Test Lab
Cert 2951.01

FCC TEST REPORT
(PART 27)

Product:	smartphone
Model Name:	Ilium LT520
FCC ID:	ZC4LT520
Applicant:	Corporativo Lanix S.A. de C.V.
Address:	Carretera Internacional Hermosillo-Nogales Km 8.5, Hermosillo Sonora, Mexico
Manufacturer:	Shenzhen Tinno Mobile Technology Corp.
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Report No.:	RF170118W004-5
Received Date:	Jan. 18, 2017
Test Date:	Jan. 19, 2017 ~ Feb. 18, 2017
Issued Date:	Feb. 20, 2017

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TABLE OF CONTENTS

RELEASE CONTROL RECORD **4**

1 CERTIFICATION **5**

2 SUMMARY OF TEST RESULTS **6**

2.1 MEASUREMENT UNCERTAINTY 6
2.2 TEST SITE AND INSTRUMENTS 7

3 GENERAL INFORMATION **8**

3.1 GENERAL DESCRIPTION OF EUT 8
3.2 CONFIGURATION OF SYSTEM UNDER TEST 10
3.3 DESCRIPTION OF SUPPORT UNITS 11
3.4 DESCRIPTION OF TEST MODES 11
3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS 14

4 TEST TYPES AND RESULTS **15**

4.1 OUTPUT POWER MEASUREMENT 15
4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT 15
4.1.2 TEST PROCEDURES 15
4.1.3 TEST SETUP 16
4.1.4 TEST RESULTS 17
4.2 FREQUENCY STABILITY MEASUREMENT 24
4.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT 24
4.2.2 TEST PROCEDURE 24
4.2.3 TEST SETUP 24
4.2.4 TEST RESULTS 25
4.3 OCCUPIED BANDWIDTH MEASUREMENT 31
4.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT 31
4.3.2 TEST SETUP 31
4.3.3 TEST PROCEDURES 31
4.3.4 TEST RESULTS 32
4.4 PEAK TO AVERAGE RATIO 35
4.4.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT 35
4.4.2 TEST SETUP 35
4.4.3 TEST PROCEDURES 35
4.4.4 TEST RESULTS 36
4.5 BAND EDGE MEASUREMENT 39
4.5.1 LIMITS OF BAND EDGE MEASUREMENT 39
4.5.2 TEST SETUP 39
4.5.3 TEST PROCEDURES 40
4.5.4 TEST RESULTS 41
4.6 CONDUCTED SPURIOUS EMISSIONS 47
4.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT 47
4.6.2 TEST PROCEDURE 47
4.6.3 TEST SETUP 47
4.6.4 TEST RESULTS 48
4.7 RADIATED EMISSION MEASUREMENT 50
4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT 50
4.7.2 TEST PROCEDURES 50
4.7.3 DEVIATION FROM TEST STANDARD 50

4.7.4 TEST SETUP 51
4.7.5 TEST RESULTS 52

5 INFORMATION ON THE TESTING LABORATORIES 66

6 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB 67

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF170118W004-5	Original release	Feb. 20, 2017

1 CERTIFICATION

PRODUCT:	smartphone
BRAND NAME:	LANIX
MODEL NAME:	Ilium LT520
APPLICANT:	Corporativo Lanix S.A. de C.V.
TESTED:	Jan. 19, 2017 ~ Feb. 18, 2017
TEST SAMPLE:	Identical Prototype
TEST STANDARDS:	**FCC Part 27, Subpart C, L**
	FCC Part 2
	ANSI/TIE/EIA-603-D

The above equipment has been tested by **Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch,** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : _____ , **DATE:** Feb. 20, 2017
(Harry Li/ Engineer)

APPROVED BY : _____ , **DATE:** Feb. 20, 2017
(Sam Tung / Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 27 & Part 2			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
2.1046 27.50(d)(4)	Maximum Peak Output Power	PASS	Meet the requirement of limit.
2.1055 27.54	Frequency Stability	PASS	Meet the requirement of limit.
2.1049 27.53(h)	Occupied Bandwidth	PASS	Meet the requirement of limit.
27.50(d)(5)	Peak to average ratio	PASS	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -17.83dB at 38.73MHz.

2.1 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	2.70dB
Radiated emissions	9KHz ~ 30MHz	2.90dB
	30MHz ~ 1GMHz	4.06dB
	1GHz ~ 18GHz	4.58dB
	18GHz ~ 40GHz	1.94dB

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

2.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Apr. 05,16	Apr. 04,17
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	Nov. 04,16	Nov. 03,17
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Apr. 05,16	Apr. 04,17
Bilog Antenna 1	Teseq	CBL 6111D	30643	Jul. 14, 16	Jul. 13, 17
Bilog Antenna 2	Teseq	CBL 6111D	27089	Jul. 14, 16	Jul. 13, 17
Loop antenna	Daze	ZN30900A	0708	Nov. 28, 16	Nov. 27, 17
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	May 18,16	May 17,17
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062557	May 18,16	May 17,17
10m Semi-anechoic Chamber	CHANGLING	21.4m*12.1m*8.8m	NSEMC006	Mar. 12,16	Mar. 11,18
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. 27, 16	Jul. 26, 17
Horn Antenna (15GHz-40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170147	Mar. 12,16	Mar. 11,17
Horn Antenna (15GHz-40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170242	Mar. 12,16	Mar. 11,17
Amplifier	Burgeon	BPA-530	100220	Apr. 05,16	Apr. 04,17
Amplifier (9kHz-1GHz)	SONOMA	310D	186955	Mar. 04,16	Mar. 03, 17
Pre-Amplifier(1-18G)	HP	8449B	3008A00409	Apr. 25,16	Apr. 24,17
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 04,16	Nov. 03,17
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.05,16	Sep. 04,17
Signal Generator	Agilent	N5183A	MY50140980	Nov. 04,16	Nov. 03,17

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 10m 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 502831.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	smartphone	
MODEL NAME	Ilium LT520	
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.8Vdc (Li-ion, battery)	
MODULATION TECHNOLOGY	**LTE**	QPSK, 16QAM
FREQUENCY RANGE	**LTE Band 4 Channel Bandwidth: 1.4MHz**	1710.7MHz ~ 1754.3MHz
	LTE Band 4 Channel Bandwidth: 3MHz	1711.5MHz ~ 1753.5MHz
	LTE Band 4 Channel Bandwidth: 5MHz	1712.5MHz ~ 1752.5MHz
	LTE Band 4 Channel Bandwidth: 10MHz	1715.0MHz ~ 1750.0MHz
	LTE Band 4 Channel Bandwidth: 15MHz	1717.5MHz ~ 1747.5MHz
	LTE Band 4 Channel Bandwidth: 20MHz	1720.0MHz ~ 1745.0MHz
EMISSION DESIGNATOR	**LTE Band 4 Channel Bandwidth: 1.4MHz**	QPSK: 1M09G7D
		16QAM: 1M08W7D
	LTE Band 4 Channel Bandwidth: 3MHz	QPSK: 2M68G7D
		16QAM: 2M68W7D
	LTE Band 4 Channel Bandwidth: 5MHz	QPSK: 4M49G7D
		16QAM: 4M48W7D
	LTE Band 4 Channel Bandwidth: 10MHz	QPSK: 8M93G7D
		16QAM: 8M94W7D
	LTE Band 4 Channel Bandwidth: 15MHz	QPSK: 13M4G7D
		16QAM: 13M4W7D
	LTE Band 4 Channel Bandwidth: 20MHz	QPSK: 17M9G7D
		16QAM: 17M9W7D
MAX. ERP/EIRP POWER	**LTE Band 4 Channel Bandwidth: 1.4MHz**	312mW
	LTE Band 4 Channel Bandwidth: 3MHz	315mW
	LTE Band 4 Channel Bandwidth: 5MHz	315mW
	LTE Band 4 Channel Bandwidth: 10MHz	331mW

	LTE Band 4 Channel Bandwidth: 15MHz	310mW
	LTE Band 4 Channel Bandwidth: 20MHz	275mW
ANTENNA TYPE	Fixed Internal Antenna with 0.5dBi gain	
HW VERSION	V1	
SW VERSION	Ilium LT520_TELCEL_SW_01	
ACCESSORY DEVICE	Refer to note as below	
DATA CABLE	USB cable: non-shielded, detachable, 1.0m Earphone cable: non-shielded, detachable, 1.0m	

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 adapter:

ADAPTER	
BRAND:	Lanix
MODEL:	Ilium LT520-C
NPUT:	AC 100-240V, 120mA
UTPUT:	DC 5V, 1000mA

3. The EUT matched the following USB cable and Earphone:

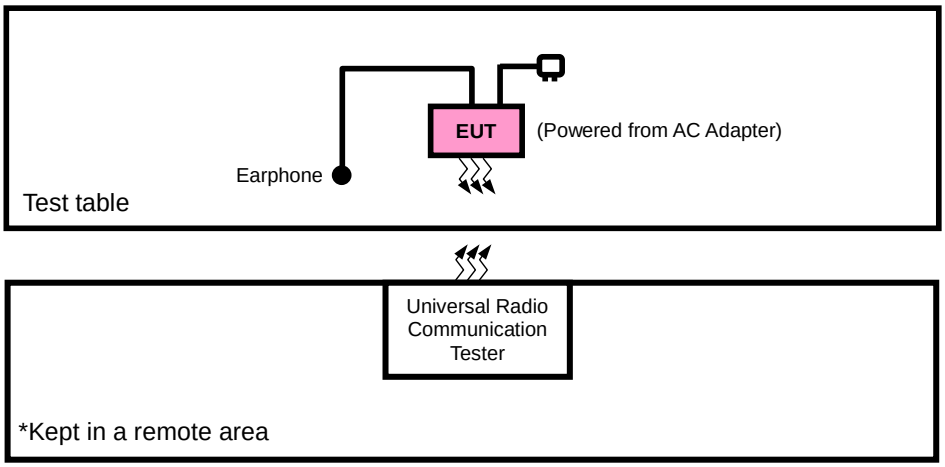
USB CABLE	
RAND:	LANIX
IODEL:	Ilium LT520
IGNAL LINE:	1.0 METER

EARPHONE	
RAND:	LANIX
IODEL:	Ilium LT520
IGNAL LINE:	1.0 METER

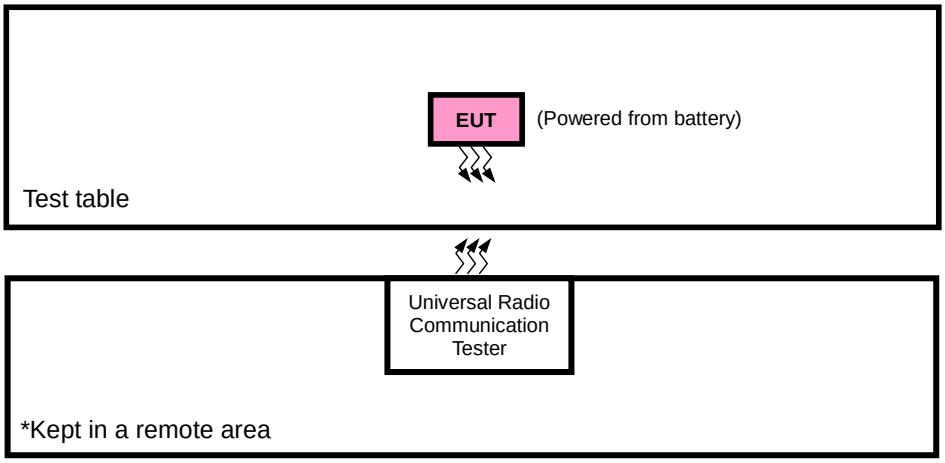
4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



FOR CONDUCTED & E.I.R.P TEST



3.3 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).

3.4 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 EIRP and radiated emission was found when positioned Z-plane for LTE. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
A	**EUT + Adapter with LTE link**
B	EUT + Battery with **LTE link**

LTE BAND 4

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
-	EIRP	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	FREQUENCY STABILITY	19957 to 20393	20175	1.4MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	20175	3MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	20175	5MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20175	10MHz	QPSK	1 RB / 0 RB Offset
		20025 to 20325	20175	15MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20175	20MHz	QPSK	1 RB / 0 RB Offset
-	OCCUPIED BANDWIDTH	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3MHz	QPSK, 16QAM	15 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	PEAK TO AVERAGE RATIO	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	BAND EDGE	19957 to 20393	19957	1.4MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			20393	1.4MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		19965 to 20385	19965	3MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
			20385	3MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		19975 to 20375	19975	5MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			20375	5MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		20000 to 20350	20000	10MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			20350	10MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset

-	BAND EDGE	20025 to 20325	20025	15MHz	QPSK	1 RB / 0 RB Offset
						75 RB / 0 RB Offset
			20325	15MHz	QPSK	1 RB / 74 RB Offset
						75 RB / 0 RB Offset
		20050 to 20300	20050	20MHz	QPSK	1 RB / 0 RB Offset
						100 RB / 0 RB Offset
			20300	20MHz	QPSK	1 RB / 99 RB Offset
						100 RB / 0 RB Offset
-	CONDCUDETED EMISSION	19957 to 20393	20175	1.4MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	20175	3MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	20175	5MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20175	10MHz	QPSK	1 RB / 0 RB Offset
		20025 to 20325	20175	15MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20175	20MHz	QPSK	1 RB / 0 RB Offset
-	RADIATED EMISSION	19957 to 20393	20175	1.4MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	20175	3MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	20175	5MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20175	10MHz	QPSK	1 RB / 0 RB Offset
		20025 to 20325	20175	15MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20175	20MHz	QPSK	1 RB / 0 RB Offset

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

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP(ERP)	24deg. C, 60%RH	3.8Vdc from Battery	Wenliang Wu
FREQUENCY STABILITY	24deg. C, 61%RH	3.8Vdc from Battery	Wenliang Wu
OCCUPIED BANDWIDTH	24deg. C, 61%RH	3.8Vdc from Battery	Wenliang Wu
PEAK TO AVERAGE RATIO	24deg. C, 61%RH	3.8Vdc from Battery	Moon Xiong
BAND EDGE	24deg. C, 61%RH	3.8Vdc from Battery	Moon Xiong
CONDCUDETED EMISSION	24deg. C, 61%RH	3.8Vdc from Battery	Moon Xiong
RADIATED EMISSION	24deg. C, 60%RH	5Vdc from adapter	Tony Zou

3.5 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 27

KDB 971168 D01 Power Meas License Digital Systems v02r02

ANSI/TIA/EIA-603-D

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

4 TEST TYPES AND RESULTS

4.1 OUTPUT POWER MEASUREMENT

4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

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

Portable stations (hand-held devices) operating in the 704-716 MHz bands are limited to 3 watts ERP.

4.1.2 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

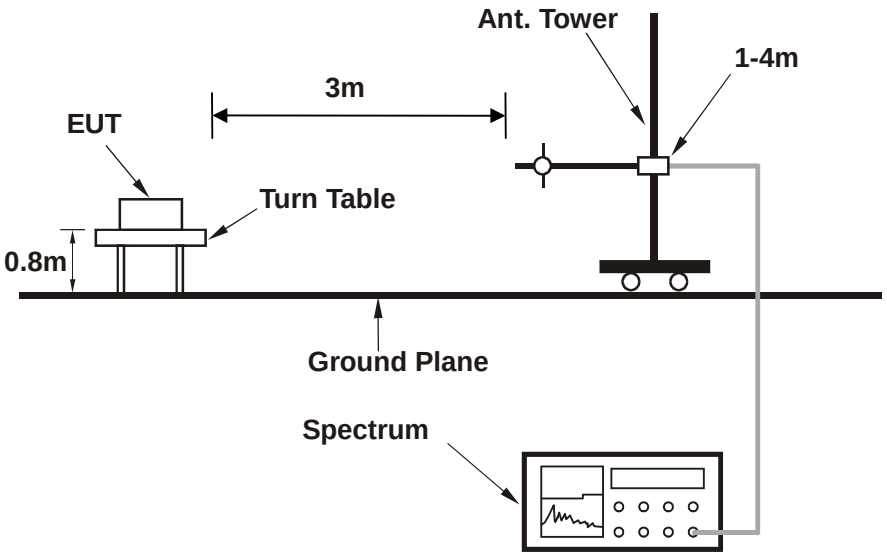
CONDUCTED POWER MEASUREMENT:

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.

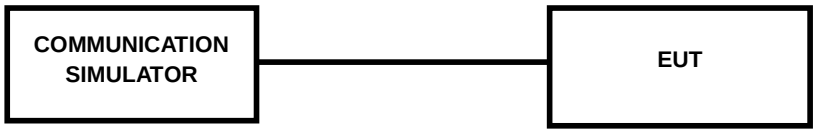
4.1.3 TEST SETUP

EIRP / ERP 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).

4.1.4 TEST RESULTS

AVERAGE CONDUCTED OUTPUT POWER (dBm)

LTE Band 4							
BW	Modulation	RB Size	RB Offset	Low CH 19957	Mid CH 20175	High CH 20393	MPR
				Frequency 1710.7 MHz	Frequency 1732.5 MHz	Frequency 1754.3 MHz	
1.4MHz	QPSK	1	0	22.56	22.77	22.60	0
		1	2	22.39	22.60	22.43	0
		1	5	22.35	22.56	22.39	0
		3	0	22.54	22.75	22.58	0
		3	1	22.37	22.58	22.41	0
		3	3	22.33	22.54	22.37	0
		6	0	21.52	21.73	21.56	1
	16QAM	1	0	21.71	21.92	21.75	1
		1	2	21.66	21.87	21.70	1
		1	5	21.62	21.83	21.66	1
		3	0	21.70	21.91	21.74	1
		3	1	21.65	21.86	21.69	1
		3	3	21.61	21.82	21.65	1
		6	0	20.52	20.73	20.56	2
BW	Modulation	RB Size	RB Offset	Low CH 19965	Mid CH 20175	High CH 20385	MPR
				Frequency 1711.5 MHz	Frequency 1732.5 MHz	Frequency 1753.5 MHz	
3 MHz	QPSK	1	0	22.57	22.78	22.61	0
		1	7	22.40	22.61	22.44	0
		1	14	22.36	22.57	22.40	0
		8	0	21.65	21.86	21.69	1
		8	3	21.60	21.81	21.64	1
		8	7	21.57	21.78	21.61	1
		15	0	21.53	21.74	21.57	1
	16QAM	1	0	21.72	21.93	21.76	1
		1	7	21.67	21.88	21.71	1
		1	14	21.63	21.84	21.67	1
		8	0	20.61	20.82	20.65	2
		8	3	20.57	20.78	20.61	2
		8	7	20.52	20.73	20.56	2
		15	0	20.53	20.74	20.57	2

LTE Band 4							
BW	Modulation	RB Size	RB Offset	Low CH 19975	Mid CH 20175	High CH 20375	MPR
				Frequency 1712.5 MHz	Frequency 1732.5 MHz	Frequency 1752.5 MHz	
5 MHz	QPSK	1	0	22.60	22.81	22.64	0
		1	12	22.43	22.64	22.47	0
		1	24	22.39	22.60	22.43	0
		12	0	21.68	21.89	21.72	1
		12	6	21.63	21.84	21.67	1
		12	13	21.60	21.81	21.64	1
		25	0	21.56	21.77	21.60	1
	16QAM	1	0	21.75	21.96	21.79	1
		1	12	21.70	21.91	21.74	1
		1	24	21.66	21.87	21.70	1
		12	0	20.64	20.85	20.68	2
		12	6	20.60	20.81	20.64	2
		12	13	20.55	20.76	20.59	2
		25	0	20.56	20.77	20.60	2
BW	Modulation	RB Size	RB Offset	Low CH 20000	Mid CH 20175	High CH 20350	MPR
				Frequency 1715 MHz	Frequency 1732.5 MHz	Frequency 1750 MHz	
10 MHz	QPSK	1	0	22.64	22.85	22.68	0
		1	24	22.47	22.68	22.51	0
		1	49	22.43	22.64	22.47	0
		25	0	21.72	21.93	21.76	1
		25	12	21.67	21.88	21.71	1
		25	25	21.64	21.85	21.68	1
		50	0	21.60	21.81	21.64	1
	16QAM	1	0	21.79	22.00	21.83	1
		1	24	21.74	21.95	21.78	1
		1	49	21.70	21.91	21.74	1
		25	0	20.68	20.89	20.72	2
		25	12	20.64	20.85	20.68	2
		25	25	20.59	20.80	20.63	2
		50	0	20.60	20.81	20.64	2

LTE Band 4							
BW	Modulation	RB Size	RB Offset	Low CH 20025	Mid CH 20175	High CH 20325	MPR
				Frequency 1717.5 MHz	Frequency 1732.5 MHz	Frequency 1747.5 MHz	
15 MHz	QPSK	1	0	22.70	22.91	22.74	0
		1	37	22.53	22.74	22.57	0
		1	74	22.49	22.70	22.53	0
		36	0	21.78	21.99	21.82	1
		36	19	21.73	21.94	21.77	1
		36	39	21.70	21.91	21.74	1
		75	0	21.66	21.87	21.70	1
	16QAM	1	0	21.85	22.06	21.89	1
		1	37	21.80	22.01	21.84	1
		1	74	21.76	21.97	21.80	1
		36	0	20.74	20.95	20.78	2
		36	19	20.70	20.91	20.74	2
		36	39	20.65	20.86	20.69	2
		75	0	20.66	20.87	20.70	2
BW	Modulation	RB Size	RB Offset	Low CH 20050	Mid CH 20175	High CH 20300	MPR
				Frequency 1720 MHz	Frequency 1732.5 MHz	Frequency 1745 MHz	
20MHz	QPSK	1	0	22.73	**22.94**	22.77	0
		1	50	22.56	22.77	22.60	0
		1	99	22.52	22.73	22.56	0
		50	0	21.81	22.02	21.85	1
		50	25	21.76	21.97	21.80	1
		50	50	21.73	21.94	21.77	1
		100	0	21.69	21.90	21.73	1
	16QAM	1	0	21.88	22.09	21.92	1
		1	50	21.83	22.04	21.87	1
		1	99	21.79	22.00	21.83	1
		50	0	20.77	20.98	20.81	2
		50	25	20.73	20.94	20.77	2
		50	50	20.68	20.89	20.72	2
		100	0	20.69	20.90	20.73	2

EIRP

LTE BAND 4

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19957	1710.7	-24.63	41.29	16.66	46.39	H	1
20175	1732.5	-25.51	41.36	15.85	38.46	H	1
20393	1754.3	-25.20	42.74	17.54	56.73	H	1
19957	1710.7	-19.30	44.25	24.95	**312.25**	V	1
20175	1732.5	-20.26	44.20	23.94	247.74	V	1
20393	1754.3	-19.46	44.09	24.63	290.07	V	1

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19957	1710.7	-25.50	41.29	15.79	37.97	H	1
20175	1732.5	-26.44	41.36	14.92	31.05	H	1
20393	1754.3	-26.16	42.74	16.58	45.48	H	1
19957	1710.7	-20.17	44.25	24.08	255.56	V	1
20175	1732.5	-21.19	44.20	23.01	199.99	V	1
20393	1754.3	-20.42	44.09	23.67	232.54	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19965	1711.5	-24.61	41.27	16.66	46.31	H	1
20175	1732.5	-25.57	41.36	15.79	37.93	H	1
20385	1753.5	-25.15	42.76	17.61	57.64	H	1
19965	1711.5	-19.28	44.26	24.98	**314.92**	V	1
20175	1732.5	-20.32	44.20	23.88	244.34	V	1
20385	1753.5	-19.41	44.23	24.82	303.53	V	1

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19965	1711.5	-25.68	41.27	15.59	36.20	H	1
20175	1732.5	-26.46	41.36	14.90	30.90	H	1
20385	1753.5	-26.14	42.76	16.62	45.89	H	1
19965	1711.5	-20.35	44.26	23.91	246.15	V	1
20175	1732.5	-21.21	44.20	22.99	199.07	V	1
20385	1753.5	-20.40	44.23	23.83	241.66	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19975	1712.5	-24.67	41.39	16.72	46.98	H	1
20175	1732.5	-25.52	41.36	15.84	38.37	H	1
20375	1752.5	-25.10	42.63	17.53	56.61	H	1
19975	1712.5	-19.34	44.17	24.83	303.81	V	1
20175	1732.5	-20.27	44.20	23.93	247.17	V	1
20375	1752.5	-19.36	44.35	24.99	**315.14**	V	1

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
19975	1712.5	-25.50	41.39	15.89	38.81	H	1
20175	1732.5	-26.54	41.36	14.82	30.34	H	1
20375	1752.5	-26.20	42.63	16.43	43.94	H	1
19975	1712.5	-20.17	44.17	24.00	250.96	V	1
20175	1732.5	-21.29	44.20	22.91	195.43	V	1
20375	1752.5	-20.46	44.35	23.89	244.62	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20000	1715.0	-24.48	41.49	17.01	50.19	H	1
20175	1732.5	-25.46	41.36	15.90	38.90	H	1
20350	1750.0	-24.97	42.28	17.31	53.86	H	1
20000	1715.0	-19.15	44.06	24.91	309.96	V	1
20175	1732.5	-20.21	44.20	23.99	250.61	V	1
20350	1750.0	-19.23	44.43	25.20	**331.13**	V	1

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20000	1715.0	-25.63	41.49	15.86	38.51	H	1
20175	1732.5	-26.56	41.36	14.80	30.20	H	1
20350	1750.0	-26.13	42.28	16.15	41.24	H	1
20000	1715.0	-20.30	44.06	23.76	237.85	V	1
20175	1732.5	-21.31	44.20	22.89	194.54	V	1
20350	1750.0	-20.39	44.43	24.04	253.51	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 15MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20025	1717.5	-24.49	41.34	16.85	48.39	H	1
20175	1732.5	-25.53	41.36	15.83	38.28	H	1
20325	1747.5	-25.04	42.09	17.05	50.65	H	1
20025	1717.5	-19.16	44.04	24.88	307.89	V	1
20175	1732.5	-20.28	44.20	23.92	246.60	V	1
20325	1747.5	-19.30	44.22	24.92	**310.10**	V	1

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20025	1717.5	-25.35	41.34	15.99	39.70	H	1
20175	1732.5	-26.40	41.36	14.96	31.33	H	1
20325	1747.5	-25.89	42.09	16.20	41.65	H	1
20025	1717.5	-20.02	44.04	24.02	252.58	V	1
20175	1732.5	-21.15	44.20	23.05	201.84	V	1
20325	1747.5	-20.15	44.22	24.07	254.98	V	1

LTE BAND 4

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20050	1720.0	-25.07	41.28	16.21	41.79	H	1
20175	1732.5	-25.98	41.36	15.38	34.52	H	1
20300	1745.0	-25.62	41.96	16.34	43.02	H	1
20050	1720.0	-19.74	44.14	24.40	**275.11**	V	1
20175	1732.5	-20.73	44.20	23.47	222.13	V	1
20300	1745.0	-19.88	43.88	24.00	251.30	V	1

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
20050	1720.0	-26.00	41.28	15.28	33.74	H	1
20175	1732.5	-27.05	41.36	14.31	26.98	H	1
20300	1745.0	-26.45	41.96	15.51	35.54	H	1
20050	1720.0	-20.67	44.14	23.47	222.08	V	1
20175	1732.5	-21.80	44.20	22.40	173.62	V	1
20300	1745.0	-20.71	43.88	23.17	207.59	V	1

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

4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

4.2.2 TEST PROCEDURE

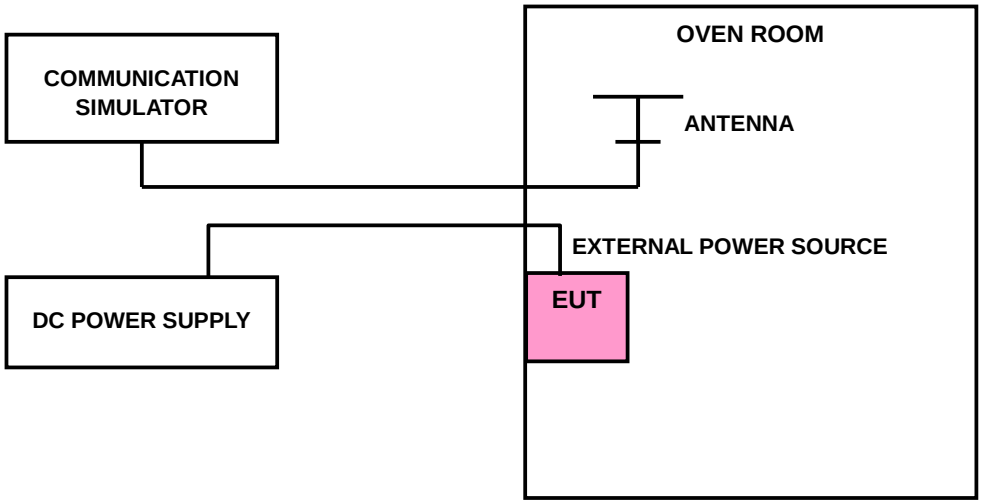
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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.

4.2.3 TEST SETUP



4.2.4 TEST RESULTS

LTE BAND 4

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	1.4MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0009	0.0010	2.5
3.5	-0.0012	-0.0011	2.5
4.4	0.0010	0.0011	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	1.4MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0061	-0.0063	2.5
-20	-0.0054	-0.0056	2.5
-10	-0.0048	-0.0050	2.5
0	-0.0041	-0.0043	2.5
10	-0.0034	-0.0036	2.5
20	-0.0027	-0.0028	2.5
30	-0.0020	-0.0021	2.5
40	-0.0012	-0.0013	2.5
50	-0.0005	-0.0005	2.5
60	0.0002	0.0002	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	3MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0010	0.0011	2.5
3.5	-0.0013	-0.0013	2.5
4.4	0.0012	0.0012	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	3MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0058	-0.0060	2.5
-20	-0.0051	-0.0053	2.5
-10	-0.0044	-0.0046	2.5
0	-0.0038	-0.0039	2.5
10	-0.0031	-0.0032	2.5
20	-0.0024	-0.0025	2.5
30	-0.0018	-0.0019	2.5
40	-0.0012	-0.0013	2.5
50	-0.0005	-0.0006	2.5
60	0.0001	0.0001	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0011	0.0012	2.5
3.5	-0.0014	-0.0016	2.5
4.4	0.0013	0.0014	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0055	-0.0056	2.5
-20	-0.0047	-0.0049	2.5
-10	-0.0041	-0.0043	2.5
0	-0.0035	-0.0036	2.5
10	-0.0028	-0.0029	2.5
20	-0.0022	-0.0022	2.5
30	-0.0015	-0.0015	2.5
40	-0.0008	-0.0008	2.5
50	-0.0002	-0.0002	2.5
60	0.0004	0.0004	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	10MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0012	-0.0012	2.5
3.5	-0.0016	-0.0016	2.5
4.4	0.0013	0.0013	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	10MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0056	-0.0059	2.5
-20	-0.0052	-0.0055	2.5
-10	-0.0045	-0.0047	2.5
0	-0.0038	-0.0040	2.5
10	-0.0032	-0.0033	2.5
20	-0.0025	-0.0026	2.5
30	-0.0018	-0.0018	2.5
40	-0.0011	-0.0011	2.5
50	-0.0005	-0.0005	2.5
60	0.0002	0.0002	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	15MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0012	0.0013	2.5
3.5	-0.0014	-0.0014	2.5
4.4	0.0013	0.0013	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	15MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0061	-0.0062	2.5
-20	-0.0057	-0.0059	2.5
-10	-0.0051	-0.0052	2.5
0	-0.0045	-0.0046	2.5
10	-0.0039	-0.0040	2.5
20	-0.0031	-0.0032	2.5
30	-0.0025	-0.0026	2.5
40	-0.0018	-0.0018	2.5
50	-0.0012	-0.0012	2.5
60	-0.0003	-0.0003	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	20MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
3.8	0.0010	0.0011	2.5
3.5	-0.0012	-0.0013	2.5
4.4	0.0011	0.0011	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

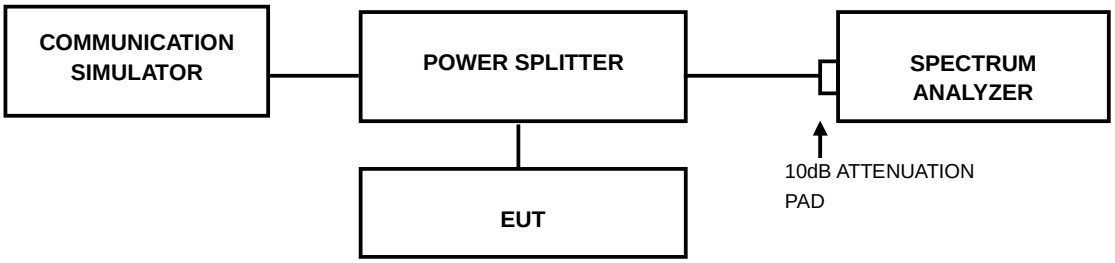
TEMP. (℃)	20MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0057	-0.0059	2.5
-20	-0.0049	-0.0051	2.5
-10	-0.0043	-0.0045	2.5
0	-0.0037	-0.0038	2.5
10	-0.0029	-0.0030	2.5
20	-0.0024	-0.0025	2.5
30	-0.0018	-0.0018	2.5
40	-0.0012	-0.0012	2.5
50	-0.0005	-0.0005	2.5
60	0.0002	0.0002	2.5

4.3 OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 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.

4.3.2 TEST SETUP



4.3.3 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.

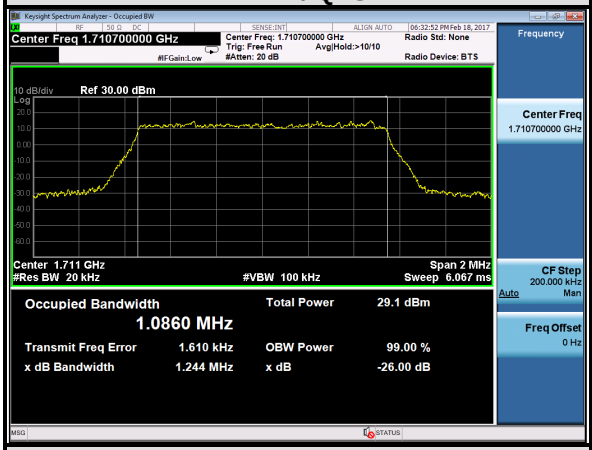
4.3.4 TEST RESULTS

LTE BAND 4

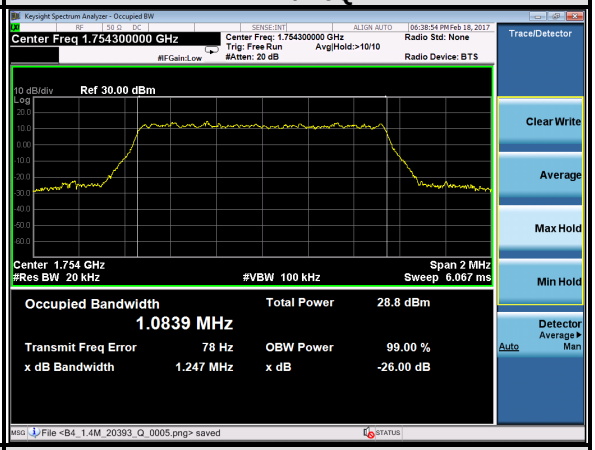
CHANNEL BANDWIDTH: 1.4MHz				CHANNEL BANDWIDTH: 3MHz			
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)		CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	1.09	1.08	19965	1711.5	2.68	2.68
20175	1732.5	1.09	1.08	20175	1732.5	2.68	2.68
20393	1754.3	1.09	1.08	20385	1753.5	2.68	2.68

SPECTRUM PLOT OF WORST VALUE

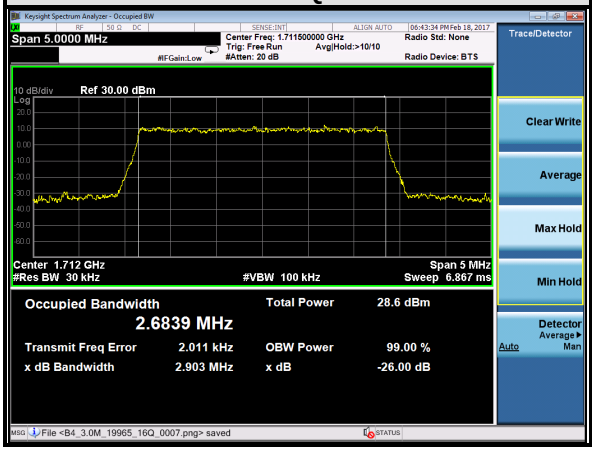
1.4MHz / QPSK



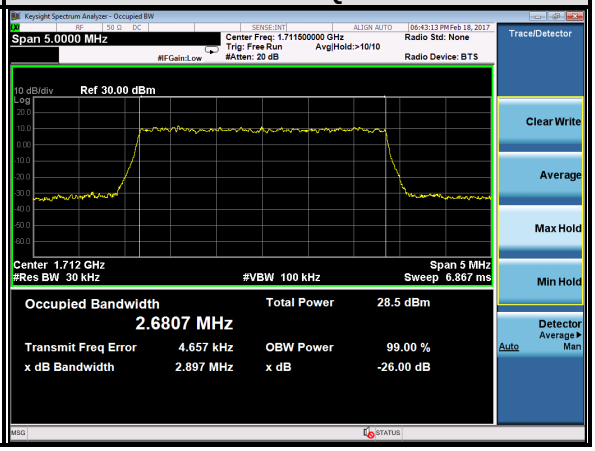
1.4MHz / 16QAM



3MHz / QPSK



3MHz / 16QAM



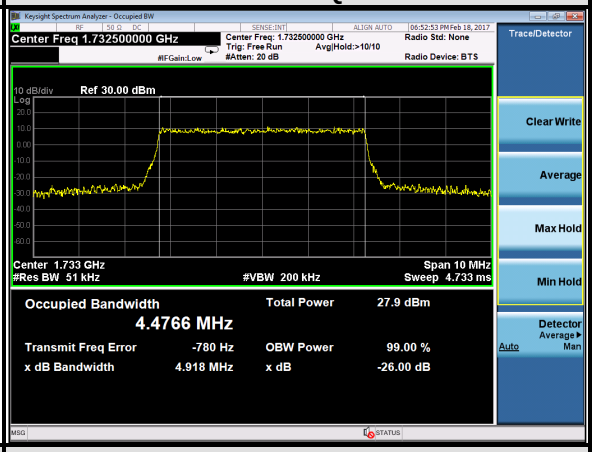
LTE BAND 4

CHANNEL BANDWIDTH: 5MHz				CHANNEL BANDWIDTH: 10MHz			
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)		CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	4.49	4.47	20000	1715	8.93	8.91
20175	1732.5	4.48	4.48	20175	1732.5	8.92	8.93
20375	1752.5	4.48	4.47	20350	1750	8.93	8.94

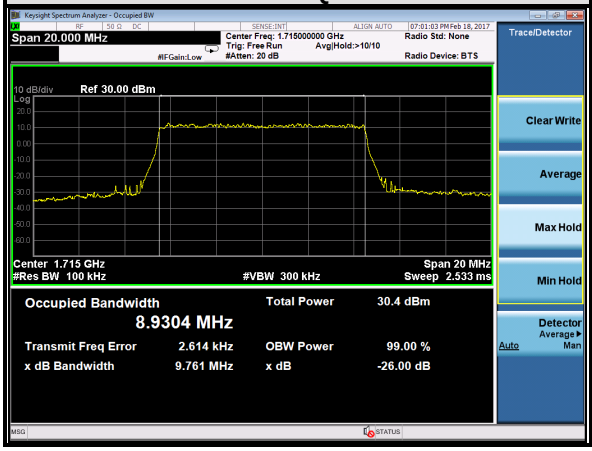
SPECTRUM PLOT OF WORST VALUE

5MHz / QPSK

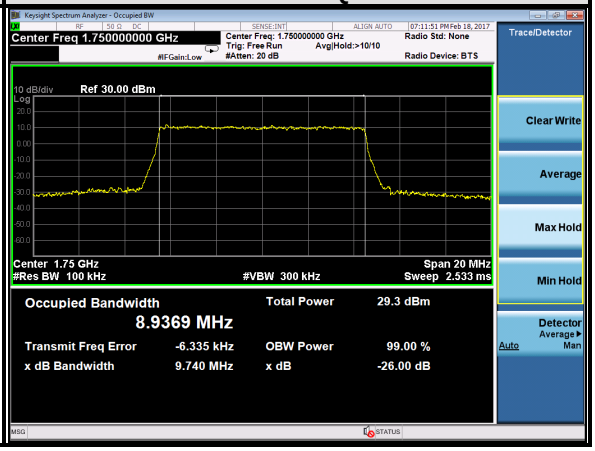
5MHz / 16QAM



10MHz / QPSK



10MHz / 16QAM

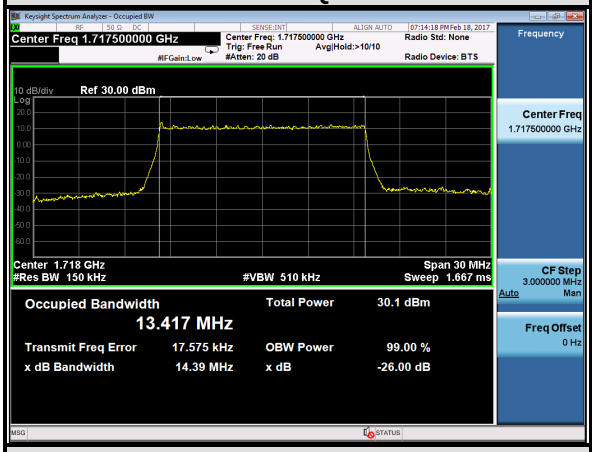


LTE BAND 4

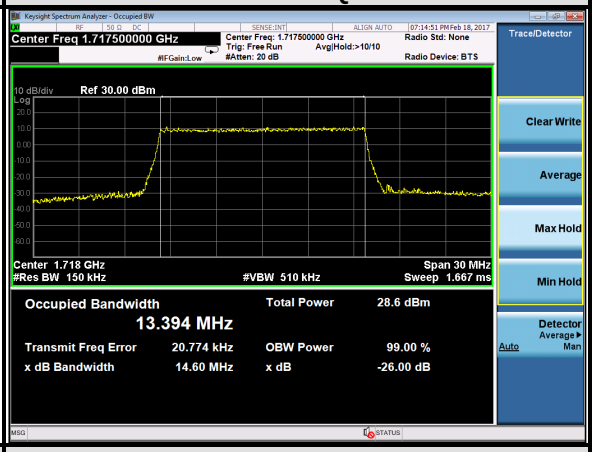
CHANNEL BANDWIDTH: 15MHz				CHANNEL BANDWIDTH: 20MHz			
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	13.42	13.39	20050	1720	17.92	17.89
20175	1732.5	13.38	13.37	20175	1732.5	17.88	17.81
20325	1747.5	13.39	13.39	20300	1745	17.89	17.86

SPECTRUM PLOT OF WORST VALUE

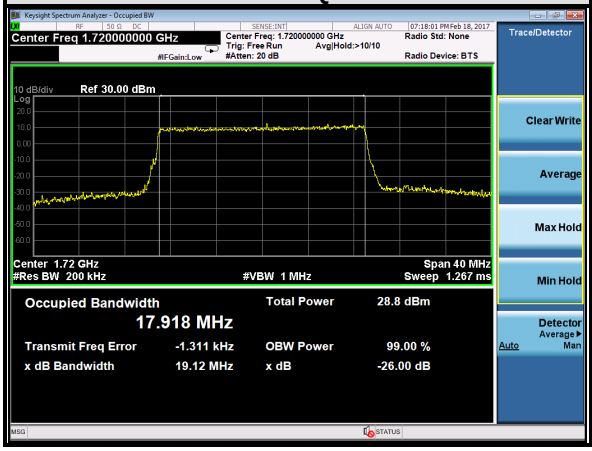
15MHz / QPSK



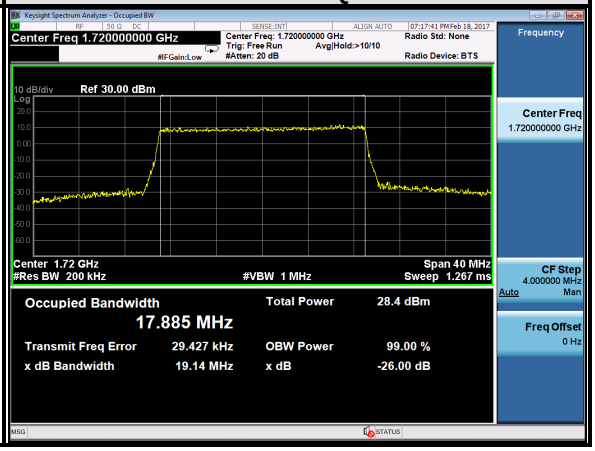
15MHz / 16QAM



20MHz / QPSK



20MHz / 16QAM

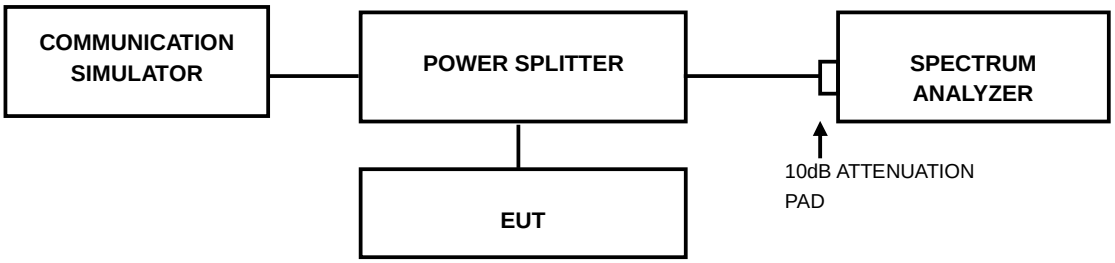


4.4 PEAK TO AVERAGE RATIO

4.4.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

4.4.2 TEST SETUP



4.4.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

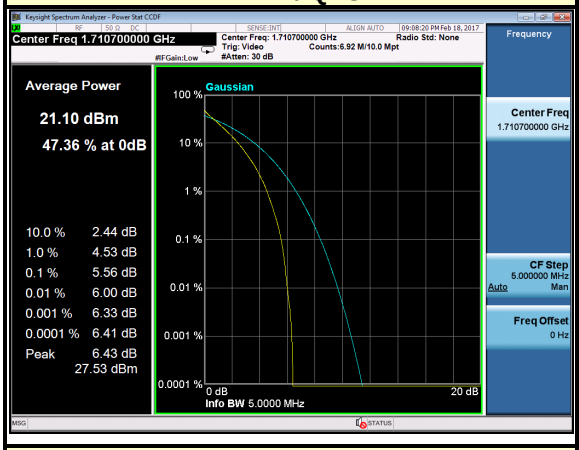
4.4.4 TEST RESULTS

LTE BAND 4

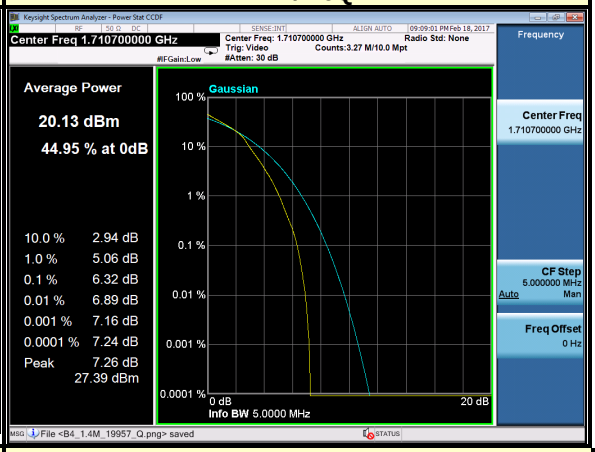
CHANNEL BANDWIDTH: 1.4MHz				CHANNEL BANDWIDTH: 3MHz			
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	5.56	6.32	19965	1711.5	5.65	6.30
20175	1732.5	4.83	5.65	20175	1732.5	5.32	6.02
20393	1754.3	5.13	5.91	20385	1753.5	5.02	5.74

SPECTRUM PLOT OF WORST VALUE

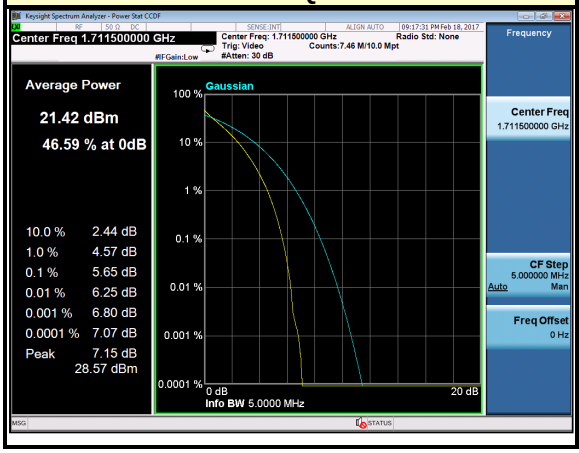
1.4MHz / QPSK



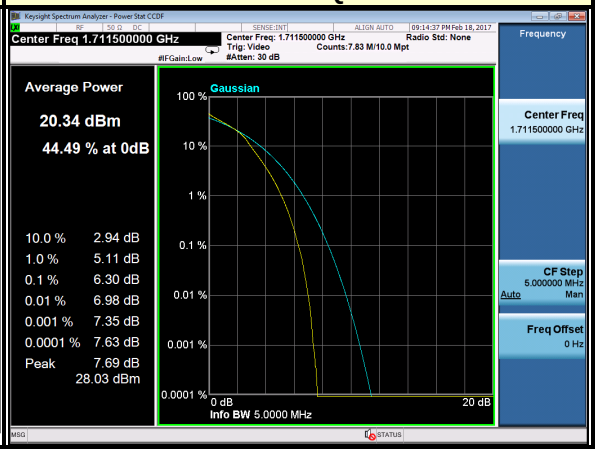
1.4MHz / 16QAM



3MHz / QPSK



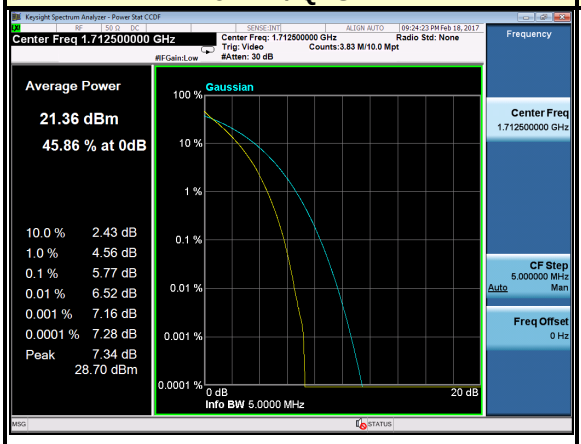
3MHz / 16QAM



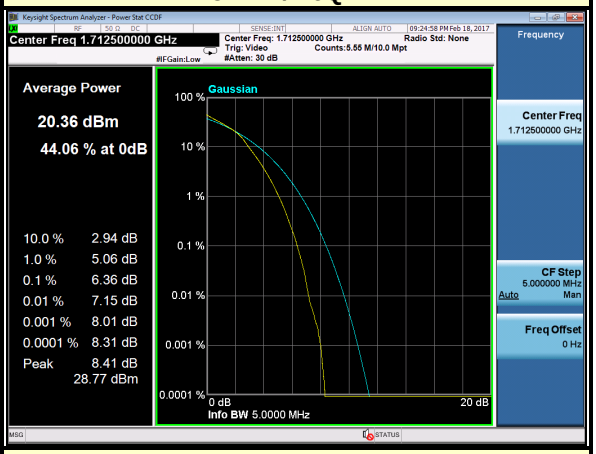
CHANNEL BANDWIDTH: 5MHz				CHANNEL BANDWIDTH: 10MHz			
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	5.77	6.36	20000	1715	5.63	6.31
20175	1732.5	5.64	6.31	20175	1732.5	4.96	5.73
20375	1752.5	5.51	6.15	20350	1750	5.40	6.09

SPECTRUM PLOT OF WORST VALUE

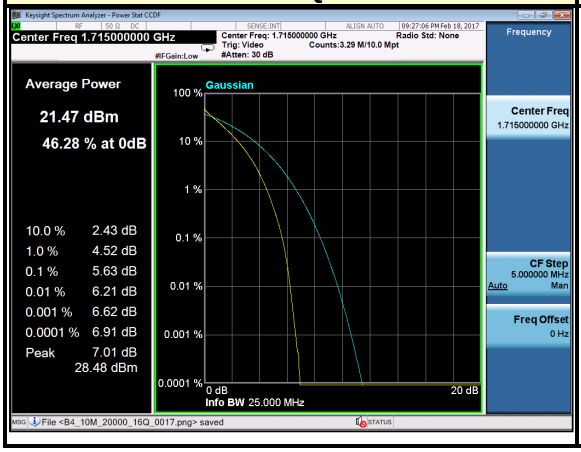
5MHz / QPSK



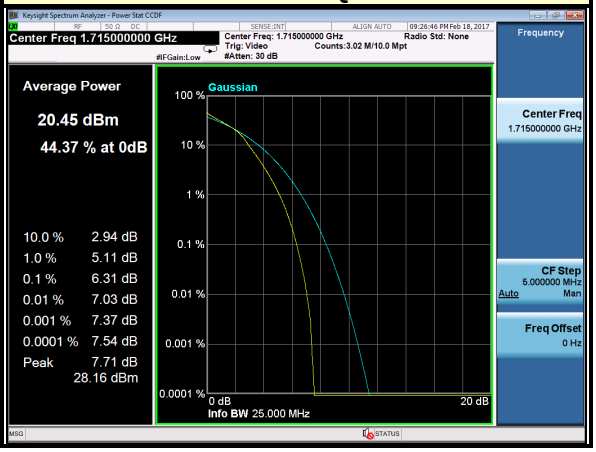
5MHz / 16QAM



10MHz / QPSK



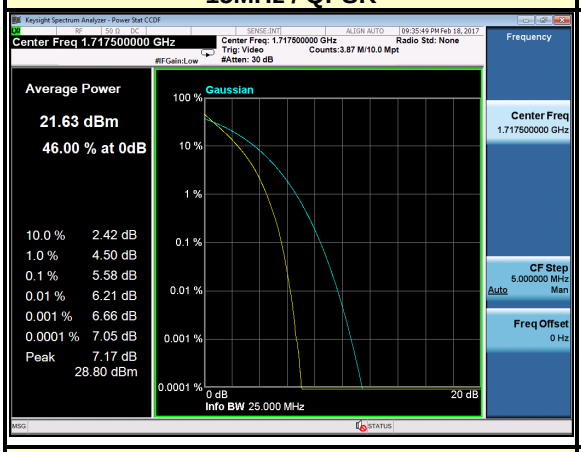
10MHz / 16QAM



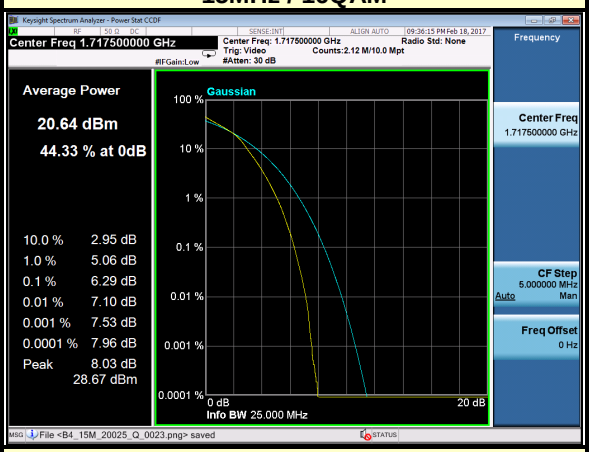
CHANNEL BANDWIDTH: 15MHz				CHANNEL BANDWIDTH: 20MHz			
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	5.58	6.29	20050	1720	5.56	6.29
20175	1732.5	5.11	5.86	20175	1732.5	5.21	5.97
20325	1747.5	5.43	6.13	20300	1745	5.42	6.14

SPECTRUM PLOT OF WORST VALUE

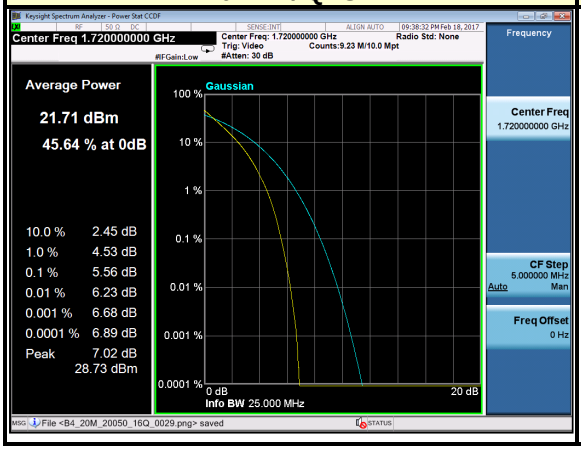
15MHz / QPSK



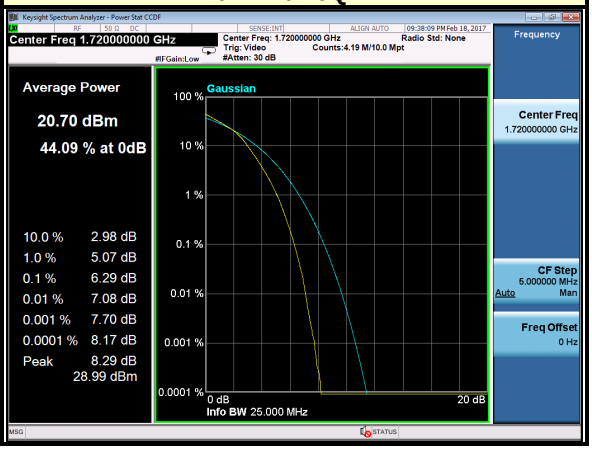
15MHz / 16QAM



20MHz / QPSK



20MHz / 16QAM

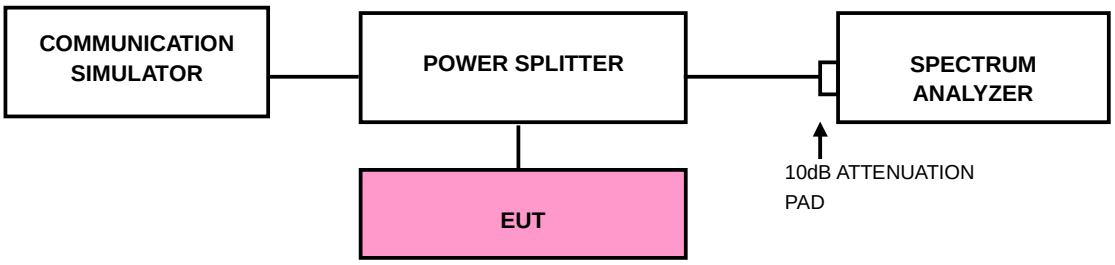


4.5 BAND EDGE MEASUREMENT

4.5.1 LIMITS OF BAND EDGE MEASUREMENT

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.
However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

4.5.2 TEST SETUP



4.5.3 TEST PROCEDURES

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

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

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

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

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

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

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

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

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

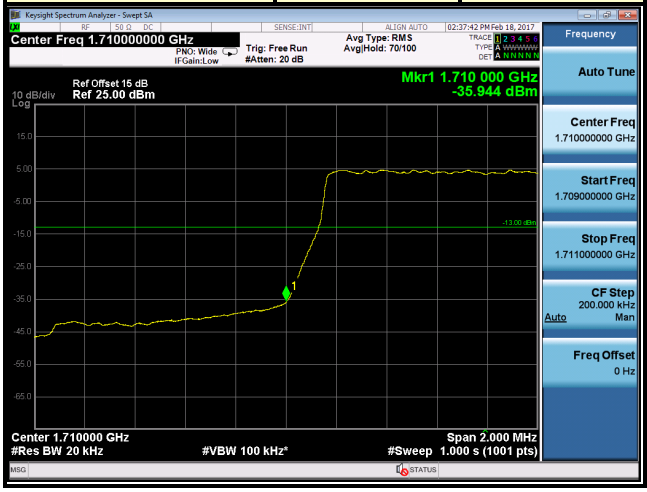
4.5.4 TEST RESULTS

LTE BAND 4

Channel Bandwidth: 1.4MHz

CHANNEL	19957	1 RB	CHANNEL	20393	1 RB

CHANNEL	19957	Full RB	CHANNEL	20393	Full RB



LTE BAND 4

Channel Bandwidth: 3MHz

CHANNEL	19965	1 RB

CHANNEL	20385	1 RB

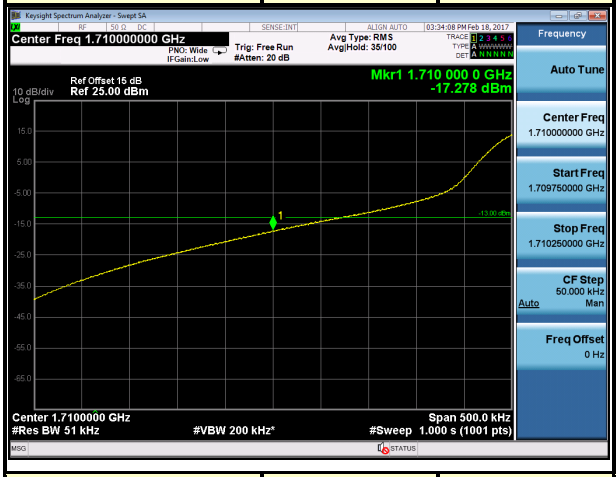
CHANNEL	19965	Full RB

CHANNEL	20385	Full RB

LTE BAND 4

Channel Bandwidth: 5MHz

CHANNEL	19975	1 RB	CHANNEL	20375	1 RB

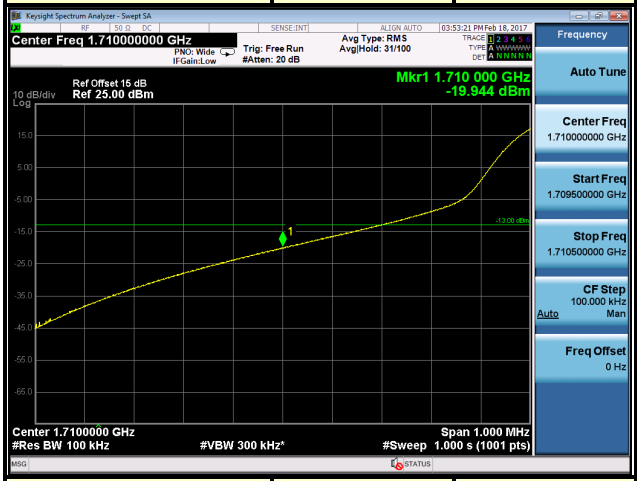


CHANNEL	19975	Full RB	CHANNEL	20375	Full RB

LTE BAND 4

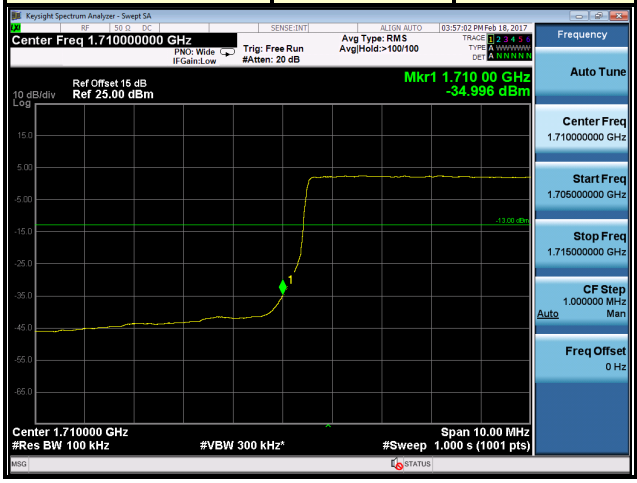
Channel Bandwidth: 10MHz

CHANNEL	20000	1 RB



CHANNEL	20350	1 RB

CHANNEL	20000	Full RB

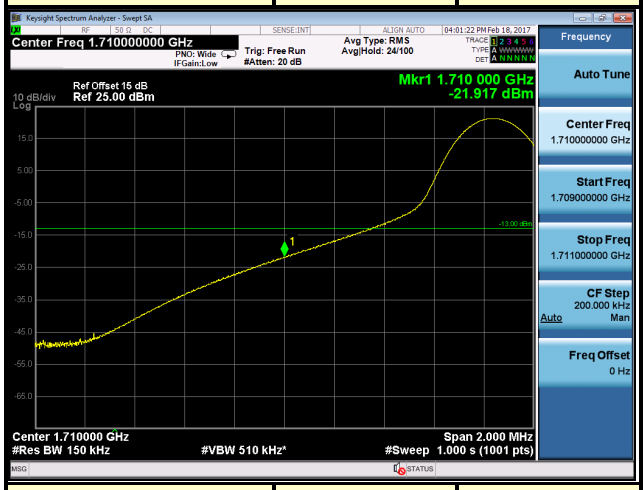


CHANNEL	20350	Full RB

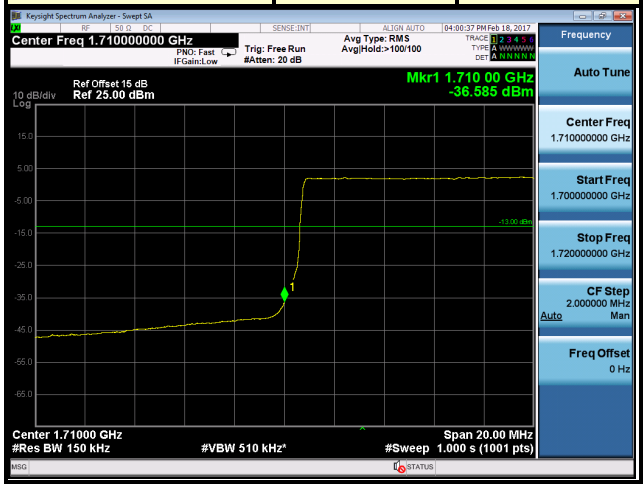
LTE BAND 4

Channel Bandwidth: 15MHz

CHANNEL	20025	1 RB	CHANNEL	20325	1 RB



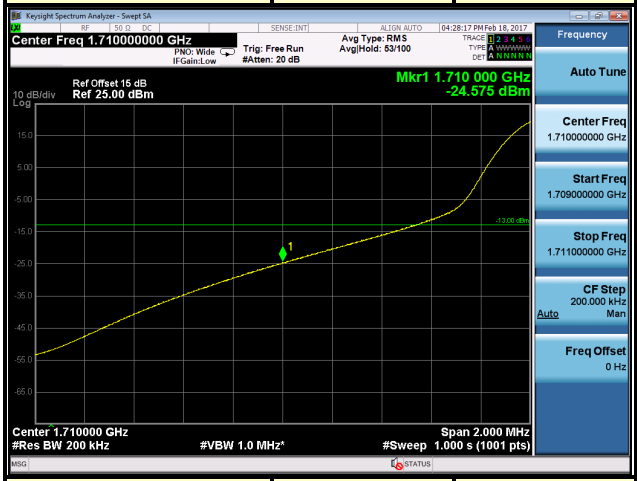
CHANNEL	20025	Full RB	CHANNEL	20325	Full RB



LTE BAND 4

Channel Bandwidth: 20MHz

CHANNEL	20050	1 RB	CHANNEL	20300	1 RB



CHANNEL	20050	Full RB	CHANNEL	20300	Full RB

4.6 CONDUCTED SPURIOUS EMISSIONS

4.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

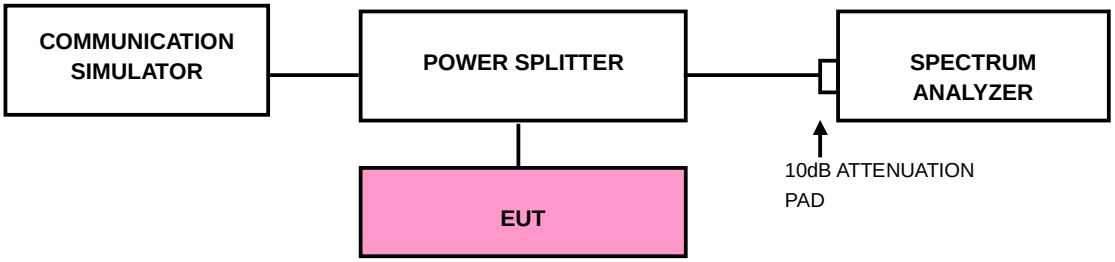
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm

4.6.2 TEST PROCEDURE

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

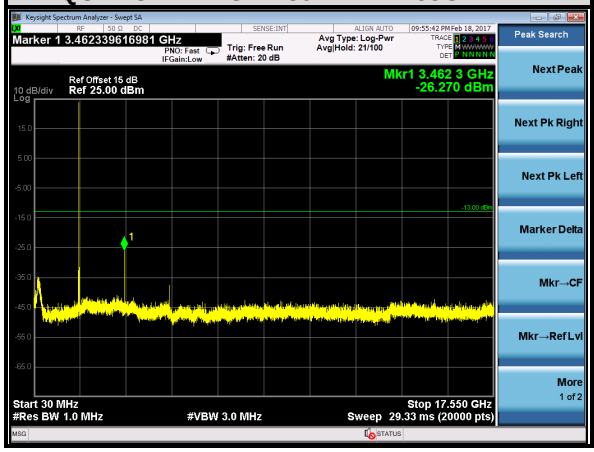
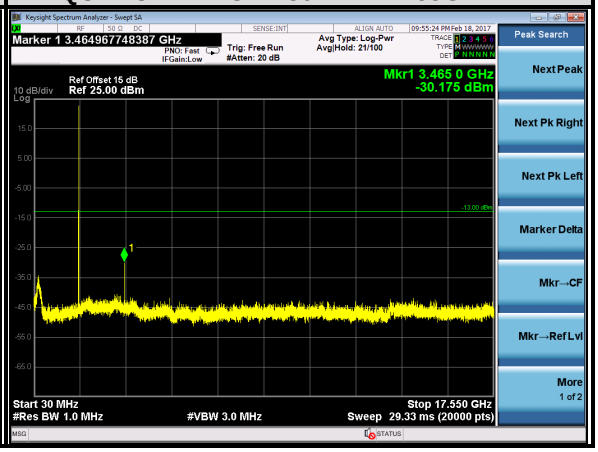
b. Measuring frequency range is from 30 MHz to 17.55GHz for LTE Band 4. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

4.6.3 TEST SETUP

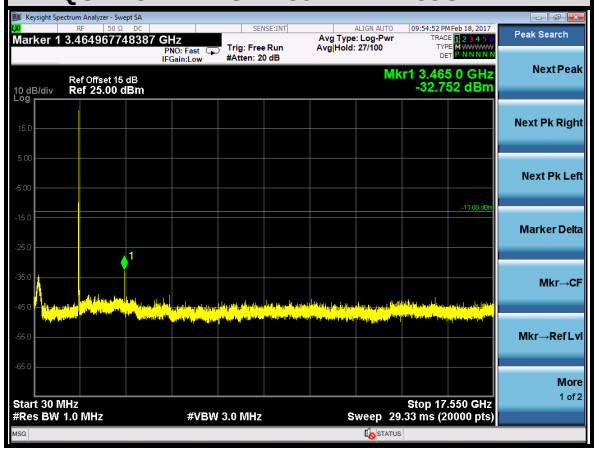
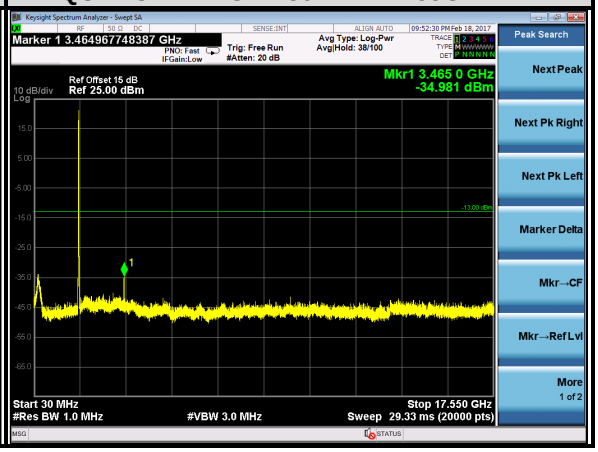


4.6.4 TEST RESULTS

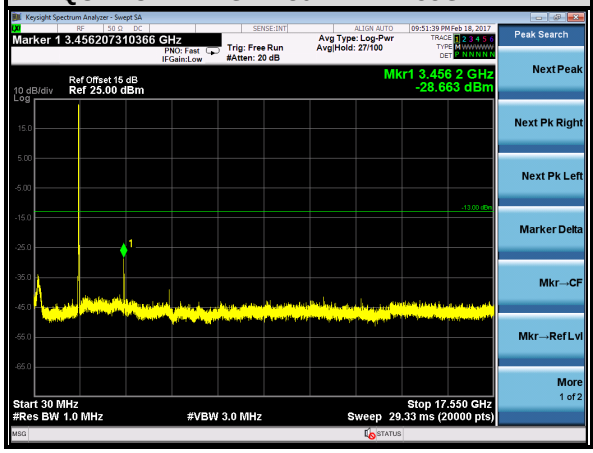
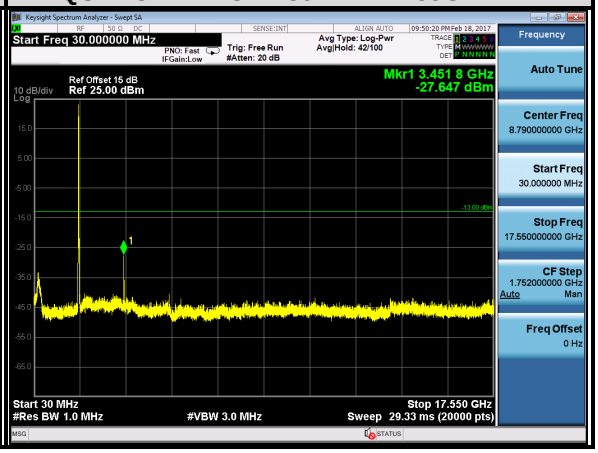
LTE BAND 4

CHANNEL 20175	CHANNEL 20175
1.4MHz / QPSK	3MHz / QPSK
FREQUENCY RANGE : 30MHz~17.55GHz	FREQUENCY RANGE : 30MHz~17.55GHz
	

LTE BAND 4

CHANNEL 20175	CHANNEL 20175
5MHz / QPSK	10MHz / QPSK
FREQUENCY RANGE : 30MHz~17.55GHz	FREQUENCY RANGE : 30MHz~17.55GHz
	

LTE BAND 4

CHANNEL 20175	CHANNEL 20175
15MHz / QPSK	20MHz / QPSK
FREQUENCY RANGE : 30MHz~17.55GHz	FREQUENCY RANGE : 30MHz~17.55GHz
	

4.7 RADIATED EMISSION MEASUREMENT

4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

4.7.2 TEST PROCEDURES

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

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

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

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

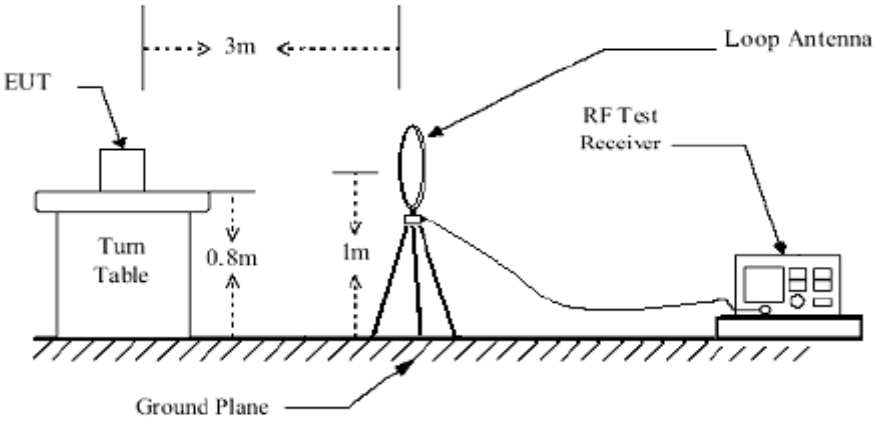
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.7.3 DEVIATION FROM TEST STANDARD

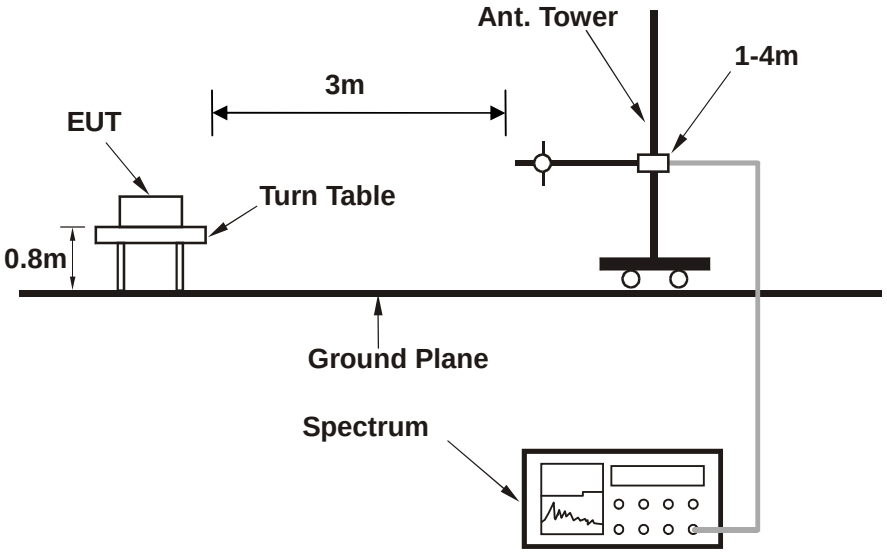
No deviation

4.7.4 TEST SETUP

<Below 30MHz>



<Above 30MHz>



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

4.7.5 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

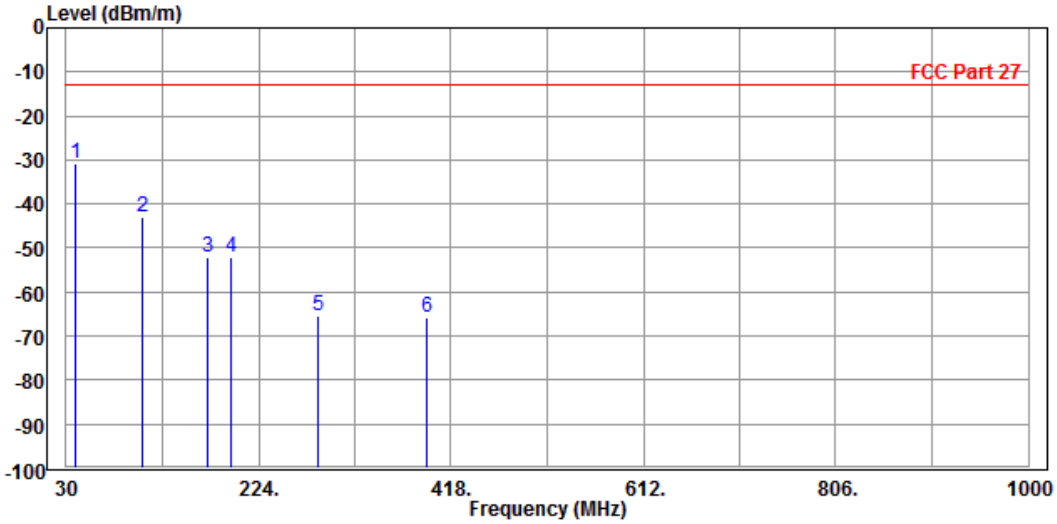
9 KHz – 30 KHz data: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

30 MHz – 1GHz data:

LTE Band 4:

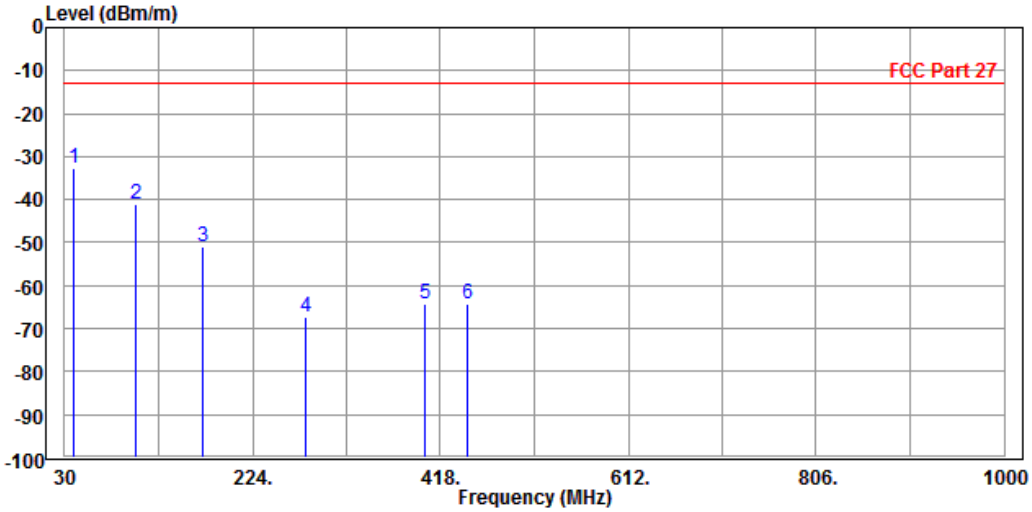
MODE	TX channel 20175	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	**INPUT POWER**	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	38.730	-30.83	-42.99	-13.00	-17.83	12.16	Peak	Horizontal
2	107.600	-42.92	-30.18	-13.00	-29.92	-12.74	Peak	Horizontal
3	172.590	-51.99	-33.97	-13.00	-38.99	-18.02	Peak	Horizontal
4	196.840	-52.24	-34.92	-13.00	-39.24	-17.32	Peak	Horizontal
5	283.170	-65.36	-50.72	-13.00	-52.36	-14.64	Peak	Horizontal
6	392.780	-65.84	-55.14	-13.00	-52.84	-10.70	Peak	Horizontal



MODE	TX channel 20175	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
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	38.730	-32.55	-31.26	-13.00	-19.55	-1.29	Peak	Vertical
2		103.720	-40.88	-29.72	-13.00	-27.88	-11.16	Peak	Vertical
3		172.590	-50.99	-37.04	-13.00	-37.99	-13.95	Peak	Vertical
4		278.320	-67.38	-55.99	-13.00	-54.38	-11.39	Peak	Vertical
5		401.510	-64.24	-53.36	-13.00	-51.24	-10.88	Peak	Vertical
6		446.130	-64.31	-55.08	-13.00	-51.31	-9.23	Peak	Vertical



ABOVE 1GHz

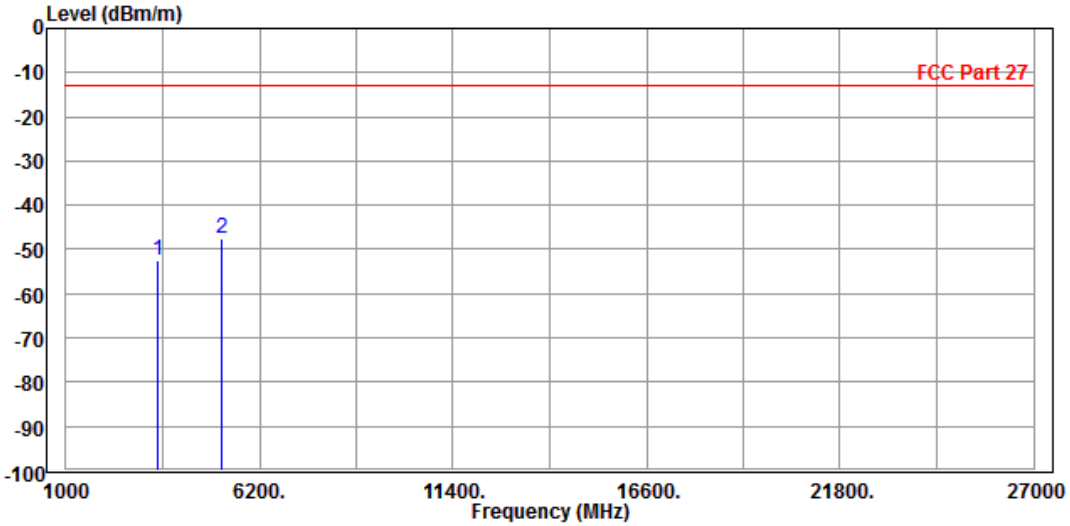
Note: For higher frequency, the emission is too low to be detected.

LTE BAND 4

CHANNEL BANDWIDTH: 1.4MHz / QPSK

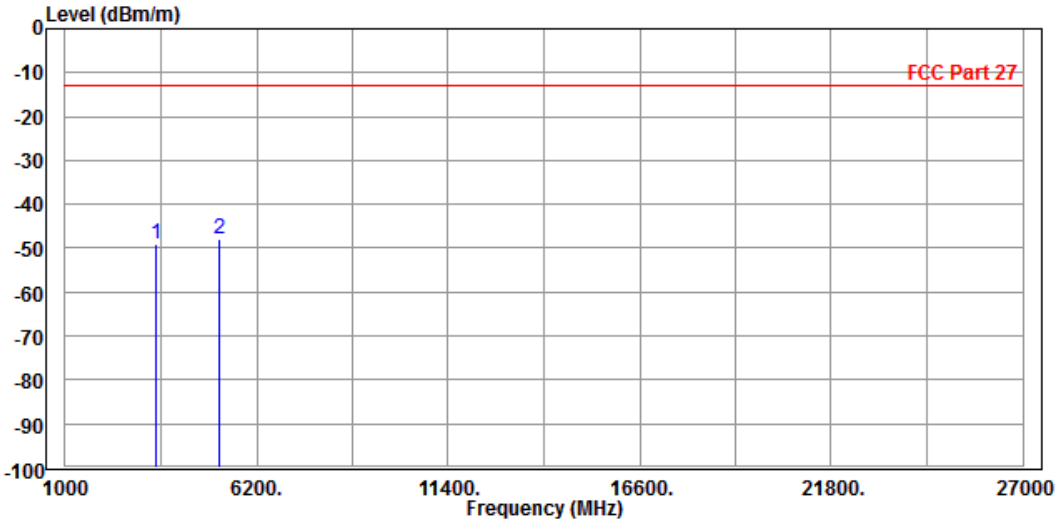
MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3465.000	-52.48	-54.51	-13.00	-39.48	2.03	Peak	Horizontal
2 PP	5197.500	-47.41	-56.02	-13.00	-34.41	8.61	Peak	Horizontal



MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

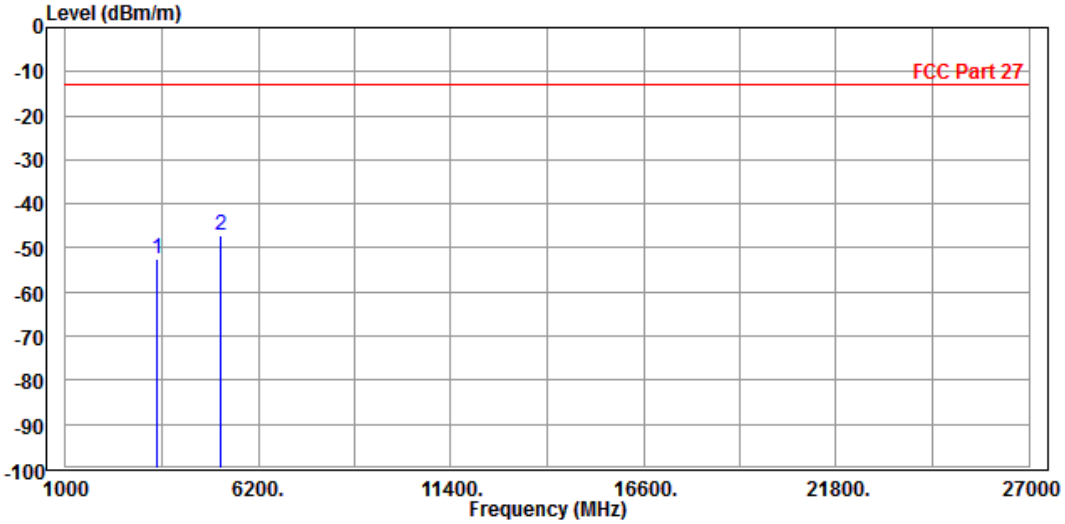
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3465.000	-48.98	-51.51	-13.00	-35.98	2.53	Peak	Vertical
2 PP	5197.500	-47.82	-55.80	-13.00	-34.82	7.98	Peak	Vertical



CHANNEL BANDWIDTH: 3MHz / QPSK

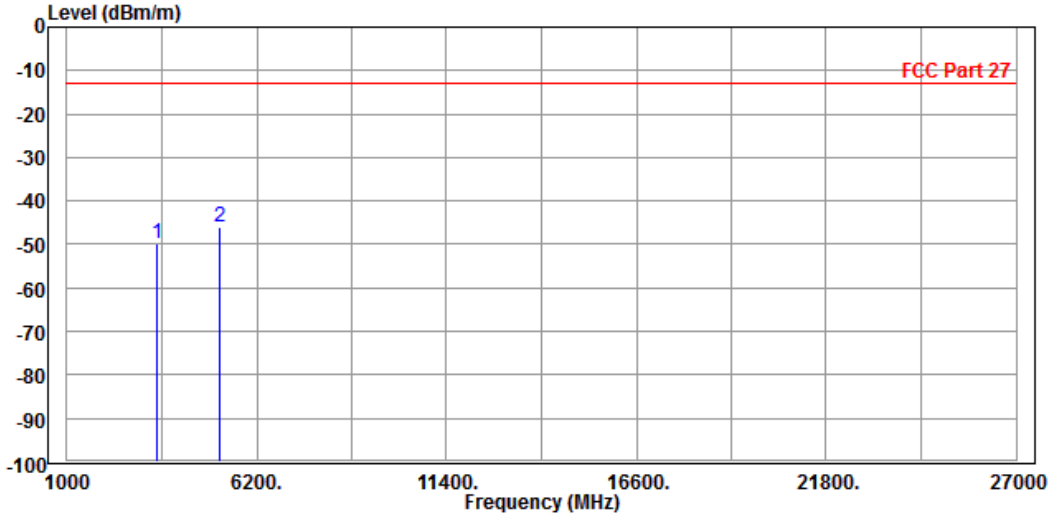
MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		3465.000	-52.64	-54.67	-13.00	-39.64	2.03	Peak	Horizontal
2	PP	5197.500	-47.07	-55.68	-13.00	-34.07	8.61	Peak	Horizontal



MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

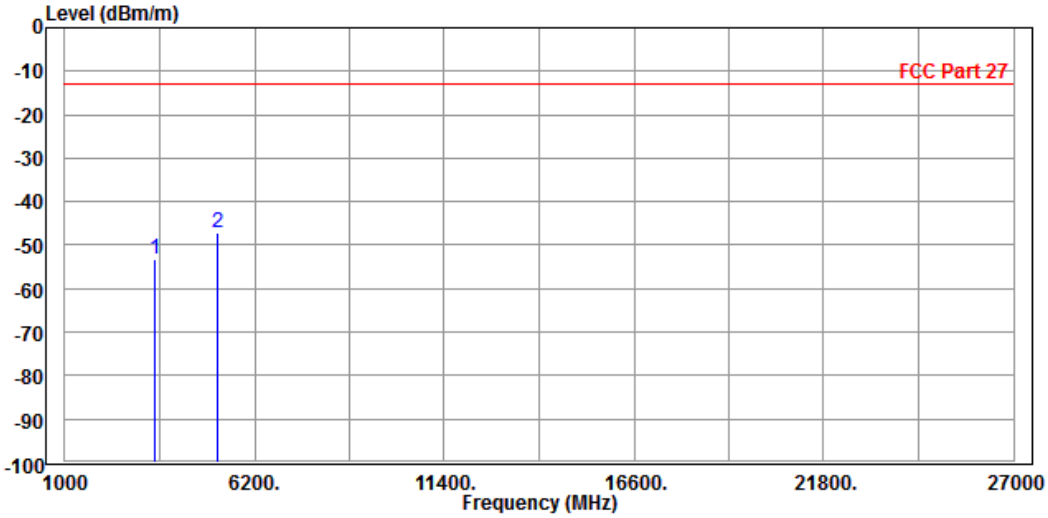
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3465.000	-49.67	-52.20	-13.00	-36.67	2.53	Peak	Vertical
2 PP	5197.500	-46.04	-54.02	-13.00	-33.04	7.98	Peak	Vertical



CHANNEL BANDWIDTH: 5MHz / QPSK

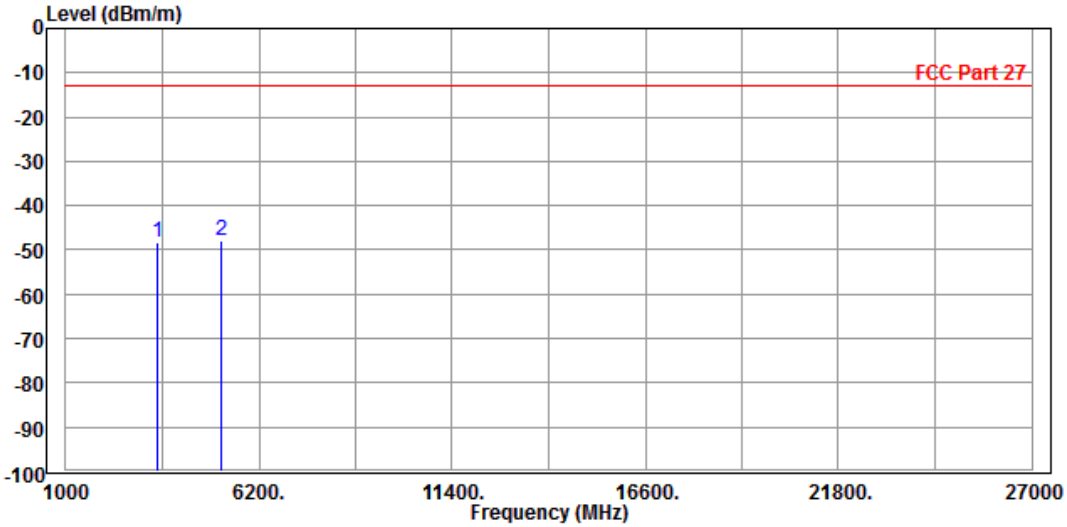
MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		3465.000	-53.15	-55.18	-13.00	-40.15	2.03	Peak	Horizontal
2	PP	5197.500	-47.27	-55.88	-13.00	-34.27	8.61	Peak	Horizontal



MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

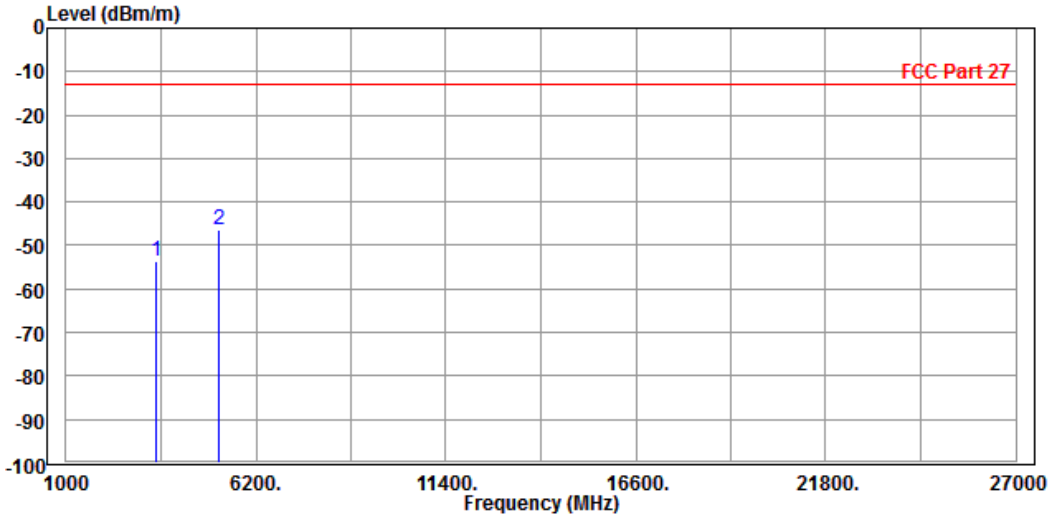
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		3465.000	-48.29	-50.82	-13.00	-35.29	2.53	Peak	Vertical
2	PP	5197.500	-47.92	-55.90	-13.00	-34.92	7.98	Peak	Vertical



CHANNEL BANDWIDTH: 10MHz / QPSK

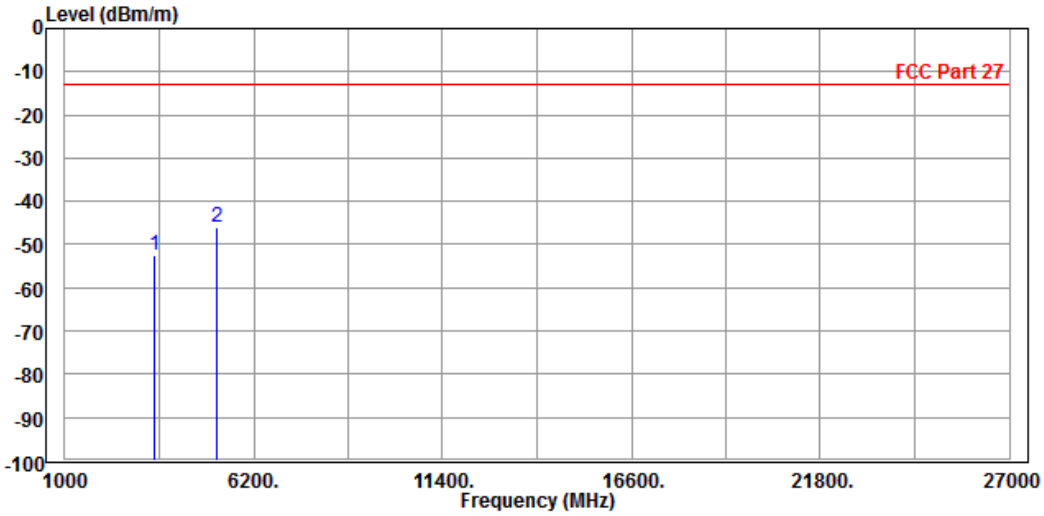
MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		3465.000	-53.59	-55.62	-13.00	-40.59	2.03	Peak	Horizontal
2	PP	5197.500	-46.54	-55.15	-13.00	-33.54	8.61	Peak	Horizontal



MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

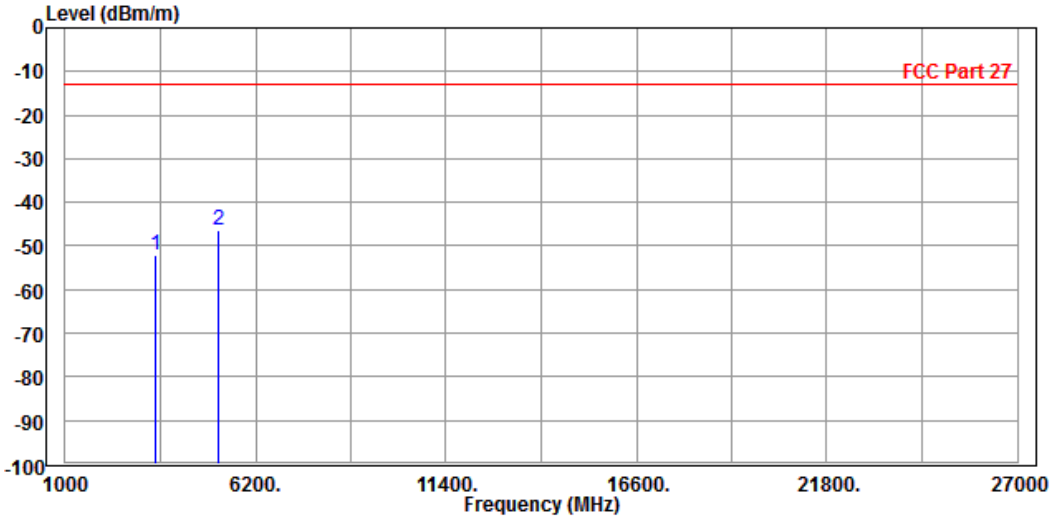
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		3465.000	-52.64	-55.17	-13.00	-39.64	2.53	Peak	Vertical
2	PP	5197.500	-46.10	-54.08	-13.00	-33.10	7.98	Peak	Vertical



CHANNEL BANDWIDTH: 15MHz / QPSK

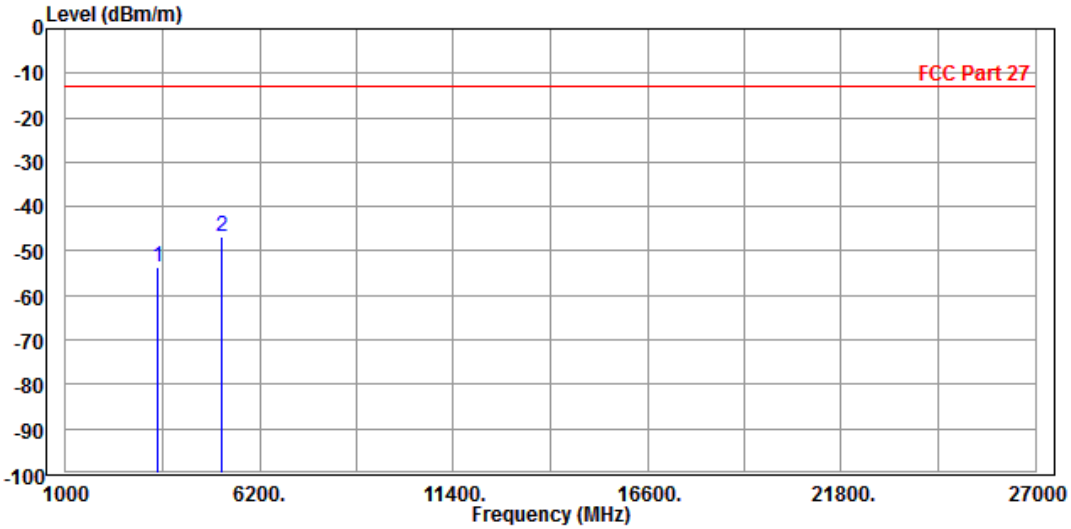
MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3465.000	-52.02	-54.05	-13.00	-39.02	2.03	Peak	Horizontal
2 PP	5197.500	-46.29	-54.90	-13.00	-33.29	8.61	Peak	Horizontal



MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

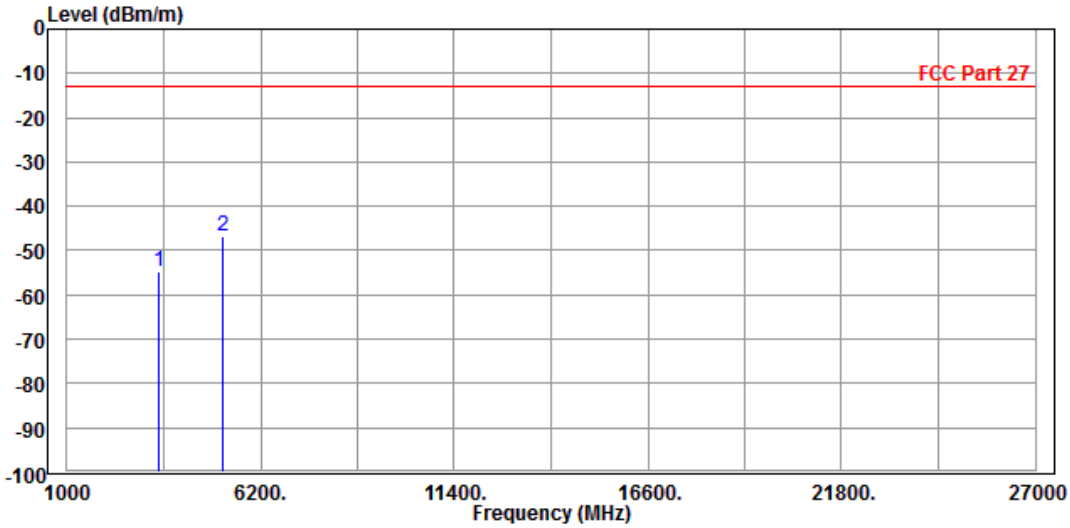
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		3465.000	-53.43	-55.96	-13.00	-40.43	2.53	Peak	Vertical
2	PP	5197.500	-46.78	-54.76	-13.00	-33.78	7.98	Peak	Vertical



CHANNEL BANDWIDTH: 20MHz / QPSK

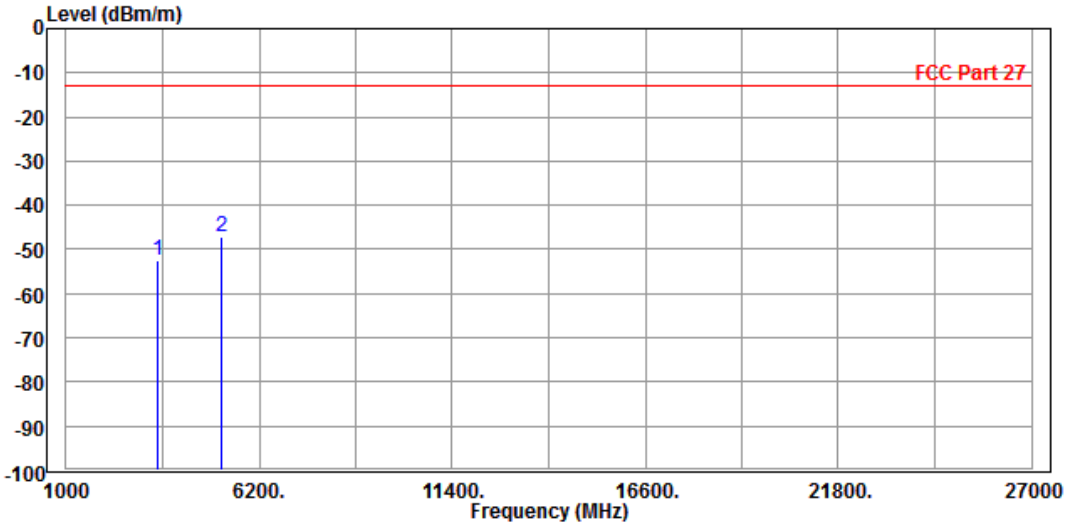
MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		3465.000	-54.65	-56.68	-13.00	-41.65	2.03	Peak	Horizontal
2	PP	5197.500	-46.69	-55.30	-13.00	-33.69	8.61	Peak	Horizontal



MODE	TX channel 20175	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Tony Zou		
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		3465.000	-52.36	-54.89	-13.00	-39.36	2.53	Peak	Vertical
2	PP	5197.500	-46.97	-54.95	-13.00	-33.97	7.98	Peak	Vertical



5 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch, were founded in 2002 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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

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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.

6 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---