KSIGN®

**KSIGN (Guangdong) Testing Co., Ltd.**

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu,Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel.: + (86)755-29852678 Fax: + (86)755-29852397 E-mail: info@gdksign.cn Website: www.gdksign.com

# TEST REPORT

| | |
|---|---|
| **Report No. ·····:** | **KS2102S00365E06** |
| **FCC ID·····:** | **2AM8GCHAMELEONH** |
| **Applicant·····:** | **GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO. LIMITED** |
| Address·····: | No.4 plant of No.43 South International Trade Avenue,Hualong Town,Panyu District,Guangzhou,Guangdong,China |
| Manufacturer·····: | **GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO. LIMITED** |
| Address·····: | No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu District,Guangzhou,China |
| **Product Name·····:** | **Chameleon-H** |
| Trade Mark·····: | CHAMELEON |
| Model/Type reference·····: | E9XG-A05-M |
| Listed Model(s) ·····: | N/A |
| **Standard·····:** | **FCC CFR Title 47 Part 2, Part 22 Subpart H, Part 24 Subpart E** |
| Date of receipt of test sample..: | Mar. 01, 2021 |
| Date of testing……..: | Mar. 01, 2021~Mar. 25, 2021 |
| Date of issue……..: | Mar. 26, 2021 |
| **Test Result……..:** | **PASS** |

| | | |
|---|---|---|
| Compiled by:<br>(Printed name+signature) | Rory Huang | Rory Huang |
| Supervised by:<br>( Printed name+signature) | Eder Zhan | Eder Zhan |
| Approved by:<br>( Printed name+signature) | Cary Luo | Cary Luo |

KSIGN(Guangdong) Testing Co., Ltd. APPROVED

| | |
|---|---|
| **Testing Laboratory Name···:** | **KSIGN(Guangdong) Testing Co., Ltd.** |
| Address……..: | West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu,Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China |

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# 1. SUMMARY

## 1.1. Test Standards

FCC Rules Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS
FCC Rules Part 22: PRIVATE LAND MOBILE RADIO SERVICES.
FCC Rules Part 24: PUBLIC MOBILE SERVICES
TIA/EIA 603 E March 2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
ANSI C63.26: 2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
KDB 971168 D01 Power Meas License Digital Systems v03: MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS

## 1.2. Report version

| Revised No. | Date of issue | Description |
|---|---|---|
| 01 | Mar. 26, 2021 | Original |
| | | |
| | | |
| | | |
| | | |

## 1.3. Test Description

| Test Item | Section in CFR 47 | RSS Rule | Result | Test Engineer |
|---|---|---|---|---|
| Conducted Output Power | Part 2.1046<br>Part 22.913(a)<br>Part 24.232(c) | RSS-132(5.4)<br>RSS-133(6.4) | Pass | Rory Huang |
| Peak-to-Average Ratio | Part 24.232<br>Part 27.50 | RSS-132(5.4)<br>RSS-133(6.4) | Pass | Rory Huang |
| 99% Occupied Bandwidth & 26 dB Bandwidth | Part 2.1049<br>Part 22.917(b)<br>Part 24.238(b) | RSS-GEN(6.6)<br>RSS-133(6.5) | Pass | Rory Huang |
| Band Edge | Part 2.1051<br>Part 22.917<br>Part 24.238 | RSS-132(5.5)<br>RSS-133(6.5) | Pass | Rory Huang |
| Conducted Spurious Emissions | Part 2.1051<br>Part 22.917<br>Part 24.238 | RSS-132(5.5)<br>RSS-133(6.5) | Pass | Rory Huang |
| Frequency stability vs temperature | Part 2.1055(a)(1)(b)<br>Part 22.355<br>Part 24.235<br>Part 27.54 | RSS-GEN(6.11)<br>RSS-132(5.3) | Pass | Rory Huang |
| Frequency stability vs voltage | Part 2.1055(d)(1)(2)<br>Part 22.355<br>Part 24.235 | RSS-GEN(6.11)<br>RSS-132(5.3) | Pass | Rory Huang |
| ERP and EIRP | Part 22.913(a)<br>Part 24.232(b)<br>Part 27.50 | RSS-132(5.4)<br>RSS-133(6.4) | Pass | Rory Huang |
| Radiated Spurious Emissions | Part 2.1053<br>Part 22.917<br>Part 24.238 | RSS-132(5.5)<br>RSS-133(6.5) | Pass | Rory Huang |
| Receiver Spurious Emissions | / | RSS-GEN(7.1.3) | Pass | Rory Huang |

Note:
1. The measurement uncertainty is not included in the test result.
2. There are dual-SIM cards(SIM1 ,SIM2),Only the worst test data SIM1 recorded in the report.

## 1.4. Test Facility

**Address of the report laboratory**

**KSIGN(Guangdong) Testing Co., Ltd.**

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu,Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China

**Laboratory accreditation**

The test facility is recognized, certified, or accredited by the following organizations:

**CNAS-Lab Code: L13261**

KSIGN(Guangdong) Testing Co., Ltd. has been assessed and proved to be in Compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

**A2LA-Lab Cert. No.: 5457.01**

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

**IC Registration No.: CN0096**

The 3m alternate test site of KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: CN0096

**FCC-Registration No.: CN1272**

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

## 1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements and is documented in the Shenzhen General Testing & Inspection Technology Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for General Testing & Inspection laboratory is reported:

| Test Items | Measurement Uncertainty | Notes |
|---|---|---|
| Frequency stability | 25 Hz | (1) |
| Transmitter power conducted | 0.57 dB | (1) |
| Transmitter power Radiated | 2.20 dB | (1) |
| Conducted spurious emission 9KHz-12.75 GHz | 1.60 dB | (1) |
| Conducted spurious emission 12.75-40GHz | 2.03 dB | (1) |
| Conducted Emission 9KHz-30MHz | 3.39 dB | (1) |
| Radiated Emission 30~1000MHz | 4.24 dB | (1) |
| Radiated Emission 1~18GHz | 5.16 dB | (1) |
| Radiated Emission 18-40GHz | 5.54 dB | (1) |
| Occupied Bandwidth | --------- | (1) |
| Emission Mask | --------- | (1) |
| Modulation Characteristic | --------- | (1) |
| Transmitter Frequency Behavior | --------- | (1) |

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

## 1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

| | |
|---|---|
| Normal Temperature: | 25°C |
| Relative Humidity: | 55 % |
| Air Pressure: | 101 kPa |

# 2. GENERAL INFORMATION

## 2.1. Client Information

| | |
|---|---|
| Applicant: | GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO. LIMITED |
| Address: | No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu District,Guangzhou,China |
| Manufacturer: | GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO. LIMITED |
| Address: | No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu District,Guangzhou,China |

## 2.2. General Description of EUT

| | |
|---|---|
| Test Sample Number: | 1-1-1(Normal Sample),1-1-2(Engineering Sample ) |
| Product Name: | Chameleon-H |
| Model/Type reference: | E9XG-A05-M |
| Trademark: | CHAMELEON |
| Listed Model(s): | / |
| Power supply(Battery): | DC 3.7V 10000mAh 37Wh |
| Power Supply(Adapter): | AC/DC ADAPTER<br>MODEL:AD018A120150UV<br>INPUT:100-240V~ 50/60Hz 0.5A Max<br>OUTPUT:DC 12V1.5A |
| Hardware version: | V1.0 |
| Software version: | V1.0 |
| **GSM** | |
| Operation Band: | GSM850: UL: 824MHz~849MHz, DL: 869MHz~894MHz<br>PCS1900: UL: 1850MHz~1910, DL: 1930MHz~1990MHz |
| Supported Type: | GSM/GPRS/EGPRS |
| Modulation Type: | GMSK for GSM/GPRS, 8PSK for EGPRS |
| Antenna Type: | FPC antenna |
| Antenna Gain: | GSM850:1.0dBi<br>PCS1900:1.1dBi |

## 2.3. Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. The CUM200 used to control the EUT staying in continuous transmitting and receiving mode for testing.

**Test Frequency:**

| GSM 850 | | PCS 1900 | |
|---|---|---|---|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 128 | 824.20 | 512 | 1850.20 |
| 190 | 836.60 | 661 | 1880.00 |
| 251 | 848.80 | 810 | 1909.80 |

## 2.4. Measurement Instruments List

| Test system | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Until |
| 1 | Spectrum Analyzer | R&S | FSV40-N | 101798 | 04/07/2021 |
| 2 | Vector Signal Generator | Agilent | N5182A | MY50142520 | 04/07/2021 |
| 3 | Analog Signal Generator | HP | 83752A | 3344A00337 | 04/07/2021 |
| 4 | Power Sensor | Agilent | E9304A | MY50390009 | 04/07/2021 |
| 5 | Power Sensor | Agilent | E9300A | MY41498315 | 04/07/2021 |
| 6 | Wideband Radio Communication Tester | R&S | CMW500 | 157282 | 04/07/2021 |
| 7 | Climate Chamber | Angul | AGNH80L | 1903042120 | 04/07/2021 |
| 8 | Dual Output DC Power Supply | Agilent | E3646A | MY40009992 | 04/07/2021 |
| 9 | RF Control Unit | Tonscend | JS0806-2 | / | 04/07/2021 |

| Transmitter spurious emissions & Receiver spurious emissions | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Until |
| 1 | EMI Test Receiver | R&S | ESR | 102525 | 04/07/2021 |
| 2 | High Pass Filter | Chengdu E-Microwave | OHF-3-18-S | 0E01901038 | 03/27/2021 |
| 3 | High Pass Filter | Chengdu E-Microwave | OHF-6.5-18-S | 0E01901039 | 03/27/2021 |
| 4 | Spectrum Analyzer | HP | 8593E | 3831U02087 | 04/07/2021 |
| 5 | Ultra-Broadband logarithmic period Antenna | Schwarzbeck | VULB 9163 | 01230 | 03/29/2023 |
| 6 | Loop Antenna | Beijin ZHINAN | ZN30900C | 18050 | 03/25/2021 |
| 7 | Spectrum Analyzer | R&S | FSV40-N | 101798 | 04/07/2021 |
| 8 | Horn Antenna | Schwarzbeck | BBHA 9120 D | 2023 | 03/29/2023 |
| 9 | Horn Antenna | Schwarzbeck | BBHA 9170 | 00943 | 25/11/2021 |

| | | | | | |
|---|---|---|---|---|---|
| 10 | Pre-Amplifier | Schwarzbeck | BBV 9721 | 9721-57 | 25/11/2021 |
| 11 | Pre-Amplifier | Schwarzbeck | BBV 9745 | 9745#129 | 04/07/2021 |
| 12 | Pre-Amplifier | EMCI | EMC051835 SE | 980662 | 04/08/2021 |
| 13 | Wideband Radio Communication Tester | R&S | CMW500 | 157282 | 04/07/2021 |

Note:
1)The Cal. Interval was one year.
2)The cable loss has calculated in test result which connection between each test instruments.

## 2.5. Test Software

| Software name | Model | Version |
|---|---|---|
| Test System | JS1120-3 | 2.5.77.0418 |
| Test System | TST | V1.0.5 |
| Radiated emission Measurement Software | EZ-EMC | FA-03A.2.RE |

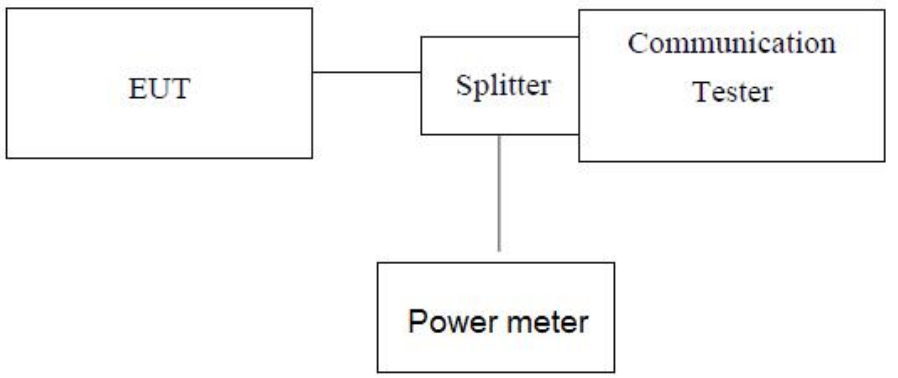
# 3. TEST ITEM AND RESULTS

## 3.1. Conducted Output Power

**LIMIT:**

GSM850/WCDMA Band V: 7W
PCS1900/WCDMA Band II/WCDMA Band IV: 2W

**TEST CONFIGURATION**




*Note: Measurement setup for testing on Antenna connector*

**TEST PROCEDURE**

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure the maximum PK burst power and maximum Avg. burst power.

## TEST RESULTS

| GSM850 | | Conducted Power (dBm) | | |
|---|---|---|---|---|
| | | CH128 | CH190 | CH251 |
| | | 824.20MHz | 836.60MHz | 848.80MHz |
| GSM | | 30.62 | 30.62 | 30.36 |
| GPRS (GMSK) | 1TXslot | 30.60 | 30.59 | 30.33 |
| | 2TXslots | 30.10 | 30.13 | 29.86 |
| | 3TXslots | 28.62 | 28.68 | 28.42 |
| | 4TXslots | 27.57 | 27.64 | 27.37 |
| EGPRS (8PSK) | 1TXslot | 26.05 | 25.95 | 25.82 |
| | 2TXslots | 24.96 | 24.81 | 24.63 |
| | 3TXslots | 22.75 | 22.58 | 22.31 |
| | 4TXslots | 21.40 | 23.54 | 21.23 |

| GSM1900 | | Conducted Power (dBm) | | |
|---|---|---|---|---|
| | | CH512 | CH661 | CH810 |
| | | 1850.2MHz | 1880.0MHz | 1909.8MHz |
| GSM | | 30.80 | 30.82 | 30.81 |
| GPRS (GMSK) | 1TXslot | 21.01 | 21.58 | 21.16 |
| | 2TXslots | 20.27 | 20.89 | 20.50 |
| | 3TXslots | 18.59 | 19.21 | 18.82 |
| | 4TXslots | 17.61 | 18.24 | 17.74 |
| EGPRS (8PSK) | 1TXslot | 18.16 | 18.30 | 17.72 |
| | 2TXslots | 17.04 | 17.29 | 16.76 |
| | 3TXslots | 14.61 | 14.95 | 14.41 |
| | 4TXslots | 13.47 | 13.73 | 13.18 |

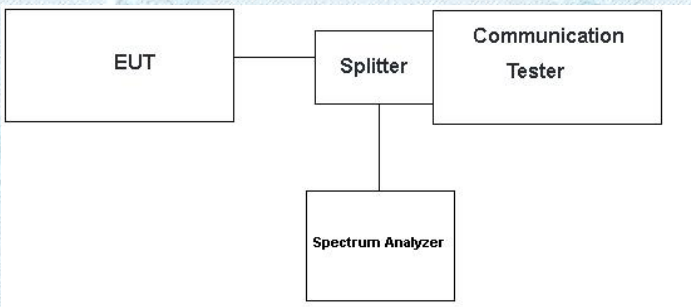
## 3.2. Peak-to-Average Ratio

**LIMIT:**

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13dB.

**TEST CONFIGURATION**

- For Peak-to-Average Ratio




**TEST PROCEDURE**

- For Peak-to-Average Ratio

1. The testing follows FCC KDB 971168 v02r02 Section 5.7.1.
2. The EUT was connected to spectrum and communication tester via a splitter
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

5.ATT:40dB ,Offset:7.06dB for GSM850,ATT:40dB ,Offset:7.30dB for PCS1900

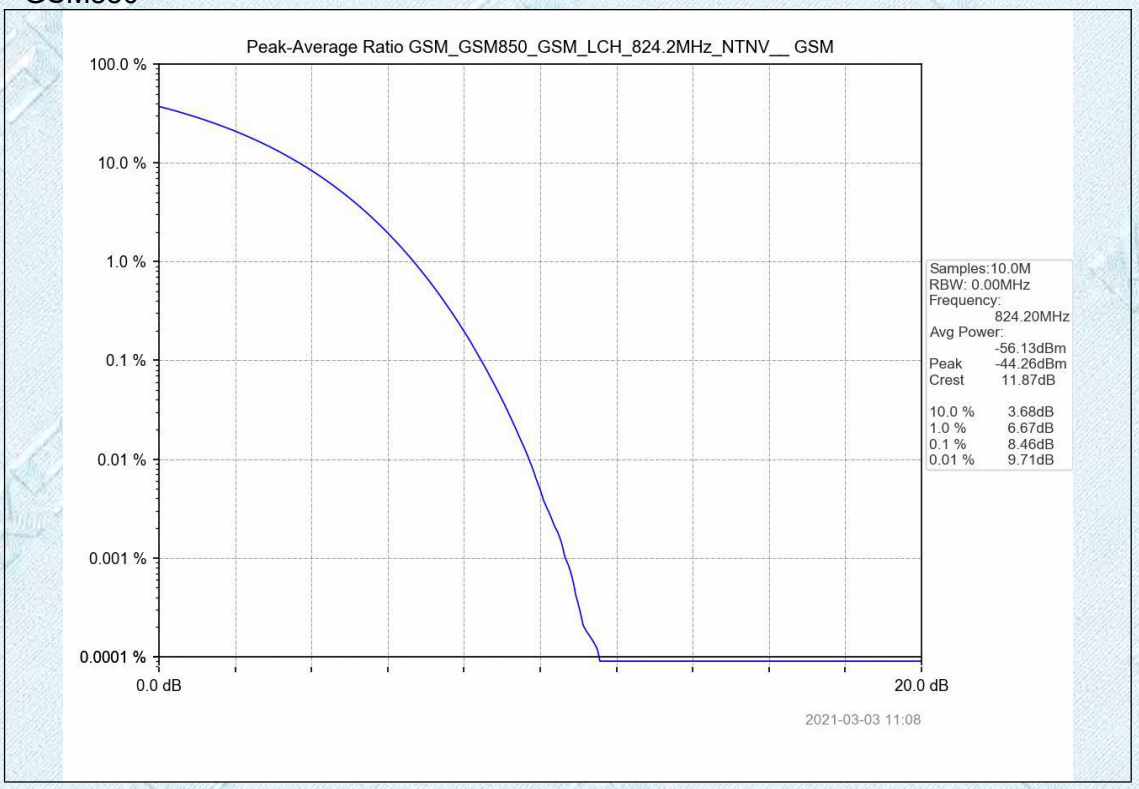
6.Record the deviation as Peak to Average Ratio.

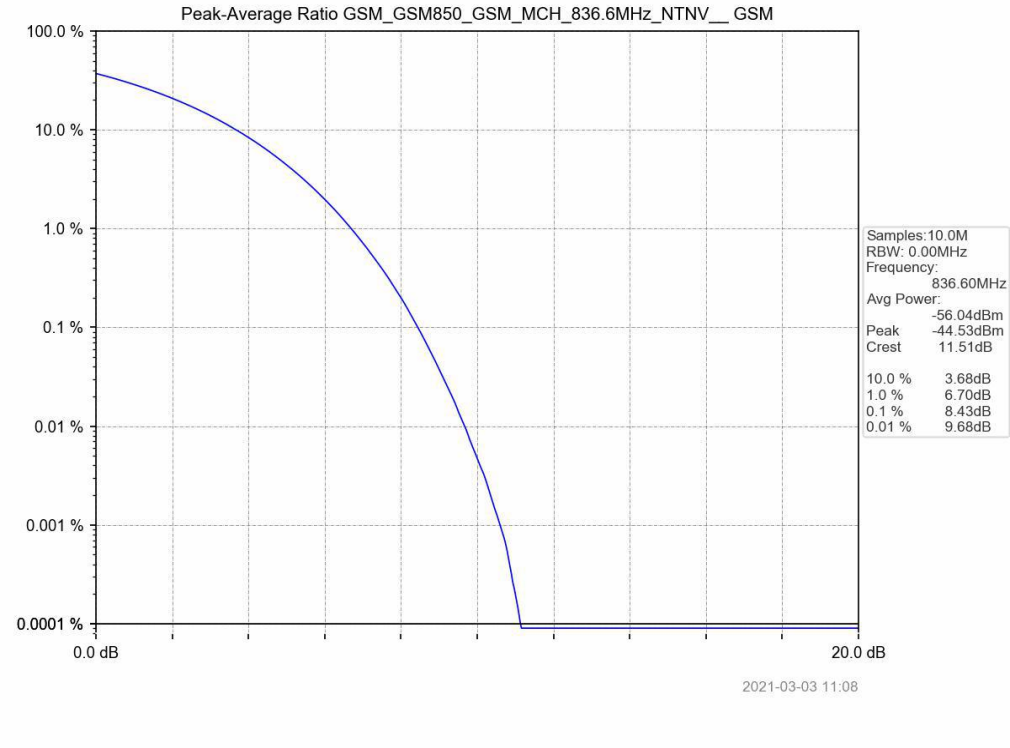
**TEST RESULTS**

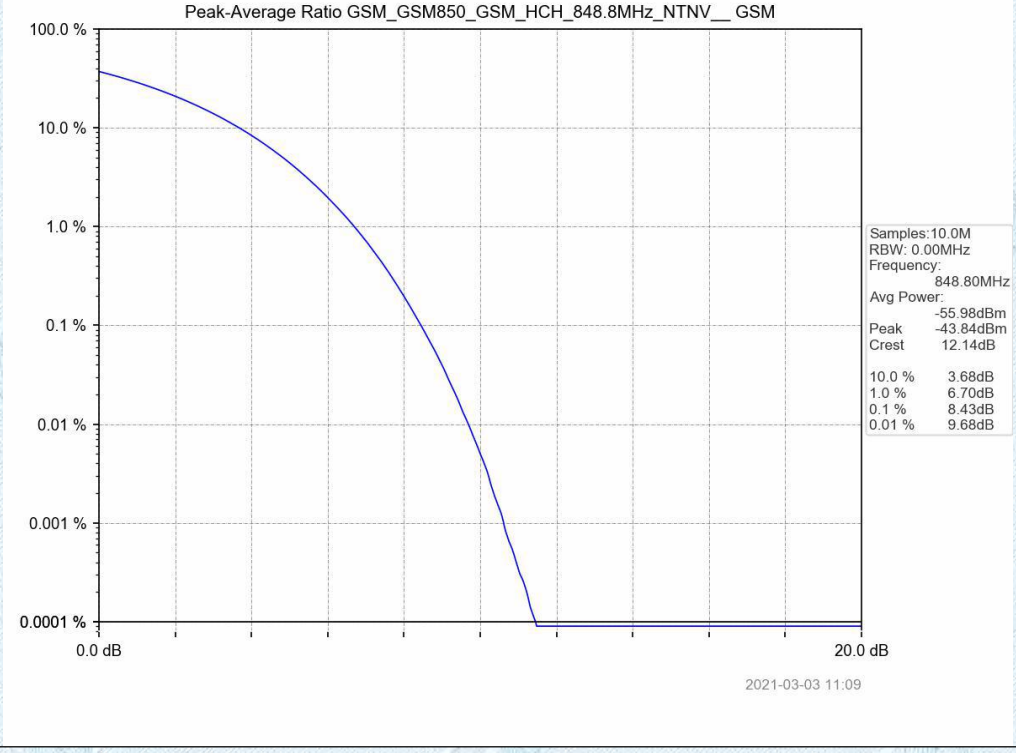
| EUT Mode | Channel | Frequency (MHz) | Peak-to-Average Ratio(dB) | Limit (dB) | Result |
|---|---|---|---|---|---|
| GSM 850 | 128 | 824.20 | 8.46 | 13 | PASS |
| | 190 | 836.60 | 8.43 | 13 | |
| | 251 | 848.80 | 8.43 | 13 | |
| GSM 850 GPRS | 128 | 824.20 | 8.46 | 13 | |
| | 190 | 836.60 | 8.43 | 13 | |
| | 251 | 848.80 | 8.46 | 13 | |
| GSM 850 EGPRS | 128 | 824.20 | 8.43 | 13 | |
| | 190 | 836.60 | 8.43 | 13 | |
| | 251 | 848.80 | 8.46 | 13 | |
| PCS 1900 | 512 | 1850.20 | 8.46 | 13 | |
| | 661 | 1880.00 | 8.46 | 13 | |
| | 810 | 1909.80 | 8.46 | 13 | |
| PCS 1900 GPRS | 512 | 1850.20 | 3.71 | 13 | |
| | 661 | 1880.00 | 3.57 | 13 | |
| | 810 | 1909.80 | 3.68 | 13 | |
| PCS 1900 EGPRS | 512 | 1850.20 | 6.99 | 13 | |
| | 661 | 1880.00 | 6.99 | 13 | |
| | 810 | 1909.80 | 7.01 | 13 | |

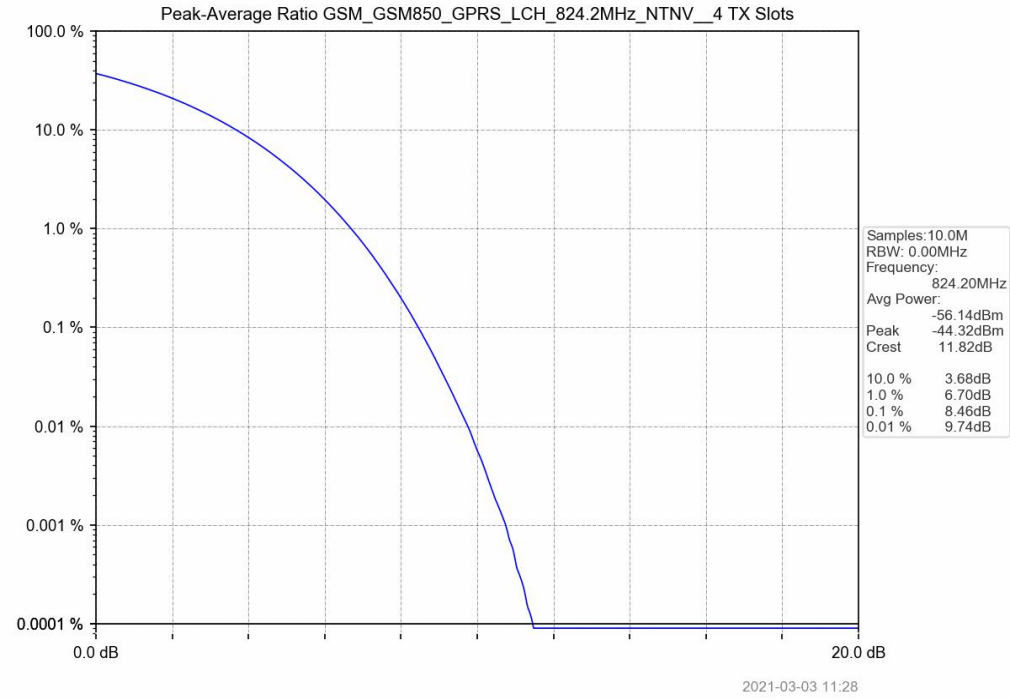
Test Graph

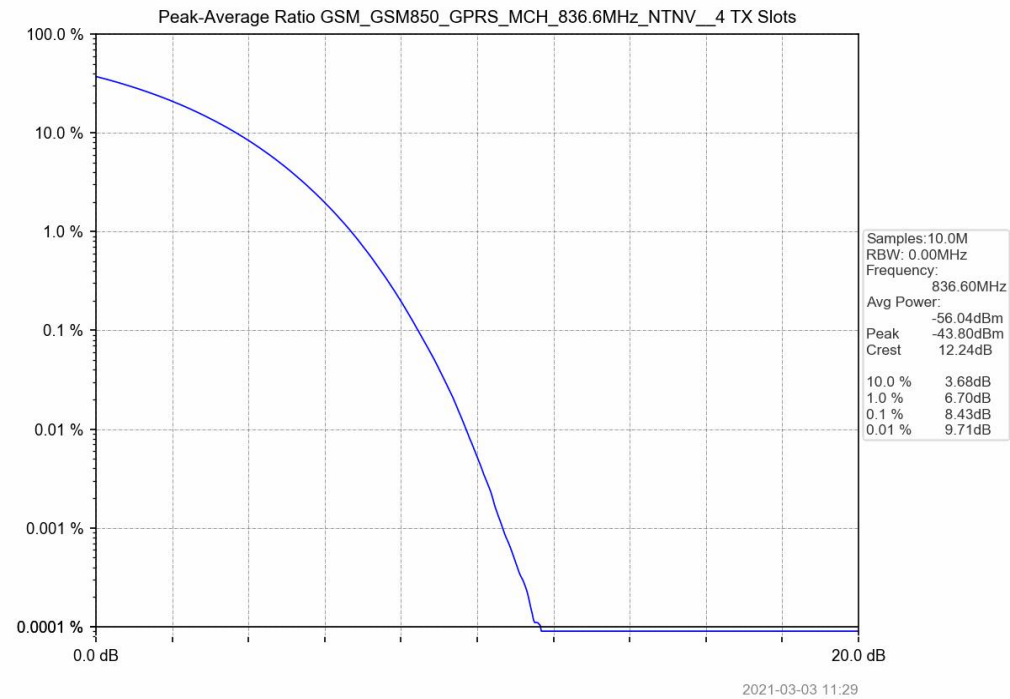
GSM850

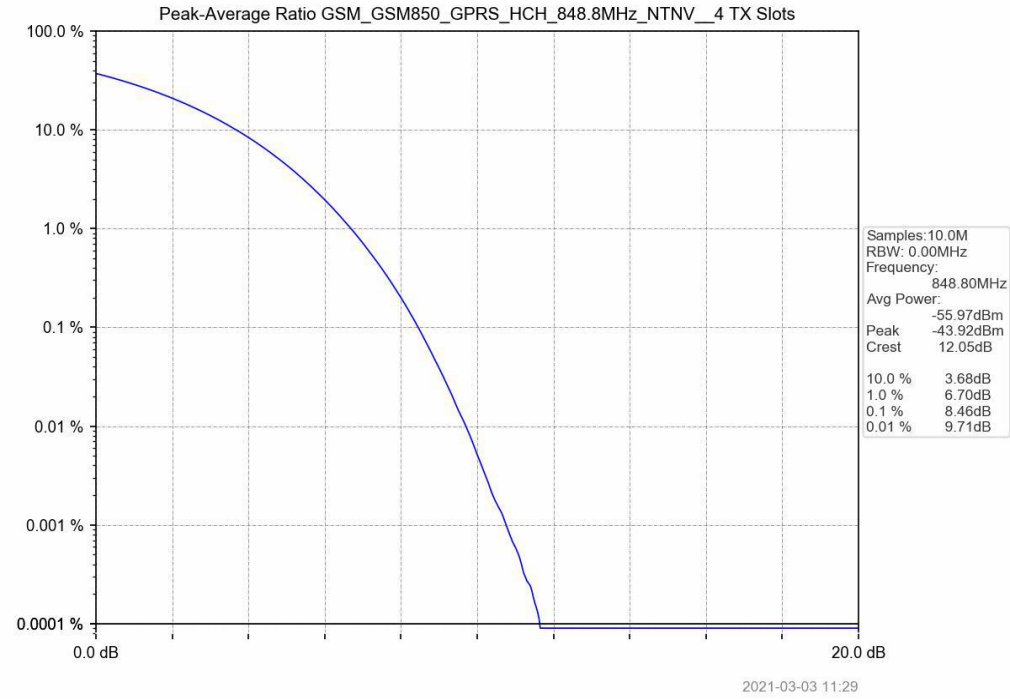


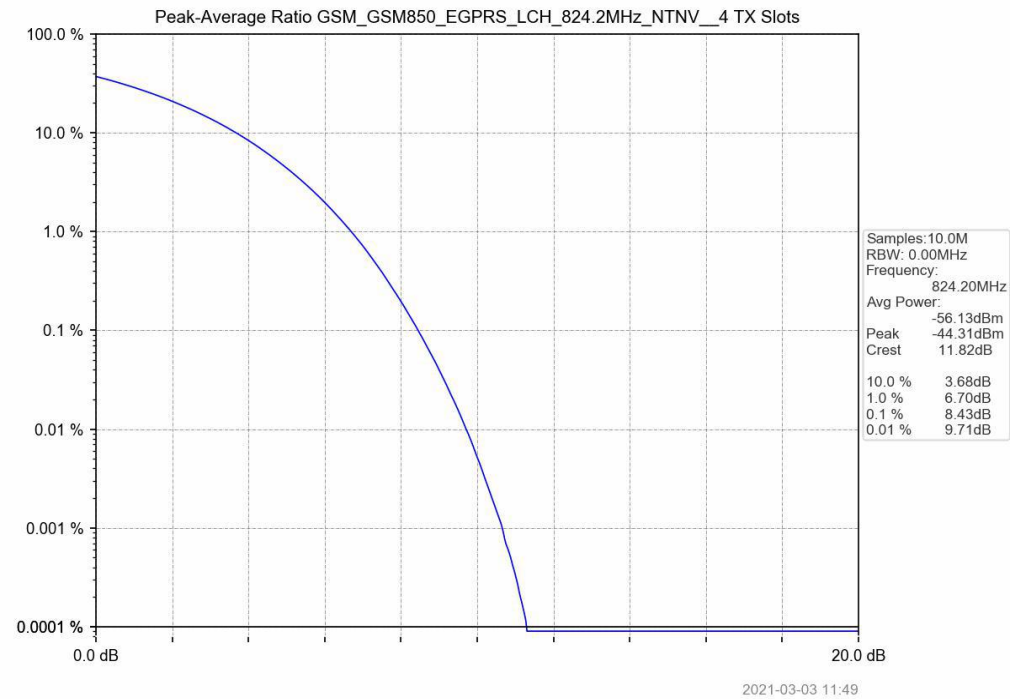

Peak-Average Ratio GSM_GSM850_GSM_MCH_836.6MHz_NTNV__ GSM
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
836.60MHz
Avg Power:
-56.04dBm
Peak -44.53dBm
Crest 11.51dB
10.0 % 3.68dB
1.0 % 6.70dB
0.1 % 8.43dB
0.01 % 9.68dB
2021-03-03 11:08

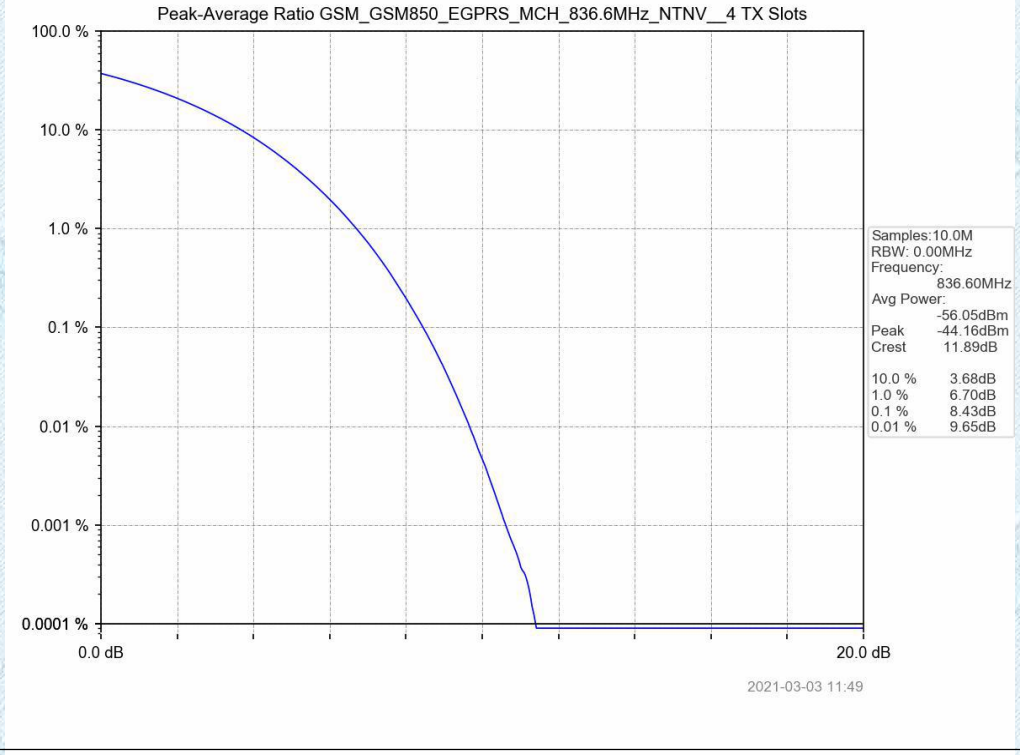

Peak-Average Ratio GSM_GSM850_GSM_HCH_848.8MHz_NTNV__ GSM
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
848.80MHz
Avg Power:
-55.98dBm
Peak -43.84dBm
Crest 12.14dB
10.0 % 3.68dB
1.0 % 6.70dB
0.1 % 8.43dB
0.01 % 9.68dB
2021-03-03 11:09

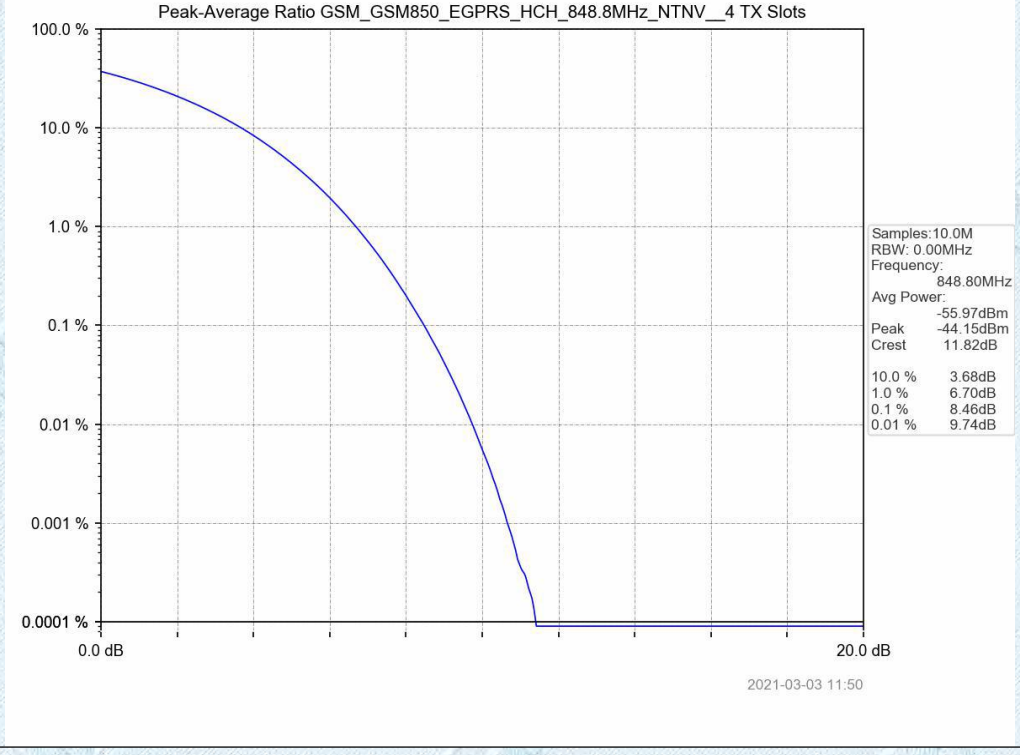

Peak-Average Ratio GSM_GSM850_GPRS_LCH_824.2MHz_NTNV__4 TX Slots
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
824.20MHz
Avg Power:
-56.14dBm
Peak -44.32dBm
Crest 11.82dB
10.0 % 3.68dB
1.0 % 6.70dB
0.1 % 8.46dB
0.01 % 9.74dB
2021-03-03 11:28


Peak-Average Ratio GSM_GSM850_GPRS_MCH_836.6MHz_NTNV__4 TX Slots
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
836.60MHz
Avg Power:
-56.04dBm
Peak -43.80dBm
Crest 12.24dB
10.0 % 3.68dB
1.0 % 6.70dB
0.1 % 8.43dB
0.01 % 9.71dB
2021-03-03 11:29

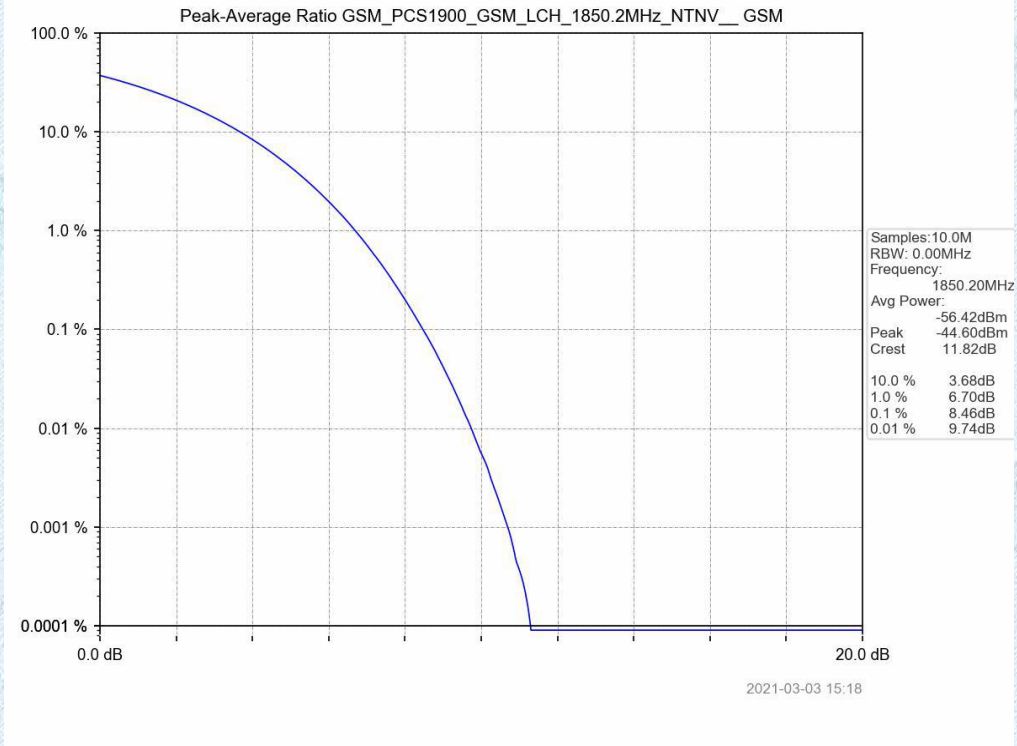

Peak-Average Ratio GSM_GSM850_GPRS_HCH_848.8MHz_NTNV__4 TX Slots
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
848.80MHz
Avg Power:
-55.97dBm
Peak -43.92dBm
Crest 12.05dB
10.0 % 3.68dB
1.0 % 6.70dB
0.1 % 8.46dB
0.01 % 9.71dB
2021-03-03 11:29

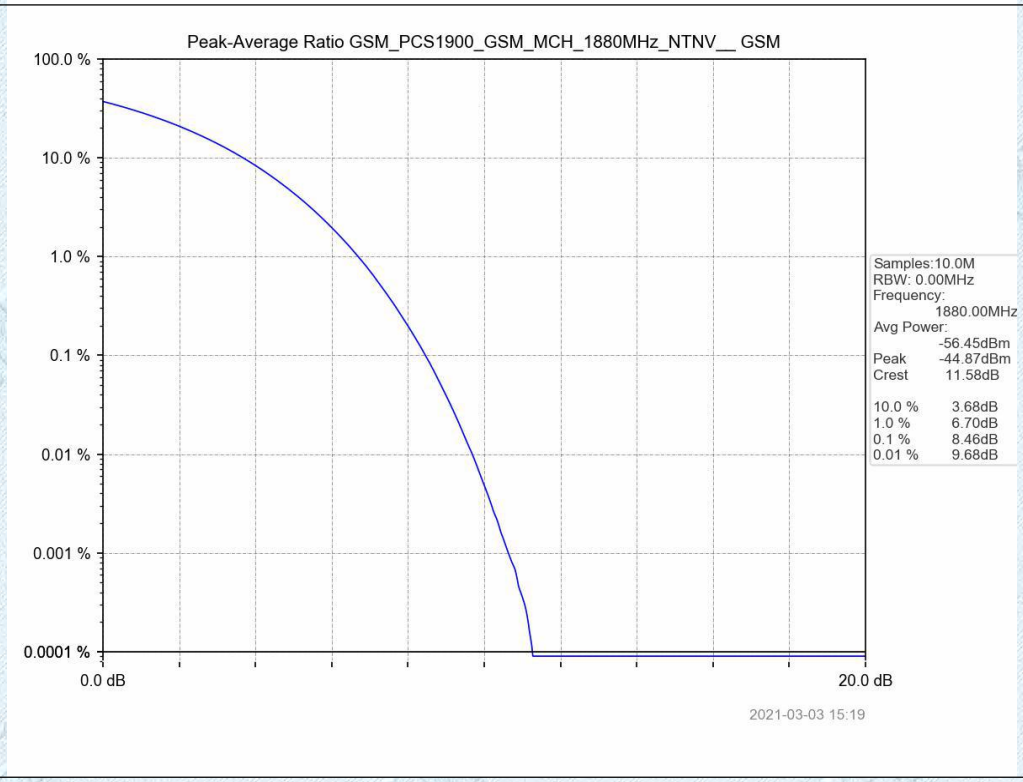

Peak-Average Ratio GSM_GSM850_EGPRS_LCH_824.2MHz_NTNV__4 TX Slots
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
824.20MHz
Avg Power:
-56.13dBm
Peak -44.31dBm
Crest 11.82dB
10.0 % 3.68dB
1.0 % 6.70dB
0.1 % 8.43dB
0.01 % 9.71dB
2021-03-03 11:49

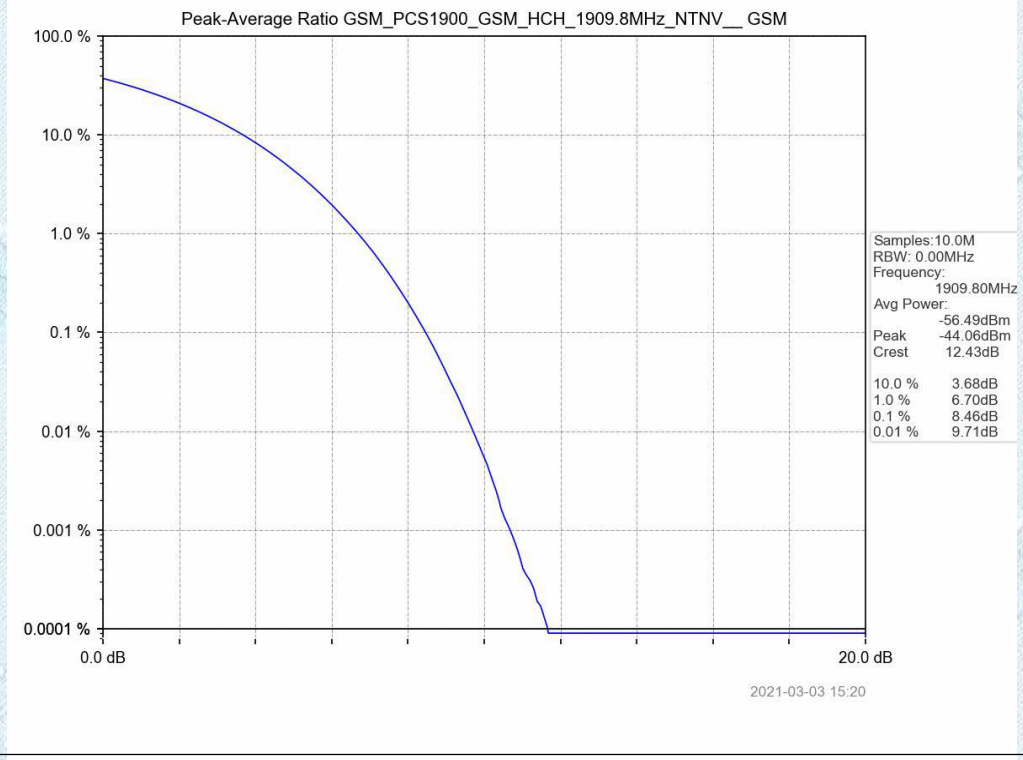

Peak-Average Ratio GSM_GSM850_EGPRS_MCH_836.6MHz_NTNV__4 TX Slots
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
836.60MHz
Avg Power:
-56.05dBm
Peak -44.16dBm
Crest 11.89dB
10.0 % 3.68dB
1.0 % 6.70dB
0.1 % 8.43dB
0.01 % 9.65dB
2021-03-03 11:49

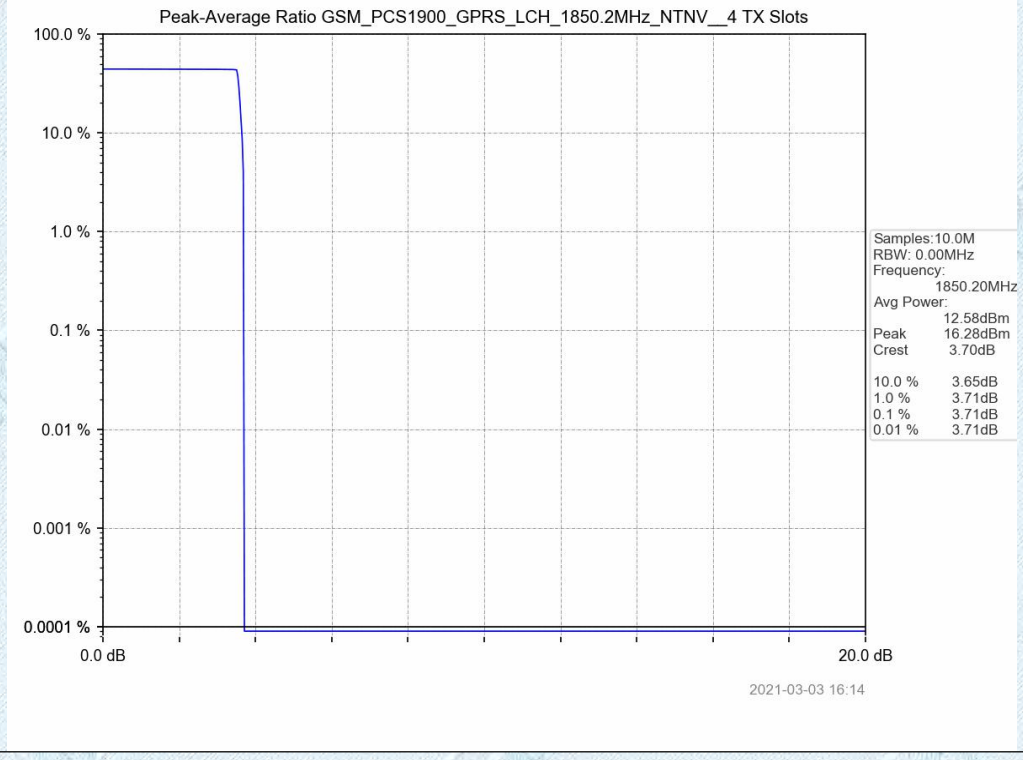

Peak-Average Ratio GSM_GSM850_EGPRS_HCH_848.8MHz_NTNV__4 TX Slots
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
848.80MHz
Avg Power:
-55.97dBm
Peak -44.15dBm
Crest 11.82dB
10.0 % 3.68dB
1.0 % 6.70dB
0.1 % 8.46dB
0.01 % 9.74dB
2021-03-03 11:50

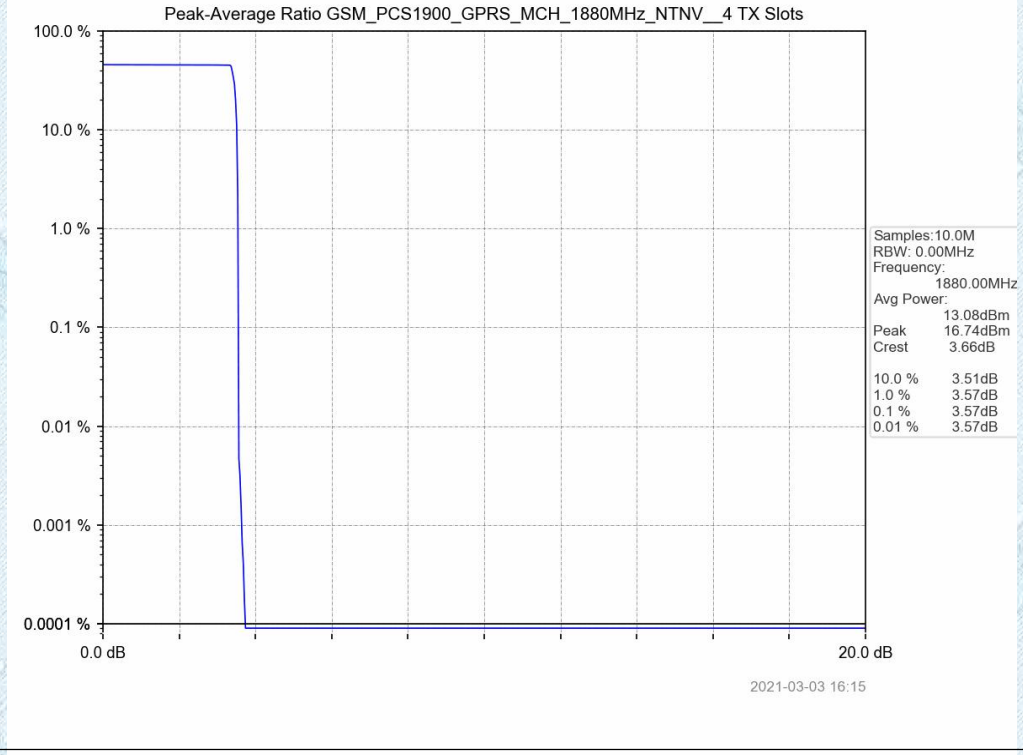
PCS 1900

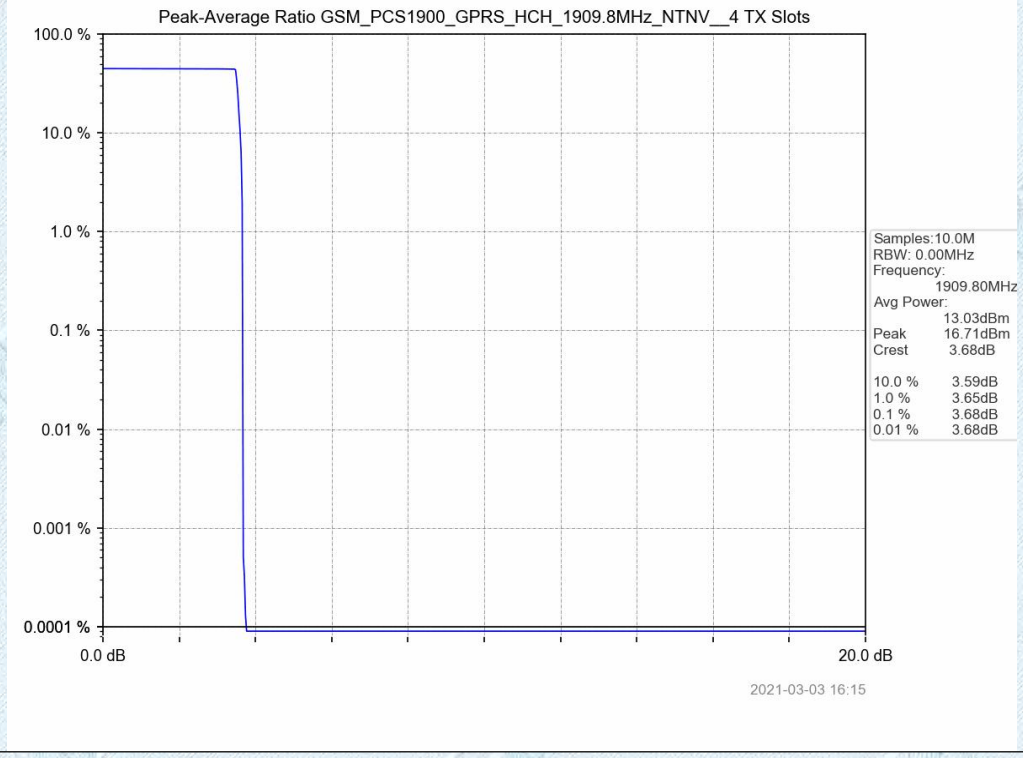

Peak-Average Ratio GSM_PCS1900_GSM_LCH_1850.2MHz_NTNV__ GSM
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
1850.20MHz
Avg Power:
-56.42dBm
Peak -44.60dBm
Crest 11.82dB
10.0 % 3.68dB
1.0 % 6.70dB
0.1 % 8.46dB
0.01 % 9.74dB
2021-03-03 15:18

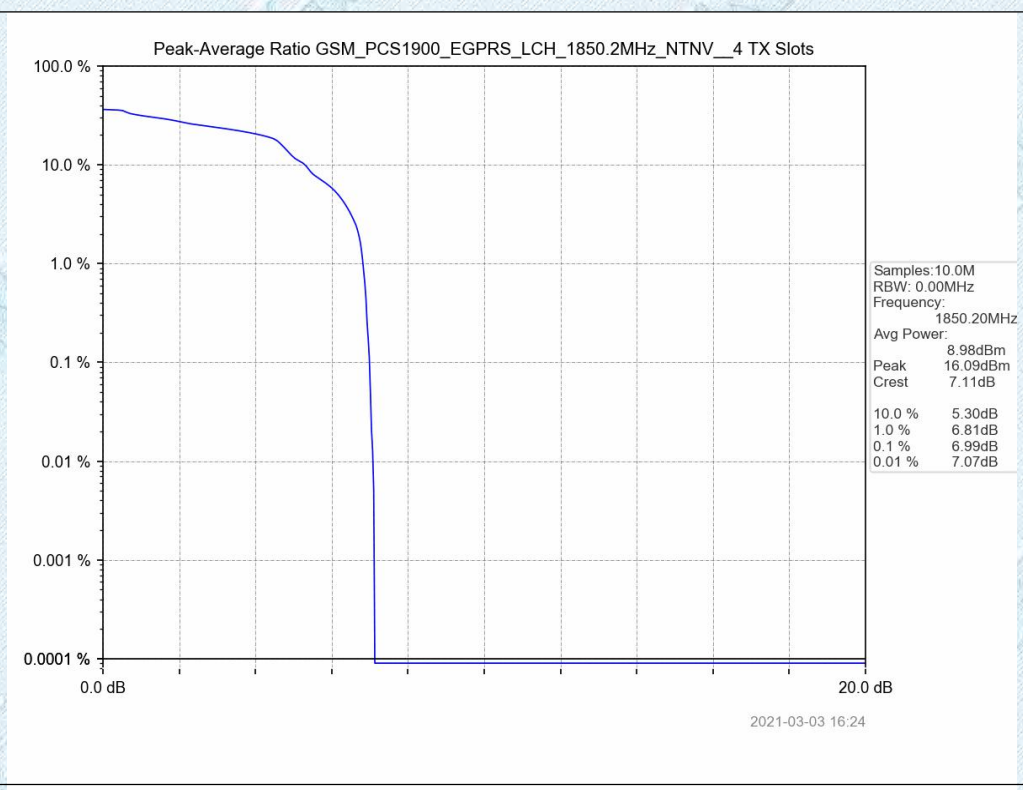

Peak-Average Ratio GSM_PCS1900_GSM_MCH_1880MHz_NTNV__ GSM
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
1880.00MHz
Avg Power:
-56.45dBm
Peak -44.87dBm
Crest 11.58dB
10.0 % 3.68dB
1.0 % 6.70dB
0.1 % 8.46dB
0.01 % 9.68dB
2021-03-03 15:19

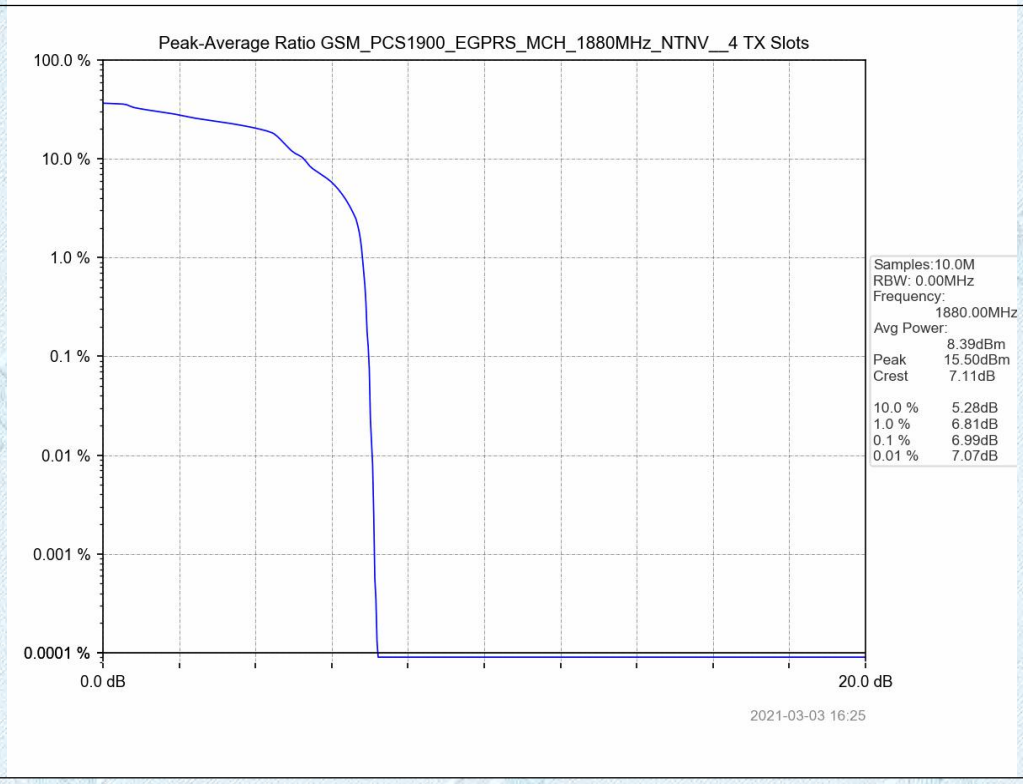

Peak-Average Ratio GSM_PCS1900_GSM_HCH_1909.8MHz_NTNV__ GSM
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
1909.80MHz
Avg Power:
-56.49dBm
Peak -44.06dBm
Crest 12.43dB
10.0 % 3.68dB
1.0 % 6.70dB
0.1 % 8.46dB
0.01 % 9.71dB
2021-03-03 15:20

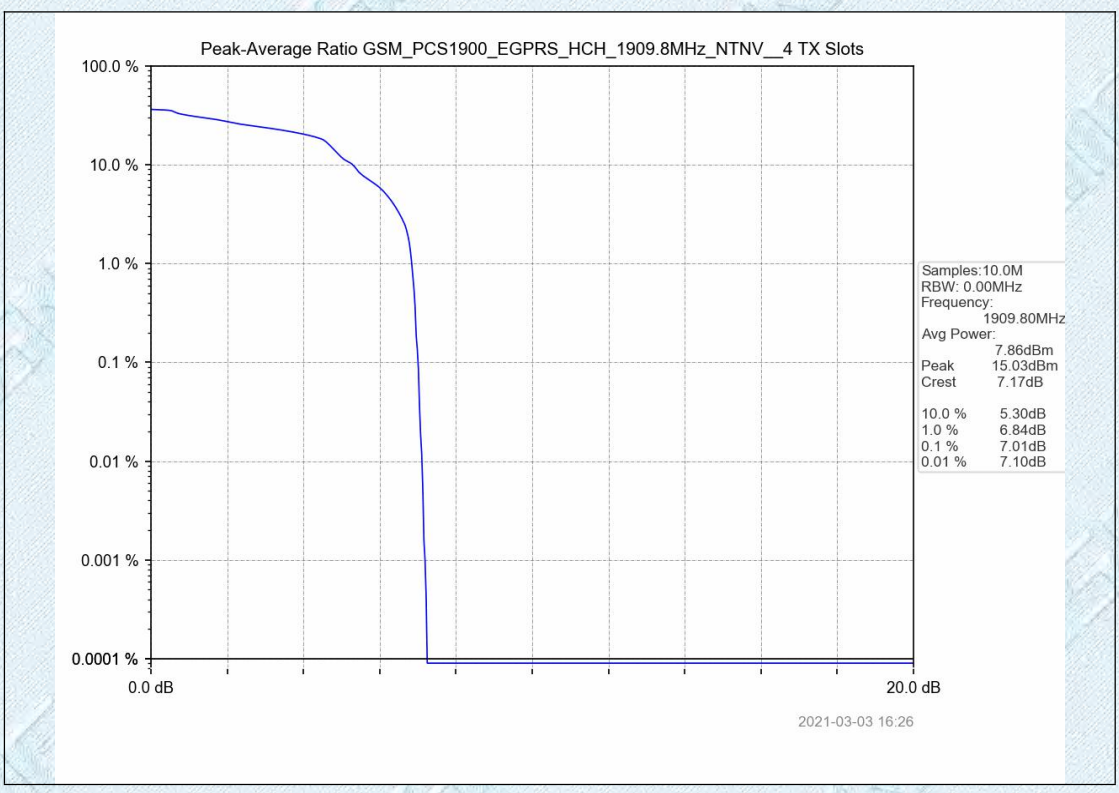

Peak-Average Ratio GSM_PCS1900_GPRS_LCH_1850.2MHz_NTNV__4 TX Slots
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
1850.20MHz
Avg Power:
12.58dBm
Peak 16.28dBm
Crest 3.70dB
10.0 % 3.65dB
1.0 % 3.71dB
0.1 % 3.71dB
0.01 % 3.71dB
2021-03-03 16:14


Peak-Average Ratio GSM_PCS1900_GPRS_MCH_1880MHz_NTNV__4 TX Slots
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
1880.00MHz
Avg Power:
13.08dBm
Peak 16.74dBm
Crest 3.66dB
10.0 % 3.51dB
1.0 % 3.57dB
0.1 % 3.57dB
0.01 % 3.57dB
2021-03-03 16:15


Peak-Average Ratio GSM_PCS1900_GPRS_HCH_1909.8MHz_NTNV__4 TX Slots
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
1909.80MHz
Avg Power:
13.03dBm
Peak 16.71dBm
Crest 3.68dB
10.0 % 3.59dB
1.0 % 3.65dB
0.1 % 3.68dB
0.01 % 3.68dB
2021-03-03 16:15

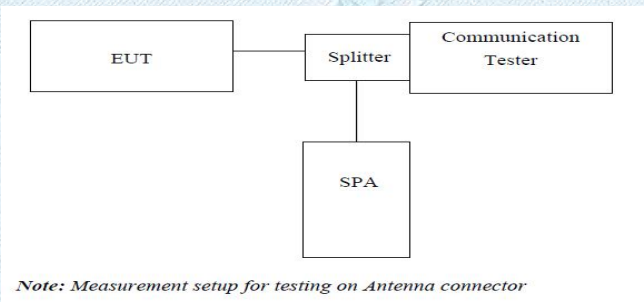

Peak-Average Ratio GSM_PCS1900_EGPRS_LCH_1850.2MHz_NTNV__4 TX Slots
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
1850.20MHz
Avg Power:
8.98dBm
Peak 16.09dBm
Crest 7.11dB
10.0 % 5.30dB
1.0 % 6.81dB
0.1 % 6.99dB
0.01 % 7.07dB
2021-03-03 16:24


Peak-Average Ratio GSM_PCS1900_EGPRS_MCH_1880MHz_NTNV__4 TX Slots
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
1880.00MHz
Avg Power:
8.39dBm
Peak 15.50dBm
Crest 7.11dB
10.0 % 5.28dB
1.0 % 6.81dB
0.1 % 6.99dB
0.01 % 7.07dB
2021-03-03 16:25


Peak-Average Ratio GSM_PCS1900_EGPRS_HCH_1909.8MHz_NTNV__4 TX Slots
100.0 %
10.0 %
1.0 %
0.1 %
0.01 %
0.001 %
0.0001 %
0.0 dB
20.0 dB
Samples:10.0M
RBW: 0.00MHz
Frequency:
1909.80MHz
Avg Power:
7.86dBm
Peak 15.03dBm
Crest 7.17dB
10.0 % 5.30dB
1.0 % 6.84dB
0.1 % 7.01dB
0.01 % 7.10dB
2021-03-03 16:26

## 3.3. Occupy Bandwidth

**TEST CONFIGURATION**




*Note: Measurement setup for testing on Antenna connector*

**TEST PROCEDURE**

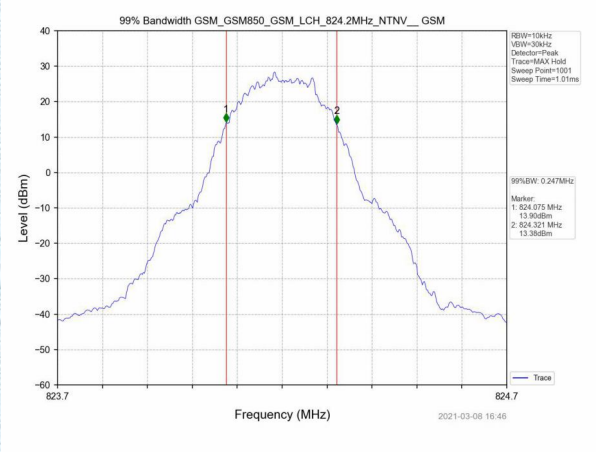
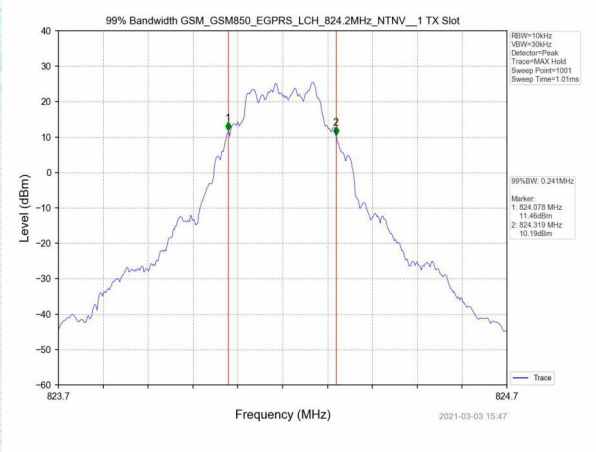
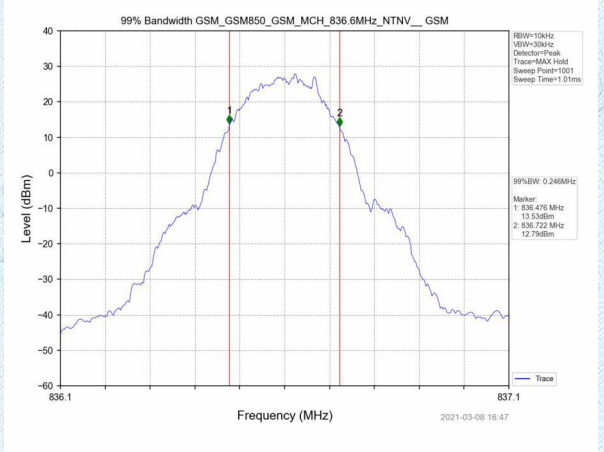
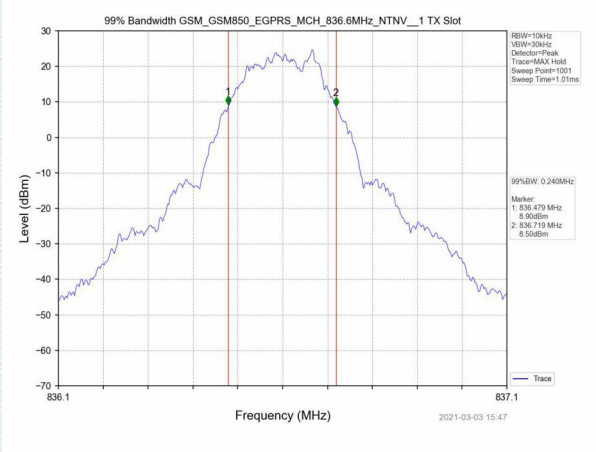
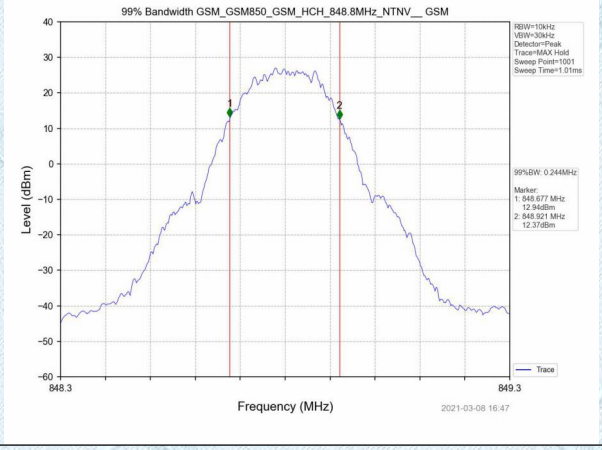
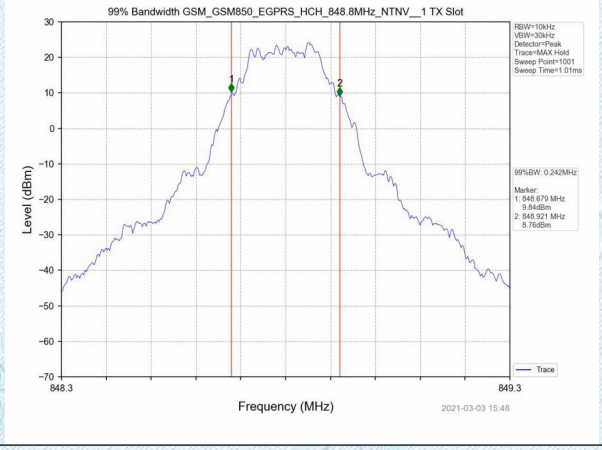
1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer
2. RBW was set to about 1% of emission BW, VBW⩾3 times RBW.
3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.
4. ATT:40dB ,Offset:7.06dB for GSM850,ATT:40dB ,Offset:7.30dB for PCS1900

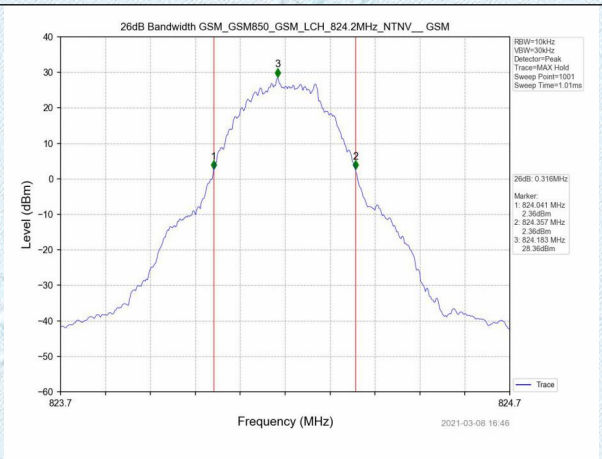
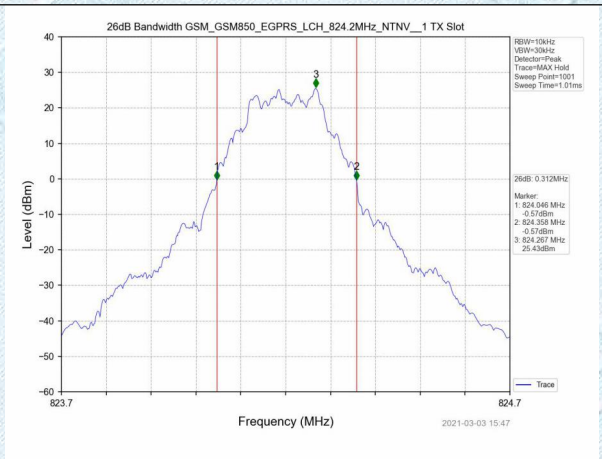
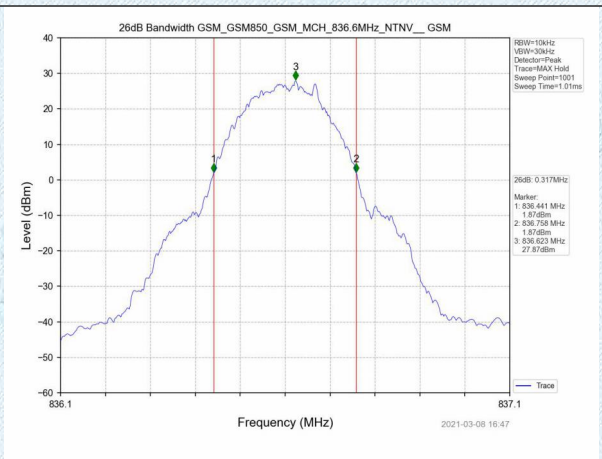
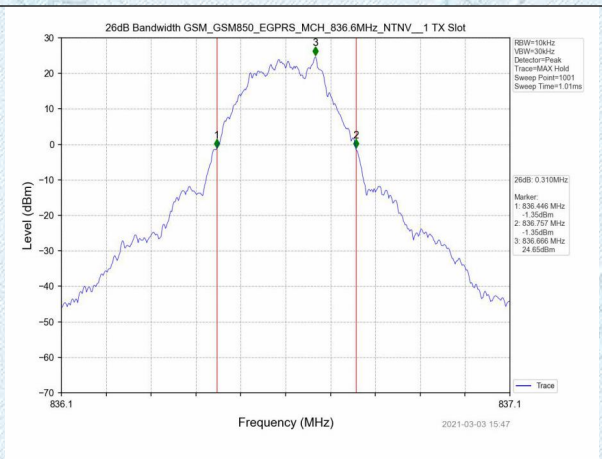
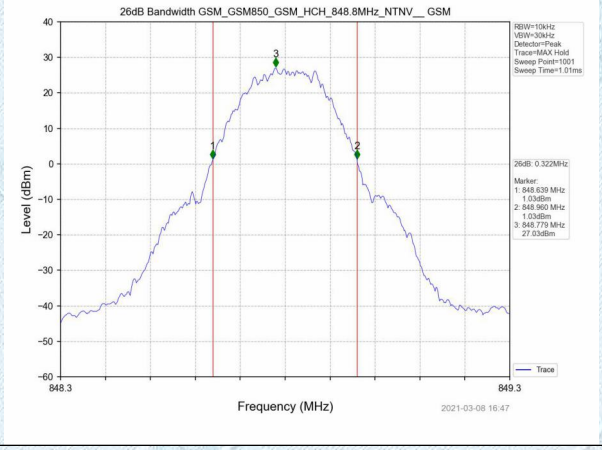
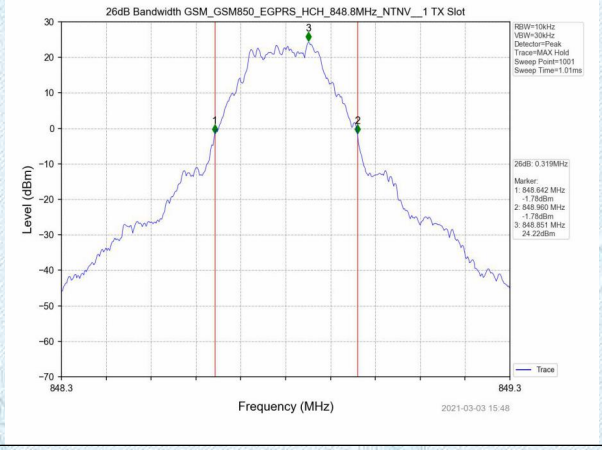
**TEST RESULTS**

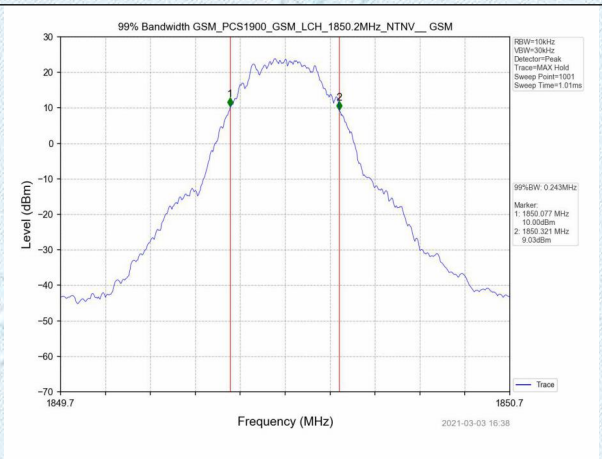
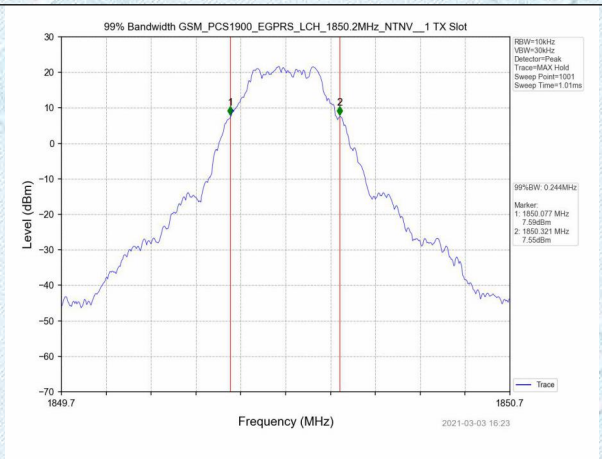
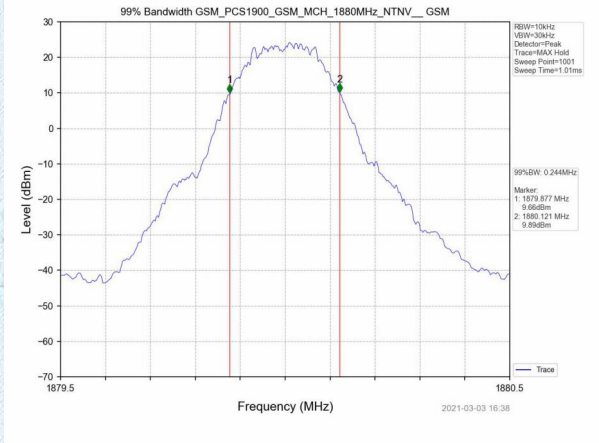
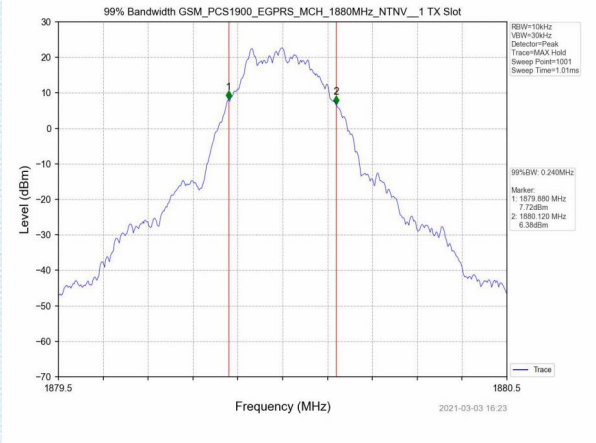
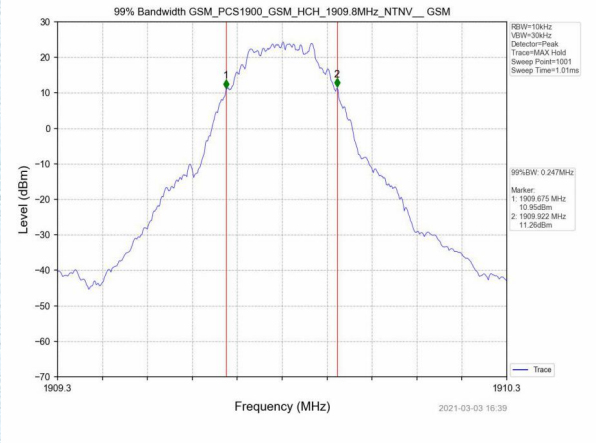
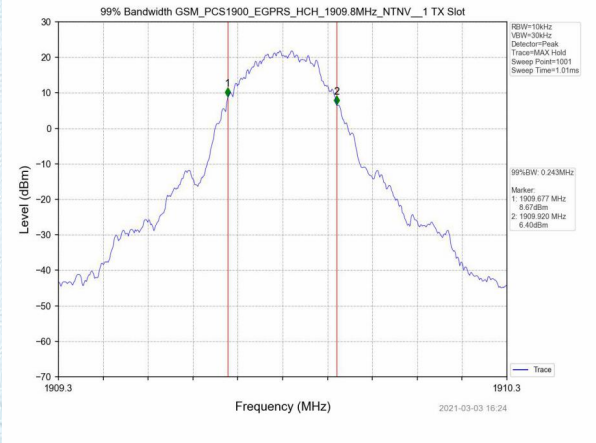
| EUT Mode | Channel | Frequency (MHz) | 99% Occupy bandwidth (MHz) | -26dB bandwidth (MHz) |
|---|---|---|---|---|
| GSM 850 | 128 | 824.20 | 0.247 | 0.316 |
| | 190 | 836.60 | 0.246 | 0.317 |
| | 251 | 848.80 | 0.244 | 0.322 |
| EGPRS850 (8PSK,1Slot) | 128 | 824.20 | 0.241 | 0.312 |
| | 190 | 836.60 | 0.240 | 0.310 |
| | 251 | 848.80 | 0.242 | 0.319 |
| PCS1900 | 512 | 1850.20 | 0.243 | 0.322 |
| | 661 | 1880.00 | 0.244 | 0.321 |
| | 810 | 1909.80 | 0.247 | 0.318 |
| EGPRS1900 (8PSK,1Slot) | 512 | 1850.20 | 0.244 | 0.321 |
| | 661 | 1880.00 | 0.240 | 0.312 |
| | 810 | 1909.80 | 0.243 | 0.319 |

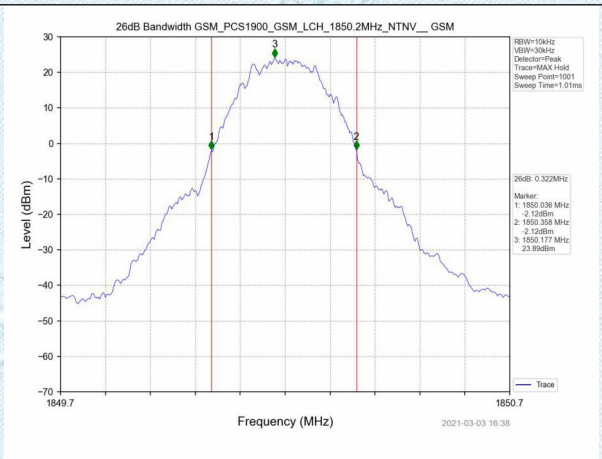
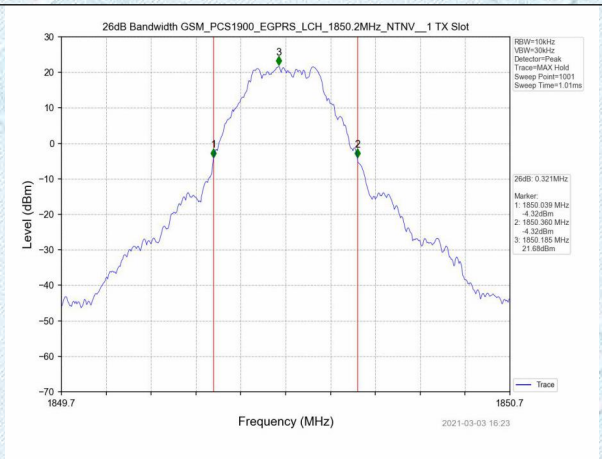
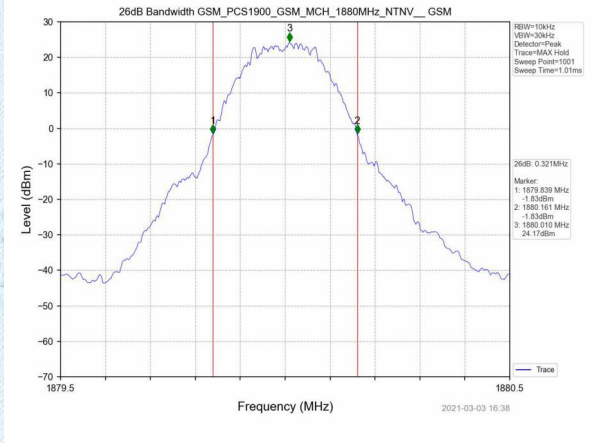
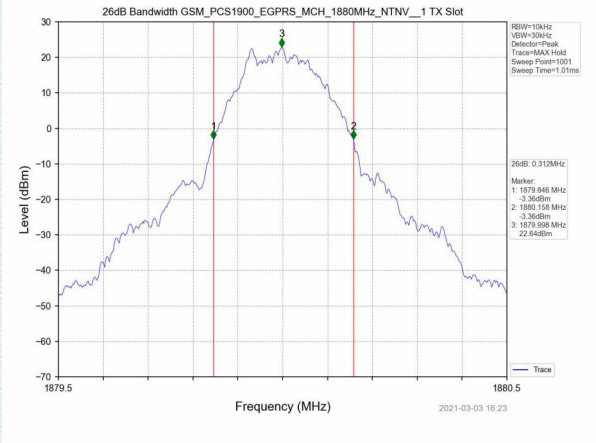
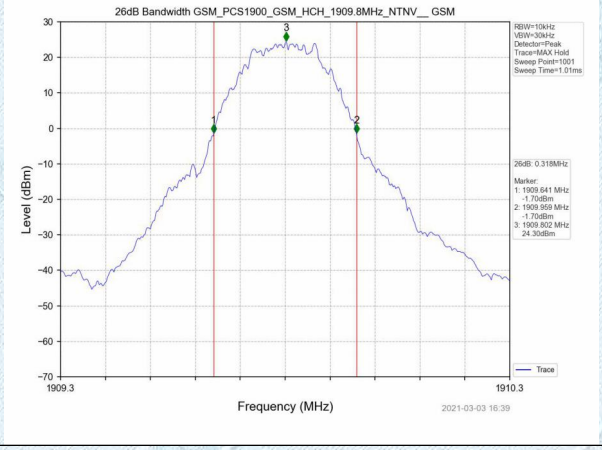
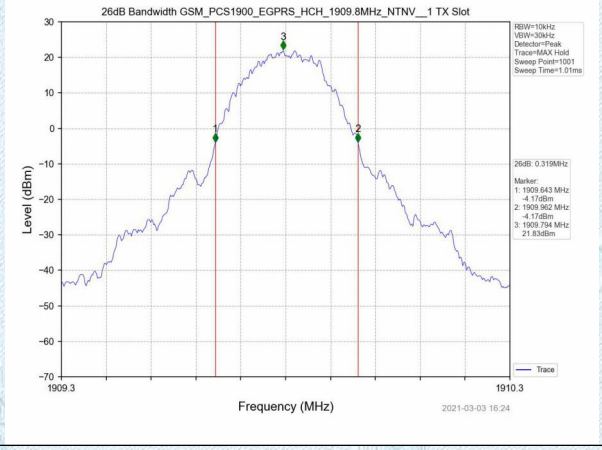
Note: GSM&GPRS use the same modulation technical (GMSK), and with the same channels, so the 99% OBW and the -26dB of GPRS not performed.

**Test plots as follow:**

| 99% Occupy bandwidth | |
|---|---|
| *GSM 850* | *EGPRS 850* |
|  |  |
| *Lowest channel* | *Lowest channel* |
|  |  |
| *Middle channel* | *Middle channel* |
|  |  |
| *Highest channel* | *Highest channel* |

| -26dB bandwidth | |
|---|---|
| *GSM 850* | *EGPRS 850* |
|  |  |
| *Lowest channel* | *Lowest channel* |
|  |  |
| *Middle channel* | *Middle channel* |
|  |  |
| *Highest channel* | *Highest channel* |

| 99% Occupy bandwidth | |
|---|---|
| *PCS 1900* | *EGPRS 1900* |
|  |  |
| *Lowest channel* | *Lowest channel* |
|  |  |
| *Middle channel* | *Middle channel* |
|  |  |
| *Highest channel* | *Highest channel* |

| -26dB Occupy bandwidth | |
|---|---|
| *PCS 1900* | *EGPRS 1900* |
|  |  |
| *Lowest channel* | *Lowest channel* |
|  |  |
| *Middle channel* | *Middle channel* |
|  |  |
| *Highest channel* | *Highest channel* |

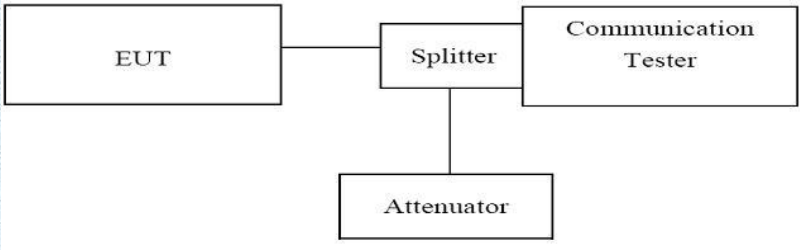
## 3.4. Out of band emission at antenna terminals

**LIMIT**

Part 24.238 and Part 22.917 specify that 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 specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

**TEST CONFIGURATION**

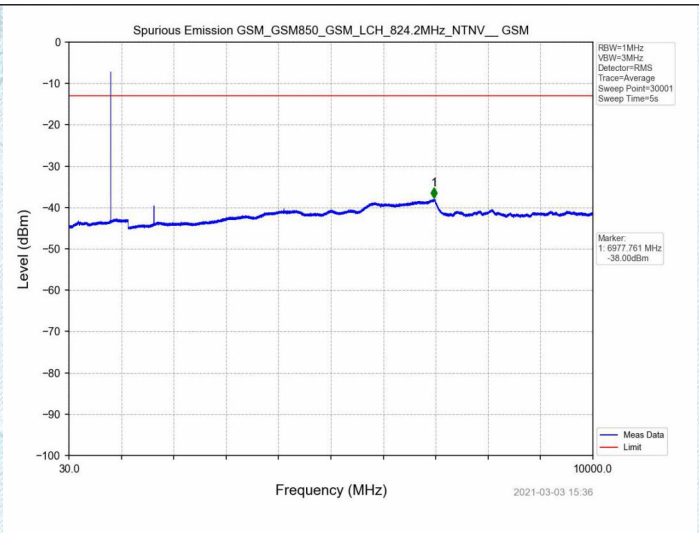
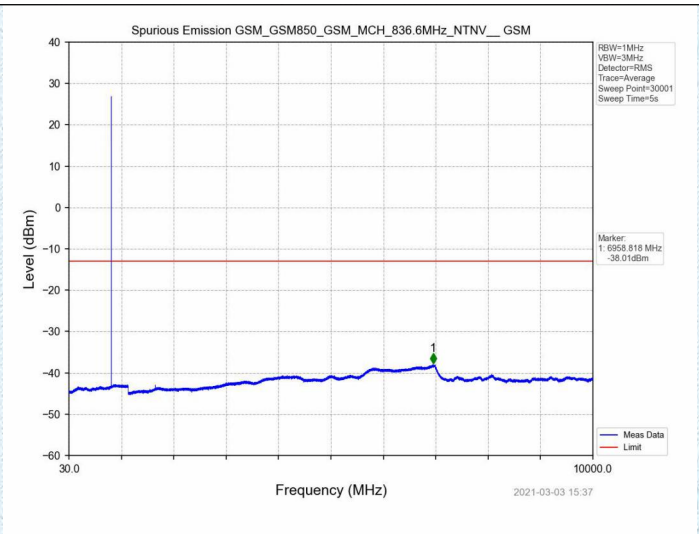
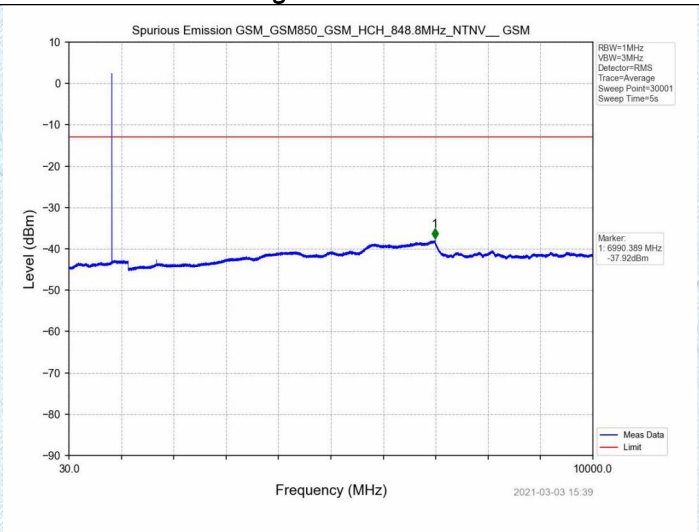


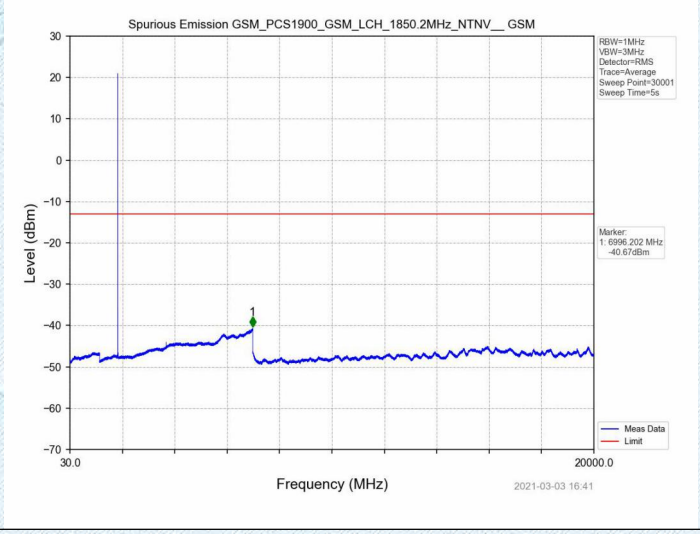
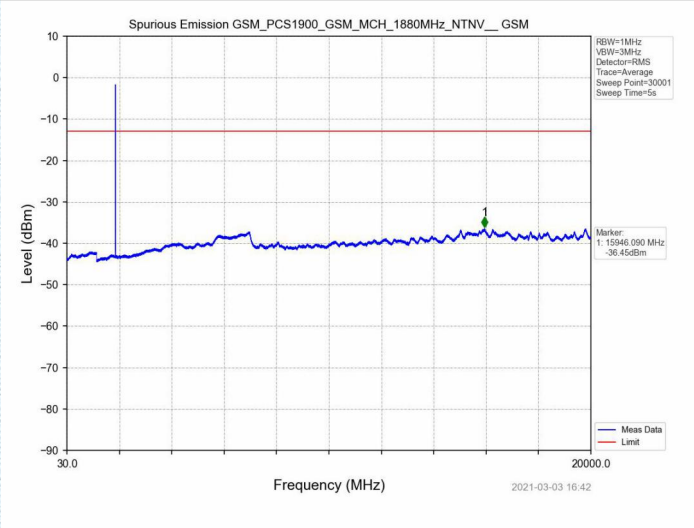
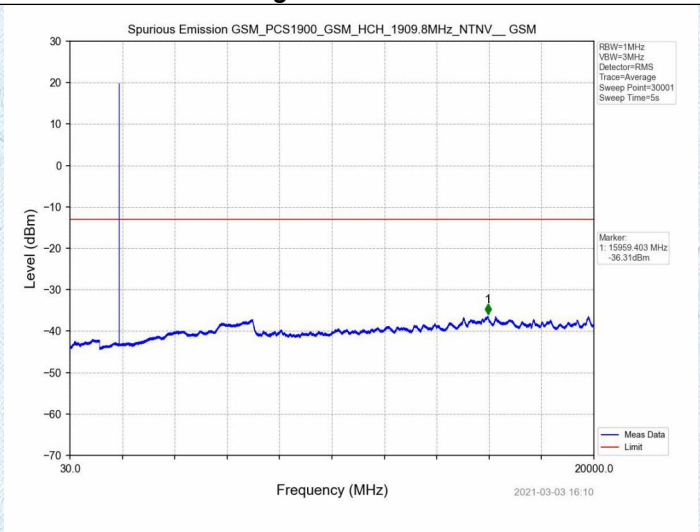

**TEST PROCEDURE**

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. The resolution bandwidth of the spectrum analyzer was set at 1MHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
3. For the out of band: Set the RBW = 1MHz VBW≥3 times RBW, Start=30MHz, Stop= 10th harmonic. ATT:40dB ,Offset:7.06dB for GSM850,ATT:40dB ,Offset:7.30dB for PCS1900

**TEST RESULTS**

Remark: We test all modulation type and record worst case at Voice mode（GSM850/PCS1900）.

| GSM 850 |
|---|
| *Lowest channel* |
|   |
| *30MHz~10GHz* |
| *Middle channel* |
|   |
| *30MHz~10GHz* |
| *Highest channel* |
|   |
| *30MHz~10GHz* |

| ***PCS 1900*** |
|---|
| *Lowest channel* |
|   |
| *30MHz~20GHz* |
| *Middle channel* |
|   |
| *30MHz~20GHz* |
| *Highest channel* |
|   |
| *30MHz~20GHz* |

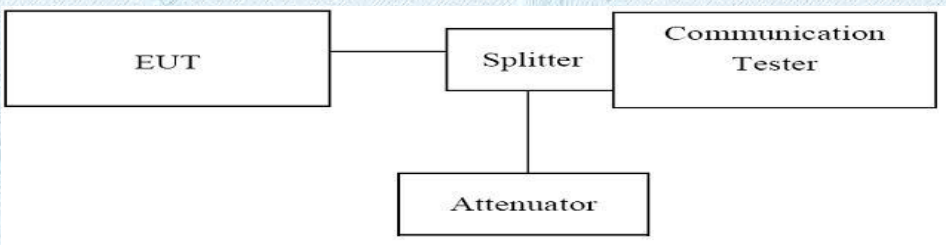
## 3.5. Band Edge compliance

**LIMIT**

Part 24.238 and Part 22.917 specify that 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 specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

**TEST CONFIGURATION**

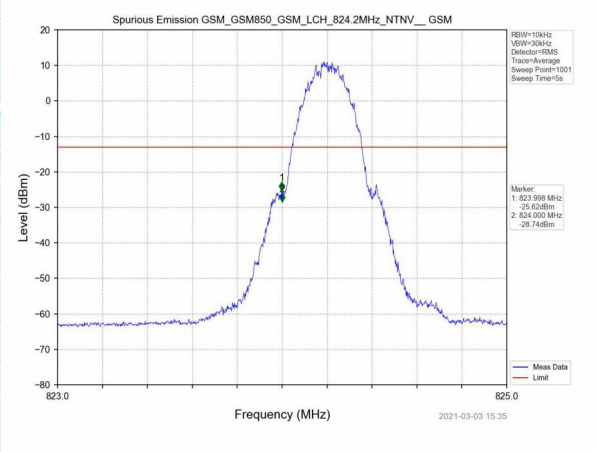


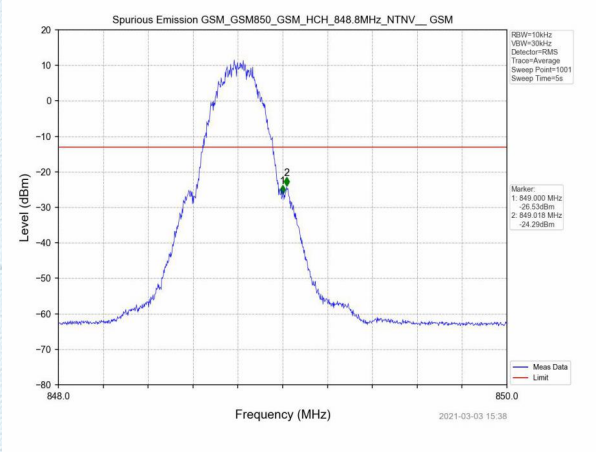

**TEST PROCEDURE**

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. Set the RBW=10KHz, VBW = 30KHz, Sweep time= Auto for 2G system measurement.
3. ATT:40dB ,Offset:7.06dB for GSM850,ATT:40dB ,Offset:7.30dB for PCS1900

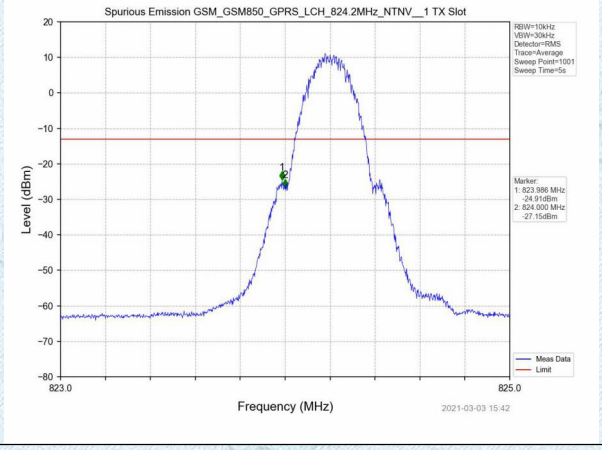
## TEST RESULTS

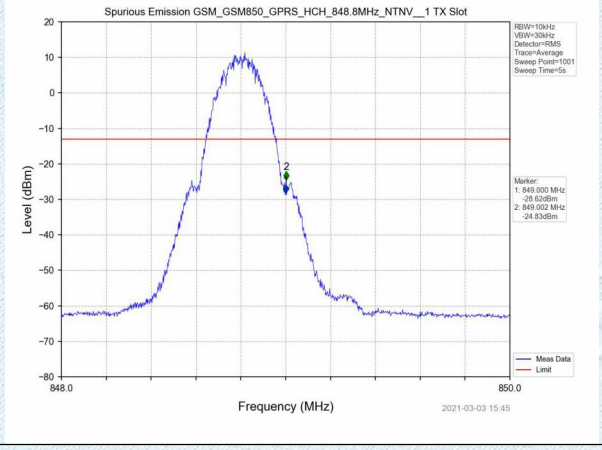
| GSM 850 | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Max Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 128 | 824.20 | 823.998 | -25.62 | -13.00 | Pass |
| 251 | 848.80 | 849.018 | -24.29 | -13.00 | Pass |



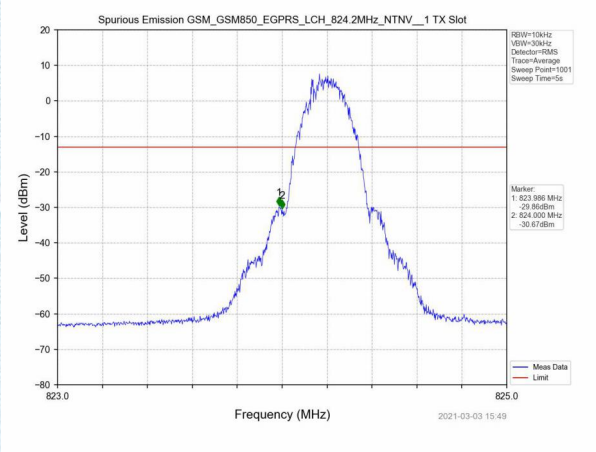



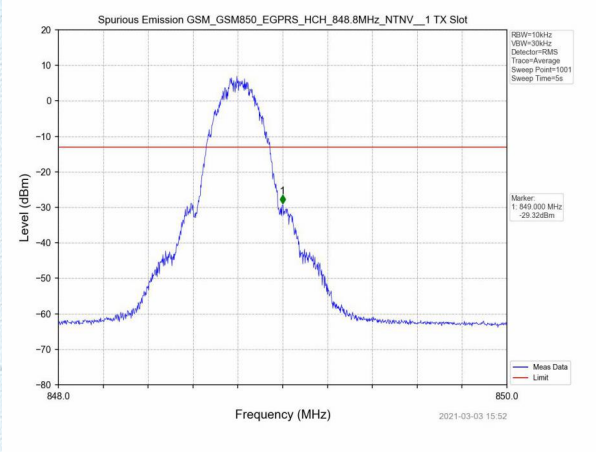

| GPRS 850 | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Max Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 128 | 824.20 | 823.986 | -24.91 | -13.00 | Pass |
| 251 | 848.80 | 849.002 | -24.83 | -13.00 | Pass |



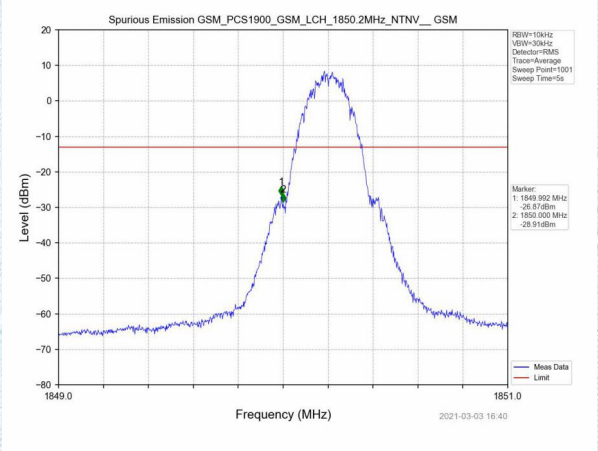



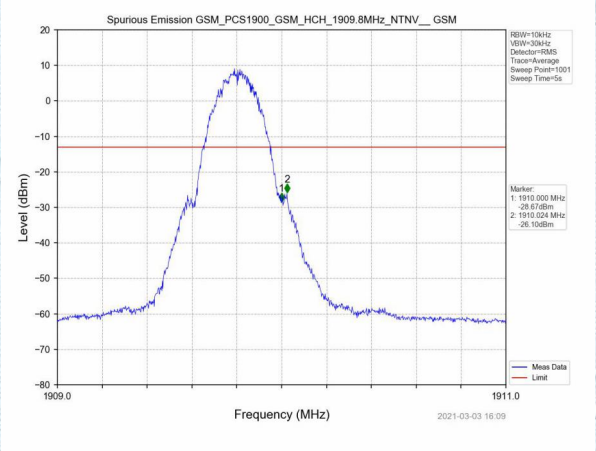
| EGPRS 850 | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 128 | 824.20 | 823.986 | -29.86 | -13.00 | Pass |
| 251 | 848.80 | 849.0 | -29.32 | -13.00 | Pass |



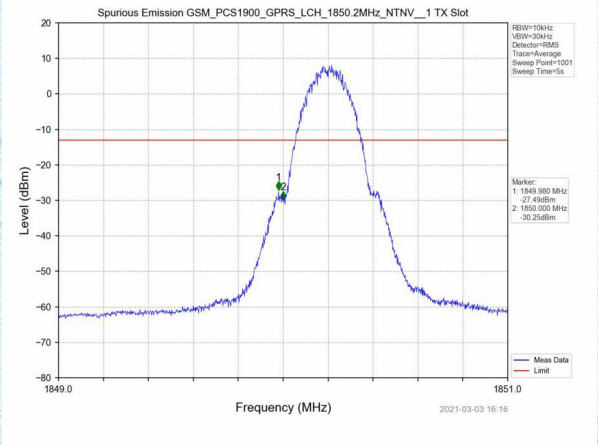



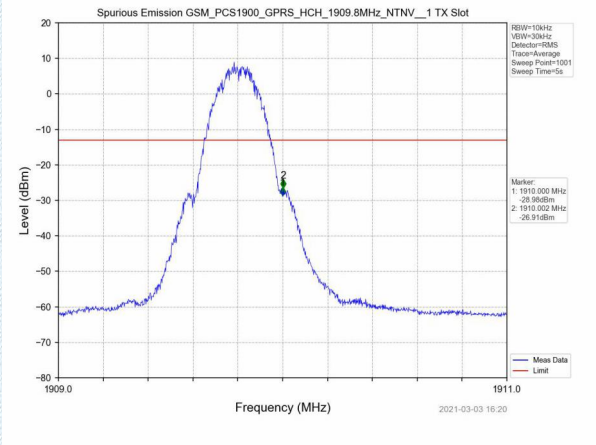

| PCS 1900 | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 512 | 1850.20 | 1849.992 | -26.87 | -13.00 | Pass |
| 810 | 1909.80 | 1910.024 | -26.10 | -13.00 | Pass |



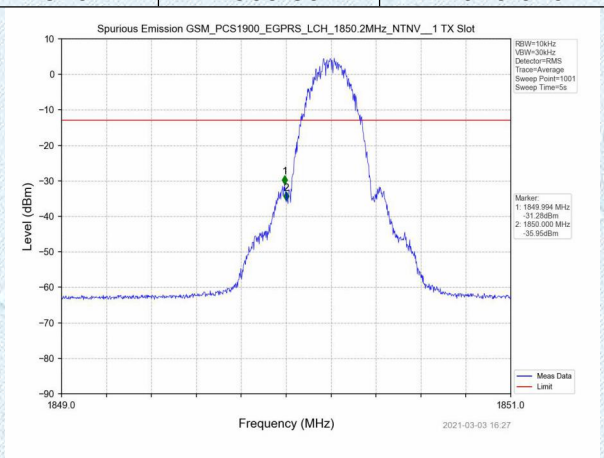



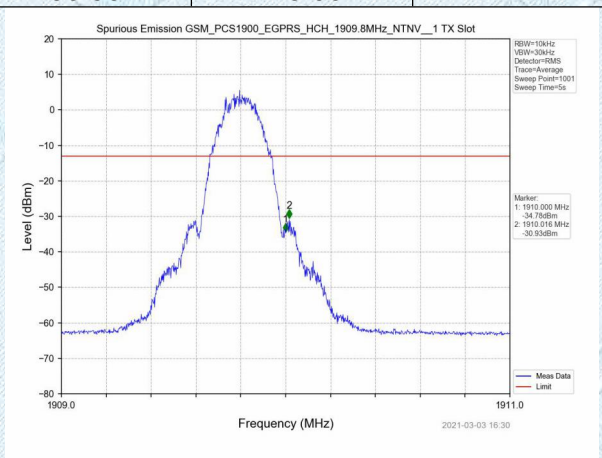
| GPRS1900 | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 512 | 1850.20 | 1849.98 | -27.49 | -13.00 | Pass |
| 810 | 1909.80 | 1910.002 | -26.91 | -13.00 | Pass |




| EGPRS 1900 | | | | | |
|---|---|---|---|---|---|
| Channel Number | Frequency (MHz) | Measurement Results | | Limit (dBm) | Verdict |
| | | Frequency (MHz) | Values (dBm) | | |
| 512 | 1850.20 | 1849.994 | -31.28 | -13.00 | Pass |
| 810 | 1909.80 | 1910.010 | -30.93 | -13.00 | Pass |



## 3.6. Radiated Power Measurement

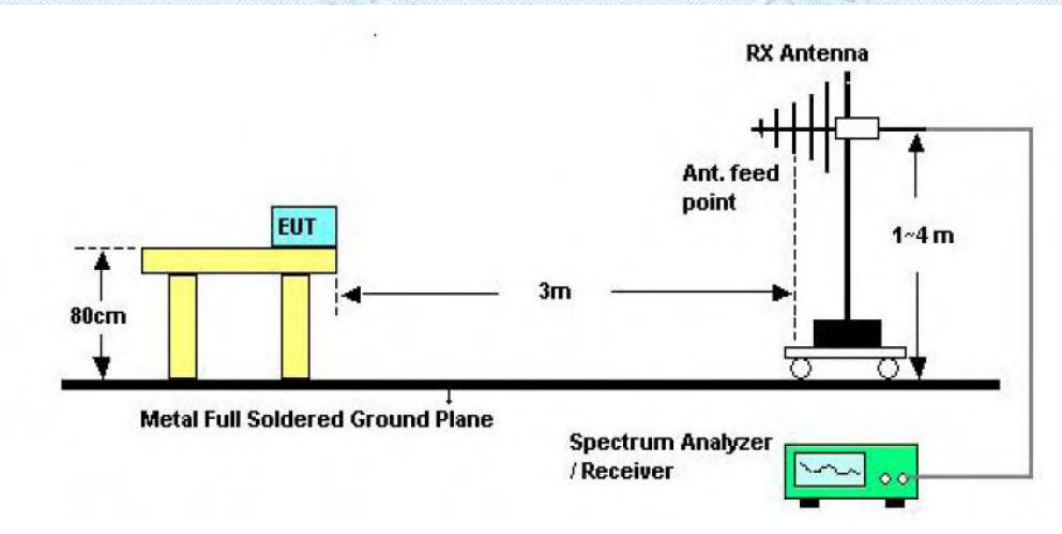
**LIMIT**

GSM850/WCDMA Band V: 7W ERP

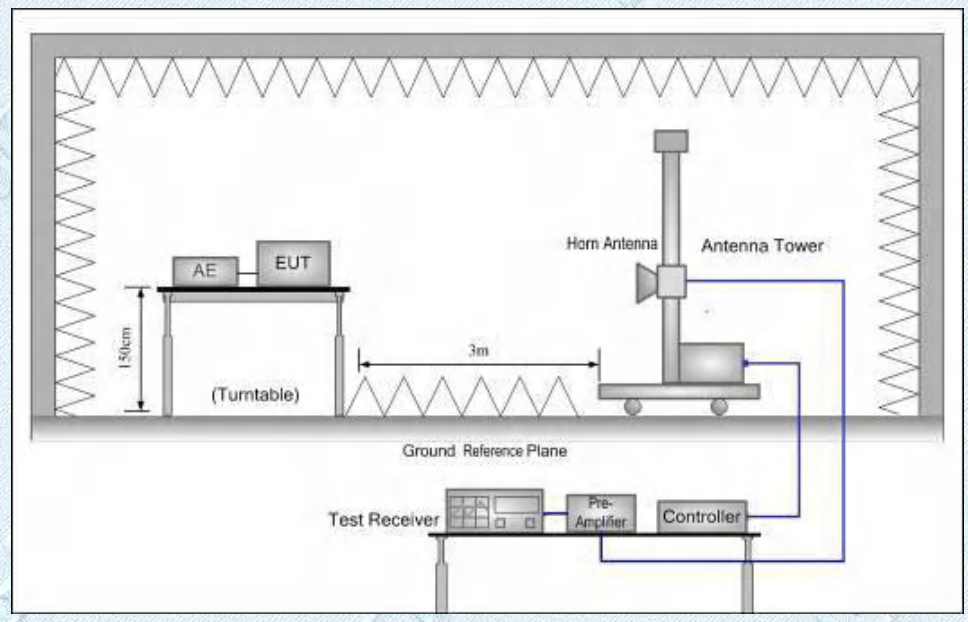
PCS1900/WCDMA Band II/WCDMA Band IV: 2W ERP

**TEST CONFIGURATION**

For the actual test configuration, please refer to the related Item – EUT Test Photos.




Below 1GHz




Above 1GHz

**TEST PROCEDURE**

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, and the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. An amplifier should be connected to the Signal Source output port. And the cable should be connecting between the Amplifier and the Substitution Antenna. The cable loss (Pcl), the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
6. The measurement results are obtained as described below:
   Power(EIRP)=PMea- PAg - Pcl + Ga
   We used N5182A microwave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substitution test; The measurement results are amend as described below:
   Power(EIRP)=PMea- Pcl + Ga
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
   ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

**TEST RESULTS**

Remark:

1. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Z axis” position was the worst, and test data recorded in this report.

**Measurement Data (worst case) :**

| Mode | Channel | Antenna Pol. | ERP | Limit (dBm) | Result |
|---|---|---|---|---|---|
| GSM850 (GSM) | 128 | V | 31.36 | 38.45 | Pass |
| | | H | 27.39 | | |
| | 190 | V | 32.77 | | |
| | | H | 25.39 | | |
| | 251 | V | 31.23 | | |
| | | H | 27.47 | | |
| GSM850 (GPRS) | 128 | V | 30.84 | 38.45 | Pass |
| | | H | 25.32 | | |
| | 190 | V | 30.14 | | |
| | | H | 26.00 | | |
| | 251 | V | 30.82 | | |
| | | H | 26.75 | | |
| GSM850 (EGPRS) | 128 | V | 30.20 | 38.45 | Pass |
| | | H | 25.19 | | |
| | 190 | V | 30.11 | | |
| | | H | 26.56 | | |
| | 251 | V | 30.08 | | |
| | | H | 25.58 | | |

| Mode | Channel | Antenna Pol. | EIRP | Limit (dBm) | Result |
|---|---|---|---|---|---|
| PCS1900 (GSM) | 512 | V | 31.04 | 33.00 | Pass |
| | | H | 30.97 | | |
| | 661 | V | 30.76 | | |
| | | H | 30.51 | | |
| | 810 | V | 30.05 | | |
| | | H | 31.63 | | |
| PCS1900 (GPRS) | 512 | V | 28.52 | 33.00 | Pass |
| | | H | 25.38 | | |
| | 661 | V | 28.94 | | |
| | | H | 24.32 | | |
| | 810 | V | 28.30 | | |
| | | H | 24.15 | | |
| PCS1900 (EGPRS) | 512 | V | 28.84 | 33.00 | Pass |
| | | H | 24.20 | | |
| | 661 | V | 28.36 | | |
| | | H | 25.03 | | |
| | 810 | V | 28.15 | | |
| | | H | 25.20 | | |

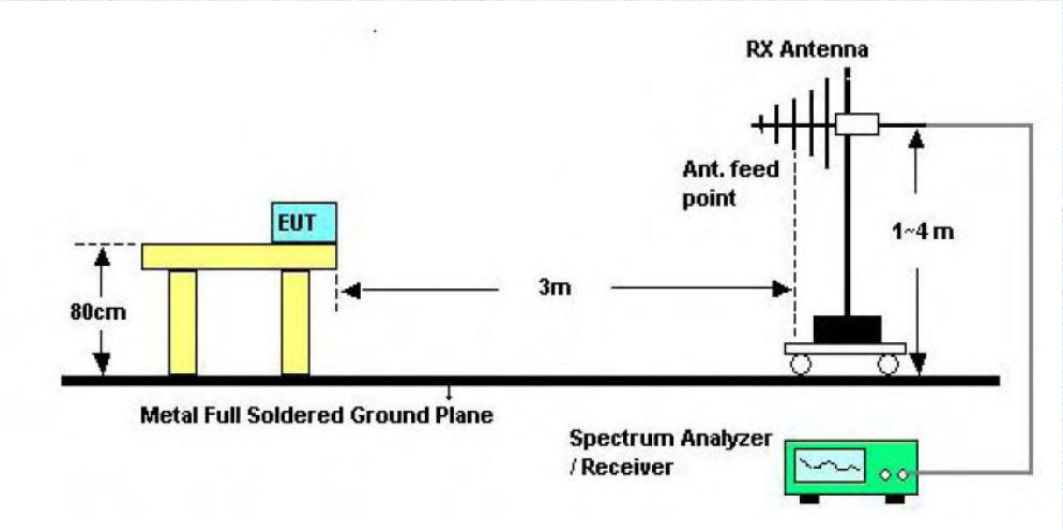
## 3.7. Radiated Spurious Emission

**LIMIT**

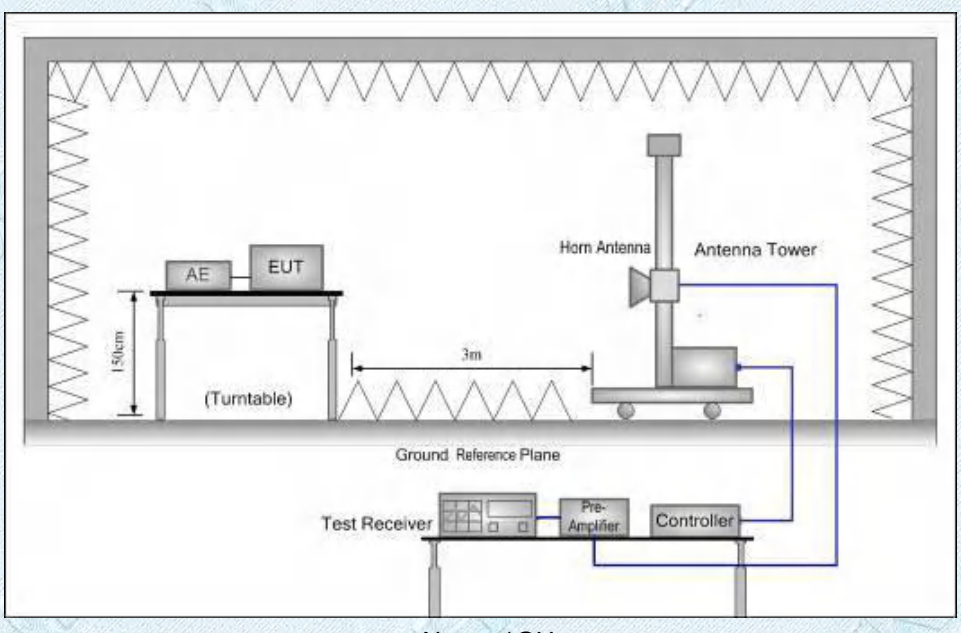
-13dBm

**TEST CONFIGURATION**

For the actual test configuration, please refer to the related Item – EUT Test Photos.




Below 1GHz




Above 1GHz

## TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, and the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. An amplifier should be connected to the Signal Source output port. And the cable should be connecting between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
6. The measurement results are obtained as described below:
   Power(EIRP)=PMea- PAg - Pcl + Ga
   We used SMF100A microwave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substitution test; The measurement results are amend as described below:
   Power(EIRP)=PMea- Pcl + Ga
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
   ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.
8. Test frequency range should extend to $10^{th}$ harmonic of highest fundamental frequency.

## TEST RESULTS

Remark:
1. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Z axis” position was the worst, and test data recorded in this report.
2. We test all modulation type and record worst case at Voice mode（GSM850/PCS1900）.

**Measurement Data (worst case):**

| GSM850 | | | | | |
|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | | Polarization | Level (dBm) | | |
| 128 | 1648.40 | Vertical | -49.01 | -13.00 | Pass |
| | 2472.60 | Vertical | -47.46 | | |
| | 1648.40 | Horizontal | -54.31 | | |
| | 2472.60 | Horizontal | -42.02 | | |
| 190 | 1673.20 | Vertical | -49.67 | | |
| | 2509.80 | Vertical | -42.15 | | |
| | 1673.20 | Horizontal | -53.25 | | |
| | 2509.80 | Horizontal | -40.02 | | |
| 251 | 1697.60 | Vertical | -47.69 | | |
| | 2546.40 | Vertical | -42.03 | | |
| | 1697.60 | Horizontal | -52.67 | | |
| | 2546.40 | Horizontal | -35.52 | | |

Remark:

The emission levels of below 1 GHz are very lower than the limit above10dB and not show in test report.

| PCS1900 | | | | | |
|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | | Polarization | Level (dBm) | | |
| 512 | 3700.40 | Vertical | -49.21 | -13.00 | Pass |
| | 5550.60 | Vertical | -47.56 | | |
| | 3700.40 | Horizontal | -54.58 | | |
| | 5550.60 | Horizontal | -42.04 | | |
| 661 | 3760.00 | Vertical | -49.33 | | |
| | 5640.00 | Vertical | -42.19 | | |
| | 3760.00 | Horizontal | -53.13 | | |
| | 5640.00 | Horizontal | -40.08 | | |
| 810 | 3819.60 | Vertical | -47.47 | | |
| | 5729.40 | Vertical | -42.19 | | |
| | 3819.60 | Horizontal | -52.55 | | |
| | 5729.40 | Horizontal | -45.19 | | |

Remark:

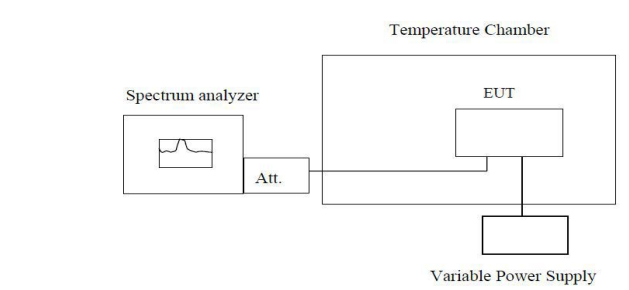
The emission levels of below 1 GHz are very lower than the limit above10dB and not show in test report.

## 3.8. Frequency stability

**LIMIT**

Cellular Band: ±2.5ppm PCS Band: Within the authorized frequency block

**TEST CONFIGURATION**




**Note :** Measurement setup for testing on Antenna connector

**TEST PROCEDURE**

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to –30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.
7. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.

## TEST RESULTS

Remark: We test all modulation type and record worst case at Voice mode

1. Temperature measurement:

| Test Band: GSM850 Middle channel=190 channel=836.6MHz (Frequency Error VS. Voltage) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Mode | Test Temp. | Test Volt. | Freq. Error (Hz) | | | Freq. vs. rated (ppm) | | | Limit (ppm) | Verdict |
| | | | LCH | MCH | HCH | LCH | MCH | HCH | | |
| GSM | NT | LV | -0.0646 | 4.4877 | 5.1980 | -0.0001 | 0.0054 | 0.0061 | ±2.50 | PASS |
| | | NV | 2.8089 | 2.4860 | 6.1989 | 0.0034 | 0.0030 | 0.0073 | ±2.50 | PASS |
| | | HV | 2.2923 | 3.3900 | 2.3246 | 0.0028 | 0.0041 | 0.0027 | ±2.50 | PASS |

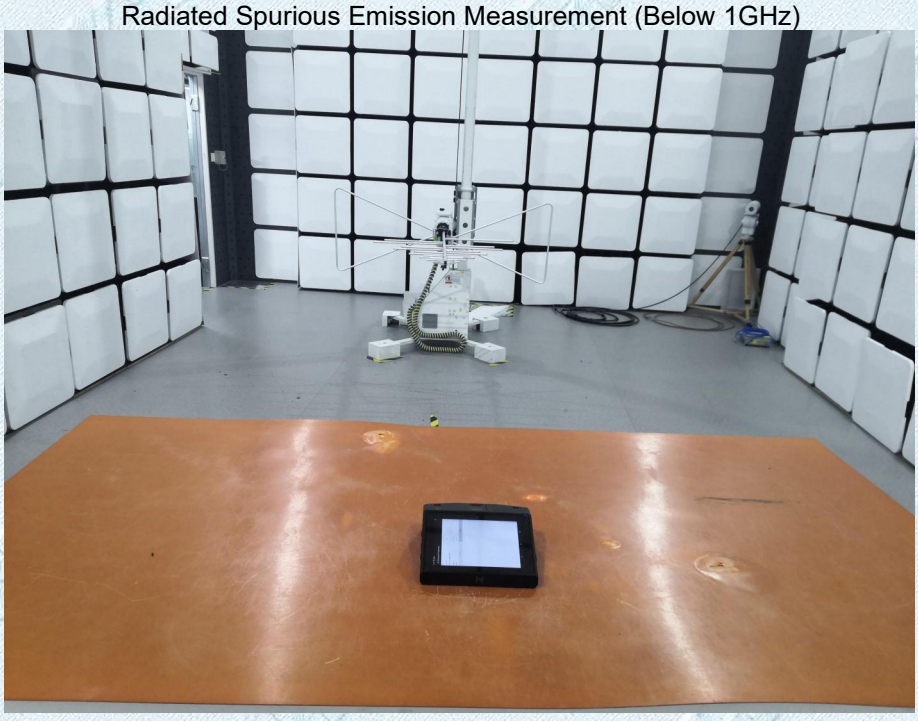
| Test Band: GSM850 Middle channel=190 channel=836.6MHz (Frequency Error VS. Temperature) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Mode | Test Volt. | Test Temp. | Freq. Error (Hz) | | | Freq. vs. rated (ppm) | | | Limit (ppm) | Verdict |
| | | | LCH | MCH | HCH | LCH | MCH | HCH | | |
| | | -20.00 | -0.6457 | 2.4214 | 5.4886 | -0.0008 | 0.0029 | 0.0065 | ±2.50 | PASS |
| | | -10.00 | 2.3569 | 2.8734 | 4.3909 | 0.0029 | 0.0034 | 0.0052 | ±2.50 | PASS |
| | | 0.00 | 2.4860 | 5.1334 | 2.3246 | 0.0030 | 0.0061 | 0.0027 | ±2.50 | PASS |
| | | 10.00 | 2.8089 | 4.0357 | 4.2294 | 0.0034 | 0.0048 | 0.0050 | ±2.50 | PASS |
| | | 20.00 | 0.5166 | 1.9694 | 6.3280 | 0.0006 | 0.0024 | 0.0075 | ±2.50 | PASS |
| | | 30.00 | -0.8717 | 0.7426 | 5.1657 | -0.0011 | 0.0009 | 0.0061 | ±2.50 | PASS |
| | | 40.00 | 2.4214 | 3.1640 | 3.7774 | 0.0029 | 0.0038 | 0.0045 | ±2.50 | PASS |
| | | 50.00 | 1.9049 | 2.1309 | 0.8394 | 0.0023 | 0.0025 | 0.0010 | ±2.50 | PASS |

| Test Band: PCS1900 (Frequency Error VS. Voltage) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Mode | Test Temp. | Test Volt. | Freq. Error (Hz) | | | Freq. vs. rated (ppm) | | | Limit (ppm) | Verdict |
| | | | LCH | MCH | HCH | LCH | MCH | HCH | | |
| GSM | NT | LV | 1.2269 | 9.3952 | 2.0986 | 0.0007 | 0.0050 | 0.0011 | ±2.50 | PASS |
| | | NV | -0.0323 | 8.7818 | 5.9406 | 0.0000 | 0.0047 | 0.0031 | ±2.50 | PASS |
| | | HV | 7.7163 | 7.7809 | 0.9363 | 0.0042 | 0.0041 | 0.0005 | ±2.50 | PASS |

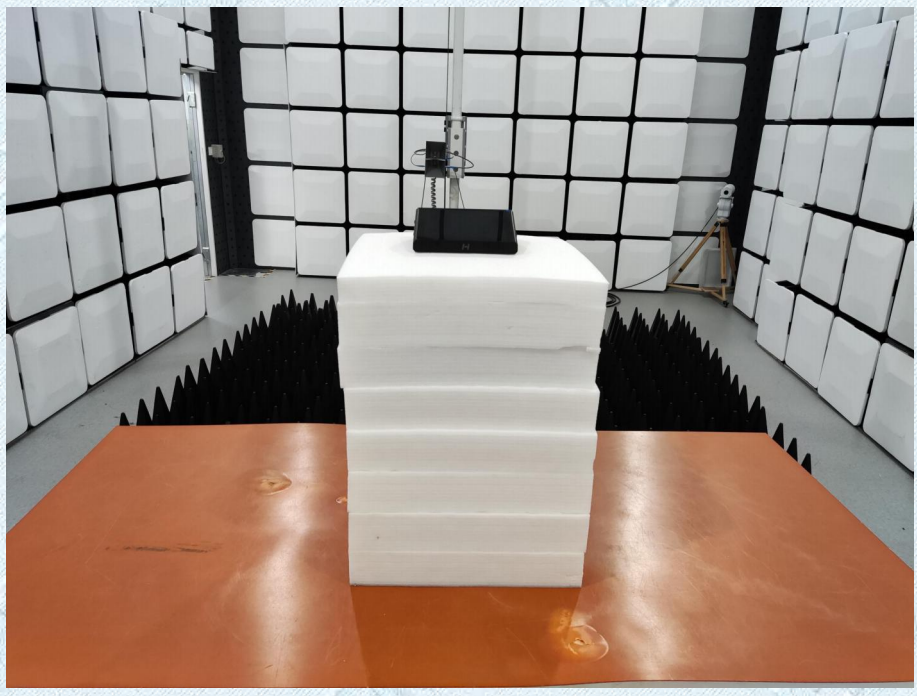
| Test Band: PCS1900 (Frequency Error VS. Temperature) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test Mode | Test Volt. | Test Temp. | Freq. Error (Hz) | | | Freq. vs. rated (ppm) | | | Limit (ppm) | Verdict |
| | | | LCH | MCH | HCH | LCH | MCH | HCH | | |
| | | -20.00 | 7.4580 | 4.0034 | 6.4249 | 0.0040 | 0.0021 | 0.0034 | ±2.50 | PASS |
| | | -10.00 | 6.8123 | 3.9712 | 4.1972 | 0.0037 | 0.0021 | 0.0022 | ±2.50 | PASS |
| | | 0.00 | 1.9372 | 5.9729 | 6.0375 | 0.0010 | 0.0032 | 0.0032 | ±2.50 | PASS |
| | | 10.00 | 4.3263 | 4.0680 | 2.2277 | 0.0023 | 0.0022 | 0.0012 | ±2.50 | PASS |
| | | 20.00 | 5.1334 | 3.4869 | 1.9694 | 0.0028 | 0.0019 | 0.0010 | ±2.50 | PASS |
| | | 30.00 | 5.1012 | 6.7477 | 2.3569 | 0.0028 | 0.0036 | 0.0012 | ±2.50 | PASS |
| | | 40.00 | 10.3960 | 9.1046 | 0.7749 | 0.0056 | 0.0048 | 0.0004 | ±2.50 | PASS |
| | | 50.00 | 1.0654 | 6.8123 | 3.9389 | 0.0006 | 0.0036 | 0.0021 | ±2.50 | PASS |

# 4. EUT TEST PHOTOS

Radiated Spurious Emission Measurement (Below 1GHz)



Radiated Spurious Emission Measurement (Above 1GHz)



RF Conducted

# 5. PHOTOGRAPHS OF EUT CONSTRUCTIONAL

**Please Refer to the External attachment for internal photos and external photos.**

**********THE END**********