FCC Test Report

Report No.: AGC03219170301FE07

FCC ID	:	2ADCR-WGHK22009
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	8 Inch 4G tablet
BRAND NAME	:	LB Technology
MODEL NAME	:	WGHK22009
CLIENT	:	LB Technology
DATE OF ISSUE	:	May. 31, 2017
STANDARD(S)	:	FCC Part 22 Rules FCC Part 24 Rules FCC Part 27 Rules
REPORT VERSION	:	V1.0

Attestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd.

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May. 31, 2017	Valid	Original Report

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1.VERIFICATION OF COMPLIANCE

Applicant	LB Technology
Address	5100 Poplar Ave. Memphis Tennessee United States 38137
Manufacturer	LB Technology
Address	5100 Poplar Ave. Memphis Tennessee United States 38137
Product Designation	8 Inch 4G tablet
Brand Name	LB Technology
Test Model	WGHK22009
Date of test	May. 16, 2017~May. 31, 2017
Deviation	None
Condition of Test Sample	Normal

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service Co., Ltd. The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI/TIA- 603-D-2010. The sample tested as described in this report is in compliance with the FCC Rules Part22, Part24 and Pant27.
The test results of this report relate only to the tested sample identified in this report.

Tested By	donjon . zhang	
	Dota Zhang(Zhang Jianfeng)	May. 31, 2017
Reviewed By	Bart Xie	
	Bart Xie(Xie Xiaobin)	May. 31, 2017
Approved By	Solger Zhang	
	Solger Zhang(Zhang Hongyi) Authorized Officer	May. 31, 2017

2. GENERAL INFORMATION

2.1 Product Description

A major technical description of EUT is described as following:

Radio System Type:	LTE	
Hardware version:	RC_L696_V2.2	
Software version:	L696M-V20LKK8G8GEN-LF05.MIPI_WXGA.3M_SKY	
Frequency Bands:	☐FDD Band 2 ☒FDD Band 4 ☐FDD Band 5 ☒FDD Band 12 ☒FDD Band 17 ☐FDD Band 25 ☐FDD Band 26 ☐TDD Band 41 (U.S. Bands) ☐FDD Band 1 ☐FDD Band 3 ☐FDD Band 7 ☐FDD Band 8 ☐FDD Band 20 ☐TDD Band 33 ☐TDD Band 34 ☐TDD Band 38 ☐FDD Band 40 ☐FDD Band 42 ☐FDD Band 43 (Non-U.S. Bands)	
	LTE Band 4	Transmission (TX): 1710 to 1754.9 MHz
		Receiving (RX): 2110 to 2154.9 MHz
	LTE Band 12	Transmission (TX): 699 to 715.9 MHz
		Receiving (RX): 729to 745.9 MHz
	LTE Band 17	Transmission (TX): 704 to 715.9 MHz
		Receiving (RX): 734 ~ 745.9 MHz
	LTE Band 4	☒ 1.4 MHz ☒ 3 MHz ☒ 5 MHz ☒ 10 MHz ☒ 15 MHz ☒ 20 MHz
	LTE Band 12	☒ 1.4 MHz ☒ 3 MHz ☒ 5 MHz ☒ 10 MHz
	LTE Band 17	☒ 5 MHz ☒ 10 MHz
Antenna:	PIFA Antenna	
Type of Modulation	QPSK/16QAM	
Antenna gain:	0.87dBi(LTE band 4), 0.36dBi(LTE band 12), 0.23dBi(LTE band 17),	
Diversity Antenna Gain	0.79dBi(LTE band 4), 0.33dBi(LTE band 12), 0.19dBi(LTE band 17),	
Power Supply:	DC 3.7V by battery	
Battery parameter:	DC 3.7V/4000mAh	
Single Card:	WCDMA/GSM/LTE Card Slot	
Power Class	3	
Voltage range	DC3.4 V to 4.2 V (Normal: DC3.7 V)	
Temperature range	-10℃ to +50℃	

*** Note: The High Voltage DC4.2V and Low Voltage DC3.4V were declared by manufacturer, The EUT couldn't be operating normally with higher or lower voltage.

2.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2ADCR-WGHK22009**, filing to comply with the FCC Part22, Part24 Pant27 requirements

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2.3 Test Methodology

The radiated emission testing was performed according to the procedures of ANSI/TIA-603-D-2010, and FCC CFR 47 Rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.
KDB 971168 D01 Power Meas License Digital Systems v02r02

2.4 Test Facility

Site	Dongguan Precise Testing Service Co., Ltd.
Location	Building D,Baoding Technology Park,Guangming Road2,Dongcheng District, Dongguan, Guangdong, China,
FCC Registration No.	371540
Description	The test site is constructed and calibrated to meet the FCC requirements in documents of ANSI/TIA-603-D-2010.

2.5 Measurement Instruments

Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 3, 2016	July 2, 2017
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9168	D69250	Mar 1, 2016	Feb 28, 2018
Trilog Broadband Antenna(substituted antenna) (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 3, 2016	July 2, 2018
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 3, 2016	July 2, 2017
RF Cable	SCHWARZBECK	AK9515E	96221	July 3, 2016	July 2, 2017
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 5, 2016	June 4, 2017
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 5, 2016	June 4, 2018
Spectrum analyzer	Agilent	E4407B	MY46185649	June 5, 2016	June 4, 2017
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA9120D	9120D-1246	July 10, 2016	July 9, 2018

Horn Antenna(substituted antenna) (1G-18GHz)	ETS LINDGREN	3117	00034609	Mar 1, 2016	Feb 28, 2018
Spectrum Analyzer	Agilent	E4411B	MY4511453	July 3, 2016	July 2, 2017
Signal Amplifier	SCHWARZBECK	BBV 9718	9718-269	July 6, 2016	July 5, 2017
RF Cable	SCHWARZBECK	AK9515H	96220	July 7, 2016	July 6, 2017
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	9170-181	June 5, 2016	June 4, 2017
Artificial Mains Network	Narda	L2-16B	000WX31025	July 7, 2016	July 6, 2017
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	July 7, 2016	July 6, 2017
RF Cable	SCHWARZBECK	AK9515E	96222	July 3, 2016	July 2, 2017
Shielded Room	CHENGYU	843	PTS-002	June 5, 2016	June 4, 2017
COMMUNICATION TESTER	AGILENT	8960	GB46490550	July 24,2016	July 23, 2017
RF attenuator	N/A	RFA20db	68	N/A	N/A
Signal Generator	AGILENT	N5182A	MY50140530	Oct 16,2015	Oct 15,2016
Signal Generator(substituted equipment)	AGILENT	E8257D	MY45141029	Oct 16,2015	Oct 15,2016

2.6 Special Accessories

The battery was supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

2.7 Equipment Modifications

Not available for this EUT intended for grant.

3. SYSTEM TEST CONFIGURATION

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

3.3 GENERAL TECHNICAL REQUIREMENTS

Item Number	Item Description		FCC Rules
1	Output Power	Conducted output power	2.1046/27.50(d)/ 27.50(c)
		Radiated output power	
2	Peak-to-Average Ratio	Peak-to-Average Ratio	27.50(d)
3	Spurious Emission	Conducted spurious emission	2.1051 / 27.53(h)/ 27.53(g)
		Radiated spurious emission	
4	Frequency Stability		2.1055/27.54
5	Occupied Bandwidth		2.1049 (h)(i)
6	Emission Bandwidth		2.1049/27.53(h)/ 27.53(g)
7	Band Edge		27.53(h)/ 27.53(g)
8	Mains Conducted Emission		15.107 / 15.207

Note: Testing was performed by configuring EUT to maximum output power status, the declared output power class for different.

3.4 CONFIGURATION OF EUT SYSTEM

Fig. 2-1 Configuration of EUT System

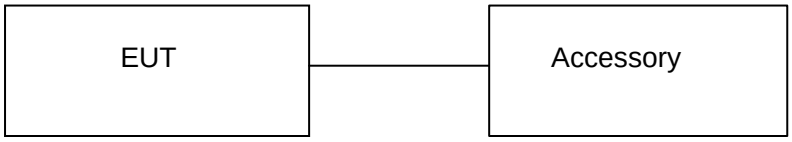


Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	8 Inch 4G tablet	WGHK22009	FCC ID: 2ADCR-WGHK22009	EUT
2	Battery	3495100	DC3.7V/ 4000mAh	Accessory
3	Adapter	AI-29 double U Car Charger	DC 5.25V/ 2.1A	Accessory
4	USB Cable	N/A	N/A	Accessory

****Note: All the accessories have been used during the test. The following "EUT" in setup diagram means EUT system.*

4. SUMMARY OF TEST RESULTS

Item Number	Item Description		FCC Rules	Result
1	Output Power	Conducted Output Power	2.1046/27.50(d)/ 27.50(c)	Pass
		Radiated Output Power		
2	Peak-to-Average Ratio	Peak-to-Average Ratio	27.50(d)	Pass
3	Spurious Emission	Conducted Spurious Emission	2.1051 / 27.53(h)/ 27.53(g)	Pass
		Radiated Spurious Emission		
4	Frequency Stability		2.1055/27.54	Pass
5	Occupied Bandwidth		2.1049 (h)(i)	Pass
6	Emission Bandwidth		2.1049/27.53(h)/ 27.53(g)	Pass
7	Band Edge		27.53(h)/ 27.53(g)	Pass
8	Mains Conducted Emission		15.107 / 15.207	Pass

5. DESCRIPTION OF TEST MODES

During the testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication Tester (CMW 500) to ensure max power transmission and proper modulation. Three channels (The top channel, the middle channel and the bottom channel) were chosen for testing on both LTE frequency band.

*****Note:** LTE band 4, LTE band 5, and LTE band 17 mode have been tested during the test.

The worst condition was recorded in the test report if no other modes test data.

Test Mode	Test Modes Description
LTE	LTE system, QPSK modulation
LTE	LTE system, 16QAM modulation

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 4	TX (1.4M)	Channel 19957	Channel 20175	Channel 20393
		1710.7 MHz	1732.5 MHz	1754.3 MHz
	TX (3M)	Channel 19965	Channel 20175	Channel 20385
		1711.5 MHz	1732.5 MHz	1753.5 MHz
	TX (5M)	Channel 19975	Channel 20175	Channel 20375
		1712.5 MHz	1732.5 MHz	1752.5 MHz
	TX (10M)	Channel 20000	Channel 20175	Channel 20350
		1715 MHz	1732.5 MHz	1750 MHz
	TX (15M)	Channel 20025	Channel 20175	Channel 20325
		1717.5 MHz	1732.5 MHz	1747.5 MHz
	TX (20M)	Channel 20050	Channel 20175	Channel 20300
		1720 MHz	1732.5 MHz	1745 MHz
	RX (1.4M)	Channel 1957	Channel 2175	Channel 2393
		2110.7 MHz	2132.5 MHz	2154.3 MHz
	RX (3M)	Channel 1965	Channel 2175	Channel 2385
		2111.5 MHz	2132.5 MHz	2153.5 MHz
	RX (5M)	Channel 1975	Channel 2175	Channel 2375
		2112.5 MHz	2132.5 MHz	2152.5 MHz
	RX (10M)	Channel 2000	Channel 2175	Channel 2350
		2115 MHz	2132.5 MHz	2150 MHz
	RX (15M)	Channel 2025	Channel 2175	Channel 2325
		2117.5 MHz	2132.5 MHz	2147.5 MHz
	RX (20M)	Channel 2050	Channel 2175	Channel 2300
		2120 MHz	2132.5 MHz	2145 MHz

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 12	TX (1.4M)	Channel 23017	Channel 23095	Channel 23173
		699.7MHz	707.5MHz	715.3MHz
	TX (3M)	Channel 23025	Channel 23095	Channel 23165
		700.5MHz	707.5MHz	714.5MHz
	TX (5M)	Channel 23035	Channel 23095	Channel 23155
		701.5MHz	707.5MHz	713.5MHz
	TX (10M)	Channel 23060	Channel 23095	Channel 23130
		704 MHz	707.5 MHz	711 MHz
	RX (1.4M)	Channel 5017	Channel 5095	Channel 5173
		729.7MHz	737.5MHz	745.3MHz
	RX (3M)	Channel 5025	Channel 5095	Channel 5165
		730.5MHz	737.5MHz	744.5MHz
	RX (5M)	Channel 5035	Channel 5095	Channel 5155
		731.5MHz	737.5MHz	743.5MHz
	RX (10M)	Channel 5060	Channel 5095	Channel 5130
		734MHz	737.5MHz	741MHz

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 17	TX (5M)	Channel 23755	Channel 23790	Channel 23825
		706.5 MHz	710 MHz	713.5 MHz
	TX (10M)	Channel 23780	Channel 23790	Channel 23800
		709 MHz	710 MHz	711 MHz
	RX (5M)	Channel 5755	Channel 5790	Channel 5825
		736.5 MHz	740 MHz	743.5 MHz
	RX (10M)	Channel 5780	Channel 5790	Channel 5800
		739 MHz	740 MHz	743.5 MHz

6. OUTPUT POWER

6.1 Conducted Output Power

6.1.1 Procedures: (According with KDB 971168)

The transmitter output port was connected to base station.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Measure the maximum burst average power and average power for other modulation signal.

The EUT was setup for the max output power with pseudo random data modulation. Power was measured with Spectrum Analyzer. The measurements were performed on all modes (LTE Band 4) at 3 typical channels (the Top Channel, the Middle Channel and the Bottom Channel) for each band.

The instrument must have an available measurement/resolution bandwidth that is equal to or exceeds the OBW. If this capability is available, then the following procedure can be used to determine the total peak output power.

a) Set the RBW ≥ OBW.

b) Set VBW ≥ 3 × RBW. c)

Set span ≥ 2 x RBW

d) Sweep time = auto couple.

e) Detector = peak.

f) Ensure that the number of measurement points ≥ span/RBW.

g) Trace mode = max hold.

h) Allow trace to fully stabilize.

1) Use the peak marker function to determine the peak amplitude level.

6.1.2 MEASUREMENT RESULT

Conducted Output Power Limits		
Mode	**Average Power**	**Tolerance(dB)**
LTE	23 dBm (0.2W)	± 2.7

LTE Band 4

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
20MHz	20050	1720.0	QPSK	1	0	0	21.59
				1	49	0	21.64
				1	99	0	21.81
				50	0	1	21.51
				50	25	1	21.85
				50	49	1	21.63
				100	0	1	21.57
			16QAM	1	0	1	21.71
				1	49	1	21.59
				1	99	1	21.79
				50	0	2	21.57

				50	25	2	21.46
				50	49	2	21.59
				100	0	2	21.53
	20175	1732.5	QPSK	1	0	0	21.78
				1	49	0	21.82
				1	99	0	21.56
				50	0	1	21.62
				50	25	1	21.51
				50	49	1	21.32
				100	0	1	21.38
			16QAM	1	0	1	21.38
				1	49	1	21.30
				1	99	1	21.71
				50	0	2	21.37
				50	25	2	21.46
				50	49	2	21.59
				100	0	2	22.19
	20300	1745.0	QPSK	1	0	0	22.16
				1	49	0	21.93
				1	99	0	21.86
				50	0	1	21.68
				50	25	1	21.80
				50	49	1	21.50
				100	0	1	21.54
			16QAM	1	0	1	21.37
				1	49	1	21.37
				1	99	1	22.03
				50	0	2	21.60
				50	25	2	21.75
				50	49	2	21.74
				100	0	2	21.66

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
15MHz	20025	1717.5	QPSK	1	0	0	21.51
				1	37	0	21.58
				1	74	0	22.05
				36	0	1	21.42
				36	16	1	21.47
				36	35	1	21.55
				75	0	1	21.87
			16QAM	1	0	1	21.88
				1	37	1	21.79
				1	74	1	21.95
				36	0	2	21.79
				36	16	2	21.79
				36	35	2	21.95
				75	0	2	21.95
	20175	1732.5	QPSK	1	0	0	22.04
				1	37	0	21.67
				1	74	0	21.60
				36	0	1	21.91
				36	16	1	21.86
				36	35	1	21.66
				75	0	1	21.84
			16QAM	1	0	1	21.64
				1	37	1	21.91
				1	74	1	21.90
				36	0	2	22.02
				36	16	2	21.23
				36	35	2	21.92
				75	0	2	21.78
	20325	1747.5	QPSK	1	0	0	22.02
				1	37	0	21.68
				1	74	0	21.63
				36	0	1	21.81
				36	16	1	21.76
				36	35	1	21.58
				75	0	1	21.77
			16QAM	1	0	1	21.68
				1	37	1	21.65
				1	74	1	21.65
				36	0	2	21.78
				36	16	2	21.62
				36	35	2	21.69
				75	0	2	21.59

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
10MHz	20000	1715.0	QPSK	1	0	0	22.06
				1	24	0	21.13
				1	49	0	22.13
				25	0	1	21.85
				25	12	1	21.36
				25	25	1	21.67
				50	0	1	22.09
			16QAM	1	0	1	22.27
				1	24	1	21.36
				1	49	1	22.03
				25	0	2	21.99
				25	12	2	21.30
				25	25	2	21.20
				50	0	2	21.90
	20175	1732.5	QPSK	1	0	0	21.89
				1	24	0	22.21
				1	49	0	21.66
				25	0	1	21.91
				25	12	1	21.62
				25	25	1	21.79
				50	0	1	21.69
			16QAM	1	0	1	21.69
				1	24	1	21.52
				1	49	1	21.80
				25	0	2	21.59
				25	12	2	21.81
				25	25	2	21.66
				50	0	2	21.92
	20350	1750.0	QPSK	1	0	0	21.85
				1	24	0	21.89
				1	49	0	21.76
				25	0	1	21.72
				25	12	1	21.72
				25	25	1	21.69
				50	0	1	21.85
			16QAM	1	0	1	21.75
				1	24	1	21.49
				1	49	1	21.45
				25	0	2	21.89
				25	12	2	21.73
				25	25	2	21.74
				50	0	2	21.73

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
5MHz	19975	1712.5	QPSK	1	0	0	21.68
				1	12	0	21.62
				1	24	0	21.54
				12	0	1	21.64
				12	6	1	21.87
				12	11	1	21.97
				25	0	1	21.52
			16QAM	1	0	1	21.89
				1	12	1	22.07
				1	24	1	21.61
				12	0	2	21.57
				12	6	2	21.68
				12	11	2	21.50
				25	0	2	21.56
	20175	1732.5	QPSK	1	0	0	21.27
				1	12	0	21.55
				1	24	0	21.99
				12	0	1	22.19
				12	6	1	22.20
				12	11	1	22.11
				25	0	1	21.85
			16QAM	1	0	1	21.76
				1	12	1	22.19
				1	24	1	21.62
				12	0	2	21.50
				12	6	2	21.65
				12	11	2	21.55
				25	0	2	21.78
	20375	1752.5	QPSK	1	0	0	22.08
				1	12	0	21.89
				1	24	0	21.56
				12	0	1	21.83
				12	6	1	22.07
				12	11	1	21.52
				25	0	1	21.71
			16QAM	1	0	1	21.66
				1	12	1	21.77
				1	24	1	21.74
				12	0	2	22.04
				12	6	2	21.29
				12	11	2	21.74
				25	0	2	21.61

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
3MHz	19965	1711.5	QPSK	1	0	0	21.62
				1	7	0	21.98
				1	14	0	21.86
				8	0	1	21.59
				8	4	1	21.63
				8	7	1	21.64
				15	0	1	22.03
			16QAM	1	0	1	21.68
				1	7	1	21.73
				1	14	1	21.42
				8	0	2	21.62
				8	4	2	21.70
				8	7	2	21.59
				15	0	2	21.58
	20175	1732.5	QPSK	1	0	0	21.79
				1	7	0	21.99
				1	14	0	21.77
				8	0	1	21.49
				8	4	1	21.59
				8	7	1	21.72
				15	0	1	21.86
			16QAM	1	0	1	21.85
				1	7	1	21.61
				1	14	1	22.05
				8	0	2	21.54
				8	4	2	21.79
				8	7	2	21.86
				15	0	2	21.95
	20385	1753.5	QPSK	1	0	0	22.19
				1	7	0	21.55
				1	14	0	21.80
				8	0	1	21.88
				8	4	1	22.16
				8	7	1	21.61
				15	0	1	21.85
			16QAM	1	0	1	22.01
				1	7	1	21.56
				1	14	1	21.59
				8	0	2	21.62
				8	4	2	21.64
				8	7	2	21.76

				15	0	2	21.58

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
1.4MHz	19957	1710.7	QPSK	1	0	0	21.48
				1	2	0	21.43
				1	5	0	21.55
				3	0	0	21.51
				3	1	0	21.66
				3	2	0	21.93
				6	0	1	21.58
			16QAM	1	0	1	21.45
				1	2	1	21.66
				1	5	1	21.71
				3	0	1	22.00
				3	1	1	21.80
				3	2	1	21.64
				6	0	2	22.02
	20175	1732.5	QPSK	1	0	0	21.79
				1	2	0	22.12
				1	5	0	21.59
				3	0	0	21.96
				3	1	0	21.41
				3	2	0	21.73
				6	0	1	21.45
			16QAM	1	0	1	21.84
				1	2	1	21.50
				1	5	1	21.78
				3	0	1	22.07
				3	1	1	21.47
				3	2	1	21.60
				6	0	2	22.16
	20393	1754.3	QPSK	1	0	0	21.59
				1	2	0	21.56
				1	5	0	21.68
				3	0	0	21.74
				3	1	0	21.61
				3	2	0	21.53
				6	0	1	21.86
			16QAM	1	0	1	21.62
				1	2	1	21.67
				1	5	1	21.63
				3	0	1	21.88
				3	1	1	21.75

				3	2	1	21.52
				6	0	2	21.54

LTE Band 12

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
10MHz	23060	704	QPSK	1	0	0	21.91
				1	24	0	21.99
				1	49	0	22.11
				25	0	1	21.87
				25	12	1	21.56
				25	25	1	21.58
				50	0	1	21.63
			16QAM	1	0	1	21.74
				1	24	1	21.60
				1	49	1	21.95
				25	0	2	21.48
				25	12	2	22.14
				25	25	2	21.93
				50	0	2	21.92
	23095	707.5	QPSK	1	0	0	21.29
				1	24	0	21.98
				1	49	0	22.05
				25	0	1	21.72
				25	12	1	21.63
				25	25	1	22.08
				50	0	1	21.85
			16QAM	1	0	1	21.41
				1	24	1	21.82
				1	49	1	21.84
				25	0	2	21.56
				25	12	2	21.92
				25	25	2	21.52
				50	0	2	21.60
	23130	711	QPSK	1	0	0	21.52
				1	24	0	21.67
				1	49	0	21.50
				25	0	1	21.49
				25	12	1	21.56
				25	25	1	21.54
				50	0	1	22.02
			16QAM	1	0	1	21.68
				1	24	1	21.92
				1	49	1	21.88
				25	0	2	21.64
				25	12	2	21.59
				25	25	2	22.01
				50	0	2	21.77

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
5MHz	23035	701.5	QPSK	1	0	0	21.69
				1	12	0	21.51
				1	24	0	21.63
				12	0	1	21.74
				12	6	1	21.59
				12	11	1	21.81
				25	0	1	21.43
			16QAM	1	0	1	21.43
				1	12	1	21.53
				1	24	1	21.44
				12	0	2	22.04
				12	6	2	21.31
				12	11	2	21.67
				25	0	2	22.11
	23095	707.5	QPSK	1	0	0	21.71
				1	12	0	21.41
				1	24	0	21.77
				12	0	1	21.63
				12	6	1	22.09
				12	11	1	21.84
				25	0	1	22.11
			16QAM	1	0	1	22.09
				1	12	1	22.01
				1	24	1	21.57
				12	0	2	21.41
				12	6	2	22.13
				12	11	2	21.58
				25	0	2	21.77
	23155	713.5	QPSK	1	0	0	21.52
				1	12	0	21.74
				1	24	0	21.61
				12	0	1	22.07
				12	6	1	21.73
				12	11	1	21.69
				25	0	1	21.51
			16QAM	1	0	1	21.53
				1	12	1	21.64
				1	24	1	21.59
				12	0	2	21.71
				12	6	2	21.53
				12	11	2	21.84
				25	0	2	21.64

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
3MHz	23025	700.5	QPSK	1	0	0	21.70
				1	7	0	22.11
				1	14	0	21.59
				8	0	1	21.98
				8	4	1	22.11
				8	7	1	21.92
				15	0	1	21.57
			16QAM	1	0	1	21.45
				1	7	1	21.53
				1	14	1	21.76
				8	0	2	21.52
				8	4	2	21.67
				8	7	2	21.79
				15	0	2	21.80
	23095	707.5	QPSK	1	0	0	21.62
				1	7	0	21.80
				1	14	0	21.54
				8	0	1	21.71
				8	4	1	21.54
				8	7	1	21.68
				15	0	1	21.53
			16QAM	1	0	1	21.75
				1	7	1	21.82
				1	14	1	21.66
				8	0	2	21.47
				8	4	2	21.95
				8	7	2	22.00
				15	0	2	21.45
	23165	714.5	QPSK	1	0	0	21.68
				1	7	0	22.06
				1	14	0	22.01
				8	0	1	21.60
				8	4	1	22.05
				8	7	1	21.50
				15	0	1	22.01
			16QAM	1	0	1	21.59
				1	7	1	21.98
				1	14	1	22.11
				8	0	2	21.92
				8	4	2	21.57
				8	7	2	21.45

				15	0	2	21.53

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
1.4MHz	23017	699.7	QPSK	1	0	0	21.66
				1	2	0	21.65
				1	5	0	21.62
				3	0	0	21.60
				3	1	0	21.63
				3	2	0	21.40
				6	0	1	21.92
			16QAM	1	0	1	21.91
				1	2	1	21.89
				1	5	1	21.94
				3	0	1	22.05
				3	1	1	21.28
				3	2	1	21.41
				6	0	2	21.67
	23095	707.5	QPSK	1	0	0	21.55
				1	2	0	21.96
				1	5	0	21.77
				3	0	0	22.03
				3	1	0	21.59
				3	2	0	21.44
				6	0	1	21.54
			16QAM	1	0	1	21.92
				1	2	1	21.51
				1	5	1	21.85
				3	0	1	21.66
				3	1	1	21.70
				3	2	1	21.98
				6	0	2	21.74
	23173	715.3	QPSK	1	0	0	21.70
				1	2	0	21.34
				1	5	0	21.96
				3	0	0	21.55
				3	1	0	22.01
				3	2	0	21.65
				6	0	1	21.52
			16QAM	1	0	1	21.48
				1	2	1	21.62
				1	5	1	21.49
				3	0	1	21.42
				3	1	1	21.66

				3	2	1	21.48
				6	0	2	21.66

LTE Band 17

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
10MHz	23780	709	QPSK	1	0	0	21.45
				1	24	0	21.60
				1	49	0	21.61
				25	0	1	22.00
				25	12	1	21.79
				25	25	1	22.74
				50	0	1	21.54
			16QAM	1	0	1	22.11
				1	24	1	21.36
				1	49	1	21.52
				25	0	2	21.69
				25	12	2	21.54
				25	25	2	21.63
				50	0	2	21.40
	23790	710	QPSK	1	0	0	21.55
				1	24	0	21.78
				1	49	0	21.68
				25	0	1	22.04
				25	12	1	21.79
				25	25	1	22.01
				50	0	1	21.71
			16QAM	1	0	1	21.58
				1	24	1	21.61
				1	49	1	21.94
				25	0	2	21.51
				25	12	2	21.79
				25	25	2	21.89
				50	0	2	22.23
	23800	711	QPSK	1	0	0	21.54
				1	24	0	21.90
				1	49	0	22.26
				25	0	1	21.70
				25	12	1	21.18
				25	25	1	21.76
				50	0	1	20.92
			16QAM	1	0	1	21.52
				1	24	1	21.50
				1	49	1	22.03
				25	0	2	21.73
				25	12	2	21.64
				25	25	2	21.90
				50	0	2	22.02

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
5MHz	23755	706.5	QPSK	1	0	0	21.75
				1	12	0	21.79
				1	24	0	21.58
				12	0	1	21.63
				12	6	1	21.58
				12	11	1	21.94
				25	0	1	21.55
			16QAM	1	0	1	21.85
				1	12	1	21.55
				1	24	1	21.68
				12	0	2	21.45
				12	6	2	21.47
				12	11	2	21.87
				25	0	2	21.73
	23790	710	QPSK	1	0	0	21.42
				1	12	0	21.62
				1	24	0	22.01
				12	0	1	21.63
				12	6	1	21.67
				12	11	1	21.56
				25	0	1	21.69
			16QAM	1	0	1	21.77
				1	12	1	21.63
				1	24	1	21.94
				12	0	2	21.67
				12	6	2	21.54
				12	11	2	21.63
				25	0	2	21.50
	23825	713.5	QPSK	1	0	0	21.52
				1	12	0	21.65
				1	24	0	21.72
				12	0	1	21.62
				12	6	1	21.57
				12	11	1	21.75
				25	0	1	21.79
			16QAM	1	0	1	21.68
				1	12	1	21.91
				1	24	1	21.74
				12	0	2	21.58
				12	6	2	21.55
				12	11	2	21.74
				25	0	2	22.01

According to 3GPP 36.521 sub-clause 6.2.3.3, the maximum output power is allowed to be reduced by following the table.

Table 6.2.3.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (For PRACH, PUCCH and SRS transmission, the allowed MPR is according to that specified for PUSCH QPSK modulation for the corresponding transmission bandwidth.).

When PRACH, PUCCH are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

For each subframe, the MPR is evaluated per slot and given by the maximum value taken over the transmission(s) within the slot, the maximum MPR over the two slots is then applied for the entire subframe.

For the UE maximum output power modified by MPR, the power limits specified in subclause 6.2.5.3 apply. The normative reference for this requirement is TS 36.101 clause 6.2.3.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

6.2 RADIATED OUTPUT POWER

6.2.1 MEASUREMENT METHOD

The measurements procedures specified in ANSI/TIA-603-D-2010 were applied.

1 In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (Pin) is applied to the input of the dipole, and the power received (Pr) at the chamber's probe antenna is recorded.

2 The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established as ARpl=Pin + 2.15 - Pr. The ARpl is the attenuation of “reference path loss”, and including the gain of receive antenna, the cable loss and the air loss. The measurement results are obtained as described below: Power=PMea+ARpl

3 The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.

4 From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.

5 The EUT is then put into continuously transmitting mode at its maximum power level.

6 Power mode measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 27.50(d)(4). The "reference path loss" from Step1 is added to this result.

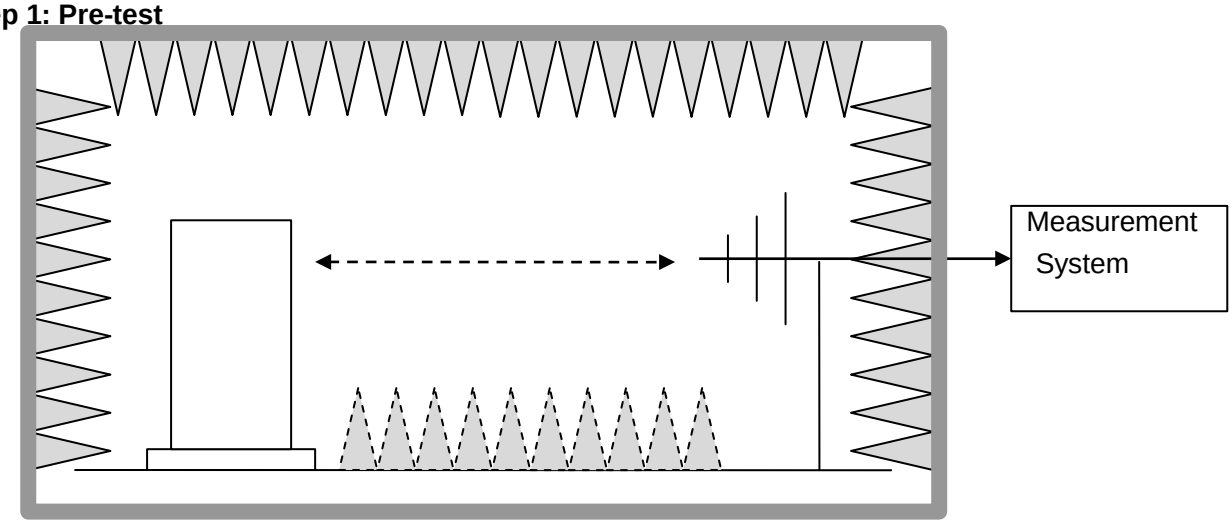
7 This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power (Pin).

8 ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi..

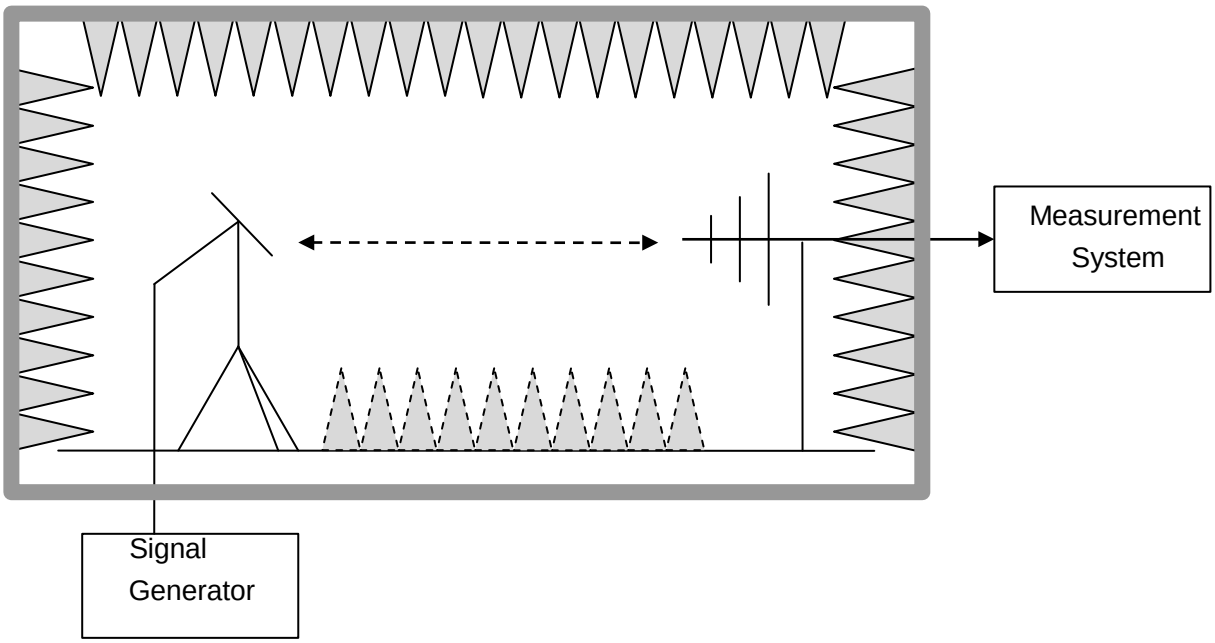
Test Setup

NOTE: Effective radiated power (ERP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

Step 1: Pre-test



Step 2: Substitution method to verify the maximum ERP



6.2.2 PROVISIONS APPLICABLE

This is the test for the maximum radiated power from the EUT. Rule Part 27.50(d) specifies, “Mobile/portable stations are limited to 1 watts e.i.r.p.

Rule Part 27.50(c)(10) specifies “Portable stations (hand-held devices) are limited to 3 watts ERP”.

Mode	Nominal Peak Power
LTE Band 4	<=30 dBm (1W)
LTE Band 12	<=34.77dBm(3W)
LTE Band 17	<=34.77dBm(3W)

6.2.3 MEASUREMENT RESULT

EIRP for LTE Band4

Frequency	Channel Bandwidth	Mode.	RB	Substituted level	Antenna Polarization	Antenna Gain correction	Cable Loss	Absolute Level	Limit (dBm)
1710.7	1.4	QPSK	1/0	12.71	V	7.95	0.79	19.87	30
1732.5	1.4	QPSK	1/0	12.33	V	7.95	0.79	19.49	30
1754.3	1.4	QPSK	1/0	13.70	V	7.95	0.79	20.86	30
1710.7	1.4	QPSK	1/0	12.95	H	7.95	0.79	20.11	30
1732.5	1.4	QPSK	1/0	10.08	H	7.95	0.79	17.24	30
1754.3	1.4	QPSK	1/0	11.10	H	7.95	0.79	18.26	30
1710.7	1.4	16-QAM	1/5	14.56	V	7.95	0.79	21.72	30
1732.5	1.4	16-QAM	1/0	11.93	V	7.95	0.79	19.09	30
1754.3	1.4	16-QAM	1/0	13.67	V	7.95	0.79	20.83	30
1710.7	1.4	16-QAM	1/5	12.47	H	7.95	0.79	19.63	30
1732.5	1.4	16-QAM	1/0	12.17	H	7.95	0.79	19.33	30
1754.3	1.4	16-QAM	1/0	12.54	H	7.95	0.79	19.70	30
1711.5	3	QPSK	1/0	13.04	V	7.95	0.79	20.20	30
1732.5	3	QPSK	1/0	12.08	V	7.95	0.79	19.24	30
1753.5	3	QPSK	1/0	12.91	V	7.95	0.79	20.07	30
1711.5	3	QPSK	1/0	10.34	H	7.95	0.79	17.50	30
1732.5	3	QPSK	1/0	11.21	H	7.95	0.79	18.37	30
1753.5	3	QPSK	1/0	11.86	H	7.95	0.79	19.02	30
1711.5	3	16-QAM	1/0	13.46	V	7.95	0.79	20.62	30
1732.5	3	16-QAM	1/0	11.65	V	7.95	0.79	18.81	30
1753.5	3	16-QAM	1/0	13.32	V	7.95	0.79	20.48	30
1711.5	3	16-QAM	1/0	11.46	H	7.95	0.79	18.62	30
1732.5	3	16-QAM	1/0	11.91	H	7.95	0.79	19.07	30
1753.5	3	16-QAM	1/0	12.36	H	7.95	0.79	19.52	30
1712.5	5	QPSK	1/0	12.13	V	7.95	0.79	19.29	30
1732.5	5	QPSK	1/0	13.27	V	7.95	0.79	20.43	30
1752.5	5	QPSK	1/24	12.99	V	7.95	0.79	20.15	30
1712.5	5	QPSK	1/0	11.42	H	7.95	0.79	18.58	30
1732.5	5	QPSK	1/0	11.47	H	7.95	0.79	18.63	30
1752.5	5	QPSK	1/24	11.80	H	7.95	0.79	18.96	30
1712.5	5	16-QAM	1/0	12.38	V	7.95	0.79	19.54	30
1732.5	5	16-QAM	1/0	12.77	V	7.95	0.79	19.93	30
1752.5	5	16-QAM	1/24	12.45	V	7.95	0.79	19.61	30
1712.5	5	16-QAM	1/0	10.09	H	7.95	0.79	17.25	30
1732.5	5	16-QAM	1/0	11.77	H	7.95	0.79	18.93	30

1752.5	5	16-QAM	1/24	10.84	H	7.95	0.79	18.00	30
1715	10	QPSK	1/0	13.85	V	7.95	0.79	21.01	30
1732.5	10	QPSK	1/49	13.58	V	7.95	0.79	20.74	30
1750	10	QPSK	1/0	12.49	V	7.95	0.79	19.65	30
1715	10	QPSK	1/0	12.82	H	7.95	0.79	19.98	30
1732.5	10	QPSK	1/49	11.64	H	7.95	0.79	18.80	30
1750	10	QPSK	1/0	10.78	H	7.95	0.79	17.94	30
1715	10	16-QAM	1/0	12.23	V	7.95	0.79	19.39	30
1732.5	10	16-QAM	1/49	11.23	V	7.95	0.79	18.39	30
1750	10	16-QAM	1/0	13.27	V	7.95	0.79	20.43	30
1715	10	16-QAM	1/0	12.34	H	7.95	0.79	19.50	30
1732.5	10	16-QAM	1/49	12.06	H	7.95	0.79	19.22	30
1750	10	16-QAM	1/0	11.56	H	7.95	0.79	18.72	30
1717.5	15	QPSK	1/0	12.33	V	7.95	0.79	19.49	30
1732.5	15	QPSK	1/74	12.68	V	7.95	0.79	19.84	30
1747.5	15	QPSK	1/0	12.11	V	7.95	0.79	19.27	30
1717.5	15	QPSK	1/0	13.23	H	7.95	0.79	20.39	30
1732.5	15	QPSK	1/74	10.44	H	7.95	0.79	17.60	30
1747.5	15	QPSK	1/0	10.93	H	7.95	0.79	18.09	30
1717.5	15	16-QAM	1/0	11.93	V	7.95	0.79	19.09	30
1732.5	15	16-QAM	1/74	12.15	V	7.95	0.79	19.31	30
1747.5	15	16-QAM	1/0	12.49	V	7.95	0.79	19.65	30
1717.5	15	16-QAM	1/0	12.62	H	7.95	0.79	19.78	30
1732.5	15	16-QAM	1/74	11.38	H	7.95	0.79	18.54	30
1747.5	15	16-QAM	1/0	12.34	H	7.95	0.79	19.50	30
1720	20	QPSK	1/99	13.15	V	7.95	0.79	20.31	30
1732.5	20	QPSK	1/99	13.58	V	7.95	0.79	20.74	30
1745	20	QPSK	1/0	12.71	V	7.95	0.79	19.87	30
1720	20	QPSK	1/99	12.96	H	7.95	0.79	20.12	30
1732.5	20	QPSK	1/99	11.42	H	7.95	0.79	18.58	30
1745	20	QPSK	1/0	13.33	H	7.95	0.79	20.49	30
1720	20	16-QAM	1/99	11.40	V	7.95	0.79	18.56	30
1732.5	20	16-QAM	1/99	13.07	V	7.95	0.79	20.23	30
1745	20	16-QAM	1/0	13.91	V	7.95	0.79	21.07	30
1720	20	16-QAM	1/99	11.06	H	7.95	0.79	18.22	30
1732.5	20	16-QAM	1/99	11.45	H	7.95	0.79	18.61	30
1745	20	16-QAM	1/0	11.34	H	7.95	0.79	18.50	30

EIRP for LTE Band12

Frequency	Channel Bandwidth	Mode.	RB	Substituted level	Antenna Polarization	Antenna Gain correction	Cable Loss	Absolute Level	Limit (dBm)
699.7	1.4	QPSK	1/0	13.28	V	6.7	0.49	19.49	34.77
707.5	1.4	QPSK	1/0	12.88	V	6.7	0.49	19.09	34.77
715.3	1.4	QPSK	1/0	14.48	V	6.7	0.49	20.69	34.77
699.7	1.4	QPSK	1/0	14.23	H	6.7	0.49	20.44	34.77
707.5	1.4	QPSK	1/0	13.48	H	6.7	0.49	19.69	34.77
715.3	1.4	QPSK	1/0	12.41	H	6.7	0.49	18.62	34.77
699.7	1.4	16-QAM	1/0	13.24	V	6.7	0.49	19.45	34.77
707.5	1.4	16-QAM	1/0	14.18	V	6.7	0.49	20.39	34.77
715.3	1.4	16-QAM	1/0	15.08	V	6.7	0.49	21.29	34.77
699.7	1.4	16-QAM	1/0	12.85	H	6.7	0.49	19.06	34.77
707.5	1.4	16-QAM	1/0	15.02	H	6.7	0.49	21.23	34.77
715.3	1.4	16-QAM	1/0	13.69	H	6.7	0.49	19.90	34.77
700.5	3	QPSK	1/0	14.03	V	6.7	0.49	20.24	34.77
707.5	3	QPSK	1/0	12.70	V	6.7	0.49	18.91	34.77
714.5	3	QPSK	1/0	13.34	V	6.7	0.49	19.55	34.77
700.5	3	QPSK	1/0	12.99	H	6.7	0.49	19.20	34.77
707.5	3	QPSK	1/0	12.71	H	6.7	0.49	18.92	34.77
714.5	3	QPSK	1/0	14.23	H	6.7	0.49	20.44	34.77
700.5	3	16-QAM	1/0	12.88	V	6.7	0.49	19.09	34.77
707.5	3	16-QAM	1/0	14.51	V	6.7	0.49	20.72	34.77
714.5	3	16-QAM	1/0	12.39	V	6.7	0.49	18.60	34.77
700.5	3	16-QAM	1/0	12.74	H	6.7	0.49	18.95	34.77
707.5	3	16-QAM	1/0	13.72	H	6.7	0.49	19.93	34.77
714.5	3	16-QAM	1/0	12.65	H	6.7	0.49	18.91	34.77
701.5	5	QPSK	1/0	14.74	V	6.7	0.49	20.95	34.77
707.5	5	QPSK	1/0	12.83	V	6.7	0.49	19.04	34.77
713.5	5	QPSK	1/0	13.52	V	6.7	0.49	19.73	34.77
701.5	5	QPSK	1/0	12.78	H	6.7	0.49	18.99	34.77
707.5	5	QPSK	1/0	12.67	H	6.7	0.49	18.88	34.77
713.5	5	QPSK	1/0	13.45	H	6.7	0.49	19.66	34.77
701.5	5	16-QAM	1/0	12.35	V	6.7	0.49	18.56	34.77
707.5	5	16-QAM	1/0	15.19	V	6.7	0.49	21.40	34.77
713.5	5	16-QAM	1/0	14.75	V	6.7	0.49	20.96	34.77
701.5	5	16-QAM	1/0	12.29	H	6.7	0.49	18.50	34.77
707.5	5	16-QAM	1/0	14.21	H	6.7	0.49	20.42	34.77
713.5	5	16-QAM	1/0	13.77	H	6.7	0.49	19.98	34.77

704	10	QPSK	1/0	13.68	V	6.7	0.49	19.89	34.77
707.5	10	QPSK	1/0	12.39	V	6.7	0.49	18.60	34.77
711	10	QPSK	1/0	12.59	V	6.7	0.49	18.80	34.77
704	10	QPSK	1/0	13.61	H	6.7	0.49	19.82	34.77
707.5	10	QPSK	1/0	13.04	H	6.7	0.49	19.25	34.77
711	10	QPSK	1/0	13.33	H	6.7	0.49	19.54	34.77
704	10	16-QAM	1/0	14.28	V	6.7	0.49	20.49	34.77
707.5	10	16-QAM	1/0	12.88	V	6.7	0.49	19.09	34.77
711	10	16-QAM	1/0	13.31	V	6.7	0.49	19.52	34.77
704	10	16-QAM	1/0	13.90	H	6.7	0.49	20.11	34.77
707.5	10	16-QAM	1/0	14.71	H	6.7	0.49	20.92	34.77
711	10	16-QAM	1/0	12.46	H	6.7	0.49	18.67	34.77

ERP for LTE Band17

Frequency	Channel BW	Mode.	RB	Substituted level	Antenna Polarization	Antenna Gain correction	Cable Loss	Absolute Level	Limit (dBm)
706.5	5	QPSK	1/0	13.04	H	6.7	0.49	19.25	34.77
710	5	QPSK	1/0	14.00	H	6.7	0.49	20.21	34.77
713.5	5	QPSK	1/0	14.01	H	6.7	0.49	20.22	34.77
706.5	5	QPSK	1/0	12.94	V	6.7	0.49	19.15	34.77
710	5	QPSK	1/0	12.61	V	6.7	0.49	18.82	34.77
713.5	5	QPSK	1/0	13.64	V	6.7	0.49	19.85	34.77
706.5	5	16-QAM	1/0	13.47	H	6.7	0.49	19.68	34.77
710	5	16-QAM	1/0	13.51	H	6.7	0.49	19.72	34.77
713.5	5	16-QAM	1/0	13.90	H	6.7	0.49	20.11	34.77
706.5	5	16-QAM	1/0	12.80	V	6.7	0.49	19.01	34.77
710	5	16-QAM	1/0	13.84	V	6.7	0.49	20.05	34.77
713.5	5	16-QAM	1/0	13.30	V	6.7	0.49	19.51	34.77

Frequency	Channel BW	Mode.	RB	Substituted level	Antenna Polarization	Antenna Gain correction	Cable Loss	Absolute Level	Limit (dBm)
709	10	QPSK	1/0	13.49	H	6.7	0.49	19.70	34.77
710	10	QPSK	1/0	12.65	H	6.7	0.49	18.86	34.77
711	10	QPSK	1/0	13.15	H	6.7	0.49	19.36	34.77
709	10	QPSK	1/0	14.22	V	6.7	0.49	20.43	34.77
710	10	QPSK	1/0	13.48	V	6.7	0.49	19.69	34.77
711	10	QPSK	1/0	13.37	V	6.7	0.49	19.58	34.77
709	10	16-QAM	1/0	12.13	H	6.7	0.49	18.34	34.77
710	10	16-QAM	1/0	13.54	H	6.7	0.49	19.75	34.77

711	10	16-QAM	1/0	14.46	H	6.7	0.49	20.67	34.77
709	10	16-QAM	1/0	12.15	V	6.7	0.49	18.36	34.77
710	10	16-QAM	1/0	13.11	V	6.7	0.49	19.32	34.77
711	10	16-QAM	1/0	12.16	V	6.7	0.49	18.37	34.77

Note: Above is the worst mode data.

6.3. Peak-to-Average Ratio

6.3.1 MEASUREMENT METHOD

FCC: 27.50(a)

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

According to KDB 971168 v02r01 5.7.1:

a)Refer to instrument’s analyzer instruction manual for details on how to use the power statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ signal’s occupied bandwidth;

c) Set the number of counts to a value that stabilizes the measured CCDF curve;

d) Set the measurement interval to 1 ms

e)Record the maximum PAPR level associated with a probability of 0.1%

6.3.2 PROVISIONS APPLICABLE

This is the test for the Peak-to-Average Ratio from the EUT.

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument’s resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. 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.

6.3.3 MEASUREMENT RESULT

LTE Band 4

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio (dB)	Limit (dB)	Verdict
		Size	Offset			
QPSK	LCH	1	0	3.25	<13	PASS
		1	3	4.00	<13	PASS
		1	5	3.59	<13	PASS
		3	0	3.98	<13	PASS
		3	2	3.81	<13	PASS
		3	3	4.08	<13	PASS
		6	0	4.26	<13	PASS

	MCH	1	0	4.79	<13	PASS
		1	3	4.03	<13	PASS
		1	5	3.77	<13	PASS
		3	0	3.81	<13	PASS
		3	2	4.00	<13	PASS
		3	3	4.81	<13	PASS
		6	0	3.73	<13	PASS
	HCH	1	0	4.31	<13	PASS
		1	3	4.19	<13	PASS
		1	5	4.26	<13	PASS
		3	0	4.28	<13	PASS
		3	2	3.22	<13	PASS
		3	3	3.97	<13	PASS
		6	0	4.82	<13	PASS
16QAM	LCH	1	0	4.54	<13	PASS
		1	3	3.75	<13	PASS
		1	5	5.02	<13	PASS
		3	0	4.50	<13	PASS
		3	2	5.07	<13	PASS
		3	3	5.32	<13	PASS
		6	0	5.74	<13	PASS
	MCH	1	0	4.59	<13	PASS
		1	3	5.55	<13	PASS
		1	5	5.42	<13	PASS
		3	0	5.25	<13	PASS
		3	2	4.28	<13	PASS
		3	3	5.56	<13	PASS
		6	0	5.87	<13	PASS
	HCH	1	0	5.18	<13	PASS
		1	3	4.07	<13	PASS
		1	5	4.18	<13	PASS
		3	0	4.43	<13	PASS
		3	2	4.26	<13	PASS
		3	3	5.35	<13	PASS
		6	0	5.96	<13	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			

Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	3.47	<13	PASS
		1	7	4.40	<13	PASS
		1	14	3.58	<13	PASS
		8	0	3.10	<13	PASS
		8	4	3.28	<13	PASS
		8	7	3.39	<13	PASS
		15	0	3.86	<13	PASS
	MCH	1	0	3.62	<13	PASS
		1	7	4.33	<13	PASS
		1	14	4.40	<13	PASS
		8	0	4.25	<13	PASS
		8	4	3.44	<13	PASS
		8	7	4.28	<13	PASS
		15	0	4.04	<13	PASS
	HCH	1	0	3.96	<13	PASS
		1	7	3.68	<13	PASS
		1	14	3.41	<13	PASS
		8	0	3.94	<13	PASS
		8	4	4.27	<13	PASS
		8	7	4.59	<13	PASS
		15	0	4.54	<13	PASS
16QAM	LCH	1	0	4.42	<13	PASS
		1	7	4.73	<13	PASS
		1	14	4.16	<13	PASS
		8	0	4.22	<13	PASS
		8	4	4.30	<13	PASS
		8	7	4.77	<13	PASS
		15	0	5.60	<13	PASS
	MCH	1	0	4.71	<13	PASS
		1	7	4.31	<13	PASS
		1	14	4.60	<13	PASS
		8	0	4.65	<13	PASS
		8	4	5.18	<13	PASS
		8	7	5.10	<13	PASS
		15	0	5.32	<13	PASS
	HCH	1	0	3.56	<13	PASS
		1	7	3.98	<13	PASS
		1	14	4.38	<13	PASS

		8	0	4.36	<13	PASS
		8	4	3.85	<13	PASS
		8	7	5.74	<13	PASS
		15	0	5.84	<13	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	3.97	<13	PASS
		1	12	3.71	<13	PASS
		1	24	4.08	<13	PASS
		12	0	3.01	<13	PASS
		12	6	3.45	<13	PASS
		12	13	4.32	<13	PASS
		25	0	3.63	<13	PASS
	MCH	1	0	3.61	<13	PASS
		1	12	4.19	<13	PASS
		1	24	3.36	<13	PASS
		12	0	4.26	<13	PASS
		12	6	4.33	<13	PASS
		12	13	4.88	<13	PASS
		25	0	4.58	<13	PASS
	HCH	1	0	3.85	<13	PASS
		1	12	3.70	<13	PASS
		1	24	3.26	<13	PASS
		12	0	3.11	<13	PASS
		12	6	4.57	<13	PASS
		12	13	3.63	<13	PASS
		25	0	4.07	<13	PASS
16QAM	LCH	1	0	4.43	<13	PASS
		1	12	4.83	<13	PASS
		1	24	4.22	<13	PASS
		12	0	4.52	<13	PASS
		12	6	4.17	<13	PASS
		12	13	4.21	<13	PASS
		25	0	4.41	<13	PASS
	MCH	1	0	4.50	<13	PASS
		1	12	4.22	<13	PASS

		1	24	3.64	<13	PASS
		12	0	4.26	<13	PASS
		12	6	4.22	<13	PASS
		12	13	4.66	<13	PASS
		25	0	4.42	<13	PASS
	HCH	1	0	3.89	<13	PASS
		1	12	4.53	<13	PASS
		1	24	4.03	<13	PASS
		12	0	4.08	<13	PASS
		12	6	3.66	<13	PASS
		12	13	4.09	<13	PASS
		25	0	4.66	<13	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	3.91	<13	PASS
		1	24	3.66	<13	PASS
		1	49	3.49	<13	PASS
		25	0	3.53	<13	PASS
		25	12	3.89	<13	PASS
		25	25	3.68	<13	PASS
		50	0	3.55	<13	PASS
	MCH	1	0	4.37	<13	PASS
		1	24	4.03	<13	PASS
		1	49	4.95	<13	PASS
		25	0	3.14	<13	PASS
		25	12	3.47	<13	PASS
		25	25	4.80	<13	PASS
		50	0	4.44	<13	PASS
	HCH	1	0	3.34	<13	PASS
		1	24	4.00	<13	PASS
		1	49	3.84	<13	PASS
		25	0	3.46	<13	PASS
		25	12	3.05	<13	PASS
		25	25	3.60	<13	PASS
		50	0	3.78	<13	PASS
16QAM	LCH	1	0	3.27	<13	PASS

		1	24	3.01	<13	PASS
		1	49	3.21	<13	PASS
		25	0	4.52	<13	PASS
		25	12	4.79	<13	PASS
		25	25	4.17	<13	PASS
		50	0	4.44	<13	PASS
	MCH	1	0	3.13	<13	PASS
		1	24	3.36	<13	PASS
		1	49	3.30	<13	PASS
		25	0	3.42	<13	PASS
		25	12	4.39	<13	PASS
		25	25	4.45	<13	PASS
		50	0	4.41	<13	PASS
	HCH	1	0	3.15	<13	PASS
		1	24	3.06	<13	PASS
		1	49	3.76	<13	PASS
		25	0	4.54	<13	PASS
		25	12	3.98	<13	PASS
		25	25	4.34	<13	PASS
		50	0	4.37	<13	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	3.55	<13	PASS
		1	37	3.04	<13	PASS
		1	74	3.88	<13	PASS
		37	0	4.06	<13	PASS
		37	18	3.21	<13	PASS
		37	38	4.24	<13	PASS
		75	0	4.01	<13	PASS
	MCH	1	0	3.84	<13	PASS
		1	37	3.46	<13	PASS
		1	74	3.99	<13	PASS
		37	0	3.18	<13	PASS
		37	18	3.26	<13	PASS
		37	38	4.60	<13	PASS
		75	0	4.31	<13	PASS
	HCH	1	0	3.29	<13	PASS

		1	37	3.78	<13	PASS
		1	74	4.45	<13	PASS
		37	0	3.31	<13	PASS
		37	18	4.25	<13	PASS
		37	38	3.36	<13	PASS
		75	0	3.51	<13	PASS
16QAM	LCH	1	0	4.05	<13	PASS
		1	37	3.51	<13	PASS
		1	74	3.09	<13	PASS
		37	0	3.84	<13	PASS
		37	18	4.94	<13	PASS
		37	38	4.06	<13	PASS
		75	0	4.66	<13	PASS
	MCH	1	0	3.85	<13	PASS
		1	37	3.26	<13	PASS
		1	74	3.65	<13	PASS
		37	0	4.34	<13	PASS
		37	18	4.92	<13	PASS
		37	38	4.13	<13	PASS
		75	0	4.10	<13	PASS
	HCH	1	0	3.38	<13	PASS
		1	37	4.47	<13	PASS
		1	74	4.24	<13	PASS
		37	0	4.40	<13	PASS
		37	18	4.08	<13	PASS
		37	38	4.37	<13	PASS
		75	0	4.36	<13	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	3.38	<13	PASS
		1	49	3.38	<13	PASS
		1	99	4.46	<13	PASS
		50	0	4.86	<13	PASS
		50	25	4.87	<13	PASS
		50	50	4.78	<13	PASS
		100	0	3.66	<13	PASS
	MCH	1	0	3.23	<13	PASS

		1	49	3.81	<13	PASS
		1	99	4.31	<13	PASS
		50	0	3.97	<13	PASS
		50	25	4.80	<13	PASS
		50	50	4.45	<13	PASS
		100	0	4.38	<13	PASS
	HCH	1	0	3.79	<13	PASS
		1	49	3.18	<13	PASS
		1	99	4.41	<13	PASS
		50	0	4.40	<13	PASS
		50	25	3.77	<13	PASS
		50	50	3.71	<13	PASS
		100	0	4.41	<13	PASS
16QAM	LCH	1	0	3.43	<13	PASS
		1	49	4.24	<13	PASS
		1	99	4.47	<13	PASS
		50	0	4.20	<13	PASS
		50	25	3.71	<13	PASS
		50	50	4.31	<13	PASS
		100	0	4.72	<13	PASS
	MCH	1	0	3.68	<13	PASS
		1	49	3.32	<13	PASS
		1	99	3.45	<13	PASS
		50	0	4.18	<13	PASS
		50	25	4.06	<13	PASS
		50	50	4.39	<13	PASS
		100	0	4.77	<13	PASS
	HCH	1	0	3.98	<13	PASS
		1	49	4.77	<13	PASS
		1	99	4.68	<13	PASS
		50	0	4.16	<13	PASS
		50	25	3.18	<13	PASS
		50	50	4.12	<13	PASS
		100	0	4.11	<13	PASS

LTE Band 12
Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio (dB)	Limit (dB)	Verdict
		Size	Offset			
QPSK	LCH	1	0	3.45	<13	PASS
		1	3	3.66	<13	PASS
		1	5	3.11	<13	PASS
		3	0	3.02	<13	PASS
		3	2	4.53	<13	PASS
		3	3	4.69	<13	PASS
		6	0	4.66	<13	PASS
	MCH	1	0	3.64	<13	PASS
		1	3	3.88	<13	PASS
		1	5	3.66	<13	PASS
		3	0	4.24	<13	PASS
		3	2	3.98	<13	PASS
		3	3	4.70	<13	PASS
		6	0	3.76	<13	PASS
	HCH	1	0	3.90	<13	PASS
		1	3	3.21	<13	PASS
		1	5	3.79	<13	PASS
		3	0	4.57	<13	PASS
		3	2	4.78	<13	PASS
		3	3	4.89	<13	PASS
		6	0	4.21	<13	PASS
16QAM	LCH	1	0	3.43	<13	PASS
		1	3	3.94	<13	PASS
		1	5	3.75	<13	PASS
		3	0	4.51	<13	PASS
		3	2	3.86	<13	PASS
		3	3	4.19	<13	PASS
		6	0	4.68	<13	PASS
	MCH	1	0	3.86	<13	PASS
		1	3	3.81	<13	PASS
		1	5	3.53	<13	PASS
		3	0	3.84	<13	PASS
		3	2	3.50	<13	PASS
		3	3	4.98	<13	PASS
		6	0	4.49	<13	PASS

	HCH	1	0	3.52	<13	PASS
		1	3	4.53	<13	PASS
		1	5	3.21	<13	PASS
		3	0	3.64	<13	PASS
		3	2	4.71	<13	PASS
		3	3	4.36	<13	PASS
		6	0	4.67	<13	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	3.67	<13	PASS
		1	7	4.83	<13	PASS
		1	14	3.09	<13	PASS
		8	0	3.45	<13	PASS
		8	4	3.66	<13	PASS
		8	7	4.18	<13	PASS
		15	0	3.35	<13	PASS
	MCH	1	0	3.89	<13	PASS
		1	7	3.84	<13	PASS
		1	14	3.37	<13	PASS
		8	0	4.64	<13	PASS
		8	4	4.67	<13	PASS
		8	7	4.22	<13	PASS
		15	0	3.89	<13	PASS
	HCH	1	0	4.19	<13	PASS
		1	7	4.78	<13	PASS
		1	14	4.12	<13	PASS
		8	0	3.79	<13	PASS
		8	4	3.85	<13	PASS
		8	7	4.80	<13	PASS
		15	0	4.18	<13	PASS
16QAM	LCH	1	0	4.53	<13	PASS
		1	7	3.59	<13	PASS
		1	14	3.74	<13	PASS
		8	0	4.09	<13	PASS
		8	4	3.48	<13	PASS
		8	7	3.35	<13	PASS
		15	0	4.38	<13	PASS

	MCH	1	0	3.38	<13	PASS
		1	7	4.16	<13	PASS
		1	14	4.54	<13	PASS
		8	0	3.98	<13	PASS
		8	4	3.96	<13	PASS
		8	7	4.91	<13	PASS
		15	0	4.33	<13	PASS
	HCH	1	0	3.73	<13	PASS
		1	7	3.50	<13	PASS
		1	14	3.72	<13	PASS
		8	0	4.15	<13	PASS
		8	4	4.79	<13	PASS
		8	7	4.42	<13	PASS
		15	0	4.98	<13	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	4.52	<13	PASS
		1	12	3.63	<13	PASS
		1	24	4.17	<13	PASS
		12	0	4.49	<13	PASS
		12	6	4.94	<13	PASS
		12	13	4.29	<13	PASS
		25	0	5.36	<13	PASS
	MCH	1	0	4.48	<13	PASS
		1	12	4.07	<13	PASS
		1	24	4.66	<13	PASS
		12	0	4.05	<13	PASS
		12	6	4.23	<13	PASS
		12	13	5.16	<13	PASS
		25	0	4.88	<13	PASS
	HCH	1	0	4.60	<13	PASS
		1	12	3.17	<13	PASS
		1	24	3.03	<13	PASS
		12	0	5.64	<13	PASS
		12	6	5.12	<13	PASS
		12	13	5.16	<13	PASS
		25	0	5.45	<13	PASS
16QAM	LCH	1	0	4.68	<13	PASS

		1	12	4.50	<13	PASS
		1	24	3.70	<13	PASS
		12	0	4.25	<13	PASS
		12	6	4.93	<13	PASS
		12	13	5.20	<13	PASS
		25	0	4.78	<13	PASS
	MCH	1	0	5.30	<13	PASS
		1	12	5.27	<13	PASS
		1	24	5.46	<13	PASS
		12	0	4.26	<13	PASS
		12	6	5.55	<13	PASS
		12	13	4.54	<13	PASS
		25	0	5.21	<13	PASS
	HCH	1	0	4.18	<13	PASS
		1	12	4.31	<13	PASS
		1	24	4.74	<13	PASS
		12	0	5.02	<13	PASS
		12	6	4.51	<13	PASS
		12	13	5.88	<13	PASS
		25	0	4.75	<13	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	4.02	<13	PASS
		1	24	4.21	<13	PASS
		1	49	4.45	<13	PASS
		25	0	5.47	<13	PASS
		25	12	4.78	<13	PASS
		25	25	5.65	<13	PASS
		50	0	4.44	<13	PASS
	MCH	1	0	5.14	<13	PASS
		1	24	5.45	<13	PASS
		1	49	5.67	<13	PASS
		25	0	4.50	<13	PASS
		25	12	5.69	<13	PASS
		25	25	4.61	<13	PASS
		50	0	5.99	<13	PASS
	HCH	1	0	3.97	<13	PASS

		1	24	4.67	<13	PASS
		1	49	4.07	<13	PASS
		25	0	4.69	<13	PASS
		25	12	5.29	<13	PASS
		25	25	6.67	<13	PASS
		50	0	5.13	<13	PASS
16QAM	LCH	1	0	5.08	<13	PASS
		1	24	5.31	<13	PASS
		1	49	5.71	<13	PASS
		25	0	6.50	<13	PASS
		25	12	5.53	<13	PASS
		25	25	6.79	<13	PASS
		50	0	5.92	<13	PASS
	MCH	1	0	5.29	<13	PASS
		1	24	5.11	<13	PASS
		1	49	5.56	<13	PASS
		25	0	5.70	<13	PASS
		25	12	6.17	<13	PASS
		25	25	5.90	<13	PASS
		50	0	5.41	<13	PASS
	HCH	1	0	5.36	<13	PASS
		1	24	5.76	<13	PASS
		1	49	4.82	<13	PASS
		25	0	6.13	<13	PASS
		25	12	6.21	<13	PASS
		25	25	5.32	<13	PASS
		50	0	6.45	<13	PASS

LTE Band 17

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	4.39	<13	PASS
		1	12	4.76	<13	PASS
		1	24	3.93	<13	PASS
		12	0	4.53	<13	PASS
		12	6	4.84	<13	PASS
		12	13	5.56	<13	PASS
		25	0	5.55	<13	PASS
	MCH	1	0	4.74	<13	PASS
		1	12	4.08	<13	PASS
		1	24	3.35	<13	PASS
		12	0	4.05	<13	PASS
		12	6	4.92	<13	PASS
		12	13	4.43	<13	PASS
		25	0	4.06	<13	PASS
	HCH	1	0	3.67	<13	PASS
		1	12	3.22	<13	PASS
		1	24	3.68	<13	PASS
		12	0	3.78	<13	PASS
		12	6	4.92	<13	PASS
		12	13	5.56	<13	PASS
		25	0	5.03	<13	PASS
16QAM	LCH	1	0	4.36	<13	PASS
		1	12	4.90	<13	PASS
		1	24	3.89	<13	PASS
		12	0	4.78	<13	PASS
		12	6	4.90	<13	PASS
		12	13	5.58	<13	PASS
		25	0	5.83	<13	PASS
	MCH	1	0	4.74	<13	PASS
		1	12	4.10	<13	PASS
		1	24	3.35	<13	PASS
		12	0	4.07	<13	PASS
		12	6	5.08	<13	PASS
		12	13	4.59	<13	PASS

		25	0	4.20	<13	PASS
	HCH	1	0	3.87	<13	PASS
		1	12	3.30	<13	PASS
		1	24	3.96	<13	PASS
		12	0	3.77	<13	PASS
		12	6	4.19	<13	PASS
		12	13	4.48	<13	PASS
		25	0	4.22	<13	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	4.93	<13	PASS
		1	24	4.46	<13	PASS
		1	49	5.18	<13	PASS
		25	0	4.81	<13	PASS
		25	12	5.99	<13	PASS
		25	25	4.93	<13	PASS
		50	0	5.77	<13	PASS
	MCH	1	0	4.49	<13	PASS
		1	24	4.92	<13	PASS
		1	49	4.14	<13	PASS
		25	0	5.33	<13	PASS
		25	12	4.39	<13	PASS
		25	25	4.73	<13	PASS
		50	0	4.51	<13	PASS
	HCH	1	0	4.27	<13	PASS
		1	24	4.62	<13	PASS
		1	49	4.17	<13	PASS
		25	0	4.58	<13	PASS
		25	12	5.66	<13	PASS
		25	25	5.83	<13	PASS
		50	0	4.97	<13	PASS
16QAM	LCH	1	0	5.04	<13	PASS
		1	24	4.70	<13	PASS
		1	49	5.18	<13	PASS
		25	0	4.93	<13	PASS
		25	12	6.20	<13	PASS
		25	25	5.23	<13	PASS

		50	0	5.98	<13	PASS
	MCH	1	0	4.49	<13	PASS
		1	24	5.22	<13	PASS
		1	49	4.20	<13	PASS
		25	0	5.31	<13	PASS
		25	12	4.38	<13	PASS
		25	25	4.79	<13	PASS
		50	0	4.54	<13	PASS
	HCH	1	0	4.29	<13	PASS
		1	24	4.91	<13	PASS
		1	49	4.37	<13	PASS
		25	0	4.53	<13	PASS
		25	12	5.66	<13	PASS
		25	25	5.75	<13	PASS
		50	0	5.13	<13	PASS

7. SPURIOUS EMISSION

7.1 CONDUCTED SPURIOUS EMISSION

7.1.1 MEASUREMENT METHOD

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.

Test Procedure Used

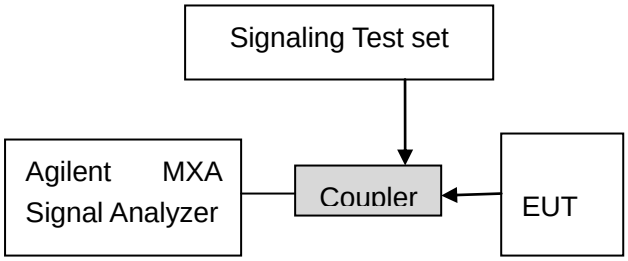
KDB 971168 v02r01 – Section 6.0

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to at least 10 * the fundamental frequency (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = max hold
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Test Instrument & Measurement Setup

shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

Test Note

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

7.1.2 MEASUREMENT RESULT

PLEASE REFER TO: APPENDIX A TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

Note: 1. No emission found in standby or receive mode, no recording in this report.

7.2 Radiated Spurious Emission

7.2.1 TEST OVERVIEW

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 v02r01 – Section 5.8
ANSI/TIA-603-C-2004 – Section 2.2.12

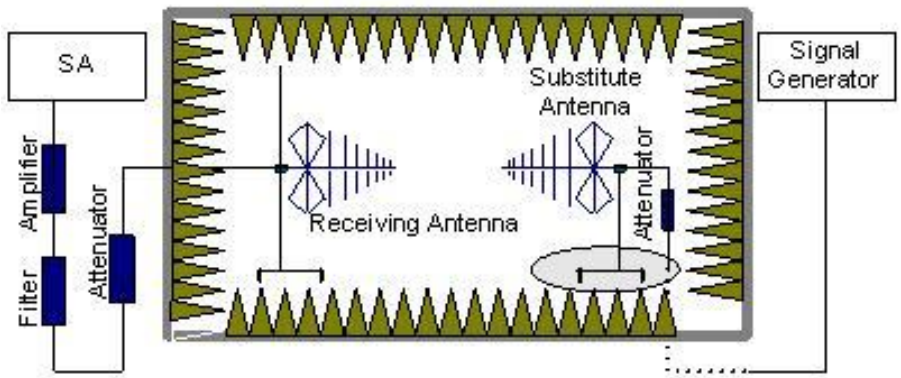
Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points > 2 x span / RBW
5. Detector = Peak
6. Trace mode = max hold
7. The trace was allowed to stabilize

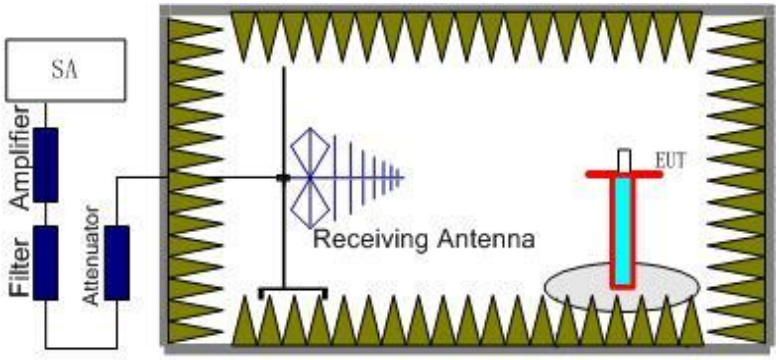
Test Setup

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, RSE=Rx（dBuV）+CL（dB）+SA（dB）+Gain（dBi）-107（dBuV to dBm）The SA is calibrated using following setup.



b) EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the LTE band 4, the LTE band 12 and LTE band 17. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below: $Power=P_{Mea}+A_{Rpl}$

7.2.2 PROVISIONS APPLICABLE

(a) On any frequency outside a licensee’s frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Note: Only record the worst condition of each test mode:

7.2.3 MEASUREMENT RESULT

LTE Band 4

Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3440	-48.07	V	10.06	2.52	-40.53	-13	-27.53
3440	-47.14	H	10.06	2.52	-39.60	-13	-26.60
257.4	-54.73	V	6.7	0.24	-48.27	-13	-35.27
640.2	-51.43	H	6.5	0.39	-45.32	-13	-32.32

Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3465	-48.18	V	10.06	2.52	-40.64	-13	-27.64
3465	-47.25	H	10.06	2.52	-39.71	-13	-26.71
256.9	-54.81	V	6.7	0.24	-48.35	-13	-35.35
639.8	-49.42	H	6.5	0.39	-43.31	-13	-30.31

High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3490	-48.01	V	10.06	2.52	-40.47	-13	-27.47
3490	-45.38	H	10.06	2.52	-37.84	-13	-24.84
254.6	-53.75	V	6.7	0.24	-47.29	-13	-34.29
639.4	-49.90	H	6.5	0.39	-43.79	-13	-30.79

LTE Band 12

Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1408	-48.73	V	10.72	1.65	-39.66	-13	-26.66
1408	-43.87	H	10.72	1.65	-34.80	-13	-21.80
255.2	-51.33	V	6.7	0.24	-44.87	-13	-31.87
641.1	-48.26	H	6.5	0.39	-42.15	-13	-29.15

Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1415	-47.52	V	10.72	1.65	-38.45	-13	-25.45
1415	-47.00	H	10.72	1.65	-37.93	-13	-24.93
254.5	-55.63	V	6.7	0.24	-49.17	-13	-36.17
640.2	-49.78	H	6.5	0.39	-43.67	-13	-30.67

High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1422	-45.93	V	10.72	1.65	-36.86	-13	-23.86
1422	-46.11	H	10.72	1.65	-37.04	-13	-24.04
254.2	-53.02	V	6.7	0.24	-46.56	-13	-33.56
640.8	-49.86	H	6.5	0.39	-43.75	-13	-30.75

LTE Band 17

Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1418	-48.87	V	10.72	1.65	-39.80	-13	-26.80
1418	-46.11	H	10.72	1.65	-37.04	-13	-24.04
253.8	-53.32	V	6.7	0.24	-46.86	-13	-33.86
640.5	-53.72	H	6.5	0.39	-47.61	-13	-34.61

Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1420	-47.39	V	10.72	1.65	-38.32	-13	-25.32
1420	-48.13	H	10.72	1.65	-39.06	-13	-26.06
253.8	-53.46	V	6.7	0.24	-47.00	-13	-34.00
639.7	-50.21	H	6.5	0.39	-44.10	-13	-31.10

High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1422	-49.36	V	10.72	1.65	-40.29	-13	-27.29
1422	-46.30	H	10.72	1.65	-37.23	-13	-24.23
254.5	-51.34	V	6.7	0.24	-44.88	-13	-31.88
639.4	-49.15	H	6.5	0.39	-43.04	-13	-30.04

Note: 1. EUT Field Strength (dBm) = Reading (Signal generator) + Antenna Gain (substitution antenna) - Cable loss (From Signal Generator to substitution antenna).

2. Below 30MHZ no Spurious found and the QPSK modes is the worst condition.

8. FREQUENCY STABILITY

8.1 MEASUREMENT METHOD

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

1 , Measure the carrier frequency at room temperature.

2 , Subject the EUT to overnight soak at -10℃.

, With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on channel 20175 for LTE band 4 measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.

3 , Repeat the above measurements at 10℃ increments from -10℃ to +50℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.

4 , Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.

5 , Subject the EUT to overnight soak at +50℃.

6 , With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.

7 , Repeat the above measurements at 10℃ increments from +50℃ to -10℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.

8 , At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

8.2 PROVISIONS APPLICABLE

8.2.1 For Hand carried battery powered equipment

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. The frequency stability of the transmitter is measured by:

a.) Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24 and Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

8.2.2 For equipment powered by primary supply voltage

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

-

8.3 MEASUREMENT RESULT (WORST)

LTE Band 4

Middle Channel, f_O = 1732.5 MHz				
Temperature (℃)	**Power Supplied**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-10	3.7	-1.13	-0.000652	±2.5
0		0.14	0.000083	±2.5
10		1.90	0.001098	±2.5
20		-0.44	-0.000256	±2.5
30		-1.49	-0.000859	±2.5
40		-1.54	-0.000892	±2.5
50		-0.13	-0.000074	±2.5
55		-0.13	-0.000074	±2.5
- 25	4.2	-1.44	-0.000834	±2.5
	3.5	0.33	0.000190	±2.5

LTE Band 12

Middle Channel, f_O = 707.5 MHz				
Temperature (℃)	**Power Supplied**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-10	3.7	-0.11	-0.000162	±2.5
0		0.36	0.000505	±2.5
10		-2.69	-0.003801	±2.5
20		0.01	0.000020	±2.5
30		-3.23	-0.004570	±2.5
40		0.06	0.000081	±2.5
50		0.21	0.000303	±2.5

55		-0.37	-0.000526	±2.5
- 25	4.2	-0.53	-0.000748	±2.5
	3.5	-0.23	-0.000324	±2.5

LTE Band 17

Middle Channel, f_O = 710 MHz				
Temperature (℃)	**Power Supplied**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-10	3.7	1.49	0.002095	±2.5
0		1.72	0.002418	±2.5
10		2.03	0.002861	±2.5
20		1.92	0.002700	±2.5
30		0.99	0.001390	±2.5
40		1.17	0.001652	±2.5
50		1.99	0.002801	±2.5
55		1.37	0.001934	±2.5
25	4.2	1.26	0.001773	±2.5
	3.5	-1.03	-0.001451	±2.5

Note: The EUT doesn't work below -10℃

9. OCCUPIED BANDWIDTH

9.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

9.2 PROVISIONS APPLICABLE

The emission bandwidth is defined as two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power

9.3 MEASUREMENT RESULT

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

LTE Band 4

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	6	0	1.0830	PASS
	MCH	6	0	1.0763	PASS
	HCH	6	0	1.0830	PASS
16QAM	LCH	6	0	1.0822	PASS
	MCH	6	0	1.0780	PASS
	HCH	6	0	1.0810	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	15	0	2.6860	PASS
	MCH	15	0	2.6830	PASS
	HCH	15	0	2.6909	PASS
16QAM	LCH	15	0	2.6872	PASS
	MCH	15	0	2.6842	PASS
	HCH	15	0	2.6891	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.4920	PASS
	MCH	25	0	4.4773	PASS
	HCH	25	0	4.4894	PASS
16QAM	LCH	25	0	4.4887	PASS
	MCH	25	0	4.4820	PASS
	HCH	25	0	4.4964	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	8.9561	PASS
	MCH	50	0	8.9436	PASS
	HCH	50	0	8.9549	PASS
16QAM	LCH	50	0	8.9473	PASS
	MCH	50	0	8.9334	PASS
	HCH	50	0	8.9518	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	75	0	13.439	PASS
	MCH	75	0	13.418	PASS
	HCH	75	0	13.433	PASS
16QAM	LCH	75	0	13.418	PASS
	MCH	75	0	13.413	PASS
	HCH	75	0	13.426	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	100	0	17.861	PASS
	MCH	100	0	17.873	PASS
	HCH	100	0	17.891	PASS
16QAM	LCH	100	0	17.860	PASS
	MCH	100	0	17.886	PASS
	HCH	100	0	17.870	PASS

LTE Band 12

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	6	0	1.0783	PASS
	MCH	6	0	1.0781	PASS
	HCH	6	0	1.0790	PASS
16QAM	LCH	6	0	1.0802	PASS
	MCH	6	0	1.0796	PASS
	HCH	6	0	1.0793	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	15	0	2.6842	PASS
	MCH	15	0	2.6841	PASS
	HCH	15	0	2.6834	PASS
16QAM	LCH	15	0	2.6856	PASS
	MCH	15	0	2.6832	PASS
	HCH	15	0	2.6827	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.4815	PASS
	MCH	25	0	4.4876	PASS
	HCH	25	0	4.4806	PASS
16QAM	LCH	25	0	4.4829	PASS
	MCH	25	0	4.4768	PASS
	HCH	25	0	4.4781	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	8.9135	PASS
	MCH	50	0	8.9411	PASS

	HCH	50	0	8.9582	PASS
16QAM	LCH	50	0	8.9176	PASS
	MCH	50	0	8.9413	PASS
	HCH	50	0	8.9581	PASS

LTE Band 17

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.4863	PASS
	MCH	25	0	4.4898	PASS
	HCH	25	0	4.4811	PASS
16QAM	LCH	25	0	4.4786	PASS
	MCH	25	0	4.4866	PASS
	HCH	25	0	4.4831	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	8.9534	PASS
	MCH	50	0	8.9516	PASS
	HCH	50	0	8.9528	PASS
16QAM	LCH	50	0	8.9472	PASS
	MCH	50	0	8.9567	PASS
	HCH	50	0	8.9462	PASS

Note: Please refers to Appendix B for compliance test plots for Occupied Bandwidth (99%)

10. EMISSION BANDWIDTH

10.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

10.2 PROVISIONS APPLICABLE

The emission bandwidth is defined as two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power

10.3 MEASUREMENT RESULT

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

LTE Band 4

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	6	0	1.310	PASS
	MCH	6	0	1.216	PASS
	HCH	6	0	1.552	PASS
16QAM	LCH	6	0	1.345	PASS
	MCH	6	0	1.222	PASS
	HCH	6	0	1.246	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	15	0	2.899	PASS
	MCH	15	0	2.863	PASS
	HCH	15	0	3.333	PASS
16QAM	LCH	15	0	2.909	PASS
	MCH	15	0	2.896	PASS
	HCH	15	0	2.938	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz

Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.976	PASS
	MCH	25	0	4.820	PASS
	HCH	25	0	5.156	PASS
16QAM	LCH	25	0	4.947	PASS
	MCH	25	0	4.867	PASS
	HCH	25	0	4.906	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	9.996	PASS
	MCH	50	0	9.510	PASS
	HCH	50	0	9.804	PASS
16QAM	LCH	50	0	9.529	PASS
	MCH	50	0	9.489	PASS
	HCH	50	0	9.511	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	75	0	19.51	PASS
	MCH	75	0	14.07	PASS
	HCH	75	0	17.77	PASS
16QAM	LCH	75	0	14.24	PASS
	MCH	75	0	14.08	PASS
	HCH	75	0	14.17	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	100	0	18.72	PASS
	MCH	100	0	18.64	PASS
	HCH	100	0	18.66	PASS
16QAM	LCH	100	0	18.70	PASS
	MCH	100	0	18.58	PASS
	HCH	100	0	18.80	PASS

LTE Band 12

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
- QPSK	LCH	6	0	1.220	PASS
	MCH	6	0	1.218	PASS
	HCH	6	0	1.230	PASS
16QAM	LCH	6	0	1.228	PASS
	MCH	6	0	1.226	PASS
	HCH	6	0	1.223	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	15	0	2.873	PASS
	MCH	15	0	2.847	PASS
	HCH	15	0	2.860	PASS
16QAM	LCH	15	0	2.883	PASS
	MCH	15	0	2.857	PASS
	HCH	15	0	2.880	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.770	PASS
	MCH	25	0	4.806	PASS
	HCH	25	0	4.802	PASS
16QAM	LCH	25	0	4.840	PASS
	MCH	25	0	4.827	PASS
	HCH	25	0	4.807	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	9.418	PASS
	MCH	50	0	9.475	PASS
	HCH	50	0	9.498	PASS
16QAM	LCH	50	0	9.459	PASS

	MCH	50	0	9.445	PASS
	HCH	50	0	9.481	PASS

LTE Band 17

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.812	PASS
	MCH	25	0	4.816	PASS
	HCH	25	0	4.780	PASS
16QAM	LCH	25	0	4.864	PASS
	MCH	25	0	4.820	PASS
	HCH	25	0	4.858	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	9.479	PASS
	MCH	50	0	9.507	PASS
	HCH	50	0	9.442	PASS
16QAM	LCH	50	0	9.508	PASS
	MCH	50	0	9.514	PASS
	HCH	50	0	9.519	PASS

Note: Please refers to Appendix B for compliance test plots for emission bandwidth (-26dBc)

11. BAND EDGE

11.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

11.2 PROVISIONS APPLICABLE

As Specified in FCC rules of §2.1051 §24.238(a) §27.53(e) §27.53(g)
KDB 971168 v02r01 – Section 6.0

11.3 MEASUREMENT RESULT

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequency. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.
The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.
Please refers to Appendix III for compliance test plots for band edge

12. MAINS CONDUCTED EMISSION

12.1 MEASUREMENT METHOD

The measurement procedure specified in ANSI/TIA-603-D-2010 was used for testing. Conducted Emission was measured with travel charger.

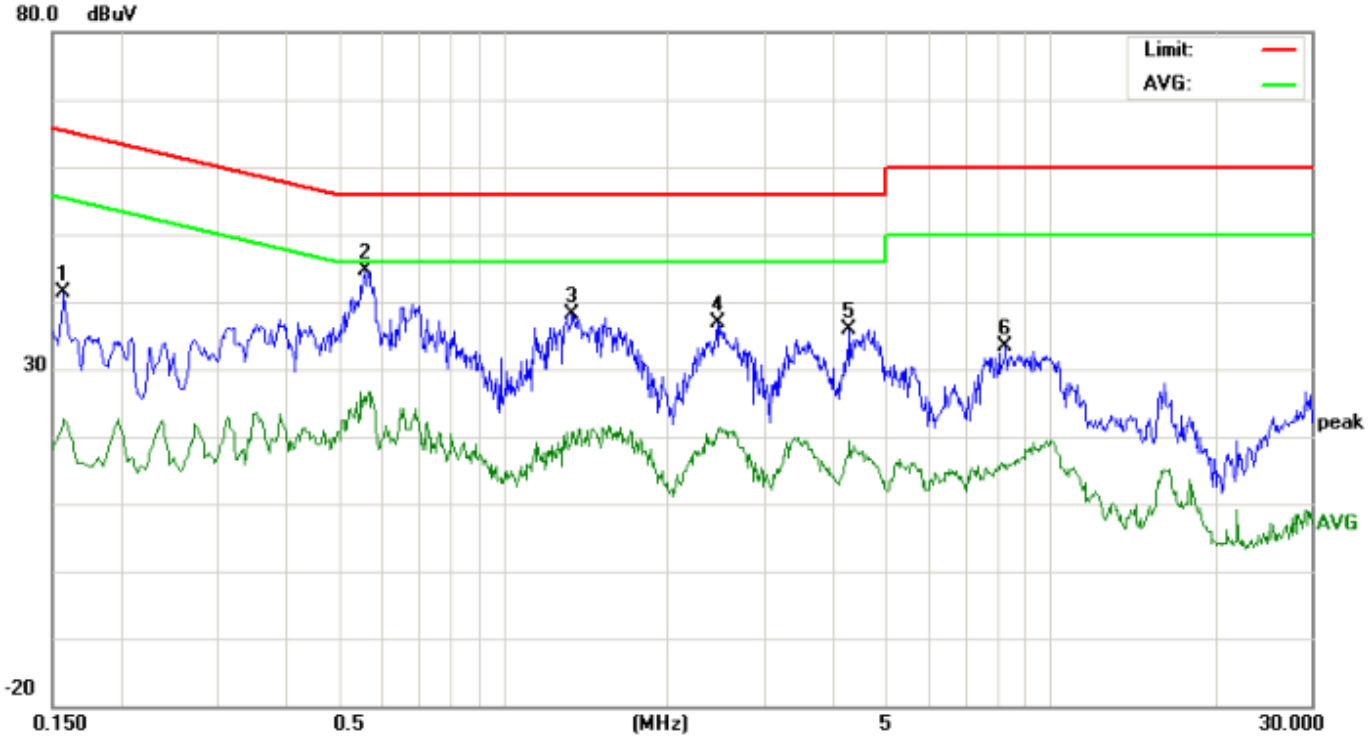
12.2 PROVISIONS APPLICABLE

Frequency of Emission (MHz)	Conducted Limit(dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50
*Decreases with the logarithm of the frequency. *The lower limit shall apply at the transition frequency.		

Note: The FDD Band 2 mode is the worst condition and the test result as following:

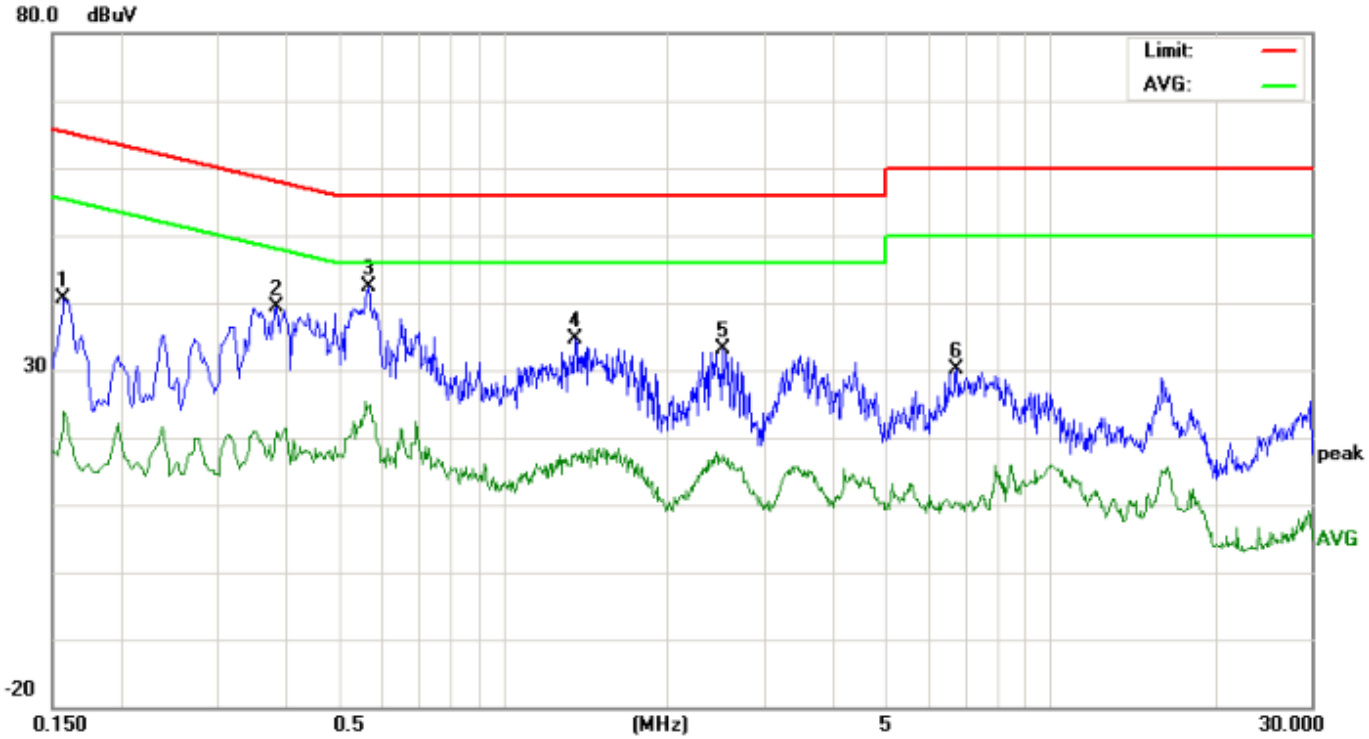
12.3 MEASUREMENT RESULT

LINE CONDUCTED EMISSION – L



No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1580	31.21		12.40	10.17	41.38		22.57	65.56	55.56	-24.18	-32.99	P	
2	0.5620	34.20		14.64	10.34	44.54		24.98	56.00	46.00	-11.46	-21.02	P	
3	1.3380	27.80		10.27	10.38	38.18		20.65	56.00	46.00	-17.82	-25.35	P	
4	2.4660	26.39		10.24	10.42	36.81		20.66	56.00	46.00	-19.19	-25.34	P	
5	4.3019	25.53		8.99	10.30	35.83		19.29	56.00	46.00	-20.17	-26.71	P	
6	8.3019	22.95		5.64	10.34	33.29		15.98	60.00	50.00	-26.71	-34.02	P	

LINE CONDUCTED EMISSION – N



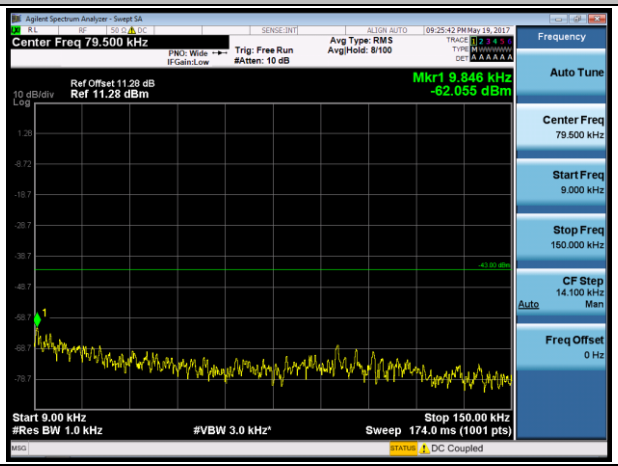
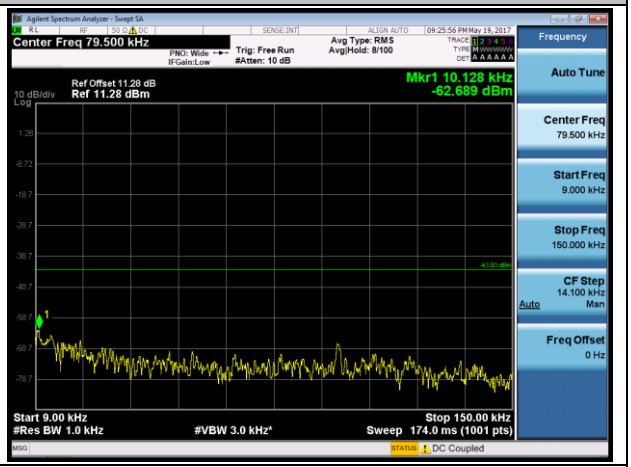
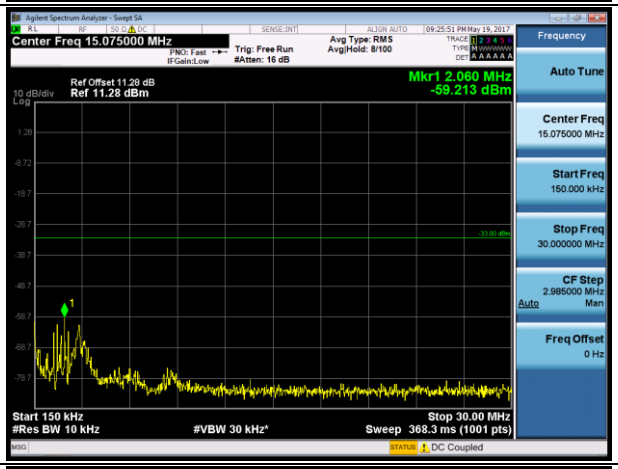
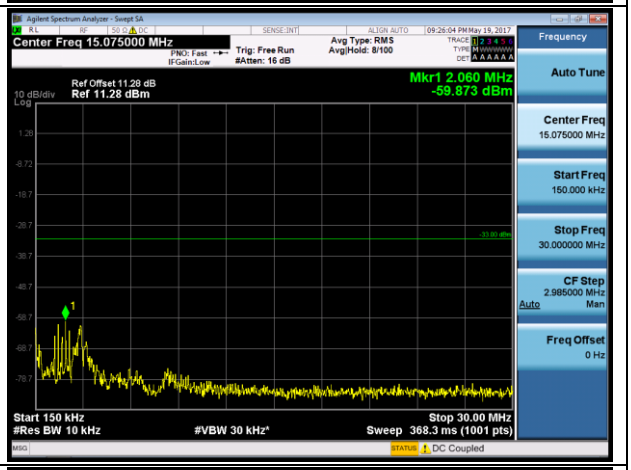
No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1580	30.42		13.73	10.17	40.59		23.90	65.56	55.56	-24.97	-31.66	P	
2	0.3860	29.10		10.63	10.32	39.42		20.95	58.15	48.15	-18.73	-27.20	P	
3	0.5700	31.96		14.40	10.34	42.30		24.74	56.00	46.00	-13.70	-21.26	P	
4	1.3540	24.20		7.32	10.38	34.58		17.70	56.00	46.00	-21.42	-28.30	P	
5	2.5220	22.57		6.21	10.44	33.01		16.65	56.00	46.00	-22.99	-29.35	P	
6	6.7459	19.69		0.03	10.33	30.02		10.36	60.00	50.00	-29.98	-39.64	P	

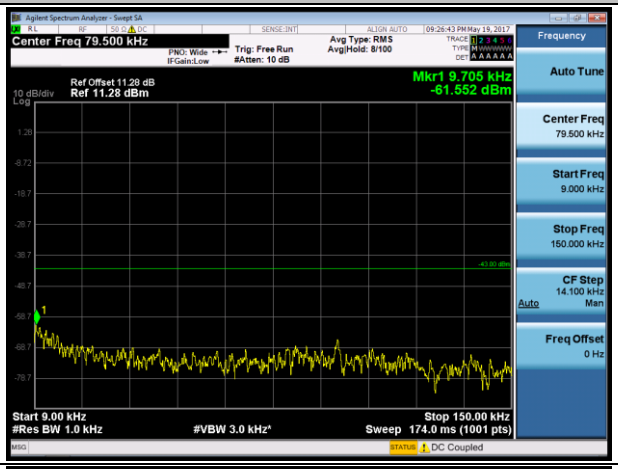
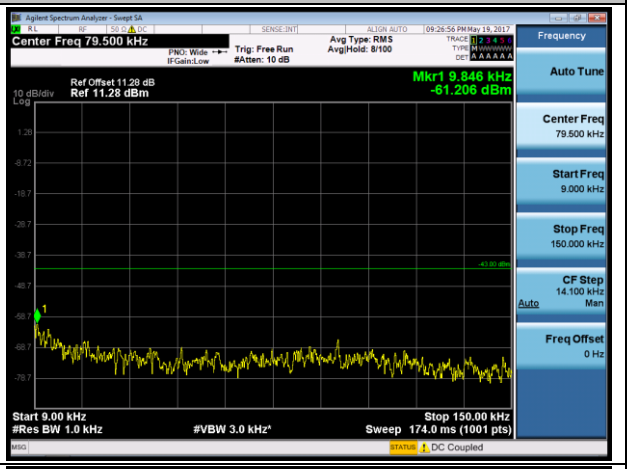
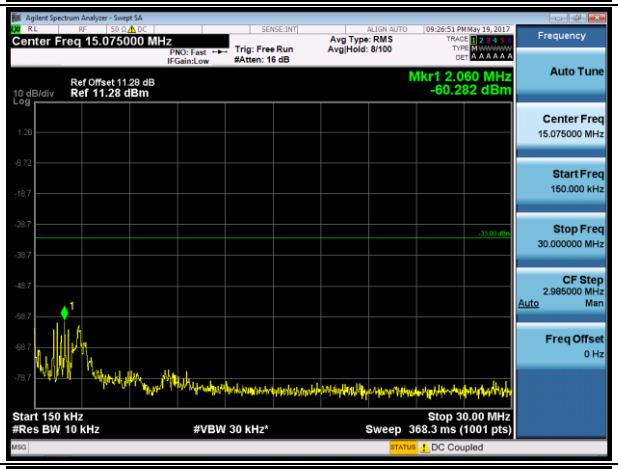
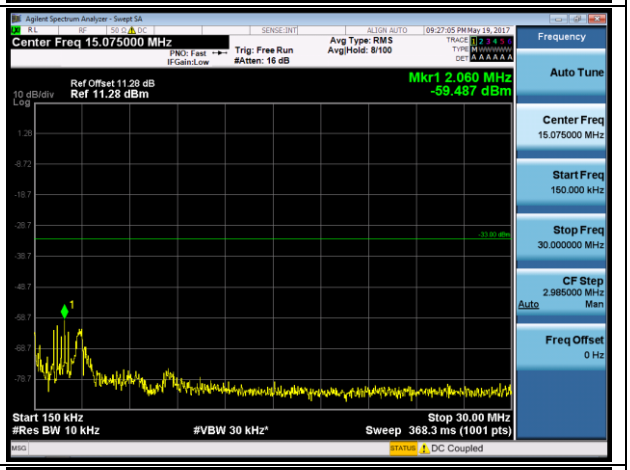
Note: The FDD Band 2 mode is the worst condition.

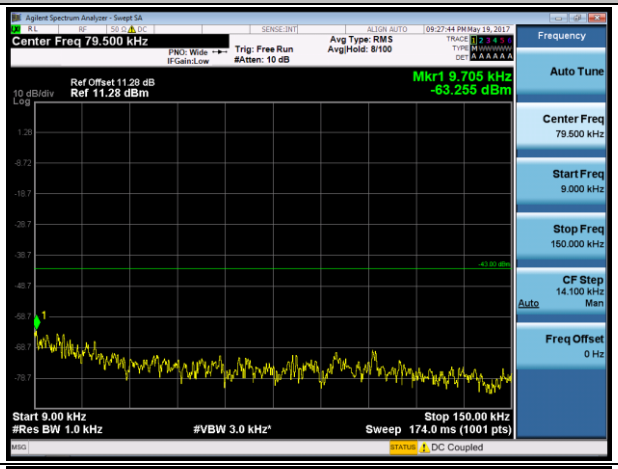
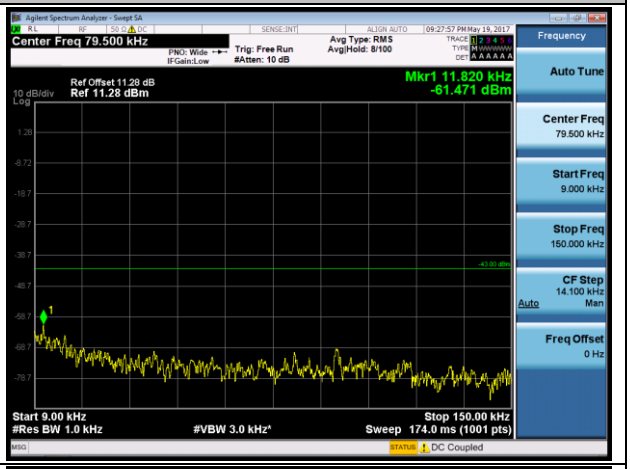
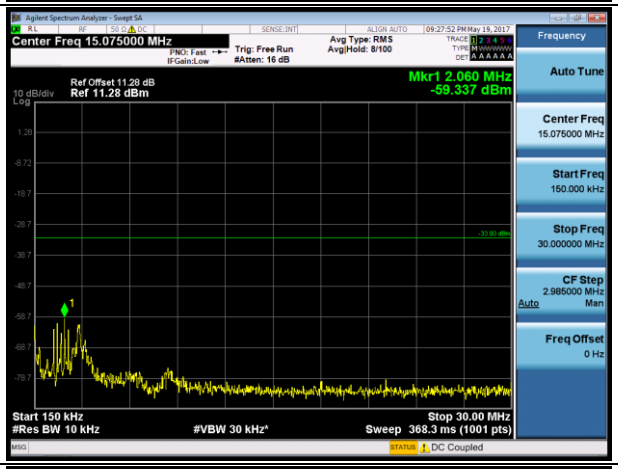
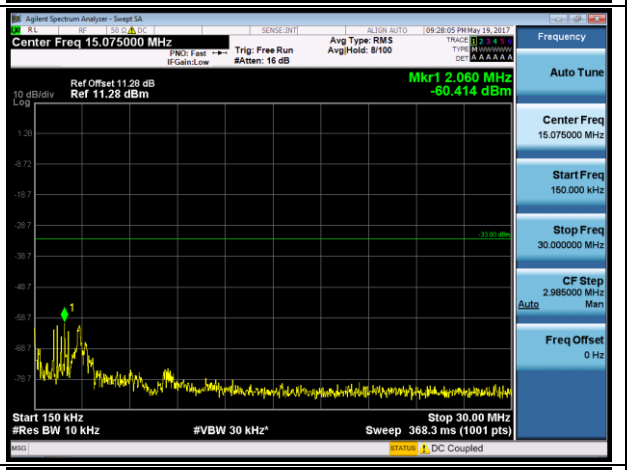
APPENDIX A

TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

LTE BAND 4

LCH_QPSK_1RB#0	LCH_QPSK_1RB#24
	
	
	

MCH_QPSK_1RB#0	MCH_QPSK_1RB#24
	
	
	

HCH_QPSK_1RB#0	HCH_QPSK_1RB#24
	
	
	

LTE BAND 12

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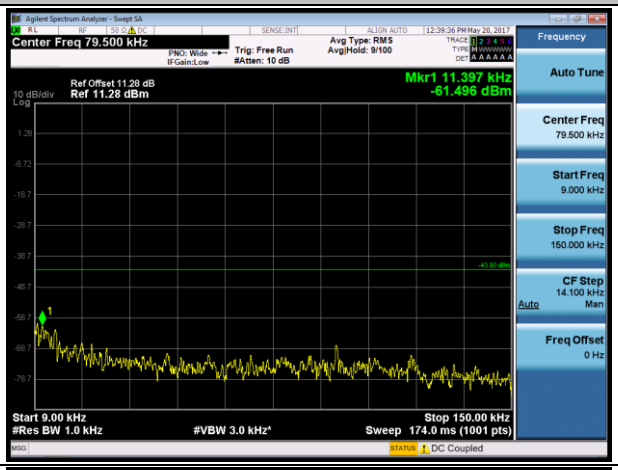	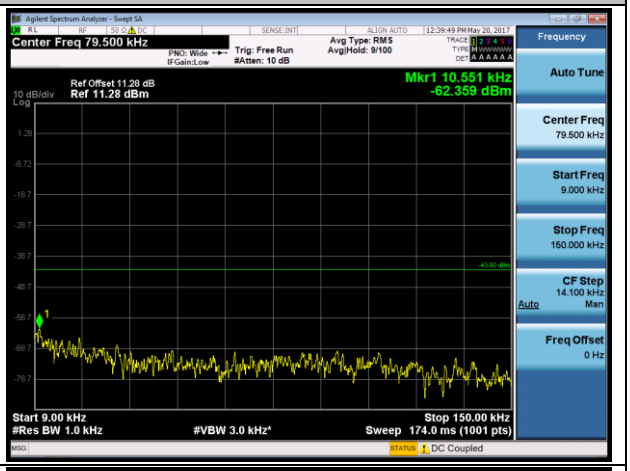
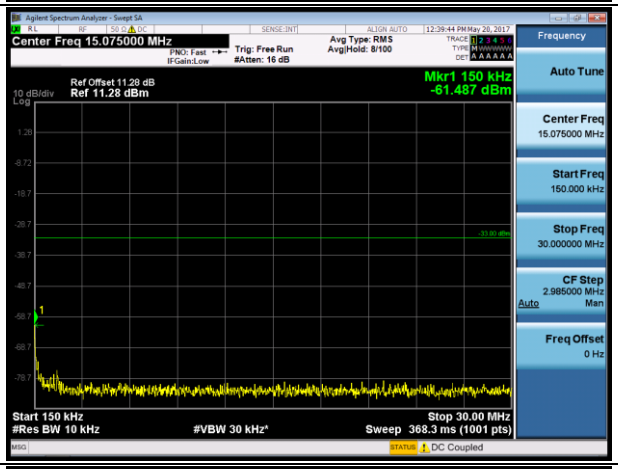	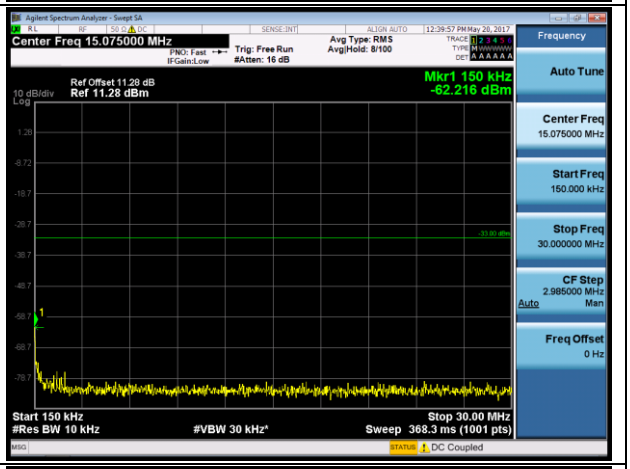
	

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