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FCC PART 22 TEST REPORT

FCC Part 22H

Report Reference No.: **CTL1507031826-WF-5**

Compiled by: (position+printed name+signature)	Jacky Chen (File administrators)	Jackychen
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Approved by: (position+printed name+signature)	Tracy Qi (Manager)	Tracy Qi

Product Name.....:	LTE WiFi Router
Model/Type reference.....:	T-N100
List Model(s).....:	/
Trade Mark.......:	/
FCC ID.....:	**XYOT-N100**
Applicant's name.....:	**Asiatelco Technologies Co.**
Address of applicant......:	#289 Bisheng Road, Building-8, 3F, Zhangjiang Hi-Tech Park, Pudong, Shanghai 201204, China
Test Firm.....:	**Shenzhen CTL Testing Technology Co., Ltd.**
Address of Test Firm.....:	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Test specification.....:	
Standard.....:	**FCC CFR Title 47 Part 2, Part 22H** **EIA/TIA 603-D: 2010** **KDB 971168 D01**
TRF Originator……..:	Shenzhen CTL Testing Technology Co., Ltd.
Master TRF……:	Dated 2011-01
Date of Receipt.....:	July 05, 2015
Date of Test Date.....:	July 07, 2015 - July 14, 2015
Data of Issue.....:	July 17, 2015
Result.......:	Positive

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T E S T R E P O R T

Test Report No. :	CTL1507031826-WF-5	July 17, 2015 Date of issue

Equipment under Test	:	LTE WiFi Router
Model /Type	:	T-N100
Listed Models	:	/
Applicant	:	**Asiatelco Technologies Co.**
Address	:	#289 Bisheng Road, Building-8, 3F, Zhangjiang Hi-Tech Park, Pudong, Shanghai 201204, China
Manufacturer	:	**Asiatelco Technologies Co.**
Address	:	#289 Bisheng Road, Building-8, 3F, Zhangjiang Hi-Tech Park, Pudong, Shanghai 201204, China

Test result	Pass *

* In the configuration tested, the EUT complied with the standards specified page 5.

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.

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1 SUMMARY

1.1 TEST STANDARDS

The tests were performed according to following standards:
FCC Part 22 : PUBLIC MOBILE SERVICES
TIA/EIA 603 D June 2010:Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS
KDB971168 D01: v02r02 MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS
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

1.2 Test Description

Test Item	Section in CFR 47	Result
RF Output Power	Part 2.1046 Part 22.913(a)	Pass
Peak-to-Average Ratio	n/a	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917(b)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917(b)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917(b)	Pass
Out of band emission, Band Edge	Part 2.1051 Part 22.917(b)	Pass
Frequency stability	Part 2.1055 22.917	Pass

1.3 Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

1.3.2 Laboratory accreditation

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318, December 19, 2013.

1.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2 GENERAL INFORMATION

2.1 Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Product Name:	LTE WiFi Router
Model/Type reference:	T-N100
Power supply:	DC 3.7V from battery or DC 12V from adapter
Serial number:	Prototype
Adapter information:	Model:C1000 Input: 100-240V, 50/60Hz 0.45A Output:12V ⎓1.0A
Hardware version:	725-0335-001-01
Software version:	V1.1
WIFI	
Supported type:	802.11b/802.11g/802.11n(H20)/802.11n(H40)
Modulation:	802.11b: DSSS 802.11g/802.11n(H20)/802.11n(H40): OFDM
Operation frequency:	802.11b/802.11g/802.11n(H20): 2412MHz~2462MHz 802.11n(H40): 2422MHz~2452MHz
Channel number:	802.11b/802.11g/802.11n(H20): 11 802.11n(H40): 7
Channel separation:	5MHz
Antenna type:	PCB Antenna : 2*TX 2*RX
Antenna gain:	2.0dBi
3G	
Operation Band:	BC0 TX: 824.70 MHz ~ 848.31 MHz BC1 TX:1851.25 MHz ~ 1908.75 MHz
	BC0 RX: 869.70 MHz ~ 893.31 MHz BC1 RX: 1931.25 MHz ~ 1988.75 MHz
Supported Type:	CDMA2000 1xRTT/ CDMA2000 1xEv-DO-Release 0/ CDMA2000 1xEv-DO-Revision A
Modulation Type:	QPSK
Antenna Type:	External omni-antenna: 1*TX 2*RX
Antenna Gain:	2dBi
LTE	
Operation Band:	TD-LTE: Band 41 FDD-LTE: Band 2/4/5/12/13/25/26
Modulation Type:	QPSK, 16QAM
Release Version:	Release 9
Category:	Cat 3
Antenna Type:	External Omni-antenna: 1*TX 2*RX
Antenna gain:	2.0dBi

Note: For more details, refer to the user's manual of the EUT.

2.3 Description of Test Modes

The EUT has been tested under typical operating condition. The CMW500 used to control the EUT staying in continuous transmitting and receiving mode for testing. Regards to the frequency band operation: the lowest、middle and highest frequency of channel were selected to perform the test, then shown on this report.

Note:

1. All tests performed with alternate AC power sulpply and DC power supply , recorded the worst case at AC mode except frequency stability test.
2. Test method and refer to 3GPP TS136521.

2.4 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2015/06/02	2016/06/01
Bilog Antenna	Sunol Sciences Corp.	JB1	A061714	2015/06/02	2016/06/01
EMI Test Receiver	R&S	ESCI	103710	2015/06/02	2016/06/01
Spectrum Analyzer	Agilent	E4407B	MY41440676	2015/05/21	2016/05/20
Spectrum Analyzer	Agilent	N9030A	MY51380383	2015/05/21	2016/05/20
Controller	EM Electronics	Controller EM 1000	N/A	2015/05/21	2016/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2015/05/19	2016/05/18
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062014	2015/05/19	2016/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2015/05/19	2016/05/18
Amplifier	Agilent	8349B	3008A02306	2015/05/19	2016/05/18
Amplifier	Agilent	8447D	2944A10176	2015/05/19	2016/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2015/05/20	2016/05/19
Radio Communication Tester	R&S	CMU200	115419	2015/05/22	2016/05/21
Wideband Radio Communication Tester	R&S	CMW500	101814	2014/11/23	2015/11/22
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2015/05/20	2016/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2015/05/20	2016/05/19
RF Cable	HUBER+SUHNER	RG214	N/A	2015/05/20	2016/05/19
Climate Chamber	ESPEC	EL-10KA	A20120523	2015/05/20	2016/05/19
SIGNAL GENERATOR	Agilent	E4421B	US40051744	2015/05/20	2016/05/19
Directional Coupler	Agilent	87300B	3116A03638	2015/05/20	2016/05/19

2.5 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: XYOT-N100 filing to comply with of the FCC Part 22 Rules.

2.6 Modifications

No modifications were implemented to meet testing criteria.

3 TEST CONDITIONS AND RESULTS

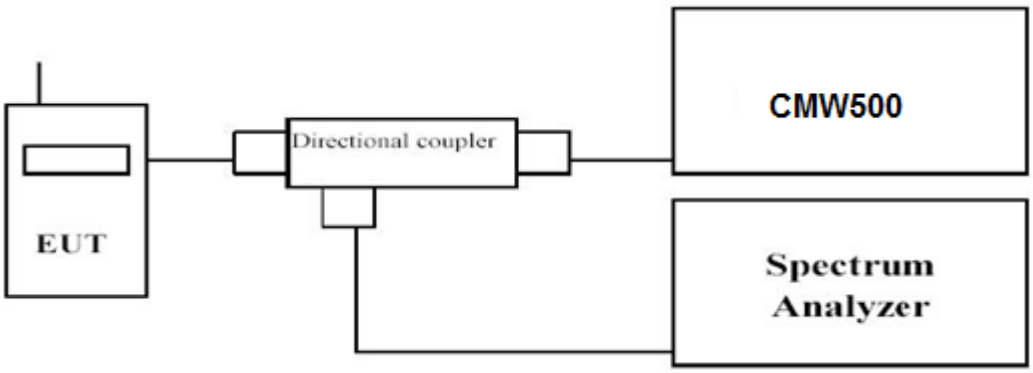
3.1 Output Power

LIMIT

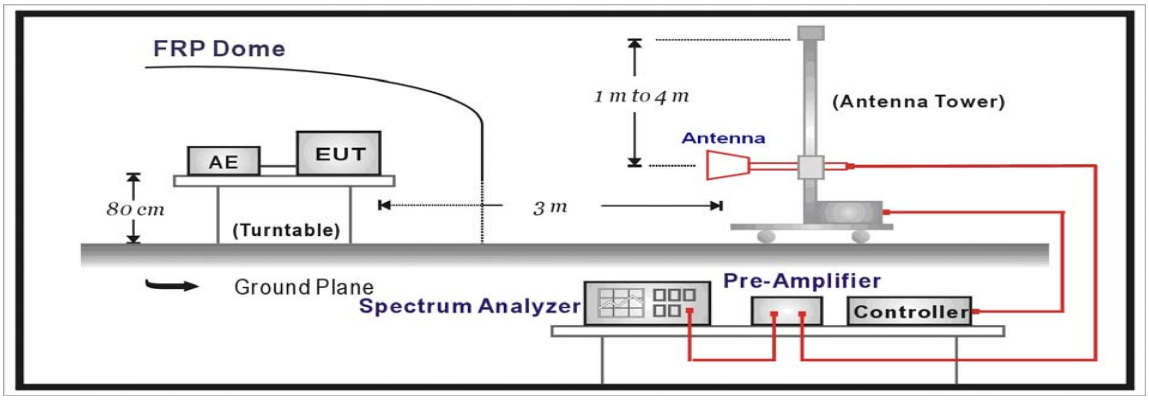
According to § 22.913(a) specifies ” The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.”

TEST CONFIGURATION

Conducted Power Measurement



Radiated Power Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

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 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.

Radiated Power Measurement:

a. The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
b. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to thefrequency of the transmitter
c. The output of the test antenna shall be connected to the measuring receiver.
d. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
e. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
f. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

g. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
h. The maximum signal level detected by the measuring receiver shall be noted.
i. The transmitter shall be replaced by a substitution antenna.
j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
k. The substitution antenna shall be connected to a calibrated signal generator.
l. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
n. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
p. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
q. Test site anechoic chamber refer to ANSI C63.4: 2009

TEST RESULTS

Conducted Measurement:

LTE FDD Band 5				
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]	
			QPSK	16QAM
1.4 MHz	1 RB low	824.7	24.12	22.91
		836.5	24.50	23.45
		848.3	24.07	23.28
	1 RB high	824.7	24.05	22.99
		836.5	24.23	23.23
		848.3	24.02	23.09
	50% RB mid	824.7	23.83	22.81
		836.5	24.36	23.44
		848.3	24.05	22.75
	100% RB	824.7	22.79	21.70
		836.5	23.39	22.33
		848.3	23.39	22.46
3 MHz	1 RB low	825.5	24.59	23.50
		836.5	24.59	23.61
		847.5	24.93	23.89
	1 RB high	825.5	24.58	23.54
		836.5	24.06	22.99
		847.5	24.91	23.04
	50% RB mid	825.5	23.60	22.71
		836.5	23.26	22.34
		847.5	23.56	22.06
	100% RB	825.5	23.60	22.62
		836.5	23.38	22.26
		847.5	23.41	21.78
5 MHz	1 RB low	826.5	23.99	23.83
		836.5	24.00	23.87
		846.5	21.59	20.48
	1 RB high	826.5	24.05	23.98
		836.5	23.06	22.45
		846.5	21.20	20.75
	50% RB mid	826.5	23.67	22.69
		836.5	22.37	22.35
		846.5	21.00	20.25
	100% RB	826.5	23.63	22.60
		836.5	22.19	22.20
		846.5	21.12	20.21

10 MHz	1 RB low	829.0	24.89	23.94
		836.5	24.12	23.80
		844.0	24.55	23.30
	1 RB high	829.0	24.24	24.09
		836.5	23.89	23.08
		844.0	24.97	22.34
	50% RB mid	829.0	23.97	22.67
		836.5	23.45	22.30
		844.0	23.08	22.18
	100% RB	829.0	23.14	22.43
		836.5	22.98	22.72
		844.0	22.37	22.16

Radiated Measurement:

Remark:

1. *We were tested all RB and RB offset Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.*
2. *EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)*
3. *ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.*

LTE FDD Band 5_Channel Bandwidth 1.4MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.7	-20.55	2.42	8.45	2.15	36.82	20.15	38.45	18.30	V
836.5	-18.24	2.46	8.45	2.15	36.82	**22.42**	38.45	16.03	V
848.3	-19.41	2.53	8.36	2.15	36.82	21.09	38.45	17.36	V

LTE FDD Band 5_Channel Bandwidth 3MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
825.5	-20.49	2.42	8.45	2.15	36.82	20.21	38.45	18.24	V
836.5	-18.21	2.46	8.45	2.15	36.82	**22.45**	38.45	16.00	V
847.5	-19.34	2.53	8.36	2.15	36.82	21.16	38.45	17.29	V

LTE FDD Band 5_Channel Bandwidth 5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.5	-20.49	2.42	8.45	2.15	36.82	20.33	38.45	18.12	V
836.5	-18.21	2.46	8.45	2.15	36.82	**22.34**	38.45	16.11	V
846.5	-19.34	2.53	8.36	2.15	36.82	21.20	38.45	17.25	V

LTE FDD Band 5_Channel Bandwidth 10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
829.0	-20.29	2.42	8.45	2.15	36.82	20.41	38.45	18.04	V
836.5	-18.17	2.46	8.45	2.15	36.82	**22.49**	38.45	15.96	V
844.0	-19.23	2.53	8.36	2.15	36.82	21.27	38.45	17.18	V

LTE FDD Band 5_Channel Bandwidth 1.4MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.7	-21.06	2.42	8.45	2.15	36.82	19.64	38.45	18.81	V
836.5	-19.49	2.46	8.45	2.15	36.82	**21.17**	38.45	17.28	V
848.3	-20.64	2.53	8.36	2.15	36.82	19.86	38.45	18.59	V

LTE FDD Band 5_Channel Bandwidth 3MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
825.5	-20.89	2.42	8.45	2.15	36.82	19.81	38.45	18.64	V
836.5	-19.34	2.46	8.45	2.15	36.82	**21.32**	38.45	17.13	V
847.5	-20.54	2.53	8.36	2.15	36.82	19.96	38.45	18.49	V

LTE FDD Band 5_Channel Bandwidth 5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.5	-20.78	2.42	8.45	2.15	36.82	19.92	38.45	18.53	V
836.5	-19.61	2.46	8.45	2.15	36.82	**21.05**	38.45	17.40	V
846.5	-20.37	2.53	8.36	2.15	36.82	20.13	38.45	18.32	V

LTE FDD Band 5_Channel Bandwidth 10MHz_16QAM

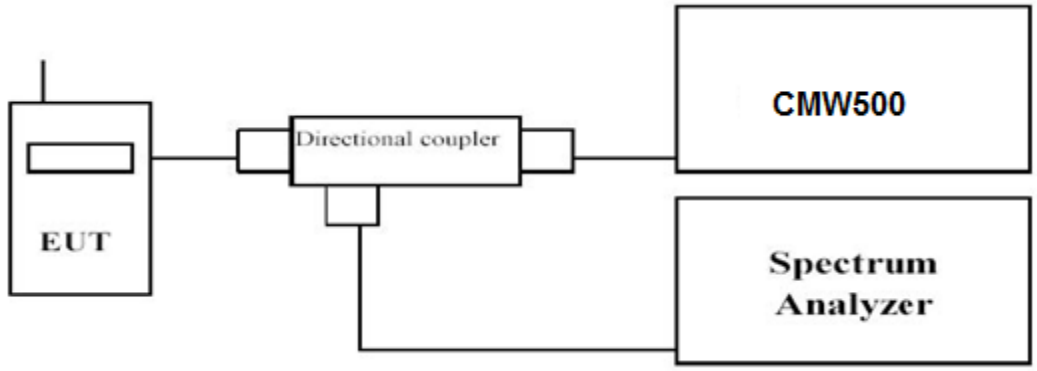
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
829.0	-20.71	2.42	8.45	2.15	36.82	19.99	38.45	18.46	V
836.5	-19.23	2.46	8.45	2.15	36.82	**21.43**	38.45	17.02	V
844.0	-20.33	2.53	8.36	2.15	36.82	20.17	38.45	18.28	V

3.3 Peak-to-Average Ratio (PAR)

LIMIT

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

TEST CONFIGURATION



TEST PROCEDURE

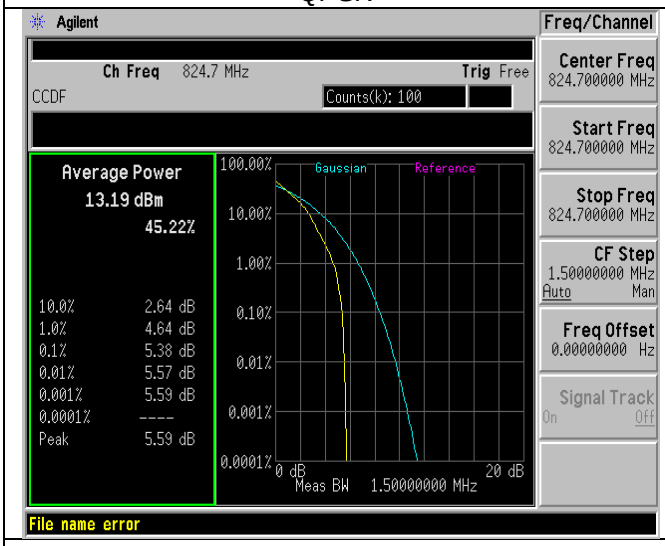
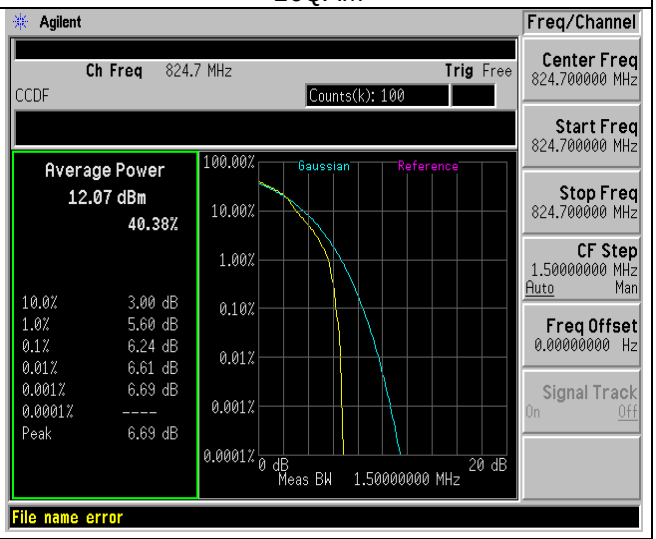
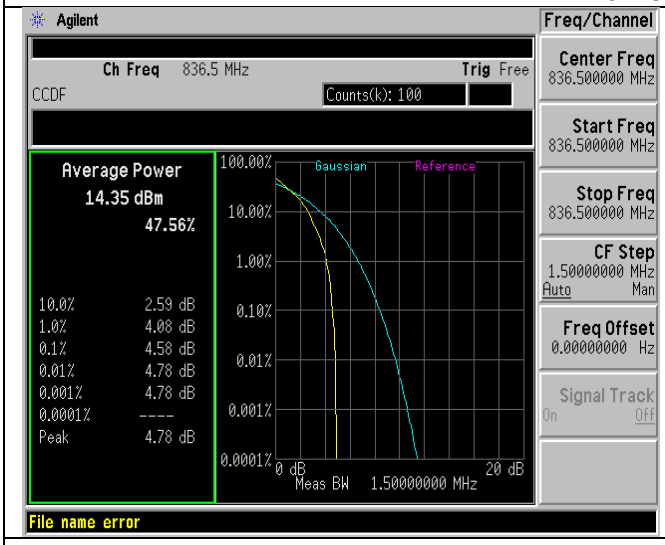
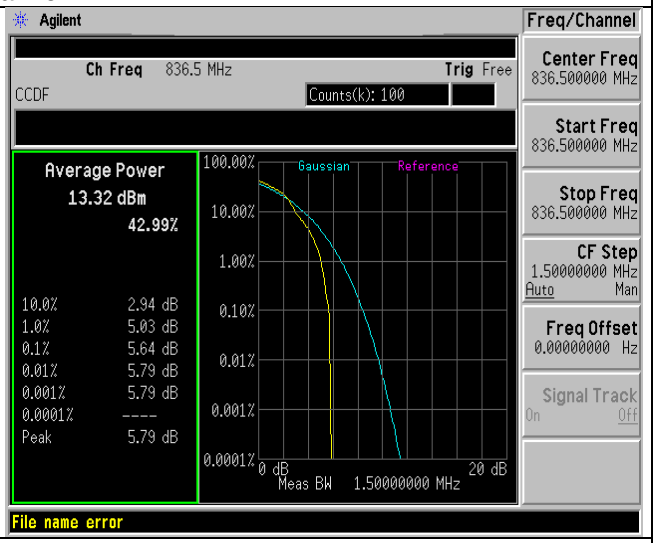
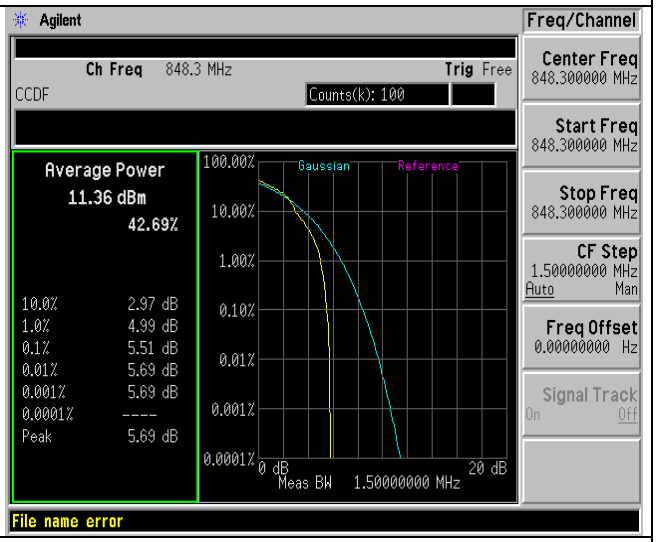
1. Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
2. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
3. Set the number of counts to a value that stabilizes the measured CCDF curve;
4. Set the measurement interval as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

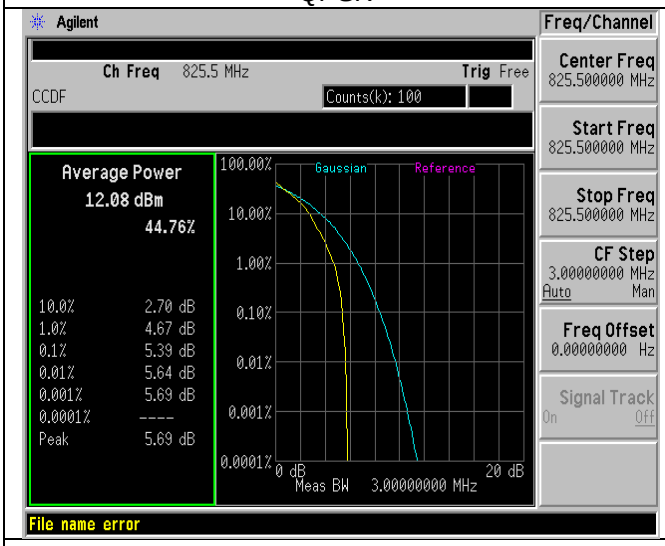
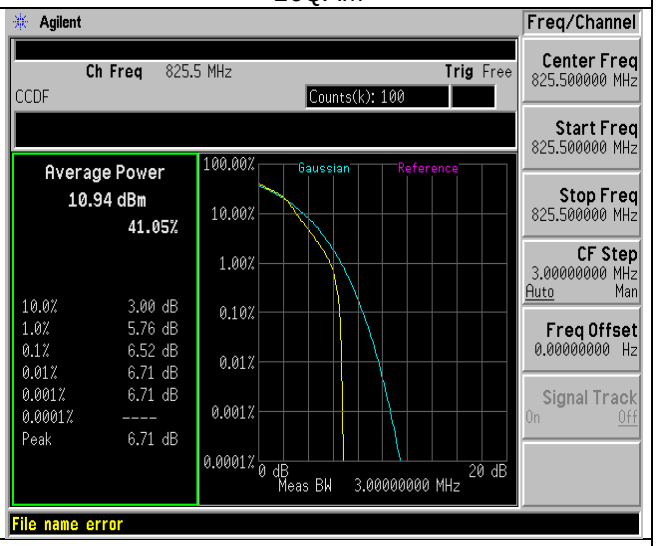
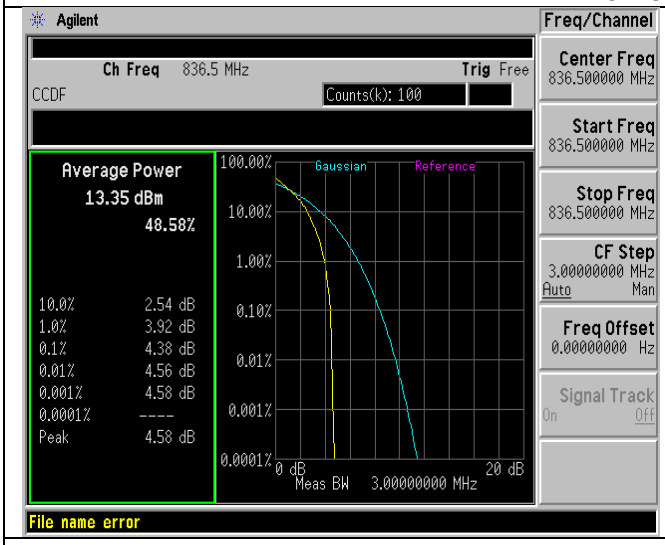
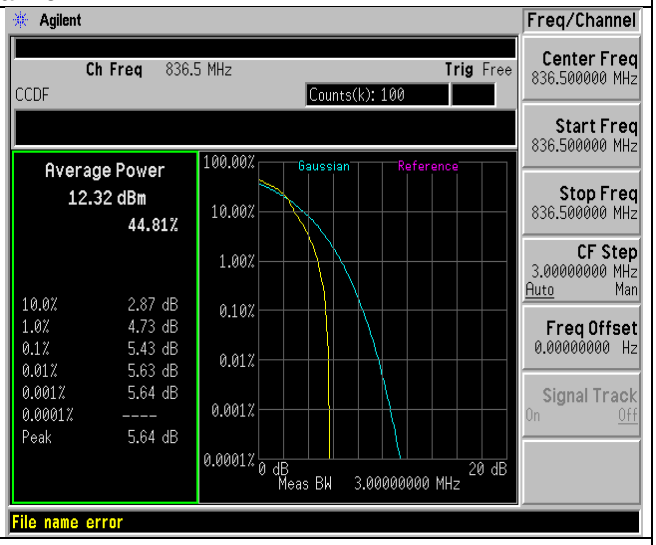
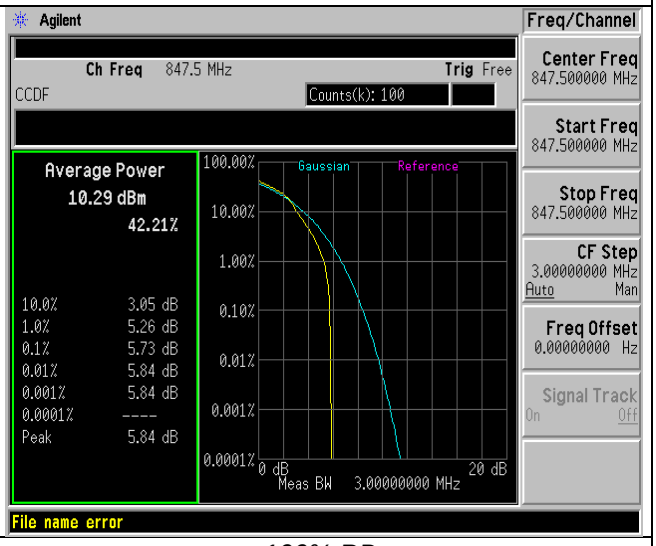
TEST RESULTS

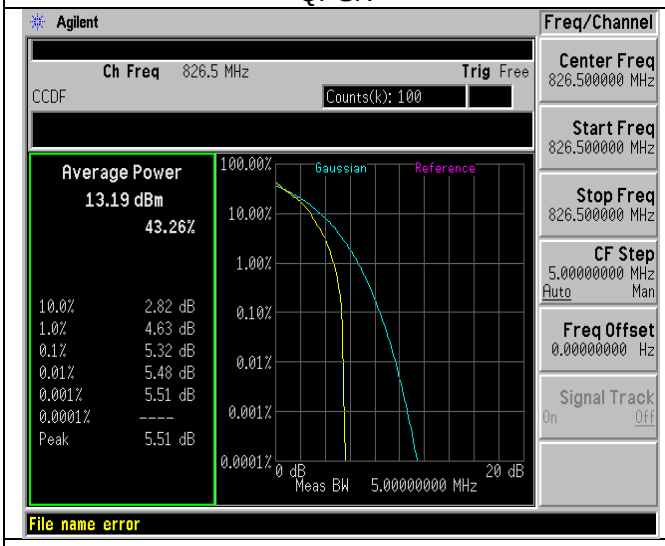
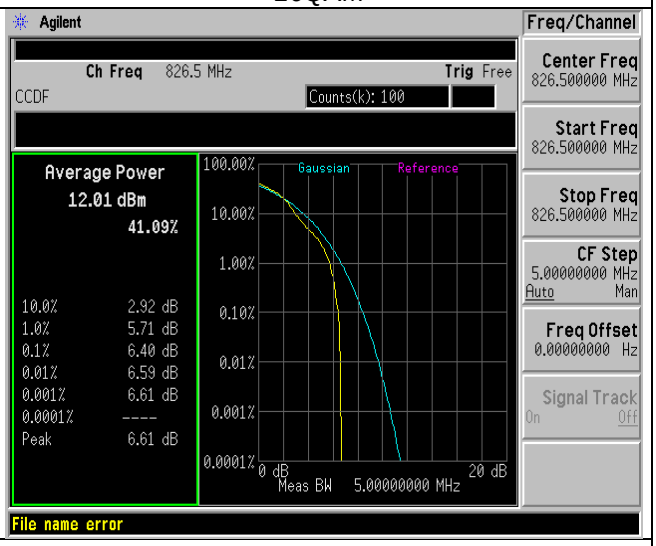
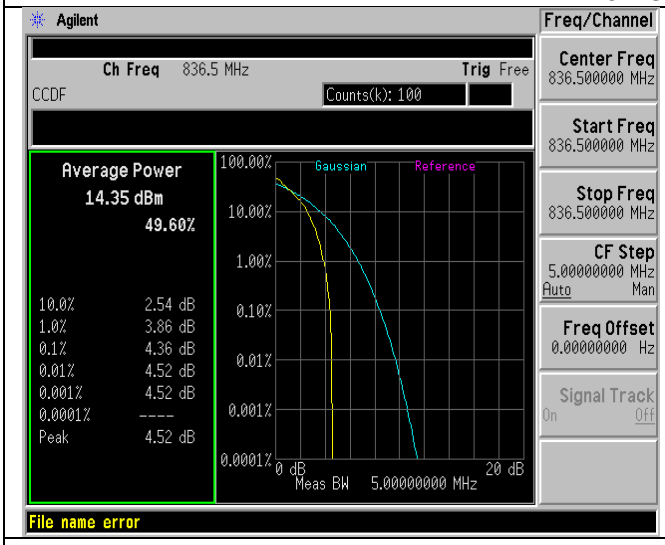
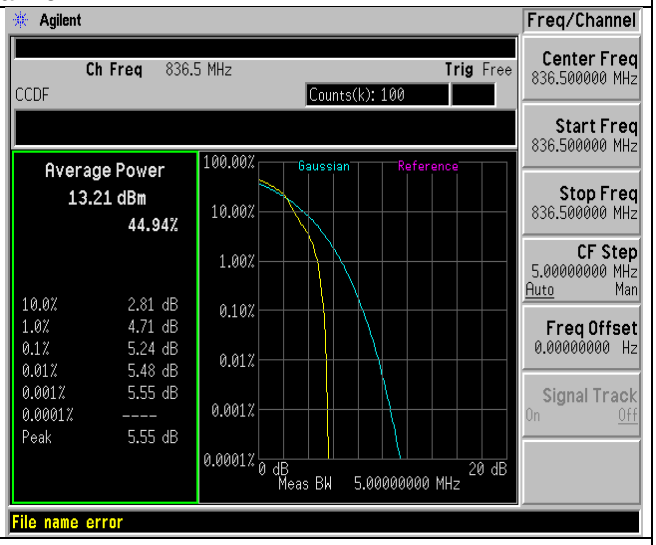
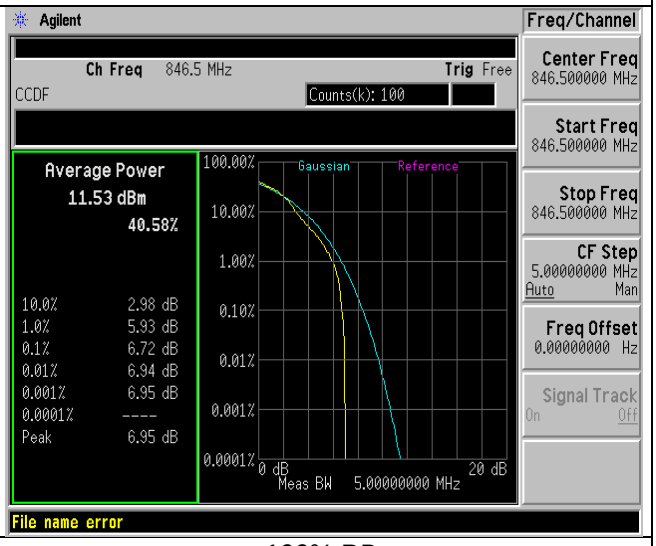
Remark:

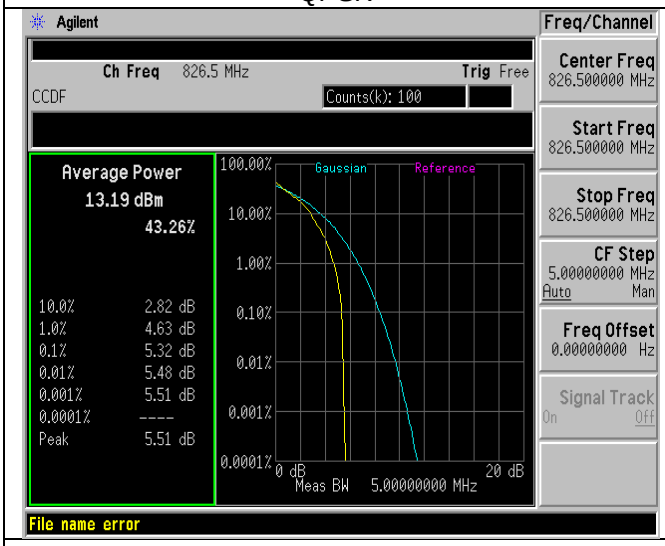
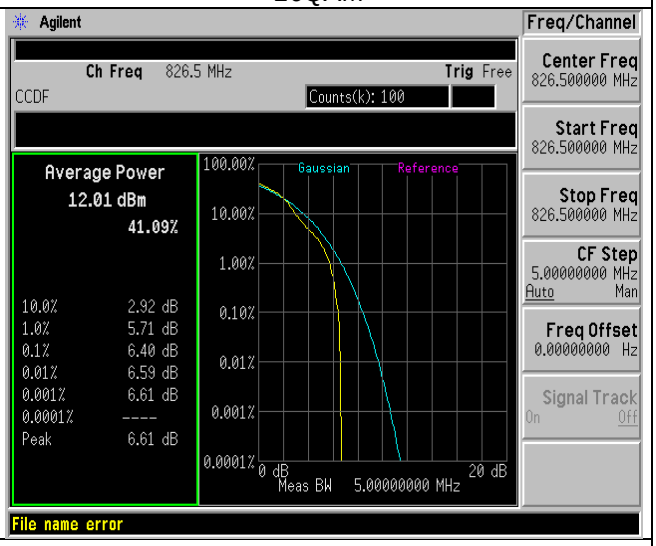
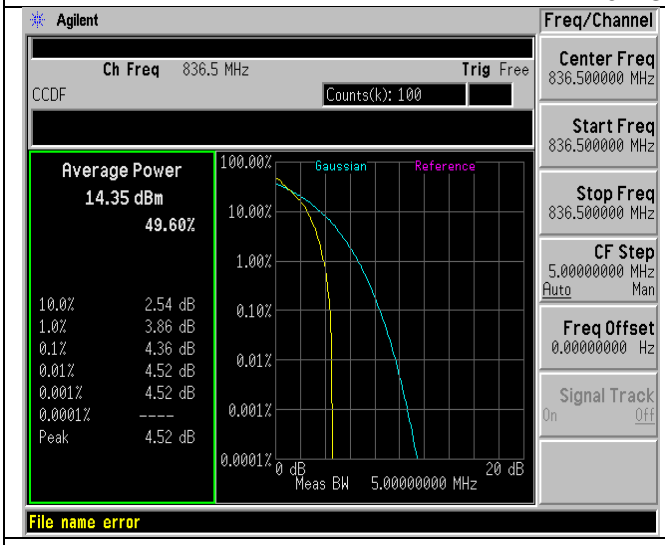
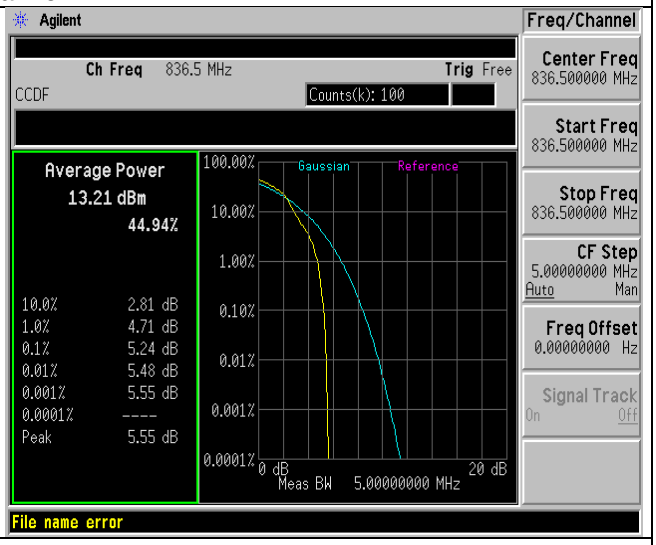
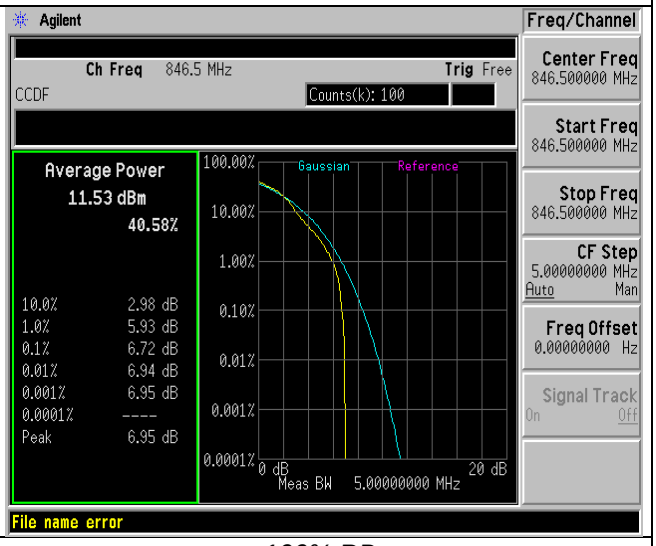
1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.

LTE FDD Band 5				
TX Channel Bandwidth	Frequency (MHz)	RB Size/Offset	PAPR (dB)	
			QPSK	16QAM
1.4 MHz	824.7	*100% RB*	5.38	6.24
	836.5		4.58	5.64
	848.3		4.43	5.51
3 MHz	825.5	*100% RB*	5.39	6.52
	836.5		4.38	5.43
	847.5		4.58	5.73
5 MHz	826.5	*100% RB*	5.32	6.40
	836.5		4.36	5.24
	846.5		5.72	6.72
10 MHz	829.0	*100% RB*	5.40	6.54
	836.5		4.27	5.38
	844.0		5.02	5.71

LTE FDD Band 5-1.4MHz Channel Bandwidth PAPR	
QPSK	16QAM
	
100% RB	100% RB
Low Channel	
	
100% RB	100% RB
Middle Channel	
	
100% RB	100% RB
High Channel	

LTE FDD Band 5-3MHz Channel Bandwidth PAPR	
QPSK	16QAM
	
100% RB	100% RB
Low Channel	
	
100% RB	100% RB
Middle Channel	
	
100% RB	100% RB
High Channel	

LTE FDD Band 5-5MHz Channel Bandwidth PAPR	
QPSK	16QAM
	
100% RB	100% RB
Low Channel	
	
100% RB	100% RB
Middle Channel	
	
100% RB	100% RB
High Channel	

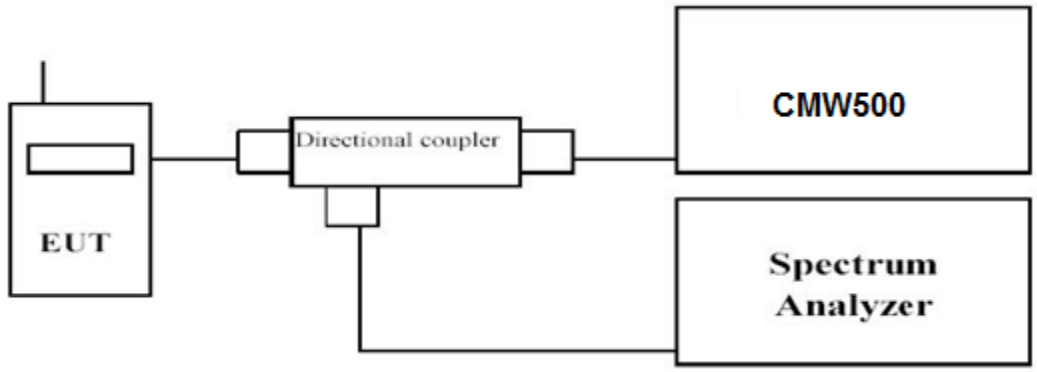
LTE FDD Band 5-10MHz Channel Bandwidth PAPR	
QPSK	16QAM
	
100% RB	100% RB
Low Channel	
	
100% RB	100% RB
Middle Channel	
	
100% RB	100% RB
High Channel	

3.4 Occupied Bandwidth and Emission Bandwidth

LIMIT

N/A

TEST CONFIGURATION



TEST PROCEDURE

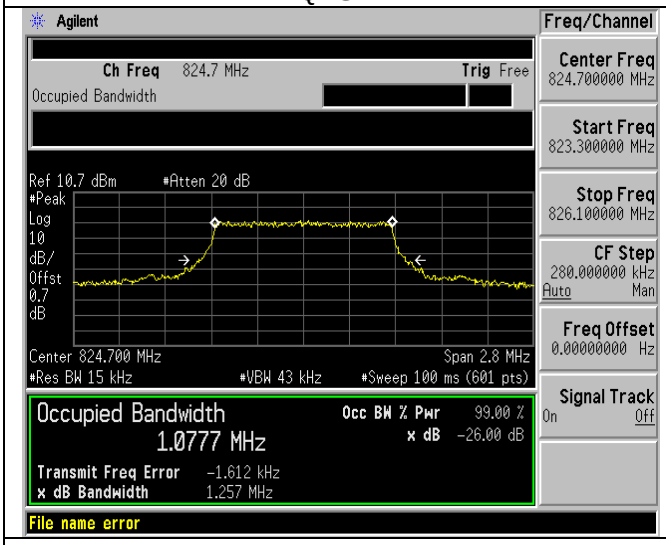
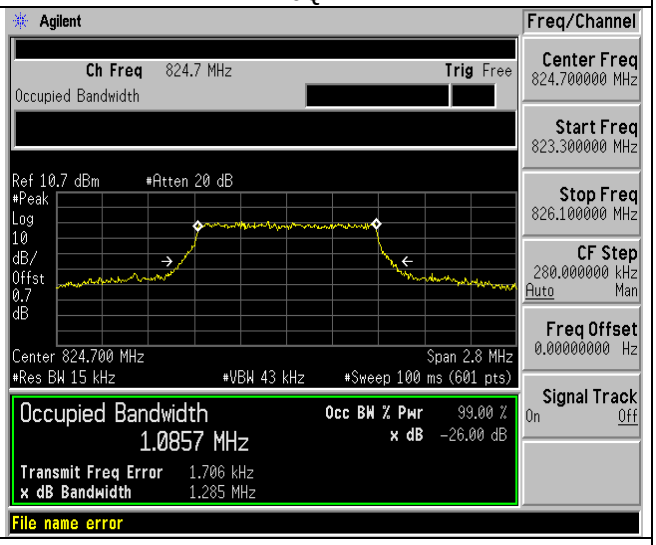
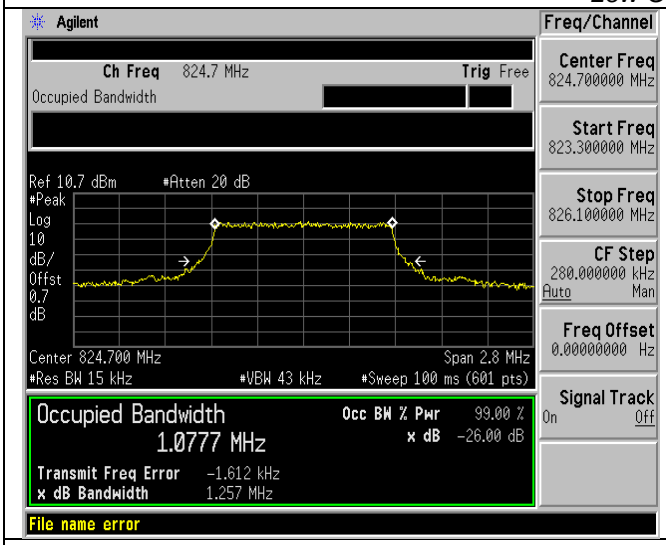
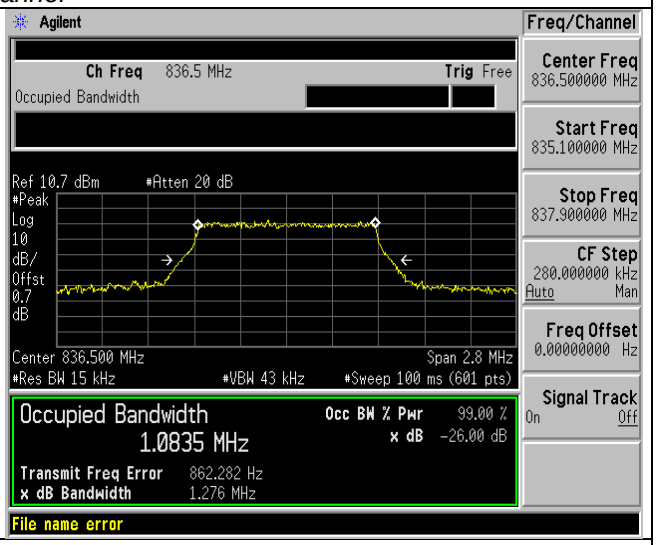
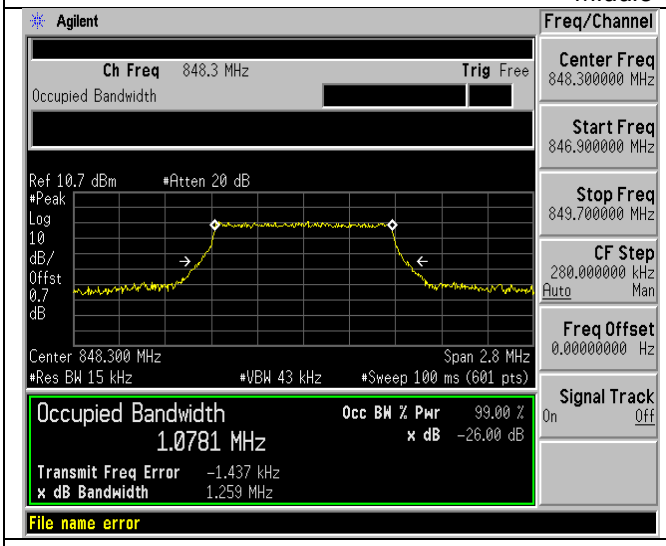
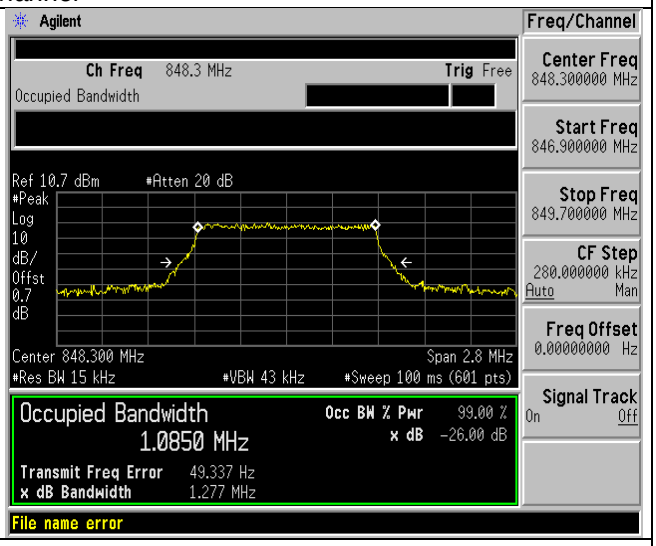
The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at low, middle and high channel in each band. The -26dBc Emission bandwidth was also measured and 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.

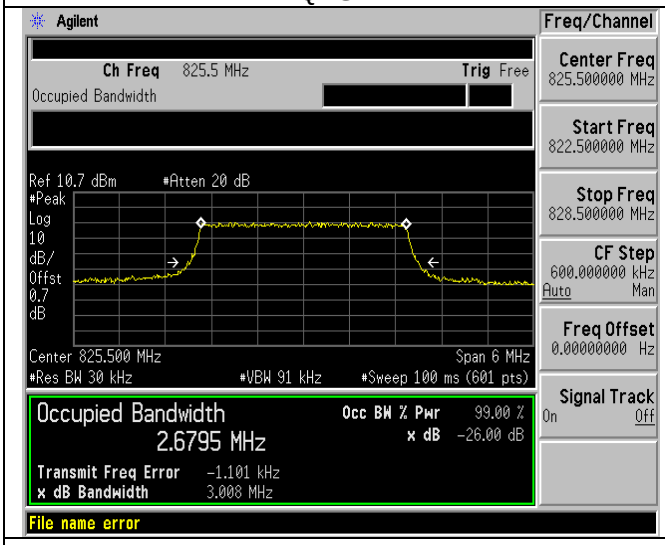
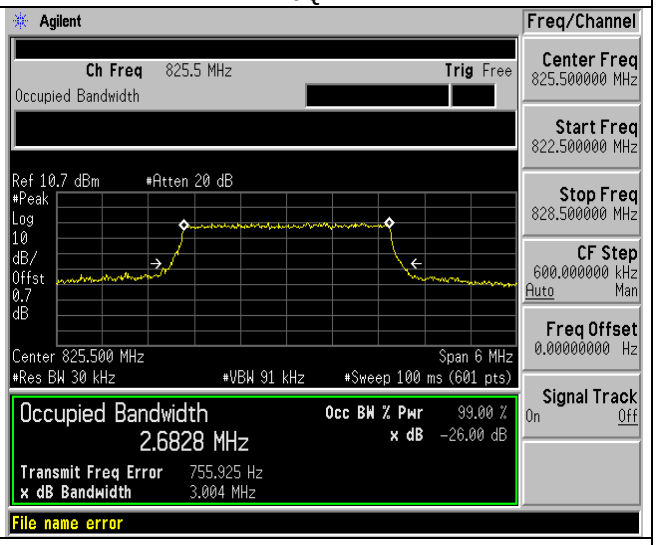
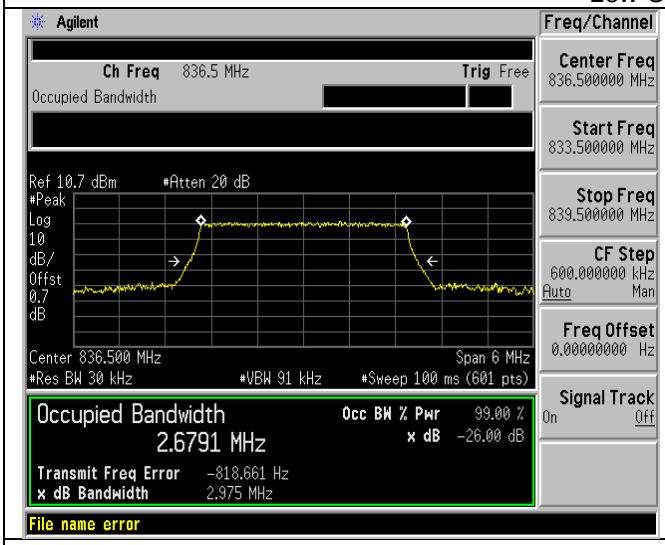
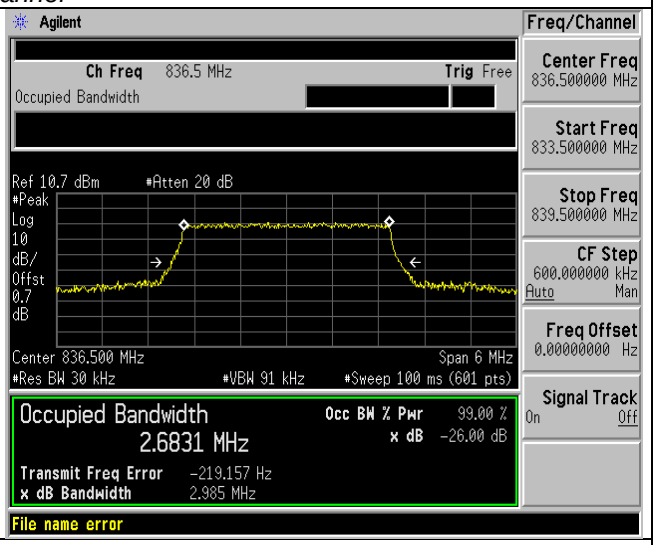
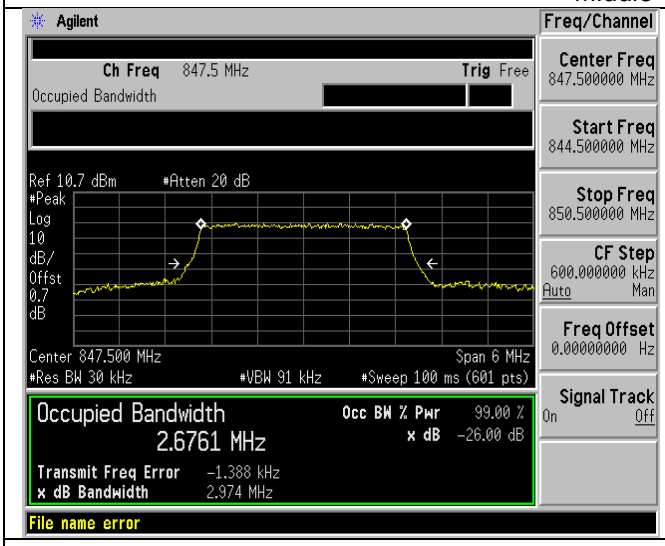
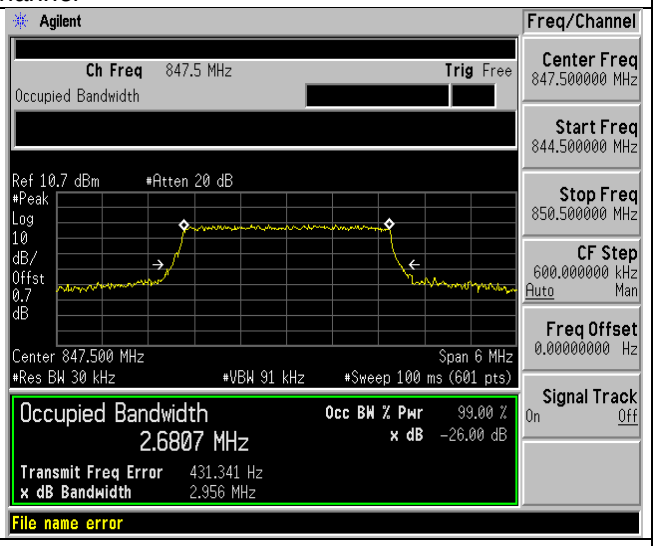
TEST RESULTS

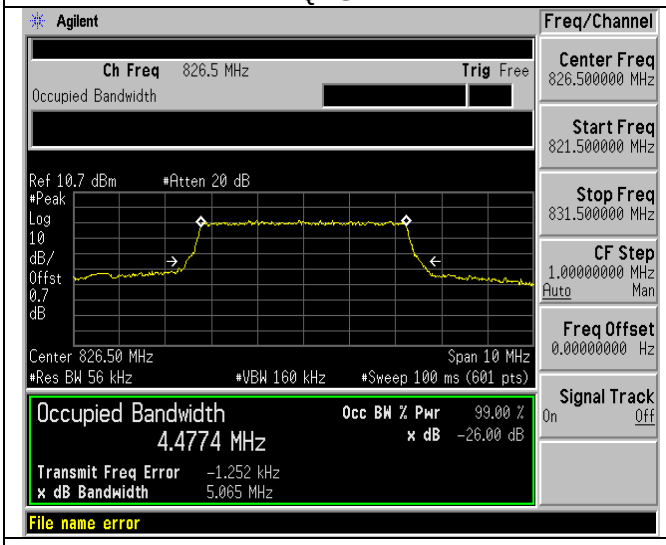
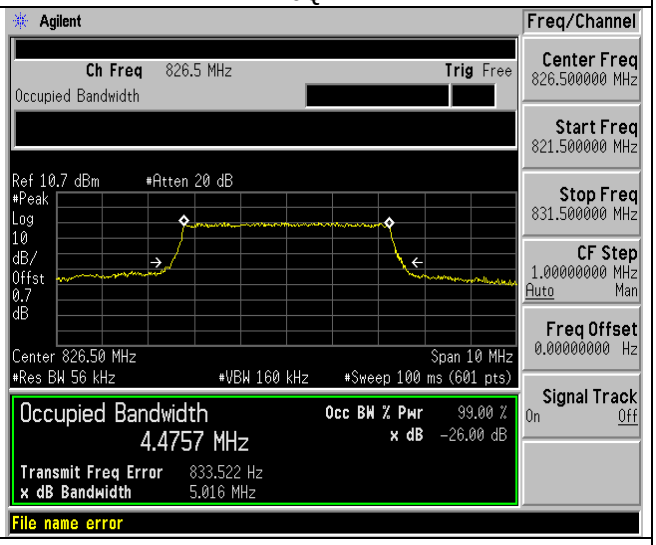
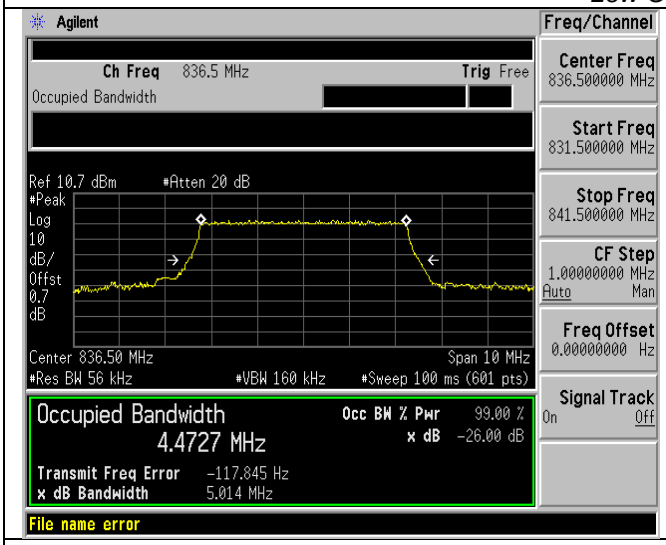
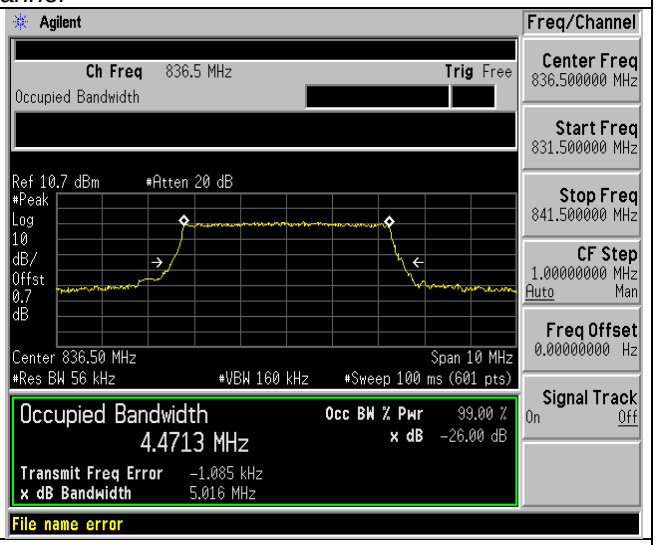
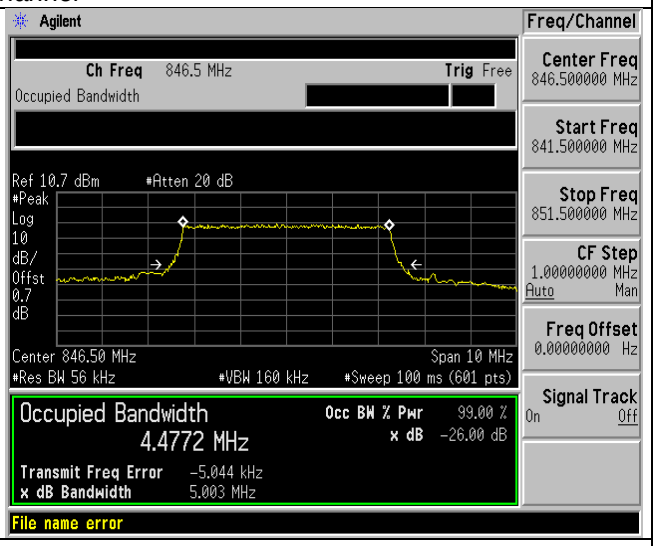
Remark:

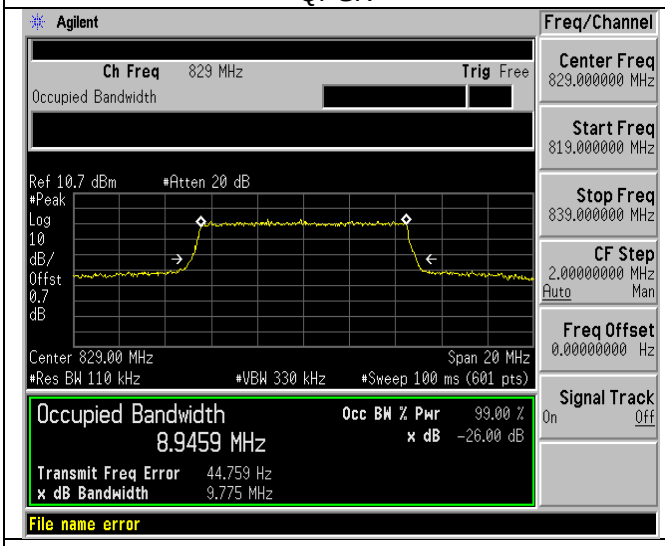
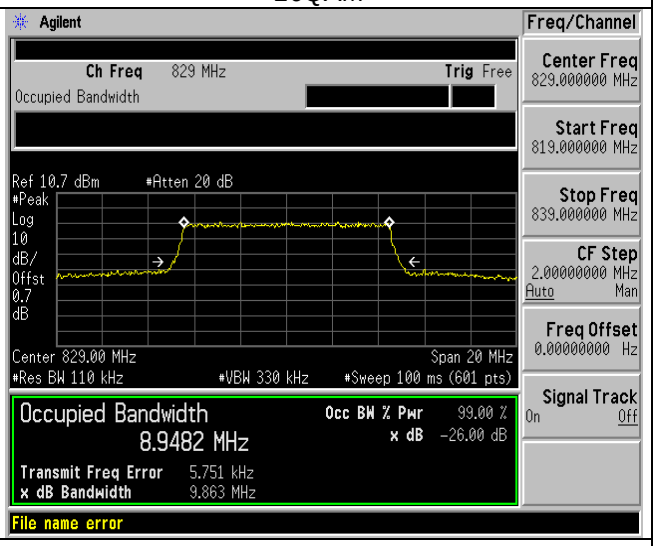
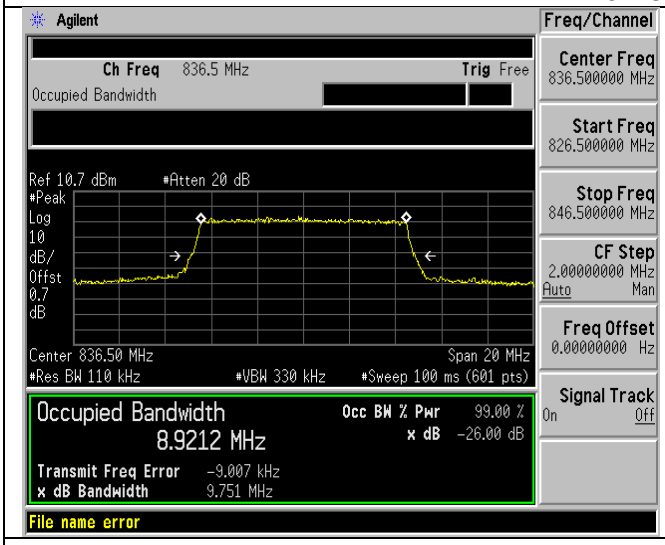
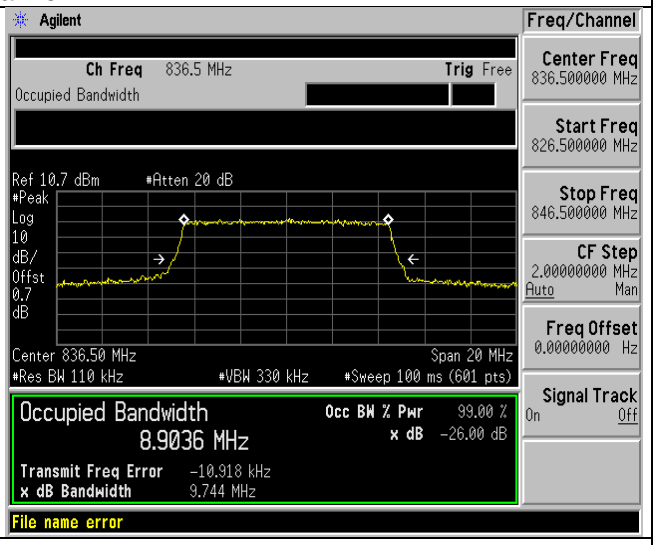
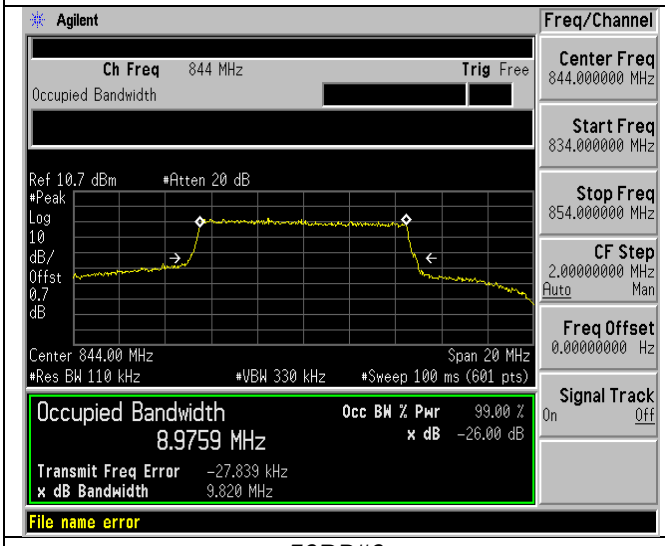
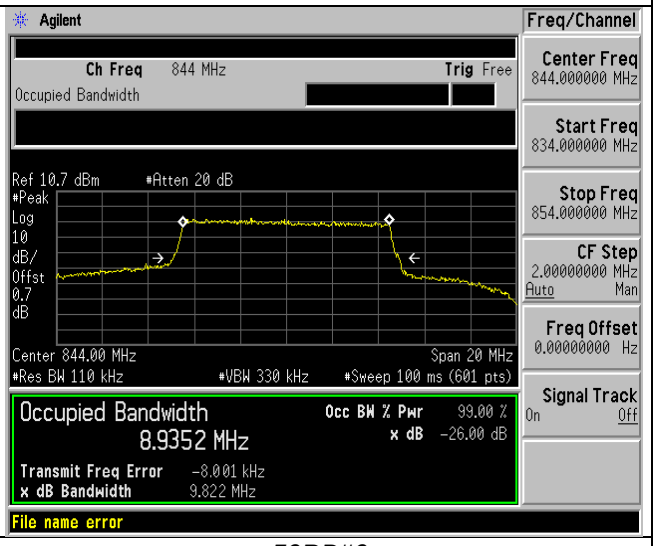
1. *We were tested all RB and RB offset Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.*

LTE FDD Band 5						
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*	824.7	1.257	1.285	1.0777	1.0857
		836.5	1.255	1.276	1.0769	1.0835
		848.3	1.259	1.277	1.0781	1.0850
3 MHz	*15RB#0*	825.5	3.008	3.004	2.6795	2.6828
		836.5	2.975	2.985	2.6791	2.6831
		847.5	2.974	2.956	2.6761	2.6807
5 MHz	*25RB#0*	826.5	5.065	5.016	4.4774	4.4757
		836.5	5.014	5.016	4.4727	4.4713
		846.5	5.036	5.003	4.4848	4.4772
10 MHz	*50RB#0*	829.0	9.775	9.863	8.9459	8.9482
		836.5	9.751	9.744	8.9212	8.9036
		844.0	9.820	9.822	8.9759	8.9352

LTE FDD Band 5-1.4MHz 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 5-3MHz 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 5-5MHz Channel Bandwidth	
QPSK	*16QAM*
	
25RB#0	*25RB#0*
Low Channel	
	
25RB#0	*25RB#0*
Middle Channel	
	
25RB#0	*25RB#0*
High Channel	

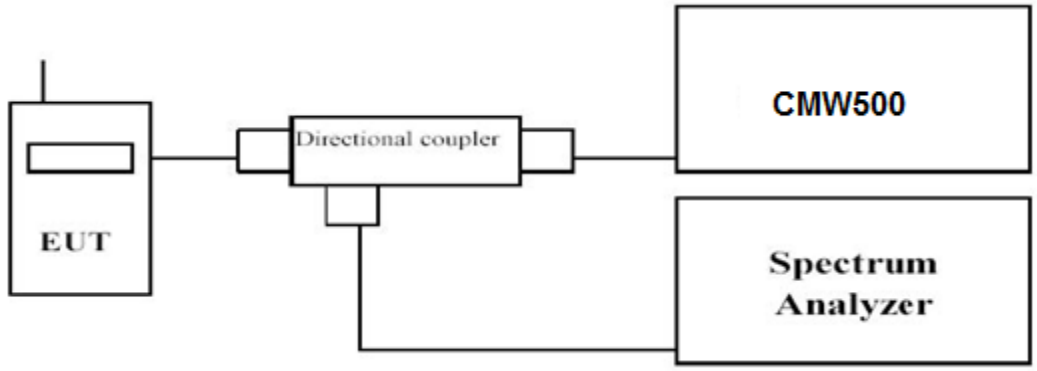
LTE FDD Band 5-10MHz Channel Bandwidth	
QPSK	16QAM
	
50RB#0	50RB#0
Low Channel	
	
50RB#0	50RB#0
Middle Channel	
	
50RB#0	50RB#0
High Channel	

3.5 Band Edge compliance

LIMIT

According to Part §22.917 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.

TEST CONFIGURATION



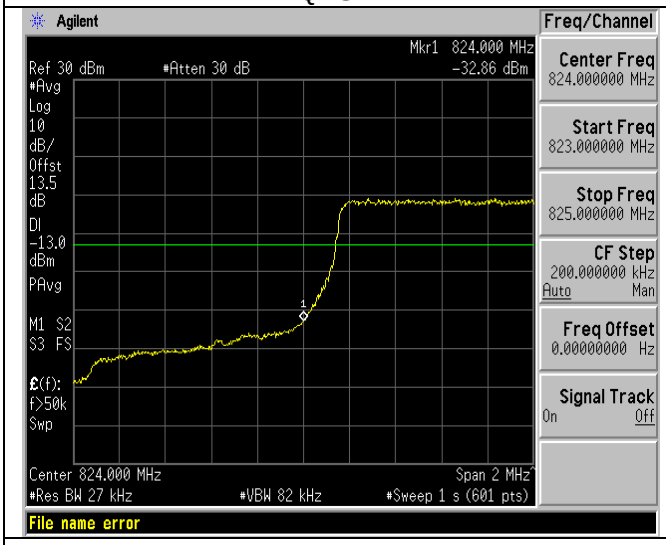
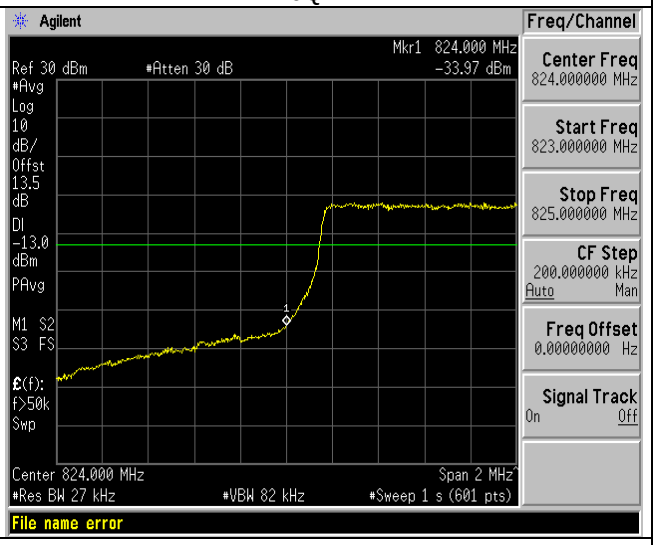
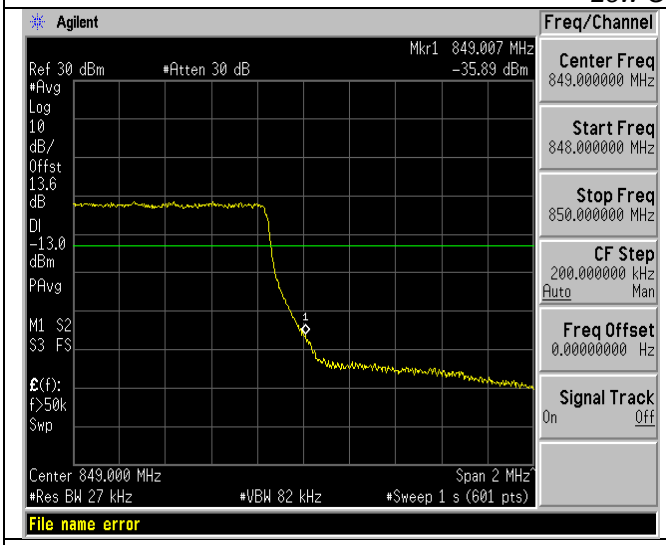
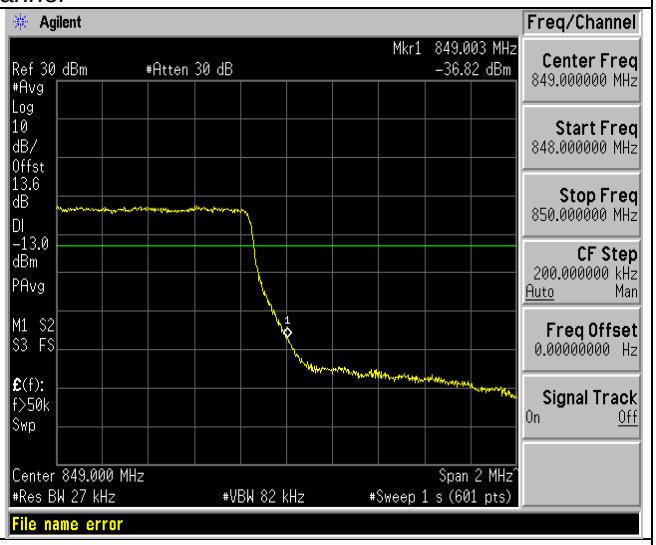
TEST PROCEDURE

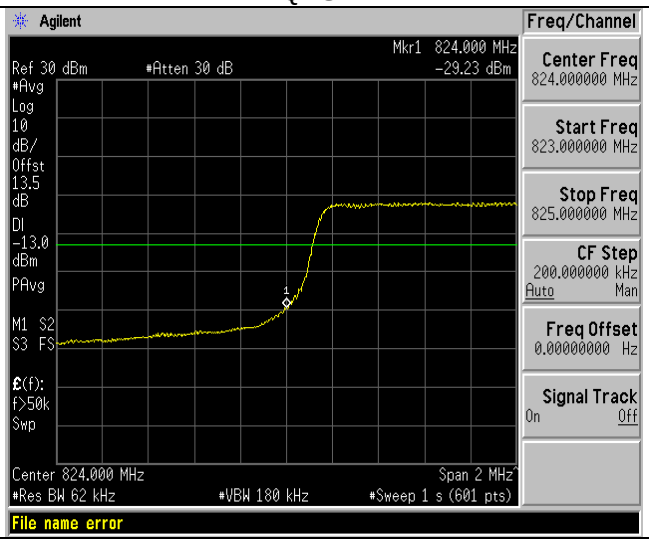
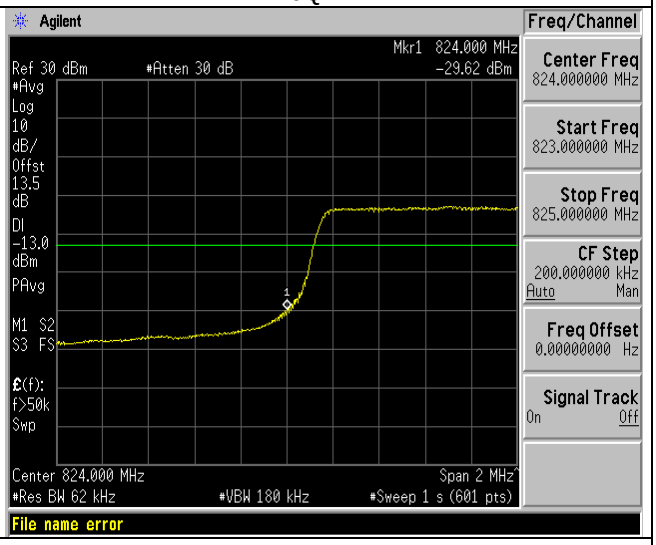
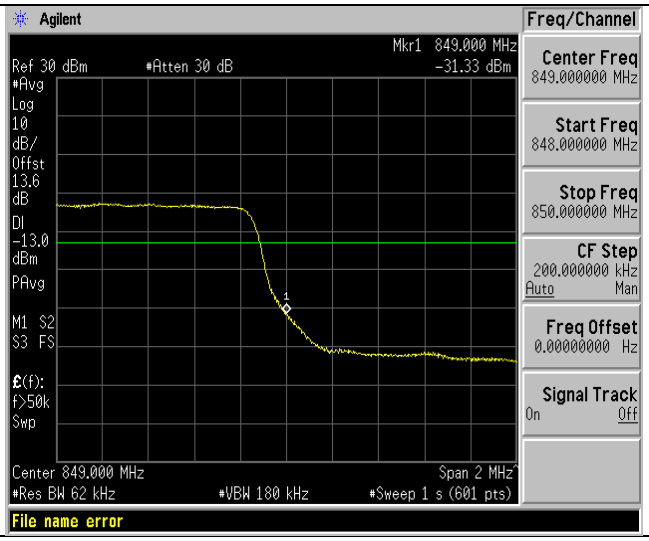
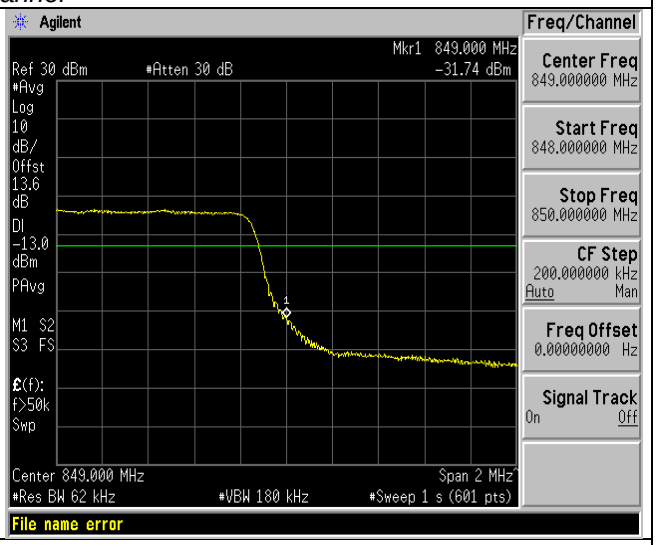
1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest and highest channels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

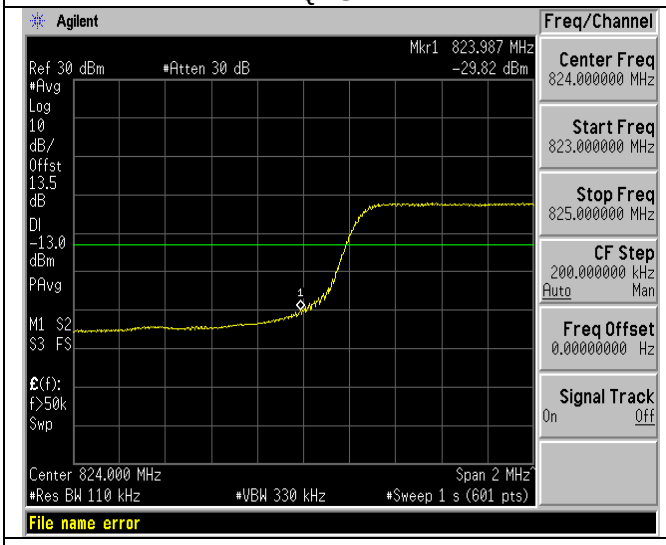
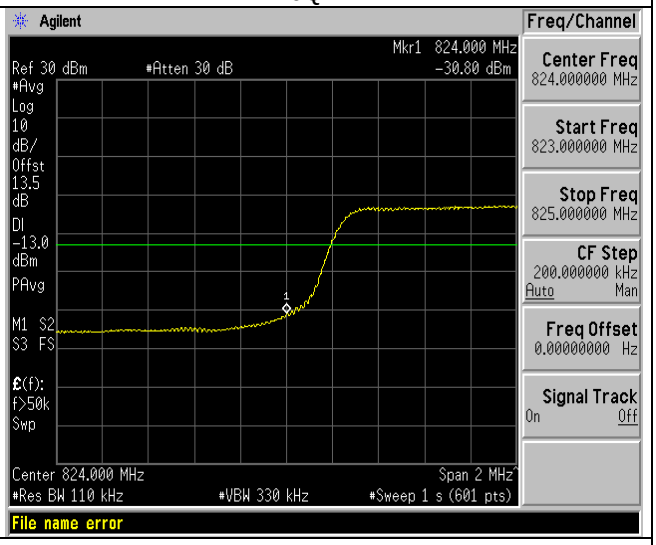
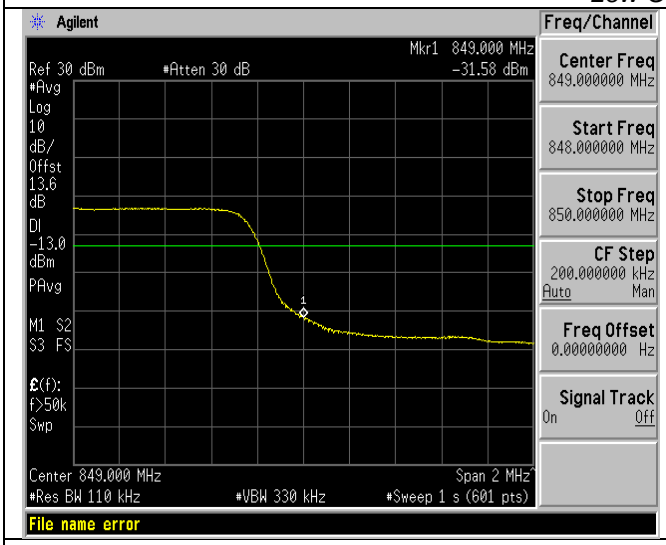
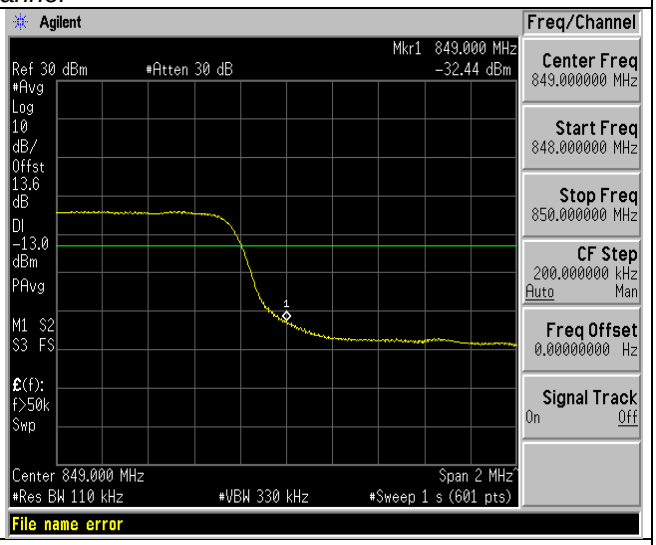
TEST RESULTS

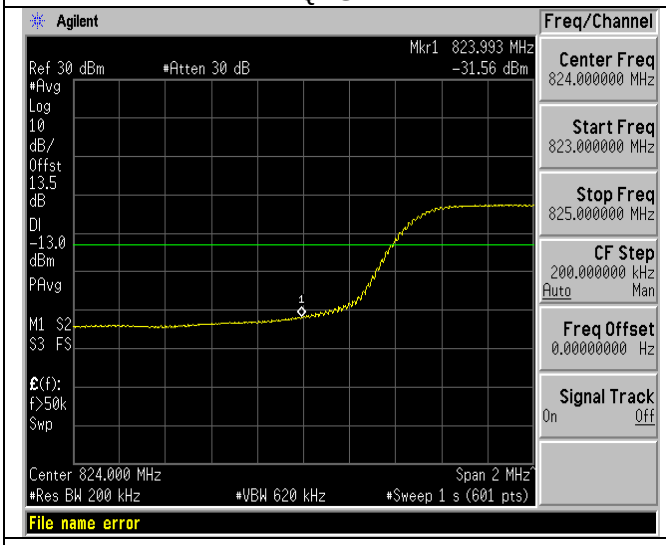
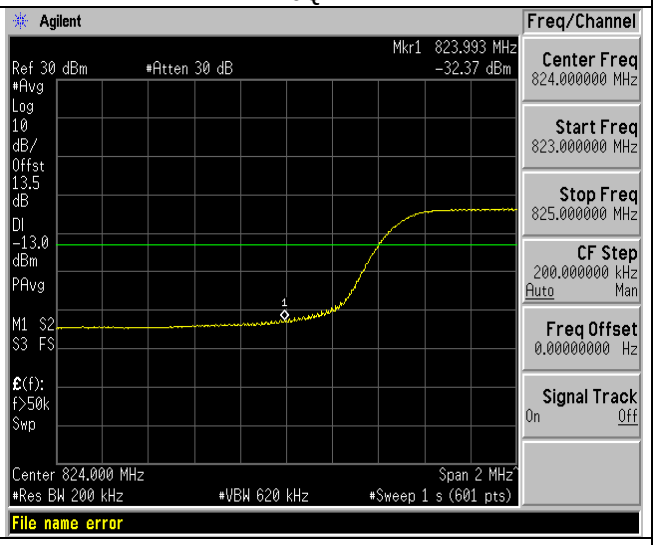
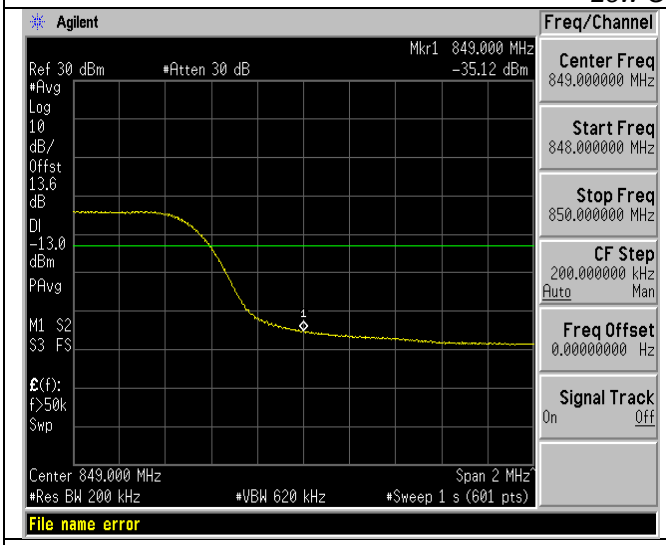
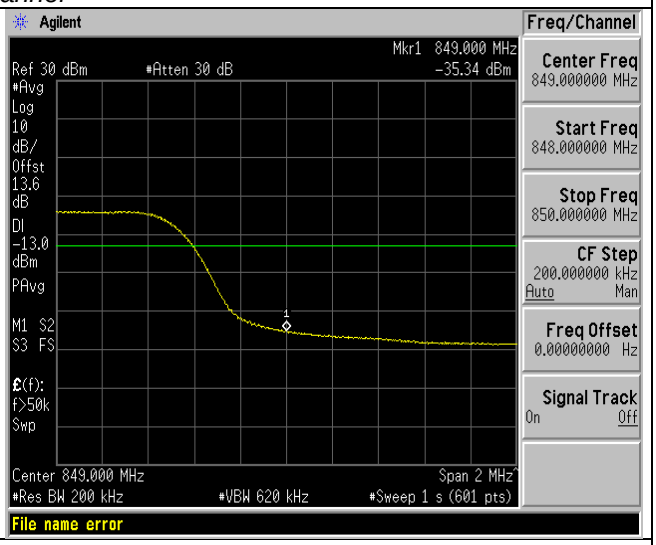
Remark:

1. *We were tested all RB and RB offset Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.*

LTE FDD Band 5-1.4MHz Channel Bandwidth Band Edge Compliance	
QPSK	16QAM
	
100% RB	100% RB
Low Channel	
	
100% RB	100% RB
High Channel	

LTE FDD Band 5-3MHz Channel Bandwidth Band Edge Compliance	
QPSK	16QAM
	
100% RB	100% RB
Low Channel	
	
100% RB	100% RB
High Channel	

LTE FDD Band 5-5MHz Channel Bandwidth Band Edge Compliance	
QPSK	16QAM
	
100% RB	100% RB
Low Channel	
	
100% RB	100% RB
High Channel	

LTE FDD Band 5-10MHz Channel Bandwidth Band Edge Compliance	
QPSK	16QAM
	
100% RB	100% RB
Low Channel	
	
100% RB	100% RB
High Channel	

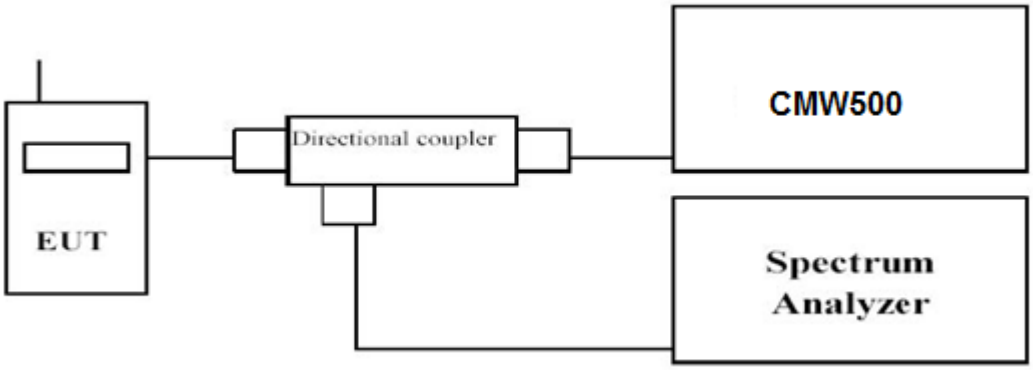
3.6 Spurious Emission

LIMIT

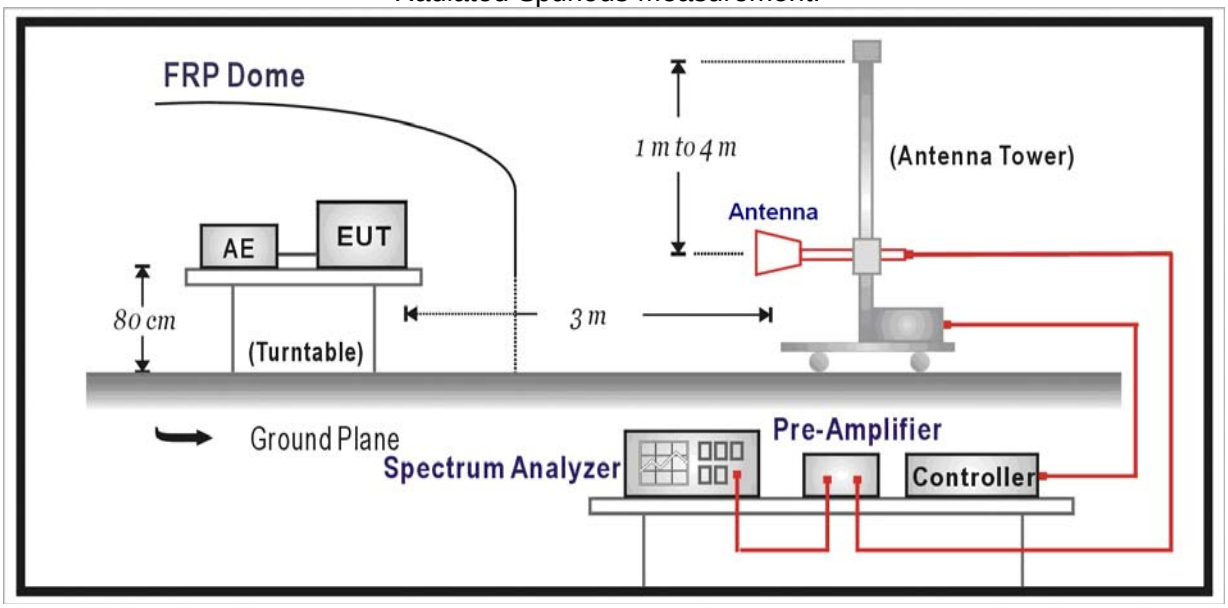
According to Part §22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.
The specification that emissions shall be attenuated below the transmitter power (P) by 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.

TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

Conducted Spurious 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 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 to10^{th} 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 5	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~26.5	1 MHz	3 MHz	Auto

Radiated Spurious Measurement:

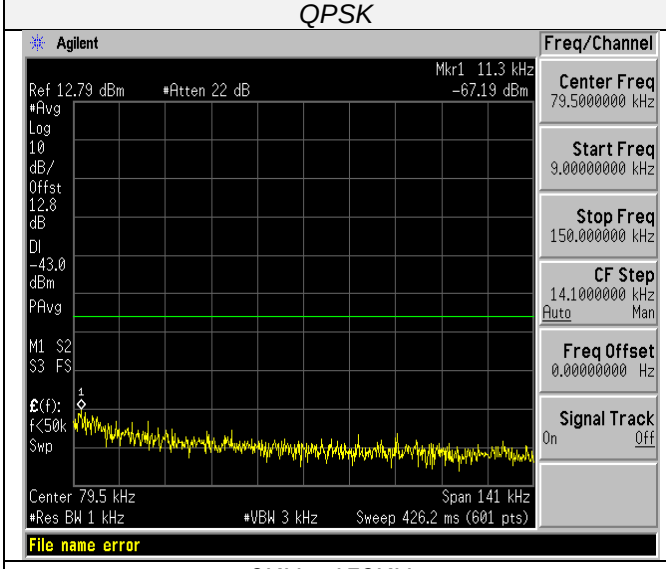
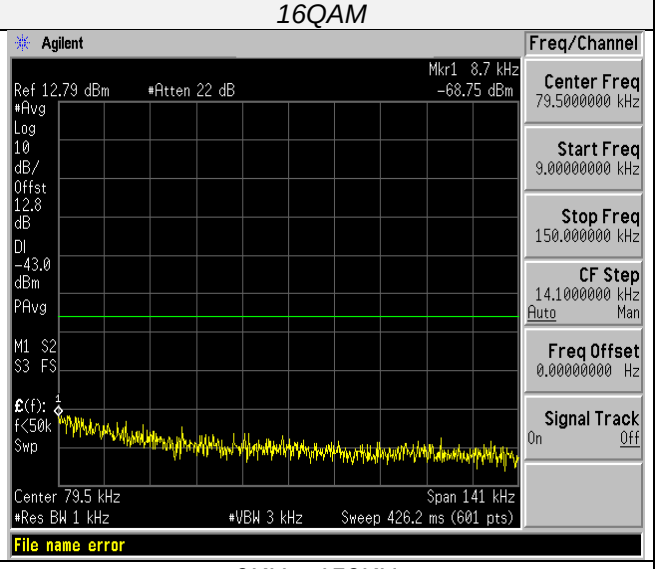
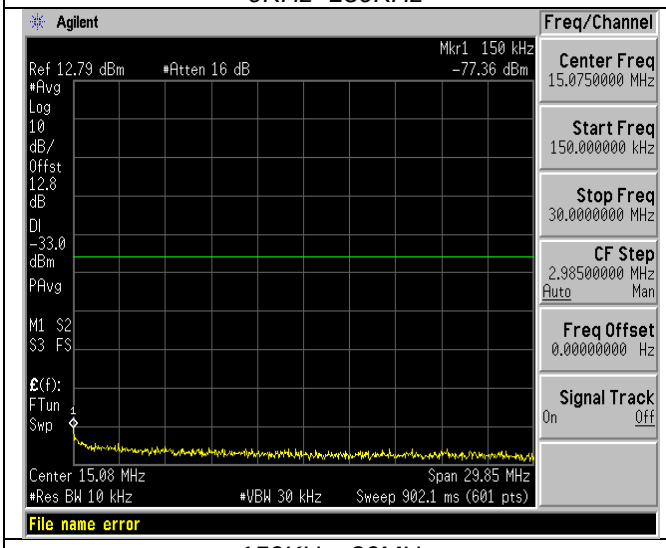
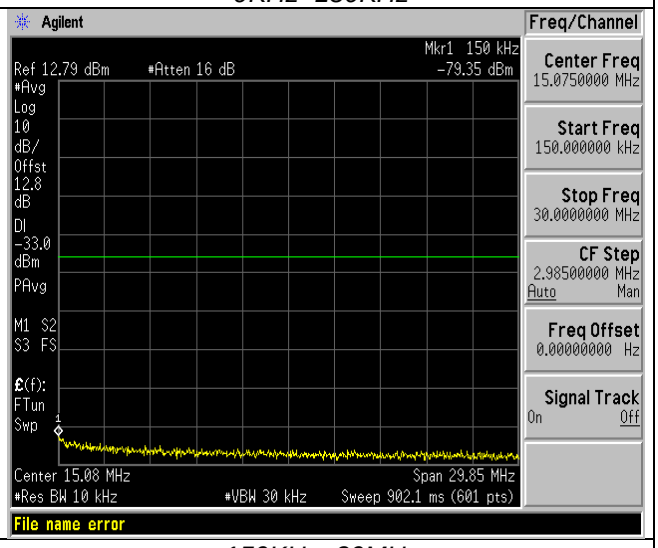
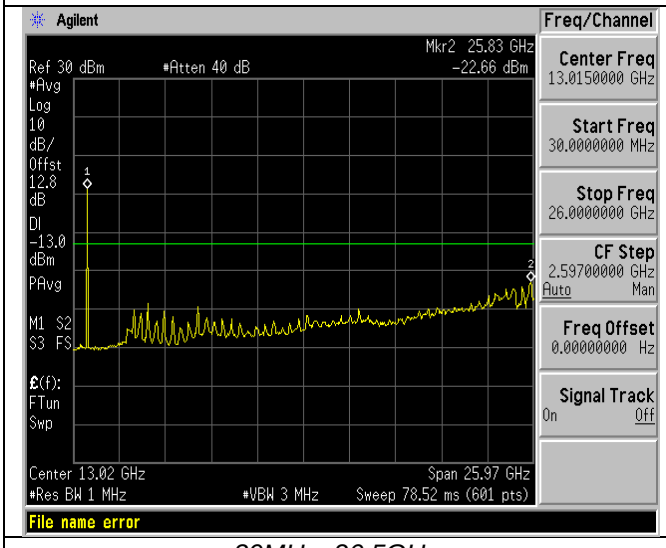
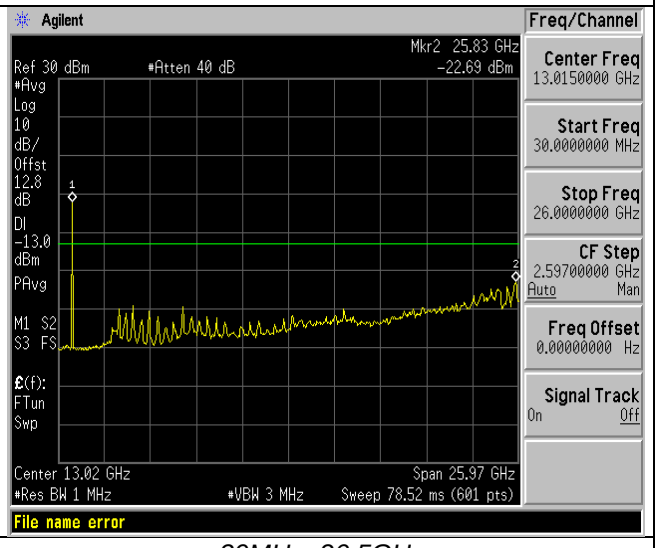
a. The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
b. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
c. The output of the test antenna shall be connected to the measuring receiver.
d. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
e. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
f. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
g. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
h. The maximum signal level detected by the measuring receiver shall be noted.
i. The transmitter shall be replaced by a substitution antenna.
j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
k. The substitution antenna shall be connected to a calibrated signal generator.
l. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
n. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
p. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
q. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for Part 22 and 1MHz for Part 24. The frequency range was checked up to 10th harmonic.
r. Test site anechoic chamber refer to ANSI C63.4: 2009

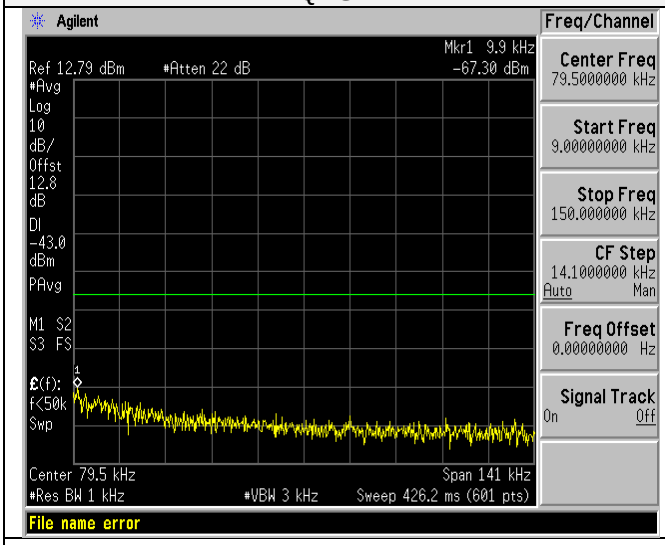
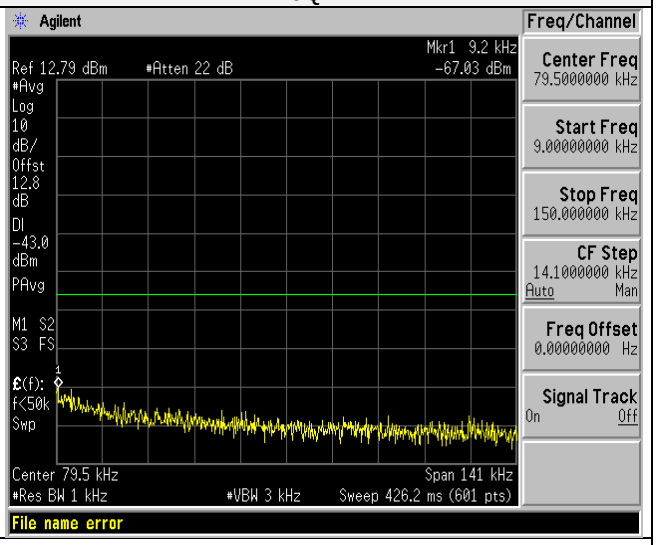
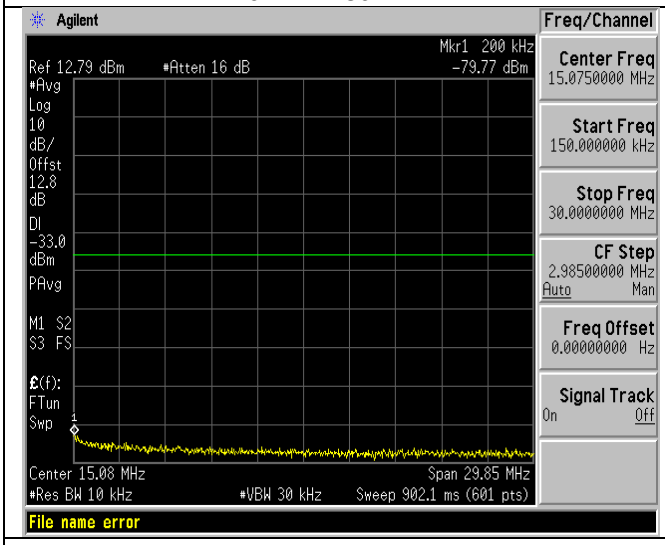
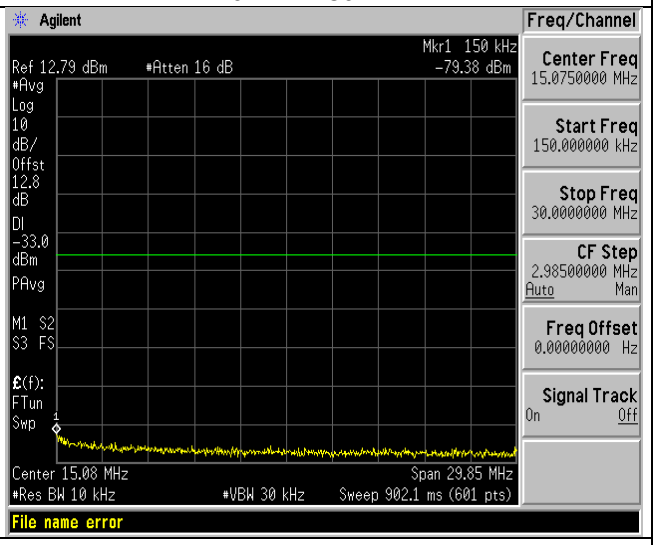
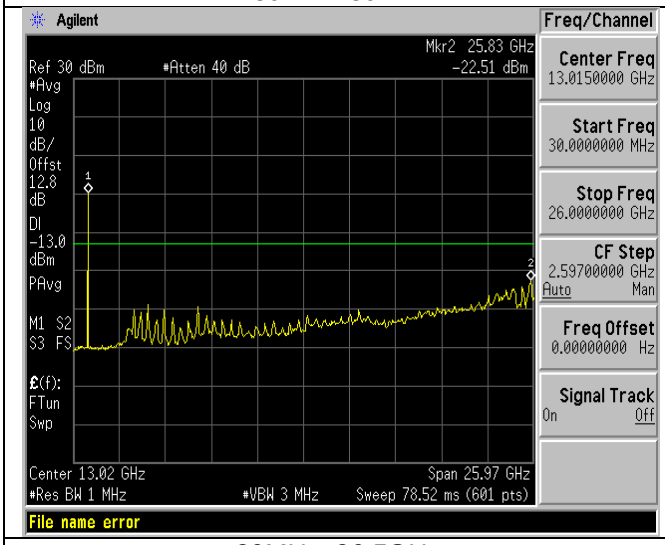
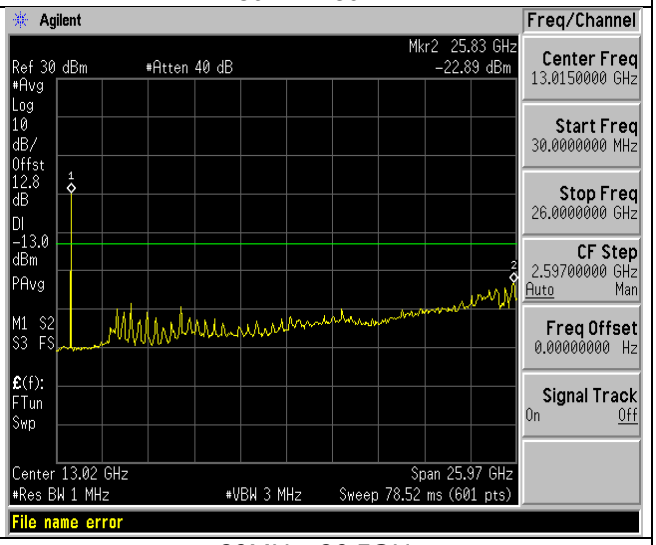
TEST RESULTS

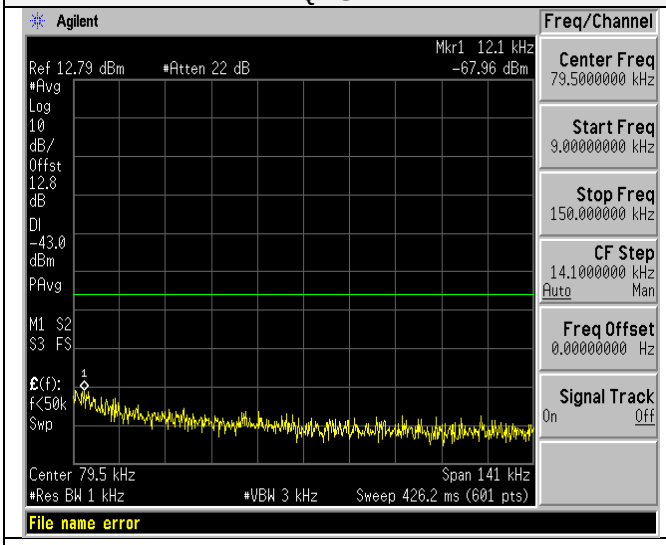
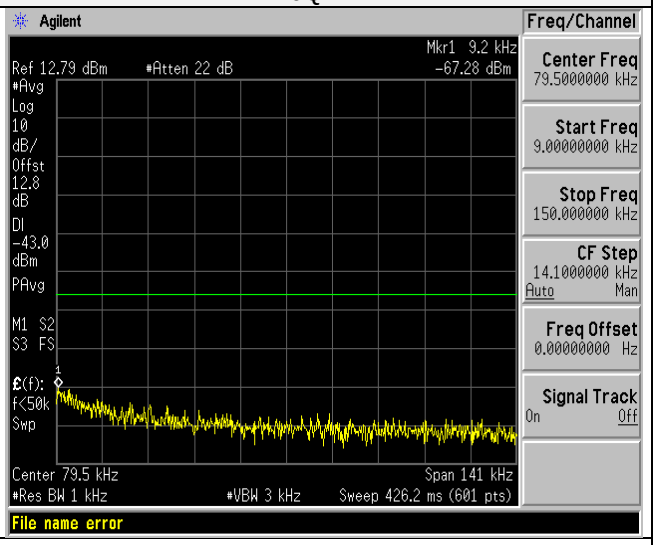
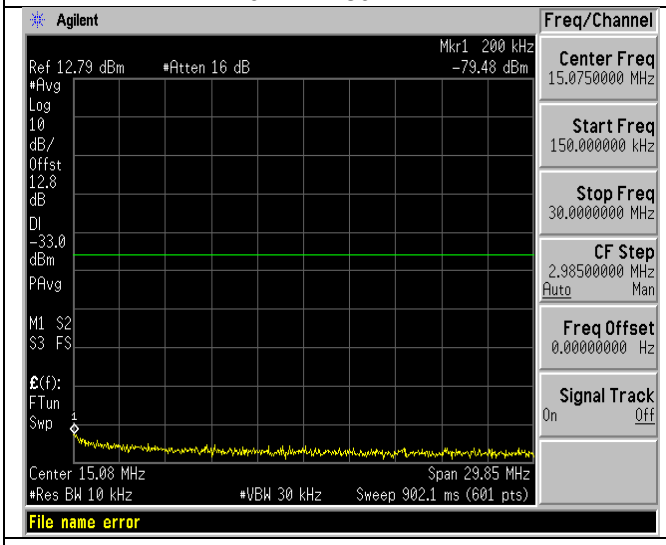
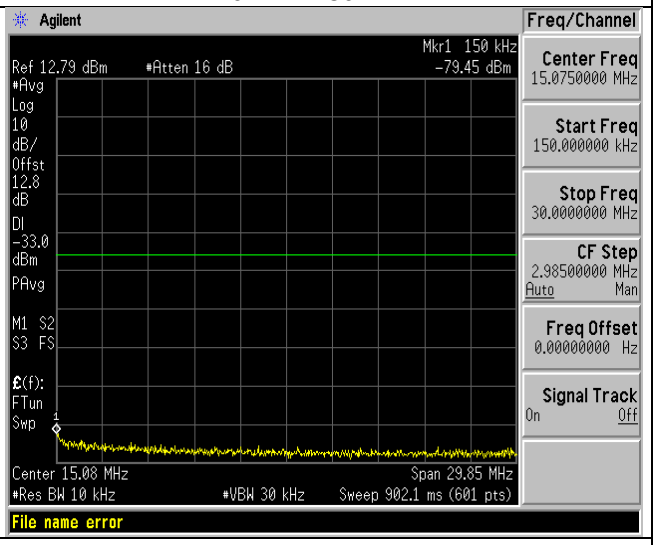
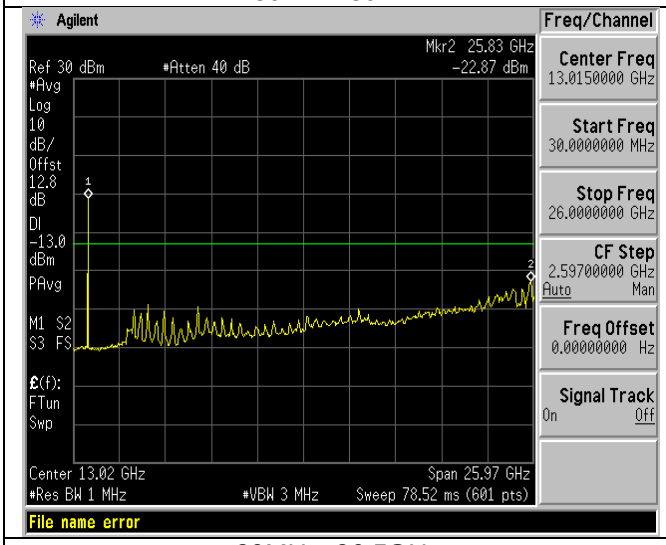
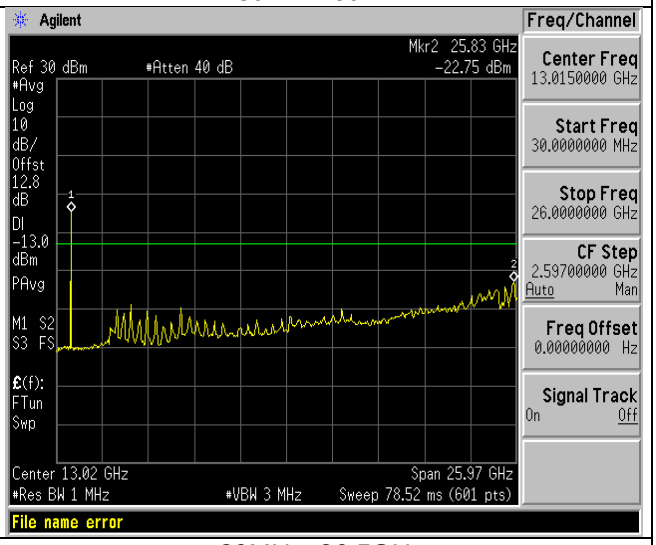
Remark:

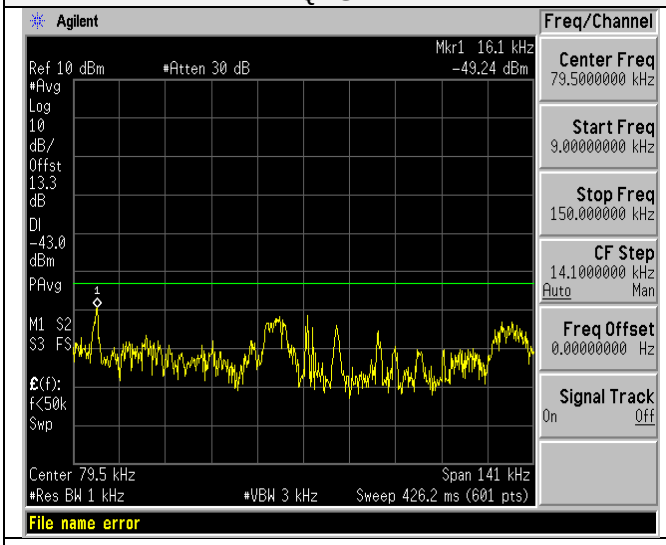
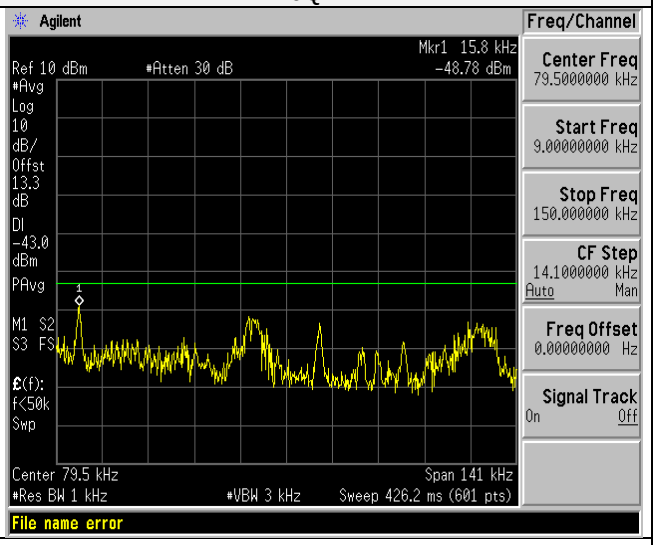
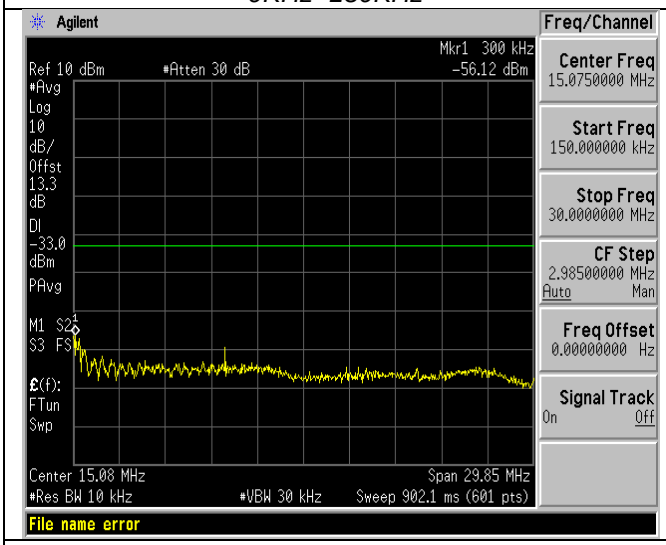
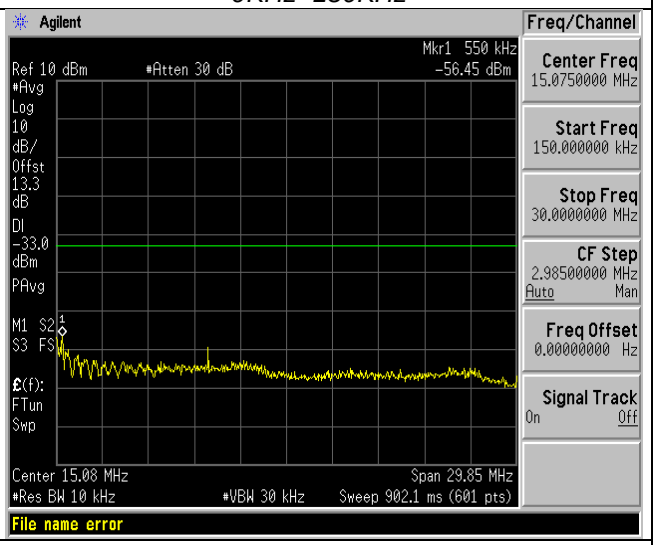
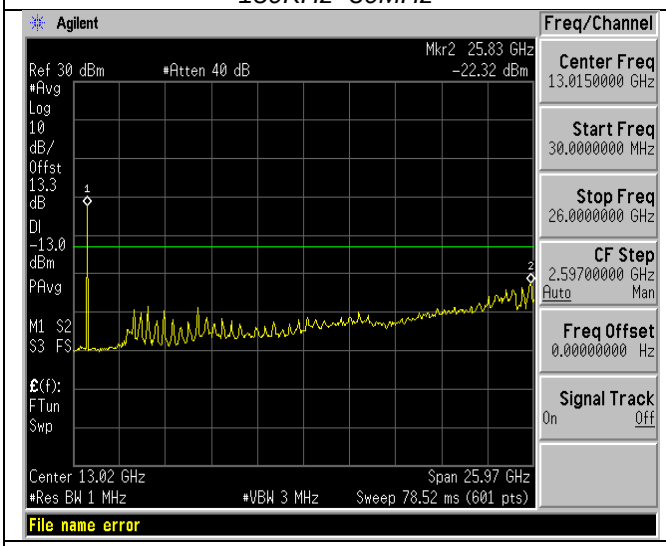
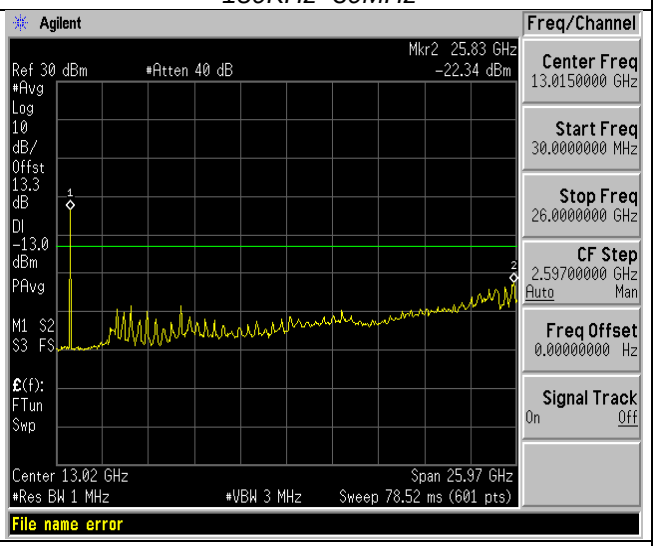
1. *We were tested all RB and RB offset Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.*

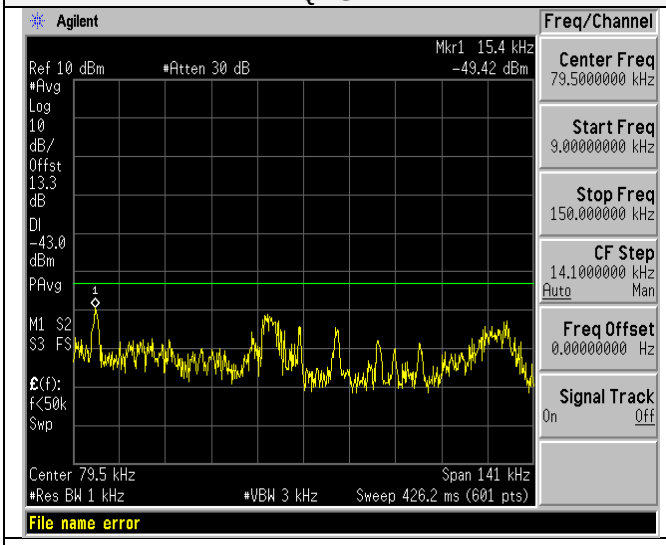
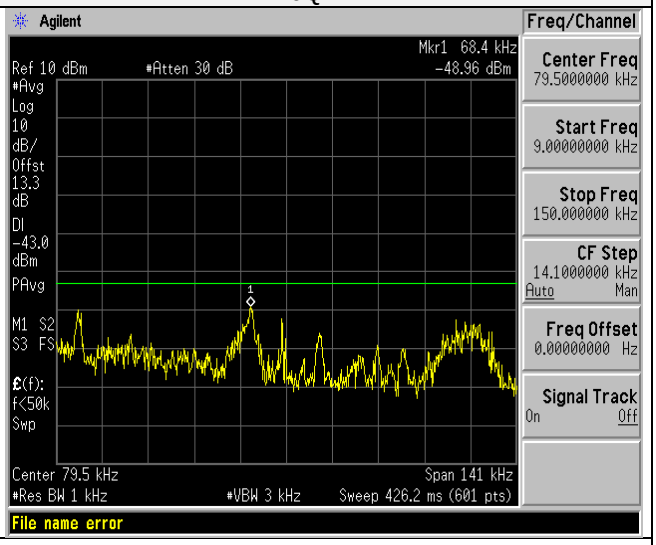
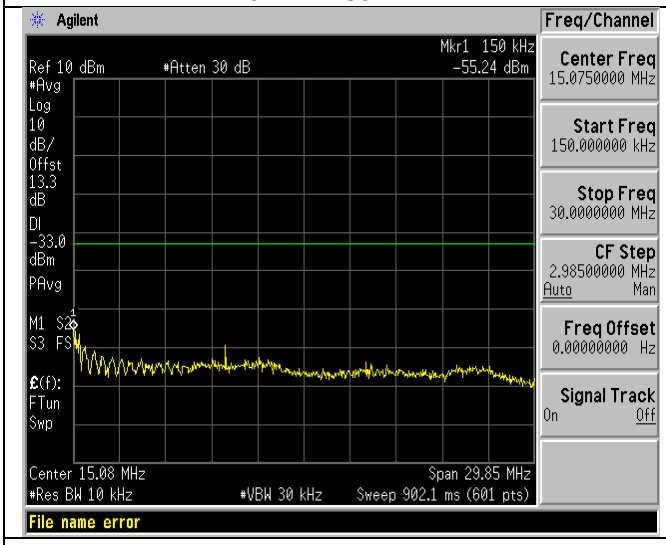
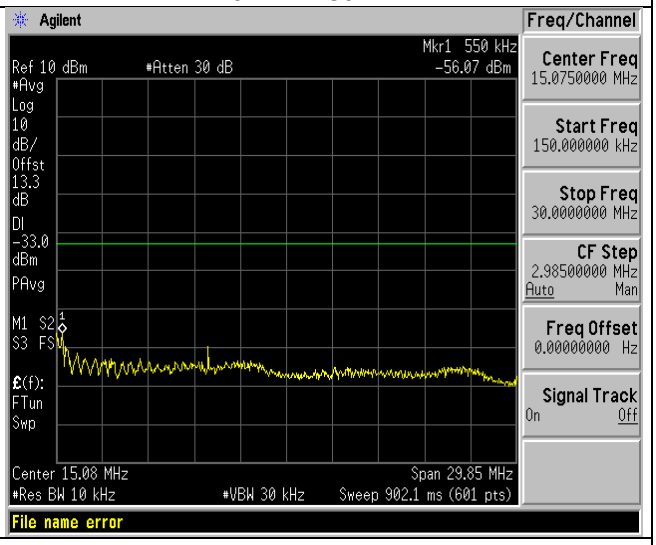
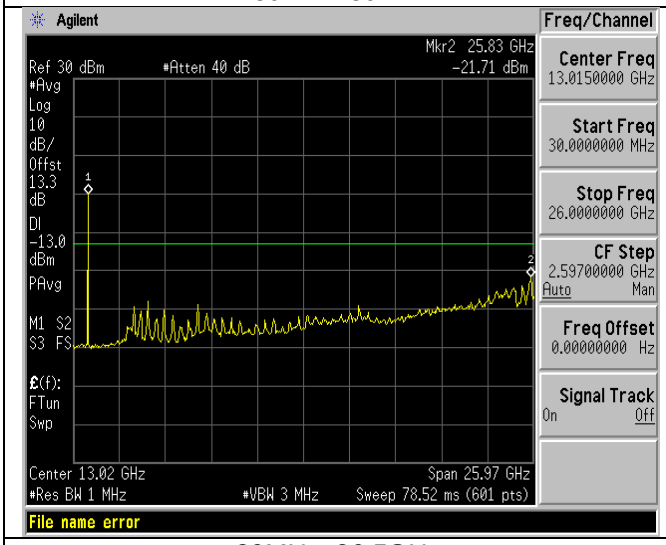
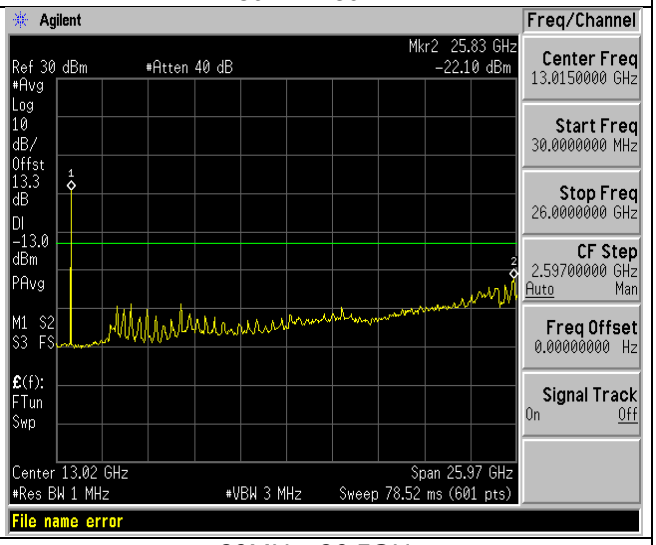
Conducted Measurement:

LTE FDD Band 5-1.4MHz Channel Bandwidth	
Low Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz

LTE FDD Band 5-1.4MHz Channel Bandwidth	
Middle Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz

LTE FDD Band 5-1.4MHz Channel Bandwidth	
High Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz

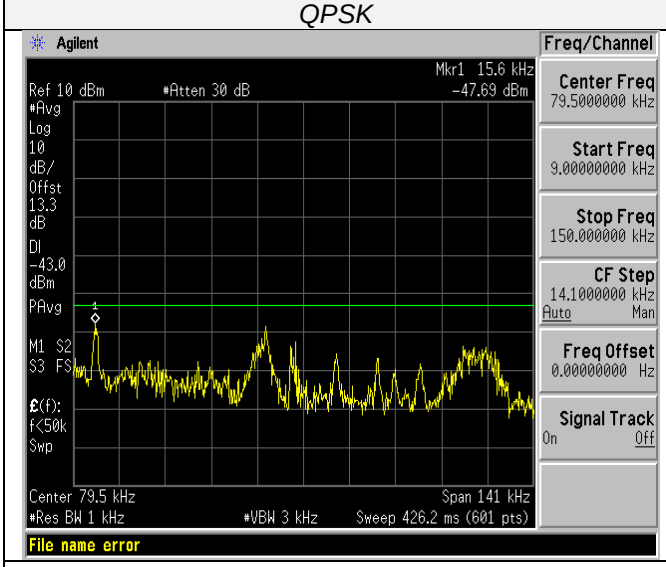
LTE FDD Band 5-3MHz Channel Bandwidth	
Low Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz

LTE FDD Band 5-3MHz Channel Bandwidth	
Middle Channel	
QPSK	*16QAM*
	
9KHz~150KHz	*9KHz~150KHz*
	
150KHz~30MHz	*150KHz~30MHz*
	
30MHz~26.5GHz	*30MHz~26.5GHz*

LTE FDD Band 5-3MHz Channel Bandwidth

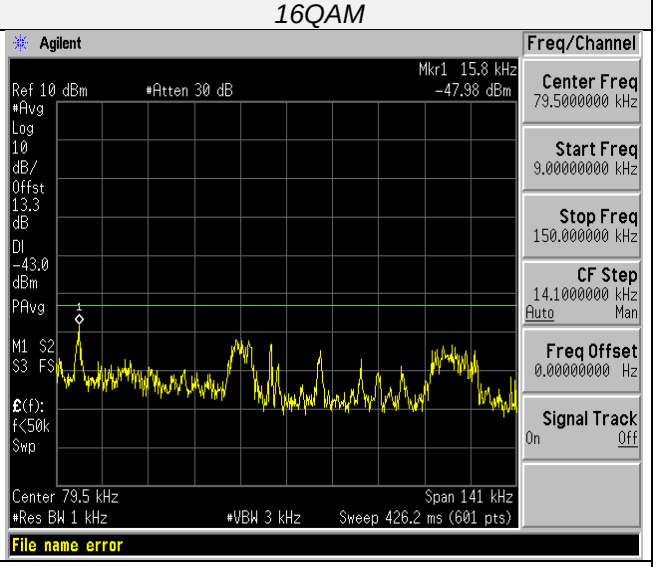
High Channel

QPSK

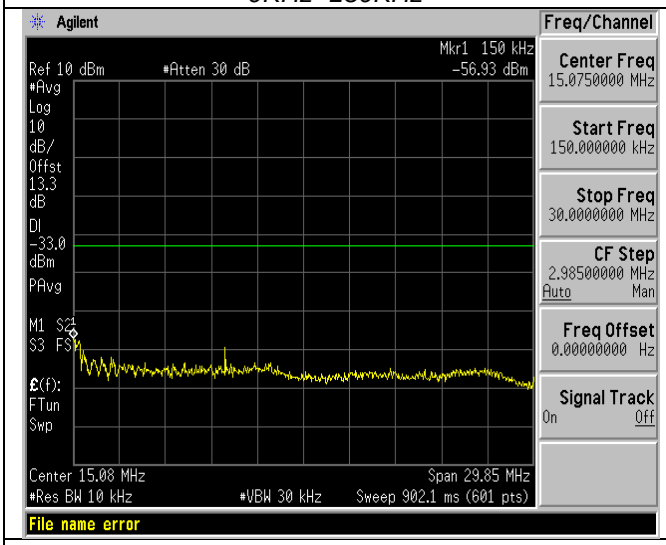


9KHz~150KHz

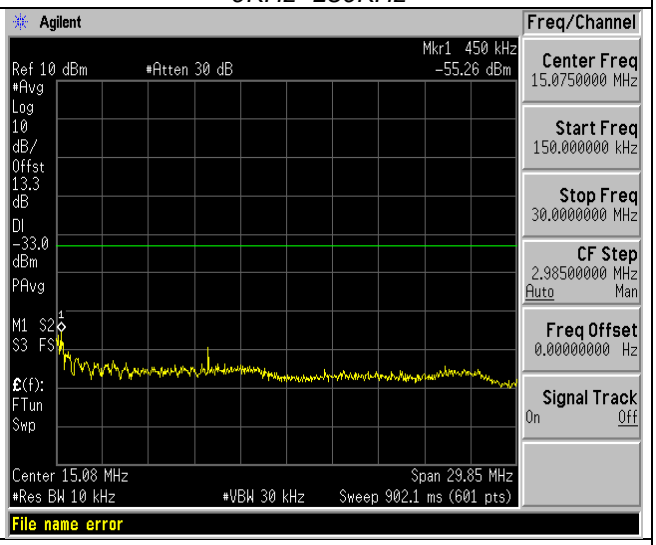
16QAM



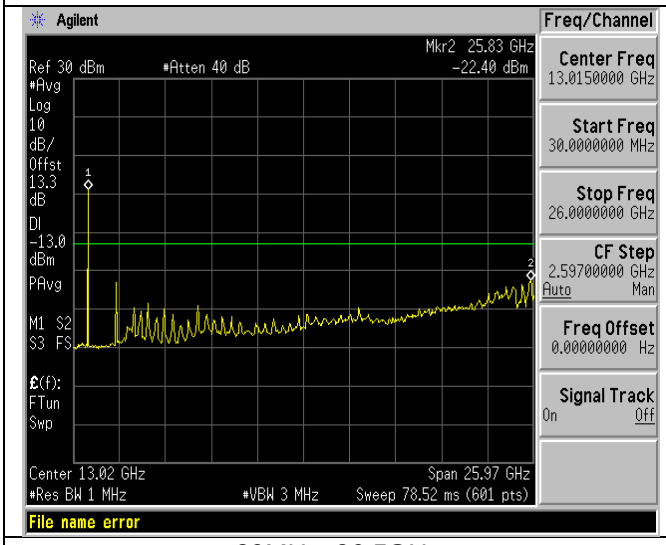
9KHz~150KHz



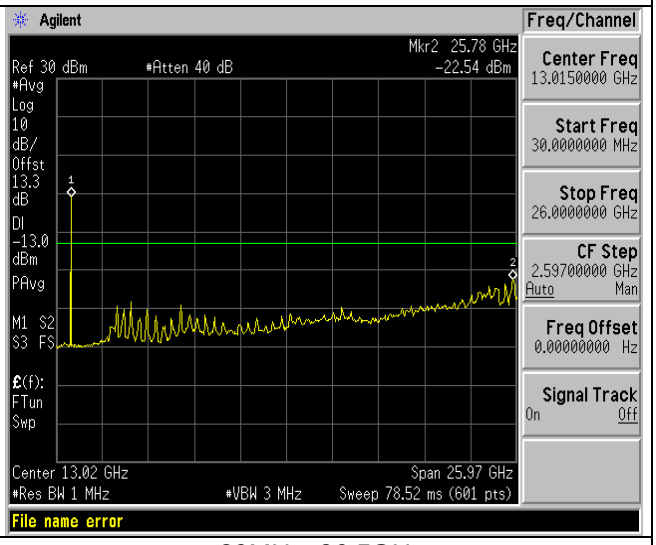
150KHz~30MHz



150KHz~30MHz



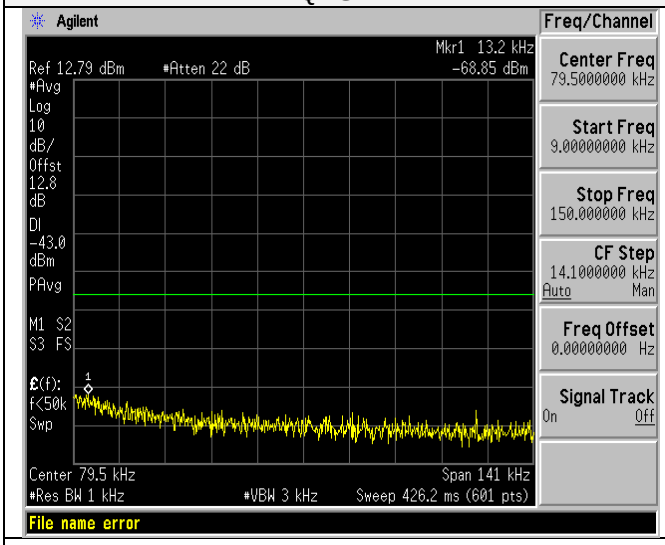
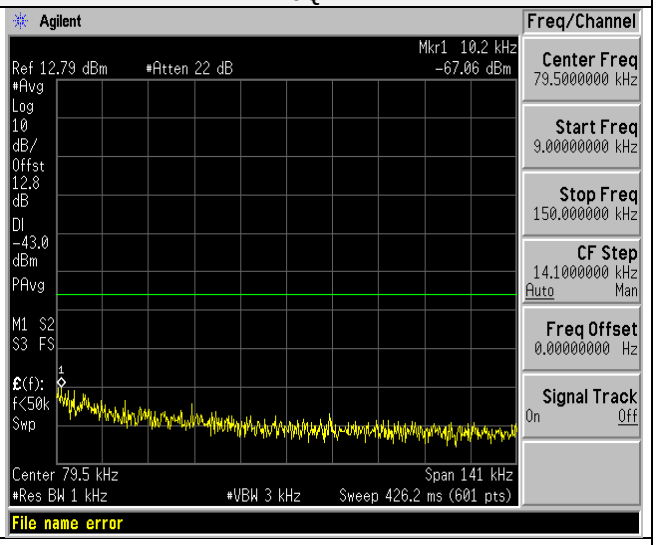
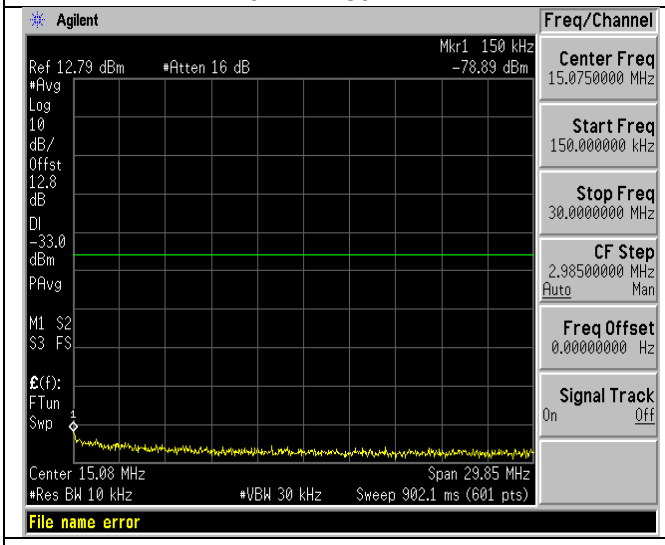
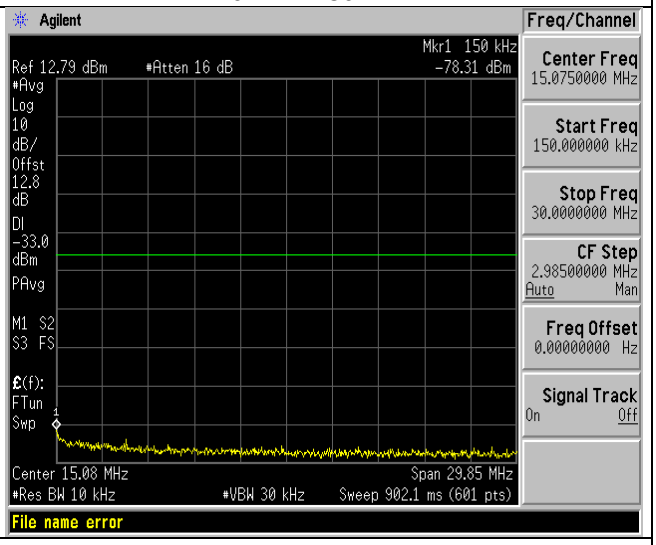
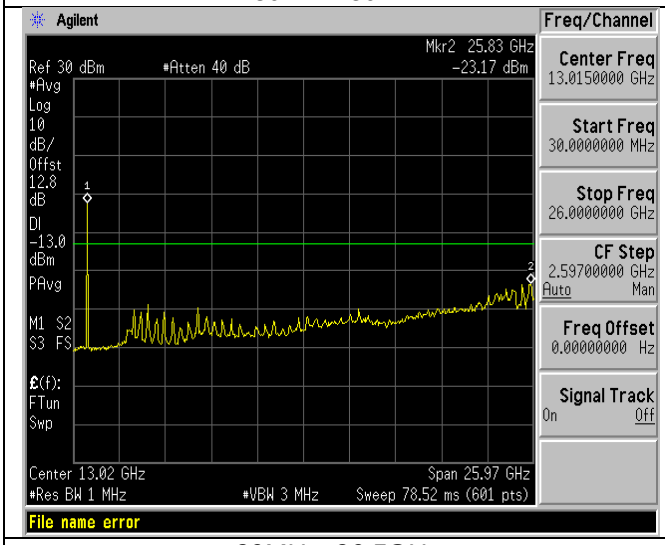
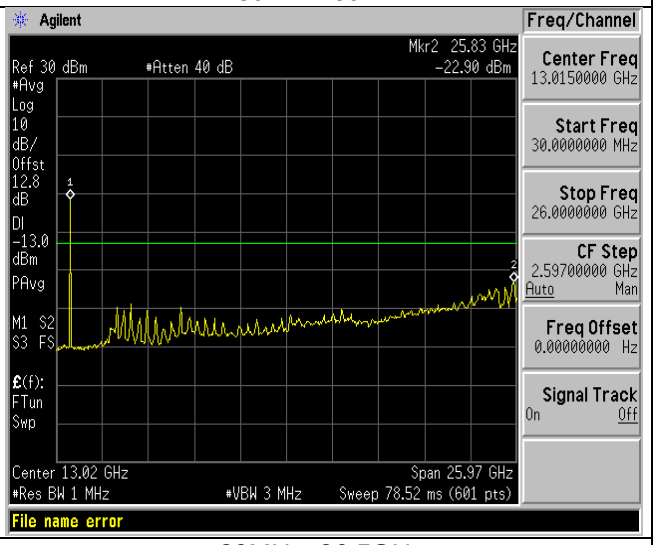
30MHz~26.5GHz

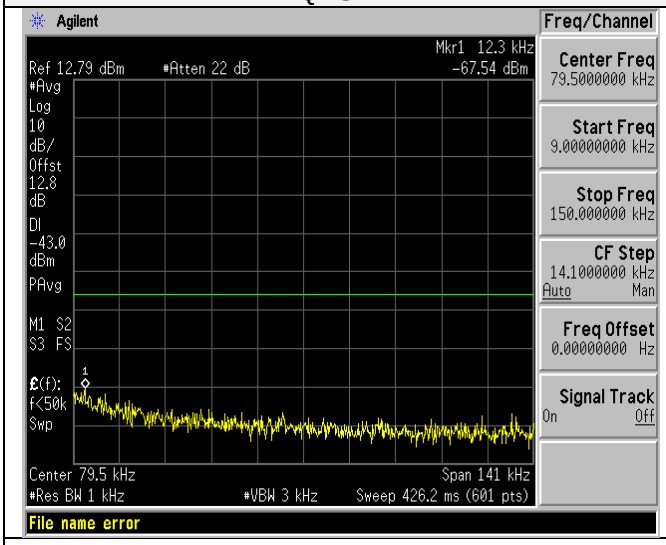
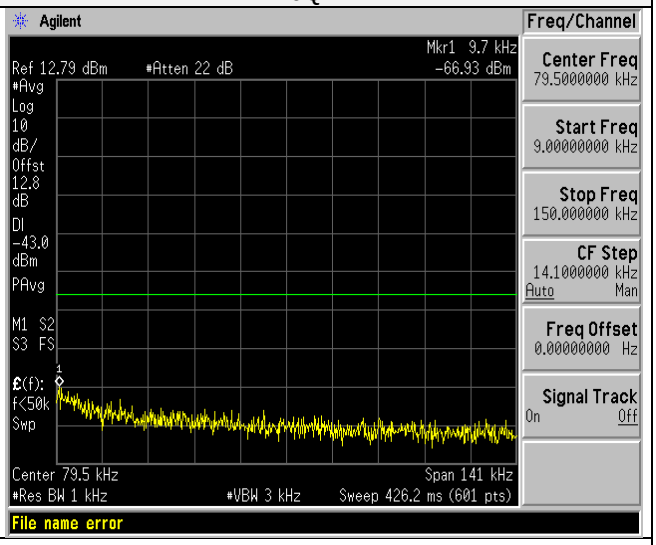
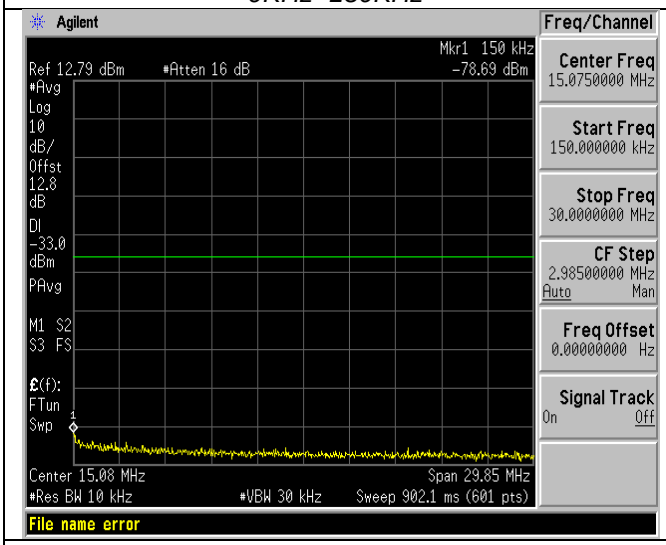
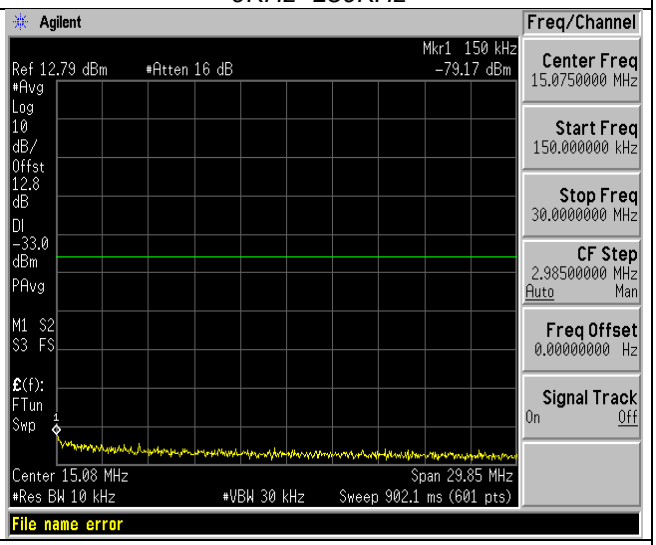
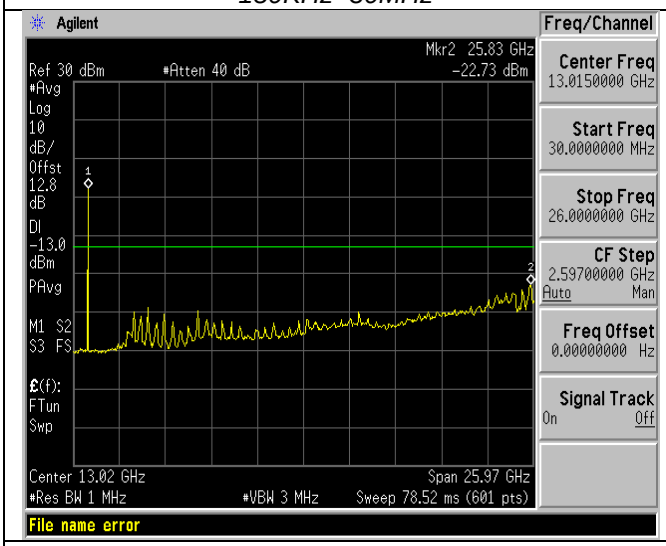
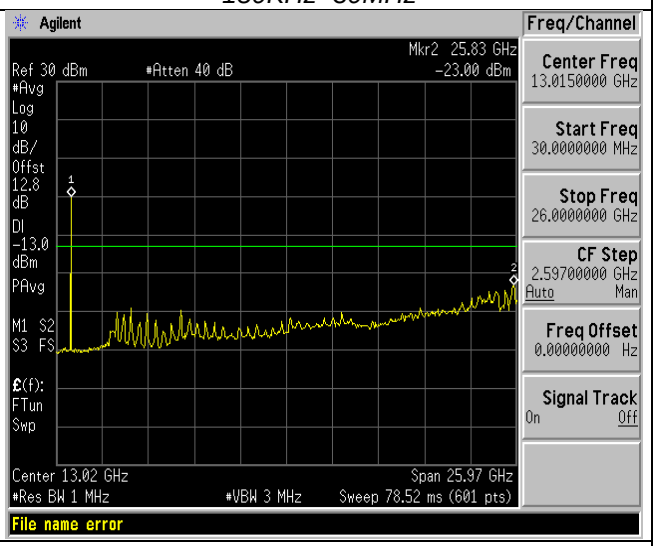


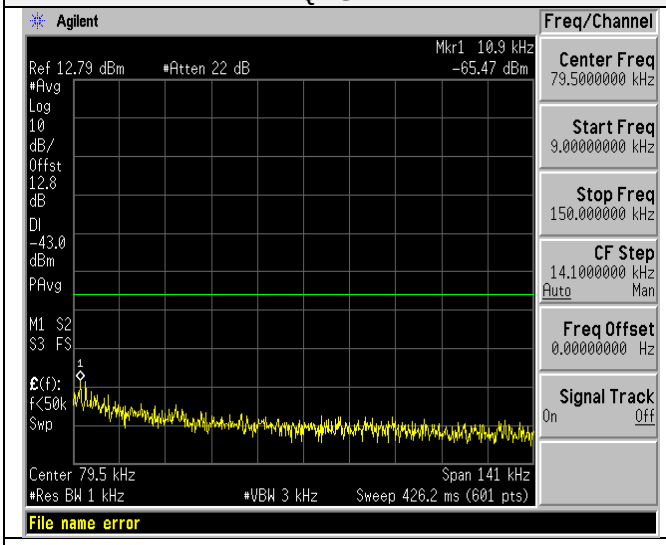
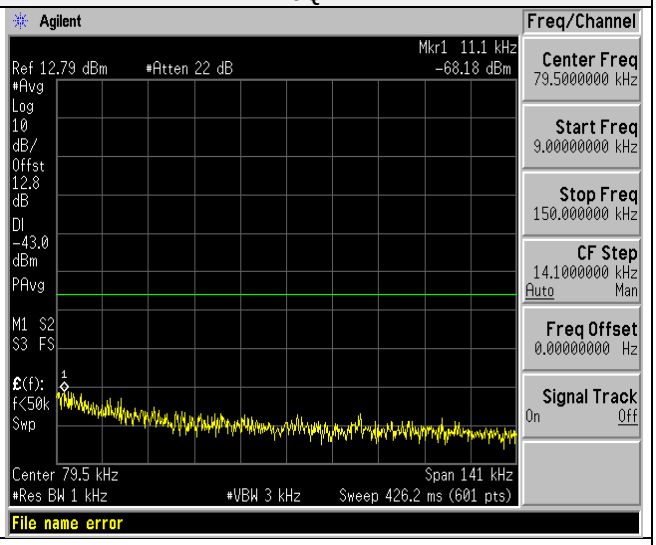
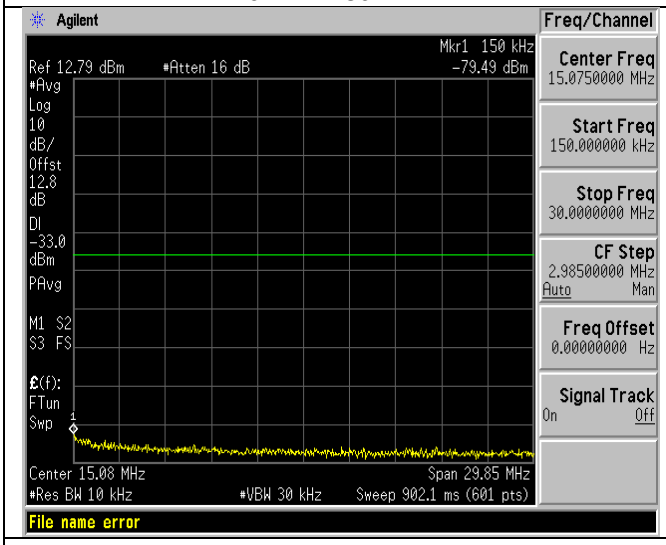
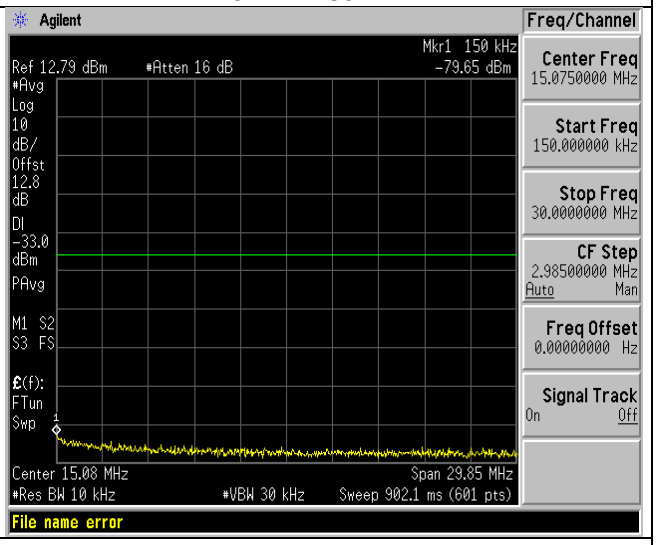
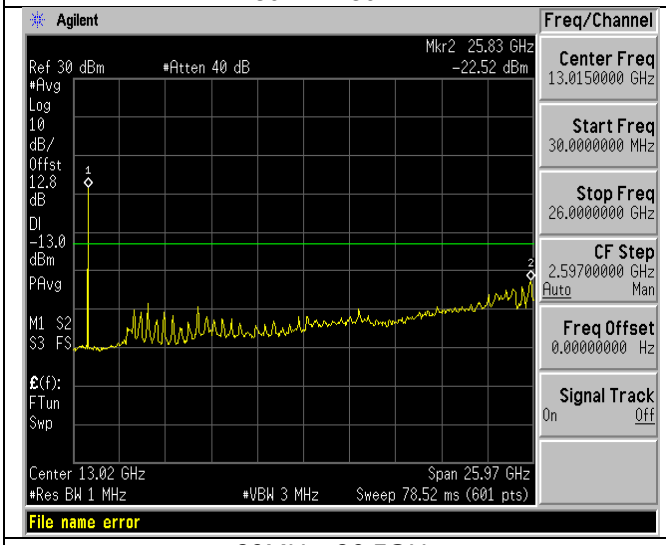
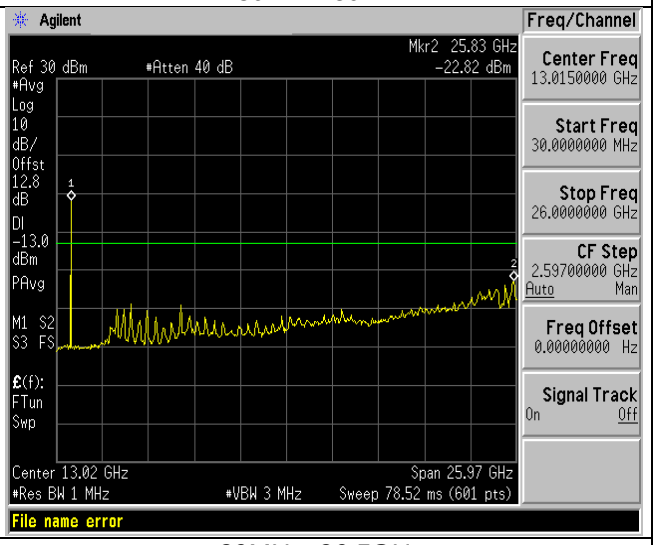
30MHz~26.5GHz

LTE FDD Band 5-5MHz Channel Bandwidth

Low Channel

QPSK	*16QAM*
	
9KHz~150KHz	*9KHz~150KHz*
	
150KHz~30MHz	*150KHz~30MHz*
	
30MHz~26.5GHz	*30MHz~26.5GHz*

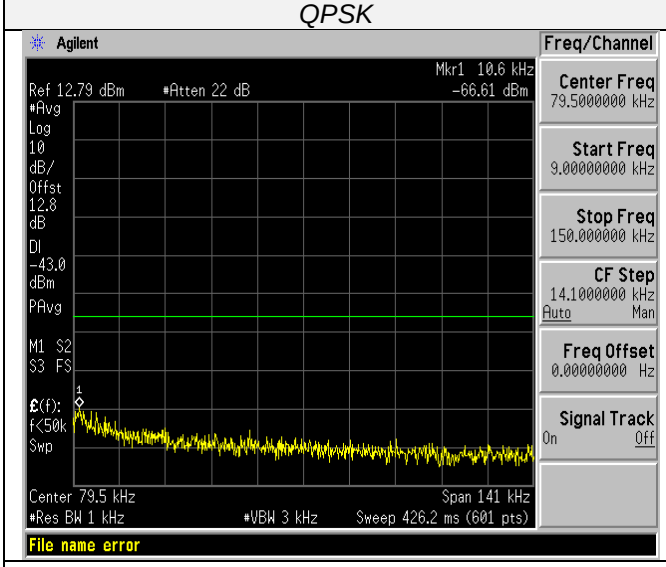
LTE FDD Band 5-5MHz Channel Bandwidth	
Middle Channel	
QPSK	*16QAM*
	
9KHz~150KHz	*9KHz~150KHz*
	
150KHz~30MHz	*150KHz~30MHz*
	
30MHz~26.5GHz	*30MHz~26.5GHz*

LTE FDD Band 5-5MHz Channel Bandwidth	
High Channel	
QPSK	16QAM
	
9KHz~150KHz	9KHz~150KHz
	
150KHz~30MHz	150KHz~30MHz
	
30MHz~26.5GHz	30MHz~26.5GHz

LTE FDD Band 5-10MHz Channel Bandwidth

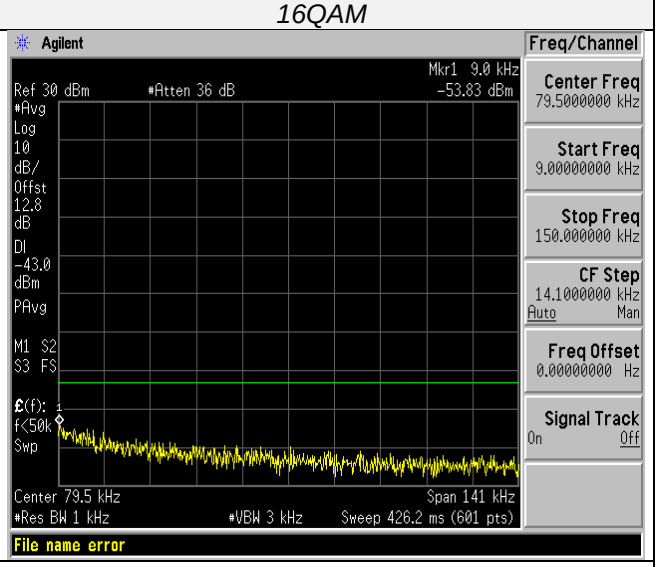
Low Channel

QPSK

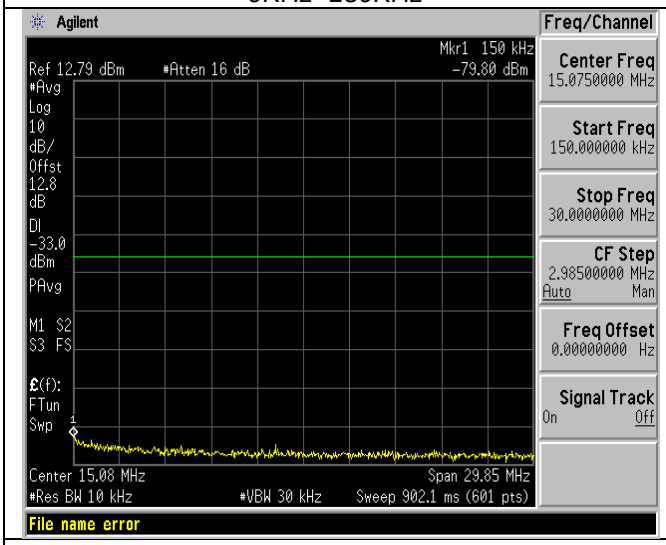


9KHz~150KHz

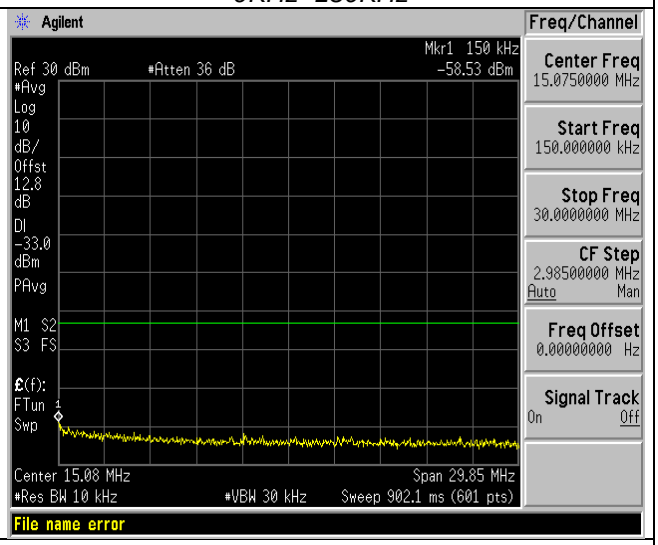
16QAM



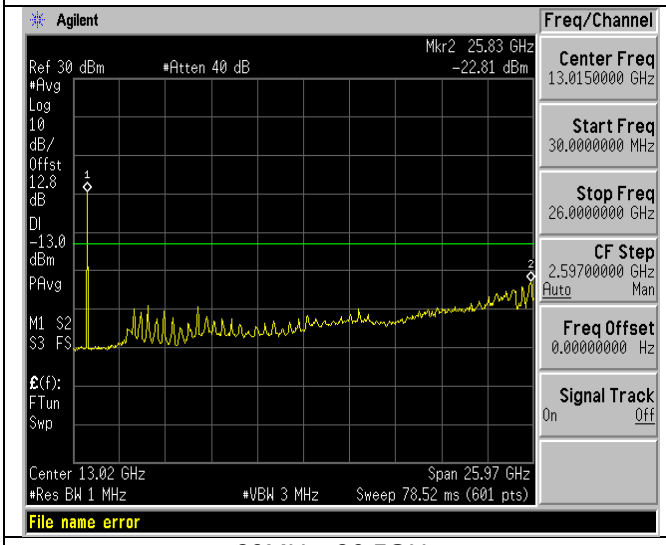
9KHz~150KHz



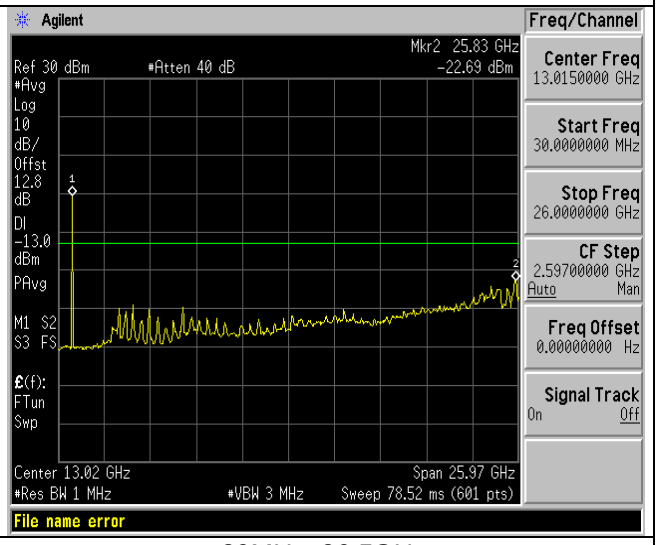
150KHz~30MHz



150KHz~30MHz



30MHz~26.5GHz

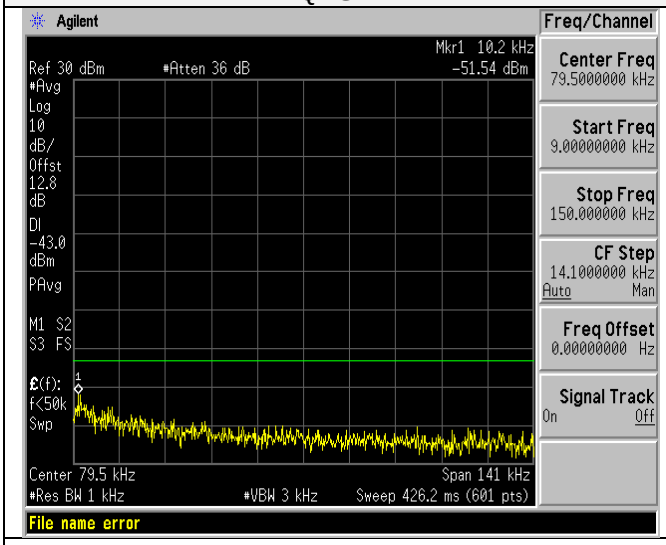


30MHz~26.5GHz

LTE FDD Band 5-10MHz Channel Bandwidth

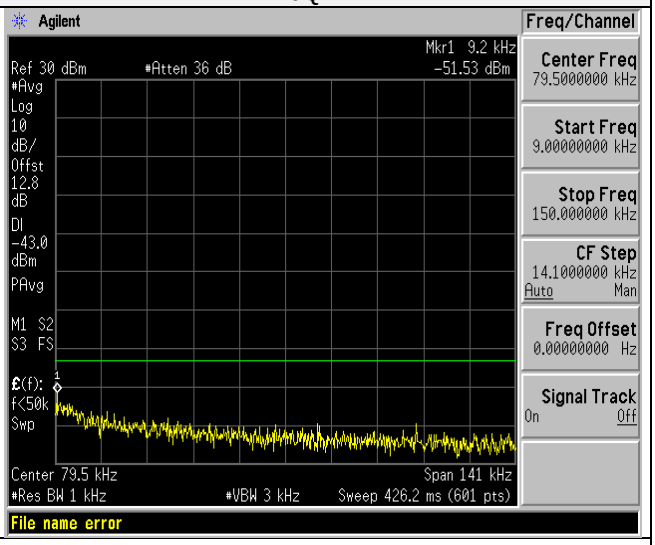
Middle Channel

QPSK

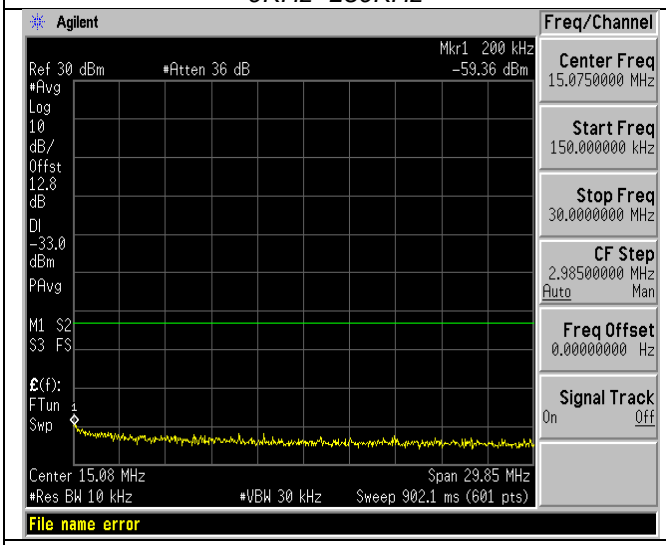


9KHz~150KHz

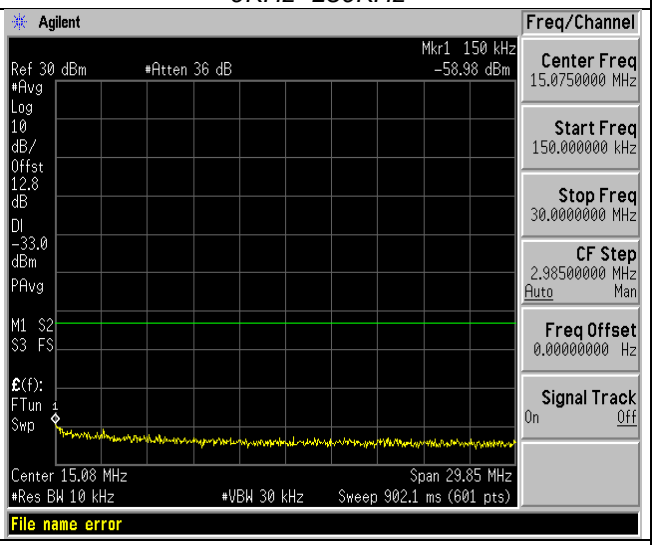
16QAM



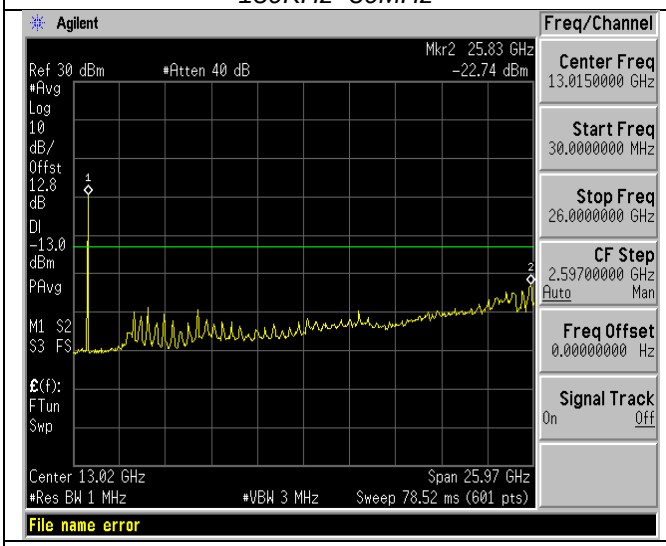
9KHz~150KHz



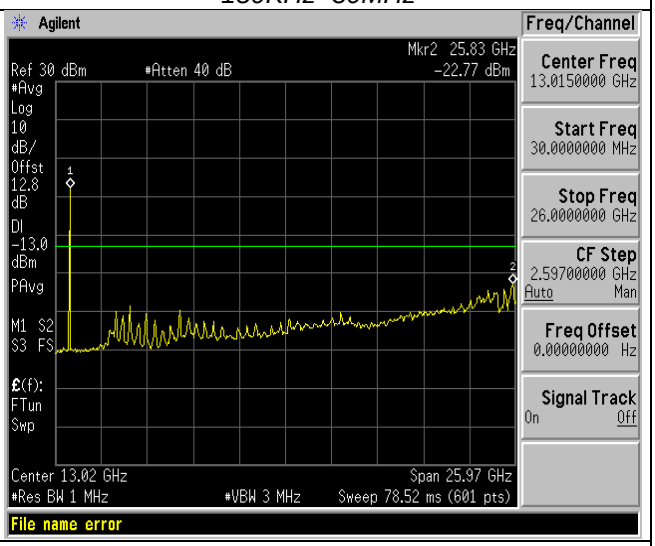
150KHz~30MHz



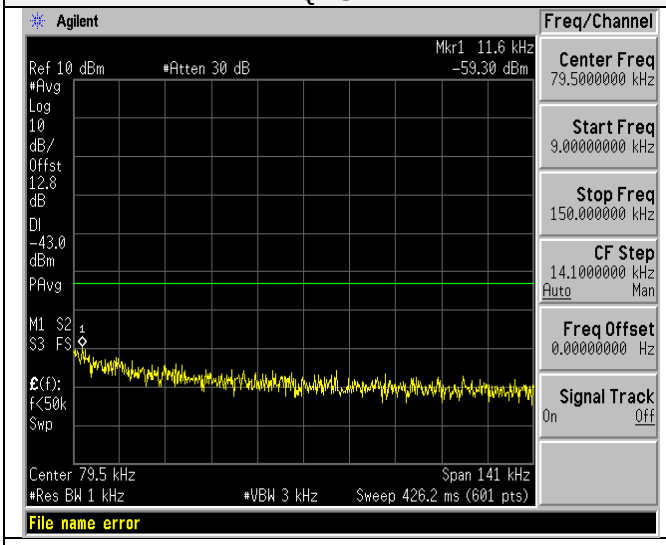
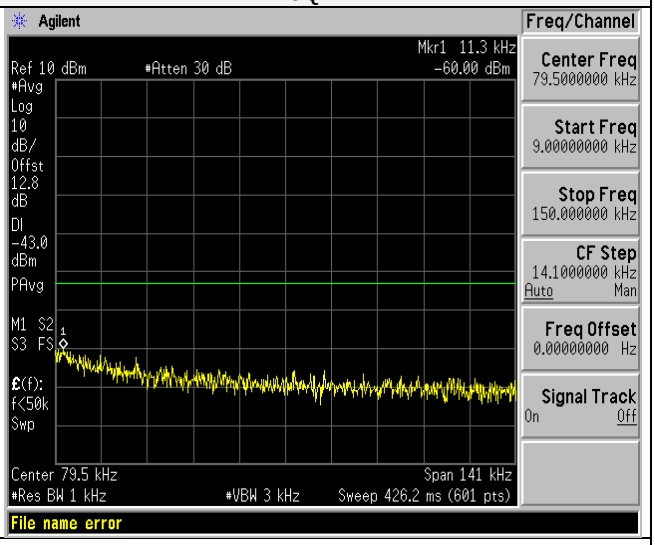
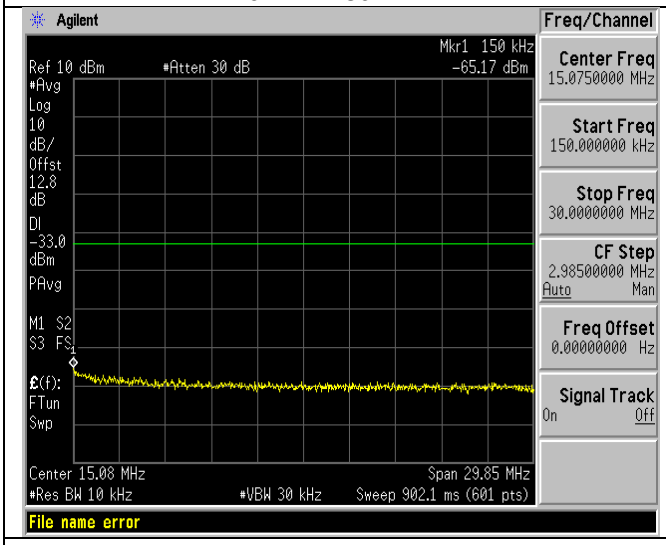
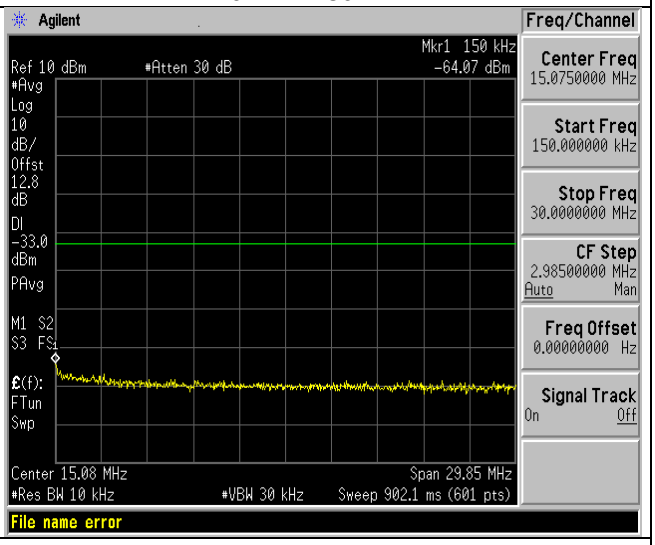
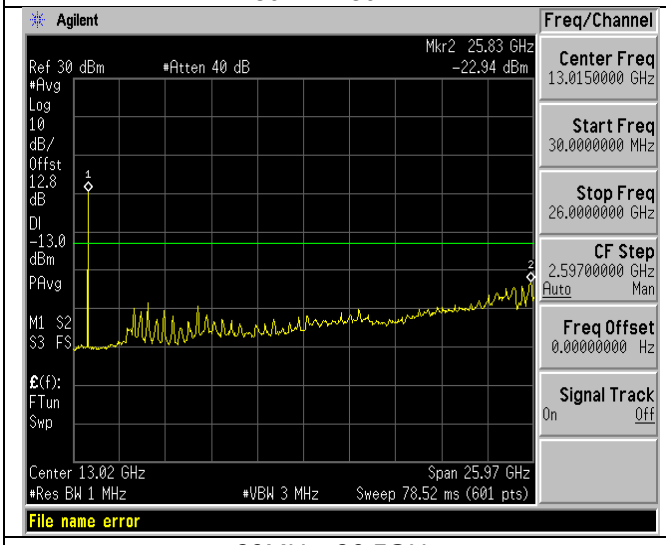
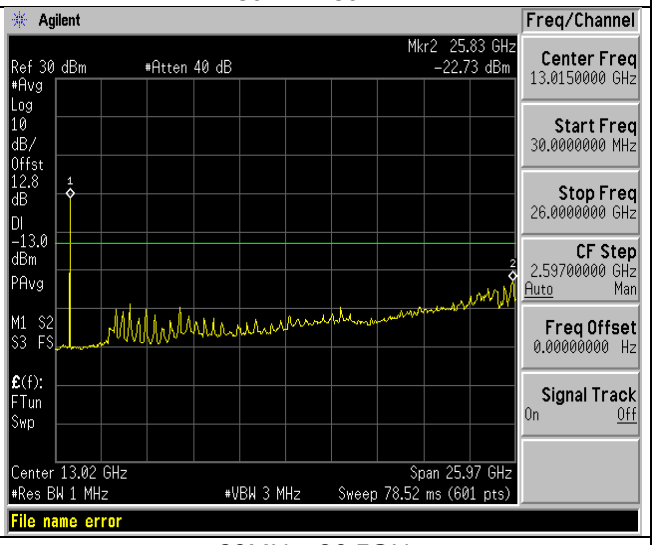
150KHz~30MHz



30MHz~26.5GHz



30MHz~26.5GHz

LTE FDD Band 5-10MHz Channel Bandwidth	
High Channel	
QPSK	*16QAM*
	
9KHz~150KHz	*9KHz~150KHz*
	
150KHz~30MHz	*150KHz~30MHz*
	
30MHz~26.5GHz	*30MHz~26.5GHz*

Radiated Measurement:

Remark:
1. *We were tested all RB and RB offset Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.*
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 5_Channel Bandwidth 1.4MHz_QPSK_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1649.4	-37.20	3.00	3.00	9.58	-30.62	-13.00	17.62	H
2474.1	-42.14	3.03	3.00	10.72	-34.45	-13.00	21.45	H
1649.4	-46.59	3.00	3.00	9.68	-39.91	-13.00	26.91	V
2474.1	-49.96	3.03	3.00	10.72	-42.27	-13.00	29.27	V

LTE FDD Band 5_Channel Bandwidth 1.4MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.0	-34.74	3.00	3.00	9.61	-28.13	-13.00	15.13	H
2509.5	-39.07	3.03	3.00	10.77	-31.33	-13.00	18.33	H
1673.0	-45.46	3.00	3.00	9.61	-38.85	-13.00	25.85	V
2509.5	-47.88	3.03	3.00	10.77	-40.14	-13.00	27.14	V

LTE FDD Band 5_Channel Bandwidth 1.4MHz_QPSK_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1696.6	-40.37	3.00	3.00	9.77	-33.60	-13.00	20.60	H
2544.9	-44.97	3.03	3.00	10.89	-37.11	-13.00	24.11	H
1696.6	-50.16	3.00	3.00	9.77	-43.39	-13.00	30.39	V
2544.9	-53.63	3.03	3.00	10.89	-45.77	-13.00	32.77	V

LTE FDD Band 5_Channel Bandwidth 3MHz_QPSK_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1651.0	-36.62	3.00	3.00	9.58	-30.04	-13.00	17.04	H
2476.5	-41.06	3.03	3.00	10.72	-33.37	-13.00	20.37	H
1651.0	-45.29	3.00	3.00	9.68	-38.61	-13.00	25.61	V
2476.5	-49.47	3.03	3.00	10.72	-41.78	-13.00	28.78	V

LTE FDD Band 5_Channel Bandwidth 3MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.0	-34.96	3.00	3.00	9.61	-28.35	-13.00	15.35	H
2509.5	-39.44	3.03	3.00	10.77	-31.70	-13.00	18.70	H
1673.0	-45.57	3.00	3.00	9.61	-38.96	-13.00	25.96	V
2509.5	-48.56	3.03	3.00	10.77	-40.82	-13.00	27.82	V

LTE FDD Band 5_Channel Bandwidth 3MHz_QPSK_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1695.0	-40.09	3.00	3.00	9.77	-33.32	-13.00	20.32	H
2542.5	-44.87	3.03	3.00	10.89	-37.01	-13.00	24.01	H
1695.0	-49.71	3.00	3.00	9.77	-42.94	-13.00	29.94	V
2542.5	-53.22	3.03	3.00	10.89	-45.36	-13.00	32.36	V

LTE FDD Band 5_Channel Bandwidth 5MHz_QPSK_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1653.0	-36.46	3.00	3.00	9.58	-29.88	-13.00	16.88	H
2479.5	-40.95	3.03	3.00	10.72	-33.26	-13.00	20.26	H
1653.0	-44.82	3.00	3.00	9.68	-38.14	-13.00	25.14	V
2479.5	-49.04	3.03	3.00	10.72	-41.35	-13.00	28.35	V

LTE FDD Band 5_Channel Bandwidth 5MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.0	-34.27	3.00	3.00	9.61	-27.66	-13.00	14.66	H
2509.5	-37.65	3.03	3.00	10.77	-29.91	-13.00	16.91	H
1673.0	-45.13	3.00	3.00	9.61	-38.52	-13.00	25.52	V
2509.5	-47.79	3.03	3.00	10.77	-40.05	-13.00	27.05	V

LTE FDD Band 5_Channel Bandwidth 5MHz_QPSK_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1693.0	-39.66	3.00	3.00	9.77	-32.89	-13.00	19.89	H
2539.5	-44.63	3.03	3.00	10.89	-36.77	-13.00	23.77	H
1693.0	-49.39	3.00	3.00	9.77	-42.62	-13.00	29.62	V
2539.5	-52.87	3.03	3.00	10.89	-45.01	-13.00	32.01	V

LTE FDD Band 5_Channel Bandwidth 10MHz_QPSK_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1658.0	-36.04	3.00	3.00	9.58	-29.46	-13.00	16.46	H
2487.0	-40.72	3.03	3.00	10.72	-33.03	-13.00	20.03	H
1658.0	-44.76	3.00	3.00	9.68	-38.08	-13.00	25.08	V
2487.0	-48.94	3.03	3.00	10.72	-41.25	-13.00	28.25	V

LTE FDD Band 5_Channel Bandwidth 10MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.0	-35.43	3.00	3.00	9.61	-28.82	-13.00	15.82	H
2509.5	-38.90	3.03	3.00	10.77	-31.16	-13.00	18.16	H
1673.0	-47.95	3.00	3.00	9.61	-41.34	-13.00	28.34	V
2509.5	-52.27	3.03	3.00	10.77	-44.53	-13.00	31.53	V

LTE FDD Band 5_Channel Bandwidth 10MHz_QPSK_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1688.0	-39.32	3.00	3.00	9.77	-32.55	-13.00	19.55	H
2532.0	-43.92	3.03	3.00	10.89	-36.06	-13.00	23.06	H
1688.0	-48.99	3.00	3.00	9.77	-42.22	-13.00	29.22	V
2532.0	-52.23	3.03	3.00	10.89	-44.37	-13.00	31.37	V

LTE FDD Band 5_Channel Bandwidth 1.4MHz_16QAM _ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1649.4	-37.61	3.00	3.00	9.58	-31.03	-13.00	18.03	H
2474.1	-42.57	3.03	3.00	10.72	-34.88	-13.00	21.88	H
1649.4	-43.64	3.00	3.00	9.68	-36.96	-13.00	23.96	V
2474.1	-49.56	3.03	3.00	10.72	-41.87	-13.00	28.87	V

LTE FDD Band 5_Channel Bandwidth 1.4MHz_16QAM _ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.0	-35.50	3.00	3.00	9.61	-28.89	-13.00	15.89	H
2509.5	-38.94	3.03	3.00	10.77	-31.20	-13.00	18.20	H
1673.0	-46.25	3.00	3.00	9.61	-39.64	-13.00	26.64	V
2509.5	-48.85	3.03	3.00	10.77	-41.11	-13.00	28.11	V

LTE FDD Band 5_Channel Bandwidth 1.4MHz_16QAM _ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1696.6	-40.76	3.00	3.00	9.77	-33.99	-13.00	20.99	H
2544.9	-45.53	3.03	3.00	10.89	-37.67	-13.00	24.67	H
1696.6	-50.59	3.00	3.00	9.77	-43.82	-13.00	30.82	V
2544.9	-53.23	3.03	3.00	10.89	-45.37	-13.00	32.37	V

LTE FDD Band 5_Channel Bandwidth 3MHz_16QAM _ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1651.0	-37.34	3.00	3.00	9.58	-30.76	-13.00	17.76	H
2476.5	-40.73	3.03	3.00	10.72	-33.04	-13.00	20.04	H
1651.0	-46.27	3.00	3.00	9.68	-39.59	-13.00	26.59	V
2476.5	-49.93	3.03	3.00	10.72	-42.24	-13.00	29.24	V

LTE FDD Band 5_Channel Bandwidth 3MHz_16QAM _ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.0	-34.84	3.00	3.00	9.61	-28.23	-13.00	15.23	H
2509.5	-38.65	3.03	3.00	10.77	-30.91	-13.00	17.91	H
1673.0	-44.98	3.00	3.00	9.61	-38.37	-13.00	25.37	V
2509.5	-48.19	3.03	3.00	10.77	-40.45	-13.00	27.45	V

LTE FDD Band 5_Channel Bandwidth 3MHz_16QAM _ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1695.0	-40.74	3.00	3.00	9.77	-33.97	-13.00	20.97	H
2542.5	-45.71	3.03	3.00	10.89	-37.85	-13.00	24.85	H
1695.0	-49.01	3.00	3.00	9.77	-42.24	-13.00	29.24	V
2542.5	-53.66	3.03	3.00	10.89	-45.80	-13.00	32.80	V

LTE FDD Band 5_Channel Bandwidth 5MHz_16QAM _ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1653.0	-36.81	3.00	3.00	9.58	-30.23	-13.00	17.23	H
2479.5	-41.67	3.03	3.00	10.72	-33.98	-13.00	20.98	H
1653.0	-45.34	3.00	3.00	9.68	-38.66	-13.00	25.66	V
2479.5	-48.82	3.03	3.00	10.72	-41.13	-13.00	28.13	V

LTE FDD Band 5_Channel Bandwidth 5MHz_16QAM _ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.0	-35.22	3.00	3.00	9.61	-28.61	-13.00	15.61	H
2509.5	-38.11	3.03	3.00	10.77	-30.37	-13.00	17.37	H
1673.0	-45.60	3.00	3.00	9.61	-38.99	-13.00	25.99	V
2509.5	-48.18	3.03	3.00	10.77	-40.44	-13.00	27.44	V

LTE FDD Band 5_Channel Bandwidth 5MHz_16QAM _ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1693.0	-40.12	3.00	3.00	9.77	-33.35	-13.00	20.35	H
2539.5	-45.02	3.03	3.00	10.89	-37.16	-13.00	24.16	H
1693.0	-49.79	3.00	3.00	9.77	-43.02	-13.00	30.02	V
2539.5	-52.77	3.03	3.00	10.89	-44.91	-13.00	31.91	V

LTE FDD Band 5_Channel Bandwidth 10MHz_16QAM _ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1658.0	-35.62	3.00	3.00	9.58	-29.04	-13.00	16.04	H
2487.0	-41.06	3.03	3.00	10.72	-33.37	-13.00	20.37	H
1658.0	-45.50	3.00	3.00	9.68	-38.82	-13.00	25.82	V
2487.0	-49.35	3.03	3.00	10.72	-41.66	-13.00	28.66	V

LTE FDD Band 5_Channel Bandwidth 10MHz_16QAM _ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.0	-36.37	3.00	3.00	9.61	-29.76	-13.00	16.76	H
2509.5	-39.27	3.03	3.00	10.77	-31.53	-13.00	18.53	H
1673.0	-48.52	3.00	3.00	9.61	-41.91	-13.00	28.91	V
2509.5	-52.51	3.03	3.00	10.77	-44.77	-13.00	31.77	V

LTE FDD Band 5_Channel Bandwidth 10MHz_16QAM _ High Channel

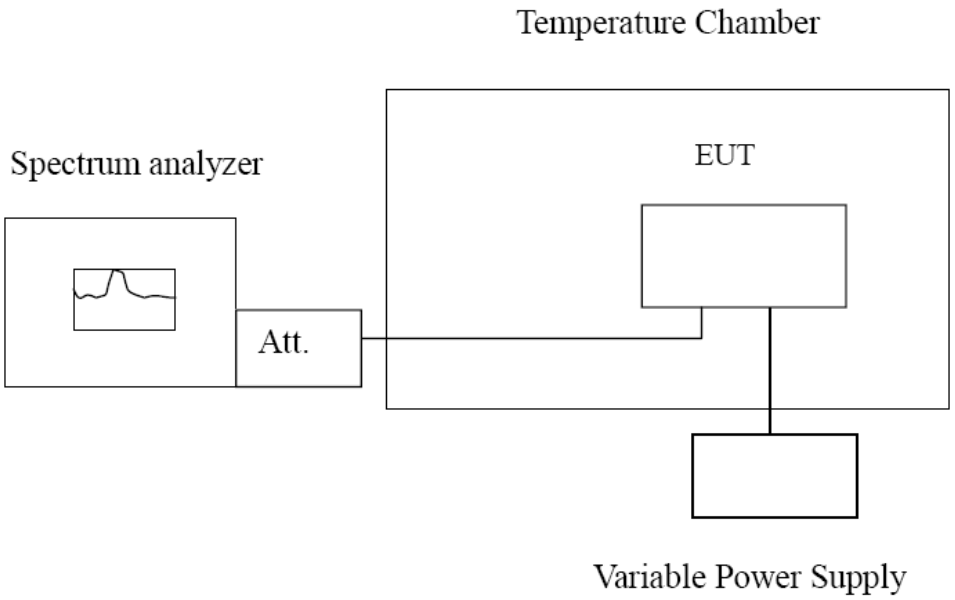
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1688.0	-39.36	3.00	3.00	9.77	-32.59	-13.00	19.59	H
2532.0	-44.27	3.03	3.00	10.89	-36.41	-13.00	23.41	H
1688.0	-49.40	3.00	3.00	9.77	-42.63	-13.00	29.63	V
2532.0	-52.44	3.03	3.00	10.89	-44.58	-13.00	31.58	V

3.7 Frequency Stability under Temperature & Voltage Variations

LIMIT

According to §22.917, §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 5, 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 and RB offset Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case.

LTE Band 5, 1.4MHz bandwidth (worst case of all bandwidths)

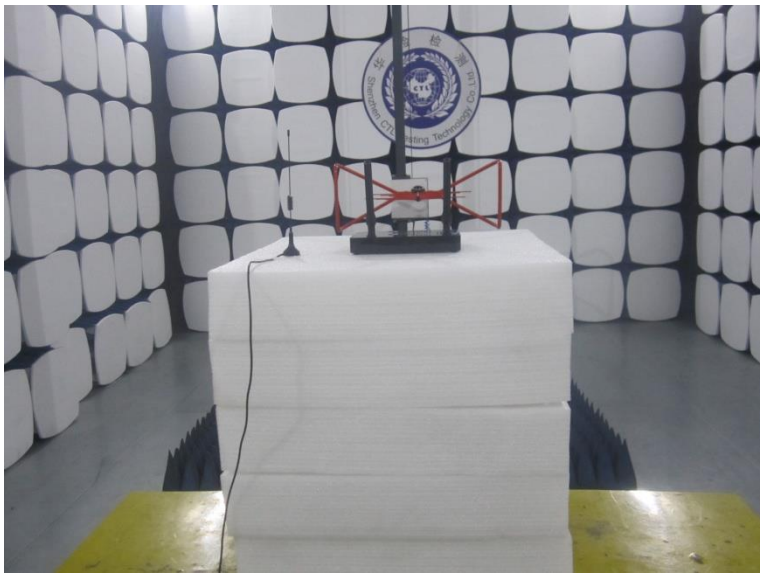
Frequency Error vs Voltage

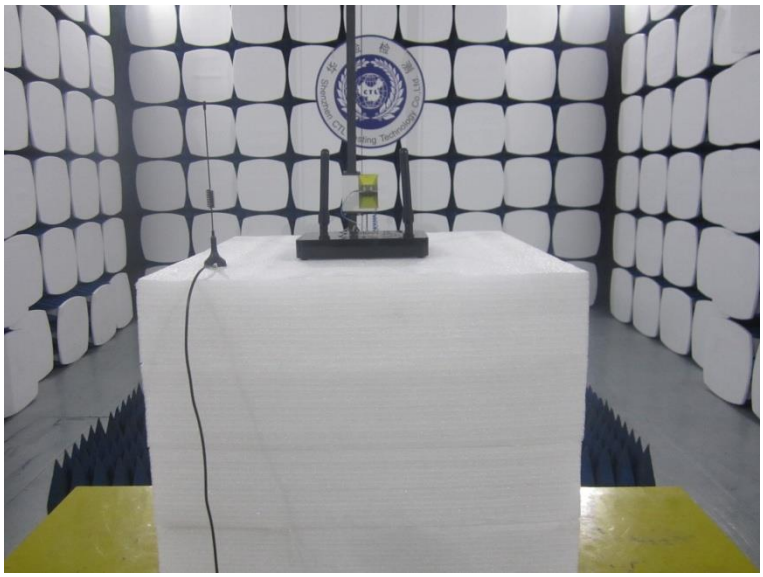
Voltage (V)	Frequency error (Hz)		Frequency error (ppm)		Limit (ppm)
	QPSK	16QAM	QPSK	16QAM	
3.50	0.11	0.03	0.001	0.000	2.50
3.70	1.86	1.35	0.002	0.002	2.50
4.20	-1.76	-2.74	0.002	0.003	2.50

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)		Limit (ppm)
	QPSK	16QAM	QPSK	16QAM	
-30°	-1.55	-2.50	0.002	0.003	2.50
-20°	-2.32	-5.35	0.003	0.006	2.50
-10°	-4.70	-5.64	0.006	0.007	2.50
0°	-8.99	-10.33	0.011	0.012	2.50
10°	-9.90	-12.03	0.012	0.014	2.50
20°	-10.14	-16.04	0.012	0.019	2.50
30°	-15.04	-14.80	0.018	0.018	2.50
40°	-0.76	-3.09	0.001	0.004	2.50
50°	-5.17	-4.65	0.006	0.005	2.50

4 Test Setup Photos of the EUT





5 External and Internal Photos of the EUT

Please reference to the test report No.: CTL1507031826-WF-1

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