FCC Test Report

(PART 27)

Report No.:	RF150727C10-3
FCC ID:	NM82PQ9300
Test Model:	2PQ9300
Received Date:	Jul. 27, 2015
Test Date:	Aug. 05, 2015 ~ Sep. 02, 2015
Issued Date:	Sep. 17, 2015
Applicant:	HTC Corporation
Address:	1F, 6-3 Baoqiang Road, Xindian City, Taipei County 231, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
Test Location:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF150727C10-3	Original Release	Sep. 17, 2015

1 Certificate of Conformity

Product:	Smartphone
Brand:	HTC
Test Model:	2PQ9300
Sample Status:	Identical Prototype
Applicant:	HTC Corporation
Test Date:	Aug. 05, 2015 ~ Sep. 02, 2015
Standards:	FCC Part 27, Subpart C, M

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan 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:** Sep. 17, 2015

Ivonne Wu / Supervisor

Approved by : _____ , **Date:** Sep. 17, 2015

Kay Wu / Supervisor

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(h)	Equivalent Isotropic Radiated Power	PASS	Meet the requirement of limit.
2.1055 27.54	Frequency Stability	PASS	Meet the requirement of limit.
2.1049	Occupied Bandwidth	PASS	Meet the requirement of limit.
	Peak to average ratio	PASS	Meet the requirement of limit.
2.1051 27.53(l)	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 27.53(m)	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 27.53(m)	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -21.75dB at 41.34MHz.

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	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	2.0153 dB
	200MHz ~1000MHz	2.0224 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.0121 dB
	18GHz ~ 40GHz	1.1508 dB

2.2 Test Site And Instruments

Description & Manaufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Jan. 21, 2015	Jan. 21, 2016
Spectrum Analyzer Agilent	N9010A	MY52220314	Sep. 03, 2015	Sep. 02, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 10, 2014	Dec. 09, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Feb. 04, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Feb. 09, 2015	Feb. 09, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Feb. 04, 2015	Feb. 04, 2016
Preamplifier EMCI	EMC 012645	980115	Dec. 12, 2014	Dec. 11, 2015
Preamplifier EMCI	EMC 184045	980116	Jan. 09, 2015	Jan. 08, 2016
Preamplifier EMCI	EMC 330H	980112	Dec. 27, 2014	Dec. 26, 2015
Power Meter Anritsu	ML2495A	1232002	Sep. 17, 2014	Sep. 16, 2015
Power Sensor Anritsu	MA2411B	1207325	Sep. 17, 2014	Sep. 16, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 18, 2014	Oct. 17, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 18, 2014	Oct. 17, 2015
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Nov. 07, 2014	Nov. 06, 2015
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Communications Tester-Wireless Agilent	8960 Series 10	MY53201073	Jul. 03, 2015	Jul. 02, 2017
Radio Communication Analyzer Anritsu	MT8820C	6201240432	Jul. 06, 2015	Jul. 05, 2017

Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC7450F-10.

3 General Information

3.1 General Description of EUT

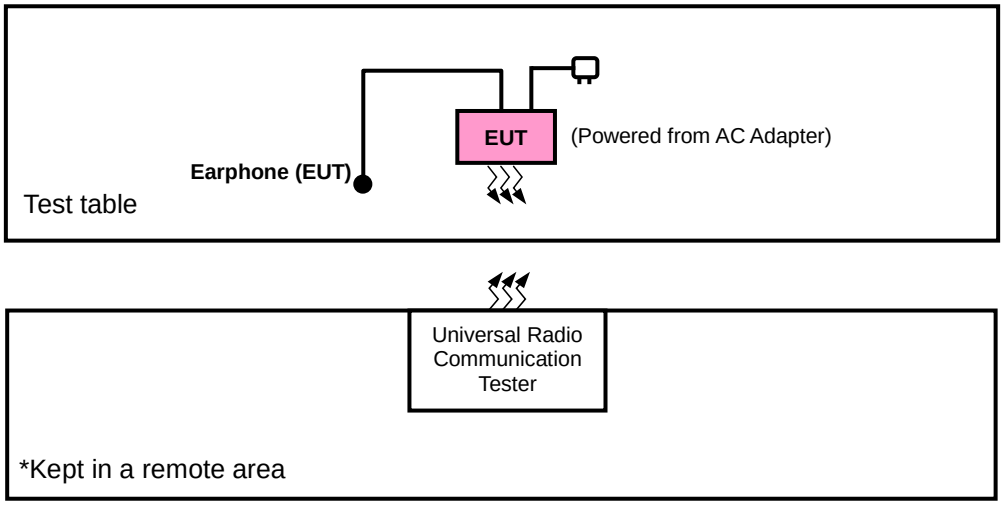
Product	Smartphone	
Brand	HTC	
Test Model	2PQ9300	
Status of EUT	Identical Prototype	
Power Supply Rating	5.0Vdc (adapter or host equipment) 3.85Vdc (Li-ion battery)	
Modulation Type	QPSK, 16QAM	
Frequency Range	LTE Band 41 (Channel Bandwidth: 5MHz)	2498.5 ~ 2687.5 MHz
	LTE Band 41 (Channel Bandwidth: 10MHz)	2501.0 ~ 2685.0 MHz
	LTE Band 41 (Channel Bandwidth: 15MHz)	2503.5 ~ 2682.5 MHz
	LTE Band 41 (Channel Bandwidth: 20MHz)	2506.0 ~ 2680.0 MHz
Max. EIRP Power	LTE Band 41 (Channel Bandwidth: 5MHz)	151.71mW
	LTE Band 41 (Channel Bandwidth: 10MHz)	144.88mW
	LTE Band 41 (Channel Bandwidth: 15MHz)	147.57mW
	LTE Band 41 (Channel Bandwidth: 20MHz)	161.44mW
Emission Designator	LTE Band 41 (Channel Bandwidth: 5MHz)	4M49G7D
	LTE Band 41 (Channel Bandwidth: 10MHz)	8M96G7D
	LTE Band 41 (Channel Bandwidth: 15MHz)	13M4G7D
	LTE Band 41 (Channel Bandwidth: 20MHz)	17M9W7D
Antenna Type	Fixed Internal Antenna	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

1. The EUT's accessories list refers to Ext. Pho.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Configuration of System Under Test

<Radiated Emission Test>



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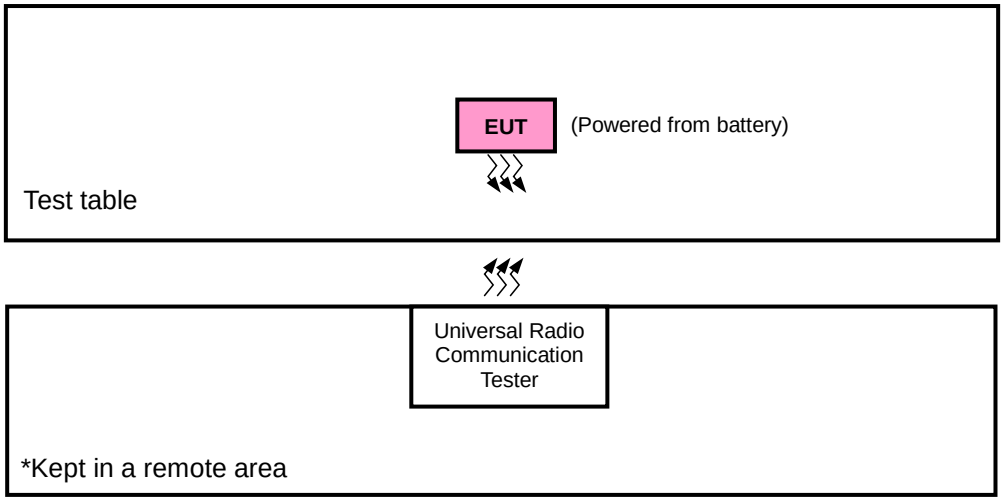


3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3 Test Mode Applicability and Tested Channel Detail

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

Band	ERP	Radiated Emission
LTE Band 41	X-plane	Z-axis

LTE BAND 41

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	39675 to 41565	39675, 40620, 41565	5MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		39700 to 41540	39700, 40620, 41540	10MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		39725 to 41515	39725, 40620, 41515	15MHz	QPSK, 16QAM	1 RB / 37 RB Offset
		39750 to 41490	39750, 40620, 41490	20MHz	QPSK, 16QAM	1 RB / 50 RB Offset
-	Frequency Stability	39675 to 41565	40620	5MHz	QPSK	1 RB / 12 RB Offset
		39700 to 41540	40620	10MHz	QPSK	1 RB / 24 RB Offset
		39725 to 41515	40620	15MHz	QPSK	1 RB / 37 RB Offset
		39750 to 41490	40620	20MHz	QPSK	1 RB / 50 RB Offset
-	Occupied Bandwidth	39675 to 41565	39675, 40620, 41565	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		39700 to 41540	39700, 40620, 41540	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		39725 to 41515	39725, 40620, 41515	15MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		39750 to 41490	39750, 40620, 41490	20MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	39675 to 41565	39675, 40620, 41565	5MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		39700 to 41540	39700, 40620, 41540	10MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		39725 to 41515	39725, 40620, 41515	15MHz	QPSK, 16QAM	1 RB / 37 RB Offset
		39750 to 41490	39750, 40620, 41490	20MHz	QPSK, 16QAM	1 RB / 50 RB Offset
-	Band Edge	39675 to 41565	39675, 41565	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		39700 to 41540	39700, 41540	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		39725 to 41515	39725, 41515	15MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		39750 to 41490	39750, 41490	20MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Conducted Emission	39675 to 41565	40620	5MHz	QPSK	1 RB / 12 RB Offset
		39700 to 41540	40620	10MHz	QPSK	1 RB / 24 RB Offset
		39725 to 41515	40620	15MHz	QPSK	1 RB / 37 RB Offset
		39750 to 41490	40620	20MHz	QPSK	1 RB / 50 RB Offset
-	Radiated Emission	39750 to 41490	40620	20MHz	QPSK	1 RB / 50 RB Offset

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

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	25deg. C, 65%RH	3.85Vdc	Anson Lin
Frequency Stability	25deg. C, 65%RH	3.85Vdc	Carlos Chen
Occupied Bandwidth	25deg. C, 65%RH	3.85Vdc	Carlos Chen
Band Edge	25deg. C, 65%RH	3.85Vdc	Carlos Chen
Peak to Average Ratio	25deg. C, 65%RH	3.85Vdc	Carlos Chen
Condcudeted Emission	25deg. C, 65%RH	3.85Vdc	Carlos Chen
Radiated Emission	25deg. C, 65%RH	120Vac, 60Hz	Anson Lin

3.4 EUT Operating Conditions

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

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
ANSI/TIA/EIA-603-C 2004

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

The radiated peak output power shall be according to the specific rule Part 27.50(h)(2) that “User stations are limited to 2 watts” and 27.50(i) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

4.1.2 Test Procedures

EIRP Measurement:

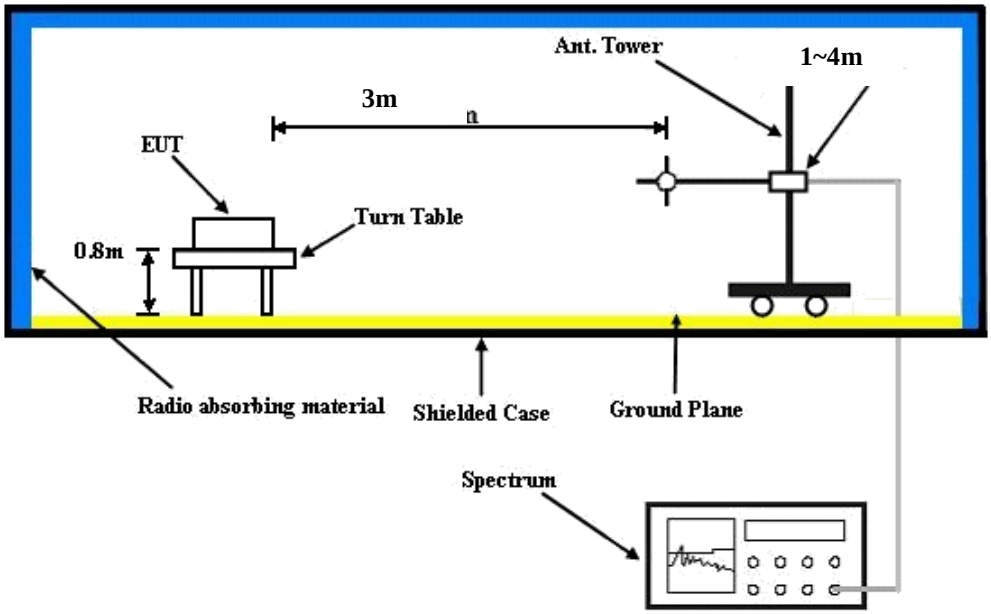
a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 10MHz for LTE mode.
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum 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.
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 b. Record the power level of S.G
d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

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:

4.1.4 Test Results

CONDUCTED OUTPUT POWER (dBm)

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 39675	Mid Ch 40620	High Ch 41565		Low Ch 39675	Mid Ch 40620	High Ch 41565	
			2498.5 MHz	2593.0 MHz	2687.5 MHz		2498.5 MHz	2593.0 MHz	2687.5 MHz	
41 / 5M	1	0	21.83	21.53	21.33	0	20.81	20.51	20.31	1
	1	12	22.14	21.84	21.64	0	21.12	20.82	20.62	1
	1	24	22.00	21.70	21.50	0	20.98	20.68	20.48	1
	12	0	21.10	20.80	20.60	1	20.08	19.78	19.58	2
	12	6	21.14	20.84	20.64	1	20.12	19.82	19.62	2
	12	13	21.08	20.78	20.58	1	20.06	19.76	19.56	2
	25	0	21.12	20.82	20.62	1	20.10	19.80	19.60	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 39700	Mid Ch 40620	High Ch 41540		Low Ch 39700	Mid Ch 40620	High Ch 41540	
			2501.0 MHz	2593.0 MHz	2685.0 MHz		2501.0 MHz	2593.0 MHz	2685.0 MHz	
41 / 10M	1	0	21.92	21.62	21.42	0	20.90	20.60	20.40	1
	1	24	22.23	21.93	21.73	0	21.21	20.91	20.71	1
	1	49	22.09	21.79	21.59	0	21.07	20.77	20.57	1
	25	0	21.19	20.89	20.69	1	20.17	19.87	19.67	2
	25	12	21.23	20.93	20.73	1	20.21	19.91	19.71	2
	25	25	21.17	20.87	20.67	1	20.15	19.85	19.65	2
	50	0	21.21	20.91	20.71	1	20.19	19.89	19.69	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 39725	Mid Ch 40620	High Ch 41515		Low Ch 39725	Mid Ch 40620	High Ch 41515	
			2503.5 MHz	2593.0 MHz	2682.5 MHz		2503.5 MHz	2593.0 MHz	2682.5 MHz	
41 / 15M	1	0	21.97	21.67	21.47	0	20.95	20.65	20.45	1
	1	37	22.28	21.98	21.78	0	21.26	20.96	20.76	1
	1	74	22.14	21.84	21.64	0	21.12	20.82	20.62	1
	36	0	21.24	20.94	20.74	1	20.22	19.92	19.72	2
	36	19	21.28	20.98	20.78	1	20.26	19.96	19.76	2
	36	39	21.22	20.92	20.72	1	20.20	19.90	19.70	2
	75	0	21.26	20.96	20.76	1	20.24	19.94	19.74	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 39750	Mid Ch 40620	High Ch 41490		Low Ch 39750	Mid Ch 40620	High Ch 41490	
			2506.0 MHz	2593.0 MHz	2680.0 MHz		2506.0 MHz	2593.0 MHz	2680.0 MHz	
41 / 20M	1	0	22.00	21.70	21.50	0	20.98	20.68	20.48	1
	1	50	22.31	22.01	21.81	0	21.29	20.99	20.79	1
	1	99	22.17	21.87	21.67	0	21.15	20.85	20.65	1
	50	0	21.27	20.97	20.77	1	20.25	19.95	19.75	2
	50	25	21.31	21.01	20.81	1	20.29	19.99	19.79	2
	50	50	21.25	20.95	20.75	1	20.23	19.93	19.73	2
	100	0	21.29	20.99	20.79	1	20.27	19.97	19.77	2

EIRP Power (dBm)

LTE Band 41							
Channel Bandwidth: 5MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
X	39675	2498.5	-17.18	38.99	21.81	151.71	H
	40620	2593.0	-16.73	38.17	21.44	139.32	
	41565	2687.5	-17.51	38.55	21.04	127.06	
	39675	2498.5	-27.45	39.27	11.82	15.19	V
	40620	2593.0	-27.45	38.68	11.23	13.27	
	41565	2687.5	-27.37	38.55	11.18	13.12	

LTE Band 41							
Channel Bandwidth: 5MHz / 16QAM							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
X	39675	2498.5	-18.39	38.99	20.60	114.82	H
	40620	2593.0	-17.74	38.17	20.43	110.41	
	41565	2687.5	-18.28	38.55	20.27	106.41	
	39675	2498.5	-28.37	39.27	10.90	12.29	V
	40620	2593.0	-27.84	38.68	10.84	12.13	
	41565	2687.5	-28.34	38.55	10.21	10.50	

LTE Band 41							
Channel Bandwidth: 10MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
X	39700	2501.0	-17.37	38.98	21.61	144.88	H
	40620	2593.0	-16.70	38.17	21.47	140.28	
	41540	2685.0	-17.35	38.45	21.10	128.82	
	39700	2501.0	-27.85	39.04	11.19	13.15	V
	40620	2593.0	-27.52	38.68	11.16	13.06	
	41540	2685.0	-27.57	38.60	11.03	12.68	

LTE Band 41							
Channel Bandwidth: 10MHz / 16QAM							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
X	39700	2501.0	-18.10	38.98	20.88	122.46	H
	40620	2593.0	-17.64	38.17	20.53	112.98	
	41540	2685.0	-18.18	38.45	20.27	106.41	
	39700	2501.0	-28.06	39.04	10.98	12.53	V
	40620	2593.0	-27.73	38.68	10.95	12.45	
	41540	2685.0	-28.25	38.60	10.35	10.84	

LTE Band 41							
Channel Bandwidth: 15MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
X	39725	2503.5	-17.40	39.09	21.69	147.57	H
	40620	2593.0	-16.70	38.17	21.47	140.28	
	41515	2682.5	-17.12	38.52	21.40	138.04	
	39725	2503.5	-27.68	39.04	11.36	13.68	V
	40620	2593.0	-27.43	38.68	11.25	13.34	
	41515	2682.5	-27.58	38.66	11.08	12.82	

LTE Band 41							
Channel Bandwidth: 15MHz / 16QAM							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
X	39725	2503.5	-18.17	39.09	20.92	123.59	H
	40620	2593.0	-17.59	38.17	20.58	114.29	
	41515	2682.5	-18.12	38.52	20.40	109.65	
	39725	2503.5	-27.98	39.04	11.06	12.76	V
	40620	2593.0	-27.67	38.68	11.01	12.62	
	41515	2682.5	-28.08	38.66	10.58	11.43	

LTE Band 41							
Channel Bandwidth: 20MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
X	39750	2506.0	-17.18	39.26	22.08	161.44	H
	40620	2593.0	-16.52	38.17	21.65	146.22	
	41490	2680.0	-17.20	38.71	21.51	141.58	
	39750	2506.0	-27.35	39.33	11.98	15.78	V
	40620	2593.0	-27.31	38.68	11.37	13.71	
	41490	2680.0	-27.54	38.76	11.22	13.24	

LTE Band 41							
Channel Bandwidth: 20MHz / 16QAM							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
X	39750	2506.0	-17.91	39.26	21.35	136.46	H
	40620	2593.0	-17.25	38.17	20.92	123.59	
	41490	2680.0	-17.93	38.71	20.78	119.67	
	39750	2506.0	-28.21	39.33	11.12	12.94	V
	40620	2593.0	-27.64	38.68	11.04	12.71	
	41490	2680.0	-28.12	38.76	10.64	11.59	

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stabiliity Measurement

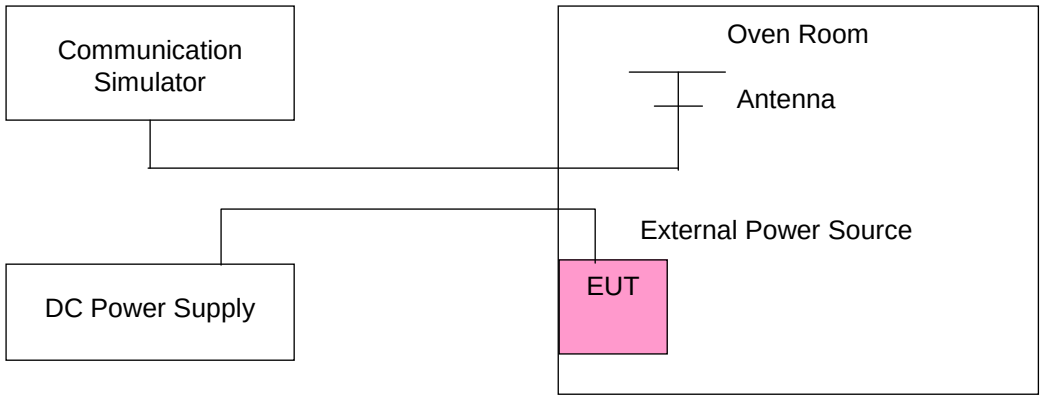
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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

Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (ppm)				Limit (ppm)
	LTE Band 41				
	5MHz	10MHz	15MHz	20MHz	
3.85	0.00114	0.00044	0.00006	0.00087	2.5
3.6	0.00101	0.00034	0.00057	0.00121	2.5
4.40	0.00061	0.00147	0.00066	0.00076	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.40Vdc.

Frequency Error vs. Temperature

Temp. (℃)	Frequency Error (ppm)				Limit (ppm)
	LTE Band 41				
	5MHz	10MHz	15MHz	20MHz	
-30	0.00129	0.00115	0.00039	0.00004	2.5
-20	0.00099	0.00091	0.00068	0.00133	2.5
-10	0.00061	0.00082	0.00107	0.00073	2.5
0	0.00135	0.00120	0.00096	0.00075	2.5
10	0.00013	0.00019	0.00130	0.00088	2.5
20	-0.00073	-0.00074	-0.00121	-0.00108	2.5
30	-0.00103	-0.00079	-0.00088	-0.00012	2.5
40	-0.00152	-0.00071	-0.00132	-0.00031	2.5
50	-0.00102	-0.00076	-0.00056	-0.00126	2.5
60	-0.00062	-0.00024	-0.00136	-0.00109	2.5

4.3 Occupied Bandwidth Measurement

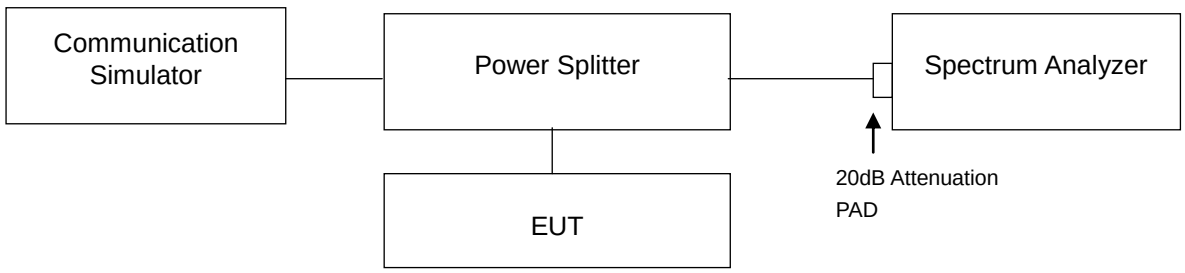
4.3.1 Limits Of Occupied Bandwidth Measurement

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 Procedure

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

4.3.3 Test Setup

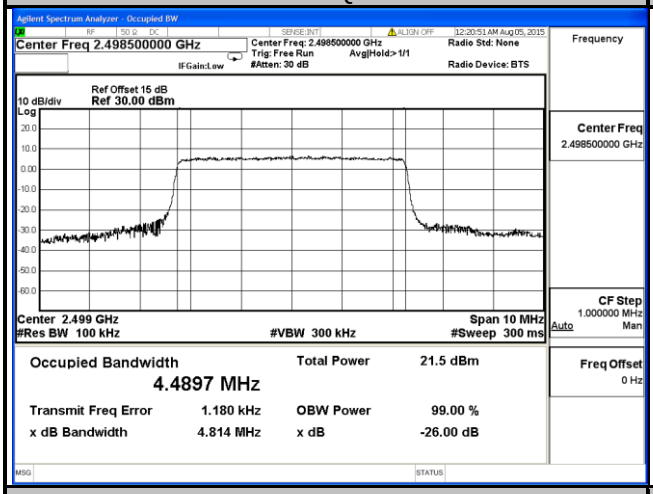


4.3.4 Test Result

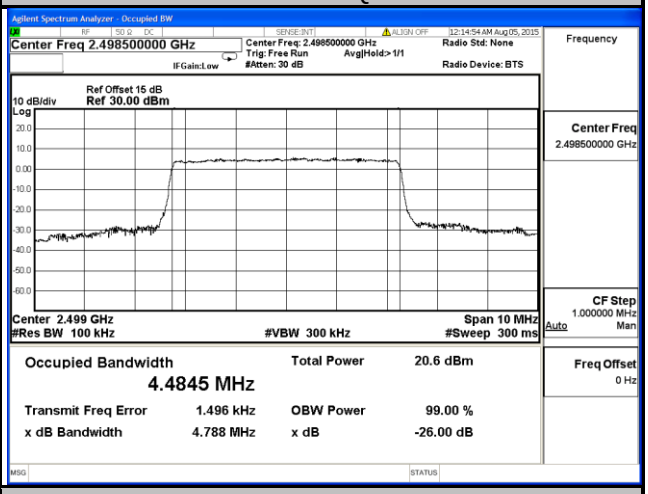
LTE Band 41							
Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
39675	2498.5	4.4897	4.4845	39700	2501.0	8.9560	8.9495
40620	2593.0	4.4895	4.4798	40620	2593.0	8.9534	8.9482
41565	2687.5	4.4855	4.4809	41540	2685.0	8.9479	8.9450

Spectrum Plot of Worst Value

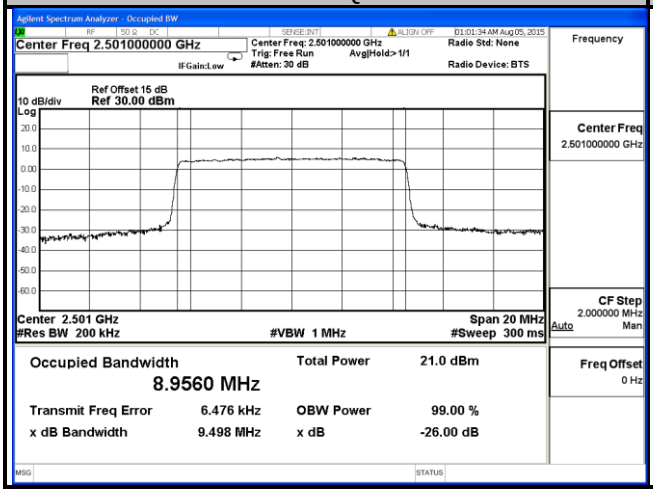
5MHz / QPSK



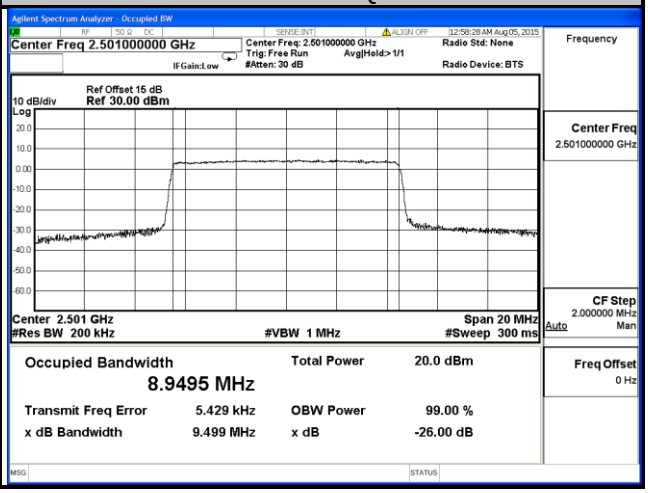
5MHz / 16QAM



10MHz / QPSK



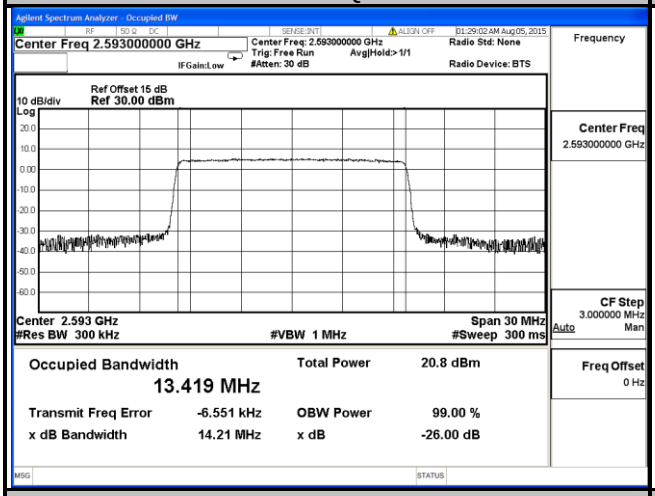
10MHz / 16QAM



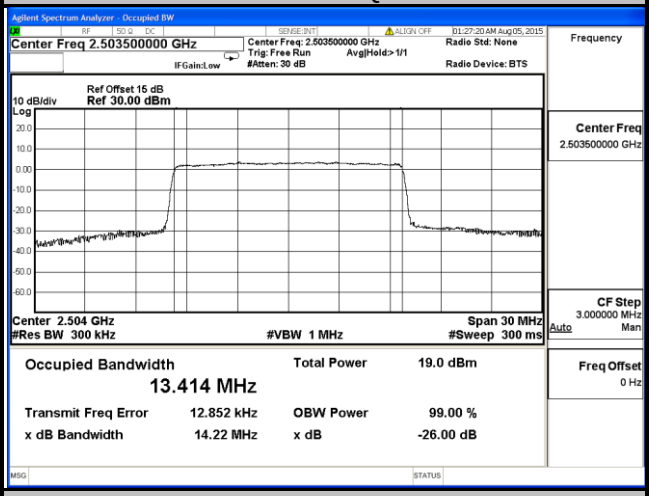
LTE Band 41							
Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
39725	2503.5	13.417	13.414	39750	2506.0	17.863	17.868
40620	2593.0	13.419	13.404	40620	2593.0	17.862	17.846
41515	2682.5	13.412	13.404	41490	2680.0	17.844	17.840

Spectrum Plot of Worst Value

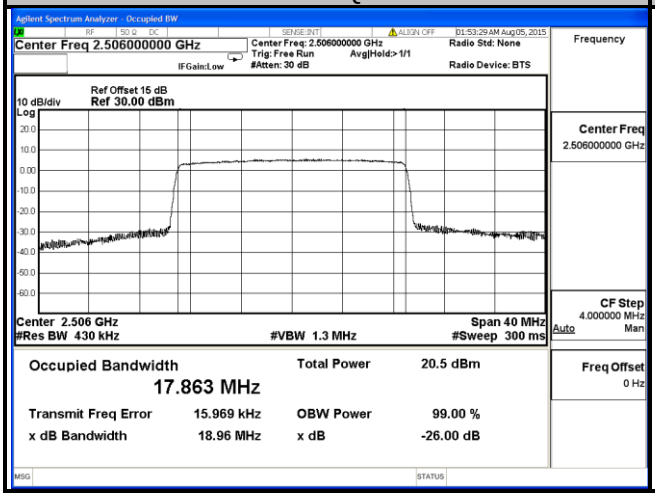
15MHz / QPSK



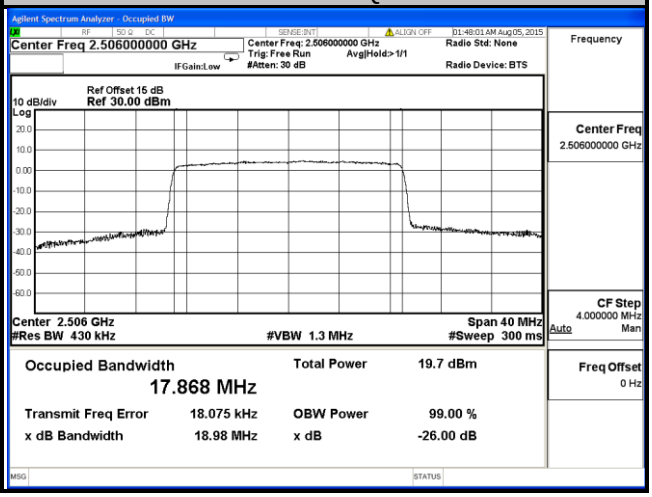
15MHz / 16QAM



20MHz / QPSK



20MHz / 16QAM

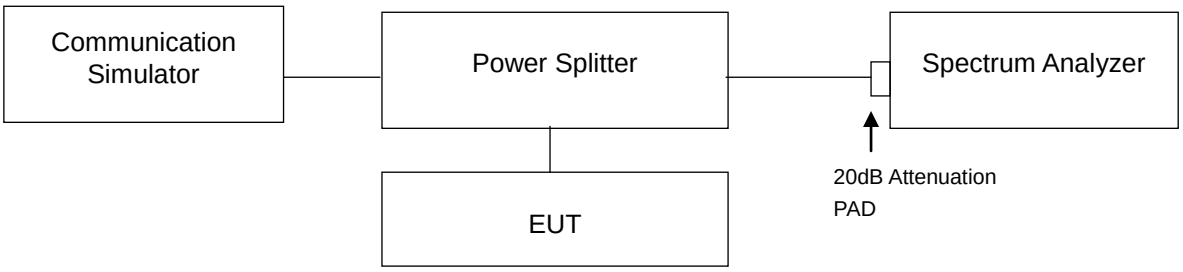


4.4 Band Edge Measurement

4.4.1 Limits of Band Edge Measurement

According to FCC 27.53(l)(4) specified that power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

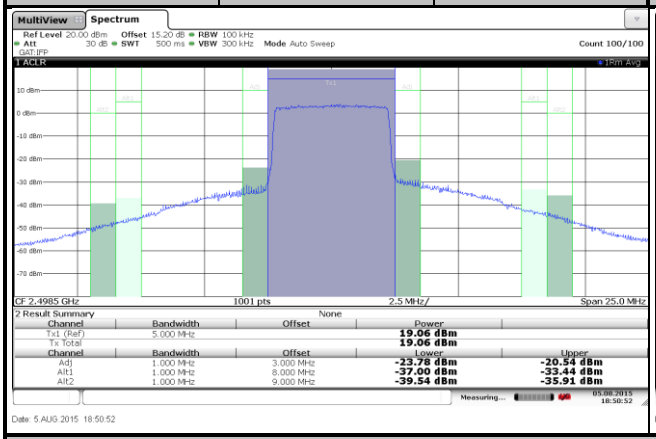
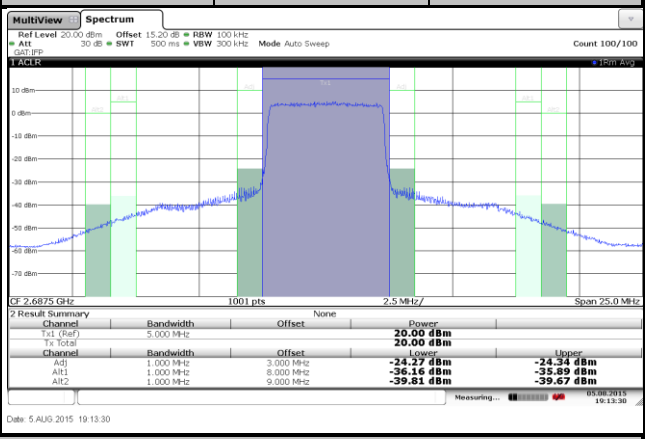
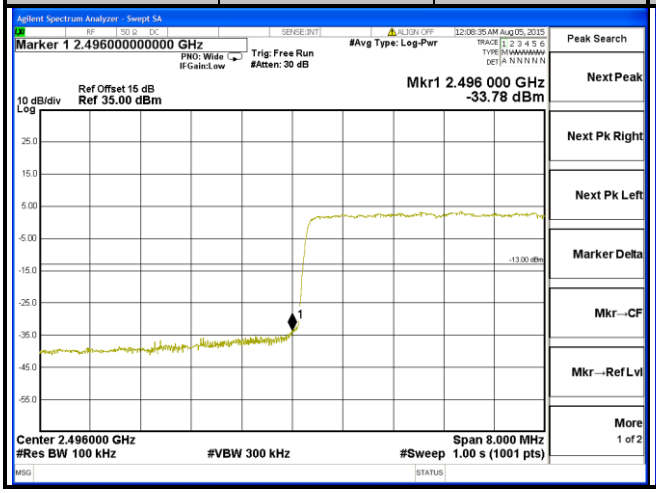
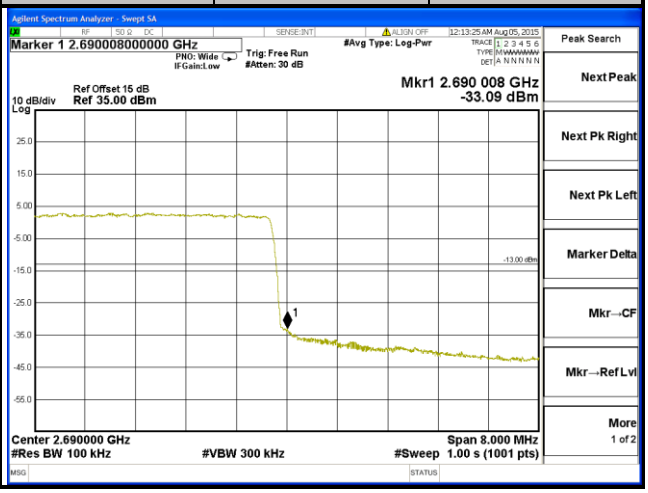
4.4.2 Test Setup

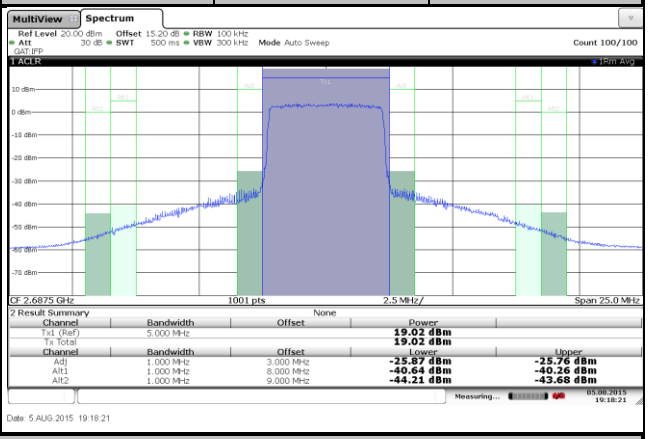
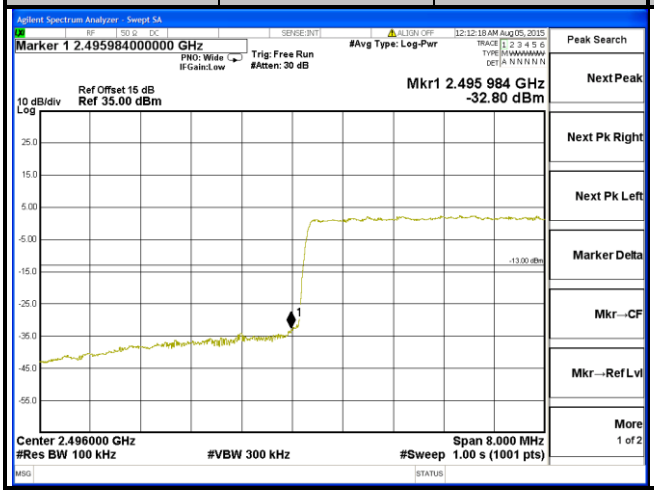
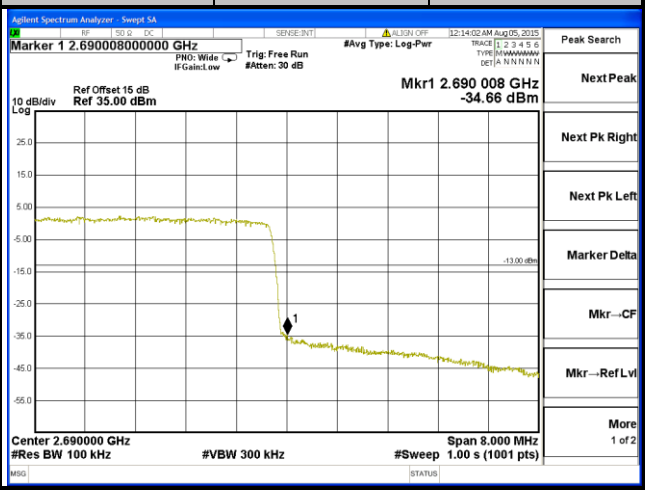


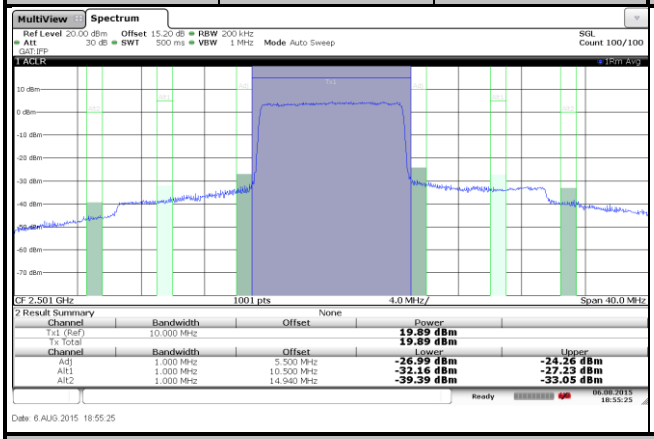
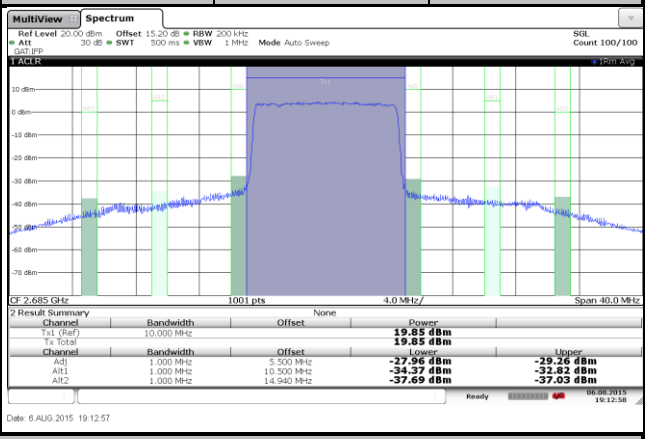
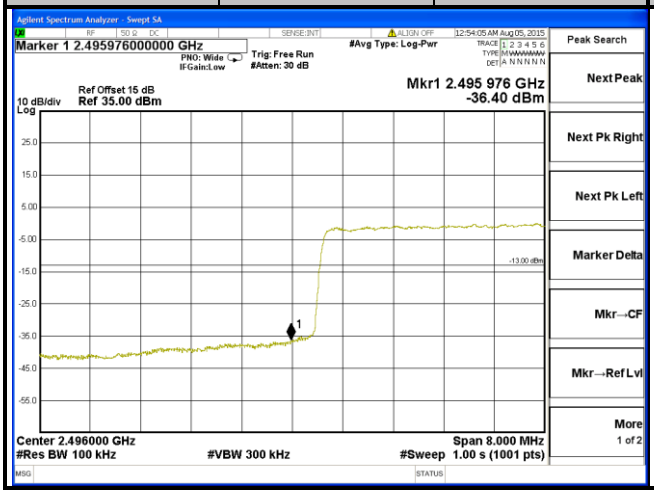
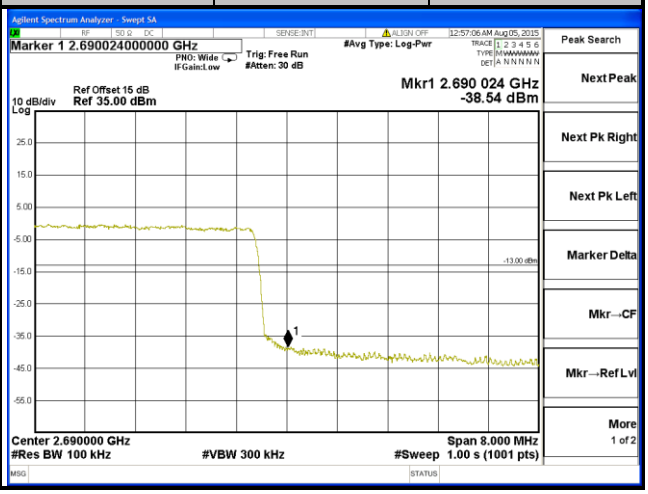
4.4.3 Test Procedures

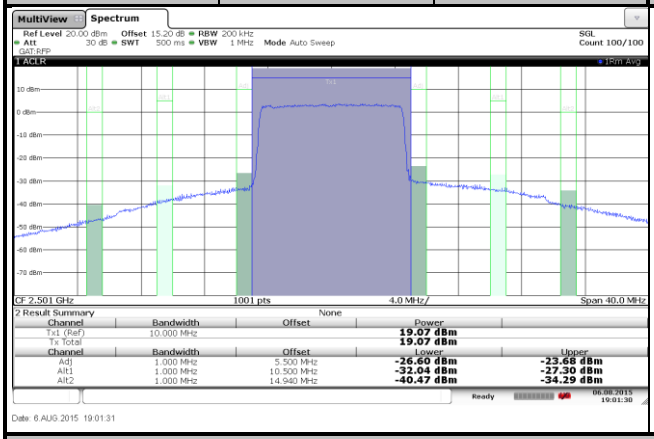
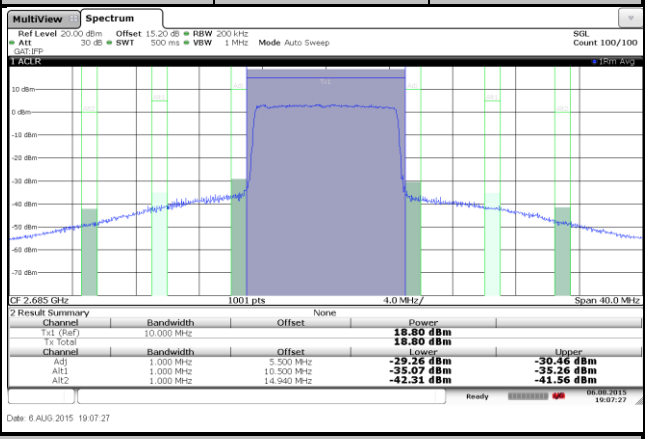
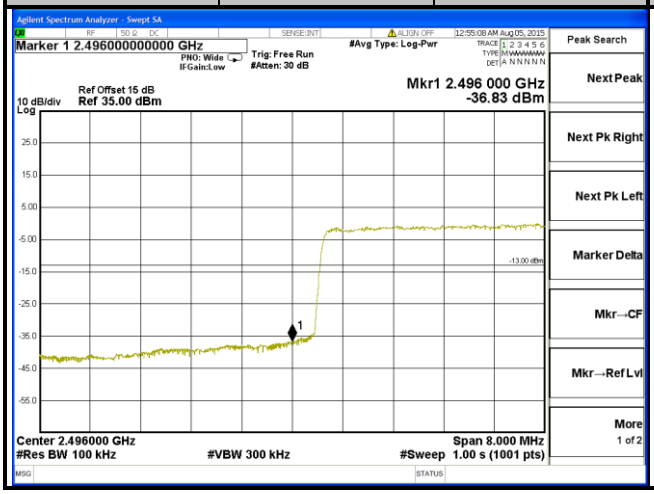
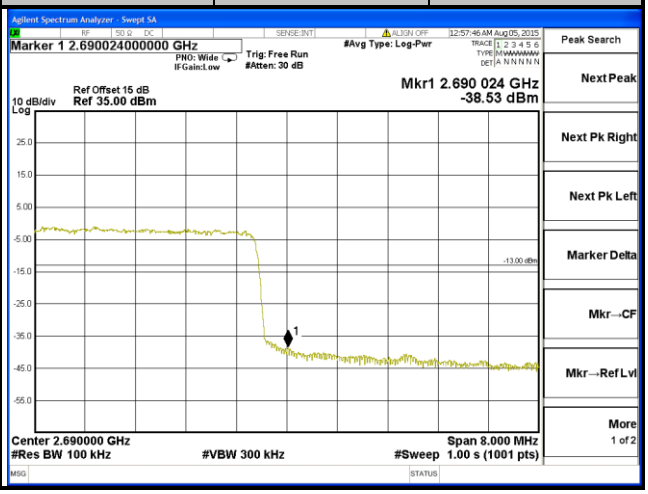
a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
c. The center frequency of spectrum is the band edge frequency and span is 20MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (Channel bandwidth 5MHz).
d. The center frequency of spectrum is the band edge frequency and span is 40MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (Channel bandwidth 10MHz).
e. The center frequency of spectrum is the band edge frequency and span is 60MHz. RB of the spectrum is 200kHz and VB of the spectrum is 1MHz (Channel bandwidth 15MHz).
f. The center frequency of spectrum is the band edge frequency and span is 80MHz. RB of the spectrum is 200kHz and VB of the spectrum is 1MHz (Channel bandwidth 20MHz).
g. Record the max trace plot into the test report.

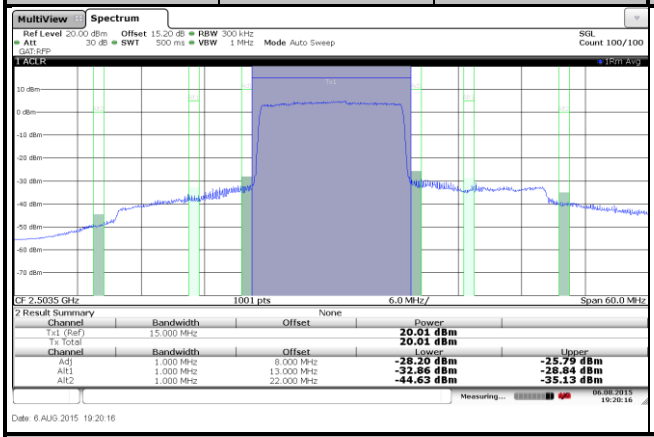
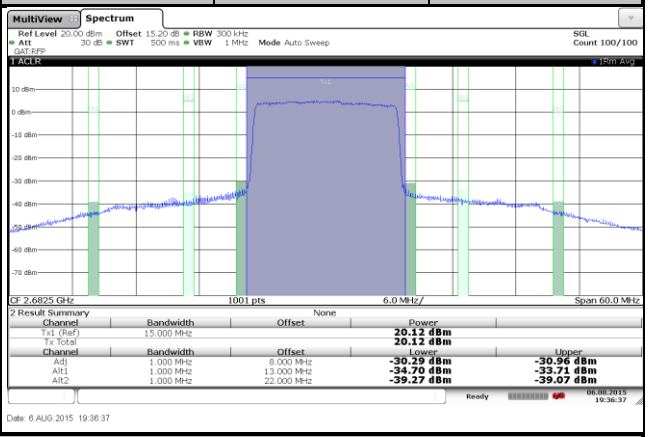
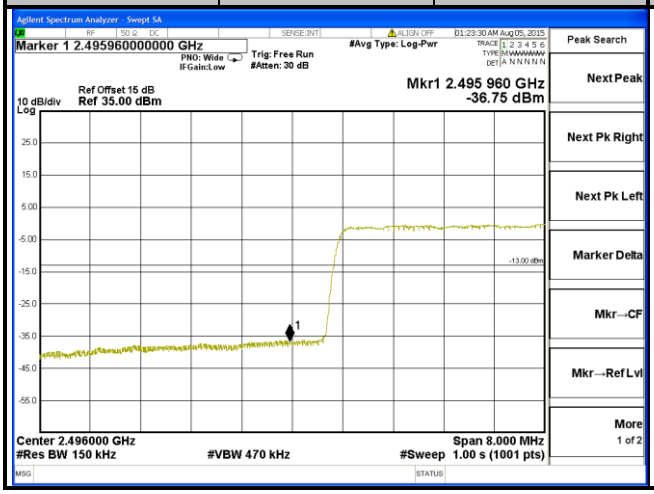
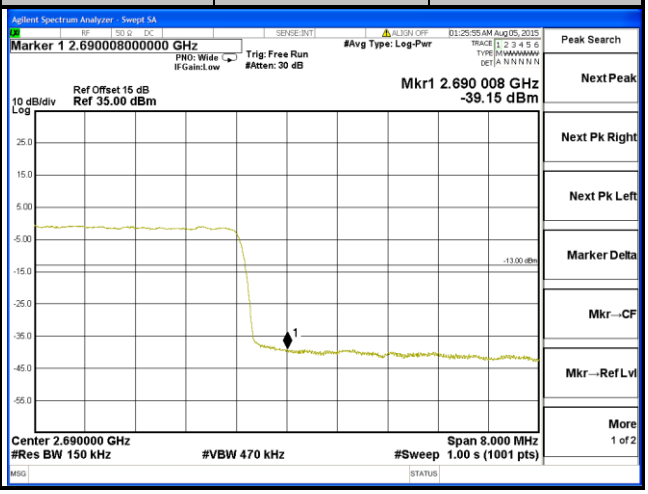
4.4.4 Test Results

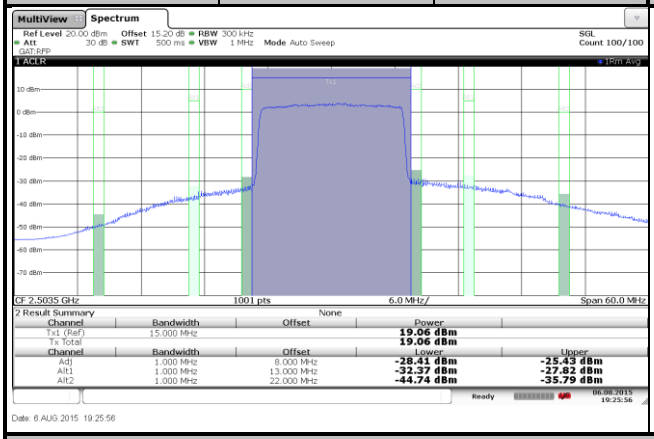
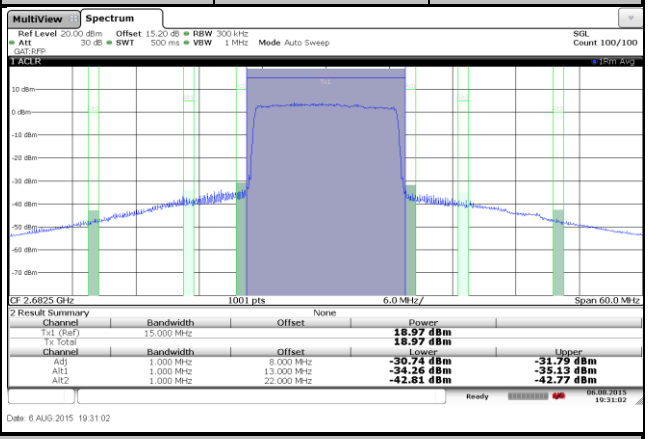
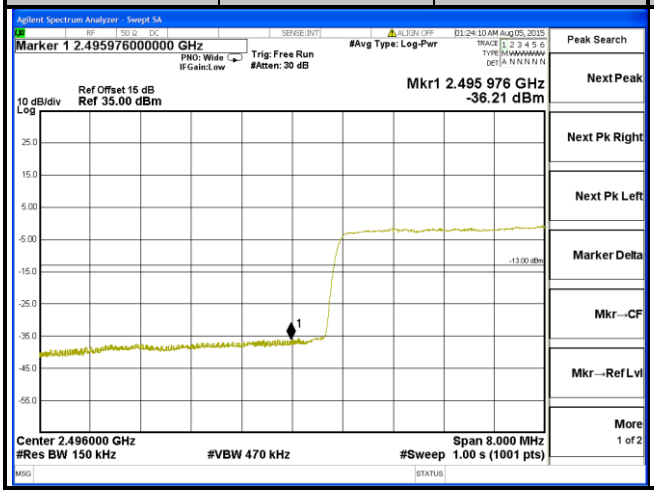
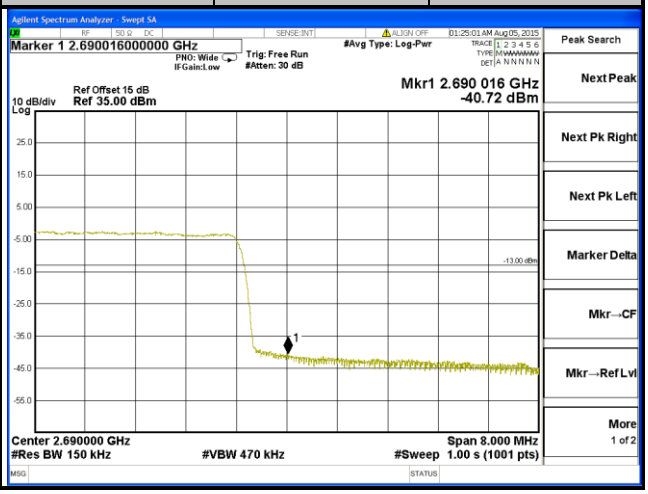
LTE Band 41					
Channel Bandwidth: 5MHz / QPSK					
<Adjacent Channel Band Edge>					
Channel	39675	25 RB	Channel	41565	25 RB
					
<Channel Band Edge>					
Channel	39675	25 RB	Channel	41565	25 RB
					

LTE Band 41					
Channel Bandwidth: 5MHz / 16QAM					
<Adjacent Channel Band Edge>					
Channel	39675	25 RB	Channel	41565	25 RB
					
<Channel Band Edge>					
Channel	39675	25 RB	Channel	41565	25 RB
					

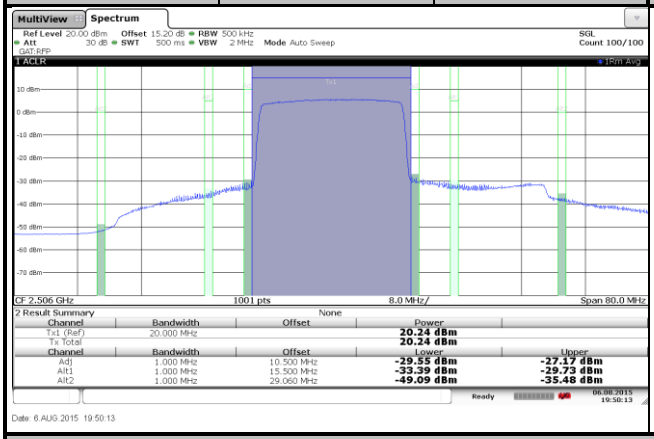
LTE Band 41					
Channel Bandwidth: 10MHz / QPSK					
<Adjacent Channel Band Edge>					
Channel	39700	50 RB	Channel	41540	50 RB
					
<Channel Band Edge>					
Channel	39700	50 RB	Channel	41540	50 RB
					

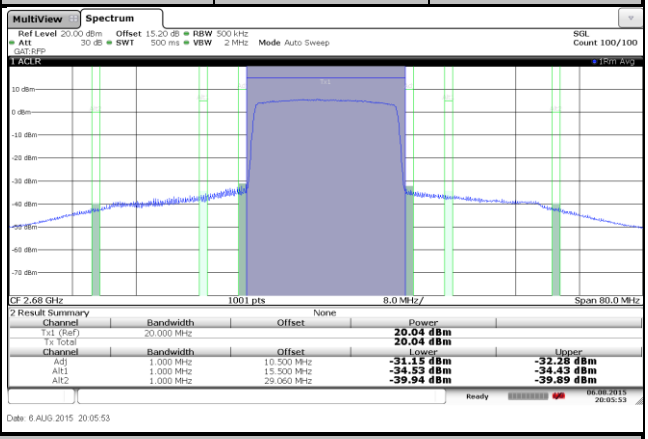
LTE Band 41					
Channel Bandwidth: 10MHz / 16QAM					
<Adjacent Channel Band Edge>					
Channel	39700	50 RB	Channel	41540	50 RB
					
<Channel Band Edge>					
Channel	39700	50 RB	Channel	41540	50 RB
					

LTE Band 41					
Channel Bandwidth: 15MHz / QPSK					
<Adjacent Channel Band Edge>					
Channel	39725	75 RB	Channel	41515	75 RB
					
<Channel Band Edge>					
Channel	39725	75 RB	Channel	41515	75 RB
					

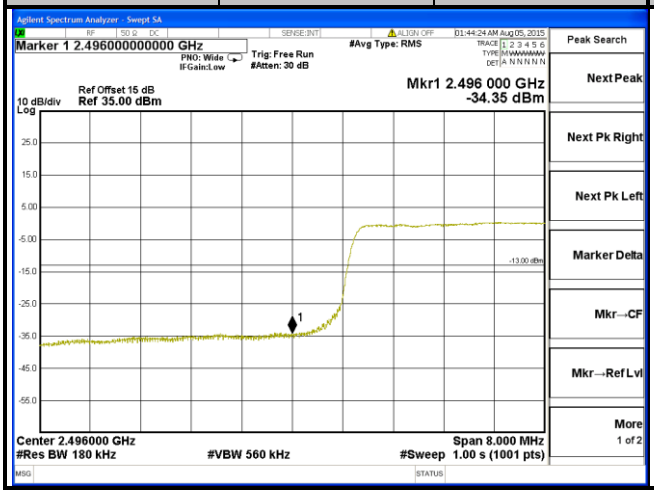
LTE Band 41					
Channel Bandwidth: 15MHz / 16QAM					
<Adjacent Channel Band Edge>					
Channel	39725	75 RB	Channel	41515	75 RB
					
<Channel Band Edge>					
Channel	39725	75 RB	Channel	41515	75 RB
					

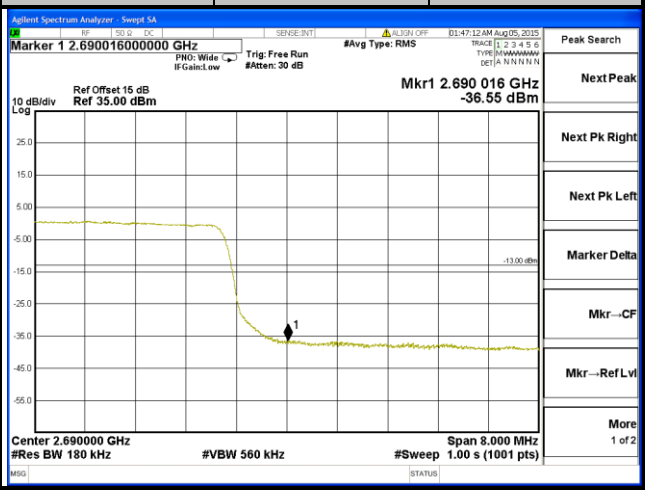
LTE Band 41					
Channel Bandwidth: 20MHz / QPSK					
<Adjacent Channel Band Edge>					
Channel	39750	100 RB	Channel	41490	100 RB

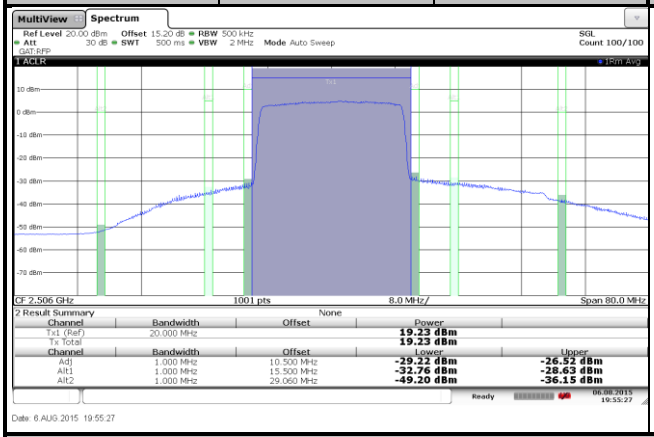
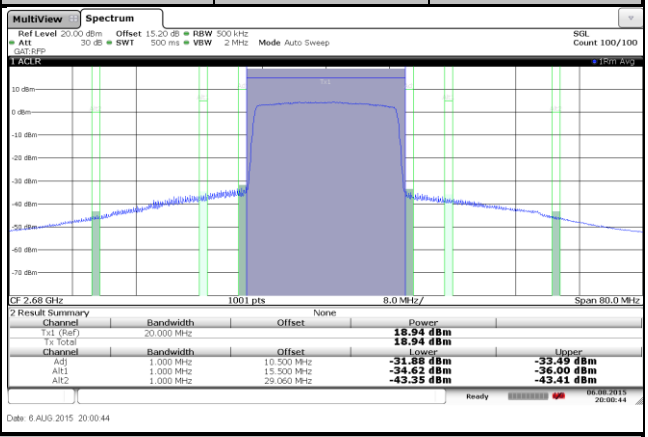
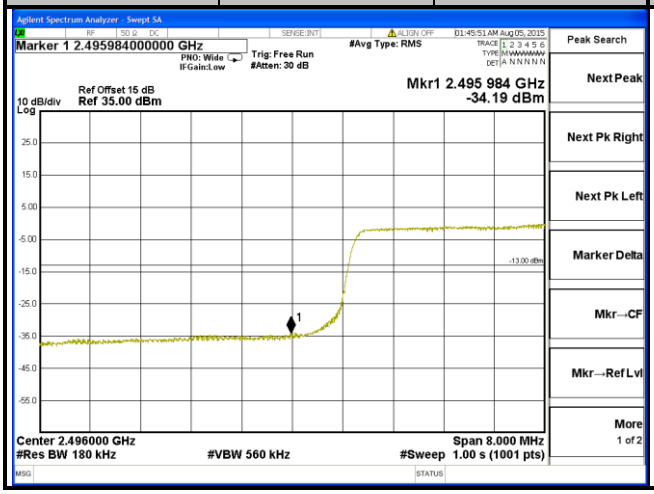
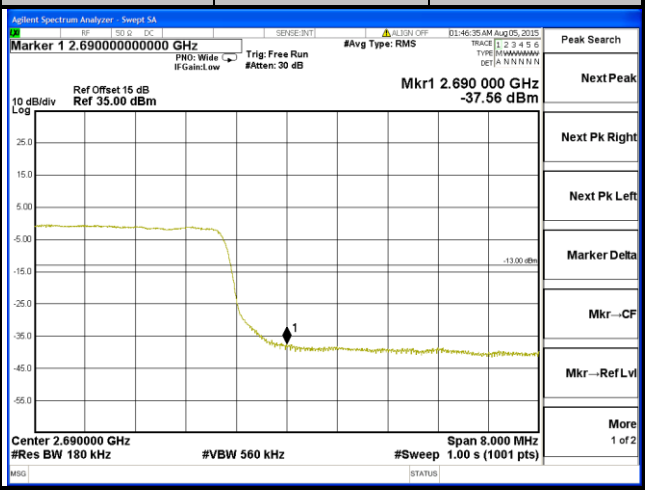




<Channel Band Edge>					
Channel	39750	100 RB	Channel	41490	100 RB





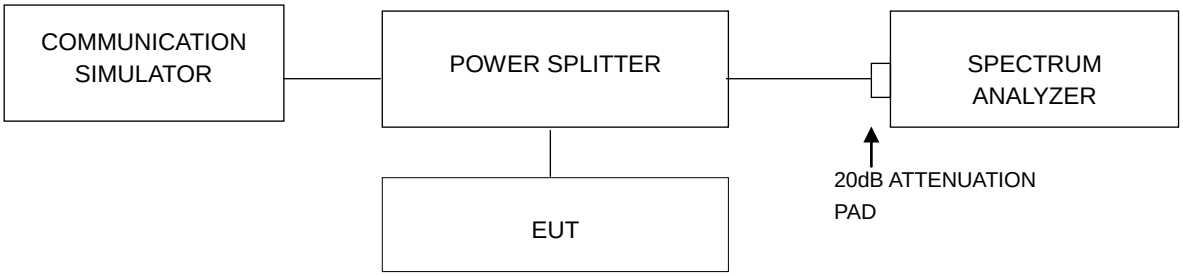
LTE Band 41					
Channel Bandwidth: 20MHz / 16QAM					
<Adjacent Channel Band Edge>					
Channel	39750	100 RB	Channel	41490	100 RB
					
<Channel Band Edge>					
Channel	39750	100 RB	Channel	41490	100 RB
					

4.5 Peak To Average Ratio

4.5.1 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

4.5.2 Test Setup



4.5.3 Test Procedures

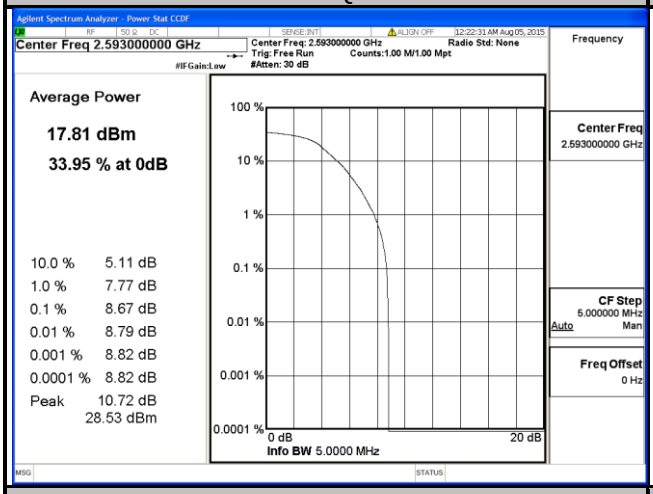
1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

4.5.4 Test Results

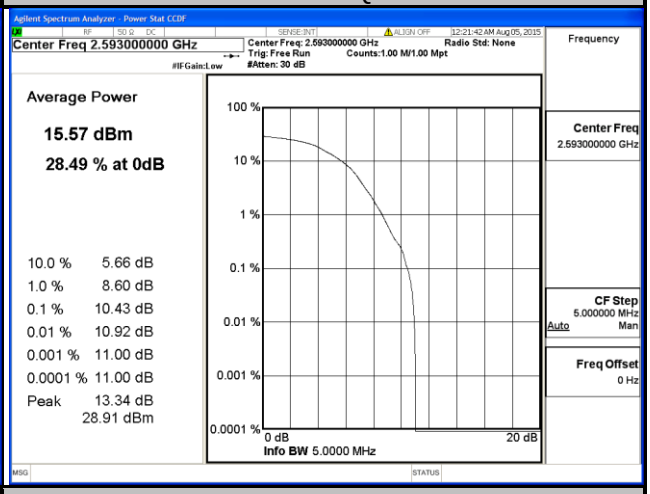
LTE Band 41							
Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
39675	2498.5	8.41	9.69	39700	2501.0	8.52	9.37
40620	2593.0	8.67	10.43	40620	2593.0	10.61	10.88
41565	2687.5	7.69	9.64	41540	2685.0	7.50	8.94

Spectrum Plot of Worst Value

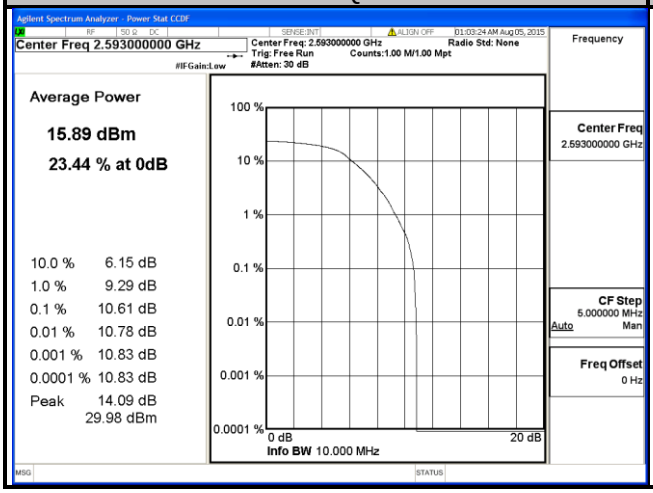
5MHz / QPSK



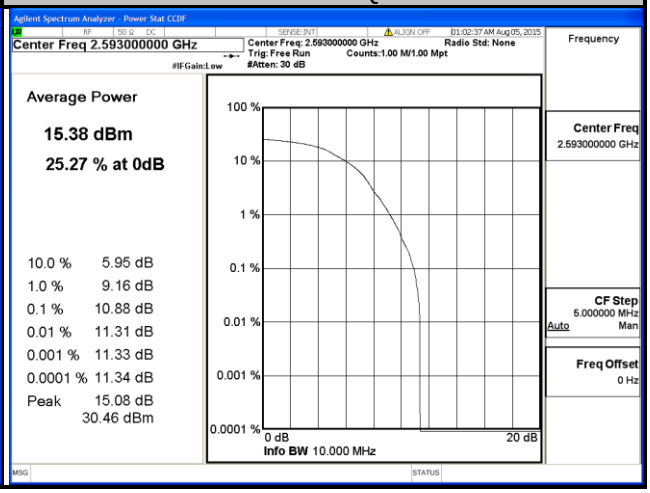
5MHz / 16QAM



10MHz / QPSK



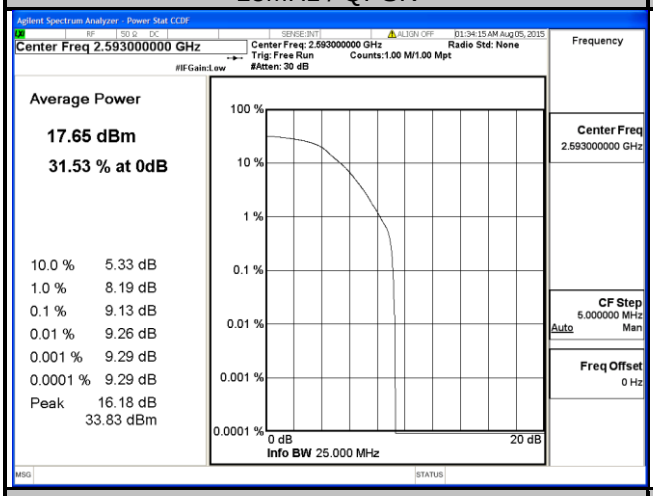
10MHz / 16QAM



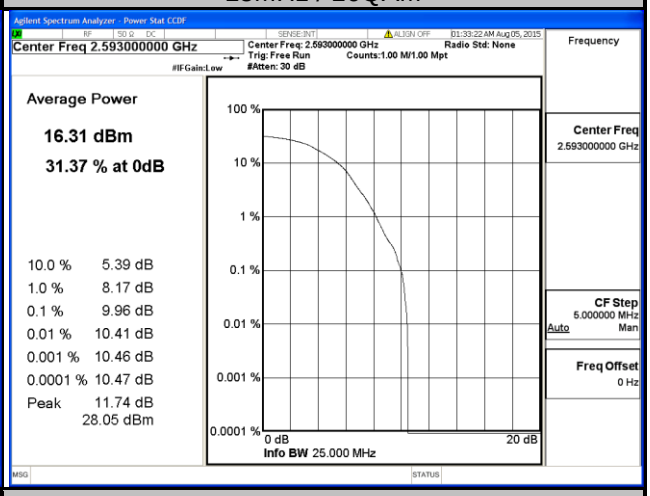
LTE Band 41							
Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
39725	2503.5	8.28	9.91	39750	2506.0	8.85	11.60
40620	2593.0	9.13	9.96	40620	2593.0	8.34	9.06
41515	2682.5	7.28	9.16	41490	2680.0	8.07	9.40

Spectrum Plot of Worst Value

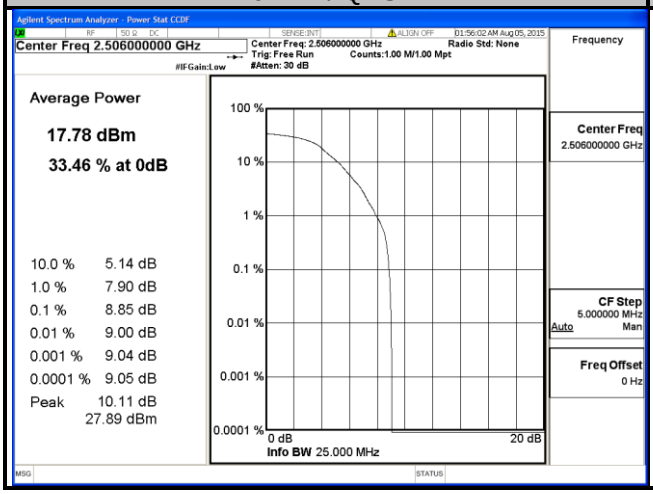
15MHz / QPSK



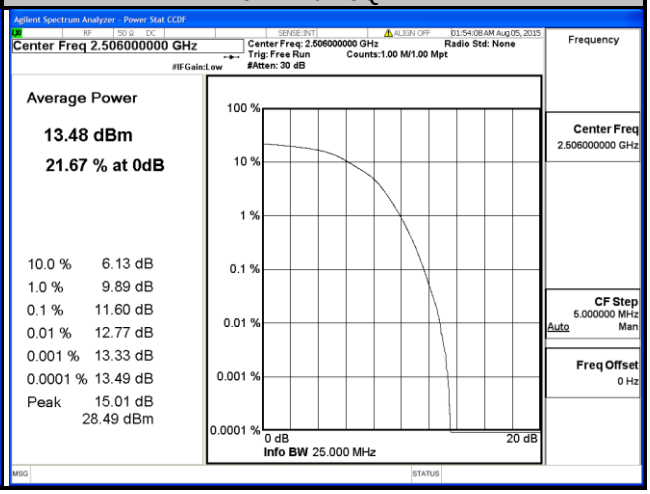
15MHz / 16QAM



20MHz / QPSK



20MHz / 16QAM

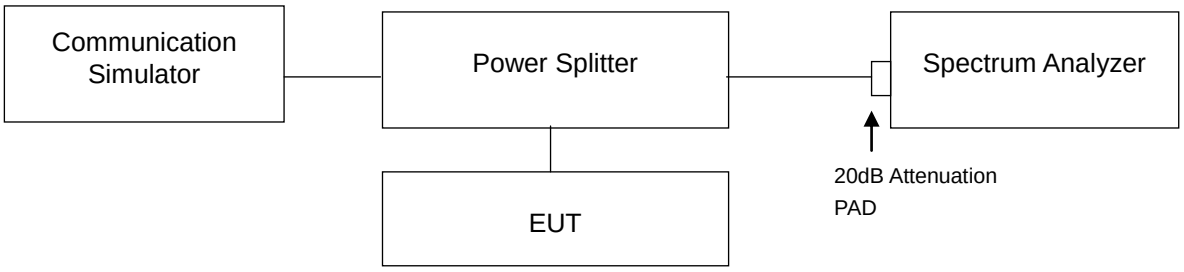


4.6 Conducted Spurious Emissions

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 55 +10 log10(P) dB. The limit of emission is equal to -25dBm.

4.6.2 Test Setup

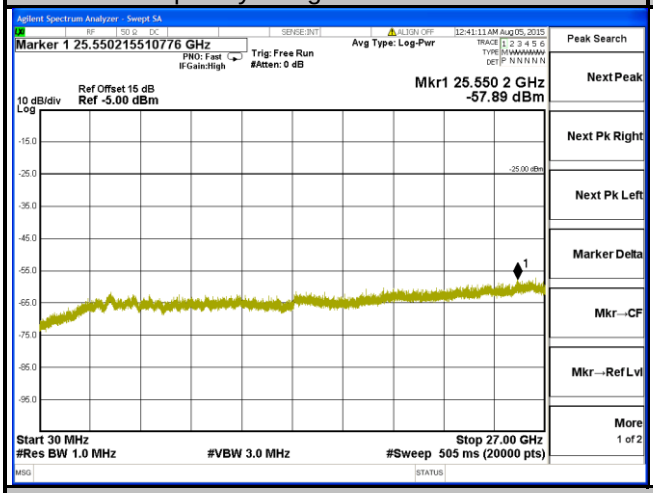
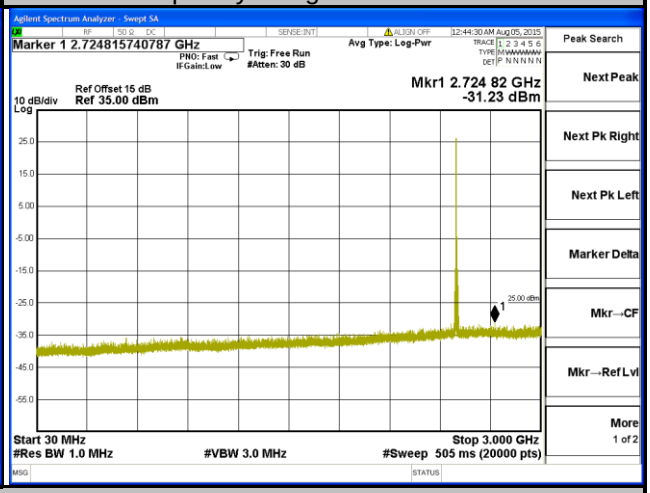
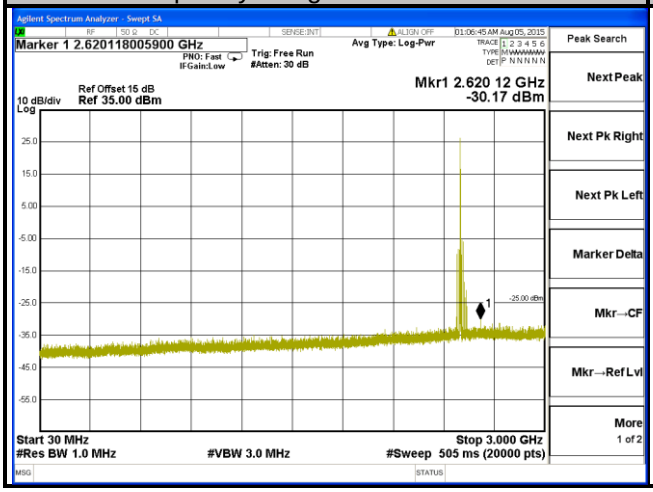
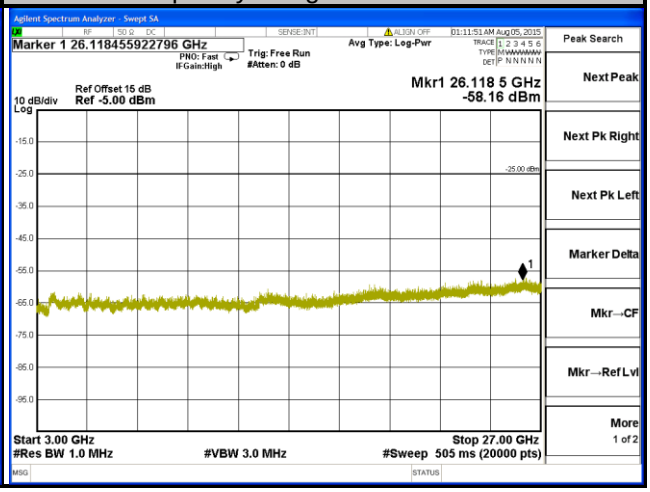


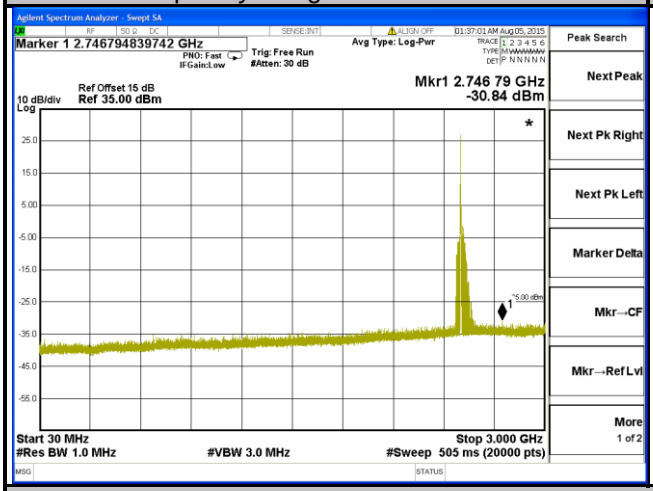
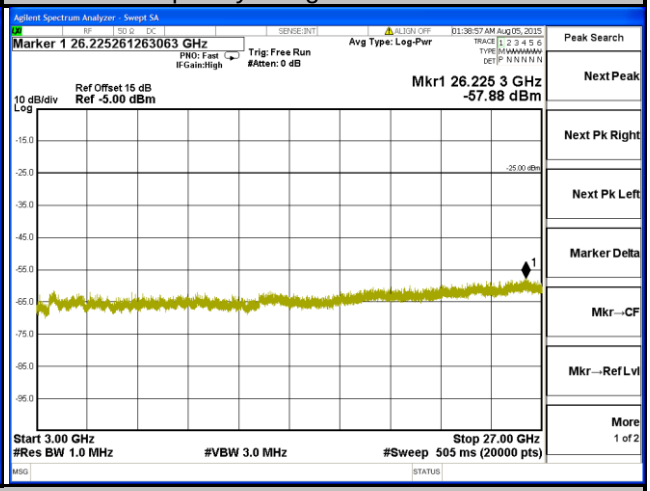
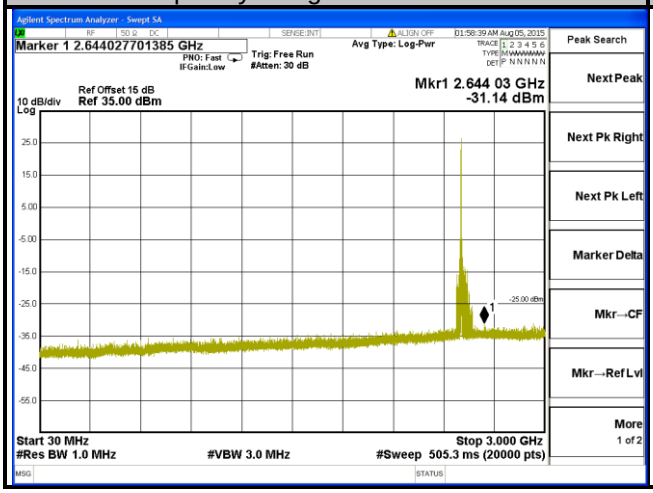
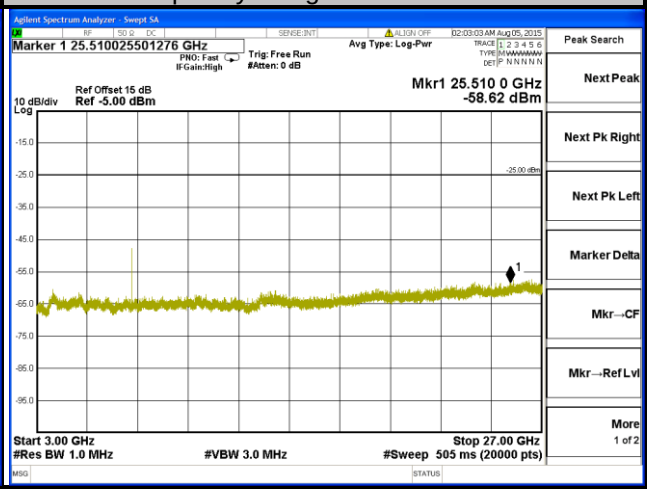
4.6.3 Test Procedure

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

b. Measuring frequency range is from 30MHz to 27GHz for LTE Band 41. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

4.6.4 Test Results

LTE Band 41	
Channel 40620	
5MHz / QPSK	
Frequency Range : 30MHz~3GHz	Frequency Range : 3GHz~27GHz
	
10MHz / QPSK	
Frequency Range : 30MHz~3GHz	Frequency Range : 3GHz~27GHz
	

LTE Band 41	
Channel 40620	
15MHz / QPSK	
Frequency Range : 30MHz~3GHz	Frequency Range : 3GHz~27GHz
	
20MHz / QPSK	
Frequency Range : 30MHz~3GHz	Frequency Range : 3GHz~27GHz
	

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 55 +10 log10(P) dB. The limit of emission equal to -25dBm.

4.7.2 Test Procedure

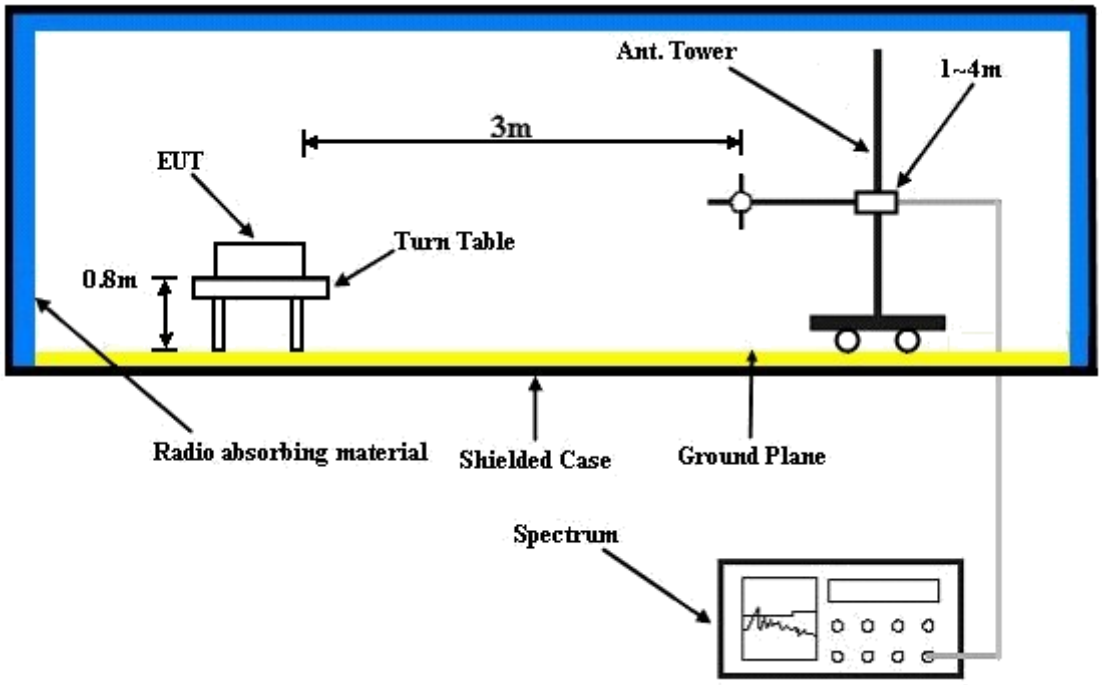
a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 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



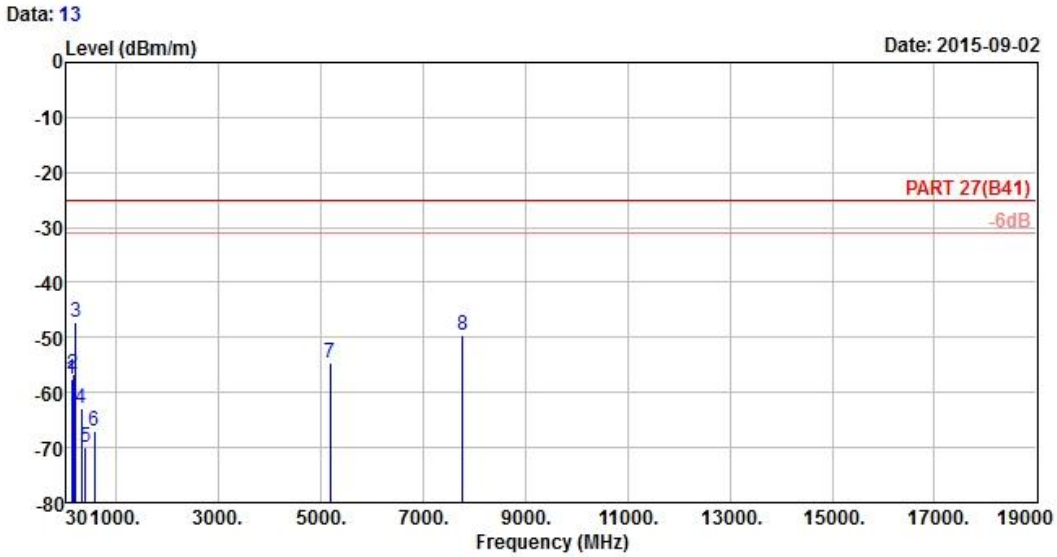
For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.5 Test Results

LTE Band 41

Channel Bandwidth: 20MHz / QPSK

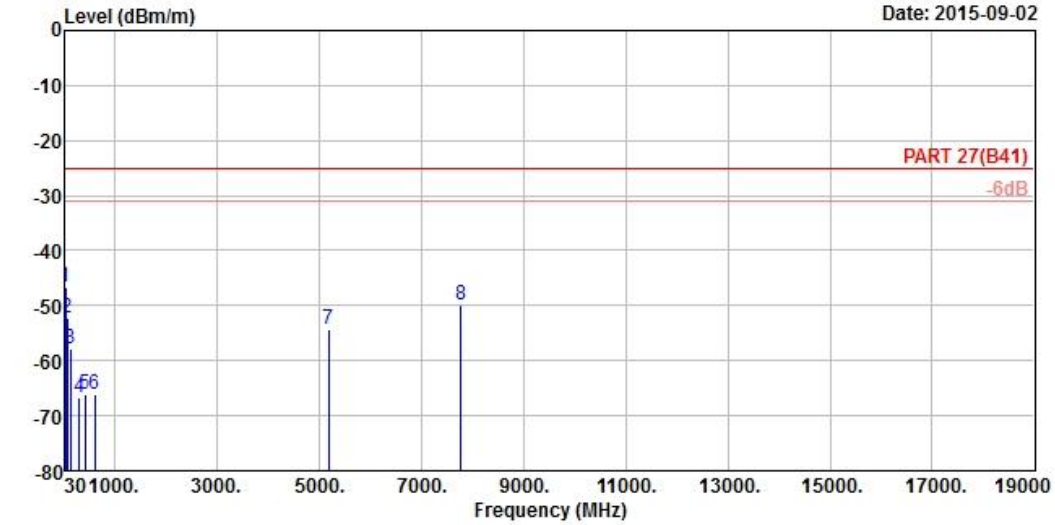
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART 27(B41) 3m HORIZONTAL
Remark : LTE Band 41_QPSK_20M_(1,50)
Tested by: Anson Lin
Plane : Z

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	127.20	-57.70	-48.66	-25.00	-32.70	-9.04	Peak
2	159.87	-56.74	-51.90	-25.00	-31.74	-4.84	Peak
3 pp	213.33	-47.14	-39.67	-25.00	-22.14	-7.47	Peak
4	321.70	-62.84	-56.17	-25.00	-37.84	-6.67	Peak
5	395.90	-69.94	-63.97	-25.00	-44.94	-5.97	Peak
6	578.60	-67.15	-65.51	-25.00	-42.15	-1.64	Peak
7	5186.00	-54.57	-51.71	-25.00	-29.57	-2.86	Peak
8	7779.00	-49.65	-54.77	-25.00	-24.65	5.12	Peak

Data: 14



Site : 966 Chamber 5
Condition: PART 27(B41) 3m VERTICAL
Remark : LTE Band 41_QPSK_20M_(1,50)
Tested by: Anson Lin
Plane : Z

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1 pp	41.34	-46.75	-46.34	-25.00	-21.75	-0.41	Peak
2	65.10	-52.20	-44.17	-25.00	-27.20	-8.03	Peak
3	127.47	-57.90	-48.86	-25.00	-32.90	-9.04	Peak
4	307.70	-66.84	-59.95	-25.00	-41.84	-6.89	Peak
5	409.20	-66.26	-60.39	-25.00	-41.26	-5.87	Peak
6	612.90	-66.14	-65.35	-25.00	-41.14	-0.79	Peak
7	5186.00	-54.46	-51.60	-25.00	-29.46	-2.86	Peak
8	7779.00	-49.79	-54.91	-25.00	-24.79	5.12	Peak

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 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:

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF Lab/Telecom Lab
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

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