

FCC TEST REPORT

(PART 24)

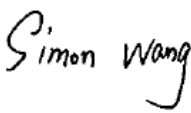
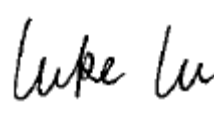
Applicant:	Micron Electronics LLC.
Address:	1001 Yamato Road, Suite 400, Boca Raton, FL 33431, USA

Manufacturer or Supplier:	Micron Electronics LLC.
Address:	1001 Yamato Road, Suite 400, Boca Raton, FL 33431, USA
Product:	Tracker
Brand Name:	Prime
Model Name:	CK106
FCC ID:	ZKQ-CK106
Date of tests:	Feb. 16, 2023 ~ Mar. 06, 2023

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

☒ **FCC PART 24, Subpart E** ☒ **FCC PART 2**
☒ **ANSI/TIA/EIA-603-D** ☒ **ANSI/TIA/EIA-603-E** ☒ **ANSI C63.26-2015**

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
	
Date: Mar. 06, 2023	Date: Mar. 06, 2023

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-230216W001RF02	Original release	Mar. 06, 2023

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 24 & Part 2		
STANDARD SECTION	TEST TYPE	RESULT
§2.1046	Conducted Output Power	Compliance
§24.232(c)	Equivalent Isotropic Radiated Power	Compliance
§2.1055 §24.235	Frequency Stability	See Note
§2.1049	Occupied Bandwidth	See Note
§24.232(d)	Peak to average ratio	See Note
§24.238(a)(b)	Band Edge Measurements	See Note
§2.1051 §24.238(a)(b)	Conducted Spurious Emissions	See Note
§2.1053 §24.238(a)(b)	Radiated Spurious Emissions	Compliance

NOTE: Refer to Module report I22W00076-CAT-M RF-FCC_Rev2/ I22W00076-NB-IoT RF-FCC-Rev2, FCC ID: 2AK9D-L710G.

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
Frequency Stability	$\pm 76.97\text{Hz}$
Radiated emissions (9KHz~30MHz)	$\pm 2.68\text{dB}$
Radiated emissions & Radiated Power (30MHz~1GHz)	$\pm 4.98\text{dB}$
Radiated emissions & Radiated Power (1GHz ~6GHz)	$\pm 4.70\text{dB}$
Radiated emissions (6GHz ~18GHz)	$\pm 4.60\text{dB}$
Radiated emissions (18GHz ~40GHz)	$\pm 4.12\text{dB}$
Conducted emissions	$\pm 4.01\text{dB}$
Occupied Channel Bandwidth	$\pm 43.58\text{KHz}$
Conducted Output power	$\pm 2.06\text{dB}$
Band Edge Measurements	$\pm 4.70\text{dB}$
Peak to average ratio	$\pm 0.76\text{dB}$

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



**BUREAU
VERITAS**

Test Report No.: W7L-230216W001RF02

1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 18,22	Feb. 17,23
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 17,23	Feb. 16,24
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.15,22	May.14,23
Loop Antenna	Schwarzbeck	FMZB 1519B	00173	Sep.03,22	Sep.02,23
Bilog Antenna	ETS-LINDGRE N	3143B	00161965	Mar. 06,22	Mar. 05,23
Bilog Antenna	ETS-LINDGRE N	3143B	00161965	Mar. 05,23	Mar. 04,24
Horn Antenna	ETS-LINDGRE N	3117	00168692	Mar. 06,22	Mar. 05,23
Horn Antenna	ETS-LINDGRE N	3117	00168692	Mar. 05,23	Mar. 04,24
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K- SG/QMS-00361	15433	Sep.04, 22	Sep.03, 23
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 14,23	Feb. 13,24
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May.12,22	May.11,23
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.12,22	May.11,23
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 18,22	Feb. 17,23
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 17,23	Feb.16,24
3m Semi-anechoic Chamber	ETS-LINDGRE N	9m*6m*6m	Euroshieldpn- CT0001143-121 6	May. 19,20	May. 18,23
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	JS1120	3.1.36	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	May. 07,22	May. 06,23
Power Meter	Anritsu	ML2495A	1506002	Feb. 14,23	Feb. 13,24
Power Sensor	Anritsu	MA2411B	1339352	May. 07,22	May. 06,23
Temperature Chamber	ESPEC	SH-242	93000855	May. 12,22	May. 11,23
MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 14,23	Feb. 13,24
Base station R&S CMW500	Rohde&Schwa rz	CMW500	153085	May.12,22	May.11,23
DC Source	Kikusui/JP	PMX18-5A	N/A	Aug. 12,22	Aug. 11,23

NOTE: 1. The calibration interval of the above test instruments is 12 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.

3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Tracker		
BRAND NAME	Prime		
MODEL NAME	CK106		
NOMINAL VOLTAGE	12Vdc (DC Source) 3.8Vdc (Li-ion, battery)		
MODULATION TYPE	LTE CAT-M1/NB-IOT: QPSK, 16QAM, BPSK		
FREQUENCY RANGE	LTE CAT-M1	LTE Band 2 Channel Bandwidth: 1.4MHz	1850.7MHz ~ 1909.3MHz
		LTE Band 2 Channel Bandwidth: 3MHz	1851.5MHz ~ 1908.5MHz
		LTE Band 2 Channel Bandwidth: 5MHz	1852.5MHz ~ 1907.5MHz
		LTE Band 2 Channel Bandwidth: 10MHz	1855.0MHz ~ 1905.0MHz
		LTE Band 2 Channel Bandwidth: 15MHz	1857.5MHz ~ 1902.5MHz
		LTE Band 2 Channel Bandwidth: 20MHz	1860.0MHz ~ 1900.0MHz
	LTE NB-IOT	LTE Band 2 (SUB-CARRIER SPEACING: 3.75KHz)	1850.2MHz ~ 1909.8MHz
		LTE Band 2 (SUB-CARRIER SPEACING: 15KHz)	1850.2MHz ~ 1909.8MHz

MAX. EIRP POWER	LTE CAT-M1	LTE Band 2 Channel Bandwidth: 1.4MHz	41.59mW
		LTE Band 2 Channel Bandwidth: 3MHz	41.11mW
		LTE Band 2 Channel Bandwidth: 5MHz	41.30mW
		LTE Band 2 Channel Bandwidth: 10MHz	41.50mW
		LTE Band 2 Channel Bandwidth: 15MHz	41.50mW
		LTE Band 2 Channel Bandwidth: 20MHz	41.78mW
	LTE NB-IOT	LTE Band 2 (SUB-CARRIER SPEACING: 3.75KHz)	44.98mW
		LTE Band 2 (SUB-CARRIER SPEACING: 15KHz)	43.85mW
EMISSION DESIGNATOR	LTE CAT-M1	LTE Band 2 Channel Bandwidth: 1.4MHz	QPSK: 1M08G7D
			16QAM: 913KW7D
			64QAM: /
		LTE Band 2 Channel Bandwidth: 3MHz	QPSK: 1M09G7D
			16QAM: 932KW7D
			64QAM: /
		LTE Band 2 Channel Bandwidth: 5MHz	QPSK: 1M13G7D
			16QAM: 1M01W7D
			64QAM: /
		LTE Band 2 Channel Bandwidth: 10MHz	QPSK: 1M13G7D
			16QAM: 1M20W7D
			64QAM: /
	LTE CAT-M1	LTE Band 2 Channel Bandwidth: 15MHz	QPSK: 1M20G7D
			16QAM: 1M03W7D
			64QAM: /

EMISSION DESIGNATOR	LTE CAT-M1	LTE Band 2 Channel Bandwidth: 20MHz	QPSK: 1M19G7D
			16QAM: 1M22W7D
			64QAM: /
	LTE NB-IOT	LTE Band 2 (SUB-CARRIER SPEACING: 3.75KHz)	BPSK: 83K2G7D
			QPSK: 105KG7D
		LTE Band 2 (SUB-CARRIER SPEACING: 15KHz)	BPSK: 127KG7D
			QPSK: 197KG7D
ANTENNA TYPE	FPC Antenna with -4dBi gain for LTE B2		
HW VERSION	CK106_MB_V2_PCBA		
SW VERSION	CK106V02.01B02PTCRB		
I/O PORTS	Refer to user's manual		
CABLE SUPPLIED	DC cable1: non-shielded cable, with w/o ferrite core, 0.23meter DC cable2: non-shielded cable, with w/o ferrite core, 0.23meter		
EXTREME TEMPERATURE	-30-85 °C		
EXTREME VOLTAGE	3.6V - 4.2V		

NOTE:

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

MODULATION MODE	TX FUNCTION
LTE	1TX/1RX

- For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
- Sample 1 and Sample 2 Difference description

The difference between 2 line and 3 line of CK106 is that there is an open drain output interface. This function can be used to power up other devices such as relay. The schematic diagram is the same. It's just that there is one more line at the end.

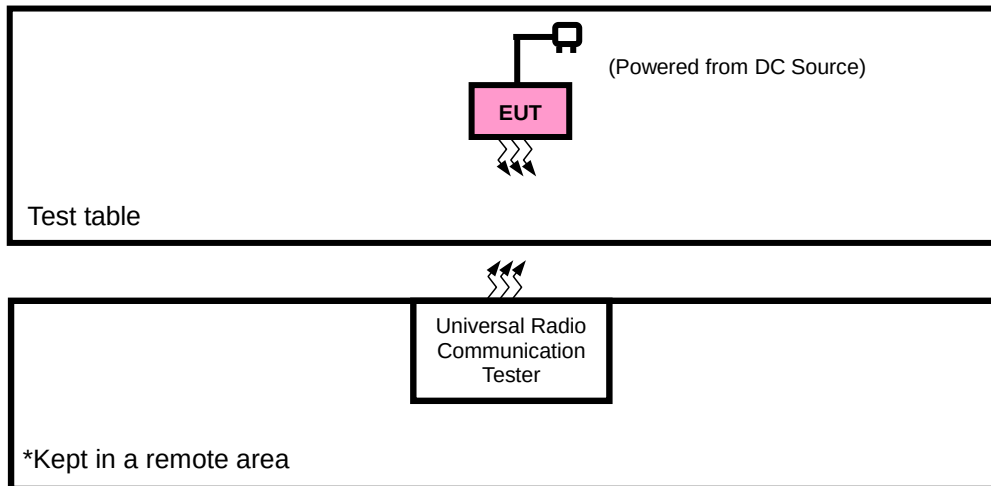
List of Accessory:

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
Battery	N/A	ZHONGSHAN ZHONGWANDE NEW ENERGY TECHNOLOGY Co., LTD	N/A	Capacity : 3.8Vdc, 130mAh
DC cable 1	N/A	SHANGHAI WUYANG ELECTRONIC TECHNOLOGY CO., LTD	N/A	Signal Line,0.23meter
DC cable 2	N/A	SHANGHAI WUYANG ELECTRONIC TECHNOLOGY CO., LTD	N/A	Signal Line,0.23meter



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	Kikusui/JP	PMX18-5A	N/A	N/A
2	DC source	Kikusui/JP	PMX18-5A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 0.23m

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 in 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
A	EUT + DC Source with LTE link

LTE CAT-M1

LTE BAND 2 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
A	EIRP	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM	1 RB / 0 RB Offset
A	RADIATED EMISSION	18607 to 19193	18900	1.4MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18900	3MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18900	5MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18900	10MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18900	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 NB-IOT

LTE BAND 2 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	SUBCARRIER SPACING	MODULATION	MODE
A	EIRP	18602 to 19198	18602, 18900, 19198	3.75KHz	BPSK,QPSK,	1 RB / 0 RB Offset
		18602 to 19198	18602, 18900, 19198	15KHz	BPSK,QPSK,	1 RB / 0 RB Offset
A	RADIATED EMISSION	18602 to 19198	18602, 18900, 19198	3.75KHz	QPSK,	1 RB / 0 RB Offset
		18602 to 19198	18900	15KHz	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	25deg. C, 57%RH	DC 12V By DC Source	Jace Hu
RADIATED EMISSION	23deg. C, 70%RH	DC 12V By DC Source	Jace Hu

2.5 EUT OPERATING CONDITIONS

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

2.6 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 24

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

Mobile and portable stations are limited to 2 watts EIRP.

3.1.2 TEST PROCEDURES

EIRP MEASUREMENT:

Per KDB 971168 D01 Power Meas License Digital Systems v03r01 or subclause 5.2.5.5 of ANSI C63.26-2015, the relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

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

Where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively

(expressed in the same units as P_{Meas} , typically dBW or dBm);

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

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

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

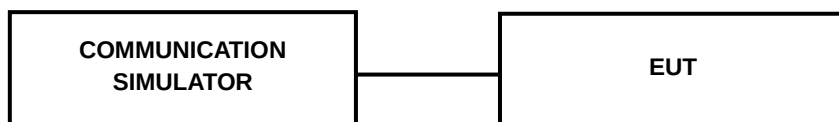
CONDUCTED POWER MEASUREMENT:

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

3.1.3 TEST SETUP

EIRP / ERP Measurement:

CONDUCTED POWER MEASUREMENT:



3.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

LTE CAT-M1

LTE BAND 2

Band/BW	Modulation	RB Size	RB Offset	Low CH 18607	Mid CH 18900	High CH 19193
				Frequency 1850.7 MHz	Frequency 1880 MHz	Frequency 1909.3 MHz
2/ 1.4	QPSK	1	0	19.93	19.74	19.86
		1	5	19.89	19.59	19.81
		3	0	20.03	19.76	19.83
		3	3	19.84	19.58	19.77
		6	0	19.99	19.72	19.81
	16QAM	1	0	20.16	19.92	20.07
		1	5	20.19	19.89	20.10
		3	0	20.14	19.84	20.09
		3	3	20.06	19.88	19.98
		5	0	20.03	19.80	19.95

Band/BW	Modulation	RB Size	RB Offset	Low CH 18615	Mid CH 18900	High CH 19185
				Frequency 1851.5 MHz	Frequency 1880 MHz	Frequency 1908.5 MHz
2/3	QPSK	1	0	19.92	19.73	19.89
		1	5	19.90	19.57	19.81
		3	0	19.96	19.77	19.86
		3	3	19.85	19.61	19.82
		6	0	19.94	19.76	19.78
	16QAM	1	0	20.14	19.94	20.10
		1	5	20.13	19.95	20.07
		3	0	20.13	19.90	20.04
		3	3	20.03	19.88	20.01
		5	0	20.03	19.75	19.95

Band/BW	Modulation	RB Size	RB Offset	Low CH 18625	Mid CH 18900	High CH 19175
				Frequency 1852.5 MHz	Frequency 1880 MHz	Frequency 1907.5 MHz
2/5	QPSK	1	0	19.92	19.79	19.85
		1	5	19.85	19.60	19.81
		3	0	19.96	19.76	19.85
		3	3	19.81	19.65	19.81
		6	0	19.96	19.73	19.75
	16QAM	1	0	20.13	19.98	20.10
		1	5	20.16	19.92	20.08
		3	0	20.16	19.86	20.08
		3	3	20.08	19.86	19.98
		5	0	20.03	19.74	19.98

Band/BW	Modulation	RB Size	RB Offset	Low CH 18650	Mid CH 18900	High CH 19150
				Frequency 1855 MHz	Frequency 1880 MHz	Frequency 1905 MHz
2/ 10	QPSK	1	0	19.97	19.77	19.83
		1	5	19.88	19.62	19.77
		3	0	20.03	19.76	19.86
		3	3	19.81	19.59	19.81
		6	0	19.99	19.74	19.80
	16QAM	1	0	20.18	19.98	20.06
		1	5	20.17	19.92	20.10
		3	0	20.11	19.88	20.05
		3	3	20.07	19.87	20.01
		5	0	20.08	19.77	19.92

Band/BW	Modulation	RB Size	RB Offset	Low CH 18675	Mid CH 18900	High CH 19125
				Frequency 1857.5 MHz	Frequency 1880 MHz	Frequency 1902.5 MHz
2/ 15	QPSK	1	0	19.90	19.77	19.86
		1	5	19.90	19.57	19.82
		3	0	20.02	19.71	19.86
		3	3	19.83	19.58	19.81
		6	0	19.99	19.76	19.75
	16QAM	1	0	20.14	19.91	20.06
		1	5	20.18	19.91	20.10
		3	0	20.17	19.84	20.09
		3	3	20.02	19.89	19.98
		5	0	20.07	19.74	19.99

Band/BW	Modulation	RB Size	RB Offset	Low CH 18700	Mid CH 18900	High CH 19100
				Frequency 1860 MHz	Frequency 1880 MHz	Frequency 1900 MHz
2/ 20	QPSK	1	0	19.98	19.81	19.91
		1	5	19.92	19.65	19.83
		3	0	20.04	19.78	19.91
		3	3	19.89	19.66	19.83
		6	0	20.00	19.78	19.83
	16QAM	1	0	20.21	19.99	20.12
		1	5	20.21	19.97	20.12
		3	0	20.19	19.92	20.10
		3	3	20.10	19.93	20.03
		5	0	20.09	19.82	20.00



LTE NB-IOT

LTE BAND 2

Band/Sub-carrier Speacing (KHz)	Modulation	RB Size	RB Offset	Low CH 18602	Mid CH 18900	High CH 19198
				Frequency 1850.2 MHz	Frequency 1880 MHz	Frequency 1909.8 MHz
2/ 3.75	BPSK	1	0	20.53	20.31	20.27
		1	47	20.45	20.24	20.28
	QPSK	1	0	20.50	20.34	20.35
		1	47	20.50	20.34	20.22

Band/Sub-carrier Speacing (KHz)	Modulation	RB Size	RB Offset	Low CH 18602	Mid CH 18900	High CH 19198
				Frequency 1850.2 MHz	Frequency 1880 MHz	Frequency 1909.8 MHz
2/ 15	BPSK	1	0	20.42	20.00	20.11
		1	11	20.37	19.89	20.13
	QPSK	1	0	20.36	20.06	20.19
		1	11	20.30	19.95	20.15
		12	0	18.22	17.88	17.66



**BUREAU
VERITAS**

Test Report No.: W7L-230216W001RF02

EIRP POWER (dBm)

LTE CAT-M1

LTE BAND 2

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18607	1850.7	20.03	-4	16.03	40.09	2
18900	1880.0	19.76	-4	15.76	37.67	2
19193	1909.3	19.86	-4	15.86	38.55	2

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18607	1850.7	20.19	-4	16.19	41.59	2
18900	1880.0	19.92	-4	15.92	39.08	2
19193	1909.3	20.1	-4	16.1	40.74	2

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18615	1851.5	19.96	-4	15.96	39.45	2
18900	1880.0	19.77	-4	15.77	37.76	2
19185	1908.5	19.89	-4	15.89	38.82	2

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18615	1851.5	20.14	-4	16.14	41.11	2
18900	1880.0	19.95	-4	15.95	39.36	2
19185	1908.5	20.1	-4	16.1	40.74	2



CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18625	1852.5	19.96	-4	15.96	39.45	2
18900	1880.0	19.79	-4	15.79	37.93	2
19175	1907.5	19.85	-4	15.85	38.46	2

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18625	1852.5	20.16	-4	16.16	41.30	2
18900	1880.0	19.98	-4	15.98	39.63	2
19175	1907.5	20.1	-4	16.1	40.74	2

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18650	1855.0	20.03	-4	16.03	40.09	2
18900	1880.0	19.77	-4	15.77	37.76	2
19150	1905.0	19.86	-4	15.86	38.55	2

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18650	1855.0	20.18	-4	16.18	41.50	2
18900	1880.0	19.98	-4	15.98	39.63	2
19150	1905.0	20.1	-4	16.1	40.74	2

**CHANNEL BANDWIDTH: 15MHz QPSK**

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18675	1857.5	20.02	-4	16.02	39.99	2
18900	1880.0	19.77	-4	15.77	37.76	2
19125	1902.5	19.86	-4	15.86	38.55	2

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18675	1857.5	20.18	-4	16.18	41.50	2
18900	1880.0	19.91	-4	15.91	38.99	2
19125	1902.5	20.1	-4	16.1	40.74	2

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18700	1860	20.04	-4	16.04	40.18	2
18900	1880	19.81	-4	15.81	38.11	2
19100	1900	19.91	-4	15.91	38.99	2

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18700	1860	20.21	-4	16.21	41.78	2
18900	1880	19.99	-4	15.99	39.72	2
19100	1900	20.12	-4	16.12	40.93	2

LTE NB-IOT

SUBCARRIER SPACING: 3.75KHz BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18602	1850.2	20.53	-4	16.53	44.98	2
18900	1880	20.31	-4	16.31	42.76	2
19198	1909.8	20.28	-4	16.28	42.46	2

SUBCARRIER SPACING: 3.75KHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18602	1850.2	20.5	-4	16.5	44.67	2
18900	1880	20.34	-4	16.34	43.05	2
19198	1909.8	20.35	-4	16.35	43.15	2

SUBCARRIER SPACING: 15KHz BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18602	1850.2	20.42	-4	16.42	43.85	2
18900	1880	20	-4	16	39.81	2
19198	1909.8	20.13	-4	16.13	41.02	2

SUBCARRIER SPACING: 15KHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18602	1850.2	20.36	-4	16.36	43.25	2
18900	1880	20.06	-4	16.06	40.36	2
19198	1909.8	20.19	-4	16.19	41.59	2



3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

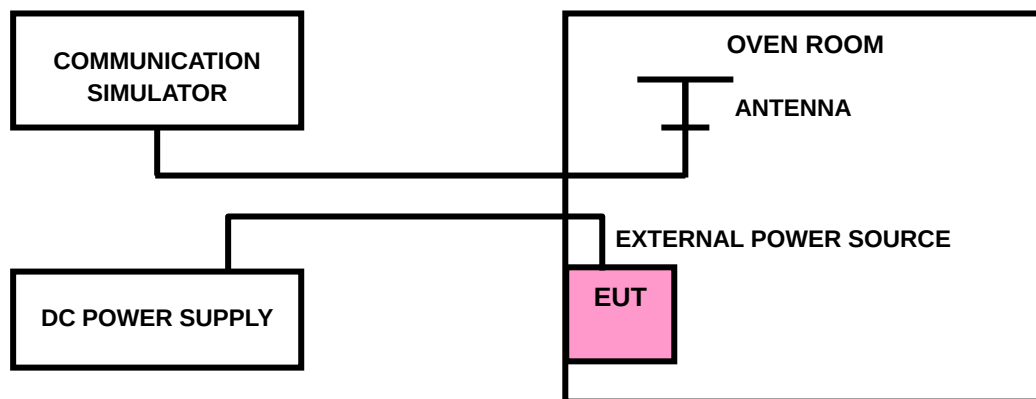
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

3.2.2 TEST PROCEDURE

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

3.2.3 TEST SETUP





Test Report No.: W7L-230216W001RF02

3.2.4 TEST RESULTS

Please Refer to Module report I22W00076-CAT-M RF-FCC_Rev2/ I22W00076-NB-IoT RF-FCC-Rev2.

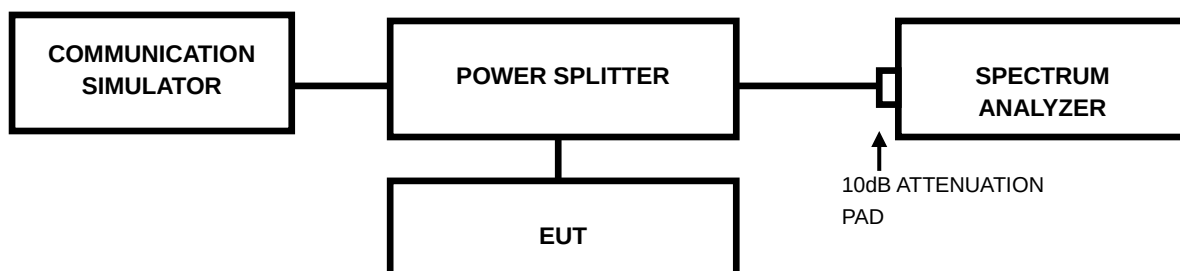


3.3 OCCUPIED BANDWIDTH MEASUREMENT

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

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



Test Report No.: W7L-230216W001RF02

3.3.4 TEST RESULTS

Please Refer to Module report I22W00076-CAT-M RF-FCC_Rev2/ I22W00076-NB-IoT RF-FCC-Rev2.

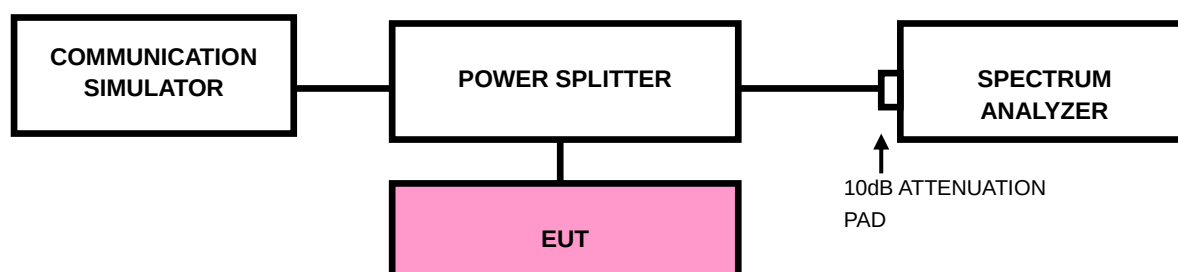


3.4 BAND EDGE MEASUREMENTC

3.4.1 LIMITS OF BAND EDGE MEASUREMENT

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

3.4.2 TEST SETUP



3.4.3 TEST PROCEDURES

- a) All measurements were done at low and high operational frequency range
- b) Connect the transmitter to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.
- c) Tune the analyzer to the nominal center frequency of the emission bandwidth (EBW)
- d) .Set the resolution bandwidth (RBW) $\geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
- e) Beyond the 1MHz band from the band edge, RBW=1MHz was used.
- f) Set the video bandwidth (VBW) to $\geq 3 \times$ RBW.
- g) Select the average power (RMS) display detector.
- h) Set the number of measurement points to ≥ 1001 .
- i) Use auto-coupled sweep time.
- j) Perform the measurement over an interval of time when the transmission is continuous and at its maximum power level.
- k) The RF fundamental frequency should be excluded against the limit line in the operating frequency band and use RBW is 10KHz or 100KHz.
- l) Record the max trace plot into the test report.



Test Report No.: W7L-230216W001RF02

3.4.4. TEST RESULTS

Please Refer to Module report I22W00076-CAT-M RF-FCC_Rev2/ I22W00076-NB-IoT RF-FCC-Rev2.



3.5 CONDUCTED SPURIOUS EMISSIONS

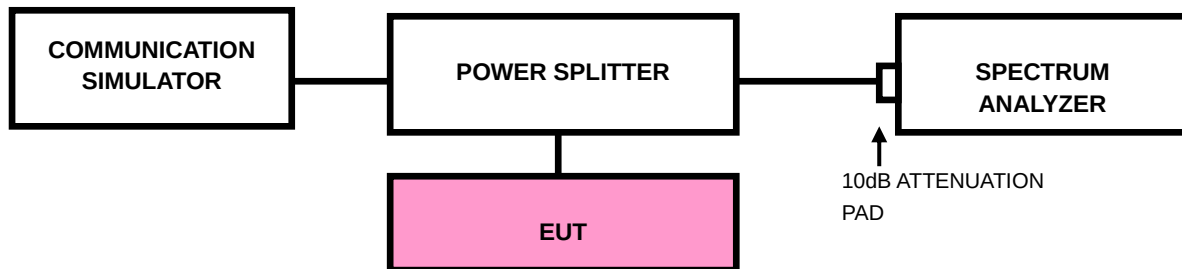
3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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

3.5.2 TEST PROCEDURE

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 30MHz up to a frequency including its 10th harmonic. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

3.5.3 TEST SETUP





Test Report No.: W7L-230216W001RF02

3.5.4 TEST RESULTS

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

Please Refer to Module report I22W00076-CAT-M RF-FCC_Rev2/ I22W00076-NB-IoT RF-FCC-Rev2.

3.6 RADIATED EMISSION MEASUREMENT

3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

3.6.2 TEST PROCEDURES

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- c. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$

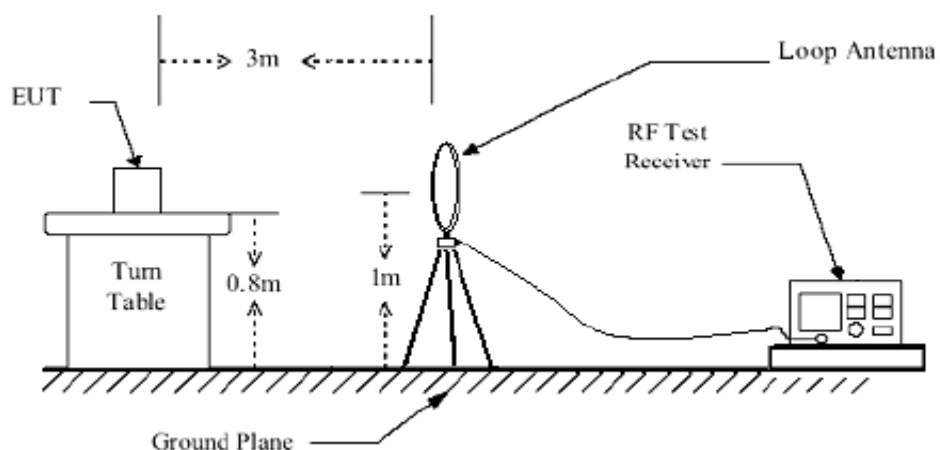
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.6.3 DEVIATION FROM TEST STANDARD

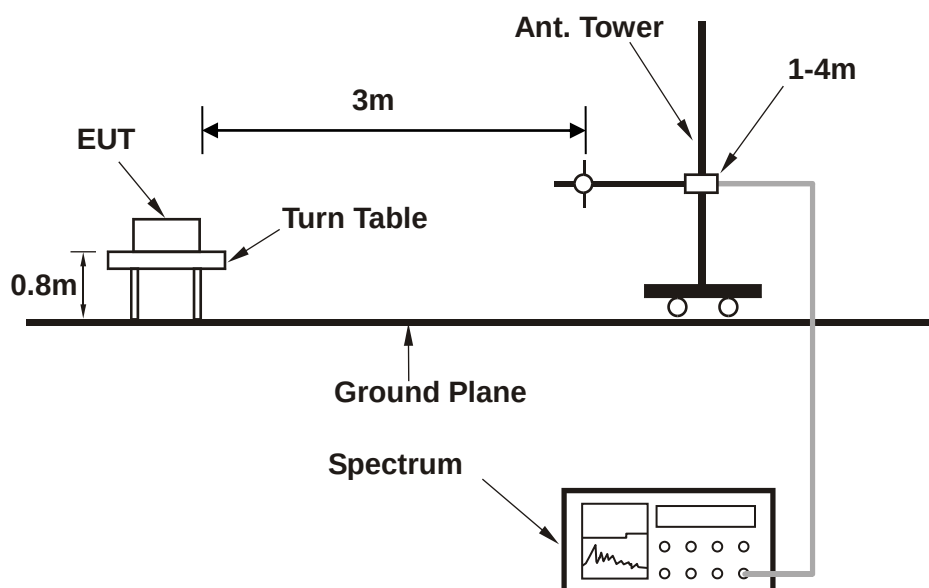
No deviation

3.6.4 TEST SETUP

< Frequency Range below 30MHz >



< Frequency Range 30MHz~1GHz >

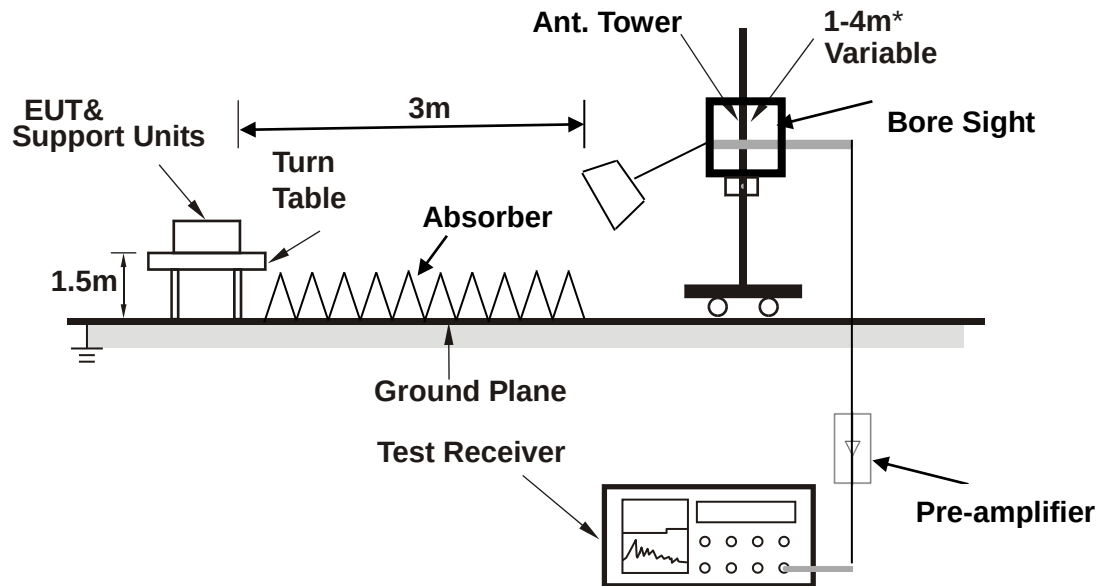




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Test Report No.: W7L-230216W001RF02

<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

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



3.6.5 TEST RESULTS

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

LTE CAT-M1

BELOW 1GHz WORST-CASE DATA

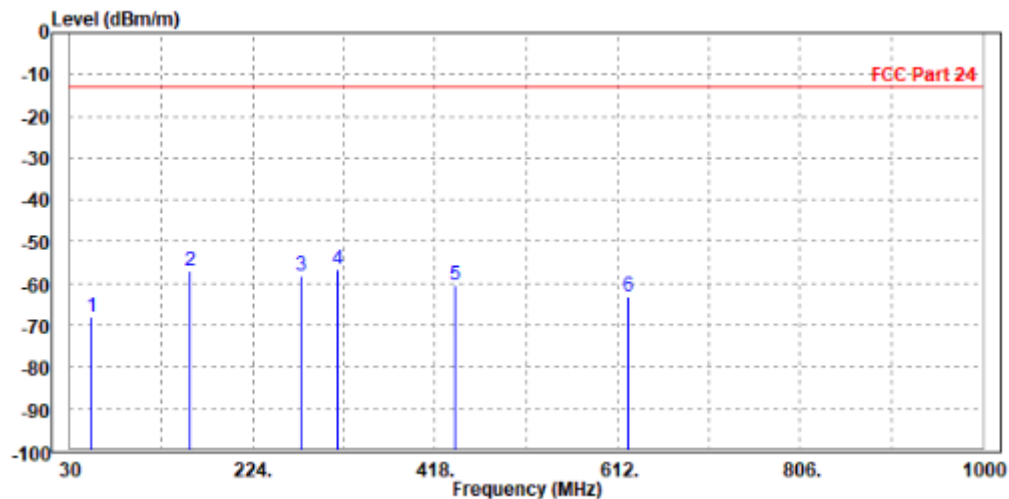
30 MHz – 1GHz data:

LTE Band 2:

CHANNEL BANDWIDTH: 15MHz / QPSK

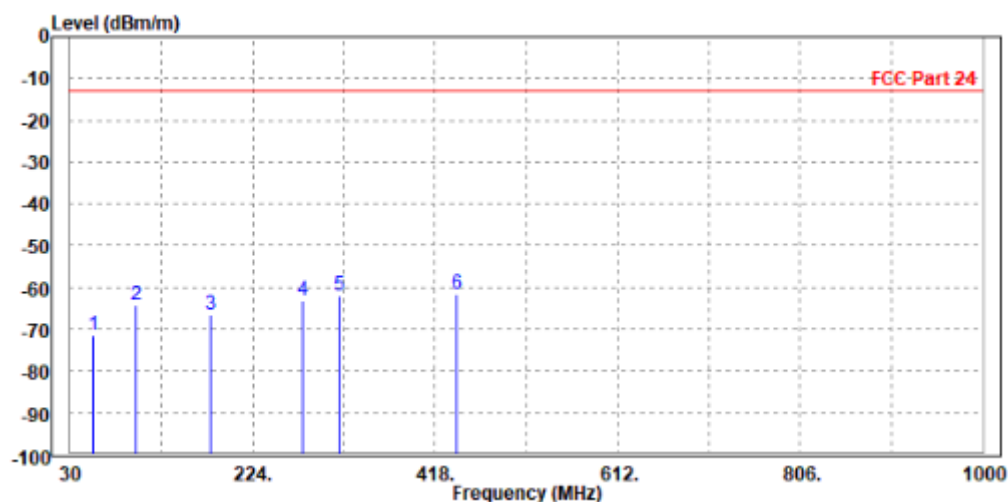
MODE	TX channel 18900	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	52.310	-67.90	-50.53	-13.00	-54.90	-17.37	Peak	Horizontal
2	157.070	-57.14	-40.34	-13.00	-44.14	-16.80	Peak	Horizontal
3	275.410	-58.16	-46.19	-13.00	-45.16	-11.97	Peak	Horizontal
4 PP	314.210	-56.80	-44.68	-13.00	-43.80	-12.12	Peak	Horizontal
5	439.340	-60.35	-51.02	-13.00	-47.35	-9.33	Peak	Horizontal
6	622.670	-63.00	-58.75	-13.00	-50.00	-4.25	Peak	Horizontal



MODE	TX channel 18900	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
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	54.250	-71.58	-46.99	-13.00	-58.58	-24.59	Peak	Vertical
2	100.810	-64.36	-57.66	-13.00	-51.36	-6.70	Peak	Vertical
3	179.380	-66.38	-47.70	-13.00	-53.38	-18.68	Peak	Vertical
4	276.380	-62.96	-50.83	-13.00	-49.96	-12.13	Peak	Vertical
5	315.180	-61.83	-51.29	-13.00	-48.83	-10.54	Peak	Vertical
6 PP	440.310	-61.67	-53.04	-13.00	-48.67	-8.63	Peak	Vertical





**BUREAU
VERITAS**

Test Report No.: W7L-230216W001RF02

ABOVE 1GHz DATA

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

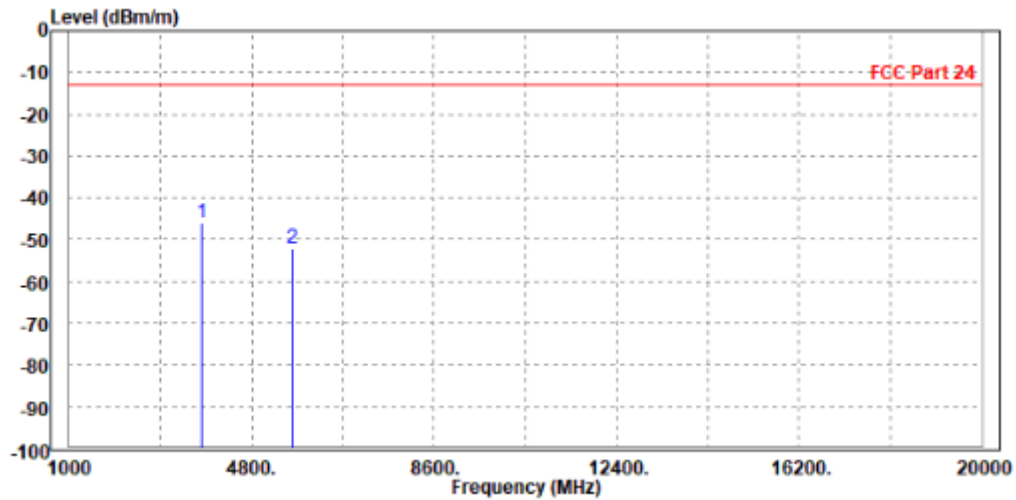
WORST-CASE DATA

LTE Band 2

CHANNEL BANDWIDTH: 1.4MHz / QPSK

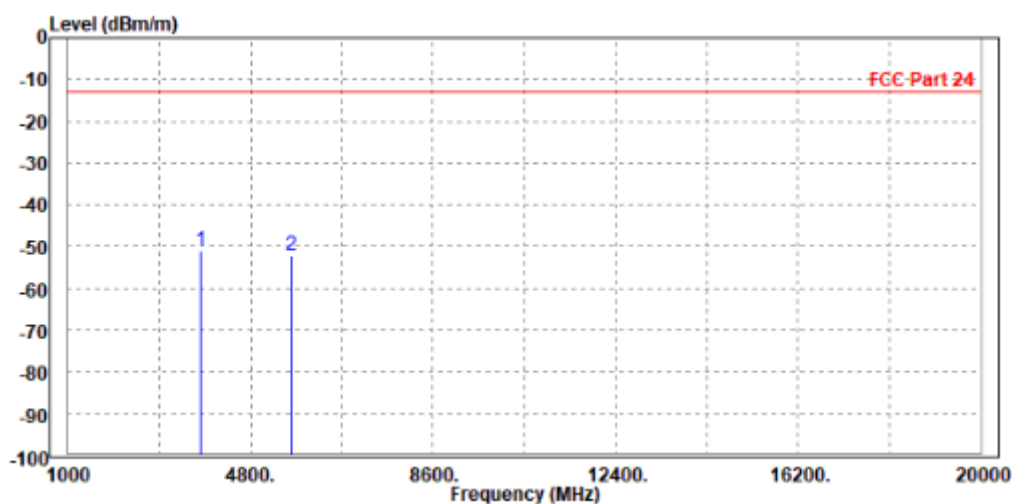
MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3760.000	-46.03	-54.02	-13.00	-33.03	7.99	Peak	Horizontal
2		5636.000	-52.14	-62.87	-13.00	-39.14	10.73	Peak	Horizontal



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
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	PP	3755.000	-50.92	-58.61	-13.00	-37.92	7.69	Peak	Vertical
2		5640.000	-51.98	-63.11	-13.00	-38.98	11.13	Peak	Vertical





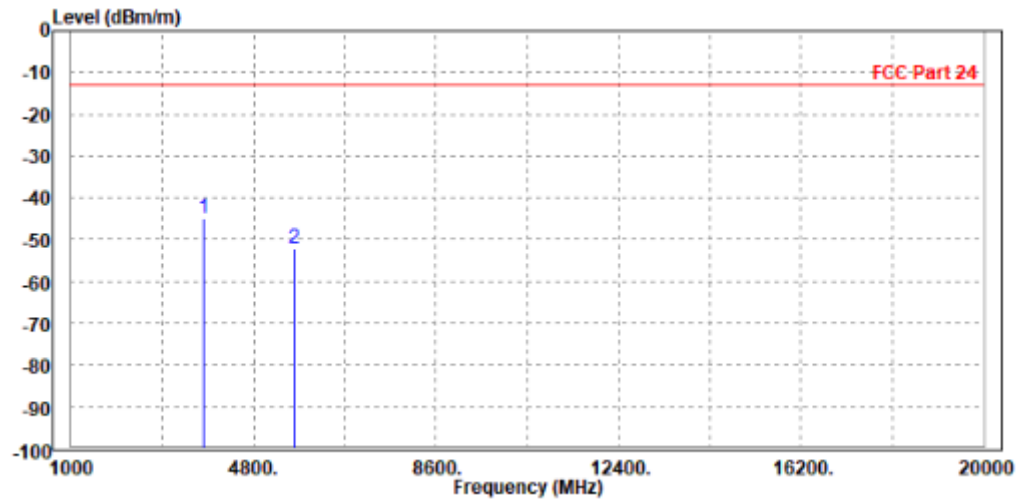
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VERITAS

Test Report No.: W7L-230216W001RF02

CHANNEL BANDWIDTH: 3MHz / QPSK

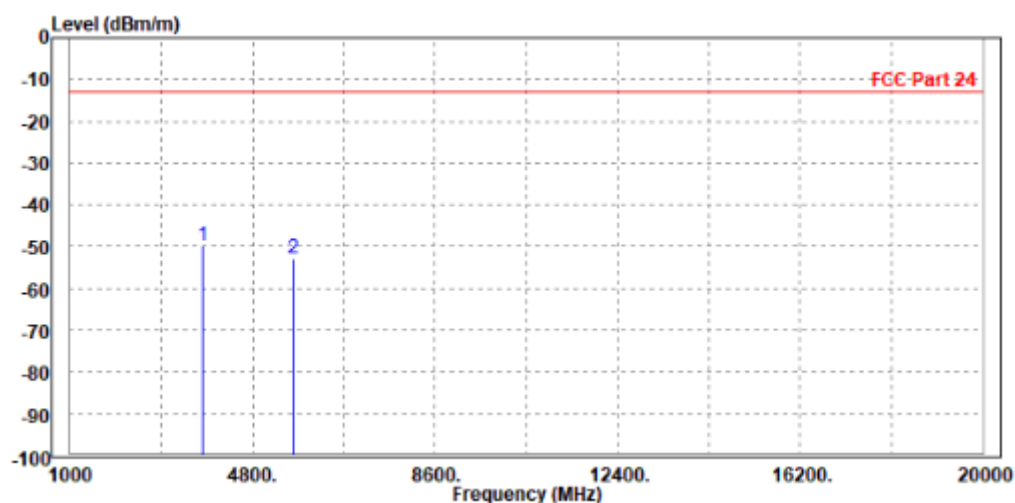
MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3755.000	-44.95	-52.93	-13.00	-31.95	7.98	Peak	Horizontal
2		5640.000	-52.20	-62.94	-13.00	-39.20	10.74	Peak	Horizontal



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
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	PP	3760.000	-49.73	-57.43	-13.00	-36.73	7.70	Peak	Vertical
2		5636.000	-52.67	-63.79	-13.00	-39.67	11.12	Peak	Vertical





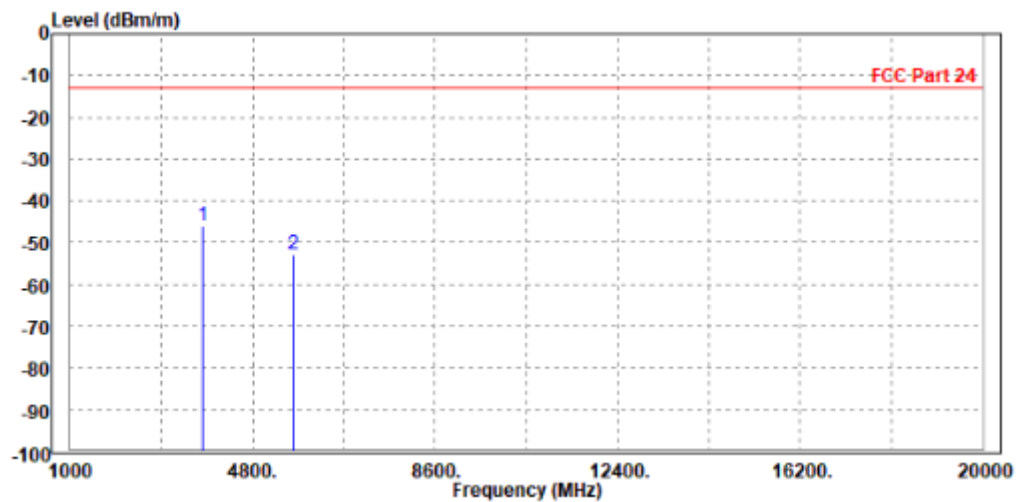
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Test Report No.: W7L-230216W001RF02

CHANNEL BANDWIDTH: 5MHz / QPSK

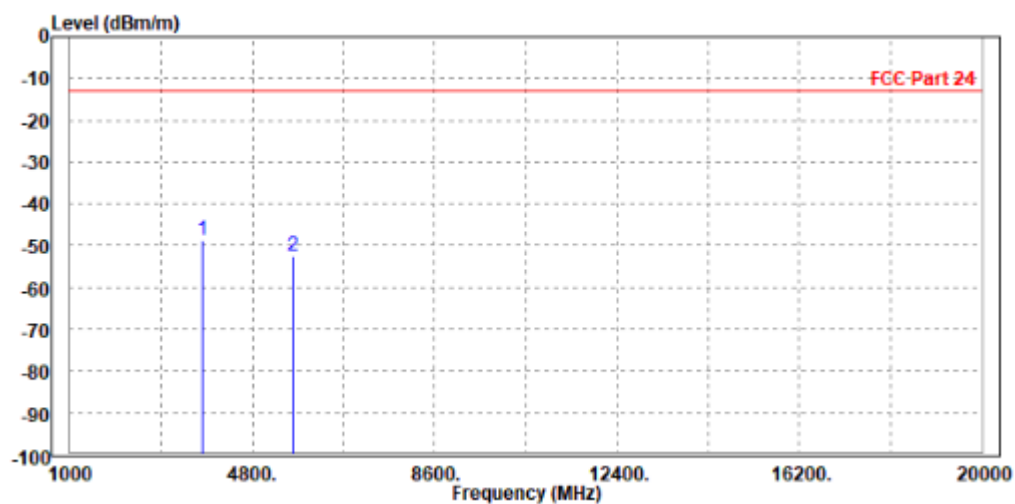
MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3760.000	-45.86	-53.85	-13.00	-32.86	7.99	Peak	Horizontal
2		5636.000	-52.90	-63.63	-13.00	-39.90	10.73	Peak	Horizontal



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

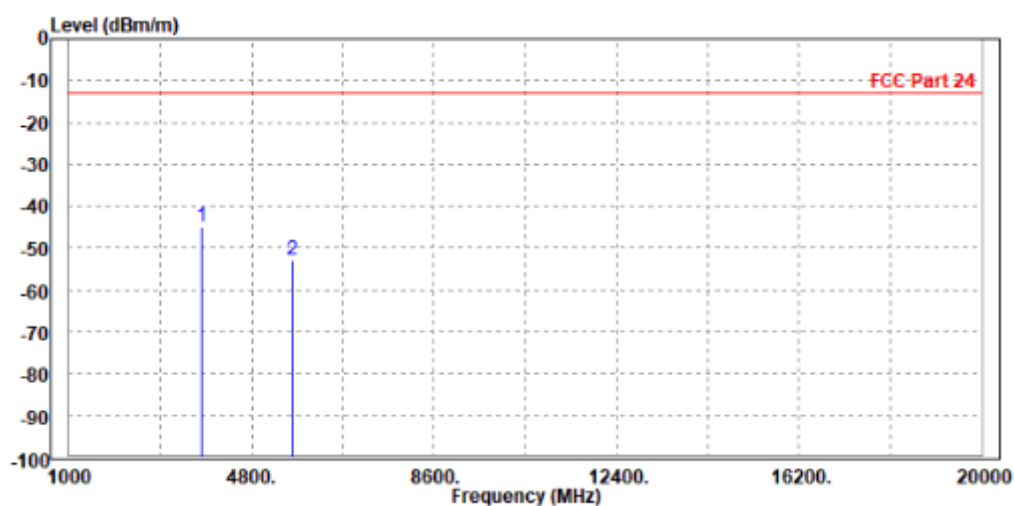
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	3755.000	-48.81	-56.50	-13.00	-35.81	7.69	Peak	Vertical
2	5640.000	-52.61	-63.74	-13.00	-39.61	11.13	Peak	Vertical



CHANNEL BANDWIDTH: 10MHz / QPSK

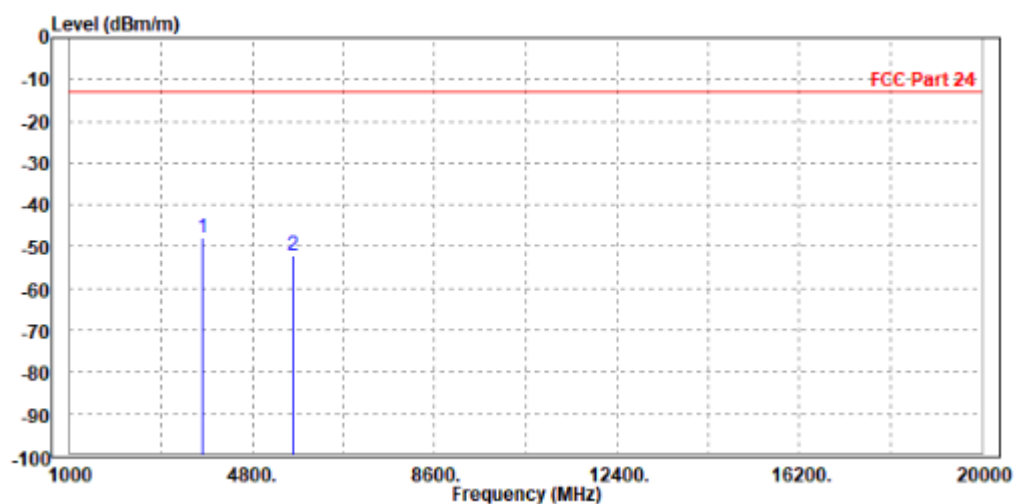
MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3755.000	-44.68	-52.66	-13.00	-31.68	7.98	Peak	Horizontal
2		5640.000	-52.71	-63.45	-13.00	-39.71	10.74	Peak	Horizontal



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
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 PP	3760.000	-47.82	-55.52	-13.00	-34.82	7.70	Peak	Vertical
2	5636.000	-52.04	-63.16	-13.00	-39.04	11.12	Peak	Vertical





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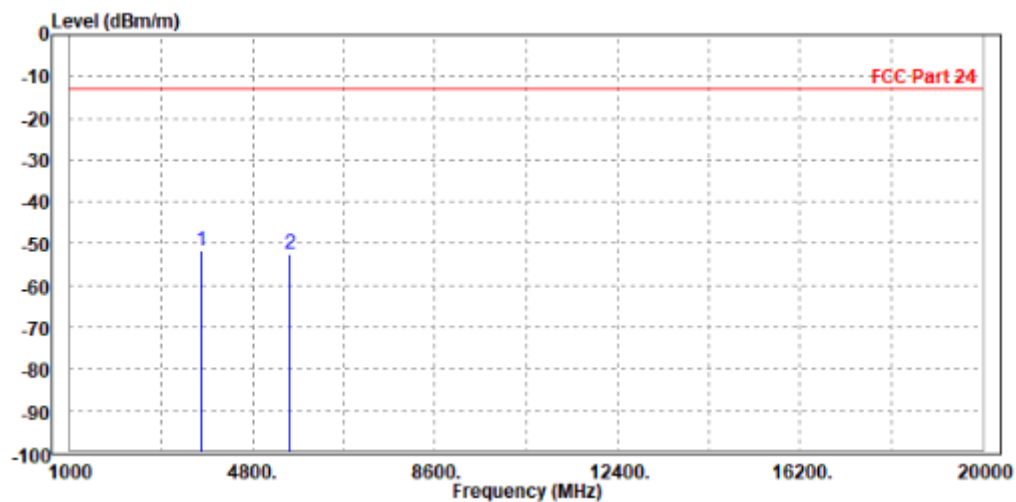
Test Report No.: W7L-230216W001RF02

CHANNEL BANDWIDTH: 15MHz / QPSK

CH18675

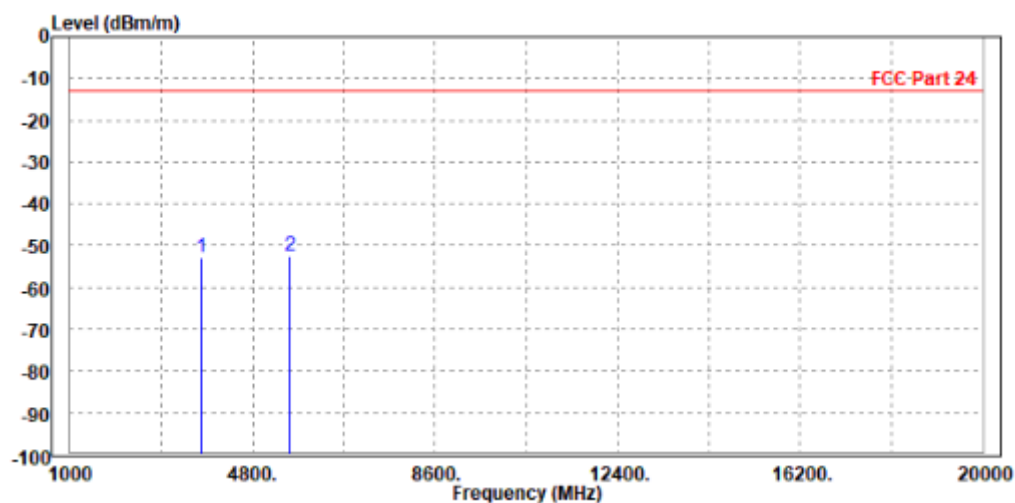
MODE	TX channel 18675	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 3717.000	-51.71	-59.59	-13.00	-38.71	7.88	Peak	Horizontal
2	5572.800	-52.39	-63.00	-13.00	-39.39	10.61	Peak	Horizontal



MODE	TX channel 18675	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
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	3715.000	-52.85	-60.48	-13.00	-39.85	7.63	Peak	Vertical
2 PP	5579.000	-52.48	-63.43	-13.00	-39.48	10.95	Peak	Vertical





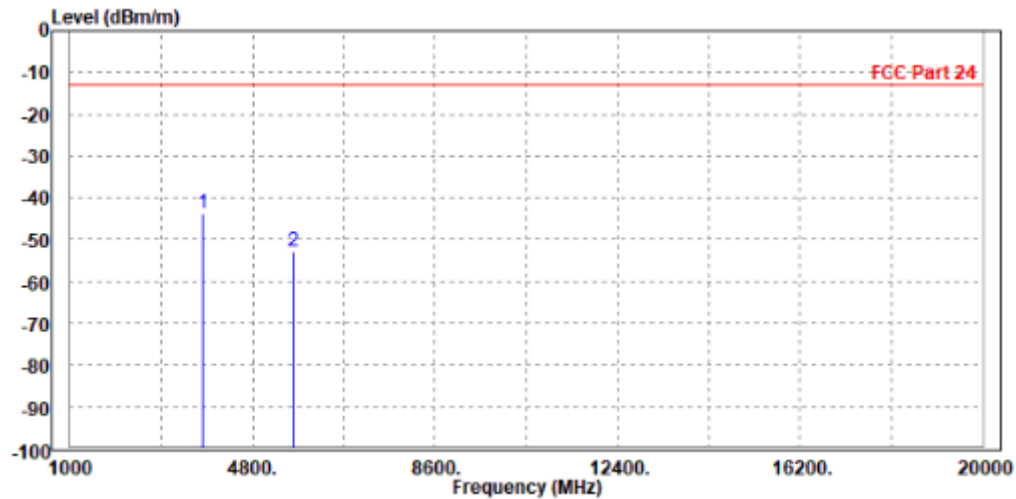
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Test Report No.: W7L-230216W001RF02

CH18900

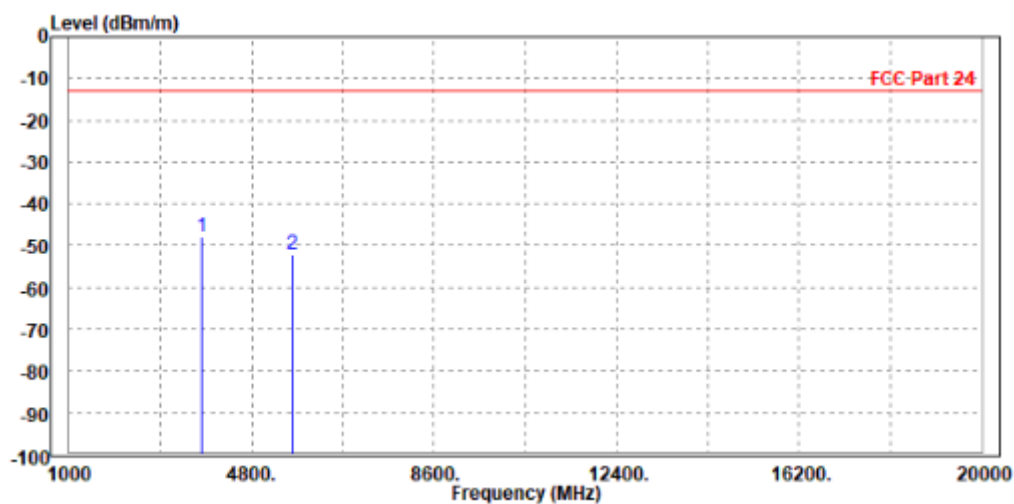
MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3755.000	-43.87	-51.85	-13.00	-30.87	7.98	Peak	Horizontal
2		5640.000	-52.92	-63.66	-13.00	-39.92	10.74	Peak	Horizontal



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
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	PP 3760.000	-47.79	-55.49	-13.00	-34.79	7.70	Peak	Vertical
2	5636.000	-52.10	-63.22	-13.00	-39.10	11.12	Peak	Vertical





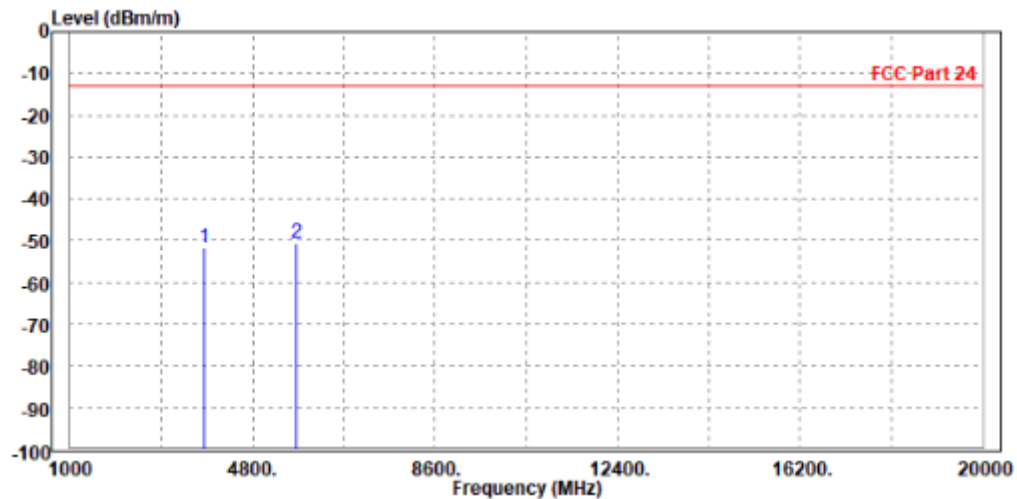
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Test Report No.: W7L-230216W001RF02

CH19125

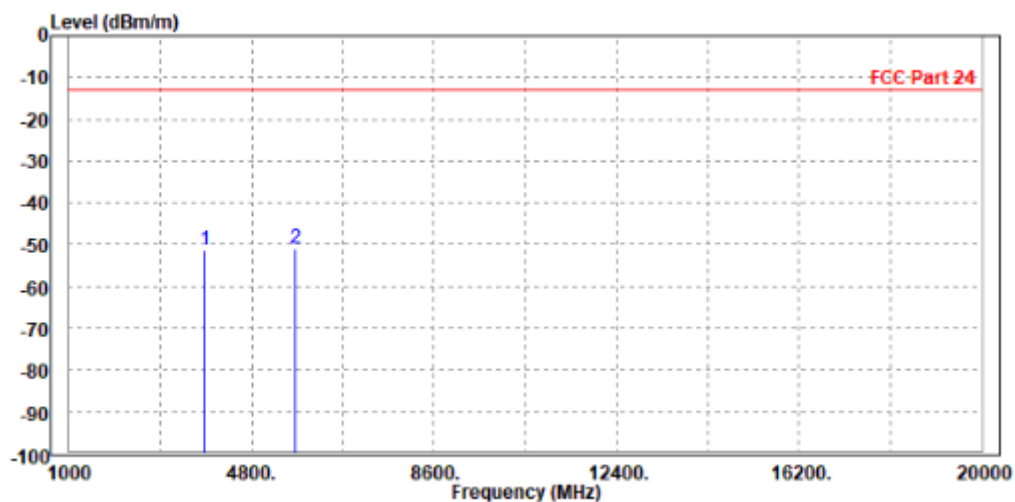
MODE	TX channel 19125	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3805.000	-51.79	-59.89	-13.00	-38.79	8.10	Peak	Horizontal
2 PP	5712.000	-50.72	-61.60	-13.00	-37.72	10.88	Peak	Horizontal



MODE	TX channel 19125	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
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	3812.000	-51.47	-59.24	-13.00	-38.47	7.77	Peak	Vertical
2 PP	5707.500	-50.94	-62.26	-13.00	-37.94	11.32	Peak	Vertical





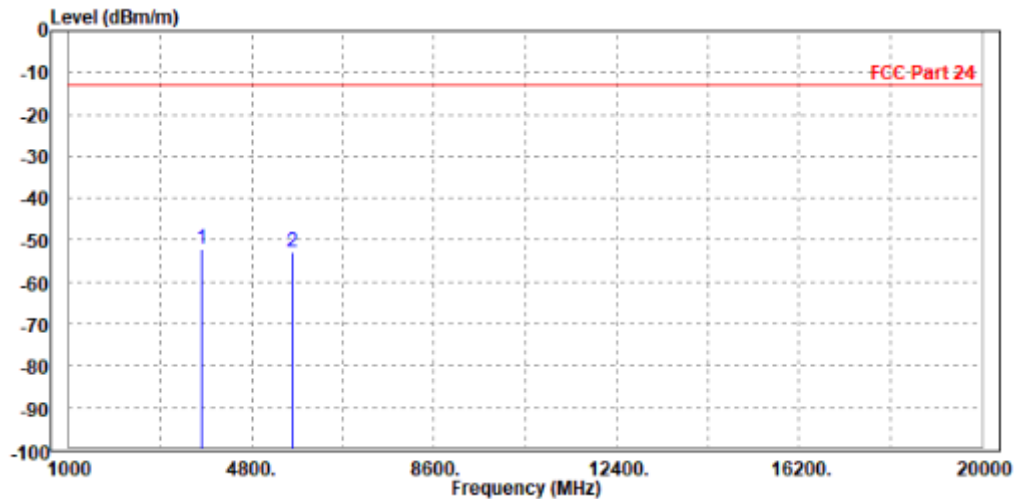
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Test Report No.: W7L-230216W001RF02

CHANNEL BANDWIDTH: 20MHz / QPSK

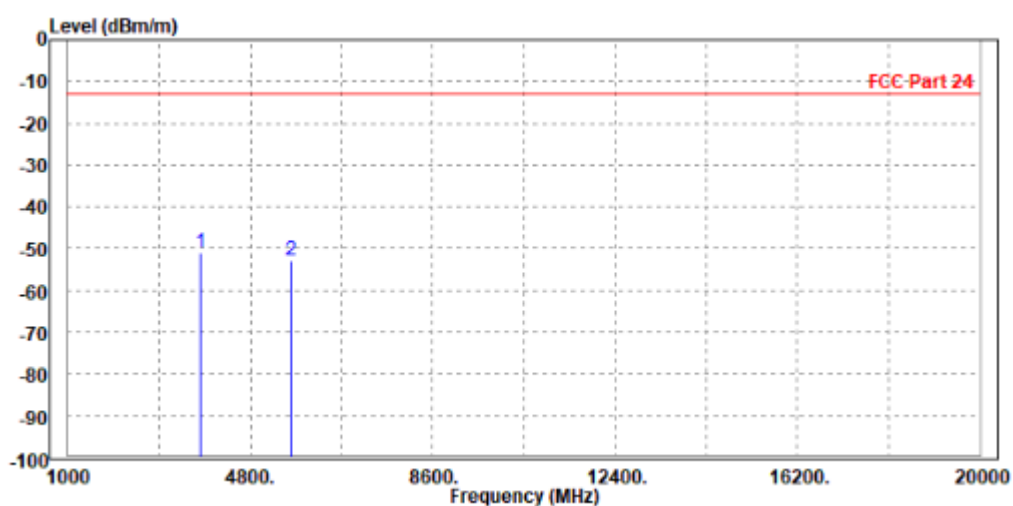
MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3760.000	-51.92	-59.91	-13.00	-38.92	7.99	Peak	Horizontal
2		5636.000	-52.90	-63.63	-13.00	-39.90	10.73	Peak	Horizontal



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
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	PP	3755.000	-51.03	-58.72	-13.00	-38.03	7.69	Peak	Vertical
2		5640.000	-52.79	-63.92	-13.00	-39.79	11.13	Peak	Vertical



LTE NB-IOT

BELOW 1GHz WORST-CASE DATA

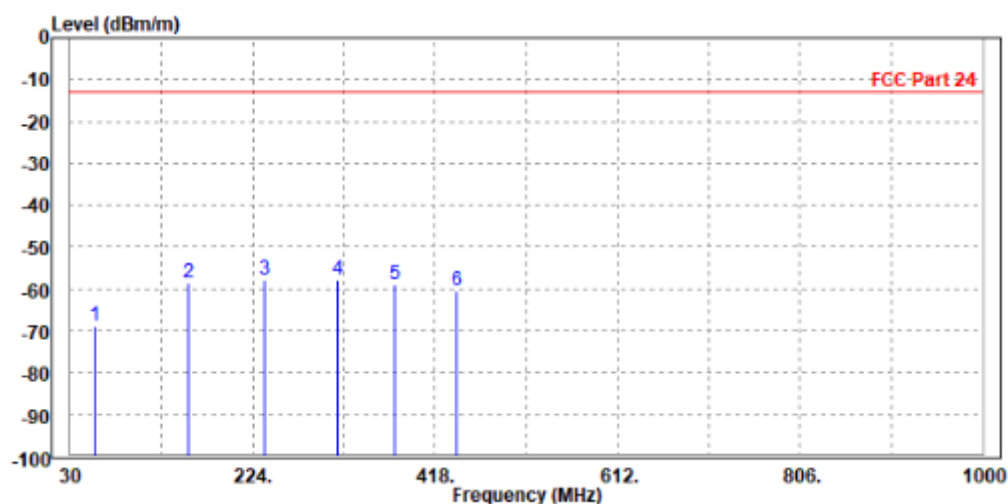
30 MHz – 1GHz data:

LTE Band 2:

SUBCARRIER SPACING: 3.75KHz / QPSK

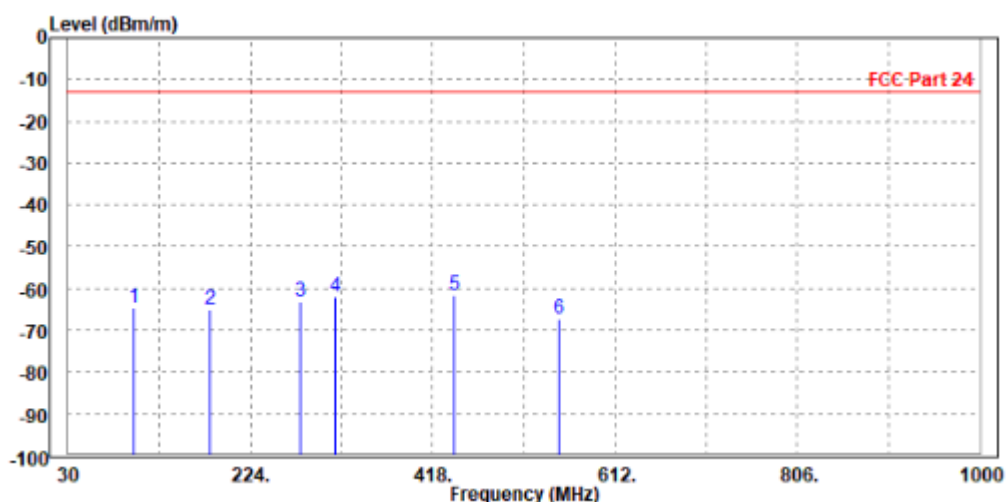
MODE	TX channel 18602	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	56.190	-68.67	-50.59	-13.00	-55.67	-18.08	Peak	Horizontal
2	155.130	-58.43	-41.00	-13.00	-45.43	-17.43	Peak	Horizontal
3 PP	236.610	-57.68	-44.63	-13.00	-44.68	-13.05	Peak	Horizontal
4	314.210	-57.72	-45.60	-13.00	-44.72	-12.12	Peak	Horizontal
5	374.350	-58.96	-48.31	-13.00	-45.96	-10.65	Peak	Horizontal
6	440.310	-60.41	-51.10	-13.00	-47.41	-9.31	Peak	Horizontal



MODE	TX channel 18602	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
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	100.810	-64.63	-57.93	-13.00	-51.63	-6.70	Peak	Vertical
2	180.350	-64.90	-46.15	-13.00	-51.90	-18.75	Peak	Vertical
3	277.350	-63.20	-51.12	-13.00	-50.20	-12.08	Peak	Vertical
4	314.210	-62.12	-51.56	-13.00	-49.12	-10.56	Peak	Vertical
5 PP	440.310	-61.68	-53.05	-13.00	-48.68	-8.63	Peak	Vertical
6	552.830	-67.23	-60.18	-13.00	-54.23	-7.05	Peak	Vertical





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ABOVE 1GHz DATA

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

WORST-CASE DATA

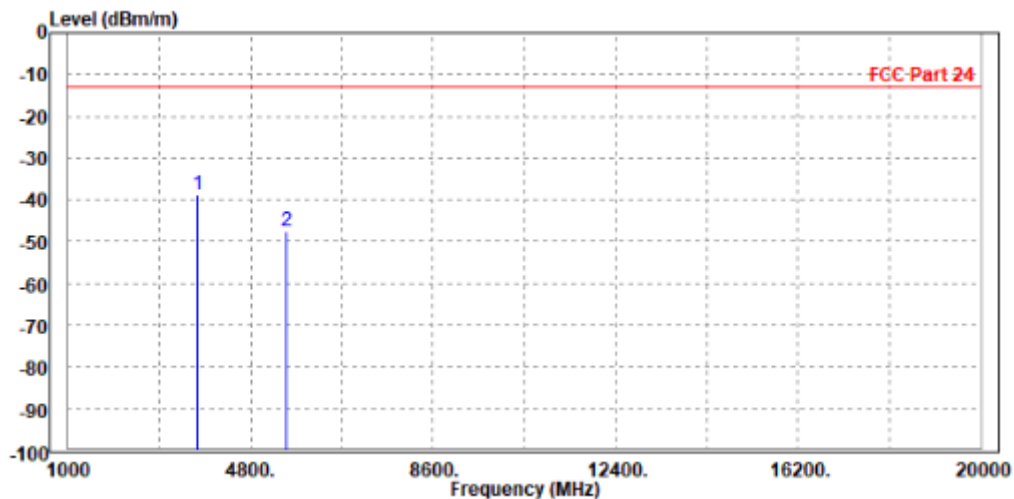
LTE Band 2

SUBCARRIER SPACING: 3.75KHz / QPSK

CH18602

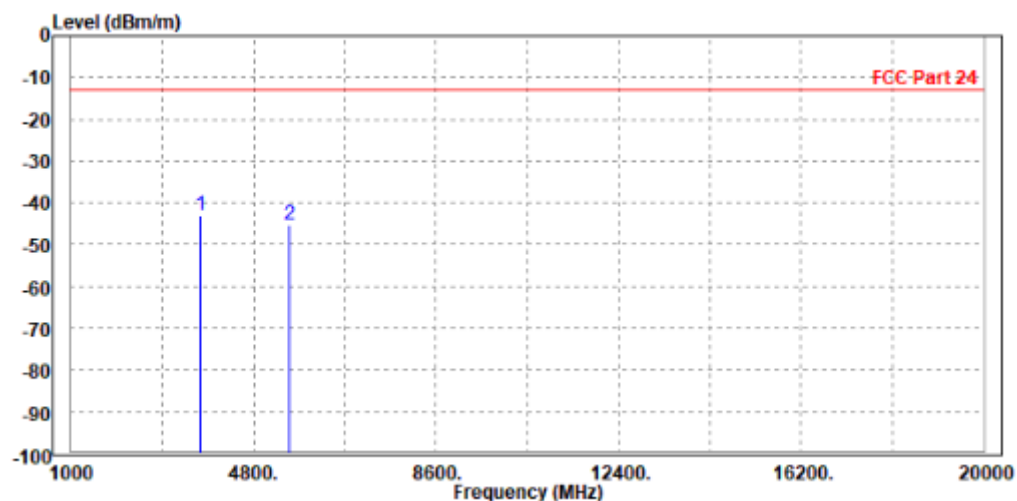
MODE	TX channel 18602	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	3700.200	-38.94	-46.77	-13.00	-25.94	7.83	Peak	Horizontal
2	5541.000	-47.44	-57.99	-13.00	-34.44	10.55	Peak	Horizontal



MODE	TX channel 18602	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
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	PP	3698.000	-43.03	-50.64	-13.00	-30.03	7.61	Peak	Vertical
2		5550.300	-45.23	-56.10	-13.00	-32.23	10.87	Peak	Vertical





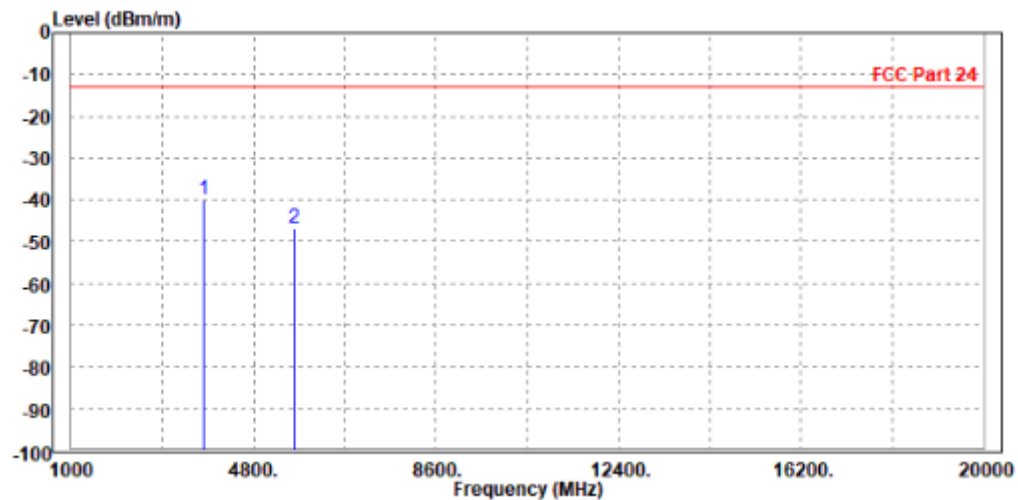
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Test Report No.: W7L-230216W001RF02

CH18900

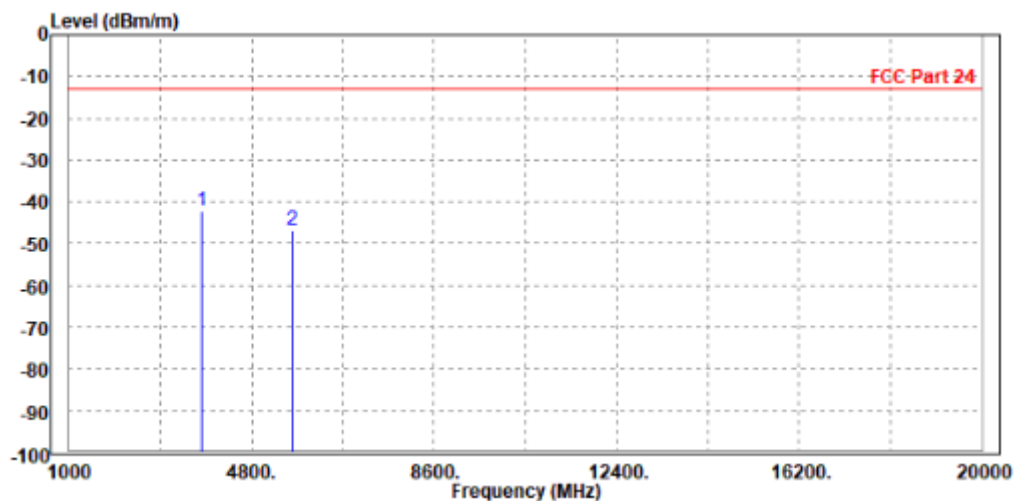
MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3760.000	-40.11	-48.10	-13.00	-27.11	7.99	Peak	Horizontal
2		5636.000	-46.60	-57.33	-13.00	-33.60	10.73	Peak	Horizontal



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
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 PP	3755.000	-42.07	-49.76	-13.00	-29.07	7.69	Peak	Vertical
2	5640.000	-46.62	-57.75	-13.00	-33.62	11.13	Peak	Vertical





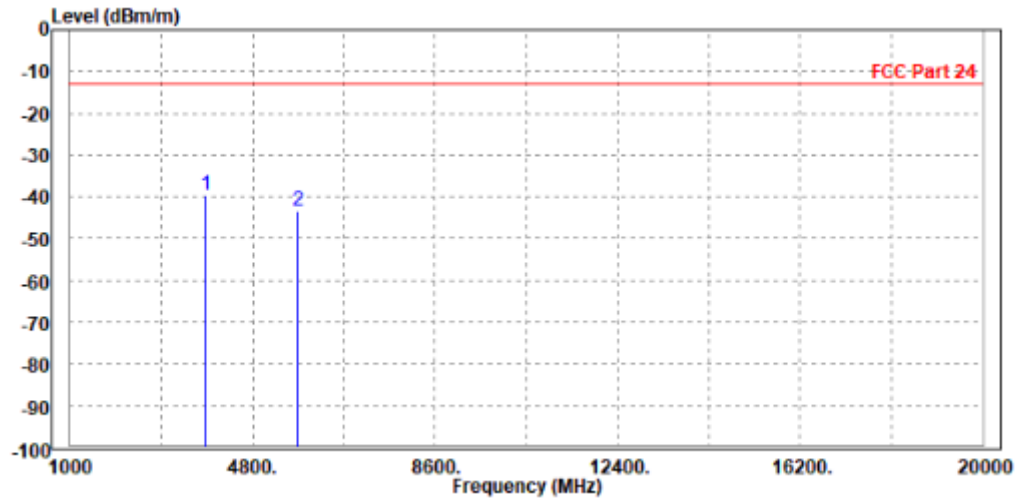
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Test Report No.: W7L-230216W001RF02

CH19198

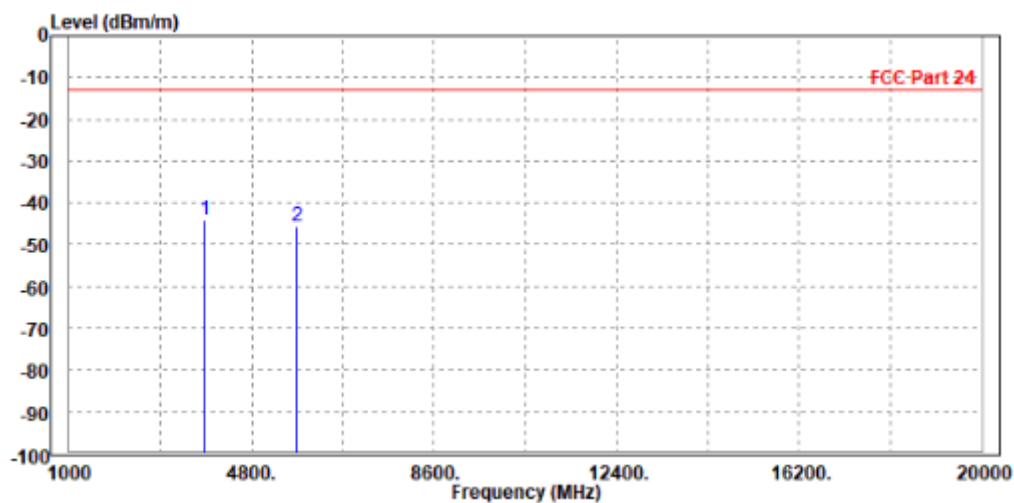
MODE	TX channel 19198	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3812.000	-39.40	-47.52	-13.00	-26.40	8.12	Peak	Horizontal
2		5729.700	-43.18	-54.09	-13.00	-30.18	10.91	Peak	Horizontal



MODE	TX channel 19198	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
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 PP	3819.800	-44.25	-52.03	-13.00	-31.25	7.78	Peak	Vertical
2	5731.000	-45.71	-57.10	-13.00	-32.71	11.39	Peak	Vertical





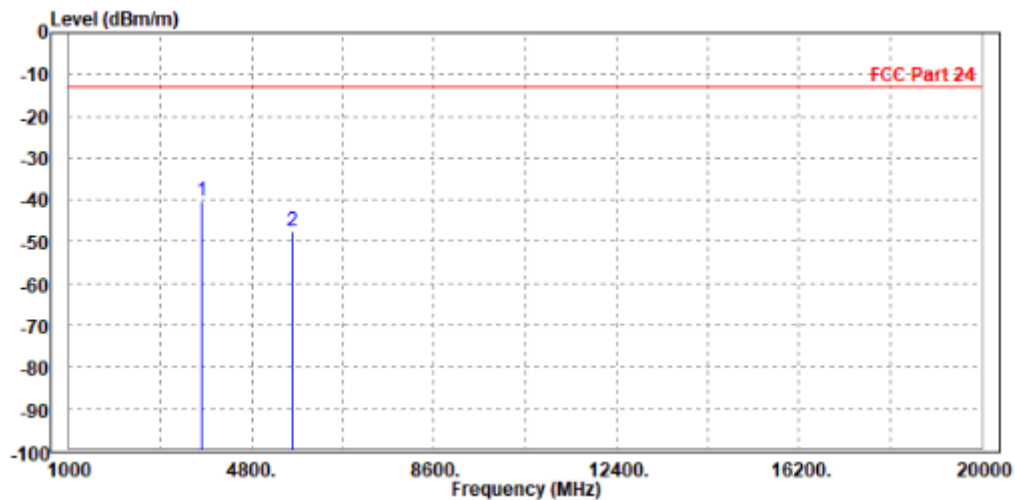
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Test Report No.: W7L-230216W001RF02

SUBCARRIER SPACING: 15KHz / QPSK

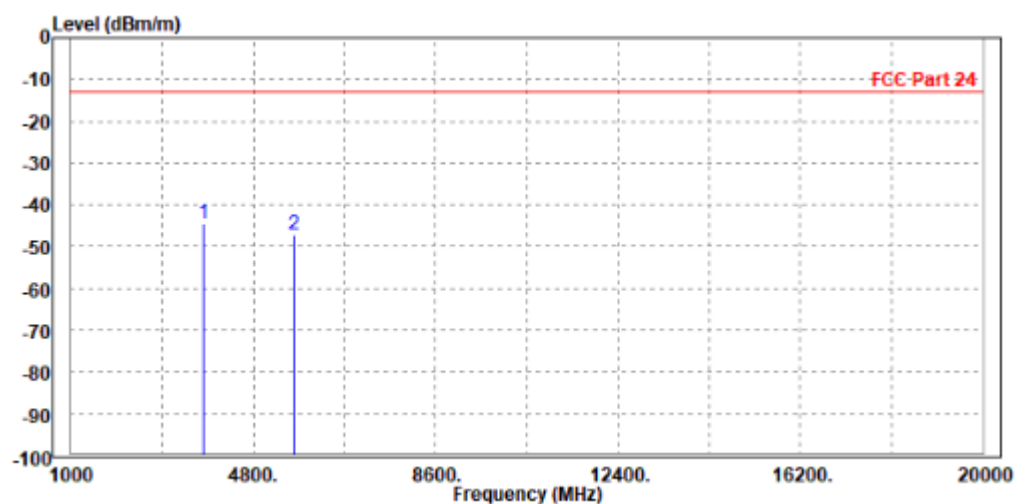
MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3755.000	-40.25	-48.23	-13.00	-27.25	7.98	Peak	Horizontal
2		5640.000	-47.51	-58.25	-13.00	-34.51	10.74	Peak	Horizontal



MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC12V
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	PP	3760.000	-44.40	-52.10	-13.00	-31.40	7.70	Peak	Vertical
2		5636.000	-47.09	-58.21	-13.00	-34.09	11.12	Peak	Vertical

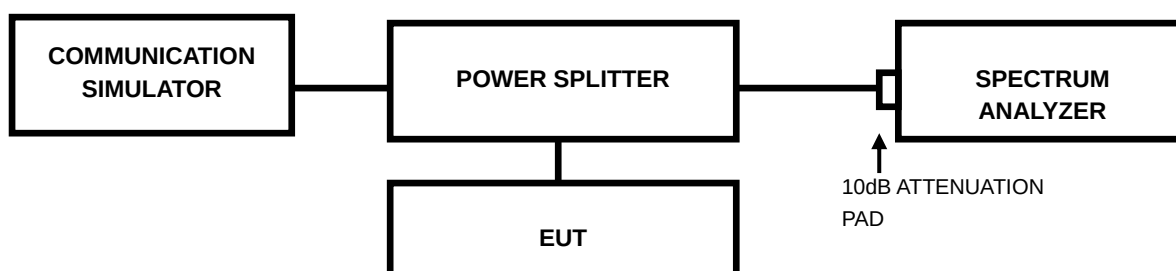


3.7 PEAK TO AVERAGE RATIO

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 $\geq$ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.



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3.7.4 TEST RESULTS

Please Refer to Module report I22W00076-CAT-M RF-FCC_Rev2/ I22W00076-NB-IoT RF-FCC-Rev2.



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Test Report No.: W7L-230216W001RF02

4 INFORMATION ON THE TESTING LABORATORIES

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

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

Shenzhen EMC/RF Lab:

Tel: +86-755-88696566

Fax: +86-755-88696577

Email: customerservice.sw@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.



Test Report No.: W7L-230216W001RF02

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.

---END---