Certificate #6613.01

FCC TEST REPORT

(PART 22)

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

Manufacturer or Supplier:	HMD Global Oy
Address:	Bertel Jungin aukio 9 Espoo 02600 Finland
Product:	Smartphone
Brand Name:	HMD
Model Name:	N159V
FCC ID:	2AJOTTA-1590
Date of tests:	Jan. 02, 2024 ~ Jan. 30, 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
Date: Jan. 30, 2024	Date: Jan. 30, 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.

TABLE OF CONTENTS

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
PSU-NQN2311090109RF01	Original release	Jan. 30, 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	Coduncted Output Power	Compliance	A
§22.913 (a)(5)	Equivalent Isotropic Radiated Power	Compliance	A
§2.1055 §22.355	Frequency Stability	Compliance	A
§2.1049	Occupied Bandwidth	Compliance	A
§22.913 (d)	Peak to average ratio	Compliance	A
§22.917(a)	Band Edge Measurements	Compliance	A
§2.1051 §22.917(a)	Conducted Spurious Emissions	Compliance	A
§2.1053 §22.917(a)	Radiated Spurious Emissions	Compliance	A

***Test Lab Information Reference**

Lab A:

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

Lab Address:

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

Accredited Test Lab Cert 6613.01

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

1.1 MEASUREMENT UNCERTAINTY

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

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

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

1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Pre-Amplifier	R&S	SCU18F1	100815	Aug.30,22	Aug.29,24
Pre-Amplifier	R&S	SCU08F1	101028	Sep.16,22	Sep.15,24
Vector Signal Generator	R&S	SMBV100B	102176	Feb.16,22	Feb.15,24
Signal Generator	R&S	SMB100A	182185	Feb.16,22	Feb.15,24
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.25,22	Nov.24,25
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.25,22	Nov.24,25
EMI TEST Receiver	R&S	ESR26	101734	Feb.25,22	Feb.24,24
EMI TEST Receiver	R&S	ESW44	101973	Feb.25,22	Feb.24,24
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Feb.28,22	Feb.27,24
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.22,22	Aug.21,24
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Feb.23,22	Feb.22,24
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.22,22	Aug.21,24
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.23,22	Feb.22,24
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.27,22	Jun.26,24
Test Software	EMC32	EMC32	N/A	N/A	N/A
6DB attenuator	Tonscend Technology Co., Ltd	N/A	23062787	N/A	N/A
Test Software	ELEKTRA	ELEKTRA4.32	N/A	N/A	N/A
Open Switch and Control Unit	R&S	OSP220	101964	Oct.01,22	Sep.30,24
DC Source	HYELEC	HY3010B	551016	Aug.31,22	Aug.30,24
Hygrothermograph	DELI	20210528	SZ014	Sep.06,22	Sep.05,24
PC	LENOVO	E14	HRSW0024	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-7.00M	N/A	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-4.00M	N/A	N/A	N/A
CABLE	R&S	W13.02	N/A	Oct.27,23	Apr.26,24
CABLE	R&S	W12.14	N/A	Oct.27,23	Apr.26,24
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Oct.27,23	Apr.26,24
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Oct.27,23	Apr.26,24

NOTE:

1. The calibration interval of the above test instruments is 12 months or 24 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 434559; The Designation No. is CN1325.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT*	Smartphone	
BRAND NAME*	HMD	
MODEL NAME*	N159V	
NOMINAL VOLTAGE*	5.0Vdc(adapter) 3.87Vdc (battery)	
MODULATION TYPE*	**GSM/EDGE**	GMSK, 8PSK
	WCDMA	HSDPA, HSUPA, DC-HSDPA
	LTE	QPSK, 16QAM, 64QAM
FREQUENCY RANGE	**GSM/EDGE**	824.2MHz ~ 848.8MHz
	WCDMA	826.4MHz ~ 846.6MHz
	LTE Band 5 (Channel Bandwidth: 1.4MHz)	824.7MHz ~ 848.3MHz
	LTE Band 5 (Channel Bandwidth: 3MHz)	825.5MHz ~ 847.5MHz
	LTE Band 5 (Channel Bandwidth: 5MHz)	826.5MHz ~ 846.5MHz
	LTE Band 5 (Channel Bandwidth: 10MHz)	829MHz ~ 844MHz
MAX. ERP POWER	**GSM**	328.85mW
	EDGE	84.92mW
	WCDMA	40.36mW
	LTE Band 5 (Channel Bandwidth: 1.4MHz)	43.35mW
	LTE Band 5 (Channel Bandwidth: 3MHz)	44.06mW
	LTE Band 5 (Channel Bandwidth: 5MHz)	43.55mW
	LTE Band 5 (Channel Bandwidth: 10MHz)	44.87mW

EMISSION DESIGNATORGOGN	**GSM**	248KGXW
	EDGE	249KG7W
	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: 4M49W7D
		64QAM: 4M49W7D
	LTE Band 5 (Channel Bandwidth: 10MHz)	QPSK: 8M97G7D
		16QAM: 8M95W7D
		64QAM: 8M95W7D
ANTENNA TYPE*	PIFA Antenna with -5.65dBi gain for GSM850/WCDMA V/LTE B5	
HW VERSION*	V1.0	
SW VERSION*	02US_0_101	
I/O PORTS*	Refer to user's manual	
CABLE SUPPLIED*	USB cable1: non-shielded cable, with w/o ferrite core, 1.0 meter USB cable2: non-shielded cable, with w/o ferrite core, 1.0 meter	
EXTREME TEMPERATURE*	-20 ~ 60 ℃	
EXTREME VOLTAGE*	3.4V ~ 4.45V	

NOTE:

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

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

4. For the product of N159V(FCC ID: 2AJOTTA-1590), the following components are different between the first and second supply, other parameters are the same.

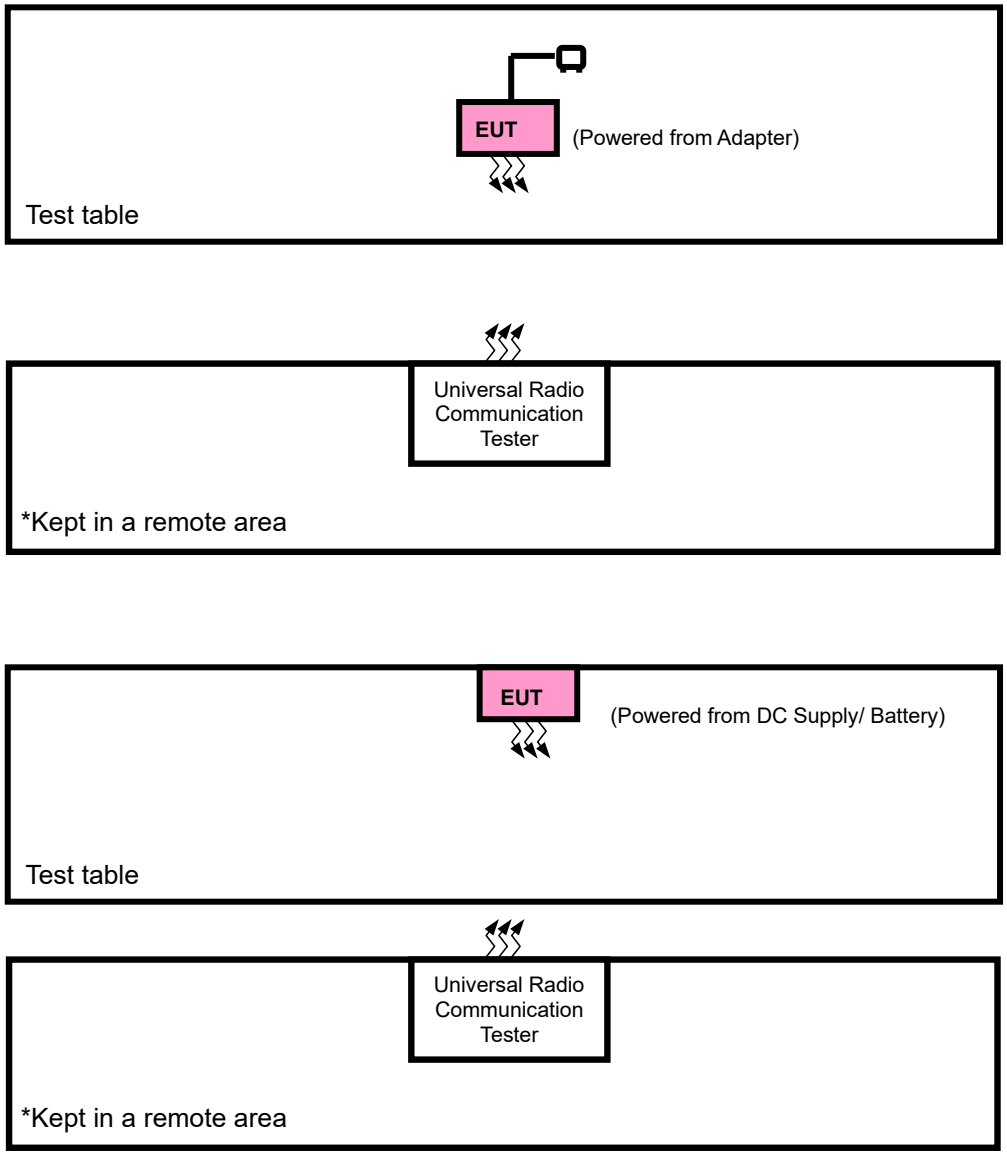
Component		First supply		Second supply	
		Supplier	specificatons	Supplier	specificatons
PCBA	3GB LPDDR	Longsys	3GB	biwin	3GB
	64GB EMMC	Longsys	64GB	biwin	64GB
	Charger IC	SGMICRO	3.78A Single Cell Switching Battery Charger IC	Unisemi	3.78A Single Cell Switching Battery Charger IC
LCM	LCD	TCL	LCD a-Si TFT;720*1612	Icetron	LCD a-Si TFT;720*1612
Front camera	Camera	Union Image	5M;FF	Imaging	5M;FF
CAM	Camera	Union Image	13 AF	Sunwin	13 AF
	Camera	SEGA	2M	Imaging	2M
Acoustic	Vibrator	KunWang	0830	HONGZHIFA	0830
	FPC	XINYE	Speaker FPC：32.1*11.46*0.15	Lat	Speaker FPC：32.1*11.46*0.15
LED		Runlite	White LED;500mA;1500mA	latticepower	White LED;500mA;1500mA
Battery		gaoyuan	4000mAh;3.87V;4.45V	highpower	4000mAh;3.87V;4.45V
antenna		Haitong	Omni-directional,Linear, antenna shrapnel	Kexinhuacheng	Omni-directional, Linear,antenna shrapnel
MIC		Gettop	L2.75xW1.85xH0.9 mm	goertek	L2.75xW1.85xH0.9 mm
Data cable		Saibao	5V2A	TorchWay	5V2A

List of Accessory:

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
Battery 1	Gaoyuan	N/A	CH426385	Power Rating: 15.48Wh
Battery 2	Highpower	N/A	CH426385	Power Rating: 15.48Wh
AC Adapter	BaiJunDa	BaiJunDa	HAD-010U	I/P: 100-240Vac, O/P: 4.8~5.4Vdc, 2.0A
USB Cable 1	Saibao	N/A	SZN-A036A	Signal Line, 1.0meter 5V 2A
USB Cable 2	TorchWay	N/A	JWUB1651-ZN01H	Signal Line, 1.0meter 5V 2A

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	DC Source	HYELEC	HY3010B	551016	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m

2.4 TEST ITEM AND TEST CONFIGURATION

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports The worst case in 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 with GSM or WCDMA or LTE link
B	EUT + DC Supply 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	CONDCUDETED 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	1 RB / 0 RB Offset
		20415 to 20635	20415, 20525, 20635	3MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK,16QAM,64QAM	6 RB / 0 RB Offset
		20415 to 20635	20415, 20525, 20635	3MHz	QPSK,16QAM,64QAM	15 RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5MHz	QPSK,16QAM,64QAM	25 RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	10MHz	QPSK,16QAM,64QAM	50 RB / 0 RB Offset

A	OCCUPIED BANDWIDTH	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK,16QAM,64QAM	6 RB / 0 RB Offset
		20415 to 20635	20415, 20525, 20635	3MHz	QPSK,16QAM,64QAM	15 RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5MHz	QPSK,16QAM,64QAM	25 RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	10MHz	QPSK,16QAM,64QAM	50 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 6 RB / 0 RB Offset
		20415 to 20635	20415, 20525, 20635	3MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset 15 RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset 25 RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset 50 RB / 0 RB Offset
A	BAND EDGE	20407 to 20643	20407	1.4 MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
		20407 to 20643	20643	1.4 MHz	QPSK,16QAM,64QAM	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		20415 to 20635	20415	3 MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
		20415 to 20635	20635	3 MHz	QPSK,16QAM,64QAM	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		20425 to 20625	20425	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
		20425 to 20625	20625	5MHz	QPSK,16QAM,64QAM	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		20450 to 20600	20450	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
		20450 to 20600	20600	10MHz	QPSK,16QAM,64QAM	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
A	CONDCUDETED EMISSION	26797 to 27033	26797, 26915, 27033	1.4MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
		26805 to 27025	26805, 26915, 27025	3MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
		26815 to 27015	26815, 26915, 27015	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
		26840 to 26990	26840, 26915, 26990	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
A	RADIATED EMISSION	20407 to 20643	20525	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	20450, 20525, 20600	10MHz	QPSK	1 RB / 0 RB Offset

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

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	23deg. C, 70%RH	DC 5V By Adapter	Hanwen Xu
FREQUENCY STABILITY	23deg. C, 70%RH	DC 3.85V By DC Supply	Hanwen Xu
OCCUPIED BANDWIDTH	23deg. C, 70%RH	DC5V By Adapter	Hanwen Xu
BAND EDGE	23deg. C, 70%RH	DC 5V By Adapter	Hanwen Xu
CONDCUDETED EMISSION	23deg. C, 70%RH	DC5V By Adapter	Hanwen Xu
RADIATED EMISSION	23deg. C, 70%RH	DC5V By Adapter	Hanwen Xu
PEAK TO AVERAGE RATIO	23deg. C, 70%RH	DC5V 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.

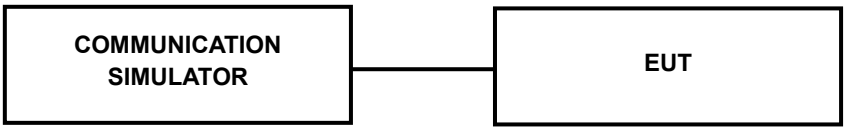
CONDUCTED POWER MEASUREMENT:

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		
Channel	128	189	251
Frequency	824.2	836.4	848.8
GSM	32.96	32.91	32.99
GPRS (GMSK, 1Tx-slot)	32.97	32.87	33.01
GPRS (GMSK, 2Tx-slot)	30.43	30.16	30.38
GPRS (GMSK, 3Tx-slot)	29.23	29.08	29.26
GPRS (GMSK, 4Tx-slot)	28.05	28.01	28.06
EDGE (8PSK, 1Tx-slot)	27.09	26.76	26.75
EDGE (8PSK, 2Tx-slot)	24.02	23.68	23.70
EDGE (8PSK, 3Tx-slot)	22.31	22.06	22.12
EDGE (8PSK, 4Tx-slot)	21.94	21.67	21.78

Band	WCDMA V		
Channel	4132	4182	4233
Frequency	826.4	836.4	846.6
RMC 12.2K	23.76	**23.86**	23.75
HSDPA Subtest-1	22.53	22.44	22.56
HSDPA Subtest-2	22.60	22.50	22.63
HSDPA Subtest-3	22.19	22.03	22.19
HSDPA Subtest-4	22.17	21.97	22.09
DC-HSDPA Subtest-1	22.54	22.38	22.48
DC-HSDPA Subtest-2	22.46	22.58	22.59
DC-HSDPA Subtest-3	22.15	21.80	22.05
DC-HSDPA Subtest-4	22.21	21.94	22.11
HSUPA Subtest-1	22.51	22.43	22.54
HSUPA Subtest-2	21.60	21.48	21.60
HSUPA Subtest-3	22.12	21.93	21.99
HSUPA Subtest-4	21.62	21.38	21.53
HSUPA Subtest-5	22.64	22.47	22.59

LTE Band 5

Band/BW	Modulation	RB Size	RB Offset	Low CH 20407	Mid CH 20525	High CH 20643
				Frequency 824.7 MHz	Frequency 836.5 MHz	Frequency 848.3 MHz
5/ 1.4	QPSK	1	0	24.15	23.98	23.98
		1	2	23.92	24.04	23.87
		1	5	**24.17**	24.08	24.11
		3	0	23.94	23.93	23.92
		3	1	**24.04**	23.95	23.89
		3	3	24.01	24.01	23.93
		6	0	23.03	22.97	23.07
	16QAM	1	0	23.40	23.53	23.49
		1	2	23.32	23.23	23.23
		1	5	23.49	23.51	23.55
		3	0	23.67	23.65	23.66
		3	1	23.56	23.64	23.59
		3	3	23.66	23.47	23.56
		6	0	22.18	22.18	22.22
	64QAM	1	0	22.34	22.41	22.30
		1	2	22.23	22.18	22.15
		1	5	22.47	22.35	22.46
		3	0	22.12	22.02	22.10
		3	1	22.10	22.05	22.03
		3	3	22.20	22.23	22.10
		6	0	21.20	21.13	21.20

Band/BW	Modulation	RB Size	RB Offset	Low CH 20415 Frequency 825.5 MHz	Mid CH 20525 Frequency 836.5 MHz	High CH 20635 Frequency 847.5 MHz
5/ 3	QPSK	1	0	24.08	23.98	24.06
		1	7	23.90	23.92	23.90
		1	14	24.19	24.15	**24.24**
		8	0	**23.08**	23.05	23.00
		8	3	23.00	23.00	22.94
		8	7	23.05	23.07	22.94
		15	0	23.06	22.97	23.01
	16QAM	1	0	23.39	23.52	23.50
		1	7	23.29	23.28	23.34
		1	14	23.52	23.57	23.43
		8	0	22.29	22.16	22.10
		8	3	22.17	22.12	22.07
		8	7	22.22	22.08	22.14
		15	0	22.19	22.24	22.17
	64QAM	1	0	22.34	22.36	22.28
		1	7	22.15	22.23	22.10
		1	14	22.48	22.45	22.46
		8	0	21.10	21.06	21.13
		8	3	21.19	21.10	20.95
		8	7	21.19	21.15	21.02
		15	0	21.20	21.21	21.13

Band/BW	Modulation	RB Size	RB Offset	Low CH 20425 Frequency 826.5 MHz	Mid CH 20525 Frequency 836.5 MHz	High CH 20625 Frequency 846.5 MHz
5/ 5	QPSK	1	0	24.05	24.05	24.00
		1	12	24.01	24.04	23.99
		1	24	24.18	**24.19**	24.18
		12	0	23.04	23.04	22.99
		12	6	23.05	22.95	22.98
		12	13	**23.12**	23.07	22.92
		25	0	23.07	22.94	23.02
	16QAM	1	0	23.39	23.56	23.39
		1	12	23.31	23.30	23.30
		1	24	23.54	23.54	23.50
		12	0	22.29	22.27	22.17
		12	6	22.12	22.16	22.16
		12	13	22.11	22.04	22.12
		25	0	22.09	22.17	22.19
	64QAM	1	0	22.36	22.43	22.29
		1	12	22.12	22.25	22.12
		1	24	22.48	22.33	22.40
		12	0	21.12	21.01	21.02
		12	6	21.17	21.07	21.07
		12	13	21.19	21.11	21.01
		25	0	21.20	21.10	21.20

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	24.16	24.12	24.10
		1	24	24.05	24.06	24.01
		1	49	**24.32**	24.22	24.26
		25	0	23.09	23.07	23.04
		25	12	23.13	23.09	23.01
		25	25	23.15	23.10	23.06
		50	0	23.14	23.09	23.12
	16QAM	1	0	23.53	23.58	23.54
		1	24	23.36	23.38	23.35
		1	49	23.62	23.63	23.57
		25	0	22.30	22.28	22.24
		25	12	22.21	22.24	22.20
		25	25	22.25	22.15	22.18
		50	0	22.23	22.25	22.24
	64QAM	1	0	22.44	22.48	22.43
		1	24	22.27	22.32	22.25
		1	49	22.55	22.48	22.50
		25	0	21.18	21.16	21.15
		25	12	21.22	21.15	21.09
		25	25	21.24	21.26	21.12
		50	0	21.23	21.24	21.25

ERP POWER (dBm)

GSM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
128	824.2	32.97	-5.65	25.17	328.85	7
189	836.4	32.91	-5.65	25.11	324.34	7
251	848.8	33.01	-5.65	25.21	331.89	7

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

EDGE

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
128	824.2	27.09	-5.65	19.29	84.92	7
189	836.4	26.76	-5.65	18.96	78.7	7
251	848.8	26.75	-5.65	18.95	78.52	7

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

WCDMA

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
4132	826.4	23.76	-5.65	15.96	39.45	7
4182	836.4	23.86	-5.65	16.06	40.36	7
4233	846.6	23.75	-5.65	15.95	39.36	7

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

LTE BAND 5

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20407	824.7	24.17	-5.65	16.37	43.35	7
20525	836.5	24.08	-5.65	16.28	42.46	7
20643	848.3	24.11	-5.65	16.31	42.76	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	23.67	-5.65	15.87	38.64	7
20525	836.5	23.65	-5.65	15.85	38.46	7
20643	848.3	23.66	-5.65	15.86	38.55	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	22.47	-5.65	14.67	29.31	7
20525	836.5	22.41	-5.65	14.61	28.91	7
20643	848.3	22.46	-5.65	14.66	29.24	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	24.19	-5.65	16.39	43.55	7
20525	836.5	24.15	-5.65	16.35	43.15	7
20635	847.5	24.24	-5.65	16.44	44.06	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	23.52	-5.65	15.72	37.33	7
20525	836.5	23.57	-5.65	15.77	37.76	7
20635	847.5	23.5	-5.65	15.7	37.15	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	22.48	-5.65	14.68	29.38	7
20525	836.5	22.45	-5.65	14.65	29.17	7
20635	847.5	22.46	-5.65	14.66	29.24	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	24.18	-5.65	16.38	43.45	7
20525	836.5	24.19	-5.65	16.39	43.55	7
20625	846.5	24.18	-5.65	16.38	43.45	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	23.54	-5.65	15.74	37.5	7
20525	836.5	23.56	-5.65	15.76	37.67	7
20625	846.5	23.5	-5.65	15.7	37.15	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	22.48	-5.65	14.68	29.38	7
20525	836.5	22.43	-5.65	14.63	29.04	7
20625	846.5	22.4	-5.65	14.6	28.84	7

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829.0	24.32	-5.65	16.52	44.87	7
20525	836.5	24.22	-5.65	16.42	43.85	7
20600	844.0	24.26	-5.65	16.46	44.26	7

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829.0	23.62	-5.65	15.82	38.19	7
20525	836.5	23.63	-5.65	15.83	38.28	7
20600	844.0	23.57	-5.65	15.77	37.76	7

CHANNEL BANDWIDTH: 10MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829.0	22.55	-5.65	14.75	29.85	7
20525	836.5	22.48	-5.65	14.68	29.38	7
20600	844.0	22.5	-5.65	14.7	29.51	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

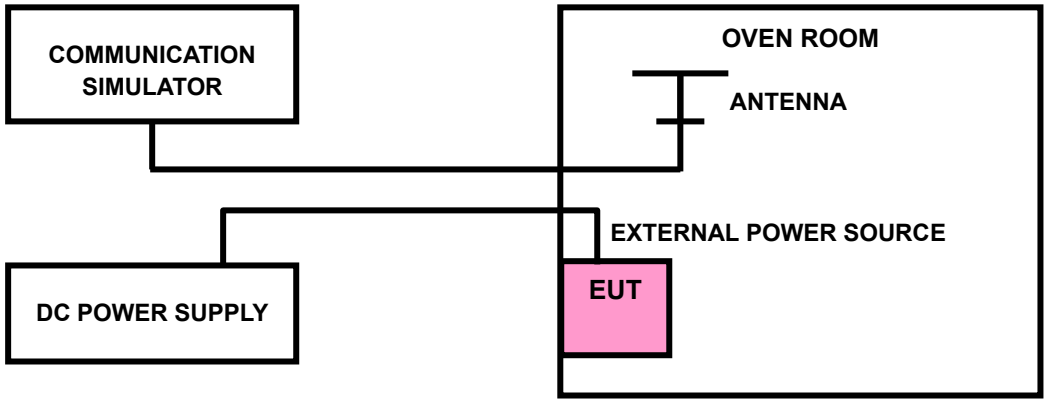
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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.

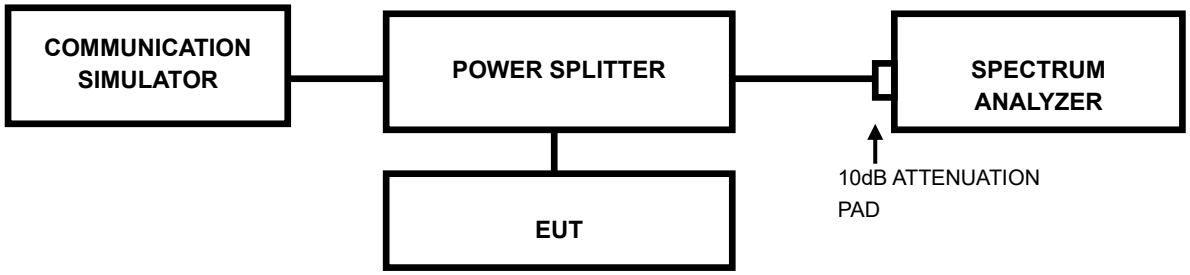
Note: VL = Low voltage(3.4V); VN/NV = Normal voltage(3.85V); VH = High voltage(4.45V);
NT = Normal temperature (25℃)

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

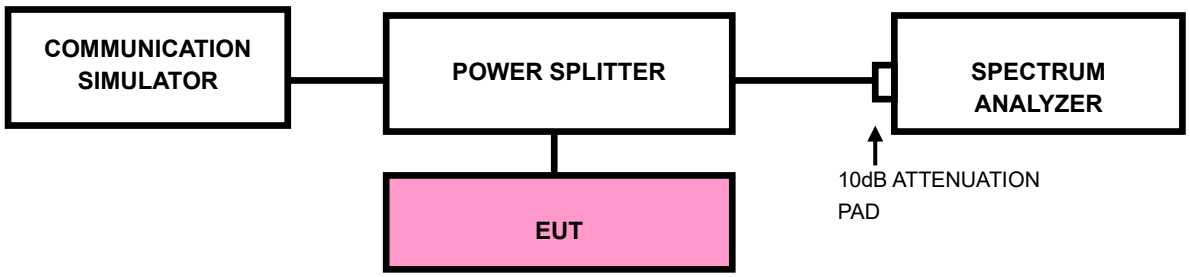
Please Refer to Appendix Of this test report.

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

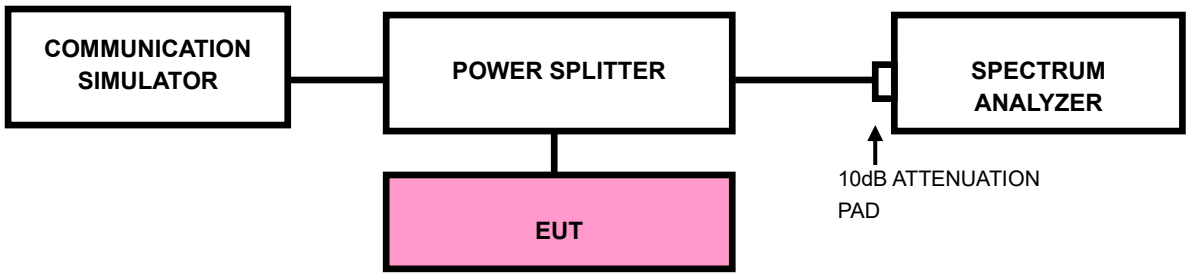
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

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.

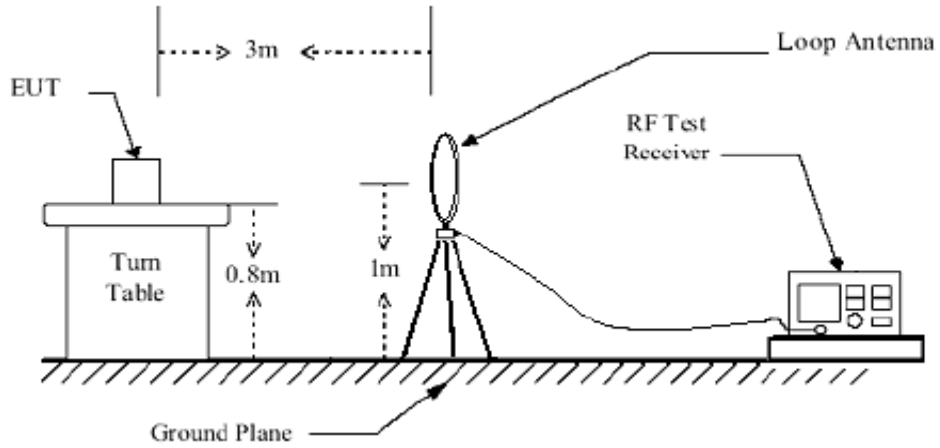
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.6.3 DEVIATION FROM TEST STANDARD

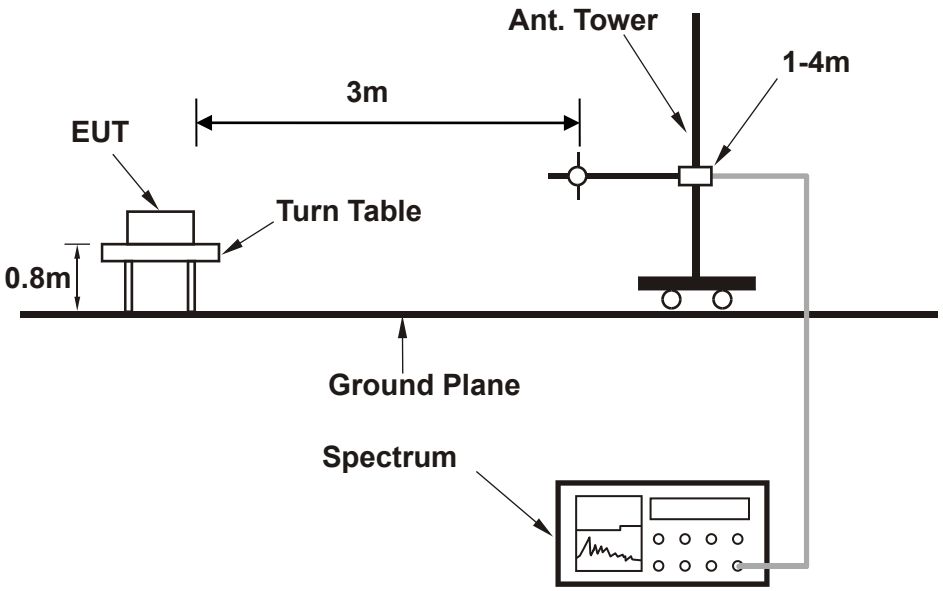
No deviation

3.6.4 TEST SETUP

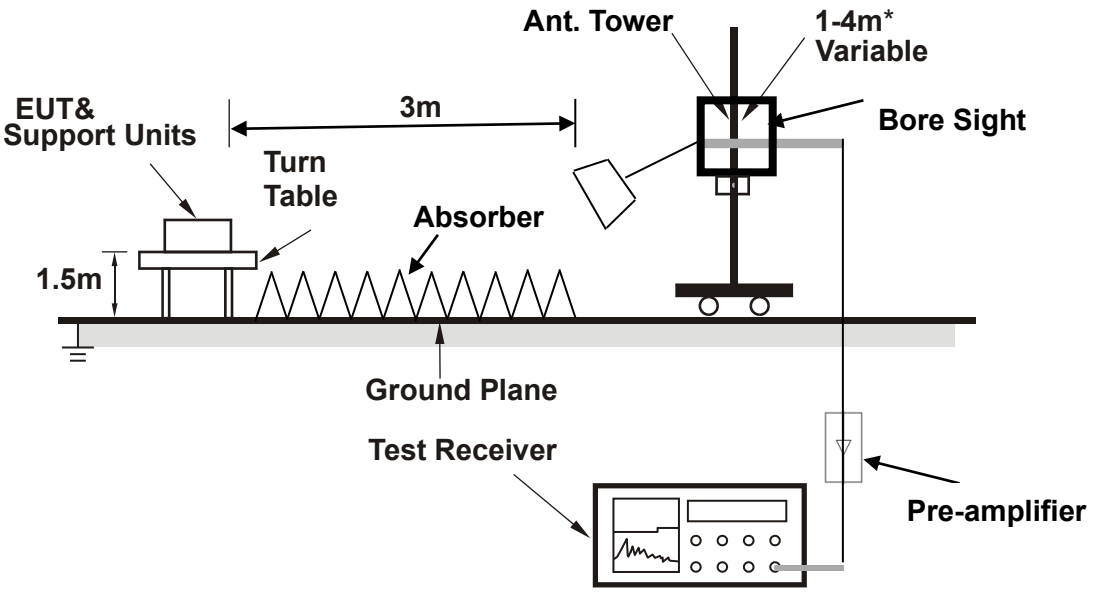
< Frequency Range below 30MHz >



< 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.

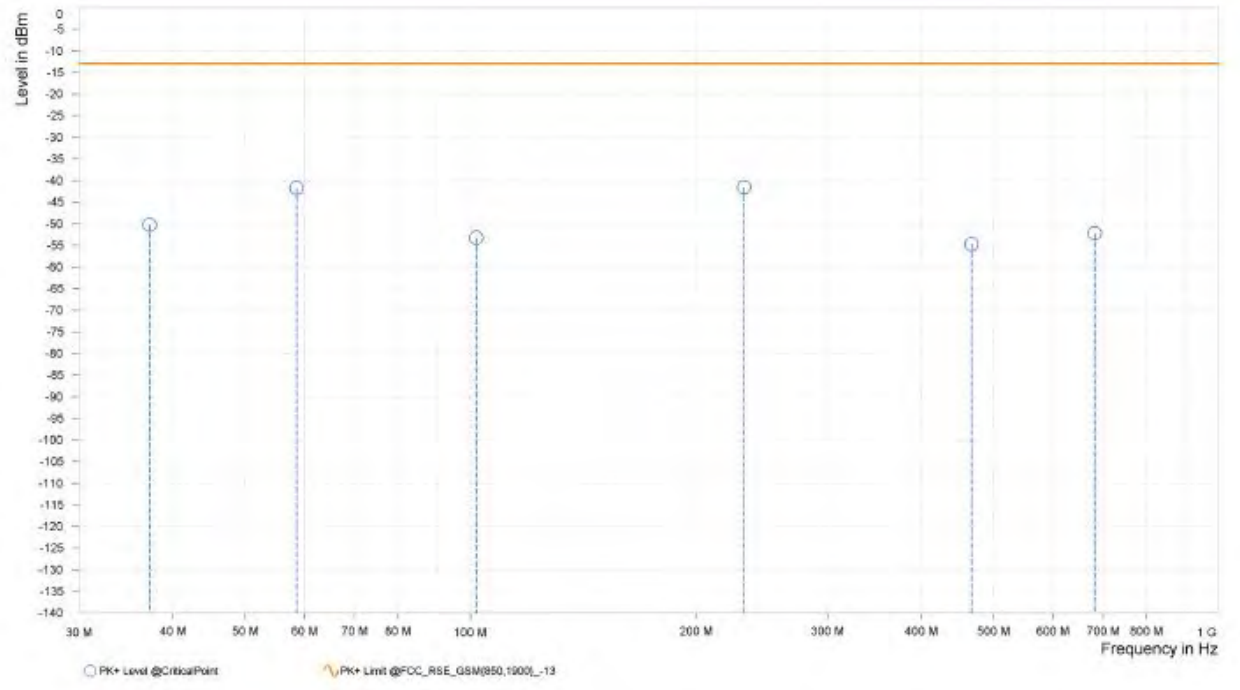
BELOW 1GHz WORST-CASE DATA

30 MHz – 1GHz data:

GSM 850 CH189

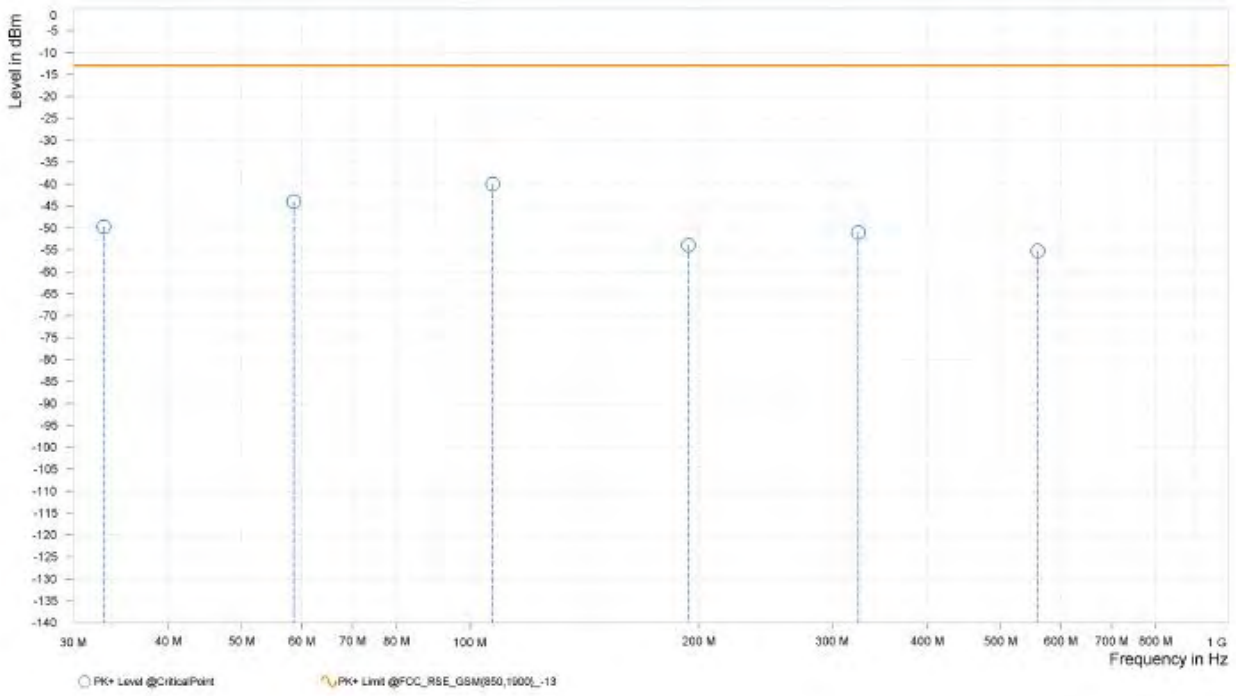
MODE	TX channel 189	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	37.275	-50.24	-13.00	37.24	4.88	H	158.6	2.00
1	58.615	-41.74	-13.00	28.74	1.12	H	158.6	2.00
1	101.780	-53.27	-13.00	40.27	-7.60	H	89.3	2.00
1	232.245	-41.54	-13.00	28.54	6.75	H	89.3	2.00
1	466.985	-54.69	-13.00	41.69	5.56	H	68.6	1.00
1	682.325	-52.24	-13.00	39.24	6.76	H	134.4	1.00



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

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	32.910	-49.71	-13.00	36.71	-1.84	V	68.6	1.00
1	58.615	-43.99	-13.00	30.99	1.19	V	340.3	1.00
1	107.115	-40.00	-13.00	27.00	8.03	V	89.4	2.00
1	193.930	-53.93	-13.00	40.93	-1.93	V	224.5	2.00
1	324.880	-51.03	-13.00	38.03	3.36	V	205	1.00
1	559.620	-55.26	-13.00	42.26	3.57	V	136.8	1.00



ABOVE 1GHz DATA

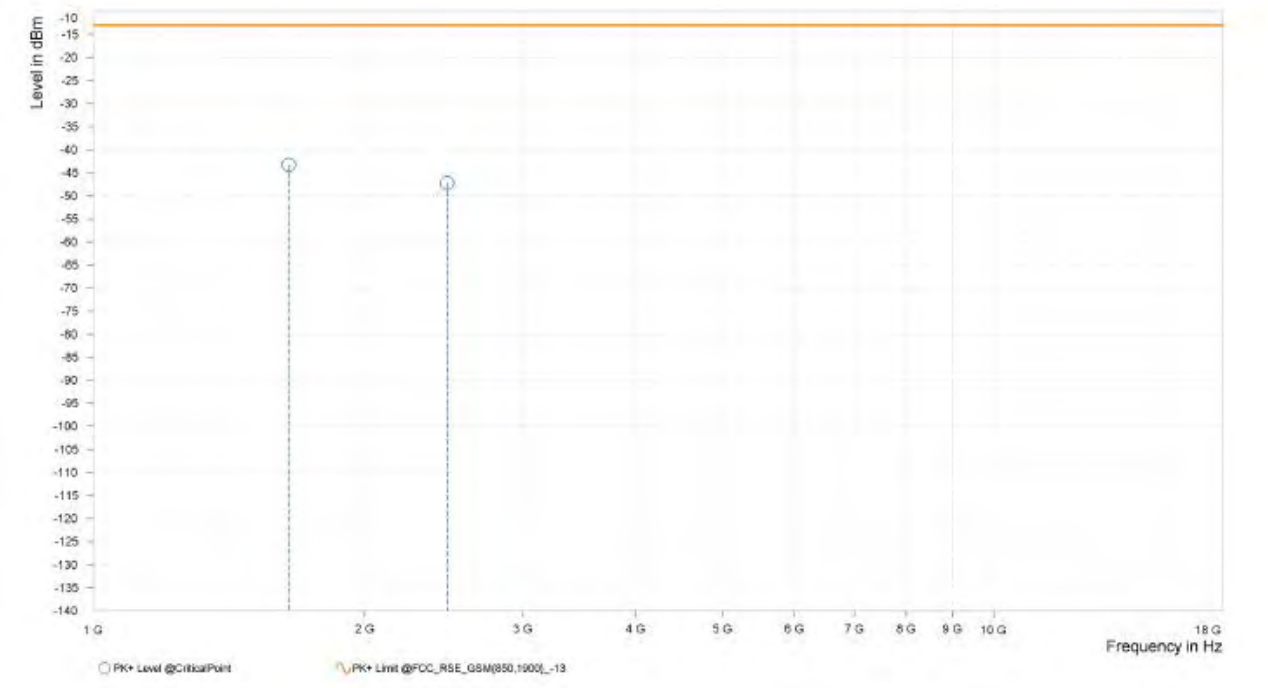
Note: For higher frequency, the emission is too low to be detected.

GSM 850

CH 128:

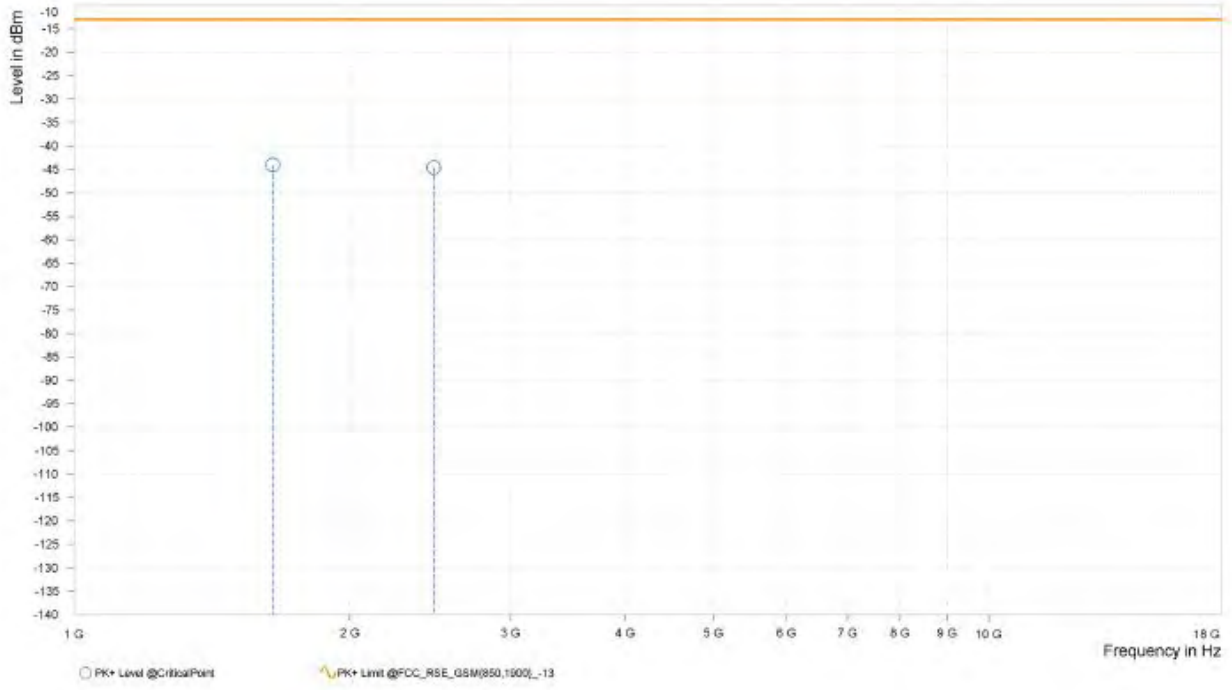
MODE	TX channel 128	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,648.500	-43.24	-13.00	30.24	17.46	H	271.1	2.00
3	2,472.500	-47.20	-13.00	34.20	22.42	H	359	2.00



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

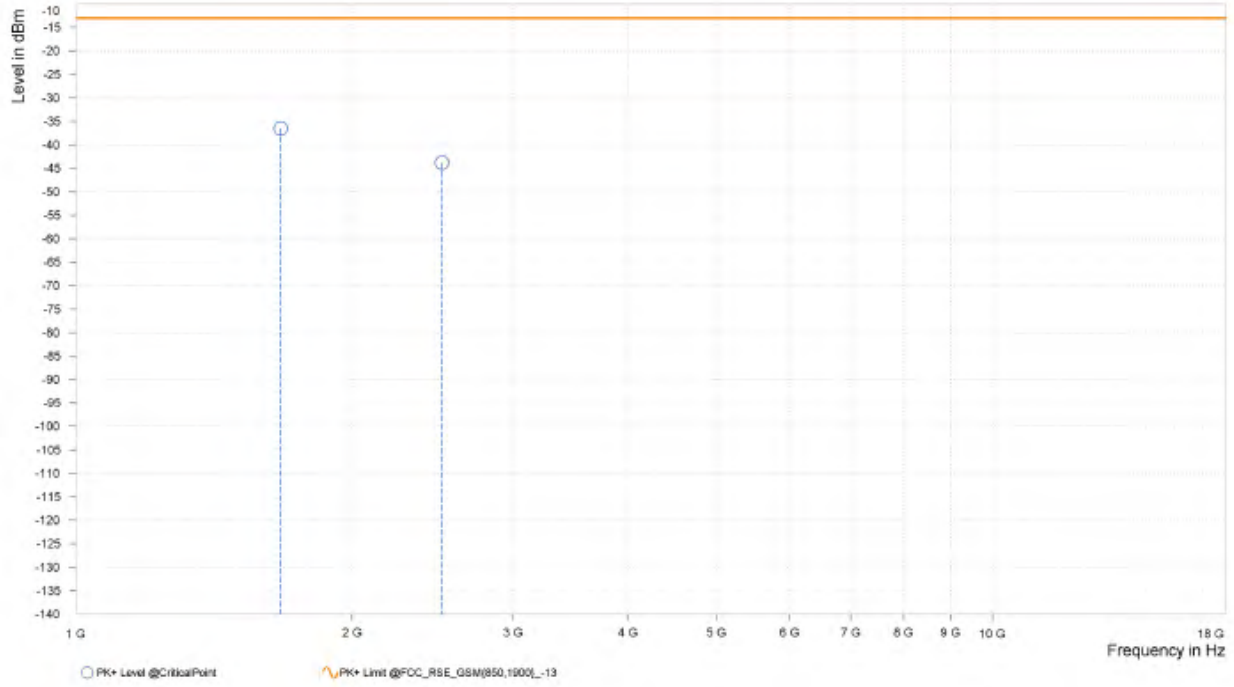
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,648.000	-44.06	-13.00	31.06	17.05	V	91.4	1.00
3	2,472.500	-44.62	-13.00	31.62	22.67	V	193.3	2.00



CH 189:

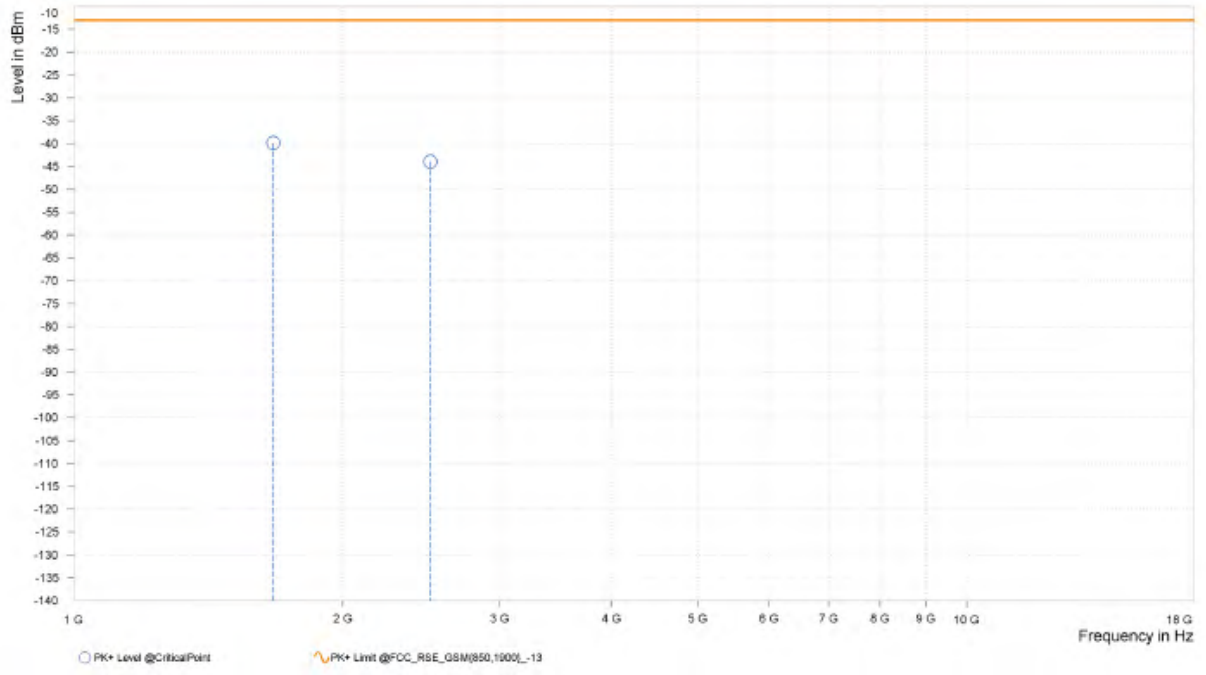
MODE	TX channel 189	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,672.500	-36.52	-13.00	23.52	18.24	H	90.1	1.00
3	2,509.000	-43.85	-13.00	30.85	22.46	H	166.6	1.00



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

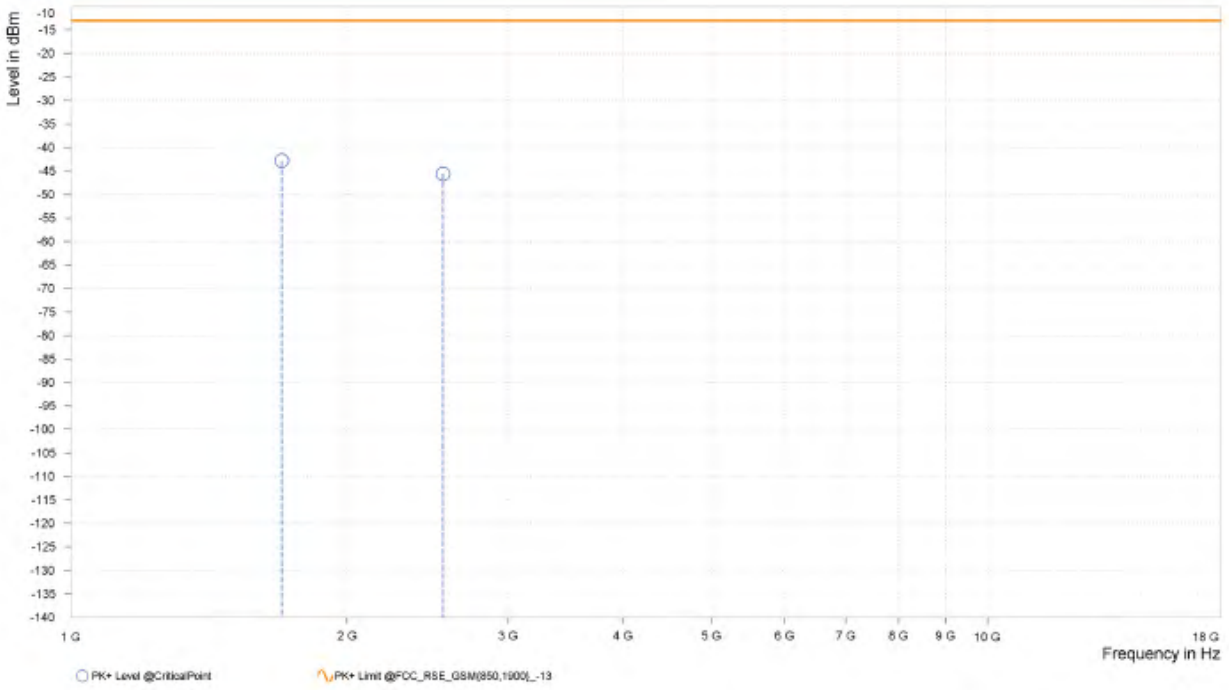
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,673.000	-39.87	-13.00	26.87	17.14	V	359.1	1.00
3	2,509.000	-43.95	-13.00	30.95	23.06	V	192.2	2.00



CH 251:

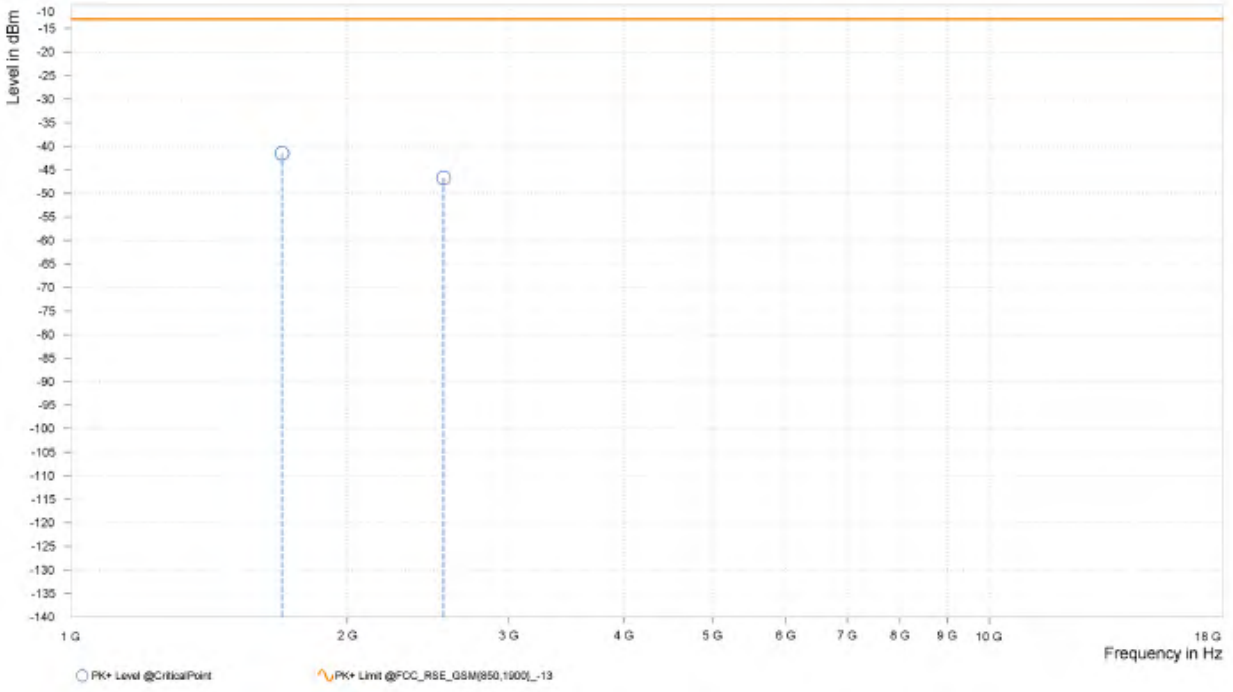
MODE	TX channel 251	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,697.500	-42.83	-13.00	29.83	18.62	H	359	2.00
3	2,546.500	-45.62	-13.00	32.62	22.51	H	359	2.00



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

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,697.500	-41.53	-13.00	28.53	17.84	V	359	1.00
3	2,546.500	-46.73	-13.00	33.73	23.13	V	359	1.00

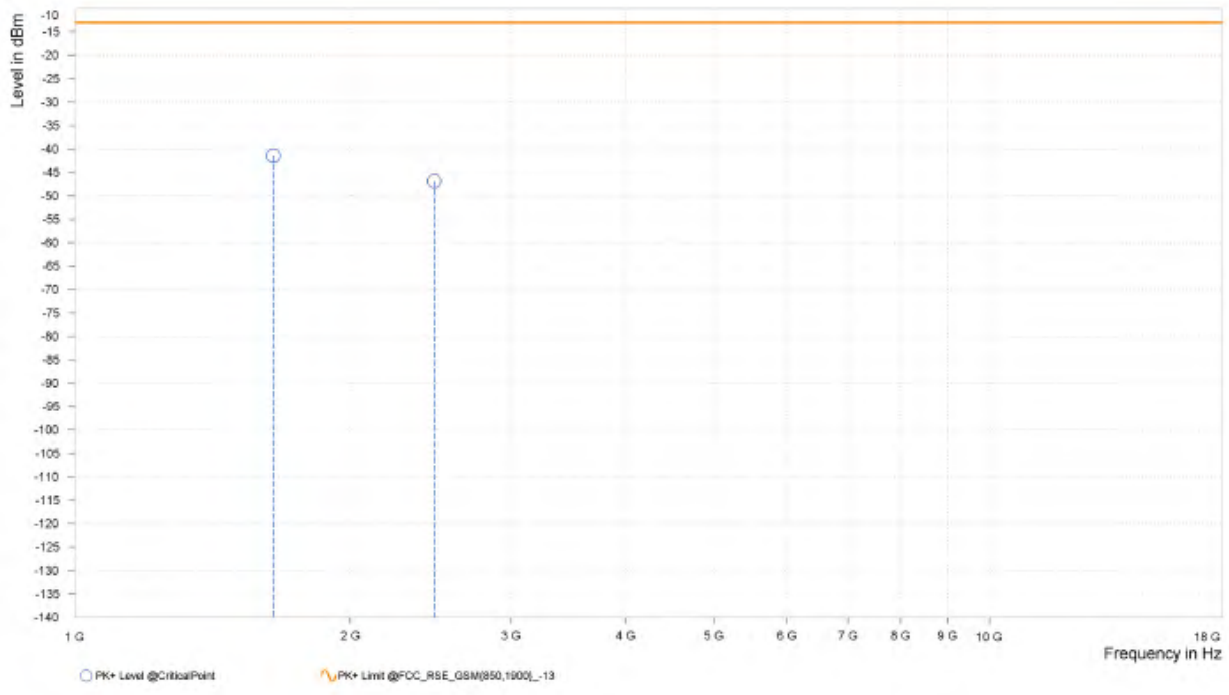


EDGE 850:

CH 128:

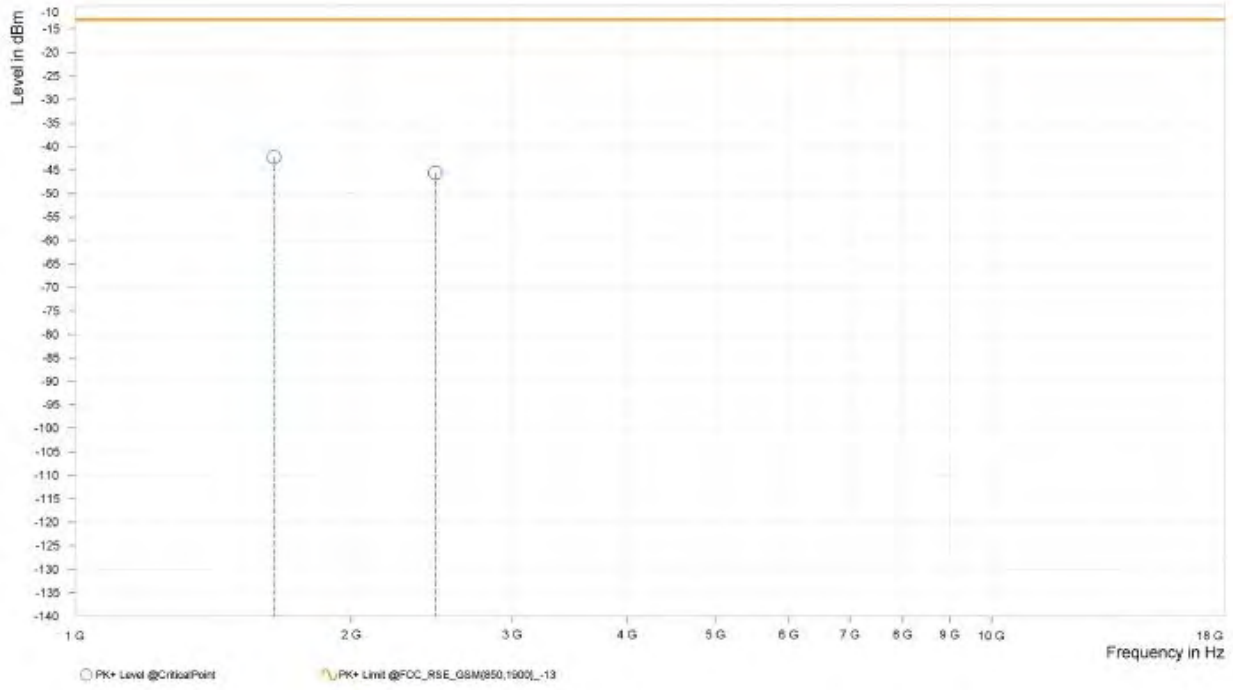
MODE	TX channel 128	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,648.500	-41.47	-13.00	28.47	17.46	H	89	1.00
3	2,472.500	-46.87	-13.00	33.87	22.42	H	0.9	2.00



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

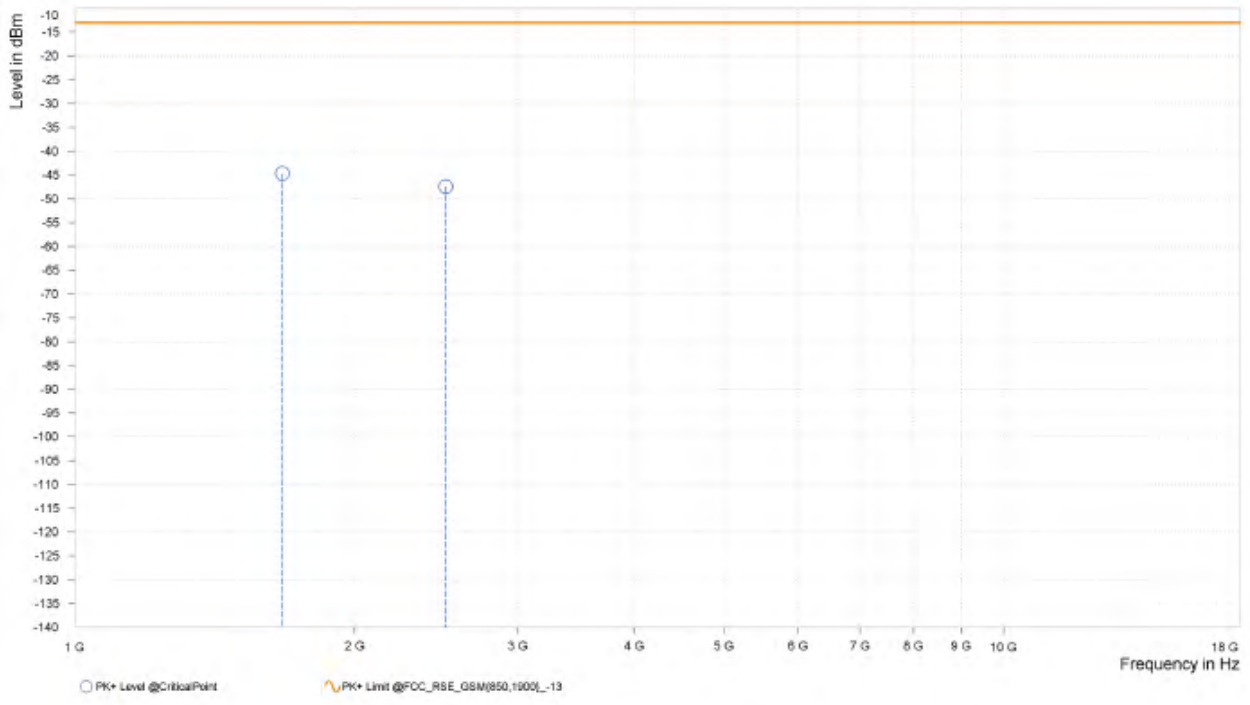
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,648.000	-42.31	-13.00	29.31	17.05	V	90.1	1.00
3	2,472.500	-45.63	-13.00	32.63	22.67	V	359	2.00



CH 189:

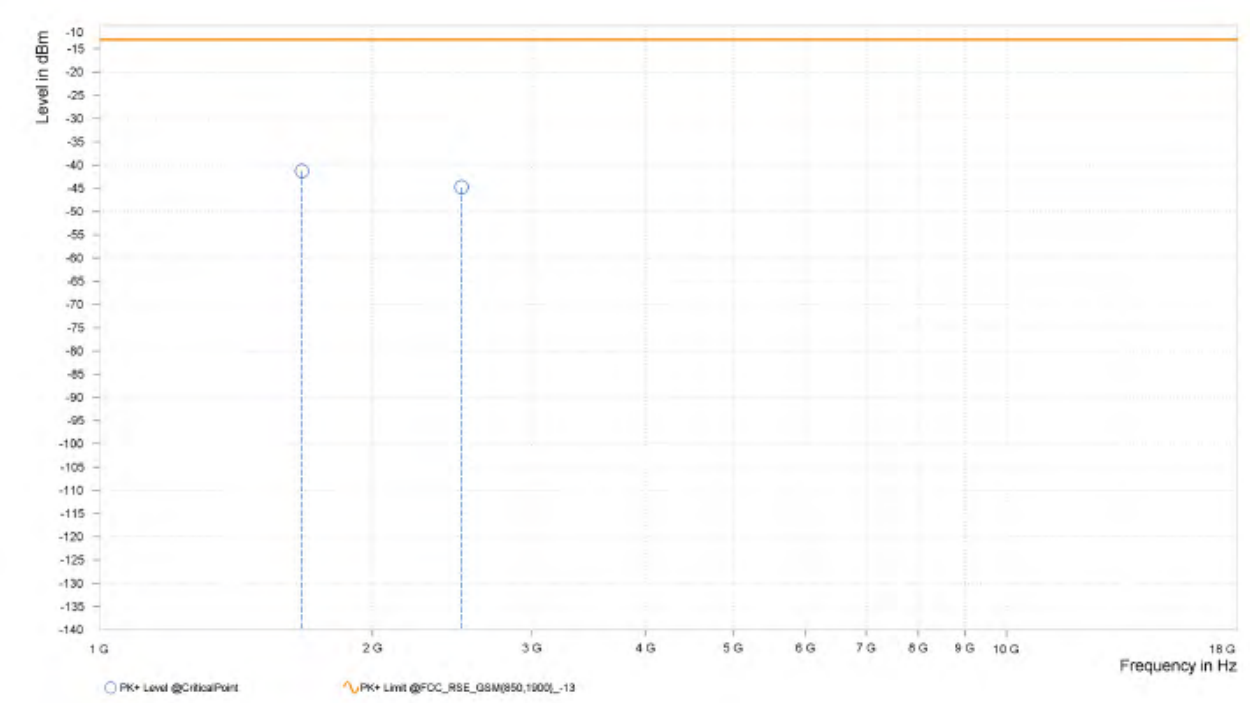
MODE	TX channel 189	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,672.500	-44.71	-13.00	31.71	18.24	H	1	1.00
3	2,509.000	-47.40	-13.00	34.40	22.46	H	358.9	1.00



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

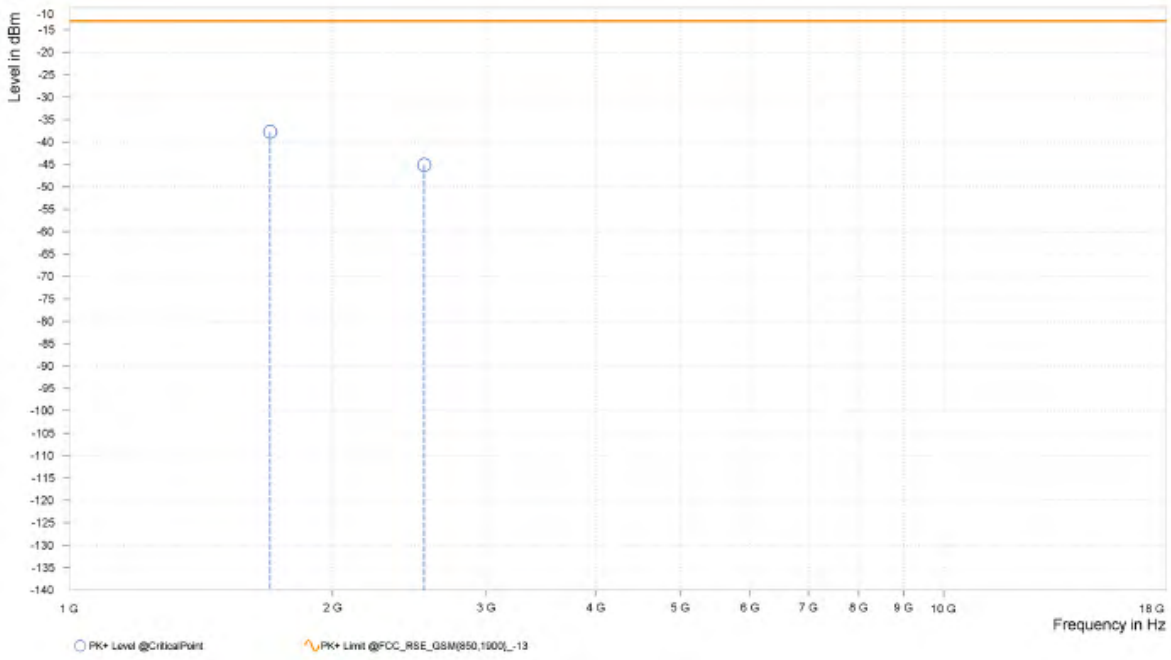
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,673.000	-41.30	-13.00	28.30	17.14	V	359	1.00
3	2,509.000	-44.78	-13.00	31.78	23.06	V	359	2.00



CH 251:

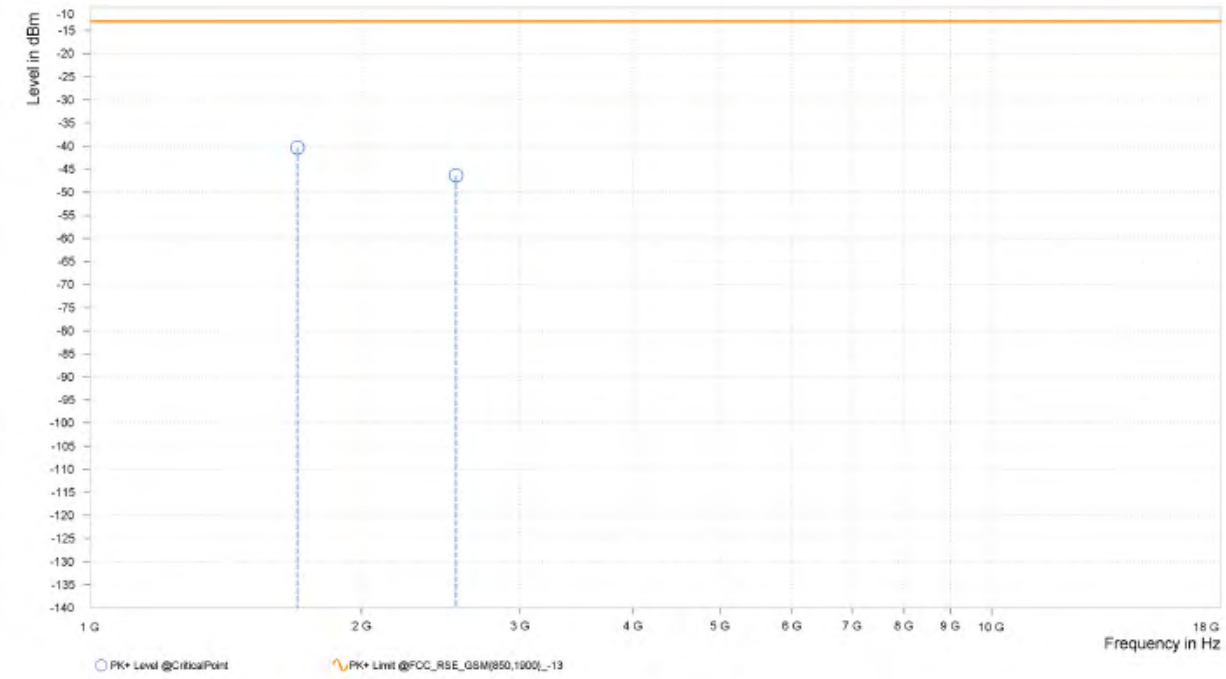
MODE	TX channel 251	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,697.000	-37.77	-13.00	24.77	18.62	H	90.2	1.00
3	2,546.500	-45.13	-13.00	32.13	22.51	H	0.9	2.00



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

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,697.500	-40.34	-13.00	27.34	17.84	V	92.5	1.00
3	2,546.500	-46.35	-13.00	33.35	23.13	V	359	2.00

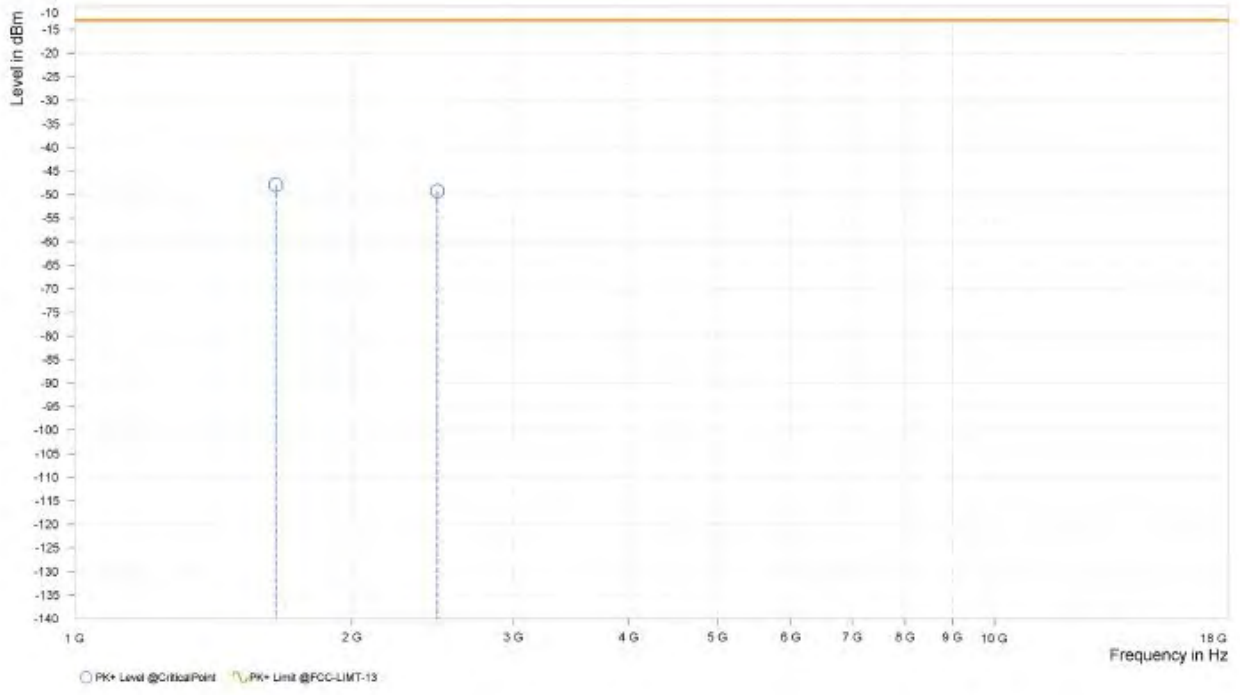


WCDMA Band V:

CH 4132:

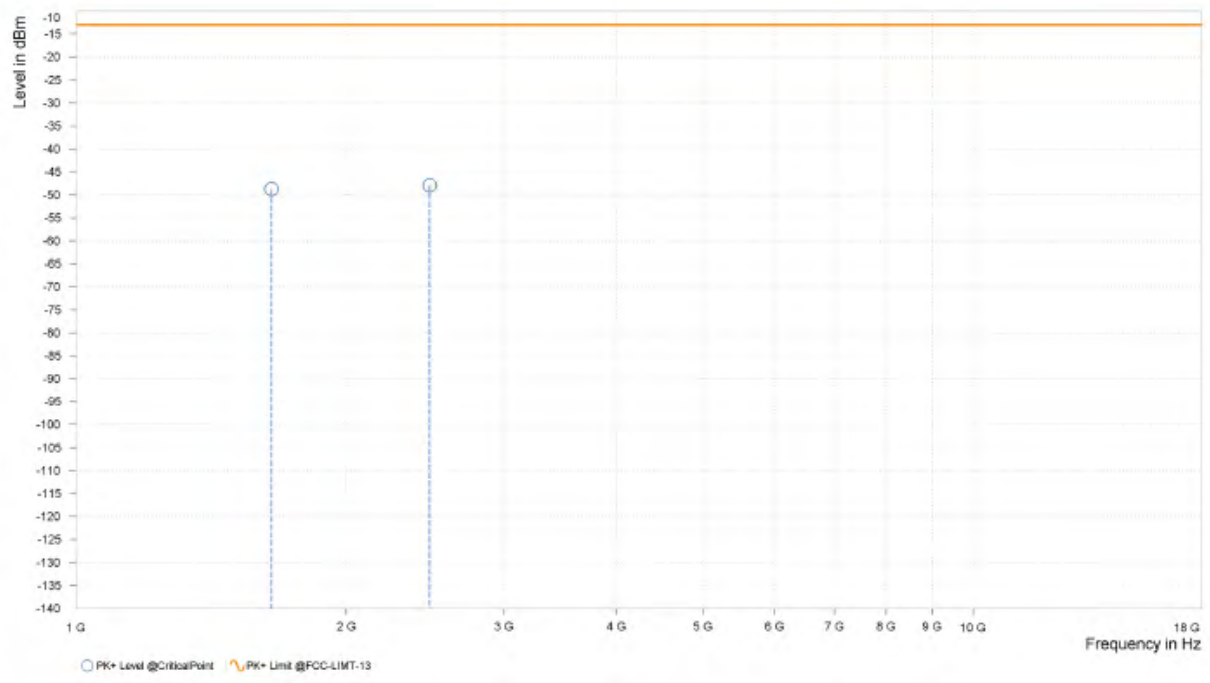
MODE	TX channel 4132	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,654.500	-47.92	-13.00	34.92	15.66	H	287.8	2.00
3	2,479.000	-49.21	-13.00	36.21	20.88	H	0.9	2.00



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

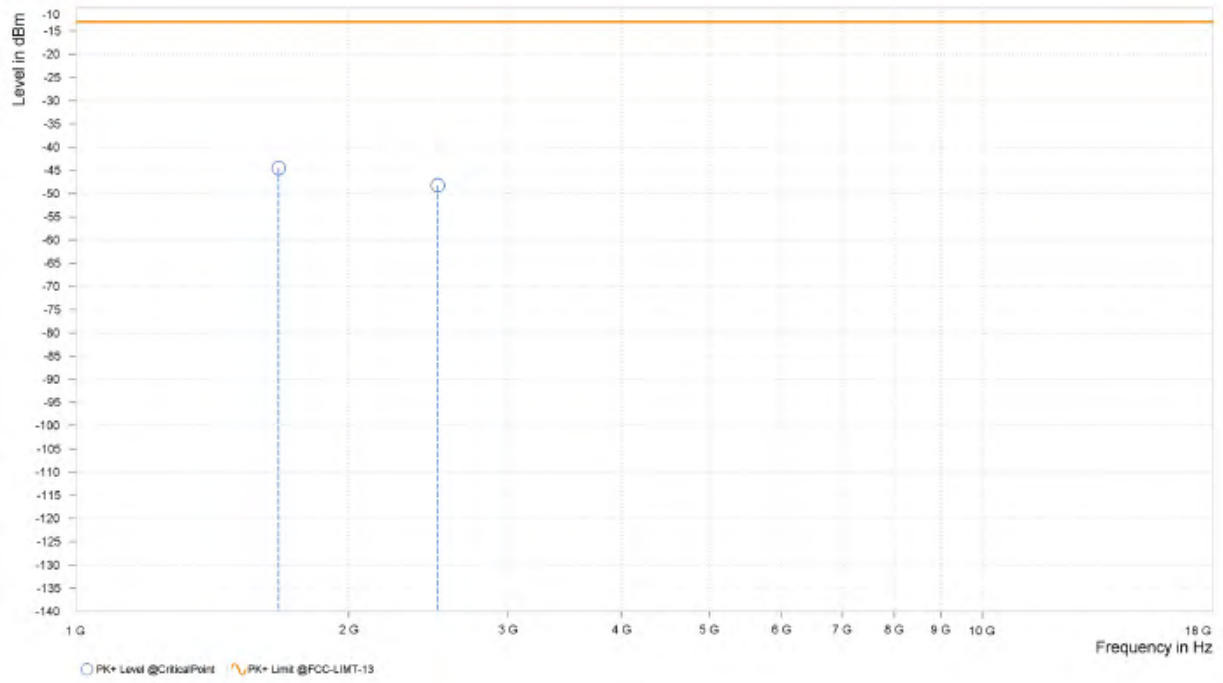
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,651.000	-48.74	-13.00	35.74	14.93	V	1	2.00
3	2,479.000	-47.96	-13.00	34.96	21.12	V	34.3	2.00



CH 4182:

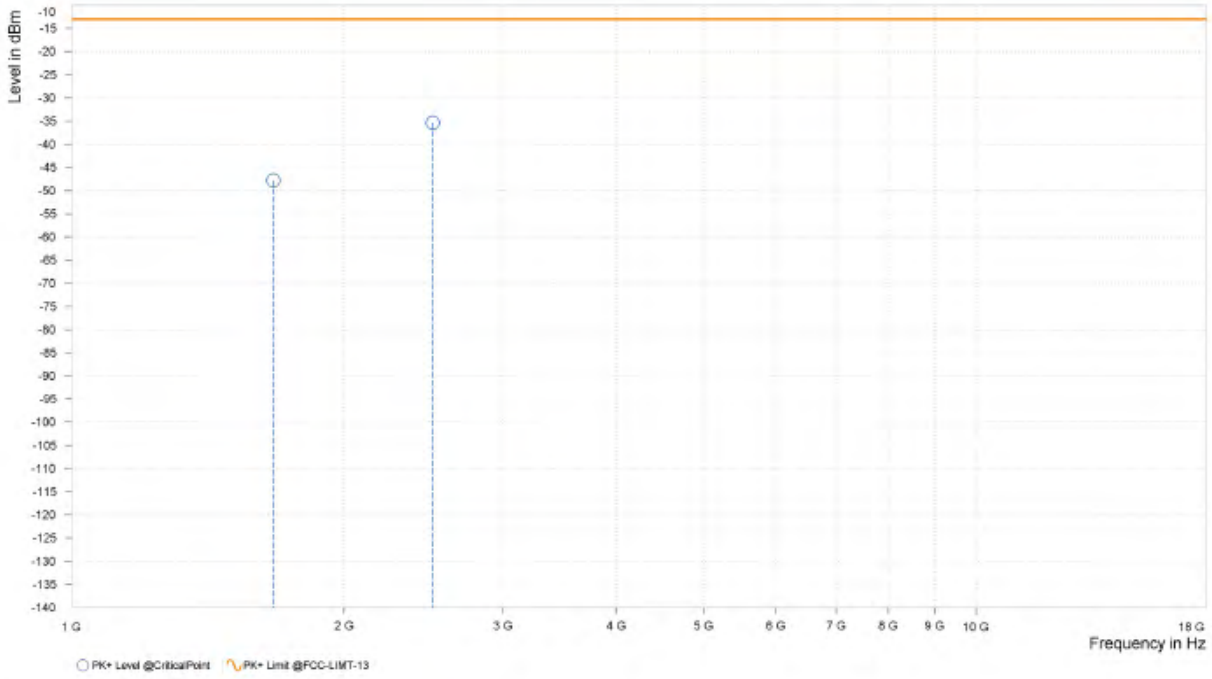
MODE	TX channel 4182	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,674.000	-44.53	-13.00	31.53	16.10	H	303.2	2.00
3	2,509.000	-48.25	-13.00	35.25	21.17	H	1	2.00



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

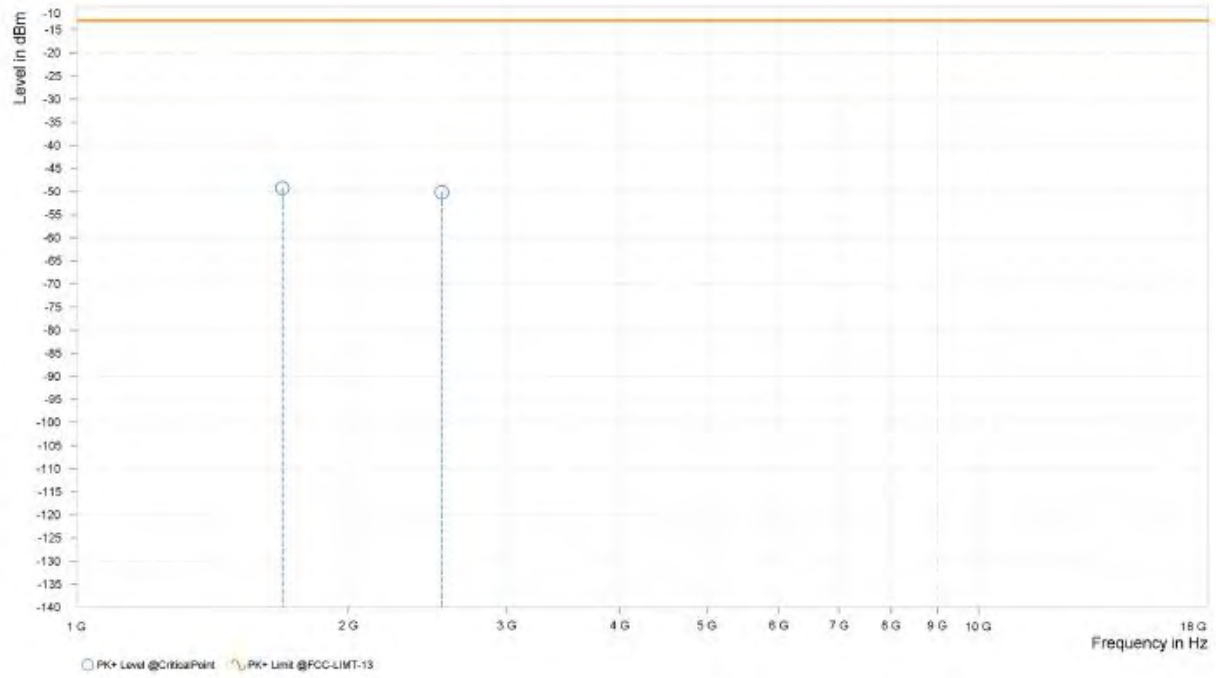
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,671.500	-47.83	-13.00	34.83	14.95	V	359.1	1.00
3	2,507.000	-35.38	-13.00	22.38	21.72	V	359	2.00



CH 4233:

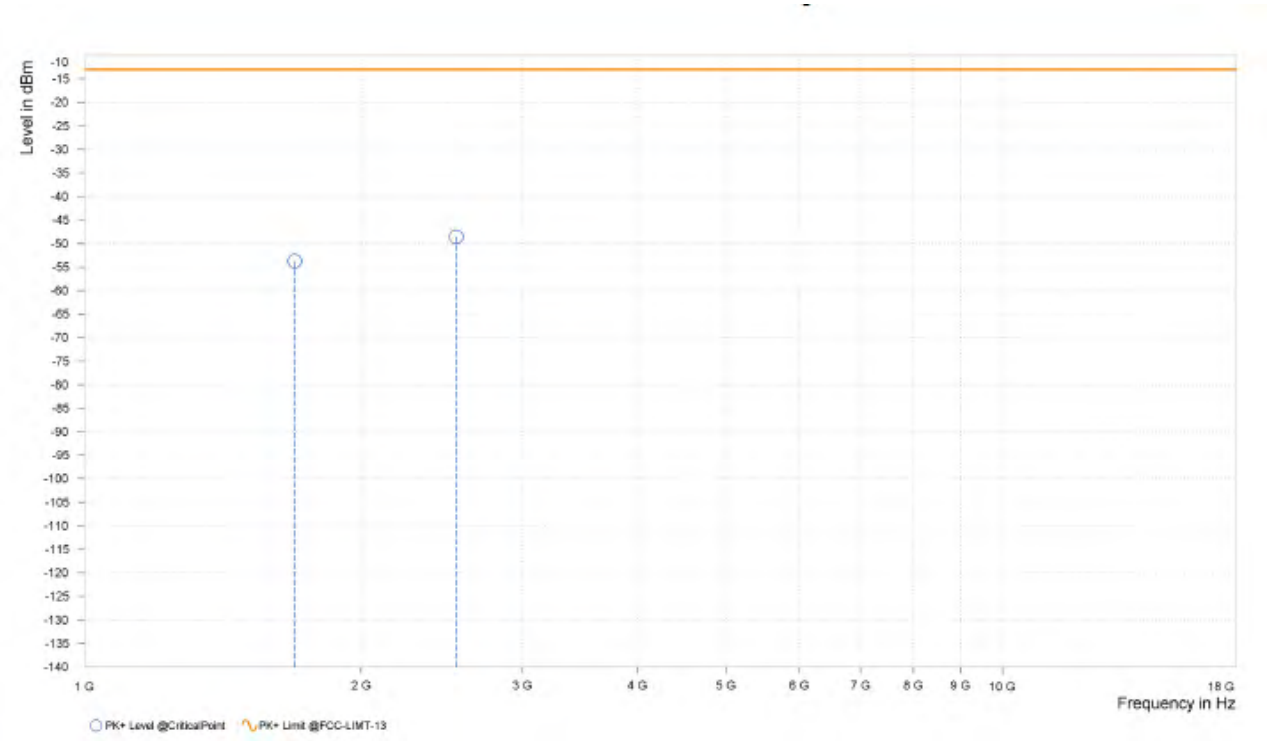
MODE	TX channel 4233	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,691.000	-49.22	-13.00	36.22	16.48	H	2.5	2.00
3	2,540.000	-50.17	-13.00	37.17	20.95	H	359	2.00



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

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,693.200	-53.74	-13.00	40.74	15.54	V	2	2.00
3	2,539.800	-48.56	-13.00	35.56	21.64	V	229.2	2.00



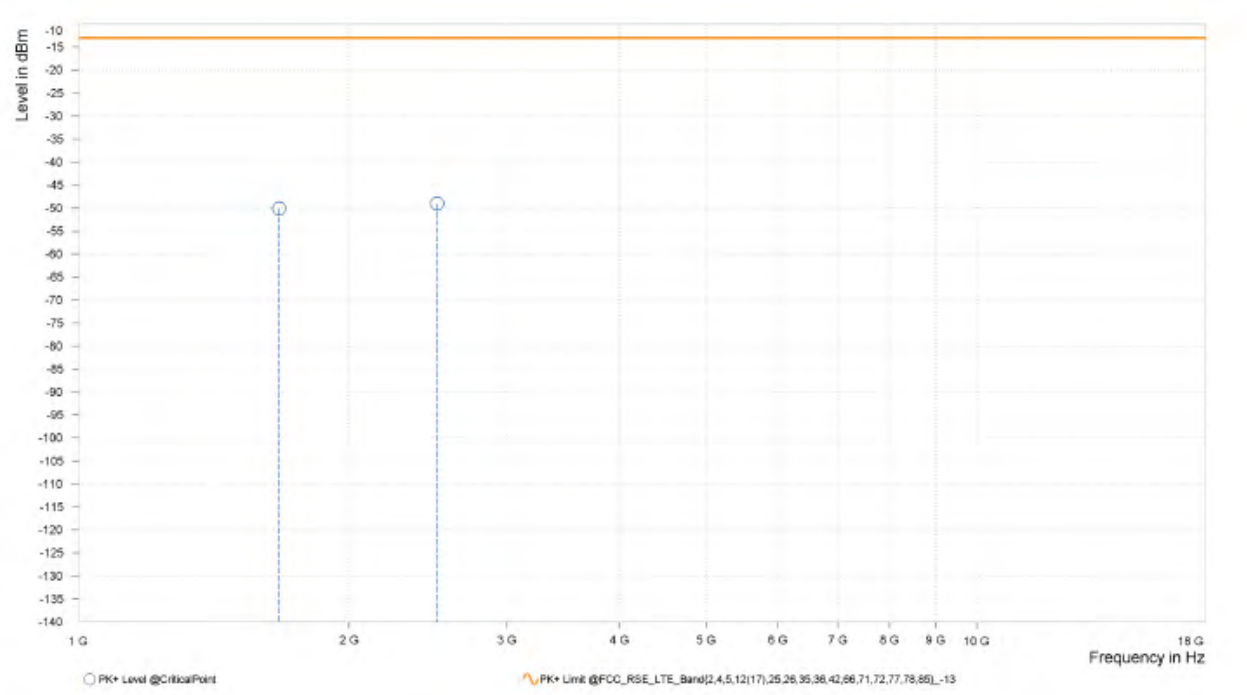
LTE Band 5

CHANNEL BANDWIDTH: 1.4MHz / QPSK

CH20525

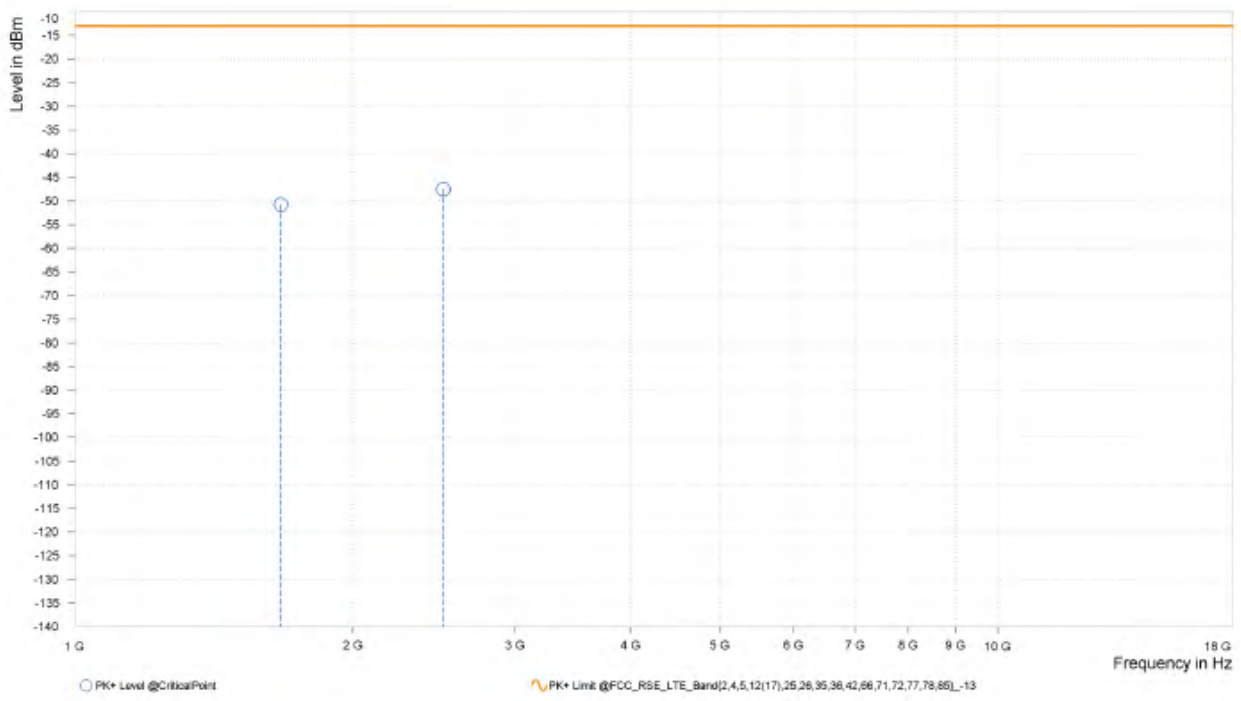
MODE	TX channel 20525	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,672.000	-50.11	-13.00	37.11	16.06	H	82.2	2.00
3	2,508.000	-49.04	-13.00	36.04	21.17	H	291	1.00



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

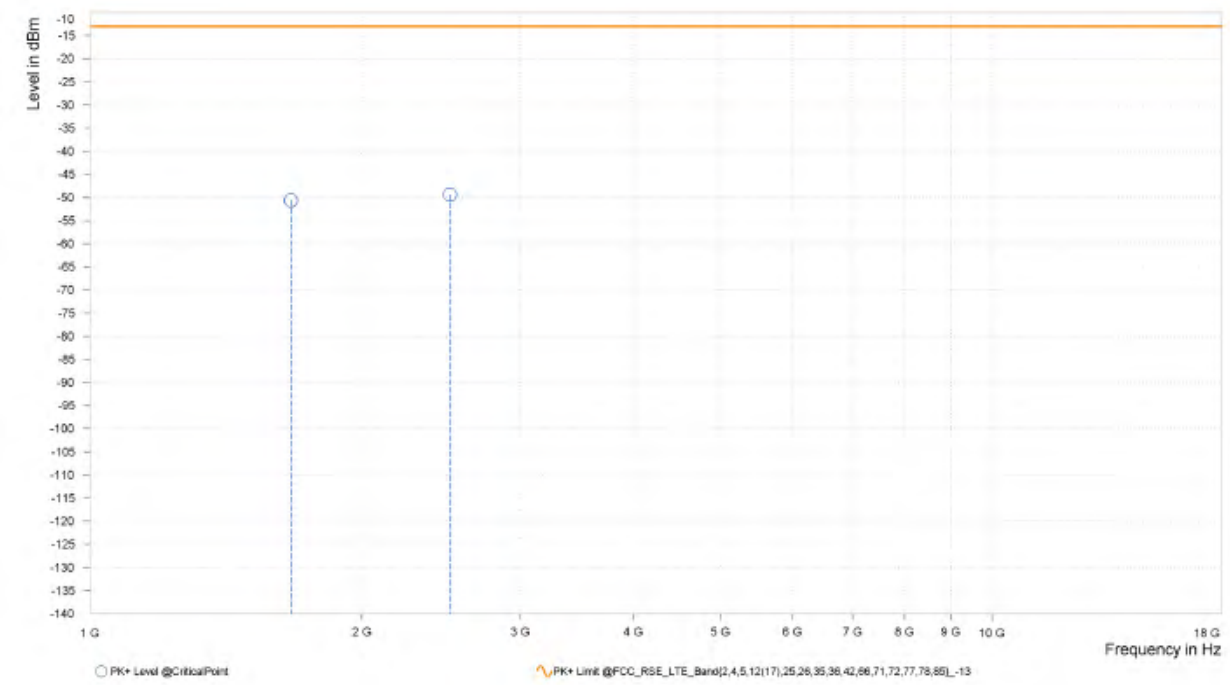
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,672.000	-50.76	-13.00	37.76	14.96	V	87.8	1.00
3	2,508.000	-47.47	-13.00	34.47	21.75	V	0.9	2.00



CHANNEL BANDWIDTH: 3MHz / QPSK

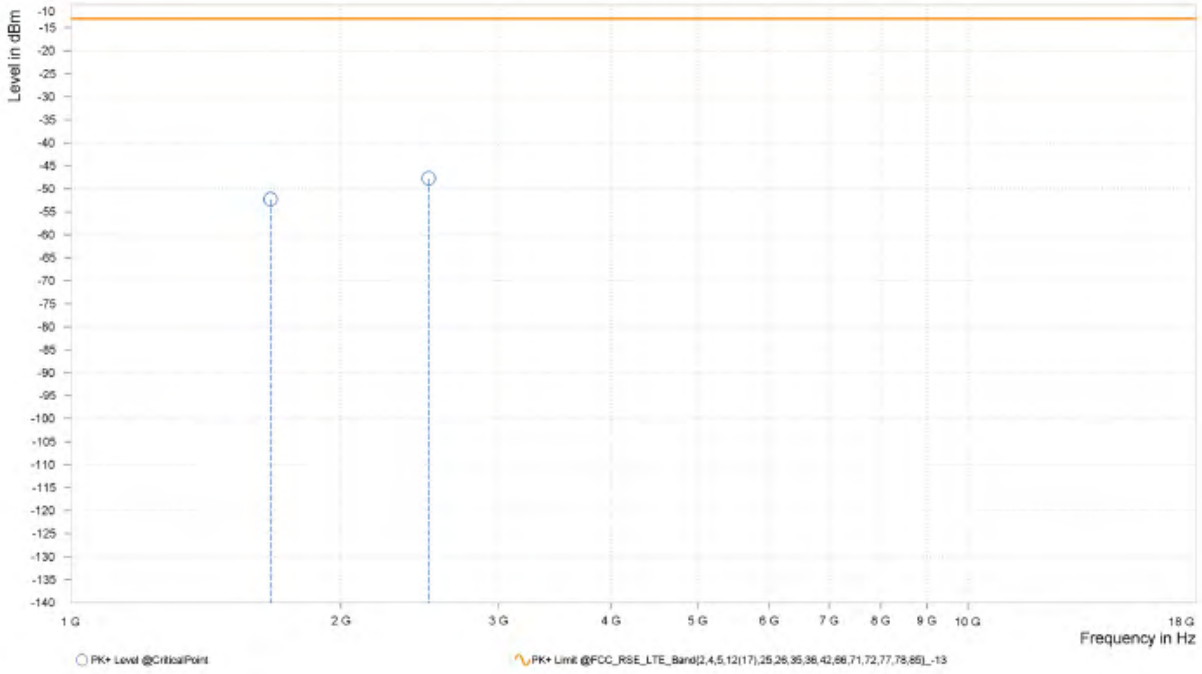
MODE	TX channel 20525	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,670.000	-50.61	-13.00	37.61	16.03	H	82.2	2.00
3	2,505.000	-49.38	-13.00	36.38	21.15	H	102.1	1.00



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

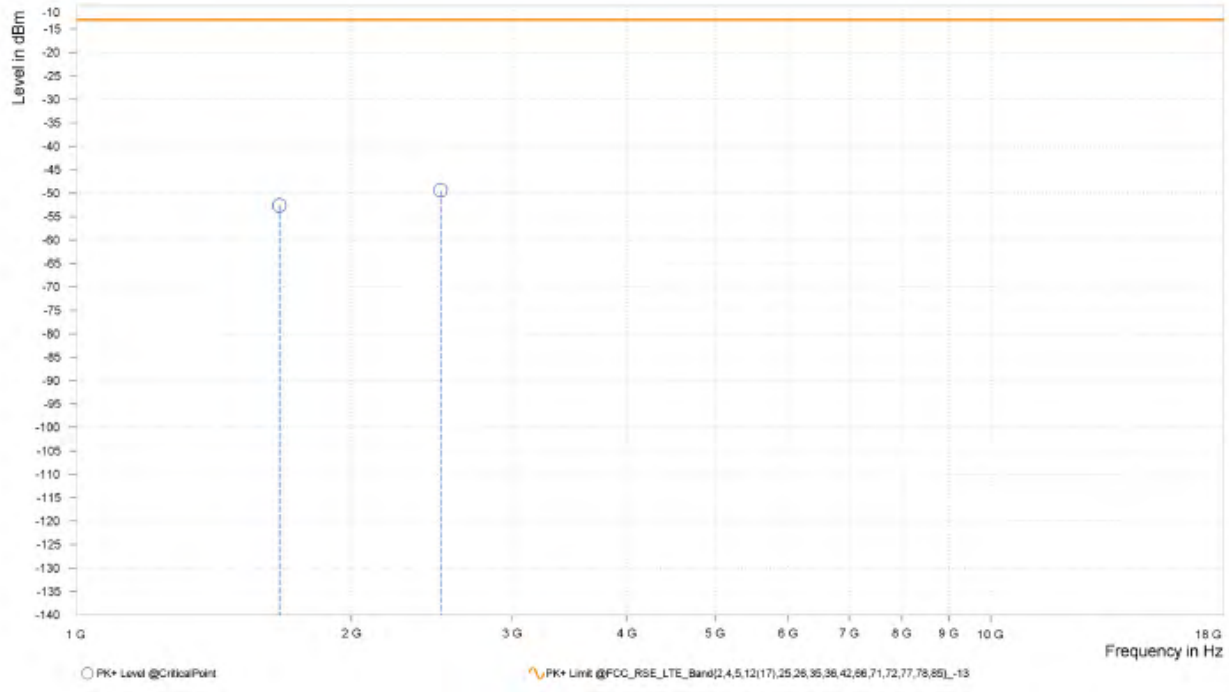
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,670.000	-52.29	-13.00	39.29	14.92	V	86.6	1.00
3	2,505.000	-47.74	-13.00	34.74	21.66	V	161.8	1.00



CHANNEL BANDWIDTH: 5MHz / QPSK

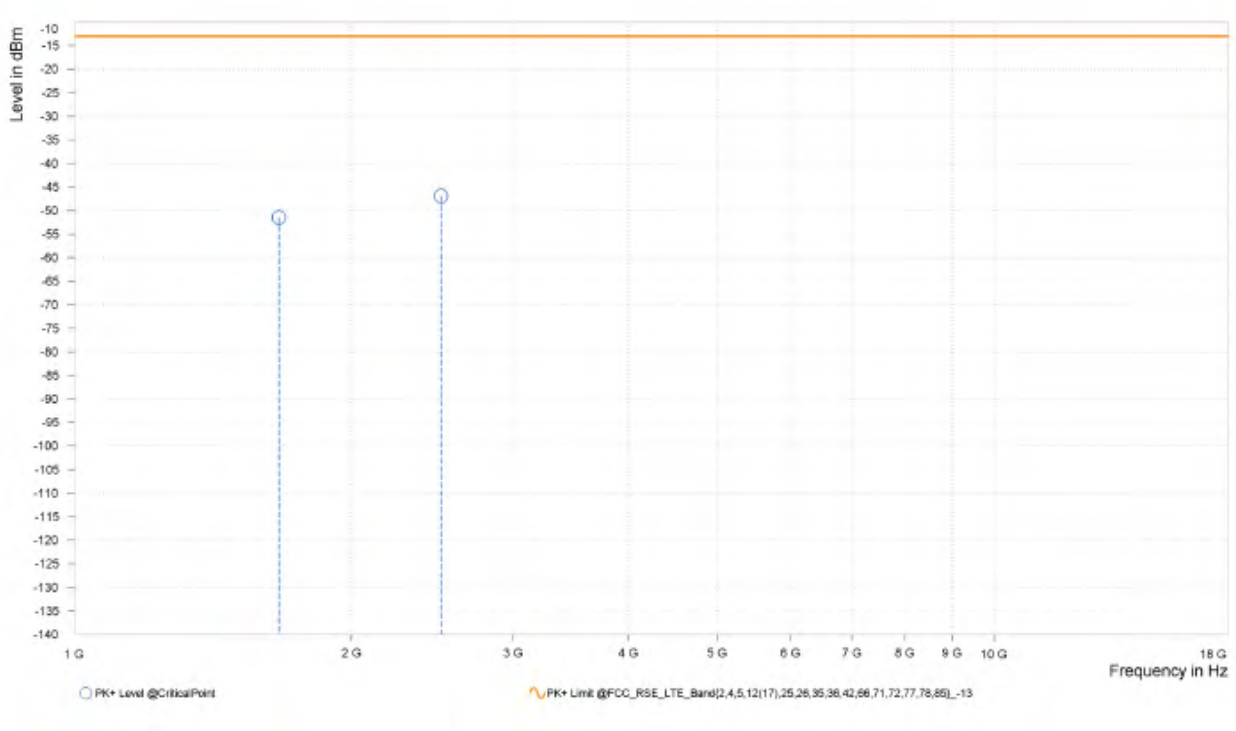
MODE	TX channel 20525	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,668.500	-52.62	-13.00	39.62	16.01	H	277.8	1.00
3	2,503.000	-49.40	-13.00	36.40	21.14	H	2.5	2.00



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

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,668.500	-51.47	-13.00	38.47	14.90	V	89	1.00
3	2,503.000	-46.96	-13.00	33.96	21.60	V	163.1	1.00

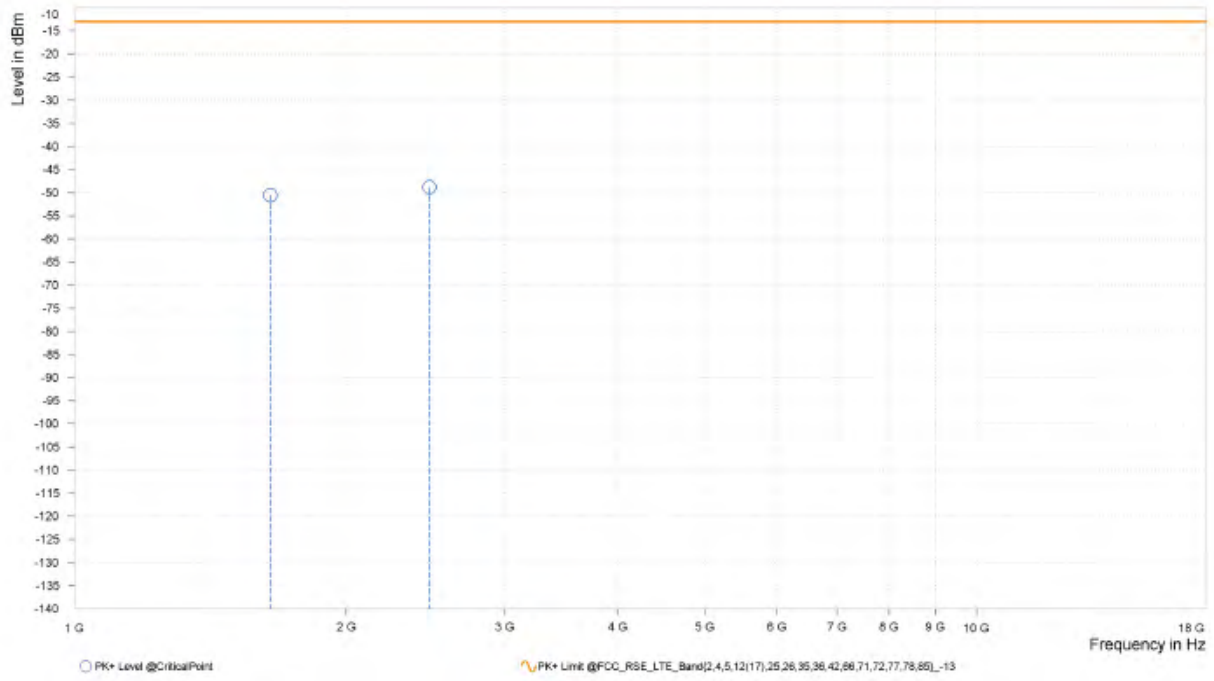


CHANNEL BANDWIDTH: 10MHz / QPSK

CH20450

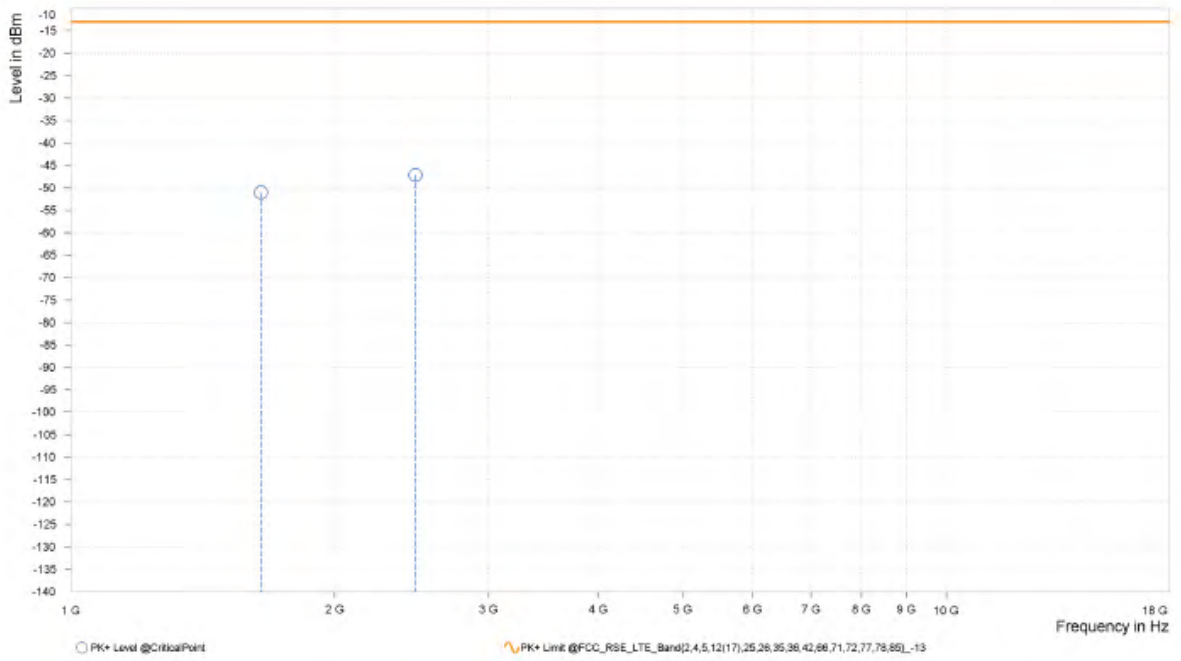
MODE	TX channel 20450	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,649.000	-50.51	-13.00	37.51	15.41	H	51.9	1.00
3	2,473.000	-48.81	-13.00	35.81	20.81	H	294.6	1.00



MODE	TX channel 20450	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

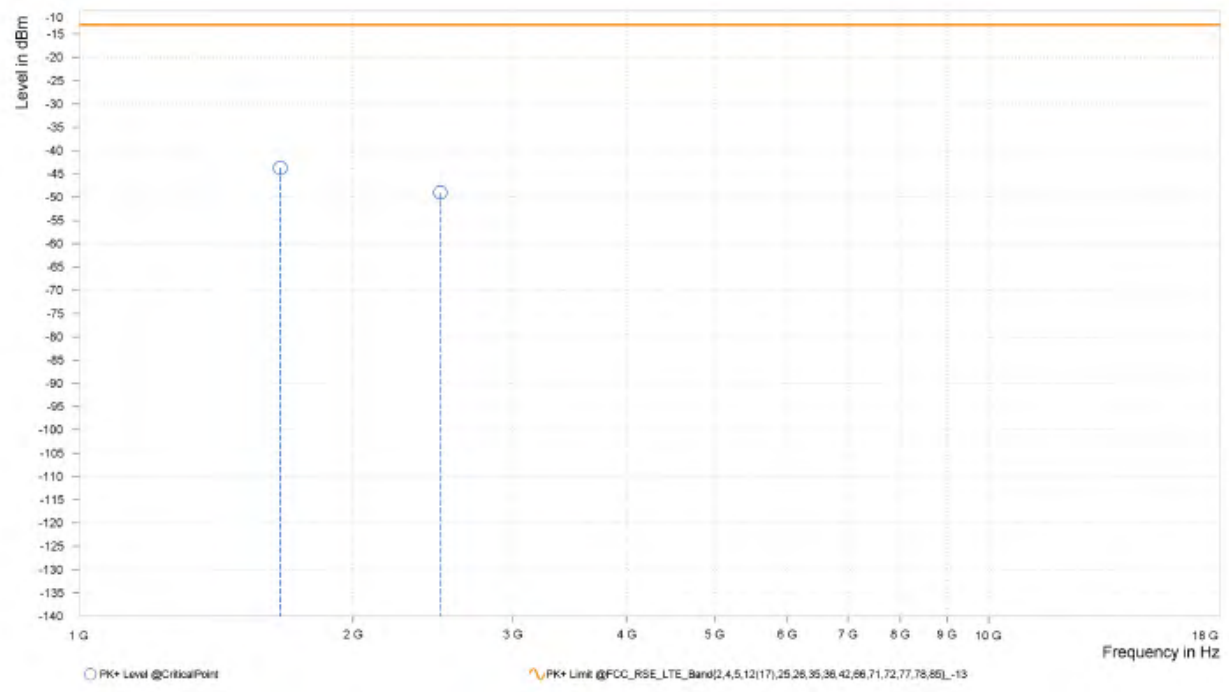
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,649.000	-51.06	-13.00	38.06	14.96	V	87.7	1.00
3	2,473.000	-47.13	-13.00	34.13	21.07	V	359	2.00



CH20525

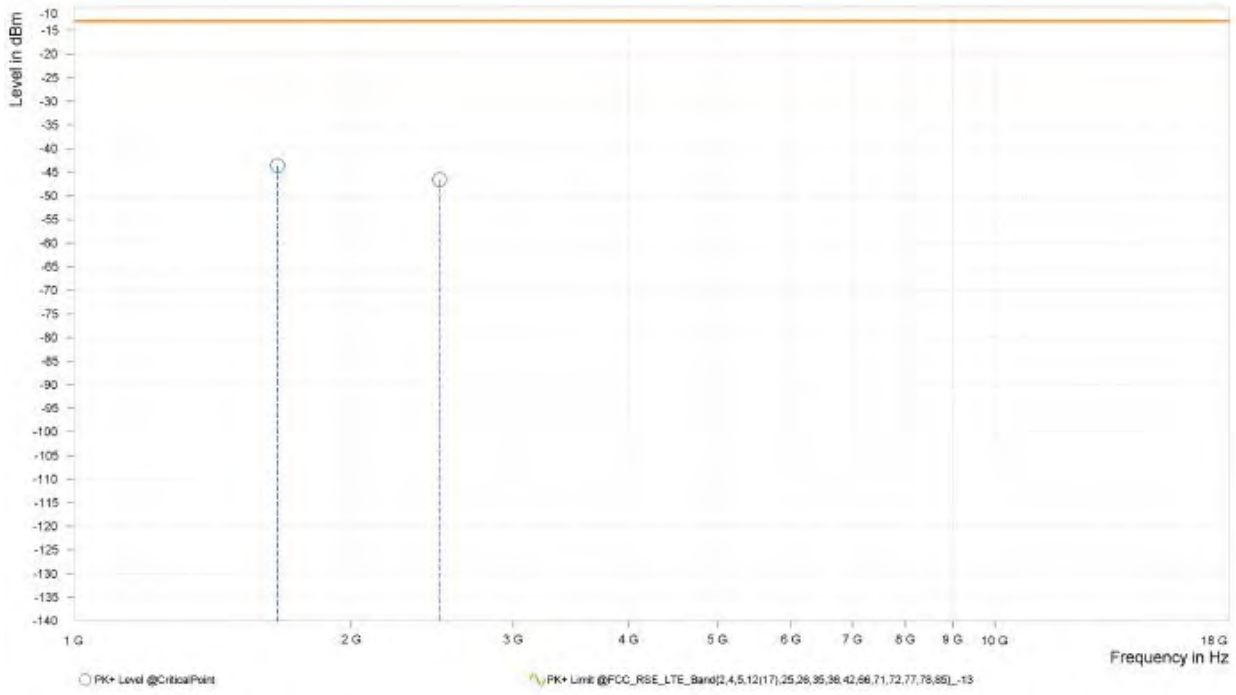
MODE	TX channel 20525	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,664.000	-43.76	-13.00	30.76	15.94	H	83.3	2.00
3	2,496.000	-49.03	-13.00	36.03	21.20	H	359	2.00



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

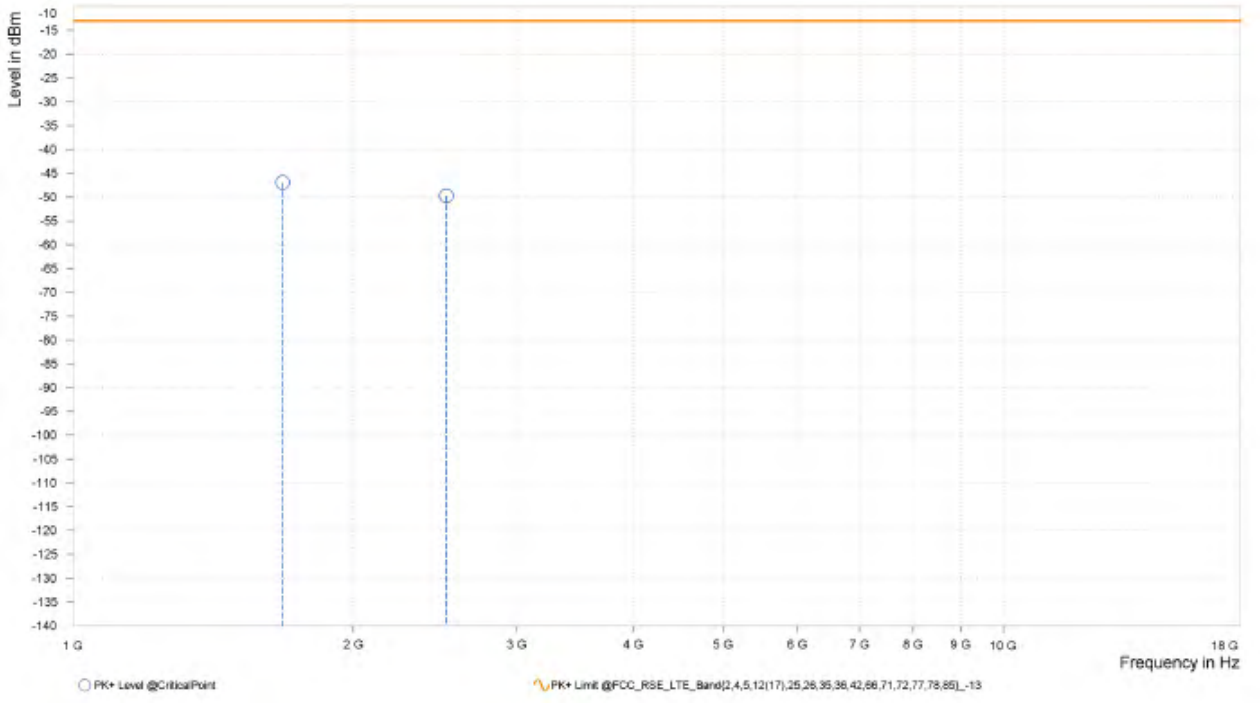
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,664.000	-43.61	-13.00	30.61	14.82	V	359	2.00
3	2,496.000	-46.57	-13.00	33.57	21.48	V	359	2.00



CH20600

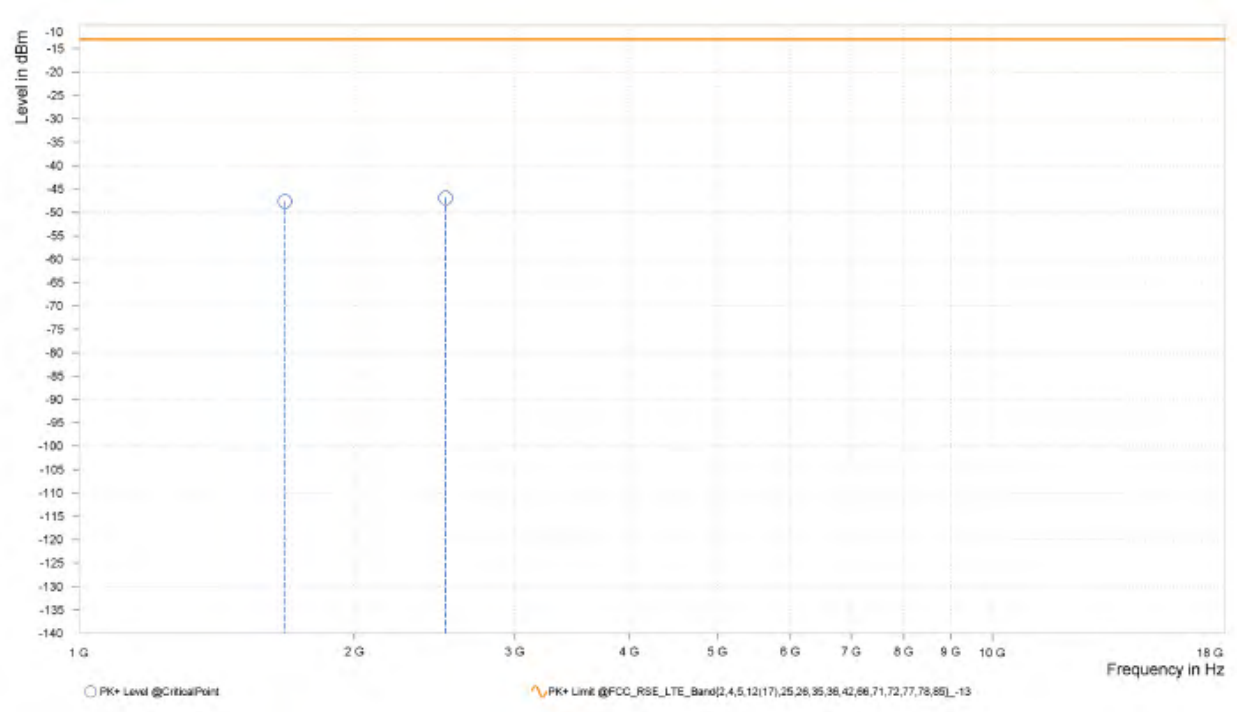
MODE	TX channel 20600	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,679.500	-46.96	-13.00	33.96	16.20	H	81	2.00
3	2,518.500	-49.75	-13.00	36.75	20.93	H	2.6	2.00



MODE	TX channel 20600	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,679.500	-47.62	-13.00	34.62	15.12	V	1	1.00
3	2,518.500	-46.92	-13.00	33.92	21.78	V	359	2.00

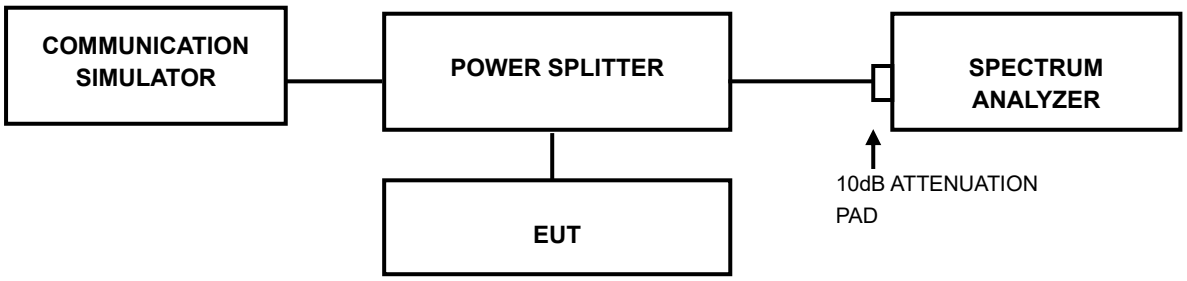


3.7 PEAK TO AVERAGE RATIO

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, BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO. LTD., were founded in 2015 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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

Shenzhen EMC/RF Lab:
Tel: +86-755-88696566
Fax: +86-755-88696577

Email: customerservice.sw@bureauveritas.com
Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.

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	2.75	13	PASS
GSM850	189	2.81	13	PASS
GSM850	251	2.78	13	PASS
EGPRS850	128	5.80	13	PASS
EGPRS850	189	5.80	13	PASS
EGPRS850	251	5.83	13	PASS

Test Graphs

GSM850-128

GSM850-189

GSM850-251

EGPRS850-128

EGPRS850-189

EGPRS850-251

26DB BANDWIDTH AND OCCUPIED BANDWIDTH

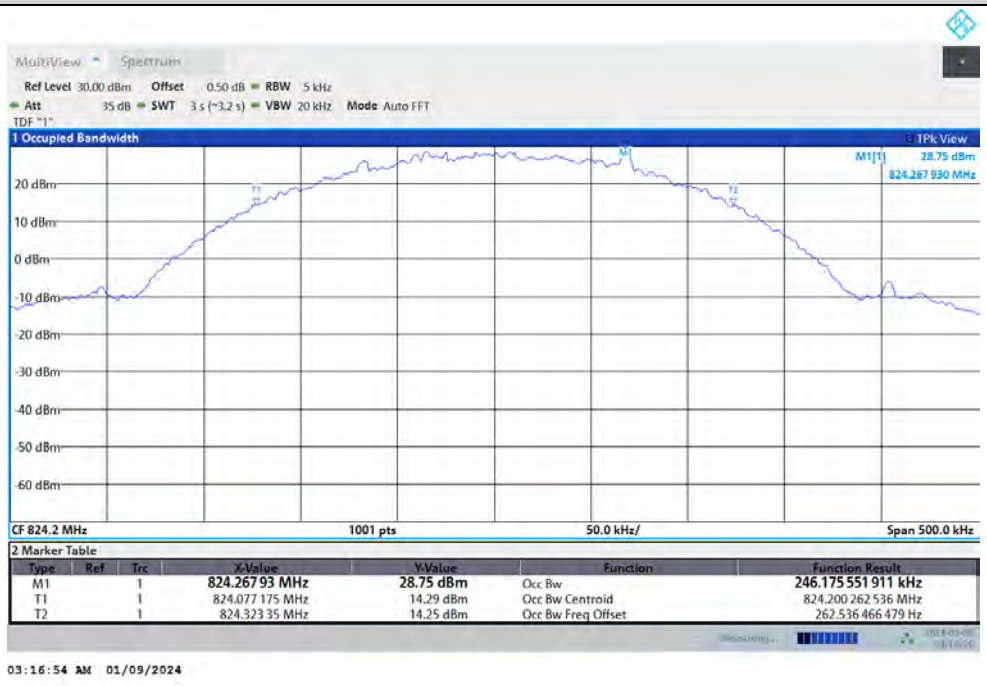
Test Result

Band	Channel	Occupied Bandwidth (KHz)	26dB Bandwidth (KHz)	Limit (MHz)	Verdict
GSM850	128	246.176	316.680	---	PASS
GSM850	189	246.495	317.680	---	PASS
GSM850	251	247.630	318.180	---	PASS
EGPRS850	128	245.681	313.190	---	PASS
EGPRS850	189	247.562	313.690	---	PASS
EGPRS850	251	248.508	314.690	---	PASS

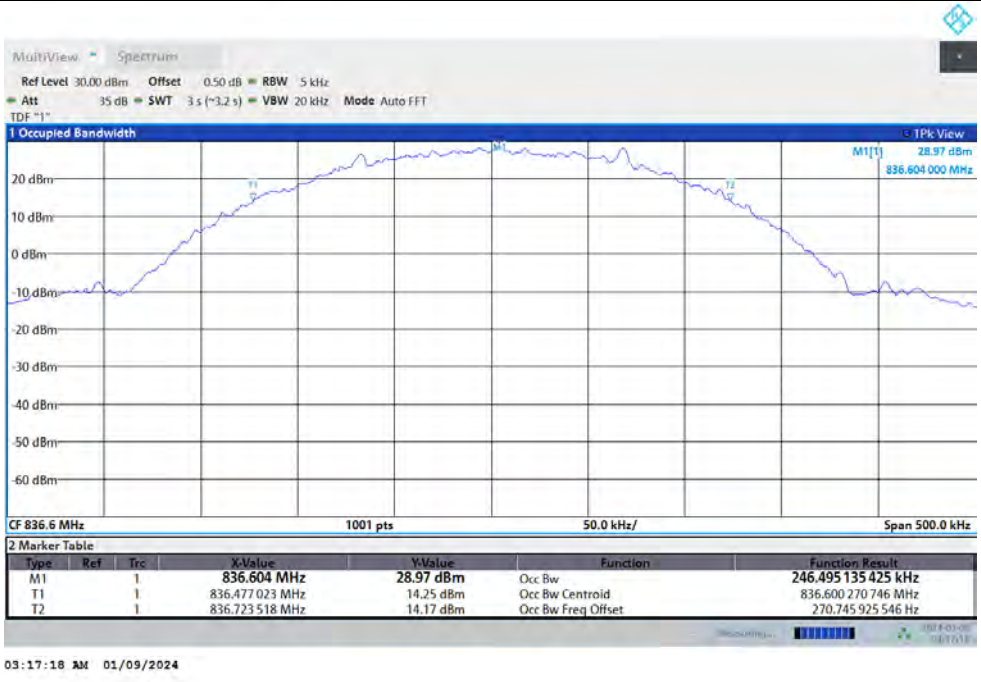
Test Graphs

Occupied Bandwidth

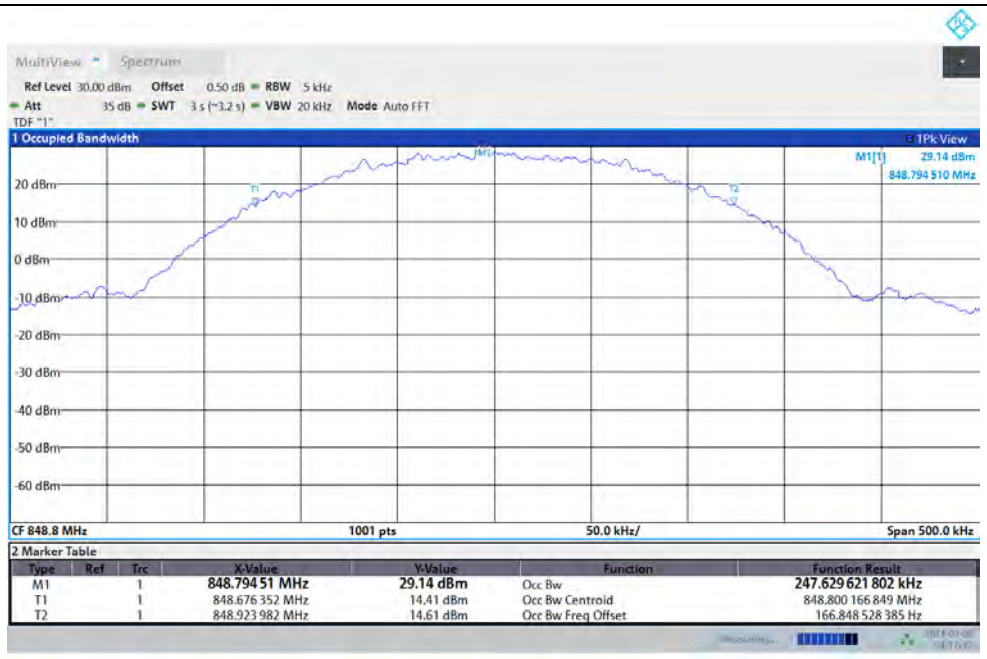
GSM850-128



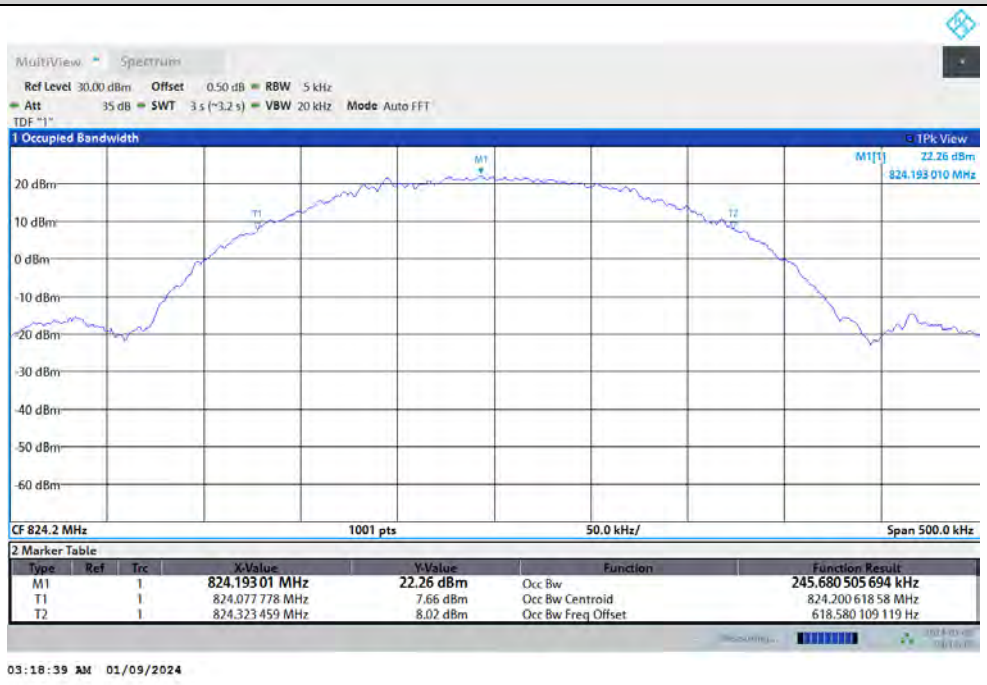
GSM850-189



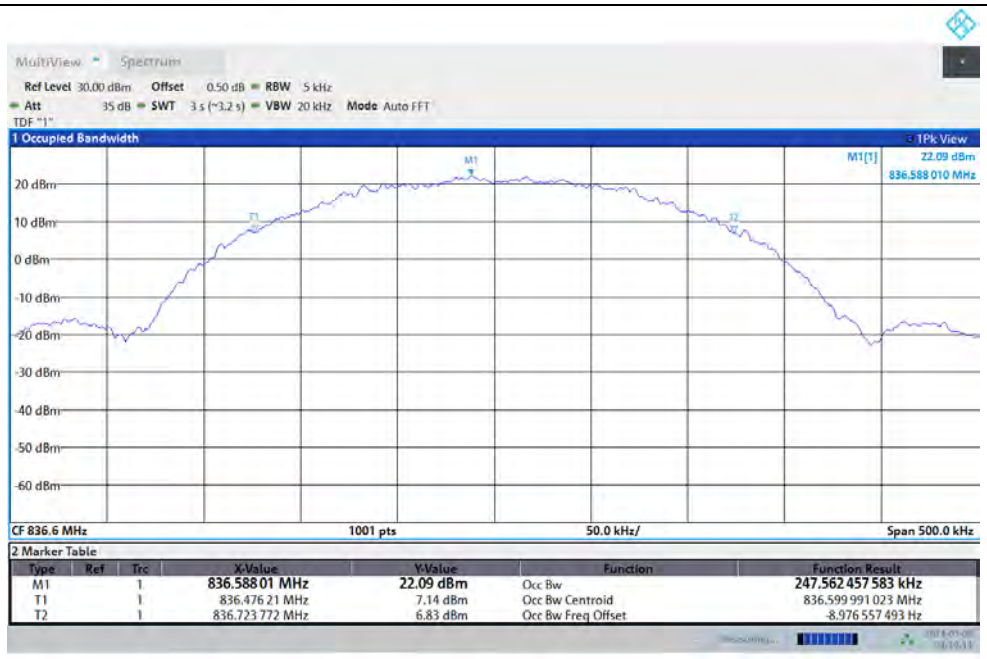
GSM850-251



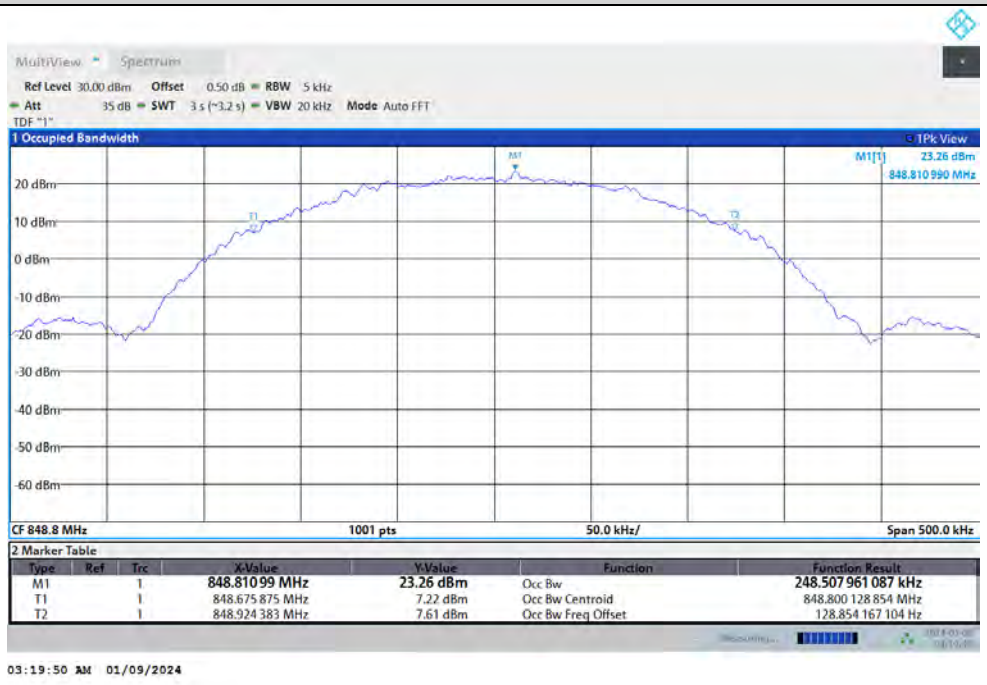
EGPRS850-128



EGPRS850-189

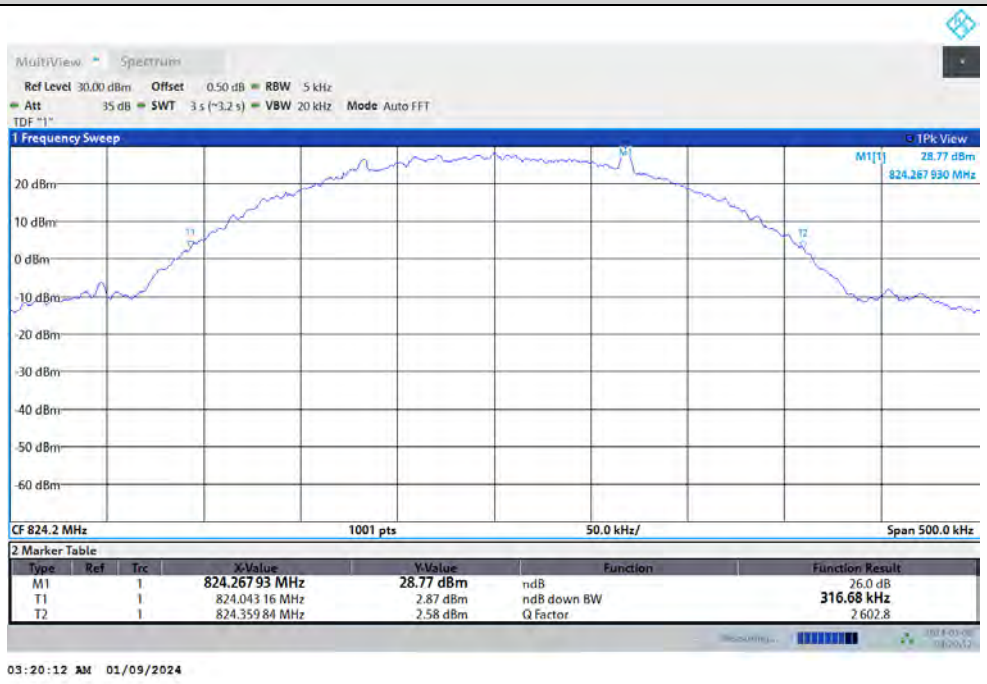


EGPRS850-251

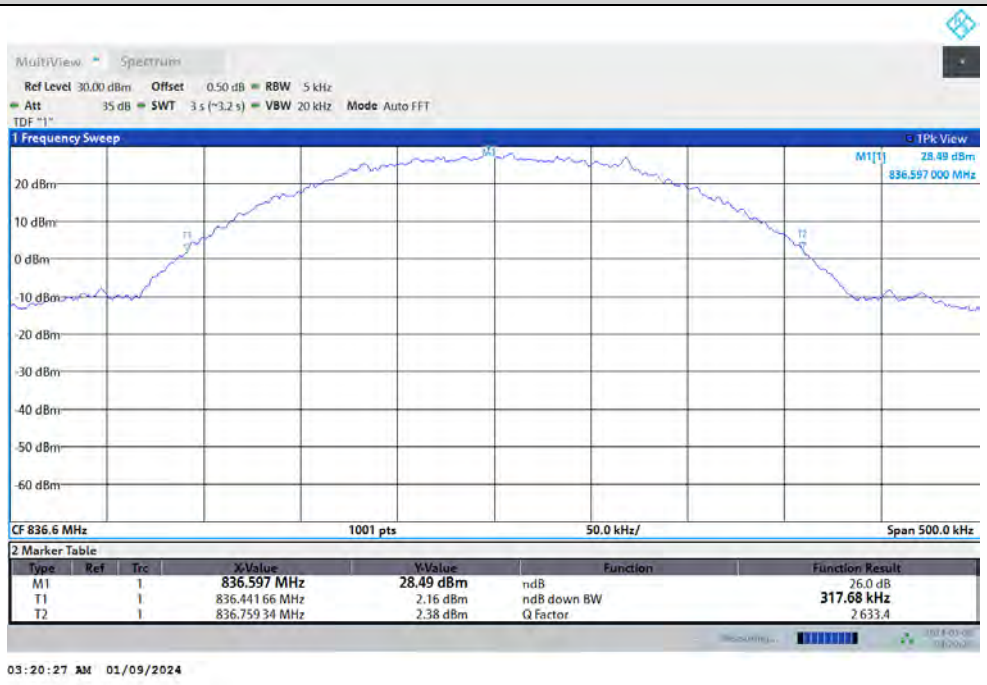


26dB Bandwidth

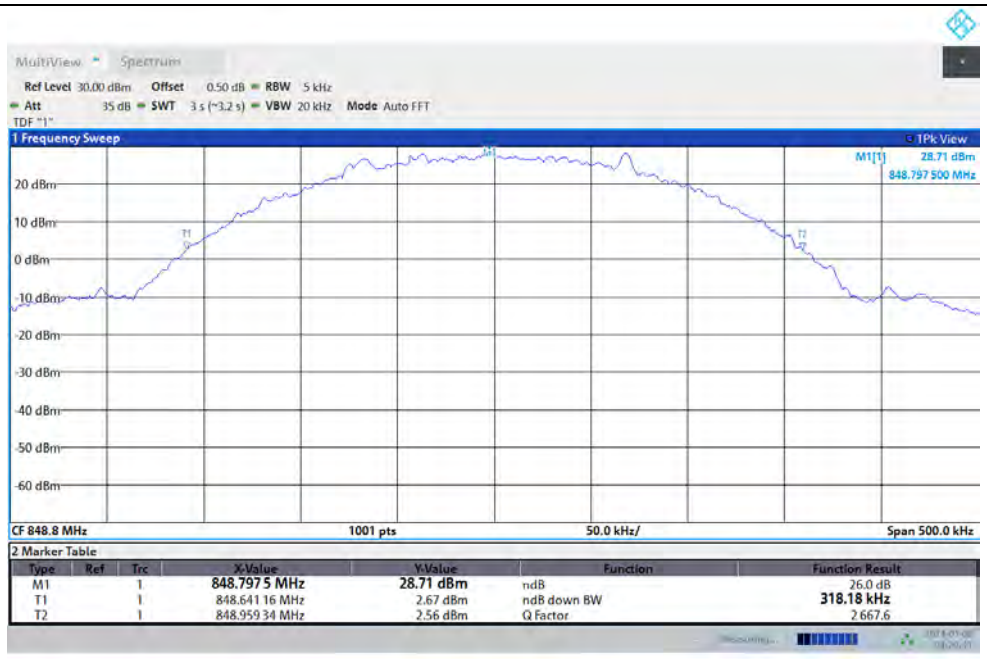
GSM850-128



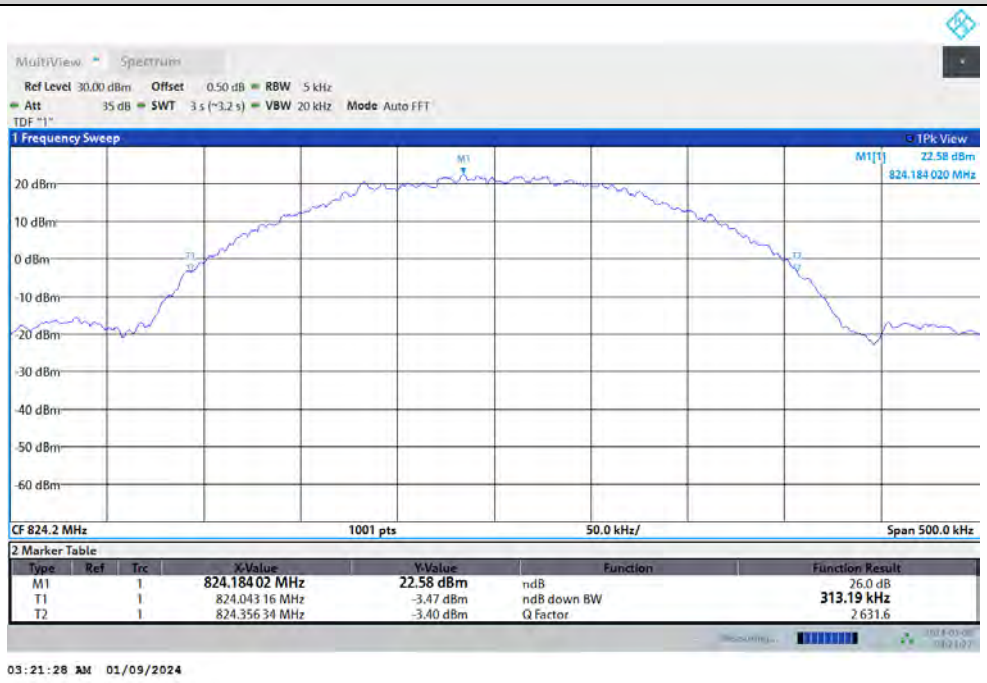
GSM850-189



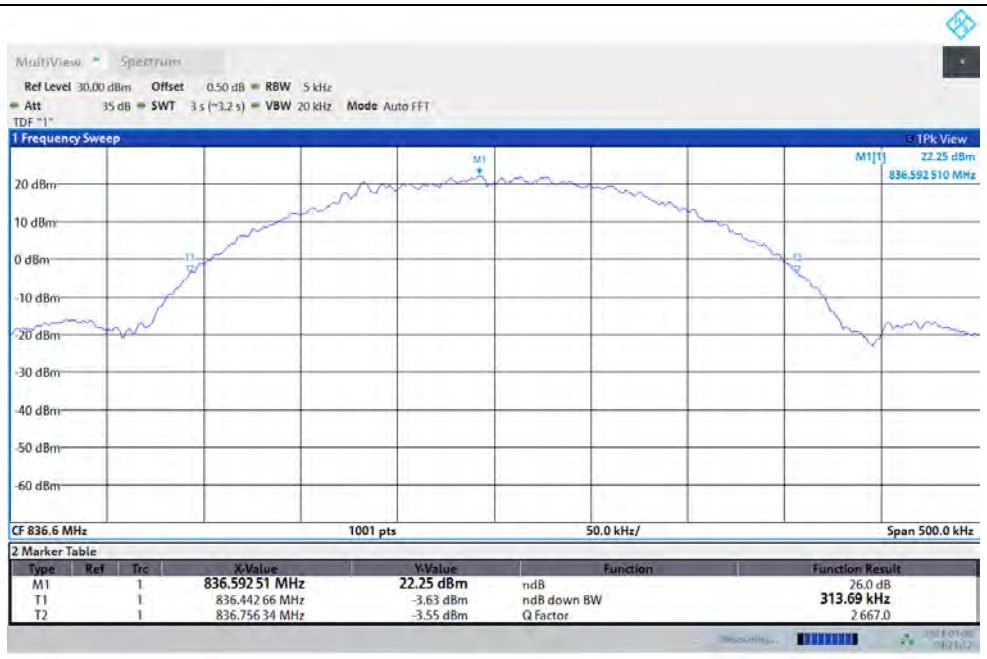
GSM850-251



EGPRS850-128

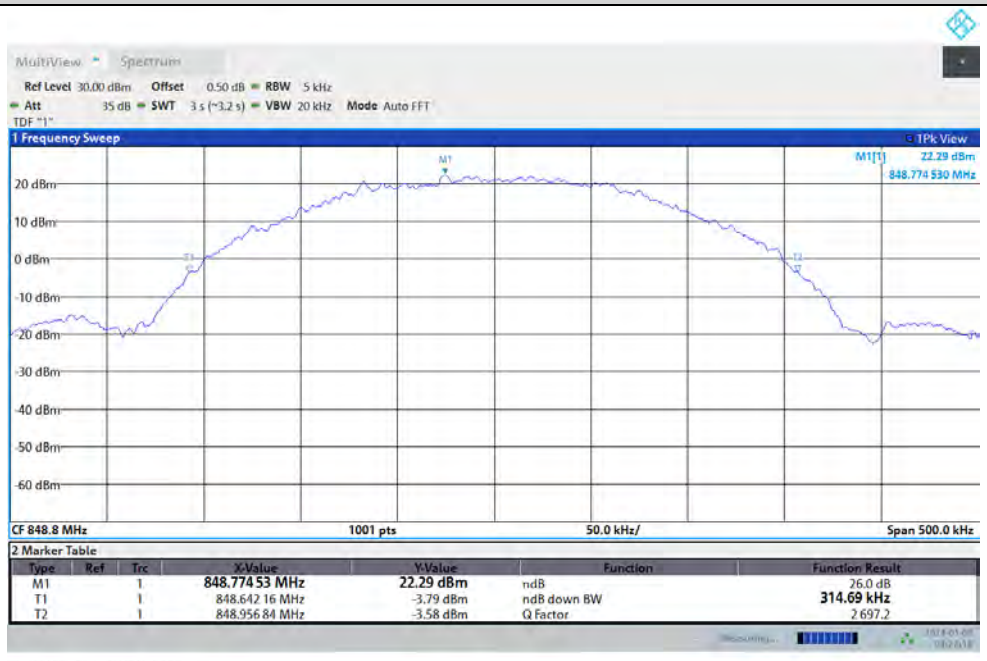


EGPRS850-189



03:21:53 AM 01/09/2024

EGPRS850-251



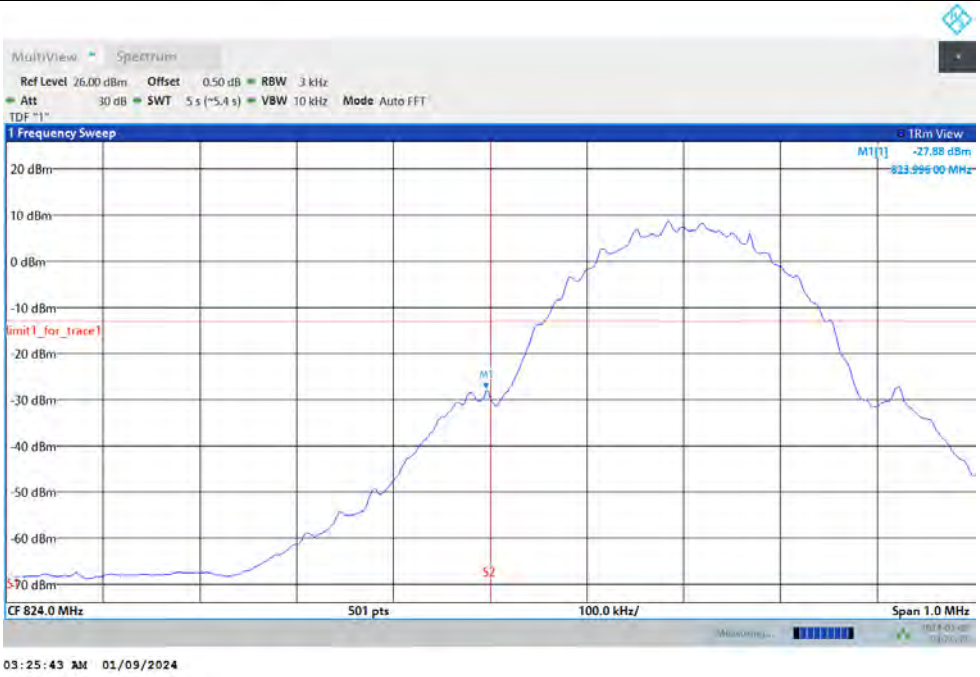
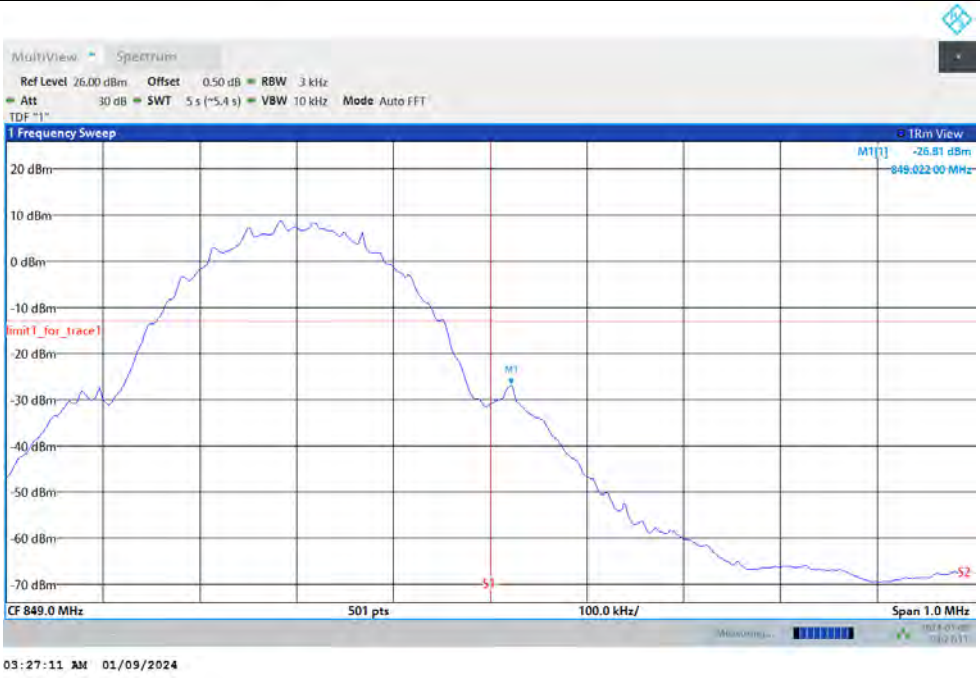
03:22:19 AM 01/09/2024

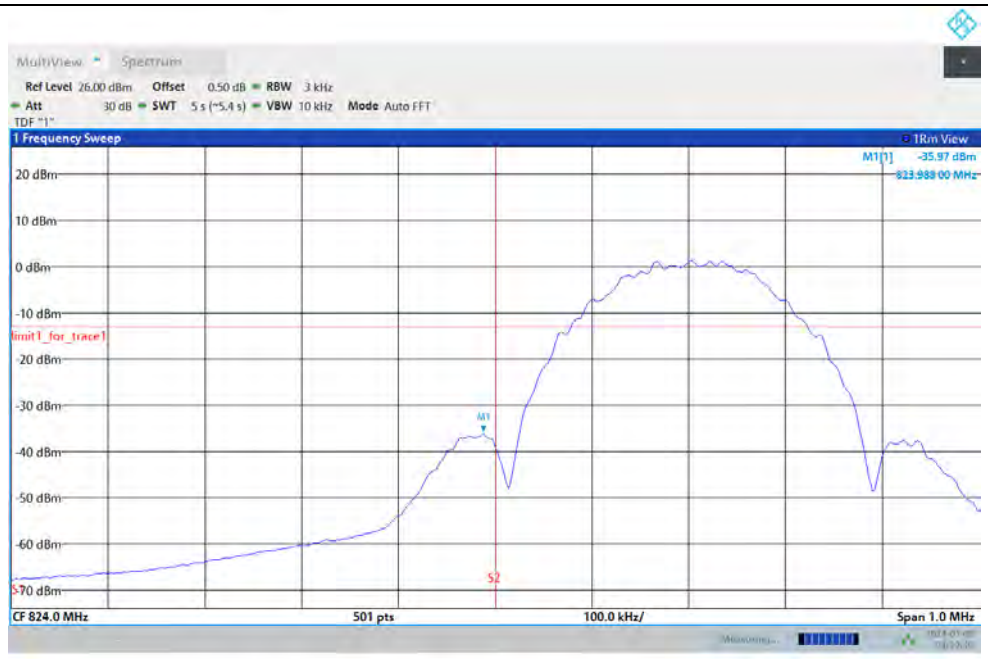
BAND EDGE

Test Result

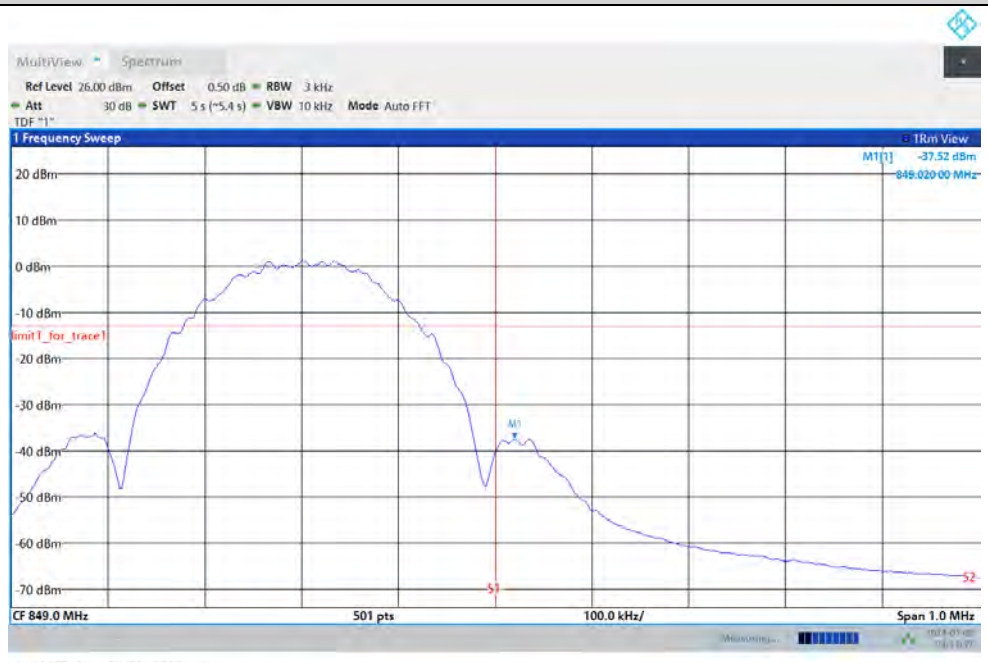
Band	Channel	Freq (MHz)	Result (dBm)	Limit(dBm)	Verdict
GSM850	128	823.996	-27.880	-13	PASS
GSM850	251	849.022	-26.805	-13	PASS
EGPRS850	128	823.988	-35.971	-13	PASS
EGPRS850	251	849.02	-37.522	-13	PASS

Test Result

GSM850-128

GSM850-251

EGPRS850-128



EGPRS850-251



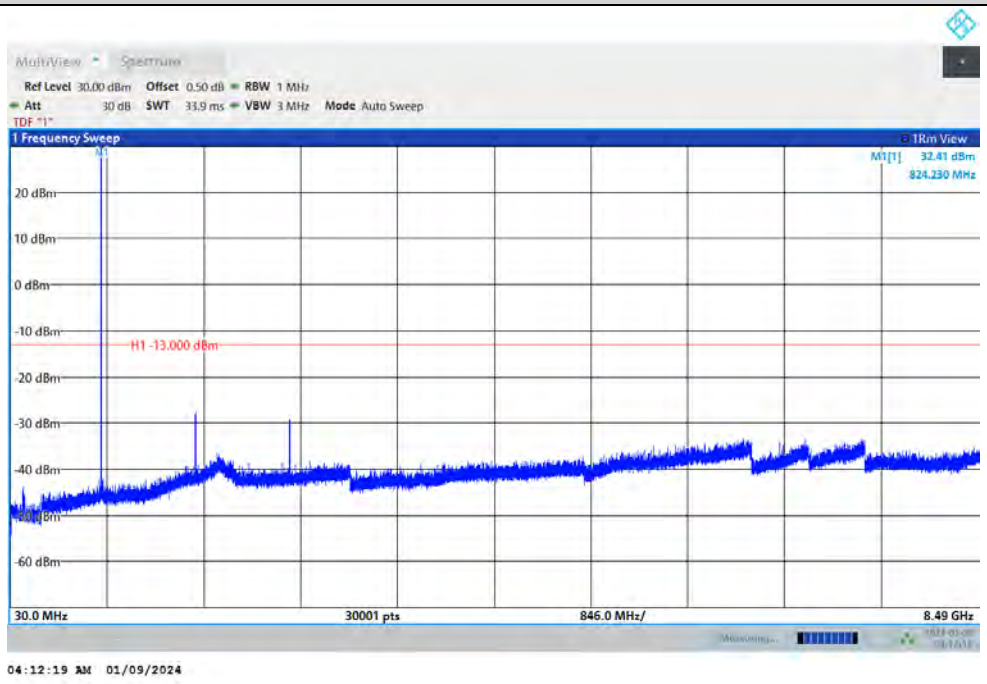
CONDUCTED SPURIOUS EMISSION

Test Result

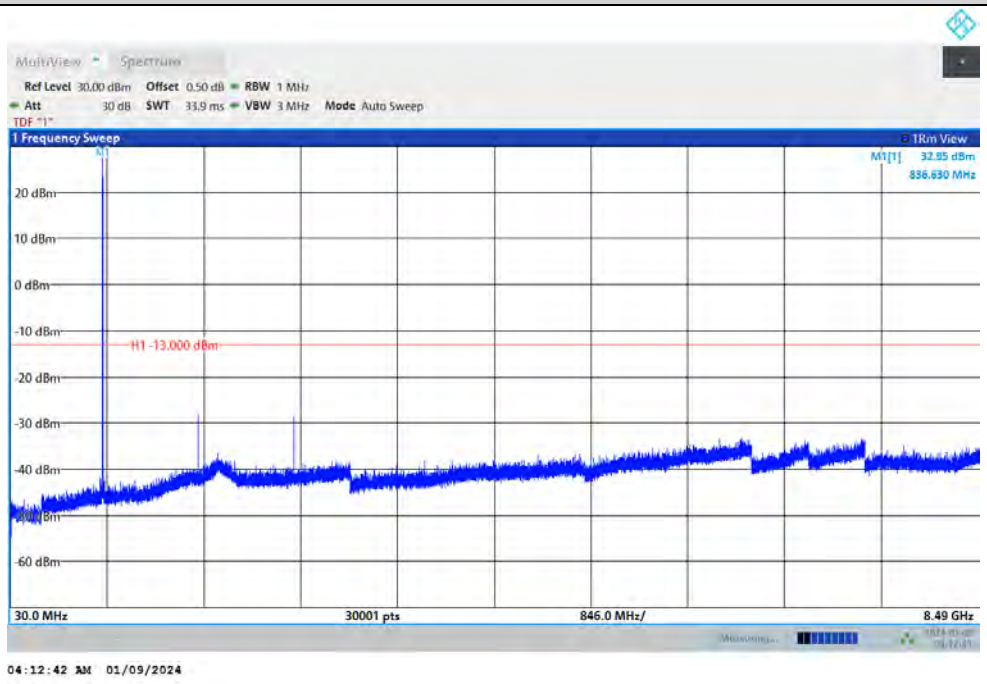
Band	Channel	Frequency Range(MHz)	Max.Freq. (MHz)	Result (dBm)	Limit (dBm)	Verdict
GSM850	128	30~84000MHz	1648.680	-27.895	-13	PASS
GSM850	189	30~84000MHz	1673.214	-28.143	-13	PASS
GSM850	251	30~84000MHz	1697.748	-27.885	-13	PASS
EGPRS850	128	30~84000MHz	1648.398	-32.483	-13	PASS
EGPRS850	189	30~84000MHz	7000.476	-33.207	-13	PASS
EGPRS850	251	30~84000MHz	7464.366	-36.002	-13	PASS

Test Graphs

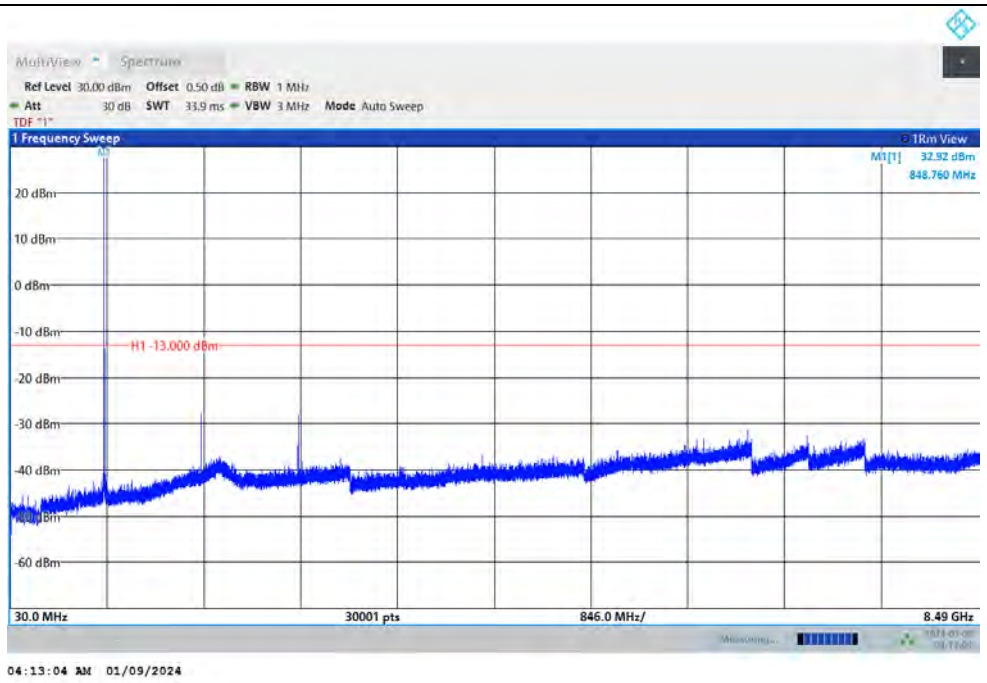
GSM850-128-30~84000MHz



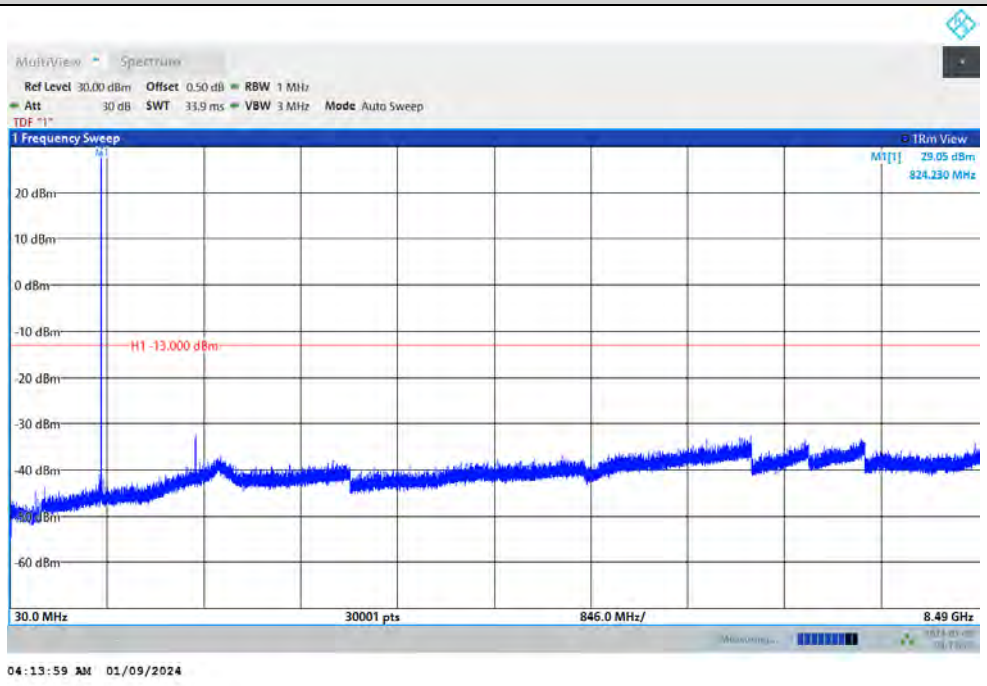
GSM850-189-30~84000MHz



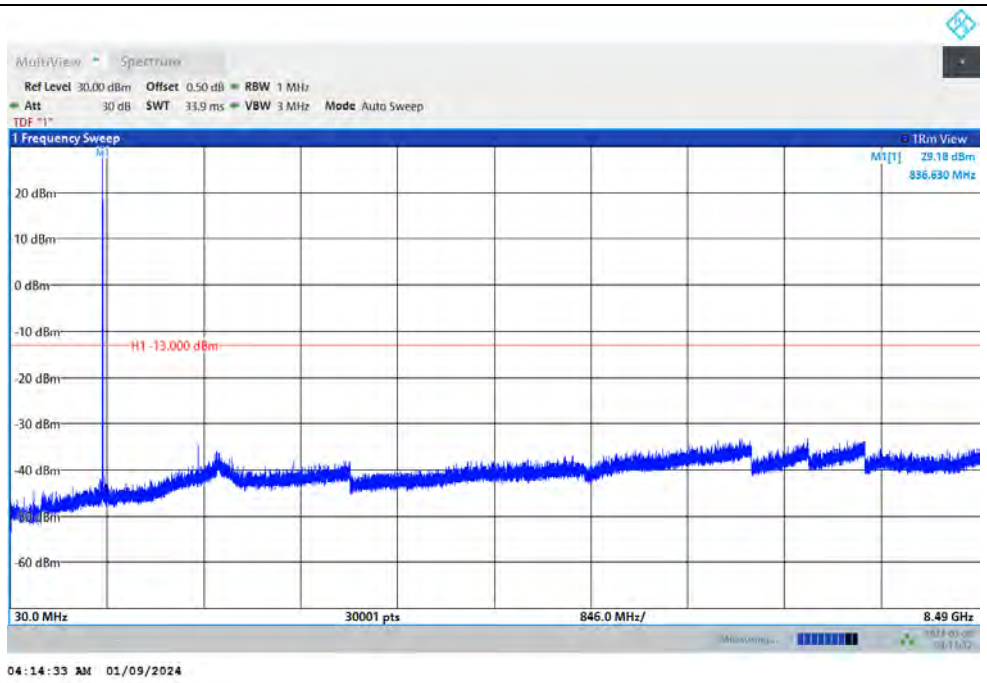
GSM850-251-30~84000MHz



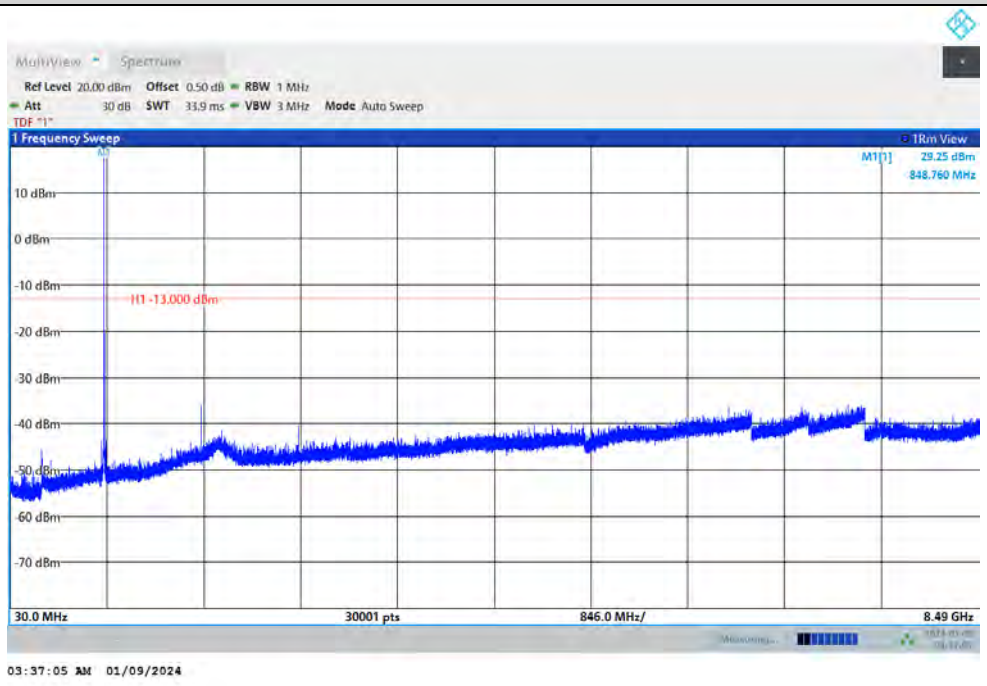
EGPRS850-128-30~84000MHz



EGPRS850-189-30~84000MHz



EGPRS850-251-30~84000MHz



FREQUENCY STABILITY

Test Result

Voltage							
Band	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM850	128	VL	NT	4.5	0.005460	±2.5	PASS
GSM850	128	VN	NT	-7.13	-0.008651	±2.5	PASS
GSM850	128	VH	NT	6.72	0.008153	±2.5	PASS
GSM850	189	VL	NT	4.72	0.005643	±2.5	PASS
GSM850	189	VN	NT	-7.06	-0.008441	±2.5	PASS
GSM850	189	VH	NT	-0.36	-0.000430	±2.5	PASS
GSM850	251	VL	NT	-5.62	-0.006621	±2.5	PASS
GSM850	251	VN	NT	2.21	0.002604	±2.5	PASS
GSM850	251	VH	NT	3.82	0.004500	±2.5	PASS
EGPRS850	128	VL	NT	-4.39	-0.005326	±2.5	PASS
EGPRS850	128	VN	NT	4.51	0.005472	±2.5	PASS
EGPRS850	128	VH	NT	1.49	0.001808	±2.5	PASS
EGPRS850	189	VL	NT	1.9	0.002272	±2.5	PASS
EGPRS850	189	VN	NT	-6.04	-0.007221	±2.5	PASS
EGPRS850	189	VH	NT	2.11	0.002523	±2.5	PASS
EGPRS850	251	VL	NT	-2.6	-0.003063	±2.5	PASS
EGPRS850	251	VN	NT	3.81	0.004489	±2.5	PASS
EGPRS850	251	VH	NT	9.19	0.010827	±2.5	PASS

Temperature							
Band	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM850	128	NV	-30	6.45	0.007826	±2.5	PASS
GSM850	128	NV	-20	0.4	0.000485	±2.5	PASS
GSM850	128	NV	-10	-3.97	-0.004817	±2.5	PASS
GSM850	128	NV	0	3.49	0.004234	±2.5	PASS
GSM850	128	NV	10	3.28	0.003980	±2.5	PASS
GSM850	128	NV	20	-5.24	-0.006358	±2.5	PASS
GSM850	128	NV	30	-0.18	-0.000218	±2.5	PASS
GSM850	128	NV	40	6.54	0.007935	±2.5	PASS
GSM850	128	NV	50	8.61	0.010446	±2.5	PASS
GSM850	189	NV	-30	7.8	0.009326	±2.5	PASS
GSM850	189	NV	-20	8.21	0.009816	±2.5	PASS
GSM850	189	NV	-10	-7.67	-0.009170	±2.5	PASS
GSM850	189	NV	0	-6.52	-0.007795	±2.5	PASS
GSM850	189	NV	10	0.76	0.000909	±2.5	PASS
GSM850	189	NV	20	5.3	0.006337	±2.5	PASS
GSM850	189	NV	30	3.44	0.004113	±2.5	PASS
GSM850	189	NV	40	-6.61	-0.007903	±2.5	PASS
GSM850	189	NV	50	10	0.011956	±2.5	PASS
GSM850	251	NV	-30	0.83	0.000978	±2.5	PASS
GSM850	251	NV	-20	-8.77	-0.010332	±2.5	PASS
GSM850	251	NV	-10	1.9	0.002238	±2.5	PASS
GSM850	251	NV	0	5.03	0.005926	±2.5	PASS
GSM850	251	NV	10	-7.56	-0.008907	±2.5	PASS
GSM850	251	NV	20	-3.55	-0.004182	±2.5	PASS
GSM850	251	NV	30	-3.85	-0.004536	±2.5	PASS
GSM850	251	NV	40	-1.36	-0.001602	±2.5	PASS
GSM850	251	NV	50	3.97	0.004677	±2.5	PASS
EGPRS850	128	NV	-30	-9.65	-0.005216	±2.5	PASS
EGPRS850	128	NV	-20	-5	-0.002702	±2.5	PASS
EGPRS850	128	NV	-10	-6.26	-0.003383	±2.5	PASS
EGPRS850	128	NV	0	-9.96	-0.005383	±2.5	PASS
EGPRS850	128	NV	10	6.47	0.003497	±2.5	PASS
EGPRS850	128	NV	20	6.68	0.003610	±2.5	PASS
EGPRS850	128	NV	30	-4.64	-0.002508	±2.5	PASS
EGPRS850	128	NV	40	0.37	0.000200	±2.5	PASS
EGPRS850	128	NV	50	-5.89	-0.003183	±2 .5	PASS
EGPRS850	189	NV	-30	-0.47	-0.000250	±2.5	PASS
EGPRS850	189	NV	-20	-1.53	-0.000814	±2.5	PASS
EGPRS850	189	NV	-10	-4.04	-0.002149	±2.5	PASS
EGPRS850	189	NV	0	1.82	0.000968	±2.5	PASS
EGPRS850	189	NV	10	-5.66	-0.003011	±2.5	PASS
EGPRS850	189	NV	20	4.67	0.002484	±2.5	PASS
EGPRS850	189	NV	30	-9.13	-0.004856	±2.5	PASS
EGPRS850	189	NV	40	-4.63	-0.002463	±2.5	PASS
EGPRS850	189	NV	50	-7.55	-0.004016	±2.5	PASS
EGPRS850	251	NV	-30	1.47	0.000770	±2.5	PASS

EGPRS850	251	NV	-20	-7.06	-0.003697	±2.5	PASS
EGPRS850	251	NV	-10	6.69	0.003503	±2.5	PASS
EGPRS850	251	NV	0	-4.49	-0.002351	±2.5	PASS
EGPRS850	251	NV	10	-2.74	-0.001435	±2.5	PASS
EGPRS850	251	NV	20	4.53	0.002372	±2.5	PASS
EGPRS850	251	NV	30	3.88	0.002032	±2.5	PASS
EGPRS850	251	NV	40	8.79	0.004603	±2.5	PASS
EGPRS850	251	NV	50	-2.71	-0.001419	±2.5	PASS

WCMDA BAND5

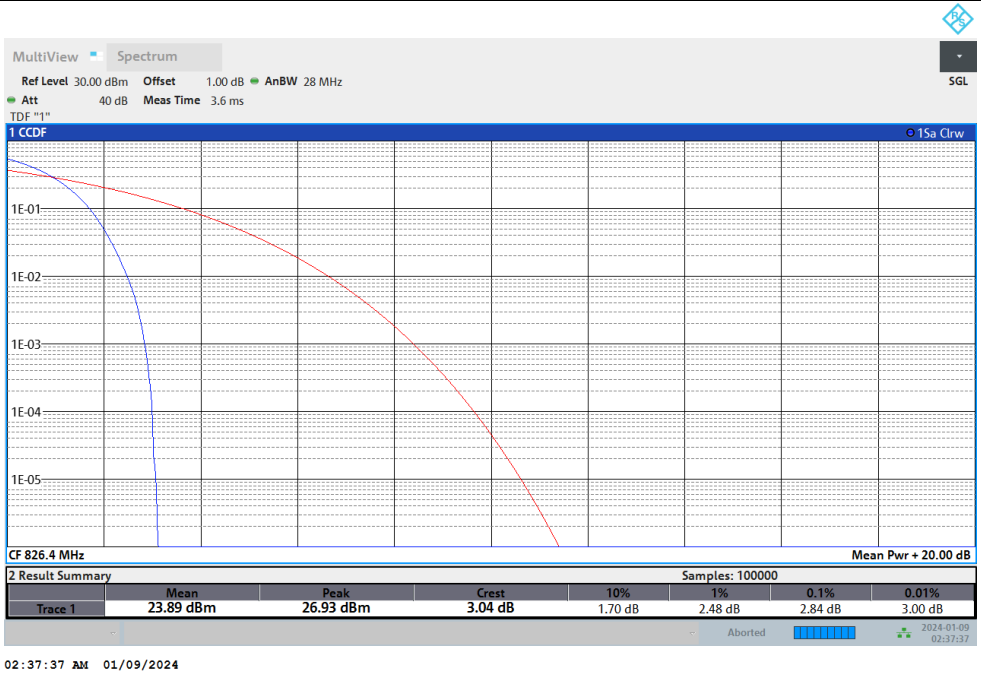
PEAK-TO-AVERAGE RATIO

Test Result

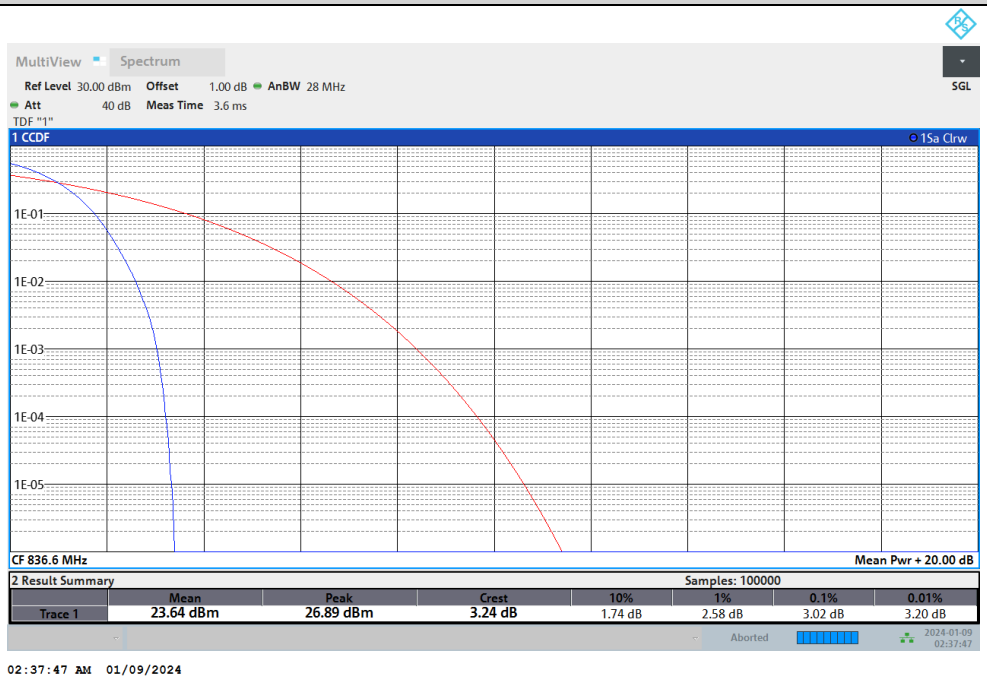
Band	Channel	Peak-to-Average Ratio(dB)	Limit(dBm)	Verdict
Band5	4132	2.84	13	PASS
Band5	4182	3.02	13	PASS
Band5	4233	2.98	13	PASS

Test Graphs

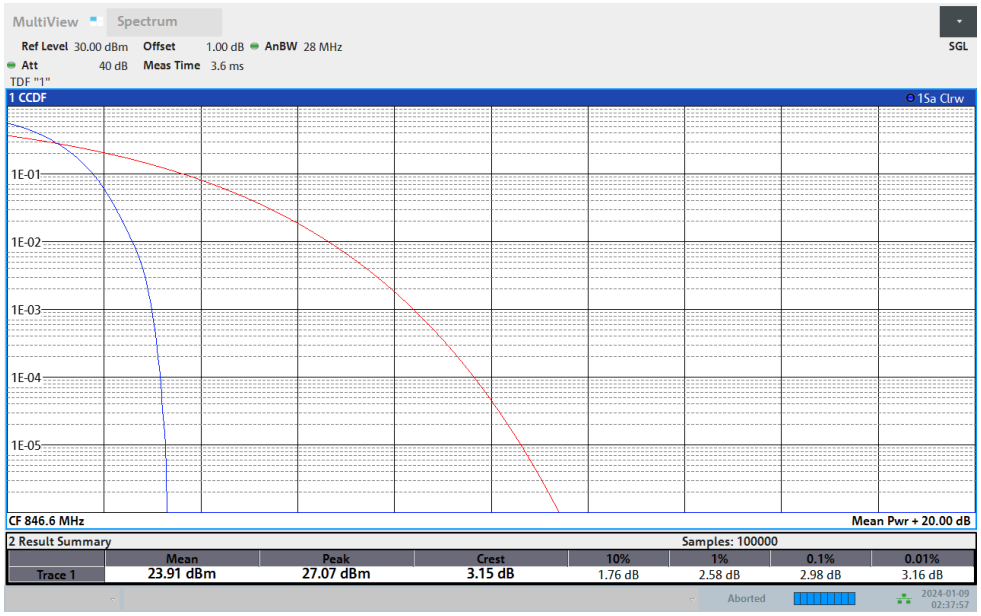
Band5-4132



Band5-4182



Band5-4233

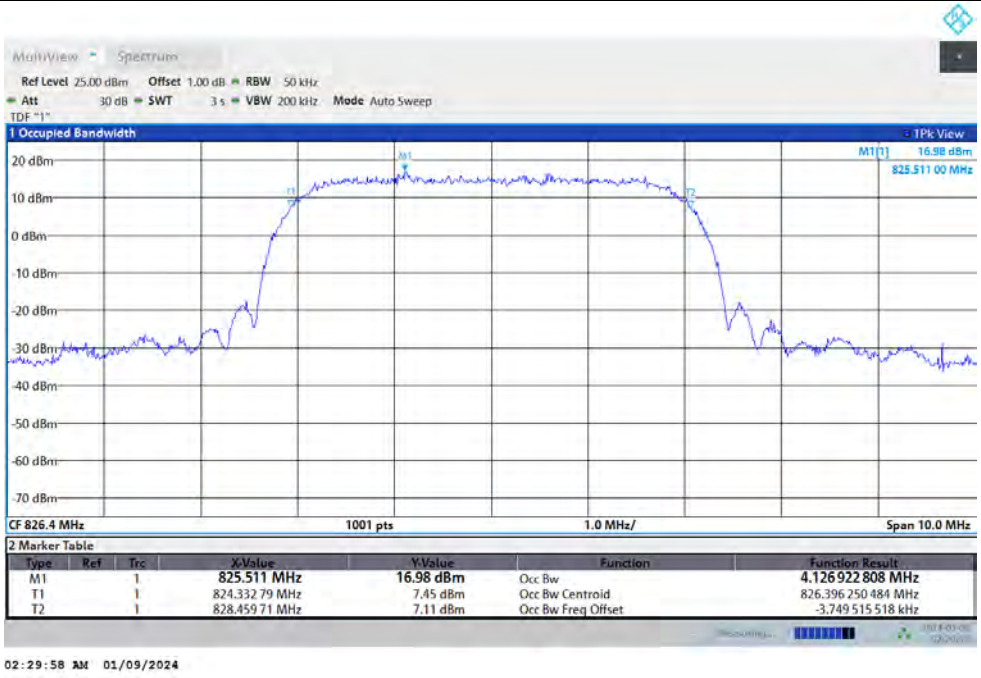
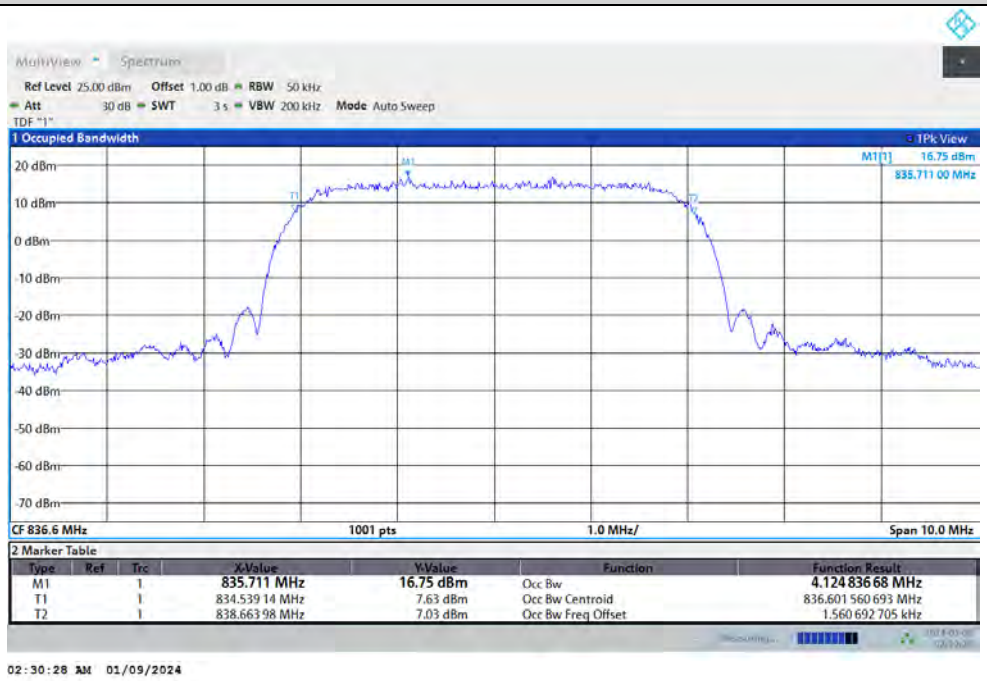

MultiView
Spectrum
Ref Level 30.00 dBm
Offset 1.00 dB
AnBW 28 MHz
Att 40 dB
Meas Time 3.6 ms
TDF "1"
SGL
1 CCDF
1Sa Clrw
1E-01
1E-02
1E-03
1E-04
1E-05
CF 846.6 MHz
Mean Pwr + 20.00 dB
2 Result Summary
Samples: 100000
Mean
Peak
Crest
10%
1%
0.1%
0.01%
Trace 1
23.91 dBm
27.07 dBm
3.15 dB
1.76 dB
2.58 dB
2.98 dB
3.16 dB
Aborted
02:37:58 AM 01/09/2024

26DB BANDWIDTH AND OCCUPIED BANDWIDTH

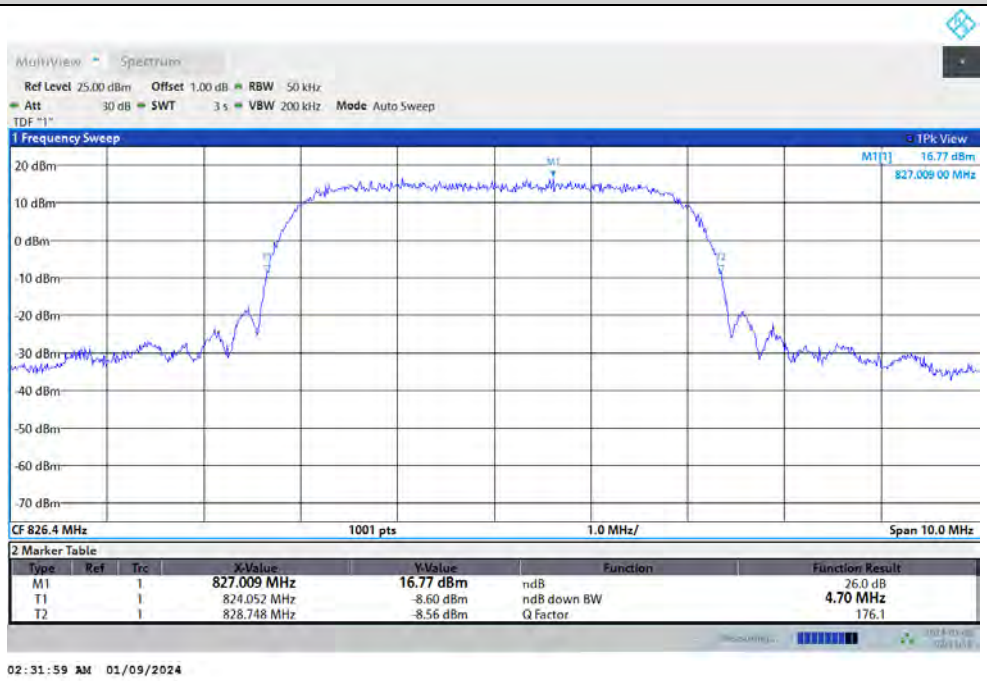
Test Result

Band	Channel	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Limit(kHz)	Verdict
Band5	4132	4.127	4.695	---	PASS
Band5	4182	4.125	4.685	---	PASS
Band5	4233	4.118	4.685	---	PASS

Test Graphs

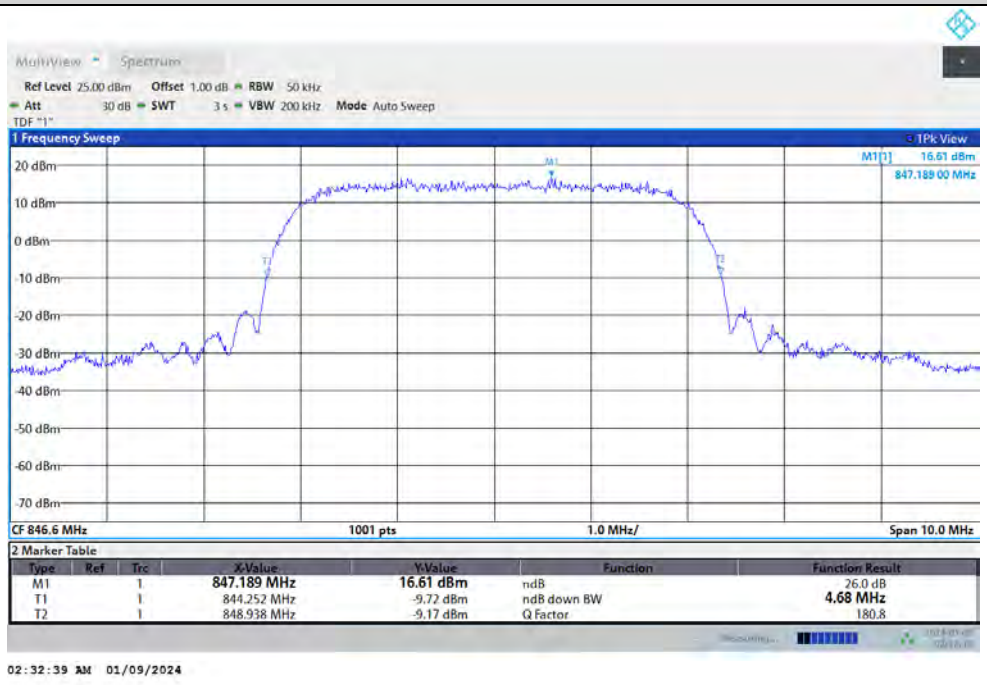
Band5-4132

Band5-4182

Band5-4233

26dB Bandwidth

Band5-4132

Band5-4182


MultiView
Spectrum
Ref Level 25.00 dBm Offset 1.00 dB RBW 50 kHz
Att 30 dB SWT 3 s VBW 200 kHz Mode Auto Sweep
TDF "1"
1 Frequency Sweep
1Pk View
M1[1] 16.61 dBm
835.721 00 MHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 836.6 MHz
1001 pts
1.0 MHz/
Span 10.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 835.721 MHz 16.61 dBm ndB 26.0 dB
T1 1 834.252 MHz -8.66 dBm ndB down BW 4.68 MHz
T2 1 838.938 MHz -9.41 dBm Q Factor 178.4
02:32:19 AM 01/09/2024

Band5-4233


MultiView
Spectrum
Ref Level 25.00 dBm Offset 1.00 dB RBW 50 kHz
Att 30 dB SWT 3 s VBW 200 kHz Mode Auto Sweep
TDF "1"
1 Frequency Sweep
1Pk View
M1[1] 16.61 dBm
847.189 00 MHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 846.6 MHz
1001 pts
1.0 MHz/
Span 10.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 847.189 MHz 16.61 dBm ndB 26.0 dB
T1 1 844.252 MHz -9.72 dBm ndB down BW 4.68 MHz
T2 1 848.938 MHz -9.17 dBm Q Factor 180.8
02:32:39 AM 01/09/2024

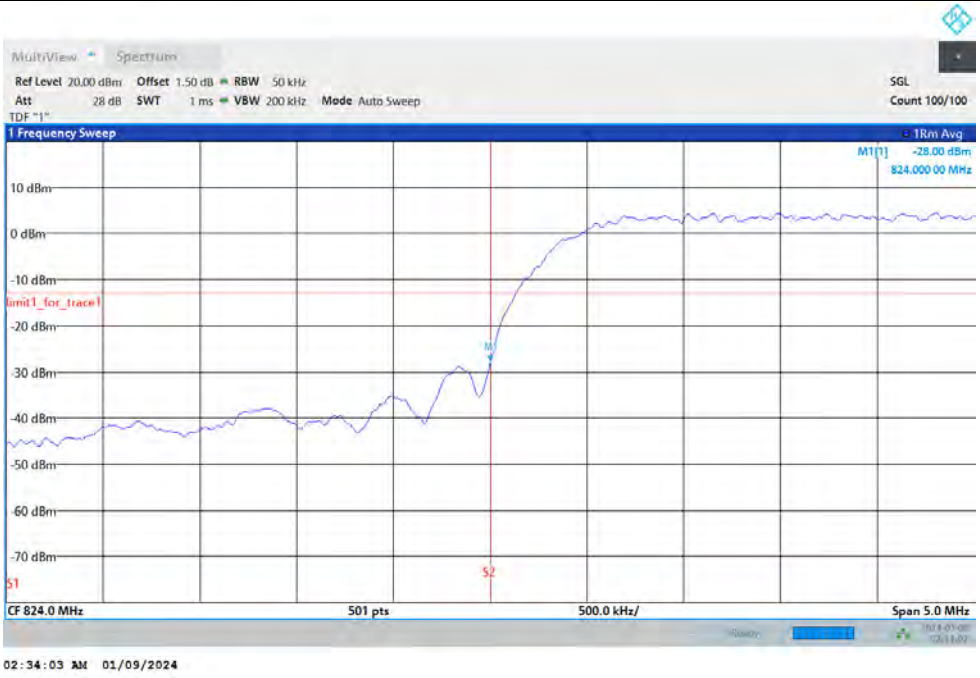
BAND EDGE

Test Result

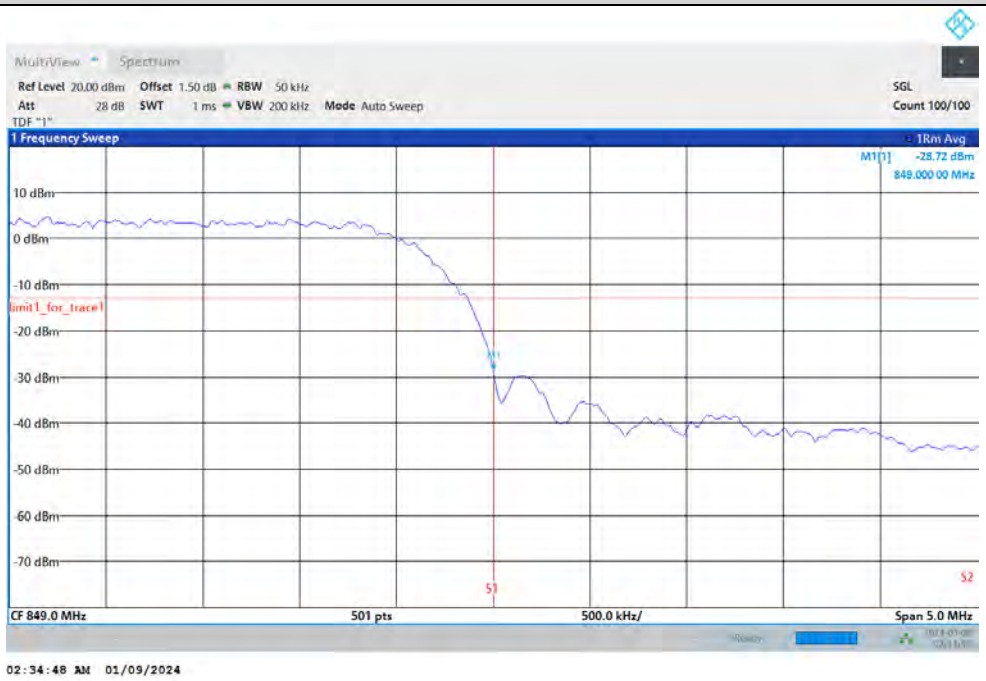
Band	Channel	Frequency (MHz)	Result (dBm)	Limit(dBm)	Verdict
Band5	4132	See Graph	See Graph	-13	PASS
Band5	4233	See Graph	See Graph	-13	PASS

Test Graphs

Band5-4132



Band5-4233

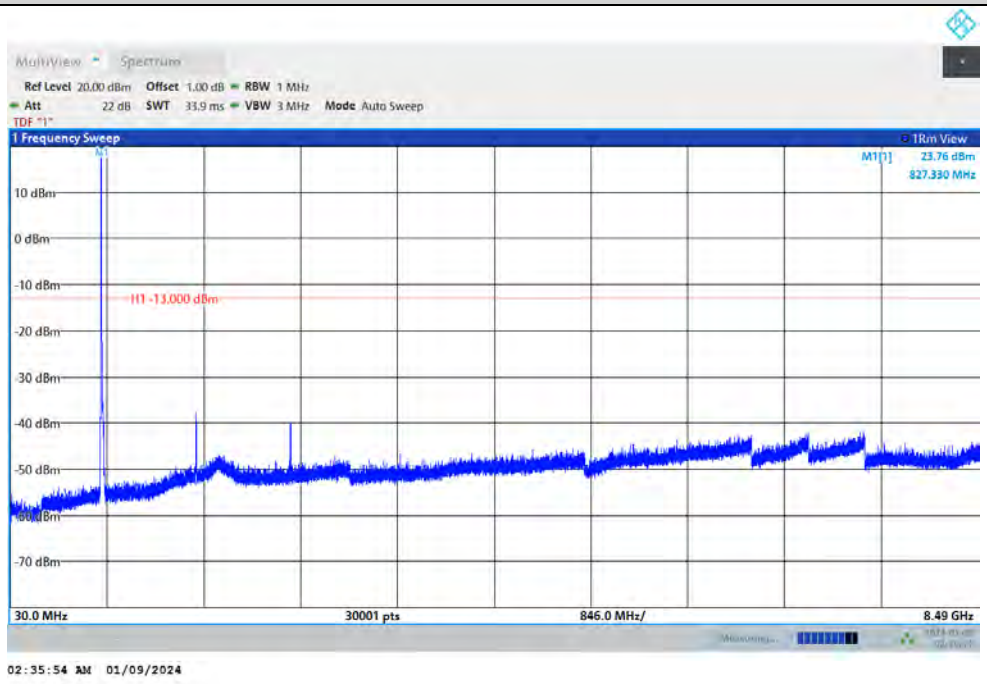
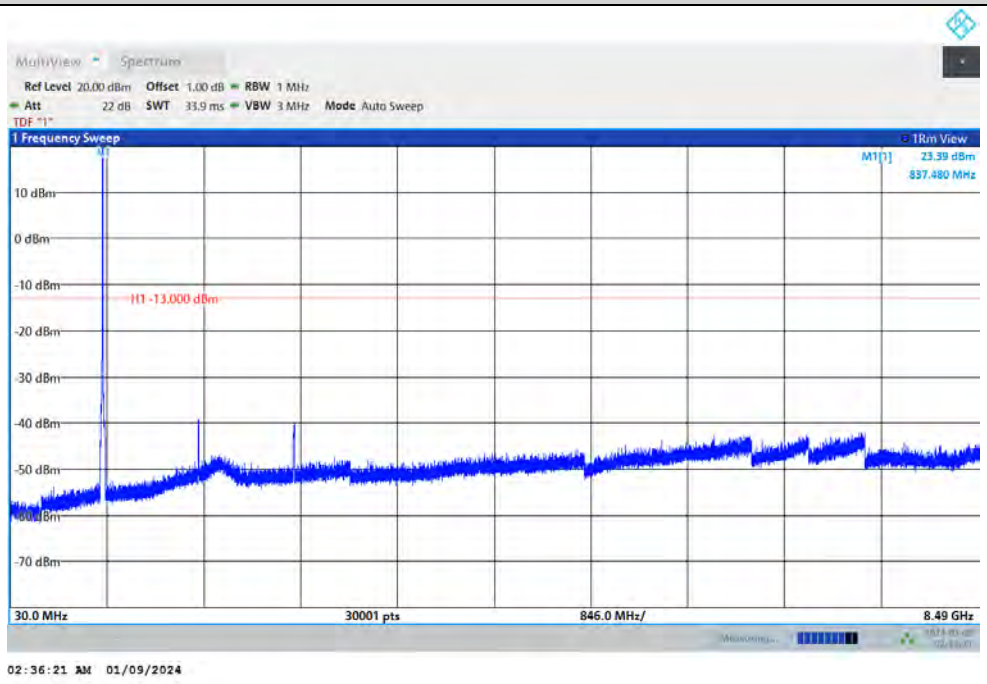


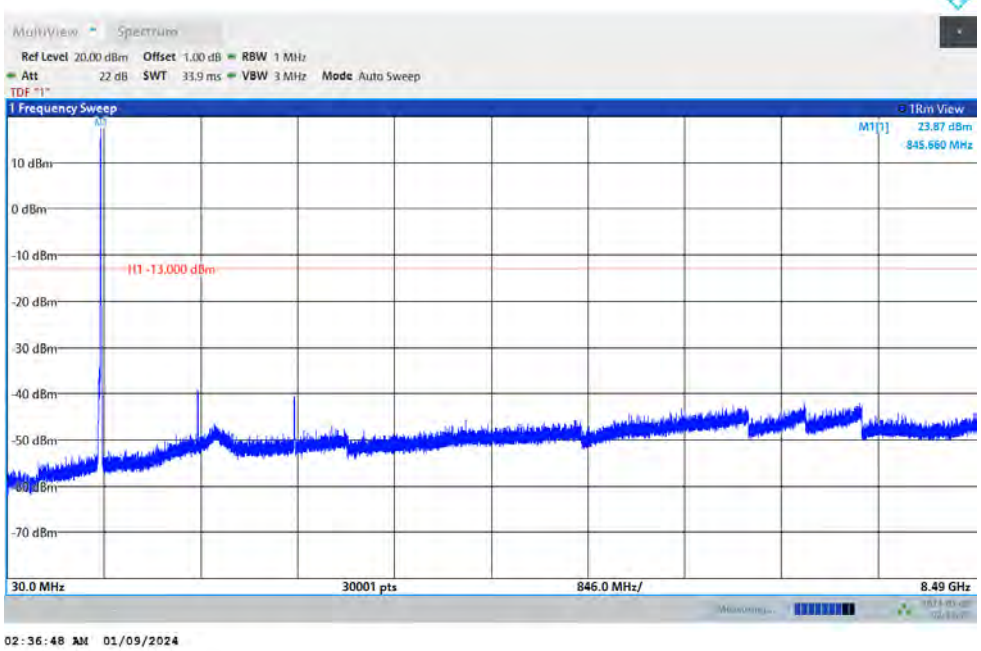
CONDUCTED SPURIOUS EMISSION

Test Result

Band	Channel	Frequency Range (Mhz)	Frequency (dBm)	Result (dBm)	Limit (dBm)	Verdict
Band5	4132	30~8490MHz	See Graph	See Graph	-13	PASS
Band5	4182	30~8490MHz	See Graph	See Graph	-13	PASS
Band5	4233	30~8490MHz	See Graph	See Graph	-13	PASS

Test Graphs

Band5-4132-30~8490MHz

Band5-4182-30~8490MHz

Band5-4233-30~8490MHz



FREQUENCY STABILITY

Test Result

Voltage							
Band	Channel	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band5	4132	VL	NT	-8.62	-0.010431	±2.5	PASS
Band5	4132	VN	NT	1.18	0.001428	±2.5	PASS
Band5	4132	VH	NT	-7.43	-0.008991	±2.5	PASS
Band5	4182	VL	NT	-7.55	-0.009025	±2.5	PASS
Band5	4182	VN	NT	-5.8	-0.006933	±2.5	PASS
Band5	4182	VH	NT	1.18	0.001410	±2.5	PASS
Band5	4233	VL	NT	3.18	0.003756	±2.5	PASS
Band5	4233	VN	NT	3.87	0.004571	±2.5	PASS
Band5	4233	VH	NT	-2.83	-0.003343	±2.5	PASS

Temperature							
Band	Channel	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band5	826.4	NV	-30	-2.28	-0.002759	±2.5	PASS
Band5	826.4	NV	-20	1.57	0.001900	±2.5	PASS
Band5	826.4	NV	-10	-3.96	-0.004792	±2.5	PASS
Band5	826.4	NV	0	2.36	0.002856	±2.5	PASS
Band5	826.4	NV	10	-2.71	-0.003279	±2.5	PASS
Band5	826.4	NV	20	5.89	0.007127	±2.5	PASS
Band5	826.4	NV	30	7.06	0.008543	±2.5	PASS
Band5	826.4	NV	40	1.31	0.001585	±2.5	PASS
Band5	826.4	NV	50	-9.12	-0.011036	±2.5	PASS
Band5	836.6	NV	-30	-1.57	-0.001877	±2.5	PASS
Band5	836.6	NV	-20	-2.38	-0.002845	±2.5	PASS
Band5	836.6	NV	-10	3.84	0.004590	±2.5	PASS
Band5	836.6	NV	0	9.98	0.011929	±2.5	PASS
Band5	836.6	NV	10	-4.93	-0.005893	±2.5	PASS
Band5	836.6	NV	20	2.39	0.002857	±2.5	PASS
Band5	836.6	NV	30	-8.9	-0.010638	±2.5	PASS
Band5	836.6	NV	40	7.78	0.009300	±2.5	PASS
Band5	836.6	NV	50	-5.98	-0.007148	±2.5	PASS
Band5	846.6	NV	-30	-5.93	-0.007004	±2.5	PASS
Band5	846.6	NV	-20	-8.83	-0.010430	±2.5	PASS
Band5	846.6	NV	-10	1.1	0.001299	±2.5	PASS
Band5	846.6	NV	0	1.32	0.001559	±2.5	PASS
Band5	846.6	NV	10	-5.99	-0.007075	±2.5	PASS
Band5	846.6	NV	20	6.04	0.007134	±2.5	PASS
Band5	846.6	NV	30	-1.63	-0.001925	±2.5	PASS
Band5	846.6	NV	40	-2.29	-0.002705	±2.5	PASS
Band5	846.6	NV	50	4.94	0.005835	±2.5	PASS

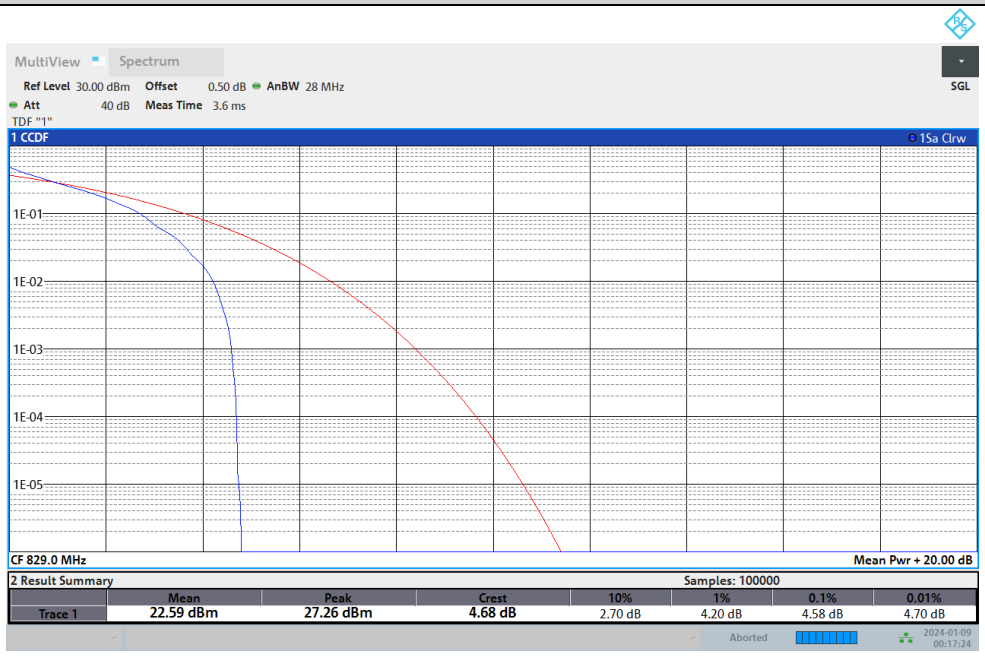
LTE BAND5

PEAK-TO-AVERAGE RATIO(CCDF)

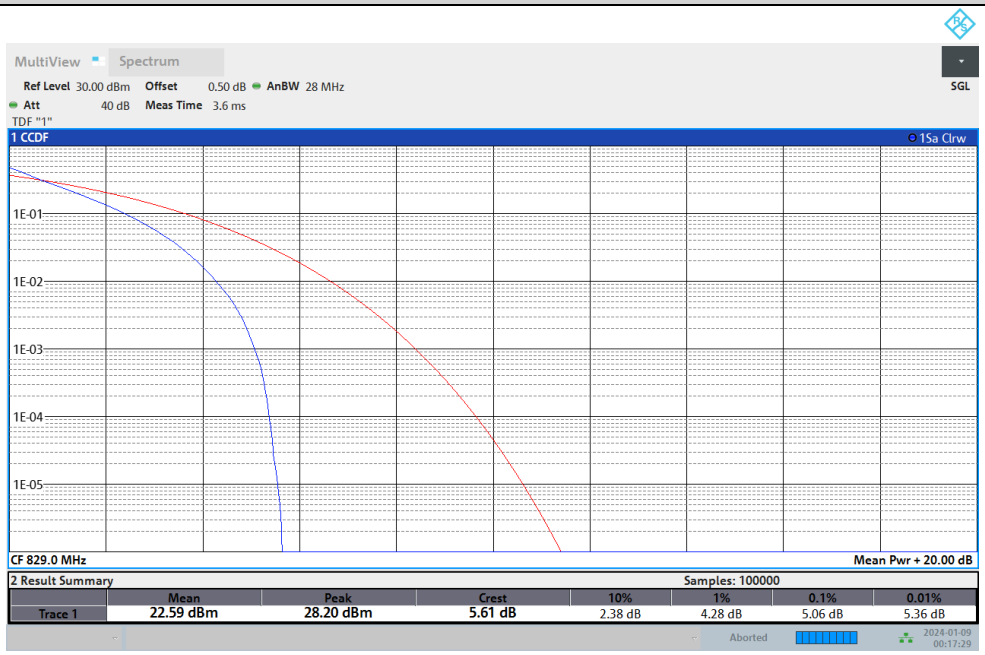
Test Result

Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dB)	Limit(dB)	Verdict
Band5	10MHz	QPSK	20450	1RB#0	4.58	13	PASS
Band5	10MHz	QPSK	20450	50RB#0	5.06	13	PASS
Band5	10MHz	QPSK	20525	1RB#0	4.80	13	PASS
Band5	10MHz	QPSK	20525	50RB#0	5.06	13	PASS
Band5	10MHz	QPSK	20600	1RB#0	4.56	13	PASS
Band5	10MHz	QPSK	20600	50RB#0	4.92	13	PASS
Band5	10MHz	16QAM	20450	1RB#0	5.10	13	PASS
Band5	10MHz	16QAM	20450	50RB#0	5.88	13	PASS
Band5	10MHz	16QAM	20525	1RB#0	5.78	13	PASS
Band5	10MHz	16QAM	20525	50RB#0	5.96	13	PASS
Band5	10MHz	16QAM	20600	1RB#0	5.02	13	PASS
Band5	10MHz	16QAM	20600	50RB#0	5.82	13	PASS
Band5	10MHz	64QAM	20450	1RB#0	5.82	13	PASS
Band5	10MHz	64QAM	20450	50RB#0	5.66	13	PASS
Band5	10MHz	64QAM	20525	1RB#0	6.46	13	PASS
Band5	10MHz	64QAM	20525	50RB#0	6.46	13	PASS
Band5	10MHz	64QAM	20600	1RB#0	6.06	13	PASS
Band5	10MHz	64QAM	20600	50RB#0	6.30	13	PASS

Test Graphs

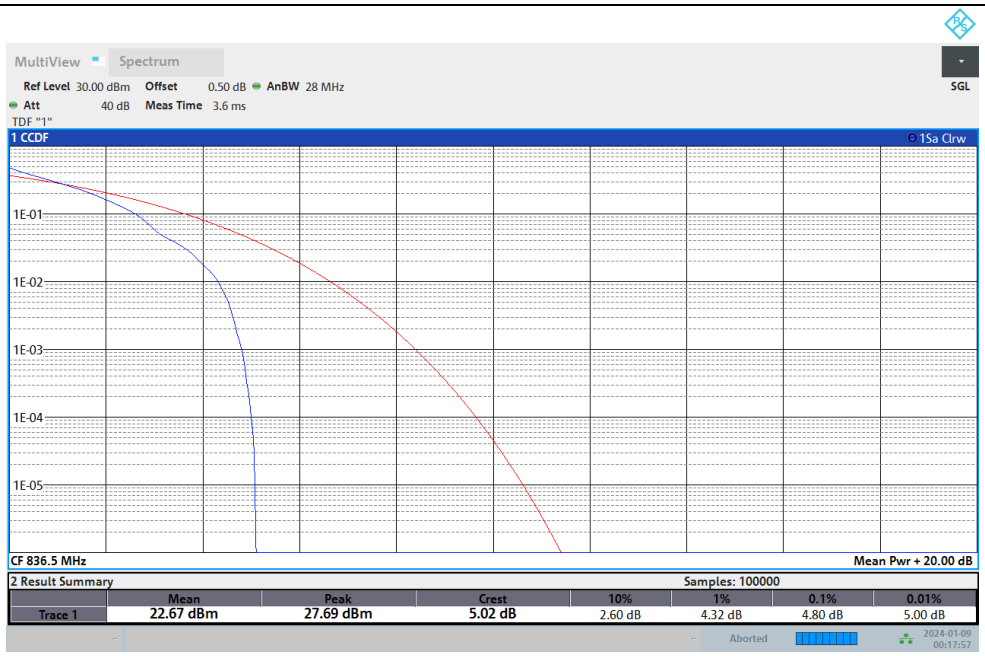
Band5-10MHz-QPSK-20450-1RB#0


12:17:25 AM 01/09/2024

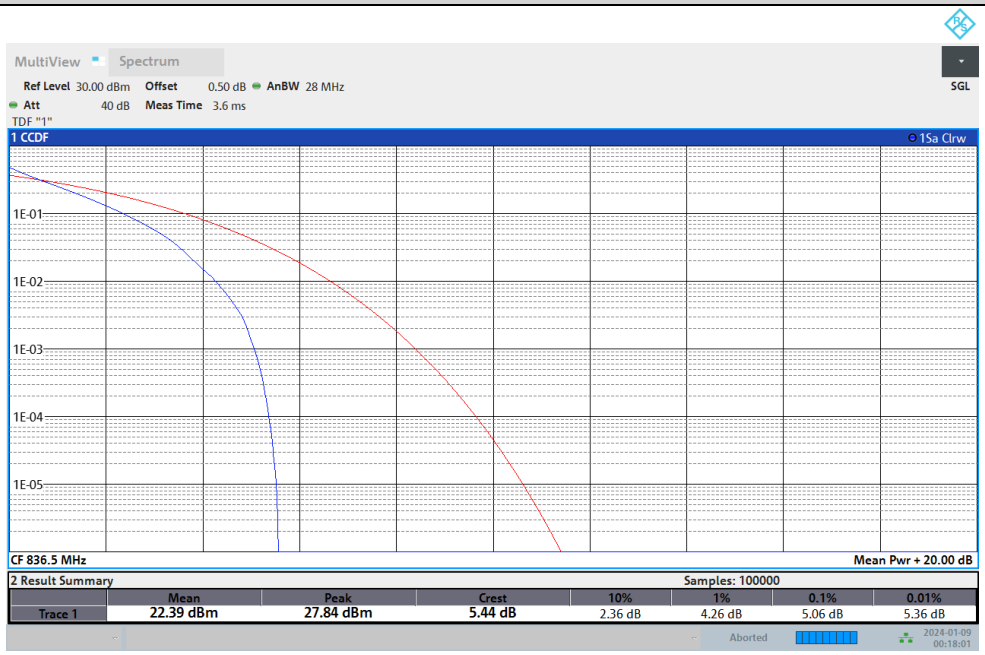
Band5-10MHz-QPSK-20450-50RB#0


12:17:29 AM 01/09/2024

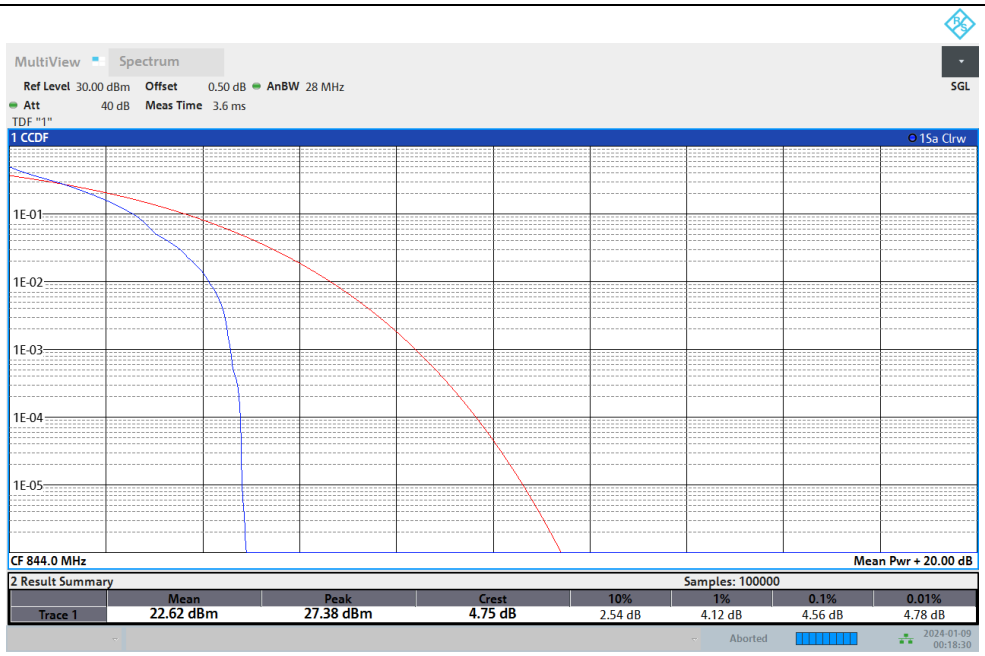
Band5-10MHz-QPSK-20525-1RB#0



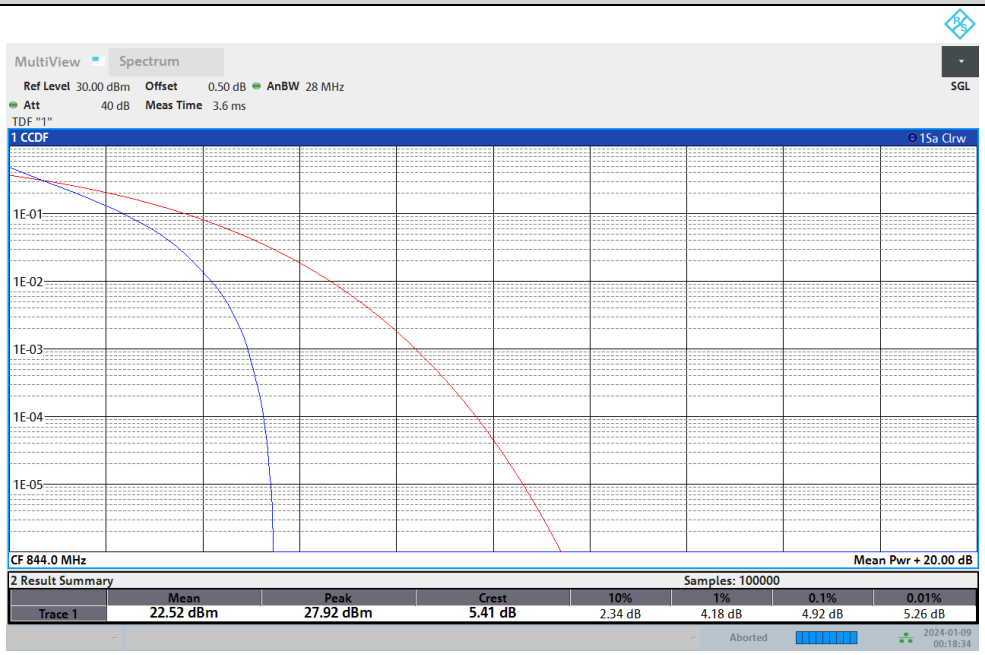
Band5-10MHz-QPSK-20525-50RB#0



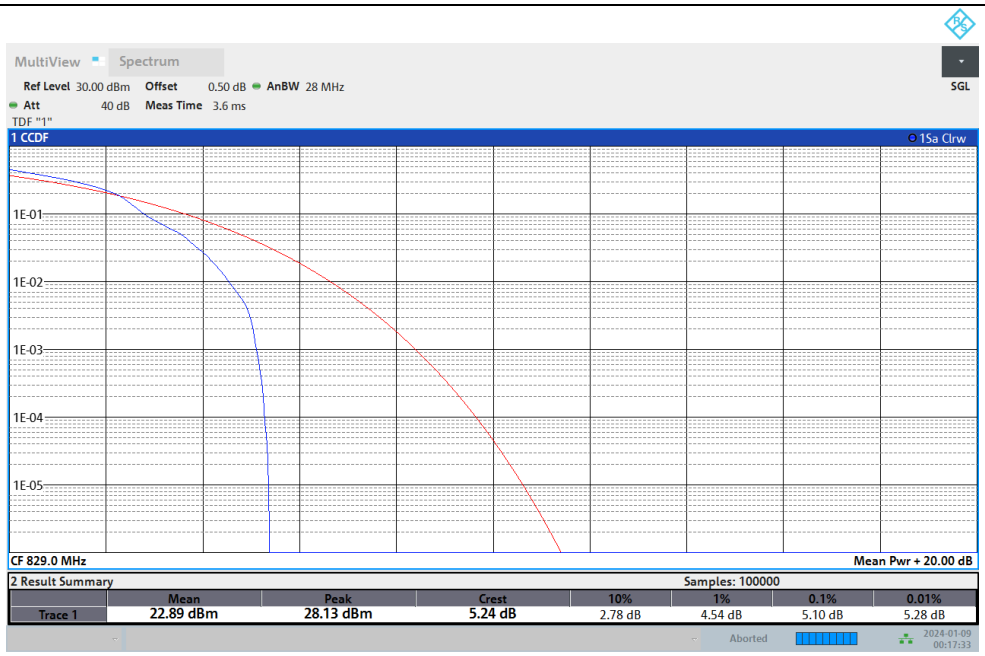
Band5-10MHz-QPSK-20600-1RB#0



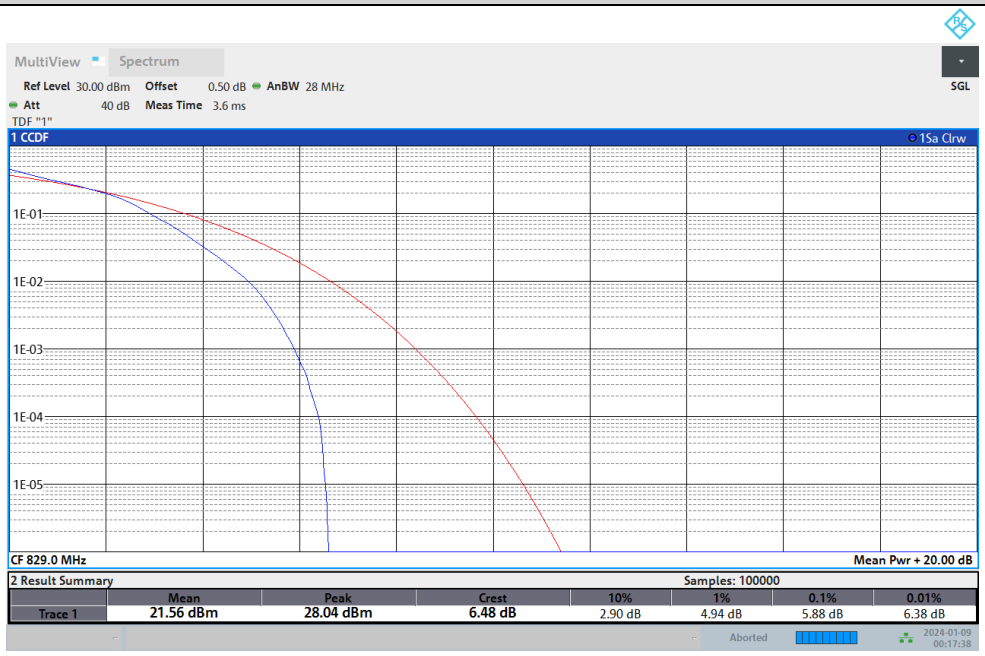
Band5-10MHz-QPSK-20600-50RB#0



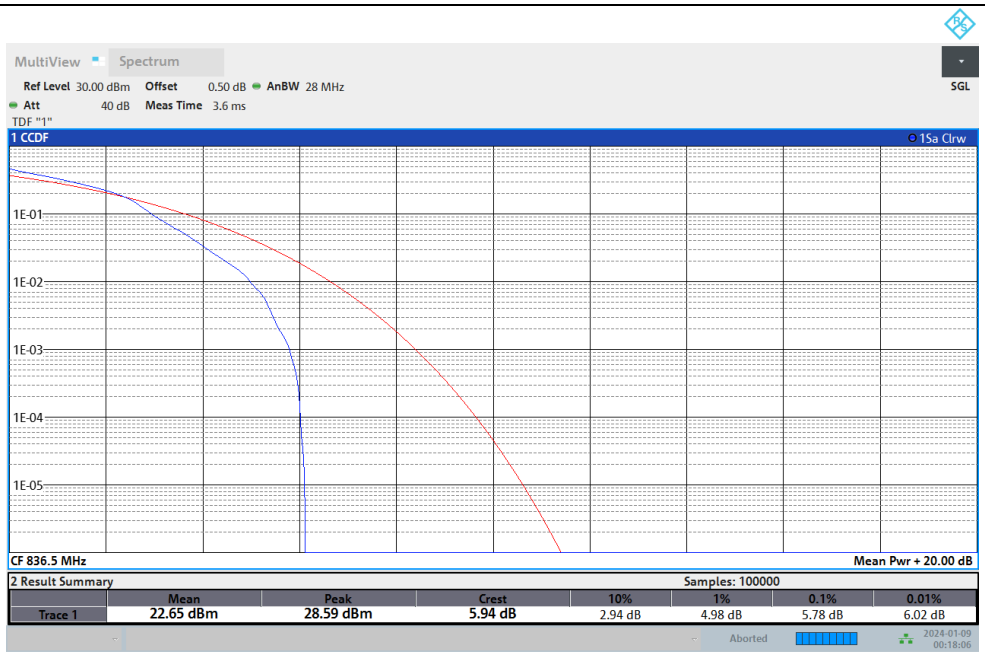
Band5-10MHz-16QAM-20450-1RB#0



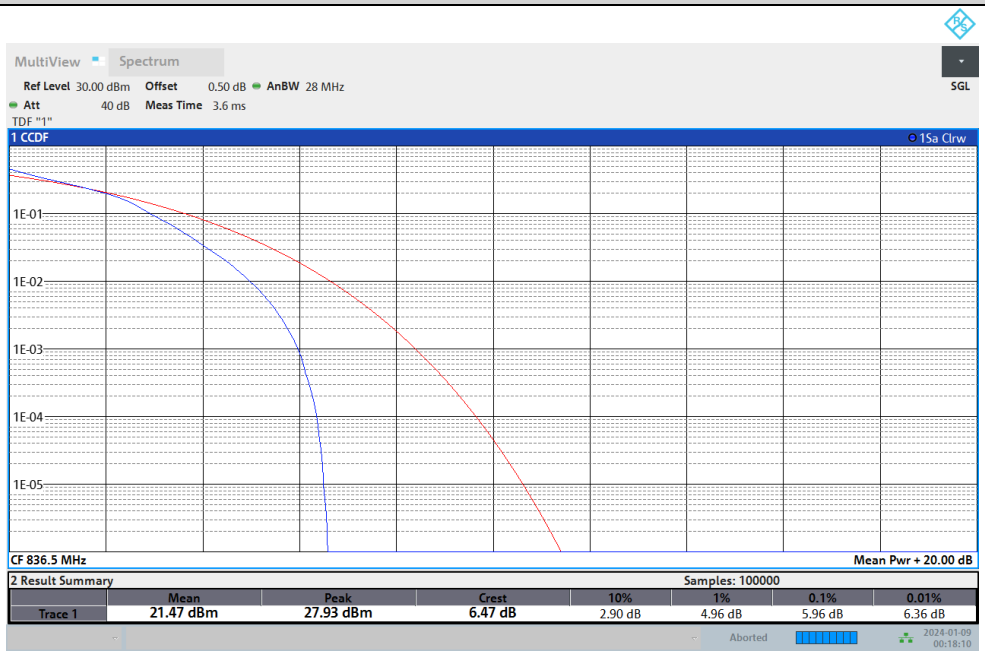
Band5-10MHz-16QAM-20450-50RB#0



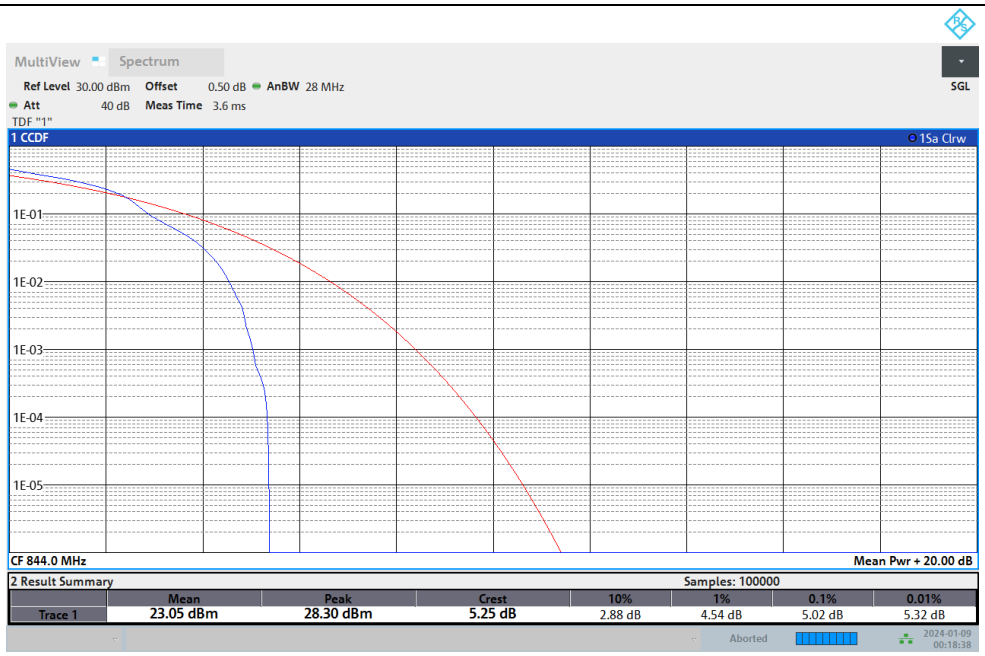
Band5-10MHz-16QAM-20525-1RB#0



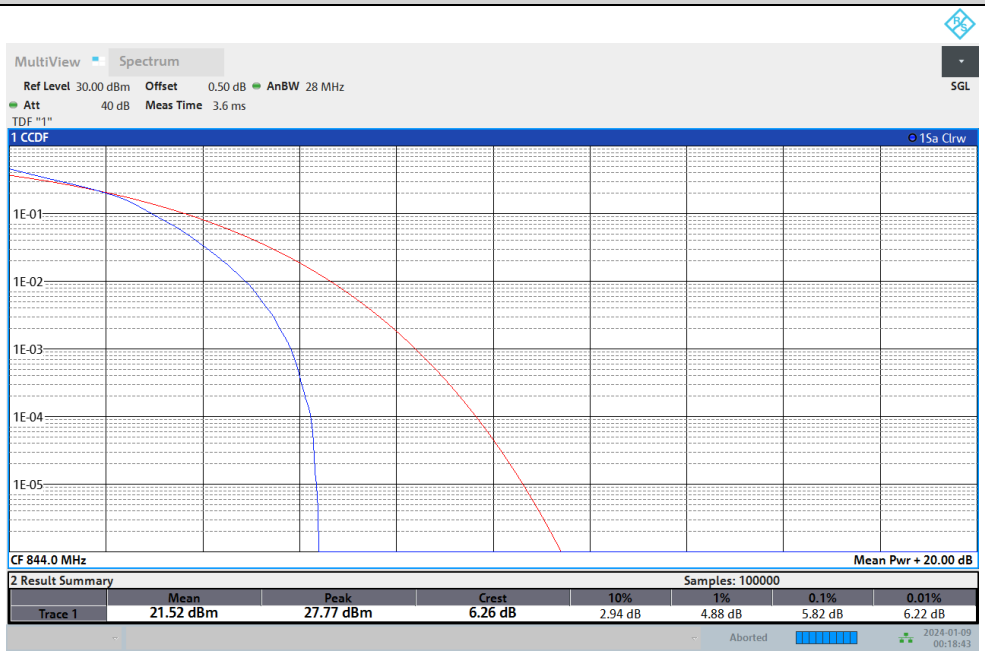
Band5-10MHz-16QAM-20525-50RB#0



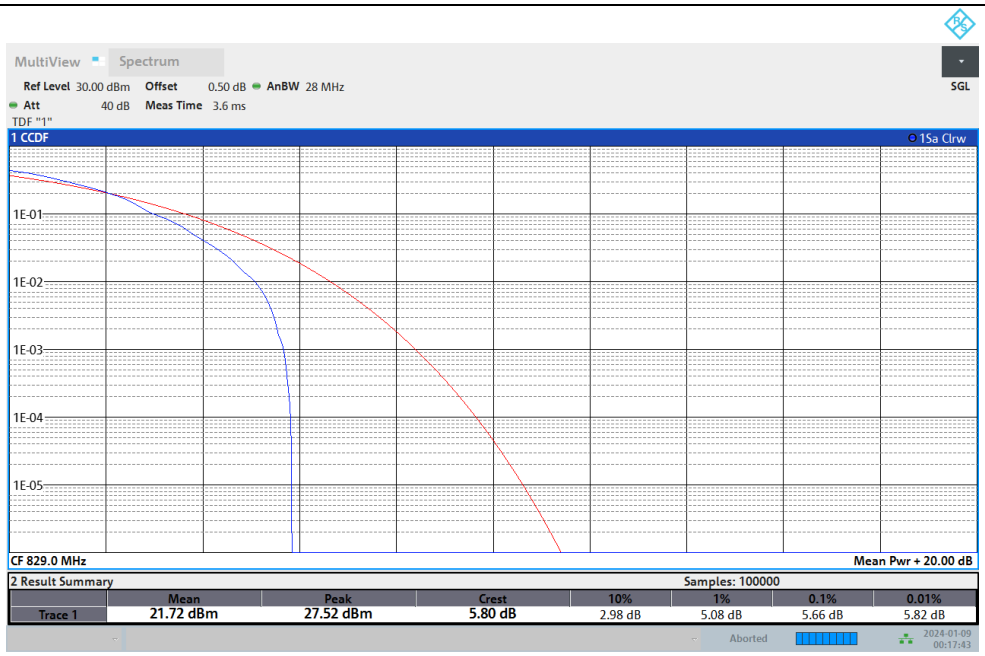
Band5-10MHz-16QAM-20600-1RB#0



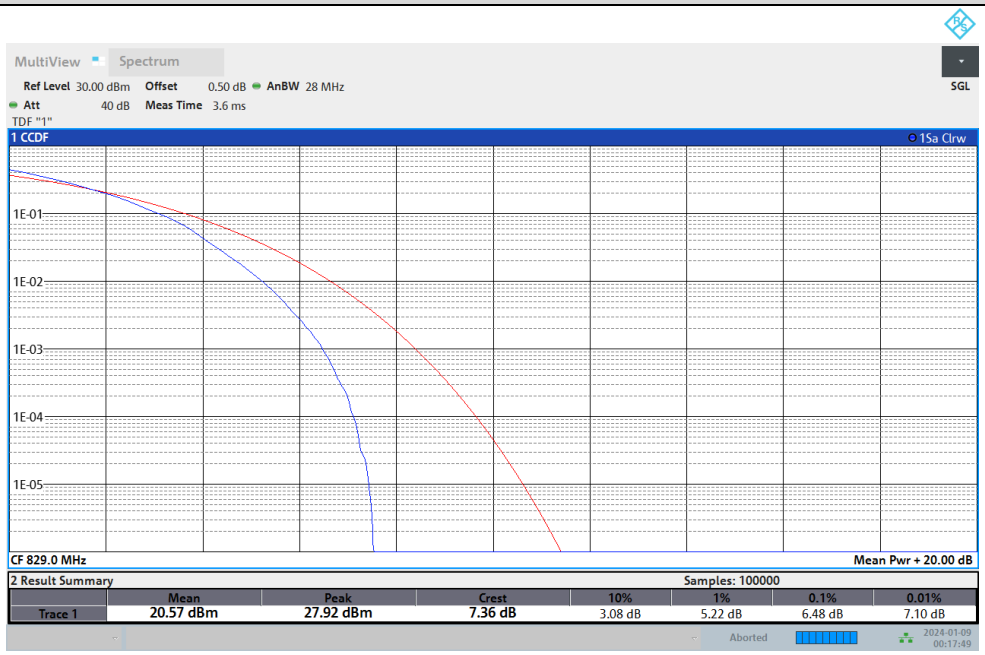
Band5-10MHz-16QAM-20600-50RB#0



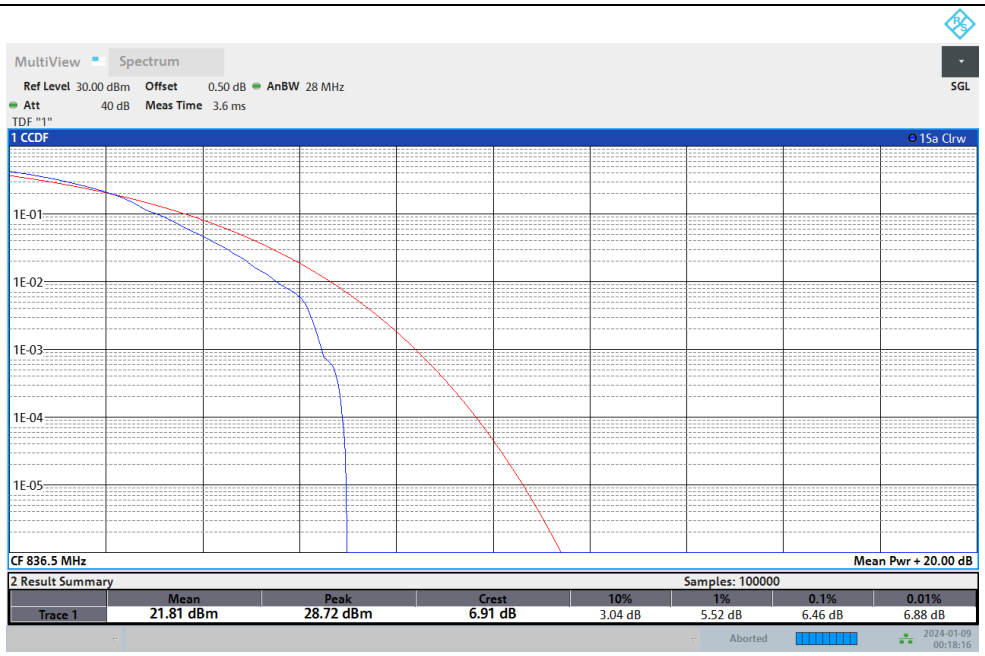
Band5-10MHz-64QAM-20450-1RB#0



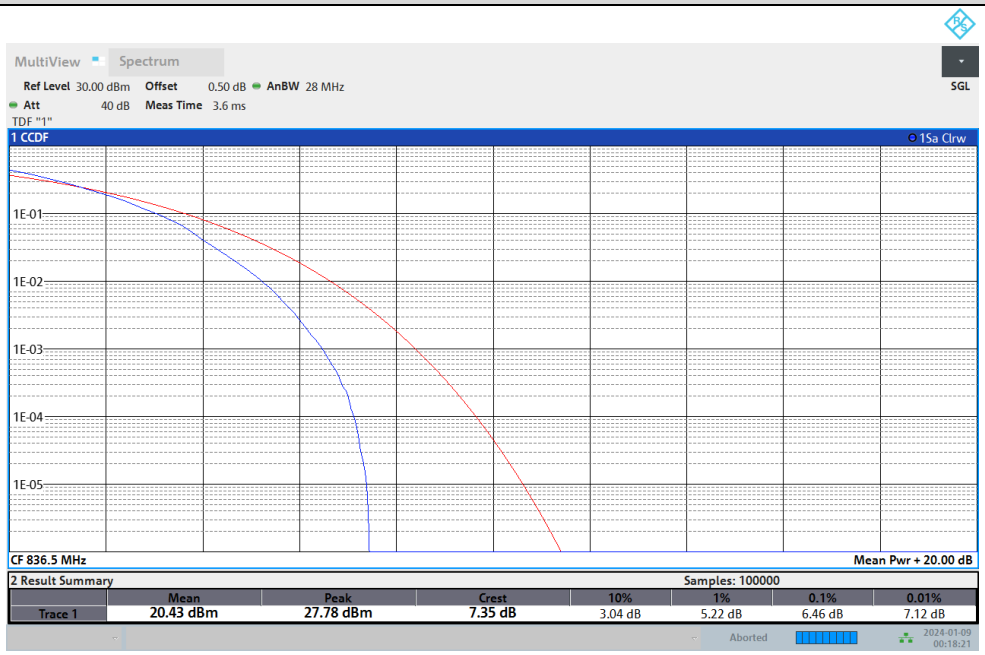
Band5-10MHz-64QAM-20450-50RB#0



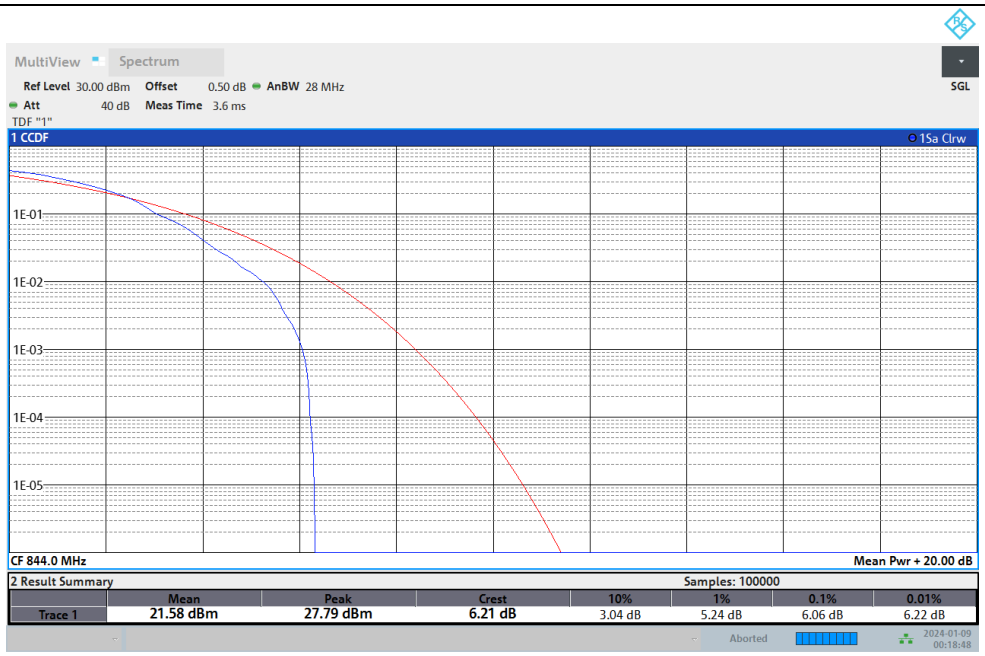
Band5-10MHz-64QAM-20525-1RB#0



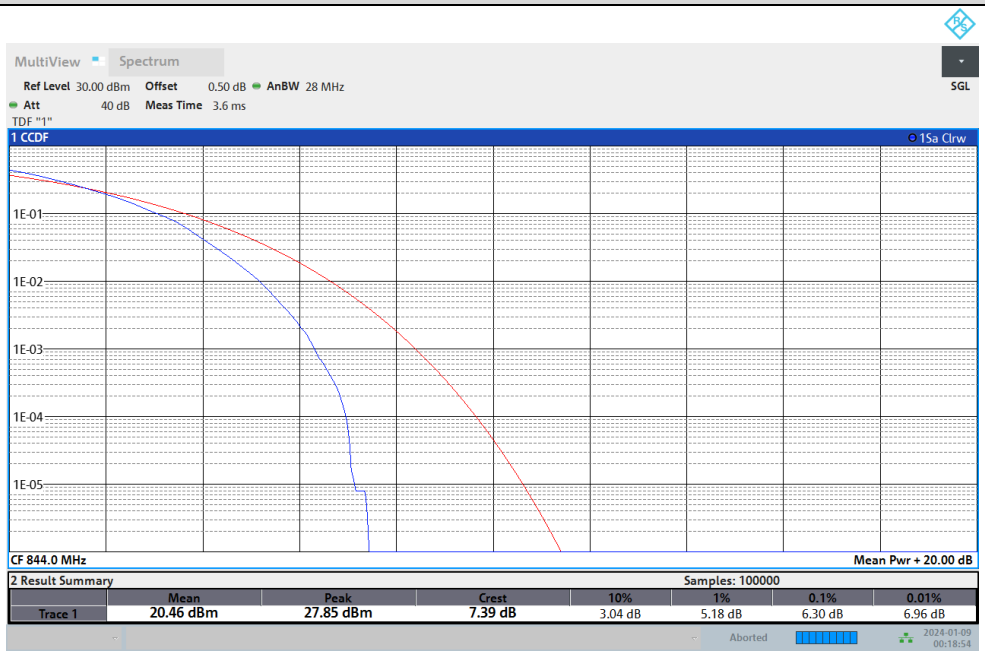
Band5-10MHz-64QAM-20525-50RB#0



Band5-10MHz-64QAM-20600-1RB#0



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



26DB BANDWIDTH AND OCCUPIED BANDWIDTH

Test Result

Band	Bandwidth	Modulation	Channel	RB Configuration	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
Band5	1.4MHz	QPSK	20407	6RB#0	1.085	1.27	PASS
Band5	1.4MHz	16QAM	20407	6RB#0	1.091	1.29	PASS
Band5	1.4MHz	64QAM	20407	6RB#0	1.083	1.27	PASS
Band5	1.4MHz	QPSK	20525	6RB#0	1.089	1.30	PASS
Band5	1.4MHz	16QAM	20525	6RB#0	1.086	1.26	PASS
Band5	1.4MHz	64QAM	20525	6RB#0	1.093	1.29	PASS
Band5	1.4MHz	QPSK	20643	6RB#0	1.093	1.26	PASS
Band5	1.4MHz	16QAM	20643	6RB#0	1.087	1.27	PASS
Band5	1.4MHz	64QAM	20643	6RB#0	1.086	1.26	PASS
Band5	3MHz	QPSK	20415	15RB#0	2.692	2.94	PASS
Band5	3MHz	16QAM	20415	15RB#0	2.689	2.95	PASS
Band5	3MHz	64QAM	20415	15RB#0	2.691	2.94	PASS
Band5	3MHz	QPSK	20525	15RB#0	2.693	2.93	PASS
Band5	3MHz	16QAM	20525	15RB#0	2.686	2.95	PASS
Band5	3MHz	64QAM	20525	15RB#0	2.685	2.91	PASS
Band5	3MHz	QPSK	20635	15RB#0	2.692	2.94	PASS
Band5	3MHz	16QAM	20635	15RB#0	2.688	2.94	PASS
Band5	3MHz	64QAM	20635	15RB#0	2.689	2.93	PASS
Band5	5MHz	QPSK	20425	25RB#0	4.494	4.87	PASS
Band5	5MHz	16QAM	20425	25RB#0	4.478	4.95	PASS
Band5	5MHz	64QAM	20425	25RB#0	4.478	4.88	PASS
Band5	5MHz	QPSK	20525	25RB#0	4.490	4.92	PASS
Band5	5MHz	16QAM	20525	25RB#0	4.492	4.86	PASS
Band5	5MHz	64QAM	20525	25RB#0	4.484	4.92	PASS
Band5	5MHz	QPSK	20625	25RB#0	4.474	4.92	PASS
Band5	5MHz	16QAM	20625	25RB#0	4.481	4.90	PASS
Band5	5MHz	64QAM	20625	25RB#0	4.473	4.92	PASS
Band5	10MHz	QPSK	20450	50RB#0	8.969	9.80	PASS
Band5	10MHz	16QAM	20450	50RB#0	8.946	9.65	PASS
Band5	10MHz	64QAM	20450	50RB#0	8.951	9.68	PASS
Band5	10MHz	QPSK	20525	50RB#0	8.936	9.68	PASS
Band5	10MHz	16QAM	20525	50RB#0	8.939	9.71	PASS
Band5	10MHz	64QAM	20525	50RB#0	8.935	9.71	PASS
Band5	10MHz	QPSK	20600	50RB#0	8.951	9.74	PASS
Band5	10MHz	16QAM	20600	50RB#0	8.941	9.74	PASS
Band5	10MHz	64QAM	20600	50RB#0	8.951	9.68	PASS