FCC TEST REPORT

(PART 96)

Applicant:	i.safe MOBILE GmbH
Address:	i_Park Tauberfranken 10 97922 Lauda-Koenigshofen Germany

Manufacturer or Supplier:	i.safe MOBILE GmbH
Address:	i_Park Tauberfranken 10 97922 Lauda-Koenigshofen Germany
Product:	Mobile phone
Brand Name:	i.safe MOBILE
Model Name:	M440A01
FCC ID:	2AACZ-M440A01
Date of tests:	Apr. 01, 2024 ~ Jun. 25, 2024

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 Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Simon Wang Date: Jun. 25, 2024	Luke Lu Date: Jun. 25, 2024

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RELEASE CONTROL RECORD

ISSUE NO.	DESCRIPTION	DATE ISSUED
W7L-P24030018RF12	Original release	Jun. 25, 2024

1 SUMMARY OF TEST RESULTS

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

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

1.1 MEASUREMENT UNCERTAINTY

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

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

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

1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Mar. 28,24	Mar. 27,25
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.10,23	May.09,24
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.09,24	May.08,25
Loop Antenna	Schwarzbeck	FMZB 1519B	00173	Sep.03,23	Sep.02,24
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Feb. 18,24	Feb. 17,25
Horn Antenna	ETS-LINDGREN	3117	00168692	Feb. 18,24	Feb. 17,25
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Sep.04, 23	Sep.03, 24
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 14,24	Feb. 13,25
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May. 06,23	May. 05,24
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May. 05,24	May. 04,25
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.10,23	May.09,24
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.09,24	May.08,25
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 17,24	Feb.16,25
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	Nov. 14,23	Nov. 13,26
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	50HF-010-SMA	May. 06,23	May. 05,24
10dB Attenuator	JFW/USA	50HF-010-SMA	50HF-010-SMA	May. 05,24	May. 04,25
Power Meter	Anritsu	ML2495A	1506002	Feb. 14,24	Feb. 13,25
Power Sensor	Anritsu	MA2411B	1339352	Feb. 14,24	Feb. 13,25
Temperature Chamber	ESPEC	SH-242	93000855	May. 06,23	May. 05,24
Temperature Chamber	ESPEC	SH-242	93000855	May. 05,24	May. 04,25
MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 14,24	Feb. 13,25
Base station R&S CMW500	Rohde&Schwarz	CMW500	153085	May.10,23	May.09,24
Base station R&S CMW500	Rohde&Schwarz	CMW500	153085	May.09,24	May.08,25
DC Source	Kikusui/JP	PMX18-5A	N/A	Aug. 11,23	Aug. 10,24

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 525120; The Designation No. is CN1171.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Mobile phone	
BRAND NAME	i.safe MOBILE	
MODEL NAME	M440A01	
NOMINAL VOLTAGE	5Vdc (adapter or host equipment) 3.7Vdc (Li-ion, battery)	
MODULATION TECHNOLOGY	**5G NR**	DFT-s-OFDM(Pi/2 BPSK,QPSK,16QAM,64QAM,256QAM); CP-OFDM(QPSK,16QAM,64QAM,256QAM);
SUPPORT ENDC COMBINE	**LTE Anchor Band for NR Band n48**	LTE Band 2/5/66
FREQUENCY RANGE	**NR Band n48**	3555 MHz ~ 3694.98MHz
EMISSION DESIGNATOR	**NR Band n48 Channel Bandwidth: 10MHz**	DFT-PI2BPSK 8M58G7D DFT-QPSK 8M57G7D DFT-16QAM 8M56W7D DFT-64QAM 8M56W7D DFT-256QAM 8M56W7D
	NR Band n48 Channel Bandwidth: 20MHz	DFT-PI2BPSK 17M8G7D DFT-QPSK 17M8G7D DFT-16QAM 17M9W7D DFT-64QAM 17M8W7D DFT-256QAM 17M8W7D
	NR Band n48 Channel Bandwidth: 40MHz	DFT-PI2BPSK 35M7G7D DFT-QPSK 35M7G7D DFT-16QAM 35M7W7D DFT-64QAM 35M8W7D DFT-256QAM 35M7W7D
MAX. EIRP POWER	**NR Band n48 Channel Bandwidth: 10MHz**	162.93mW
	NR Band n48 Channel Bandwidth: 20MHz z	163.68mW
	NR Band n48 Channel Bandwidth: 40MHz	166.34mW
ANTENNA GAIN	PIFA Antenna with -1dBi gain for NR Band n48	
HW Version	V05	

SW Version	IS440_00.00_1_20240613
I/O PORTS	Refer to user's manual
DATA CABLE	USB cable: with shielded cable, w/o ferrite core, 1.0 meter
EXTREME TEMPERATURE	-10 ~55℃
EXTREME VOLTAGE	3.6V - 4.2V

NOTE:

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

MODULATION MODE	TX FUNCTION
LTE	1TX

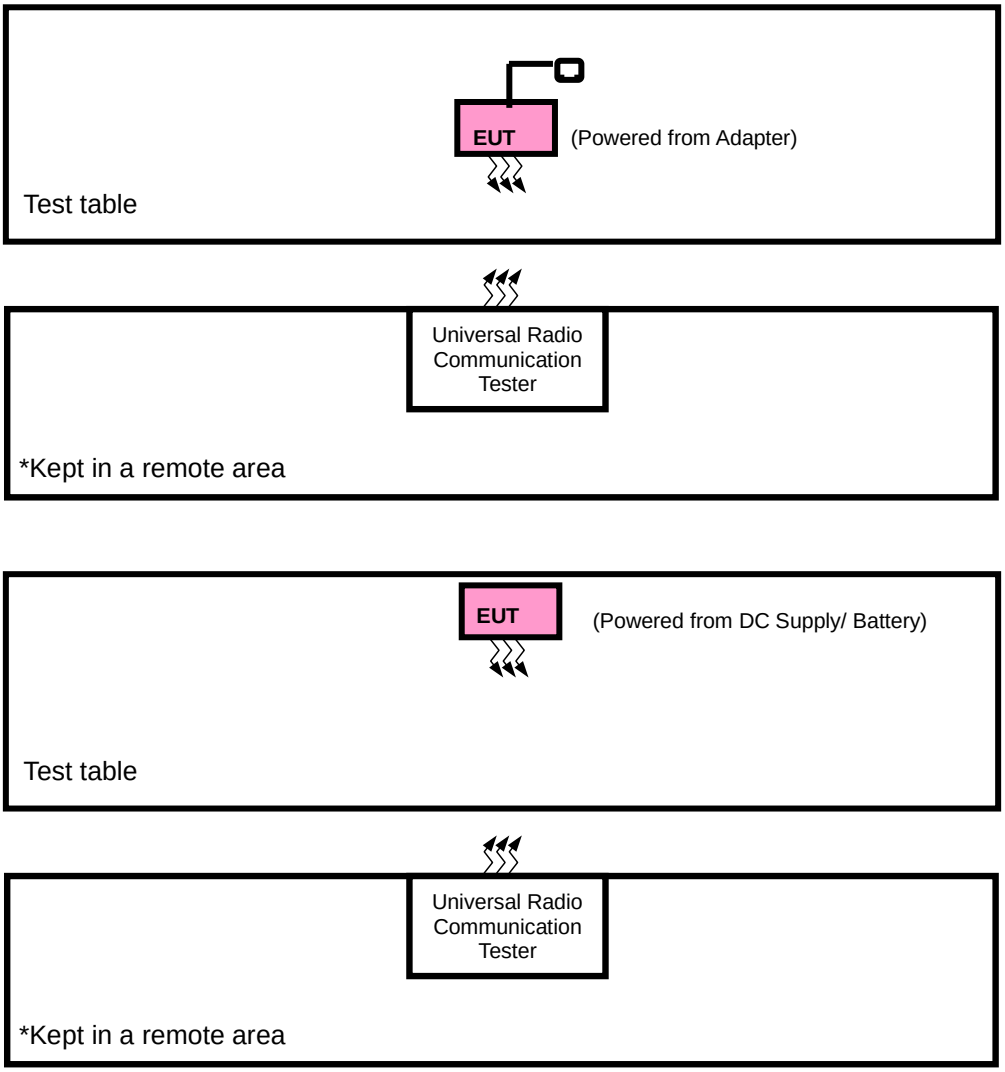
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
4. Antenna gain and EUT conducted cable loss are provided by the customer, and the laboratory will record the results based on these items that involve these two parameters.

5. List of Accessory:

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
AC Adapter	N/A	SHENZHEN SHI YINGYUAN POWER SUPPLY TECHNOLOGY CO., LTD.	ICP12-050-2000B	I/P: 100-240Vac, 0.5A, O/P: 5Vdc, 2A
Battery 1	N/A	FPR Connectivity Technology Inc.	BPIS440A.1A	Capacity: 3.7Vdc, 2400mAh
Battery 2	N/A	FPR Connectivity Technology Inc.	IS440.1H	Capacity: 3.7Vdc, 4800mAh
USB Cable	N/A	Winpower Technology Co., LTD	PROTECTOR 2.0	Signal Line,1.0meter

2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



2.3 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	LONG WEI	PS-6403D	010934269	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.8m

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

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 642666	637334 to 642666	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
A	CONDUCTED EMISSION	637334 to 646000	637334 to 646000	Low, Middle, High	20MHz	QPSK	1RB/ 0RB Offset
A	CONDUCTED EMISSION	638000 to 645332	638000 to 645332	Low, Middle, High	40MHz	QPSK	1RB/ 0RB Offset
A	RADIATED EMISSION	637000 to 646332	637000 to 646332	Middle	10MHz	QPSK	1RB/ 0RB Offset
A	RADIATED EMISSION	637334 to 646000	637334 to 646000	Middle	20MHz	QPSK	1RB/ 0RB Offset
A	RADIATED EMISSION	638000 to 645332	638000 to 645332	Low, Middle, High	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	Jace Hu
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
CONDUCTED EMISSION	23deg. C, 70%RH	DC5V By Adapter	James Fu
RADIATED EMISSION	23deg. C, 70%RH	DC5V By Adapter	Jace Hu
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.

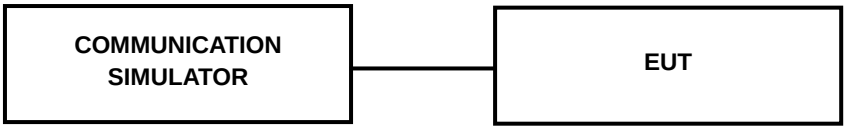
2 TEST TYPES AND RESULTS

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 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.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

3.1.5 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

5G SA

n48 (SCS 30 kHz) (Ant7)						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		638000	641666	645332
		Frequence (MHz)		3570	3624.99	3679.98
40M	DFT-s-OFDM Pi/2 BPSK	1	1	22.92	22.95	22.98
		1	52	22.75	22.87	22.89
		1	104	22.87	22.91	22.91
		50	0	22.41	22.52	22.52
		50	28	22.84	22.89	22.94
		50	56	22.35	22.44	22.43
		100	0	22.29	22.46	22.48
	DFT-s-OFDM QPSK	1	1	23.04	23.06	23.21
		1	52	23.08	23.11	23.10
		1	104	22.98	23.09	23.20
		50	0	21.84	21.95	21.98
		50	28	22.84	23.00	22.91
		50	56	21.79	22.00	21.95
		100	0	21.90	21.95	22.08
	DFT-s-OFDM 16QAM	1	1	21.98	22.12	22.12
	DFT-s-OFDM 64QAM	1	1	20.51	20.65	20.69
	DFT-s-OFDM 256QAM	1	1	18.19	18.18	18.23

BW	MCS Index	Channel		637334	641666	646000
		Frequence (MHz)		3560.01	3624.99	3690
20M	DFT-s-OFDM QPSK	1	1	23.03	22.99	23.14
BW	MCS Index	Channel		637000	641666	646332
		Frequence (MHz)		3555	3624.99	3694.98
10M	DFT-s-OFDM QPSK	1	1	22.91	22.93	23.12

EIRP

N48

n48 40M DFT-s-OFDM Pi/2 BPSK For FCC						
Channel	Frequency (MHz)	Conducted Power (dBm)	Gain (dB)	EIRP (dBm)	EIRP (mW)	Limit (dBm/10Mhz)
638000	3570	22.92	-1	21.92	155.6	23
641666	3624.99	22.95	-1	21.95	156.68	23
645332	3679.98	22.98	-1	21.98	157.76	23

n48 40M DFT-s-OFDM QPSK For FCC						
Channel	Frequency (MHz)	Conducted Power (dBm)	Gain (dB)	EIRP (dBm)	EIRP (mW)	Lmit (dBm/10Mhz)
638000	3570	23.08	-1	22.08	161.44	23
641666	3624.99	23.11	-1	22.11	162.55	23
645332	3679.98	23.21	-1	22.21	166.34	23

n48 40M DFT-s-OFDM 16QAM For FCC						
Channel	Frequency (MHz)	Conducted Power (dBm)	Gain (dB)	EIRP (dBm)	EIRP (mW)	Lmit (dBm/10Mhz)
638000	3570	21.98	-1	20.98	125.31	23
641666	3624.99	22.12	-1	21.12	129.42	23
645332	3679.98	22.12	-1	21.12	129.42	23

n48 40M DFT-s-OFDM 64QAM For FCC						
Channel	Frequency (MHz)	Conducted Power (dBm)	Gain (dB)	EIRP (dBm)	EIRP (mW)	Lmit (dBm/10Mhz)
638000	3570	20.51	-1	19.51	89.33	23
641666	3624.99	20.65	-1	19.65	92.26	23
645332	3679.98	20.69	-1	19.69	93.11	23

n48 40M DFT-s-OFDM 256QAM For FCC						
Channel	Frequency (MHz)	Conducted Power (dBm)	Gain (dB)	EIRP (dBm)	EIRP (mW)	Lmit (dBm/10Mhz)
638000	3570	18.19	-1	17.19	52.36	23
641666	3624.99	18.18	-1	17.18	52.24	23
645332	3679.98	18.23	-1	17.23	52.84	23

n48 20M DFT-s-OFDM QPSK For FCC						
Channel	Frequency (MHz)	Conducted Power (dBm)	Gain (dB)	EIRP (dBm)	EIRP (mW)	Lmit (dBm/10Mhz)
637334	3560.01	23.03	-1	22.03	159.59	23
641666	3624.99	22.99	-1	21.99	158.12	23
646000	3690	23.14	-1	22.14	163.68	23

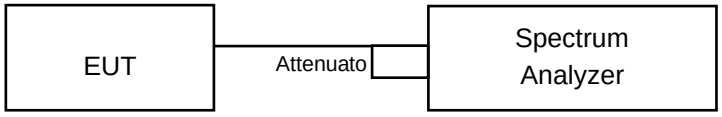
n48 10M DFT-s-OFDM QPSK For FCC						
Channel	Frequency (MHz)	Conducted Power (dBm)	Gain (dB)	EIRP (dBm)	EIRP (mW)	Lmit (dBm/10Mhz)
637000	3555	22.91	-1	21.91	155.24	23
641666	3624.99	22.93	-1	21.93	155.96	23
646332	3694.98	23.12	-1	22.12	162.93	23

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 O 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 of 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) ≧ 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.

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 D.

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

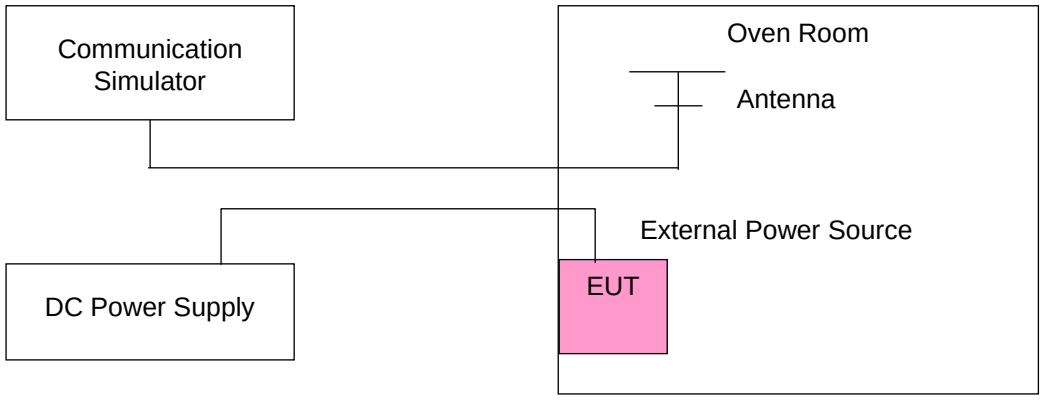
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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.

3.3.3 TEST SETUP



3.3.4 TEST RESULTS

Please Refer to Appendix D.

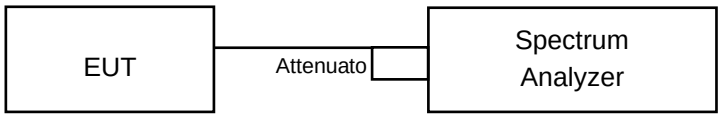
Note: VL = Low voltage(3.6V); VN/NV = Normal voltage(3.7V); VH = High voltage(4.2V);
NT = Normal temperature (25℃)

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.

3.4.6 TEST RESULT

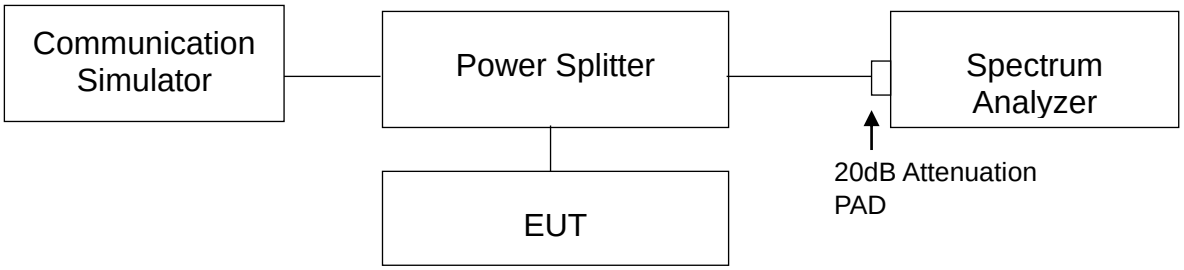
Please Refer to Appendix D.

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

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 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 D.

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, E.R.P power = E.I.P.R power - 2.15dBi.

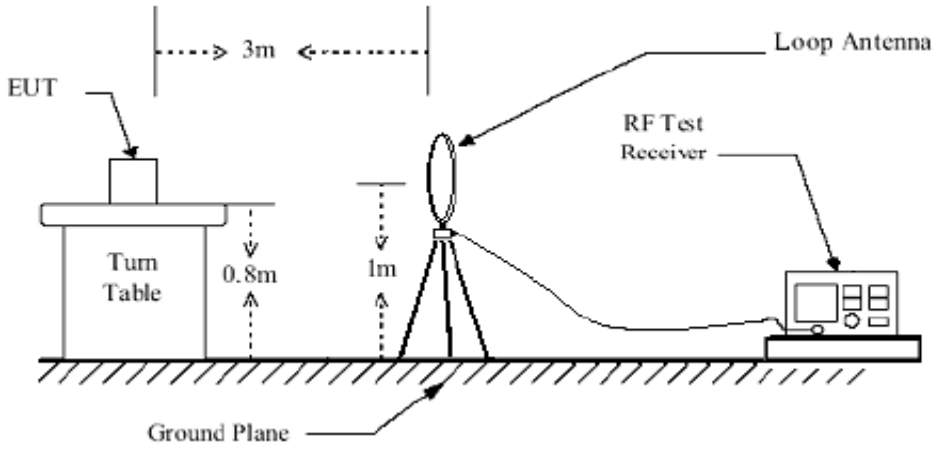
Note: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.6.3 DEVIATION FROM TEST STANDARD

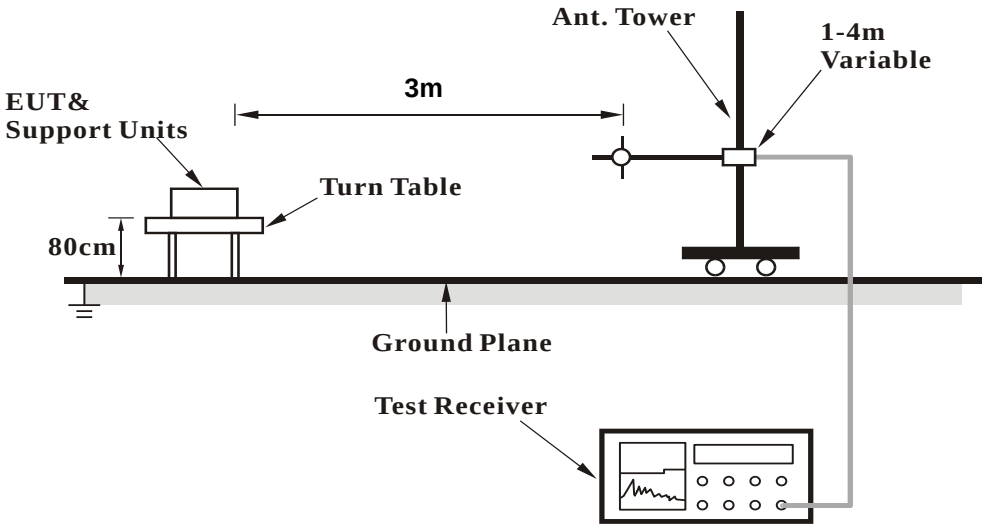
No deviation.

3.6.4 TEST SET UP

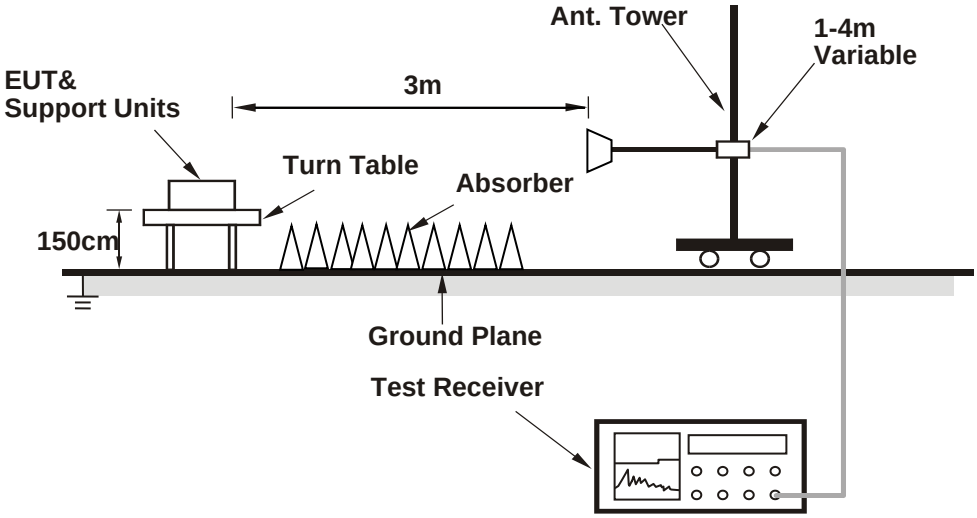
< Frequency Range below 30MHz >



<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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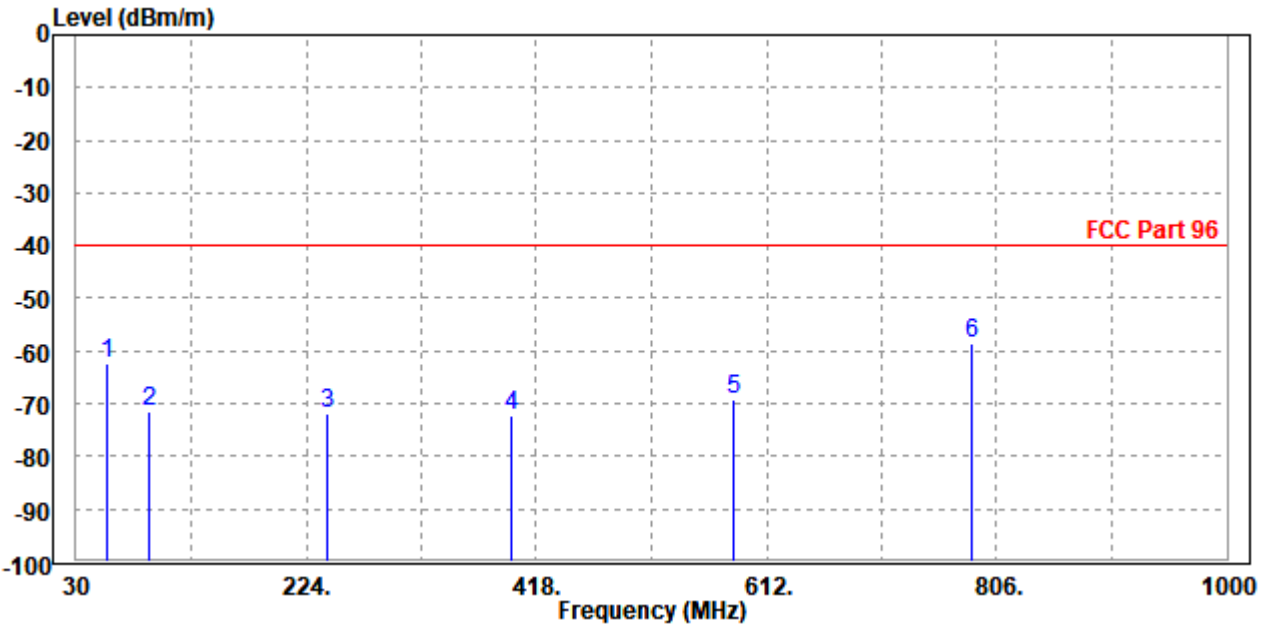
CHANNEL BANDWIDTH: 10MHz / QPSK

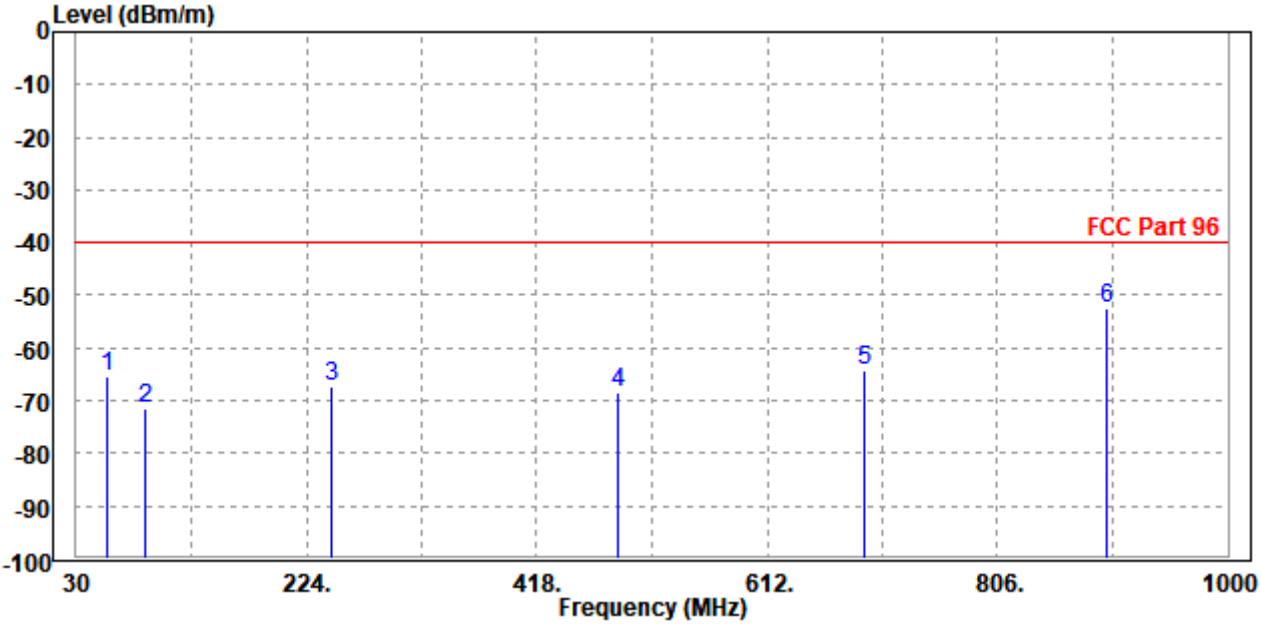
MODE	TX channel 646332	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		56.190	-62.21	-50.23	-40.00	-22.21	-11.98	Peak	Horizontal
2		92.080	-71.47	-58.69	-40.00	-31.47	-12.78	Peak	Horizontal
3		242.430	-72.03	-60.21	-40.00	-32.03	-11.82	Peak	Horizontal
4		397.630	-72.32	-65.35	-40.00	-32.32	-6.97	Peak	Horizontal
5		583.870	-69.02	-64.60	-40.00	-29.02	-4.42	Peak	Horizontal
6	PP	784.660	-58.41	-63.47	-40.00	-18.41	5.06	Peak	Horizontal



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

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	56.190	-65.42	-46.29	-40.00	-25.42	-19.13	Peak	Vertical
2	88.200	-71.31	-53.64	-40.00	-31.31	-17.67	Peak	Vertical
3	245.340	-67.41	-63.16	-40.00	-27.41	-4.25	Peak	Vertical
4	486.870	-68.55	-63.45	-40.00	-28.55	-5.10	Peak	Vertical
5	694.450	-64.08	-64.10	-40.00	-24.08	0.02	Peak	Vertical
6 PP	898.150	-52.29	-64.29	-40.00	-12.29	12.00	Peak	Vertical



ABOVE 1GHz

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

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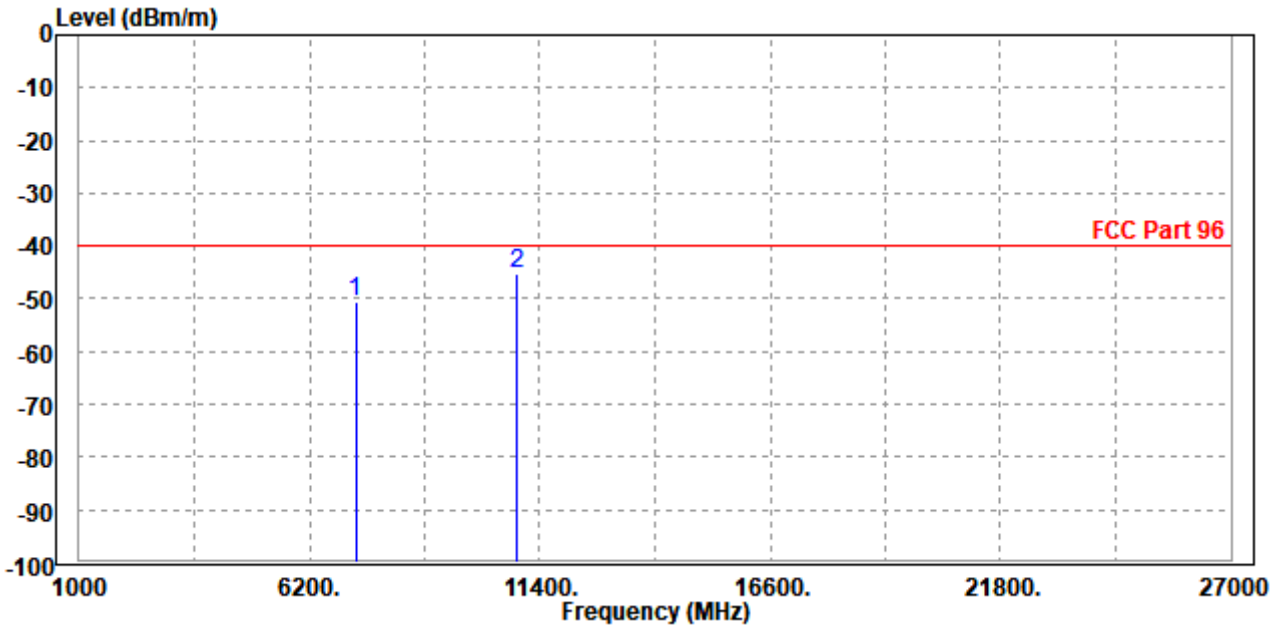
Note: For frequency above 27GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.

CHANNEL BANDWIDTH: 10MHz / QPSK

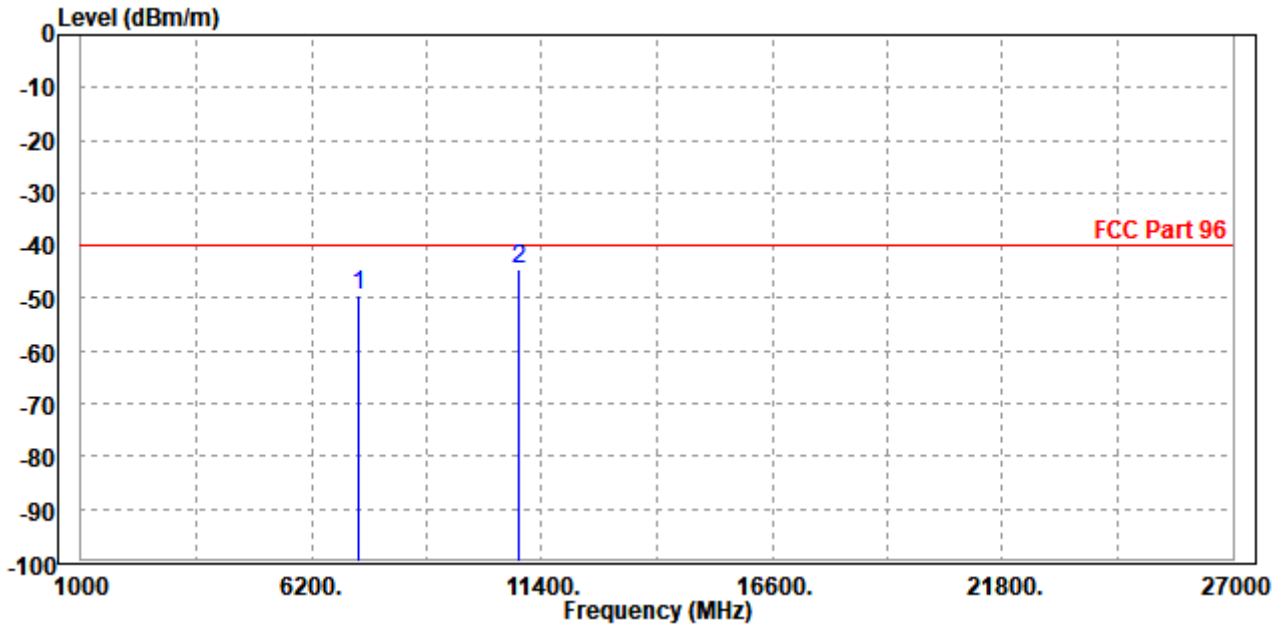
MODE	TX channel 641666	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	7240.000	-50.73	-64.77	-40.00	-10.73	14.04	Peak	Horizontal
2	PP10880.000	-45.41	-65.60	-40.00	-5.41	20.19	Peak	Horizontal



MODE	TX channel 641666	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			

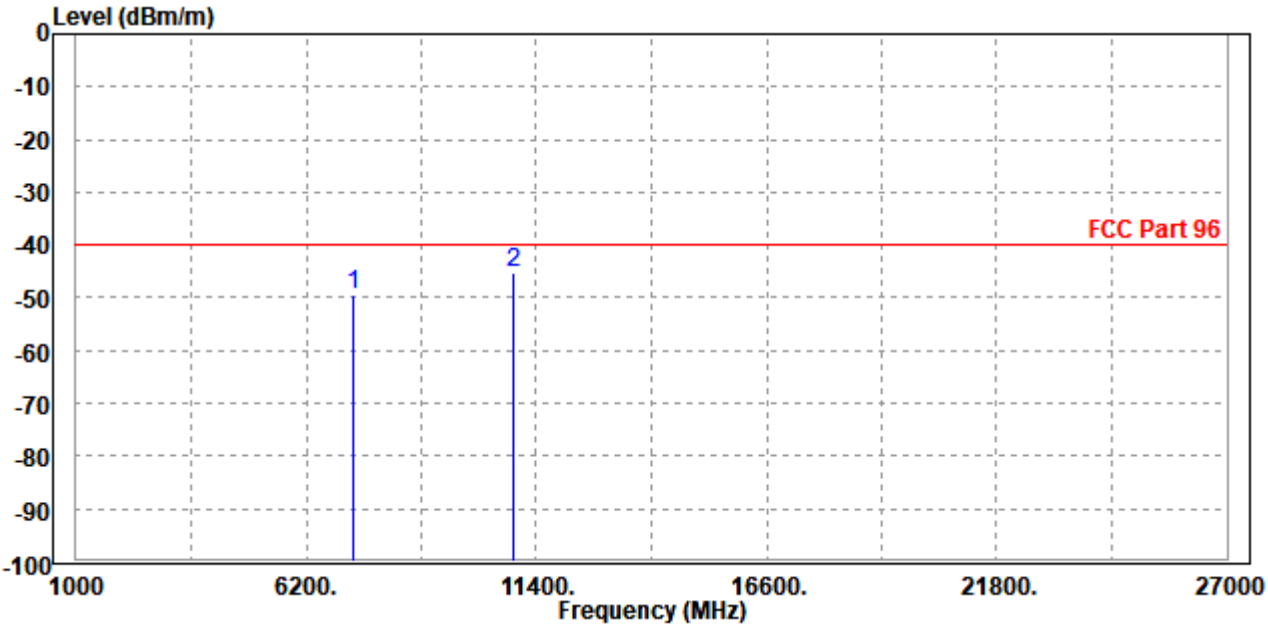
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	7250.000	-49.28	-63.08	-40.00	-9.28	13.80	Peak	Vertical
2	PP10880.000	-44.48	-65.00	-40.00	-4.48	20.52	Peak	Vertical



CHANNEL BANDWIDTH: 20MHz / QPSK

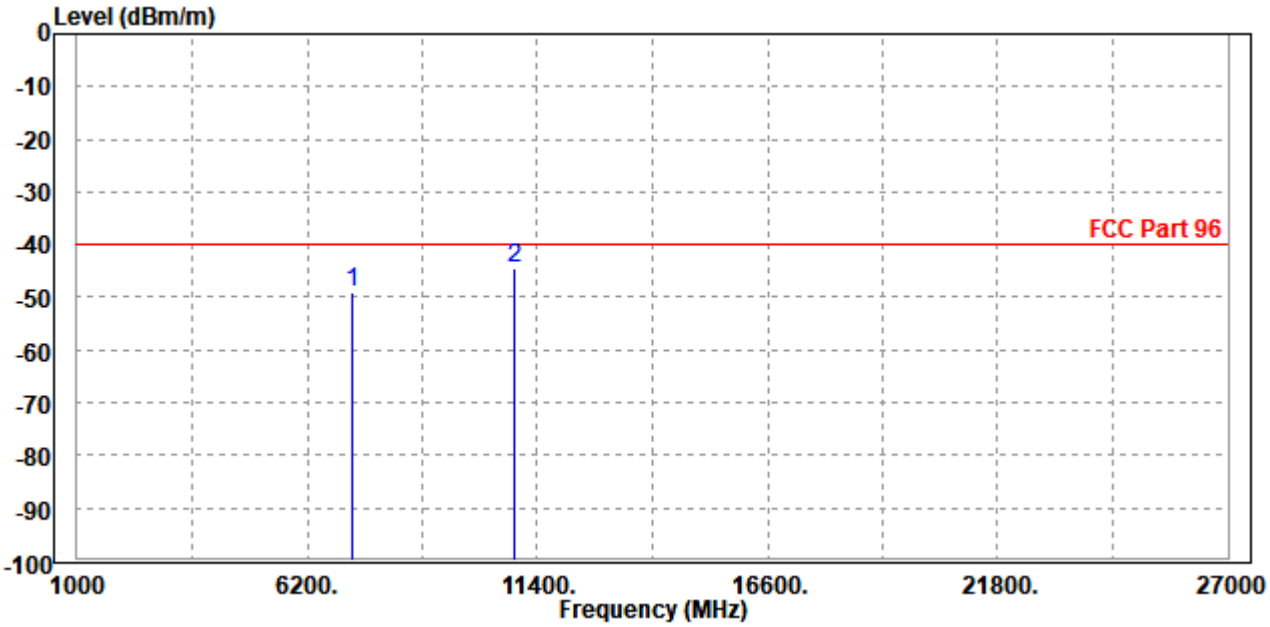
MODE	TX channel 641666	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	7250.000	-49.29	-63.35	-40.00	-9.29	14.06	Peak	Horizontal
2	PP10880.000	-45.41	-65.60	-40.00	-5.41	20.19	Peak	Horizontal



MODE	TX channel 641666	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			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	7214.000	-49.14	-63.05	-40.00	-9.14	13.91	Peak	Vertical
2	PP10880.000	-44.65	-65.17	-40.00	-4.65	20.52	Peak	Vertical

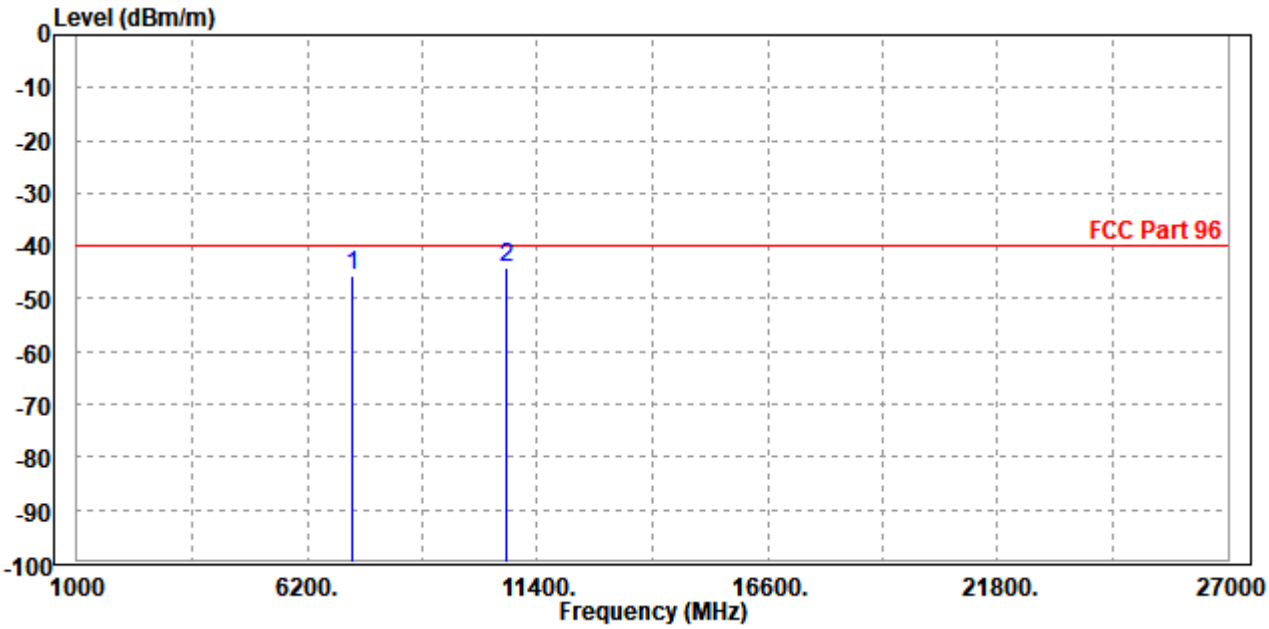


CHANNEL BANDWIDTH: 40MHz / QPSK

CH 638000

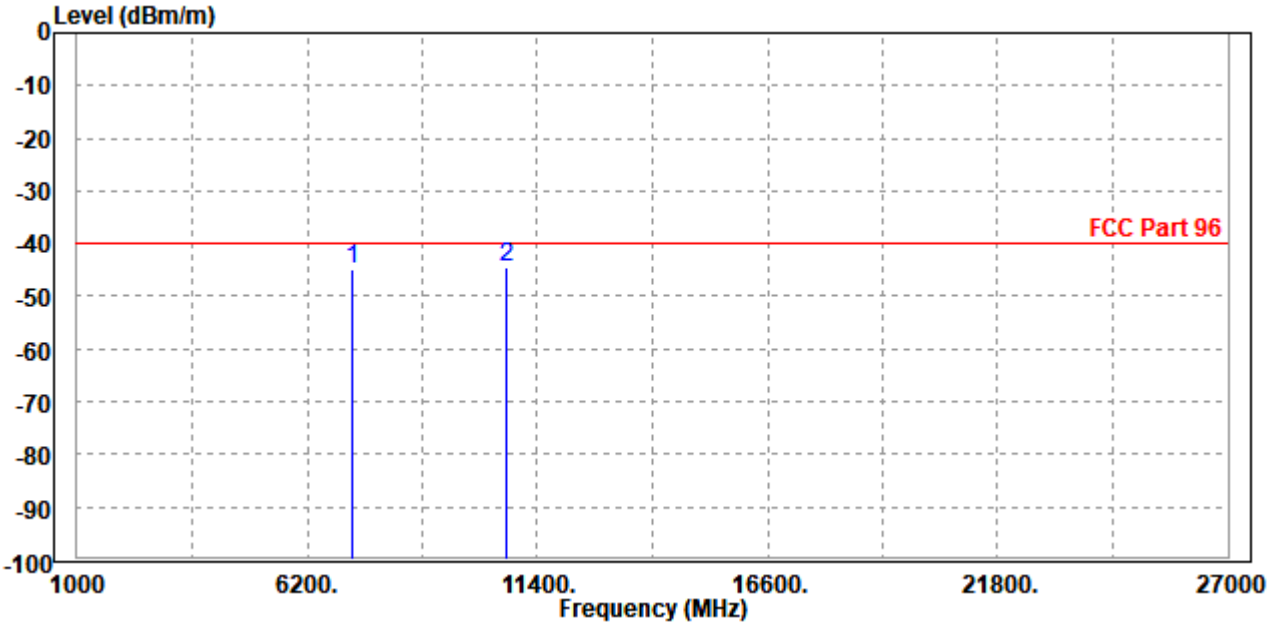
MODE	TX channel 638000	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	7214.000	-45.44	-59.45	-40.00	-5.44	14.01	Peak	Horizontal
2	PP10698.000	-44.28	-64.21	-40.00	-4.28	19.93	Peak	Horizontal



MODE	TX channel 638000	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			

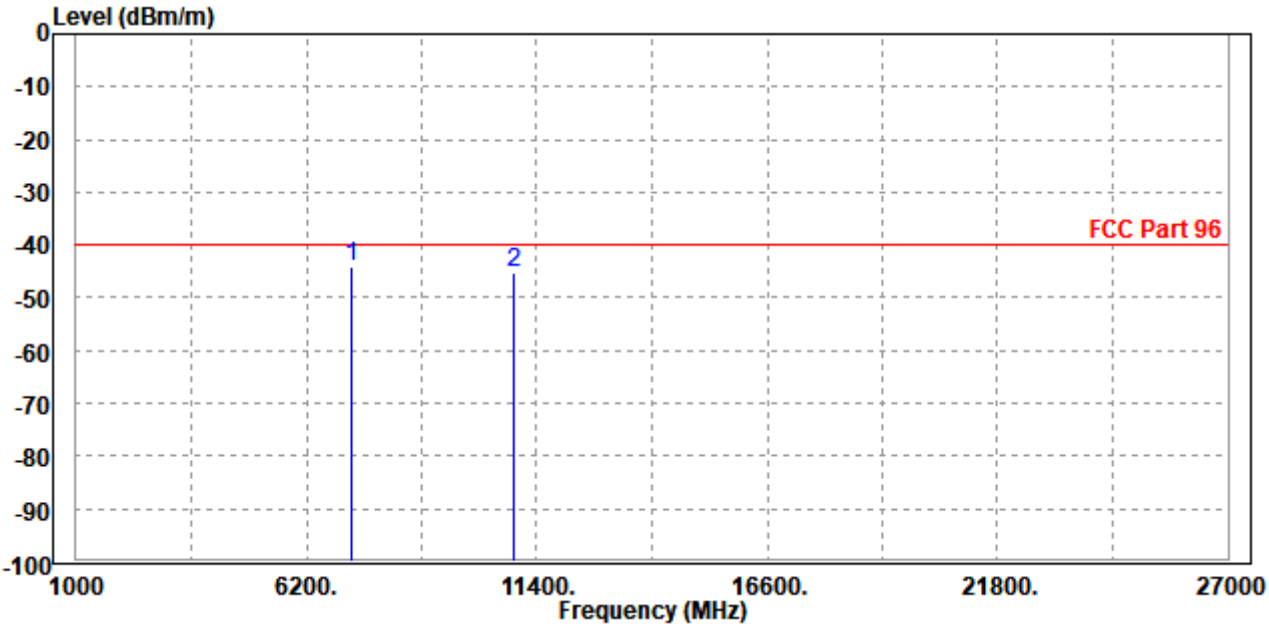
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	7214.000	-44.90	-58.81	-40.00	-4.90	13.91	Peak	Vertical
2	PP10698.000	-44.62	-65.16	-40.00	-4.62	20.54	Peak	Vertical



CH 641666

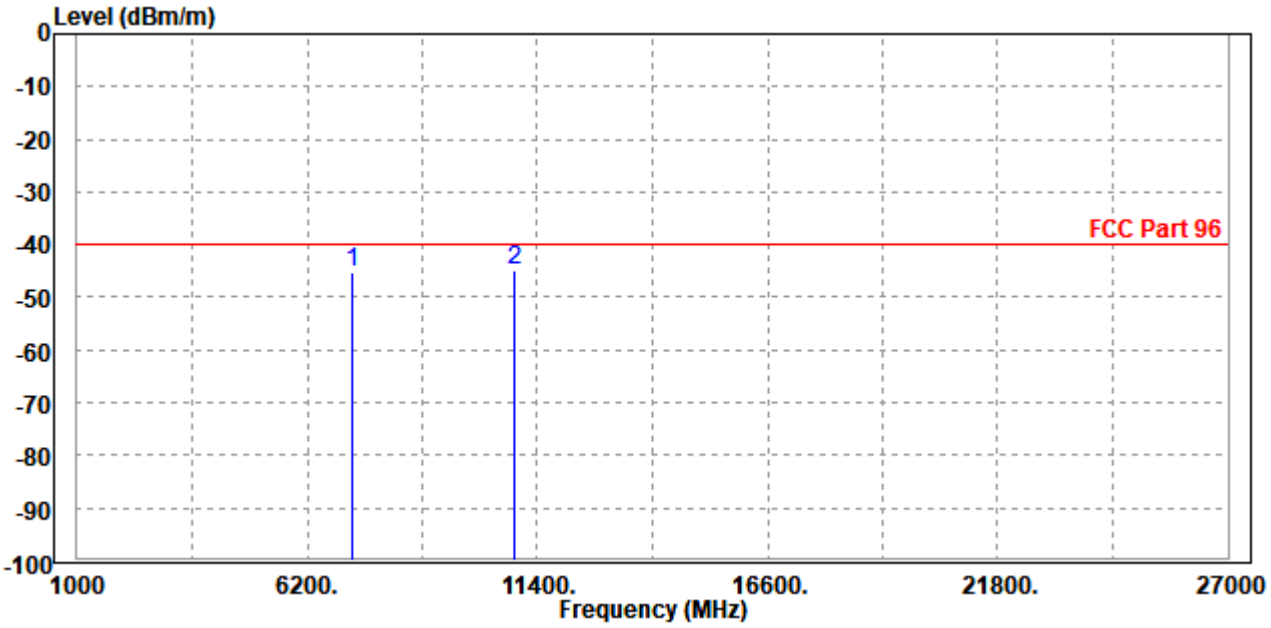
MODE	TX channel 641666	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 7214.000	-44.22	-58.23	-40.00	-4.22	14.01	Peak	Horizontal
2	10880.000	-45.18	-65.37	-40.00	-5.18	20.19	Peak	Horizontal



MODE	TX channel 641666	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			

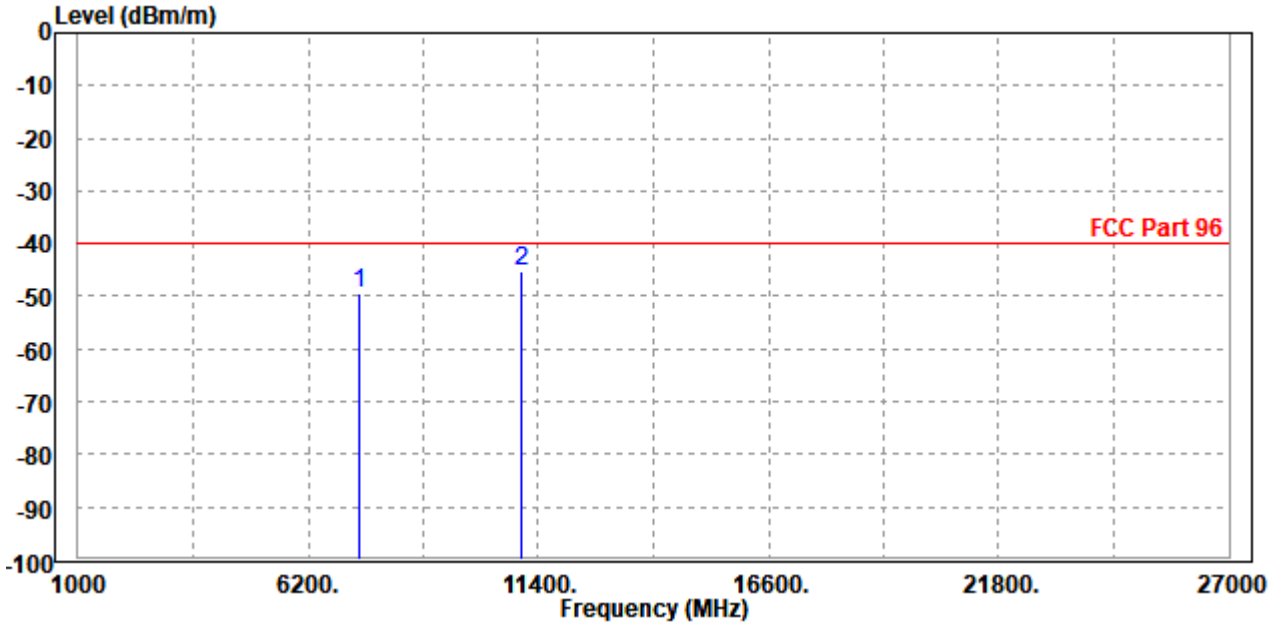
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	7214.000	-45.39	-59.30	-40.00	-5.39	13.91	Peak	Vertical
2	PP10880.000	-44.73	-65.25	-40.00	-4.73	20.52	Peak	Vertical



CH 645332

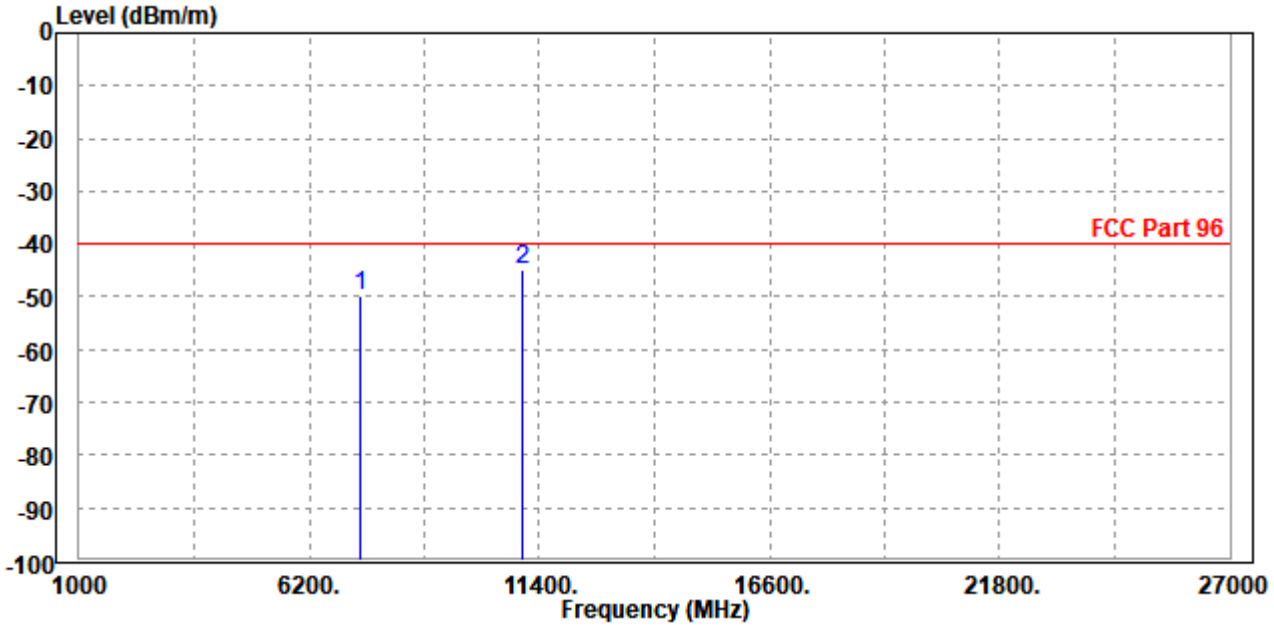
MODE	TX channel 645332	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	7370.000	-49.44	-63.63	-40.00	-9.44	14.19	Peak	Horizontal
2	PP11036.000	-45.17	-65.55	-40.00	-5.17	20.38	Peak	Horizontal



MODE	TX channel 645332	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			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	7360.000	-49.68	-63.13	-40.00	-9.68	13.45	Peak	Vertical
2	PP11036.000	-44.92	-65.33	-40.00	-4.92	20.41	Peak	Vertical

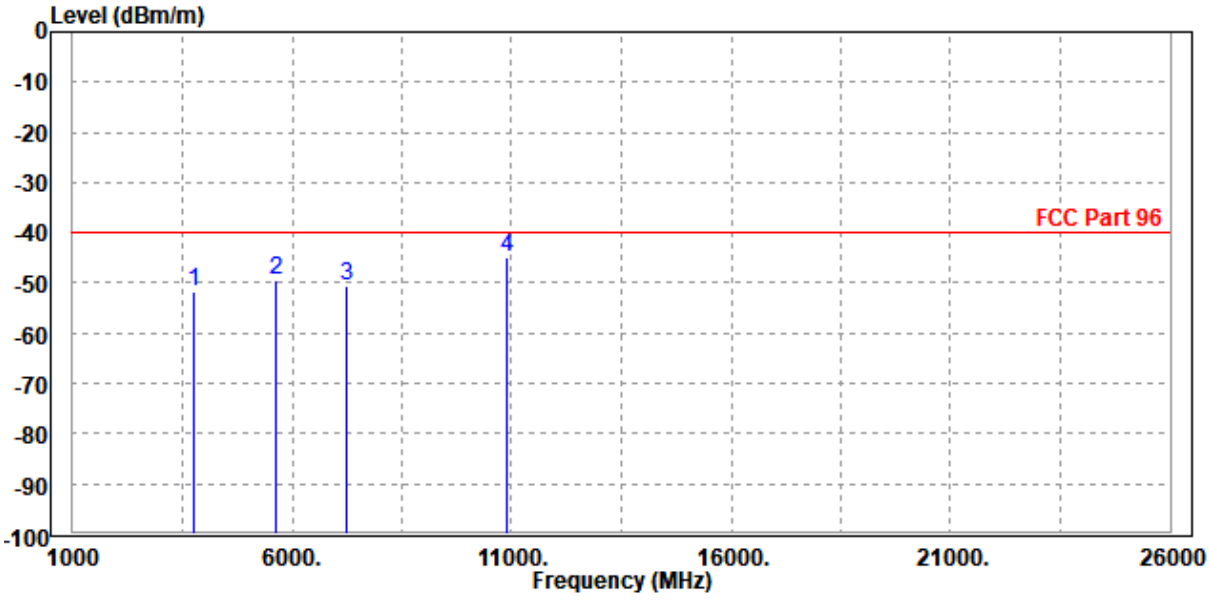


DC 2A-n48A

CHANNEL BANDWIDTH: 20+40MHz / QPSK

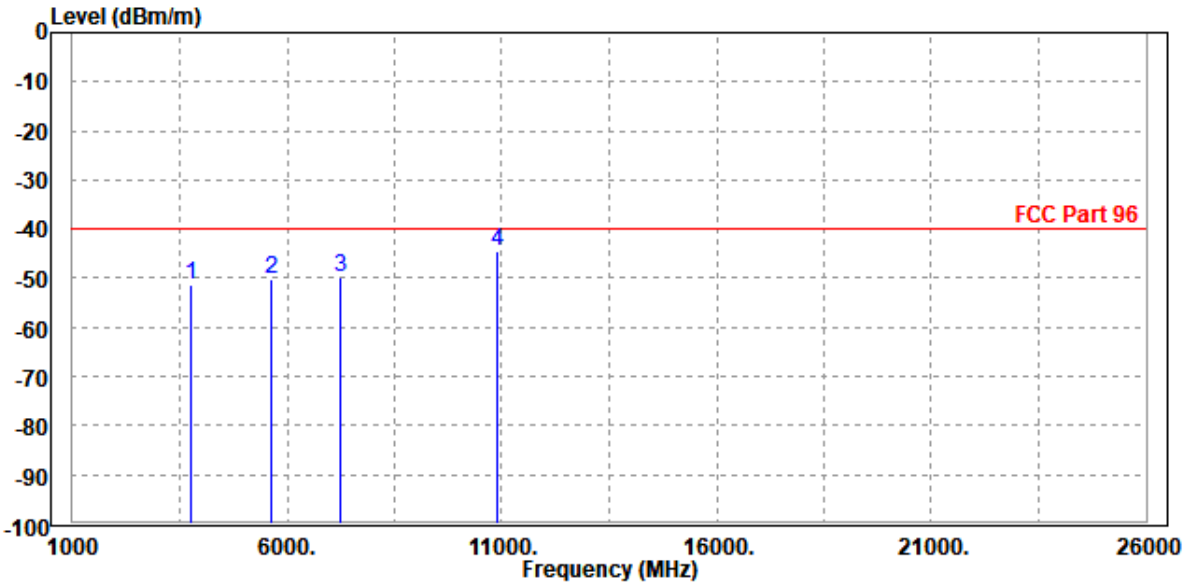
MODE	TX channel 18900/641666	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3760.000	-51.70	-60.05	-40.00	-11.70	8.35	Peak	Horizontal
2	5640.000	-49.56	-61.37	-40.00	-9.56	11.81	Peak	Horizontal
3	7250.000	-50.48	-64.54	-40.00	-10.48	14.06	Peak	Horizontal
4	PP10875.000	-44.90	-65.08	-40.00	-4.90	20.18	Peak	Horizontal



MODE	TX channel 18900/641666	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			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3760.000	-51.26	-59.89	-40.00	-11.26	8.63	Peak	Vertical
2	5650.000	-50.11	-62.43	-40.00	-10.11	12.32	Peak	Vertical
3	7250.000	-49.87	-63.67	-40.00	-9.87	13.80	Peak	Vertical
4	PP10875.000	-44.61	-65.13	-40.00	-4.61	20.52	Peak	Vertical

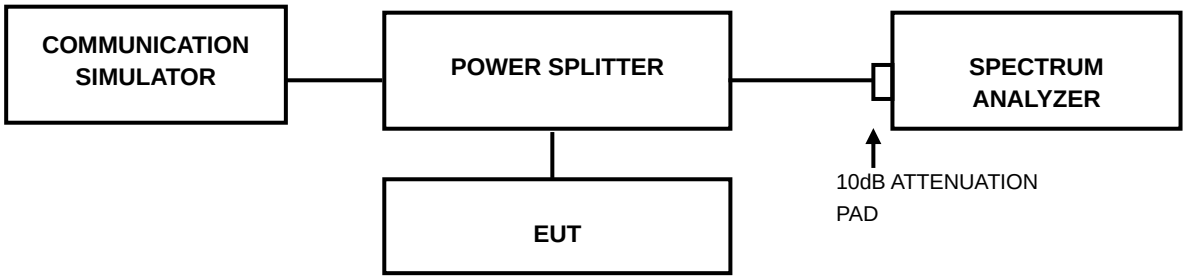


3.7 PEAK TO AVERAGE RATIO

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 D.

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:

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Tel: +86-755-88696566
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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.