Certificate #6613.01

FCC TEST REPORT

(PART 22)

Applicant:	BARTEC GmbH
Address:	Max-Eyth-Str.16 , 97980 Bad Mergentheim, Germany

Manufacturer or Supplier:	BARTEC GmbH
Address:	Max-Eyth-Str.16 , 97980 Bad Mergentheim, Germany
Product:	Smartscanner / Smartphone
Brand Name:	BARTEC
Model Name:	SP9EX1/SC9EX1/SP9EX2/SC9EX2
FCC ID:	TBUSX9EX
Date of tests:	Jan. 02, 2024~ Jul. 26, 2024

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 Hanwen Xu Engineer / Mobile Department	Approved by Peibo Sun Manager / Mobile Department
Xu Hanwen Date: Jul. 26, 2024	Sun Peibo Date: Jul. 26, 2024

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
PSU-QSU2312140113RF01	Original release	Jul. 26, 2024

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) §22.913(a)(2)	Effective Radiated Power	Compliance	A
§2.1055 §22.355	Frequency Stability	Compliance	A/B
§2.1049 §22.917(b)	Occupied Bandwidth	Compliance	A/B
§22.913 (d)	Peak to average ratio*	Compliance	A/B
§22.917(a)	Band Edge Measurements	Compliance	A/B
§2.1051 §22.917(a)	Conducted Spurious Emissions	Compliance	A/B
§2.1053 §22.917(a)	Radiated Spurious Emissions	Compliance	A

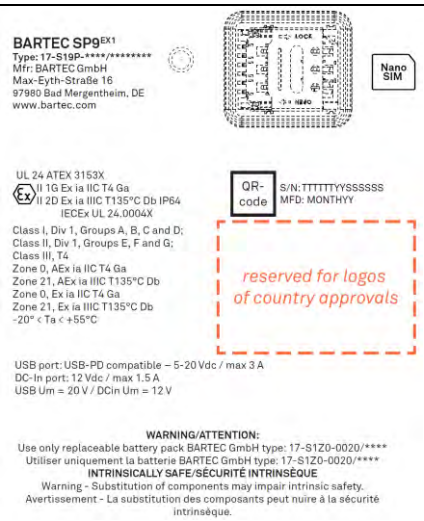
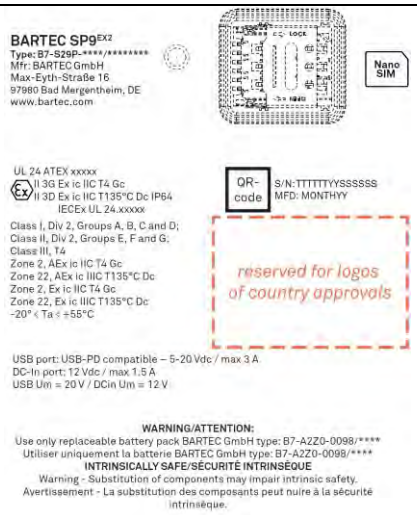
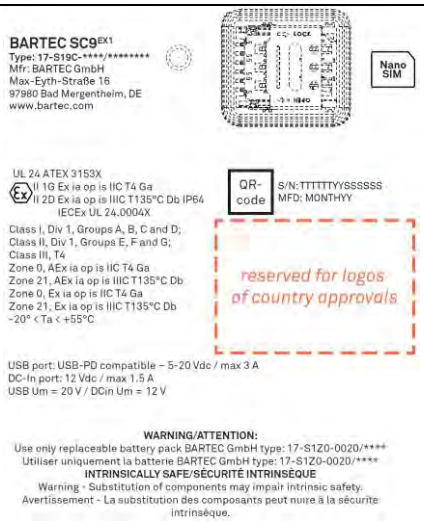
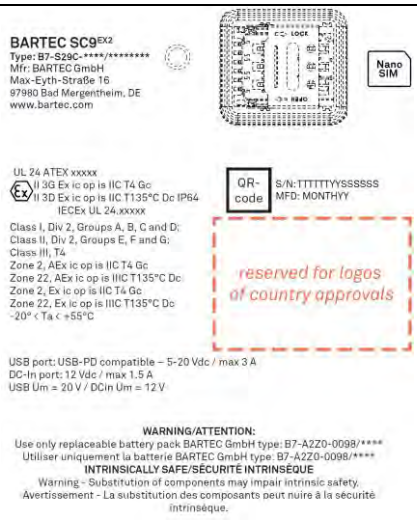
* Refer to KDB 971168 D01 Power Meas License Digital Systems v03r01.

NOTE:

1. In this report, the test EUT version is EVT, after the test is completed, the customer optimizes the product to DVT, and the final customer's shipment is PVT. For differences between EVT and DVT and PVT, please refer to the documentation provided by the customer (SC9EX1_SP9EX1 PCBA HW Release Note rev 2_0).

2. There are no differences on the PCBA between the Model SC9EX1 (FCC ID: TBUSX9EX) and the variants SP9EX1 (FCC ID: TBUSX9EX). All mounted components are the same. No functionality related to any radio interface is affected. The only difference is the presence of the barcode scanner module and the “bump” on the back cover that incorporates the barcode scanner module.Testing has been run on parent product SC9EX1 and the worst cases of power and RSE have been verified also on SP9EX1 variant. Only the worst-case data (SC9EX1) have been reported.

3. The devices BARTEC SP9EX1 Smartphone and BARTEC SP9EX2 Smartphone share the same hardware and software. The same applies for the devices BARTEC SC9EX1 Smartscanner and BARTEC SC9EX2 Smartscanner. The only difference are the hazardous area marking of the devices, see table for clarification.

BARTEC SP9EX1 Smartphone	BARTEC SP9EX2 Smartphone
	
BARTEC SC9EX1 Smartscanner	**BARTEC SC9EX2 Smartscanner**
	

***Test Lab Information Reference**

Lab A:

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

Lab Address:

Tower N, Innovation Center, 88 Zuyi 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.

Lab B:

BV 7Layers Communications Technology (Shenzhen) Co. Ltd

Lab Address:

Room B37, Warehouse A5, No.3 Chiwan 4th Road, Zhaoshang Street, Nanshan District Shenzhen, Guangdong, People's Republic of China

Accredited Test Lab Cert 3939.01

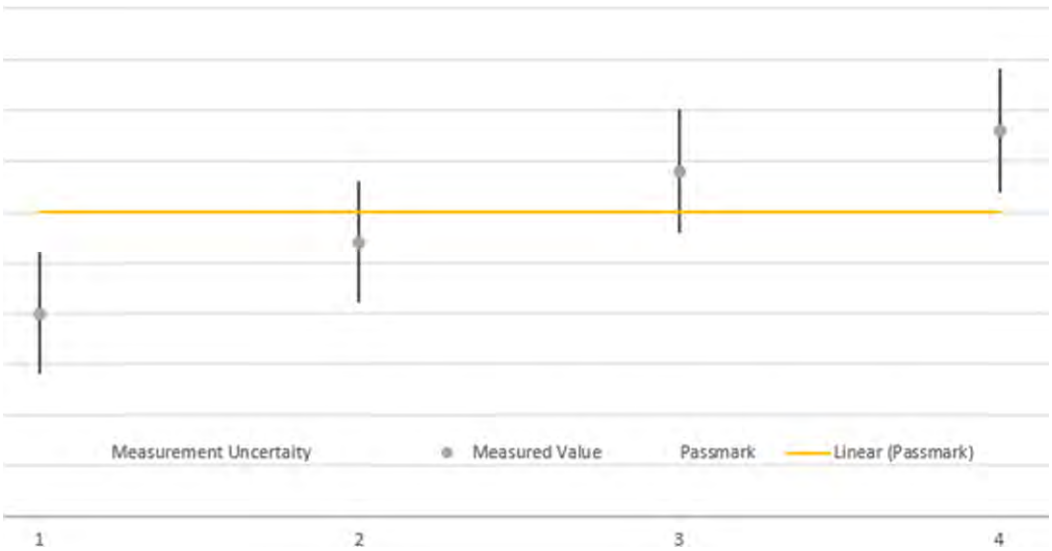
The FCC Site Registration No. is 525120; The Designation No. is CN1171.

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

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

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



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

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

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

1.2 TEST SITE AND INSTRUMENTS

Lab A:

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
Vector Signal Generator	R&S	SMBV100B	102176	Feb.15,24	Feb.14,26
Signal Generator	R&S	SMB100A	182185	Feb.16,22	Feb.15,24
Signal Generator	R&S	SMB100A	182185	Feb.15,24	Feb.14,26
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.25,22	Nov.24,25
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.25,22	Nov.24,25
EMI TEST Receiver	R&S	ESR26	101734	Feb.25,22	Feb.24,24
EMI TEST Receiver	R&S	ESR26	101734	Feb.24,24	Feb.23,26
EMI TEST Receiver	R&S	ESW44	101973	Feb.25,22	Feb.24,24
EMI TEST Receiver	R&S	ESW44	101973	Feb.24,24	Feb.23,26
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Feb.28,22	Feb.27,24
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Feb.27,24	Feb.26,26
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.22,22	Aug.21,24
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Feb.23,22	Feb.22,24
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Feb.22,24	Feb.21,26
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.22,22	Aug.21,24
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.23,22	Feb.22,24
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.22,24	Feb.21,26
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.27,22	Jun.26,24
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.26,24	Jun.25,26
Test Software	EMC32	EMC32	N/A	N/A	N/A
Test Software	ELEKTRA	ELEKTRA4.32	N/A	N/A	N/A
Open Switch and Control Unit	R&S	OSP220	101964	Oct.01,22	Sep.30,24
DC Source	HYELEC	HY3010B	551016	Aug.31,22	Aug.30,24
Hygrothermograph	DELI	20210528	SZ014	Sep.06,22	Sep.05,24
PC	LENOVO	E14	HRSW0024	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-7.00M	N/A	N/A	N/A

TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-4.00M	N/A	N/A	N/A
CABLE	R&S	W13.02	N/A	Apr.28,23	Apr.27,24
CABLE	R&S	W13.02	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	W12.14	N/A	Apr.28,23	Apr.27,24
CABLE	R&S	W12.14	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.28,23	Apr.27,24
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.27,24	Apr.26,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.28,23	Apr.27,24
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.27,24	Apr.26,25
Temperature Chamber	votsch	VT4002	58566078100050	May.31,22	May.30,24
Temperature Chamber	votsch	VT4002	58566078100050	May.30,24	May.29,26

NOTE: 1. The calibration interval of the above test instruments is 12/ 24 / 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.

3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.

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

Lab B：

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Mar. 28,23	Mar. 27,24
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Mar. 27,24	Mar. 26,25
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.10,23	May.09,24
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.09,24	May.08,25
Loop Antenna	Schwarzbeck	FMZB 1519B	00173	Sep.02,23	Sep.01,24
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Feb. 18,23	Feb. 17,24
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Feb. 17,24	Feb. 16,25
Horn Antenna	ETS-LINDGREN	3117	00168692	Feb. 18,23	Feb. 17,24
Horn Antenna	ETS-LINDGREN	3117	00168692	Feb. 17,24	Feb. 16,25
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Sep.03, 23	Sep.02, 24
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 14,23	Feb. 13,24
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 13,24	Feb. 12,25
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May. 06,23	May. 05,24
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May. 05,24	May. 04,25
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.10,23	May.09,24
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.09,24	May.08,25

Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 17,23	Feb.16,24
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb.16,24	Feb.15,25
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	Nov. 14,23	Nov. 13,26
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	JS1120	3.1.36	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	50HF-010-SMA	May. 06,23	May. 05,24
10dB Attenuator	JFW/USA	50HF-010-SMA	50HF-010-SMA	May. 05,24	May. 04,25
Power Meter	Anritsu	ML2495A	1506002	Feb. 14,23	Feb. 13,24
Power Meter	Anritsu	ML2495A	1506002	Feb. 13,24	Feb. 12,25
Power Sensor	Anritsu	MA2411B	1339352	Feb. 14,23	Feb. 13,24
Power Sensor	Anritsu	MA2411B	1339352	Feb. 13,24	Feb. 12,25
Temperature Chamber	ESPEC	SH-242	93000855	May. 06,23	May. 05,24
Temperature Chamber	ESPEC	SH-242	93000855	May. 05,24	May. 04,25
MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 14,23	Feb. 13,24
MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 13,24	Feb. 12,25
Base station R&S CMW500	Rohde&Schwarz	CMW500	153085	May.10,23	May.09,24
Base station R&S CMW500	Rohde&Schwarz	CMW500	153085	May.09,24	May.08,25
DC Source	Kikusui/JP	PMX18-5A	N/A	Aug. 11,23	Aug. 10,24

NOTE: 1. The calibration interval of the above test instruments is 12/ 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.

3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT*	Smartscanner / Smartphone	
BRAND NAME*	BARTEC	
MODEL NAME*	SP9EX1/SC9EX1/SP9EX2/SC9EX2	
NOMINAL VOLTAGE*	5.0V/9.0V/12.0Vdc (adapter) 3.2V/3.8V/4.2V/dc (battery)	
MODULATION TYPE	**GSM/EDGE**	GMSK, 8PSK
	WCDMA	BPSK, QPSK
	LTE	QPSK, 16QAM, 64QAM, 256QAM
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**	297.17mW
	EDGE	104.71mW
	WCDMA	41.3mW
	LTE Band 5 (Channel Bandwidth: 1.4MHz)	35.65mW
	LTE Band 5 (Channel Bandwidth: 3MHz)	35.48mW
	LTE Band 5 (Channel Bandwidth: 5MHz)	35.08mW
	LTE Band 5 (Channel Bandwidth: 10MHz)	35.97mW
EMISSION DESIGNATORGOGN	**GSM**	245KGXW
	EDGE	244KG7W
	WCDMA	4M13F9W
	LTE Band 5 (Channel Bandwidth: 1.4MHz)	QPSK: 1M09G7D
		16QAM: 1M09W7D
		64QAM: 1M09W7D
	LTE Band 5 (Channel Bandwidth: 3MHz)	QPSK: 2M69G7D
		16QAM: 2M69W7D

		64QAM: 2M69W7D
	LTE Band 5 (Channel Bandwidth: 5MHz)	QPSK: 4M49G7D
		16QAM: 4M48W7D
		64QAM: 4M48W7D
	LTE Band 5 (Channel Bandwidth: 10MHz)	QPSK: 8M95G7D
		16QAM: 8M04W7D
		64QAM: 8M94W7D
ANTENNA TYPE*	Main TX/RX ANT 0: IFA Antenna with -4.9dBi gain for GSM850/ WCDMA V/LTE B5 RX ANT SEC. ANT 2: IFA Antenna with -11dBi gain for GSM850/ WCDMA V/LTE B5	
HW VERSION*	E	
SW VERSION*	TWG1.240820.261	
I/O PORTS*	Refer to user's manual	
CABLE SUPPLIED*	USB cable: non-shielded cable, with w/o ferrite core, 0.8 meter	
EXTREME TEMPERATURE*	-20℃-60 ℃	
EXTREME VOLTAGE*	3.2V – 4.2V	

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 two receivers.

MODULATION MODE	TX FUNCTION
GSM/GPRS/EDGE	1TX/2RX
WCDMA	1TX/2RX
LTE	1TX/2RX

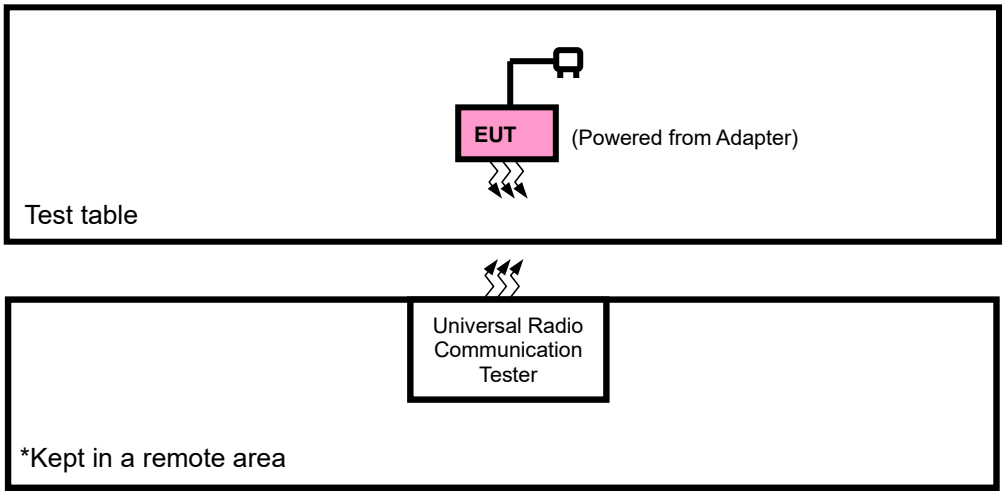
4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in the test report.
5. Output power measurements were measured on QPSK,16QAM,64QAM and 256QAM modulations. And tests other than output power are performed only in worst-case QPSK and 16QAM,64QAM modes.

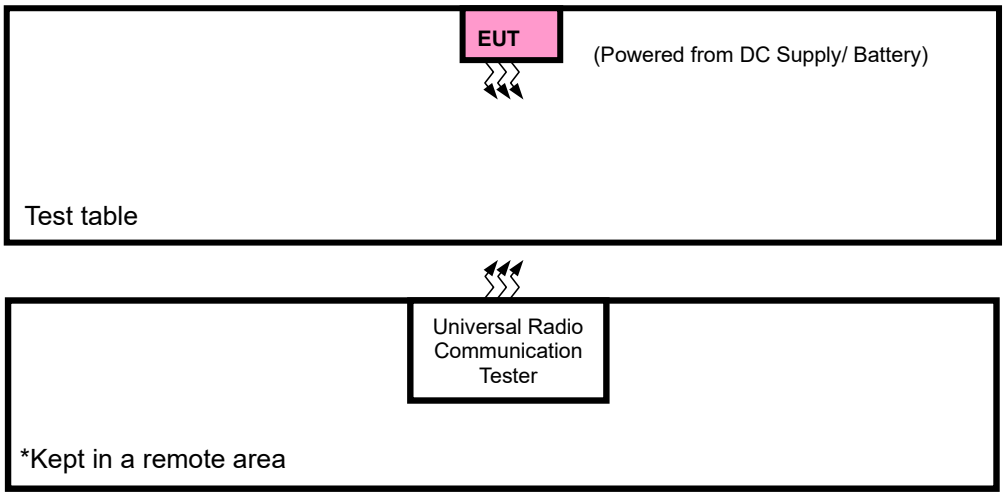
6. **List of Accessory:**

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
Display(AMOLED)	Xiao Xin	N/A	XX611OLED-A002.1	N/A
Back cover	IV Techmould	N/A	N/A	N/A
Bezel	IV Techmould	N/A	N/A	N/A
Photo/Video Camera 1	Sunny Optical	N/A	F48N03A (Auto focus)	N/A
Photo/Video Camera 2	TrulyOpto	N/A	CSF208-B8BF-E(Fix focus)	N/A
CPU	Qualcomm	N/A	QCM6490	N/A
UFS	Kioxia	N/A	THGJFAT0T44BAIL	N/A
BT/WLAN Module	Murata	N/A	LBEE5QG2CX-830	N/A
NFC chipset	NXP	N/A	SN110TUK1	N/A
Battery	BARTEC	N/A	17-S1Z0-0020/****	4300 mAh, 3.68V
USB-C Cable	BARTEC	N/A	G7-A0Z0-0010	Length: 0.8m

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	Adapter	N/A	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	USB Line: Shielded, Detachable 0.8m;

2.4 TEST ITEM AND TEST CONFIGURATION

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

EUT CONFIGURE MODE	DESCRIPTION
A	EUT + Adapter + USB Cable with GSM or WCDMA or LTE link
B	EUT + Battery 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, 189, 251	GSM,EDGE
B	FREQUENCY STABILITY	128 to 251	128, 189, 251	GSM,EDGE
A	OCCUPIED BANDWIDTH	128 to 251	128, 189, 251	GSM,EDGE
A	BAND EDGE	128 to 251	128, 251	GSM,EDGE
A	CONDUCTED EMISSION	128 to 251	128, 189, 251	GSM,EDGE
A	RADIATED EMISSION	128 to 251	128, 189, 251	GSM,EDGE
A	PEAK TO AVERAGE RATIO	128 to 251	128, 189, 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,256QAM	1 RB / 0 RB Offset
		20415 to 20635	20415, 20525, 20635	3MHz	QPSK,16QAM,64QAM,256QAM	1 RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5MHz	QPSK,16QAM,64QAM,256QAM	1 RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	10MHz	QPSK,16QAM,64QAM,256QAM	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	20407, 20525, 20643	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 Full RB / 0 RB Offset
		20415 to 20635	20415, 20525, 20635	3MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset

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

2. Output power measurements were measured on QPSK,16QAM,64QAM and 256QAM modulations. And tests other than output power are performed only in worst-case QPSK and 16QAM,64QAM modes.

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	23deg. C, 70%RH	DC 5.0V/ 9.0V/ 12.0V By Adapter	Hanwen Xu
FREQUENCY STABILITY	23deg. C, 70%RH	DC 3.2V/ 3.8V/ 4.2V By Battery	Hanwen Xu
OCCUPIED BANDWIDTH	23deg. C, 70%RH	DC 5.0V/ 9.0V/ 12.0V By Adapter	Hanwen Xu
BAND EDGE	23deg. C, 70%RH	DC 5.0V/ 9.0V/ 12.0V By Adapter	Hanwen Xu
CONDCUDETED EMISSION	23deg. C, 70%RH	DC 5.0V/ 9.0V/ 12.0V By Adapter	Hanwen Xu
RADIATED EMISSION	23deg. C, 70%RH	DC 5.0V/ 9.0V/ 12.0V By Adapter	Hanwen Xu
PEAK TO AVERAGE RATIO	23deg. C, 70%RH	DC 5.0V/ 9.0V/ 12.0V By Adapter	Hanwen Xu

2.5 EUT OPERATING CONDITIONS

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

2.6 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC 47 CFR Part 2

FCC 47 CFR Part 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.

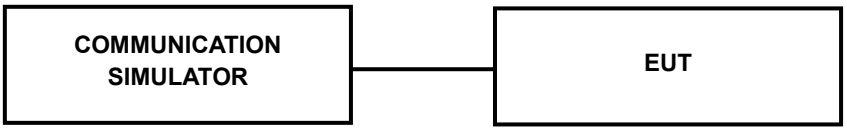
CONDUCTED POWER MEASUREMENT:

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

3.1.3 TEST SETUP

EIRP / ERP Measurement:

CONDUCTED POWER MEASUREMENT:



3.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm):

Band	GSM850(ANT0)		
Channel	128	189	251
Frequency(MHz)	824.2	836.4	848.8
GSM	31.74	31.75	**31.78**
GPRS 1Tx Slot	31.74	31.72	31.77
GPRS 2Tx Slot	30.29	30.27	30.18
GPRS 3Tx Slot	28.48	28.37	28.34
GPRS 4Tx Slot	27.25	27.21	27.24
EDGE 1Tx Slot	25.97	25.99	26.04
EDGE 2Tx Slot	24.56	24.30	24.55
EDGE 3Tx Slot	22.74	22.78	22.70
EDGE 4Tx Slot	21.53	21.54	21.63

Band	WCDMA V(ANT0)		
TX Channel	4132	4182	4233
Rx Channel	4357	4407	4458
Frequency(MHz)	826.4	836.4	846.6
RMC 12.2K	23.12	23.13	**23.21**
HSDPA Subtest-1	22.27	22.31	22.31
HSDPA Subtest-2	22.32	22.27	22.30
HSDPA Subtest-3	21.79	21.82	21.91
HSDPA Subtest-4	21.80	21.76	21.89
DC-HSDPA Subtest-1	22.26	22.26	22.34
DC-HSDPA Subtest-2	22.32	22.25	22.31
DC-HSDPA Subtest-3	21.79	21.76	21.89
DC-HSDPA Subtest-4	21.77	21.73	21.86
HSUPA Subtest-1	21.51	21.51	21.59
HSUPA Subtest-2	20.13	20.17	20.26
HSUPA Subtest-3	21.04	21.04	21.13
HSUPA Subtest-4	20.09	20.04	20.16
HSUPA Subtest-5	22.09	22.09	22.16

LTE Band 5(ANT0)

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	22.28	22.55	22.46
		1	2	22.10	22.41	22.42
		1	5	22.26	22.43	22.45
		3	0	22.53	22.56	22.57
		3	1	22.55	22.50	22.53
		3	3	22.50	22.42	22.54
		6	0	21.66	21.51	21.68
	16QAM	1	0	21.72	21.66	21.74
		1	2	21.53	21.73	21.75
		1	5	21.73	21.79	21.70
		3	0	21.54	21.56	21.54
		3	1	21.46	21.51	21.60
		3	3	21.55	21.42	21.57
		6	0	20.50	20.50	20.61
	64QAM	1	0	20.61	20.58	20.79
		1	2	20.49	20.56	20.70
		1	5	20.62	20.46	20.64
		3	0	20.56	20.54	20.64
		3	1	20.54	20.47	20.56
		3	3	20.60	20.49	20.66
		6	0	19.68	19.47	19.57
	256QAM	1	0	19.61	19.64	19.61
		1	2	19.48	19.52	19.62
		1	5	19.53	19.50	19.55
		3	0	19.21	19.25	19.34
		3	1	19.26	19.10	19.31
		3	3	19.25	19.13	19.37
		6	0	18.56	18.39	18.57

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	22.32	22.49	22.55
		1	7	22.20	22.43	22.32
		1	14	22.32	22.44	22.46
		8	0	21.51	21.49	21.67
		8	3	21.50	21.57	21.55
		8	7	21.54	21.39	21.51
		15	0	21.68	21.57	21.58
	16QAM	1	0	21.60	21.63	21.86
		1	7	21.63	21.67	21.72
		1	14	21.70	21.83	21.77
		8	0	20.42	20.62	20.48
		8	3	20.52	20.54	20.62
		8	7	20.49	20.47	20.58
		15	0	20.57	20.52	20.63
	64QAM	1	0	20.59	20.57	20.72
		1	7	20.52	20.60	20.60
		1	14	20.62	20.48	20.67
		8	0	19.55	19.46	19.76
		8	3	19.49	19.44	19.59
		8	7	19.60	19.43	19.61
		15	0	19.61	19.48	19.65
	256QAM	1	0	19.53	19.56	19.61
		1	7	19.47	19.51	19.53
		1	14	19.50	19.47	19.67
		8	0	18.39	18.49	18.62
		8	3	18.50	18.33	18.57
		8	7	18.54	18.34	18.53
		15	0	18.50	18.41	18.52

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	22.23	22.47	22.49
		1	12	22.21	22.43	22.41
		1	24	22.30	22.41	22.50
		12	0	21.62	21.56	21.53
		12	6	21.60	21.54	21.54
		12	13	21.51	21.38	21.59
		25	0	21.55	21.54	21.55
	16QAM	1	0	21.70	21.63	21.75
		1	12	21.59	21.70	21.69
		1	24	21.61	21.78	21.73
		12	0	20.56	20.60	20.52
		12	6	20.52	20.57	20.54
		12	13	20.53	20.50	20.59
		25	0	20.56	20.56	20.55
	64QAM	1	0	20.62	20.59	20.69
		1	12	20.57	20.61	20.64
		1	24	20.59	20.44	20.63
		12	0	19.54	19.47	19.66
		12	6	19.51	19.51	19.54
		12	13	19.66	19.51	19.73
		25	0	19.56	19.52	19.59
	256QAM	1	0	19.61	19.58	19.66
		1	12	19.45	19.53	19.64
		1	24	19.52	19.38	19.58
		12	0	18.38	18.42	18.65
		12	6	18.42	18.32	18.44
		12	13	18.47	18.31	18.49
		25	0	18.54	18.39	18.57

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	22.38	22.60	**22.61**
		1	24	22.23	22.51	22.45
		1	49	22.35	22.47	22.54
		25	0	21.64	21.61	21.68
		25	12	21.62	21.58	21.65
		25	25	21.61	21.52	21.63
		50	0	21.69	21.61	21.70
	16QAM	1	0	21.73	21.67	21.88
		1	24	21.67	21.80	21.84
		1	49	21.74	21.85	21.85
		25	0	20.57	20.63	20.59
		25	12	20.61	20.64	20.68
		25	25	20.59	20.56	20.65
		50	0	20.62	20.58	20.68
	64QAM	1	0	20.68	20.72	20.80
		1	24	20.62	20.65	20.71
		1	49	20.65	20.55	20.73
		25	0	19.63	19.56	19.77
		25	12	19.62	19.57	19.64
		25	25	19.68	19.52	19.76
		50	0	19.71	19.53	19.72
	256QAM	1	0	19.65	19.68	19.67
		1	24	19.55	19.63	19.68
		1	49	19.56	19.53	19.70
		25	0	18.53	18.51	18.68
		25	12	18.56	18.42	18.58
		25	25	18.59	18.45	18.61
		50	0	18.63	18.51	18.62

ERP POWER (dBm)

GSM 850(ANT0)

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
128	824.2	31.74	-4.9	24.69	294.44	7
189	836.4	31.75	-4.9	24.7	295.12	7
251	848.8	31.78	-4.9	24.73	297.17	7

EDGE 850(ANT0)

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
128	824.2	25.97	-4.9	18.92	77.98	7
189	836.4	25.99	-4.9	18.94	78.34	7
251	848.8	26.04	-4.9	18.99	79.25	7

WCDMA(ANT0)

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
4132	826.4	23.12	-4.9	16.07	40.46	7
4182	836.4	23.13	-4.9	16.08	40.55	7
4233	846.6	23.21	-4.9	16.16	41.3	7

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

LTE BAND 5 (ANT0)

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	22.55	-4.9	15.5	35.48	7
20525	836.5	22.56	-4.9	15.51	35.56	7
20643	848.3	22.57	-4.9	15.52	35.65	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	21.73	-4.9	14.68	29.38	7
20525	836.5	21.79	-4.9	14.74	29.79	7
20643	848.3	21.75	-4.9	14.7	29.51	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	20.62	-4.9	13.57	22.75	7
20525	836.5	20.58	-4.9	13.53	22.54	7
20643	848.3	20.79	-4.9	13.74	23.66	7

CHANNEL BANDWIDTH: 1.4MHz 256QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20407	824.7	19.61	-4.9	12.56	18.03	7
20525	836.5	19.64	-4.9	12.59	18.16	7
20643	848.3	19.62	-4.9	12.57	18.07	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	22.32	-4.9	15.27	33.65	7
20525	836.5	22.49	-4.9	15.44	34.99	7
20635	847.5	22.55	-4.9	15.5	35.48	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	21.7	-4.9	14.65	29.17	7
20525	836.5	21.83	-4.9	14.78	30.06	7
20635	847.5	21.86	-4.9	14.81	30.27	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	20.62	-4.9	13.57	22.75	7
20525	836.5	20.6	-4.9	13.55	22.65	7
20635	847.5	20.72	-4.9	13.67	23.28	7

CHANNEL BANDWIDTH: 3MHz 256QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20415	825.5	19.53	-4.9	12.48	17.7	7
20525	836.5	19.56	-4.9	12.51	17.82	7
20635	847.5	19.67	-4.9	12.62	18.28	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	22.3	-4.9	15.25	33.5	7
20525	836.5	22.47	-4.9	15.42	34.83	7
20625	846.5	22.5	-4.9	15.45	35.08	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	21.7	-4.9	14.65	29.17	7
20525	836.5	21.78	-4.9	14.73	29.72	7
20625	846.5	21.75	-4.9	14.7	29.51	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	20.62	-4.9	13.57	22.75	7
20525	836.5	20.61	-4.9	13.56	22.7	7
20625	846.5	20.69	-4.9	13.64	23.12	7

CHANNEL BANDWIDTH: 5MHz 256QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20425	826.5	19.61	-4.9	12.56	18.03	7
20525	836.5	19.58	-4.9	12.53	17.91	7
20625	846.5	19.66	-4.9	12.61	18.24	7

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829	22.38	-4.9	15.33	34.12	7
20525	836.5	22.6	-4.9	15.55	35.89	7
20600	844	22.61	-4.9	15.56	35.97	7

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829	21.74	-4.9	14.69	29.44	7
20525	836.5	21.85	-4.9	14.8	30.2	7
20600	844	21.88	-4.9	14.83	30.41	7

CHANNEL BANDWIDTH: 10MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829	20.68	-4.9	13.63	23.07	7
20525	836.5	20.72	-4.9	13.67	23.28	7
20600	844	20.8	-4.9	13.75	23.71	7

CHANNEL BANDWIDTH: 10MHz 256QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829	19.65	-4.9	12.6	18.2	7
20525	836.5	19.68	-4.9	12.63	18.32	7
20600	844	19.7	-4.9	12.65	18.41	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

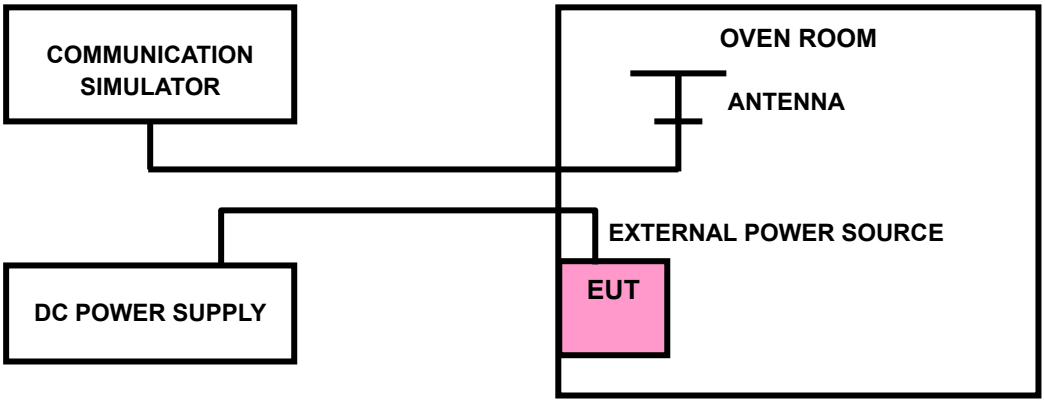
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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.

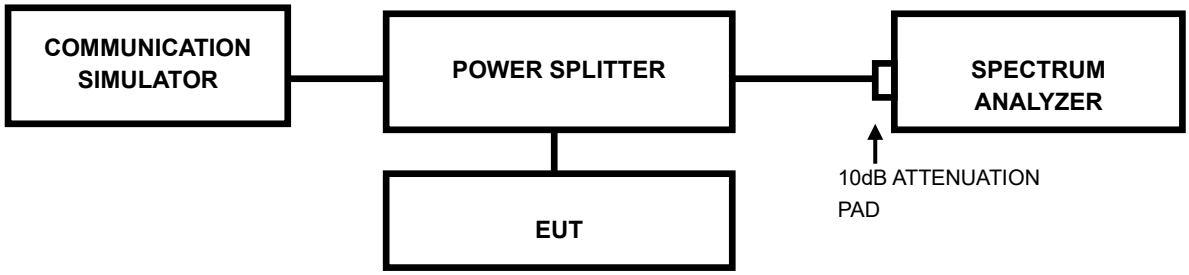
Note: VL = Low voltage(3.2V); VN/NV = Normal voltage(3.8V); VH = High voltage(4.2V);
NT = Normal temperature (25℃)

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage
0.5 %of the total mean power of a given emission.

3.3.2 TEST SETUP



3.3.3 TEST PROCEDURES

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

3.3.4 TEST RESULTS

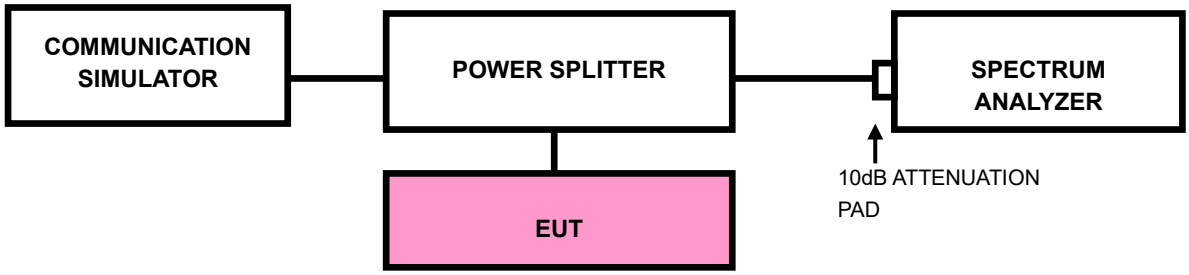
Please Refer to Appendix Of this test report.

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

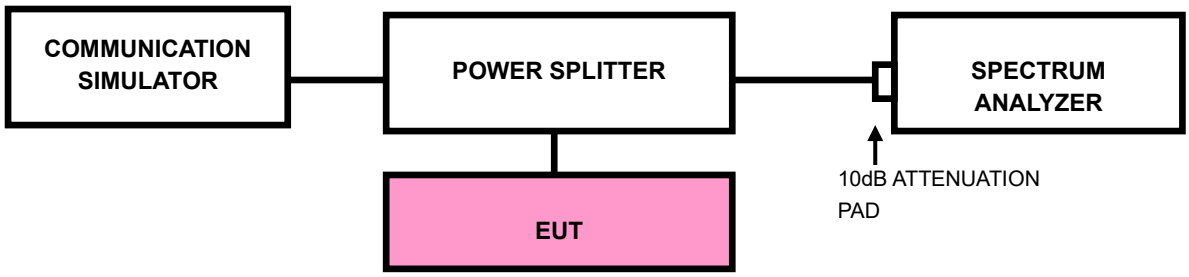
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

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.

3.5.3 TEST SETUP



3.5.4 TEST RESULTS

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

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.

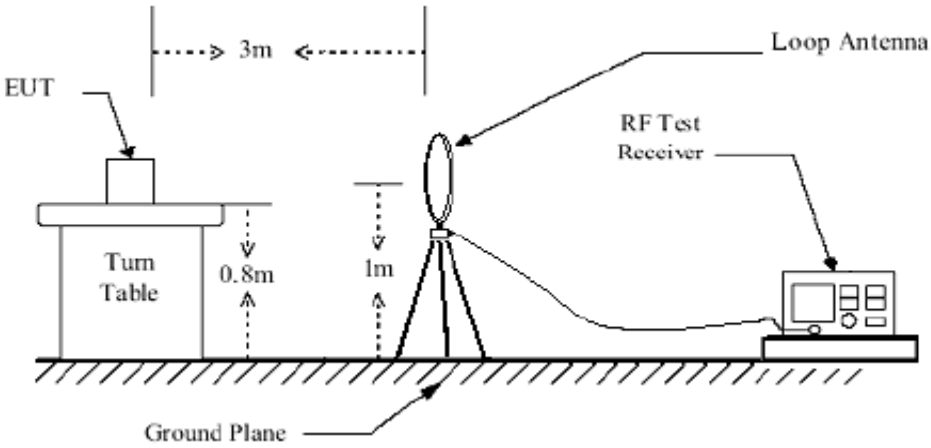
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.6.3 DEVIATION FROM TEST STANDARD

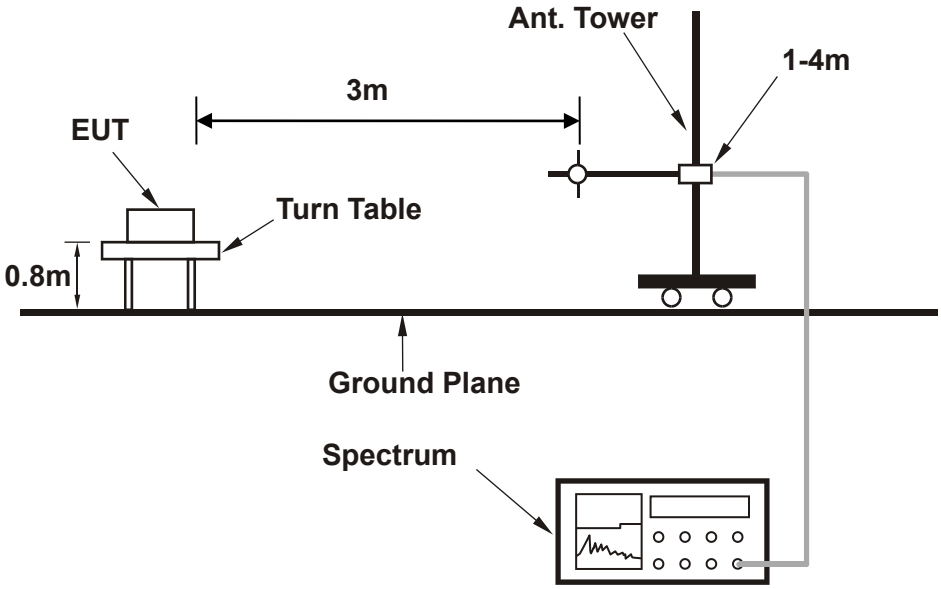
No deviation

3.6.4 TEST SETUP

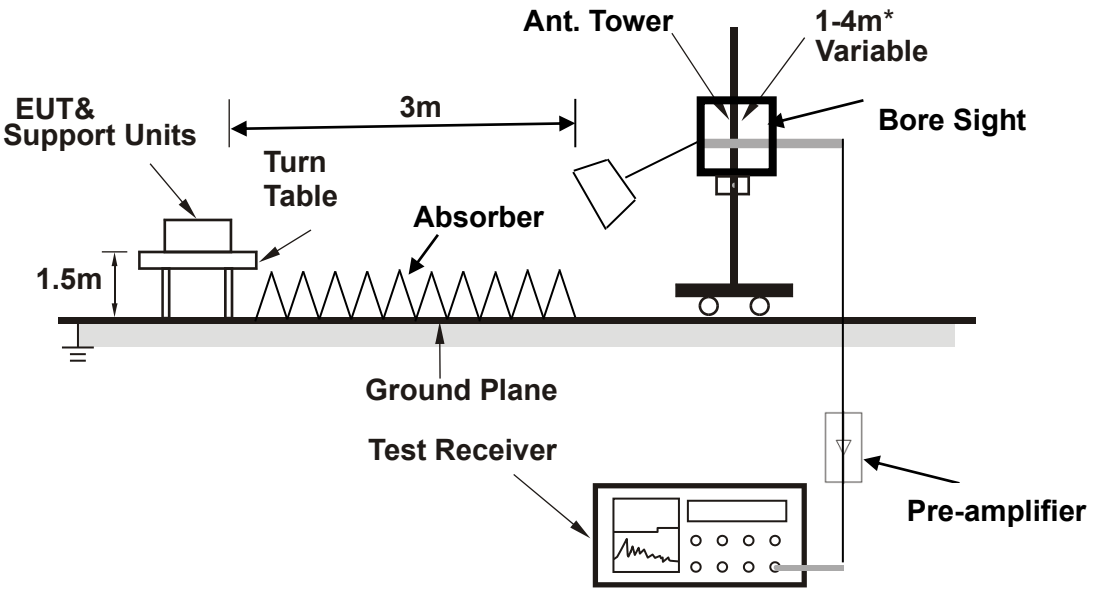
< Frequency Range below 30MHz >



< 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

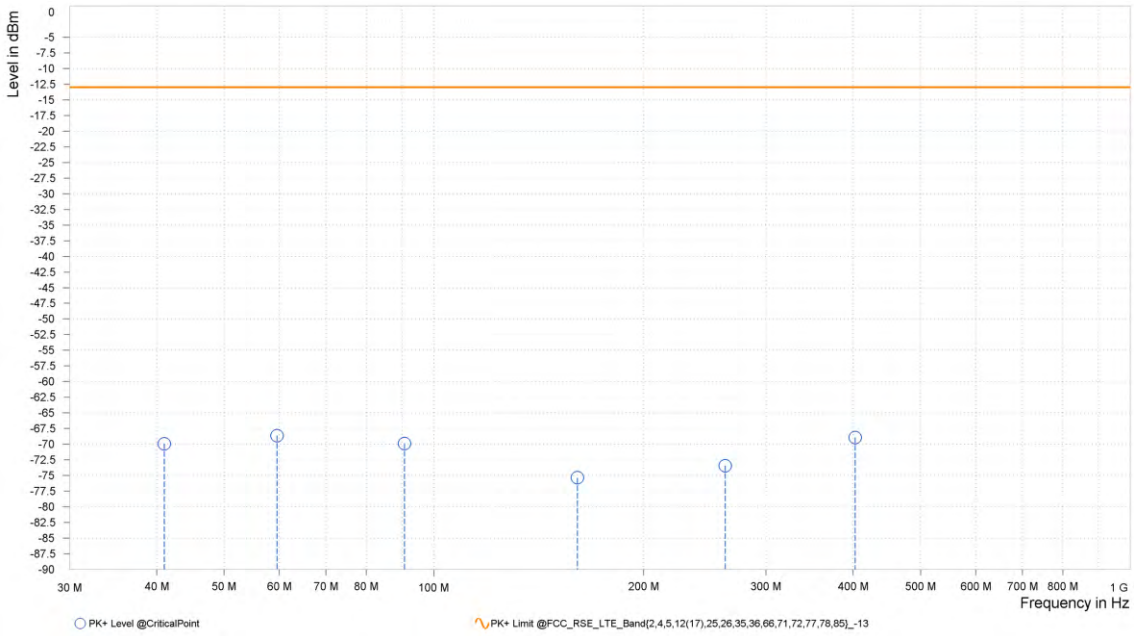
30 MHz – 1GHz data:

GSM 850 :

CHANNEL BANDWIDTH: 128 ~ 251

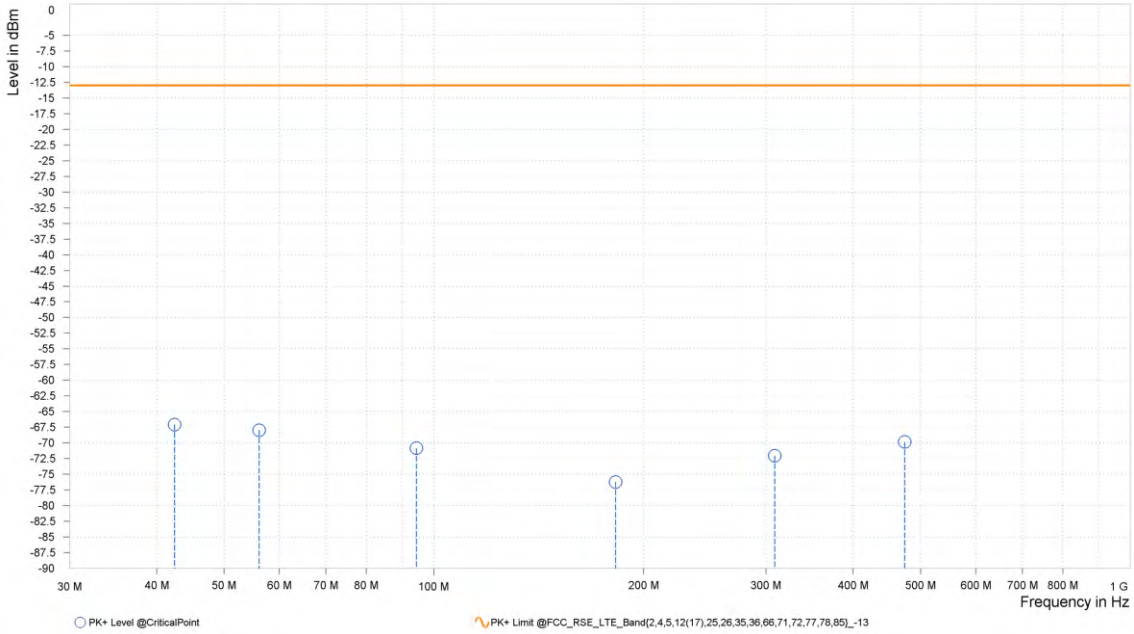
MODE	TX channel 128	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	41.000	-69.93	-13.00	56.93	0.84	H	134.6	1.00
1	59.550	-68.62	-13.00	55.62	3.58	H	131	2.00
1	90.750	-69.88	-13.00	56.88	-1.25	H	1	2.00
1	160.750	-75.35	-13.00	62.35	-4.61	H	131	2.00
1	262.200	-73.43	-13.00	60.43	3.15	H	1	1.00
1	402.750	-68.92	-13.00	55.92	7.26	H	359	1.00



MODE	TX channel 128	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	42.450	-67.09	-13.00	54.09	3.85	V	0.9	2.00
1	56.150	-67.97	-13.00	54.97	3.40	V	359	2.00
1	94.400	-70.85	-13.00	57.85	1.69	V	229.1	2.00
1	182.500	-76.23	-13.00	63.23	0.01	V	131	1.00
1	308.700	-72.06	-13.00	59.06	5.47	V	355.5	2.00
2	474.429	-69.86	-13.00	56.86	6.22	V	0.9	2.00



ABOVE 1GHz DATA

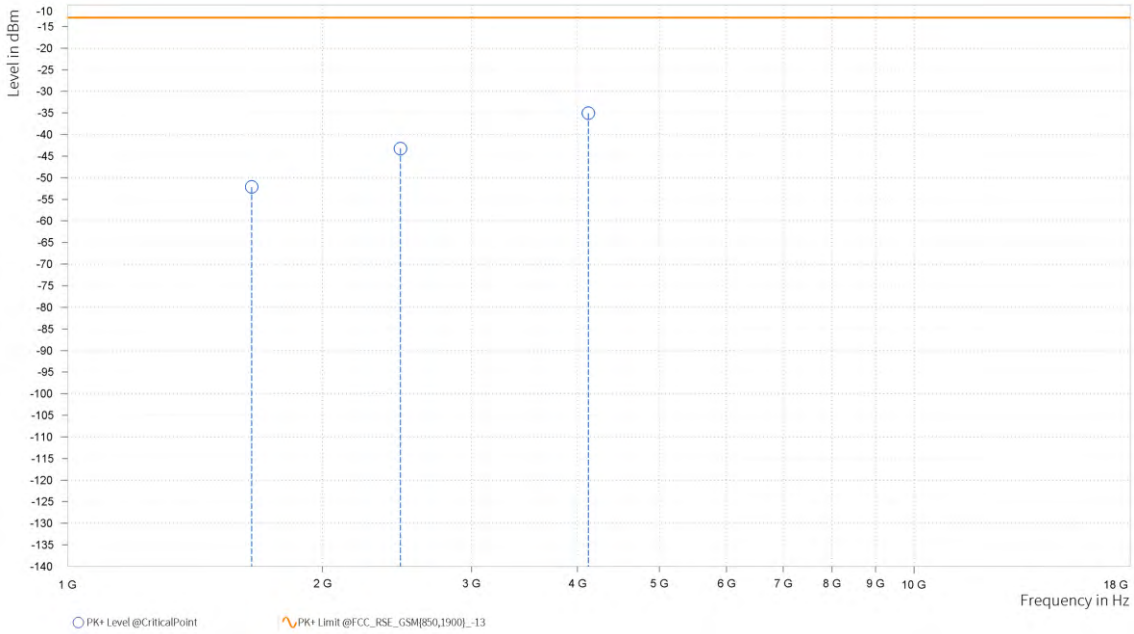
Note: For higher frequency, the emission is too low to be detected.

GSM 850

CH 128:

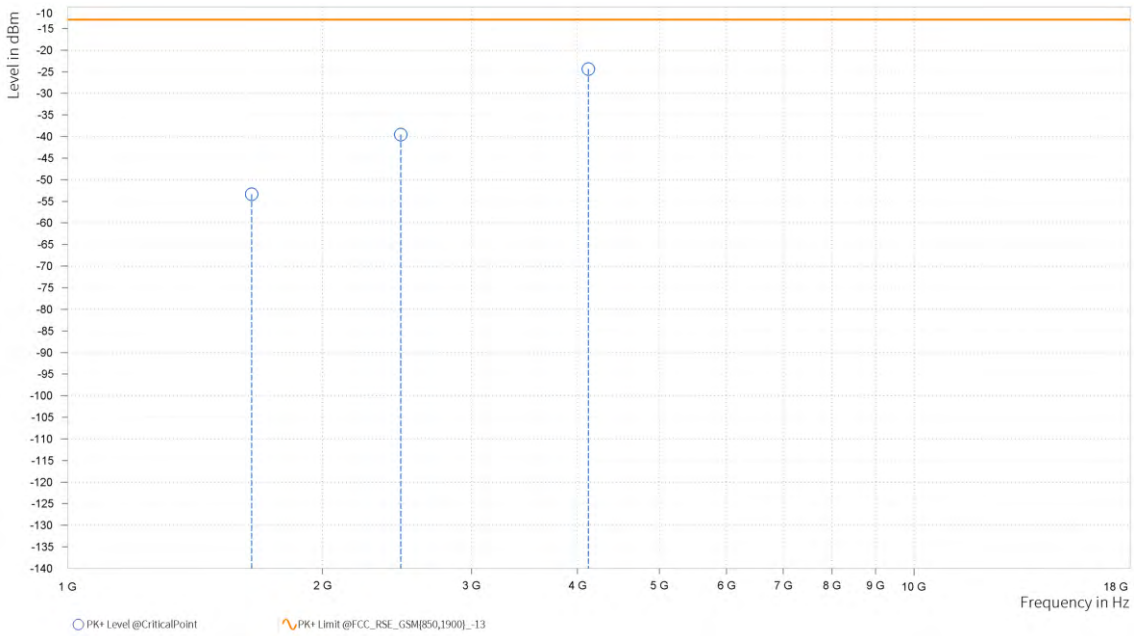
MODE	TX channel 128	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,648.400	-52.15	-13.00	39.15	15.93	H	88.9	1.00
3	2,472.500	-43.23	-13.00	30.23	20.69	H	359	2.00
4	4,121.000	-35.08	-13.00	22.08	21.74	H	237.1	1.00



MODE	TX channel 128	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

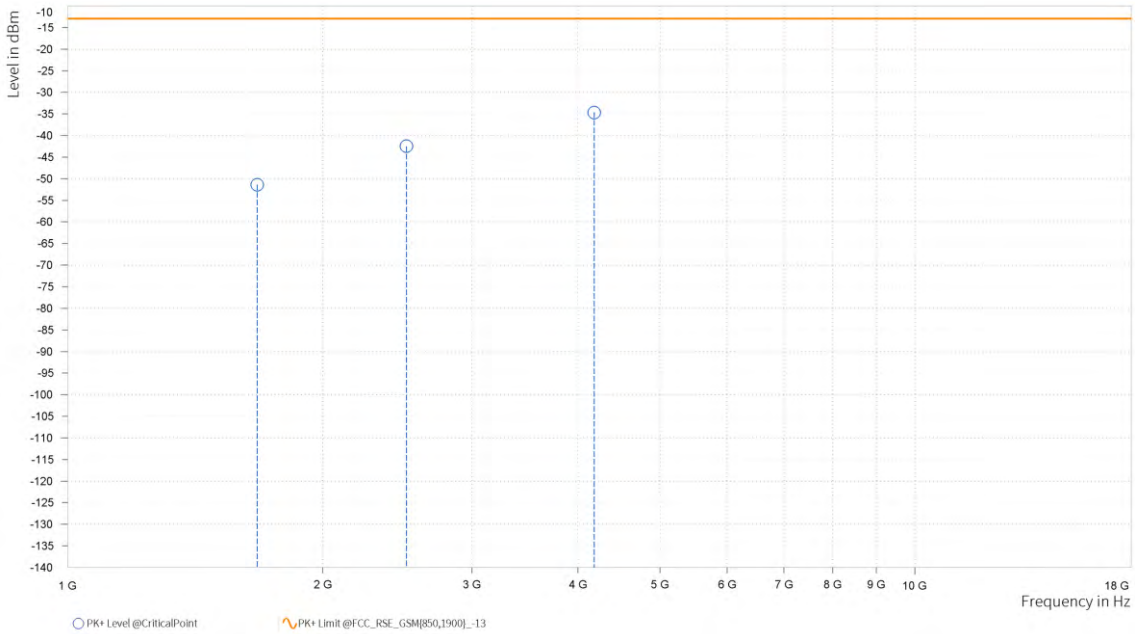
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,648.400	-53.33	-13.00	40.33	15.51	V	359.1	1.00
3	2,473.000	-39.54	-13.00	26.54	20.95	V	1	1.00
4	4,121.000	-24.36	-13.00	11.36	22.13	V	1	1.00



CH 189:

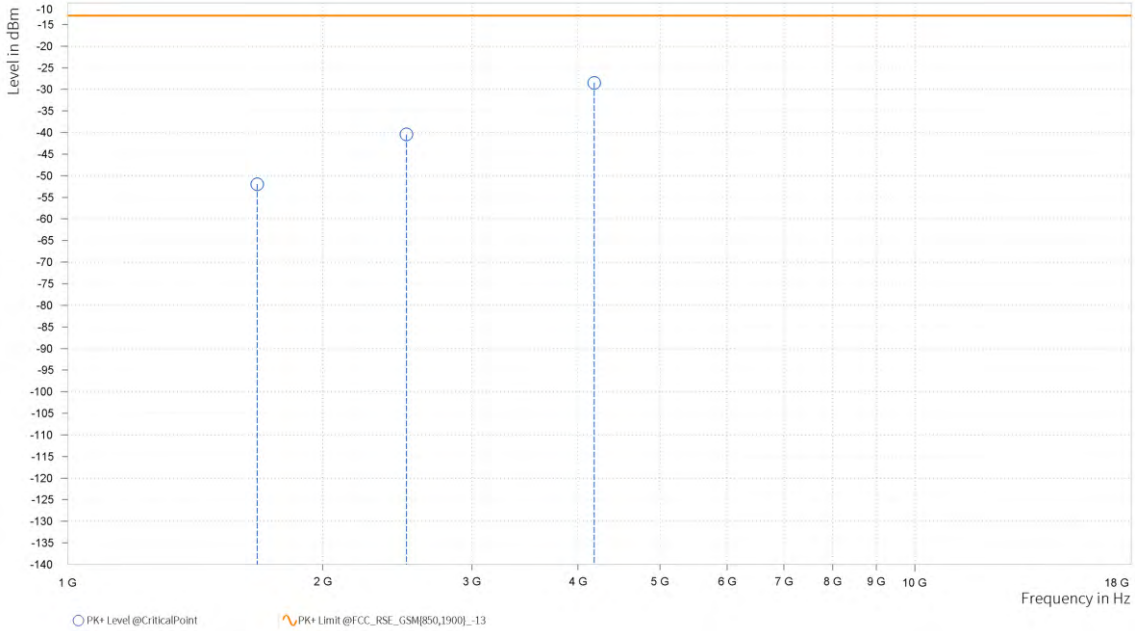
MODE	TX channel 189	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,672.800	-51.37	-13.00	38.37	16.68	H	269.8	2.00
3	2,509.500	-42.47	-13.00	29.47	20.99	H	359	2.00
4	4,181.500	-34.68	-13.00	21.68	21.79	H	359	2.00



MODE	TX channel 189	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

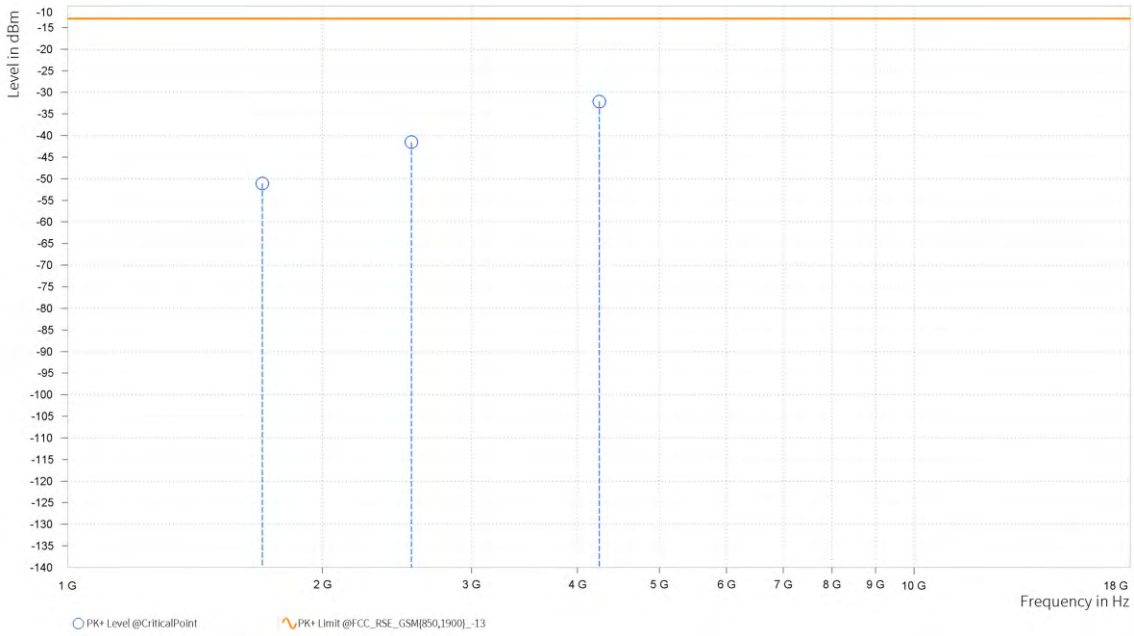
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,672.800	-51.96	-13.00	38.96	15.57	V	271	2.00
3	2,509.000	-40.43	-13.00	27.43	21.61	V	195.7	2.00
4	4,181.500	-28.50	-13.00	15.50	22.28	V	359	2.00



CH 251:

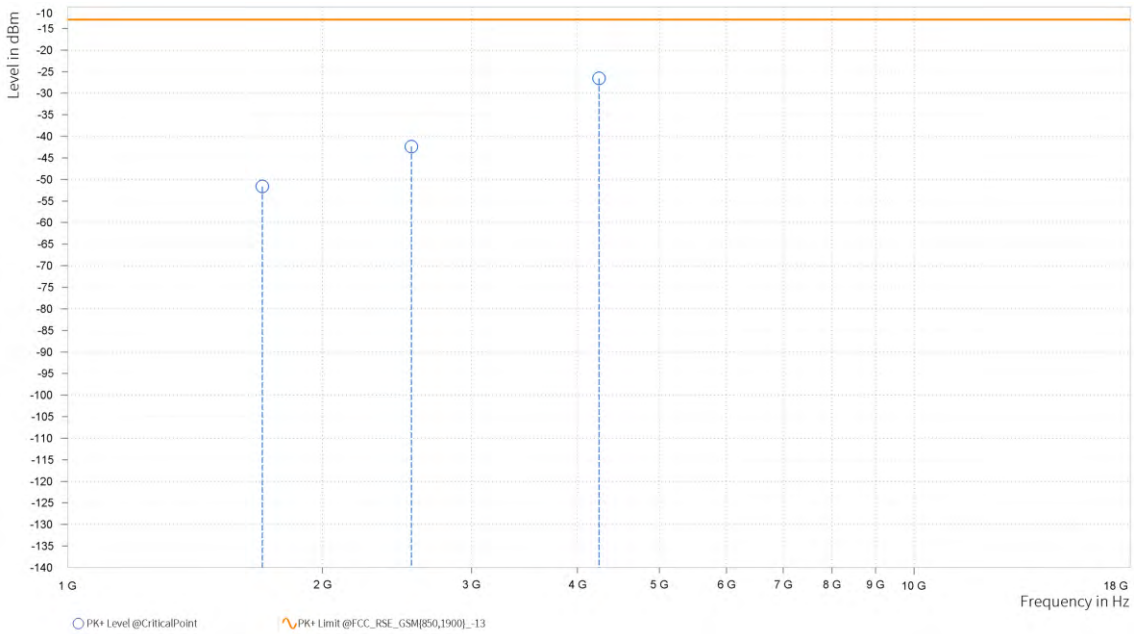
MODE	TX channel 251	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,697.600	-51.09	-13.00	38.09	17.07	H	359	2.00
3	2,546.000	-41.54	-13.00	28.54	20.93	H	359	2.00
4	4,244.500	-32.13	-13.00	19.13	22.36	H	1	2.00



MODE	TX channel 251	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,697.600	-51.64	-13.00	38.64	16.29	V	1	1.00
3	2,547.000	-42.38	-13.00	29.38	21.57	V	195.7	2.00
4	4,244.000	-26.57	-13.00	13.57	22.92	V	1	1.00

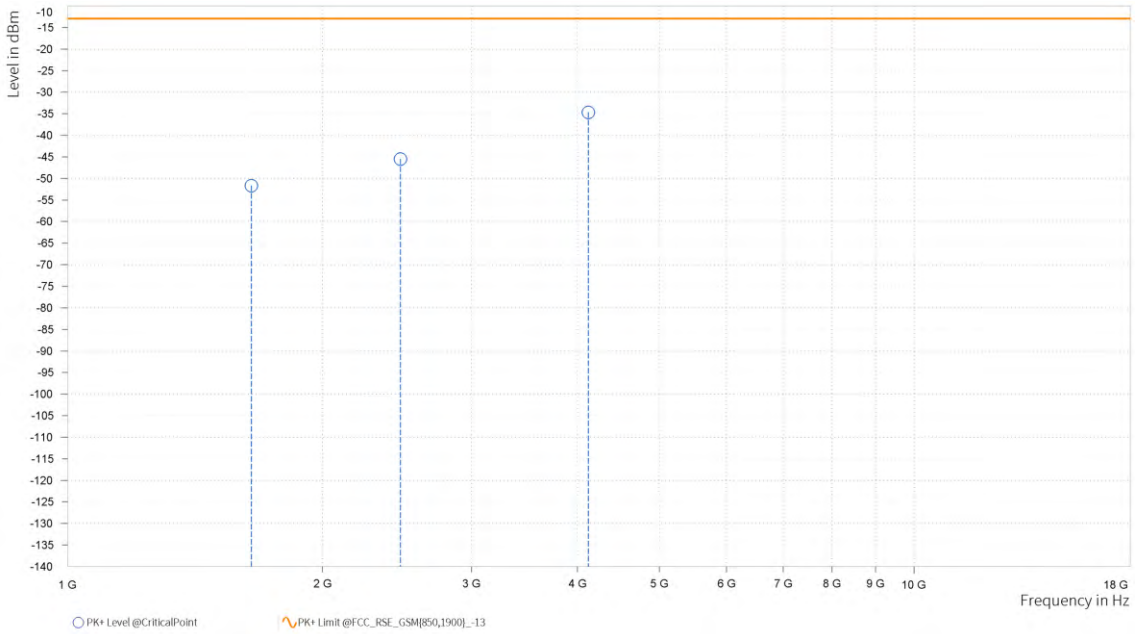


EDGE 850:

CH 128:

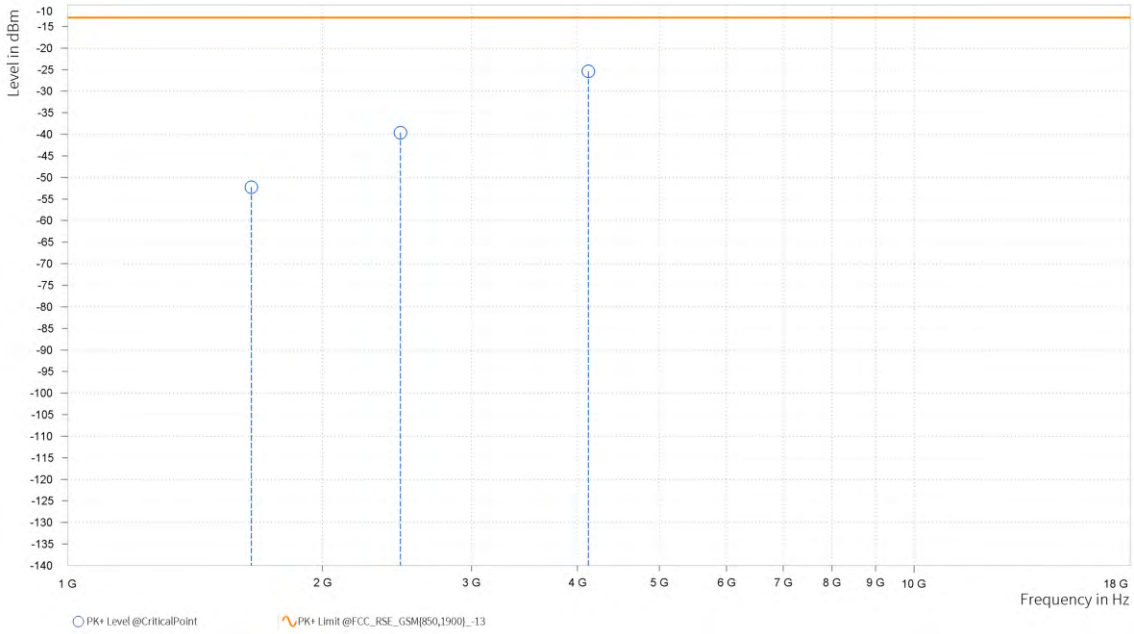
MODE	TX channel 128	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,648.000	-51.67	-13.00	38.67	15.90	H	271	2.00
3	2,472.000	-45.51	-13.00	32.51	20.69	H	165.4	1.00
4	4,120.500	-34.69	-13.00	21.69	21.74	H	0.9	2.00



MODE	TX channel 128	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

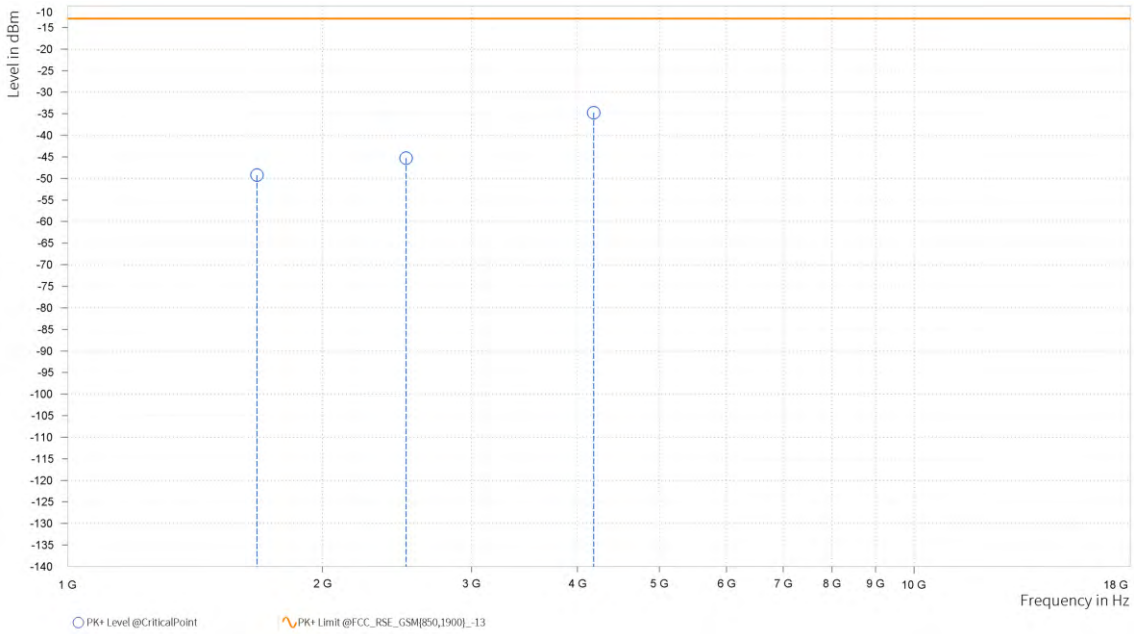
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,648.000	-52.24	-13.00	39.24	15.51	V	265	2.00
3	2,472.500	-39.61	-13.00	26.61	20.95	V	166.6	1.00
4	4,121.500	-25.41	-13.00	12.41	22.13	V	359.1	1.00



CH 189:

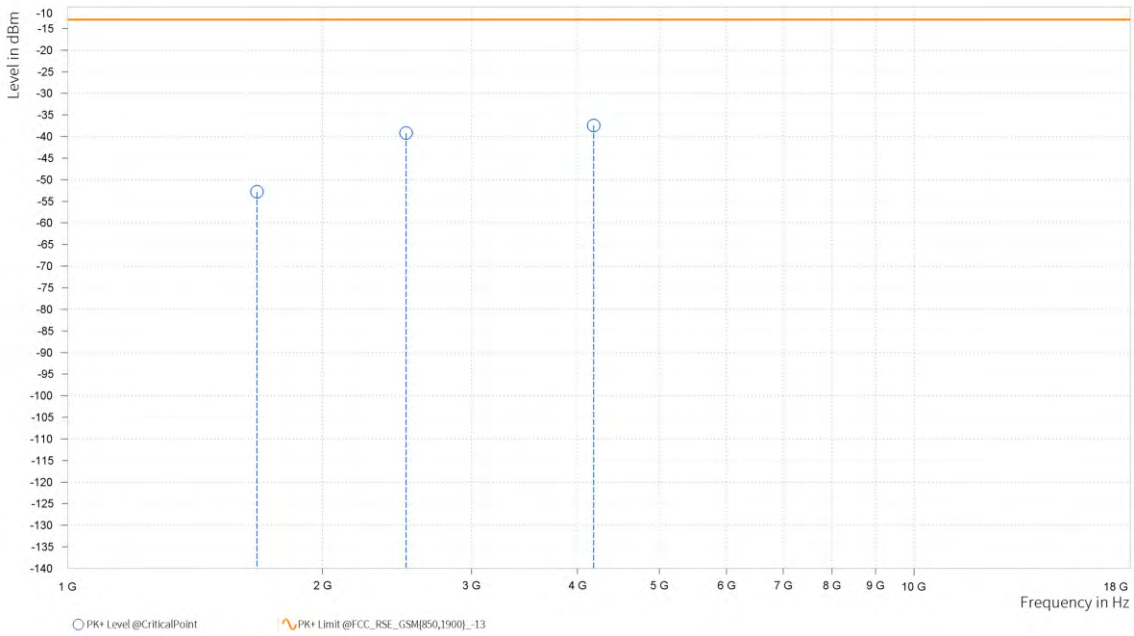
MODE	TX channel 189	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,672.800	-49.23	-13.00	36.23	16.68	H	0.9	2.00
3	2,509.200	-45.28	-13.00	32.28	21.00	H	0.9	2.00
4	4,181.500	-34.76	-13.00	21.76	21.79	H	1	1.00



MODE	TX channel 189	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

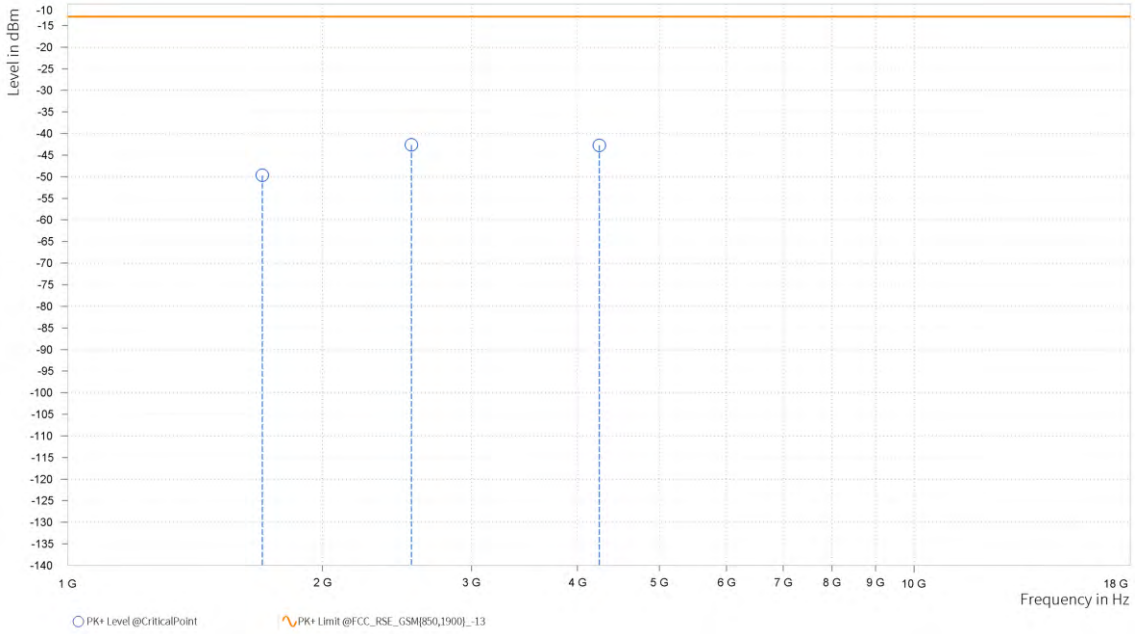
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,672.800	-52.81	-13.00	39.81	15.57	V	359	2.00
3	2,509.000	-39.21	-13.00	26.21	21.61	V	1	1.00
4	4,182.500	-37.45	-13.00	24.45	22.29	V	120.4	2.00



CH 251:

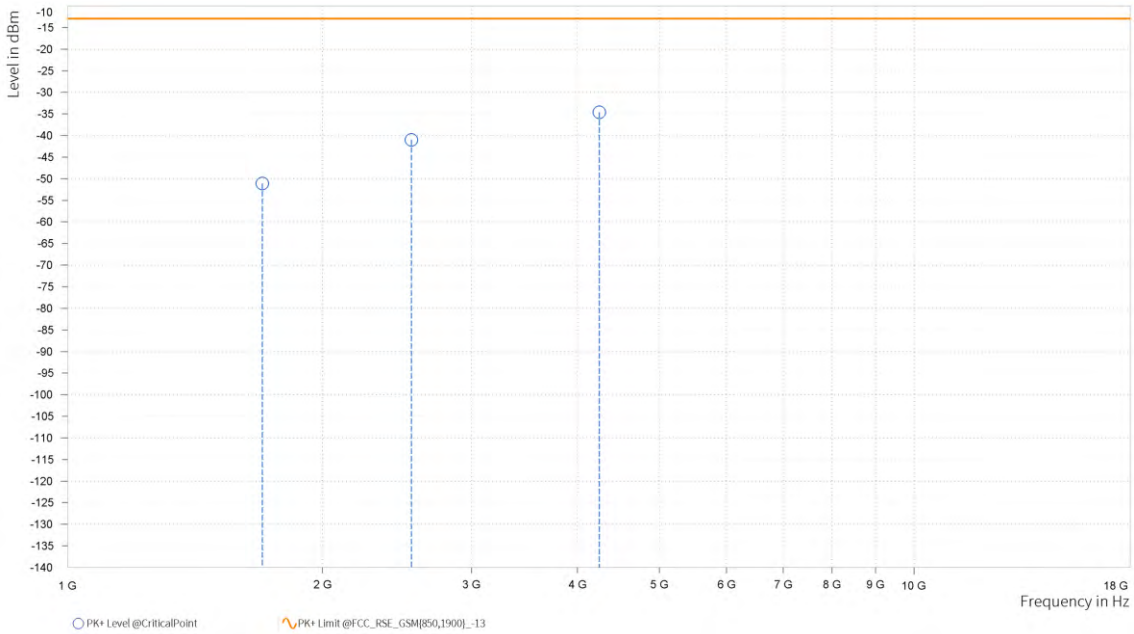
MODE	TX channel 251	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,697.500	-49.66	-13.00	36.66	17.07	H	269.8	2.00
3	2,546.000	-42.61	-13.00	29.61	20.93	H	1	1.00
4	4,245.000	-42.72	-13.00	29.72	22.37	H	0.9	2.00



MODE	TX channel 251	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,697.500	-51.08	-13.00	38.08	16.29	V	1	1.00
3	2,546.000	-41.00	-13.00	28.00	21.56	V	359	1.00
4	4,244.500	-34.61	-13.00	21.61	22.92	V	270.6	1.00

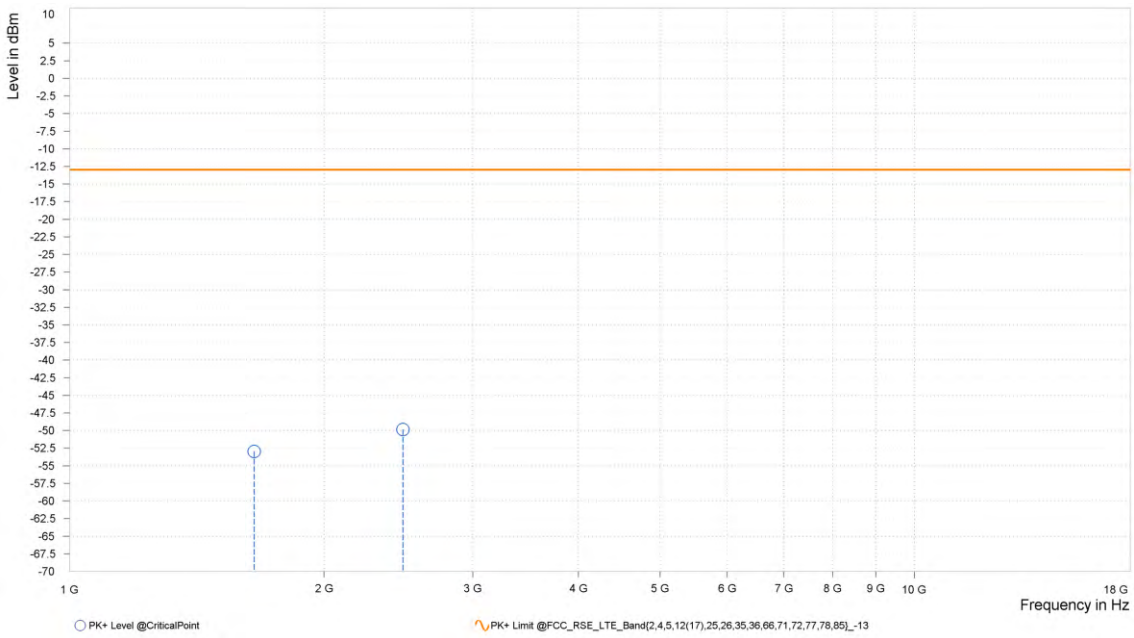


WCDMA Band V:

CH 4132:

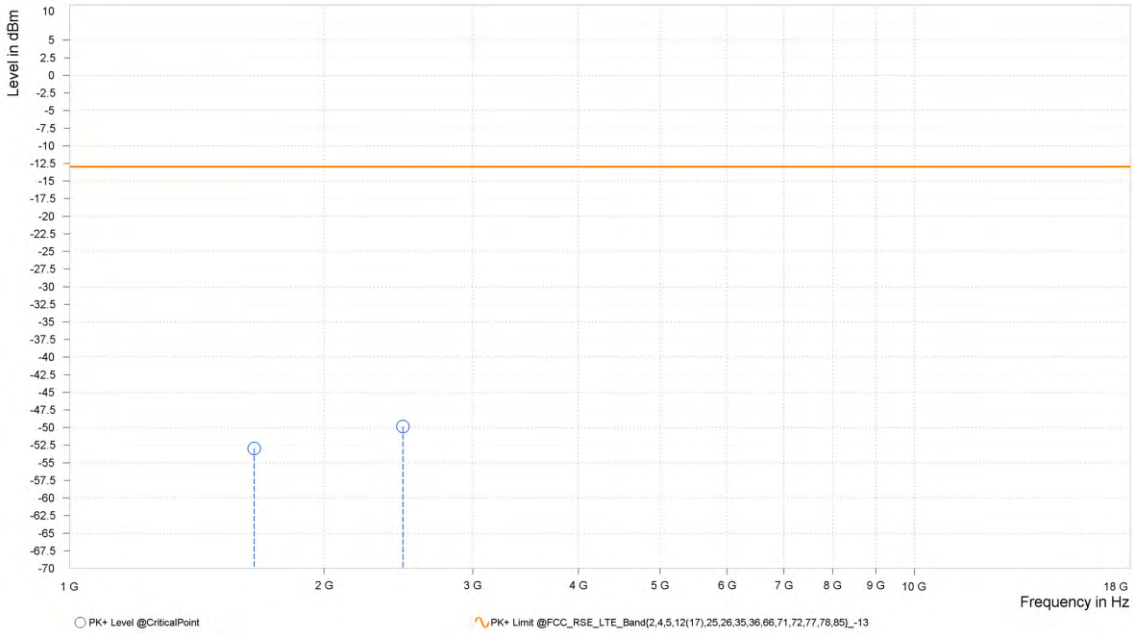
MODE	TX channel 4132	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,652.800	-52.95	-13.00	39.95	7.15	H	355.4	2.00
1	2,479.200	-49.85	-13.00	36.85	12.38	H	359	2.00



MODE	TX channel 4132	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

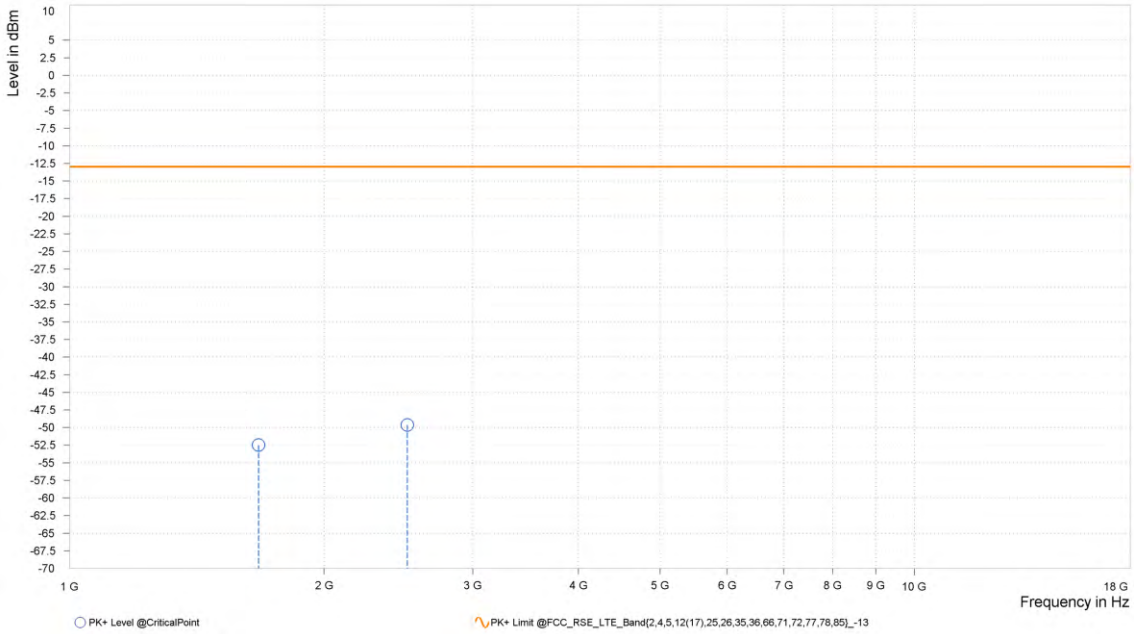
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,652.800	-54.90	-13.00	41.90	6.62	V	5.2	1.00
1	2,479.200	-50.58	-13.00	37.58	12.06	V	133.4	2.00



CH 4182:

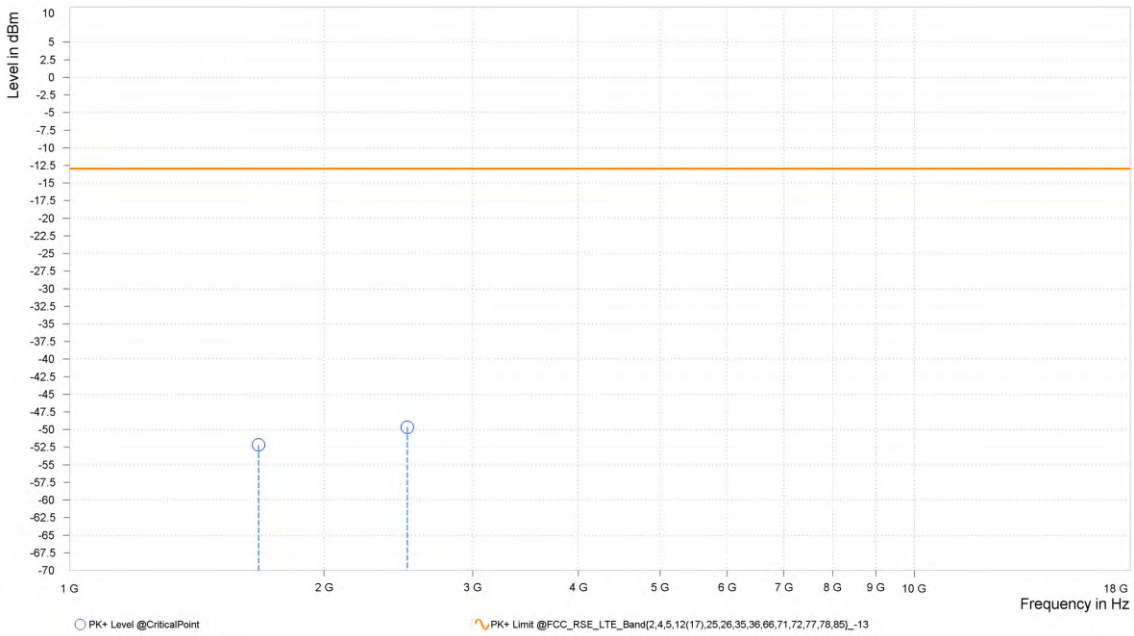
MODE	TX channel 4182	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,672.800	-52.50	-13.00	39.50	7.83	H	2.2	2.00
1	2,509.200	-49.63	-13.00	36.63	12.28	H	5.2	1.00



MODE	TX channel 4182	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

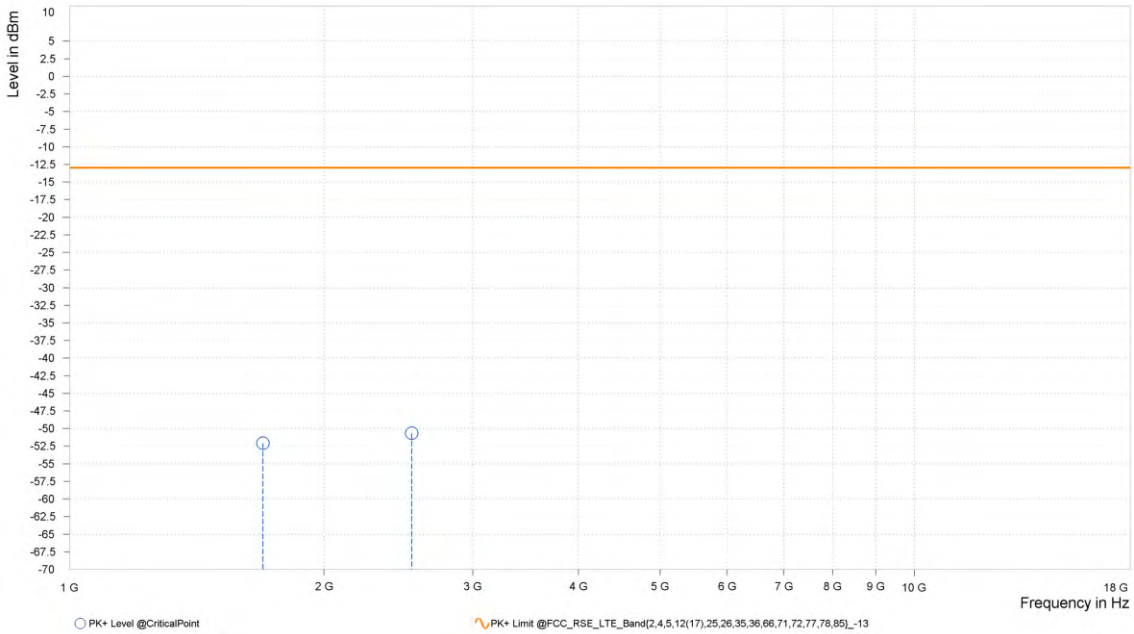
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,672.800	-52.18	-13.00	39.18	7.63	V	1	1.00
1	2,509.200	-49.67	-13.00	36.67	11.94	V	1	1.00



CH 4233:

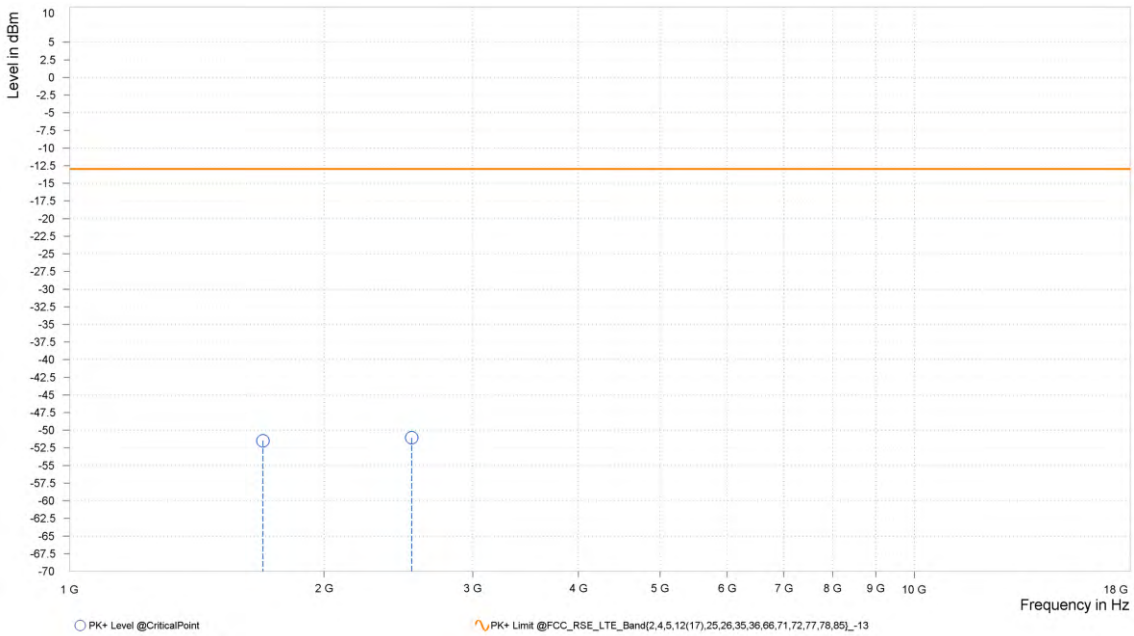
MODE	TX channel 4233	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,693.200	-52.09	-13.00	39.09	8.41	H	129.8	2.00
1	2,539.800	-50.67	-13.00	37.67	12.12	H	5.8	1.00



MODE	TX channel 4233	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,693.200	-51.48	-13.00	38.48	8.54	V	359	2.00
1	2,539.800	-51.07	-13.00	38.07	11.89	V	356.1	2.00



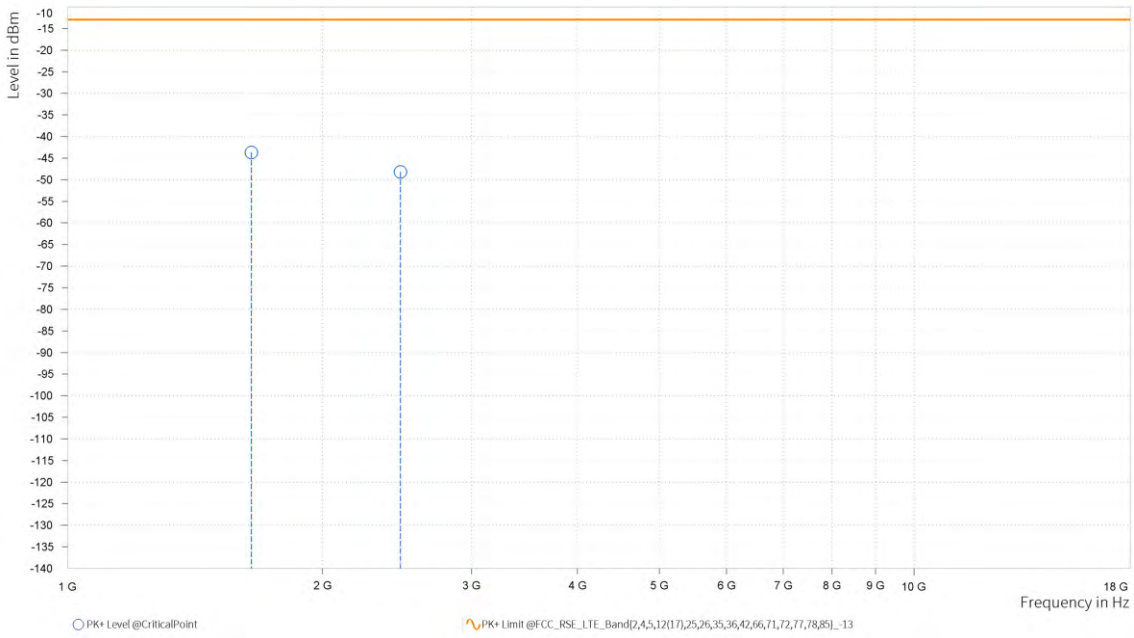
LTE Band 5

CHANNEL BANDWIDTH: 1.4MHz / QPSK

CH20407

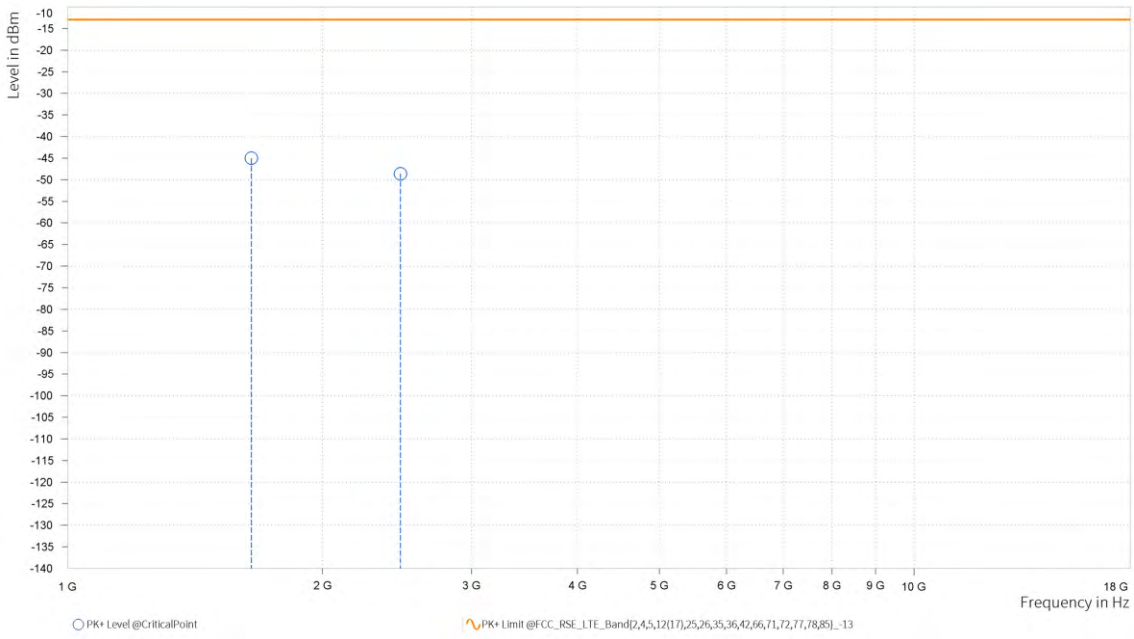
MODE	TX channel 20407	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,648.140	-43.68	-13.00	30.68	25.00	H	359.1	1.00
3	2,472.210	-48.18	-13.00	35.18	20.80	H	0.9	2.00



MODE	TX channel 20407	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

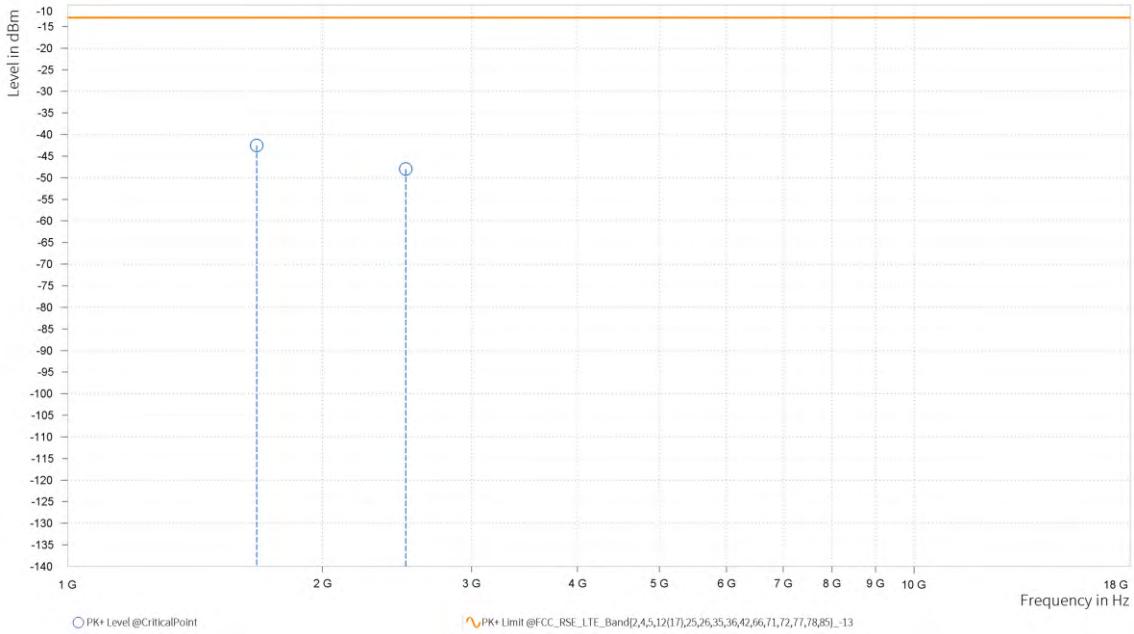
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,648.140	-45.02	-13.00	32.02	24.62	V	54.3	1.00
3	2,472.210	-48.62	-13.00	35.62	21.06	V	257.8	2.00



CH20525

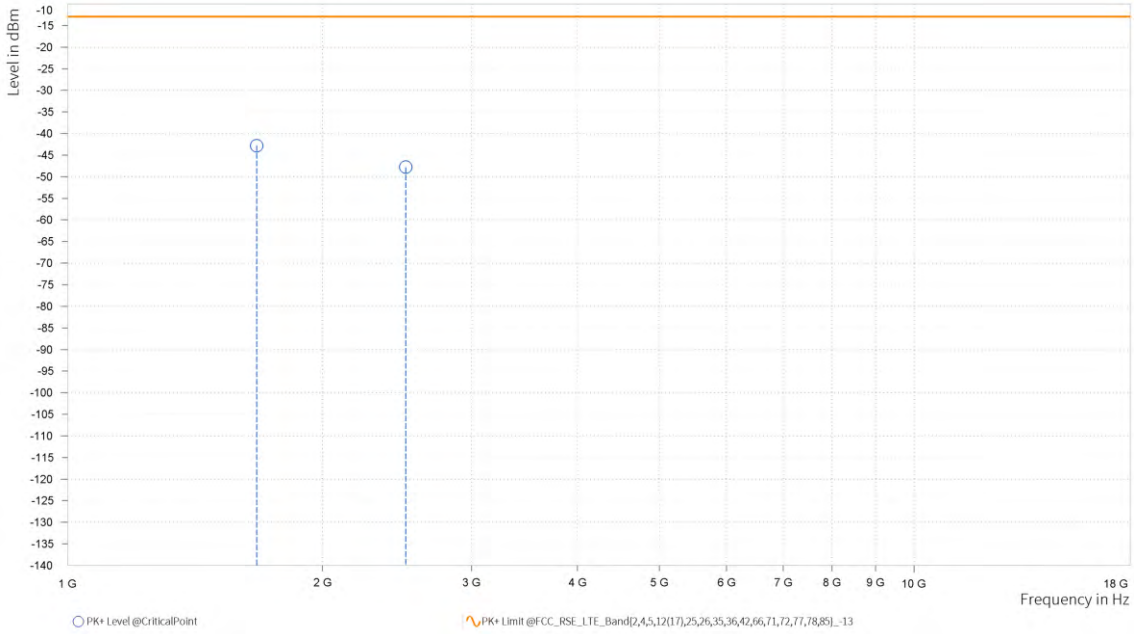
MODE	TX channel 20525	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,671.740	-42.53	-13.00	29.53	25.74	H	309.2	2.00
3	2,507.610	-48.01	-13.00	35.01	21.17	H	357.4	1.00



MODE	TX channel 20525	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

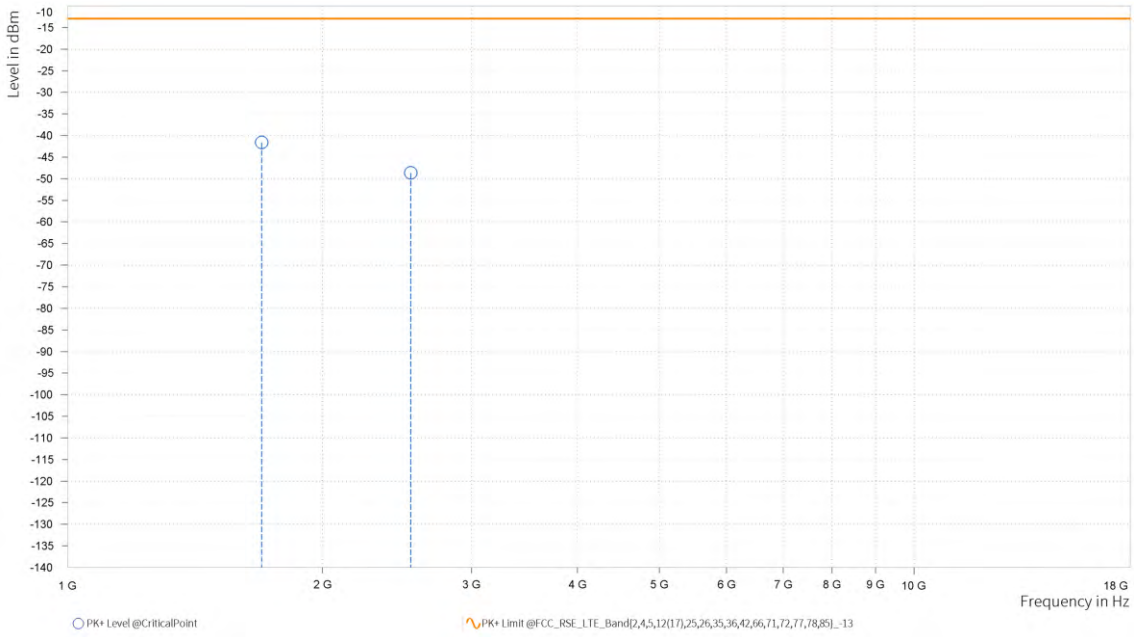
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,671.740	-42.80	-13.00	29.80	24.63	V	5	2.00
3	2,507.610	-47.78	-13.00	34.78	21.73	V	101	1.00



CH20643

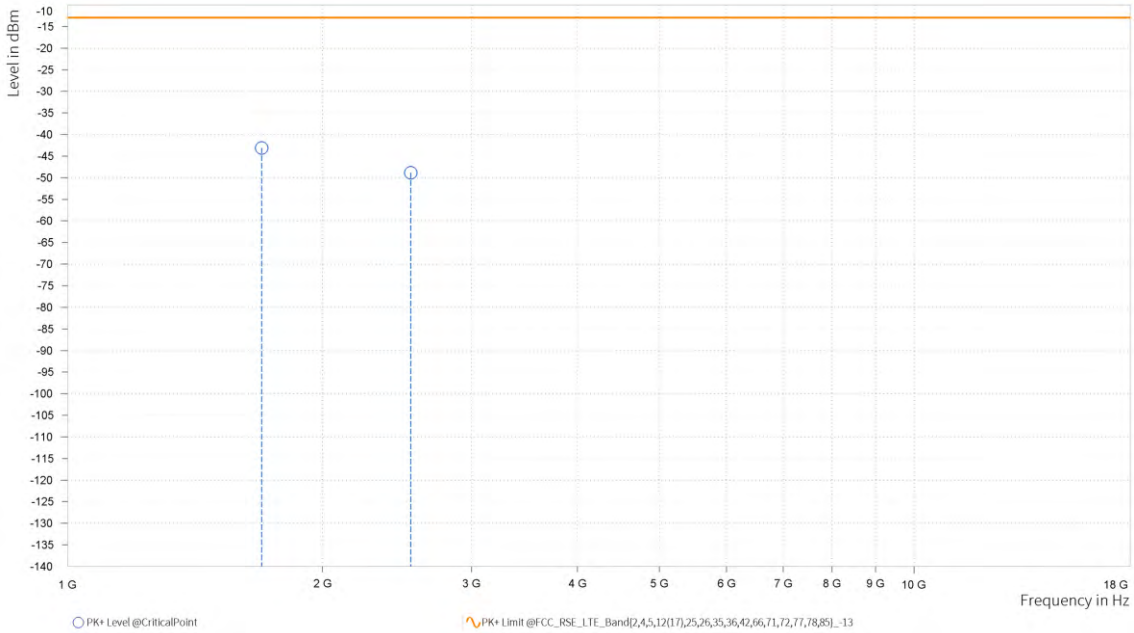
MODE	TX channel 20643	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,695.340	-41.62	-13.00	28.62	26.14	H	310.4	2.00
3	2,543.010	-48.66	-13.00	35.66	21.00	H	294.6	1.00



MODE	TX channel 20643	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

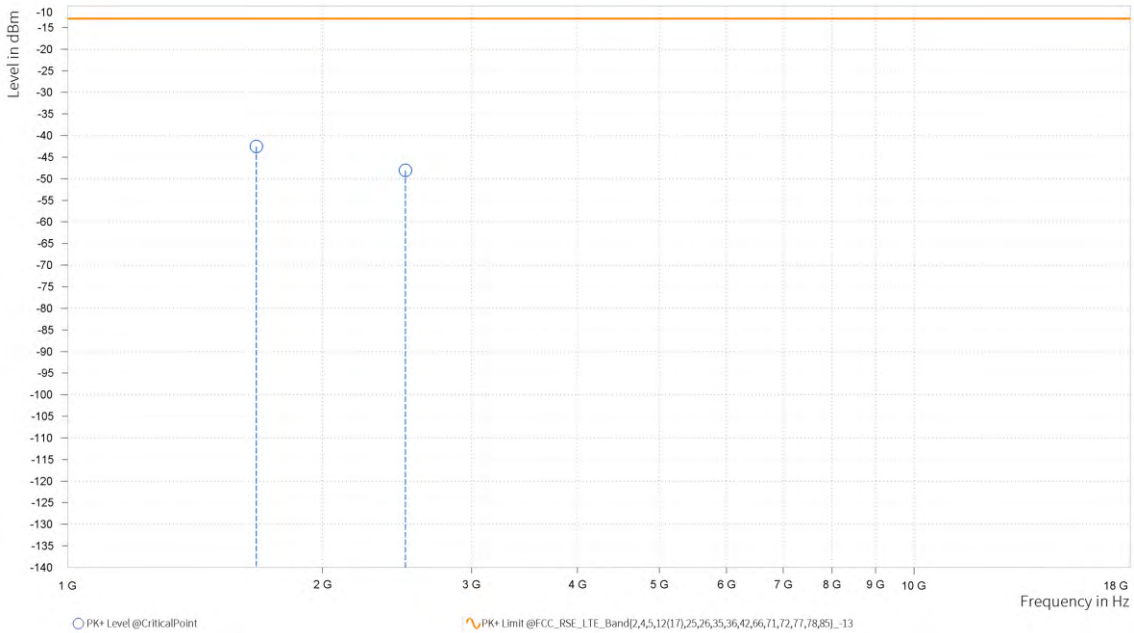
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,695.340	-43.10	-13.00	30.10	25.28	V	355	1.00
3	2,543.010	-48.84	-13.00	35.84	21.66	V	0.9	2.00



CHANNEL BANDWIDTH: 3MHz / QPSK

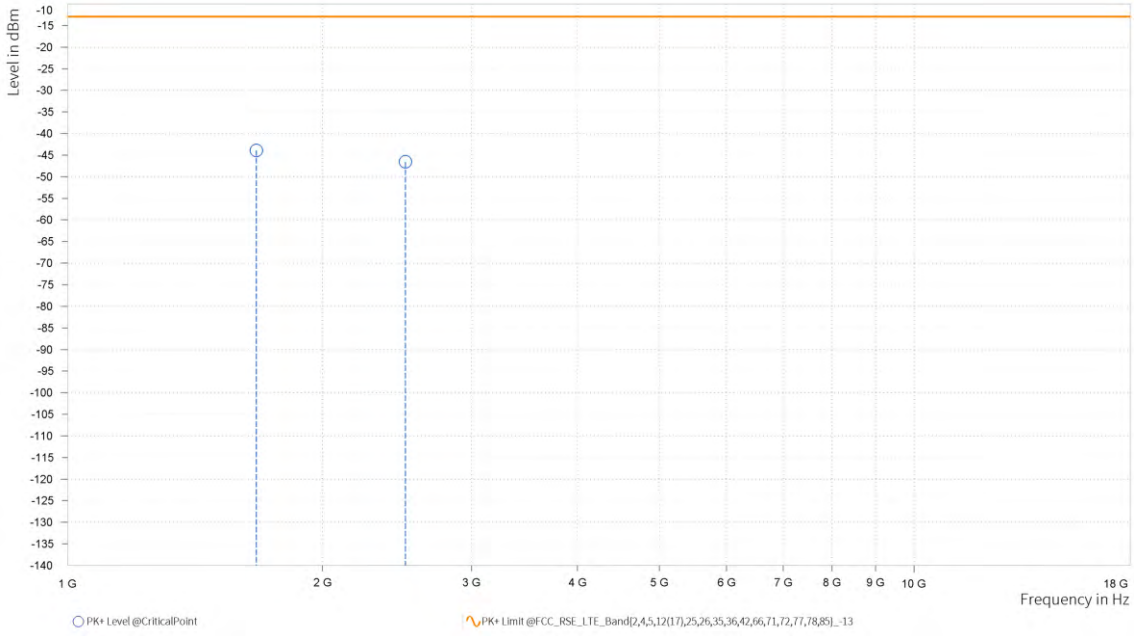
MODE	TX channel 20525	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,670.300	-42.54	-13.00	29.54	25.72	H	79.8	2.00
3	2,505.450	-48.09	-13.00	35.09	21.15	H	313.7	1.00



MODE	TX channel 20525	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

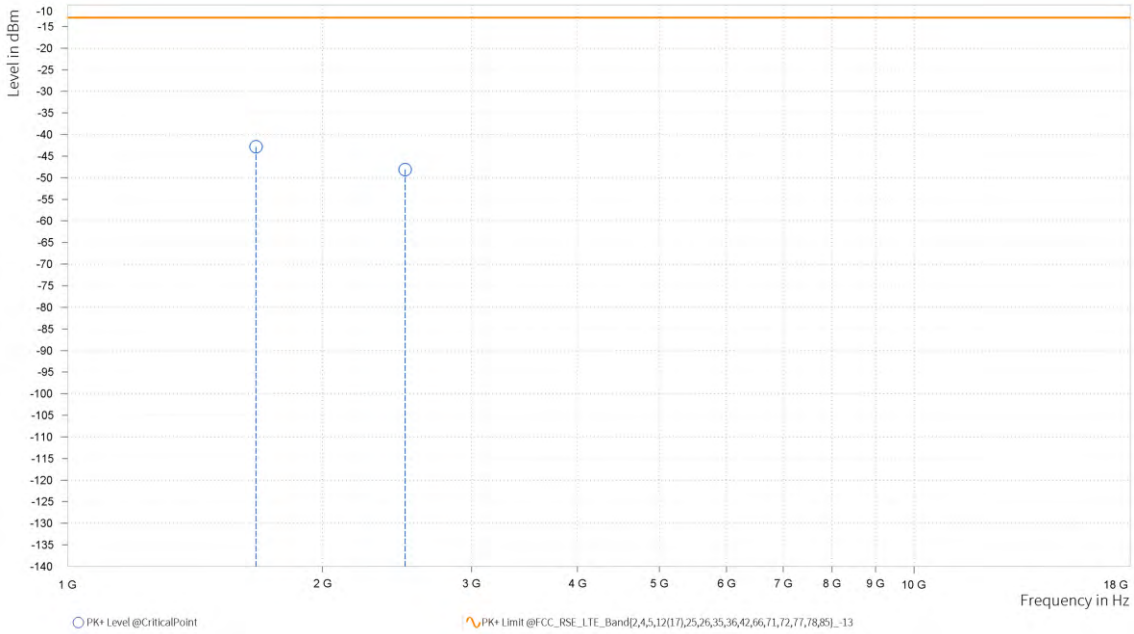
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,670.300	-43.89	-13.00	30.89	24.61	V	359	2.00
3	2,505.450	-46.54	-13.00	33.54	21.67	V	53.5	2.00



CHANNEL BANDWIDTH: 5MHz / QPSK

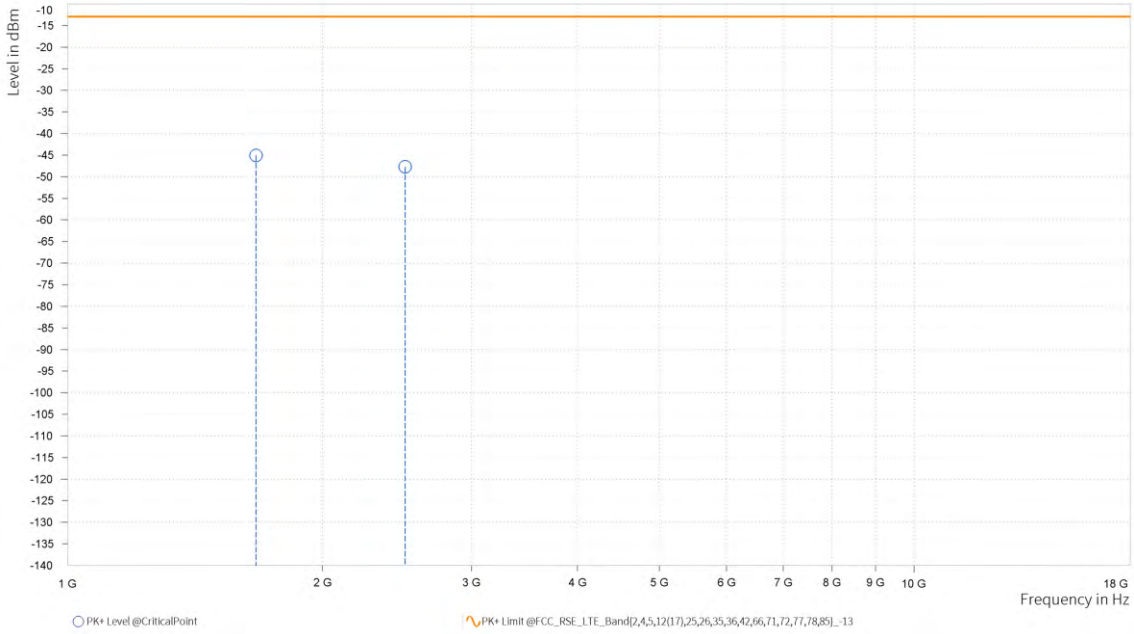
MODE	TX channel 20525	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,668.500	-42.85	-13.00	29.85	25.69	H	305.3	1.00
3	2,502.750	-48.10	-13.00	35.10	21.14	H	257.8	2.00



MODE	TX channel 20525	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

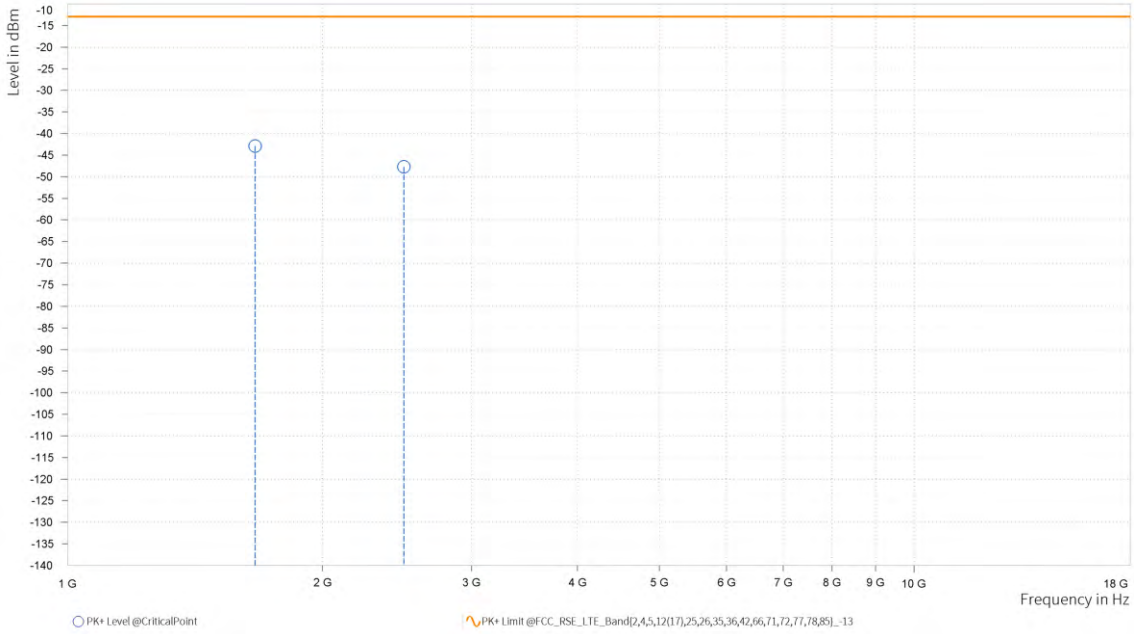
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,668.500	-45.04	-13.00	32.04	24.58	V	308	2.00
3	2,502.750	-47.71	-13.00	34.71	21.58	V	304.2	1.00



CHANNEL BANDWIDTH: 10MHz / QPSK

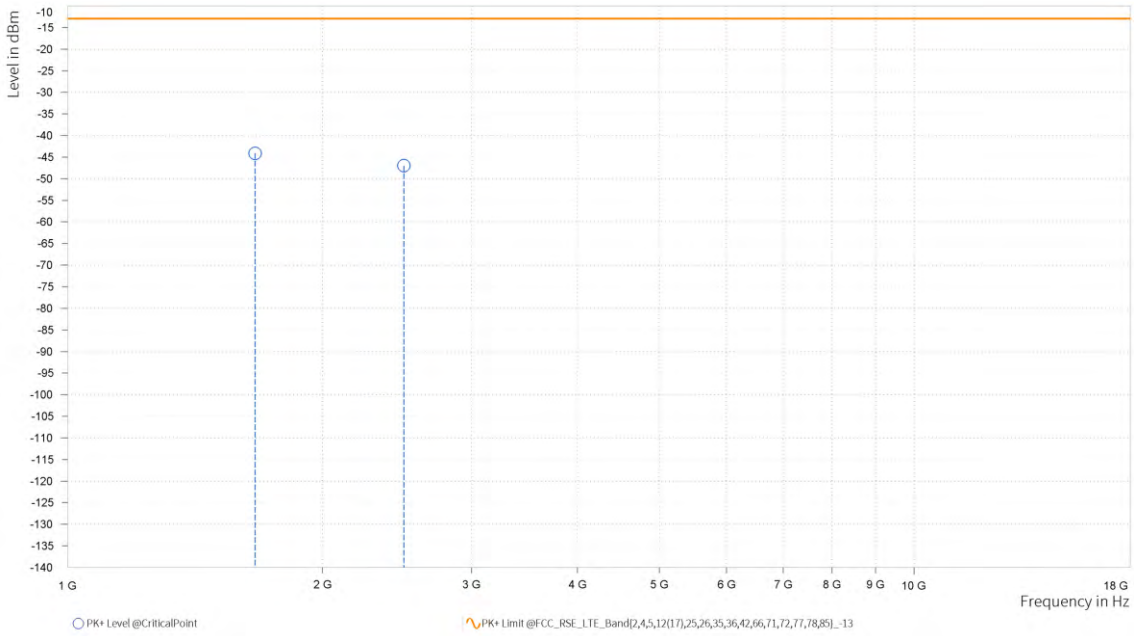
MODE	TX channel 20525	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,664.000	-42.88	-13.00	29.88	25.62	H	359	1.00
3	2,496.000	-47.72	-13.00	34.72	21.20	H	1	1.00



MODE	TX channel 20525	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,664.000	-44.12	-13.00	31.12	24.50	V	309.3	2.00
3	2,496.000	-46.97	-13.00	33.97	21.48	V	67.8	2.00

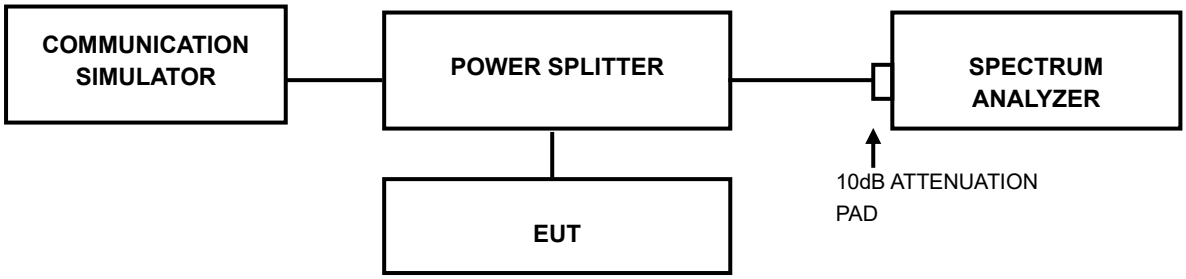


3.7 PEAK TO AVERAGE RATIO

3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

3.7.2 TEST SETUP



3.7.3 TEST PROCEDURES

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

3.7.4 TEST RESULTS

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.

Huarui 7Layers High Technology (Suzhou) Co., Ltd.
Lab Address:
Tower N, Innovation Center, 88 Zuyi Road, High-tech District, Suzhou City, Anhui Province
Accredited Test Lab Cert 6613.01

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	2.64	13	PASS
GSM850	189	2.65	13	PASS
GSM850	251	2.68	13	PASS
EGPRS850	128	5.91	13	PASS
EGPRS850	189	5.81	13	PASS
EGPRS850	251	5.75	13	PASS

Test Graphs

GSM850-128

GSM850-189

GSM850-251

EGPRS850-128

EGPRS850-189

EGPRS850-251

26DB BANDWIDTH AND OCCUPIED BANDWIDTH

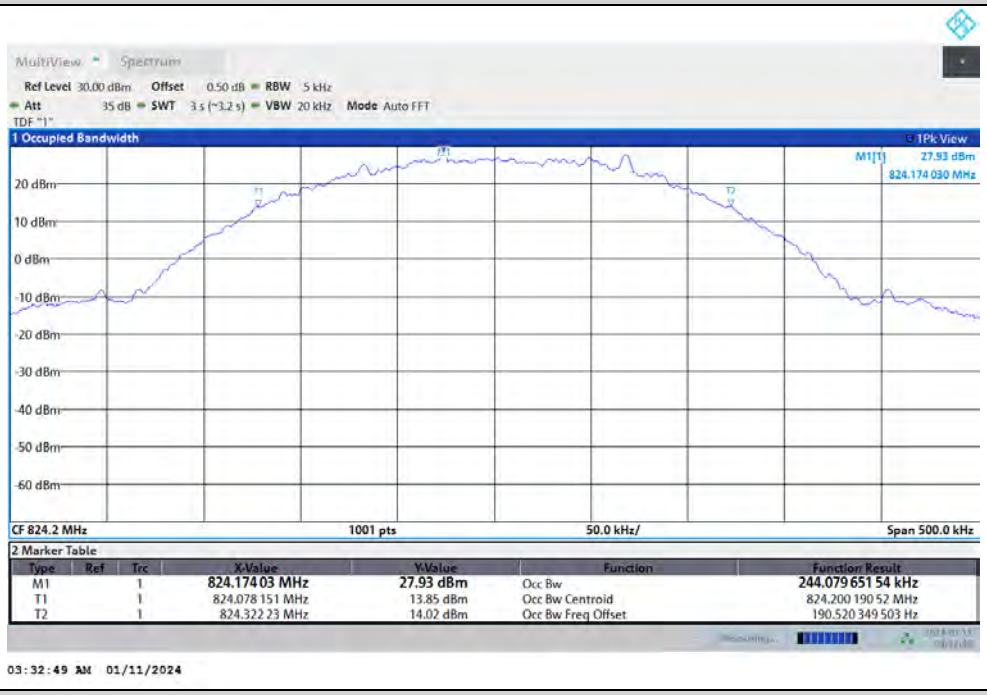
Test Result

Band	Channel	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Limit (MHz)	Verdict
GSM850	128	244.080	317.180	---	PASS
GSM850	189	244.575	313.690	---	PASS
GSM850	251	243.815	313.690	---	PASS
EGPRS850	128	242.141	311.190	---	PASS
EGPRS850	189	243.882	309.690	---	PASS
EGPRS850	251	244.083	310.190	---	PASS

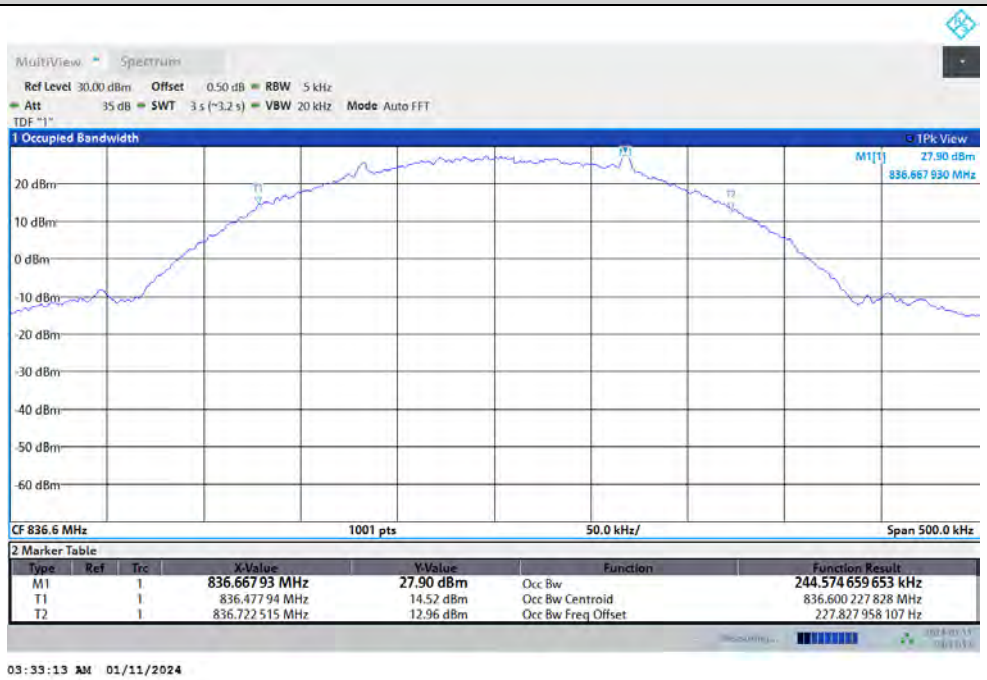
Test Graphs

Occupied Bandwidth

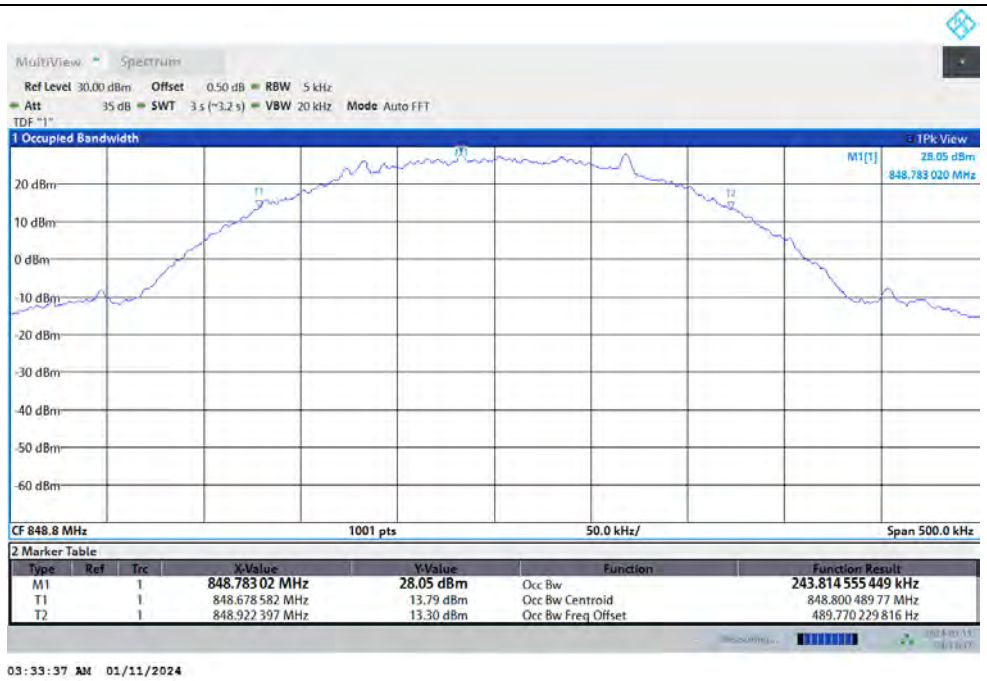
GSM850-128



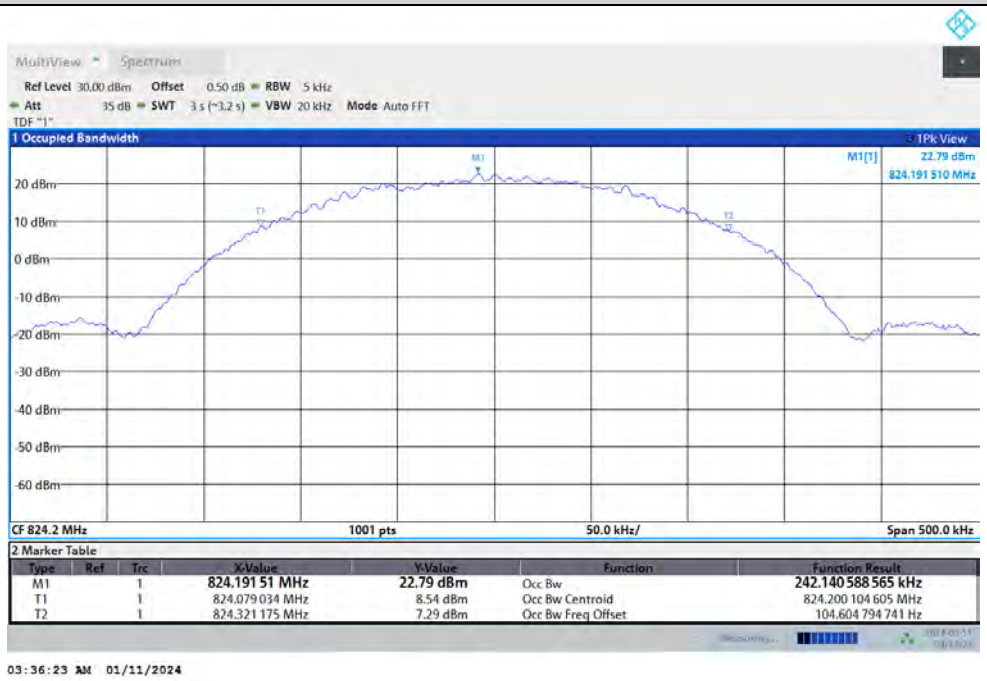
GSM850-189



GSM850-251



EGPRS850-128



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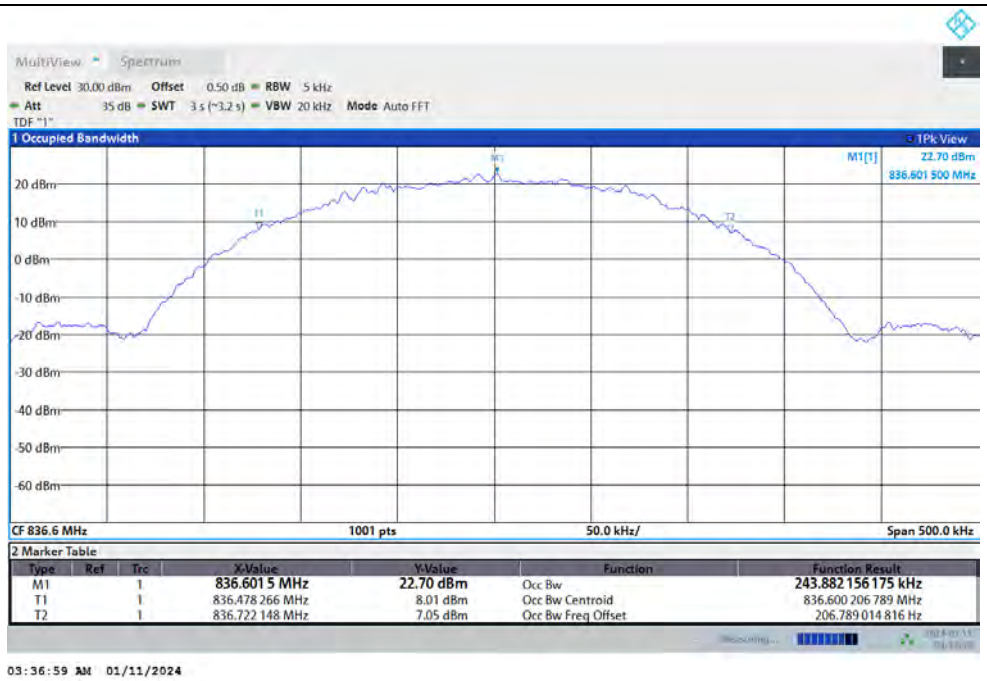
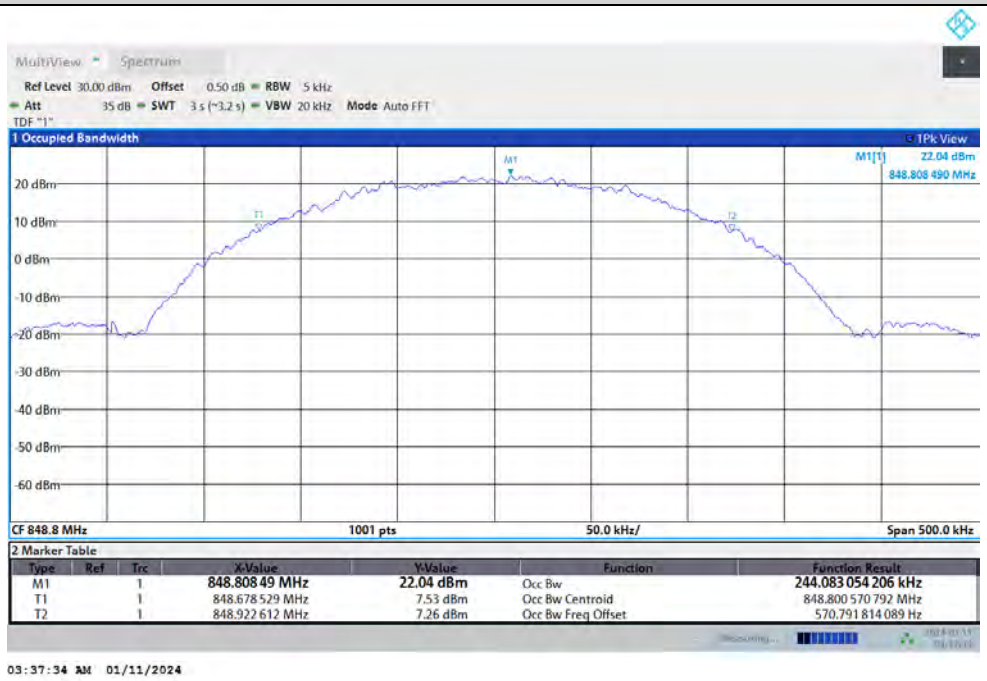
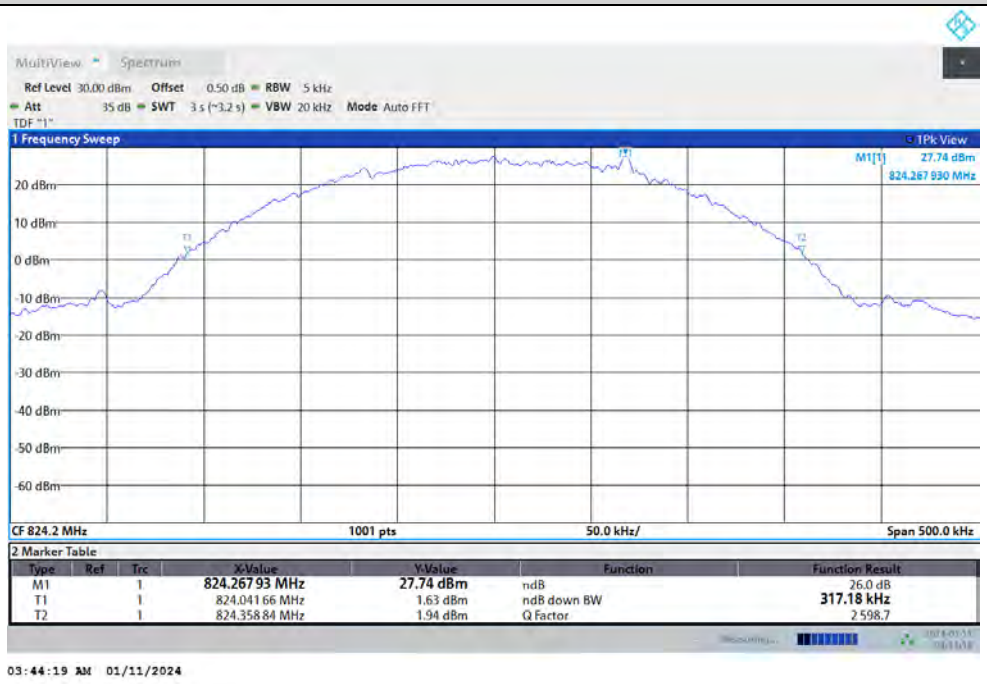


EGPRS850-251



26dB Bandwidth

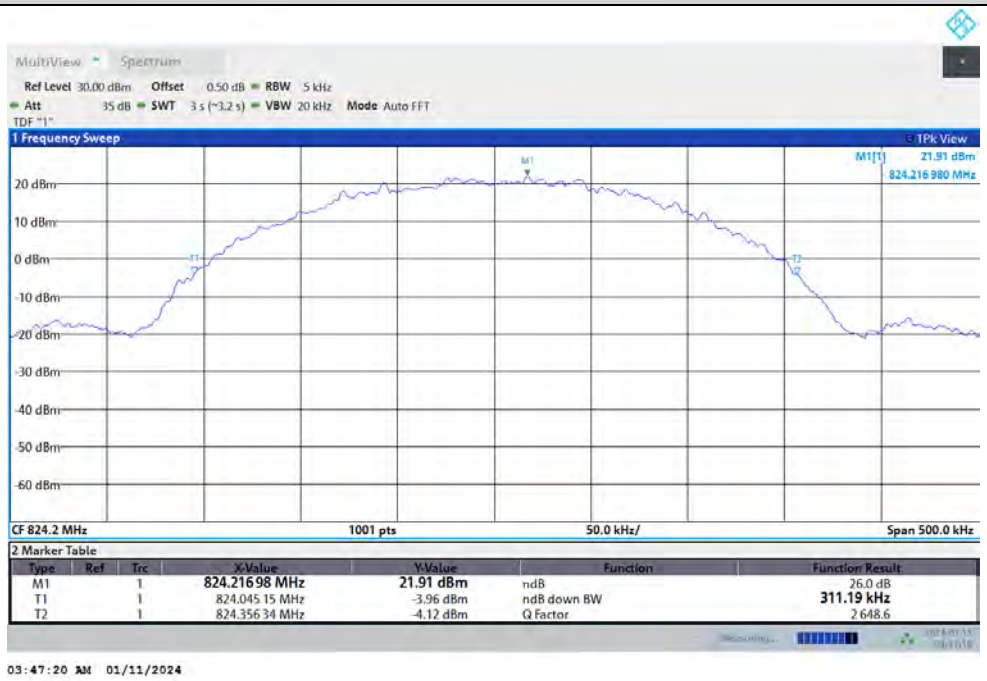
GSM850-128



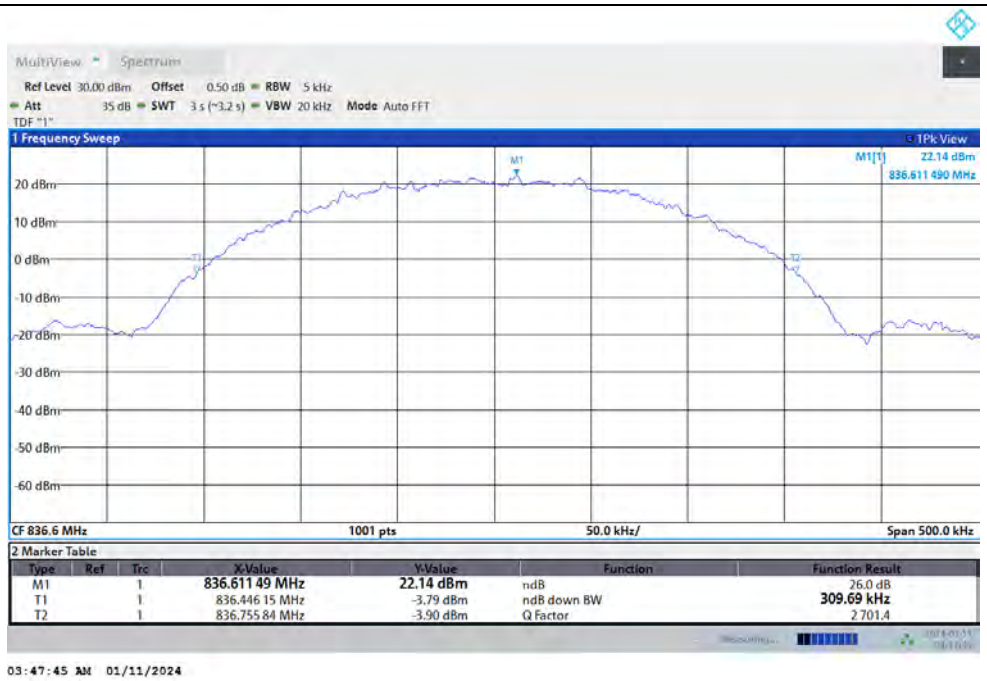
GSM850-189

GSM850-251

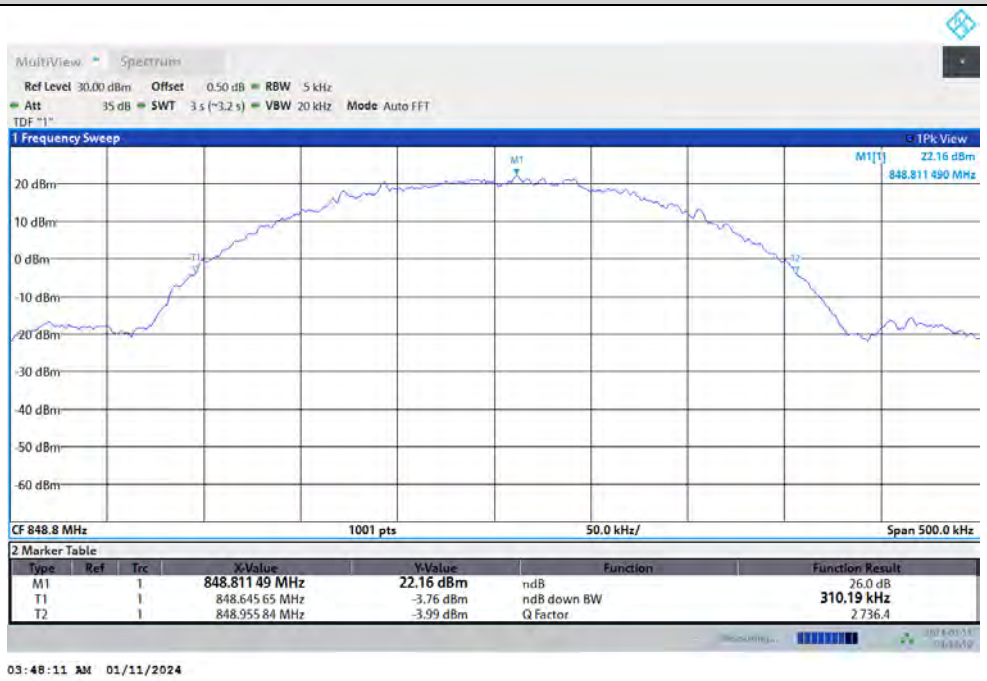
EGPRS850-128



EGPRS850-189



EGPRS850-251



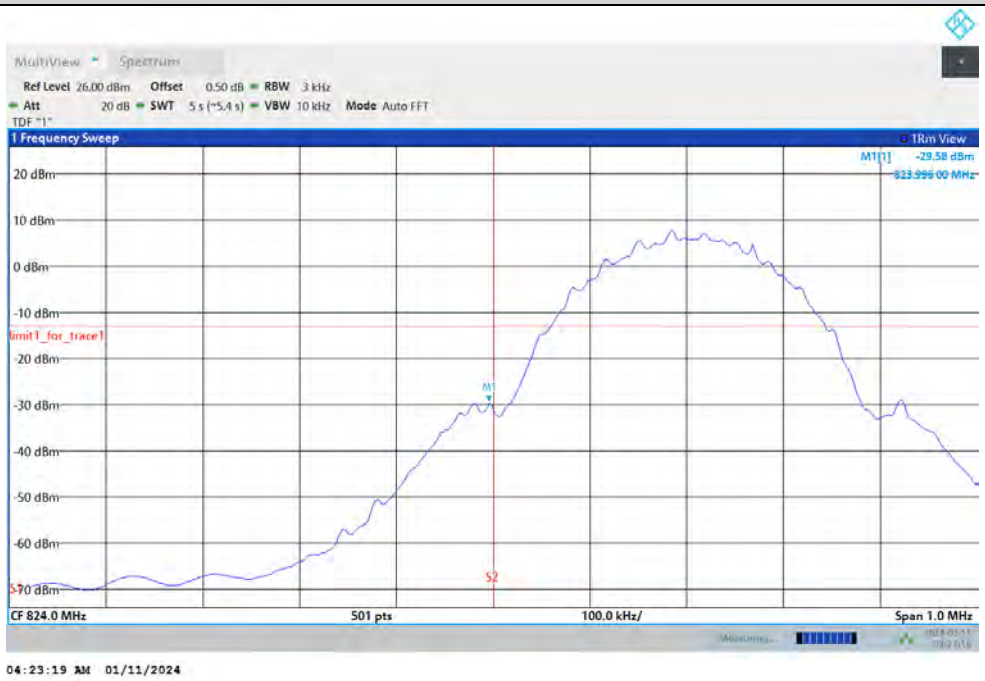
BAND EDGE

Test Result

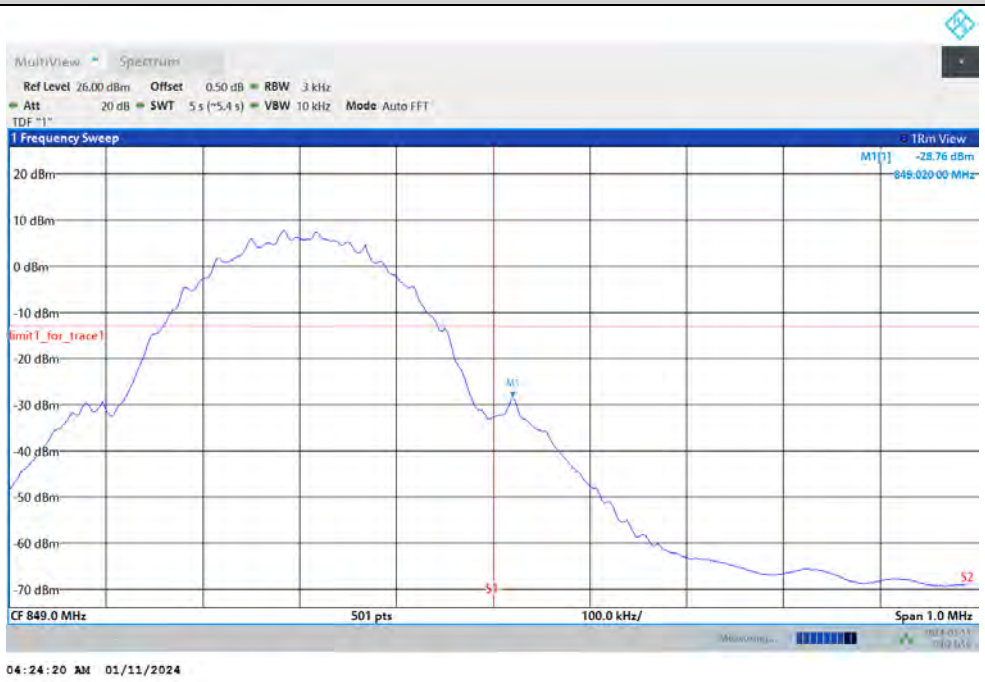
Band	Channel	Freq (MHz)	Result (dBm)	Limit(dBm)	Verdict
GSM850	128	823.996	-29.576	-13	PASS
GSM850	251	849.02	-28.758	-13	PASS
EGPRS850	128	823.978	-56.617	-13	PASS
EGPRS850	251	849.0359	-37.819	-13	PASS

Test Graphs

GSM850-128



GSM850-251



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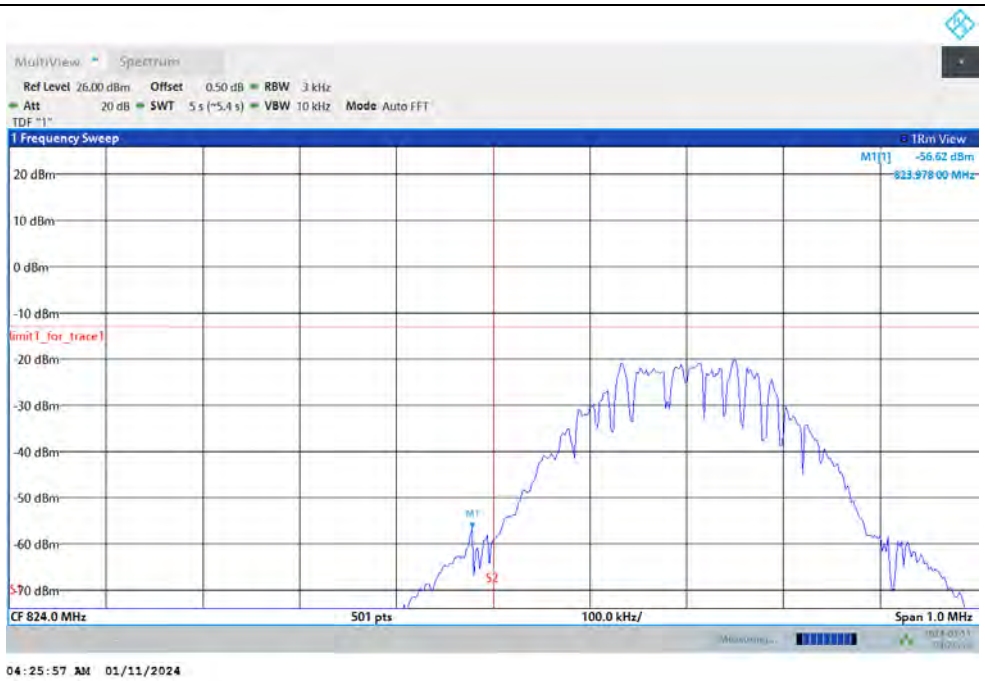
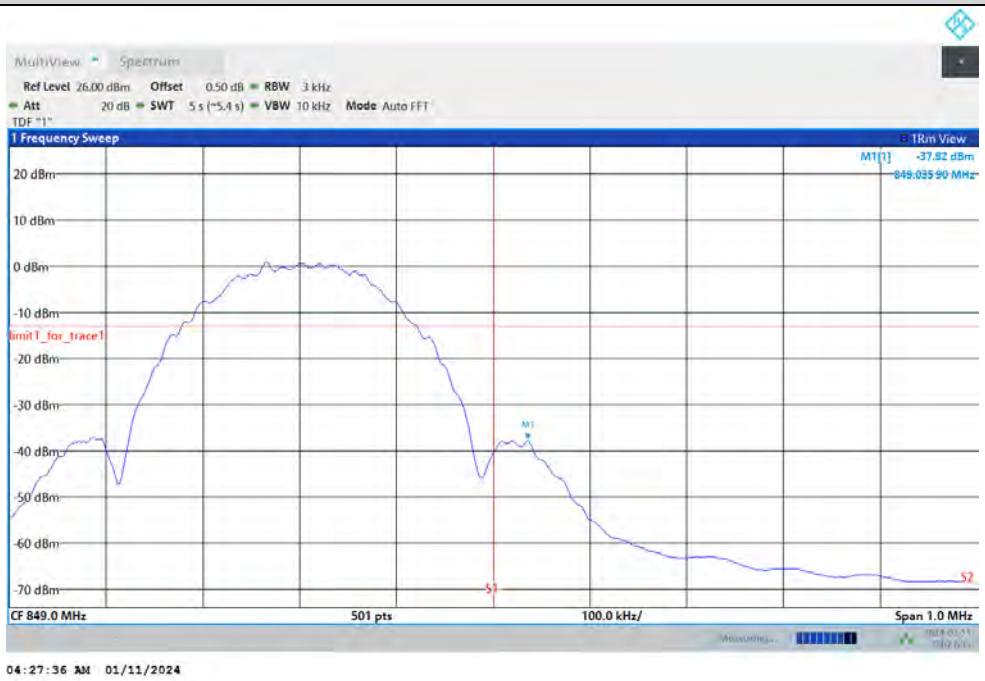


EGPRS850-251



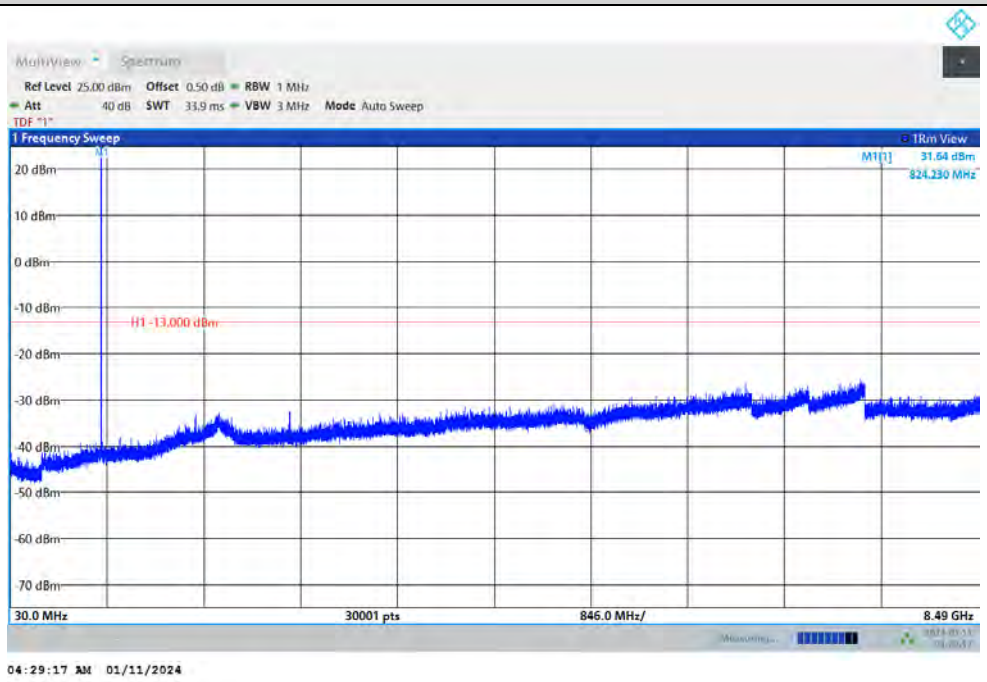
CONDUCTED SPURIOUS EMISSION

Test Result

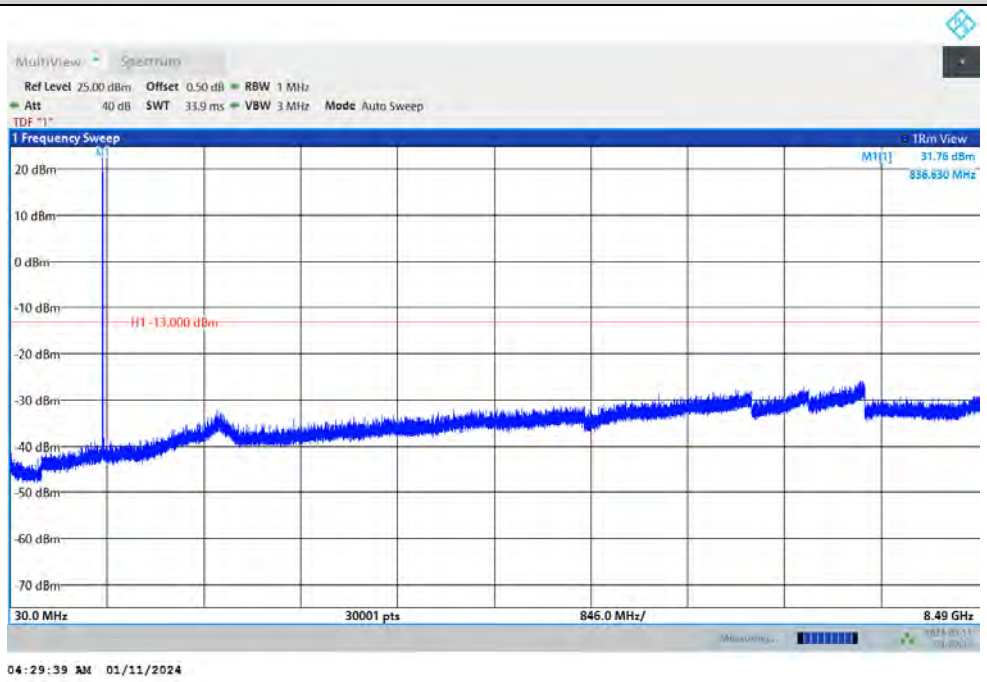
Band	Channel	Frequency Range(MHz)	Max.Freq. (MHz)	Result (dBm)	Limit (dBm)	Verdict
GSM850	128	30~8490MHz	7461.264	-25.591	-13	PASS
GSM850	189	30~8490MHz	7482.696	-25.829	-13	PASS
GSM850	251	30~8490MHz	7490.310	-26.199	-13	PASS
EGPRS850	128	30~8490MHz	7482.132	-26.248	-13	PASS
EGPRS850	189	30~8490MHz	2509.626	-19.748	-13	PASS
EGPRS850	251	30~8490MHz	7329.288	-25.879	-13	PASS

Test Graphs

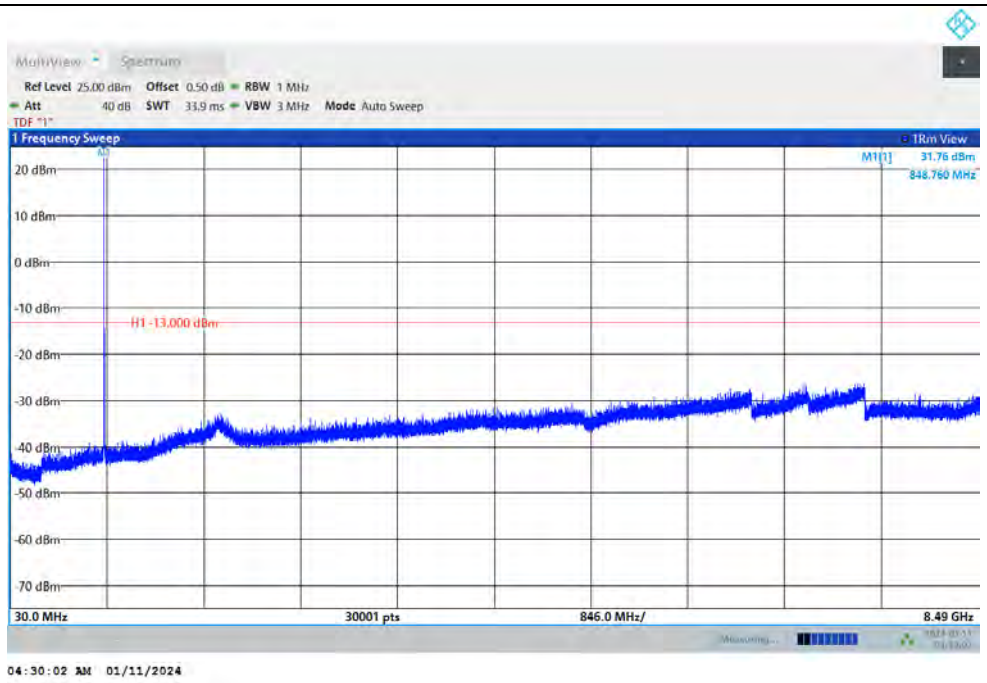
GSM850-128-30~8490MHz



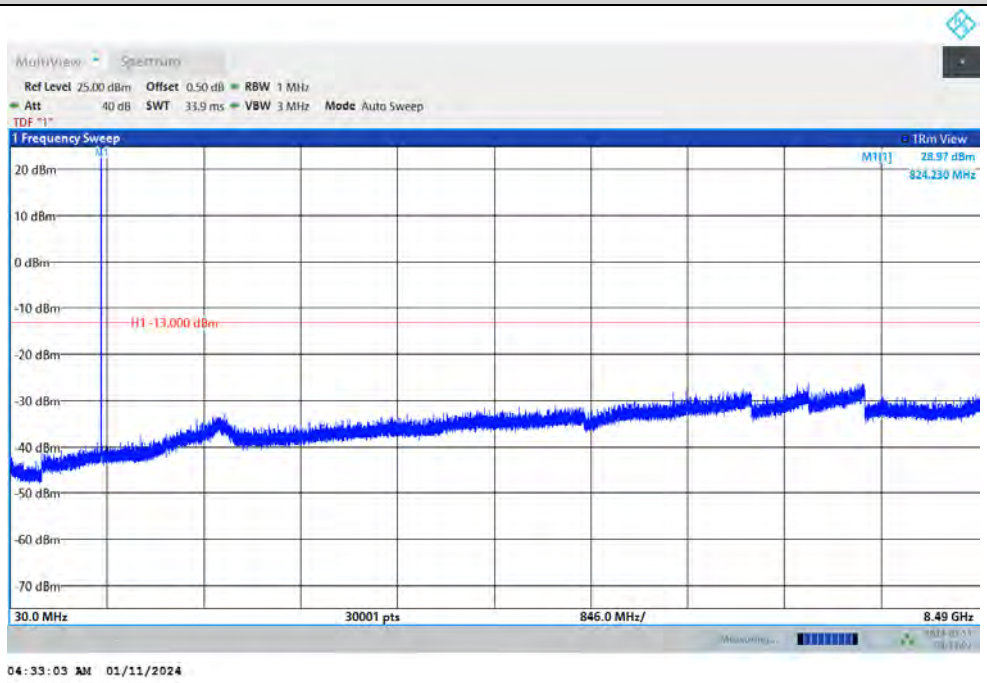
GSM850-189-30~8490MHz



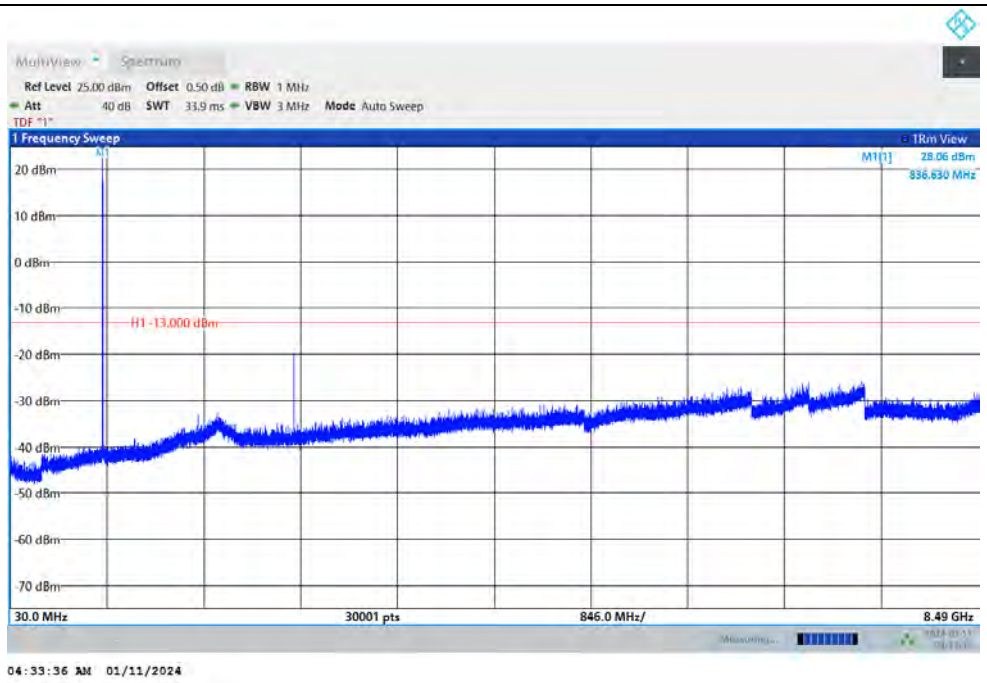
GSM850-251-30~8490MHz



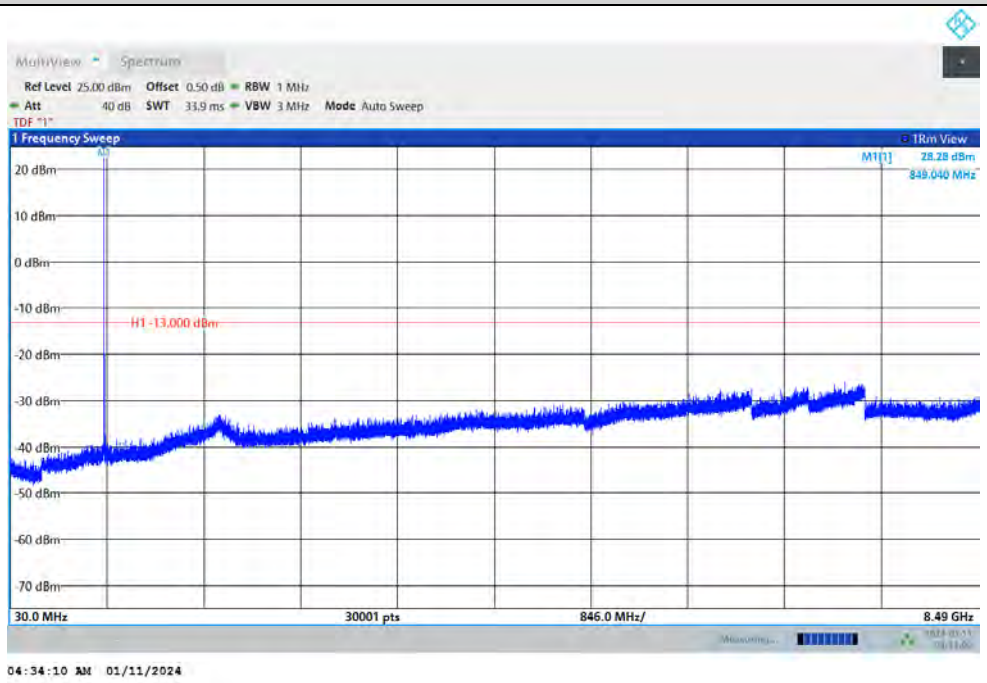
EGPRS850-128-30~8490MHz



EGPRS850-189-30~8490MHz



EGPRS850-251-30~8490MHz



FREQUENCY STABILITY

Test Result

Voltage							
Band	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM850	128	VL	NT	2.8	0.003397	±2.5	PASS
GSM850	128	VN	NT	9.27	0.011247	±2.5	PASS
GSM850	128	VH	NT	3.29	0.003992	±2.5	PASS
GSM850	189	VL	NT	2.75	0.003288	±2.5	PASS
GSM850	189	VN	NT	5.55	0.006636	±2.5	PASS
GSM850	189	VH	NT	4.88	0.005835	±2.5	PASS
GSM850	251	VL	NT	2.87	0.003381	±2.5	PASS
GSM850	251	VN	NT	-1.39	-0.001638	±2.5	PASS
GSM850	251	VH	NT	9.65	0.011369	±2.5	PASS
EGPRS850	128	VL	NT	0.82	0.000995	±2.5	PASS
EGPRS850	128	VN	NT	9.02	0.010944	±2.5	PASS
EGPRS850	128	VH	NT	-1.4	-0.001699	±2.5	PASS
EGPRS850	189	VL	NT	-0.23	-0.000275	±2.5	PASS
EGPRS850	189	VN	NT	9.06	0.010832	±2.5	PASS
EGPRS850	189	VH	NT	-1.99	-0.002379	±2.5	PASS
EGPRS850	251	VL	NT	7.19	0.008471	±2.5	PASS
EGPRS850	251	VN	NT	-0.48	-0.000566	±2.5	PASS
EGPRS850	251	VH	NT	6.01	0.007081	±2.5	PASS

Temperature							
Band	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM850	128	NV	-30	-5.8	-0.007037	±2.5	PASS
GSM850	128	NV	-20	-2.61	-0.003167	±2.5	PASS
GSM850	128	NV	-10	5.84	0.007086	±2.5	PASS
GSM850	128	NV	0	-7.84	-0.009512	±2.5	PASS
GSM850	128	NV	10	-8.24	-0.009998	±2.5	PASS
GSM850	128	NV	20	1.25	0.001517	±2.5	PASS
GSM850	128	NV	30	9.94	0.012060	±2.5	PASS
GSM850	128	NV	40	-7.89	-0.009573	±2.5	PASS
GSM850	128	NV	50	-6.86	-0.008323	±2.5	PASS
GSM850	189	NV	-30	-3.05	-0.003647	±2.5	PASS
GSM850	189	NV	-20	-8.67	-0.010366	±2.5	PASS
GSM850	189	NV	-10	-2.02	-0.002415	±2.5	PASS
GSM850	189	NV	0	-3.65	-0.004364	±2.5	PASS
GSM850	189	NV	10	0.41	0.000490	±2.5	PASS
GSM850	189	NV	20	-8.7	-0.010402	±2.5	PASS
GSM850	189	NV	30	-1.64	-0.001961	±2.5	PASS
GSM850	189	NV	40	-5.82	-0.006958	±2.5	PASS
GSM850	189	NV	50	1.9	0.002272	±2.5	PASS
GSM850	251	NV	-30	6.26	0.007375	±2.5	PASS
GSM850	251	NV	-20	-6.81	-0.008023	±2.5	PASS

GSM850	251	NV	-10	-5.28	-0.006221	±2.5	PASS
GSM850	251	NV	0	-5.27	-0.006209	±2.5	PASS
GSM850	251	NV	10	8.77	0.010332	±2.5	PASS
GSM850	251	NV	20	-1.95	-0.002297	±2.5	PASS
GSM850	251	NV	30	6.87	0.008094	±2.5	PASS
GSM850	251	NV	40	8.55	0.010073	±2.5	PASS
GSM850	251	NV	50	8.01	0.009437	±2.5	PASS
EGPRS850	128	NV	-30	-1.79	-0.000967	±2.5	PASS
EGPRS850	128	NV	-20	-3.78	-0.002043	±2.5	PASS
EGPRS850	128	NV	-10	-5.58	-0.003016	±2.5	PASS
EGPRS850	128	NV	0	2.41	0.001303	±2.5	PASS
EGPRS850	128	NV	10	3.7	0.002000	±2.5	PASS
EGPRS850	128	NV	20	-7.93	-0.004286	±2.5	PASS
EGPRS850	128	NV	30	0.58	0.000313	±2.5	PASS
EGPRS850	189	NV	40	8.48	0.004583	±2.5	PASS
EGPRS850	189	NV	50	-9.36	-0.005059	±2.5	PASS
EGPRS850	189	NV	-30	1.77	0.000941	±2.5	PASS
EGPRS850	189	NV	-20	8.95	0.004761	±2.5	PASS
EGPRS850	189	NV	-10	6.03	0.003207	±2.5	PASS
EGPRS850	189	NV	0	4.67	0.002484	±2.5	PASS
EGPRS850	189	NV	10	-8.47	-0.004505	±2.5	PASS
EGPRS850	189	NV	20	-6.33	-0.003367	±2.5	PASS
EGPRS850	189	NV	30	-1.82	-0.000968	±2.5	PASS
EGPRS850	189	NV	40	4.51	0.002399	±2.5	PASS
EGPRS850	189	NV	50	6.25	0.003324	±2.5	PASS
EGPRS850	251	NV	-30	9.7	0.005079	±2.5	PASS
EGPRS850	251	NV	-20	-5.91	-0.003095	±2.5	PASS
EGPRS850	251	NV	-10	0.37	0.000194	±2.5	PASS
EGPRS850	251	NV	0	8.45	0.004425	±2.5	PASS
EGPRS850	251	NV	10	-6.64	-0.003477	±2.5	PASS
EGPRS850	251	NV	20	-2.76	-0.001445	±2.5	PASS
EGPRS850	251	NV	30	-0.01	-0.000005	±2.5	PASS
EGPRS850	251	NV	40	1.95	0.001021	±2.5	PASS
EGPRS850	251	NV	50	-4.35	-0.002278	±2.5	PASS

WCMDA BAND5

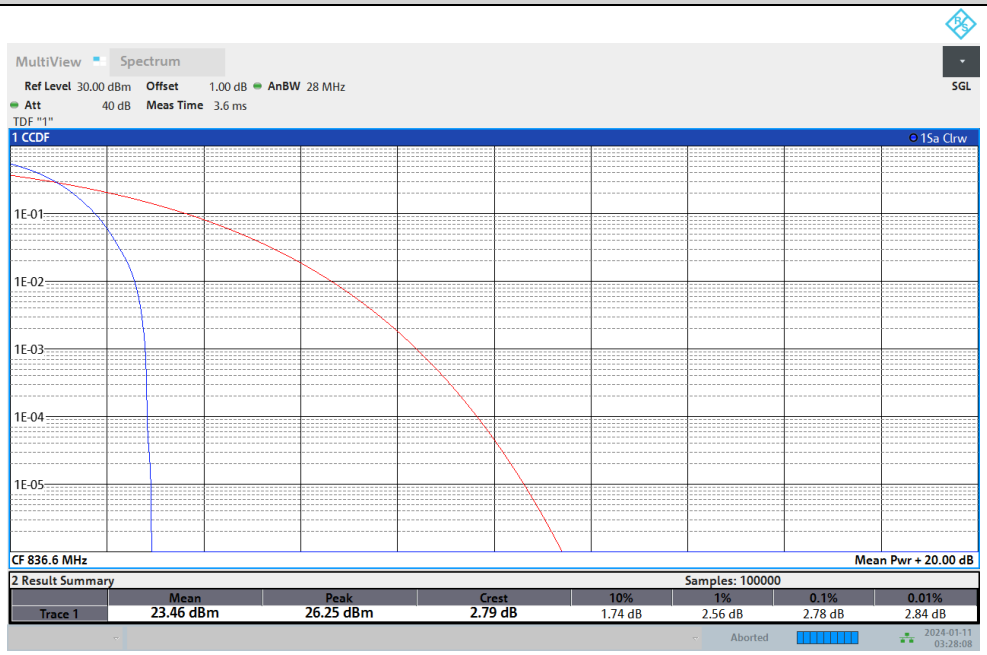
PEAK-TO-AVERAGE RATIO

Test Result

Band	Channel	Peak-to-Average Ratio(dB)	Limit(dBm)	Verdict
Band5	4132	2.78	13	PASS
Band5	4182	2.98	13	PASS
Band5	4233	2.98	13	PASS

Test Graphs

Band5-4132



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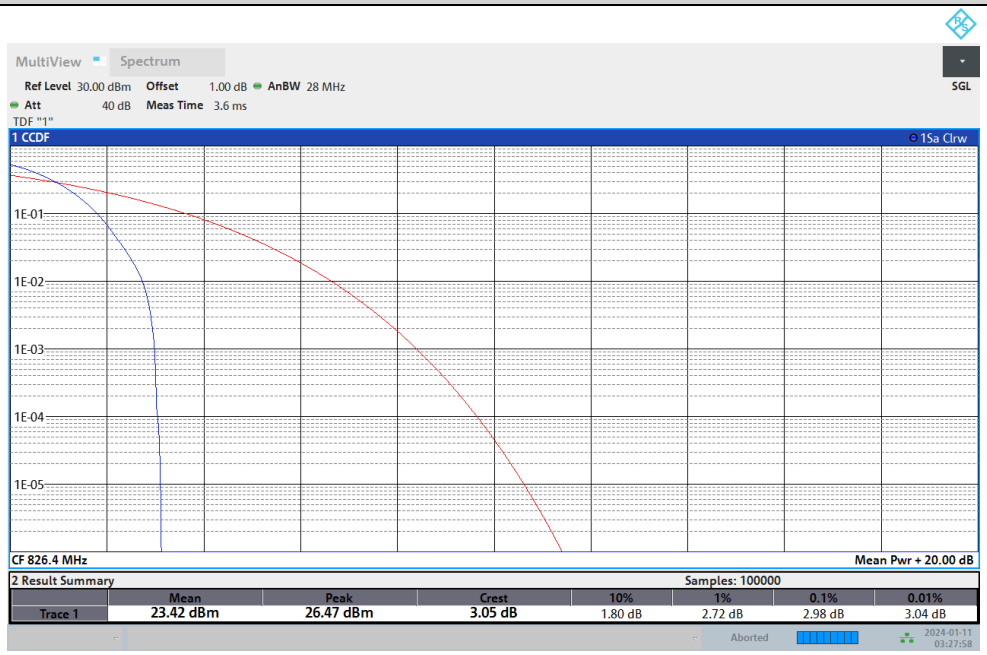
Band5-4182



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Band5-4233