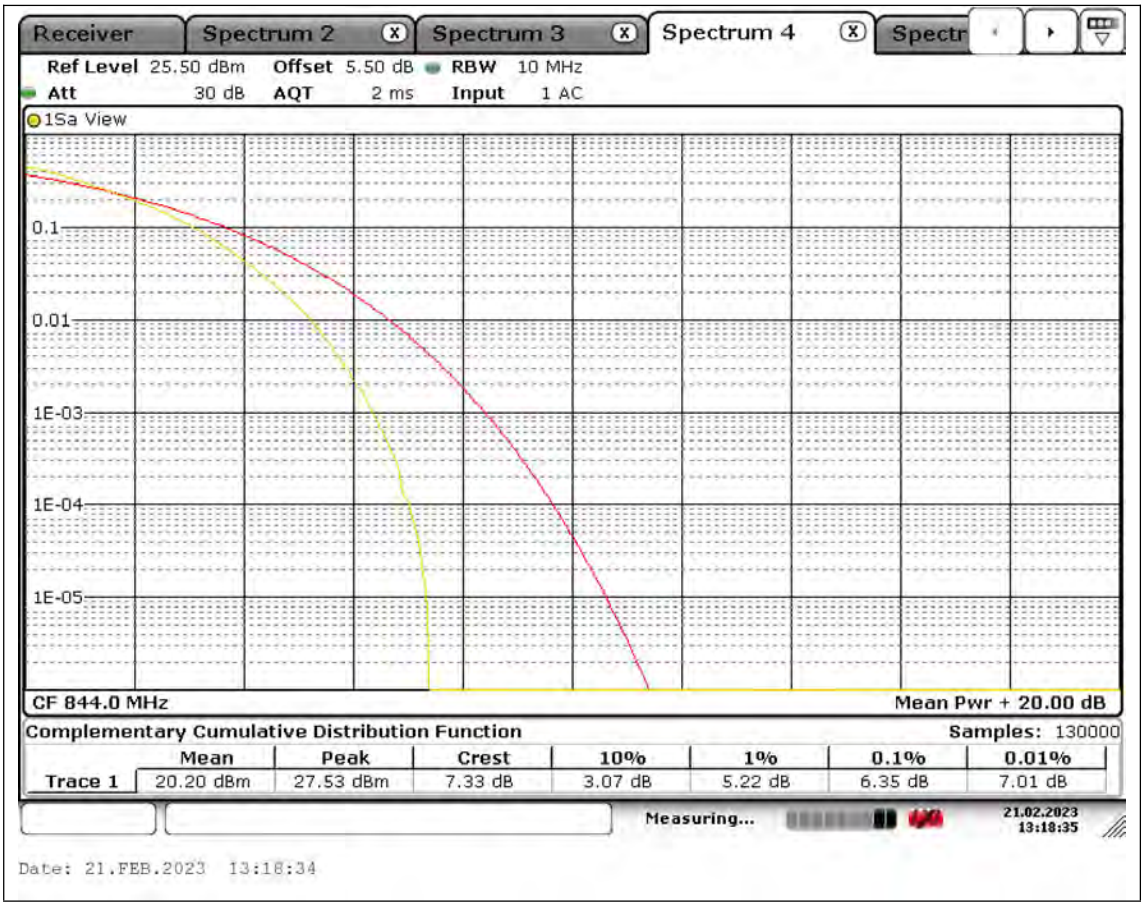



Band5-10MHz-64QAM-20600-50RB#0


Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Spectr
Ref Level 25.50 dBm Offset 5.50 dB RBW 10 MHz
Att 30 dB AQT 2 ms Input 1 AC
1Sa View
0.1
0.01
1E-03
1E-04
1E-05
CF 844.0 MHz
Mean Pwr + 20.00 dB
Complementary Cumulative Distribution Function
Samples: 130000
Mean Peak Crest 10% 1% 0.1% 0.01%
Trace 1 20.20 dBm 27.53 dBm 7.33 dB 3.07 dB 5.22 dB 6.35 dB 7.01 dB
Measuring...
21.02.2023
13:18:35
Date: 21.FEB.2023 13:18:34

## 26DB BANDWIDTH AND OCCUPIED BANDWIDTH

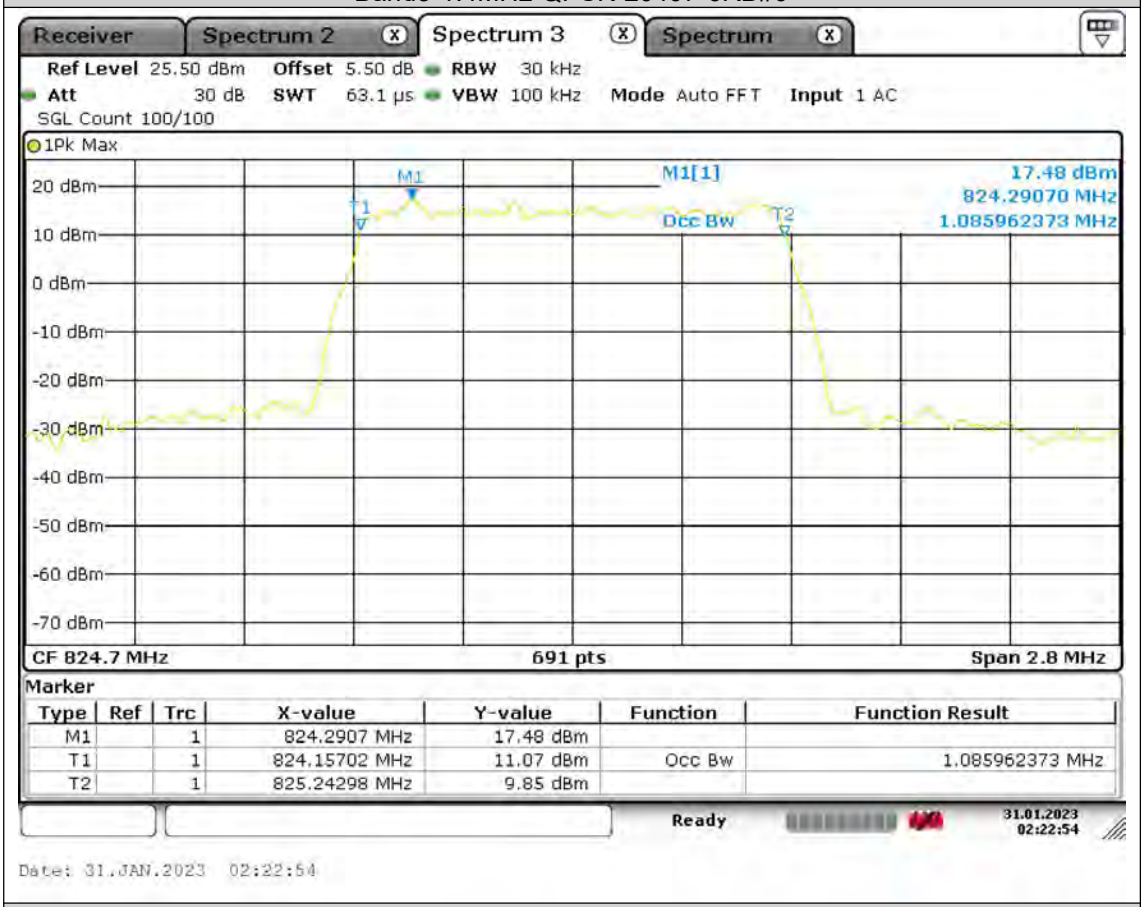
### Test Result

| Band | Bandwidth | Modulation | Channel | RB Configuration | Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) | Verdict |
|---|---|---|---|---|---|---|---|
| Band5 | 1.4MHz | QPSK | 20407 | 6RB#0 | 1.086 | 1.240 | PASS |
| Band5 | 1.4MHz | QPSK | 20525 | 6RB#0 | 1.090 | 1.244 | PASS |
| Band5 | 1.4MHz | QPSK | 20643 | 6RB#0 | 1.098 | 1.244 | PASS |
| Band5 | 1.4MHz | 16QAM | 20407 | 6RB#0 | 1.098 | 1.240 | PASS |
| Band5 | 1.4MHz | 16QAM | 20525 | 6RB#0 | 1.094 | 1.236 | PASS |
| Band5 | 1.4MHz | 16QAM | 20643 | 6RB#0 | 1.090 | 1.240 | PASS |
| Band5 | 3MHz | QPSK | 20415 | 15RB#0 | 2.770 | 3.065 | PASS |
| Band5 | 3MHz | QPSK | 20525 | 15RB#0 | 2.744 | 3.091 | PASS |
| Band5 | 3MHz | QPSK | 20635 | 15RB#0 | 2.735 | 3.091 | PASS |
| Band5 | 3MHz | 16QAM | 20415 | 15RB#0 | 2.735 | 3.109 | PASS |
| Band5 | 3MHz | 16QAM | 20525 | 15RB#0 | 2.735 | 3.083 | PASS |
| Band5 | 3MHz | 16QAM | 20635 | 15RB#0 | 2.744 | 3.056 | PASS |
| Band5 | 5MHz | QPSK | 20425 | 25RB#0 | 4.501 | 4.935 | PASS |
| Band5 | 5MHz | QPSK | 20525 | 25RB#0 | 4.486 | 4.863 | PASS |
| Band5 | 5MHz | QPSK | 20625 | 25RB#0 | 4.645 | 4.877 | PASS |
| Band5 | 5MHz | 16QAM | 20425 | 25RB#0 | 4.486 | 4.863 | PASS |
| Band5 | 5MHz | 16QAM | 20525 | 25RB#0 | 4.515 | 4.920 | PASS |
| Band5 | 5MHz | 16QAM | 20625 | 25RB#0 | 4.660 | 4.964 | PASS |
| Band5 | 10MHz | QPSK | 20450 | 50RB#0 | 9.059 | 9.783 | PASS |
| Band5 | 10MHz | QPSK | 20525 | 50RB#0 | 9.059 | 9.812 | PASS |
| Band5 | 10MHz | QPSK | 20600 | 50RB#0 | 9.059 | 9.986 | PASS |
| Band5 | 10MHz | 16QAM | 20450 | 50RB#0 | 9.001 | 9.841 | PASS |
| Band5 | 10MHz | 16QAM | 20525 | 50RB#0 | 9.001 | 9.841 | PASS |
| Band5 | 10MHz | 16QAM | 20600 | 50RB#0 | 9.001 | 9.812 | PASS |
| Band5 | 1.4MHz | 64QAM | 20407 | 6RB#0 | 1.094 | 1.256 | PASS |
| Band5 | 1.4MHz | 64QAM | 20525 | 6RB#0 | 1.086 | 1.240 | PASS |
| Band5 | 1.4MHz | 64QAM | 20643 | 6RB#0 | 1.094 | 1.232 | PASS |
| Band5 | 3MHz | 64QAM | 20415 | 15RB#0 | 2.735 | 3.074 | PASS |
| Band5 | 3MHz | 64QAM | 20525 | 15RB#0 | 2.735 | 3.048 | PASS |
| Band5 | 3MHz | 64QAM | 20635 | 15RB#0 | 2.770 | 3.040 | PASS |
| Band5 | 5MHz | 64QAM | 20425 | 25RB#0 | 4.486 | 4.978 | PASS |
| Band5 | 5MHz | 64QAM | 20525 | 25RB#0 | 4.515 | 4.906 | PASS |
| Band5 | 5MHz | 64QAM | 20625 | 25RB#0 | 4.472 | 4.935 | PASS |
| Band5 | 10MHz | 64QAM | 20450 | 50RB#0 | 9.059 | 9.754 | PASS |
| Band5 | 10MHz | 64QAM | 20525 | 50RB#0 | 9.030 | 9.899 | PASS |
| Band5 | 10MHz | 64QAM | 20600 | 50RB#0 | 9.030 | 9.899 | PASS |

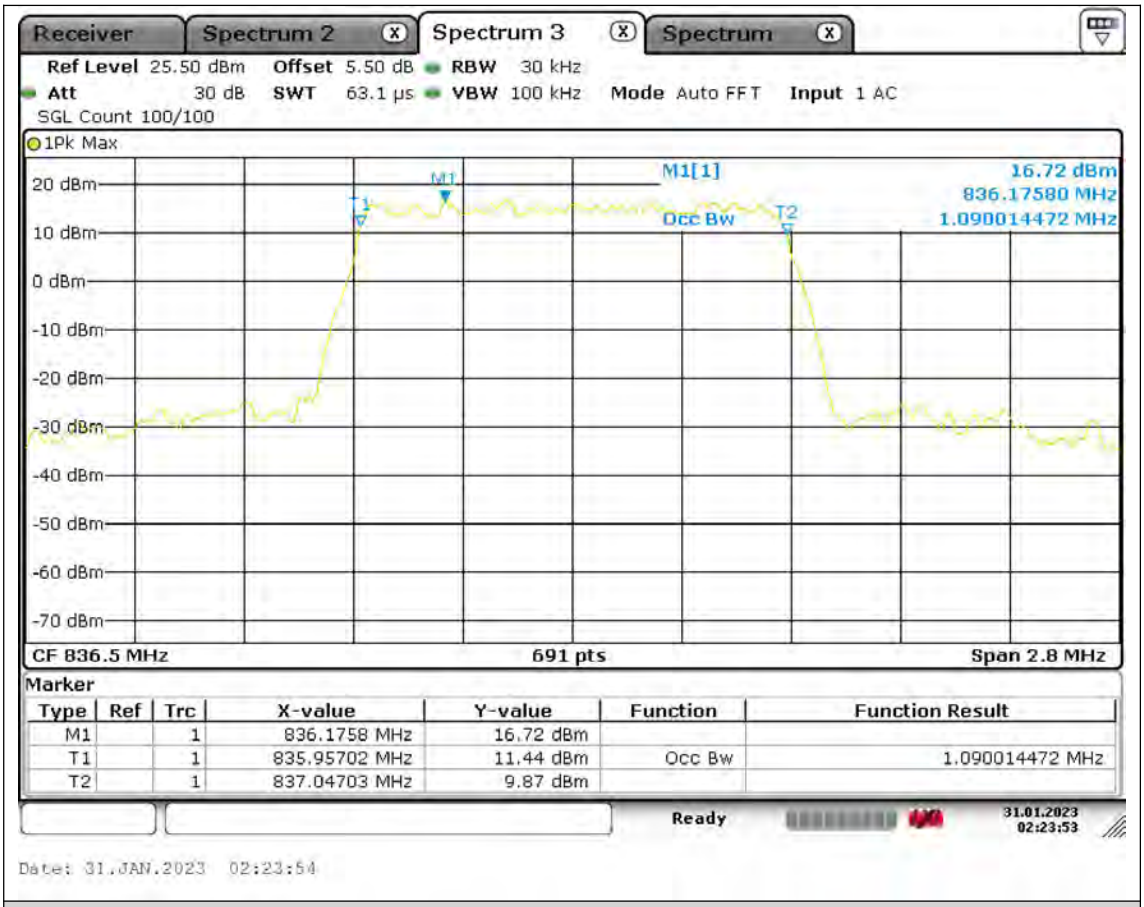
## Test Graphs

### Occupied Bandwidth

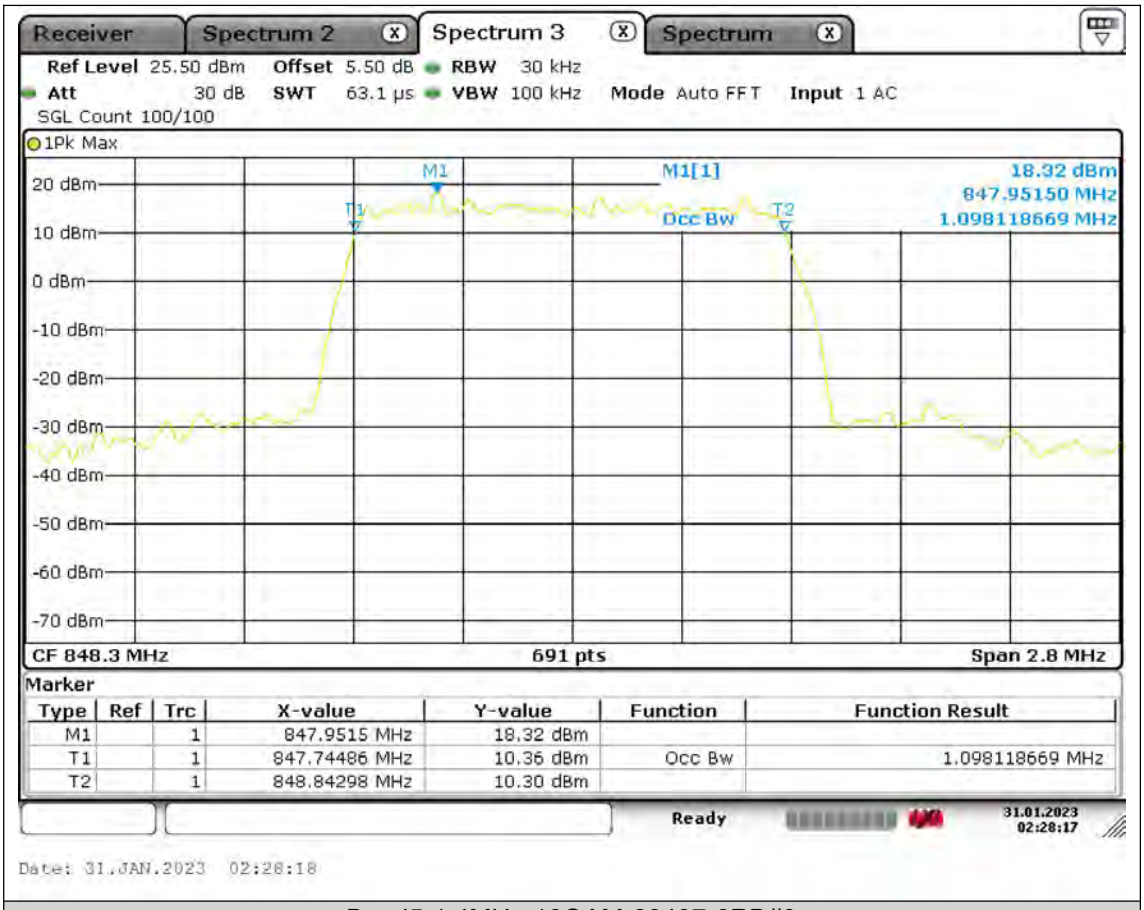
Band5-1.4MHz-QPSK-20407-6RB#0



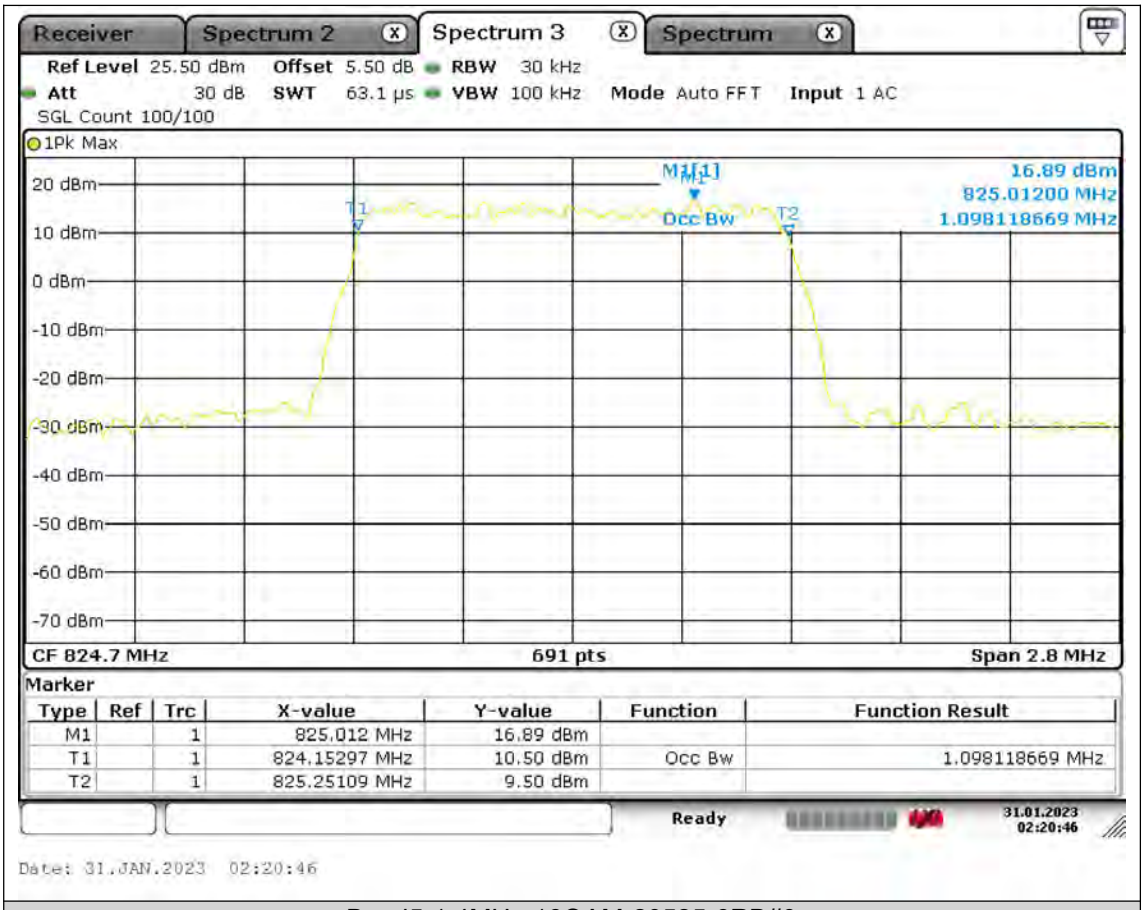

Band5-1.4MHz-QPSK-20525-6RB#0



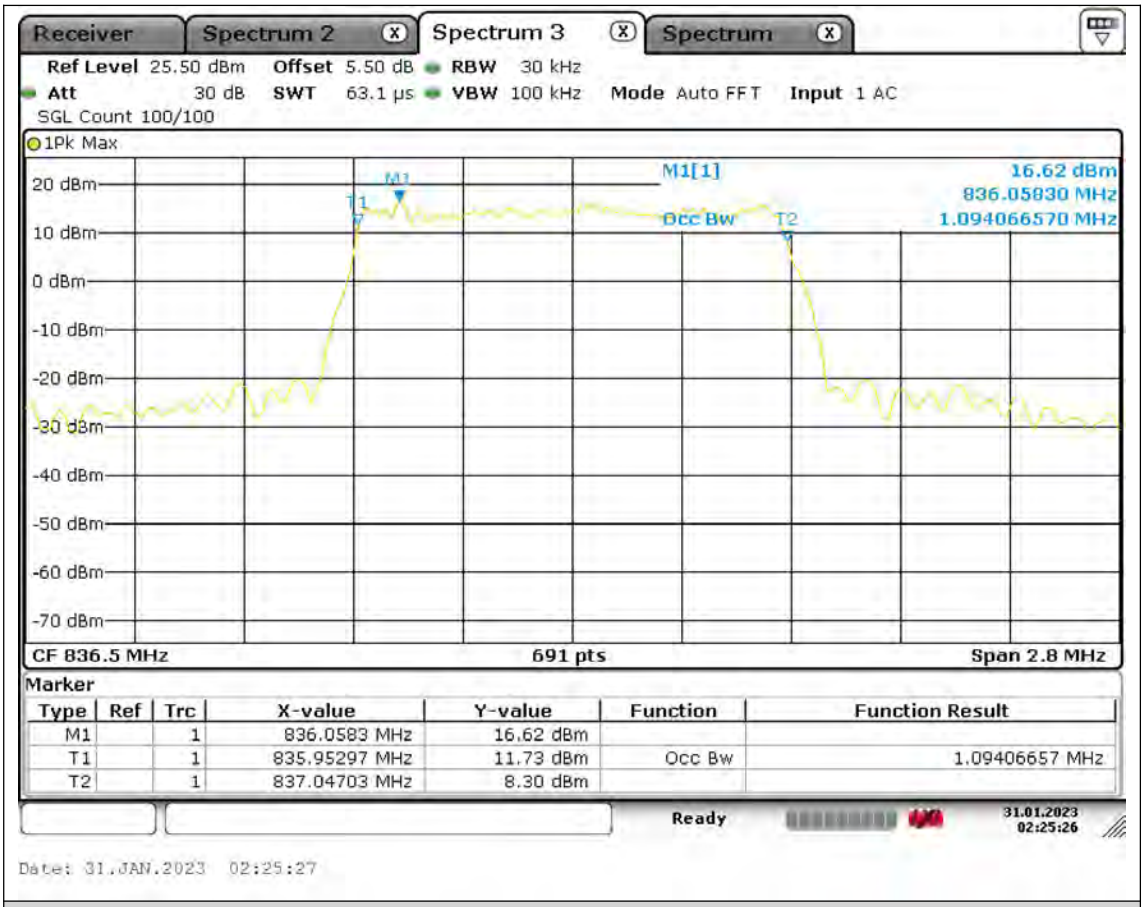

Band5-1.4MHz-QPSK-20643-6RB#0




Band5-1.4MHz-16QAM-20407-6RB#0




Band5-1.4MHz-16QAM-20525-6RB#0

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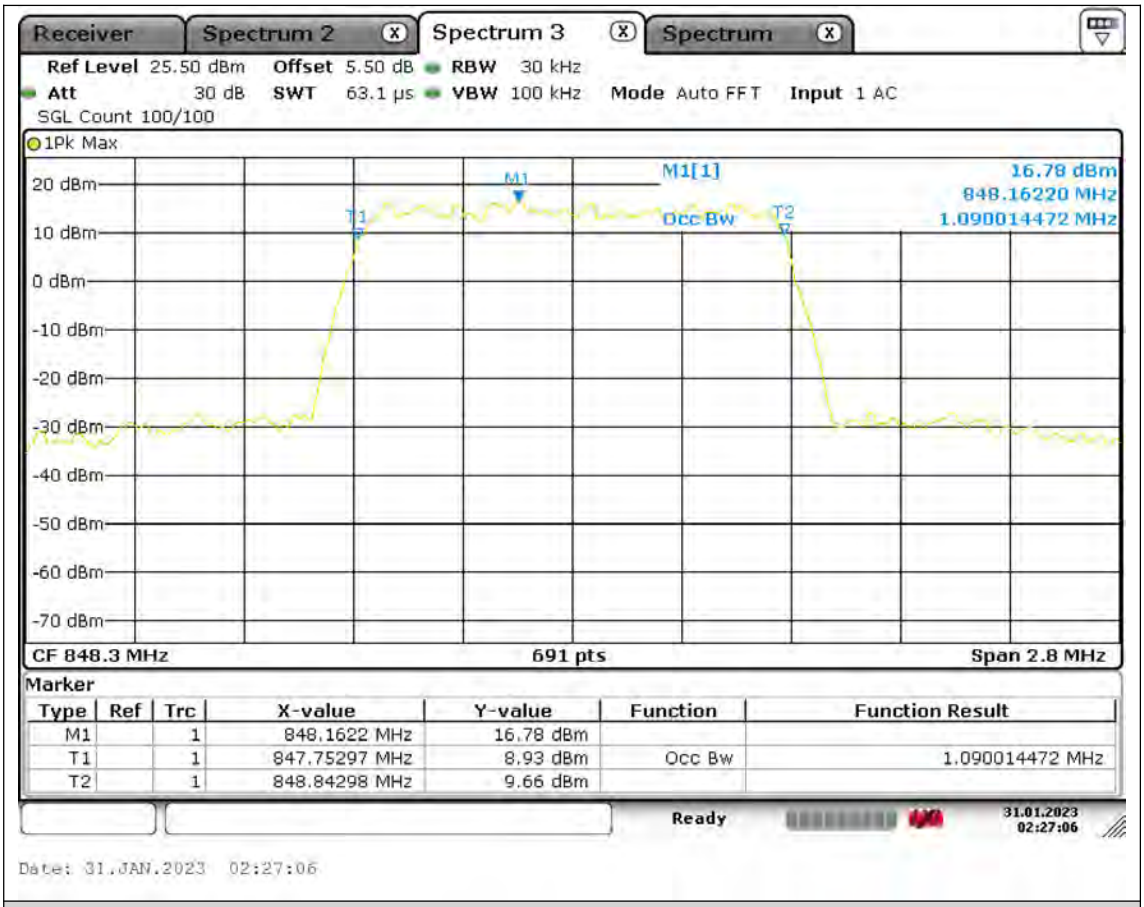
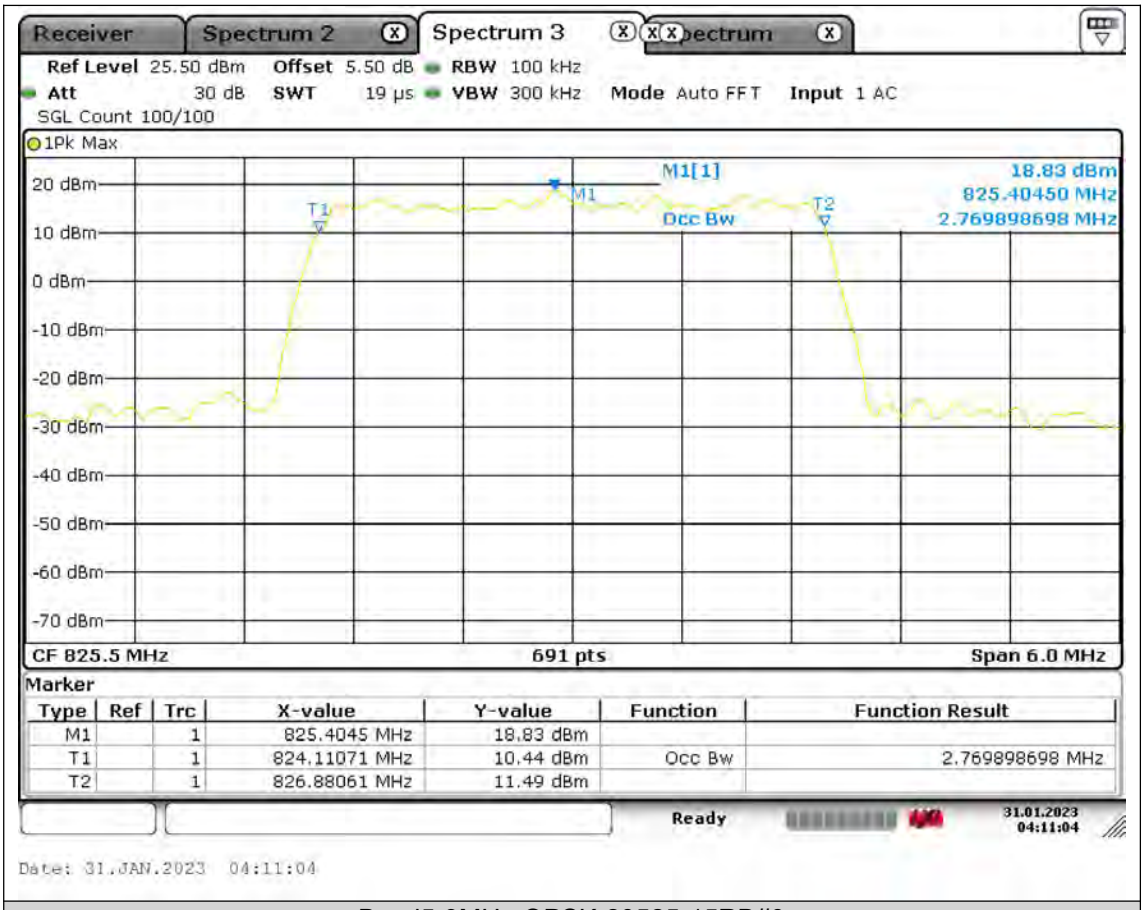



Band5-3MHz-QPSK-20415-15RB#0

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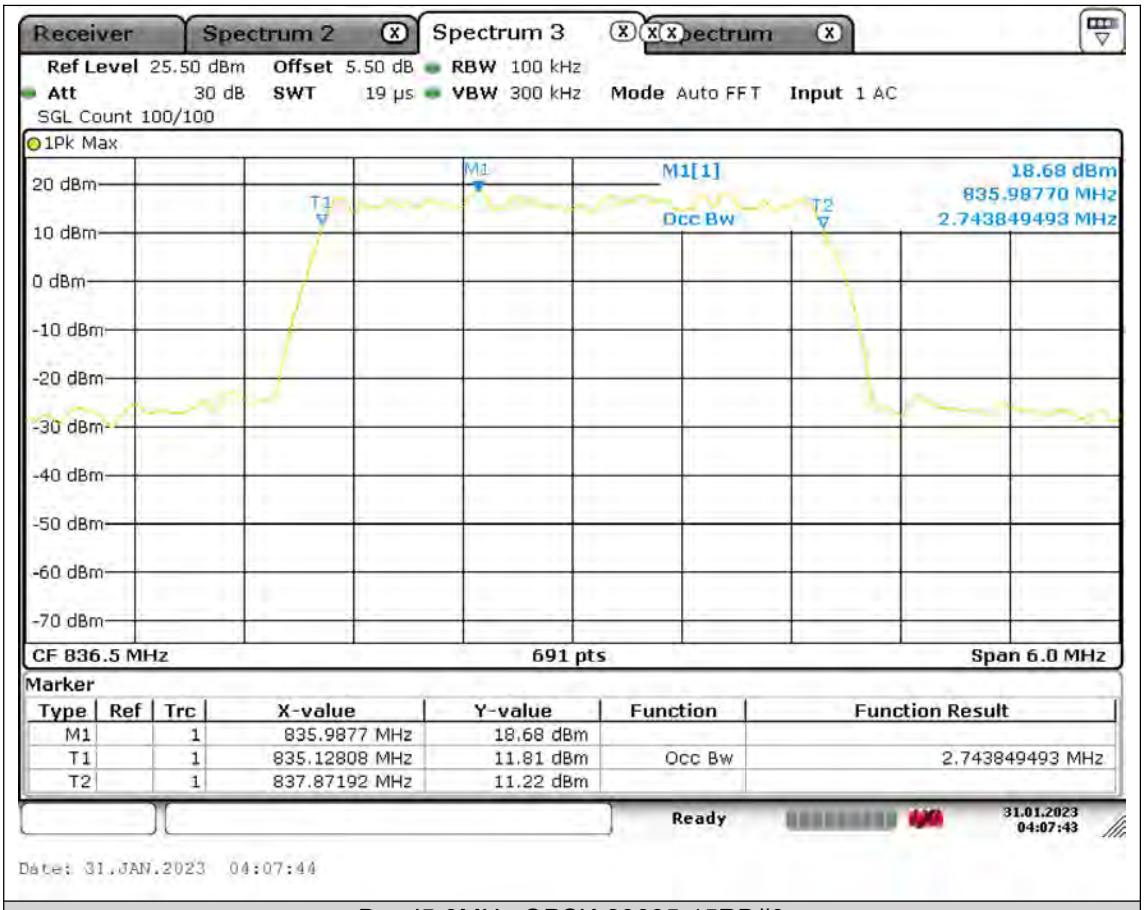


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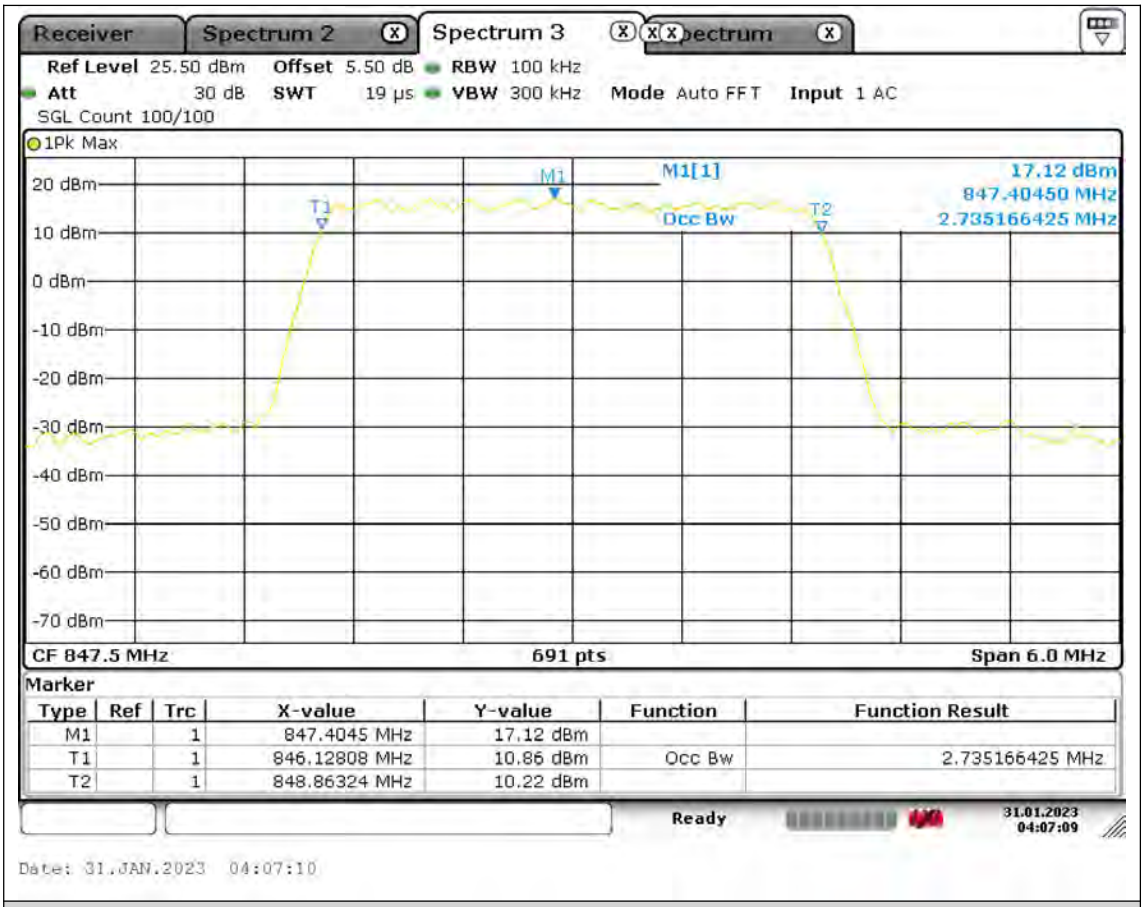


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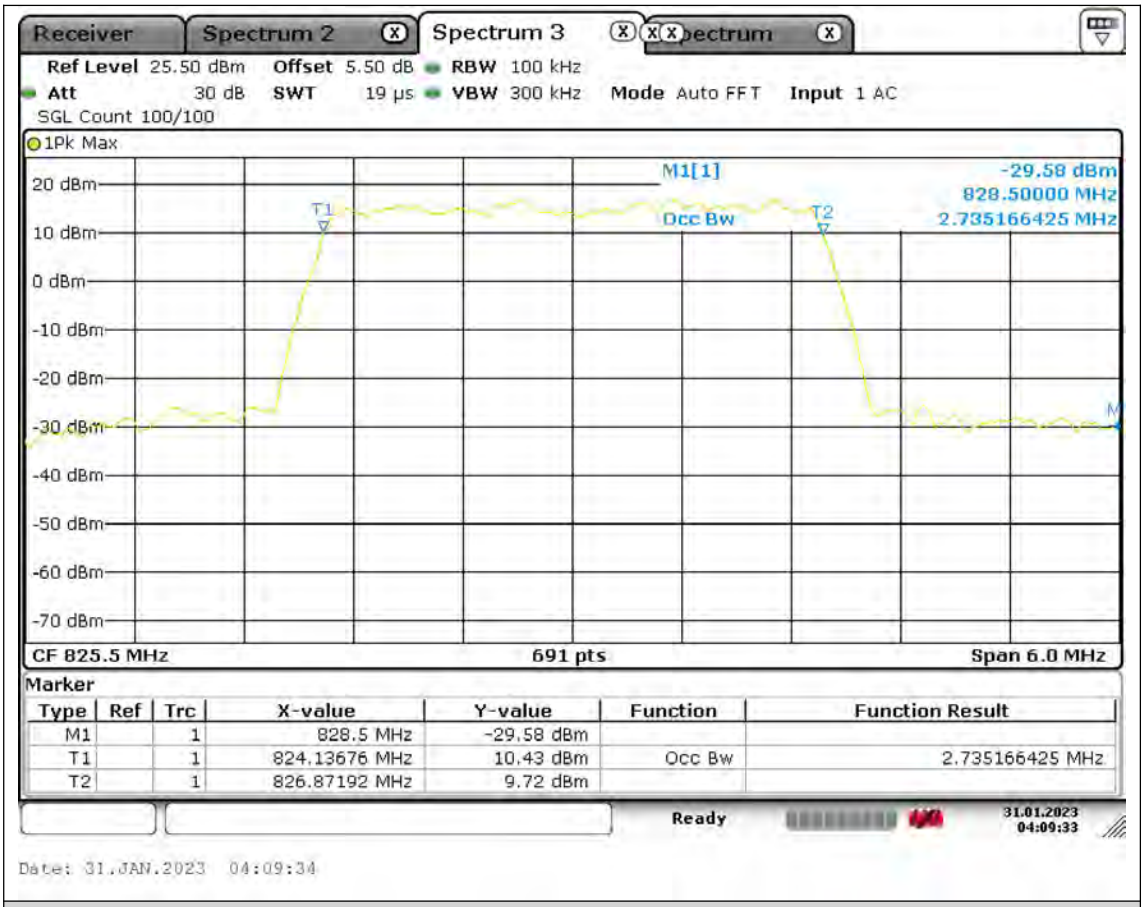


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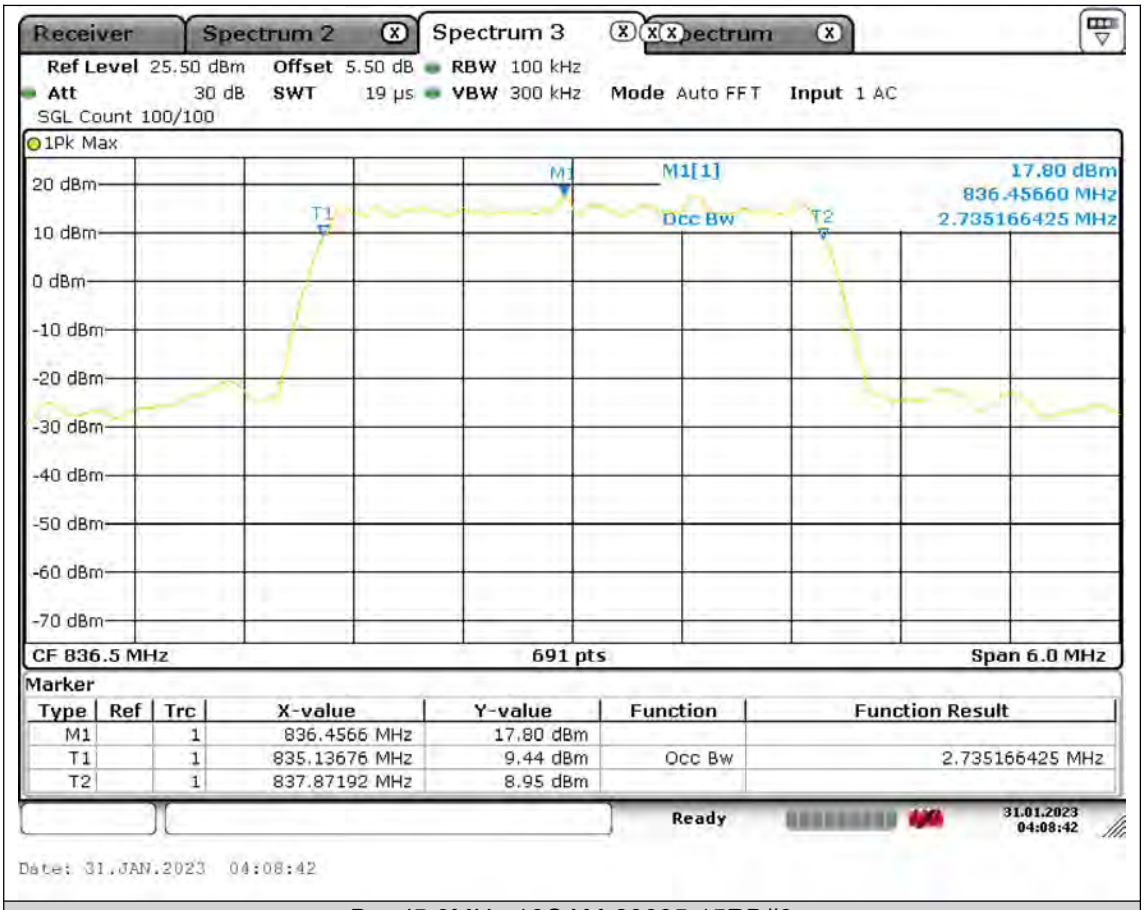


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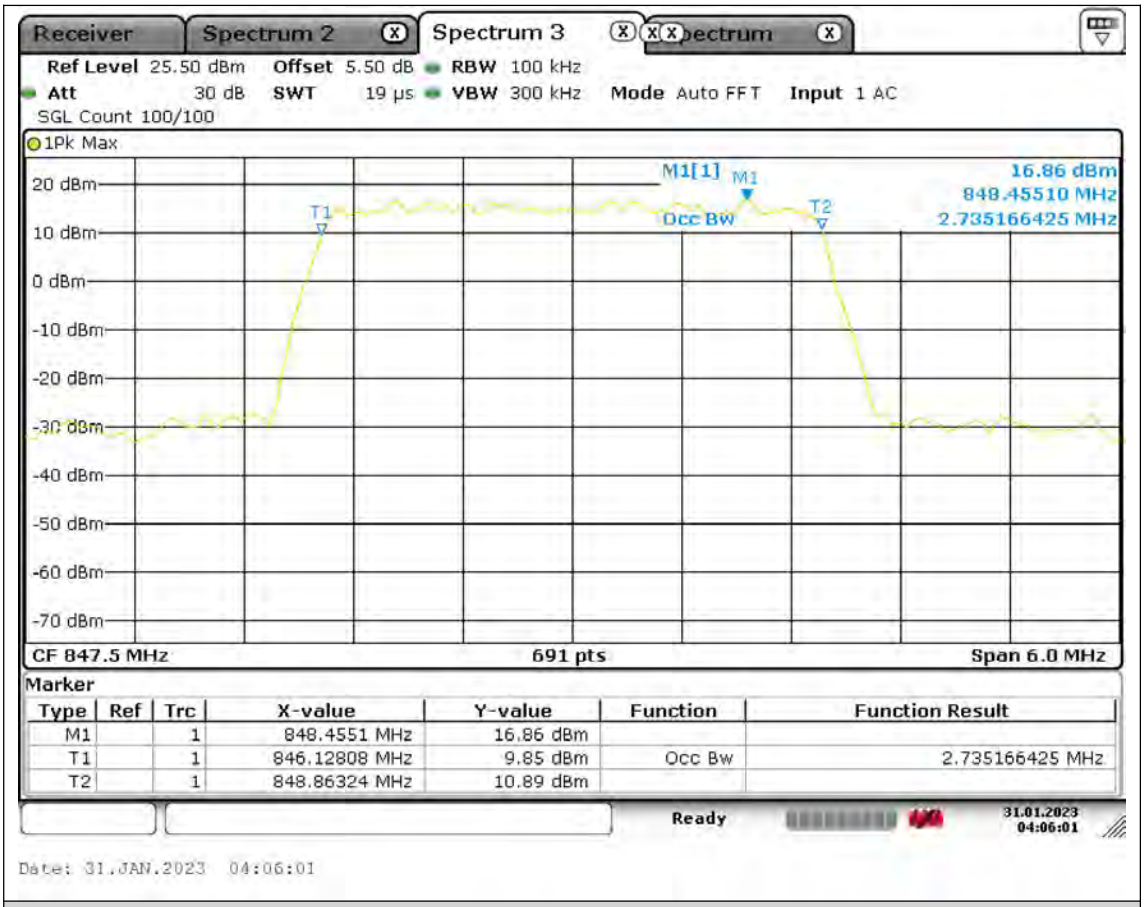
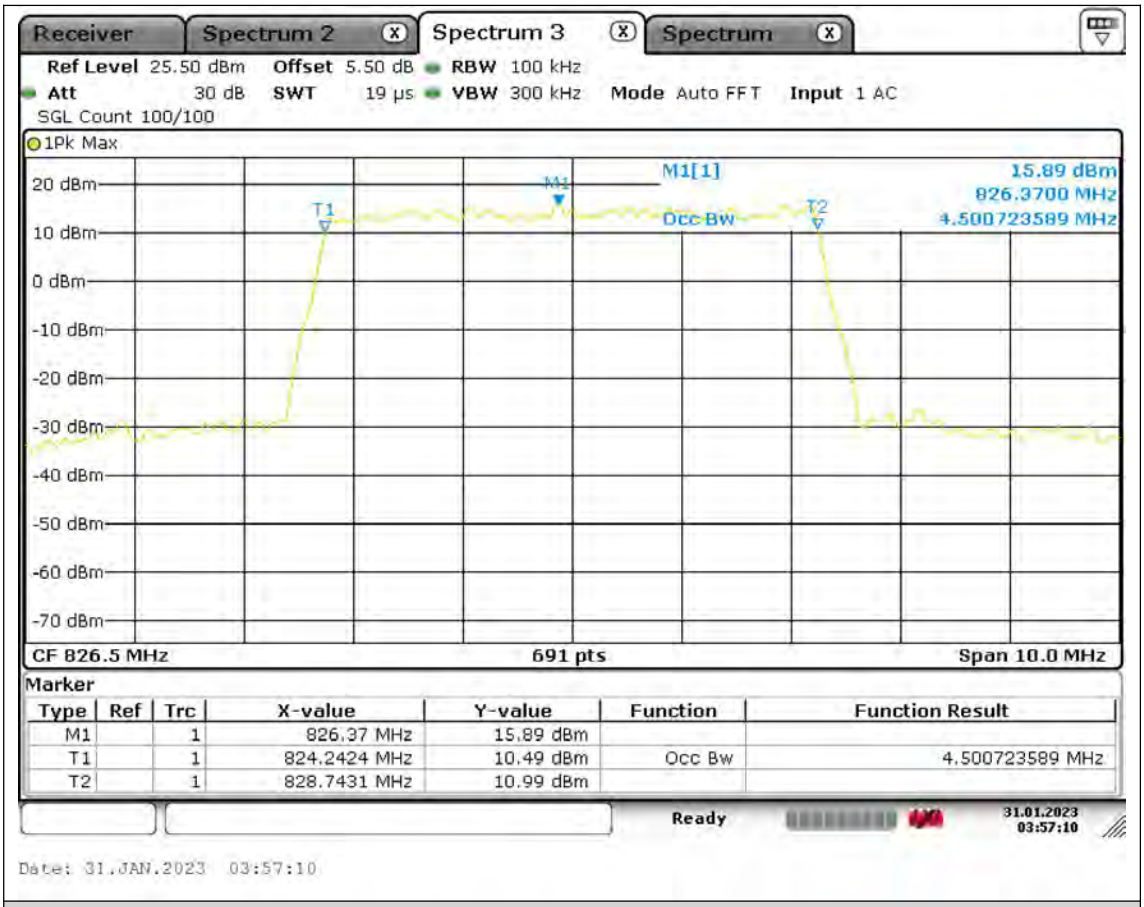



Band5-5MHz-QPSK-20425-25RB#0

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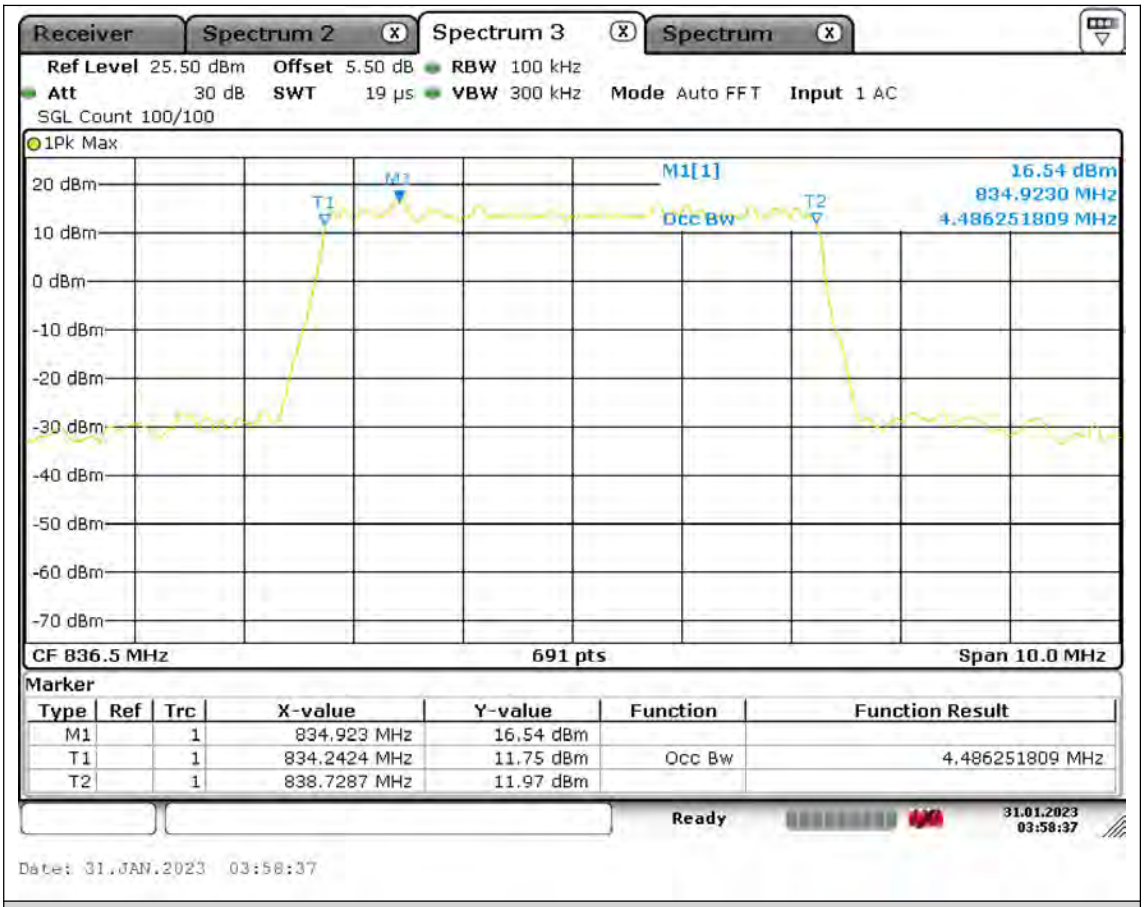


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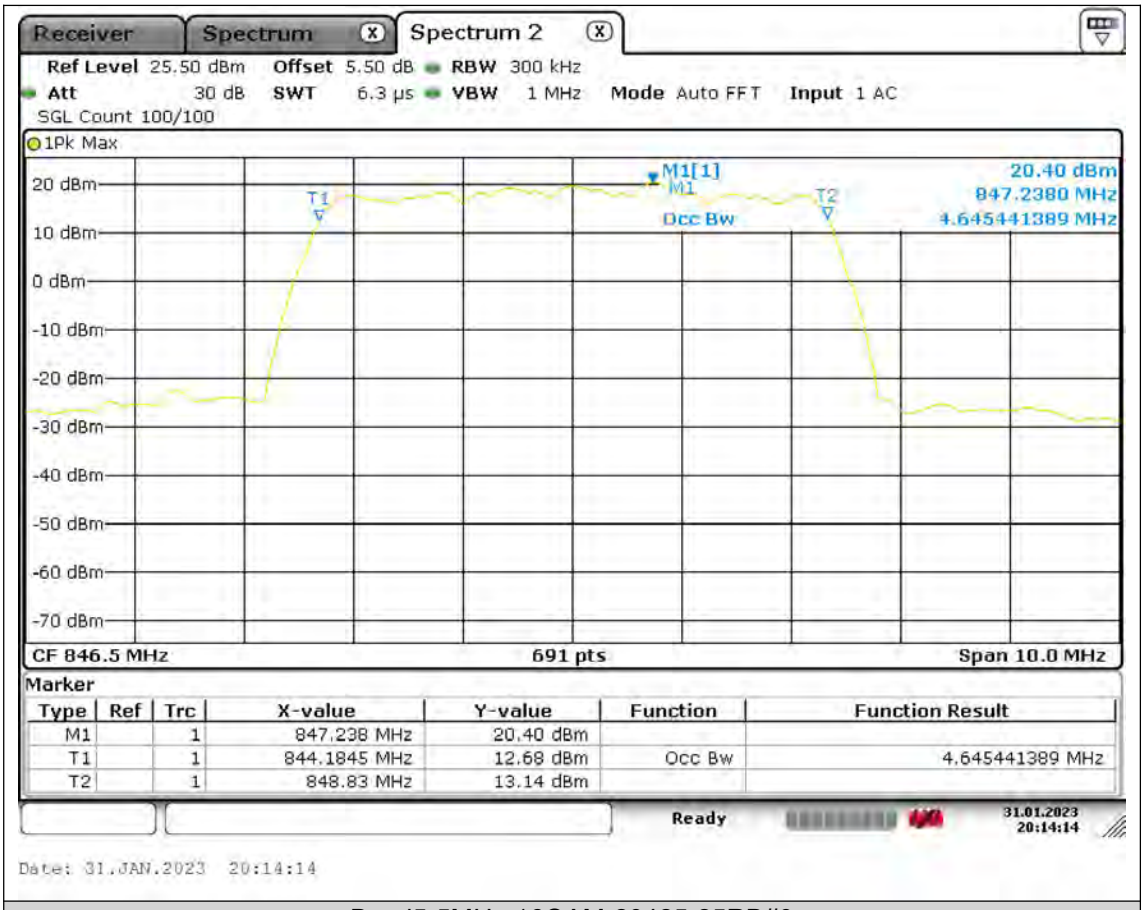


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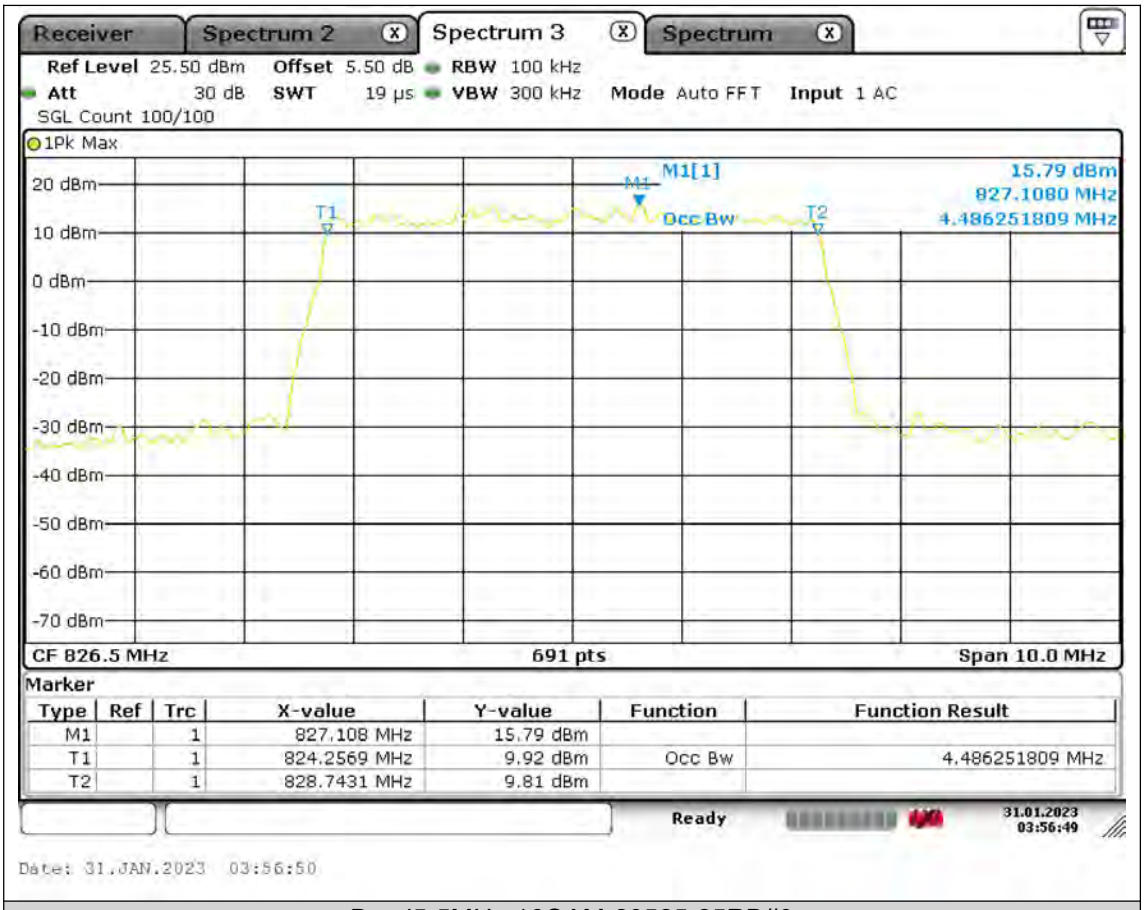
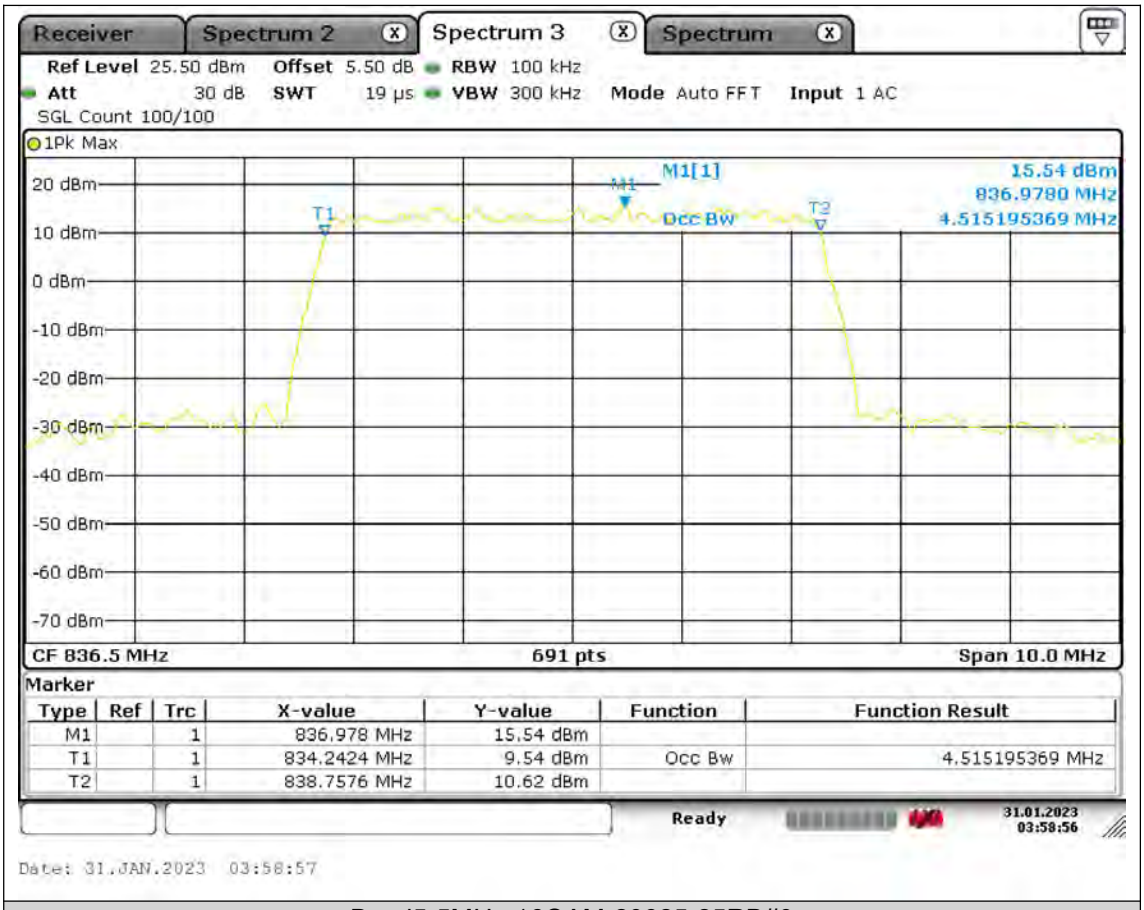



Band5-5MHz-16QAM-20525-25RB#0




Band5-5MHz-16QAM-20625-25RB#0