FCC 47 CFR PART 27 SUBPART L

CERTIFICATION TEST REPORT

For

4G Smart phone

Model No.: BRIO L1 PLUS, Brio L1 E

FCC ID:2ADVA-L1PLUS

Trademark: XTRATECH

REPORT NO.: ES150716209E4

ISSUE DATE: July 31, 2015

Prepared for

XTRATECH COMPUTERS S.A.

Ciudadela Profesor Aguirre Abad,solar 40 de la manzana 118

Prepared by

SHENZHEN EMTEK CO., LTD.

Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China
TEL: 86-755-26954280
FAX: 86-755-26954282

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1 TEST RESULT CERTIFICATION

Applicant:	XTRATECH COMPUTERS S.A. Ciudadela Profesor Aguirre Abad,solar 40 de la manzana 118
Manufacturer:	IT TEK Corp. 1970 NW 129 AV. UNIT 105- Miami FL, 33182 USA
Product Description:	4G Smart phone
Model Number:	BRIO L1 PLUS, Brio L1 E
File Number:	ES150716209E4
Date of Test:	July 17, 2015 to July 31, 2015

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 2, Subpart J, June 11, 2014 FCC 47 CFR Part 27, Subpart L, May 9, 2014	PASS

The above equipment was tested by SHENZHEN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 2 and Part 27.

The test results of this report relate only to the tested sample identified in this report.

Date of Test : July 17, 2015 to July 31, 2015

Prepared by : Andy Wei

Andy Wei/Editor

Reviewer : Joe Xia

Joe Xia/Supervisor

Approve & Authorized Signer :

Lisa Wang/Manager

2 EUT TECHNICAL DESCRIPTION

Characteristics	Description
Bandwidth:	LTE Band 4: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz
LTE Band 4 Tx Frequency:	LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz
LTE Band 4 Rx Frequency:	LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz
Modulation:	QPSK, 16QAM,64QAM for LTE Band; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n; DSSS with DBPSK/DQPSK/CCK for 802.11b; GFSK, pi/4-DQPSK, 8DPSK for Bluetooth 3.0 DSS; GFSK for Bluetooth 4.0 DTS;
Operating Frequency Range:	GSM850: TX824.2MHz~848.8MHz/RX869.2MHz~893.8MHz; PCS1900: TX1850.2MHz~1909.8MHz/RX1930.2MHz~1989.8MHz; WCDMA Band V: TX826.4MHz~846.6MHz /RX871.4MHz~891.6MHz; WCDMA Band II: TX 1852.4 MHz ~ 1907.6 MHz /RX 1932.4 MHz ~1987.6 MHz; LTE Band 4: Tx 1710.7 MHz ~ 1754.3 MHz /RX 2110.7 MHz ~ 2154.3 MHz: 2412-2462MHz for 802.11b/g; 2412-2462MHz for 802.11n(HT20); 2422-2452MHz for 802.11n(HT40); 2402-2480MHz for Bluetooth;
Maximum Output Power to Antenna:	23.70dBm
Number of Channels:	124 Channels for GSM850; 299 Channels for PCS1900; 102Channels for WCDMA V; 277Channels for WCDMA II; 11 channels for 802.11b/g; 11 channels for 802.11n(HT20); 7 channels for 802.11n(HT40); 79 channels for Bluetooth 3.0 DSS; 40 channels for Bluetooth 4.0 DTS;
Antenna Type:	☒integral antenna; ☐antenna connector
Antenna Port:	☐Ant1 ; ☒Ant2 ;
Antenna Gain(Main Antenna):	1dBi for LTE Band 4;
Power supply:	☒DC supply: DC 3.7V internal rechargeable lithium battery or DC 5V from AC Adapter
	☒Adapter supply: Model: ACDC-10BAU Input: 100-240V, 50-60Hz, 0.5A Output: DC 5V, 2A
Temperature Range:	-10°C ~ +55°C

Note: for more details, please refer to the User's manual of the EUT.

Modified Information

Version.	Summary	Date of Rev.	Report No.
Ver.1.0	Original Report	2015-07-31	ES150716209E4

3 SUMMARY OF TEST RESULT

FCC Part Clause	Test Parameter	Verdict	Remark
§2.1046(a)	RF Power Output	PASS	
§2.1049(h) §27.53(h)(3)	Occupied Bandwidth	PASS	
§2.1055(a)(1) §27.54 §2.1055(d)(1)	Frequency Stability	PASS	
§2.1046(a) §27.50(b)(10) §27.50(d)(4)	ERP/ EIRP measurement	PASS	
§2.1053 §27.53(c)(2) §27.53(f) §27.53(h)	Radiated Spurious Emission Conducted Band Edge	PASS	
§27.50(i) (B)	Peak to Average Ratio	PASS	
§2.1053 §27.53(c)(2) §27.53(f) §27.53(g)	Conducted Spurious Emission	PASS	
§27.56	Antenna Application	PASS	

NOTE1: N/A (Not Applicable)
NOTE2:
Both conducted and radiated testing were performed according to the procedures document of ANSI C63.4 (2014) and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.
The Output power Procedure of KDB941225 (SAR Measurement Procedures for 3G devices, WCDMA / HSPA / LTE) was used for EUT and Base station setting.
KDB971168 D01 Power Meas license Digital System v01 as the supplemental guideline to conduct the measurement, including Peak to Power Average Ratio, Average Power over the fundamental signal BW (EIRP/ERP) and Signal Bandwidth.

4 TEST METHODOLOGY

4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:

FR Part 2, 27
ANSI / TIA / EIA-603-C-2014
FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

4.2 MEASUREMENT EQUIPMENT USED

4.2.1 Conducted Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Calibration Date	Indate
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/17/2015	1 year
L.I.S.N.	Schwarzbeck	NNLK8129	8129203	05/17/2015	1 year
50Ω Coaxial Switch	Anritsu	MP59B	M20531	N/A	N/A
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	05/17/2015	1 year
Voltage Probe	Rohde & Schwarz	TK9416	N/A	05/17/2015	1 year
I.S.N	Rohde & Schwarz	ENY22	1109.9508.02	05/17/2015	1 year

4.2.2 Radiated Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Calibration Date	Indate
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/17/2015	1 year
Pre-Amplifier	HP	8447D	2944A07999	05/17/2015	1 year
Bilog Antenna	Schwarzbeck	VULB9163	142	05/17/2015	1 year
Loop Antenna	ARA	PLA-1030/B	1029	05/17/2015	1 year
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/17/2015	1 year
Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/17/2015	1 year
Cable	Schwarzbeck	AK9513	ACRX1	05/17/2015	1 year
Cable	Rosenberger	N/A	FP2RX2	05/17/2015	1 year
Cable	Schwarzbeck	AK9513	CRPX1	05/17/2015	1 year
Cable	Schwarzbeck	AK9513	CRRX2	05/17/2015	1 year

4.2.3 Radio Frequency Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Calibration Date	Indate
Spectrum Analyzer	Agilent	E4407B	88156318	05/17/2015	1 year
Power meter	Anritsu	ML2495A	0824006	05/17/2015	1 year
Power sensor	Anritsu	MA2411B	0738172	05/17/2015	1 year
Temperature & Humidity Chamber	YINHE	SDH0525F	2003003	05/17/2015	1 year
EMI Test Receiver	Rohde & Schwarz	FSV40	132.1-3008K39-100967-AP	05/17/2015	1 year
Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50-140822zk	05/17/2015	1 year

Remark: Each piece of equipment is scheduled for calibration once a year.

4.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.
The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.
The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting, Linking to simulator.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.This test report applies for LTE Band 4.
The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The Z-plane results were found as the worst case and were shown in this report.

The evaluation of Test Mode as configured in UE presented on the Test Report:

The Measurement Data of field strength of spurious emission with respect to supported configuration of given application (Transmission Band, Modulation Scheme, Resource Block) have been pre-scanned, and the result that yields in the highest emission close to the limit are presented on the test report. In comparison among all Out of Band Emission at Antenna Terminal and Bandedge in the variety of combination on LTE band 4, respectively, It's revealed to generate the highest emission at 1.4M, 3M, 5M, 10M, 15MHz Transmission Bandwidth for band LTE 4 while RB size = 1 with 0 offset and RB size = 1 with 99 offset for 20MHz of LTE band 4.

The evaluation of Test band and frequency as configured in UE presented:

According to 3GPP TS 36.508 V9.5.0 ,For Signalling testing, E-UTRA frequency to be tested is mid range and E-UTRA channel bandwidth to be tested is 5MHz for all operating bands for all test cases as the default configuration unless specific channel bandwidth is specified for the operating band below:
For RF testing, E-UTRA frequencies to be tested are low range, mid range and high range for all supported operating bands by default. E-UTRA channel bandwidths to be tested are lowest bandwidth, 5MHz bandwidth and highest bandwidth for all supported operating bands by default. Actual test configurations are specified case by case and stated in test case itself as the initial conditions.
The lowest bandwidth, 5MHz bandwidth and highest bandwidth are selected from the combined table which includes nominal and additional channel bandwidth.
In the case 5MHz bandwidth is not supported by the UE, E-UTRA channel bandwidth to be tested is only lowest bandwidth and highest bandwidth.
In addition to the default channel bandwidths to be tested specified above, for Bands 4 and 20, an industry requirement of testing in 10MHz channel bandwidth is allowed for test cases in chapters 6 and 7 in TS 36.521-1 [21].
For RF testing, an industry requirement of testing in 10MHz channel bandwidth is requested for Bands 4 for test cases in chapters 6 and 7 in TS 36.521-1[21], changing the existing test points to address this is being discussed in RAN5 and will be considered pending technical justification.

TEST BAND	TEST BANDWIDTH
Band 4	1.4MHz ,3MHz, 5MHz , 10MHz, 20MHz

Test condition description:

Normal Means Tnorm (℃)=25 and Vnorm=3.7; L.V means Vmin=3.2v; H.V means Vmax=4.2v;

L.T means Tmin(℃)=0; H.T means Tmax(℃)=40;

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

Bldg 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

5.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

EMC Lab. : Accredited by CNAS, 2013.10.29
The certificate is valid until 2016.10.28
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01: 2006(identical to ISO/IEC17025: 2005)
The Certificate Registration Number is L2291

: Accredited by TUV Rheinland Shenzhen, 2010.5.25
The Laboratory has been assessed according to the requirements ISO/IEC 17025.

: Accredited by FCC, October 28, 2010
The Certificate Registration Number is 406365.

: Accredited by FCC, February 28, 2013
The Certificate Registration Number is 709623.

: Accredited by Industry Canada, May 24, 2008
The Certificate Registration Number is 4480A-2

6 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

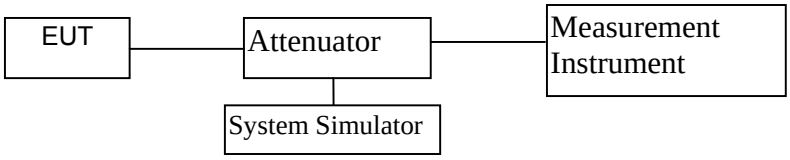
Parameter	Uncertainty
RF Output Power Test	±1.42dB
Conducted Emissions Test	±2.74dB
Radiated Emission Test	±4.27dB
Occupied Bandwidth Test	±1.55dB
Band Edge Test	±1.55dB
Peak to Average Ratio	±1.55dB
All emission, radiated	±3dB
Antenna Port Emission	±3dB
Temperature	±0.5℃
Humidity	±3%

Measurement Uncertainty for a level of Confidence of 95%

7 SETUP OF EQUIPMENT UNDER TEST

7.1 RADIO FREQUENCY TEST SETUP 1

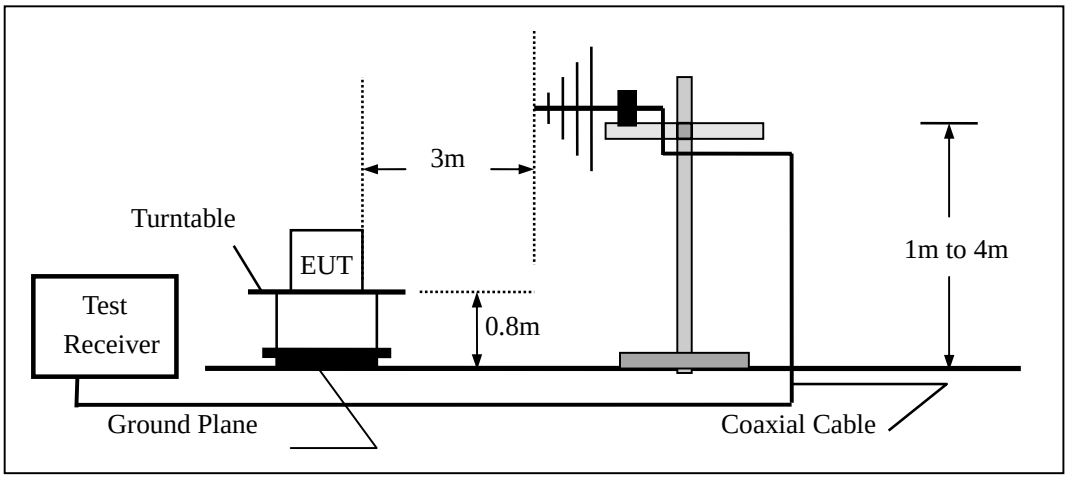
The WWAN component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting, Linking to simulator.



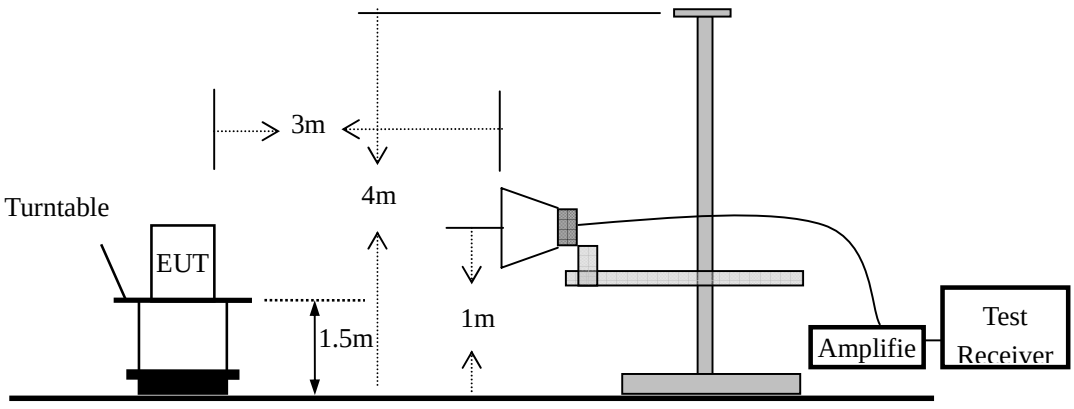
7.2 RADIO FREQUENCY TEST SETUP 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.4. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.4-2014 and CAN/CSA-CEI/IEC CISPR 22.
The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz

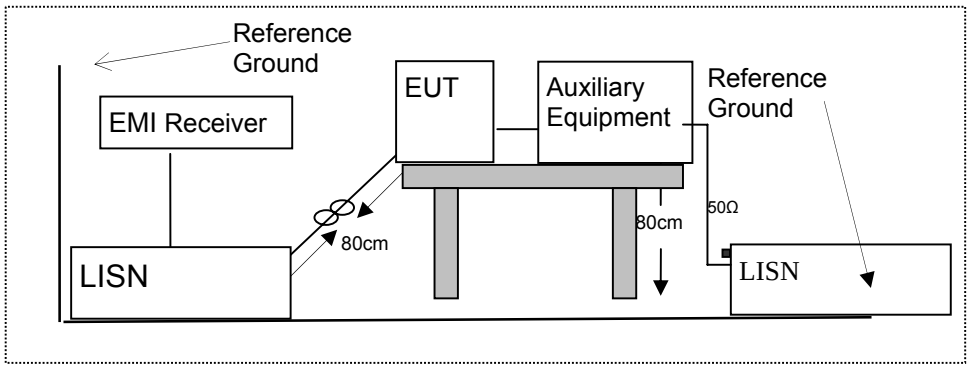


(c) Radiated Emission Test Set-Up, Frequency above 1000MHz



7.3 CONDUCTED EMISSION TEST SETUP

The mains cable of the EUT (4G Smart phone) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.
Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.
According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



7.4 SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note

Notes:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

8 TEST REQUIREMENTS

8.1 RF OUTPUT POWER

8.1.1 Applicable Standard

According to FCC Part 2.1046, FCC Part 27.50(b)(10) and FCC Part 27.50(d)(4).

8.1.2 Conformance Limit

For band 4 output power limit:
FCC Part 27.50 (d)(4): Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band are limited to 1 watt EIRP. Fixed stations operating in this band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in this band must employ a means for limiting power to the minimum necessary for successful communications.

8.1.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.1.4 Test Procedure

The RF output of the transmitter was connected to base station simulator.
Set EUT at maximum average power by base station simulator.
Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
Set VBW ≥ 3 × RBW.
Number of points in sweep ≥ 2 × span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
Sweep time = auto.
Detector = RMS (power averaging).
Set sweep trigger to “free run”.
Trace average at least 100 traces in power averaging (i.e., RMS) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the on and off periods of the transmitter.
Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10 log (1/0.25) = 6 dB if the duty cycle is a constant 25%.
Measure lowest, middle, and highest channels for each bandwidth and different modulation.
Measure and record the results in the test report.

8.1.5 Test Results

Lmiti

E-UTRA Band	Power class 3（dBm）	tolerance（dB）
Band 4	23	±2.7

All the modulation modes were tested, the data of the worst mode are described in the following table.

Temperature:	24℃	Test Date:	July 31, 2015
Humidity:	53 %	Test By:	KING KONG

Mode	Band Width (MHz)	Modulation	Uplink Channel Number	Frequency (MHz)	RB Size	RB Offset	Maximum Average Power (dBm)
LTE Band 4	20MHz	QPSK	20050	1720	1	0	22.13
					1	50	23.70
					1	99	21.71
					50	0	21.09
					50	50	20.96
					100	0	20.71
			20175	1732.5	1	0	22.06
					1	50	21.63
					1	99	21.65
					50	0	20.99
					50	50	20.84
					100	0	20.41
			20300	1745	1	0	22.03
					1	50	21.73
					1	99	21.51
					50	0	20.96
					50	50	20.83
					100	0	20.42
		16-QAM	20050	1720	1	0	21.65
					1	50	21.48
					1	99	21.69
					24	0	20.73
					24	76	20.52
					100	0	20.56
			20175	1732.5	1	0	21.42
					1	50	21.33
					1	99	21.38
					75	0	20.40
					75	25	20.44
					100	0	20.41
			20300	1745	1	0	21.59
					1	49	21.72
					1	99	21.44
					75	0	20.78
					75	25	20.74
					100	0	20.72
LTE Band 4	15MHz	QPSK	20025	1717.5	1	0	21.26
					1	38	21.46
					1	74	21.72
					36	0	20.87
					36	39	20.83
					75	0	20.89
			20175	1732.5	1	0	21.68
					1	38	21.57
					1	74	21.56
					36	0	20.55
					36	39	20.53
					75	0	20.58
			20325	1747.5	1	0	21.77
					1	38	21.67
					1	74	21.63

					36	0	20.33
					36	39	20.30
					75	0	20.40
		16-QAM	20025	1717.5	1	0	21.44
					1	37	21.27
					1	74	21.64
					24	0	20.93
					24	51	20.82
					75	0	20.09
			20175	1732.5	1	0	21.70
					1	37	21.54
					1	74	21.53
					24	0	20.59
					24	51	20.55
					75	0	20.41
			20325	1747.5	1	0	21.38
					1	37	21.29
					1	74	21.18
					24	0	20.28
					24	51	20.08
					75	0	20.15
LTE Band 4	10MHz	QPSK	20000	1715	1	0	21.44
					1	24	21.31
					1	49	21.25
					25	0	20.85
					25	25	20.73
					50	0	20.74
			20175	1732.5	1	0	21.20
					1	24	21.12
					1	49	21.00
					25	0	20.30
					25	25	20.01
					50	0	20.09
			20350	1750	1	0	21.77
					1	24	21.57
					1	49	21.58
					25	0	20.88
					25	25	20.98
					50	0	20.99
		16-QAM	20000	1715	1	0	21.14
					1	25	20.96
					1	49	20.85
					30	0	20.89
					30	20	20.75
					50	0	20.74
			20175	1732.5	1	0	21.68
					1	25	21.40
					1	49	21.01
					30	0	20.64
					30	20	20.46
					50	0	20.12
			20350	1750	1	0	21.34
					1	25	21.23
					1	49	21.17
					30	0	21.02
					30	20	20.39

					50	0	20.33
LTE Band 4	5MHz	QPSK	19975	1712.5	1	0	21.89
					1	13	21.46
					1	24	21.62
					10	0	20.95
					10	15	20.89
					25	0	20.86
			20175	1732.5	1	0	21.26
					1	12	21.39
					1	24	21.38
					10	0	20.37
					10	6	20.30
					25	0	20.31
			20375	1752.5	1	0	21.39
					1	13	21.35
					1	24	21.28
					10	0	20.24
					10	6	20.22
					25	0	20.22
		16-QAM	19975	1712.5	1	0	21.62
					1	13	21.54
					1	24	21.42
					8	0	20.96
					8	17	20.90
					25	0	20.86
			20175	1732.5	1	0	21.16
					1	13	21.13
					1	24	21.15
					8	0	20.38
					8	17	20.39
					25	0	20.22
			20375	1752.5	1	0	20.37
					1	13	20.36
					1	24	20.30
					8	0	20.03
					8	17	20.09
					25	0	20.03
LTE Band 4	3MHz	QPSK	19965	1711.5	1	0	21.92
					1	8	21.68
					1	14	21.65
					10	0	20.99
					10	5	20.97
					15	0	20.90
			20175	1732.5	1	0	21.48
					1	8	21.60
					1	14	21.52
					10	0	20.62
					10	5	20.57
					15	0	20.59
			20385	1753.5	1	0	20.75
					1	7	20.86
					1	14	20.73
					10	0	20.05
					10	5	20.08
					15	0	20.03
		16-QAM	19965	1711.5	1	0	21.54

					1	8	21.53
					1	14	21.48
					6	0	20.83
					6	9	20.82
					15	0	20.75
			20175	1732.5	1	0	21.35
					1	8	21.37
					1	14	21.28
					6	0	20.33
					6	4	20.28
					15	0	20.01
			20385	1753.5	1	0	20.83
					1	7	20.80
					1	14	20.69
					6	0	20.02
					6	9	20.04
					15	0	20.06
LTE Band 4	1.4MHz	QPSK	19957	1710.7	1	0	21.31
					1	2	21.39
					1	5	21.37
					3	0	20.81
					3	2	20.83
					6	0	20.82
			20175	1732.5	1	0	21.45
					1	2	21.49
					1	5	21.35
					3	0	20.89
					3	2	20.82
					6	0	20.59
			20393	1754.3	1	0	20.87
					1	2	20.76
					1	5	20.78
					3	0	20.62
					3	2	20.64
					6	0	20.09
		16-QAM	19957	1710.7	1	0	21.99
					1	2	21.91
					1	5	21.89
					3	0	20.91
					3	2	20.92
					6	0	20.84
			20175	1732.5	1	0	21.07
					1	2	21.00
					1	5	21.10
					3	0	20.55
					3	2	20.48
					6	0	20.39
			20393	1754.3	1	0	20.16
					1	2	20.05
					1	5	20.06
					3	0	20.10
					3	2	20.08
					6	0	20.03

Mode	Band Width (MHz)	Modulation	Uplink Channel Number	Frequency (MHz)	RB Size	RB Offset	Maximum Average Power (dBm)
LTE Band 4	20MHz	64-QAM	20050	1720	1	0	21.62
					1	50	21.45
					1	99	21.66
					24	0	20.70
					24	76	20.49
					100	0	20.53
			20175	1732.5	1	0	21.39
					1	50	21.30
					1	99	21.35
					75	0	20.37
					75	25	20.41
					100	0	20.38
			20300	1745	1	0	21.56
					1	49	21.69
					1	99	21.41
					75	0	20.75
					75	25	20.71
					100	0	20.69
	15MHz	64-QAM	20025	1717.5	1	0	21.23
					1	38	21.43
					1	74	21.70
					36	0	20.84
					36	39	20.80
					75	0	20.86
			20175	1732.5	1	0	21.65
					1	38	21.54
					1	74	21.53
					36	0	20.52
					36	39	20.50
					75	0	20.55
			20325	1747.5	1	0	21.74
					1	38	21.64
					1	74	21.60

Mode	Band Width (MHz)	Modulation	Uplink Channel Number	Frequency (MHz)	RB Size	RB Offset	Maximum Average Power (dBm)
LTE Band 4	10MHz	64-QAM	20000	1715	1	0	21.41
					1	24	21.28
					1	49	21.22
					25	0	20.82
					25	25	20.70
					50	0	20.71
			20175	1732.5	1	0	21.17
					1	24	21.09
					1	49	20.97
					25	0	20.27
					25	25	19.98
					50	0	20.06
			20350	1750	1	0	21.74
					1	24	21.54
					1	49	21.55
					25	0	20.85
					25	25	20.95
					50	0	20.96
	5MHz	64-QAM	19975	1712.5	1	0	21.86
					1	13	21.43
					1	24	21.59
					10	0	20.92
					10	15	20.86
					25	0	20.83
			20175	1732.5	1	0	21.23
					1	12	21.36
					1	24	21.35
					10	0	20.34
					10	6	20.27
					25	0	20.28
			20375	1752.5	1	0	21.36
					1	13	21.32
					1	24	21.25

Mode	Band Width (MHz)	Modulation	Uplink Channel Number	Frequency (MHz)	RB Size	RB Offset	Maximum Average Power (dBm)
LTE Band 4	3MHz	64-QAM	19965	1711.5	1	0	21.89
					1	8	21.65
					1	14	21.62
					10	0	20.96
					10	5	20.94
					15	0	20.87
			20175	1732.5	1	0	21.45
					1	8	21.57
					1	14	21.49
					10	0	20.59
					10	5	20.54
					15	0	20.56
			20385	1753.5	1	0	20.72
					1	7	20.83
					1	14	20.7
					10	0	20.02
					10	5	20.05
					15	0	20.01
	1.4MHz	64-QAM	19957	1710.7	1	0	21.96
					1	2	21.88
					1	5	21.86
					3	0	20.88
					3	2	20.89
					6	0	20.81
			20175	1732.5	1	0	21.04
					1	2	20.97
					1	5	21.07
					3	0	20.52
					3	2	20.45
					6	0	20.36
			20393	1754.3	1	0	20.13
					1	2	20.02
					1	5	20.03

8.2 OCCUPIED BANDWIDTH

8.2.1 Applicable Standard

According to FCC Part 2.1049(h)

8.2.2 Conformance Limit

No limit requirement.

8.2.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.2.4 Test Procedure

The 99% occupied bandwidth is 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 transmitted power.
The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
The 99% occupied bandwidth and 26 dB bandwidth of the Low channel, middle channel and High channel for the highest RF powers were measured.
The testing follows FCC KDB 971168 v02r02 Section 4.2.

■ The following procedure shall be used for measuring (99 %) power bandwidth

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.
d) NOTE—Steps a) through c) may require iteration to adjust within the specified tolerances.
e) Set the detection mode to peak, and the trace mode to max hold..
f) Use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.
g) If the instrument does not have a 99 % power bandwidth function, the trace data points are to be recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99 % power bandwidth is the difference between these two

frequencies.
h) The OBW shall be reported by providing plot(s) of the measuring instrument display. The frequency and amplitude axes and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

■ The reference value is the highest level of the spectral envelope of the modulated signal.

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
b) The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
c) Set the reference level of the instrument as required to prevent the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.
d) NOTE—Steps a) through c) may require iteration to adjust within the specified tolerances.
e) The dynamic range of the spectrum analyzer at the selected RBW shall be at least 10 dB below the target "-X dB down" requirement (i.e., if the requirement calls for measuring the –26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference value).
f) Set the detection mode to peak, and the trace mode to max hold.
g) Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
h) Determine the "-X dB down amplitude" as equal to (Reference Value – X). Alternatively, this calculation can be performed by the analyzer by using the marker-delta function.
i) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the "–X dB down amplitude" determined in step g). If a marker is below this "-X dB down amplitude" value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
j) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display. The frequency and amplitude axes and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

8.2.5 Test Results

Temperature:	24℃	Test Date:	July 31, 2015
Humidity:	53 %	Test By:	KING KONG

Mode	Uplink Channel Number	Frequency (MHz)	Bandwidth (MHz)	Modulation	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
LTE Band 4	20050	1720.00	20	QPSK	29.43	15.56
	20175	1732.50	20		16.26	14.06
	20300	1745.00	20		16.16	14.06
	20050	1720.00	20	16-QAM	20.05	14.56
	20175	1732.50	20		16.36	14.26
	20300	1745.00	20		15.86	14.16
	20050	1720.00	20	64-QAM	21.08	14.86
	20175	1732.50	20		20.92	14.62
	20300	1745.00	20		21.08	14.51

Temperature: 24℃ Test Date: July 31, 2015
Humidity: 53 % Test By: KING KONG

Mode	Uplink Channel Number	Frequency (MHz)	Bandwidth (MHz)	Modulation	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
LTE Band 4	20025	1717.50	15	QPSK	14.67	13.50
	20175	1732.50	15		14.76	13.47
	20325	1747.50	15		14.73	13.47
	20025	1717.50	15	16-QAM	14.67	13.47
	20175	1732.50	15		14.70	13.47
	20325	1747.50	15		14.73	13.50
	20025	1717.50	15	64-QAM	14.68	13.45
	20175	1732.50	15		14.69	13.45
	20325	1747.50	15		14.71	13.46

Temperature: 24℃ Test Date: July 31, 2015
Humidity: 53 % Test By: KING KONG

Mode	Uplink Channel Number	Frequency (MHz)	Bandwidth (MHz)	Modulation	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
LTE Band 4	20000	1715.00	10	QPSK	10.04	9.04
	20175	1732.50	10		10.06	9.08
	20350	1750.00	10		10.04	9.04
	20000	1715.00	10	16-QAM	10.06	9.10
	20175	1732.50	10		10.08	9.06
	20350	1750.00	10		10.12	9.10
	20000	1715.00	10	64-QAM	10.03	9.06
	20175	1732.50	10		10.03	9.06
	20350	1750.00	10		10.02	9.05

Temperature: 24℃ Test Date: July 31, 2015
Humidity: 53 % Test By: KING KONG

Mode	Uplink Channel Number	Frequency (MHz)	Bandwidth (MHz)	Modulation	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
LTE Band 4	19975	1712.50	5	QPSK	4.91	4.50
	20175	1732.50	5		4.94	4.50
	20375	1752.50	5		4.97	4.49
	19975	1712.50	5	16-QAM	4.97	4.50
	20175	1732.50	5		4.98	4.51
	20375	1752.50	5		5.00	4.50
	19975	1712.50	5	64-QAM	4.93	4.48
	20175	1732.50	5		4.93	4.48
	20375	1752.50	5		4.92	4.49

Temperature: 24℃ Test Date: July 31, 2015
Humidity: 53 % Test By: KING KONG

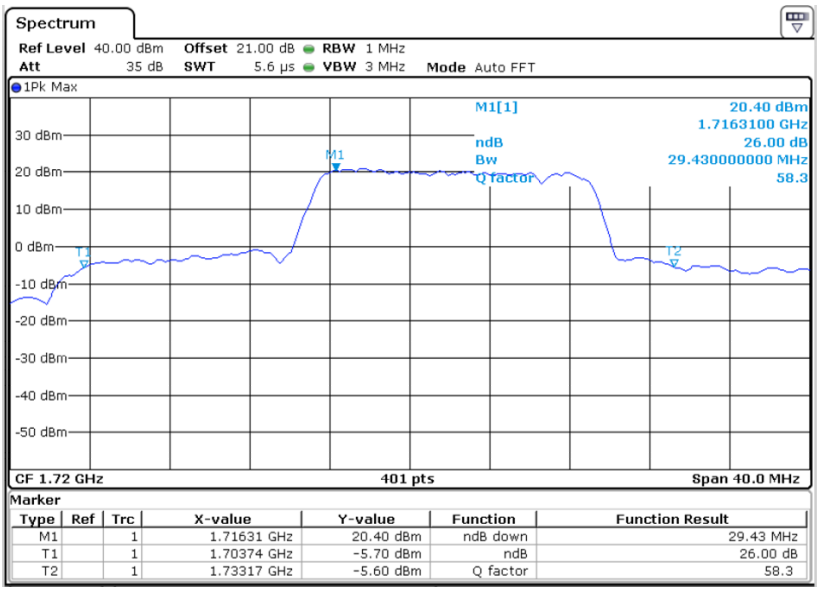
Mode	Uplink Channel Number	Frequency (MHz)	Bandwidth (MHz)	Modulation	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
LTE Band 4	19965	1711.5	3	QPSK	3.03	2.72
	20175	1732.5	3		3.04	2.71
	20385	1753.5	3		3.04	2.72
	19965	1711.5	3	16-QAM	3.01	2.72
	20175	1732.5	3		3.03	2.73
	20385	1753.5	3		3.02	2.72
	19965	1711.5	3	64-QAM	3.01	2.68
	20175	1732.5	3		3.02	2.70
	20385	1753.5	3		3.01	2.71

Temperature:	24℃	Test Date:	July 31, 2015
Humidity:	53 %	Test By:	KING KONG

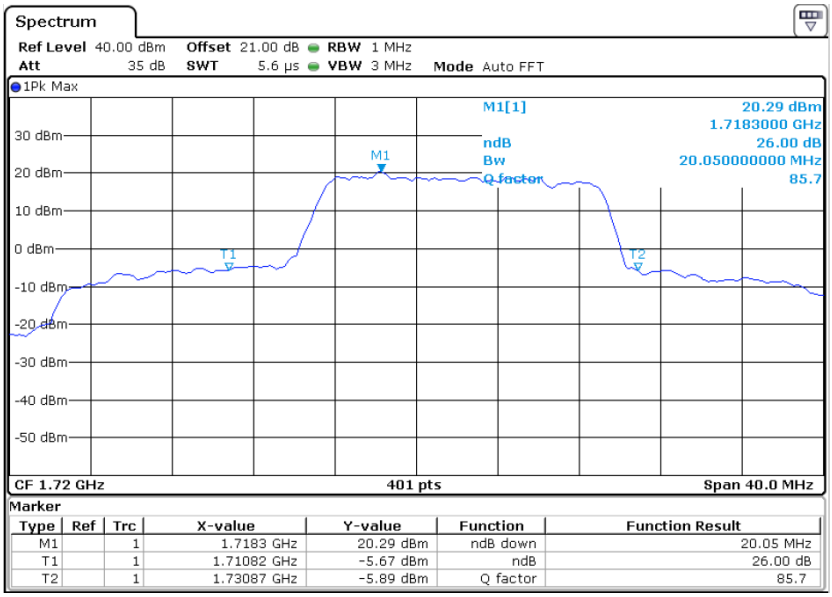
Mode	Uplink Channel Number	Frequency (MHz)	Bandwidth (MHz)	Modulation	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
LTE Band 4	19957	1710.7	1.4	QPSK	1.27	1.10
	20175	1732.5	1.4		1.28	1.10
	20393	1754.3	1.4		1.27	1.10
	19957	1710.7	1.4	16-QAM	1.28	1.09
	20175	1732.5	1.4		1.27	1.10
	20393	1754.3	1.4		1.30	1.09
	19957	1710.7	1.4	64-QAM	1.26	1.05
	20175	1732.5	1.4		1.25	1.04
	20393	1754.3	1.4		1.28	1.05

All the modulation modes were tested, the data of the worst mode are described in the following table.

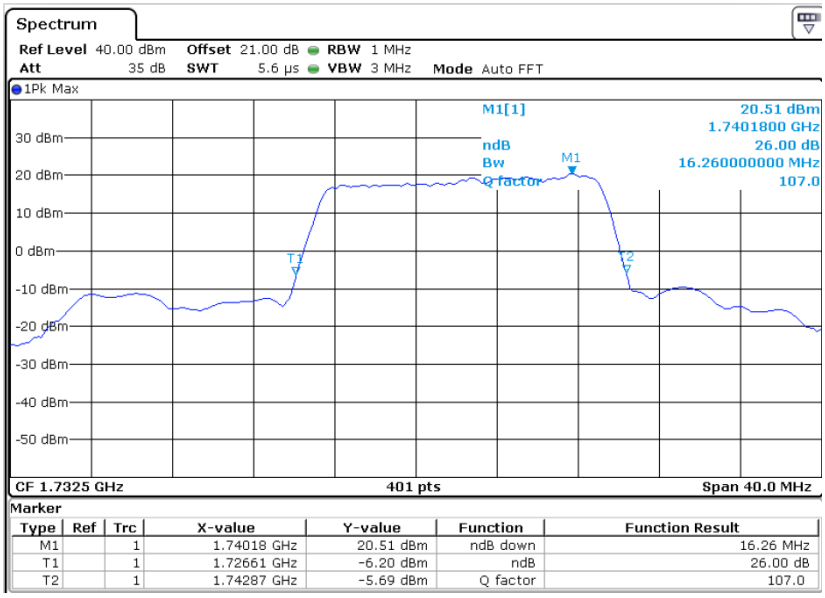
Test Model	99% Occupied Bandwidth & 26dB Bandwidth	
	LTE Band 4	
	Low Channel /20MHz	QPSK/Full RB



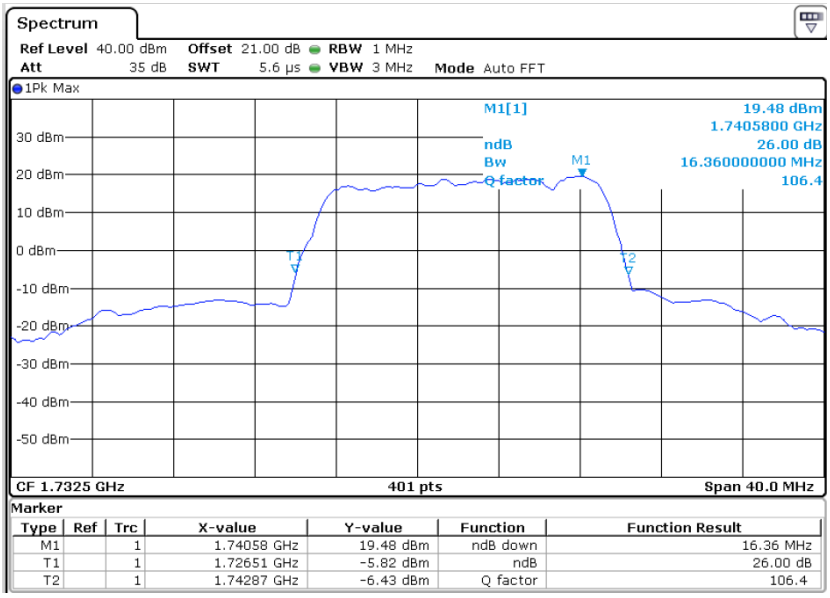
Test Model	99% Occupied Bandwidth & 26dB Bandwidth	
	LTE Band 4	
	Low Channel/20MHz	16-QAM/Full RB



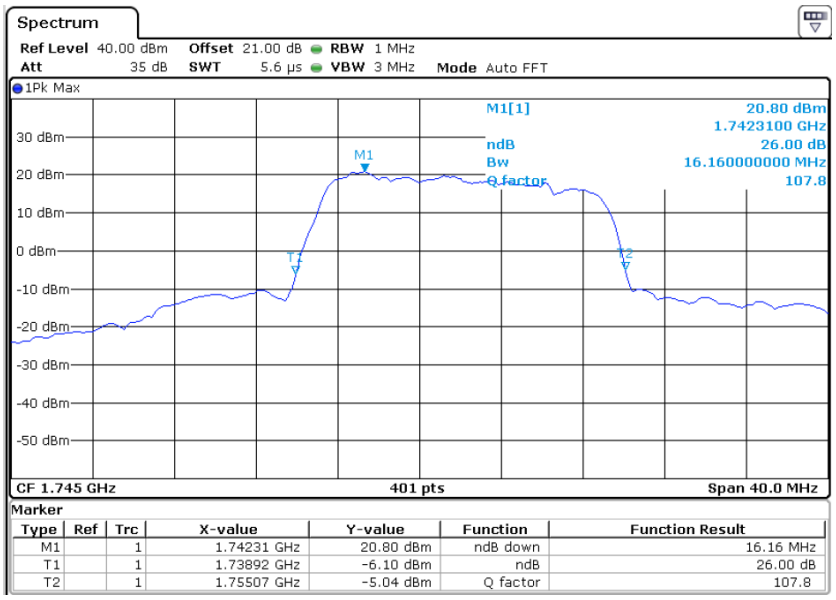
Test Model	99% Occupied Bandwidth & 26dB Bandwidth	
	LTE Band 4	
	Middle Channel /20MHz	QPSK/Full RB



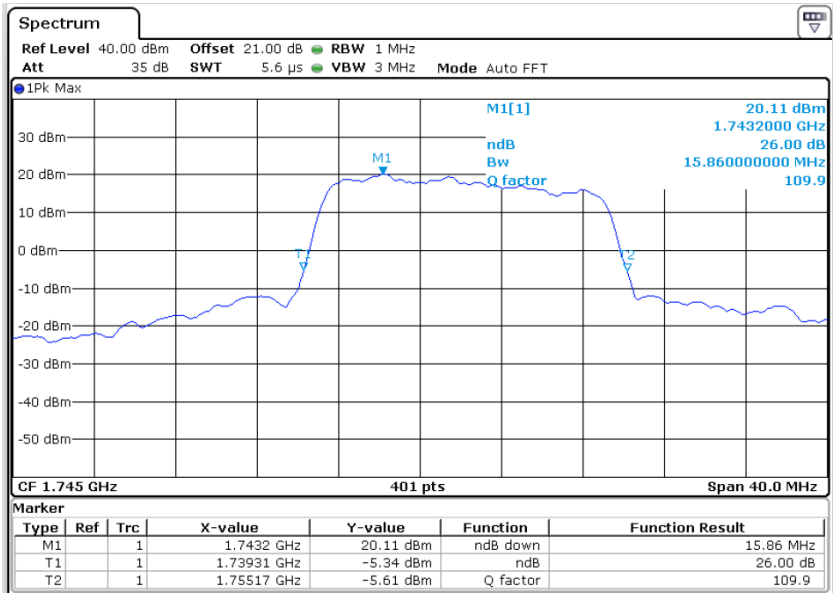
Test Model	99% Occupied Bandwidth & 26dB Bandwidth	
	LTE Band 4	
	Middle Chanel /20MHz	16-QAM/Full RB



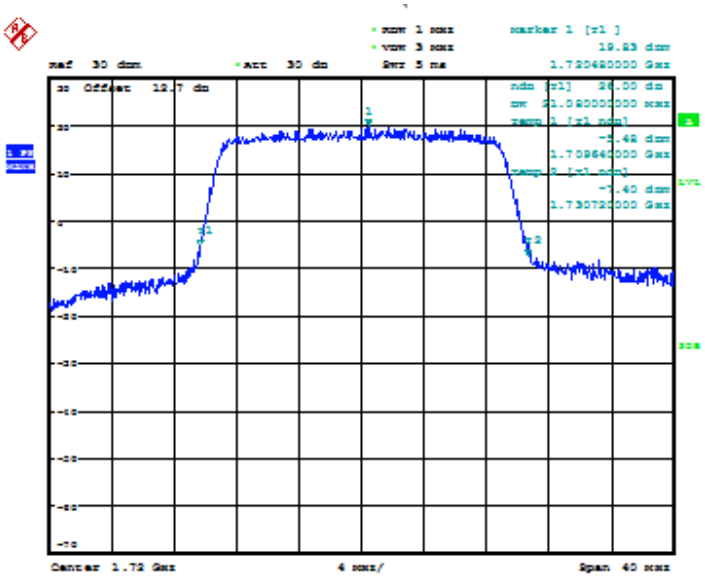
Test Model	99% Occupied Bandwidth & 26dB Bandwidth	
	LTE Band 4	
	High Channel /20MHz	QPSK/Full RB



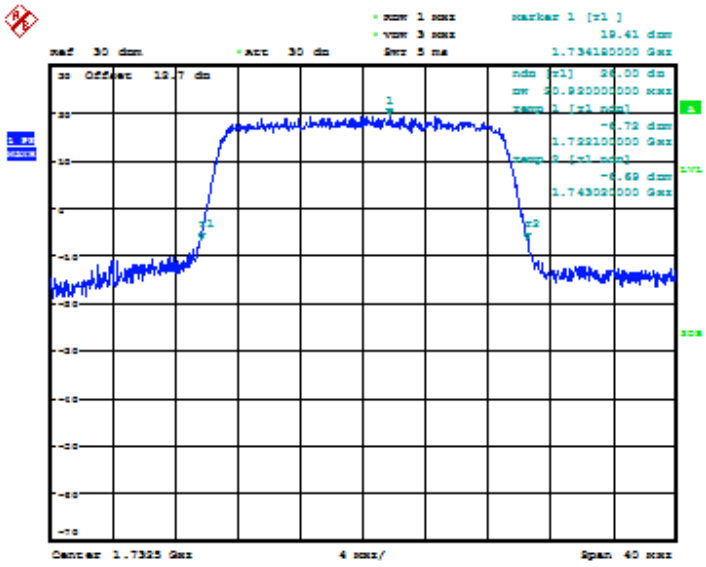
Test Model	99% Occupied Bandwidth & 26dB Bandwidth	
	LTE Band 4	
	High Chanel /20MHz	16-QAM/Full RB



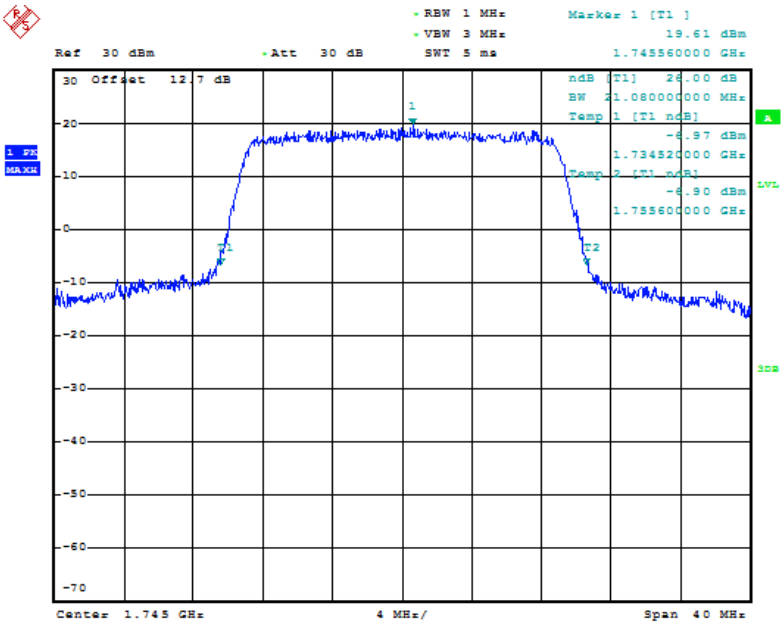
Test Model	99% Occupied Bandwidth & 26dB Bandwidth	
	LTE Band 4	
	low Channel /20MHz	64-QAM/Full RB



Test Model	99% Occupied Bandwidth & 26dB Bandwidth	
	LTE Band 4	
	Middle Chanel /20MHz	64-QAM/Full RB



Test Model	99% Occupied Bandwidth & 26dB Bandwidth	
	LTE Band 4	
	High Channel /20MHz	64-QAM/Full RB



8.3 FREQUENCY STABILITY MEASUREMENT

8.3.1 Applicable Standard

According to FCC Part 2.1055 and Part 27.54.

8.3.2 Conformance Limit

According to FCC Part 2.1055
The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.
According to Part 27.54
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation

8.3.3 Test Procedures

EUT was placed at temperature chamber and connected to an external power supply.
Temperature and voltage condition shall be tested to confirm frequency stability.
Temperature range is from -30~70℃ and voltage range is from lowest to highest working voltage.
Tem Link up EUT and simulator. Confirm frequency drift value of simulator and record it.

8.3.4 Test Results

Temperature:	N/A	Test Date:	July 31, 2015
Humidity:	53 %	Test By:	KING KONG
		Test Band	LTE Band 4

Test Condition	Mode	Bandwidth (MHz)	Channel	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
Normal	QPSK	3MHz	19965	11	0.0064	2.5	PASS
			20175	13	0.0075		
			20385	14	0.0080		
		5MHz	19975	13	0.0076		
			20175	14	0.0081		
			20375	15	0.0086		
		20MHz	20050	10	0.0058		
			20175	12	0.0069		
			20300	11	0.0063		
	16QAM	3MHz	19965	11	0.0064		
			20175	11	0.0063		
			20385	13	0.0074		
		5MHz	19975	14	0.0082		
			20175	11	0.0063		
			20375	10	0.0057		
		20MHz	20050	10	0.0058		
			20175	11	0.0063		
			20300	11	0.0063		
	64QAM	3MHz	19965	10	0.0058		
			20175	11	0.0063		
			20385	13	0.0074		
		5MHz	19975	13	0.0074		
			20175	11	0.0063		
			20375	10	0.0057		
		20MHz	20050	10	0.0058		
			20175	11	0.0063		
			20300	10	0.0058		

Test Condition	Mode	Bandwidth (MHz)	Channel	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
Normal	QPSK	1.4MHz	19957	10	0.0058	2.5	PASS
			20175	10	0.0058		
			20393	11	0.0063		
		10MHz	20000	9	0.0052		
			20175	10	0.0058		
			20350	11	0.0063		
		15MHz	20025	12	0.0070		
			20175	10	0.0058		
			20325	11	0.0063		
	16QAM	1.4MHz	19957	10	0.0058		
			20175	10	0.0058		
			20393	11	0.0063		
		10MHz	20000	13	0.0076		
			20175	14	0.0081		
			20350	12	0.0069		
		15MHz	20025	10	0.0058		
			20175	11	0.0063		
			20325	14	0.0080		
	64QAM	1.4MHz	19957	11	0.0063		
			20175	10	0.0058		
			20393	11	0.0063		
		10MHz	20000	10	0.0058		
			20175	10	0.0058		
			20350	11	0.0063		
		15MHz	20025	12	0.0070		
			20175	12	0.0070		
			20325	11	0.0063		

Temperature: N/A
Humidity: 53 %

Test Date: July 31, 2015
Test By: KING KONG
Test Band LTE Band 4

Test Condition	Mode	Bandwidth (MHz)	Channel	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
L.T /H.V	QPSK	3MHz	19965	8	0.0047	2.5	PASS
			20175	8	0.0046		
			20385	7	0.0040		
		5MHz	19975	10	0.0058		
			20175	9	0.0052		
			20375	9	0.0051		
		20MHz	20050	11	0.0064		
			20175	11	0.0063		
			20300	10	0.0057		
	16QAM	3MHz	19965	9	0.0053		
			20175	8	0.0046		
			20385	5	0.0029		
		5MHz	19975	10	0.0058		
			20175	12	0.0069		
			20375	9	0.0051		
		20MHz	20050	9	0.0052		
			20175	7	0.0040		
			20300	9	0.0052		
	64QAM	3MHz	19965	10	0.0058		
			20175	8	0.0046		
			20385	9	0.0051		
		5MHz	19975	10	0.0058		
			20175	12	0.0069		
			20375	9	0.0051		
		20MHz	20050	9	0.0052		
			20175	7	0.0040		
			20300	10	0.0057		

Test Condition	Mode	Bandwidth (MHz)	Channel	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
L.T /H.V	QPSK	1.4MHz	19957	11	0.0064	2.5	PASS
			20175	10	0.0058		
			20393	11	0.0063		
		10MHz	20000	10	0.0058		
			20175	10	0.0058		
			20350	14	0.008		
		15MHz	20025	10	0.0058		
			20175	10	0.0058		
			20325	11	0.0063		
	16QAM	1.4MHz	19957	9	0.0053		
			20175	10	0.0058		
			20393	13	0.0074		
		10MHz	20000	10	0.0058		
			20175	11	0.0063		
			20350	12	0.0069		
		15MHz	20025	13	0.0076		
			20175	10	0.0058		
			20325	11	0.0063		
	64QAM	1.4MHz	19957	9	0.0053		
			20175	10	0.0058		
			20393	11	0.0063		
		10MHz	20000	10	0.0058		
			20175	10	0.0058		
			20350	14	0.008		
		15MHz	20025	10	0.0058		
			20175	10	0.0058		
			20325	11	0.0063		

Temperature: N/A
Humidity: 53 %

Test Date: July 31, 2015
Test By: KING KONG
Test Band LTE Band 4

	Mode	Bandwidth (MHz)	Channel	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
L.T /L.V	QPSK	3MHz	19965	5	0.0029	2.5	PASS
			20175	5	0.0029		
			20385	8	0.0046		
		5MHz	19975	6	0.0035		
			20175	4	0.0023		
			20375	7	0.0040		
		20MHz	20050	7	0.0041		
			20175	9	0.0052		
			20300	6	0.0034		
	16QAM	3MHz	19965	10	0.0058		
			20175	10	0.0058		
			20385	8	0.0046		
		5MHz	19975	9	0.0053		
			20175	9	0.0052		
			20375	11	0.0063		
		20MHz	20050	12	0.0070		
			20175	10	0.0058		
			20300	6	0.0034		
	64QAM	3MHz	19965	10	0.0058		
			20175	5	0.0029		
			20385	8	0.0046		
		5MHz	19975	9	0.0053		
			20175	4	0.0023		
			20375	7	0.0040		
		20MHz	20050	7	0.0041		
			20175	10	0.0058		
			20300	6	0.0034		

Test Condition	Mode	Bandwidth (MHz)	Channel	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
L.T /L.V	QPSK	1.4MHz	19957	9	0.0053	2.5	PASS
			20175	10	0.0058		
			20393	13	0.0074		
		10MHz	20000	12	0.007		
			20175	8	0.0046		
			20350	11	0.0063		
		15MHz	20025	10	0.0058		
			20175	12	0.0069		
			20325	8	0.0046		
	16QAM	1.4MHz	19957	10	0.0058		
			20175	11	0.0063		
			20393	13	0.0074		
		10MHz	20000	11	0.0064		
			20175	9	0.0052		
			20350	10	0.0057		
		15MHz	20025	11	0.0064		
			20175	13	0.0075		
			20325	8	0.0046		
	64QAM	1.4MHz	19957	9	0.0053		
			20175	11	0.0063		
			20393	13	0.0074		
		10MHz	20000	11	0.0064		
			20175	9	0.0052		
			20350	11	0.0063		
		15MHz	20025	10	0.0058		
			20175	13	0.0075		
			20325	8	0.0046		

Temperature: N/A
Humidity: 53 %

Test Date: July 31, 2015
Test By: KING KONG
Test Band LTE Band 4

Test Condition	Mode	Bandwidth (MHz)	Channel	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
H.T /L.V	QPSK	3MHz	19965	16	0.0093	2.5	PASS
			20175	16	0.0092		
			20385	15	0.0086		
		5MHz	19975	12	0.0070		
			20175	14	0.0081		
			20375	15	0.0086		
		20MHz	20050	15	0.0087		
			20175	14	0.0081		
			20300	16	0.0092		
	16QAM	3MHz	19965	18	0.0105		
			20175	12	0.0069		
			20385	15	0.0086		
		5MHz	19975	16	0.0093		
			20175	16	0.0092		
			20375	11	0.0063		
		20MHz	20050	15	0.0087		
			20175	16	0.0092		
			20300	16	0.0092		
	64QAM	3MHz	19965	18	0.0105		
			20175	16	0.0092		
			20385	15	0.0086		
		5MHz	19975	12	0.0070		
			20175	14	0.0081		
			20375	15	0.0086		
		20MHz	20050	15	0.0087		
			20175	14	0.0081		
			20300	16	0.0092		

Test Condition	Mode	Bandwidth (MHz)	Channel	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
H.T /L.V	QPSK	1.4MHz	19957	12	0.007	2.5	PASS
			20175	10	0.0058		
			20393	15	0.0086		
		10MHz	20000	14	0.0082		
			20175	10	0.0058		
			20350	11	0.0063		
		15MHz	20025	8	0.0047		
			20175	14	0.0081		
			20325	10	0.0057		
	16QAM	1.4MHz	19957	13	0.0076		
			20175	10	0.0058		
			20393	11	0.0063		
		10MHz	20000	8	0.0047		
			20175	10	0.0058		
			20350	12	0.0069		
		15MHz	20025	14	0.0082		
			20175	12	0.0069		
			20325	10	0.0057		
	64QAM	1.4MHz	19957	13	0.0076		
			20175	10	0.0058		
			20393	11	0.0063		
		10MHz	20000	8	0.0047		
			20175	10	0.0058		
			20350	12	0.0069		
		15MHz	20025	14	0.0082		
			20175	12	0.0069		
			20325	10	0.0057		

Temperature:	N/A	Test Date:	July 31, 2015
Humidity:	53 %	Test By:	KING KONG
		Test Band	LTE Band 4

Test Condition	Mode	Bandwidth (MHz)	Channel	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
H.T /H.V	QPSK	1.4MHz	19957	14	0.0082	2.5	PASS
			20175	11	0.0063		
			20393	13	0.0074		
		10MHz	20000	14	0.0082		
			20175	12	0.0069		
			20350	10	0.0057		
		15MHz	20025	12	0.007		
			20175	12	0.0069		
			20325	13	0.0074		
	16QAM	1.4MHz	19957	10	0.0058		
			20175	15	0.0087		
			20393	12	0.0068		
		10MHz	20000	10	0.0058		
			20175	12	0.0069		
			20350	14	0.0080		
		15MHz	20025	13	0.0076		
			20175	10	0.0058		
			20325	11	0.0063		
	64QAM	1.4MHz	19957	10	0.0058		
			20175	11	0.0063		
			20393	13	0.0074		
		10MHz	20000	14	0.0082		
			20175	12	0.0069		
			20350	10	0.0057		
		15MHz	20025	12	0.0070		
			20175	12	0.0069		
			20325	13	0.0074		

Test Condition	Mode	Bandwidth (MHz)	Channel	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
H.T /H.V	QPSK	3MHz	19965	18	0.0105	2.5	PASS
			20175	15	0.0087		
			20385	17	0.0097		
		5MHz	19975	16	0.0093		
			20175	16	0.0092		
			20375	12	0.0068		
		20MHz	20050	12	0.0070		
			20175	17	0.0098		
			20300	15	0.0086		
	16QAM	3MHz	19965	15	0.0088		
			20175	13	0.0075		
			20385	16	0.0091		
		5MHz	19975	17	0.0099		
			20175	19	0.0110		
			20375	18	0.0103		
		20MHz	20050	14	0.0081		
			20175	14	0.0081		
			20300	17	0.0097		
	64QAM	3MHz	19965	15	0.0088		
			20175	13	0.0075		
			20385	16	0.0091		
		5MHz	19975	17	0.0099		
			20175	16	0.0092		
			20375	18	0.0103		
		20MHz	20050	14	0.0081		
			20175	14	0.0081		
			20300	15	0.0086		

8.4 EFFECTIVE ISOTROPIC RADIATED POWER

8.4.1 Applicable Standard

According to FCC Part 2.1046, FCC Part 27.50(b)(10) and FCC Part 27.50(d)(4).

8.4.2 Conformance Limit

For band 4 output power limit:
FCC Part 27.50 (d)(4): Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band are limited to 1 watt EIRP. Fixed stations operating in this band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in this band must employ a means for limiting power to the minimum necessary for successful communications.

8.4.3 Test Configuration

Test according to clause 7.2 radio frequency test setup 2

8.4.4 Test Procedure

Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at a height of 0.8m test table above the ground plane.

Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.

This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Effective Radiated Power (ERP) and Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna(substitution antenna) at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss +Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, EIRP= LVL + Correction factor.
ERP = EIRP -2.15dBi.

8.4.5 Test Results

PASS.

Temperature:	24℃	Test Date:	July 31, 2015
Humidity:	53 %	Test By:	KING KONG
Test Band	LTE Band 4		

Frequency (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Modulation	EIRP (dBm)	EIRP (W)	Limit (W)
1724.15	H	20	1	0	QPSK	18.33	0.0681	1
1735.20	H	20	1	0		17.28	0.0535	1
1750.30	H	20	1	0		17.47	0.0558	1
1724.15	V	20	1	0		6.34	0.0043	1
1735.20	V	20	1	0		6.44	0.0044	1
1750.30	V	20	1	0		7.04	0.0051	1
1724.15	H	20	1	0	16-QAM	18.25	0.0668	1
1735.20	H	20	1	0		16.89	0.0489	1
1750.30	H	20	1	0		17.32	0.0540	1
1724.15	V	20	1	0		6.30	0.0043	1
1735.20	V	20	1	0		6.06	0.0040	1
1750.30	V	20	1	0		6.84	0.0048	1
1724.15	H	20	1	0	64-QAM	18.20	0.0661	1
1735.20	H	20	1	0		16.81	0.0480	1
1750.30	H	20	1	0		17.25	0.0531	1
1724.15	V	20	1	0		6.23	0.0042	1
1735.20	V	20	1	0		6.10	0.0041	1
1750.30	V	20	1	0		6.72	0.0047	1

Frequency (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Modulation	EIRP (dBm)	EIRP (W)	Limit (W)
1736.33	H	15	1	0	QPSK	18.18	0.0658	1
1747.38	H	15	1	0		17.13	0.0516	1
1762.48	H	15	1	0		17.32	0.0540	1
1736.33	V	15	1	0		6.19	0.0042	1
1747.38	V	15	1	0		6.29	0.0043	1
1762.48	V	15	1	0		6.89	0.0049	1
1736.33	H	15	1	0	16-QAM	18.1	0.0646	1
1747.38	H	15	1	0		16.74	0.0472	1
1762.48	H	15	1	0		17.17	0.0521	1
1736.33	V	15	1	0		6.15	0.0041	1
1747.38	V	15	1	0		5.91	0.0039	1
1762.48	V	15	1	0		6.69	0.0047	1
1736.33	H	15	1	0	64-QAM	18.20	0.0661	1
1747.38	H	15	1	0		16.70	0.0468	1
1762.48	H	15	1	0		17.24	0.0530	1
1736.33	V	15	1	0		6.15	0.0041	1
1747.38	V	15	1	0		5.90	0.0039	1
1762.48	V	15	1	0		6.50	0.0045	1

Temperature:	24℃	Test Date:	July 31, 2015
Humidity:	53 %	Test By:	KING KONG
Test Band	LTE Band 4		

Frequency (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Modulation	EIRP (dBm)	EIRP (W)	Limit (W)
1732.78	H	10	1	0	QPSK	18.64	0.0731	1
1757.48	H	10	1	0		17.11	0.0514	1
1762.38	H	10	1	0		17.21	0.0526	1
1732.78	V	10	1	0		7.22	0.0053	1
1757.48	V	10	1	0		6.92	0.0049	1
1762.38	V	10	1	0		5.63	0.0037	1
1732.78	H	10	1	0	16-QAM	18.64	0.0731	1
1757.48	H	10	1	0		17.11	0.0514	1
1762.38	H	10	1	0		17.21	0.0526	1
1732.78	V	10	1	0		7.22	0.0053	1
1757.48	V	10	1	0		6.92	0.0049	1
1762.38	V	10	1	0		5.63	0.0037	1
1732.78	H	10	1	0	64-QAM	18.50	0.0708	1
1757.48	H	10	1	0		17.05	0.0507	1
1762.38	H	10	1	0		17.10	0.0513	1
1732.78	V	10	1	0		7.25	0.0053	1
1757.48	V	10	1	0		6.80	0.0048	1
1762.38	V	10	1	0		5.40	0.0035	1

Frequency (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Modulation	EIRP (dBm)	EIRP (W)	Limit (W)
1720.60	H	5	1	0	QPSK	18.79	0.0757	1
1745.30	H	5	1	0		17.26	0.0532	1
1750.20	H	5	1	0		17.36	0.0545	1
1720.60	V	5	1	0		7.37	0.0055	1
1745.30	V	5	1	0		7.07	0.0051	1
1750.20	V	5	1	0		5.78	0.0038	1
1720.60	H	5	1	0	16-QAM	18.79	0.0757	1
1745.30	H	5	1	0		17.26	0.0532	1
1750.20	H	5	1	0		17.36	0.0545	1
1720.60	V	5	1	0		7.37	0.0055	1
1745.30	V	5	1	0		7.07	0.0051	1
1750.20	V	5	1	0		5.78	0.0038	1
1720.60	H	5	1	0	64-QAM	18.75	0.0757	1
1745.30	H	5	1	0		17.20	0.0532	1
1750.20	H	5	1	0		17.10	0.0545	1
1720.60	V	5	1	0		7.31	0.0055	1
1745.30	V	5	1	0		7.08	0.0051	1
1750.20	V	5	1	0		5.78	0.0038	1
1720.60	H	5	1	0		18.78	0.0757	1

Temperature:	24℃	Test Date:	July 31, 2015
Humidity:	53 %	Test By:	KING KONG
Test Band	LTE Band 4		

Frequency (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Modulation	EIRP (dBm)	EIRP (W)	Limit (W)
1735.20	H	3	1	0	QPSK	21.85	0.1531	1
1730.50	H	3	1	0		19.35	0.0861	1
1755.50	H	3	1	0		18.88	0.0773	1
1735.20	V	3	1	0		10.37	0.0109	1
1730.50	V	3	1	0		7.41	0.0055	1
1755.50	V	3	1	0		5.94	0.0039	1
1735.20	H	3	1	0	16-QAM	21.83	0.1524	1
1730.50	H	3	1	0		19.60	0.0912	1
1755.50	H	3	1	0		20.02	0.1005	1
1735.20	V	3	1	0		10.66	0.0116	1
1730.50	V	3	1	0		7.46	0.0056	1
1755.50	V	3	1	0		6.71	0.0047	1
1735.20	H	3	1	0	64-QAM	21.82	0.1524	1
1730.50	H	3	1	0		19.61	0.0912	1
1755.50	H	3	1	0		20.01	0.1005	1
1735.20	V	3	1	0		10.65	0.0116	1
1730.50	V	3	1	0		7.45	0.0056	1
1755.50	V	3	1	0		6.70	0.0047	1

Frequency (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Modulation	EIRP (dBm)	EIRP (W)	Limit (W)
1747.38	H	1.4	1	0	QPSK	20.99	0.1256	1
1742.68	H	1.4	1	0		18.49	0.0706	1
1767.68	H	1.4	1	0		18.02	0.0634	1
1747.38	V	1.4	1	0		9.51	0.0089	1
1742.68	V	1.4	1	0		6.55	0.0045	1
1767.68	V	1.4	1	0		5.08	0.0032	1
1747.38	H	1.4	1	0	16-QAM	20.97	0.1250	1
1742.68	H	1.4	1	0		18.74	0.0748	1
1767.68	H	1.4	1	0		19.16	0.0824	1
1747.38	V	1.4	1	0		9.8	0.0095	1
1742.68	V	1.4	1	0		6.6	0.0046	1
1767.68	V	1.4	1	0		5.85	0.0038	1
1747.38	H	1.4	1	0	64-QAM	20.96	0.1250	1
1742.68	H	1.4	1	0		18.75	0.0748	1
1767.68	H	1.4	1	0		19.15	0.0824	1
1747.38	V	1.4	1	0		9.80	0.0095	1
1742.68	V	1.4	1	0		6.61	0.0046	1
1767.68	V	1.4	1	0		5.86	0.0038	1

All the modulation modes were tested, the data of the worst mode are described in the following table.

8.5 RADIATED SPURIOUS EMISSION

8.5.1 Applicable Standard

According to FCC Part2.1053, Part27.53(c)(1) and Part 27.53(g).

8.5.2 Conformance Limit

■ Radiated Spurious Emission

For band 4 Emission limit:
On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

■ 100KHz Band Edge

For LTE Band4 Band Edge:
Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's 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 emissions are attenuated at least 26 dB below the transmitter power. (m)(4) For mobile digital stations, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge and 55 + 10 log (P) dB at 5.5 megahertz from the channel edges.

8.5.3 Test Configuration

Test according to clause 7.2 radio frequency test setup 2

8.5.4 Test Procedure

Step1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
Step2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
Step3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
Step4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
Step5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
Step6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
Step7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
Step8. Taking the record of output power at antenna port.
Step9. Repeat step 7 to step 8 for another polarization.
Step10. Emission level (dBm) = output power + substitution Gain.

8.5.5 Test Results

■ Spurious Emission below 1000MHz (30MHz to 1000MHz)

Temperature:	24℃	Test Date:	July 31, 2015
Humidity:	53 %	Test By:	KING KONG
Test Band	LTE Band 4	Test Mode:	QPSK/ Middle Channel

Freq. (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Emission Level(dBm)	Limit (dBm)	Margin (dBm)	Verdict
102.51	H	5	1	0	-64.40	-13.00	-51.40	PASS
232.15	H	5	1	0	-63.12	-13.00	-50.12	PASS
315.02	H	5	1	0	-60.70	-13.00	-47.70	PASS
50.26	H	5	1	0	-56.30	-13.00	-43.30	PASS
862.30	H	5	1	0	-50.35	-13.00	-37.35	PASS
960.20	H	5	1	0	-50.12	-13.00	-37.12	PASS
83.25	V	5	1	0	-58.35	-13.00	-45.35	PASS
152.12	V	5	1	0	-61.12	-13.00	-48.12	PASS
185.36	V	5	1	0	-64.60	-13.00	-51.60	PASS
530.21	V	5	1	0	-55.85	-13.00	-42.85	PASS
712.25	V	5	1	0	-51.26	-13.00	-38.26	PASS
853.64	V	5	1	0	-49.53	-13.00	-36.53	PASS

Test Band LTE Band 4 Test Mode: QPSK/ Middle Channel

Freq. (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Emission Level(dBm)	Limit (dBm)	Margin (dBm)	Verdict
52.12	H	5	1	0	-65.10	-13.00	-52.10	PASS
85.32	H	5	1	0	-63.15	-13.00	-50.15	PASS
162.30	H	5	1	0	-65.52	-13.00	-52.52	PASS
650.12	H	5	1	0	-55.10	-13.00	-42.10	PASS
815.30	H	5	1	0	-50.70	-13.00	-37.70	PASS
953.25	H	5	1	0	-49.15	-13.00	-36.15	PASS
83.16	V	5	1	0	-50.50	-13.00	-37.50	PASS
121.35	V	5	1	0	-52.14	-13.00	-39.14	PASS
453.10	V	5	1	0	-46.53	-13.00	-33.53	PASS
750.32	V	5	1	0	-39.45	-13.00	-26.45	PASS
860.37	V	5	1	0	-37.78	-13.00	-24.78	PASS
911.20	V	5	1	0	-36.20	-13.00	-23.20	PASS

Test Band LTE Band 4 Test Mode: QPSK/ Middle Channel

Freq. (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Emission Level(dBm)	Limit (dBm)	Margin (dBm)	Verdict
53.21	H	3	1	0	-64.35	-13.00	-51.35	PASS
84.30	H	3	1	0	-63.65	-13.00	-50.65	PASS
125.35	H	3	1	0	-65.21	-13.00	-52.21	PASS
305.26	H	3	1	0	-58.54	-13.00	-45.54	PASS
702.15	H	3	1	0	-49.80	-13.00	-36.80	PASS
924.33	H	3	1	0	-48.22	-13.00	-35.22	PASS
45.60	V	3	1	0	-59.47	-13.00	-46.47	PASS
143.67	V	3	1	0	-58.52	-13.00	-45.52	PASS
207.33	V	3	1	0	-60.60	-13.00	-47.60	PASS
522.31	V	3	1	0	-50.85	-13.00	-37.85	PASS
711.20	V	3	1	0	-50.34	-13.00	-37.34	PASS
885.33	V	3	1	0	-48.30	-13.00	-35.30	PASS

Spurious Emission Above 1GHz (1GHz to 18GHz)

Temperature:	24℃	Test Date:	July 31, 2015
Humidity:	53 %	Test By:	KING KONG
Test Band	LTE Band 4	Test Mode:	QPSK/ Middle Channel

Freq. (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Emission Level(dBm)	Limit (dBm)	Margin (dBm)	Verdict
3145.46	H	1.4	1	0	-21.04	-13	-8.04	PASS
4523.80	H	1.4	1	0	-22.12	-13	-9.12	PASS
5143.81	H	1.4	1	0	-28.27	-13	-15.27	PASS
7235.45	H	1.4	1	0	-31.12	-13	-18.12	PASS
12055.77	H	1.4	1	0	-33.16	-13	-20.16	PASS
13022.71	H	1.4	1	0	-37.62	-13	-24.62	PASS
3270.36	V	1.4	1	0	-20.14	-13	-7.14	PASS
4623.93	V	1.4	1	0	-21.25	-13	-8.25	PASS
5322.82	V	1.4	1	0	-26.02	-13	-13.02	PASS
7557.01	V	1.4	1	0	-30.40	-13	-17.40	PASS
11260.50	V	1.4	1	0	-35.17	-13	-22.17	PASS
13521.98	V	1.4	1	0	-40.62	-13	-27.62	PASS

Freq. (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Emission Level(dBm)	Limit (dBm)	Margin (dBm)	Verdict
3125.31	H	3	1	0	-20.22	-13.00	-7.22	PASS
4503.65	H	3	1	0	-21.30	-13.00	-8.30	PASS
5123.66	H	3	1	0	-27.45	-13.00	-14.45	PASS
7215.30	H	3	1	0	-30.30	-13.00	-17.30	PASS
12035.62	H	3	1	0	-32.34	-13.00	-19.34	PASS
13002.56	H	3	1	0	-36.80	-13.00	-23.80	PASS
3250.21	V	3	1	0	-19.32	-13.00	-6.32	PASS
4603.78	V	3	1	0	-20.43	-13.00	-7.43	PASS
5302.67	V	3	1	0	-25.20	-13.00	-12.20	PASS
7536.86	V	3	1	0	-29.58	-13.00	-16.58	PASS
11240.35	V	3	1	0	-34.35	-13.00	-21.35	PASS
13501.83	V	3	1	0	-39.80	-13.00	-26.80	PASS

Test Band LTE Band 4 Test Mode: QPSK/ Middle Channel

Freq. (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Emission Level(dBm)	Limit (dBm)	Margin (dBm)	Verdict
3251.20	H	5	1	0	-22.12	-13.00	-9.12	PASS
4430.21	H	5	1	0	-22.34	-13.00	-9.34	PASS
6402.37	H	5	1	0	-28.50	-13.00	-15.50	PASS
7530.69	H	5	1	0	-31.24	-13.00	-18.24	PASS
11680.56	H	5	1	0	-34.75	-13.00	-21.75	PASS
13205.70	H	5	1	0	-38.10	-13.00	-25.10	PASS
3351.64	V	5	1	0	-20.52	-13.00	-7.52	PASS
4503.25	V	5	1	0	-21.70	-13.00	-8.70	PASS
7203.96	V	5	1	0	-26.35	-13.00	-13.35	PASS
9102.34	V	5	1	0	-30.80	-13.00	-17.80	PASS

11543.12	V	5	1	0	-35.21	-13.00	-22.21	PASS
13005.62	V	5	1	0	-41.47	-13.00	-28.47	PASS

Freq. (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Emission Level(dBm)	Limit (dBm)	Margin (dBm)	Verdict
3271.35	H	10	1	0	-19.58	-13	-6.58	PASS
4450.36	H	10	1	0	-20.66	-13	-7.66	PASS
6422.52	H	10	1	0	-26.81	-13	-13.81	PASS
7550.84	H	10	1	0	-29.66	-13	-16.66	PASS
11700.71	H	10	1	0	-31.70	-13	-18.70	PASS
13225.85	H	10	1	0	-36.16	-13	-23.16	PASS
3371.79	V	10	1	0	-18.68	-13	-5.68	PASS
4523.40	V	10	1	0	-19.79	-13	-6.79	PASS
7224.11	V	10	1	0	-24.56	-13	-11.56	PASS
9122.49	V	10	1	0	-28.94	-13	-15.94	PASS
11563.27	V	10	1	0	-33.71	-13	-20.71	PASS
13025.77	V	10	1	0	-39.16	-13	-26.16	PASS

Test Band LTE Band 4 Test Mode: QPSK/ Middle Channel

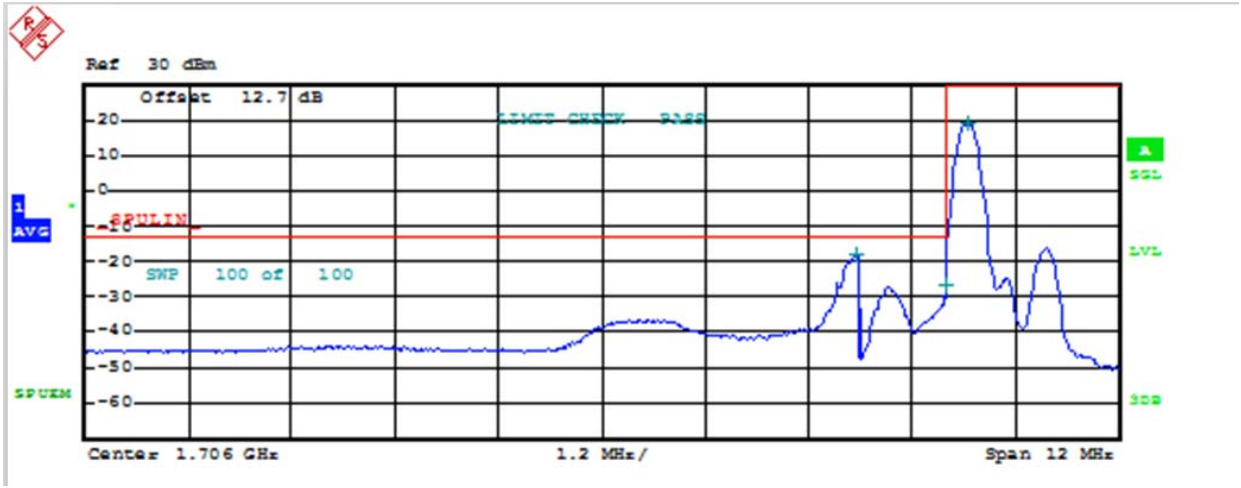
Freq. (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Emission Level(dBm)	Limit (dBm)	Margin (dBm)	Verdict
3283.38	H	15	1	0	-18.98	-13	-5.98	PASS
4462.39	H	15	1	0	-20.06	-13	-7.06	PASS
6434.55	H	15	1	0	-26.21	-13	-13.21	PASS
7562.87	H	15	1	0	-29.06	-13	-16.06	PASS
11712.74	H	15	1	0	-31.1	-13	-18.10	PASS
13237.88	H	15	1	0	-35.56	-13	-22.56	PASS
3383.82	V	15	1	0	-18.08	-13	-5.08	PASS
4535.43	V	15	1	0	-19.19	-13	-6.19	PASS
7236.14	V	15	1	0	-23.96	-13	-10.96	PASS
9134.52	V	15	1	0	-28.34	-13	-15.34	PASS
11575.30	V	15	1	0	-33.11	-13	-20.11	PASS
13037.8	V	15	1	0	-38.56	-13	-25.56	PASS

Freq. (MHz)	H/V	Bandwidth (MHz)	RB Size	RB Offset	Emission Level(dBm)	Limit (dBm)	Margin (dBm)	Verdict
3210.55	H	20	1	0	-19.12	-13.00	-6.12	PASS
5160.38	H	20	1	0	-20.45	-13.00	-7.45	PASS
7102.51	H	20	1	0	-26.42	-13.00	-13.42	PASS
7805.68	H	20	1	0	-29.87	-13.00	-16.87	PASS
11550.42	H	20	1	0	-32.12	-13.00	-19.12	PASS
13004.62	H	20	1	0	-35.65	-13.00	-22.65	PASS
3305.67	V	20	1	0	-18.70	-13.00	-5.70	PASS
4806.75	V	20	1	0	-19.74	-13.00	-6.74	PASS
6125.35	V	20	1	0	-24.21	-13.00	-11.21	PASS
7805.35	V	20	1	0	-28.00	-13.00	-15.00	PASS
11045.63	V	20	1	0	-33.50	-13.00	-20.50	PASS
12652.30	V	20	1	0	-38.90	-13.00	-25.90	PASS

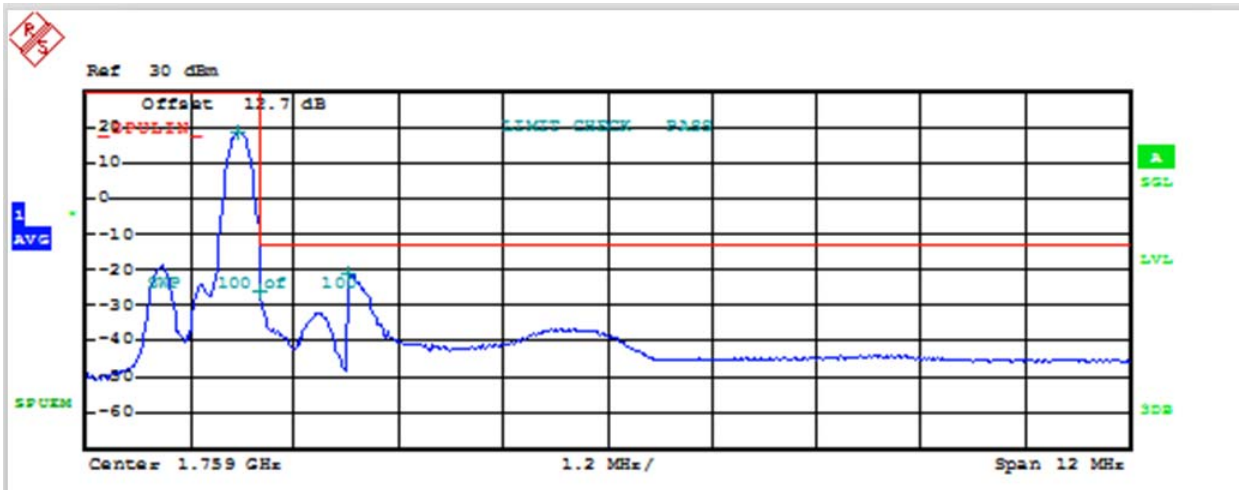
Note:

PMea= The power of signal source
Ppl = Path loss
Ga = Antenna Gain
Correct Factor(EIRP)=PMea –Ppl -Ga
Peak ERP=Correct Factor –Correction(ERP=EIRP-2.15)

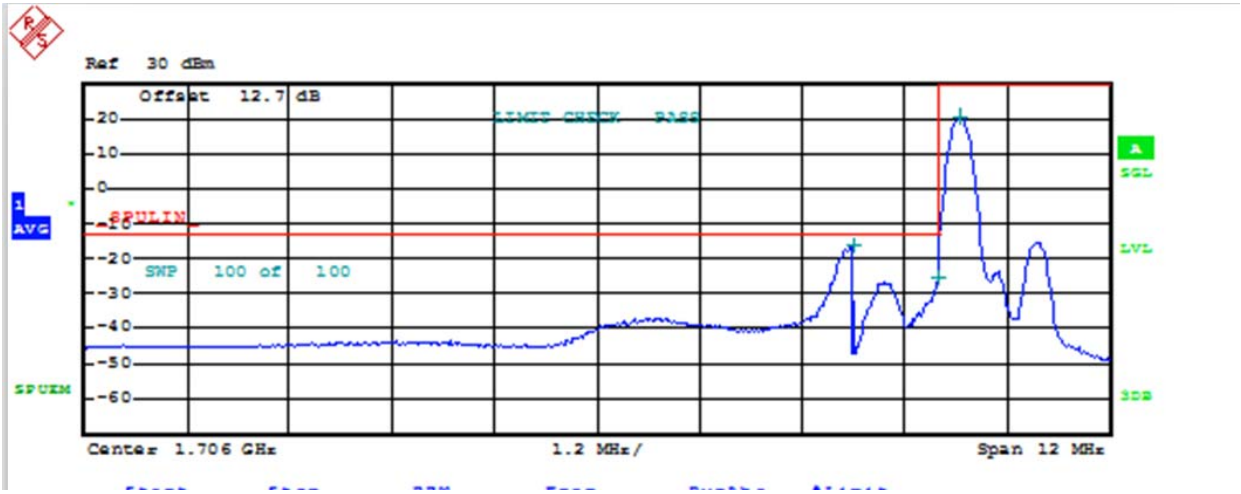
Test Model	Band edge	
	LTE Band 4/ 1.4MHz /QPSK	
	Low Channel: 19957	1 RB/ 0 offset



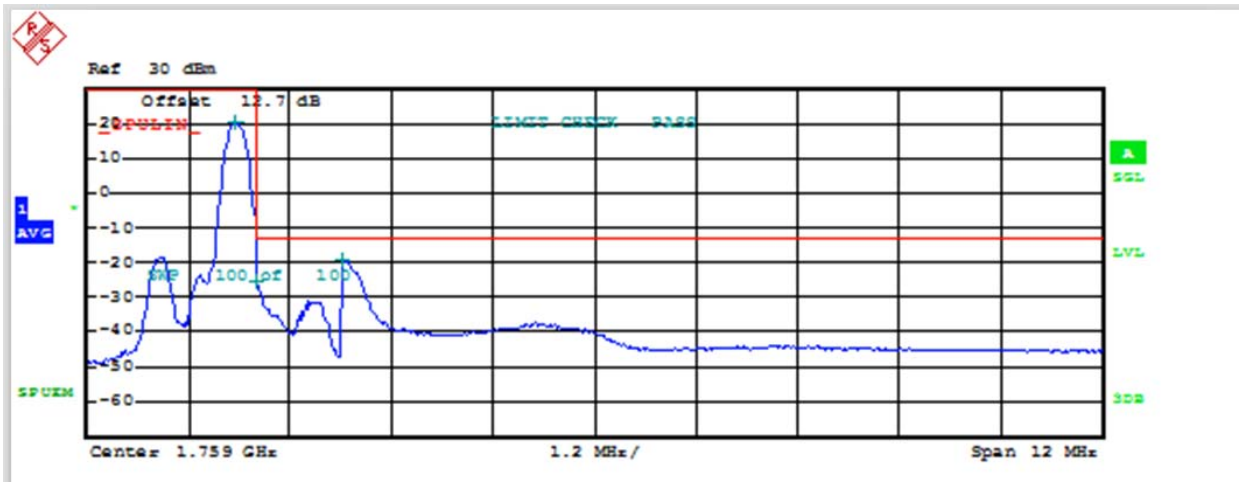
Test Model	Band edge	
	LTE Band 4/ 1.4MHz /QPSK	
	High Channel: 20393	1 RB/ 0 offset



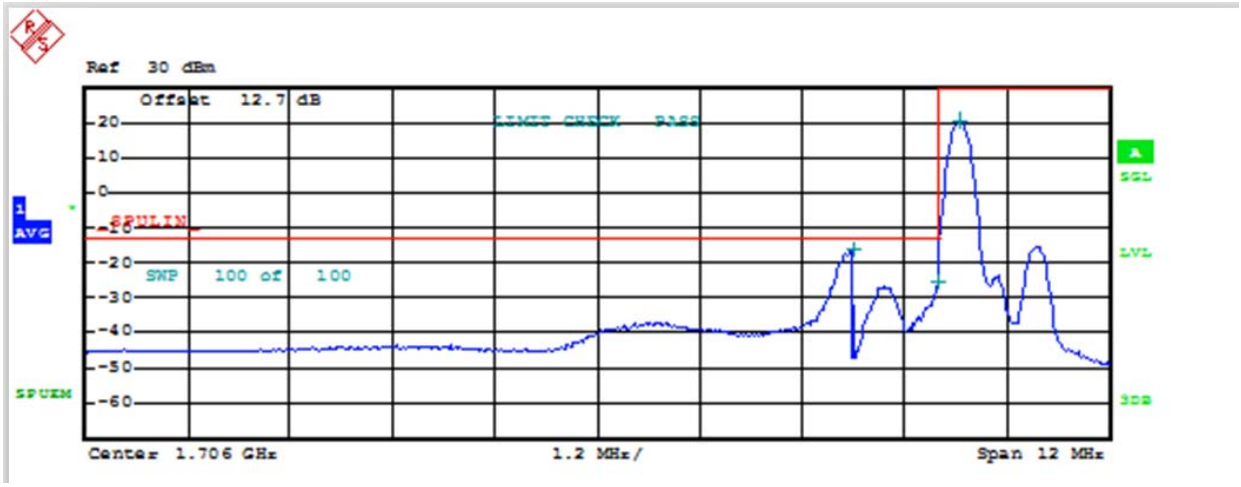
Test Model	Band edge	
	LTE Band 4/ 1.4MHz /16QAM	
	Low Channel: 19957	1 RB/ 14 offset



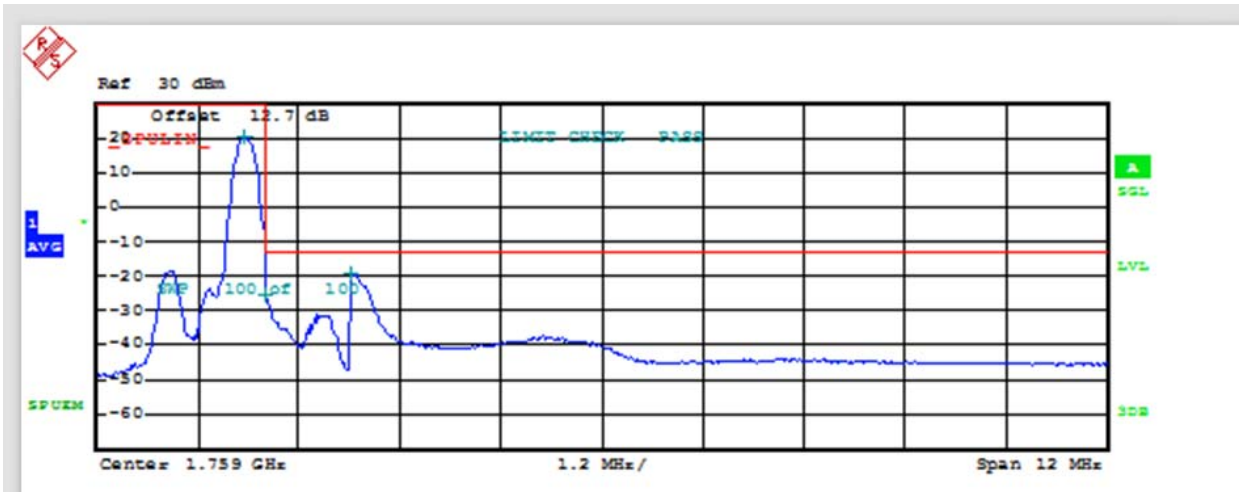
Test Model	Band edge	
	LTE Band 4/ 1.4MHz /16QAM	
	High Channel: 20393	1 RB/ 14 offset



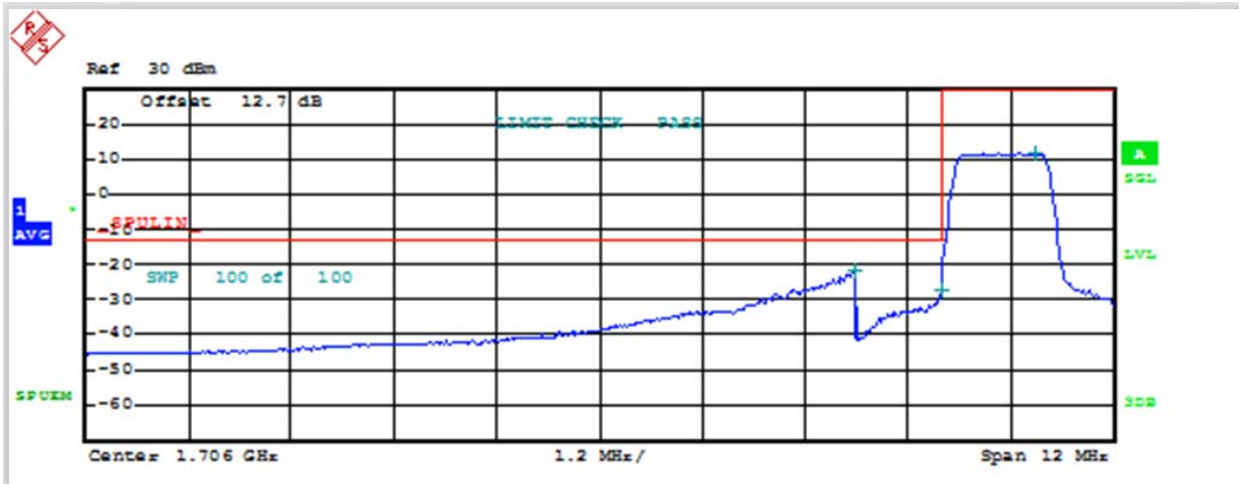
Test Model	Band edge	
	LTE Band 4/ 1.4MHz /64QAM	
	Low Channel: 19957	1 RB/ 14 offset



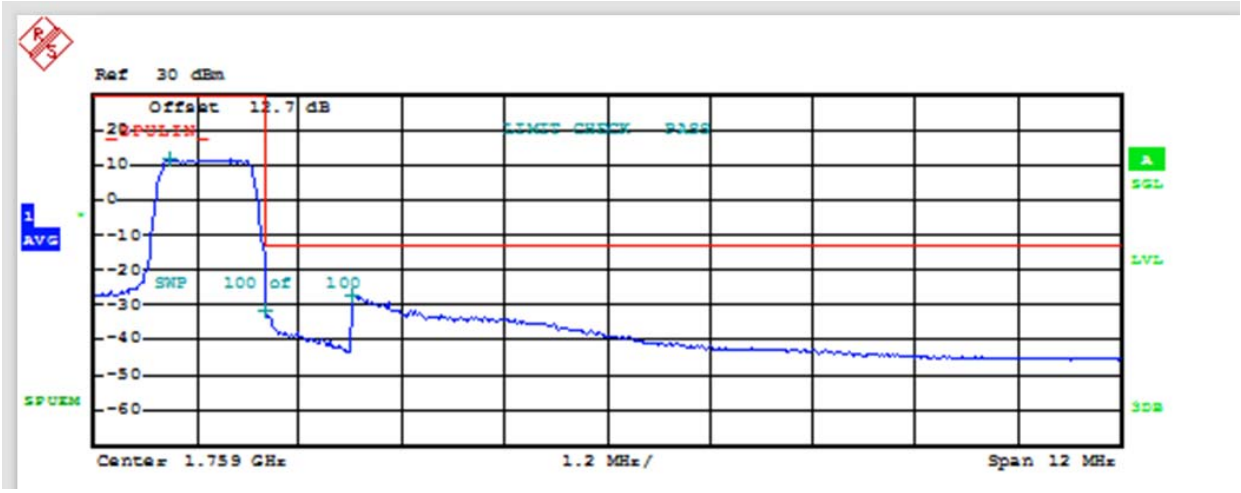
Test Model	Band edge	
	LTE Band 4/ 1.4MHz /64QAM	
	High Channel: 20393	1 RB/ 14 offset



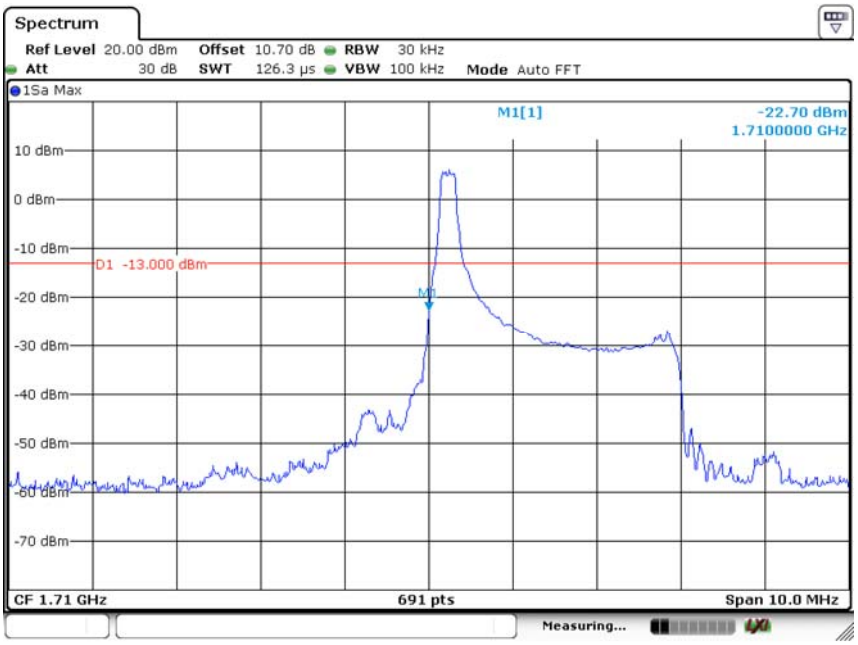
Test Model	Band edge	
	LTE Band 4/ 1.4MHz	
	Low Channel: 19957	1 RB/ 14 offset



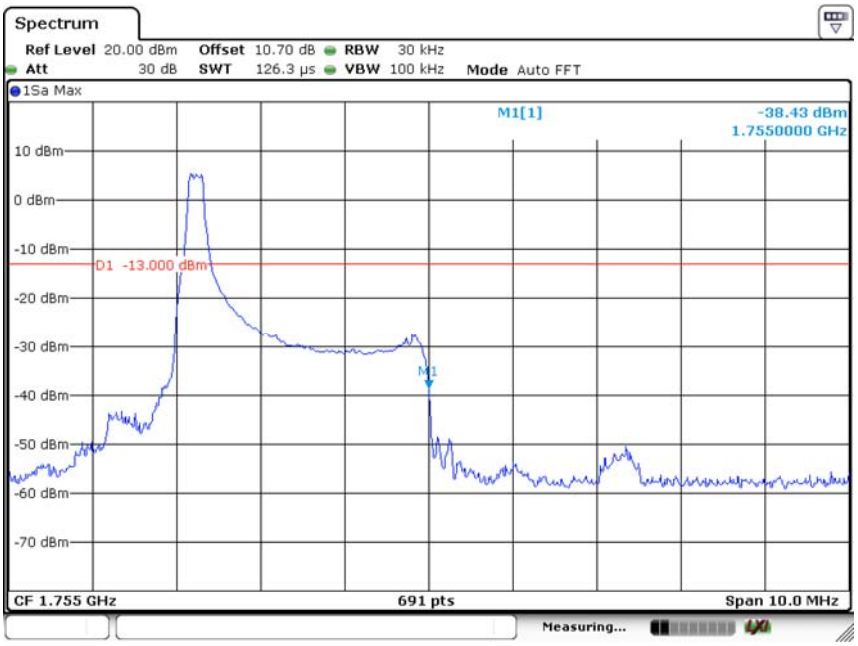
Test Model	Band edge	
	LTE Band 4/ 1.4MHz	
	High Channel: 20393	1 RB/ 14 offset



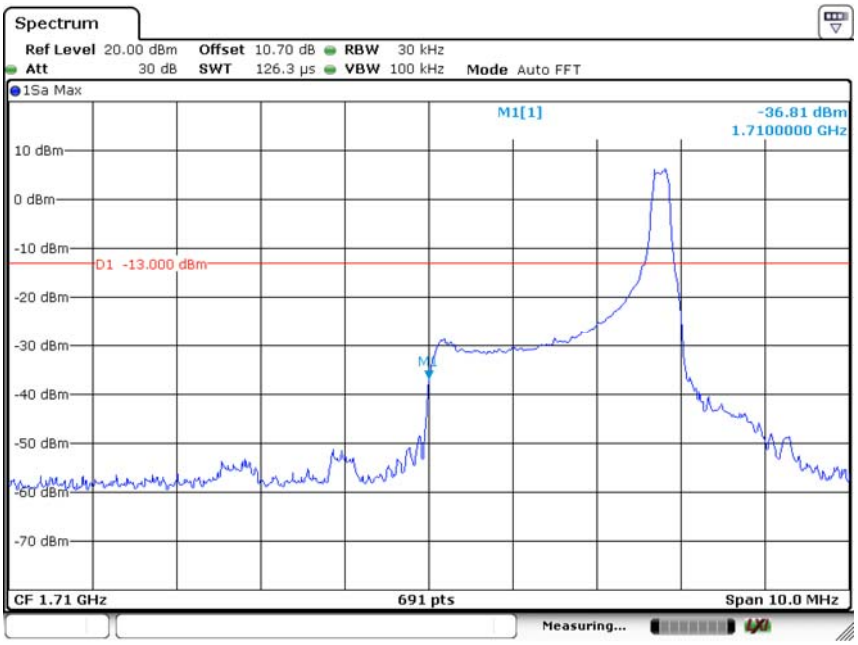
Test Model	Band edge	
	LTE Band 4/ 3MHz /QPSK	
	Low Channel:19965	1 RB/ 0 offset



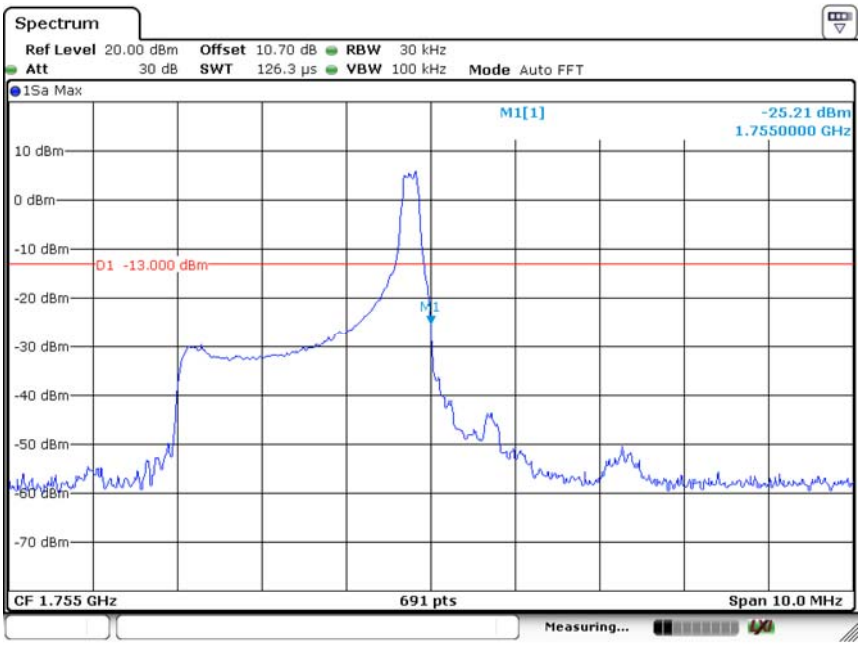
Test Model	Band edge	
	LTE Band 4/ 3MHz /QPSK	
	High Channel: 20385	1 RB/ 0 offset



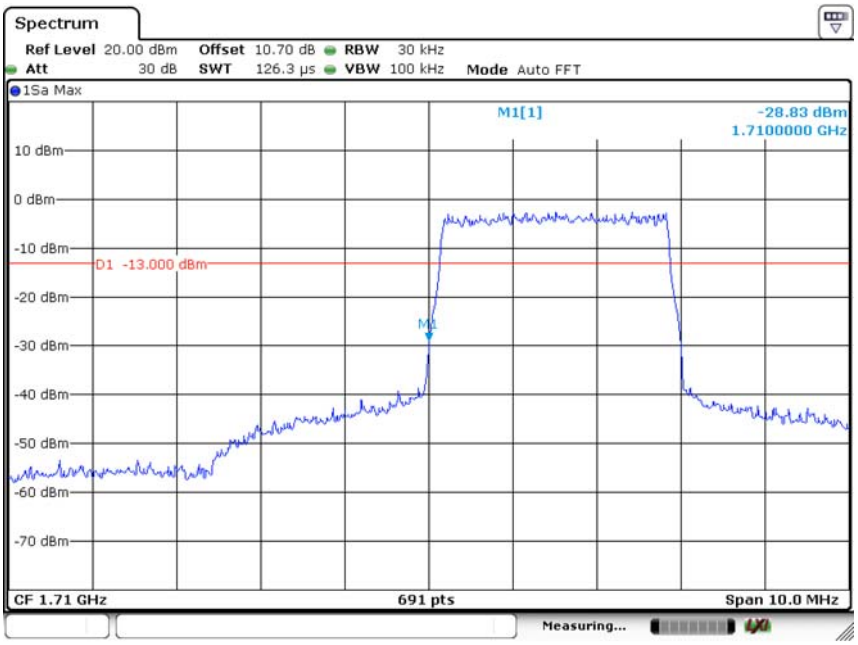
Test Model	Band edge	
	LTE Band 4/ 3MHz /QPSK	
	Low Channel: 19965	1 RB/ 14 offset



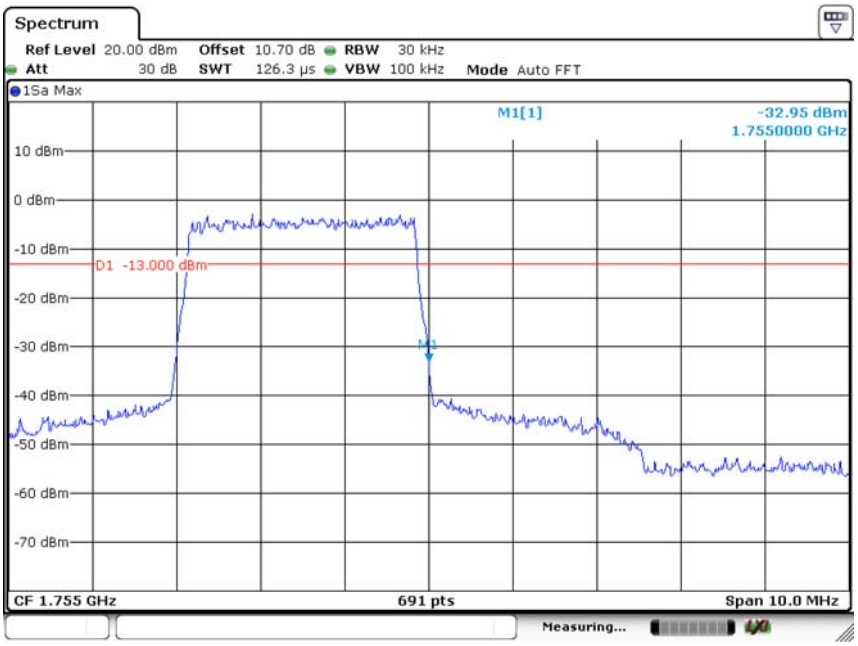
Test Model	Band edge	
	LTE Band 4/ 3MHz /QPSK	
	High Channel: 20385	1 RB/ 14 offset



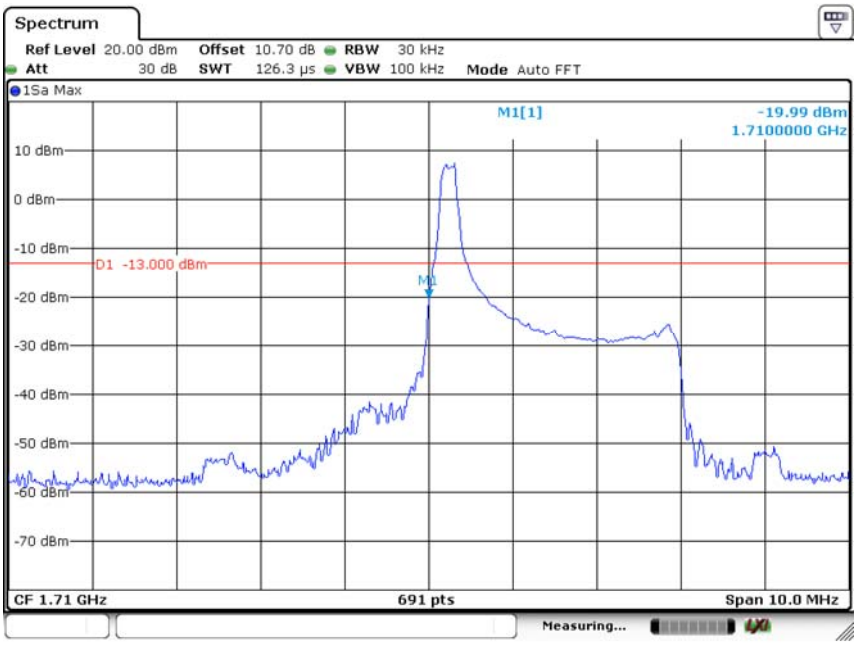
Test Model	Band edge	
	LTE Band 4/ 3MHz /QPSK	
	Low Channel: 19965	15 RB/ 0 offset



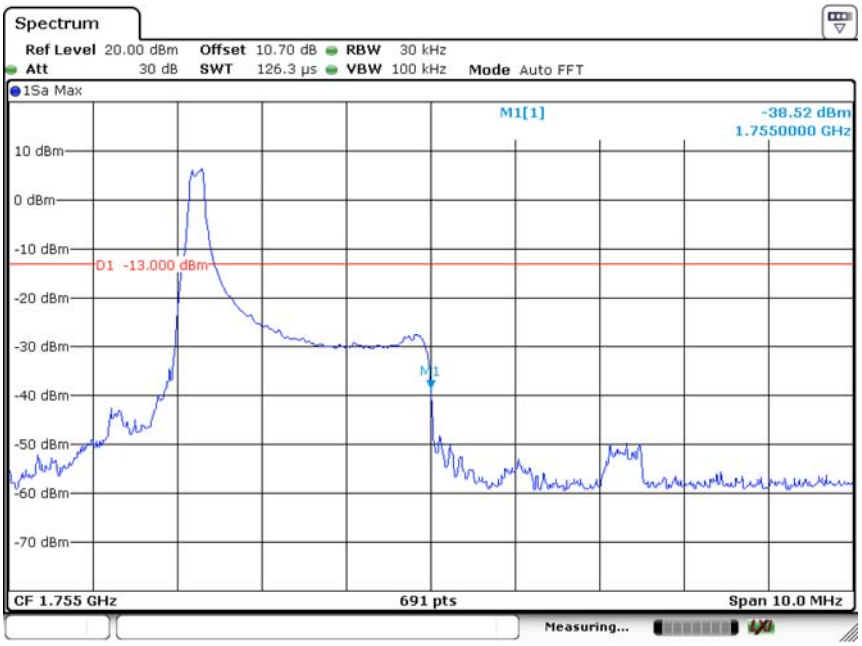
Test Model	Band edge	
	LTE Band 4/ 3MHz /QPSK	
	High Channel: 20385	15 RB/ 0 offset



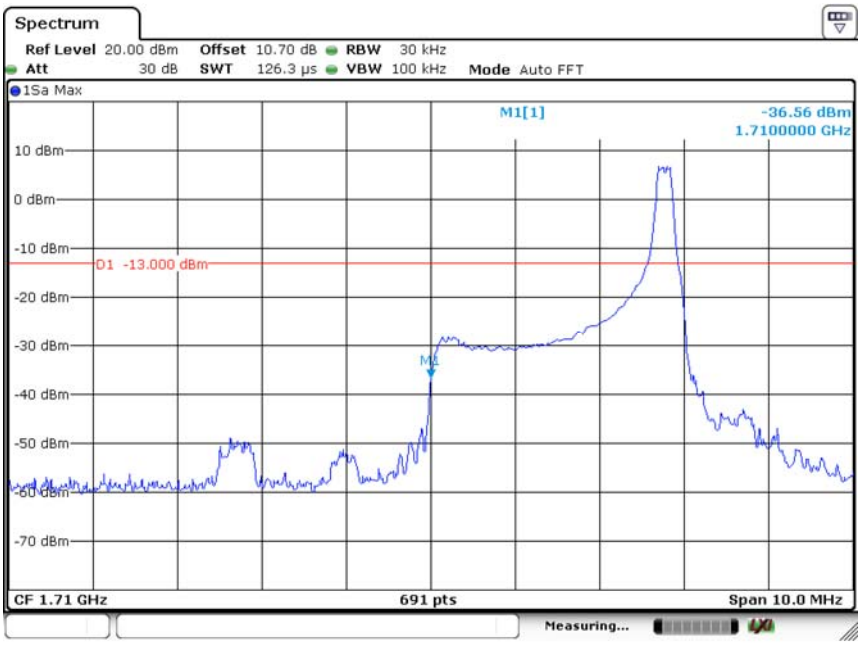
Test Model	Band edge	
	LTE Band 4/ 3MHz /16-QAM	
	Low Channel:19965	1 RB/ 0 offset



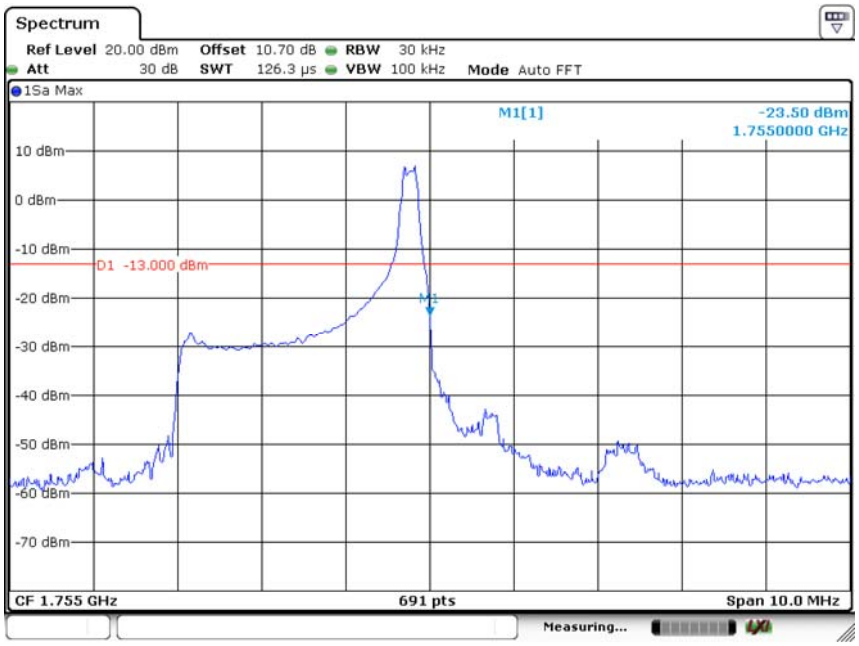
Test Model	Band edge	
	LTE Band 4/ 3MHz /16-QAM	
	High Channel: 20385	1 RB/ 0 offset



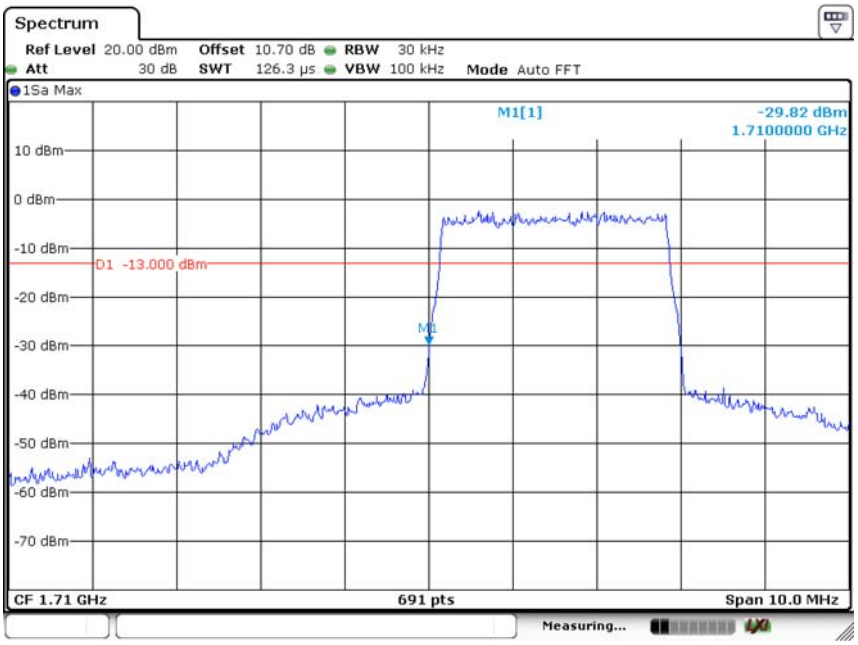
Test Model	Band edge	
	LTE Band 4/ 3MHz /16-QAM	
	Low Channel: 19965	1 RB/ 14 offset



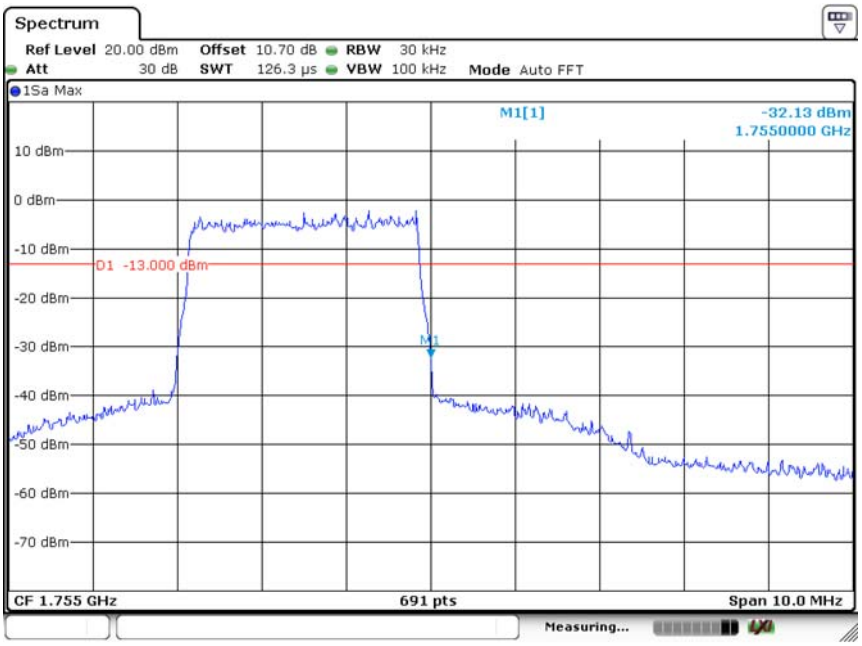
Test Model	Band edge	
	LTE Band 4/ 3MHz /16-QAM	
	High Channel: 20385	1 RB/ 14 offset



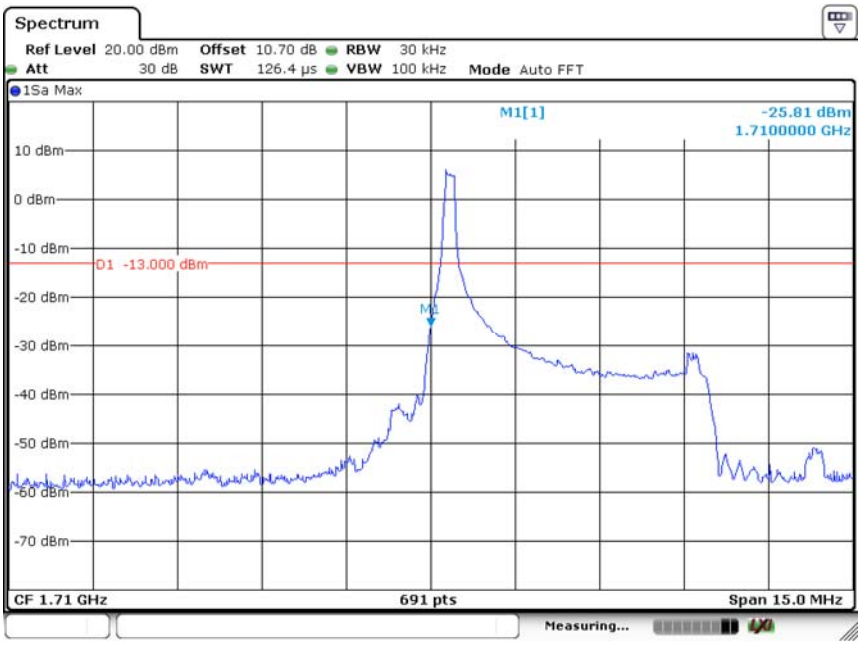
Test Model	Band edge	
	LTE Band 4/ 3MHz /16-QAM	
	Low Channel: 19965	15 RB/ 0 offset



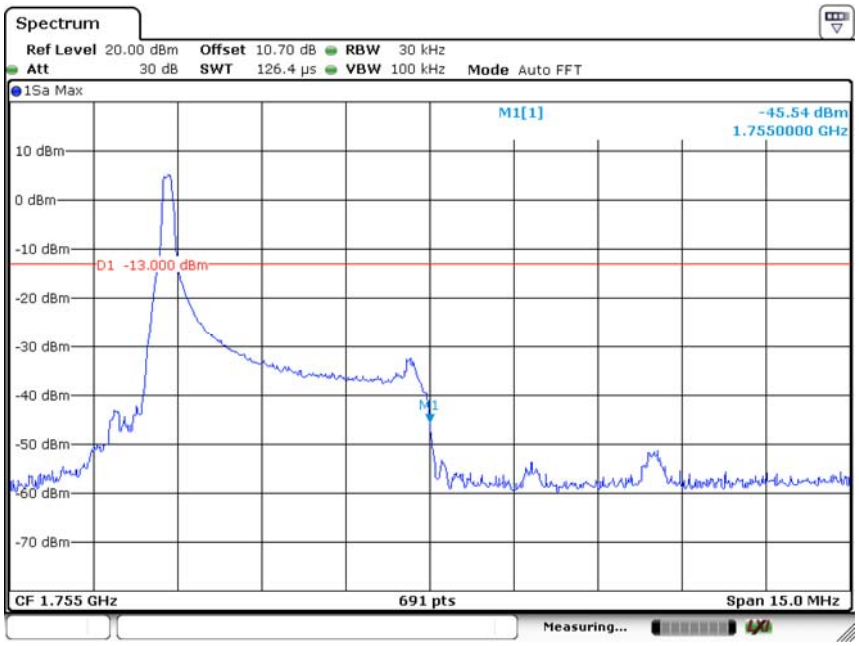
Test Model	Band edge	
	LTE Band 4/ 3MHz /16-QAM	
	High Channel: 20385	15 RB/ 0 offset



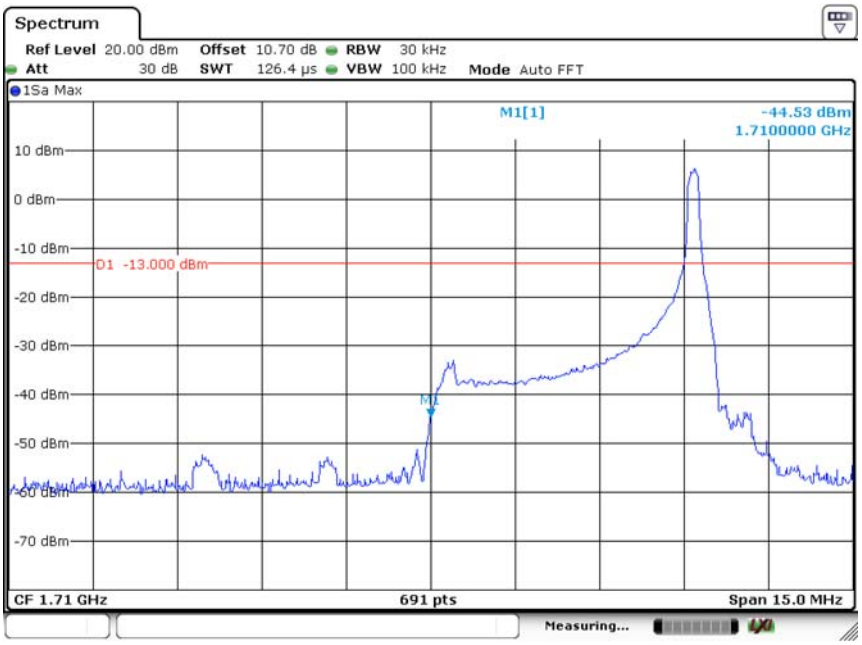
Test Model	Band edge	
	LTE Band 4/ 5MHz /QPSK	
	Low Channel: 19975	1 RB/ 0 offset



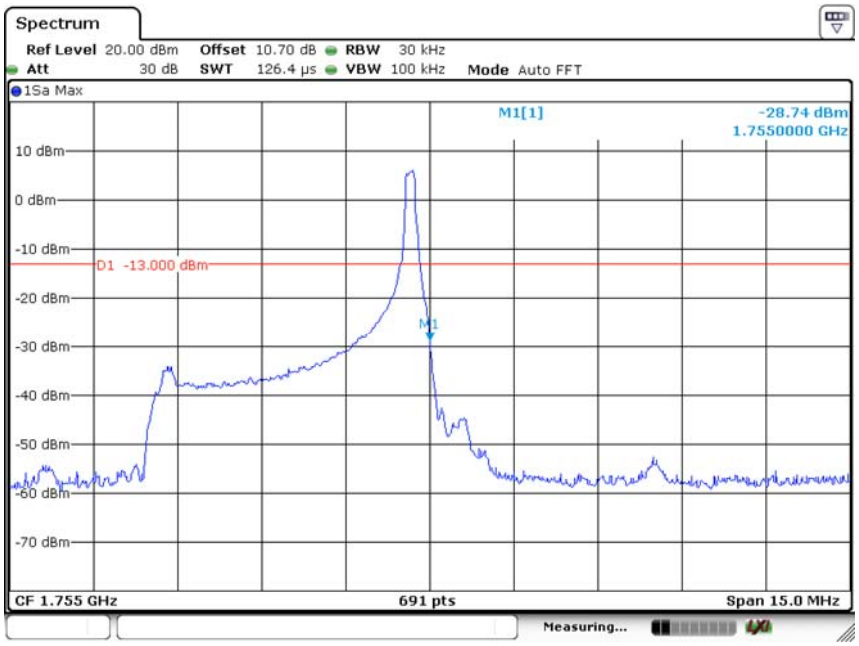
Test Model	Band edge	
	LTE Band 4/ 5MHz /QPSK	
	High Channel: 20375	1 RB/ 0 offset



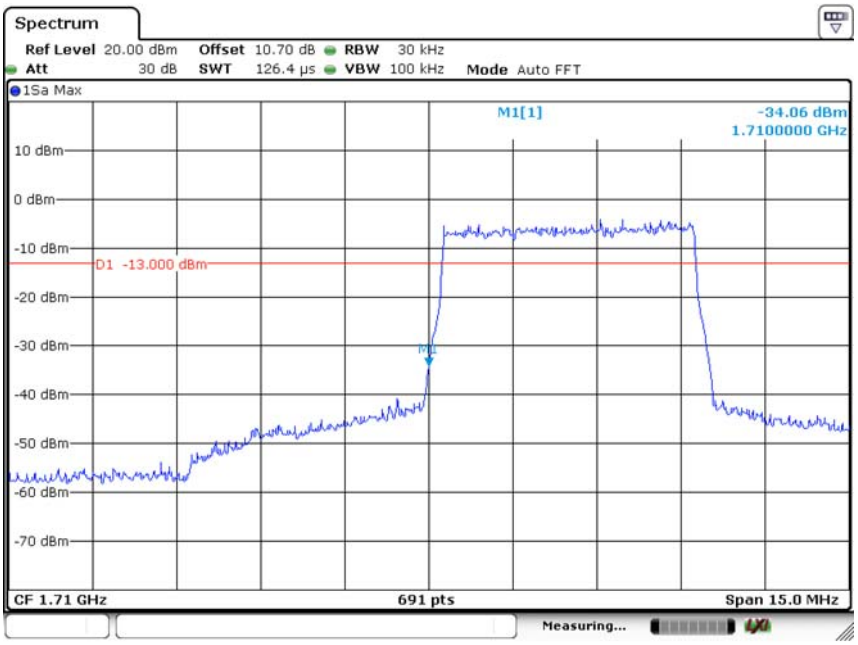
Test Model	Band edge	
	LTE Band 4/ 5MHz /QPSK	
	Low Channel: 19975	1 RB/ 24 offset



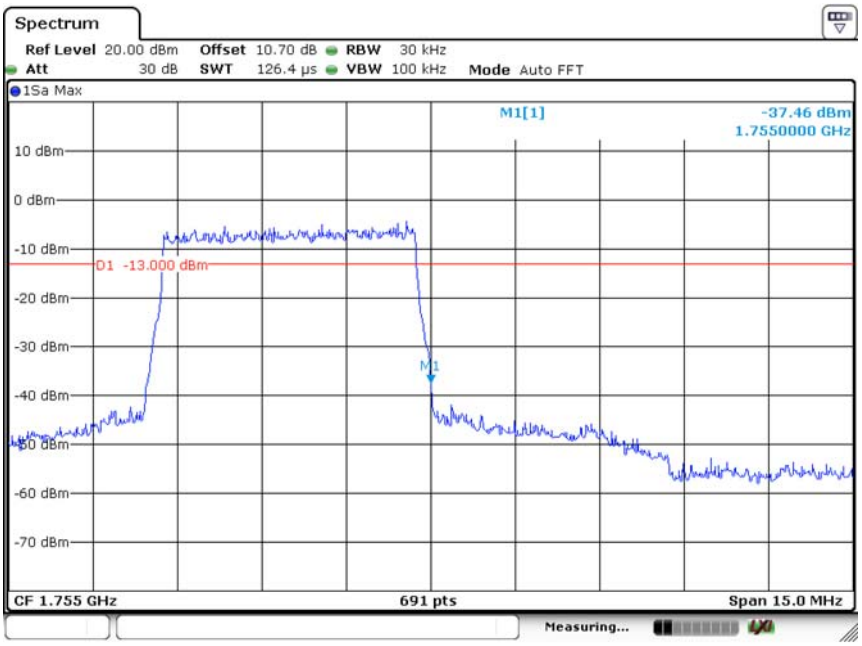
Test Model	Band edge	
	LTE Band 4/ 5MHz /QPSK	
	High Channel: 20375	1 RB/ 24 offset



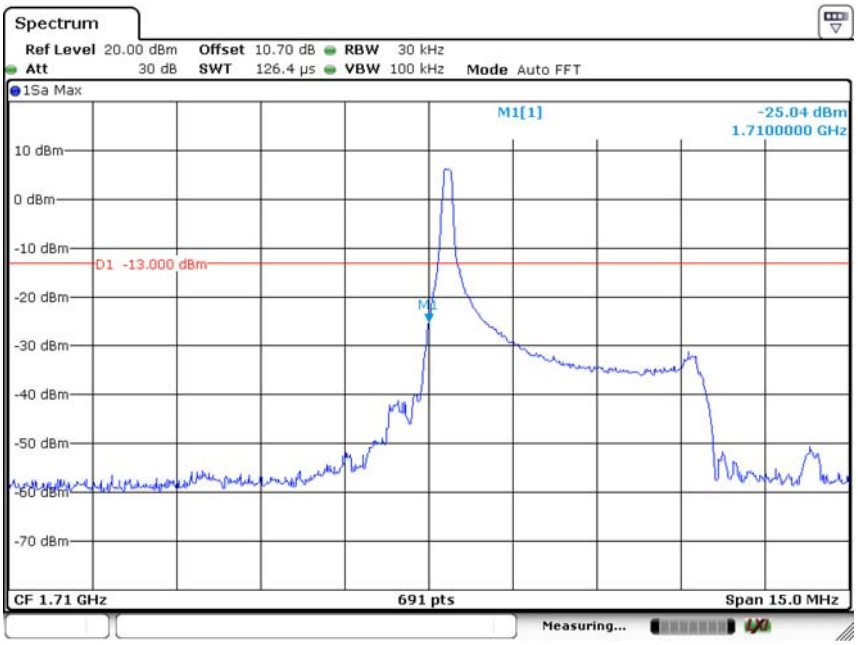
Test Model	Band edge	
	LTE Band 4/ 5MHz /QPSK	
	Low Channel: 19975	25 RB/ 0 offset



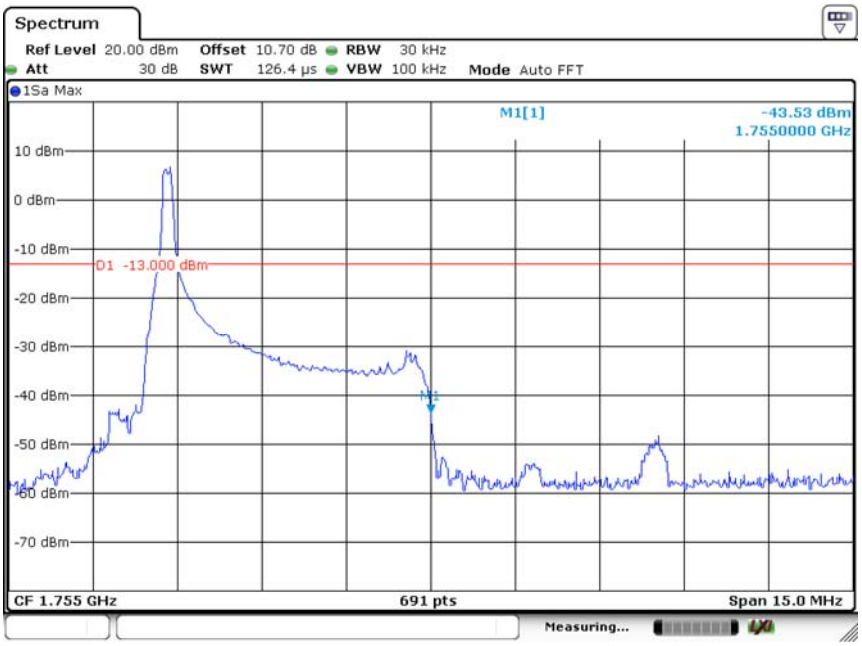
Test Model	Band edge	
	LTE Band 4/ 5MHz /QPSK	
	High Channel: 20375	25 RB/ 0 offset



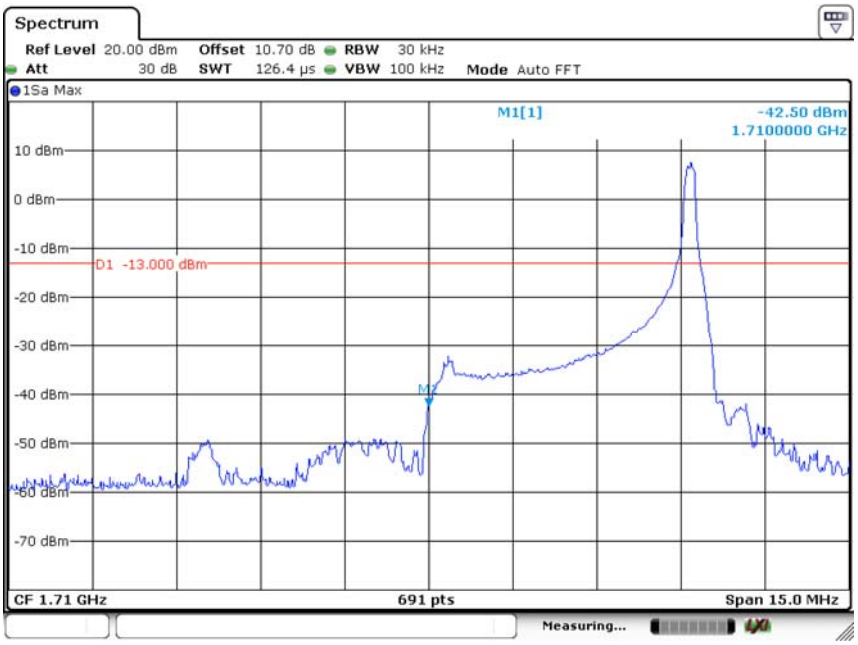
Test Model	Band edge	
	LTE Band 4/ 5MHz /16-QAM	
	Low Channel:19975	1 RB/ 0 offset



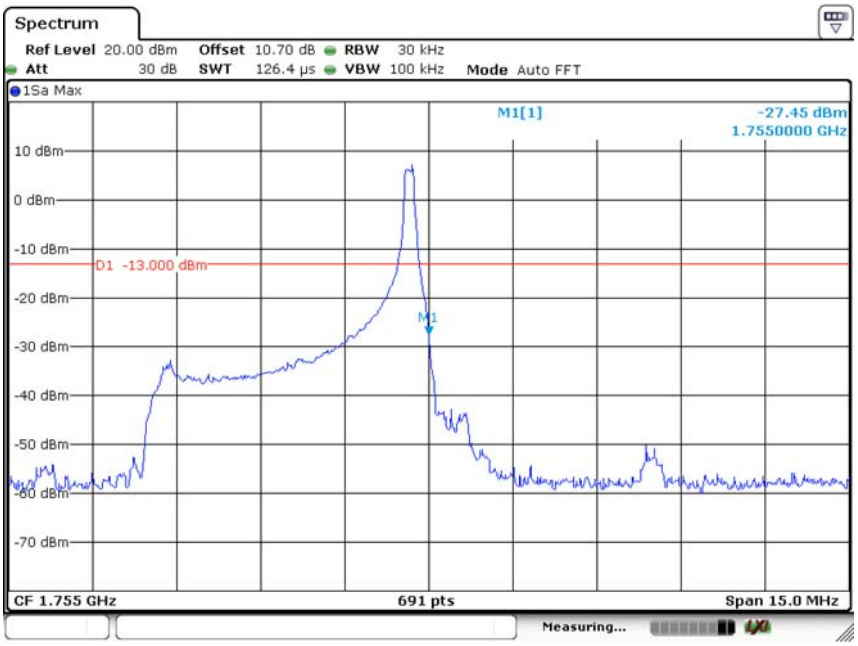
Test Model	Band edge	
	LTE Band 4/ 5MHz /16-QAM	
	High Channel: 20375	1 RB/ 0 offset



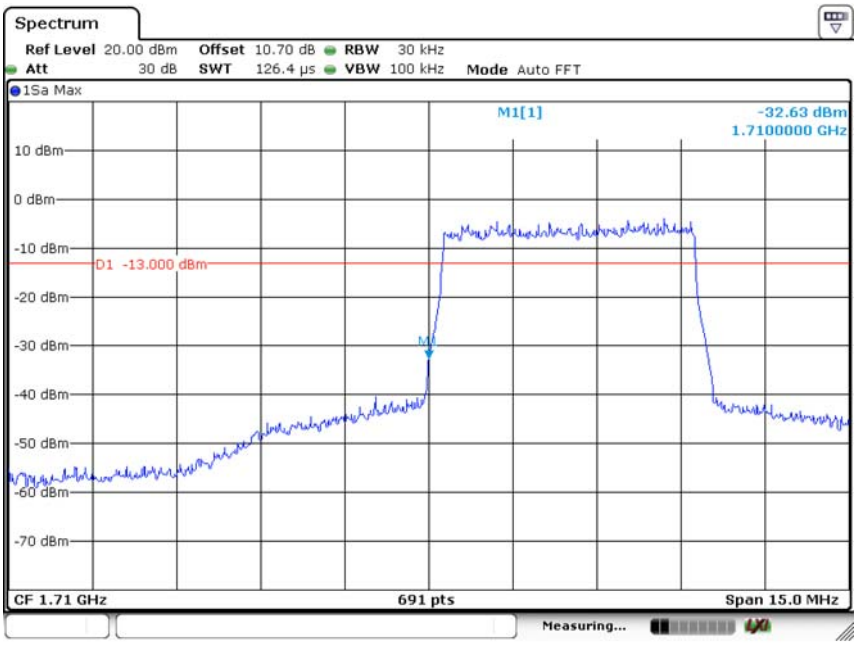
Test Model	Band edge	
	LTE Band 4/ 5MHz /16-QAM	
	Low Channel: 19975	1 RB/ 24 offset



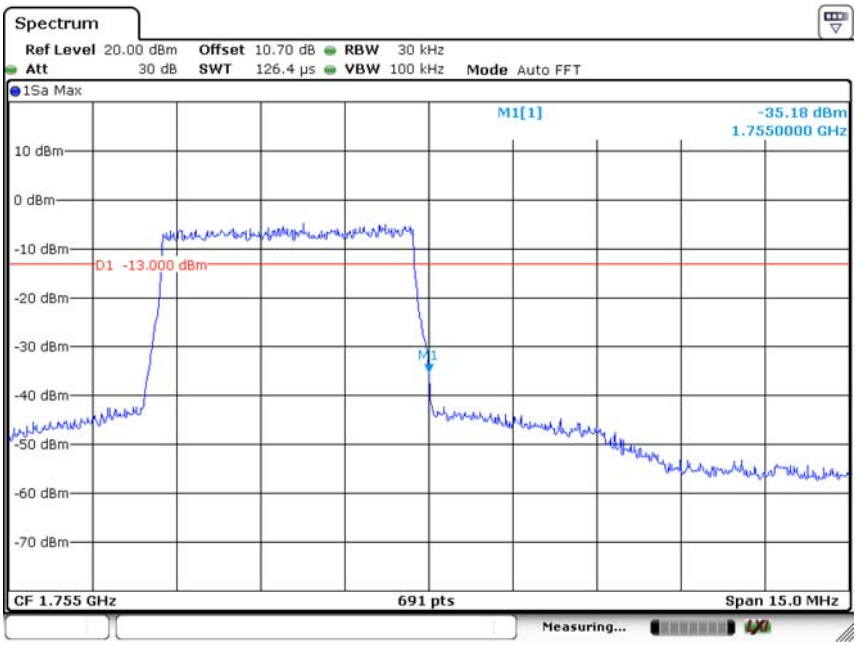
Test Model	Band edge	
	LTE Band 4/ 5MHz /16-QAM	
	High Channel: 20375	1 RB/ 24 offset



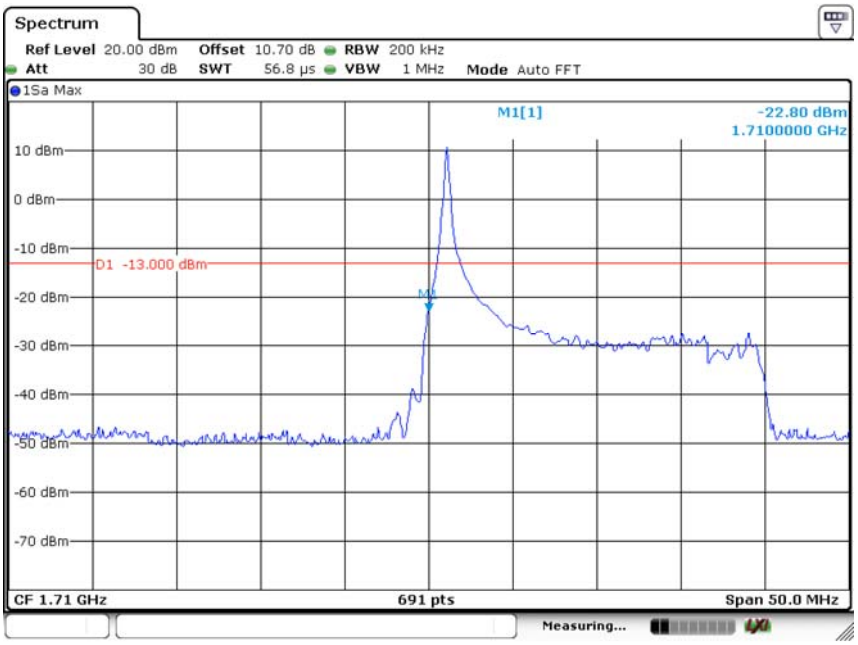
Test Model	Band edge	
	LTE Band 4/ 5MHz /16-QAM	
	Low Channel: 19975	25 RB/ 0 offset



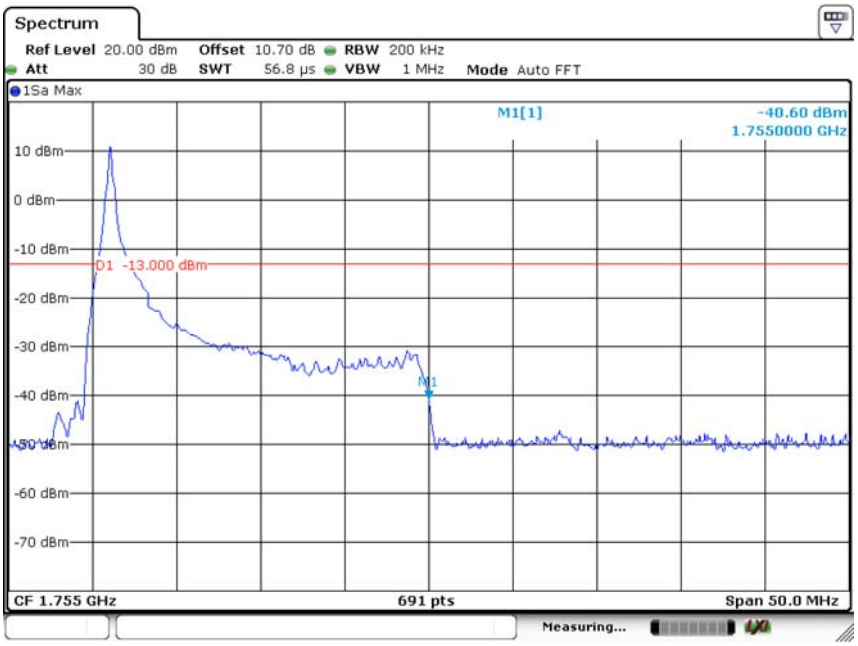
Test Model	Band edge	
	LTE Band 4/ 5MHz /16-QAM	
	High Channel: 20375	25 RB/ 0 offset



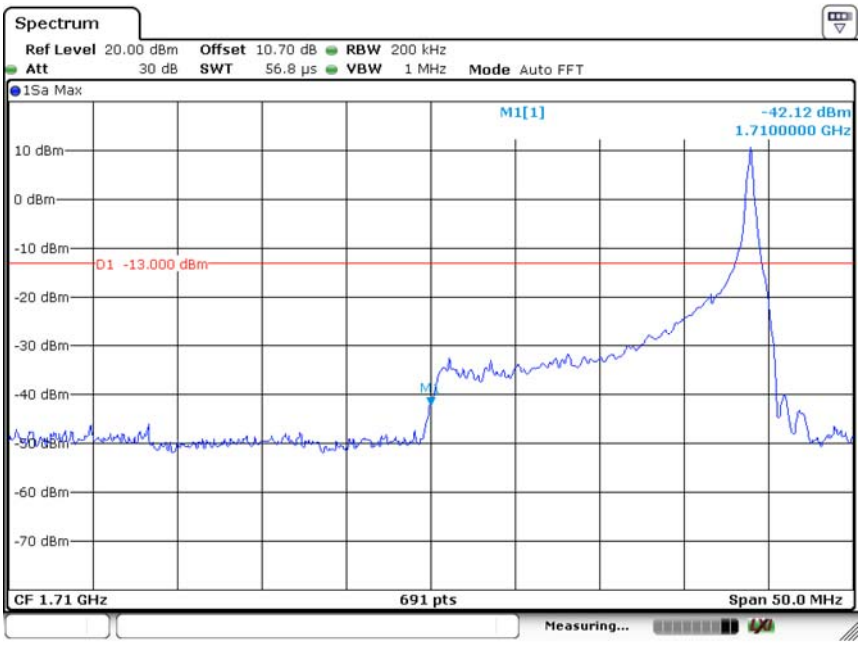
Test Model	Band edge	
	LTE Band 4/ 20MHz /QPSK	
	Low Channel: 20050	1 RB/ 0 offset



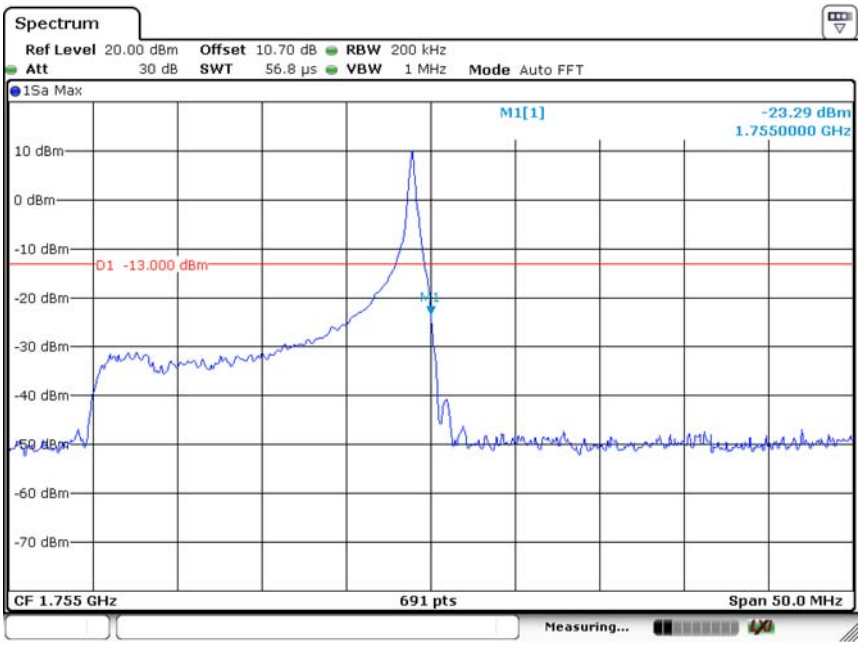
Test Model	Band edge	
	LTE Band 4/ 20MHz /QPSK	
	High Channel: 20300	1 RB/ 0 offset



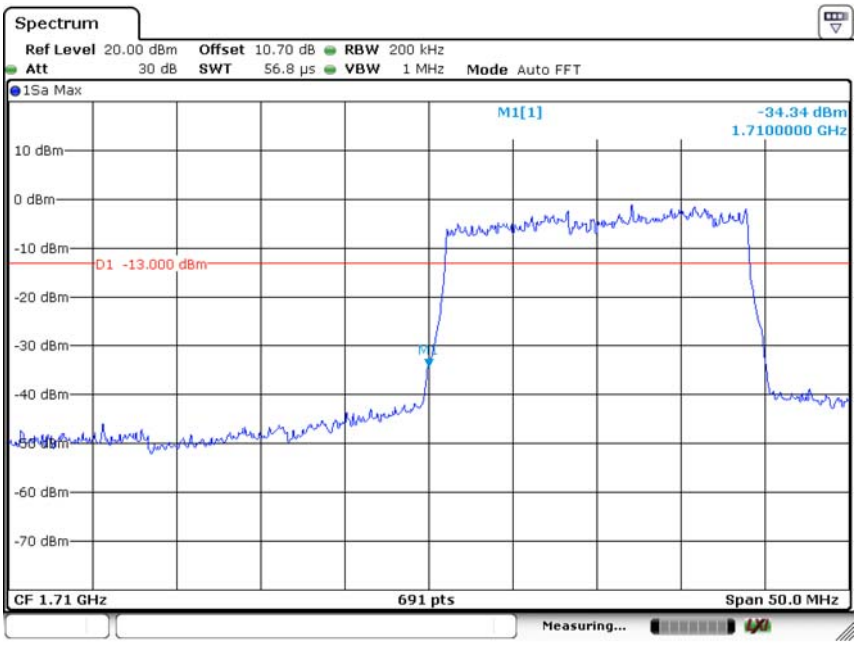
Test Model	Band edge	
	LTE Band 4/ 20MHz /QPSK	
	Low Channel: 20050	1 RB/ 99 offset



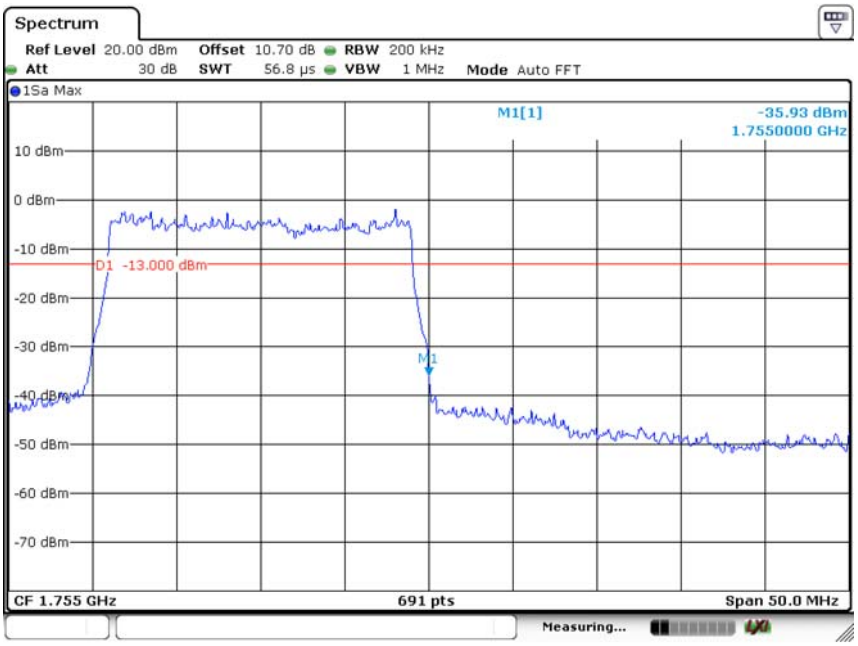
Test Model	Band edge	
	LTE Band 4/ 20MHz /QPSK	
	High Channel: 20300	1 RB/ 99 offset



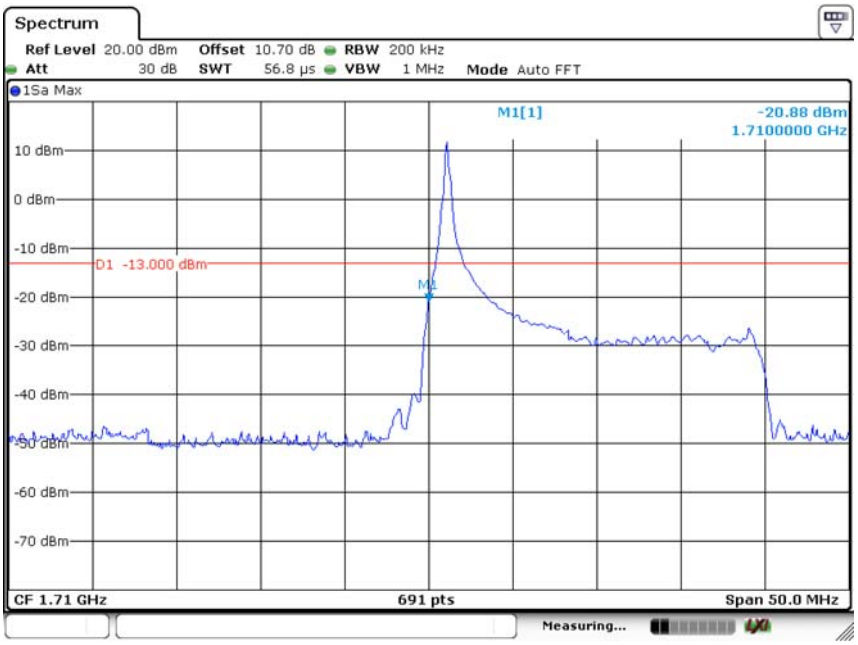
Test Model	Band edge	
	LTE Band 4/ 20MHz /QPSK	
	Low Channel: 20050	100 RB/ 0 offset



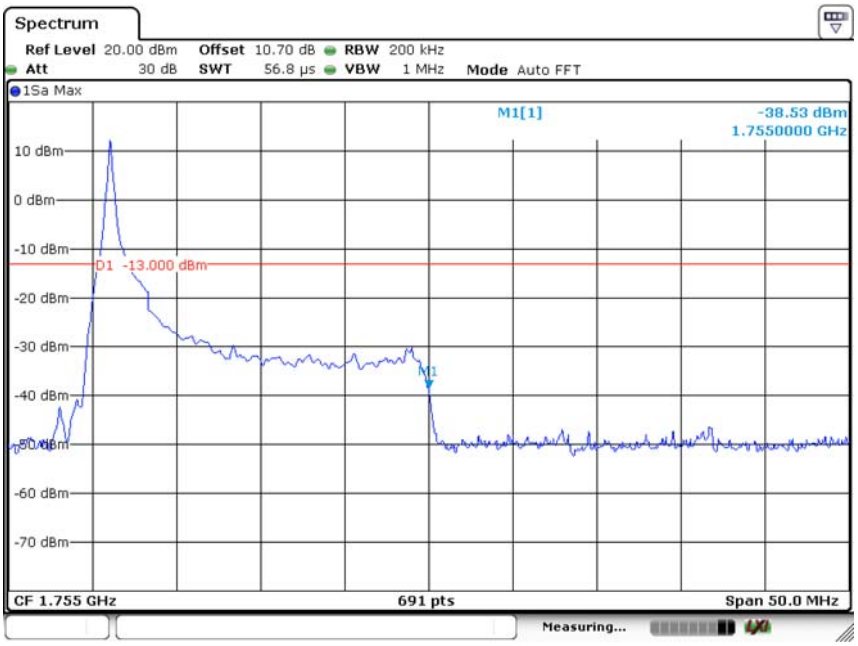
Test Model	Band edge	
	LTE Band 4/ 20MHz /QPSK	
	High Channel: 20300	100 RB/ 0 offset



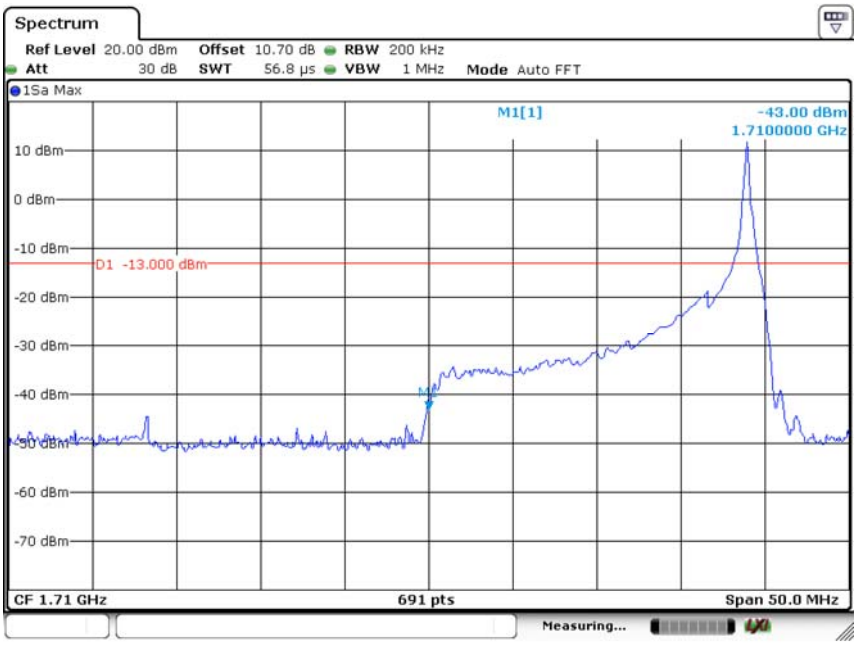
Test Model	Band edge	
	LTE Band 4/ 20MHz /16-QAM	
	Low Channel: 20050	1 RB/ 0 offset



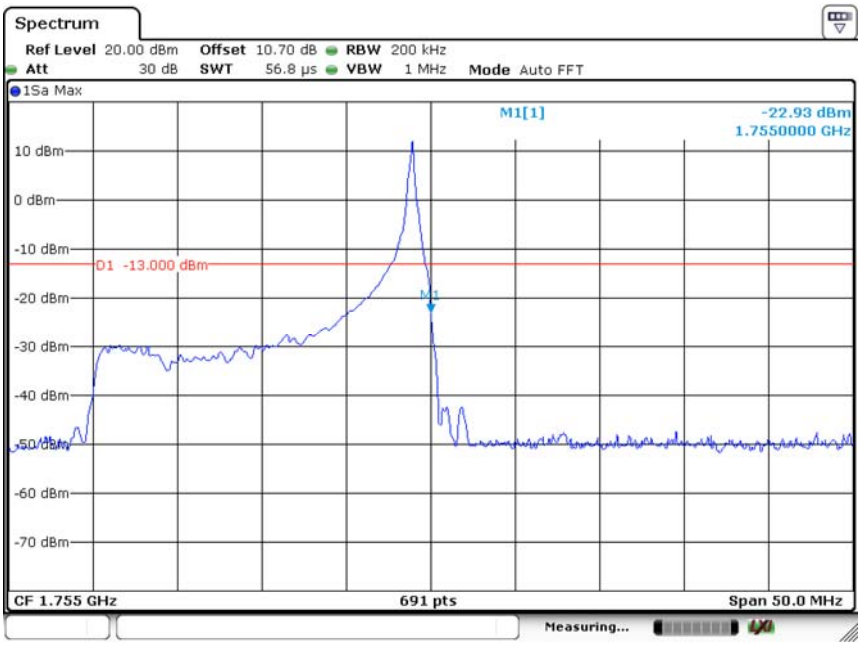
Test Model	Band edge	
	LTE Band 4/ 20MHz /16-QAM	
	High Channel: 20300	1 RB/ 0 offset



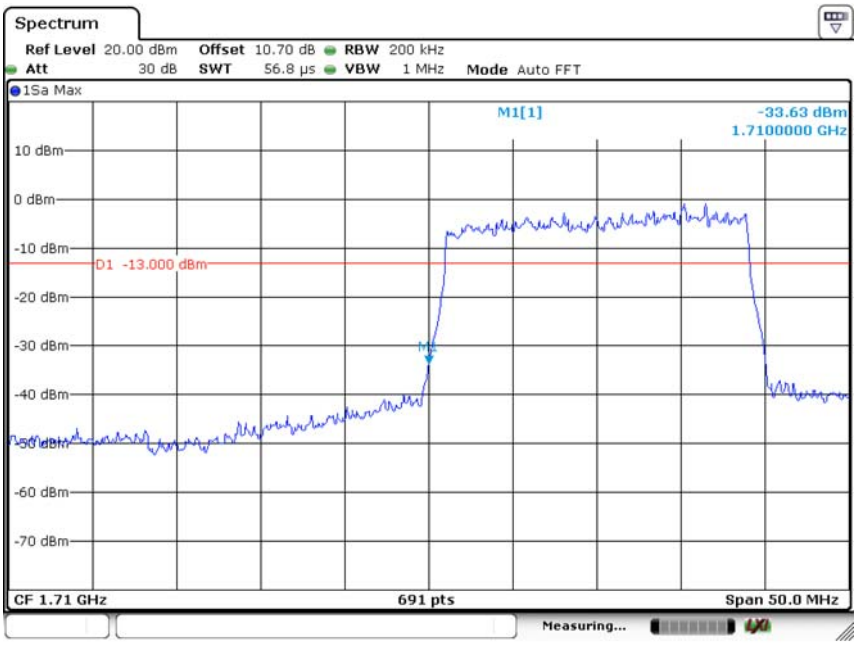
Test Model	Band edge	
	LTE Band 4/ 20MHz /16-QAM	
	Low Channel: 20050	1 RB/ 99 offset



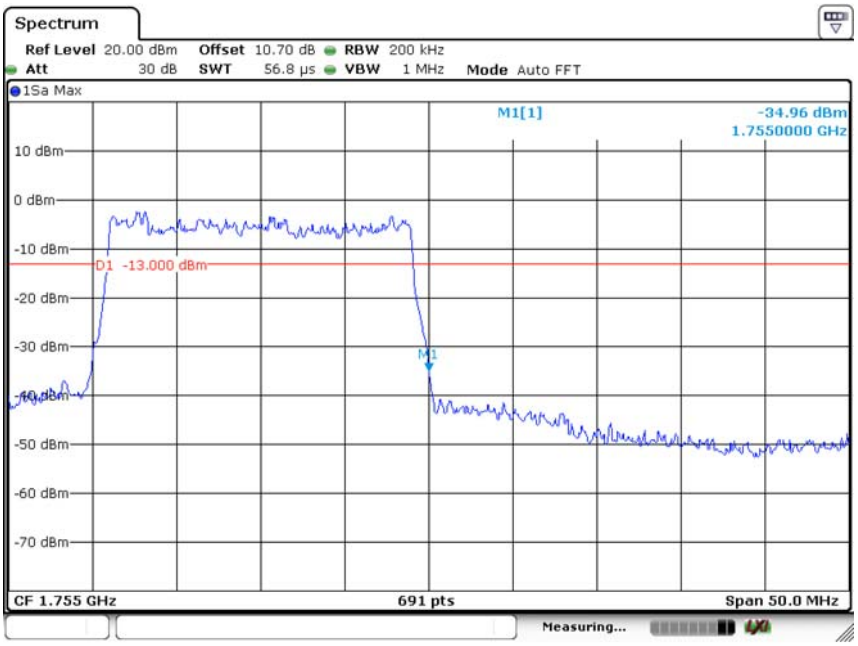
Test Model	Band edge	
	LTE Band 4/ 3MHz /16-QAM	
	High Channel: 20300	1 RB/ 99 offset



Test Model	Band edge	
	LTE Band 4/ 20MHz /16-QAM	
	Low Channel: 20050	100 RB/ 0 offset

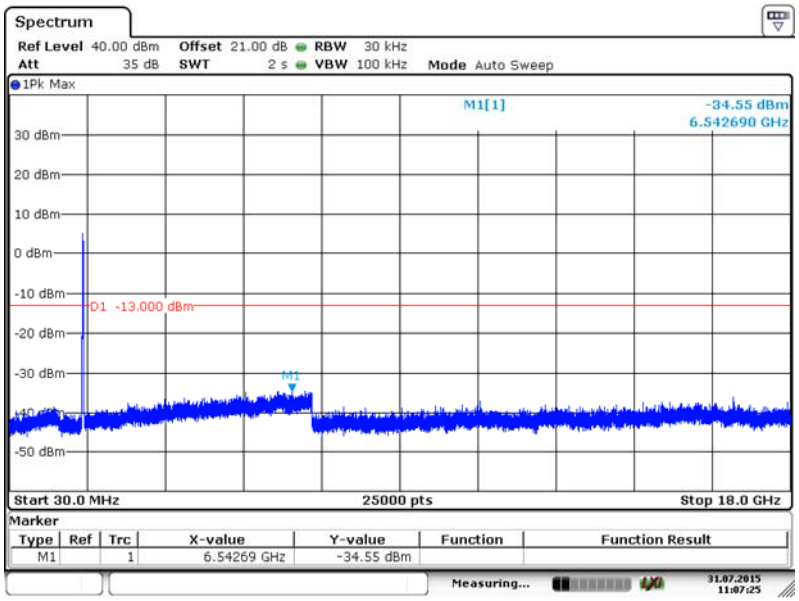


Test Model	Band edge	
	LTE Band 4/ 20MHz /16-QAM	
	High Channel: 20300	100 RB/ 0 offset



All the modulation modes were tested, the data of the worst mode are described in the following table

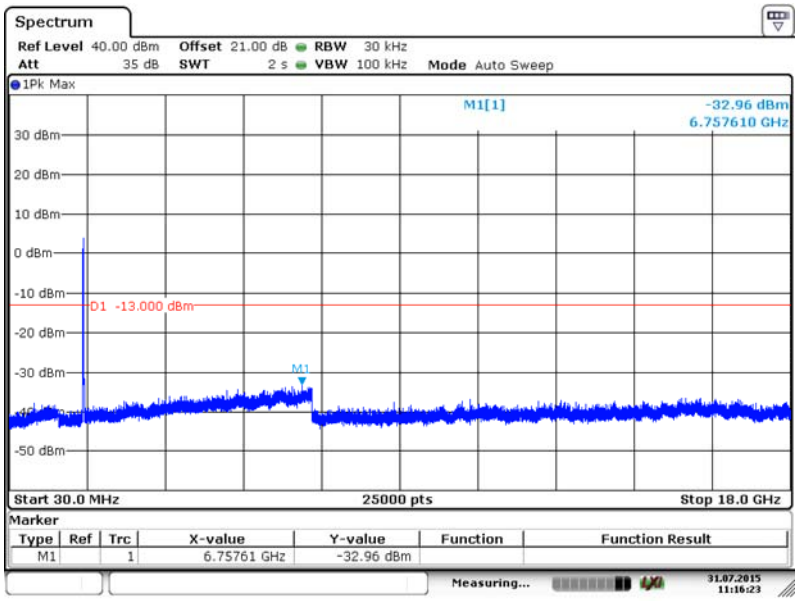
Test Model	Conducted Emissions	
	LTE Band 4	
	Low Channel /20MHz	QPSK/Full RB



P

Date: 31.JUL.2015 11:07:25

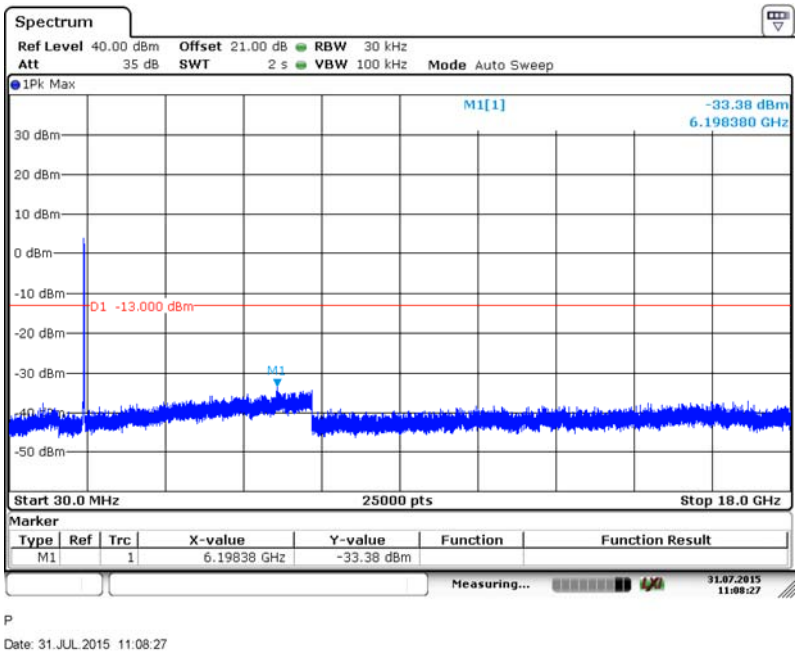
Test Model	Conducted Emissions	
	LTE Band 4	
	Middle Channel /20MHz	QPSK/Full RB



P

Date: 31.JUL.2015 11:16:22

Test Model	Conducted Emissions	
	LTE Band 4	
	High Channel /20MHz	QPSK/Full RB



8.6 PEAK TO AVERAGE RATIO

8.6.1 Applicable Standard

According to FCC 27.50(a)(1) (b)

8.6.2 Conformance Limit

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.

8.6.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.6.4 Test Procedure

The EUT was connected to Spectrum Analyzer and Base Station via power divider.
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.
Set the number of counts to a value that stabilizes the measured CCDF curve.
Set the measurement interval to 1 ms.
Record the maximum PAPR level associated with a probability of 0.1%.
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 as follows:
1) for continuous transmissions, set to 1 ms,
2) for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
e) Record the maximum PAPR level associated with a probability of 0.1%.

8.6.5 Test Results

Temperature:	24℃	Test Date:	July 31, 2015
Humidity:	53 %	Test By:	KING KONG

Mode	Band Width (MHz)	Modulation	Uplink Channel Number	RB Size	RB Offset	P. A .R (dB)	Limit (dB)	Verdict
LTE Band 4	1.4MHz	QPSK	19957	1	0	2.12	13	PASS
			20175	1	0	3.10	13	PASS
			20393	1	0	2.60	13	PASS
		16-QAM	19957	1	0	3.65	13	PASS
			20175	1	0	2.01	13	PASS
			20393	1	0	2.02	13	PASS
		64-QAM	19957	1	0	3.20	13	PASS
			20175	1	0	2.10	13	PASS
			20393	1	0	2.15	13	PASS

Mode	Band Width (MHz)	Modulation	Uplink Channel Number	RB Size	RB Offset	P. A .R (dB)	Limit (dB)	Verdict
LTE Band 4	3MHz	QPSK	19965	1	0	2.27	13	PASS
			20175	1	0	3.21	13	PASS
			20385	1	0	2.66	13	PASS
		16-QAM	19965	1	0	3.61	13	PASS
			20175	1	0	1.95	13	PASS
			20385	1	0	2.57	13	PASS
		64-QAM	19965	1	0	3.25	13	PASS
			20175	1	0	1.96	13	PASS
			20385	1	0	2.52	13	PASS

Temperature: 24℃ Test Date: July 31, 2015
Humidity: 53 % Test By: KING KONG

Mode	Band Width (MHz)	Modulation	Uplink Channel Number	RB Size	RB Offset	P. A .R (dB)	Limit (dB)	Verdict
LTE Band 4	5MHz	QPSK	19975	1	0	2.34	13	PASS
			20175	1	0	3.24	13	PASS
			20375	1	0	2.35	13	PASS
		16-QAM	19975	1	0	3.46	13	PASS
			20175	1	0	1.88	13	PASS
			20375	1	0	3.11	13	PASS
		64-QAM	19975	1	0	3.42	13	PASS
			20175	1	0	1.85	13	PASS
			20375	1	0	3.15	13	PASS

Mode	Band Width (MHz)	Modulation	Uplink Channel Number	RB Size	RB Offset	P. A .R (dB)	Limit (dB)	Verdict
LTE Band 4	10MHz	QPSK	20000	1	0	3.12	13	PASS
			20175	1	0	3.10	13	PASS
			20350	1	0	2.87	13	PASS
		16-QAM	20000	1	0	2.66	13	PASS
			20175	1	0	2.52	13	PASS
			20350	1	0	2.36	13	PASS
		64-QAM	20000	1	0	2.62	13	PASS
			20175	1	0	2.52	13	PASS
			20350	1	0	2.30	13	PASS

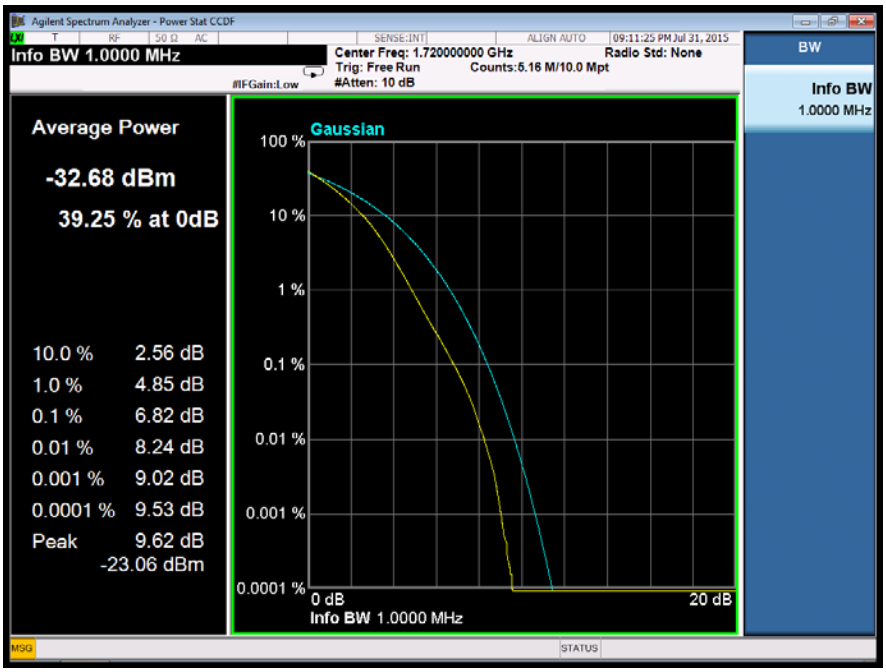
Temperature: 24℃ Test Date: July 31, 2015
Humidity: 53 % Test By: KING KONG

Mode	Band Width (MHz)	Modulation	Uplink Channel Number	RB Size	RB Offset	P. A .R (dB)	Limit (dB)	Verdict
LTE Band 4	15MHz	QPSK	20025	1	0	3.25	13	PASS
			20175	1	0	3.30	13	PASS
			20325	1	0	3.42	13	PASS
		16-QAM	20025	1	0	3.15	13	PASS
			20175	1	0	3.32	13	PASS
			20325	1	0	3.52	13	PASS
		64-QAM	20025	1	0	3.12	13	PASS
			20175	1	0	3.30	13	PASS
			20325	1	0	3.56	13	PASS

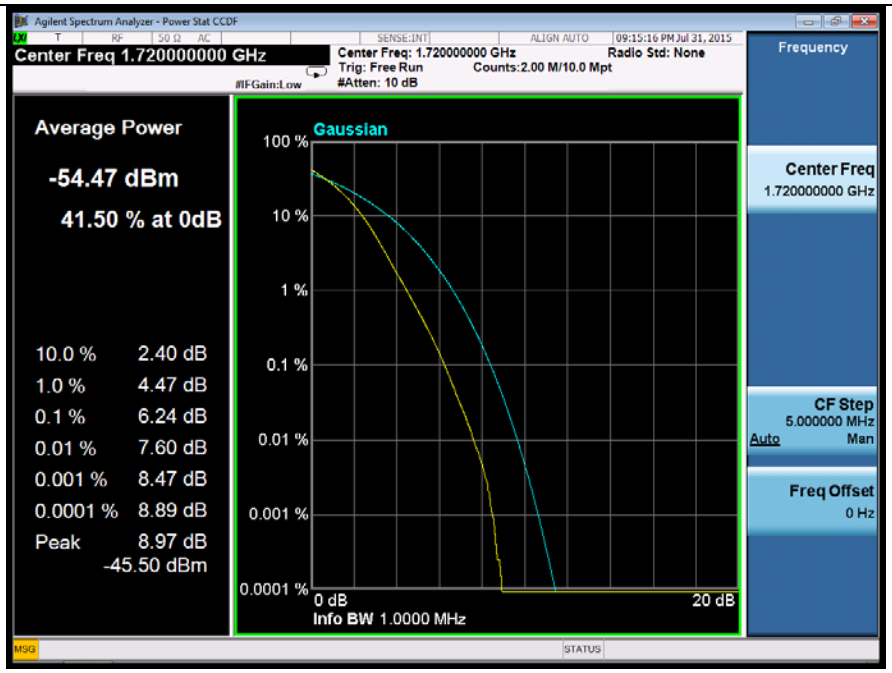
Mode	Band Width (MHz)	Modulation	Uplink Channel Number	RB Size	RB Offset	P. A .R (dB)	Limit (dB)	Verdict
LTE Band 4	20MHz	QPSK	20050	1	0	6.82	13	PASS
			20175	1	0	6.24	13	PASS
			20300	1	0	7.33	13	PASS
		16-QAM	20050	1	0	6.43	13	PASS
			20175	1	0	6.88	13	PASS
			20300	1	0	6.11	13	PASS
		64-QAM	20050	1	0	6.40	13	PASS
			20175	1	0	6.85	13	PASS
			20300	1	0	6.10	13	PASS

All the modulation modes were tested, the data of the worst mode are described in the following table

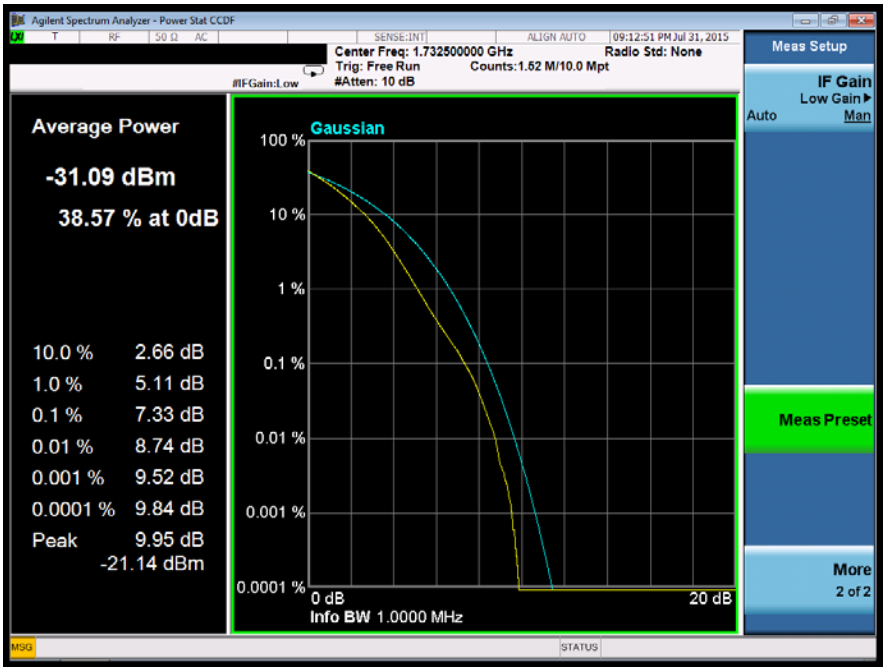
Test Model	LTE Band 4	
	20MHz Bandwidth/ QPSK	
	1RB /0 offset	Low Channel



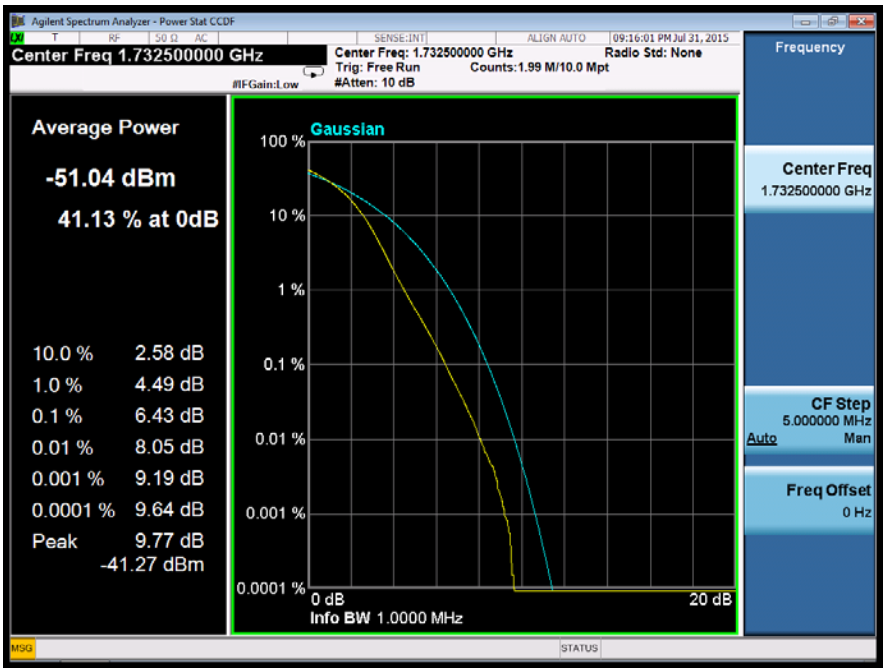
Test Model	LTE Band 4	
	20MHz Bandwidth/ 16-QAM	
	1RB /0 offset	Low Channel


Agilent Spectrum Analyzer - Power Stat CCDF
Center Freq 1.720000000 GHz
Center Freq: 1.720000000 GHz
Trig: Free Run
#Atten: 10 dB
Counts:2.00 M/10.0 Mpt
Radio Std: None
Frequency
Average Power
-54.47 dBm
41.50 % at 0dB
10.0 % 2.40 dB
1.0 % 4.47 dB
0.1 % 6.24 dB
0.01 % 7.60 dB
0.001 % 8.47 dB
0.0001 % 8.89 dB
Peak 8.97 dB
-45.50 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 1.0000 MHz
Center Freq
1.720000000 GHz
CF Step
5.000000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

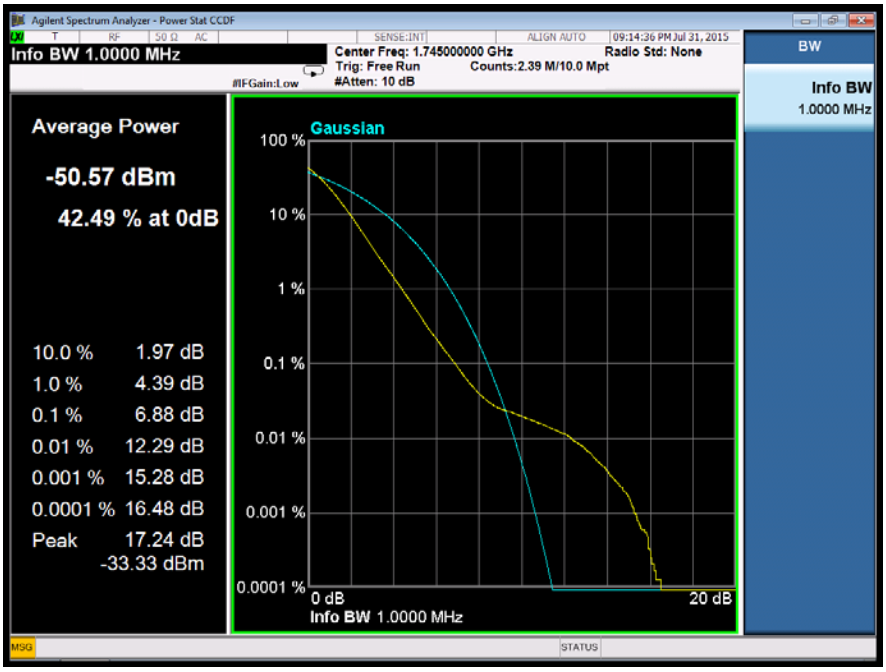
Test Model	LTE Band 4	
	20MHz Bandwidth/ QPSK	
	1RB /0 offset	Middle Channel



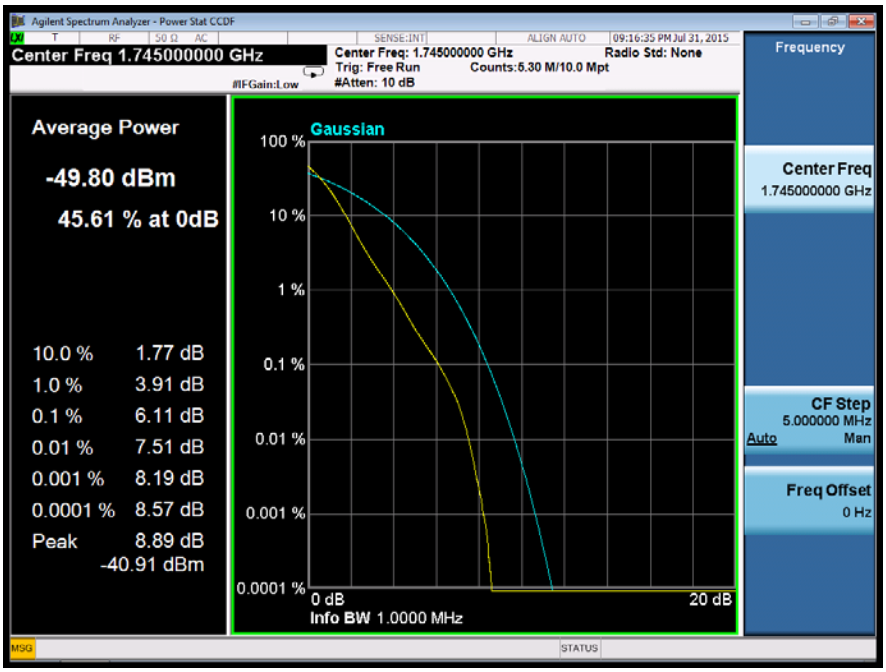
Test Model	LTE Band 4	
	20MHz Bandwidth/ 16-QAM	
	1RB /0 offset	Middle Channel



Test Model	LTE Band 4	
	20MHz Bandwidth/ QPSK	
	1RB /0 offset	High Channel



Test Model	LTE Band 4	
	20MHz Bandwidth/ 16-QAM	
	1RB /0 offset	High Channel



8.7 CONDUCTED EMISSION TEST

8.7.1 Applicable Standard

According to FCC Part 15.207(a)

8.7.2 Conformance Limit

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50
Note: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.		

8.7.3 Test Configuration

Test according to clause 7.3 conducted emission test setup

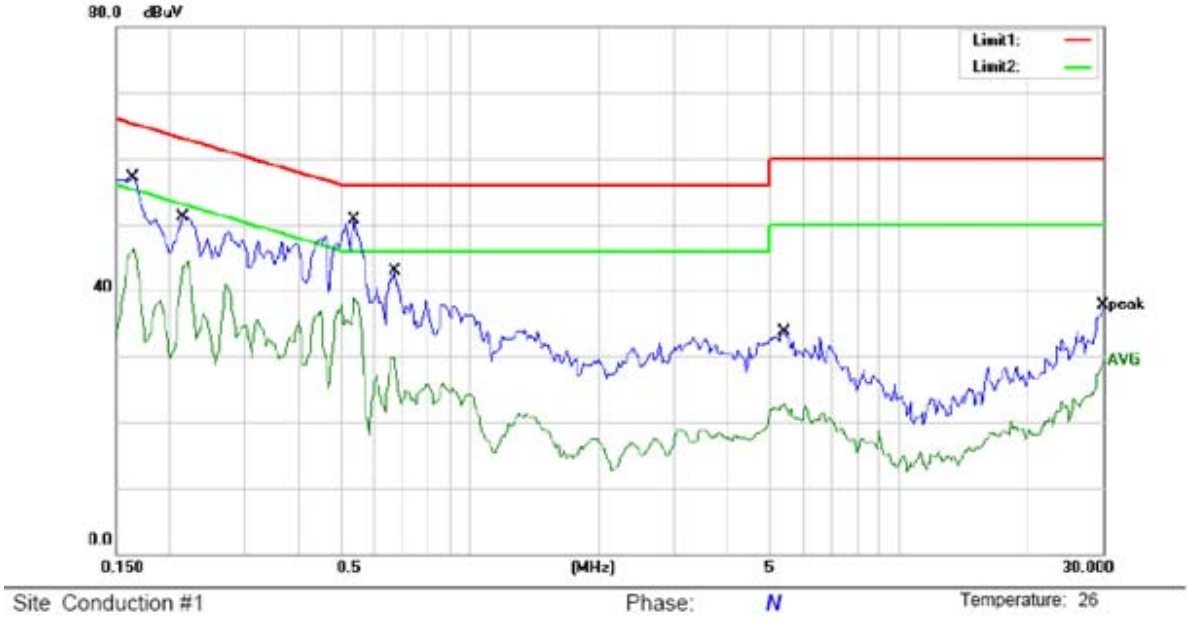
8.7.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

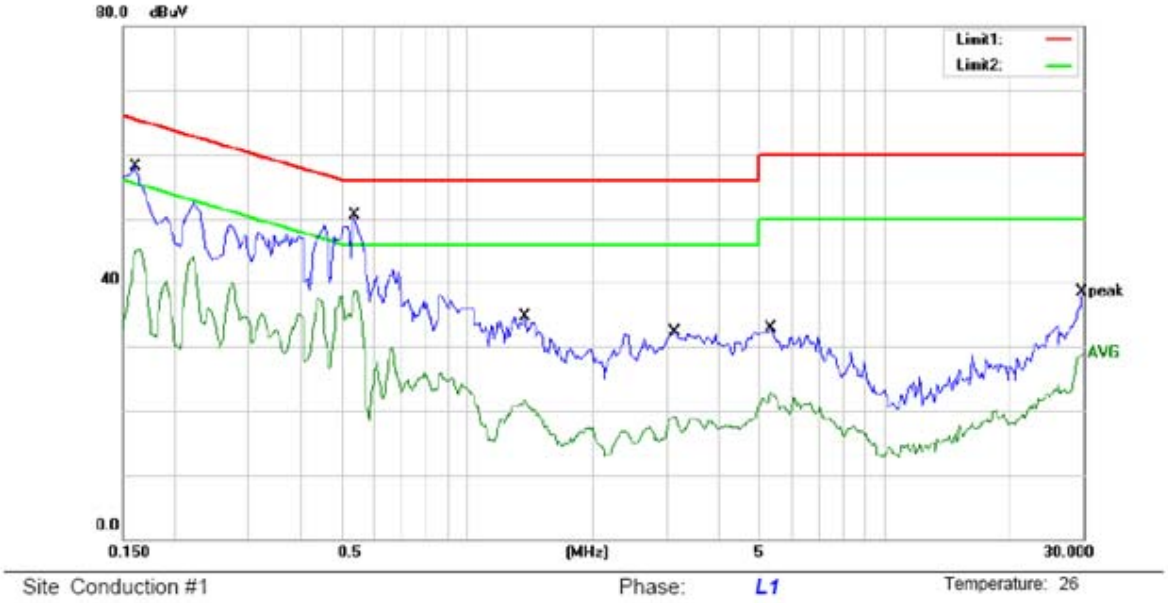
8.7.5 Test Results

PASS.

All the modes were tested, the data of the worst mode are described in the following table



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1650	57.02	0.00	57.02	65.21	-8.19	QP	
2		0.1650	46.22	0.00	46.22	55.21	-8.99	AVG	
3		0.2150	51.10	0.00	51.10	63.01	-11.91	QP	
4		0.2150	44.43	0.00	44.43	53.01	-8.58	AVG	
5	*	0.5400	50.68	0.00	50.68	56.00	-5.32	QP	
6		0.5400	38.85	0.00	38.85	46.00	-7.15	AVG	
7		0.6700	42.83	0.00	42.83	56.00	-13.17	QP	
8		0.6700	29.79	0.00	29.79	46.00	-16.21	AVG	
9		5.4000	33.72	0.00	33.72	60.00	-26.28	QP	
10		5.4000	22.88	0.00	22.88	50.00	-27.12	AVG	
11		29.9750	37.65	0.00	37.65	60.00	-22.35	QP	
12		29.9750	29.33	0.00	29.33	50.00	-20.67	AVG	



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1600	58.20	0.00	58.20	65.46	-7.26	QP	
2		0.1600	45.19	0.00	45.19	55.46	-10.27	AVG	
3	*	0.5350	50.60	0.00	50.60	56.00	-5.40	QP	
4		0.5350	38.75	0.00	38.75	46.00	-7.25	AVG	
5		1.3750	34.69	0.00	34.69	56.00	-21.31	QP	
6		1.3750	21.71	0.00	21.71	46.00	-24.29	AVG	
7		3.1550	32.24	0.00	32.24	56.00	-23.76	QP	
8		3.1550	19.11	0.00	19.11	46.00	-26.89	AVG	
9		5.3500	32.94	0.00	32.94	60.00	-27.06	QP	
10		5.3500	22.88	0.00	22.88	50.00	-27.12	AVG	
11		29.7750	38.51	0.00	38.51	60.00	-21.49	QP	
12		29.7750	28.94	0.00	28.94	50.00	-21.06	AVG	

8.8 ANTENNA APPLICATION

8.8.1 Antenna Requirement

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

A licensee that owns its antenna structure(s) must not allow such antenna structure(s) to become a hazard to air navigation. In general, antenna structure owners are responsible for registering antenna structures with the FCC if required by part 17 of this chapter, and for installing and maintaining any required marking and lighting. However, in the event of default of this responsibility by an antenna structure owner, the FCC permittee or licensee authorized to use an affected antenna structure will be held responsible by the FCC for ensuring that the antenna structure continues to meet the requirements of part 17 of this chapter. See §17.6 of this chapter.

(a) Marking and lighting. Antenna structures must be marked, lighted and maintained in accordance with part 17 of this chapter and all applicable rules and requirements of the Federal Aviation Administration. For any construction or alteration that would exceed the requirements of section 17.7 of this chapter, licensees must notify the appropriate Regional Office of the Federal Aviation Administration (FAA Form 7460-1) and file a request for antenna height clearance and obstruction marking and lighting specifications (FCC Form 854) with the FCC, WTB, 1270 Fairfield Road, Gettysburg, PA 17325.

(b) Maintenance contracts. Antenna structure owners (or licensees and permittees, in the event of default by an antenna structure owner) may enter into contracts with other entities to monitor and carry out necessary maintenance of antenna structures. Antenna structure owners (or licensees and permittees, in the event of default by an antenna structure owner) that make such contractual arrangements continue to be responsible for the maintenance of antenna structures in regard to air navigation safety

8.8.2 Result

The EUT has 2 antennas:

Main Antenna	LTE band 4/Antenna Gain:1dBi

The antenna can’t be replaced by the user, which in accordance to section 15.203, please refer to the internal photos.

END OF REPORT