FCC TEST REPORT

(PART 90)

Applicant:	Sonim Technologies, Inc.
Address:	1875 S. Grant St., Suite 750., San Mateo, CA, 94402

Manufacturer or Supplier	Sonim Technologies (Shenzhen) Limited
Address	2nd Floor, No. 2 Building Phase B, Daqian Industrial park, Longchang Road, 67 District, Baoan, Shenzhen, P. R. China
Product	Mobile Phone
Brand Name	Sonim
Model Name	XP3800
FCC ID	WYPPG2212
Date of tests	Sep. 25, 2018 ~ Oct. 23, 2018

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

☒ **FCC Part 90, Subpart R, S** ☒ **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 Roger Li Engineer / Mobile Department	Approved by Sam Tung Manager / Mobile Department
 Date: Oct. 24, 2018	 Date: Oct. 24, 2018

TABLE OF CONTENTS

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF180628W003-10	Original release	Oct. 24, 2018

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 90 & Part 2			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
2.1046 90.635(b) 90.542(a)(7)	Maximum Peak Output Power	PASS	Meet the requirement of limit.
2.1055 90.213 90.539	Frequency Stability	PASS	Meet the requirement of limit.
2.1049 90.209	Occupied Bandwidth	PASS	Meet the requirement of limit.
2.1051 90.691 90.543	Emission Masks	PASS	Meet the requirement of limit.
2.1051 90.691 90.543	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 90.691 90.543	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -17.14dB at 37.82MHz.

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	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.66dB
Radiated emissions	9KHz ~ 30MHz	2.68dB
	30MHz ~ 1GMHz	3.26dB
	1GHz ~ 18GHz	4.48dB
	18GHz ~ 40GHz	4.12dB

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

1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Mar. 16,18	Mar. 15,19
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Mar. 16,18	Mar. 15,19
Bilog Antenna 1	ETS-LINDGREN	3143B	00161964	Nov. 26,16	Nov. 25,18
Bilog Antenna 2	ETS-LINDGREN	3143B	00161965	Nov. 26,16	Nov. 25,18
Horn Antenna 1	ETS-LINDGREN	3117	00168728	Nov. 26,16	Nov. 25,18
Horn Antenna 2	ETS-LINDGREN	3117	00168692	Nov. 26,16	Nov. 25,18
Loop antenna	Daze	ZN30900A	0708	Nov. 20,17	Nov. 19,18
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Dec. 16,16	Dec. 15,18
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Mar. 02,18	Mar. 01,19
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jul. 09,18	Jul. 08,19
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jul. 09,18	Jul. 08,19
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Jul. 09,18	Jul. 08,19
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	Apr. 21,18	Apr. 20,19
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	Jul. 09,18	Jul. 08,19
Power Meter	Anritsu	ML2495A	1506002	Mar. 02,18	Mar. 01,19
Power Sensor	Anritsu	MA2411B	1339352	Mar. 16,18	Mar. 15,19
Humid & Temp Programmable Tester	Juyi	ITH-120-45-CP-AR	IAA1504-001	Jul. 09,18	Jul. 08,19
MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Mar. 13,18	Mar. 12,19

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.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

EUT	Mobile Phone	
BRAND NAME	Sonim	
MODEL NAME	XP3800	
TYPE NUMBER	PG2212	
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.7Vdc (Li-ion, battery)	
MODULATION TECHNOLOGY	**LTE**	QPSK, 16QAM, 64QAM
FREQUENCY RANGE	**LTE Band 14 (Channel Bandwidth: 5MHz)**	790.5MHz ~ 795.5 MHz
	LTE Band 14 (Channel Bandwidth: 10MHz)	793 MHz
	LTE Band 26 (Channel Bandwidth: 1.4MHz)	814.7MHz ~ 823.3MHz
	LTE Band 26 (Channel Bandwidth: 3MHz)	815.5MHz ~ 822.5MHz
	LTE Band 26 (Channel Bandwidth: 5MHz)	816.5MHz ~ 821.5MHz
	LTE Band 26 (Channel Bandwidth: 10MHz)	819MHz
EMISSION DESIGNATOR	**LTE Band 14 (Channel Bandwidth: 5MHz)**	QPSK: 4M47G7D
		16QAM: 4M47W7D
		64QAM: 4M47W7D
	LTE Band 14 (Channel Bandwidth: 10MHz)	QPSK: 8M94G7D
		16QAM: 8M91W7D
		64QAM: 8M91W7D
	LTE Band 26 (Channel Bandwidth: 1.4MHz)	QPSK: 1M09G7D
		16QAM: 1M09W7D
		64QAM: 1M09W7D
	LTE Band 26 (Channel Bandwidth: 3MHz)	QPSK: 2M68G7D
		16QAM: 2M68W7D
		64QAM: 2M69W7D
	LTE Band 26 (Channel Bandwidth: 5MHz)	QPSK: 4M47G7D
		16QAM: 4M47W7D
		64QAM: 4M47W7D
	LTE Band 26 (Channel Bandwidth: 10MHz)	QPSK: 8M92G7D
		16QAM: 8M89W7D
		64QAM: 8M91W7D

MAX. ERP POWER	**LTE Band 14 (Channel Bandwidth: 5MHz)**	278mW
	LTE Band 14 (Channel Bandwidth: 10MHz)	251mW
	LTE Band 26 (Channel Bandwidth: 1.4MHz)	144mW
	LTE Band 26 (Channel Bandwidth: 3MHz)	152mW
	LTE Band 26 (Channel Bandwidth: 5MHz)	151mW
	LTE Band 26 (Channel Bandwidth: 10MHz)	115mW
ANTENNA TYPE	Fixed Internal antenna	
ANTENNA GAIN	1.7dBi for LTE Band 14 2dBi for LTE Band 26	
HW VERSION	A	
SW VERSION	3A.0.0-00-8.1.0-00.09.01	
I/O PORTS	Refer to user's manual	
DATA CABLE	USB cable: non-shielded, detachable, 1.5m	

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT was powered by the following adapters:

ADAPTER 1	
BRAND:	Sonim
MODEL:	TUUS050100-K00
INPUT:	AC 100-240V, 200mA
OUTPUT:	DC 5V, 1000mA

ADAPTER 2	
BRAND:	Sonim
MODEL:	AQ05A-050B
INPUT:	AC 100-240V, 200mA
OUTPUT:	DC 5V, 1000mA

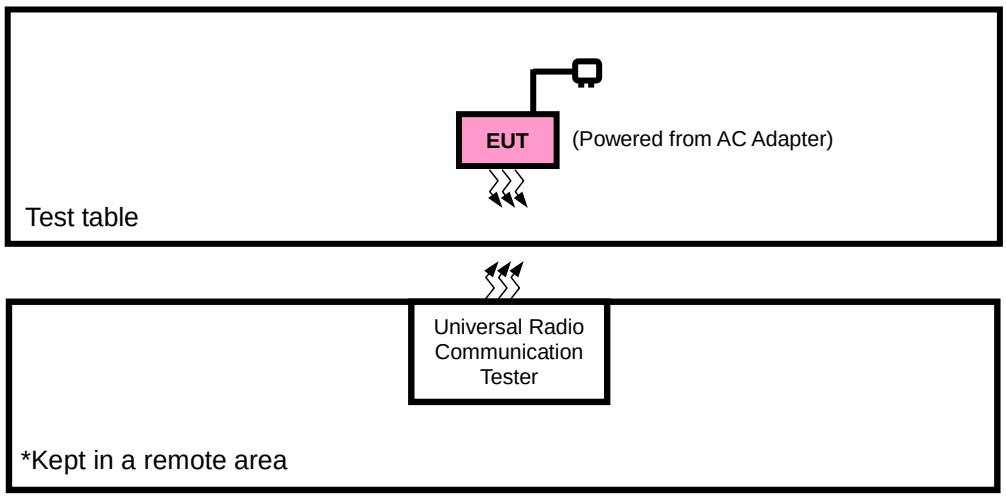
3. The EUT matched the following USB cable:

USB CABLE	
BRAND:	N.A
MODEL:	N.A
SIGNAL LINE:	1.5 METER

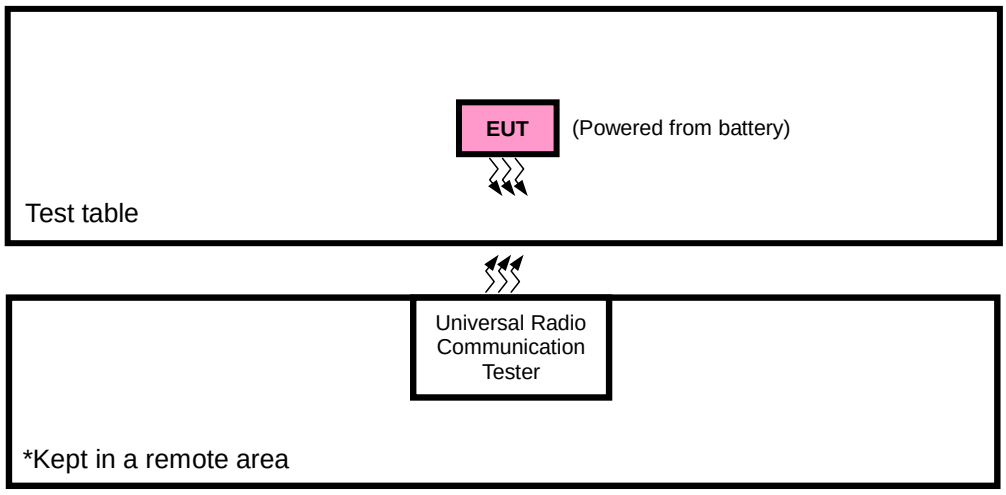
4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

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 SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	LONG WEI	PS-6403D	010934269	N/A
2	PC	HP	A6608CN	3CR83825X3	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m
2	AC Line: Unshielded, Detachable 1.5m

NOTE:

1. All power cords of the above support units are non shielded (1.8m).

2.4 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
A	**EUT + Adapter + USB Cable + with LTE link**
B	EUT + Battery with **LTE link**

LTE BAND 14

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
B	EIRP	23305 to 23355	23305, 23330, 23355	5MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		23330	23330	10MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	23305 to 23355	23305, 23355	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23330	23330	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
B	OCCUPIED BANDWIDTH	23305 to 23355	23305, 23330, 23355	5MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		23330	23330	10MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
B	BAND EDGE	23305 to 23355	23305	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
			23330	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
			23355	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		23330	23330	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset
			23330	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset
B	CONDCUDETED EMISSION	23305 to 23355	23305, 23330, 23355	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23330	23330	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
A	RADIATED EMISSION	23305 to 23355	23330	5MHz	QPSK	1 RB / 0 RB Offset
		23330	23330	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 26

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
B	ERP	26697 to 26783	26697, 26740, 26783	1.4MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		26705 to 26775	26705, 26740, 26775	3MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		26715 to 26765	26715, 26740, 26765	5MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		26740	26740	10MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	26697 to 26783	26697, 26783	1.4MHz	QPSK	1 RB / 0 RB Offset
		26705 to 26775	26705, 26775	3MHz	QPSK	1 RB / 0 RB Offset
		26715 to 26765	26715, 26765	5MHz	QPSK	1 RB / 0 RB Offset
		26740	26740	10MHz	QPSK	1 RB / 0 RB Offset
B	OCCUPIED BANDWIDTH	26697 to 26783	26697, 26740, 26783	1.4MHz	QPSK, 16QAM, 64QAM	6 RB / 0 RB Offset
		26705 to 26775	26705, 26740, 26775	3MHz	QPSK, 16QAM, 64QAM	15 RB / 0 RB Offset
		26715 to 26765	26715, 26740, 26765	5MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		26740	26740	10MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
B	BAND EDGE	26697 to 26783	26697	1.4MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			26783	1.4MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		26705 to 26775	26705	3MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
			26775	3MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		26715 to 26765	26715	5MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			26765	5MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		26740	26740	10MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			26740	10MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
B	CONDCUDETED EMISSION	26697 to 26783	26697, 26740, 26783	1.4MHz	QPSK	1 RB / 0 RB Offset
		26705 to 26775	26705, 26740, 26775	3MHz	QPSK	1 RB / 0 RB Offset
		26715 to 26765	26715, 26740, 26765	5MHz	QPSK	1 RB / 0 RB Offset
		26740	26740	10MHz	QPSK	1 RB / 0 RB Offset
A	RADIATED EMISSION	26697 to 26783	26697, 26740, 26783	1.4MHz	QPSK	1 RB / 0 RB Offset
		26705 to 26775	26740	3MHz	QPSK	1 RB / 0 RB Offset
		26715 to 26765	26740	5MHz	QPSK	1 RB / 0 RB Offset
		26740	26740	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	Rose Ma
FREQUENCY STABILITY	24deg. C, 61%RH	DC 3.4V/3.7V/4.2V	Rain Wang
OCCUPIED BANDWIDTH	24deg. C, 61%RH	3.7Vdc from Battery	Rain Wang
BAND EDGE	24deg. C, 61%RH	3.7Vdc from Battery	Rain Wang
CONDCUDETED EMISSION	24deg. C, 61%RH	3.7Vdc from Battery	Rain Wang
RADIATED EMISSION	23deg. C, 70%RH	DC 5V from adaptor	Rose Ma

2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 90

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

Per FCC Part 90.635(a)(b)
Mobile stations are limited to 100 watts e.r.p. Portable stations are limited to 3 watts e.r.p.

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

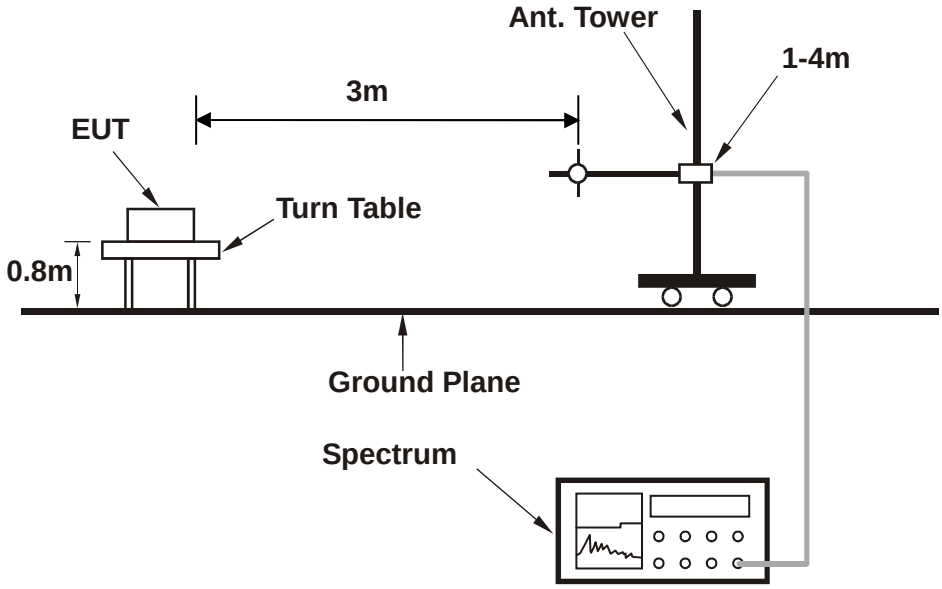
CONDUCTED POWER MEASUREMENT:

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

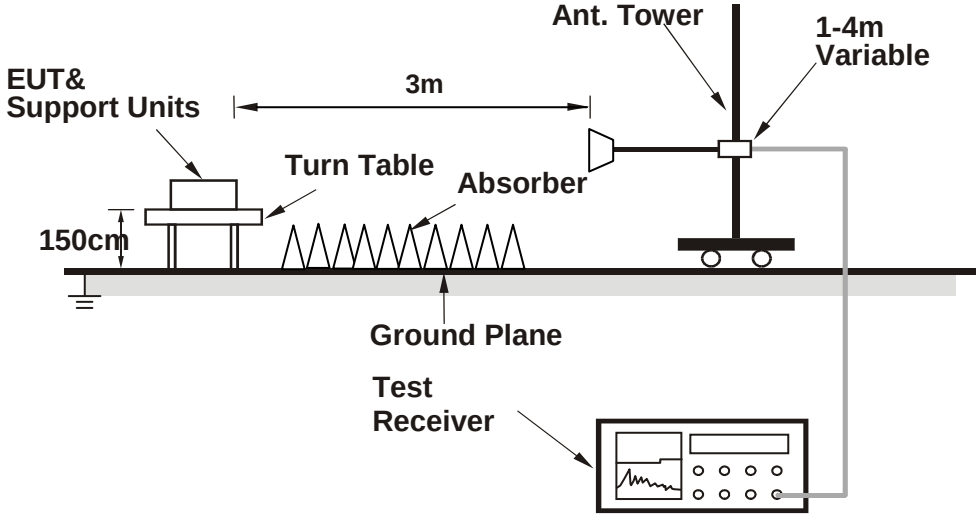
b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

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)

LTE Band 14							
BW	**Modulation**	**RB Size**	**RB Offset**	**Low CH 23305**	**Mid CH 23330**	**High CH 23355**	**MPR**
				Frequency 790.5 MHz	**Frequency 793 MHz**	**Frequency 795.5 MHz**	
5 MHz	QPSK	1	0	22.63	22.67	22.58	0
		1	12	23.15	23.19	23.10	0
		1	24	22.87	22.91	22.82	0
		12	0	21.77	21.81	21.72	1
		12	6	21.69	21.73	21.64	1
		12	13	21.68	21.72	21.63	1
		25	0	21.68	21.72	21.63	1
	16QAM	1	0	21.47	21.51	21.42	1
		1	12	21.53	21.57	21.48	1
		1	24	21.34	21.38	21.29	1
		12	0	20.68	20.72	20.63	2
		12	6	20.75	20.79	20.70	2
		12	13	20.67	20.71	20.62	2
		25	0	20.77	20.81	20.72	2
	64QAM	1	0	20.53	20.57	20.48	2
		1	12	20.72	20.76	20.67	2
		1	24	20.83	20.87	20.78	2
		12	0	19.94	19.98	19.89	3
		12	6	19.87	19.91	19.82	3
		12	13	19.77	19.81	19.72	3
		25	0	19.78	19.82	19.73	3

LTE Band 14							
BW	Modulation	RB Size	RB Offset	CH Frequency MHz	CH 23330 Frequency 793 MHz	CH Frequency MHz	MPR
10 MHz	QPSK	1	0	-	22.70	-	0
		1	24	-	**23.22**	-	0
		1	49	-	22.94	-	0
		25	0	-	21.84	-	1
		25	12	-	21.76	-	1
		25	25	-	21.75	-	1
		50	0	-	21.75	-	1
	16QAM	1	0	-	21.54	-	1
		1	24	-	21.60	-	1
		1	49	-	21.41	-	1
		25	0	-	20.75	-	2
		25	12	-	20.82	-	2
		25	25	-	20.74	-	2
		50	0	-	20.84	-	2
	64QAM	1	0	-	20.60	-	2
		1	24	-	20.79	-	2
		1	49	-	20.90	-	2
		25	0	-	20.01	-	3
		25	12	-	19.94	-	3
		25	25	-	19.84	-	3
		50	0	-	19.85	-	3

LTE Band 26							
BW	Modulation	RB Size	RB Offset	Low CHG 26697	Mid CH 26740	High CH 26783	MPR
				Frequency 814.7 MHz	Frequency 819 MHz	Frequency 823.3 MHz	
1.4 MHz	QPSK	1	0	23.37	23.31	23.29	0
		1	2	23.37	23.31	23.29	0
		1	5	23.35	23.29	23.27	0
		3	0	23.35	23.29	23.27	0
		3	1	23.35	23.29	23.27	0
		3	3	23.33	23.27	23.25	0
		6	0	22.50	22.44	22.42	1
	16QAM	1	0	22.45	22.39	22.37	1
		1	2	22.35	22.29	22.27	1
		1	5	22.45	22.39	22.37	1
		3	0	22.44	22.38	22.36	1
		3	1	22.34	22.28	22.26	1
		3	3	22.44	22.38	22.36	1
		6	0	21.45	21.39	21.37	2
	64QAM	1	0	21.76	21.70	21.68	2
		1	2	21.62	21.56	21.54	2
		1	5	21.71	21.65	21.63	2
		3	0	21.75	21.69	21.67	3
		3	1	21.61	21.55	21.53	3
		3	3	21.70	21.64	21.62	3
		6	0	20.30	20.24	20.22	3

LTE Band 26							
BW	Modulation	RB Size	RB Offset	Low CHG 26705	Mid CH 26740	High CH 26775	MPR
				Frequency 815.5 MHz	Frequency 819 MHz	Frequency 822.5 MHz	
3 MHz	QPSK	1	0	23.41	23.35	23.33	0
		1	7	23.41	23.35	23.33	0
		1	14	23.39	23.33	23.31	0
		8	0	22.47	22.41	22.39	1
		8	3	22.43	22.37	22.35	1
		8	7	22.37	22.31	22.29	1
		15	0	22.54	22.48	22.46	1
	16QAM	1	0	22.49	22.43	22.41	1
		1	7	22.39	22.33	22.31	1
		1	14	22.49	22.43	22.41	1
		8	0	21.35	21.29	21.27	2
		8	3	21.34	21.28	21.26	2
		8	7	21.40	21.34	21.32	2
		15	0	21.49	21.43	21.41	2
	64QAM	1	0	21.80	21.74	21.72	2
		1	7	21.66	21.60	21.58	2
		1	14	21.75	21.69	21.67	2
		8	0	21.79	21.73	21.71	3
		8	3	21.65	21.59	21.57	3
		8	7	21.74	21.68	21.66	3
		15	0	20.34	20.28	20.26	3

LTE Band 26							
BW	Modulation	RB Size	RB Offset	Low CHG 26715	Mid CH 26740	High CH 26765	MPR
				Frequency 816.5 MHz	Frequency 819 MHz	Frequency 821.5 MHz	
5 MHz	QPSK	1	0	23.44	23.38	23.36	0
		1	12	23.44	23.38	23.36	0
		1	24	23.42	23.36	23.34	0
		12	0	22.50	22.44	22.42	1
		12	6	22.46	22.40	22.38	1
		12	13	22.40	22.34	22.32	1
		25	0	22.57	22.51	22.49	1
	16QAM	1	0	22.52	22.46	22.44	1
		1	12	22.42	22.36	22.34	1
		1	24	22.52	22.46	22.44	1
		12	0	21.38	21.32	21.30	2
		12	6	21.37	21.31	21.29	2
		12	13	21.43	21.37	21.35	2
		25	0	21.52	21.46	21.44	2
	64QAM	1	0	21.84	21.78	21.76	2
		1	12	21.70	21.64	21.62	2
		1	24	21.79	21.73	21.71	2
		12	0	21.83	21.77	21.75	3
		12	6	21.69	21.63	21.61	3
		12	13	21.78	21.72	21.70	3
		25	0	20.38	20.32	20.30	3

LTE Band 26							
BW	Modulation	RB Size	RB Offset	CH Frequency MHz	CH 26740 Frequency 819 MHz	CH Frequency MHz	MPR
10 MHz	QPSK	1	0	-	**23.41**	-	0
		1	24	-	23.41	-	0
		1	49	-	23.39	-	0
		25	0	-	22.47	-	1
		25	12	-	22.43	-	1
		25	25	-	22.37	-	1
		50	0	-	22.54	-	1
	16QAM	1	0	-	22.49	-	1
		1	24	-	22.39	-	1
		1	49	-	22.49	-	1
		25	0	-	21.35	-	2
		25	12	-	21.34	-	2
		25	25	-	21.40	-	2
		50	0	-	21.49	-	2
	64QAM	1	0	-	21.82	-	2
		1	24	-	21.68	-	2
		1	49	-	21.77	-	2
		25	0	-	20.40	-	3
		25	12	-	20.33	-	3
		25	25	-	20.39	-	3
		50	0	-	20.36	-	3

EIRP

LTE BAND 14

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23305	790.5	-8.87	33.18	22.16	164.44	H	3
23330	793.0	-6.67	33.26	24.44	**278.16**	H	3
23355	795.5	-9.21	33.28	21.92	155.42	H	3
23305	790.5	-15.97	32.25	14.13	25.90	V	3
23330	793.0	-14.79	32.34	15.40	34.67	V	3
23355	795.5	-16.24	32.41	14.02	25.26	V	3

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23305	790.5	-9.45	33.18	21.58	143.88	H	3
23330	793.0	-7.54	33.26	23.57	227.67	H	3
23355	795.5	-9.88	33.28	21.25	133.20	H	3
23305	790.5	-16.48	32.25	13.62	23.03	V	3
23330	793.0	-15.66	32.34	14.53	28.38	V	3
23355	795.5	-16.96	32.41	13.30	21.40	V	3

CHANNEL BANDWIDTH: 5MHz 64QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23305	790.5	-10.21	33.18	20.82	120.78	H	3
23330	793.0	-8.78	33.26	22.33	171.12	H	3
23355	795.5	-10.98	33.28	20.15	103.40	H	3
23305	790.5	-17.66	32.25	12.44	17.55	V	3
23330	793.0	-16.88	32.34	13.31	21.43	V	3
23355	795.5	-18.15	32.41	12.11	16.27	V	3

LTE BAND 14

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23330	793.0	-7.12	33.26	23.99	**250.78**	H	3
23330	793.0	-15.24	32.34	14.95	31.25	V	3

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23330	793.0	-8.19	33.26	22.92	196.02	H	3
23330	793.0	-16.31	32.34	13.88	24.42	V	3

CHANNEL BANDWIDTH: 10MHz 64QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23330	793.0	-9.23	33.26	21.88	154.28	H	3
23330	793.0	-17.33	32.34	12.86	19.31	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 26

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
26697	814.7	-9.94	33.67	21.58	**143.98**	H	3
26740	819.0	-10.42	33.62	21.05	127.47	H	3
26783	823.3	-10.42	33.65	21.08	128.09	H	3
26697	814.7	-17.46	34.25	14.64	29.09	V	3
26740	819.0	-16.31	34.60	16.14	41.10	V	3
26783	823.3	-17.83	34.63	14.65	29.17	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)
26697	814.7	-10.77	33.67	20.75	118.93	H	3
26915	819.0	-11.44	33.62	20.03	100.79	H	3
26783	823.3	-11.52	33.65	19.98	99.43	H	3
26697	814.7	-18.29	34.25	13.81	24.03	V	3
26915	819.0	-17.33	34.60	15.12	32.49	V	3
26783	823.3	-18.93	34.63	13.55	22.65	V	3

CHANNEL BANDWIDTH: 1.4MHz 64QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
26697	814.7	-11.41	33.67	20.11	102.64	H	3
26915	819.0	-11.98	33.62	19.49	89.00	H	3
26783	823.3	-12.11	33.65	19.39	86.80	H	3
26697	814.7	-18.98	34.25	13.12	20.50	V	3
26915	819.0	-17.80	34.60	14.65	29.16	V	3
26783	823.3	-19.28	34.63	13.20	20.89	V	3

LTE BAND 26

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
26705	815.5	-9.75	33.72	21.82	**152.09**	H	3
26740	819.0	-10.36	33.62	21.11	129.24	H	3
26775	822.5	-10.29	33.65	21.21	132.10	H	3
26705	815.5	-17.27	34.30	14.88	30.77	V	3
26740	819.0	-16.25	34.60	16.20	41.67	V	3
26775	822.5	-17.70	34.57	14.72	29.66	V	3

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
26705	815.5	-10.90	33.72	20.67	116.71	H	3
26740	819.0	-11.46	33.62	20.01	100.32	H	3
26775	822.5	-11.45	33.65	20.05	101.13	H	3
26705	815.5	-18.42	34.30	13.73	23.61	V	3
26740	819.0	-17.35	34.60	15.10	32.34	V	3
26775	822.5	-18.86	34.57	13.56	22.70	V	3

CHANNEL BANDWIDTH: 3MHz 64QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
26705	815.5	-11.22	33.72	20.35	108.42	H	3
26740	819.0	-11.92	33.62	19.55	90.24	H	3
26775	822.5	-11.98	33.65	19.52	89.52	H	3
26705	815.5	-18.79	34.30	13.36	21.68	V	3
26740	819.0	-17.74	34.60	14.71	29.57	V	3
26775	822.5	-19.15	34.57	13.27	21.24	V	3

LTE BAND 26

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
26715	816.5	-9.76	33.69	21.78	**150.80**	H	3
26740	819.0	-10.43	33.62	21.04	127.17	H	3
26765	821.5	-10.36	33.66	21.15	130.35	H	3
26715	816.5	-17.28	34.85	15.42	34.83	V	3
26740	819.0	-16.32	34.60	16.13	41.00	V	3
26765	821.5	-17.77	34.59	14.67	29.34	V	3

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
26715	816.5	-10.62	33.69	20.92	123.71	H	3
26740	819.0	-11.30	33.62	20.17	104.09	H	3
26765	821.5	-11.21	33.66	20.30	107.18	H	3
26715	816.5	-18.14	34.85	14.56	28.57	V	3
26740	819.0	-17.19	34.60	15.26	33.56	V	3
26765	821.5	-18.62	34.59	13.82	24.12	V	3

CHANNEL BANDWIDTH: 5MHz 64QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
26715	816.5	-11.23	33.69	20.31	107.50	H	3
26740	819.0	-11.99	33.62	19.48	88.80	H	3
26765	821.5	-12.05	33.66	19.46	88.33	H	3
26715	816.5	-18.80	34.85	13.90	24.54	V	3
26740	819.0	-17.81	34.60	14.64	29.09	V	3
26765	821.5	-19.22	34.59	13.22	21.01	V	3

LTE BAND 26

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
26740	819.0	-10.88	33.62	20.59	**114.66**	H	3
26740	819.0	-16.77	34.60	15.68	36.97	V	3

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
26740	819.0	-11.95	33.62	19.52	89.62	H	3
26740	819.0	-17.84	34.60	14.61	28.89	V	3

CHANNEL BANDWIDTH: 10MHz 64QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
26740	819.0	-12.44	33.62	19.03	80.06	H	3
26740	819.0	-18.26	34.60	14.19	26.23	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 of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked

3.2.2 TEST PROCEDURE

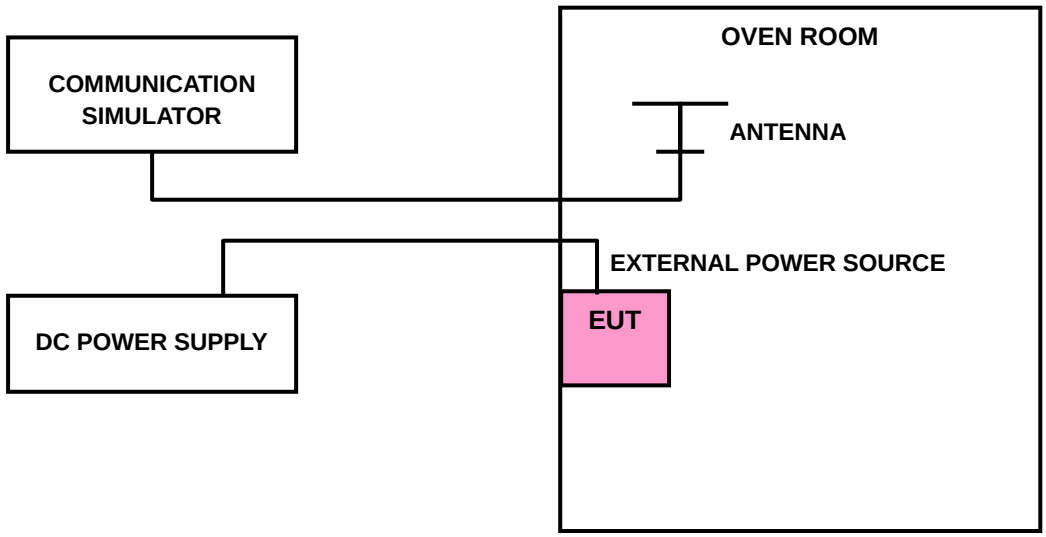
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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

LTE BAND 14

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.7	0.0020	0.0019	2.5
3.4	-0.0026	-0.0024	2.5
4.2	0.0019	0.0021	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.4Vdc to 4.2Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0146	-0.0145	2.5
-20	-0.0132	-0.0130	2.5
-10	-0.0119	-0.0117	2.5
0	-0.0096	-0.0093	2.5
10	-0.0073	-0.0070	2.5
20	-0.0061	-0.0059	2.5
30	-0.0049	-0.0046	2.5
40	-0.0027	-0.0024	2.5
50	-0.0010	-0.0007	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	10MHz	LIMIT (ppm)
	FREQUENCY ERROR (ppm)	
	Channel 23330	
3.7	0.0025	2.5
3.4	-0.0026	2.5
4.2	0.0021	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.4Vdc to 4.2Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	10MHz	LIMIT (ppm)
	FREQUENCY ERROR (ppm)	
	Channel 23330	
-30	-0.0152	2.5
-20	-0.0138	2.5
-10	-0.0114	2.5
0	-0.0085	2.5
10	-0.0069	2.5
20	-0.0049	2.5
30	-0.0028	2.5
40	-0.0013	2.5
50	0.0006	2.5

LTE BAND 26

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	1.4MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.7	0.0008	0.0009	2.5
3.4	-0.0009	-0.0010	2.5
4.2	0.0007	0.0008	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.4Vdc to 4.2Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	1.4MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0057	-0.0052	2.5
-20	-0.0053	-0.0051	2.5
-10	-0.0051	-0.0044	2.5
0	-0.0046	-0.0040	2.5
10	-0.0037	-0.0040	2.5
20	-0.0030	-0.0035	2.5
30	-0.0024	-0.0023	2.5
40	-0.0023	-0.0012	2.5
50	-0.0003	-0.0002	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	3MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.7	0.0008	0.0010	2.5
3.4	-0.0010	-0.0010	2.5
4.2	0.0010	0.0010	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.4Vdc to 4.2Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	3MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0051	-0.0053	2.5
-20	-0.0050	-0.0050	2.5
-10	-0.0048	-0.0043	2.5
0	-0.0037	-0.0036	2.5
10	-0.0037	-0.0032	2.5
20	-0.0033	-0.0027	2.5
30	-0.0030	-0.0027	2.5
40	-0.0023	-0.0017	2.5
50	0.0000	0.0004	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.7	0.0009	0.0011	2.5
3.4	-0.0012	-0.0011	2.5
4.2	0.0010	0.0010	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.4Vdc to 4.2Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0058	-0.0056	2.5
-20	-0.0054	-0.0052	2.5
-10	-0.0049	-0.0044	2.5
0	-0.0040	-0.0038	2.5
10	-0.0036	-0.0035	2.5
20	-0.0035	-0.0028	2.5
30	-0.0031	-0.0027	2.5
40	-0.0014	-0.0018	2.5
50	-0.0005	-0.0004	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	10MHz	LIMIT (ppm)
	FREQUENCY ERROR (ppm)	
	Channel 26740	
3.7	0.0010	2.5
3.4	-0.0011	2.5
4.2	-0.0009	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.4Vdc to 4.2Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

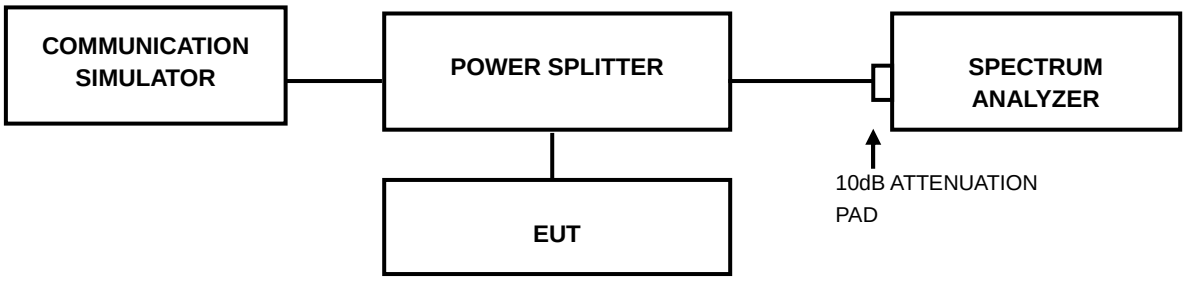
TEMP. (℃)	10MHz	LIMIT (ppm)
	FREQUENCY ERROR (ppm)	
	Channel 26740	
-30	-0.0054	2.5
-20	-0.0052	2.5
-10	-0.0046	2.5
0	-0.0044	2.5
10	-0.0034	2.5
20	-0.0029	2.5
30	-0.0026	2.5
40	-0.0021	2.5
50	-0.0004	2.5

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.

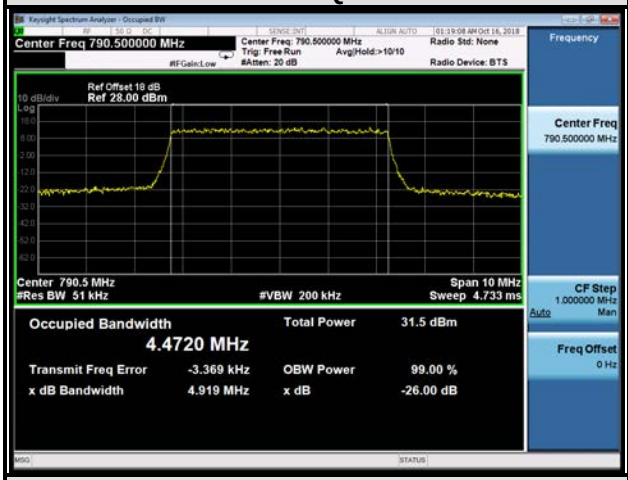
3.3.4 TEST RESULTS

LTE BAND 14

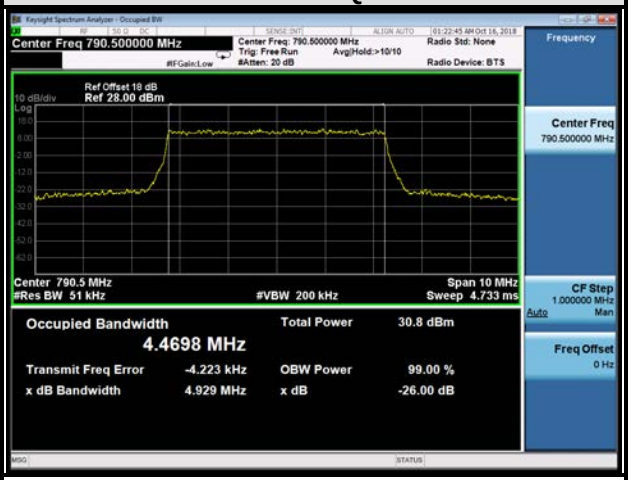
CHANNEL BANDWIDTH: 5MHz				
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED Bandwidth (MHz)		
		QPSK	16QAM	64QAM
23305	790.5	4.47	4.47	4.47
23330	793	4.47	4.47	4.47
23355	795.5	4.47	4.47	4.47

SPECTRUM PLOT OF WORST VALUE

5MHz / QPSK



5MHz / 16QAM



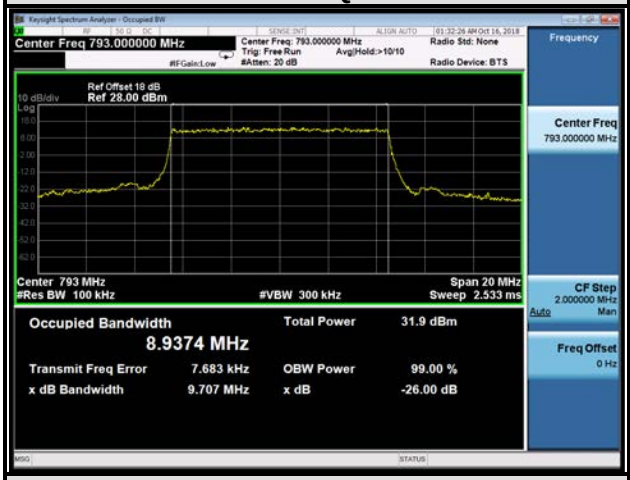
5MHz / 64QAM

LTE BAND 14

CHANNEL BANDWIDTH: 10MHz				
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED Bandwidth (MHz)		
		QPSK	16QAM	64QAM
-	-	-	-	-
23330	793	8.94	8.91	8.91
-	-	-	-	-

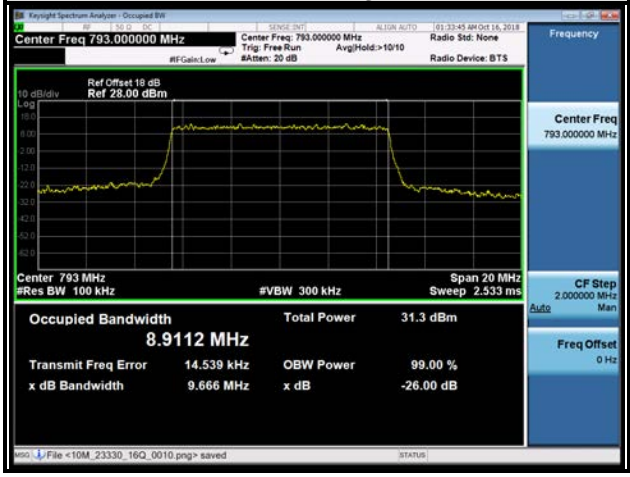
SPECTRUM PLOT OF WORST VALUE

10MHz / QPSK



10MHz / 16QAM

10MHz / 64QAM

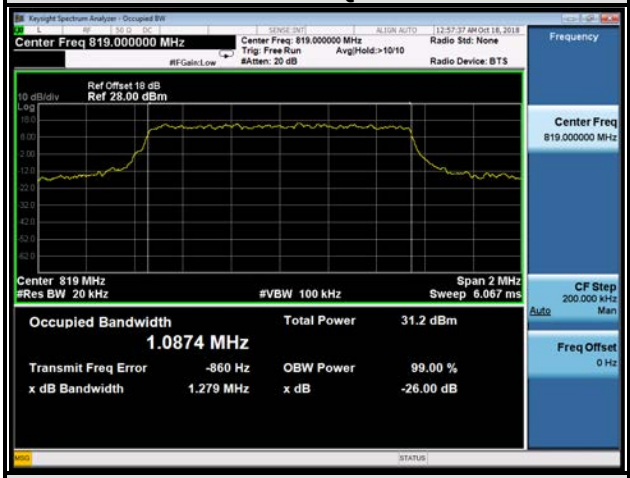


LTE BAND 26

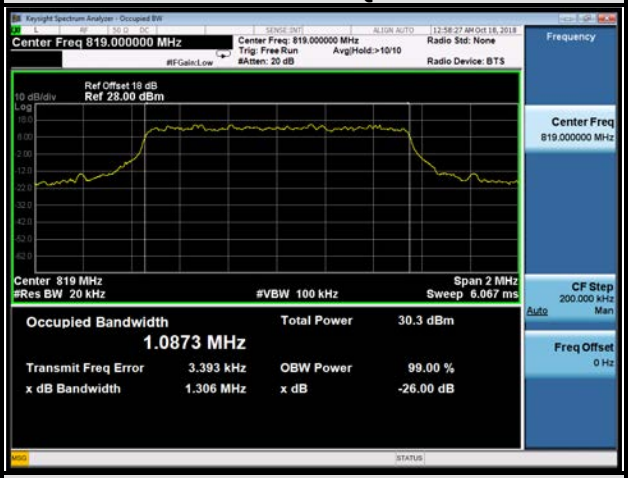
CHANNEL BANDWIDTH: 1.4MHz				
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)		
		QPSK	16QAM	64QAM
26697	814.7	1.08	1.08	1.08
26740	819	1.09	1.09	1.09
26783	823.3	1.09	1.09	1.08

SPECTRUM PLOT OF WORST VALUE

1.4MHz / QPSK



1.4MHz / 16QAM



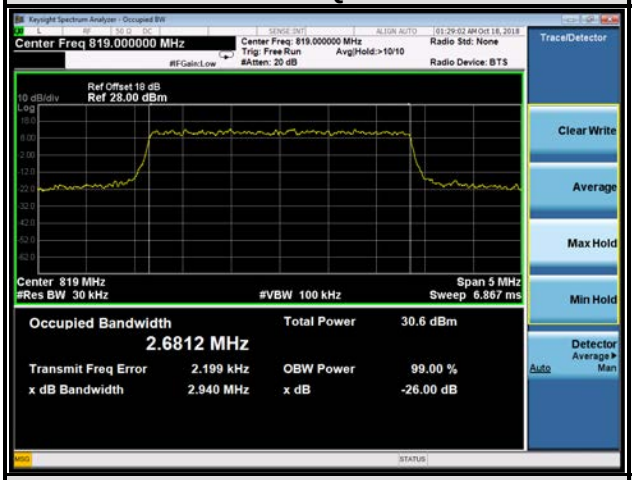
1.4MHz / 64QAM

LTE BAND 26

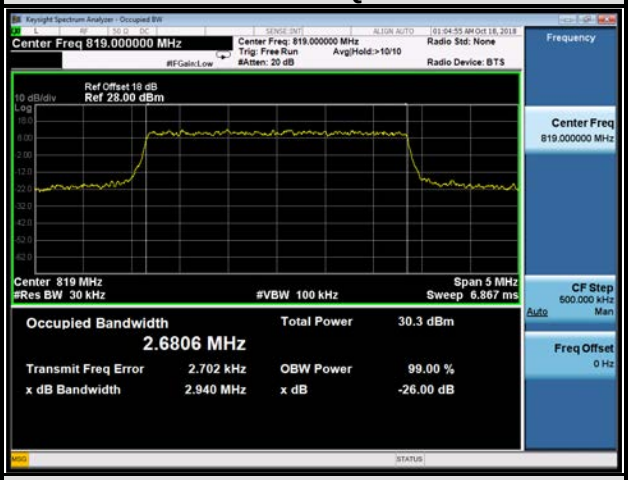
CHANNEL BANDWIDTH: 3MHz				
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)		
		QPSK	16QAM	64QAM
26705	815.5	2.68	2.68	2.69
26740	819	2.68	2.68	2.69
26775	822.5	2.68	2.68	2.69

SPECTRUM PLOT OF WORST VALUE

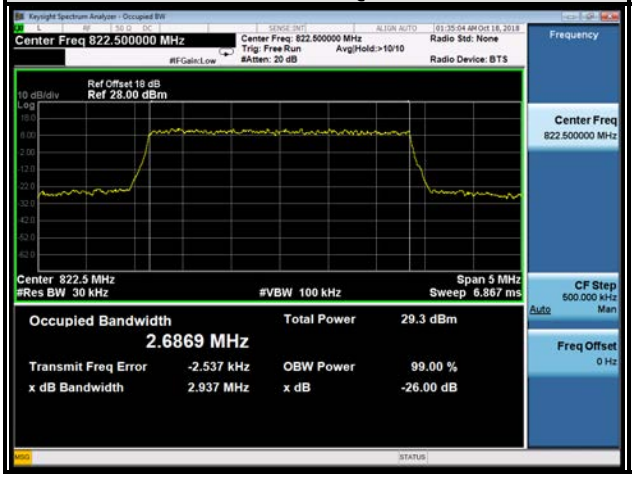
3MHz / QPSK



3MHz / 16QAM



3MHz / 64QAM



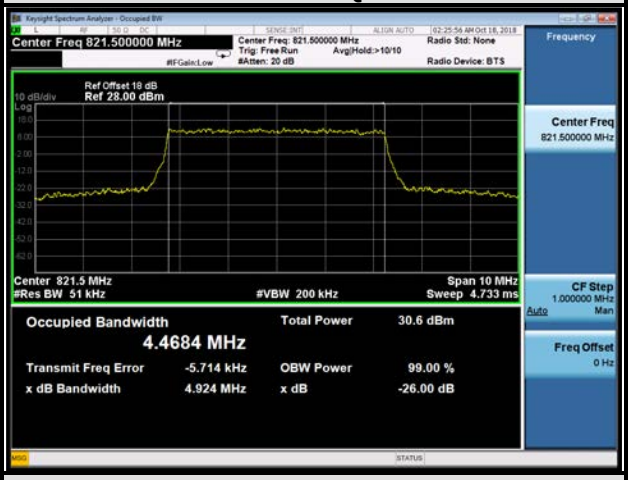
LTE BAND 26

CHANNEL BANDWIDTH: 5MHz				
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)		
		QPSK	16QAM	64QAM
26715	816.5	4.47	4.47	4.47
26740	819	4.47	4.47	4.47
26765	821.5	4.47	4.47	4.47

SPECTRUM PLOT OF WORST VALUE

5MHz / QPSK

5MHz / 16QAM



5MHz / 64QAM

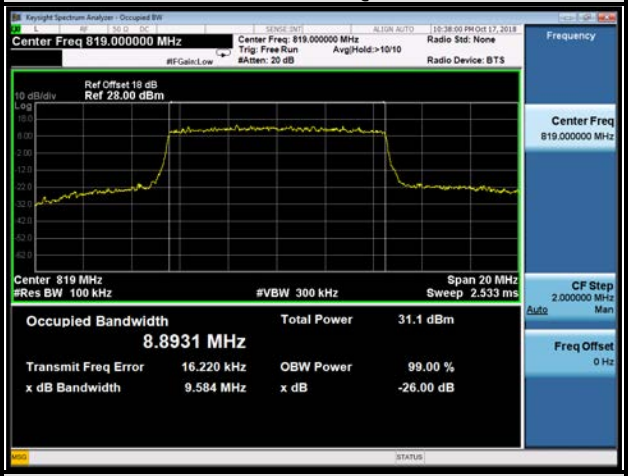
LTE BAND 26

CHANNEL BANDWIDTH: 10MHz				
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)		
		QPSK	16QAM	64QAM
-	-	-	-	-
26740	819	8.92	8.89	8.91
-	-	-	-	-

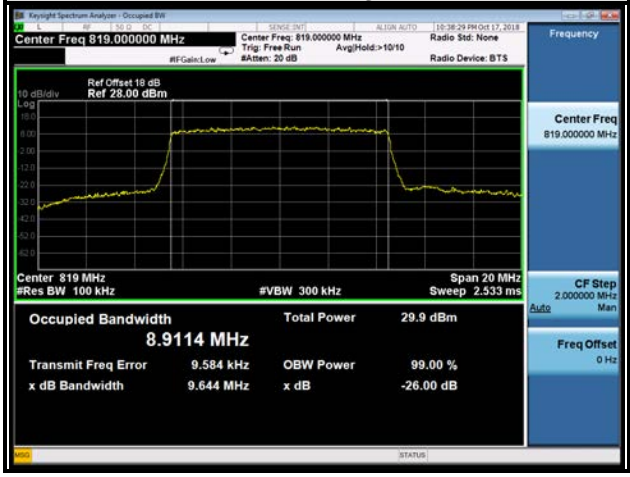
SPECTRUM PLOT OF WORST VALUE

10MHz / QPSK

10MHz / 16QAM



10MHz / 64QAM

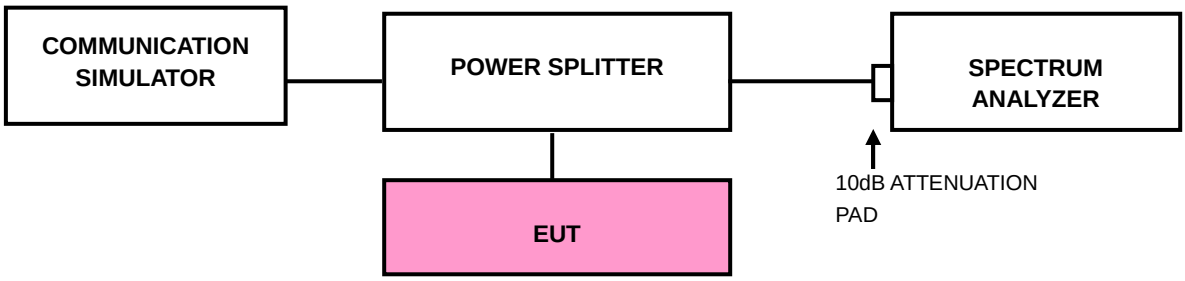


3.4 EMISSION MASK MEASUREMENT

3.4.1 LIMITS OF EMISSION MASK MEASUREMENT

According to FCC part 90.691 shall be tested the emission mask. For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

3.4.2 TEST SETUP



3.4.3 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)

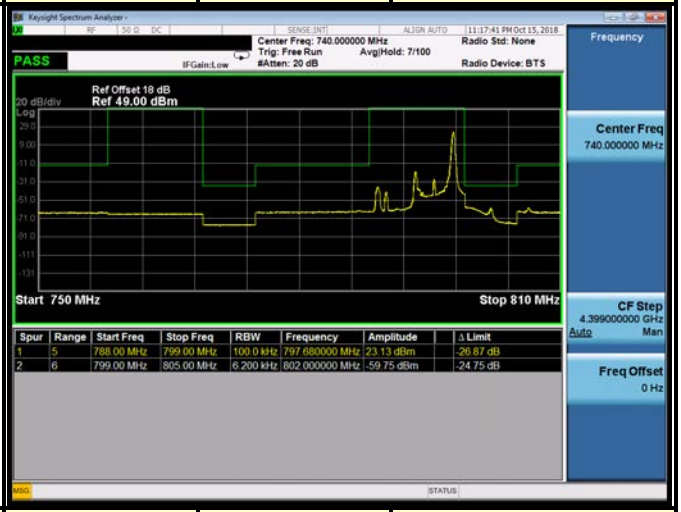
e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 50kHz and VBW of the spectrum is 200kHz. (LTE bandwidth 5MHz)

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)

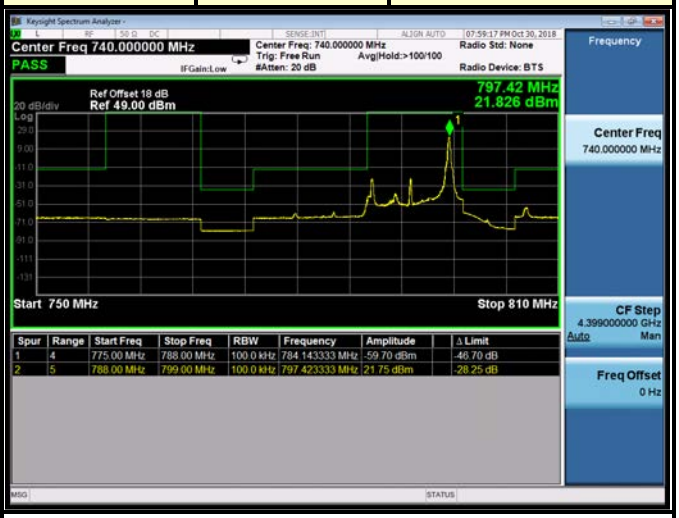
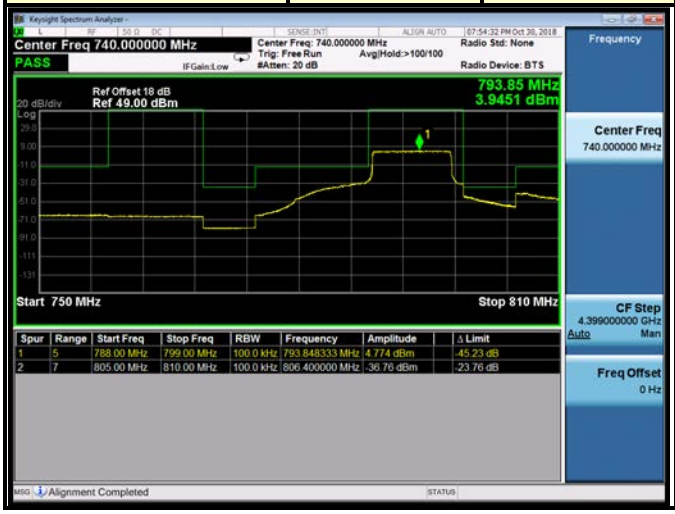
g. Record the max trace plot into the test report.

3.4.4 TEST RESULTS

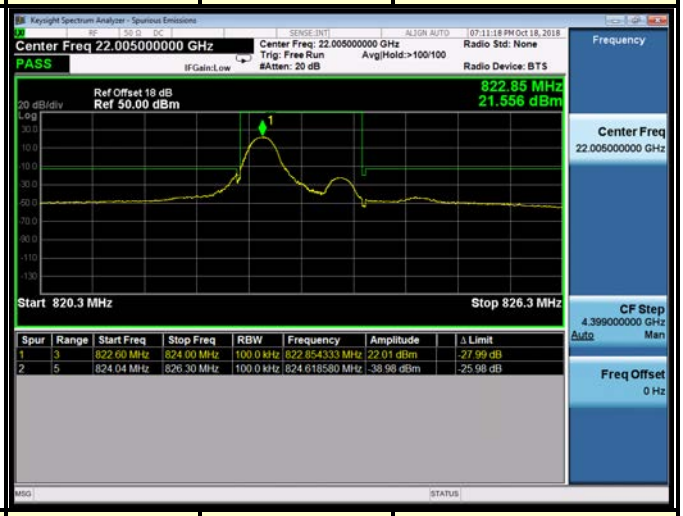
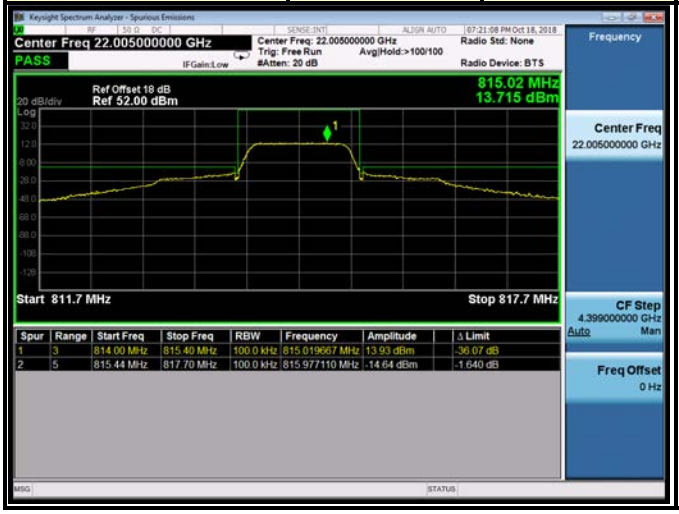
LTE BAND 14

Channel Bandwidth: 5MHz					
CHANNEL	23305	1 RB	CHANNEL	23355	1 RB
					
CHANNEL	23305	Full RB	CHANNEL	23355	Full RB
					

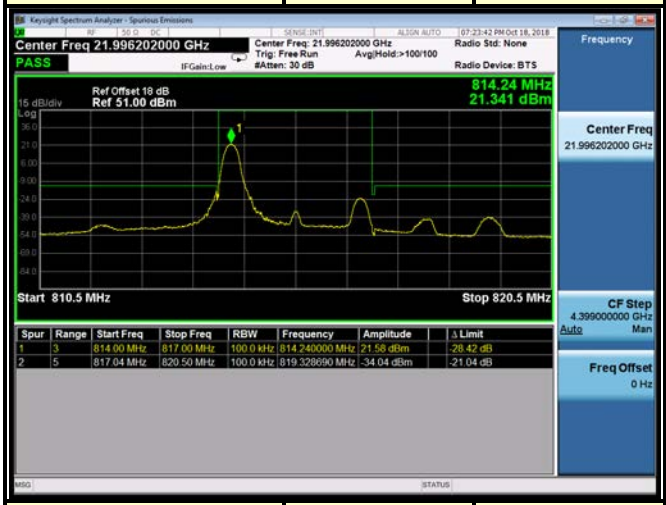
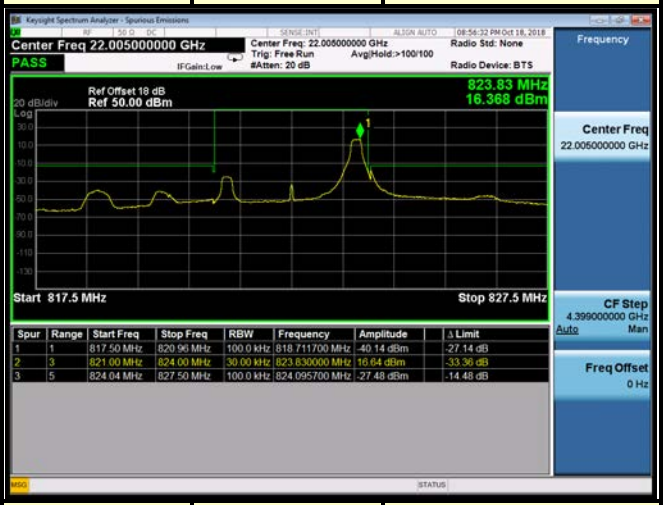
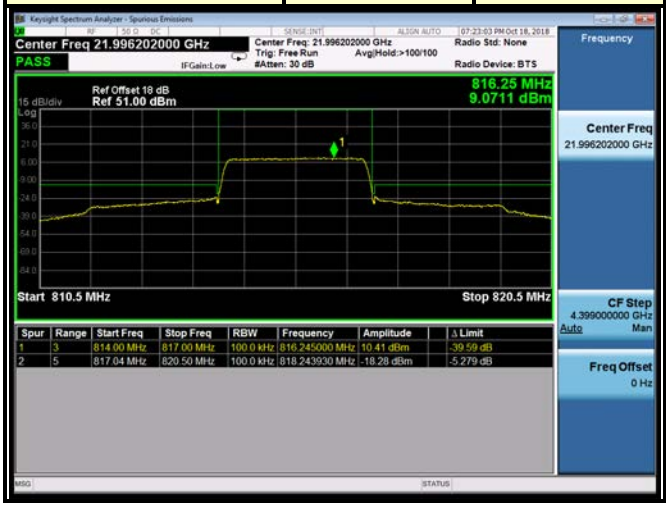
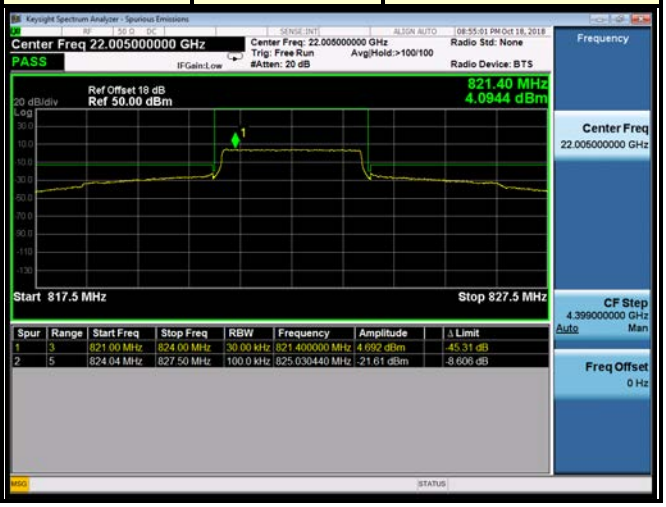
LTE BAND 14

Channel Bandwidth: 10MHz					
CHANNEL	23330	1 RB	CHANNEL	23330	1 RB
					
CHANNEL	23330	Full RB			
					

LTE BAND 26

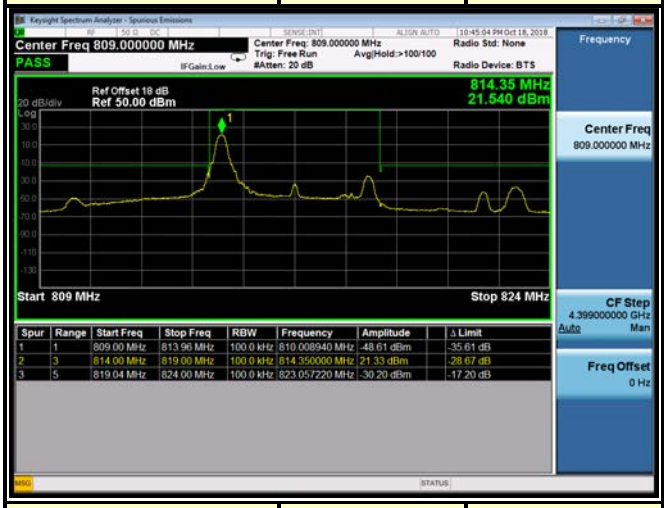
Channel Bandwidth: 1.4MHz					
CHANNEL	26697	1 RB	CHANNEL	26783	1 RB
					
CHANNEL	26697	Full RB	CHANNEL	26783	Full RB
					

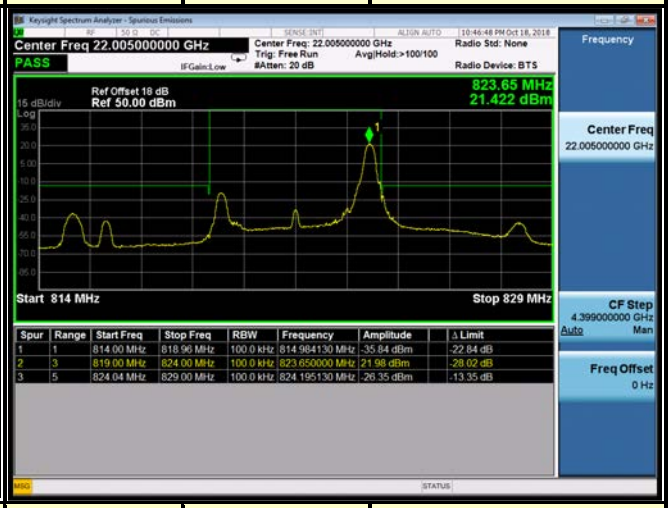
LTE BAND 26

Channel Bandwidth: 3MHz					
CHANNEL	26705	1 RB	CHANNEL	26775	1 RB
					
CHANNEL	26705	Full RB	CHANNEL	26775	Full RB
					

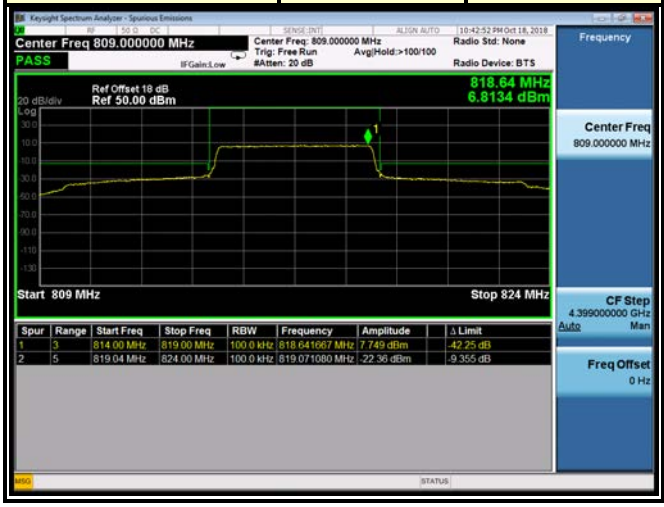
LTE BAND 26

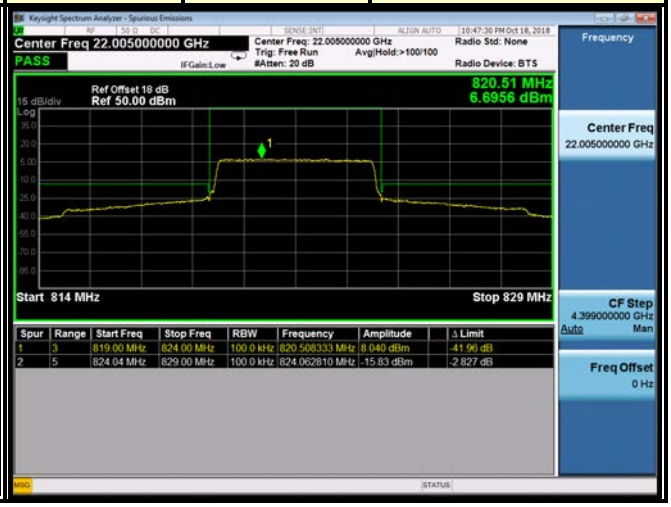
Channel Bandwidth: 5MHz					
CHANNEL	26715	1 RB	CHANNEL	26765	1 RB





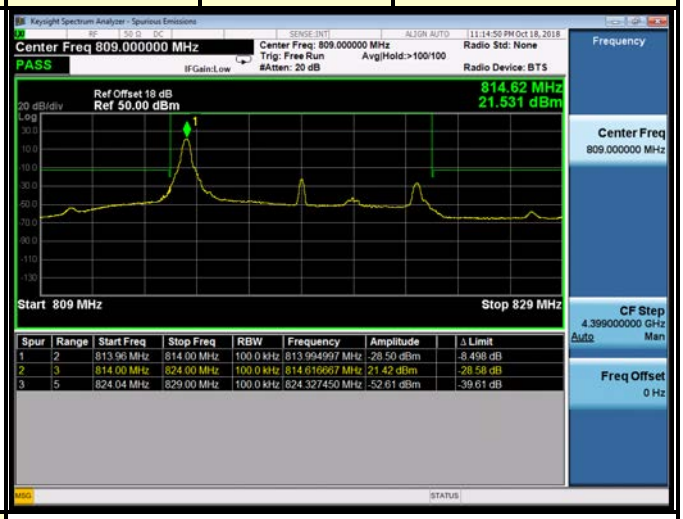
CHANNEL	26715	Full RB	CHANNEL	26765	Full RB



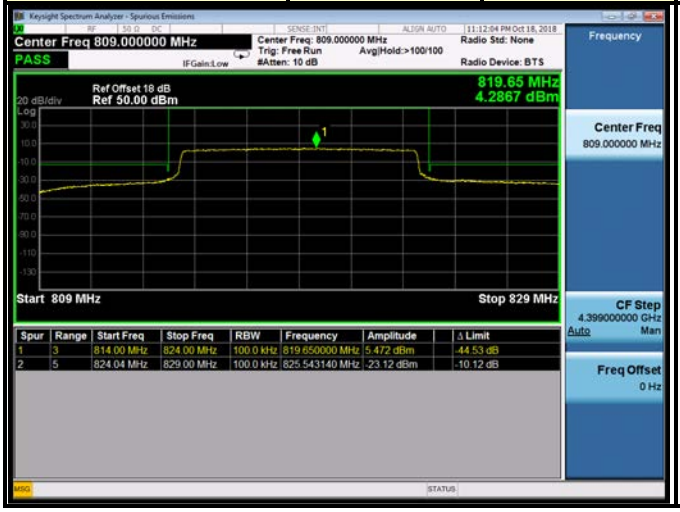


LTE BAND 26

Channel Bandwidth: 10MHz					
CHANNEL	26740	1 RB	CHANNEL	26740	1 RB



CHANNEL	26740	Full RB



3.5 CONDUCTED SPURIOUS EMISSIONS

3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

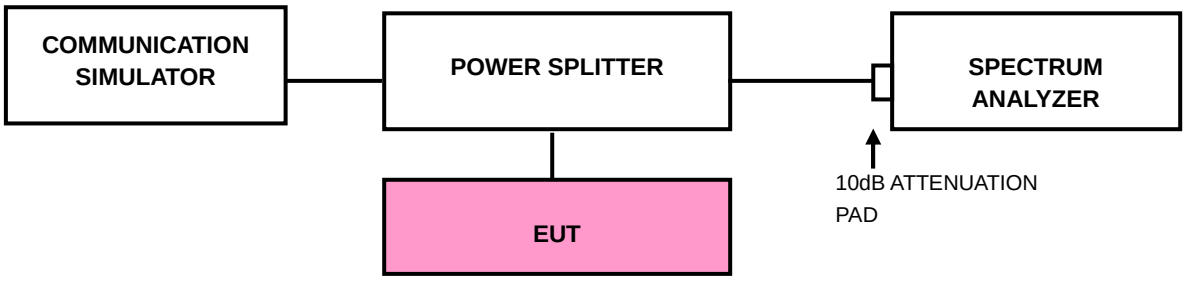
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm

3.5.2 TEST PROCEDURE

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

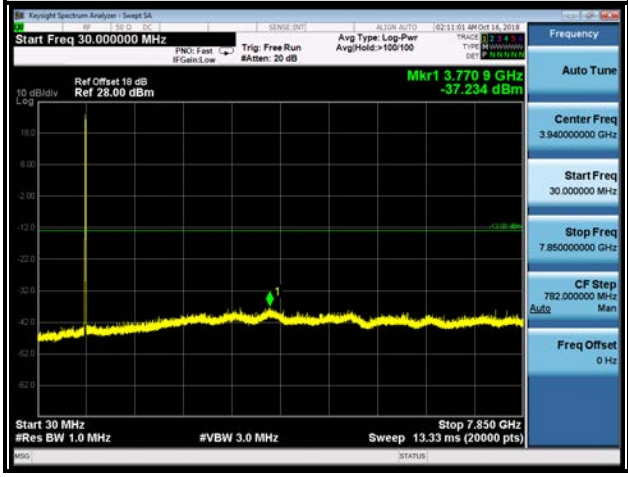
b. Measuring frequency range is from 30 MHz to 9GHz for LTE Band 14& LTE Band 26. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

3.5.3 TEST SETUP



3.5.4 TEST RESULTS

LTE Band 14

5MHz / QPSK	
CHANNEL 23305	CHANNEL 23330
FREQUENCY RANGE : 30MHz~7.85GHz	FREQUENCY RANGE : 30MHz~7.85GHz
	
CHANNEL 23355	
FREQUENCY RANGE : 30MHz~7.85GHz	
	

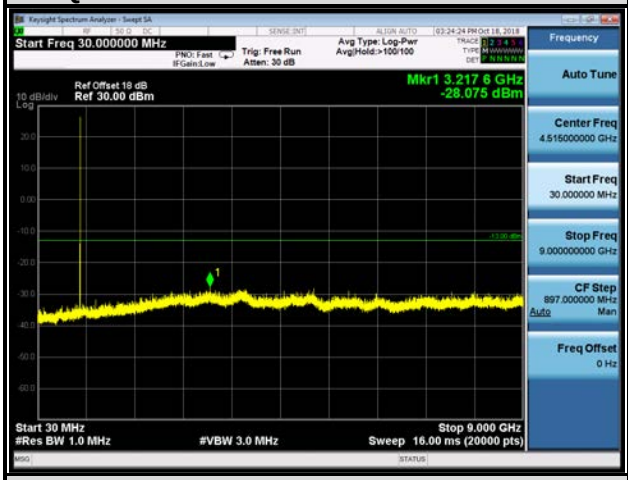
10MHz / QPSK	
CHANNEL 23330	
FREQUENCY RANGE : 30MHz~7.85GHz	
	

LTE BAND 26

1.4MHz / QPSK

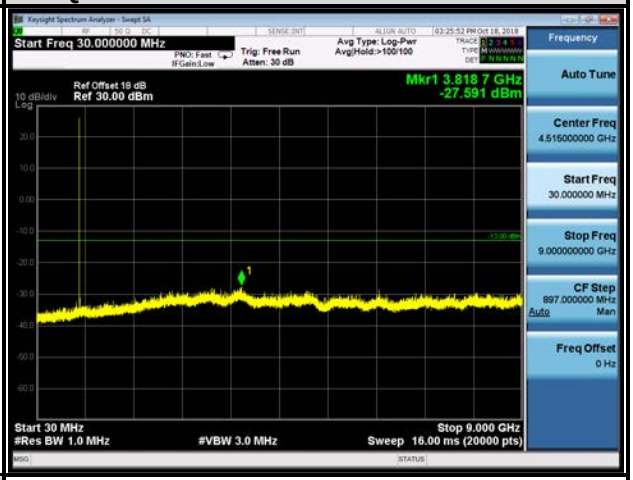
CHANNEL 26697

FREQUENCY RANGE : 30MHz~9GHz



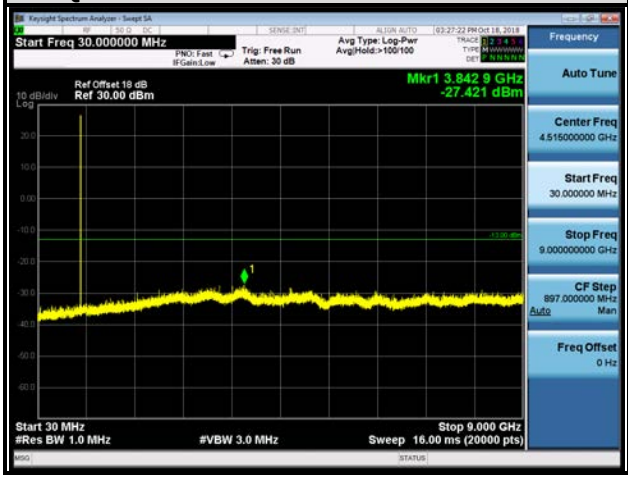
CHANNEL 26740

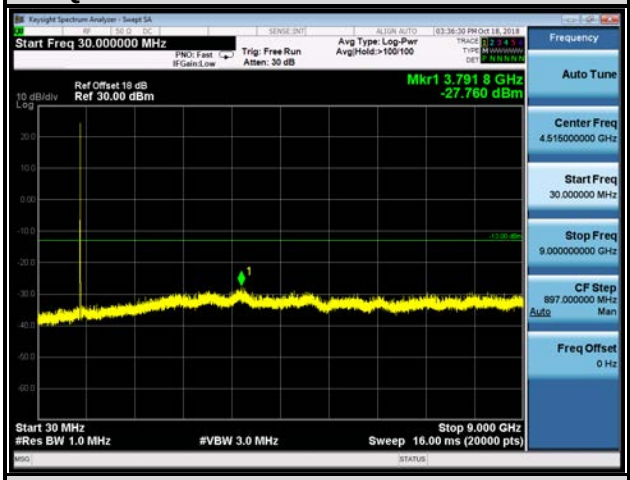
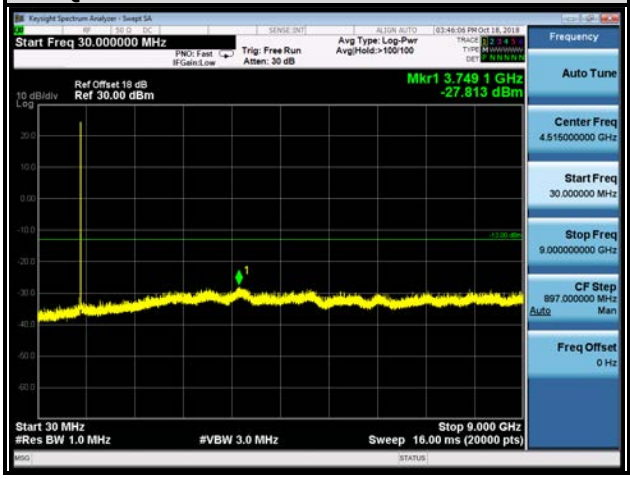
FREQUENCY RANGE : 30MHz~9GHz

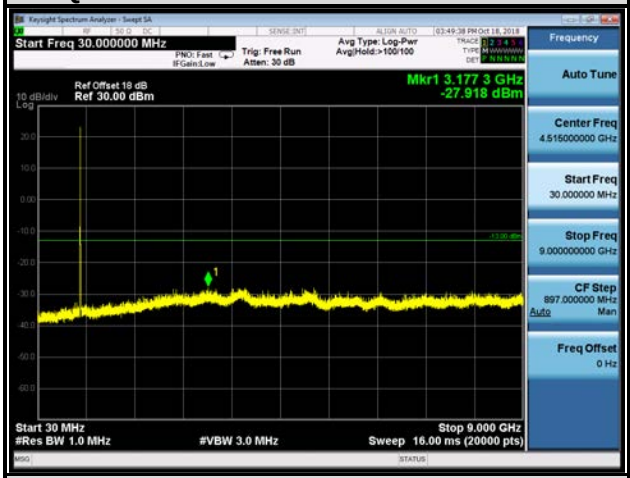
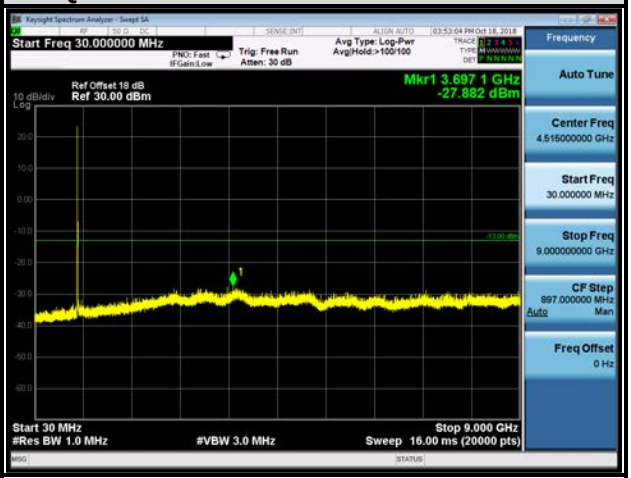


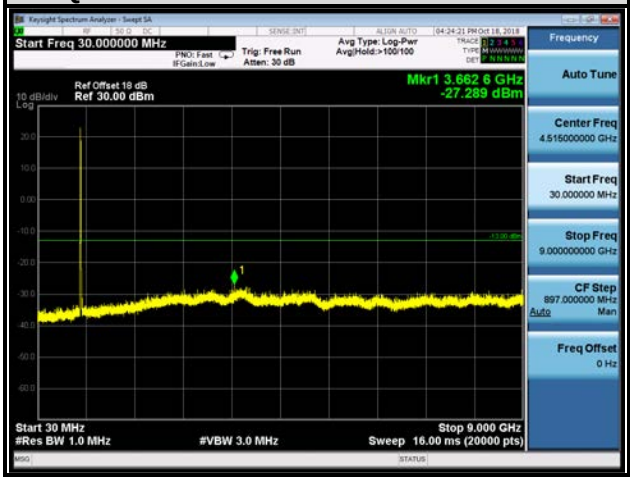
CHANNEL 26783

FREQUENCY RANGE : 30MHz~9GHz



3MHz / QPSK	
CHANNEL 26705	CHANNEL 26740
FREQUENCY RANGE : 30MHz~9GHz	FREQUENCY RANGE : 30MHz~9GHz
	
CHANNEL 26775	
FREQUENCY RANGE : 30MHz~9GHz	
	

5MHz / QPSK	
CHANNEL 26715	CHANNEL 26740
FREQUENCY RANGE : 30MHz~9GHz	FREQUENCY RANGE : 30MHz~9GHz
	
CHANNEL 26765	
FREQUENCY RANGE : 30MHz~9GHz	
	

10MHz / QPSK	
CHANNEL 26740	
FREQUENCY RANGE : 30MHz~9GHz	
	

3.6 RADIATED EMISSION MEASUREMENT

3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

(1)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

(2) For operations in the 763–775 MHz and 793–805 MHz bands, all emissions including harmonics in the band 1559– 1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

3.6.2 TEST PROCEDURES

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G

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

d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

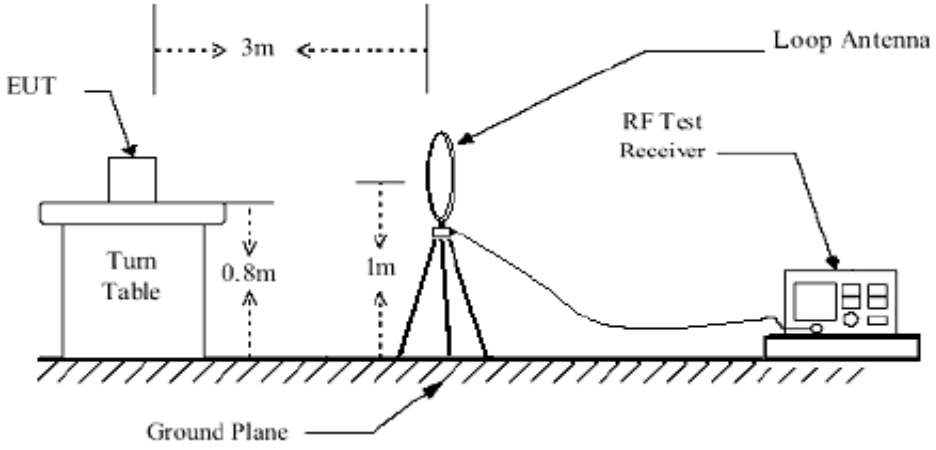
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.6.3 DEVIATION FROM TEST STANDARD

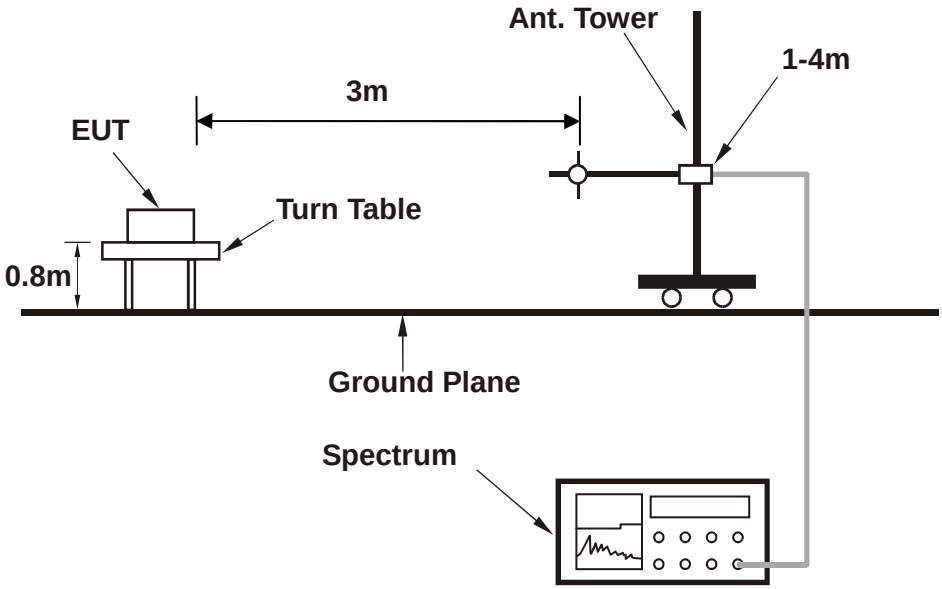
No deviation

3.6.4 TEST SETUP

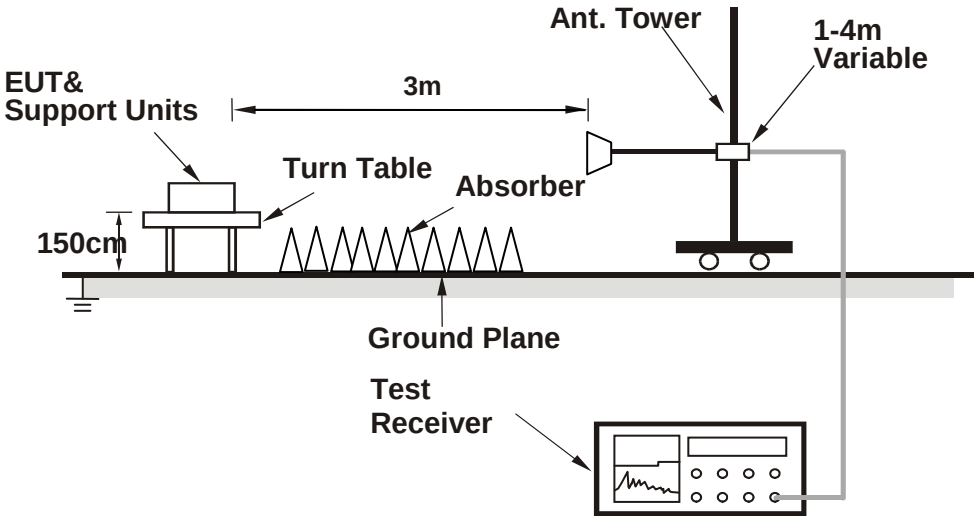
<Below 30MHz>



< Frequency Range 30MHz~1GHz >



< Frequency Range above 1GHz >



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

3.6.5 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

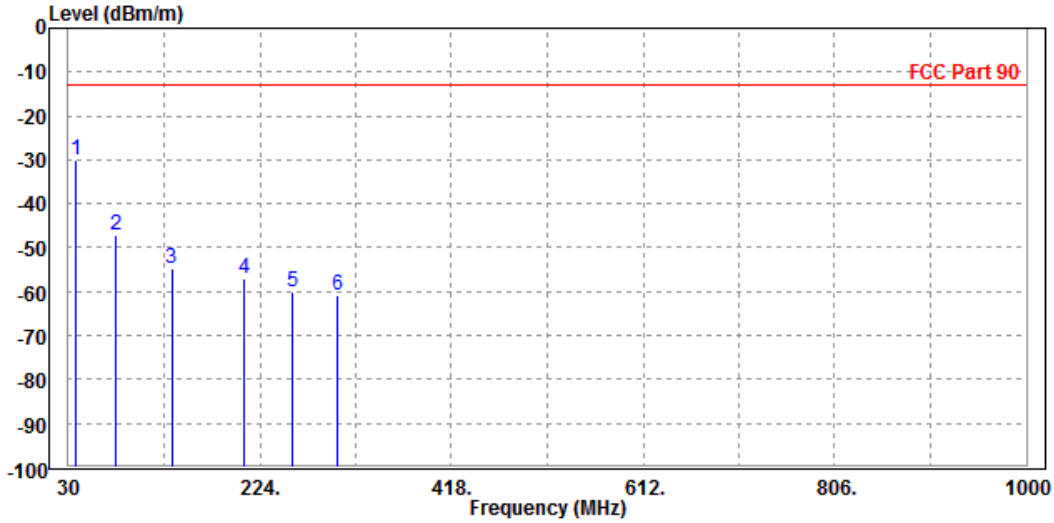
9 KHz – 30 MHz data: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

30 MHz – 1GHz data:

LTE Band 14:

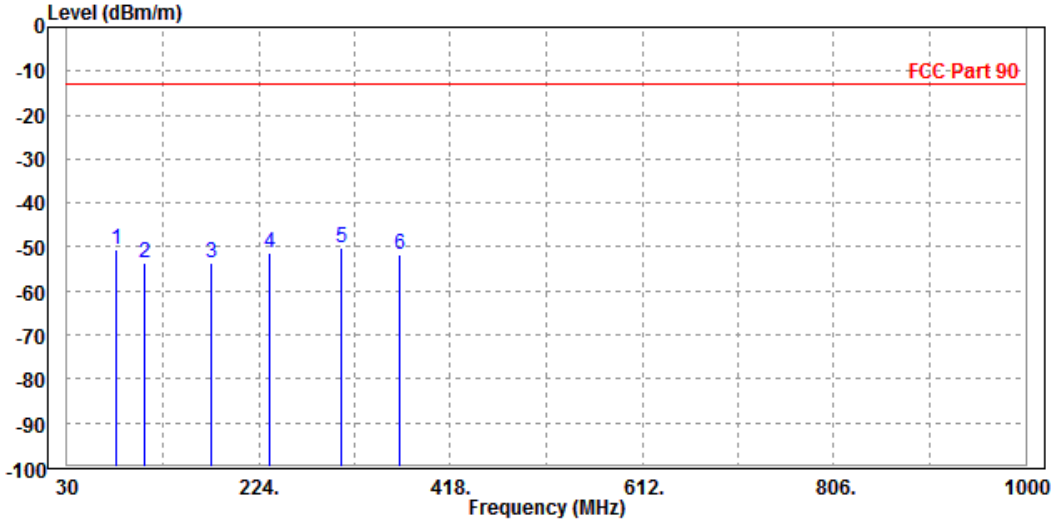
MODE	TX channel 23330	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	37.820	-30.14	-42.38	-13.00	-17.14	12.24	Peak	Horizontal
2	78.910	-47.23	-39.08	-13.00	-34.23	-8.15	Peak	Horizontal
3	134.660	-54.82	-37.16	-13.00	-41.82	-17.66	Peak	Horizontal
4	208.390	-57.20	-40.13	-13.00	-44.20	-17.07	Peak	Horizontal
5	256.750	-60.20	-44.26	-13.00	-47.20	-15.94	Peak	Horizontal
6	302.330	-60.98	-47.25	-13.00	-47.98	-13.73	Peak	Horizontal



MODE	TX channel 23330	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
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	79.380	-50.60	-40.02	-13.00	-37.60	-10.58	Peak	Vertical
2	108.230	-53.65	-41.89	-13.00	-40.65	-11.76	Peak	Vertical
3	176.560	-53.65	-40.12	-13.00	-40.65	-13.53	Peak	Vertical
4	234.450	-51.42	-40.17	-13.00	-38.42	-11.25	Peak	Vertical
5 PP	306.880	-50.32	-39.05	-13.00	-37.32	-11.27	Peak	Vertical
6	366.000	-51.64	-40.58	-13.00	-38.64	-11.06	Peak	Vertical



ABOVE 1GHz

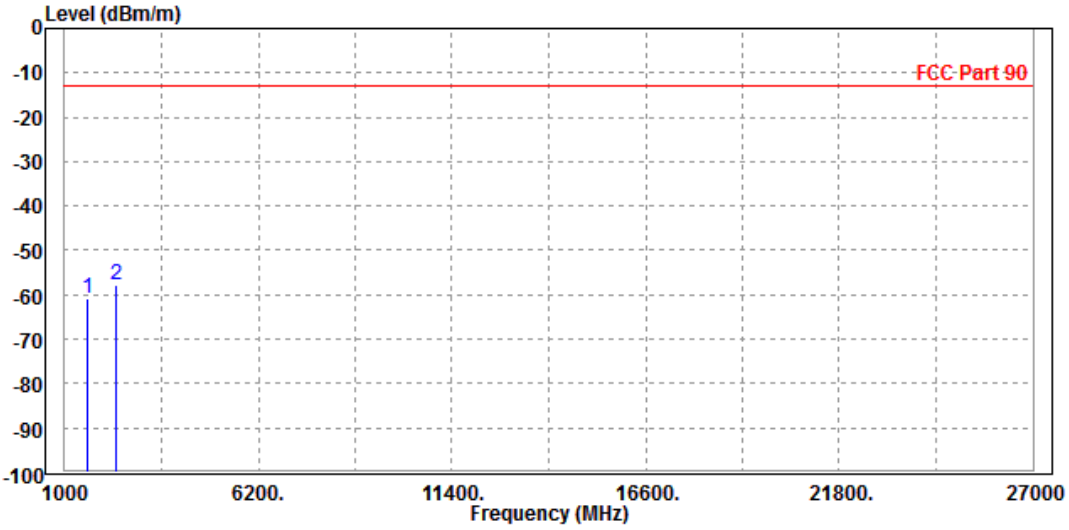
Note: For higher frequency, the emission is too low to be detected.

LTE BAND 14

CHANNEL BANDWIDTH: 5MHz / QPSK

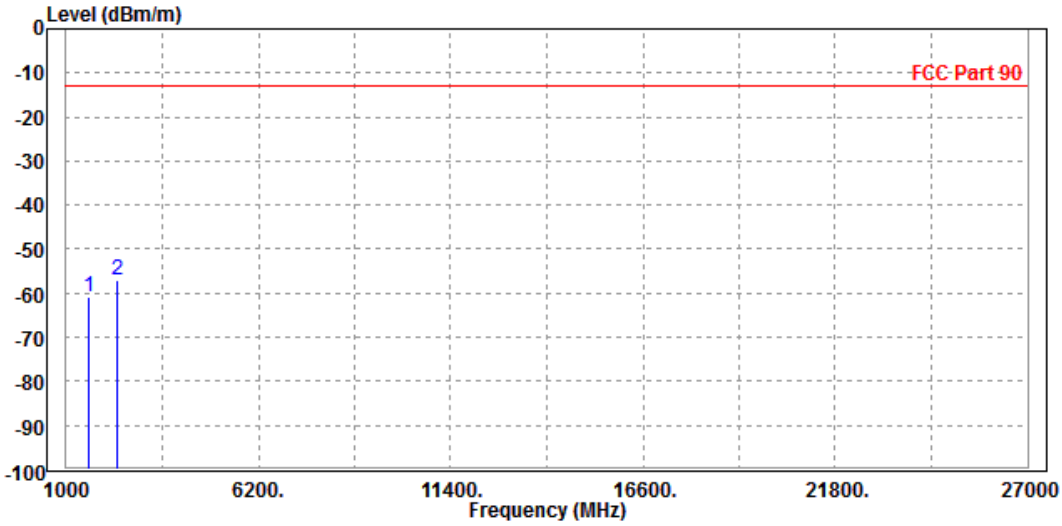
MODE	TX channel 23330	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1598.000	-60.96	-55.58	-13.00	-47.96	-5.38	Peak	Horizontal
2 PP	2379.000	-57.83	-56.10	-13.00	-44.83	-1.73	Peak	Horizontal



MODE	TX channel 23330	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

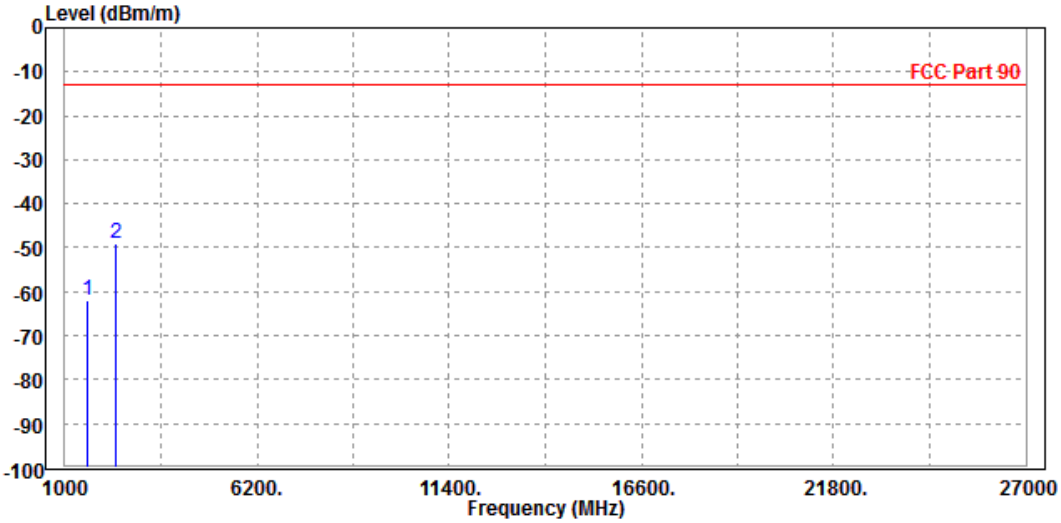
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1598.000	-60.95	-56.93	-13.00	-47.95	-4.02	Peak	Vertical
2 PP	2379.000	-57.21	-57.02	-13.00	-44.21	-0.19	Peak	Vertical



CHANNEL BANDWIDTH: 10MHz / QPSK

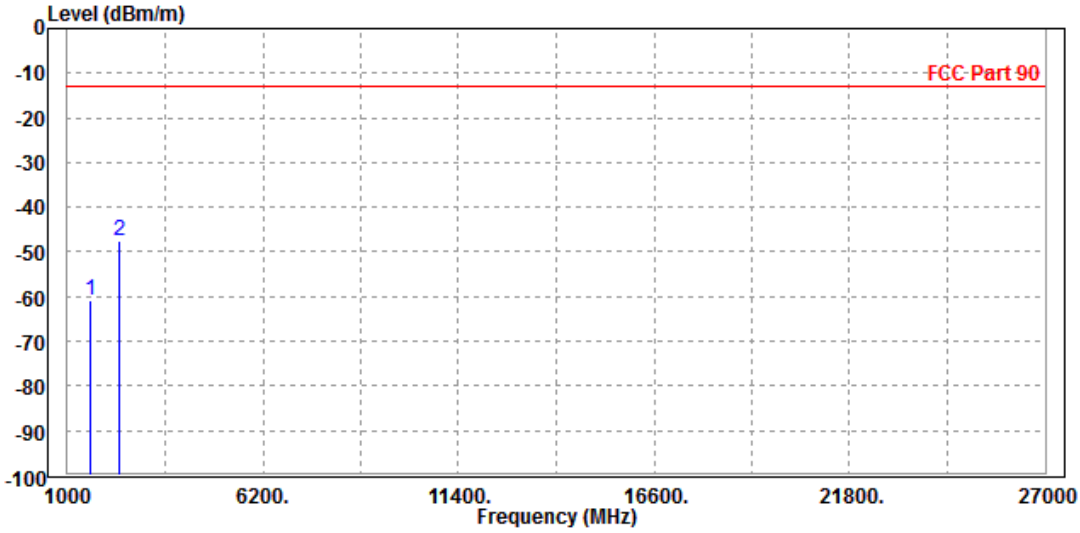
MODE	TX channel 23330	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1598.000	-61.99	-56.61	-13.00	-48.99	-5.38	Peak	Horizontal
2 PP	2379.000	-49.07	-47.34	-13.00	-36.07	-1.73	Peak	Horizontal



MODE	TX channel 23330	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
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	1598.000	-60.95	-56.93	-13.00	-47.95	-4.02	Peak	Vertical
2 PP	2379.000	-47.43	-47.24	-13.00	-34.43	-0.19	Peak	Vertical



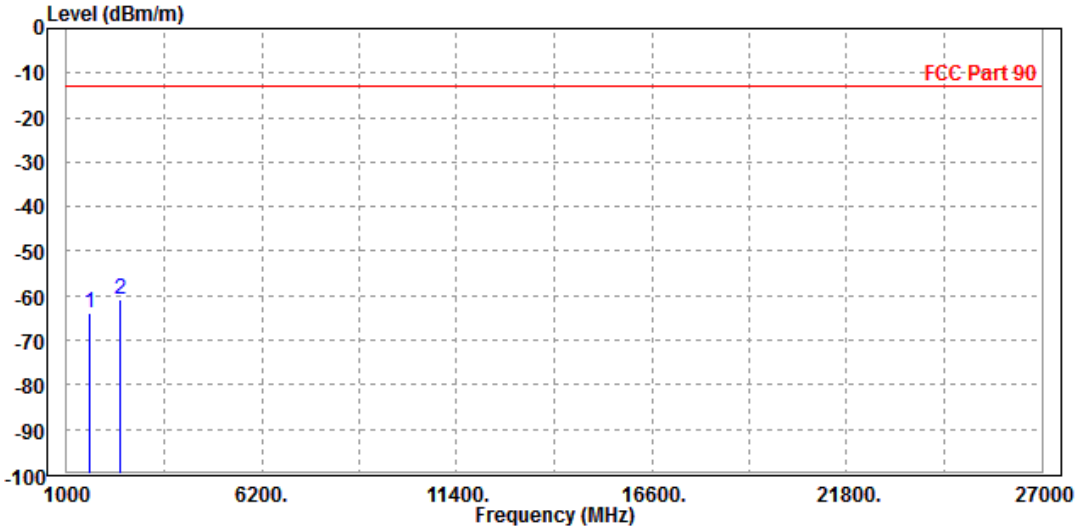
LTE BAND 26

CHANNEL BANDWIDTH: 1.4MHz / QPSK

CH 26697

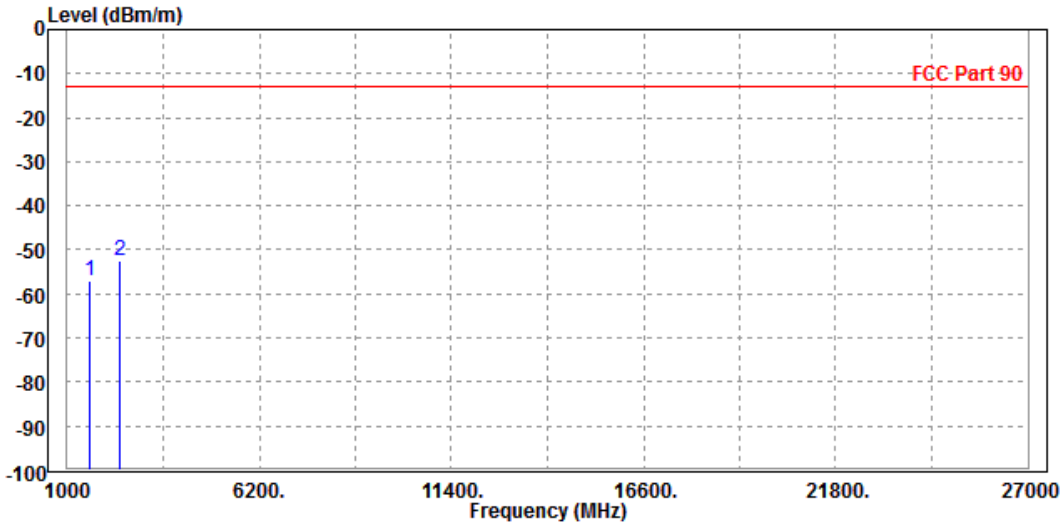
MODE	TX channel 26697	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1629.400	-64.05	-58.93	-13.00	-51.05	-5.12	Peak	Horizontal
2 PP	2444.100	-60.83	-59.15	-13.00	-47.83	-1.68	Peak	Horizontal



MODE	TX channel 26697	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

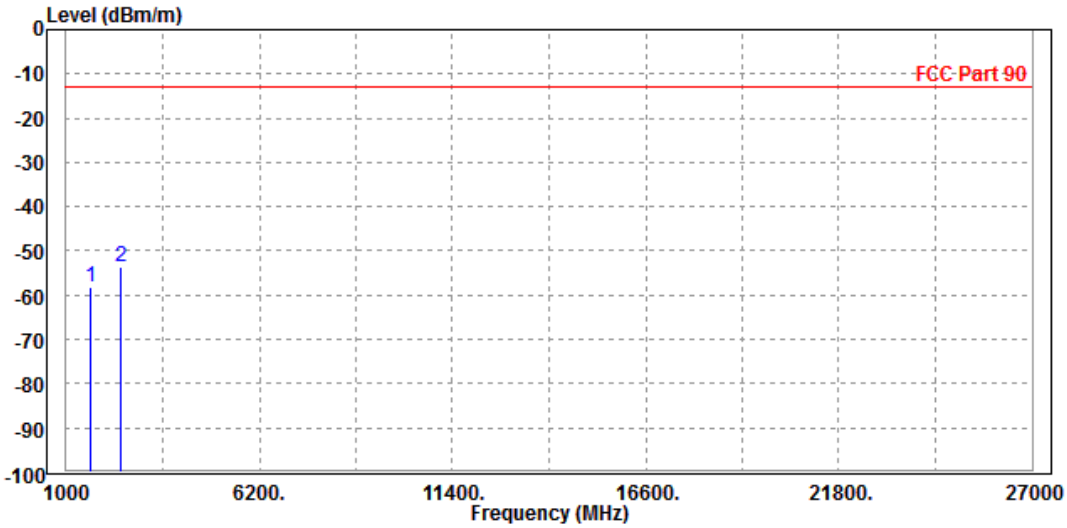
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1629.400	-57.00	-53.28	-13.00	-44.00	-3.72	Peak	Vertical
2 PP	2444.100	-52.49	-52.31	-13.00	-39.49	-0.18	Peak	Vertical



CH 26740

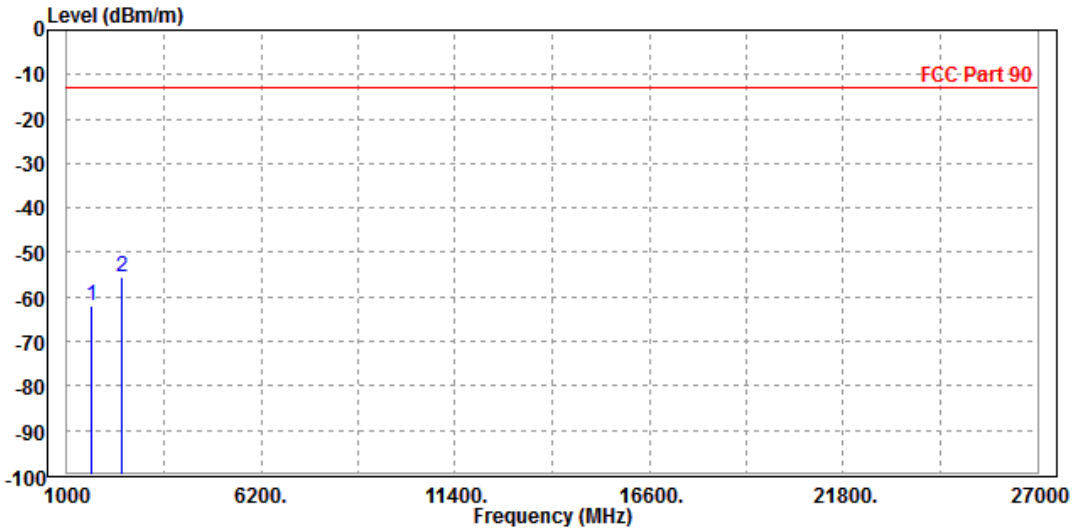
MODE	TX channel 26740	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1638.000	-58.23	-53.18	-13.00	-45.23	-5.05	Peak	Horizontal
2 PP	2457.000	-53.51	-51.84	-13.00	-40.51	-1.67	Peak	Horizontal



MODE	TX channel 26740	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

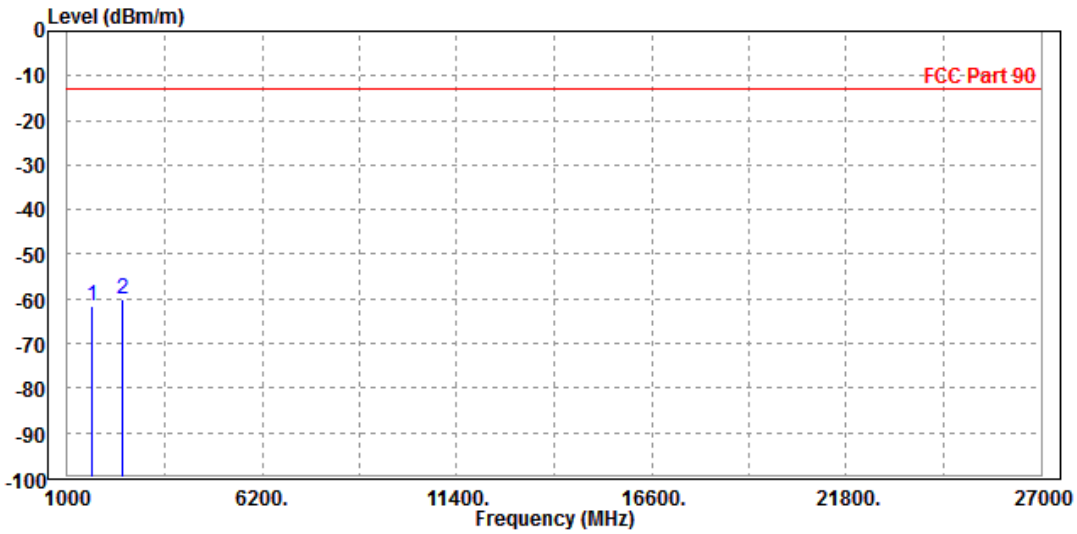
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1638.000	-62.00	-58.36	-13.00	-49.00	-3.64	Peak	Vertical
2 PP	2457.000	-55.57	-55.39	-13.00	-42.57	-0.18	Peak	Vertical



CH 26783

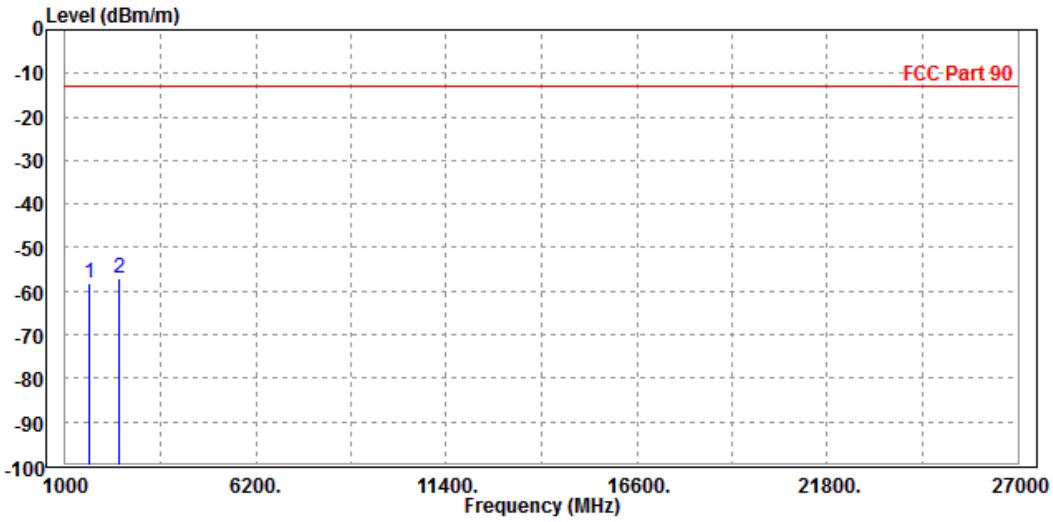
MODE	TX channel 26783	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1646.600	-61.57	-56.59	-13.00	-48.57	-4.98	Peak	Horizontal
2 PP	2469.900	-59.89	-58.23	-13.00	-46.89	-1.66	Peak	Horizontal



MODE	TX channel 26783	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

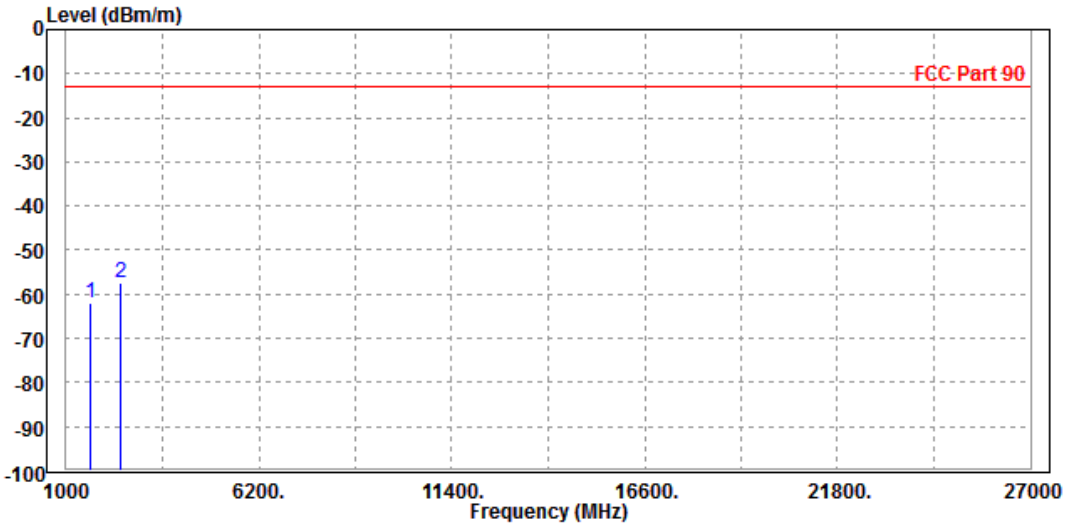
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1646.600	-58.19	-54.63	-13.00	-45.19	-3.56	Peak	Vertical
2 PP	2469.900	-57.14	-56.97	-13.00	-44.14	-0.17	Peak	Vertical



CHANNEL BANDWIDTH: 3MHz / QPSK

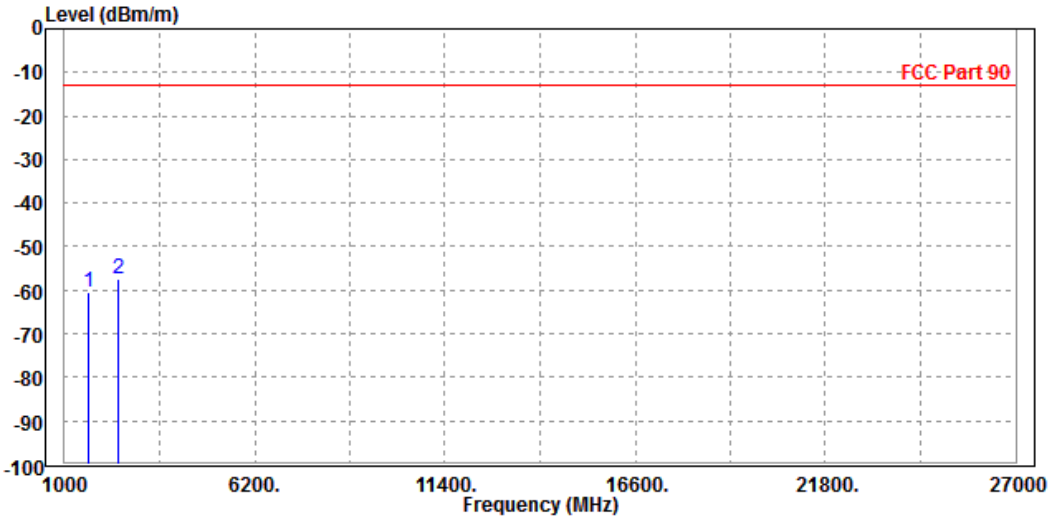
MODE	TX channel 26740	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1638.000	-61.99	-56.94	-13.00	-48.99	-5.05	Peak	Horizontal
2 PP	2457.000	-57.56	-55.89	-13.00	-44.56	-1.67	Peak	Horizontal



MODE	TX channel 26740	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

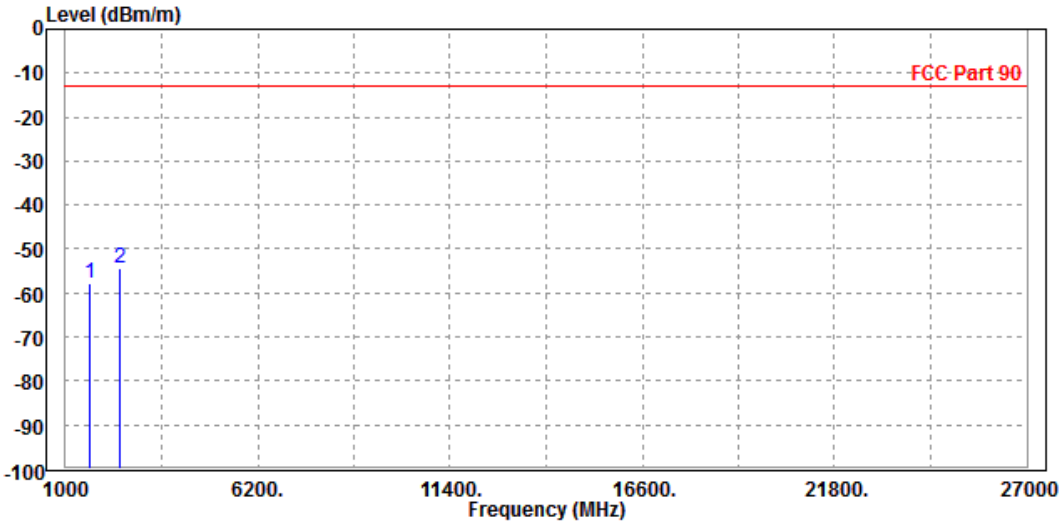
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1638.000	-60.63	-56.99	-13.00	-47.63	-3.64	Peak	Vertical
2 PP	2457.000	-57.30	-57.12	-13.00	-44.30	-0.18	Peak	Vertical



CHANNEL BANDWIDTH: 5MHz / QPSK

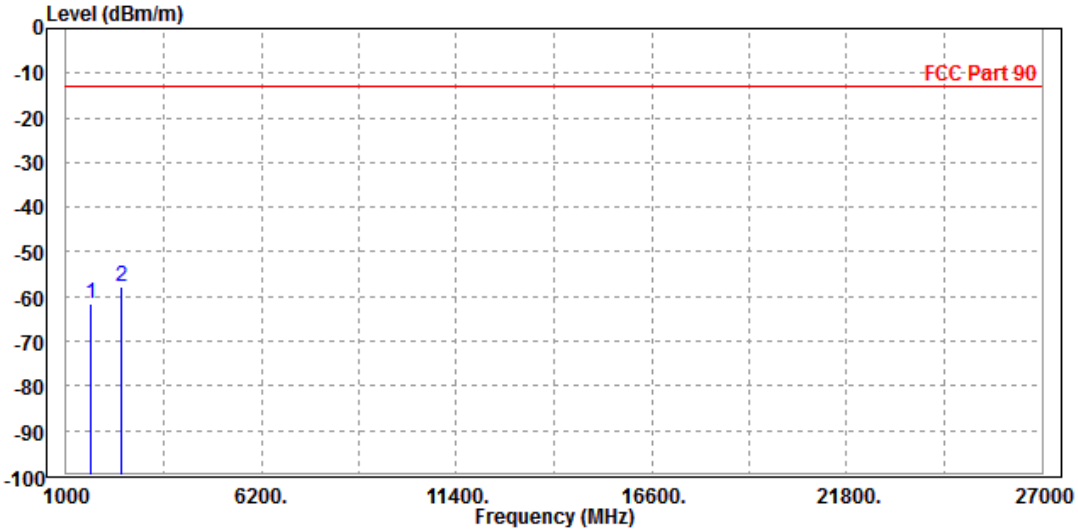
MODE	TX channel 26740	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1638.000	-57.66	-52.61	-13.00	-44.66	-5.05	Peak	Horizontal
2 PP	2457.000	-54.39	-52.72	-13.00	-41.39	-1.67	Peak	Horizontal



MODE	TX channel 26740	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

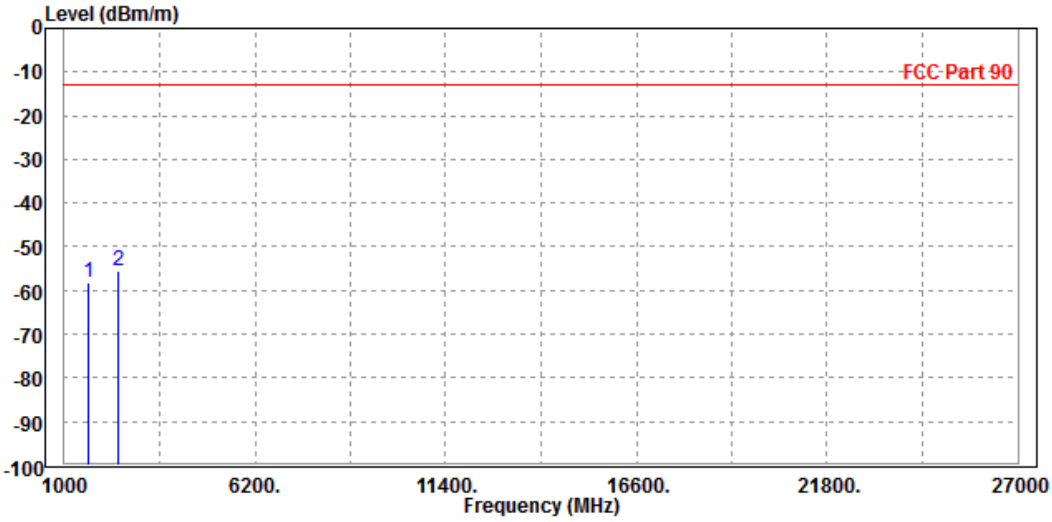
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1638.000	-61.77	-58.13	-13.00	-48.77	-3.64	Peak	Vertical
2 PP	2457.000	-57.97	-57.79	-13.00	-44.97	-0.18	Peak	Vertical



CHANNEL BANDWIDTH: 10MHz / QPSK

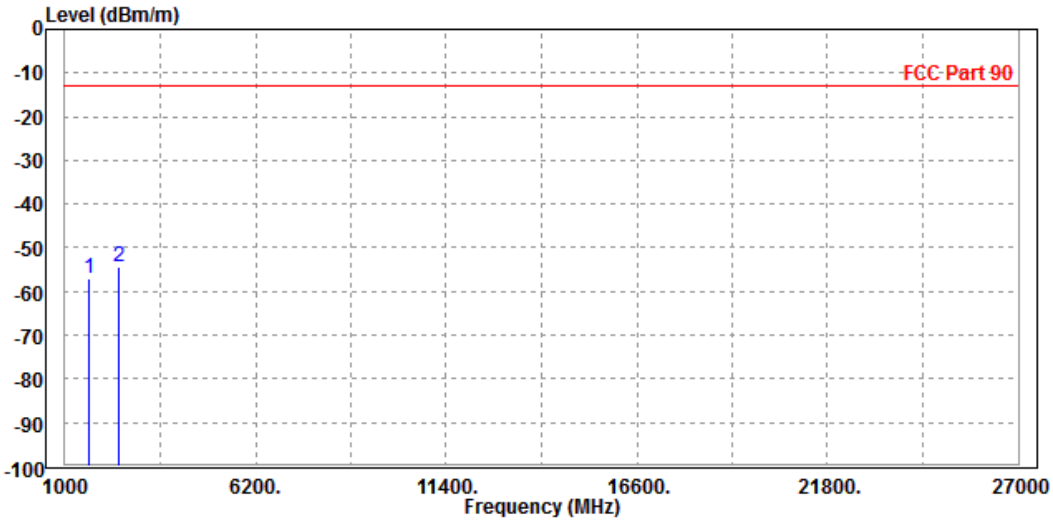
MODE	TX channel 26740	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1638.000	-58.34	-53.29	-13.00	-45.34	-5.05	Peak	Horizontal
2 PP	2457.000	-55.55	-53.88	-13.00	-42.55	-1.67	Peak	Horizontal



MODE	TX channel 26740	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Rose Ma		
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	1638.000	-56.86	-53.22	-13.00	-43.86	-3.64	Peak	Vertical
2 PP	2457.000	-54.30	-54.12	-13.00	-41.30	-0.18	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:

Shenzhen EMC/RF Lab:
Tel: +86-755-88696566
Fax: +86-755-88696577

Email: customerservice.dg@cn.bureauveritas.com
Web Site: www.adt.com.tw

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

5 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---