FCC TEST REPORT

(PART 27)

Applicant:	ThingsMatrix Inc.
Address:	9442 North Capital of Texas Hwy,Plaza One, Suite 500,Austin, TX 78759

Manufacturer or Supplier:	ThingsMatrix Inc.
Address:	9442 North Capital of Texas Hwy,Plaza One, Suite 500,Austin, TX 78759
Product:	IoT Wireless Device
Brand Name:	ThingsMatrix
Model Name:	TMX08
FCC ID:	2ATV9TMX08
Date of tests:	Jul. 02, 2019 ~ Jul. 22, 2019

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

☒ **FCC Part 27, Subpart C, L** ☒ **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 Alex Chen Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Alex Date: Jul. 24, 2019	Luke Lu Date: Jul. 24, 2019

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF190701W004-3	Original release	Jul. 24, 2019

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**	**REMARK**
2.1046 27.50(d)(4)	Maximum Peak Output Power	PASS	See Note
2.1055 27.54	Frequency Stability	N/A	See Note
2.1049 27.53(h)	Occupied Bandwidth	N/A	See Note
27.50(d)(5)	Peak to average ratio	N/A	See Note
27.53(h)	Band Edge Measurements	N/A	See Note
2.1051 27.53(h)	Conducted Spurious Emissions	N/A	See Note
2.1053 27.53(h)	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -20.98 48.570 MHz.

Note: : These items please refer to the LTE module report RXA1706-0199RF01R1 which The FCC ID is XMR201707BG96, and the LTE module has been certified by TA Technology(shanghai)Co.,Ltd on 09/12/2017.

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	±1dB
Frequency Stability	±39.27Hz
Radiated emissions	±4.48dB
Conducted emissions	±2 dB
Occupied Channel Bandwidth	±21.7KHz
Band Edge Measurements	±4.48dB
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. 26,19	Feb. 25,20
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Feb. 26,19	Feb. 25,20
Bilog Antenna 1	ETS-LINDGREN	3143B	00161964	Feb. 26,19	Feb. 25,20
Bilog Antenna 2	ETS-LINDGREN	3143B	00161965	Feb. 26,19	Feb. 25,20
Horn Antenna 1	ETS-LINDGREN	3117	00168728	Feb. 26,19	Feb. 25,20
Horn Antenna 2	ETS-LINDGREN	3117	00168692	Nov. 30, 18	Nov. 29, 19
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Nov. 21, 18	Nov. 20, 19
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 26,19	Feb. 25,20
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 24,19	Jun. 23,20
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 24,19	Jun. 23,20
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Jun. 24,19	Jun. 23,20
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	Feb. 26,19	Feb. 25,20
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 24,19	Jun. 23,20
Power Meter	Anritsu	ML2495A	1506002	Feb. 26,19	Feb. 25,20
Power Sensor	Anritsu	MA2411B	1339352	Feb. 26,19	Feb. 25,20
Humid & Temp Programmable Tester	Juyi	ITH-120-45-CP-AR	IAA1504-001	Jun. 24,19	Jun. 23,20
MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 26,19	Feb. 25,20

NOTE: 1. The calibration interval of the above test instruments is 12 months or 24 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	IoT Wireless Device	
MODEL NAME	TMX08	
POWER SUPPLY	12Vdc (adapter or host equipment) 3.7Vdc (Li-ion, battery)	
MODULATION TECHNOLOGY	**LTE**	QPSK, 16QAM
FREQUENCY RANGE	**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	1715.0MHz ~ 1750.0MHz
	LTE Band 4 Channel Bandwidth: 15MHz	1717.5MHz ~ 1747.5MHz
	LTE Band 4 Channel Bandwidth: 20MHz	1720.0MHz ~ 1745.0MHz
	LTE Band 12 Channel Bandwidth: 1.4MHz	699.7MHz ~ 715.3MHz
	LTE Band 12 Channel Bandwidth: 3MHz	700.5MHz ~ 714.5MHz
	LTE Band 12 Channel Bandwidth: 5MHz	701.5MHz ~ 713.5MHz
	LTE Band 12 Channel Bandwidth: 10MHz	704.0MHz ~ 711.0MHz
	LTE Band 13 Channel Bandwidth: 5MHz	779.5MHZ ~ 784.5MHZ
	LTE Band 13 Channel Bandwidth: 10MHz	782.0MHZ
MAX. ERP/EIRP POWER	**LTE Band 4 Channel Bandwidth: 1.4MHz**	105mW
	LTE Band 4 Channel Bandwidth: 3MHz	104mW
	LTE Band 4 Channel Bandwidth: 5MHz	105mW
	LTE Band 4 Channel Bandwidth: 10MHz	107mW
	LTE Band 4 Channel Bandwidth: 15MHz	105mW
	LTE Band 4 Channel Bandwidth: 20MHz	94mW
	LTE Band 12 Channel Bandwidth: 1.4MHz	131mW

	LTE Band 12 Channel Bandwidth: 3MHz	137mW
	LTE Band 12 Channel Bandwidth: 5MHz	137mW
	LTE Band 12 Channel Bandwidth: 10MHz	123mW
	LTE Band 13 Channel Bandwidth: 5MHz	81mW
	LTE Band 13 Channel Bandwidth: 10MHz	69mW
ANTENNA TYPE	External antenna	
ANTENNA GAIN	2dBi for LTE Band 4 0dBi for LTE Band 12 -2dBi for LTE Band 13	
HW VERSION	BJ51AV01	
SW VERSION	BJ51V01	
ACCESSORY DEVICE	Refer to user's manual	
DATA CABLE	N/A	

NOTE:

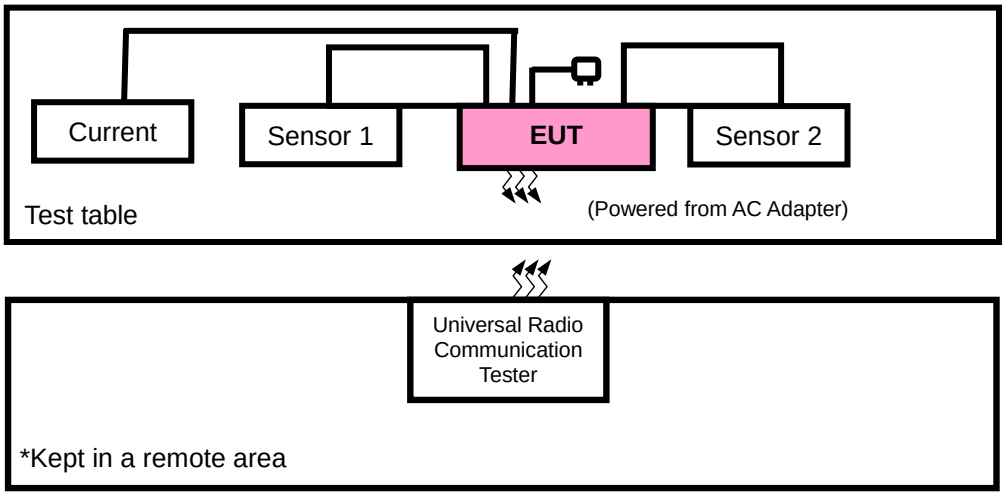
1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

List of Accessories:

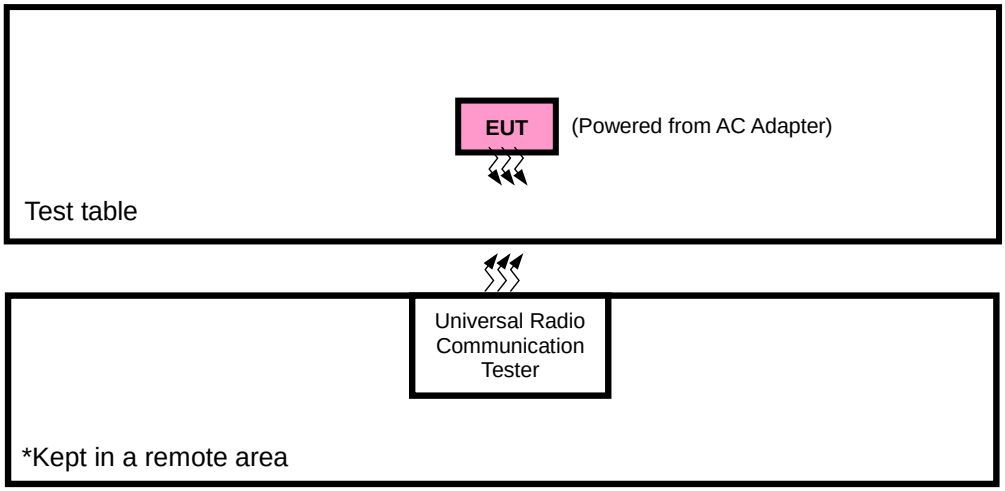
ACCESSORIES	MODEL	SPECIFICATION
Power supply adapter	TDX-1201000	I/P:100~240VAC O/P:12VDC/1A
Battery	Li-ion Polymer Battery	DC 3.7V, 3000mAh, 11.1Wh
Sensor 1	Ultrasonic&Temperature sensor	-
Sensor 2	Ultrasonic sensor	-
Current draw sensor	Current draw sensor	-
Cellular Antenna	Cellular Antenna	-
GPS Antenna	GPS Antenna	-

2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



FOR CONDUCTED & E.R.P./E.I.R.P TEST



2.3 DESCRIPTION OF TEST MODES

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

EUT CONFIGURE MODE	DESCRIPTION
–	EUT + Adapter with LTE link

LTE BAND 4

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

LTE BAND 12

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	23017 to 23173	23017, 23095 , 23173	1.4MHz	QPSK, 16QAM	1 RB / 0 RB Offset
	23025 to 23165	23025, 23095 ,23165	3MHz	QPSK, 16QAM	1 RB / 0 RB Offset
	23035 to 23155	23035, 23095 ,23155	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
	23060 to 23130	23060, 23095 ,23130	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
RADIATED EMISSION	23017 to 23173	23095	1.4MHz	QPSK	1 RB / 0 RB Offset
	23025 to 23165	23025, 23095 ,23165	3MHz	QPSK	1 RB / 0 RB Offset
	23035 to 23155	23095	5MHz	QPSK	1 RB / 0 RB Offset
	23060 to 23130	23095	10MHz	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.

LTE BAND 13

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	23205 to 23255	23205, 23230, 23255	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
	23230	23230	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
RADIATED EMISSION	23205 to 23255	23205, 23230, 23255	5MHz	QPSK	1 RB / 0 RB Offset
	23230	23230	10MHz	QPSK	1 RB / 0 RB Offset

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

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP(ERP)	24deg. C, 60%RH	3.7Vdc from Battery	Star Le
RADIATED EMISSION	23deg. C, 70%RH	12Vdc from adapter	Star Le

2.4 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

Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

Portable stations (hand-held devices) operating in the 699-716 MHz and 777-7887 bands are limited to 3 watts ERP.

3.1.2 TEST PROCEDURES

EIRP / ERP MEASUREMENT:

a. The EUT was set up for the maximum power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range). RBW and VBW is 10MHz for LTE.

b. E.I.R.P power 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.

c. 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

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

e. E.R.P = E.I.R.P- 2.15 dB

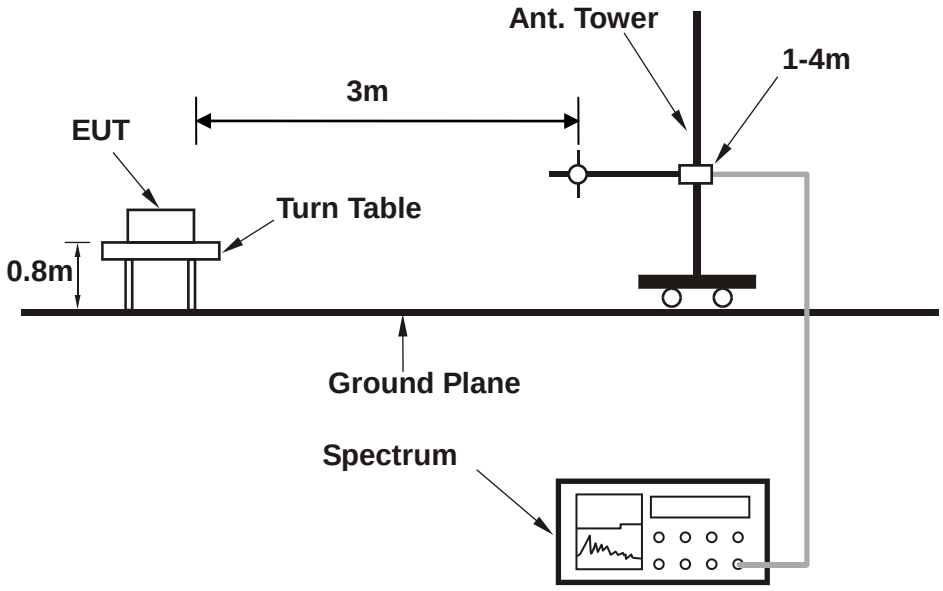
CONDUCTED POWER MEASUREMENT:

a. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.

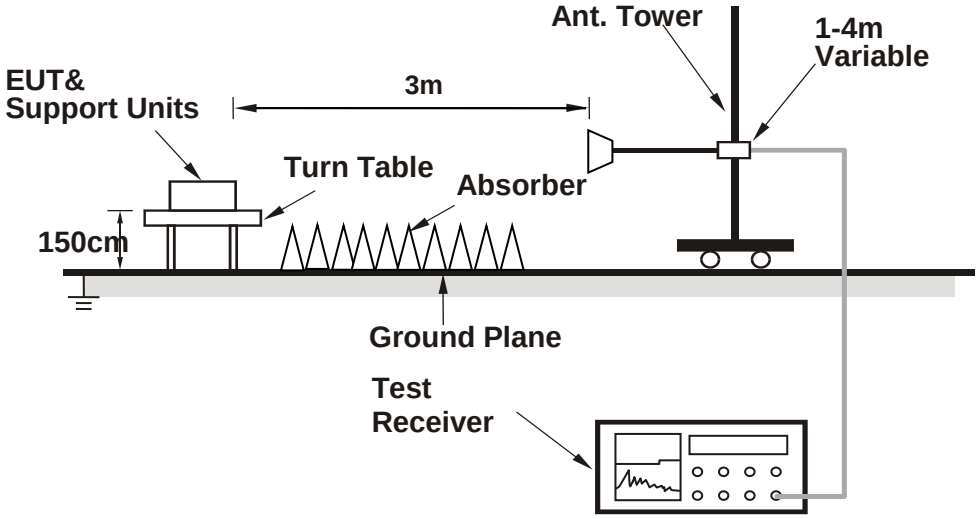
b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

3.1.3 TEST SETUP

ERP MEASUREMENT:



EIRP MEASUREMENT:



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

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)

Base on verify the Conducted Power is the same with module test report (RXA1706-0399RF03R1) by lab, the test results please refer the module Report No.: RXA1706-0199RF03R1, and the pre-scan data as below.

LTE BAND 4

LTE Band 4							
BW	Modulation	RB Size	RB Offset	Low CH 19957	Mid CH 18900	High CH 19193	MPR
				Frequency 1710.7 MHz	Frequency 1732.5 MHz	Frequency 1754.3 MHz	
1.4	QPSK	1	0	22.58	22.07	22.65	0
		1	3	22.84	22.96	22.30	0
		1	5	22.75	22.05	22.11	0
		3	0	22.95	22.07	22.22	0
		3	2	22.88	22.02	22.25	0
		3	3	22.78	22.90	22.04	0
		6	0	22.36	22.16	22.79	0
	16QAM	1	0	22.96	22.59	22.41	0
		1	3	21.71	21.79	22.45	0
		1	5	21.72	21.85	22.21	0
		3	0	22.33	21.94	22.24	0
		3	2	22.29	21.70	22.08	0
		3	3	22.36	21.87	22.20	0
		6	0	21.76	21.94	22.01	0

LTE BAND 12

LTE Band 12							
BW	Modulation	RB Size	RB Offset	Low CH 23017	Mid CH 23095	High CH 23173	MPR
				Frequency 699.7 MHz	Frequency 707.5 MHz	Frequency 715.3 MHz	
1.4	QPSK	1	0	22.57	23.06	23.66	0
		1	3	22.85	22.98	23.31	0
		1	5	22.75	23.06	23.12	0
		3	0	22.94	23.08	23.23	0
		3	2	22.87	23.02	23.26	0
		3	3	22.78	22.91	23.04	0
		6	0	22.37	23.16	22.81	0
	16QAM	1	0	22.96	22.59	23.41	0
		1	3	23.70	22.79	23.46	0
		1	5	23.73	22.84	23.23	0
		3	0	23.33	22.94	23.23	0
		3	2	23.29	22.71	23.09	0
		3	3	23.37	22.87	23.22	0
		6	0	22.76	22.95	23.03	0

LTE BAND 13

LTE Band 13							
BW	Modulation	RB Size	RB Offset	Low CH 23205	Mid CH 23230	High CH 23255	MPR
				Frequency 779.5 MHz	Frequency 782 MHz	Frequency 784.5 MHz	
5	QPSK	1	0	22.94	23.12	23.15	0
		1	3	22.95	23.00	23.13	0
		1	5	22.89	23.06	23.15	0
		3	0	22.99	23.14	22.76	0
		3	2	22.89	23.08	22.65	0
		3	3	22.87	22.92	23.07	0
		6	0	22.69	23.21	22.89	0
	16QAM	1	0	23.88	22.93	23.46	0
		1	3	23.75	22.82	23.51	0
		1	5	23.73	22.88	23.22	0
		3	0	22.79	22.37	23.27	0
		3	2	22.76	22.43	23.09	0
		3	3	22.88	22.69	22.74	0
		6	0	21.81	22.17	22.11	0

EIRP / ERP

LTE BAND 4

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19957	1710.7	-30.18	41.29	11.11	12.92	H	1
20175	1732.5	-30.78	41.36	10.58	11.43	H	1
20393	1754.3	-31.44	42.74	11.30	13.48	H	1
19957	1710.7	-24.45	44.25	19.80	95.39	V	1
20175	1732.5	-23.98	44.20	20.22	**105.20**	V	1
20393	1754.3	-24.36	44.09	19.73	93.86	V	1

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19957	1710.7	-31.05	41.29	10.24	10.58	H	1
20175	1732.5	-31.71	41.36	9.65	9.23	H	1
20393	1754.3	-32.40	42.74	10.34	10.81	H	1
19957	1710.7	-25.32	44.25	18.93	78.07	V	1
20175	1732.5	-24.91	44.20	19.29	84.92	V	1
20393	1754.3	-25.32	44.09	18.77	75.25	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19965	1711.5	-30.16	41.27	11.11	12.90	H	1
20175	1732.5	-30.84	41.36	10.52	11.27	H	1
20385	1753.5	-31.39	42.76	11.37	13.70	H	1
19965	1711.5	-24.43	44.26	19.83	96.21	V	1
20175	1732.5	-24.04	44.20	20.16	**103.75**	V	1
20385	1753.5	-24.31	44.23	19.92	98.22	V	1

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19965	1711.5	-31.23	41.27	10.04	10.09	H	1
20175	1732.5	-31.73	41.36	9.63	9.18	H	1
20385	1753.5	-32.38	42.76	10.38	10.91	H	1
19965	1711.5	-25.50	44.26	18.76	75.20	V	1
20175	1732.5	-24.93	44.20	19.27	84.53	V	1
20385	1753.5	-25.30	44.23	18.93	78.20	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19975	1712.5	-30.22	41.39	11.17	13.09	H	1
20175	1732.5	-30.79	41.36	10.57	11.40	H	1
20375	1752.5	-31.34	42.63	11.29	13.46	H	1
19975	1712.5	-24.49	44.17	19.68	92.81	V	1
20175	1732.5	-23.99	44.20	20.21	**104.95**	V	1
20375	1752.5	-24.26	44.35	20.09	101.98	V	1

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19975	1712.5	-31.05	41.39	10.34	10.81	H	1
20175	1732.5	-31.81	41.36	9.55	9.02	H	1
20375	1752.5	-32.44	42.63	10.19	10.44	H	1
19975	1712.5	-25.32	44.17	18.85	76.67	V	1
20175	1732.5	-25.01	44.20	19.19	82.99	V	1
20375	1752.5	-25.36	44.35	18.99	79.16	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20000	1715.0	-30.03	41.49	11.46	13.98	H	1
20175	1732.5	-30.73	41.36	10.63	11.56	H	1
20350	1750.0	-31.21	42.28	11.07	12.80	H	1
20000	1715.0	-24.30	44.06	19.76	94.69	V	1
20175	1732.5	-23.93	44.20	20.27	106.41	V	1
20350	1750.0	-24.13	44.43	20.30	**107.15**	V	1

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20000	1715.0	-31.18	41.49	10.31	10.73	H	1
20175	1732.5	-31.83	41.36	9.53	8.97	H	1
20350	1750.0	-32.37	42.28	9.91	9.80	H	1
20000	1715.0	-25.45	44.06	18.61	72.66	V	1
20175	1732.5	-25.03	44.20	19.17	82.60	V	1
20350	1750.0	-25.29	44.43	19.14	82.04	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 15MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20025	1717.5	-30.04	41.34	11.30	13.48	H	1
20175	1732.5	-30.80	41.36	10.56	11.38	H	1
20325	1747.5	-31.28	42.09	10.81	12.04	H	1
20025	1717.5	-24.31	44.04	19.73	94.06	V	1
20175	1732.5	-24.00	44.20	20.20	**104.71**	V	1
20325	1747.5	-24.20	44.22	20.02	100.35	V	1

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20025	1717.5	-30.90	41.34	10.44	11.06	H	1
20175	1732.5	-31.67	41.36	9.69	9.31	H	1
20325	1747.5	-32.13	42.09	9.96	9.90	H	1
20025	1717.5	-25.17	44.04	18.87	77.16	V	1
20175	1732.5	-24.87	44.20	19.33	85.70	V	1
20325	1747.5	-25.05	44.22	19.17	82.51	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20050	1720.0	-30.62	41.28	10.66	11.64	H	1
20175	1732.5	-31.25	41.36	10.11	10.26	H	1
20300	1745.0	-31.86	41.96	10.10	10.23	H	1
20050	1720.0	-24.89	44.14	19.25	84.04	V	1
20175	1732.5	-24.45	44.20	19.75	**94.32**	V	1
20300	1745.0	-24.78	43.88	19.10	81.32	V	1

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20050	1720.0	-31.55	41.28	9.73	9.40	H	1
20175	1732.5	-32.32	41.36	9.04	8.02	H	1
20300	1745.0	-32.69	41.96	9.27	8.45	H	1
20050	1720.0	-25.82	44.14	18.32	67.84	V	1
20175	1732.5	-25.52	44.20	18.68	73.72	V	1
20300	1745.0	-25.61	43.88	18.27	67.17	V	1

LTE BAND 12

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23017	699.7	-9.83	32.77	20.79	119.95	H	3
23095	707.5	-9.83	33.23	21.25	133.35	H	3
23173	715.3	-9.82	33.14	21.17	**130.86**	H	3
23017	699.7	-14.84	32.42	15.43	34.88	V	3
23095	707.5	-13.86	32.60	16.59	45.60	V	3
23173	715.3	-14.86	32.19	15.18	32.93	V	3

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23017	699.7	-10.66	32.77	19.96	99.08	H	3
23095	707.5	-10.85	33.23	20.23	105.44	H	3
23173	715.3	-10.92	33.14	20.07	101.58	H	3
23017	699.7	-15.67	32.42	14.60	28.81	V	3
23095	707.5	-14.88	32.60	15.57	36.06	V	3
23173	715.3	-15.96	32.19	14.08	25.56	V	3

LTE BAND 12

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23025	700.5	-9.64	32.63	20.84	121.37	H	3
23095	707.5	-9.77	33.23	21.31	135.21	H	3
23165	714.5	-9.69	33.21	21.37	**136.93**	H	3
23025	700.5	-14.65	32.33	15.53	35.70	V	3
23095	707.5	-13.80	32.60	16.65	46.24	V	3
23165	714.5	-14.73	32.30	15.42	34.84	V	3

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23025	700.5	-10.79	32.63	19.69	93.13	H	3
23095	707.5	-10.87	33.23	20.21	104.95	H	3
23165	714.5	-10.85	33.21	20.21	104.83	H	3
23025	700.5	-15.80	32.33	14.38	27.40	V	3
23095	707.5	-14.90	32.60	15.55	35.89	V	3
23165	714.5	-15.89	32.30	14.26	26.67	V	3

LTE BAND 12

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23035	701.5	-9.65	32.53	20.73	118.17	H	3
23095	707.5	-9.84	33.23	21.24	132.98	H	3
23155	713.5	-9.76	33.29	21.38	**137.31**	H	3
23035	701.5	-14.66	32.25	15.44	35.03	V	3
23095	707.5	-13.87	32.60	16.58	45.50	V	3
23155	713.5	-14.80	32.39	15.44	34.96	V	3

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23035	701.5	-10.51	32.53	19.87	96.94	H	3
23095	707.5	-10.71	33.23	20.37	108.84	H	3
23155	713.5	-10.61	33.29	20.53	112.90	H	3
23035	701.5	-15.52	32.25	14.58	28.73	V	3
23095	707.5	-14.74	32.60	15.71	37.24	V	3
23155	713.5	-15.65	32.39	14.59	28.75	V	3

LTE BAND 12

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23060	704.0	-10.23	32.68	20.30	107.23	H	3
23095	707.5	-10.29	33.23	20.79	119.95	H	3
23130	711.0	-10.34	33.39	20.90	**122.94**	H	3
23060	704.0	-15.24	32.37	14.98	31.46	V	3
23095	707.5	-14.32	32.60	16.13	41.02	V	3
23130	711.0	-15.38	32.56	15.03	31.81	V	3

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23060	704.0	-11.16	32.68	19.37	86.56	H	3
23095	707.5	-11.36	33.23	19.72	93.76	H	3
23130	711.0	-11.17	33.39	20.07	101.55	H	3
23060	704.0	-16.17	32.37	14.05	25.40	V	3
23095	707.5	-15.39	32.60	15.06	32.06	V	3
23130	711.0	-16.21	32.56	14.20	26.27	V	3

REMARKS: 1. ERP Output Power (dBm) = SPA LVL (dBm) + Correction Factor (dB) -2.15(dB).

2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss

LTE BAND 13

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23205	779.5	-12.12	32.60	18.33	68.08	H	3
23230	782.0	-11.59	32.75	19.01	79.62	H	3
23255	784.5	-11.86	33.08	19.07	**80.72**	H	3
23205	779.5	-17.87	31.54	11.52	14.19	V	3
23230	782.0	-17.58	31.70	11.97	15.74	V	3
23255	784.5	-18.05	31.97	11.77	15.03	V	3

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23205	779.5	-12.98	32.60	17.47	55.85	H	3
23230	782.0	-12.46	32.75	18.14	65.16	H	3
23255	784.5	-12.63	33.08	18.30	67.61	H	3
23205	779.5	-18.73	31.54	10.66	11.64	V	3
23230	782.0	-18.45	31.70	11.10	12.88	V	3
23255	784.5	-18.75	31.97	11.07	12.79	V	3

LTE BAND 13

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23230	782.0	-12.24	32.75	18.36	**68.55**	H	3
23230	782.0	-18.17	31.70	11.38	13.74	V	3

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23230	782.0	-13.11	32.75	17.49	56.10	H	3
23230	782.0	-13.17	31.70	16.38	43.45	V	3

REMARKS: 1. ERP Output Power (dBm) = SPA LVL (dBm) + Correction Factor (dB) -2.15(dB).
2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss

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

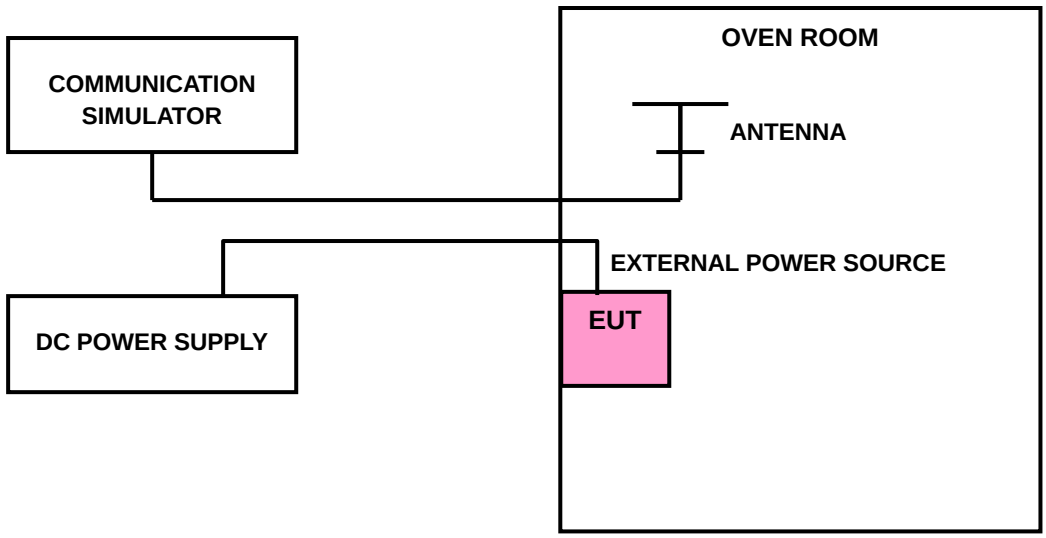
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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

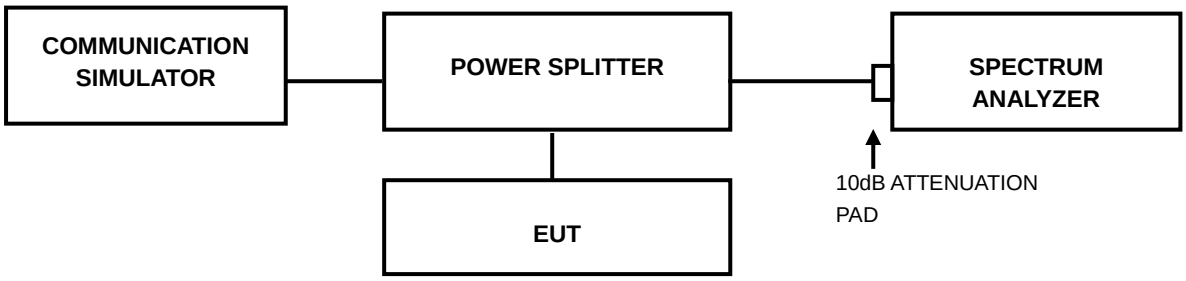
The test results was recorded in Report No.: RXA1706-0199RF03R1.

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

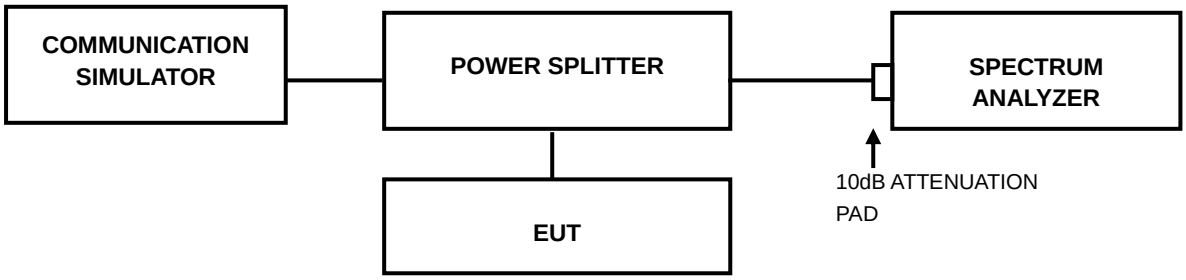
The test results was recorded in Report No.: RXA1706-0199RF03R1.

3.4 PEAK TO AVERAGE RATIO

3.4.1 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

3.4.2 TEST SETUP



3.4.3 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%.

3.4.4 TEST RESULTS

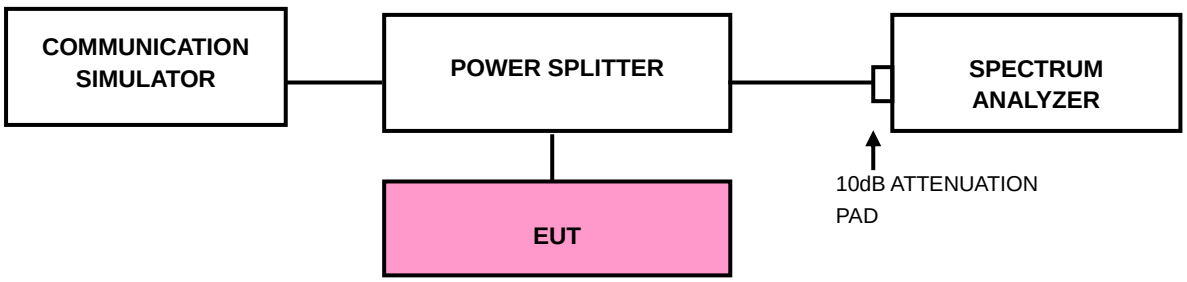
The test results was recorded in Report No.: RXA1706-0199RF03R1.

3.5 BAND EDGE MEASUREMENT

3.5.1 LIMITS OF BAND EDGE MEASUREMENT

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. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.
However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

3.5.2 TEST SETUP



3.5.3 TEST PROCEDURES

a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).

b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

c. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 20kHz and VBW of the spectrum is 100 kHz. (LTE bandwidth 1.4MHz)

d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 30kHz and VBW of the spectrum is 100kHz. (LTE bandwidth 3MHz)

e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 50kHz and VBW of the spectrum is 200kHz. (LTE bandwidth 5MHz)

f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz. (LTE bandwidth 10MHz)

g. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 1MHz. (LTE bandwidth 15MHz)

h. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 1MHz. (LTE bandwidth 20MHz)

i. Record the max trace plot into the test report.

3.5.4 TEST RESULTS

The test results was recorded in Report No.: RXA1706-0199RF03R1.

3.6 CONDUCTED SPURIOUS EMISSIONS

3.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm

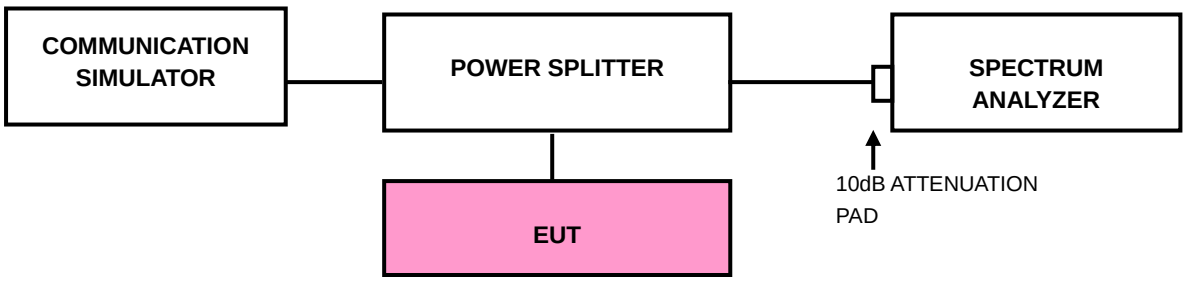
On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

3.6.2 TEST PROCEDURE

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

b. Measuring frequency range is from 30 MHz to 19.1GHz for WCDMA Band 4 & LTE Band 4, and 30 MHz to 9GHz for LTE Band 13. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

3.6.3 TEST SETUP



3.6.4 TEST RESULTS

The test results was recorded in Report No.: RXA1706-0199RF03R1.

3.7 RADIATED EMISSION MEASUREMENT

3.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm

3.7.2 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.

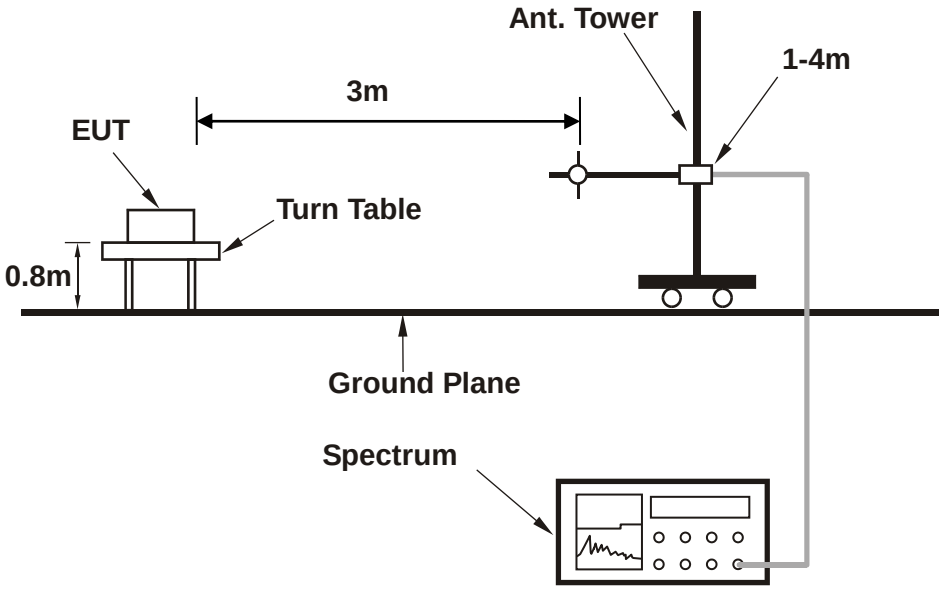
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.7.3 DEVIATION FROM TEST STANDARD

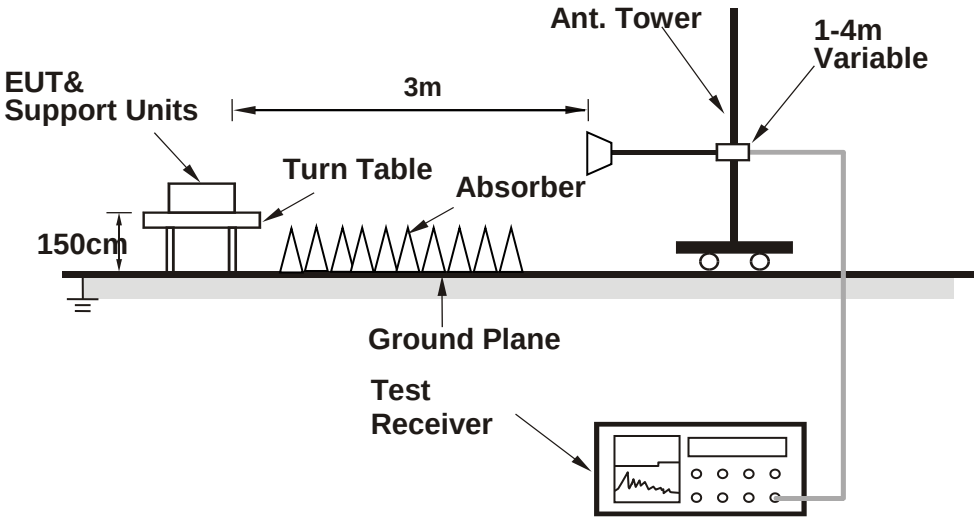
No deviation

3.7.4 TEST SETUP

< Frequency Range 30MHz~1GHz >



< Frequency Range above 1GHz >



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

3.7.5 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

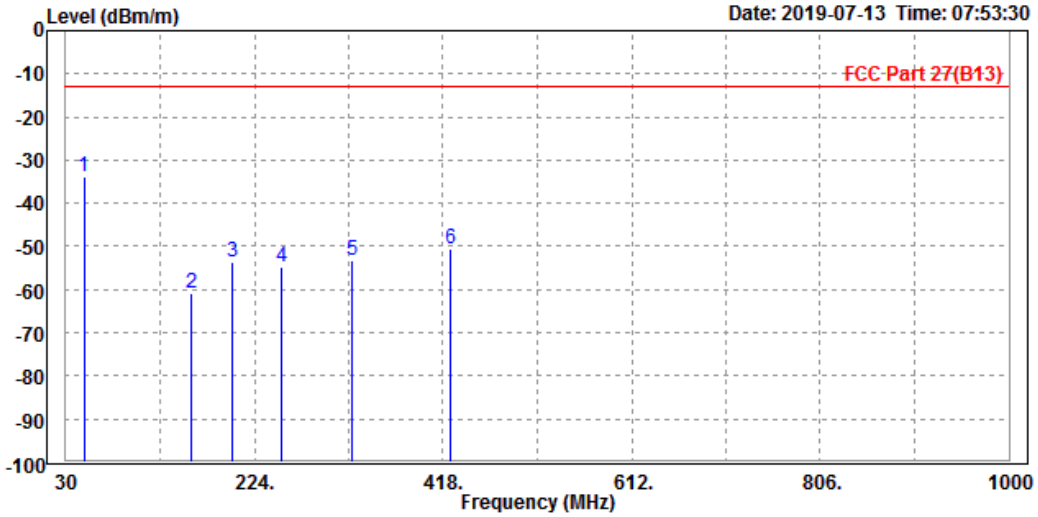
30 MHz – 1GHz data:

LTE BAND 13

CHANNEL BANDWIDTH: 5Hz / QPSK

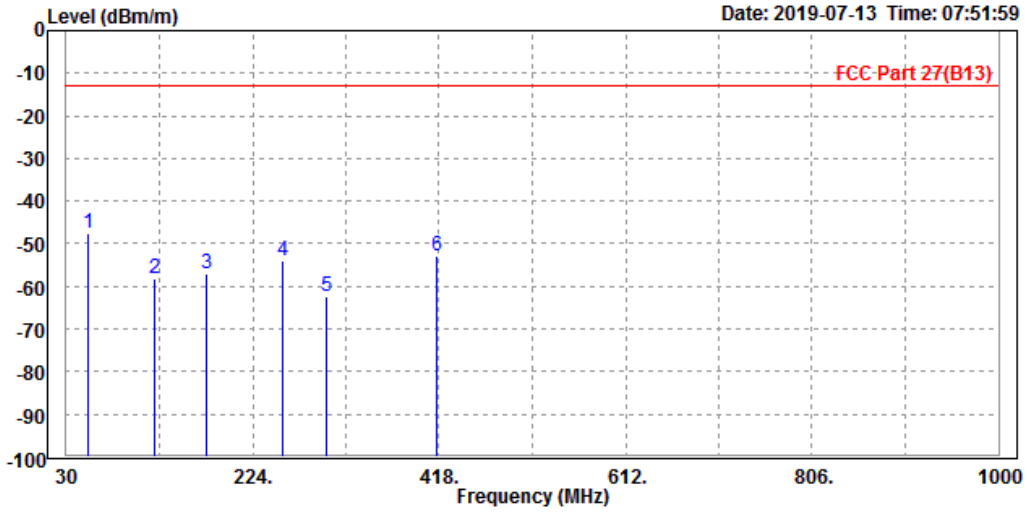
MODE	TX channel 23230	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	48.570	-33.98	-38.41	-13.00	-20.98	4.43	Peak	Horizontal
2	158.420	-60.88	-42.31	-13.00	-47.88	-18.57	Peak	Horizontal
3	201.320	-53.73	-36.52	-13.00	-40.73	-17.21	Peak	Horizontal
4	251.340	-54.85	-38.64	-13.00	-41.85	-16.21	Peak	Horizontal
5	325.160	-53.09	-40.12	-13.00	-40.09	-12.97	Peak	Horizontal
6	425.610	-50.69	-40.25	-13.00	-37.69	-10.44	Peak	Horizontal



MODE	TX channel 23230	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
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	PP	52.120	-47.35	-41.01	-13.00	-34.35	-6.34	Peak	Vertical
2		121.360	-58.24	-45.23	-13.00	-45.24	-13.01	Peak	Vertical
3		175.480	-57.20	-43.56	-13.00	-44.20	-13.64	Peak	Vertical
4		255.140	-53.85	-42.35	-13.00	-40.85	-11.50	Peak	Vertical
5		301.210	-62.50	-51.21	-13.00	-49.50	-11.29	Peak	Vertical
6		415.230	-52.68	-42.31	-13.00	-39.68	-10.37	Peak	Vertical



ABOVE 1GHz

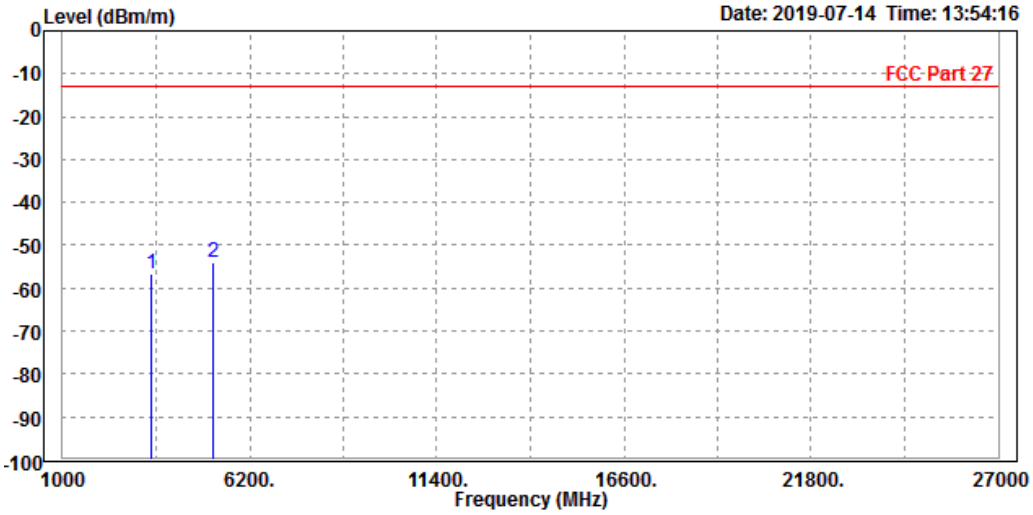
Note: For higher frequency, the emission is too low to be detected.

LTE BAND 4

CHANNEL BANDWIDTH: 1.4MHz / QPSK

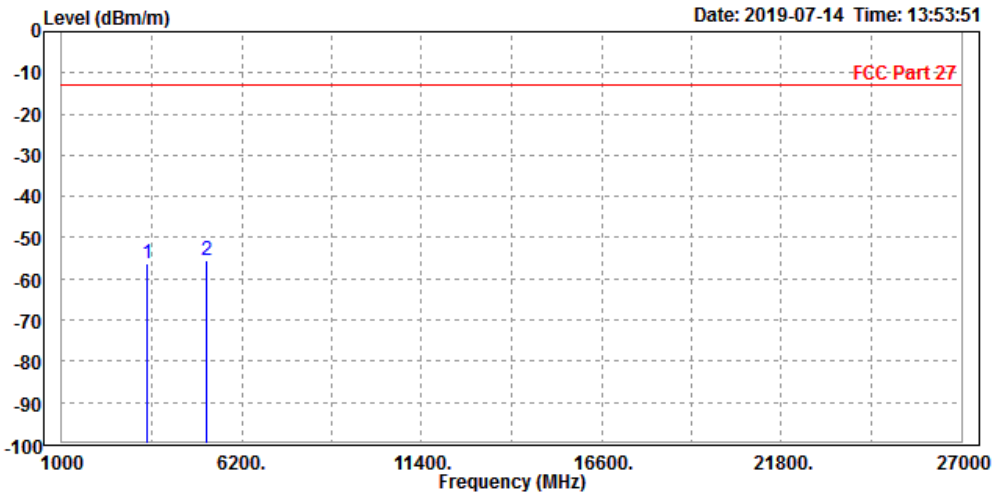
MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3470.000	-56.62	-58.67	-13.00	-43.62	2.05	Peak	Horizontal
2 PP	5197.000	-53.90	-62.51	-13.00	-40.90	8.61	Peak	Horizontal



MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
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	3470.000	-56.11	-58.64	-13.00	-43.11	2.53	Peak	Vertical
2 PP	5197.000	-55.34	-63.32	-13.00	-42.34	7.98	Peak	Vertical

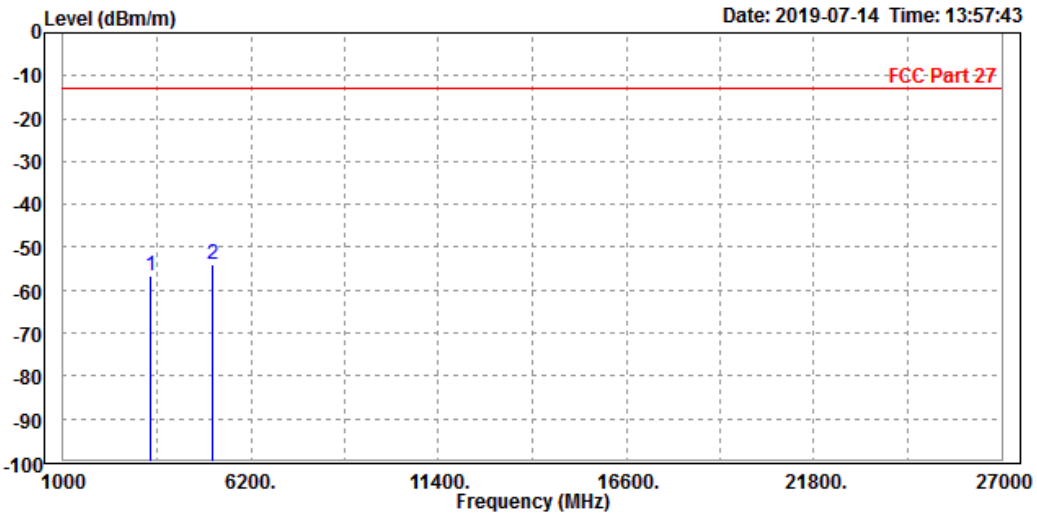


CHANNEL BANDWIDTH: 3MHz / QPSK

CH 19965

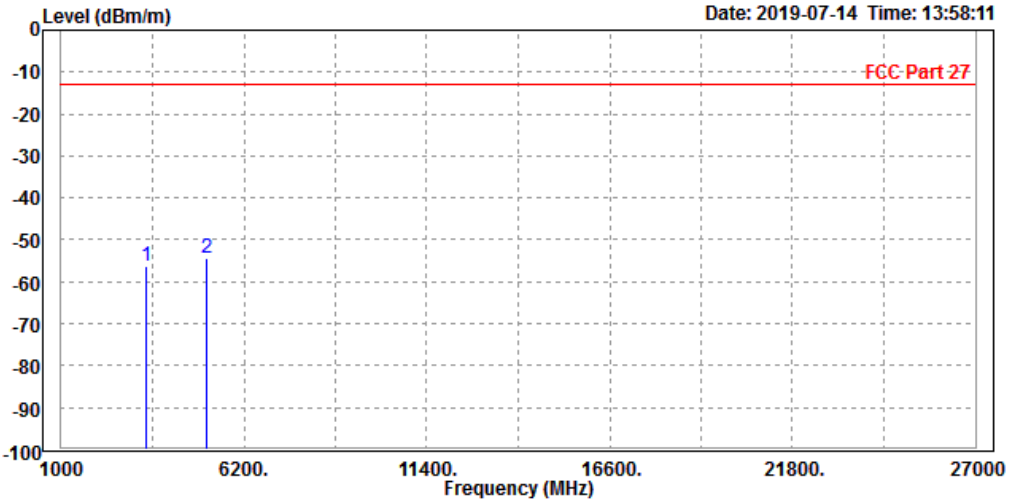
MODE	TX channel 19965	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3418.000	-56.76	-58.61	-13.00	-43.76	1.85	Peak	Horizontal
2 PP	5132.000	-53.83	-62.36	-13.00	-40.83	8.53	Peak	Horizontal



MODE	TX channel 19965	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

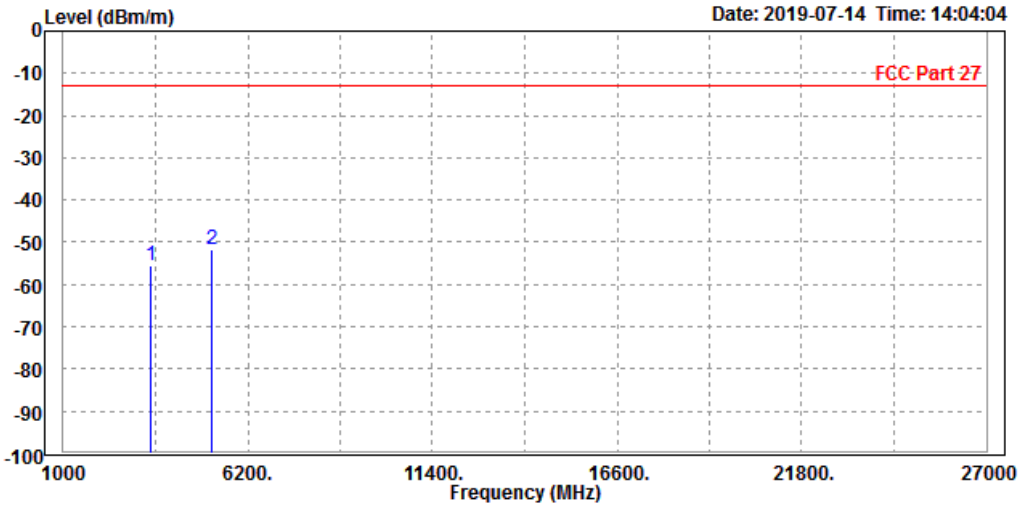
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3418.000	-56.28	-58.75	-13.00	-43.28	2.47	Peak	Vertical
2 PP	5132.000	-54.53	-62.52	-13.00	-41.53	7.99	Peak	Vertical



CH 20175

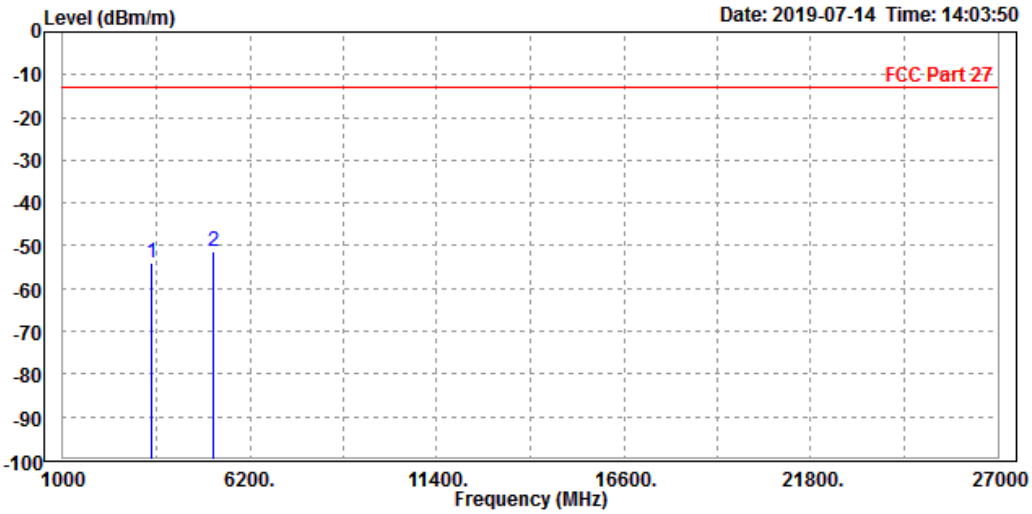
MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3470.000	-55.63	-57.68	-13.00	-42.63	2.05	Peak	Horizontal
2 PP	5197.000	-51.84	-60.45	-13.00	-38.84	8.61	Peak	Horizontal



MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

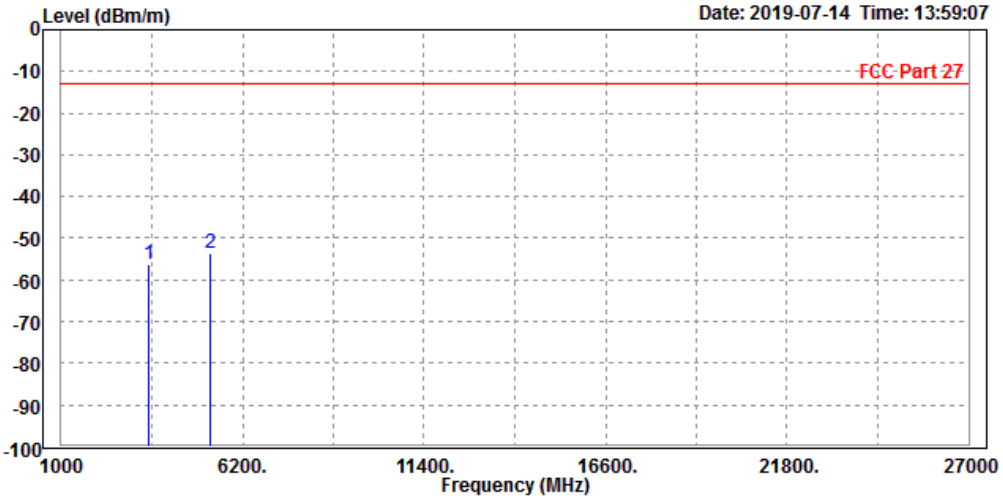
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3470.000	-54.11	-56.64	-13.00	-41.11	2.53	Peak	Vertical
2 PP	5197.000	-51.33	-59.31	-13.00	-38.33	7.98	Peak	Vertical



CH 20385

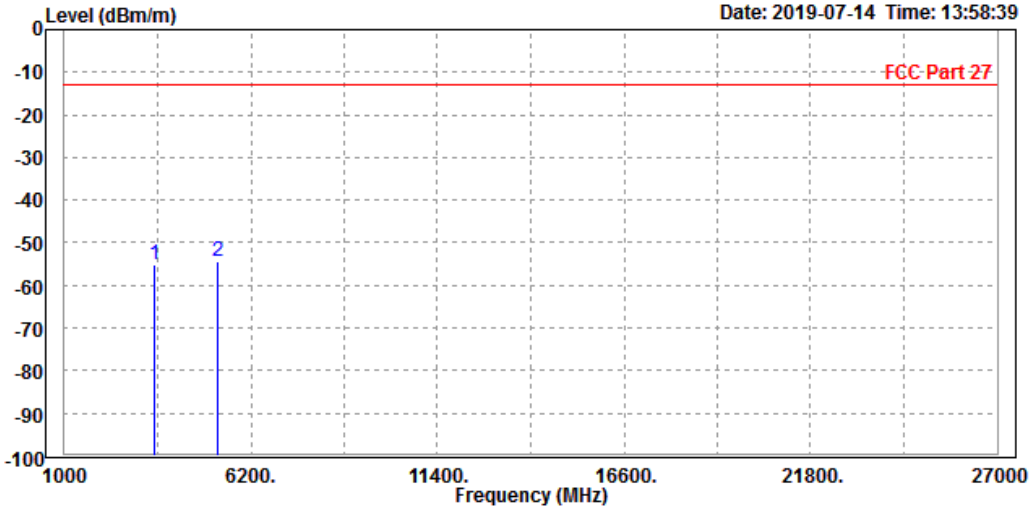
MODE	TX channel 20385	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3502.000	-56.31	-58.48	-13.00	-43.31	2.17	Peak	Horizontal
2 PP	5266.000	-53.63	-62.32	-13.00	-40.63	8.69	Peak	Horizontal



MODE	TX channel 20385	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

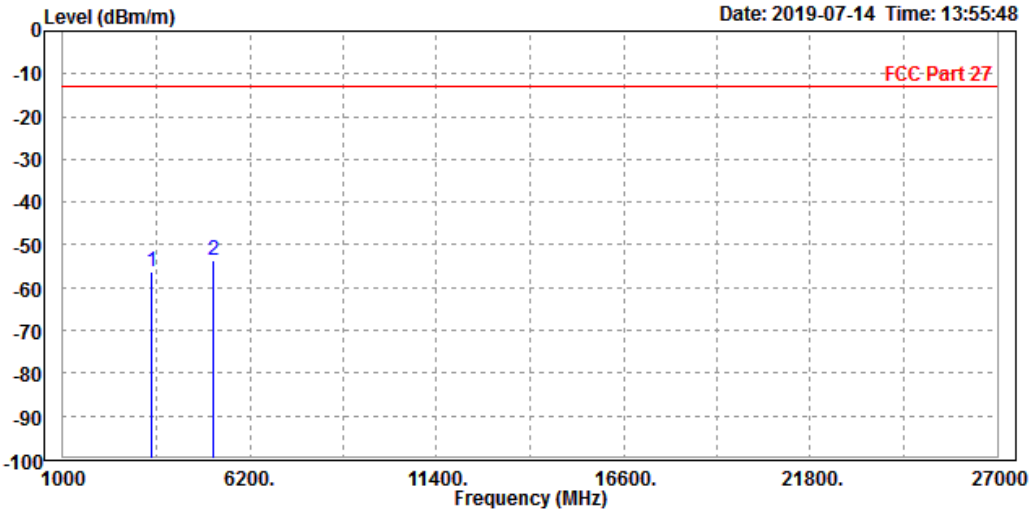
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3502.000	-55.26	-57.84	-13.00	-42.26	2.58	Peak	Vertical
2 PP	5266.000	-54.37	-62.35	-13.00	-41.37	7.98	Peak	Vertical



CHANNEL BANDWIDTH: 5MHz / QPSK

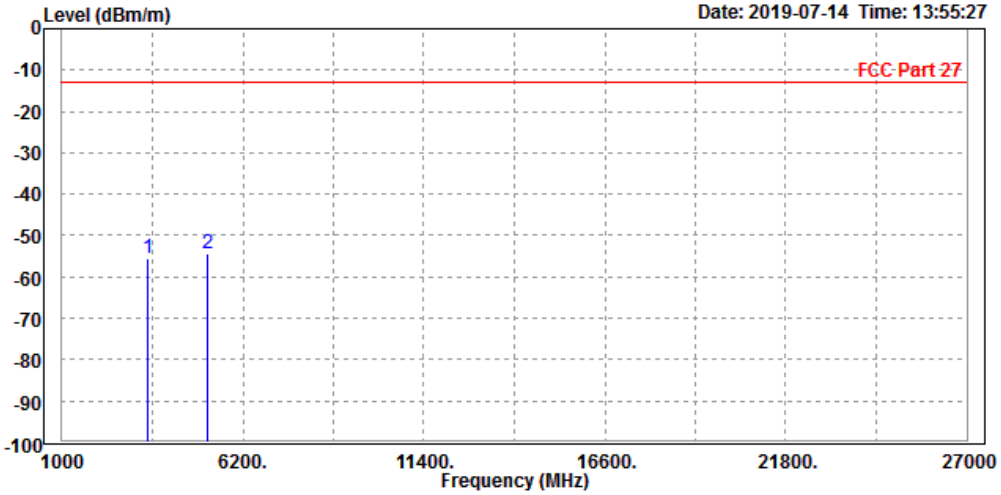
MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3470.000	-56.41	-58.46	-13.00	-43.41	2.05	Peak	Horizontal
2 PP	5197.000	-53.54	-62.15	-13.00	-40.54	8.61	Peak	Horizontal



MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

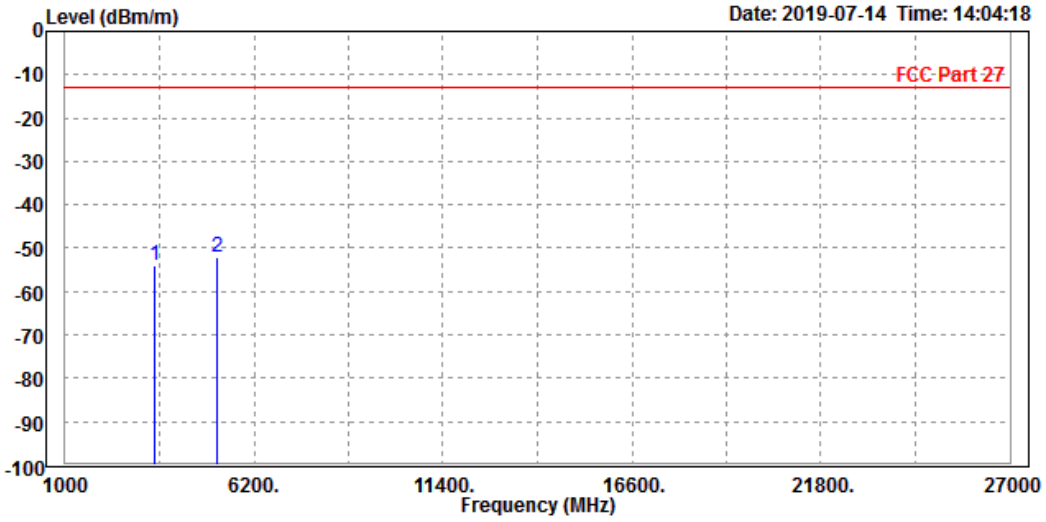
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3470.000	-55.59	-58.12	-13.00	-42.59	2.53	Peak	Vertical
2 PP	5197.000	-54.37	-62.35	-13.00	-41.37	7.98	Peak	Vertical



CHANNEL BANDWIDTH: 10MHz / QPSK

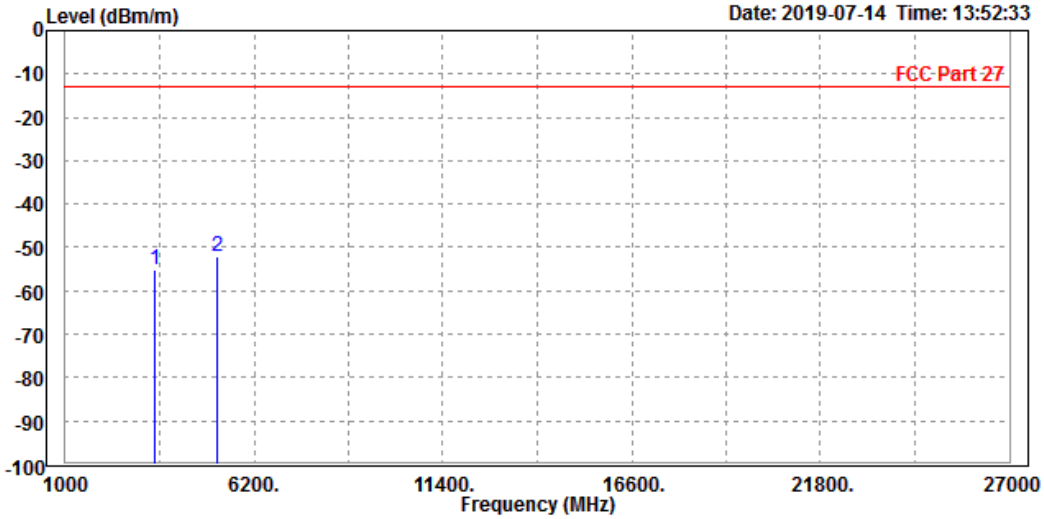
MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3470.000	-54.16	-56.21	-13.00	-41.16	2.05	Peak	Horizontal
2 PP	5197.000	-52.07	-60.68	-13.00	-39.07	8.61	Peak	Horizontal



MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

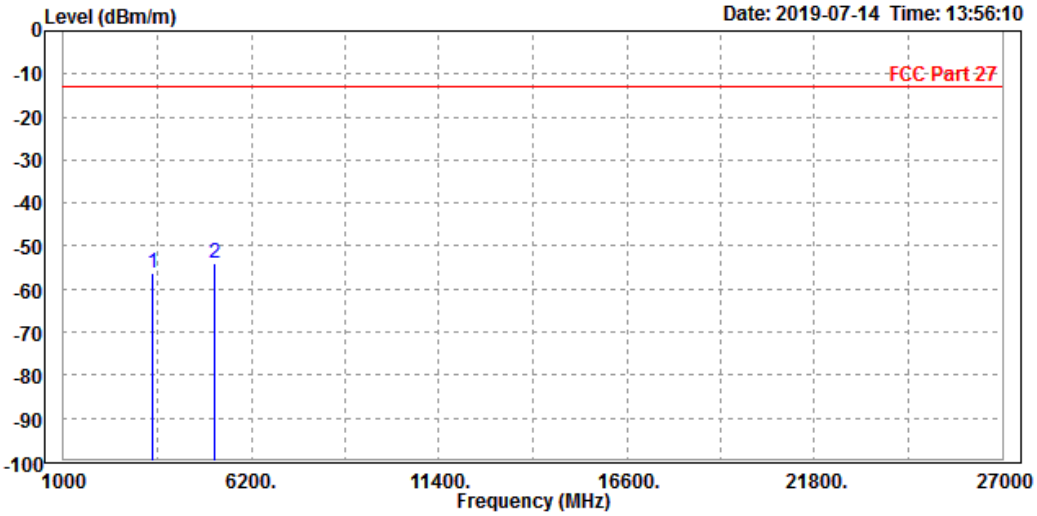
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3470.000	-54.95	-57.48	-13.00	-41.95	2.53	Peak	Vertical
2 PP	5197.000	-52.27	-60.25	-13.00	-39.27	7.98	Peak	Vertical



CHANNEL BANDWIDTH: 15MHz / QPSK

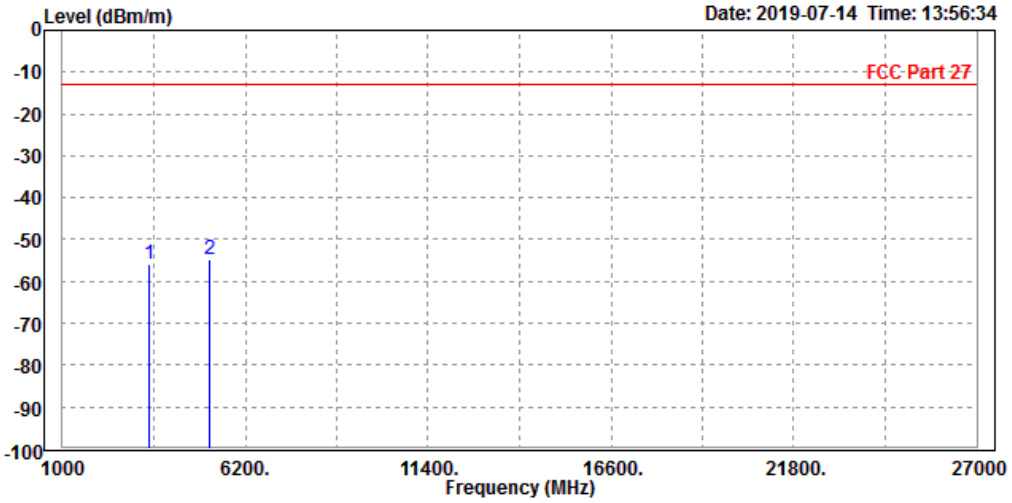
MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3470.000	-56.37	-58.42	-13.00	-43.37	2.05	Peak	Horizontal
2 PP	5197.000	-53.91	-62.52	-13.00	-40.91	8.61	Peak	Horizontal



MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

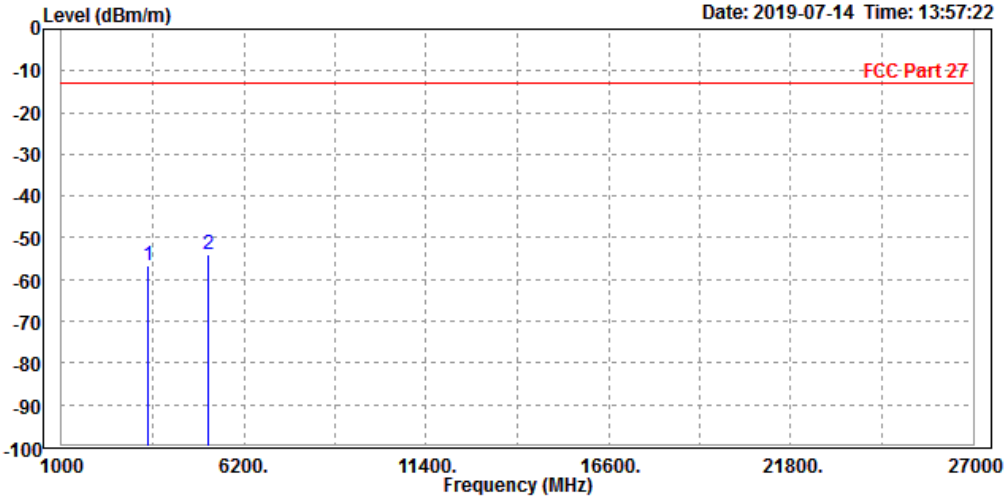
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3470.000	-55.89	-58.42	-13.00	-42.89	2.53	Peak	Vertical
2 PP	5197.000	-54.58	-62.56	-13.00	-41.58	7.98	Peak	Vertical



CHANNEL BANDWIDTH: 20MHz / QPSK

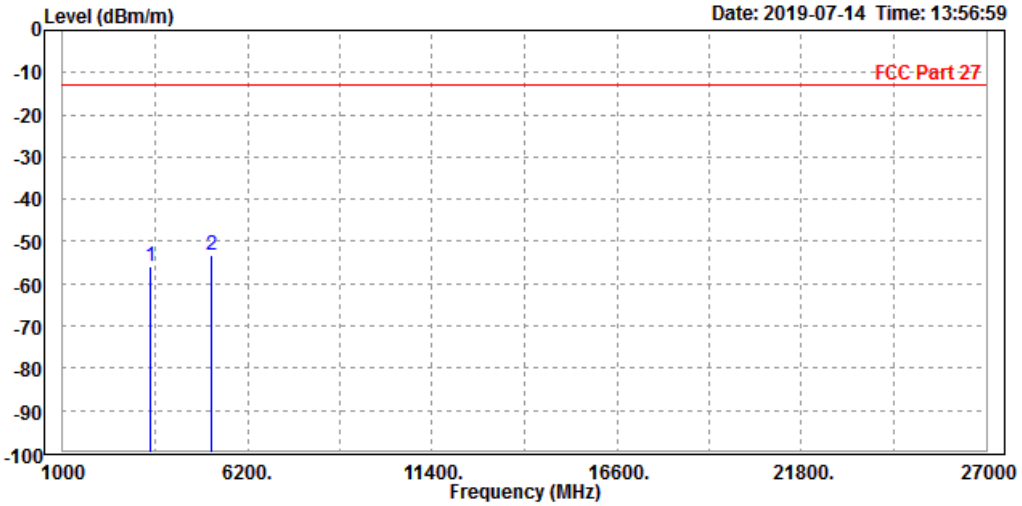
MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3470.000	-56.62	-58.67	-13.00	-43.62	2.05	Peak	Horizontal
2 PP	5197.000	-53.95	-62.56	-13.00	-40.95	8.61	Peak	Horizontal



MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
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	3470.000	-55.72	-58.25	-13.00	-42.72	2.53	Peak	Vertical
2 PP	5197.000	-53.41	-61.39	-13.00	-40.41	7.98	Peak	Vertical

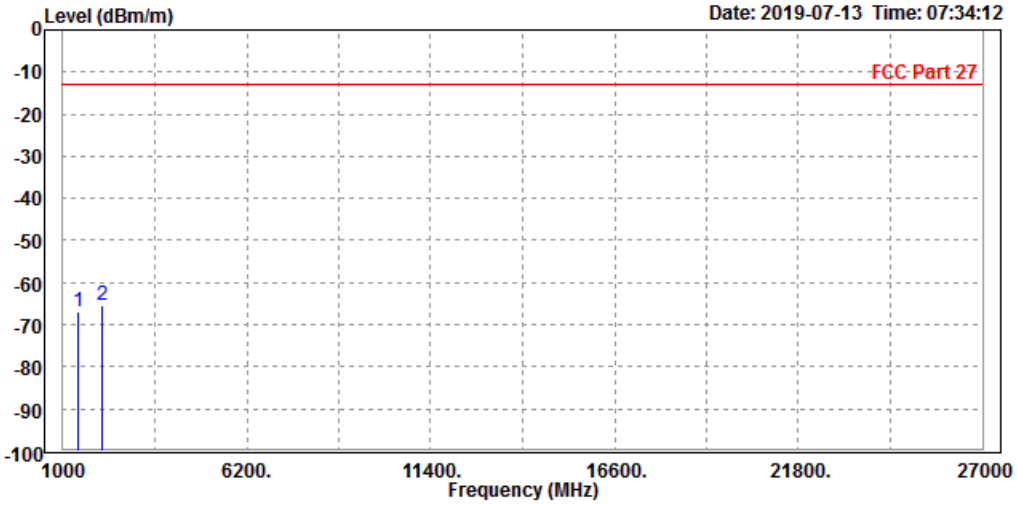


LTE BAND 12

CHANNEL BANDWIDTH: 1.4MHz / QPSK

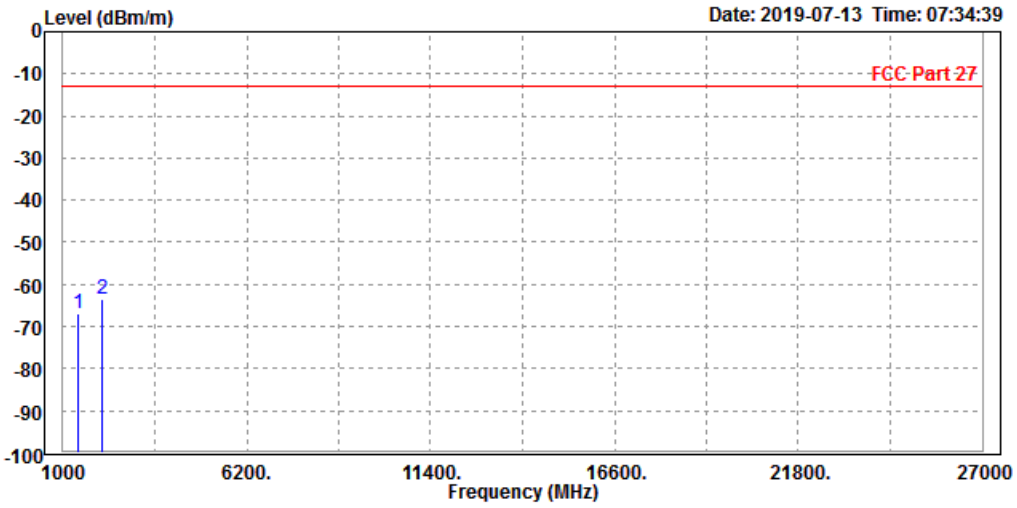
MODE	TX channel 23095	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1416.000	-66.95	-60.23	-13.00	-53.95	-6.72	Peak	Horizontal
2 PP	2122.500	-65.35	-63.42	-13.00	-52.35	-1.93	Peak	Horizontal



MODE	TX channel 23095	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
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	1416.000	-66.87	-61.43	-13.00	-53.87	-5.44	Peak	Vertical
2 PP	2122.500	-63.50	-63.26	-13.00	-50.50	-0.24	Peak	Vertical

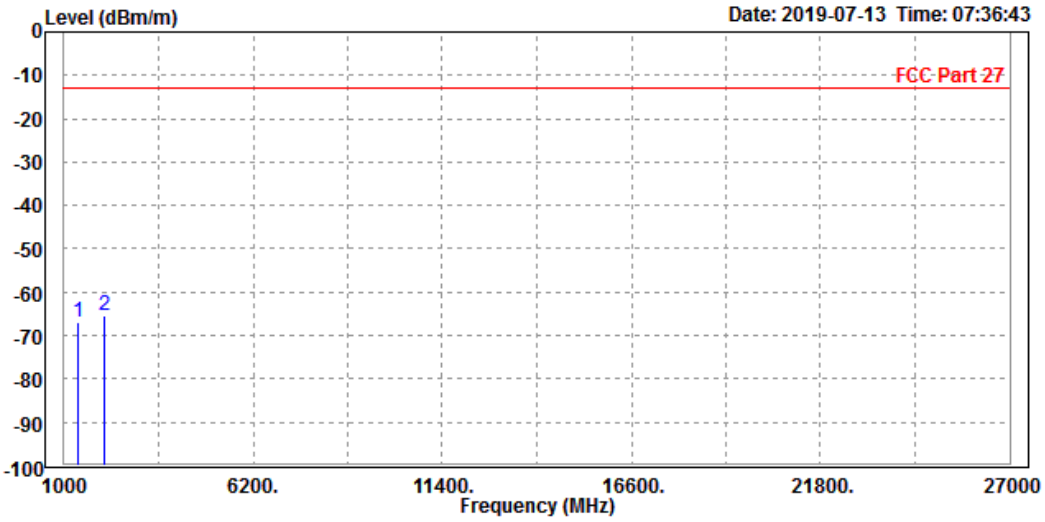


CHANNEL BANDWIDTH: 3MHz / QPSK

CH 23025

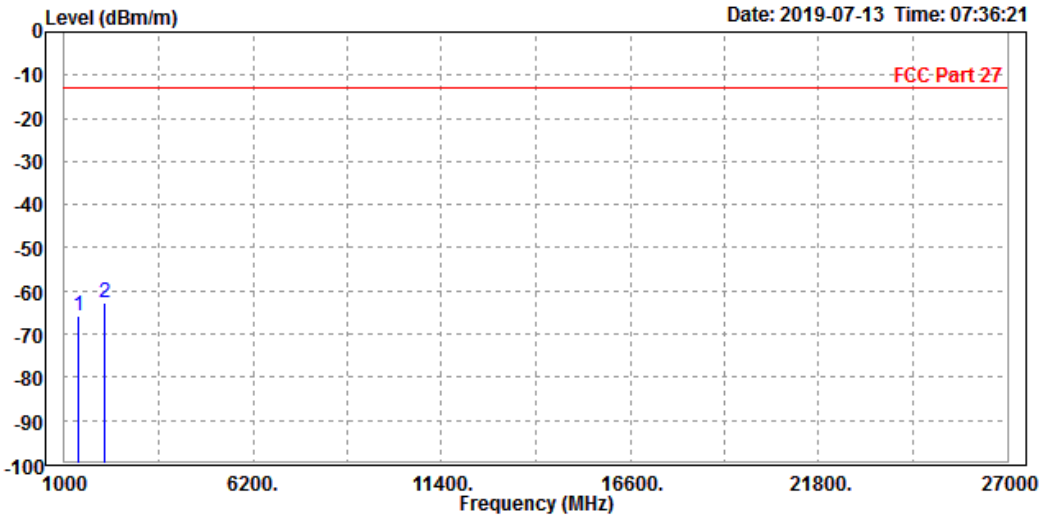
MODE	TX channel 23025	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1390.000	-67.11	-60.23	-13.00	-54.11	-6.88	Peak	Horizontal
2 PP	2101.500	-65.40	-63.45	-13.00	-52.40	-1.95	Peak	Horizontal



MODE	TX channel 23025	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

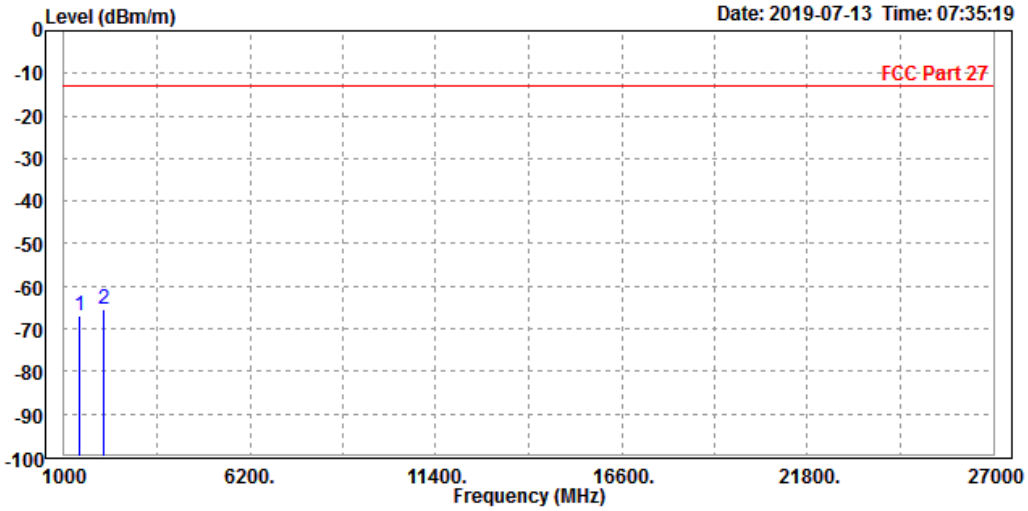
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1390.000	-65.81	-60.21	-13.00	-52.81	-5.60	Peak	Vertical
2 PP	2101.500	-62.73	-62.48	-13.00	-49.73	-0.25	Peak	Vertical



CH 23095

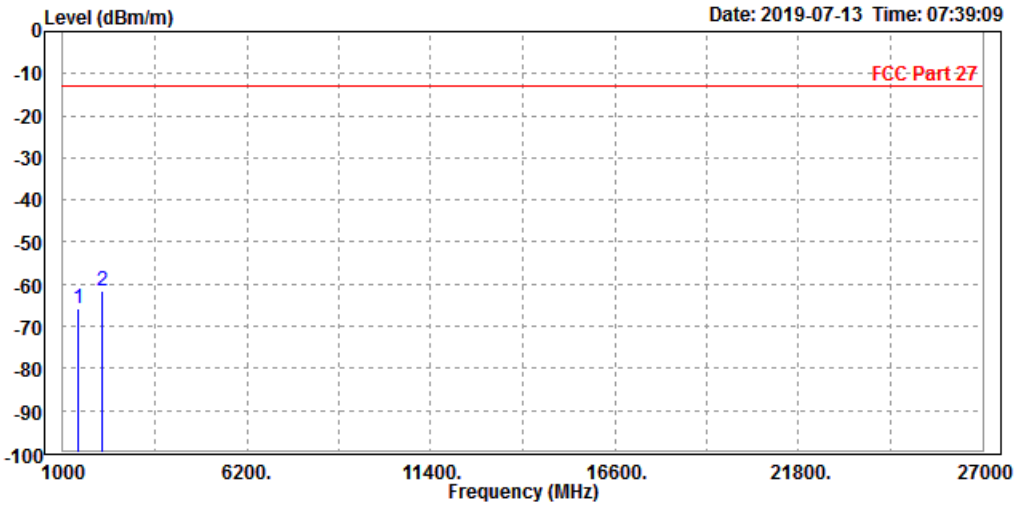
MODE	TX channel 23095	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1416.000	-67.00	-60.28	-13.00	-54.00	-6.72	Peak	Horizontal
2 PP	2122.500	-65.27	-63.34	-13.00	-52.27	-1.93	Peak	Horizontal



MODE	TX channel 23095	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

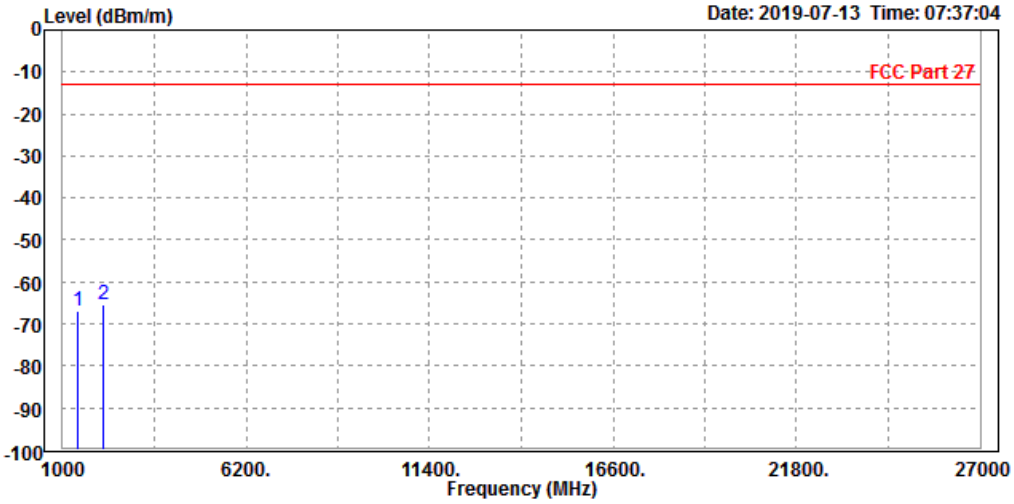
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1416.000	-65.65	-60.21	-13.00	-52.65	-5.44	Peak	Vertical
2 PP	2122.500	-61.59	-61.35	-13.00	-48.59	-0.24	Peak	Vertical



CH 23165

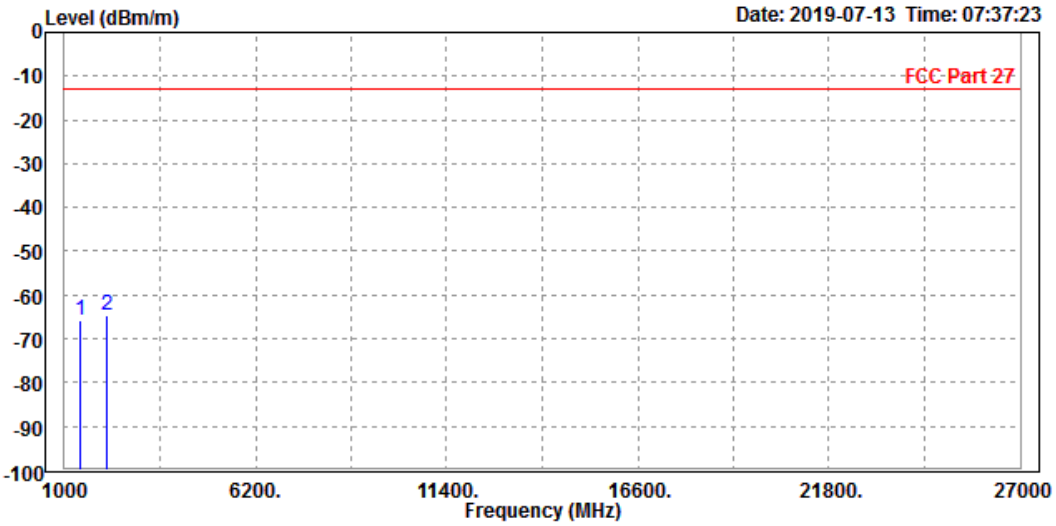
MODE	TX channel 23165	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1416.000	-67.00	-60.28	-13.00	-54.00	-6.72	Peak	Horizontal
2 PP	2143.500	-65.26	-63.34	-13.00	-52.26	-1.92	Peak	Horizontal



MODE	TX channel 23165	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

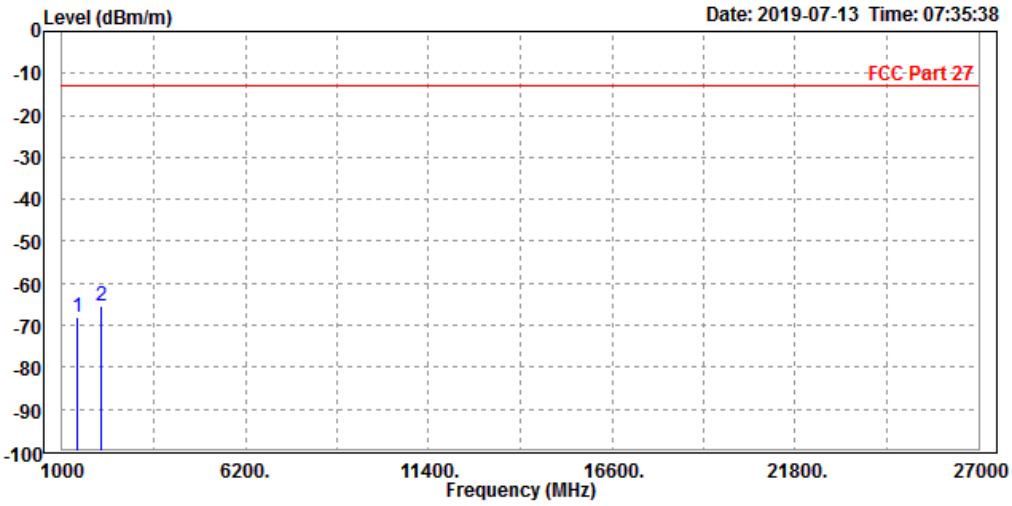
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1416.000	-65.75	-60.31	-13.00	-52.75	-5.44	Peak	Vertical
2 PP	2143.500	-64.75	-64.51	-13.00	-51.75	-0.24	Peak	Vertical



CHANNEL BANDWIDTH: 5MHz / QPSK

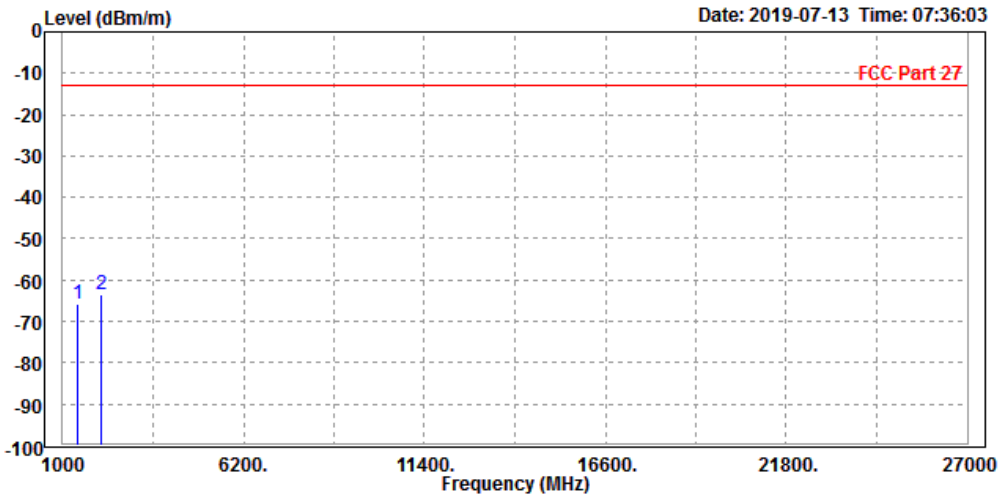
MODE	TX channel 23095	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1416.000	-67.97	-61.25	-13.00	-54.97	-6.72	Peak	Horizontal
2 PP	2122.500	-65.31	-63.38	-13.00	-52.31	-1.93	Peak	Horizontal



MODE	TX channel 23095	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

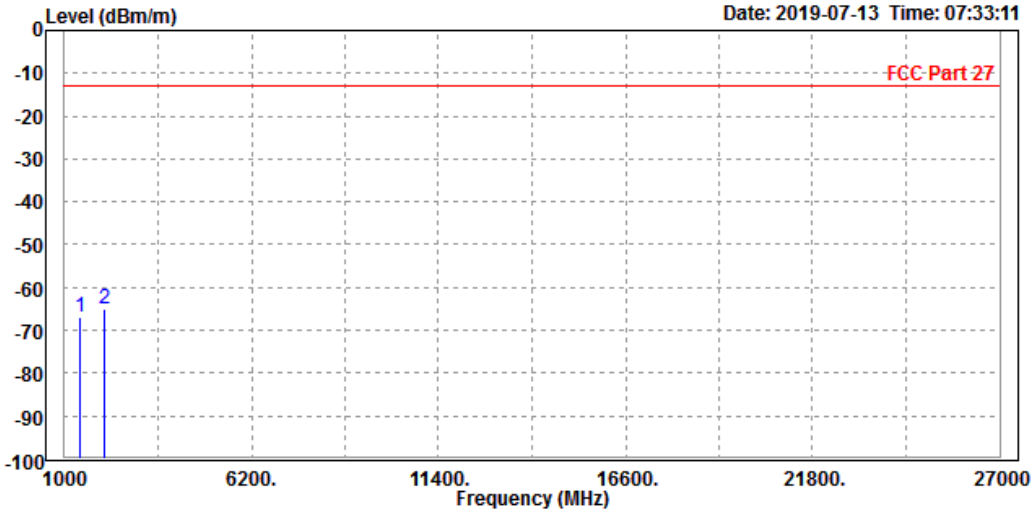
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1416.000	-65.79	-60.35	-13.00	-52.79	-5.44	Peak	Vertical
2 PP	2122.500	-63.47	-63.23	-13.00	-50.47	-0.24	Peak	Vertical



CHANNEL BANDWIDTH: 10MHz / QPSK

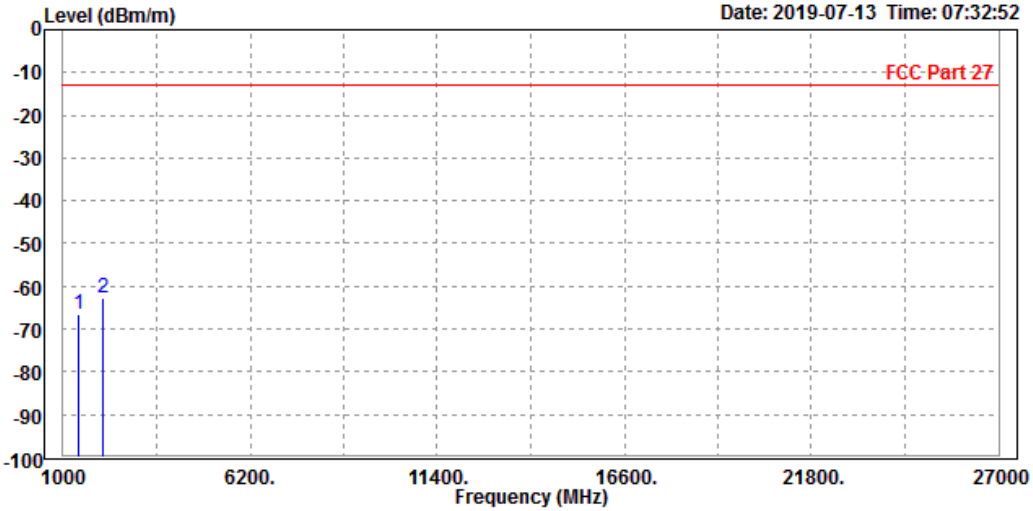
MODE	TX channel 23095	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1416.000	-66.97	-60.25	-13.00	-53.97	-6.72	Peak	Horizontal
2 PP	2122.500	-65.05	-63.12	-13.00	-52.05	-1.93	Peak	Horizontal



MODE	TX channel 23095	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
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	1416.000	-66.65	-61.21	-13.00	-53.65	-5.44	Peak	Vertical
2 PP	2122.500	-62.59	-62.35	-13.00	-49.59	-0.24	Peak	Vertical



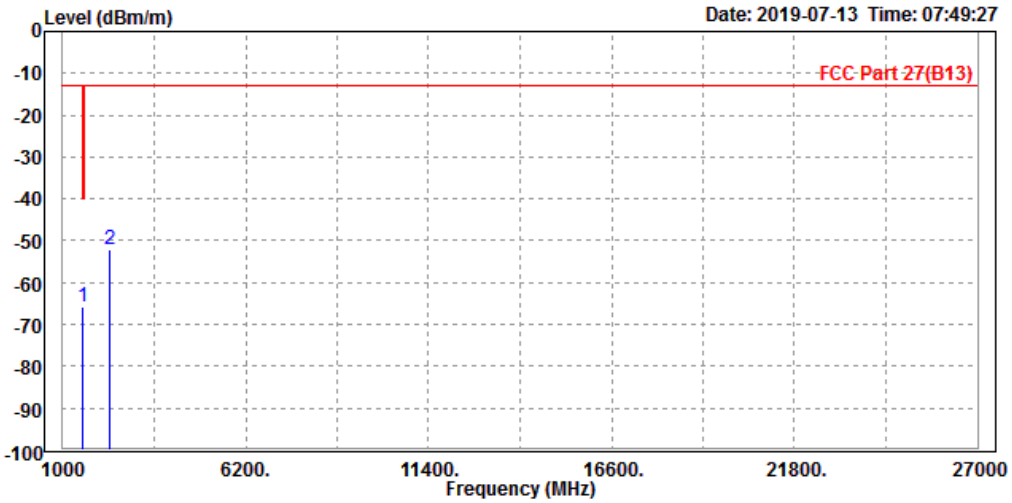
LTE BAND 13

CHANNEL BANDWIDTH: 5MHz / QPSK

CH 23205

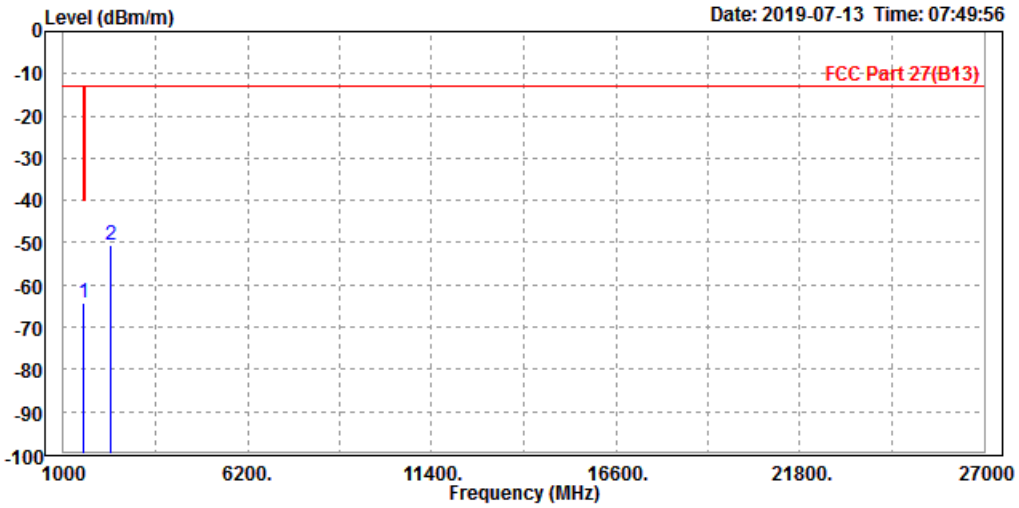
MODE	TX channel 23205	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1572.000	-65.92	-60.32	-40.00	-25.92	-5.60	Peak	Horizontal
2	2338.500	-51.91	-50.15	-13.00	-38.91	-1.76	Peak	Horizontal



MODE	TX channel 23205	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

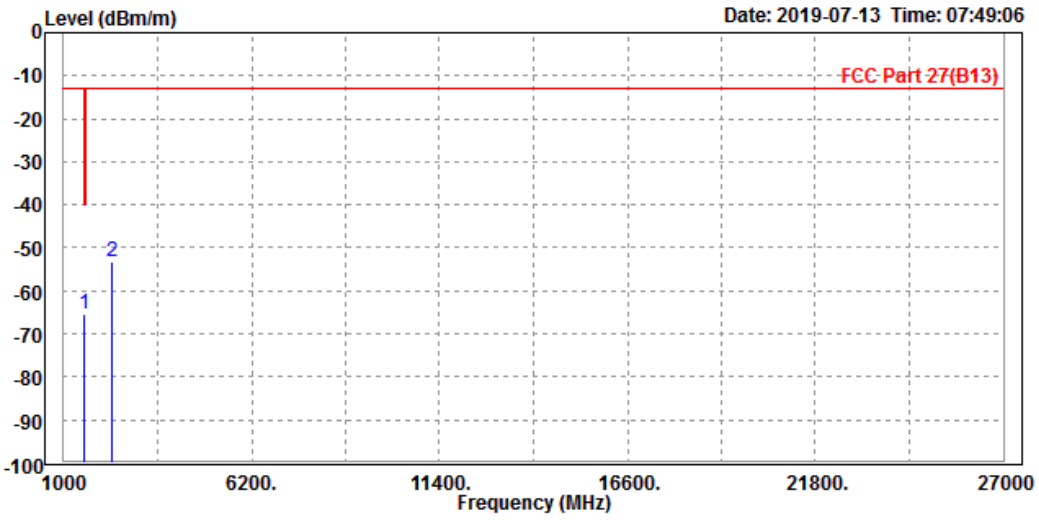
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1572.000	-64.12	-59.86	-40.00	-24.12	-4.26	Peak	Vertical
2	2338.500	-50.62	-50.42	-13.00	-37.62	-0.20	Peak	Vertical



CH 23230

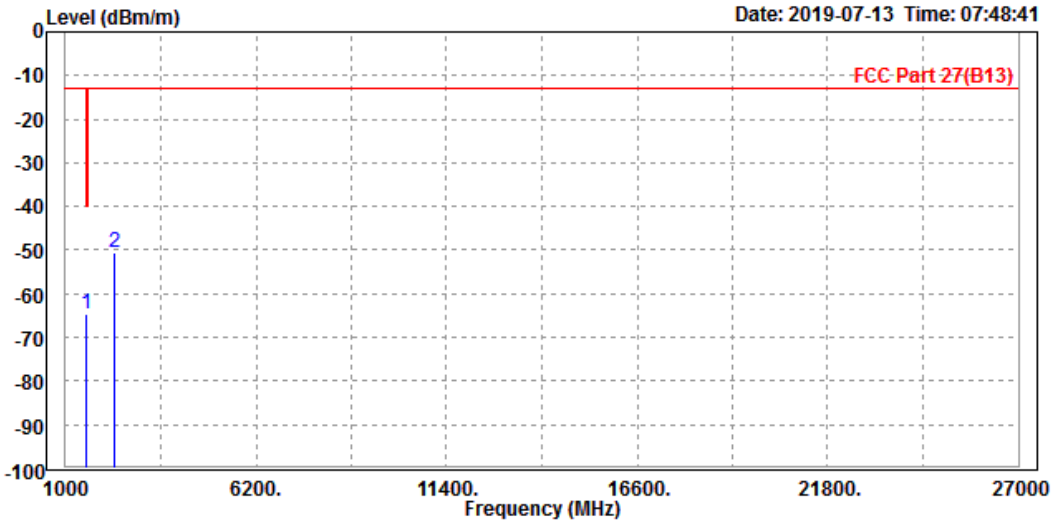
MODE	TX channel 23230	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	1572.000	-65.35	-59.75	-40.00	-25.35	-5.60	Peak	Horizontal
2		2346.000	-53.24	-51.48	-13.00	-40.24	-1.76	Peak	Horizontal



MODE	TX channel 23230	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

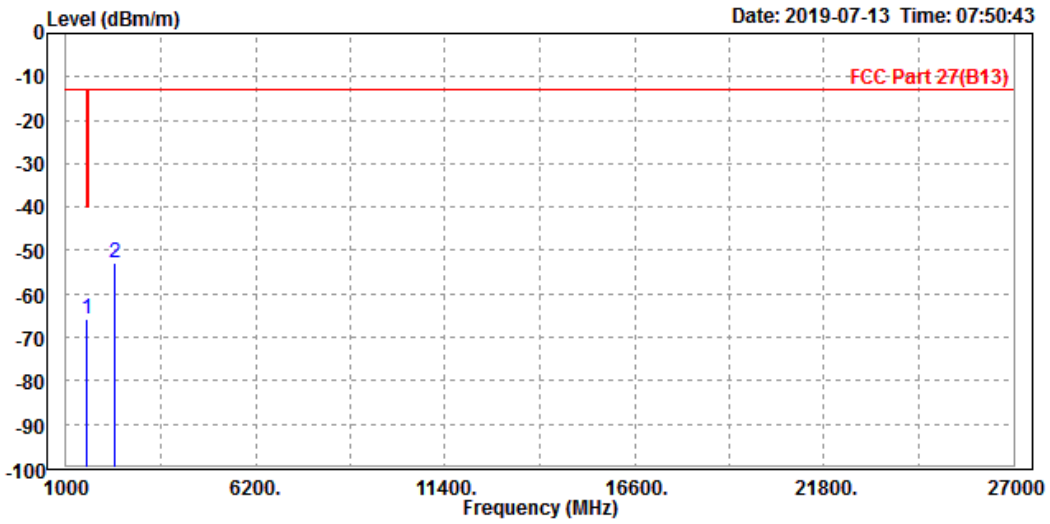
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 1572.000	-64.47	-60.21	-40.00	-24.47	-4.26	Peak	Vertical
2	2346.000	-50.56	-50.36	-13.00	-37.56	-0.20	Peak	Vertical



CH 23255

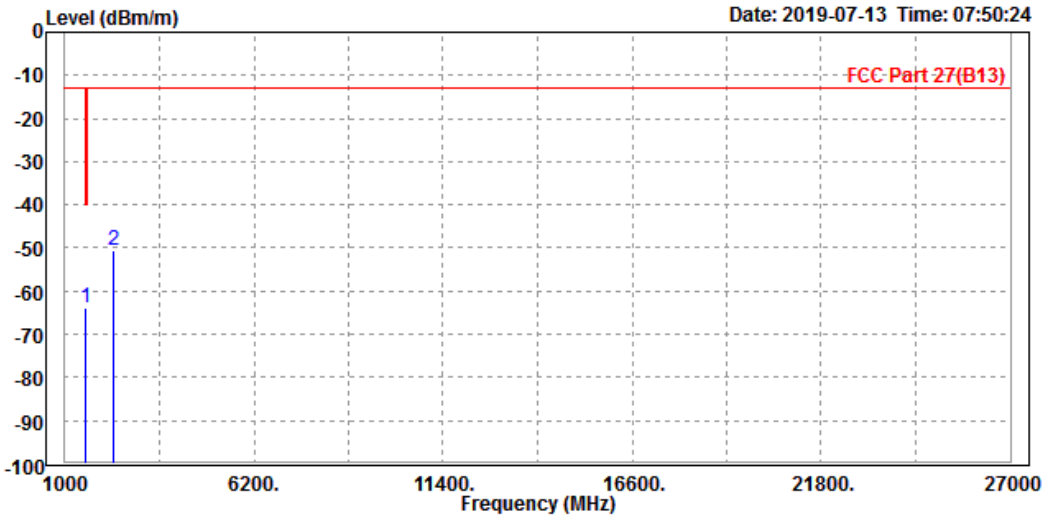
MODE	TX channel 23255	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 1572.000	-65.91	-60.31	-40.00	-25.91	-5.60	Peak	Horizontal
2	2353.500	-52.99	-51.24	-13.00	-39.99	-1.75	Peak	Horizontal



MODE	TX channel 23255	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

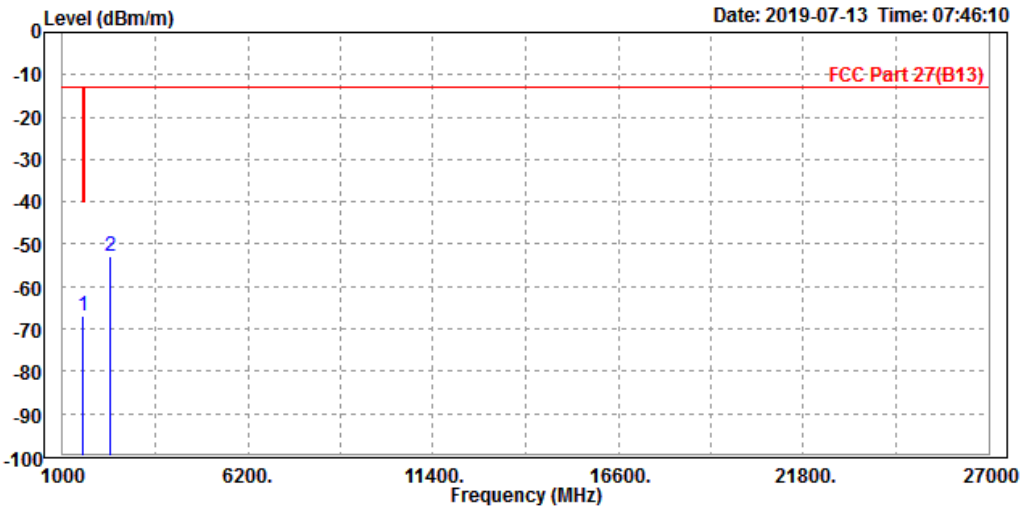
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 1572.000	-64.04	-59.78	-40.00	-24.04	-4.26	Peak	Vertical
2	2353.500	-50.41	-50.21	-13.00	-37.41	-0.20	Peak	Vertical



CHANNEL BANDWIDTH: 10MHz / QPSK

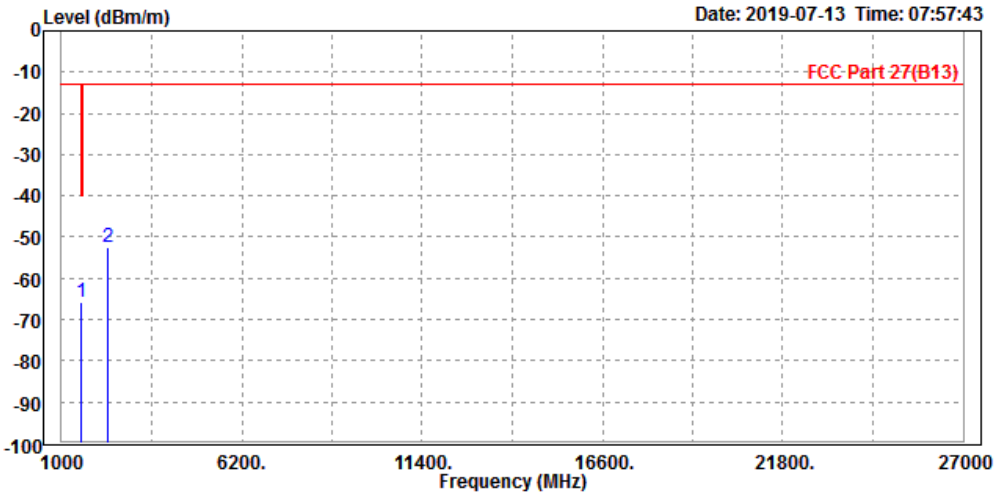
MODE	TX channel 23230	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 1572.000	-66.92	-61.32	-40.00	-26.92	-5.60	Peak	Horizontal
2	2346.000	-53.02	-51.26	-13.00	-40.02	-1.76	Peak	Horizontal



MODE	TX channel 23230	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
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	PP	1572.000	-65.61	-61.35	-40.00	-25.61	-4.26	Peak	Vertical
2		2346.000	-52.51	-52.31	-13.00	-39.51	-0.20	Peak	Vertical



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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Web Site: www.adt.com.tw

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

5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---