Certificate #6613.01

FCC TEST REPORT

(PART 27)

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 27** ☒ **ANSI/TIA/EIA-603-D**
☒ **FCC Part 2** ☒ **ANSI/TIA/EIA-603-E** ☒ **ANSI C63.26-2015**

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-240204W001RF04	Original release	Apr. 26, 2024

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 27 & PART 2			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**TEST LAB***
§2.1046	Conducted Output Power	Compliance	A
§27.50(d)(4) §27.50(h)(2)	Equivalent Isotropically Radiated Power (Band 4) (Band 66)	Compliance	A
§2.1055 §27.54	Frequency Stability	Compliance	A
§2.1049	Occupied Bandwidth	Compliance	A
§2.1051 §27.53(h) §27.53(m)(4)(6)	Conducted Band Edge Measurements (Band 4) (Band 66)	Compliance	A
§2.1051 §27.53(h) §27.53(m)(4)(6)	Conducted Spurious Emissions (Band 4) (Band 66)	Compliance	A
§2.1053 §27.53(h) §27.53(m)(4)(6)	Radiated Spurious Emissions (Band 4) (Band 66)	Compliance	A
§27.50(d)(5)	Peak to average ratio	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

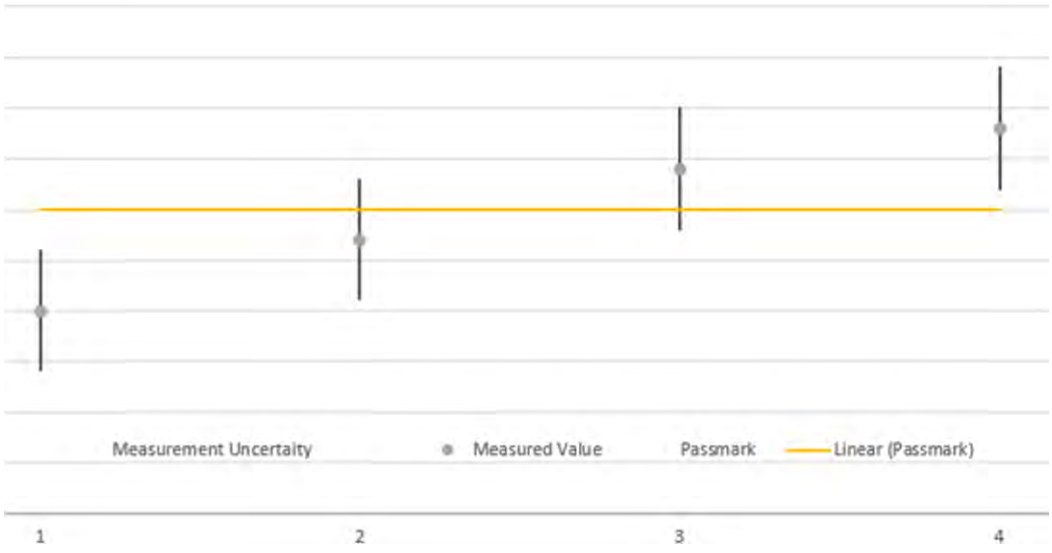
The FCC Site Registration No. is 434559; The Designation No. is CN1325.

1.1 MEASREMENT 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 (9KHz~30MHz)	±2.68dB
Radiated emissions & Radiated Power (30MHz~1GHz)	±4.98dB
Radiated emissions & Radiated Power (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
Conducted Output power	±2.06dB
Band Edge Measurements	±4.70dB

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 TECHNOLOGY	**CAT-M / NB-IOT :LTE**	BPSK, QPSK, 16QAM
FREQUENCY RANGE CAM-T	**LTE Band 4 Channel Bandwidth: 1.4MHz**	1710.7MHz ~ 1754.3MHz
	LTE Band 4 Channel Bandwidth: 3MHz	1711.5MHz ~ 1753.5MHz
	LTE Band 4 Channel Bandwidth: 5MHz	1712.5MHz ~ 1752.5MHz
	LTE Band 4 Channel Bandwidth: 10MHz	1715MHz ~ 1750MHz
	LTE Band 4 Channel Bandwidth: 15MHz	1717.5MHz ~ 1747.5 MHz
	LTE Band 4 Channel Bandwidth: 20MHz	1720MHz ~ 1745MHz
	LTE Band 66 Channel Bandwidth: 1.4MHz	1710.7MHz ~ 1779.3MHz
	LTE Band 66 Channel Bandwidth: 3MHz	1711.5MHz ~ 1778.5MHz
	LTE Band 66 Channel Bandwidth: 5MHz	1712.5MHz ~ 1777.5MHz
	LTE Band 66 Channel Bandwidth: 10MHz	1715MHz ~ 1775MHz
	LTE Band 66 Channel Bandwidth: 15MHz	1717.5MHz ~ 1772.5MHz
	LTE Band 66 Channel Bandwidth: 20MHz	1720MHz ~ 1770MHz
FREQUENCY RANGE NB-IOT	**LTE Band 4 (Sub-carrier Speacing: 3.75/15KHz)**	1710.2MHz ~ 1754.8MHz
	LTE Band 66 (Sub-carrier Speacing: 3.75/15KHz)	1710.2MHz ~ 1779.8MHz
MAX. EIRP POWER CAM-T	**LTE Band 4 Channel Bandwidth: 1.4MHz**	320.63mW
	LTE Band 4 Channel Bandwidth: 3MHz	323.59mW
	LTE Band 4 Channel Bandwidth: 5MHz	322.85mW

	LTE Band 4 Channel Bandwidth: 10MHz	322.85mW
	LTE Band 4 Channel Bandwidth: 15MHz	319.15mW
	LTE Band 4 Channel Bandwidth: 20MHz	324.34mW
	LTE Band 66 Channel Bandwidth: 1.4MHz	325.84mW
	LTE Band 66 Channel Bandwidth: 3MHz	329.61mW
	LTE Band 66 Channel Bandwidth: 5MHz	323.59mW
	LTE Band 66 Channel Bandwidth: 10MHz	328.1mW
	LTE Band 66 Channel Bandwidth: 15MHz	327.34mW
	LTE Band 66 Channel Bandwidth: 20MHz	331.13mW
MAX. EIRP POWER NB-IOT	**LTE Band 4 (Sub-carrier Speacing: 3.75KHz)**	312.61mW
	LTE Band 4 (Sub-carrier Speacing: 15KHz)	307.61mW
	LTE Band 66 (Sub-carrier Speacing: 3.75KHz)	316.23mW
	LTE Band 66 (Sub-carrier Speacing: 15KHz)	316.96mW
EMISSION DESIGNATOR CAM-T	**LTE Band 66 Channel Bandwidth: 1.4MHz**	QPSK: 1M08G7D
		16QAM: 1M08W7D
	LTE Band 66 Channel Bandwidth: 3MHz	QPSK: 1M08G7D
		16QAM: 1M07W7D
	LTE Band 66 Channel Bandwidth: 5MHz	QPSK: 1M08G7D
		16QAM: 1M08W7D
	LTE Band 66 Channel Bandwidth: 10MHz	QPSK: 1M08G7D
		16QAM: 1M08W7D
	LTE Band 66 Channel Bandwidth: 15MHz	QPSK: 1M09G7D
		16QAM: 1M09W7D
	LTE Band 66 Channel Bandwidth: 20MHz	QPSK: 1M09G7D
		16QAM: 1M08W7D
EMISSION DESIGNATOR NB-IOT	**LTE Band 66 (Sub-carrier Speacing: 3.75KHz)**	QPSK: 46K45G7D
		16QAM: 47K85W7D
	LTE Band 66 (Sub-carrier Speacing: 15KHz)	QPSK: 122K3G7D
		16QAM: 191K3W7D

ANTENNA TYPE*	1/4 1 Antenna with 2.14dBi for LTE 4/LTE 66
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.

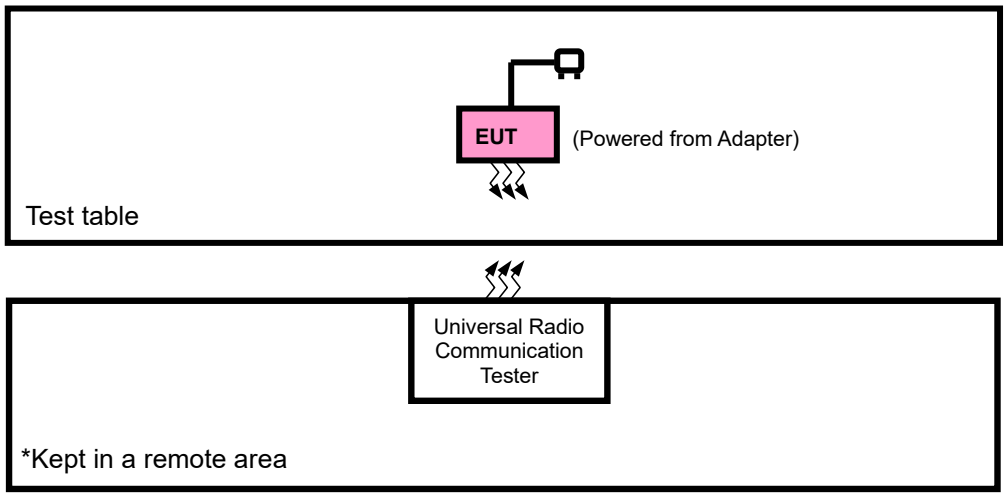
3. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

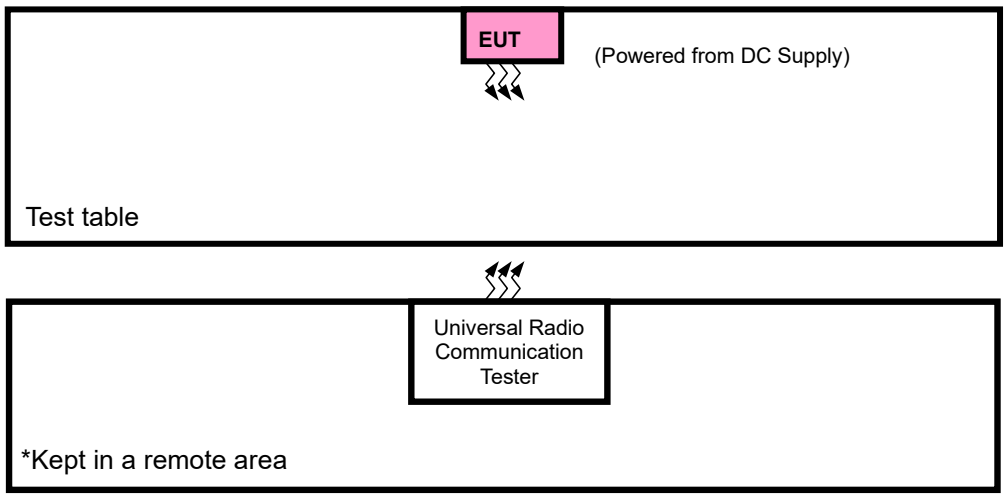
MODULATION MODE	TX FUNCTION
LTE	1TX/1RX

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

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	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 was found when positioned on Y-plane for EIRP and X-axis for radiated emission. 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 Source with LTE link**

LTE BAND 4 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
A CAM-T	EIRP	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	1 RB / 0 RB Offset
B NB-IOT	EIRP	19952 to 20398	19952, 20525, 20398	3.75KHz	BPSK,QPSK	1 RB / 0 RB Offset
		19952 to 20398	19952, 20525, 20398	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 4 are covered by LTE Band 66, Because it is a subset of LTE Band 66 with the same output power and supported bandwidths, So the conducted test data and RSE test data please refer to LTE Band 66.

CAM-T LTE BAND 66 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
A	EIRP	131979 to 132665	131979,132322,132665	1.4MHz	QPSK,16QAM	1 RB / 0 RB Offset
		131987 to 132657	131987,132322,132657	3MHz	QPSK,16QAM	1 RB / 0 RB Offset
		131997 to 132647	131997,132322,132647	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
		132022 to 132622	132022,132322,132622	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
		132047 to 132597	132047,132322,132597	15MHz	QPSK,16QAM	1 RB / 0 RB Offset
		132072 to 132572	132072,132322,132572	20MHz	QPSK,16QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	132072 to 132572	132072,132322,132572	20MHz	QPSK,16QAM	100 RB / 0 RB Offset
A	OCCUPIED BANDWIDTH	131979 to 132665	131979,132322,132665	1.4MHz	QPSK,16QAM	6 RB / 0 RB Offset
		131987 to 132657	131987,132322,132657	3MHz	QPSK,16QAM	15 RB / 0 RB Offset
		131997 to 132647	131997,132322,132647	5MHz	QPSK,16QAM	25 RB / 0 RB Offset
		132022 to 132622	132022,132322,132622	10MHz	QPSK,16QAM	50 RB / 0 RB Offset
		132047 to 132597	132047,132322,132597	15MHz	QPSK,16QAM	75 RB / 0 RB Offset
		132072 to 132572	132072,132322,132572	20MHz	QPSK,16QAM	100 RB / 0 RB Offset
A	BAND EDGE	131979 to 132322	131979	1.4MHz	QPSK,16QAM	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			132322	1.4MHz	QPSK,16QAM	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		131987 to 132657	131987	3MHz	QPSK,16QAM	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
			132657	3MHz	QPSK,16QAM	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		131997 to 132647	131997	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			132647	5MHz	QPSK,16QAM	1 RB / 24 RB Offset
						25 RB / 0 RB Offset

		132022 to 132622	132022	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			132622	10MHz	QPSK,16QAM	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
		132047 to 132597	132047	15MHz	QPSK,16QAM	1 RB / 0 RB Offset
						75 RB / 0 RB Offset
			132597	15MHz	QPSK,16QAM	1 RB / 74 RB Offset
						75 RB / 0 RB Offset
		132072 to 132572	132072	20MHz	QPSK,16QAM	1 RB / 0 RB Offset
						100 RB / 0 RB Offset
			132572	20MHz	QPSK,16QAM	1 RB / 99 RB Offset
						100 RB / 0 RB Offset
A	CONDCUDETED EMISSION	131979 to 132665	131979,132322,132665	1.4MHz	QPSK,16QAM	1 RB / 0 RB Offset
		131987 to 132657	131987,132322,132657	3MHz	QPSK,16QAM	1 RB / 0 RB Offset
		131997 to 132647	131997,132322,132647	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
		132022 to 132622	132022,132322,132622	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
		132047 to 132597	132047,132322,132597	15MHz	QPSK,16QAM	1 RB / 0 RB Offset
		132072 to 132572	132072,132322,132572	20MHz	QPSK,16QAM	1 RB / 0 RB Offset
A	PEAK TO AVERAGE RATIO	132072 to 132572	132072,132322,132572	20MHz	QPSK,16QAM	1 RB / 0 RB Offset 100 RB / 0 RB Offset
A	RADIATED EMISSION	131979 to 132665	132322	1.4MHz	QPSK	1 RB / 0 RB Offset
		131987 to 132657	132322	3MHz	QPSK	1 RB / 0 RB Offset
		131997 to 132647	131997,132322,132647	5MHz	QPSK	1 RB / 0 RB Offset
		132022 to 132622	132322	10MHz	QPSK	1 RB / 0 RB Offset
		132047 to 132597	132322	15MHz	QPSK	1 RB / 0 RB Offset
		132072 to 132572	132322	20MHz	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 66 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	MODE
A	ERP	131974 to 132670	131974, 132322, 132670	BPSK,QPSK	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	132322	132322	BPSK,QPSK	50 RB / 0 RB Offset
A	OCCUPIED BANDWIDTH	26692 to 26788	26697, 26740, 26783	BPSK,QPSK	6 RB / 0 RB Offset
		132322	132322	BPSK,QPSK	50 RB / 0 RB Offset
A	PEAK TO AVERAGE RATIO	132322	132322	BPSK,QPSK	1 RB / 0 RB Offset 50 RB / 0 RB Offset
A	BAND EDGE	131974 to 132670	131974	BPSK,QPSK	1 RB / 0 RB Offset
					6 RB / 0 RB Offset
			132670	BPSK,QPSK	1 RB / 5 RB Offset
					6 RB / 0 RB Offset
		132322	132322	BPSK,QPSK	1 RB / 0 RB Offset
					50 RB / 0 RB Offset
			132322	BPSK,QPSK	1 RB / 49 RB Offset
					50 RB / 0 RB Offset
A	CONDUCTED EMISSION	131974 to 132670	131974, 132322, 132670	BPSK,QPSK	1 RB / 0 RB Offset
		132322	132322	BPSK,QPSK	1 RB / 0 RB Offset
A	RADIATED EMISSION	131974 to 132670	131974, 132322, 132670	QPSK	1 RB / 0 RB Offset
		132322	132322	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
EIRP	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 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 27

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

The radiated peak output power shall be according to the specific rule Part 27.50(h)(2) that “User stations are limited to 2 watts” and 27.50(i) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt 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);

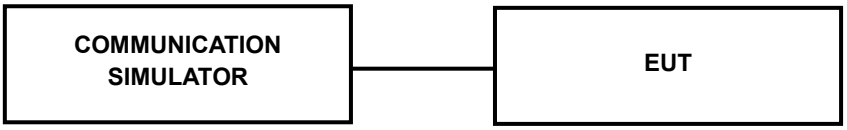
L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

CONDUCTED POWER MEASUREMENT:

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

3.1.3 TEST SETUP

CONDUCTED POWER MEASUREMENT:



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

3.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

LTE Band 4

Band/BW	Modulation	RB Size	RB Offset	Low CH 19957 Frequency 1710.7 MHz	Mid CH 20175 Frequency 1732.5 MHz	High CH 20393 Frequency 1754.3 MHz
4/ 1.4	QPSK	1	0	22.71	22.68	22.80
		1	5	22.76	22.83	22.75
		3	0	22.72	22.72	22.86
		3	3	22.91	22.92	22.86
		6	0	22.84	22.84	22.81
	16QAM	1	0	22.57	22.61	22.73
		1	5	22.63	22.56	22.76
		3	0	22.71	22.71	22.75
		3	3	22.86	22.92	22.81
		6	0	22.76	22.83	22.76

Band/BW	Modulation	RB Size	RB Offset	Low CH 19965 Frequency 1711.5 MHz	Mid CH 20175 Frequency 1732.5 MHz	High CH 20385 Frequency 1753.5 MHz
4/ 3	QPSK	1	0	22.73	22.69	22.82
		1	5	22.76	22.70	22.78
		3	0	22.77	22.75	22.84
		3	3	22.80	22.86	22.84
		6	0	22.82	22.96	22.90
	16QAM	1	0	22.52	22.63	22.69
		1	5	22.61	22.56	22.69
		3	0	22.73	22.76	22.75
		3	3	22.74	22.82	22.76
		6	0	22.75	22.85	22.74

Band/BW	Modulation	RB Size	RB Offset	Low CH 19975 Frequency 1712.5 MHz	Mid CH 20175 Frequency 1732.5 MHz	High CH 20375 Frequency 1752.5 MHz
4/ 5	QPSK	1	0	22.61	22.63	22.72
		1	5	22.73	22.79	22.84
		3	0	22.78	22.75	22.88
		3	3	22.85	22.91	22.88
		6	0	22.85	22.95	22.84
	16QAM	1	0	22.58	22.61	22.71
		1	5	22.66	22.64	22.76
		3	0	22.66	22.73	22.75
		3	3	22.81	22.81	22.77
		6	0	22.70	22.87	22.77

Band/BW	Modulation	RB Size	RB Offset	Low CH 20000 Frequency 1715 MHz	Mid CH 20175 Frequency 1732.5 MHz	High CH 20350 Frequency 1750 MHz
4/ 10	QPSK	1	0	22.69	22.76	22.81
		1	5	22.77	22.80	22.86
		3	0	22.84	22.83	22.78
		3	3	22.85	22.93	22.85
		6	0	22.86	22.95	22.89
	16QAM	1	0	22.47	22.63	22.68
		1	5	22.68	22.57	22.73
		3	0	22.66	22.76	22.84
		3	3	22.75	22.82	22.69
		6	0	22.68	22.90	22.76

Band/BW	Modulation	RB Size	RB Offset	Low CH 20025	Mid CH 20175	High CH 20325
				Frequency 1717.5 MHz	Frequency 1732.5 MHz	Frequency 1747.5 MHz
4/ 15	QPSK	1	0	22.74	22.77	22.75
		1	5	22.69	22.77	22.78
		3	0	22.73	22.77	22.90
		3	3	22.78	22.87	22.82
		6	0	22.89	22.82	22.82
	16QAM	1	0	22.56	22.71	22.70
		1	5	22.62	22.55	22.77
		3	0	22.78	22.79	22.77
		3	3	22.78	22.87	22.79
		6	0	22.75	22.88	22.85

Band/BW	Modulation	RB Size	RB Offset	Low CH 20050	Mid CH 20175	High CH 20300
				Frequency 1720 MHz	Frequency 1732.5 MHz	Frequency 1745 MHz
4/ 20	QPSK	1	0	22.75	22.78	22.83
		1	5	22.82	22.84	22.88
		3	0	22.87	22.86	22.92
		3	3	22.93	22.95	22.93
		6	0	22.96	22.97	22.95
	16QAM	1	0	22.60	22.73	22.79
		1	5	22.72	22.70	22.82
		3	0	22.80	22.82	22.85
		3	3	22.88	22.94	22.83
		6	0	22.82	22.95	22.88

LTE Band 66

Band/BW	Modulation	RB Size	RB Offset	Low CH 131979 Frequency 1710.7MHz	Mid CH 132322 Frequency 1745MHz	High CH 132665 Frequency 1779.3MHz
66/ 1.4	QPSK	1	0	22.72	22.70	22.73
		1	5	22.84	22.67	22.84
		3	0	22.93	22.90	22.90
		3	3	22.83	22.80	22.97
		6	0	22.94	22.83	22.99
	16QAM	1	0	22.73	22.74	22.72
		1	5	22.68	22.68	22.70
		3	0	22.87	22.68	22.69
		3	3	22.77	22.80	22.86
		6	0	22.80	22.77	22.85

Band/BW	Modulation	RB Size	RB Offset	Low CH 131987 Frequency 1711.5MHz	Mid CH 132322 Frequency 1745MHz	High CH 132657 Frequency 1778.5MHz
66/ 3	QPSK	1	0	22.76	22.69	22.75
		1	5	22.76	22.77	22.88
		3	0	22.82	22.81	22.87
		3	3	22.81	22.80	22.95
		6	0	22.91	22.83	23.04
	16QAM	1	0	22.64	22.73	22.74
		1	5	22.69	22.69	22.71
		3	0	22.82	22.70	22.66
		3	3	22.76	22.79	22.96
		6	0	22.83	22.84	22.88

Band/BW	Modulation	RB Size	RB Offset	Low CH 131997	Mid CH 132322	High CH 132647
				Frequency 1712.5MHz	Frequency 1745MHz	Frequency 1777.5MHz
66/ 5	QPSK	1	0	22.79	22.78	22.82
		1	5	22.82	22.73	22.76
		3	0	22.81	22.81	22.92
		3	3	22.89	22.76	22.90
		6	0	22.89	22.87	22.92
	16QAM	1	0	22.69	22.75	22.64
		1	5	22.63	22.74	22.67
		3	0	22.77	22.74	22.79
		3	3	22.74	22.75	22.96
		6	0	22.88	22.88	22.78

Band/BW	Modulation	RB Size	RB Offset	Low CH 132022	Mid CH 132322	High CH 132622
				Frequency 1715MHz	Frequency 1745MHz	Frequency 1775MHz
66/ 10	QPSK	1	0	22.86	22.83	22.78
		1	5	22.80	22.69	22.75
		3	0	22.87	22.88	22.90
		3	3	22.85	22.84	22.94
		6	0	22.94	22.91	23.02
	16QAM	1	0	22.65	22.72	22.72
		1	5	22.76	22.67	22.64
		3	0	22.78	22.72	22.74
		3	3	22.73	22.68	22.89
		6	0	22.83	22.90	22.81

Band/BW	Modulation	RB Size	RB Offset	Low CH 132047	Mid CH 132322	High CH 132597
				Frequency 1717.5 MHz	Frequency 1745MHz	Frequency 1772.5 MHz
66/ 15	QPSK	1	0	22.85	22.75	22.82
		1	5	22.87	22.74	22.84
		3	0	22.94	22.78	22.92
		3	3	22.87	22.76	22.96
		6	0	22.83	22.85	23.01
	16QAM	1	0	22.72	22.81	22.64
		1	5	22.65	22.70	22.72
		3	0	22.84	22.68	22.75
		3	3	22.80	22.78	22.86
		6	0	22.91	22.81	22.78

Band/BW	Modulation	RB Size	RB Offset	Low CH 132072	Mid CH 132322	High CH 132572
				Frequency 1720MHz	Frequency 1745MHz	Frequency 1770MHz
66/ 20	QPSK	1	0	22.87	22.84	22.85
		1	5	22.91	22.78	22.89
		3	0	22.95	22.92	22.94
		3	3	22.93	22.91	23.03
		6	0	22.96	22.93	23.06
	16QAM	1	0	22.75	22.82	22.75
		1	5	22.77	22.76	22.77
		3	0	22.91	22.81	22.81
		3	3	22.88	22.81	22.98
		6	0	22.93	22.92	22.91

NB-IOT

LTE Band 4						
Sub-carrier Speacing (KHz)	Modulation	RB Size	RB Offset	Low	Mid	High
		Channel		19952	20175	20398
		Frequence (MHz)		1710.2	1732.5	1754.8
3.75	BPSK	1	0	22.80	22.66	22.76
		1	47	**22.81**	22.63	22.73
	QPSK	1	0	22.79	22.69	22.72
		1	47	22.78	22.68	22.71
15	BPSK	1	0	22.74	22.67	22.68
		1	11	22.71	22.66	22.67
	QPSK	1	0	22.73	22.68	22.69
		1	11	22.72	22.70	22.68
		12	0	21.52	21.41	21.51

LTE Band 66						
Sub-carrier Speacing (KHz)	Modulation	RB Size	RB Offset	Low	Mid	High
		Channel		131974	132322	132670
		Frequence (MHz)		1710.2	1745	1779.8
3.75	BPSK	1	0	22.68	22.71	22.78
		1	47	22.69	22.68	22.82
	QPSK	1	0	22.66	22.63	22.78
		1	47	22.68	22.62	22.86
15	BPSK	1	0	22.64	22.72	**22.87**
		1	11	22.59	22.71	22.86
	QPSK	1	0	22.62	22.63	22.85
		1	11	22.61	22.70	22.86
		12	0	21.45	21.53	21.60

EIRP
LTE BAND 4
CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19957	1710.7	22.91	2.14	25.05	319.89	1
20175	1732.5	22.92	2.14	25.06	320.63	1
20393	1754.3	22.86	2.14	25	316.23	1

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19957	1710.7	22.86	2.14	25	316.23	1
20175	1732.5	22.92	2.14	25.06	320.63	1
20393	1754.3	22.81	2.14	24.95	312.61	1

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19965	1711.5	22.82	2.14	24.96	313.33	1
20175	1732.5	22.96	2.14	25.1	323.59	1
20385	1753.5	22.9	2.14	25.04	319.15	1

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19965	1711.5	22.75	2.14	24.89	308.32	1
20175	1732.5	22.85	2.14	24.99	315.5	1
20385	1753.5	22.76	2.14	24.9	309.03	1

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19975	1712.5	22.85	2.14	24.99	315.5	1
20175	1732.5	22.95	2.14	25.09	322.85	1
20375	1752.5	22.88	2.14	25.02	317.69	1

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19975	1712.5	22.81	2.14	24.95	312.61	1
20175	1732.5	22.87	2.14	25.01	316.96	1
20375	1752.5	22.77	2.14	24.91	309.74	1

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20000	1715	22.86	2.14	25	316.23	1
20175	1732.5	22.95	2.14	25.09	322.85	1
20350	1750	22.89	2.14	25.03	318.42	1

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20000	1715	22.75	2.14	24.89	308.32	1
20175	1732.5	22.9	2.14	25.04	319.15	1
20350	1750	22.84	2.14	24.98	314.77	1

CHANNEL BANDWIDTH: 15MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20025	1717.5	22.89	2.14	25.03	318.42	1
20175	1732.5	22.87	2.14	25.01	316.96	1
20325	1747.5	22.9	2.14	25.04	319.15	1

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20025	1717.5	22.78	2.14	24.92	310.46	1
20175	1732.5	22.88	2.14	25.02	317.69	1
20325	1747.5	22.85	2.14	24.99	315.5	1

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20050	1720	22.96	2.14	25.1	323.59	1
20175	1732.5	22.97	2.14	25.11	324.34	1
20300	1745	22.95	2.14	25.09	322.85	1

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20050	1720	22.88	2.14	25.02	317.69	1
20175	1732.5	22.95	2.14	25.09	322.85	1
20300	1745	22.88	2.14	25.02	317.69	1

LTE BAND 66

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
131979	1710.7	22.94	2.14	25.08	322.11	1
132322	1745	22.9	2.14	25.04	319.15	1
132665	1779.3	22.99	2.14	25.13	325.84	1

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
131979	1710.7	22.87	2.14	25.01	316.96	1
132322	1745	22.8	2.14	24.94	311.89	1
132665	1779.3	22.86	2.14	25	316.23	1

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
131987	1711.5	22.91	2.14	25.05	319.89	1
132322	1745	22.83	2.14	24.97	314.05	1
132657	1778.5	23.04	2.14	25.18	329.61	1

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
131987	1711.5	22.83	2.14	24.97	314.05	1
132322	1745	22.84	2.14	24.98	314.77	1
132657	1778.5	22.96	2.14	25.1	323.59	1

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
131997	1712.5	22.89	2.14	25.03	318.42	1
132322	1745	22.87	2.14	25.01	316.96	1
132647	1777.5	22.92	2.14	25.06	320.63	1

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
131997	1712.5	22.88	2.14	25.02	317.69	1
132322	1745	22.88	2.14	25.02	317.69	1
132647	1777.5	22.96	2.14	25.1	323.59	1

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
132022	1715	22.94	2.14	25.08	322.11	1
132322	1745	22.91	2.14	25.05	319.89	1
132622	1775	23.02	2.14	25.16	328.1	1

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
132022	1715	22.83	2.14	24.97	314.05	1
132322	1745	22.9	2.14	25.04	319.15	1
132622	1775	22.89	2.14	25.03	318.42	1

CHANNEL BANDWIDTH: 15MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
132047	1717.5	22.94	2.14	25.08	322.11	1
132322	1745	22.85	2.14	24.99	315.5	1
132597	1772.5	23.01	2.14	25.15	327.34	1

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
132047	1717.5	22.91	2.14	25.05	319.89	1
132322	1745	22.81	2.14	24.95	312.61	1
132597	1772.5	22.86	2.14	25	316.23	1

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
132072	1720	22.96	2.14	25.1	323.59	1
132322	1745	22.93	2.14	25.07	321.37	1
132572	1770	23.06	2.14	25.2	331.13	1

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
132072	1720	22.93	2.14	25.07	321.37	1
132322	1745	22.92	2.14	25.06	320.63	1
132572	1770	22.98	2.14	25.12	325.09	1

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

NB-IOT

LTE B4 3.75KHz

CHANNEL BANDWIDTH: BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
19952	1710.2	22.81	2.14	24.95	312.61	1
20175	1732.5	22.66	2.14	24.8	302	1
20398	1754.8	22.76	2.14	24.9	309.03	1

CHANNEL BANDWIDTH: QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
19952	1710.2	22.79	2.14	24.93	311.17	1
20175	1732.5	22.69	2.14	24.83	304.09	1
20398	1754.8	22.72	2.14	24.86	306.2	1

LTE B4 15KHz

CHANNEL BANDWIDTH: BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
19952	1710.2	22.74	2.14	24.88	307.61	1
20175	1732.5	22.67	2.14	24.81	302.69	1
20398	1754.8	22.68	2.14	24.82	303.39	1

CHANNEL BANDWIDTH: QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
19952	1710.2	22.73	2.14	24.87	306.9	1
20175	1732.5	22.7	2.14	24.84	304.79	1
20398	1754.8	22.69	2.14	24.83	304.09	1

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

NB-IOT

LTE B66 3.75KHz

CHANNEL BANDWIDTH: BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
131974	1710.2	22.69	2.14	24.83	304.09	1
132322	1745	22.71	2.14	24.85	305.49	1
132670	1779.8	22.82	2.14	24.96	313.33	1

CHANNEL BANDWIDTH: QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
131974	1710.2	22.68	2.14	24.82	303.39	1
132322	1745	22.63	2.14	24.77	299.92	1
132670	1779.8	22.86	2.14	25	316.23	1

LTE B66 15KHz

CHANNEL BANDWIDTH: BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
131974	1710.2	22.64	2.14	24.78	300.61	1
132322	1745	22.72	2.14	24.86	306.2	1
132670	1779.8	22.87	2.14	25.01	316.96	1

CHANNEL BANDWIDTH: QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
131974	1710.2	22.62	2.14	24.76	299.23	1
132322	1745	22.7	2.14	24.84	304.79	1
132670	1779.8	22.86	2.14	25	316.23	1

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

3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

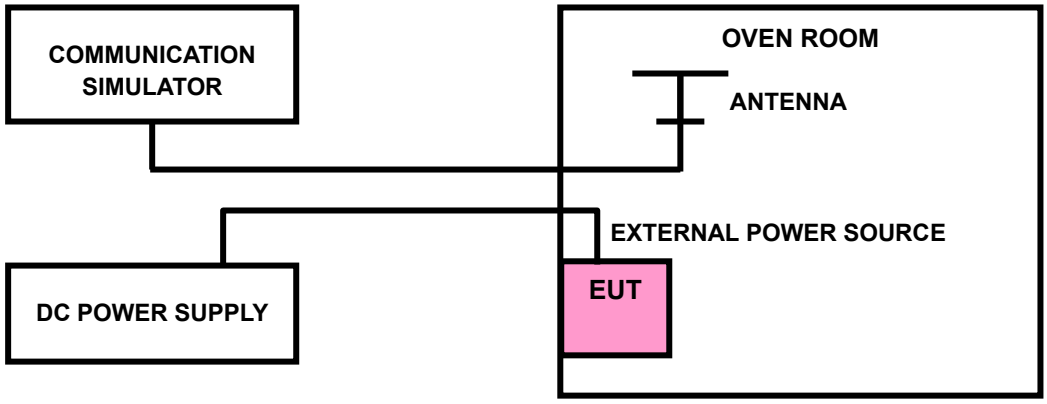
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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.

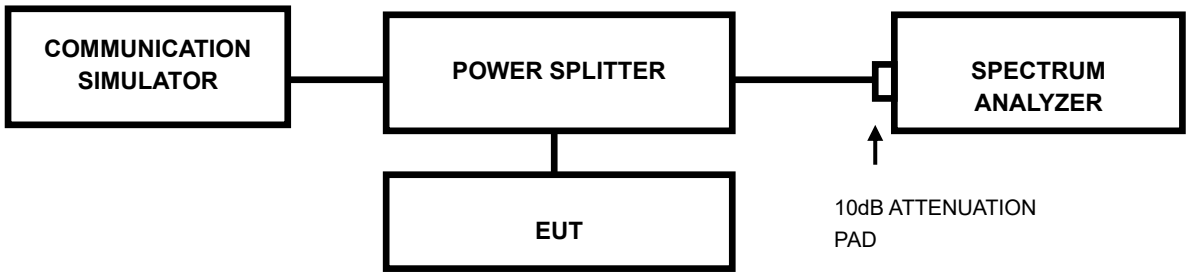
Note: VL = Low voltage(2.5V); VN/NV = Normal voltage(3.8V); VH = High voltage(4.5V);
NT = Normal temperature (25℃)

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

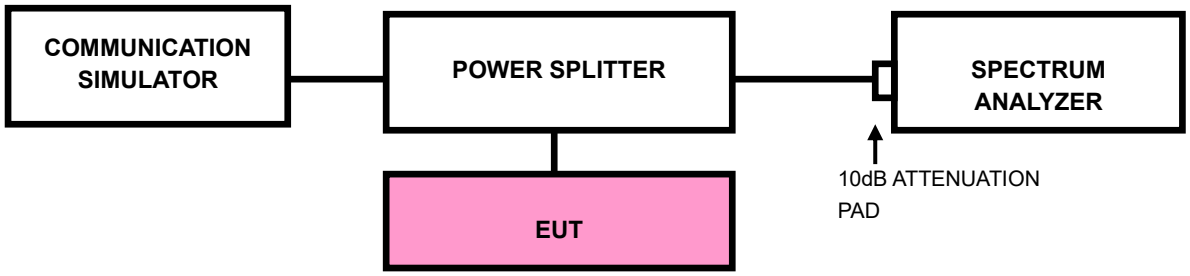
3.4.1 LIMITS OF BAND EDGE MEASUREMENT

According to FCC Part 27.53(h) specified that for operations in the 1710-1755 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. However, in the 1-megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

47 CFR 27.50(d)(4)

Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band and mobile and portable stations operating in the 1695–1710 MHz and 1755–1780 MHz bands are limited to 1-watt EIRP. Fixed stations operating in the 1710–1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

3.4.2 TEST SETUP



3.4.3 TEST PROCEDURES

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

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

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

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

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

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

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

h) Use auto-coupled sweep time.

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

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

k) 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

For LTE Band4/66
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 is equal to –13dBm.

For LTE Band38/41

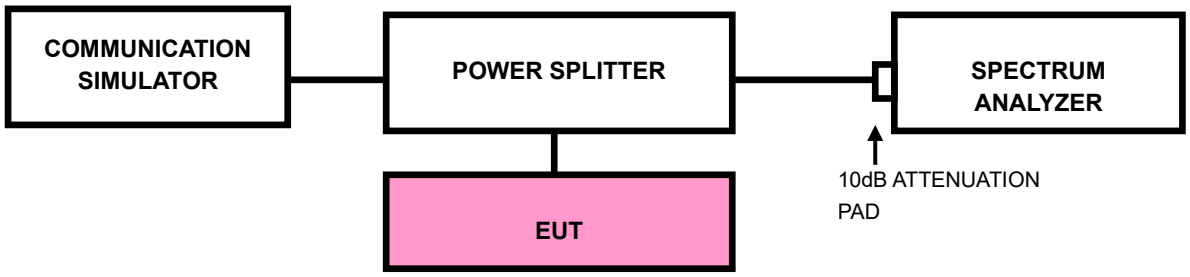
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 55 +10 log10(P) dB. The limit of emission is equal to -25dBm.

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

For LTE Band4/66
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 is equal to –13dBm.

For LTE Band38/41

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 55 +10 log10(P) dB. The limit of emission is equal to -25dBm.

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.

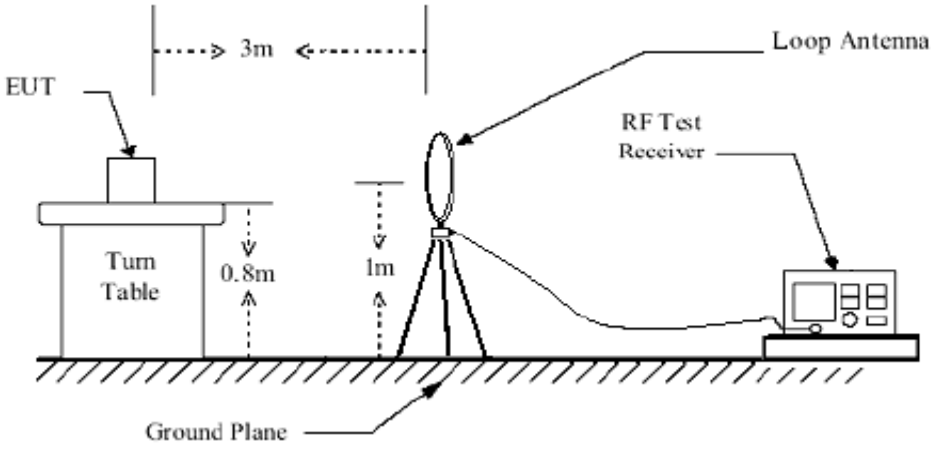
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.6.3 DEVIATION FROM TEST STANDARD

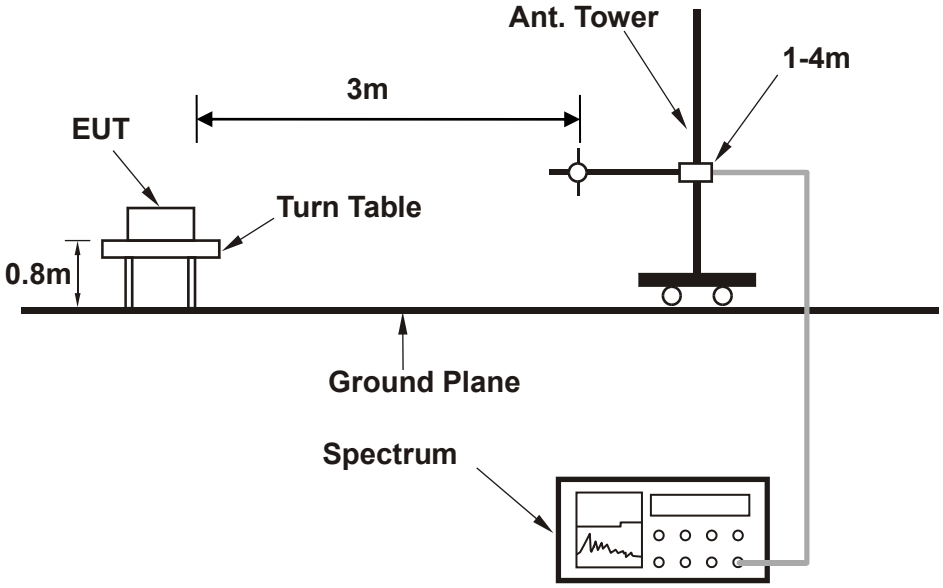
No deviation

3.6.4 TEST SETUP

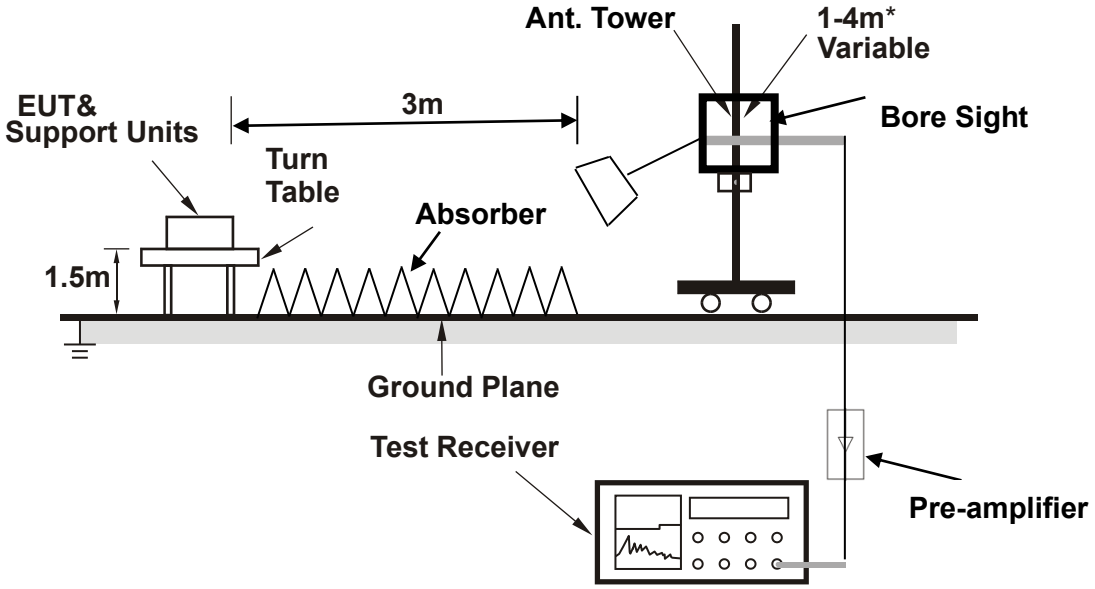
< Frequency Range below 30MHz >



< 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.

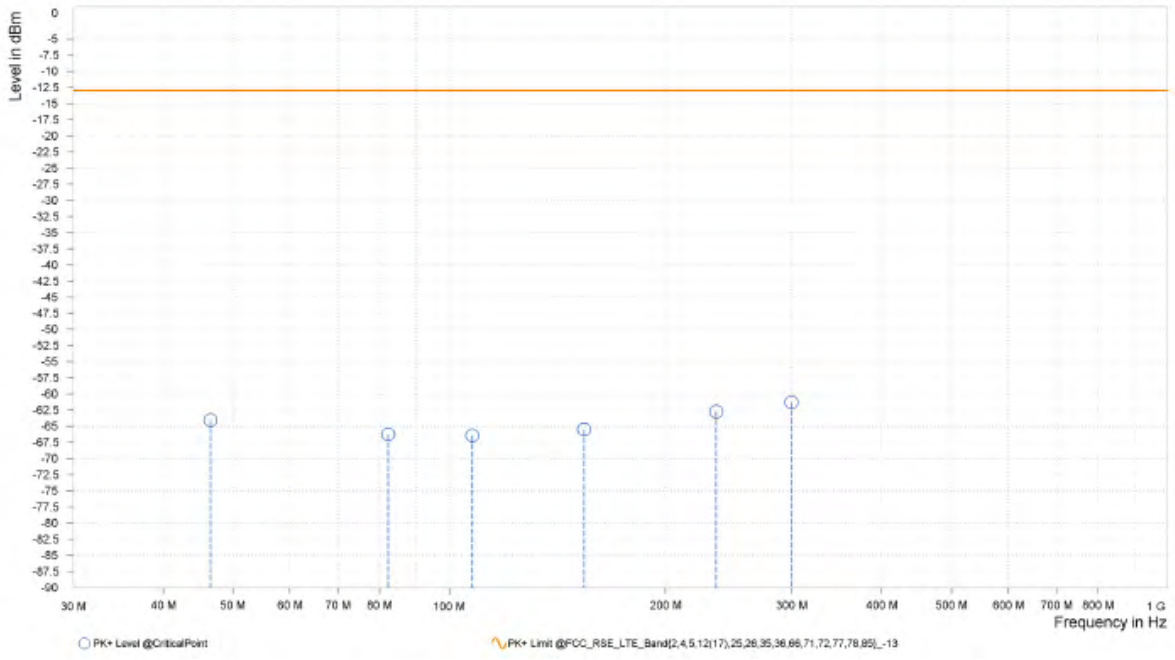
BELOW 1GHz WORST-CASE DATA

30 MHz – 1GHz data:

NB-IOT LTE Band 66
CHANNEL BANDWIDTH: QPSK

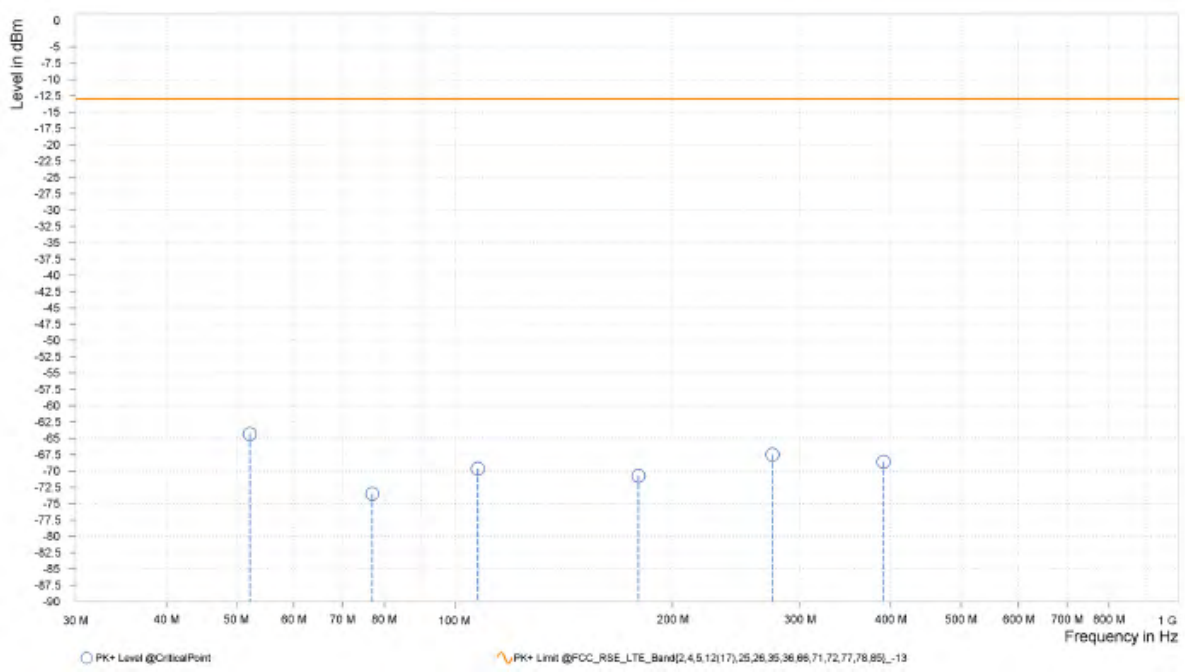
MODE	TX channel 131974	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	46.550	-64.02	-13.00	51.02	3.02	H	223	2.00
1	82.300	-66.25	-13.00	53.25	-3.44	H	121.4	2.00
1	107.650	-66.46	-13.00	53.46	-0.41	H	354.9	2.00
1	154.150	-65.49	-13.00	52.49	-5.48	H	237.5	1.00
1	235.350	-62.72	-13.00	49.72	2.57	H	237.5	1.00
1	299.600	-61.30	-13.00	48.30	5.44	H	237.5	1.00



MODE	TX channel 131974	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	52.150	-64.33	-13.00	51.33	5.20	V	0.9	2.00
1	76.950	-73.50	-13.00	60.50	-1.71	V	224.2	2.00
1	107.650	-69.62	-13.00	56.62	2.43	V	21.4	2.00
1	179.450	-70.71	-13.00	57.71	-0.77	V	21.4	2.00
1	274.650	-67.48	-13.00	54.48	3.38	V	235.1	1.00
1	390.750	-68.57	-13.00	55.57	6.87	V	354.9	2.00



ABOVE 1GHz

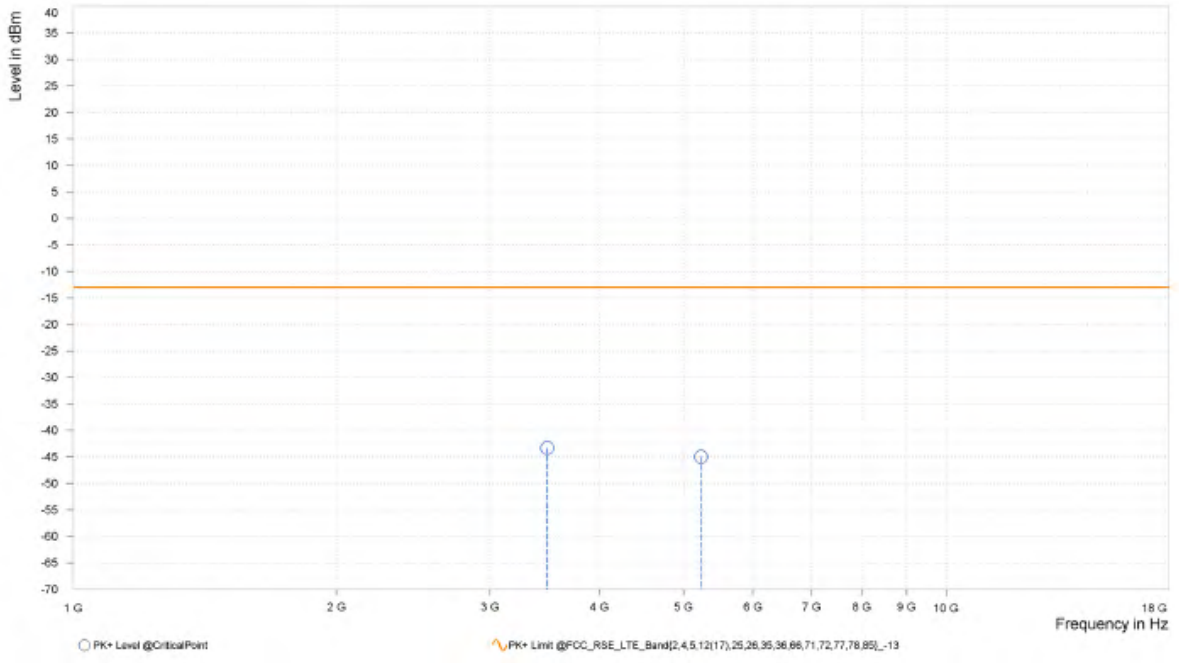
Note: For higher frequency, the emission is too low to be detected.

LTE B66

CHANNEL BANDWIDTH: 1.4MHz / QPSK

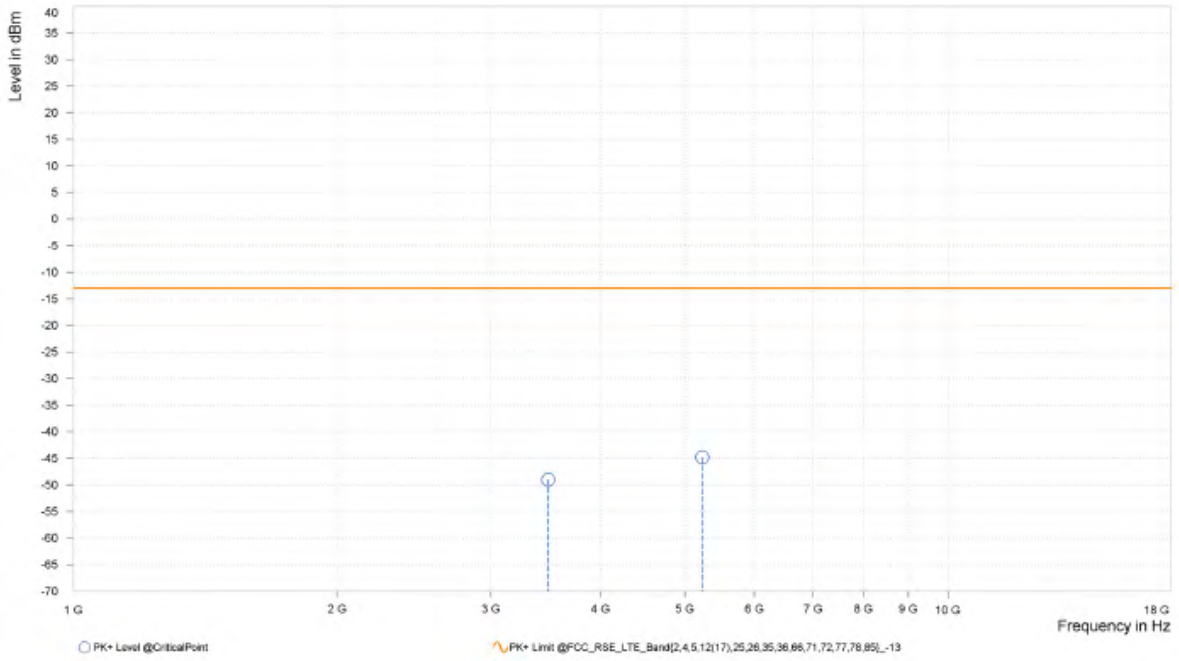
MODE	TX channel 132322	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,490.000	-43.33	-13.00	30.33	15.63	H	274.5	1.00
2	5,233.110	-44.99	-13.00	31.99	17.98	H	359	2.00



MODE	TX channel 132322	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

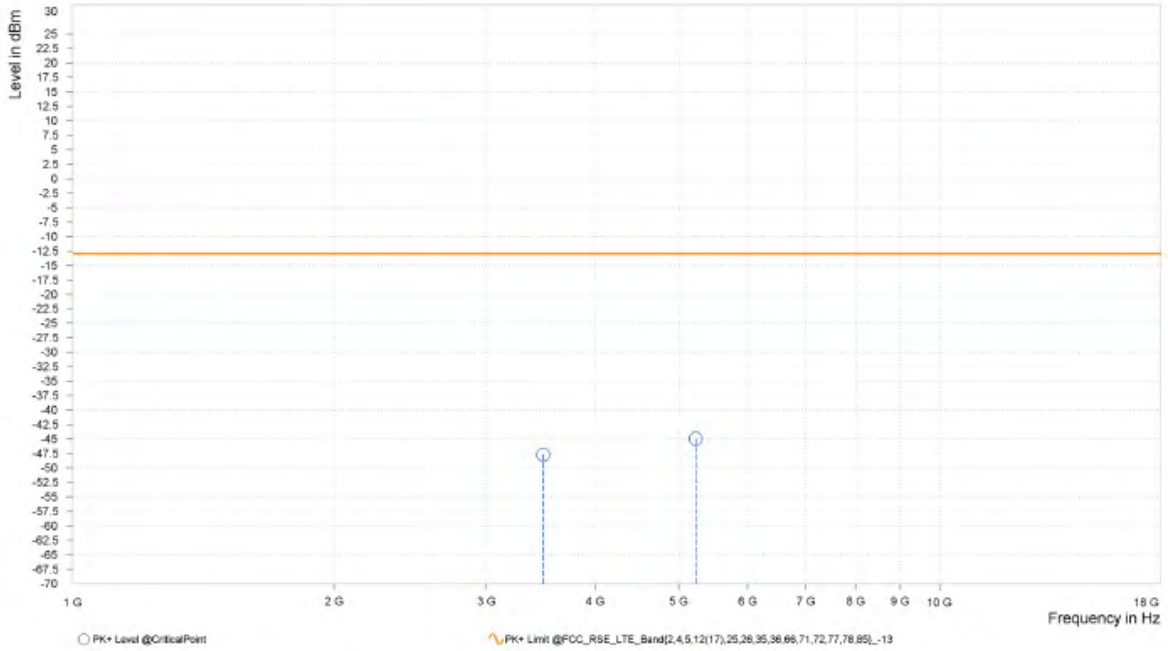
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,488.740	-49.02	-13.00	36.02	15.43	V	359	2.00
2	5,233.110	-44.84	-13.00	31.84	17.95	V	1	1.00



CHANNEL BANDWIDTH: 3MHz / QPSK

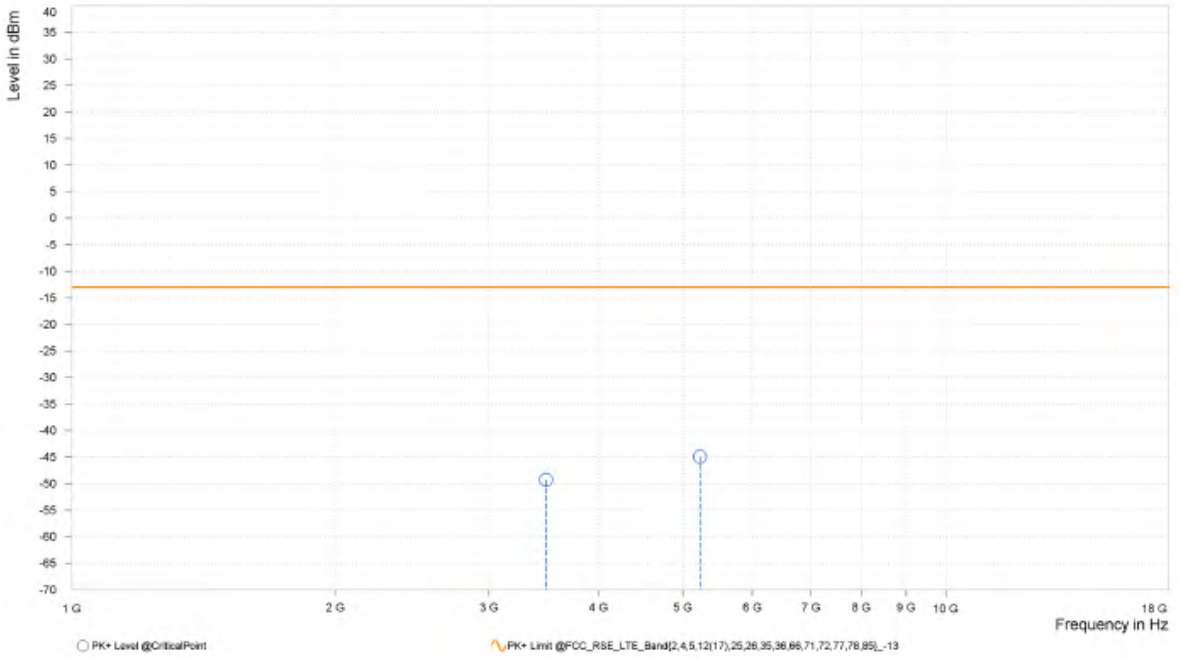
MODE	TX channel 132322	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,487.300	-47.70	-13.00	34.70	15.68	H	273.3	1.00
2	5,230.950	-44.94	-13.00	31.94	18.00	H	89.2	1.00



MODE	TX channel 132322	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,487.300	-49.28	-13.00	36.28	15.44	V	359	2.00
2	5,230.950	-44.94	-13.00	31.94	17.97	V	88.1	1.00

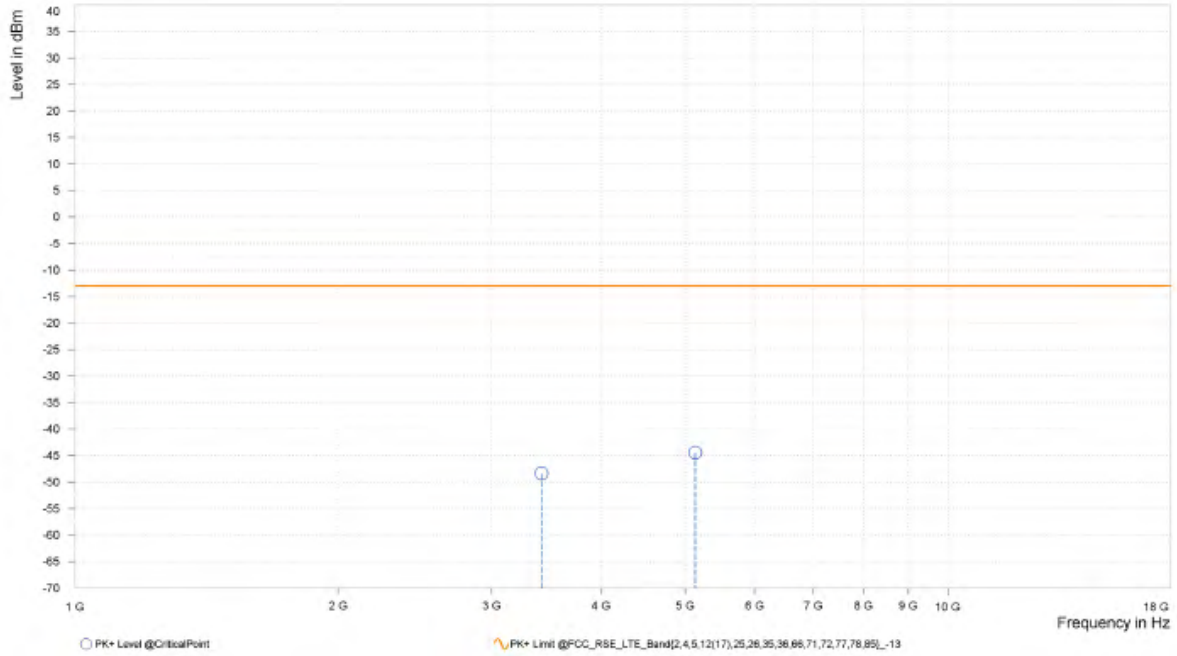


CHANNEL BANDWIDTH: 5MHz / QPSK

CH 131997

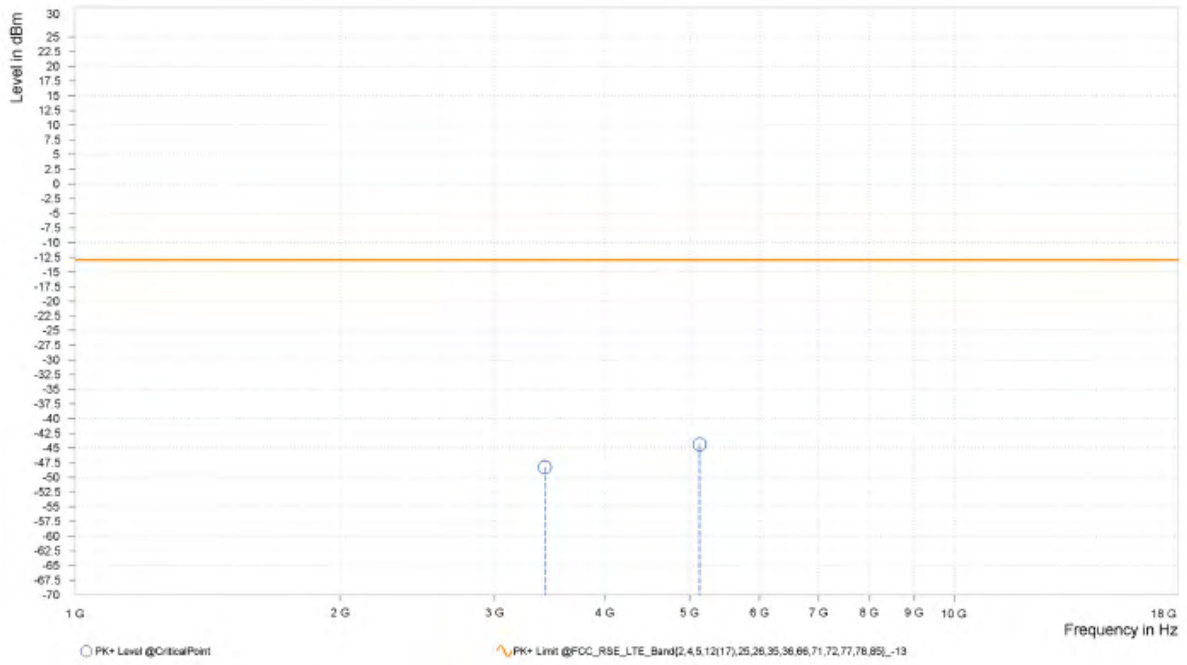
MODE	TX channel 131997	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,420.500	-48.38	-13.00	35.38	15.95	H	83.2	2.00
2	5,130.750	-44.45	-13.00	31.45	17.55	H	359	2.00



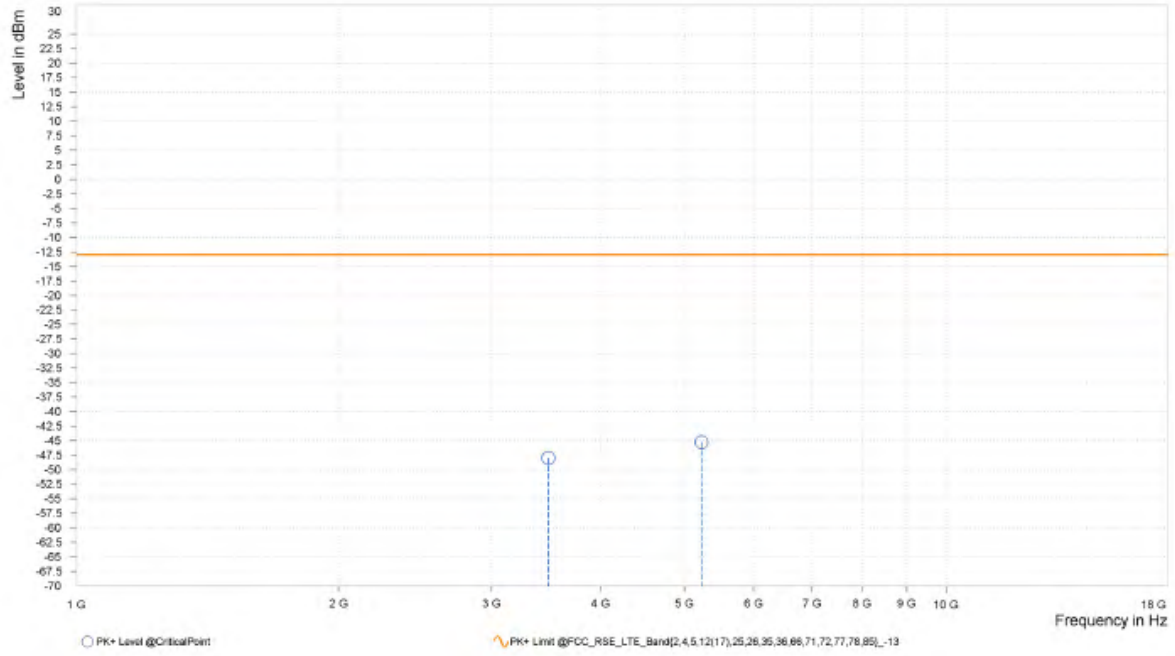
MODE	TX channel 131997	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,420.500	-48.24	-13.00	35.24	15.75	V	238.6	2.00
2	5,130.750	-44.36	-13.00	31.36	17.41	V	52.1	2.00



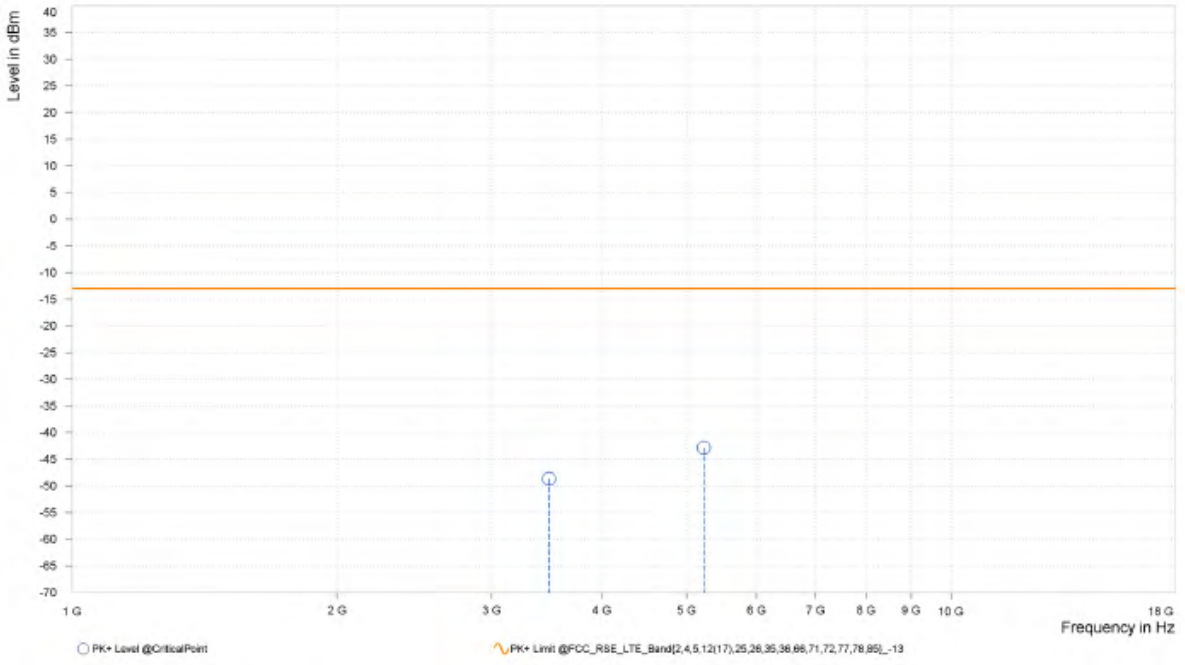
MODE	TX channel 132322	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,485.500	-47.98	-13.00	34.98	15.71	H	359	2.00
2	5,228.250	-45.25	-13.00	32.25	18.04	H	1	1.00



MODE	TX channel 132322	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

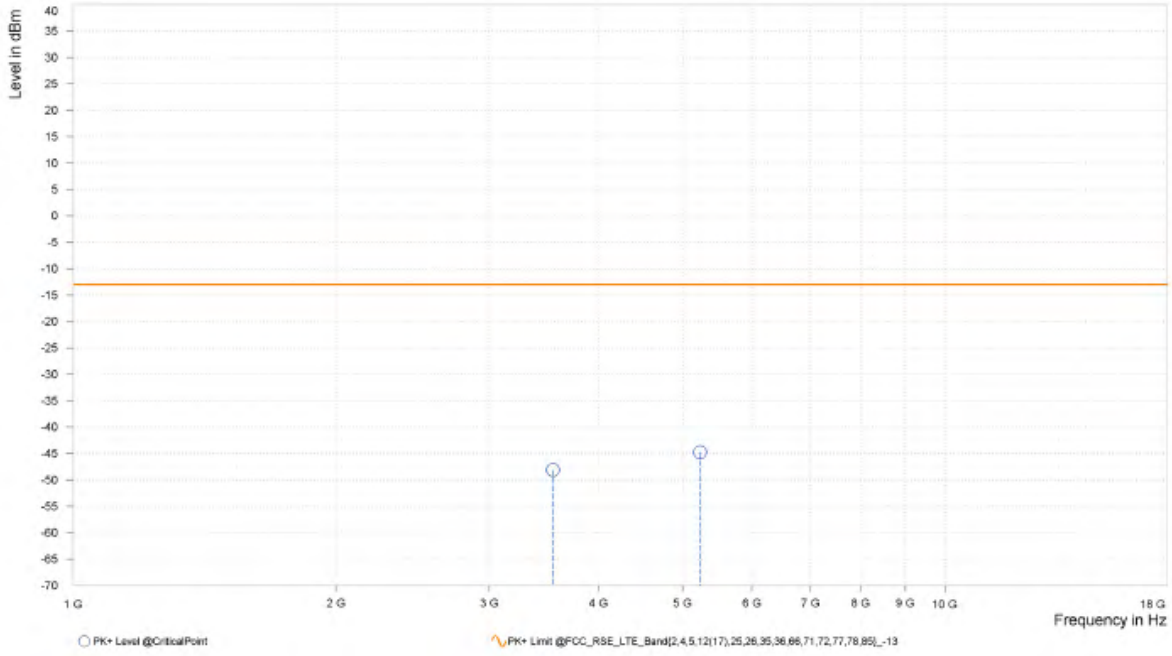
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,485.500	-48.68	-13.00	35.68	15.47	V	84.4	2.00
2	5,228.250	-42.86	-13.00	29.86	18.01	V	269.6	2.00



CH 132647

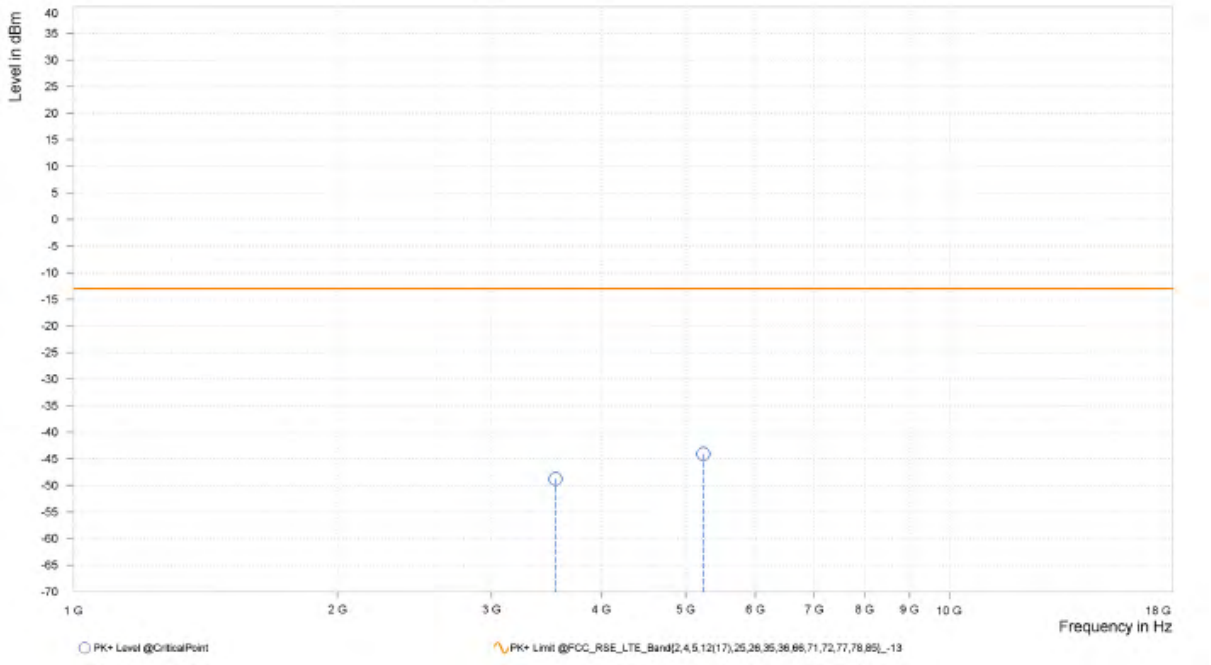
MODE	TX channel 132647	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,550.500	-48.12	-13.00	35.12	15.20	H	1	1.00
2	5,235.750	-44.77	-13.00	31.77	17.95	H	91.7	1.00



MODE	TX channel 132624	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

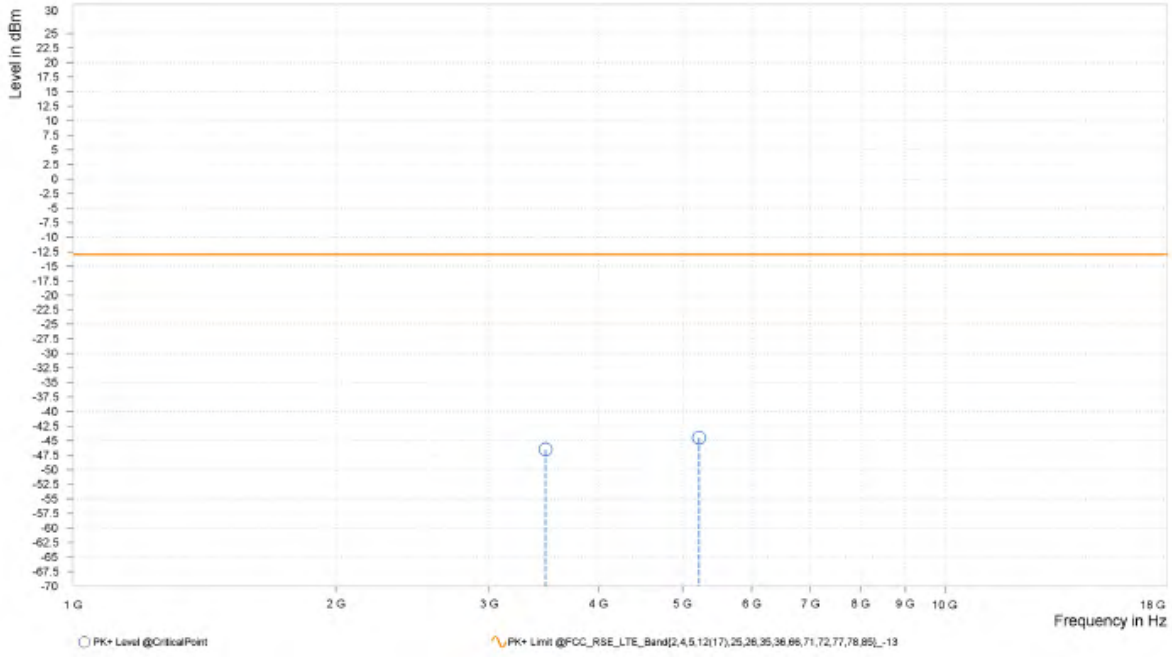
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,550.500	-48.76	-13.00	35.76	15.11	V	86.8	2.00
2	5,235.750	-44.07	-13.00	31.07	17.92	V	359	2.00



CHANNEL BANDWIDTH: 10MHz / QPSK

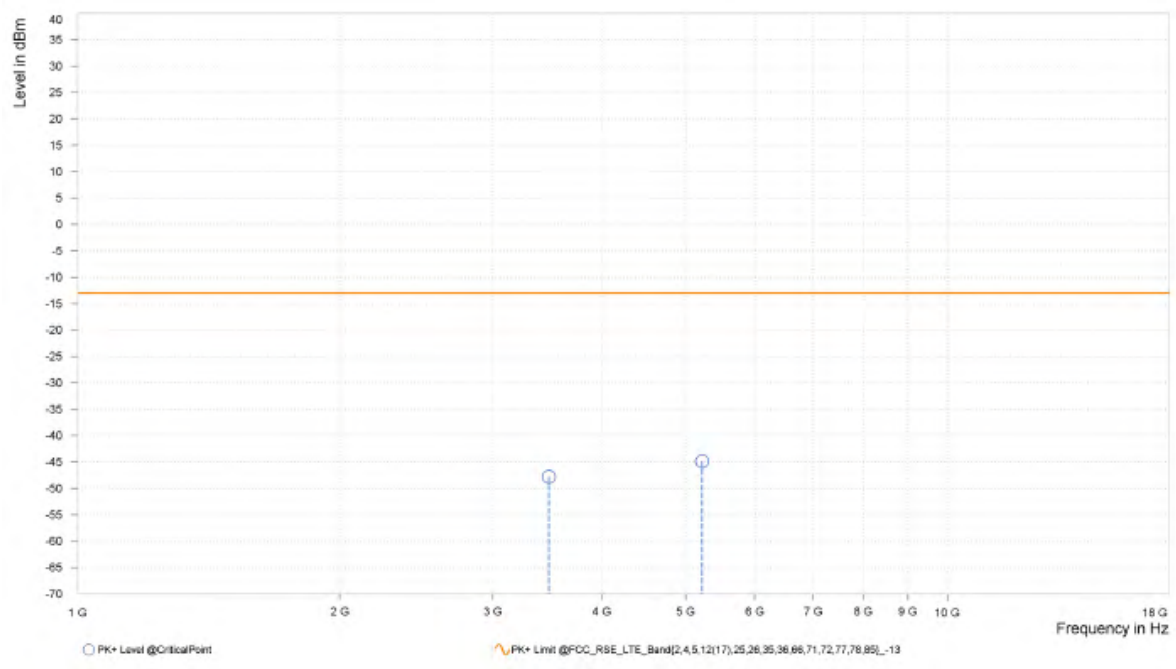
MODE	TX channel 132322	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,481.000	-46.49	-13.00	33.49	15.79	H	359.1	1.00
2	5,221.500	-44.51	-13.00	31.51	18.11	H	269.6	2.00



MODE	TX channel 132322	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

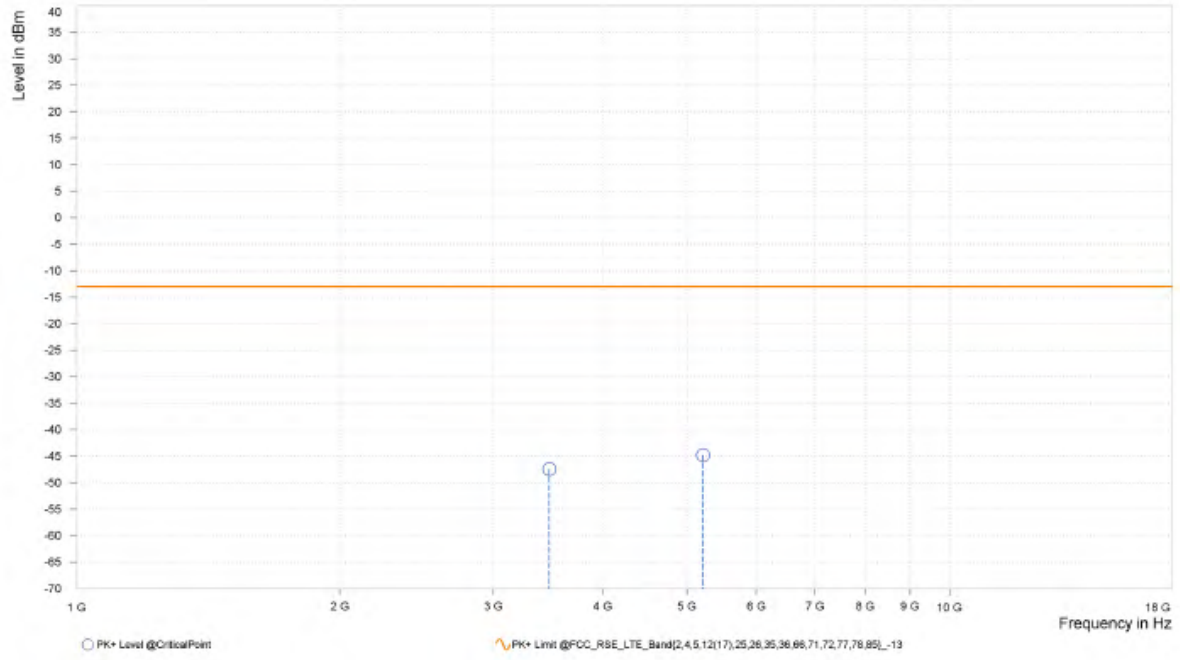
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,481.000	-47.81	-13.00	34.81	15.54	V	83.3	2.00
2	5,221.500	-44.89	-13.00	31.89	18.09	V	1	1.00



CHANNEL BANDWIDTH: 15MHz / QPSK

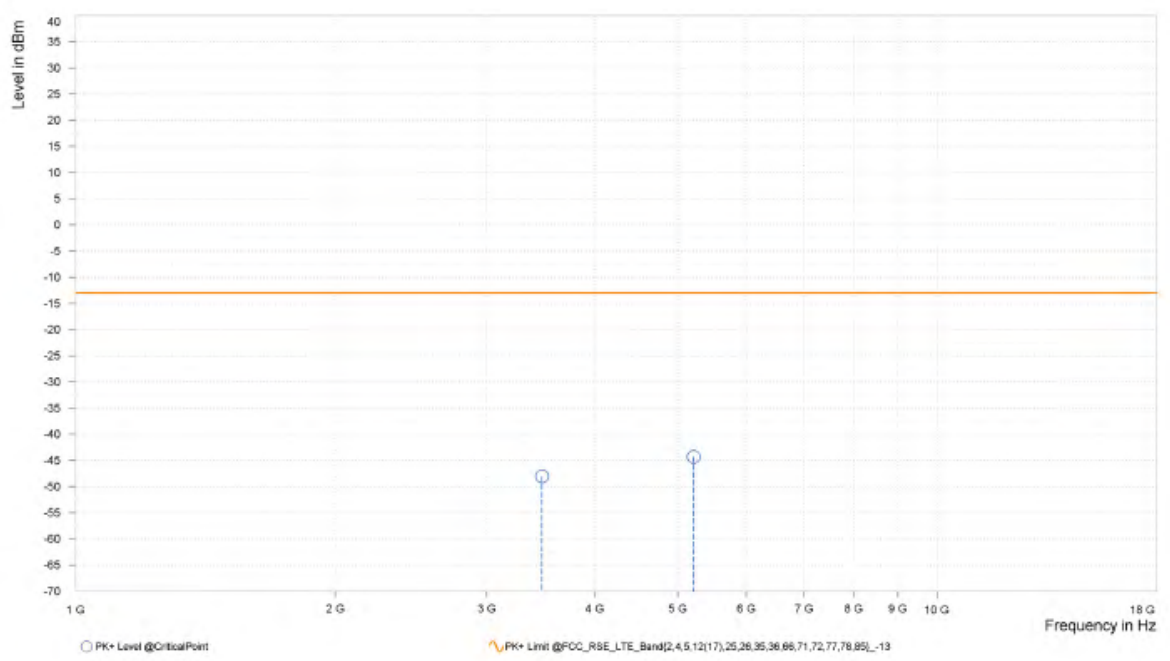
MODE	TX channel 132322	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,476.500	-47.47	-13.00	34.47	15.86	H	0.9	2.00
2	5,214.750	-44.81	-13.00	31.81	18.18	H	275.6	1.00



MODE	TX channel 132322	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,476.500	-48.07	-13.00	35.07	15.61	V	1	1.00
2	5,214.750	-44.31	-13.00	31.31	18.17	V	84.4	2.00

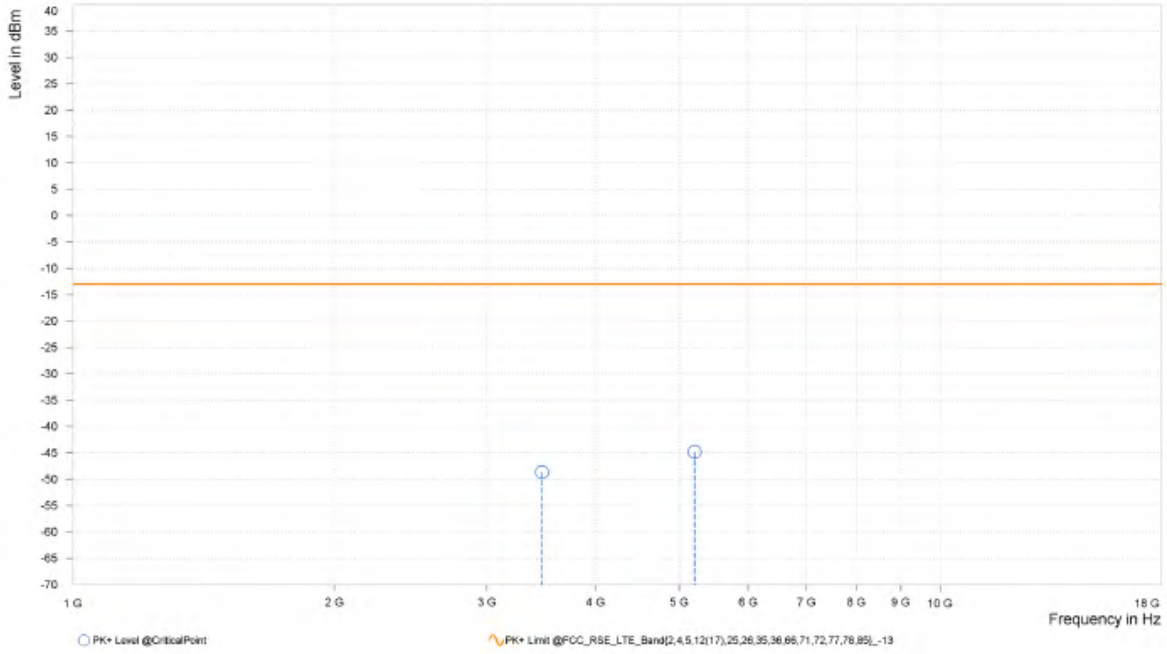


CHANNEL BANDWIDTH: 20MHz / QPSK

CH132322

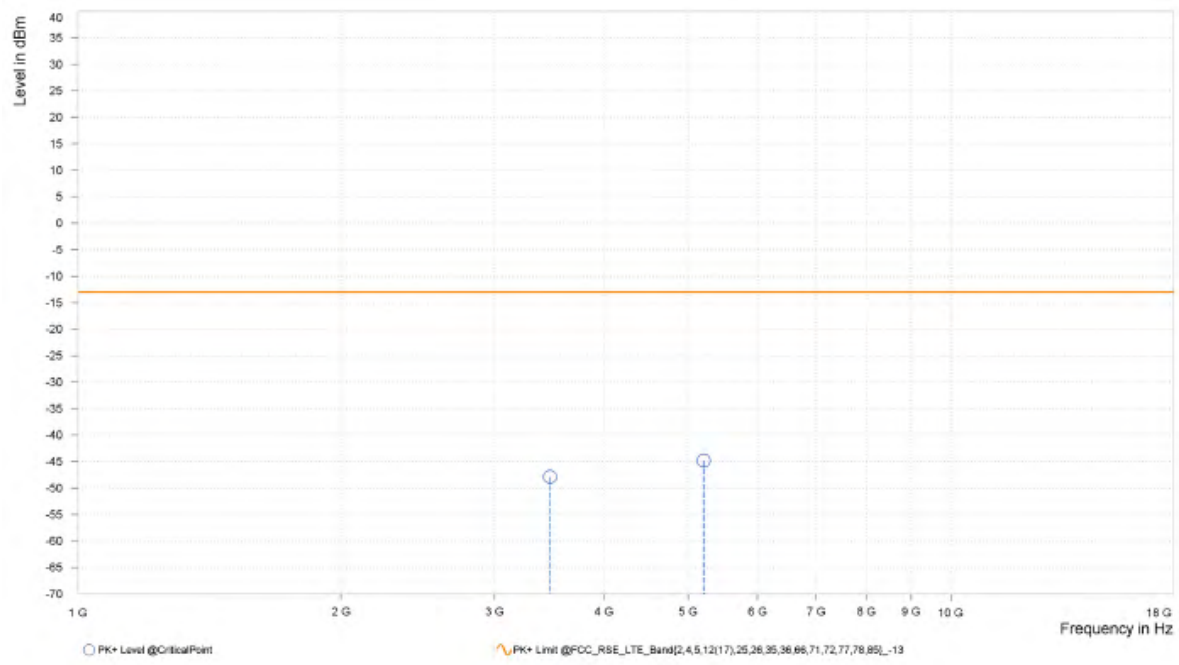
MODE	TX channel 132322	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,472.000	-48.66	-13.00	35.66	15.94	H	269.7	2.00
2	5,208.000	-44.84	-13.00	31.84	18.22	H	0.9	2.00



MODE	TX channel 132322	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

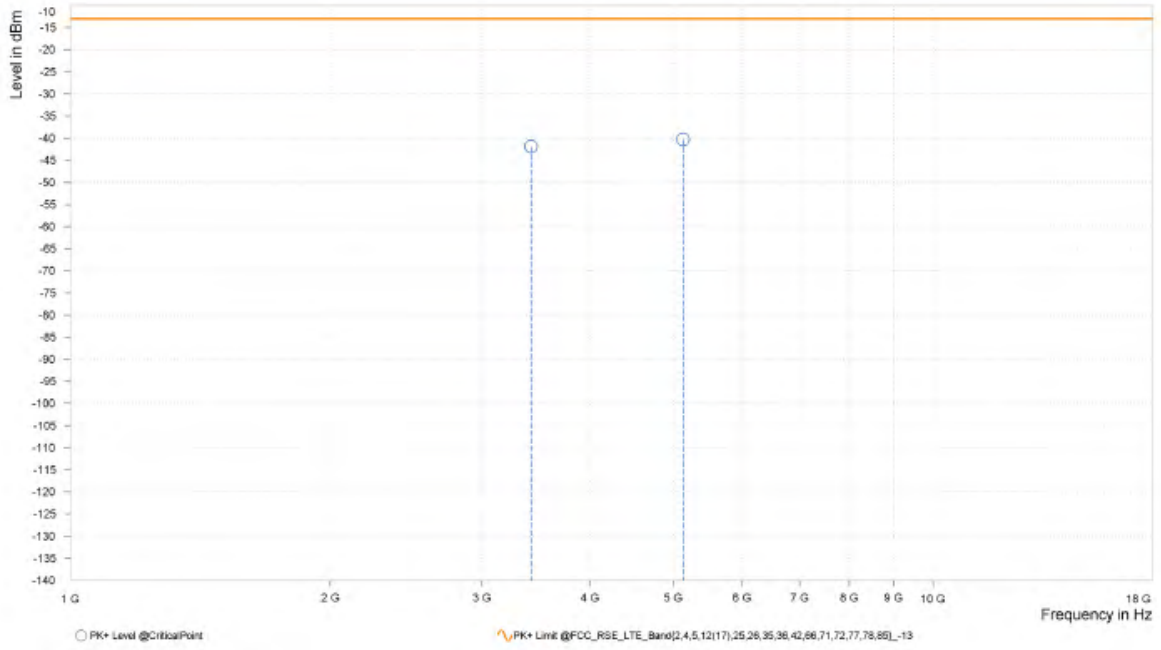
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,472.000	-47.87	-13.00	34.87	15.68	V	259	2.00
2	5,208.000	-44.84	-13.00	31.84	18.20	V	274.4	1.00



NB-IOT LTE Band 66
CHANNEL BANDWIDTH: QPSK
CH 131974

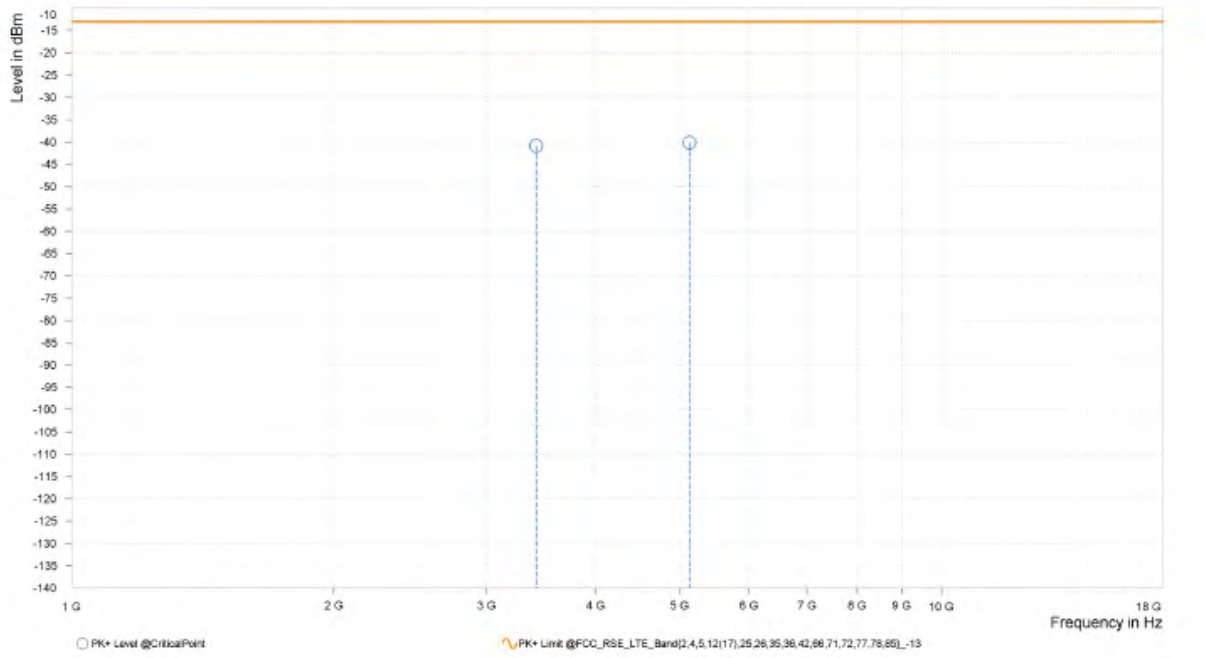
MODE	TX channel 131974	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,420.200	-41.87	-13.00	28.87	29.86	H	33.1	2.00
4	5,130.300	-40.26	-13.00	27.26	32.81	H	0.9	2.00



MODE	TX channel 131974	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

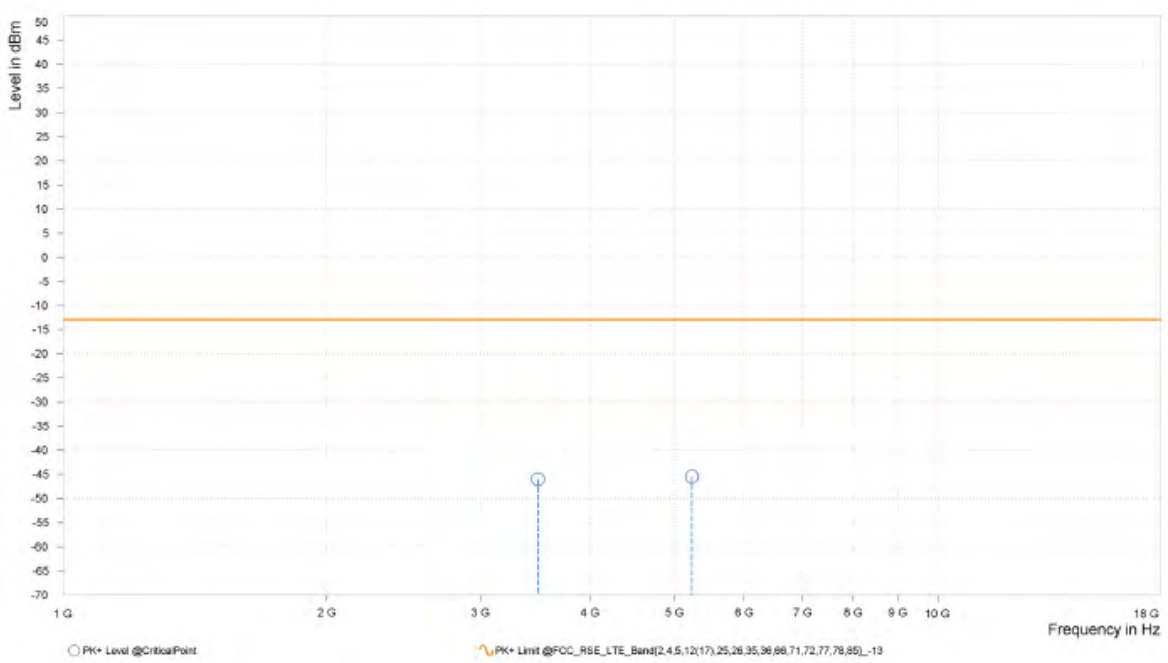
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,420.200	-40.89	-13.00	27.89	30.19	V	313.7	1.00
4	5,130.300	-40.16	-13.00	27.16	33.14	V	155.8	1.00



CH 132322

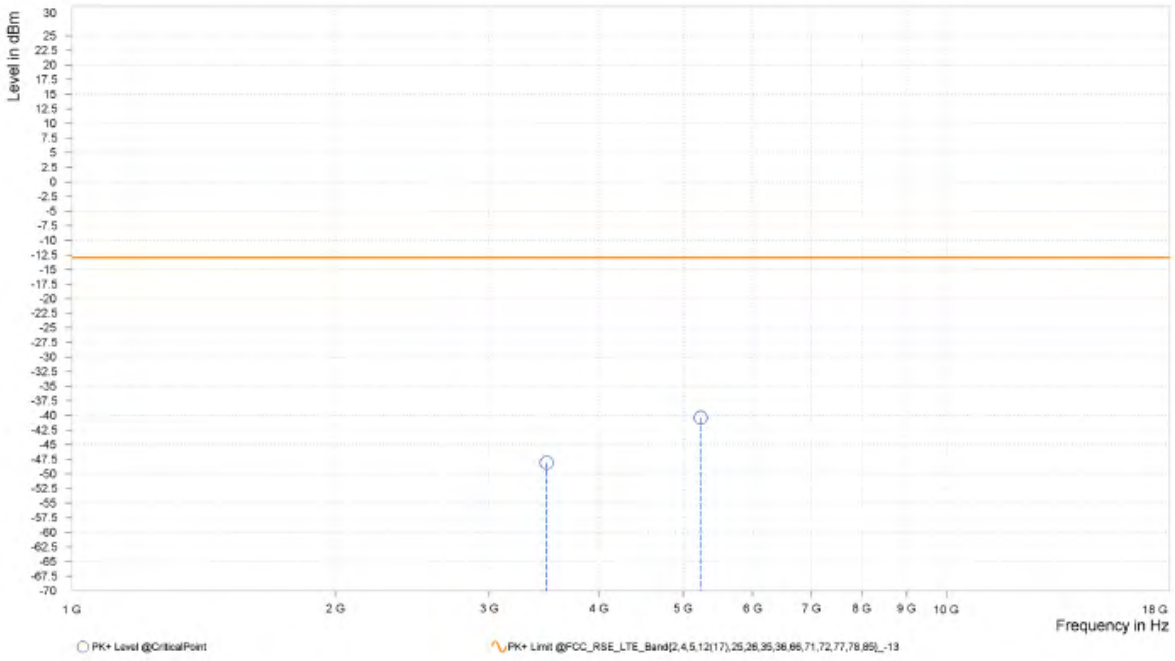
MODE	TX channel 132322	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,490.000	-45.96	-13.00	32.96	15.63	H	269.6	2.00
2	5,235.000	-45.48	-13.00	32.48	17.96	H	359	1.00



MODE	TX channel 132322	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

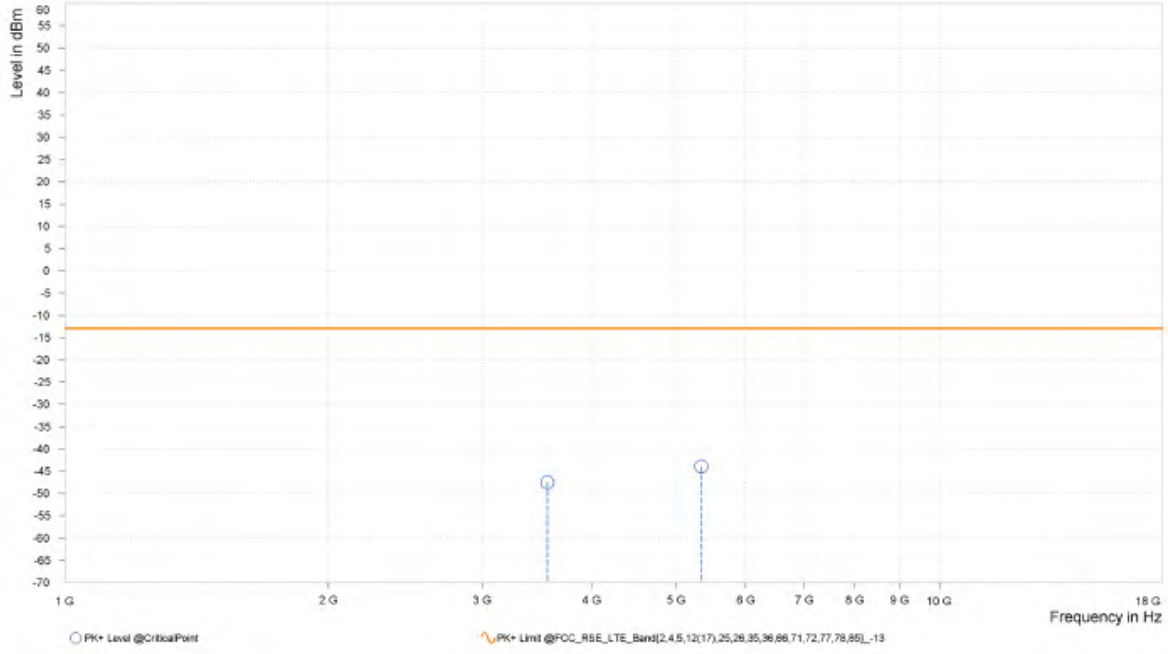
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,490.000	-48.09	-13.00	35.09	15.41	V	359	2.00
2	5,235.000	-40.36	-13.00	27.36	17.93	V	84.4	2.00



CH 132670

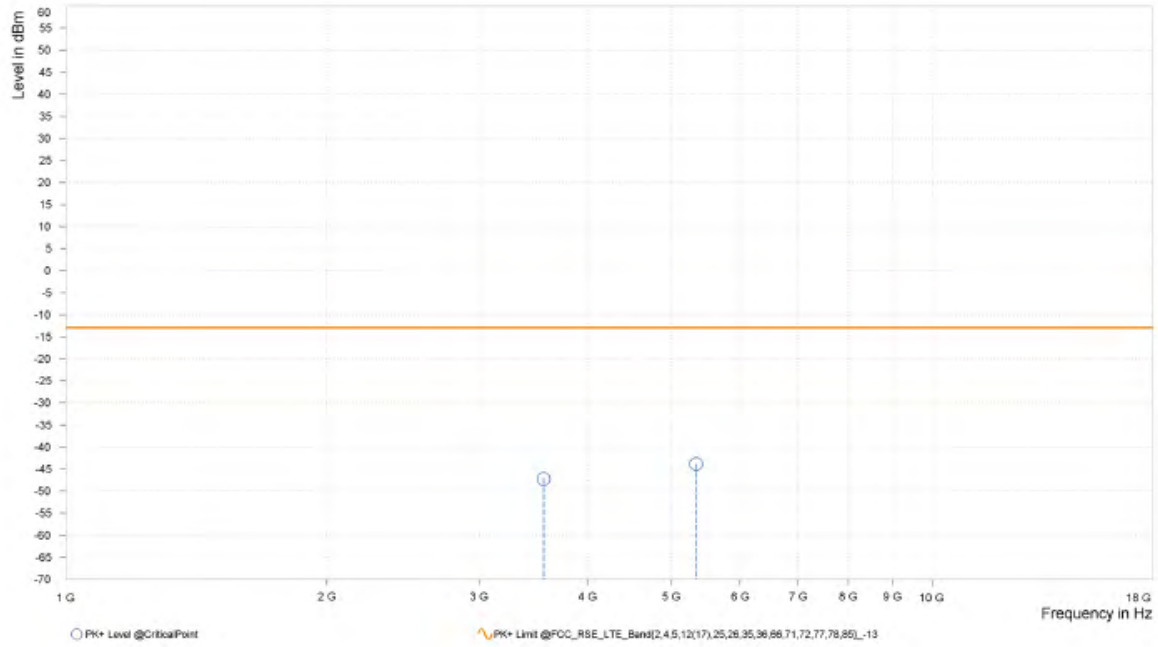
MODE	TX channel 132670	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,559.800	-47.52	-13.00	34.52	15.16	H	80.8	2.00
2	5,339.700	-43.95	-13.00	30.95	17.34	H	359.1	1.00



MODE	TX channel 132670	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,559.800	-47.22	-13.00	34.22	15.09	V	285.1	1.00
2	5,339.700	-43.84	-13.00	30.84	17.19	V	285.1	1.00

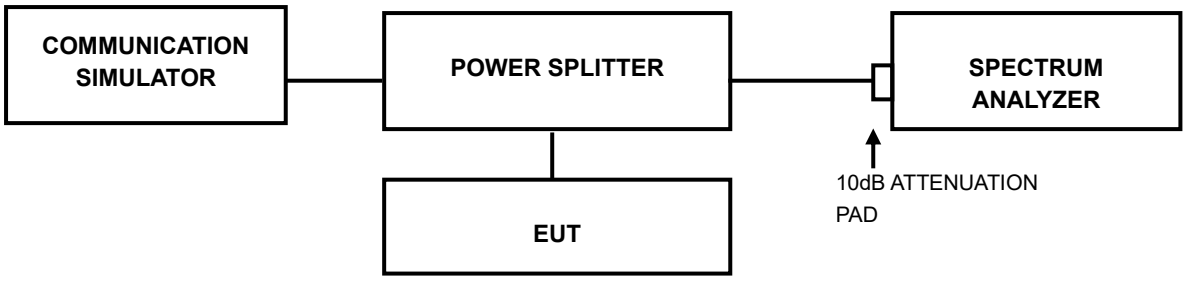


3.7 PEAK TO AVERAGE RATIO

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 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.

6 Appendix

CAT-M: LTE BAND66(INCLUDING LTE BAND4)

PEAK-TO-AVERAGE RATIO(CCDF)

Test Result

Band	Bandwidth	Modulation	Channel	Result(dB)	Limit(dB)	Verdict
Band66	1.4MHz	QPSK	131979	5.11	13	PASS
Band66	1.4MHz	QPSK	132322	4.87	13	PASS
Band66	1.4MHz	QPSK	132665	5.11	13	PASS
Band66	1.4MHz	16QAM	131979	6.63	13	PASS
Band66	1.4MHz	16QAM	132322	6.44	13	PASS
Band66	1.4MHz	16QAM	132665	6.54	13	PASS
Band66	3MHz	QPSK	131987	5.28	13	PASS
Band66	3MHz	QPSK	132322	4.85	13	PASS
Band66	3MHz	QPSK	132657	5.08	13	PASS
Band66	3MHz	16QAM	131987	6.69	13	PASS
Band66	3MHz	16QAM	132322	6.66	13	PASS
Band66	3MHz	16QAM	132657	6.60	13	PASS
Band66	5MHz	QPSK	131997	5.92	13	PASS
Band66	5MHz	QPSK	132322	6.18	13	PASS
Band66	5MHz	QPSK	132647	5.91	13	PASS
Band66	5MHz	16QAM	131997	7.13	13	PASS
Band66	5MHz	16QAM	132322	6.35	13	PASS
Band66	5MHz	16QAM	132647	6.67	13	PASS
Band66	10MHz	QPSK	132022	5.89	13	PASS
Band66	10MHz	QPSK	132322	5.80	13	PASS
Band66	10MHz	QPSK	132622	5.80	13	PASS
Band66	10MHz	16QAM	132022	7.69	13	PASS
Band66	10MHz	16QAM	132322	6.43	13	PASS
Band66	10MHz	16QAM	132622	6.35	13	PASS
Band66	15MHz	QPSK	132047	5.93	13	PASS
Band66	15MHz	QPSK	132322	5.73	13	PASS
Band66	15MHz	QPSK	132597	5.69	13	PASS
Band66	15MHz	16QAM	132047	6.61	13	PASS
Band66	15MHz	16QAM	132322	6.52	13	PASS
Band66	15MHz	16QAM	132597	6.79	13	PASS
Band66	20MHz	QPSK	132072	5.98	13	PASS
Band66	20MHz	QPSK	132322	5.84	13	PASS
Band66	20MHz	QPSK	132572	5.97	13	PASS
Band66	20MHz	16QAM	132072	6.55	13	PASS
Band66	20MHz	16QAM	132322		13	PASS
Band66	20MHz	16QAM	132572		13	PASS

Test Graphs

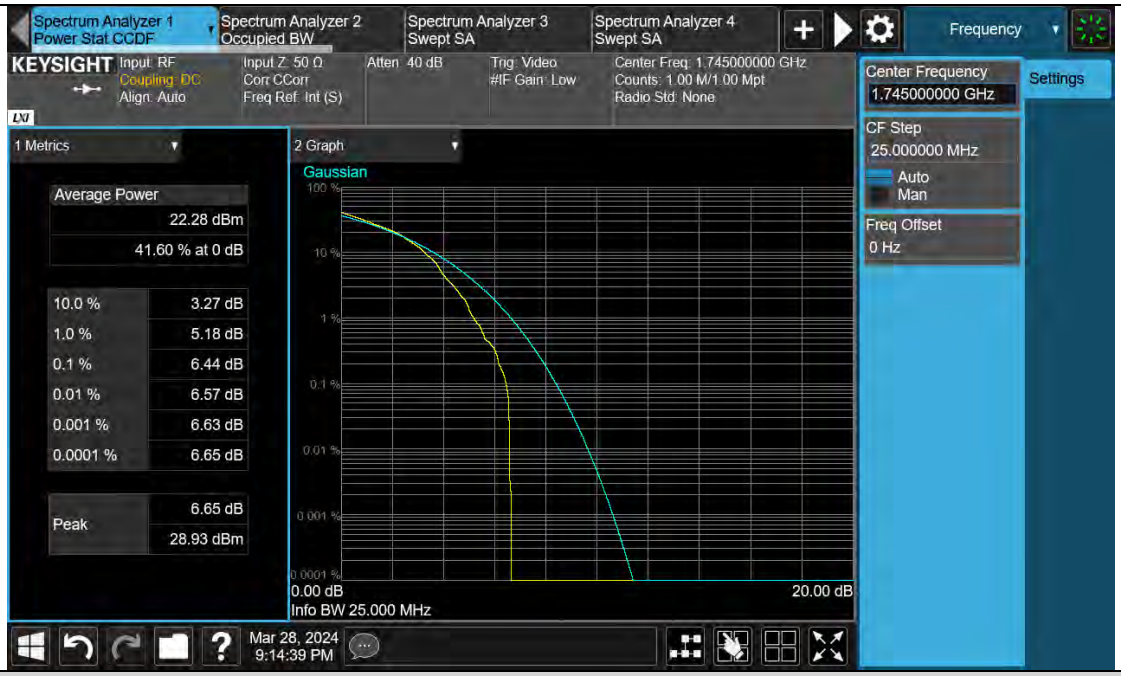
Band66-1.4MHz-QPSK-131979

Band66-1.4MHz-QPSK-132322

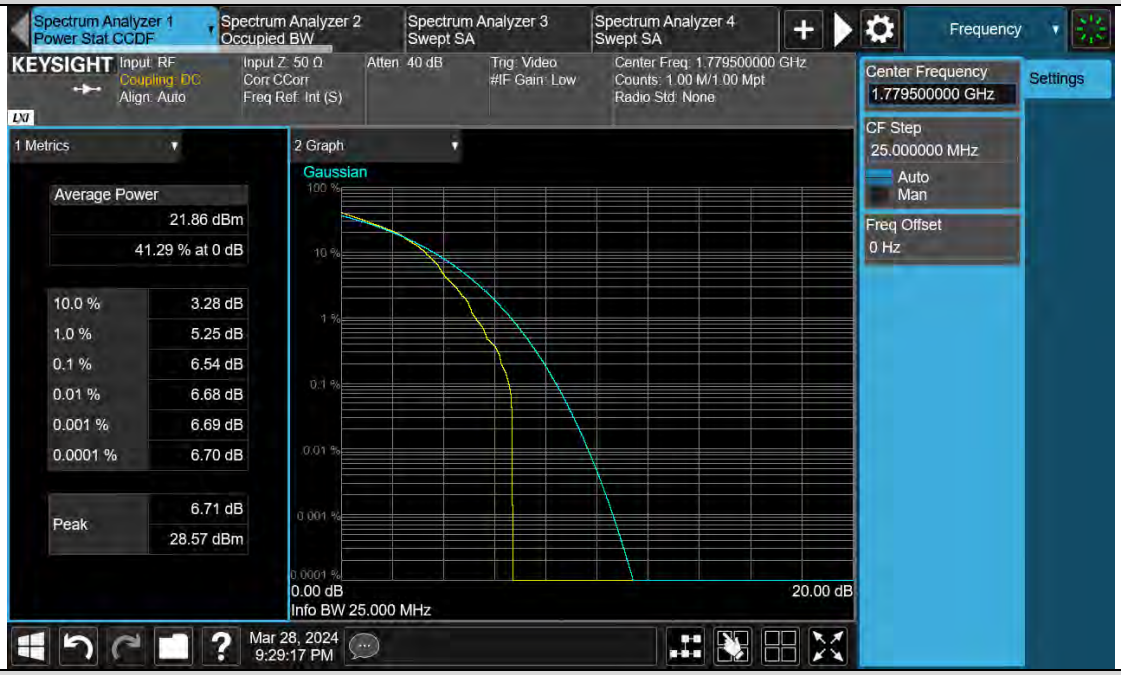
Band66-1.4MHz-QPSK-132665

Band66-1.4MHz-16QAM-131979

Band66-1.4MHz-16QAM-132322



Band66-1.4MHz-16QAM-132665



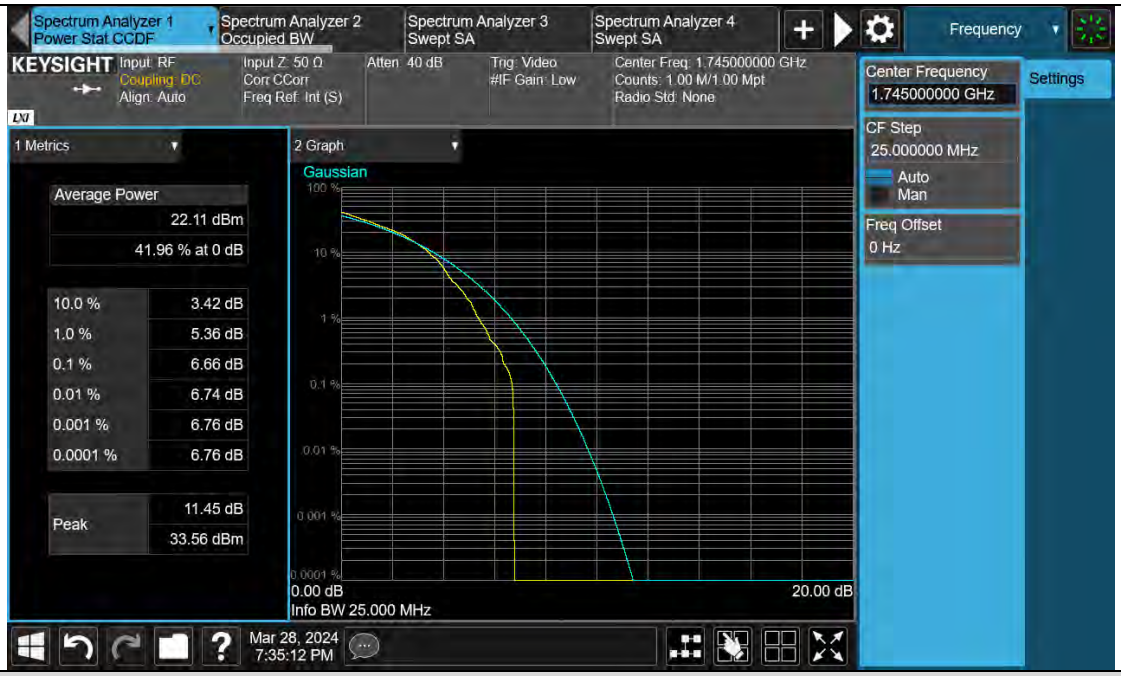
Band66-3MHz-QPSK-131987

Band66-3MHz-QPSK-132322

Band66-3MHz-QPSK-132657

Band66-3MHz-16QAM-131987

Band66-3MHz-16QAM-132322



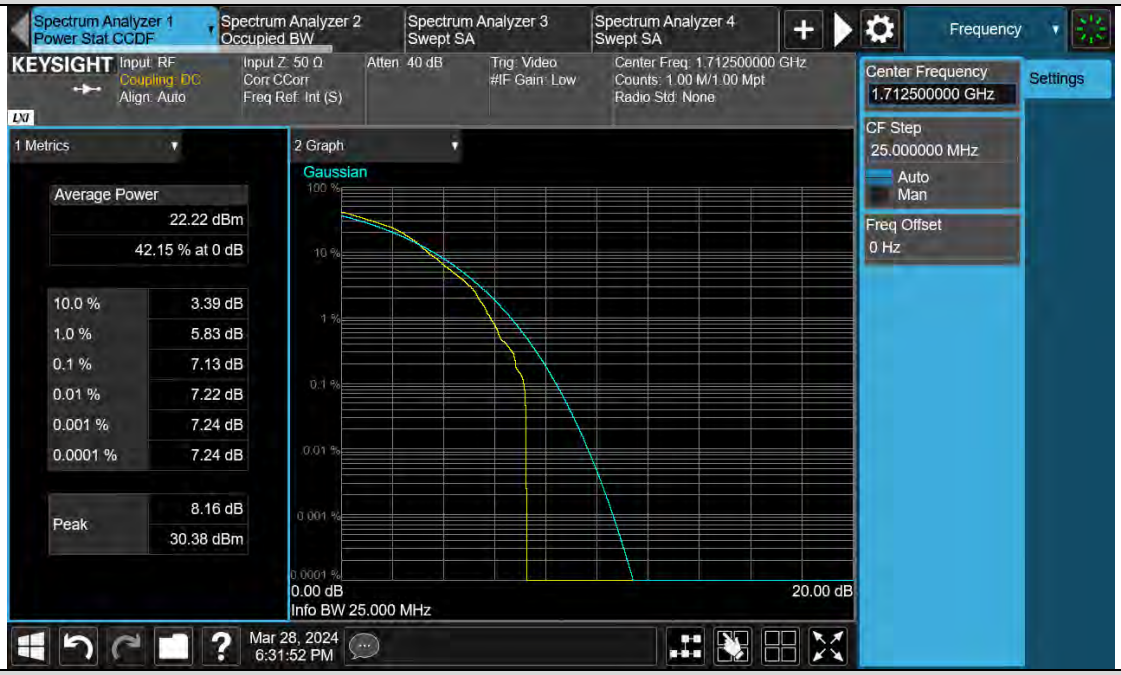
Band66-3MHz-16QAM-132657

Band66-5MHz-QPSK-131997

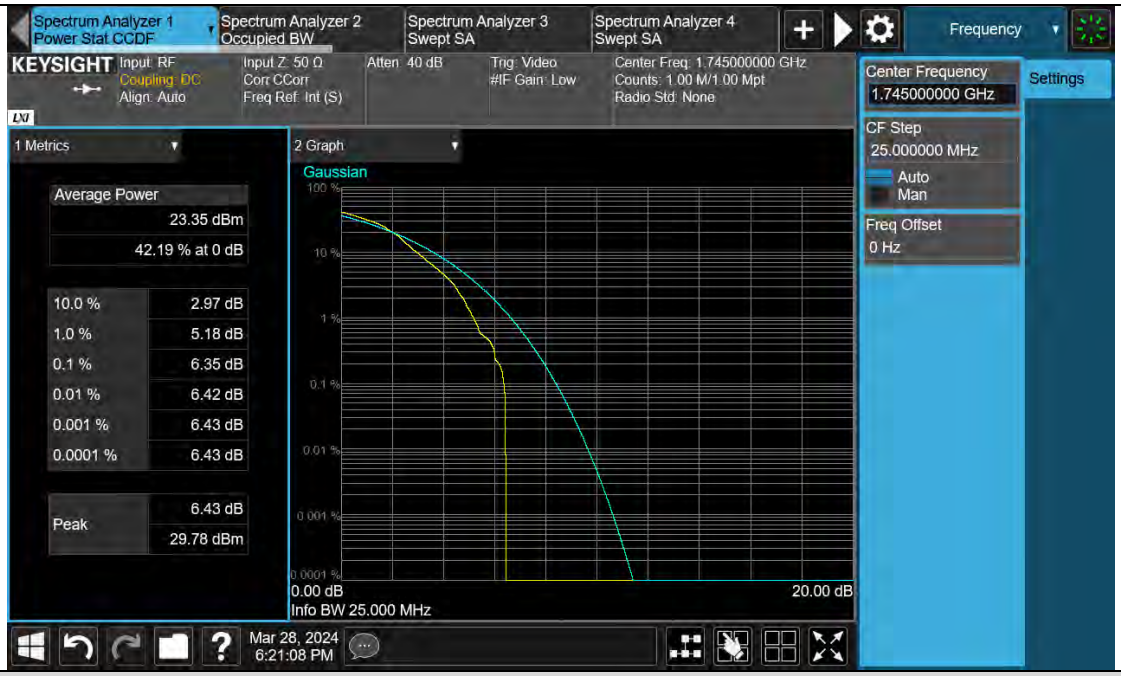
Band66-5MHz-QPSK-132322

Band66-5MHz-QPSK-132647

Band66-5MHz-16QAM-131997



Band66-5MHz-16QAM-132322

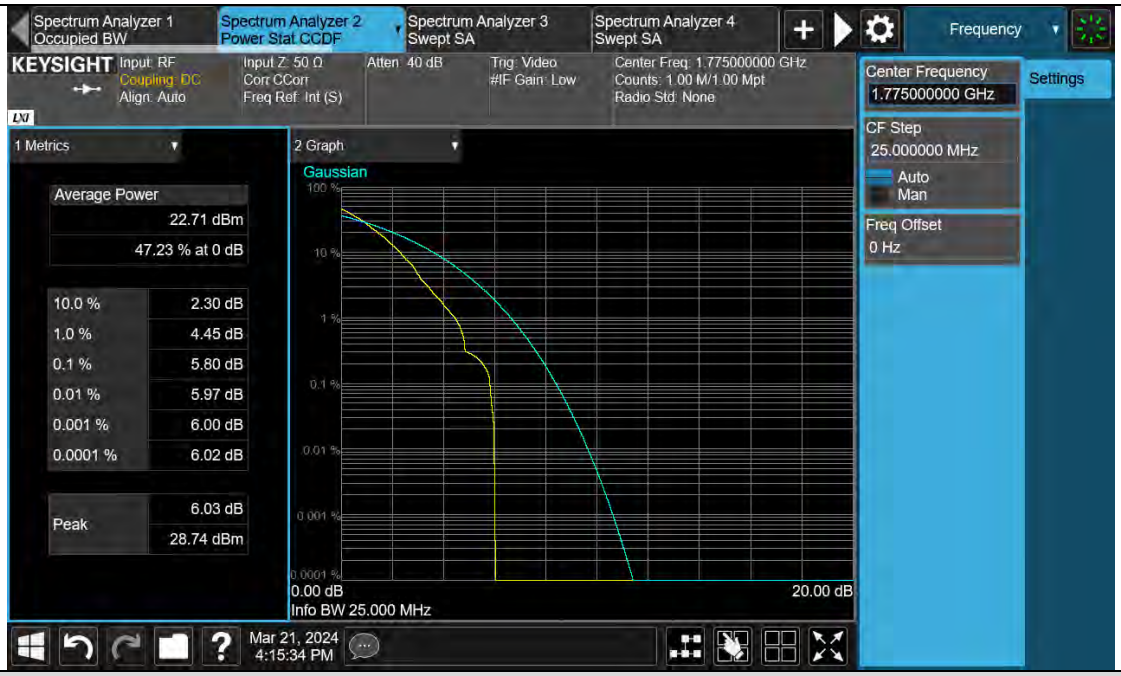


Band66-5MHz-16QAM-132647

Band66-10MHz-QPSK-132022

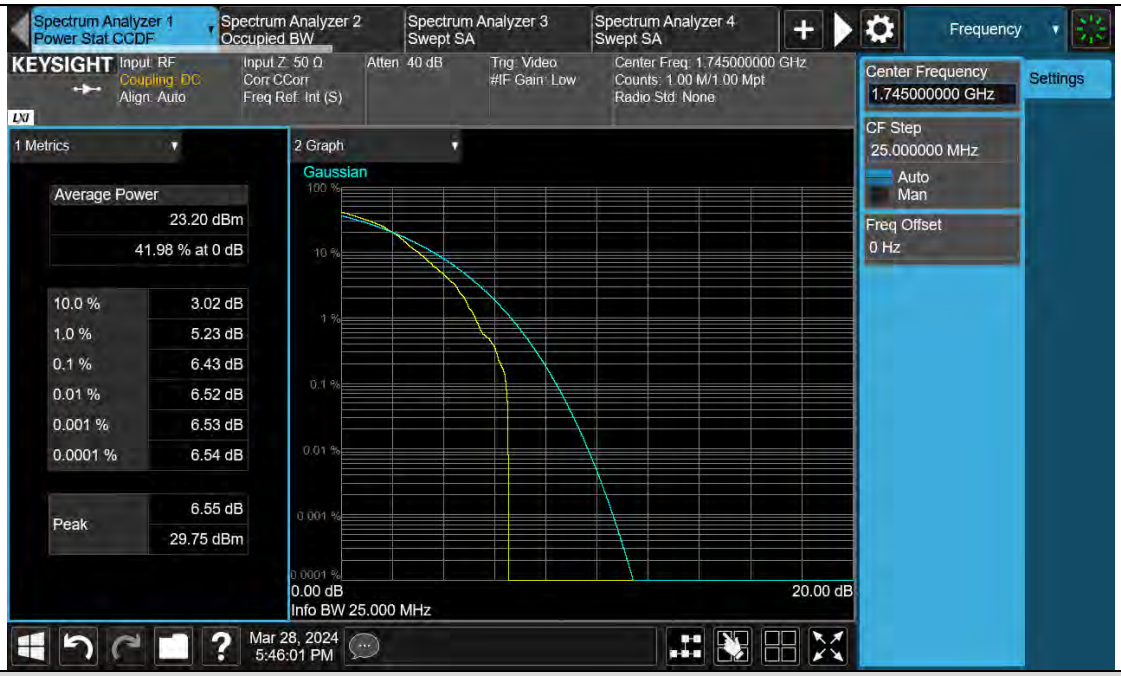
Band66-10MHz-QPSK-132322

Band66-10MHz-QPSK-132622

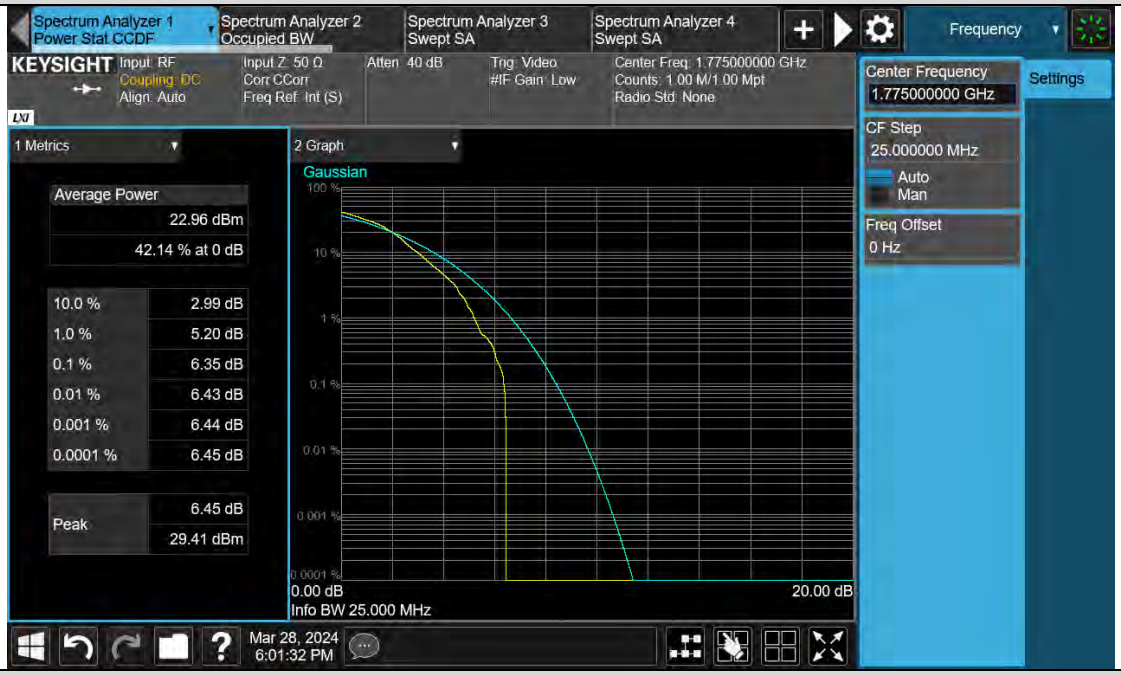


Band66-10MHz-16QAM-132022

Band66-10MHz-16QAM-132322



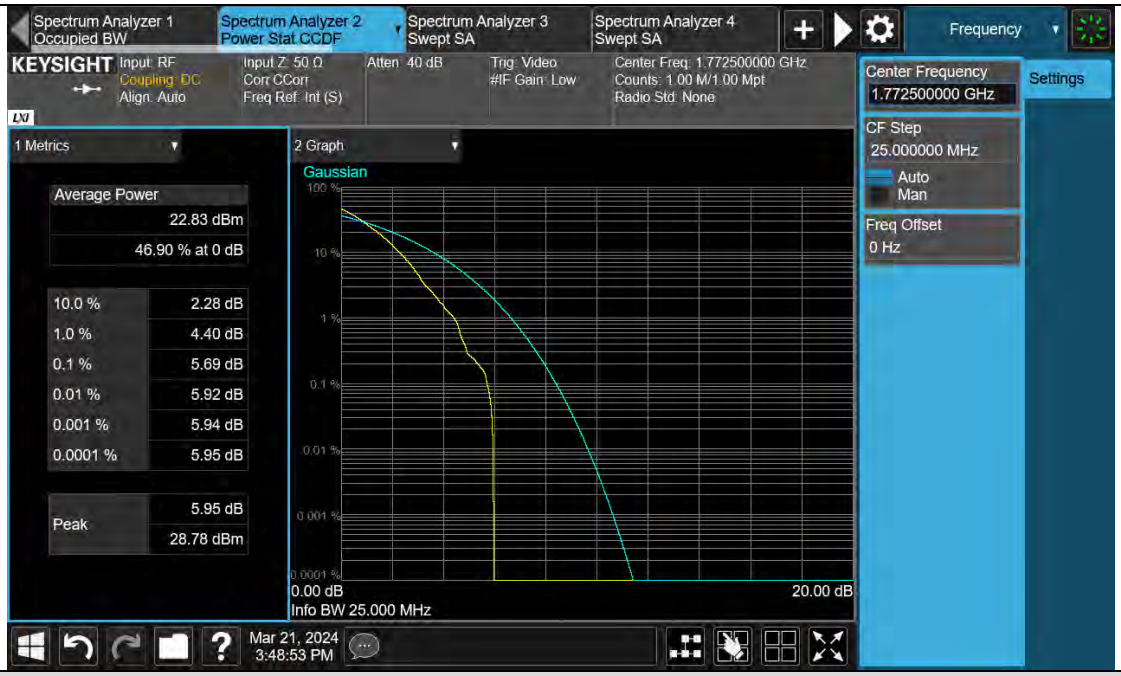
Band66-10MHz-16QAM-132622



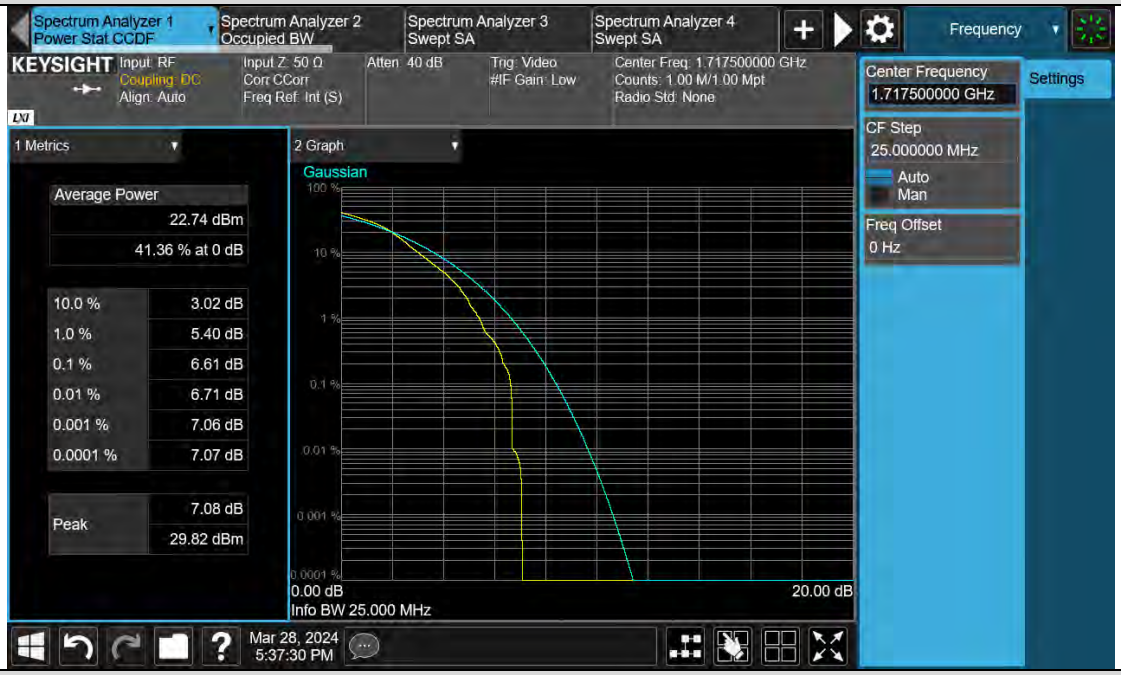
Band66-15MHz-QPSK-132047

Band66-15MHz-QPSK-132322

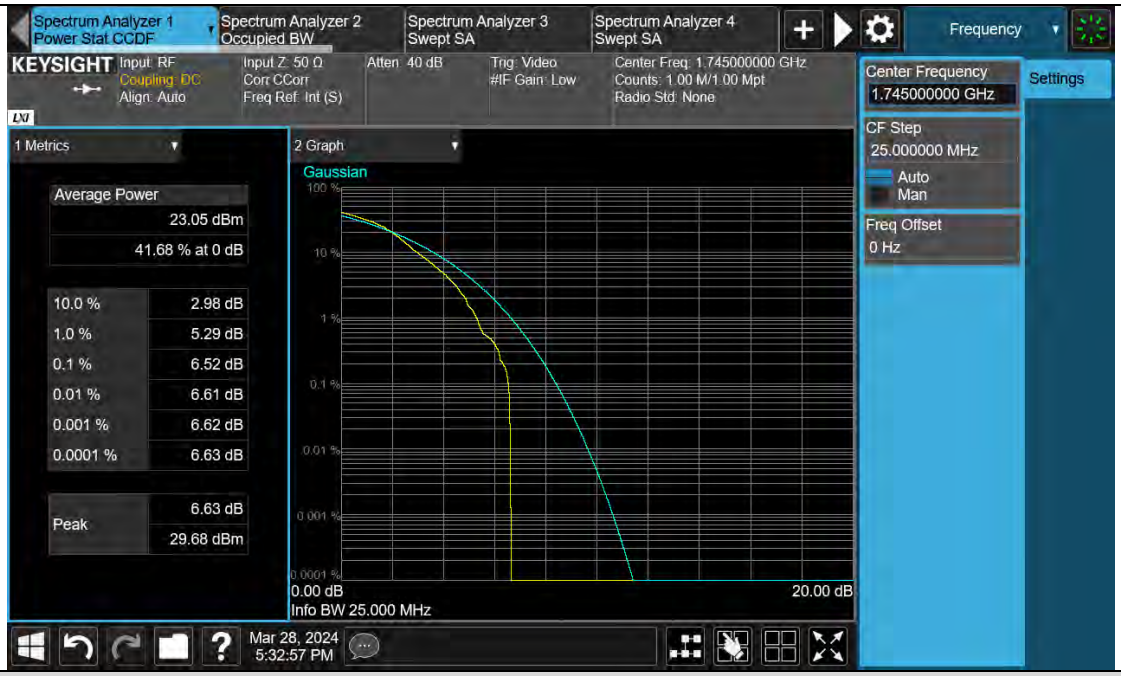
Band66-15MHz-QPSK-132597



Band66-15MHz-16QAM-132047

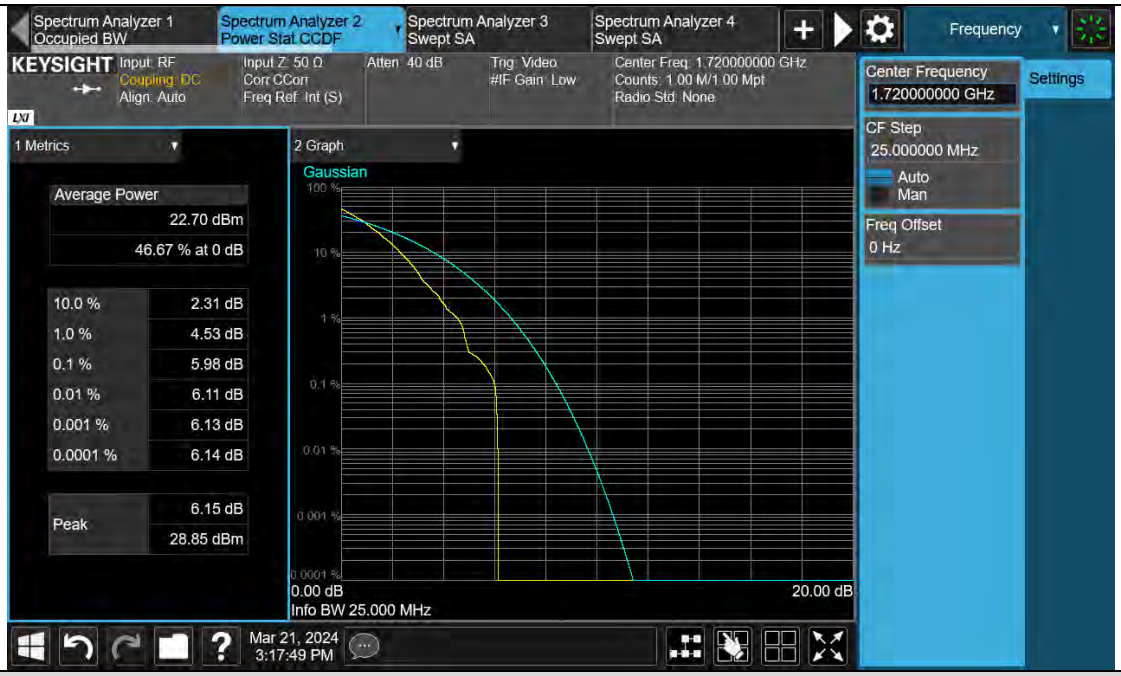


Band66-15MHz-16QAM-132322

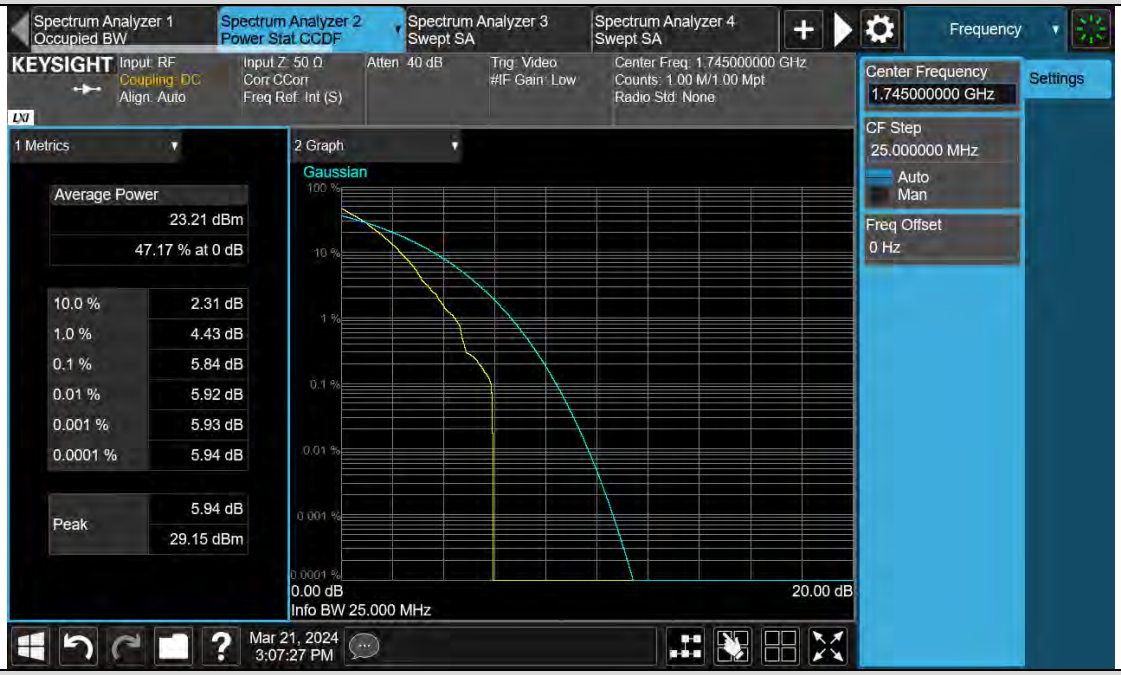


Band66-15MHz-16QAM-132597

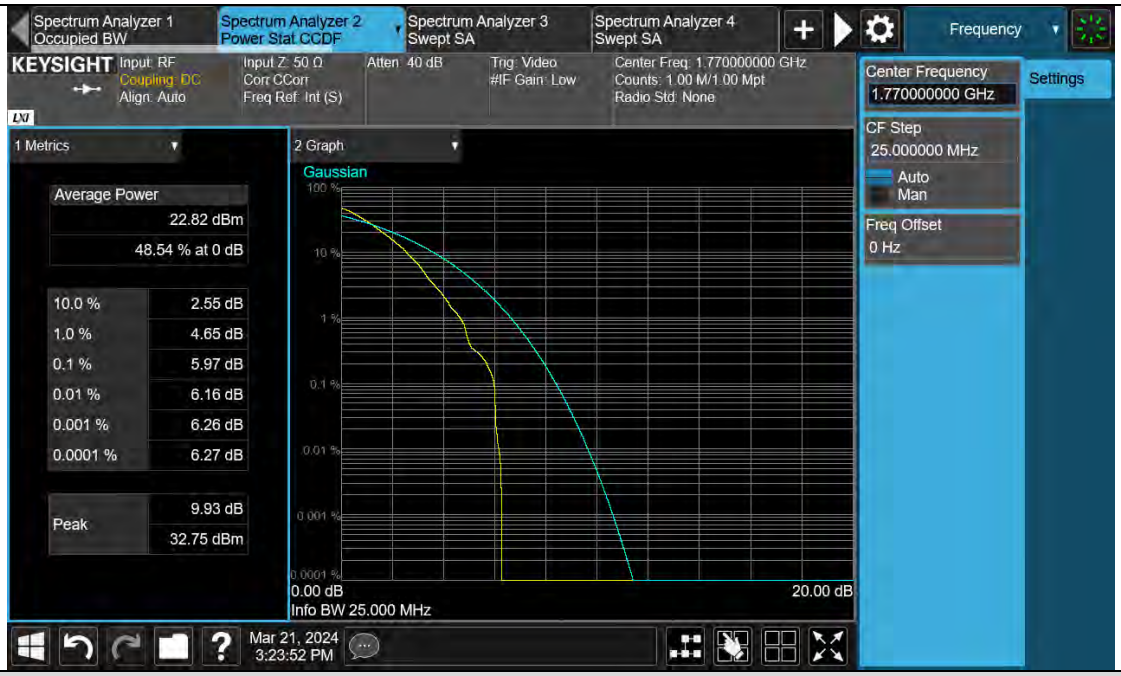
Band66-20MHz-QPSK-132072



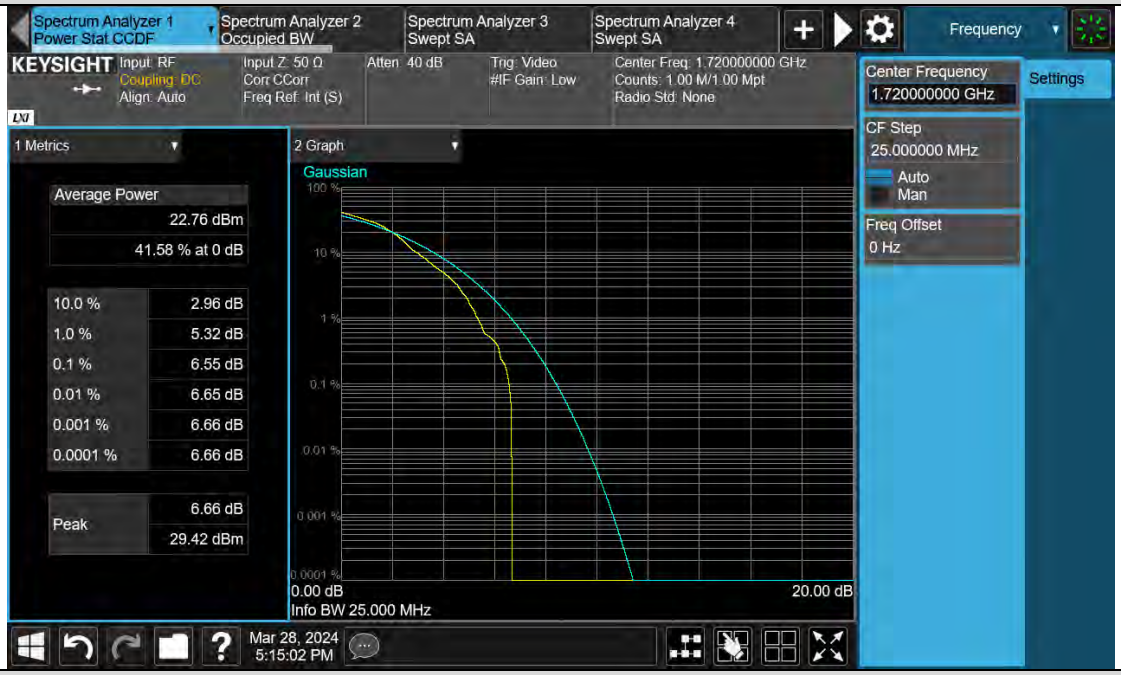
Band66-20MHz-QPSK-132322



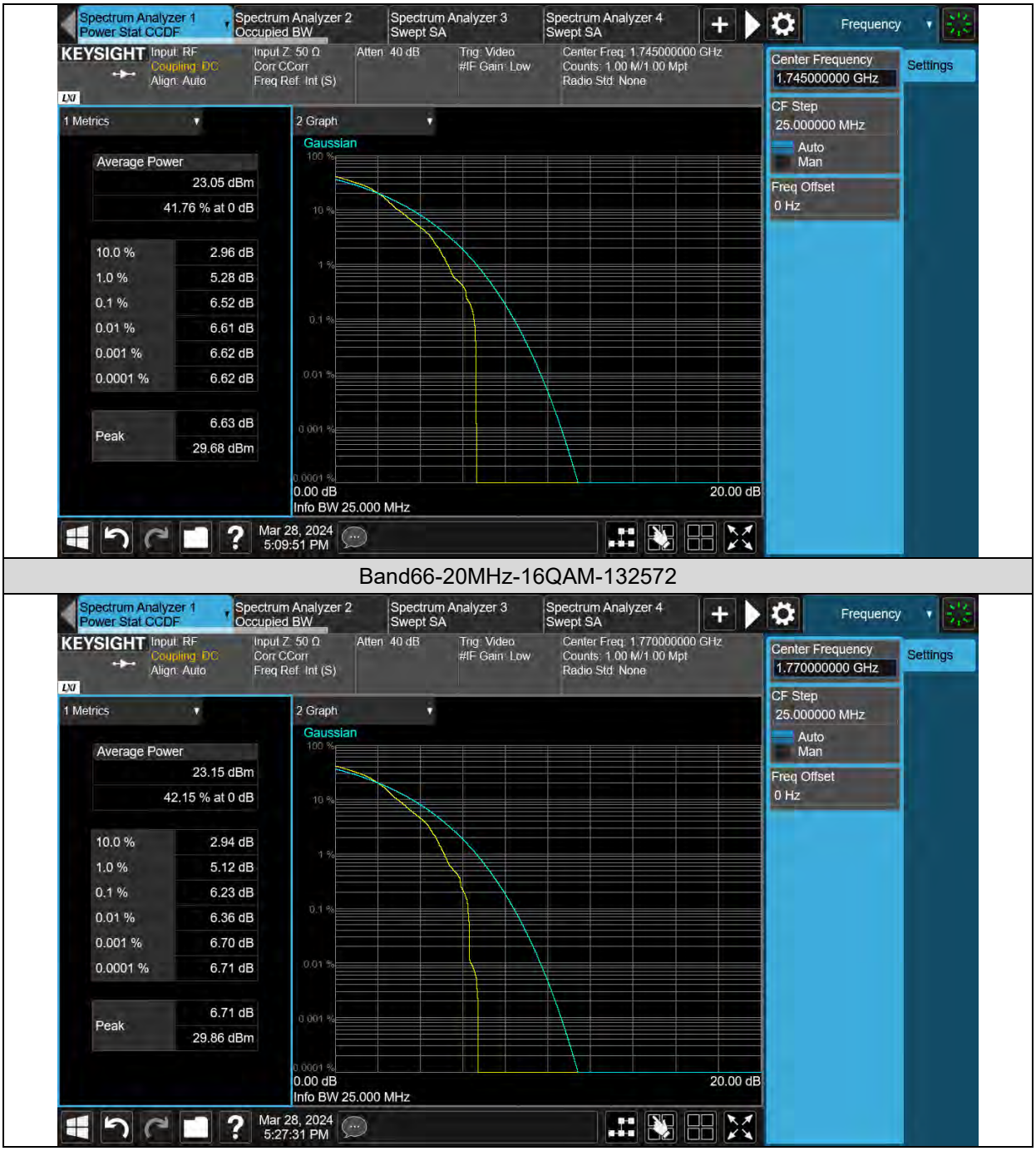
Band66-20MHz-QPSK-132572



Band66-20MHz-16QAM-132072



Band66-20MHz-16QAM-132322



Band66-20MHz-16QAM-132572

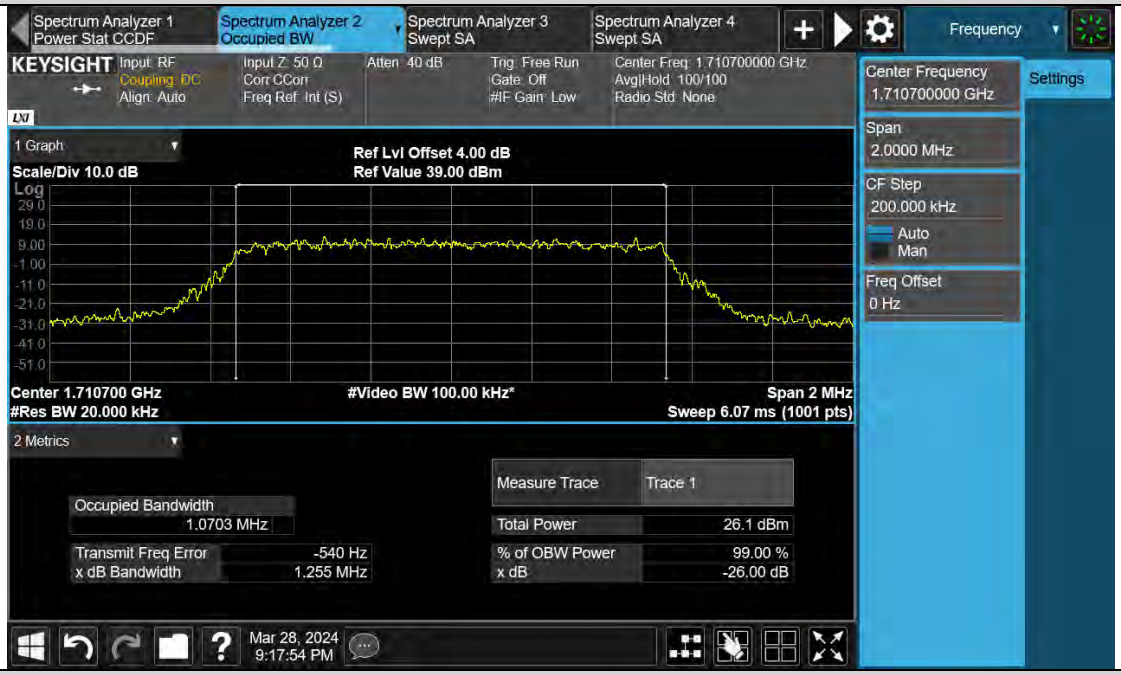
26DB BANDWIDTH AND OCCUPIED BANDWIDTH

Test Result

Band	Bandwidth	Modulation	Channel	RB Configuration	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
Band66	1.4MHz	QPSK	131979	6RB#0	1.0703	1.255	PASS
Band66	1.4MHz	QPSK	132322	6RB#0	1.0779	1.289	PASS
Band66	1.4MHz	QPSK	132665	6RB#0	1.0747	1.250	PASS
Band66	1.4MHz	16QAM	131979	6RB#0	1.0832	1.267	PASS
Band66	1.4MHz	16QAM	132322	6RB#0	1.0738	1.277	PASS
Band66	1.4MHz	16QAM	132665	6RB#0	1.0711	1.282	PASS
Band66	3MHz	QPSK	131987	6RB#0	1.0754	1.266	PASS
Band66	3MHz	QPSK	132322	6RB#0	1.0857	1.286	PASS
Band66	3MHz	QPSK	132657	6RB#0	1.0862	1.258	PASS
Band66	3MHz	16QAM	131987	6RB#0	1.0701	1.262	PASS
Band66	3MHz	16QAM	132322	6RB#0	1.0741	1.260	PASS
Band66	3MHz	16QAM	132657	6RB#0	1.0733	1.282	PASS
Band66	5MHz	QPSK	131997	6RB#0	1.0827	1.272	PASS
Band66	5MHz	QPSK	132322	6RB#0	1.0745	1.274	PASS
Band66	5MHz	QPSK	132647	6RB#0	1.0843	1.266	PASS
Band66	5MHz	16QAM	131997	6RB#0	1.0764	1.290	PASS
Band66	5MHz	16QAM	132322	6RB#0	1.0796	1.284	PASS
Band66	5MHz	16QAM	132647	6RB#0	1.0722	1.277	PASS
Band66	10MHz	QPSK	132022	6RB#0	1.0808	1.283	PASS
Band66	10MHz	QPSK	132322	6RB#0	1.0755	1.262	PASS
Band66	10MHz	QPSK	132622	6RB#0	1.0764	1.263	PASS
Band66	10MHz	16QAM	132022	6RB#0	1.0752	1.288	PASS
Band66	10MHz	16QAM	132322	6RB#0	1.0742	1.285	PASS
Band66	10MHz	16QAM	132622	6RB#0	1.0767	1.258	PASS
Band66	15MHz	QPSK	132047	6RB#0	1.0884	1.249	PASS
Band66	15MHz	QPSK	132322	6RB#0	1.0840	1.271	PASS
Band66	15MHz	QPSK	132597	6RB#0	1.0864	1.263	PASS
Band66	15MHz	16QAM	132047	6RB#0	1.0879	1.249	PASS
Band66	15MHz	16QAM	132322	6RB#0	1.0765	1.266	PASS
Band66	15MHz	16QAM	132597	6RB#0	1.0781	1.253	PASS
Band66	20MHz	QPSK	132072	6RB#0	1.0894	1.259	PASS
Band66	20MHz	QPSK	132322	6RB#0	1.0809	1.255	PASS
Band66	20MHz	QPSK	132572	6RB#0	1.0873	1.254	PASS
Band66	20MHz	16QAM	132072	6RB#0	1.0763	1.295	PASS
Band66	20MHz	16QAM	132322	6RB#0	1.0780	1.256	PASS
Band66	20MHz	16QAM	132572	6RB#0	1.0772	1.292	PASS

Test Graphs

Band66-1.4MHz-QPSK-131979-6RB#0



Band66-1.4MHz-QPSK-132322-6RB#0

Band66-1.4MHz-QPSK-132665-6RB#0

Band66-1.4MHz-16QAM-131979-6RB#0

Band66-1.4MHz-16QAM-132322-6RB#0

Band66-1.4MHz-16QAM-132665-6RB#0

Band66-3MHz-QPSK-131987-6RB#0

Band66-3MHz-QPSK-132322-6RB#0

Band66-3MHz-QPSK-132657-6RB#0

Band66-3MHz-16QAM-131987-6RB#0

Band66-3MHz-16QAM-132322-6RB#0

Band66-3MHz-16QAM-132657-6RB#0