

FCC TEST REPORT

(PART 96)

Applicant:	Unplugged Technologies Ltd.
Address:	3 Hakidma St., Yokneam 2066731, Israel

Manufacturer or Supplier:	Unplugged Technologies Ltd.
Address:	3 Hakidma St., Yokneam 2066731, Israel
Product:	UP Phone 1
Brand Name:	UP Phone
Model Name:	UP01
FCC ID:	2BBBCUP01
Date of tests:	Jul. 03, 2023 ~ Sep. 28, 2023

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

☒ **47 CFR FCC Part 96**

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

Prepared by Chao Wu Engineer / Mobile Department	Approved by Peibo Sun Manager / Mobile Department
 Date: Sep. 28, 2023	 Date: Sep. 28, 2023

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RELEASE CONTROL RECORD

ISSUE NO.	DESCRIPTION	DATE ISSUED
PSU-QSU2306120115RF09	Original release	Sep. 28, 2023

1 SUMMARY OF TEST RESULTS

47 CFR FCC PART 96			
FCC CLAUSE	TEST ITEM	RESULT	LAB
2.1046 96.41(b)	Maximum Peak Output Power and Maximum EIRP	Compliance	A
2.1046 96.41(e)	Conducted Band Edge	Compliance	A
2.1049	Occupied Bandwidth	Compliance	A
2.1055	Frequency Stability	Compliance	A
2.1051 96.41(e)	Conducted Spurious Emissions	Compliance	A
2.1053 96.41(e)	Radiated Spurious Emissions	Compliance	A/B
96.41(g)	Peak-to-Average Power Ratio	Compliance	A

Note:

Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

*Test Lab Information Reference

Lab A:

BV 7Layers Communications Technology (Shenzhen) Co., Ltd

Lab Address:

No.B102, Dazu Chuangxin Mansion, North of Beihuan Avenue, North Area, Hi-Tech Industrial Park,
Nanshan District, Shenzhen, Guangdong, China

Accredited Test Lab Cert 3939.01

FCC Site Registration No. : 525120; Designation No. : CN1171;

Lab B:

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

Lab Address:

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

Accredited Test Lab Cert 6613.01

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



1.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	UNCERTAINTY
Effective Radiated Power	±1.48dB
Frequency Stability	±39.27Hz
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	±4.01 dB
Occupied Channel Bandwidth	±21.7KHz
Band Edge Measurements	±1.48dB
Peak to average ratio	±0.76dB

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

1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 18,23	Feb. 17,24
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.15,23	May.14,24
Loop Antenna	Schwarzbeck	FMZB 1519B	00173	Sep.04,22	Sep.03,23
Loop Antenna	Schwarzbeck	FMZB 1519B	00173	Sep.03,23	Sep.02,24
Bilog Antenna	ETS-LINDGRE N	3143B	00161965	Mar. 05,23	Mar. 04,24
Horn Antenna	ETS-LINDGRE N	3117	00168692	Mar. 05,23	Mar. 04,24
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K- SG/QMS-00361	15433	Aug. 24, 22	Aug. 23, 23
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K- SG/QMS-00361	15433	Aug. 23, 23	Aug. 22, 24
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 14,23	Feb. 13,24
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May.11,23	May.10,24
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.11,23	May.10,24
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 20,23	Feb.19,24
3m Semi-anechoic Chamber	ETS-LINDGRE N	9m*6m*6m	Euroshieldpn- CT0001143-121 6	May. 18,23	May. 17,26
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	JS1120	3.1.36	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	May. 06,23	May. 05,24
Power Meter	Anritsu	ML2495A	1506002	Feb. 21,23	Feb. 20,24
Power Sensor	Anritsu	MA2411B	1339352	May. 06,23	May. 05,24
Temperature Chamber	ESPEC	SH-242	93000855	May. 11,23	May. 10,24
MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 17,23	Feb. 16,24
Base station R&S CMW500	Rohde&Schwa rz	CMW500	153085	May.11,23	May.10,24
Radio Communication Analyzer	Starpont	SP9500-CTS	20460	Oct. 13,22	Oct. 12,23

- NOTE:**
1. The calibration interval of the above test instruments is 12 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 525120; The Designation No. is CN1171.

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

- NOTE:**
1. The calibration interval of the above test instruments is 12 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	UP Phone 1	
BRAND NAME	UP Phone	
MODEL NAME	UP01	
NOMINAL VOLTAGE	3.87 Vdc (Battery)	
MODULATION TECHNOLOGY	5G NR	DFT-s-OFMA(Pi/2 BPSK,QPSK,16QAM,64QAM,256QAM); CP-OFMA(QPSK,16QAM,64QAM,256QAM);
FREQUENCY RANGE	NR Band n48	3555 MHz ~ 3694.98MHz
EMISSION DESIGNATOR	NR Band n48 Channel Bandwidth: 10MHz	QPSK: 8M82G7D 16QAM: 8M87W7D 64QAM: 8M79W7D 256QAM: 8M80W7D Pi/2BPSK: 8M75G7D
	NR Band n48 Channel Bandwidth: 15MHz	QPSK: 13M0G7D 16QAM: 13M0W7D 64QAM: 13M0W7D 256QAM: 13M0W7D Pi/2BPSK: 13M0G7D
	NR Band n48 Channel Bandwidth: 20MHz	QPSK: 18M0G7D 16QAM: 18M0W7D 64QAM: 18M0W7D 256QAM: 18M0W7D Pi/2BPSK: 17M9G7D
	NR Band n48 Channel Bandwidth: 40MHz	QPSK: 35M8G7D 16QAM: 35M8W7D 64QAM: 35M7W7D 256QAM: 35M8W7D Pi/2BPSK: 35M8G7D
MAX. EIRP POWER	NR Band n48 Channel Bandwidth: 10MHz	206.54mW
	NR Band n48 Channel Bandwidth: 15MHz	206.06mW
	NR Band n48 Channel Bandwidth: 20MHz	202.77mW
	NR Band n48 Channel Bandwidth: 40MHz	196.79mW



ANTENNA GAIN	PIFA Antenna with 0.5dBi gain for NR Band n48
HW VERSION	M156-MUB-V2
SW VERSION	NR_D011.13_N_UP01_1.000.01
I/O PORTS	Refer to user's manual
DATA CABLE	N/A
EXTREME TEMPERATURE	0-55 °C
EXTREME VOLTAGE	3.6V – 4.45V

NOTE:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and four receivers.

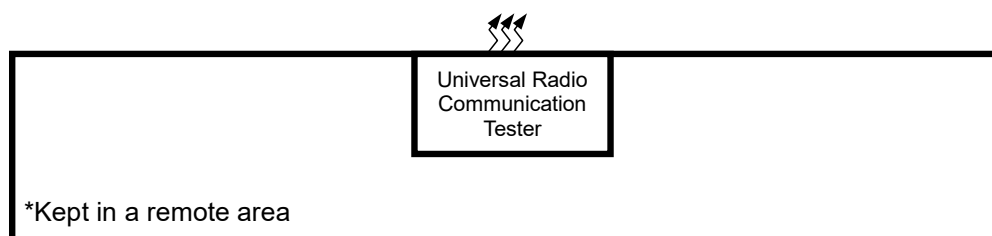
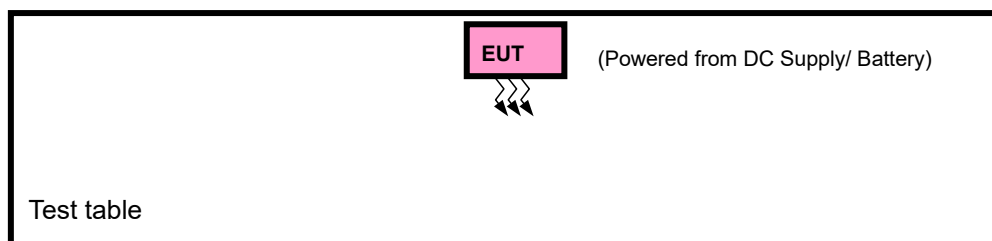
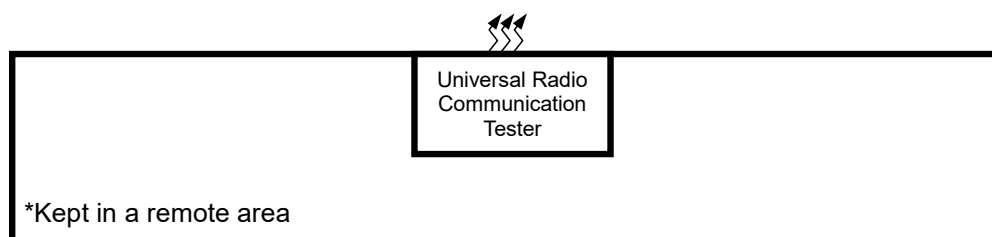
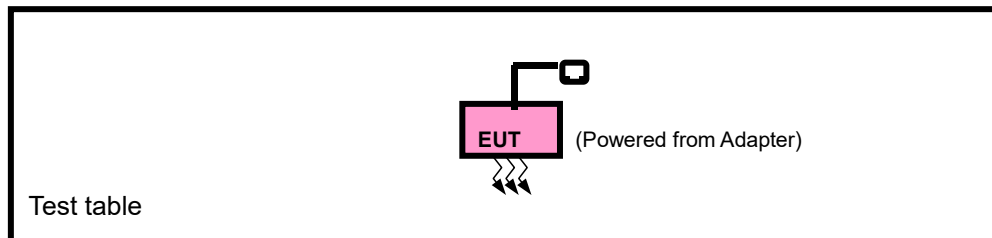
MODULATION MODE	TX FUNCTION
NR	1TX/4RX

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

List of Accessory:

ACCESSORIES	Brand	MODEL / SPECIFICATION
CPU	MediaTek	MT6893
eMMC 1 (=ROM 1)	Sandisk	SDINFDK4-256G
eMMC 2 (=ROM 2)	Samsung	KLUEG4RHGB-B0E1
eMMC 3 (=ROM 3)	Samsung	KLUEG4RHGB-B0E1
eMMC 4 (=ROM 4)	Samsung	KLUEG4RHGB-B0E1
RAM 1	Hynix	H9HKNNNFBMAVAR-NEH
RAM 2	Samsung	K3UH7H70BM-AGCL
BT/WLAN Module	MediaTek	/
NFC chipset	ST	/
Battery	/	Power Rating: 16.98Wh

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
4	USB cable	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 Cable: 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 5G NR link
B	EUT + DC Supply with 5G NR link

5G NR n48 MODE (SA_n25, DC_2A_n48, DC_5A_n48, DC_13A_n48, DC_66A_n48,)

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CP-OFDM CHANNEL	AVAILABLE DFT-S-OFDM CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE(DFT-S-OFDM) (INCLUDE CP-OFDM)
A	EIRP	637000 to 646332	637000 to 646332	Low, Middle, High	10MHz	QPSK	1RB/ 0RB Offset
		637334 to 646000	637334 to 646000	Low, Middle, High	20MHz	QPSK,	1RB/ 0RB Offset
		638000 to 645332	638000 to 645332	Low, Middle, High	40MHz	Pi/2BPSK, QPSK, 16QAM, 64QAM, 256QAM	1RB/ 0RB Offset
B	FREQUENCY STABILITY	637334 to 646000	637334 to 646000	Low, Middle, High	20MHz	QPSK	Outer_ Full
A	PEAK TO AVERAGE RATIO	637334 to 646000	637334 to 646000	Low, Middle, High	20MHz	QPSK	Outer_ Full
A	OCCUPIED BANDWIDTH	637000 to 646332	637000 to 646332	Middle	10MHz	Pi/2BPSK, QPSK, 16QAM, 64QAM, 256QAM	Outer_ Full



		637334 to 646000	637334 to 646000	Middle	20MHz	Pi/2BPSK,QPSK, 16QAM, 64QAM, 256QAM	Outer_Full
		638000 to 645332	638000 to 645332	Middle	40MHz	Pi/2BPSK,QPSK, 16QAM, 64QAM, 256QAM	Outer_Full
A	BAND EDGE	637000 to 646332	637000 to 646332	Low	10MHz	QPSK	1RB/ 0RB Offset
							Outer_Full
				High	10MHz	QPSK	1RB/ max Offset
							Outer_Full
		637334 to 646000	637334 to 646000	Low	20MHz	QPSK	1RB/ 0RB Offset
							Outer_Full
				High	20MHz	QPSK	1RB/ max Offset
							Outer_Full
		638000 to 645332	638000 to 645332	Low	40MHz	QPSK	1RB/ 0RB Offset
							Outer_Full
				High	40MHz	QPSK	1RB/ max Offset
							Outer_Full
A	CONDUCTED EMISSION	637000 to 646332	637000 to 646332	Low, Middle, High	10MHz	QPSK	1RB/ 0RB Offset
		637334 to 646000	637334 to 646000	Low, Middle, High	20MHz	QPSK	1RB/ 0RB Offset
		638000 to 645332	638000 to 645332	Low, Middle, High	40MHz	QPSK	1RB/ 0RB Offset
A	RADIATED EMISSION	637000 to 646332	637000 to 646332	Low, Middle, High	10MHz	QPSK	1RB/ 0RB Offset
		637334 to 646000	637334 to 646000	Middle	20MHz	QPSK	1RB/ 0RB Offset
		638000 to 645332	638000 to 645332	Middle,	40MHz	QPSK	1RB/ 0RB Offset
A	ACLR	637000 to 646332	637000 to 646332	Low	10MHz	QPSK	1RB/ 0RB Offset
							Outer_Full
				High	10MHz	QPSK	1RB/ max Offset
							Outer_Full
		637334 to 646000	637334 to 646000	Low	20MHz	QPSK	1RB/ 0RB Offset
							Outer_Full
				High	20MHz	QPSK	1RB/ max Offset
							Outer_Full
		638000 to 645332	638000 to 645332	Low	40MHz	QPSK	1RB/ 0RB Offset
							Outer_Full
				High	40MHz	QPSK	1RB/ max Offset
							Outer_Full

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

2. The test data presented in the report from worst SA_n48

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP&EIRP	23deg. C, 70%RH	DC 5V By Adapter	Chao Wu
FREQUENCY STABILITY	23deg. C, 70%RH	DC 3.6V/3.7V/4.2V By DC Supply	James Fu
OCCUPIED BANDWIDTH	23deg. C, 70%RH	DC5V By Adapter	James Fu
BAND EDGE	23deg. C, 70%RH	DC 5V By Adapter	James Fu
CONDCUDED EMISSION	23deg. C, 70%RH	DC5V By Adapter	James Fu
RADIATED EMISSION	23deg. C, 70%RH	DC5V By Adapter	Chao Wu
PEAK TO AVERAGE RATIO	23deg. C, 70%RH	DC5V By Adapter	James Fu

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 96

KDB 971168 D02 Power Meas License Digital Systems v02r02

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

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

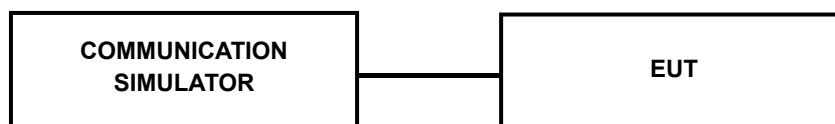
3 TEST TYPES AND RESULTS

3.1 MAXIMUM EIRP MEASUREMENT

3.1.1 LIMITS OF MAXIMUM EIRP MEASUREMENT

Device	Maximum EIRP (dBm/10 MHz)
End User Device	23
Category A CBSD	30
Category B CBSD	47

3.1.2 TEST SETUP



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

3.1.3 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 determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_T - L_C$$

Where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively
(expressed in the same units as P_{Meas} , typically dBW or dBm);

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

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

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

CONDUCTED POWER MEASUREMENT:

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

Note: The worst case EIRP shown in this section is found with SA operating only using 1RB. As such, the EIRP/10MHz and full channel EIRP values will be identical since 1RB is fully contained within all available channel bandwidths (i.e., 10, 15, 20, 40MHz).

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

3.1.5 TEST RESULTS

5G SA

N48

BW	MCS Index	RB Size	RB Offset	Low CH 637000	Mid CH 641666	High CH 646332
				Frequency 3555MHz	Frequency 3624.99MHz	Frequency 3694.98MHz
10M	CP-OFDM QPSK	1	12	20.34	20.84	21.13

BW	MCS Index	RB Size	RB Offset	Low CH 637000	Mid CH 641666	High CH 646332
				Frequency 3555MHz	Frequency 3624.99MHz	Frequency 3694.98MHz
15M	CP-OFDM QPSK	1	19	20.55	20.63	21.17

BW	MCS Index	RB Size	RB Offset	Low CH 637334	Mid CH 641666	High CH 646000
				Frequency 3560.01MHz	Frequency 3624.99MHz	Frequency 3690MHz
20M	CP-OFDM QPSK	1	26	20.18	20.79	21.02

BW	MCS Index	RB Size	RB Offset	Low CH 638000	Mid CH 641666	High CH 645332
				Frequency 3570MHz	Frequency 3624.99MHz	Frequency 3679.98MHz
40M	CP-OFDM QPSK	1	53	20.61	20.77	21.15

BW	MCS Index	RB Size	RB Offset	Low CH 637000	Mid CH 641666	High CH 646332
				Frequency 3555MHz	Frequency 3624.99MHz	Frequency 3694.98MHz
10M	DFT-s-OFDM QPSK	1	12	21.71	22.21	22.31

BW	MCS Index	RB Size	RB Offset	Low CH 637000	Mid CH 641666	High CH 646332
				Frequency 3555MHz	Frequency 3624.99MHz	Frequency 3694.98MHz
15M	DFT-s-OFDM QPSK	1	19	21.84	22.26	22.30

BW	MCS Index	RB Size	RB Offset	Low CH 637334	Mid CH 641666	High CH 646000
				Frequency 3560.01MHz	Frequency 3624.99MHz	Frequency 3690MHz
20M	DFT-s-OFDM QPSK	1	26	21.72	22.32	22.31

BW	MCS Index	RB Size	RB Offset	Low CH 638000	Mid CH 641666	High CH 645332
				Frequency 3570MHz	Frequency 3624.99MHz	Frequency 3679.98MHz
40M	DFT-s-OFDM Pi/2 BPSK	1	1	21.69	21.81	21.28
		1	53	21.29	21.94	22.26
		1	104	21.18	21.57	22.16
		50	0	21.56	21.37	21.32
		50	28	21.29	22.37	22.18
		50	56	21.78	21.66	21.75
		100	0	21.71	21.75	21.53
	DFT-s-OFDM QPSK	1	1	21.72	21.89	21.32
		1	53	21.46	22.44	22.27
		1	104	21.27	21.77	22.07
		50	0	21.30	21.28	20.83
		50	28	21.27	22.33	22.14
		50	56	21.29	21.11	21.27
		100	0	21.20	21.21	21.04
	DFT-s-OFDM 16QAM	1	53	20.72	20.98	21.35
	DFT-s-OFDM 64QAM	1	53	18.74	19.40	19.65
	DFT-s-OFDM 256QAM	1	53	17.39	18.10	18.42



EIRP

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CHANNEL BANDWIDTH: 40M DFT-s-OFDM Pi/2 BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	EIRP (dBm)	EIRP (mW)	Limit (dBm/10MHz)
638000	3570	21.78	0.5	22.28	169.04	23
641666	3624.99	22.37	0.5	22.87	193.64	23
645332	3679.98	22.26	0.5	22.76	188.8	23

CHANNEL BANDWIDTH: 40M DFT-s-OFDM QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	EIRP (dBm)	EIRP (mW)	Limit (dBm/10MHz)
638000	3570	21.72	0.5	22.22	166.72	23
641666	3624.99	22.44	0.5	22.94	196.79	23
645332	3679.98	22.27	0.5	22.77	189.23	23

CHANNEL BANDWIDTH: 40M DFT-s-OFDM 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	EIRP (dBm)	EIRP (mW)	Limit (dBm/10MHz)
638000	3570	20.72	0.5	21.22	132.43	23
641666	3624.99	20.98	0.5	21.48	140.6	23
645332	3679.98	21.35	0.5	21.85	153.11	23

CHANNEL BANDWIDTH: 40M DFT-s-OFDM 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	EIRP (dBm)	EIRP (mW)	Limit (dBm/10MHz)
638000	3570	18.74	0.5	19.24	83.95	23
641666	3624.99	19.4	0.5	19.9	97.72	23
645332	3679.98	19.65	0.5	20.15	103.51	23

CHANNEL BANDWIDTH: 40M DFT-s-OFDM 256QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	EIRP (dBm)	EIRP (mW)	Limit (dBm/10MHz)
638000	3570	17.39	0.5	17.89	61.52	23
641666	3624.99	18.1	0.5	18.6	72.44	23
645332	3679.98	18.42	0.5	18.92	77.98	23

CHANNEL BANDWIDTH: 20M DFT-s-OFDM QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	EIRP (dBm)	EIRP (mW)	Limit (dBm/10MHz)
637334	3560.01	21.72	0.5	22.22	166.72	23
641666	3624.99	22.32	0.5	22.82	191.43	23
646000	3690	22.31	0.5	22.81	190.99	23

CHANNEL BANDWIDTH: 15M DFT-s-OFDM QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	EIRP (dBm)	EIRP (mW)	Limit (dBm/10MHz)
637168	3557.52	21.84	0.5	22.34	171.4	23
641666	3624.99	22.26	0.5	22.76	188.8	23
646166	3692.49	22.3	0.5	22.8	190.55	23

CHANNEL BANDWIDTH: 10M DFT-s-OFDM QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _c (dB)	EIRP (dBm)	EIRP (mW)	Limit (dBm/10MHz)
637000	3555	21.71	0.5	22.21	166.34	23
641666	3624.99	22.21	0.5	22.71	186.64	23
646332	3694.98	22.31	0.5	22.81	190.99	23

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

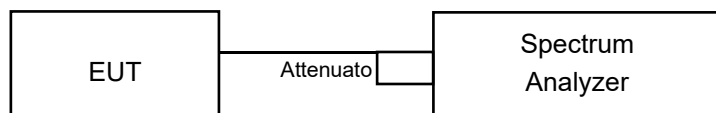
Note: The worst case EIRP shown in this section is found with NR operating only using 1RB. As such, the EIRP/10MHz and full channel EIRP values will be identical since 1RB is fully contained within all available channel bandwidths (i.e., 10, 15, 20,40MHz).

3.2 CONDUCTED BAND EDGE

3.2.1 LIMITS OF CONDUCTED BAND EDGE MEASUREMENT

The conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

3.2.2 TEST SETUP



3.2.3 TEST INSTRUMENTS

Refer to section 1.2 to get information about the above instrument.

3.2.4 TEST PROCEDURE

For the Conducted Band Edge:

- 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) $\geq 1\%$ 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 $\geq 3 \times$ 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.

For Adjacent Channel Leakage Ratio (ACLR) measurement:

1. The Adjacent Channel Leakage Ratio (ACLR) is the ratio of the average power in the assigned aggregated channel bandwidth to the average power over the equivalent adjacent channel bandwidth.
2. The option ACLR of spectrum analyzer is used and measures the ACLR ratio by setting equivalent channel bandwidth.
3. The measured ACLR ratio shall be at least 30 dB.

3.2.5 DEVIATION FROM TEST STANDARD

No deviation.



3.2.6 TEST RESULTS

Please Refer to Appendix Of this test report.



3.3 FREQUENCY STABILITY MEASUREMENT

3.3.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

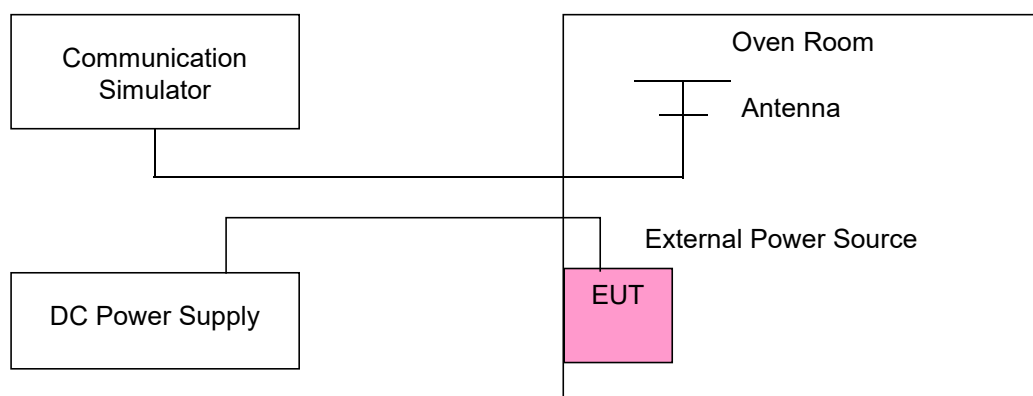
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency band.

3.3.2 TEST PROCEDURE

- 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.
- 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.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ 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.

3.3.3 TEST SETUP





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3.3.4 TEST RESULTS

Please Refer to Appendix Of this test report.

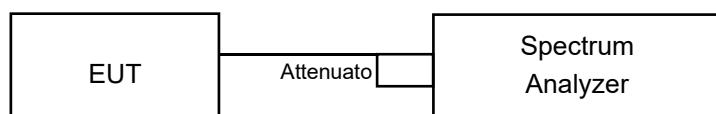
Note: VL = Low voltage(3.6V); VN/NV = Normal voltage(3.7V); VH = High voltage(4.2V);
NT = Normal temperature (25°C)

3.4 OCCUPIED BANDWIDTH MEASUREMENT

3.4.1 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.

3.4.2 TEST SETUP



3.4.3 TEST INSTRUMENTS

Refer to section 1.2 to get information of above instrument.

3.4.4 TEST PROCEDURE

- 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.

3.4.5 DEVIATION FROM TEST STANDARD

No deviation.



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3.4.6 TEST RESULT

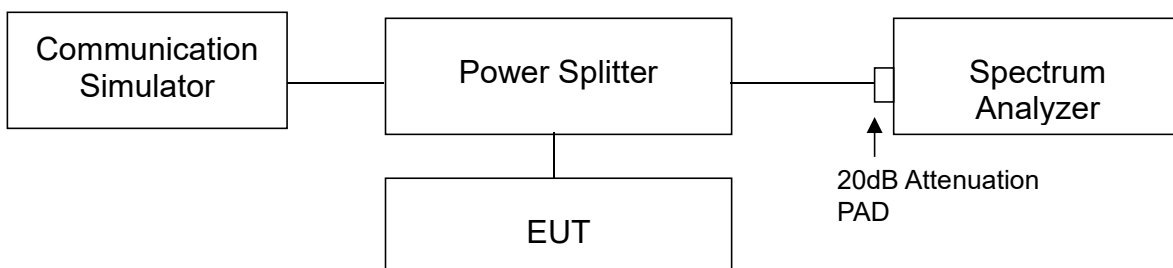
Please Refer to Appendix Of this test report.

3.5 CONDUCTED SPURIOUS EMISSIONS

3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

The power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

3.5.2 TEST SETUP



3.5.3 TEST PROCEDURE

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 40 GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.



3.5.4 TEST RESULTS

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 emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

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(below or equal 1GHz) and/or 1.5m(above 1GHz) 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 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,
$$\text{E.R.P power} = \text{E.I.P.R power} - 2.15\text{dBi}.$$

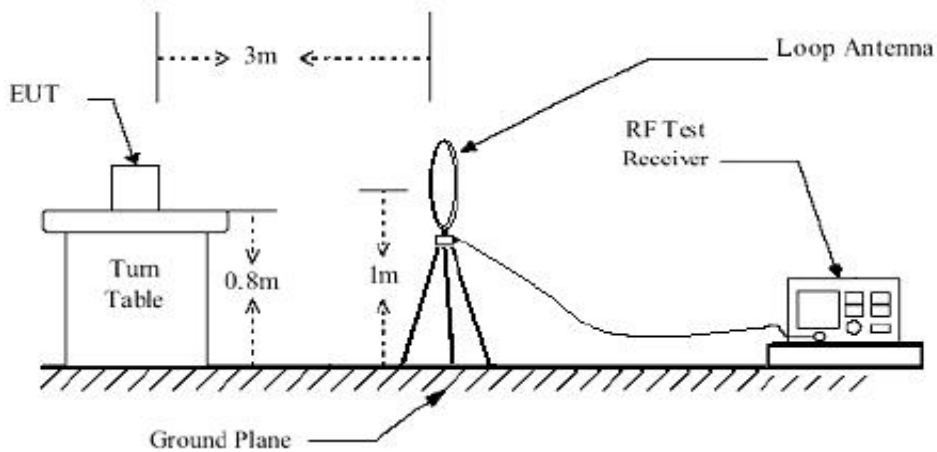
Note: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.6.3 DEVIATION FROM TEST STANDARD

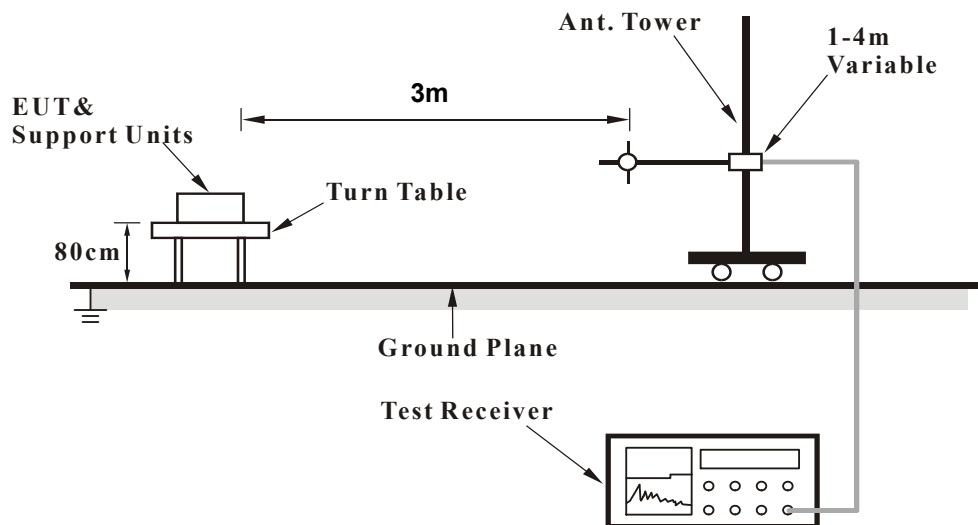
No deviation.

3.6.4 TEST SET UP

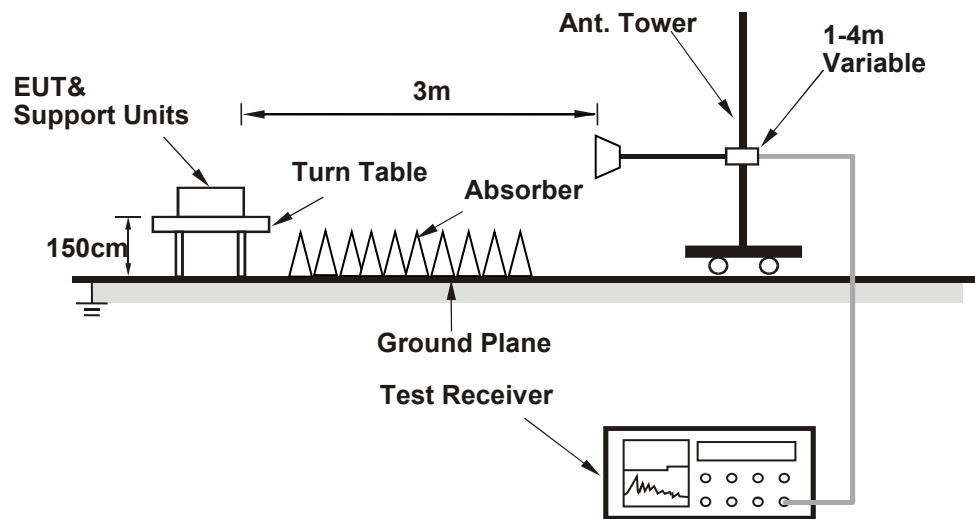
< Frequency Range below 30MHz >



<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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.

5G SA BELOW 1GHz WORST-CASE DATA

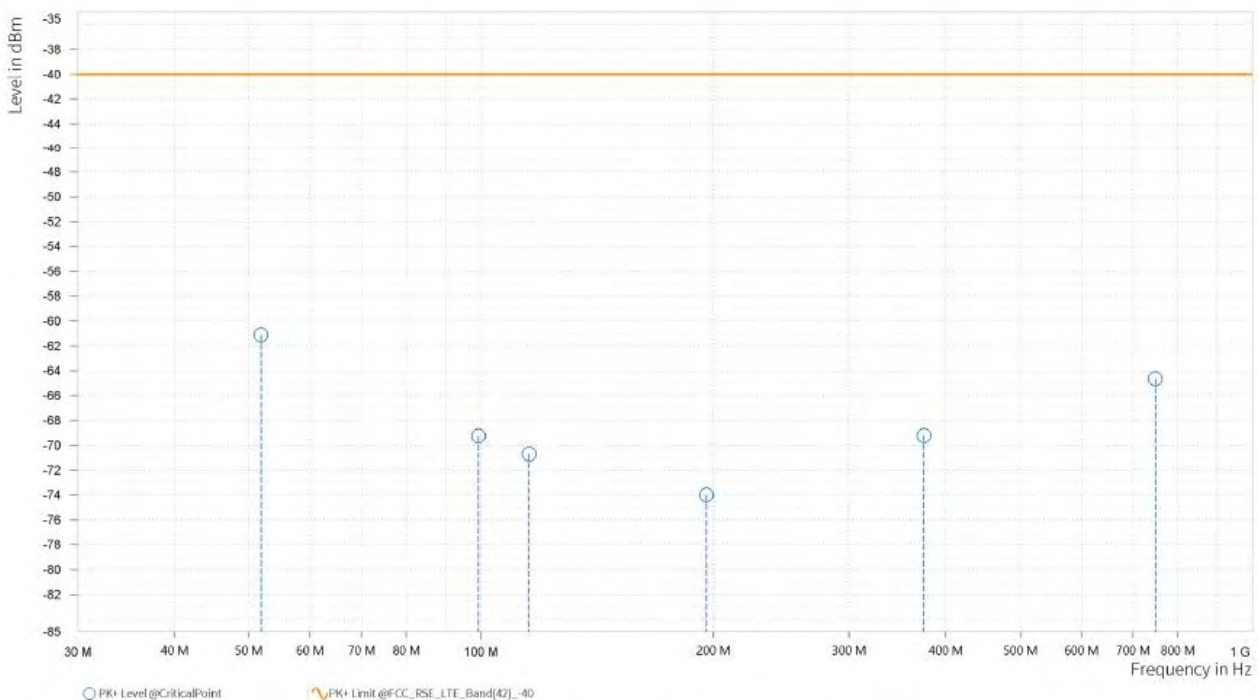
30 MHz – 1GHz data:

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CHANNEL BANDWIDTH: 10MHz / QPSK

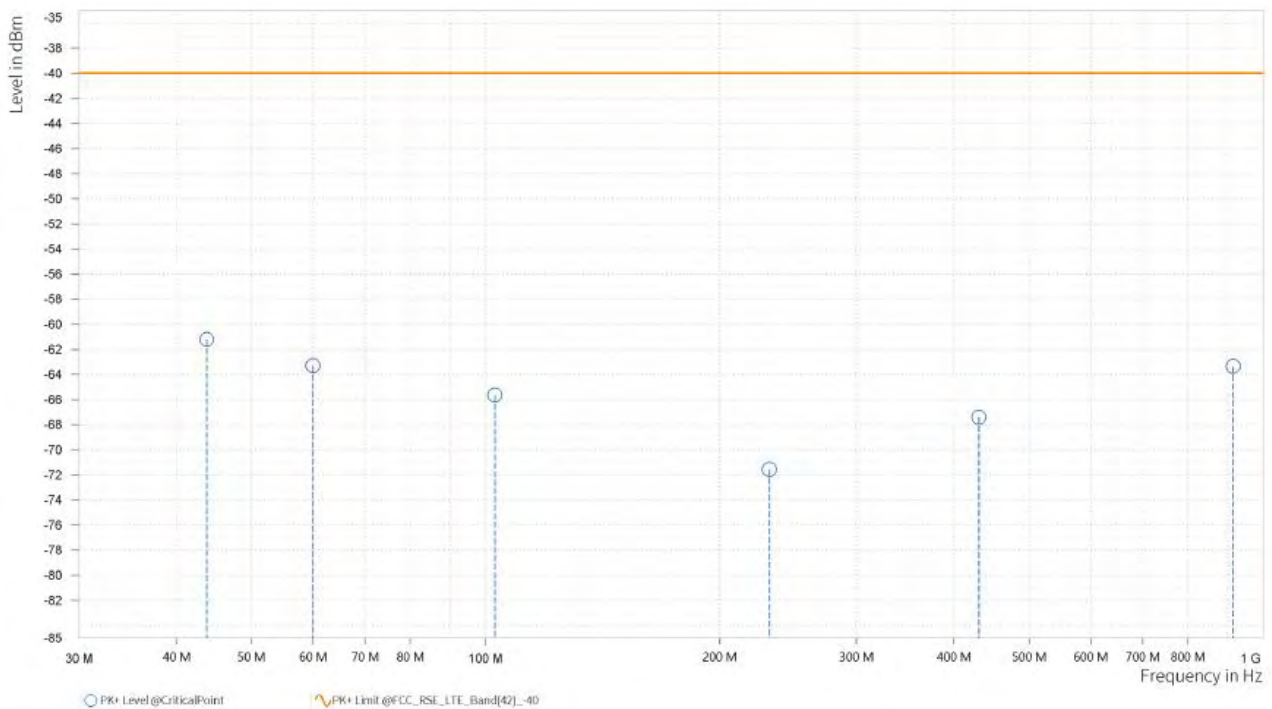
MODE	TX channel 646332	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	51.850	-61.13	-40.00	21.13	4.94	H	130.6	1
1	99.200	-69.24	-40.00	29.24	0.42	H	126	1
1	115.400	-70.71	-40.00	30.71	-0.44	H	238	2
1	196.000	-74.00	-40.00	34.00	-0.67	H	126	1
1	375.000	-69.21	-40.00	29.21	7.17	H	126	1
2	748.513	-64.64	-40.00	24.64	11.50	H	126	1



MODE	TX channel 646332	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	43.800	-61.21	-40.00	21.21	5.36	V	125.9	2
1	59.950	-63.31	-40.00	23.31	4.41	V	238	2
1	102.750	-65.65	-40.00	25.65	2.61	V	238	2
1	231.750	-71.56	-40.00	31.56	2.96	V	233.8	2
1	431.000	-67.40	-40.00	27.40	7.72	V	125.9	2
2	914.933	-63.36	-40.00	23.36	15.39	V	126	1



ABOVE 1GHz

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

N48

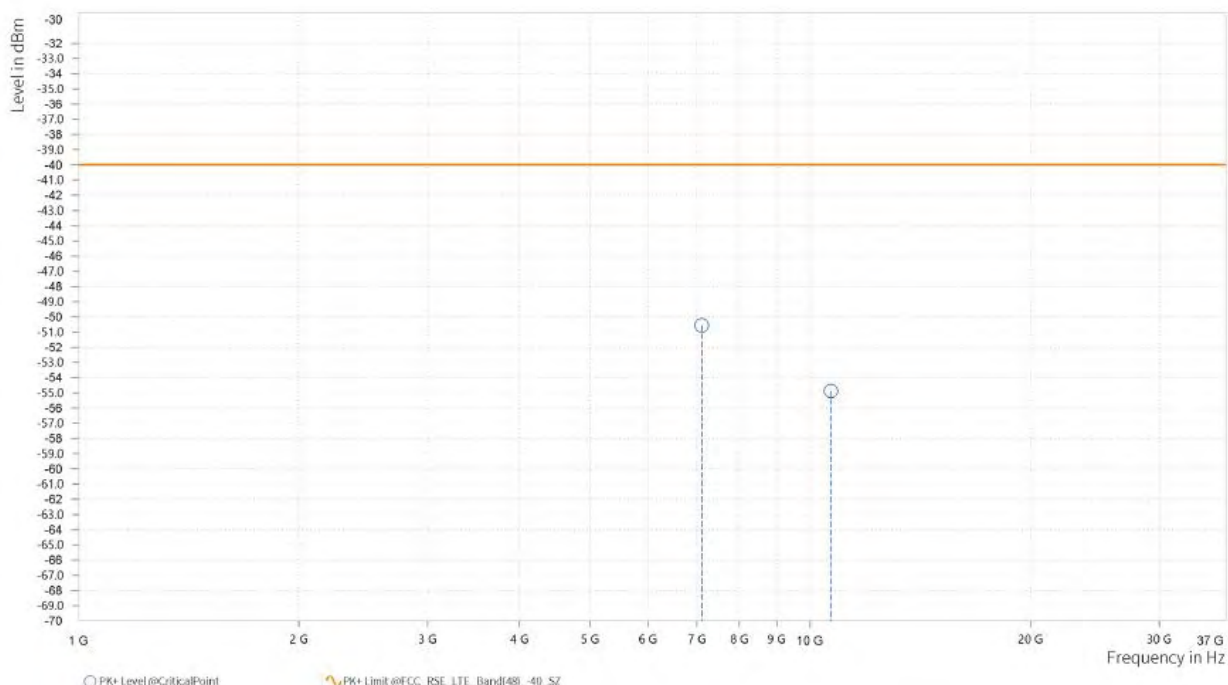
Note: For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.

CHANNEL BANDWIDTH: 10MHz / QPSK

637000

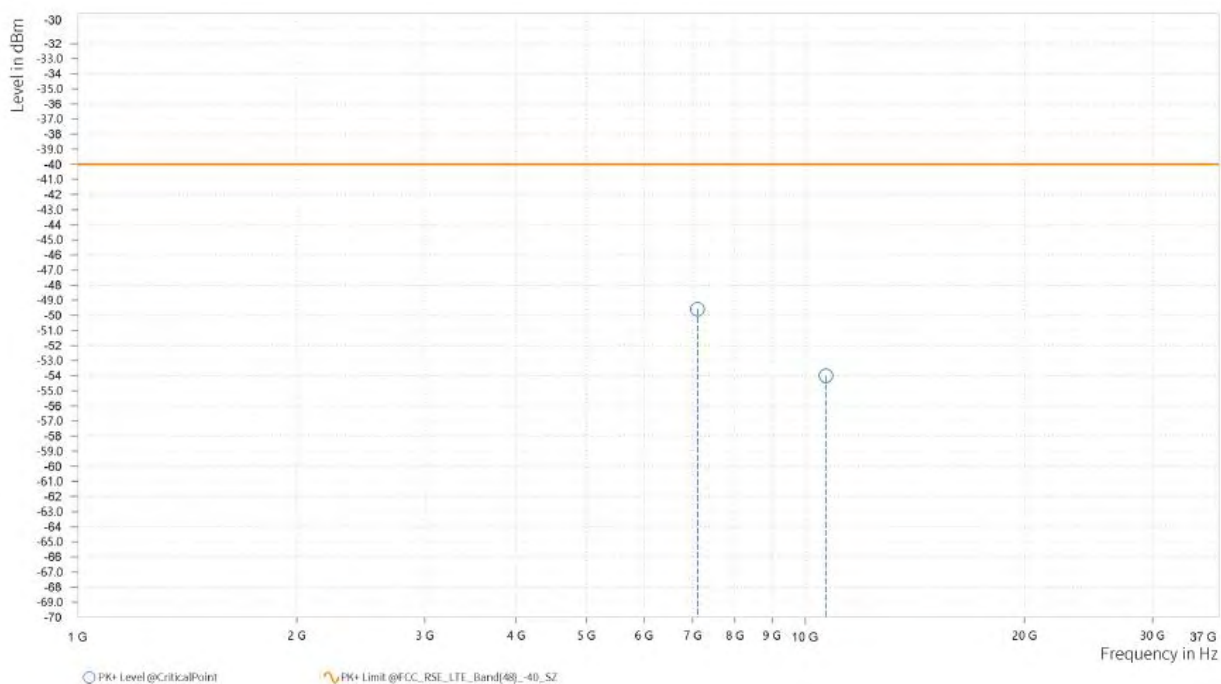
MODE	TX channel 637000	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	7,110.076	-50.55	-40.00	10.55	27.42	H	359	2
6	10,665.909	-54.87	-40.00	14.87	16.94	H	0.9	2



MODE	TX channel 637000	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	7,111.106	-49.59	-40.00	9.59	27.40	V	78.3	1
6	10,665.909	-54.01	-40.00	14.01	17.14	V	359	1





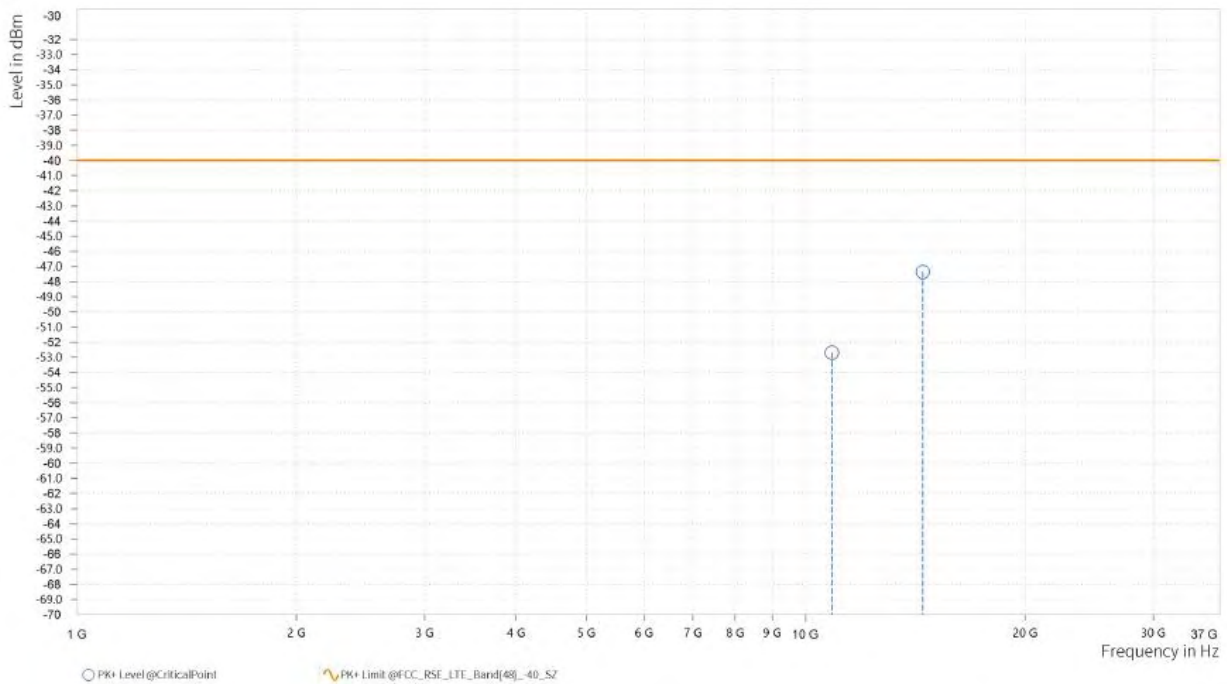
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Test Report No.: W7L-P22110036RF11

CH641666

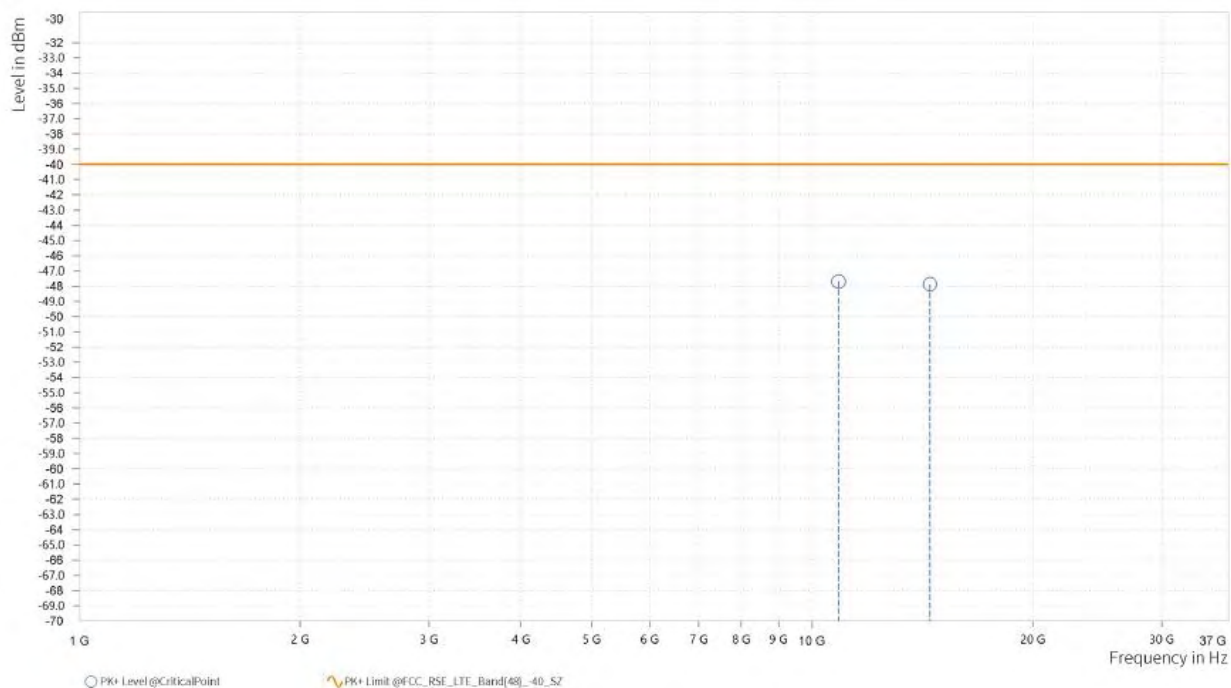
MODE	TX channel 641666	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	10,861.800	-52.70	-40.00	12.70	16.38	H	0.9	2
6	14,482.273	-47.36	-40.00	7.36	20.02	H	359	2



MODE	TX channel 641666	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

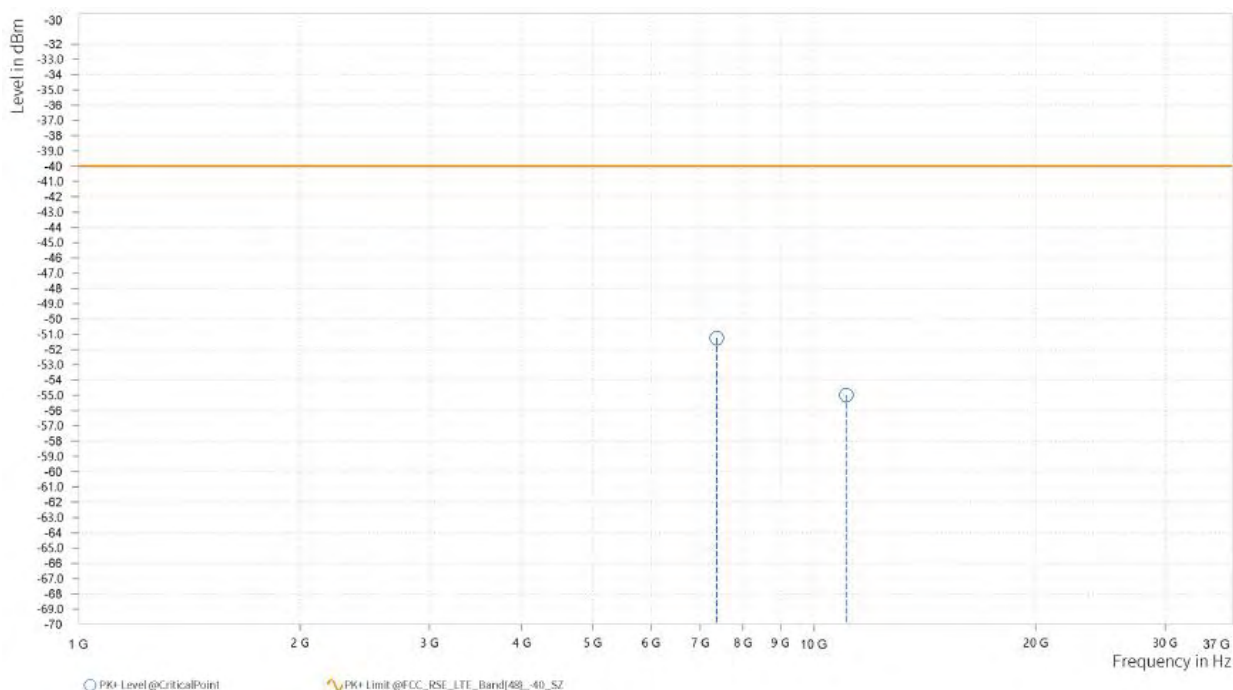
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	10,861.818	-47.69	-40.00	7.69	16.51	V	1	1
6	14,482.273	-47.87	-40.00	7.87	19.96	V	1	1



CH646332

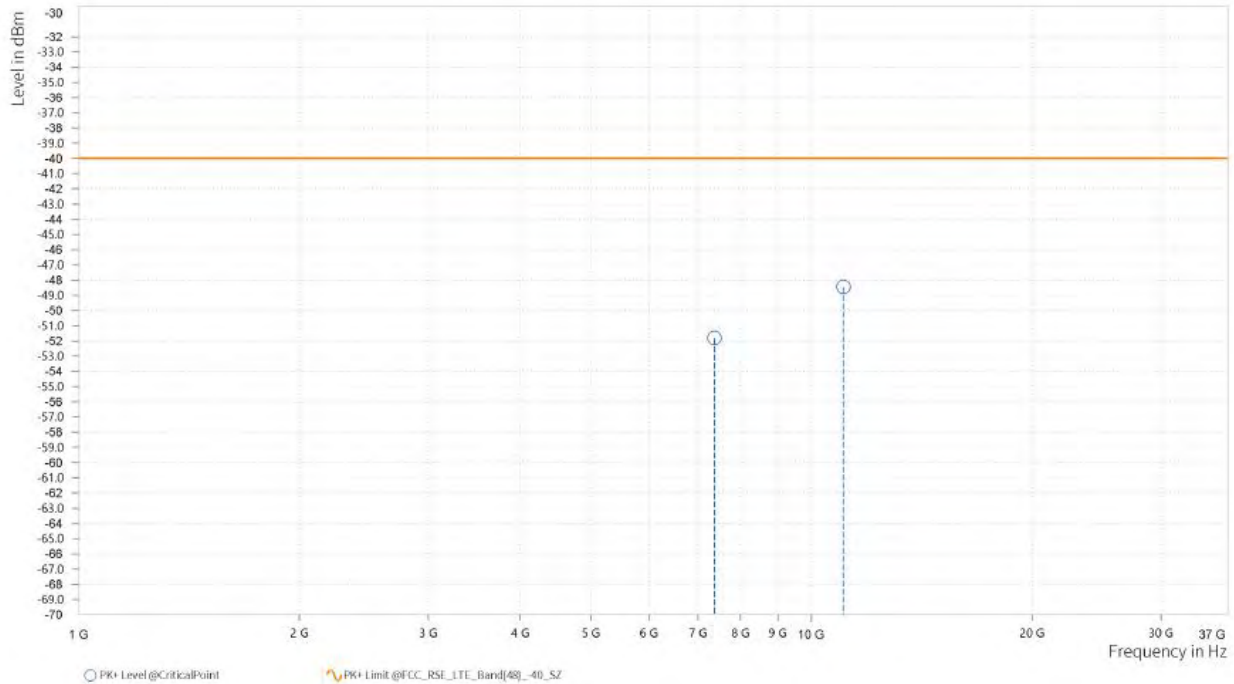
MODE	TX channel 646332	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	7,371.000	-51.25	-40.00	11.25	26.57	H	359	1
6	11,055.909	-54.97	-40.00	14.97	17.05	H	359	2



MODE	TX channel 646332	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

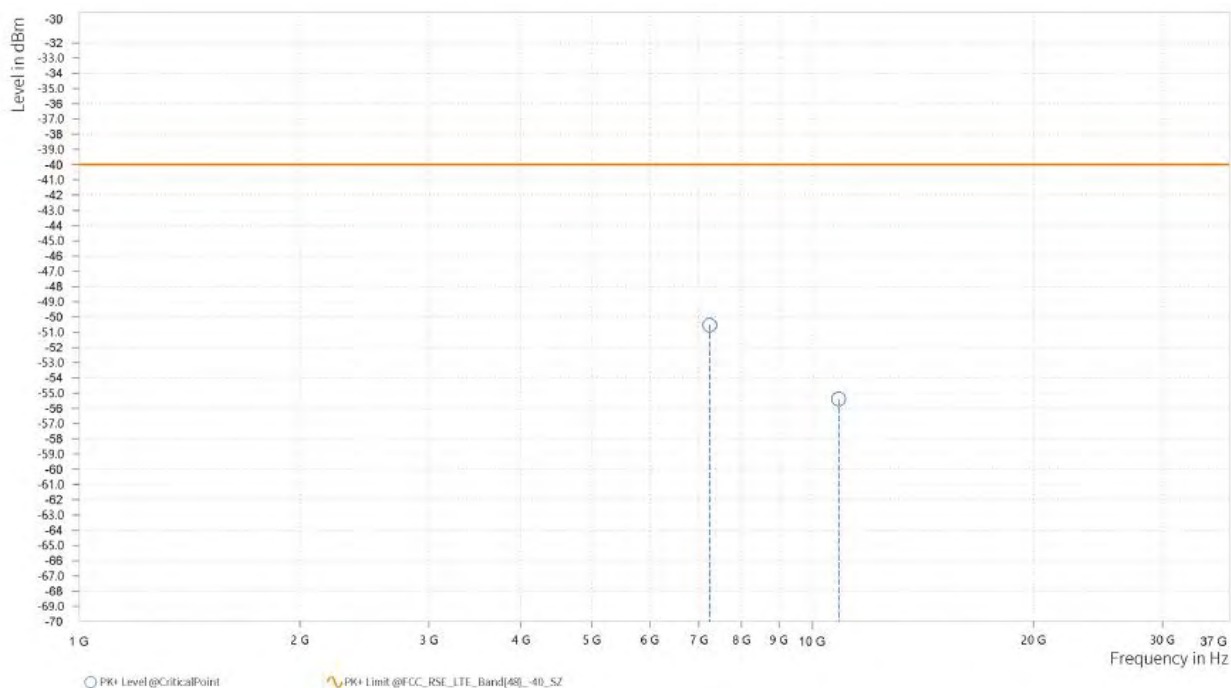
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	7,371.000	-51.82	-40.00	11.82	26.61	V	78.3	1
6	11,057.273	-48.44	-40.00	8.44	17.24	V	1	2



CHANNEL BANDWIDTH: 15MHz / QPSK

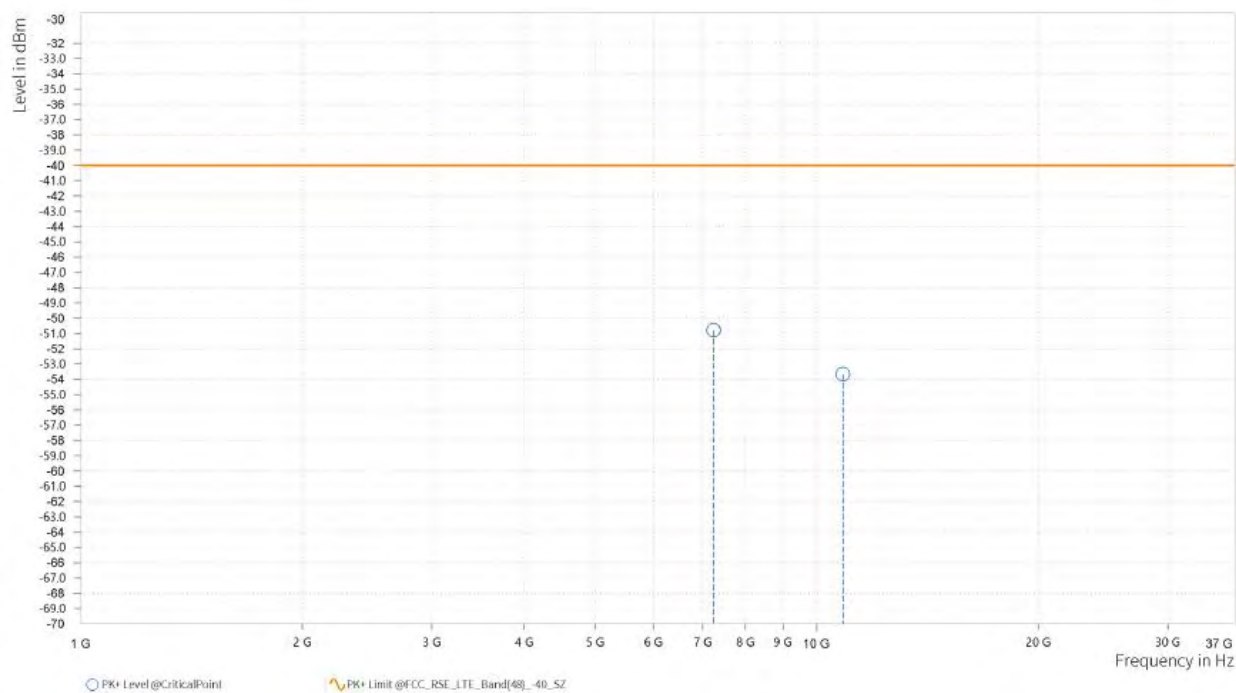
MODE	TX channel 641666	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	7,236.288	-50.53	-40.00	10.53	27.41	H	1	1
6	10,853.636	-55.40	-40.00	15.40	16.42	H	359.1	1



MODE	TX channel 641666	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	7,236.030	-50.78	-40.00	10.78	27.38	V	69.9	1
6	10,855.000	-53.68	-40.00	13.68	16.55	V	1	2





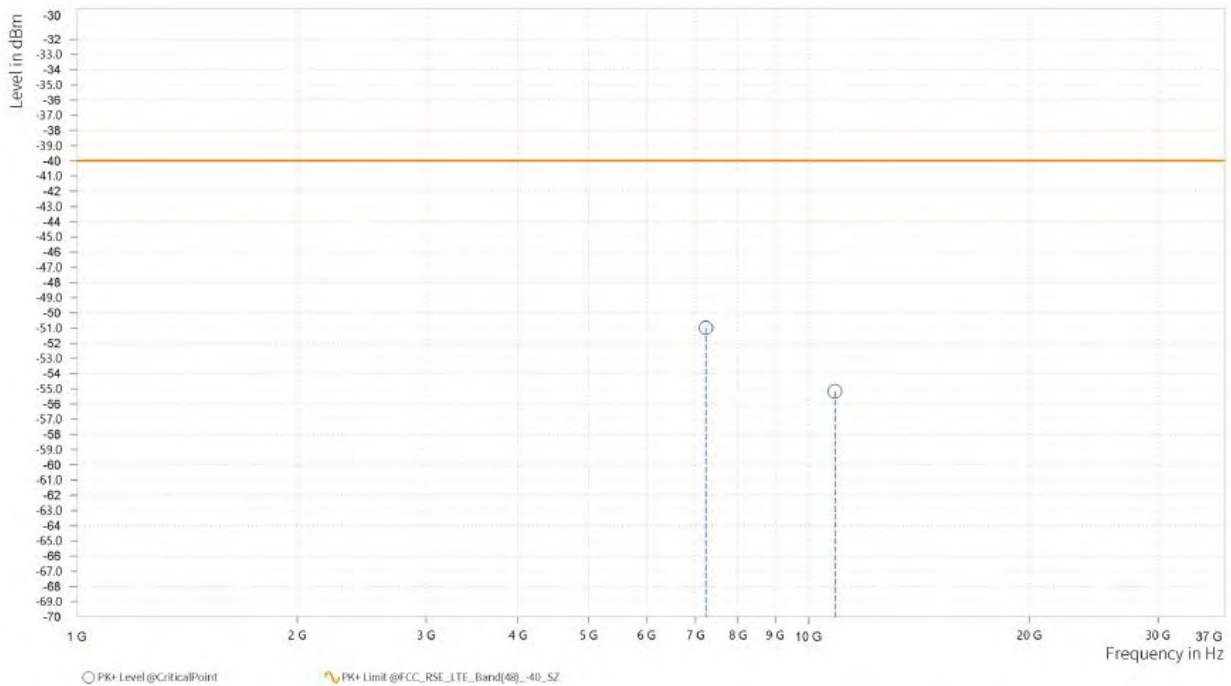
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VERITAS

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CHANNEL BANDWIDTH: 20MHz / QPSK

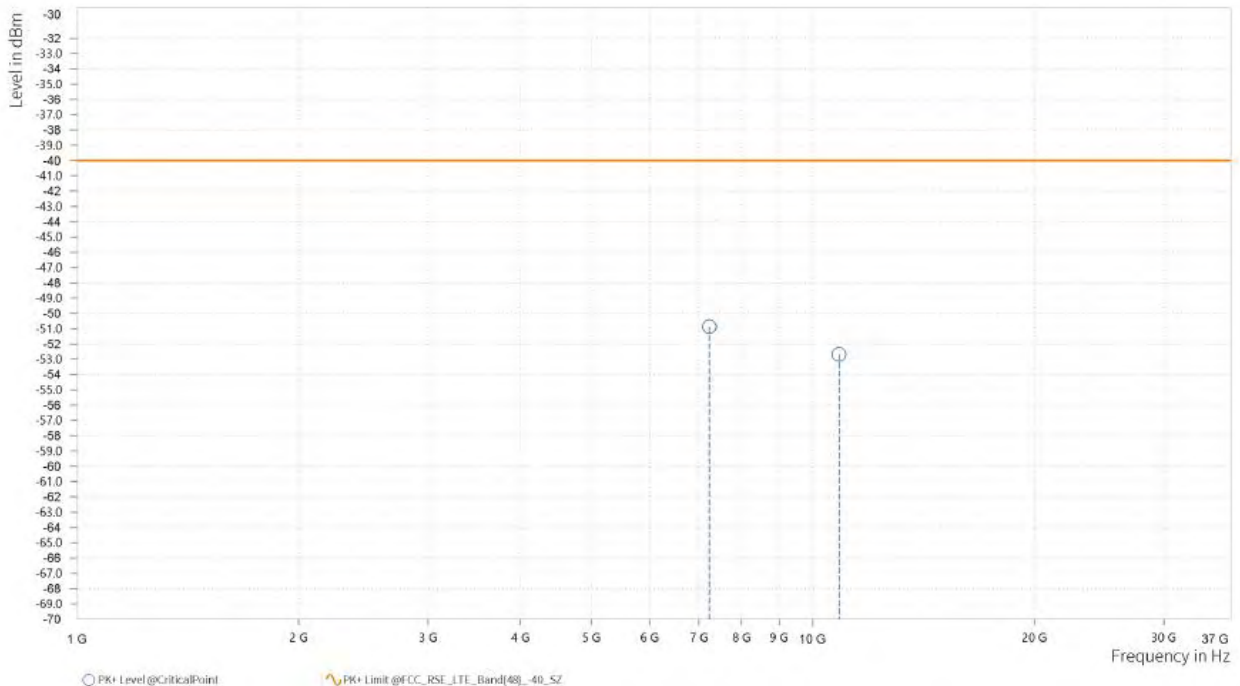
MODE	TX channel 641666	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	7,232.167	-50.99	-40.00	10.99	27.44	H	1	1
6	10,848.182	-55.16	-40.00	15.16	16.45	H	6.1	2



MODE	TX channel 641666	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V 60HZ
TESTED BY	Chao Wu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	7,231.909	-50.87	-40.00	10.87	27.42	V	359	1
6	10,848.182	-52.67	-40.00	12.67	16.58	V	6.2	1



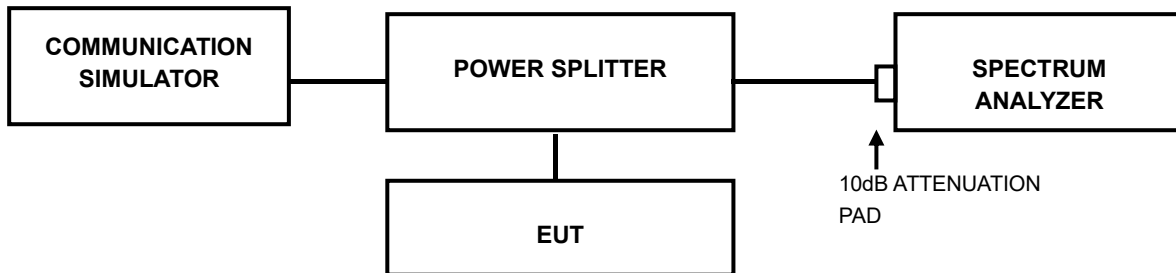


3.7 PEAK TO AVERAGE RATIO

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 $\geq$ 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%.



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3.7.4 TEST RESULTS

Please Refer to Appendix Of this test report.



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4 INFORMATION ON THE TESTING LABORATORIES

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

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

Shenzhen EMC/RF Lab:

Tel: +86-755-88696566

Fax: +86-755-88696577

Email: customerservice.sw@cn.bureauveritas.com

Web Site: www.adt.com.tw

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

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

NR BAND N48

PEAK-TO-AVERAGE RATIO(CCDF) TEST RESULT

Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dB)	Limit(dB)	Verdict
N48	20MHz	QPSK	637334	1RB#0	5.35	13	PASS
N48	20MHz	QPSK	637334	50RB#0	5.74	13	PASS
N48	20MHz	QPSK	641666	1RB#0	5.31	13	PASS
N48	20MHz	QPSK	641666	50RB#0	5.57	13	PASS
N48	20MHz	QPSK	646000	1RB#0	5.35	13	PASS
N48	20MHz	QPSK	646000	50RB#0	5.55	13	PASS

TEST GRAPHS

N48-20MHz-QPSK-637334-1RB#0



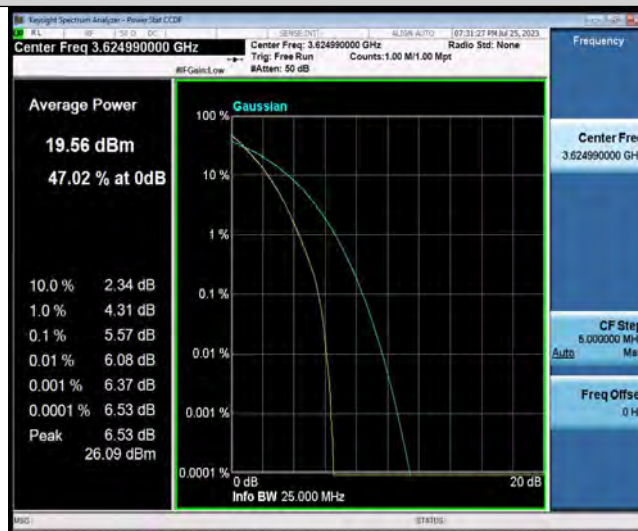
N48-20MHz-QPSK-637334-50RB#0



N48-20MHz-QPSK-641666-1RB#0



N48-20MHz-QPSK-641666-50RB#0



N48-20MHz-QPSK-646000-1RB#0



N48-20MHz-QPSK-646000-50RB#0



26DB BANDWIDTH AND OCCUPIED BANDWIDTH TEST RESULT

Band	Bandwidth	Modulation	Channel	RB Configuration	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
N48	10MHz	QPSK	641666	24RB#0	8.8182	9.968	PASS
N48	10MHz	16QAM	641666	24RB#0	8.8730	9.985	PASS
N48	10MHz	64QAM	641666	24RB#0	8.7867	9.953	PASS
N48	10MHz	256QAM	641666	24RB#0	8.7951	10.04	PASS
N48	10MHz	BPSK	641666	24RB#0	8.7549	9.849	PASS
N48	15MHz	QPSK	641666	36RB#0	12.987	14.43	PASS
N48	15MHz	16QAM	641666	36RB#0	13.030	14.52	PASS
N48	15MHz	64QAM	641666	36RB#0	12.955	14.43	PASS
N48	15MHz	256QAM	641666	36RB#0	13.004	14.42	PASS
N48	15MHz	BPSK	641666	36RB#0	13.023	14.39	PASS
N48	20MHz	QPSK	641666	50RB#0	18.006	19.46	PASS
N48	20MHz	16QAM	641666	50RB#0	17.950	19.51	PASS
N48	20MHz	64QAM	641666	50RB#0	17.980	19.35	PASS
N48	20MHz	256QAM	641666	50RB#0	18.046	19.66	PASS
N48	20MHz	BPSK	641666	50RB#0	17.947	19.23	PASS
N48	40MHz	QPSK	641666	100RB#0	35.806	37.87	PASS
N48	40MHz	16QAM	641666	100RB#0	35.802	38.17	PASS
N48	40MHz	64QAM	641666	100RB#0	35.711	37.75	PASS
N48	40MHz	BPSK	641666	100RB#0	35.780	37.98	PASS
N48	40MHz	256QAM	641666	100RB#0	35.846	37.97	PASS



TEST GRAPHS

N48-10MHz-QPSK-641666-24RB#0



N48-10MHz-16QAM-641666-24RB#0



N48-10MHz-64QAM-641666-24RB#0

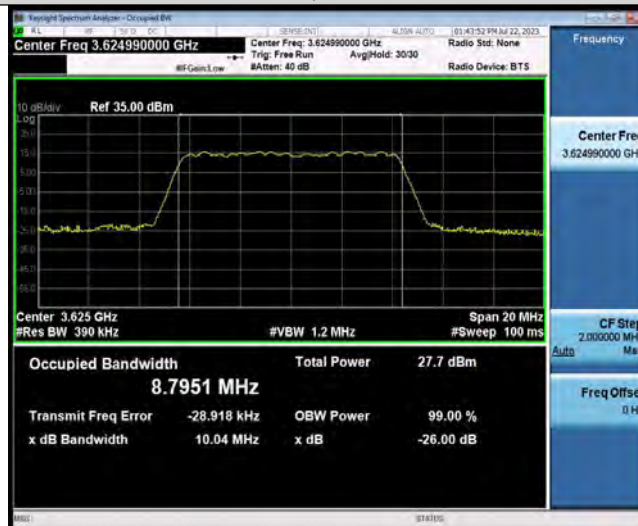


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N48-10MHz-256QAM-641666-24RB#0



N48-10MHz-BPSK-641666-24RB#0



N48-15MHz-QPSK-641666-36RB#0



N48-15MHz-16QAM-641666-36RB#0



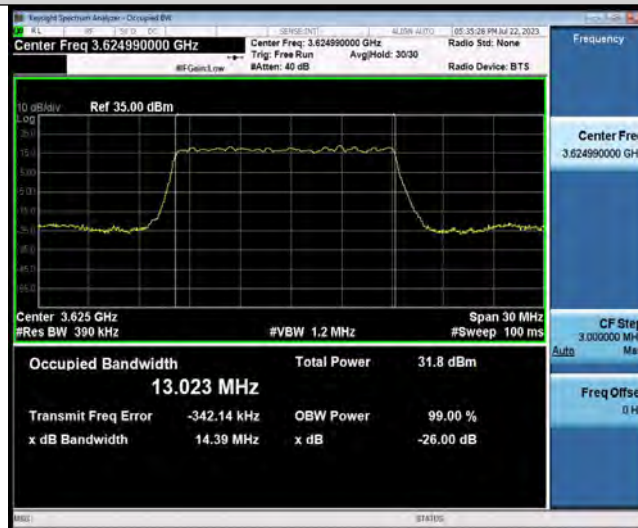
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N48-15MHz-256QAM-641666-36RB#0



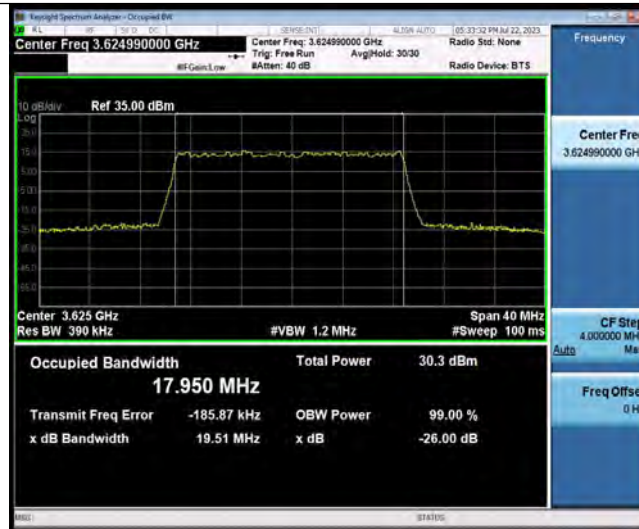
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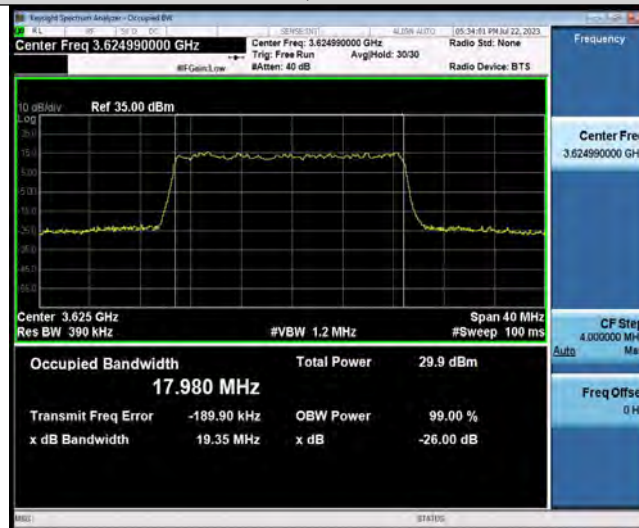
N48-20MHz-QPSK-641666-50RB#0



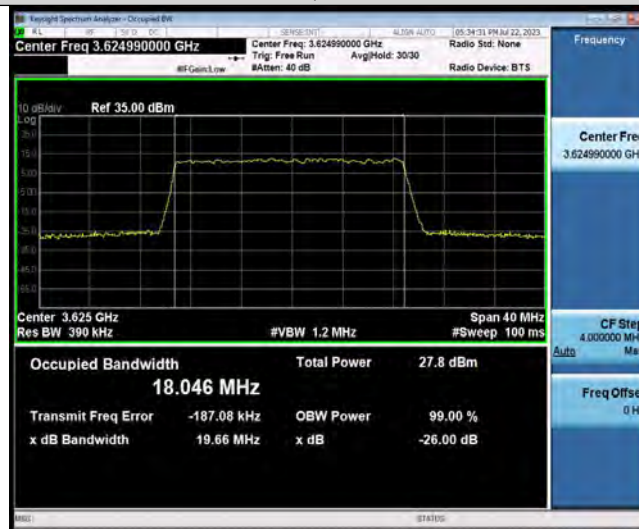
N48-20MHz-16QAM-641666-50RB#0



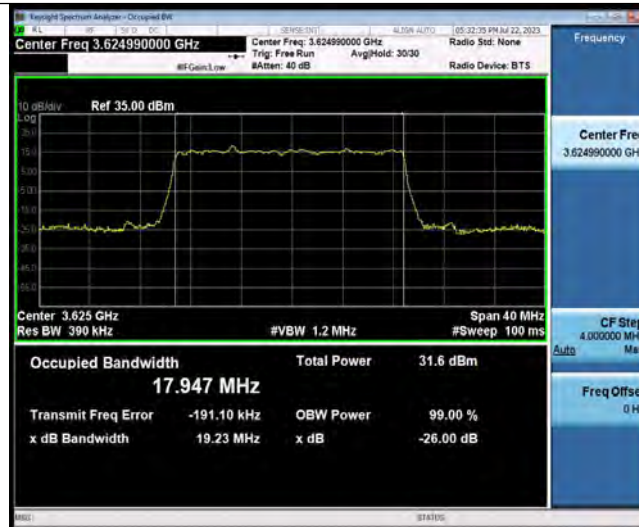
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N48-20MHz-256QAM-641666-50RB#0



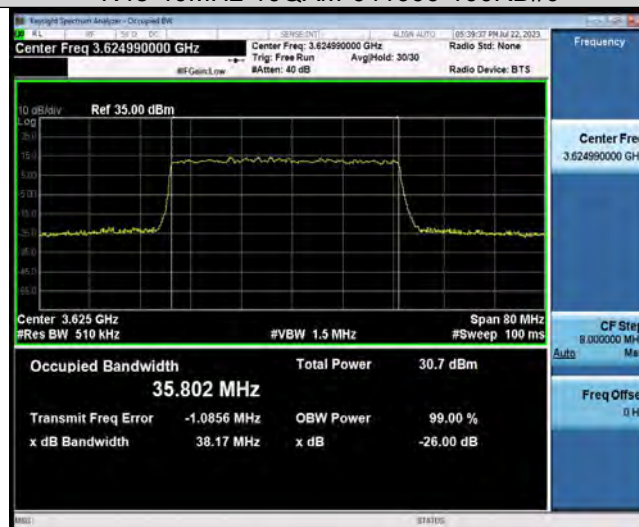
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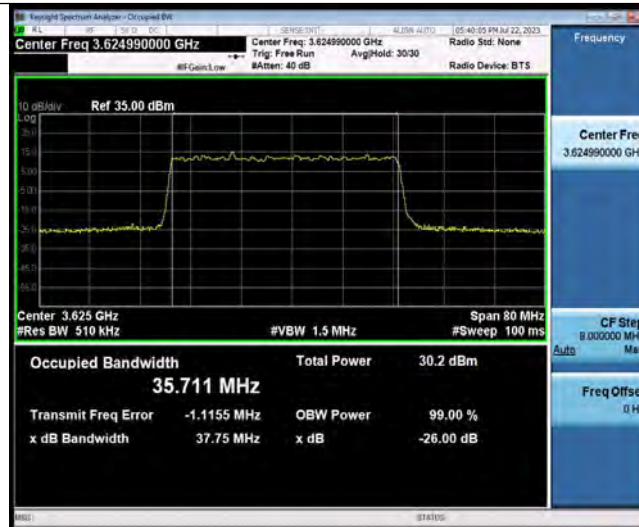
N48-40MHz-QPSK-641666-100RB#0



N48-40MHz-16QAM-641666-100RB#0



N48-40MHz-64QAM-641666-100RB#0



N48-40MHz-BPSK-641666-100RB#0



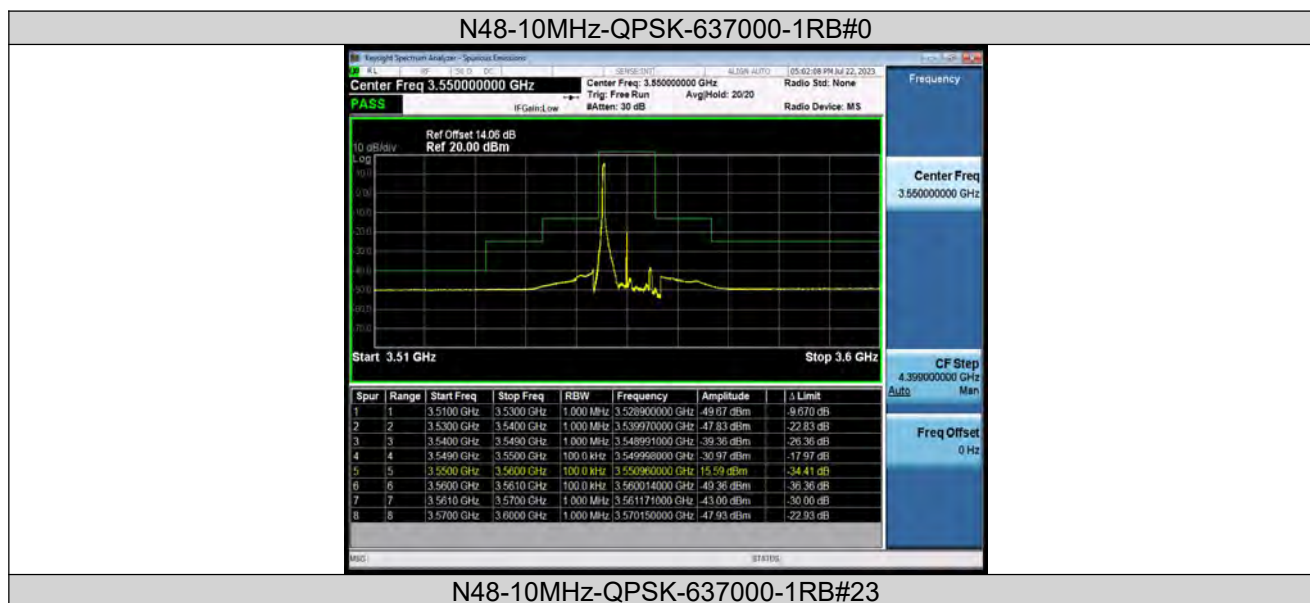
N48-40MHz-256QAM-641666-100RB#0



BAND EDGE TEST RESULT

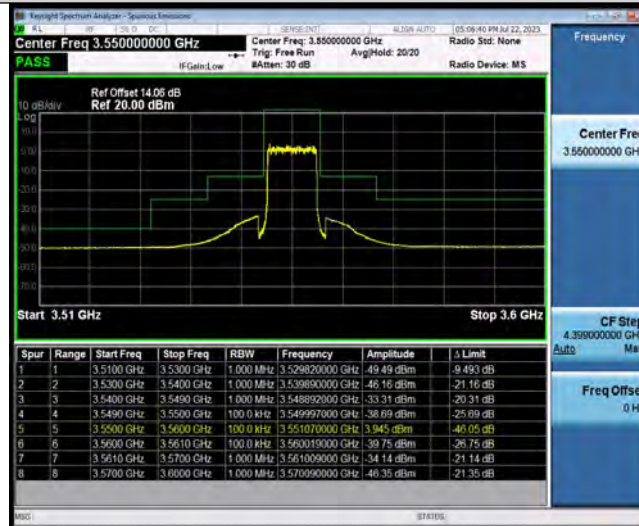
Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dBm)	Verdict
N48	10MHz	QPSK	637000	1RB#0	-49.67,-47.83,-39.36,-30.97	PASS
N48	10MHz	QPSK	637000	1RB#23	-49.31,-48.04,-42.81,-49.02	PASS
N48	10MHz	QPSK	637000	24RB#0	-49.49,-46.16,-33.31,-38.69	PASS
N48	10MHz	QPSK	641666	1RB#0	-30.75,-48.27,-41.82,-45.88	PASS
N48	10MHz	QPSK	641666	1RB#23	-45.93,-33.41,-38.78,-45.85	PASS
N48	10MHz	QPSK	641666	24RB#0	-28.14,-35.44,-28.64,-43.70	PASS
N48	10MHz	QPSK	646332	1RB#0	-47.68,-41.58,-45.14,-45.41	PASS
N48	10MHz	QPSK	646332	1RB#23	-33.52,-39.00,-45.07,-45.51	PASS
N48	10MHz	QPSK	646332	24RB#0	-34.60,-27.69,-42.27,-45.54	PASS

TEST GRAPHS





N48-10MHz-QPSK-637000-24RB#0



N48-10MHz-QPSK-641666-1RB#0



N48-10MHz-QPSK-641666-1RB#23



N48-10MHz-QPSK-641666-24RB#0



N48-10MHz-QPSK-646332-1RB#0



N48-10MHz-QPSK-646332-1RB#23



N48-10MHz-QPSK-646332-24RB#0





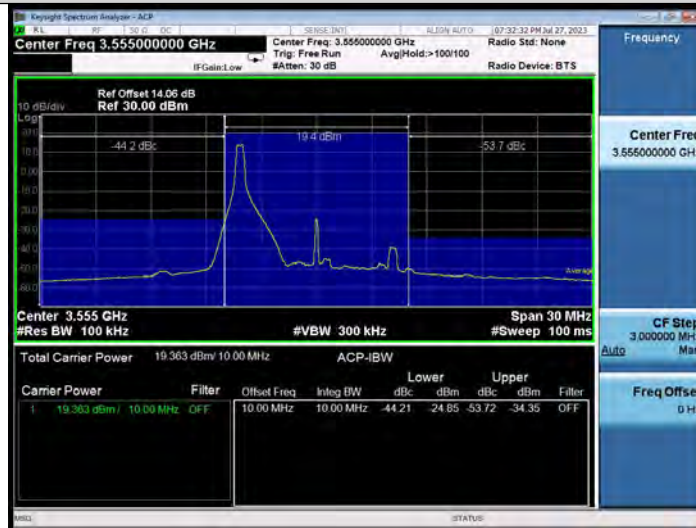
ACLR TEST RESULT

Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dBm)	Verdict
N48	10MHz	QPSK	637000	1RB#0	SeeGarph	PASS
N48	10MHz	QPSK	637000	1RB#23	SeeGarph	PASS
N48	10MHz	QPSK	637000	24RB#0	SeeGarph	PASS
N48	10MHz	QPSK	641666	1RB#0	SeeGarph	PASS
N48	10MHz	QPSK	641666	1RB#23	SeeGarph	PASS
N48	10MHz	QPSK	641666	24RB#0	SeeGarph	PASS
N48	10MHz	QPSK	646332	1RB#0	SeeGarph	PASS
N48	10MHz	QPSK	646332	1RB#23	SeeGarph	PASS
N48	10MHz	QPSK	646332	24RB#0	SeeGarph	PASS

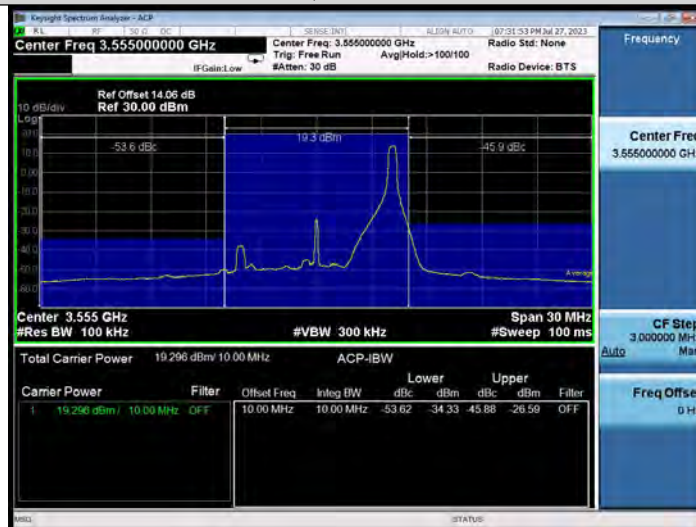


TEST GRAPHS

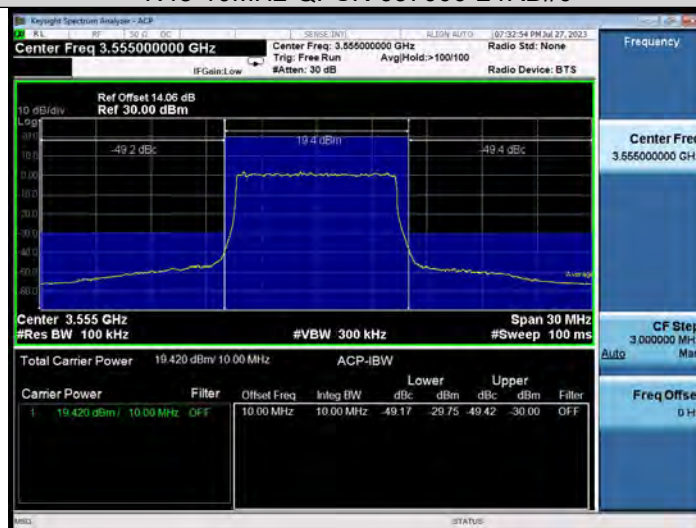
N48-10MHz-QPSK-637000-1RB#0



N48-10MHz-QPSK-637000-1RB#23

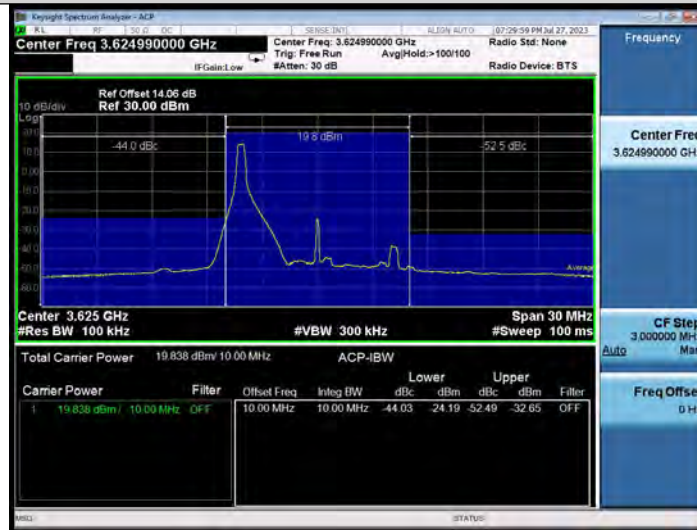


N48-10MHz-QPSK-637000-24RB#0

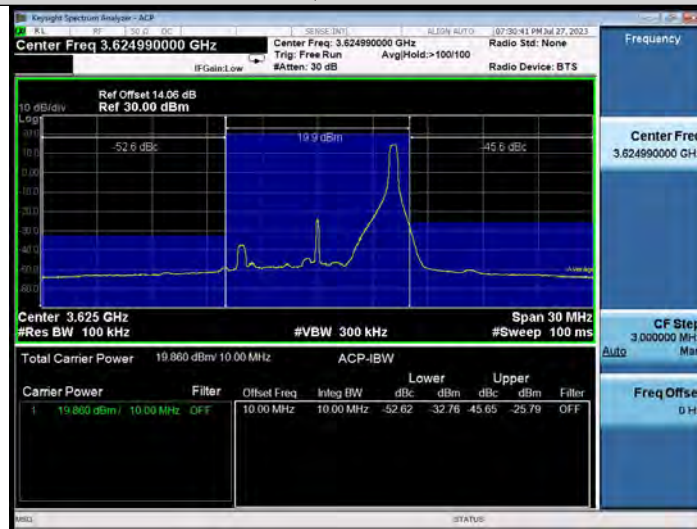




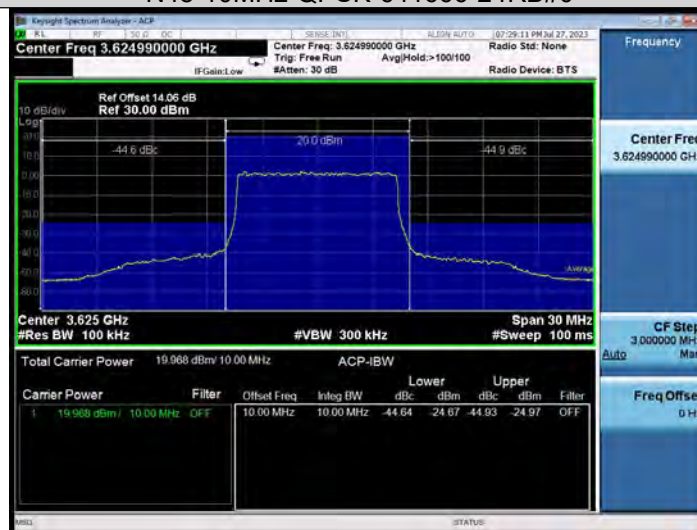
N48-10MHz-QPSK-641666-1RB#0



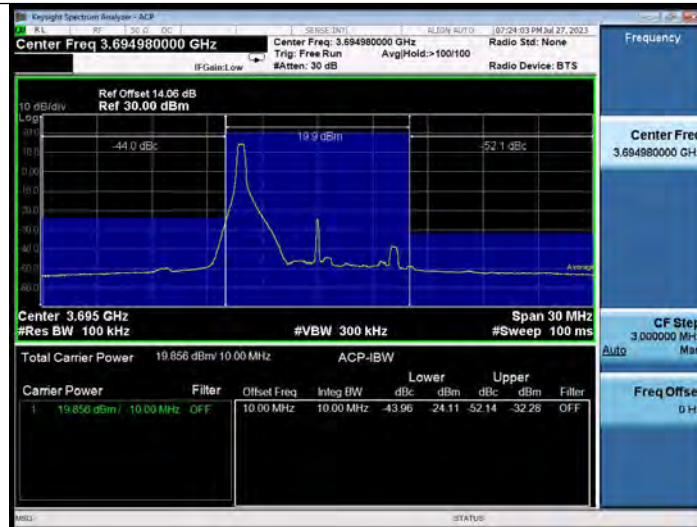
N48-10MHz-QPSK-641666-1RB#23



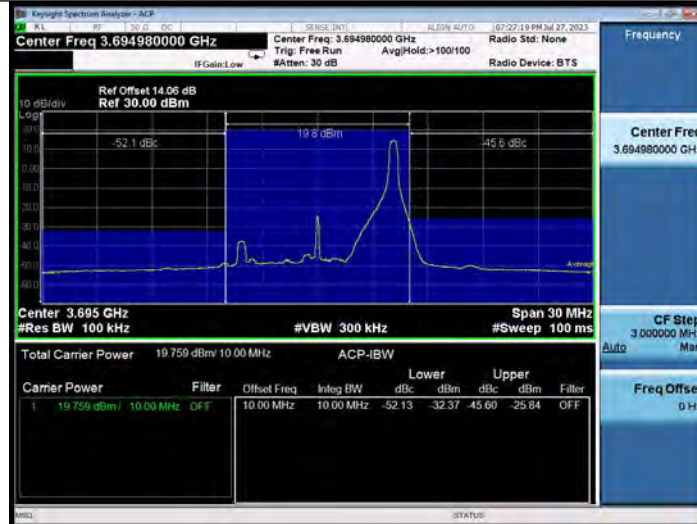
N48-10MHz-QPSK-641666-24RB#0



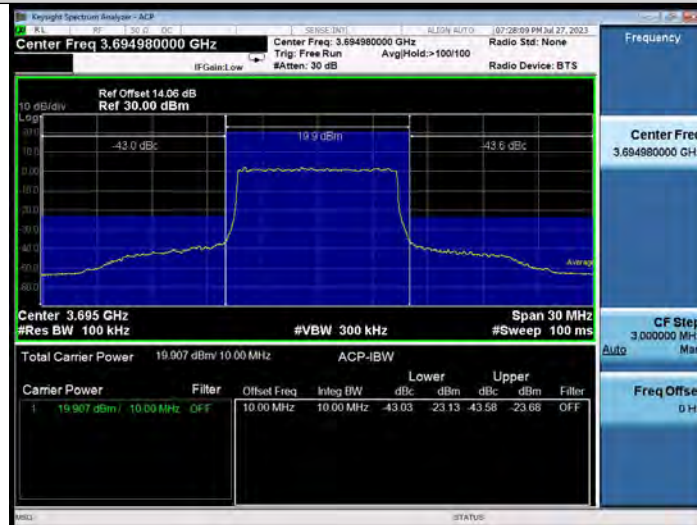
N48-10MHz-QPSK-646332-1RB#0



N48-10MHz-QPSK-646332-1RB#23



N48-10MHz-QPSK-646332-24RB#0



CONDUCTED SPURIOUS EMISSION TEST RESULT

Band	Bandwidth	Modulation	Channel	RB Configuration	Frequency Range	Result (dBm)	Verdict
N48	10MHz	QPSK	637000	1RB#0	Range1:30~40000MHz	-47.1	PASS
N48	10MHz	QPSK	641666	1RB#0	Range1:30~40000MHz	-47.79	PASS
N48	10MHz	QPSK	646332	1RB#0	Range1:30~40000MHz	-47.64	PASS
N48	100MHz	QPSK	643332	1RB#0	Range1:30~40000MHz	-47.28	PASS

TEST GRAPHS

N48-10MHz-QPSK-637000-1RB#0-Range1:30~40000MHz



N48-10MHz-QPSK-641666-1RB#0-Range1:30~40000MHz

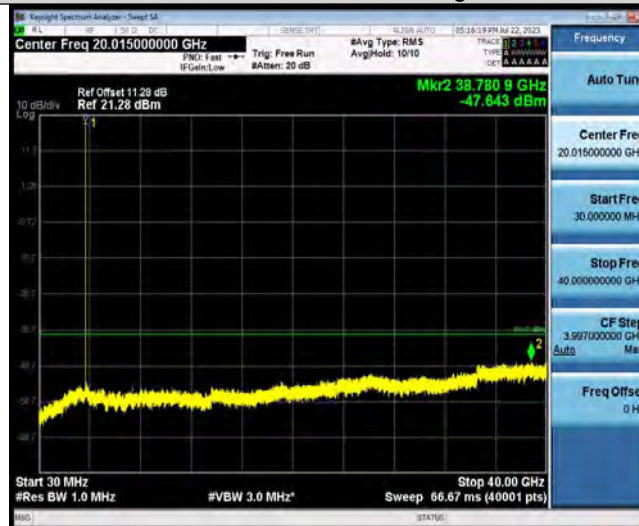


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N48-10MHz-QPSK-646332-1RB#0-Range1:30~40000MHz



FREQUENCY STABILITY TEST RESULT

Voltage										
Band	Bandwidth	Modulation	Channel	RB Configuration	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
N48	20MHz	QPSK	637334	100RB#0	VL	NT	-61.74	-0.01734	±2.5	PASS
N48	20MHz	QPSK	637334	100RB#0	VN	NT	-12.32	-0.00346	±2.5	PASS
N48	20MHz	QPSK	637334	100RB#0	VH	NT	-80.93	-0.02273	±2.5	PASS
N48	20MHz	QPSK	641666	100RB#0	VL	NT	9.68	0.00275	±2.5	PASS
N48	20MHz	QPSK	641666	100RB#0	VN	NT	25.99	0.00737	±2.5	PASS
N48	20MHz	QPSK	641666	100RB#0	VH	NT	-47.38	-0.01344	±2.5	PASS
N48	20MHz	QPSK	646000	100RB#0	VL	NT	28.72	0.00778	±2.5	PASS
N48	20MHz	QPSK	646000	100RB#0	VN	NT	-9.33	-0.00253	±2.5	PASS
N48	20MHz	QPSK	646000	100RB#0	VH	NT	-71.39	-0.01935	±2.5	PASS

Temperature										
Band	Bandwidth	Modulation	Channel	RB Configuration	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
N48	20MHz	QPSK	637334	100RB#0	NV	-30	93.65	0.02631	±2.5	PASS
N48	20MHz	QPSK	637334	100RB#0	NV	-20	-15.10	-0.00424	±2.5	PASS
N48	20MHz	QPSK	637334	100RB#0	NV	0	-46.03	-0.01293	±2.5	PASS
N48	20MHz	QPSK	637334	100RB#0	NV	10	-30.47	-0.00856	±2.5	PASS
N48	20MHz	QPSK	637334	100RB#0	NV	20	24.08	0.00676	±2.5	PASS
N48	20MHz	QPSK	637334	100RB#0	NV	30	-72.91	-0.02048	±2.5	PASS



N48	20MHz	QPSK	63733 4	100RB# 0	NV	40	65.38	0.01837	±2.5	PAS S
N48	20MHz	QPSK	63733 4	100RB# 0	NV	50	-55.76	-0.0156 6	±2.5	PAS S
N48	20MHz	QPSK	63733 4	100RB# 0	NV	-30	-65.56	-0.0186 0	±2.5	PAS S
N48	20MHz	QPSK	63733 4	100RB# 0	NV	-20	57.76	0.01638	±2.5	PAS S
N48	20MHz	QPSK	63733 4	100RB# 0	NV	0	-27.61	-0.0078 3	±2.5	PAS S
N48	20MHz	QPSK	63733 4	100RB# 0	NV	10	11.61	0.00329	±2.5	PAS S
N48	20MHz	QPSK	63733 4	100RB# 0	NV	20	34.14	0.00969	±2.5	PAS S
N48	20MHz	QPSK	63733 4	100RB# 0	NV	30	58.63	0.01663	±2.5	PAS S
N48	20MHz	QPSK	63733 4	100RB# 0	NV	40	8.13	0.00231	±2.5	PAS S
N48	20MHz	QPSK	63733 4	100RB# 0	NV	50	-6.67	-0.0018 9	±2.5	PAS S
N48	20MHz	QPSK	64600 0	100RB# 0	NV	-30	38.05	0.01031	±2.5	PAS S
N48	20MHz	QPSK	64600 0	100RB# 0	NV	-20	-38.96	-0.0105 6	±2.5	PAS S
N48	20MHz	QPSK	64600 0	100RB# 0	NV	0	92.74	0.02513	±2.5	PAS S
N48	20MHz	QPSK	64600 0	100RB# 0	NV	10	-43.90	-0.0119 0	±2.5	PAS S
N48	20MHz	QPSK	64600 0	100RB# 0	NV	20	4.54	0.00123	±2.5	PAS S
N48	20MHz	QPSK	64600 0	100RB# 0	NV	30	7.16	0.00194	±2.5	PAS S
N48	20MHz	QPSK	64600 0	100RB# 0	NV	40	-66.57	-0.0180 4	±2.5	PAS S
N48	20MHz	QPSK	64600 0	100RB# 0	NV	50	-6.56	-0.0017 8	±2.5	PAS S

---END---