FCC Test Report

(PART 27)

Report No.:	RF160112C17-2
FCC ID:	NM82PS6200
Test Model:	2PS6200
Received Date:	Dec. 21, 2015
Test Date:	Jan. 20, 2016 ~ Jan. 29, 2016
Issued Date:	Feb. 25, 2016
Applicant:	HTC Corporation
Address:	1F, 6-3 Baoqiang Road, Xindian District, New Taipei City, Taiwan 231
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 (1):	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.
Test Location (2):	No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C

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Release Control Record

Issue No.	Description	Date Issued
RF160112C17-2	Original Release	Feb. 25, 2016

1 Certificate of Conformity

Product:	Smartphone
Brand:	HTC
Test Model:	2PS6200
Sample Status:	Production Unit
Applicant:	HTC Corporation
Test Date:	Jan. 20, 2016 ~ Jan. 29, 2016
Standards:	FCC Part 27, Subpart C, L

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:** Feb. 25, 2016

Ivonne Wu / Supervisor

Approved by : _____ , **Date:** Feb. 25, 2016

Stanley Wu / Assistant Manager

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2 (LTE 12)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(C)(10)	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(g)	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(g)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(g)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(g)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -32.93 dB at 197.40 MHz.

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	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	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 Technologies	N9038A	MY52260177	May 19, 2015	May 18, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2015	Dec. 16, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna ETS-Lindgren	3117	00143293	Jan. 04, 2016	Jan. 03, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Jan. 04, 2016	Jan. 03, 2017
Bluetooth Tester	CBT	100980	Apr. 27, 2015	Apr. 26, 2017
Agilent Communications Tester-Wireless	8960 Series 10	MY53201073	Jul. 03, 2015	Jul. 02, 2017
Preamplifier Agilent	310N	187226	Jun. 29, 2015	Jun. 28, 2016
Preamplifier Agilent	83017A	MY39501357	Jun. 29, 2015	Jun. 28, 2016
Power Meter Anritsu	ML2495A	1232002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor Anritsu	MA2411B	1207325	Sep. 21, 2015	Sep. 20, 2016
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 27, 2015	Jun. 26, 2016
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 27, 2015	Jun. 26, 2016
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	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 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HsinTien Chamber 1.
3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Site Registration No. is 149147.
5. The IC Site Registration No. is IC7450I-1.

3 General Information

3.1 General Description of EUT

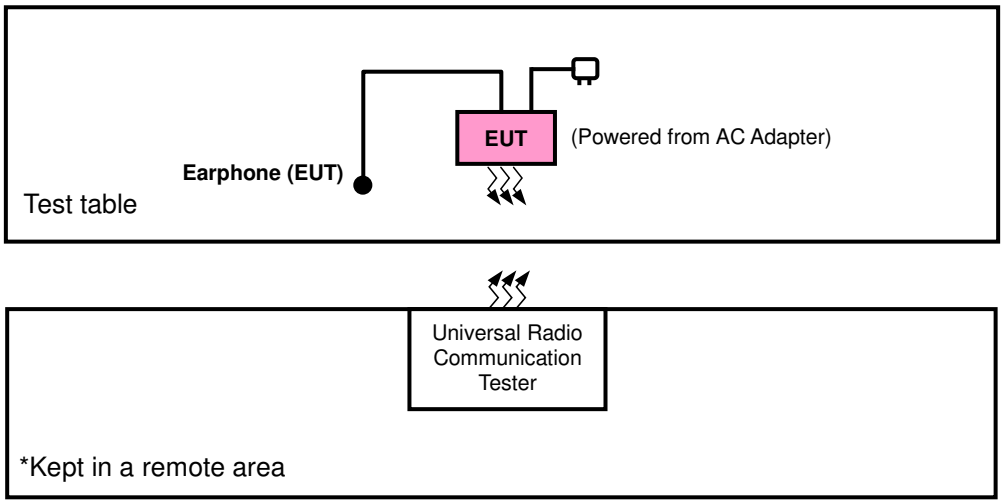
Product	Smartphone	
Brand	HTC	
Test Model	2PS6200	
Status of EUT	Production Unit	
Power Supply Rating	5.0 Vdc (adapter or host equipment) 3.85 Vdc (Li-ion battery)	
Modulation Type	LTE	QPSK, 16QAM
Frequency Range	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	699.7 ~ 715.3 MHz
	LTE Band 12 (Channel Bandwidth: 3 MHz)	700.5 ~ 714.5 MHz
	LTE Band 12 (Channel Bandwidth: 5 MHz)	701.5 ~ 713.5 MHz
	LTE Band 12 (Channel Bandwidth: 10 MHz)	704.0 ~ 711.0 MHz
Emission Designator	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	1M09G7D
	LTE Band 12 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE Band 12 (Channel Bandwidth: 5 MHz)	4M50G7D
	LTE Band 12 (Channel Bandwidth: 10 MHz)	8M97W7D
Max. ERP Power	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	51.51mW
	LTE Band 12 (Channel Bandwidth: 3 MHz)	51.71mW
	LTE Band 12 (Channel Bandwidth: 5 MHz)	52.35mW
	LTE Band 12 (Channel Bandwidth: 10 MHz)	54.19mW
Antenna Type	Fixed Internal Antenna	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

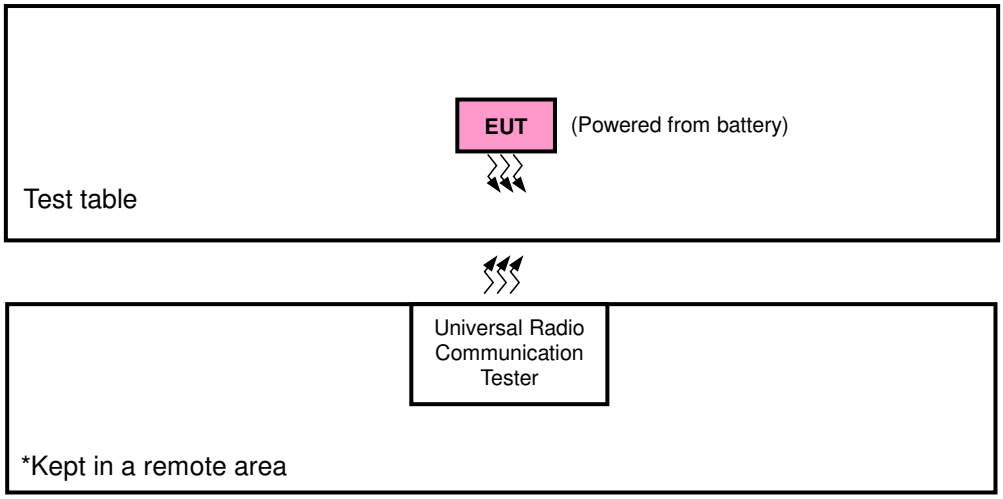
1. The EUT's accessories list refers to Ext. Pho.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

<Radiated Emission Test>



<E.R.P. / E.I.R.P. Test>



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 / EIRP	Radiated Emission
LTE Band 12	Y-plane	X-axis

LTE Band 12

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	1 RB / 5 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	1 RB / 14 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM	1 RB / 49 RB Offset
-	Frequency Stability	23017 to 23173	23095	1.4 MHz	QPSK	1 RB / 5 RB Offset
		23025 to 23165	23095	3 MHz	QPSK	1 RB / 14 RB Offset
		23035 to 23155	23095	5 MHz	QPSK	1 RB / 24 RB Offset
		23060 to 23130	23095	10 MHz	QPSK	1 RB / 49 RB Offset
-	Occupied Bandwidth	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	15 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
-	Peak to Average Ratio	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	1 RB / 5 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	1 RB / 14 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM	1 RB / 49 RB Offset
-	Band Edge	23017 to 23173	23017	1.4 MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			23173	1.4 MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		23025 to 23165	23025	3 MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
			23165	3 MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		23035 to 23155	23035	5 MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			23155	5 MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		23060 to 23130	23060	10 MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			23130	10 MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Conducted Emission	23017 to 23173	23095	1.4 MHz	QPSK	1 RB / 5 RB Offset
		23025 to 23165	23095	3 MHz	QPSK	1 RB / 14 RB Offset
		23035 to 23155	23095	5 MHz	QPSK	1 RB / 24 RB Offset
		23060 to 23130	23095	10 MHz	QPSK	1 RB / 49 RB Offset
-	Radiated Emission	23060 to 23130	23095	10 MHz	QPSK	1 RB / 49 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
ERP / EIRP	25 deg. C, 65 % RH	3.85 Vdc	Carlos Chen
Frequency Stability	25 deg. C, 65 % RH	3.85 Vdc	Carlos Chen
Occupied Bandwidth	25 deg. C, 65 % RH	3.85 Vdc	Carlos Chen
Band Edge	25 deg. C, 65 % RH	3.85 Vdc	Carlos Chen
Peak to Average Ratio	25 deg. C, 65 % RH	3.85 Vdc	Carlos Chen
Condcudeted Emission	25 deg. C, 65 % RH	3.85 Vdc	Carlos Chen
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Charles Hsiao

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
KDB 971168 D01 Power Meas License Digital Systems v02r02
ANSI/TIA/EIA-603-D 2010

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

Portable stations (hand-held devices) operating in the 699-716 MHz band are limited to 3 watts ERP

4.1.2 Test Procedures

EIRP / ERP Measurement:

a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 10 MHz for LTE mode.

b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m 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 1 m to 4 m 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.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 - 2.15 dBi.

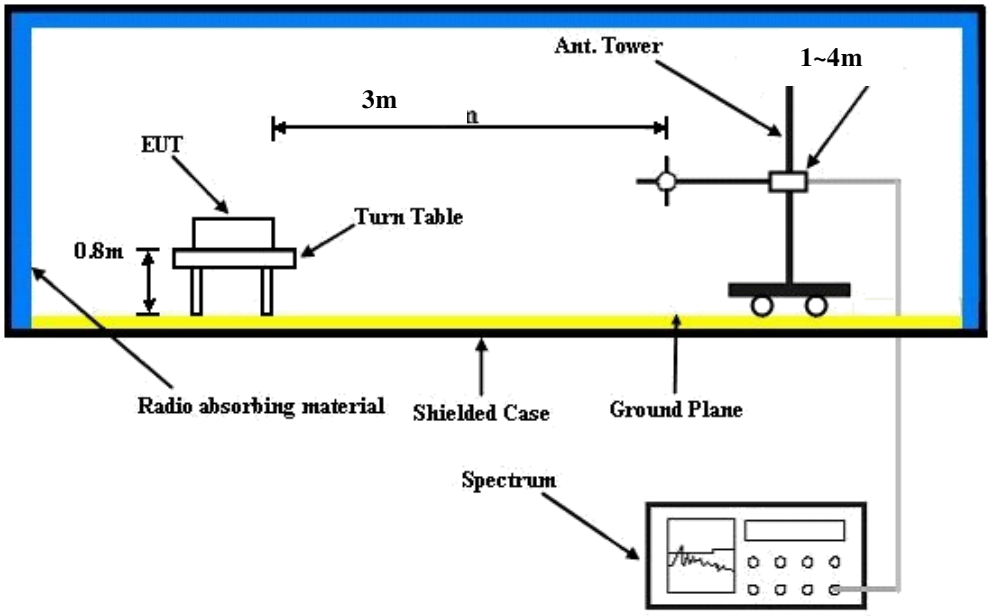
Conducted Power Measurement:

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 23017	Mid Ch 23095	High Ch 23173		Low Ch 23017	Mid Ch 23095	High Ch 23173	
			699.7 MHz	707.5 MHz	715.3 MHz		699.7 MHz	707.5 MHz	715.3 MHz	
12 / 1.4M	1	0	22.95	23.09	23.13	0	21.89	22.03	22.07	1
	1	2	23.08	23.17	23.06	0	22.02	22.11	22.00	1
	1	5	23.20	23.21	23.13	0	22.14	22.15	22.07	1
	3	0	22.78	22.92	22.96	0	21.72	21.86	21.90	1
	3	1	22.86	23.00	23.04	0	21.80	21.94	21.98	1
	3	3	22.81	22.95	22.99	0	21.75	21.89	21.93	1
	6	0	22.00	22.14	22.18	1	20.94	21.08	21.12	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23025	Mid Ch 23095	High Ch 23165		Low Ch 23025	Mid Ch 23095	High Ch 23165	
			700.5 MHz	707.5 MHz	714.5 MHz		700.5 MHz	707.5 MHz	714.5 MHz	
12 / 3M	1	0	23.03	23.17	23.21	0	21.97	22.11	22.15	1
	1	7	23.16	23.25	23.14	0	22.10	22.19	22.08	1
	1	14	23.28	23.29	23.21	0	22.22	22.23	22.15	1
	8	0	22.06	22.20	22.24	1	21.00	21.14	21.18	2
	8	3	22.14	22.28	22.32	1	21.08	21.22	21.26	2
	8	7	22.09	22.23	22.27	1	21.03	21.17	21.21	2
	15	0	22.08	22.22	22.26	1	21.02	21.16	21.20	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23035	Mid Ch 23095	High Ch 23155		Low Ch 23035	Mid Ch 23095	High Ch 23155	
			701.5 MHz	707.5 MHz	713.5 MHz		701.5 MHz	707.5 MHz	713.5 MHz	
12 / 5M	1	0	23.14	23.28	23.32	0	22.08	22.22	22.26	1
	1	12	23.27	23.36	23.25	0	22.21	22.30	22.19	1
	1	24	23.39	23.40	23.32	0	22.33	22.34	22.26	1
	12	0	22.17	22.31	22.35	1	21.11	21.25	21.29	2
	12	6	22.25	22.39	22.43	1	21.19	21.33	21.37	2
	12	13	22.20	22.34	22.38	1	21.14	21.28	21.32	2
	25	0	22.19	22.33	22.37	1	21.13	21.27	21.31	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23060	Mid Ch 23095	High Ch 23130		Low Ch 23060	Mid Ch 23095	High Ch 23130	
			704.0 MHz	707.5 MHz	711.0 MHz		704.0 MHz	707.5 MHz	711.0 MHz	
12 / 10M	1	0	23.23	23.37	23.41	0	22.17	22.31	22.35	1
	1	24	23.36	23.45	23.34	0	22.30	22.39	22.28	1
	1	49	23.48	23.49	23.41	0	22.42	22.43	22.35	1
	25	0	22.26	22.40	22.44	1	21.20	21.34	21.38	2
	25	12	22.34	22.48	22.42	1	21.28	21.42	21.46	2
	25	25	22.29	22.43	22.47	1	21.23	21.37	21.41	2
	50	0	22.28	22.42	22.46	1	21.22	21.36	21.40	2

ERP Power (dBm)

LTE Band 12							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
Y	23017	699.7	-13.45	32.719	17.12	51.51	H
	23095	707.5	-13.56	32.736	17.03	50.42	
	23173	715.3	-13.37	32.591	17.07	50.94	
	23017	699.7	-16.51	32.69	14.03	25.29	V
	23095	707.5	-16.42	32.81	14.24	26.55	
	23173	715.3	-16.37	32.74	14.22	26.42	
Channel Bandwidth: 1.4 MHz / 16QAM							
Y	23017	699.7	-14.23	32.719	16.34	43.04	H
	23095	707.5	-14.21	32.736	16.38	43.41	
	23173	715.3	-14.26	32.591	16.18	41.50	
	23017	699.7	-17.12	32.69	13.42	21.98	V
	23095	707.5	-16.85	32.81	13.81	24.04	
	23173	715.3	-16.99	32.74	13.60	22.91	

LTE Band 12							
Channel Bandwidth: 3 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
Y	23025	700.5	-13.51	32.719	17.06	50.80	H
	23095	707.5	-13.45	32.736	17.14	51.71	
	23165	714.5	-13.37	32.591	17.07	50.94	
	23025	700.5	-16.42	32.69	14.12	25.82	V
	23095	707.5	-16.37	32.81	14.29	26.85	
	23165	714.5	-16.33	32.74	14.26	26.67	
Channel Bandwidth: 3 MHz / 16QAM							
Y	23025	700.5	-14.21	32.719	16.36	43.24	H
	23095	707.5	-14.33	32.736	16.26	42.23	
	23165	714.5	-14.28	32.591	16.16	41.31	
	23025	700.5	-16.79	32.69	13.75	23.71	V
	23095	707.5	-16.91	32.81	13.75	23.71	
	23165	714.5	-17.17	32.74	13.42	21.98	

LTE Band 12							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Y	23035	701.5	-13.38	32.719	17.19	52.35	H
	23095	707.5	-13.51	32.736	17.08	51.00	
	23155	713.5	-13.28	32.591	17.16	52.01	
	23035	701.5	-16.50	32.69	14.04	25.35	V
	23095	707.5	-16.38	32.81	14.28	26.79	
	23155	713.5	-16.41	32.74	14.18	26.18	
Channel Bandwidth: 5 MHz / 16QAM							
Y	23035	701.5	-14.31	32.719	16.26	42.26	H
	23095	707.5	-14.32	32.736	16.27	42.33	
	23155	713.5	-14.20	32.591	16.24	42.08	
	23035	701.5	-16.88	32.69	13.66	23.23	V
	23095	707.5	-16.92	32.81	13.74	23.66	
	23155	713.5	-16.86	32.74	13.73	23.60	

LTE Band 12							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Y	23060	704.0	-13.38	32.727	17.20	52.44	H
	23095	707.5	-13.25	32.739	17.34	54.19	
	23130	711.0	-13.41	32.728	17.17	52.10	
	23060	704.0	-16.39	32.75	14.21	26.36	V
	23095	707.5	-16.55	32.81	14.11	25.76	
	23130	711.0	-16.41	32.84	14.28	26.79	
Channel Bandwidth: 10 MHz / 16QAM							
Y	23060	704.0	-14.36	32.727	16.22	41.85	H
	23095	707.5	-14.52	32.739	16.07	40.45	
	23130	711.0	-13.97	32.728	16.61	45.79	
	23060	704.0	-17.36	32.75	13.24	21.09	V
	23095	707.5	-16.85	32.81	13.81	24.04	
	23130	711.0	-16.89	32.84	13.80	23.99	

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stabiliity Measurement

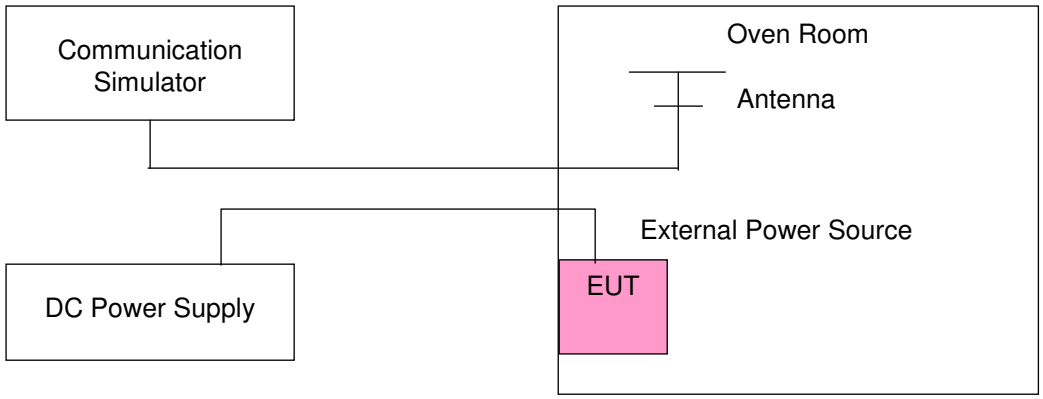
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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 12				
	1.4 MHz	3 MHz	5 MHz	10 MHz	
3.85	0.0018	0.0014	0.0021	0.0017	2.5
3.6	0.0018	0.0001	0.0018	0.0017	2.5
4.4	0.0021	0.0006	0.0030	0.0028	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	Frequency Error (ppm)				Limit (ppm)
	LTE Band 12				
	1.4 MHz	3 MHz	5 MHz	10 MHz	
-30	0.0047	0.0025	0.0021	0.0041	2.5
-20	0.0047	0.0025	0.0030	0.0018	2.5
-10	0.0025	0.0054	0.0054	0.0045	2.5
0	0.0044	0.0014	0.0007	0.0055	2.5
10	0.0014	0.0047	0.0042	0.0054	2.5
20	-0.0035	-0.0021	-0.0057	-0.0023	2.5
30	-0.0051	-0.0001	-0.0028	-0.0016	2.5
40	-0.0047	-0.0018	-0.0035	-0.0017	2.5
50	-0.0023	-0.0007	-0.0038	-0.0033	2.5
55	-0.0042	-0.0049	-0.0014	-0.0047	2.5

4.3 Occupied Bandwidth Measurement

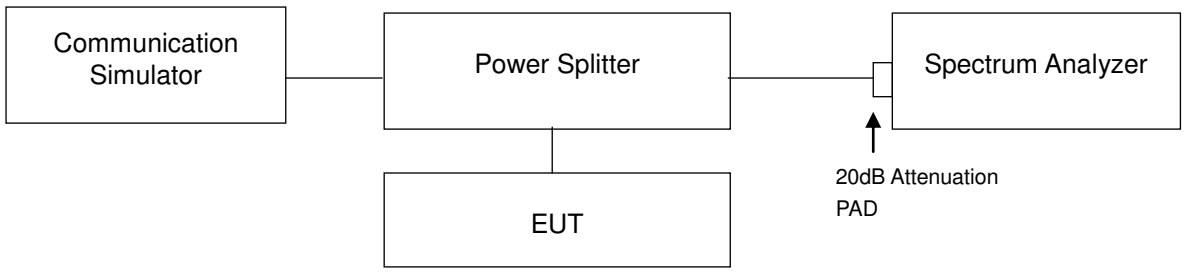
4.3.1 Limits of Occupied Bandwidth Measurement

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

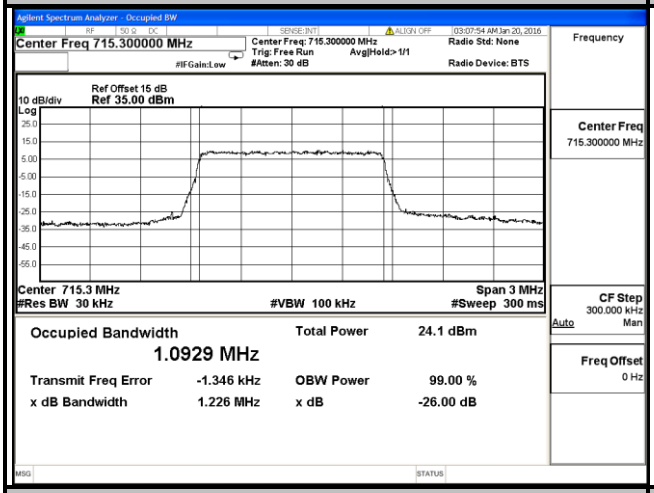


4.3.4 Test Result

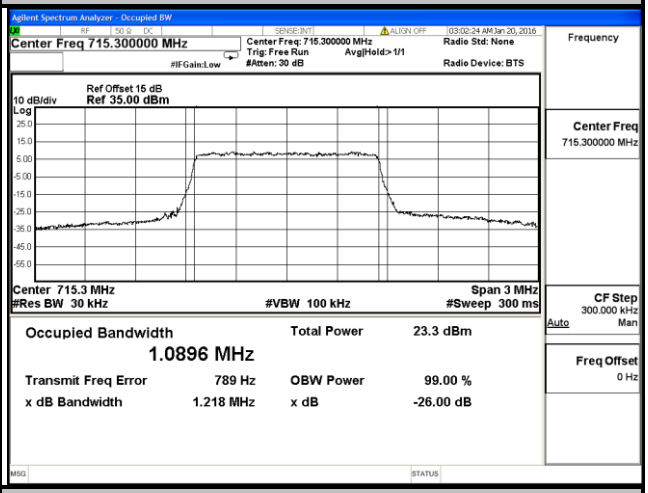
LTE Band 12							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
23017	699.7	1.0894	1.0891	23025	700.5	2.6953	2.6930
23095	707.5	1.0897	1.0883	23095	707.5	2.6980	2.6969
23173	715.3	1.0929	1.0896	23165	714.5	2.7013	2.6974

Spectrum Plot of Worst Value

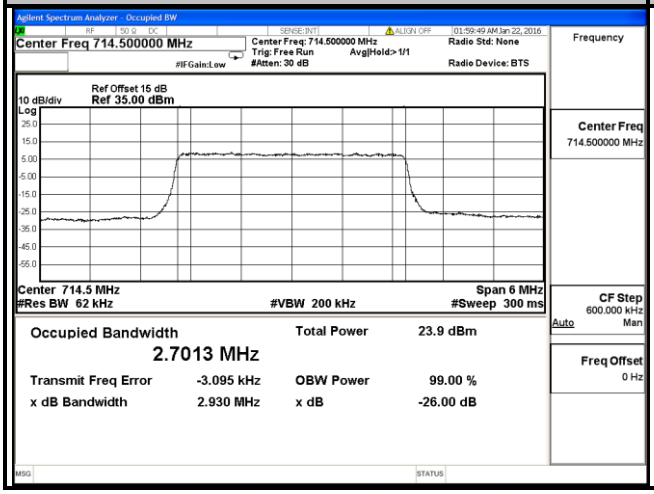
1.4 MHz / QPSK



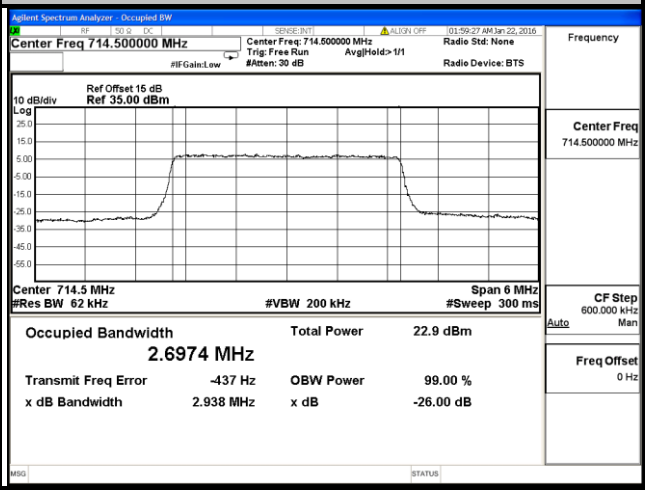
1.4 MHz / 16QAM



3 MHz / QPSK



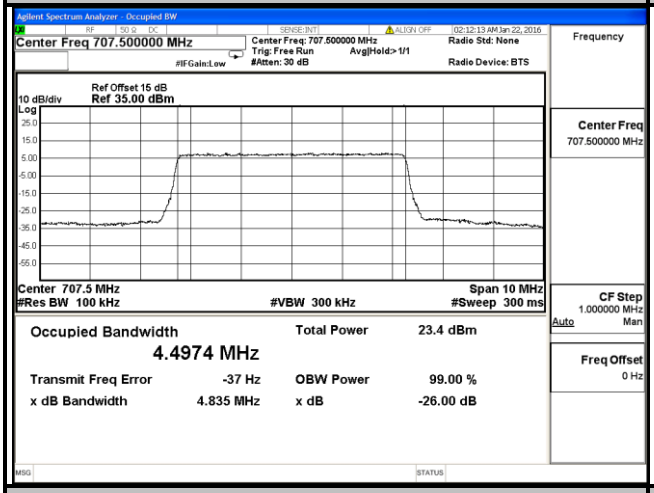
3 MHz / 16QAM



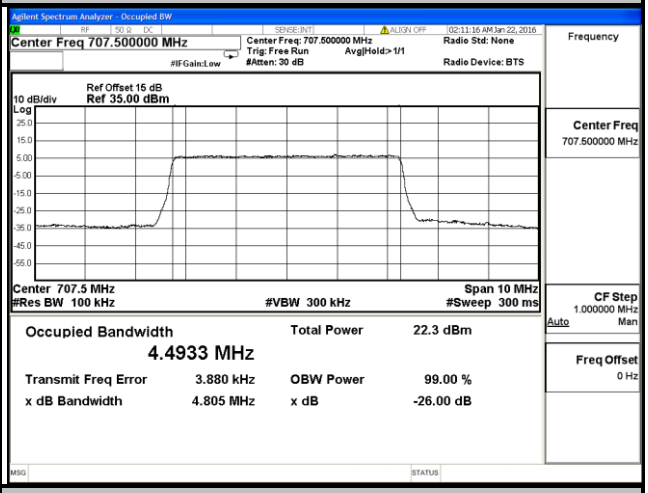
LTE Band 12							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
23035	701.5	4.4909	4.4854	23060	704.0	8.9713	8.9694
23095	707.5	4.4974	4.4933	23095	707.5	8.9714	8.9716
23155	713.5	4.4949	4.4905	23130	711.0	8.9577	8.9605

Spectrum Plot of Worst Value

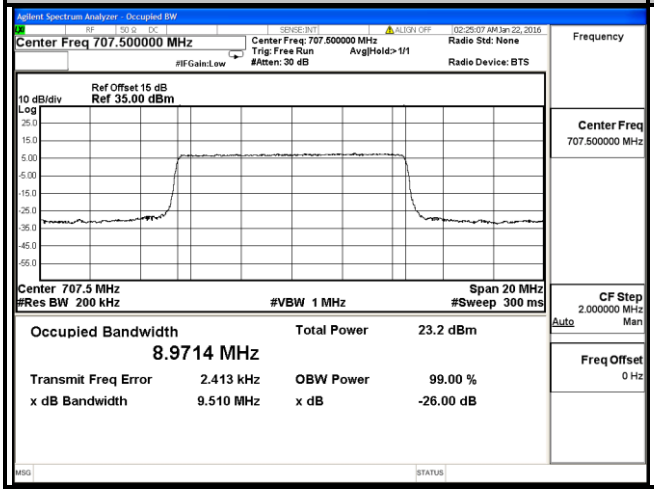
5 MHz / QPSK



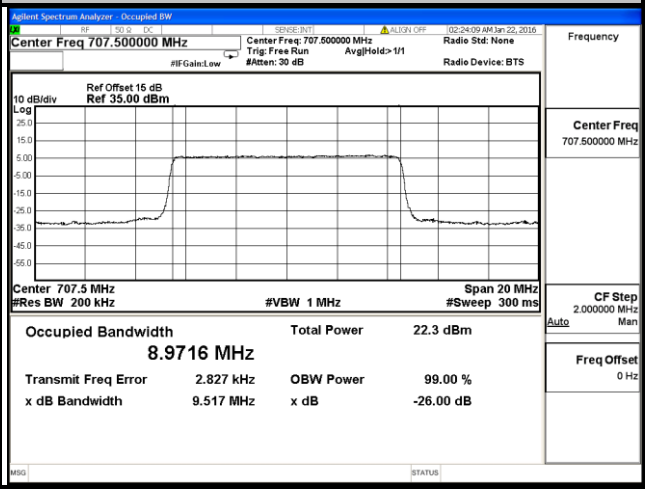
5 MHz / 16QAM



10 MHz / QPSK



10 MHz / 16QAM



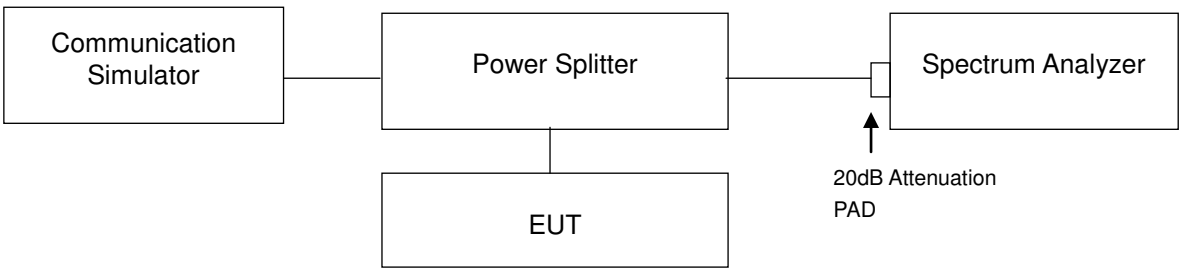
4.4 Band Edge Measurement

4.4.1 Limits of Band Edge Measurement

For operations in the 699-787 MHz band, 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.

For operations in the 1710–1755 MHz bands, 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.

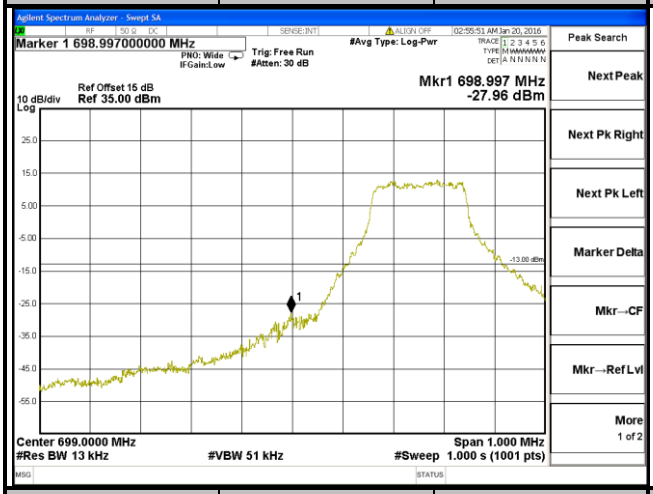
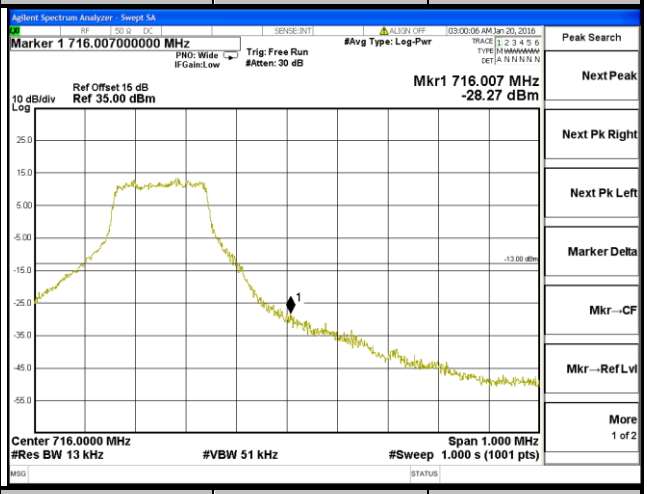
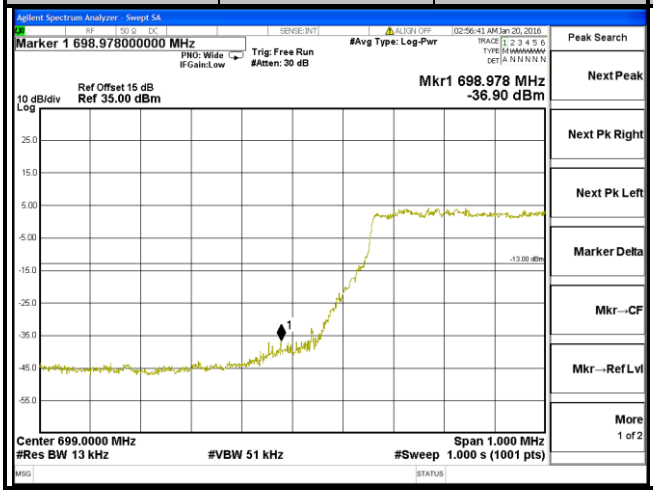
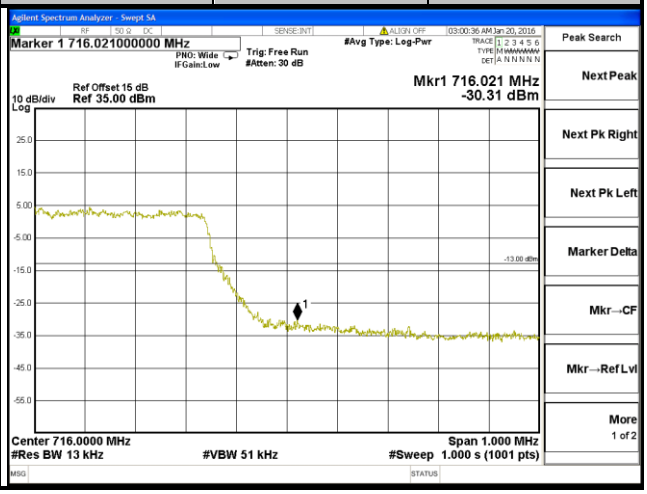
4.4.2 Test Setup

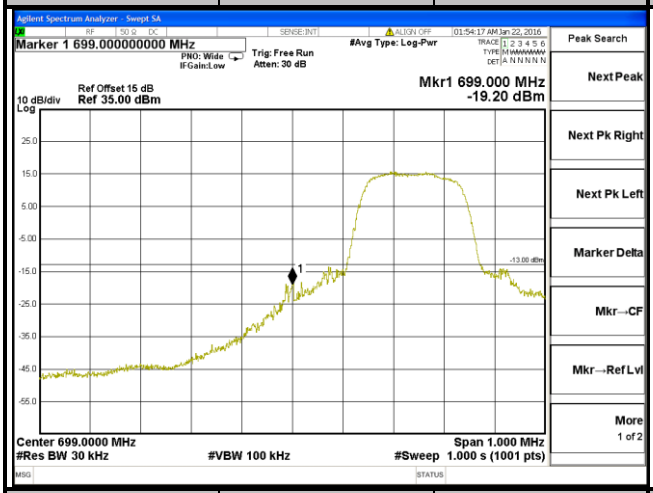
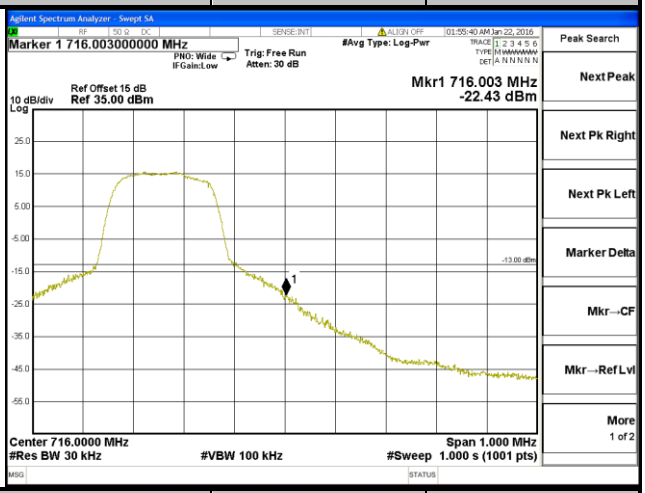
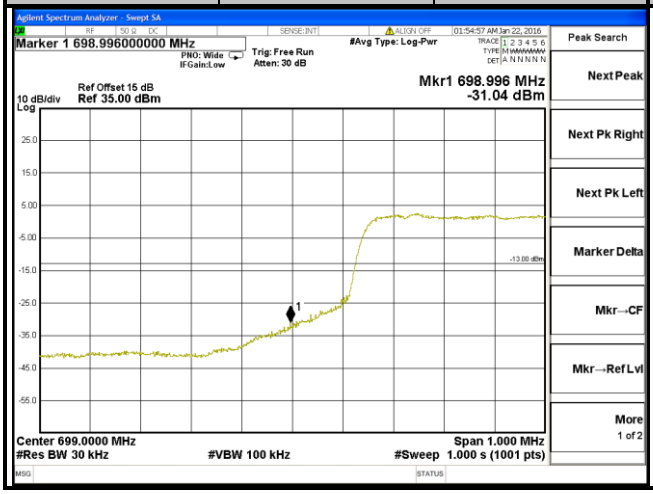
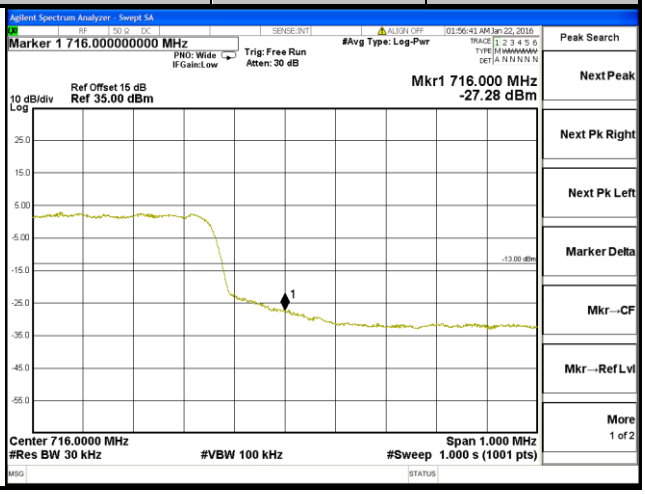


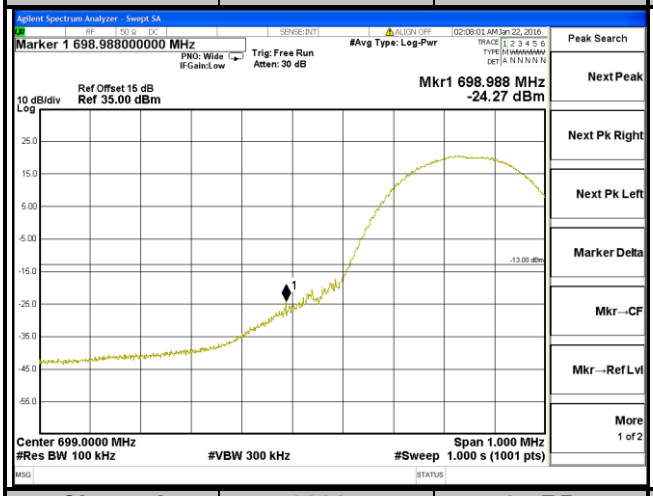
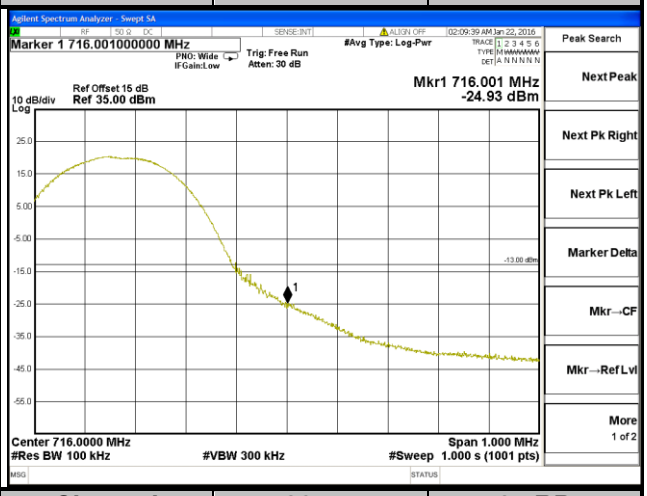
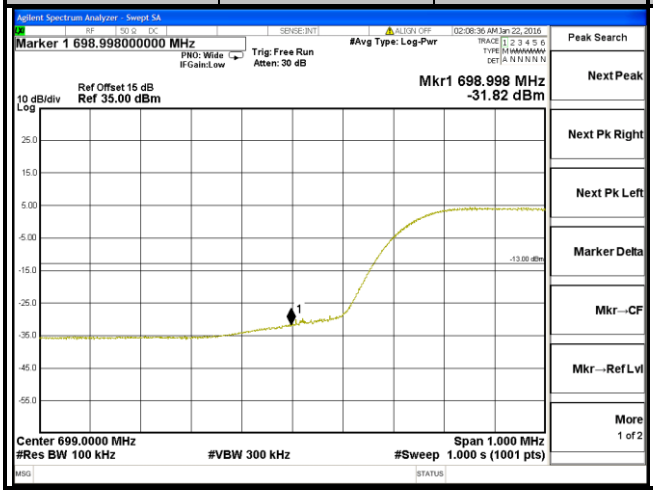
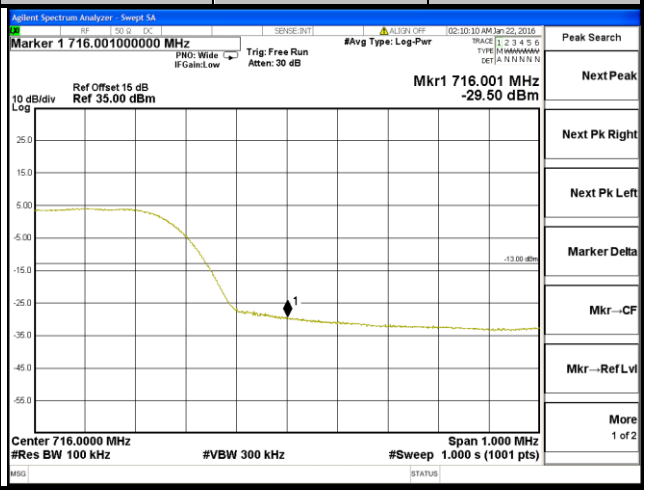
4.4.3 Test Procedures

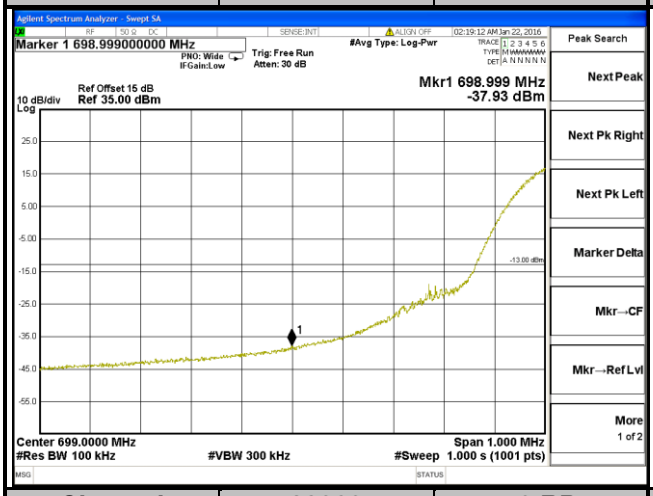
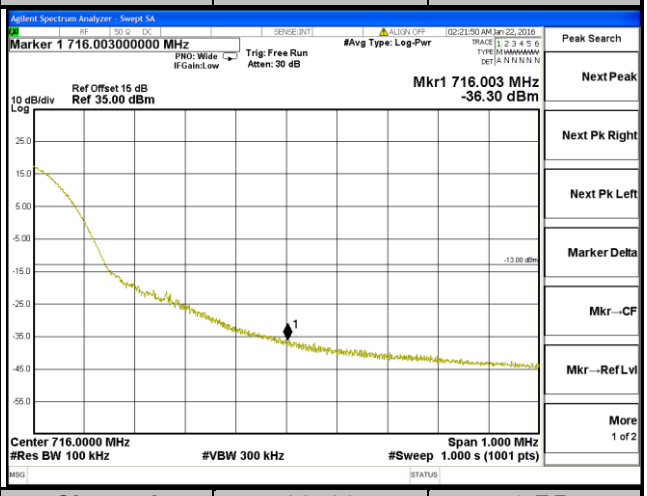
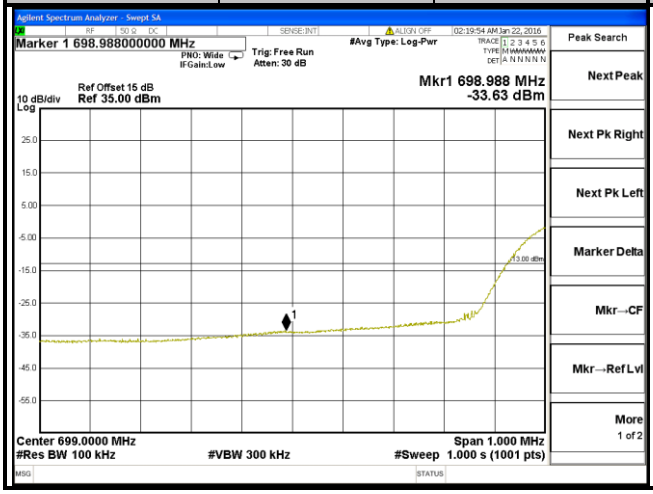
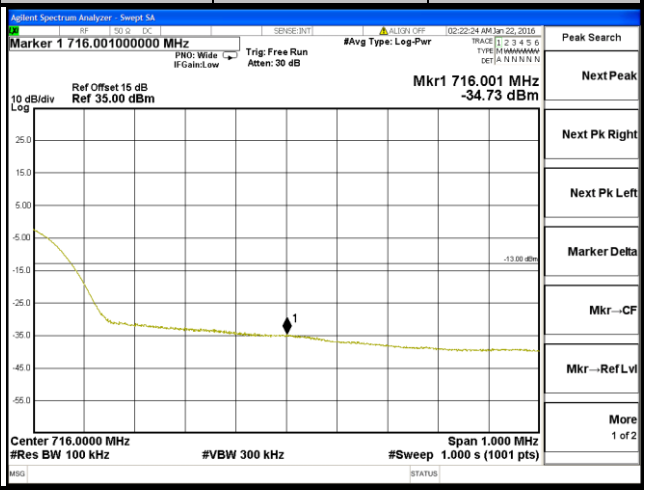
a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 13 kHz and VB of the spectrum is 51 kHz (LTE Bandwidth 1.4 MHz).
c. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz (LTE Bandwidth 3 MHz).
d. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (LTE Bandwidth 5 MHz/10 MHz).
e. Record the max trace plot into the test report.

4.4.4 Test Results

LTE Band 12					
Channel Bandwidth: 1.4 MHz					
Channel	23017	1 RB	Channel	23173	1 RB
					
Channel	23017	6 RB	Channel	23173	6 RB
					

LTE Band 12					
Channel Bandwidth: 3 MHz					
Channel	23025	1 RB	Channel	23165	1 RB
					
Channel	23025	15 RB	Channel	23165	15 RB
					

LTE Band 12					
Channel Bandwidth: 5 MHz					
Channel	23035	1 RB	Channel	23155	1 RB
					
Channel	23035	25 RB	Channel	23155	25 RB
					

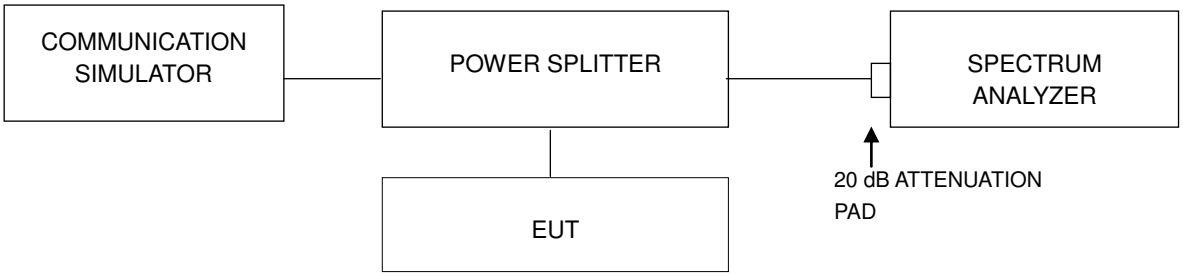
LTE Band 12					
Channel Bandwidth: 10 MHz					
Channel	23060	1 RB	Channel	23130	1 RB
					
Channel	23060	50 RB	Channel	23130	50 RB
					

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

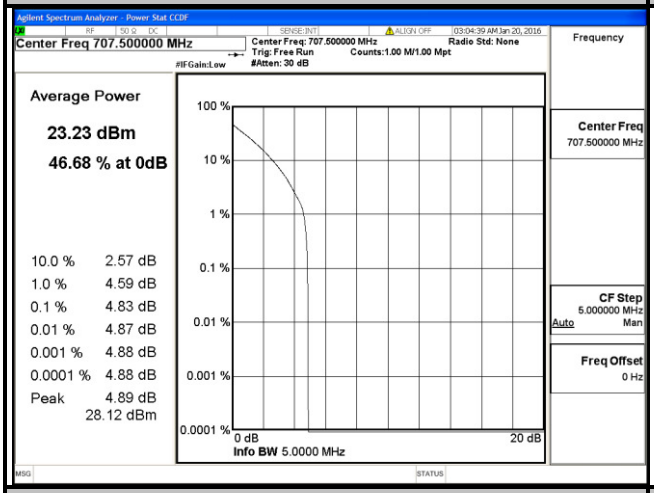
1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

4.5.4 Test Results

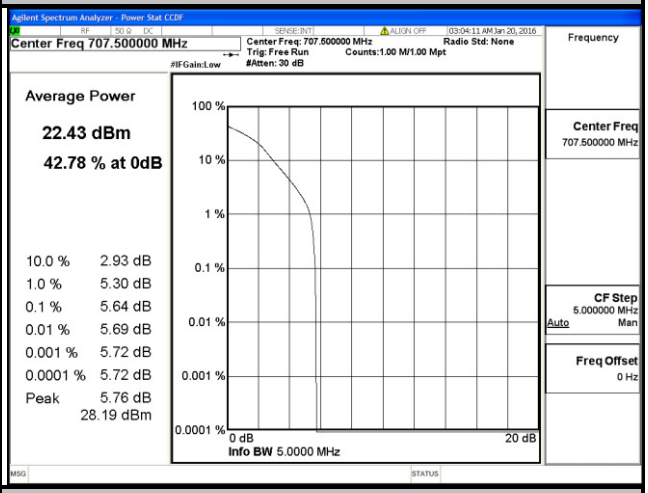
LTE Band 12							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
23017	699.7	4.81	5.60	23025	700.5	4.61	5.35
23095	707.5	4.83	5.64	23095	707.5	4.26	5.37
23173	715.3	4.38	5.16	23165	714.5	4.12	4.88

Spectrum Plot of Worst Value

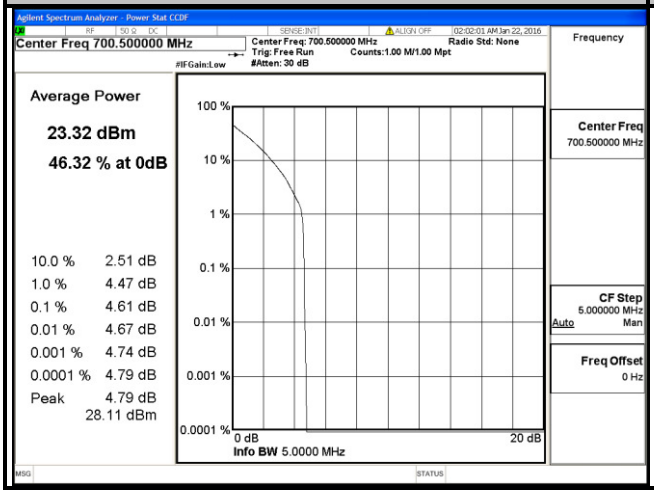
1.4 MHz / QPSK



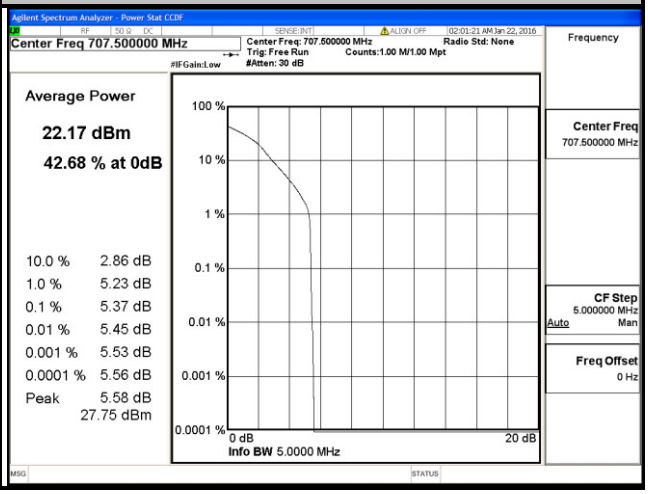
1.4 MHz / 16QAM



3 MHz / QPSK



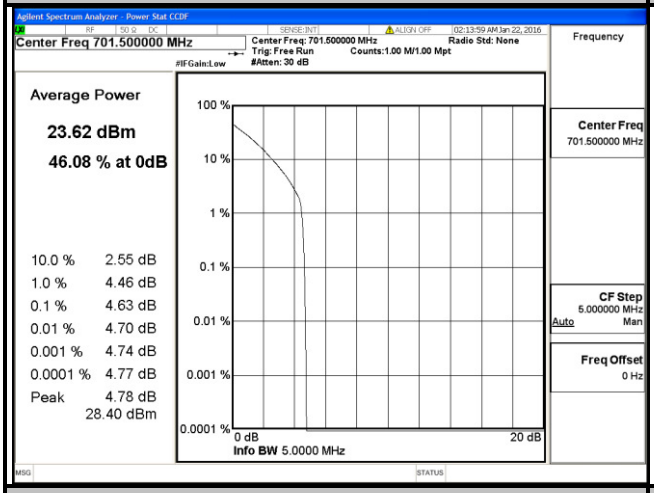
3 MHz / 16QAM



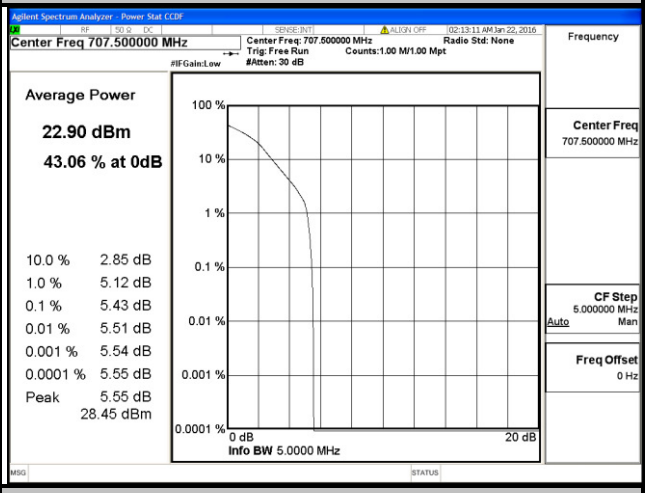
LTE Band 12							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
23035	701.5	4.63	5.38	23060	704.0	4.55	5.38
23095	707.5	4.55	5.43	23095	707.5	4.49	5.25
23155	713.5	4.56	5.34	23130	711.0	4.58	5.41

Spectrum Plot of Worst Value

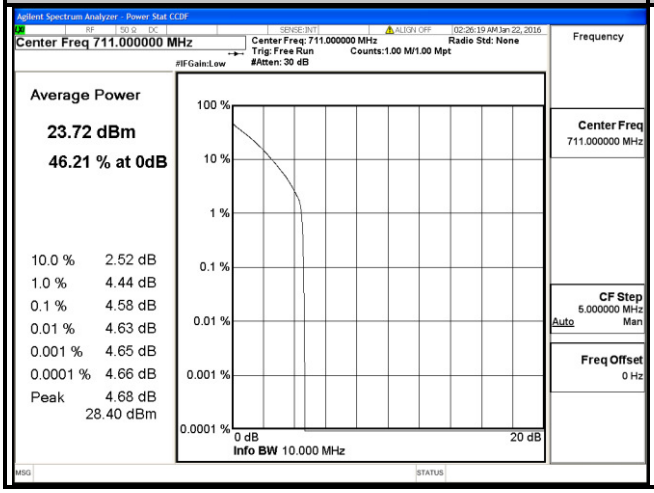
5 MHz / QPSK



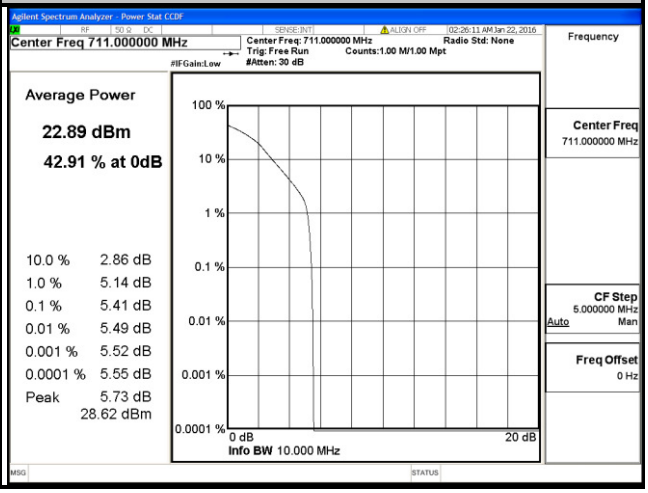
5 MHz / 16QAM



10 MHz / QPSK



10 MHz / 16QAM

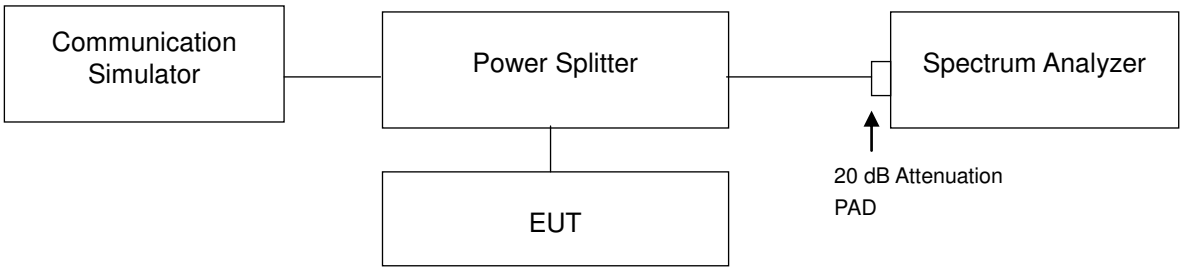


4.6 Conducted Spurious Emissions

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 43 +10 log10(P) dB. The limit of emission is equal to -13 dBm.

4.6.2 Test Setup



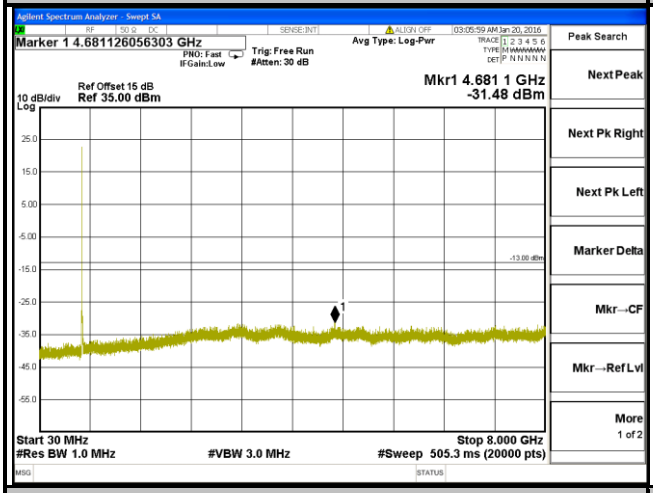
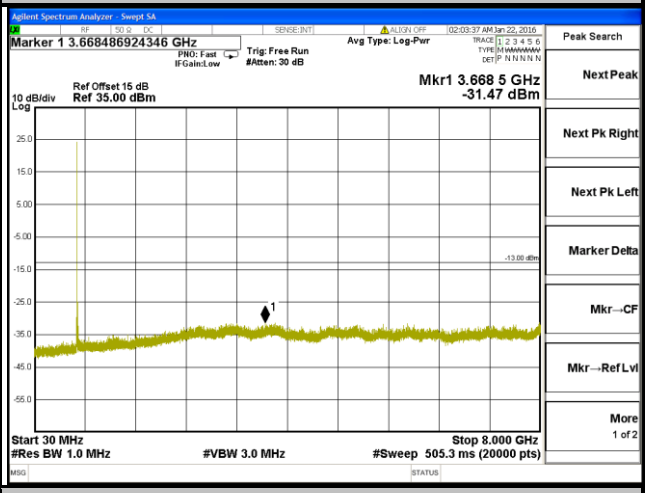
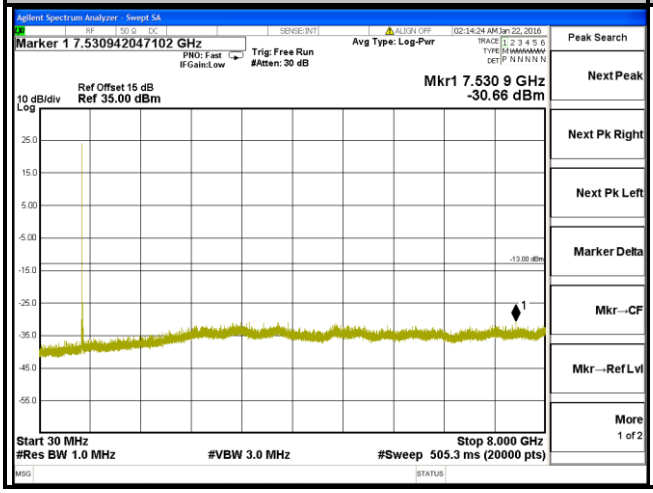
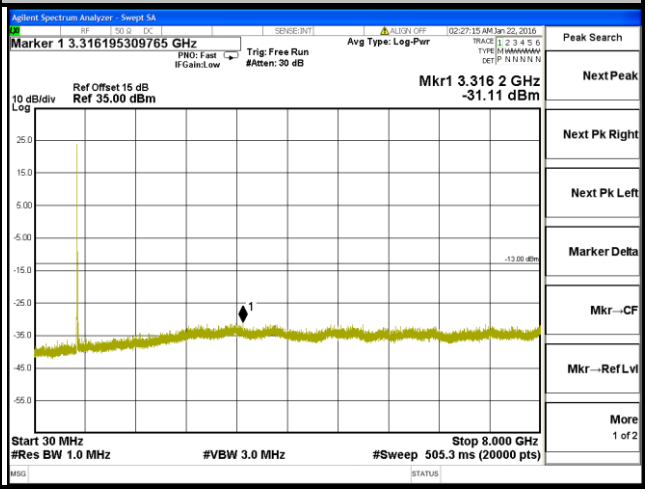
4.6.3 Test Procedure

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 30 MHz to 8 GHz for LTE Band 12. 10 dB attenuation pad is connected with spectrum. RBW=1 MHz and VBW=3 MHz are used for conducted emission measurement.

4.6.4 Test Results

Frequency Range: 30 MHz ~ 8 GHz

LTE Band 12	
Channel 23095	
1.4 MHz / QPSK	3 MHz / QPSK
	
5 MHz / QPSK	10 MHz / QPSK
	

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 is equal to -13 dBm.

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 0.8 m 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 1 m to 4 m 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.

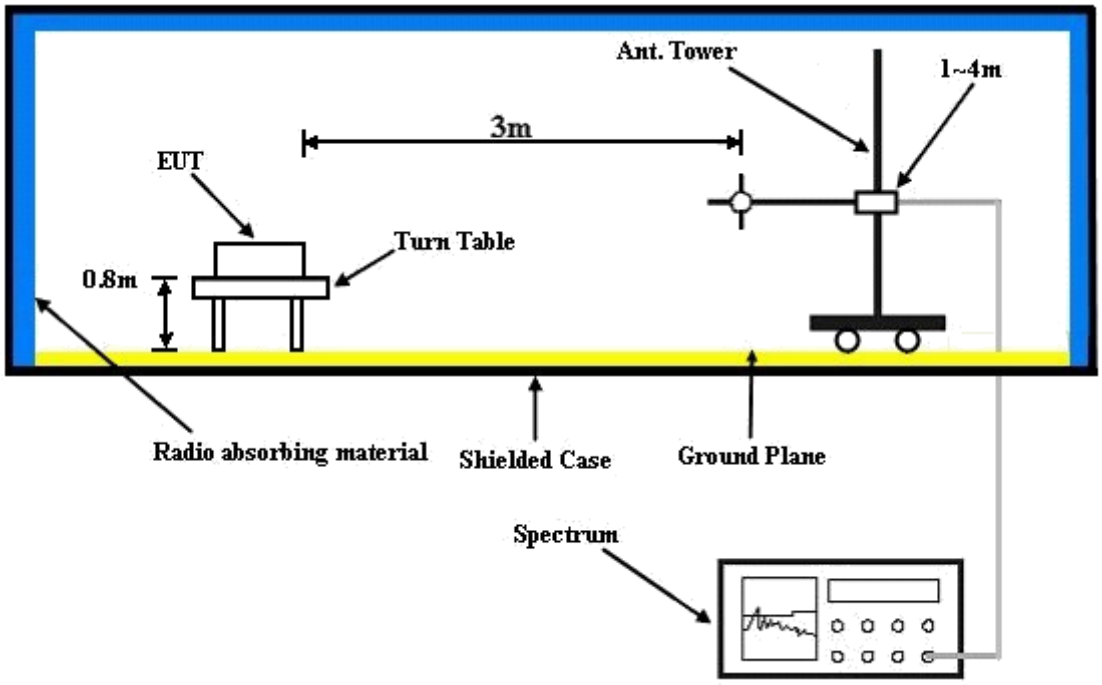
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15 dBi.

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



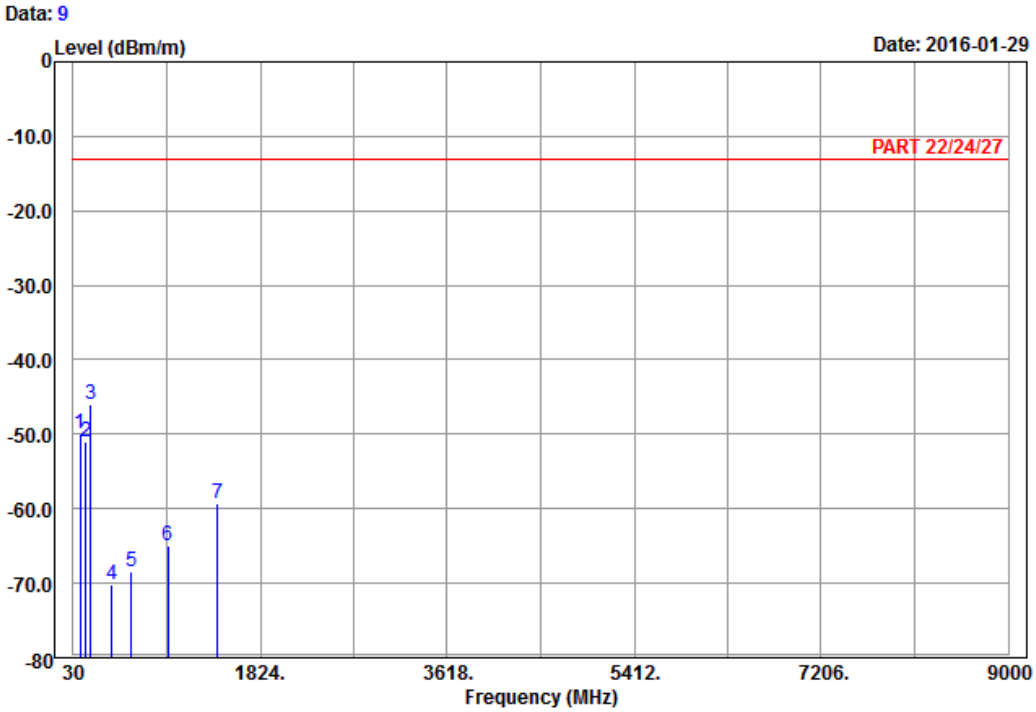
For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.5 Test Results

LTE Band 12

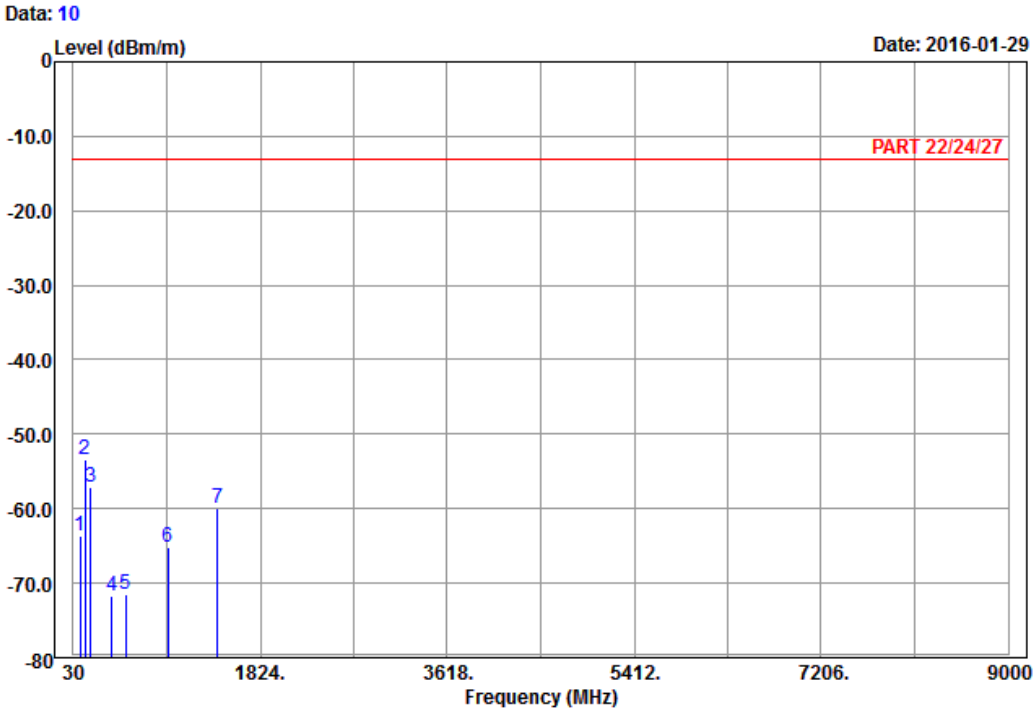
Channel Bandwidth: 10 MHz / QPSK

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24/27 3m Horizontal
Remark : LTE_Band 12_QPSK(1,49)_10M_CH23095
Tested by: Charles Hsiao
Plane : X

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	97.77	-49.96	-39.73	-13.00	-36.96	-10.23	Peak
2	148.26	-50.96	-43.06	-13.00	-37.96	-7.90	Peak
3 pp	197.40	-45.93	-39.84	-13.00	-32.93	-6.09	Peak
4	397.30	-70.22	-67.38	-13.00	-57.22	-2.84	Peak
5	589.10	-68.40	-68.35	-13.00	-55.40	-0.05	Peak
6	941.20	-64.97	-69.68	-13.00	-51.97	4.71	Peak
7	1415.00	-59.39	-65.75	-13.00	-46.39	6.36	Peak



Site : 966 chamber 1
Condition: PART 22/24/27 3m Vertical
Remark : LTE_Band 12_QPSK(1,49)_10M_CH23095
Tested by: Charles Hsiao
Plane : X

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	94.80	-63.65	-53.25	-13.00	-50.65	-10.40	Peak
2 pp	146.91	-53.48	-45.60	-13.00	-40.48	-7.88	Peak
3	196.59	-57.06	-51.01	-13.00	-44.06	-6.05	Peak
4	398.00	-71.78	-68.94	-13.00	-58.78	-2.84	Peak
5	532.40	-71.59	-68.65	-13.00	-58.59	-2.94	Peak
6	937.70	-65.13	-69.71	-13.00	-52.13	4.58	Peak
7	1415.00	-59.96	-66.32	-13.00	-46.96	6.36	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:

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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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