Certificate #6613.01

FCC TEST REPORT
(PART 24)

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

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

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

☒ **FCC PART 24, Subpart E** ☒ **FCC PART 2**
☒ **ANSI/TIA/EIA-603-D** ☒ **ANSI/TIA/EIA-603-E** ☒ **ANSI C63.26-2015**

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

Prepared by Chao Wu Engineer / Mobile Department	Approved by Peibo Sun Manager / Mobile Department
Chao Wu Date: Sep. 12, 2023	Sun Peibo Date: Sep. 12, 2023

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P23010004-2RF02	Original release	Feb. 23, 2023
PSU-QSU2309010210RF02	Based on the original product adding 2G PA second supply. The FX5196 add 2nd supply FX5596Y, raw material of Wafer and the printing model have changes. The IC design has not changed and there is no impact on BT and WIFI, other has not changed. This report verify the GSM1900,EDGE1900 and replace the test result.	Sep. 12, 2023

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 24 & Part 2			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**Test lab***
§2.1046	Coduncted Output Power	Compliance	A
§24.232(c)	Equivalent Isotropic Radiated Power	Compliance	A
§2.1055 §24.235	Frequency Stability	Compliance	A
§2.1049	Occupied Bandwidth	Compliance	A
§24.232(d)	Peak to average ratio	Compliance	A
§24.238(a)(b)	Band Edge Measurements	Compliance	A
§2.1051 §24.238(a)(b)	Conducted Spurious Emissions	Compliance	A
§2.1053 §24.238(a)(b)	Radiated Spurious Emissions	Compliance	A

NOTE:

1. This report refers to the data of W7L-P23010004-1RF02(model:TA-1536, FCC ID: 2AJOTTA-1536), the difference of TA-1536 and TA-1541 is TA-1541 change model name, TA-1536 is dual card, TA-1541 is single card, and functions are realized through softwareIn. The test data of this report is copied from the report W7L-P23010004-1RF02(model:TA-1536, FCC ID: 2AJOTTA-1536).
2. Based on the original product adding 2G PA second supply. The FX5196 add 2nd supply FX5596Y, raw material of Wafer and the printing model have changes. The IC design has not changed and there is no impact on BT and WIFI, other has not changed. This report verify the GSM850,EDGE850 and replace the test result.

***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.

Lab B:

BV 7Layers Communications Technology (Shenzhen) Co. Ltd

Lab Address:

No.B102, Dazu Chuangxin Mansion, North of Beihuan Avenue, North Area, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 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
Frequency Stability	±76.97Hz
Radiated emissions & Radiated Power (30MHz~1GMHz)	±4.98dB
Radiated emissions & Radiated Power (1GMHz ~6GMHz)	±4.70dB
Radiated emissions (6GMHz ~18GMHz)	±4.60dB
Radiated emissions (18GMHz ~40GMHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Band Edge Measurements	±4.70dB
Peak to average ratio	±0.76dB

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

1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Pre-Amplifier	R&S	SCU18F1	100815	Aug.30,22	Aug.29,24
Pre-Amplifier	R&S	SCU08F1	101028	Sep.16,22	Sep.15,24
Vector Signal Generator	R&S	SMBV100B	102176	Feb.16,22	Feb.15,24
Signal Generator	R&S	SMB100A	182185	Feb.16,22	Feb.15,24
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.25,22	Nov.24,25
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.25,22	Nov.24,25
EMI TEST Receiver	R&S	ESR26	101734	Feb.25,22	Feb.24,24
EMI TEST Receiver	R&S	ESW44	101973	Feb.25,22	Feb.24,24
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Feb.28,22	Feb.27,24
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.22,22	Aug.21,24
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Feb.23,22	Feb.22,24
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.22,22	Aug.21,24
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.23,22	Feb.22,24
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.27,22	Jun.26,24
Test Software	EMC32	EMC32	N/A	N/A	N/A
Test Software	ELEKTRA	ELEKTRA4.32	N/A	N/A	N/A
Open Switch and Control Unit	R&S	OSP220	101964	Oct.01,22	Sep.30,24
DC Source	HYELEC	HY3010B	551016	Aug.31,22	Aug.30,24
Hygrothermograph	DELI	20210528	SZ014	Sep.06,22	Sep.05,24
PC	LENOVO	E14	HRSW0024	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-7.00M	N/A	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-4.00M	N/A	N/A	N/A
CABLE	R&S	W13.02	N/A	Apr.28,23	Oct.27,23
CABLE	R&S	W12.14	N/A	Apr.28,23	Oct.27,23
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.28,23	Oct.27,23
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.28,23	Oct.27,23
Temperature Chamber	votsch	VT4002	58566078100050	May.31,22	May.30,24

NOTE: 1. The calibration interval of the above test instruments is 6 months or 24 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

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

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

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT*	Mobile phone	
BRAND NAME*	NOKIA	
MODEL NAME*	TA-1541	
NOMINAL VOLTAGE*	5.0Vdc(adapter) 3.85Vdc (Li-ion, battery)	
MODULATION TYPE*	**GSM/EDGE:** GMSK,8PSK **WCDMA:** HSUPA, HSDPA,DC-HSDPA,HSPA+ **LTE Band 2:** QPSK,16QAM, 64QAM	
FREQUENCY RANGE	**GSM/EDGE**	1850.2MHz ~ 1909.8MHz
	WCDMA	1852.4MHz ~ 1907.6MHz
	LTE Band 2 Channel Bandwidth: 1.4MHz	1850.7MHz ~ 1909.3MHz
	LTE Band 2 Channel Bandwidth: 3MHz	1851.5MHz ~ 1908.5MHz
	LTE Band 2 Channel Bandwidth: 5MHz	1852.5MHz ~ 1907.5MHz
	LTE Band 2 Channel Bandwidth: 10MHz	1855.0MHz ~ 1905.0MHz
	LTE Band 2 Channel Bandwidth: 15MHz	1857.5MHz ~ 1902.5MHz
	LTE Band 2 Channel Bandwidth: 20MHz	1860.0MHz ~ 1900.0MHz
MAX. EIRP POWER	**GSM**	1399.59mW
	EDGE	574.12mW
	WCDMA	245.47mW
	LTE Band 2 Channel Bandwidth: 1.4MHz	273.53mW
	LTE Band 2 Channel Bandwidth: 3MHz	274.16mW
	LTE Band 2 Channel Bandwidth: 5MHz	272.27mW
	LTE Band 2 Channel Bandwidth: 10MHz	272.27mW
	LTE Band 2 Channel Bandwidth: 15MHz	275.42mW
	LTE Band 2 Channel Bandwidth: 20MHz	277.33mW

EMISSION DESIGNATOR	GSM	245KGXW
	EDGE	239KG7W
	WCDMA	4M15F9W
	LTE Band 2 Channel Bandwidth: 1.4MHz	QPSK: 1M09G7D
		16QAM: 1M10W7D
		64QAM: 1M10W7D
	LTE Band 2 Channel Bandwidth: 3MHz	QPSK: 2M74G7D
		16QAM: 2M73W7D
		64QAM: 2M74W7D
	LTE Band 2 Channel Bandwidth: 5MHz	QPSK: 4M49G7D
		16QAM: 4M50W7D
		64QAM: 4M53W7D
	LTE Band 2 Channel Bandwidth: 10MHz	QPSK: 9M09G7D
		16QAM: 9M20W7D
		64QAM: 9M03W7D
	LTE Band 2 Channel Bandwidth: 15MHz	QPSK: 13M5G7D
		16QAM: 13M6W7D
		64QAM: 13M5W7D
	LTE Band 2 Channel Bandwidth: 20MHz	QPSK: 18M5G7D
		16QAM: 18M6W7D
		64QAM: 18M5W7D
ANTENNA TYPE*	Fixed Internal Antenna with 2.2dBi gain for GSM1900/WCDMA II / LTE B2	
HW VERSION*	SPR_S63Q0	
SW VERSION*	00WW_0_090	
I/O PORTS*	Refer to user's manual	
CABLE SUPPLIED*	USB cable1: non-shielded cable, with w/o ferrite core, 1 meter USB cable2: non-shielded cable, with w/o ferrite core, 1 meter USB cable3: non-shielded cable, with w/o ferrite core, 1 meter Earphone: non-shielded cable, with w/o ferrite core, 1.2 meter	
EXTREME TEMPERATURE*	-20-60℃	
EXTREME VOLTAGE*	EUT 3.4V - EUT 4.4V	

NOTE:

1. *Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information , Test Lab is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.

2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

3. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

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

4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

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

NO.	Change Description		specificatons	first supplier	specificatons	second supplier
1	PCBA	64GB EMMC	FEMDNN064G-A3A56 BWCTARV11X64G	Longsys	FEMDNN064G-A3A56 BWCTARV11X64G	Biwin
2		2GB LPDDR	FLXC2002G-N2 BWMZEX32H2A-16G-X	Longsys	FLXC2002G-N2 BWMZEX32H2A-16G-X	Biwin
3		3GB LPDDR	FLXC4003G-50 BWMEXX32H2A-24Gb-X	Longsys	FLXC4003G-50 BWMEXX32H2A-24Gb-X	Biwin
4		4GB LPDDR	FLXC2004G-30 BWMZCX32H2A-32G-X	Longsys	FLXC2004G-30 BWMZCX32H2A-32G-X	Biwin
5		PCB	/	KINGSHINE	/	WUZHU
6	LCM	LCD	6.517 HKC，360min,400typ, 2.5D	TCL	6.517 BOE（B8），360min,400typ, 2.5D	Lian Chuang
7	Front camera	Camera	8M FF COM	Lian Heyingxiang	8M FF COM	Shijia
8	Rear camera	Camera	13M-AF COB	Lian Heyingxiang	13M-AF COB	Ruicheng
9	Macro CAM	Camera	2M FF	Shijia	2M FF	Lian Heyingxiang
10	fingerprint	module	Back fingerprint	Hedayuan	Back fingerprint	Sanyingxin
11	Speaker		1712 1W	Dong Sheng	1712 1W	Xin Rongda
12	Vibrator		1027 FPC	Kai Long	1027 FPC	Chao Yin
13	Receiver		0809	Dong Sheng	0809	Xin Rongda
14	FPC		/	Lante	/	Kaihongxing

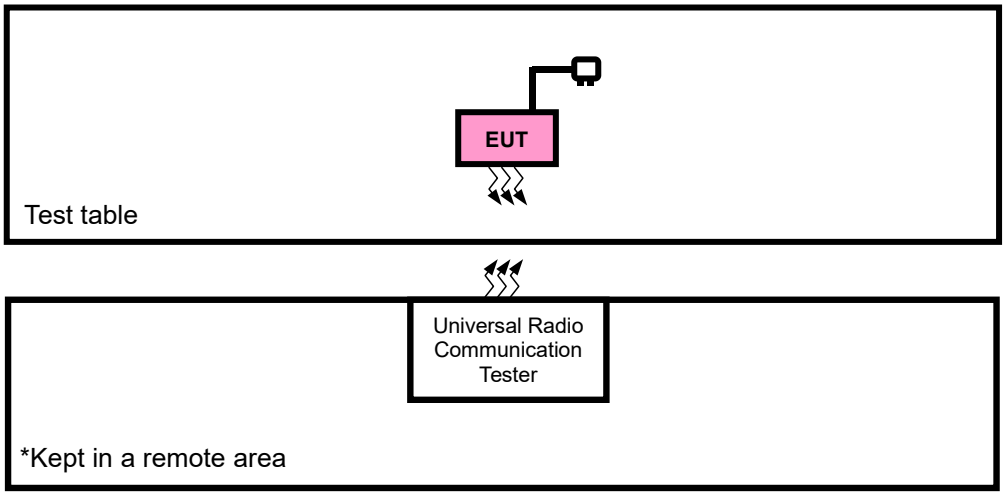
15	Battery	5000MAH	Gaoyuan	5000MAH	Feng Hua
16	Data cable	2A typeC	Yuwei	2A typeC	Juwei

6. List of Accessory:

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

2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	N/A	N/A	N/A	N/A	N/A

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

2.4 TEST ITEM AND TEST CONFIGURATION

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

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

GSM MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
A	EIRP	512 to 810	512, 661, 810	GSM/EDGE
B	FREQUENCY STABILITY	512 to 810	512, 661, 810	GSM/EDGE
A	OCCUPIED BANDWIDTH	512 to 810	512, 661, 810	GSM/EDGE
A	PEAK TO AVERAGE RATIO	512 to 810	512, 661, 810	GSM/EDGE
A	BAND EDGE	512 to 810	512, 810	GSM/EDGE
A	CONDCUDETED EMISSION	512 to 810	512, 661, 810	GSM/EDGE
A	RADIATED EMISSION	512 to 810	512, 661, 810	GSM/EDGE

WCDMA

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
A	EIRP	9262 to 9538	9262, 9400, 9538	WCDMA
B	FREQUENCY STABILITY	9262 to 9538	9262, 9400, 9538	WCDMA
A	OCCUPIED BANDWIDTH	9262 to 9538	9262, 9400, 9538	WCDMA
A	PEAK TO AVERAGE RATIO	9262 to 9538	9262, 9400, 9538	WCDMA
A	BAND EDGE	9262 to 9538	9262, 9538	WCDMA
A	CONDCUDETED EMISSION	9262 to 9538	9262, 9400, 9538	WCDMA
A	RADIATED EMISSION	9262 to 9538	9262, 9400, 9538	WCDMA

LTE BAND 2 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
A	EIRP	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM · 64QAM	Full RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM · 64QAM	Full RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM · 64QAM	Full RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM · 64QAM	Full RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM · 64QAM	Full RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM · 64QAM	Full RB / 0 RB Offset
A	OCCUPIED BANDWIDTH	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM · 64QAM	Full RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM · 64QAM	Full RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM · 64QAM	Full RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM · 64QAM	Full RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM · 64QAM	Full RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM · 64QAM	Full RB / 0 RB Offset
A	PEAK TO AVERAGE RATIO	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset

		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset
A	BAND EDGE	18607 to 19193	18607	1.4MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset
			19193	1.4MHz	QPSK,16QAM · 64QAM	1 RB / 5 RB Offset Full RB / 0 RB Offset
		18615 to 19185	18615	3MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset
			19185	3MHz	QPSK,16QAM · 64QAM	1 RB / 14 RB Offset Full RB / 0 RB Offset
		18625 to 19175	18625	5MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset
			19175	5MHz	QPSK,16QAM · 64QAM	1 RB / 24 RB Offset Full RB / 0 RB Offset
		18650 to 19150	18650	10MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset
			19150	10MHz	QPSK,16QAM · 64QAM	1 RB / 49 RB Offset Full RB / 0 RB Offset
		18675 to 19125	18675	15MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset
			19125	15MHz	QPSK,16QAM · 64QAM	1 RB / 74 RB Offset Full RB / 0 RB Offset
		18700 to 19100	18700	20MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset Full RB / 0 RB Offset
			19100	20MHz	QPSK,16QAM · 64QAM	1 RB / 99 RB Offset Full RB / 0 RB Offset
A	CONDCUDETED EMISSION	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM · 64QAM	1 RB / 0 RB Offset
A	RADIATED EMISSION	18607 to 19193	18900	1.4MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18900	3MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18900	5MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18615,18900,19185	10MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18900	15MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18900	20MHz	QPSK	1 RB / 0 RB Offset

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP	25deg. C, 57%RH	DC 5.0V By Adapter	Chao Wu
FREQUENCY STABILITY	23deg. C, 61%RH	DC 5.0V By Adapter	Chao Wu
OCCUPIED BANDWIDTH	23deg. C, 61%RH	DC 5.0V By Adapter	Chao Wu
PEAK TO AVERAGE RATIO	23deg. C, 61%RH	DC 5.0V By Adapter	Chao Wu
BAND EDGE	23deg. C, 61%RH	DC 5.0V By Adapter	Chao Wu
CONDCUDETED EMISSION	23deg. C, 61%RH	DC 5.0V By Adapter	Chao Wu/Jace Hu
RADIATED EMISSION	23deg. C, 70%RH	DC 5.0V By Adapter	Chao Wu

2.5 EUT OPERATING CONDITIONS

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

2.6 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC 47 CFR Part 2

FCC 47 CFR Part 24

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 and portable stations are limited to 2 watts EIRP.

3.1.2 TEST PROCEDURES

EIRP 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.

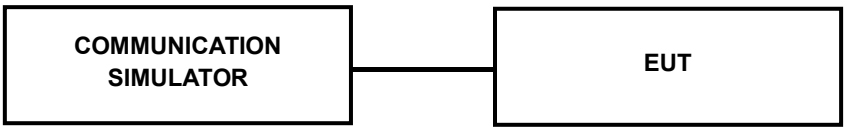
CONDUCTED POWER MEASUREMENT:

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

3.1.3 TEST SETUP

EIRP / ERP Measurement:

CONDUCTED POWER MEASUREMENT:



3.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

Band	GSM1900			Max. Tune-up Power
Channel	512	661	810	
Frequency	1850.2	1880	1909.8	
GSM	29.17	**29.26**	29.15	30.00
GPRS 1Tx Slot	29.19	29.11	29.08	30.00
GPRS 2Tx Slot	26.82	26.73	26.68	27.50
GPRS 3Tx Slot	25.21	25.19	25.04	26.00
GPRS 4Tx Slot	23.05	23.01	22.96	23.50
EDGE 1Tx Slot	25.39	25.28	24.81	26.00
EDGE 2Tx Slot	23.36	23.59	23.45	24.50
EDGE 3Tx Slot	20.95	20.91	20.56	21.50
EDGE 4Tx Slot	17.78	17.82	17.27	18.50

Band	WCDMA II			Max. Tune-up Power
Channel	9262	9400	9538	
Frequency	1852.4	1880	1907.6	
RMC 12.2K	**21.70**	21.68	21.66	22.50
HSDPA Subtest-1	21.12	21.10	21.08	22.00
HSDPA Subtest-2	21.11	21.09	21.07	22.00
HSDPA Subtest-3	20.60	20.58	20.56	21.50
HSDPA Subtest-4	20.59	20.57	20.55	21.50
DC-HSDPA Subtest-1	21.04	21.04	21.00	22.00
DC-HSDPA Subtest-2	21.03	21.03	20.99	22.00
DC-HSDPA Subtest-3	20.61	20.52	20.50	21.50
DC-HSDPA Subtest-4	20.60	20.51	20.49	21.50
HSUPA Subtest-1	21.08	21.06	21.04	22.00
HSUPA Subtest-2	20.07	20.05	20.03	21.00
HSUPA Subtest-3	20.55	20.54	20.52	21.50
HSUPA Subtest-4	20.04	20.03	20.01	21.00
HSUPA Subtest-5	21.03	21.02	21.00	22.00
HSPA+ Subtest-1	19.79	19.79	19.77	20.50

LTE BAND 2

Band/BW	Modulation	RB Size	RB Offset	Low CH 18607	Mid CH 18900	High CH 19193
				Frequency 1850.7 MHz	Frequency 1880 MHz	Frequency 1909.3 MHz
2/ 1.4	QPSK	1	0	22.04	22.06	21.98
		1	2	22.12	22.17	22.05
		1	5	22.11	22.10	21.99
		3	0	22.01	22.09	22.07
		3	1	22.02	22.13	21.96
		3	3	21.99	22.00	21.96
		6	0	21.11	21.07	21.03
	16QAM	1	0	20.84	20.55	20.82
		1	2	20.94	20.45	20.77
		1	5	20.93	20.66	20.88
		3	0	20.68	20.67	20.58
		3	1	20.57	20.75	20.59
		3	3	20.60	21.07	21.05
		6	0	20.13	20.16	20.00
	64QAM	1	0	20.26	20.51	20.32
		1	2	20.33	20.59	20.33
		1	5	20.49	20.77	20.25
		3	0	20.31	20.37	20.24
		3	1	20.32	20.35	20.33
		3	3	20.39	20.69	20.64
		6	0	19.28	19.33	19.19

Band/BW	Modulation	RB Size	RB Offset	Low CH 18615	Mid CH 18900	High CH 19185
				Frequency 1851.5 MHz	Frequency 1880 MHz	Frequency 1908.5 MHz
2/ 3	QPSK	1	0	22.06	22.08	21.97
		1	7	22.08	22.18	22.05
		1	14	22.07	22.10	21.99
		8	0	21.00	21.12	21.07
		8	3	20.95	21.13	20.98
		8	7	20.96	21.07	21.00
		15	0	21.08	21.08	20.97
	16QAM	1	0	20.81	20.61	20.85
		1	7	20.91	20.48	20.75
		1	14	20.96	20.66	20.88
		8	0	20.14	20.18	20.08
		8	3	20.12	20.20	20.12
		8	7	20.12	20.55	20.51
		15	0	20.13	20.10	20.03
	64QAM	1	0	20.32	20.54	20.26
		1	7	20.36	20.53	20.32
		1	14	20.50	20.79	20.25
		8	0	19.34	19.41	19.25
		8	3	19.36	19.29	19.38
		8	7	19.36	19.73	19.60
		15	0	19.30	19.30	19.23

Band/BW	Modulation	RB Size	RB Offset	Low CH 18625	Mid CH 18900	High CH 19175
				Frequency 1852.5 MHz	Frequency 1880 MHz	Frequency 1907.5 MHz
2/ 5	QPSK	1	0	22.07	22.03	21.98
		1	12	22.13	22.15	22.05
		1	24	22.08	22.09	22.03
		12	0	21.03	21.12	21.04
		12	6	20.95	21.14	20.99
		12	13	21.00	21.03	21.01
		25	0	21.06	21.11	21.00
	16QAM	1	0	20.82	20.57	20.85
		1	12	20.88	20.51	20.74
		1	24	20.96	20.66	20.87
		12	0	20.14	20.16	20.05
		12	6	20.09	20.24	20.08
		12	13	20.07	20.57	20.54
		25	0	20.13	20.11	20.00
	64QAM	1	0	20.26	20.51	20.32
		1	12	20.33	20.59	20.32
		1	24	20.43	20.84	20.25
		12	0	19.35	19.38	19.24
		12	6	19.30	19.36	19.37
		12	13	19.40	19.72	19.57
		25	0	19.26	19.36	19.21

Band/BW	Modulation	RB Size	RB Offset	Low CH 18650	Mid CH 18900	High CH 19150
				Frequency 1855 MHz	Frequency 1880 MHz	Frequency 1905 MHz
2/ 10	QPSK	1	0	22.04	22.06	21.98
		1	24	22.13	22.15	22.06
		1	49	22.05	22.13	21.99
		25	0	21.04	21.11	21.07
		25	12	21.01	21.08	20.99
		25	25	20.98	21.00	21.00
		50	0	21.11	21.11	20.97
	16QAM	1	0	20.82	20.54	20.81
		1	24	20.93	20.47	20.77
		1	49	20.96	20.67	20.84
		25	0	20.16	20.14	20.11
		25	12	20.13	20.18	20.13
		25	25	20.06	20.58	20.51
		50	0	20.17	20.10	20.04
	64QAM	1	0	20.25	20.52	20.29
		1	24	20.38	20.55	20.36
		1	49	20.49	20.78	20.22
		25	0	19.33	19.35	19.30
		25	12	19.37	19.35	19.31
		25	25	19.39	19.69	19.59
		50	0	19.31	19.32	19.22

Band/BW	Modulation	RB Size	RB Offset	Low CH 18675	Mid CH 18900	High CH 19125
				Frequency 1857.5 MHz	Frequency 1880 MHz	Frequency 1902.5 MHz
2/ 15	QPSK	1	0	22.11	22.06	21.95
		1	37	22.11	22.20	22.01
		1	74	22.11	22.16	22.00
		36	0	21.01	21.12	21.08
		36	19	21.02	21.13	20.99
		36	39	20.96	21.01	21.00
		75	0	21.11	21.09	21.02
	16QAM	1	0	20.86	20.61	20.81
		1	37	20.92	20.48	20.77
		1	74	20.92	20.72	20.86
		36	0	20.20	20.14	20.12
		36	19	20.07	20.22	20.09
		36	39	20.11	20.56	20.54
		75	0	20.18	20.13	19.97
	64QAM	1	0	20.27	20.53	20.30
		1	37	20.39	20.54	20.33
		1	74	20.45	20.77	20.25
		36	0	19.38	19.41	19.24
		36	19	19.31	19.29	19.33
		36	39	19.42	19.76	19.61
		75	0	19.30	19.30	19.23

Band/BW	Modulation	RB Size	RB Offset	Low CH 18700	Mid CH 18900	High CH 19100
				Frequency 1860 MHz	Frequency 1880 MHz	Frequency 1900 MHz
2/ 20	QPSK	1	0	22.12	22.10	22.03
		1	50	22.15	**22.23**	22.07
		1	99	22.13	22.17	22.04
		50	0	21.07	21.17	21.09
		50	25	21.03	21.15	21.04
		50	50	21.04	21.08	21.02
		100	0	21.12	21.13	21.05
	16QAM	1	0	20.89	20.62	20.87
		1	50	20.96	20.53	20.79
		1	99	20.98	20.74	20.89
		50	0	20.22	20.22	20.13
		50	25	20.15	20.26	20.14
		50	50	20.14	20.62	20.56
		100	0	20.19	20.18	20.05
	64QAM	1	0	20.33	20.56	20.34
		1	50	20.41	20.61	20.38
		1	99	20.51	20.85	20.27
		50	0	19.39	19.43	19.32
		50	25	19.38	19.37	19.39
		50	50	19.44	19.77	19.65
		100	0	19.32	19.38	19.24

EIRP POWER (dBm)

GSM 1900

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
512	1850.2	29.19	2.2	31.39	1377.21	2
661	1880	29.26	2.2	31.46	1399.59	2
810	1909.8	29.15	2.2	31.35	1364.58	2

EDGE 1900

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
512	1850.2	25.39	2.2	27.59	574.12	2
661	1880	25.28	2.2	27.48	559.76	2
810	1909.8	24.81	2.2	27.01	502.34	2

WCDMA

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
9662	1852.4	21.7	2.2	23.9	245.47	2
9800	1880	21.68	2.2	23.88	244.34	2
9938	1907.6	21.66	2.2	23.86	243.22	2

LTE BAND 2

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18607	1850.7	22.12	2.2	24.32	270.4	2
18900	1880	22.17	2.2	24.37	273.53	2
19193	1909.3	22.07	2.2	24.27	267.3	2

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18607	1850.7	20.94	2.2	23.14	206.06	2
18900	1880	21.07	2.2	23.27	212.32	2
19193	1909.3	21.05	2.2	23.25	211.35	2

CHANNEL BANDWIDTH: 1.4MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18607	1850.7	20.49	2.2	22.69	185.78	2
18900	1880	20.77	2.2	22.97	198.15	2
19193	1909.3	20.64	2.2	22.84	192.31	2

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18615	1851.5	22.08	2.2	24.28	267.92	2
18900	1880	22.18	2.2	24.38	274.16	2
19185	1908.5	22.05	2.2	24.25	266.07	2

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18615	1851.5	20.96	2.2	23.16	207.01	2
18900	1880	20.66	2.2	22.86	193.2	2
19185	1908.5	20.88	2.2	23.08	203.24	2

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18615	1851.5	20.5	2.2	22.7	186.21	2
18900	1880	20.79	2.2	22.99	199.07	2
19185	1908.5	20.32	2.2	22.52	178.65	2

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18625	1852.5	22.13	2.2	24.33	271.02	2
18900	1880	22.15	2.2	24.35	272.27	2
19175	1907.5	22.05	2.2	24.25	266.07	2

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18625	1852.5	20.96	2.2	23.16	207.01	2
18900	1880	20.66	2.2	22.86	193.2	2
19175	1907.5	20.87	2.2	23.07	202.77	2

CHANNEL BANDWIDTH: 5MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18625	1852.5	20.43	2.2	22.63	183.23	2
18900	1880	20.84	2.2	23.04	201.37	2
19175	1907.5	20.32	2.2	22.52	178.65	2

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18650	1855	22.13	2.2	24.33	271.02	2
18900	1880	22.15	2.2	24.35	272.27	2
19150	1905	22.06	2.2	24.26	266.69	2

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18650	1855	20.96	2.2	23.16	207.01	2
18900	1880	20.67	2.2	22.87	193.64	2
19150	1905	20.84	2.2	23.04	201.37	2

CHANNEL BANDWIDTH: 10MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18650	1855	20.49	2.2	22.69	185.78	2
18900	1880	20.78	2.2	22.98	198.61	2
19150	1905	20.36	2.2	22.56	180.3	2

CHANNEL BANDWIDTH: 15MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18675	1857.5	22.11	2.2	24.31	269.77	2
18900	1880	22.2	2.2	24.4	275.42	2
19125	1902.5	22.01	2.2	24.21	263.63	2

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18675	1857.5	20.92	2.2	23.12	205.12	2
18900	1880	20.72	2.2	22.92	195.88	2
19125	1902.5	20.86	2.2	23.06	202.3	2

CHANNEL BANDWIDTH: 15MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18675	1857.5	20.45	2.2	22.65	184.08	2
18900	1880	20.77	2.2	22.97	198.15	2
19125	1902.5	20.33	2.2	22.53	179.06	2

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18700	1860	22.15	2.2	24.35	272.27	2
18900	1880	22.23	2.2	24.43	277.33	2
19100	1900	22.07	2.2	24.27	267.3	2

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18700	1860	20.98	2.2	23.18	207.97	2
18900	1880	20.74	2.2	22.94	196.79	2
19100	1900	20.89	2.2	23.09	203.7	2

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18700	1860	20.51	2.2	22.71	186.64	2
18900	1880	20.85	2.2	23.05	201.84	2
19100	1900	20.38	2.2	22.58	181.13	2

3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

3.2.2 TEST PROCEDURE

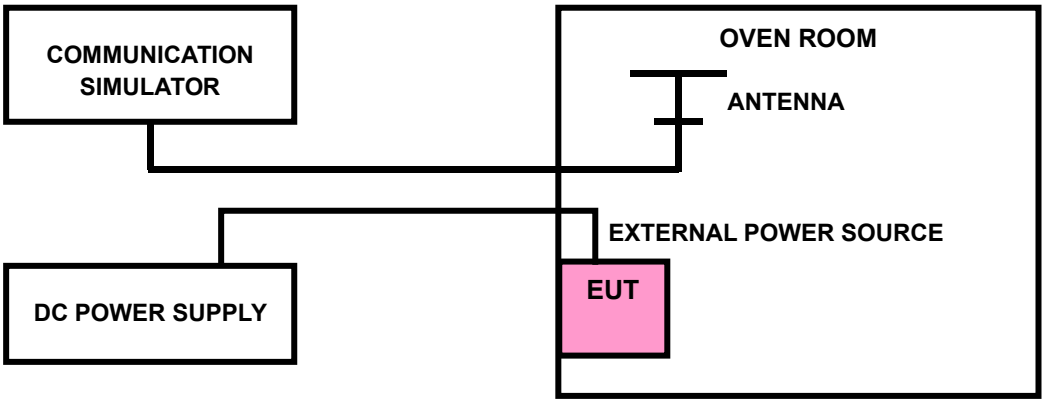
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

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

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

3.2.3 TEST SETUP



3.2.4 TEST RESULTS

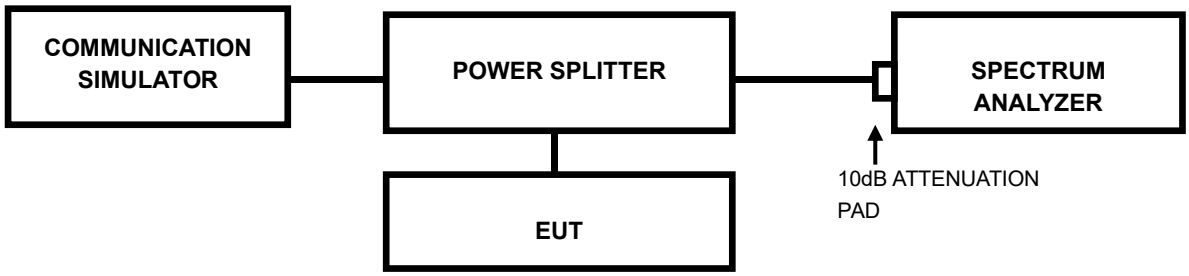
Please Refer to Appendix Of this test report.

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 TEST PROCEDURES

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

3.3.2 TEST SETUP



3.3.3 TEST RESULTS

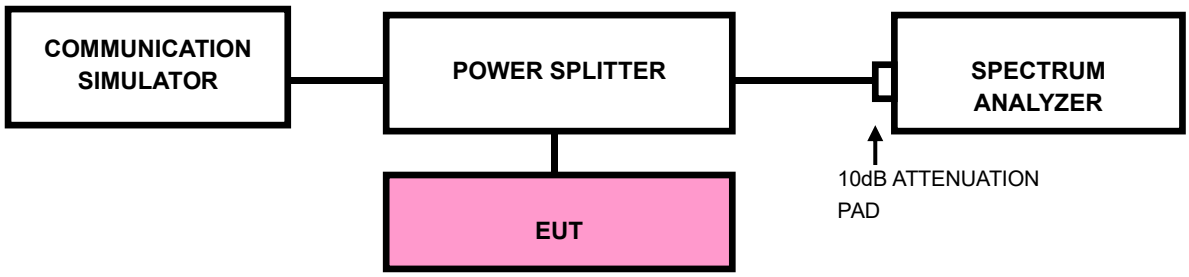
Please Refer to Appendix Of this test report.

3.4 BAND EDGE MEASUREMENTC

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.

a. 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

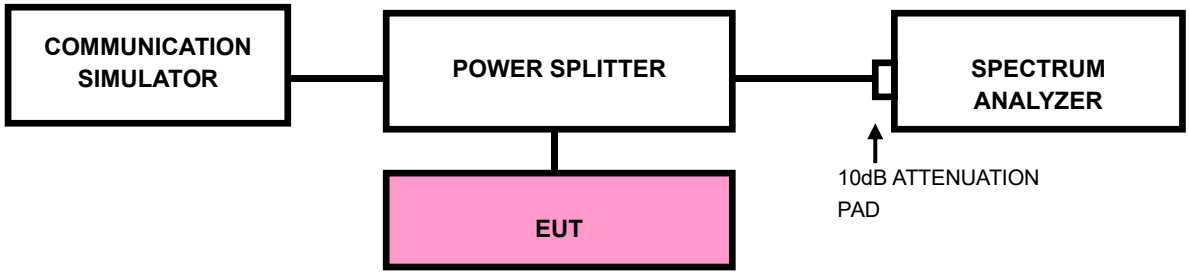
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

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 10th 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.

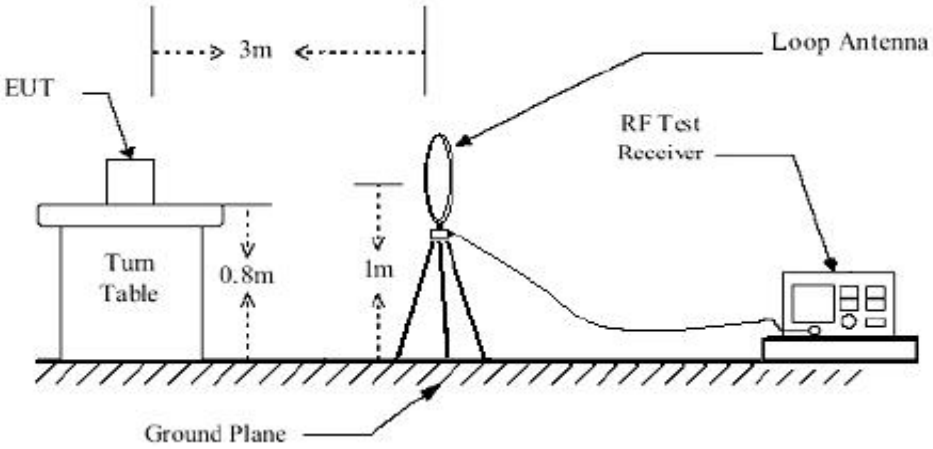
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.6.3 DEVIATION FROM TEST STANDARD

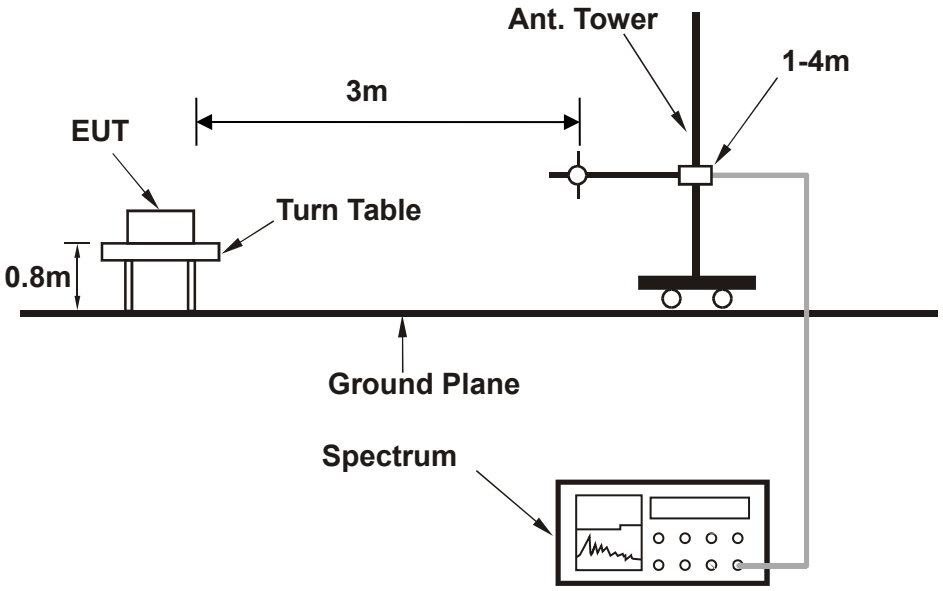
No deviation

3.6.4 TEST SETUP

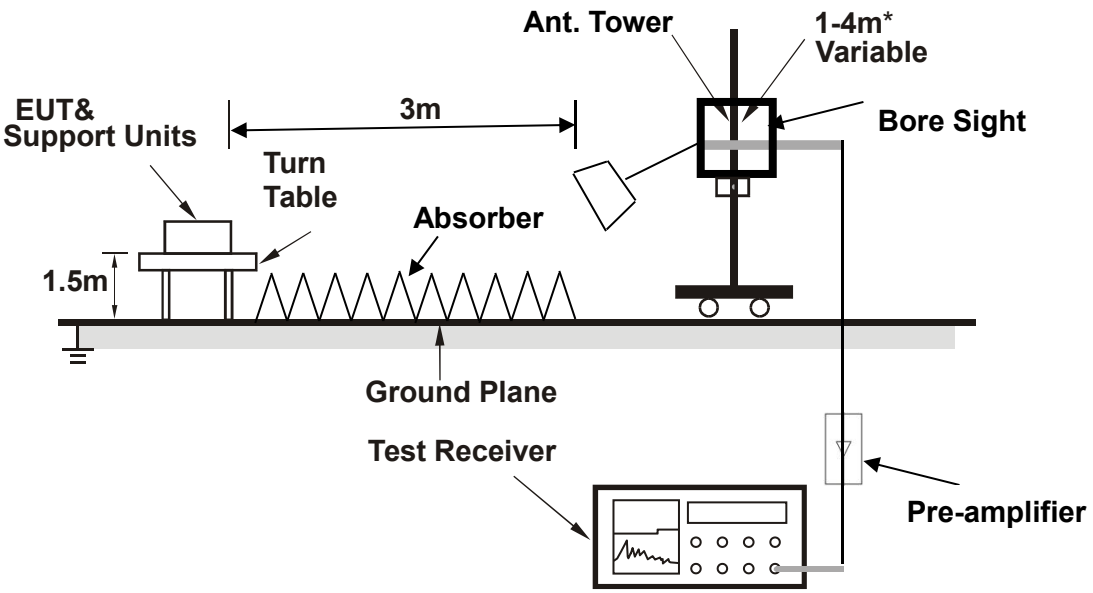
< Frequency Range below 30MHz >



< 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

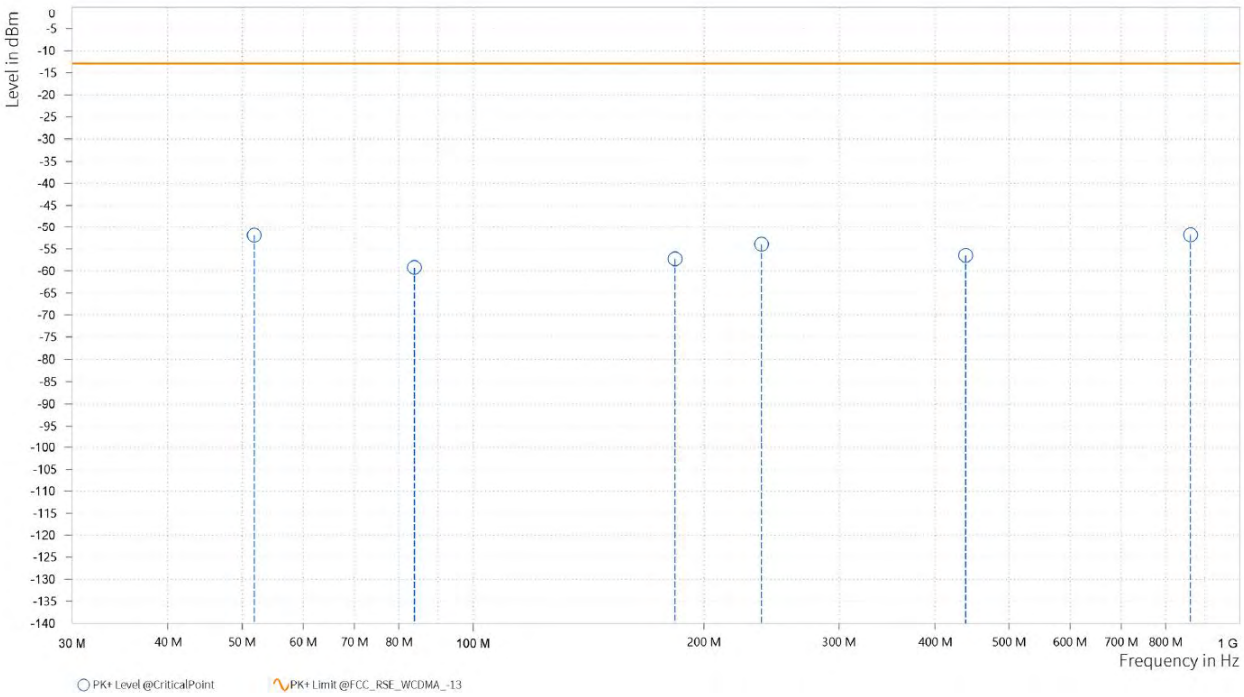
30 MHz – 1GHz data:

GSM 1900

CHANNEL BANDWIDTH: 512~810

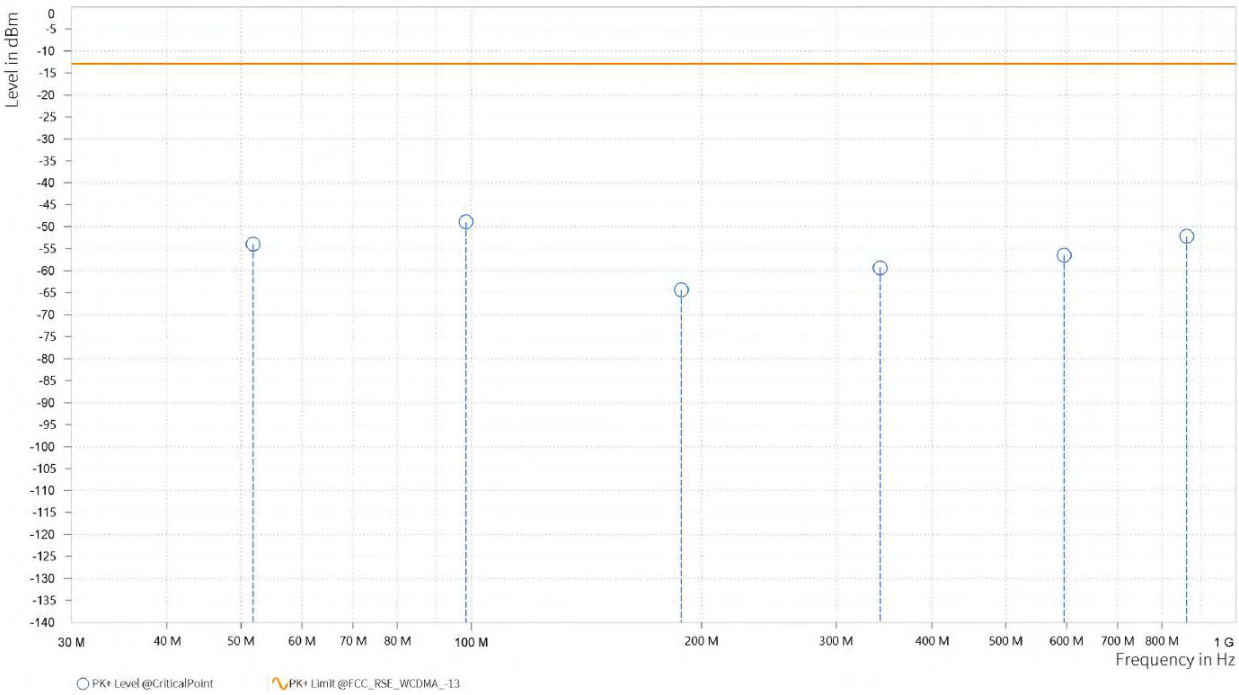
MODE	TX channel 810	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	51.825	-51.91	-13.00	38.91	4.16	H	150	2
1	83.835	-59.24	-13.00	46.24	-5.95	H	150	2
1	183.260	-57.28	-13.00	44.28	0.27	H	98.6	1
1	237.580	-53.97	-13.00	40.97	7.50	H	252.8	2
1	438.855	-56.47	-13.00	43.47	8.22	H	98.6	1
1	861.775	-51.85	-13.00	38.85	13.91	H	48.4	2



MODE	TX channel 810	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	51.825	-54.01	-13.00	41.01	0.37	V	47.2	2
1	98.385	-48.91	-13.00	35.91	11.61	V	1	2
1	188.110	-64.35	-13.00	51.35	-1.54	V	99.8	2
1	342.340	-59.35	-13.00	46.35	6.38	V	304.2	2
1	595.510	-56.44	-13.00	43.44	7.99	V	201.4	2
1	861.290	-52.17	-13.00	39.17	13.52	V	99.8	2



ABOVE 1GHz

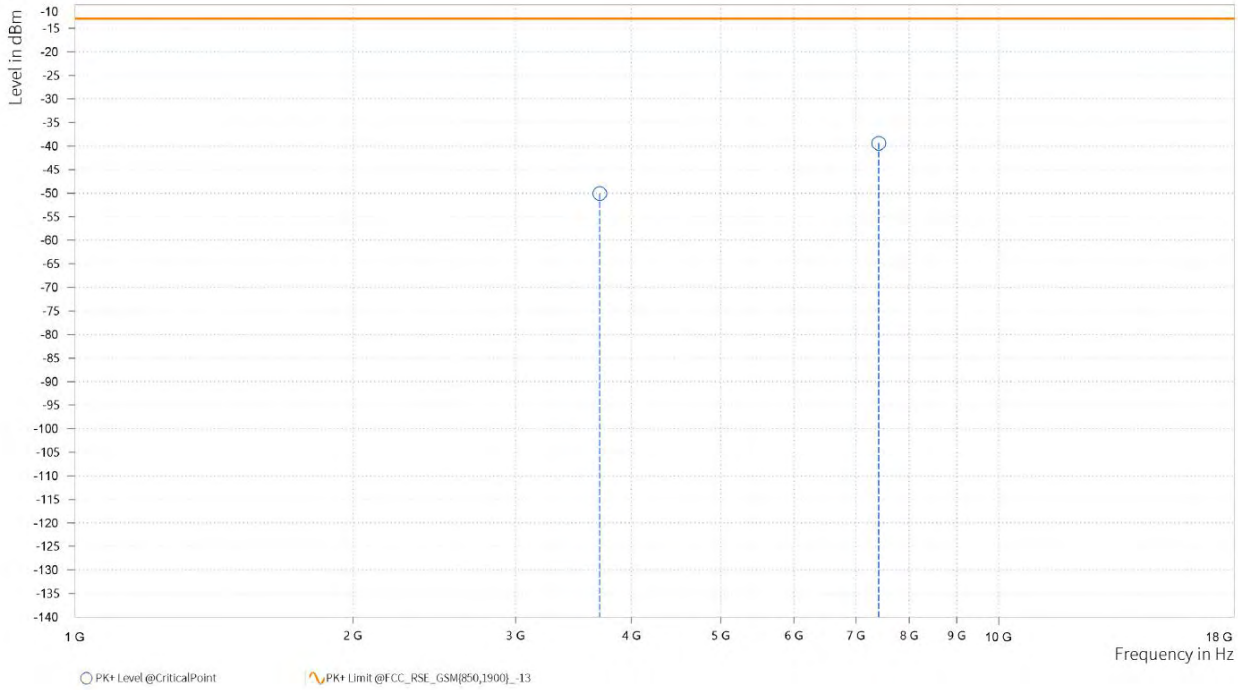
Note: For higher frequency, the emission is too low to be detected.

GSM 1900:

CH 512

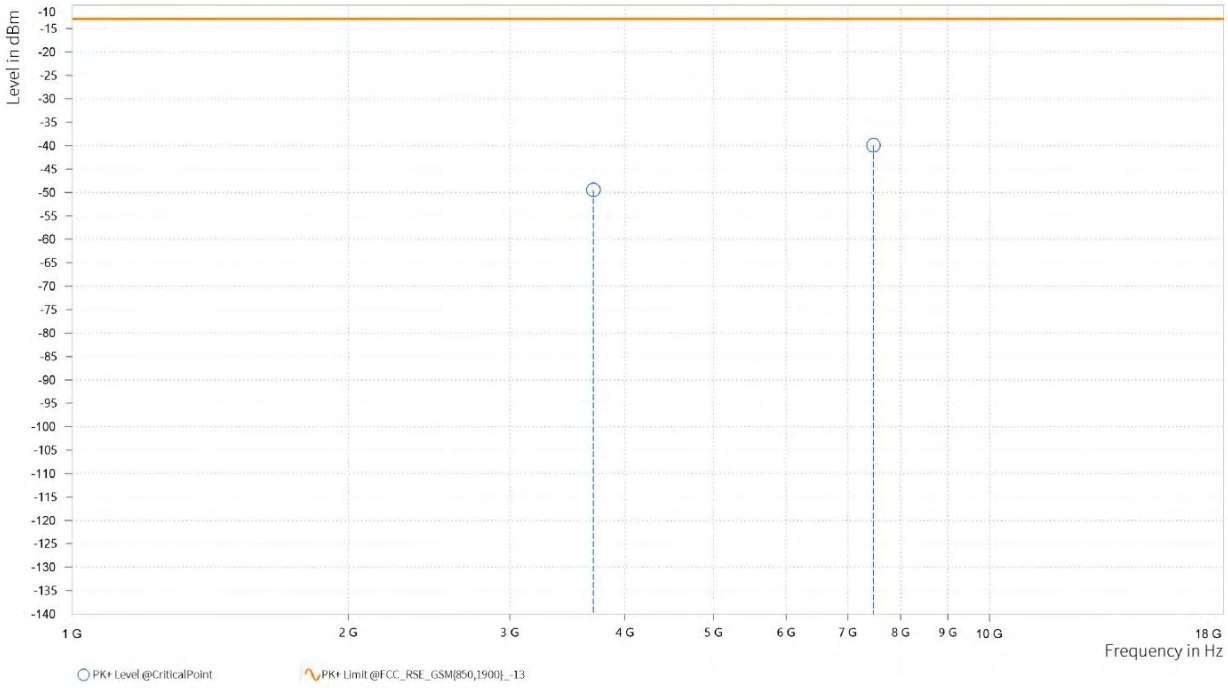
MODE	TX channel 512	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,700.000	-50.09	-13.00	37.09	22.48	H	0.9	2
4	7,410.500	-39.39	-13.00	26.39	29.68	H	239.6	1



MODE	TX channel 512	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

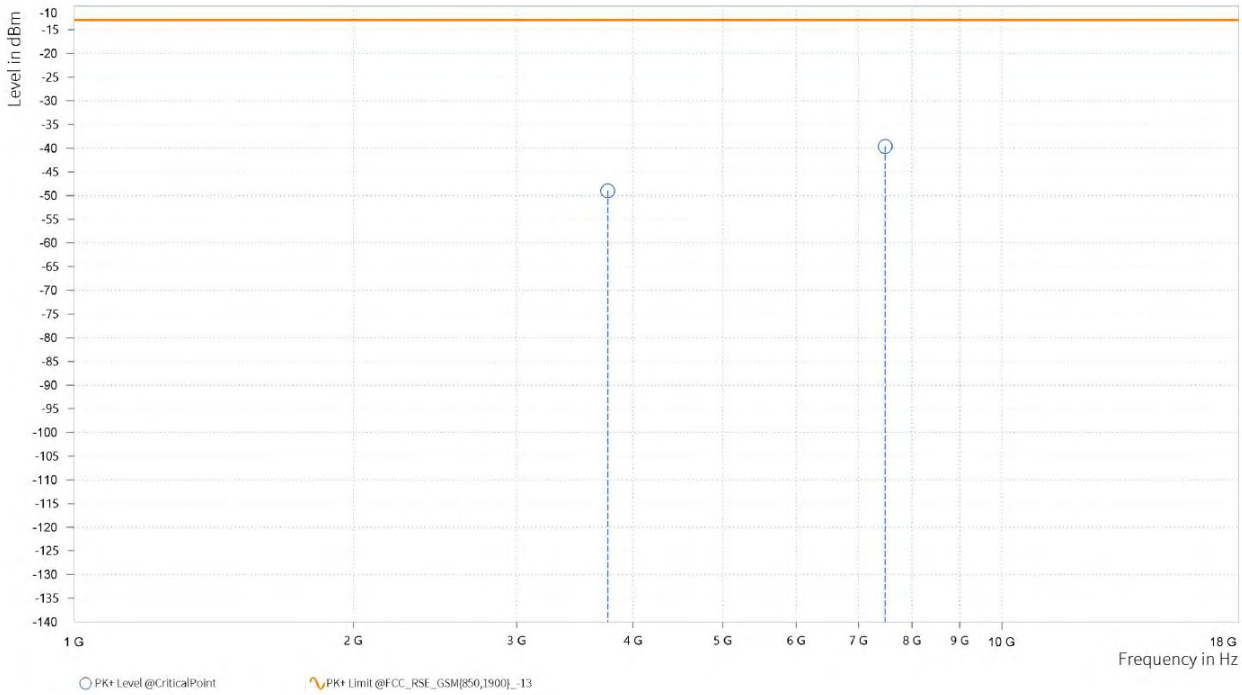
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,700.000	-49.47	-13.00	36.47	23.07	V	0.9	2
4	7,471.000	-39.92	-13.00	26.92	29.06	V	359	2



CH 661

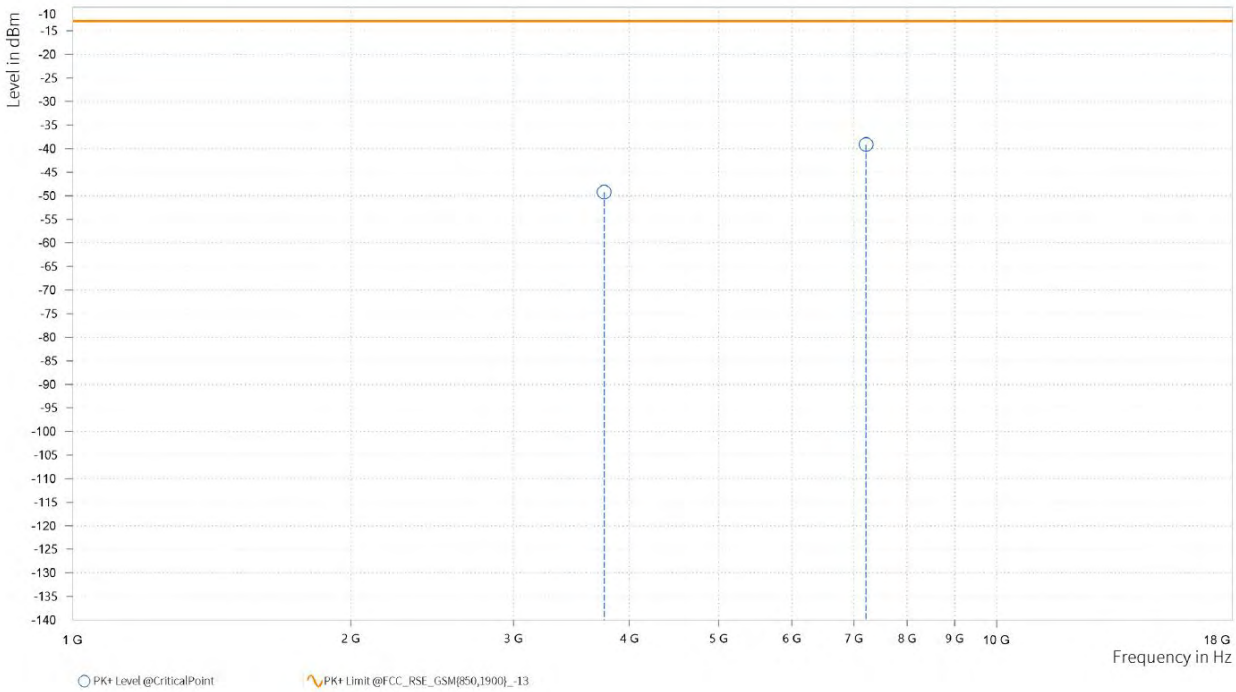
MODE	TX channel 661	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,760.000	-48.98	-13.00	35.98	23.12	H	359	1
4	7,485.500	-39.62	-13.00	26.62	29.02	H	359	2



MODE	TX channel 661	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

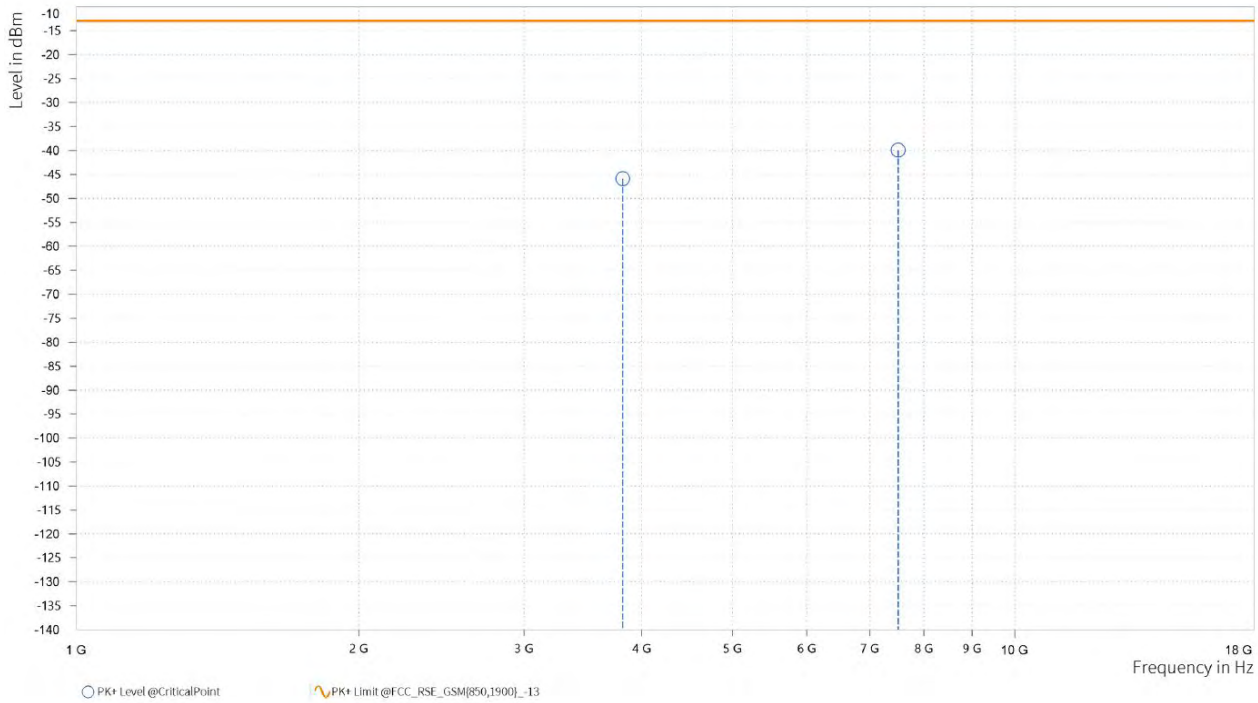
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,760.000	-49.18	-13.00	36.18	23.61	V	359	1
4	7,220.000	-39.16	-13.00	26.16	29.55	V	359	2



CH 810

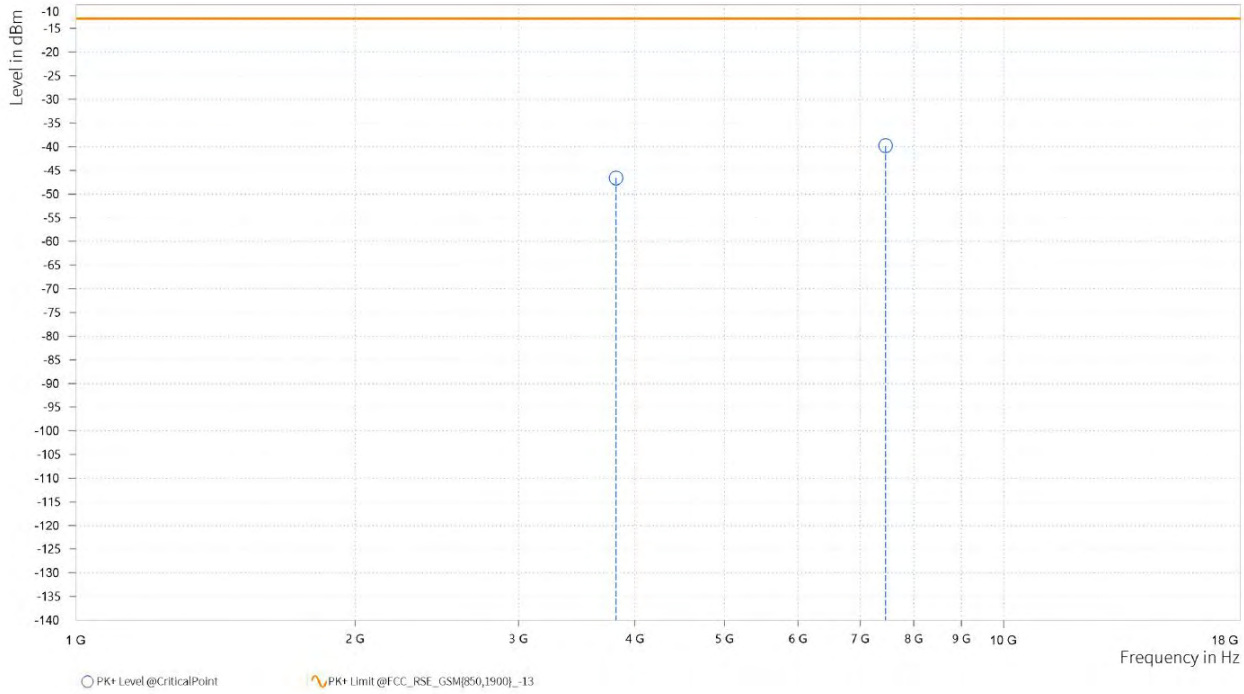
MODE	TX channel 810	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,819.500	-45.90	-13.00	32.90	23.26	H	303	1
4	7,511.000	-39.95	-13.00	26.95	29.22	H	119.1	2



MODE	TX channel 810	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,819.000	-46.58	-13.00	33.58	23.60	V	274.4	1
4	7,456.500	-39.79	-13.00	26.79	29.06	V	359	2

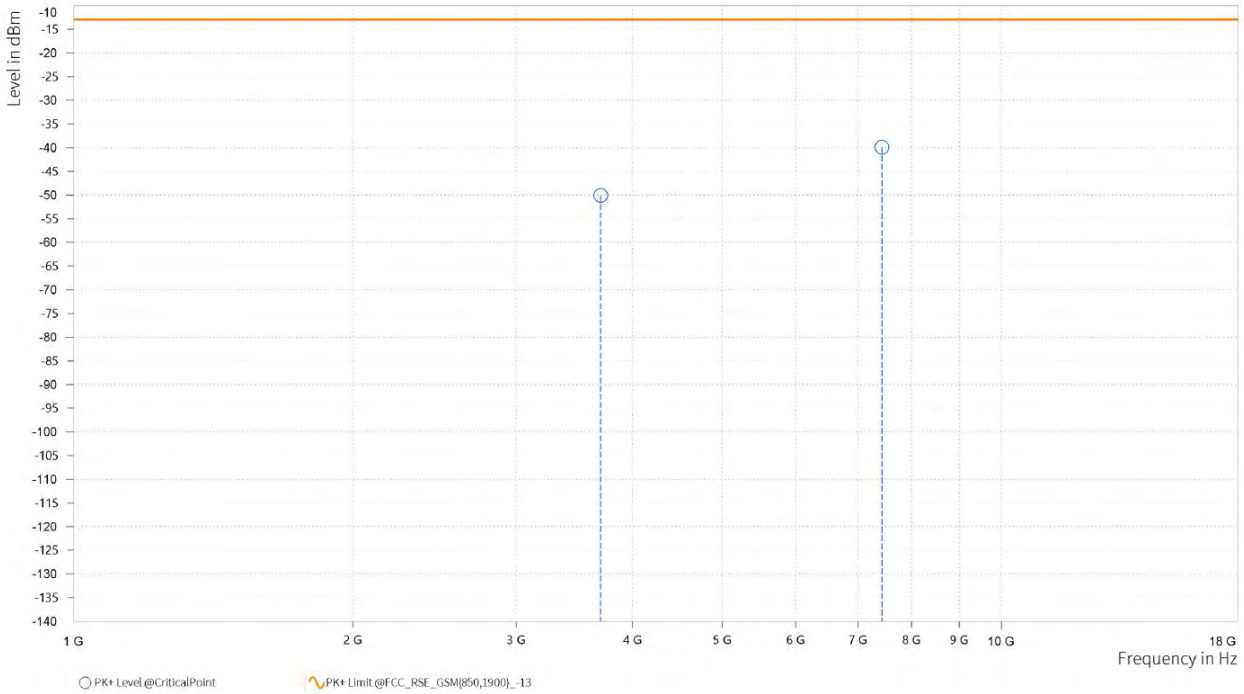


EDGE 1900:

CH 512

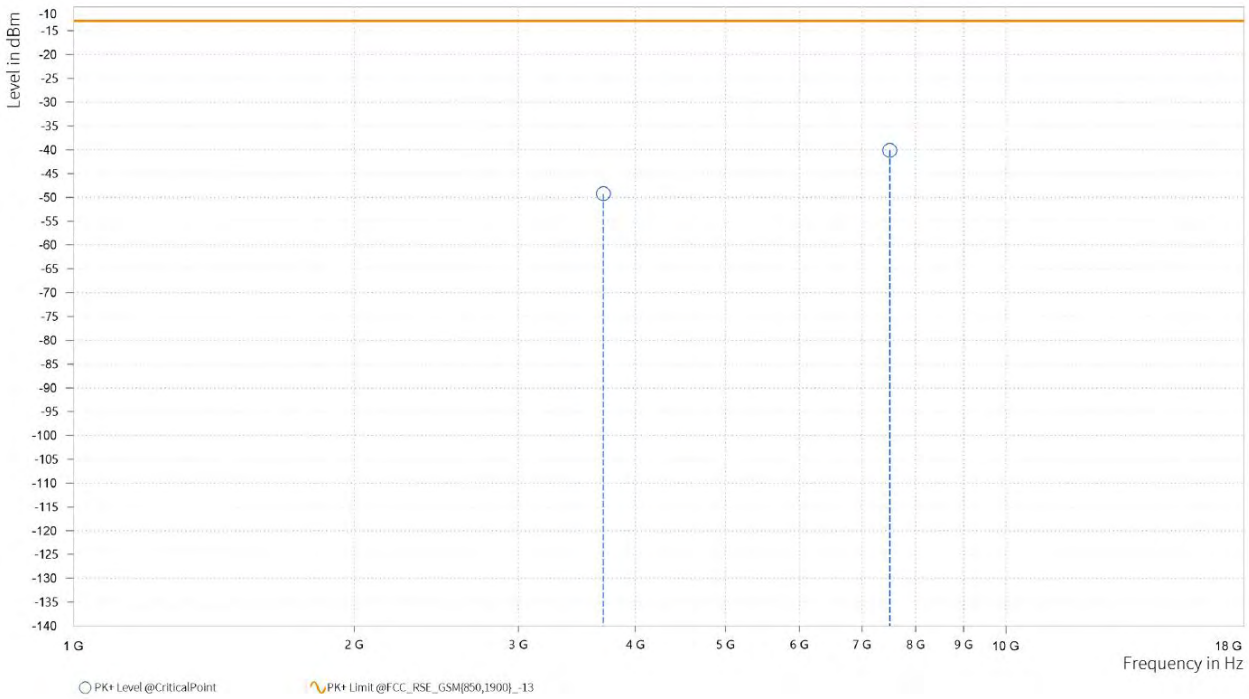
MODE	TX channel 512	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,700.000	-50.12	-13.00	37.12	22.48	H	0.9	2
4	7,430.000	-39.90	-13.00	26.90	29.14	H	359.1	1



MODE	TX channel 512	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

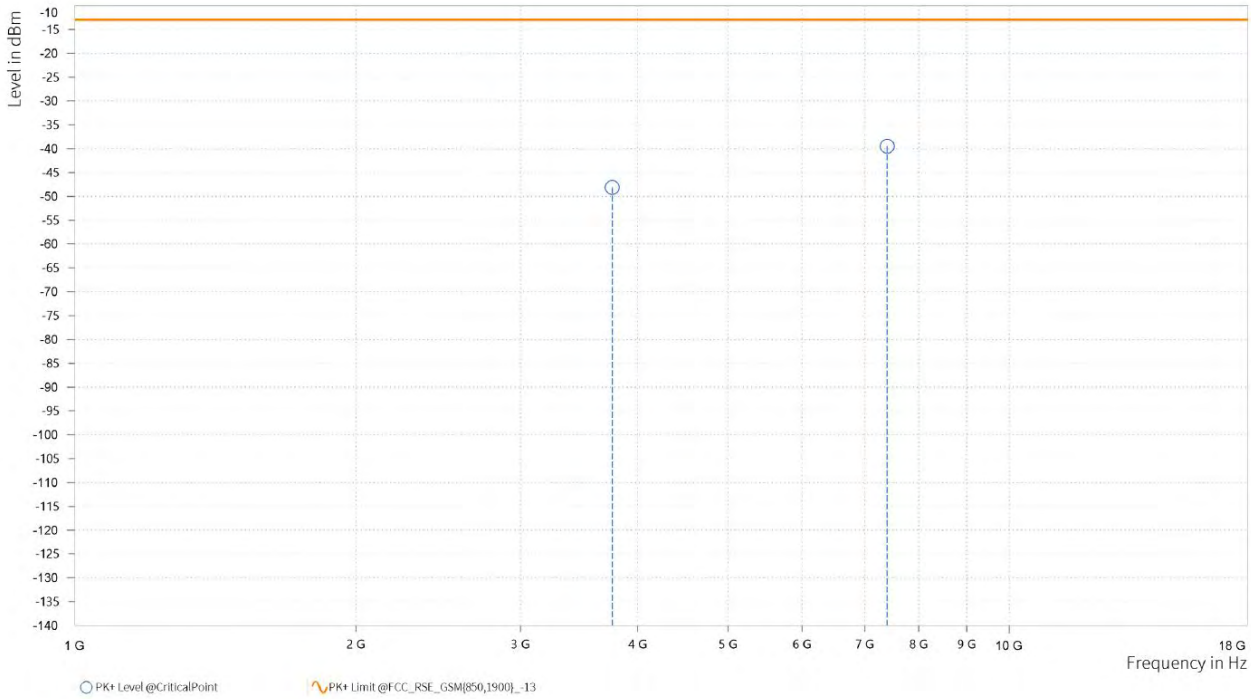
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,700.000	-49.24	-13.00	36.24	23.07	V	1	1
4	7,502.000	-40.11	-13.00	27.11	29.16	V	359	1



CH 661

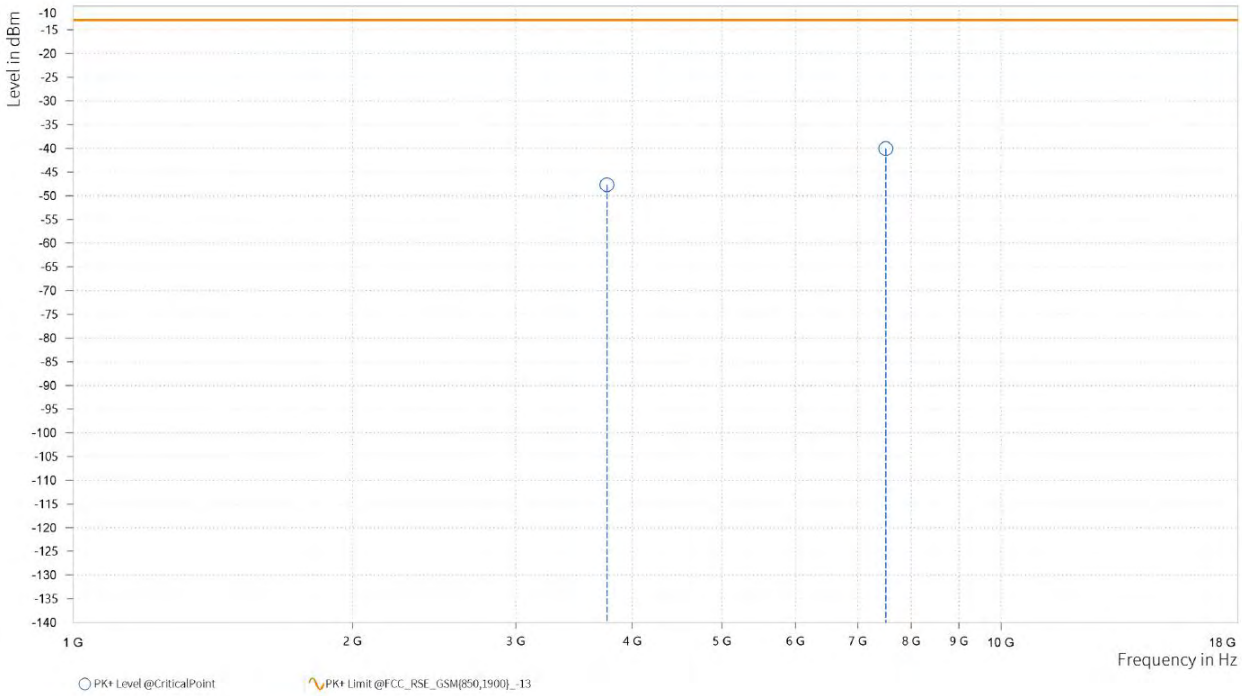
MODE	TX channel 661	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,760.000	-48.11	-13.00	35.11	23.12	H	242	1
4	7,403.000	-39.47	-13.00	26.47	29.64	H	119.1	2



MODE	TX channel 661	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

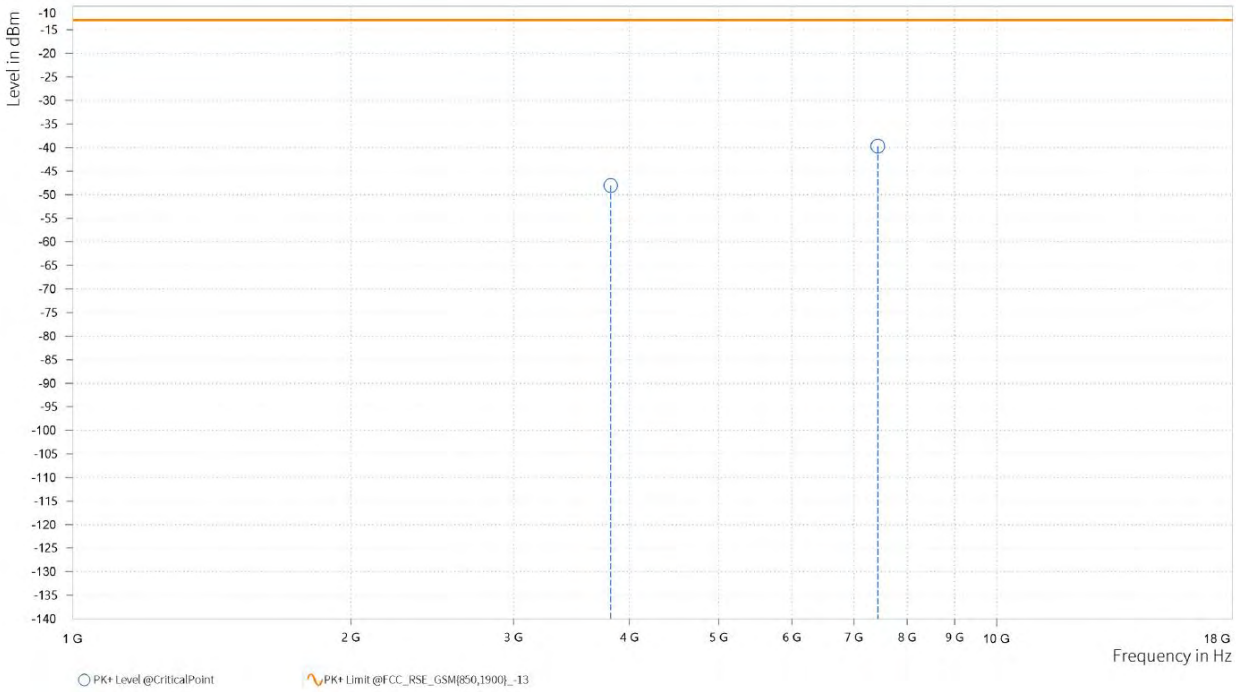
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,760.000	-47.71	-13.00	34.71	23.61	V	359	1
4	7,506.500	-40.07	-13.00	27.07	29.18	V	0.9	2



CH 810

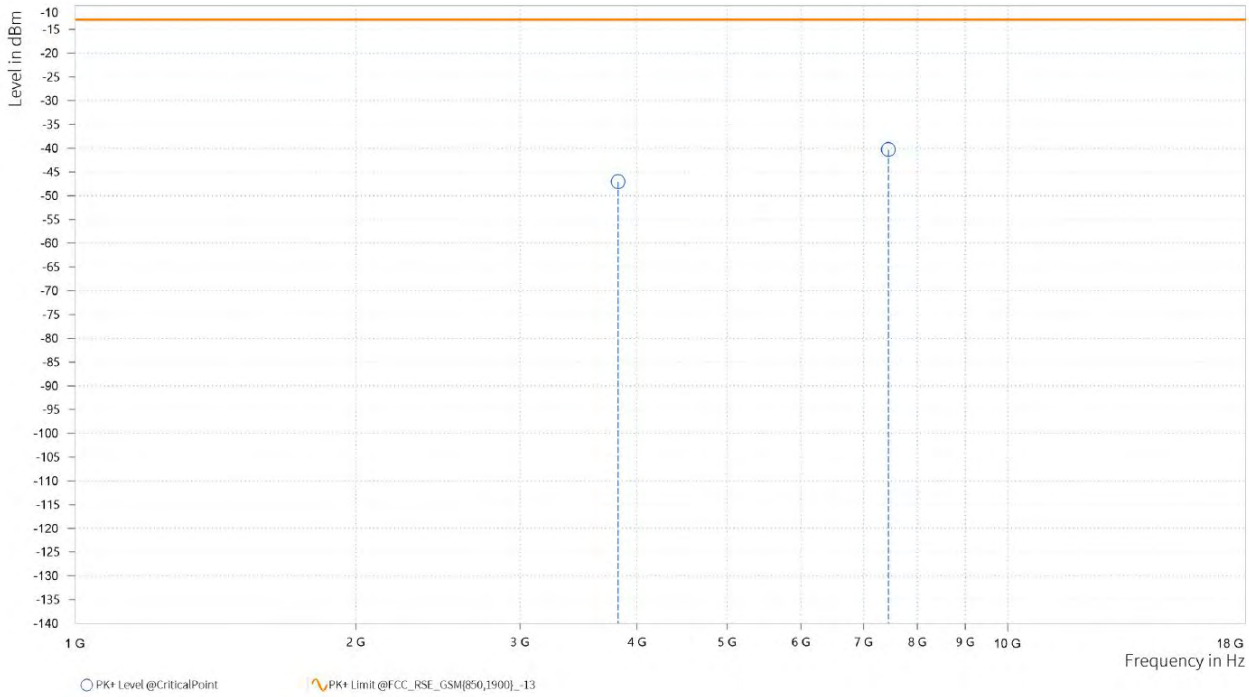
MODE	TX channel 810	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,819.000	-48.03	-13.00	35.03	23.26	H	0.9	2
4	7,434.000	-39.72	-13.00	26.72	29.10	H	1	1



MODE	TX channel 810	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,819.000	-47.06	-13.00	34.06	23.60	V	359.1	1
4	7,447.500	-40.29	-13.00	27.29	29.14	V	118	2

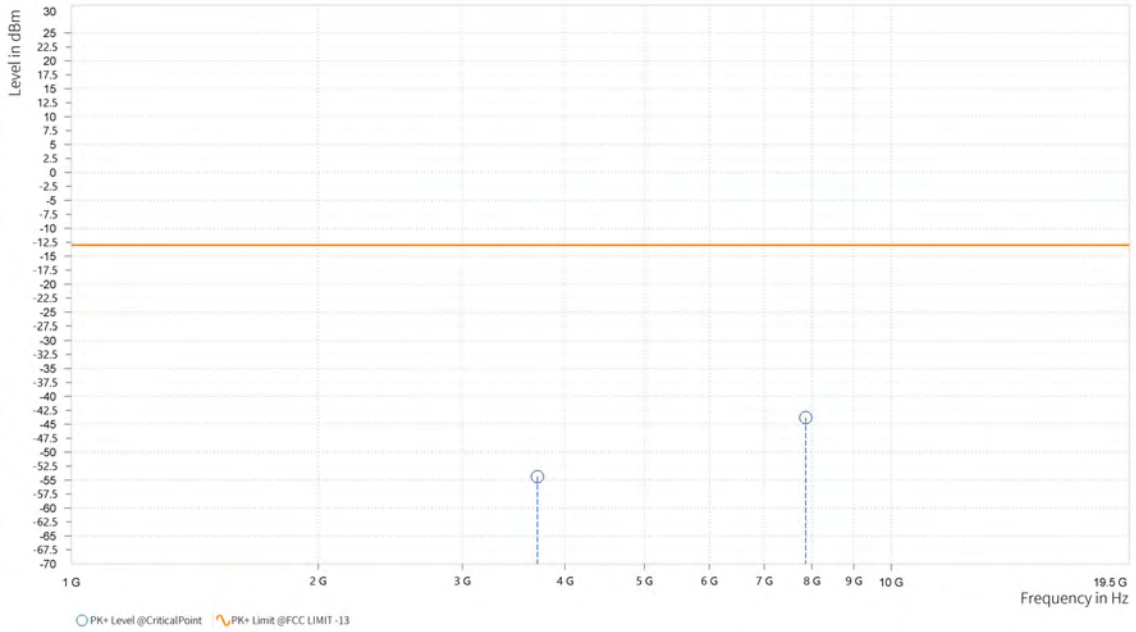


WCDMA Band II

CH 9262

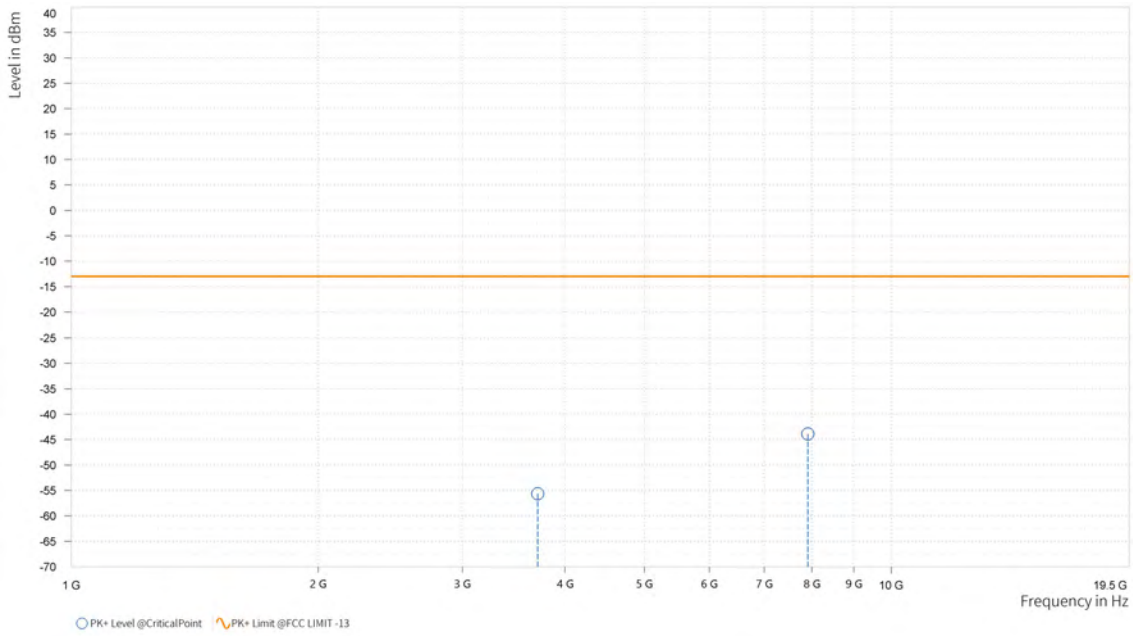
MODE	TX channel 9262	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,703.500	-54.40	-13.00	41.40	22.67	H	196.8	1
5	7,866.000	-43.80	-13.00	30.80	32.99	H	1	2



MODE	TX channel 9262	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

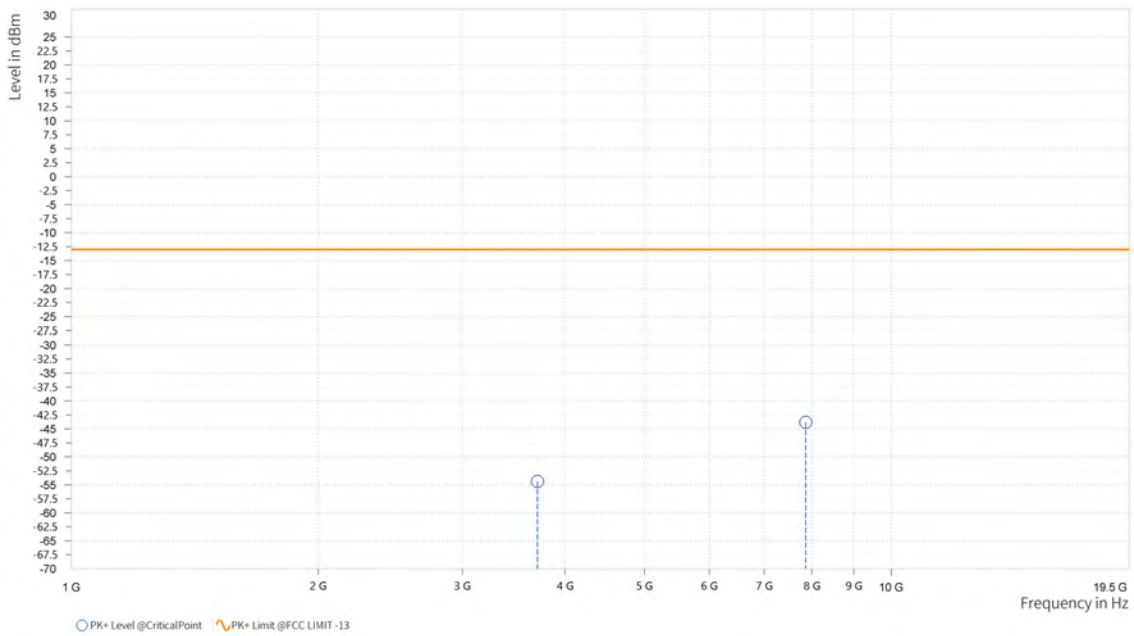
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,704.500	-55.62	-13.00	42.62	22.66	V	1	1
5	7,913.000	-43.89	-13.00	30.89	33.10	V	0.9	2



CH 9400

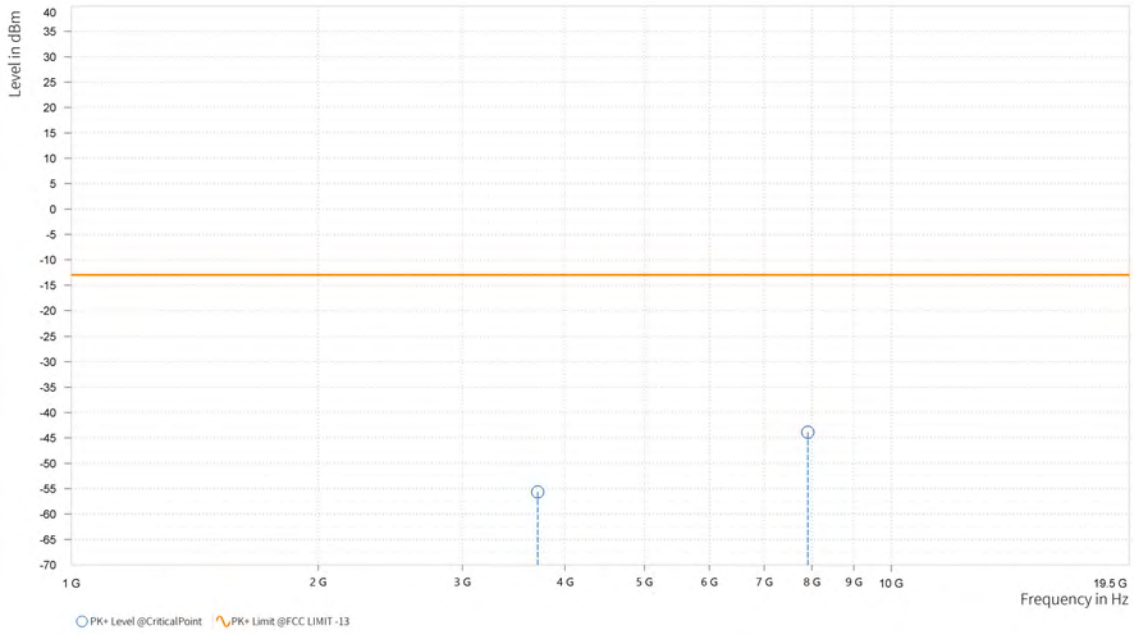
MODE	TX channel 9400	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,703.500	-54.40	-13.00	41.40	22.67	H	196.8	1
5	7,866.000	-43.80	-13.00	30.80	32.99	H	1	2



MODE	TX channel 9400	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

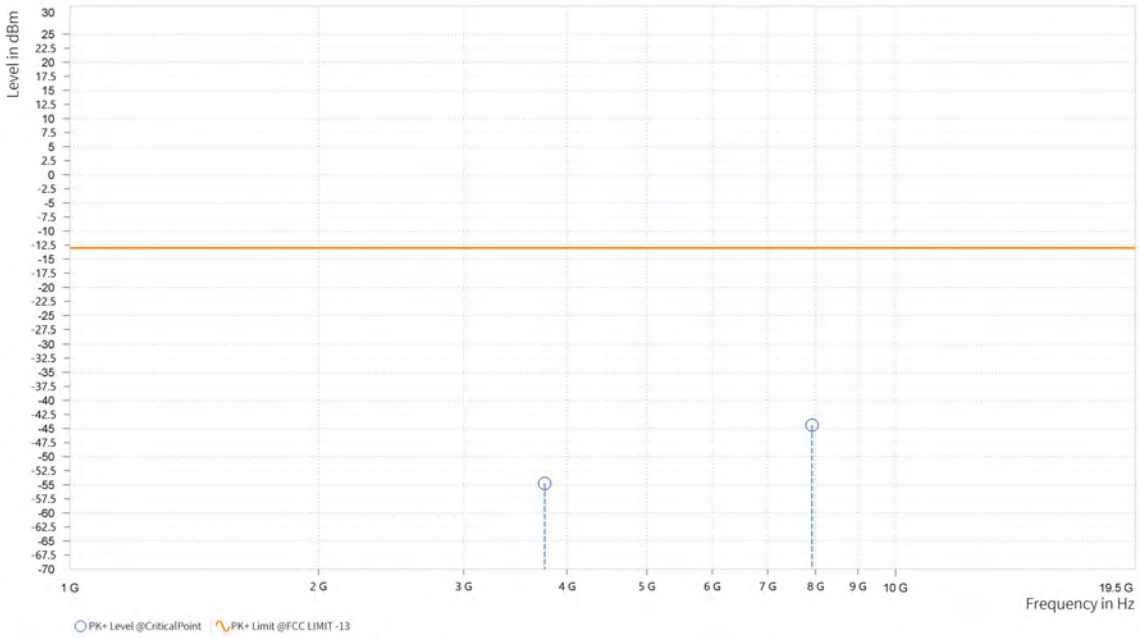
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,704.500	-55.62	-13.00	42.62	22.66	V	1	1
5	7,913.000	-43.89	-13.00	30.89	33.10	V	0.9	2



CH 9538

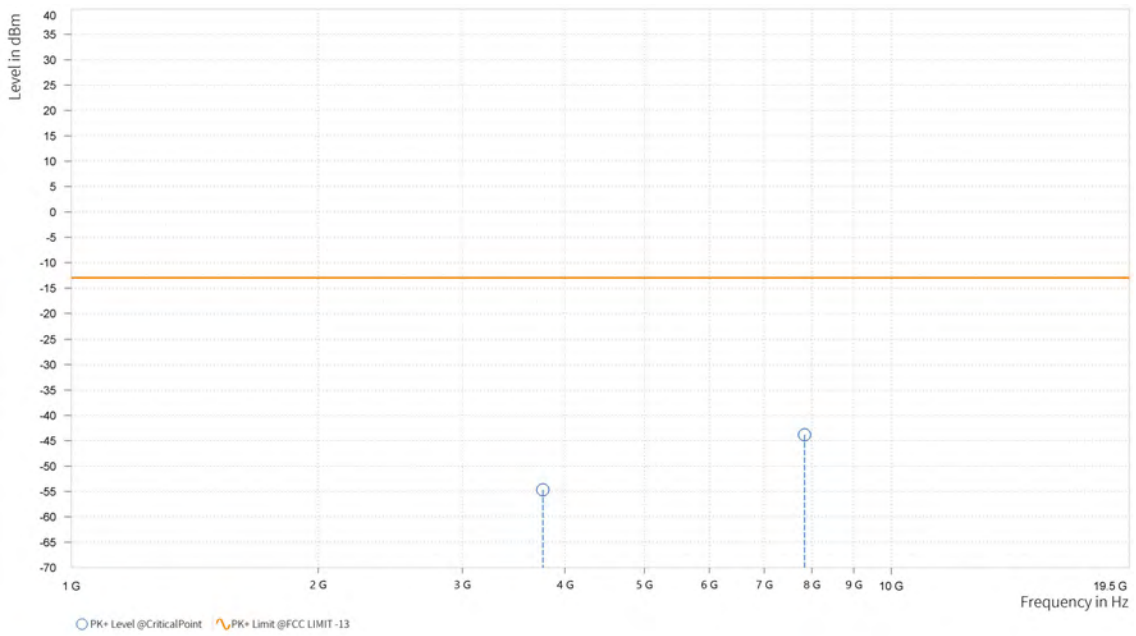
MODE	TX channel 9538	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,759.500	-54.75	-13.00	41.75	23.53	H	161.9	2
5	7,920.000	-44.40	-13.00	31.40	33.00	H	1	1



MODE	TX channel 9538	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,759.500	-54.66	-13.00	41.66	23.42	V	359	2
5	7,839.500	-43.84	-13.00	30.84	33.06	V	359	1



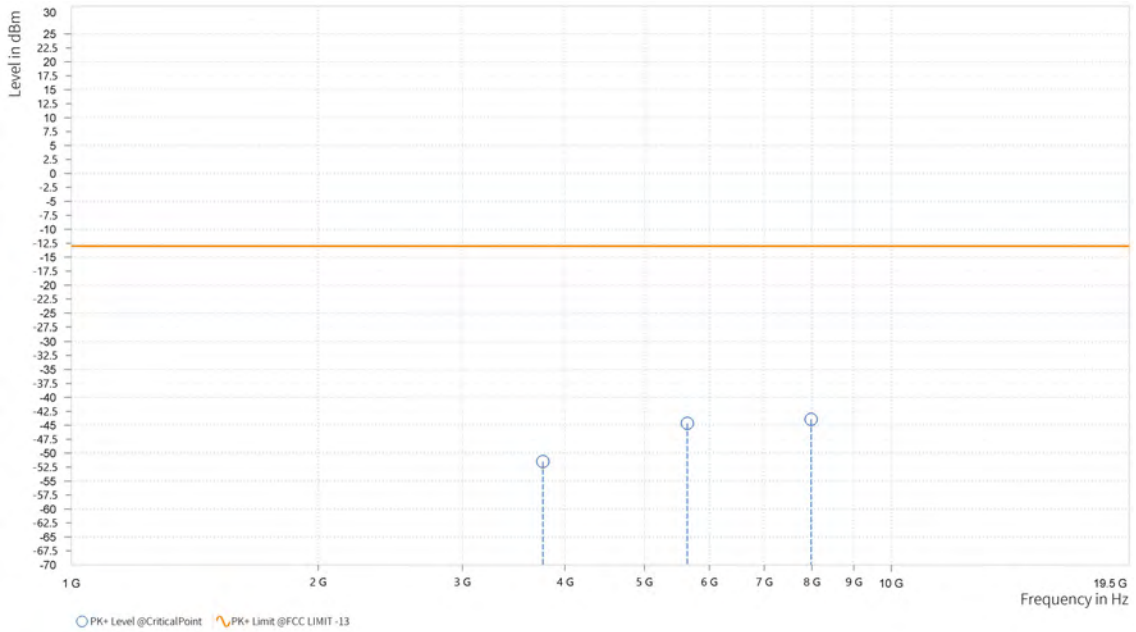
LTE Band 2

CHANNEL BANDWIDTH: 1.4MHz / QPSK

CH18900

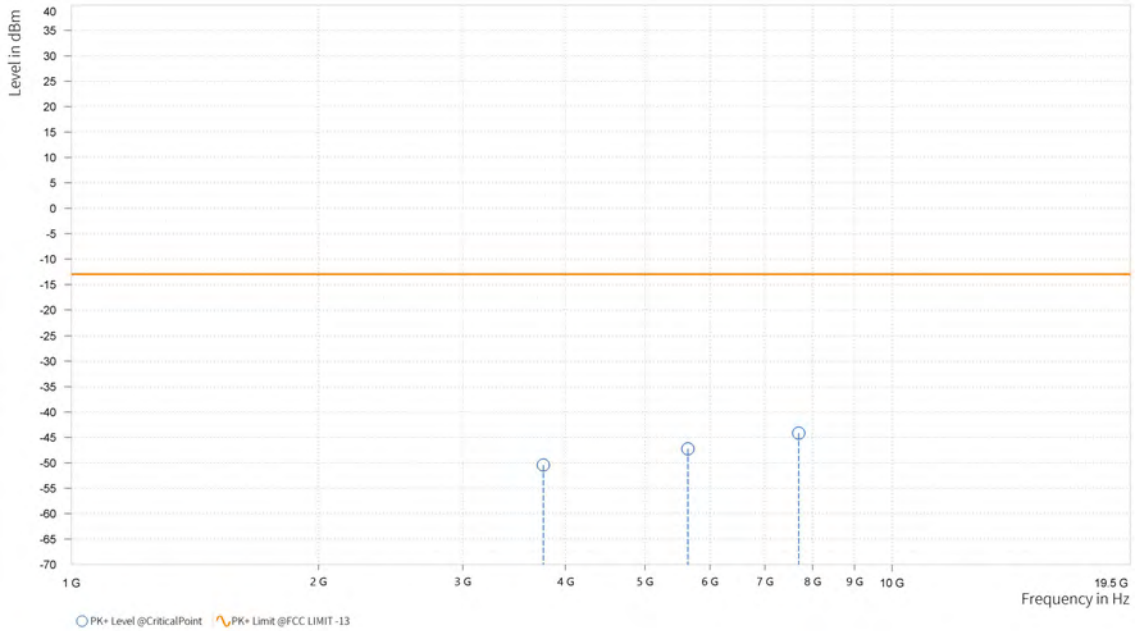
MODE	TX channel 18900	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,758.000	-51.49	-13.00	38.49	23.54	H	1	1
4	5,639.000	-44.66	-13.00	31.66	26.46	H	162	2
5	7,987.000	-43.94	-13.00	30.94	33.07	H	78.4	2



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,758.500	-50.44	-13.00	37.44	23.43	V	359	2
4	5,639.000	-47.22	-13.00	34.22	25.64	V	211.1	1
5	7,697.500	-44.17	-13.00	31.17	32.88	V	296	1

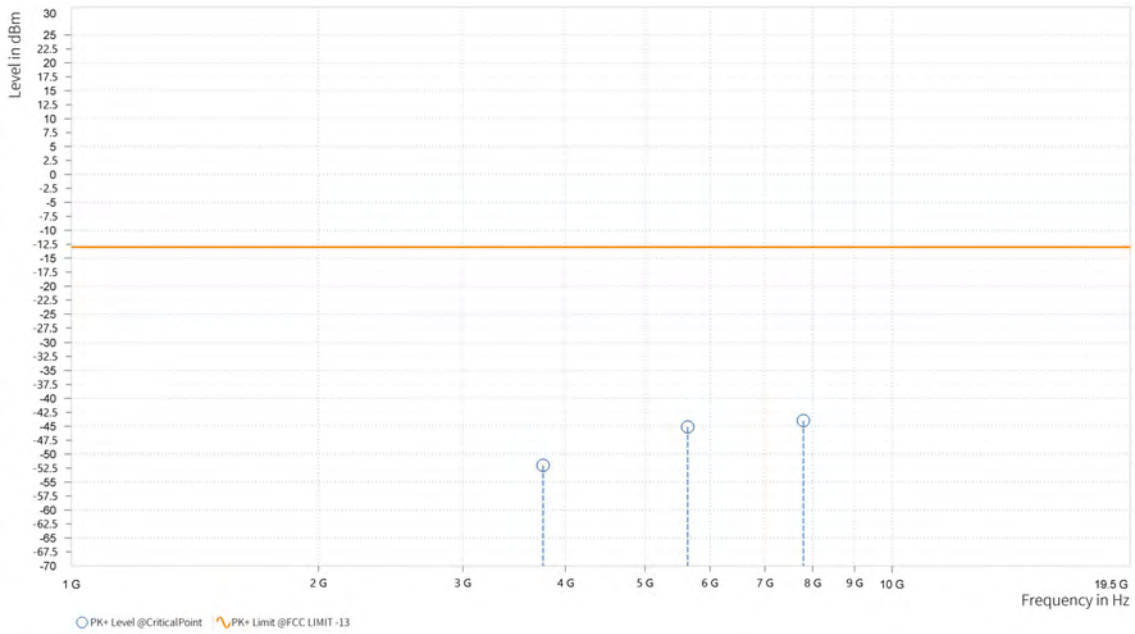


CHANNEL BANDWIDTH: 3MHz / QPSK

CH18900

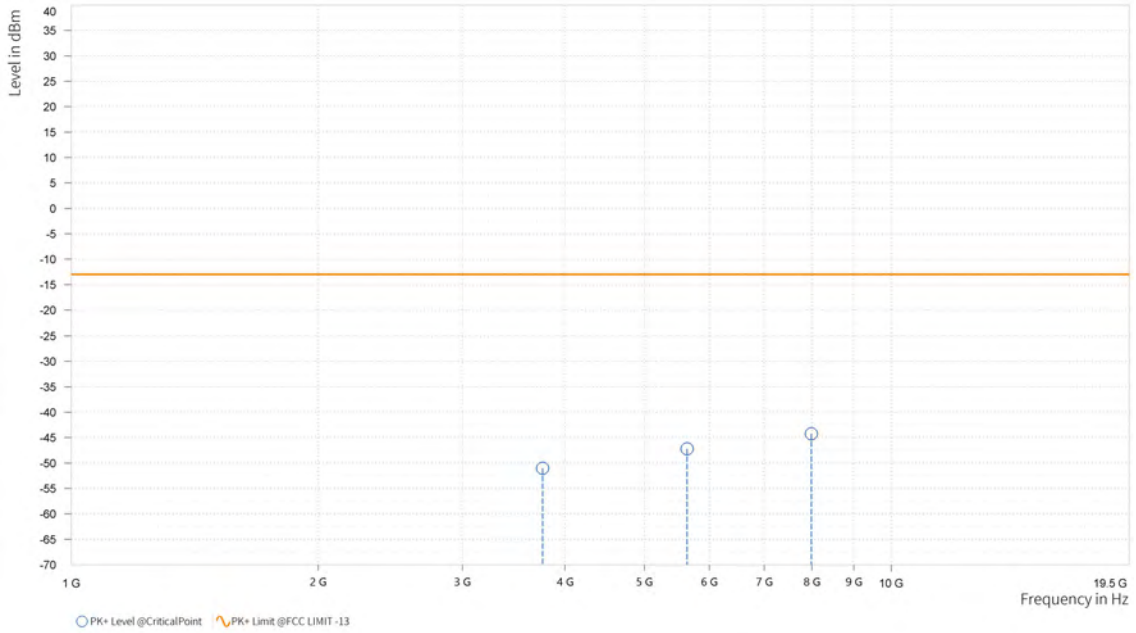
MODE	TX channel 18900	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,757.000	-51.98	-13.00	38.98	23.54	H	213.5	1
4	5,636.500	-45.10	-13.00	32.10	26.46	H	161.9	2
5	7,797.000	-43.97	-13.00	30.97	32.90	H	359	2



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,757.500	-51.03	-13.00	38.03	23.43	V	1	1
4	5,636.000	-47.19	-13.00	34.19	25.64	V	359	2
5	7,990.500	-44.22	-13.00	31.22	33.33	V	62.9	2

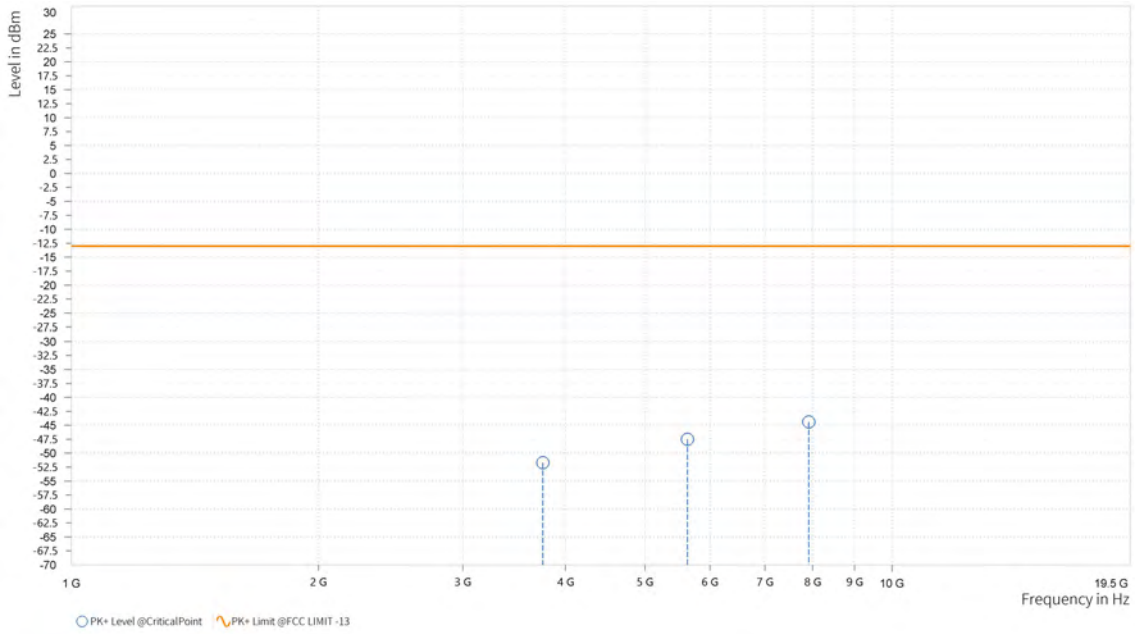


CHANNEL BANDWIDTH: 5MHz / QPSK

CH18900

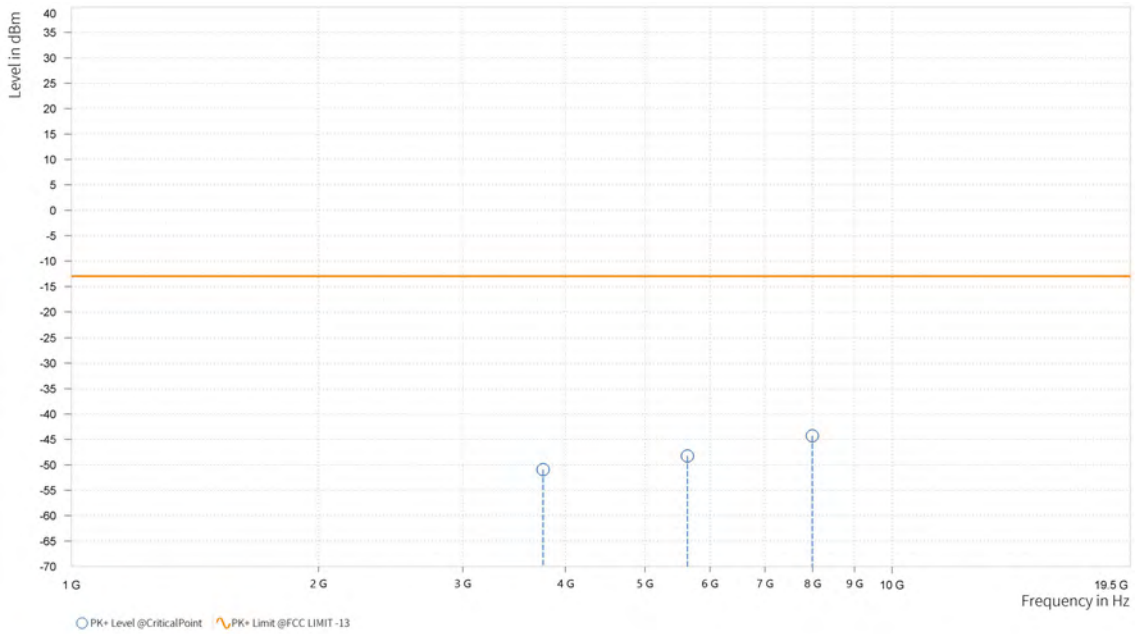
MODE	TX channel 18900	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,755.000	-51.70	-13.00	38.70	23.55	H	0.9	2
4	5,633.500	-47.50	-13.00	34.50	26.47	H	160.8	2
5	7,917.000	-44.38	-13.00	31.38	33.01	H	295.9	1



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,755.500	-50.94	-13.00	37.94	23.44	V	1	1
4	5,633.500	-48.25	-13.00	35.25	25.64	V	211.1	1
5	7,994.500	-44.30	-13.00	31.30	33.34	V	296	1

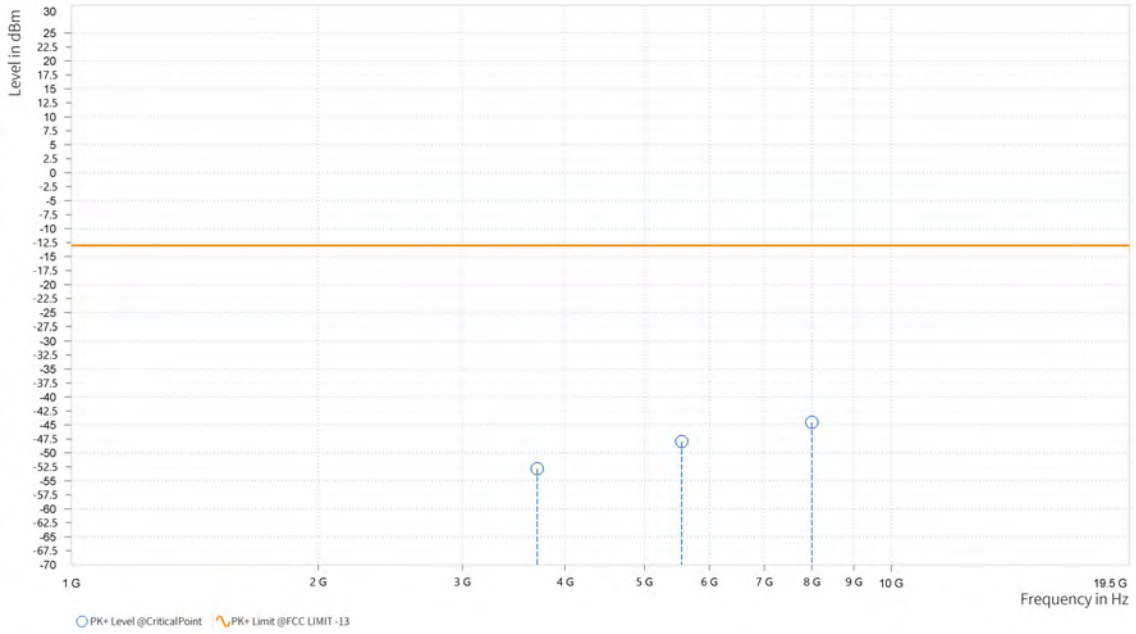


CHANNEL BANDWIDTH: 10MHz / QPSK

CH 18615

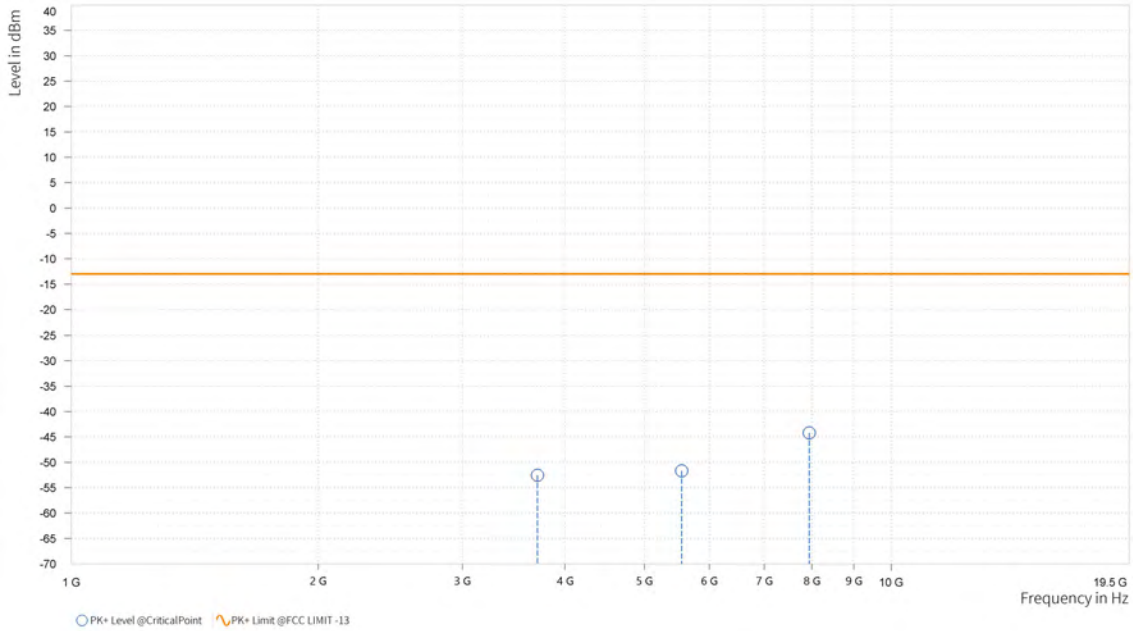
MODE	TX channel 18615	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,700.500	-52.83	-13.00	39.83	22.65	H	359	2
4	5,552.500	-47.96	-13.00	34.96	26.60	H	161.9	2
5	7,999.000	-44.53	-13.00	31.53	33.15	H	75.9	2



MODE	TX channel 18615	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

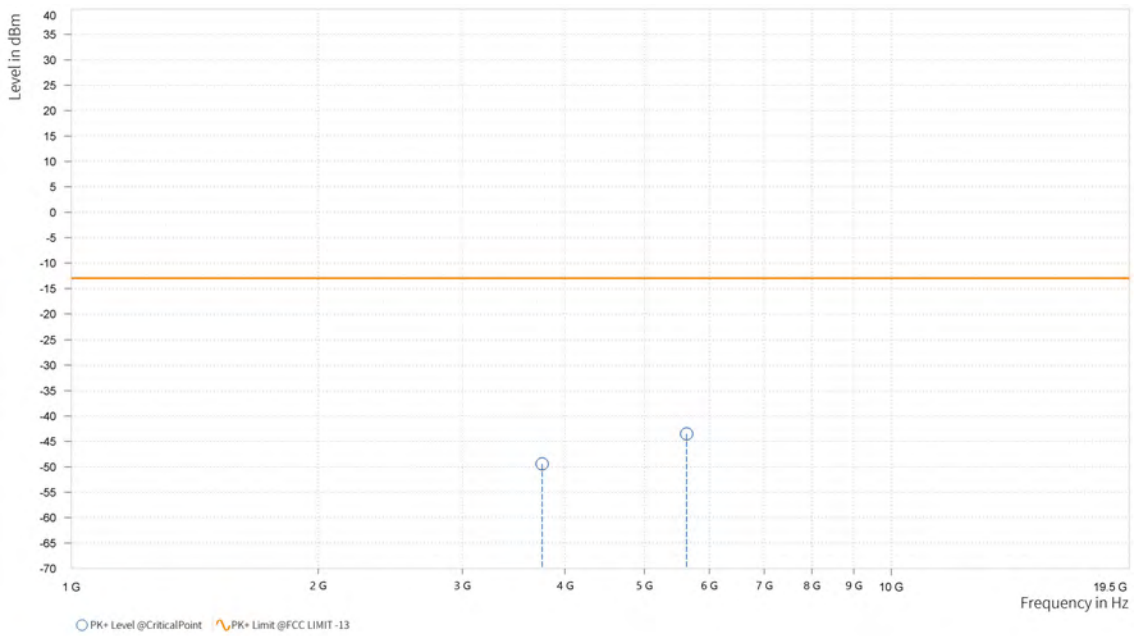
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,701.500	-52.56	-13.00	39.56	22.60	V	1	1
4	5,551.500	-51.67	-13.00	38.67	25.84	V	0.9	2
5	7,943.000	-44.22	-13.00	31.22	33.19	V	0.9	2



CH 18900

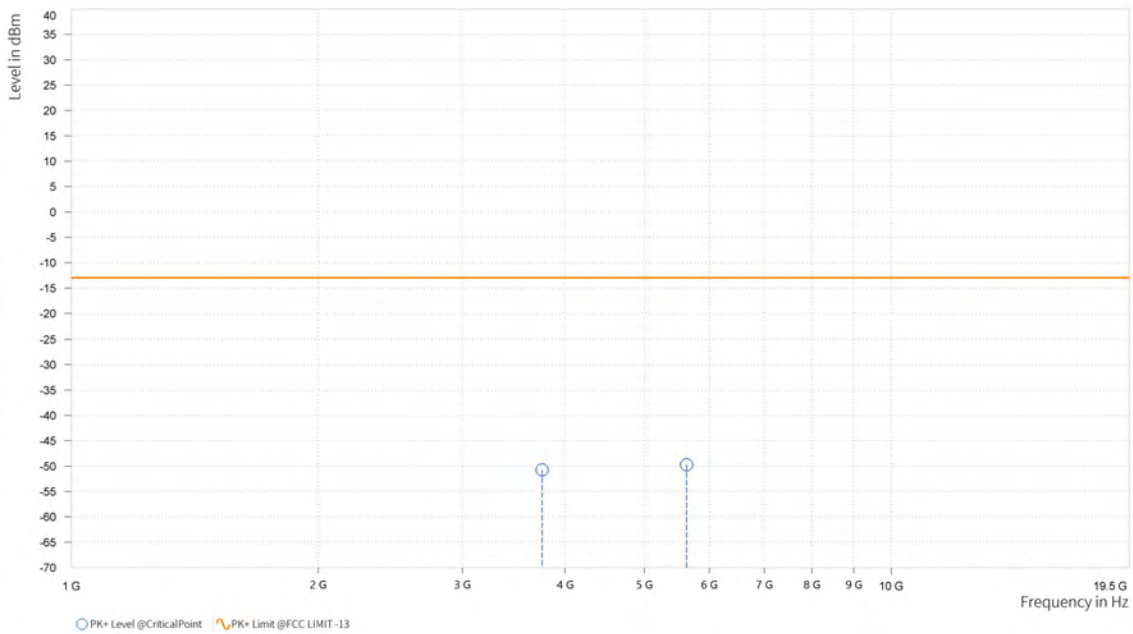
MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,751.000	-49.42	-13.00	36.42	23.56	H	1	1
4	5,627.000	-43.49	-13.00	30.49	26.49	H	359	2



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

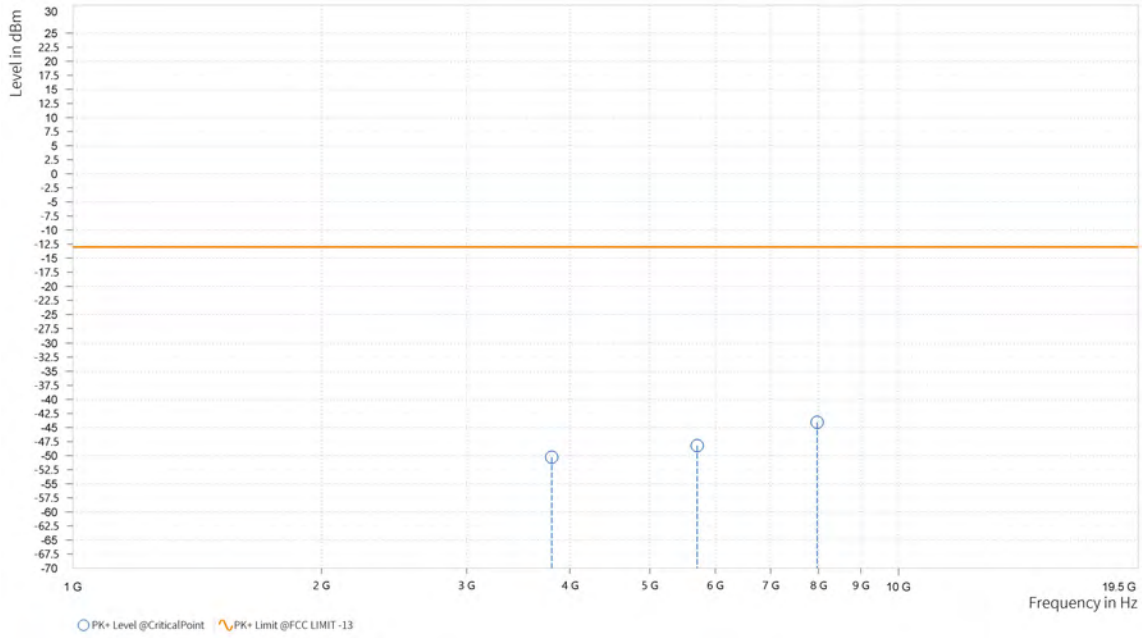
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,751.000	-50.76	-13.00	37.76	23.43	V	1	1
4	5,627.000	-49.72	-13.00	36.72	25.66	V	359	2



CH19185

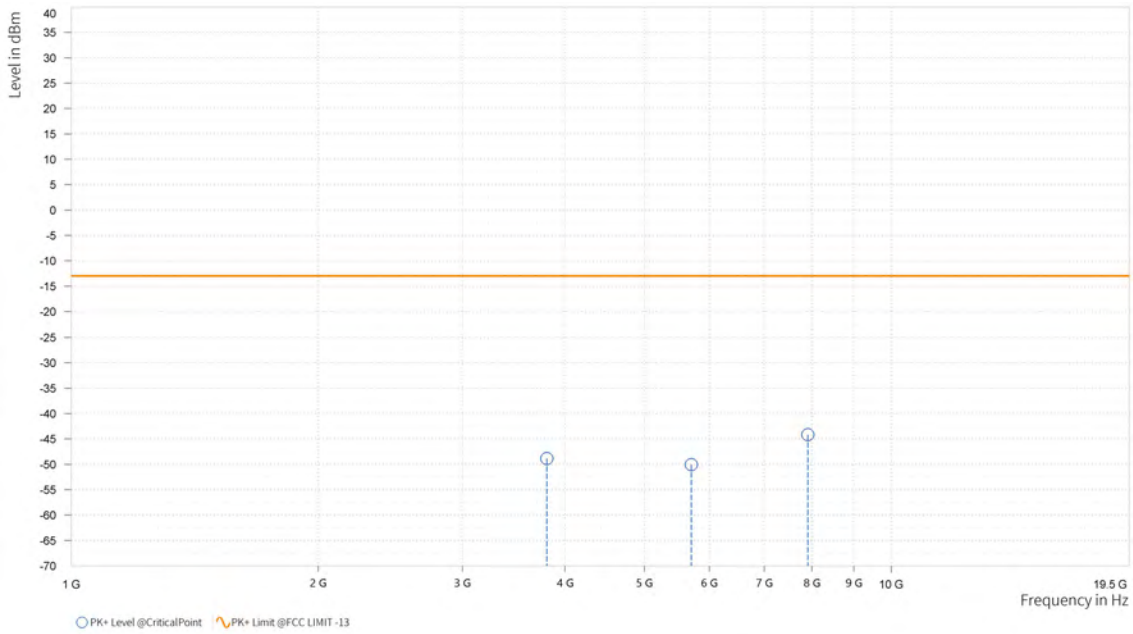
MODE	TX channel 19185	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,800.500	-50.29	-13.00	37.29	23.43	H	213.4	1
4	5,702.000	-48.23	-13.00	35.23	26.97	H	160.8	2
5	7,968.500	-44.08	-13.00	31.08	32.97	H	359	2



MODE	TX channel 19185	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

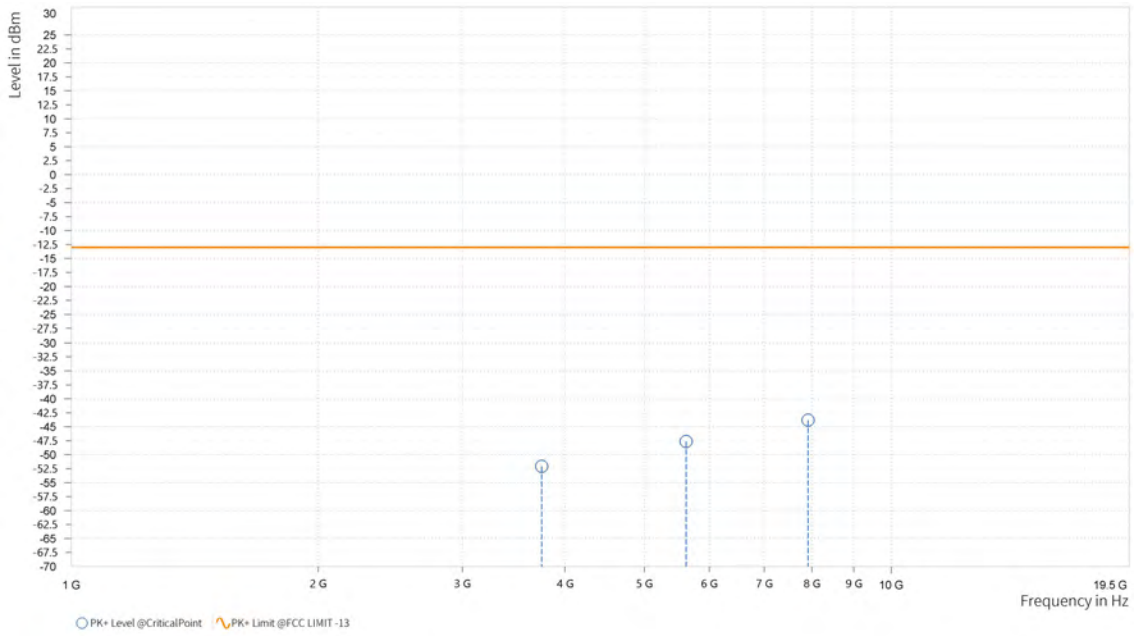
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,801.000	-48.85	-13.00	35.85	23.31	V	359.1	1
4	5,701.500	-50.04	-13.00	37.04	26.20	V	0.9	2
5	7,909.000	-44.13	-13.00	31.13	33.09	V	1	1



CHANNEL BANDWIDTH: 15MHz / QPSK

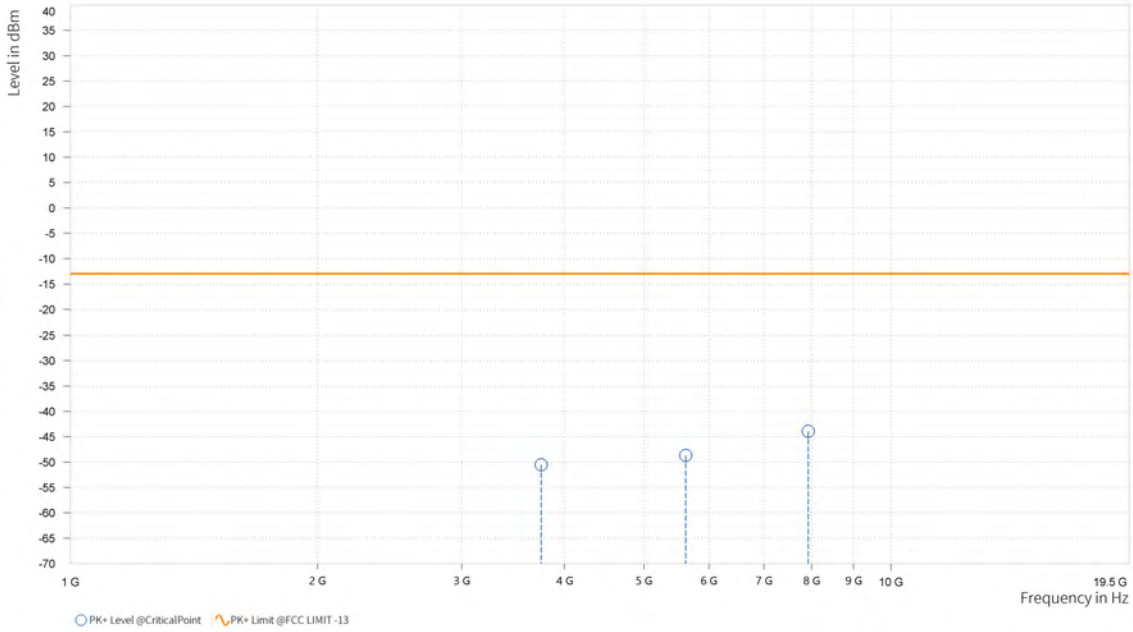
MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,747.000	-52.06	-13.00	39.06	23.56	H	359	2
4	5,620.000	-47.63	-13.00	34.63	26.52	H	160.8	2
5	7,917.500	-43.80	-13.00	30.80	33.01	H	298.3	1



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,747.000	-50.53	-13.00	37.53	23.43	V	1	1
4	5,620.000	-48.67	-13.00	35.67	25.70	V	213.4	1
5	7,929.500	-43.92	-13.00	30.92	33.15	V	359.1	1

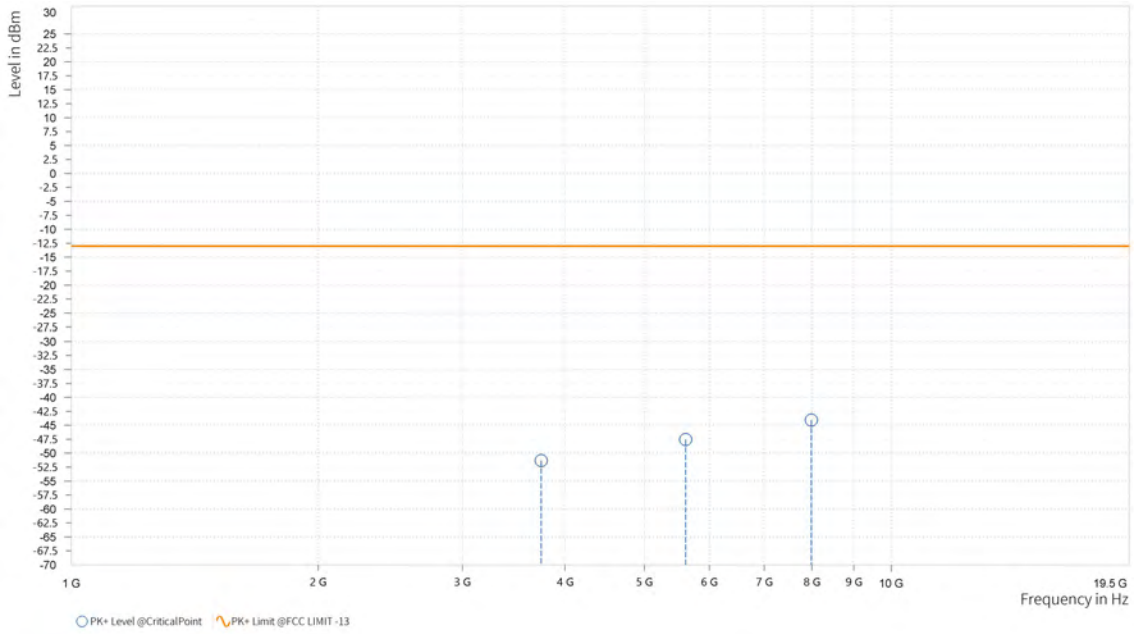


CHANNEL BANDWIDTH: 20MHz / QPSK

CH18900

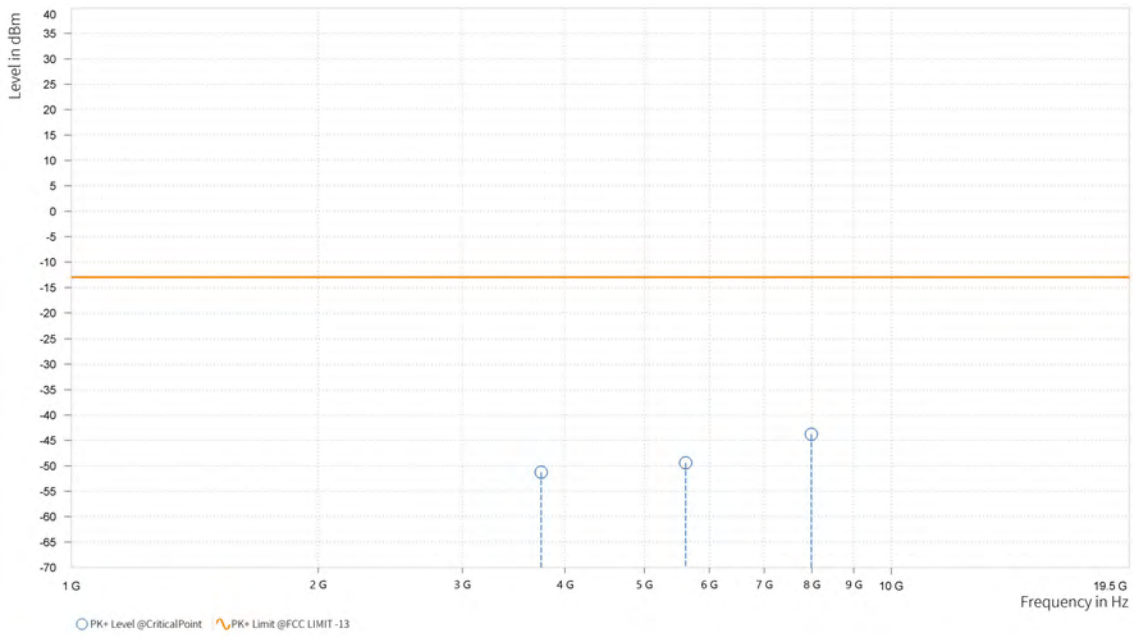
MODE	TX channel 18900	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,742.500	-51.31	-13.00	38.31	23.47	H	212.3	1
4	5,613.500	-47.57	-13.00	34.57	26.54	H	162	2
5	7,988.000	-44.05	-13.00	31.05	33.08	H	295.9	1



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	CHAO WU		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,742.000	-51.25	-13.00	38.25	23.35	V	359.1	1
4	5,613.500	-49.42	-13.00	36.42	25.74	V	0.9	2
5	7,991.000	-43.79	-13.00	30.79	33.33	V	64	2

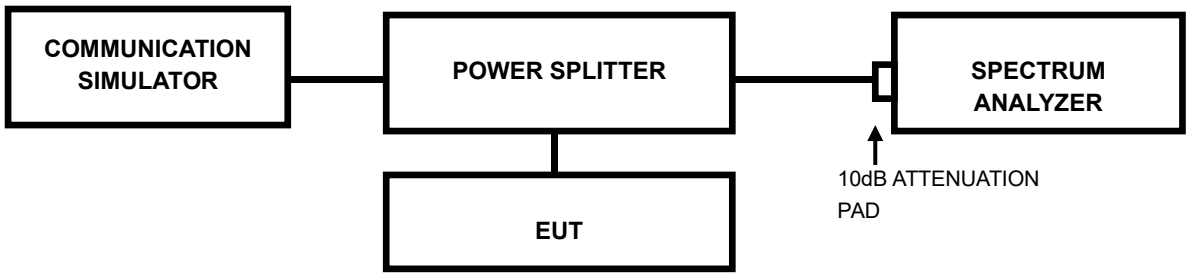


3.7 PEAK TO AVERAGE RATIO

3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

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

3.7.2 TEST SETUP



3.7.3 TEST PROCEDURES

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

3.7.4 TEST RESULTS

Please Refer to Appendix Of this test report.

4 INFORMATION ON THE TESTING LABORATORIES

We, Huarui 7layers High Technology (Suzhou) Co., Ltd. ,were founded in 2020 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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

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

5 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.

APPENDIX

GSM1900

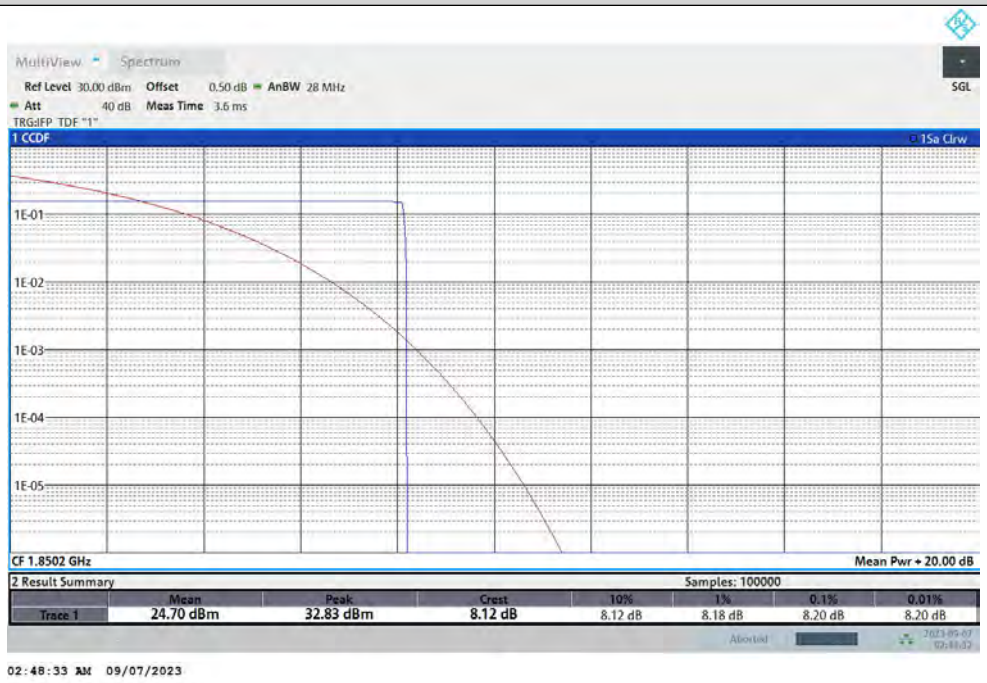
PEAK-TO-AVERAGE RATIO(CCDF)

Test Result

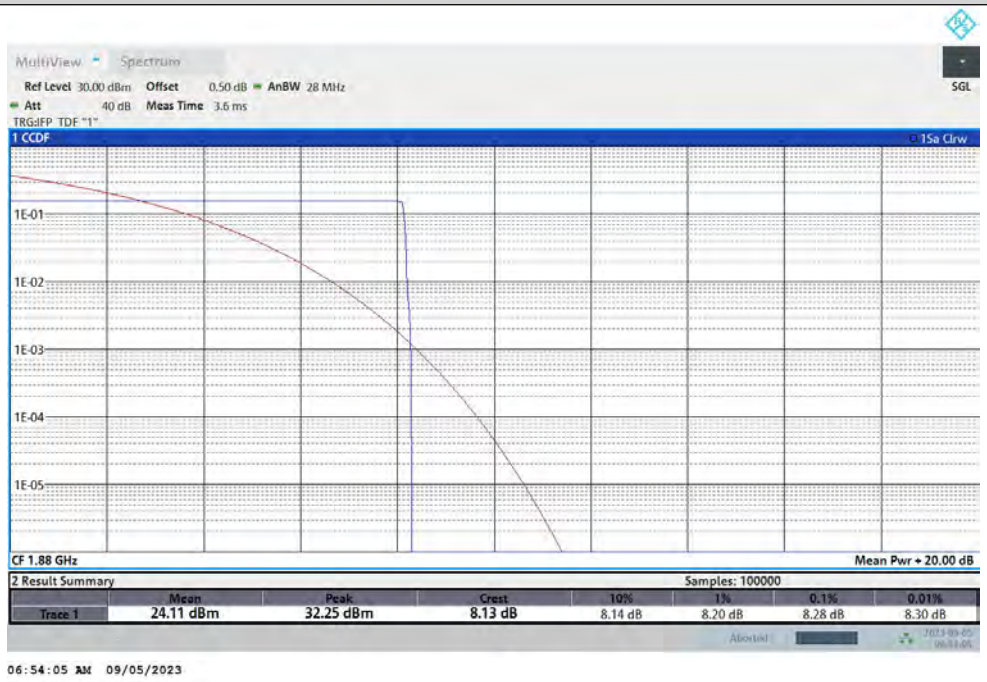
Band	Channel	Result(dB)	Limit(dB)	Verdict
GSM1900	512	8.20	13	PASS
GSM1900	661	8.28	13	PASS
GSM1900	810	8.20	13	PASS
EGPRS1900	512	11.96	13	PASS
EGPRS1900	661	11.64	13	PASS
EGPRS1900	810	12.22	13	PASS

Test Graphs

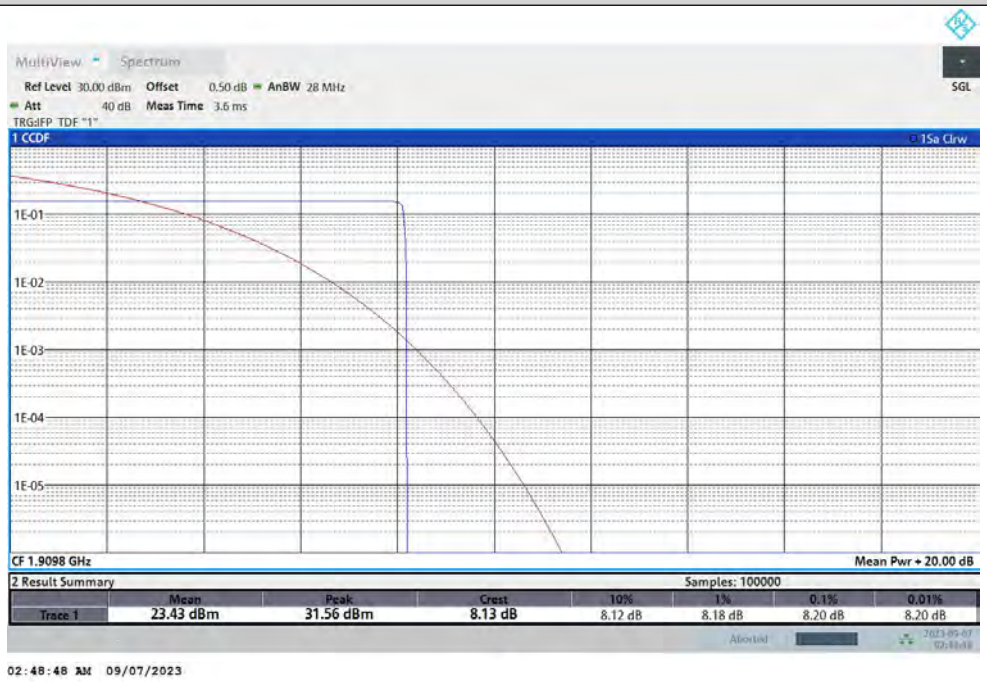
GSM1900-512



GSM1900-661

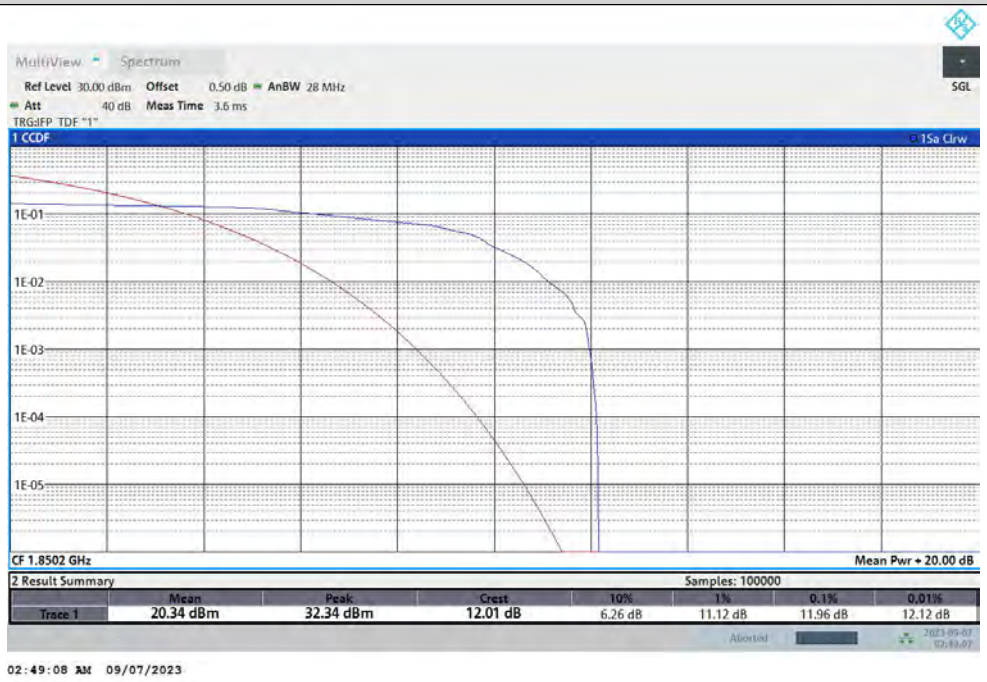


GSM1900-810



02:48:48 AM 09/07/2023

EGPRS1900-512



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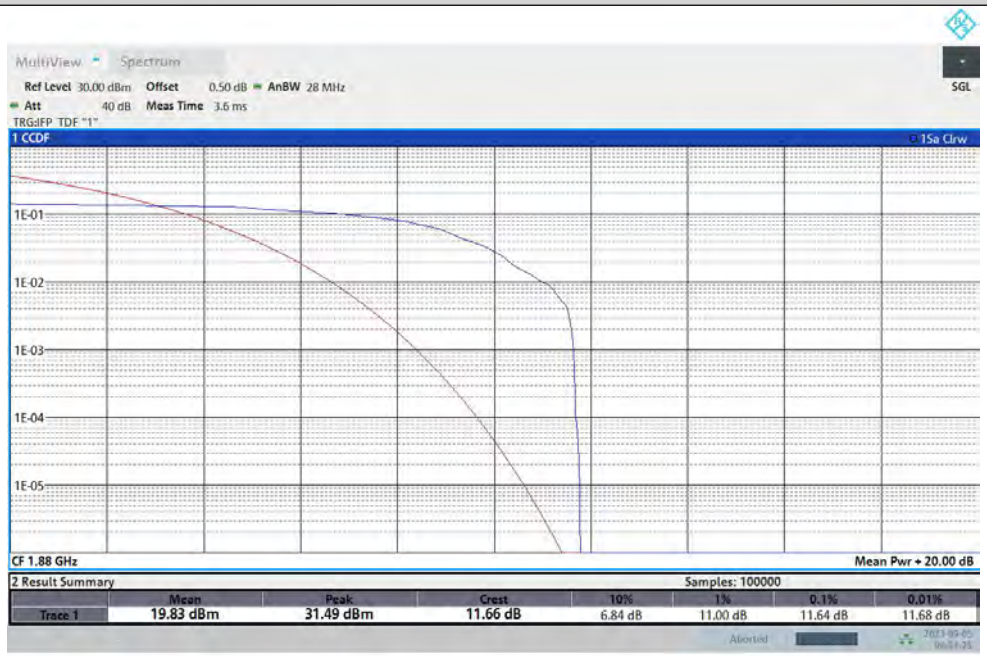
EGPRS1900-661



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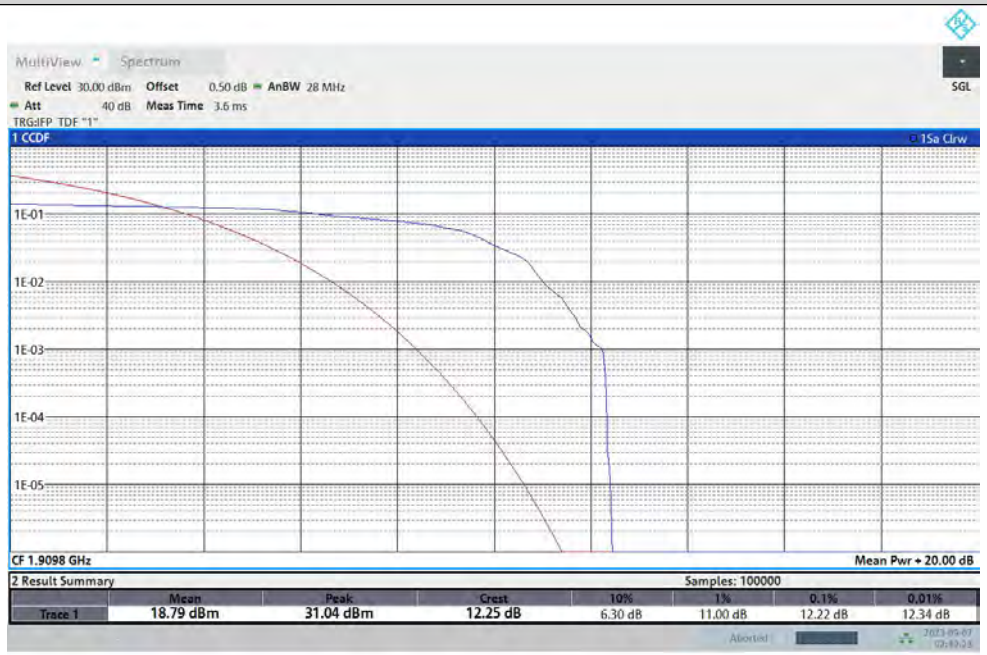
EGPRS1900-810



02:49:24 AM 09/07/2023

26DB BANDWIDTH AND OCCUPIED BANDWIDTH

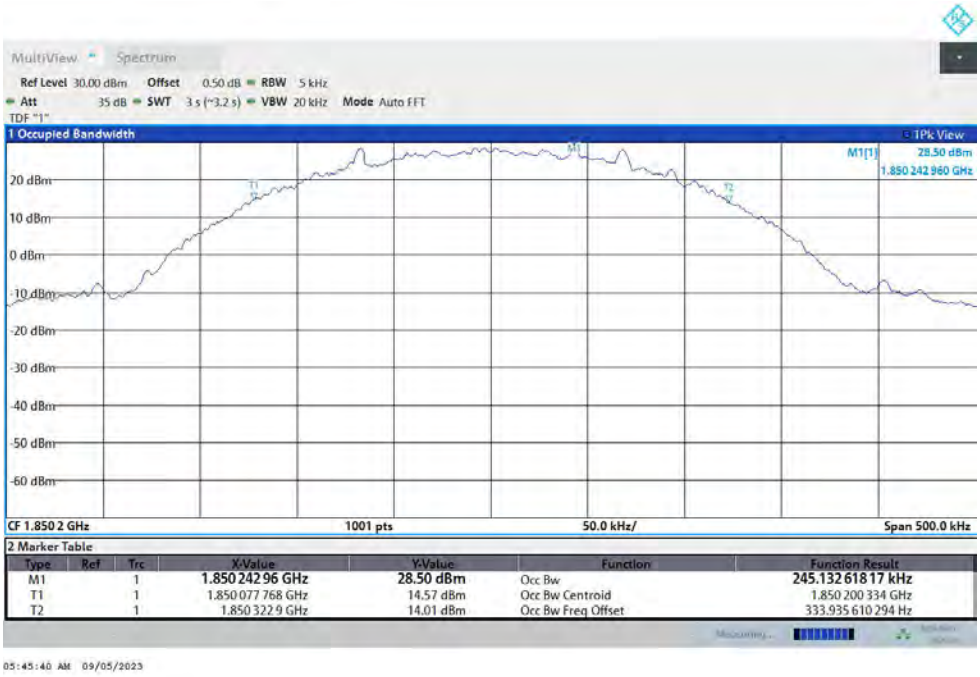
Test Result

Band	Channel	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Limit (MHz)	Verdict
GSM1900	512	245.133	316.680	---	PASS
GSM1900	661	244.712	315.680	---	PASS
GSM1900	810	244.634	313.690	---	PASS
EGPRS1900	512	238.487	312.190	---	PASS
EGPRS1900	661	238.943	310.690	---	PASS
EGPRS1900	810	238.776	310.690	---	PASS

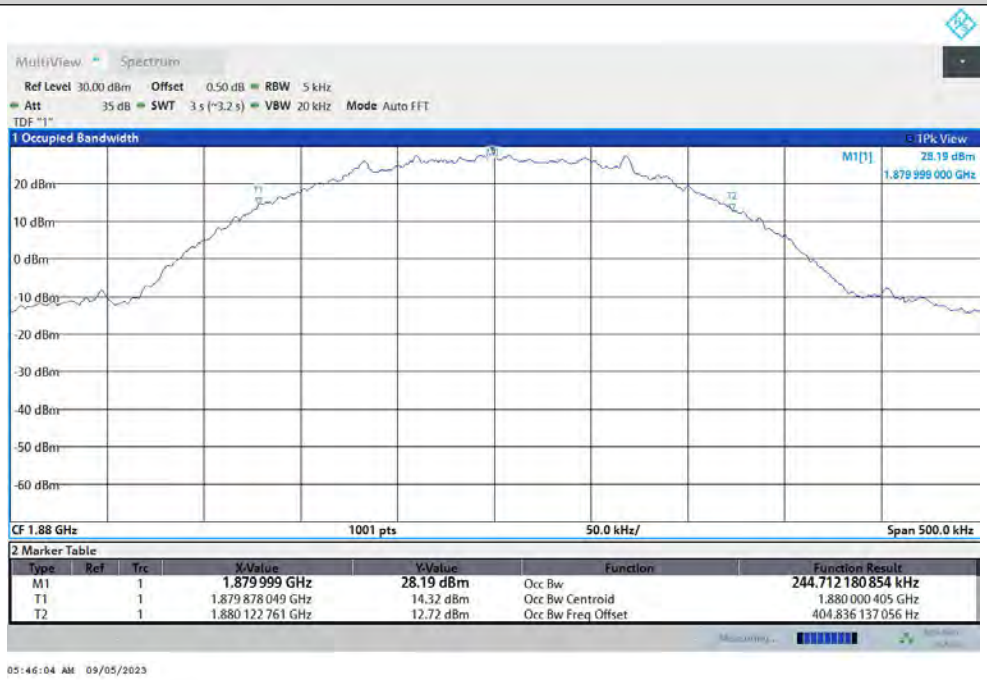
Test Graphs

Occupied Bandwidth

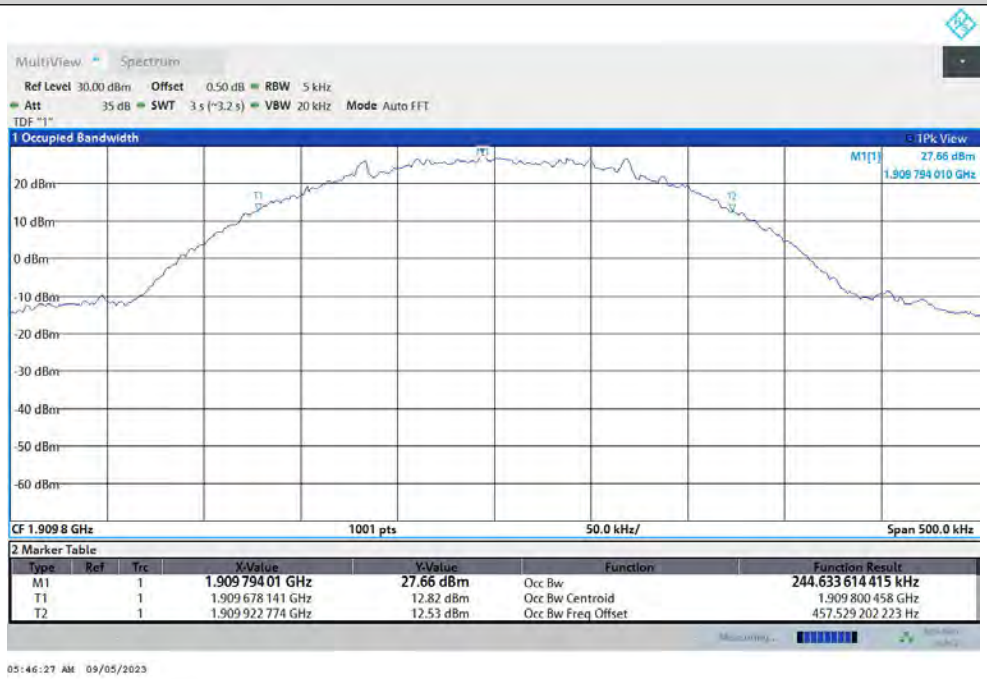
GSM1900-512



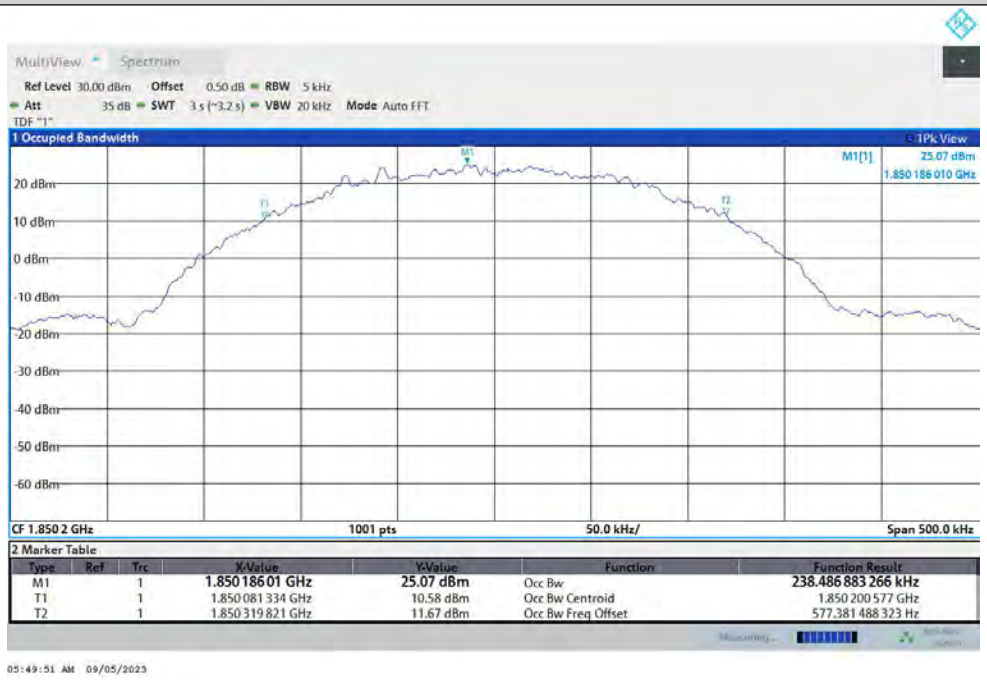
GSM1900-661



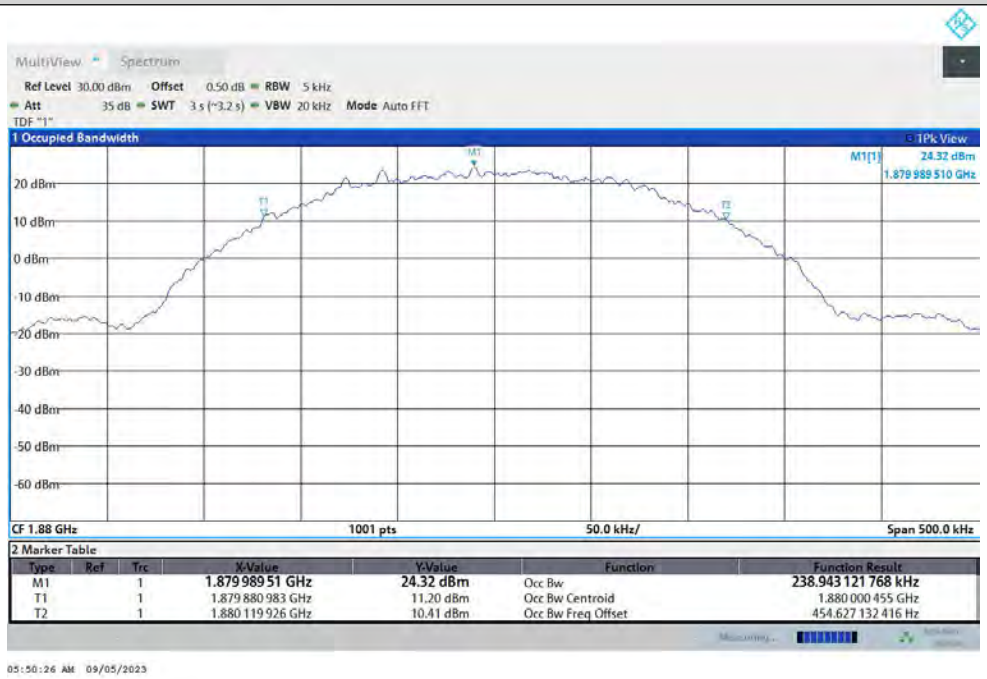
GSM1900-810



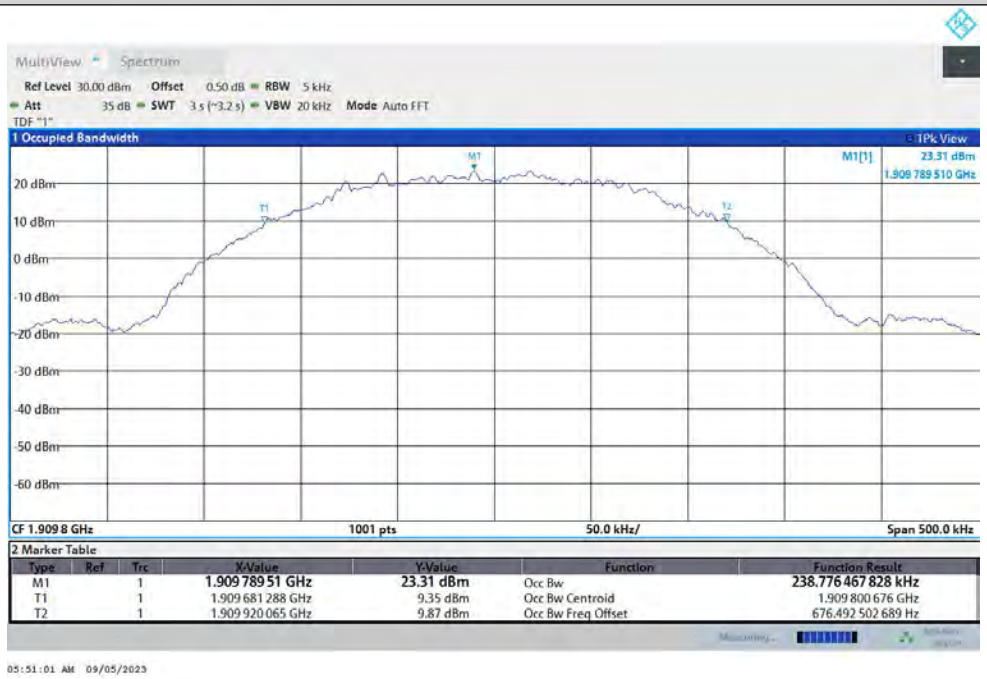
EGPRS1900-512



EGPRS1900-661

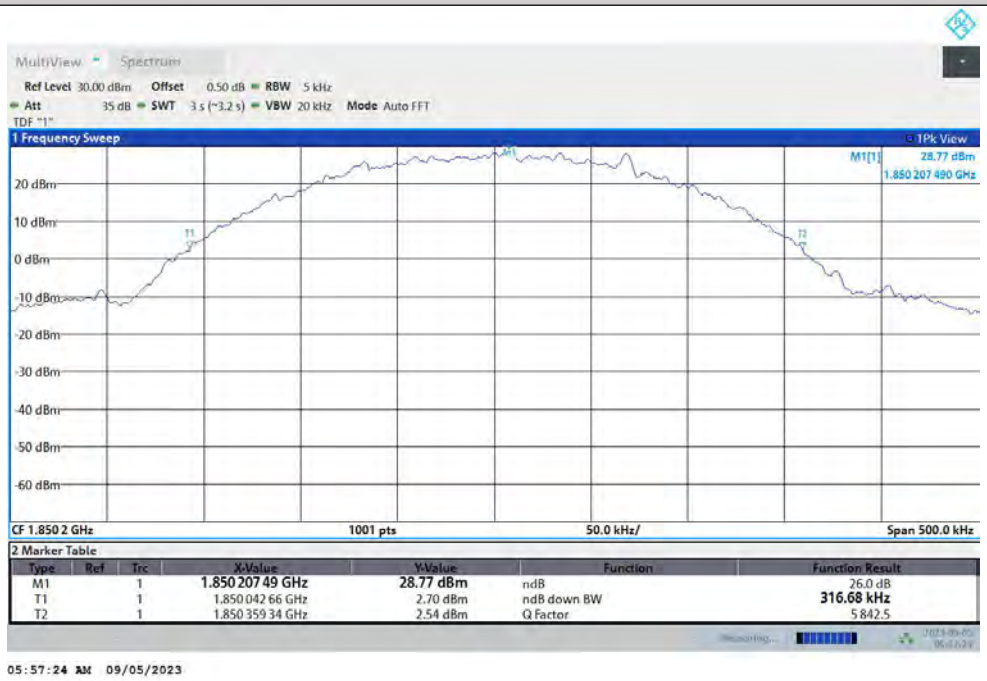


EGPRS1900-810

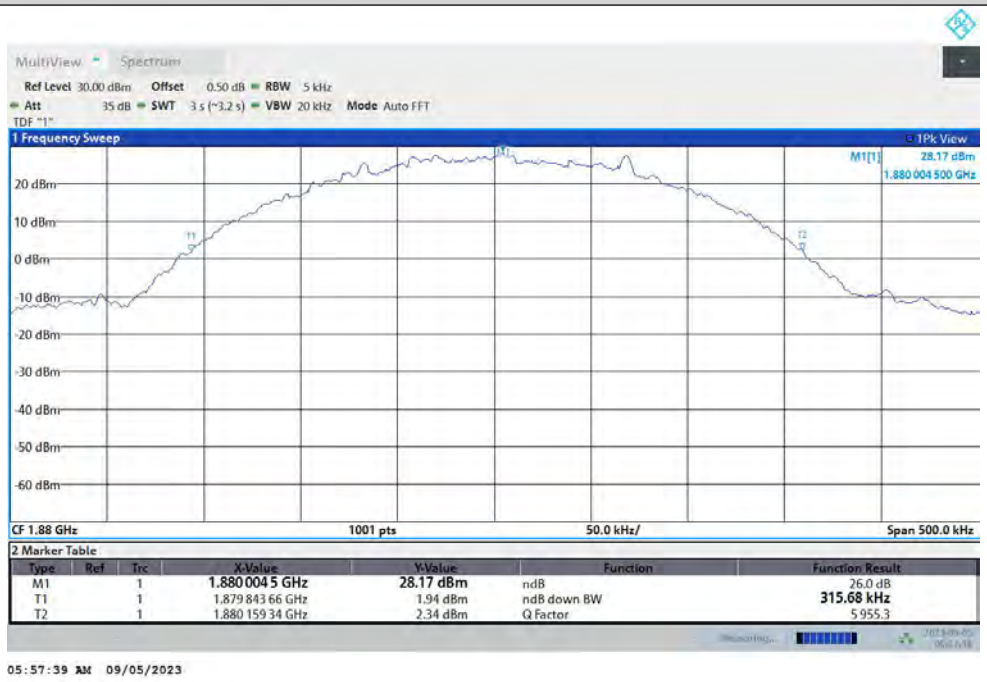


26dB Bandwidth

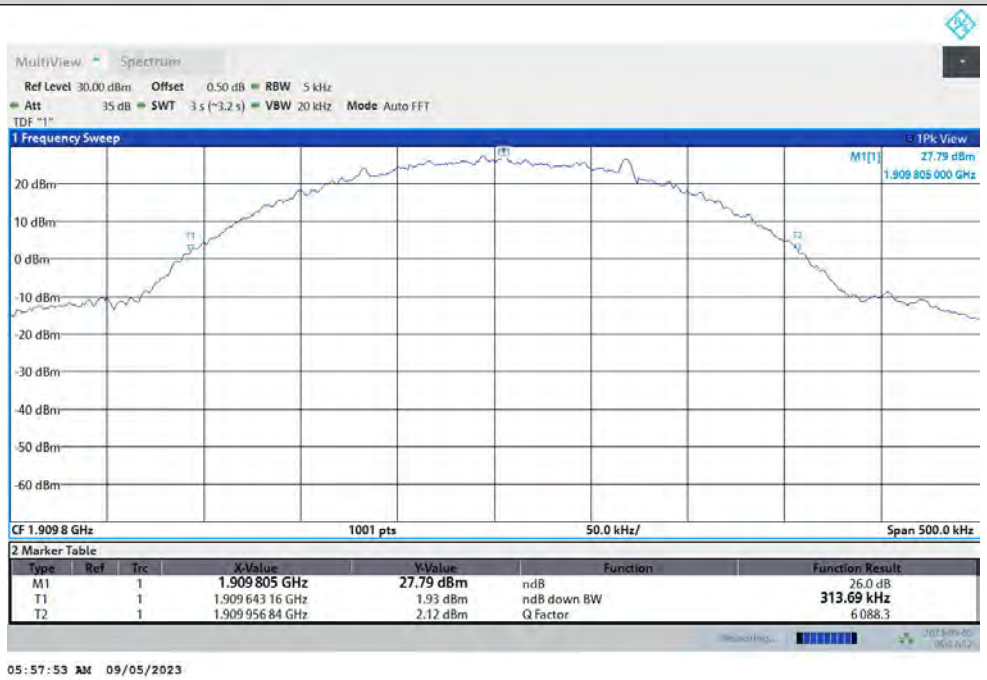
GSM1900-512



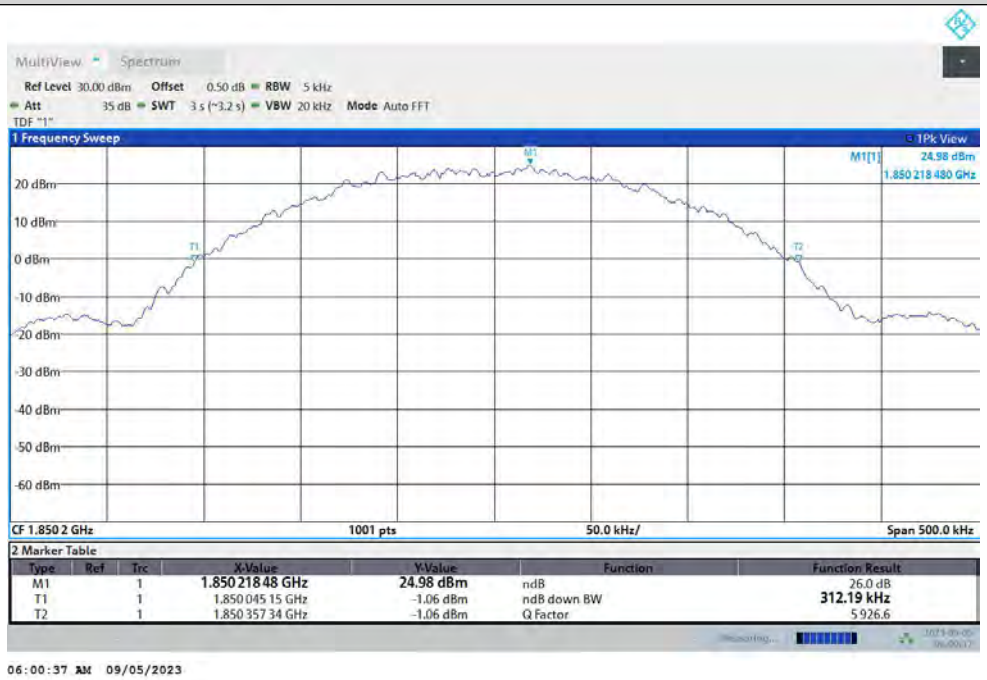
GSM1900-661



GSM1900-810



EGPRS1900-512



EGPRS1900-661

06:01:03 AM 09/05/2023

EGPRS1900-810

06:01:28 AM 09/05/2023

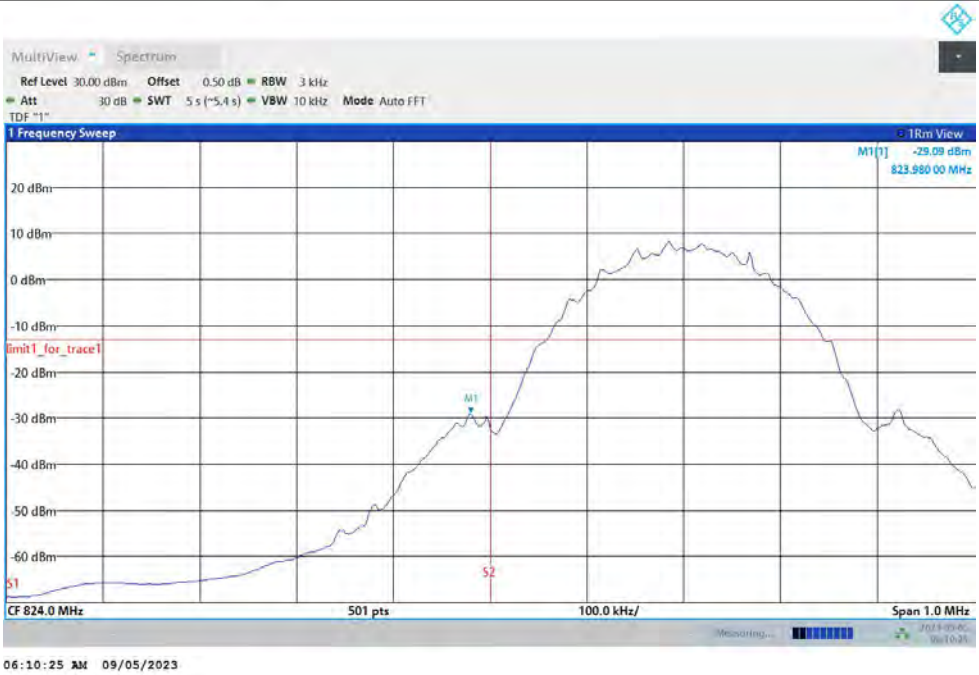
BAND EDGE

Test Result

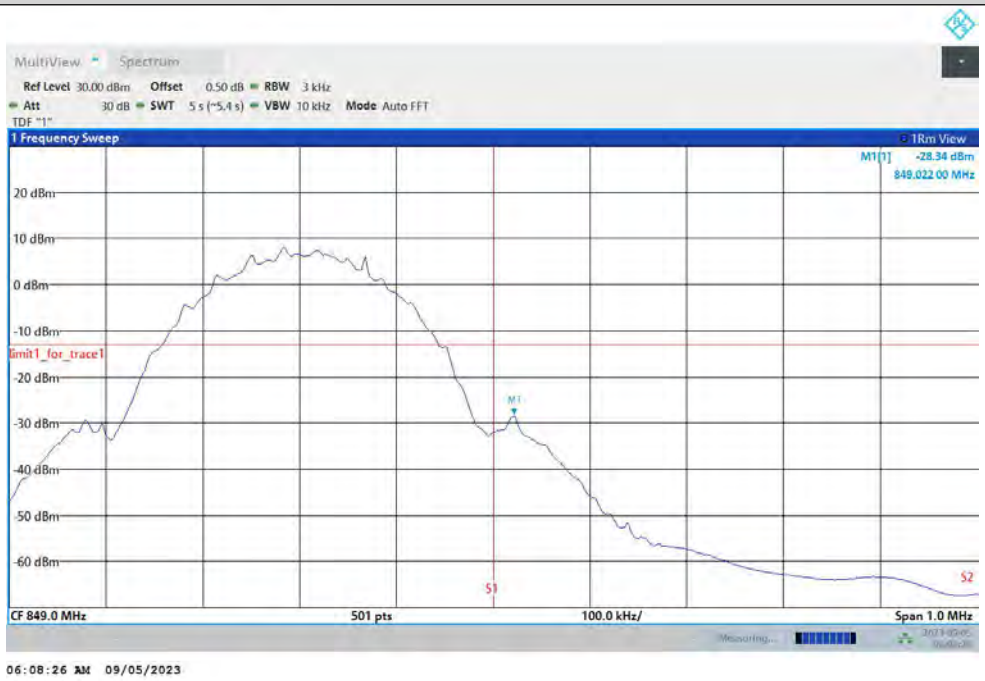
Band	Channel	Freq (MHz)	Result (dBm)	Limit(dBm)	Verdict
GSM1900	512	See Graph	See Graph	-13	PASS
GSM1900	810	See Graph	See Graph	-13	PASS
EGPRS1900	512	See Graph	See Graph	-13	PASS
EGPRS1900	810	See Graph	See Graph	-13	PASS

Test Graphs

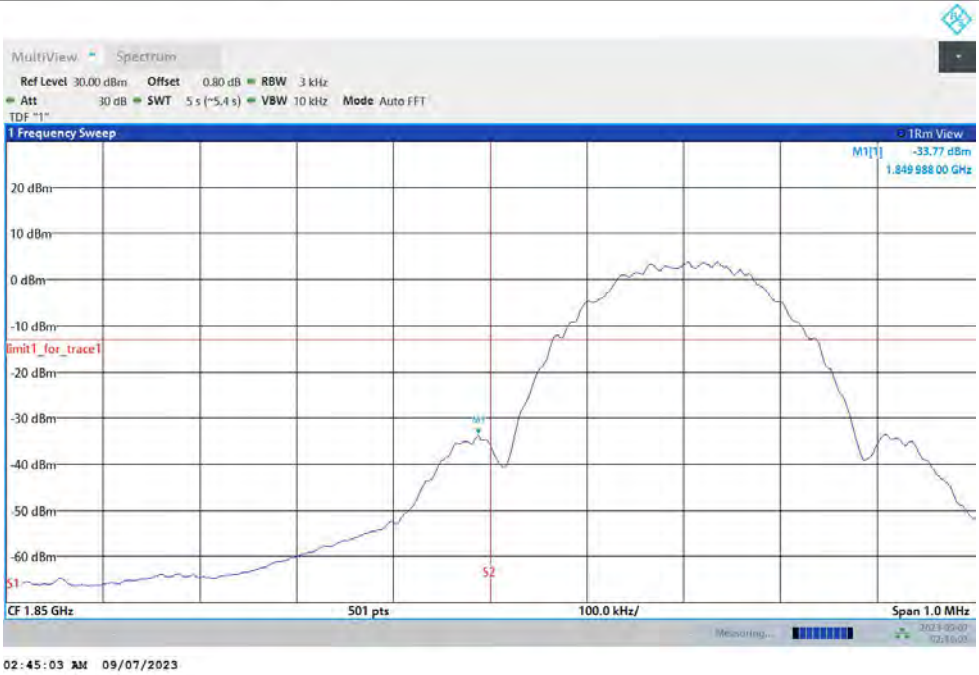
GSM1900-512



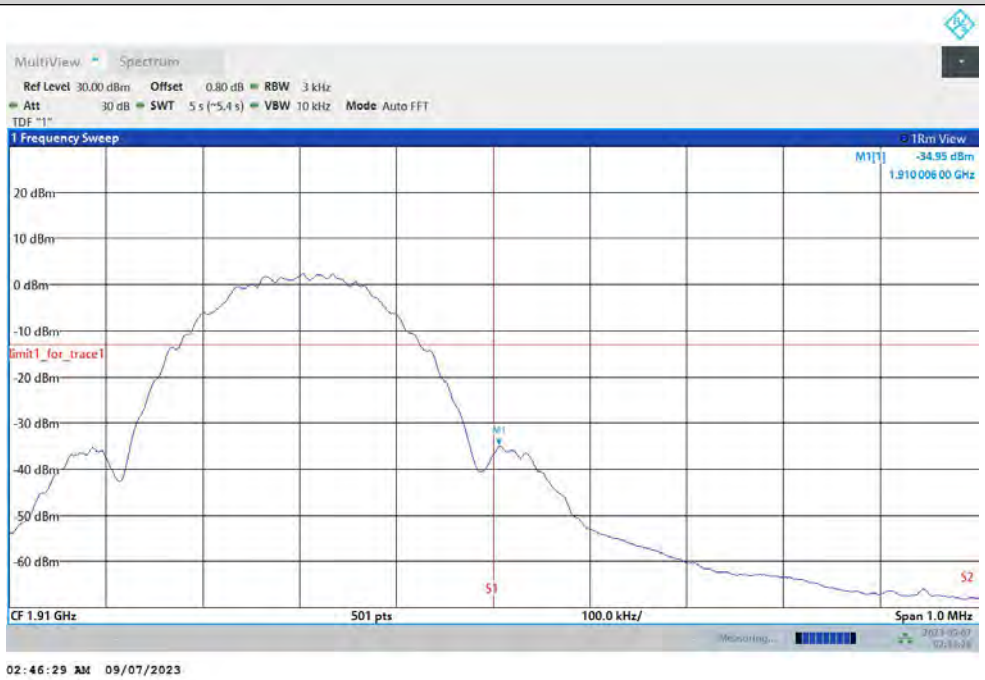
GSM1900-810



EGPRS1900-512



EGPRS1900-810



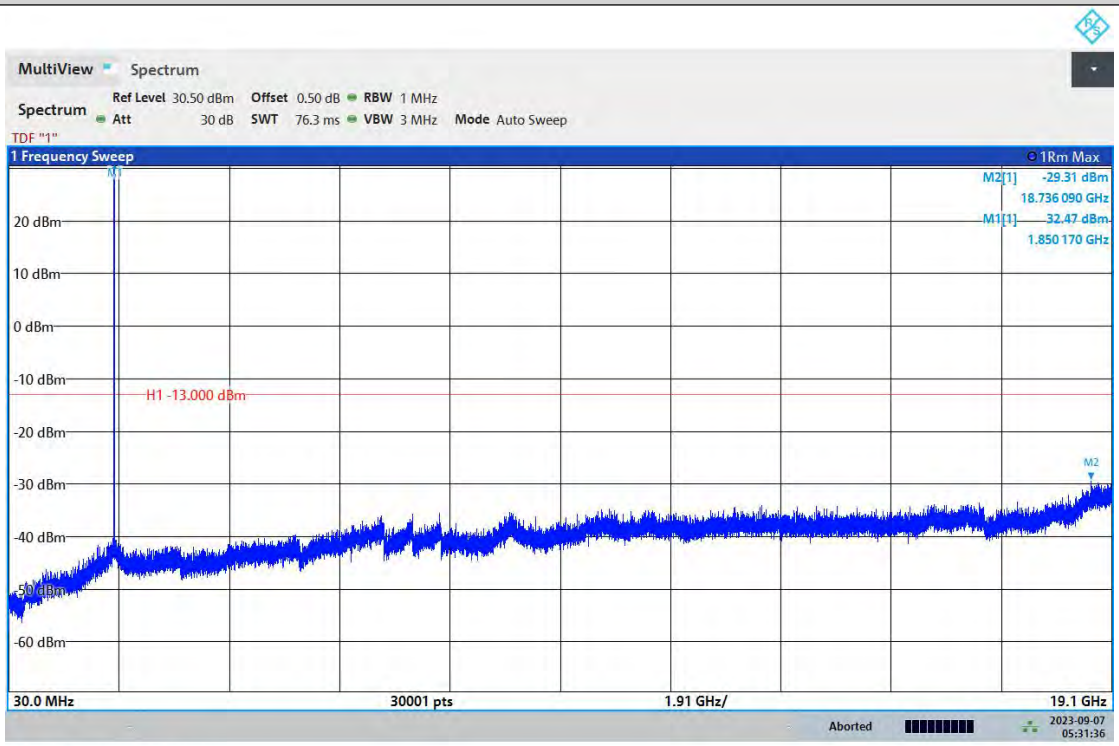
CONDUCTED SPURIOUS EMISSION

Test Result

Band	Channel	Frequency Range(MHz)	Max.Freq. (MHz)	Result (dBm)	Limit (dBm)	Verdict
GSM1900	512	30~19100MHz	See Graph	See Graph	-13	PASS
GSM1900	661	30~19100MHz	See Graph	See Graph	-13	PASS
GSM1900	810	30~19100MHz	See Graph	See Graph	-13	PASS
EGPRS1900	512	30~19100MHz	See Graph	See Graph	-13	PASS
EGPRS1900	661	30~19100MHz	See Graph	See Graph	-13	PASS
EGPRS1900	810	30~19100MHz	See Graph	See Graph	-13	PASS

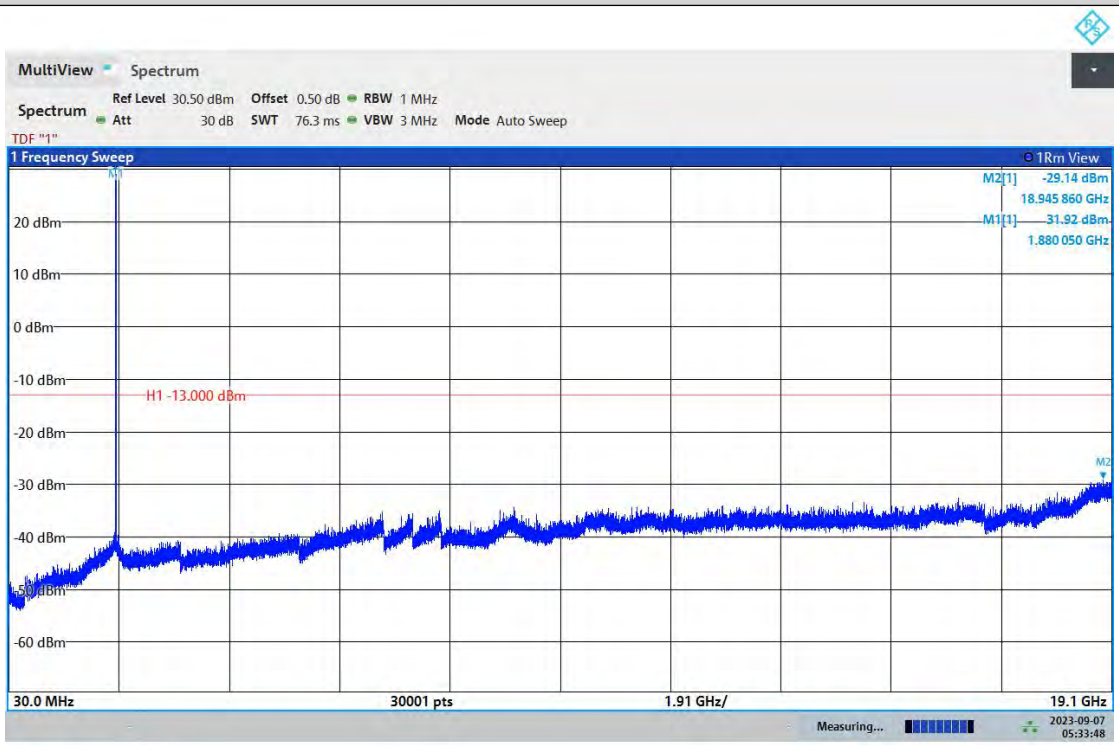
Test Graphs

GSM1900-512-30~19100MHz



05:31:37 AM 09/07/2023

GSM1900-661-30~19100MHz



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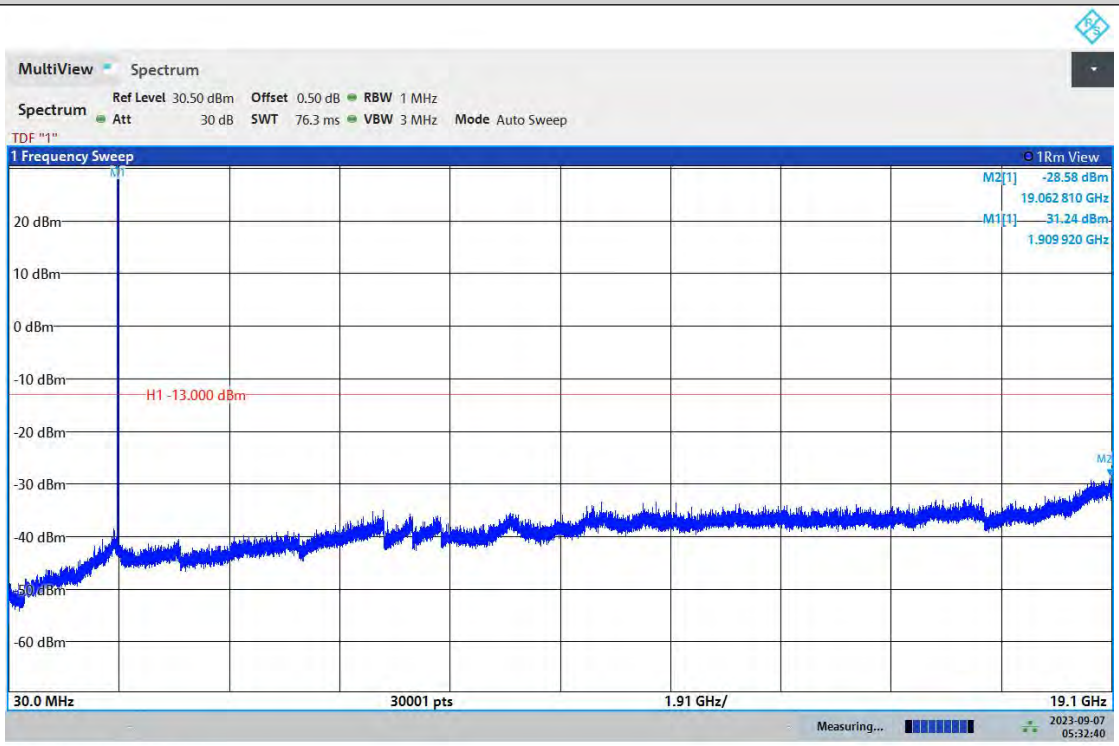
GSM1900-810-30~19100MHz



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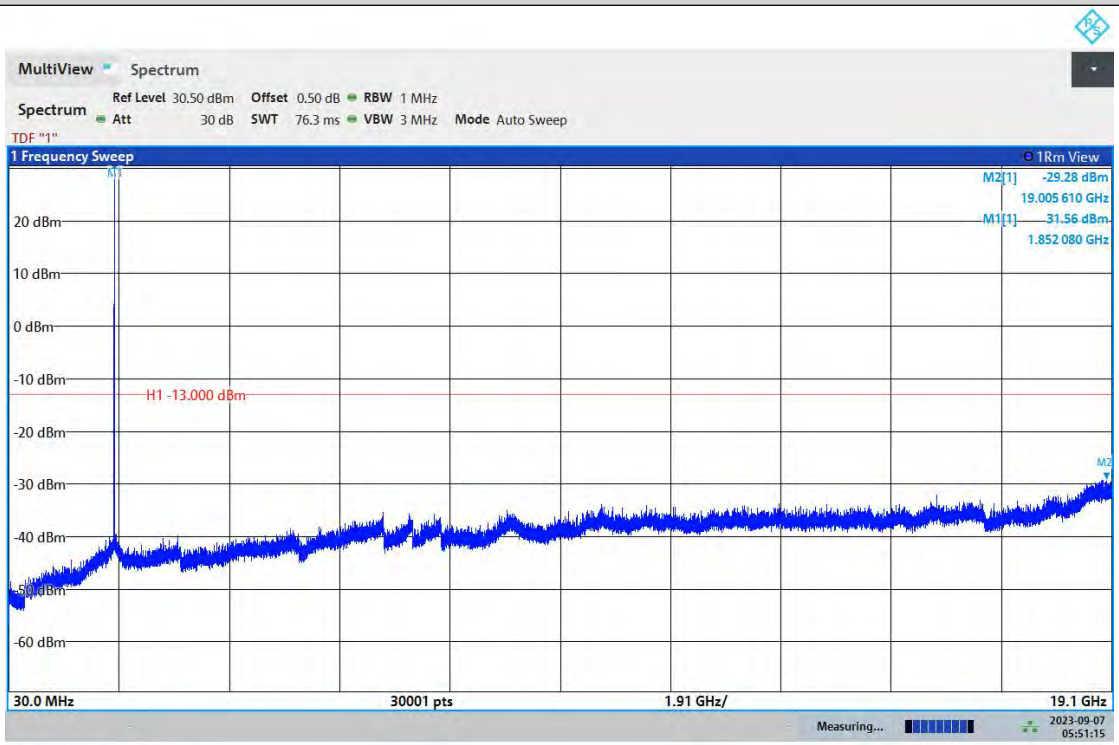
EGPRS1900-512-30~19100MHz



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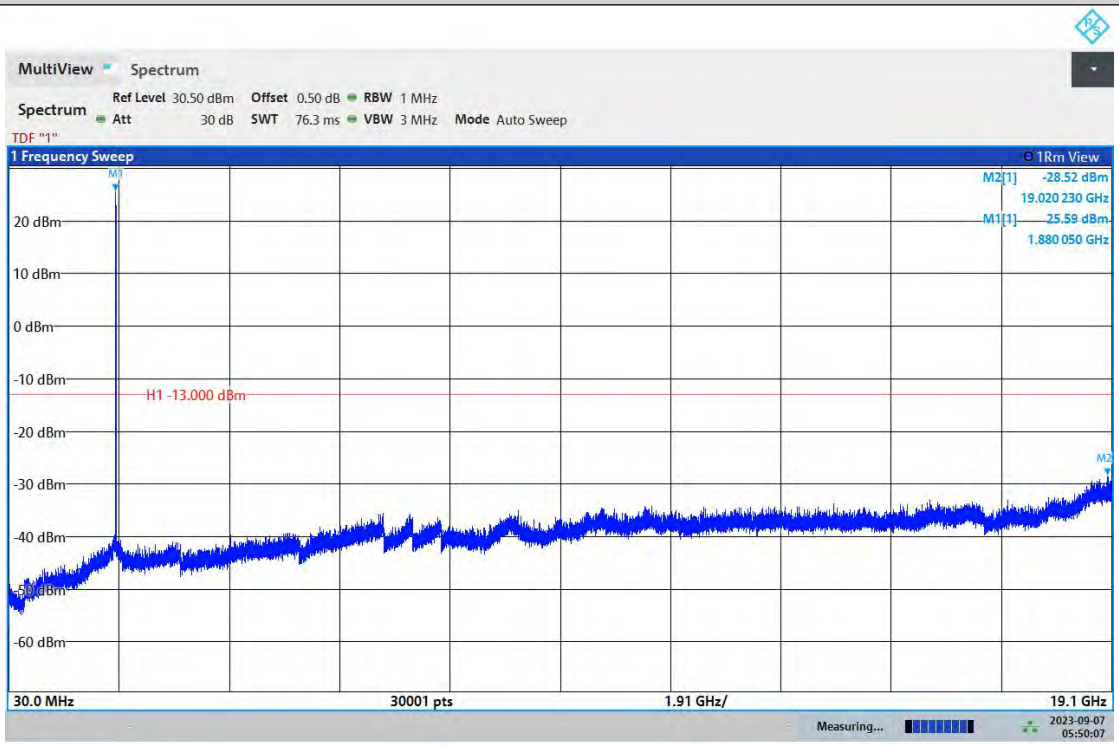
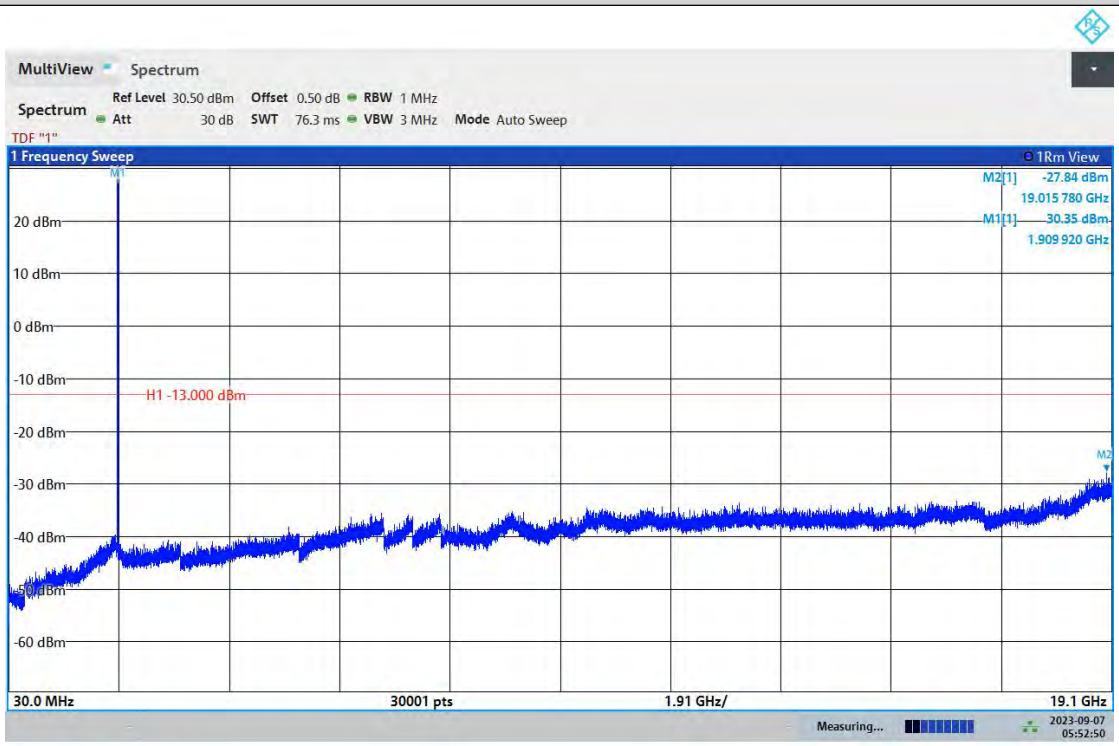
EGPRS1900-661-30~19100MHz



05:50:08 AM 09/07/2023

EGPRS1900-810-30~19100MHz



05:52:50 AM 09/07/2023

FREQUENCY STABILITY

Test Result

Voltage							
Band	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM1900	512	VL	NT	6.18	0.003340	±2.5	PASS
GSM1900	512	VN	NT	2.13	0.001151	±2.5	PASS
GSM1900	512	VH	NT	-7.41	-0.004005	±2.5	PASS
GSM1900	661	VL	NT	-4.64	-0.002468	±2.5	PASS
GSM1900	661	VN	NT	-1.38	-0.000734	±2.5	PASS
GSM1900	661	VH	NT	7.86	0.004181	±2.5	PASS
GSM1900	810	VL	NT	1.2	0.000628	±2.5	PASS
GSM1900	810	VN	NT	0.38	0.000199	±2.5	PASS
GSM1900	810	VH	NT	2.38	0.001246	±2.5	PASS
EGPRS1900	512	VL	NT	-7.47	-0.004037	±2.5	PASS
EGPRS1900	512	VN	NT	7.91	0.004275	±2.5	PASS
EGPRS1900	512	VH	NT	-5.09	-0.002751	±2.5	PASS
EGPRS1900	661	VL	NT	-9.65	-0.005133	±2.5	PASS
EGPRS1900	661	VN	NT	3.43	0.001824	±2.5	PASS
EGPRS1900	661	VH	NT	-9.67	-0.005144	±2.5	PASS
EGPRS1900	810	VL	NT	4.24	0.002220	±2.5	PASS
EGPRS1900	810	VN	NT	-7.15	-0.003744	±2.5	PASS
EGPRS1900	810	VH	NT	-2.46	-0.001288	±2.5	PASS

Temperature							
Band	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
EGPRS850	251	NV	50	2.73	0.001476	±2.5	PASS
GSM1900	512	NV	-30	4.48	0.002421	±2.5	PASS
GSM1900	512	NV	-20	7.24	0.003913	±2.5	PASS
GSM1900	512	NV	-10	1.3	0.000703	±2.5	PASS
GSM1900	512	NV	0	5.39	0.002913	±2.5	PASS
GSM1900	512	NV	10	6.49	0.003508	±2.5	PASS
GSM1900	512	NV	20	4.5	0.002432	±2.5	PASS
GSM1900	512	NV	30	-7.23	-0.003908	±2.5	PASS
GSM1900	512	NV	40	-7.16	-0.003870	±2.5	PASS
GSM1900	512	NV	50	3.07	0.001633	±2.5	PASS
GSM1900	661	NV	-30	-1.84	-0.000979	±2.5	PASS
GSM1900	661	NV	-20	-4.31	-0.002293	±2.5	PASS
GSM1900	661	NV	-10	-9.09	-0.004835	±2.5	PASS
GSM1900	661	NV	0	-0.28	-0.000149	±2.5	PASS
GSM1900	661	NV	10	4.63	0.002463	±2.5	PASS
GSM1900	661	NV	20	-1.57	-0.000835	±2.5	PASS
GSM1900	661	NV	30	2.04	0.001085	±2.5	PASS
GSM1900	661	NV	40	0.04	0.000021	±2.5	PASS

GSM1900	661	NV	50	-5.99	-0.003136	±2.5	PASS
GSM1900	810	NV	-30	-3.05	-0.001597	±2.5	PASS
GSM1900	810	NV	-20	0.62	0.000325	±2.5	PASS
GSM1900	810	NV	-10	-3.04	-0.001592	±2.5	PASS
GSM1900	810	NV	0	-4.85	-0.002540	±2.5	PASS
GSM1900	810	NV	10	-5.94	-0.003110	±2.5	PASS
GSM1900	810	NV	20	-7.46	-0.003906	±2.5	PASS
GSM1900	810	NV	30	7.85	0.004110	±2.5	PASS
GSM1900	810	NV	40	-1.42	-0.000744	±2.5	PASS
GSM1900	810	NV	50	2.62	0.001416	±2.5	PASS
EGPRS1900	512	NV	-30	0.11	0.000059	±2.5	PASS
EGPRS1900	512	NV	-20	-1.34	-0.000724	±2.5	PASS
EGPRS1900	512	NV	-10	3.69	0.001994	±2.5	PASS
EGPRS1900	512	NV	0	8.23	0.004448	±2.5	PASS
EGPRS1900	512	NV	10	5.5	0.002973	±2.5	PASS
EGPRS1900	512	NV	20	5.44	0.002940	±2.5	PASS
EGPRS1900	512	NV	30	5.56	0.003005	±2.5	PASS
EGPRS1900	512	NV	40	0.28	0.000151	±2.5	PASS
EGPRS1900	512	NV	50	-7.7	-0.004096	±2.5	PASS
EGPRS1900	661	NV	-30	-2.03	-0.001080	±2.5	PASS
EGPRS1900	661	NV	-20	-1.8	-0.000957	±2.5	PASS
EGPRS1900	661	NV	-10	-5.25	-0.002793	±2.5	PASS
EGPRS1900	661	NV	0	-1.57	-0.000835	±2.5	PASS
EGPRS1900	661	NV	10	0.93	0.000495	±2.5	PASS
EGPRS1900	661	NV	20	5.59	0.002973	±2.5	PASS
EGPRS1900	661	NV	30	6.68	0.003553	±2.5	PASS
EGPRS1900	661	NV	40	-4.79	-0.002548	±2.5	PASS
EGPRS1900	661	NV	50	6.39	0.003346	±2.5	PASS
EGPRS1900	810	NV	-30	-4.73	-0.002477	±2.5	PASS
EGPRS1900	810	NV	-20	-3.58	-0.001875	±2.5	PASS
EGPRS1900	810	NV	-10	9.87	0.005168	±2.5	PASS
EGPRS1900	810	NV	0	-7.29	-0.003817	±2.5	PASS
EGPRS1900	810	NV	10	5.17	0.002707	±2.5	PASS
EGPRS1900	810	NV	20	6.33	0.003314	±2.5	PASS
EGPRS1900	810	NV	30	-3.44	-0.001801	±2.5	PASS
EGPRS1900	810	NV	40	4.96	0.002597	±2.5	PASS
EGPRS1900	810	NV	50	2.73	0.001476	±2.5	PASS

WCDMA II

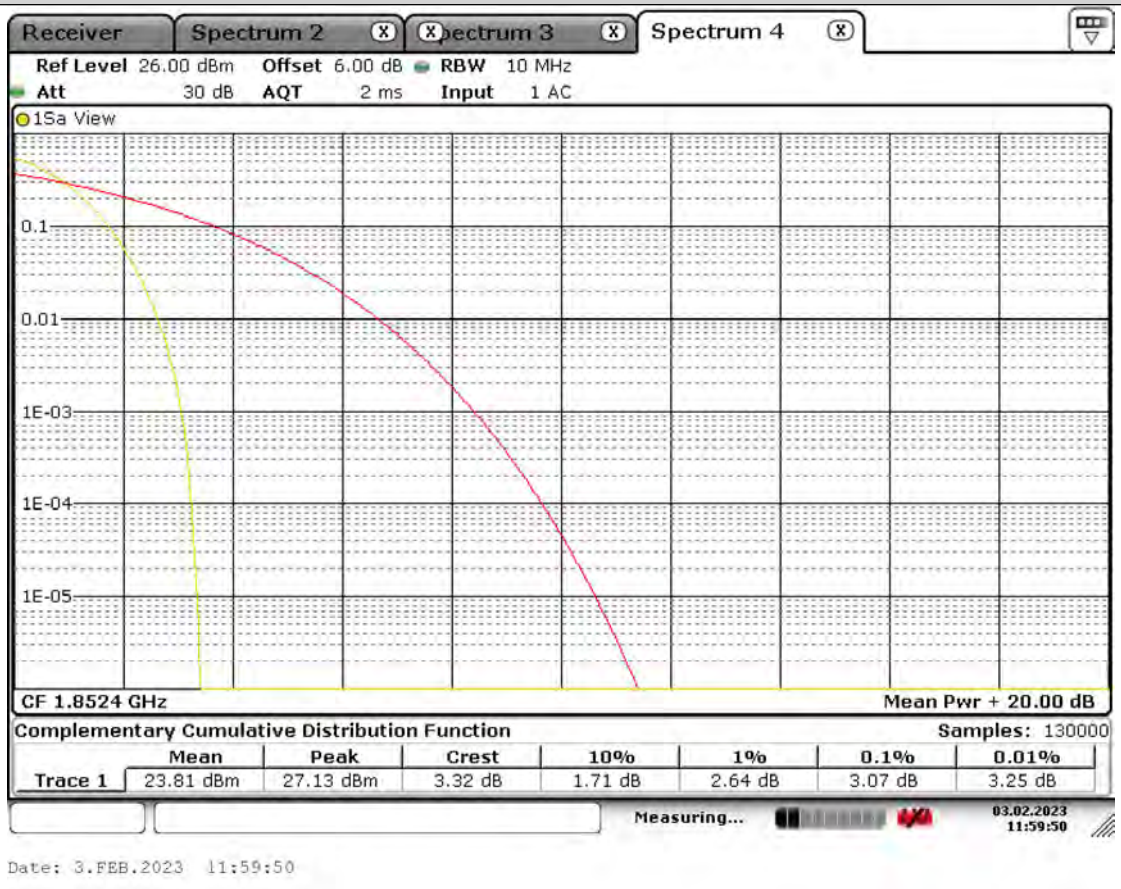
PEAK-TO-AVERAGE RATIO

Test Result

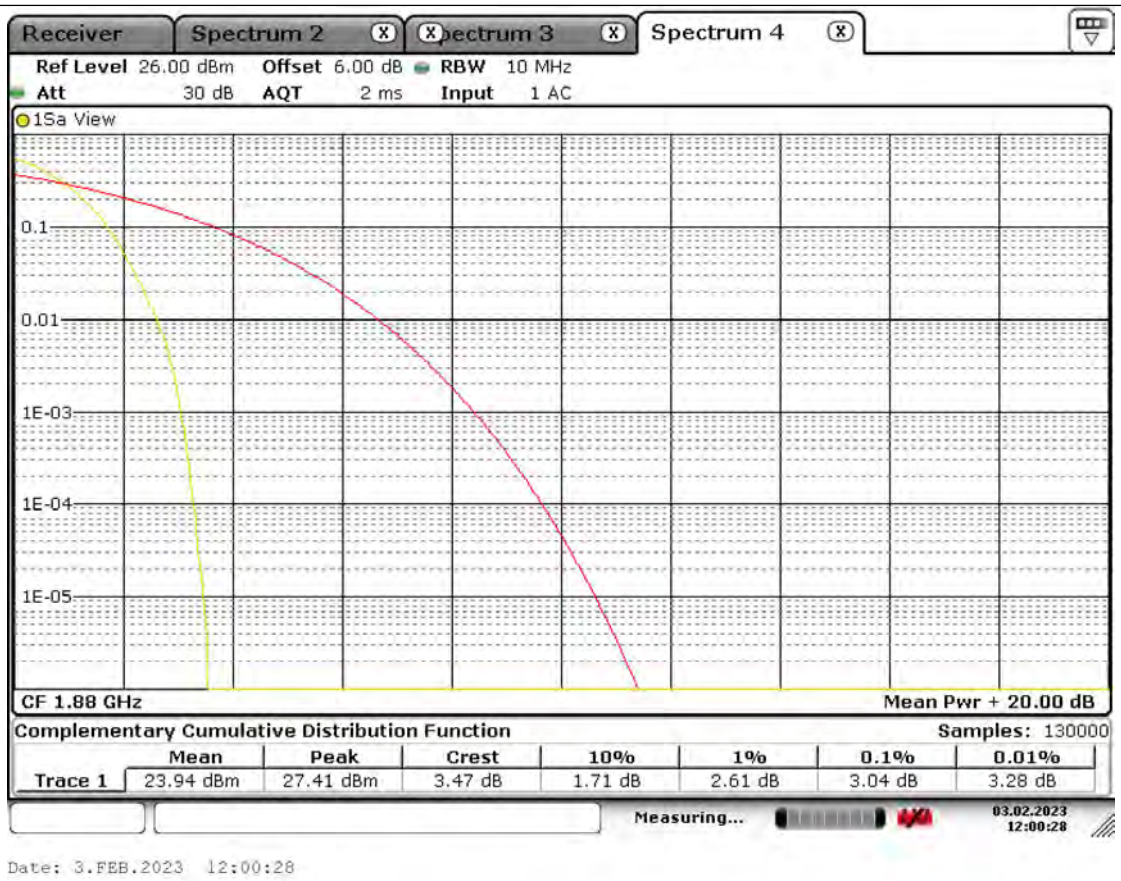
Band	Channel	Peak-to-Average Ratio(dB)	Limit(dBm)	Verdict
Band2	9262	3.07	13	PASS
Band2	9400	3.04	13	PASS
Band2	9538	2.67	13	PASS

Test Graphs

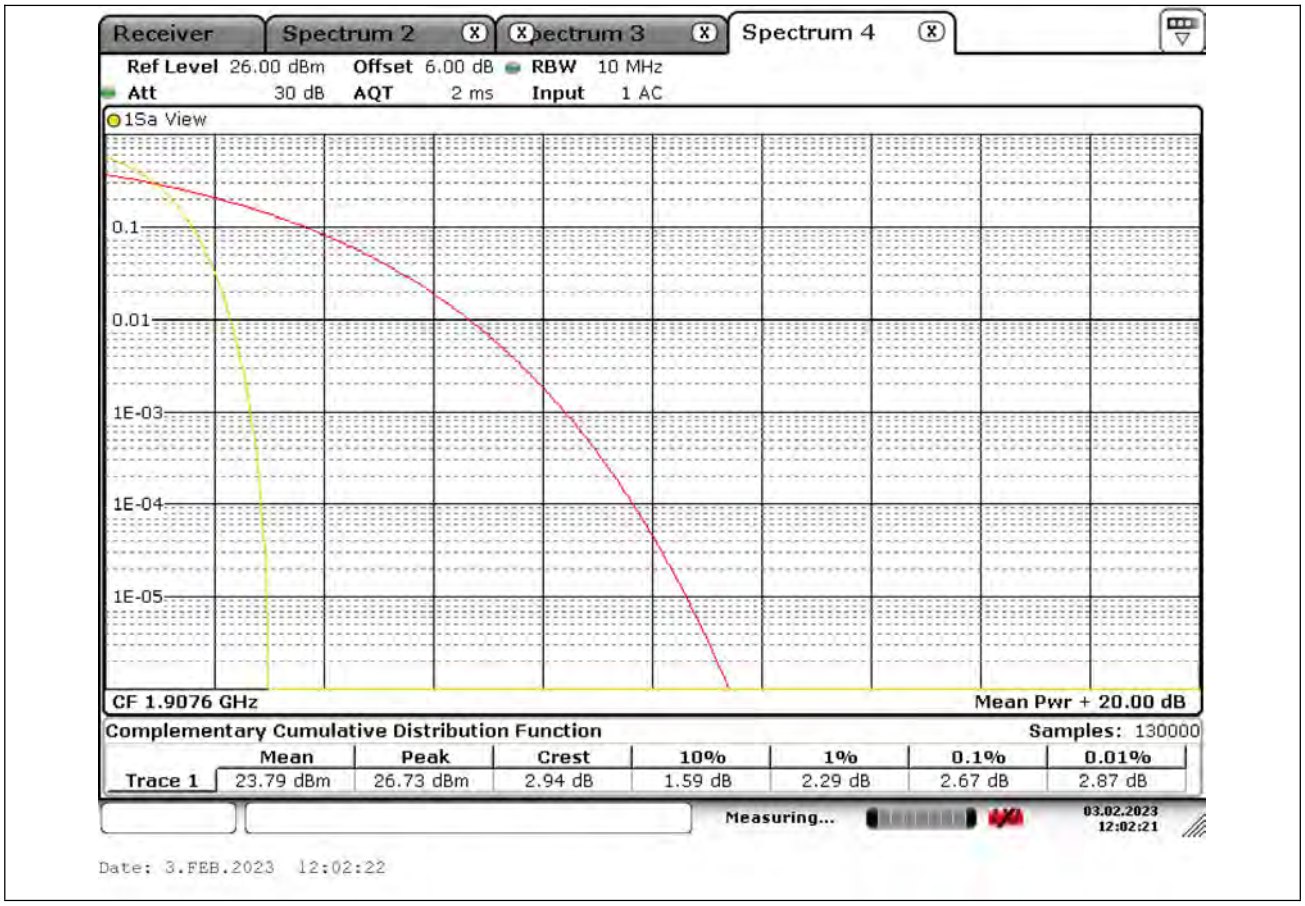
Band2-9262



Band2-9400


Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 26.00 dBm Offset 6.00 dB RBW 10 MHz
Att 30 dB AQT 2 ms Input 1 AC
1Sa View
0.1
0.01
1E-03
1E-04
1E-05
CF 1.88 GHz
Mean Pwr + 20.00 dB
Complementary Cumulative Distribution Function
Samples: 130000
Mean Peak Crest 10% 1% 0.1% 0.01%
Trace 1 23.94 dBm 27.41 dBm 3.47 dB 1.71 dB 2.61 dB 3.04 dB 3.28 dB
Measuring...
03.02.2023
12:00:28
Date: 3.FEB.2023 12:00:28

Band2-9538


Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 26.00 dBm Offset 6.00 dB RBW 10 MHz
Att 30 dB AQT 2 ms Input 1 AC
1Sa View
0.1
0.01
1E-03
1E-04
1E-05
CF 1.9076 GHz
Mean Pwr + 20.00 dB
Complementary Cumulative Distribution Function
Samples: 130000
Mean Peak Crest 10% 1% 0.1% 0.01%
Trace 1 23.79 dBm 26.73 dBm 2.94 dB 1.59 dB 2.29 dB 2.67 dB 2.87 dB
Measuring...
03.02.2023
12:02:21
Date: 3.FEB.2023 12:02:22

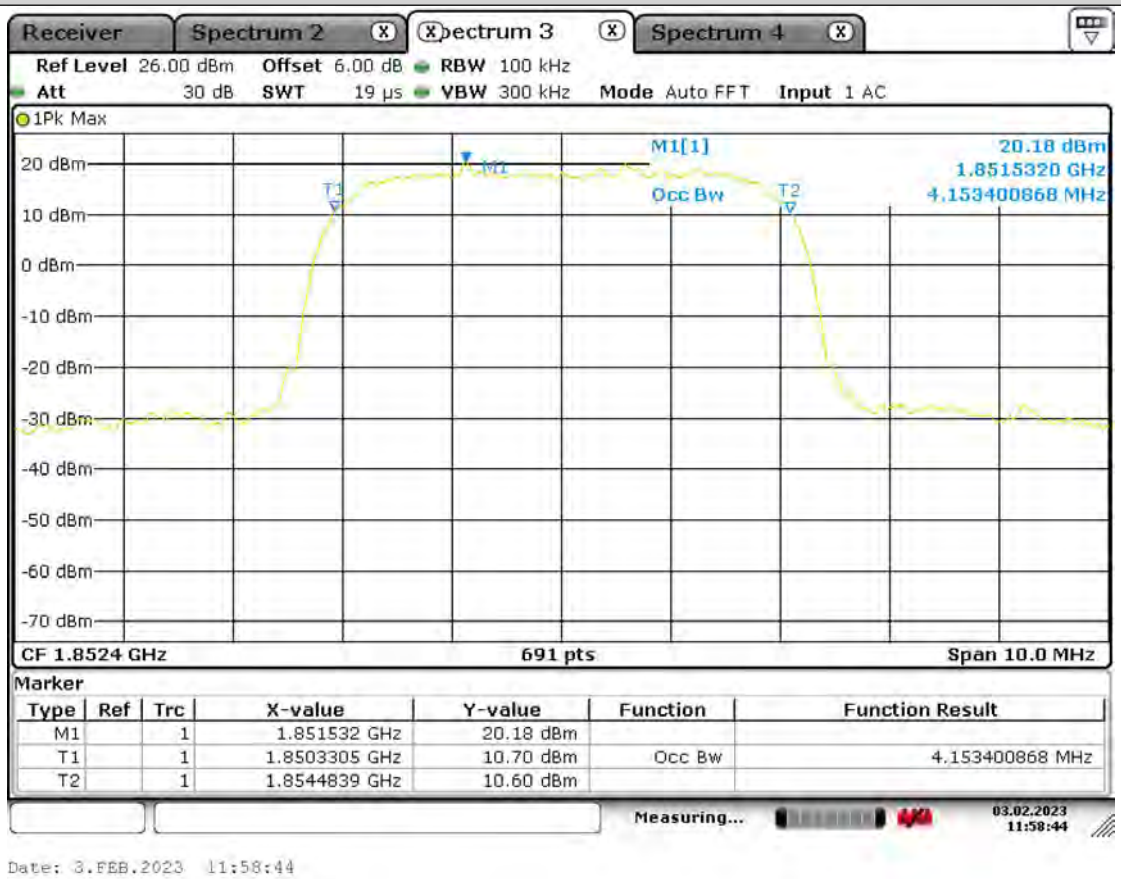
26DB BANDWIDTH AND OCCUPIED BANDWIDTH

Test Result

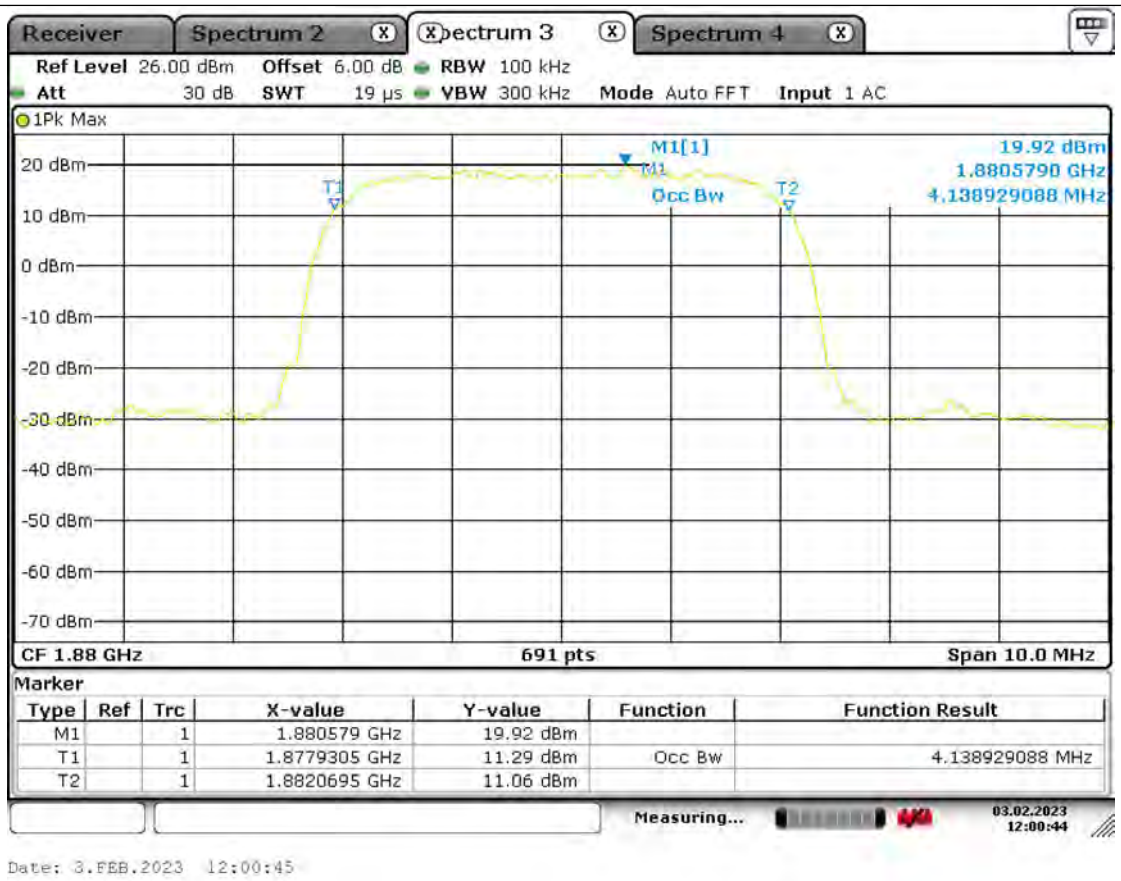
Band	Channel	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Limit(kHz)	Verdict
Band2	9262	4.153	4.674	---	PASS
Band2	9400	4.139	4.66	---	PASS
Band2	9538	4.153	4.689	---	PASS

Test Graphs Occupied Bandwidth

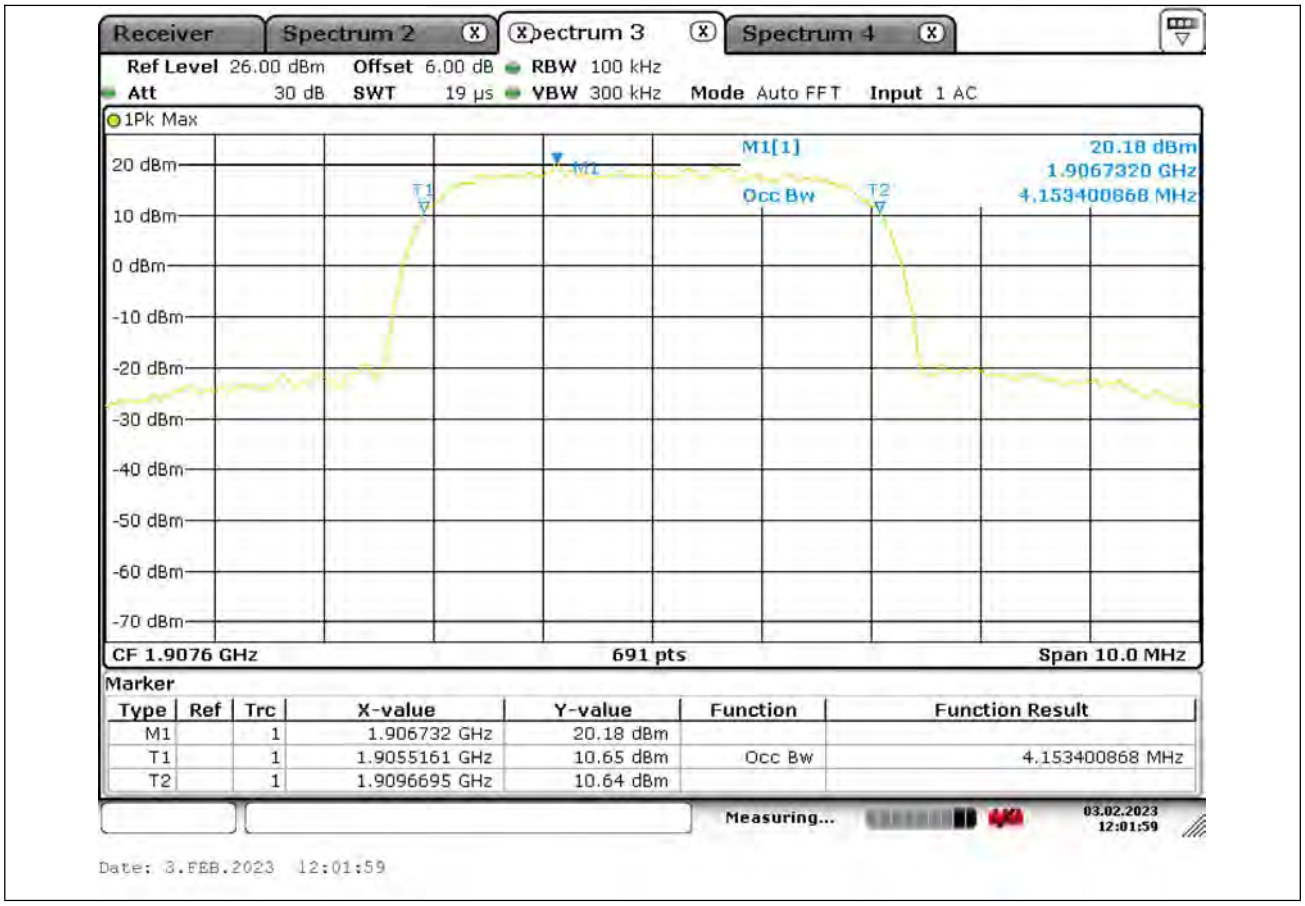
Band2-9262



Band2-9400

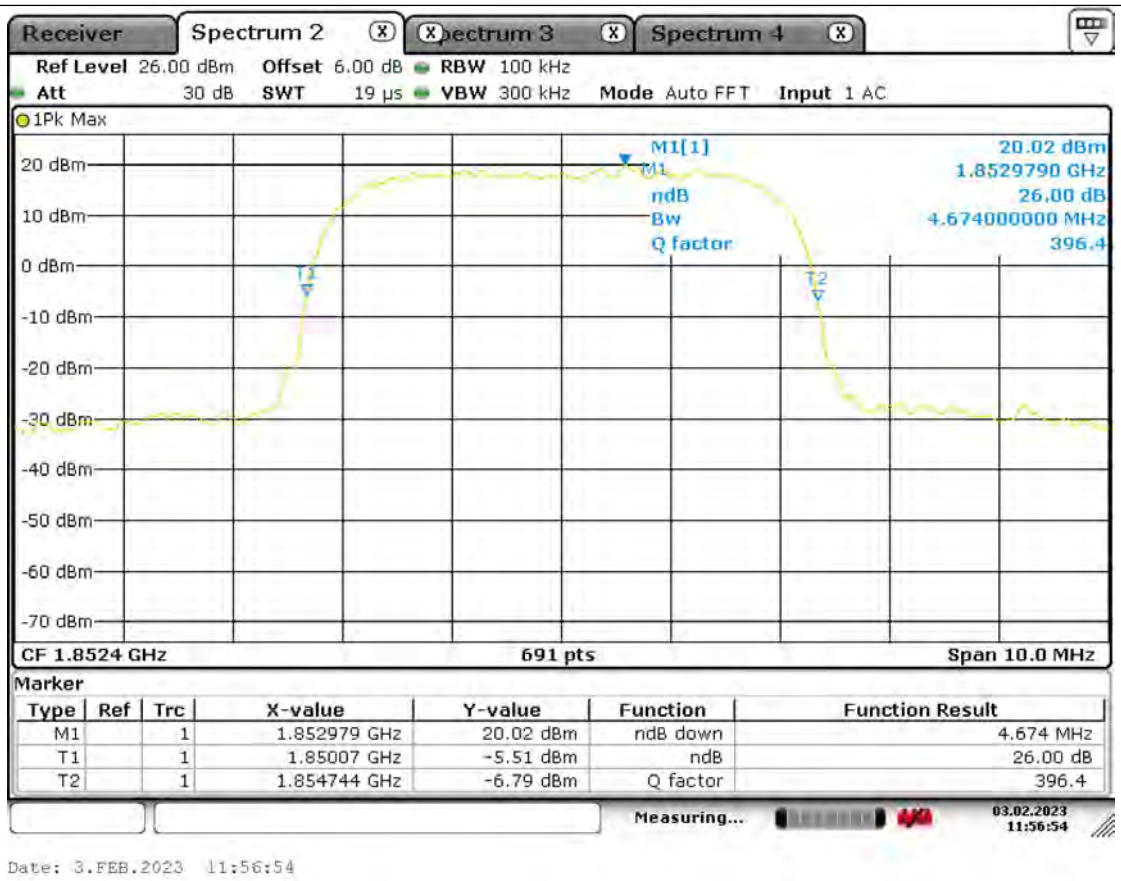

Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 26.00 dBm Offset 6.00 dB RBW 100 kHz
Att 30 dB SWT 19 µs VBW 300 kHz Mode Auto FFT Input 1 AC
1Pk Max
M1[1] 19.92 dBm
1.8805790 GHz
4.138929088 MHz
Occ Bw
T1
T2
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 1.88 GHz
691 pts
Span 10.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 1.880579 GHz 19.92 dBm
T1 1 1.8779305 GHz 11.29 dBm Occ Bw 4.138929088 MHz
T2 1 1.8820695 GHz 11.06 dBm
Measuring...
03.02.2023
12:00:44
Date: 3.FEB.2023 12:00:45

Band2-9538

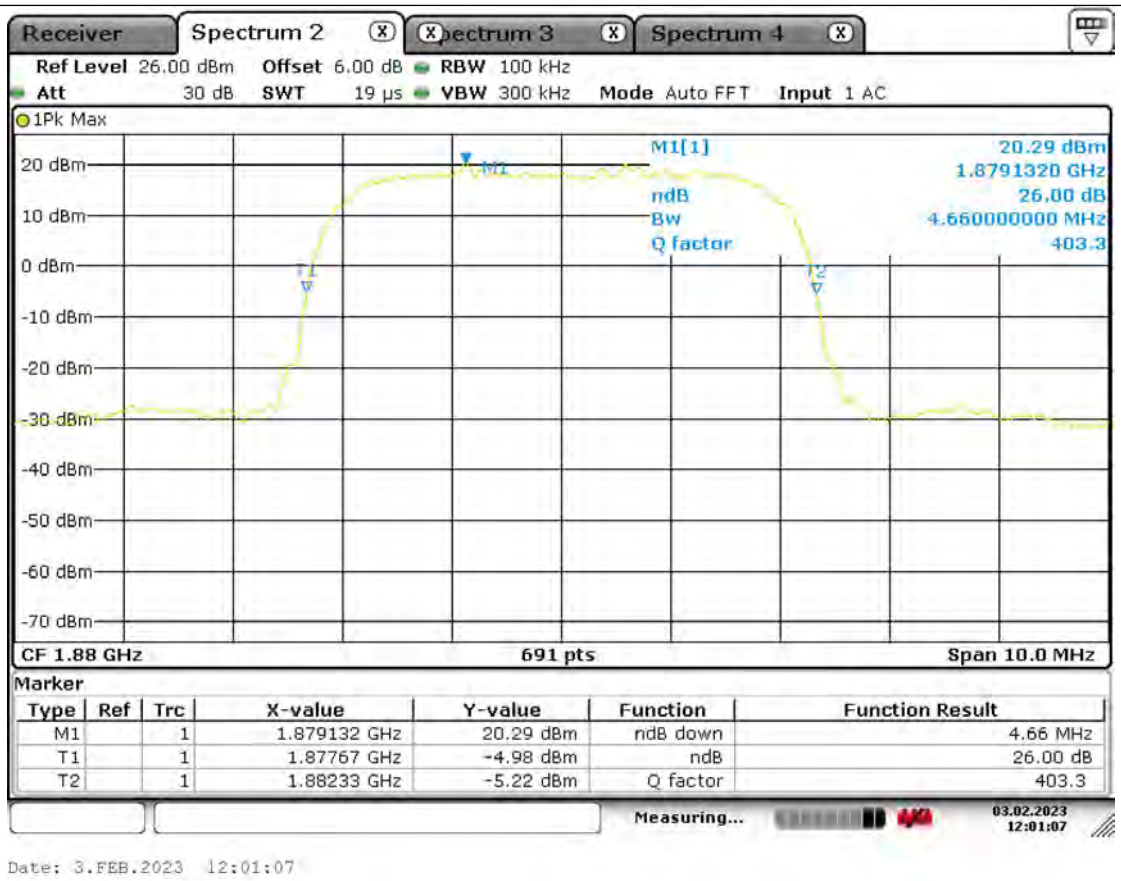


26dB Bandwidth

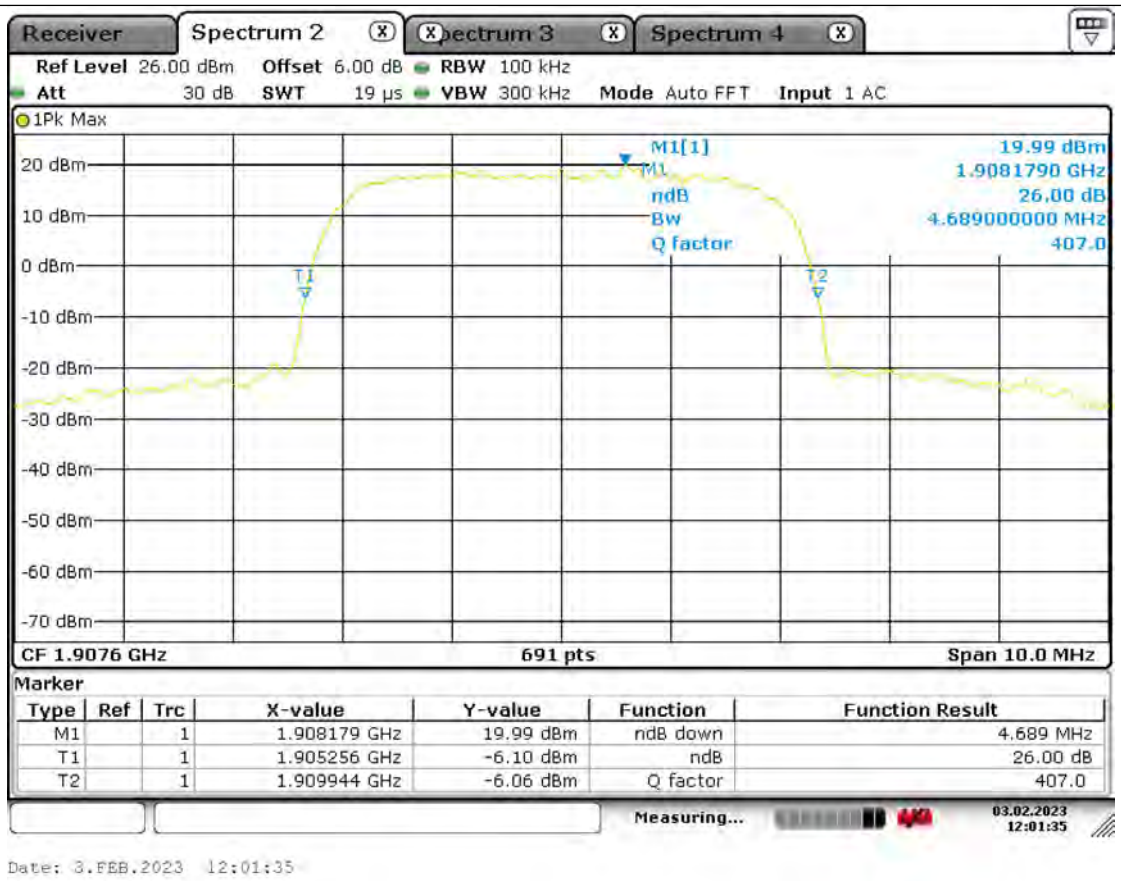
Band2-9262


Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 26.00 dBm Offset 6.00 dB RBW 100 kHz
Att 30 dB SWT 19 µs VBW 300 kHz Mode Auto FFT Input 1 AC
1Pk Max
M1[1] 20.02 dBm
M1 1.8529790 GHz
ndB 26.00 dB
Bw 4.674000000 MHz
Q factor 396.4
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
T1
T2
CF 1.8524 GHz
691 pts
Span 10.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 1.852979 GHz 20.02 dBm ndB down 4.674 MHz
T1 1 1.85007 GHz -5.51 dBm ndB 26.00 dB
T2 1 1.854744 GHz -6.79 dBm Q factor 396.4
Measuring...
03.02.2023
11:56:54
Date: 3.FEB.2023 11:56:54

Band2-9400


Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 26.00 dBm Offset 6.00 dB RBW 100 kHz
Att 30 dB SWT 19 µs VBW 300 kHz Mode Auto FFT Input 1 AC
1Pk Max
M1[1] 20.29 dBm
1.879132D GHz
ndB 26.00 dB
Bw 4.660000000 MHz
Q factor 403.3
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 1.88 GHz
691 pts
Span 10.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 1.879132 GHz 20.29 dBm ndB down 4.66 MHz
T1 1 1.87767 GHz -4.98 dBm ndB 26.00 dB
T2 1 1.88233 GHz -5.22 dBm Q factor 403.3
Measuring...
03.02.2023
12:01:07
Date: 3.FEB.2023 12:01:07

Band2-9538


Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 26.00 dBm Offset 6.00 dB RBW 100 kHz
Att 30 dB SWT 19 µs VBW 300 kHz Mode Auto FFT Input 1 AC
1Pk Max
M1[1] 19.99 dBm
1.9081790 GHz
ndB 26.00 dB
Bw 4.689000000 MHz
Q factor 407.0
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
T1
T2
CF 1.9076 GHz
691 pts
Span 10.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 1.908179 GHz 19.99 dBm ndB down 4.689 MHz
T1 1 1.905256 GHz -6.10 dBm ndB 26.00 dB
T2 1 1.909944 GHz -6.06 dBm Q factor 407.0
Measuring...
03.02.2023
12:01:35
Date: 3.FEB.2023 12:01:35

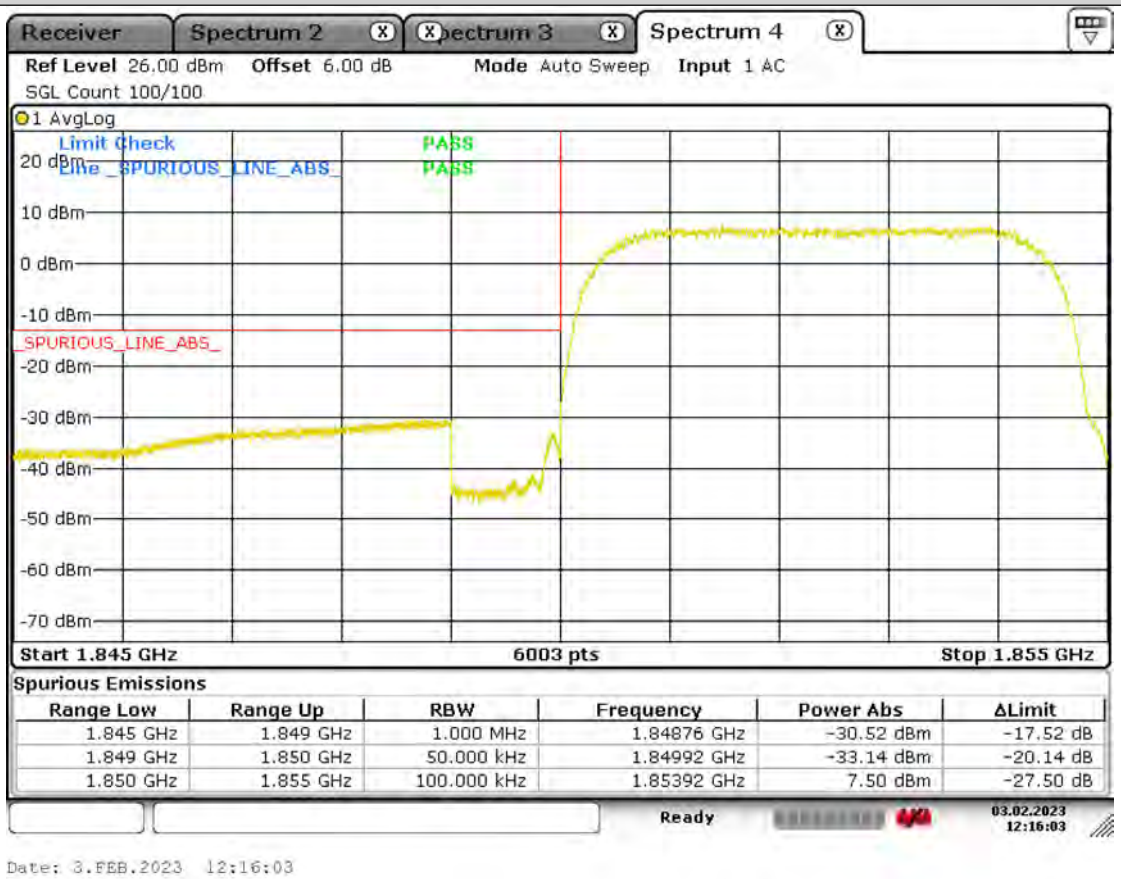
BAND EDGE

Test Result

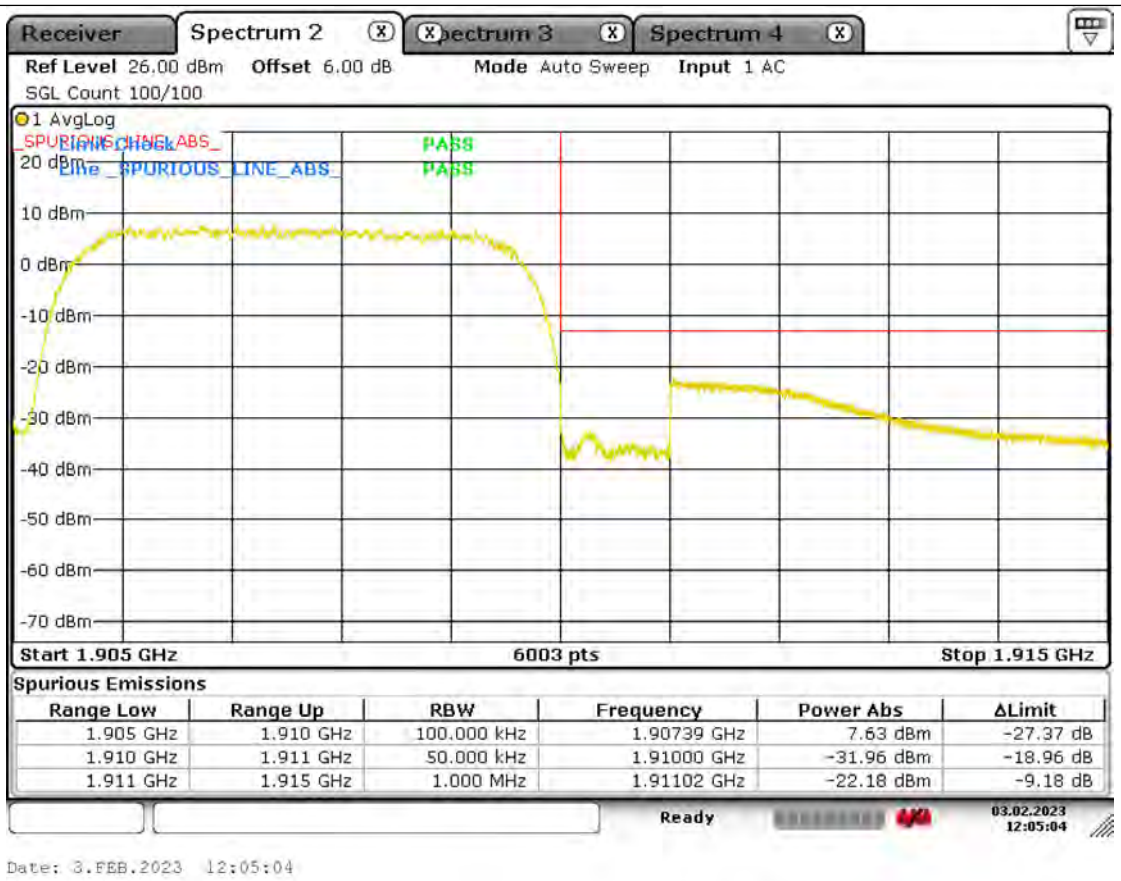
Band	Channel	Frequency (MHz)	Result (dBm)	Limit(dBm)	Verdict
Band2	9262	1849.92	-33.14	-13	PASS
Band2	9538	1910	-31.96	-13	PASS

Test Graphs

Band2-9262



Band2-9538



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.905 GHz	1.910 GHz	100.000 kHz	1.90739 GHz	7.63 dBm	-27.37 dB
1.910 GHz	1.911 GHz	50.000 kHz	1.91000 GHz	-31.96 dBm	-18.96 dB
1.911 GHz	1.915 GHz	1.000 MHz	1.91102 GHz	-22.18 dBm	-9.18 dB

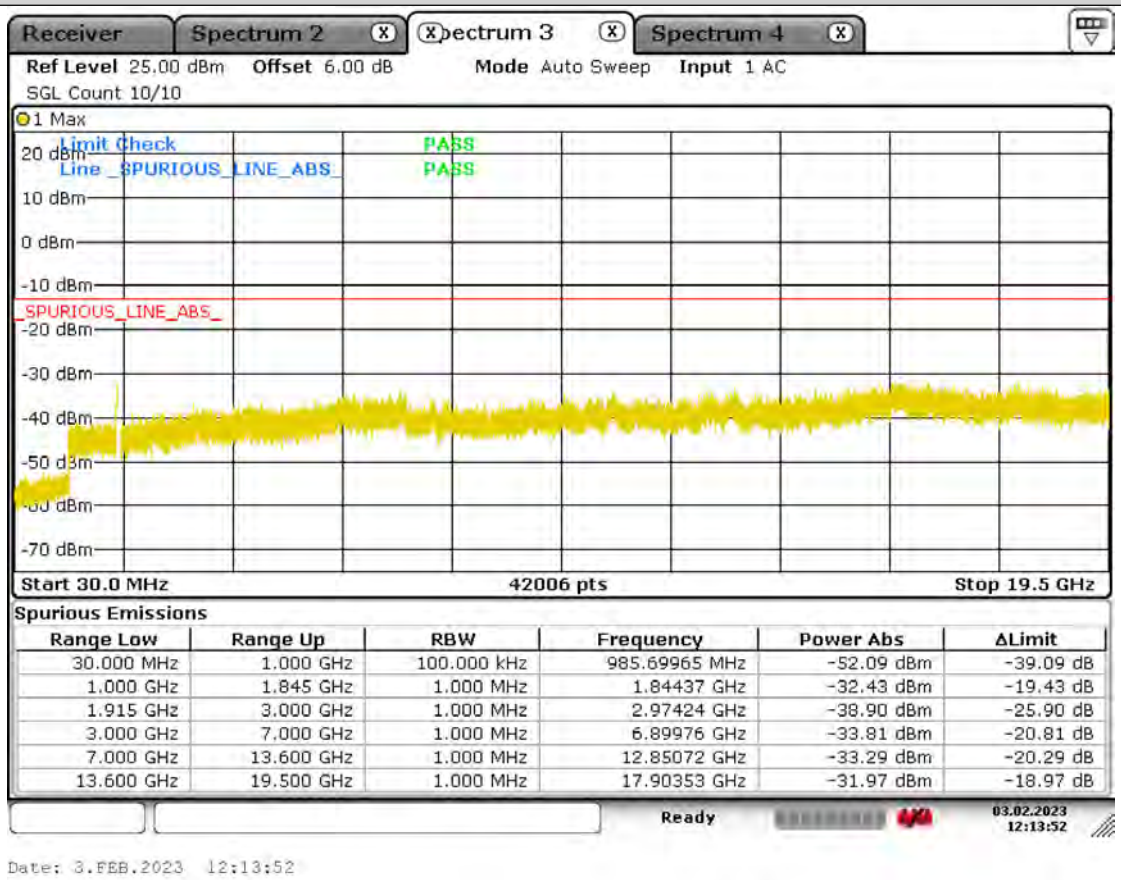
CONDUCTED SPURIOUS EMISSION

Test Result

Band	Channel	Frequency Range (Mhz)	Frequency (MHz)	Result (dBm)	Limit (dBm)	Verdict
Band2	9262	30~1000MHz	985.69965	-52.09	-13	PASS
Band2	9262	1000~3000MHz	1844.37	-32.43	-13	PASS
Band2	9262	3000~19100MHz	17903.53	-31.97	-13	PASS
Band2	9400	30~1000MHz	933.83058	-51.34	-13	PASS
Band2	9400	1000~3000MHz	1915.27	-29.22	-13	PASS
Band2	9400	3000~19100MHz	15670.12	-31.22	-13	PASS
Band2	9538	30~1000MHz	920.25737	-52.16	-13	PASS
Band2	9538	1000~3000MHz	1915.81	-28.04	-13	PASS
Band2	9538	3000~19100MHz	15670.96	-30.98	-13	PASS

Test Graphs

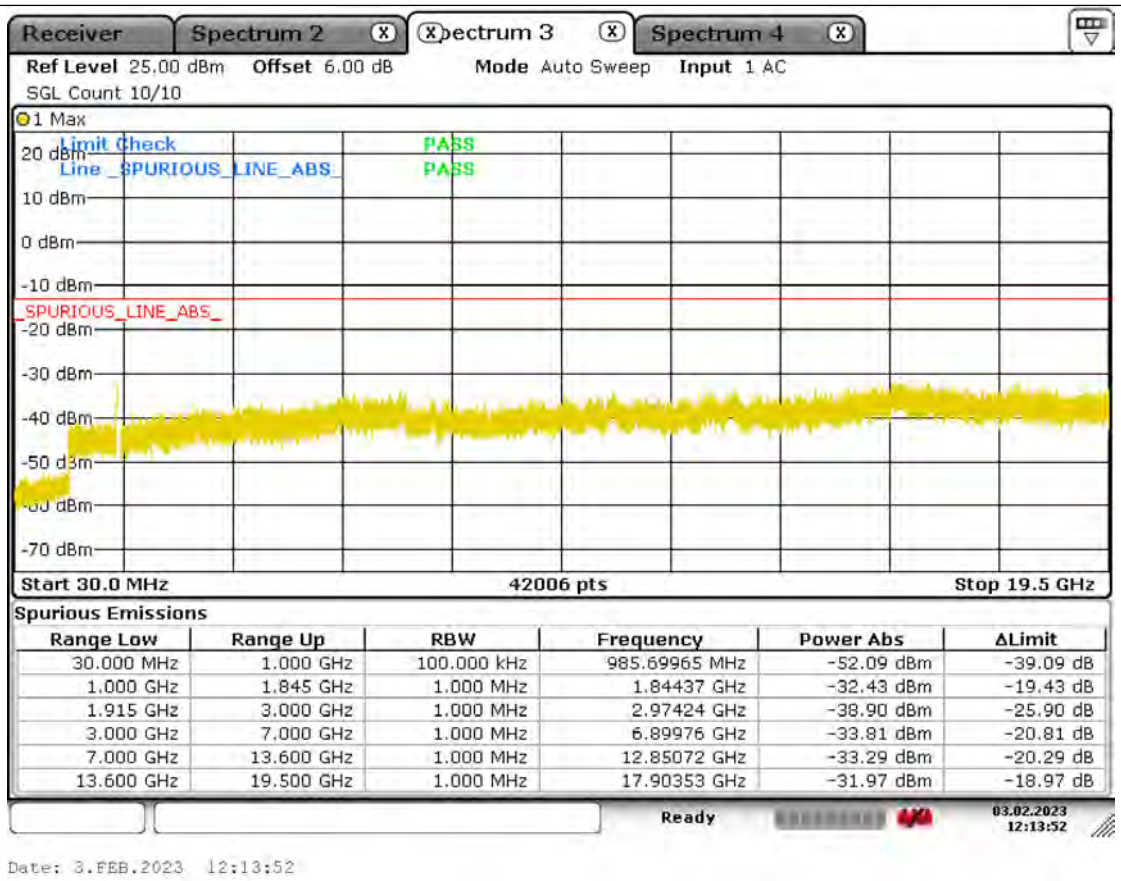
Band2-9262-30~1000MHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	100.000 kHz	985.69965 MHz	-52.09 dBm	-39.09 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.84437 GHz	-32.43 dBm	-19.43 dB
1.915 GHz	3.000 GHz	1.000 MHz	2.97424 GHz	-38.90 dBm	-25.90 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.89976 GHz	-33.81 dBm	-20.81 dB
7.000 GHz	13.600 GHz	1.000 MHz	12.85072 GHz	-33.29 dBm	-20.29 dB
13.600 GHz	19.500 GHz	1.000 MHz	17.90353 GHz	-31.97 dBm	-18.97 dB

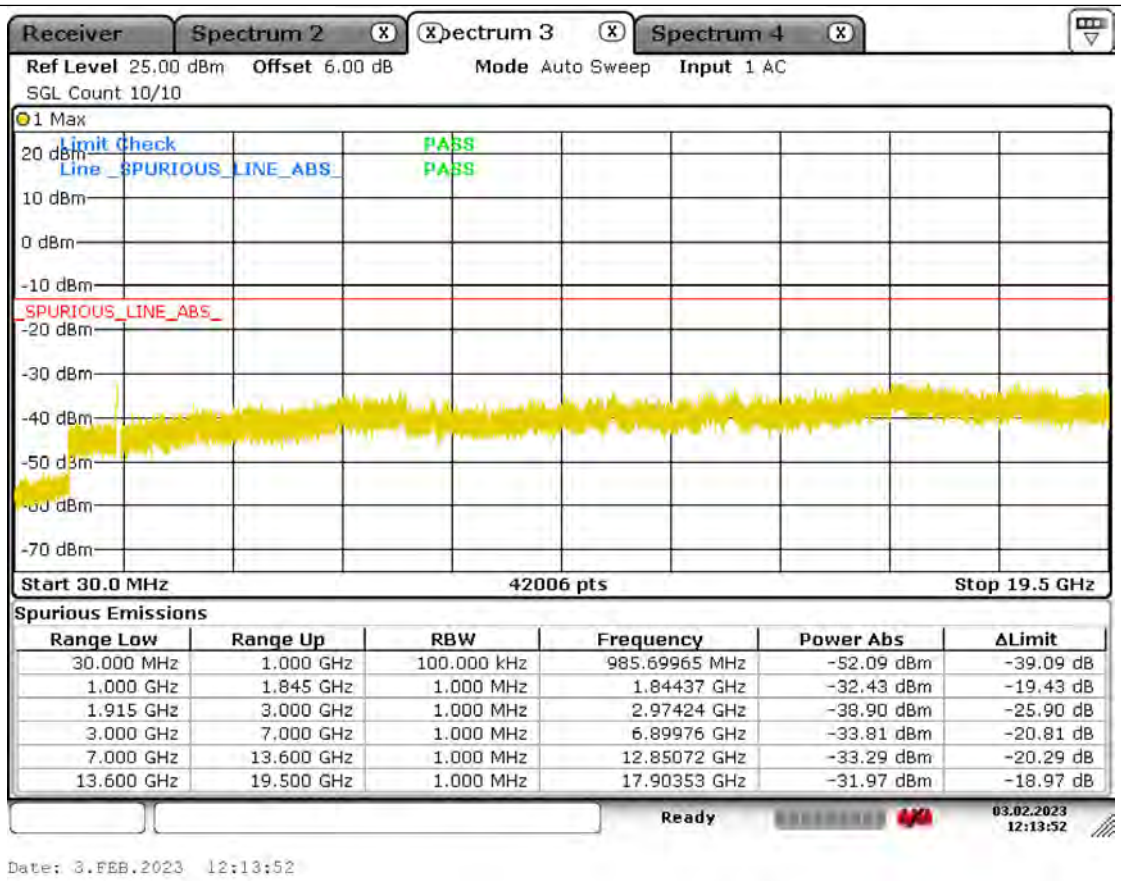
Band2-9262-1000~3000MHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	100.000 kHz	985.69965 MHz	-52.09 dBm	-39.09 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.84437 GHz	-32.43 dBm	-19.43 dB
1.915 GHz	3.000 GHz	1.000 MHz	2.97424 GHz	-38.90 dBm	-25.90 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.89976 GHz	-33.81 dBm	-20.81 dB
7.000 GHz	13.600 GHz	1.000 MHz	12.85072 GHz	-33.29 dBm	-20.29 dB
13.600 GHz	19.500 GHz	1.000 MHz	17.90353 GHz	-31.97 dBm	-18.97 dB

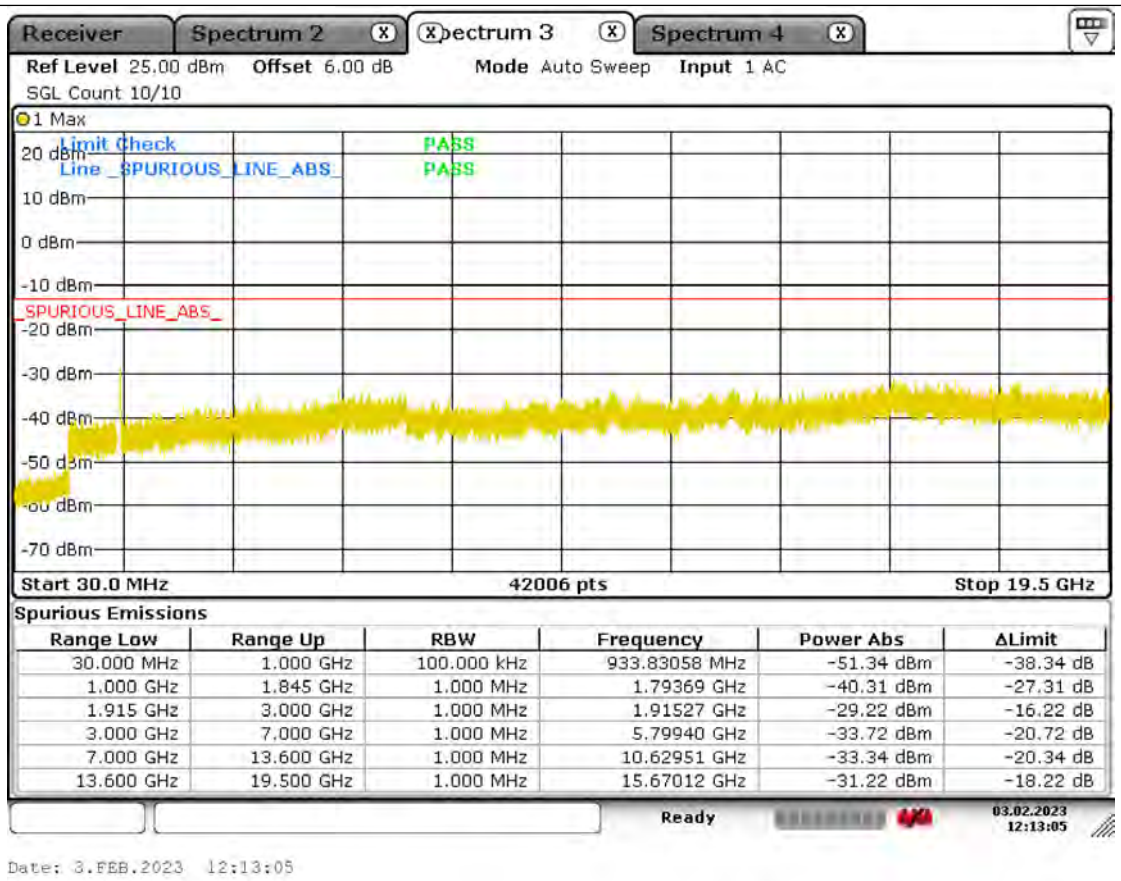
Band2-9262-3000~19100MHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	100.000 kHz	985.69965 MHz	-52.09 dBm	-39.09 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.84437 GHz	-32.43 dBm	-19.43 dB
1.915 GHz	3.000 GHz	1.000 MHz	2.97424 GHz	-38.90 dBm	-25.90 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.89976 GHz	-33.81 dBm	-20.81 dB
7.000 GHz	13.600 GHz	1.000 MHz	12.85072 GHz	-33.29 dBm	-20.29 dB
13.600 GHz	19.500 GHz	1.000 MHz	17.90353 GHz	-31.97 dBm	-18.97 dB

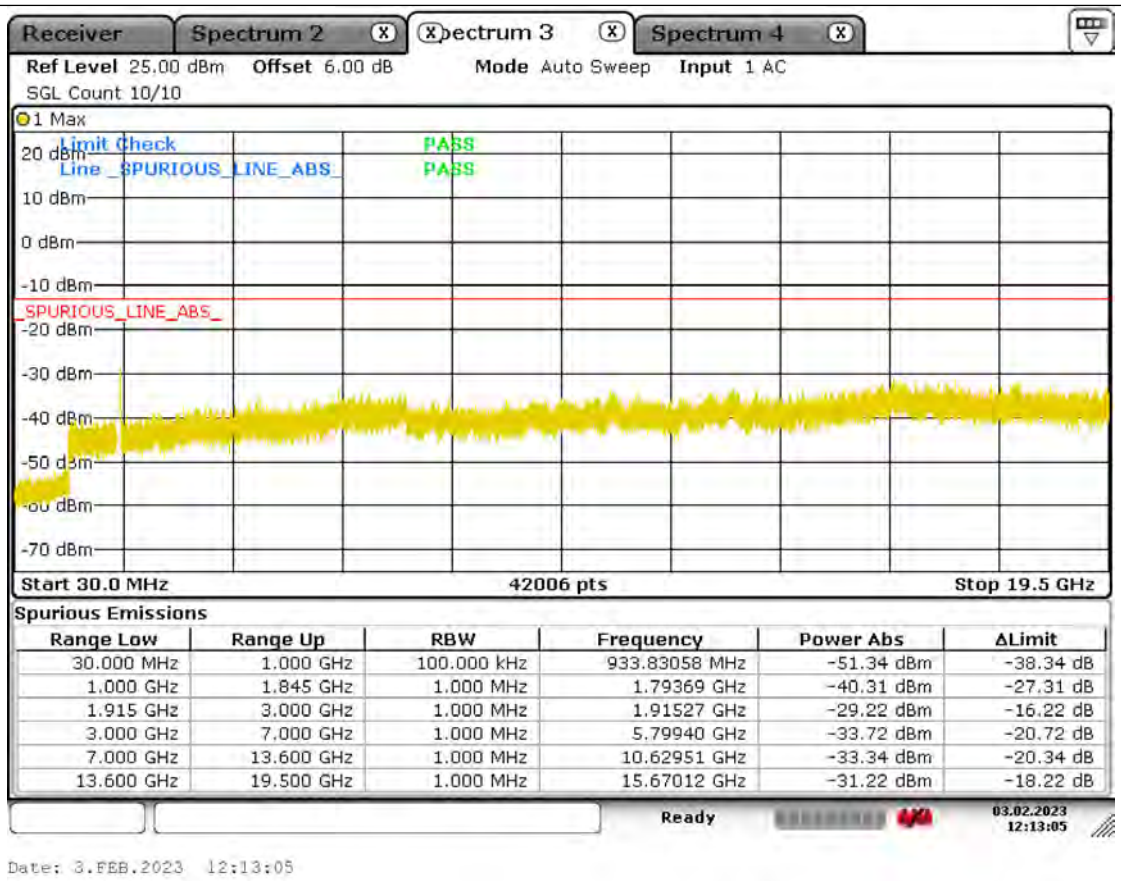
Band2-9400-30~1000MHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	100.000 kHz	933.83058 MHz	-51.34 dBm	-38.34 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.79369 GHz	-40.31 dBm	-27.31 dB
1.915 GHz	3.000 GHz	1.000 MHz	1.91527 GHz	-29.22 dBm	-16.22 dB
3.000 GHz	7.000 GHz	1.000 MHz	5.79940 GHz	-33.72 dBm	-20.72 dB
7.000 GHz	13.600 GHz	1.000 MHz	10.62951 GHz	-33.34 dBm	-20.34 dB
13.600 GHz	19.500 GHz	1.000 MHz	15.67012 GHz	-31.22 dBm	-18.22 dB

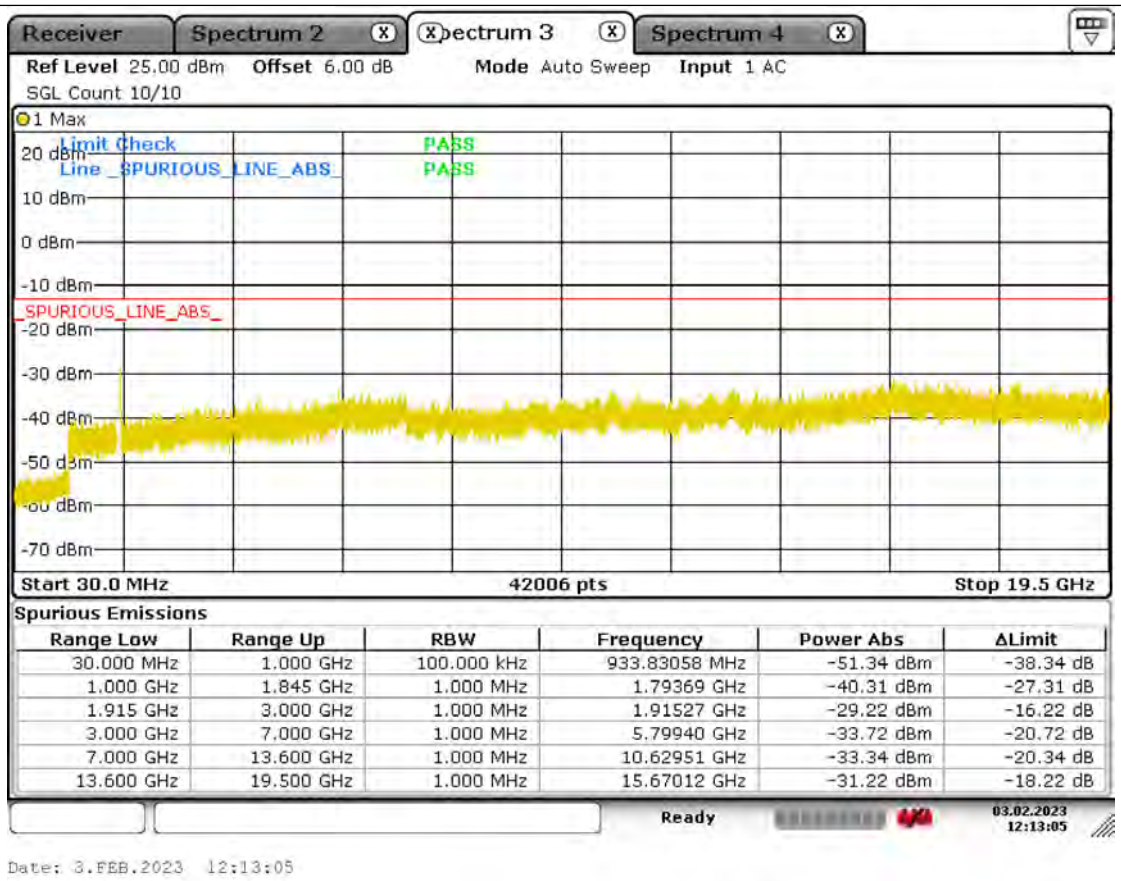
Band2-9400-1000~3000MHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	100.000 kHz	933.83058 MHz	-51.34 dBm	-38.34 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.79369 GHz	-40.31 dBm	-27.31 dB
1.915 GHz	3.000 GHz	1.000 MHz	1.91527 GHz	-29.22 dBm	-16.22 dB
3.000 GHz	7.000 GHz	1.000 MHz	5.79940 GHz	-33.72 dBm	-20.72 dB
7.000 GHz	13.600 GHz	1.000 MHz	10.62951 GHz	-33.34 dBm	-20.34 dB
13.600 GHz	19.500 GHz	1.000 MHz	15.67012 GHz	-31.22 dBm	-18.22 dB

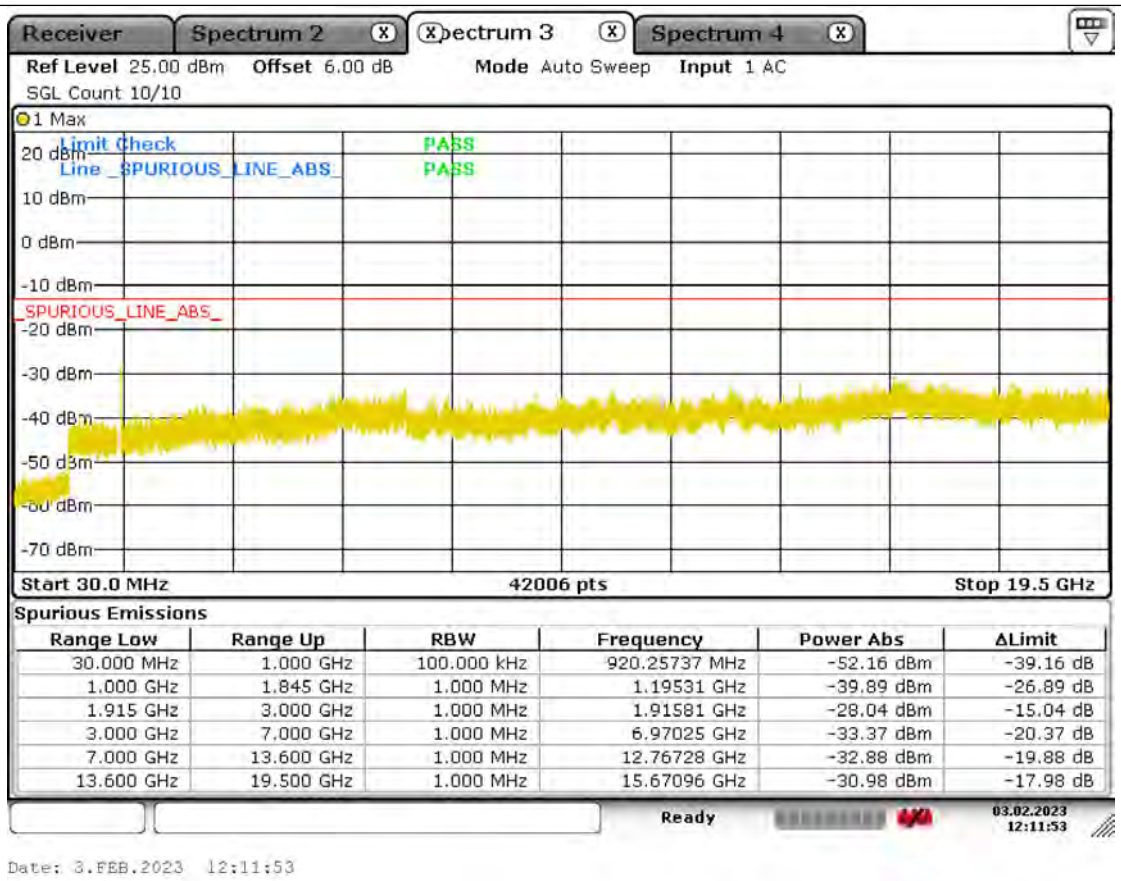
Band2-9400-3000~19100MHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	100.000 kHz	933.83058 MHz	-51.34 dBm	-38.34 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.79369 GHz	-40.31 dBm	-27.31 dB
1.915 GHz	3.000 GHz	1.000 MHz	1.91527 GHz	-29.22 dBm	-16.22 dB
3.000 GHz	7.000 GHz	1.000 MHz	5.79940 GHz	-33.72 dBm	-20.72 dB
7.000 GHz	13.600 GHz	1.000 MHz	10.62951 GHz	-33.34 dBm	-20.34 dB
13.600 GHz	19.500 GHz	1.000 MHz	15.67012 GHz	-31.22 dBm	-18.22 dB

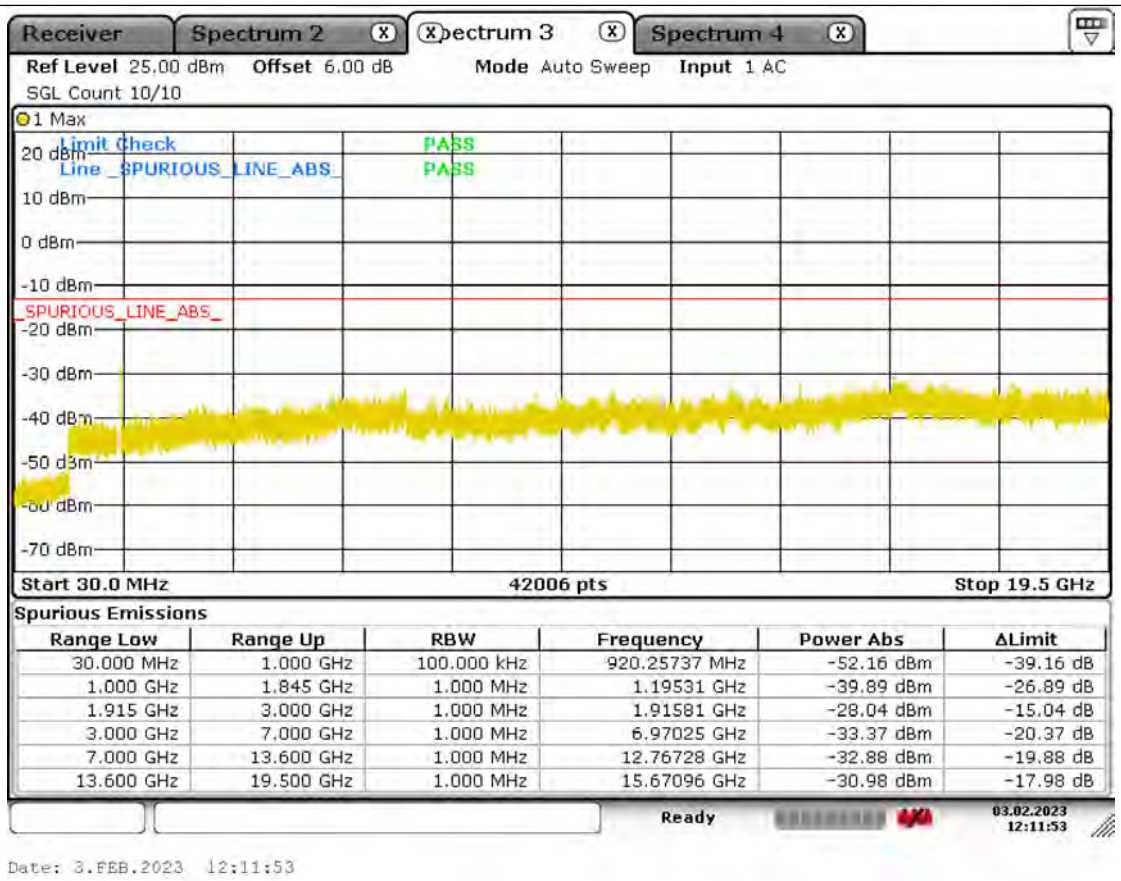
Band2-9538-30~1000MHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	100.000 kHz	920.25737 MHz	-52.16 dBm	-39.16 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.19531 GHz	-39.89 dBm	-26.89 dB
1.915 GHz	3.000 GHz	1.000 MHz	1.91581 GHz	-28.04 dBm	-15.04 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.97025 GHz	-33.37 dBm	-20.37 dB
7.000 GHz	13.600 GHz	1.000 MHz	12.76728 GHz	-32.88 dBm	-19.88 dB
13.600 GHz	19.500 GHz	1.000 MHz	15.67096 GHz	-30.98 dBm	-17.98 dB

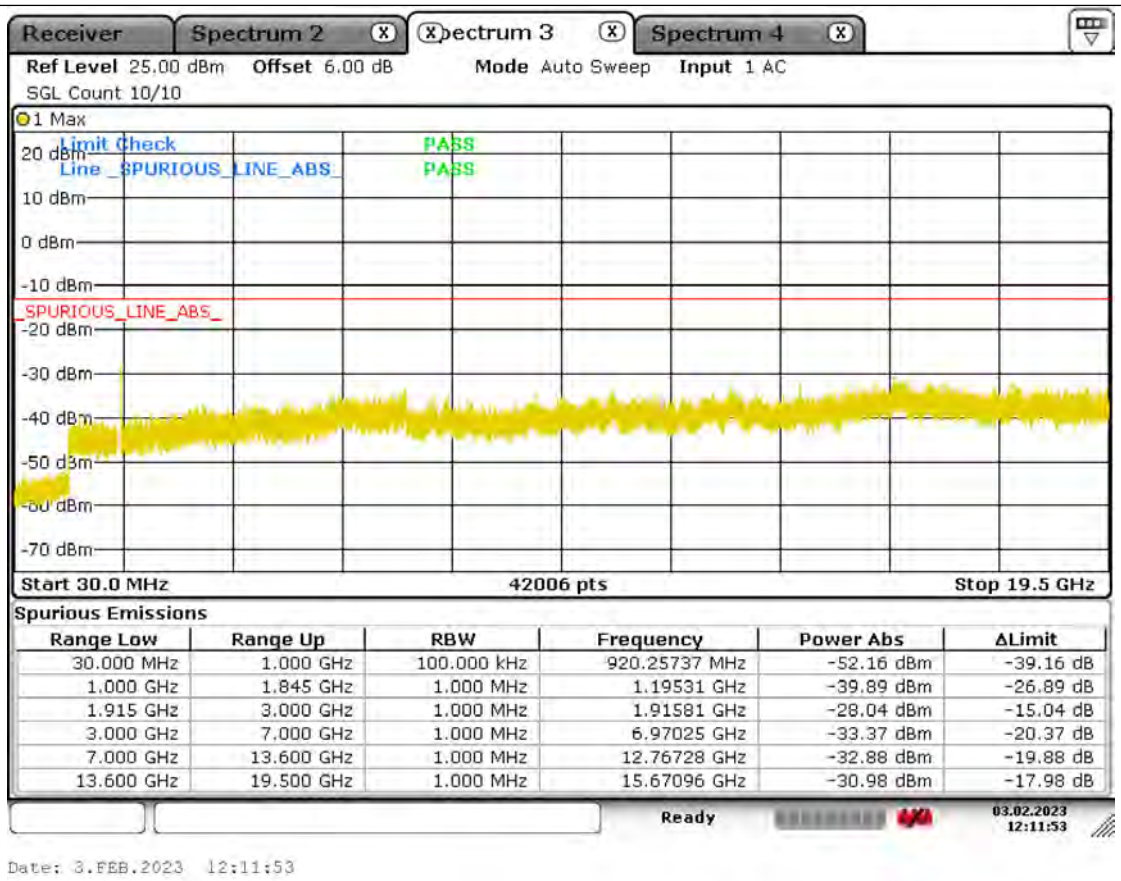
Band2-9538-1000~3000MHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	100.000 kHz	920.25737 MHz	-52.16 dBm	-39.16 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.19531 GHz	-39.89 dBm	-26.89 dB
1.915 GHz	3.000 GHz	1.000 MHz	1.91581 GHz	-28.04 dBm	-15.04 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.97025 GHz	-33.37 dBm	-20.37 dB
7.000 GHz	13.600 GHz	1.000 MHz	12.76728 GHz	-32.88 dBm	-19.88 dB
13.600 GHz	19.500 GHz	1.000 MHz	15.67096 GHz	-30.98 dBm	-17.98 dB

Band2-9538-3000~19100MHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	100.000 kHz	920.25737 MHz	-52.16 dBm	-39.16 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.19531 GHz	-39.89 dBm	-26.89 dB
1.915 GHz	3.000 GHz	1.000 MHz	1.91581 GHz	-28.04 dBm	-15.04 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.97025 GHz	-33.37 dBm	-20.37 dB
7.000 GHz	13.600 GHz	1.000 MHz	12.76728 GHz	-32.88 dBm	-19.88 dB
13.600 GHz	19.500 GHz	1.000 MHz	15.67096 GHz	-30.98 dBm	-17.98 dB

FREQUENCY STABILITY

Test Result

Voltage							
Band	Channel	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band2	9262	VL	NT	-5.7	-0.003077	±2.5	PASS
Band2	9262	VN	NT	-1.91	-0.001031	±2.5	PASS
Band2	9262	VH	NT	-5.31	-0.002867	±2.5	PASS
Band2	9400	VL	NT	4.65	0.002473	±2.5	PASS
Band2	9400	VN	NT	4.81	0.002559	±2.5	PASS
Band2	9400	VH	NT	5.11	0.002718	±2.5	PASS
Band2	9538	VL	NT	-8	-0.004045	±2.5	PASS
Band2	9538	VN	NT	0.18	0.000091	±2.5	PASS
Band2	9538	VH	NT	3.34	0.001689	±2.5	PASS

Temperature							
Band	Channel	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band2	1852.4	NV	-30	4.6	0.002483	±2.5	PASS
Band2	1852.4	NV	-20	-8.78	-0.004740	±2.5	PASS
Band2	1852.4	NV	0	-1.08	-0.000583	±2.5	PASS
Band2	1852.4	NV	10	2.42	0.001306	±2.5	PASS
Band2	1852.4	NV	20	7.06	0.003811	±2.5	PASS
Band2	1852.4	NV	30	6.15	0.003320	±2.5	PASS
Band2	1852.4	NV	40	6.66	0.003595	±2.5	PASS
Band2	1852.4	NV	50	1.08	0.000583	±2.5	PASS
Band2	1880	NV	-30	4.99	0.002654	±2.5	PASS
Band2	1880	NV	-20	0.72	0.000383	±2.5	PASS
Band2	1880	NV	0	-9.78	-0.005202	±2.5	PASS
Band2	1880	NV	10	1.9	0.001011	±2.5	PASS
Band2	1880	NV	20	-4.14	-0.002202	±2.5	PASS
Band2	1880	NV	30	8.09	0.004303	±2.5	PASS
Band2	1880	NV	40	9.34	0.004968	±2.5	PASS
Band2	1880	NV	50	-2.05	-0.001090	±2.5	PASS
Band2	1977.6	NV	-30	-4.49	-0.002270	±2.5	PASS
Band2	1977.6	NV	-20	4.15	0.002099	±2.5	PASS
Band2	1977.6	NV	0	-8.06	-0.004076	±2.5	PASS
Band2	1977.6	NV	10	-6.02	-0.003044	±2.5	PASS
Band2	1977.6	NV	20	-9.1	-0.004602	±2.5	PASS
Band2	1977.6	NV	30	9.5	0.004804	±2.5	PASS
Band2	1977.6	NV	40	-4.86	-0.002458	±2.5	PASS
Band2	1977.6	NV	50	-1.04	-0.000526	±2.5	PASS

LTE BAND 2

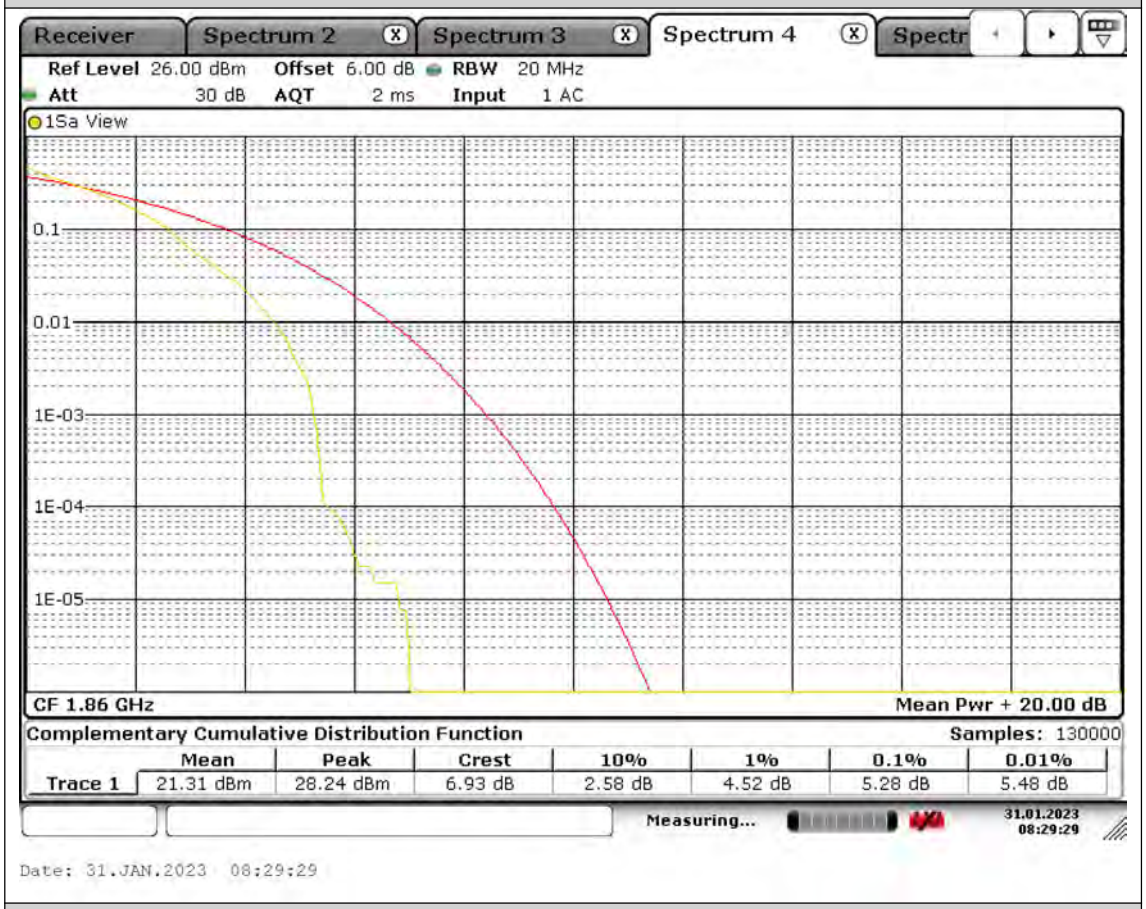
PEAK-TO-AVERAGE RATIO(CCDF)

Test Result

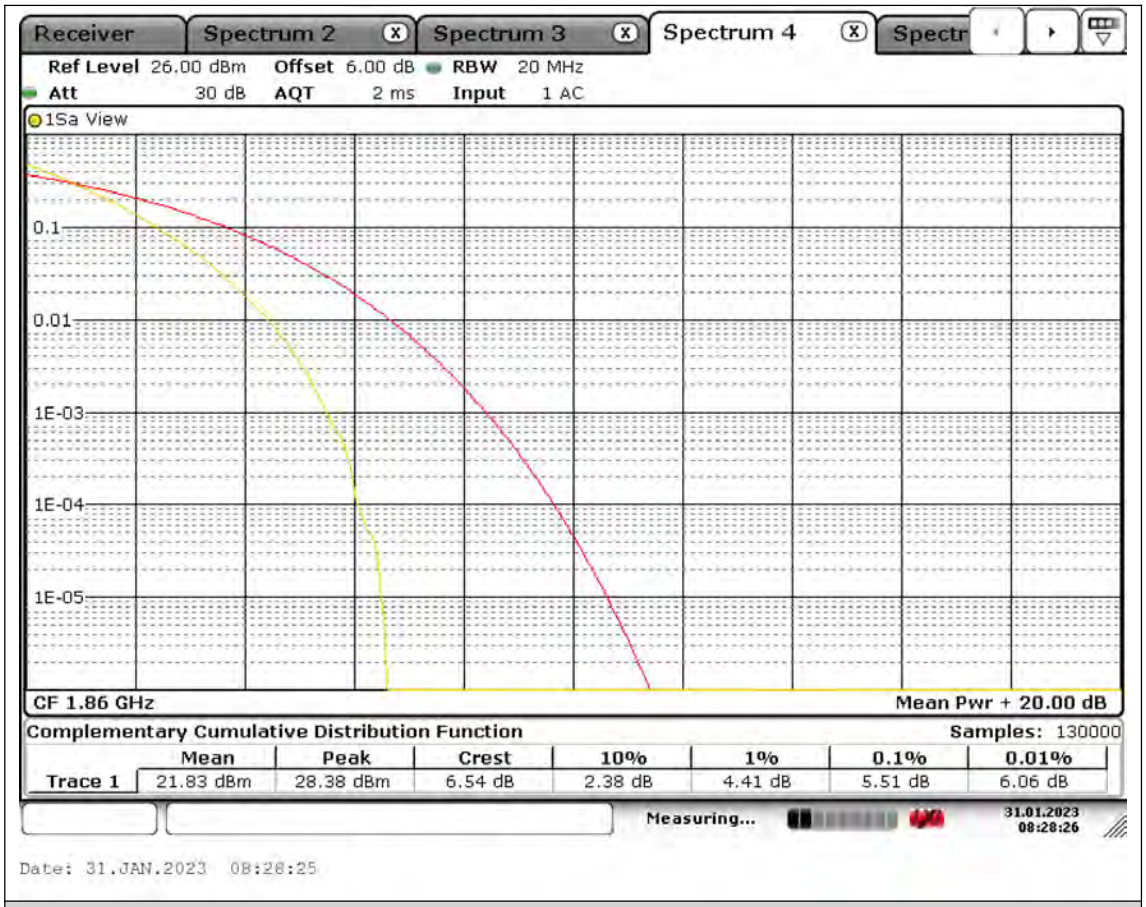
Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dB)	Limit(dB)	Verdict
Band2	20MHz	QPSK	18700	1RB#0	5.28	13	PASS
Band2	20MHz	QPSK	18700	100RB#0	5.51	13	PASS
Band2	20MHz	QPSK	18900	1RB#0	5.19	13	PASS
Band2	20MHz	QPSK	18900	100RB#0	5.54	13	PASS
Band2	20MHz	QPSK	19100	1RB#0	5.19	13	PASS
Band2	20MHz	QPSK	19100	100RB#0	5.39	13	PASS
Band2	20MHz	16QAM	18700	1RB#0	6.26	13	PASS
Band2	20MHz	16QAM	18700	100RB#0	6.38	13	PASS
Band2	20MHz	16QAM	18900	1RB#0	5.83	13	PASS
Band2	20MHz	16QAM	18900	100RB#0	6.38	13	PASS
Band2	20MHz	16QAM	19100	1RB#0	6.14	13	PASS
Band2	20MHz	16QAM	19100	100RB#0	6.29	13	PASS
Band2	20MHz	64QAM	18700	1RB#0	6.12	13	PASS
Band2	20MHz	64QAM	18700	100RB#0	6.55	13	PASS
Band2	20MHz	64QAM	18900	1RB#0	6.38	13	PASS
Band2	20MHz	64QAM	18900	100RB#0	6.70	13	PASS
Band2	20MHz	64QAM	19100	1RB#0	6.09	13	PASS
Band2	20MHz	64QAM	19100	100RB#0	6.58	13	PASS

Test Graphs

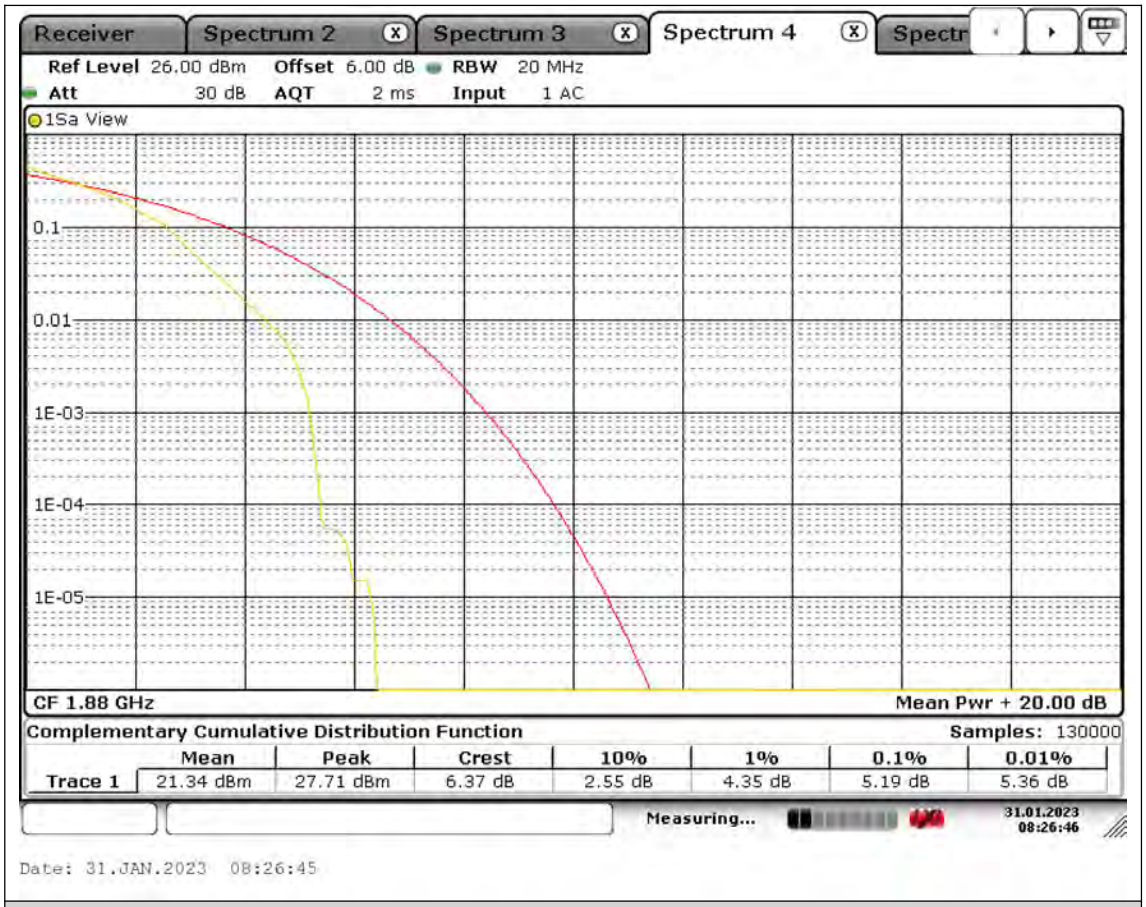
Band2-20MHz-QPSK-18700-1RB#0



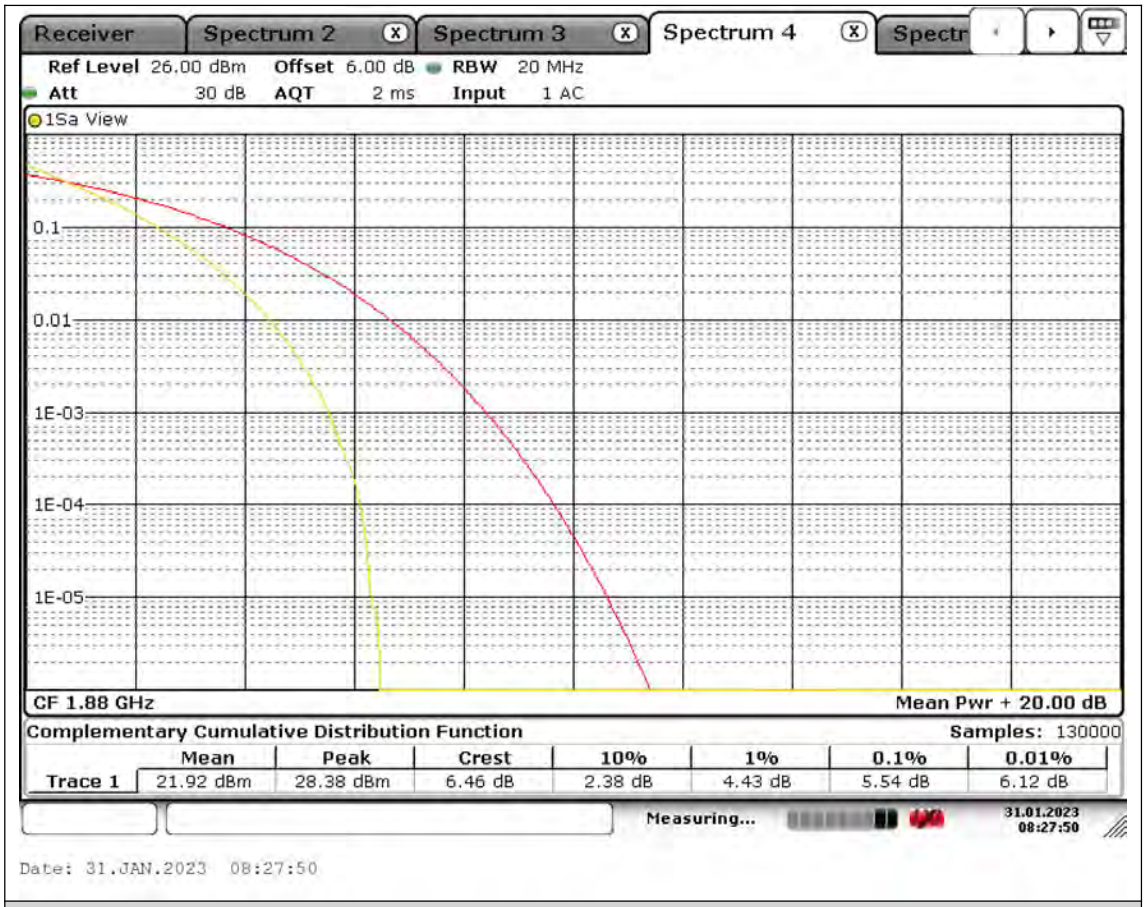
Band2-20MHz-QPSK-18700-100RB#0



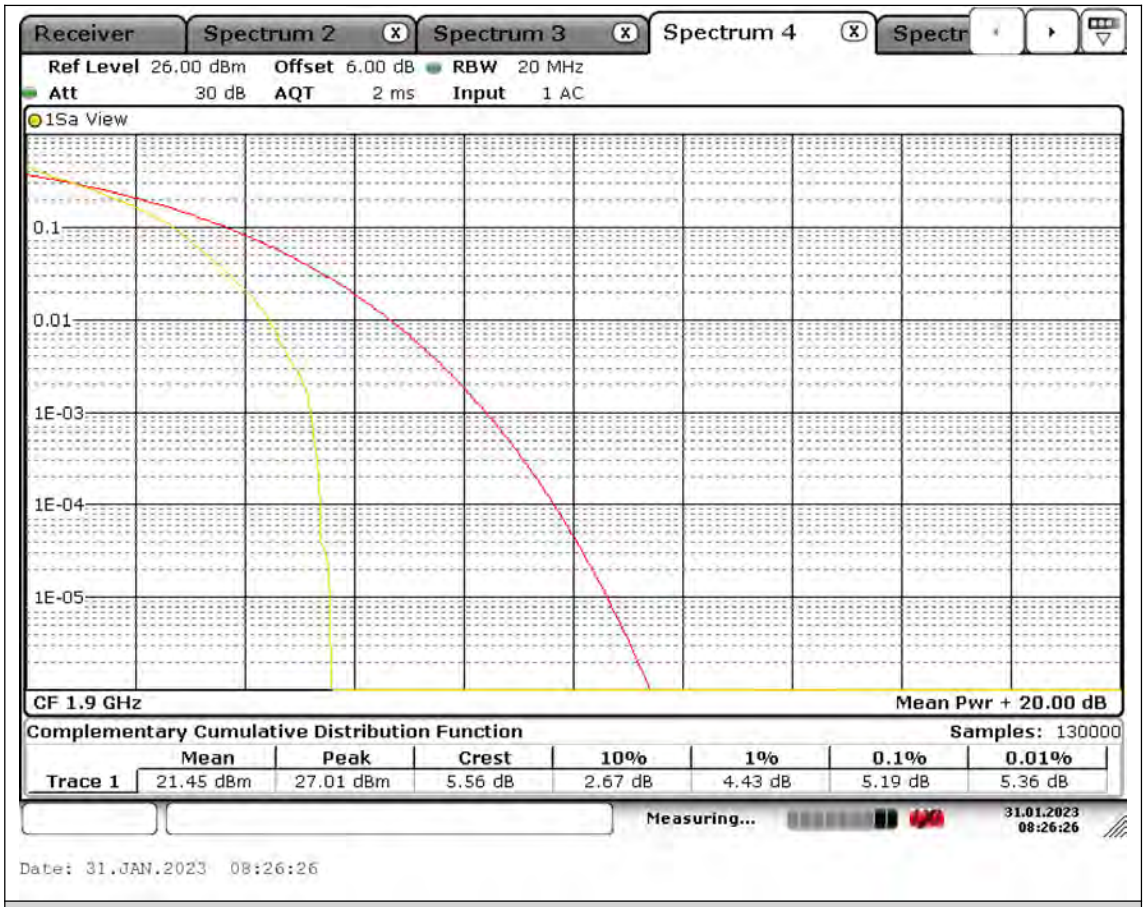
Band2-20MHz-QPSK-18900-1RB#0



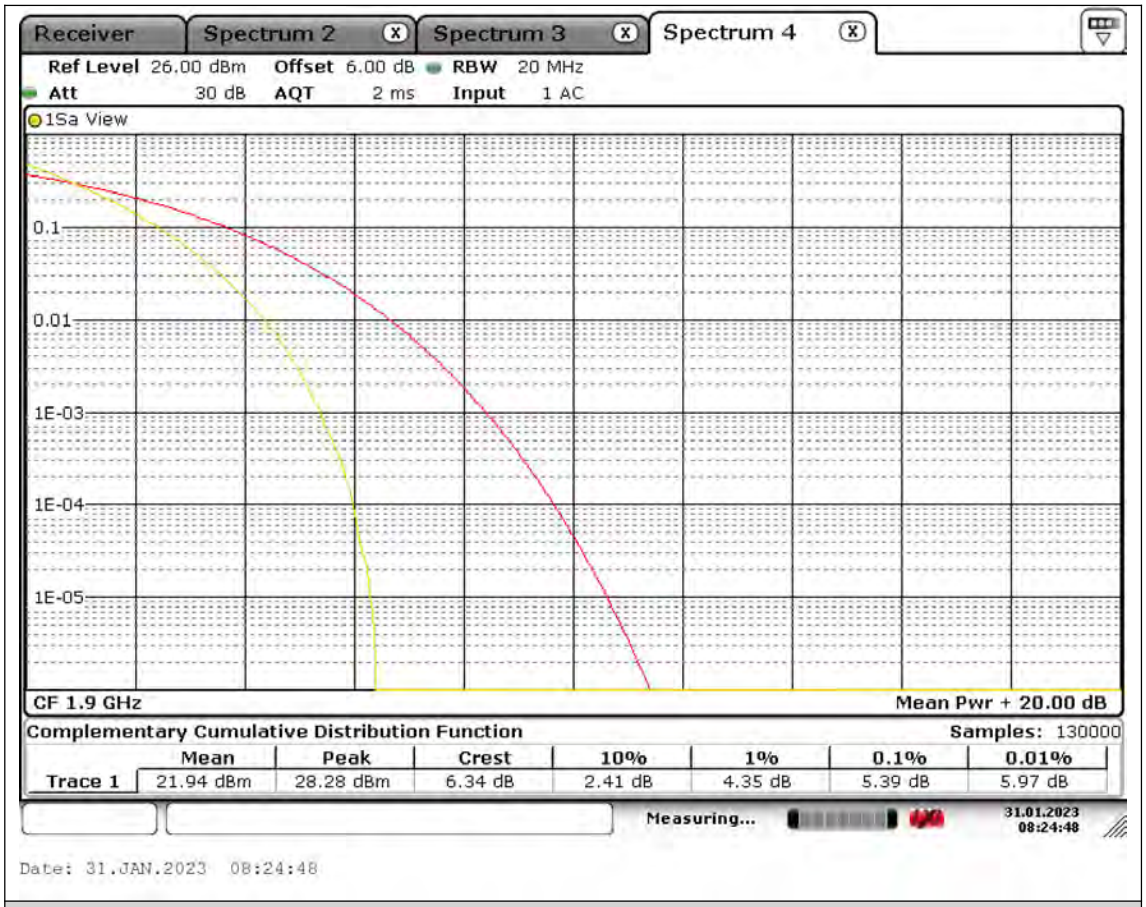
Band2-20MHz-QPSK-18900-100RB#0



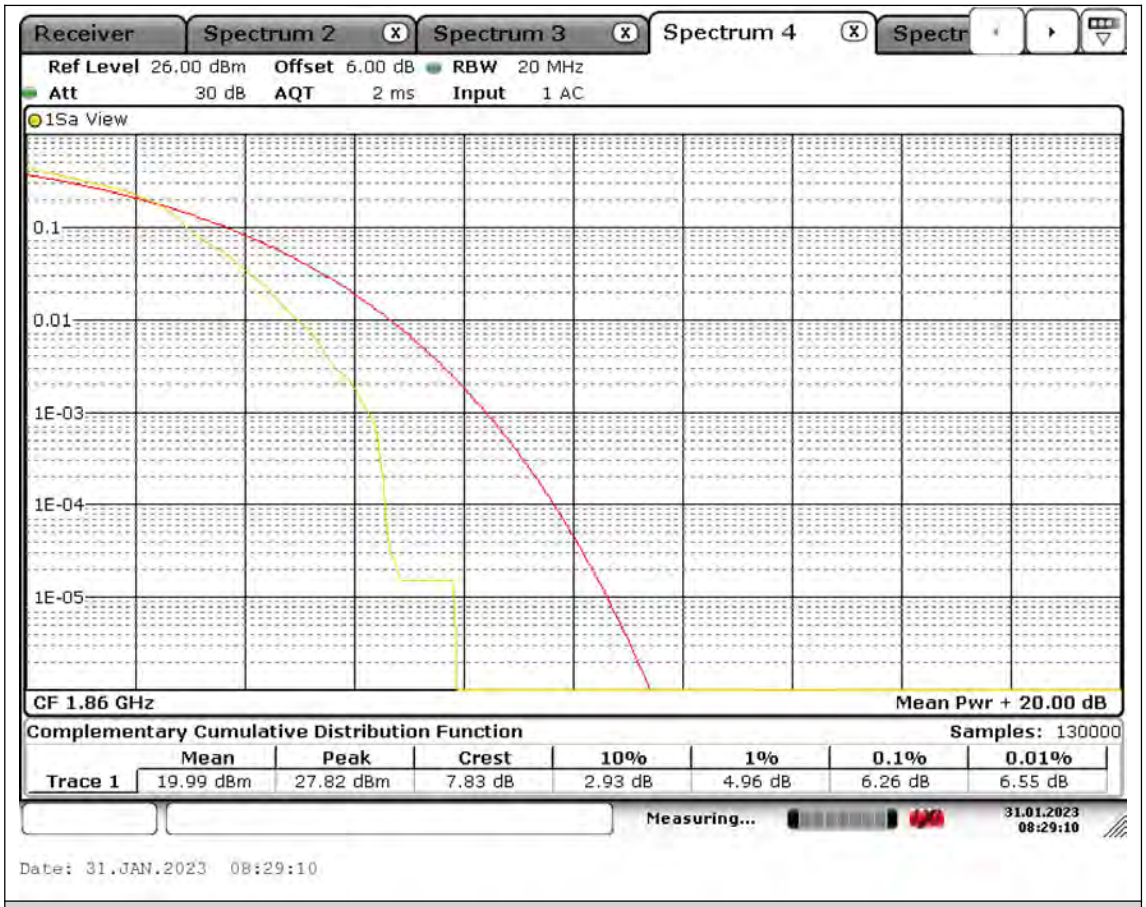
Band2-20MHz-QPSK-19100-1RB#0



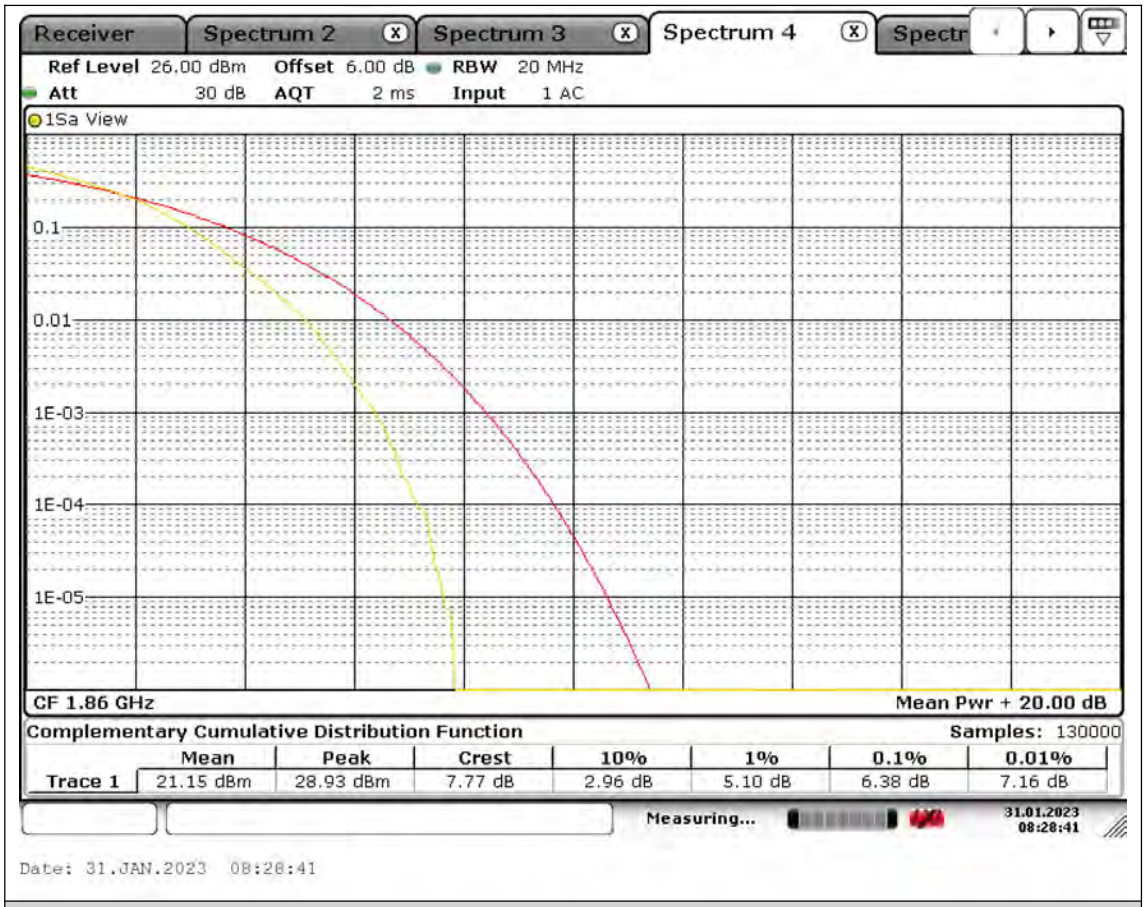
Band2-20MHz-QPSK-19100-100RB#0



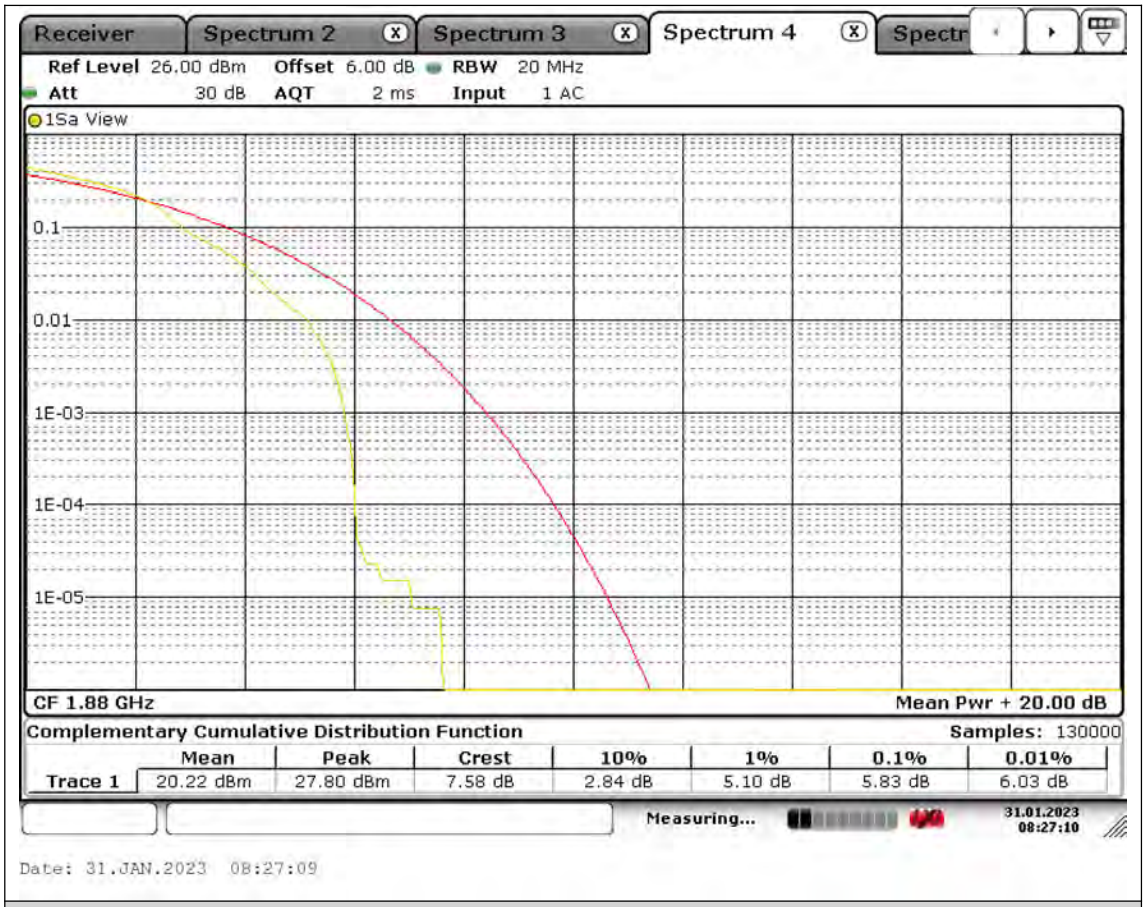
Band2-20MHz-16QAM-18700-1RB#0



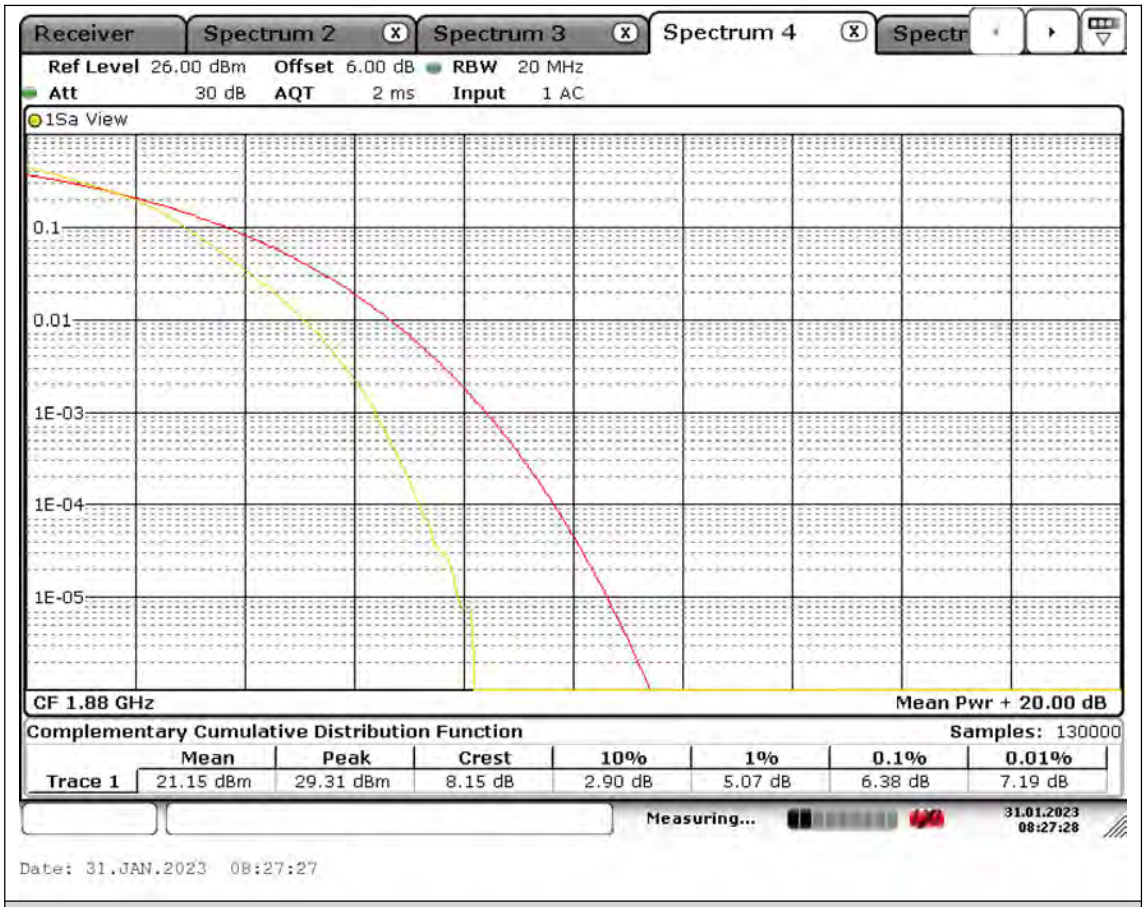
Band2-20MHz-16QAM-18700-100RB#0



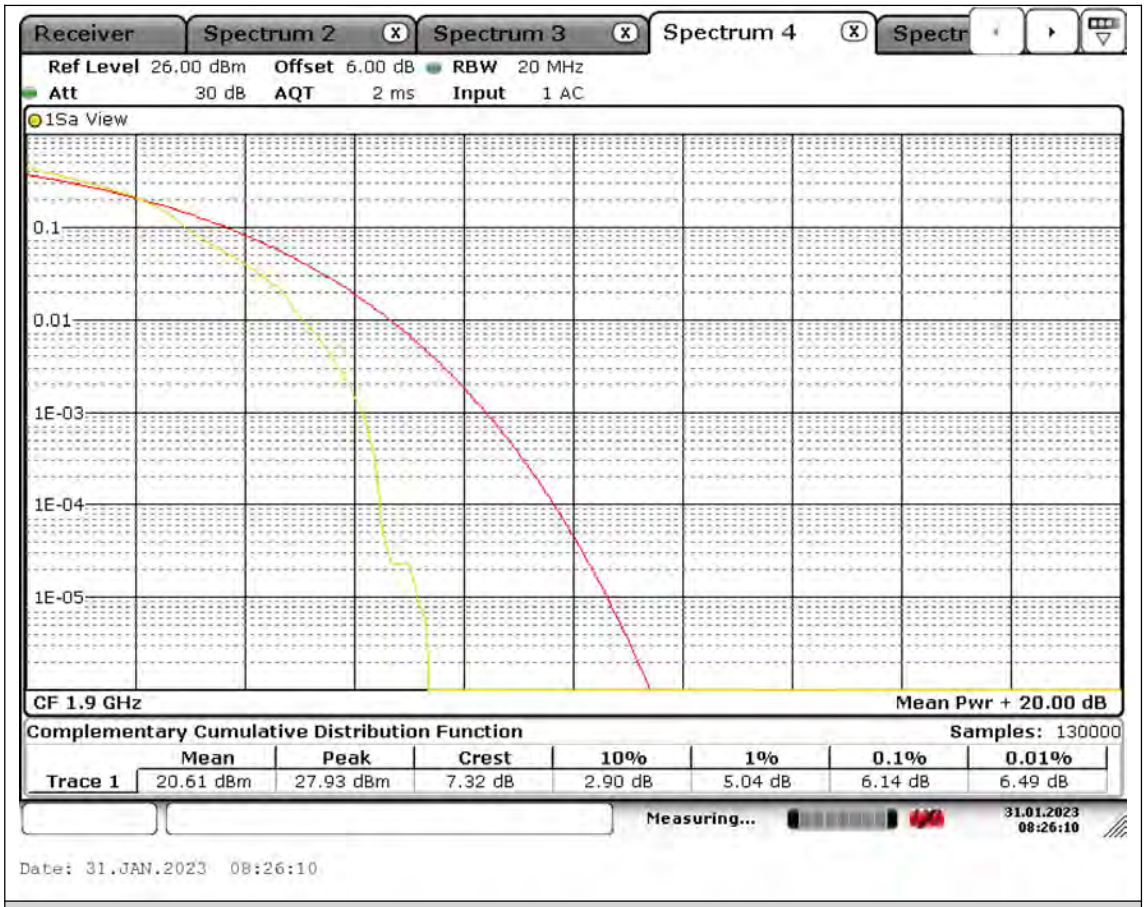
Band2-20MHz-16QAM-18900-1RB#0



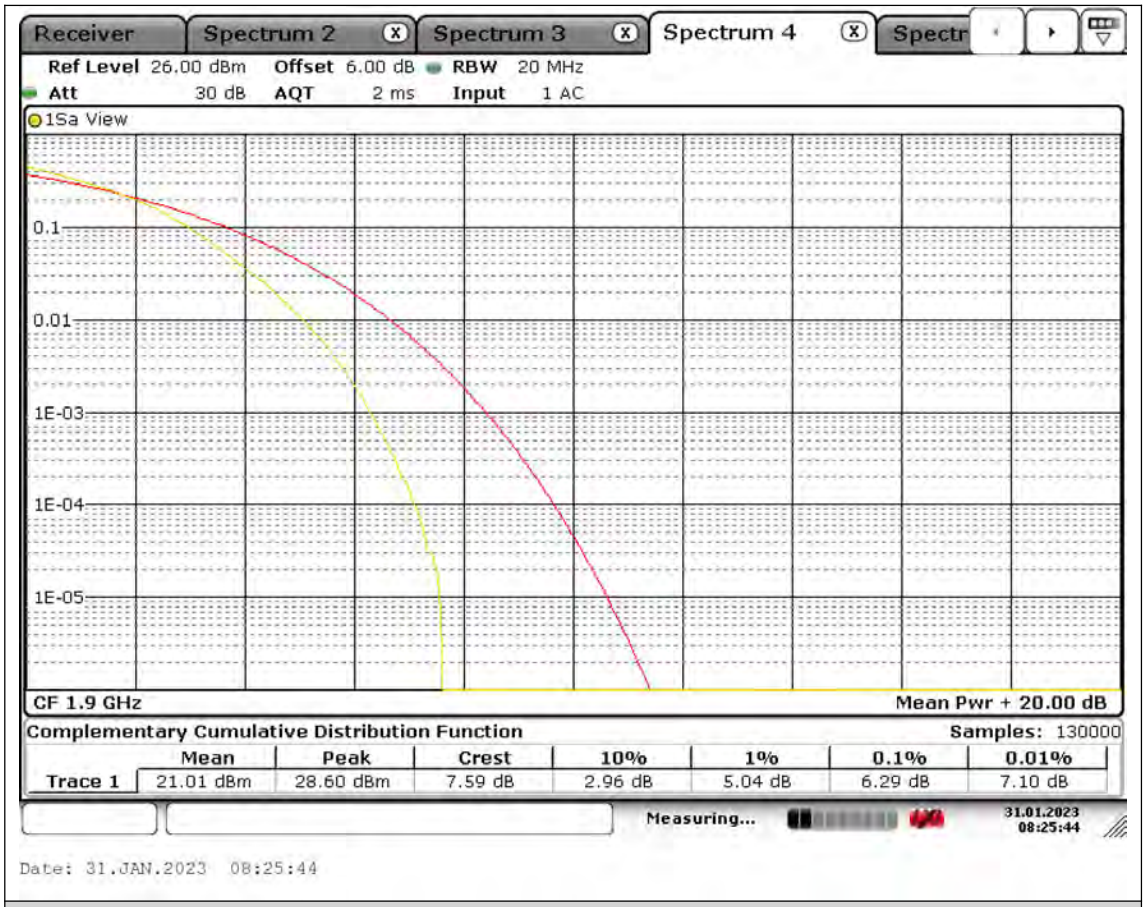
Band2-20MHz-16QAM-18900-100RB#0



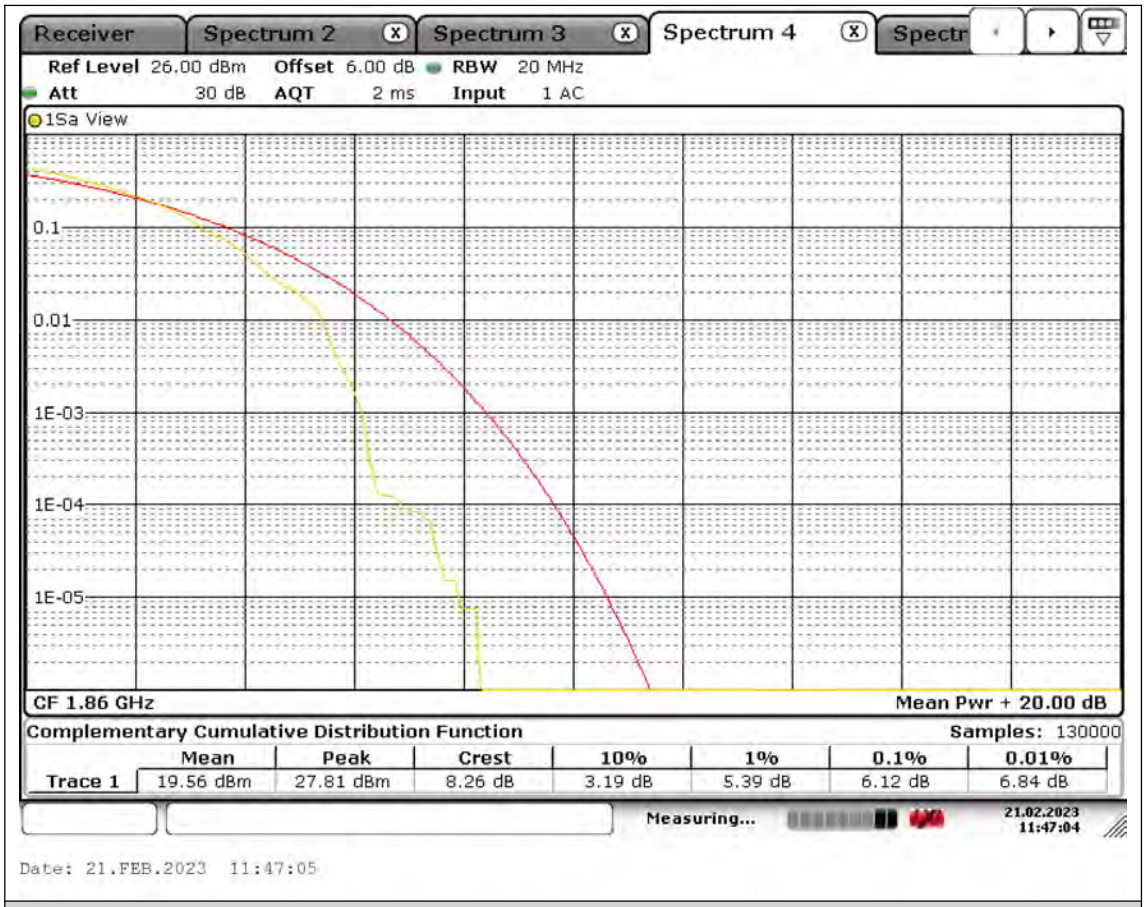
Band2-20MHz-16QAM-19100-1RB#0



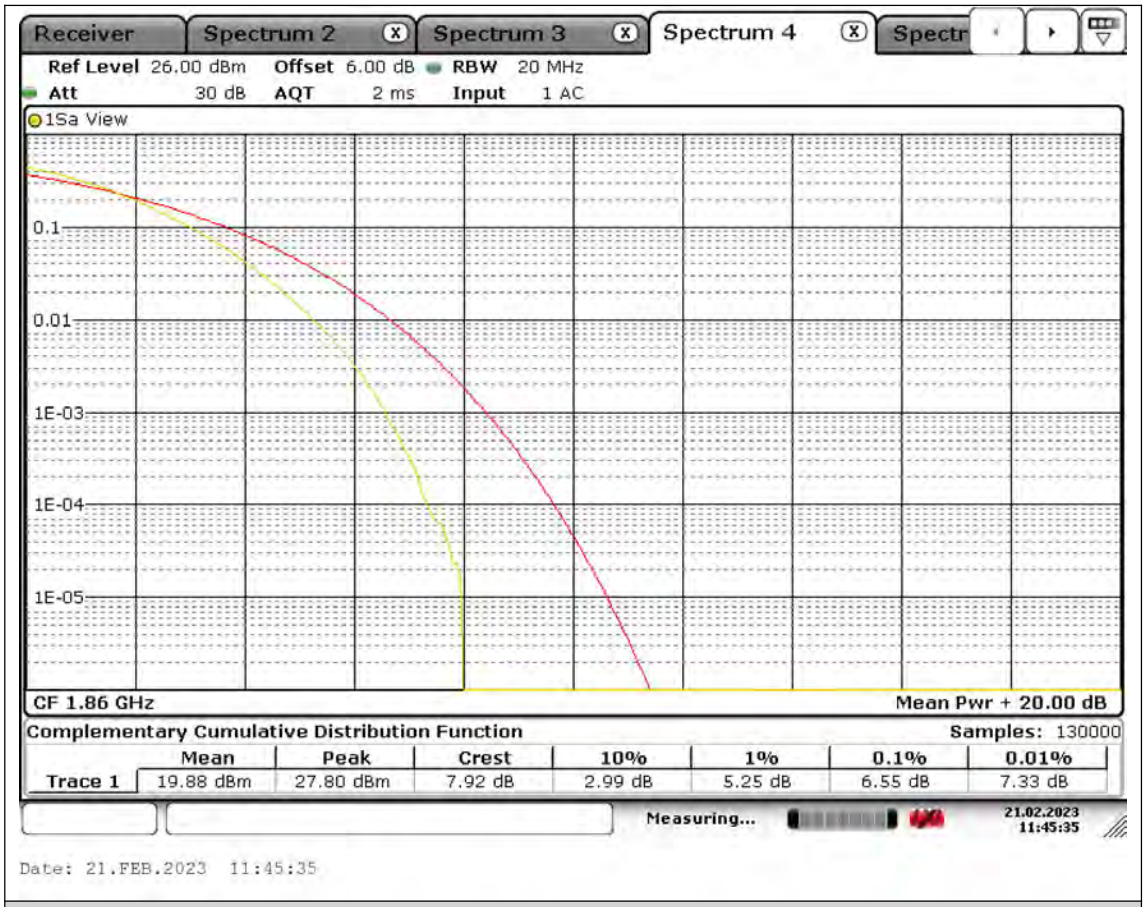
Band2-20MHz-16QAM-19100-100RB#0



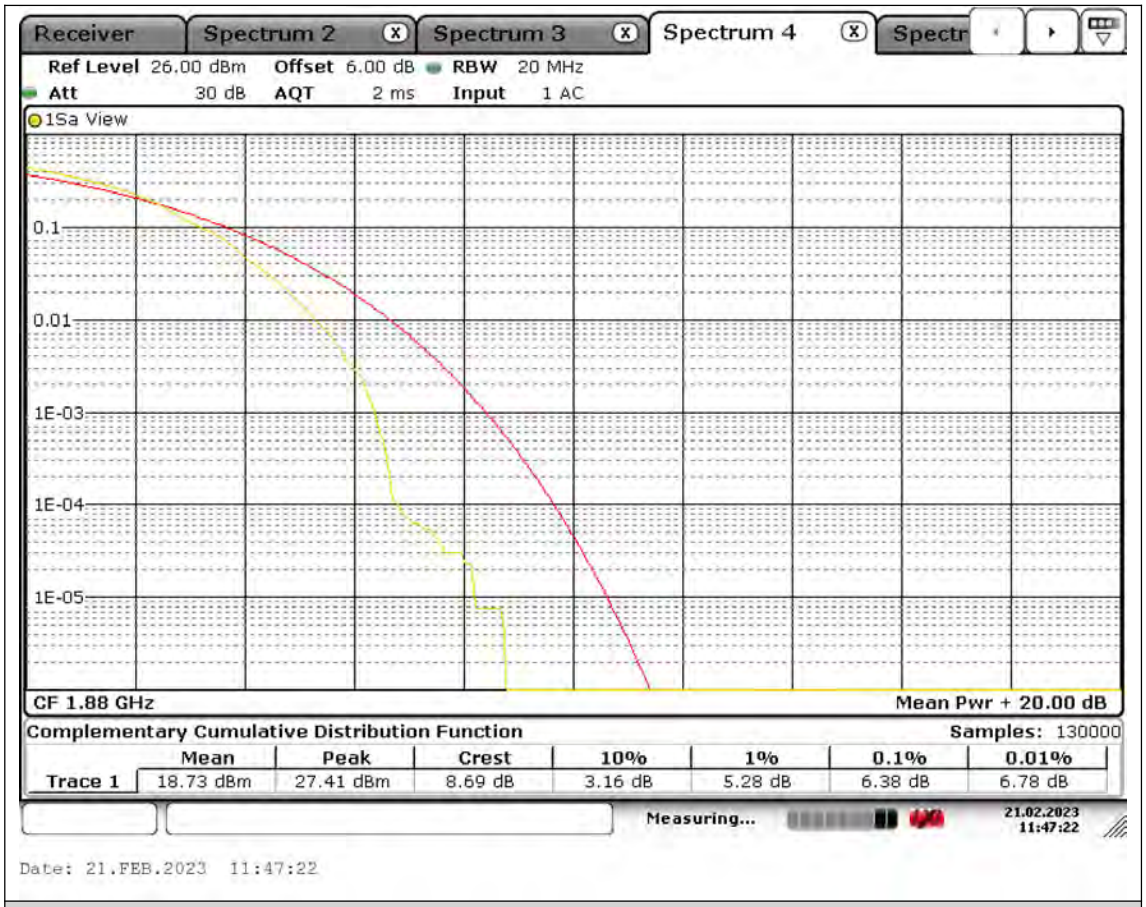
Band2-20MHz-64QAM-18700-1RB#0



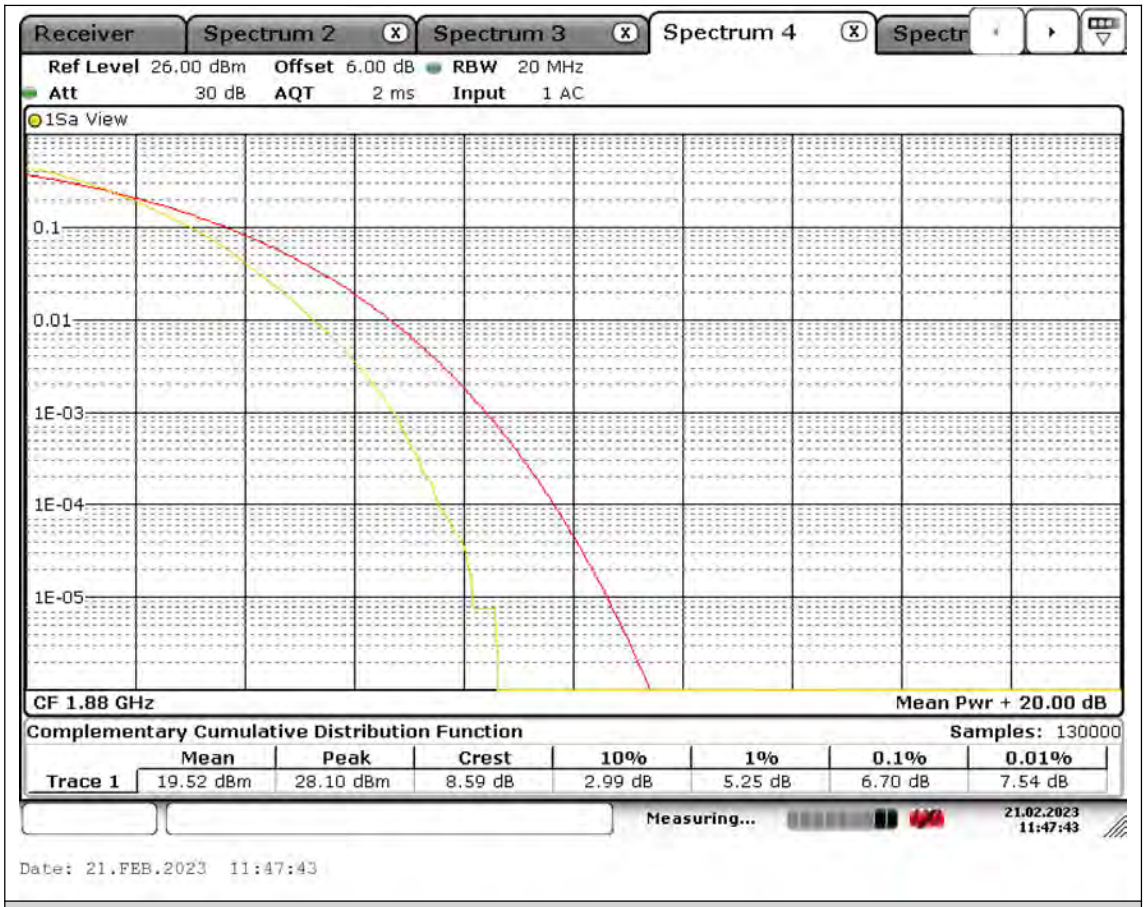
Band2-20MHz-64QAM-18700-100RB#0



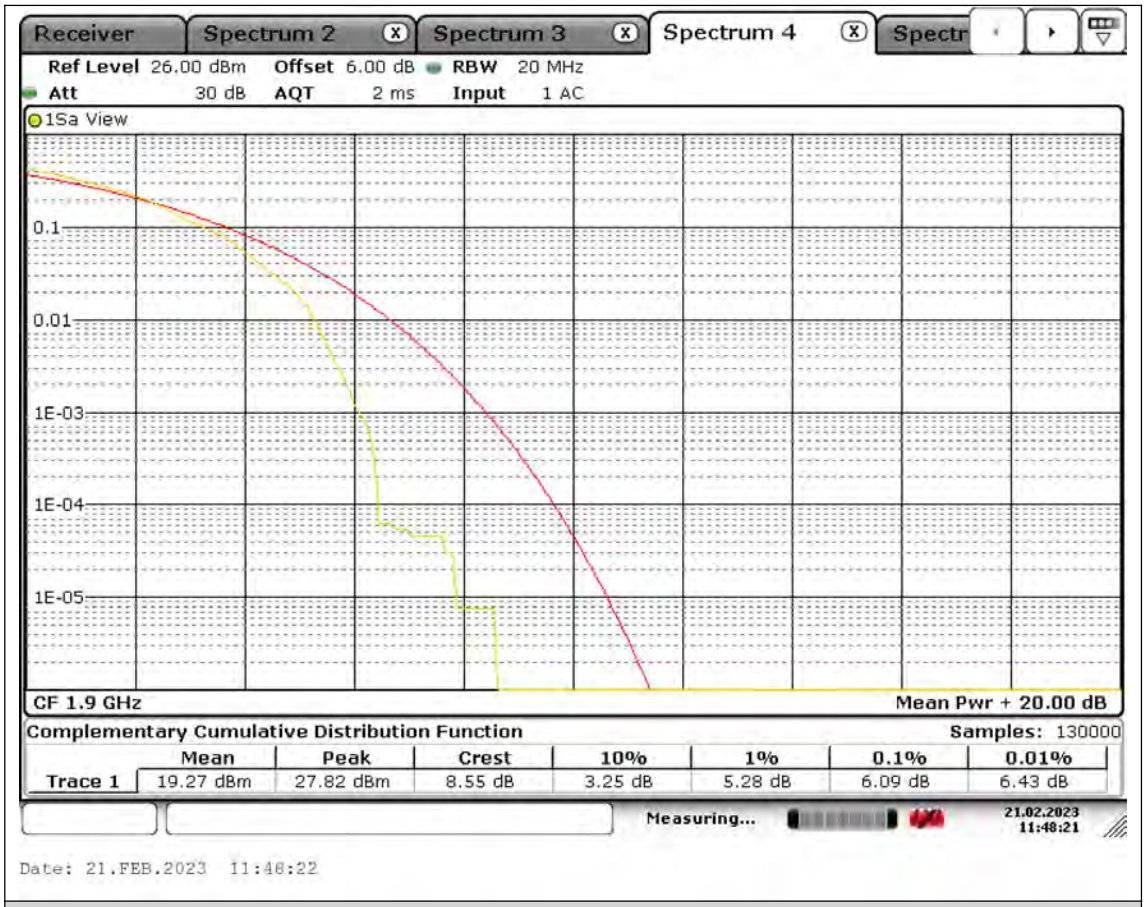
Band2-20MHz-64QAM-18900-1RB#0



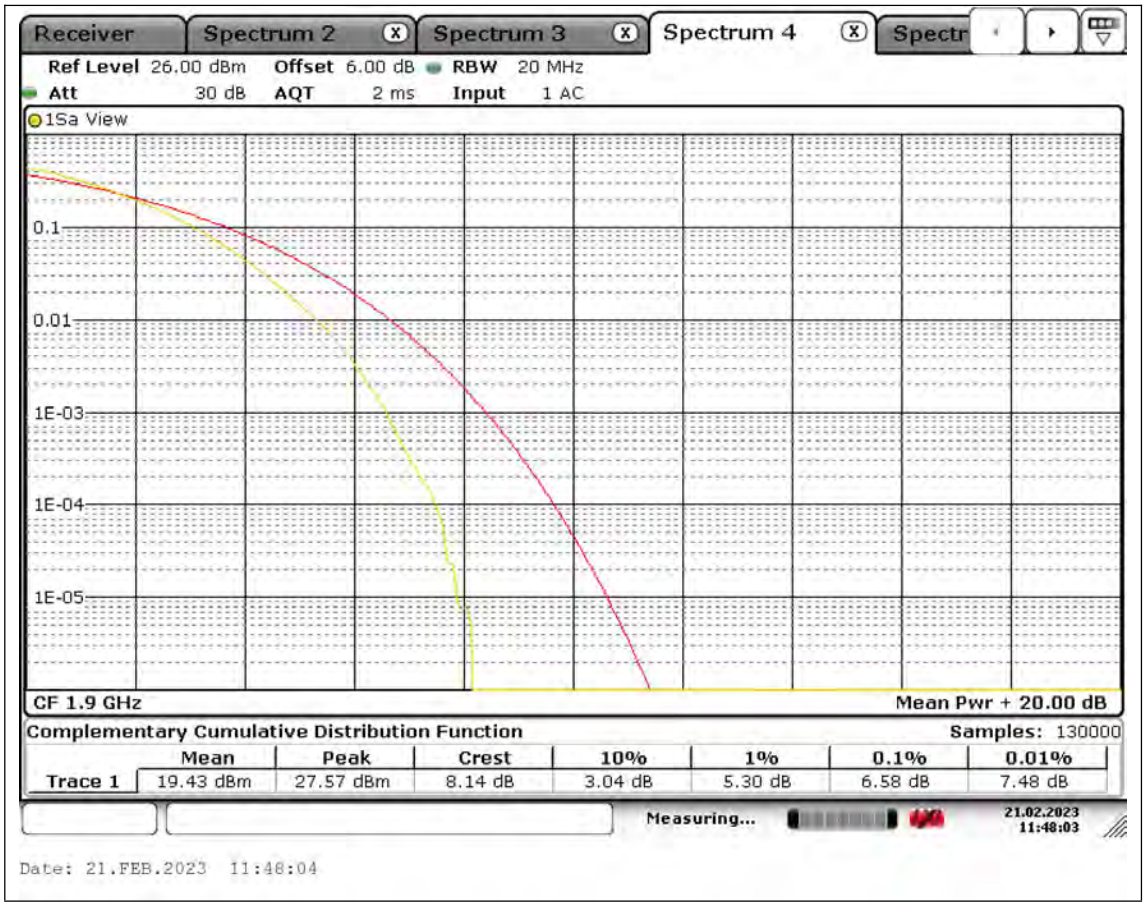
Band2-20MHz-64QAM-18900-100RB#0



Band2-20MHz-64QAM-19100-1RB#0



Band2-20MHz-64QAM-19100-100RB#0


Receiver
Spectrum 2
Spectrum 3
Spectrum 4
Spectr
Ref Level 26.00 dBm Offset 6.00 dB RBW 20 MHz
Att 30 dB AQT 2 ms Input 1 AC
1Sa View
0.1
0.01
1E-03
1E-04
1E-05
CF 1.9 GHz
Mean Pwr + 20.00 dB
Complementary Cumulative Distribution Function
Samples: 130000
Mean Peak Crest 10% 1% 0.1% 0.01%
Trace 1 19.43 dBm 27.57 dBm 8.14 dB 3.04 dB 5.30 dB 6.58 dB 7.48 dB
Measuring...
21.02.2023
11:48:03
Date: 21.FEB.2023 11:48:04

26DB BANDWIDTH AND OCCUPIED BANDWIDTH

Test Result

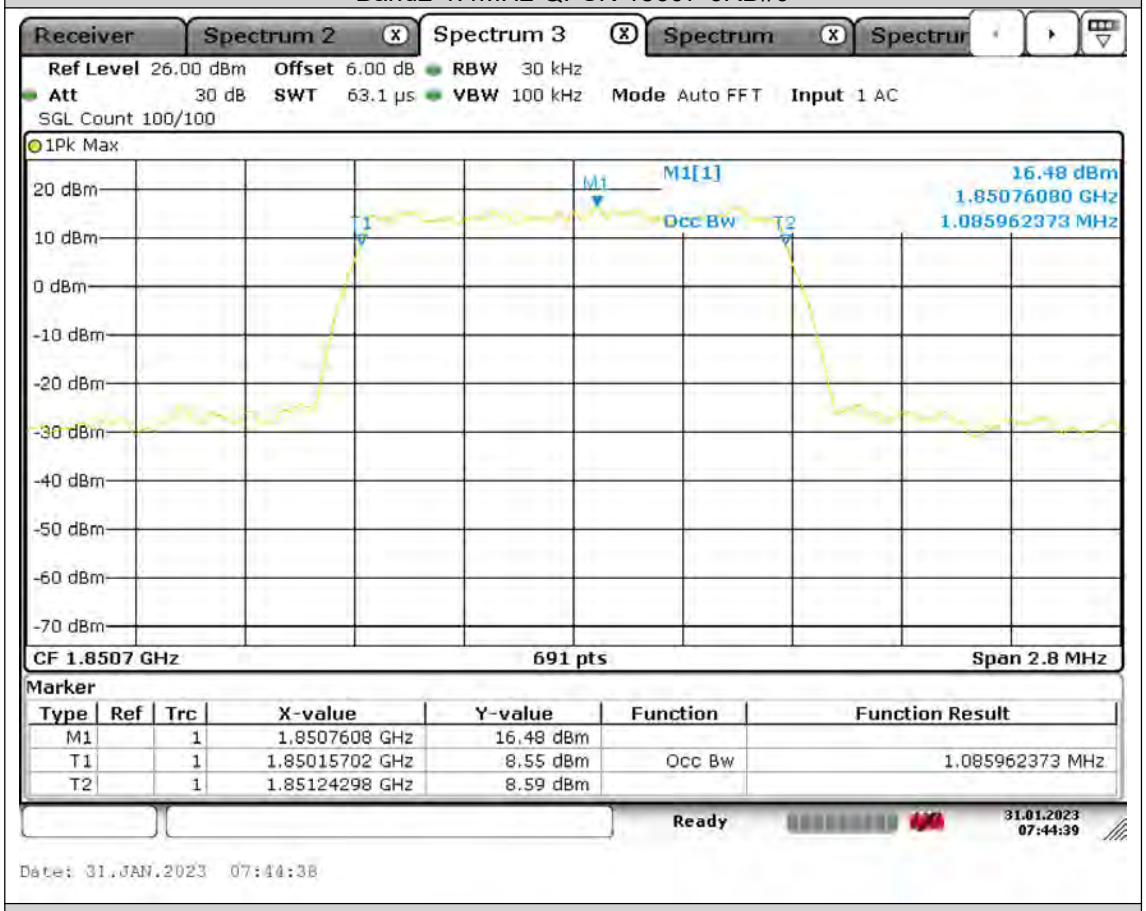
Band	Bandwidth	Modulation	Channel	RB Configuration	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
Band2	1.4MHz	QPSK	18607	6RB#0	1.086	1.240	PASS
Band2	1.4MHz	QPSK	18900	6RB#0	1.086	1.240	PASS
Band2	1.4MHz	QPSK	19193	6RB#0	1.094	1.248	PASS
Band2	1.4MHz	16QAM	18607	6RB#0	1.098	1.244	PASS
Band2	1.4MHz	16QAM	18900	6RB#0	1.090	1.248	PASS
Band2	1.4MHz	16QAM	19193	6RB#0	1.094	1.240	PASS
Band2	3MHz	QPSK	18615	15RB#0	2.744	3.039	PASS
Band2	3MHz	QPSK	18900	15RB#0	2.726	3.074	PASS
Band2	3MHz	QPSK	19185	15RB#0	2.735	3.100	PASS
Band2	3MHz	16QAM	18615	15RB#0	2.726	3.048	PASS
Band2	3MHz	16QAM	18900	15RB#0	2.718	3.048	PASS
Band2	3MHz	16QAM	19185	15RB#0	2.718	3.083	PASS
Band2	5MHz	QPSK	18625	25RB#0	4.486	4.877	PASS
Band2	5MHz	QPSK	18900	25RB#0	4.486	4.935	PASS
Band2	5MHz	QPSK	19175	25RB#0	4.486	4.920	PASS
Band2	5MHz	16QAM	18625	25RB#0	4.486	4.935	PASS
Band2	5MHz	16QAM	18900	25RB#0	4.486	4.920	PASS
Band2	5MHz	16QAM	19175	25RB#0	4.501	4.993	PASS
Band2	10MHz	QPSK	18650	50RB#0	9.001	9.841	PASS
Band2	10MHz	QPSK	18900	50RB#0	9.088	10.014	PASS
Band2	10MHz	QPSK	19150	50RB#0	9.030	9.841	PASS
Band2	10MHz	16QAM	18650	50RB#0	9.030	9.754	PASS
Band2	10MHz	16QAM	18900	50RB#0	9.001	9.841	PASS
Band2	10MHz	16QAM	19150	50RB#0	9.204	10.043	PASS
Band2	15MHz	QPSK	18675	75RB#0	13.502	14.674	PASS
Band2	15MHz	QPSK	18900	75RB#0	13.502	15.109	PASS
Band2	15MHz	QPSK	19125	75RB#0	13.546	14.370	PASS
Band2	15MHz	16QAM	18675	75RB#0	13.502	14.284	PASS
Band2	15MHz	16QAM	18900	75RB#0	13.459	14.718	PASS
Band2	15MHz	16QAM	19125	75RB#0	13.589	14.544	PASS
Band2	20MHz	QPSK	18700	100RB#0	18.524	20.376	PASS
Band2	20MHz	QPSK	18900	100RB#0	18.466	20.318	PASS
Band2	20MHz	QPSK	19100	100RB#0	18.292	20.260	PASS
Band2	20MHz	16QAM	18700	100RB#0	18.234	20.318	PASS
Band2	20MHz	16QAM	18900	100RB#0	18.466	20.376	PASS
Band2	20MHz	16QAM	19100	100RB#0	18.640	20.318	PASS
Band2	1.4MHz	64QAM	18607	6RB#0	1.094	1.232	PASS
Band2	1.4MHz	64QAM	18900	6RB#0	1.098	1.248	PASS
Band2	1.4MHz	64QAM	19193	6RB#0	1.090	1.244	PASS
Band2	3MHz	64QAM	18615	15RB#0	2.744	3.056	PASS
Band2	3MHz	64QAM	18900	15RB#0	2.735	3.065	PASS
Band2	3MHz	64QAM	19185	15RB#0	2.735	3.091	PASS
Band2	5MHz	64QAM	18625	25RB#0	4.501	4.906	PASS
Band2	5MHz	64QAM	18900	25RB#0	4.486	4.920	PASS

Band2	5MHz	64QAM	19175	25RB#0	4.530	4.891	PASS
Band2	10MHz	64QAM	18650	50RB#0	9.030	9.986	PASS
Band2	10MHz	64QAM	18900	50RB#0	9.001	9.928	PASS
Band2	10MHz	64QAM	19150	50RB#0	9.030	9.841	PASS
Band2	15MHz	64QAM	18675	75RB#0	13.459	14.544	PASS
Band2	15MHz	64QAM	18900	75RB#0	13.459	14.240	PASS
Band2	15MHz	64QAM	19125	75RB#0	13.459	14.501	PASS
Band2	20MHz	64QAM	18700	100RB#0	18.292	20.145	PASS
Band2	20MHz	64QAM	18900	100RB#0	18.524	20.318	PASS
Band2	20MHz	64QAM	19100	100RB#0	18.350	20.608	PASS

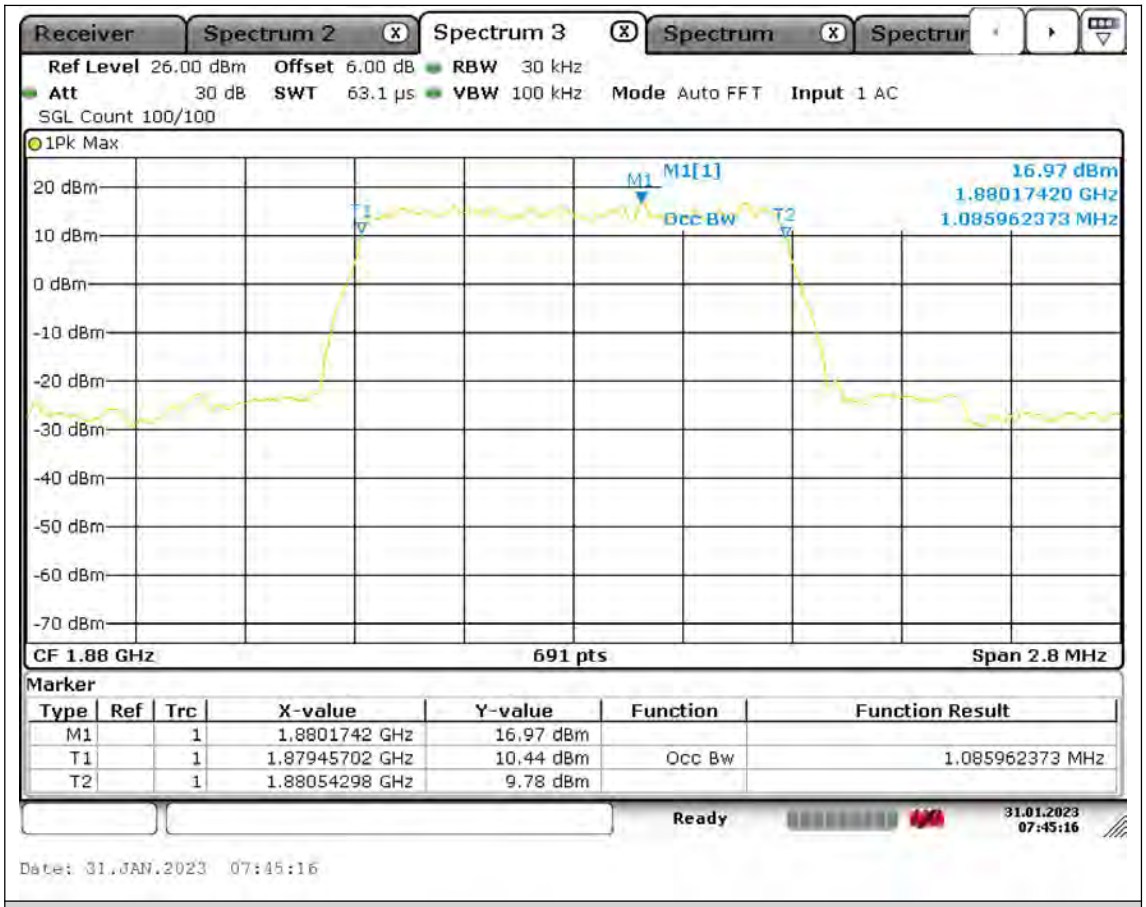
Test Graphs

Occupied Bandwidth

Band2-1.4MHz-QPSK-18607-6RB#0



Band2-1.4MHz-QPSK-18900-6RB#0



Band2-1.4MHz-QPSK-19193-6RB#0