

FCC Radio Test Report

FCC ID: 2AP7K-T401

Original Grant

Report No. : TB-FCC160368
Applicant : Shenzhen Holloo Technology Co.,Ltd.
Equipment Under Test (EUT)
EUT Name : Vehicle Wireless Terminal
Model No. : T401
Serial Model No. : T400
Brand Name : Holloo
Receipt Date : 2018-06-12
Test Date : 2018-06-12 to 2018-07-17
Issue Date : 2018-07-18
Standards : 47 CFR Part 2, 24(E), 27
Test Method : ANSI C63.26 2015
Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above,

Test/Witness Engineer

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This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

Contents

CONTENTS.....	2
1. GENERAL INFORMATION ABOUT EUT	5
1.1 Client Information.....	5
1.2 General Description of EUT (Equipment Under Test)	5
1.3 Block Diagram Showing the Configuration of System Tested.....	7
1.4 Description of Support Units	7
1.5 Description of Test Mode.....	8
1.6 Measurement Uncertainty	9
1.7 Test Facility.....	9
2. TEST SUMMARY	10
3. TEST EQUIPMENT.....	11
4. CONDUCTED RF OUTPUT POWER.....	12
4.1 Test Standard and Limit.....	12
4.2 Test Setup.....	12
4.3 Test Procedure.....	12
4.4 EUT Operating Condition	12
4.5 Test Data.....	12
5. PEAK-AVERAGE RATIO	13
5.1 Test Standard and Limit.....	13
5.2 Test Setup.....	13
5.3 Test Procedure.....	13
5.4 EUT Operating Condition	13
5.5 Test Data.....	13
6. OCCUPIED BANDWIDTH	14
6.1 Test Standard and Limit.....	14
6.2 Test Setup.....	14
6.3 Test Procedure.....	14
6.4 EUT Operating Condition	15
6.5 Test Data.....	15
7. OUT OF BAND EMISSION AT ANTENNA TERMINALS.....	16
7.1 Test Standard and Limit.....	16
7.2 Test Setup.....	16
7.3 Test Procedure.....	17
7.4 EUT Operating Condition	17
7.5 Test Data.....	17
8. BAND EDGE TEST	18
8.1 Test Standard and Limit.....	18
8.2 Test Setup.....	18
8.3 Test Procedure.....	18

8.4 EUT Operating Condition	19
8.5 Test Data.....	19
9. RADIATED OUTPUT POWER	20
9.1 Test Standard and Limit.....	20
9.2 Test Setup.....	20
9.3 Test Procedure.....	21
9.4 EUT Operating Condition	21
9.5 Test Data.....	21
10. RADIATED OUT BAND OF EMISSIONS.....	22
10.1 Test Standard and Limit	22
10.2 Test Setup.....	22
10.3 Test Procedure.....	22
10.4 EUT Operating Condition	23
10.5 Test Data.....	23
11. FREQUENCY STABILITY	24
11.1 Test Standard and Limit	24
11.2 Test Setup.....	24
11.3 Test Procedure.....	25
11.4 EUT Operating Condition	25
11.5 Test Data.....	25
ATTACHMENT A--CONDUCTED RF OUTPUT POWER	26
ATTACHMENT B--PEAK-AVERAGE RATIO	30
ATTACHMENT C--OCCUPY BANDWIDTH	33
ATTACHMENT D--OUT OF BAND EMISSION AT ANTENNA TERMINALS	43
ATTACHMENT E--BAND EDGE TEST	58
ATTACHMENT F--RADIATED OUTPUT POWER	74
ATTACHMENT G--RADIATED OUT BAND OF EMISSIONS	78
ATTACHMENT H--FREQUENCY STABILITY	82

Revision History

Report No.	Version	Description	Issued Date
TB-FCC160369	Rev.01	Initial issue of report	2018-07-18

1. General Information about EUT

1.1 Client Information

Applicant	:	Shenzhen Holloo Technology Co.,Ltd.
Address	:	103,105, Building6, 1980 Industrial Park, Minzhi Street, Longhua New District, Shenzhen, China
Manufacturer	:	Shenzhen Holloo Technology Co.,Ltd.
Address	:	103,105, Building6, 1980 Industrial Park, Minzhi Street, Longhua New District, Shenzhen, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Vehicle Wireless Terminal	
Models No.	:	T401, T400	
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is model name for commercial.	
Product Description	:	Frequency Bands: LTE Band 4:TX: 1710MHz-1755MHz, RX: 2110MHz-2155MHz LTE Band 13: TX: 777MHz -787MHz, RX: 746MHz-756MHz	
		Antenna Type:	Dipole Antenna
		Antenna Gain:	LTE Band 4: 3.8dBi LTE Band 13: 3.8dBi
		Modulation Type:	QPSK, 16QAM
		Bandwidth:	LTE Band 4 :1.4MHz/3MHz/5MHz/10MHz/15MHz/20MHz LTE Band 13 : 5MHz / 10MHz
Power Rating	:	DC 9~36V	
Software Version	:	HLTV201337	
Hardware Version	:	V1.03	
Connecting I/O Port(S)	:	Please refer to the User's Manual	

Note:

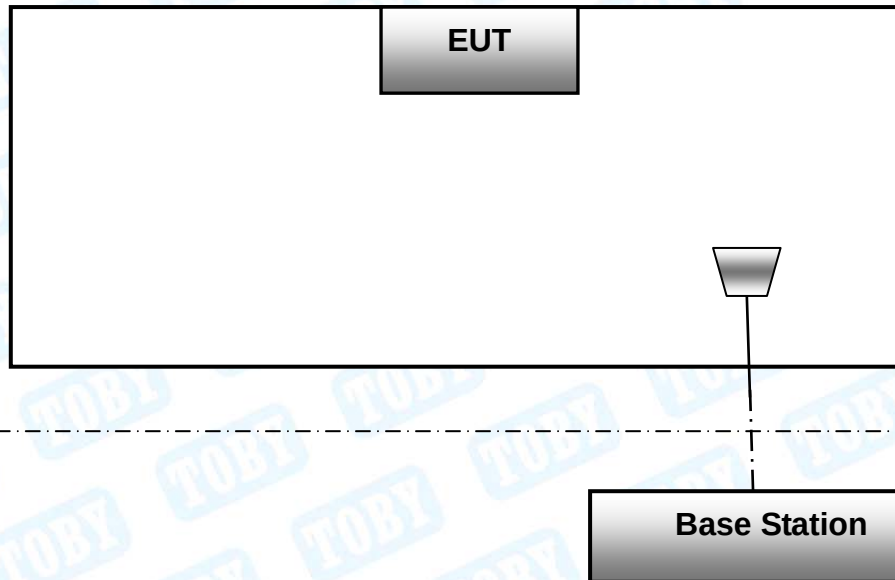
- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

(2) Channel List

LTE Band 4(1.4MHz)		LTE Band 4(3MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
19957	1710.70	19965	1711.50
19958	1710.80	19966	1711.60
.....			
20174	1732.40	20174	1732.40
20175	1732.50	20175	1732.50
20176	1732.60	20176	1732.60
.....			
20392	1754.20	20384	1753.40
20393	1754.30	20385	1753.50
LTE Band 4(5MHz)		LTE Band 4(10MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
19975	1712.50	20000	1715.00
19976	1712.60	20001	1715.10
.....			
20174	1732.40	20174	1732.40
20175	1732.50	20175	1732.50
20176	1732.60	20176	1732.60
.....			
20374	1752.40	20349	1749.90
20375	1752.50	20350	1750.00
LTE Band 4(15MHz)		LTE Band 4(20MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
20025	1717.50	20050	1720.00
20026	1717.60	20051	1720.10
.....			
20174	1732.40	20174	1732.40
20175	1732.50	20175	1732.50
20176	1732.60	20176	1732.60
.....			
20324	1747.40	20299	1744.90
20325	1747.50	20300	1745.00
LTE Band 13(5MHz)		LTE Band 13(10MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
23205	779.50	.....	.....
23205	779.60	.....	.....
.....			
23229	781.90	.....	.....
23230	782.00	23230	782.00
23231	782.10	.....	.....

.....			
23254	784.40	.....	.....
23255	784.50	.....	.....

1.3 Block Diagram Showing the Configuration of System Tested



The above block diagram of setup is the normal mode. And more detail please refer to the test setup of each test item of bellow.

1.4 Description of Support Units

The EUT has been tested as an independent unit.

1.5 Description of Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 v03r01 and ANSI C63.26 2015 Power Meas. License Digital Systems with maximum output power. Radiated measurements are performed by rotating the EUT in three different ortho-gonal test planes to find the maximum emission.

Remark:

1. The mark "v " means that this configuration is chosen for testing
2. The mark "--" means that this bandwidth is not supported.
3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated

ITEMS	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
RF Output Power	4	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	13	--	--	V	V	--	--	V	V	V	V	V	V	V	V
Peak-to-Average Ratio	4	--	--	--	--	--	V	V	V			V	V	V	V
	13	--	--	V	V	--	--	V	V			V	V	V	V
99% & -26 dB Occupied Bandwidth	4	V	V	V	V	V	V	V	V	V			V	V	V
	13	--	---	V	V	--	--	V	V	V			V	V	V
Spurious Emissions at Antenna Terminal	4	V	V	V	V	V	V	V	V	V		V	V	V	V
	13	--	---	V	V	--	--	V	V	V		V	V	V	V
Field Strength of Spurious Radiation	4	V	V	V	V	V	V	V	V	V				V	
	13	--	--	V	V	--	--	V	V	V				V	
Out of band emission, Band Edge	4	V	V	V	V	V	V	V	V	V		V	V	V	V
	13	--	--	V	V	--	--	V	V	V		V	V	V	V
Frequency stability	4	V	V	V	V	V	V	V	V	V				V	
	13	--	--	V	V	--	--	V	V	V				V	

Note:

- (1) During the testing procedure, the EUT is in link mode with base station emulator at maximum power level in each test mode.
- (2) The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis, X-plane, Y-plane and Z-plane. The worst case was found positioned on Z-plane as the normal use. Therefore only the test data of this Z-plane was used for radiated emission measurement test.

1.6 Measurement Uncertainty

Test Item	Parameters	Expanded Uncertainty (U_{Lab})
RF Power, conducted	/	± 0.82 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	± 4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	± 4.40 dB
Radiated Emission	Level Accuracy: Above 1000MHz	± 4.20 dB

1.7 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.

IC Registration No.: (11950A-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.

2. Test Summary

Test Item	Section in CFR 47	Result
RF Output Power	Part 2.1046 Part 27.50 (b)(10) Part 27.50 (d)(4) Part 27.50 (h)(2)	PASS
Peak-to-Average Ratio	Part 27.50(d)(5)	PASS
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 27.53(h) Part 27.53(m)	PASS
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 27.53 (h) Part 27.53(m)	PASS
Field Strength of Spurious Radiation	Part 2.1053 Part 27.53 (h) Part 27.53(m)	PASS
Out of band emission, Band Edge	Part 27.53 (h) Part 27.53(m)	PASS
Frequency stability vs. temperature	Part 27.54 Part 2.1055(a)(1)(b)	PASS
Frequency stability vs. voltage	Part 27.54 Part 2.1055(d)(2)	PASS
Pass: The EUT complies with the essential requirements in the standard.		

3. Test Equipment

Radiation Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 20, 2017	Jul. 19, 2018
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 20, 2017	Jul. 19, 2018
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar.16, 2018	Mar. 15, 2019
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar.16, 2018	Mar. 15, 2019
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar.16, 2018	Mar. 15, 2019
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar.16, 2018	Mar. 15, 2019
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 03, 2018	Jul. 02, 2019
Pre-amplifier	Sonoma	310N	185903	Mar.17, 2018	Mar. 16, 2019
Pre-amplifier	HP	8449B	3008A00849	Mar.17, 2018	Mar. 16, 2019
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar.17, 2018	Mar. 16, 2019
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conducted Emission					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 20, 2017	Jul. 19, 2018
Spectrum Analyzer	Rohde & Schwarz	ESCI	100010/007	Jul. 20, 2017	Jul. 19, 2018
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Oct. 26, 2017	Oct. 25, 2018
Vector Signal Generator	Agilent	N5182A	MY50141294	Oct. 26, 2017	Oct. 25, 2018
Analog Signal Generator	Agilent	N5181A	MY50141953	Oct. 26, 2017	Oct. 25, 2018
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Oct. 26, 2017	Oct. 25, 2018
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Oct. 26, 2017	Oct. 25, 2018
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Oct. 26, 2017	Oct. 25, 2018
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Oct. 26, 2017	Oct. 25, 2018
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	144382	Oct. 26, 2017	Oct. 25, 2018
Universal Radio Communication Tester	Rohde&Schwarz	CMU200	103903	Jul. 20, 2017	Jul. 19, 2018

4. Conducted RF Output Power

4.1 Test Standard and Limit

4.1.1 Test Standard

FCC part 2.1046

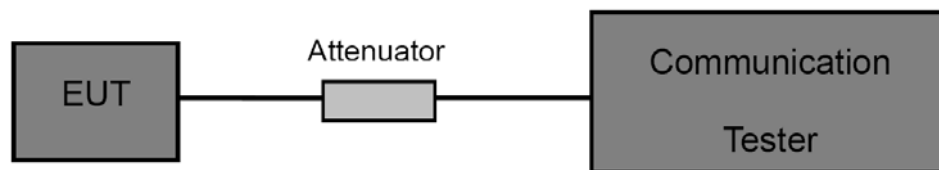
FCC Part 27.50(b)&(d),

FCC Part 27.50 (h)

4.1.2 Test Limit

RF Output Power	
LTE Band 4	LTE Band 13
1W(30dBm)	30W(44.77dBm)

4.2 Test Setup



4.3 Test Procedure

- (1) The EUT is coupled to the Base Station with the suitable Attenuator, the path loss is calibrated to correct the reading.
- (2) A call is set up by the Base Station to the generic call set up procedure.
- (3) Set EUT at maximum power level through base station by power level command.
- (4) Then read record the power value from the Base Station in dBm.

4.4 EUT Operating Condition

The EUT was continuously connected with the Base station and transmitting in the max power during the test.

4.5 Test Data

Please refer to the Attachment A.

5. Peak-Average Ratio

5.1 Test Standard and Limit

5.1.1 Test Standard

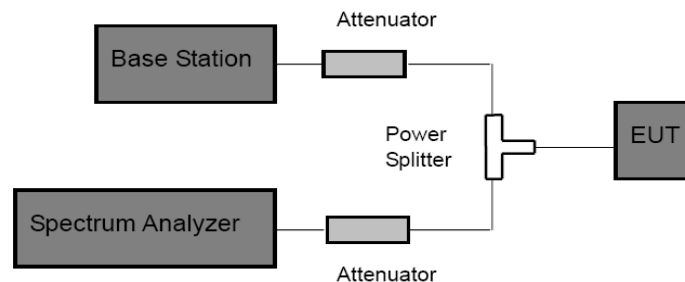
FCC Part 27.50(d), FCC Part 27.50 (h)

5.1.2 Test Limit

Peak-to-Average Ratio

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

5.2 Test Setup



5.3 Test Procedure

According with KDB 971168

- (1) The signal analyzer's CCDF measurement profile is enabled.
- (2) Frequency = carrier center frequency.
- (3) Measurement BW > Emission bandwidth of signal.
- (4) The signal analyzer was set to collect one million samples to generate the CCDF curve.
- (5) Set the EUT working in highest power level, measured and recorded the 0.1% as PAPR level.
- (6) The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which of the transmitter is operating at maximum power.

5.4 EUT Operating Condition

The EUT was continuously connected with the Base station and transmitting in the max power during the test.

5.5 Test Data

Please refer to the Attachment B.

6. Occupied Bandwidth

6.1 Test Standard and Limit

6.1.1 Test Standard

FCC Part 2: 2.1049

FCC Part 27.53(h)

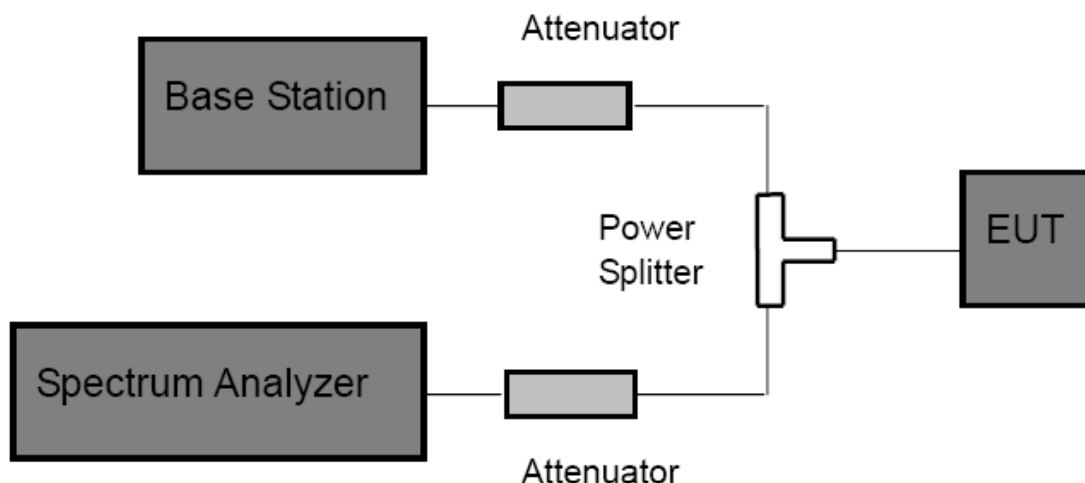
FCC Part 27.53(m)

6.1.2 Test Requirement

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Occupied bandwidth is also known as 99% power and -26dBC occupied bandwidths.

6.2 Test Setup



6.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.
- (2) The resolution bandwidth of the Spectrum Analyzer is set to at least 1% of the occupied bandwidth. VBW= 3 times RBW.
- (3) The low, middle and the high channels are selected to perform tests respectively.
- (4) Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak; make a line whose value is 26dB lower than the peak; mark two points which the line intersected the waveform at; finally record the delta of the two points as the occupied bandwidth and the plot.
- (5) Set the Spectrum Analyzer Occupied bandwidth function to measure the 99% occupied bandwidth.

6.4 EUT Operating Condition

The EUT was continuously connected with the Base station and transmitting in the max power during the test.

6.5 Test Data

Please refer to the Attachment C.

7. Out of Band Emission at Antenna Terminals

7.1 Test Standard and Limit

7.1.1 Test Standard

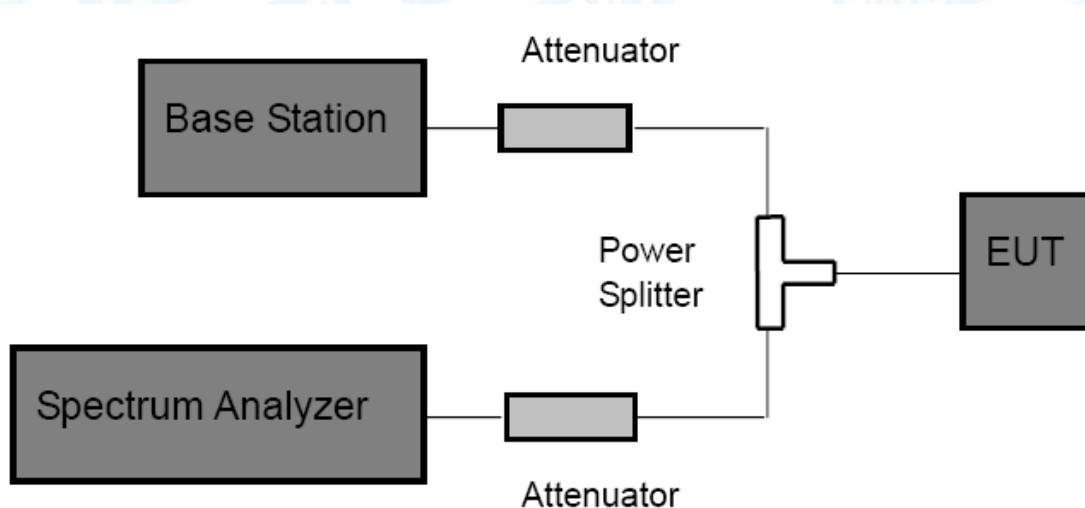
FCC Part 2: 2.1051, 2.1057

FCC Part 27.53 (h), FCC Part 27.53(m)

7.1.2 Test Limit

Band 7: For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. 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. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

7.2 Test Setup



7.3 Test Procedure

- 1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
- 2 The resolution bandwidth of the spectrum analyzer was set at 100 kHz when below 1GHz, 1MHz when above 1 GHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
- 3 For the out of band: Set the RBW=100 kHz, VBW=300 kHz when below 1 GHz, RBW =1 MHz, VBW=3 MHz when above 1 GHz, Start=30MHz, Stop= 10th harmonic.
- 4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter.

7.4 EUT Operating Condition

The EUT was continuously connected with the Base station and transmitting in the max power during the test.

7.5 Test Data

Please refer to the Attachment D.

8. Band Edge Test

8.1 Test Standard and Limit

8.1.1 Test Standard

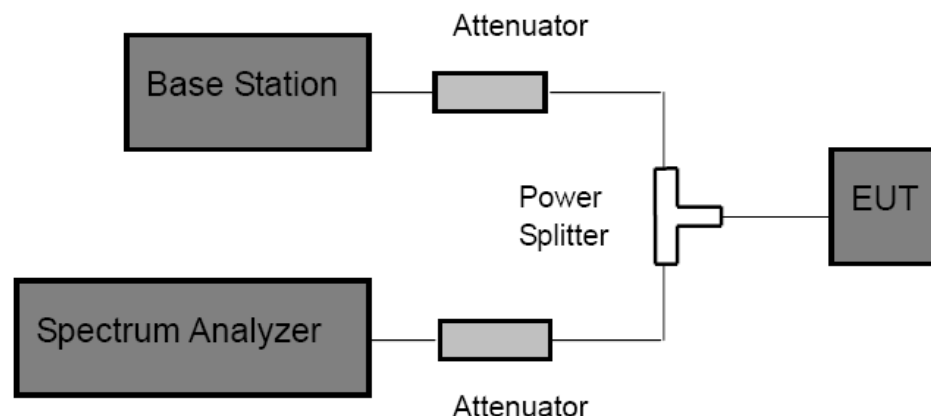
FCC Part 2: 2.1051, 2.1057

FCC Part 27.53 (h), FCC Part 27.53(m)

8.1.2 Test Limit

Band 7: For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. 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. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

8.2 Test Setup



8.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.
- (2) Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter.

8.4 EUT Operating Condition

The EUT was continuously connected with the Base station and transmitting in the max power during the test.

8.5 Test Data

Please refer to the Attachment E.

9. Radiated Output Power

9.1 Test Standard and Limit

9.1.1 Test Standard

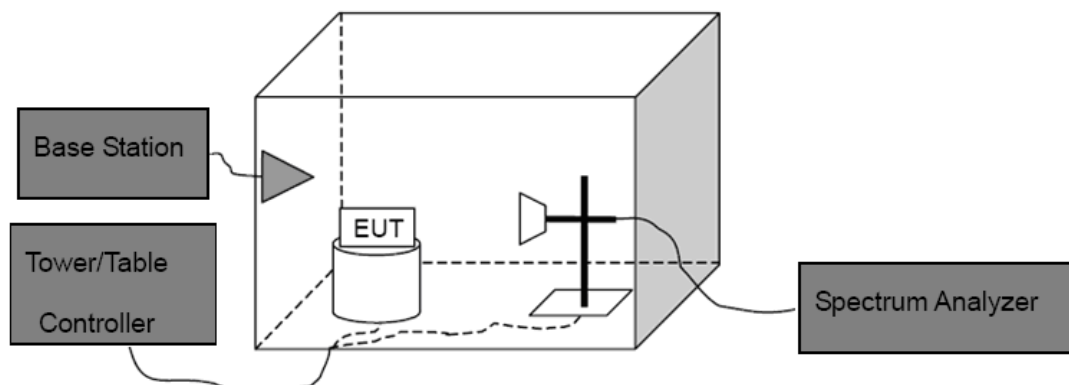
FCC Part 2.1046

FCC part 27.50(c), FCC part 27.50(d)

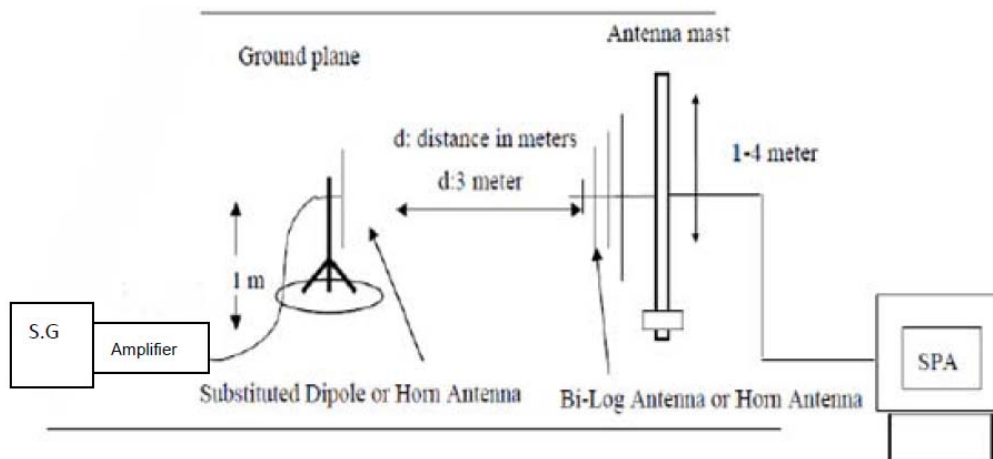
9.1.2 Test Limit

E.I.R.P	
LTE Band 4	LTE Band 13
1W(30 dBm)	3W (34.77 dBm)

9.2 Test Setup



Above 1G



Substituted Method

9.3 Test Procedure

- (1) The EUT was placed on an non-conductive rotating platform with 0.8 meter height in an anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RBW=3 MHz, VBW=3 MHz and peak detector settings.
- (2) During the measurement, the EUT was enforced in maximum power and linked with the Base Station. The highest was recorded from analyzer power level (LVT) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
- (3) Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to C63.26. The EUT was replaced by dipole antenna (for frequency below 1 GHz) or Horn antenna (for frequency above 1 GHz) at same location with same polarize of receiver antenna and then a known power of each measure frequency from S.G. was applied into the dipole antenna or Horn antenna through a TX cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna.

Note: In test, the S.G Connect the Pre-amplifier(Sonoma 310N Pre-amplifier for frequency below 1 GHz, HP 8449B Pre-amplifier for frequency above 1 GHz)

Then the EUT's EIRP and ERP was calculated with the correction factor:

$ERP = S.G.Level + Antenna\ Gain\ Cord.(dBd) - Cable\ Loss(dB)$

$EIRP = S.G.Level + Antenna\ Gain\ Cord.(dBi) - Cable\ Loss(dB)$

9.4 EUT Operating Condition

The EUT was continuously connected with the Base station and transmitting in the max power during the test.

9.5 Test Data

Please refer to the Attachment F.
Measurement Data (worst case)

10. Radiated Out Band of Emissions

10.1 Test Standard and Limit

10.1.1 Test Standard

FCC Part 2: 2.1053, 2.1057

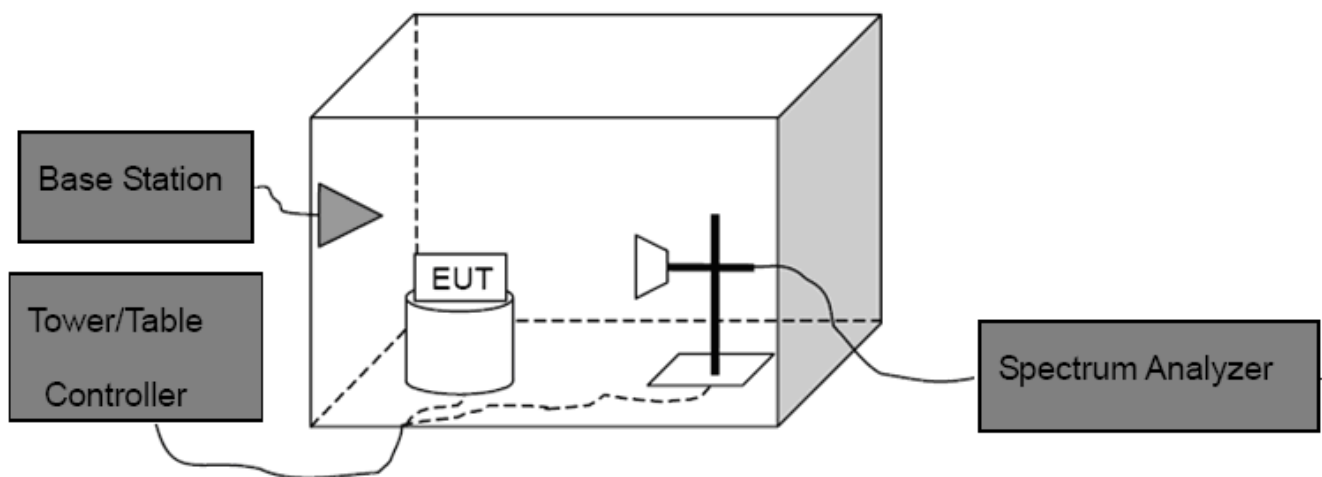
FCC Part 22H: 22.917

FCC Part 24E: 24.238

10.1.2 Test Limit

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. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

10.2 Test Setup



10.3 Test Procedure

- (1) The test system setup as show in the block diagram above.
- (2) The EUT was placed on an non-conductive rotating platform in an anechoic chamber. The radiated spurious emissions from 30MHz to 10^{th} harmonious of fundamental frequency were measured at 3 m with a test antenna and a spectrum analyzer with RBW=1 MHz, VBW=1 MHz, peak detector settings.
- (3) During the measurement, the EUT was enforced in maximum power and linked with a base station. All the spurious emissions at 3m were measured by rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
- (4) When found the maximum level of emissions from the EUT. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB=10 log(TX power in Watts/0.001)-the absolute level
Spurious attenuation limit in dB=43+10 log(power out in Watts)

10.4 EUT Operating Condition

The EUT was continuously connected with the Base station and transmitting in the max power during the test.

10.5 Test Data

Please refer to the Attachment G.
Measurement Data (worst case)

11. Frequency Stability

11.1 Test Standard and Limit

11.1.1 Test Standard

FCC Part 2.1055(a)(1)(b)

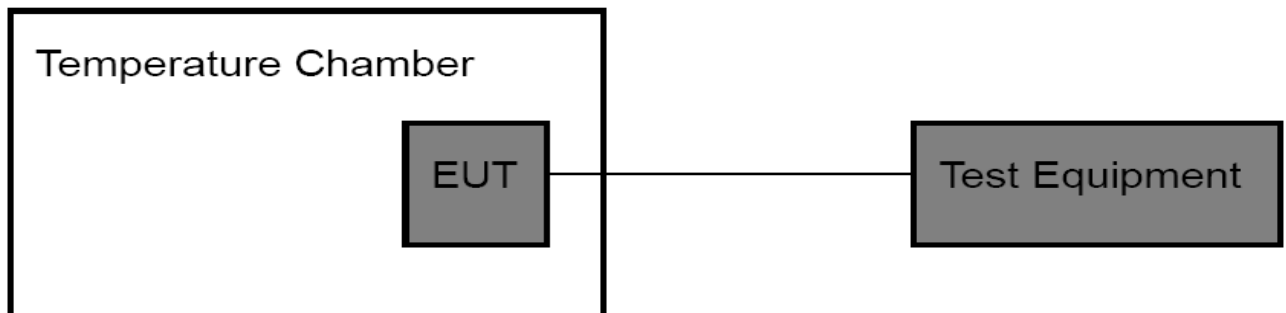
FCC Part 24.235, Part 27.54, FCC Part 2.1055(a)(1)(b)

11.1.2 Limit

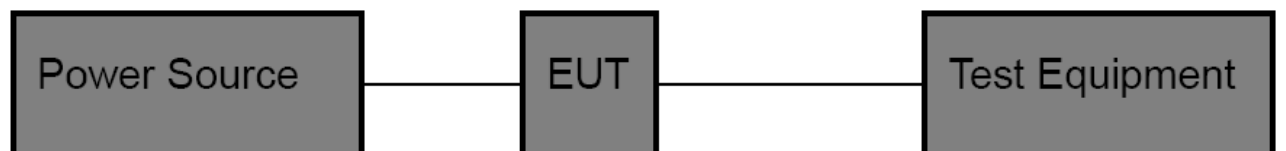
Limit
$\pm 2.5\text{ppm}$

11.2 Test Setup

For Temperature Test:



For Voltage Test:



11.3 Test Procedure

Test Procedures for Temperature Variation:

- (1) The EUT was set up in the thermal chamber and connected with the base station.
- (2) With power off, the temperature was decreased to -30°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
- (3) With power off, the temperature was raised in 10°C set up to 50°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
- (4) If the EUT cannot be turned on at -30°C , the testing lowest temperature will be raised in 10°C step until the EUT can be turned on.

Test Procedures for Voltage Variation:

- (1) The EUT was placed in a temperature chamber at $25 \pm 5^{\circ}\text{C}$ and connected with the base station.
- (2) Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.
- (3) The variation in frequency was measured for the worst case.

11.4 EUT Operating Condition

The Equipment Under Test was set to Communication with the Base Station.

11.5 Test Data

Please refer to the Attachment H.

ATTACHMENT A--CONDUCTED RF OUTPUT POWER

FDD-LTE Band 4						
Channel Bandwidth: 1.4 MHz						
Modulation	RB Size	RB Offset	Conducted Power (dBm)			Result
			Low CH	Middle CH	High CH	
QPSK	1	0	21.95	21.79	21.90	PASS
	1	2	22.03	21.77	21.74	PASS
	1	5	21.91	21.88	21.83	PASS
	3	0	21.03	20.94	20.95	PASS
	3	1	21.05	20.93	20.97	PASS
	3	2	21.00	20.93	20.93	PASS
	6	0	21.01	20.91	20.93	PASS
16QAM	1	0	21.11	21.12	21.01	PASS
	1	2	21.17	20.81	21.35	PASS
	1	5	20.86	20.68	20.76	PASS
	3	0	20.32	20.35	20.34	PASS
	3	1	20.37	20.33	20.39	PASS
	3	2	20.31	20.36	20.31	PASS
	6	0	20.37	20.39	20.37	PASS
Channel Bandwidth: 3 MHz						
Modulation	RB Size	RB Offset	Conducted Power (dBm)			Result
			Low CH	Middle CH	High CH	
QPSK	1	0	21.68	22.21	22.51	PASS
	1	7	21.67	21.99	22.18	PASS
	1	14	21.72	21.98	22.19	PASS
	8	0	20.85	21.19	21.24	PASS
	8	4	20.88	21.15	21.15	PASS
	8	7	21.03	21.06	21.23	PASS
	15	0	20.83	21.12	21.25	PASS
16QAM	1	0	21.00	20.96	21.23	PASS
	1	7	20.51	20.77	21.25	PASS
	1	14	20.56	20.71	21.29	PASS
	8	0	19.71	20.25	21.00	PASS
	8	4	20.18	20.35	21.03	PASS
	8	7	20.25	20.39	20.18	PASS
	15	0	19.90	20.17	20.24	PASS

FDD-LTE Band 4						
Channel Bandwidth: 5 MHz						
Modulation	RB Size	RB Offset	Conducted Power (dBm)			Result
			Low CH	Middle CH	High CH	
QPSK	1	0	21.76	22.37	22.34	PASS
	1	12	22.32	22.13	22.47	PASS
	1	24	21.90	22.04	22.45	PASS
	12	0	20.71	21.18	21.29	PASS
	12	6	20.89	21.12	21.19	PASS
	12	11	20.85	21.13	21.20	PASS
	25	0	20.73	21.22	21.39	PASS
16QAM	1	0	20.23	20.86	21.01	PASS
	1	12	20.54	20.75	21.89	PASS
	1	24	20.89	20.89	21.86	PASS
	12	0	19.78	20.17	20.26	PASS
	12	6	19.89	20.08	20.26	PASS
	12	11	19.94	20.21	20.32	PASS
	25	0	19.63	20.29	20.39	PASS
Channel Bandwidth: 10 MHz						
Modulation	RB Size	RB Offset	Conducted Power (dBm)			Result
			Low CH	Middle CH	High CH	
QPSK	1	0	21.65	22.06	21.95	PASS
	1	24	22.04	22.02	22.68	PASS
	1	49	21.81	21.90	22.25	PASS
	25	0	20.87	21.35	21.31	PASS
	25	12	20.99	21.14	21.40	PASS
	25	24	20.96	21.06	21.31	PASS
	50	0	20.88	21.25	21.40	PASS
16QAM	1	0	21.07	20.92	21.31	PASS
	1	24	20.91	20.68	21.25	PASS
	1	49	20.46	20.43	21.21	PASS
	25	0	19.87	20.37	21.65	PASS
	25	12	20.13	20.11	21.16	PASS
	25	24	20.10	19.94	20.57	PASS
	50	0	19.93	20.20	20.55	PASS

FDD-LTE Band 4						
Channel Bandwidth: 15 MHz						
Modulation	RB Size	RB Offset	Conducted Power (dBm)			Result
			Low CH	Middle CH	High CH	
QPSK	1	0	20.43	20.00	20.11	PASS
	1	37	20.28	20.06	20.25	PASS
	1	74	21.76	22.03	20.03	PASS
	36	0	22.14	22.28	20.11	PASS
	36	16	22.03	22.13	20.25	PASS
	36	35	21.07	21.27	22.03	PASS
	75	0	21.02	21.15	22.45	PASS
16QAM	1	0	20.98	21.05	22.21	PASS
	1	37	20.98	21.12	21.04	PASS
	1	74	20.84	21.00	21.38	PASS
	36	0	20.97	20.78	21.43	PASS
	36	16	20.55	20.90	21.20	PASS
	36	35	20.17	20.35	21.21	PASS
	75	0	20.13	20.23	21.38	PASS
Channel Bandwidth: 20 MHz						
Modulation	RB Size	RB Offset	Conducted Power (dBm)			Result
			Low CH	Middle CH	High CH	
QPSK	1	0	21.62	22.25	22.11	PASS
	1	49	22.15	22.40	22.44	PASS
	1	99	21.94	22.62	22.32	PASS
	50	0	21.01	21.40	21.24	PASS
	50	24	20.97	21.25	21.33	PASS
	50	49	21.11	21.12	21.34	PASS
	100	0	21.11	21.23	21.21	PASS
16QAM	1	0	20.45	21.35	21.10	PASS
	1	49	20.92	20.93	21.36	PASS
	1	99	20.63	21.41	21.32	PASS
	50	0	20.08	20.35	20.12	PASS
	50	24	20.15	20.23	20.37	PASS
	50	49	19.98	20.16	20.45	PASS
	100	0	20.11	20.32	20.21	PASS

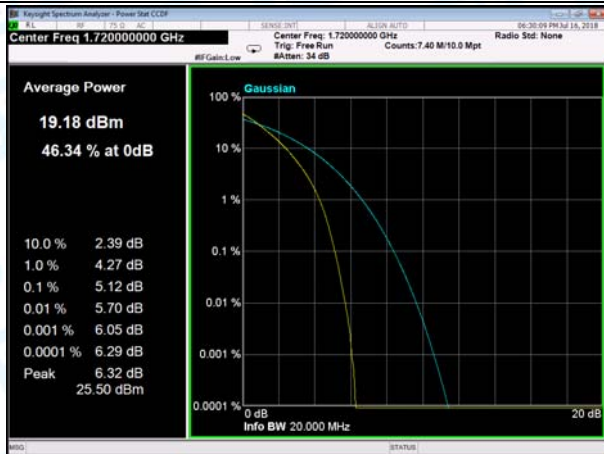
FDD-LTE Band 13						
Channel Bandwidth: 5 MHz						
Modulation	RB Size	RB Offset	Conducted Power (dBm)			Result
			Low CH	Middle CH	High CH	
QPSK	1	0	22.14	21.96	22.13	PASS
	1	12	22.24	22.40	22.25	PASS
	1	24	22.29	22.52	22.56	PASS
	12	0	21.32	21.28	21.36	PASS
	12	6	21.23	21.35	21.36	PASS
	12	11	21.21	21.36	21.39	PASS
	25	0	21.28	21.27	21.23	PASS
16QAM	1	0	20.75	20.71	21.10	PASS
	1	12	20.34	21.23	20.79	PASS
	1	24	20.26	20.97	21.21	PASS
	12	0	20.29	20.09	20.22	PASS
	12	6	20.21	20.24	20.49	PASS
	12	11	20.16	20.20	20.43	PASS
	25	0	20.25	20.05	20.20	PASS
Channel Bandwidth: 10 MHz						
Modulation	RB Size	RB Offset	Conducted Power (dBm)			Result
			Low CH	Middle CH	High CH	
QPSK	1	0	--	22.22	--	PASS
	1	24	--	23.00	--	PASS
	1	49	--	22.57	--	PASS
	25	0	--	21.27	--	PASS
	25	12	--	21.56	--	PASS
	25	24	--	21.40	--	PASS
	50	0	--	21.22	--	PASS
16QAM	1	0	--	20.73	--	PASS
	1	24	--	21.27	--	PASS
	1	49	--	21.05	--	PASS
	25	0	--	19.86	--	PASS
	25	12	--	20.34	--	PASS
	25	24	--	20.30	--	PASS
	50	0	--	20.20	--	PASS

ATTACHMENT B--PEAK-AVERAGE RATIO

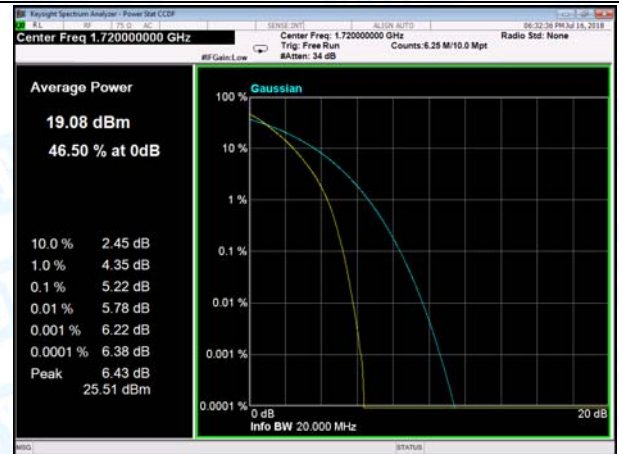
Test Mode	Modulation	RB Size	RB Offset	PAPR	Result
LTE BAND 4 20MHz (Low Channel)	QPSK	100	0	4.27	PASS
	16QAM	100	0	4.35	PASS
LTE BAND 4 20MHz (Middle Channel)	QPSK	100	0	4.43	PASS
	16QAM	100	0	4.49	PASS
LTE BAND 4 20MHz (High Channel)	QPSK	100	0	4.24	PASS
	16QAM	100	0	4.31	PASS
LTE BAND 13 5MHz (Low Channel)	QPSK	25	0	5.02	PASS
	16QAM	25	0	5.09	PASS
LTE BAND 13 5MHz (Middle Channel)	QPSK	25	0	5.35	PASS
	16QAM	25	0	5.41	PASS
LTE BAND 13 5MHz (High Channel)	QPSK	25	0	5.17	PASS
	16QAM	25	0	5.14	PASS
LTE BAND 13 10MHz (High Channel)	QPSK	50	0	5.03	PASS
	16QAM	50	0	5.14	PASS

Note: Only show the worst case data

LTE Band 4 20MHz (Low Channel)-QPSK



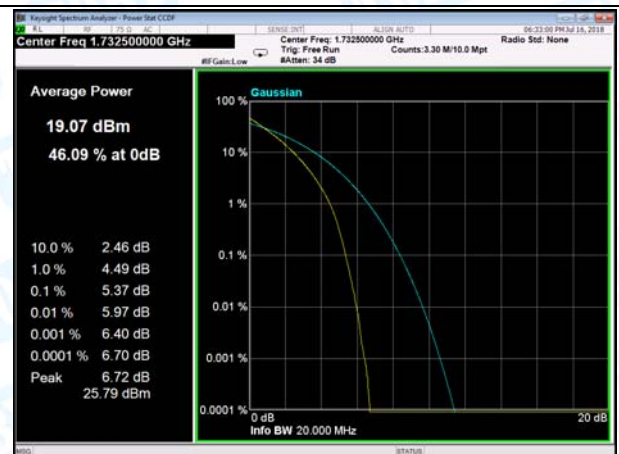
LTE Band 4 20MHz (Low Channel)-16QAM



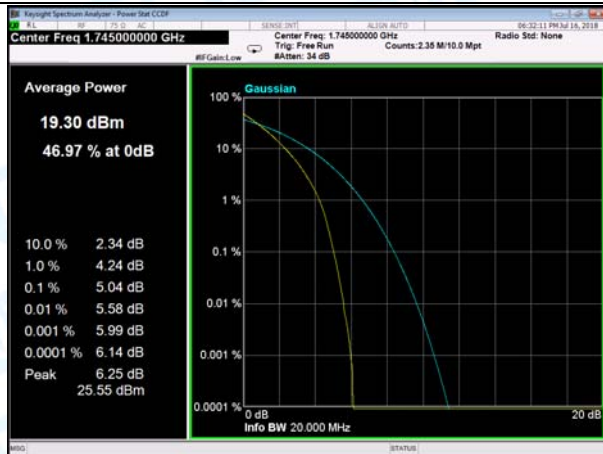
LTE Band 4 20MHz (Middle Channel)-QPSK



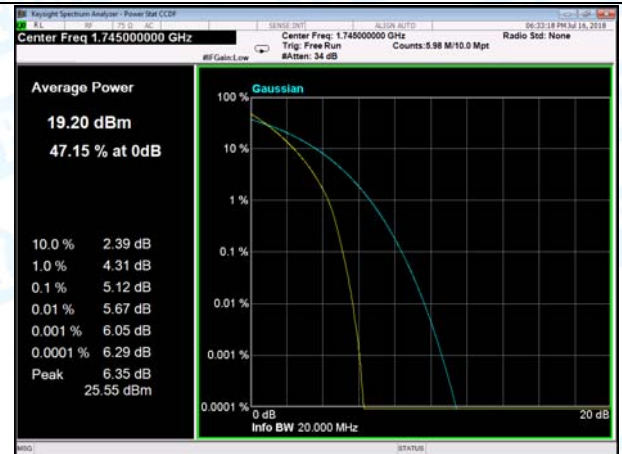
LTE Band 4 20MHz (Middle Channel)-16QAM



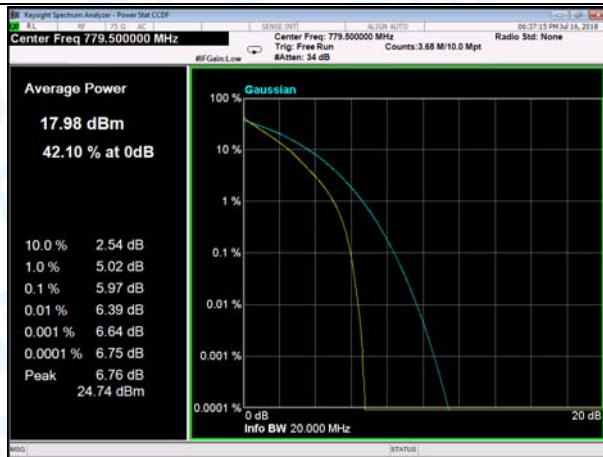
LTE Band 4 20MHz (High Channel)-QPSK



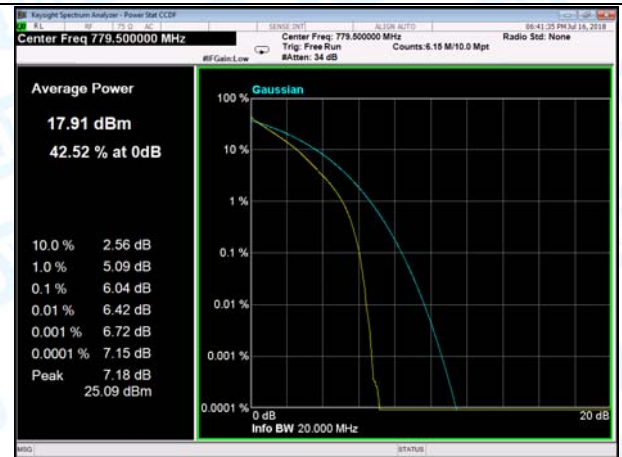
LTE Band 4 20MHz (High Channel)-16QAM



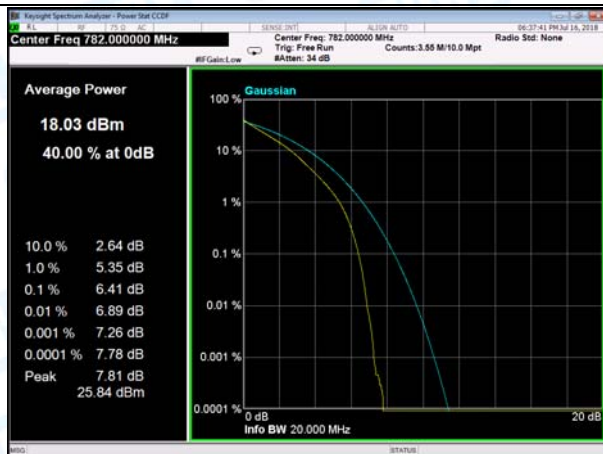
LTE Band 13 5MHz (Low Channel)-QPSK



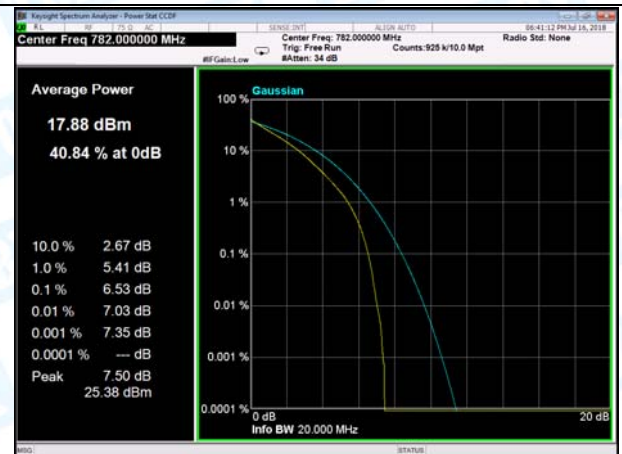
LTE Band 13 5MHz (Low Channel)-16QAM



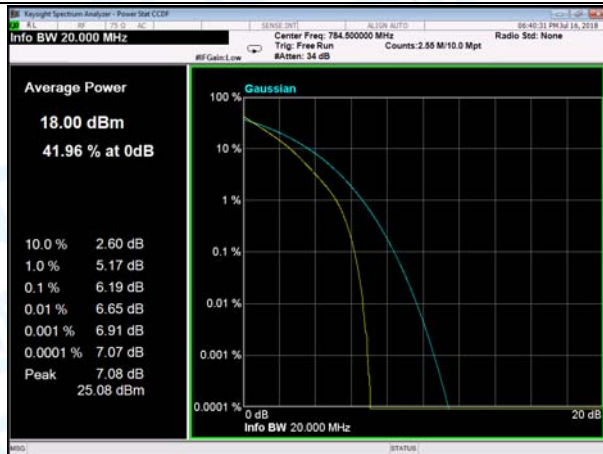
LTE Band 13 5MHz (Middle Channel)-QPSK



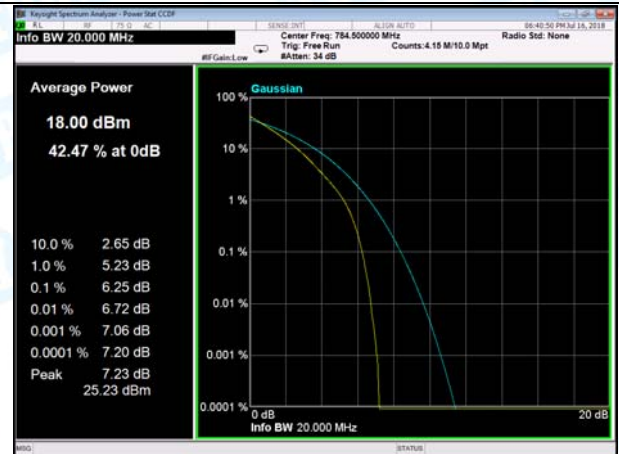
LTE Band 13 5MHz (Middle Channel)-16QAM



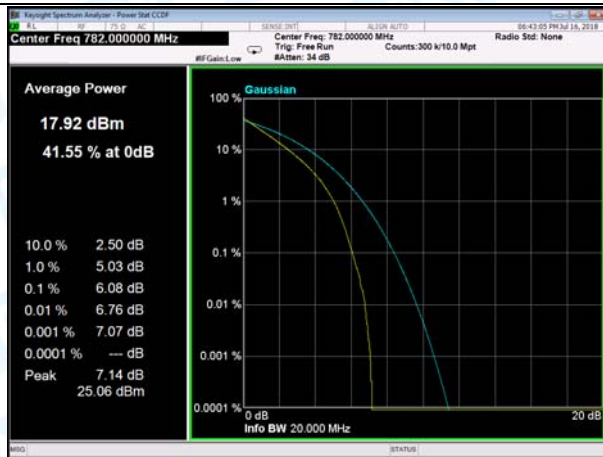
LTE Band 13 5MHz (High Channel)-QPSK



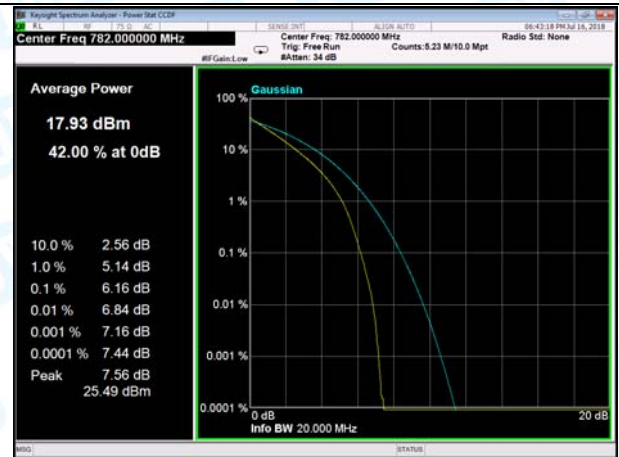
LTE Band 13 5MHz (High Channel)-16QAM



LTE Band 13 10MHz-QPSK



LTE Band 13 10MHz-16QAM



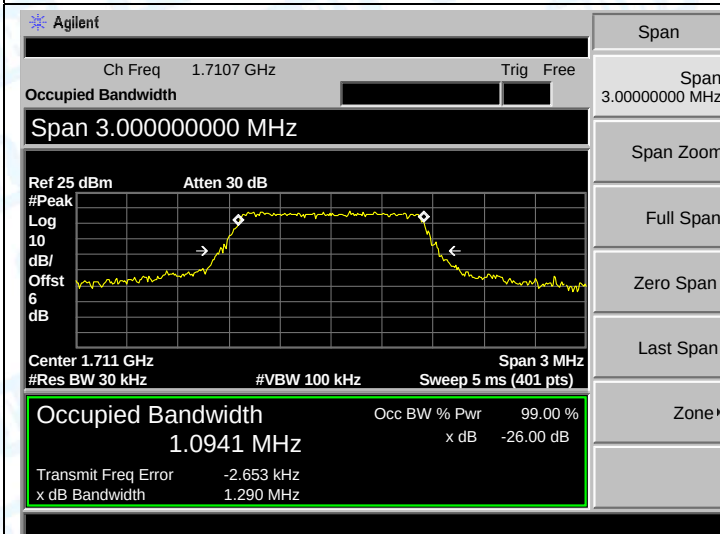
ATTACHMENT C--OCCUPY BANDWIDTH

LTE Band 4					
Mode	Channel	Frequency (MHz)	Modulation	99% OBW (MHz)	-26dB Bandwidth (kHz)
1.4MHz	19957	1710.70	16QAM	1.0911	1.272
			QPSK	1.0941	1.290
	20175	1732.50	16QAM	1.0916	1.301
			QPSK	1.0889	1.261
	20393	1754.30	16QAM	1.0959	1.299
			QPSK	1.0880	1.298
3MHz	19965	1711.50	16QAM	2.6814	2.925
			QPSK	2.6804	2.949
	20175	1732.50	16QAM	2.6724	2.929
			QPSK	2.6816	2.915
	20385	1753.50	16QAM	2.6958	2.954
			QPSK	2.6813	2.947
5MHz	19975	1712.50	16QAM	4.4535	4.861
			QPSK	4.5452	5.085
	20175	1732.50	16QAM	4.4985	4.815
			QPSK	4.4967	4.988
	20375	1752.50	16QAM	4.4496	4.829
			QPSK	4.5141	5.011
10MHz	20000	1715.00	16QAM	8.9277	9.578
			QPSK	8.9178	9.728
	20175	1732.50	16QAM	8.9504	9.697
			QPSK	8.9049	9.562
	20350	1750.00	16QAM	8.9277	9.727
			QPSK	8.9187	9.726
15MHz	20025	1717.50	16QAM	13.3978	14.805
			QPSK	13.3881	14.753
	20175	1732.50	16QAM	13.4525	14.702
			QPSK	13.4471	14.041
	20325	1747.50	16QAM	13.4074	14.591
			QPSK	13.3955	14.585
20MHz	20050	1720.00	16QAM	18.4824	21.297
			QPSK	17.8780	19.301
	20175	1732.50	16QAM	18.5839	21.473
			QPSK	17.8324	19.053
	20300	1745.00	16QAM	17.7676	19.213
			QPSK	17.7817	19.134

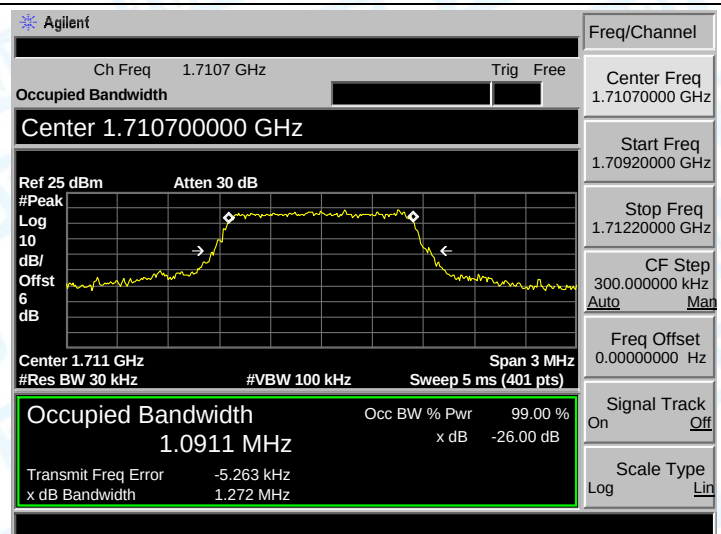
LTE Band 13					
Mode	Channel	Frequency (MHz)	Modulation	99% OBW (MHz)	-26dB Bandwidth (kHz)
5MHz	23205	779.5	16QAM	4.5079	4.941
			QPSK	4.5410	5.017
	23230	782.0	16QAM	4.5378	5.005
			QPSK	4.5298	5.018
	23255	784.5	16QAM	4.5206	5.057
			QPSK	4.5140	5.010
10MHz	---	----	----	----	----
			----	----	----
	23230	782.0	16QAM	9.1253	10.122
			QPSK	9.1320	10.138
	---	----	----	----	----
			----	----	----

Occupancy Bandwidth Test Plot

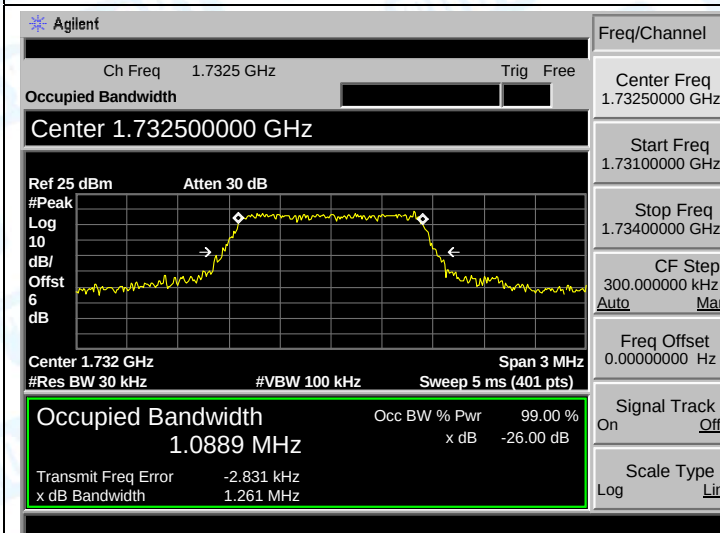
LTE BAND 4 (1.4MHz QPSK-Low CH)



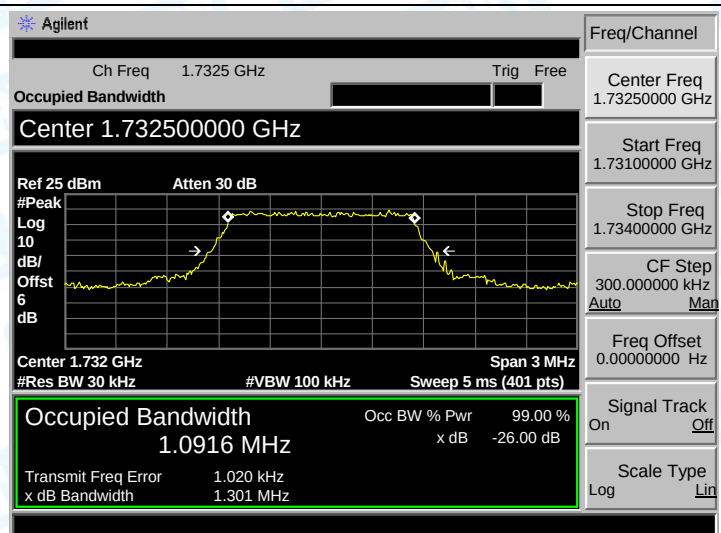
LTE BAND 4 (1.4MHz 16QAM-Low CH)



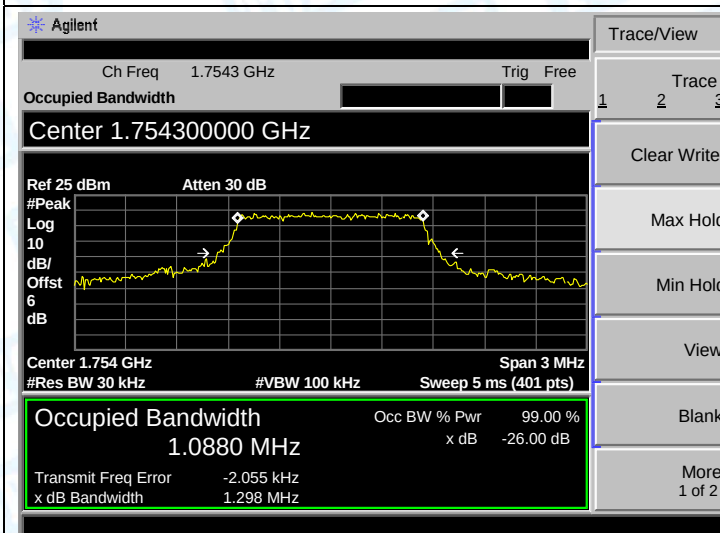
LTE BAND 4 (1.4MHz QPSK-Middle CH)



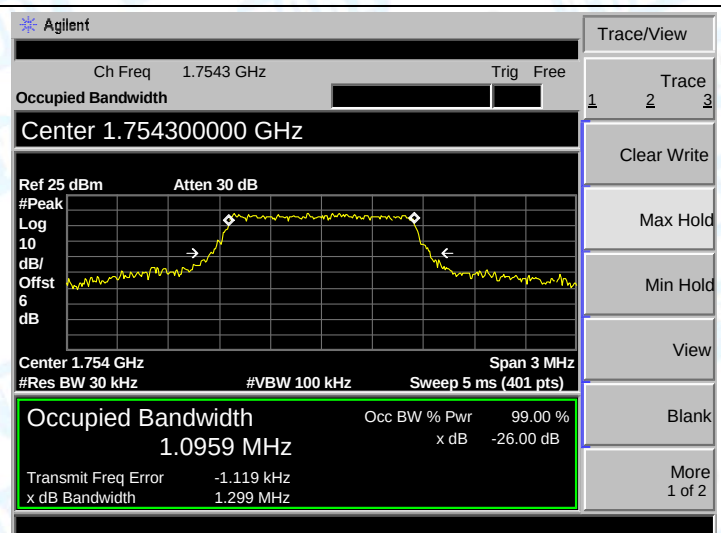
LTE BAND 4 (1.4MHz 16QAM- Middle CH)



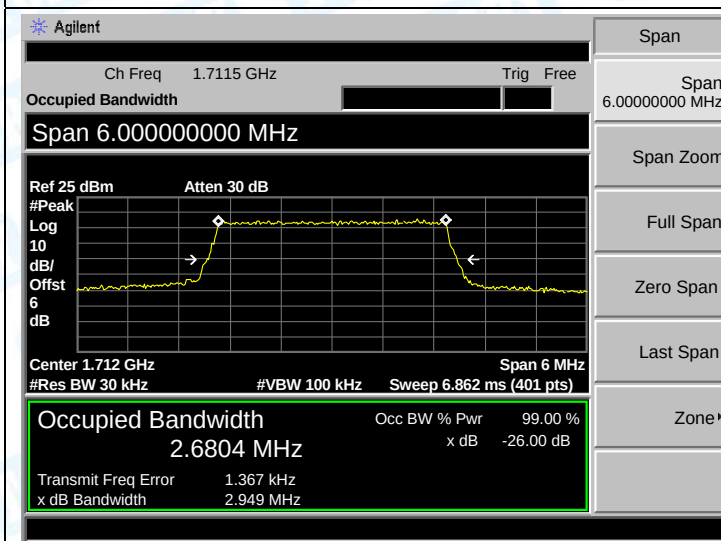
LTE BAND 4 (1.4MHz QPSK-High CH)



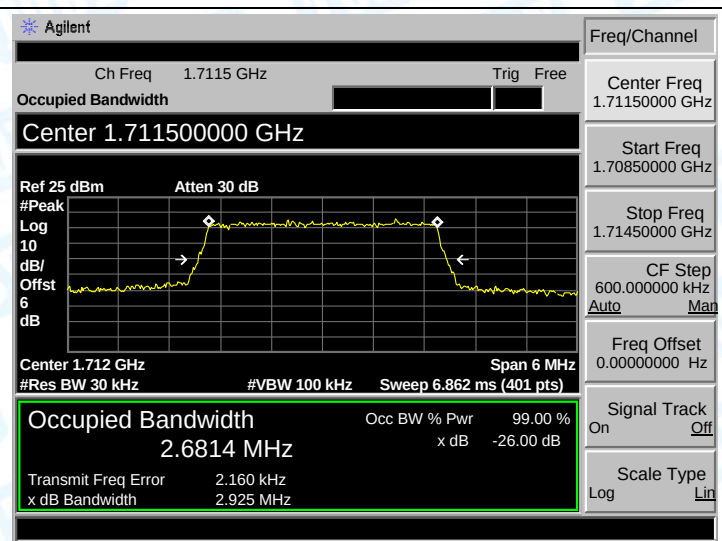
LTE BAND 4 (1.4MHz 16QAM-High CH)



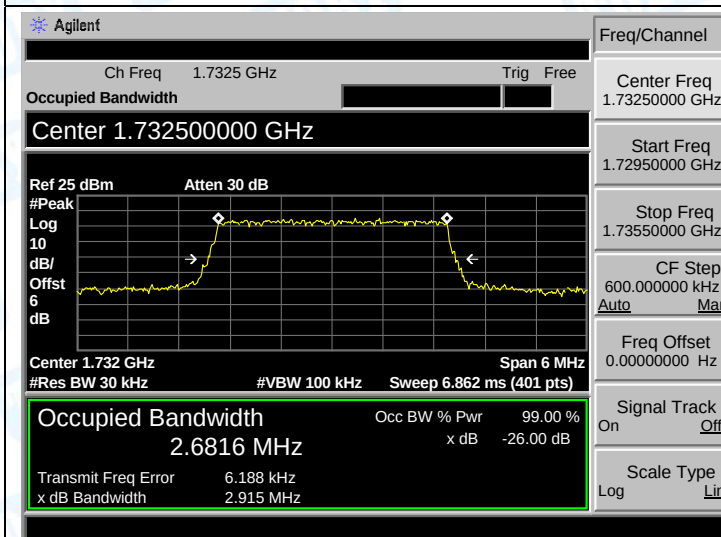
LTE BAND 4 (3MHz QPSK-Low CH)



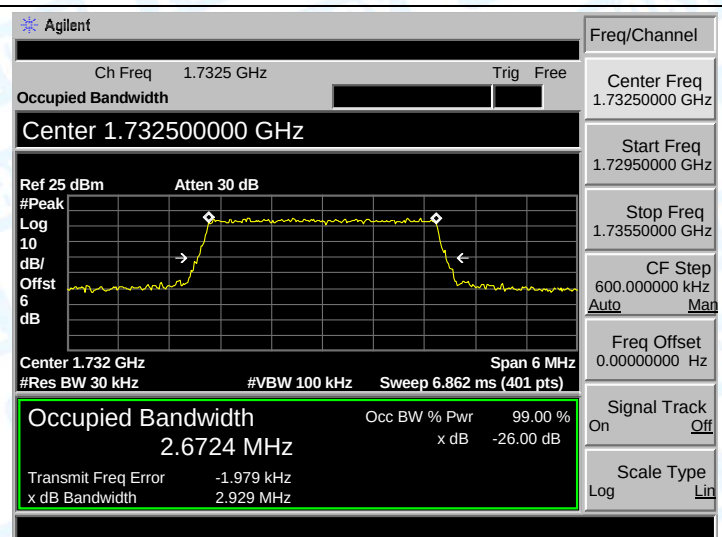
LTE BAND 4 (3MHz 16QAM-Low CH)



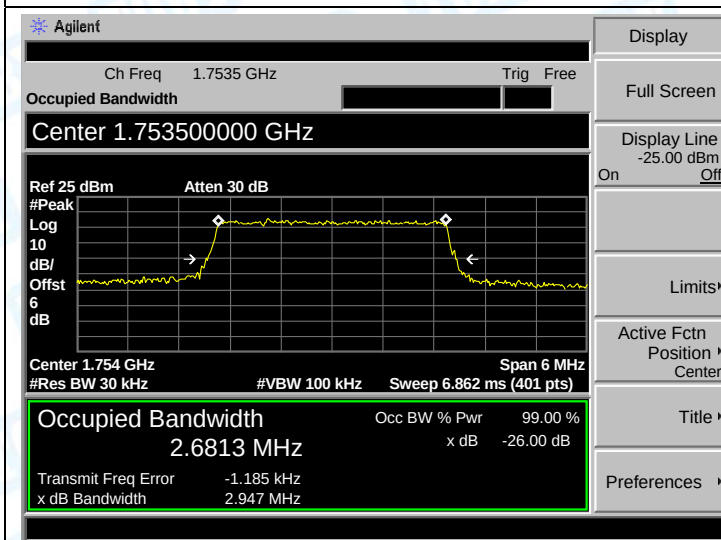
LTE BAND 4 (3MHz QPSK-Middle CH)



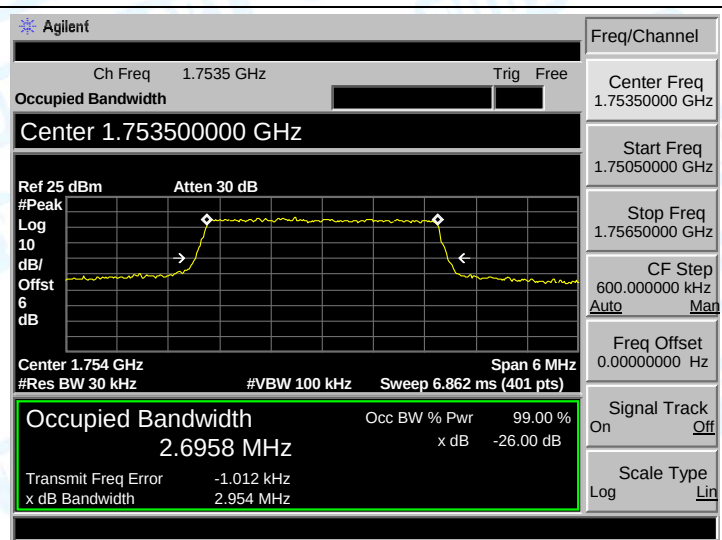
LTE BAND 4 (3MHz 16QAM- Middle CH)



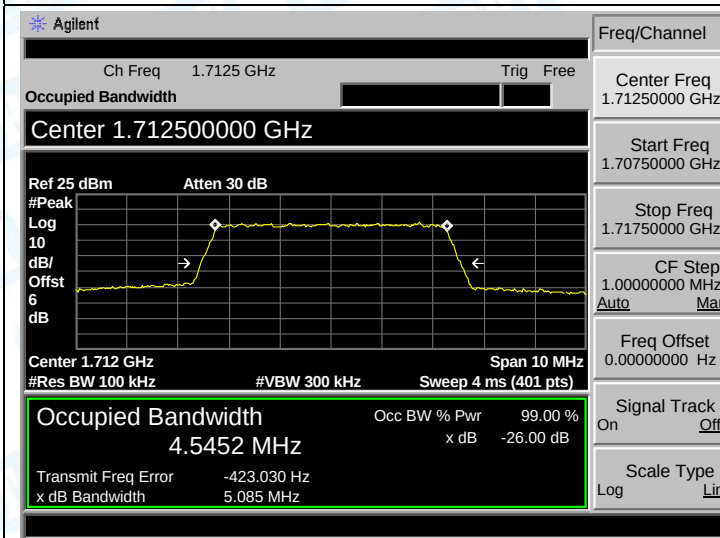
LTE BAND 4 (3MHz QPSK-High CH)



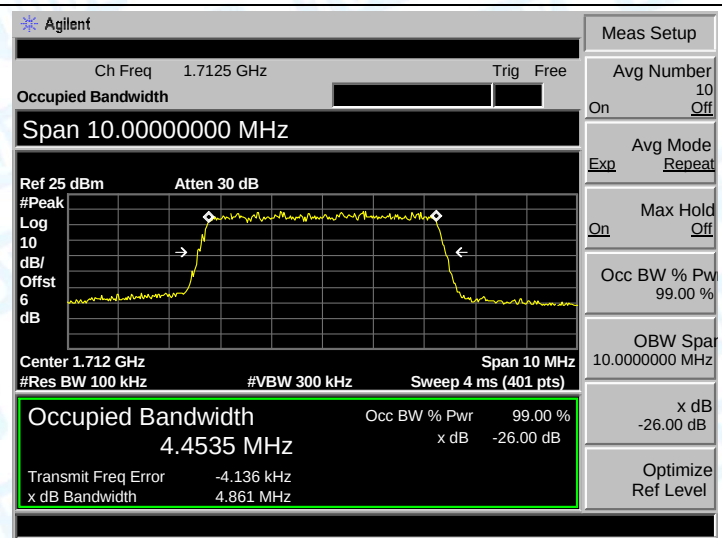
LTE BAND 4 (3MHz 16QAM-High CH)



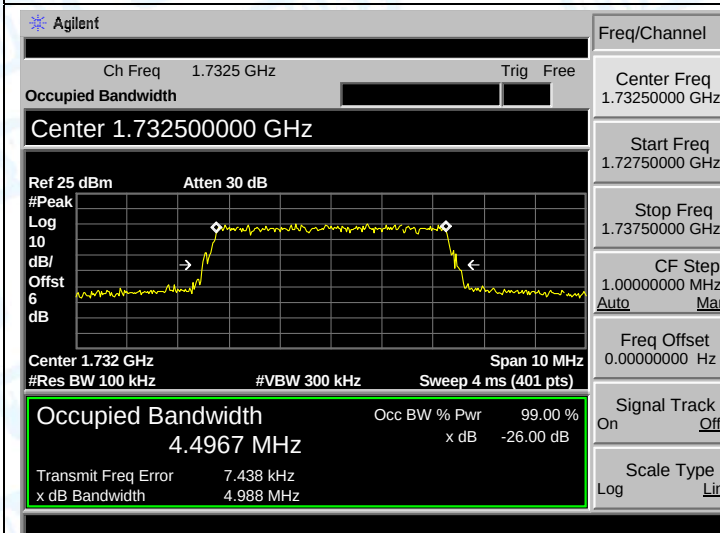
LTE BAND 4 (5MHz QPSK-Low CH)



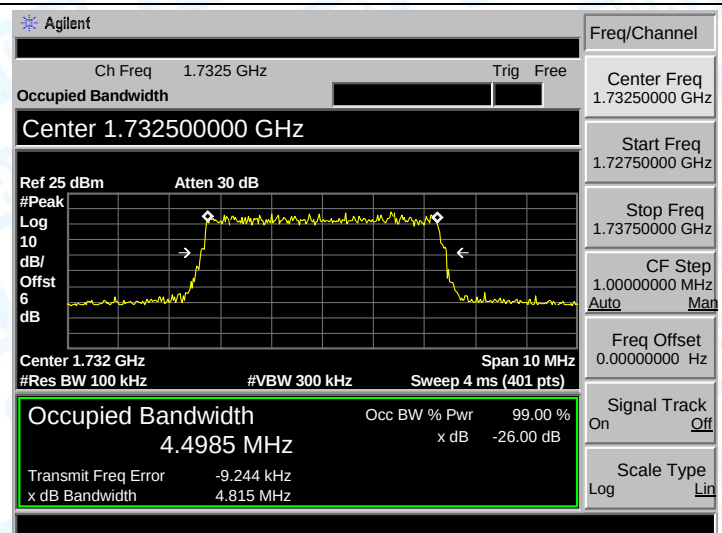
LTE BAND 4 (5MHz 16QAM-Low CH)



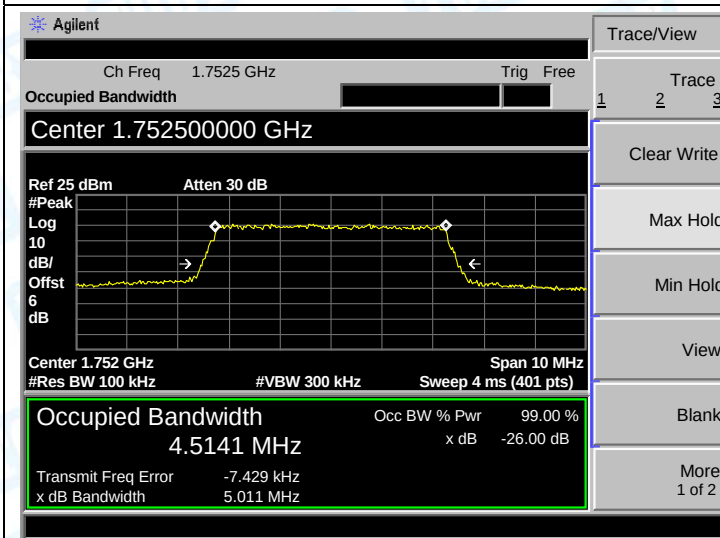
LTE BAND 4 (5MHz QPSK-Middle CH)



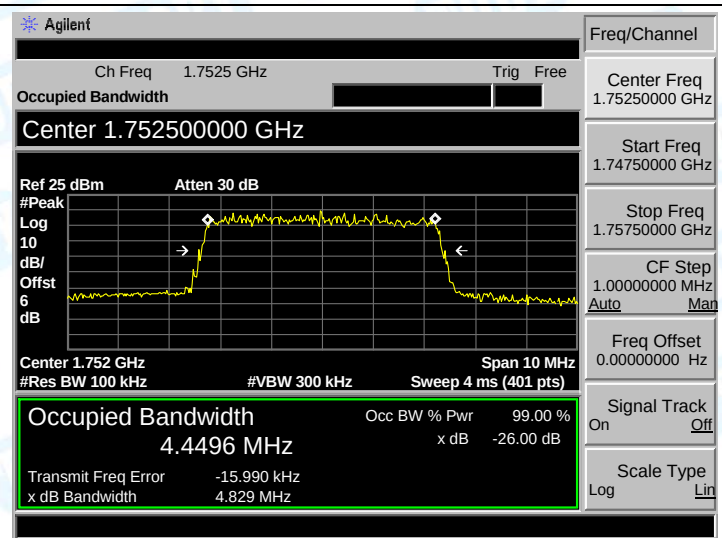
LTE BAND 4 (5MHz 16QAM- Middle CH)



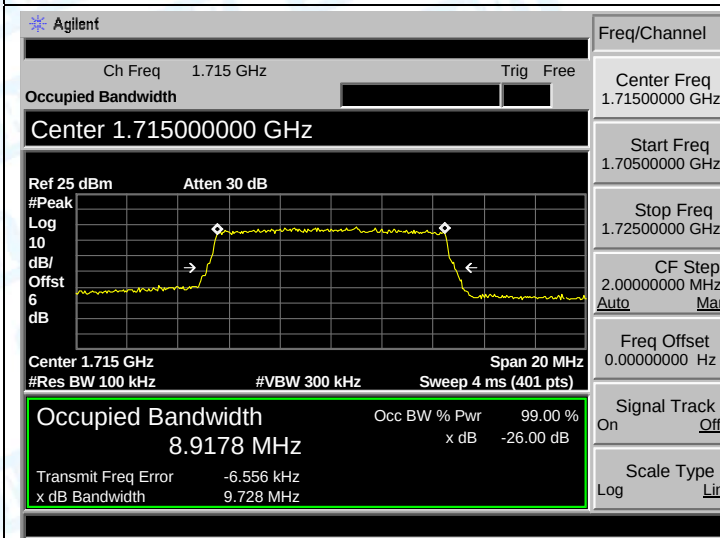
LTE BAND 4 (5MHz QPSK-High CH)



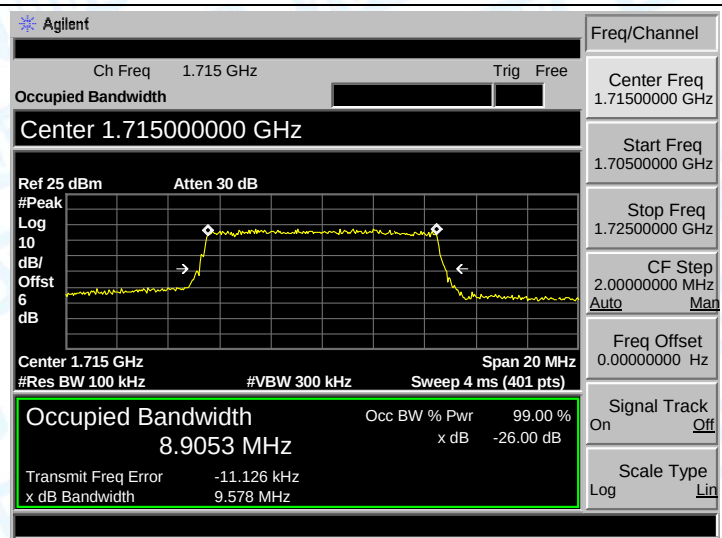
LTE BAND 4 (5MHz 16QAM-High CH)



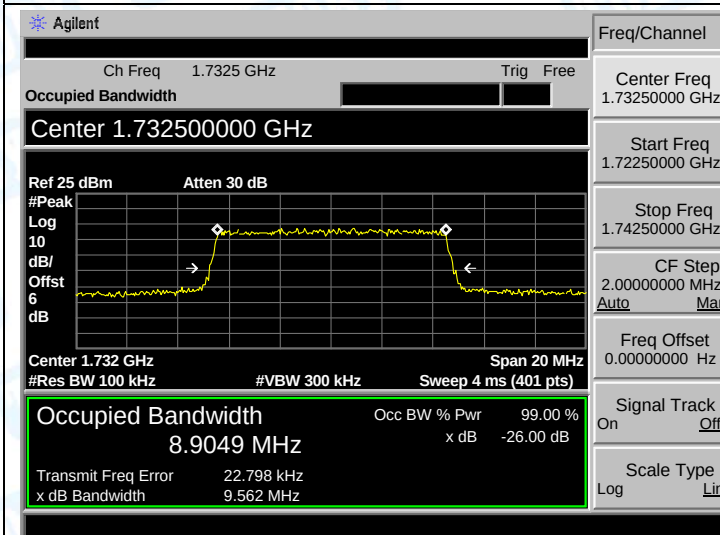
LTE BAND 4 (10MHz QPSK-Low CH)



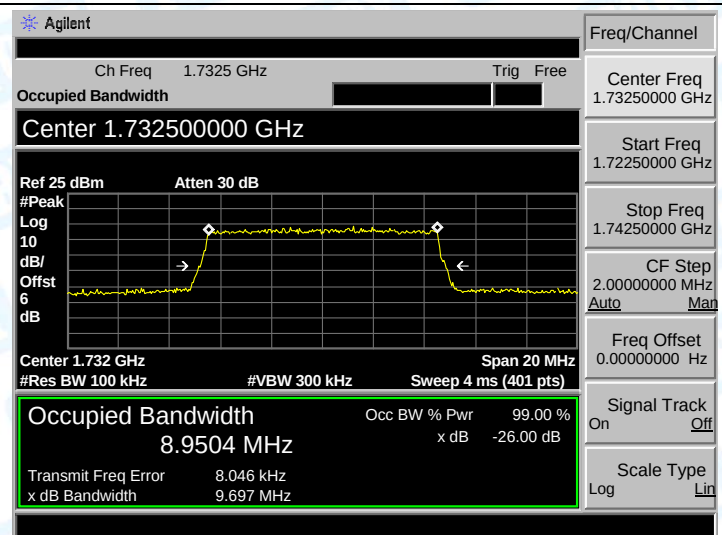
LTE BAND 4 (10MHz 16QAM-Low CH)



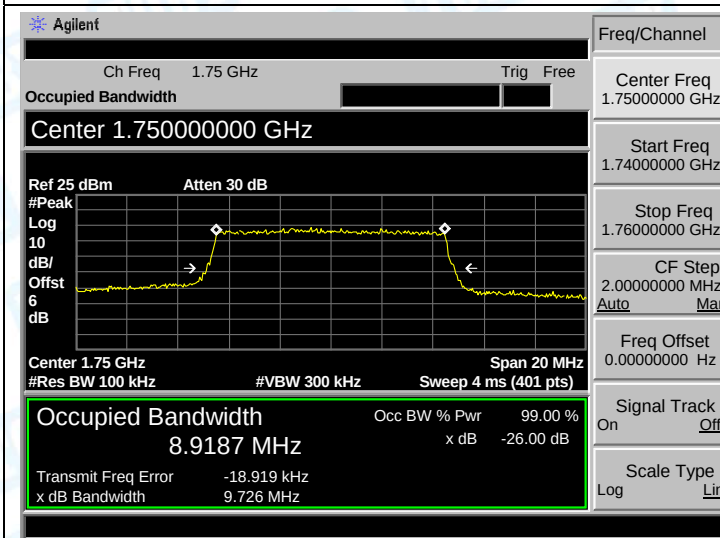
LTE BAND 4 (10MHz QPSK-Middle CH)



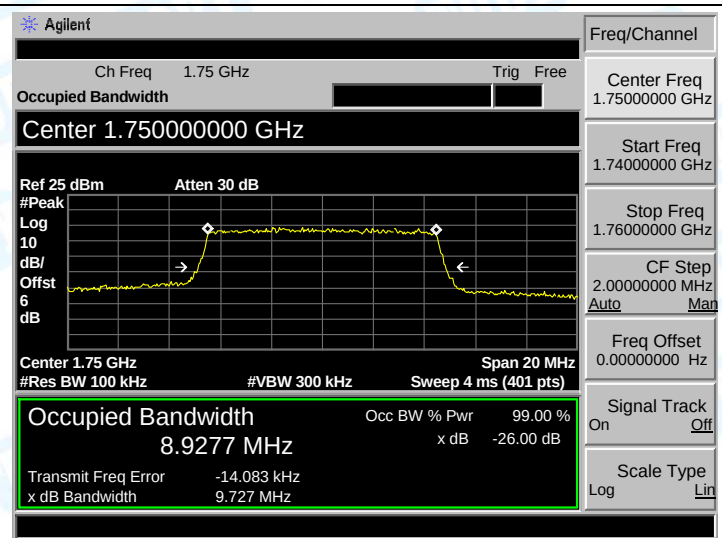
LTE BAND 4 (10MHz 16QAM- Middle CH)



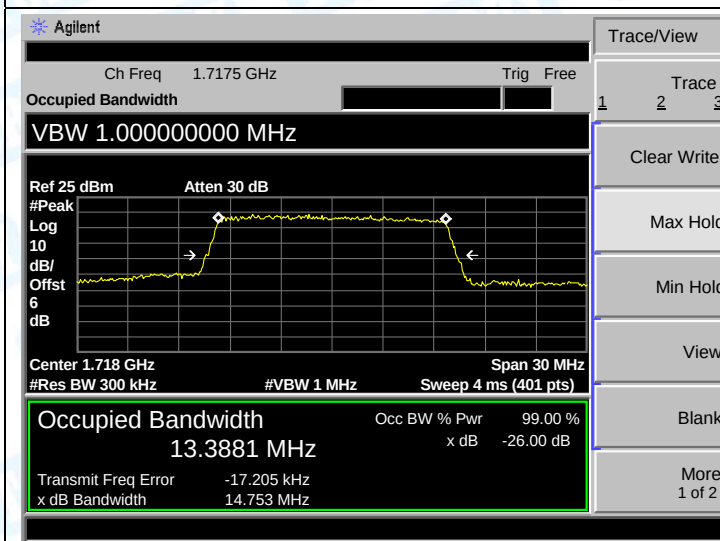
LTE BAND 4 (10MHz QPSK-High CH)



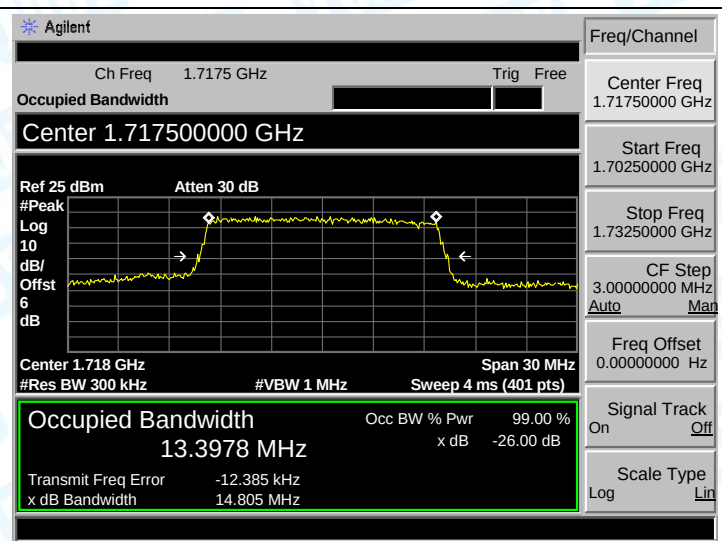
LTE BAND 4 (10MHz 16QAM-High CH)



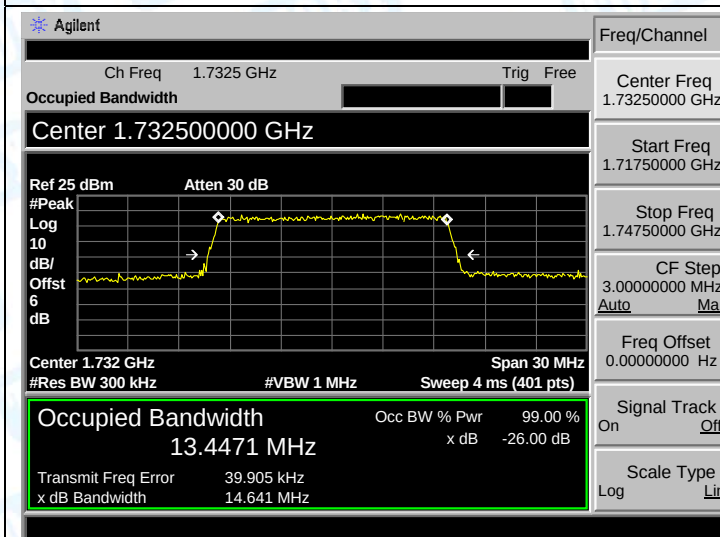
LTE BAND 4 (15MHz QPSK-Low CH)



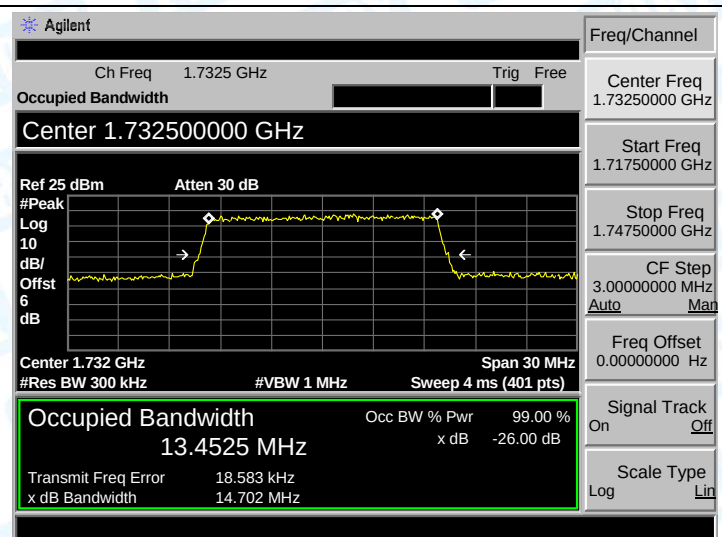
LTE BAND 4 (15MHz 16QAM-Low CH)



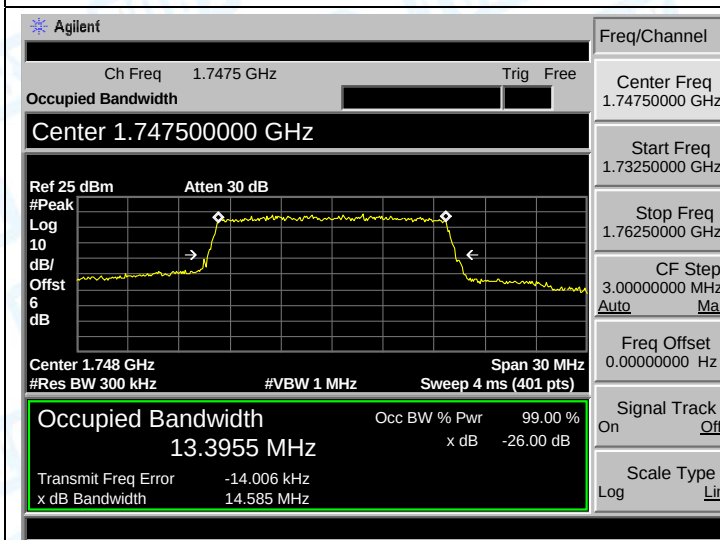
LTE BAND 4 (15MHz QPSK-Middle CH)



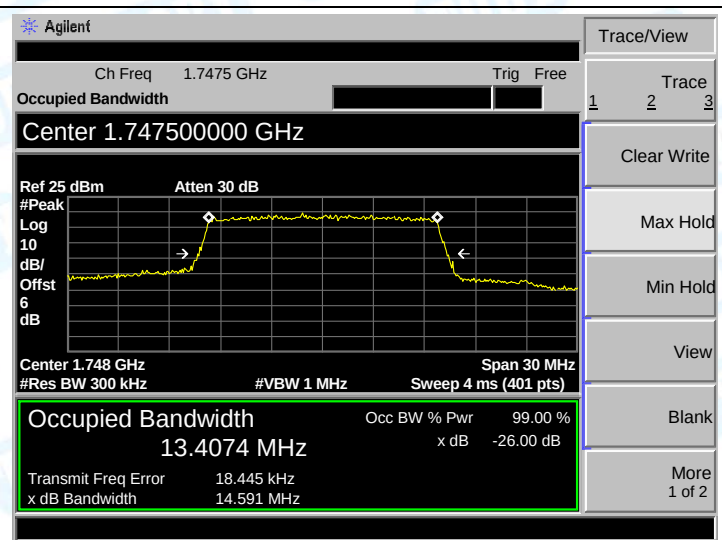
LTE BAND 4 (15MHz 16QAM- Middle CH)



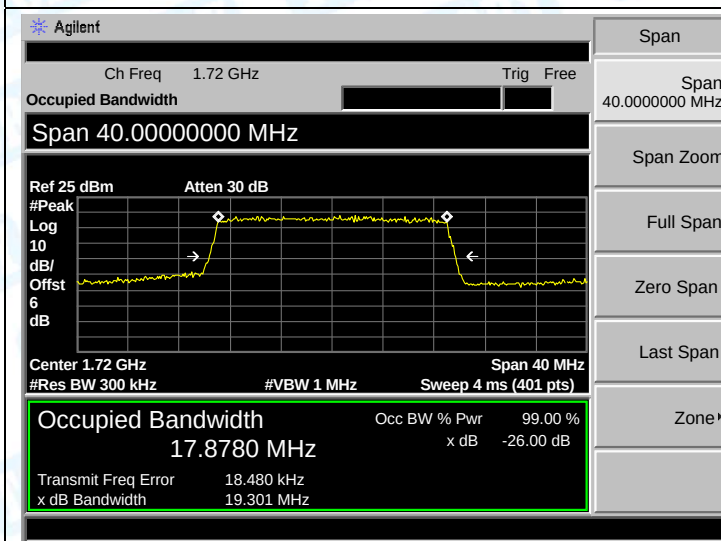
LTE BAND 4 (15MHz QPSK-High CH)



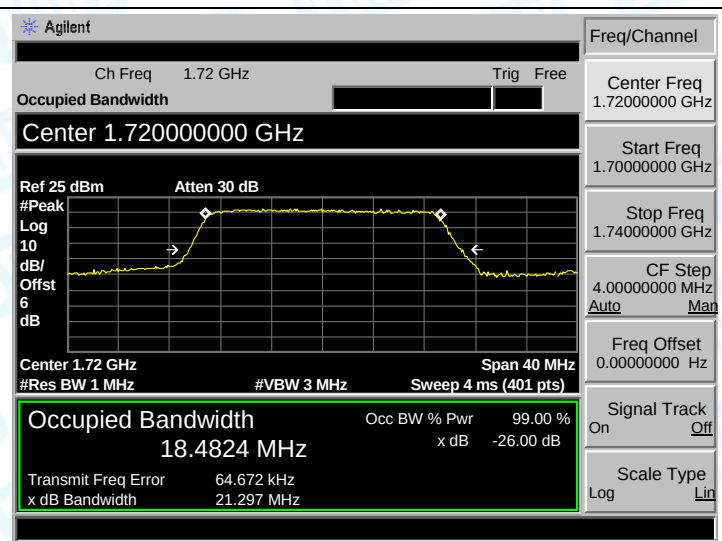
LTE BAND 4 (15MHz 16QAM-High CH)



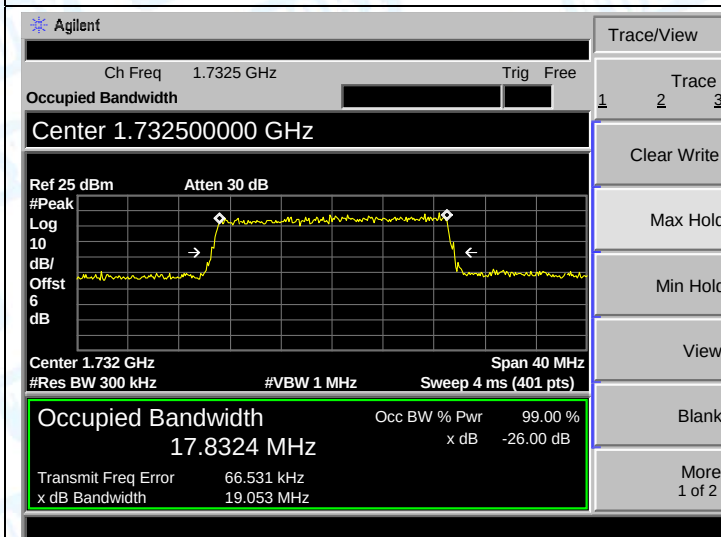
LTE BAND 4 (20MHz QPSK-Low CH)



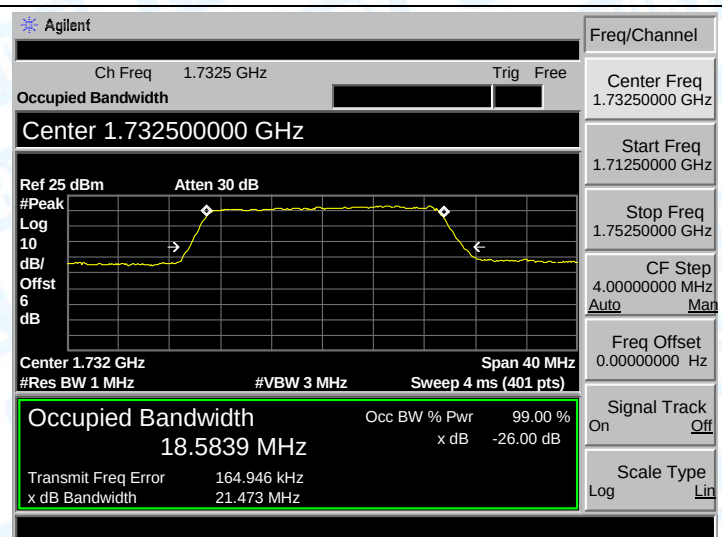
LTE BAND 4 (20MHz 16QAM-Low CH)



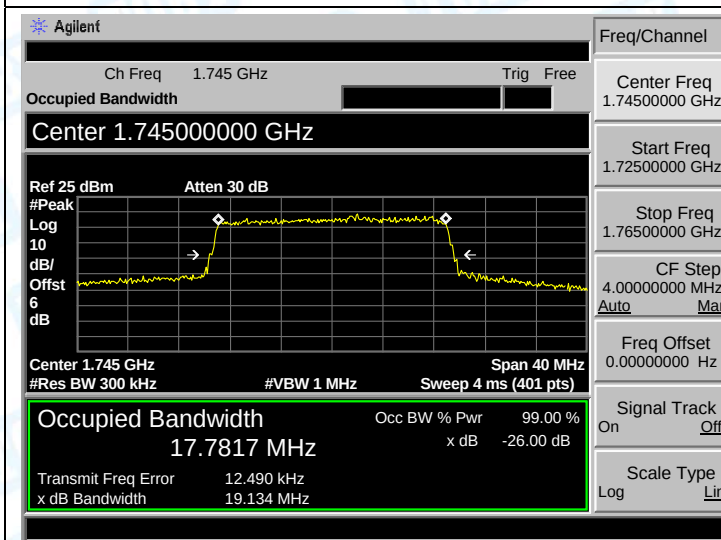
LTE BAND 4 (20MHz QPSK-Middle CH)



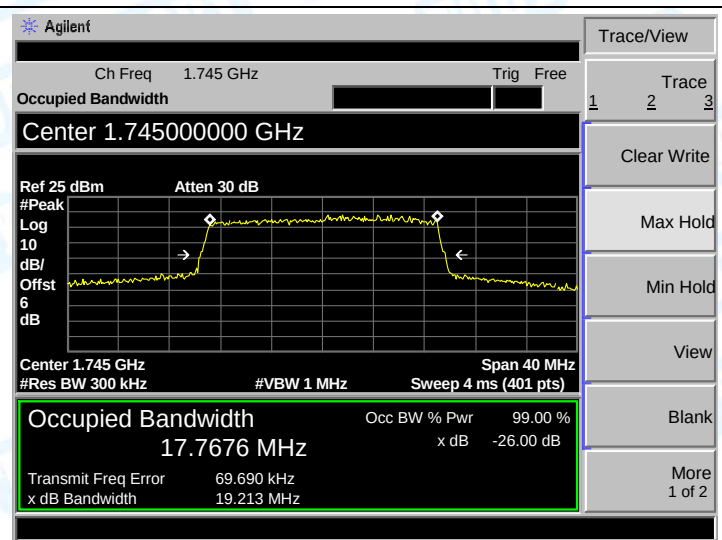
LTE BAND 4 (20MHz 16QAM- Middle CH)



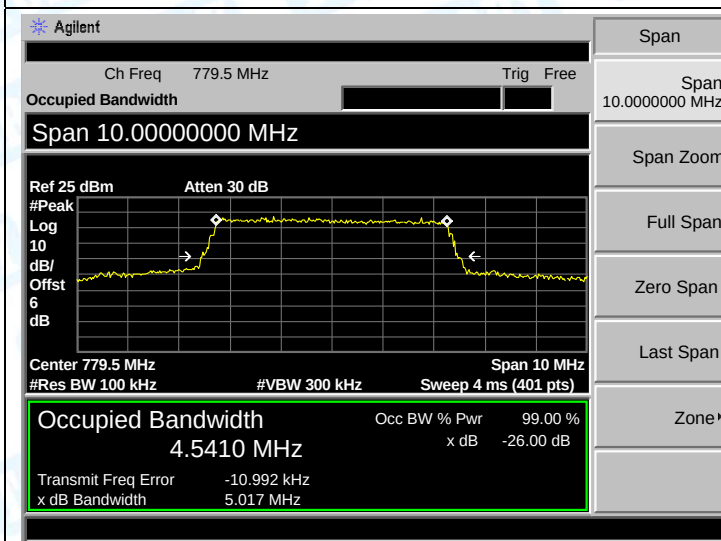
LTE BAND 4 (20MHz QPSK-High CH)



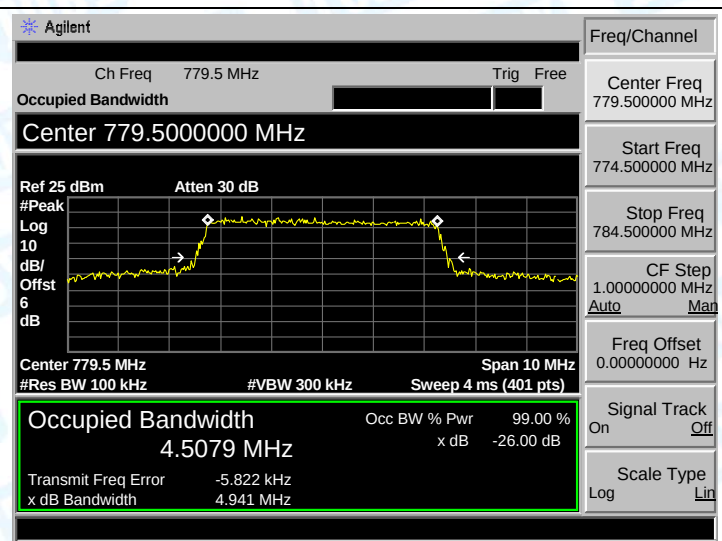
LTE BAND 4 (20MHz 16QAM-High CH)



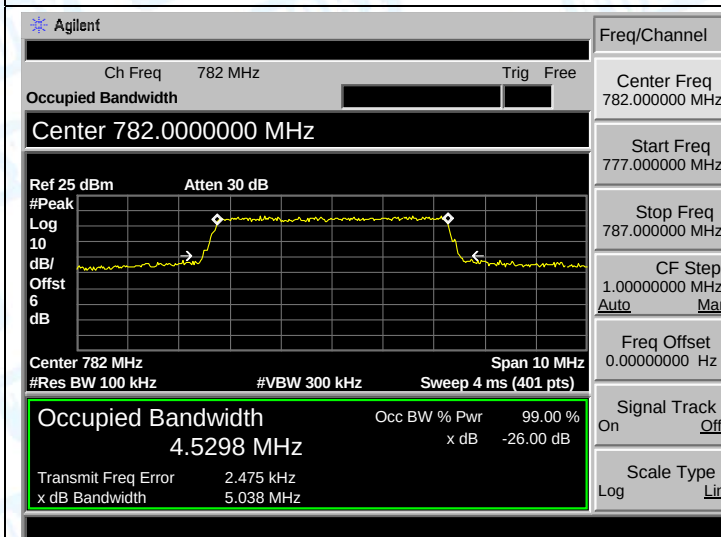
LTE BAND 13 (5MHz QPSK-Low CH)



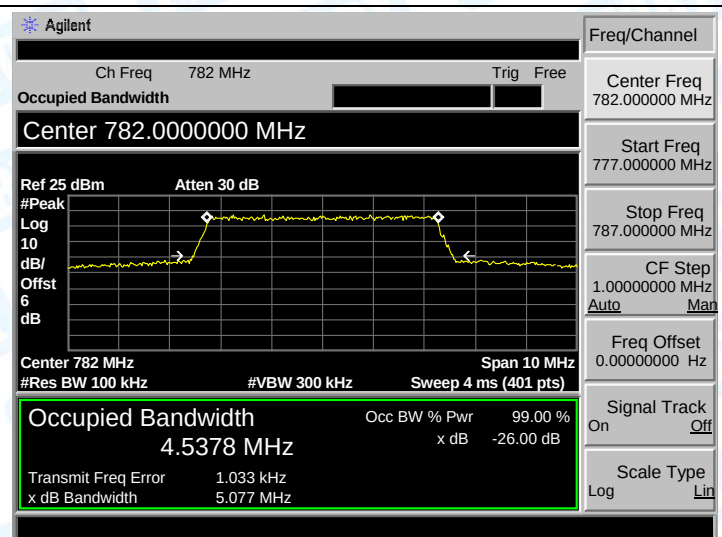
LTE BAND 13 (5MHz 16QAM-Low CH)



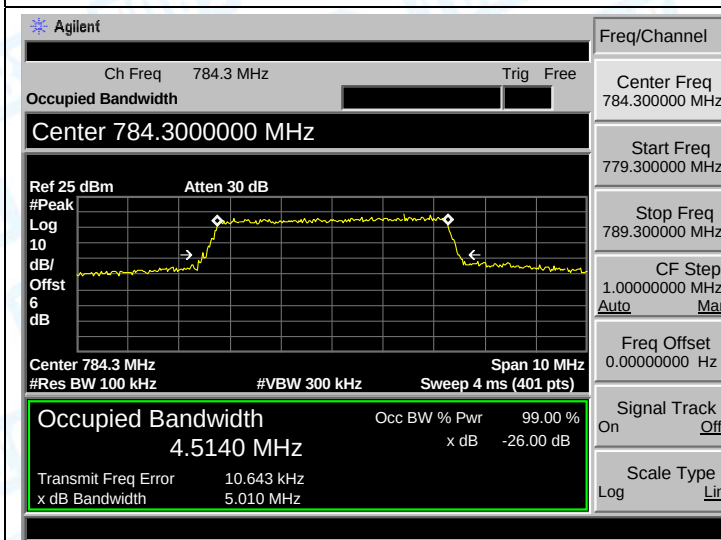
LTE BAND 13 (5MHz QPSK-Middle CH)



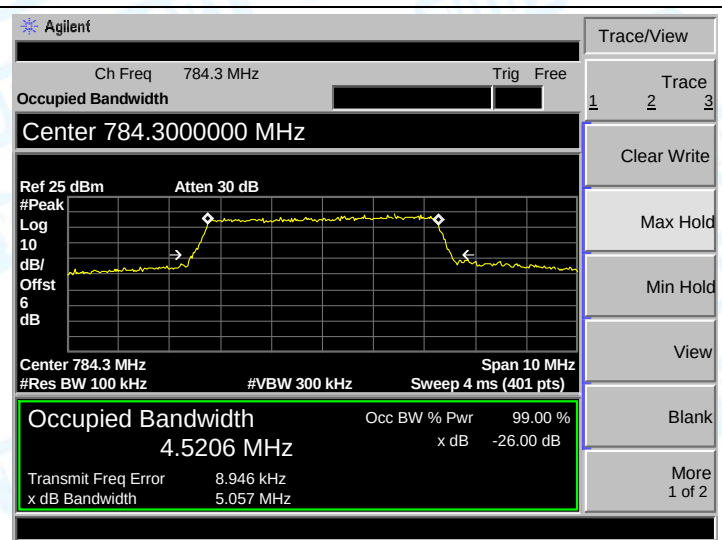
LTE BAND 13 (5MHz 16QAM- Middle CH)

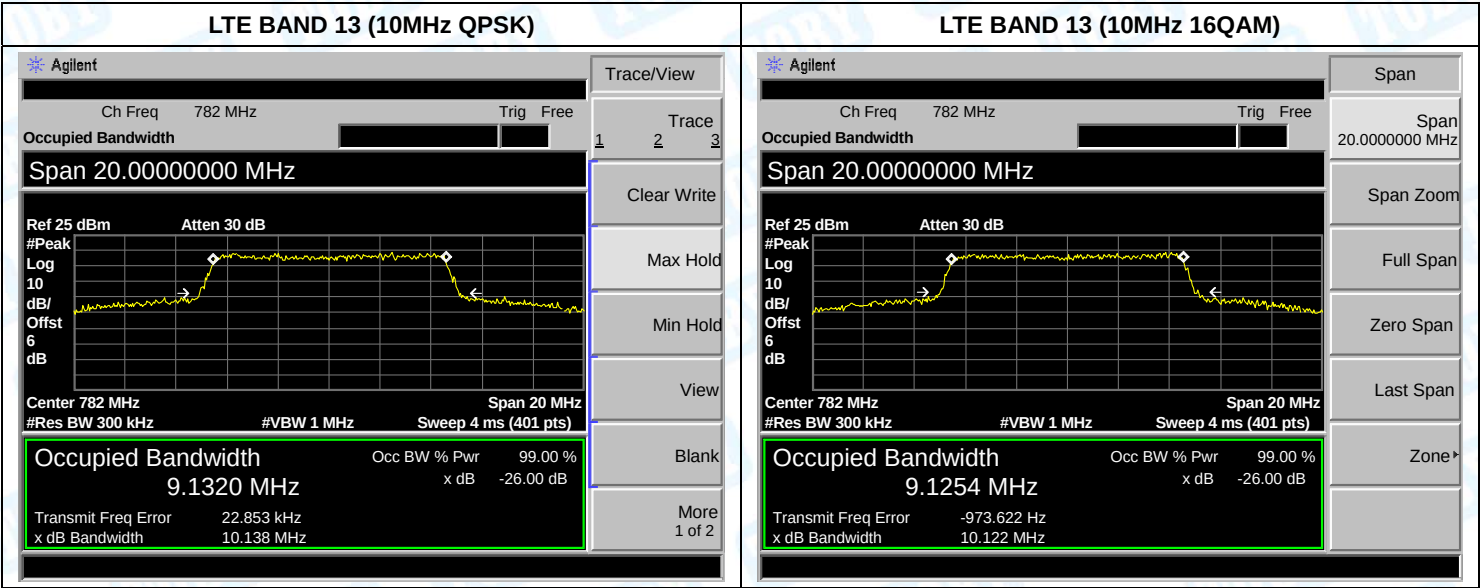


LTE BAND 13 (5MHz QPSK-High CH)

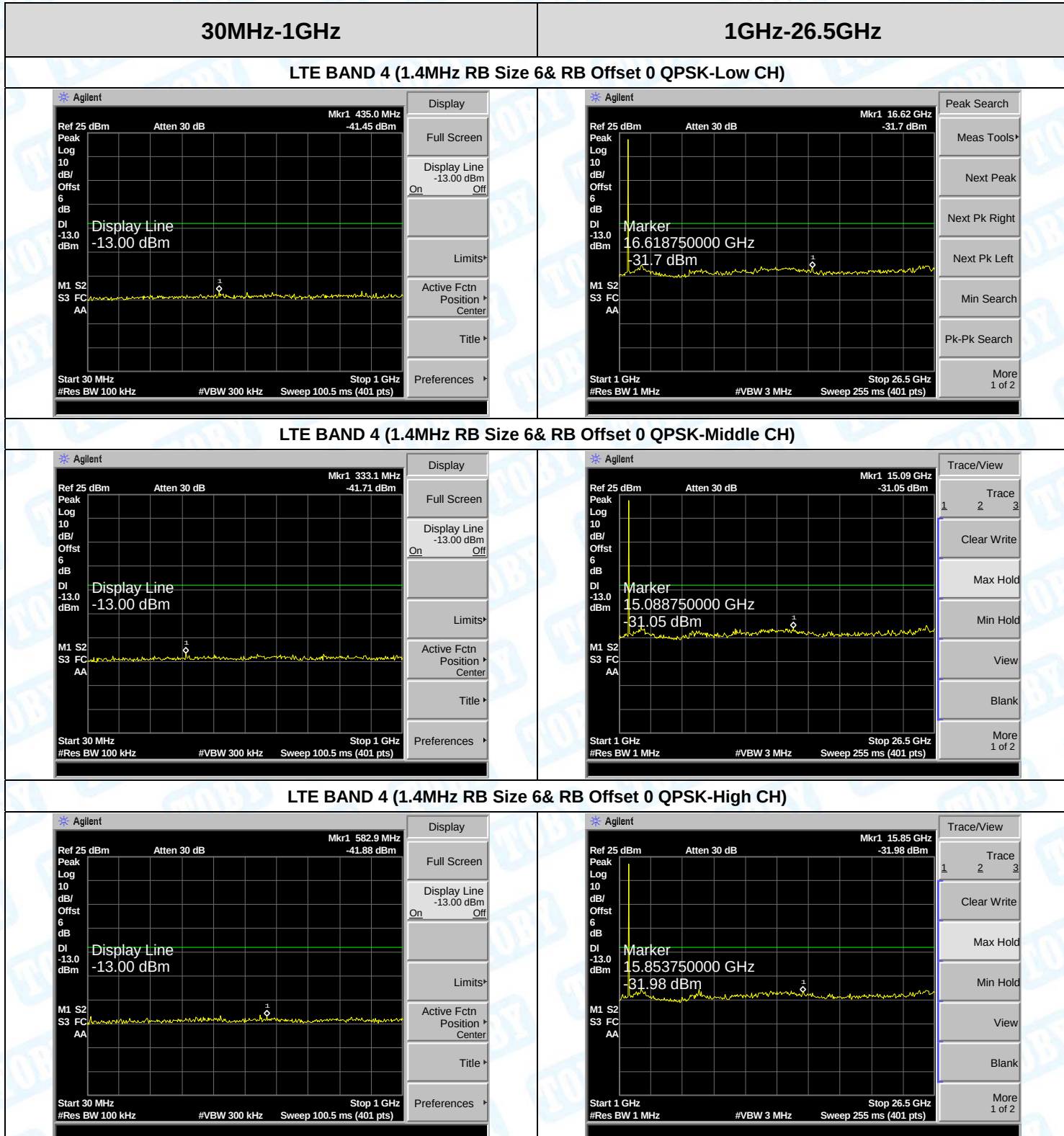


LTE BAND 13 (5MHz 16QAM-High CH)





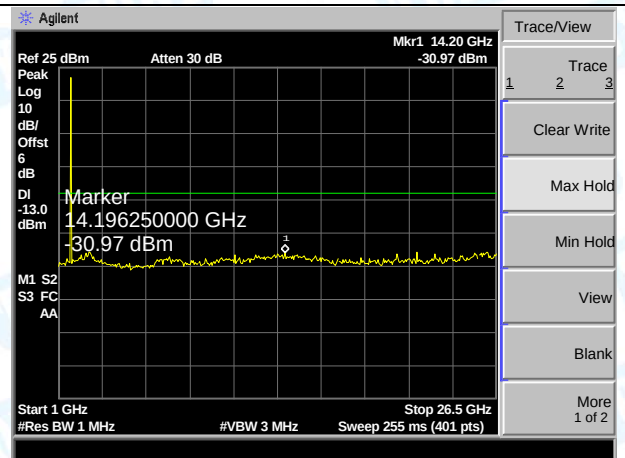
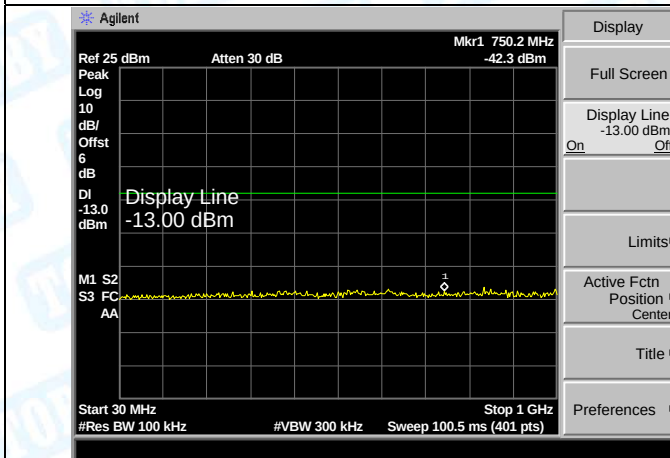
ATTACHMENT D--OUT OF BAND EMISSION AT ANTENNA TERMINALS



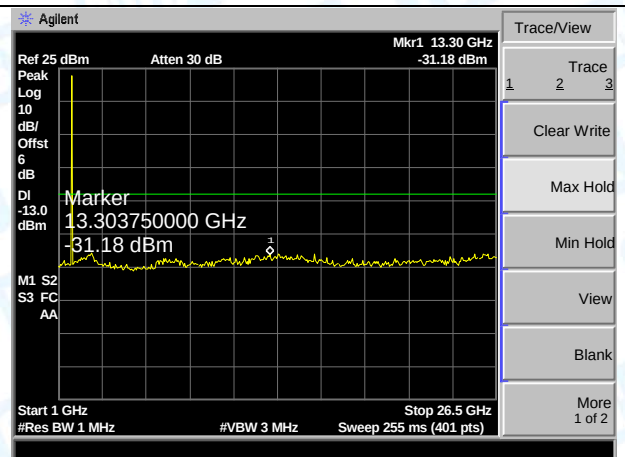
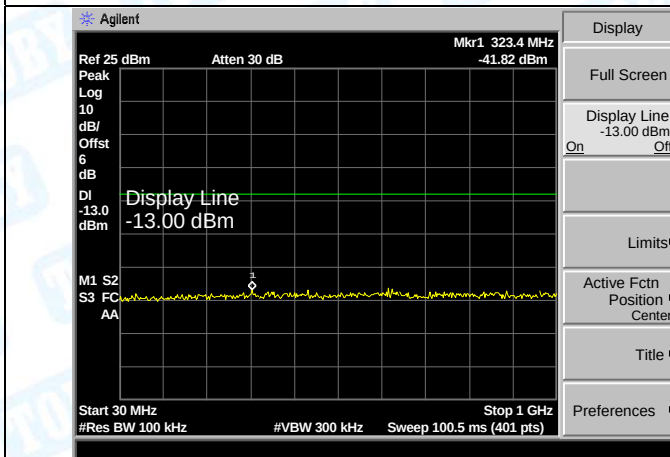
30MHz-1GHz

1GHz-26.5GHz

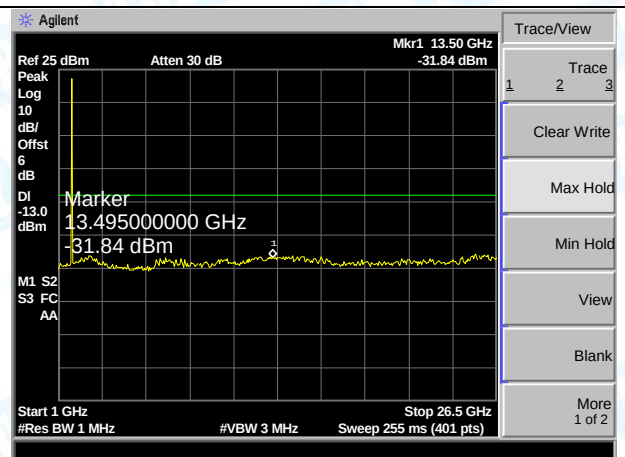
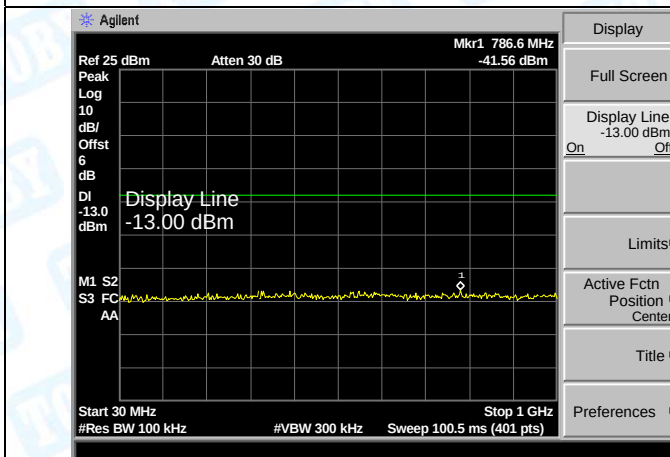
LTE BAND 4 (1.4MHz RB Size 6& RB Offset 0 16QAM-Low CH)



LTE BAND 4 (1.4MHz RB Size 6& RB Offset 0 16QAM-Middle CH)



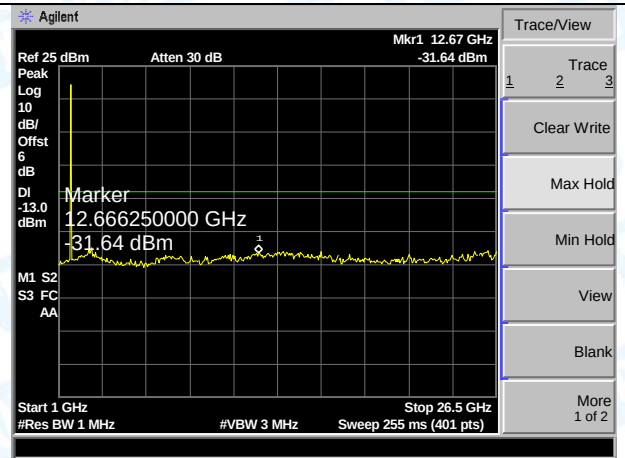
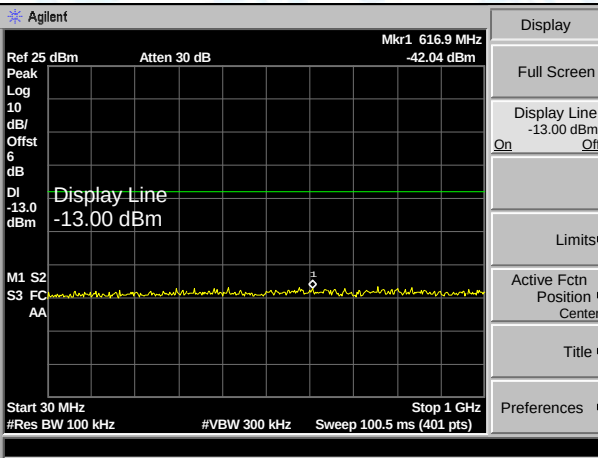
LTE BAND 4 (1.4MHz RB Size 6& RB Offset 0 16QAM-High CH)



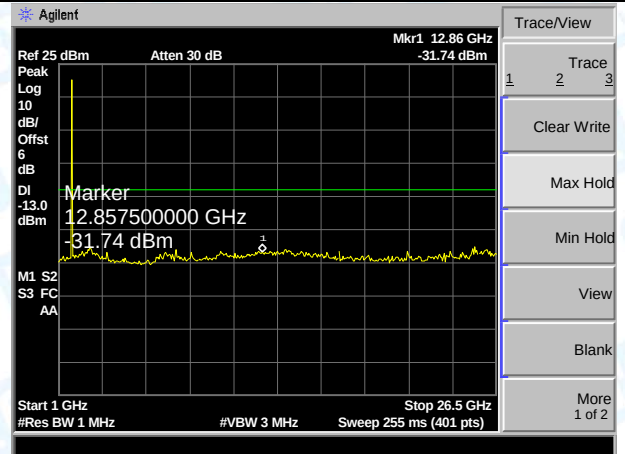
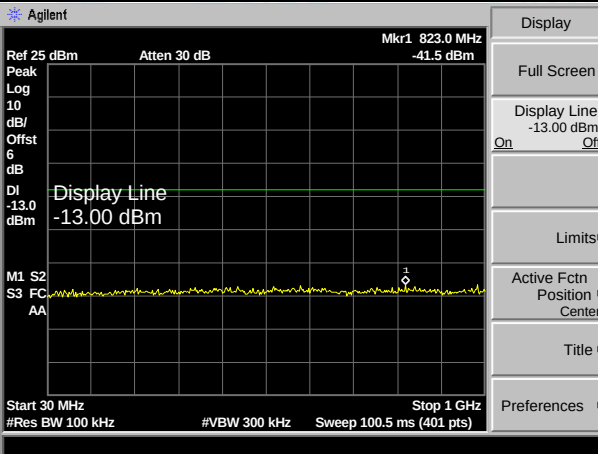
30MHz-1GHz

1GHz-26.5GHz

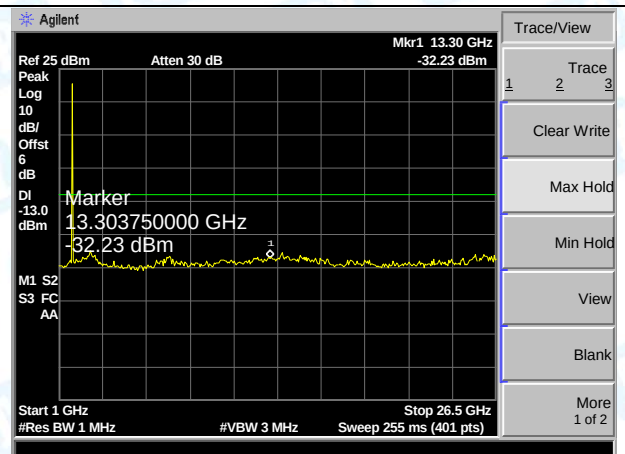
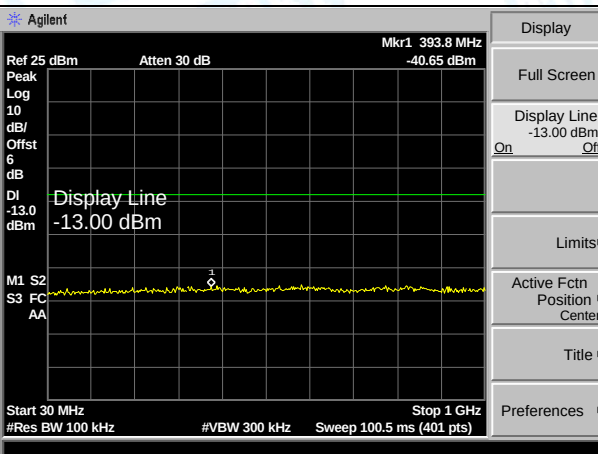
LTE BAND 4 (3MHz RB Size 15& RB Offset 0 QPSK-Low CH)



LTE BAND 4 (3MHz RB Size 15& RB Offset 0 QPSK-Middle CH)



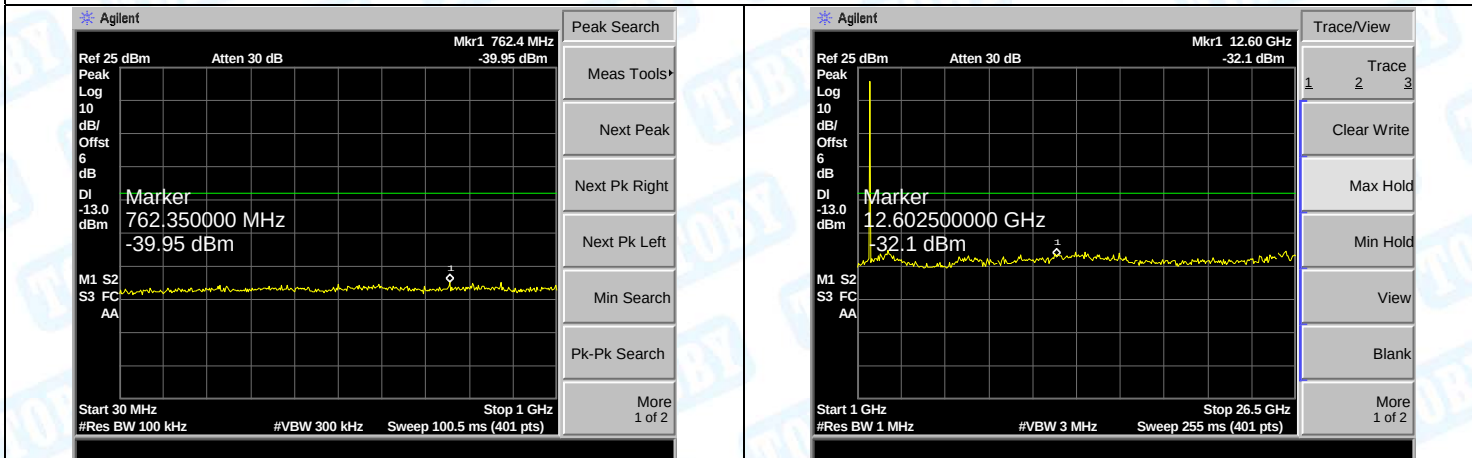
LTE BAND 4 (3MHz RB Size 15& RB Offset 0 QPSK-High CH)



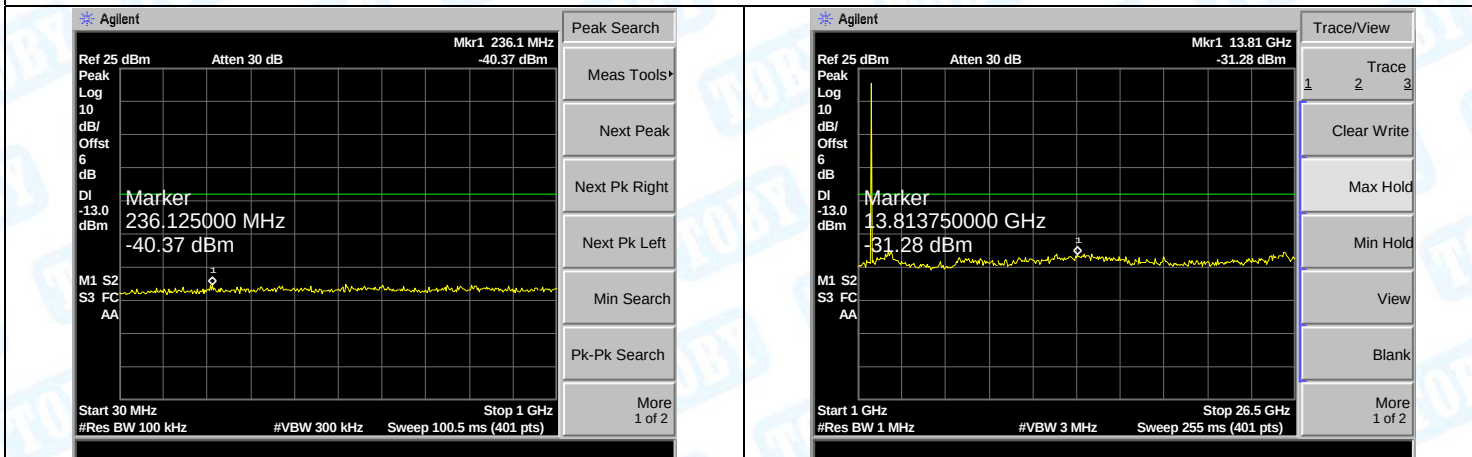
30MHz-1GHz

1GHz-26.5GHz

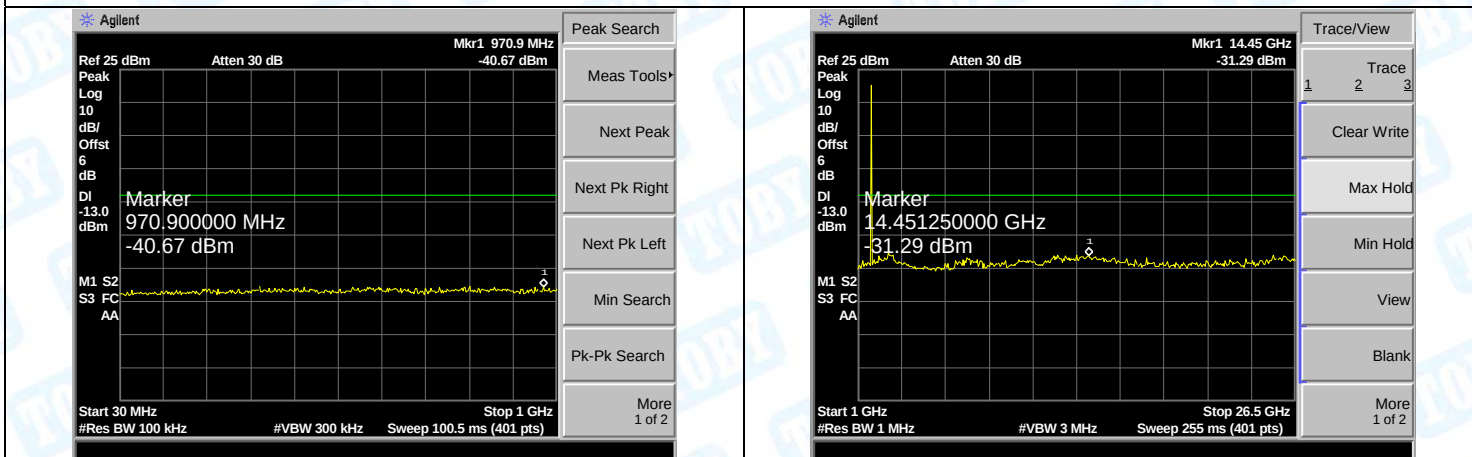
LTE BAND 4 (3MHz RB Size 15& RB Offset 0 16QAM-Low CH)



LTE BAND 4 (3MHz RB Size 15& RB Offset 0 16QAM-Middle CH)



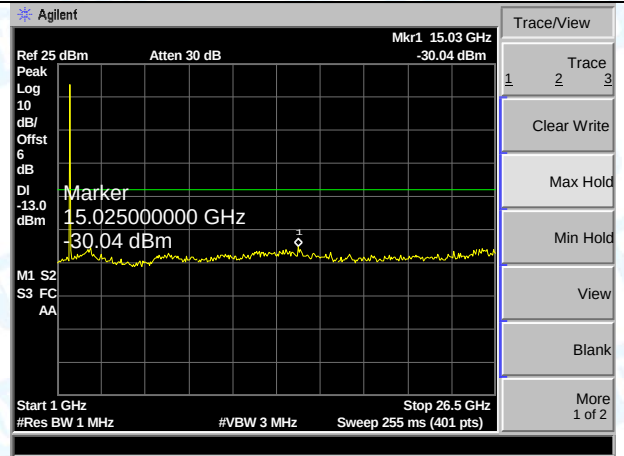
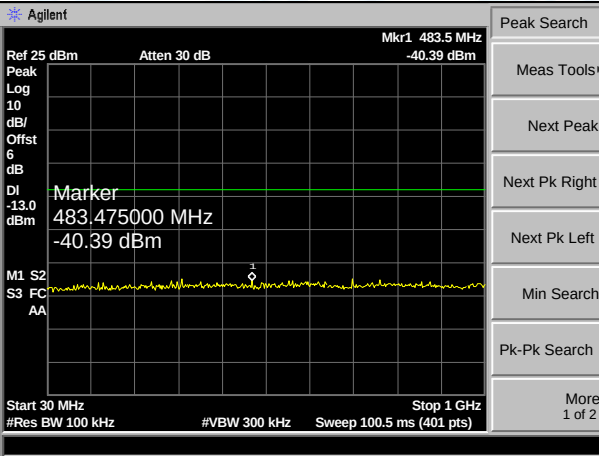
LTE BAND 4 (3MHz RB Size 15& RB Offset 0 16QAM-High CH)



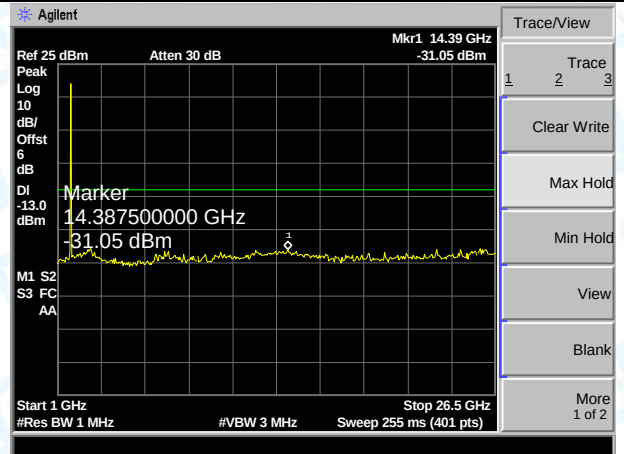
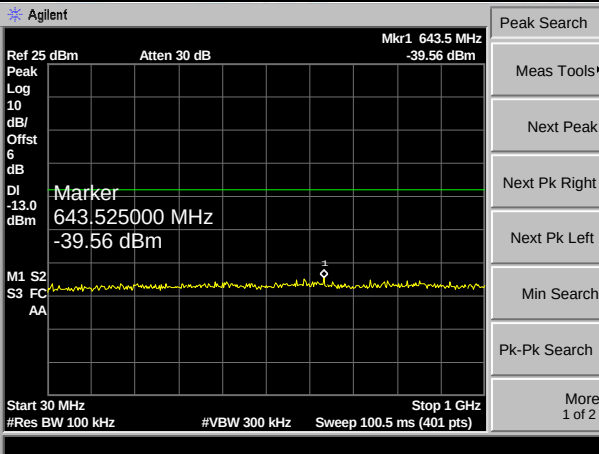
30MHz-1GHz

1GHz-26.5GHz

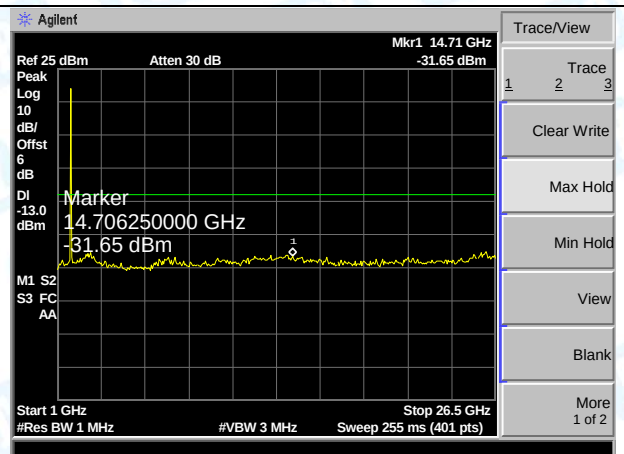
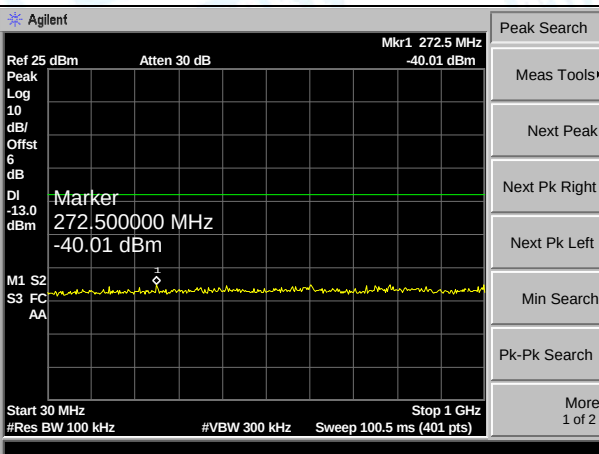
LTE BAND 4 (5MHz RB Size 25& RB Offset 0 QPSK-Low CH)



LTE BAND 4 (5MHz RB Size 25& RB Offset 0 QPSK-Middle CH)



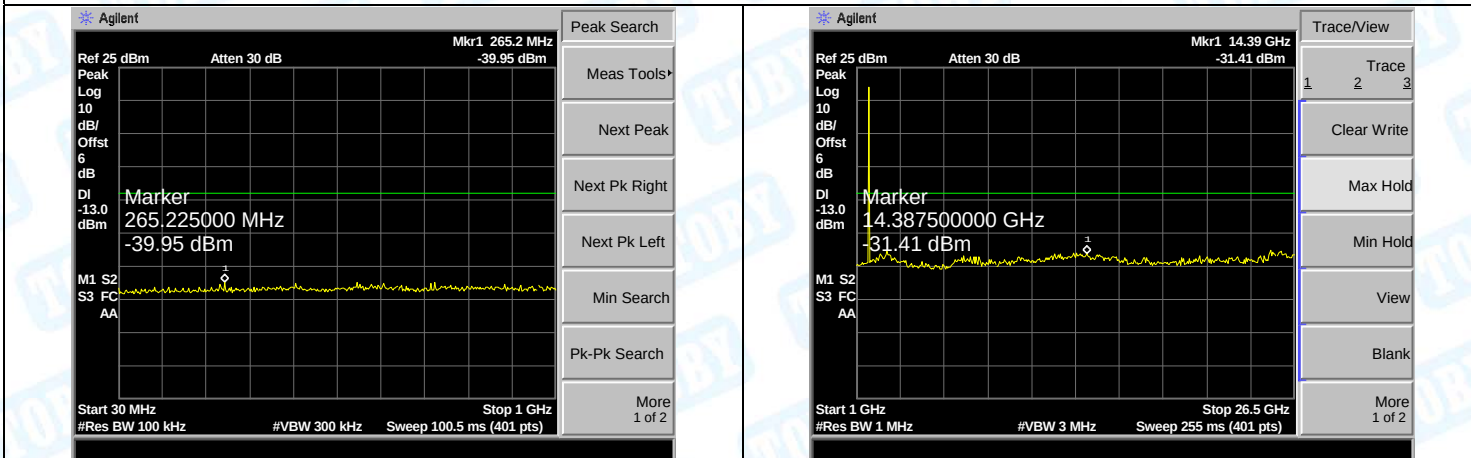
LTE BAND 4 (5MHz RB Size 25& RB Offset 0 QPSK-High CH)



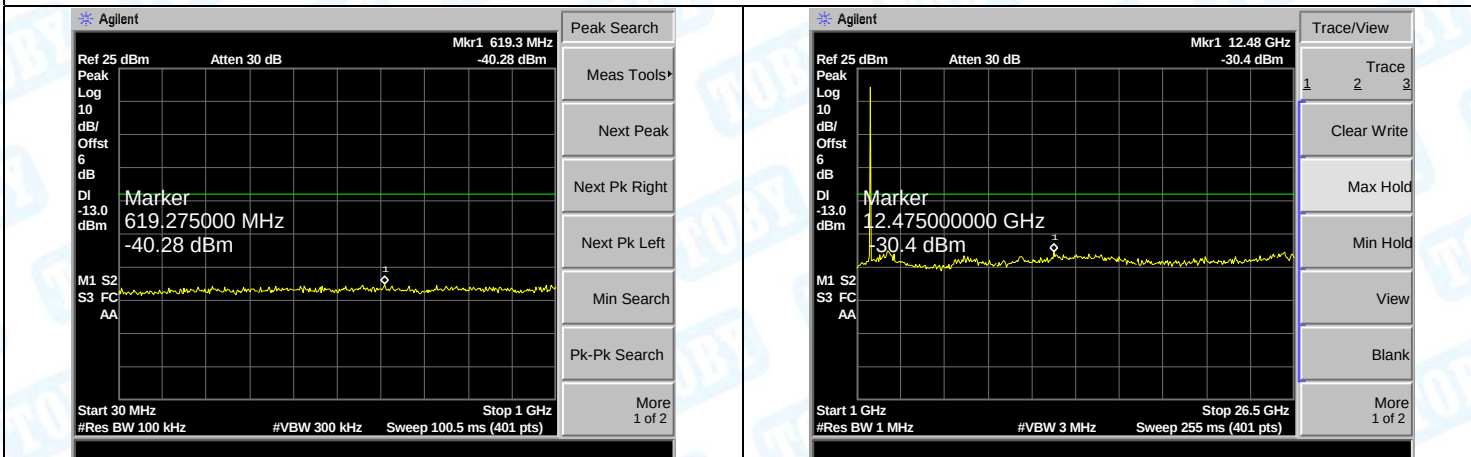
30MHz-1GHz

1GHz-26.5GHz

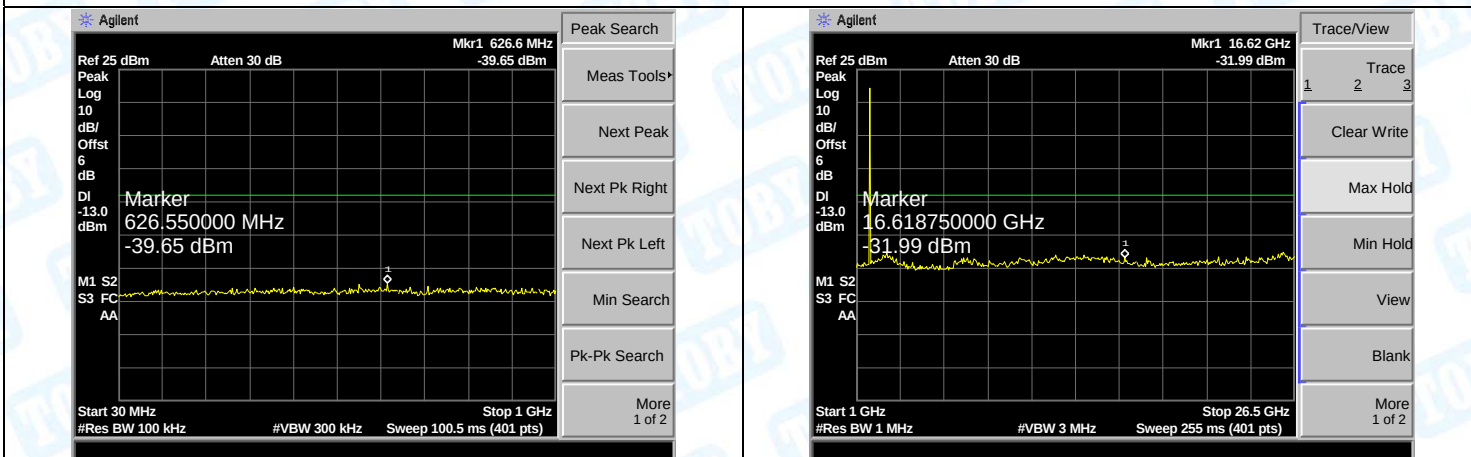
LTE BAND 4 (5MHz RB Size 25& RB Offset 0 16QAM-Low CH)



LTE BAND 4 (5MHz RB Size 25& RB Offset 0 16QAM-Middle CH)



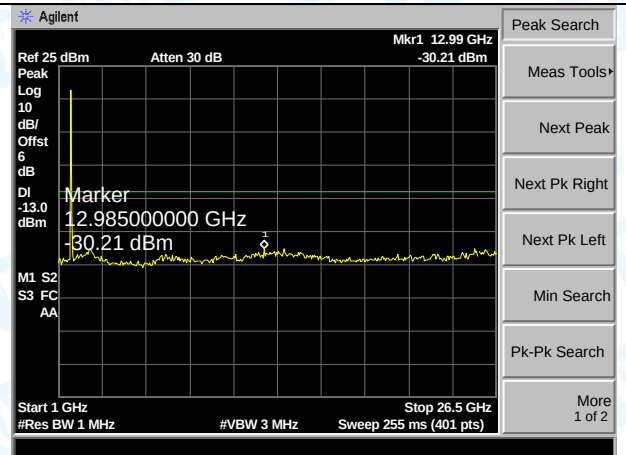
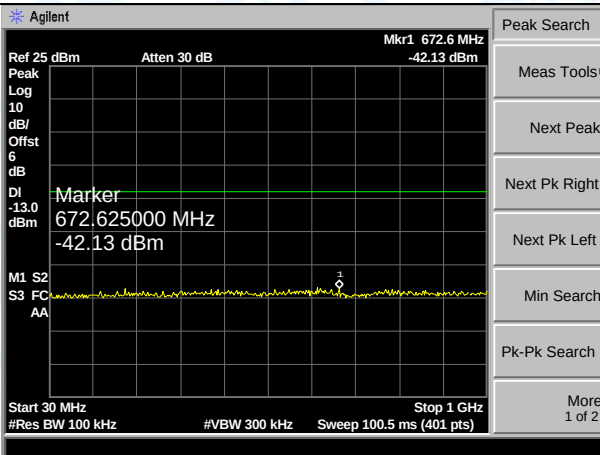
LTE BAND 4 (5MHz RB Size 25& RB Offset 0 16QAM-High CH)



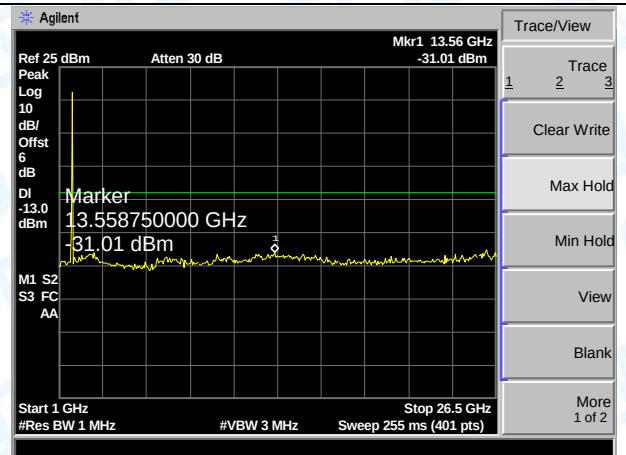
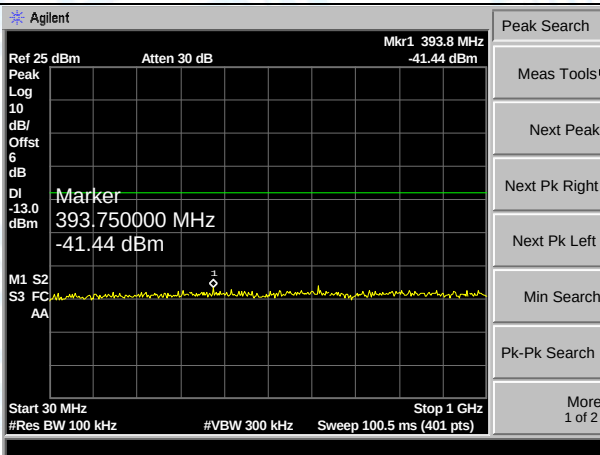
30MHz-1GHz

1GHz-26.5GHz

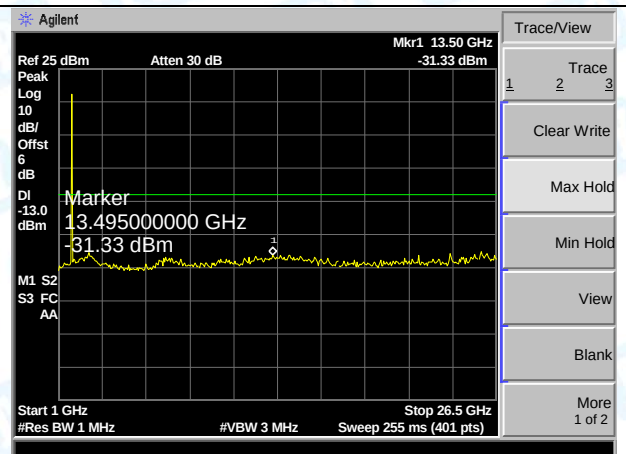
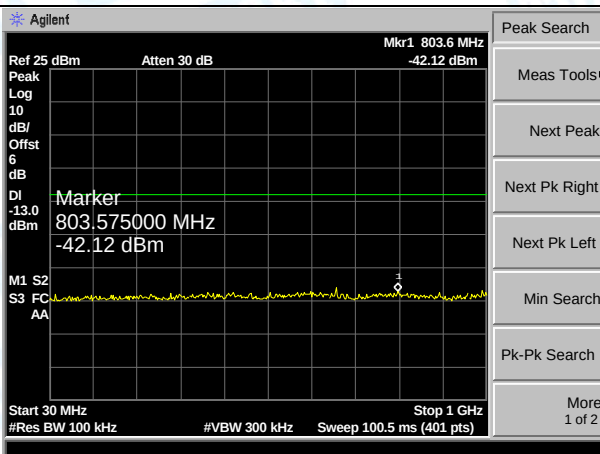
LTE BAND 4 (10MHz RB Size 50& RB Offset 0 QPSK-Low CH)



LTE BAND 4 (10MHz RB Size 50& RB Offset 0 QPSK-Middle CH)



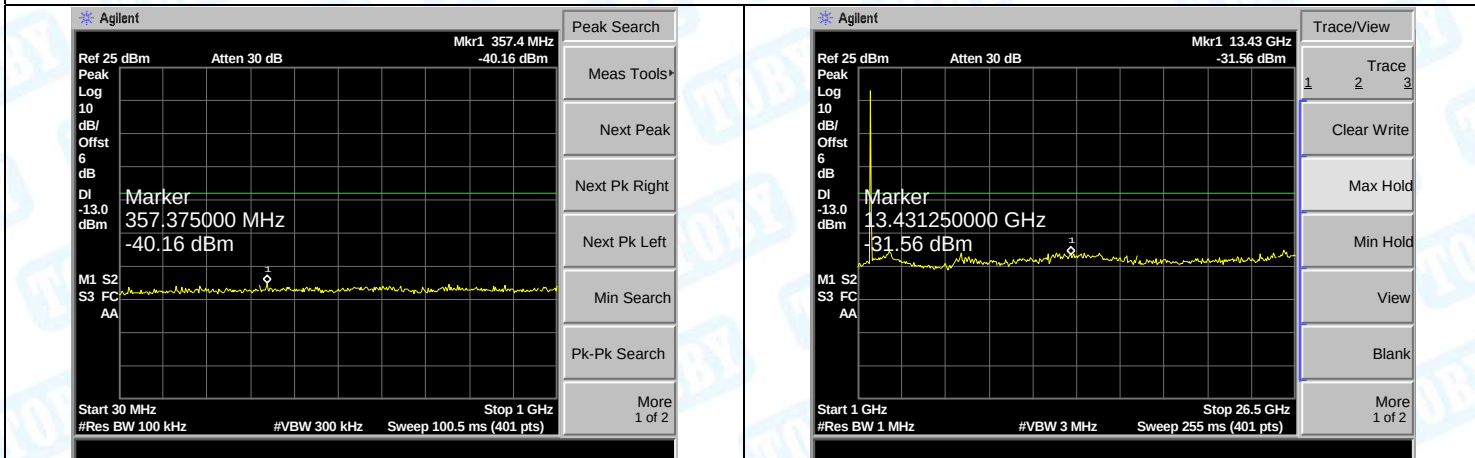
LTE BAND 4 (10MHz RB Size 50& RB Offset 0 QPSK-High CH)



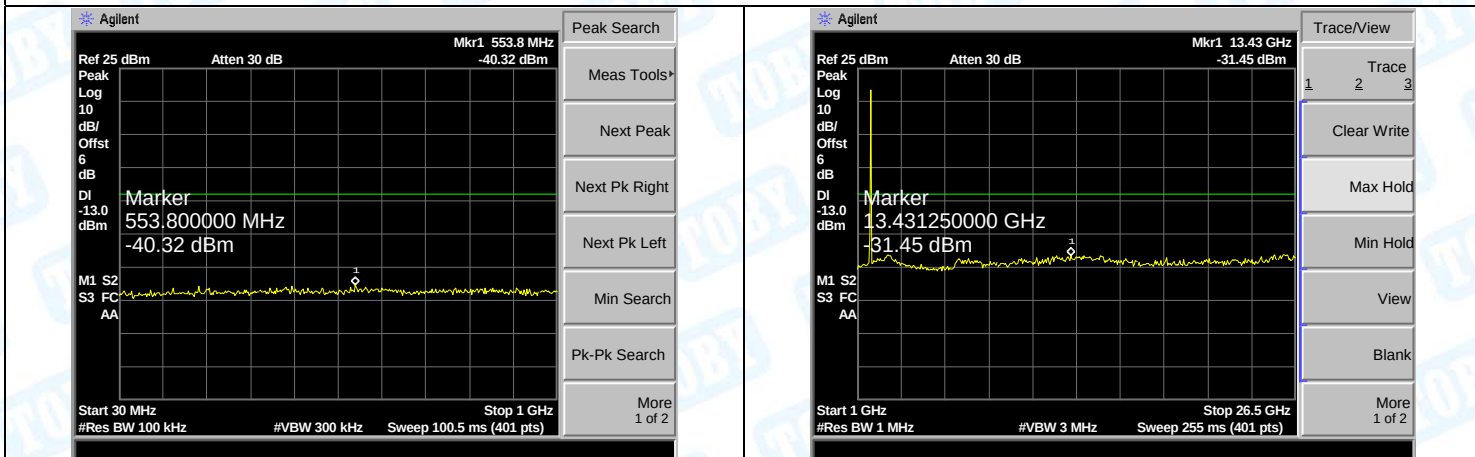
30MHz-1GHz

1GHz-26.5GHz

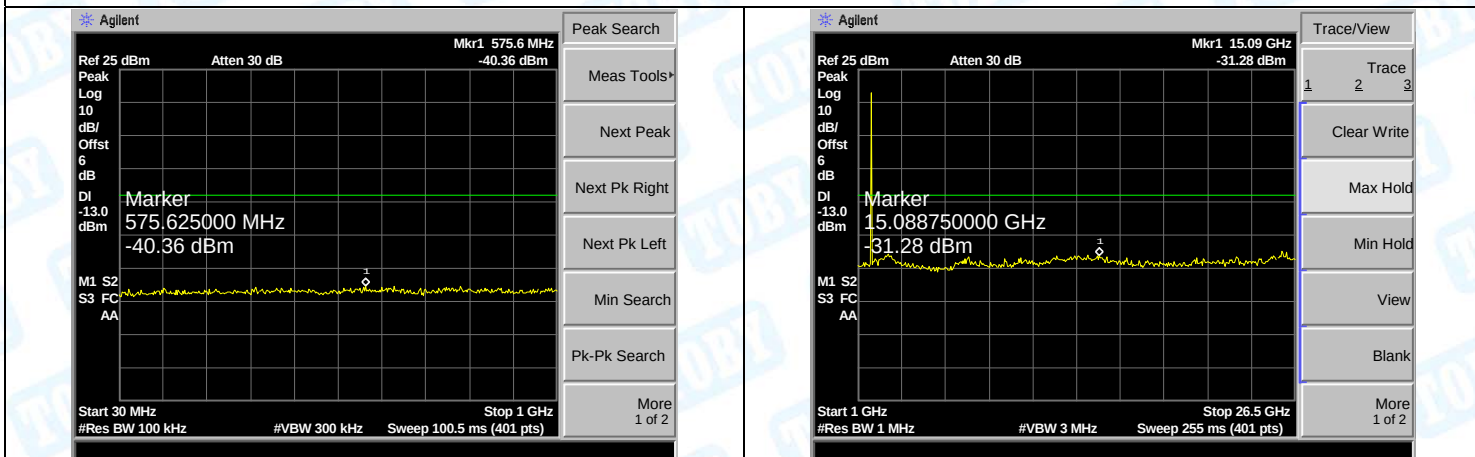
LTE BAND 4 (10MHz RB Size 50& RB Offset 0 16QAM-Low CH)



LTE BAND 4 (10MHz RB Size 50& RB Offset 0 16QAM-Middle CH)



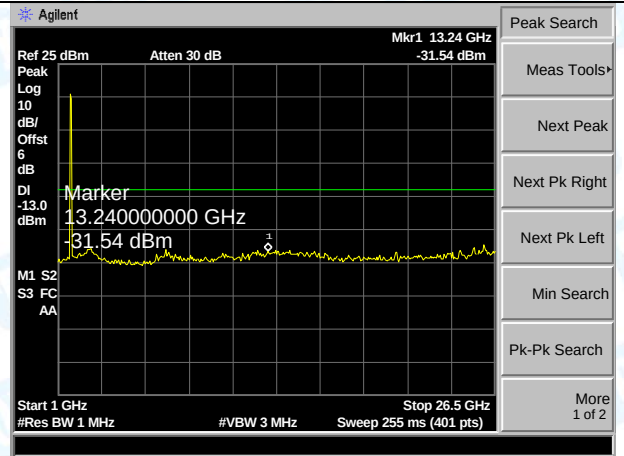
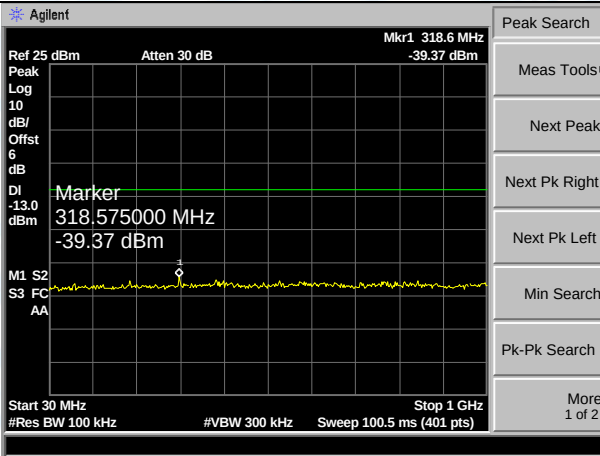
LTE BAND 4 (10MHz RB Size 50& RB Offset 0 16QAM-High CH)



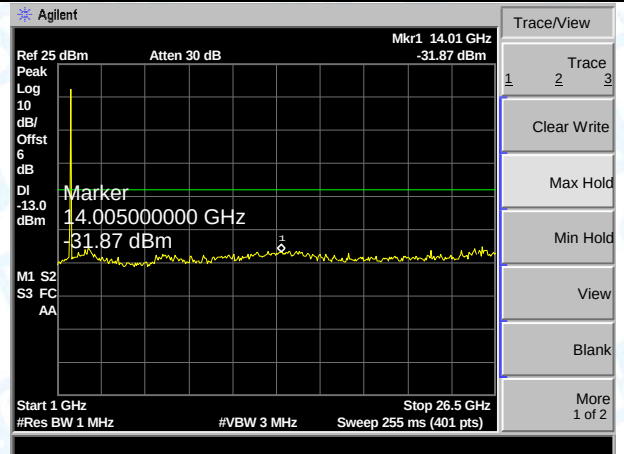
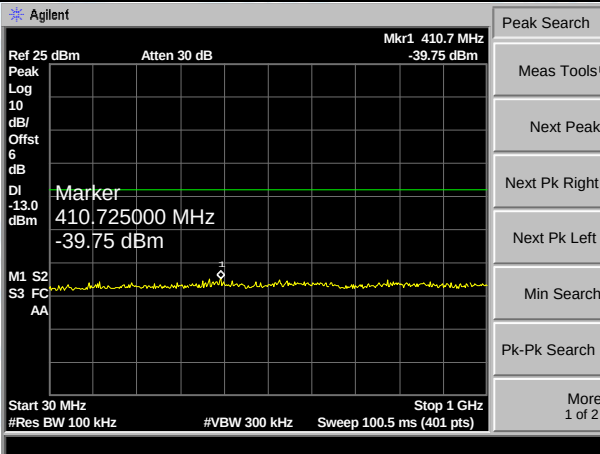
30MHz-1GHz

1GHz-26.5GHz

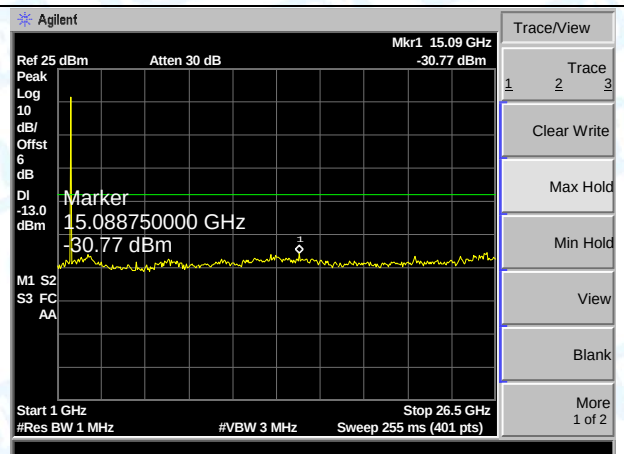
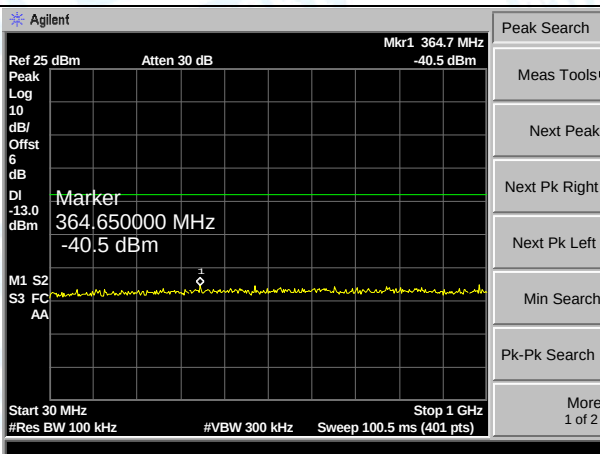
LTE BAND 4 (15MHz RB Size 75& RB Offset 0 QPSK-Low CH)



LTE BAND 4 (15MHz RB Size 75& RB Offset 0 QPSK-Middle CH)



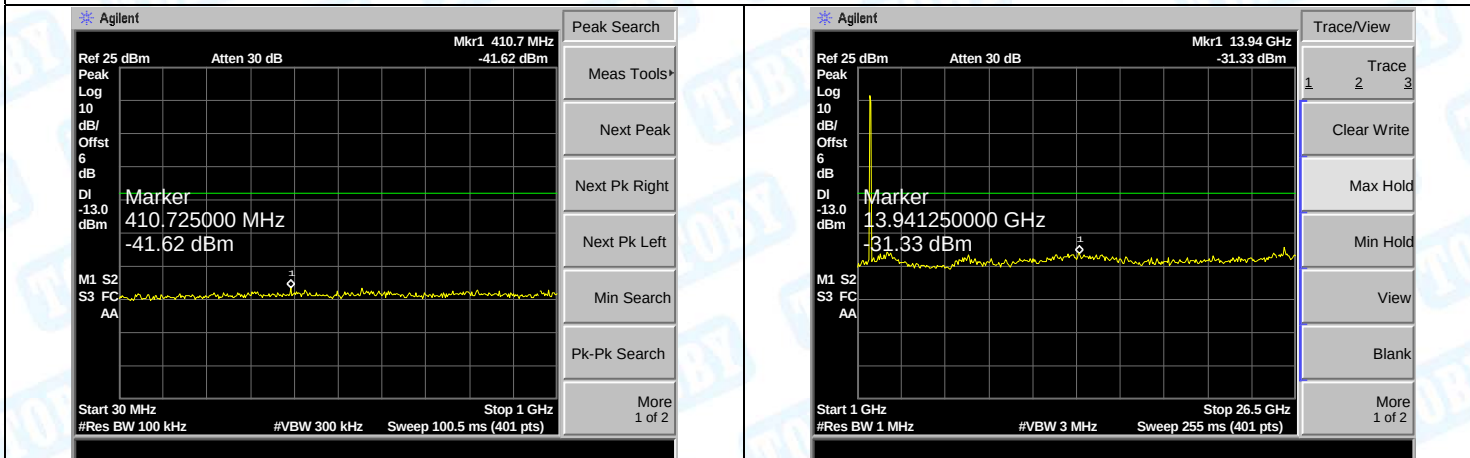
LTE BAND 4 (15MHz RB Size 75& RB Offset 0 QPSK-High CH)



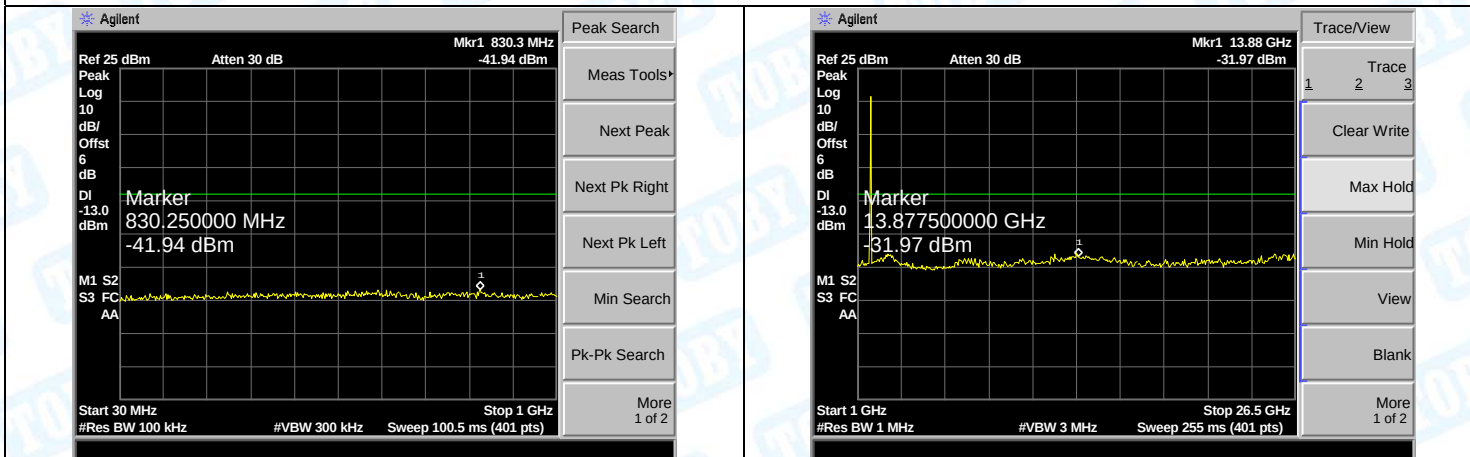
30MHz-1GHz

1GHz-26.5GHz

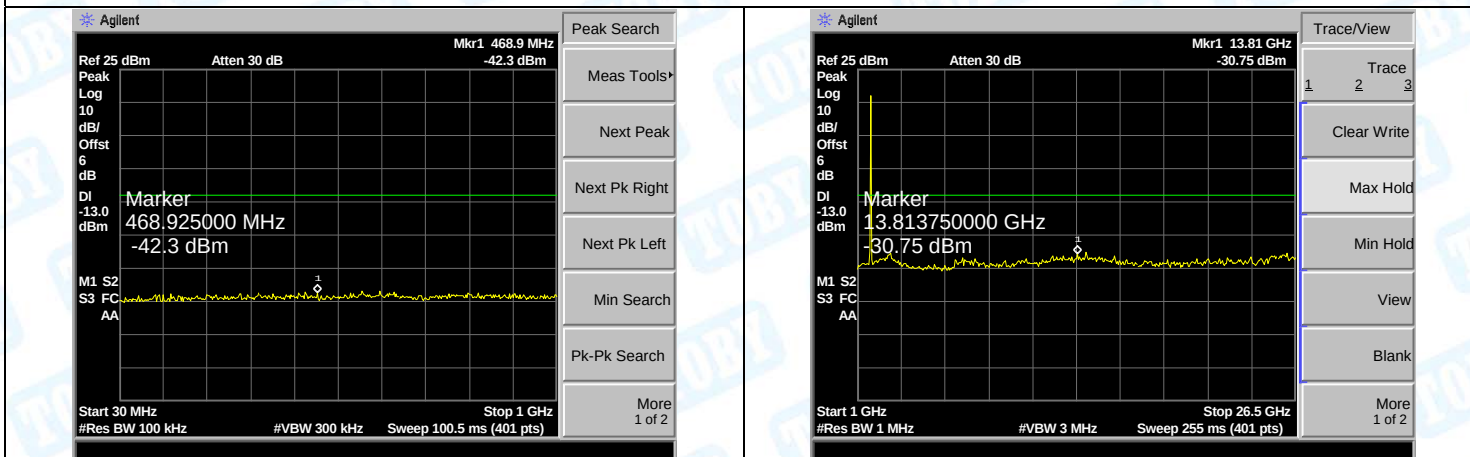
LTE BAND 4 (15MHz RB Size 75& RB Offset 0 16QAM-Low CH)



LTE BAND 4 (15MHz RB Size 75& RB Offset 0 16QAM-Middle CH)



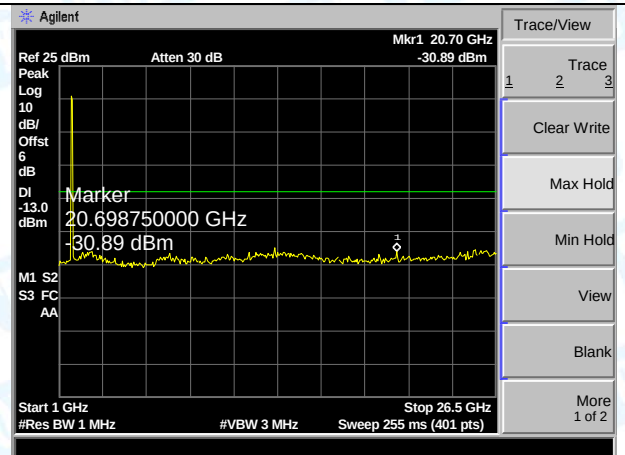
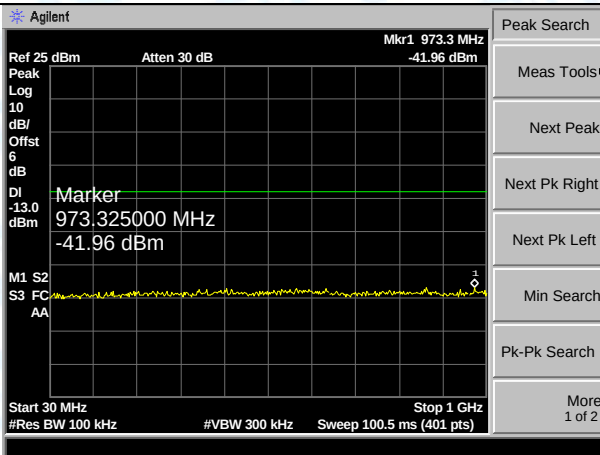
LTE BAND 4 (15MHz RB Size 75& RB Offset 0 16QAM-High CH)



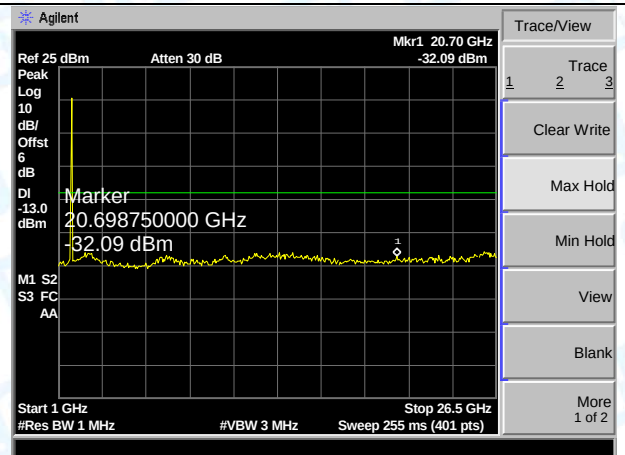
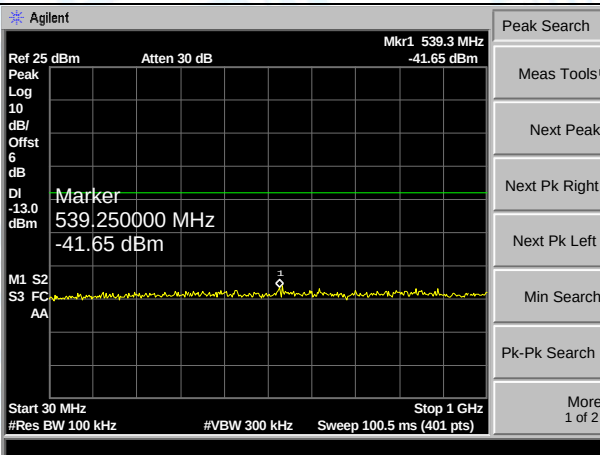
30MHz-1GHz

1GHz-26.5GHz

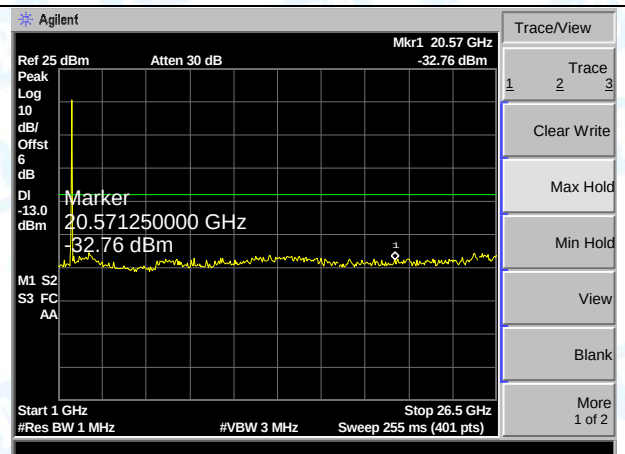
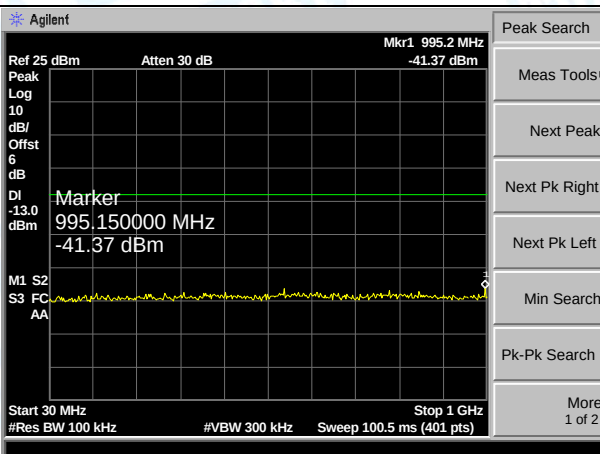
LTE BAND 4 (20MHz RB Size 100& RB Offset 0 QPSK-Low CH)



LTE BAND 4 (20MHz RB Size 100& RB Offset 0 QPSK-Middle CH)



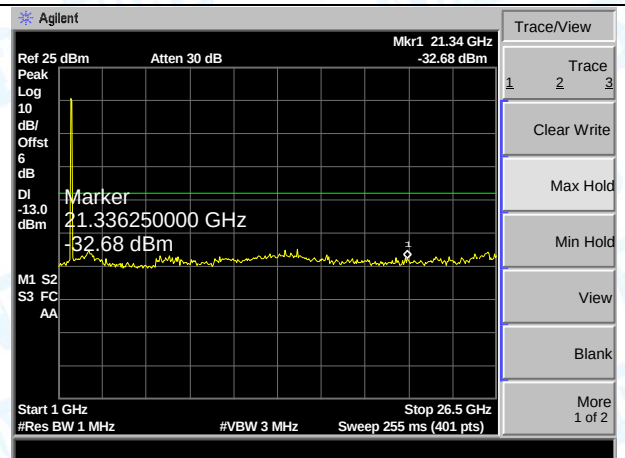
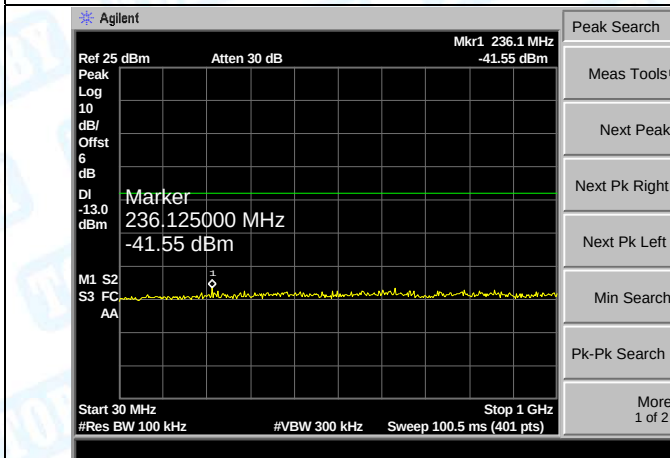
LTE BAND 4 (20MHz RB Size 100& RB Offset 0 QPSK-High CH)



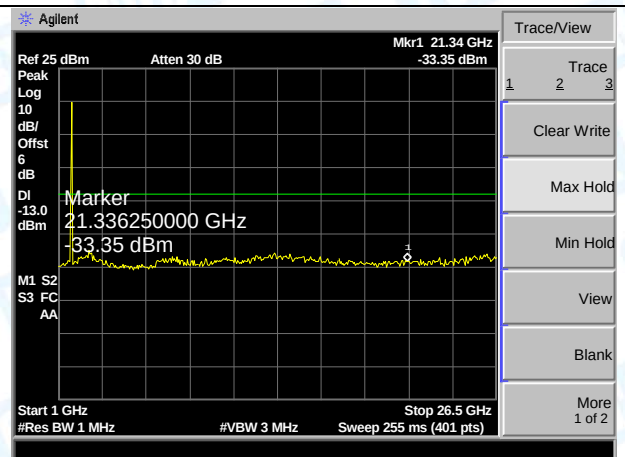
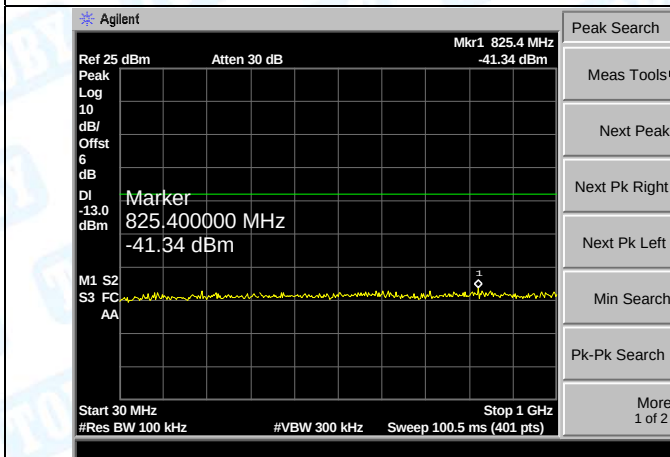
30MHz-1GHz

1GHz-26.5GHz

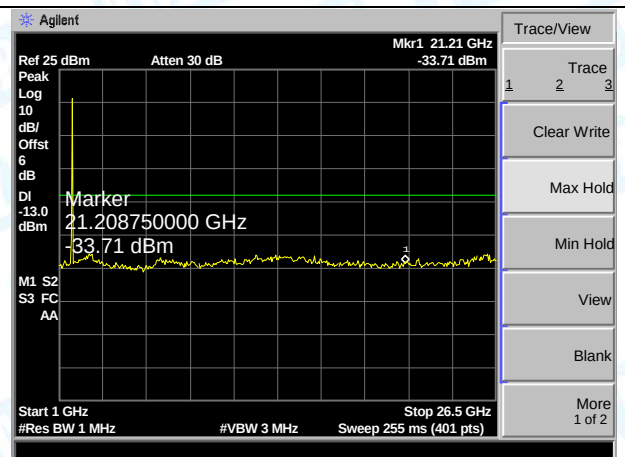
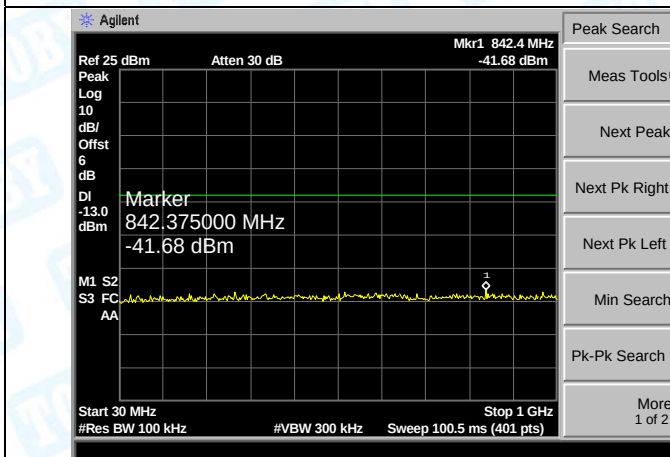
LTE BAND 4 (20MHz RB Size 100& RB Offset 0 16QAM-Low CH)



LTE BAND 4 (20MHz RB Size 100& RB Offset 0 16QAM-Middle CH)



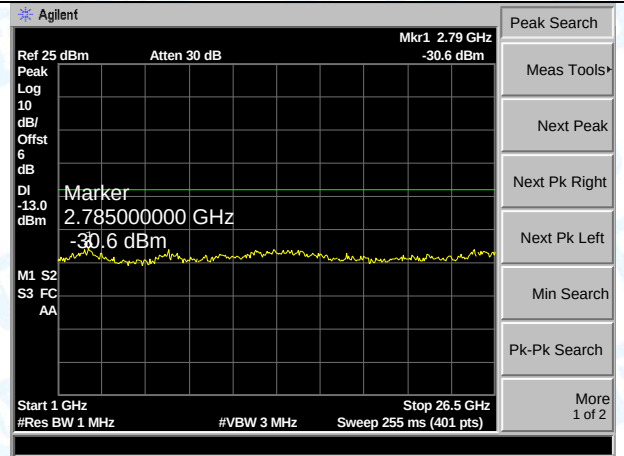
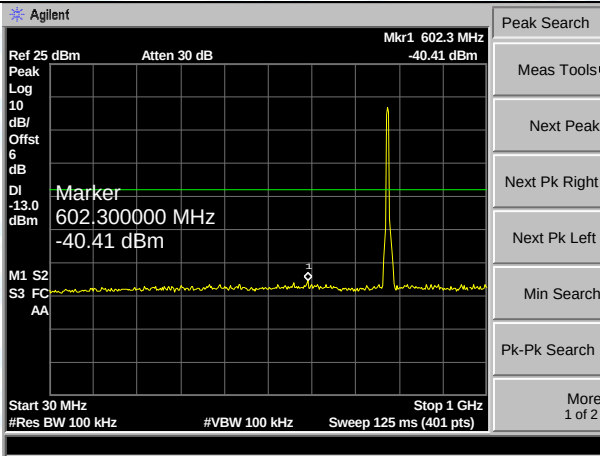
LTE BAND 4 (20MHz RB Size 100& RB Offset 0 16QAM-High CH)



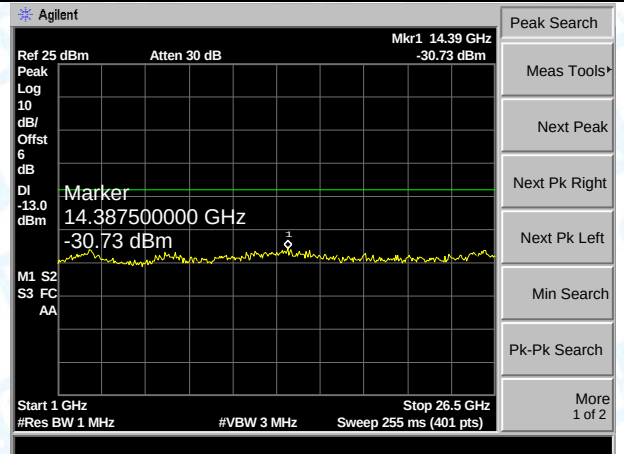
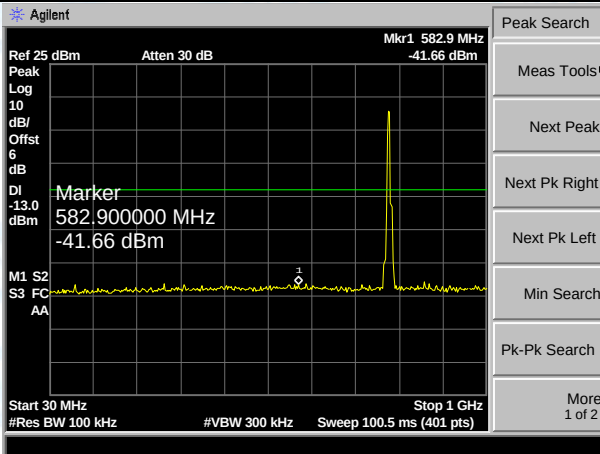
30MHz-1GHz

1GHz-26.5GHz

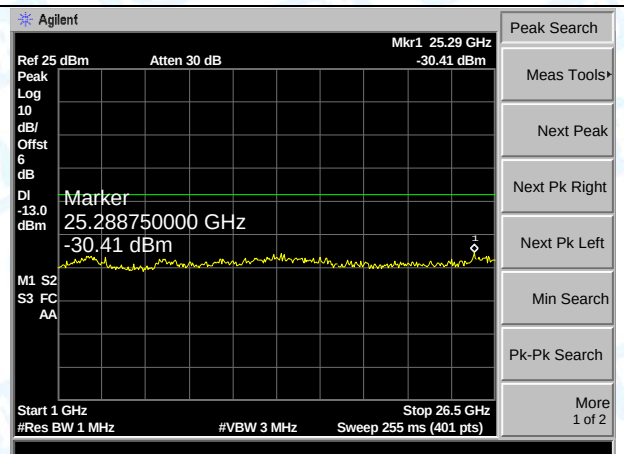
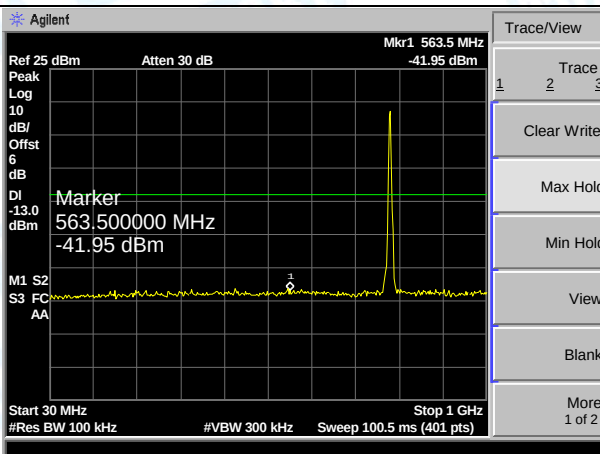
LTE BAND 13 (5MHz RB Size 25& RB Offset 0 QPSK-Low CH)



LTE BAND 13 (5MHz RB Size 25& RB Offset 0 QPSK-Middle CH)



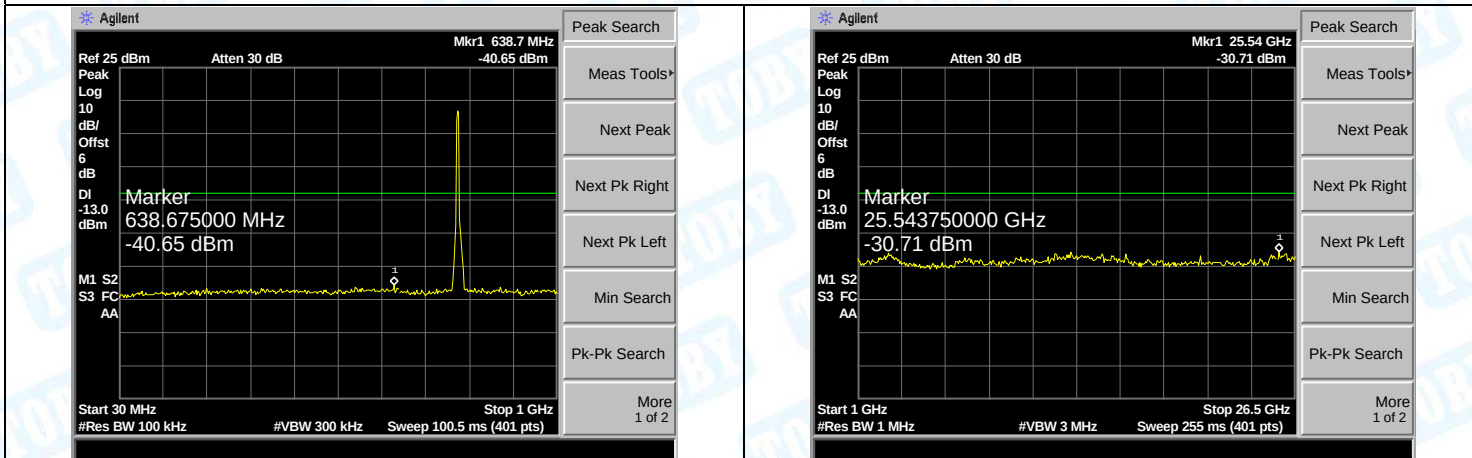
LTE BAND 13 (5MHz RB Size 25& RB Offset 0 QPSK-High CH)



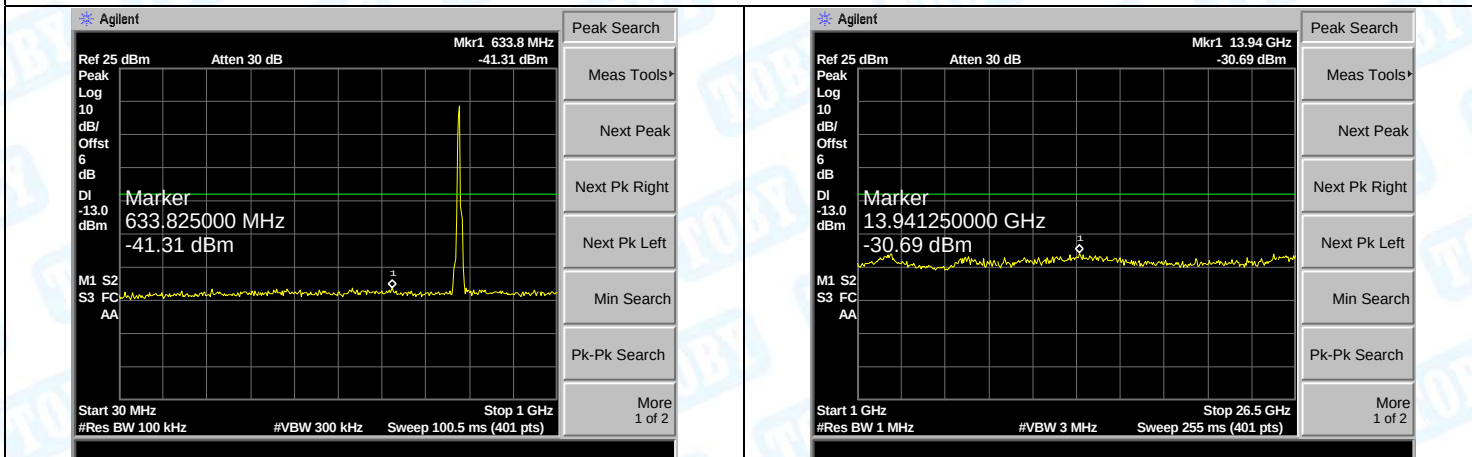
30MHz-1GHz

1GHz-26.5GHz

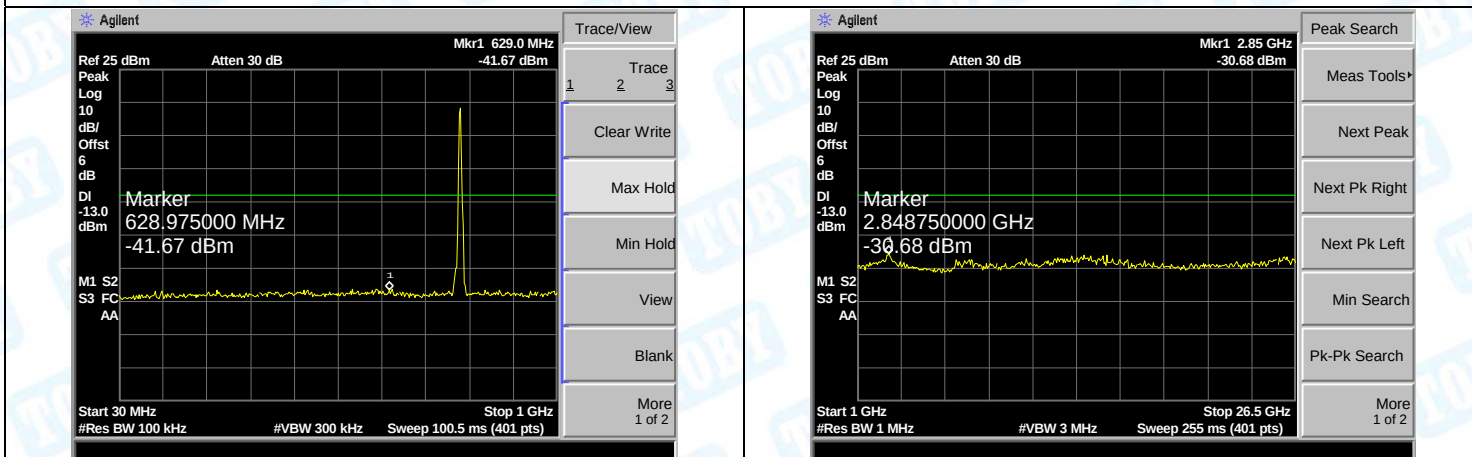
LTE BAND 13 (5MHz RB Size 25& RB Offset 0 16QAM-Low CH)

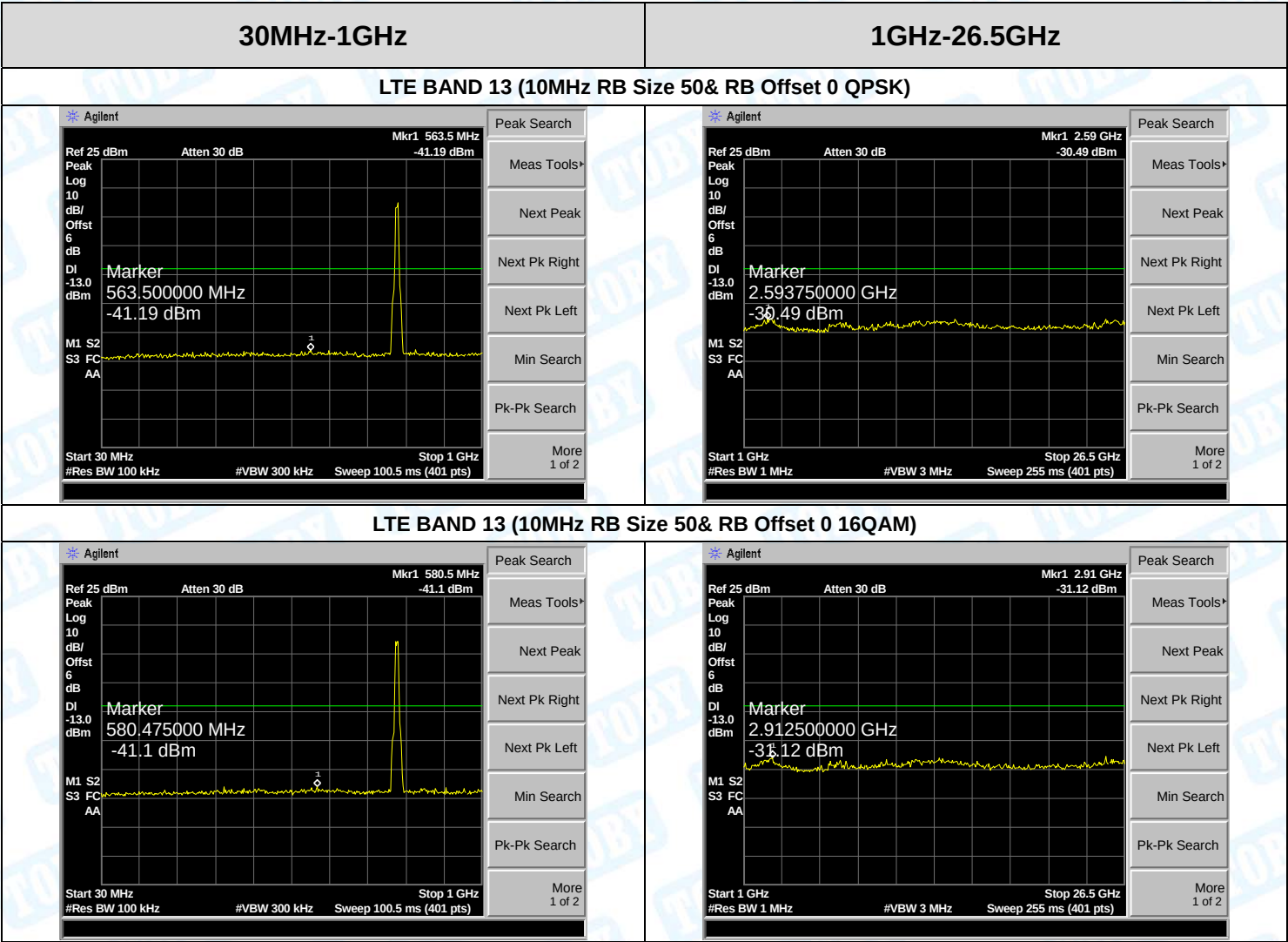


LTE BAND 13 (5MHz RB Size 25& RB Offset 0 16QAM-Middle CH)



LTE BAND 13 (5MHz RB Size 25& RB Offset 0 16QAM-High CH)



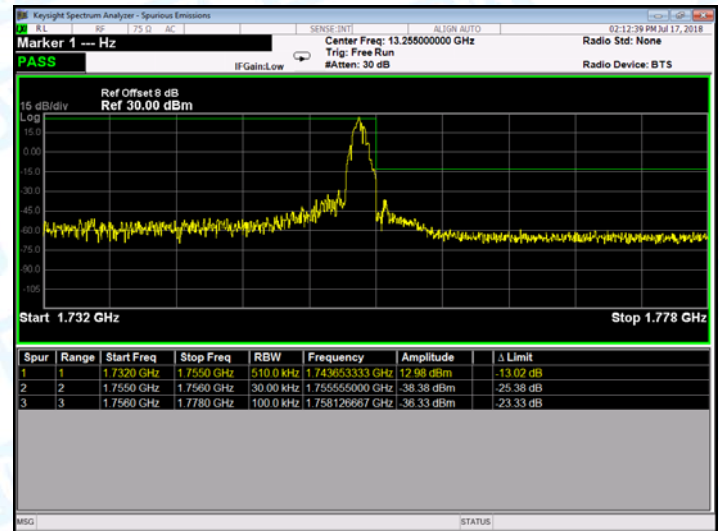


ATTACHMENT E--BAND EDGE TEST

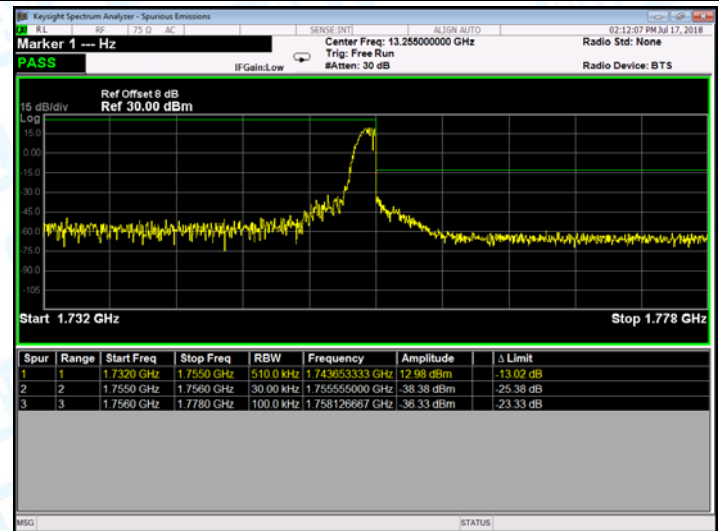
Low Channel

High Channel

LTE BAND 4 (1.4MHz RB Size 1& RB Offset 0 QPSK)



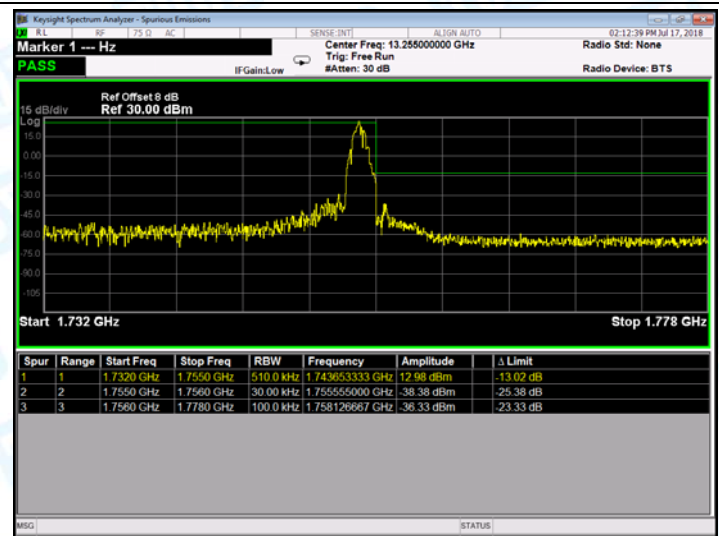
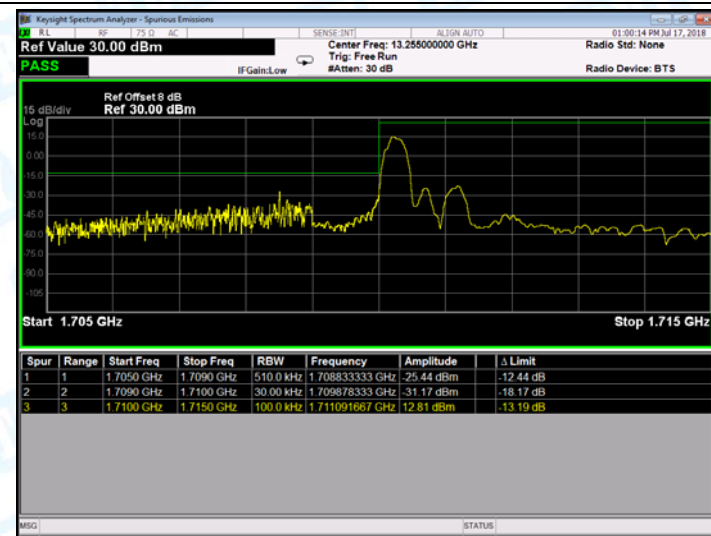
LTE BAND 4 (1.4MHz RB Size 6& RB Offset 0 QPSK)



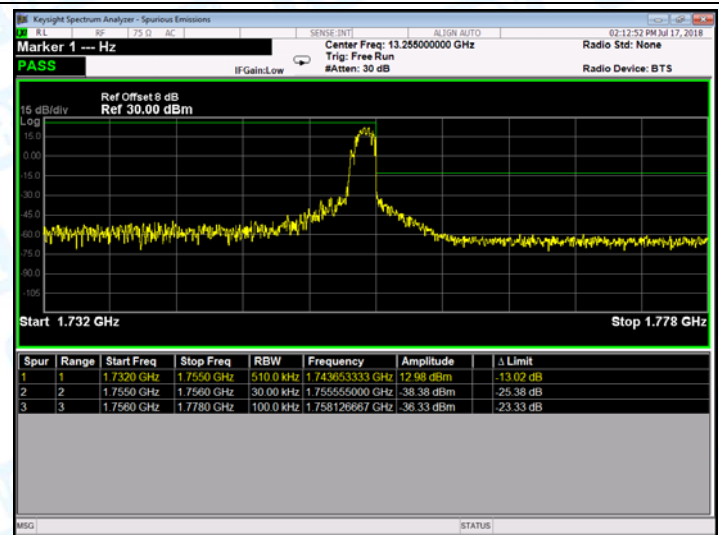
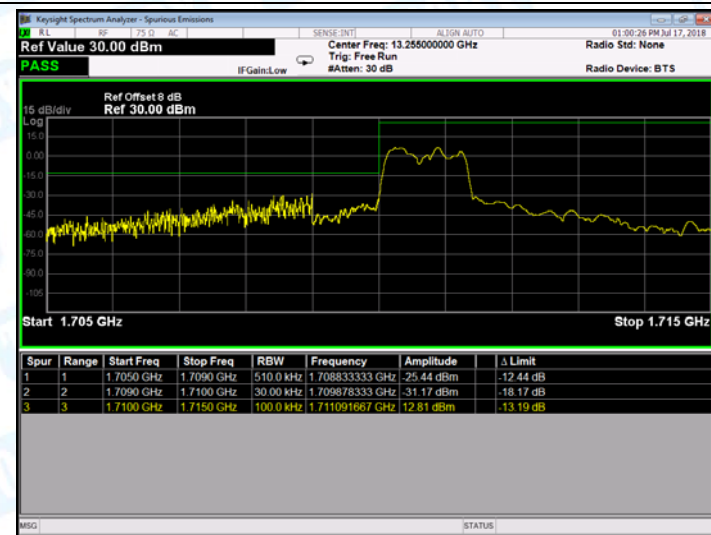
Low Channel

High Channel

LTE BAND 4 (1.4MHz RB Size 1& RB Offset 0 16QAM)



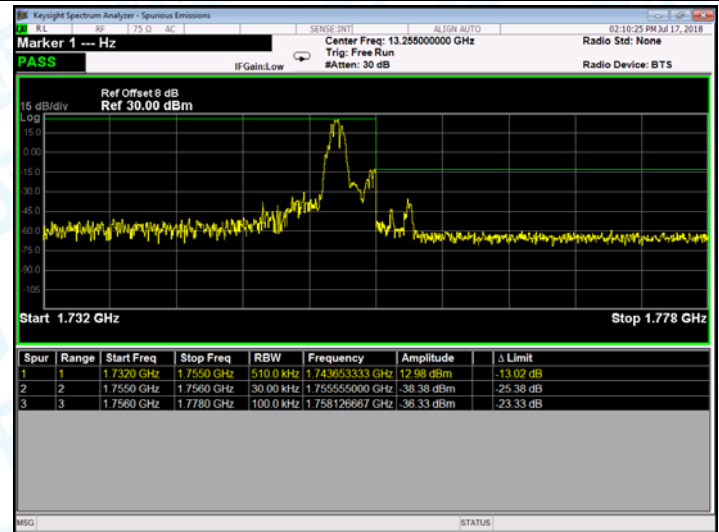
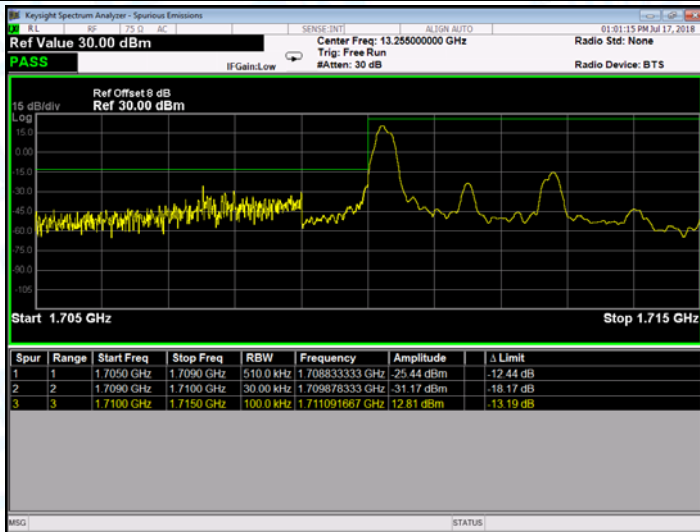
LTE BAND 4 (1.4MHz RB Size 6& RB Offset 0 16QAM)



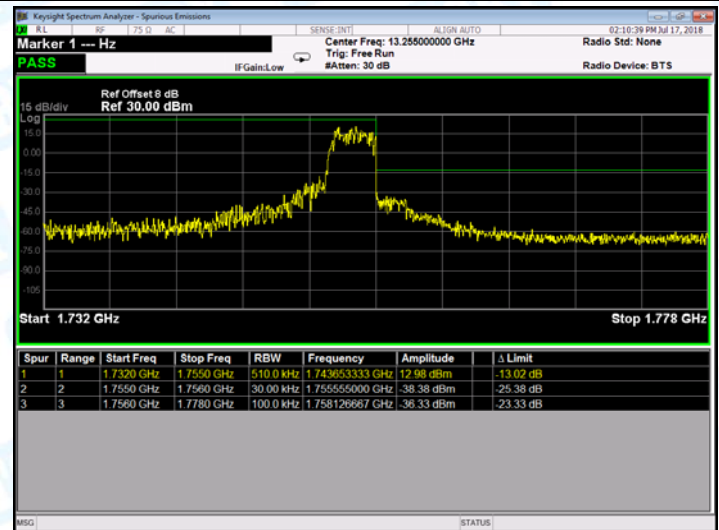
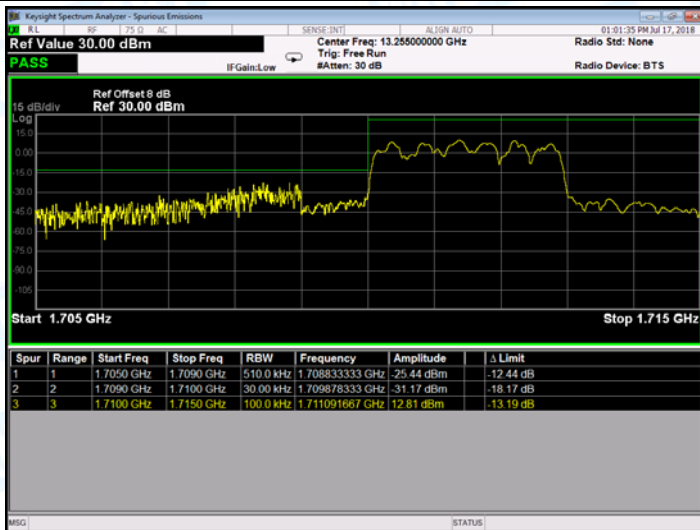
Low Channel

High Channel

LTE BAND 4 (3MHz RB Size 1& RB Offset 0 QPSK)



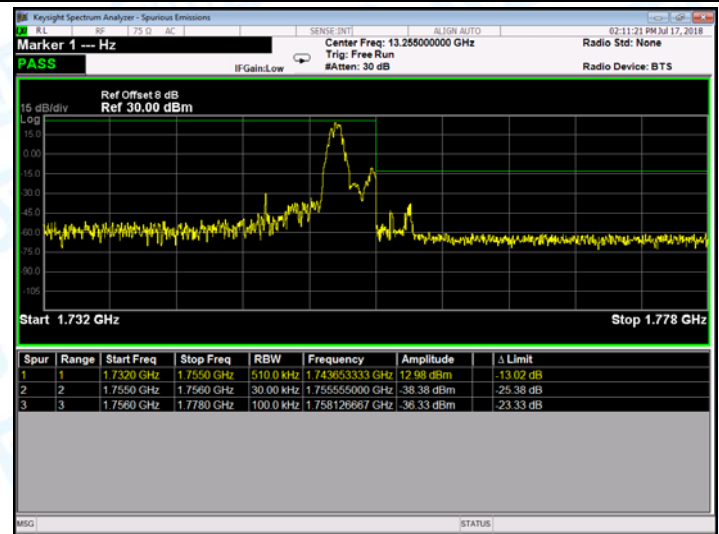
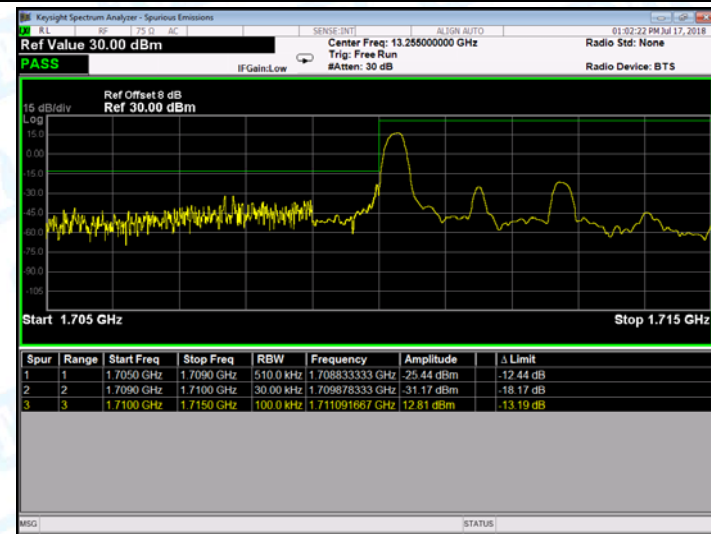
LTE BAND 4 (3MHz RB Size 15& RB Offset 0 QPSK)



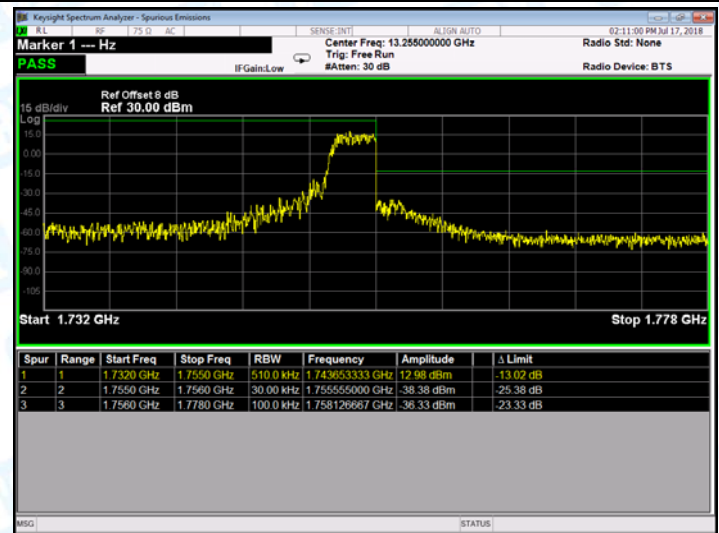
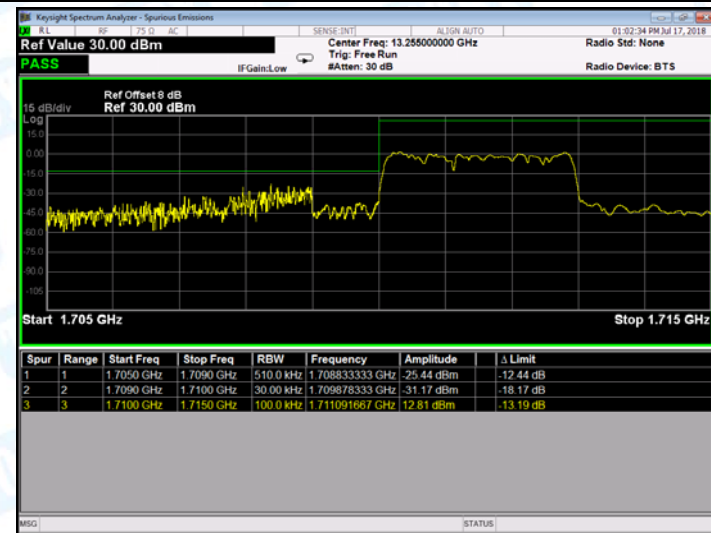
Low Channel

High Channel

LTE BAND 4 (3MHz RB Size 1& RB Offset 0 16QAM)



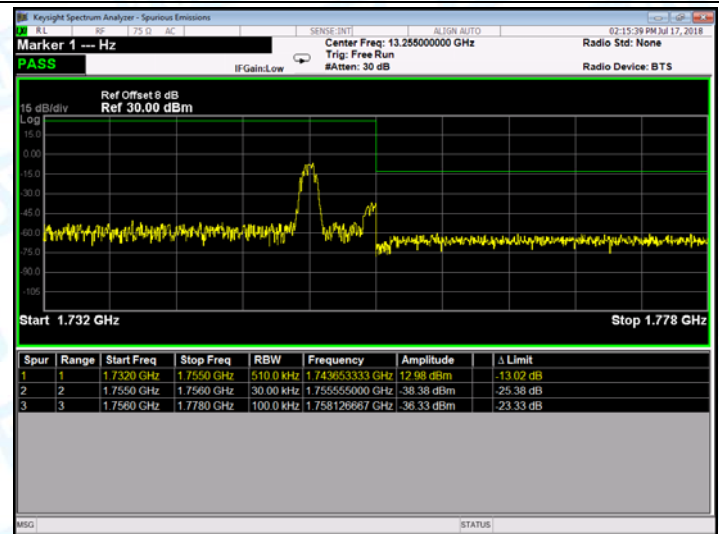
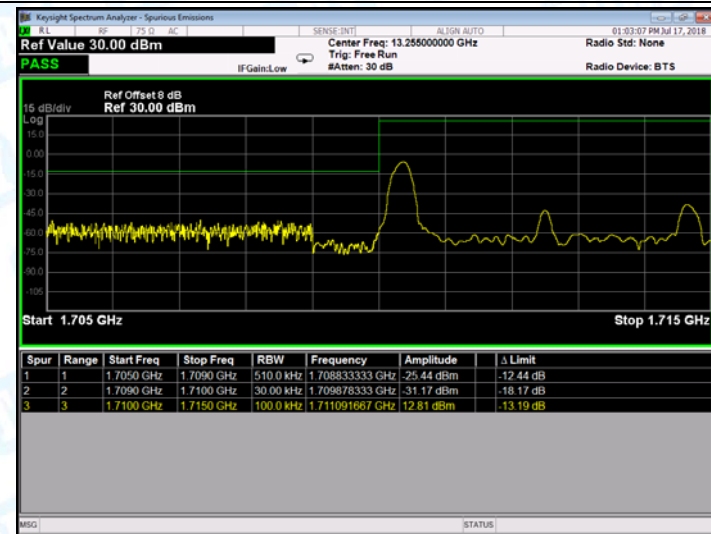
LTE BAND 4 (3MHz RB Size 15& RB Offset 0 16QAM)



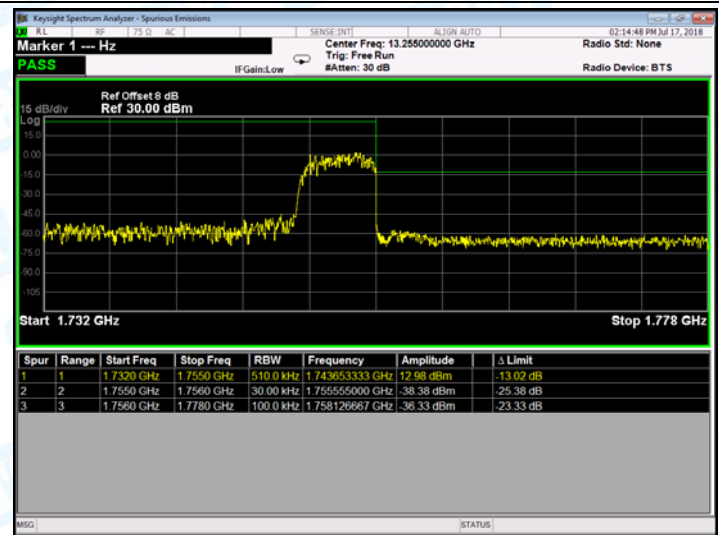
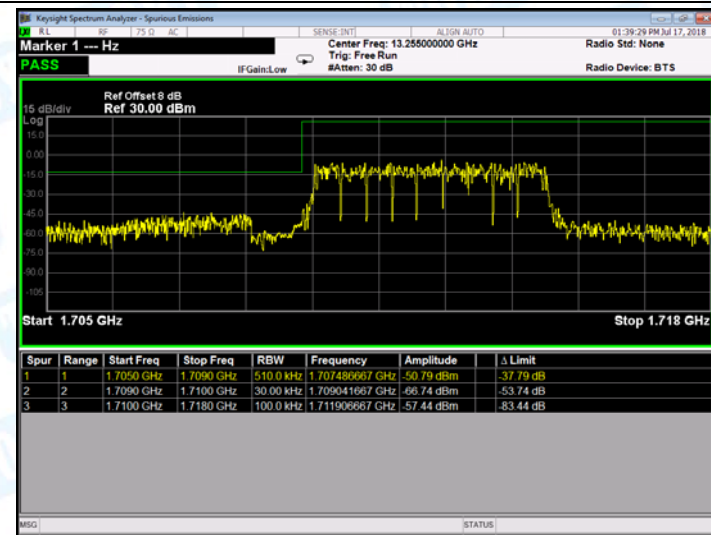
Low Channel

High Channel

LTE BAND 4 (5MHz RB Size 1& RB Offset 0 QPSK)



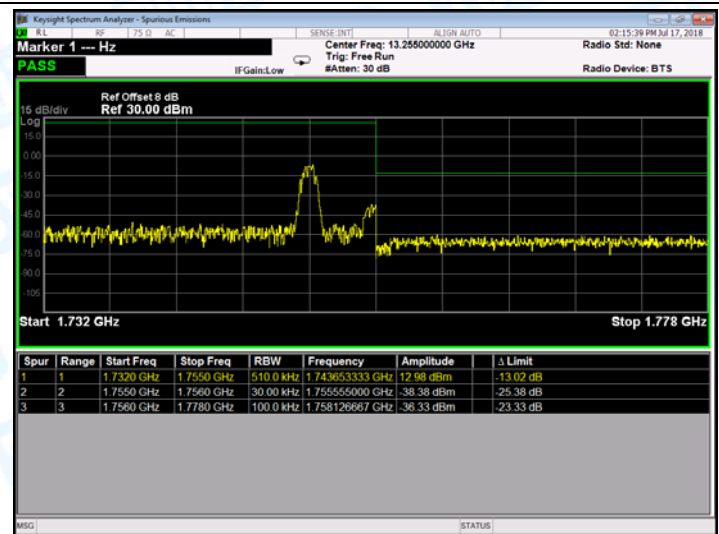
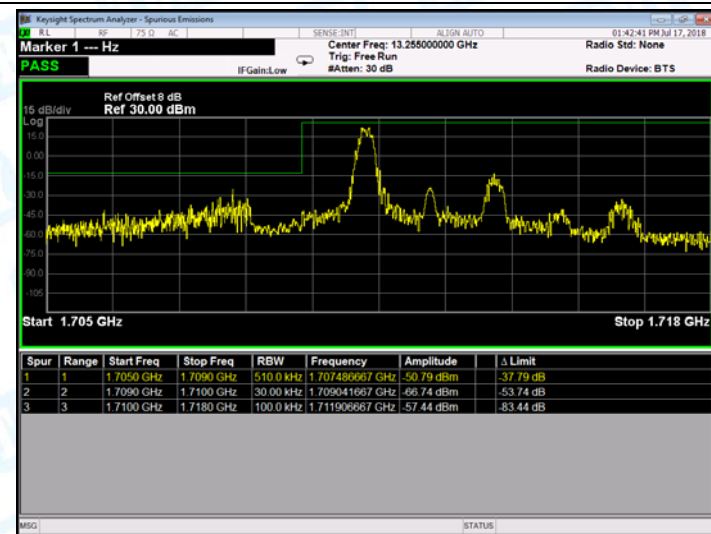
LTE BAND 4 (5MHz RB Size 25& RB Offset 0 QPSK)



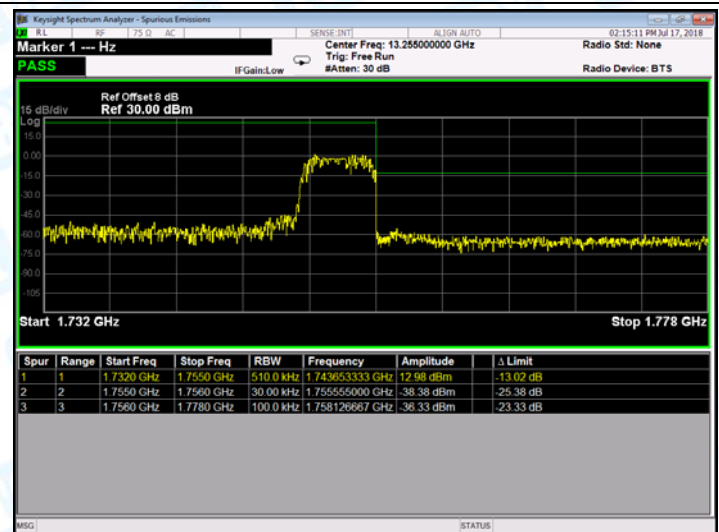
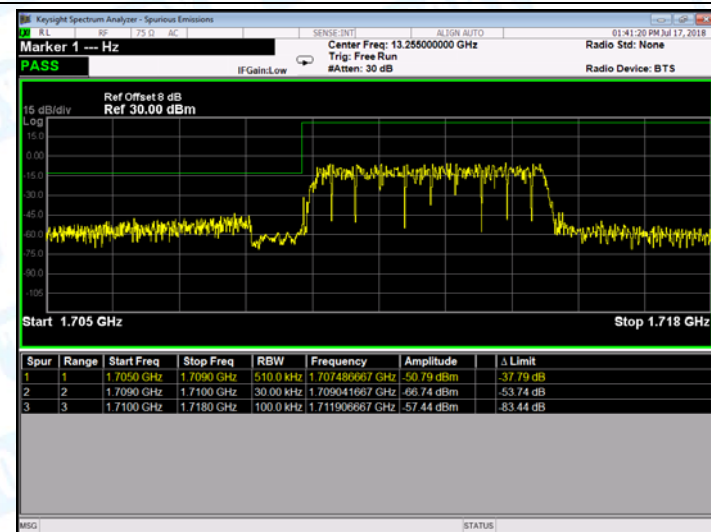
Low Channel

High Channel

LTE BAND 4 (5MHz RB Size 1& RB Offset 0 16QAM)



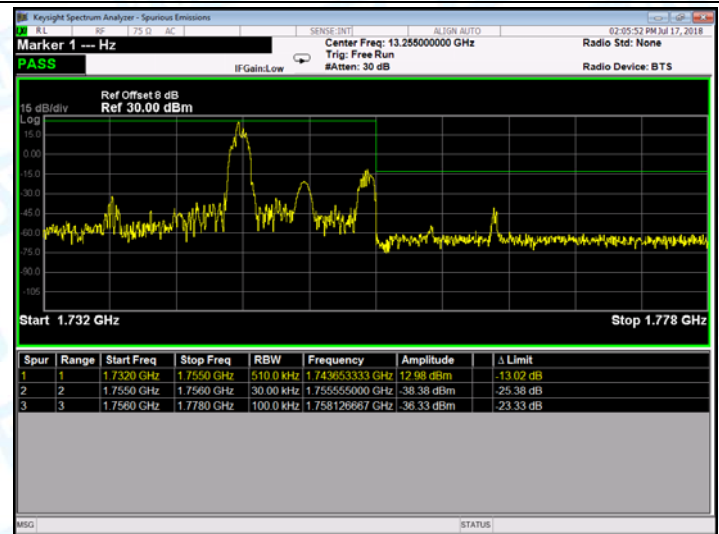
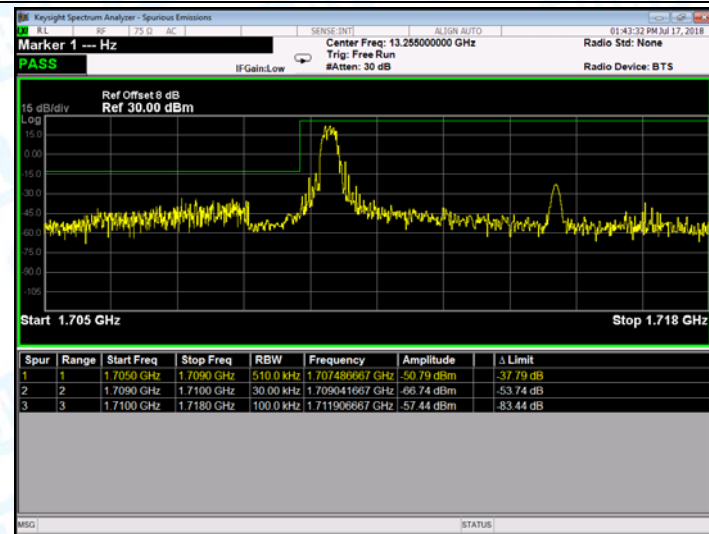
LTE BAND 4 (5MHz RB Size 25& RB Offset 0 16QAM)



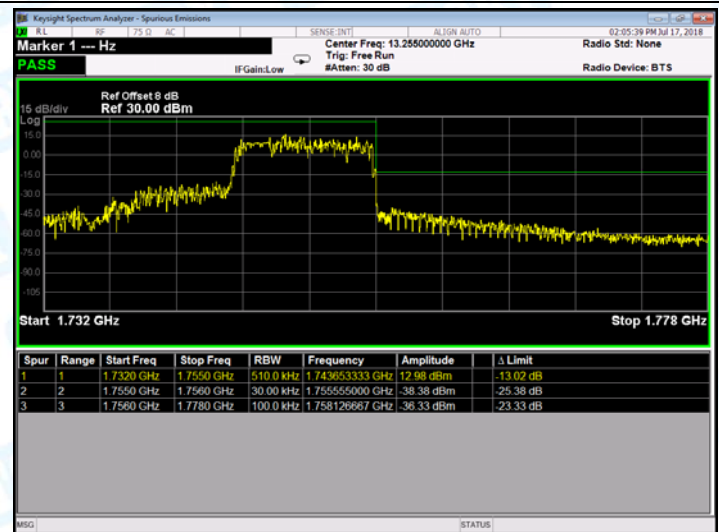
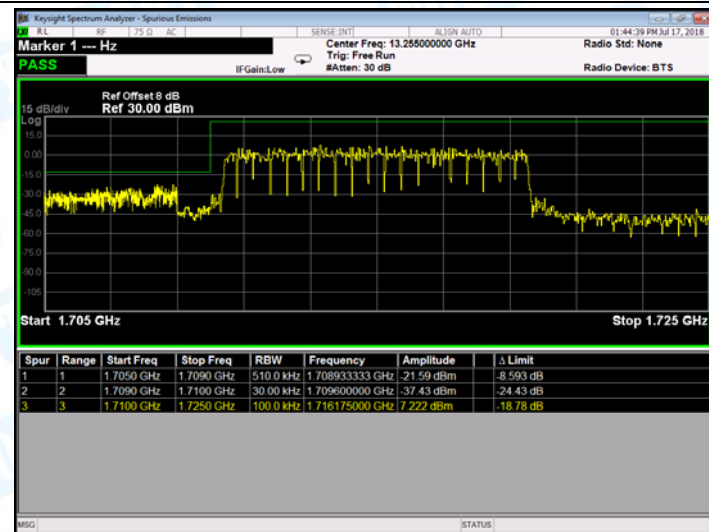
Low Channel

High Channel

LTE BAND 4 (10MHz RB Size 1& RB Offset 0 QPSK)



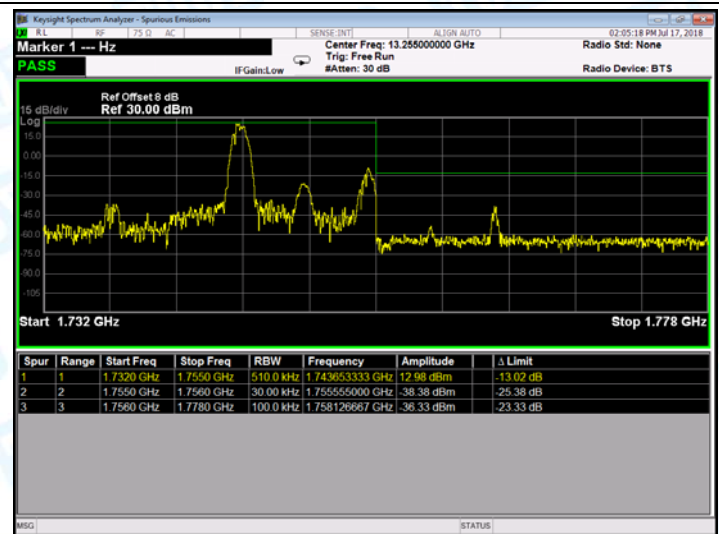
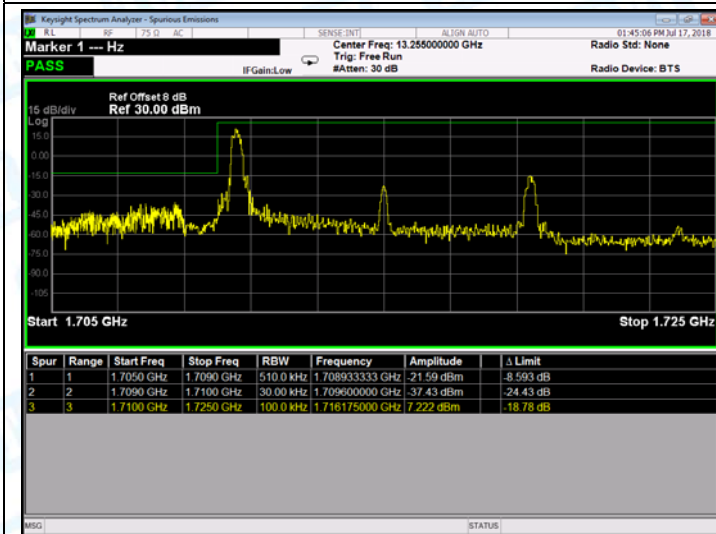
LTE BAND 4 (10MHz RB Size 50& RB Offset 0 QPSK)



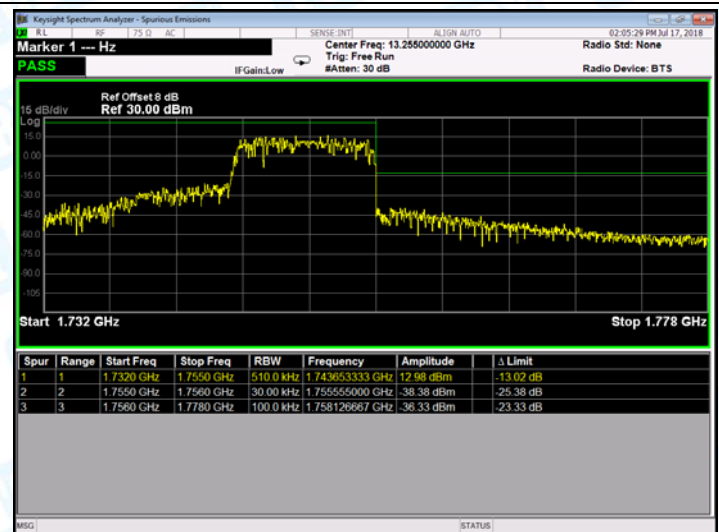
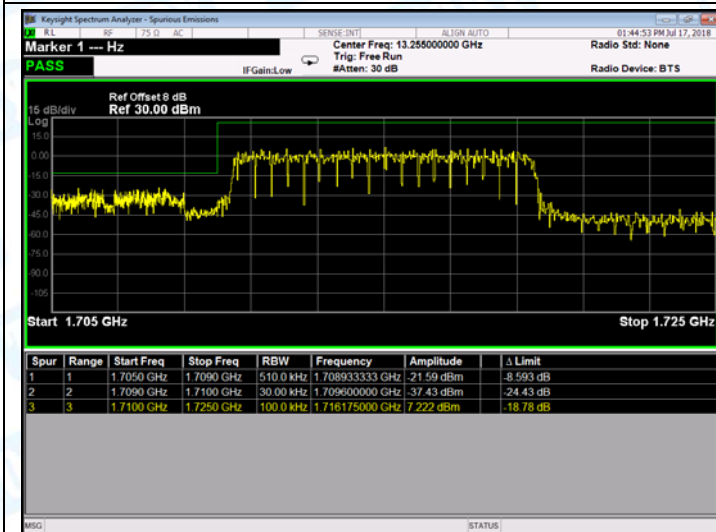
Low Channel

High Channel

LTE BAND 4 (10MHz RB Size 1& RB Offset 0 16QAM)



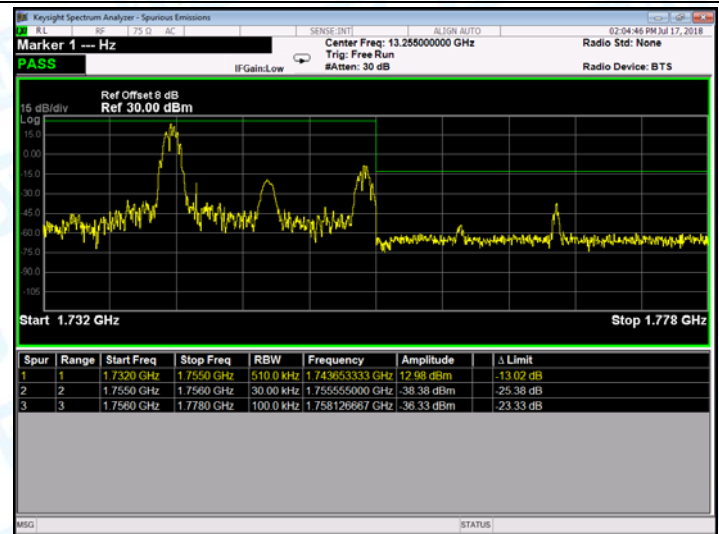
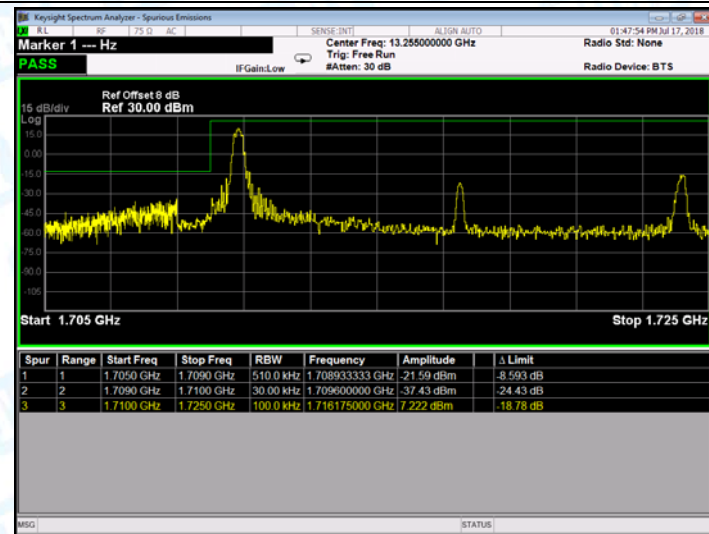
LTE BAND 4 (10MHz RB Size 50& RB Offset 0 16QAM)



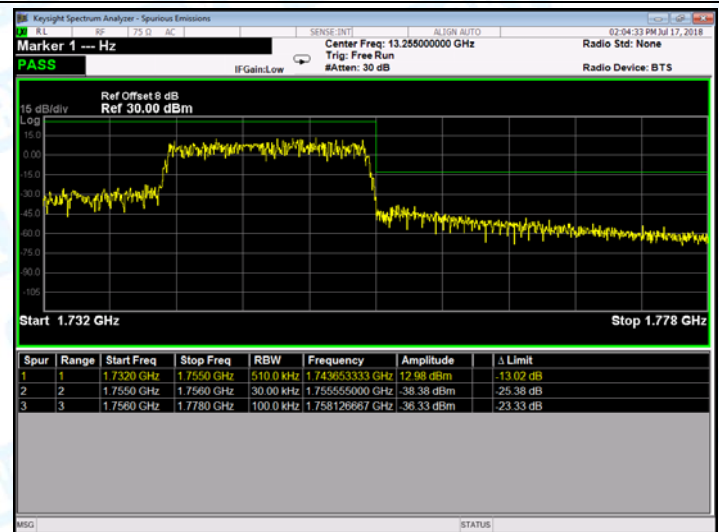
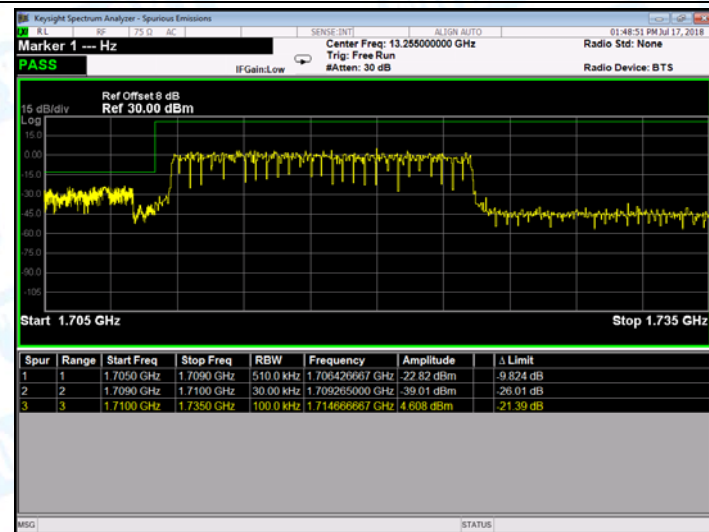
Low Channel

High Channel

LTE BAND 4 (15MHz RB Size 1& RB Offset 0 QPSK)



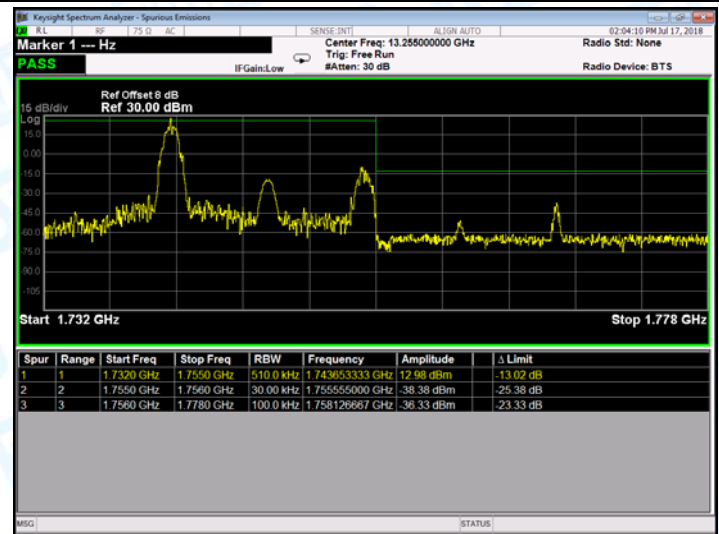
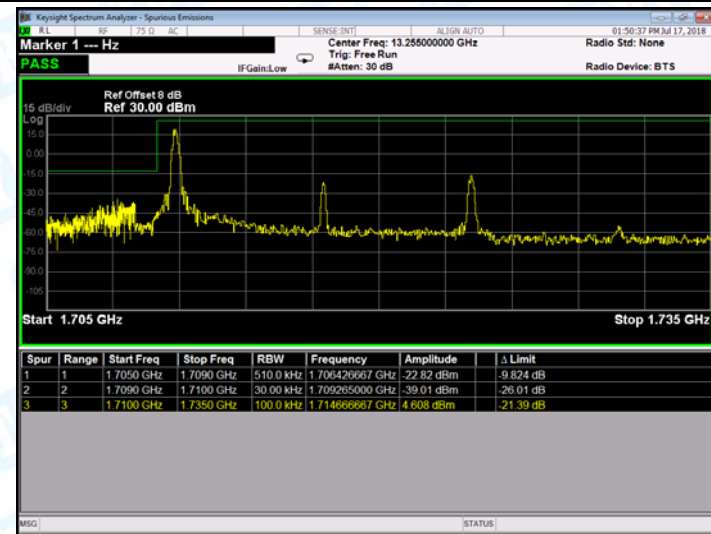
LTE BAND 4 (15MHz RB Size 75& RB Offset 0 QPSK)



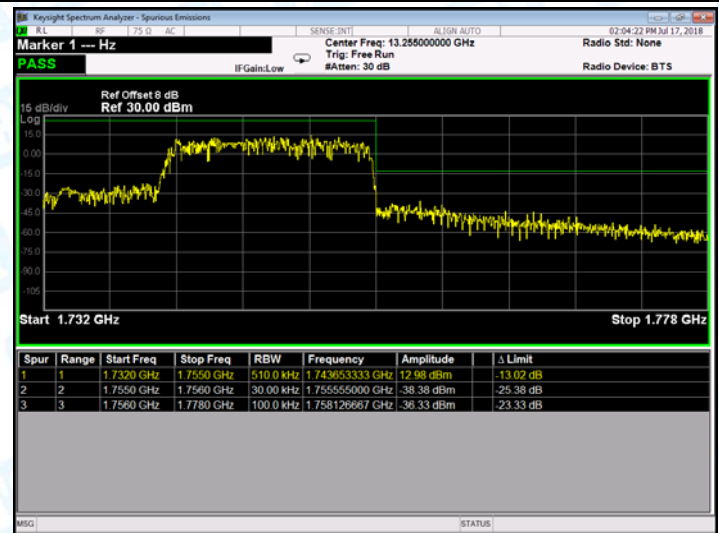
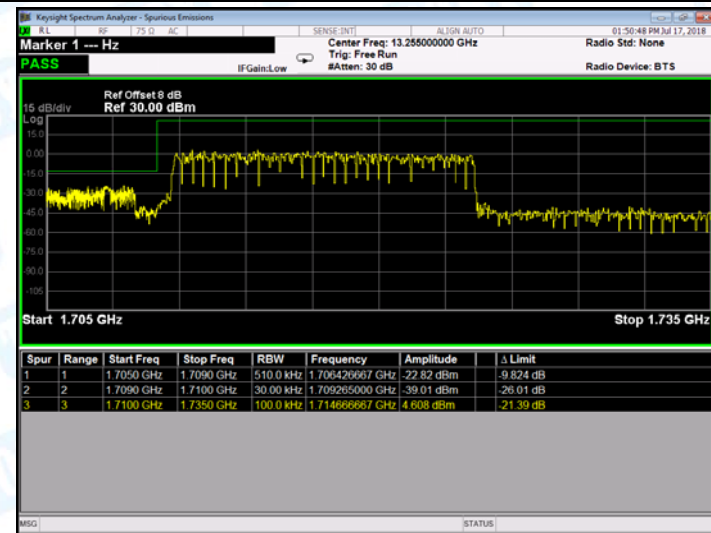
Low Channel

High Channel

LTE BAND 4 (15MHz RB Size 1& RB Offset 0 16QAM)



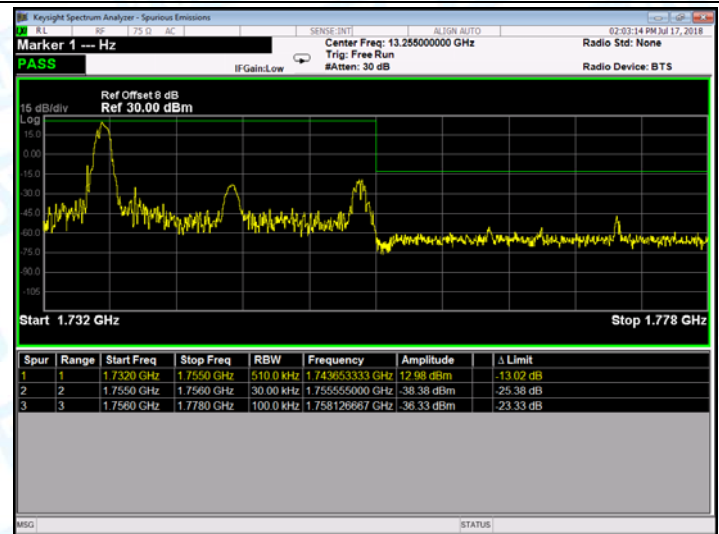
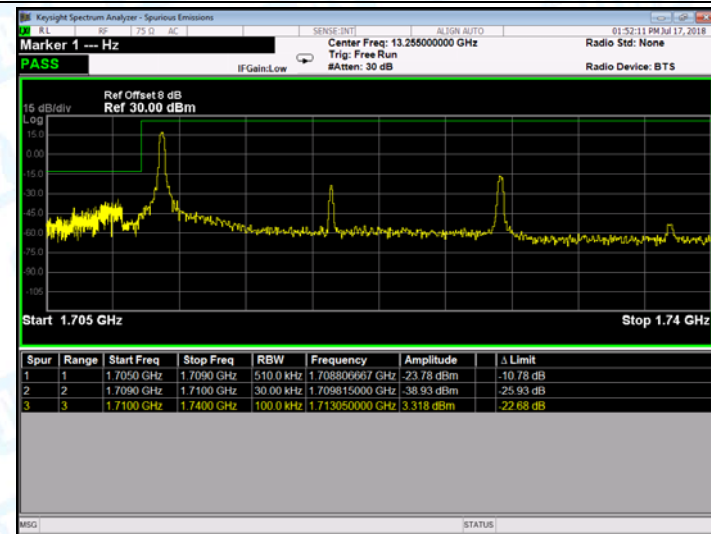
LTE BAND 4 (15MHz RB Size 75& RB Offset 0 16QAM)



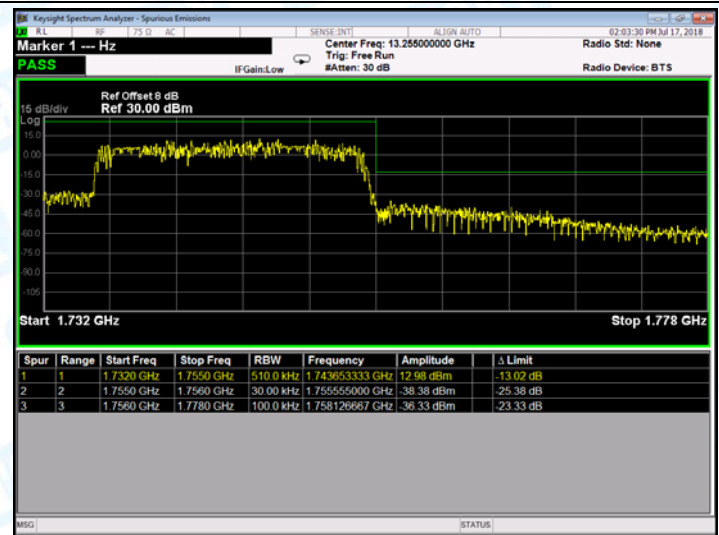
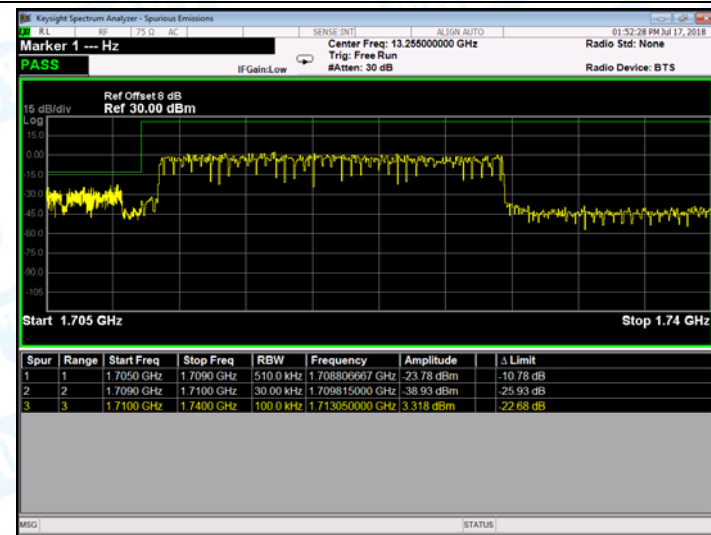
Low Channel

High Channel

LTE BAND 4 (20MHz RB Size 1& RB Offset 0 QPSK)



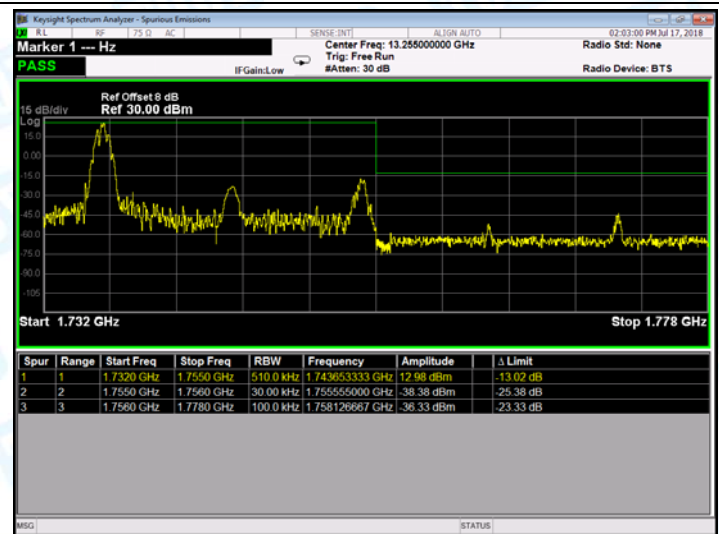
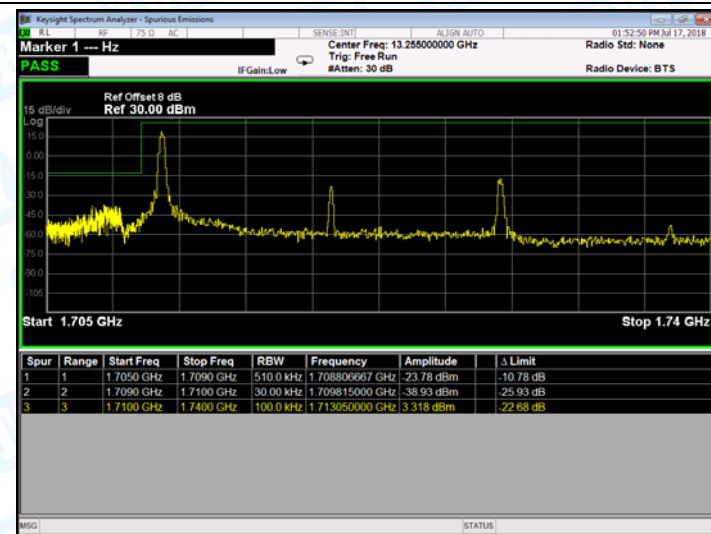
LTE BAND 4 (20MHz RB Size 100& RB Offset 0 QPSK)



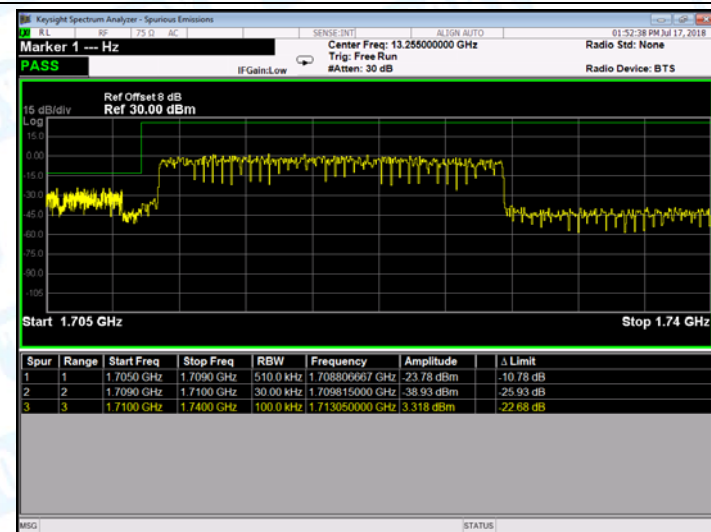
Low Channel

High Channel

LTE BAND 4 (20MHz RB Size 1& RB Offset 0 16QAM)



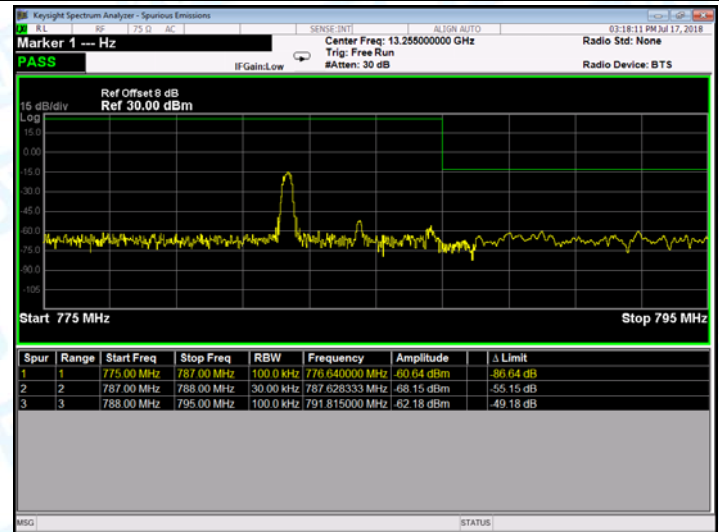
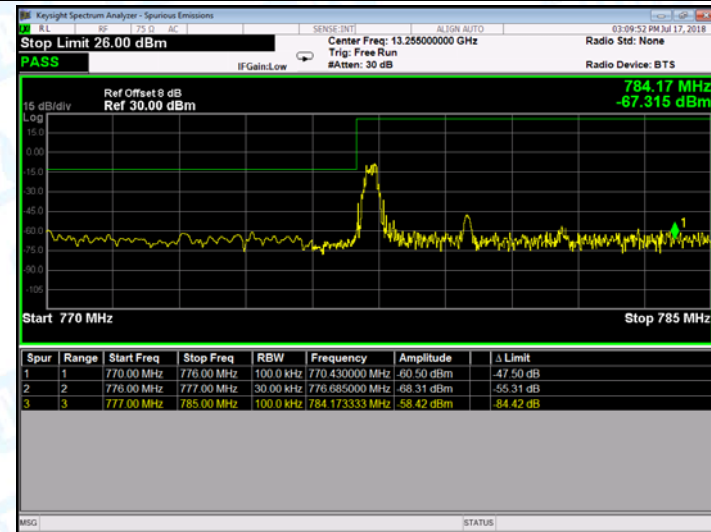
LTE BAND 4 (20MHz RB Size 100& RB Offset 0 16QAM)



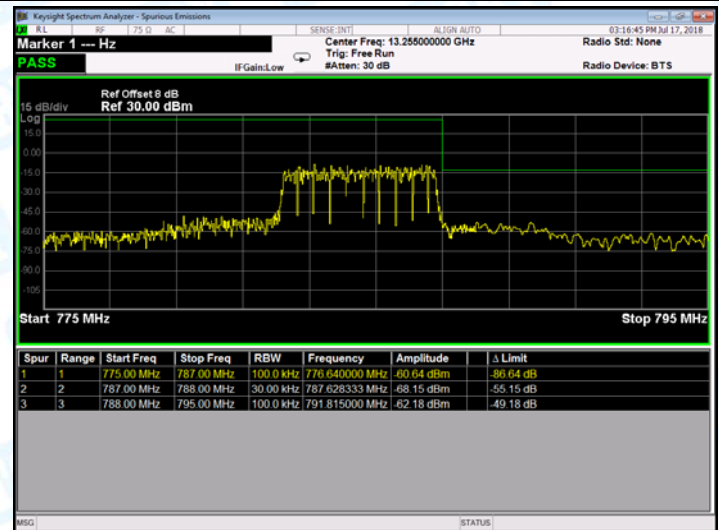
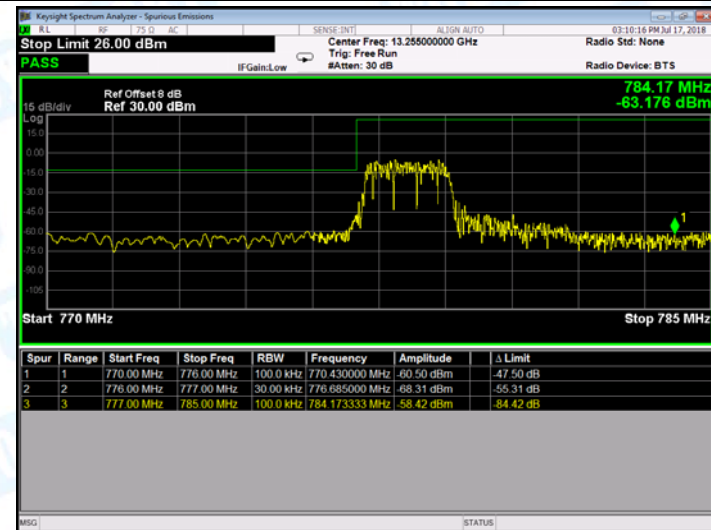
Low Channel

High Channel

LTE BAND 13 (5MHz RB Size 1& RB Offset 0 QPSK)



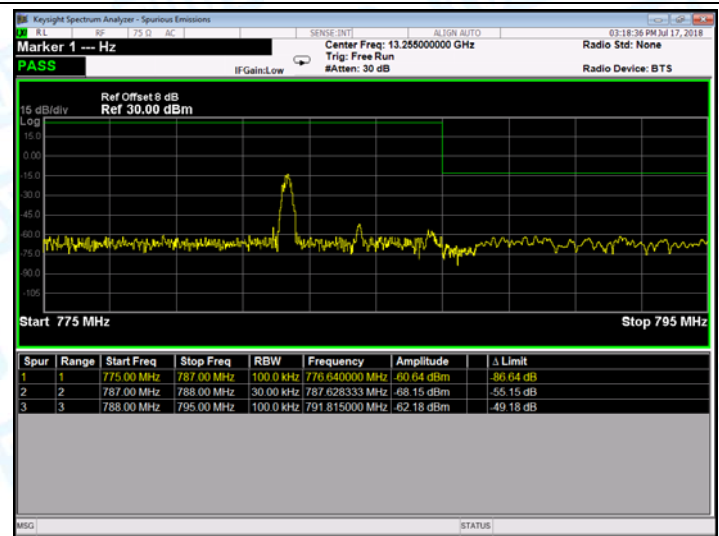
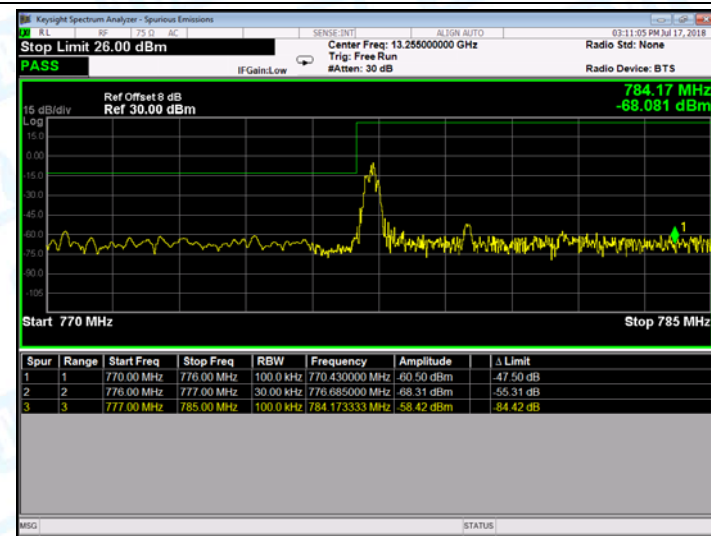
LTE BAND 13 (5MHz RB Size 25& RB Offset 0 QPSK)



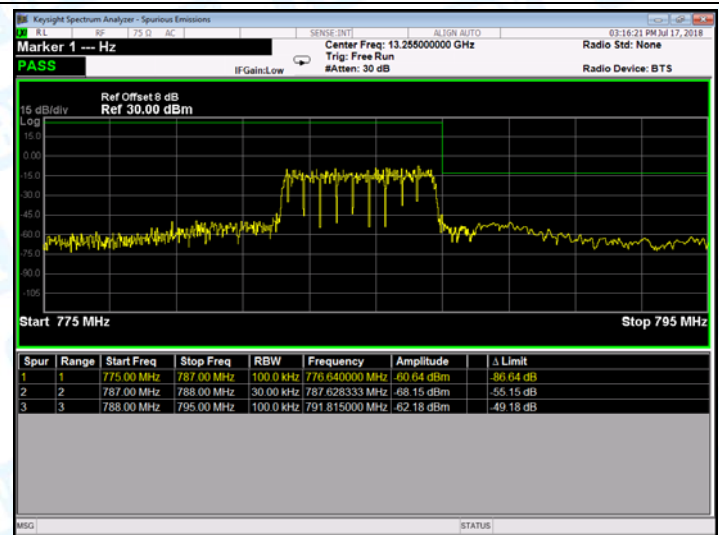
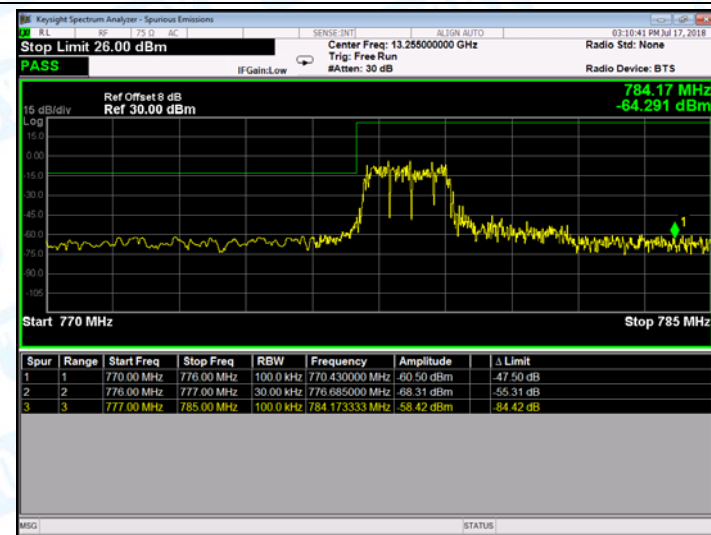
Low Channel

High Channel

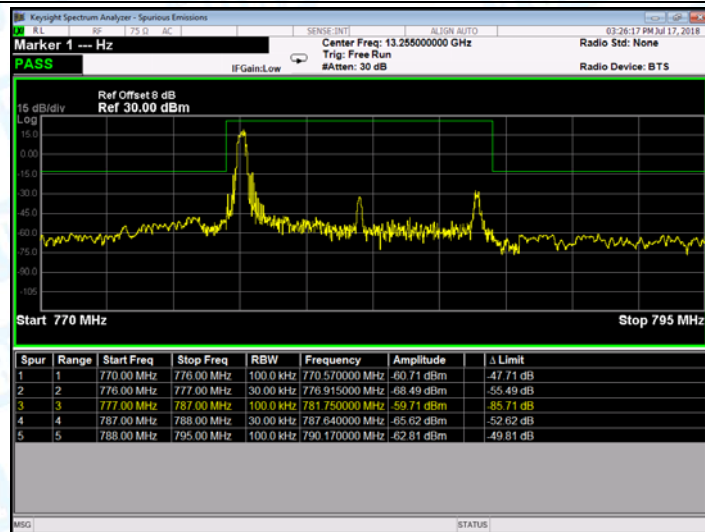
LTE BAND 13 (5MHz RB Size 1& RB Offset 0 16QAM)



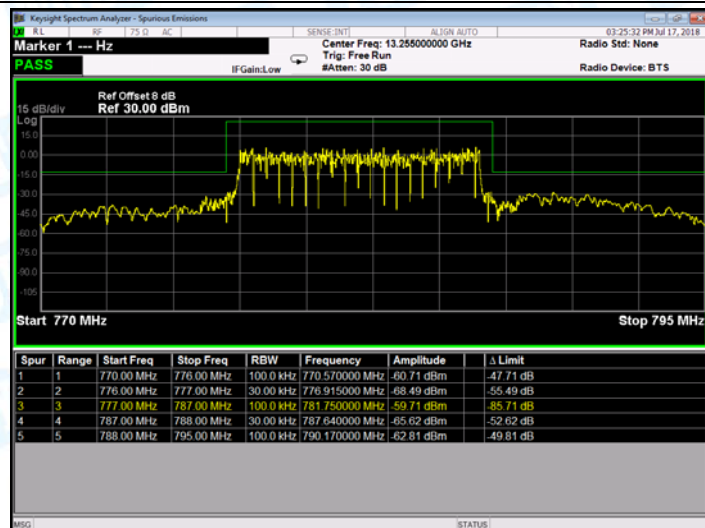
LTE BAND 13 (5MHz RB Size 25& RB Offset 0 16QAM)



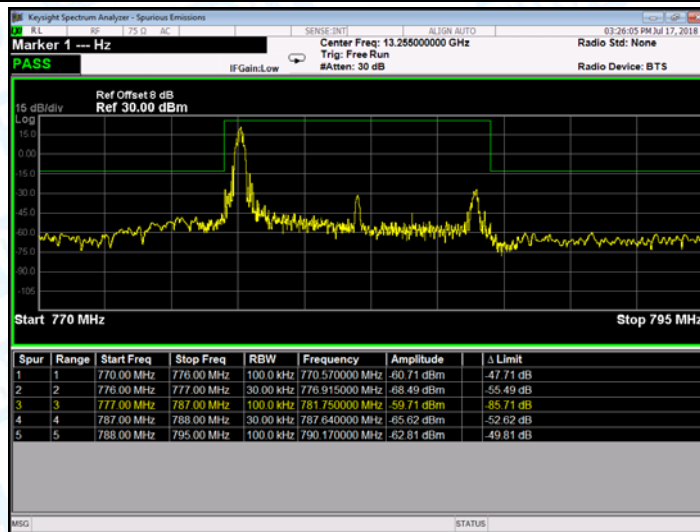
LTE BAND 13 (10MHz RB Size 1& RB Offset 0 QPSK)



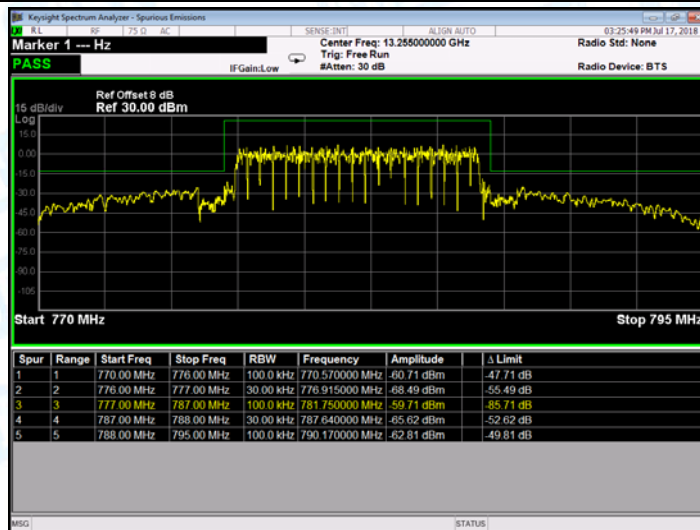
LTE BAND 13 (10MHz RB Size 50& RB Offset 0 QPSK)



LTE BAND 13 (10MHz RB Size 1& RB Offset 0 16QAM)



LTE BAND 13 (10MHz RB Size 50& RB Offset 0 16QAM)



ATTACHMENT F--RADIATED OUTPUT POWER

Radiated Power (EIRP) for LTE Band 4 / 1.4M									
Modulation	RB		Channel	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBd)	Cable Loss (dB)	ERP Power (dBm)	ERP Power (W)
	Size	offset							
QPSK	1	0	Lowest	H	17.42	5.01	2.59	19.84	0.096
				V	17.23	5.01	2.59	19.65	0.092
	1	0	Middle	H	17.18	4.82	2.59	19.41	0.087
				V	18.96	4.82	2.59	21.19	0.132
	1	0	Highest	H	19.21	4.45	2.59	21.07	0.128
				V	19.02	4.45	2.59	20.88	0.122
16QAM	1	0	Lowest	H	16.78	5.01	2.59	19.20	0.083
				V	16.17	5.01	2.59	18.59	0.072
	1	0	Middle	H	16.15	4.82	2.59	18.38	0.069
				V	18.31	4.82	2.59	20.54	0.113
	1	0	Highest	H	18.16	4.45	2.59	20.02	0.100
				V	17.83	4.45	2.59	19.69	0.093
Limit								30	1

Radiated Power (EIRP) for LTE Band 4 / 3M									
Modulation	RB		Channel	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBd)	Cable Loss (dB)	ERP Power (dBm)	ERP Power (W)
	Size	offset							
QPSK	1	0	Lowest	H	17.42	5.01	2.59	19.84	0.096
				V	17.24	5.01	2.59	19.66	0.092
	1	0	Middle	H	17.19	4.82	2.59	19.42	0.087
				V	19.02	4.82	2.59	21.25	0.133
	1	0	Highest	H	19.21	4.45	2.59	21.07	0.128
				V	19.00	4.45	2.59	20.86	0.122
16QAM	1	0	Lowest	H	15.98	5.01	2.59	18.40	0.069
				V	16.36	5.01	2.59	18.78	0.076
	1	0	Middle	H	16.46	4.82	2.59	18.69	0.074
				V	17.60	4.82	2.59	19.83	0.096
	1	0	Highest	H	18.26	4.45	2.59	20.12	0.103
				V	18.17	4.45	2.59	20.03	0.101
Limit								30	1

Radiated Power (EIRP) for LTE Band 4 / 5M									
Modulation	RB		Channel	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBd)	Cable Loss (dB)	ERP Power (dBm)	ERP Power (W)
	Size	offset							
QPSK	1	0	Lowest	H	17.32	5.01	2.59	19.74	0.094
				V	17.12	5.01	2.59	19.54	0.090
	1	0	Middle	H	17.18	4.82	2.59	19.41	0.087
				V	18.87	4.82	2.59	21.10	0.129
	1	0	Highest	H	19.07	4.45	2.59	20.93	0.124
				V	19.00	4.45	2.59	20.86	0.122
16QAM	1	0	Lowest	H	16.11	5.01	2.59	18.53	0.071
				V	16.07	5.01	2.59	18.49	0.071
	1	0	Middle	H	16.38	4.82	2.59	18.61	0.073
				V	17.64	4.82	2.59	19.87	0.097
	1	0	Highest	H	17.96	4.45	2.59	19.82	0.096
				V	18.08	4.45	2.59	19.94	0.099
Limit								30	1

Radiated Power (EIRP) for LTE Band 4 / 10M									
Modulation	RB		Channel	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBd)	Cable Loss (dB)	ERP Power (dBm)	ERP Power (W)
	Size	offset							
QPSK	1	0	Lowest	H	17.76	5.01	2.59	20.18	0.104
				V	17.35	5.01	2.59	19.77	0.095
	1	0	Middle	H	17.67	4.82	2.59	19.90	0.098
				V	19.34	4.82	2.59	21.57	0.144
	1	0	Highest	H	19.35	4.45	2.59	21.21	0.132
				V	19.36	4.45	2.59	21.22	0.132
16QAM	1	0	Lowest	H	16.18	5.01	2.59	18.60	0.072
				V	16.20	5.01	2.59	18.62	0.073
	1	0	Middle	H	16.68	4.82	2.59	18.91	0.078
				V	17.79	4.82	2.59	20.02	0.100
	1	0	Highest	H	18.16	4.45	2.59	20.02	0.100
				V	18.51	4.45	2.59	20.37	0.109
Limit								30	1

Radiated Power (EIRP) for LTE Band 4 / 15M									
Modulation	RB		Channel	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBd)	Cable Loss (dB)	ERP Power (dBm)	ERP Power (W)
	Size	offset							
QPSK	1	0	Lowest	H	17.34	5.01	2.59	19.76	0.095
				V	17.28	5.01	2.59	19.70	0.093
	1	0	Middle	H	17.22	4.82	2.59	19.45	0.088
				V	18.83	4.82	2.59	21.06	0.128
	1	0	Highest	H	19.20	4.45	2.59	21.06	0.128
				V	18.99	4.45	2.59	20.85	0.122
16QAM	1	0	Lowest	H	17.06	5.01	2.59	19.48	0.089
				V	16.92	5.01	2.59	19.34	0.086
	1	0	Middle	H	16.84	4.82	2.59	19.07	0.081
				V	18.68	4.82	2.59	20.91	0.123
	1	0	Highest	H	18.83	4.45	2.59	20.69	0.117
				V	18.60	4.45	2.59	20.46	0.111
Limit								30	1

Radiated Power (EIRP) for LTE Band 4 / 20M									
Modulation	RB		Channel	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBd)	Cable Loss (dB)	ERP Power (dBm)	ERP Power (W)
	Size	offset							
QPSK	1	0	Lowest	H	17.46	5.01	2.59	19.88	0.097
				V	17.22	5.01	2.59	19.64	0.092
	1	0	Middle	H	17.29	4.82	2.59	19.52	0.090
				V	18.99	4.82	2.59	21.22	0.132
	1	0	Highest	H	19.15	4.45	2.59	21.01	0.126
				V	19.06	4.45	2.59	20.92	0.124
16QAM	1	0	Lowest	H	16.94	5.01	2.59	19.36	0.086
				V	16.84	5.01	2.59	19.26	0.084
	1	0	Middle	H	17.01	4.82	2.59	19.24	0.084
				V	18.63	4.82	2.59	20.86	0.122
	1	0	Highest	H	18.79	4.45	2.59	20.65	0.116
				V	18.76	4.45	2.59	20.62	0.115
Limit								30	1

Radiated Power (EIRP) for LTE Band 13 / 5M									
Modulation	RB		Channel	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBd)	Cable Loss (dB)	ERP Power (dBm)	ERP Power (W)
	Size	offset							
QPSK	1	0	Lowest	H	17.19	3.46	1.26	19.39	0.087
				V	17.22	3.46	1.26	19.42	0.087
	1	0	Middle	H	16.99	3.82	1.26	19.55	0.090
				V	18.28	3.82	1.26	20.84	0.121
	1	0	Highest	H	17.99	4.16	1.26	20.89	0.123
				V	18.13	4.16	1.26	21.03	0.127
16QAM	1	0	Lowest	H	15.98	3.46	1.26	18.18	0.066
				V	15.98	3.46	1.26	18.18	0.066
	1	0	Middle	H	15.90	3.82	1.26	18.46	0.070
				V	16.94	3.82	1.26	19.5	0.089
	1	0	Highest	H	16.64	4.16	1.26	19.54	0.090
				V	17.01	4.16	1.26	19.91	0.098
Limit								34.77	3

Radiated Power (EIRP) for LTE Band 13 / 10M									
Modulation	RB		Channel	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBd)	Cable Loss (dB)	ERP Power (dBm)	ERP Power (W)
	Size	offset							
QPSK	1	0	Middle	H	19.72	3.46	1.26	21.92	0.156
				V	17.93	3.46	1.26	20.13	0.103
16QAM	1	0	Middle	H	19.25	3.82	1.26	21.81	0.152
				V	17.42	3.82	1.26	19.98	0.100
Limit								34.77	3

ATTACHMENT G--RADIATED OUT BAND OF EMISSIONS

Measurement Data (worst case)

Test mode: LTE BAND 4 1.4MHz(RB size 1 & RB offset 0) for QPSK							
Channel: Middle		Date of Test: 2018-07-03					
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
3465.99	Horizontal	-42.96	14.70	6.12	-22.14	-13.00	Pass
5198.98	H	-47.94	13.67	7.86	-26.41		
6932.13	H	-54.85	14.27	9.54	-31.04		
3465.99	Vertical	-44.96	15.81	6.12	-23.03	-13.00	Pass
5198.98	V	-47.34	13.80	7.86	-25.68		
6932.13	V	-52.75	13.40	9.54	-29.81		
Remark: 1, The testing has been conformed to 10*1732.5MHz=17325MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	LTE BAND 4 3MHz(RB size 1 & RB offset 0) for QPSK						
Channel:	Middle			Date of Test:	2018-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
3465.99	Horizontal	-42.49	14.70	6.12	-21.67	-13.00	Pass
5198.98	H	-47.61	13.67	7.86	-26.08		
6932.13	H	-54.70	14.27	9.54	-30.89		
3465.99	Vertical	-44.53	15.81	6.12	-22.60	-13.00	Pass
5198.98	V	-47.55	13.80	7.86	-25.89		
6932.13	V	-53.75	13.40	9.54	-30.81		
Remark: 1, The testing has been conformed to 10*1732.5MHz=17325MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	LTE BAND 4 5MHz(RB size 1 & RB offset 0) for QPSK						
Channel:	Middle			Date of Test:	2018-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
3465.99	Horizontal	-42.86	14.70	6.12	-22.04	-13.00	Pass
5198.98	H	-47.64	13.67	7.86	-26.11		
6932.13	H	-54.51	14.27	9.54	-30.70		
3465.99	Vertical	-43.80	15.81	6.12	-21.87	-13.00	Pass
5198.98	V	-47.78	13.80	7.86	-26.12		
6932.13	V	-53.03	13.40	9.54	-30.09		
Remark: 1, The testing has been conformed to 10*1732.5MHz=17325MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	LTE BAND 4 10MHz(RB size 1 & RB offset 0) for QPSK						
Channel:	Middle			Date of Test:	2018-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
3465.99	Horizontal	-42.60	14.70	6.12	-21.78	-13.00	Pass
5198.98	H	-47.27	13.67	7.86	-25.74		
6932.13	H	-54.81	14.27	9.54	-31.00		
3465.99	Vertical	-44.11	15.81	6.12	-22.18	-13.00	Pass
5198.98	V	-47.89	13.80	7.86	-26.23		
6932.13	V	-52.60	13.40	9.54	-29.66		
Remark: 1, The testing has been conformed to 10*1732.5MHz=17325MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	LTE BAND 4 15MHz(RB size 1 & RB offset 0) for QPSK						
Channel:	Middle			Date of Test:	2018-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
3465.99	Horizontal	-42.27	14.70	6.12	-21.45	-13.00	Pass
5198.98	H	-46.98	13.67	7.86	-25.45		
6932.13	H	-55.01	14.27	9.54	-31.20		
3465.99	Vertical	-43.81	15.81	6.12	-21.88	-13.00	Pass
5198.98	V	-47.24	13.80	7.86	-25.58		
6932.13	V	-52.53	13.40	9.54	-29.59		
Remark: 1, The testing has been conformed to 10*1732.5MHz=17325MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	LTE BAND 4 20MHz(RB size 1 & RB offset 0) for QPSK						
Channel:	Middle			Date of Test:	2018-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
3465.99	Horizontal	-41.88	14.70	6.12	-21.06	-13.00	Pass
5198.98	H	-47.42	13.67	7.86	-25.89		
6932.13	H	-54.57	14.27	9.54	-30.76		
3465.99	Vertical	-45.23	15.81	6.12	-23.30	-13.00	Pass
5198.98	V	-46.92	13.80	7.86	-25.26		
6932.13	V	-52.93	13.40	9.54	-29.99		
Remark: 1, The testing has been conformed to 10*1732.5MHz=17325MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	LTE BAND 13 5MHz(RB size 1 & RB offset 0) for QPSK						
Channel:	Middle			Date of Test:	2018-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
1564.00	Horizontal	-32.78	7.49	3.97	-21.78	-13.00	Pass
2345.98	H	-43.62	7.03	5.05	-26.09		
3128.17	H	-48.41	12.48	5.98	-29.95		
1564.00	Vertical	-36.95	8.02	3.97	-22.51	-13.00	Pass
2345.98	V	-47.20	10.47	5.05	-25.23		
3128.17	V	-51.82	16.92	5.98	-30.80		
Remark: 1, The testing has been conformed to 10*782MHz=7820MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	LTE BAND 13 10MHz(RB size 1 & RB offset 0) for QPSK						
Channel:	Middle			Date of Test:	2018-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
1564.00	Horizontal	-32.78	7.49	3.97	-21.78	-13.00	Pass
2345.98	H	-43.25	7.03	5.05	-25.72		
3128.17	H	-48.42	12.48	5.98	-29.96		
1564.00	Vertical	-36.53	8.02	3.97	-22.09	-13.00	Pass
2345.98	V	-47.82	10.47	5.05	-25.85		
3128.17	V	-51.70	16.92	5.98	-30.68		
Remark: 1, The testing has been conformed to 10*782MHz=7820MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

ATTACHMENT H--FREQUENCY STABILITY

Temperature Variation					
Reference Frequency: LTE Band 4 QPSK(1.4MHz) Middle channel=20175 Frequency=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	24.49	0.0141	±2.5	Pass
	-20	15.46	0.0089		
	-10	20.98	0.0121		
	0	18.48	0.0107		
	10	15.37	0.0089		
	20	29.07	0.0168		
	30	18.16	0.0105		
	40	34.18	0.0197		
	50	21.53	0.0124		
Reference Frequency: LTE Band 4 QPSK(3MHz) Middle channel=20175 Frequency=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	23.65	0.0137	±2.5	Pass
	-20	15.98	0.0092		
	-10	27.76	0.0160		
	0	35.10	0.0203		
	10	18.98	0.0110		
	20	21.36	0.0123		
	30	25.10	0.0145		
	40	19.68	0.0114		
	50	16.73	0.0097		
Reference Frequency: LTE Band 4 QPSK(5MHz) Middle channel=20175 Frequency=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	26.90	0.0155	±2.5	Pass
	-20	27.56	0.0159		
	-10	13.47	0.0078		
	0	34.78	0.0201		
	10	35.51	0.0205		
	20	28.99	0.0167		
	30	30.47	0.0176		
	40	20.29	0.0117		
	50	19.32	0.0112		
Reference Frequency: LTE Band 4 QPSK(10MHz) Middle channel=20175 Frequency=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	21.51	0.0124	±2.5	Pass
	-20	25.79	0.0149		
	-10	27.03	0.0156		
	0	27.63	0.0159		
	10	14.93	0.0086		
	20	32.43	0.0187		
	30	26.11	0.0151		
	40	16.65	0.0096		
	50	35.01	0.0202		

Temperature Variation					
Reference Frequency: LTE Band 4 QPSK(15MHz) Middle channel=20175 Frequency=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	18.91	0.0109	±2.5	Pass
	-20	13.75	0.0079		
	-10	33.18	0.0192		
	0	14.48	0.0084		
	10	34.48	0.0199		
	20	33.81	0.0195		
	30	28.45	0.0164		
	40	32.44	0.0187		
	50	12.80	0.0074		
Reference Frequency: LTE Band 4 QPSK(20MHz) Middle channel=20175 Frequency=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	20.29	0.0117	±2.5	Pass
	-20	35.09	0.0203		
	-10	16.00	0.0092		
	0	18.79	0.0108		
	10	13.00	0.0075		
	20	12.63	0.0073		
	30	27.50	0.0159		
	40	28.75	0.0166		
	50	30.53	0.0176		
Reference Frequency: LTE Band 13 QPSK(5MHz) Middle channel=23230 Frequency=782.0MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	20.26	0.0259	±2.5	Pass
	-20	24.43	0.0312		
	-10	13.63	0.0174		
	0	28.06	0.0359		
	10	33.01	0.0422		
	20	31.47	0.0402		
	30	11.62	0.0149		
	40	26.03	0.0333		
	50	30.28	0.0387		
Reference Frequency: LTE Band 13 QPSK(10MHz) Middle channel=23230 Frequency=782.0MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	19.69	0.0252	±2.5	Pass
	-20	36.18	0.0463		
	-10	32.52	0.0416		
	0	24.81	0.0317		
	10	33.77	0.0432		
	20	21.17	0.0271		
	30	36.00	0.0460		
	40	23.19	0.0297		
	50	18.14	0.0232		

Temperature Variation					
Reference Frequency: LTE Band 4 16QAM(1.4MHz) Middle channel=20175 Frequency=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	14.22	0.0082	±2.5	Pass
	-20	35.52	0.0205		
	-10	16.87	0.0097		
	0	22.29	0.0129		
	10	24.88	0.0144		
	20	20.89	0.0121		
	30	14.76	0.0085		
	40	28.96	0.0167		
	50	23.11	0.0133		
Reference Frequency: LTE Band 4 16QAM (3MHz) Middle channel=20175 Frequency=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	19.02	0.0110	±2.5	Pass
	-20	18.07	0.0104		
	-10	28.01	0.0162		
	0	24.03	0.0139		
	10	17.67	0.0102		
	20	28.61	0.0165		
	30	26.91	0.0155		
	40	15.90	0.0092		
	50	18.77	0.0108		
Reference Frequency: LTE Band 4 16QAM (5MHz) Middle channel=20175 Frequency=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	25.26	0.0146	±2.5	Pass
	-20	32.55	0.0188		
	-10	15.60	0.0090		
	0	25.67	0.0148		
	10	17.10	0.0099		
	20	25.27	0.0146		
	30	25.29	0.0146		
	40	25.42	0.0147		
	50	17.38	0.0100		
Reference Frequency: LTE Band 4 16QAM(10MHz) Middle channel=20175 Frequency=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	27.07	0.0156	±2.5	Pass
	-20	28.41	0.0164		
	-10	34.42	0.0199		
	0	33.56	0.0194		
	10	33.08	0.0191		
	20	31.76	0.0183		
	30	28.29	0.0163		
	40	16.67	0.0096		
	50	17.92	0.0103		

Temperature Variation					
Reference Frequency: LTE Band 4 16QAM(15MHz) Middle channel=20175 Frequency=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	46	0.0266	±2.5	Pass
	-20	61	0.0352		
	-10	54	0.0312		
	0	38	0.0219		
	10	28	0.0162		
	20	14	0.0081		
	30	45	0.0260		
	40	58	0.0335		
	50	27	0.0156		
Reference Frequency: LTE Band 4 16QAM(20MHz) Middle channel=20175 Frequency=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	26	0.0150	±2.5	Pass
	-20	34	0.0196		
	-10	26	0.0150		
	0	18	0.0104		
	10	28	0.0162		
	20	42	0.0242		
	30	29	0.0167		
	40	35	0.0202		
	50	41	0.0237		
Reference Frequency: LTE Band 13 16QAM (5MHz) Middle channel=23230 Frequency=782.0MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	35	0.0448	±2.5	Pass
	-20	24	0.0307		
	-10	29	0.0371		
	0	48	0.0614		
	10	52	0.0665		
	20	15	0.0192		
	30	36	0.0460		
	40	42	0.0537		
	50	35	0.0448		
Reference Frequency: LTE Band 13 16QAM (10MHz) Middle channel=23230 Frequency=782.0MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	53	0.0678	±2.5	Pass
	-20	29	0.0371		
	-10	39	0.0499		
	0	45	0.0575		
	10	38	0.0486		
	20	59	0.0754		
	30	42	0.0537		
	40	84	0.1074		
	50	44	0.0563		

Voltage Variation					
Reference Frequency: LTE Band 4 QPSK(1.4MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	85	0.0491	±2.5	Pass
	12.0	76	0.0439		
	36.0	63	0.0364		
Reference Frequency: LTE Band 4 QPSK (3MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	82	0.0473	±2.5	Pass
	12.0	46	0.0266		
	36.0	88	0.0508		
Reference Frequency: LTE Band 4 QPSK (5MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	56	0.0323	±2.5	Pass
	12.0	43	0.0248		
	36.0	48	0.0277		
Reference Frequency: LTE Band 4 QPSK (10MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	65	0.0375	±2.5	Pass
	12.0	58	0.0335		
	36.0	68	0.0392		
Reference Frequency: LTE Band 4 QPSK (15MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	56	0.0323	±2.5	Pass
	12.0	59	0.0341		
	36.0	45	0.0260		
Reference Frequency: LTE Band 4 QPSK (20MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	59	0.0341	±2.5	Pass
	12.0	65	0.0375		
	36.0	67	0.0387		

Voltage Variation					
Reference Frequency: LTE Band 13 QPSK (5MHz) Middle channel=23230 Frequency=782.0MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	96	0.1228	±2.5	Pass
	12.0	42	0.0537		
	36.0	59	0.0754		
Reference Frequency: LTE Band 13 QPSK (10MHz) Middle channel=23230 Frequency=782.0MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	47	0.0601	±2.5	Pass
	12.0	63	0.0806		
	36.0	75	0.0959		

Voltage Variation					
Reference Frequency: LTE Band 4 16QAM(1.4MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	76	0.0439	±2.5	Pass
	12.0	59	0.0341		
	36.0	84	0.0485		
Reference Frequency: LTE Band 4 16QAM (3MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	36	0.0208	±2.5	Pass
	12.0	46	0.0266		
	36.0	52	0.0300		
Reference Frequency: LTE Band 4 16QAM (5MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	69	0.0398	±2.5	Pass
	12.0	57	0.0329		
	36.0	43	0.0248		
Reference Frequency: LTE Band 4 16QAM (10MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	29	0.0167	±2.5	Pass
	12.0	48	0.0277		
	36.0	72	0.0416		
Reference Frequency: LTE Band 4 16QAM (15MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	51	0.0294	±2.5	Pass
	12.0	69	0.0398		
	36.0	80	0.0462		
Reference Frequency: LTE Band 4 16QAM (20MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	56	0.0323	±2.5	Pass
	12.0	63	0.0364		
	36.0	64	0.0369		

Voltage Variation					
Reference Frequency: LTE Band 13 16QAM (5MHz) Middle channel=23230 Frequency=782.0MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	89	0.1138	±2.5	Pass
	12.0	48	0.0614		
	36.0	75	0.0959		
Voltage Variation					
Reference Frequency: LTE Band 13 16QAM (10MHz) Middle channel=23230 Frequency=782.0MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	9.0	56	0.0716	±2.5	Pass
	12.0	68	0.0870		
	36.0	74	0.0946		

-----End of Report-----