Certificate #6613.01

FCC TEST REPORT

(PART 27)

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

Manufacturer or Supplier:	HMD Global Oy
Address:	Bertel Jungin aukio 9 Espoo 02600 Finland
Product:	Mobile Phone
Brand Name:	HMD
Model Name:	TA-1606
FCC ID:	2AJOTTA-1606
Date of tests:	May. 14, 2024 ~ Jun. 13, 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
Xu Hanwen	Sun Peibo
Date: Jun. 13, 2024	Date: Jun. 13, 2024

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
PSU-NQN2405090215RF04	Original release	Jun. 13, 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)	Equivalent Isotropically Radiated Power (WCMDAB4) (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)	Conducted Band Edge Measurements (WCMDAB4) (Band 4) (Band 66)	Compliance	A
§2.1051 §27.53(h)	Conducted Spurious Emissions (WCMDAB4) (Band 4) (Band 66)	Compliance	A
§2.1053 §27.53(h)	Radiated Spurious Emissions (WCMDAB4) (Band 4) (Band 66)	Compliance	A
N/A	Peak to average ratio	Compliance	A

***Test Lab Information Reference**

Lab A:

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

Lab Address:

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

Accredited Test Lab Cert 6613.01

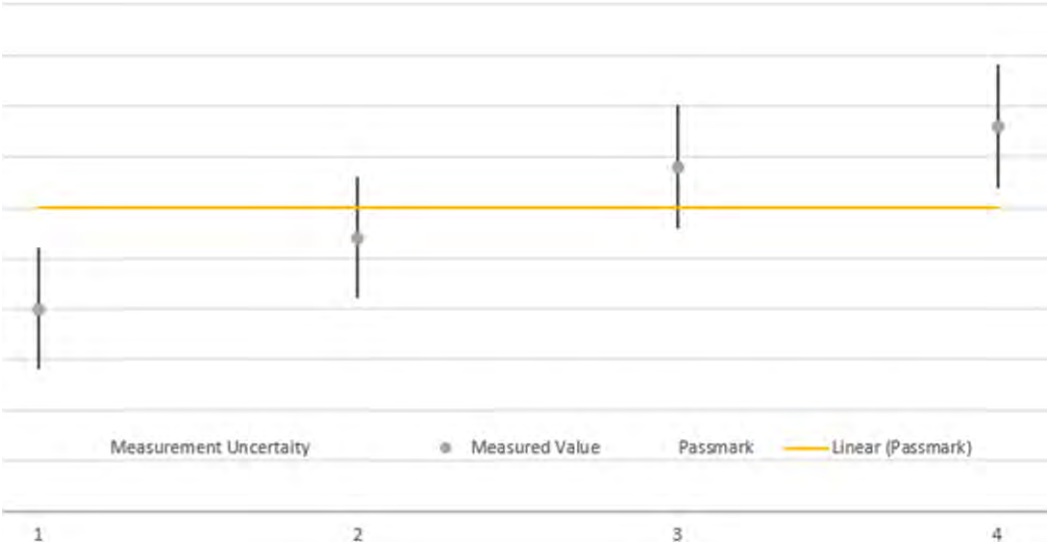
The FCC Site Registration No. is 434559; The Designation No. is CN1325.

1.1 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.16,24	Feb.15,26
Signal Generator	R&S	SMB100A	182185	Feb.16,24	Feb.15,26
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.25,24	Feb.24,26
EMI TEST Receiver	R&S	ESW44	101973	Feb.25,24	Feb.24,26
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Feb.28,24	Feb.27,26
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.22,22	Aug.21,24
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Feb.23,24	Feb.22,26
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.22,22	Aug.21,24
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.23,24	Feb.22,26
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.27,22	Jun.26,24
Test Software	EMC32	EMC32	N/A	N/A	N/A
6DB attenuator	Tonscend Technology Co., Ltd	N/A	23062787	N/A	N/A
Test Software	ELEKTRA	ELEKTRA4.32	N/A	N/A	N/A
Open Switch and Control Unit	R&S	OSP220	101964	Oct.01,22	Sep.30,24
DC Source	HYELEC	HY3010B	551016	Aug.31,22	Aug.30,24
Hygrothermograph	DELI	20210528	SZ014	Sep.06,22	Sep.05,24
PC	LENOVO	E14	HRSW0024	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-7.00M	N/A	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-4.00M	N/A	N/A	N/A
CABLE	R&S	W13.02	N/A	Apr.26,24	Apr.25,25
CABLE	R&S	W12.14	N/A	Apr.26,24	Apr.25,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.26,24	Apr.25,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.26,24	Apr.25,25
Temperature Chamber	votsch	VT4002	58566078100050	May.31,22	May.30,24
Temperature Chamber	votsch	VT4002	58566078100050	May.30,24	May.29,26

NOTE:

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

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT*	Mobile Phone	
BRAND NAME*	HMD	
MODEL NAME*	TA-1606	
NOMINAL VOLTAGE*	5.0 or 9.0 or 12.0 Vdc (adapter) 3.87Vdc (battery)	
MODULATION TECHNOLOGY*	**LTE**	QPSK, 16QAM, 64QAM
FREQUENCY RANGE	**WCDMA IV**	1712.4MHz ~ 1752.6MHz
	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
MAX. EIRP POWER	**WCDMA IV**	192.75mW
	LTE Band 4 Channel Bandwidth: 1.4MHz	238.78mW
	LTE Band 4 Channel Bandwidth: 3MHz	236.59mW
	LTE Band 4 Channel Bandwidth: 5MHz	236.59mW

	LTE Band 4 Channel Bandwidth: 10MHz	235.5mW
	LTE Band 4 Channel Bandwidth: 15MHz	238.23mW
	LTE Band 4 Channel Bandwidth: 20MHz	240.44mW
	LTE Band 66 Channel Bandwidth: 1.4MHz	218.78mW
	LTE Band 66 Channel Bandwidth: 3MHz	221.31mW
	LTE Band 66 Channel Bandwidth: 5MHz	219.28mW
	LTE Band 66 Channel Bandwidth: 10MHz	218.78mW
	LTE Band 66 Channel Bandwidth: 15MHz	223.36mW
	LTE Band 66 Channel Bandwidth: 20MHz	224.39mW
EMISSION DESIGNATOR	**WCDMA IV**	4M15F9W
	LTE Band 66 Channel Bandwidth: 1.4MHz	QPSK: 1M10G7D
		16QAM: 1M10W7D
	LTE Band 66 Channel Bandwidth: 3MHz	QPSK: 2M71G7D
		16QAM: 2M71W7D
	LTE Band 66 Channel Bandwidth: 5MHz	QPSK: 4M53G7D
		16QAM: 4M50W7D
	LTE Band 66 Channel Bandwidth: 10MHz	QPSK: 9M03G7D
		16QAM: 9M02W7D
	LTE Band 66 Channel Bandwidth: 15MHz	QPSK: 13M5G7D
		16QAM: 13M5W7D
	LTE Band 66 Channel Bandwidth: 20MHz	QPSK: 18M1G7D
		16QAM: 18M0W7D
ANTENNA TYPE*	PIFA Antenna with 0.2dBi gain for WCDMA IV/ LTE B4/ LTE B66	
HW VERSION*	V00	
SW VERSION*	V0.019_A01	
I/O PORTS*	Refer to user's manual	
CABLE SUPPLIED*	USB cable1: non-shielded cable, with w/o ferrite core, 1.0 meter USB cable2: non-shielded cable, with w/o ferrite core, 1.0 meter USB cable3: non-shielded cable, with w/o ferrite core, 1.0 meter USB cable4: non-shielded cable, with w/o ferrite core, 1.0 meter	

EXTREME TEMPERATURE*	-10 ~ 55 ℃
EXTREME VOLTAGE*	3.6V ~ 4.45V

NOTE:

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

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

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

MODULATION MODE	TX FUNCTION
LTE	1TX/1RX

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

5. For the product of TA-1606 (FCC ID: 2AJOTTA-1606), the following components are different between the first and second supply, other parameters are the same.

Key Component List

No.	Component	Description	First supply		Second supply	
			SUPPLIER	Spec	SUPPLIER	Spec
1	NMOS	PCBA	PRISEMI	PNM3FD20V2	JSCJ	CJBA3134K
2	E-compass		MEMSIC	MMC5603NJ	QST	QMC6308-TR
3	Memory-256GB		FORESEE	FEUDNN256G-C2G07	BIWIN	BWU2ASV46A256G
4	Memory-64GB		FORESEE	FLXC4008G-30	BIWIN	BWMZCX32H2A-64G-X
5	nano-SIM		LCN	CAF99-06033-0305	HRD	S186-1B01F13F
6	T-card		LCN	CAF11-08136-031901	HRD	S186-1B02F13F
7	iron covering		LCN	CAF00-21134-032307	HRD	S186-2B21F13F-1
8	Type C connector		LETCON	15-16815-110	LCN	UAF05-16323-3007
9	headphone socket		LETCON	11-058126A	HRD	PH157-0B12F36M
10	G sensor		slan	2*2 12bit	sensortek	2*2 12bit
11	Proximity light sensor		Liteon	LTR-569ALS-02	sensortek	STK3335-X
12	Backlight driver		AWINIC	dfn2*2-6L	broadchip	dfn2*2-6L
13	Flash driver		AWINIC	2A DCDC	OCS	2A DCDC
14	CKDID baschip		AWINIC	±5V	OCS	±5V
15	overvoltage protection chip		broadchip	6.8V FCQFN12	AWINIC	6.8V FCQFN12
16	CKD BDS/GPS/GAL LNA		SILICONWAVE	LNA 1.5*1.0 6pin	AWINIC	LNA 1.5*1.0 6pin
17	MIC		GETTOP	2.75*1.85*0.9mm	YUTAI	2.75*1.85*0.9mm
18	LCM	LCD	HUAXIAN	incell5.56HD+	DZX	incell5.56HD+
19	Macro cam	camera	CXT	2M CSP	lianhe	2M CSP
20	Finger print	module	SYX	side fingerprint	SHENAO	side fingerprint
21	Battery		GAOYUAN	Rated: 4900mAh Typical: 5000mAh	FENGHUA	Rated: 4900mAh Typical: 5000mAh
22	Receiver		SENNOR	'0809	TUNESS	'0809
23	Vibrator		JX	0830 3.35mm	JD	0830 3.35mm
24	Charger US		BJD	5V 2A	JUWEI	5V 2A
25	Data cable		JUWEI	A-C	FKY	A-C
			JUWEI	C-C	FKY	C-C

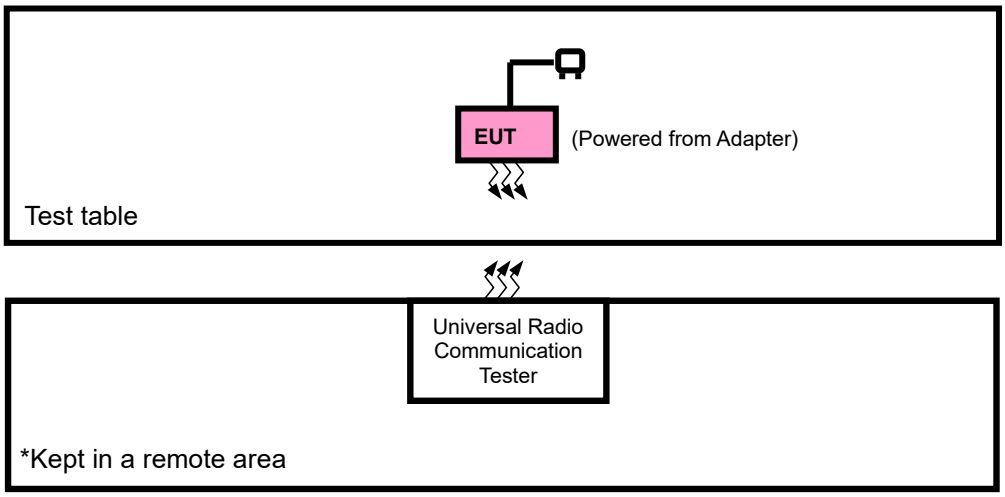
List of Accessory:

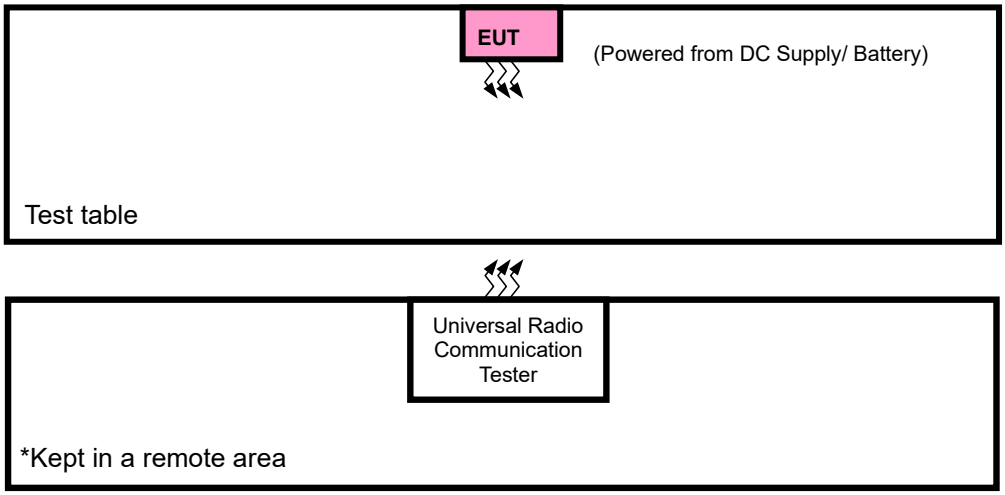
ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
Battery 1	HMD	Gaoyuan	HBA5020AA	Power Rating: 3.87 Vdc;18.963 Wh;4900 mAh
Battery 2	HMD	Fenghua	HBA5020AA	Power Rating: 3.87 Vdc;18.963 Wh;4900 mAh
AC Adapter 1	HMD	Shenzhen Baijunda Electronics Co.,Ltd	HAD-020U(US-PD 20W)	I/P: 100-240 V,50~60Hz,0.6A O/P: USB-C Output:5.0V 3.0A or 9.0V 2.22A or 12.0V 1.67A 20.0W Max
AC Adapter 2	HMD	Shenzhen Baijunda Electronics Co.,Ltd	HAD-010U(US)	I/P: 100-240 V,50~60Hz,0.35A O/P: 5V 2A,10W
AC Adapter 3	HMD	Huizhou Juwei Electronics Co., Ltd.	HAD-010U(US)	I/P: 100-240 V,50~60Hz,0.35A O/P: 5V 2A,10W
Earphone	HMD	N/A	JWEP1266-H24H	N/A
USB Cable 1	HMD	JUWEI	JWUB1684-M01H	A to C
USB Cable 2	HMD	JUWEI	JWUB1688-M01H	C to C
USB Cable 3	HMD	FUKANGYUAN	FKY-23-368	A to C
USB Cable 4	HMD	FUKANGYUAN	FKY-23-369	C to C

6. The worst-case scenario for all measurements is based on an engineering evaluation made on different modulations. Then, QPSK and 16QAM were observed as the worst mode to LTE bands respectively and set for all conducted and radiated. Output power measurements were measured on QPSK,16QAM, 64QAM modulations, and tests other than output power are performed only in worse-case QPSK and 16QAM modulations.

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	DC Source	HYELEC	HY3010B	551016	N/A

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

2.4 TEST ITEM AND TEST CONFIGURATION

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports The worst case 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 WCDMA or LTE link
B	EUT + DC Supply with WCDMA or LTE link

WCDMA MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
A	EIRP	1312 to 1513	1312, 1413, 1513	WCDMA
B	FREQUENCY STABILITY	1312 to 1513	1312, 1413, 1513	WCDMA
A	OCCUPIED BANDWIDTH	1312 to 1513	1312, 1413, 1513	WCDMA
A	BAND EDGE	1312 to 1513	1312, 1513	WCDMA
A	PEAK TO AVERAGE RATIO	1312 to 1513	1312, 1413, 1513	WCDMA
A	CONDUCTED EMISSION	1312 to 1513	1312, 1413, 1513	WCDMA
A	RADIATED EMISSION	1312 to 1513	1312, 1413, 1513	WCDMA

LTE BAND 4 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
A	EIRP	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM, 64QAM	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.

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,64QAM	1 RB / 0 RB Offset
		131987 to 132657	131987,132322,132657	3MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
		131997 to 132647	131997,132322,132647	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
		132022 to 132622	132022,132322,132622	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
		132047 to 132597	132047,132322,132597	15MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
		132072 to 132572	132072,132322,132572	20MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	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	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	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	132322	5MHz	QPSK	1 RB / 0 RB Offset
		132022 to 132622	132022,132322,132622	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.

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP&EIRP	23deg. C, 70%RH	DC 5/9/12V By Adapter	Hanwen Xu
FREQUENCY STABILITY	23deg. C, 70%RH	DC 3.87V By DC Supply	Hanwen Xu
OCCUPIED BANDWIDTH	23deg. C, 70%RH	DC 5/9/12V By Adapter	Hanwen Xu
BAND EDGE	23deg. C, 70%RH	DC 5/9/12V By Adapter	Hanwen Xu
CONDCUDETED EMISSION	23deg. C, 70%RH	DC 5/9/12V By Adapter	Hanwen Xu
RADIATED EMISSION	23deg. C, 70%RH	DC 5/9/12V By Adapter	Hanwen Xu
PEAK TO AVERAGE RATIO	23deg. C, 70%RH	DC 5/9/12V 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

According to the specific rule Part 27.50 (k)(3)Mobile devices are limited to 1Watt (30 dBm) EIRP, Mobile devices operating inl these bands must employ a means for limiting power to the minimum necessary for successful communications

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);

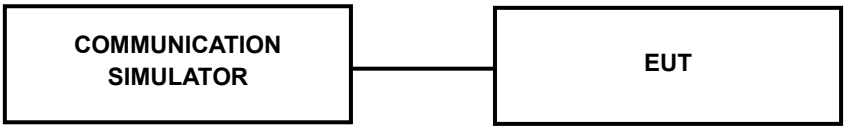
L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

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

AVERAGE CONDUCTED OUTPUT POWER (dBm)

Band	WCDMA IV		
Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
RMC 12.2K	22.60	**22.65**	22.61
HSDPA Subtest-1	22.23	22.28	22.27
HSDPA Subtest-2	22.18	22.16	22.10
HSDPA Subtest-3	21.72	21.63	21.57
HSDPA Subtest-4	21.65	21.56	21.78
DC-HSDPA Subtest-1	22.13	22.18	22.11
DC-HSDPA Subtest-2	22.03	22.25	22.05
DC-HSDPA Subtest-3	21.76	21.55	21.62
DC-HSDPA Subtest-4	21.71	21.58	21.69
HSUPA Subtest-1	21.27	21.38	21.19
HSUPA Subtest-2	20.82	20.91	20.78
HSUPA Subtest-3	21.40	21.29	21.33
HSUPA Subtest-4	20.66	20.74	20.79
HSUPA Subtest-5	21.72	21.70	21.80
HSPA+ Subtest-1	21.20	21.43	21.33

LTE Band 4

Band/BW	Modulation	RB Size	RB Offset	Low CH 19957	Mid CH 20175	High CH 20393
				Frequency 1710.7 MHz	Frequency 1732.5 MHz	Frequency 1754.3 MHz
4/ 1.4	QPSK	1	0	23.28	23.42	23.12
		1	2	23.33	23.58	22.83
		1	5	23.53	23.55	23.20
		3	0	23.16	23.31	22.51
		3	1	23.11	23.18	22.49
		3	3	23.21	23.28	22.67
		6	0	22.20	22.25	22.04
	16QAM	1	0	22.50	22.40	22.29
		1	2	22.51	22.63	22.29
		1	5	22.65	22.49	22.29
		3	0	22.17	22.25	22.17
		3	1	22.08	22.35	22.19
		3	3	22.23	22.27	22.52
		6	0	21.22	21.36	21.00
	64QAM	1	0	21.67	21.50	21.42
		1	2	21.63	21.66	21.20
		1	5	21.50	21.47	21.47
		3	0	21.14	21.11	21.03
		3	1	21.23	21.18	20.92
		3	3	21.16	21.20	20.99
		6	0	20.16	20.08	20.06

Band/BW	Modulation	RB Size	RB Offset	Low CH 19965	Mid CH 20175	High CH 20385
				Frequency 1711.5 MHz	Frequency 1732.5 MHz	Frequency 1753.5 MHz
4/ 3	QPSK	1	0	23.30	23.41	23.16
		1	7	23.33	23.54	22.80
		1	14	23.40	23.52	23.33
		8	0	22.02	22.20	21.61
		8	3	22.18	22.18	21.55
		8	7	22.15	22.30	21.76
		15	0	22.12	22.23	22.09
	16QAM	1	0	22.54	22.51	22.24
		1	7	22.53	22.72	22.30
		1	14	22.63	22.51	22.33
		8	0	21.23	21.28	21.24
		8	3	21.28	21.46	21.33
		8	7	21.38	21.40	21.57
		15	0	21.22	21.36	21.03
	64QAM	1	0	21.62	21.54	21.41
		1	7	21.68	21.62	21.21
		1	14	21.64	21.58	21.44
		8	0	20.27	20.24	20.19
		8	3	20.22	20.28	20.15
		8	7	20.24	20.20	20.06
		15	0	20.17	20.17	20.06

Band/BW	Modulation	RB Size	RB Offset	Low CH 19975	Mid CH 20175	High CH 20375
				Frequency 1712.5 MHz	Frequency 1732.5 MHz	Frequency 1752.5 MHz
4/ 5	QPSK	1	0	23.27	23.46	23.15
		1	12	23.46	23.53	22.81
		1	24	23.49	23.54	23.34
		12	0	22.14	22.20	21.50
		12	6	22.15	22.17	21.60
		12	13	22.12	22.36	21.70
		25	0	22.19	22.15	22.00
	16QAM	1	0	22.59	22.53	22.23
		1	12	22.42	22.69	22.40
		1	24	22.57	22.57	22.22
		12	0	21.28	21.34	21.18
		12	6	21.31	21.43	21.21
		12	13	21.37	21.35	21.66
		25	0	21.28	21.38	21.08
	64QAM	1	0	21.60	21.61	21.39
		1	12	21.65	21.73	21.22
		1	24	21.63	21.57	21.42
		12	0	20.17	20.20	20.06
		12	6	20.31	20.32	20.12
		12	13	20.28	20.28	20.17
		25	0	20.12	20.08	20.03

Band/BW	Modulation	RB Size	RB Offset	Low CH 20000	Mid CH 20175	High CH 20350
				Frequency 1715 MHz	Frequency 1732.5 MHz	Frequency 1750 MHz
4/ 10	QPSK	1	0	23.31	23.47	23.13
		1	24	23.47	23.47	22.88
		1	49	23.47	23.52	23.21
		25	0	22.03	22.25	21.58
		25	12	22.11	22.18	21.52
		25	25	22.24	22.27	21.79
		50	0	22.11	22.16	22.08
	16QAM	1	0	22.55	22.48	22.28
		1	24	22.50	22.66	22.33
		1	49	22.68	22.56	22.26
		25	0	21.27	21.26	21.23
		25	12	21.27	21.50	21.29
		25	25	21.35	21.43	21.67
		50	0	21.29	21.40	21.03
	64QAM	1	0	21.64	21.54	21.40
		1	24	21.65	21.76	21.21
		1	49	21.56	21.60	21.38
		25	0	20.22	20.30	20.13
		25	12	20.26	20.30	20.07
		25	25	20.30	20.20	20.14
		50	0	20.15	20.16	20.02

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	23.33	23.35	23.15
		1	37	23.35	23.44	22.86
		1	74	23.46	23.57	23.20
		36	0	22.14	22.24	21.60
		36	19	22.20	22.18	21.54
		36	39	22.22	22.28	21.80
		75	0	22.15	22.25	22.03
	16QAM	1	0	22.52	22.44	22.29
		1	37	22.47	22.70	22.35
		1	74	22.68	22.59	22.20
		36	0	21.16	21.37	21.25
		36	19	21.25	21.51	21.34
		36	39	21.29	21.35	21.59
		75	0	21.33	21.46	21.05
	64QAM	1	0	21.65	21.58	21.52
		1	37	21.59	21.63	21.23
		1	74	21.53	21.60	21.41
		36	0	20.17	20.29	20.15
		36	19	20.28	20.25	20.12
		36	39	20.27	20.28	20.11
		75	0	20.19	20.13	20.04

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	23.41	23.48	23.20
		1	50	23.48	23.59	22.94
		1	99	23.54	**23.61**	23.35
		50	0	22.17	22.35	21.64
		50	25	22.26	22.27	21.63
		50	50	22.27	**22.38**	21.82
		100	0	22.25	**22.27**	22.15
	16QAM	1	0	22.61	22.54	22.33
		1	50	22.57	22.74	22.42
		1	99	22.69	22.61	22.35
		50	0	21.29	21.38	21.33
		50	25	21.33	21.53	21.36
		50	50	21.44	21.50	21.69
		100	0	21.37	21.49	21.15
	64QAM	1	0	21.68	21.63	21.53
		1	50	21.70	21.77	21.28
		1	99	21.65	21.62	21.52
		50	0	20.29	20.32	20.21
		50	25	20.34	20.38	20.16
		50	50	20.36	20.31	20.21
		100	0	20.26	20.20	20.11

LTE Band 66

Band/BW	Modulation	RB Size	RB Offset	Low CH 131979	Mid CH 132322	High CH 132665
				Frequency 1710.7MHz	Frequency 1745MHz	Frequency 1779.3MHz
66/ 1.4	QPSK	1	0	23.10	22.87	23.00
		1	2	23.20	22.90	23.11
		1	5	23.05	22.80	23.10
		3	0	22.98	22.87	22.86
		3	1	23.07	22.98	22.96
		3	3	23.04	22.93	22.85
		6	0	22.02	21.97	21.97
	16QAM	1	0	22.37	22.20	21.86
		1	2	22.47	22.36	21.98
		1	5	22.55	22.37	21.79
		3	0	22.00	22.09	22.06
		3	1	22.08	22.09	22.17
		3	3	22.06	22.25	22.10
		6	0	21.16	21.16	21.08
	64QAM	1	0	21.55	21.23	21.55
		1	2	21.69	21.35	21.74
		1	5	21.68	21.37	21.60
		3	0	21.60	21.55	21.54
		3	1	21.62	21.67	21.76
		3	3	21.64	21.67	21.69
		6	0	20.54	20.57	20.63

Band/BW	Modulation	RB Size	RB Offset	Low CH 131987	Mid CH 132322	High CH 132657
				Frequency 1711.5MHz	Frequency 1745MHz	Frequency 1778.5MHz
66/ 3	QPSK	1	0	23.11	22.84	22.93
		1	7	23.25	22.95	23.09
		1	14	22.94	22.84	23.17
		8	0	22.03	21.89	21.89
		8	3	22.10	22.03	21.89
		8	7	22.06	21.95	21.88
		15	0	22.00	22.03	21.97
	16QAM	1	0	22.33	22.32	21.84
		1	7	22.42	22.42	21.88
		1	14	22.56	22.42	21.72
		8	0	21.05	21.14	21.00
		8	3	21.19	21.10	21.23
		8	7	21.04	21.23	21.02
		15	0	21.13	21.19	21.09
	64QAM	1	0	21.45	21.22	21.54
		1	7	21.63	21.24	21.70
		1	14	21.57	21.30	21.61
		8	0	20.56	20.60	20.56
		8	3	20.65	20.70	20.73
		8	7	20.63	20.68	20.62
		15	0	20.57	20.48	20.67

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	23.18	22.90	23.01
		1	12	23.21	22.89	23.18
		1	24	23.02	22.81	23.04
		12	0	21.96	21.88	21.91
		12	6	22.10	22.00	21.92
		12	13	22.04	21.84	21.85
		25	0	21.93	22.02	22.02
	16QAM	1	0	22.27	22.20	21.90
		1	12	22.51	22.36	21.99
		1	24	22.55	22.38	21.79
		12	0	21.00	21.15	20.95
		12	6	21.20	21.10	21.22
		12	13	21.02	21.14	21.04
		25	0	21.08	21.18	21.05
	64QAM	1	0	21.51	21.25	21.52
		1	12	21.56	21.31	21.77
		1	24	21.59	21.31	21.62
		12	0	20.62	20.62	20.59
		12	6	20.66	20.62	20.65
		12	13	20.69	20.64	20.63
		25	0	20.56	20.46	20.68

Band/BW	Modulation	RB Size	RB Offset	Low CH 132022 Frequency 1715MHz	Mid CH 132322 Frequency 1745MHz	High CH 132622 Frequency 1775MHz
66/ 10	QPSK	1	0	23.10	22.78	23.00
		1	24	23.20	22.94	23.20
		1	49	22.97	22.85	23.08
		25	0	22.08	21.90	21.90
		25	12	22.08	22.01	21.92
		25	25	22.03	21.82	21.77
		50	0	22.02	22.03	21.89
	16QAM	1	0	22.38	22.29	21.77
		1	24	22.49	22.34	21.96
		1	49	22.51	22.46	21.80
		25	0	20.96	21.07	21.02
		25	12	21.20	21.13	21.13
		25	25	21.03	21.13	21.03
		50	0	21.09	21.11	21.00
	64QAM	1	0	21.51	21.29	21.42
		1	24	21.69	21.32	21.74
		1	49	21.59	21.37	21.64
		25	0	20.58	20.57	20.53
		25	12	20.58	20.69	20.70
		25	25	20.60	20.68	20.62
		50	0	20.60	20.60	20.69

Band/BW	Modulation	RB Size	RB Offset	Low CH 132047 Frequency 1717.5 MHz	Mid CH 132322 Frequency 1745MHz	High CH 132597 Frequency 1772.5 MHz
66/ 15	QPSK	1	0	23.14	22.82	22.91
		1	37	23.29	22.90	23.23
		1	74	22.99	22.82	23.09
		36	0	22.02	21.86	21.90
		36	19	22.06	21.99	21.94
		36	39	22.04	21.96	21.88
		75	0	21.94	21.90	21.91
	16QAM	1	0	22.35	22.25	21.84
		1	37	22.49	22.37	21.98
		1	74	22.54	22.47	21.78
		36	0	20.96	21.07	21.04
		36	19	21.20	21.09	21.09
		36	39	21.05	21.23	21.08
		75	0	21.18	21.07	21.05
	64QAM	1	0	21.43	21.18	21.48
		1	37	21.67	21.25	21.67
		1	74	21.59	21.38	21.65
		36	0	20.64	20.59	20.53
		36	19	20.59	20.69	20.65
		36	39	20.69	20.72	20.60
		75	0	20.65	20.49	20.60

Band/BW	Modulation	RB Size	RB Offset	Low CH 132072 Frequency 1720MHz	Mid CH 132322 Frequency 1745MHz	High CH 132572 Frequency 1770MHz
66/ 20	QPSK	1	0	23.25	22.91	23.02
		1	50	**23.31**	22.98	23.24
		1	99	23.09	22.95	23.19
		50	0	22.10	21.95	21.96
		50	25	**22.13**	22.06	22.02
		50	50	22.09	21.97	21.90
		100	0	**22.07**	22.04	22.03
	16QAM	1	0	22.42	22.34	21.92
		1	50	22.54	22.46	22.00
		1	99	22.58	22.51	21.86
		50	0	21.11	21.17	21.07
		50	25	21.21	21.20	21.24
		50	50	21.16	21.26	21.14
		100	0	21.23	21.20	21.15
	64QAM	1	0	21.58	21.31	21.57
		1	50	21.70	21.39	21.79
		1	99	21.69	21.41	21.70
		50	0	20.66	20.70	20.66
		50	25	20.68	20.72	20.79
		50	50	20.72	20.73	20.74
		100	0	20.66	20.61	20.71

EIRP

WCDMA IV

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
1312	1712.4	22.6	0.2	22.8	190.55	1
1413	1732.6	22.65	0.2	22.85	192.75	1
1513	1752.6	22.61	0.2	22.81	190.99	1

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	23.53	0.2	23.73	236.05	1
20175	1732.5	23.58	0.2	23.78	238.78	1
20393	1754.3	23.2	0.2	23.4	218.78	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	22.65	0.2	22.85	192.75	1
20175	1732.5	22.63	0.2	22.83	191.87	1
20393	1754.3	22.52	0.2	22.72	187.07	1

CHANNEL BANDWIDTH: 1.4MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19957	1710.7	21.67	0.2	21.87	153.82	1
20175	1732.5	21.66	0.2	21.86	153.46	1
20393	1754.3	21.47	0.2	21.67	146.89	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	23.4	0.2	23.6	229.09	1
20175	1732.5	23.54	0.2	23.74	236.59	1
20385	1753.5	23.33	0.2	23.53	225.42	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	22.63	0.2	22.83	191.87	1
20175	1732.5	22.63	0.2	22.83	191.87	1
20385	1753.5	22.63	0.2	22.83	191.87	1

CHANNEL BANDWIDTH: 3MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19965	1711.5	21.68	0.2	21.88	154.17	1
20175	1732.5	21.62	0.2	21.82	152.05	1
20385	1753.5	21.44	0.2	21.64	145.88	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	23.49	0.2	23.69	233.88	1
20175	1732.5	23.54	0.2	23.74	236.59	1
20375	1752.5	23.34	0.2	23.54	225.94	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	22.59	0.2	22.79	190.11	1
20175	1732.5	22.69	0.2	22.89	194.54	1
20375	1752.5	22.4	0.2	22.6	181.97	1

CHANNEL BANDWIDTH: 5MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
19975	1712.5	21.65	0.2	21.85	153.11	1
20175	1732.5	21.73	0.2	21.93	155.96	1
20375	1752.5	21.42	0.2	21.62	145.21	1

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20000	1715	23.47	0.2	23.67	232.81	1
20175	1732.5	23.52	0.2	23.72	235.5	1
20350	1750	23.21	0.2	23.41	219.28	1

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20000	1715	22.68	0.2	22.88	194.09	1
20175	1732.5	22.66	0.2	22.86	193.2	1
20350	1750	22.33	0.2	22.53	179.06	1

CHANNEL BANDWIDTH: 10MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20000	1715	21.65	0.2	21.85	153.11	1
20175	1732.5	21.76	0.2	21.96	157.04	1
20350	1750	21.4	0.2	21.6	144.54	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	23.46	0.2	23.66	232.27	1
20175	1732.5	23.57	0.2	23.77	238.23	1
20325	1747.5	23.2	0.2	23.4	218.78	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	22.68	0.2	22.88	194.09	1
20175	1732.5	22.7	0.2	22.9	194.98	1
20325	1747.5	22.35	0.2	22.55	179.89	1

CHANNEL BANDWIDTH: 15MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20025	1717.5	21.65	0.2	21.85	153.11	1
20175	1732.5	21.63	0.2	21.83	152.41	1
20325	1747.5	21.52	0.2	21.72	148.59	1

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20050	1720	23.54	0.2	23.74	236.59	1
20175	1732.5	23.61	0.2	23.81	240.44	1
20300	1745	23.35	0.2	23.55	226.46	1

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20050	1720	22.69	0.2	22.89	194.54	1
20175	1732.5	22.74	0.2	22.94	196.79	1
20300	1745	22.42	0.2	22.62	182.81	1

CHANNEL BANDWIDTH: 20MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
20050	1720	21.7	0.2	21.9	154.88	1
20175	1732.5	21.77	0.2	21.97	157.4	1
20300	1745	21.53	0.2	21.73	148.94	1

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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	23.2	0.2	23.4	218.78	1
132322	1745	22.98	0.2	23.18	207.97	1
132665	1779.3	23.11	0.2	23.31	214.29	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	22.55	0.2	22.75	188.36	1
132322	1745	22.37	0.2	22.57	180.72	1
132665	1779.3	22.17	0.2	22.37	172.58	1

CHANNEL BANDWIDTH: 1.4MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
131979	1710.7	21.69	0.2	21.89	154.53	1
132322	1745	21.67	0.2	21.87	153.82	1
132665	1779.3	21.76	0.2	21.96	157.04	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	23.25	0.2	23.45	221.31	1
132322	1745	22.95	0.2	23.15	206.54	1
132657	1778.5	23.17	0.2	23.37	217.27	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	22.56	0.2	22.76	188.8	1
132322	1745	22.42	0.2	22.62	182.81	1
132657	1778.5	21.88	0.2	22.08	161.44	1

CHANNEL BANDWIDTH: 3MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
131987	1711.5	21.63	0.2	21.83	152.41	1
132322	1745	21.3	0.2	21.5	141.25	1
132657	1778.5	21.7	0.2	21.9	154.88	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	23.21	0.2	23.41	219.28	1
132322	1745	22.9	0.2	23.1	204.17	1
132647	1777.5	23.18	0.2	23.38	217.77	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	22.55	0.2	22.75	188.36	1
132322	1745	22.38	0.2	22.58	181.13	1
132647	1777.5	21.99	0.2	22.19	165.58	1

CHANNEL BANDWIDTH: 5MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
131997	1712.5	21.59	0.2	21.79	151.01	1
132322	1745	21.31	0.2	21.51	141.58	1
132647	1777.5	21.77	0.2	21.97	157.4	1

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
132022	1715	23.2	0.2	23.4	218.78	1
132322	1745	22.94	0.2	23.14	206.06	1
132622	1775	23.2	0.2	23.4	218.78	1

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
132022	1715	22.51	0.2	22.71	186.64	1
132322	1745	22.46	0.2	22.66	184.5	1
132622	1775	21.96	0.2	22.16	164.44	1

CHANNEL BANDWIDTH: 10MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
132022	1715	22.51	0.2	22.71	186.64	1
132322	1745	22.46	0.2	22.66	184.5	1
132622	1775	21.96	0.2	22.16	164.44	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	23.29	0.2	23.49	223.36	1
132322	1745	22.9	0.2	23.1	204.17	1
132597	1772.5	23.23	0.2	23.43	220.29	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	22.54	0.2	22.74	187.93	1
132322	1745	22.47	0.2	22.67	184.93	1
132597	1772.5	21.98	0.2	22.18	165.2	1

CHANNEL BANDWIDTH: 15MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
132047	1717.5	21.67	0.2	21.87	153.82	1
132322	1745	21.38	0.2	21.58	143.88	1
132597	1772.5	21.67	0.2	21.87	153.82	1

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
132072	1720	23.31	0.2	23.51	224.39	1
132322	1745	22.98	0.2	23.18	207.97	1
132572	1770	23.24	0.2	23.44	220.8	1

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
132072	1720	22.58	0.2	22.78	189.67	1
132322	1745	22.51	0.2	22.71	186.64	1
132572	1770	22	0.2	22.2	165.96	1

CHANNEL BANDWIDTH: 20MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
132072	1720	21.7	0.2	21.9	154.88	1
132322	1745	21.41	0.2	21.61	144.88	1
132572	1770	21.79	0.2	21.99	158.12	1

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

3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

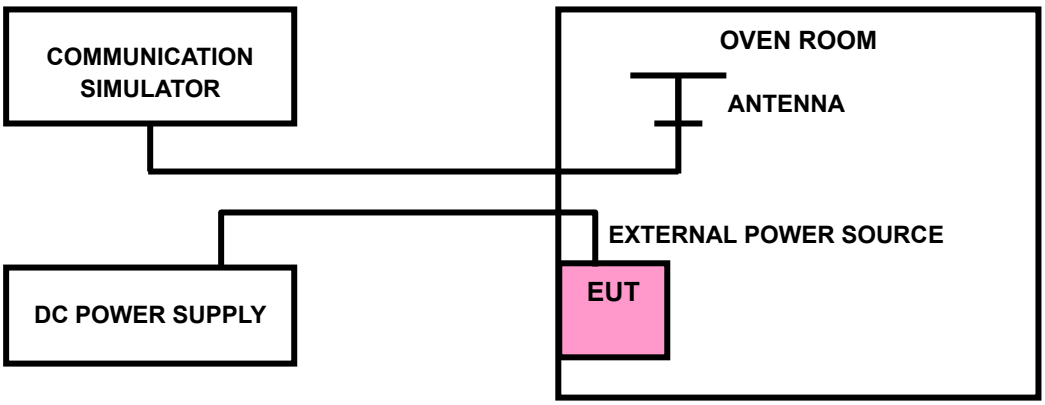
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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.

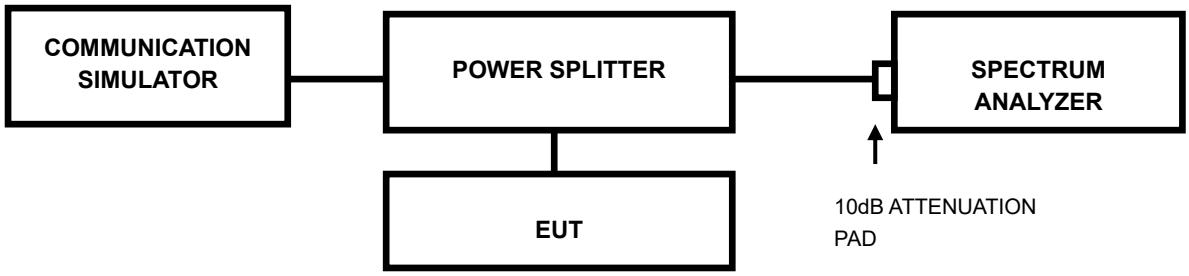
Note: VL = Low voltage(3.6V); VN/NV = Normal voltage(3.87V); VH = High voltage(4.45V);
NT = Normal temperature (25℃)

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

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

3.3.2 TEST SETUP



3.3.3 TEST PROCEDURES

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

3.3.4 TEST RESULTS

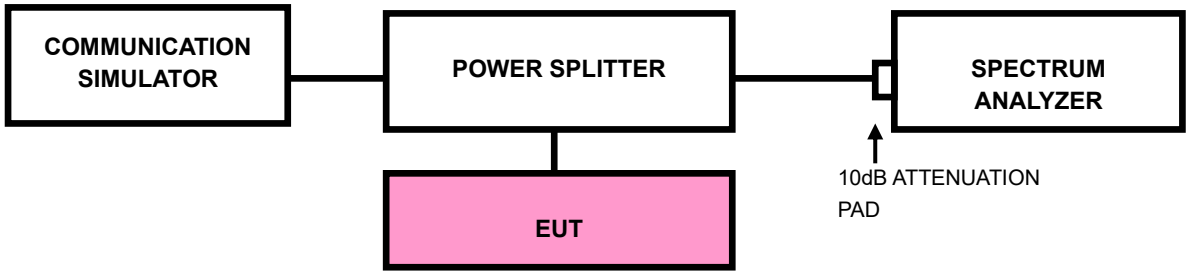
Please Refer to Appendix Of this test report.

3.4 BAND EDGE MEASUREMENT

3.4.1 LIMITS OF BAND EDGE MEASUREMENT

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.

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

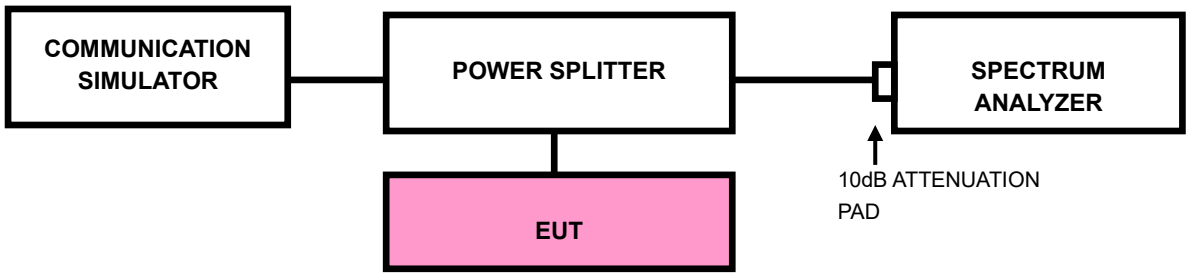
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

3.5.2 TEST PROCEDURE

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

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

3.5.3 TEST SETUP



3.5.4 TEST RESULTS

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

Please Refer to Appendix Of this test report.

3.6 RADIATED EMISSION MEASUREMENT

3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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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.

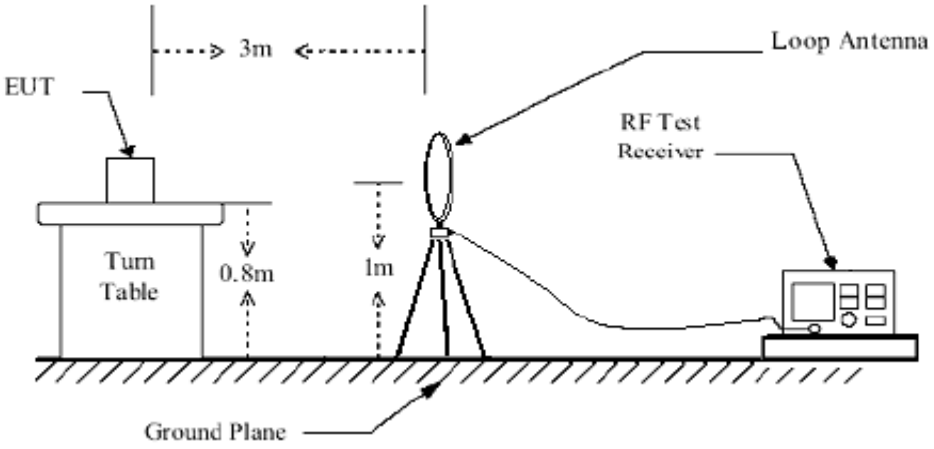
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.6.3 DEVIATION FROM TEST STANDARD

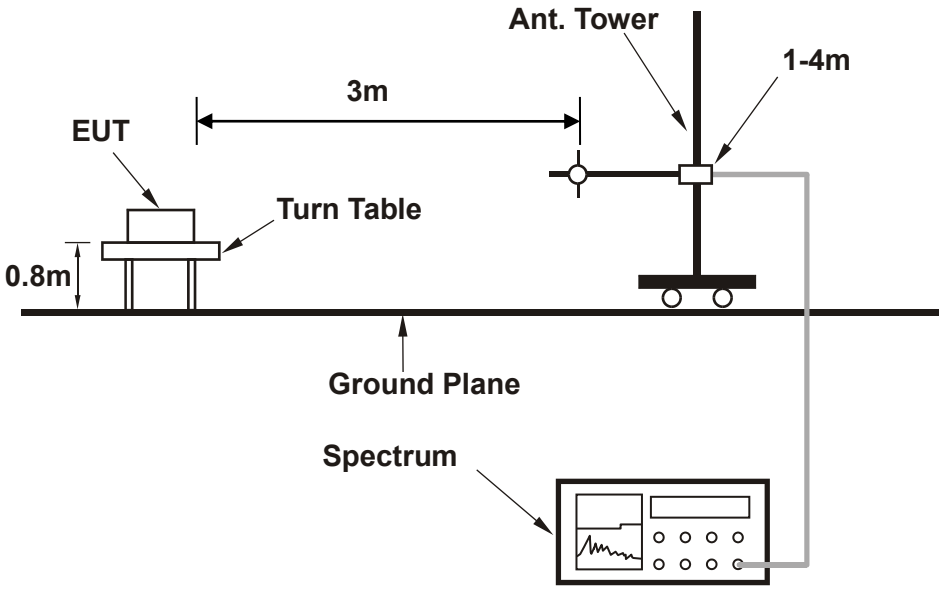
No deviation

3.6.4 TEST SETUP

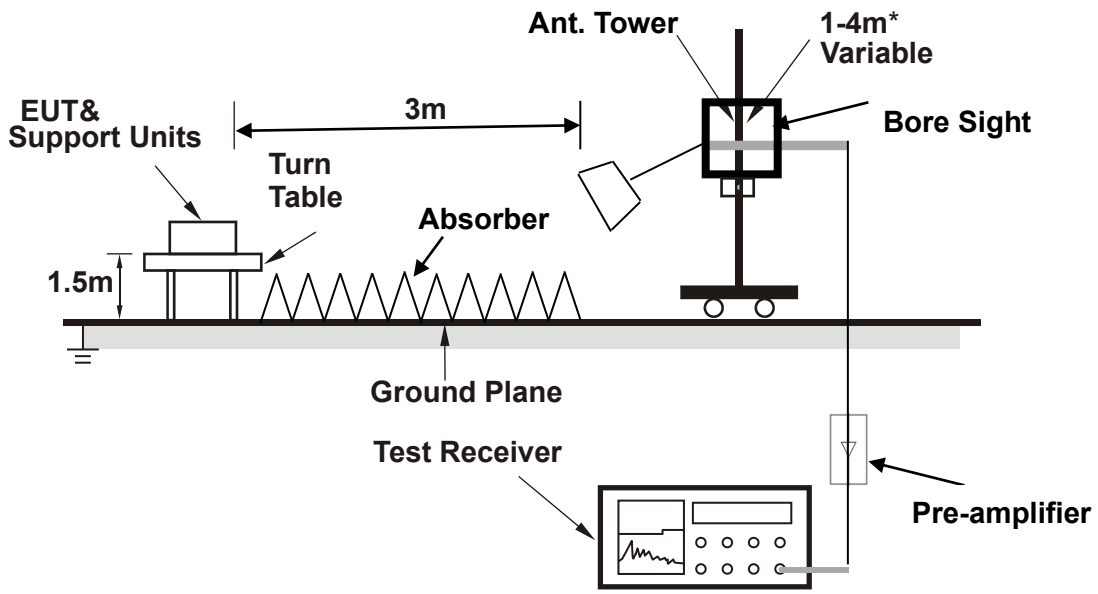
< Frequency Range below 30MHz >



< 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

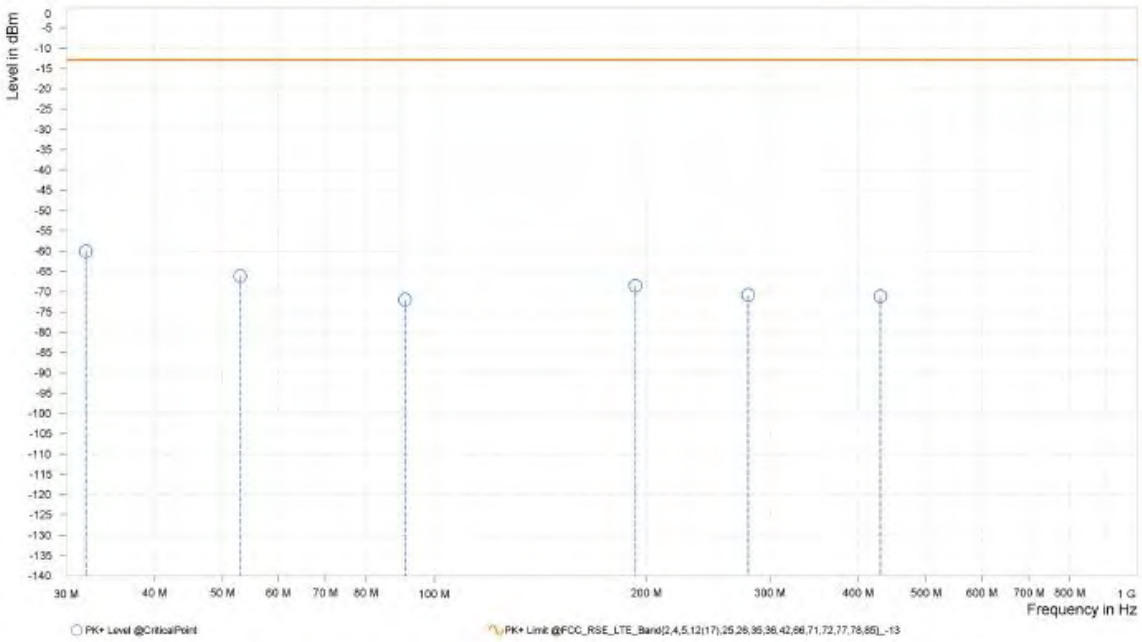
30 MHz – 1GHz data:

LTE Band 66

CHANNEL BANDWIDTH: 10MHz / QPSK

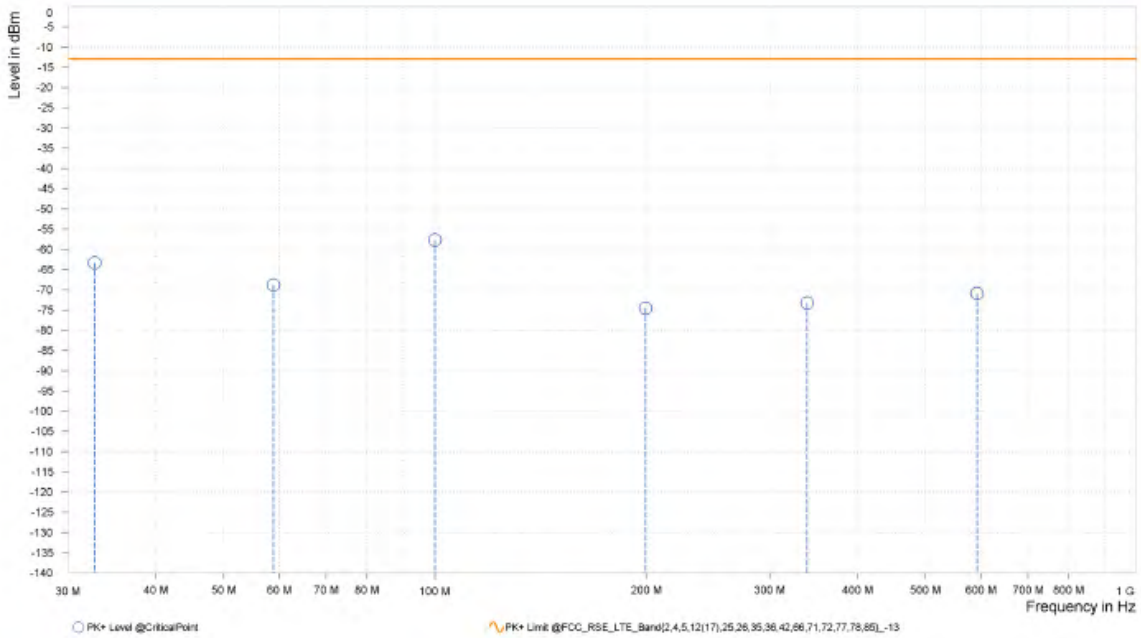
MODE	TX channel 132322	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	32.000	-60.04	-13.00	47.04	4.56	H	1	2.00
1	53.000	-66.15	-13.00	53.15	1.37	H	274.2	1.00
1	90.900	-72.01	-13.00	59.01	-5.84	H	146.7	2.00
1	193.200	-68.56	-13.00	55.56	0.11	H	97.3	1.00
1	279.350	-70.84	-13.00	57.84	3.66	H	215.6	1.00
1	430.650	-71.10	-13.00	58.10	7.73	H	355.7	2.00



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]
1	32.750	-63.31	-13.00	50.31	-1.73	V	17.9	2.00
1	58.900	-68.77	-13.00	55.77	1.28	V	17.9	2.00
1	100.000	-57.67	-13.00	44.67	9.62	V	355	2.00
1	199.700	-74.54	-13.00	61.54	-1.62	V	318.5	1.00
1	339.000	-73.23	-13.00	60.23	4.97	V	357.5	1.00
2	592.450	-70.93	-13.00	57.93	5.66	V	358.3	1.00



ABOVE 1GHz

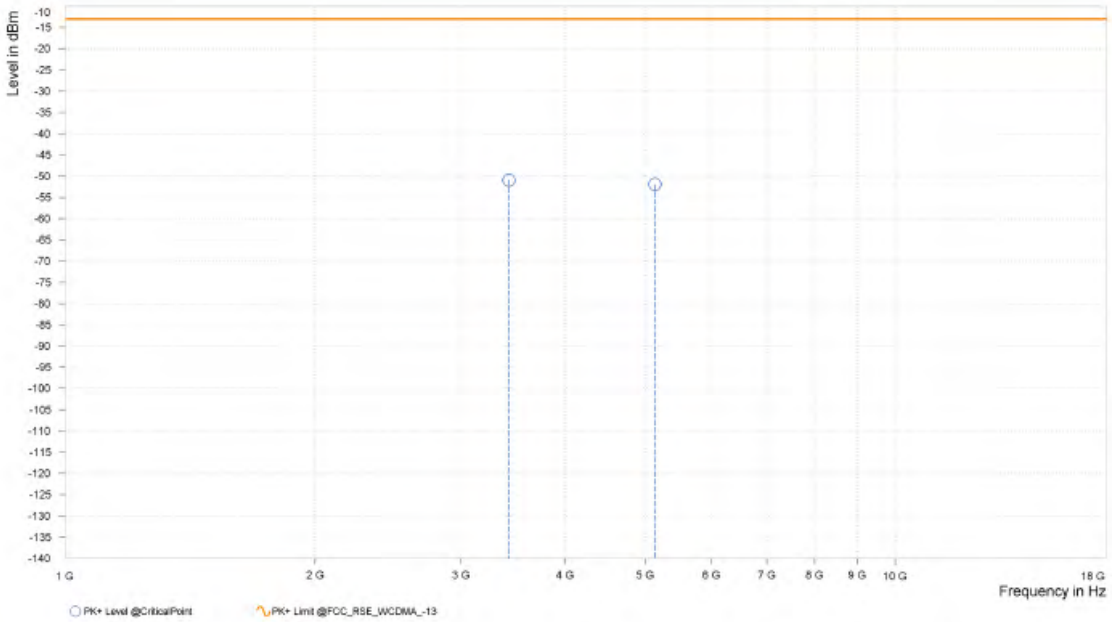
Note: For higher frequency, the emission is too low to be detected.

WCDMA Band IV:

CH 1312

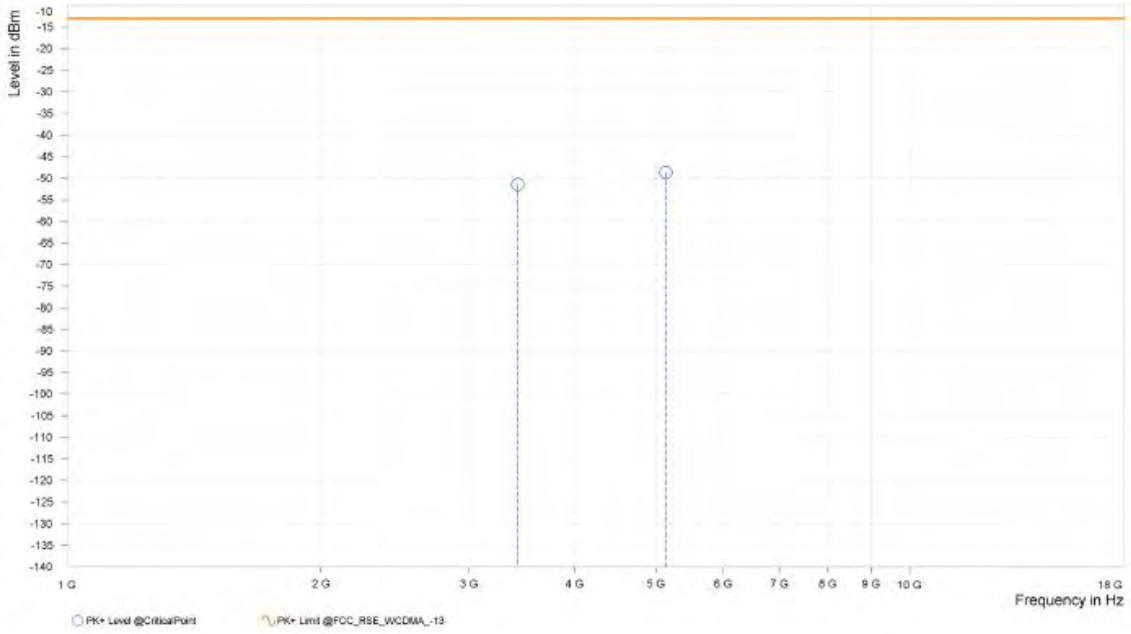
MODE	TX channel 1312	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,425.000	-50.96	-13.00	37.96	20.64	H	359	2.00
4	5,137.000	-51.91	-13.00	38.91	23.11	H	1	2.00



MODE	TX channel 1312	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

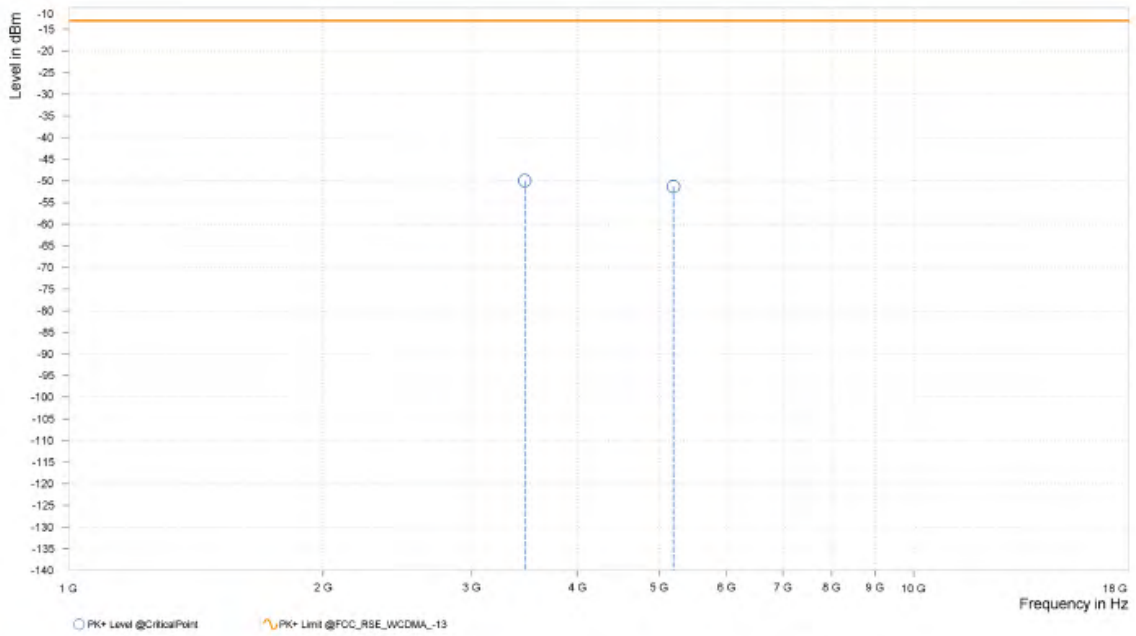
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,425.000	-51.46	-13.00	38.46	21.03	V	359	1.00
4	5,137.000	-48.66	-13.00	35.66	23.39	V	1	1.00



CH 1413

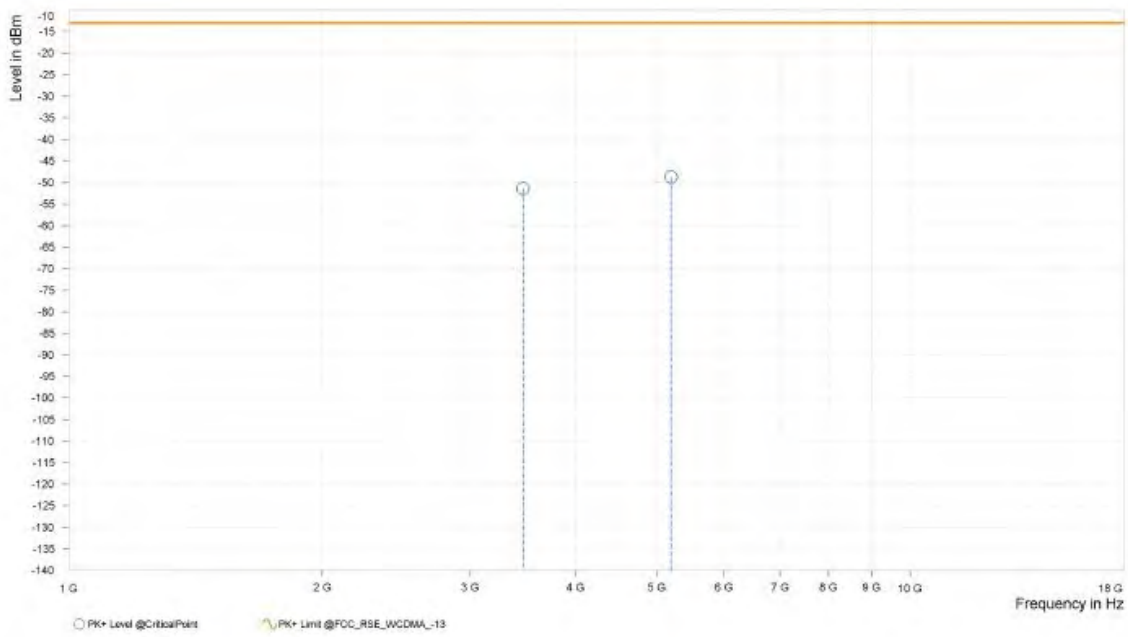
MODE	TX channel 1413	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,465.000	-49.98	-13.00	36.98	20.40	H	185.8	1.00
4	5,198.000	-51.30	-13.00	38.30	23.43	H	359	2.00



MODE	TX channel 1413	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

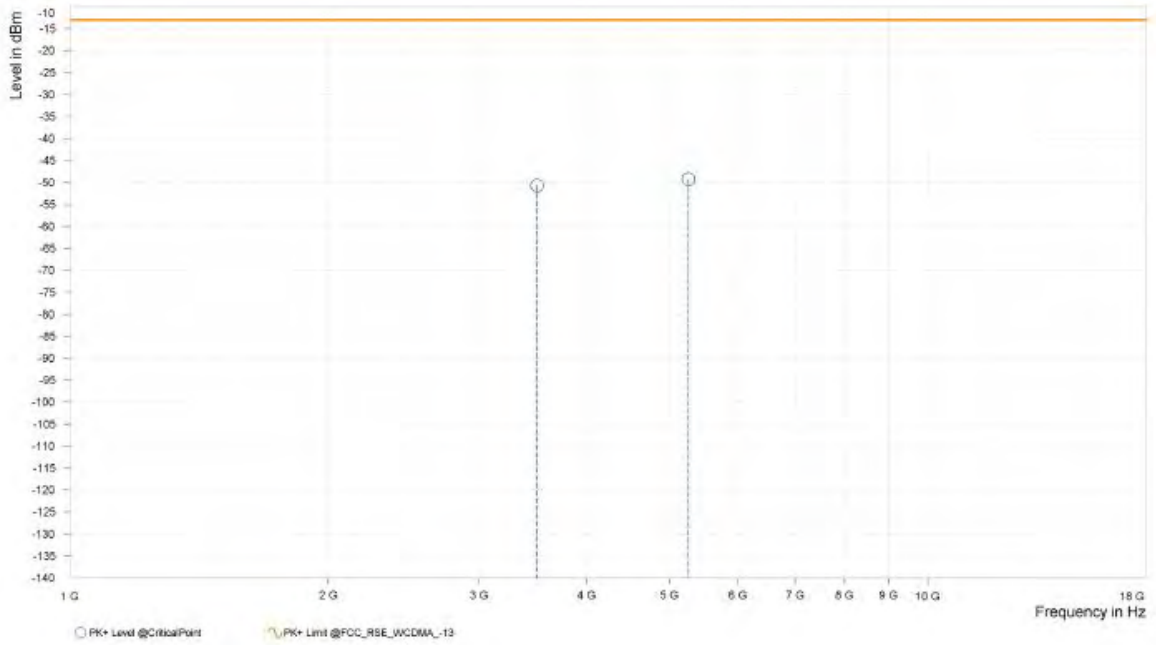
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,465.000	-51.42	-13.00	38.42	21.09	V	175	1.00
4	5,198.000	-48.73	-13.00	35.73	24.03	V	1	1.00



CH 1513

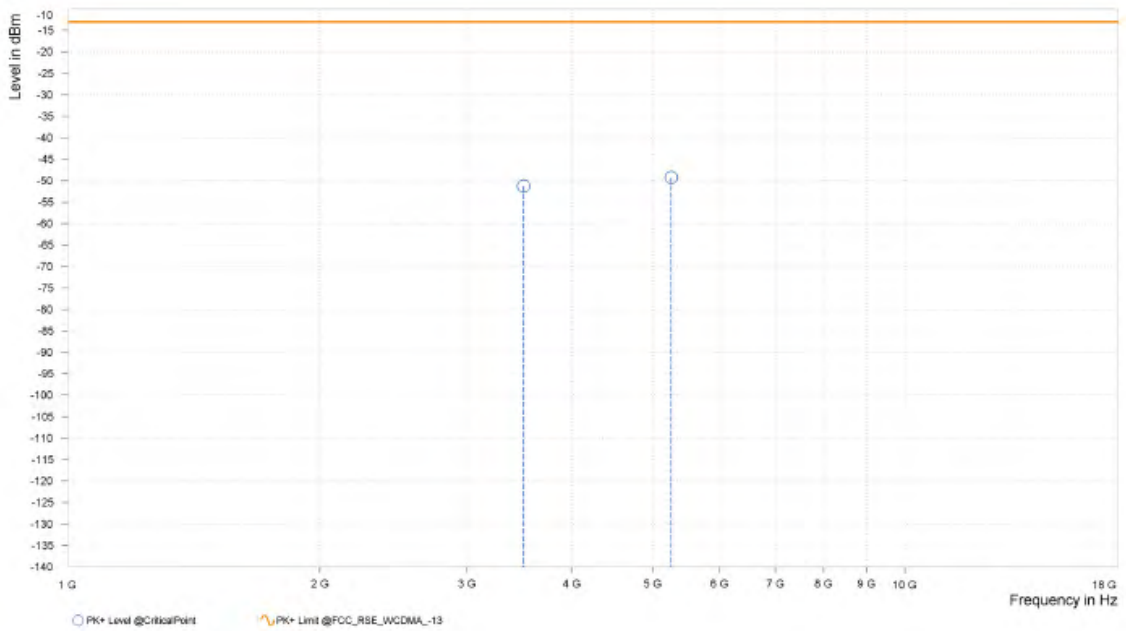
MODE	TX channel 1513	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,505.000	-50.67	-13.00	37.67	20.55	H	355.8	1.00
4	5,258.000	-49.27	-13.00	36.27	23.64	H	359.1	1.00



MODE	TX channel 1513	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,505.000	-51.26	-13.00	38.26	21.28	V	1	2.00
4	5,258.000	-49.24	-13.00	36.24	24.12	V	1	1.00

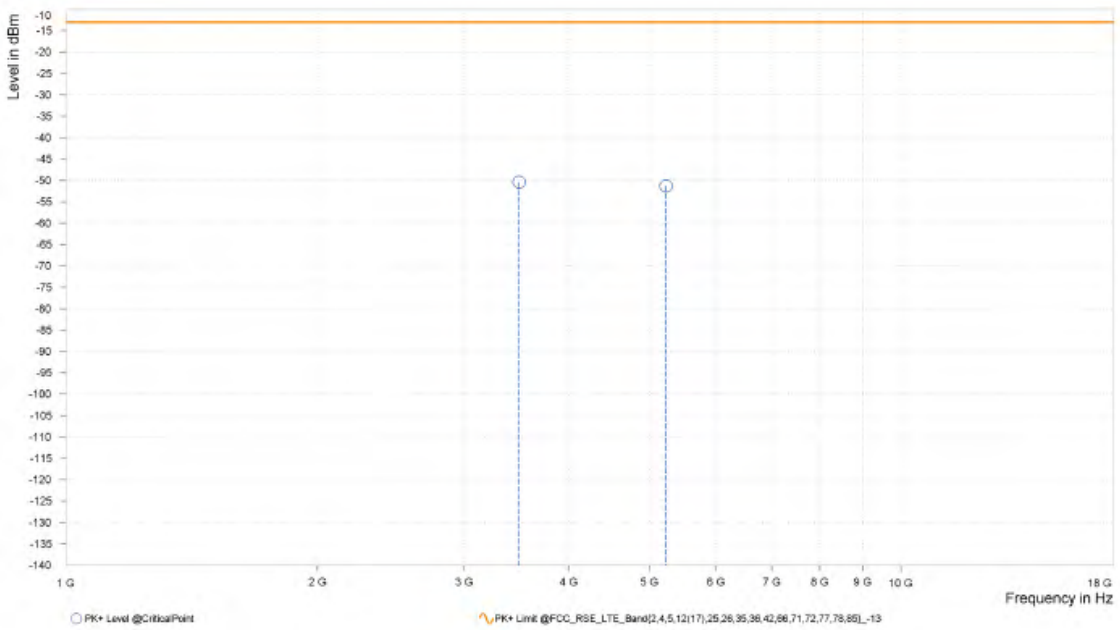


LTE B66

CHANNEL BANDWIDTH: 1.4MHz / QPSK

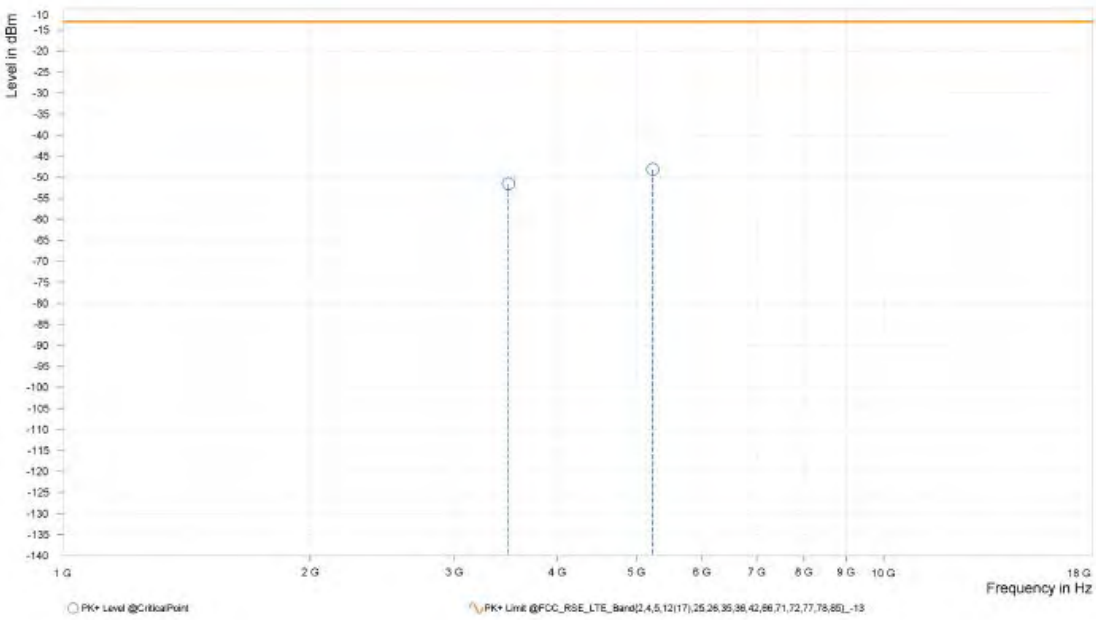
MODE	TX channel 132322	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,488.740	-50.41	-13.00	37.41	20.51	H	157	2.00
4	5,233.110	-51.30	-13.00	38.30	23.57	H	338.2	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			

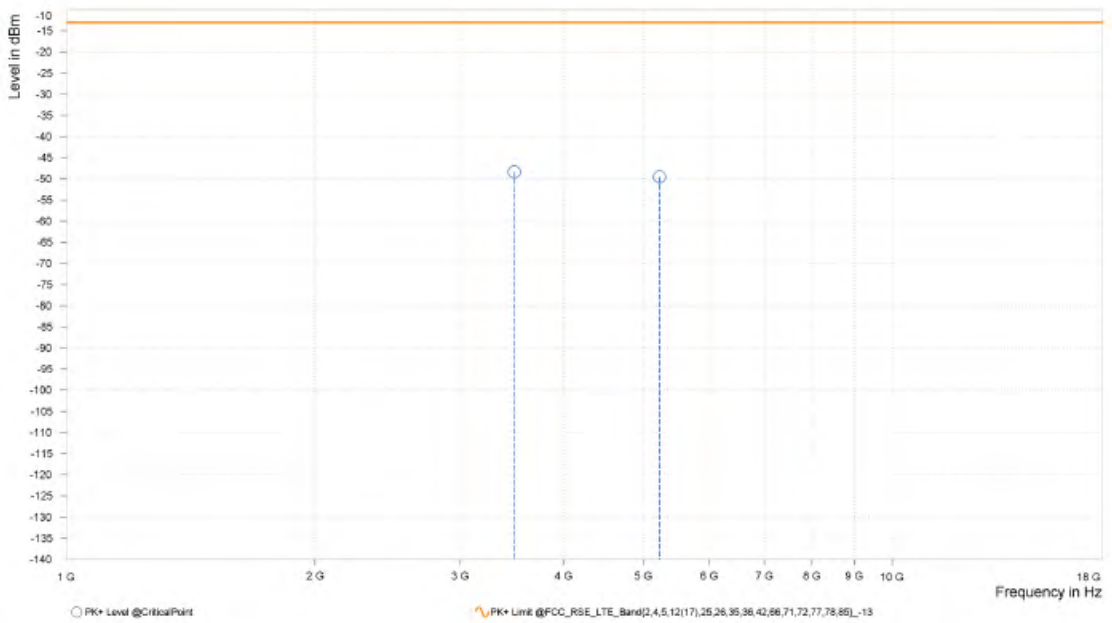
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,488.740	-51.55	-13.00	38.55	21.30	V	0.8	2.00
4	5,233.110	-48.16	-13.00	35.16	24.10	V	266	2.00



CHANNEL BANDWIDTH: 3MHz / QPSK

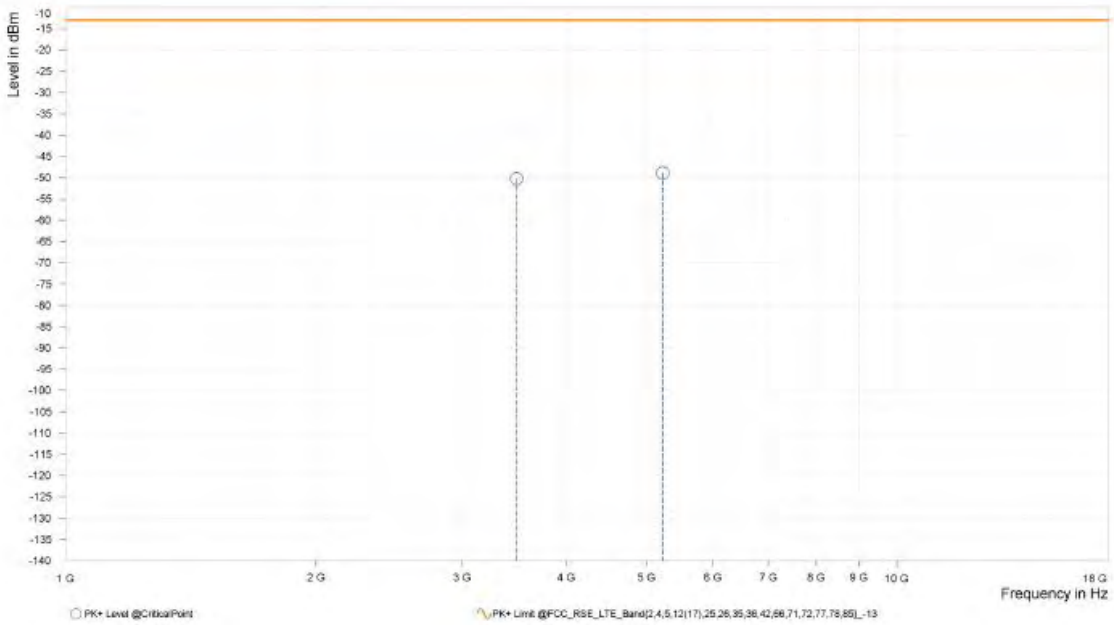
MODE	TX channel 132322	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,487.300	-48.36	-13.00	35.36	20.50	H	158.3	2.00
4	5,230.950	-49.53	-13.00	36.53	23.56	H	265.9	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			

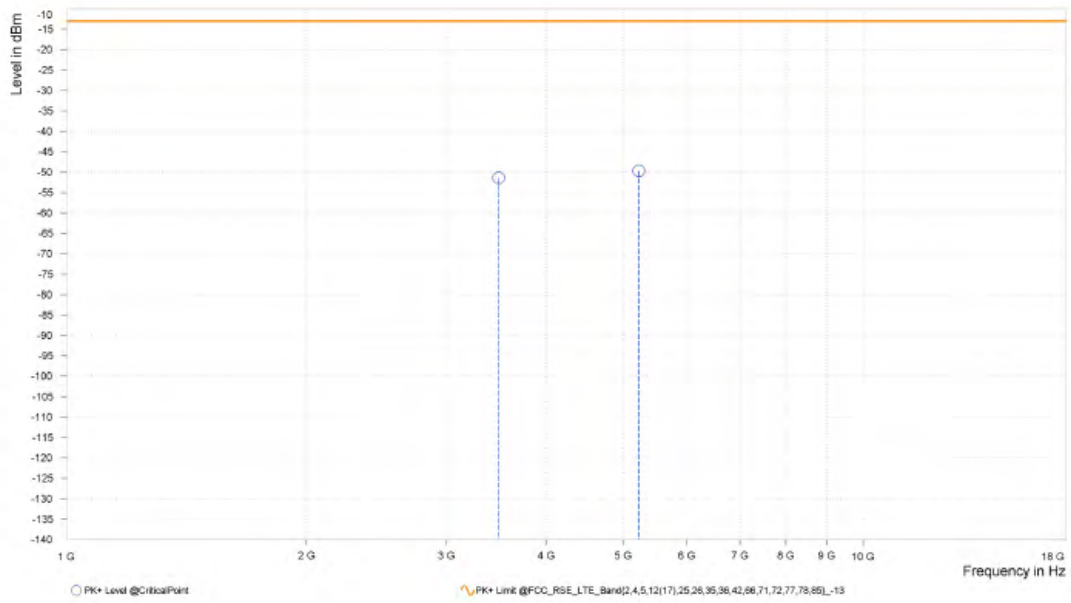
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,487.300	-50.25	-13.00	37.25	21.29	V	23.2	2.00
4	5,230.950	-48.87	-13.00	35.87	24.09	V	334.6	1.00



CHANNEL BANDWIDTH: 5MHz / QPSK

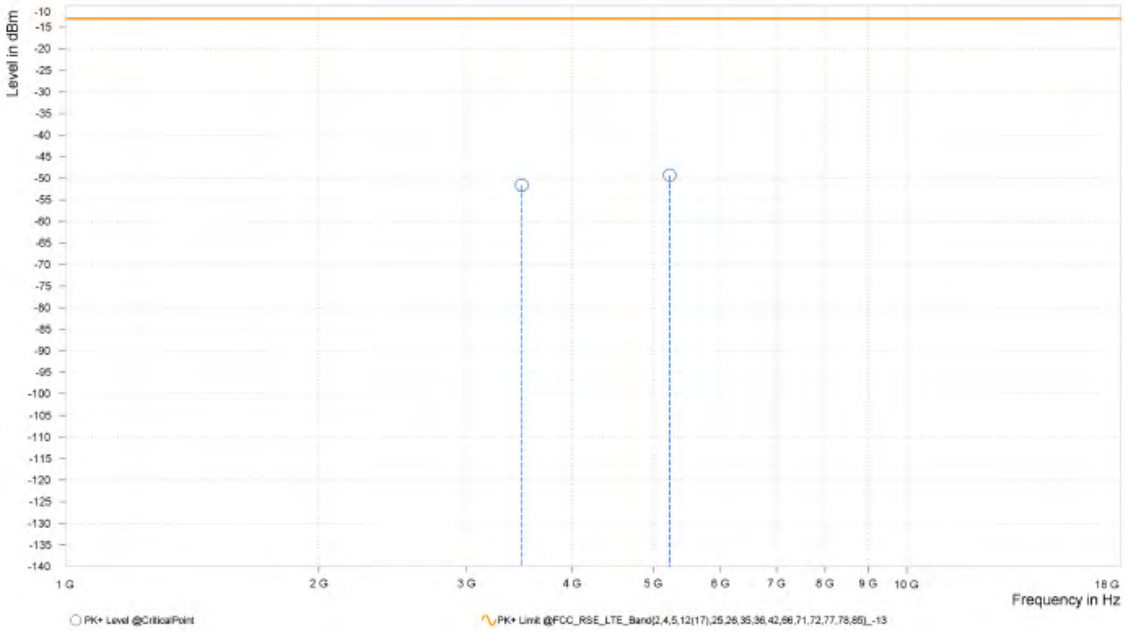
MODE	TX channel 132322	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,485.500	-51.42	-13.00	38.42	20.49	H	149.9	1.00
4	5,228.250	-49.67	-13.00	36.67	23.55	H	211.3	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]
4	3,485.500	-51.66	-13.00	38.66	21.27	V	148.6	1.00
4	5,228.250	-49.32	-13.00	36.32	24.09	V	1	1.00

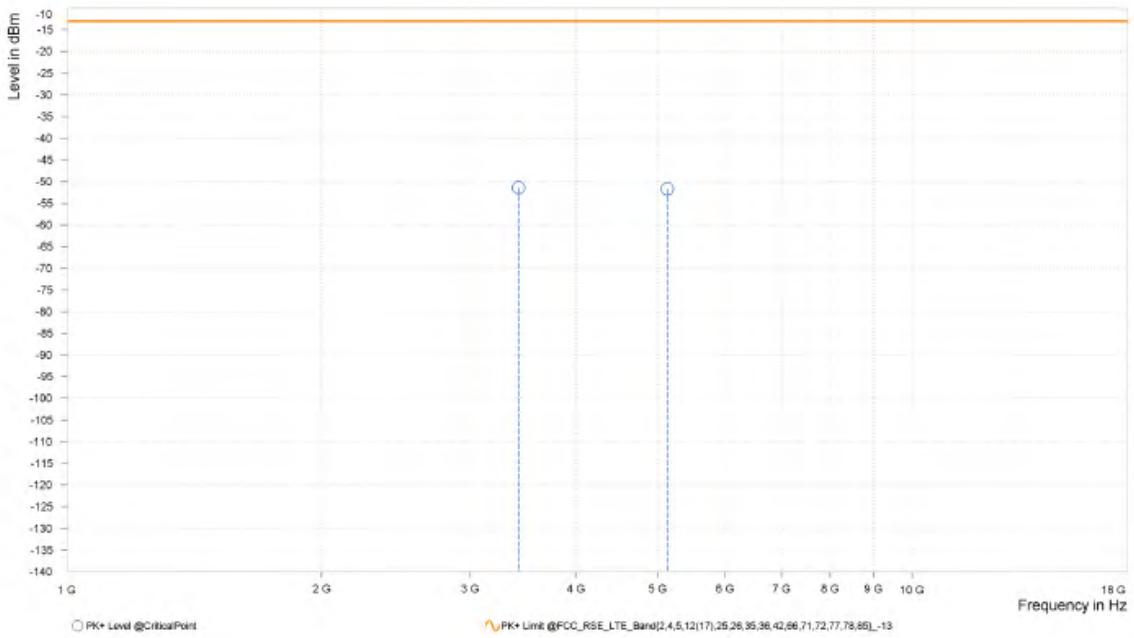


CHANNEL BANDWIDTH: 10MHz / QPSK

CH132022

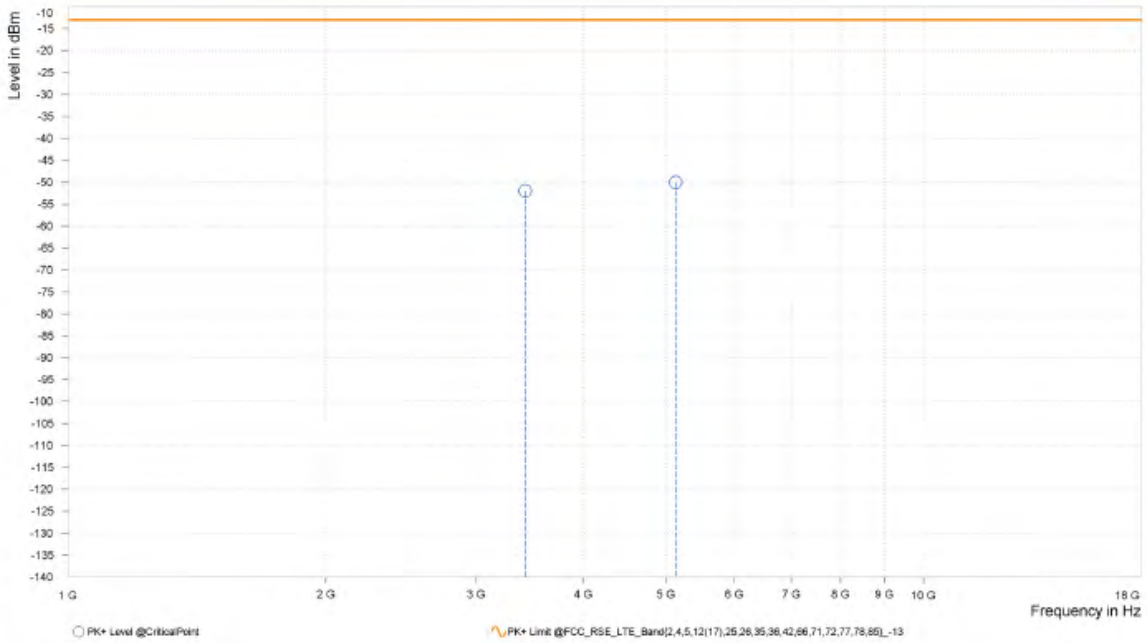
MODE	TX channel 132022	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,421.000	-51.41	-13.00	38.41	20.66	H	0.9	2.00
4	5,131.500	-51.72	-13.00	38.72	23.08	H	149.9	1.00



MODE	TX channel 132022	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			

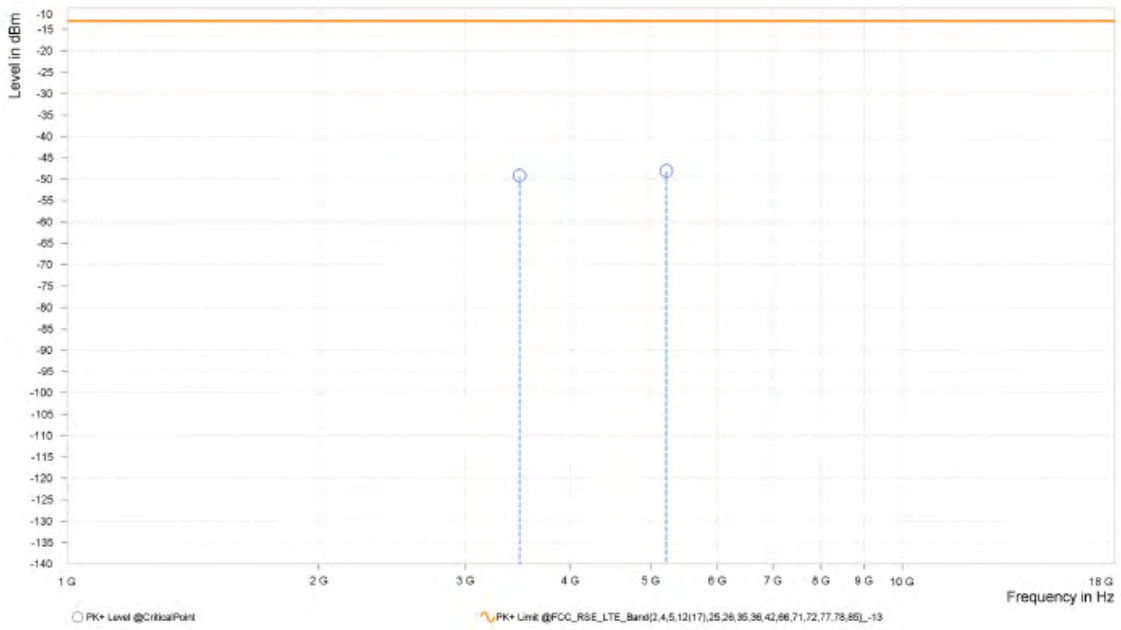
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,421.000	-51.98	-13.00	38.98	21.00	V	359.1	1.00
4	5,131.500	-50.04	-13.00	37.04	23.40	V	211.3	2.00



CH132322

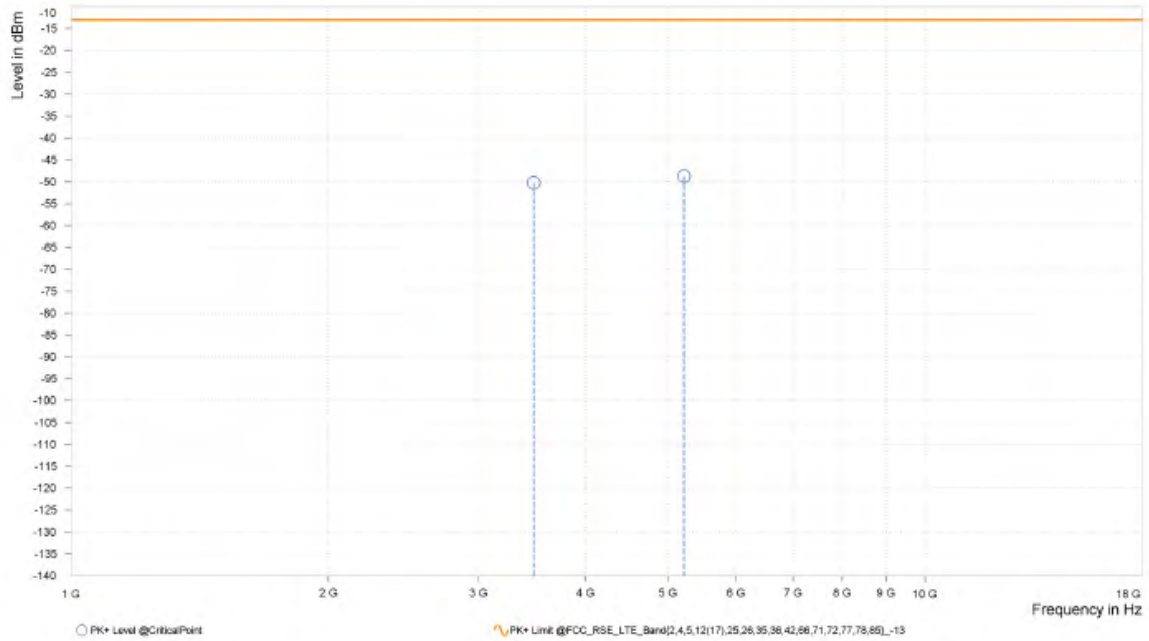
MODE	TX channel 132322	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,481.000	-49.19	-13.00	36.19	20.47	H	1	1.00
4	5,221.500	-48.09	-13.00	35.09	23.52	H	157	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			

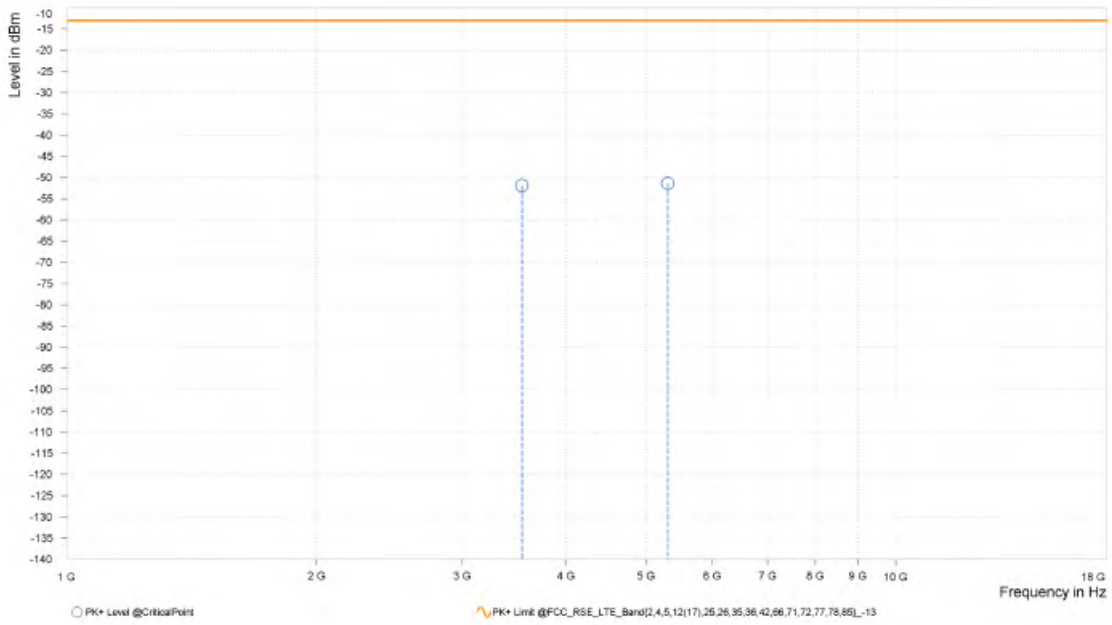
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,481.000	-50.23	-13.00	37.23	21.23	V	13.4	2.00
4	5,221.500	-48.75	-13.00	35.75	24.08	V	359.1	1.00



CH132622

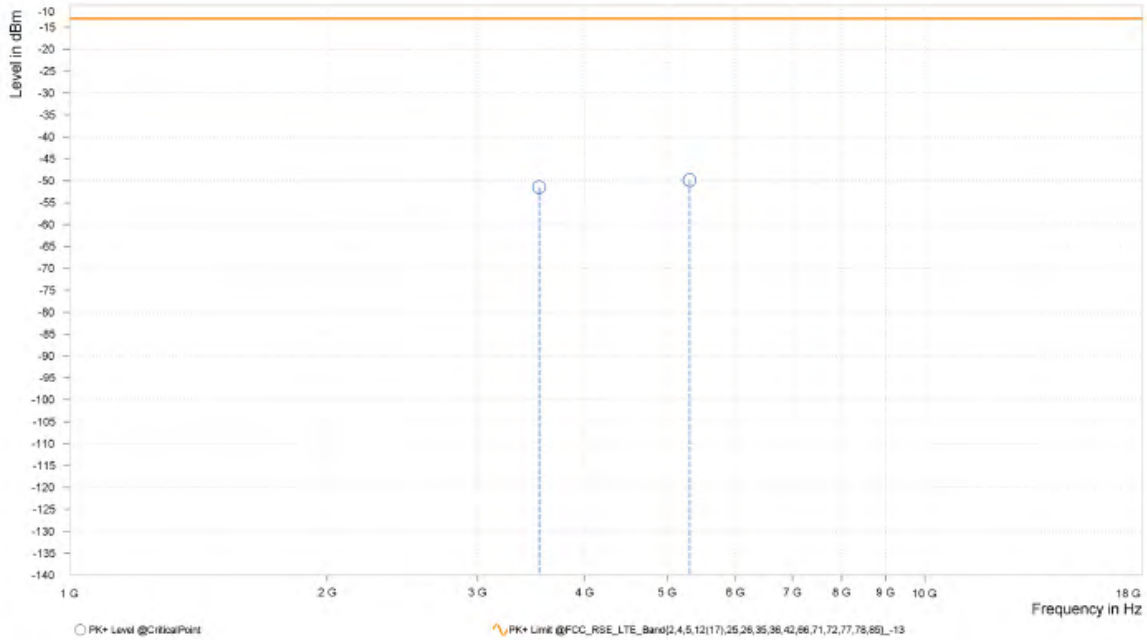
MODE	TX channel 132622	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,541.000	-51.90	-13.00	38.90	20.63	H	359	2.00
4	5,311.500	-51.40	-13.00	38.40	23.62	H	359.1	1.00



MODE	TX channel 132622	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			

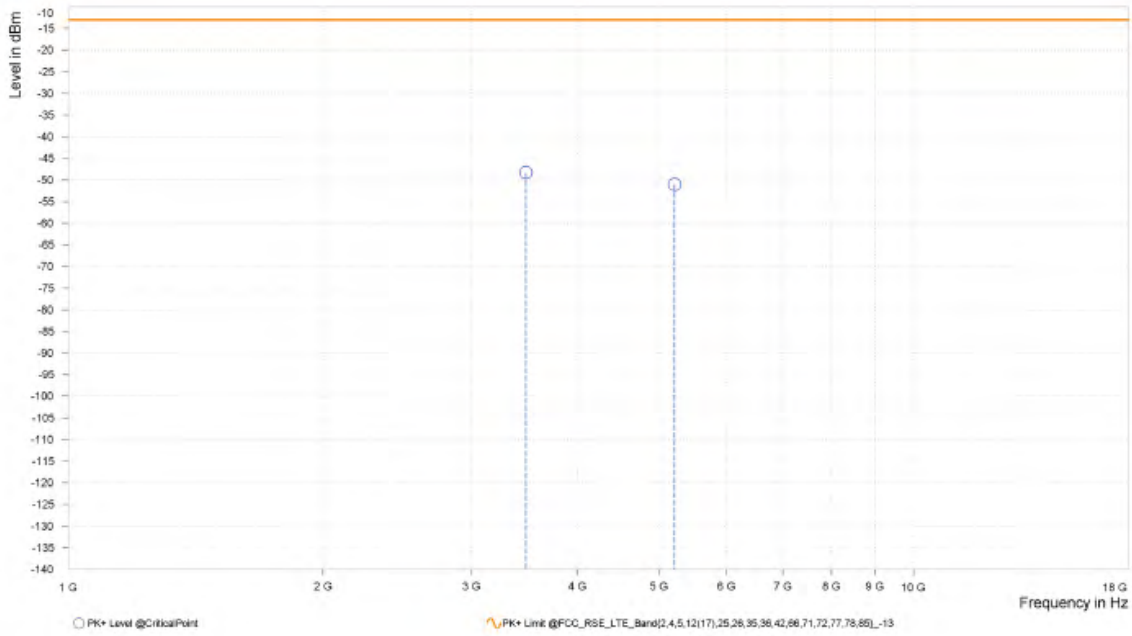
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,541.000	-51.49	-13.00	38.49	21.15	V	0.9	2.00
4	5,311.500	-49.91	-13.00	36.91	24.14	V	0.9	2.00



CHANNEL BANDWIDTH: 15MHz / QPSK

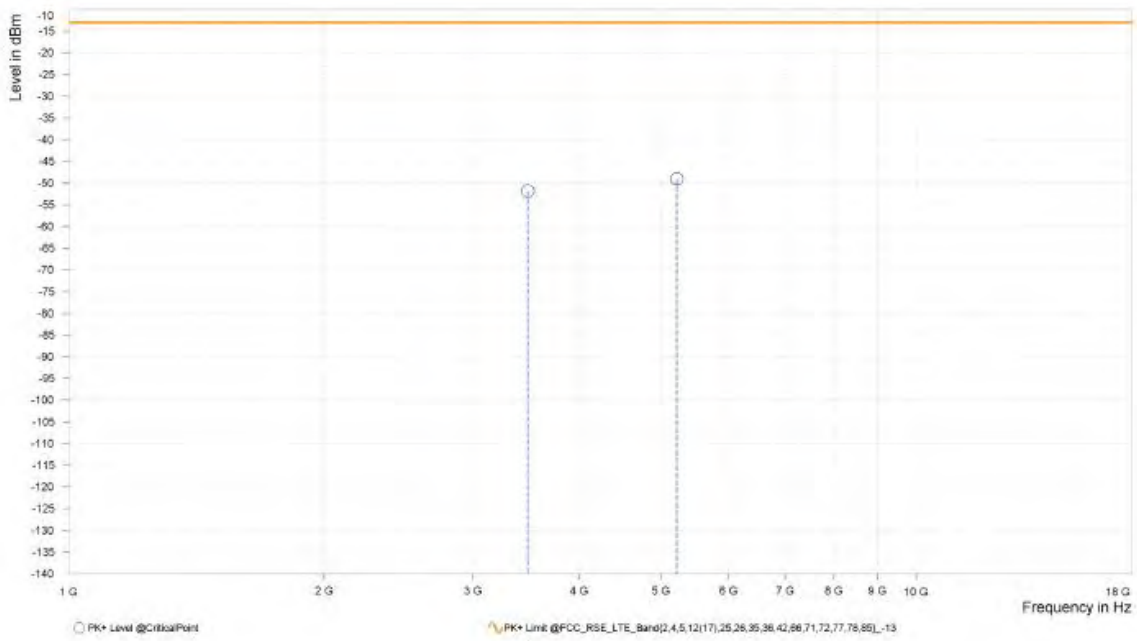
MODE	TX channel 132322	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,476.500	-48.32	-13.00	35.32	20.45	H	152.3	1.00
4	5,214.750	-51.05	-13.00	38.05	23.50	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			

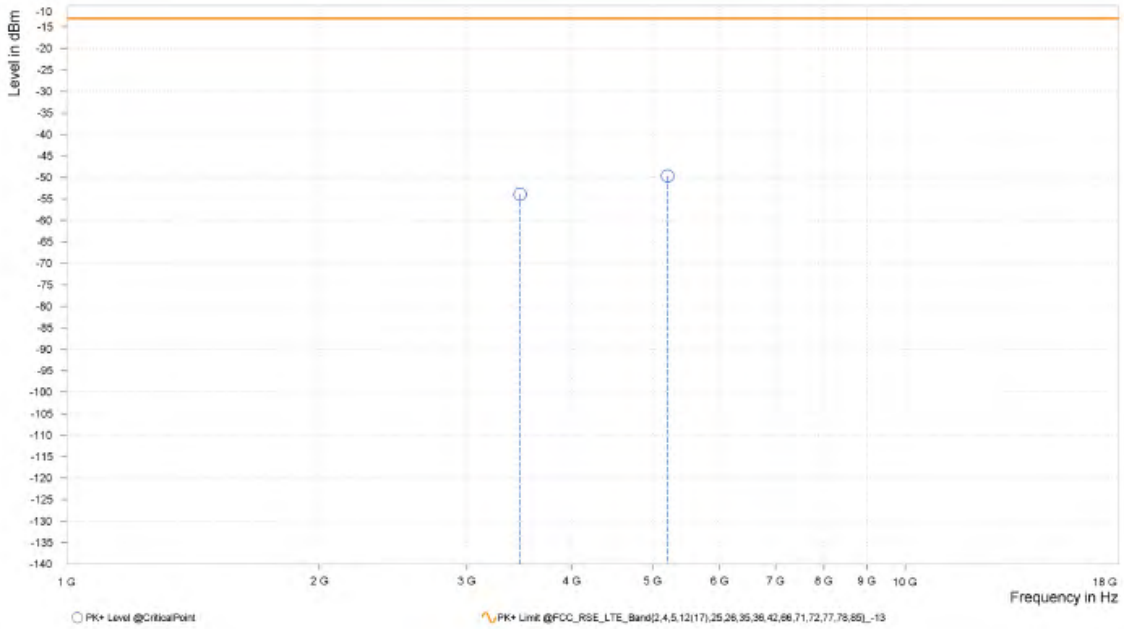
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,481.000	-51.83	-13.00	38.83	21.23	V	322	1.00
4	5,221.500	-49.05	-13.00	36.05	24.08	V	359.1	1.00



CHANNEL BANDWIDTH: 20MHz / QPSK

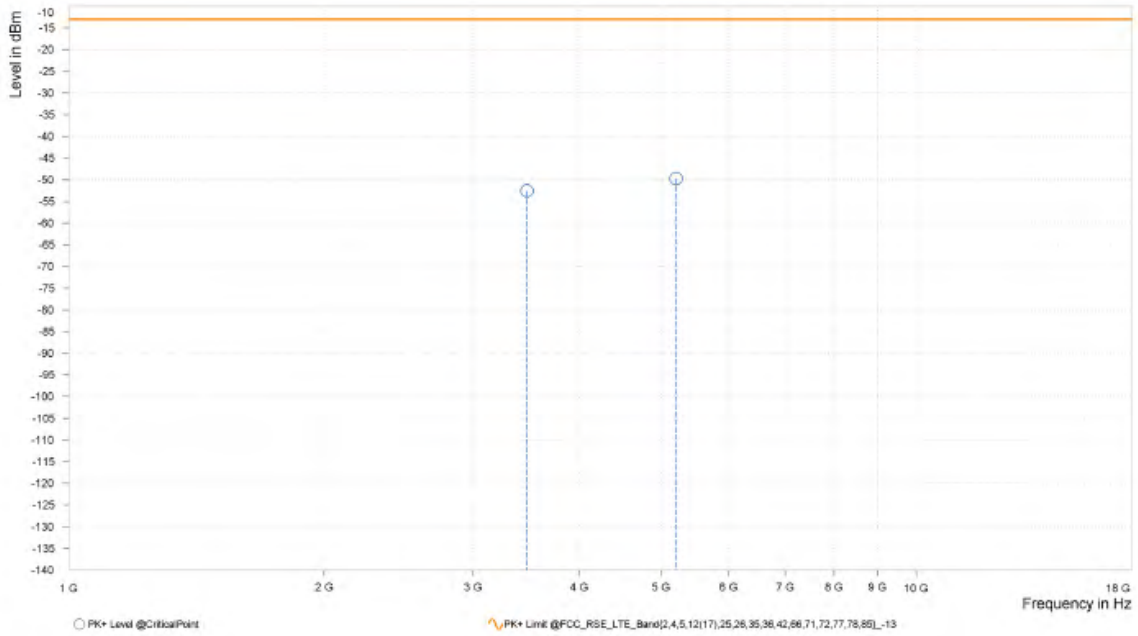
MODE	TX channel 132322	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	3,472.000	-53.90	-13.00	40.90	20.43	H	320.9	1.00
4	5,208.000	-49.70	-13.00	36.70	23.47	H	359	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]
4	3,472.000	-52.58	-13.00	39.58	21.15	V	1	1.00
4	5,208.000	-49.72	-13.00	36.72	24.07	V	210.2	2.00

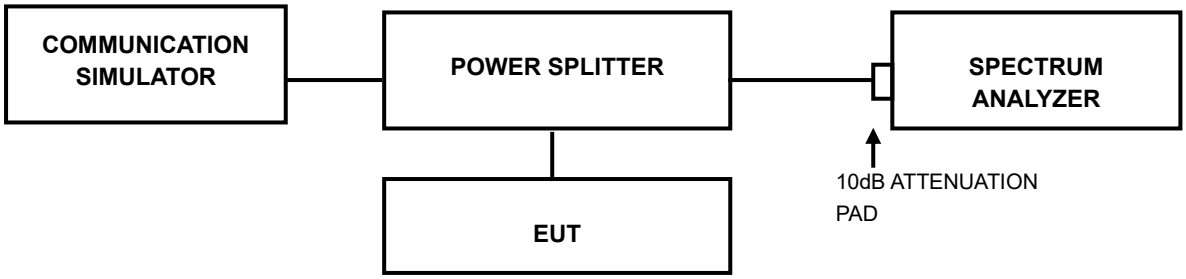


3.7 PEAK TO AVERAGE RATIO

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 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

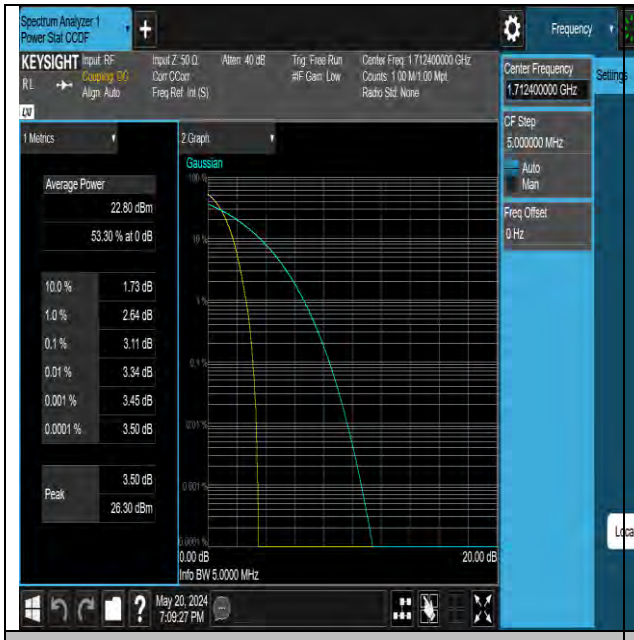
WCDMA BAND4.

PEAK-TO-AVERAGE RATIO

Test Result

Band	Channel	Peak-to-Average Ratio(dB)	Limit(dBm)	Verdict
Band4	1312	3.11	13	PASS
Band4	1413	3.21	13	PASS
Band4	1513	2.97	13	PASS

Test Graphs



Band4-1312-PASS

Band4-1413-PASS

Band4-1513-PASS

26DB BANDWIDTH AND OCCUPIED BANDWIDTH

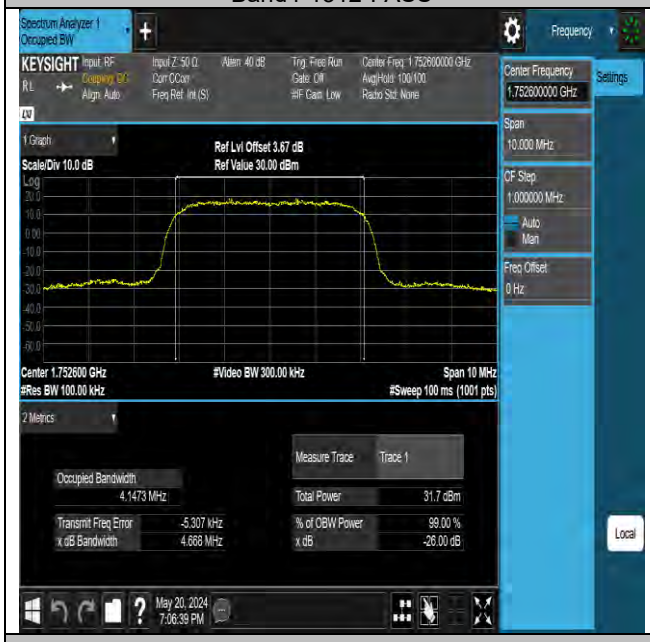
Test Result

Band	Channel	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Limit(MHz)	Verdict
Band4	1312	4.1474	4.663	---	PASS
Band4	1413	4.1456	4.665	---	PASS
Band4	1513	4.1473	4.668	---	PASS

Test Graphs

Band4-1312-PASS

Band4-1413-PASS



Band4-1513-PASS

BAND EDGE

Test Result

Band	Channel	Frequency (MHz)	Result (dBm)	Limit(dBm)	Verdict
Band4	1312	1709.95	-29.496	-13	PASS
Band4	1513	1755.06	-31.591	-13	PASS

Test Graphs

Band4-1312-PASS

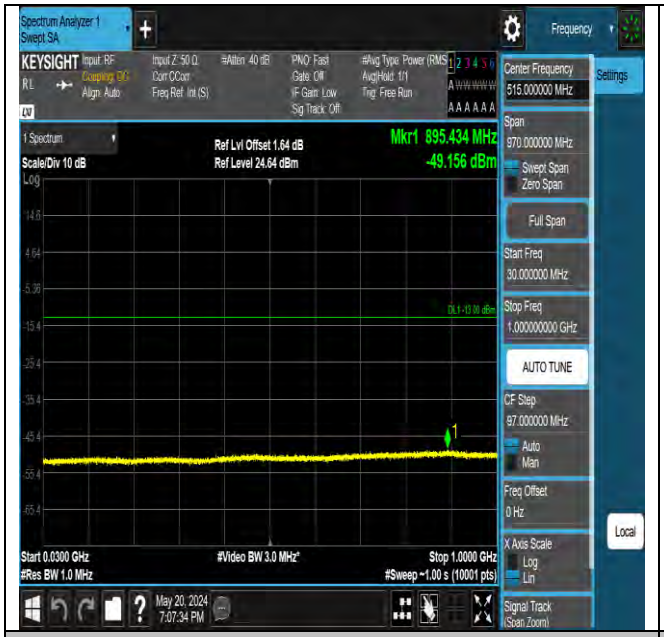
Band4-1513-PASS

CONDUCTED SPURIOUS EMISSION

Test Result

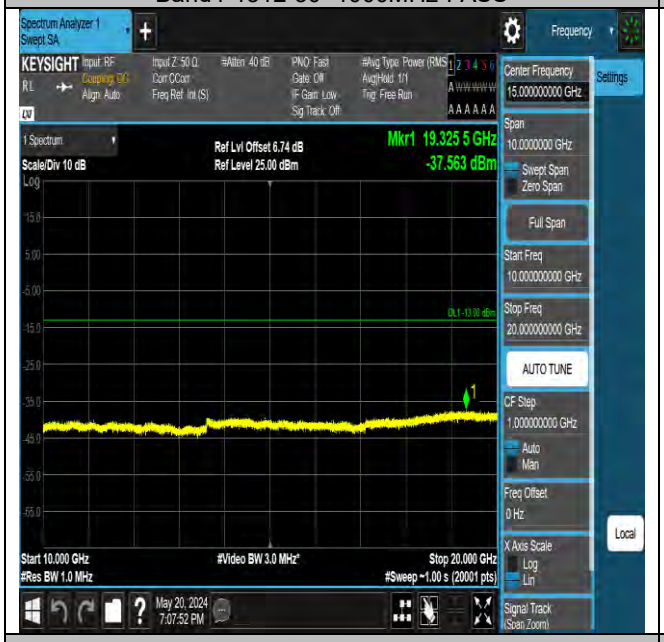
Band	Channel	Frequency Range (Mhz)	Frequency (dBm)	Result (dBm)	Limit (dBm)	Verdict
Band4	1312	30~1000MHz	895.43	-49.16	-13	PASS
Band4	1312	1000~10000MHz	3809.35	-41.05	-13	PASS
Band4	1312	10000~20000MHz	19325.5	-37.56	-13	PASS
Band4	1413	30~1000MHz	898.93	-49.35	-13	PASS
Band4	1413	1000~10000MHz	3871.45	-40.85	-13	PASS
Band4	1413	10000~20000MHz	19184	-37.53	-13	PASS
Band4	1513	30~1000MHz	880.5	-49.36	-13	PASS
Band4	1513	1000~10000MHz	3841.3	-40.91	-13	PASS
Band4	1513	10000~20000MHz	19317.5	-37.41	-13	PASS

Test Graphs



Band4-1312-30~1000MHz-PASS

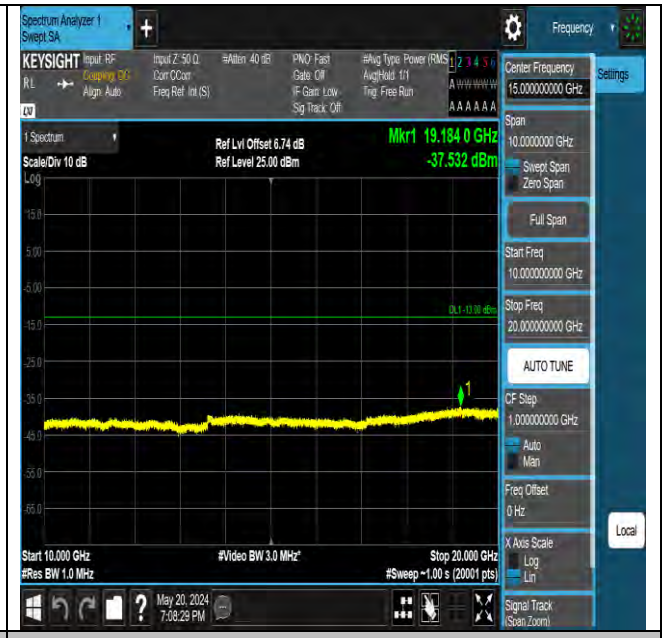
Band4-1312-1000~10000MHz-PASS



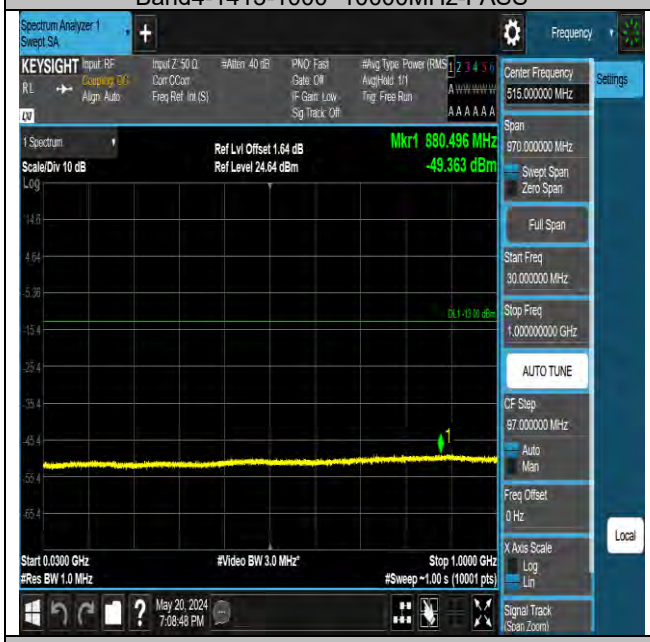
Band4-1312-10000~20000MHz-PASS

Band4-1413-30~1000MHz-PASS

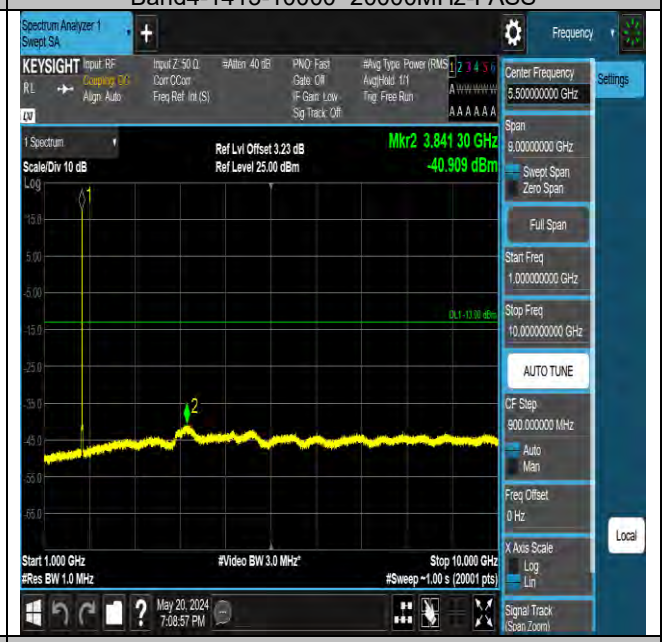
Band4-1413-1000~10000MHz-PASS



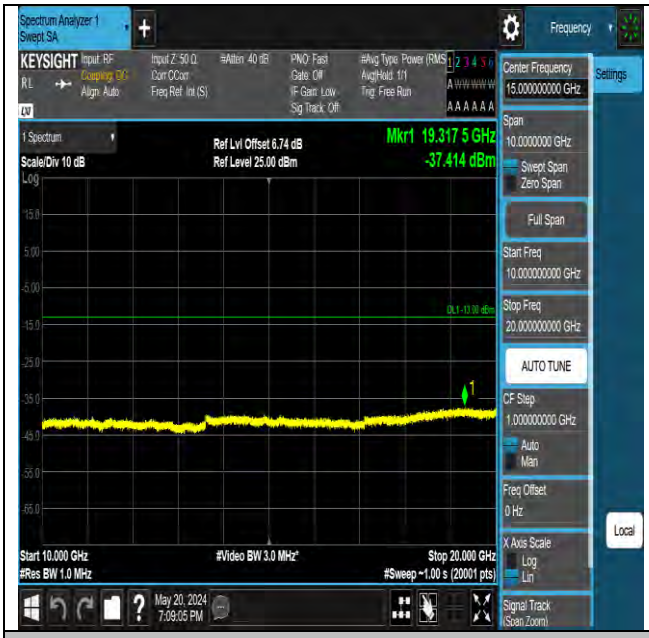
Band4-1413-10000~20000MHz-PASS



Band4-1513-30~1000MHz-PASS



Band4-1513-1000~10000MHz-PASS

	
Band4-1513-10000~20000MHz-PASS	

FREQUENCY STABILITY

Test Result

Voltage									
Band	Channel	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	FL (MHz)	FH (MHz)	Limit (MHz)	Verdict
Band4	1312	VN	NT	-1942.23	-1.1342	1710.32814	---	1710-1755	PASS
Band4	1312	VL	NT	-2263.88	-1.3221	1710.32791	---	1710-1755	PASS
Band4	1312	VH	NT	-2071.61	-1.2098	1710.32704	---	1710-1755	PASS
Band4	1513	VN	NT	-1875.32	-1.07	---	1754.67022	1710-1755	PASS
Band4	1513	VL	NT	-1874.87	-1.0698	---	1754.66813	1710-1755	PASS
Band4	1513	VH	NT	-1907.07	-1.0881	---	1754.66896	1710-1755	PASS

Temperature									
Band	Channel	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	FL (MHz)	FH (MHz)	Limit (MHz)	Verdict
Band4	1312	NV	-30	1966.25	1.1482	1710.33076	---	1710-1755	PASS
Band4	1312	NV	-20	1855.67	1.0837	1710.32983	---	1710-1755	PASS
Band4	1312	NV	-10	-2097.81	-1.2251	1710.32967	---	1710-1755	PASS
Band4	1312	NV	0	1930.44	1.1273	1710.32737	---	1710-1755	PASS
Band4	1312	NV	10	1839.12	1.0740	1710.32601	---	1710-1755	PASS
Band4	1312	NV	20	-2164.51	-1.2640	1710.32547	---	1710-1755	PASS
Band4	1312	NV	30	2101.95	1.2275	1710.32659	---	1710-1755	PASS
Band4	1312	NV	40	1906.89	1.1136	1710.3278	---	1710-1755	PASS
Band4	1312	NV	50	2053.78	1.1994	1710.32546	---	1710-1755	PASS
Band4	1513	NV	-30	1707.97	0.9745	---	1754.6706	1710-1755	PASS
Band4	1513	NV	-20	1880.06	1.0727	---	1754.67221	1710-1755	PASS
Band4	1513	NV	-10	1821.04	1.0391	---	1754.66616	1710-1755	PASS
Band4	1513	NV	0	-1875.93	-1.0704	---	1754.66515	1710-1755	PASS
Band4	1513	NV	10	1866.4	1.065	---	1754.6	1710-1	PASS

				4			7349	755	
Band4	1513	NV	20	1888.70	1.0777	---	1754.67428	1710-1755	PASS
Band4	1513	NV	30	-2046.74	-1.1678	---	1754.66468	1710-1755	PASS
Band4	1513	NV	40	-1953.32	-1.1145	---	1754.66443	1710-1755	PASS
Band4	1513	NV	50	-1967.20	-1.1224	---	1754.67025	1710-1755	PASS

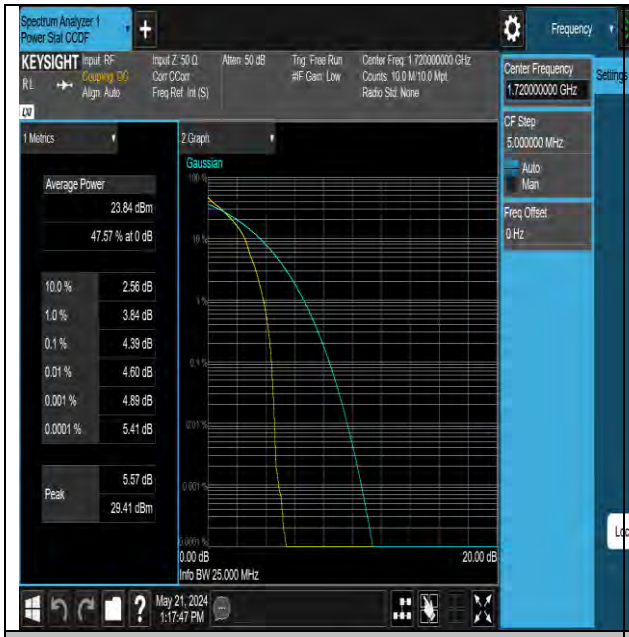
LTE BAND66(INCLUDE LTE B4)

PEAK-TO-AVERAGE RATIO(CCDF)

Test Result

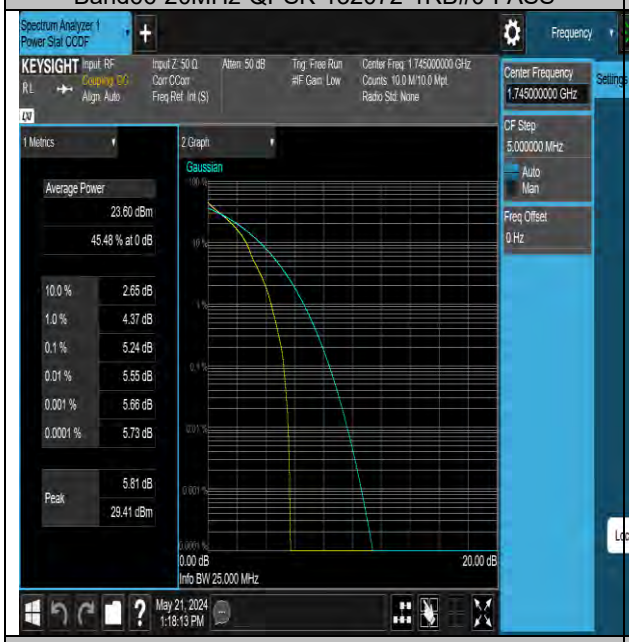
Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dB)	Limit(dB)	Verdict
Band66	20MHz	QPSK	132072	1RB#0	4.39	13	PASS
Band66	20MHz	QPSK	132072	100RB#0	5.71	13	PASS
Band66	20MHz	QPSK	132322	1RB#0	5.24	13	PASS
Band66	20MHz	QPSK	132322	100RB#0	5.39	13	PASS
Band66	20MHz	QPSK	132572	1RB#0	4.30	13	PASS
Band66	20MHz	QPSK	132572	100RB#0	5.70	13	PASS

Test Graphs



Band66-20MHz-QPSK-132072-1RB#0-PASS

Band66-20MHz-QPSK-132072-100RB#0-PASS



Band66-20MHz-QPSK-132322-1RB#0-PASS

Band66-20MHz-QPSK-132322-100RB#0-PASS

Band66-20MHz-QPSK-132572-1RB#0-PASS

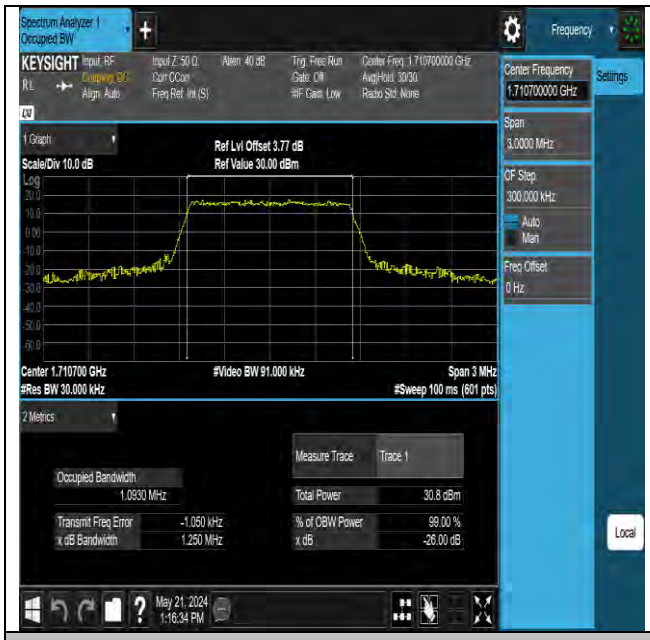
Band66-20MHz-QPSK-132572-100RB#0-PASS

26DB BANDWIDTH AND OCCUPIED BANDWIDTH

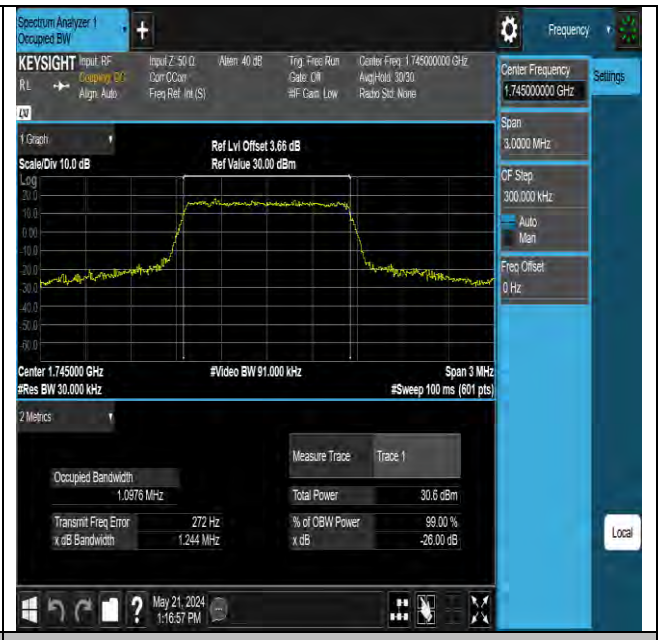
Test Result

Band	Bandwidth	Modulation	Channel	RB Configuration	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
Band66	1.4MHz	QPSK	131979	6RB#0	1.0930	1.250	PASS
Band66	1.4MHz	QPSK	132322	6RB#0	1.0976	1.244	PASS
Band66	1.4MHz	QPSK	132665	6RB#0	1.0969	1.251	PASS
Band66	1.4MHz	16QAM	131979	6RB#0	1.0982	1.244	PASS
Band66	1.4MHz	16QAM	132322	6RB#0	1.0981	1.250	PASS
Band66	1.4MHz	16QAM	132665	6RB#0	1.0908	1.253	PASS
Band66	3MHz	QPSK	131987	15RB#0	2.7051	3.022	PASS
Band66	3MHz	QPSK	132322	15RB#0	2.7072	3.049	PASS
Band66	3MHz	QPSK	132657	15RB#0	2.6939	3.012	PASS
Band66	3MHz	16QAM	131987	15RB#0	2.7044	3.036	PASS
Band66	3MHz	16QAM	132322	15RB#0	2.7114	3.036	PASS
Band66	3MHz	16QAM	132657	15RB#0	2.7089	3.018	PASS
Band66	5MHz	QPSK	131997	25RB#0	4.5291	5.012	PASS
Band66	5MHz	QPSK	132322	25RB#0	4.5072	4.998	PASS
Band66	5MHz	QPSK	132647	25RB#0	4.5180	4.995	PASS
Band66	5MHz	16QAM	131997	25RB#0	4.4997	4.993	PASS
Band66	5MHz	16QAM	132322	25RB#0	4.4995	4.980	PASS
Band66	5MHz	16QAM	132647	25RB#0	4.5003	4.999	PASS
Band66	10MHz	QPSK	132022	50RB#0	9.0258	9.944	PASS
Band66	10MHz	QPSK	132322	50RB#0	8.9946	9.843	PASS
Band66	10MHz	QPSK	132622	50RB#0	8.9876	9.921	PASS
Band66	10MHz	16QAM	132022	50RB#0	9.0070	9.938	PASS
Band66	10MHz	16QAM	132322	50RB#0	9.0179	9.890	PASS
Band66	10MHz	16QAM	132622	50RB#0	9.0074	10.01	PASS
Band66	15MHz	QPSK	132047	75RB#0	13.498	14.91	PASS
Band66	15MHz	QPSK	132322	75RB#0	13.474	14.91	PASS
Band66	15MHz	QPSK	132597	75RB#0	13.520	15.04	PASS
Band66	15MHz	16QAM	132047	75RB#0	13.506	14.89	PASS
Band66	15MHz	16QAM	132322	75RB#0	13.476	14.94	PASS
Band66	15MHz	16QAM	132597	75RB#0	13.516	14.98	PASS
Band66	20MHz	QPSK	132072	100RB#0	18.054	19.82	PASS
Band66	20MHz	QPSK	132322	100RB#0	17.965	19.81	PASS
Band66	20MHz	QPSK	132572	100RB#0	18.038	19.75	PASS
Band66	20MHz	16QAM	132072	100RB#0	17.995	19.68	PASS
Band66	20MHz	16QAM	132322	100RB#0	17.978	19.73	PASS
Band66	20MHz	16QAM	132572	100RB#0	18.024	19.78	PASS

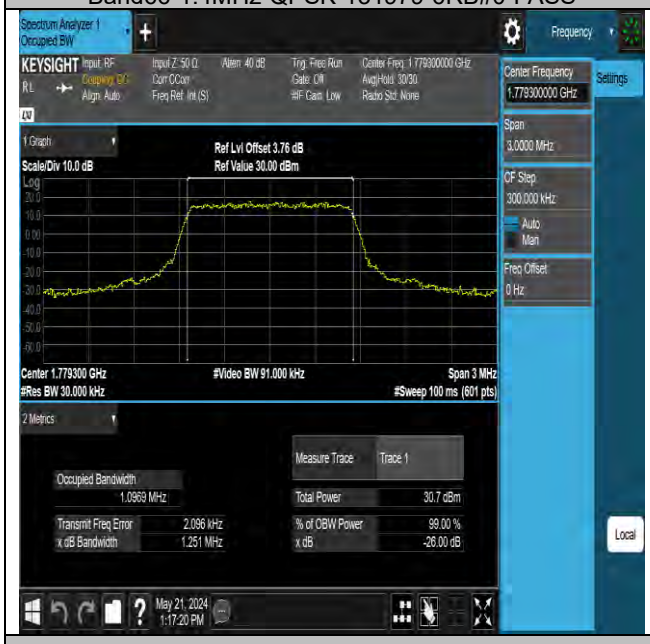
Test Graphs



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



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



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

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

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

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

Band66-3MHz-QPSK-131987-15RB#0-PASS

Band66-3MHz-QPSK-132322-15RB#0-PASS

Band66-3MHz-QPSK-132657-15RB#0-PASS

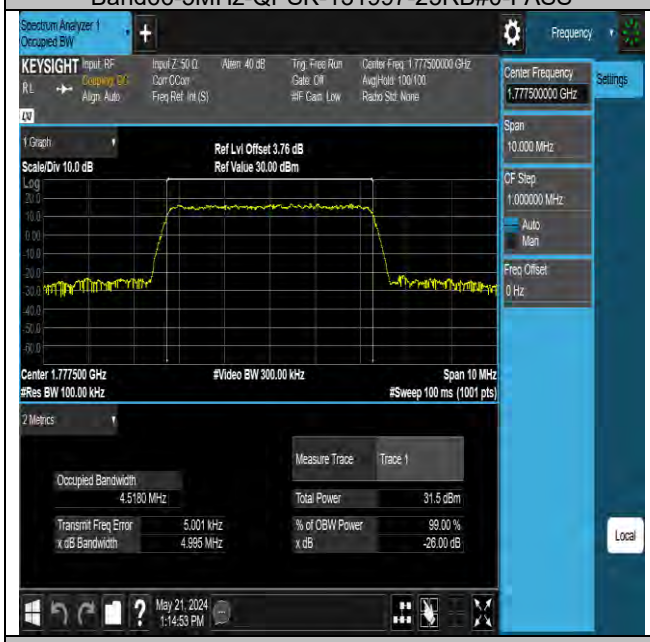
Band66-3MHz-16QAM-131987-15RB#0-PASS

Band66-3MHz-16QAM-132322-15RB#0-PASS

Band66-3MHz-16QAM-132657-15RB#0-PASS

Band66-5MHz-QPSK-131997-25RB#0-PASS

Band66-5MHz-QPSK-132322-25RB#0-PASS



Band66-5MHz-QPSK-132647-25RB#0-PASS

Band66-5MHz-16QAM-131997-25RB#0-PASS

Band66-5MHz-16QAM-132322-25RB#0-PASS

Band66-5MHz-16QAM-132647-25RB#0-PASS

Band66-10MHz-QPSK-132022-50RB#0-PASS

Band66-10MHz-QPSK-132322-50RB#0-PASS

Band66-10MHz-QPSK-132622-50RB#0-PASS

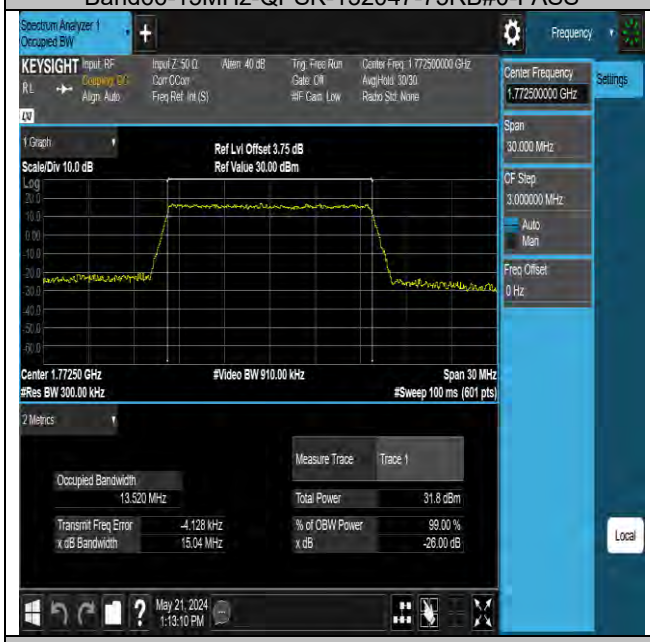
Band66-10MHz-16QAM-132022-50RB#0-PASS

Band66-10MHz-16QAM-132322-50RB#0-PASS

Band66-10MHz-16QAM-132622-50RB#0-PASS

Band66-15MHz-QPSK-132047-75RB#0-PASS

Band66-15MHz-QPSK-132322-75RB#0-PASS



Band66-15MHz-QPSK-132597-75RB#0-PASS

Band66-15MHz-16QAM-132047-75RB#0-PASS

Band66-15MHz-16QAM-132322-75RB#0-PASS

Band66-15MHz-16QAM-132597-75RB#0-PASS

Band66-20MHz-QPSK-132072-100RB#0-PASS

Band66-20MHz-QPSK-132322-100RB#0-PASS

Band66-20MHz-QPSK-132572-100RB#0-PASS

Band66-20MHz-16QAM-132072-100RB#0-PASS

Band66-20MHz-16QAM-132322-100RB#0-PASS

Band66-20MHz-16QAM-132572-100RB#0-PASS