FCC PART 27 TEST REPORT

FCC Part 27

Report Reference No.....:	**JTT20151100307**	
FCC ID.....:	**2AEP7N502**	
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Date of issue.....:	Nov 16, 2015	
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Testing Laboratory Name .....:	**Shenzhen Academy of Metrology and Quality Inspection**	
Address .....:	No.4 TongFa Road, Xili TownNanshan District, Shenzhen, China	
Applicant's name.....:	**Noblex Argentina S.A.**	
Address .....:	Jaramillo 3670 – CIUDAD AUTONOMA DE BUENOS AIRES – ARGENTINA	
Test specification .....**:**		
Standard .....:	**FCC CFR Title 47 Part 2, Part 27** **EIA/TIA 603-D: 2010** **KDB 971168 D01**	
TRF Originator.....:	SHENZHEN JIETONG INFORMATION TECHNOLOGY CO., LTD	

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Test item description .....:	Smart Phone
Trade Mark .....:	NOBLEX
Manufacturer.....:	**AMER MOBILE CO.,LIMITED**
Model/Type reference.....:	N502
Listed Models .....:	N/A
Modulation Type .....:	QPSK, 16QAM
Rating .....:	DC 3.70V
Hardware version .....:	E520_WMCK
Software version .....:	NOBLEX_L500C_V01_20150925
Result.....:	**PASS**

T E S T R E P O R T

Test Report No. :	JTT20151100307	Nov. 16, 2015 Date of issue

Equipment under Test	:	Smart Phone
Model /Type	:	N502
Listed Models	:	N/A
Applicant	:	**Noblex Argentina S.A.**
Address	:	Jaramillo 3670 – CIUDAD AUTONOMA DE BUENOS AIRES – ARGENTINA
Manufacturer	:	**AMER MOBILE CO.,LIMITED**
Address	:	FLAT / RM 1903 ,19/F PODIUM PLAZA 5 HANOI ROAD TSIM SHA TSUI KL HONG KONG.

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1 TEST STANDARDS 4

2 SUMMARY 5

2.1 General Remarks 5
2.2 Product Description 5
2.3 Equipment under Test 6
2.4 Short description of the Equipment under Test (EUT) 6
2.5 Internal Identification of AE used during the test 6
2.6 Normal Accessory setting 6
2.7 EUT configuration 6
2.8 Related Submittal(s) / Grant (s) 6
2.9 Modifications 7
2.10 General Test Conditions/Configurations 7

3 TEST ENVIRONMENT 8

3.1 Address of the test laboratory 8
3.2 Test Facility 8
3.3 Environmental conditions 8
3.4 Test Description 8
3.5 Equipments Used during the Test 9

4 TEST CONDITIONS AND RESULTS 10

4.1 Output Power 10
4.2 Peak-to-Average Ratio (PAR) 15
4.3 Occupied Bandwidth and Emission Bandwidth 22
4.4 Band Edge compliance 29
4.5 Spurious Emssion on Antenna Port 36
4.6 Radiated Spurious Emssion 55
4.7 Frequency Stability under Temperature & Voltage Variations 62

5 TEST SETUP PHOTOS OF THE EUT 64

6 EXTERNAL PHOTOS OF THE EUT 64

7 INTERNAL PHOTOS OF THE EUT 64

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Part 27(10-1-12 Edition): MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

TIA/EIA 603 D June 2010: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

47 CFR FCC Part 15 Subpart B: - Unintentional Radiators

FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS

ANSI C63.4:2009: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

FCCKDB971168D01 Power Meas License Digital Systems

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	Oct. 12, 2015
Testing commenced on	:	Oct. 13, 2015
Testing concluded on	:	Nov. 16, 2015

2.2 Product Description

The **Noblex Argentina S.A.**'s Model: N502 or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Smart Phone
Model Number	N502
Modilation Type	GMSK for GSM/GPRS, 8-PSK for EDGE,QPSK for UMTS, QPSK, 16QAM for LTE
Antenna Type	Internal
UMTS Operation Frequency Band	Device supported UMTS FDD Band II/V
WLAN FCC Operation frequency	IEEE 802.11b:2412-2462MHz IEEE 802.11g:2412-2462MHz IEEE 802.11n HT20:2412-2462MHz IEEE 802.11n HT40:2422-2452MHz
BT FCC Operation frequency	2402MHz-2480MHz
HSDPA Release Version	Release 10
HSUPA Release Version	Release 6
DC-HSUPA Release Version	Not Supported
WCDMA Release Version	R99
LTE Release Version	R8
UMTS Operation Frequency Band	Device supported FDD band 4, FDD band 7
WLAN FCC Modulation Type	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
BT Modulation Type	GFSK,8DPSK,π/4DQPSK(BT 3.0+EDR)
Hardware version	E520_WMCK
Software version	NOBLEX_L500C_V01_20150925
Android version	Android 4.4.2
GPS function	Supported
WLAN	Supported 802.11b/802.11g/802.11n
Bluetooth	Supported BT 4.0/BT 3.0+EDR
GSM/EDGE/GPRS	Supported GSM/GPRS/EDGE
GSM/EDGE/GPRS Power Class	GSM850:Power Class 4/ PCS1900:Power Class 1
GSM/EDGE/GPRS Operation Frequency	GSM850 :824.2MHz-848.8MHz/PCS1900:1850.2MHz-1909.8MHz
GSM/EDGE/GPRS Operation Frequency Band	GSM850/PCS1900/GPRS850/GPRS1900/EDGE850/EDGE1900
GSM Release Version	R99
GPRS/EDGE Multislot Class	GPRS/EDGE: Multi-slot Class 12
Extreme temp. Tolerance	-30°C to +50°C
Extreme vol. Limits	3.40VDC to 4.20VDC (nominal: 3.70VDC)
GPRS operation mode	Class B

2.3 Equipment under Test

Power supply system utilised

Power supply voltage	:	○	120V / 60 Hz	○	115V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 3.70V

2.4 Short description of the Equipment under Test (EUT)

2.4.1 General Description

N502 is subscriber equipment in the WCDMA/GSM /LTE system. The HSPA/UMTS frequency band is Band II and Band V, LTE frequency band is.band 4, band 7; The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900, but only Band II and Band V and GSM850 and PCS1900 bands test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, HSPA/UMTS ,LTE and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS and WIFI etc. Externally it provides micro SD card interface, earphone port (to provide voice service) and SIM card interface. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

2.5 Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery
AE2	Charger

AE1
Model: S005UA0500100
INPUT: AC100-240V 50/60Hz 150mA
OUTPUT: DC 5.0V 1.0A

*AE ID: is used to identify the test sample in the lab internally.

2.6 Normal Accessory setting

Fully charged battery was used during the test.

2.7 EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.8 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2AEP7N502** filing to comply with FCC Part 27 Rules

2.9 Modifications

No modifications were implemented to meet testing criteria.

2.10 General Test Conditions/Configurations

2.10.1 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Voltage	VL	3.4V
	VN	3.7V
	VH	4.2V

NOTE: VL=lower extreme test voltage VN=nominal voltage
VH=upper extreme test voltage TN=normal temperature

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen Academy of Metrology and Quality Inspection

No.4 TongFa Road, Xili TownNanshan District, Shenzhen, China
The sites are constructed in conformance with the requirements of ANSI C63.4 (2003) and CISPR Publication 22.

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration information:

Shenzhen Academy of Metrology and Quality Inspection
No.4 TongFa Road, Xili TownNanshan District, Shenzhen, China
Test Firm FCC Registration number: 806614

3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4 Test Description

3.4.1 AWS Band (1710-1755MHz pairedwith 2110-2155MHz)

Test Item	FCC Rule No.	Requirements	Verdict
Effective (Isotropic) Radiated Output Power	§2.1046, §27.50(d)	EIRP ≤ 1W;	Pass
Peak-Average Ratio	§2.1046, §27.50(d)	Limit≤13dB	Pass
Modulation Characteristics	§2.1047	Digital modulation	N/A
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §27.53(h)	≤ -13dBm/1%*EBW,in1MHz bands immediately outside and adjacent to The frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(h)	≤ -13dBm/1MHz, from 9kHz to 10th harmonics but outside authorized operating frequency ranges.	Pass
Field Strength of Spurious Radiation	§2.1055, §27.54	Within authorized bands of operation/frequency block.	Pass
Frequency Stability	§2.1053, §27.53(h)	≤ -13dBm/1MHz.	Pass
NOTE 1: For the verdict, the “N/A” denotes “not applicable”, the “N/T” de notes “not tested”.			

3.5 Equipments Used during the Test

Internal No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB8501/09	EMI Test Receiver	Rohde & Schwarz	ESU40	Mar.27, 2015	1 Year
SB9721/04	Signal Generator	Agilent	E8257D	Jan.05, 2015	1 Year
SB8501/04	Bilog Antenna	Schwarzbeck	VULB9163	May 12, 2015	3 Year
SB5472/02	Bilog Antenna	Schwarzbeck	VULB9163	Jan.19, 2015	3 Year
SB3435	Horn Antenna	Rohde & Schwarz	HF906	Jan.19, 2015	3 Year
SB3434	Horn Antenna	Rohde & Schwarz	HF906	Jan.19, 2015	3 Year
SB3435/01	Amplifier(1-18GHz)	Rohde & Schwarz	---	Jan.19, 2015	1 Year
SB3435/02	Amplifier(18-40GHz)	Rohde & Schwarz	---	May.15, 2015	1 Year
SB8501/16	Horn Antenna	Rohde & Schwarz	SCU-26	Mar.23, 2015	1 Year
SB3450/01	3m Semi-anechoic chamber	Albatross Projects	9X6X6	Oct.11, 2014	2 Years
SB8501/02	Communication Test Unit	Rohde & Schwarz	CMU200	Jun.05, 2015	1 Year
SB9054/02	Wideband Radio communication Tester	Rohde & Schwarz	CMW500	Oct.26, 2015	1 Year
SB9721/02	Signal Analyzer	Agilent	N9020A	Jan.05, 2015	1 Year
SB3611	DC Power Supply	KENWOOD	PDS36-10	May.15, 2015	1 Year
SB6691	Climatic Chamber	NANYA	DW-0150	Apr.12, 2015	1 Year
SB9060	Signal Analyzer	Rohde & Schwarz	FSQ40	May.13,2015	1 Year
SB9721/01	Universal Radio Communication Tester	Agilent	E5515C	Jan. 05, 2015	1year
SB3345	Loop Antenna	Schwarzbeck	FMZB1516	Jan.20, 2015	1Year

4 TEST CONDITIONS AND RESULTS

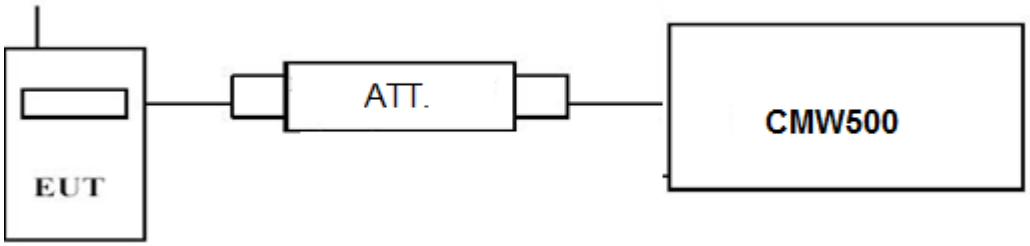
4.1 Output Power

TEST APPLICABLE

During the process of testing, the EUT was controlled via R&S Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation. This result contains output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

4.1.1. Conducted Output Power

TEST CONFIGURATION



TEST PROCEDURE

Conducted Power Measurement:
a) Place the EUT on a bench and set it in transmitting mode.
b) Connect a low loss RF cable from the antenna port to a CMW500 by an Att.
c) EUT Communicate with CMW500 then selects a channel for testing.
d) Add a correction factor to the display CMW500, and then test.

TEST RESULTS

Remark:
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4;*

LTE FDD Band 4				
TX Channel Bandwidth	Frequency (MHz)	RB Size/Offset	Average Power [dBm]	
			QPSK	16QAM
1.4 MHz	1710.7	1 RB low	22.48	21.67
		1 RB high	22.46	21.65
		50% RB mid	22.48	21.57
		100% RB	21.55	20.48
	1732.5	1 RB low	22.47	21.59
		1 RB high	22.46	21.62
		50% RB mid	22.45	21.51
		100% RB	21.54	20.44
	1754.3	1 RB low	22.59	21.76
		1 RB high	22.60	21.69
		50% RB mid	22.53	21.41
		100% RB	21.66	20.52
3 MHz	1711.5	1 RB low	22.40	21.67
		1 RB high	22.41	21.66
		50% RB mid	21.56	20.60
		100% RB	21.53	21.49
	1732.5	1 RB low	22.38	21.59
		1 RB high	22.36	21.58
		50% RB mid	21.53	20.54
		100% RB	21.51	20.53
	1753.5	1 RB low	22.56	21.75

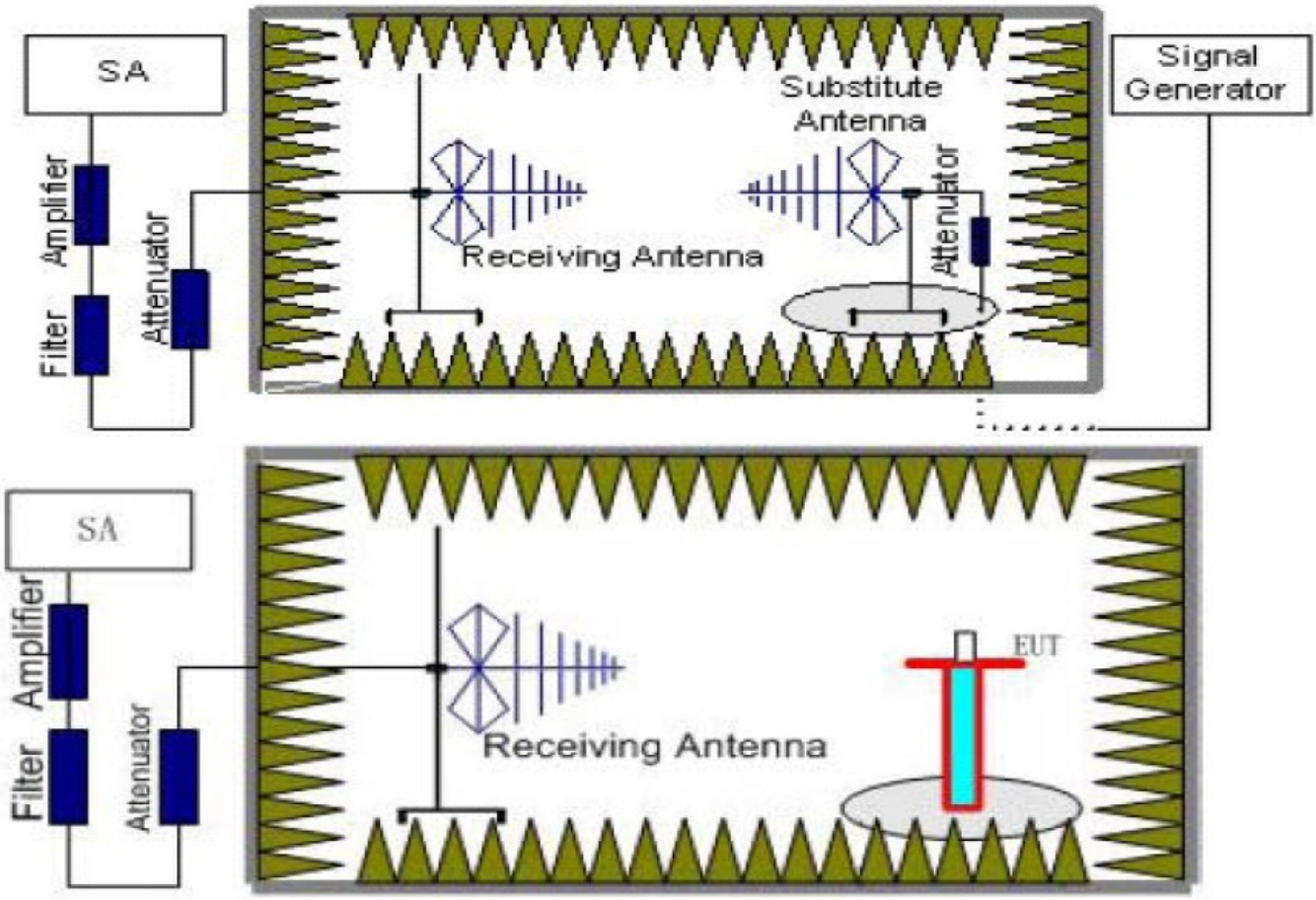
		1 RB high	22.59	21.59
		50% RB mid	21.66	20.57
		100% RB	21.55	20.53
5 MHz	1712.	1 RB low	22.55	21.90
		1 RB high	22.54	21.87
		50% RB mid	21.61	20.72
		100% RB	21.56	20.57
	1732.5	1 RB low	22.55	21.84
		1 RB high	22.58	21.76
		50% RB mid	21.54	20.63
		100% RB	21.48	20.49
	1752.5	1 RB low	22.65	21.55
		1 RB high	22.67	21.61
		50% RB mid	21.60	20.63
		100% RB	21.59	20.59
10 MHz	1715.0	1 RB low	22.52	21.77
		1 RB high	22.51	21.73
		50% RB mid	21.55	20.57
		100% RB	21.57	20.56
	1732.5	1 RB low	22.49	21.70
		1 RB high	22.40	21.77
		50% RB mid	21.50	20.45
		100% RB	21.53	20.48
	1750.0	1 RB low	25.54	21.88
		1 RB high	22.43	21.80
		50% RB mid	21.56	20.59
		100% RB	21.50	20.61
15 MHz	1717.5	1 RB low	22.55	21.81
		1 RB high	22.54	21.71
		50% RB mid	22.69	20.62
		100% RB	22.68	20.63
	1732.5	1 RB low	22.53	21.70
		1 RB high	22.44	21.71
		50% RB mid	21.67	20.57
		100% RB	21.66	20.60
	1747.5	1 RB low	22.55	21.78
		1 RB high	22.57	21.79
		50% RB mid	21.68	20.68
		100% RB	21.71	20.65
20 MHz	1720.0	1 RB low	22.70	21.83
		1 RB high	22.49	21.75
		50% RB mid	21.58	20.53
		100% RB	21.57	20.55
	1732.5	1 RB low	22.68	21.78
		1 RB high	22.58	21.76
		50% RB mid	21.53	20.48
		100% RB	21.54	20.51
	1745.0	1 RB low	22.68	21.93
		1 RB high	22.54	21.90
		50% RB mid	21.54	20.59
		100% RB	21.83	20.57

4.1.2. Radiated Output Power

LIMIT

This is the test for the maximum radiated power from the EUT.
Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p.

TEST CONFIGURATION



TEST PROCEDURE

1. EUT was placed on a 1.50 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 EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} + G_a
   We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below:
   Power(EIRP)=P_{Mea}- P_{cl} + G_a
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST RESULTS

Note: We test the H direction and V direction and V direction is worse.

Radiated Measurement:

Remark:

1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4; recorded worst case for each Channel Bandwidth of LTE FDD Band 4.*
2. *EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)*

LTE FDD Band 4_Channel Bandwidth 1.4MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1710.7	-21.76	3.06	9.68	34.8	19.66	30	10.34	H
1732.5	-21.57	3.17	9.68	34.8	19.74	30	10.26	H
1754.3	-21.08	3.22	9.75	34.8	20.25	30	9.75	H

LTE FDD Band 4_Channel Bandwidth 3MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1711.5	-21.27	3.06	9.68	34.8	20.15	30	9.85	H
1732.5	-21.44	3.17	9.68	34.8	19.87	30	10.13	H
1753.5	-21.64	3.22	9.75	34.8	19.69	30	10.31	H

LTE FDD Band 4_Channel Bandwidth 5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.5	-22.07	3.06	9.68	34.8	19.35	30	10.65	H
1732.5	-21.87	3.17	9.68	34.8	19.44	30	10.56	H
1752.5	-21.07	3.22	9.75	34.8	20.26	30	9.74	H

LTE FDD Band 4_Channel Bandwidth 10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1715.0	-21.55	3.06	9.68	34.80	19.87	30.00	10.13	H
1732.5	-20.62	3.17	9.68	34.80	20.69	30.00	9.31	H
1750.0	-21.59	3.22	9.75	34.80	19.74	30.00	10.26	H

LTE FDD Band 4_Channel Bandwidth 15MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1717.5	-21.06	3.06	9.68	34.8	20.36	30	9.64	H
1732.5	-20.02	3.17	9.68	34.8	21.29	30	8.71	H
1747.5	-20.89	3.22	9.75	34.8	20.44	30	9.56	H

LTE FDD Band 4_Channel Bandwidth 20MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1720.0	-22.09	3.06	9.68	34.8	19.33	30	10.67	H
1732.5	-21.84	3.17	9.68	34.8	19.47	30	10.53	H
1745.0	-20.83	3.22	9.75	34.8	20.50	30	9.50	H

LTE FDD Band 4_Channel Bandwidth 1.4MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1710.7	-23.2	3.06	9.68	34.8	18.22	30	11.78	H
1732.5	-21.82	3.17	9.68	34.8	19.49	30	10.51	H
1754.3	-21.79	3.22	9.75	34.8	19.54	30	10.46	H

LTE FDD Band 4_Channel Bandwidth 3MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1711.5	-23.09	3.06	9.68	34.8	18.33	30	11.67	H
1732.5	-23.06	3.17	9.68	34.8	18.25	30	11.75	H
1753.5	-22.16	3.22	9.75	34.8	19.17	30	10.83	H

LTE FDD Band 4_Channel Bandwidth 5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.5	-22.07	3.06	9.68	34.8	19.35	30	10.65	H
1732.5	-21.66	3.17	9.68	34.8	19.65	30	10.35	H
1752.5	-23.11	3.22	9.75	34.8	18.22	30	11.78	H

LTE FDD Band 4_Channel Bandwidth 10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1715.0	-22.98	3.06	9.68	34.8	18.44	30	11.56	H
1732.5	-22.02	3.17	9.68	34.8	19.29	30	10.71	H
1750.0	-23.05	3.22	9.75	34.8	18.28	30	11.72	H

LTE FDD Band 4_Channel Bandwidth 15MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1717.5	-23.07	3.06	9.68	34.8	18.35	30	11.65	H
1732.5	-22.84	3.17	9.68	34.8	18.47	30	11.53	H
1747.5	-22.11	3.22	9.75	34.8	19.22	30	10.78	H

LTE FDD Band 4_Channel Bandwidth 20MHz_16QAM

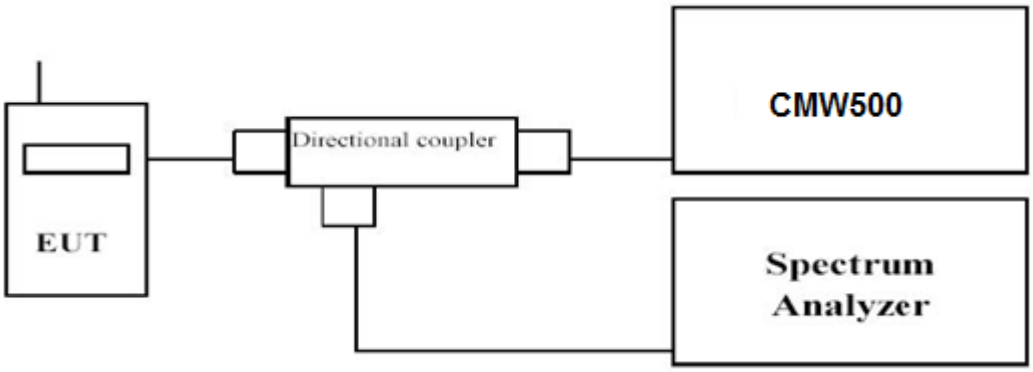
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1720.0	-22.12	3.06	9.68	34.8	19.30	30	10.70	H
1732.5	-22.57	3.17	9.68	34.8	18.74	30	11.26	H
1745.0	-21.76	3.22	9.75	34.8	19.57	30	10.43	H

4.2 Peak-to-Average Ratio (PAR)

LIMIT

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

TEST CONFIGURATION



TEST PROCEDURE

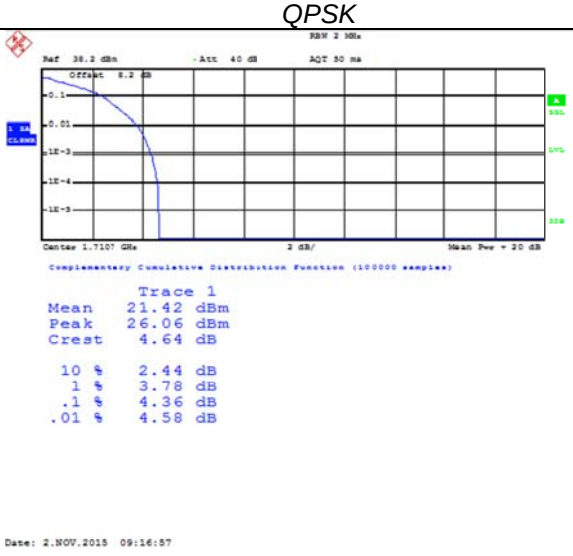
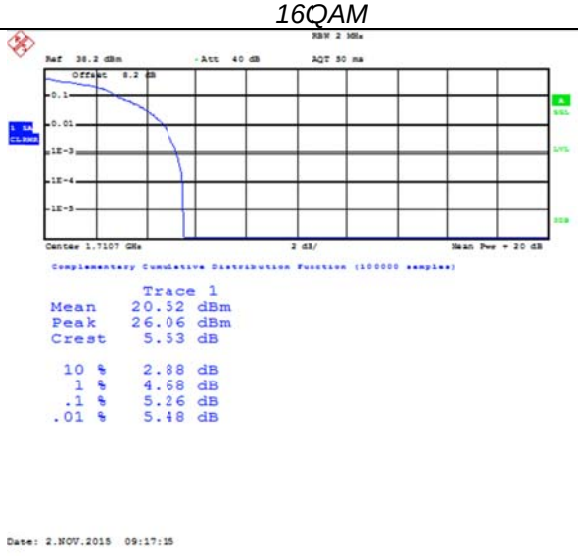
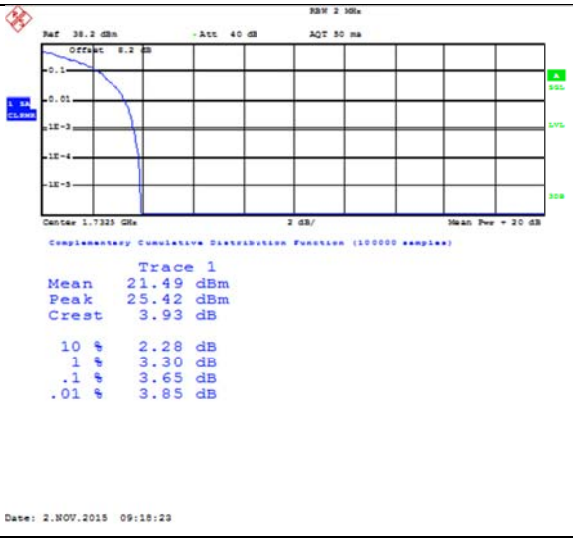
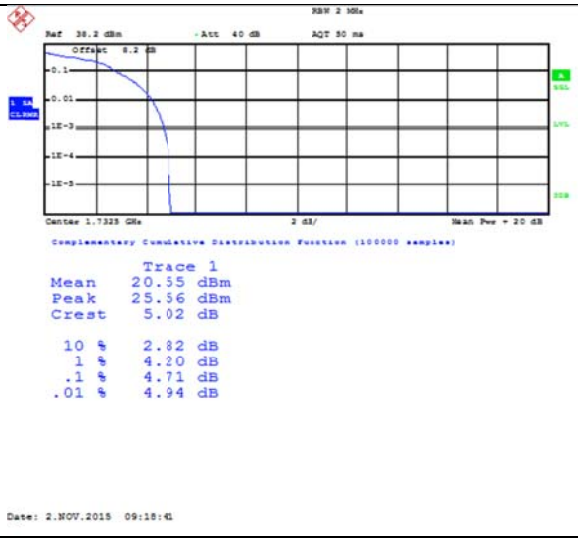
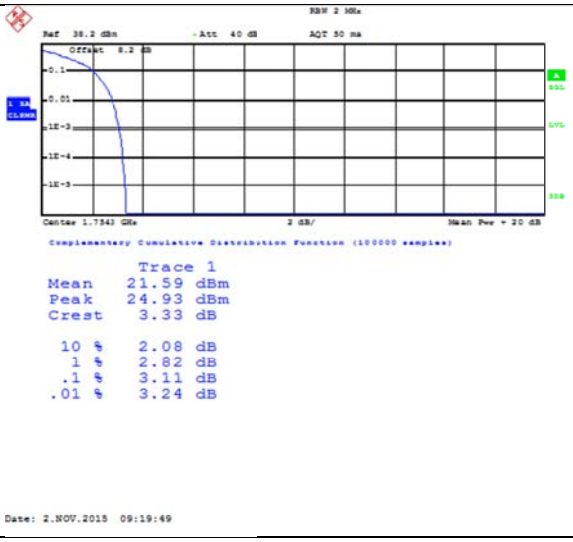
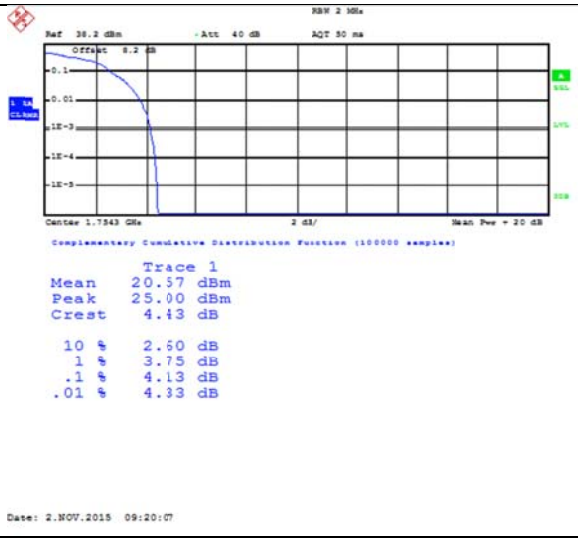
1. Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
2. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
3. Set the number of counts to a value that stabilizes the measured CCDF curve;
4. Set the measurement interval as 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.
5. Record the maximum PAPR level associated with a probability of 0.1%.

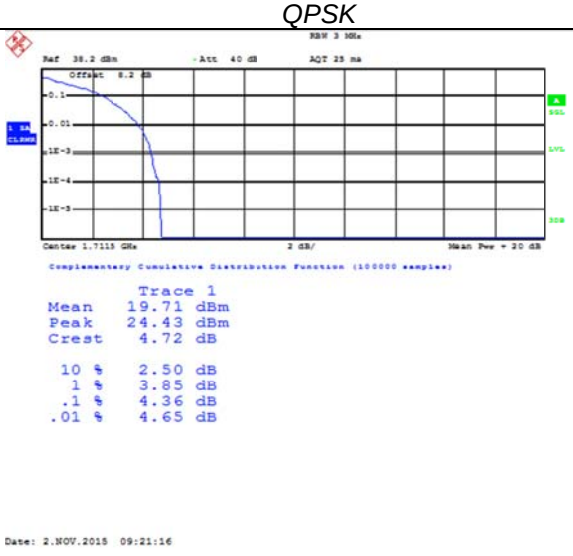
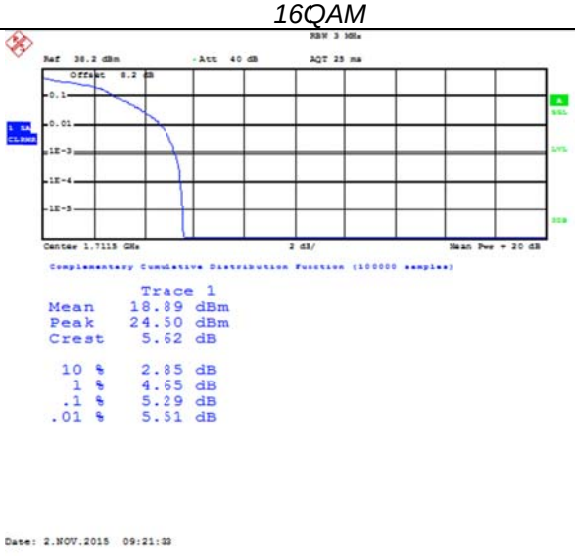
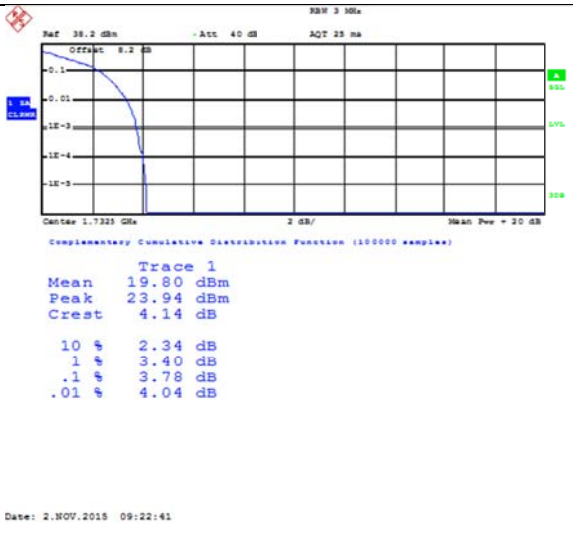
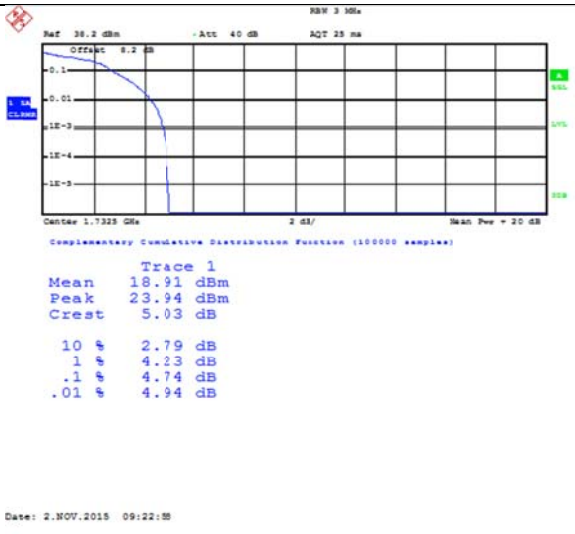
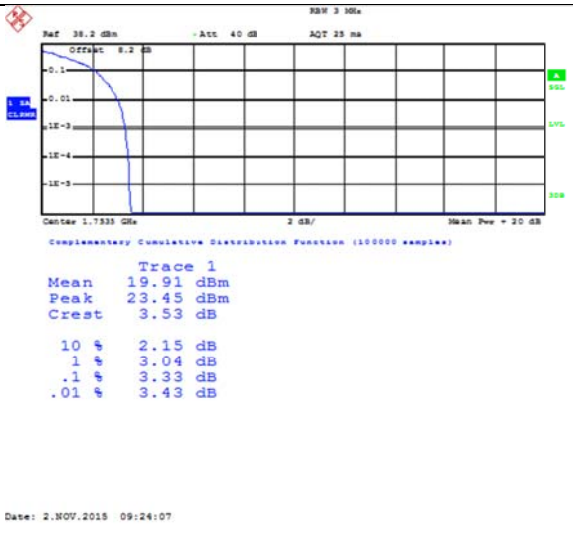
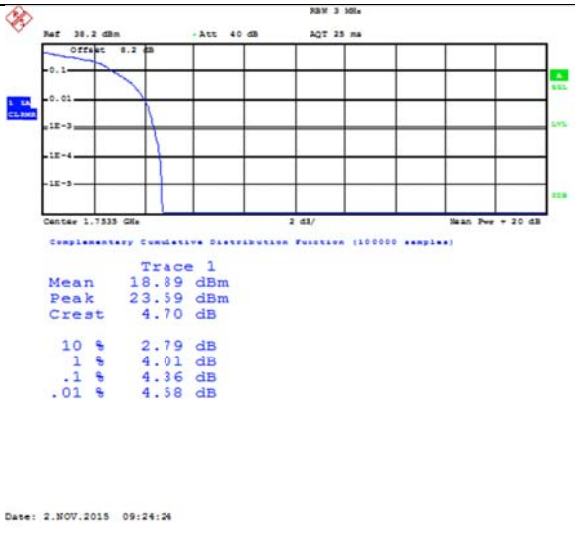
TEST RESULTS

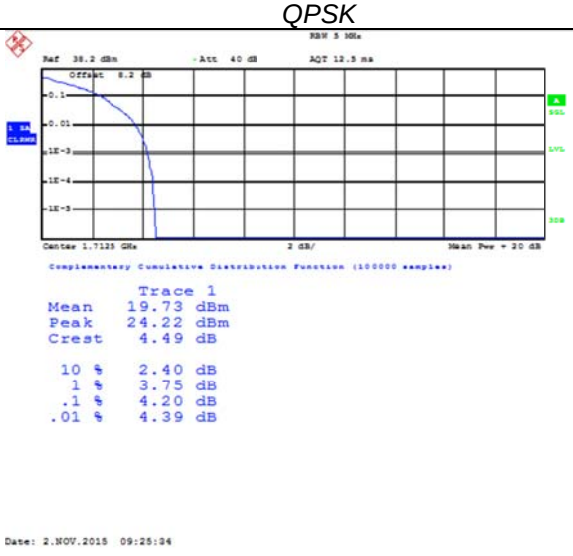
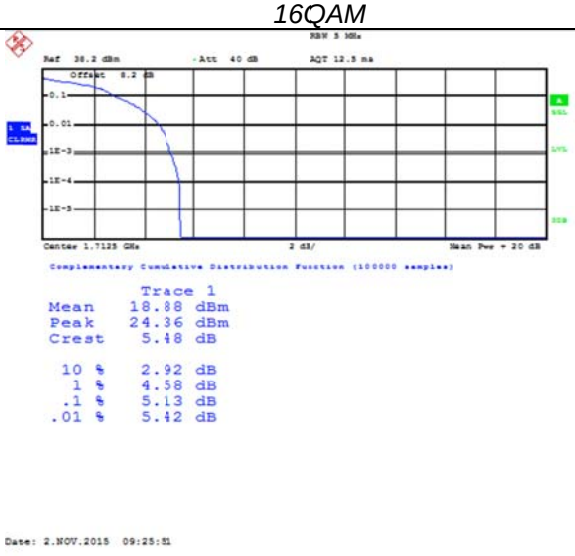
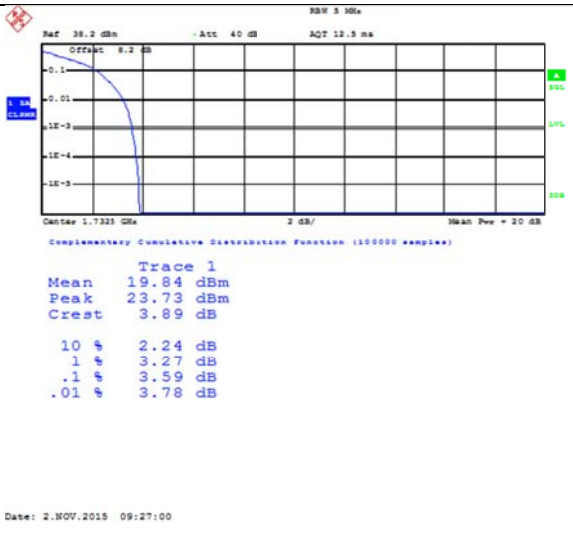
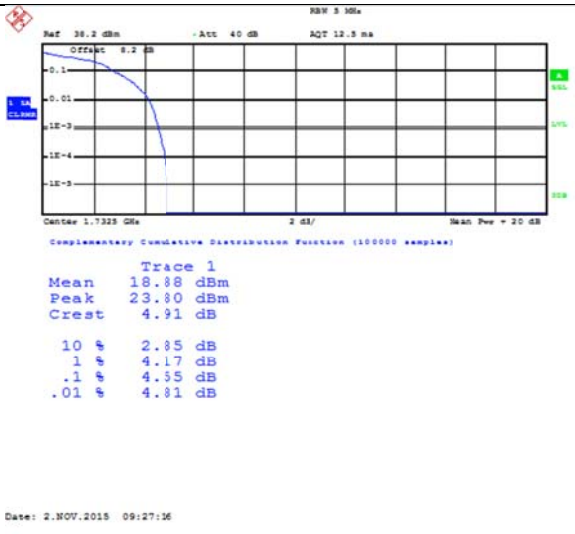
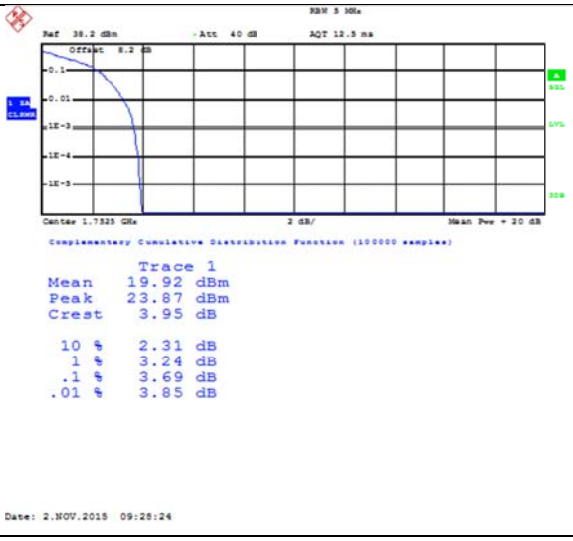
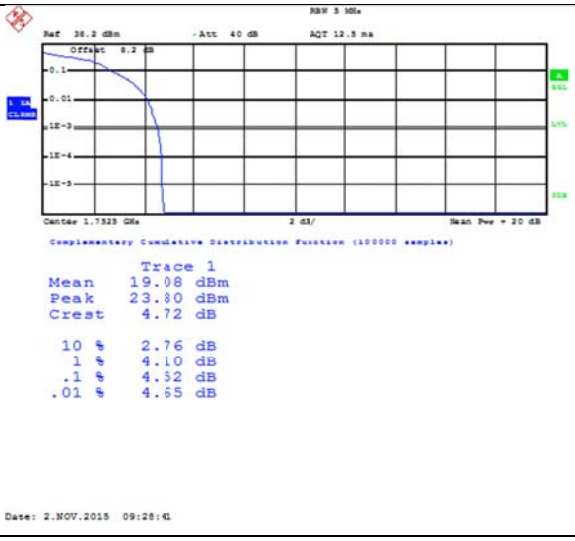
Remark:

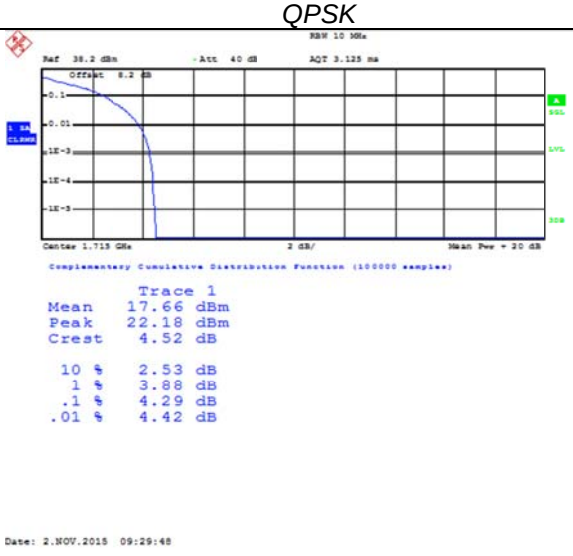
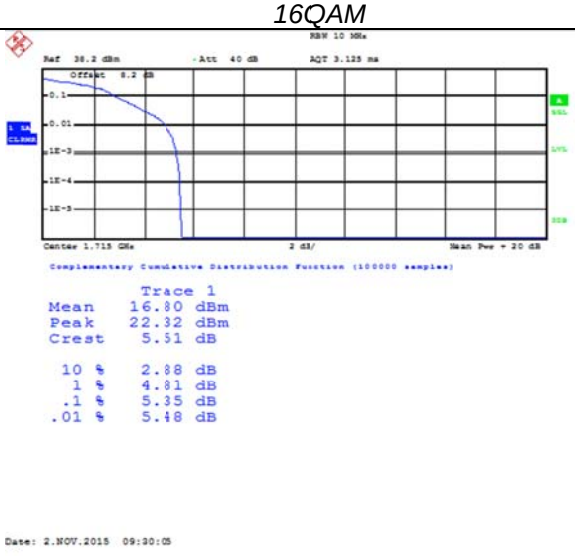
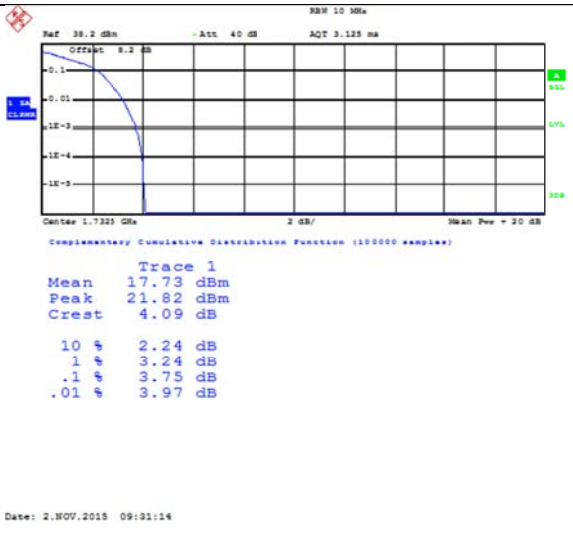
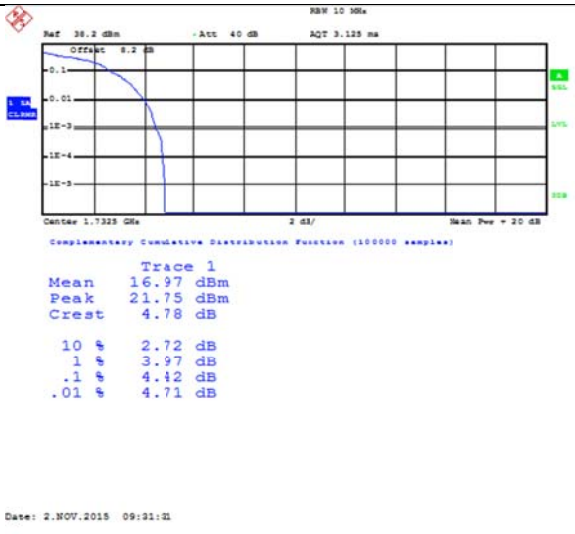
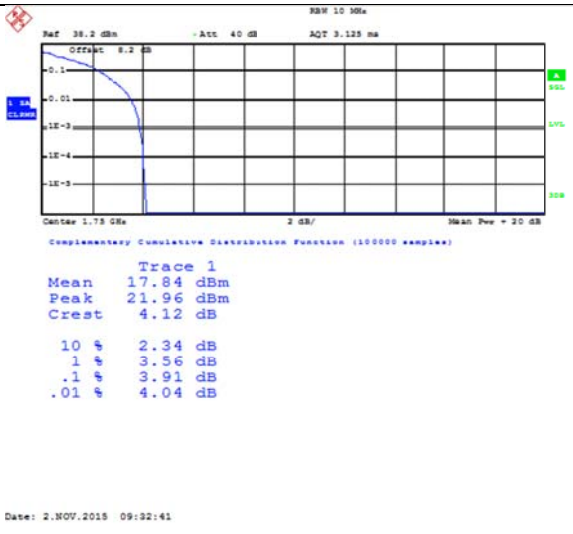
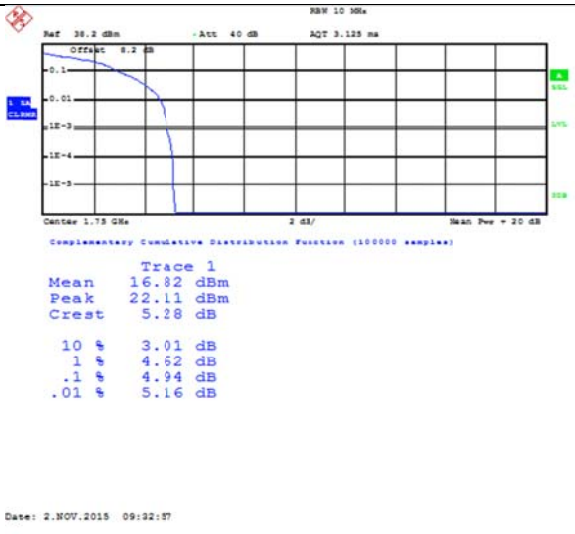
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4; recorded worst case for each Channel Bandwidth of LTE FDD Band 4.*

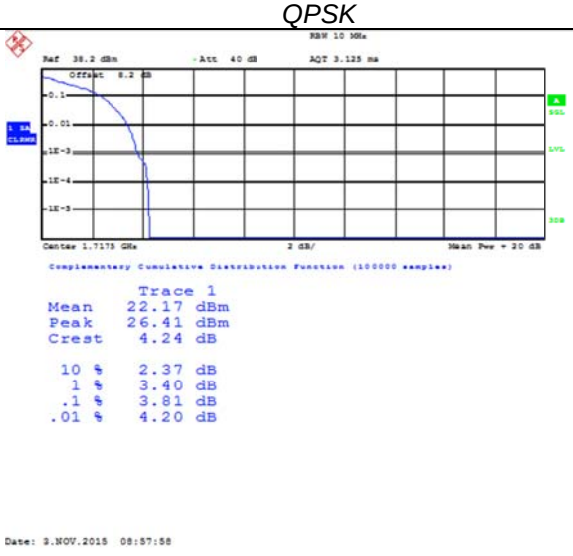
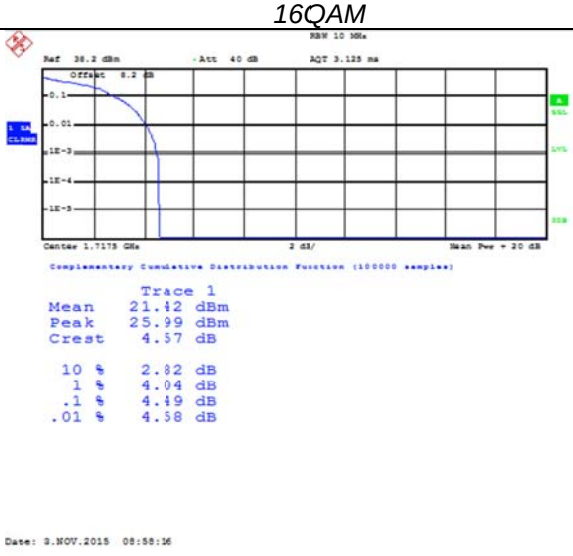
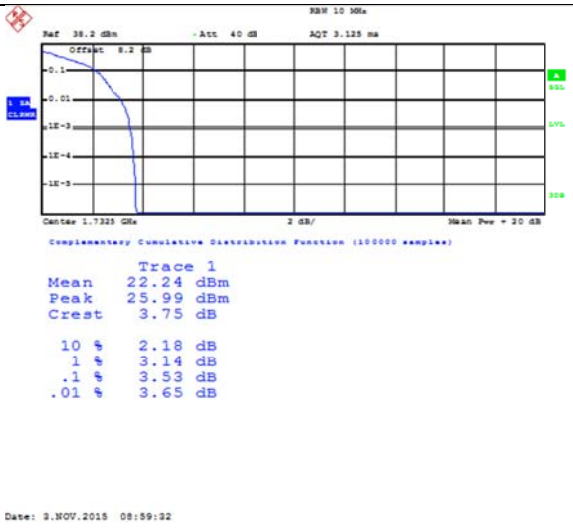
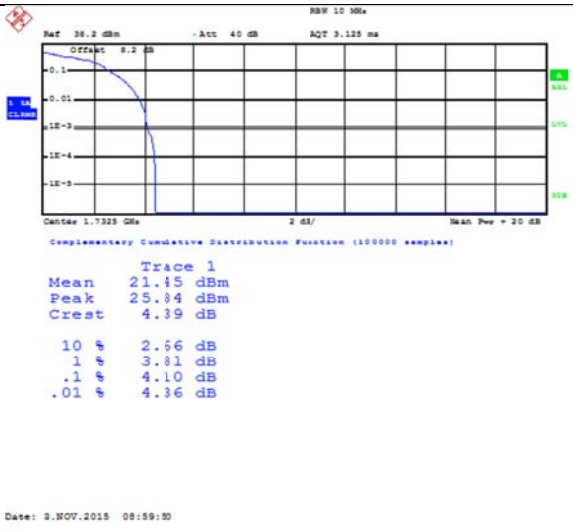
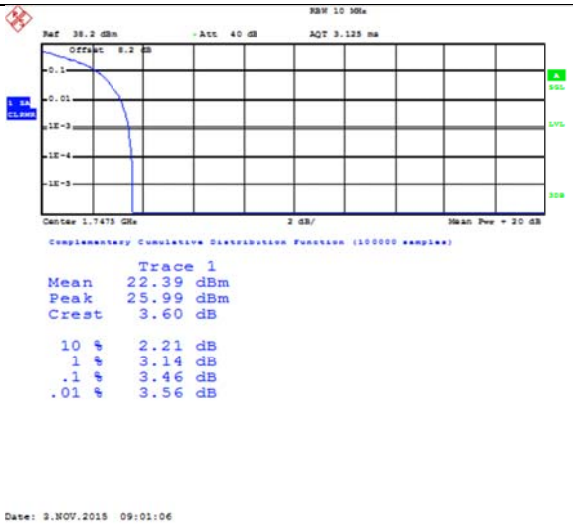
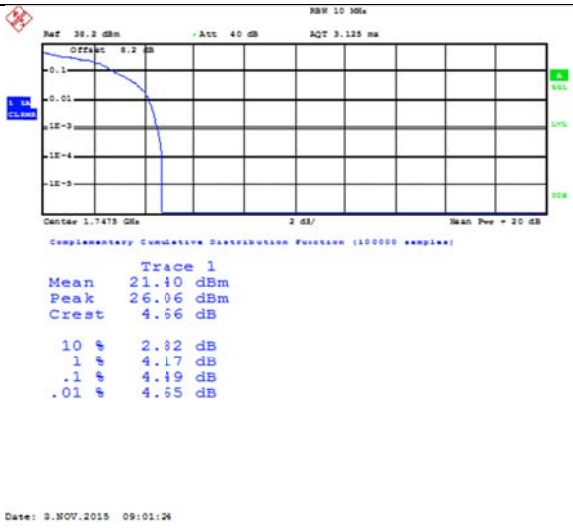
LTE FDD Band 4				
TX Channel Bandwidth	Frequency (MHz)	RB Size/Offset	PAPR (dB)	
			QPSK	16QAM
1.4 MHz	1710.7	*1RB#0*	4.64	5.53
	1732.5		3.93	5.02
	1754.3		3.33	4.43
3 MHz	1711.5	*1RB#0*	4.72	5.62
	1732.5		4.14	5.03
	1753.5		3.53	4.70
5 MHz	1712.5	*1RB#0*	4.49	5.48
	1732.5		3.89	4.91
	1752.5		3.95	4.72
10 MHz	1715.0	*1RB#0*	4.52	5.51
	1732.5		4.09	4.78
	1750.0		4.12	5.28
15 MHz	1717.5	*1RB#0*	4.24	4.57
	1732.5		3.75	4.39
	1747.5		3.60	4.66
20 MHz	1720.0	*1RB#0*	4.04	4.40
	1732.5		4.07	4.36
	1745.0		4.28	5.09

LTE FDD Band 4-1.4MHz Channel Bandwidth PAPR	
QPSK	16QAM
	
1RB#0	1RB#0
Low Channel	
	
1RB#0	1RB#0
Middle Channel	
	
1RB#0	1RB#0
High Channel	

LTE FDD Band 4-3MHz Channel Bandwidth PAPR	
QPSK	16QAM
	
1RB#0	1RB#0
Low Channel	
	
1RB#0	1RB#0
Middle Channel	
	
1RB#0	1RB#0
High Channel	

LTE FDD Band 4-5MHz Channel Bandwidth PAPR	
QPSK	16QAM
	
1RB#0	1RB#0
Low Channel	
	
1RB#0	1RB#0
Middle Channel	
	
1RB#0	1RB#0
High Channel	

LTE FDD Band 4-10MHz Channel Bandwidth PAPR	
QPSK	16QAM
	
1RB#0	1RB#0
Low Channel	
	
1RB#0	1RB#0
Middle Channel	
	
1RB#0	1RB#0
High Channel	

LTE FDD Band 4-15MHz Channel Bandwidth PAPR	
QPSK	16QAM
	
1RB#0	1RB#0
Low Channel	
	
1RB#0	1RB#0
Middle Channel	
	
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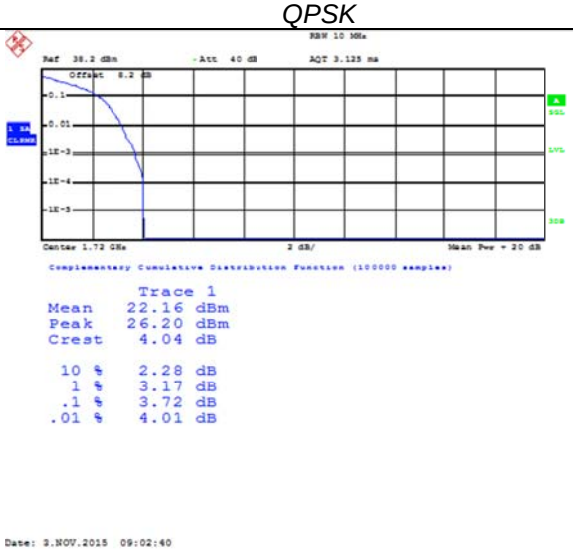
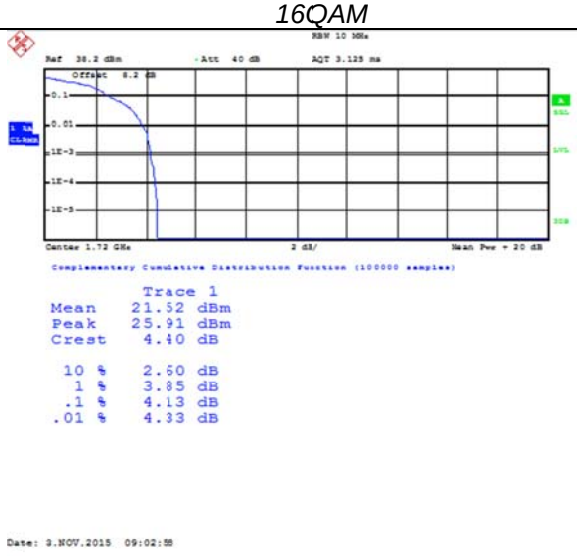
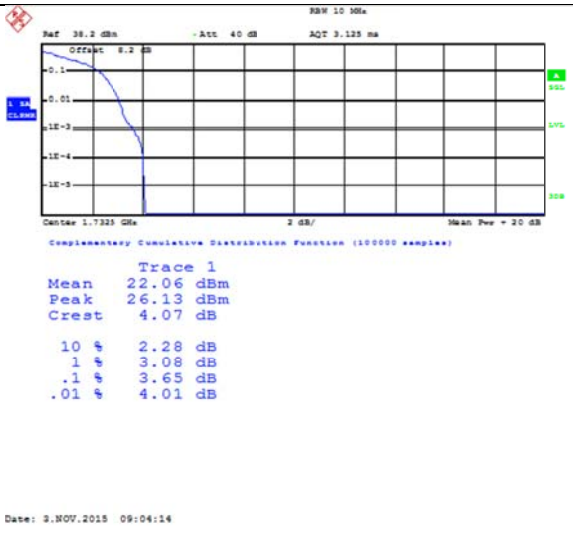
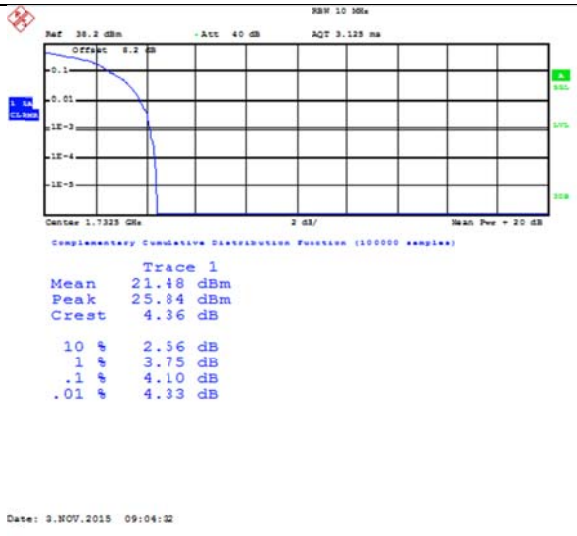
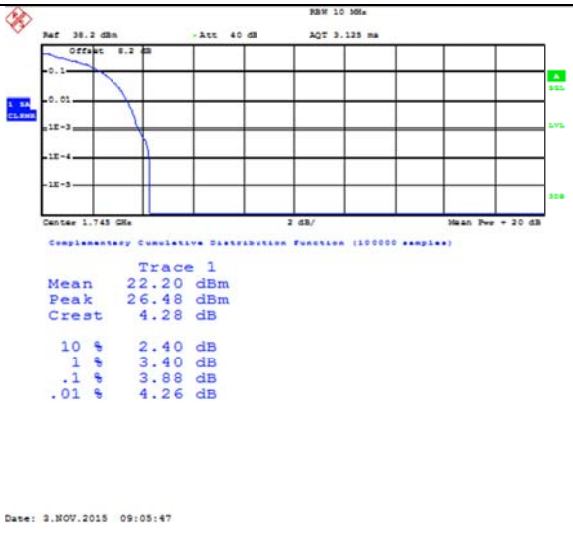
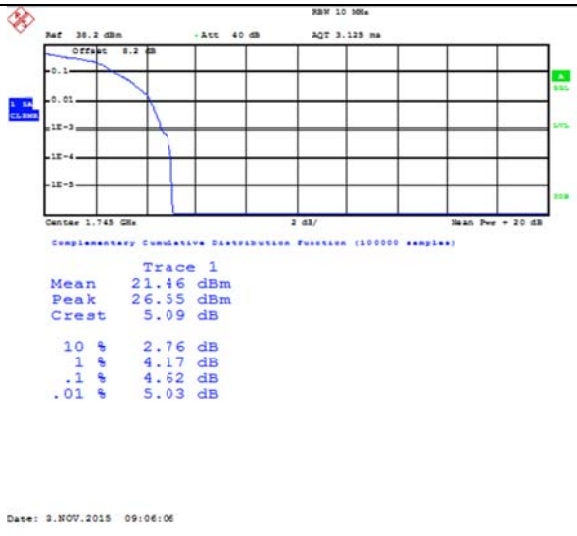
High Channel	

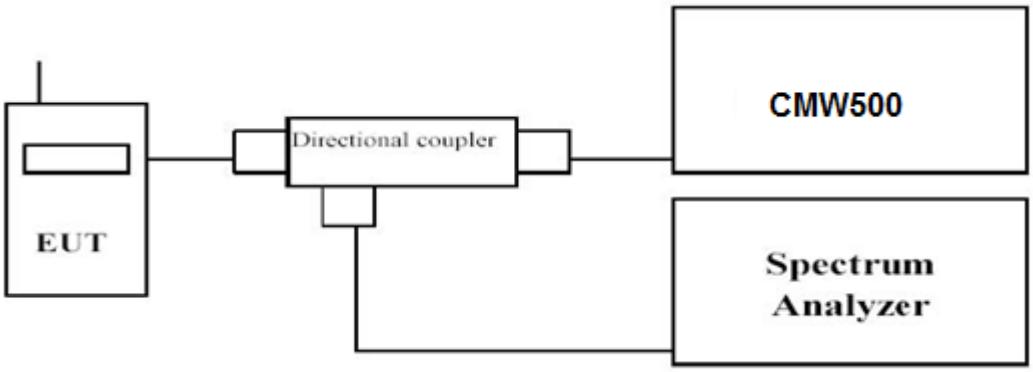
LTE FDD Band 4-20MHz Channel Bandwidth PAPR	
QPSK	16QAM
	
1RB#0	1RB#0
Low Channel	
	
1RB#0	1RB#0
Middle Channel	
	
1RB#0	1RB#0
High Channel	

4.3 Occupied Bandwidth and Emission Bandwidth

LIMIT

N/A

TEST CONFIGURATION



TEST PROCEDURE

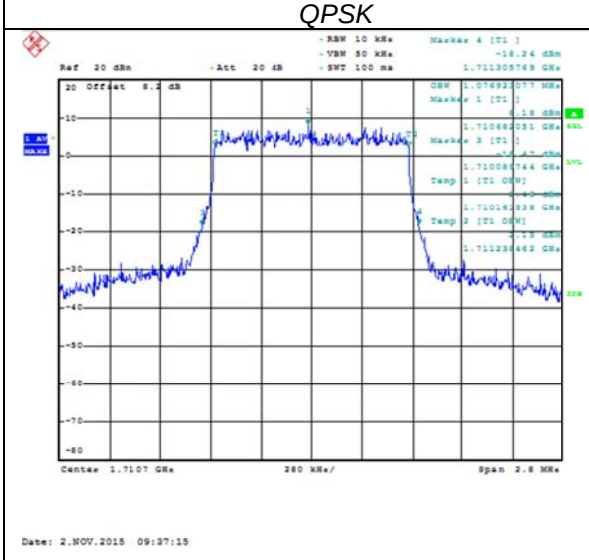
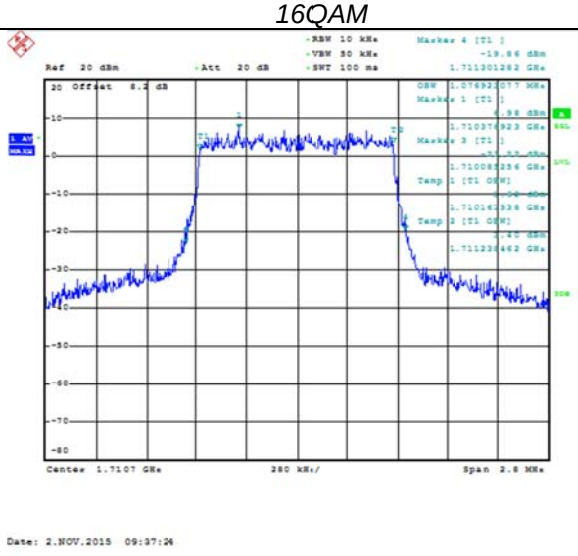
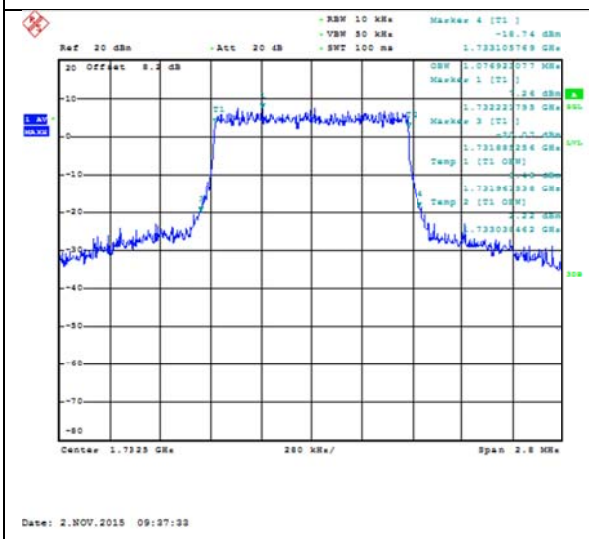
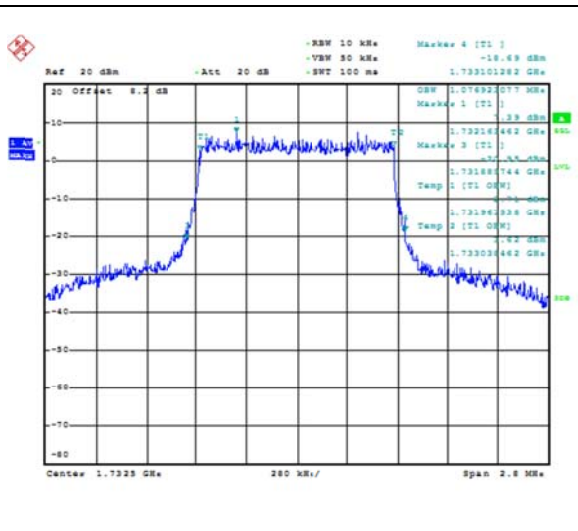
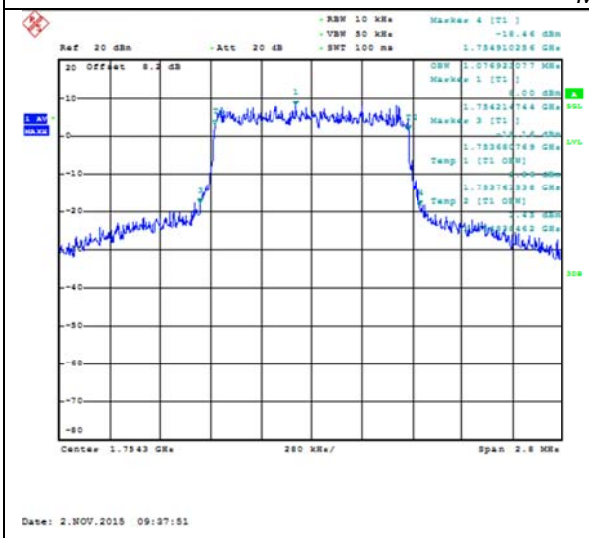
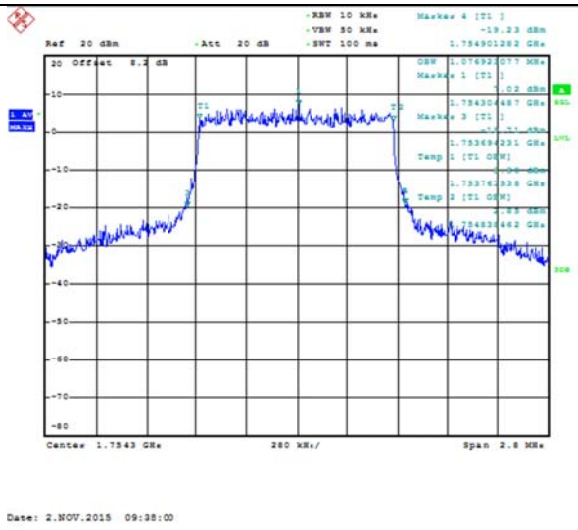
The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at low, middle and high channel in each band. The -26dBc Emission bandwidth was also measured and recorded. Set RBW was set to about 1% of emission BW, VBW≥3 times RBW.
-26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

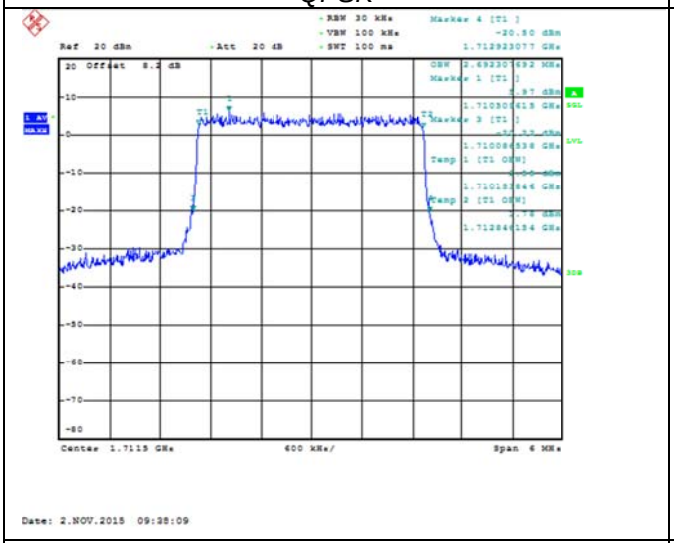
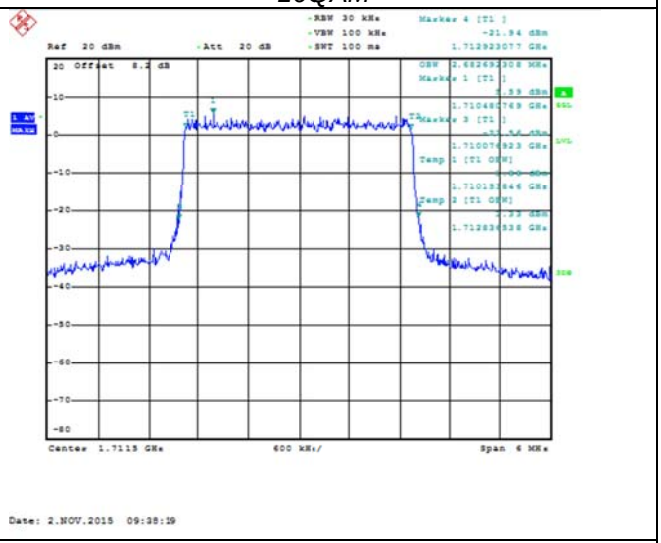
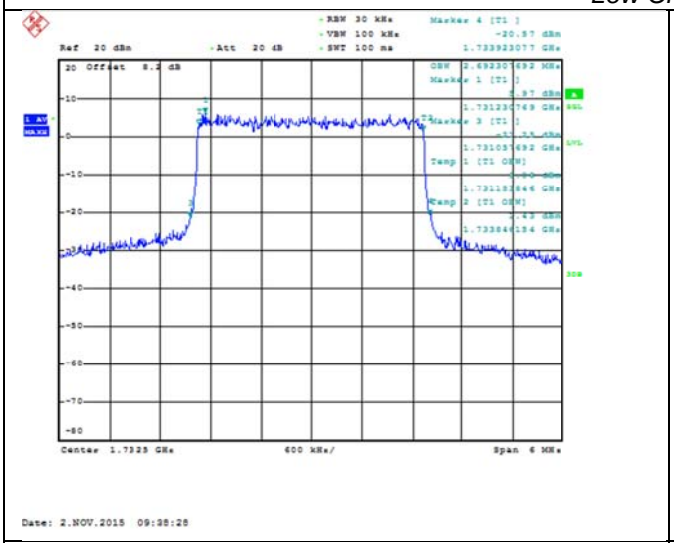
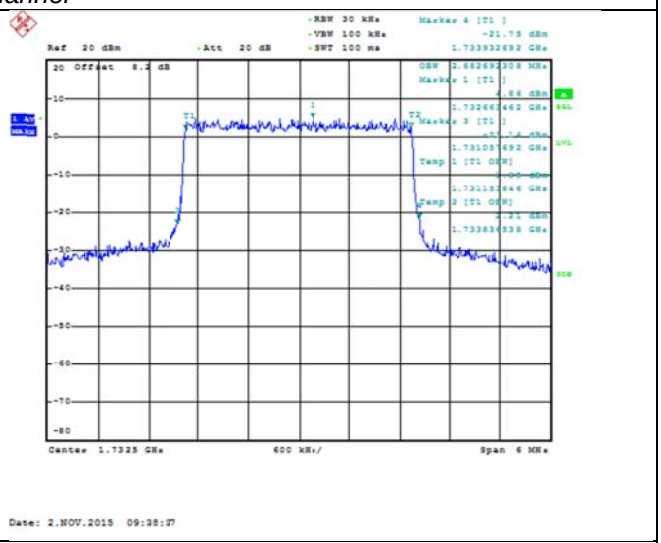
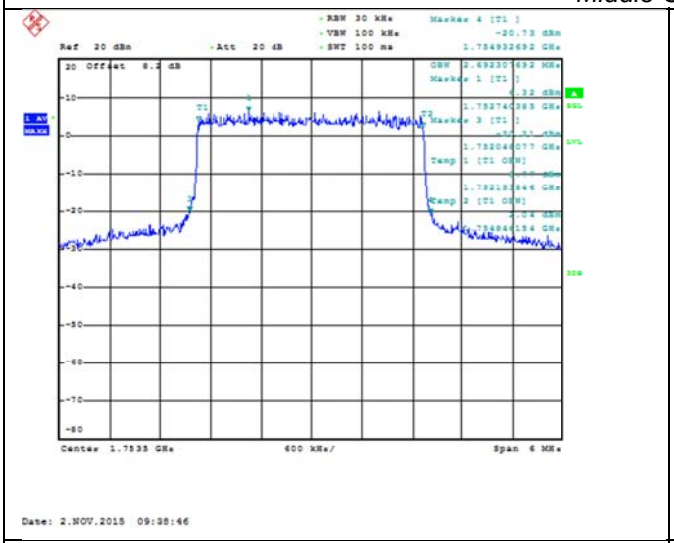
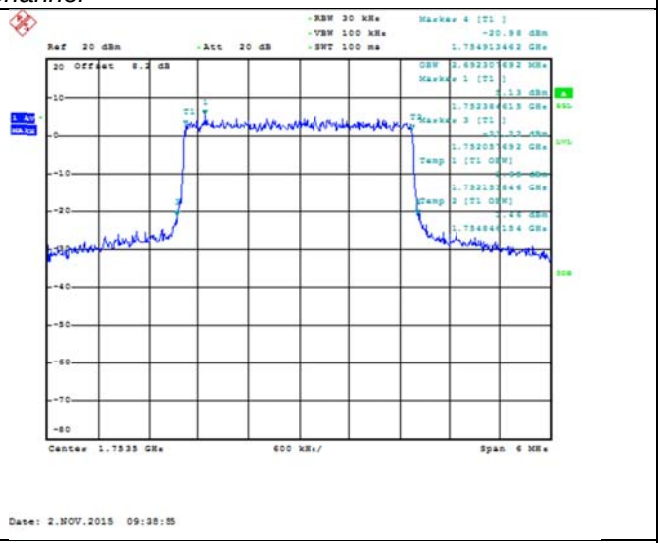
TEST RESULTS

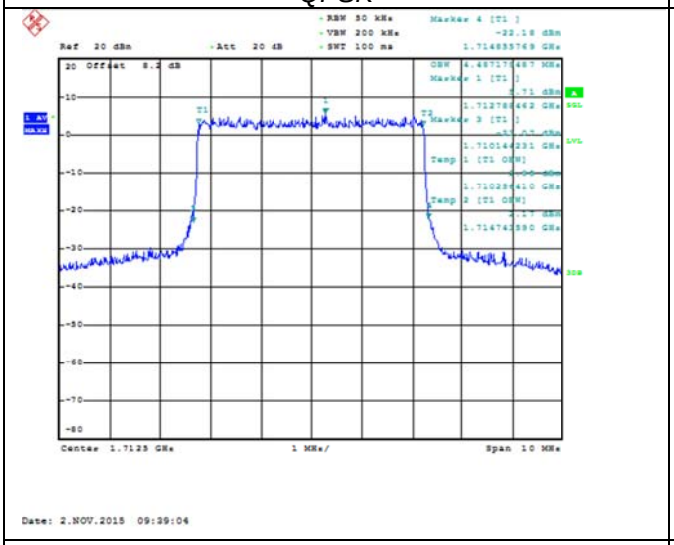
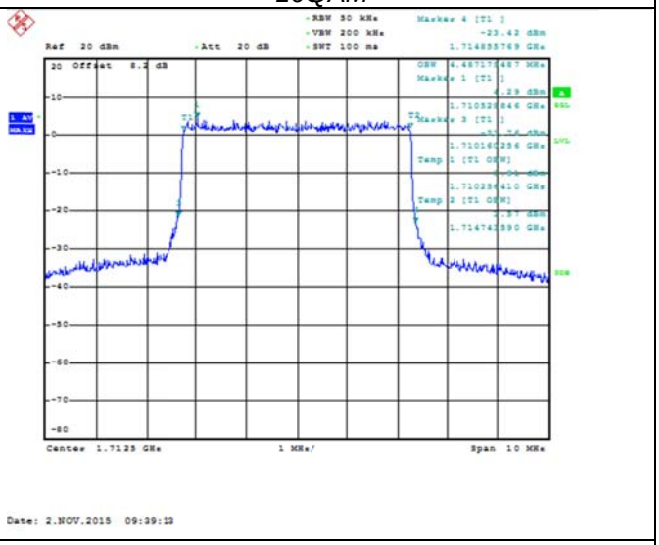
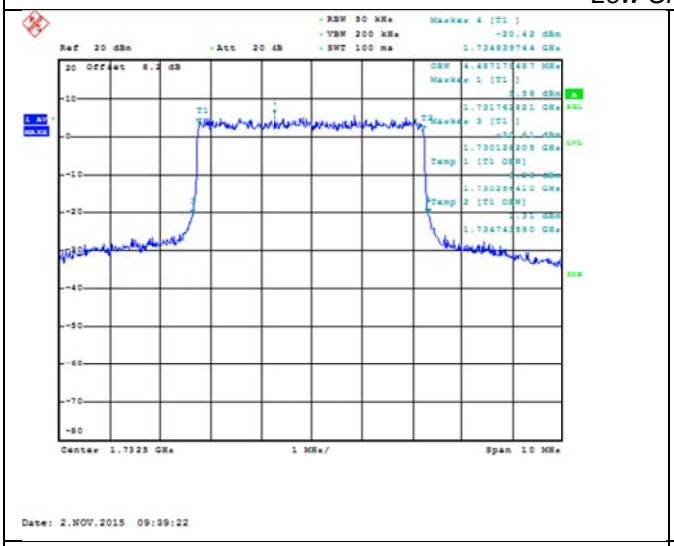
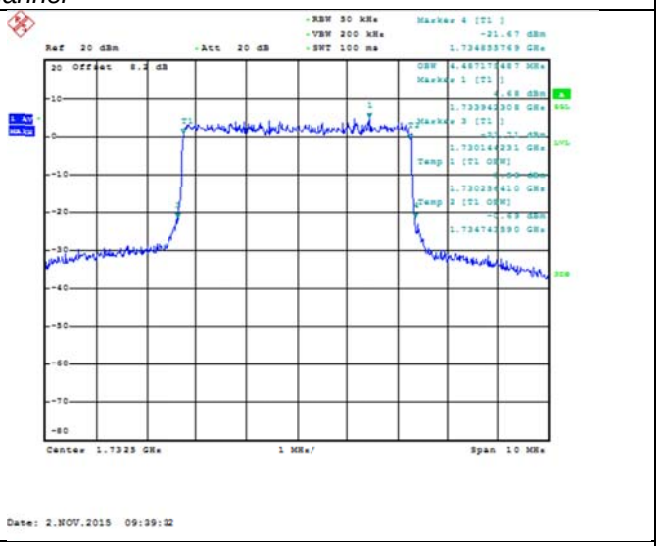
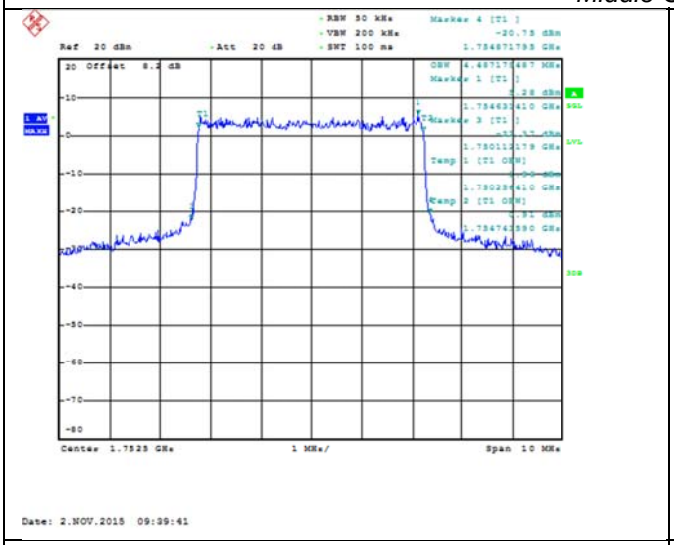
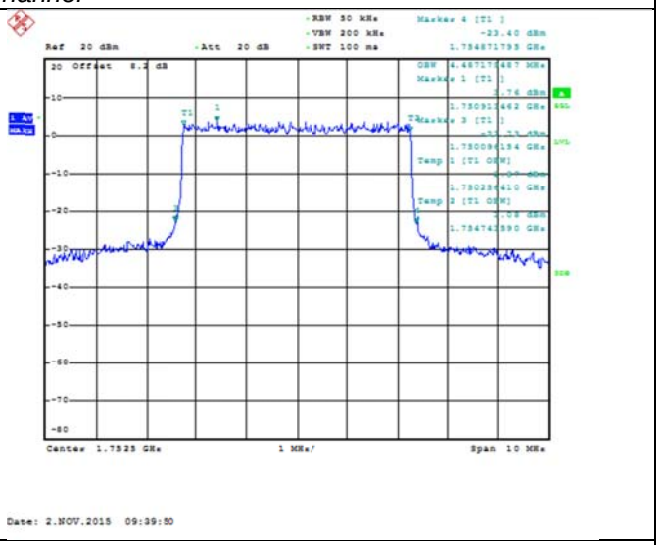
Remark:

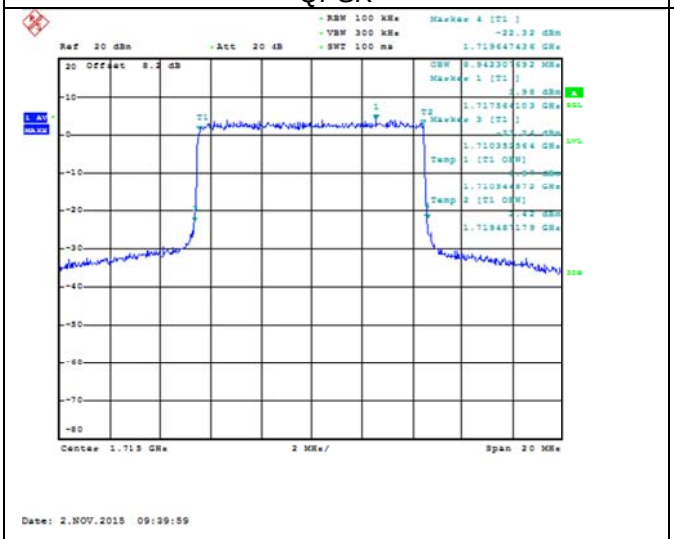
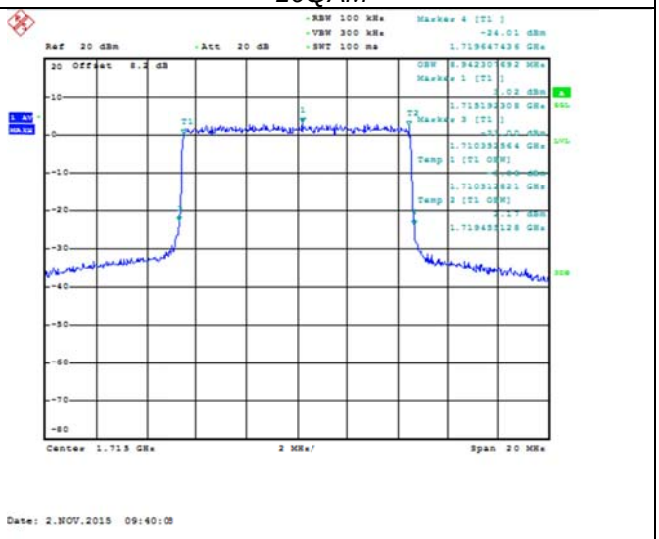
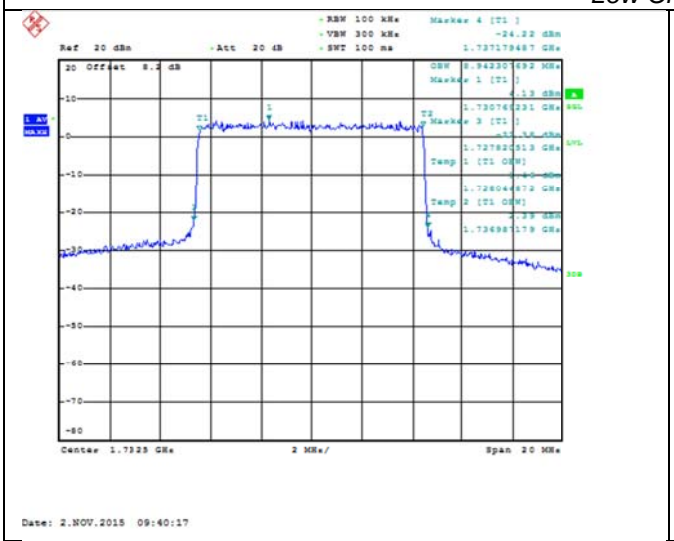
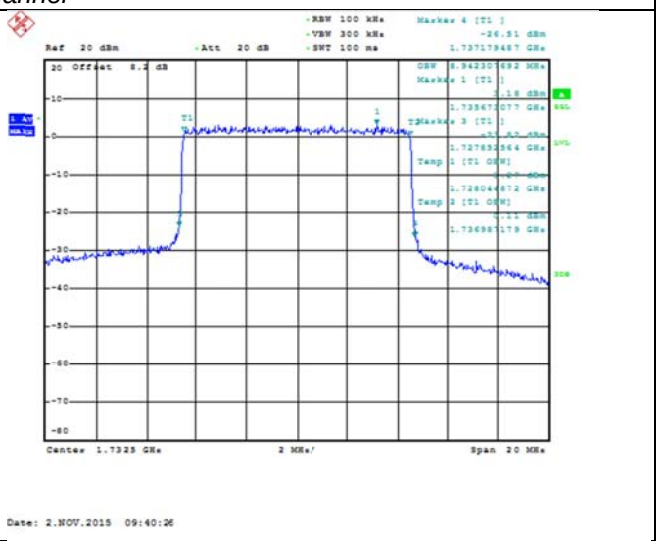
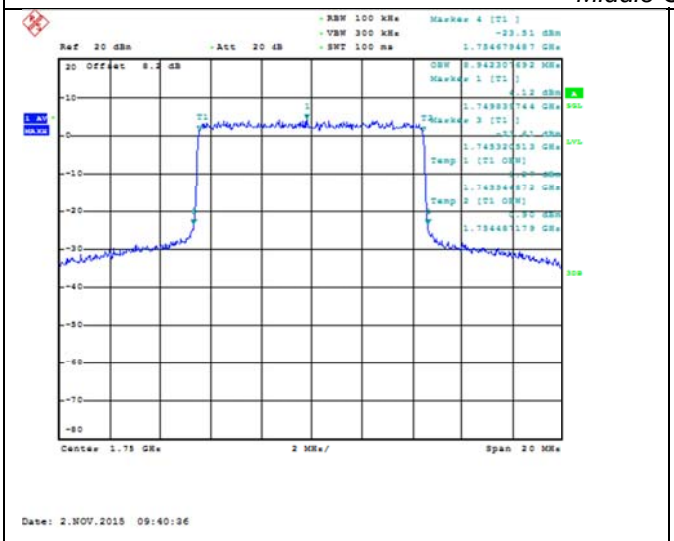
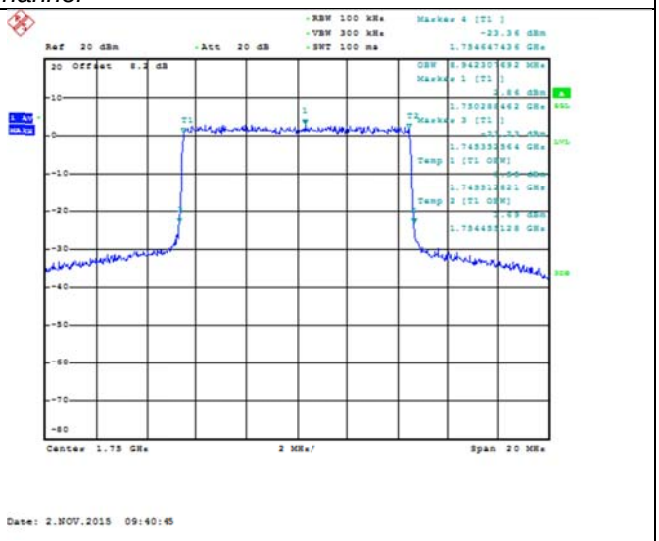
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4; recorded worst case for each Channel Bandwidth of LTE FDD Band 4.*

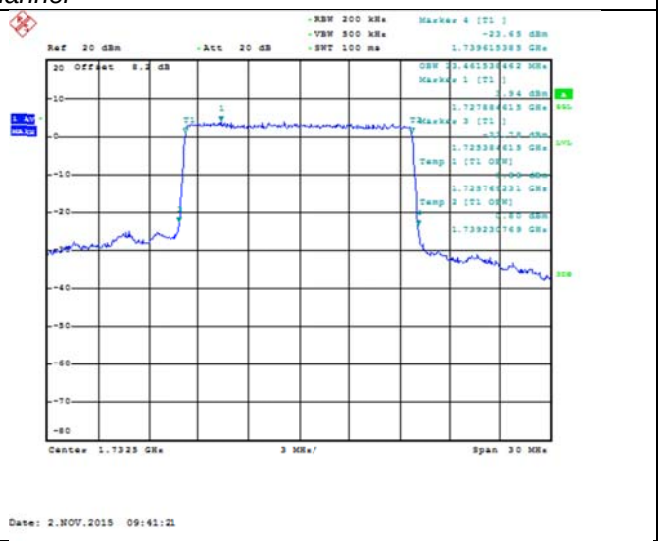
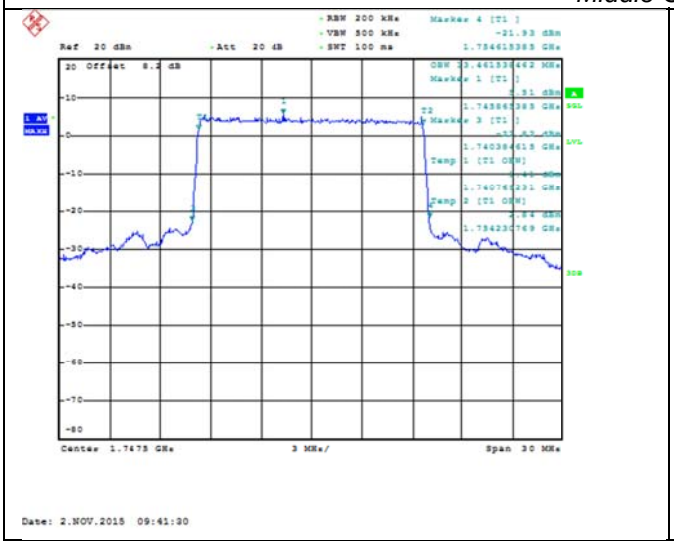
LTE FDD Band 4						
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	-26dBc Emission bandwidth (MHz)		99% Occupied bandwidth (MHz)	
			QPSK	16QAM	QPSK	16QAM
1.4 MHz	*6RB#0*	1710.7	1.120	1.216	1.077	1.077
		1732.5	1.220	1.216	1.077	1.077
		1754.3	1.229	1.207	1.077	1.077
3 MHz	*15RB#0*	1711.5	2.837	2.846	2.692	2.683
		1732.5	2.865	2.875	2.692	2.623
		1753.5	2.183	2.856	2.692	2.692
5 MHz	*25RB#0*	1712.5	4.712	4.696	4.487	4.487
		1732.5	4.712	4.712	4.487	4.487
		1752.5	4.760	4.776	4.487	4.487
10 MHz	*50RB#0*	1715.0	9.295	9.295	8.942	8.942
		1732.5	9.359	9.327	8.942	8.942
		1750.0	9.359	9.295	8.942	8.942
15 MHz	*75RB#0*	1717.5	14.231	14.231	13.462	13.462
		1732.5	14.279	14.231	13.462	13.462
		1747.5	14.231	14.231	13.462	13.462
20 MHz	*100RB#0*	1720.0	18.718	18.718	17.885	17.885
		1732.5	18.782	18.782	17.885	17.949
		1745.0	18.718	18.718	17.949	17.821

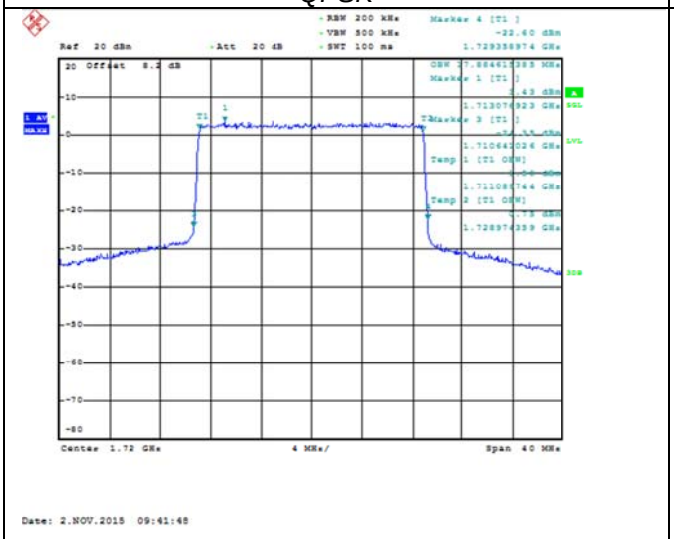
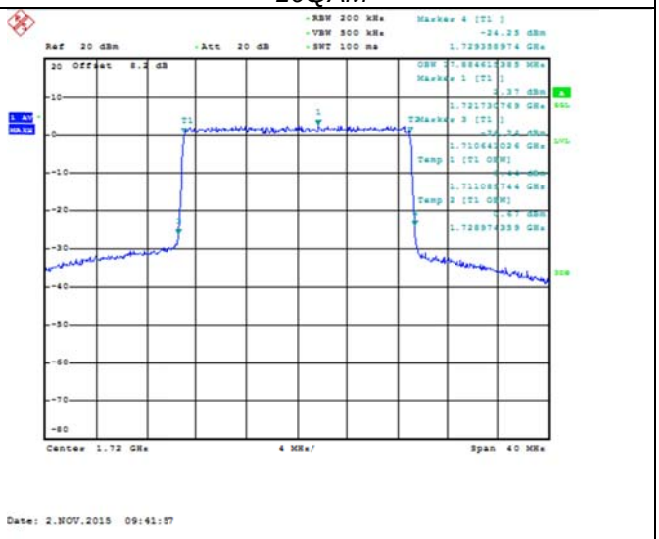
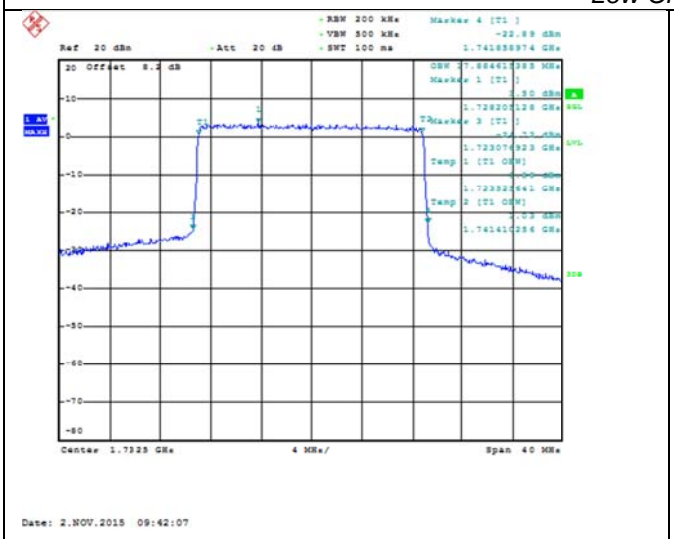
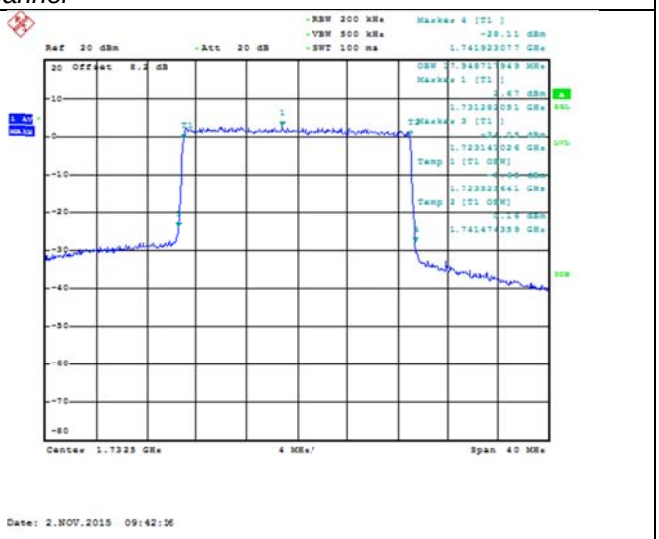
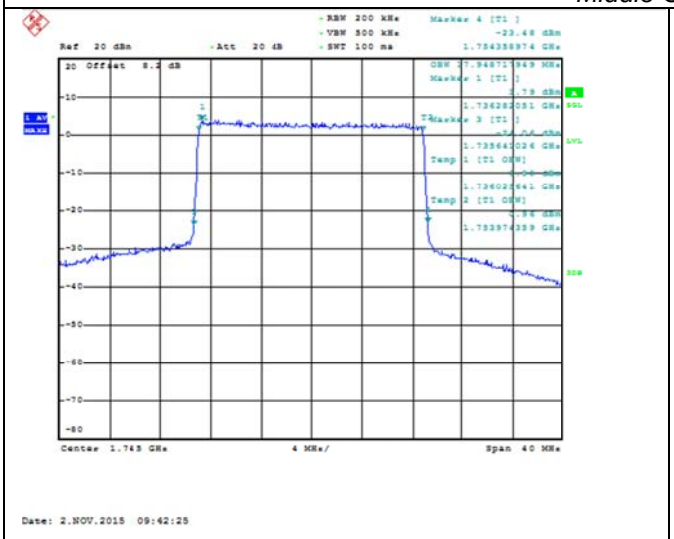
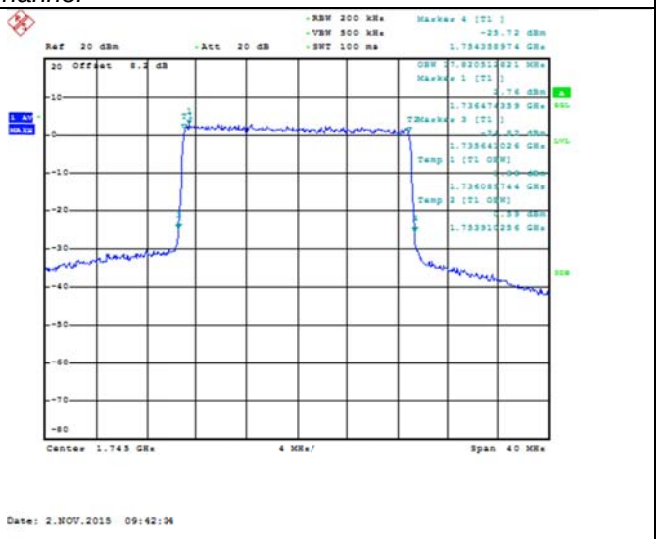
LTE FDD Band 4-1.4MHz Channel Bandwidth	
QPSK	16QAM
	
6RB#0	6RB#0
Low Channel	
	
6RB#0	6RB#0
Middle Channel	
	
6RB#0	6RB#0
High Channel	

LTE FDD Band 4-3MHz Channel Bandwidth	
QPSK	16QAM
	
15RB#0	15RB#0
Low Channel	
	
15RB#0	15RB#0
Middle Channel	
	
15RB#0	15RB#0
High Channel	

LTE FDD Band 4-5MHz Channel Bandwidth	
QPSK	16QAM
	
25RB#0	25RB#0
Low Channel	
	
25RB#0	25RB#0
Middle Channel	
	
25RB#0	25RB#0
High Channel	

LTE FDD Band 4-10MHz Channel Bandwidth	
QPSK	16QAM
	
50RB#0	50RB#0
Low Channel	
	
50RB#0	50RB#0
Middle Channel	
	
50RB#0	50RB#0
High Channel	

LTE FDD Band 4-15MHz Channel Bandwidth	
QPSK	*16QAM*
75RB#0	*75RB#0*
Low Channel	
	
75RB#0	*75RB#0*
Middle Channel	
	
75RB#0	*75RB#0*
High Channel	

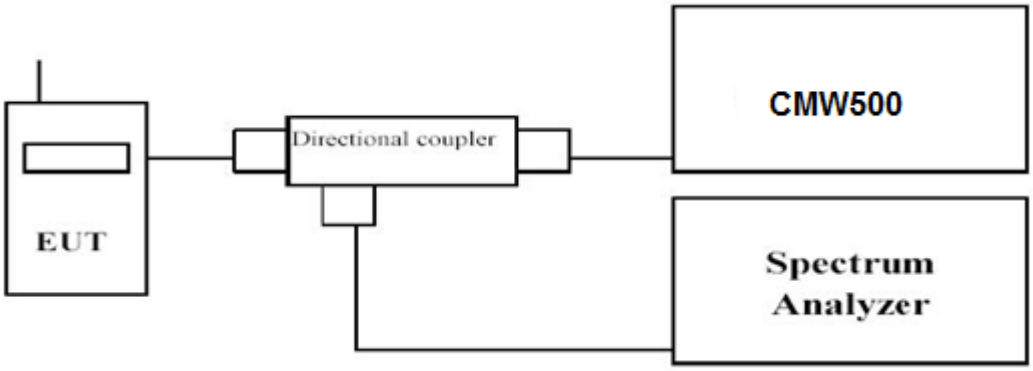
LTE FDD Band 4-20MHz Channel Bandwidth	
QPSK	16QAM
	
100RB#0	100RB#0
Low Channel	
	
100RB#0	100RB#0
Middle Channel	
	
100RB#0	100RB#0
High Channel	

4.4 Band Edge compliance

LIMIT

According to §27.53 (h): For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.

TEST CONFIGURATION



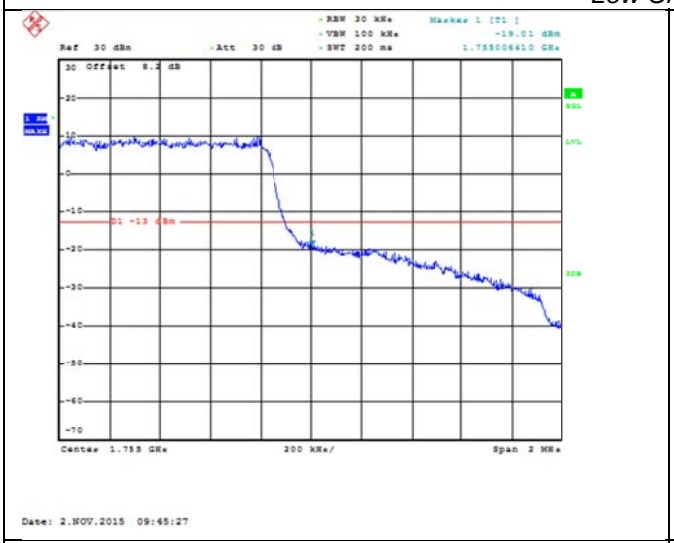
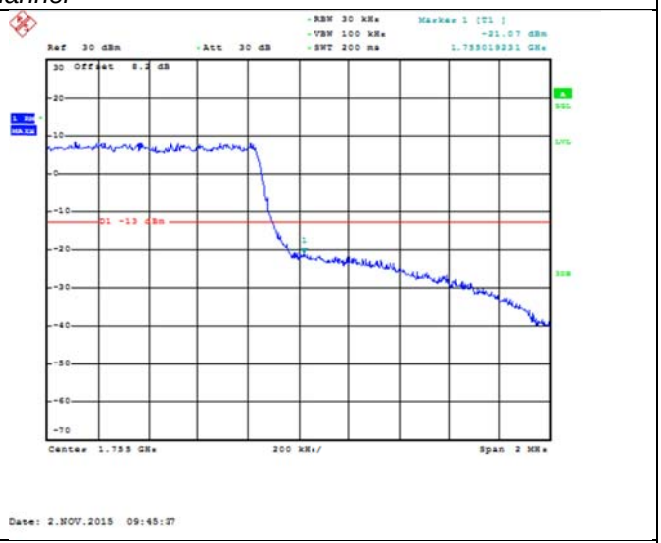
TEST PROCEDURE

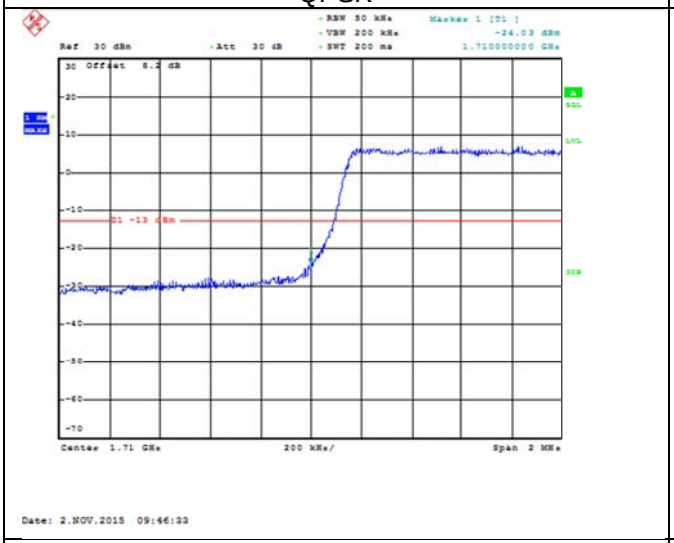
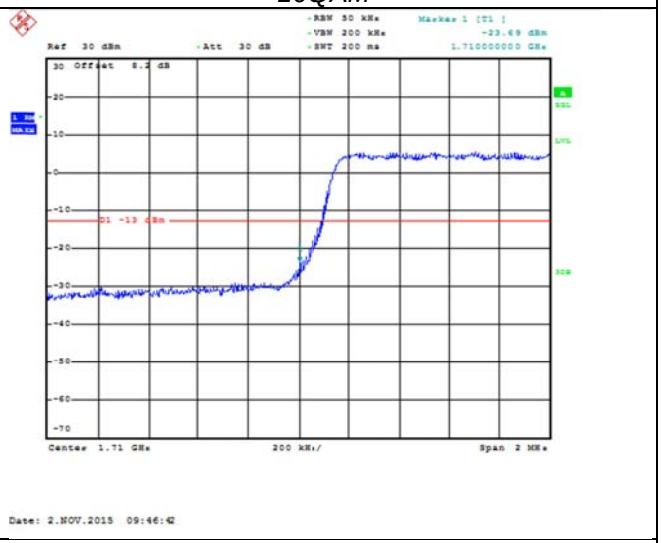
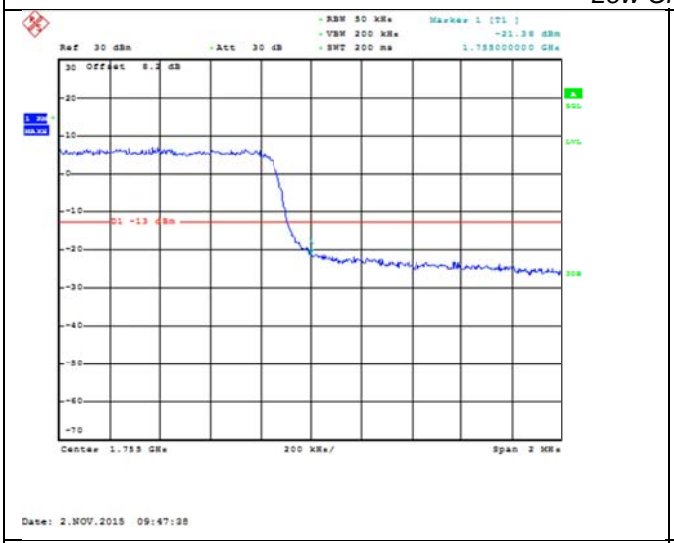
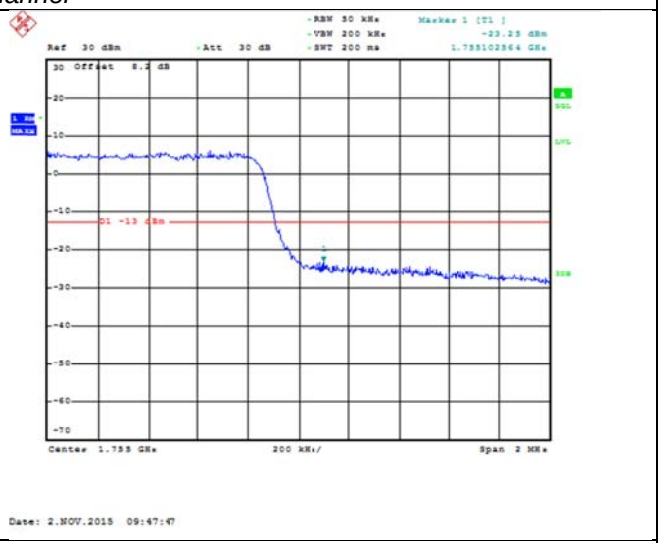
1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest and highest channels for each band and different modulation.
5. Measure Band edge using RMS (Average) detector by spectrum

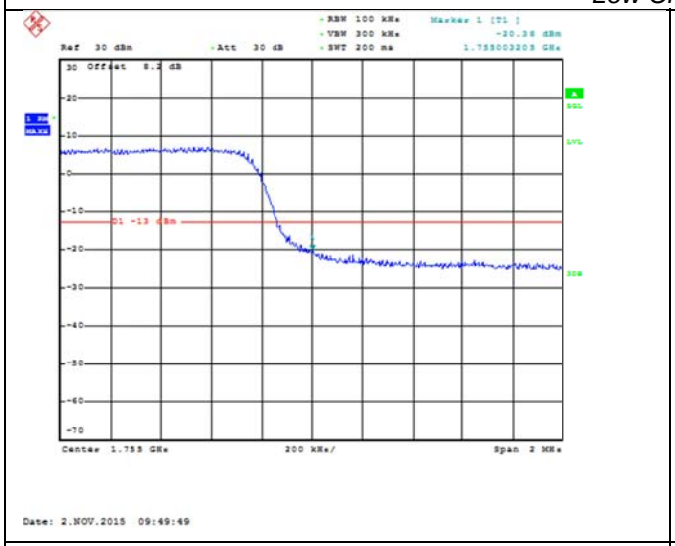
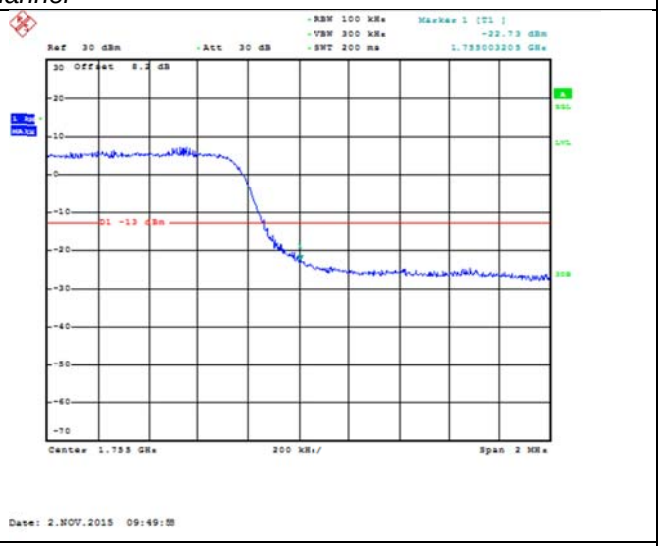
TEST RESULTS

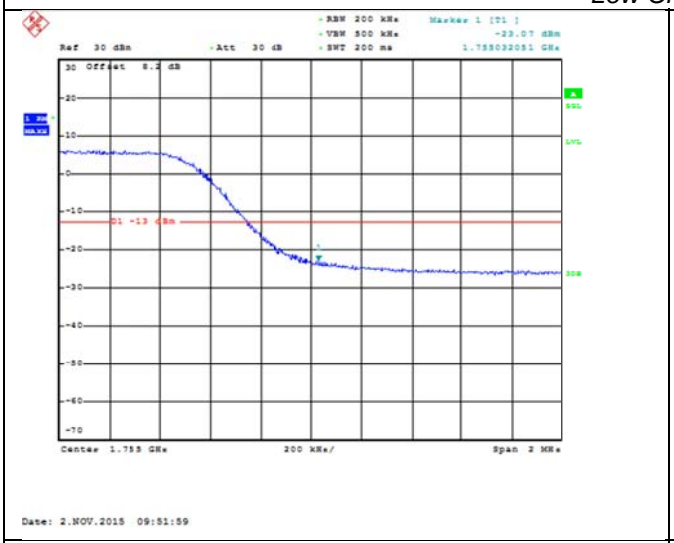
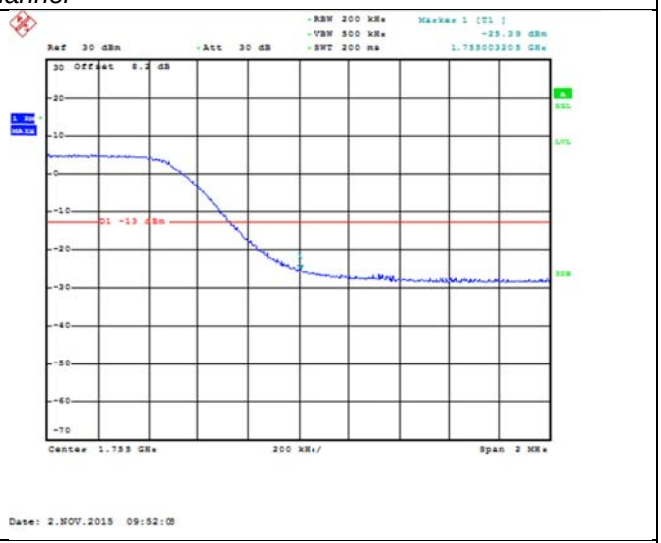
Remark:

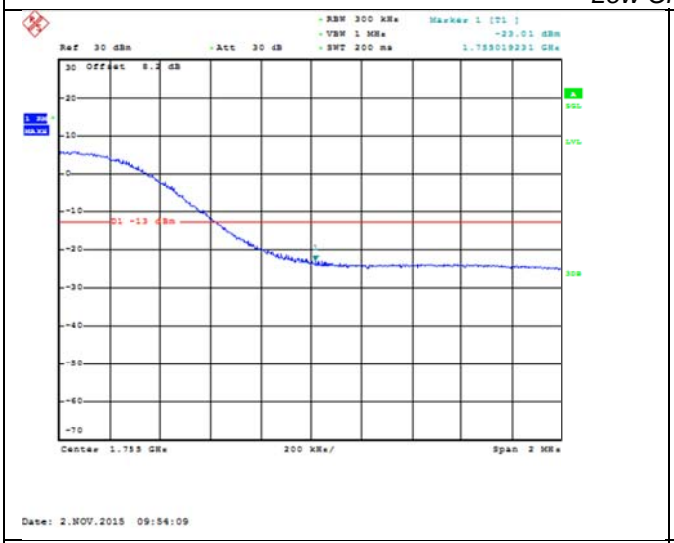
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4; recorded worst case for each Channel Bandwidth of LTE FDD Band 4.*

LTE FDD Band 4-1.4MHz Channel Bandwidth Band Edge Compliance	
QPSK	16QAM
1RB#0	1RB#0
Low Channel	
	
1RB#0	1RB#0
High Channel	

LTE FDD Band 4-3MHz Channel Bandwidth Band Edge Compliance	
QPSK	16QAM
	
1RB#0	1RB#0
Low Channel	
	
1RB#0	1RB#0
High Channel	

LTE FDD Band 4-5MHz Channel Bandwidth Band Edge Compliance	
QPSK	16QAM
1RB#0	1RB#0
Low Channel	
	
1RB#0	1RB#0
High Channel	

LTE FDD Band 4-10MHz Channel Bandwidth Band Edge Compliance	
QPSK	16QAM
1RB#0	1RB#0
Low Channel	
	
1RB#0	1RB#0
High Channel	

LTE FDD Band 4-15MHz Channel Bandwidth Band Edge Compliance	
QPSK	16QAM
1RB#0	1RB#0
Low Channel	
	
1RB#0	1RB#0
High Channel	

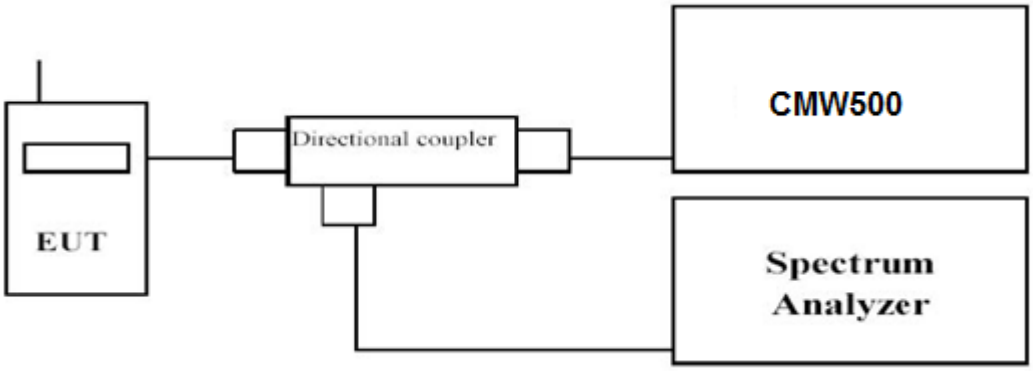
LTE FDD Band 4-20MHz Channel Bandwidth Band Edge Compliance	
QPSK	16QAM
1RB#0	1RB#0
Low Channel	
1RB#0	1RB#0
High Channel	

4.5 Spurious Emssion on Antenna Port

LIMIT

According to §27.53 (h): For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

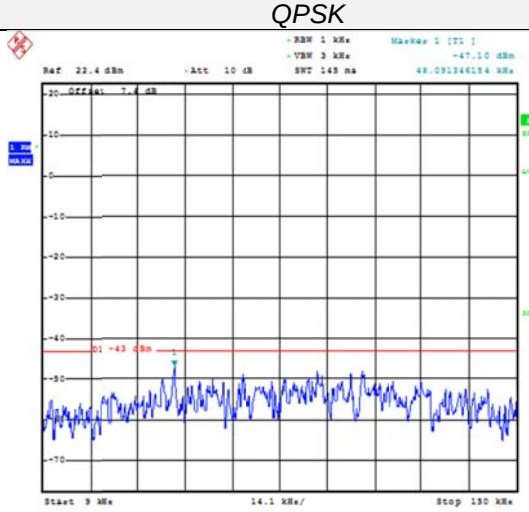
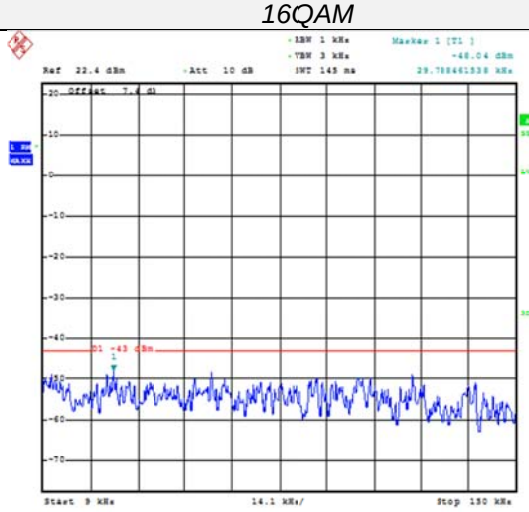
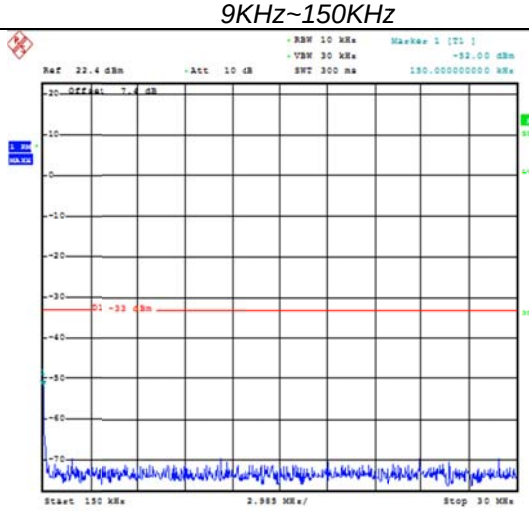
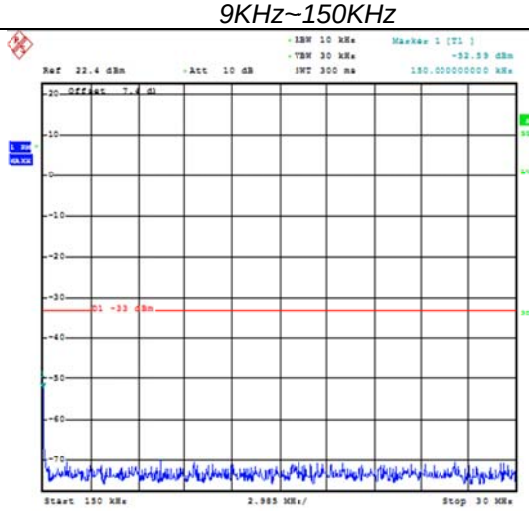
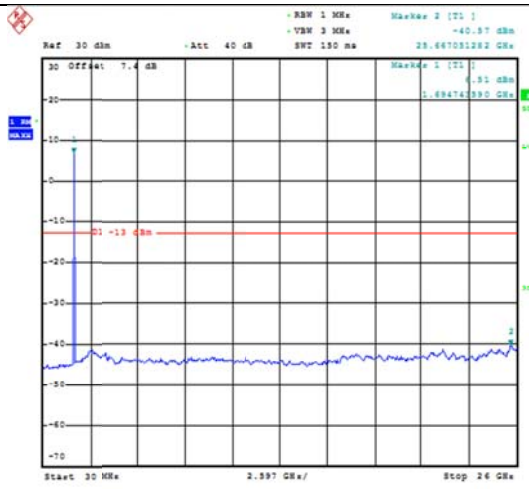
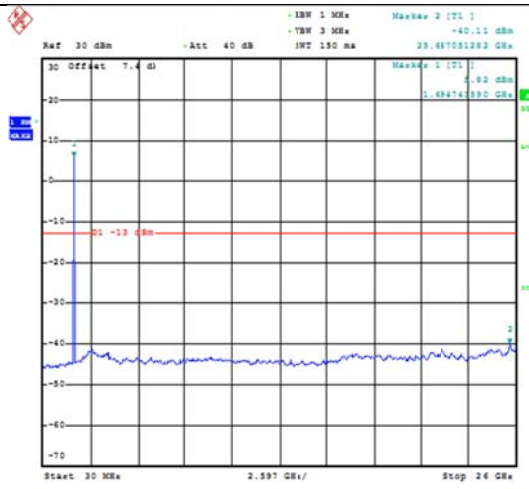
a. Place the EUT on a bench and set it in transmitting mode.
b. Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
c. EUT Communicate with CMW500, then select a channel for testing.
d. Add a correction factor to the display of spectrum, and then test.
e. The resolution bandwidth of the spectrum analyzer was set sufficient scans were taken to show the out of band Emission if any up to10th harmonic.
f. Please refer to following tables for test antenna conducted emissions.

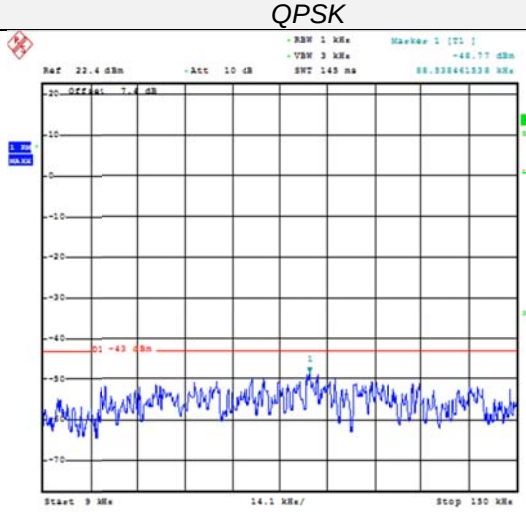
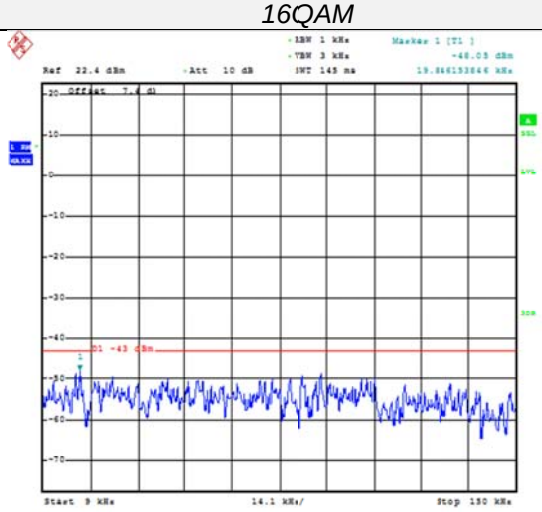
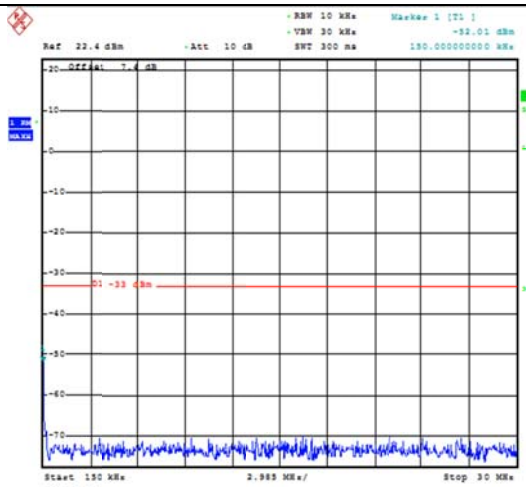
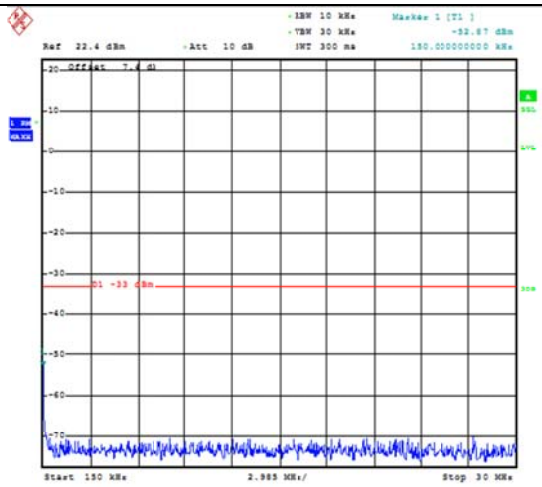
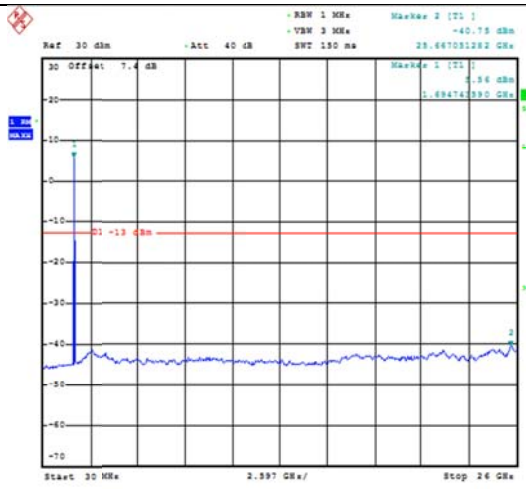
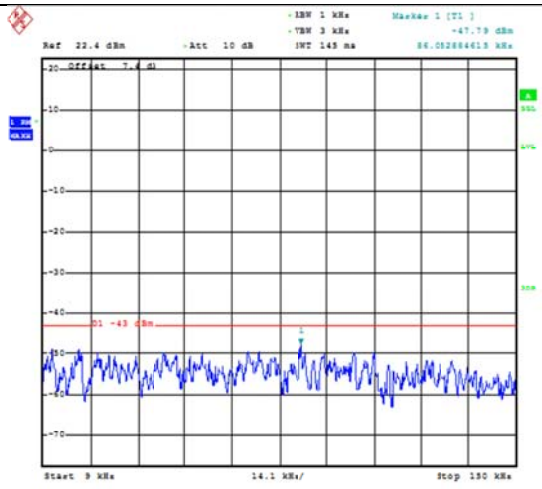
Working Frequency	Sub range (GHz)	RBW	VBW	Sweep time (s)
LTE FDD Band 4	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~26.5	1 MHz	3 MHz	Auto

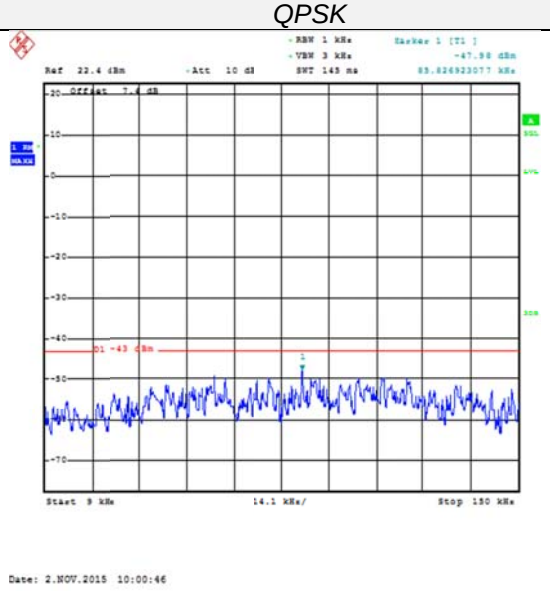
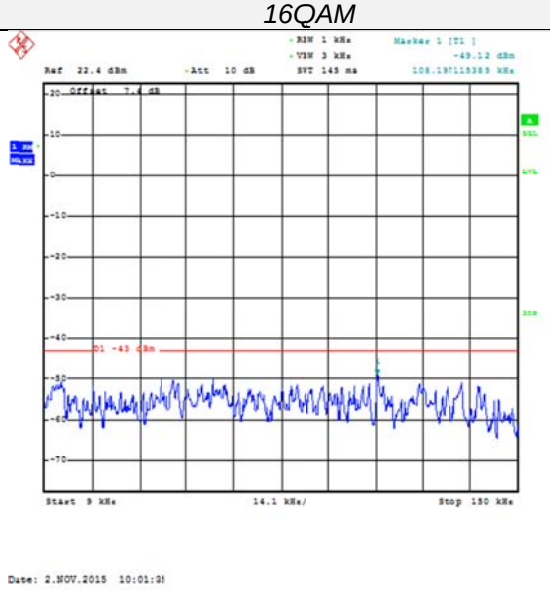
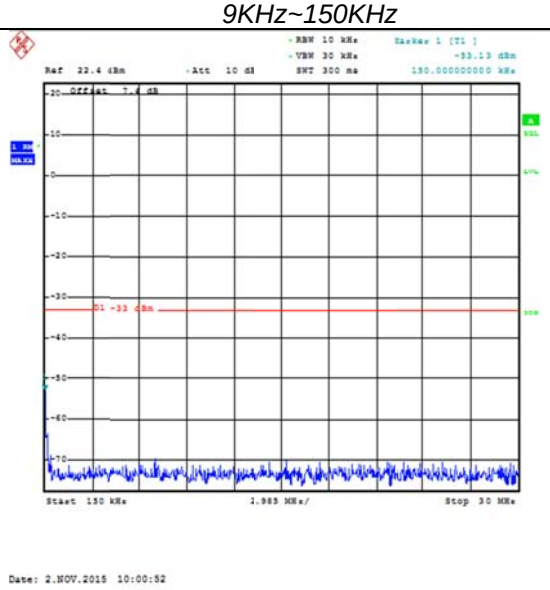
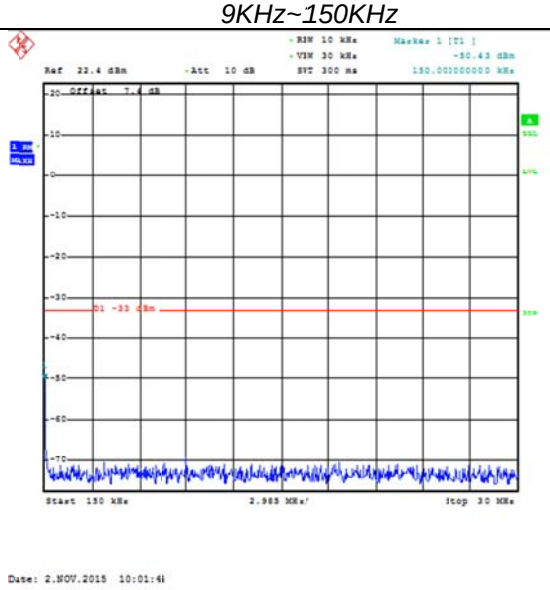
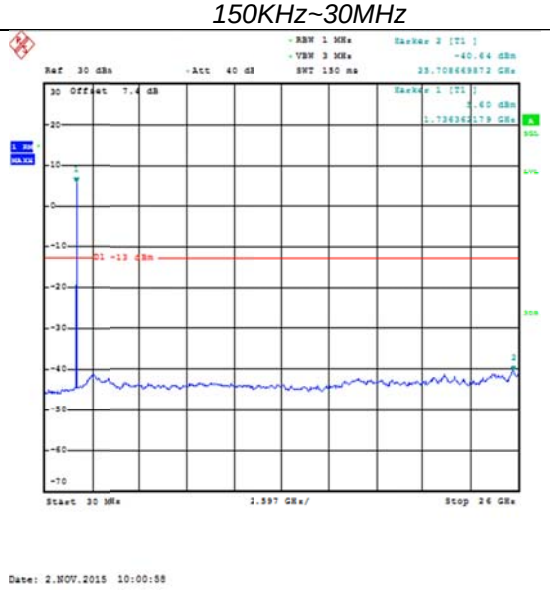
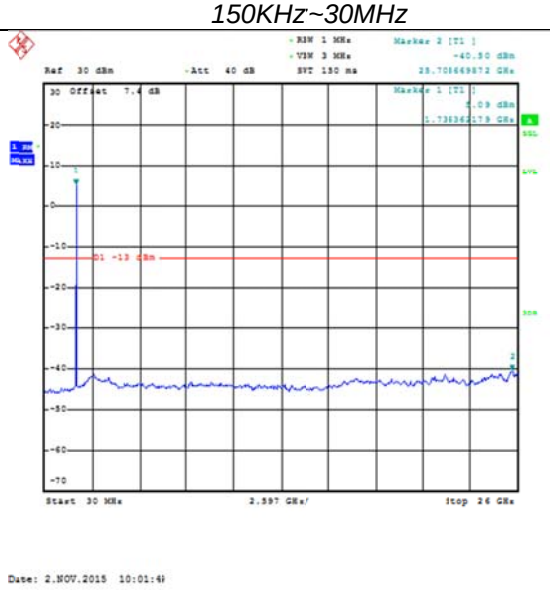
TEST RESULTS

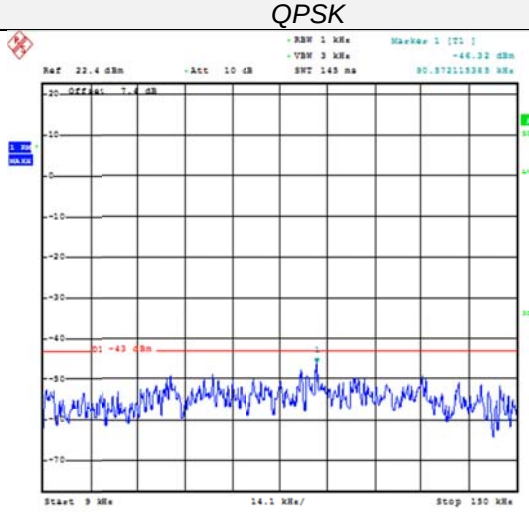
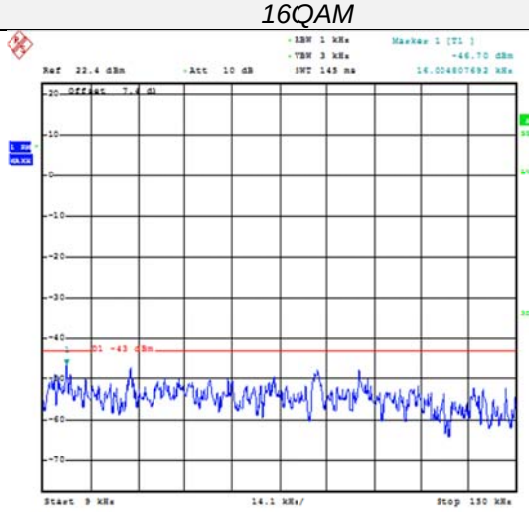
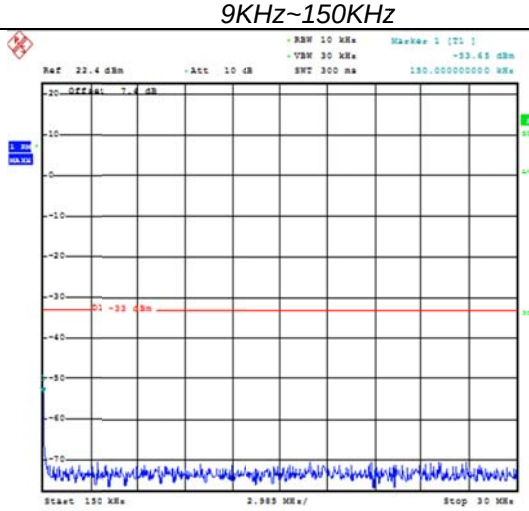
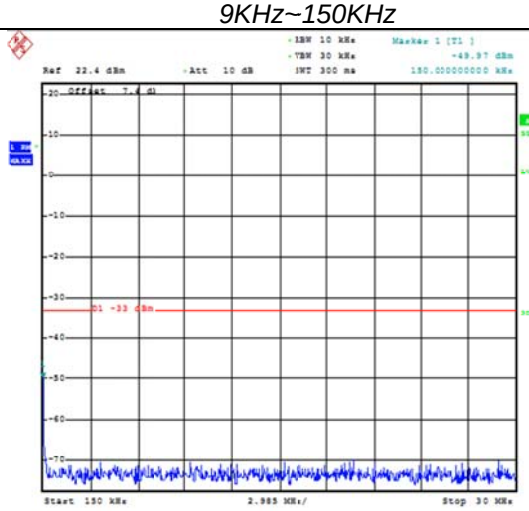
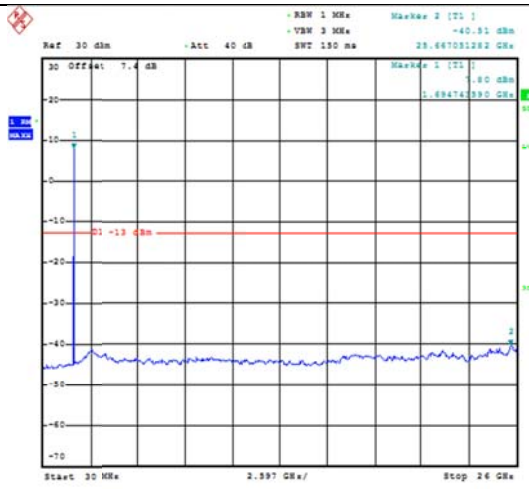
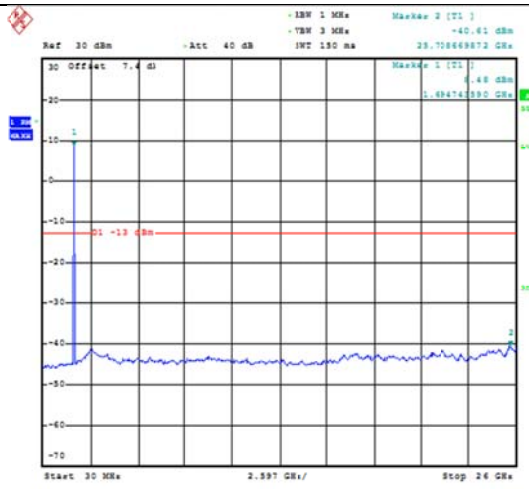
Remark:

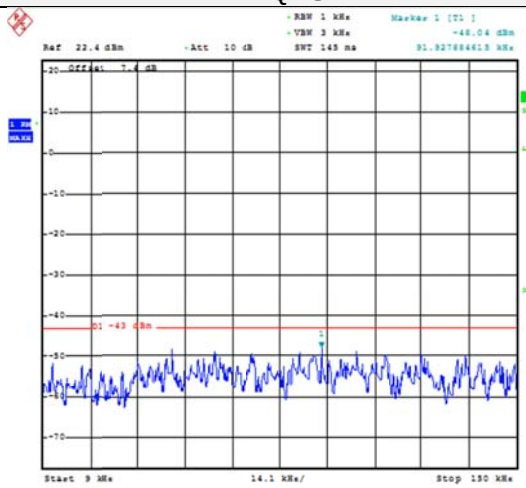
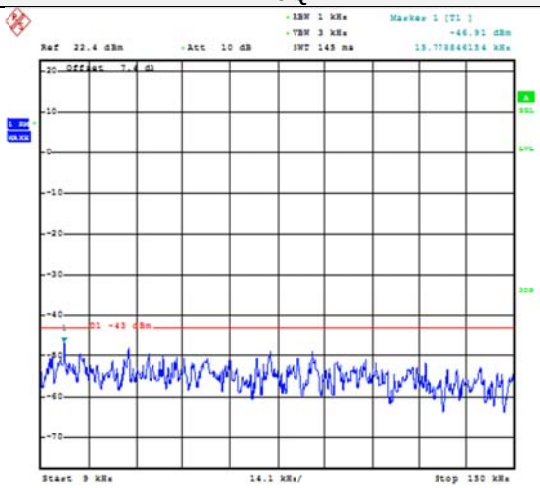
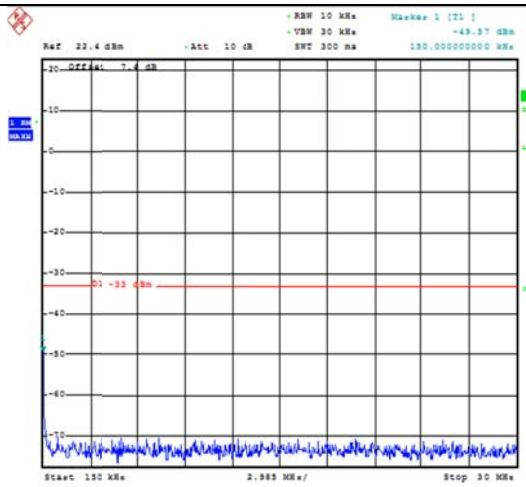
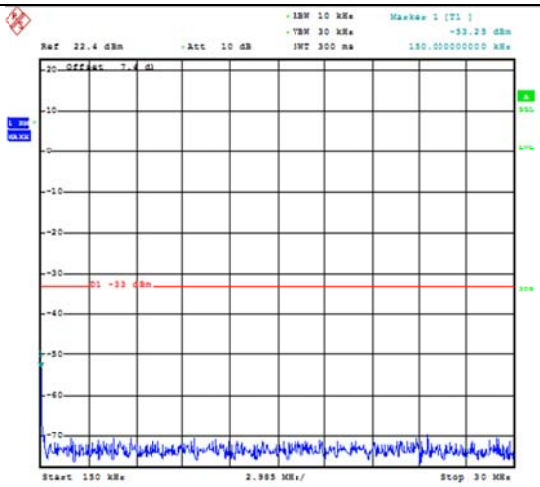
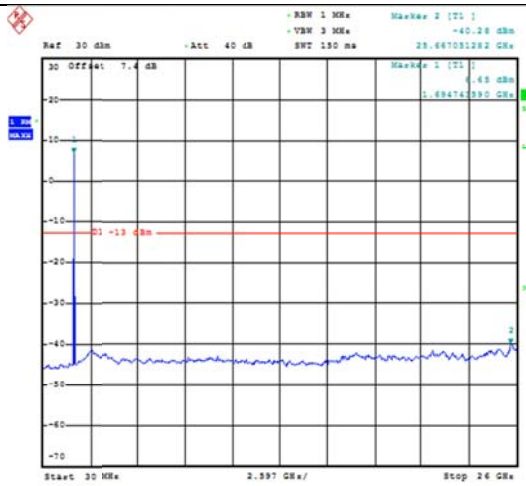
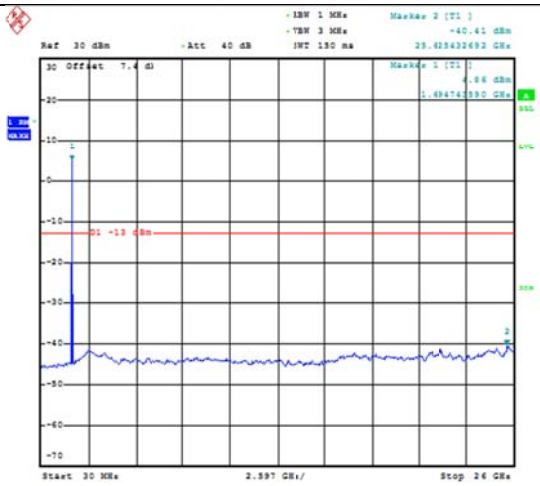
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4; recorded worst case for each Channel Bandwidth of LTE FDD Band 4.*

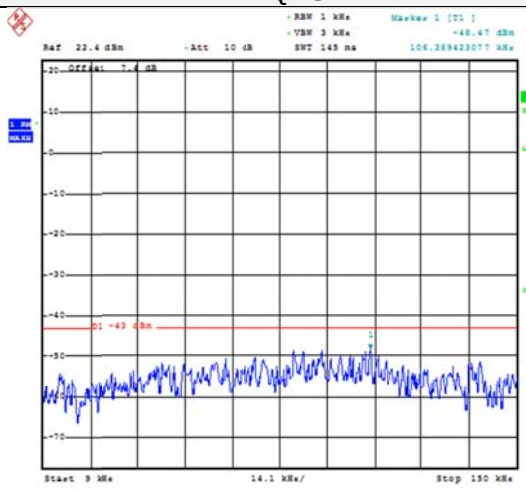
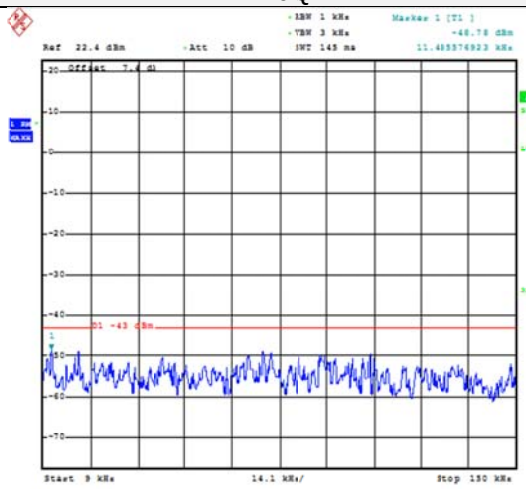
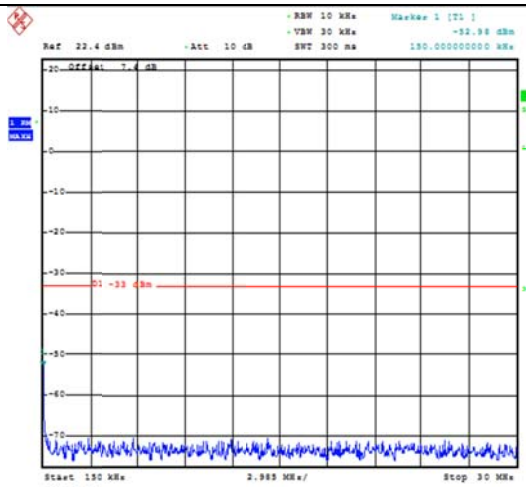
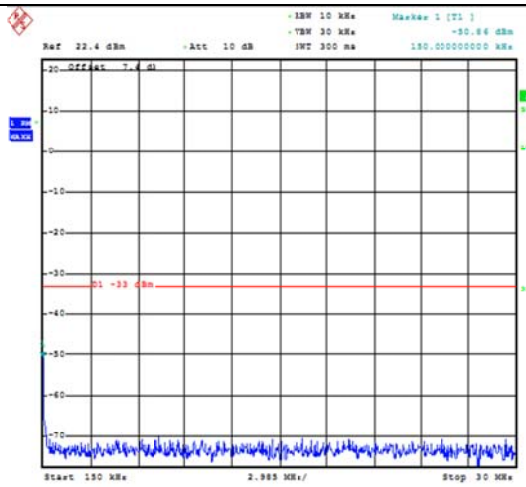
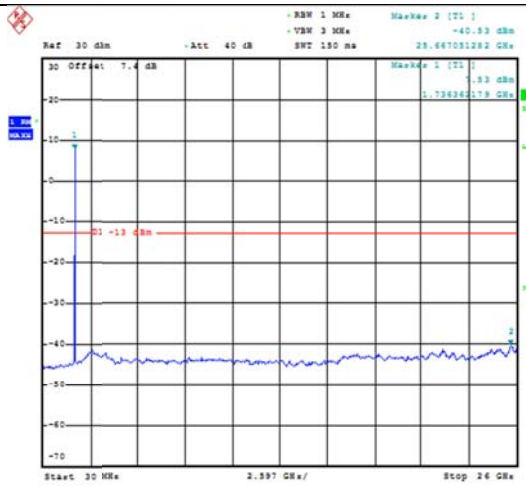
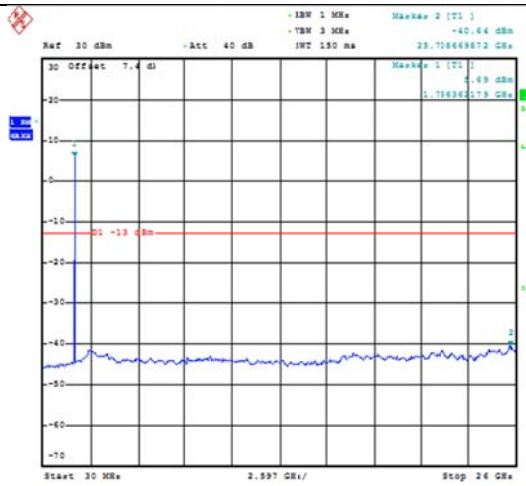
LTE FDD Band 4-1.4MHz Channel Bandwidth	
Low Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

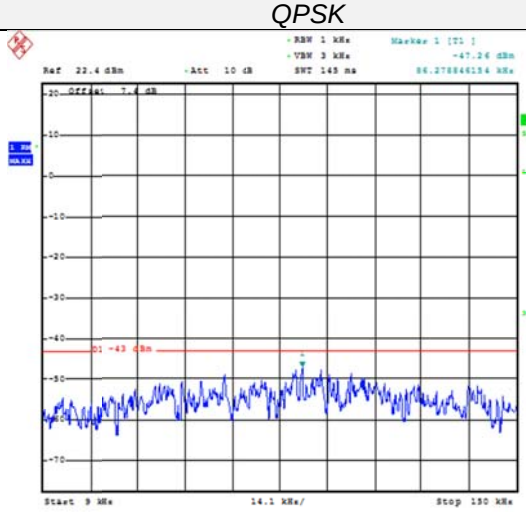
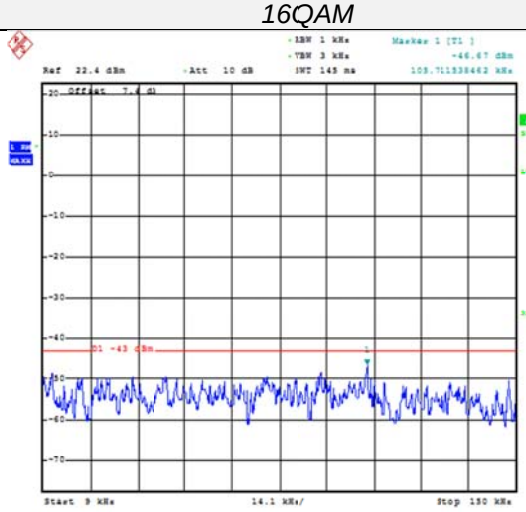
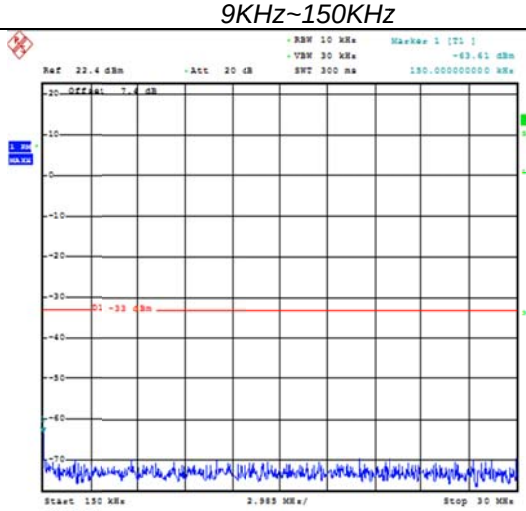
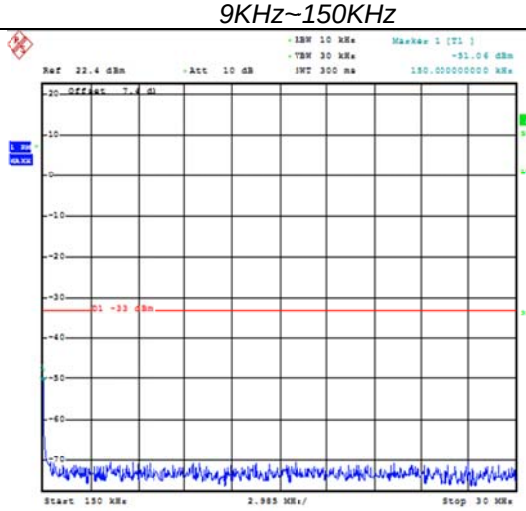
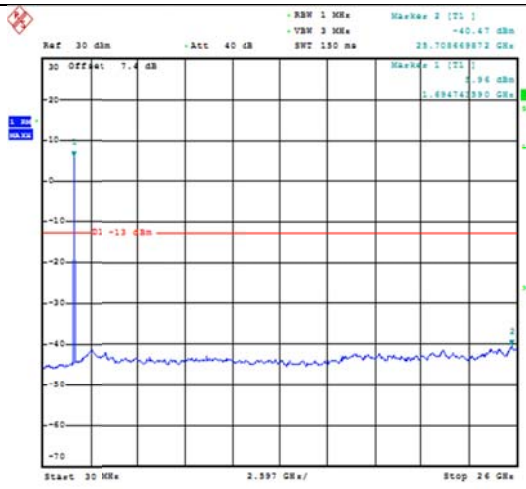
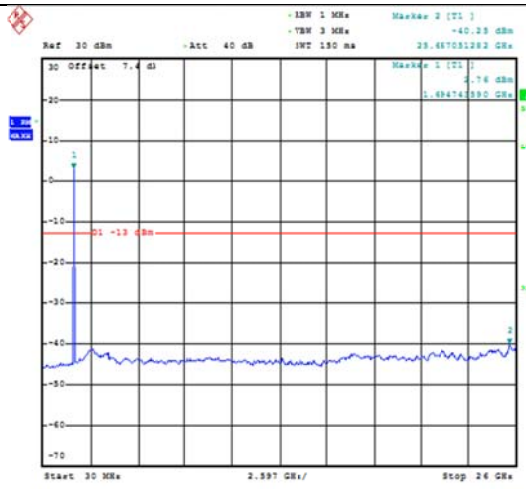
LTE FDD Band 4-1.4MHz Channel Bandwidth	
Middle Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

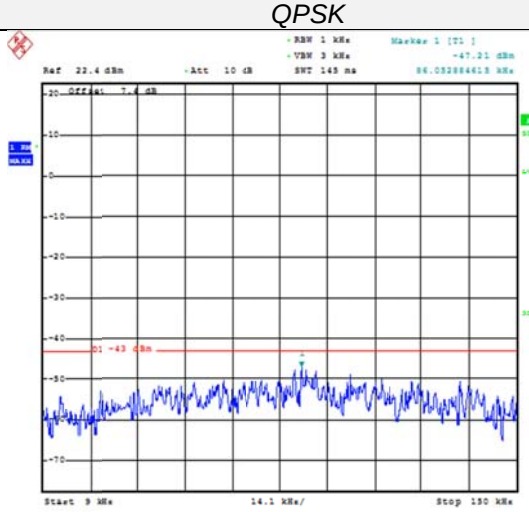
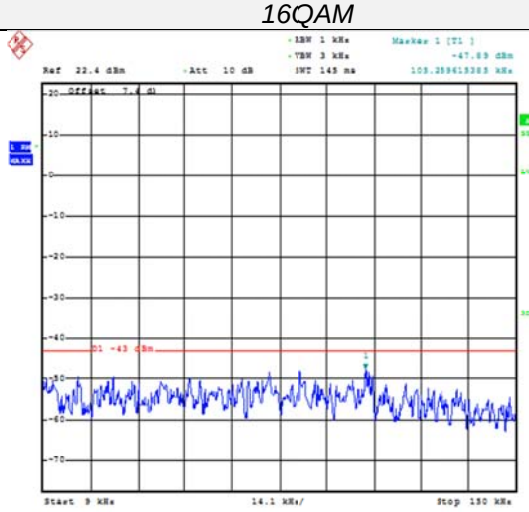
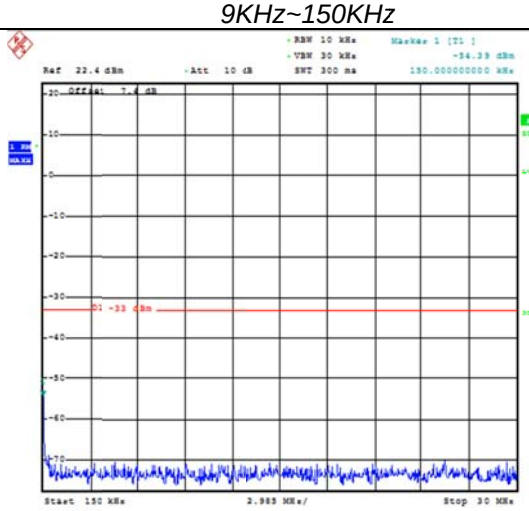
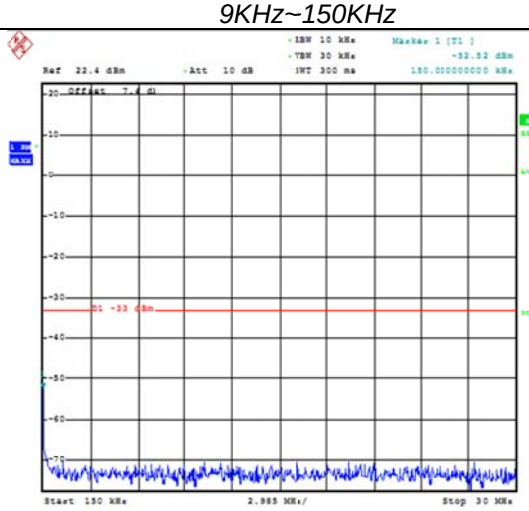
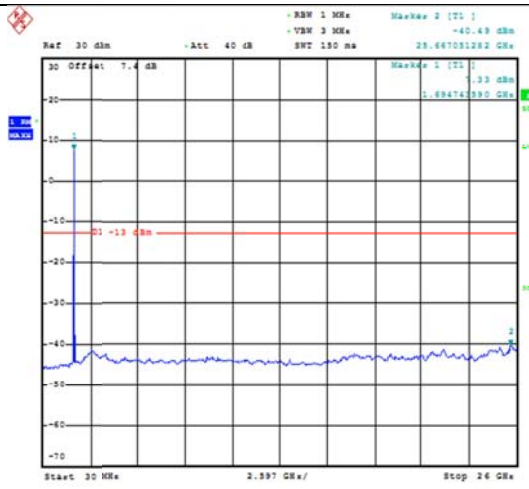
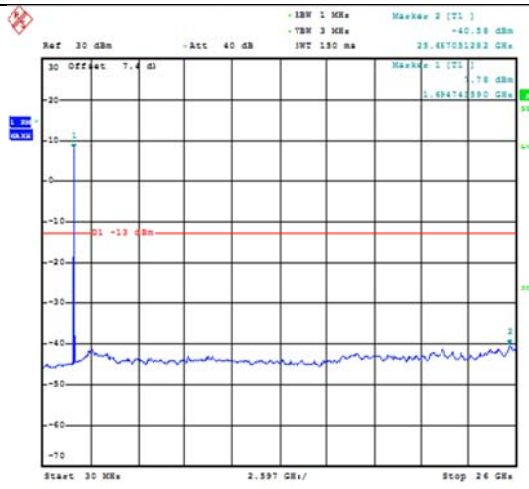
LTE FDD Band 4-1.4MHz Channel Bandwidth	
High Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

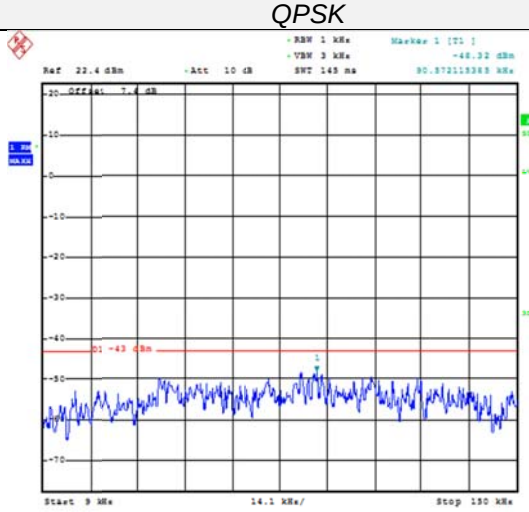
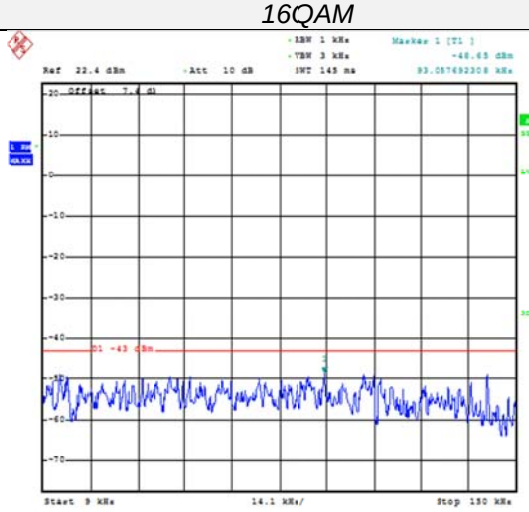
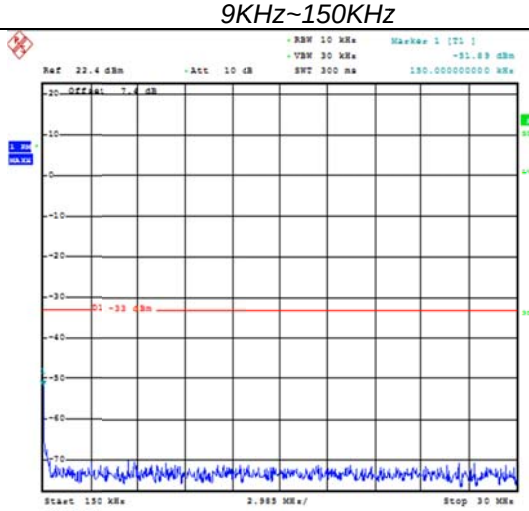
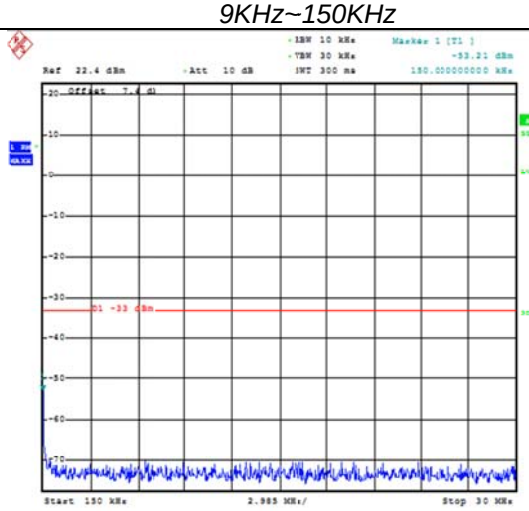
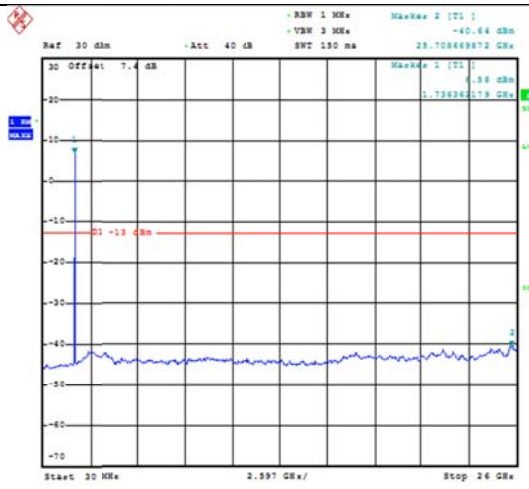
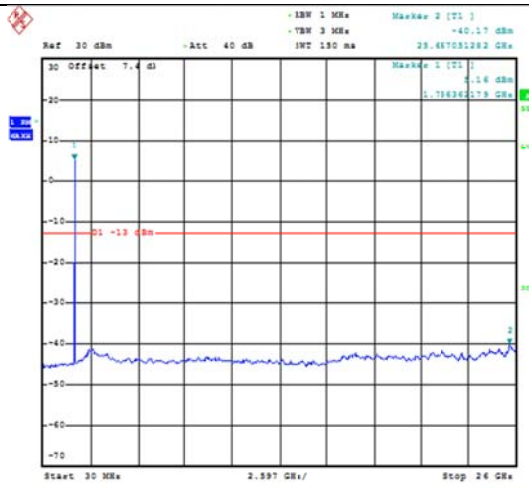
LTE FDD Band 4-3MHz Channel Bandwidth	
Low Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

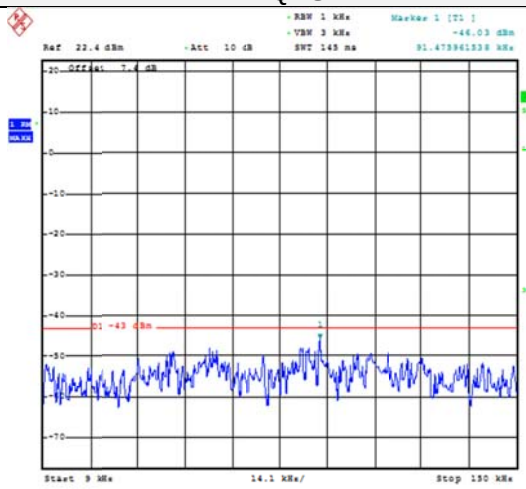
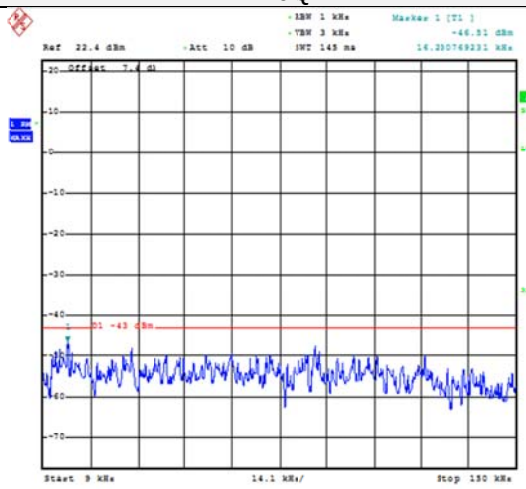
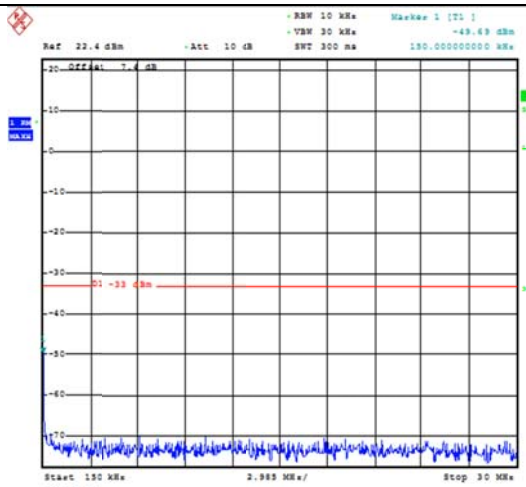
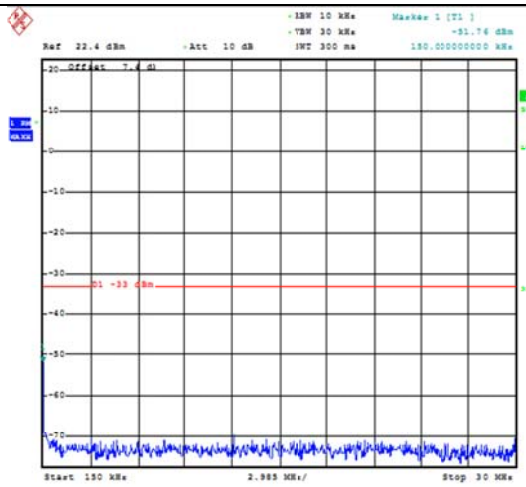
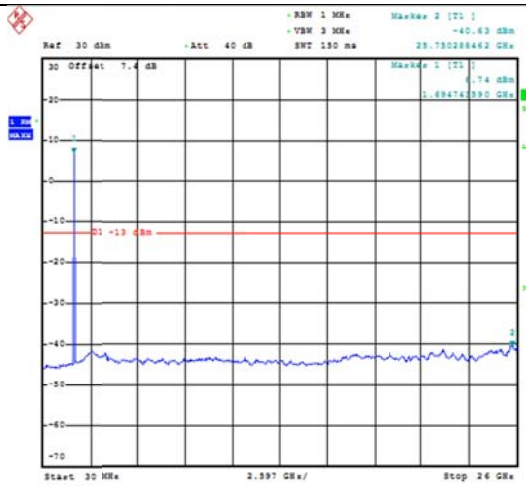
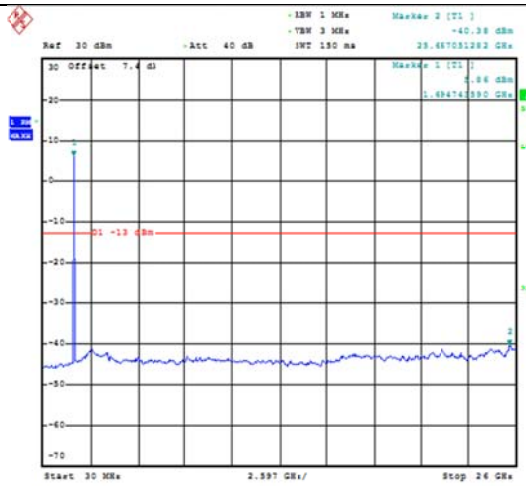
LTE FDD Band 4-3MHz Channel Bandwidth	
Middle Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

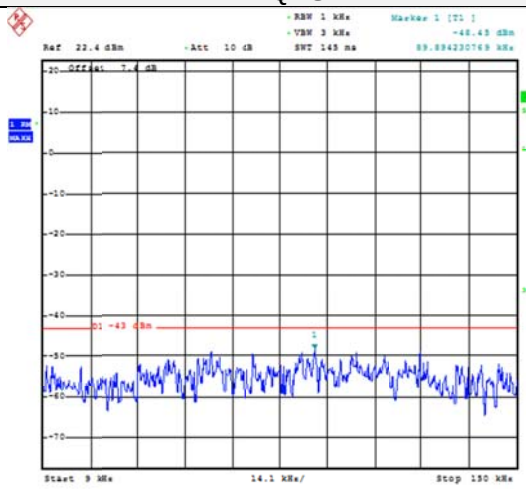
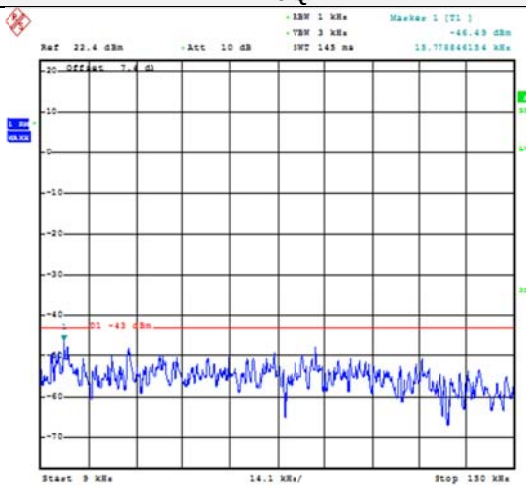
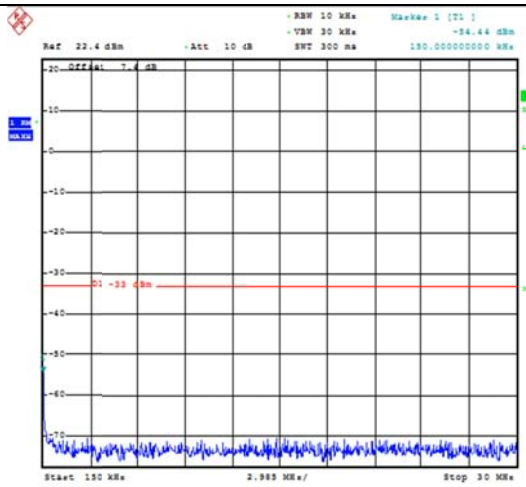
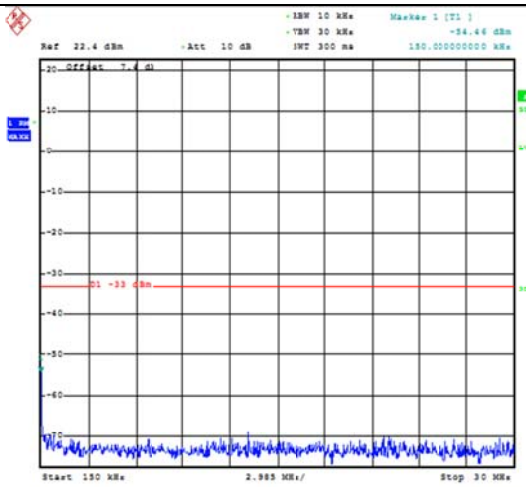
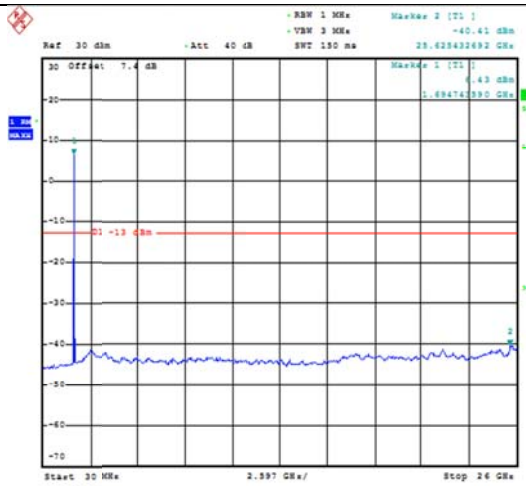
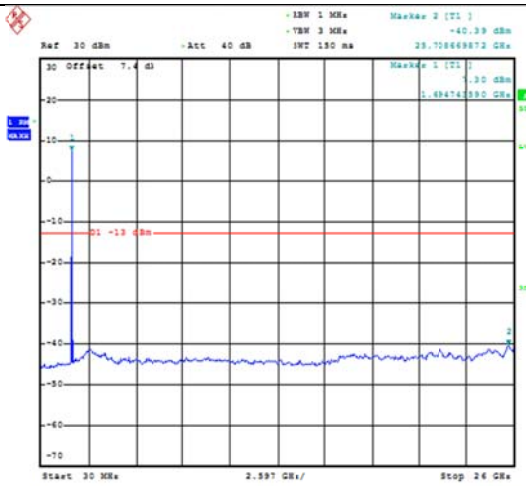
LTE FDD Band 4-3MHz Channel Bandwidth	
High Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

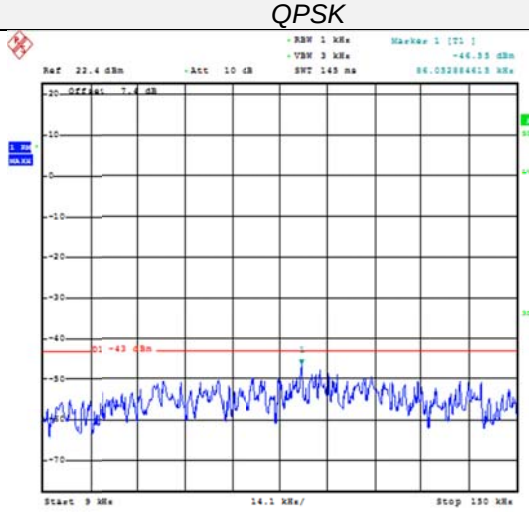
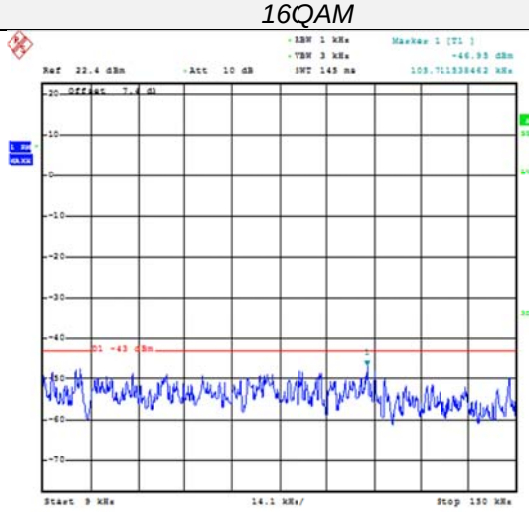
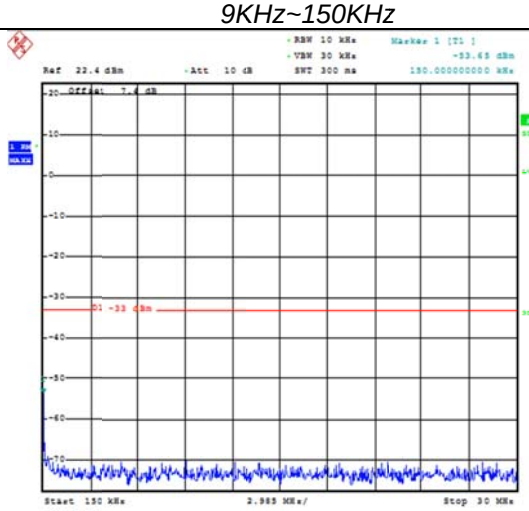
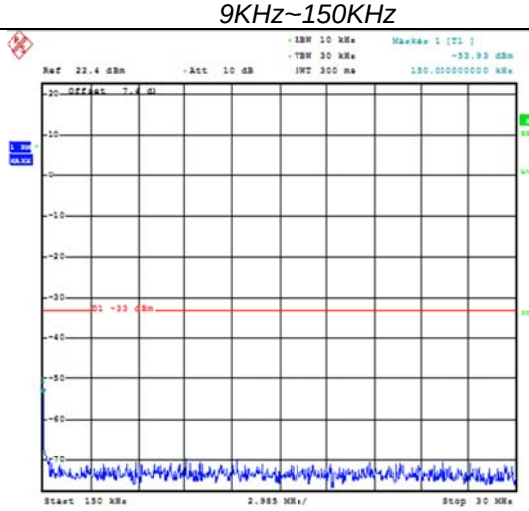
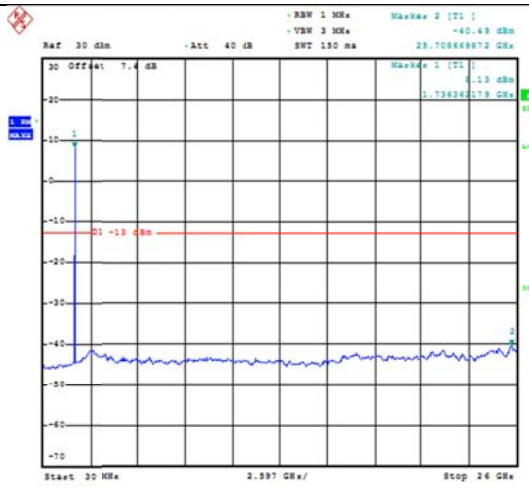
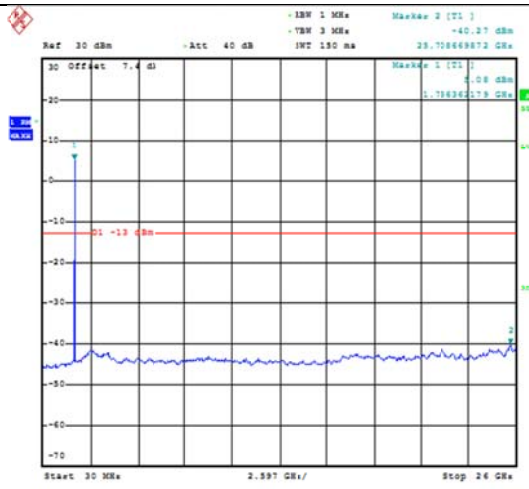
LTE FDD Band 4-5MHz Channel Bandwidth	
Low Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

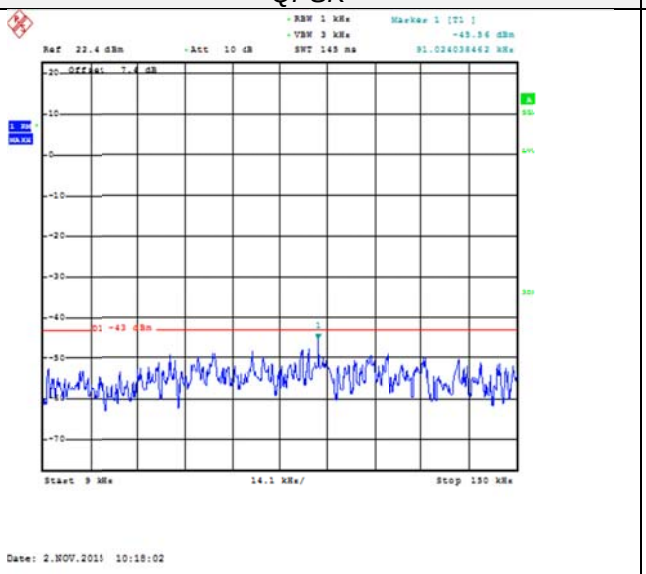
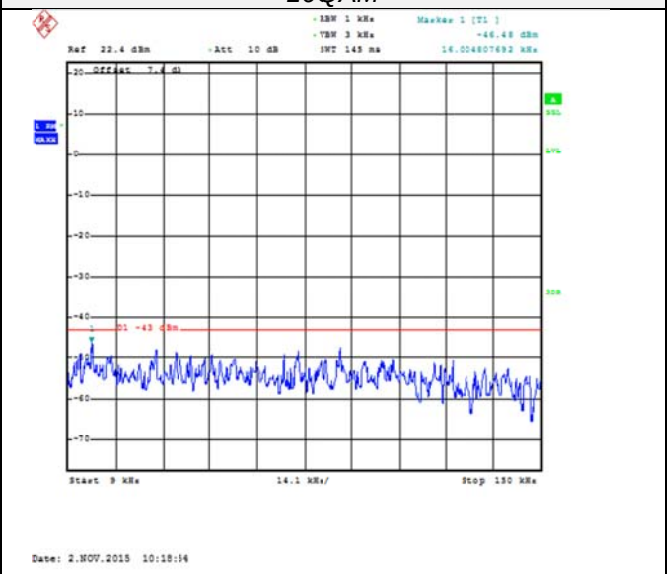
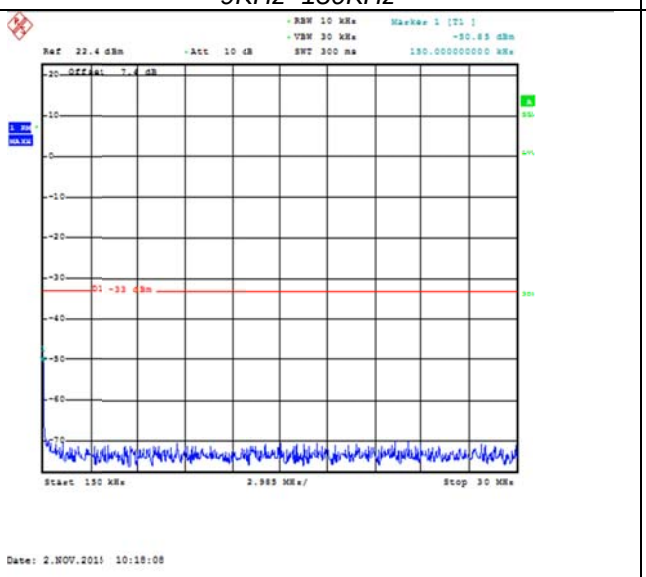
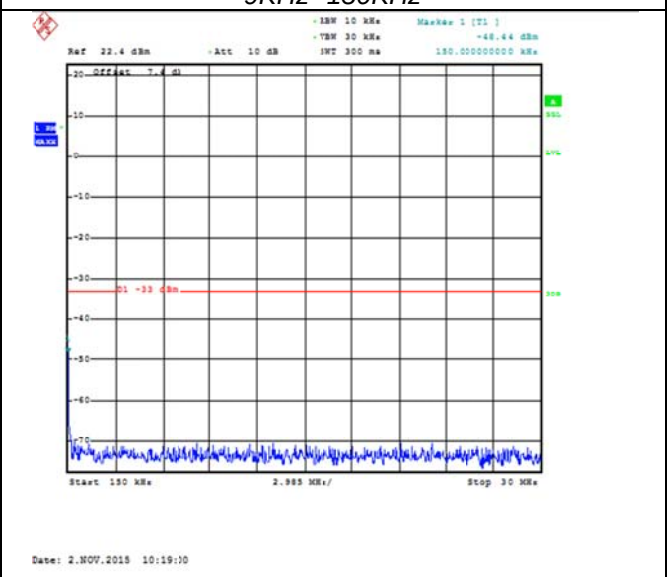
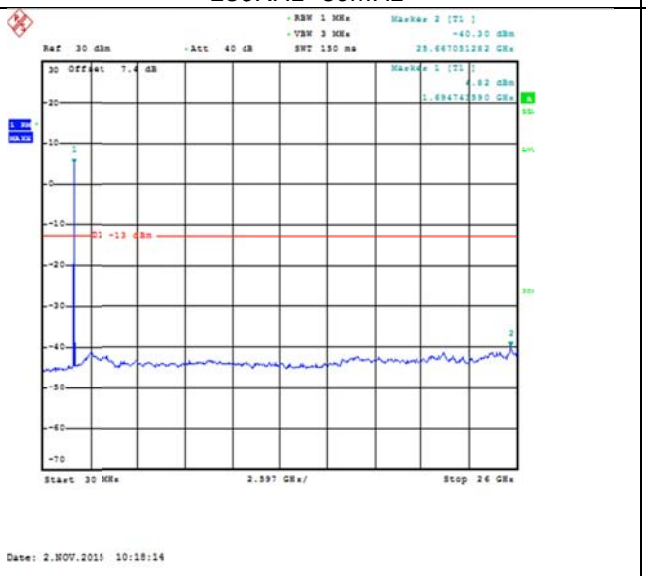
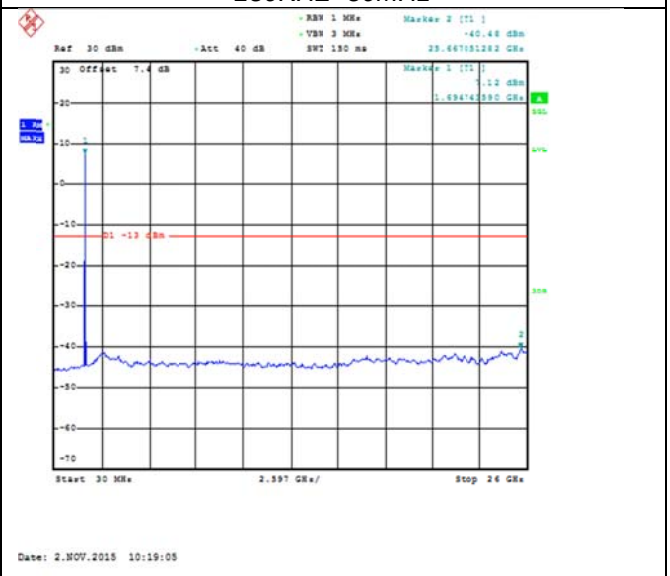
LTE FDD Band 4-5MHz Channel Bandwidth	
Middle Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

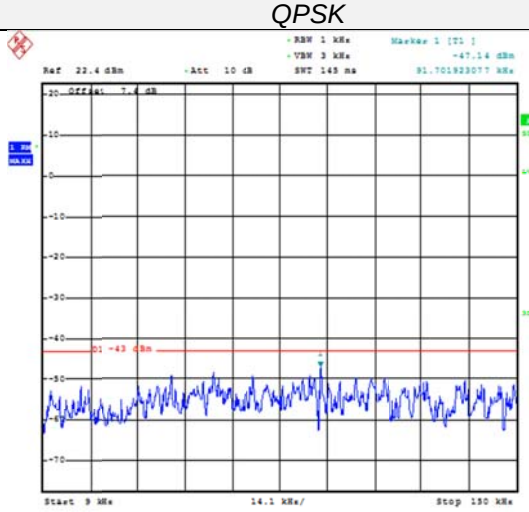
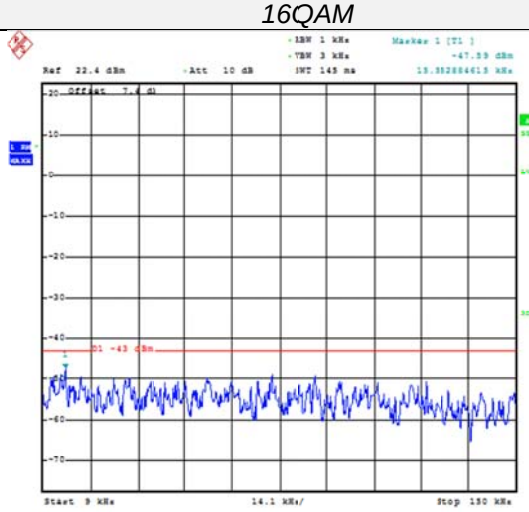
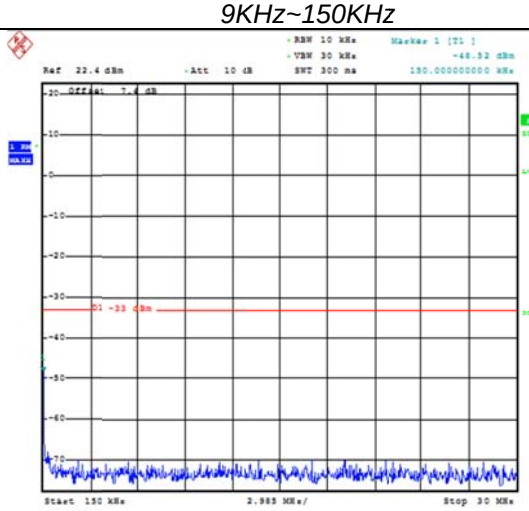
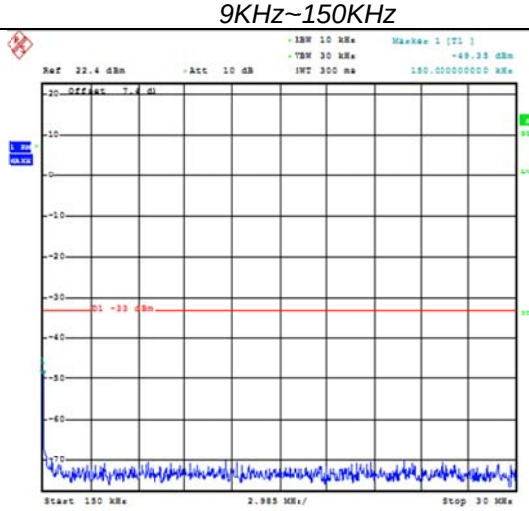
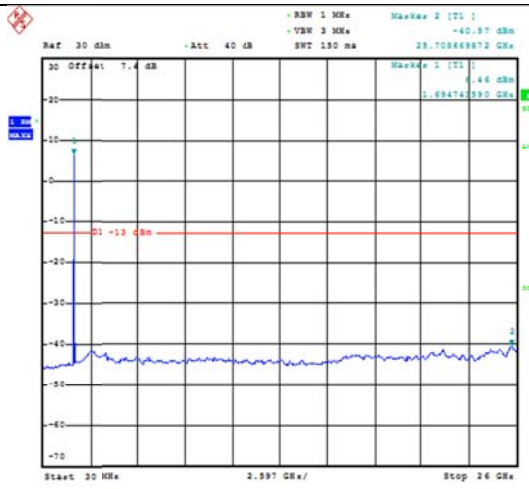
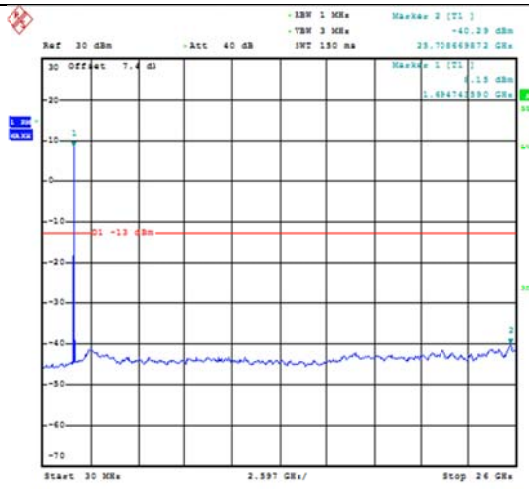
LTE FDD Band 4-5MHz Channel Bandwidth	
High Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

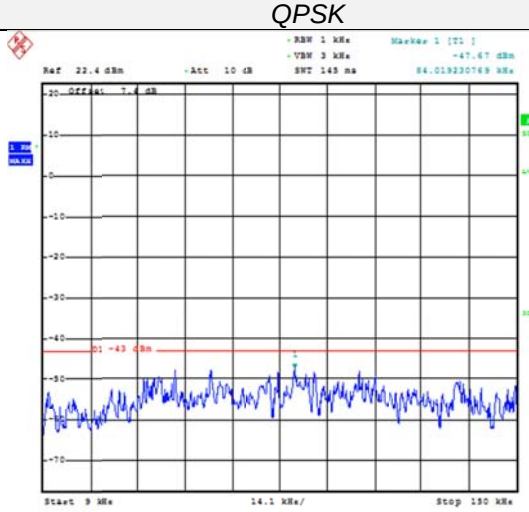
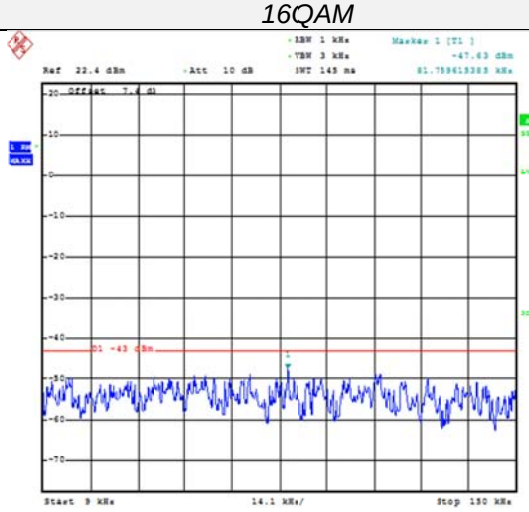
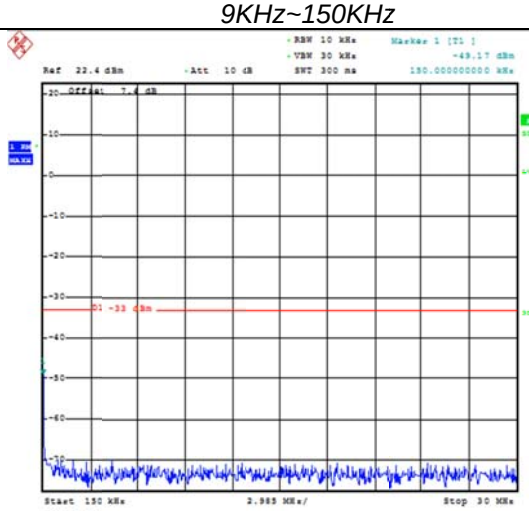
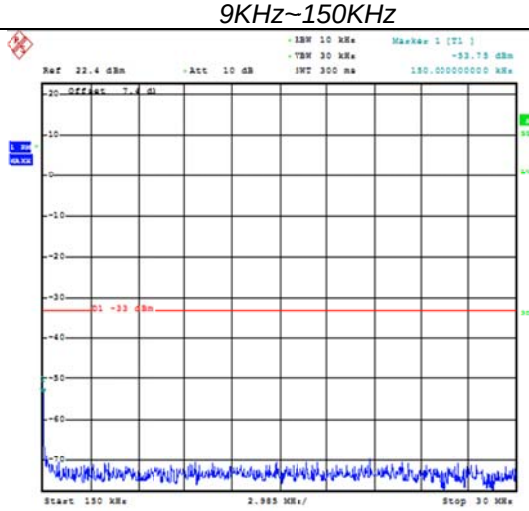
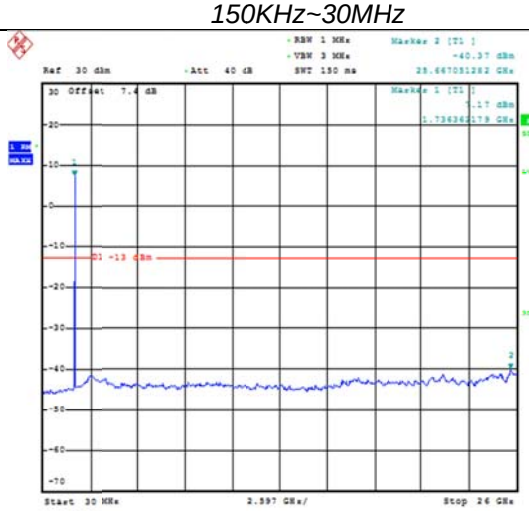
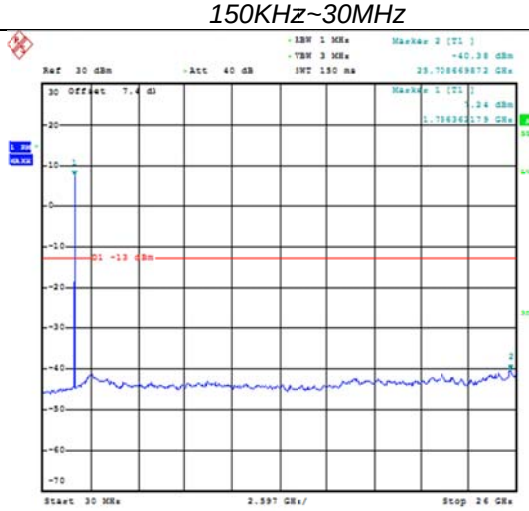
LTE FDD Band 4-10MHz Channel Bandwidth	
Low Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

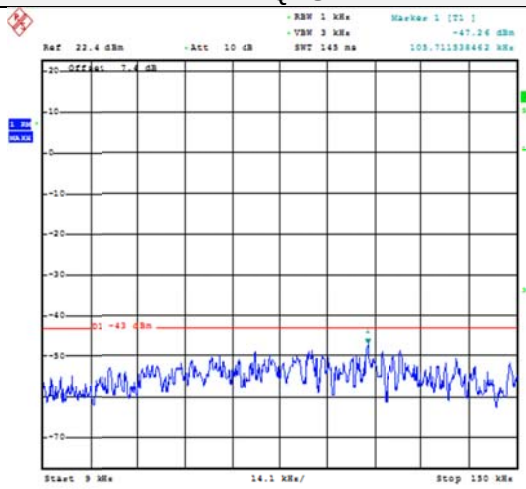
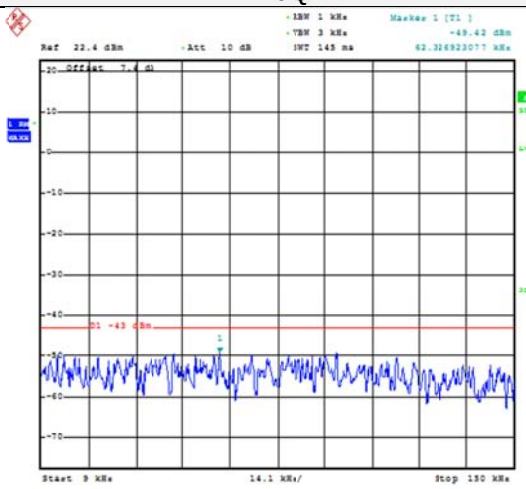
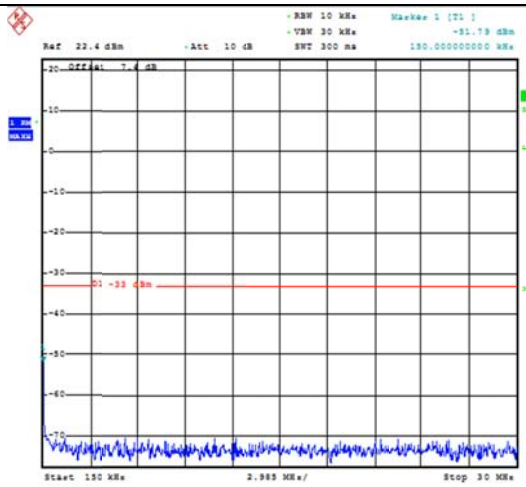
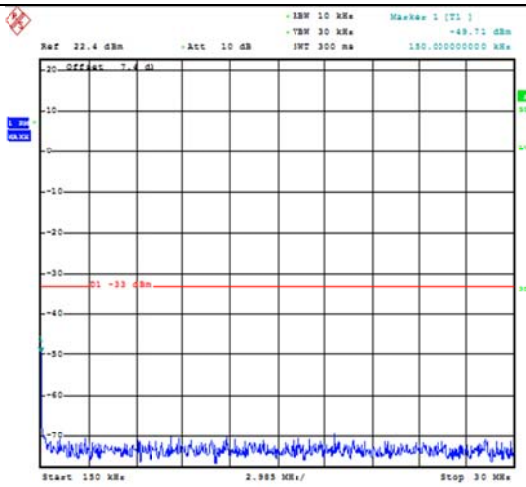
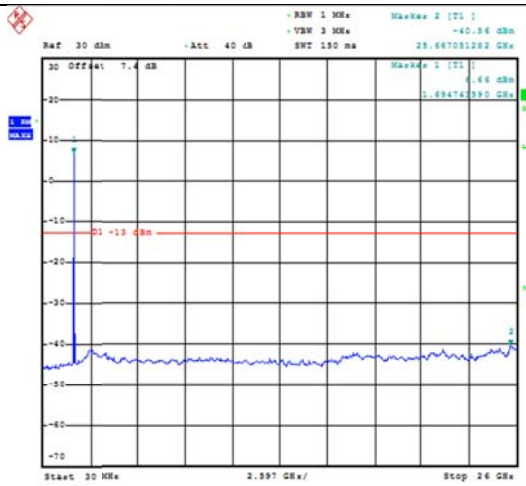
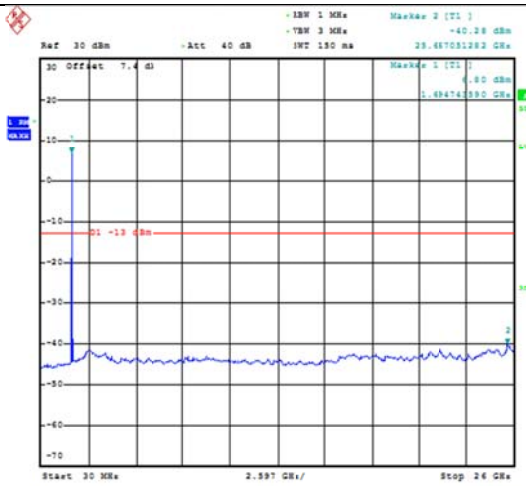
LTE FDD Band 4-10MHz Channel Bandwidth	
Middle Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

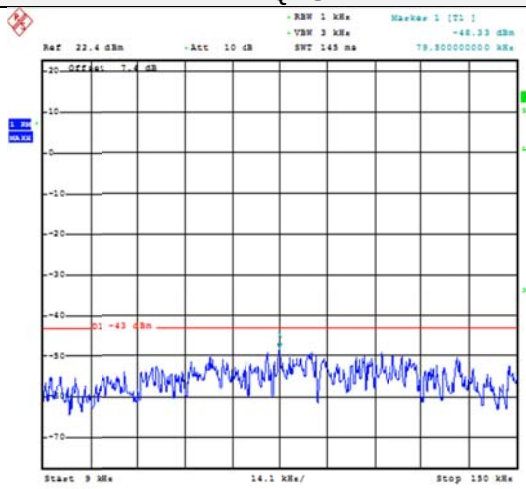
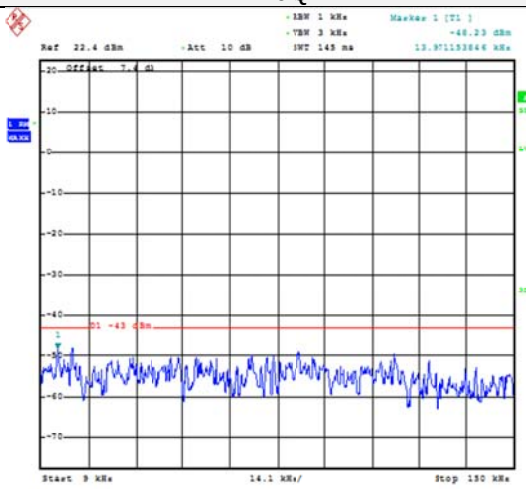
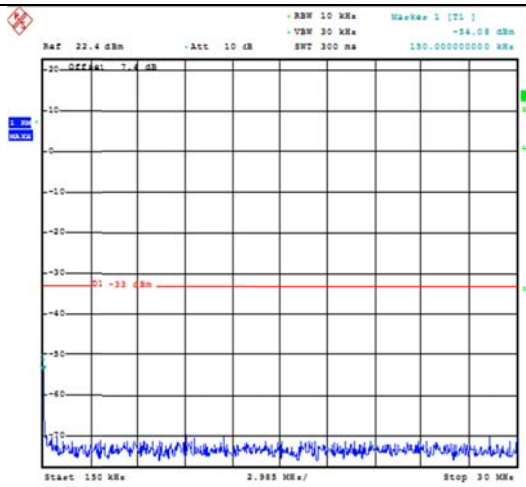
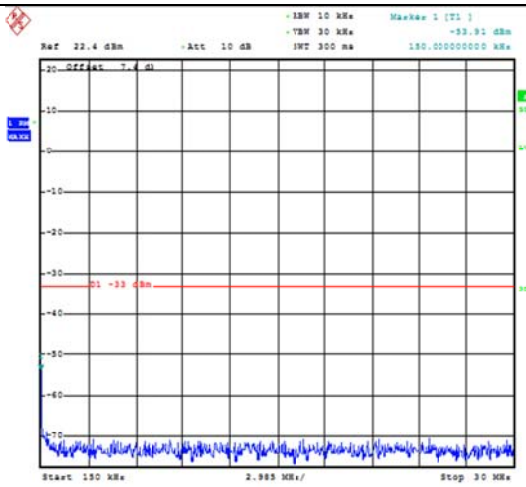
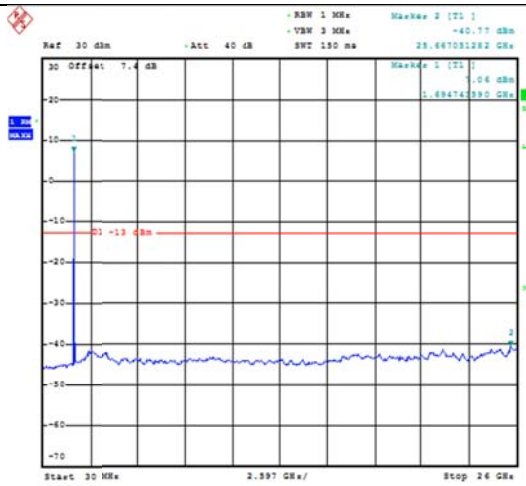
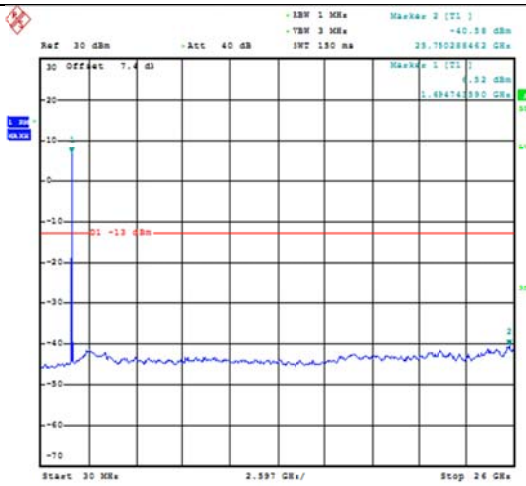
LTE FDD Band 4-10MHz Channel Bandwidth	
High Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

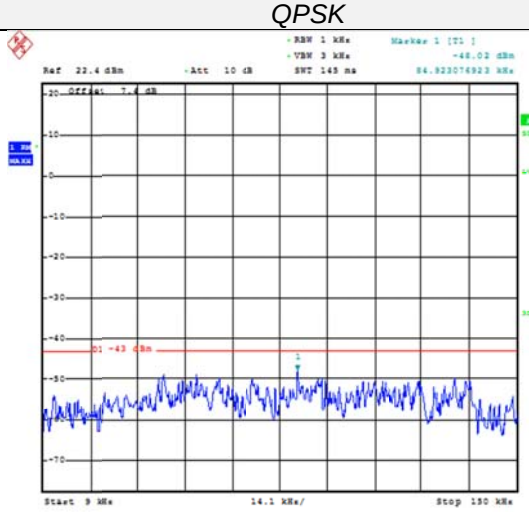
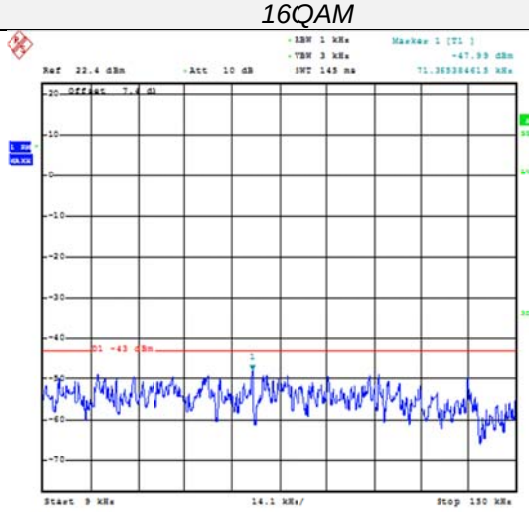
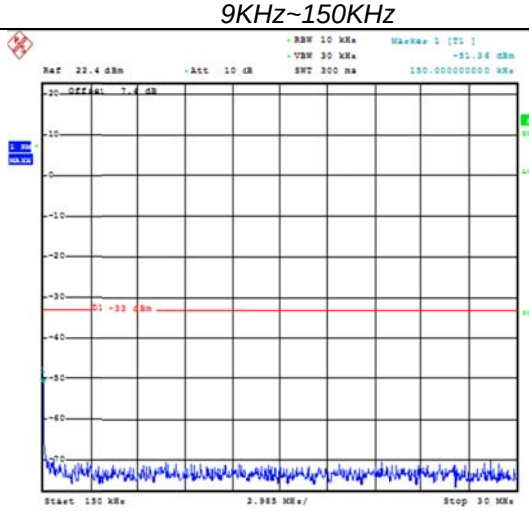
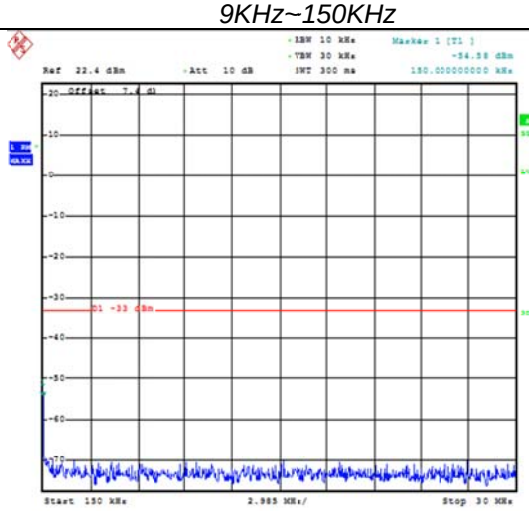
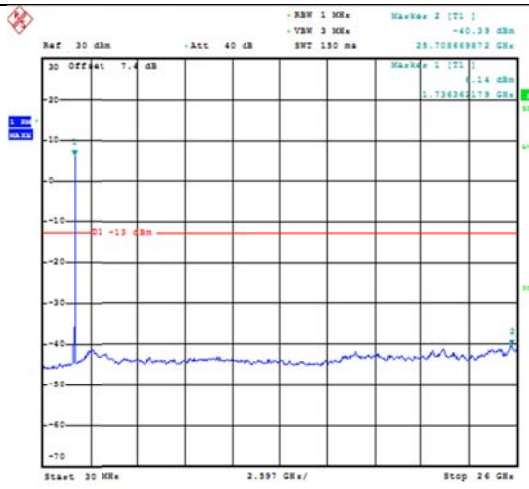
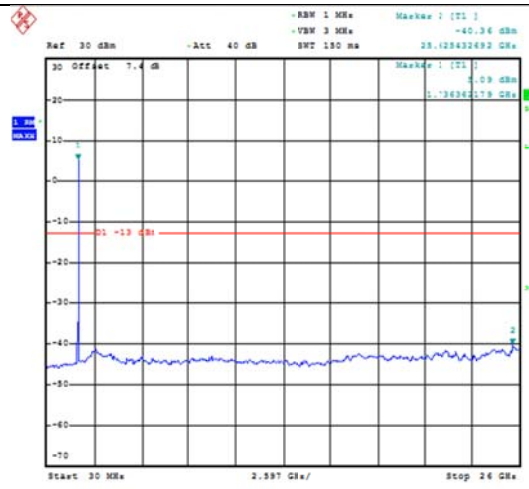
LTE FDD Band 4-15MHz Channel Bandwidth	
Low Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

LTE FDD Band 4-15MHz Channel Bandwidth	
Middle Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

LTE FDD Band 4-15MHz Channel Bandwidth	
High Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

LTE FDD Band 4-20MHz Channel Bandwidth	
Low Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

LTE FDD Band 4-20MHz Channel Bandwidth	
Middle Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

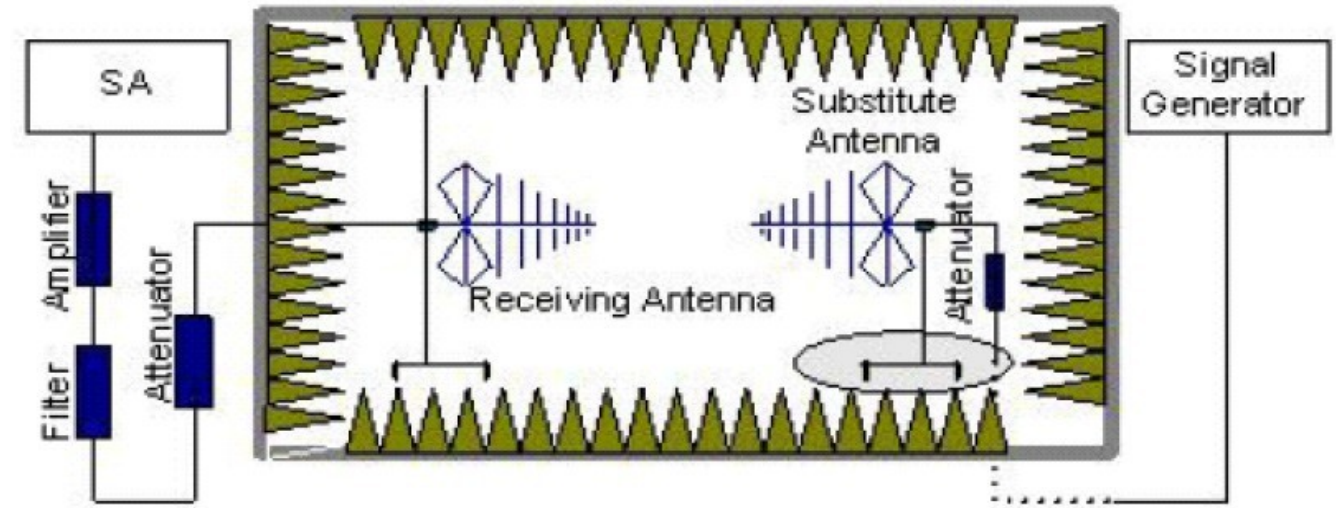
LTE FDD Band 4-20MHz Channel Bandwidth	
High Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz
1RB#0	1RB#0

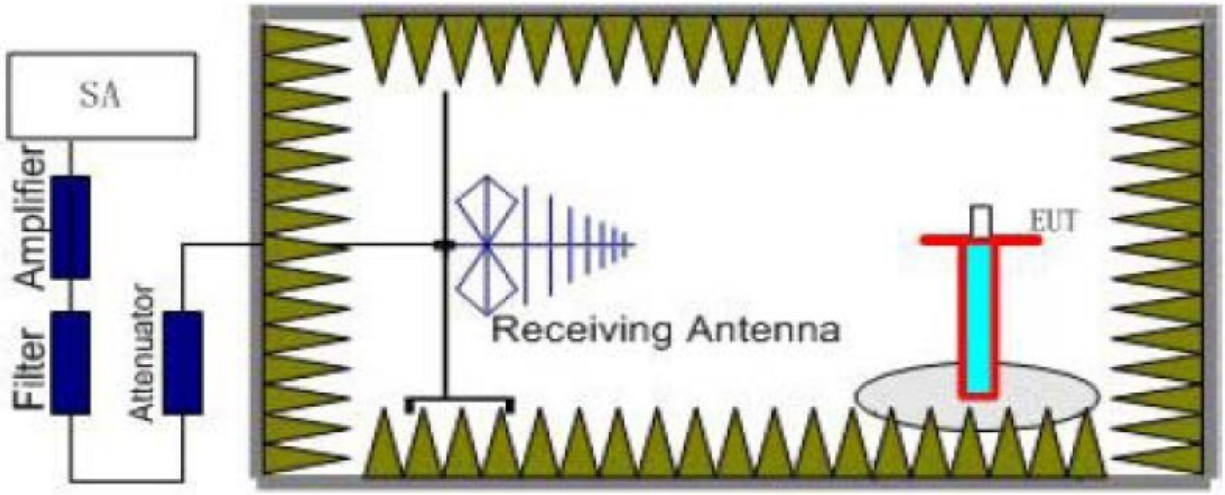
4.6 Radiated Spurious Emssion

LIMIT

According to §27.53 (h): For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.

TEST CONFIGURATION





TEST PROCEDURE

1. EUT was placed on a 1.50 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 EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the

frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} + G_a
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.
8. In order to make sure test results more clearly,we set frequency range and sweep time for difference frequency range as follows table:

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
LTE FDD Band 4	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2

TEST LIMITS

According to 27.53(h) specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(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.

Frequency	Channel	Frequency Range	Verdict
LTE FDD Band 4	Low	9KHz -20GHz	PASS
	Middle	9KHz -20GHz	PASS
	High	9KHz -20GHz	PASS

Radiated Measurement:

Remark:
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4; recorded worst case for each Channel Bandwidth of LTE FDD Band 4.*
2. *EIRP=P_{Mea}(dBm)-P_{cl}(dB) +G_a(dBi)*
3. *We were not recorded other points as values lower than limits.*
4. *Margin = Limit – EIRP*

LTE FDD Band 4_Channel Bandwidth 1.4MHz_QPSK_ Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3421.4	-44.22	4.02	3	12.50	-35.74	-13	22.74	H
5132.1	-50.75	5.11	3	13.38	-42.48	-13	29.48	H
3421.4	-41.74	4.02	3	12.50	-33.26	-13	20.26	V
5132.1	-48.57	5.11	3	13.38	-40.30	-13	27.30	V

LTE FDD Band 4_Channel Bandwidth 1.4MHz_QPSK_ Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-44.54	4.02	3	12.45	-36.11	-13	23.11	H
5197.5	-49.75	5.11	3	13.38	-41.48	-13	28.48	H
3465.0	-43.95	4.02	3	12.45	-35.52	-13	22.52	V
5197.5	-47.60	5.11	3	13.38	-39.33	-13	26.33	V

LTE FDD Band 4_Channel Bandwidth 1.4MHz_QPSK_ High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3508.6	-43.48	4.02	3	12.21	-35.29	-13	22.29	H
5262.9	-50.85	5.11	3	13.26	-42.70	-13	29.70	H
3508.6	-40.78	4.02	3	12.21	-32.59	-13	19.59	V
5262.9	-50.02	5.11	3	13.26	-41.87	-13	28.87	V

LTE FDD Band 4_Channel Bandwidth 3MHz_QPSK_ Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3423.0	-44.57	4.02	3	12.21	-36.38	-13	23.38	H
5134.5	-51.56	5.11	3	13.26	-43.41	-13	30.41	H
3423.0	-41.45	4.02	3	12.21	-33.26	-13	20.26	V
5134.5	-49.64	5.11	3	13.26	-41.49	-13	28.49	V

LTE FDD Band 4_Channel Bandwidth 3MHz_QPSK_ Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-43.99	4.02	3	12.45	-35.56	-13	22.56	H
5197.5	-50.56	5.11	3	13.38	-42.29	-13	29.29	H
3465.0	-41.82	4.02	3	12.45	-33.39	-13	20.39	V
5197.5	-49.01	5.11	3	13.38	-40.74	-13	27.74	V

LTE FDD Band 4_Channel Bandwidth 3MHz_QPSK_ High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3507.0	-44.69	4.02	3	12.21	-36.5	-13	23.50	H
5260.5	-51.41	5.11	3	13.26	-43.26	-13	30.26	H
3507.0	-43.93	4.02	3	12.21	-35.74	-13	22.74	V
5260.5	-50.34	5.11	3	13.26	-42.19	-13	29.19	V

LTE FDD Band 4_Channel Bandwidth 5MHz_QPSK_ Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3425.0	-43.68	4.02	3	12.5	-35.2	-13	22.20	H
5137.5	-52.74	5.11	3	13.38	-44.47	-13	31.47	H
3425.0	-43.06	4.02	3	12.5	-34.58	-13	21.58	V
5137.5	-51.82	5.11	3	13.38	-43.55	-13	30.55	V

LTE FDD Band 4_Channel Bandwidth 5MHz_QPSK_ Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-44.79	4.02	3	12.45	-36.36	-13	23.36	H
5197.5	-54.25	5.11	3	13.38	-45.98	-13	32.98	H
3465.0	-42.84	4.02	3	12.45	-34.41	-13	21.41	V
5197.5	-50.11	5.11	3	13.38	-41.84	-13	28.84	V

LTE FDD Band 4_Channel Bandwidth 5MHz_QPSK_ High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3505.0	-45.71	4.02	3	12.21	-37.52	-13	24.52	H
5257.5	-52.39	5.11	3	13.26	-44.24	-13	31.24	H
3505.0	-41.55	4.02	3	12.21	-33.36	-13	20.36	V
5257.5	-49.56	5.11	3	13.26	-41.41	-13	28.41	V

LTE FDD Band 4_Channel Bandwidth 10MHz_QPSK_ Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3430.0	-45.87	4.02	3	12.5	-37.39	-13	24.39	H
5145.0	-51.84	5.11	3	13.38	-43.57	-13	30.57	H
3430.0	-42.89	4.02	3	12.5	-34.41	-13	21.41	V
5145.0	-49.47	5.11	3	13.38	-41.2	-13	28.20	V

LTE FDD Band 4_Channel Bandwidth 10MHz_QPSK_ Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-45.17	4.02	3	12.45	-36.74	-13	23.74	H
5197.5	-52.53	5.11	3	13.38	-44.26	-13	31.26	H
3465.0	-43.98	4.02	3	12.45	-35.55	-13	22.55	V
5197.5	-48.59	5.11	3	13.38	-40.32	-13	27.32	V

LTE FDD Band 4_Channel Bandwidth 10MHz_QPSK_ High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3500.0	-43.86	4.02	3	12.5	-35.38	-13	22.38	H
5250.0	-51.51	5.11	3	13.38	-43.24	-13	30.24	H
3500.0	-39.89	4.02	3	12.5	-31.41	-13	18.41	V
5250.0	-48.78	5.11	3	13.38	-40.51	-13	27.51	V

LTE FDD Band 4_Channel Bandwidth 15MHz_QPSK_ Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3435.0	-42.92	4.02	3	12.5	-34.44	-13	21.44	H
5152.5	-50.45	5.11	3	13.38	-42.18	-13	29.18	H
3435.0	-38.72	4.02	3	12.5	-30.24	-13	17.24	V
5152.5	-48.67	5.11	3	13.38	-40.4	-13	27.40	V

LTE FDD Band 4_Channel Bandwidth 15MHz_QPSK_ Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-43.67	4.02	3	12.45	-35.24	-13	22.24	H
5197.5	-49.37	5.11	3	13.38	-41.1	-13	28.10	H
3465.0	-40.79	4.02	3	12.45	-32.36	-13	19.36	V
5197.5	-49.75	5.11	3	13.38	-41.48	-13	28.48	V

LTE FDD Band 4_Channel Bandwidth 15MHz_QPSK_ High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3495.0	-43.76	4.02	3	12.5	-35.28	-13	22.28	H
5242.5	-51.01	5.11	3	13.38	-42.74	-13	29.74	H
3495.0	-41.74	4.02	3	12.5	-33.26	-13	20.26	V
5242.5	-47.60	5.11	3	13.38	-39.33	-13	26.33	V

LTE FDD Band 4_Channel Bandwidth 20MHz_QPSK_ Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3440.0	-43.03	4.02	3	12.5	-34.55	-13	21.55	H
5160.0	-52.44	5.11	3	13.38	-44.17	-13	31.17	H
3440.0	-40.76	4.02	3	12.5	-32.28	-13	19.28	V
5160.0	-48.71	5.11	3	13.38	-40.44	-13	27.44	V

LTE FDD Band 4_Channel Bandwidth 20MHz_QPSK_ Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-43.82	4.02	3	12.45	-35.39	-13	22.39	H
5197.5	-51.77	5.11	3	13.38	-43.5	-13	30.50	H
3465.0	-39.72	4.02	3	12.45	-31.29	-13	18.29	V
5197.5	-48.01	5.11	3	13.38	-39.74	-13	26.74	V

LTE FDD Band 4_Channel Bandwidth 20MHz_QPSK_ High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3490.0	-43.02	4.02	3	12.5	-34.54	-13	21.54	H
5235.0	-51.63	5.11	3	13.38	-43.36	-13	30.36	H
3490.0	-39.68	4.02	3	12.5	-31.2	-13	18.20	V
5235.0	-49.01	5.11	3	13.38	-40.74	-13	27.74	V

LTE FDD Band 4_Channel Bandwidth 1.4MHz_16QAM _ Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3421.4	-46.81	4.02	3	12.5	-38.33	-13	25.33	H
5132.1	-53.56	5.11	3	13.38	-45.29	-13	32.29	H
3421.4	-44.28	4.02	3	12.5	-35.8	-13	22.80	V
5132.1	-51.71	5.11	3	13.38	-43.44	-13	30.44	V

LTE FDD Band 4_Channel Bandwidth 1.4MHz_16QAM _ Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-46.68	4.02	3	12.45	-38.25	-13	25.25	H
5197.5	-53.53	5.11	3	13.38	-45.26	-13	32.26	H
3465.0	-44.30	4.02	3	12.45	-35.87	-13	22.87	V
5197.5	-52.87	5.11	3	13.38	-44.6	-13	31.60	V

LTE FDD Band 4_Channel Bandwidth 1.4MHz_16QAM _ High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3508.6	-46.55	4.02	3	12.21	-38.36	-13	25.36	H
5262.9	-53.67	5.11	3	13.26	-45.52	-13	32.52	H
3508.6	-44.60	4.02	3	12.21	-36.41	-13	23.41	V
5262.9	-52.40	5.11	3	13.26	-44.25	-13	31.25	V

LTE FDD Band 4_Channel Bandwidth 3MHz_16QAM _ Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3423.0	-45.81	4.02	3	12.5	-37.33	-13	24.33	H
5134.5	-54.68	5.11	3	13.38	-46.41	-13	33.41	H
3423.0	-44.22	4.02	3	12.5	-35.74	-13	22.74	V
5134.5	-51.47	5.11	3	13.38	-43.2	-13	30.20	V

LTE FDD Band 4_Channel Bandwidth 3MHz_16QAM _ Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-44.79	4.02	3	12.45	-36.36	-13	23.36	H
5197.5	-52.74	5.11	3	13.38	-44.47	-13	31.47	H
3465.0	-45.65	4.02	3	12.45	-37.22	-13	24.22	V
5197.5	-52.86	5.11	3	13.38	-44.59	-13	31.59	V

LTE FDD Band 4_Channel Bandwidth 3MHz_16QAM _ High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3507.0	-45.39	4.02	3	12.21	-37.2	-13	24.20	H
5260.5	-53.56	5.11	3	13.26	-45.41	-13	32.41	H
3507.0	-44.44	4.02	3	12.21	-36.25	-13	23.25	V
5260.5	-53.45	5.11	3	13.26	-45.3	-13	32.30	V

LTE FDD Band 4_Channel Bandwidth 5MHz_16QAM _ Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3425.0	-46.89	4.02	3	12.5	-38.41	-13	25.41	H
5137.5	-53.79	5.11	3	13.38	-45.52	-13	32.52	H
3425.0	-45.16	4.02	3	12.5	-36.68	-13	23.68	V
5137.5	-52.72	5.11	3	13.38	-44.45	-13	31.45	V

LTE FDD Band 4_Channel Bandwidth 5MHz_16QAM _ Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-45.95	4.02	3	12.45	-37.52	-13	24.52	H
5197.5	-52.92	5.11	3	13.38	-44.65	-13	31.65	H
3465.0	-46.17	4.02	3	12.45	-37.74	-13	24.74	V
5197.5	-52.53	5.11	3	13.38	-44.26	-13	31.26	V

LTE FDD Band 4_Channel Bandwidth 5MHz_16QAM _ High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3505.0	-46.75	4.02	3	12.21	-38.56	-13	25.56	H
5257.5	-54.80	5.11	3	13.26	-46.65	-13	33.65	H
3505.0	-46.07	4.02	3	12.21	-37.88	-13	24.88	V
5257.5	-52.84	5.11	3	13.26	-44.69	-13	31.69	V

LTE FDD Band 4_Channel Bandwidth 10MHz_16QAM _ Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3430.0	-47.00	4.02	3	12.5	-38.52	-13	25.52	H
5145.0	-54.50	5.11	3	13.38	-46.23	-13	33.23	H
3430.0	-43.95	4.02	3	12.5	-35.47	-13	22.47	V
5145.0	-53.93	5.11	3	13.38	-45.66	-13	32.66	V

LTE FDD Band 4_Channel Bandwidth 10MHz_16QAM _ Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-45.76	4.02	3	12.45	-37.33	-13	24.33	H
5197.5	-53.84	5.11	3	13.38	-45.57	-13	32.57	H
3465.0	-44.02	4.02	3	12.45	-35.59	-13	22.59	V
5197.5	-52.14	5.11	3	13.38	-43.87	-13	30.87	V

LTE FDD Band 4_Channel Bandwidth 10MHz_16QAM _ High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3500.0	-47.08	4.02	3	12.5	-38.6	-13	25.60	H
5250.0	-55.01	5.11	3	13.38	-46.74	-13	33.74	H
3500.0	-46.37	4.02	3	12.5	-37.89	-13	24.89	V
5250.0	-53.71	5.11	3	13.38	-45.44	-13	32.44	V

LTE FDD Band 4_Channel Bandwidth 15MHz_16QAM _ Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3435.0	-46.81	4.02	3	12.5	-38.33	-13	25.33	H
5152.5	-54.52	5.11	3	13.38	-46.25	-13	33.25	H
3435.0	-46.06	4.02	3	12.5	-37.58	-13	24.58	V
5152.5	-51.68	5.11	3	13.38	-43.41	-13	30.41	V

LTE FDD Band 4_Channel Bandwidth 15MHz_16QAM _ Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-48.17	4.02	3	12.45	-39.74	-13	26.74	H
5197.5	-55.50	5.11	3	13.38	-47.23	-13	34.23	H
3465.0	-44.75	4.02	3	12.45	-36.32	-13	23.32	V
5197.5	-50.68	5.11	3	13.38	-42.41	-13	29.41	V

LTE FDD Band 4_Channel Bandwidth 15MHz_16QAM _ High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3495.0	-46.10	4.02	3	12.5	-37.62	-13	24.62	H
5242.5	-54.72	5.11	3	13.38	-46.45	-13	33.45	H
3495.0	-44.32	4.02	3	12.5	-35.84	-13	22.84	V
5242.5	-48.53	5.11	3	13.38	-40.26	-13	27.26	V

LTE FDD Band 4_Channel Bandwidth 20MHz_16QAM _ Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3440.0	-47.22	4.02	3	12.5	-38.74	-13	25.74	H
5160.0	-54.53	5.11	3	13.38	-46.26	-13	33.26	H
3440.0	-44.80	4.02	3	12.5	-36.32	-13	23.32	V
5160.0	-50.72	5.11	3	13.38	-42.45	-13	29.45	V

LTE FDD Band 4_Channel Bandwidth 20MHz_16QAM _ Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-48.07	4.02	3	12.45	-39.64	-13	26.64	H
5197.5	-53.93	5.11	3	13.38	-45.66	-13	32.66	H
3465.0	-44.95	4.02	3	12.45	-36.52	-13	23.52	V
5197.5	-50.60	5.11	3	13.38	-42.33	-13	29.33	V

LTE FDD Band 4_Channel Bandwidth 20MHz_16QAM _ High Channel

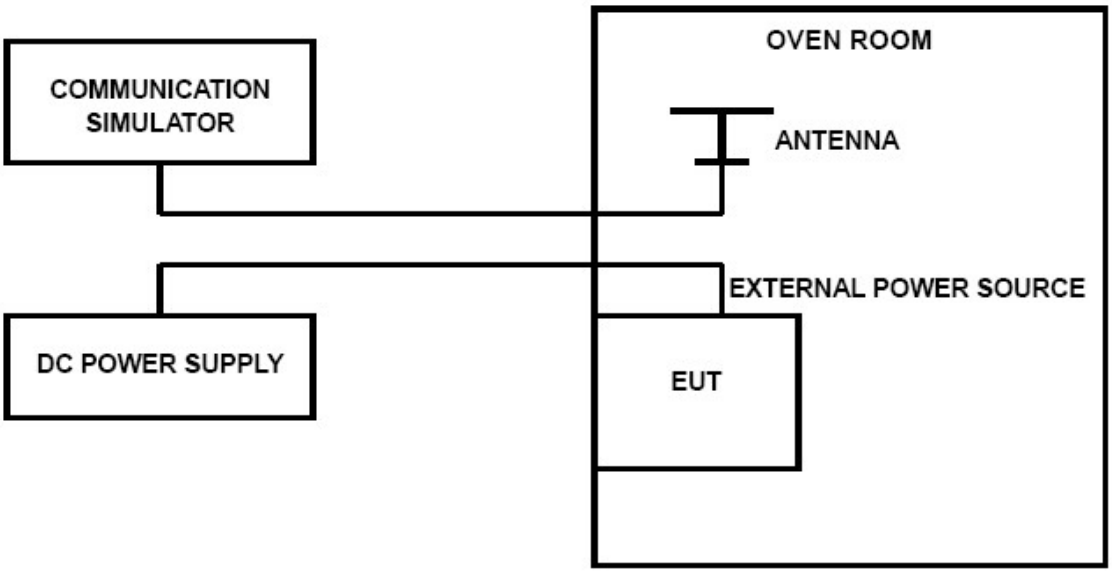
Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3490.0	-45.89	4.02	3	12.5	-37.41	-13	24.41	H
5235.0	-54.79	5.11	3	13.38	-46.52	-13	33.52	H
3490.0	-44.84	4.02	3	12.5	-36.36	-13	23.36	V
5235.0	-51.79	5.11	3	13.38	-43.52	-13	30.52	V

4.7 Frequency Stability under Temperature & Voltage Variations

LIMIT

According to §27.54, §2.1055 requirement, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation and should not exceed 2.5ppm.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

Frequency Stability Under Temperature Variations:
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 -30℃.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel 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.
4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. 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 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. 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.
8. Repeat the above measurements at 10 ℃ increments from +50℃ to -30℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

Frequency Stability Under Voltage Variations:
Set chamber temperature to 20℃. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

TEST RESULTS

Remark:
1. We tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 4; recorded worst case.

LTE Band 4, 1.4MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)		Limit (ppm)
	QPSK	16QAM	QPSK	16QAM	
3.40	22	32	0.01	0.02	2.50
3.70	15	31	0.01	0.02	2.50
4.20	35	35	0.02	0.02	2.50

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)		Limit (ppm)
	QPSK	16QAM	QPSK	16QAM	
-30°	35	29	0.02	0.02	2.50
-20°	26	38	0.02	0.02	2.50
-10°	48	41	0.03	0.02	2.50
0°	54	51	0.03	0.03	2.50
10°	26	38	0.02	0.02	2.50
20°	38	47	0.02	0.03	2.50
30°	41	51	0.02	0.03	2.50
40°	46	20	0.03	0.01	2.50
50°	50	26	0.03	0.02	2.50

5 Test Setup Photos of the EUT

Please refer to separated files for Test Setup Photos of the EUT.

6 External Photos of the EUT

Please refer to separated files for External Photos of the EUT.

7 Internal Photos of the EUT

Please refer to separated files for Internal Photos of the EUT.

********** **End of Report** **********