FCC TEST REPORT

(PART 22)

Applicant:	Telit Communications S.p.A.
Address:	Via Stazione di Prosecco 5/b – 34010 Sgonico, Trieste – Italy

Manufacturer or Supplier:	Telit Communications S.p.A.
Address:	Via Stazione di Prosecco 5/b – 34010 Sgonico, Trieste – Italy
Product:	ME310M1-W2 / ME310M1-W1
Brand Name:	Telit Cinterion
Model Name:	ME310M1-W2 / ME310M1-W1
FCC ID	RI7ME310M1WX
Date of tests	Feb. 18, 2024 ~ Apr. 26, 2024

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

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

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

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-240204W001RF01	Original release	Apr. 26, 2024

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

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

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

Note:

The differences between LTE NB-IoT/Cat-M1 modules ME310M1-W1 (FCC ID:RI7ME310M1WX) HW 0.0 and ME310M1-W2 (FCC ID: RI7ME310M1W2) HW0.0 are as shown in the following list. Testing has been run on parent product ME310M1-W2 and the worst cases of power and RSE have been verified also on ME310M1-W1 variant. Only the worst-case data (ME310M1-W2) have been reported.

Model	ME310M1-W1 HW0.0	ME310M1-W2 HW0.0
The PSRAM section (U403/R402/R402/C402)	NOT-mounted	Mounted
The FLASH dimensions and capacity (U401)	(Small dimensions) 8MB	(Big dimensions) 16MB

***Test Lab Information Reference**

Lab A:

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

Lab Address:

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

Accredited Test Lab Cert 6613.01

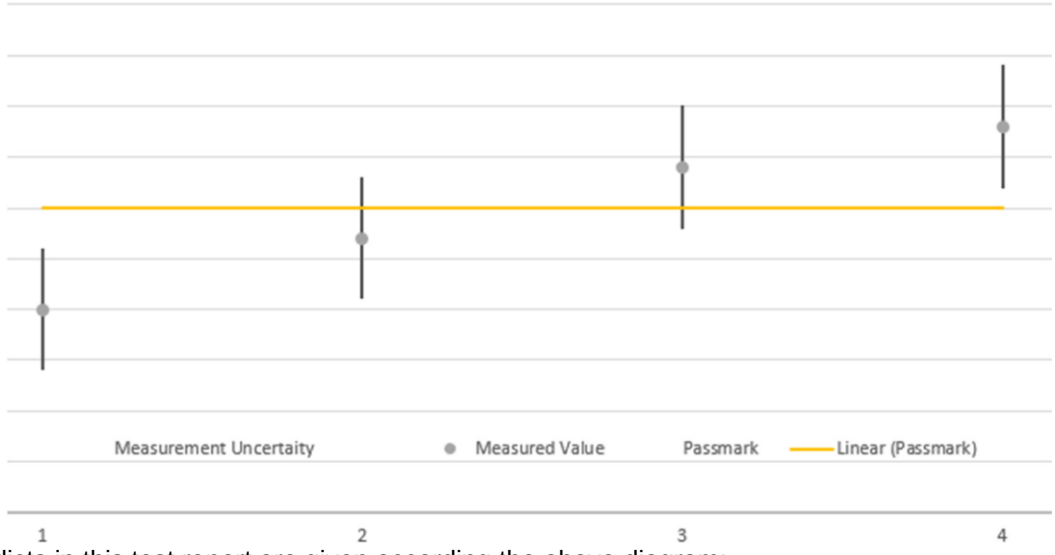
The FCC Site Registration No. is 434559; The Designation No. is CN1325.

1.1 MEASUREMENT UNCERTAINTY

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

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

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



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

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

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

1.2 TEST SITE AND INSTRUMENTS

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.15,24	Feb.14,26
Signal Generator	R&S	SMB100A	182185	Feb.15,24	Feb.14,26
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.25,22	Nov.24,25
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.25,22	Nov.24,25
EMI TEST Receiver	R&S	ESR26	101734	Feb.25,22	Feb.24,24
EMI TEST Receiver	R&S	ESR26	101734	Feb.24,24	Feb.23,26
EMI TEST Receiver	R&S	ESW44	101973	Feb.25,22	Feb.24,24
EMI TEST Receiver	R&S	ESW44	101973	Feb.24,24	Feb.23,26
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Feb.28,22	Feb.27,24
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Feb.27,24	Feb.26,26
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.22,22	Aug.21,24
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Feb.23,22	Feb.22,24
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Feb.22,24	Feb.21,26
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.22,22	Aug.21,24
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.23,22	Feb.22,24
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.22,24	Feb.21,26
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.27,22	Jun.26,24
Test Software	EMC32	EMC32	N/A	N/A	N/A
Test Software	ELEKTRA	ELEKTRA4.32	N/A	N/A	N/A
Open Switch and Control Unit	R&S	OSP220	101964	Oct.01,22	Sep.30,24
DC Source	HYELEC	HY3010B	551016	Aug.31,22	Aug.30,24
Hygrothermograph	DELI	20210528	SZ014	Sep.06,22	Sep.05,24
PC	LENOVO	E14	HRSW0024	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-7.00M	N/A	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-4.00M	N/A	N/A	N/A
CABLE	R&S	W13.02	N/A	Apr.28,23	Apr.27,24
CABLE	R&S	W12.14	N/A	Apr.28,23	Apr.27,24
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.28,23	Apr.27,24
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.28,23	Apr.27,24
Temperature Chamber	votsch	VT4002	58566078100050	May.31,22	May.30,24

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

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

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

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

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT*	ME310M1-W2 / ME310M1-W1	
BRAND NAME*	Telit Cinterion	
MODEL NAME*	ME310M1-W2 / ME310M1-W1	
NOMINAL VOLTAGE*	EUT 3.8Vdc	
MODULATION TYPE	**CAT-M / NB-IOT :LTE**	BPSK, QPSK, 16QAM
FREQUENCY RANGE CAT-M	**LTE Band 5 (Channel Bandwidth: 1.4MHz)**	824.7MHz ~ 848.3MHz
	LTE Band 5 (Channel Bandwidth: 3MHz)	825.5MHz ~ 847.5MHz
	LTE Band 5 (Channel Bandwidth: 5MHz)	826.5MHz ~ 846.5MHz
	LTE Band 5 (Channel Bandwidth: 10MHz)	829MHz ~ 844MHz
	LTE Band 26 (Channel Bandwidth: 1.4MHz)	824.7MHz ~ 848.3MHz
	LTE Band 26 (Channel Bandwidth: 3MHz)	825.5MHz ~ 847.5MHz
	LTE Band 26 (Channel Bandwidth: 5MHz)	826.5MHz ~ 846.5MHz
	LTE Band 26 (Channel Bandwidth: 10MHz)	829MHz ~ 844MHz
	LTE Band 26 (Channel Bandwidth: 15MHz)	831.5MHz ~ 841.5MHz
FREQUENCY RANGE NB-IOT	**LTE Band 5 (Sub-carrier Speacing: 3.75/15KHz)**	824.2MHz ~ 848.8MHz
	LTE Band 26 (Sub-carrier Speacing: 3.75/15KHz)	824.2MHz ~ 848.8MHz
MAX. ERP POWER CAT-M	**LTE Band 5 (Channel Bandwidth: 1.4MHz)**	309.74mW
	LTE Band 5 (Channel Bandwidth: 3MHz)	308.32mW
	LTE Band 5 (Channel Bandwidth: 5MHz)	307.61mW
	LTE Band 5 (Channel Bandwidth: 10MHz)	311.17mW
	LTE Band 26 (Channel Bandwidth: 1.4MHz)	317.69mW
	LTE Band 26 (Channel Bandwidth: 3MHz)	319.15mW

	LTE Band 26 (Channel Bandwidth: 5MHz)	319.89mW
	LTE Band 26 (Channel Bandwidth: 10MHz)	319.89mW
	LTE Band 26 (Channel Bandwidth: 15MHz)	321.37mW
MAX. ERP POWER NB-IOT	**LTE Band 5 (Sub-carrier Speacing: 3.75KHz)**	308.32mW
	LTE Band 5 (Sub-carrier Speacing: 15KHz)	311.17mW
	LTE Band 26 (Sub-carrier Speacing: 3.75KHz)	306.2mW
	LTE Band 26 (Sub-carrier Speacing: 15KHz)	308.32mW
EMISSION DESIGNATORGOGN CAT-M	**LTE Band 26 (Channel Bandwidth: 1.4MHz)**	QPSK: 1M08G7D
		16QAM: 1M07W7D
	LTE Band 26 (Channel Bandwidth: 3MHz)	QPSK: 1M08G7D
		16QAM: 1M08W7D
	LTE Band 26 (Channel Bandwidth: 5MHz)	QPSK: 1M08G7D
		16QAM: 1M08W7D
	LTE Band 26 (Channel Bandwidth: 10MHz)	QPSK: 1M08G7D
		16QAM: 1M08W7D
	LTE Band 26 (Channel Bandwidth: 15MHz)	QPSK: 1M08G7D
		16QAM: 1M09W7D
EMISSION DESIGNATORGOGN NB-IOT	**LTE Band 26 (Sub-carrier Speacing: 3.75KHz)**	BPSK: 44K66G7D
		QPSK: 49K15W7D
	LTE Band 26 (Sub-carrier Speacing: 15KHz)	BPSK: 120K0G7D
		QPSK: 121K6W7D
ANTENNA TYPE*	1/4 1 Antenna with 2.14dBi gain for LTE B5/ LTE B26	
HW VERSION*	0.0	
SW VERSION*	ME310M1-W2: M0U.100001/ME310M1-W1: M0U.000001	
I/O PORTS*	Refer to user's manual	
CABLE SUPPLIED*	N/A	
EXTREME TEMPERATURE*	-40-85 ℃	
EXTREME VOLTAGE*	2.5V - 4.5V	

NOTE:

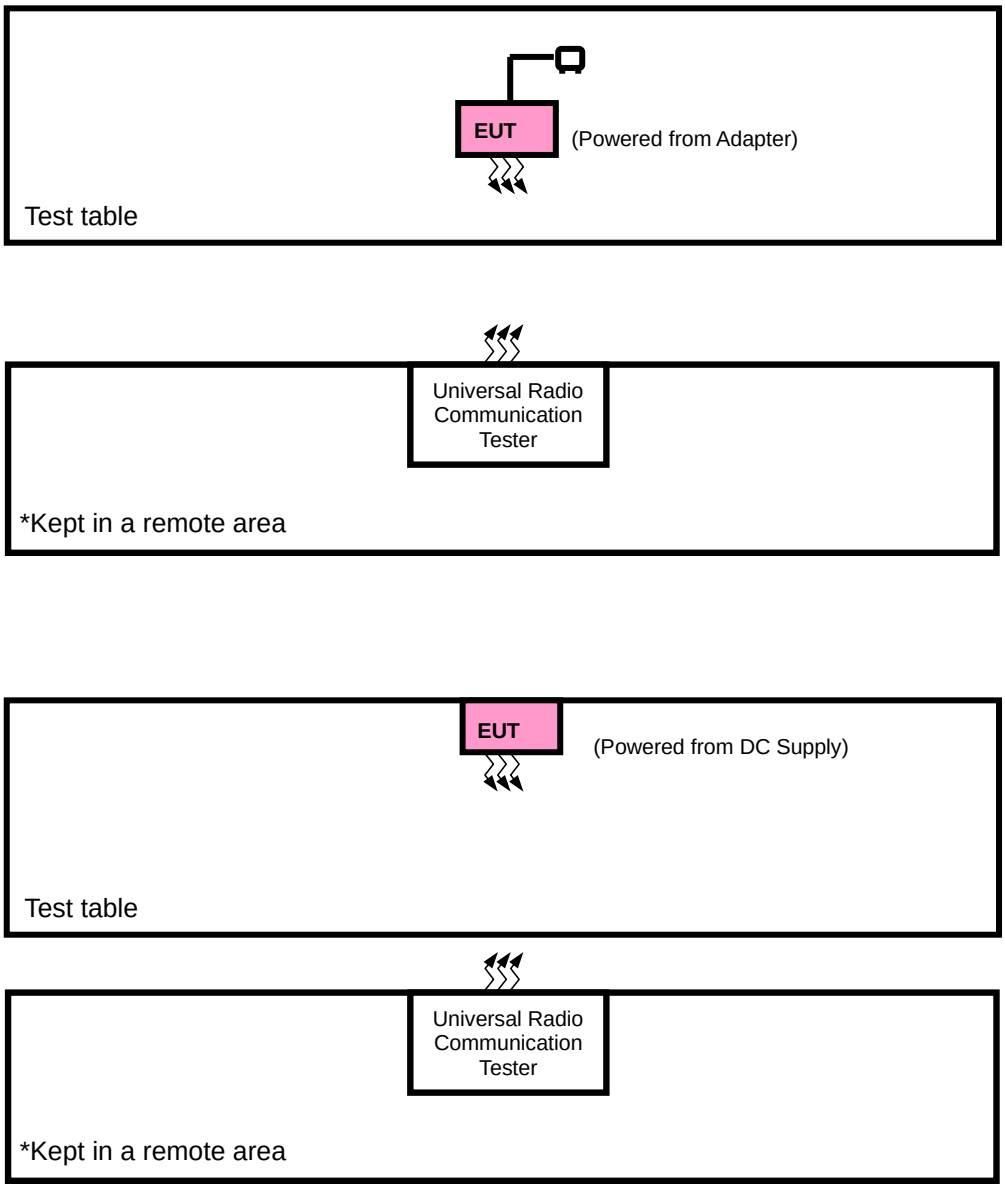
1. ***Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, Test Lab is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.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

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

2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION



2.3 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Laptop	Lenovo	ThinkPad E14	HRSW00024	N/A
2	DC Source	HYELEC	HY3010B	551016	N/A
3	Adapter	N/A	N/A	N/A	N/A

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

2.4 TEST ITEM AND TEST CONFIGURATION

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

EUT CONFIGURE MODE	DESCRIPTION
A	EUT + Adapter+USB cable with LTE link
B	EUT + DC Supply with LTE link

LTE BAND 5 MODE

EUT CONFIGURE MODE	TEST ITEM	Available Channel	Tested Channel	Channel bandwidth/ Sub-carrier Speacing	modulation	mode
A CAM-T	ERP	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK,16QAM	1 RB / 0 RB Offset
		20415 to 20635	20415, 20525, 20635	3MHz	QPSK,16QAM	1 RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
B NB-IOT	ERP	20402 to 20648	20402, 20525, 20648	3.75KHz	BPSK,QPSK	1 RB / 0 RB Offset
		20402 to 20648	20402, 20525, 20648	15KHz	BPSK,QPSK	1 RB / 0 RB Offset

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

2. LTE Band 5 are covered by LTE Band 26, Because it is a subset of LTE Band 26 with the same output power and supported bandwidths, So the test data please refer to LTE Band 26

CAM-T LTE BAND 26 MODE

EUT CONFIGURE MODE	TEST ITEM	Available Channel	Tested Channel	Channel bandwidth	modulation	mode
A	ERP	26797 to 27033	26797, 26915, 27033	1.4MHz	QPSK,16QAM	1 RB / 0 RB Offset
		26805 to 27025	26805, 26915, 27025	3MHz	QPSK,16QAM	1 RB / 0 RB Offset
		26815 to 27015	26815, 26915, 27015	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
		26840 to 26990	26840, 26915, 26990	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
		26865 to 26965	26865, 26915, 26965	15MHz	QPSK,16QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	26865 to 26965	26865, 26915, 26965	15MHz	QPSK	75 RB / 0 RB Offset
A	OCCUPIED BANDWIDTH	26797 to 27033	26797, 26915, 27033	1.4MHz	QPSK,16QAM	6 RB / 0 RB Offset
		26805 to 27025	26805, 26915, 27025	3MHz	QPSK,16QAM	15 RB / 0 RB Offset
		26815 to 27015	26815, 26915, 27015	5MHz	QPSK,16QAM	25 RB / 0 RB Offset
		26840 to 26990	26840, 26915, 26990	10MHz	QPSK,16QAM	50 RB / 0 RB Offset
		26865 to 26965	26865, 26915, 26965	15MHz	QPSK,16QAM	75 RB / 0 RB Offset
A	PEAK TO AVERAGE RATIO	26865 to 26965	26865, 26915, 26965	15MHz	QPSK,16QAM	1 RB / 0 RB Offset 75 RB / 0 RB Offset
A	BAND EDGE	26797 to 27033	26797	1.4 MHz	QPSK,16QAM	1 RB / 0 RB Offset
						6 RB / 0 RB Offset

		26797 to 27033	27033	1.4 MHz	QPSK,16QAM	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		26805 to 27025	26805	3 MHz	QPSK,16QAM	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
		26805 to 27025	27025	3 MHz	QPSK,16QAM	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		26815 to 27015	26815	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
		26815 to 27015	27015	5MHz	QPSK,16QAM	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		26840 to 26990	26840	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
		26840 to 26990	26990	10MHz	QPSK,16QAM	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
		26865 to 26965	26865	15MHz	QPSK,16QAM	1 RB / 0 RB Offset
						75 RB / 0 RB Offset
		26865 to 26965	26965	15MHz	QPSK,16QAM	1 RB / 74 RB Offset
						75 RB / 0 RB Offset
A	CONDCUDETED EMISSION	26797 to 27033	26797, 26915, 27033	1.4MHz	QPSK,16QAM	1 RB / 0 RB Offset
		26805 to 27025	26805, 26915, 27025	3MHz	QPSK,16QAM	1 RB / 0 RB Offset
		26815 to 27015	26815, 26915, 27015	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
		26840 to 26990	26840, 26915, 26990	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
		26865 to 26965	26865, 26915, 26965	15MHz	QPSK,16QAM	1 RB / 0 RB Offset
A	RADIATED EMISSION	26797 to 27033	26915	1.4MHz	QPSK	1 RB / 0 RB Offset
		26805 to 27025	26915	3MHz	QPSK	1 RB / 0 RB Offset
		26815 to 27015	26915	5MHz	QPSK	1 RB / 0 RB Offset
		26840 to 26990	26840, 26915, 26990	10MHz	QPSK	1 RB / 0 RB Offset
		26865 to 26965	26915	15MHz	QPSK	1 RB / 0 RB Offset

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

NB-IOT LTE BAND 26 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	MODE
A	ERP	26792 to 27038	26792,26915,27038	BPSK,QPSK	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	26915	26915	BPSK,QPSK	50 RB / 0 RB Offset
A	OCCUPIED BANDWIDTH	26792 to 27038	26792,26915,27038	BPSK,QPSK	6 RB / 0 RB Offset
		26915	26915	BPSK,QPSK	50 RB / 0 RB Offset
A	PEAK TO AVERAGE RATIO	26915	26915	BPSK,QPSK	1 RB / 0 RB Offset 50 RB / 0 RB Offset
A	BAND EDGE	26792 to 27038	26792	BPSK,QPSK	1 RB / 0 RB Offset
					6 RB / 0 RB Offset
			27038	BPSK,QPSK	1 RB / 5 RB Offset
					6 RB / 0 RB Offset
		26915	26915	BPSK,QPSK	1 RB / 0 RB Offset
					50 RB / 0 RB Offset
			26915	BPSK,QPSK	1 RB / 49 RB Offset
					50 RB / 0 RB Offset
A	CONDUCTED EMISSION	26792 to 27038	26792,26915,27038	BPSK,QPSK	1 RB / 0 RB Offset
		26915	26915	BPSK,QPSK	1 RB / 0 RB Offset
A	RADIATED EMISSION	26792 to 27038	26792,26915,27038	QPSK	1 RB / 0 RB Offset
		26915	26915	QPSK	1 RB / 0 RB Offset

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

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	23deg. C, 70%RH	DC 4.5V By Adapter	Hanwen Xu
FREQUENCY STABILITY	23deg. C, 70%RH	DC 2.5V/ 3.8V/ 4.5V By DC Source	Hanwen Xu
OCCUPIED BANDWIDTH	23deg. C, 70%RH	DC 4.5V By Adapter	Hanwen Xu
BAND EDGE	23deg. C, 70%RH	DC 4.5V By Adapter	Hanwen Xu
CONDCUDETED EMISSION	23deg. C, 70%RH	DC 4.5V By Adapter	Hanwen Xu
RADIATED EMISSION	23deg. C, 70%RH	DC 4.5V By Adapter	Hanwen Xu
PEAK TO AVERAGE RATIO	23deg. C, 70%RH	DC 4.5V By Adapter	Hanwen Xu

2.5 EUT OPERATING CONDITIONS

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

2.6 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC 47 CFR Part 2

FCC 47 CFR Part 22

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI/TIA/EIA-603-D

ANSI/TIA/EIA-603-E

ANSI C63.26-2015

NOTE: All test items have been performed and recorded as per the above standards.

3 TEST TYPES AND RESULTS

3.1 OUTPUT POWER MEASUREMENT

3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

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

3.1.2 TEST PROCEDURES

EIRP / ERP MEASUREMENT:

Per KDB 971168 D01 Power Meas License Digital Systems v03r01 or subclause 5.2.5.5 of ANSI C63.26-2015, the relevant equation for determing the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

ERP or EIRP = $P_{Meas} + G_T – L_C$

Where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively

(expressed in the same units as P_{Meas}, typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

G_T = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

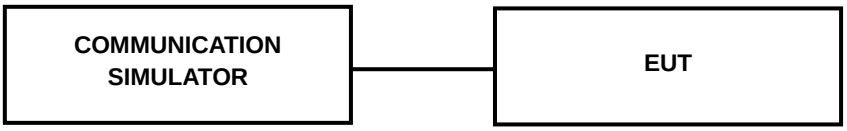
CONDUCTED POWER MEASUREMENT:

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

3.1.3 TEST SETUP

EIRP / ERP Measurement:

CONDUCTED POWER MEASUREMENT:



3.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm):

CAT-M

LTE Band 5

Band/BW	Modulation	RB Size	RB Offset	Low CH 20407	Mid CH 20525	High CH 20643
				Frequency 824.7 MHz	Frequency 836.5 MHz	Frequency 848.3 MHz
5/ 1.4	QPSK	1	0	22.43	22.51	22.55
		1	5	22.53	22.59	22.59
		3	0	22.70	22.70	22.77
		3	3	22.63	22.69	22.70
		6	0	22.42	22.47	22.62
	16QAM	1	0	22.36	22.48	22.43
		1	5	22.44	22.48	22.50
		3	0	22.70	22.61	22.66
		3	3	22.54	22.55	22.69
		6	0	22.37	22.26	22.48

Band/BW	Modulation	RB Size	RB Offset	Low CH 20415 Frequency 825.5 MHz	Mid CH 20525 Frequency 836.5 MHz	High CH 20635 Frequency 847.5 MHz
5/ 3	QPSK	1	0	22.39	22.50	22.58
		1	5	22.56	22.64	22.60
		3	0	22.73	22.74	22.74
		3	3	22.60	22.69	22.69
		6	0	22.37	22.40	22.57
	16QAM	1	0	22.43	22.48	22.53
		1	5	22.34	22.58	22.56
		3	0	22.58	22.55	22.70
		3	3	22.52	22.56	22.75
		6	0	22.36	22.26	22.37

Band/BW	Modulation	RB Size	RB Offset	Low CH 20425 Frequency 826.5 MHz	Mid CH 20525 Frequency 836.5 MHz	High CH 20625 Frequency 846.5 MHz
5/ 5	QPSK	1	0	22.52	22.51	22.54
		1	5	22.60	22.52	22.63
		3	0	22.69	22.70	22.74
		3	3	22.68	22.64	22.65
		6	0	22.38	22.45	22.50
	16QAM	1	0	22.34	22.53	22.44
		1	5	22.38	22.55	22.59
		3	0	22.61	22.58	22.68
		3	3	22.56	22.55	22.74
		6	0	22.44	22.24	22.39

Band/BW	Modulation	RB Size	RB Offset	Low CH 20450	Mid CH 20525	High CH 20600
				Frequency 829 MHz	Frequency 836.5 MHz	Frequency 844 MHz
5/ 10	QPSK	1	0	22.54	22.64	22.59
		1	5	22.61	22.67	22.64
		3	0	22.74	22.76	22.78
		3	3	22.72	22.74	22.79
		6	0	22.48	22.51	22.65
	16QAM	1	0	22.46	22.60	22.55
		1	5	22.48	22.63	22.63
		3	0	22.73	22.68	22.72
		3	3	22.57	22.61	22.76
		6	0	22.46	22.39	22.51

LTE BAND 26

Band/BW	Modulation	RB Size	RB Offset	Low CH 26797	Mid CH 26915	High CH 27033
				Frequency 824.7 MHz	Frequency 836.5 MHz	Frequency 848.3 MHz
26/ 1.4	QPSK	1	0	22.59	22.68	22.77
		1	5	22.71	22.70	22.65
		3	0	22.63	22.64	22.81
		3	3	22.74	22.66	22.80
		6	0	22.74	22.79	22.82
	16QAM	1	0	22.83	22.69	22.72
		1	5	22.64	22.84	22.78
		3	0	22.75	22.70	22.81
		3	3	22.82	22.77	22.70
		6	0	22.74	22.87	22.88

Band/BW	Modulation	RB Size	RB Offset	Low CH 26805	Mid CH 26915	High CH 27025
				Frequency 825.5 MHz	Frequency 836.5 MHz	Frequency 847.5 MHz
26/ 3	QPSK	1	0	22.61	22.66	22.69
		1	5	22.71	22.69	22.72
		3	0	22.62	22.60	22.79
		3	3	22.68	22.74	22.72
		6	0	22.71	22.74	22.90
	16QAM	1	0	22.82	22.67	22.77
		1	5	22.66	22.86	22.83
		3	0	22.67	22.63	22.78
		3	3	22.78	22.84	22.83
		6	0	22.76	22.86	22.90

Band/BW	Modulation	RB Size	RB Offset	Low CH 26815	Mid CH 26915	High CH 27015
				Frequency 826.5 MHz	Frequency 836.5 MHz	Frequency 846.5 MHz
26/ 5	QPSK	1	0	22.68	22.67	22.70
		1	5	22.71	22.72	22.73
		3	0	22.59	22.67	22.79
		3	3	22.67	22.60	22.75
		6	0	22.81	22.74	22.91
	16QAM	1	0	22.83	22.63	22.67
		1	5	22.65	22.83	22.88
		3	0	22.65	22.72	22.82
		3	3	22.69	22.72	22.77
		6	0	22.81	22.82	22.83

Band/BW	Modulation	RB Size	RB Offset	Low CH 26840	Mid CH 26915	High CH 26990
				Frequency 829 MHz	Frequency 836.5 MHz	Frequency 844 MHz
26/10	QPSK	1	0	22.58	22.76	22.79
		1	5	22.79	22.77	22.78
		3	0	22.61	22.63	22.72
		3	3	22.76	22.65	22.81
		6	0	22.82	22.81	22.91
	16QAM	1	0	22.80	22.62	22.68
		1	5	22.66	22.81	22.83
		3	0	22.78	22.71	22.84
		3	3	22.76	22.78	22.77
		6	0	22.78	22.79	22.76

Band/BW	Modulation	RB Size	RB Offset	Low CH 26865	Mid CH 26915	High CH 26965
				Frequency 831.5 MHz	Frequency 836.5 MHz	Frequency 841.5 MHz
26/ 15	QPSK	1	0	22.73	22.81	22.83
		1	5	22.83	22.78	22.79
		3	0	22.73	22.74	22.85
		3	3	22.79	22.75	22.82
		6	0	22.85	22.89	22.93
	16QAM	1	0	22.84	22.77	22.80
		1	5	22.70	22.88	22.92
		3	0	22.79	22.74	22.90
		3	3	22.84	22.87	22.84
		6	0	22.88	22.92	22.91

NB-IOT

LTE Band 5						
Sub-carrier Speacing (KHz)	Modulation	RB Size	RB Offset	Low	Mid	High
		Channel		20402	20525	20648
		Frequence (MHz)		824.2	836.5	848.8
3.75	BPSK	1	0	22.68	22.71	22.75
		1	47	22.66	22.69	22.74
	QPSK	1	0	22.63	22.72	22.73
		1	47	22.65	22.56	22.72
15	BPSK	1	0	22.71	**22.79**	22.77
		1	11	22.59	22.76	22.75
	QPSK	1	0	22.72	22.77	22.69
		1	11	22.70	22.75	22.78
		12	0	21.56	21.62	21.52

LTE Band 26						
Sub-carrier Speacing (KHz)	Modulation	RB Size	RB Offset	Low	Mid	High
		Channel		20402	26792	26915
		Frequence (MHz)		824.2	824.2	836.5
3.75	BPSK	1	0	22.56	22.66	22.65
		1	47	22.57	22.62	22.62
	QPSK	1	0	22.59	22.52	22.72
		1	47	22.50	22.53	22.62
15	BPSK	1	0	22.60	22.65	**22.75**
		1	11	22.45	22.64	22.73
	QPSK	1	0	22.49	22.60	22.64
		1	11	22.50	22.59	22.71
		12	0	21.39	21.49	21.41

ERP POWER (dBm)

CAM-T
LTE BAND 5
CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20407	824.7	22.7	2.14	24.84	304.79	7
20525	836.5	22.7	2.14	24.84	304.79	7
20643	848.3	22.77	2.14	24.91	309.74	7

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20407	824.7	22.7	2.14	24.84	304.79	7
20525	836.5	22.61	2.14	24.75	298.54	7
20643	848.3	22.69	2.14	24.83	304.09	7

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20415	825.5	22.73	2.14	24.87	306.9	7
20525	836.5	22.74	2.14	24.88	307.61	7
20635	847.5	22.74	2.14	24.88	307.61	7

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20415	825.5	22.58	2.14	24.72	296.48	7
20525	836.5	22.58	2.14	24.72	296.48	7
20635	847.5	22.75	2.14	24.89	308.32	7

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20425	826.5	22.69	2.14	24.83	304.09	7
20525	836.5	22.7	2.14	24.84	304.79	7
20625	846.5	22.74	2.14	24.88	307.61	7

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20425	826.5	22.61	2.14	24.75	298.54	7
20525	836.5	22.58	2.14	24.72	296.48	7
20625	846.5	22.74	2.14	24.88	307.61	7

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829	22.74	2.14	24.88	307.61	7
20525	836.5	22.76	2.14	24.9	309.03	7
20600	844	22.79	2.14	24.93	311.17	7

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829	22.73	2.14	24.87	306.9	7
20525	836.5	22.68	2.14	24.82	303.39	7
20600	844	22.76	2.14	24.9	309.03	7

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

LTE BAND 26

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26797	824.7	22.74	2.14	24.88	307.61	7
26915	836.5	22.79	2.14	24.93	311.17	7
27033	848.3	22.82	2.14	24.96	313.33	7

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26797	824.7	22.83	2.14	24.97	314.05	7
26915	836.5	22.87	2.14	25.01	316.96	7
27033	848.3	22.88	2.14	25.02	317.69	7

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26805	825.5	22.71	2.14	24.85	305.49	7
26915	836.5	22.74	2.14	24.88	307.61	7
27025	847.5	22.9	2.14	25.04	319.15	7

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26805	825.5	22.82	2.14	24.96	313.33	7
26915	836.5	22.86	2.14	25	316.23	7
27025	847.5	22.9	2.14	25.04	319.15	7

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26815	826.5	22.81	2.14	24.95	312.61	7
26915	836.5	22.74	2.14	24.88	307.61	7
27015	846.5	22.91	2.14	25.05	319.89	7

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26815	826.5	22.83	2.14	24.97	314.05	7
26915	836.5	22.83	2.14	24.97	314.05	7
27015	846.5	22.88	2.14	25.02	317.69	7

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26840	829	22.82	2.14	24.96	313.33	7
26915	836.5	22.81	2.14	24.95	312.61	7
26990	844	22.91	2.14	25.05	319.89	7

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26840	829	22.8	2.14	24.94	311.89	7
26915	836.5	22.81	2.14	24.95	312.61	7
26990	844	22.84	2.14	24.98	314.77	7

CHANNEL BANDWIDTH: 15MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26865	831.5	22.85	2.14	24.99	315.5	7
26915	836.5	22.89	2.14	25.03	318.42	7
26965	841.5	22.93	2.14	25.07	321.37	7

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26865	831.5	22.88	2.14	25.02	317.69	7
26915	836.5	22.92	2.14	25.06	320.63	7
26965	841.5	22.92	2.14	25.06	320.63	7

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

NB-IOT

LTE B5 3.75KHz

CHANNEL BANDWIDTH: BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20402	824.2	22.68	2.14	24.82	303.39	7
20525	836.5	22.71	2.14	24.85	305.49	7
20648	848.8	22.75	2.14	24.89	308.32	7

CHANNEL BANDWIDTH: QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20402	824.2	22.65	2.14	24.79	301.3	7
20525	836.5	22.72	2.14	24.86	306.2	7
20648	848.8	22.73	2.14	24.87	306.9	7

LTE B5 15KHz

CHANNEL BANDWIDTH: BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20402	824.2	22.71	2.14	24.85	305.49	7
20525	836.5	22.79	2.14	24.93	311.17	7
20648	848.8	22.77	2.14	24.91	309.74	7

CHANNEL BANDWIDTH: QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20402	824.2	22.72	2.14	24.86	306.2	7
20525	836.5	22.77	2.14	24.91	309.74	7
20648	848.8	22.78	2.14	24.92	310.46	7

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

NB-IOT

LTE B26 3.75KHz

CHANNEL BANDWIDTH: BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26792	824.2	22.57	2.14	24.71	295.8	7
26915	836.5	22.66	2.14	24.8	302	7
27038	848.8	22.65	2.14	24.79	301.3	7

CHANNEL BANDWIDTH: QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26792	824.2	22.59	2.14	24.73	297.17	7
26915	836.5	22.53	2.14	24.67	293.09	7
27038	848.8	22.72	2.14	24.86	306.2	7

LTE B26 15KHz

CHANNEL BANDWIDTH: BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26792	824.2	22.6	2.14	24.74	297.85	7
26915	836.5	22.65	2.14	24.79	301.3	7
27038	848.8	22.75	2.14	24.89	308.32	7

CHANNEL BANDWIDTH: QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26792	824.2	22.5	2.14	24.64	291.07	7
26915	836.5	22.6	2.14	24.74	297.85	7
27038	848.8	22.71	2.14	24.85	305.49	7

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

3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

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

3.2.2 TEST PROCEDURE

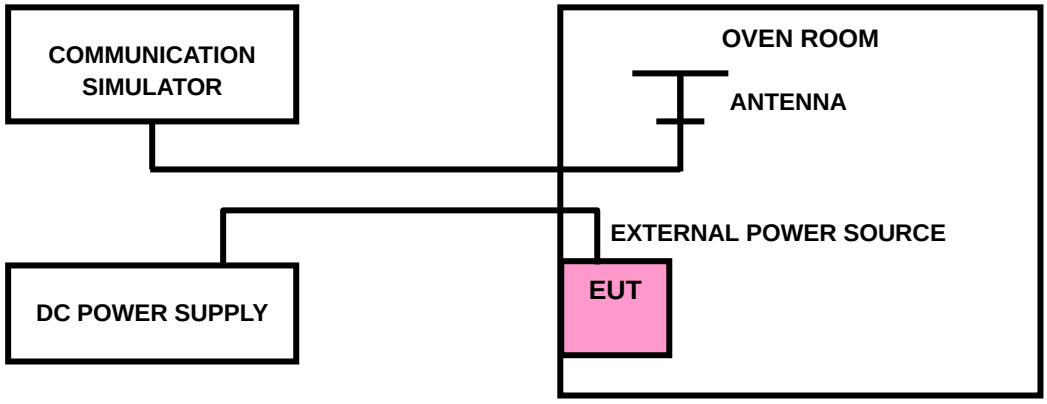
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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

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

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

3.2.3 TEST SETUP



3.2.4 TEST RESULTS

Please Refer to Appendix Of this test report.

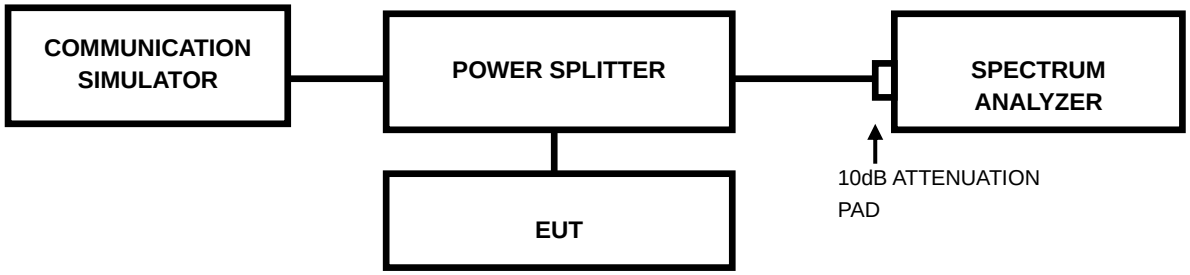
Note: VL = Low voltage(2.5V); VN/NV = Normal voltage(3.8V); VH = High voltage(4.5V);
NT = Normal temperature (25℃)

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

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

3.3.2 TEST SETUP



3.3.3 TEST PROCEDURES

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

3.3.4 TEST RESULTS

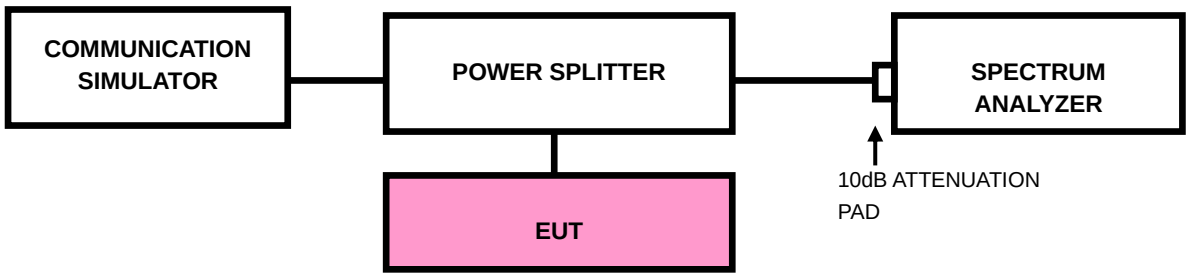
Please Refer to Appendix Of this test report.

3.4 BAND EDGE MEASUREMENT

3.4.1 LIMITS OF BAND EDGE MEASUREMENT

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

3.4.2 TEST SETUP



3.4.3 TEST PROCEDURES

a) All measurements were done at low and high operational frequency range

b) Connect the transmitter to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.

c) Tune the analyzer to the nominal center frequency of the emission bandwidth (EBW)

d) .Set the resolution bandwidth (RBW) ≧ 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.

e) Beyond the 1MHz band from the band edge, RBW=1MHz was used.

f) Set the video bandwidth (VBW) to ≧3 x RBW.

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

h) Set the number of measurement points to ≧ 1001.

i) Use auto-coupled sweep time.

j) Perform the measurement over an interval of time when the transmission is continuous and at its maximum power level.

k) The RF fundamental frequency should be excluded against the limit line in the operating frequency band and use RBW is 10KHz or 100KHz.

l) Record the max trace plot into the test report.

3.4.4 TEST RESULTS

Please Refer to Appendix Of this test report.

3.5 CONDUCTED SPURIOUS EMISSIONS

3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

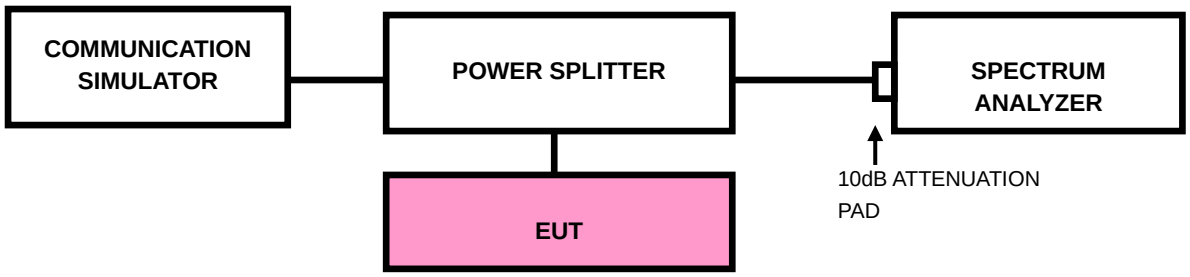
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

3.5.2 TEST PROCEDURE

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

b. Measuring frequency range is from 9kHz up to a frequency including its 10 th harmonic. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

3.5.3 TEST SETUP



3.5.4 TEST RESULTS

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

Please Refer to Appendix Of this test report.

3.6 RADIATED EMISSION MEASUREMENT

3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

3.6.2 TEST PROCEDURES

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step a. Record the power level of S.G

c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

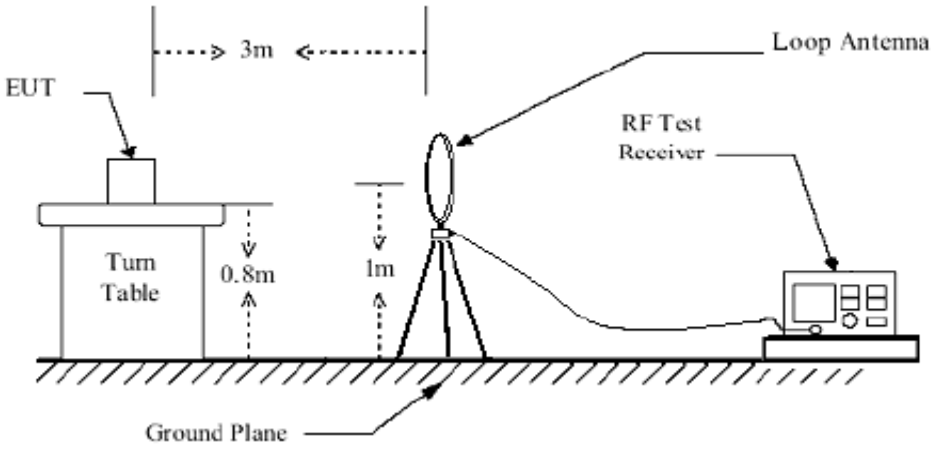
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.6.3 DEVIATION FROM TEST STANDARD

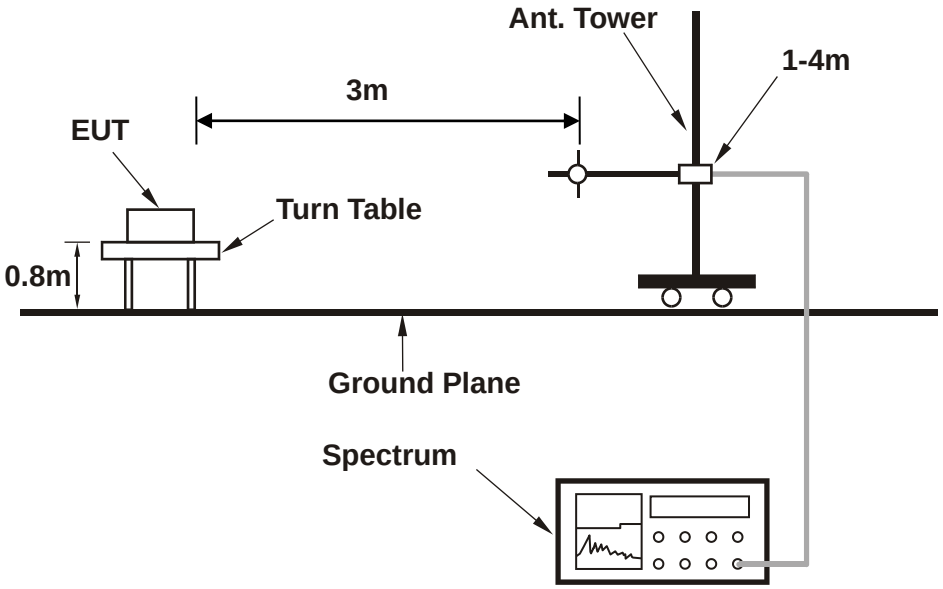
No deviation

3.6.4 TEST SETUP

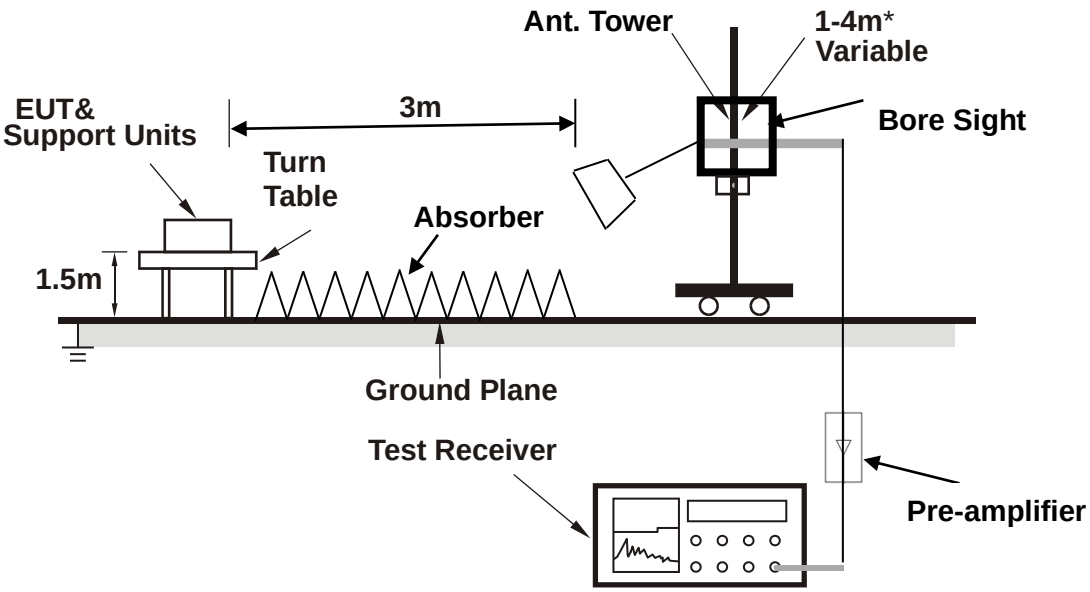
< Frequency Range below 30MHz >



< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.6.5 TEST RESULTS

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

BELOW 1GHz WORST-CASE DATA

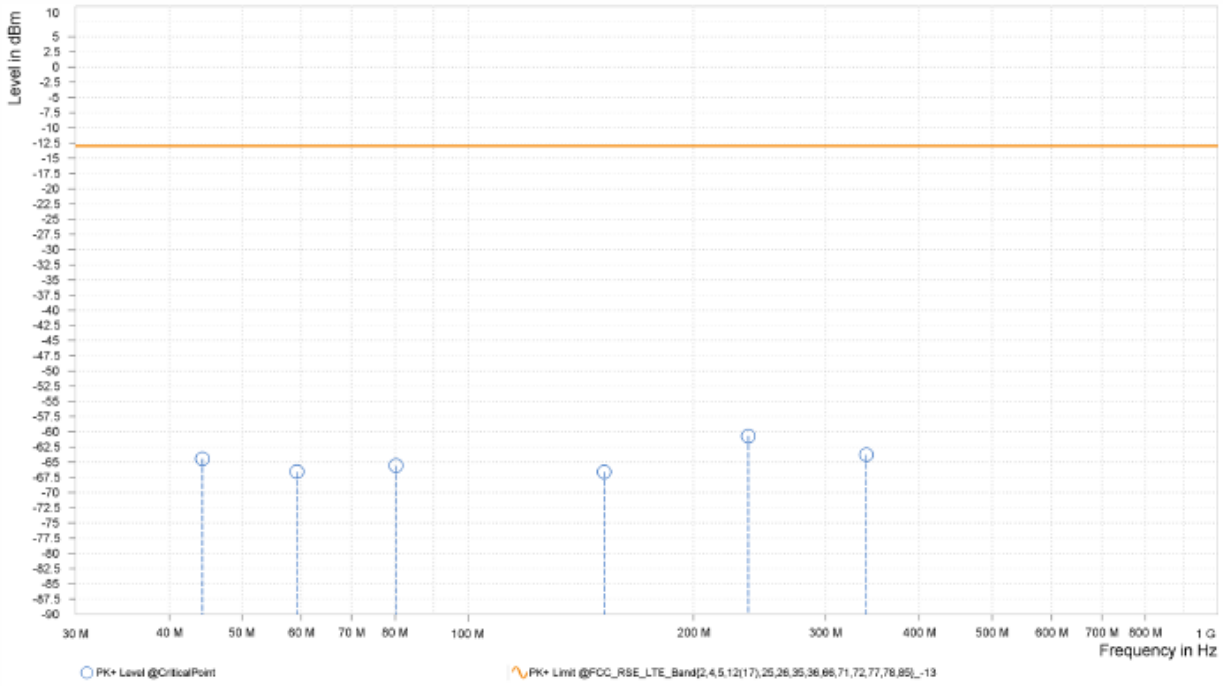
30 MHz – 1GHz data:

NB-IOT LTE B26 :

CHANNEL BANDWIDTH: QPSK

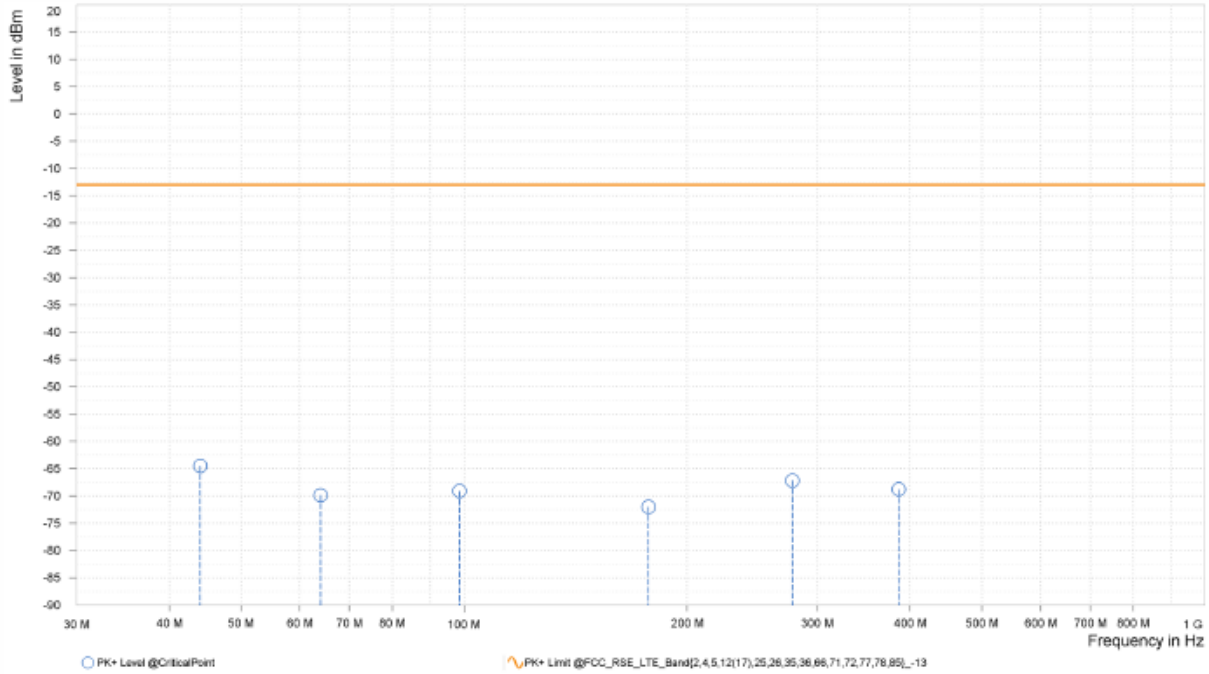
MODE	TX channel 26915	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	44.300	-64.40	-13.00	51.40	3.55	H	225.4	2.00
1	59.150	-66.54	-13.00	53.54	3.38	H	340.5	1.00
1	80.200	-65.57	-13.00	52.57	-5.69	H	135.8	1.00
1	151.950	-66.59	-13.00	53.59	-5.23	H	238.7	1.00
1	236.500	-60.69	-13.00	47.69	2.47	H	238.7	1.00
1	339.850	-63.78	-13.00	50.78	6.05	H	122.6	2.00



MODE	TX channel 26915	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	44.050	-64.50	-13.00	51.50	5.35	V	359.1	1.00
1	64.050	-69.88	-13.00	56.88	0.42	V	226.6	2.00
1	98.600	-69.12	-13.00	56.12	5.05	V	25.8	2.00
1	177.450	-72.00	-13.00	59.00	-1.51	V	25.8	2.00
1	277.350	-67.16	-13.00	54.16	3.17	V	235.1	1.00
1	386.050	-68.80	-13.00	55.80	7.16	V	5.2	1.00



ABOVE 1GHz DATA

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

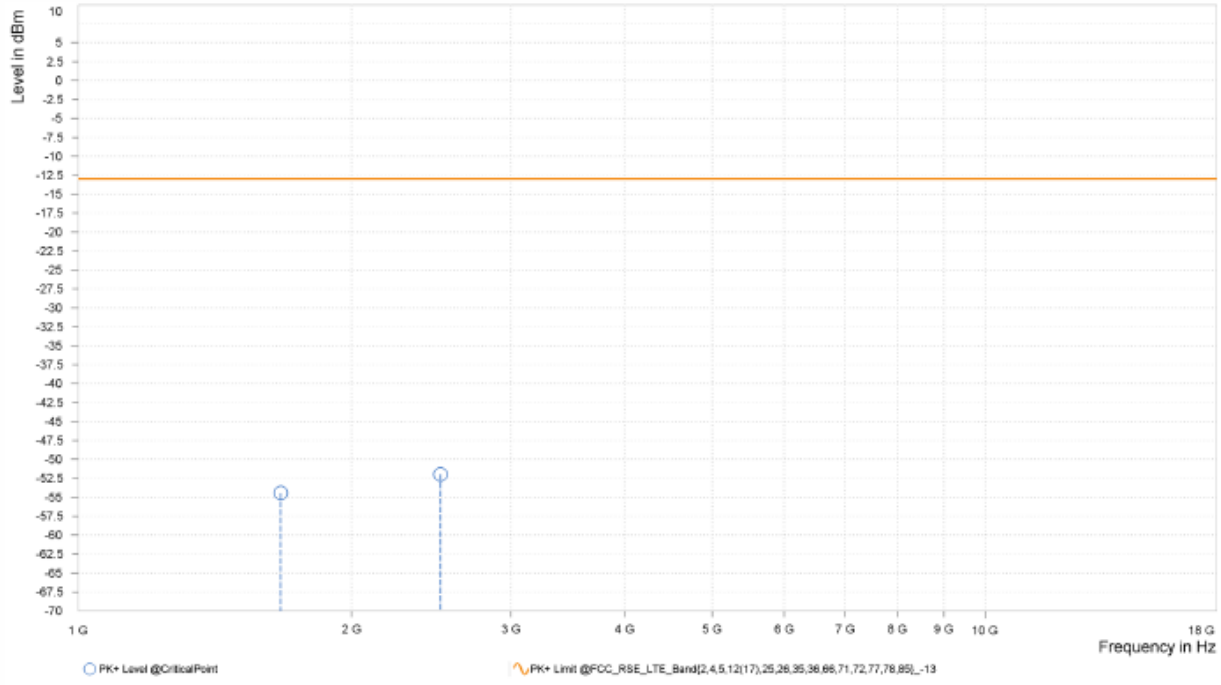
CAT-M LTE Band 26

CHANNEL BANDWIDTH: 1.4MHz / QPSK

CH26915

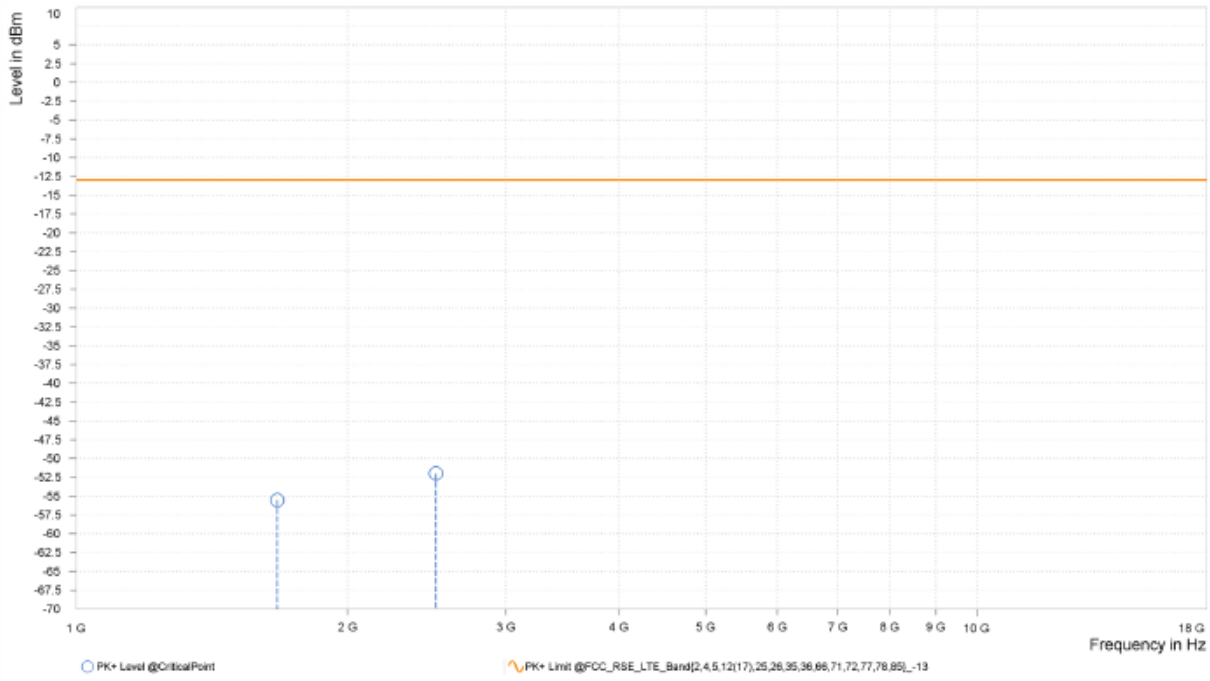
MODE	TX channel 26915	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,671.740	-54.44	-13.00	41.44	7.78	H	1	1.00
1	2,507.610	-51.99	-13.00	38.99	12.28	H	3.9	1.00



MODE	TX channel 26915	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

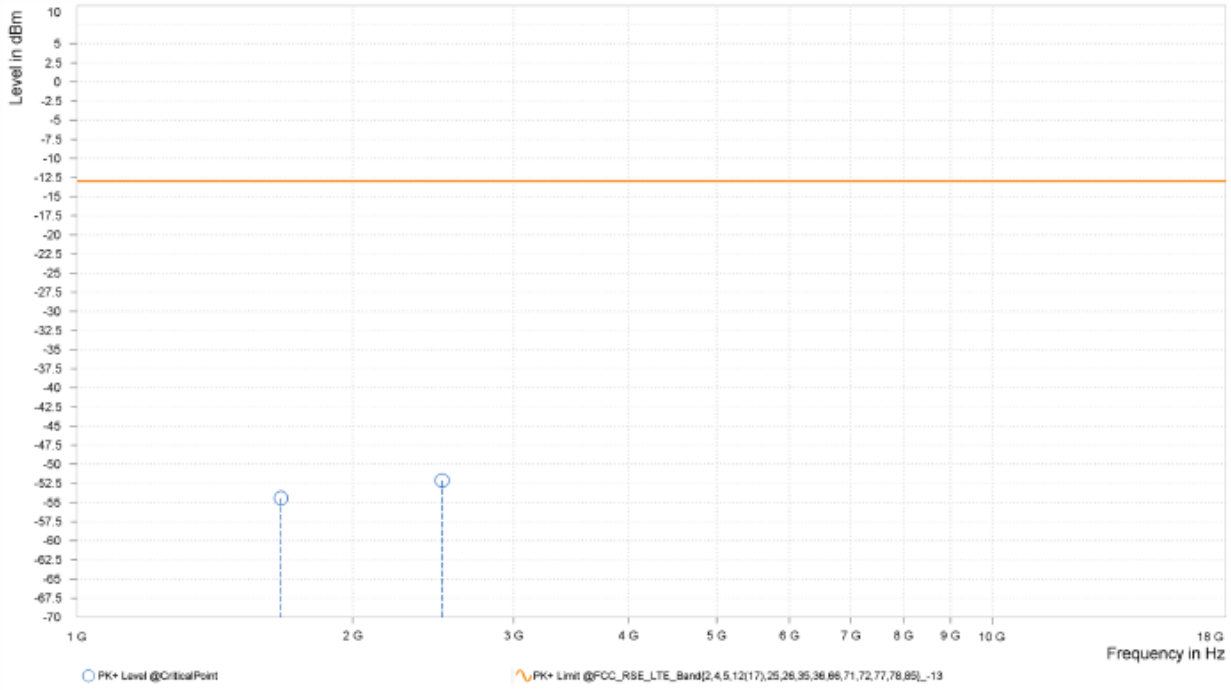
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,671.740	-55.55	-13.00	42.55	7.56	V	356.1	2.00
1	2,507.610	-51.99	-13.00	38.99	11.94	V	1	1.00



CHANNEL BANDWIDTH: 3MHz / QPSK

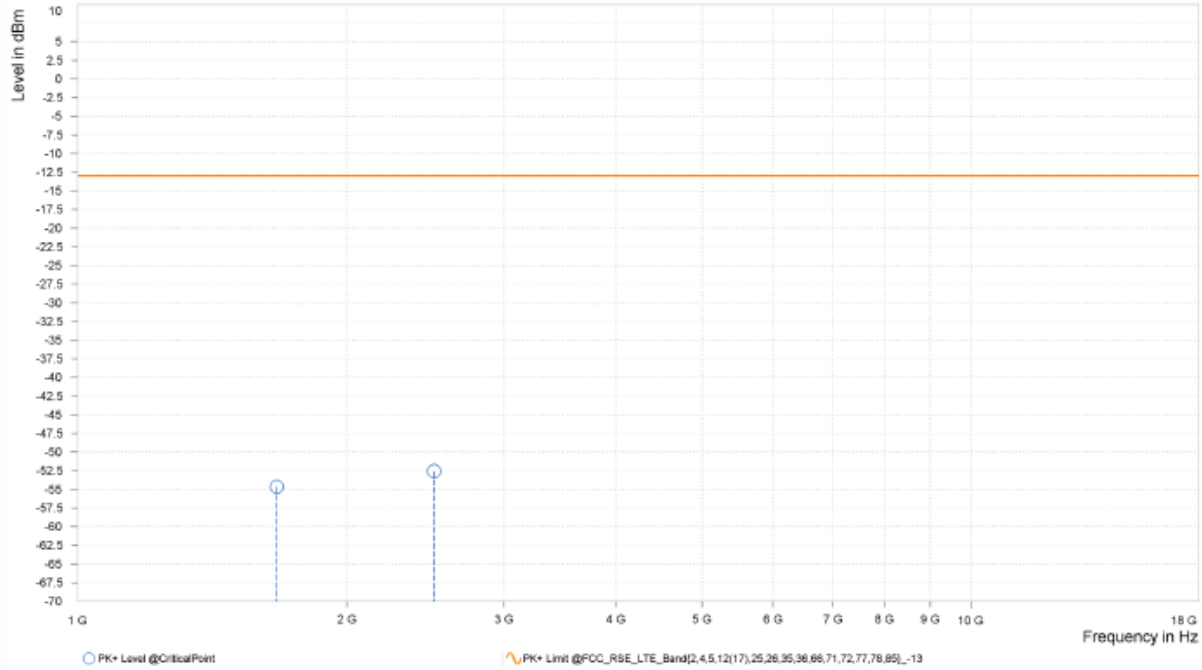
MODE	TX channel 26915	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,670.000	-54.43	-13.00	41.43	7.74	H	359	2.00
1	2,505.000	-52.12	-13.00	39.12	12.29	H	254.2	1.00



MODE	TX channel 26915	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

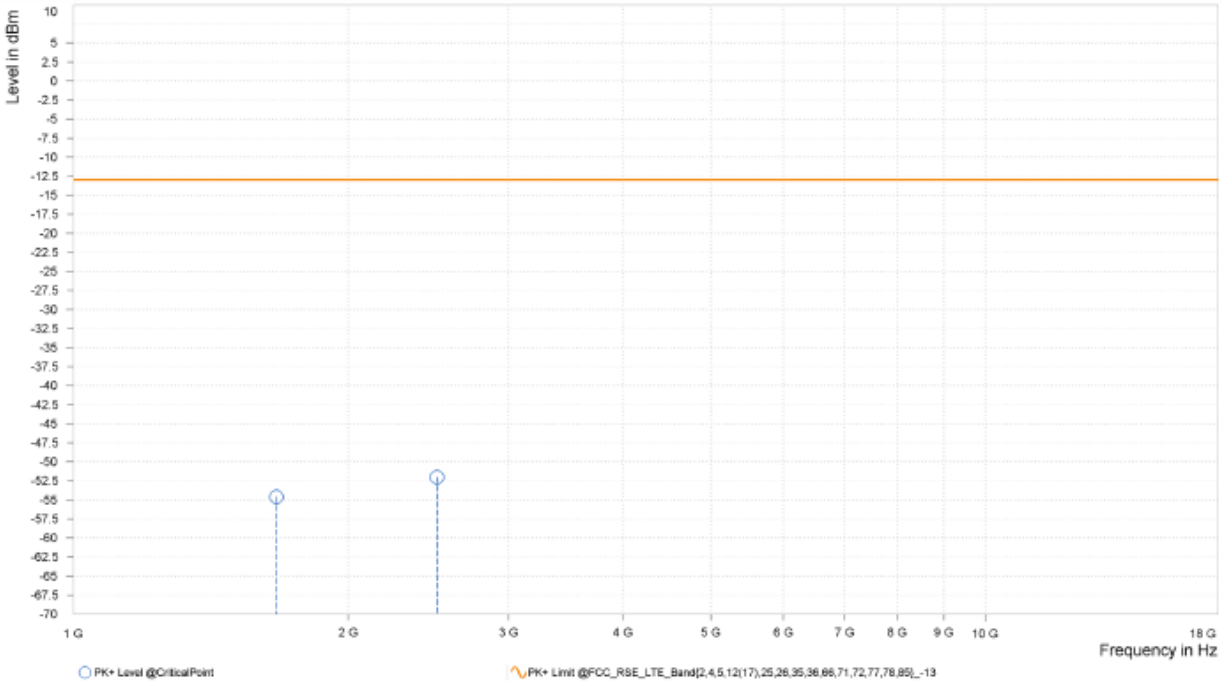
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,670.300	-54.65	-13.00	41.65	7.52	V	3	2.00
1	2,505.450	-52.58	-13.00	39.58	11.93	V	7.3	1.00



CHANNEL BANDWIDTH: 5MHz / QPSK

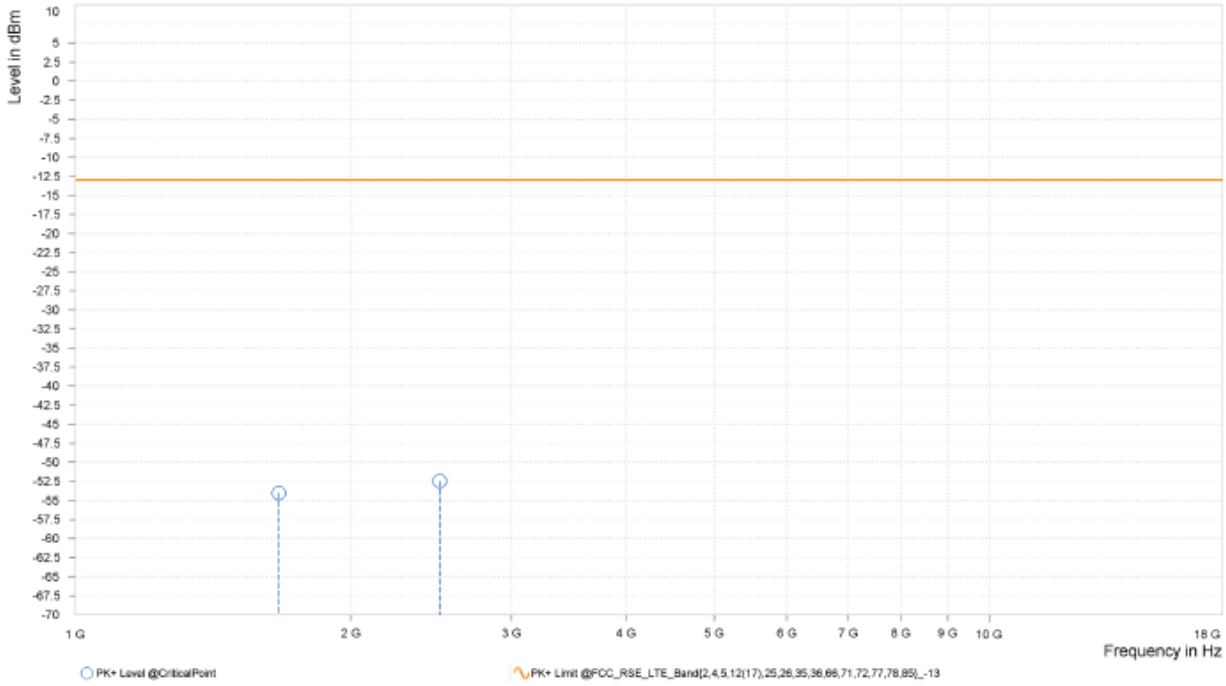
MODE	TX channel 26915	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,668.500	-54.61	-13.00	41.61	7.69	H	3	2.00
1	2,502.750	-52.03	-13.00	39.03	12.29	H	5.1	1.00



MODE	TX channel 26915	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 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	1,668.500	-54.03	-13.00	41.03	7.43	V	357.2	1.00
1	2,502.750	-52.46	-13.00	39.46	11.93	V	5.1	1.00

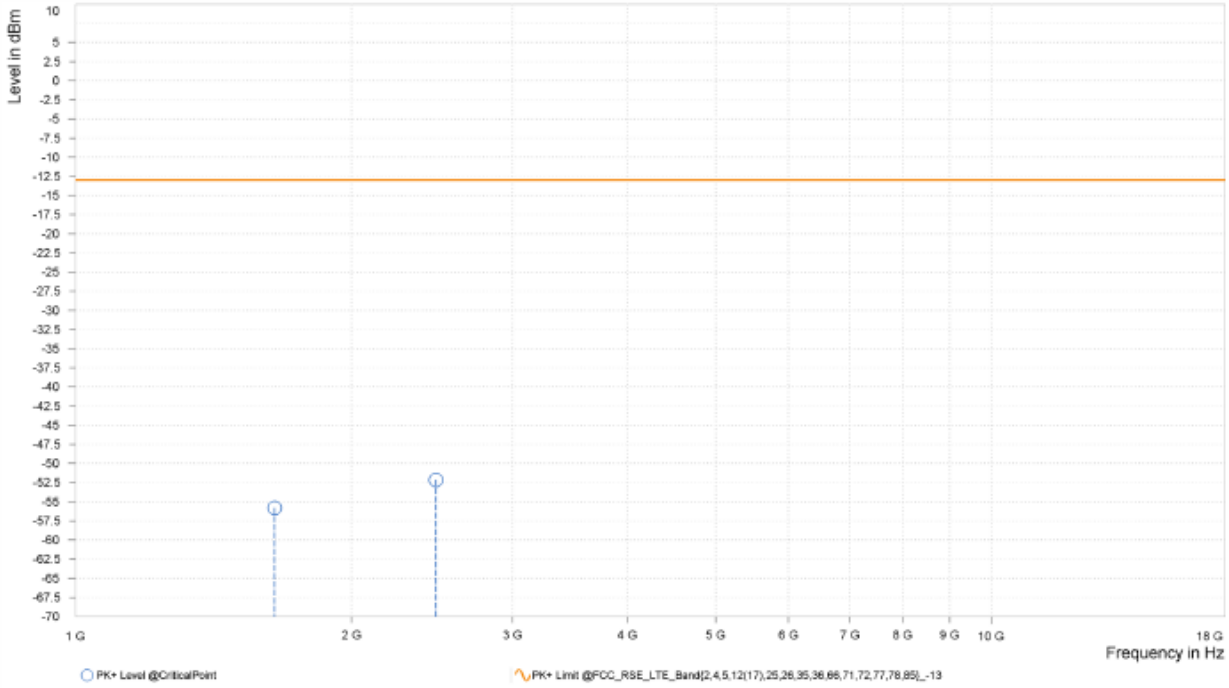


CHANNEL BANDWIDTH: 10MHz / QPSK

CH26840

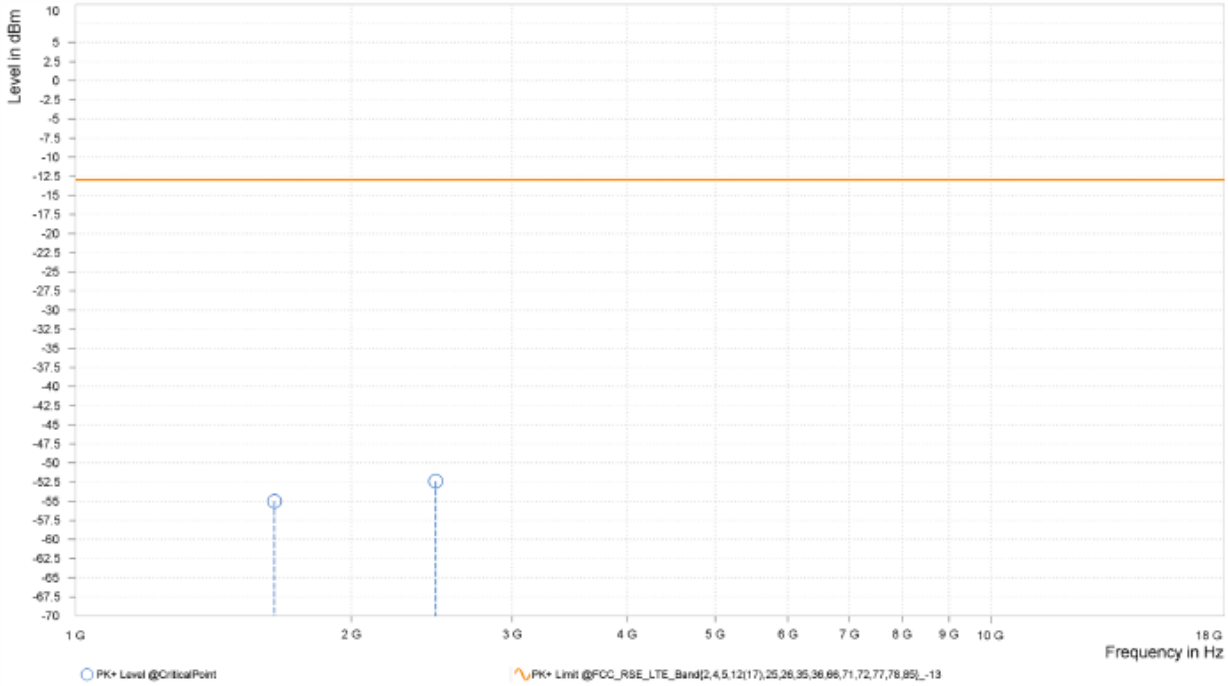
MODE	TX channel 26840	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,649.000	-55.79	-13.00	42.79	6.98	H	2.7	2.00
1	2,473.500	-52.15	-13.00	39.15	12.41	H	357	1.00



MODE	TX channel 26840	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

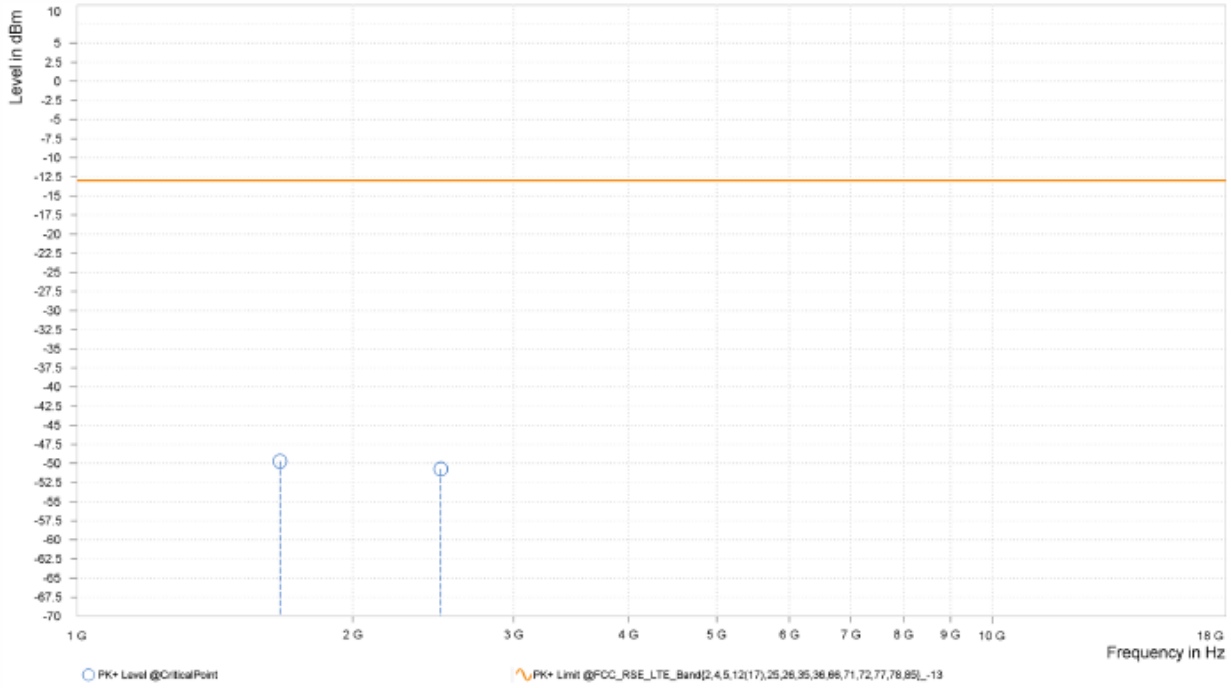
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,649.000	-55.00	-13.00	42.00	6.45	V	5.2	1.00
1	2,473.500	-52.38	-13.00	39.38	12.11	V	137	2.00



CH 26915

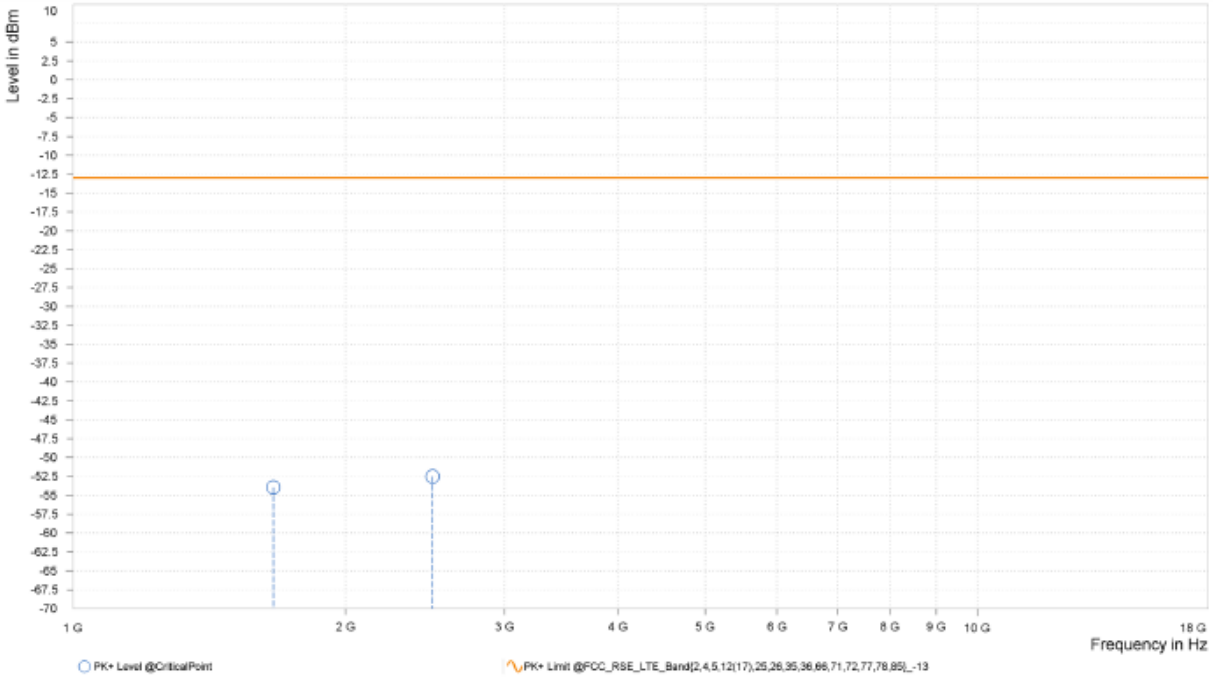
MODE	TX channel 26915	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,666.000	-49.73	-13.00	36.73	7.62	H	354.9	2.00
1	2,496.000	-50.73	-13.00	37.73	12.30	H	1	1.00



MODE	TX channel 26915	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

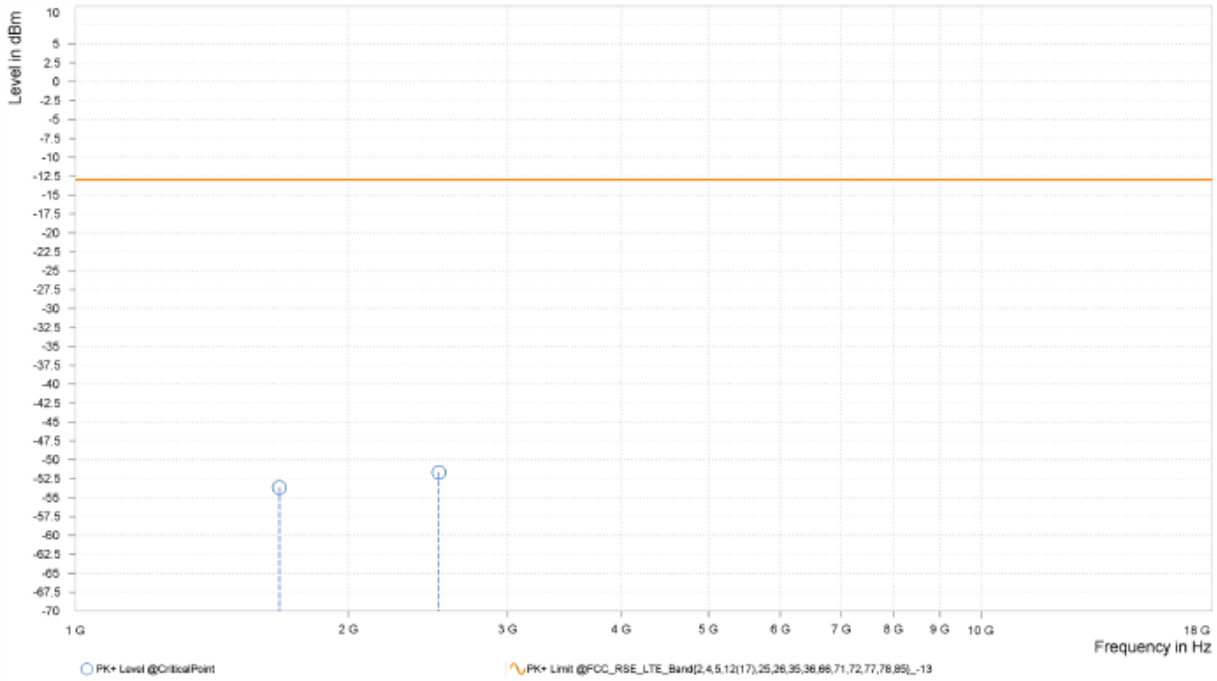
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,664.000	-53.95	-13.00	40.95	7.21	V	1	1.00
1	2,496.000	-52.51	-13.00	39.51	11.92	V	359	1.00



CH26990

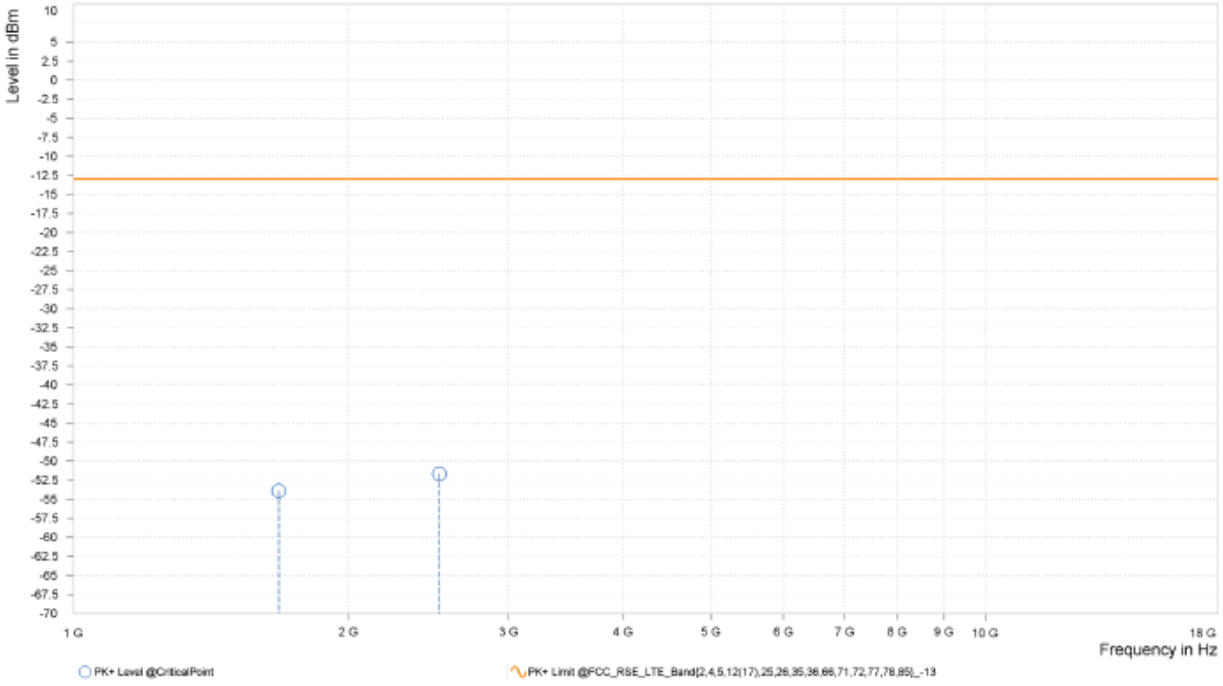
MODE	TX channel 26990	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,679.000	-53.68	-13.00	40.68	8.00	H	5.2	1.00
1	2,518.500	-51.67	-13.00	38.67	12.25	H	357	1.00



MODE	TX channel 26965	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 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	1,679.000	-53.88	-13.00	40.88	7.91	V	354.8	2.00
1	2,518.500	-51.66	-13.00	38.66	11.94	V	356.4	1.00

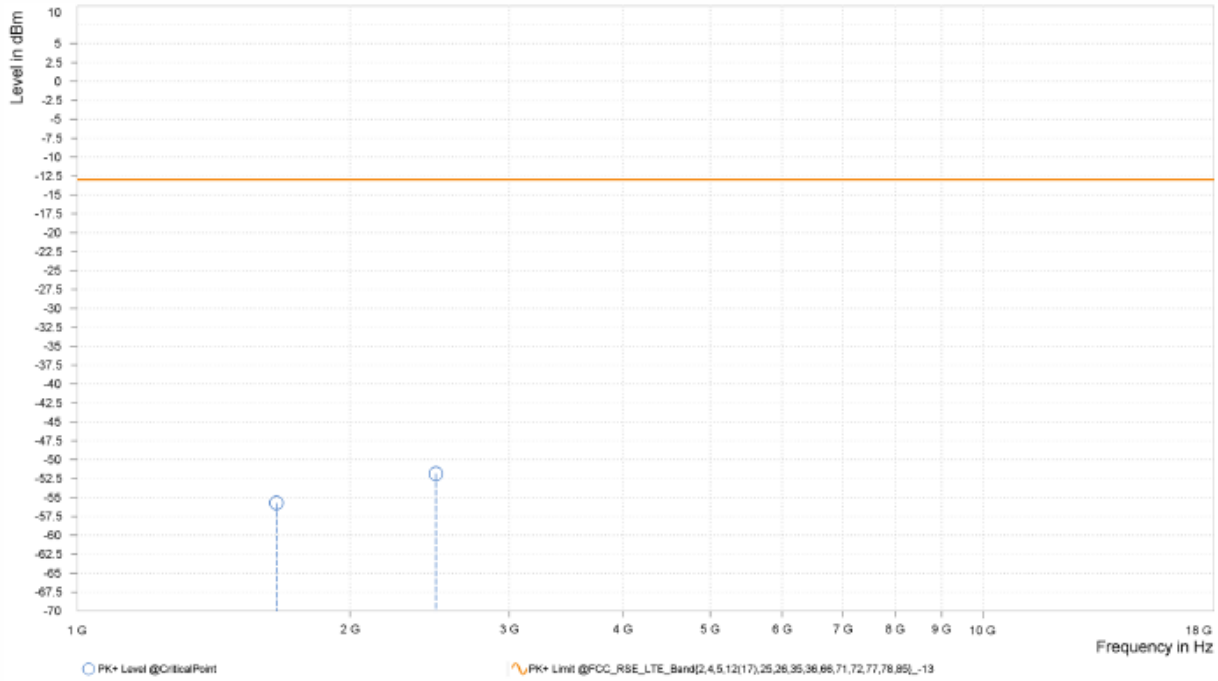


CHANNEL BANDWIDTH: 15MHz / QPSK

CH26915

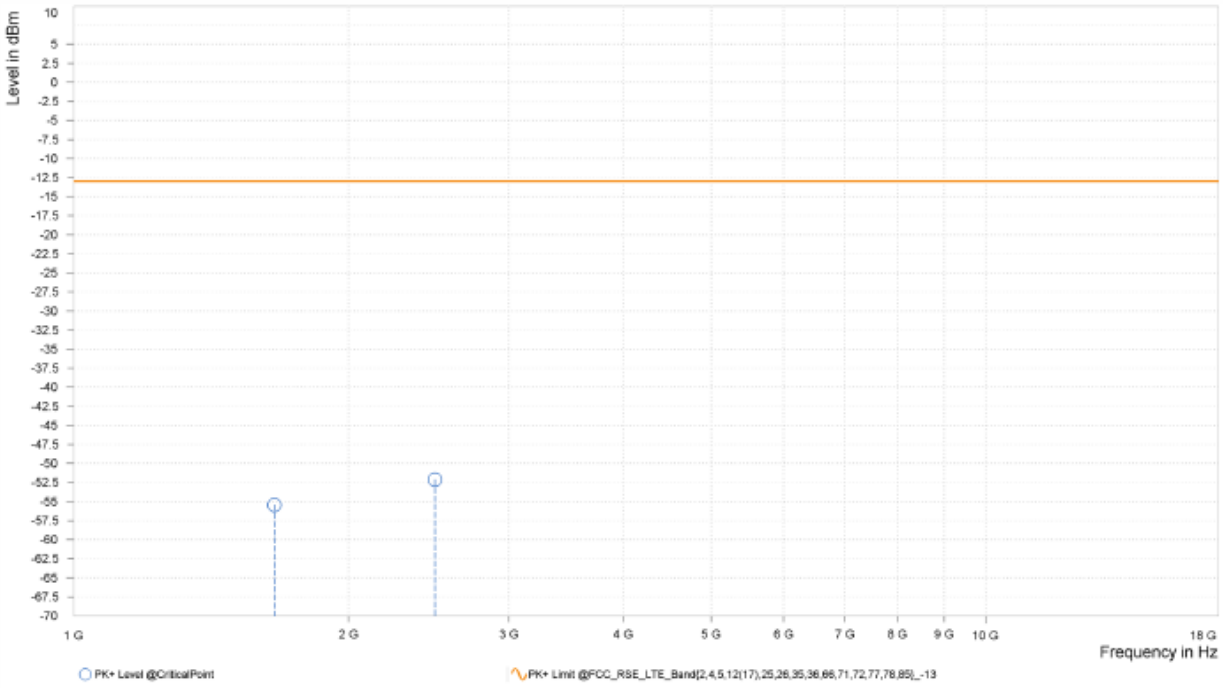
MODE	TX channel 26915	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,659.500	-55.74	-13.00	42.74	7.39	H	5.1	1.00
1	2,489.250	-51.85	-13.00	38.85	12.33	H	359	1.00



MODE	TX channel 26915	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 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	1,659.500	-55.45	-13.00	42.45	6.97	V	1	1.00
1	2,489.250	-52.11	-13.00	39.11	11.97	V	359	2.00



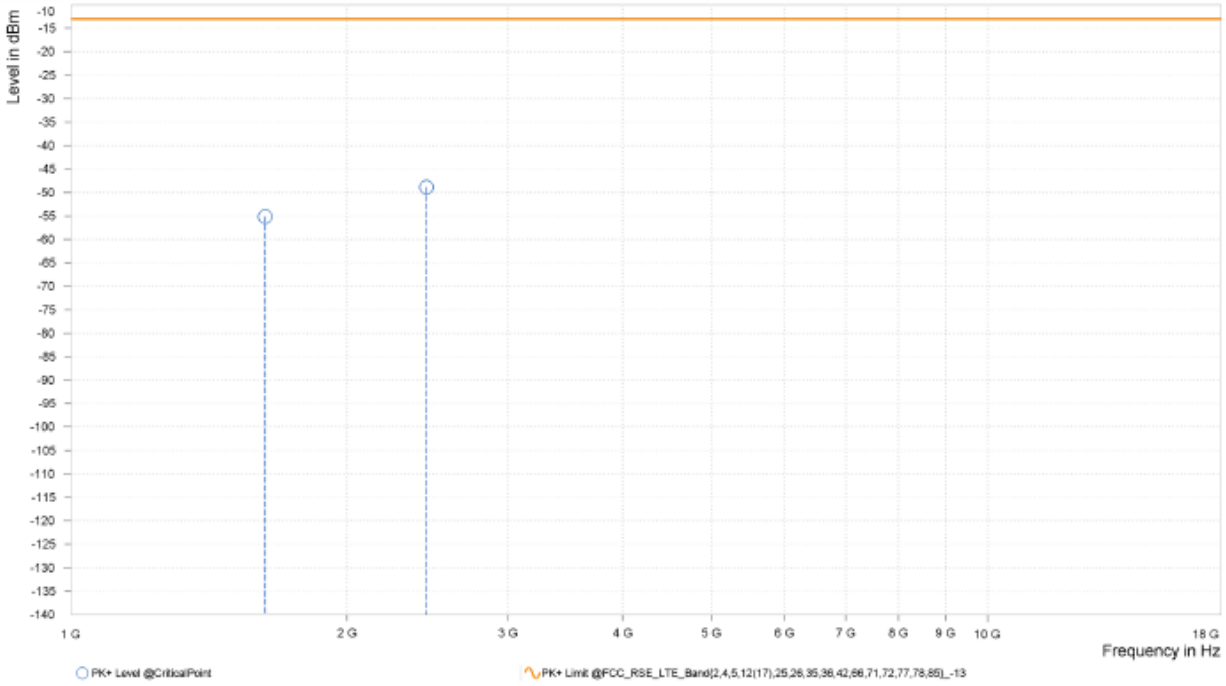
NB-IOT LTE Band 26

CHANNEL BANDWIDTH: QPSK

CH26792

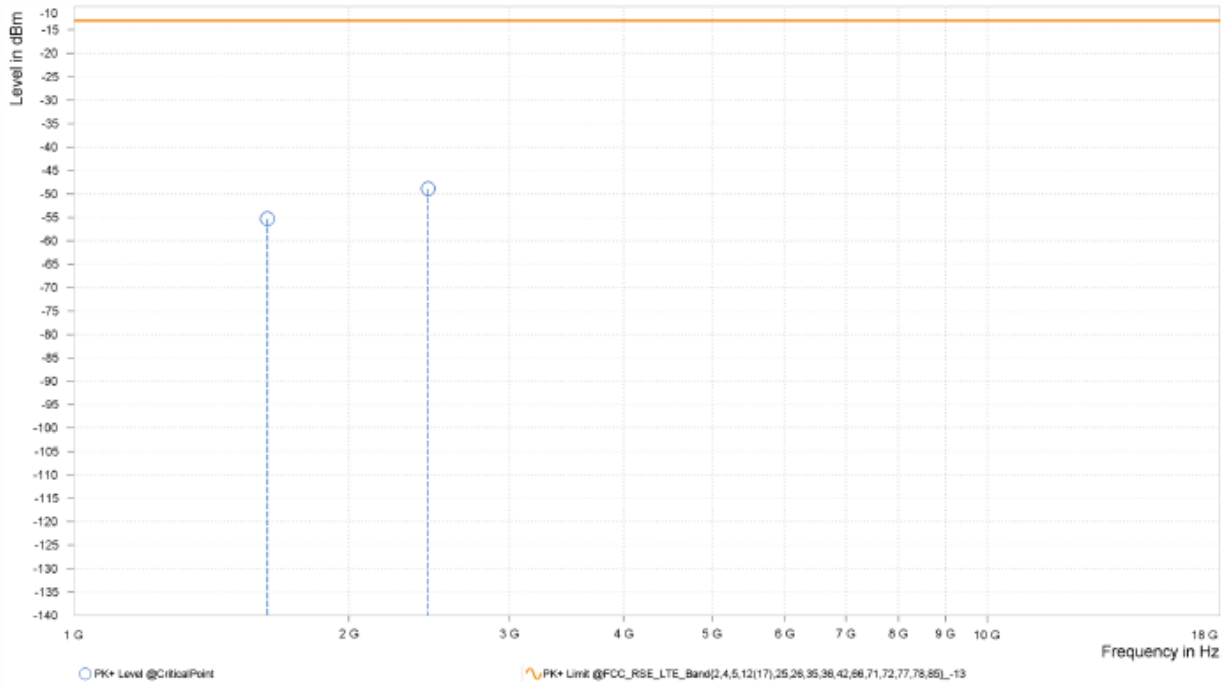
MODE	TX channel 26792	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,628.200	-55.15	-13.00	42.15	13.46	H	79.7	2.00
3	2,442.300	-48.86	-13.00	35.86	19.66	H	103.4	1.00



MODE	TX channel 26792	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

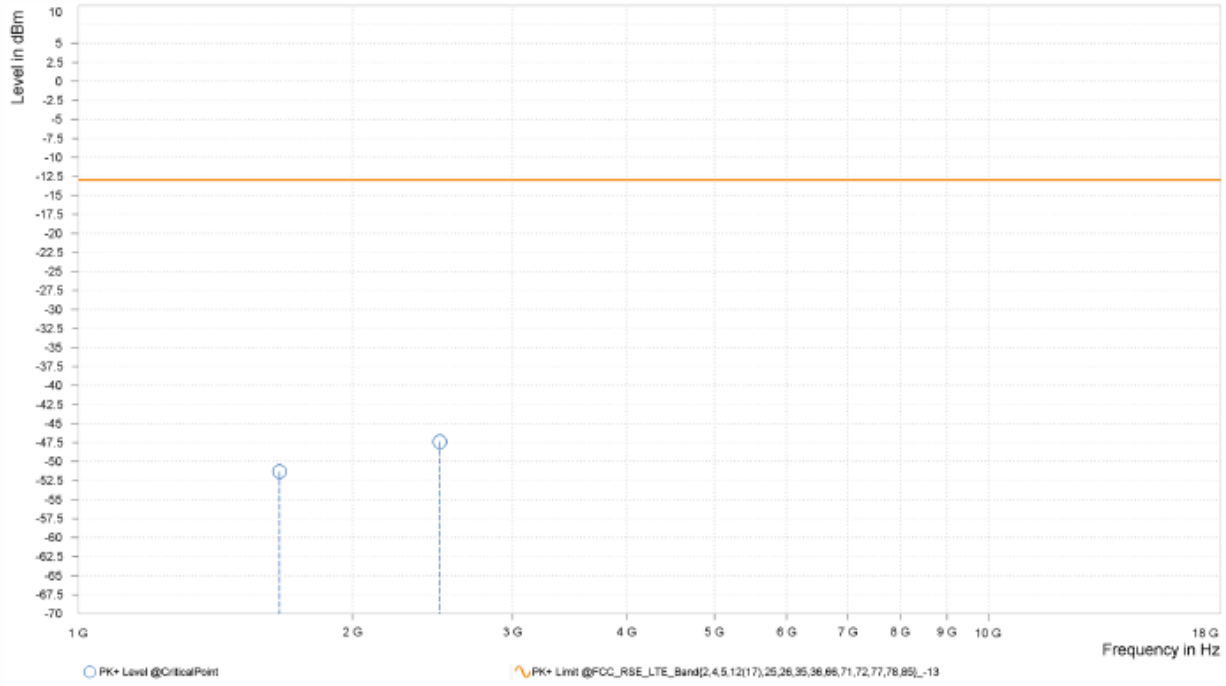
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,628.200	-55.34	-13.00	42.34	13.68	V	358.4	1.00
3	2,442.300	-48.90	-13.00	35.90	19.45	V	359	1.00



CHANNEL BANDWIDTH: QPSK
CH 26915

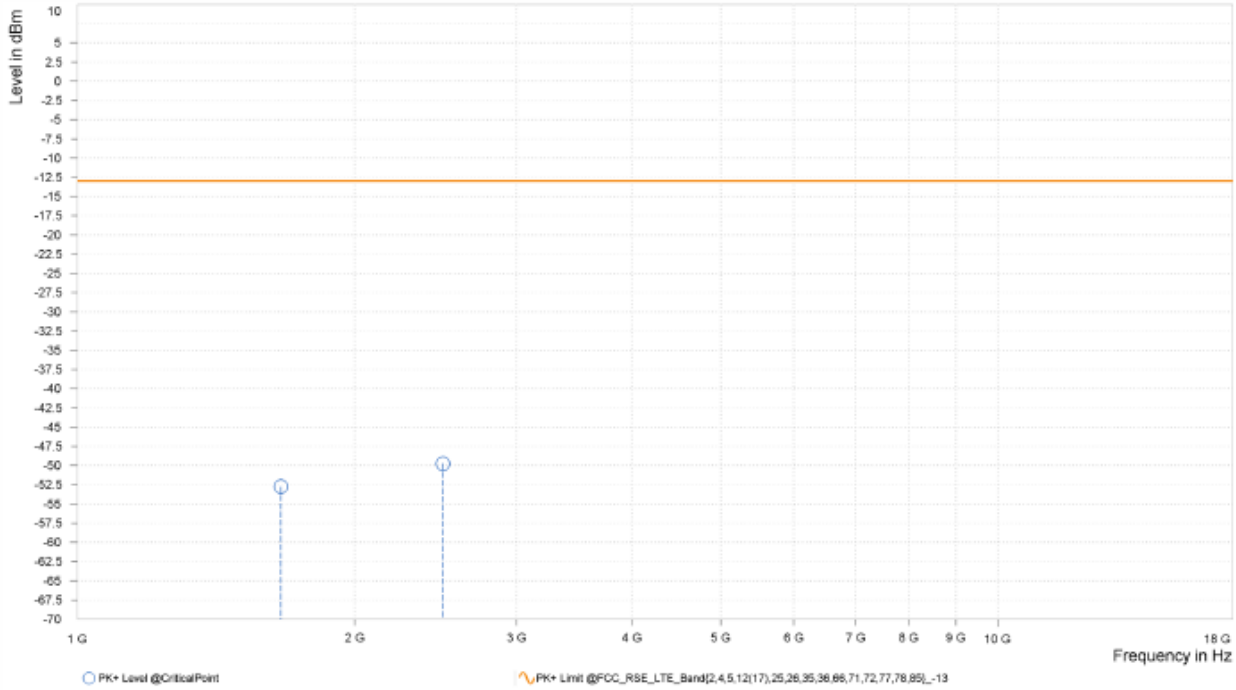
MODE	TX channel 26915	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,663.500	-51.31	-13.00	38.31	7.53	H	4.6	1.00
1	2,494.000	-47.40	-13.00	34.40	12.31	H	224.4	1.00



MODE	TX channel 26915	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

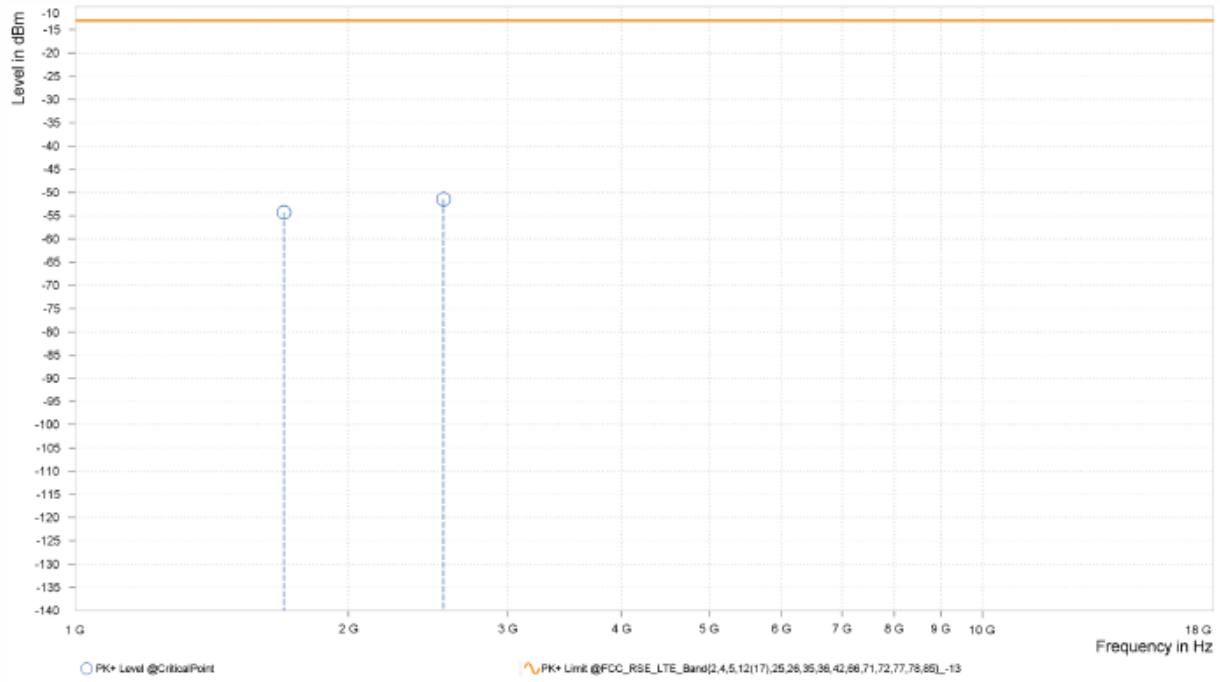
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	1,663.000	-52.76	-13.00	39.76	7.16	V	354.8	2.00
1	2,494.500	-49.75	-13.00	36.75	11.92	V	3	2.00



CHANNEL BANDWIDTH: QPSK
CH 27038

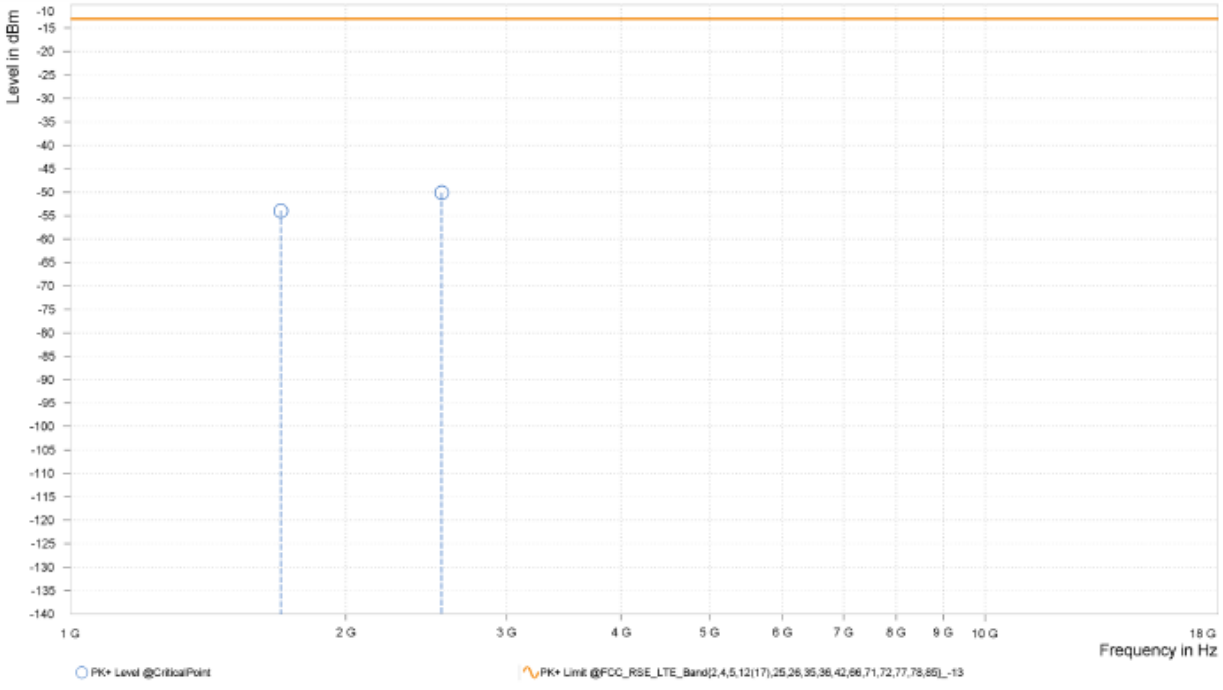
MODE	TX channel 27038	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,697.800	-54.27	-13.00	41.27	15.11	H	359	2.00
3	2,546.700	-51.51	-13.00	38.51	19.40	H	1	1.00



MODE	TX channel 27038	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	1,697.800	-53.98	-13.00	40.98	14.35	V	51.8	1.00
3	2,546.700	-50.12	-13.00	37.12	20.02	V	359	2.00

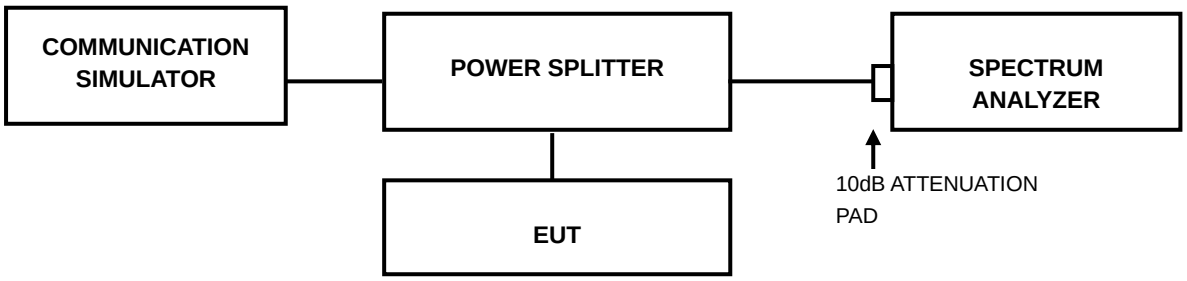


3.7 PEAK TO AVERAGE RATIO

3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

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

3.7.2 TEST SETUP



3.7.3 TEST PROCEDURES

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

3.7.4 TEST RESULTS

Please Refer to Appendix Of this test report.

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

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

5 INFORMATION ON THE TESTING LABORATORIES

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

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

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

6 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

7 APPENDIX:

CAT-M: LTE BAND26(INCLUDING LTE BAND5)

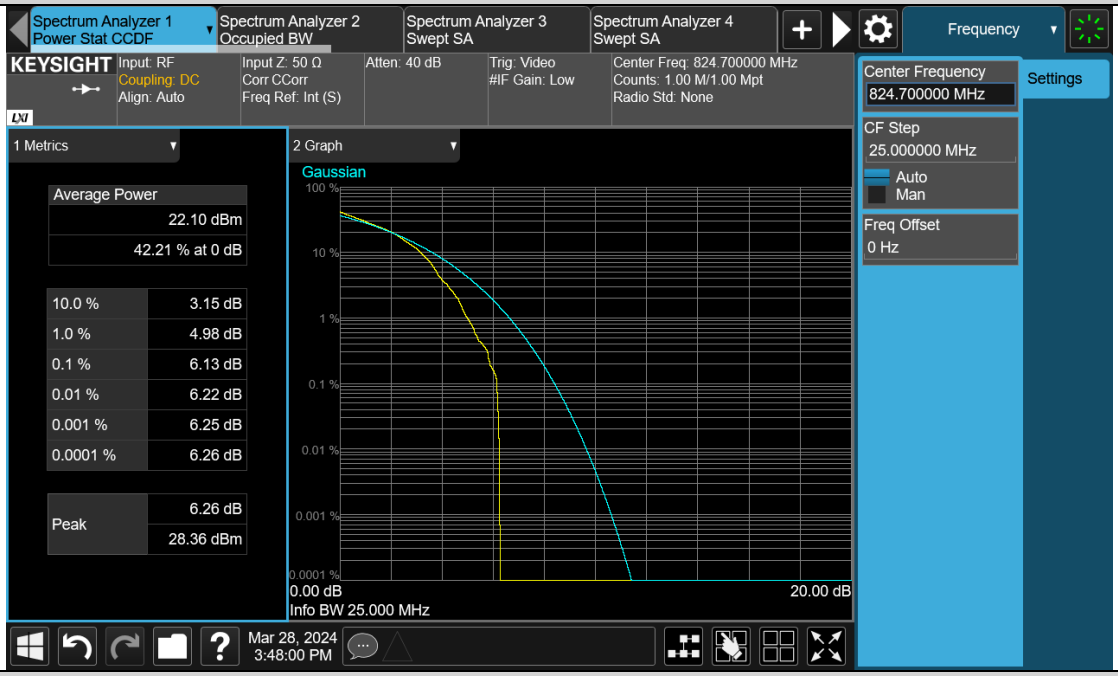
PEAK-TO-AVERAGE RATIO(CCDF)

Test Result

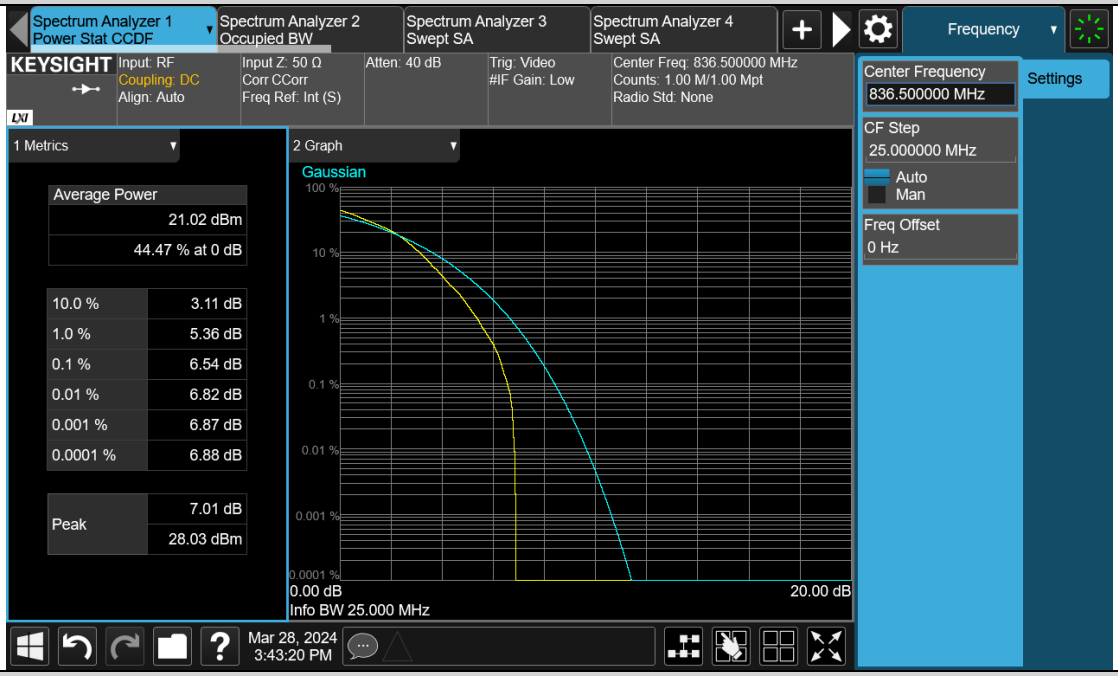
Band	Bandwidth	Modulation	Channel	Result(dB)	Limit(dB)	Verdict
Band26	1.4MHz	QPSK	26797	6.13	13	PASS
Band26	1.4MHz	QPSK	26915	6.54	13	PASS
Band26	1.4MHz	QPSK	27033	6.42	13	PASS
Band26	1.4MHz	16QAM	26797	4.91	13	PASS
Band26	1.4MHz	16QAM	26915	5.57	13	PASS
Band26	1.4MHz	16QAM	27033	5.05	13	PASS
Band26	3MHz	QPSK	26805	4.86	13	PASS
Band26	3MHz	QPSK	26915	4.90	13	PASS
Band26	3MHz	QPSK	27025	5.22	13	PASS
Band26	3MHz	16QAM	26805	6.65	13	PASS
Band26	3MHz	16QAM	26915	6.63	13	PASS
Band26	3MHz	16QAM	27025	6.41	13	PASS
Band26	5MHz	QPSK	26815	5.65	13	PASS
Band26	5MHz	QPSK	26915	5.61	13	PASS
Band26	5MHz	QPSK	27015	5.85	13	PASS
Band26	5MHz	16QAM	26815	5.93	13	PASS
Band26	5MHz	16QAM	26915	6.02	13	PASS
Band26	5MHz	16QAM	27015	6.32	13	PASS
Band26	10MHz	QPSK	26840	5.98	13	PASS
Band26	10MHz	QPSK	26915	5.61	13	PASS
Band26	10MHz	QPSK	26990	5.73	13	PASS
Band26	10MHz	16QAM	26840	6.34	13	PASS
Band26	10MHz	16QAM	26915	6.04	13	PASS
Band26	10MHz	16QAM	26990	6.20	13	PASS
Band26	15MHz	QPSK	26865	5.35	13	PASS
Band26	15MHz	QPSK	26915	5.63	13	PASS
Band26	15MHz	QPSK	26965	5.65	13	PASS
Band26	15MHz	16QAM	26865	5.71	13	PASS
Band26	15MHz	16QAM	26915	5.97	13	PASS
Band26	15MHz	16QAM	26965	6.15	13	PASS

Test Graphs

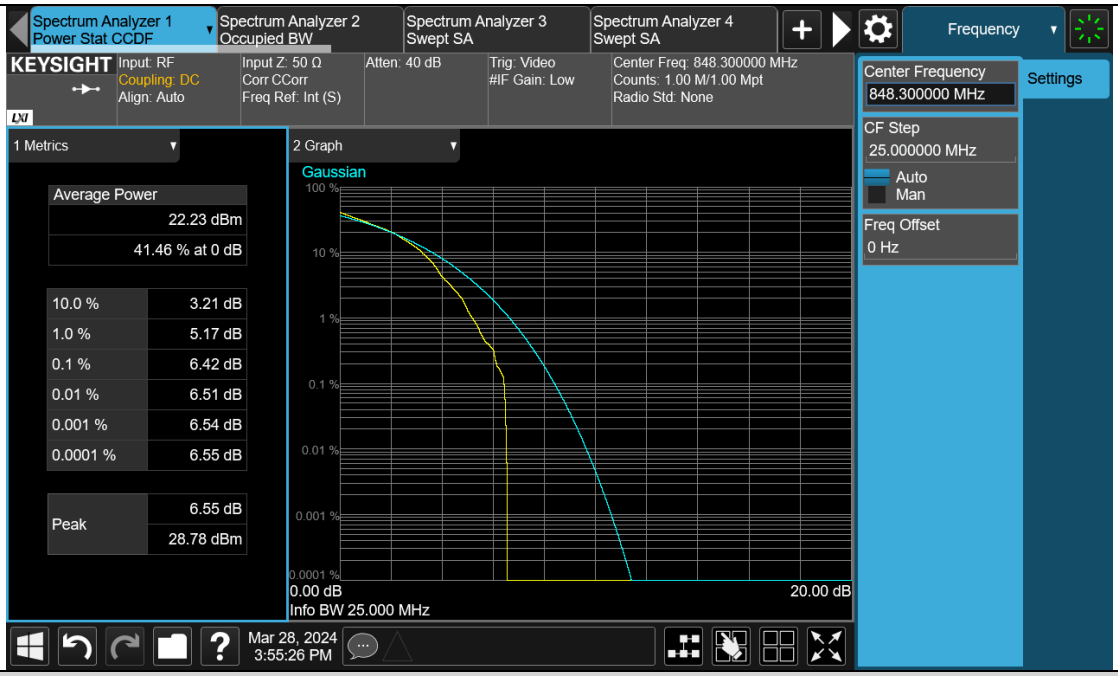
Band26-1.4MHz-QPSK-26797



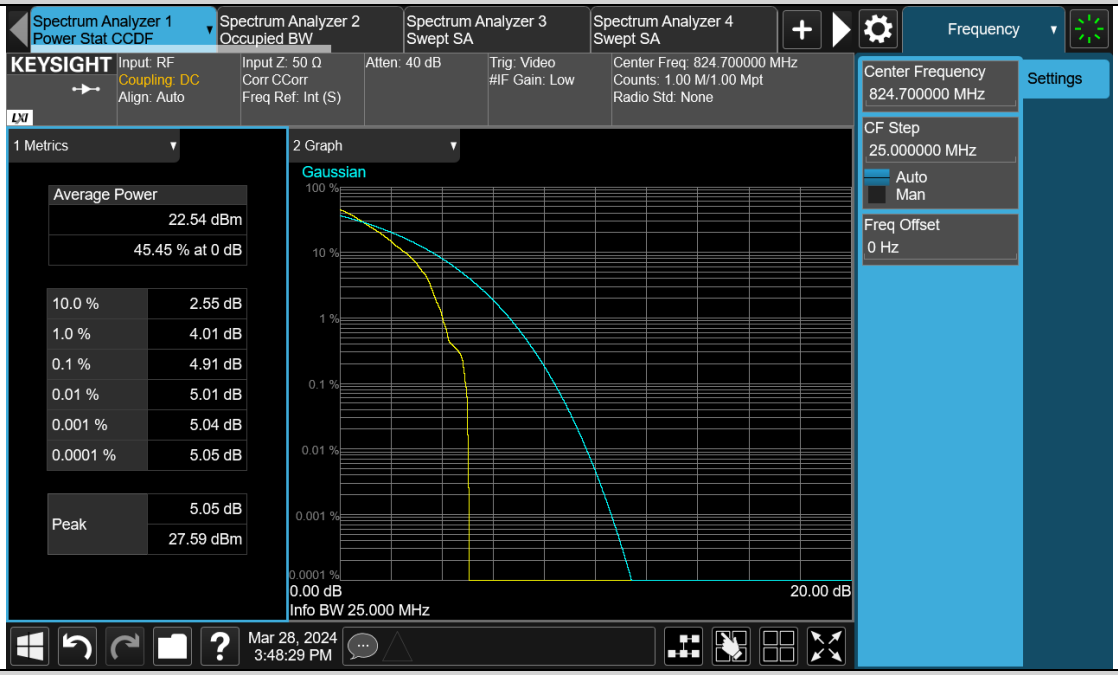
Band26-1.4MHz-QPSK-26915



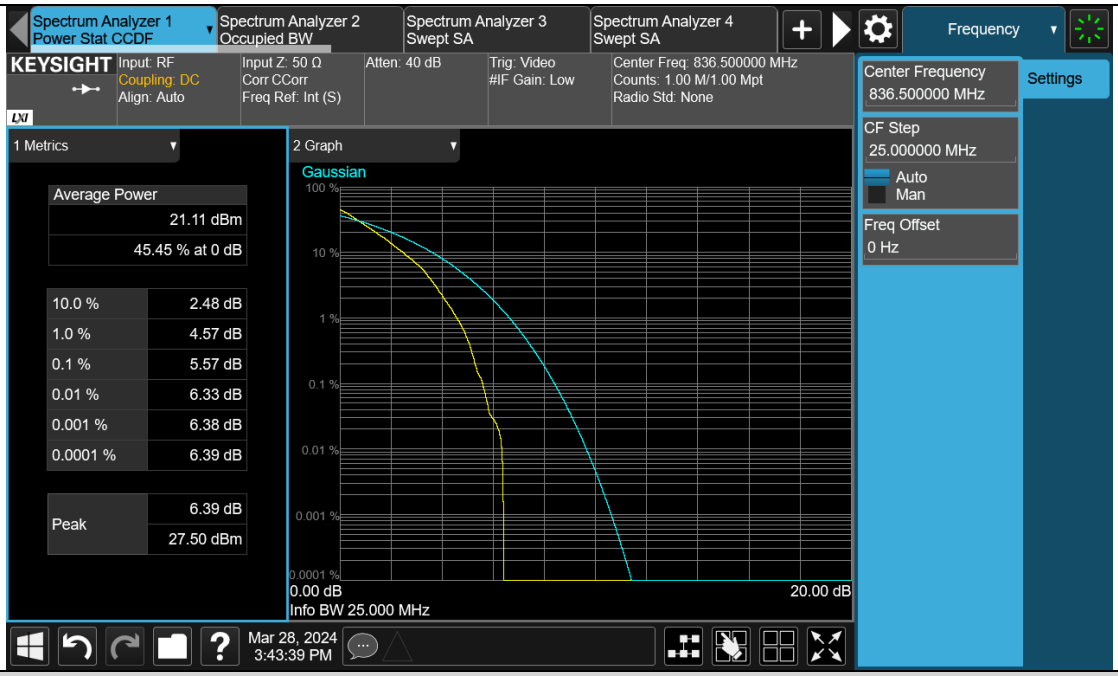
Band26-1.4MHz-QPSK-27033



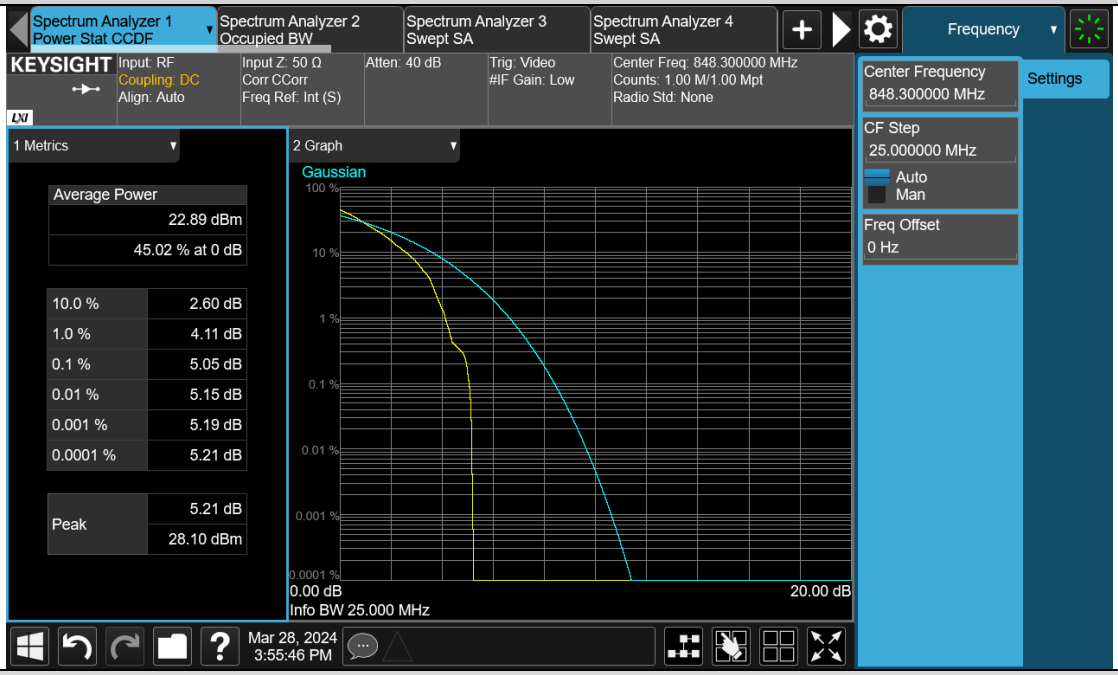
Band26-1.4MHz-16QAM-26797



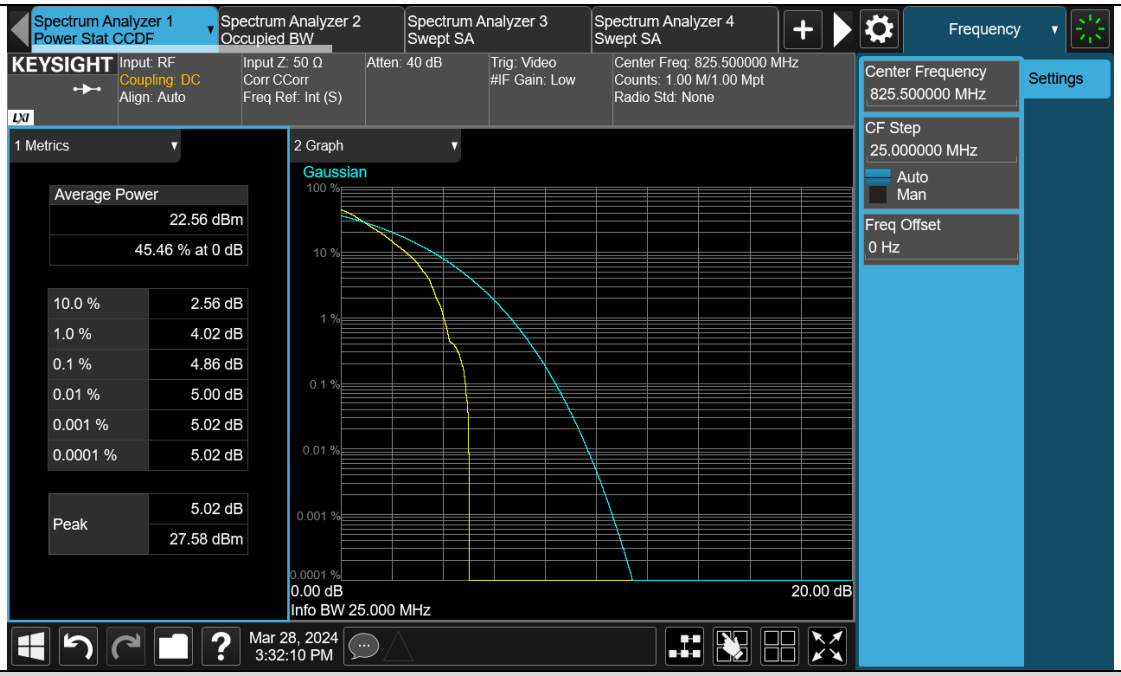
Band26-1.4MHz-16QAM-26915



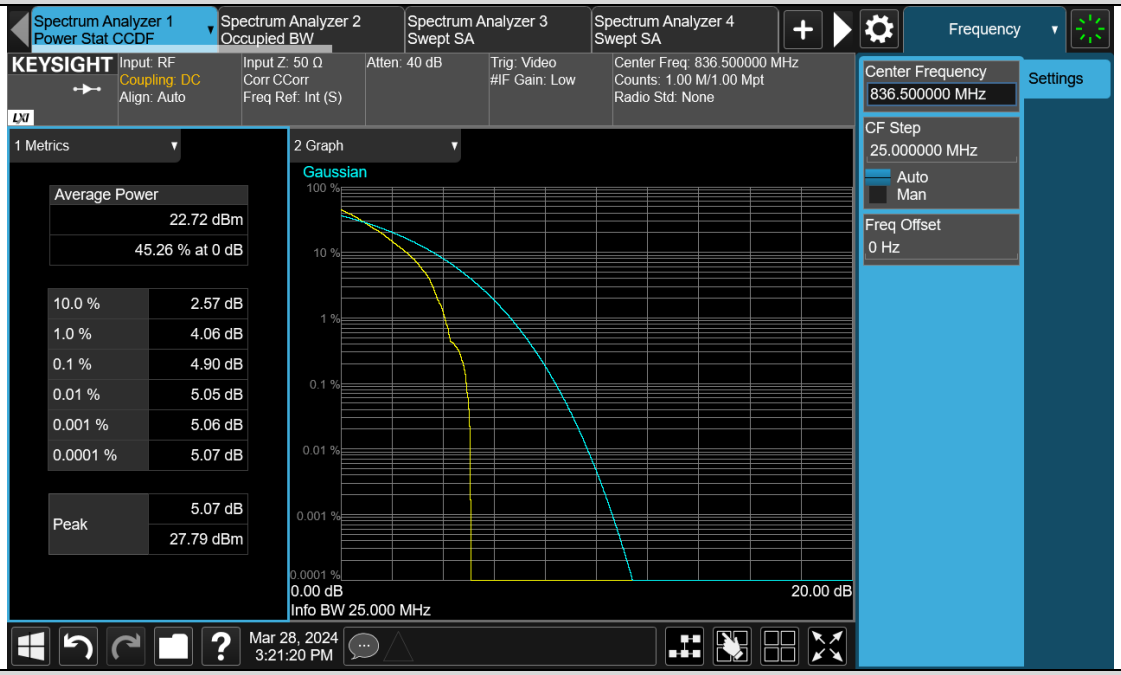
Band26-1.4MHz-16QAM-27033



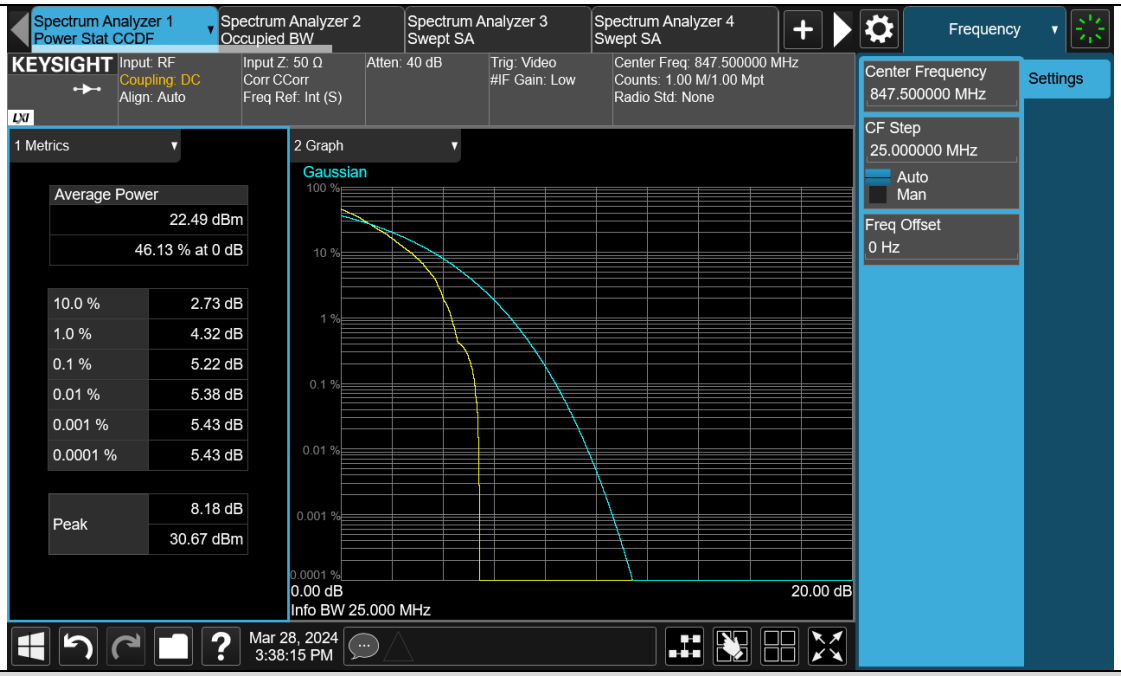
Band26-3MHz-QPSK-26805



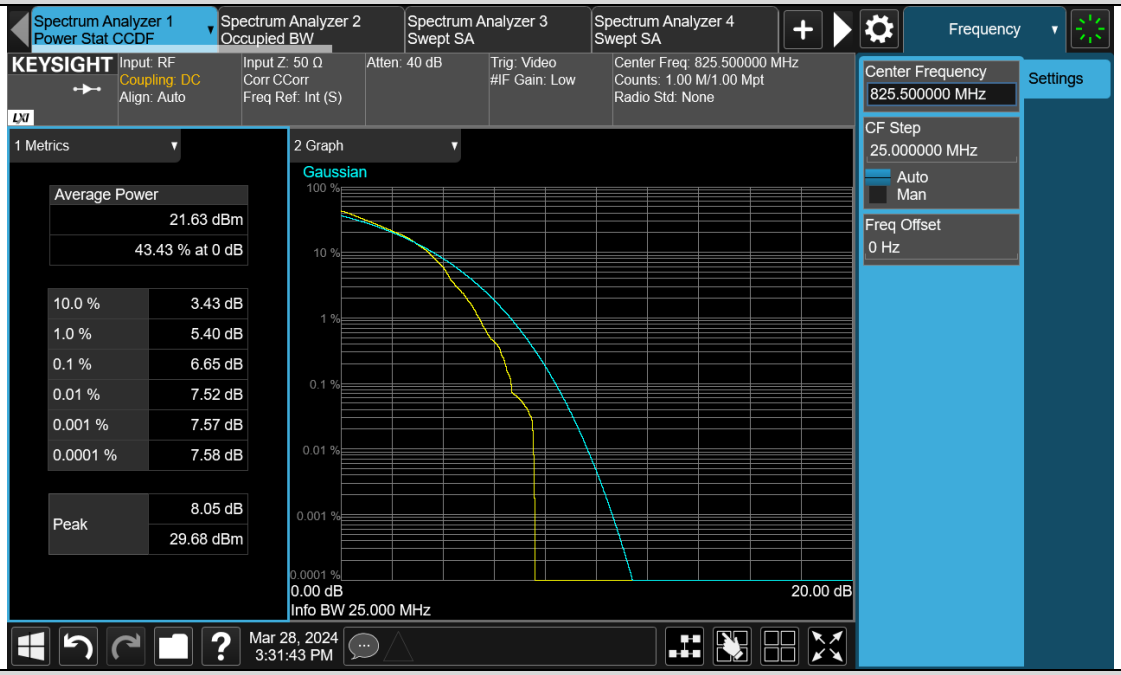
Band26-3MHz-QPSK-26915



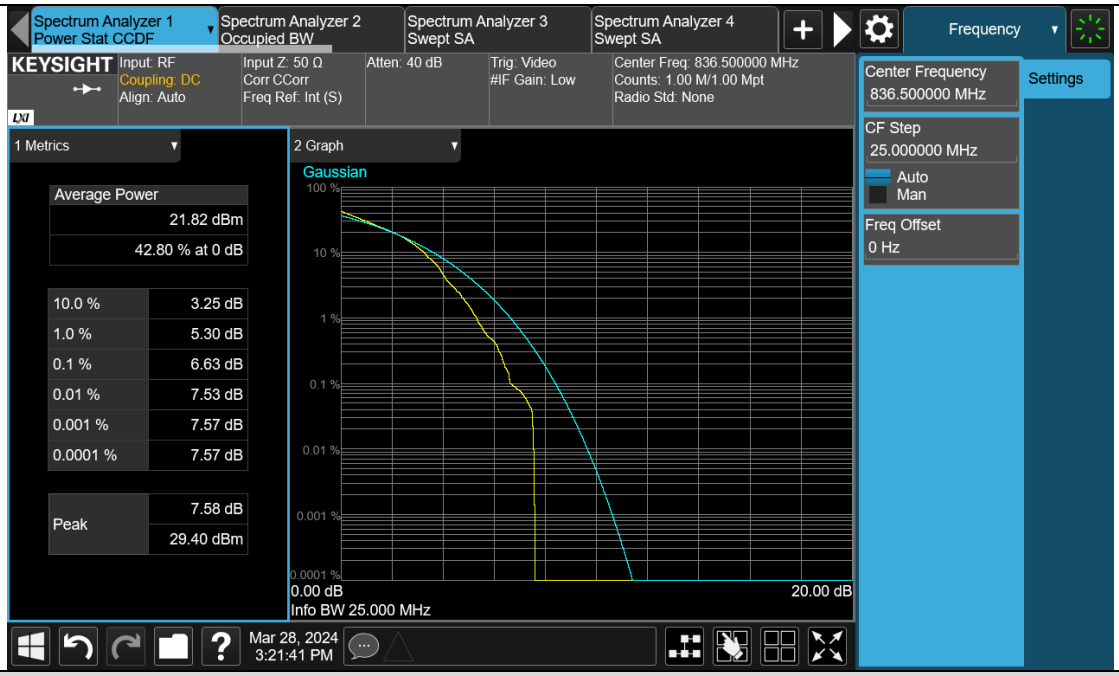
Band26-3MHz-QPSK-27025



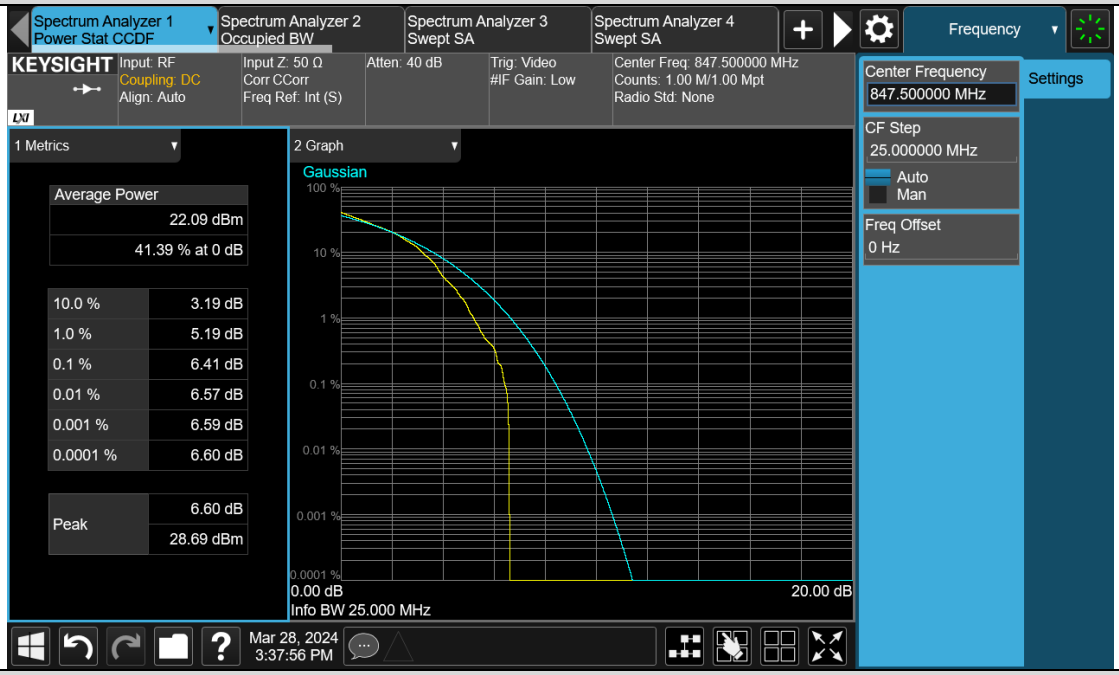
Band26-3MHz-16QAM-26805



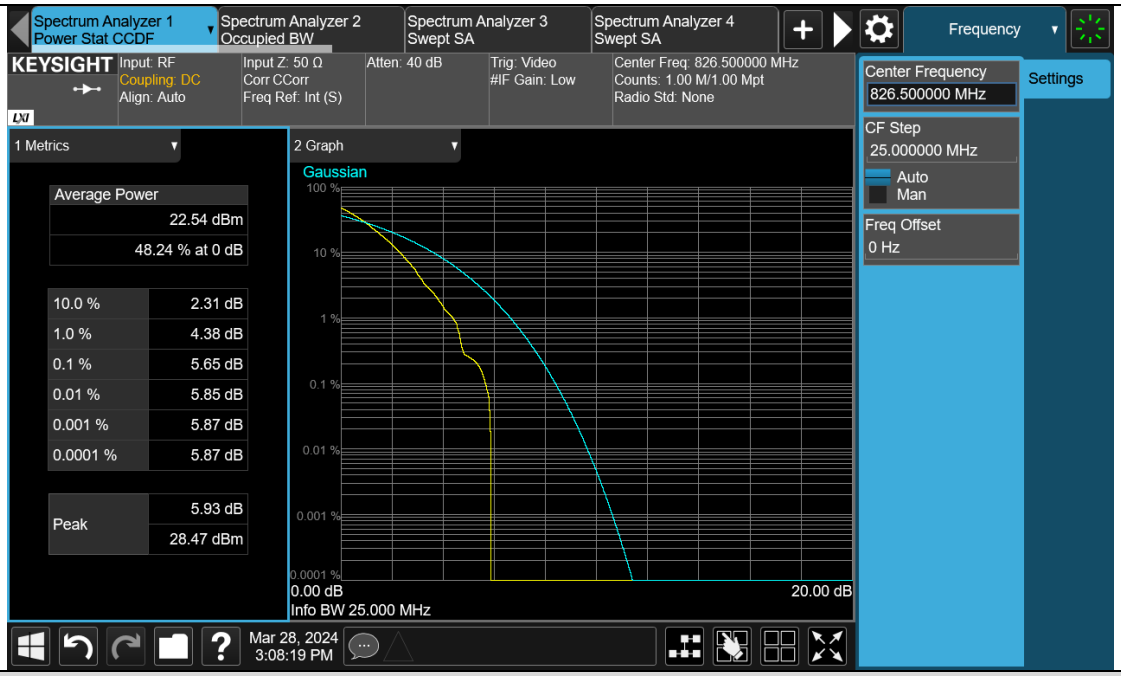
Band26-3MHz-16QAM-26915



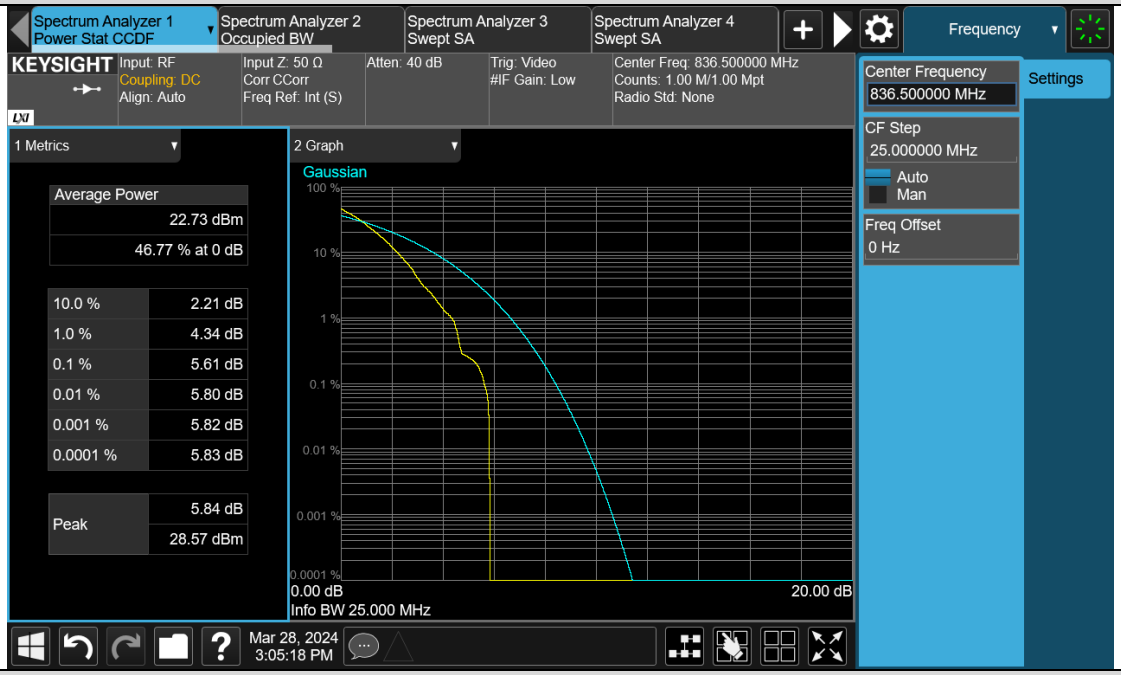
Band26-3MHz-16QAM-27025



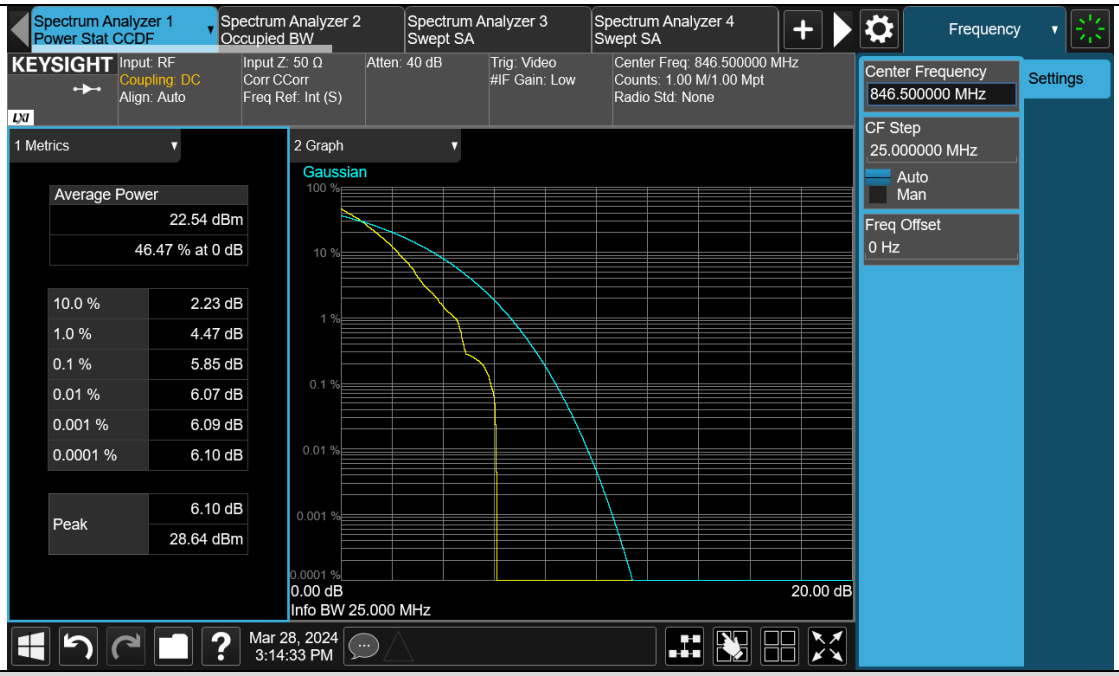
Band26-5MHz-QPSK-26815



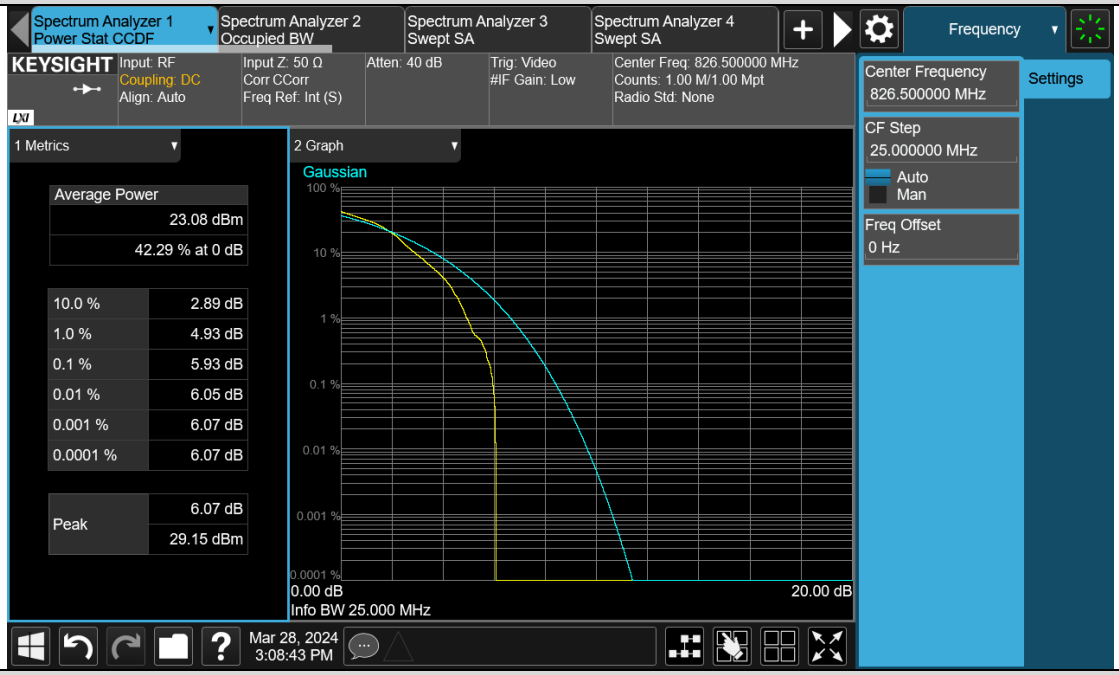
Band26-5MHz-QPSK-26915



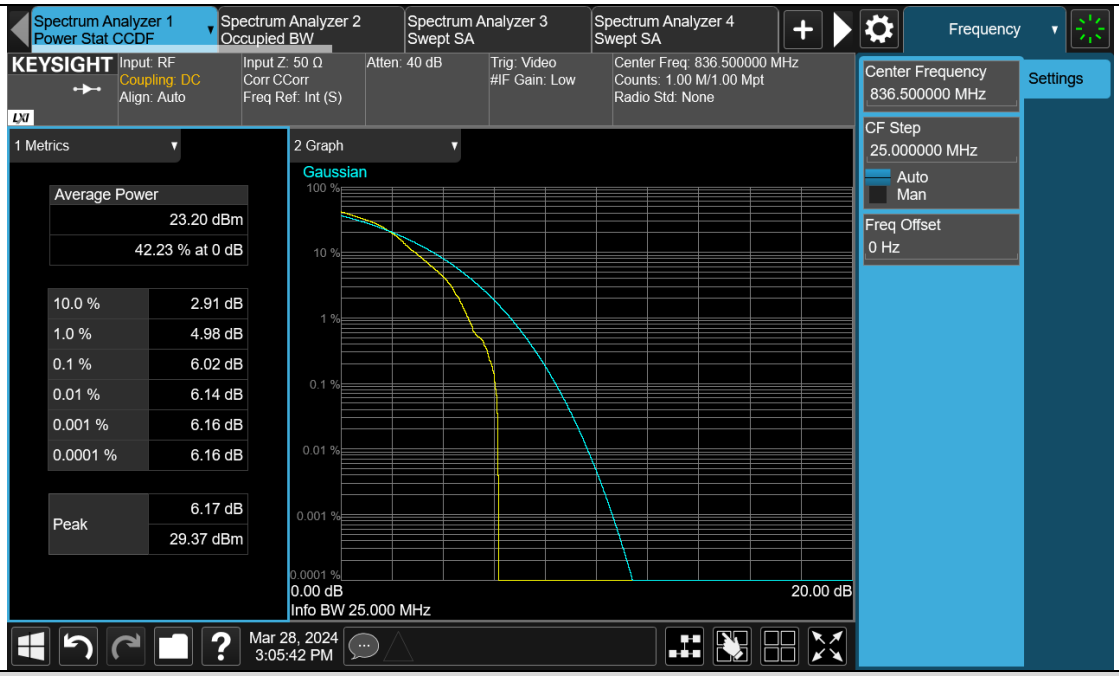
Band26-5MHz-QPSK-27015



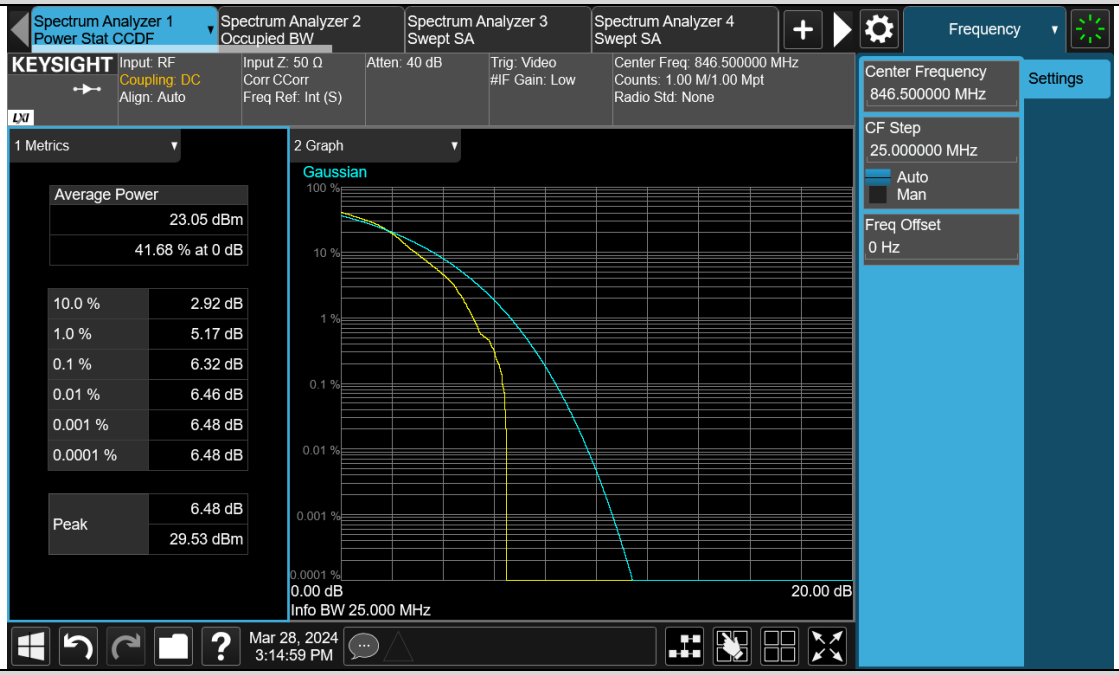
Band26-5MHz-16QAM-26815



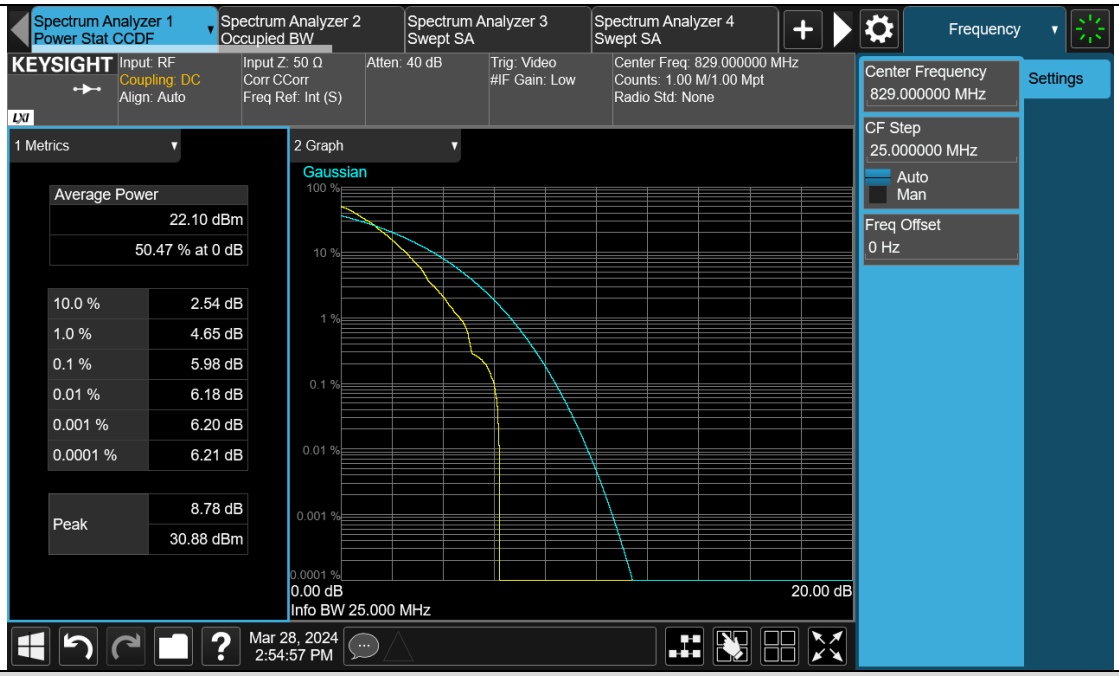
Band26-5MHz-16QAM-26915



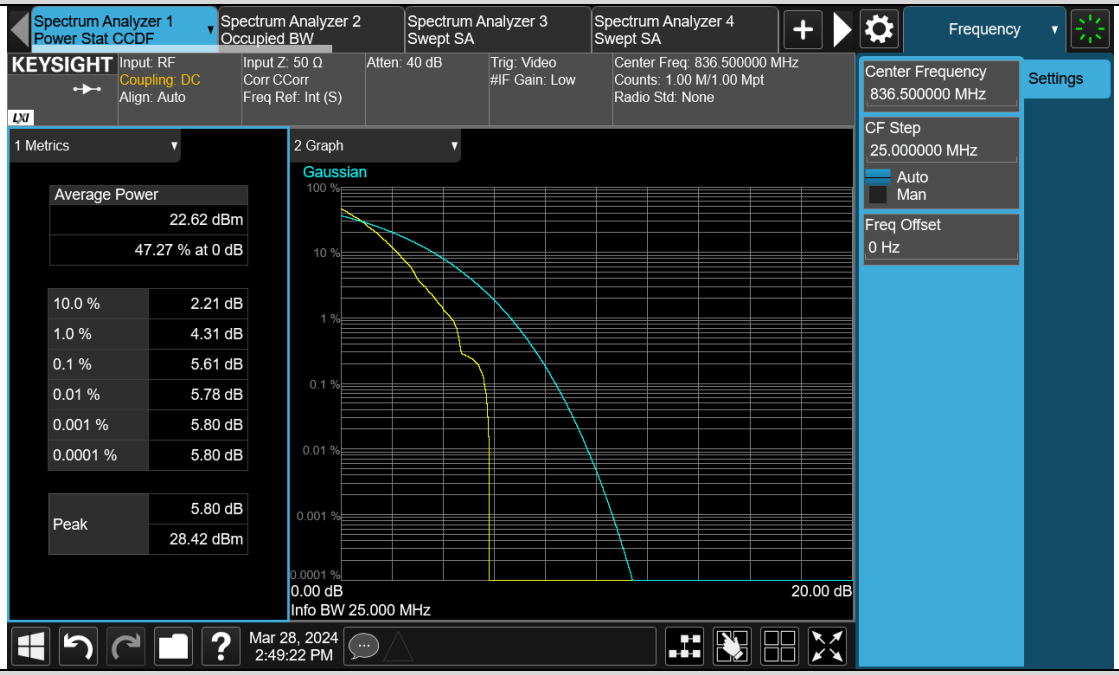
Band26-5MHz-16QAM-27015



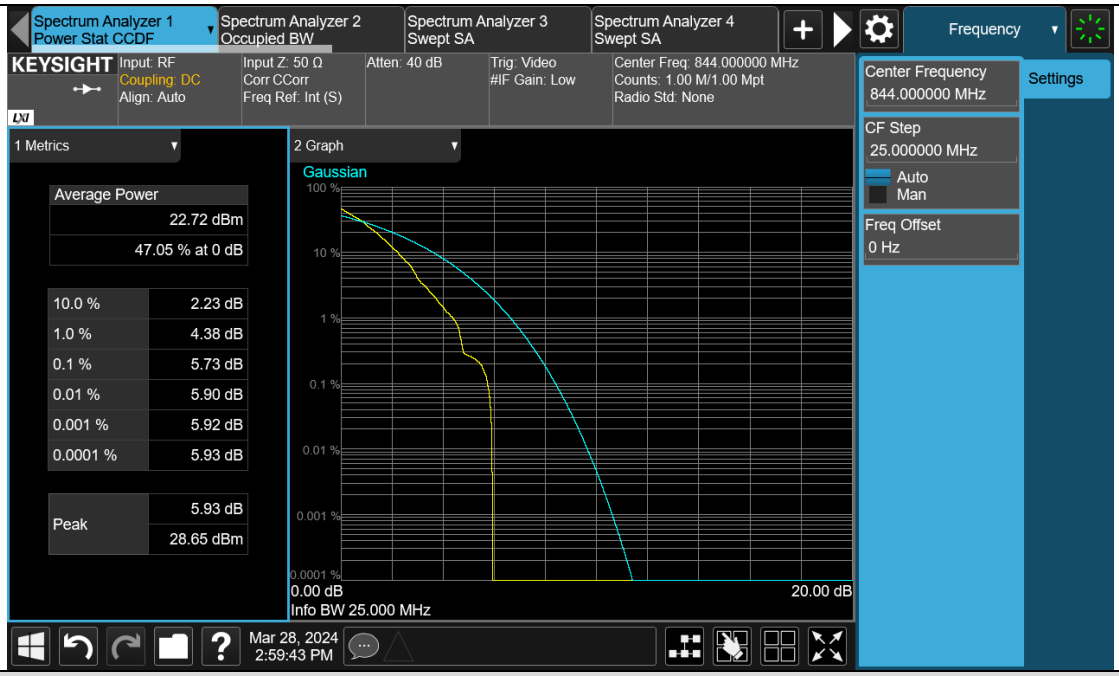
Band26-10MHz-QPSK-26840



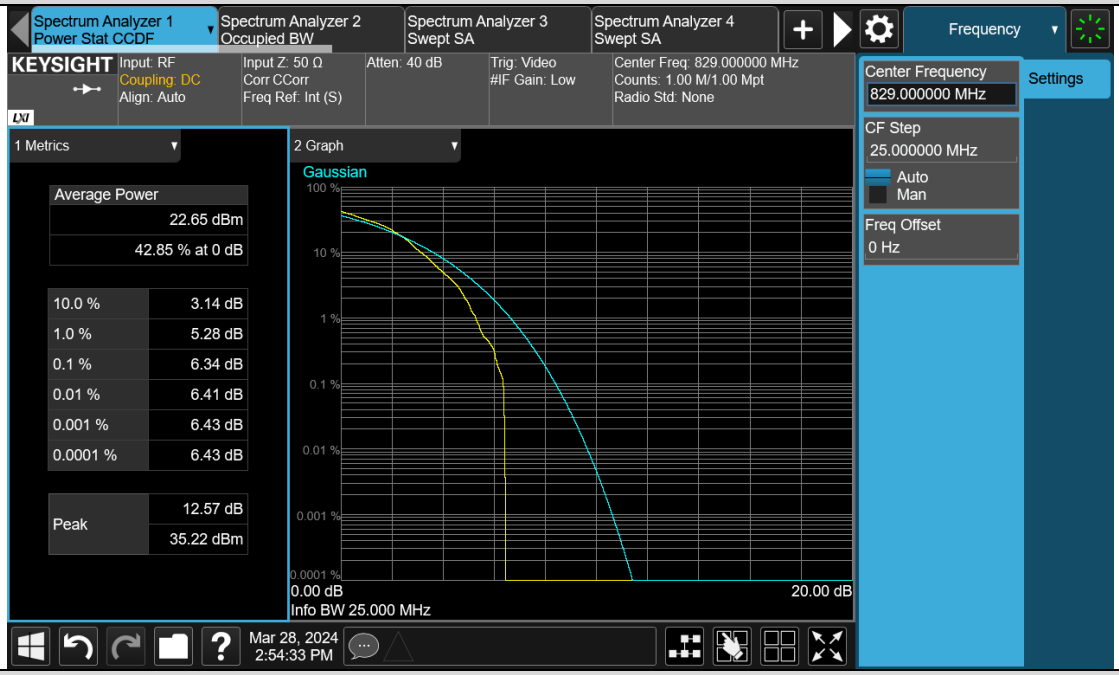
Band26-10MHz-QPSK-26915



Band26-10MHz-QPSK-26990



Band26-10MHz-16QAM-26840



Band26-10MHz-16QAM-26915