FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E
FCC CFR47 PART 27 SUBPART L

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE PHONE WITH BT and DTS WLAN b/g/n

MODEL NUMBER: LG-L61AL, L61AL, LGL61AL

FCC ID: ZNFL61AL

REPORT NUMBER: 15I22343-E1V2

ISSUE DATE: 12/28/2015

Prepared for
LG ELECTRONICS MOBILECOMM U.S.A., INC
1000 SYLVAN AVENUE
ENGLEWOOD CLIFFS,
NEW JERSEY, 07632, U.S.A

Prepared by
UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

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Rev.	Issue Date	Revisions	Revised By
V1	12/21/15	Initial Issue	D. Coronia
V2	12/28/15	Updated Section 5.5, 10.1.1 and 11.1.1	D. Coronia

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC.

EUT DESCRIPTION: GSM/WCDMA/LTE PHONE WITH BT and DTS WLAN b/g/n

MODEL: LG-L61AL, L61AL, LGL61AL

SERIAL NUMBER: 510KPAE000152

DATE TESTED: NOVEMBER 24 – DECEMBER 8, 2015

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 22H, 24E, 27L	PASS

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Verification Services Inc. By:

DAN CORONIA
CONSUMER TECHNOLOGY DIVISION
WiSE PROJECT LEAD
UL VERIFICATION SERVICES INC

PENG ZHANG
CONSUMER TECHNOLOGY DIVISION
WiSE OPERATION MANAGER
UL VERIFICATION SERVICES INC

Tested By:

KIYA KEDIDA
CONSUMER TECHNOLOGY DIVISION
WiSE LAB ENGINEER
UL VERIFICATION SERVICES INC

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-D, FCC CFR 47 Part 22, FCC CFR Part 24, FCC CFR 47 Part 27.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☒ Chamber A	☐ Chamber D
☐ Chamber B	☐ Chamber E
☒ Chamber C	☐ Chamber F
	☐ Chamber G
	☒ Chamber H

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, respectively.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

EIRP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna) + Substitution Antenna Factor (dBi)

ERP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna)

(Path loss = Signal generator output – PSA reading with substitution antenna)

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4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB
Radiated Disturbance, 1GHz to 40GHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

This EUT is a GSM/WCDMA/LTE PHONE WITH BT and DTS WLAN b/g/n.

5.2. MAXIMUM OUTPUT POWER (GSM/EGPRS)

The transmitter has a maximum peak conducted and radiated ERP / EIRP output powers as follows:

FCC Part 22/24						
Band	Frequency Range(MHz)	Modulation	Conducted		Radiated	
			AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
GSM850	824~849	GMSK	33.4	2187.76		
	824~849	GPRS	33.4	2187.76	29.92	981.75
	824~849	EGPRS	27.7	588.84	25.33	341.19
GSM1900	1850~1910	GMSK	30.6	1148.15		
	1850~1910	GPRS	30.6	1148.15	31.01	1261.83
	1850~1910	EGPRS	26.7	467.74	28.81	760.33

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5.3. MAXIMUM OUTPUT POWER (WCDMA)

The transmitter has a maximum peak conducted and radiated ERP / EIRP output powers as follows:

FCC Part 22/24/27						
Band	Frequency Range(MHz)	Modulation	Conducted		Radiated	
			AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
Band 2	1850~1910	REL99	23.3	213.80	24.86	306.20
	1850~1910	HSDPA	23.2	208.93	24.41	276.06
	1850~1910	HSUPA	23.2	208.93		
Band 5	824~849	REL99	23.4	218.78	21.09	128.53
	824~849	HSDPA	23.4	218.78	20.23	105.44
	824~849	HSUPA	23.3	213.80		

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5.4. MAXIMUM OUTPUT POWER (LTE)

The transmitter has a maximum peak conducted and radiated ERP/EIRP output powers as follows:

FCC Part 24							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE2	1850~1910	1.4MHz	QPSK	24.2	263.03	27.34	542.00
			16QAM	23.2	208.93	26.84	483.06
		3MHz	QPSK	23.79	239.33	27.24	529.66
			16QAM	23.2	208.93	26.74	472.06
		5MHz	QPSK	23.98	250.03	26.90	489.78
			16QAM	23.08	203.24	26.53	449.78
		10MHz	QPSK	23.91	246.04	26.73	470.98
			16QAM	23.2	208.93	26.27	423.64
		15MHz	QPSK	23.94	247.74	26.88	487.53
			16QAM	23.2	208.93	26.44	440.55
		20MHz	QPSK	24.11	257.63	26.45	441.57
			16QAM	23.2	208.93	25.99	397.19

FCC Part 27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE4	1710~1755	1.4MHz	QPSK	24.24	265.46	23.94	247.74
			16QAM	23.4	218.78	23.68	233.35
		3MHz	QPSK	24.15	260.02	24.19	262.42
			16QAM	23.4	218.78	23.78	238.78
		5MHz	QPSK	24.35	272.27	23.82	240.99
			16QAM	23.2	208.93	23.53	225.42
		10MHz	QPSK	24.23	264.85	23.94	247.74
			16QAM	23.2	208.93	23.54	225.94
		15MHz	QPSK	24.31	269.77	24.55	285.10
			16QAM	23.35	216.27	24.17	261.22
		20MHz	QPSK	24.29	268.53	23.96	248.89
			16QAM	23.37	217.27	23.79	239.33

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FCC Part 22							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE5	824~849	1.4MHz	QPSK	23.75	237.14	21.64	145.88
			16QAM	23.2	208.93	21.1	128.82
		3MHz	QPSK	23.66	232.27	21.5	141.25
			16QAM	23.2	208.93	21.2	131.83
		5MHz	QPSK	23.67	232.81	21.8	151.36
			16QAM	22.98	198.61	21.4	138.04
		10MHz	QPSK	23.80	239.88	20.9	123.03
			16QAM	23.2	208.93	20.5	112.20

FCC Part 27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE17	704~716	5MHz	QPSK	23.68	233.35	18.57	71.94
			16QAM	22.98	198.61	17.95	62.37
		10MHz	QPSK	23.60	229.09	18.85	76.74
			16QAM	22.85	192.75	18.18	65.77

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5.5. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna for the [List the bands supported] with a maximum peak gain as follow:

Frequency (MHz)	Peak Gain (dBi)
LTE B2, 1850~1910MHz	0.31
LTE B4, 1710~1755MHz	-0.57
LTE B17, 704~716MHz	-4.34
GSM/WCDMA B5/LTE B5, 824~849MHz	-2.41
GSM/WCDMA B2, 1850~1910MHz	0.31

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	MCS-02WRE	N/A	N/A
Earphone	LG	N/A	N/A	N/A

I/O CABLES (CONDUCTED SETUP)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Shielded	None	NA
2	Antenna Port	1	EUT	Shielded	0.1m	NA
3	RF In/Out	1	Communication Test Set	Shielded	1m	NA

I/O CABLES (RADIATED SETUP)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	USB	1	AC Adapter	Un-shielded	1.2m	No
2	Jack	1	Headset	Shielded	1m	No
3	RF In/out	1	Communication Test Set	Un-shielded	2m	Yes

TEST SETUP

The EUT is continuously communicated to the call box during the tests.

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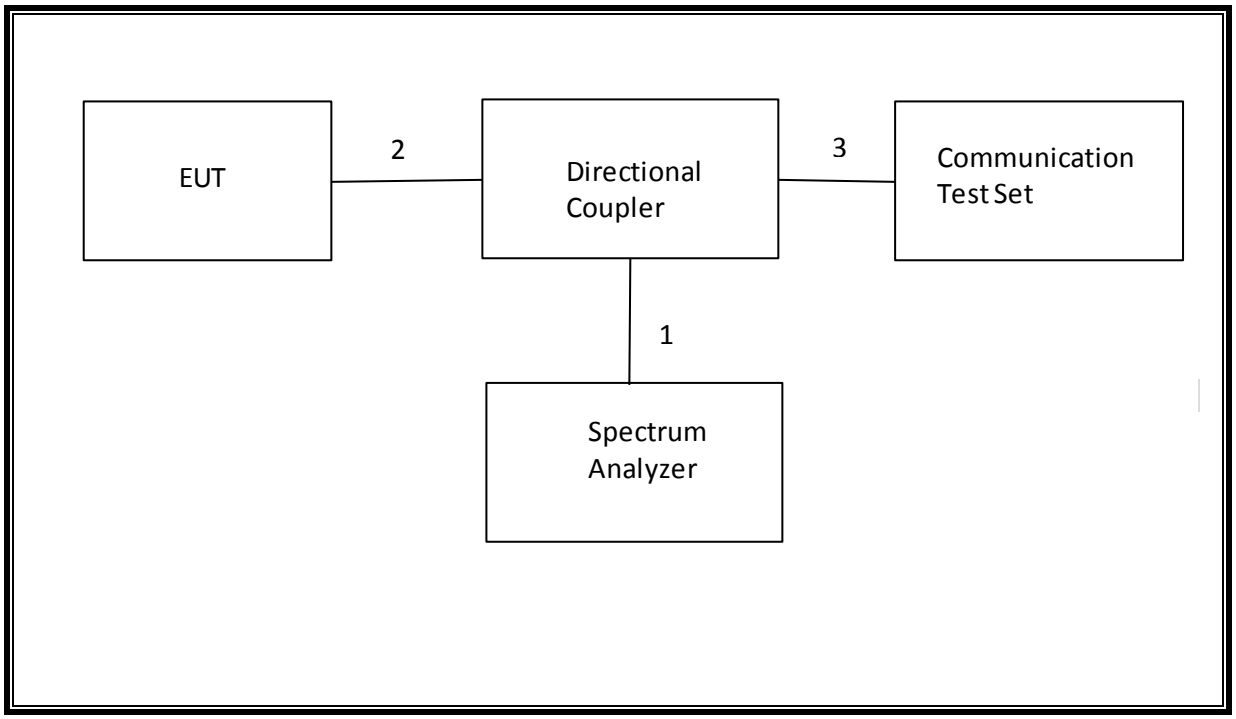
SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



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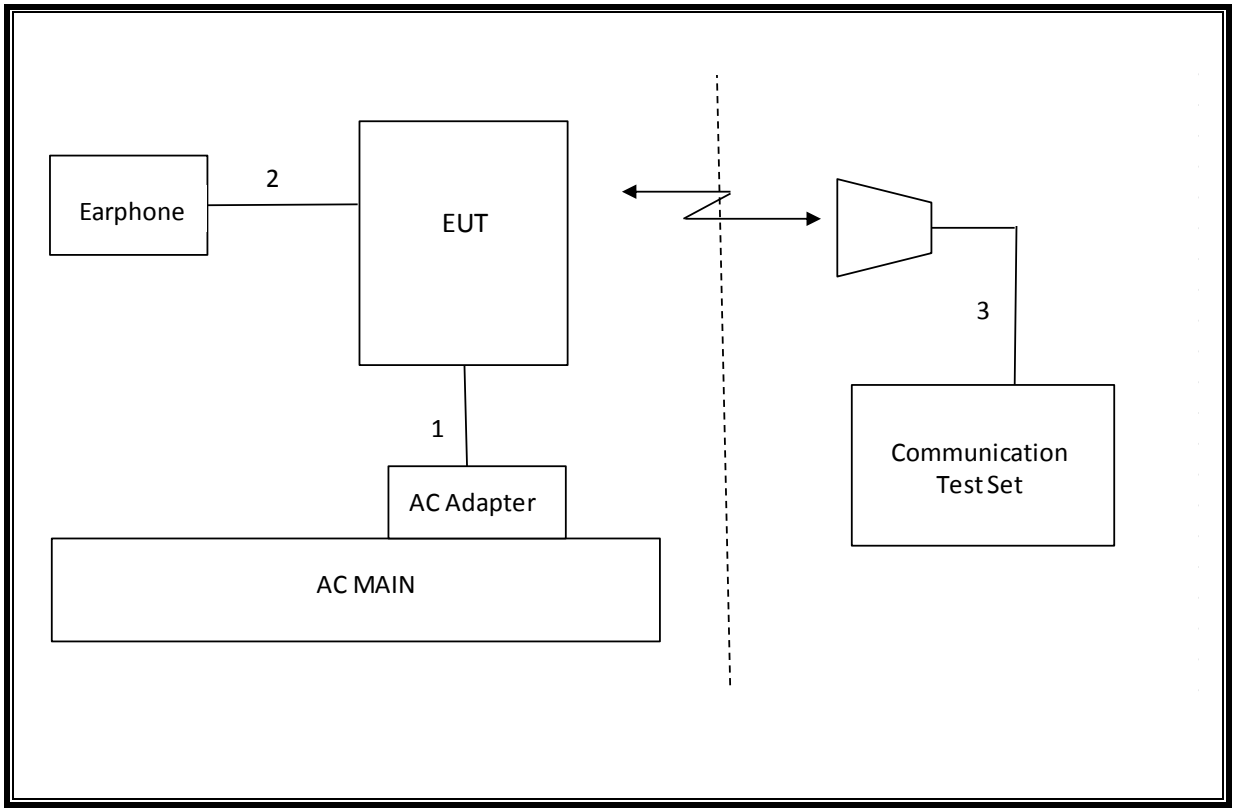
SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**T Number**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	123	10/22/16
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	130	06/10/16
Antenna, Horn, 18 GHz	EMCO	3115	59	11/18/16
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	151	CNR
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	153	CNR
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	80	05/15/16
Communications Test Set	R&S	CMW500	159	07/10/16
DC power supply, 8 V @ 3 A or 15 V	Agilent / HP	E3610A	None	CNR
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	06/16/16
Antenna, Tuned Dipole 400~1000	ETS	3121C DB4	273	05/05/16
Directional Coupler	RF-Lambda	RFDC5M06G15	None	CNR
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	447	05/18/16

Test Software List			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	UL	UL EMC	Ver 9.5, June 24, 2015
Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015
CLT Software	UL	UL RF	Ver 1.0, Feb 2, 2015
Antenna Port Software	UL	UL RF	Ver 3.7, Nov 12, 2015

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7. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
2.1049	N/A	Occupied Band width (99%)	N/A	Conducted	Pass	17.90 MHz
22.917(a) 24.238(a) 27.53(g) 90.691	RSS-132(4.5.1) RSS-133(6.5.1) RSS-139(6.5.1)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-17.073 dBm
2.1046	N/A	Conducted output power	N/A		Pass	33.4 dBm
22.355 24.235 27.54 90.213	RSS-132(4.3) RSS-133(6.3) RSS-139(6.3) RSS-199(4.3)	Frequency Stability	2.5PPM		Pass	0.011 PPM
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	29.92 dBm
27.50(c)(10)	N/A		34.77 dBm		Pass	18.85 dBm
24.232(c) 27.50(h)(2)	RSS-133(6.4) RSS-199(4.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	31.01 dBm
27.50(d)(4)	RSS-139(6.4)		30dBm		Pass	24.55 dBm
22.917(a) 24.238(a) 27.53(g)	RSS-132(4.5.1) RSS-133(6.5.1) RSS-139(6.5.1)	Radiated Spurious Emission	-13dBm		Pass	-32.8 dBm

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8. RF POWER OUTPUT VERIFICATION

8.1. GSM/GPRS/EDGE

Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900

Press Connection control to choose the different menus

Press RESET > choose all to reset all settings

Connection Press Signal Off to turn off the signal and change settings

Network Support > GSM+GPRS or GSM+EGPRS

Main Service > Packet Data

Service selection > Test Mode A – Auto Slot Config. off

MS Signal Press Slot Config bottom on the right twice to select and change the number of time slots and power setting

> Slot configuration > Uplink/Gamma

> 33 dBm for GPRS 850/900

> 30 dBm for GPRS1800/1900

BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel

Frequency Offset > + 0 Hz

Mode > BCCH and TCH

BCCH Level > -85 dBm (May need to adjust if link is not stable)

BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]

Channel Type > Off

P0> 4 dB

Slot Config > Unchanged (if already set under MS Signal)

TCH > choose desired test channel

Hopping > Off

Main Timeslot > 3 (Default)

Network Coding Scheme > CS4 (GPRS) and MCS5 ~ MCS9 (EGPRS)

Bit Stream > 2E9-1PSR Bit Pattern

AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input

Connection Press Signal On to turn on the signal and change settings

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8.1.1. GSM OUTPUT POWER RESULT

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pw r (dBm)	Frame Pw r (dBm)
GSM (Voice)	CS1	1	128	824.4	33.3	24.3
			190	836.6	33.4	24.4
			251	848.8	33.4	24.4
GPRS (GMSK)	CS1	1	128	824.4	33.3	24.3
			190	836.6	33.4	24.4
			251	848.8	33.4	24.4
		2	128	824.4	31.3	25.3
			190	836.6	31.0	25.0
			251	848.8	31.0	25.0
EGPRS (8PSK)	MCS5	1	128	824.4	27.7	18.7
			190	836.6	27.7	18.7
			251	848.8	27.6	18.6
		2	128	824.4	25.7	19.7
			190	836.6	25.6	19.6
			251	848.8	25.5	19.5

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pw r (dBm)	Frame Pw r (dBm)
GSM (Voice)	CS1	1	512	1850.2	30.4	21.4
			661	1880.0	30.6	21.6
			810	1909.8	30.5	21.5
GPRS (GMSK)	CS1	1	512	1850.2	30.4	21.4
			661	1880.0	30.6	21.6
			810	1909.8	30.5	21.5
		2	512	1850.2	29.1	23.1
			661	1880.0	29.1	23.1
			810	1909.8	29.2	23.2
EGPRS (8PSK)	MCS5	1	512	1850.2	26.6	17.6
			661	1880.0	26.7	17.7
			810	1909.8	26.7	17.7
		2	512	1850.2	24.5	18.5
			661	1880.0	24.7	18.7
			810	1909.8	24.6	18.6

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8.2. UMTS REL 99

TEST PROCEDURE

The following summary of these settings are illustrated below:

	Mode	Rel99
	Subtest	-
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	HSDPA FRC	Not Applicable
	HSUPA Test	Not Applicable
	Power Control Algorithm	Algorithm2
	βc	Not Applicable
	βd	Not Applicable
	βec	Not Applicable
	βc/βd	8/15
	βhs	Not Applicable
	βed	Not Applicable

8.2.1. UMTS REL 99 OUTPUT POWER RESULT

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Rel 99 (RMC, 12.2 kbps)	4132	826.4	0	23.3
		4183	836.6	0	23.3
		4233	846.6	0	23.4

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	0	23.3
		9400	1880.0	0	23.3
		9538	1907.6	0	23.3

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8.3. UMTS HSDPA

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	Rel5 HSDPA			
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs =βhs/βc	30/15			

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8.3.1. UMTS HSDPA OUTPUT POWER RESULT

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	0	23.3
		4183	836.6	0	23.3
		4233	846.6	0	23.4
	Subtest 2	4132	826.4	0	23.3
		4183	836.6	0	23.4
		4233	846.6	0	23.4
	Subtest 3	4132	826.4	0.5	22.9
		4183	836.6	0.5	22.9
		4233	846.6	0.5	23.0
	Subtest 4	4132	826.4	0.5	22.9
		4183	836.6	0.5	23.0
		4233	846.6	0.5	23.0

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	23.2
		9400	1880.0	0	23.2
		9538	1907.6	0	23.2
	Subtest 2	9262	1852.4	0	23.2
		9400	1880.0	0	22.8
		9538	1907.6	0	23.1
	Subtest 3	9262	1852.4	0.5	23.0
		9400	1880.0	0.5	23.0
		9538	1907.6	0.5	23.0
	Subtest 4	9262	1852.4	0.5	23.0
		9400	1880.0	0.5	23.0
		9538	1907.6	0.5	23.0

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8.4. UMTS HSUPA

TEST PROCEDURE

The following summary of these settings are illustrated below: (ETSI TS 134.121-1 Table C.11.1)

	Mode	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	P-CPICH (dB)	-10				
	P-CCPCH (dB)	-12				
	SCH (dB)	-12				
	PICH(dB)	-15				
	DPCH (dB)	-9				
	HS-SCCH_1 (dB)	-8				
	HS-PDSCH (dB)	-3				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	Bc	11/15	6/15	15/15	2/15	15/15
	Bd	15/15	15/15	9/15	15/15	15/15
	Bec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	Bhs	22/15	12/15	30/15	4/15	30/15
	βed (note1)	1309/225	94/75	47/15 47/15	56/75	134/15
	MPR	0	2	1	2	0
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	Reference E-TFCIs	5	5	2	5	5
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27	

Note1: βed cannot be set directly, it is set by Absolute Grant Value.

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8.4.1. UMTS HSUPA OUTPUT POWER RESULT

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	0	23.3
		4183	836.6	0	22.7
		4233	846.6	0	22.3
	Subtest 2	4132	826.4	2	21.4
		4183	836.6	2	21.3
		4233	846.6	2	21.6
	Subtest 3	4132	826.4	1	22.3
		4183	836.6	1	21.8
		4233	846.6	1	22.4
	Subtest 4	4132	826.4	2	21.6
		4183	836.6	2	21.6
		4233	846.6	2	21.7
	Subtest 5	4132	826.4	0	23.3
		4183	836.6	0	23.4
		4233	846.6	0	23.4

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	23.2
		9400	1880.0	0	23.2
		9538	1907.6	0	23.1
	Subtest 2	9262	1852.4	2	21.7
		9400	1880.0	2	21.3
		9538	1907.6	2	21.3
	Subtest 3	9262	1852.4	1	22.4
		9400	1880.0	1	22.5
		9538	1907.6	1	22.4
	Subtest 4	9262	1852.4	2	21.6
		9400	1880.0	2	21.5
		9538	1907.6	2	21.3
	Subtest 5	9262	1852.4	0	23.5
		9400	1880.0	0	23.5
		9538	1907.6	0	23.5

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8.5. LTE OUTPUT POWER RESULT

LTE Band 2

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						18700	18900	19100
						1860 MHz	1880 MHz	1900 MHz
LTE Band 2	20	QPSK	1	0	0	23.99	23.98	24.11
			1	49	0	24.04	23.79	24.01
			1	99	0	23.89	23.87	23.85
			50	0	1	23.00	22.98	22.94
			50	24	1	22.99	22.94	22.93
			50	50	1	22.99	22.98	22.84
			100	0	1	23.03	22.98	22.95
		16QAM	1	0	1	23.07	23.20	22.97
			1	49	1	22.76	23.20	22.89
			1	99	1	22.57	23.20	22.76
			50	0	2	21.93	21.94	22.08
			50	24	2	22.12	21.94	21.98
			50	50	2	22.19	21.92	21.90
			100	0	2	22.04	21.86	22.04
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						18675	18900	19125
						1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 2	15	QPSK	1	0	0	23.73	23.55	23.94
			1	37	0	23.87	23.65	23.82
			1	74	0	23.78	23.83	23.81
			36	0	1	22.90	22.97	22.95
			36	20	1	22.91	22.93	22.86
			36	39	1	22.93	22.96	22.83
			75	0	1	22.87	22.91	22.75
		16QAM	1	0	1	23.20	23.20	23.20
			1	37	1	23.20	23.20	23.20
			1	74	1	23.20	23.20	23.20
			36	0	2	22.00	21.81	21.86
			36	20	2	21.95	21.78	21.71
			36	39	2	21.97	21.76	21.84
			75	0	2	21.85	21.89	21.80

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Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						18650	18900	19150
						1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	23.75	23.77	23.91
			1	25	0	23.77	23.62	23.60
			1	49	0	23.76	23.70	23.69
			25	0	1	22.88	22.91	22.85
			25	12	1	22.85	22.92	22.88
			25	25	1	22.85	22.90	22.87
			50	0	1	22.90	22.91	22.88
		16QAM	1	0	1	23.12	23.05	23.20
			1	25	1	23.15	23.20	23.20
			1	49	1	23.10	23.20	23.20
			25	0	2	21.87	21.93	21.93
			25	12	2	21.87	21.92	21.94
			25	25	2	21.85	21.91	21.94
			50	0	2	21.89	21.81	21.82

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						18625	18900	19175
						1852.5 MHz	1880 MHz	1907.5 MHz
LTE Band 2	5	QPSK	1	0	0	23.55	23.76	23.62
			1	12	0	23.98	23.88	23.57
			1	24	0	23.66	23.69	23.65
			12	0	1	22.84	22.85	22.84
			12	7	1	22.87	22.90	22.88
			12	13	1	22.86	22.87	22.87
			25	0	1	22.84	22.87	22.87
		16QAM	1	0	1	23.08	22.88	22.81
			1	12	1	23.00	22.52	22.94
			1	24	1	23.07	22.75	22.91
			12	0	2	21.75	21.81	21.77
			12	7	2	21.93	21.90	21.88
			12	13	2	21.78	21.81	21.97
			25	0	2	21.88	21.92	22.06

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Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						18615	18900	19185
						1851.5 MHz	1880 MHz	1908.5 MHz
LTE Band 2	3	QPSK	1	0	0	23.59	23.59	23.62
			1	8	0	23.55	23.68	23.66
			1	14	0	23.49	23.59	23.79
			8	0	1	22.81	22.79	22.77
			8	4	1	22.78	22.82	22.89
			8	7	1	22.73	22.83	22.81
			15	0	1	22.72	22.87	22.78
		16QAM	1	0	1	22.45	23.20	23.20
			1	8	1	22.31	23.20	23.20
			1	14	1	22.45	23.20	23.20
			8	0	2	21.85	21.80	21.82
			8	4	2	21.96	21.74	21.83
			8	7	2	21.78	21.66	21.79
			15	0	2	21.80	21.89	21.90

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						18607	18900	19193
						1850.7 MHz	1880 MHz	1909.3 MHz
LTE Band 2	1.4	QPSK	1	0	0	23.69	24.18	22.75
			1	3	0	23.85	24.20	23.59
			1	5	0	23.89	24.20	23.47
			3	0	0	24.01	24.03	23.58
			3	1	0	24.00	24.03	23.56
			3	3	0	24.04	23.99	23.63
			6	0	1	23.20	23.20	22.67
		16QAM	1	0	1	23.20	22.90	23.20
			1	3	1	22.90	23.05	23.20
			1	5	1	22.89	23.01	23.20
			3	0	1	22.75	22.78	23.01
			3	1	1	22.74	23.20	23.07
			3	3	1	22.70	23.20	23.09
			6	0	2	22.20	22.20	22.15

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LTE Band 4

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20050	20175	20300
						1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4	20	QPSK	1	0	0	24.03	24.14	24.29
			1	49	0	23.93	24.05	23.94
			1	99	0	23.89	23.99	23.67
			50	0	1	23.24	23.35	23.20
			50	24	1	23.23	23.34	23.20
			50	50	1	23.14	23.29	23.33
			100	0	1	23.30	23.36	23.20
		16QAM	1	0	1	23.20	23.20	23.20
			1	49	1	23.20	23.20	23.20
			1	99	1	23.20	23.20	23.37
			50	0	2	22.29	22.20	22.20
			50	24	2	22.30	22.29	22.20
			50	50	2	22.34	22.25	22.20
			100	0	2	22.26	22.36	22.39

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20025	20175	20325
						1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	24.11	23.96	24.20
			1	37	0	24.31	24.09	24.26
			1	74	0	23.89	23.80	24.25
			36	0	1	23.27	23.36	23.20
			36	20	1	23.22	23.28	23.38
			36	39	1	23.23	23.34	23.39
			75	0	1	23.26	23.35	23.38
		16QAM	1	0	1	23.20	23.20	23.35
			1	37	1	23.20	23.20	23.18
			1	74	1	23.20	23.20	23.28
			36	0	2	22.32	22.20	22.29
			36	20	2	22.30	22.20	22.19
			36	39	2	22.20	22.39	22.20
			75	0	2	22.23	22.34	22.34

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Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20000	20175	20350
						1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	23.85	23.94	24.23
			1	25	0	23.82	24.11	23.96
			1	49	0	23.85	23.91	24.03
			25	0	1	23.19	23.29	23.33
			25	12	1	23.18	23.30	23.38
			25	25	1	23.19	23.31	23.39
			50	0	1	23.23	23.26	23.31
		16QAM	1	0	1	23.20	23.20	23.20
			1	25	1	23.20	23.20	23.20
			1	49	1	23.20	23.20	23.20
			25	0	2	22.34	22.20	22.30
			25	12	2	22.33	22.31	22.22
			25	25	2	22.32	22.21	22.21
			50	0	2	22.37	22.27	22.31

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						19975	20175	20375
						1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	24.03	24.11	23.95
			1	12	0	24.05	24.35	24.22
			1	24	0	24.02	24.03	24.12
			12	0	1	23.33	23.20	23.20
			12	7	1	23.20	23.20	23.20
			12	13	1	23.23	23.38	23.20
			25	0	1	23.24	23.34	23.40
		16QAM	1	0	1	23.20	23.00	23.20
			1	12	1	23.20	23.11	23.20
			1	24	1	23.20	22.69	23.20
			12	0	2	22.26	22.35	22.39
			12	7	2	22.26	22.20	22.20
			12	13	2	22.38	22.35	22.20
			25	0	2	22.28	22.20	22.20

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Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						19965	20175	20385
						1711.5 MHz	1732.5 MHz	1753.5 MHz
LTE Band 4	3	QPSK	1	0	0	23.80	24.05	24.11
			1	8	0	23.89	24.15	23.95
			1	14	0	23.92	23.98	24.15
			8	0	1	23.32	23.38	23.40
			8	4	1	23.32	23.40	23.40
			8	7	1	23.22	23.38	23.33
			15	0	1	23.25	23.40	23.40
		16QAM	1	0	1	23.40	23.40	23.40
			1	8	1	23.40	23.40	23.40
			1	14	1	23.40	23.40	23.40
			8	0	2	22.37	22.40	22.15
			8	4	2	22.40	22.23	21.95
			8	7	2	22.40	22.21	21.94
			15	0	2	22.20	22.40	22.40

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						19957	20175	20393
						1710.7 MHz	1732.5 MHz	1754.3 MHz
LTE Band 4	1.4	QPSK	1	0	0	23.91	23.26	24.20
			1	3	0	23.94	23.92	24.17
			1	5	0	23.78	24.01	24.02
			3	0	0	24.11	24.18	24.06
			3	1	0	24.03	24.15	24.24
			3	3	0	24.01	24.13	24.12
			6	0	1	23.22	23.31	23.27
		16QAM	1	0	1	23.40	23.40	23.40
			1	3	1	23.40	23.40	23.40
			1	5	1	23.40	23.40	23.40
			3	0	1	23.40	23.40	23.34
			3	1	1	23.40	23.40	23.30
			3	3	1	23.40	23.40	23.29
			6	0	2	22.40	22.40	22.23

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LTE Band 5

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20450	20525	20600
						829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0	23.53	23.57	23.79
			1	25	0	23.34	23.41	23.46
			1	49	0	23.36	23.56	23.80
			25	0	1	22.77	22.78	22.84
			25	12	1	22.67	22.71	22.77
			25	25	1	22.78	22.76	22.87
			50	0	1	22.67	22.76	22.94
		16QAM	1	0	1	22.96	22.88	22.95
			1	25	1	22.96	23.15	22.77
			1	49	1	22.90	23.20	23.20
			25	0	2	21.85	21.76	21.82
			25	12	2	21.63	21.57	21.84
			25	25	2	21.71	21.69	21.84
			50	0	2	21.73	21.66	21.91

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20425	20525	20625
						826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	23.63	23.62	23.44
			1	12	0	23.67	23.55	23.66
			1	24	0	23.48	23.59	23.42
			12	0	1	22.79	22.74	22.77
			12	7	1	22.68	22.70	22.84
			12	13	1	22.68	22.70	22.87
			25	0	1	22.64	22.69	22.83
		16QAM	1	0	1	22.98	22.72	22.72
			1	12	1	22.59	22.46	22.82
			1	24	1	22.88	22.59	22.83
			12	0	2	21.71	21.71	21.77
			12	7	2	21.56	21.59	21.83
			12	13	2	21.55	21.64	21.79
			25	0	2	21.72	21.66	21.76

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Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20415	20525	20635
						825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	23.57	23.47	23.47
			1	8	0	23.48	23.62	23.47
			1	14	0	23.38	23.66	23.65
			8	0	1	22.73	22.81	22.95
			8	4	1	22.68	22.67	22.87
			8	7	1	22.69	22.72	22.83
			15	0	1	22.66	22.69	22.87
		16QAM	1	0	1	22.85	23.20	23.20
			1	8	1	22.52	23.20	23.20
			1	14	1	22.37	23.20	23.20
			8	0	2	21.86	21.91	21.94
			8	4	2	21.82	21.92	21.79
			8	7	2	21.85	21.85	21.46
			15	0	2	21.67	21.65	21.93

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20407	20525	20643
						824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	23.66	23.42	23.51
			1	3	0	23.50	23.35	23.47
			1	5	0	23.45	23.45	23.46
			3	0	0	23.51	23.46	23.59
			3	1	0	23.49	23.59	23.75
			3	3	0	23.58	23.57	23.57
			6	0	1	22.64	22.70	22.75
		16QAM	1	0	1	23.15	23.20	23.20
			1	3	1	23.20	23.20	23.20
			1	5	1	23.20	23.20	23.20
			3	0	1	22.97	22.71	22.72
			3	1	1	22.90	22.74	22.75
			3	3	1	22.89	22.38	22.81
			6	0	2	21.60	21.59	21.48

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LTE Band 17

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm) 23790 710 MHz
LTE Band 17	10	QPSK	1	0	0	23.60
			1	25	0	23.60
			1	49	0	23.60
			25	0	1	22.70
			25	12	1	22.70
			25	25	1	22.60
			50	0	1	22.70
		16QAM	1	0	1	22.85
			1	25	1	22.84
			1	49	1	22.75
			25	0	2	21.78
			25	12	2	21.60
			25	25	2	21.76
			50	0	2	21.78
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm) 23790 710 MHz
LTE Band 17	5	QPSK	1	0	0	23.52
			1	12	0	23.68
			1	24	0	23.57
			12	0	1	22.62
			12	7	1	22.58
			12	13	1	22.62
			25	0	1	22.61
		16QAM	1	0	1	22.98
			1	12	1	22.67
			1	24	1	22.91
			12	0	2	21.72
			12	7	2	21.50
			12	13	2	21.53
			25	0	2	21.68

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9. PEAK TO AVERAGE RATIO

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

TEST SPEC

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

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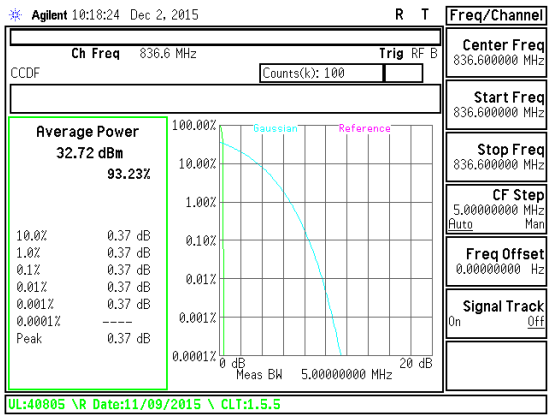
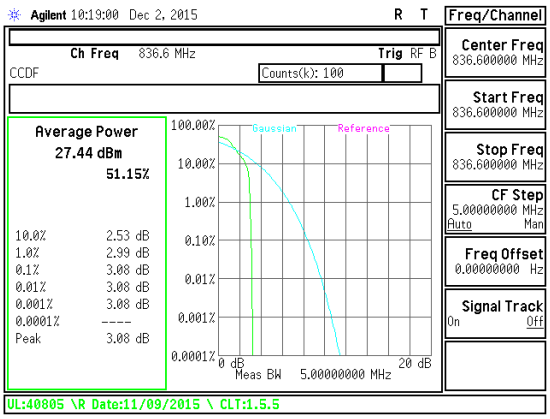
9.1. CONDUCTED PEAK TO AVERAGE RESULT

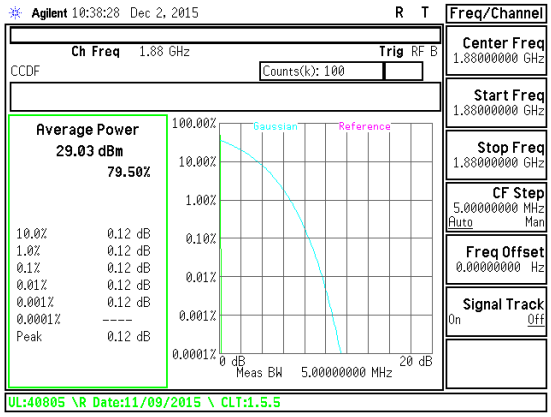
GSM



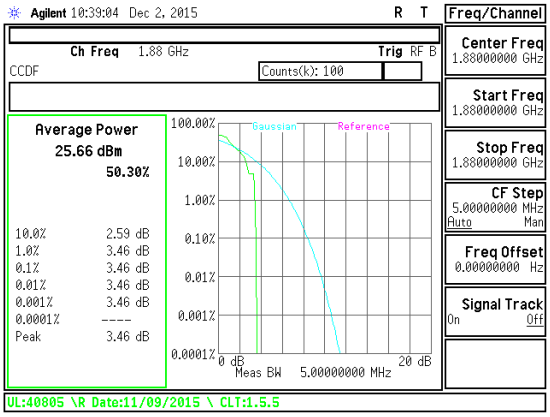
Band GSM850 GPRS Mid channel



Band GSM850 EGPRS Mid channel



Band GSM1900 GPRS Mid channel



Band GSM1900 EGPRS Mid channel

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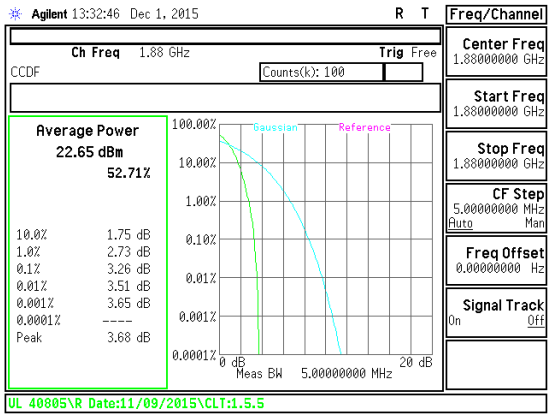
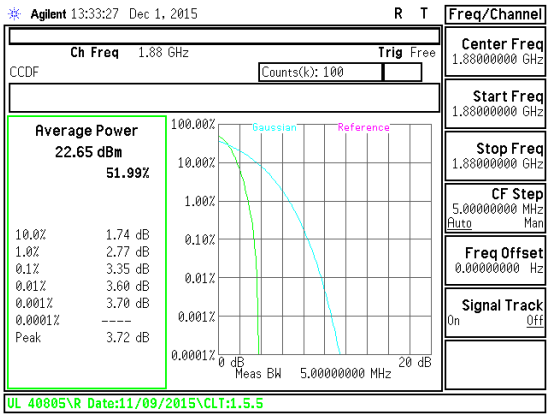
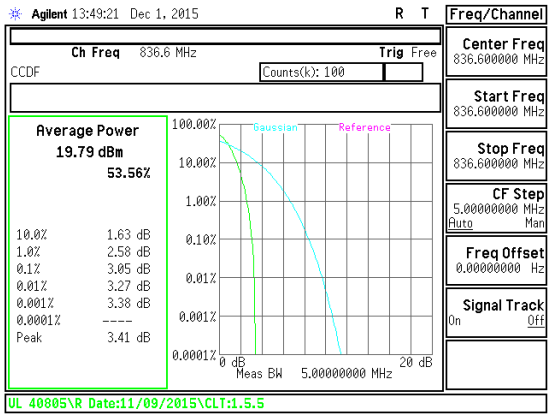
WCDMA



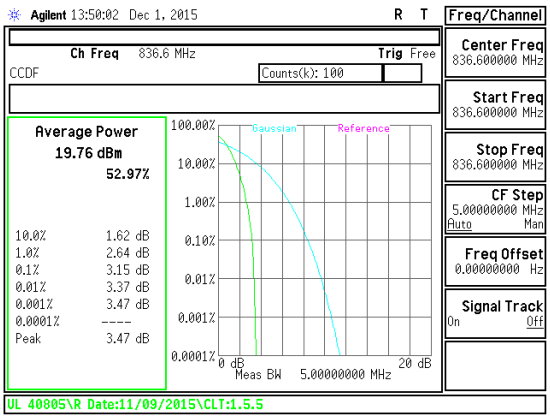
Band WCDMA B2 REL99



Band WCDMA B2 HSDPA



Band WCDMA B5 REL99



Band WCDMA B5 HSDPA

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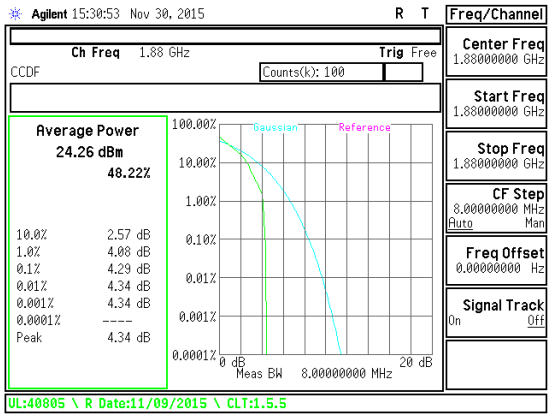
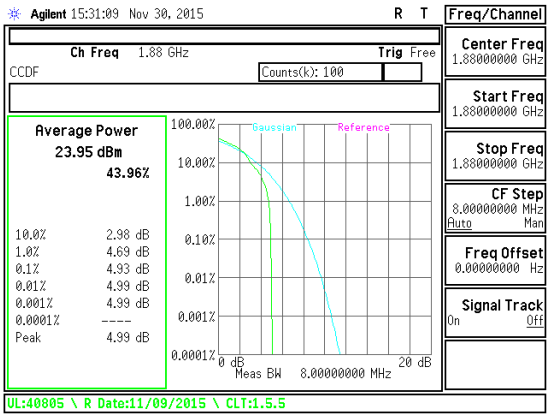
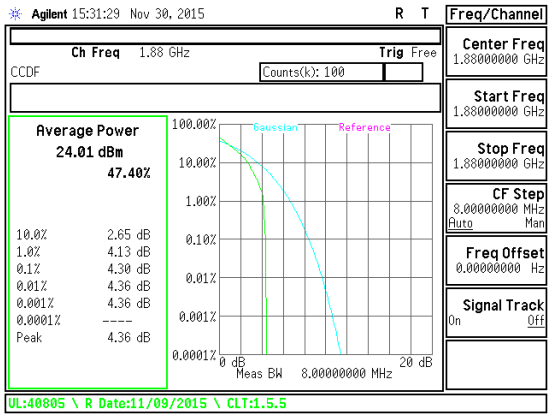
LTE Band 2



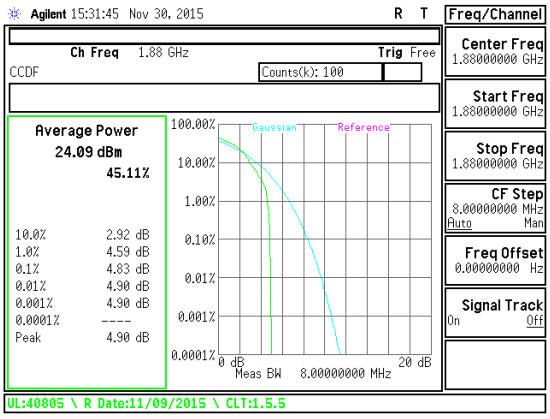
Band LTE2 1.4MHz QPSK Mid Channel



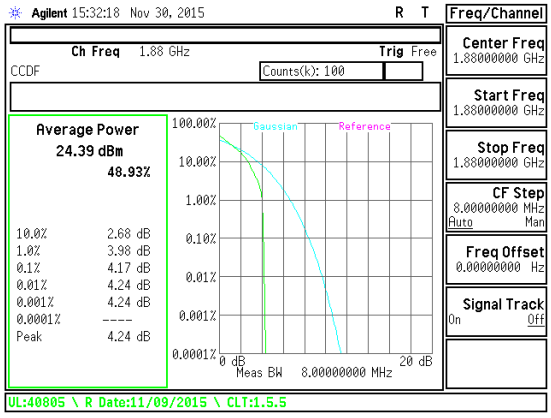
Band LTE2 1.4MHz 16QAM Mid Channel



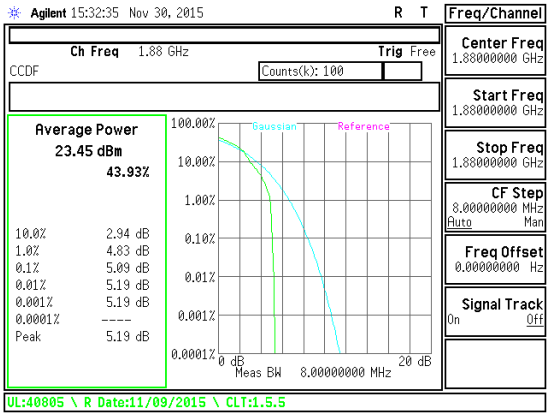
Band LTE2 3MHz QPSK Mid Channel



Band LTE2 3MHz 16QAM Mid Channel



Band LTE2 5MHz QPSK Mid Channel



Band LTE2 5MHz 16QAM Mid Channel

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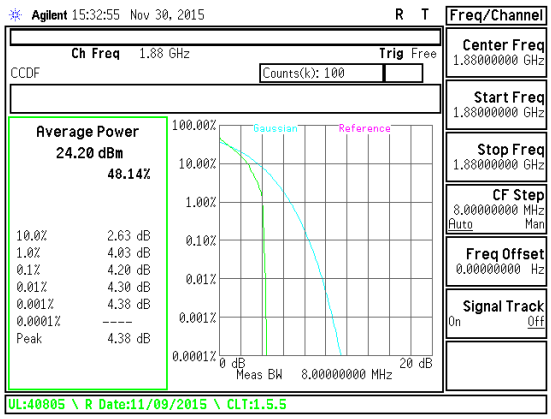
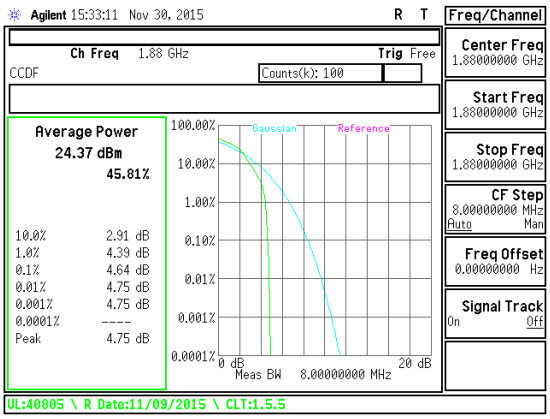
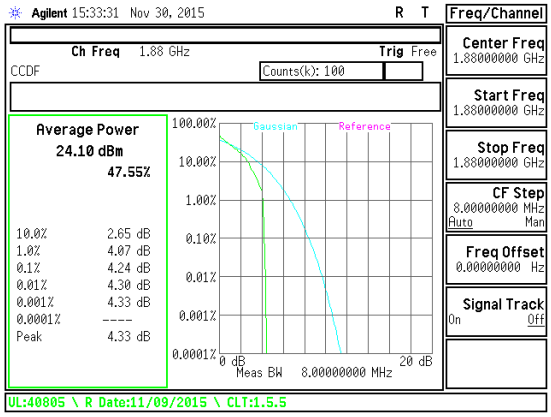


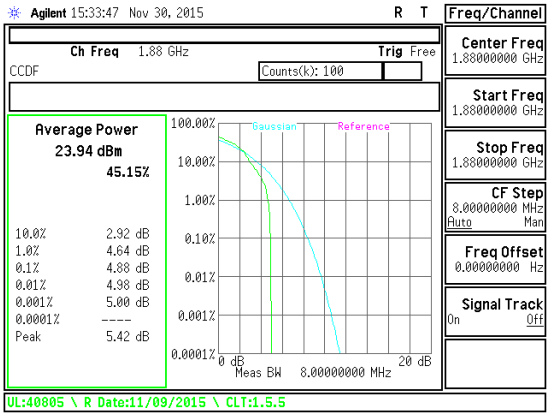
Band LTE2 10MHz QPSK Mid Channel



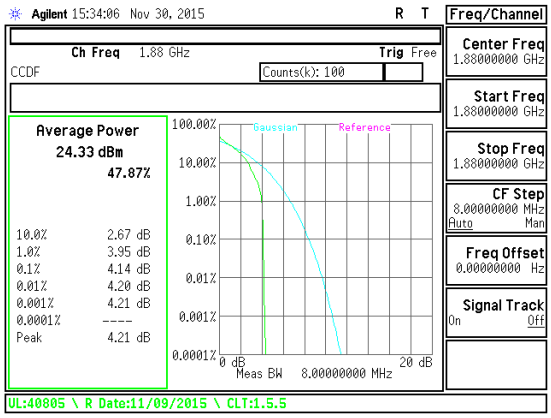
Band LTE2 10MHz 16QAM Mid Channel



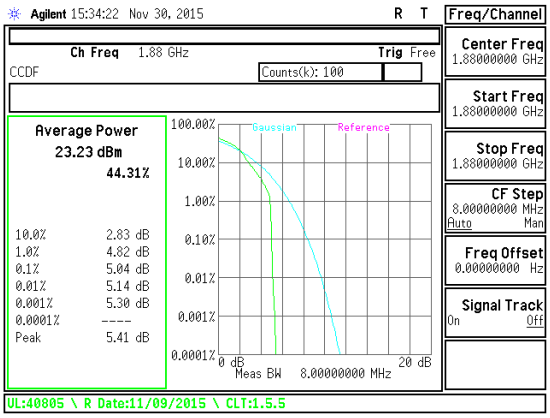
Band LTE2 15MHz QPSK Mid Channel



Band LTE2 15MHz 16QAM Mid Channel



Band LTE2 20MHz QPSK Mid Channel



Band LTE2 20MHz 16QAM Mid Channel

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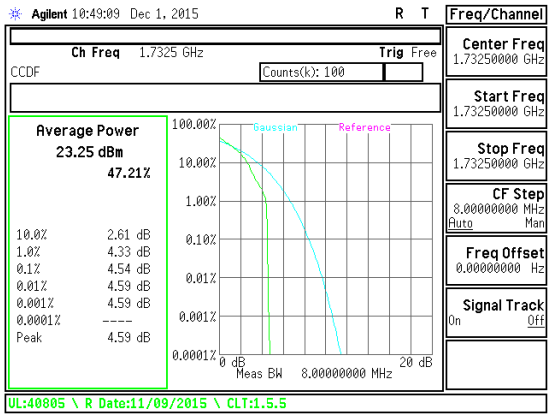
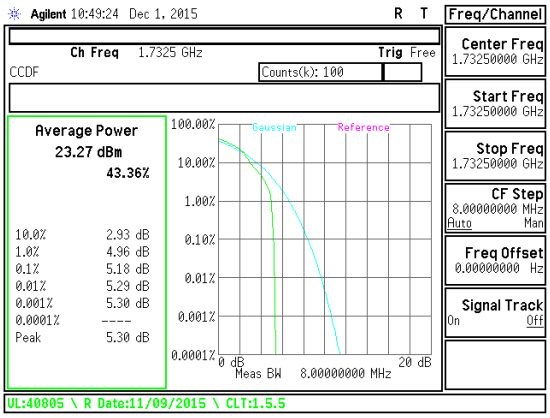
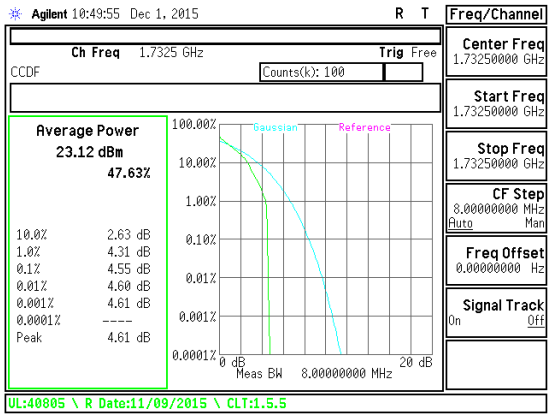
LTE Band 4



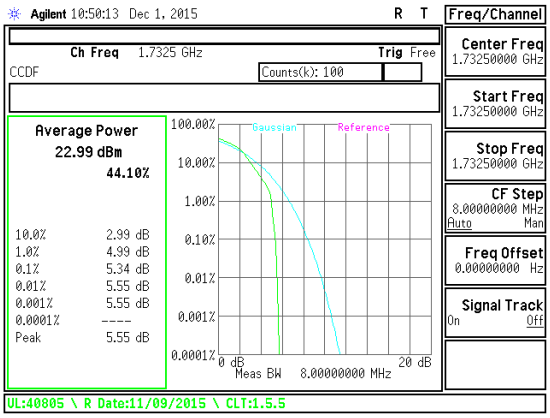
Band LTE4 1.4MHz QPSK Mid Channel



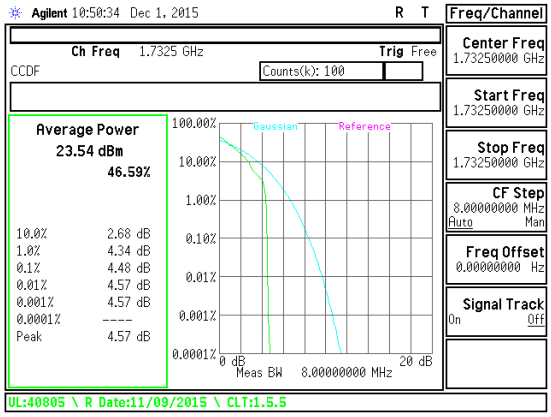
Band LTE4 1.4MHz 16QAM Mid Channel



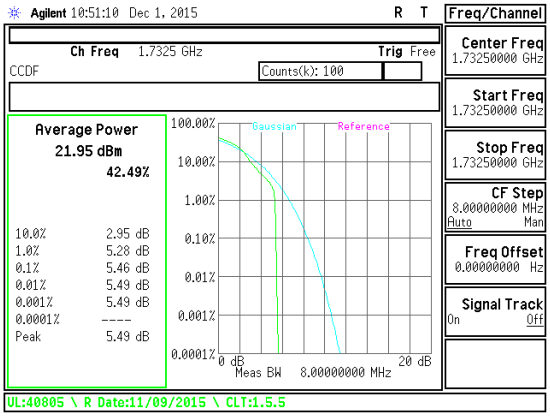
Band LTE4 3MHz QPSK Mid Channel



Band LTE4 3MHz 16QAM Mid Channel



Band LTE4 5MHz QPSK Mid Channel



Band LTE4 5MHz 16QAM Mid Channel

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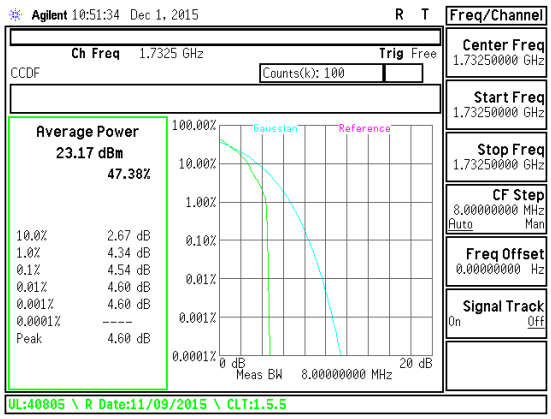
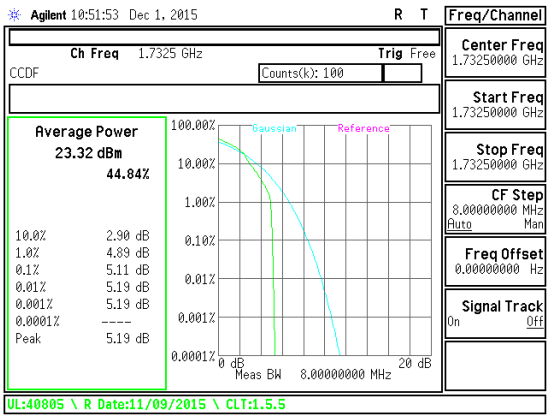
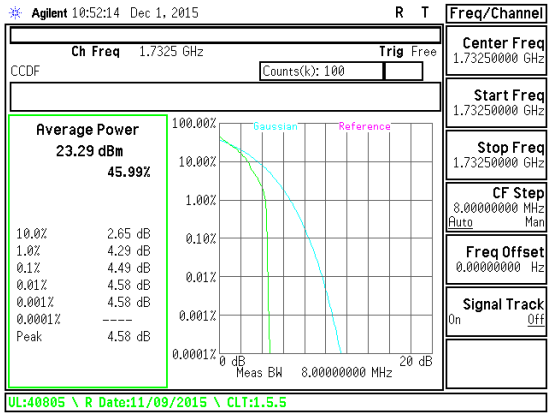


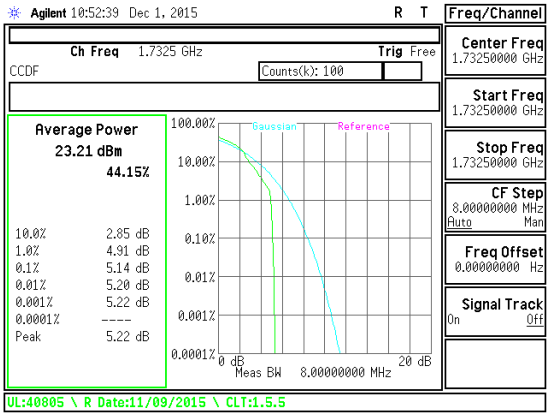
Band LTE4 10MHz QPSK Mid Channel



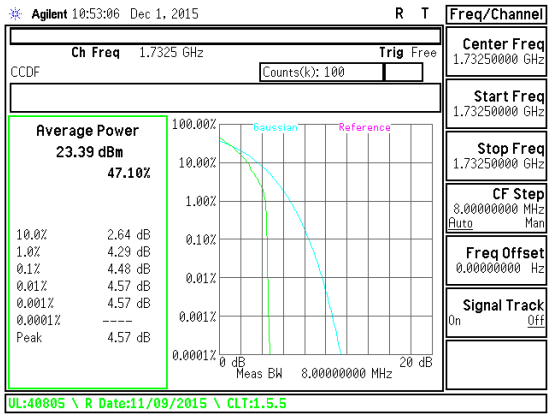
Band LTE4 10MHz 16QAM Mid Channel



Band LTE4 15MHz QPSK Mid Channel

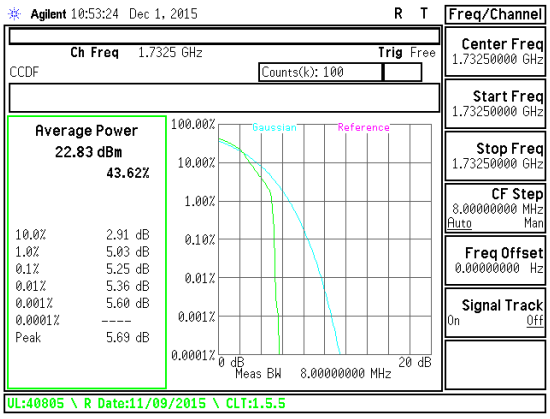


Band LTE4 15MHz 16QAM Mid Channel



Band LTE4 20MHz QPSK Mid Channel

B



and LTE4 20MHz 16QAM Mid Channel

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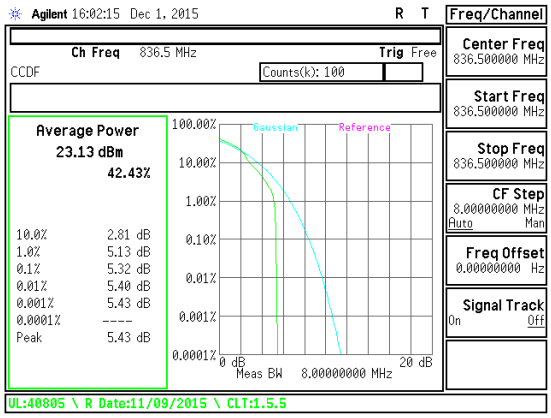
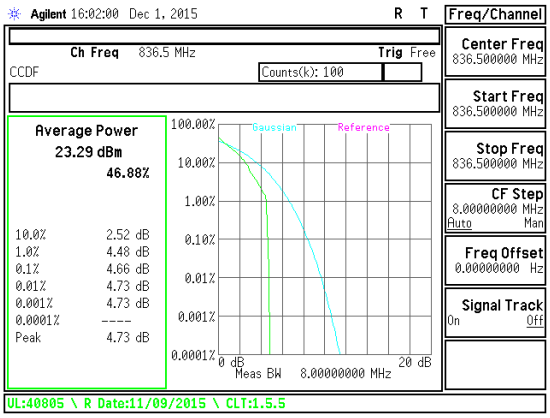
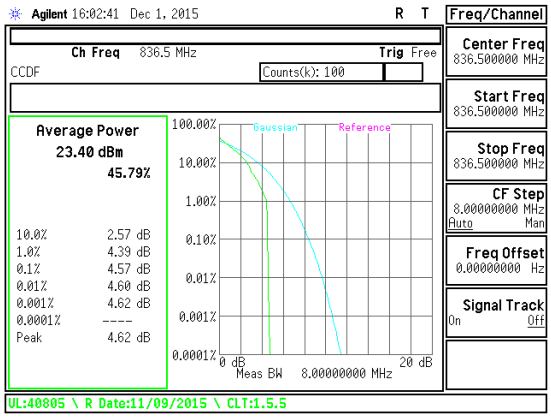
LTE Band 5



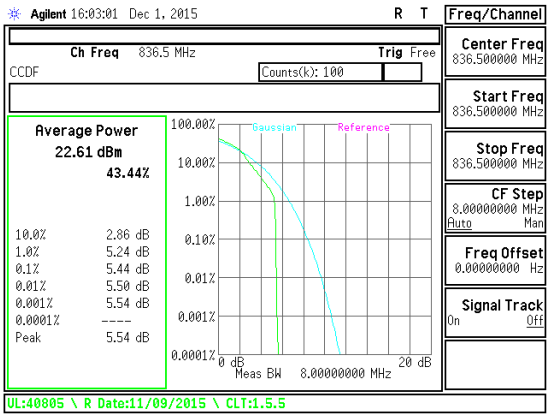
Band LTE5 1.4MHz QPSK Mid Channel



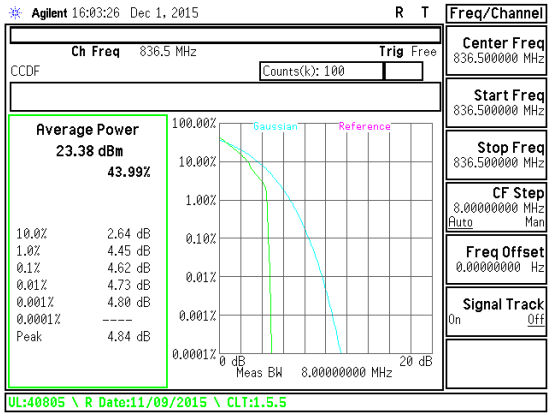
Band LTE5 1.4MHz 16QAM Mid Channel



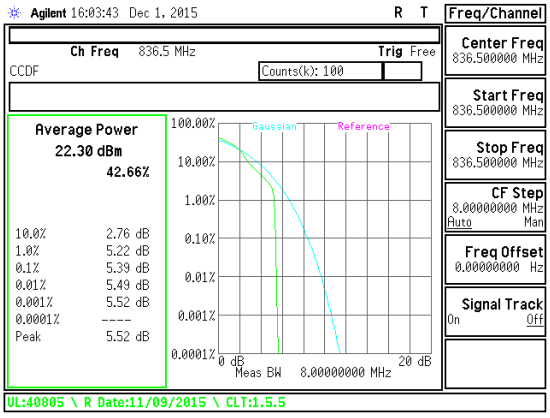
Band LTE5 3MHz QPSK Mid Channel



Band LTE5 3MHz 16QAM Mid Channel



Band LTE5 5MHz QPSK Mid Channel



Band LTE5 5MHz 16QAM Mid Channel

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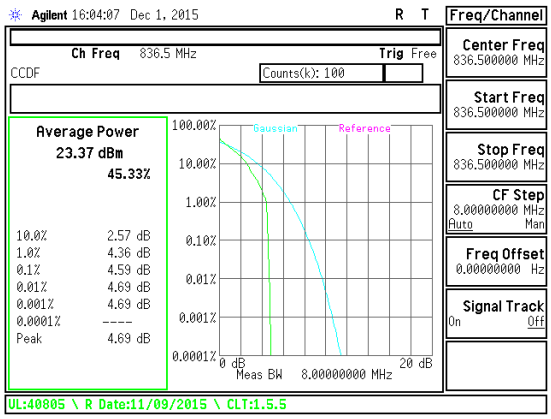
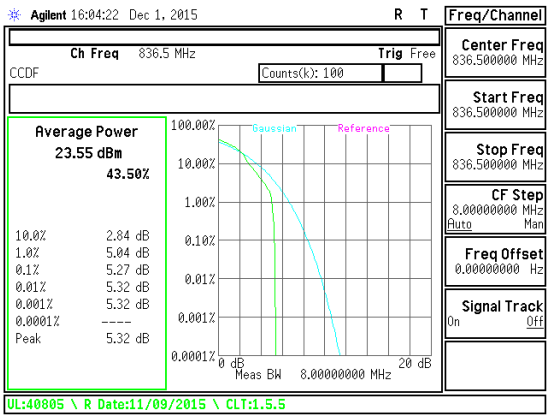


Band LTE5 10MHz QPSK Mid Channel



Band LTE5 10MHz 16QAM Mid Channel

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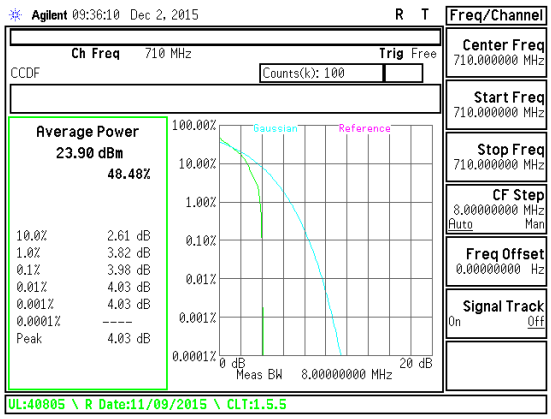
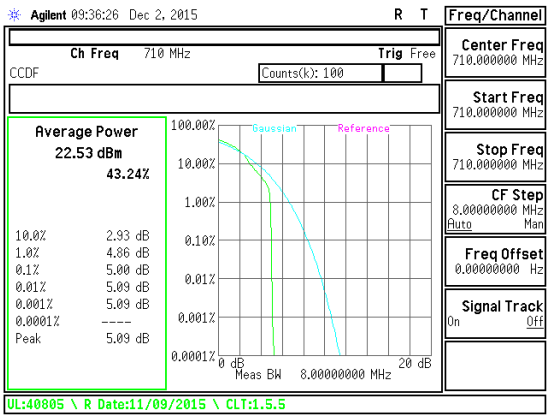
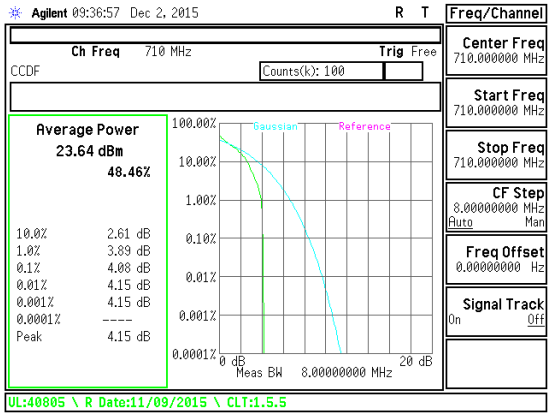
LTE Band 17



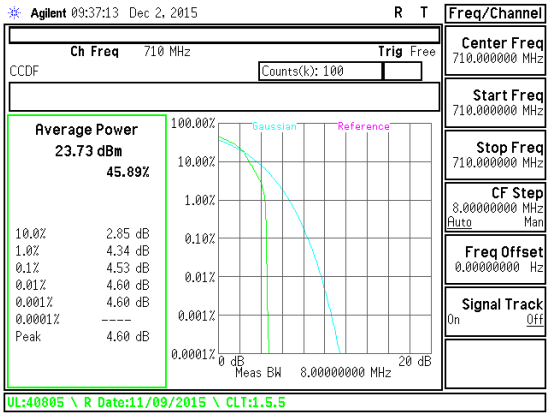
Band LTE17 5MHz QPSK Mid Channel



Band LTE17 5MHz 16QAM Mid Channel



Band LTE17 10MHz QPSK Mid Channel



Band LTE17 10MHz 16QAM Mid Channel

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10. LIMITS AND CONDUCTED RESULTS

10.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

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 the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v02r02)

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10.1.1. OCCUPIED BANDWIDTH RESULTS AND PLOTS

GSM

Band	Mode	Channel	f (MHz)	99% BW (kHz)	-26dB (kHz)
GSM 850	GPRS	128	824.2	246.1	314.4
		190	836.6	243.3	317.6
		251	848.8	246	316.1
	EGPRS	128	824.2	238.2	302.8
		190	836.6	238.5	296.1
		251	848.8	240.7	302.2
GSM 1900	GPRS	512	1850.2	246	316.7
		661	1880	243	311.4
		810	1909.8	248.5	317.4
	EGPRS	512	1850.2	239	312.2
		661	1880	241.2	300.2
		810	1909.8	244.5	311.7

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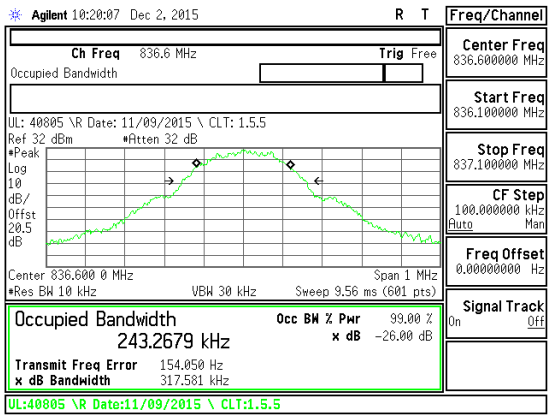
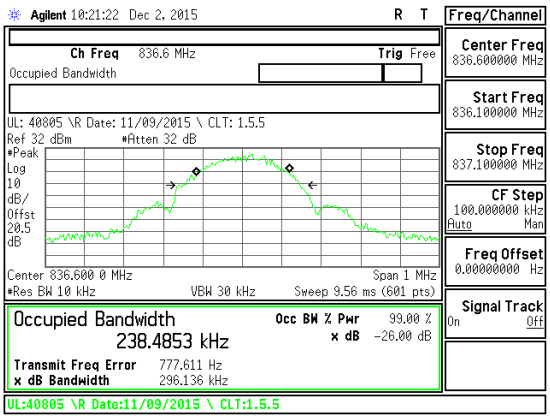
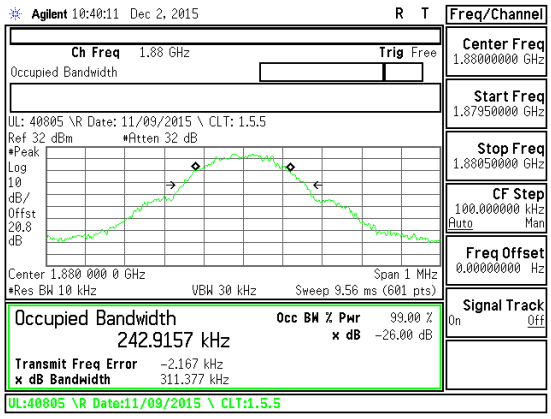


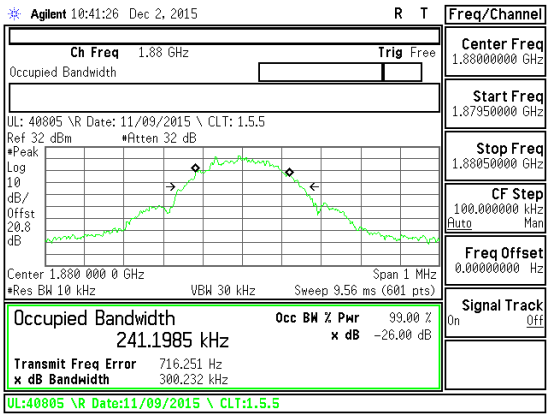
Band GSM850 GPRS Mid channel



Band GSM850 EGPRS Mid channel



Band GSM1900 GPRS Mid channel



Band GSM1900 EGPRS Mid channel

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WCDMA

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB (MHz)
Band 2	REL99	9262	1852.4	4.18	4.636
		9400	1880	4.168	4.631
		9538	1907.6	4.174	4.634
	HSDPA	9262	1852.4	4.192	4.602
		9400	1880	4.184	4.643
		9538	1907.6	4.182	4.62
Band 5	REL99	4132	826.4	4.165	4.656
		4183	836.6	4.152	4.662
		4233	846.6	4.166	4.66
	HSDPA	4132	826.4	4.167	4.655
		4183	836.6	4.147	4.633
		4233	846.6	4.154	4.646

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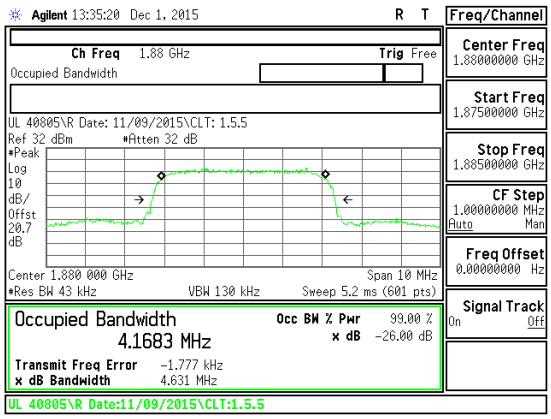
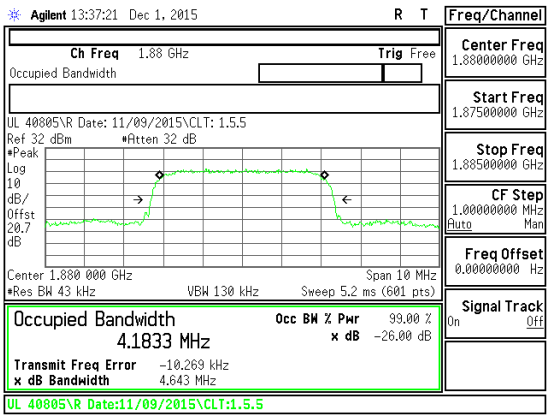
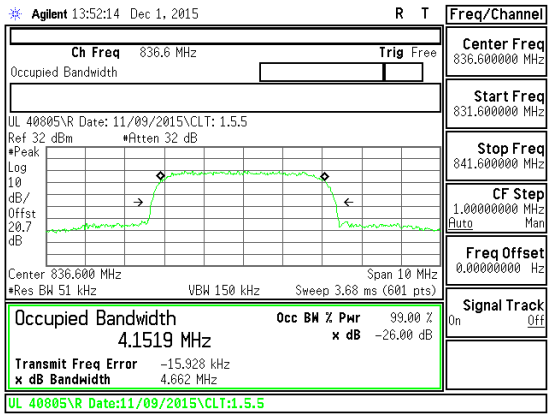


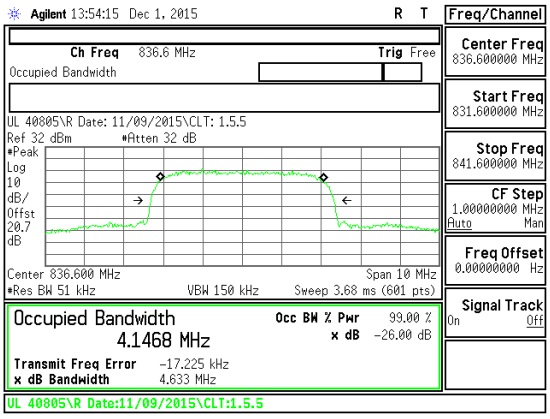
Band B2 REL99



Band B2 HSDPA



Band B5 **REL99**



Band B5 HSDPA

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LTE Band 2

BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
1.4	QPSK	6/0	1850.7	1.086	1.27
		6/0	1880	1.079	1.246
		6/0	1909.3	1.084	1.305
	16QAM	6/0	1850.7	1.082	1.272
		6/0	1880	1.08	1.275
		6/0	1909.3	1.092	1.303
3	QPSK	15/0	1851.5	2.684	2.97
		15/0	1880	2.689	2.977
		15/0	1908.5	2.69	2.996
	16QAM	15/0	1851.5	2.695	2.944
		15/0	1880	2.684	2.969
		15/0	1908.5	2.684	2.987
5	QPSK	25/0	1852.5	4.497	4.943
		25/0	1880	4.503	4.949
		25/0	1907.5	4.502	4.932
	16QAM	25/0	1852.5	4.517	5.019
		25/0	1880	4.496	4.934
		25/0	1907.5	4.496	4.947
10	QPSK	50/0	1855	8.966	9.641
		50/0	1880	8.971	9.809
		50/0	1905	8.983	9.888
	16QAM	50/0	1855	8.965	9.767
		50/0	1880	8.962	9.681
		50/0	1905	8.996	9.746
15	QPSK	75/0	1857.5	13.415	14.241
		75/0	1880	13.410	14.448
		75/0	1902.5	13.46.	14.559
	16QAM	75/0	1857.5	13.402	14.583
		75/0	1880	13.424	14.517
		75/0	1902.5	13.438	14.472
20	QPSK	100/0	1860	17.882	19.146
		100/0	1880	17.851	19.224
		100/0	1900	17.872	19.432
	16QAM	100/0	1860	17.844	19.828
		100/0	1880	17.889	19.330
		100/0	1900	17.867	19.319

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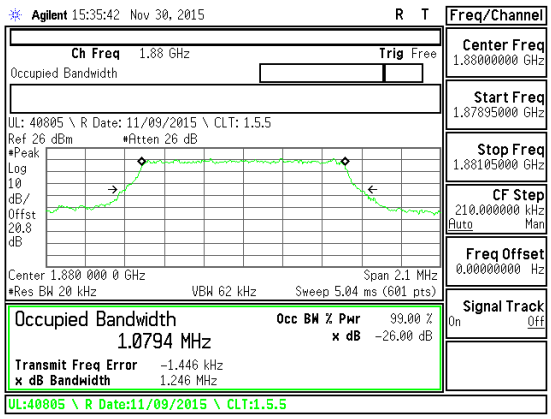
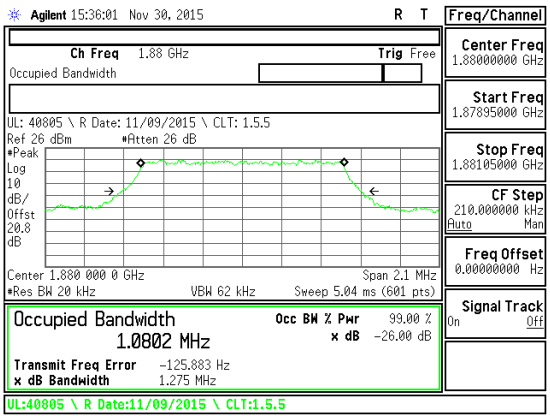
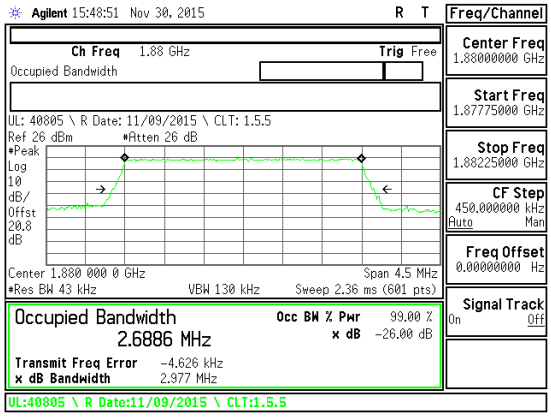


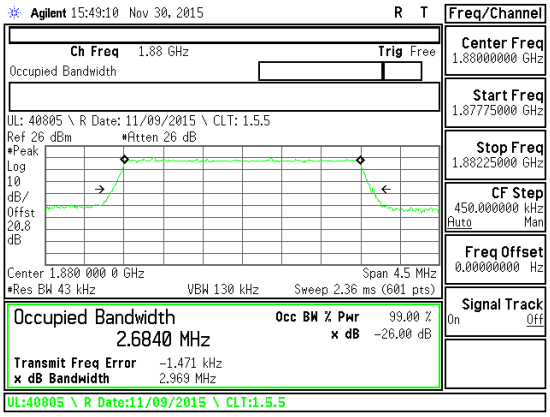
Band LTE2 1.4MHz QPSK Mid Channel



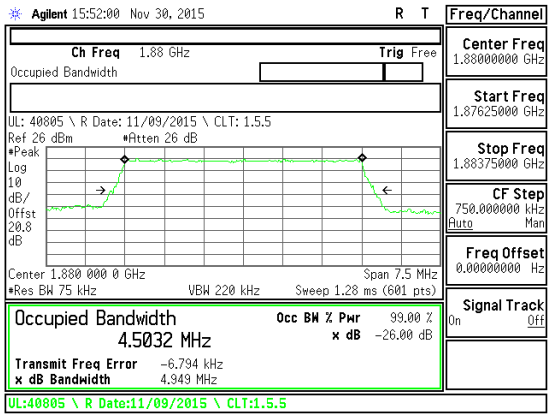
Band LTE2 1.4MHz 16QAM Mid Channel



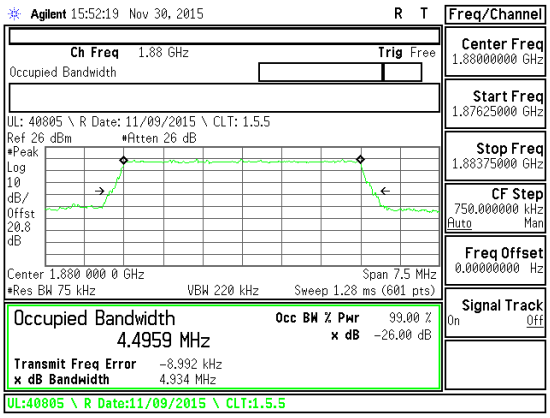
Band LTE2 3MHz QPSK Mid Channel



Band LTE2 3MHz 16QAM Mid Channel



Band LTE2 5MHz QPSK Mid Channel



Band LTE2 5MHz 16QAM Mid Channel

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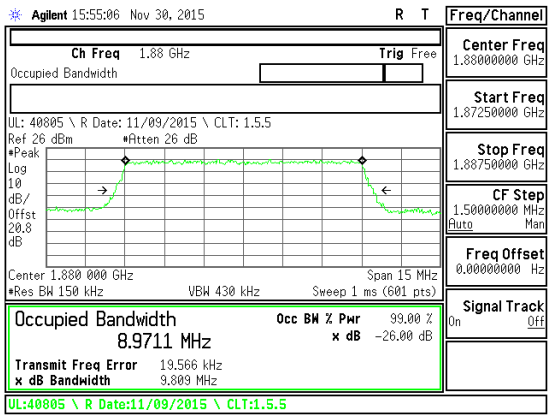
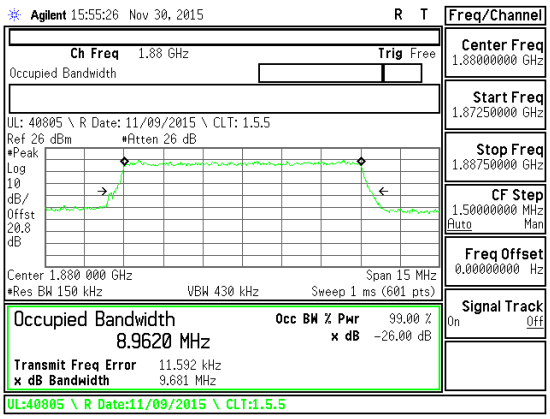
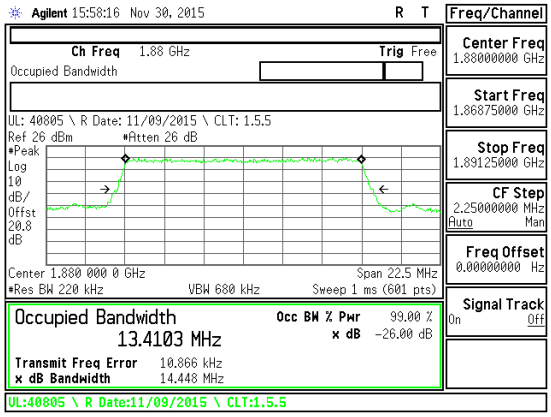


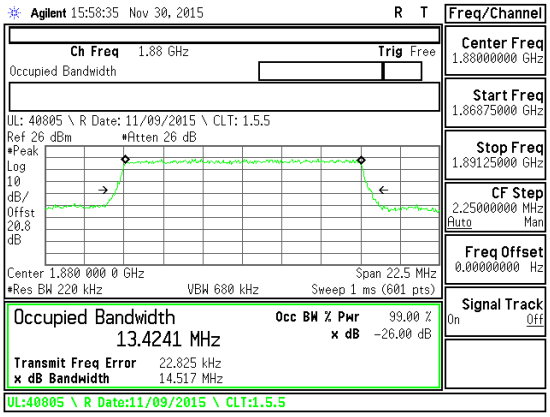
Band LTE2 10MHz QPSK Mid Channel



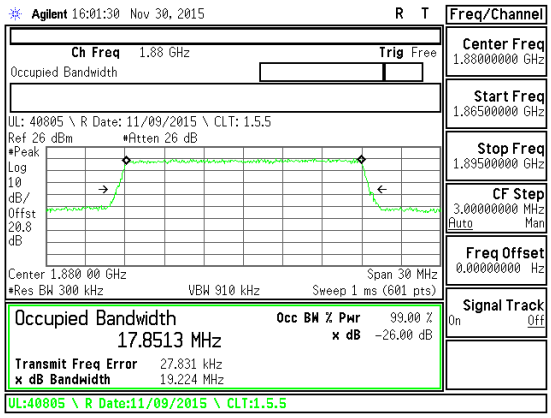
Band LTE2 10MHz 16QAM Mid Channel



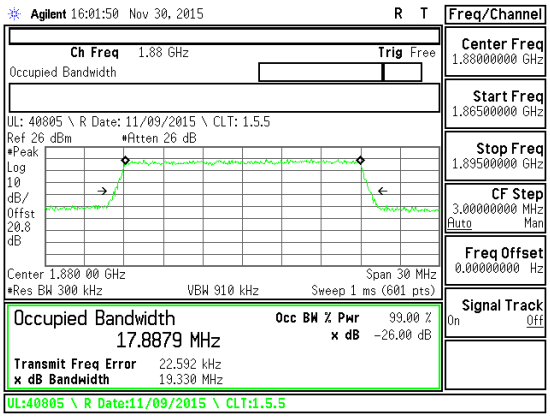
Band LTE2 15MHz QPSK Mid Channel



Band LTE2 15MHz 16QAM Mid Channel



Band LTE2 20MHz QPSK Mid Channel



Band LTE2 20MHz 16QAM Mid Channel

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LTE Band 4

BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
1.4	QPSK	6/0	1710.7	1.086	1.265
		6/0	1732.5	1.081	1.253
		6/0	1754.3	1.087	1.264
	16QAM	6/0	1710.7	1.08	1.263
		6/0	1732.5	1.086	1.282
		6/0	1754.3	1.084	1.291
3	QPSK	15/0	1711.5	2.691	2.952
		15/0	1732.5	2.693	2.977
		15/0	1753.5	2.69	2.957
	16QAM	15/0	1711.5	2.691	2.95
		15/0	1732.5	2.69	2.962
		15/0	1753.5	2.683	2.965
5	QPSK	25/0	1712.5	4.492	4.981
		25/0	1732.5	4.5	5.019
		25/0	1752.5	4.511	4.905
	16QAM	25/0	1712.5	4.516	4.929
		25/0	1732.5	4.503	4.972
		25/0	1752.5	4.495	4.909
10	QPSK	50/0	1715	8.96	9.8
		50/0	1732.5	8.96	9.782
		50/0	1750	8.987	9.769
	16QAM	50/0	1715	8.956	9.682
		50/0	1732.5	8.978	9.697
		50/0	1750	8.971	9.659
15	QPSK	75/0	1717.5	13.368	14.666
		75/0	1732.5	13.403	14.417
		75/0	1747.5	13.435	14.595
	16QAM	75/0	1717.5	13.435	14.456
		75/0	1732.5	13.466	14.535
		75/0	1747.5	13.420	14.382
20	QPSK	100/0	1720	17.853	19.101
		100/0	1732.5	17.888	19.207
		100/0	1745	17.863	19.242
	16QAM	100/0	1720	17.851	19.288
		100/0	1732.5	17.897	19.226
		100/0	1745	17.875	19.280

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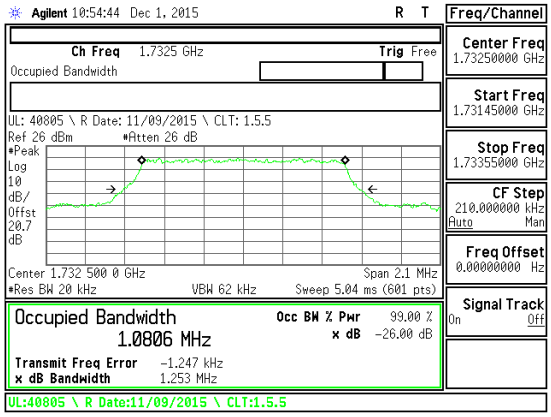
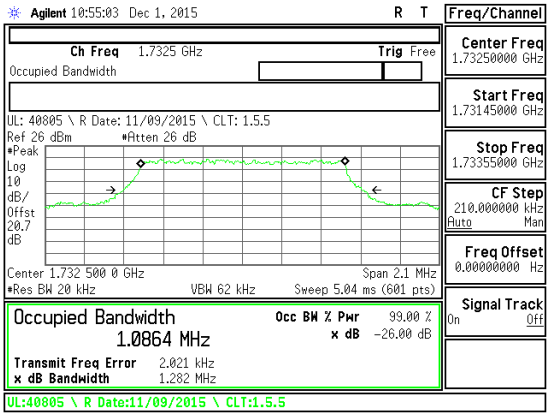
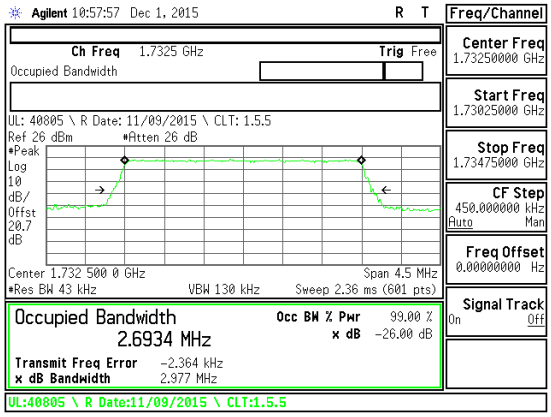


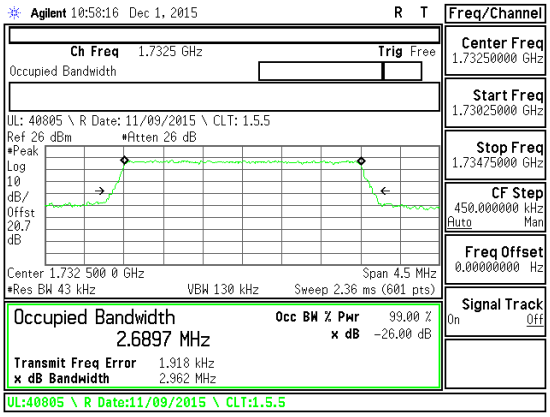
Band LTE4 1.4MHz QPSK Mid Channel



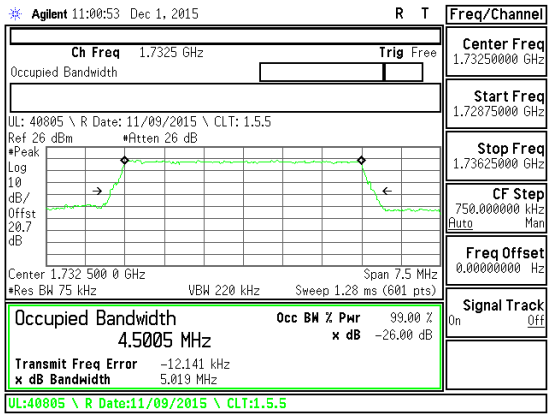
Band LTE4 1.4MHz 16QAM Mid Channel



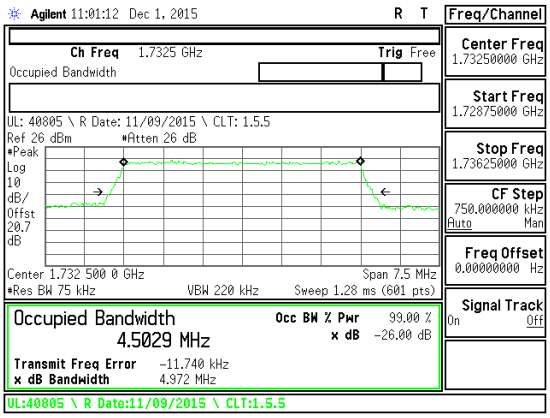
Band LTE4 3MHz QPSK Mid Channel



Band LTE4 3MHz 16QAM Mid Channel



Band LTE4 5MHz QPSK Mid Channel



Band LTE4 5MHz 16QAM Mid Channel

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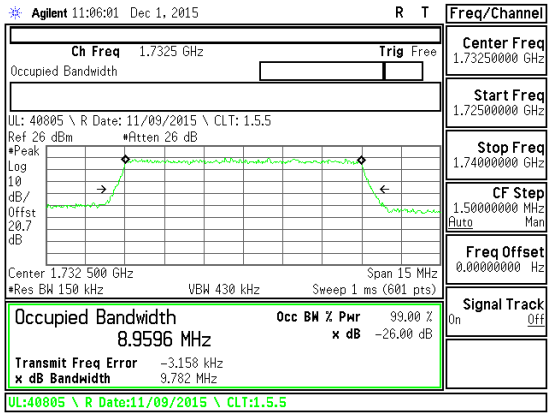
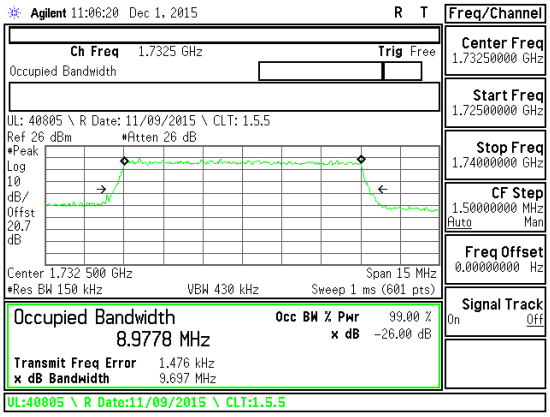
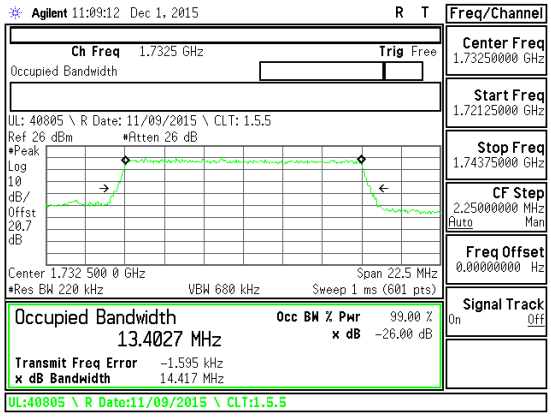


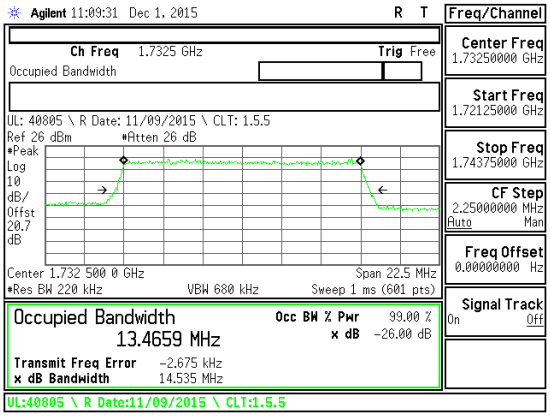
Band LTE4 10MHz QPSK Mid Channel



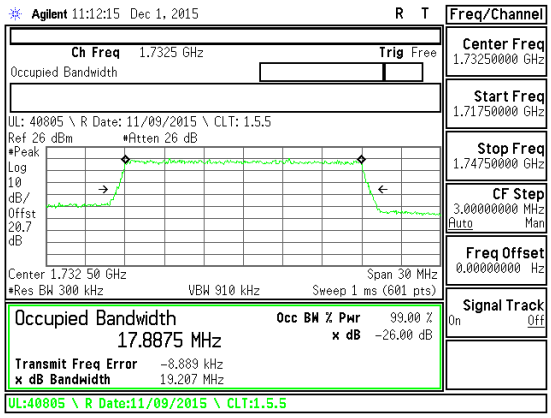
Band LTE4 10MHz 16QAM Mid Channel



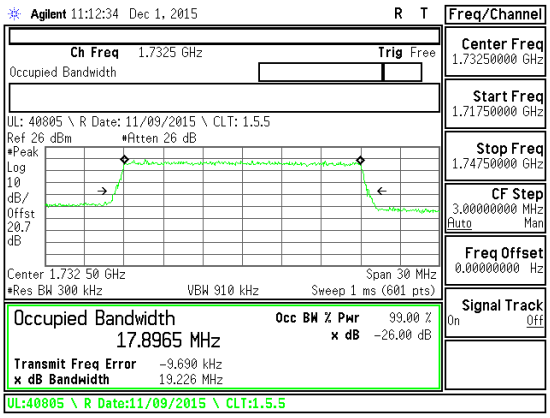
Band LTE4 15MHz QPSK Mid Channel



Band LTE4 15MHz 16QAM Mid Channel



Band LTE4 20MHz QPSK Mid Channel



Band LTE4 20MHz 16QAM Mid Channel

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LTE Band 5

BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
1.4	QPSK	6/0	824.7	1.083	1.266
		6/0	836.5	1.079	1.257
		6/0	848.3	1.084	1.261
	16QAM	6/0	824.7	1.084	1.277
		6/0	836.5	1.085	1.273
		6/0	848.3	1.09	1.287
3	QPSK	15/0	825.5	2.68	2.959
		15/0	836.5	2.688	2.927
		15/0	847.5	2.69	2.946
	16QAM	15/0	825.5	2.688	2.952
		15/0	836.5	2.684	2.966
		15/0	847.5	2.687	2.974
5	QPSK	25/0	826.5	4.506	4.958
		25/0	836.5	4.5	4.957
		25/0	846.5	4.492	4.943
	16QAM	25/0	826.5	4.511	4.951
		25/0	836.5	4.486	4.953
		25/0	846.5	4.494	4.941
10	QPSK	50/0	829	8.98	9.754
		50/0	836.5	8.974	9.783
		50/0	844	8.961	9.719
	16QAM	50/0	829	8.984	9.789
		50/0	836.5	8.968	9.864
		50/0	844	8.967	9.825

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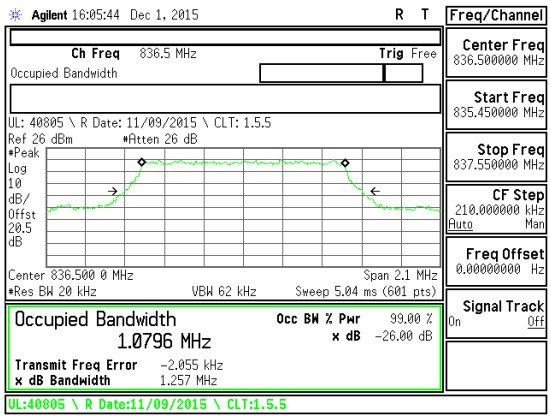
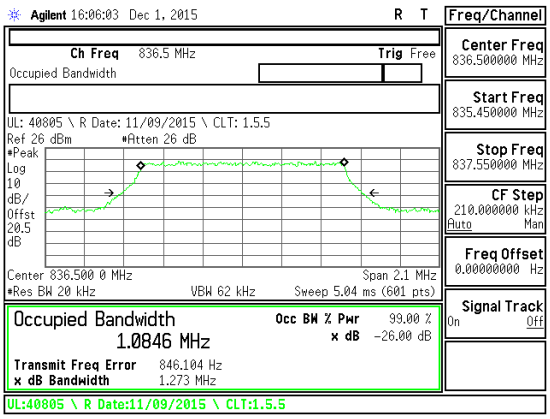
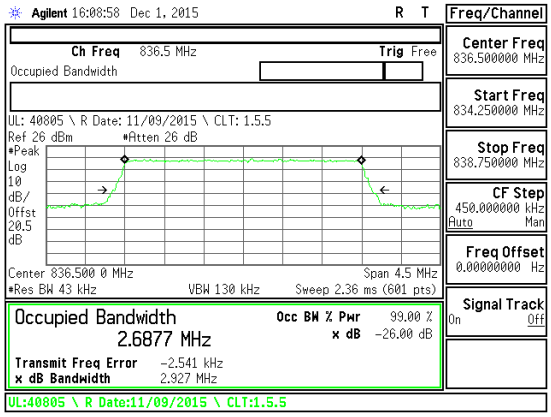


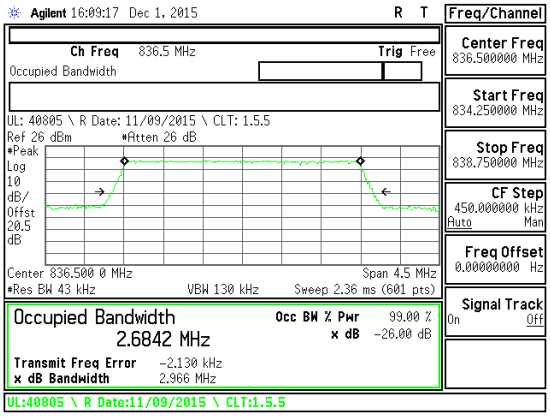
Band LTE5 1.4MHz QPSK Mid Channel



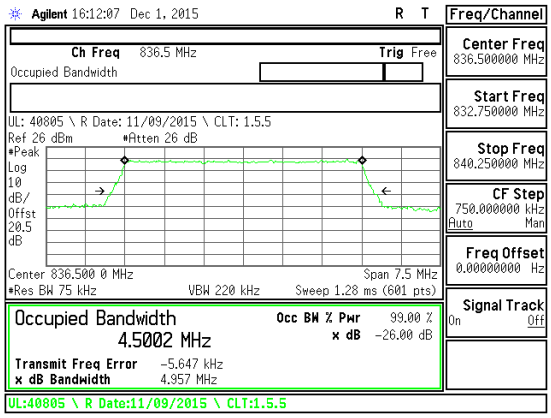
Band LTE5 1.4MHz 16QAM Mid Channel



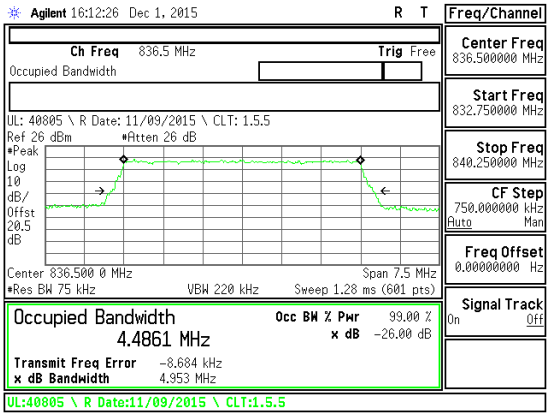
Band LTE5 3MHz QPSK Mid Channel



Band LTE5 3MHz 16QAM Mid Channel



Band LTE5 5MHz QPSK Mid Channel



Band LTE5 5MHz 16QAM Mid Channel

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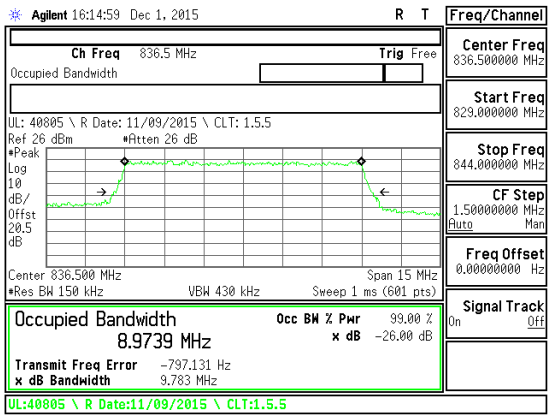
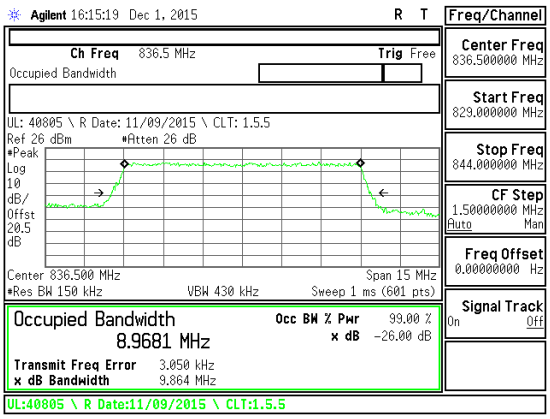


Band LTE5 10MHz QPSK Mid Channel



Band LTE5 10MHz 16QAM Mid Channel

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LTE Band 17

BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
5	QPSK	25/0	706.5	4.507	4.973
		25/0	710	4.503	4.985
		25/0	713.5	4.513	4.961
	16QAM	25/0	706.5	4.504	4.967
		25/0	710	4.505	4.965
		25/0	713.5	4.497	4.98
10	QPSK	50/0	709	8.982	9.794
		50/0	710	8.971	9.781
		50/0	711	8.965	9.631
	16QAM	50/0	709	8.962	9.762
		50/0	710	8.956	9.698
		50/0	711	8.992	9.82

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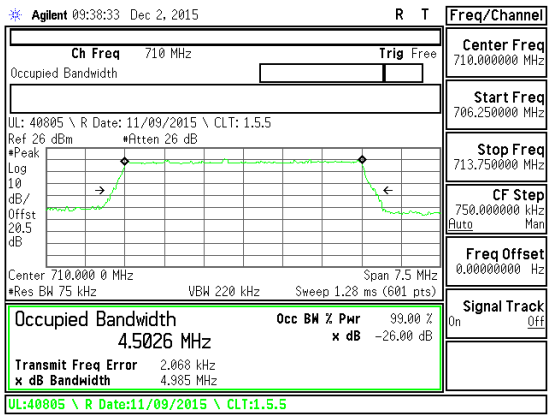
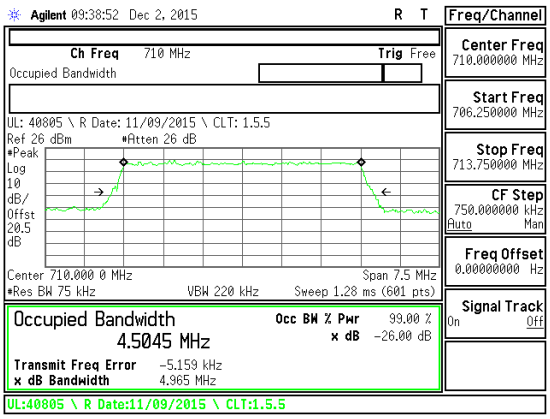
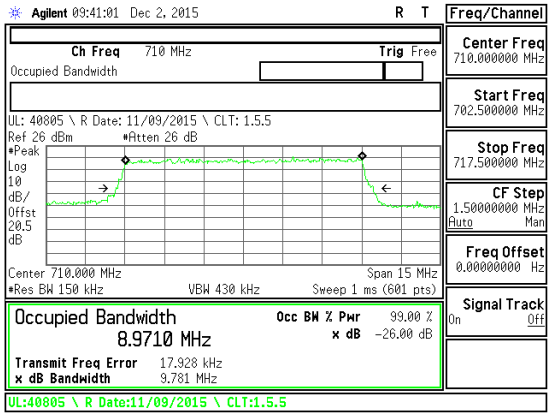


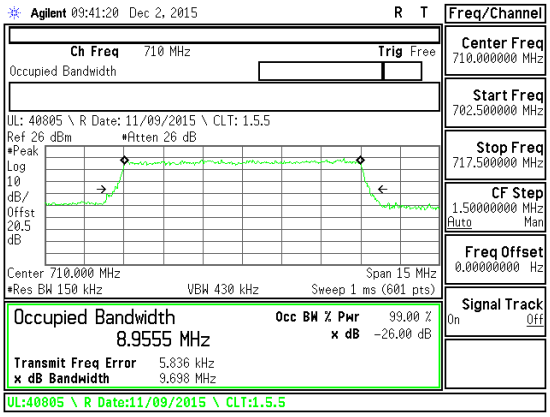
Band LTE17 5MHz QPSK Mid Channel



Band LTE17 5MHz 16QAM Mid Channel



Band LTE17 10MHz QPSK Mid Channel



Band LTE17 10MHz 16QAM Mid Channel

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11. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.917, §24.238, §27.53

LIMITS

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.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02
The transmitter output was connected to an Agilent 8960 or a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

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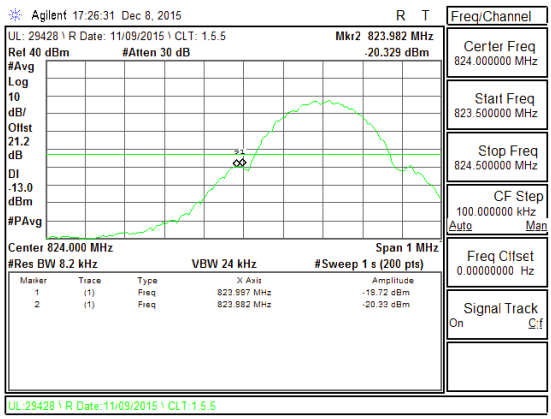
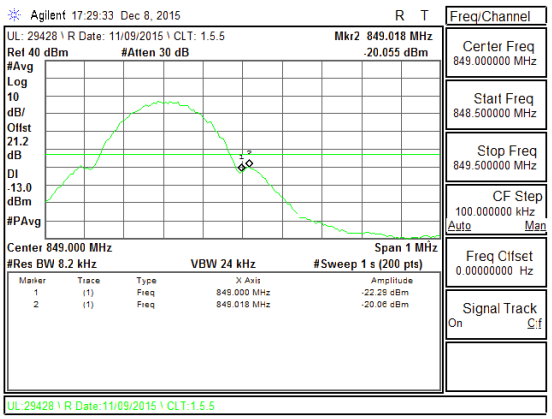
11.1.1. BAND EDGE PLOTS

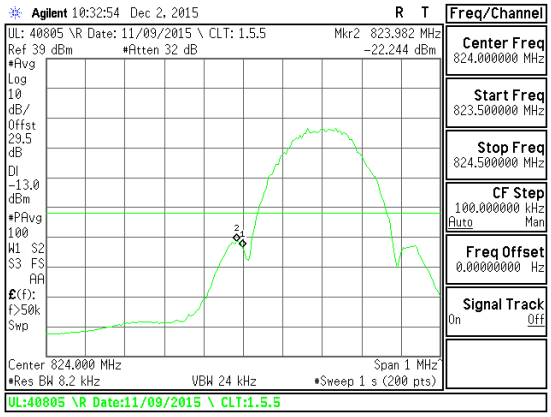
GSM



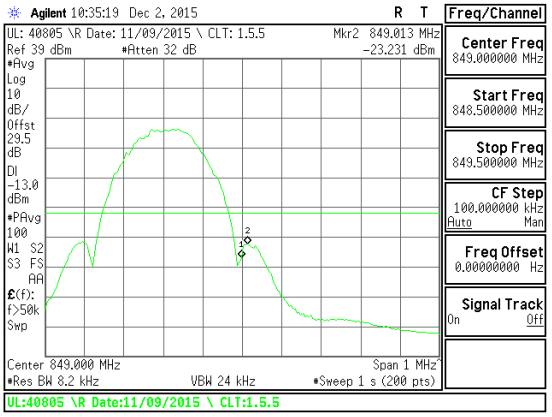
Band GSM850 GPRS Low channel



Band GSM850 GPRS High channel



Band GSM850 EGPRS Low channel



Band GSM850 EGPRS High channel

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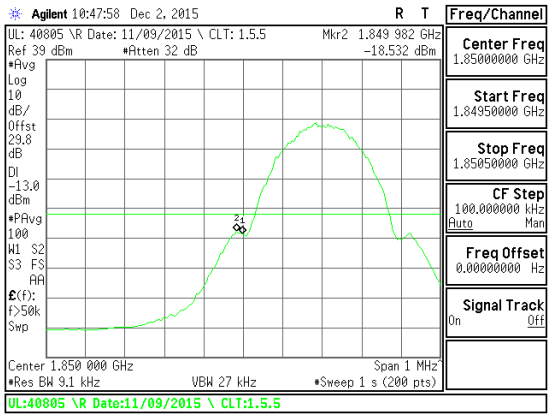
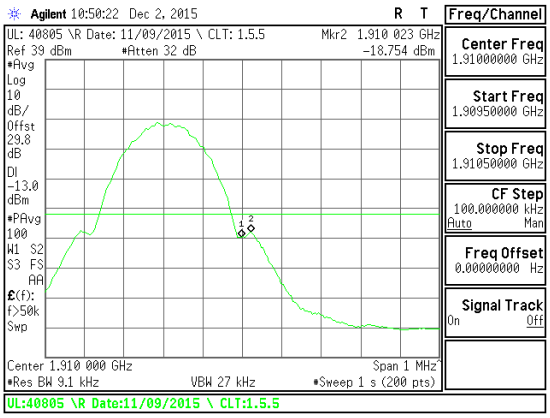
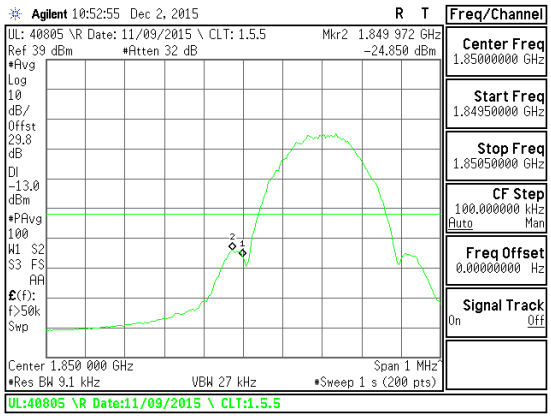


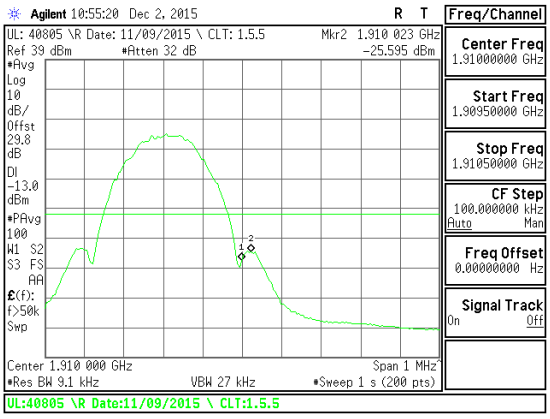
Band GSM1900 GPRS Low channel



Band GSM1900 GPRS High channel



Band GSM1900 EGPRS Low channel



Band GSM1900 EGPRS High channel

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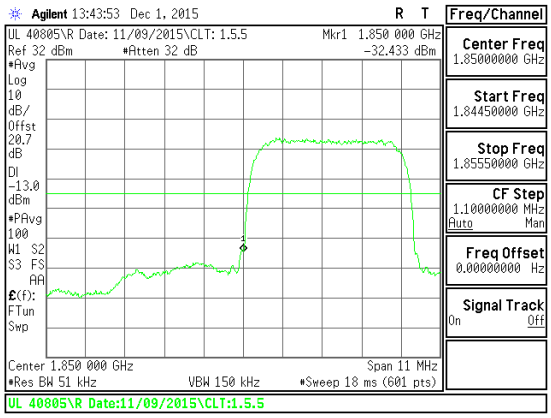
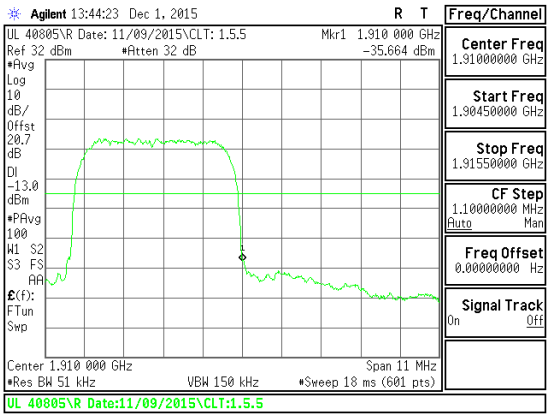
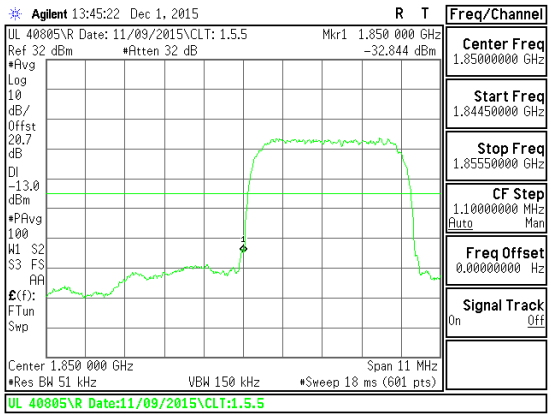
WCDMA



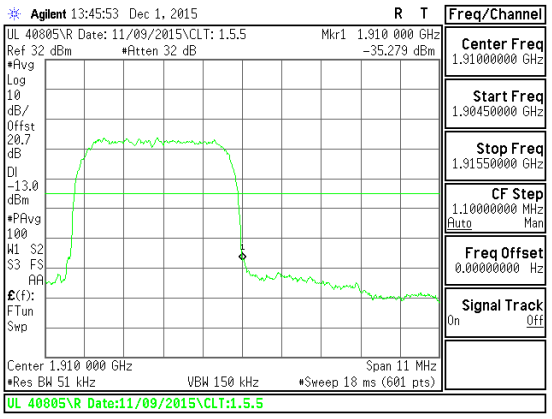
Band B2 REL99 Low channel



Band B2 REL99 High channel



Band B2 HSDPA Low channel



Band B2 HSDPA High channel

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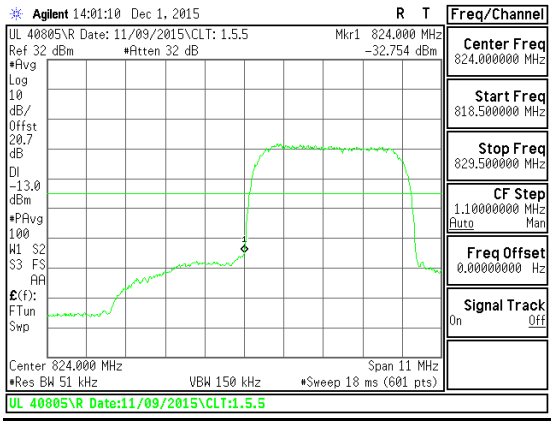
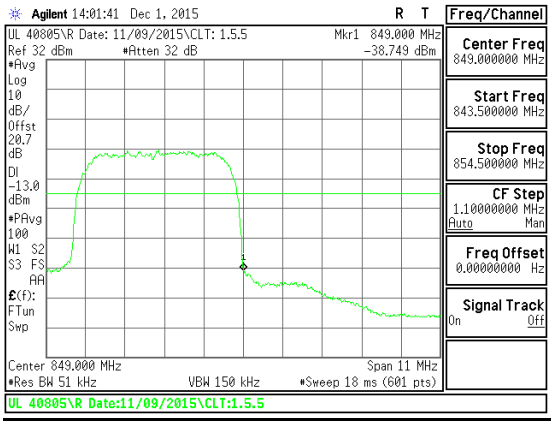
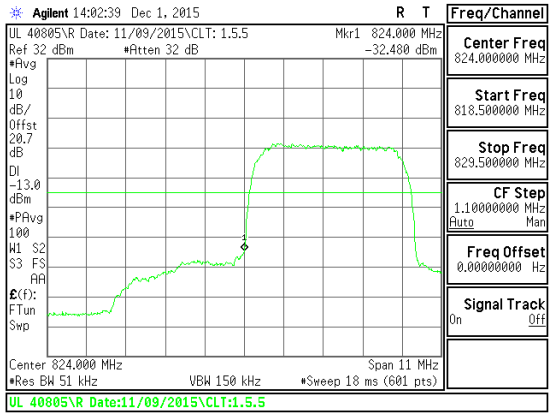


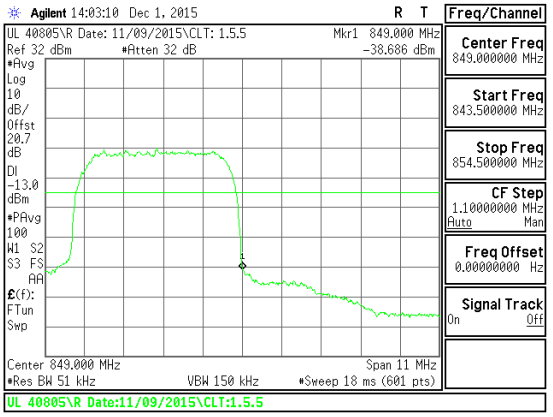
Band B5 REL99 Low channel



Band B5 REL99 High channel



Band B5 HSDPA Low channel



Band B5 HSDPA High channel

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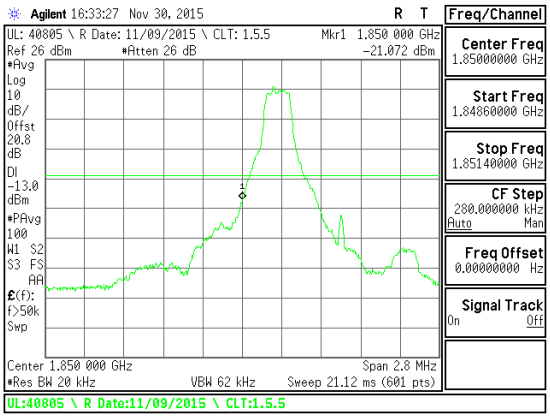
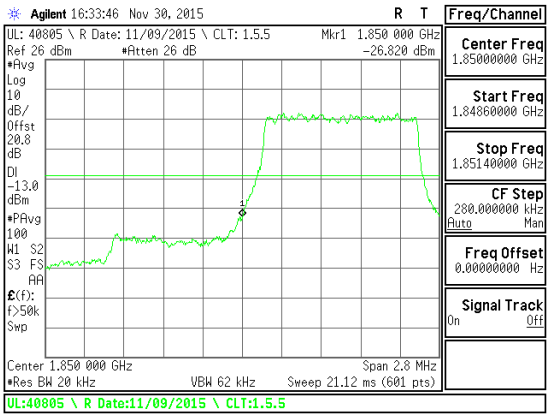
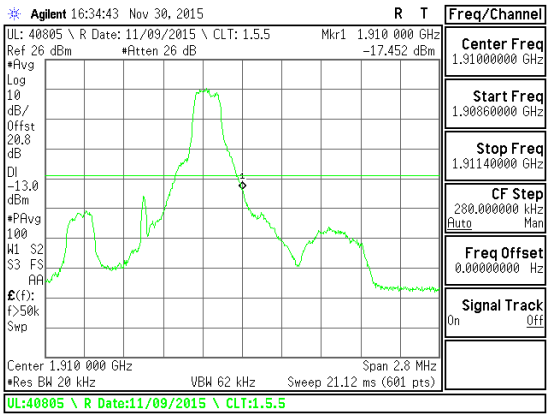
LTE Band 2



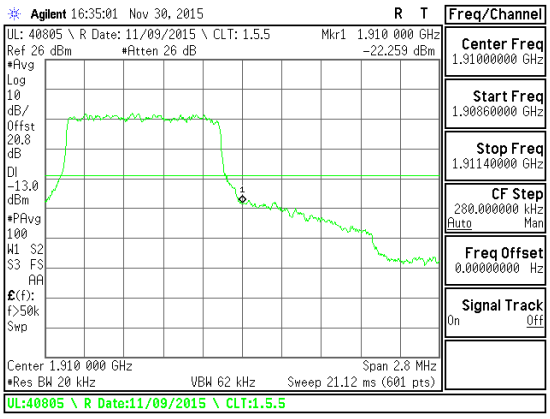
Band LTE2 1.4MHz QPSK Low Channel 1RB.gif



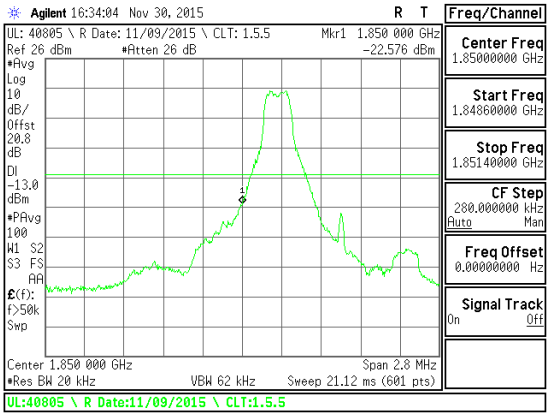
Band LTE2 1.4MHz QPSK Low Channel FRB.gif



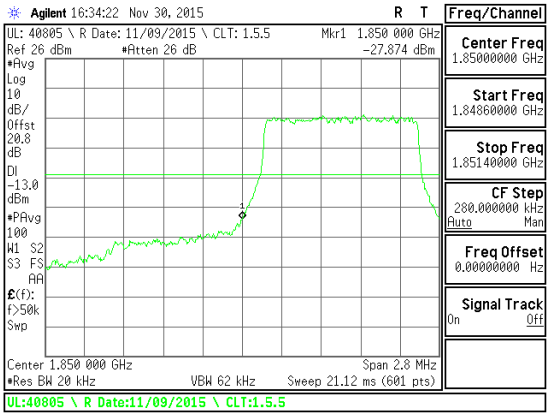
Band LTE2 1.4MHz QPSK High Channel 1RB.gif



Band LTE2 1.4MHz QPSK High Channel FRB.gif



Band LTE2 1.4MHz 16QAM Low Channel 1RB.gif



Band LTE2 1.4MHz 16QAM Low Channel FRB.gif

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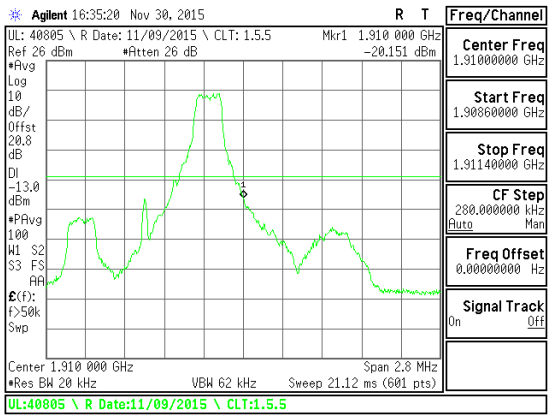
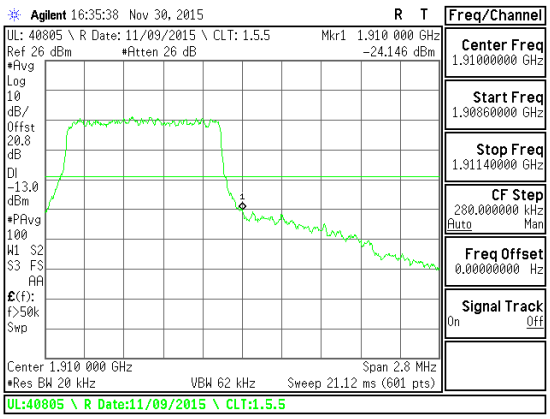
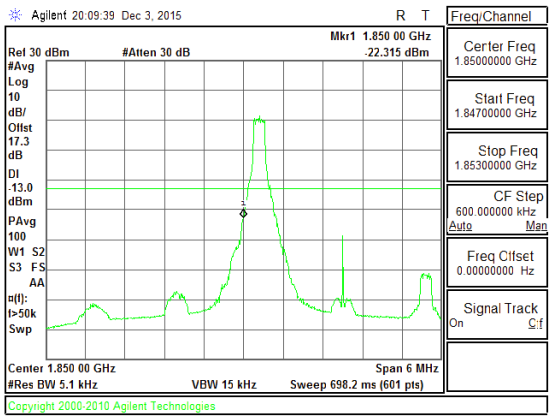


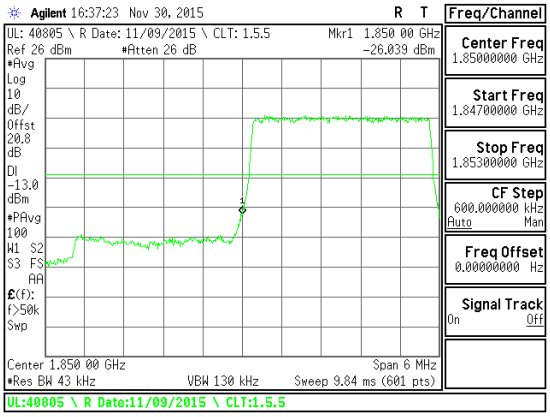
Band LTE2 1.4MHz 16QAM High Channel 1RB.gif



Band LTE2 1.4MHz 16QAM High Channel FRB.gif



Band LTE2 3MHz QPSK Low Channel 1RB.gif
Note: RBW used is 1% of 1RB OBW.



Band LTE2 3MHz QPSK Low Channel FRB.gif

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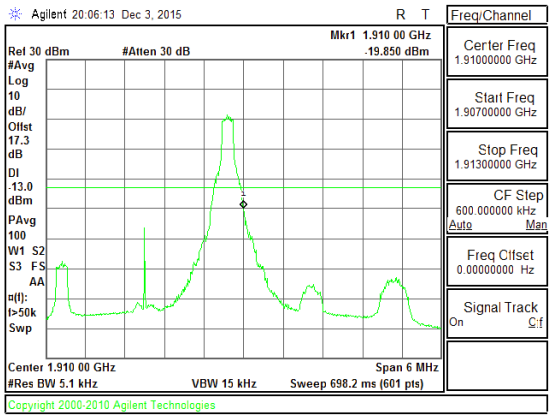
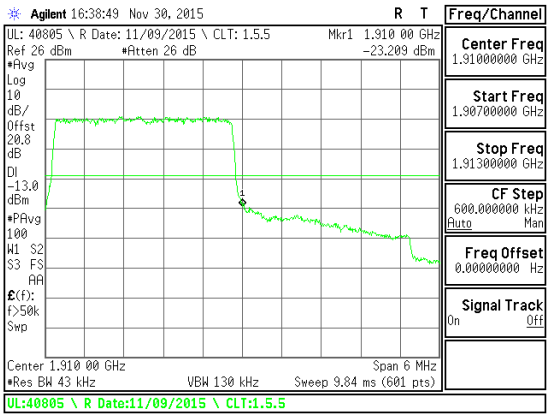
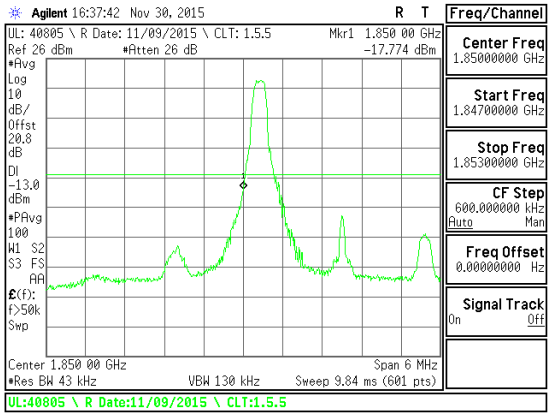


Band LTE2 3MHz QPSK High Channel 1RB.gif

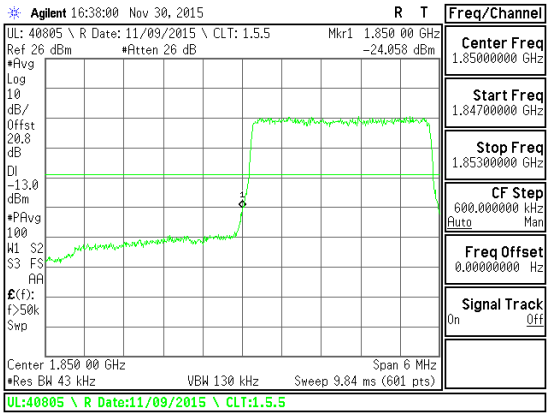
Note: RBW used is 1% of 1RB OBW.



Band LTE2 3MHz QPSK High Channel FRB.gif



Band LTE2 3MHz 16QAM Low Channel 1RB.gif



Band LTE2 3MHz 16QAM Low Channel FRB.gif

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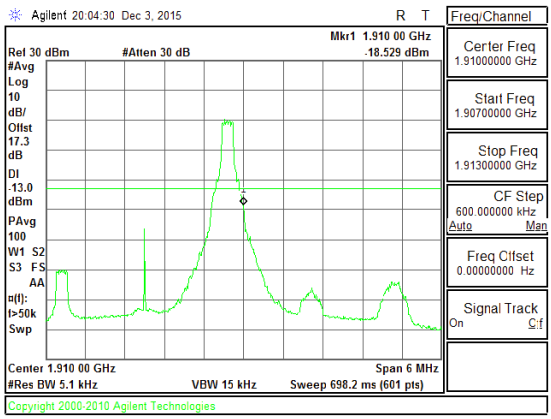
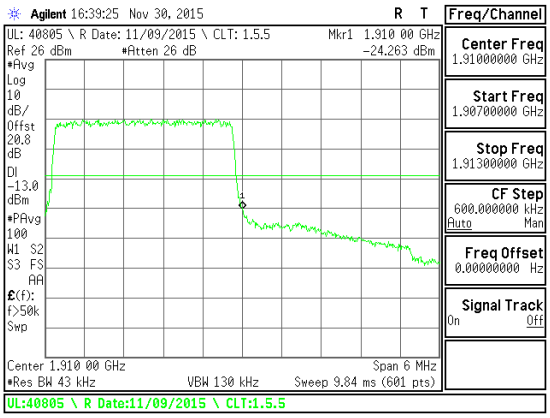
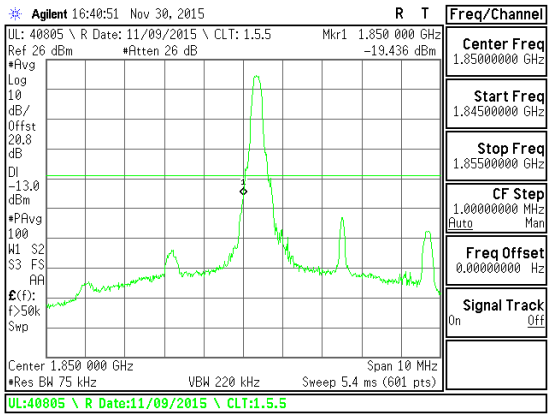


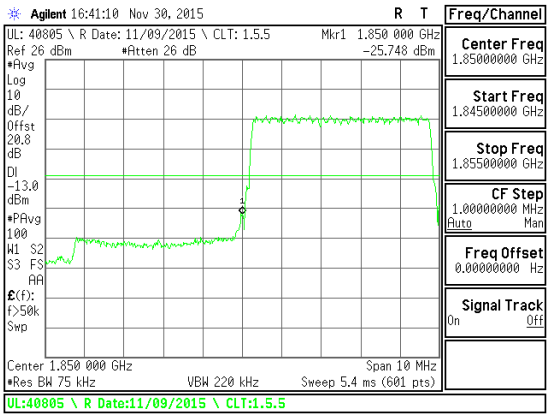
Band LTE2 3MHz 16QAM High Channel 1RB.gif
Note: RBW used is 1% of 1RB OBW.



Band LTE2 3MHz 16QAM High Channel FRB.gif



Band LTE2 5MHz QPSK Low Channel 1RB.gif



Band LTE2 5MHz QPSK Low Channel FRB.gif

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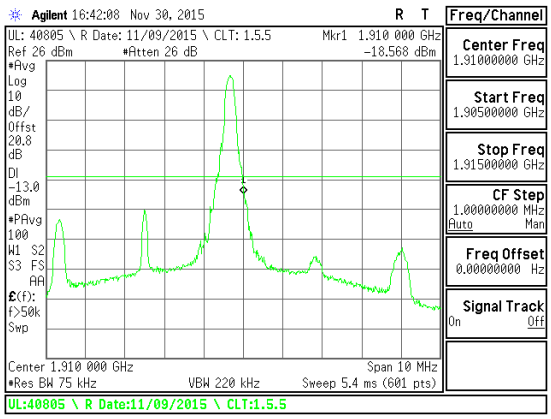
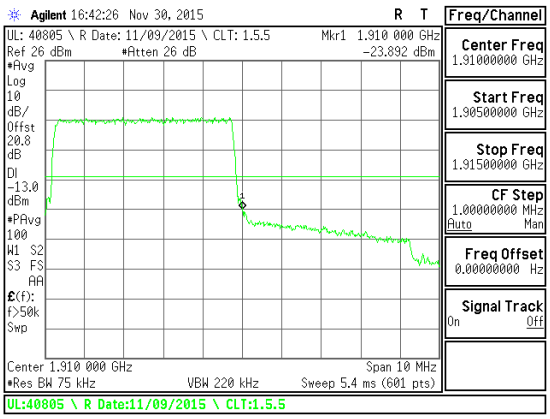
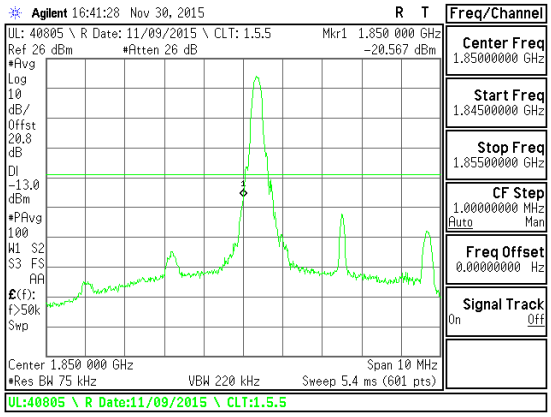


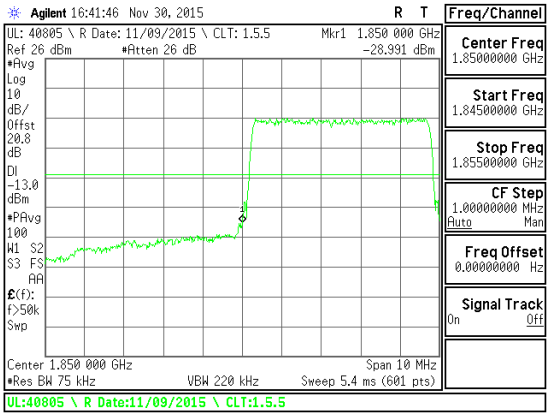
Band LTE2 5MHz QPSK High Channel 1RB.gif



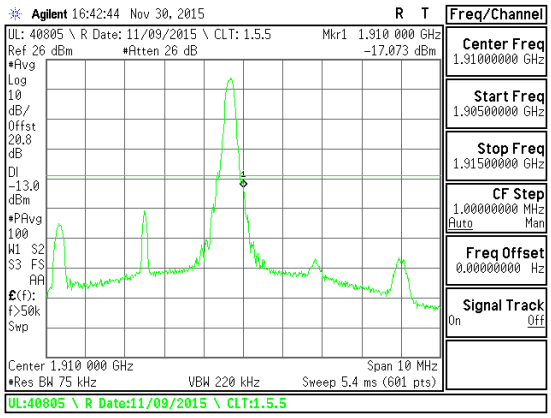
Band LTE2 5MHz QPSK High Channel FRB.gif



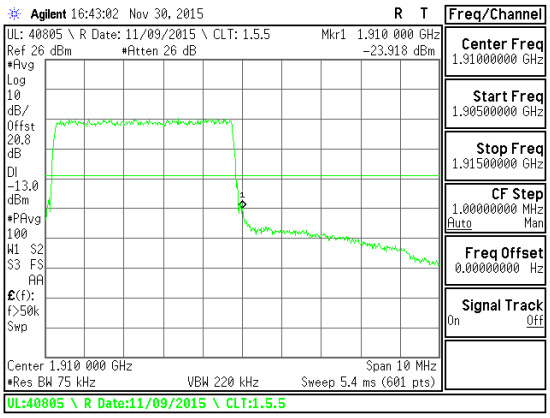
Band LTE2 5MHz 16QAM Low Channel 1RB.gif



Band LTE2 5MHz 16QAM Low Channel FRB.gif



Band LTE2 5MHz 16QAM High Channel 1RB.gif



Band LTE2 5MHz 16QAM High Channel FRB.gif

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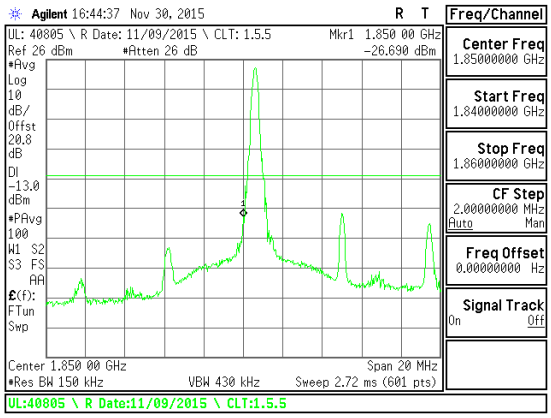
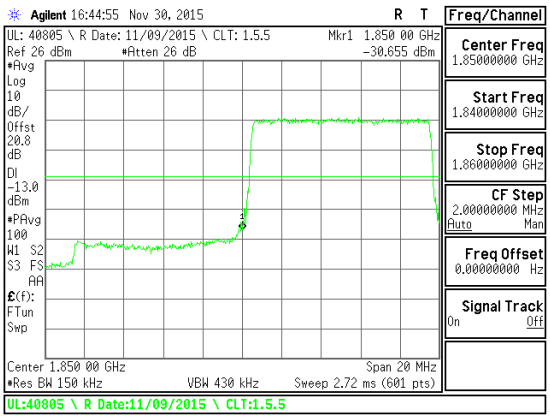
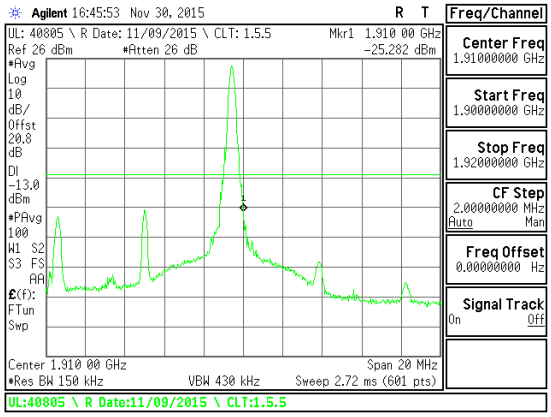


Band LTE2 10MHz QPSK Low Channel 1RB.gif



Band LTE2 10MHz QPSK Low Channel FRB.gif



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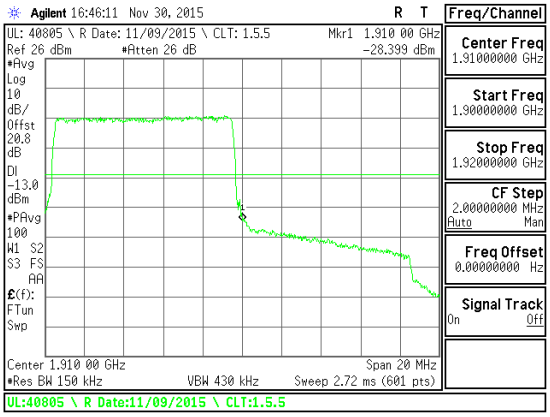

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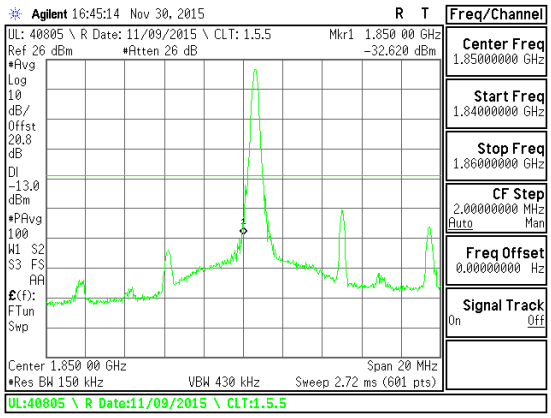

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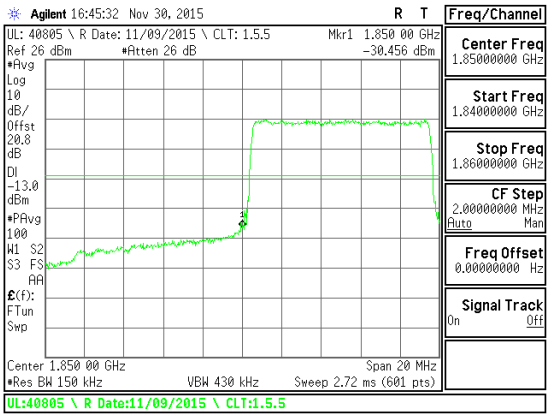

Band LTE2 10MHz 16QAM Low Channel FRB.gif

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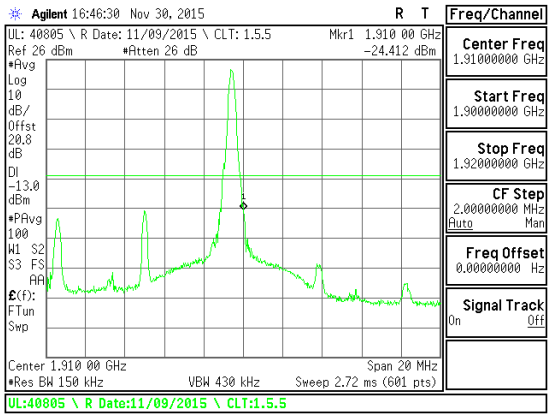

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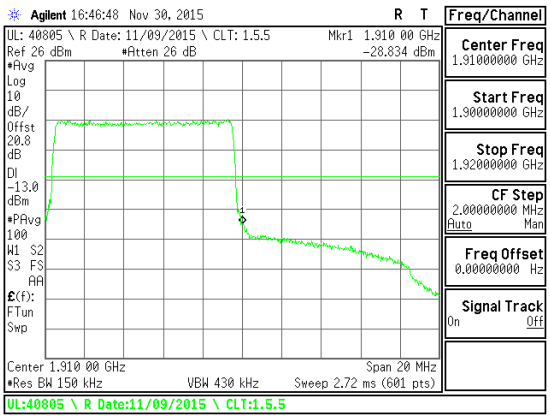

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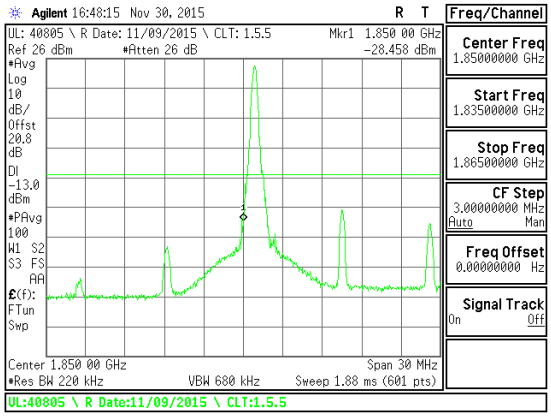
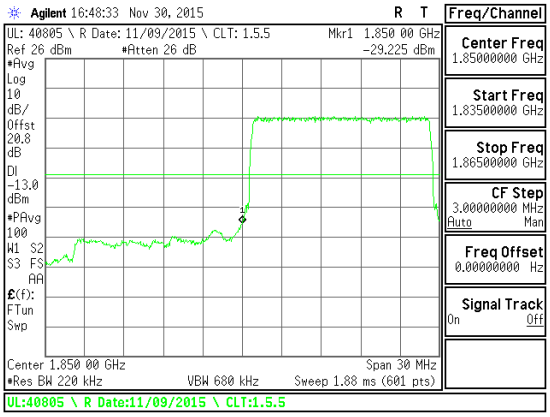


Band LTE2 15MHz QPSK Low Channel 1RB.gif



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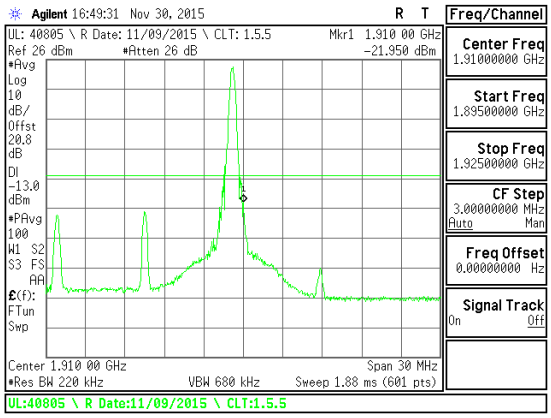

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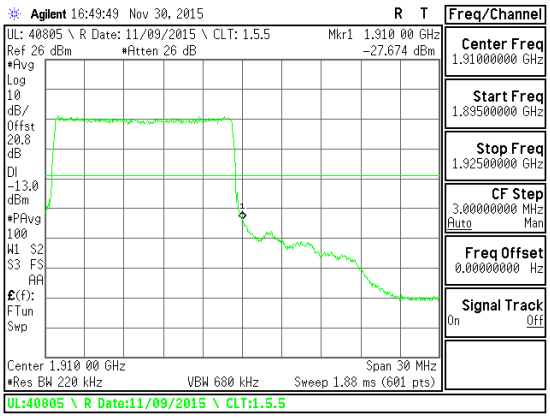

Band LTE2 15MHz QPSK High Channel FRB.gif

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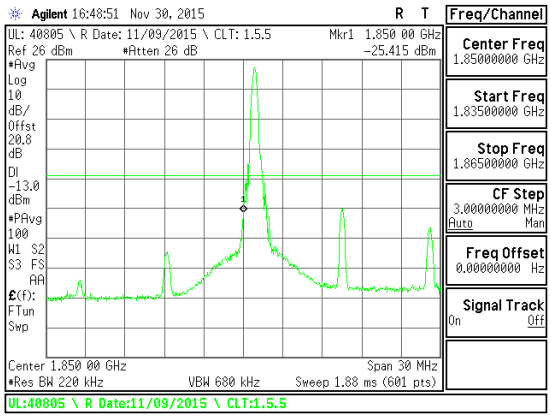

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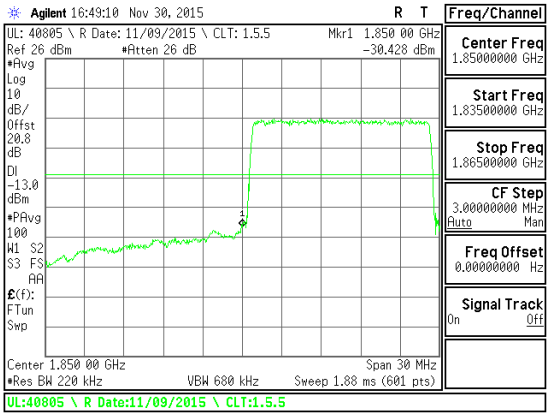

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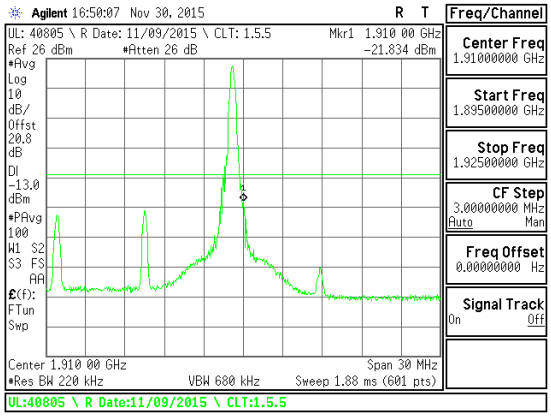

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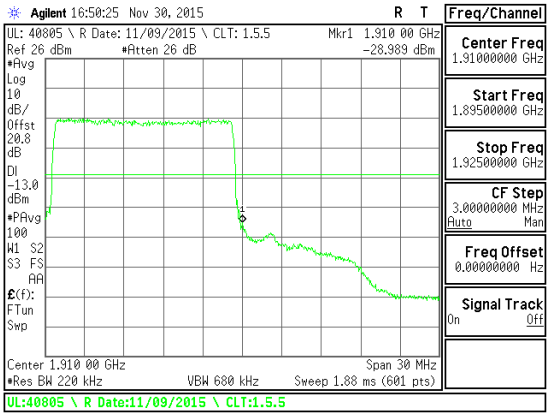

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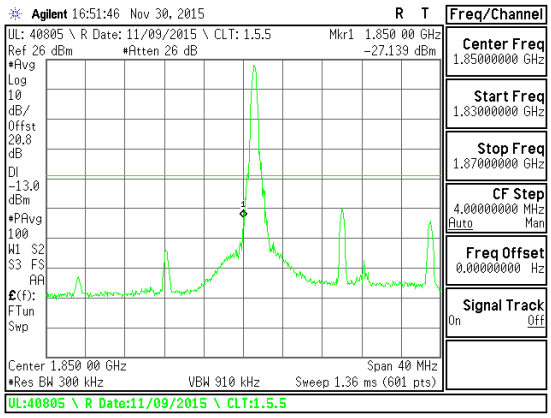
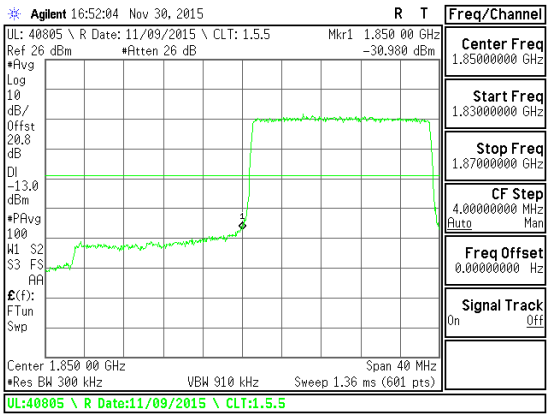


Band LTE2 20MHz QPSK Low Channel 1RB.gif



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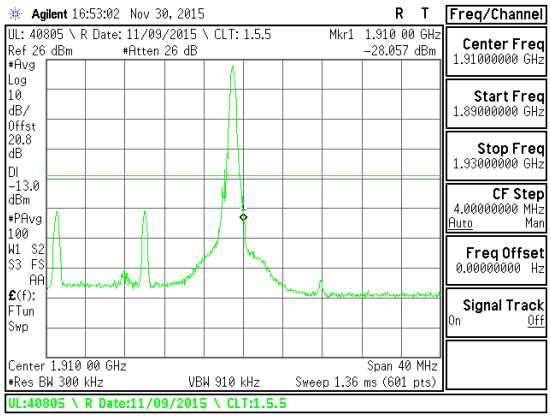

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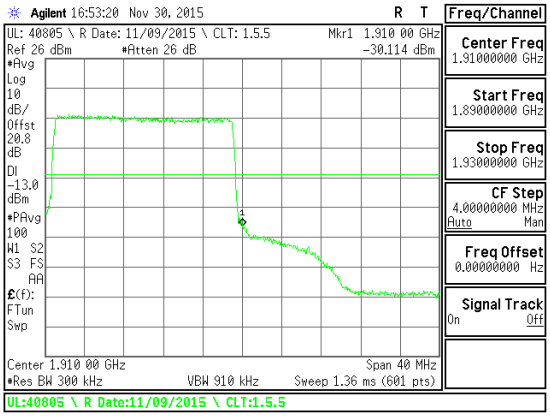

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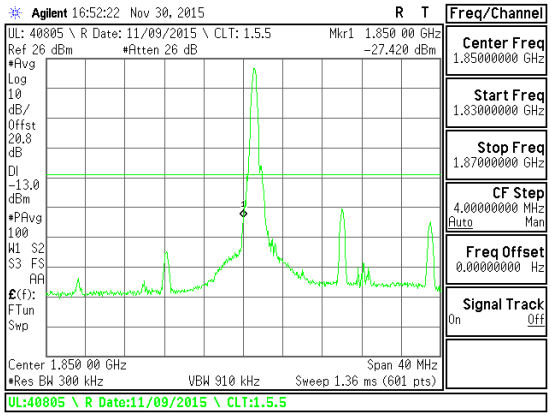

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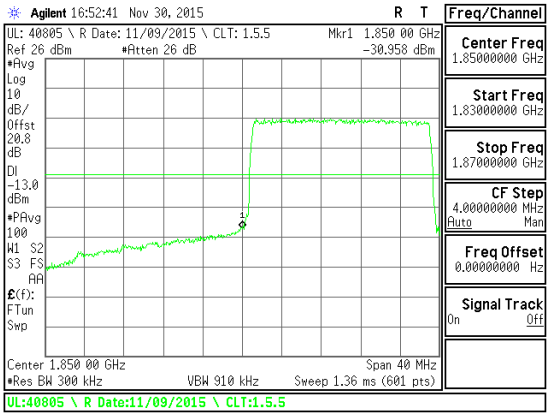
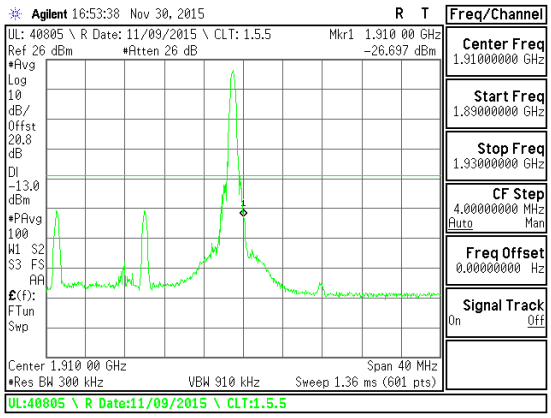


Band LTE2 20MHz 16QAM Low Channel FRB.gif



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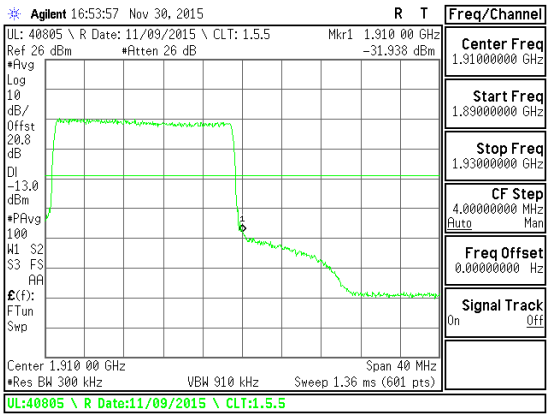

Band LTE2 20MHz 16QAM High Channel FRB.gif

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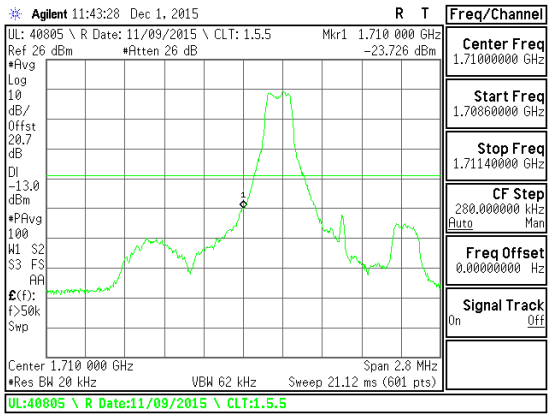
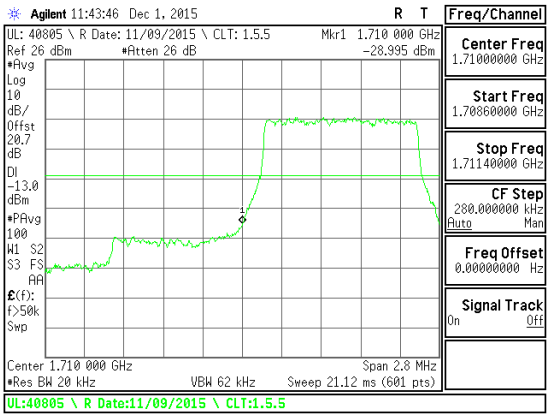
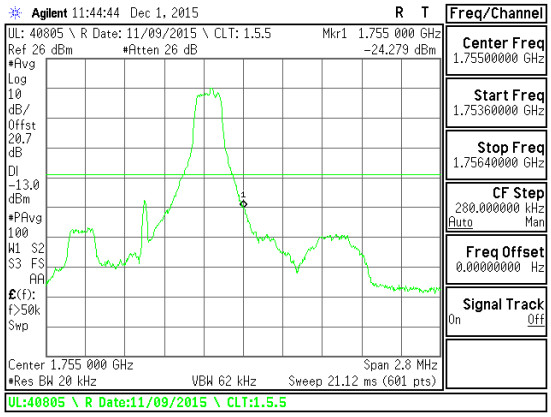
LTE Band 4



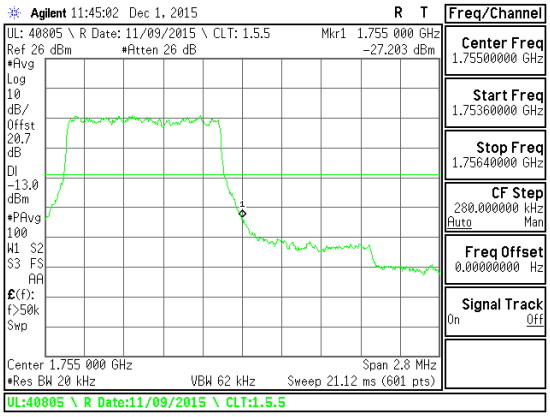
Band LTE4 1.4MHz QPSK Low Channel 1RB.gif



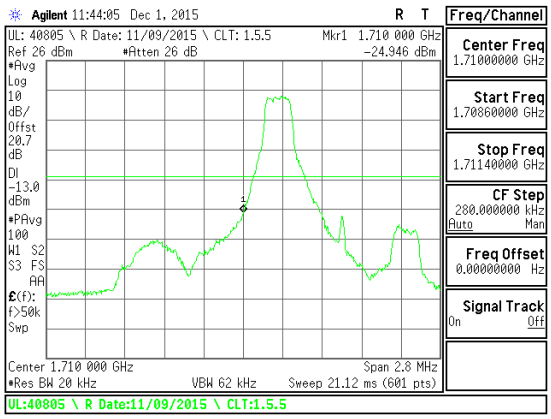
Band LTE4 1.4MHz QPSK Low Channel FRB.gif



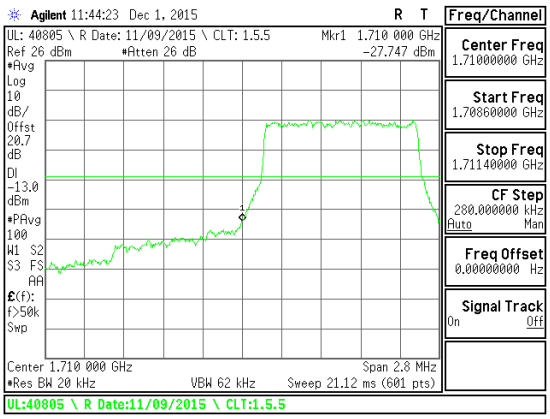
Band LTE4 1.4MHz QPSK High Channel 1RB.gif



Band LTE4 1.4MHz QPSK High Channel FRB.gif



Band LTE4 1.4MHz 16QAM Low Channel 1RB.gif



Band LTE4 1.4MHz 16QAM Low Channel FRB.gif

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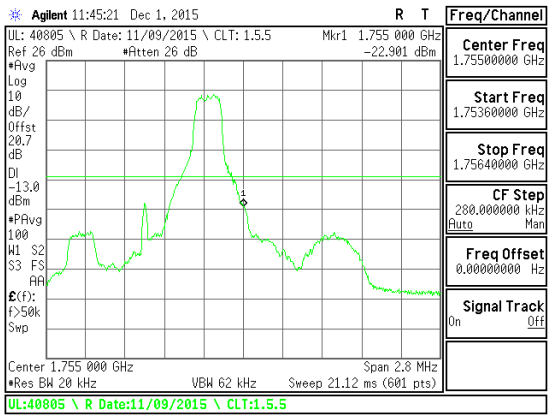
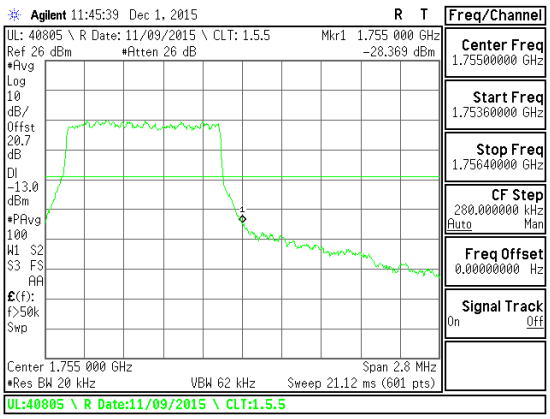
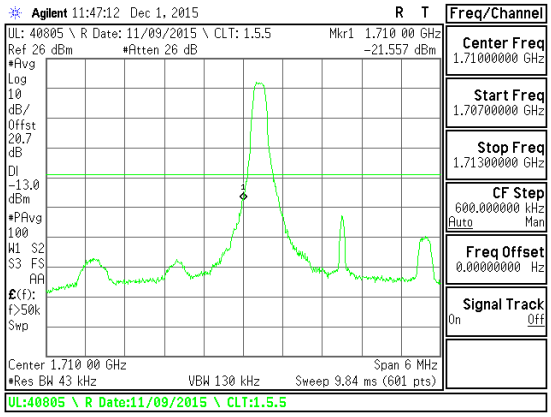


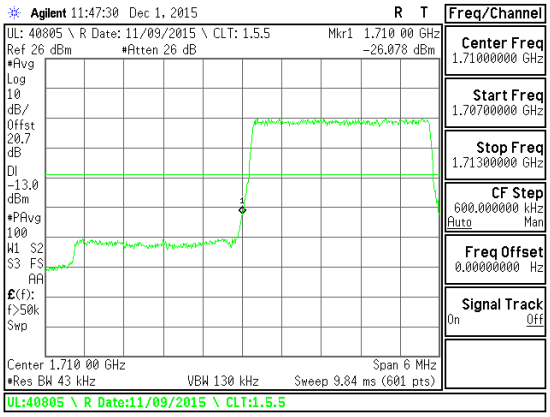
Band LTE4 1.4MHz 16QAM High Channel 1RB.gif



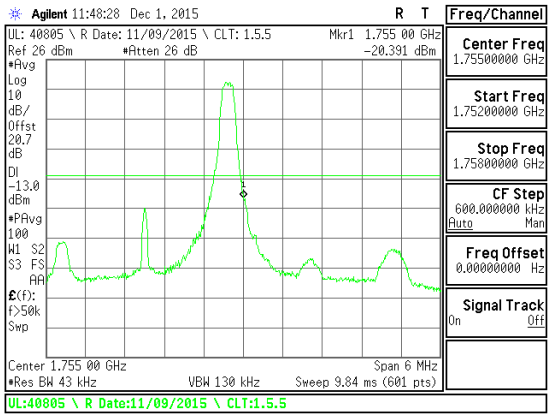
Band LTE4 1.4MHz 16QAM High Channel 1RB.gif



Band LTE4 3MHz QPSK Low Channel 1RB.gif



Band LTE4 3MHz QPSK Low Channel FRB.gif



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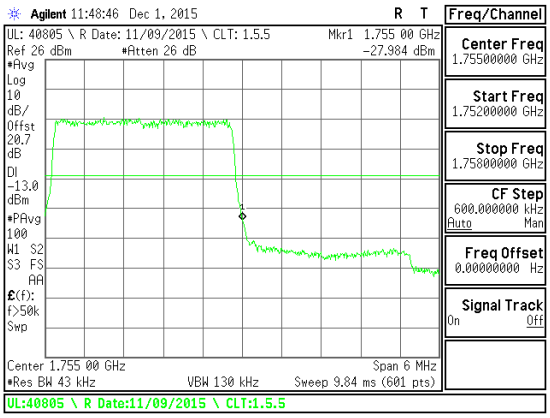

Band LTE4 3MHz QPSK High Channel FRB.gif

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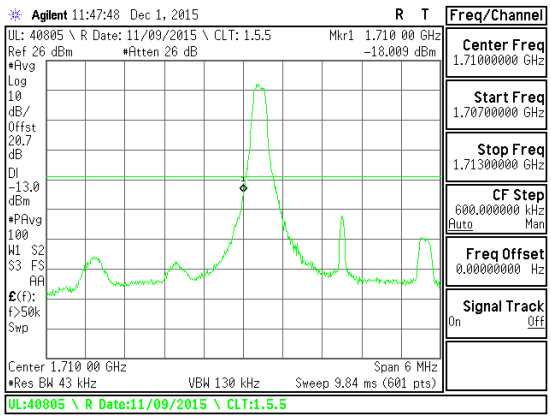
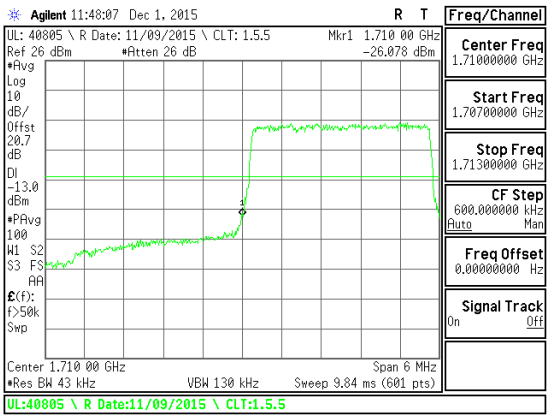
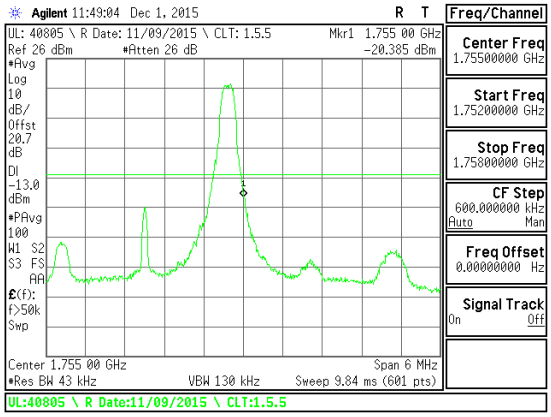


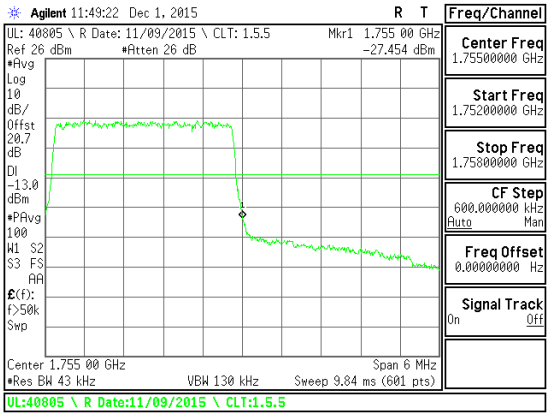
Band LTE4 3MHz 16QAM Low Channel 1RB.gif



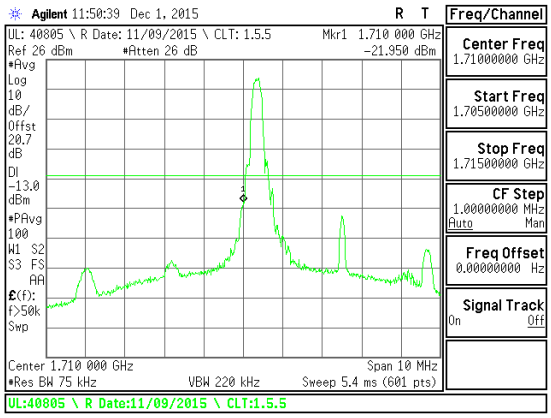
Band LTE4 3MHz 16QAM Low Channel FRB.gif



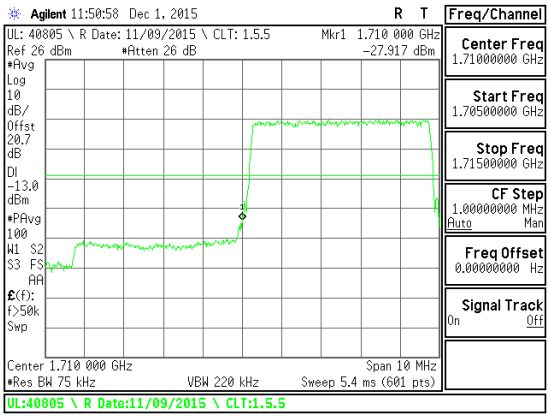
Band LTE4 3MHz 16QAM High Channel 1RB.gif



Band LTE4 3MHz 16QAM High Channel FRB.gif



Band LTE4 5MHz QPSK Low Channel 1RB.gif



Band LTE4 5MHz QPSK Low Channel FRB.gif

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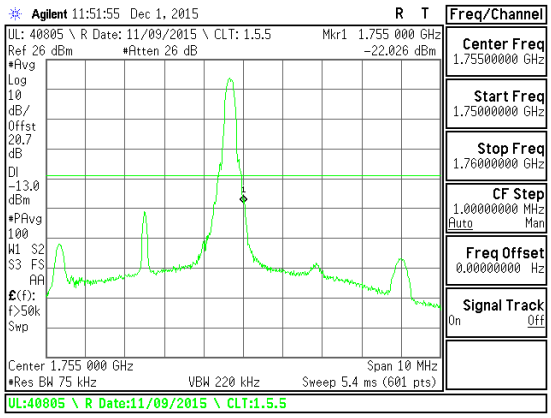
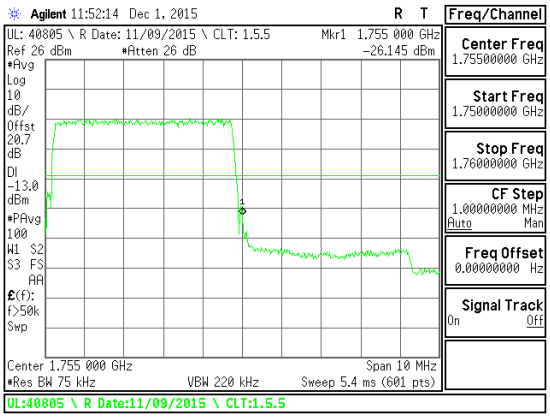
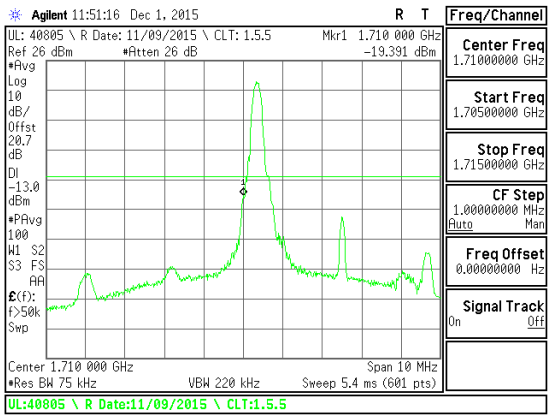


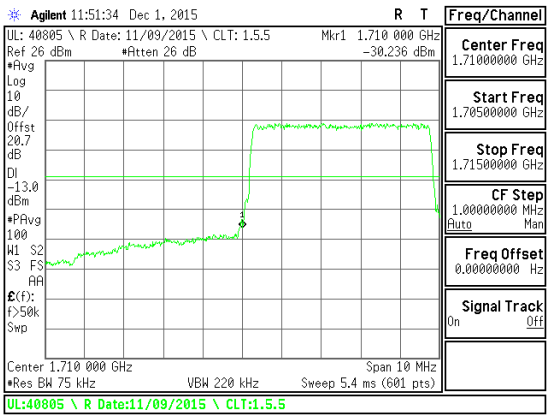
Band LTE4 5MHz QPSK High Channel 1RB.gif



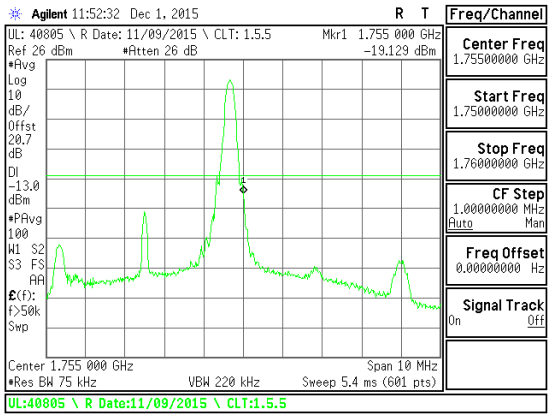
Band LTE4 5MHz QPSK High Channel FRB.gif



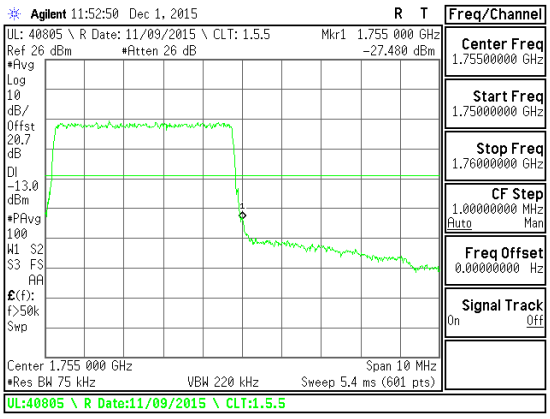
Band LTE4 5MHz 16QAM Low Channel 1RB.gif



Band LTE4 5MHz 16QAM Low Channel FRB.gif



Band LTE4 5MHz 16QAM High Channel 1RB.gif



Band LTE4 5MHz 16QAM High Channel FRB.gif

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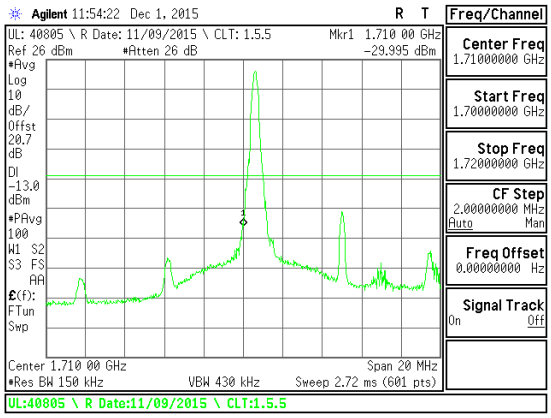
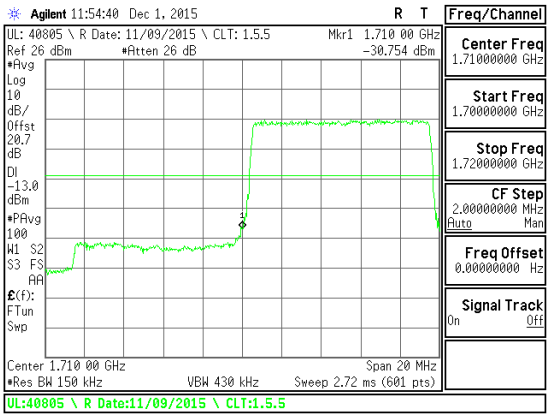
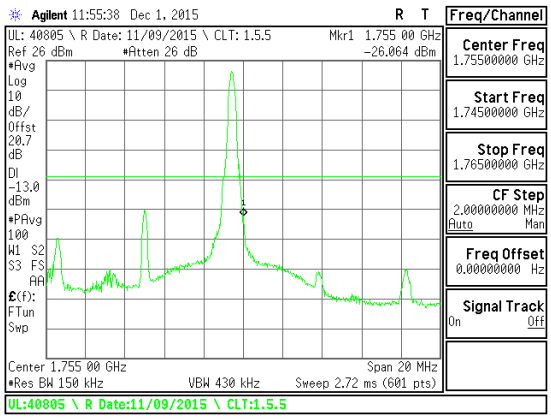


Band LTE4 10MHz QPSK Low Channel 1RB.gif



Band LTE4 10MHz QPSK Low Channel FRB.gif



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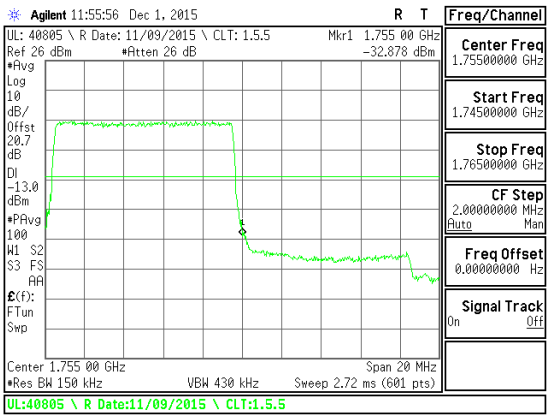

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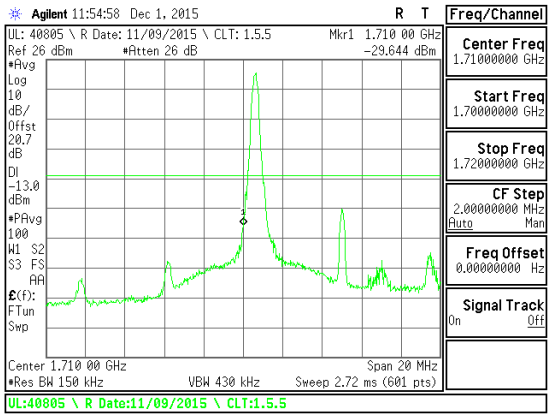

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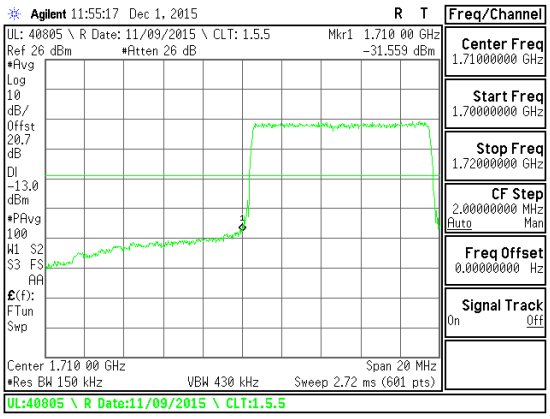

Band LTE4 10MHz 16QAM Low Channel FRB.gif

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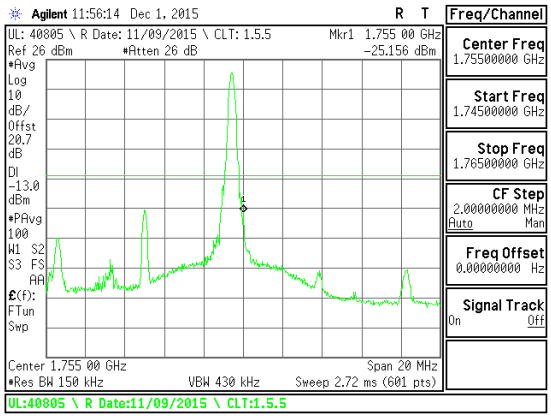
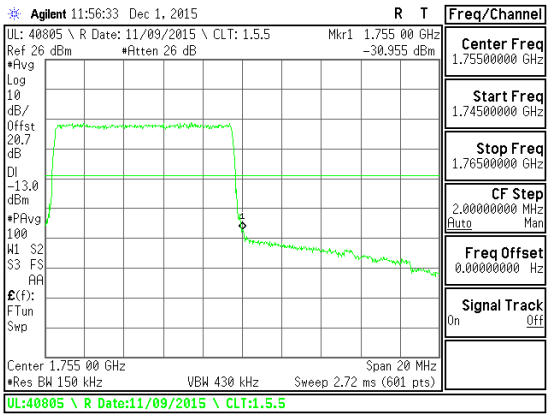
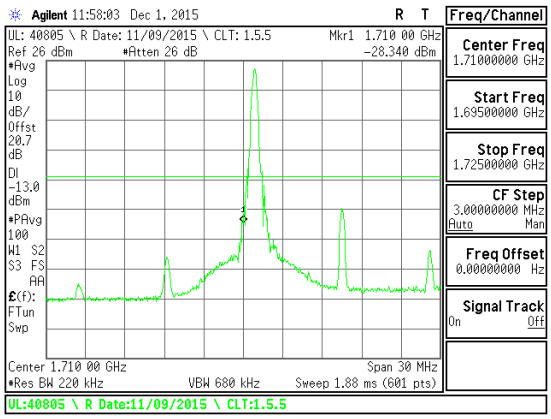


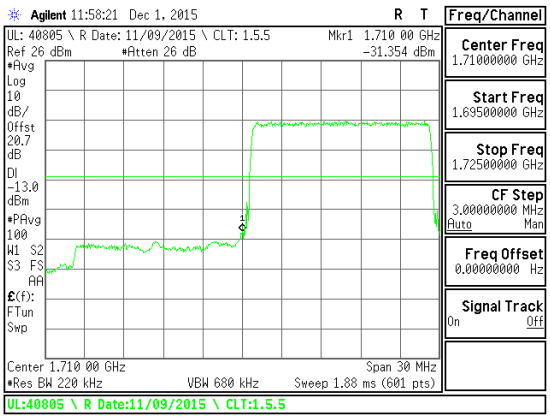
Band LTE4 10MHz QPSK Low Channel 1RB.gif



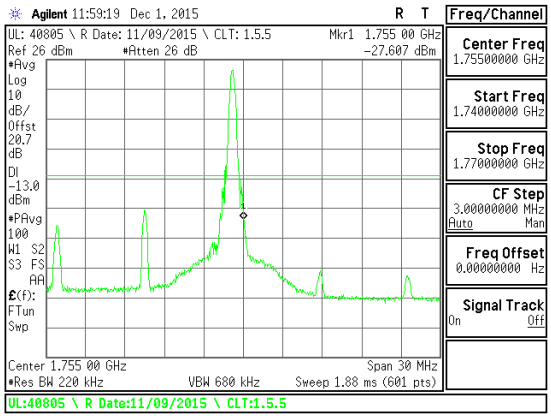
Band LTE4 10MHz QPSK Low Channel FRB.gif



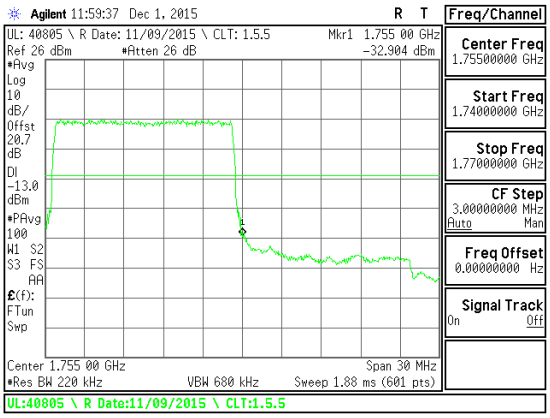
Band LTE4 15MHz QPSK Low Channel 1RB.gif



Band LTE4 15MHz QPSK Low Channel FRB.gif



Band LTE4 15MHz QPSK High Channel 1RB.gif



Band LTE4 15MHz QPSK High Channel FRB.gif

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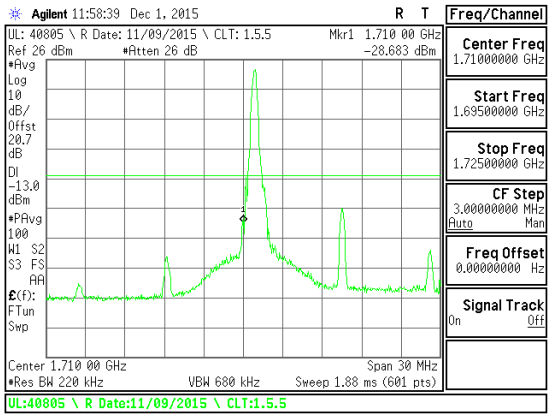
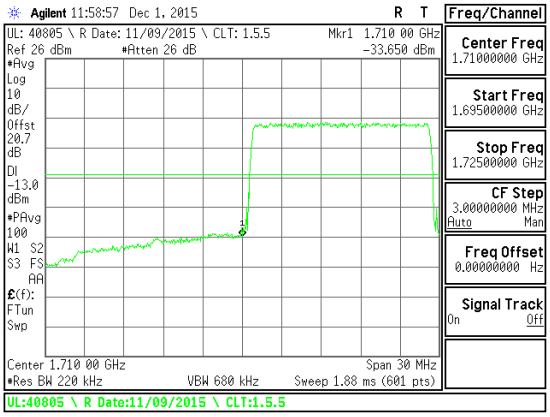


Band LTE4 15MHz 16QAM Low Channel 1RB.gif



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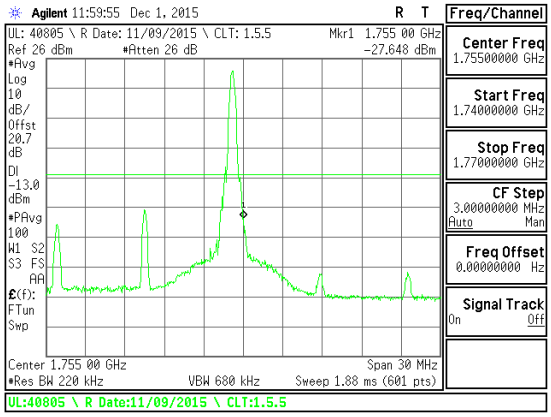

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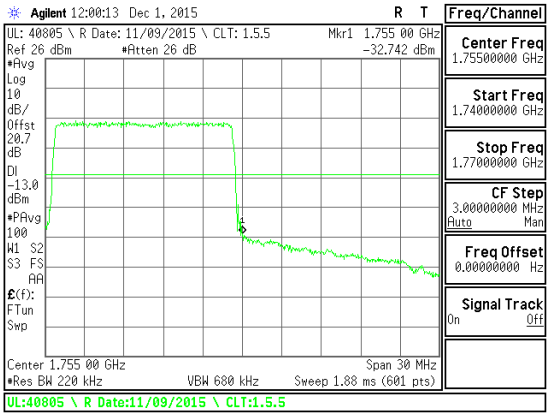

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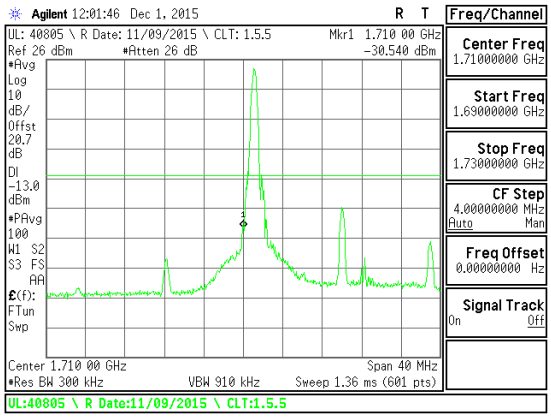
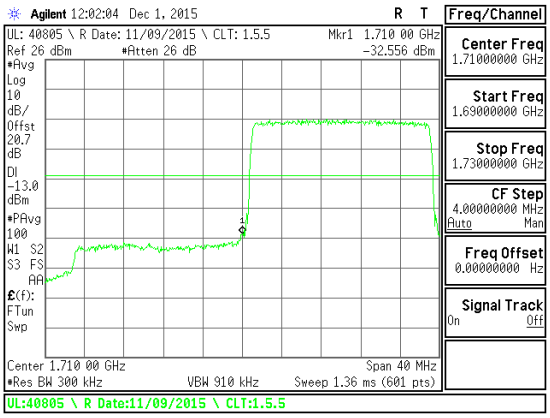


Band LTE4 20MHz QPSK Low Channel 1RB.gif



Band LTE4 20MHz QPSK Low Channel FRB.gif

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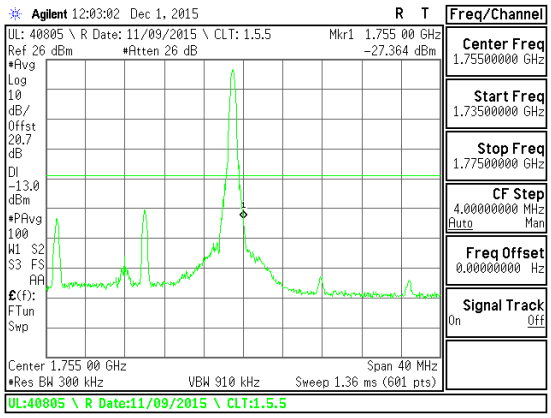

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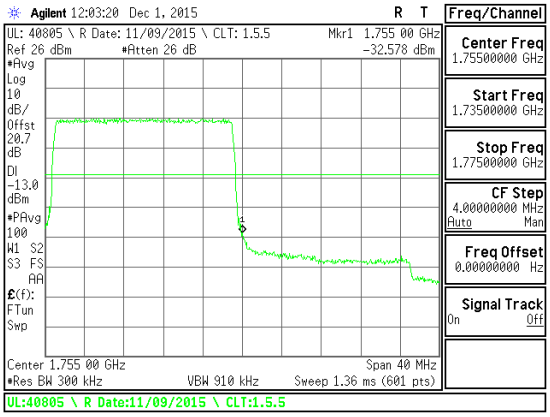

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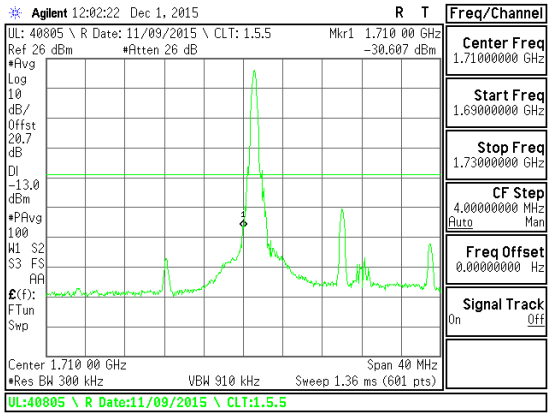

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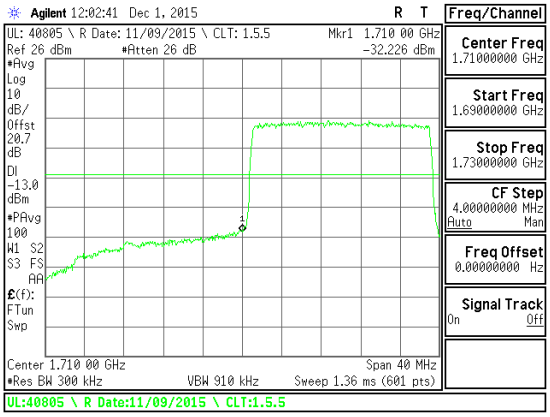

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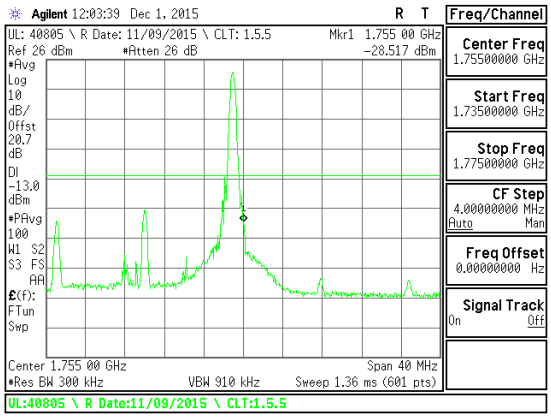
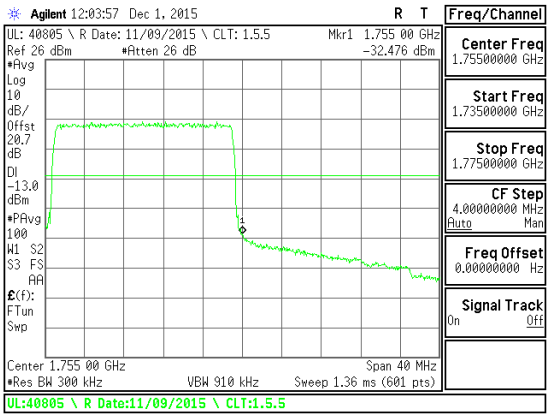


Band LTE4 20MHz 16QAM High Channel 1RB.gif



Band LTE4 20MHz 16QAM High Channel FRB.gif

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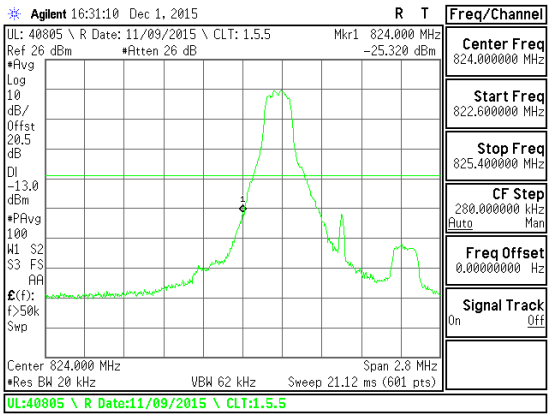
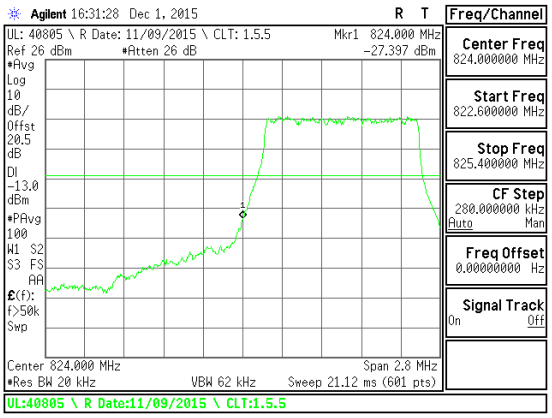
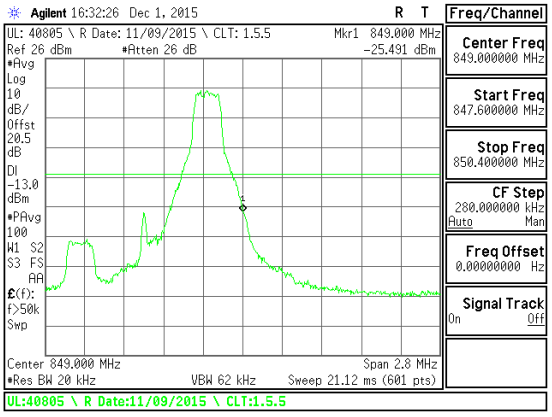
LTE Band 5



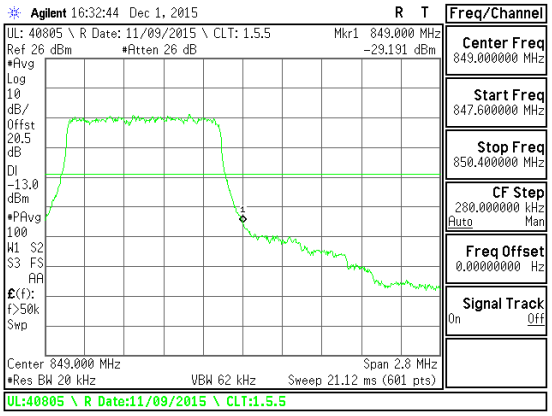
Band LTE5 1.4MHz QPSK Low Channel 1RB.gif



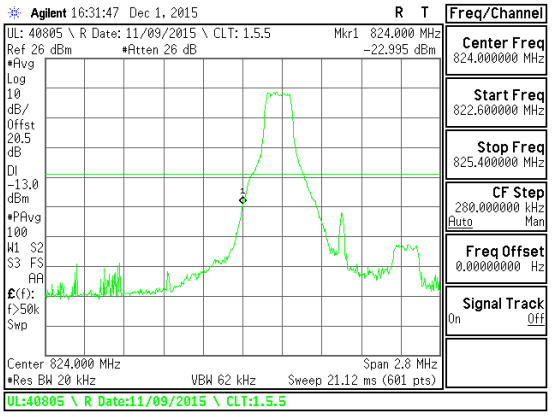
Band LTE5 1.4MHz QPSK Low Channel FRB.gif



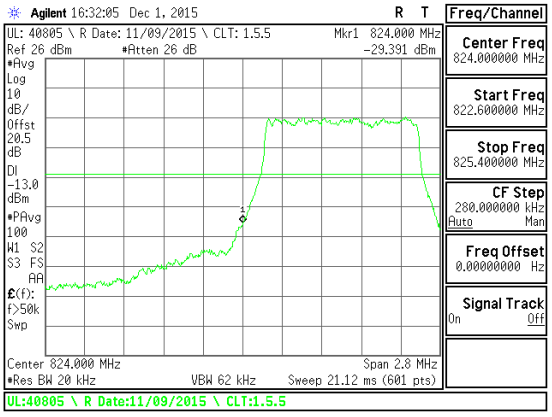
Band LTE5 1.4MHz QPSK High Channel 1RB.gif



Band LTE5 1.4MHz QPSK High Channel FRB.gif



Band LTE5 1.4MHz 16QAM Low Channel 1RB.gif



Band LTE5 1.4MHz 16QAM Low Channel FRB.gif

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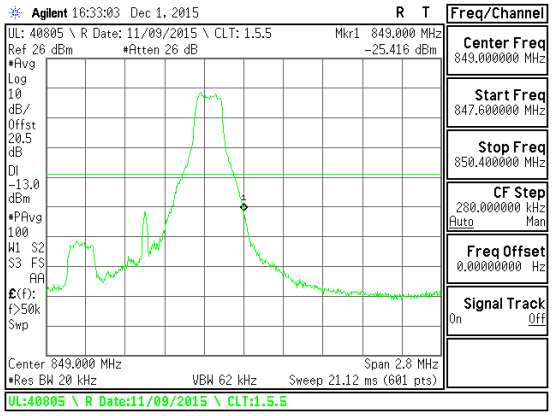
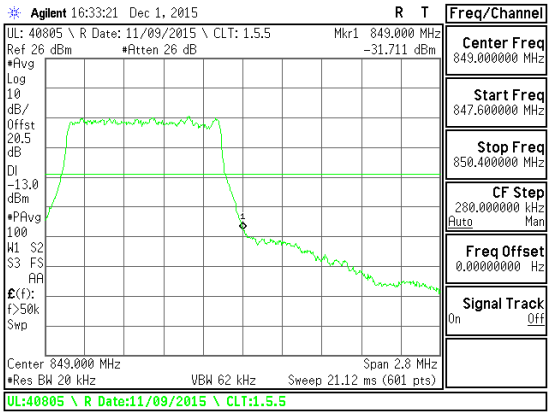


Band LTE5 1.4MHz 16QAM High Channel 1RB.gif



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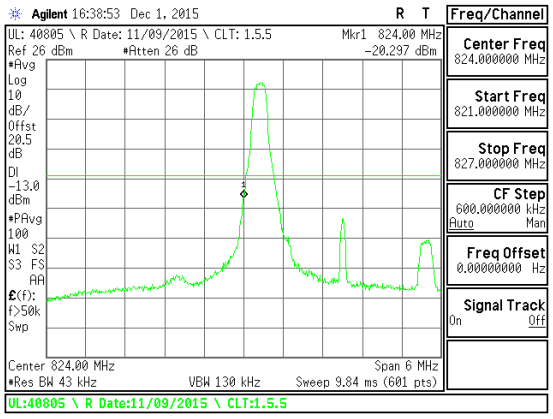
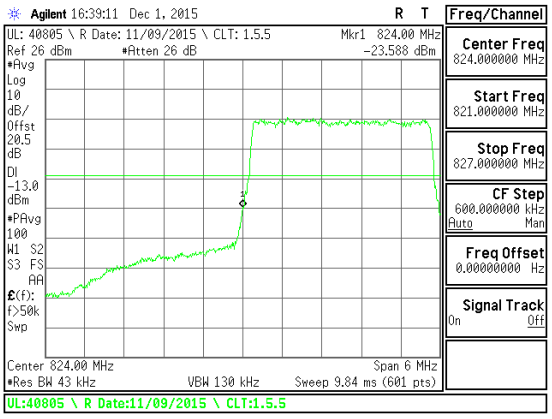


Band LTE5 3MHz QPSK Low Channel 1RB.gif



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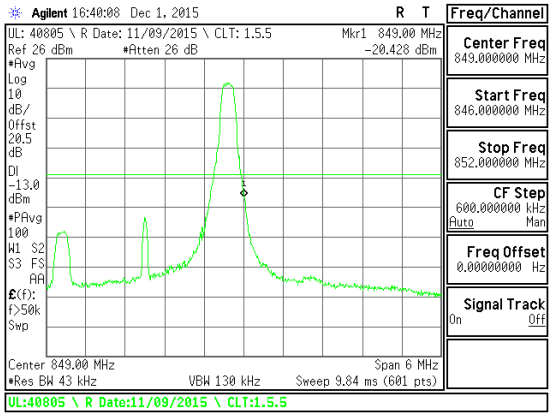

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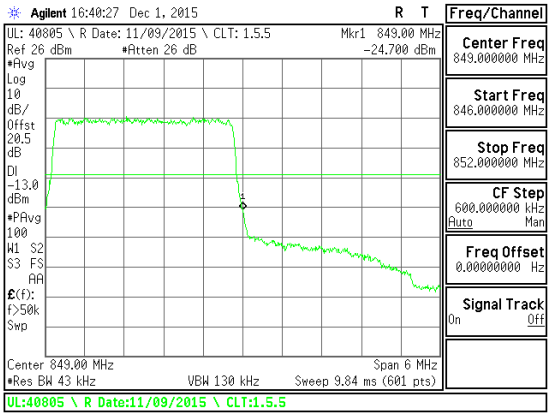

Band LTE5 3MHz QPSK High Channel FRB.gif

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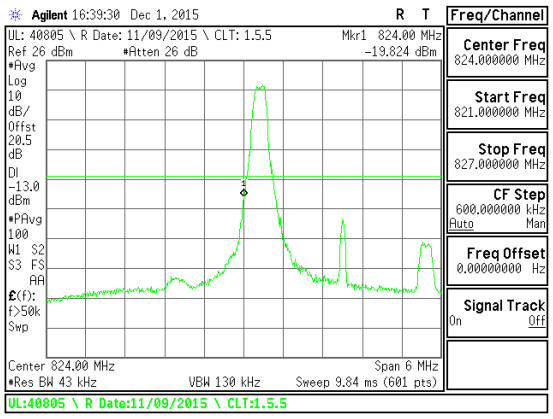

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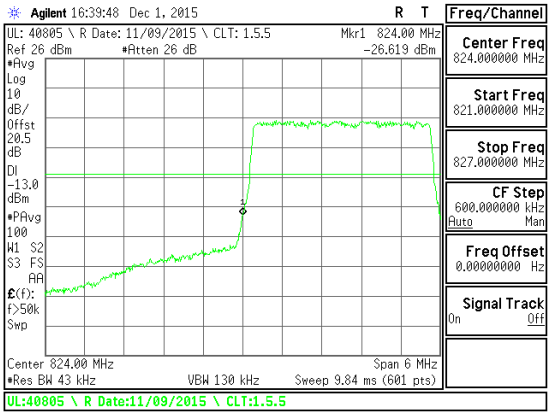

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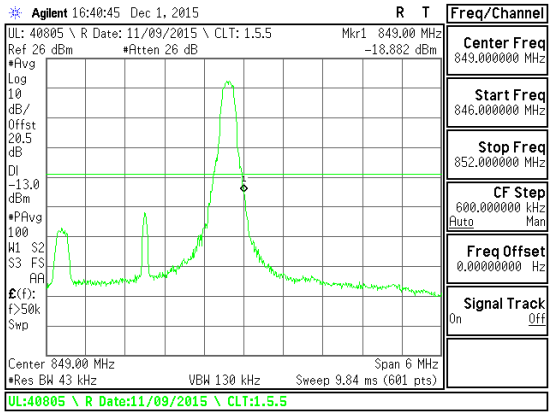

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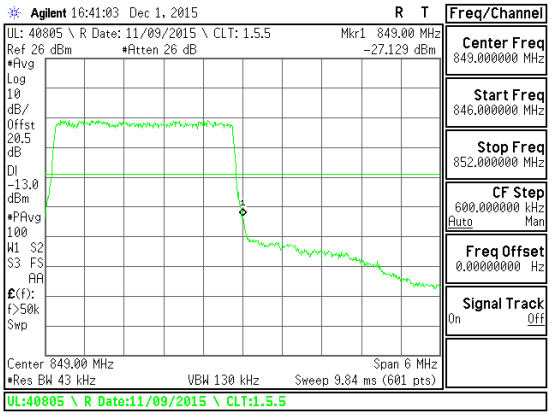

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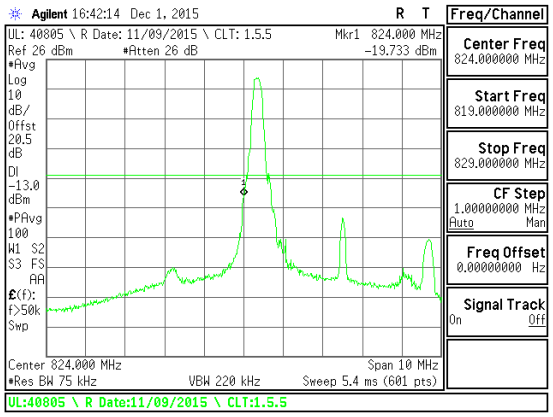
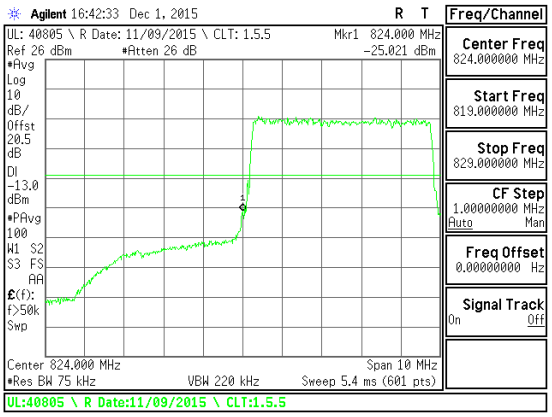


Band LTE5 5MHz QPSK Low Channel 1RB.gif



Band LTE5 5MHz QPSK Low Channel FRB.gif

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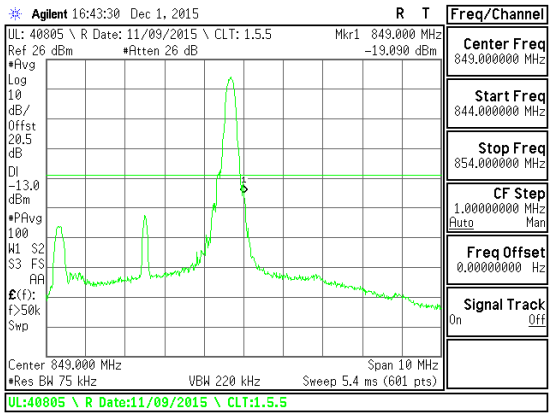

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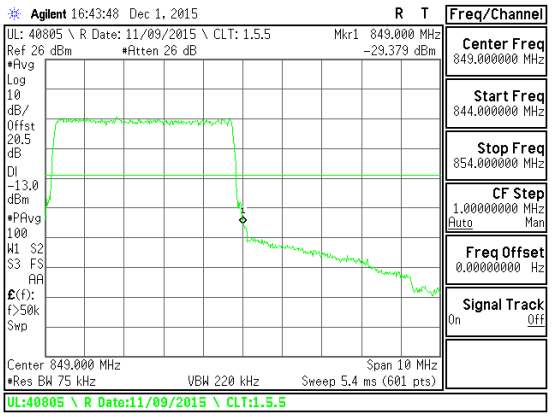

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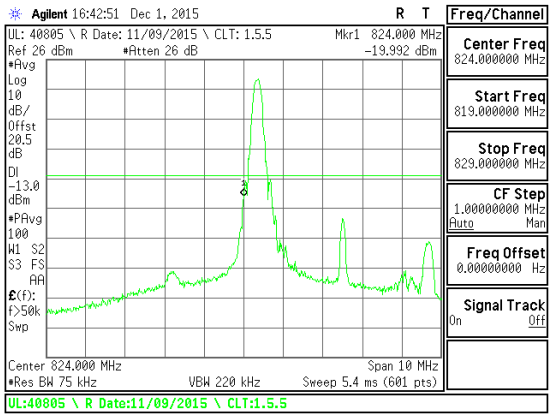

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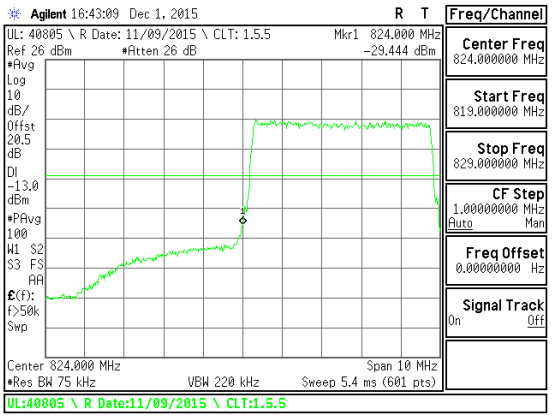

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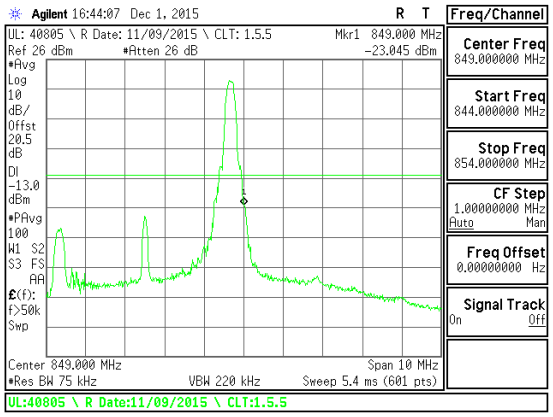

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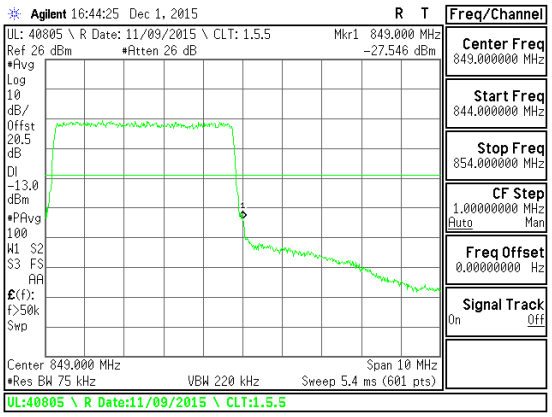

Band LTE5 5MHz 16QAM High Channel FRB.gif

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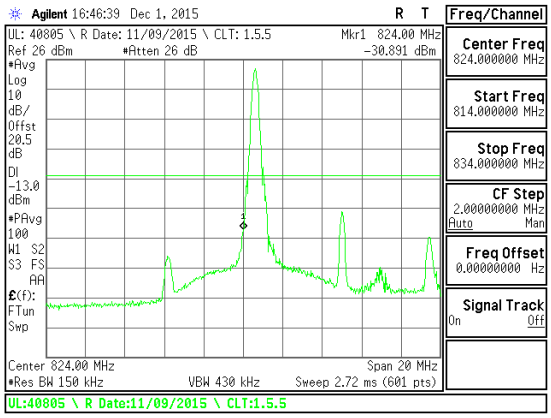
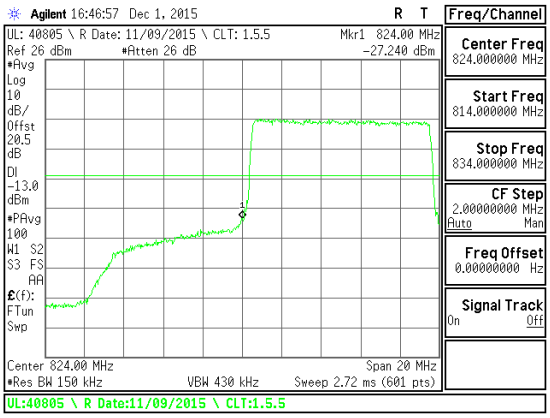


Band LTE5 10MHz QPSK Low Channel 1RB.gif



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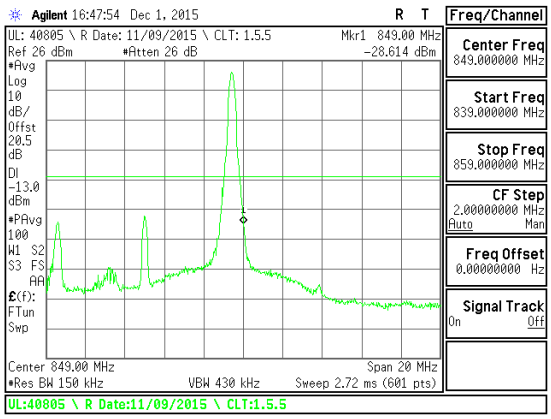

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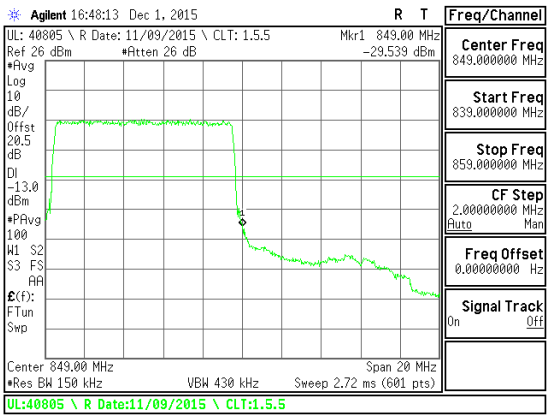

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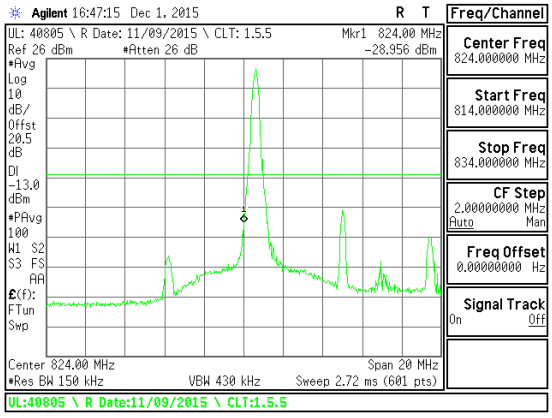

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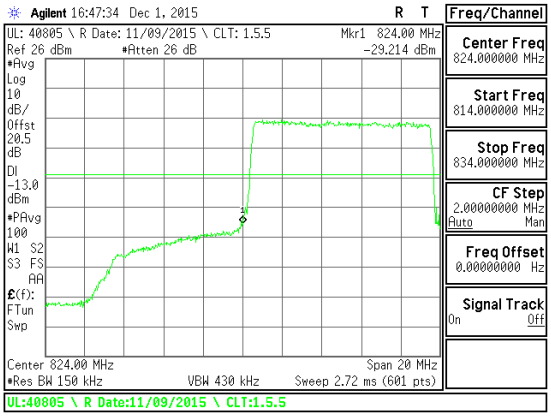

Band LTE5 10MHz 16QAM Low Channel FRB.gif

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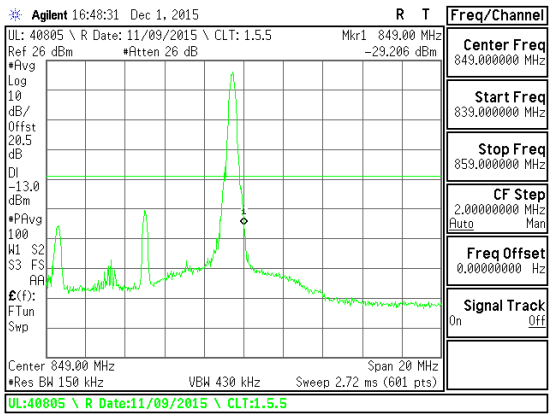
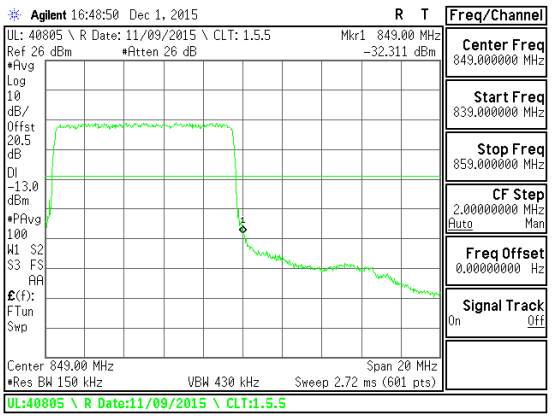


Band LTE5 10MHz 16QAM High Channel 1RB.gif



Band LTE5 10MHz 16QAM High Channel FRB.gif

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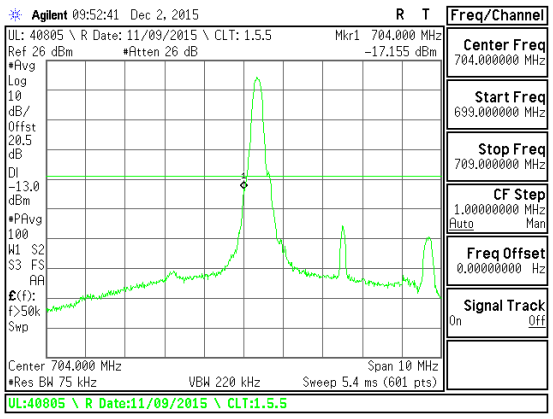
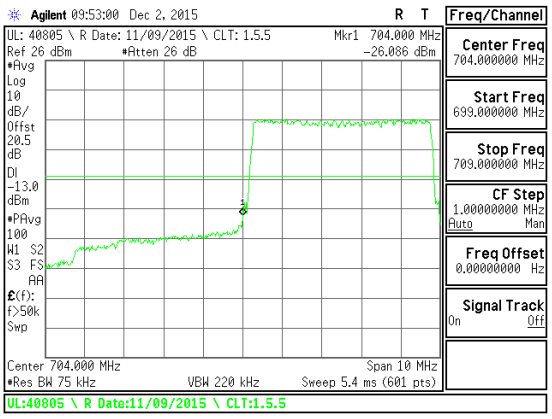
LTE Band 17



Band LTE17 5MHz QPSK Low Channel 1RB.gif



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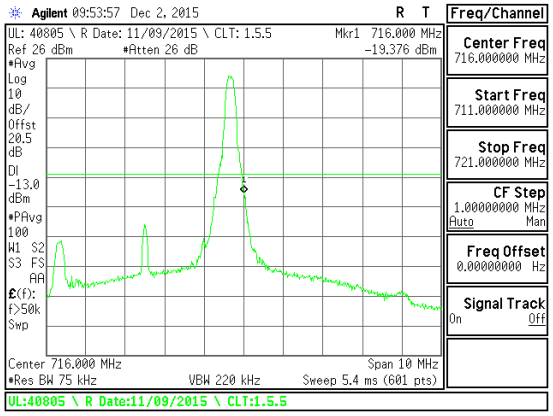

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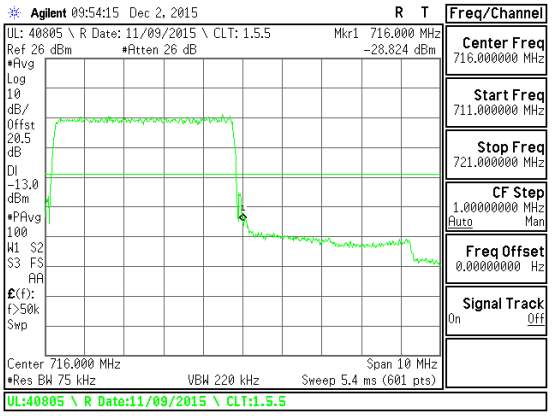

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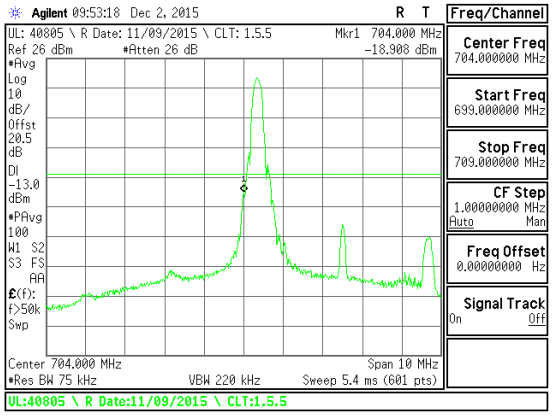

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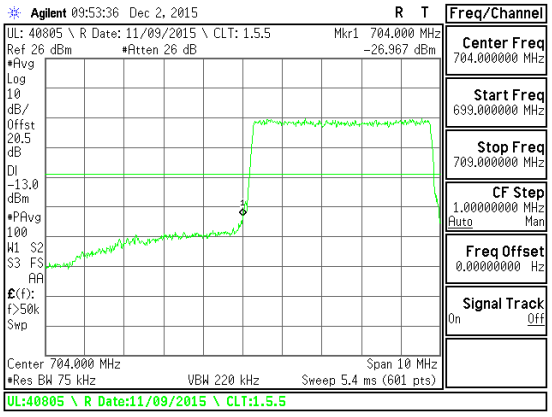

Band LTE17 5MHz 16QAM Low Channel FRB.gif

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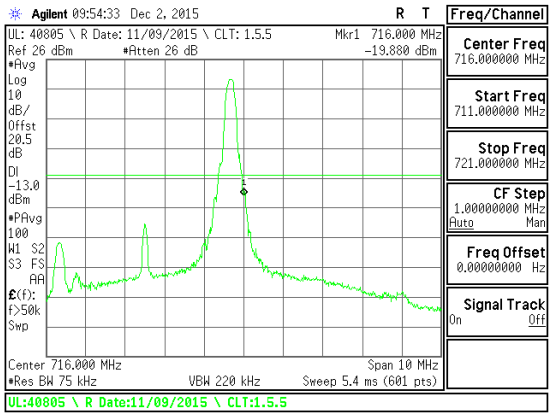

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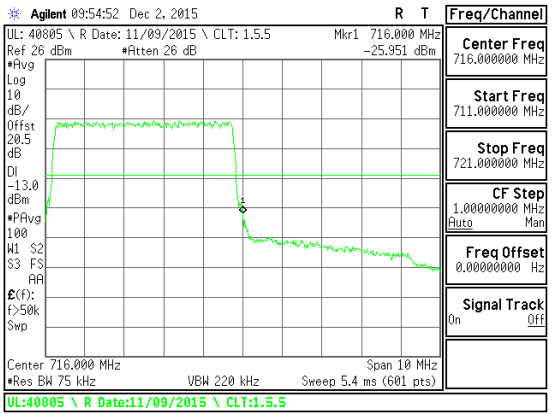

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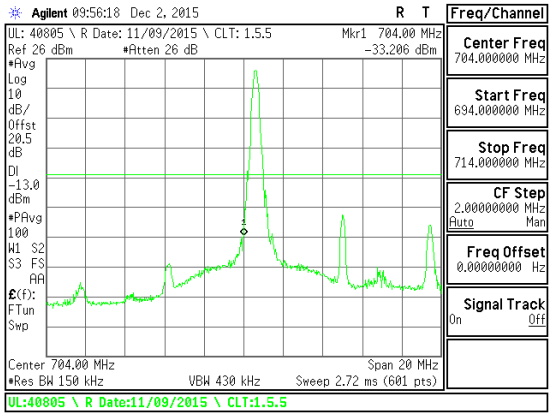
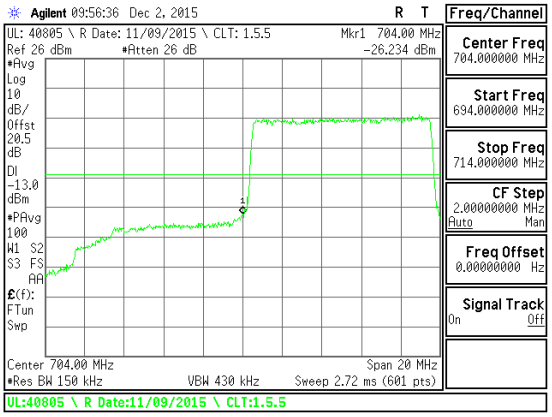


Band LTE17 10MHz QPSK Low Channel 1RB.gif



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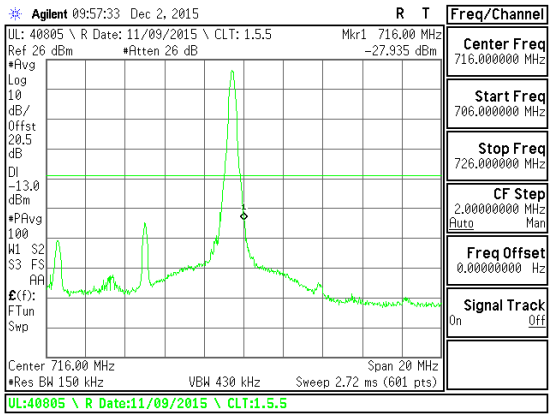

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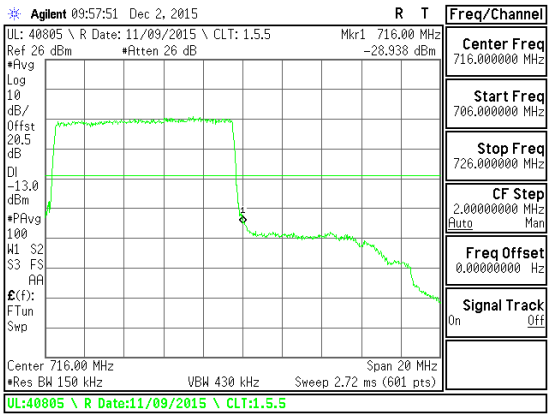

Band LTE17 10MHz QPSK High Channel FRB.gif

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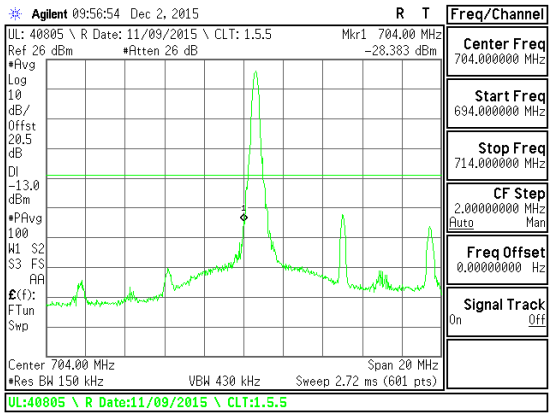

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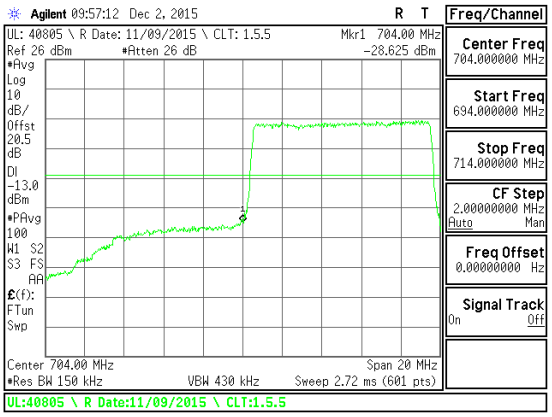

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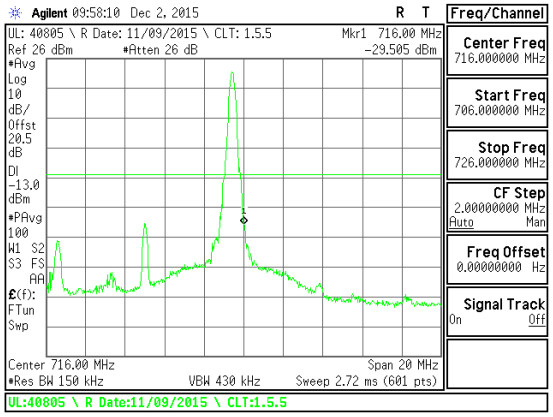

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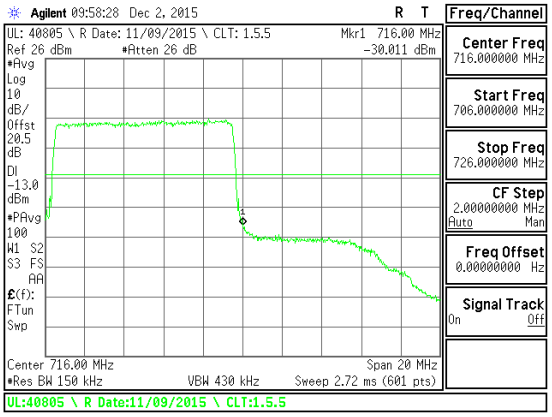

Band LTE17 10MHz 16QAM High Channel FRB.gif

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12. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.917, §24.238, §27.53

LIMITS

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.

Part 27: (m)(4) (4) 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 that 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. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

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12.1.1. OUT OF BAND EMISSIONS RESULT AND PLOTS

GSM

Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM 850	GPRS	824.2	-23.84	-13	-10.84
		836.6	-24.293	-13	-11.293
		848.8	-24.182	-13	-11.182
	EGPRS	824.2	-24.078	-13	-11.078
		836.6	-22.951	-13	-9.951
		848.8	-23.422	-13	-10.422
GSM 1900	GPRS	1850.2	-24.139	-13	-11.139
		1880	-23.371	-13	-10.371
		1909.8	-23.645	-13	-10.645
	EGPRS	1850.2	-23.037	-13	-10.037
		1880	-23.571	-13	-10.571
		1909.8	-23.523	-13	-10.523

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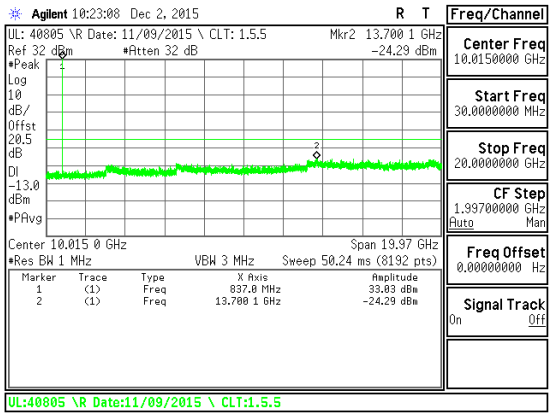
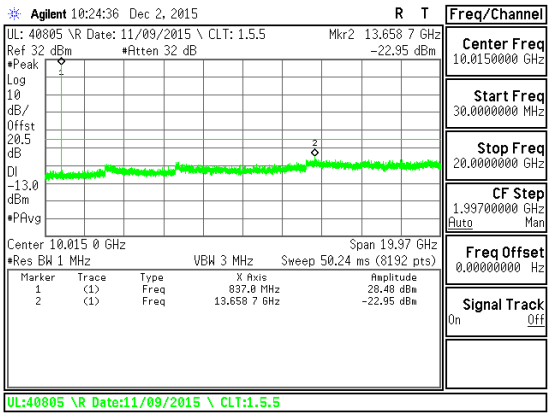
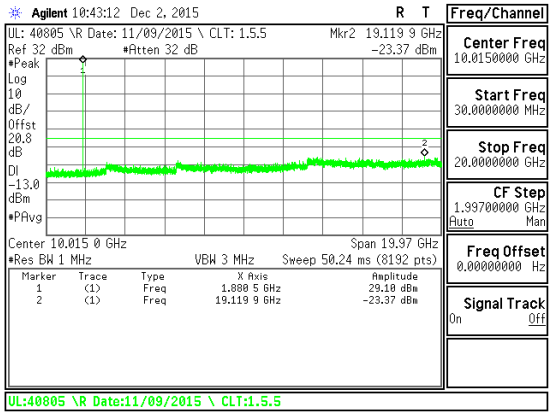


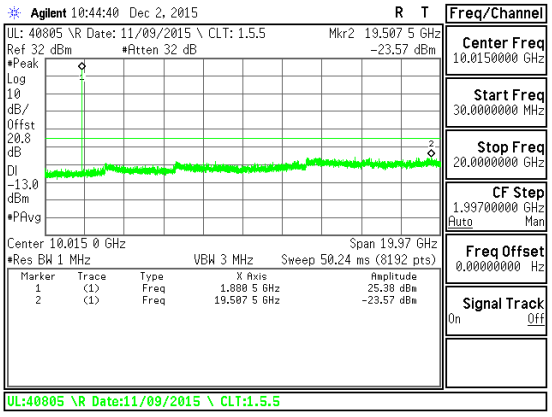
Band GSM850 GPRS CSE Mid channel



Band GSM850 EGPRS CSE Mid channel



Band GSM1900 GPRS CSE Mid channel



Band GSM1900 EGPRS CSE Mid channel

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WCDMA

Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
Band 5	REL99	826.4	-23.104	-13	-10.104
		836.6	-23.741	-13	-10.741
		846.6	-23.643	-13	-10.643
	HSDPA	826.4	-23.718	-13	-10.718
		836.6	-23.325	-13	-10.325
		846.6	-22.669	-13	-9.669
Band 2	REL99	1852.4	-23.749	-13	-10.749
		1880	-23.349	-13	-10.349
		1907.6	-22.97	-13	-9.97
	HSDPA	1852.4	-22.713	-13	-9.713
		1880	-23.501	-13	-10.501
		1907.6	-23.383	-13	-10.383

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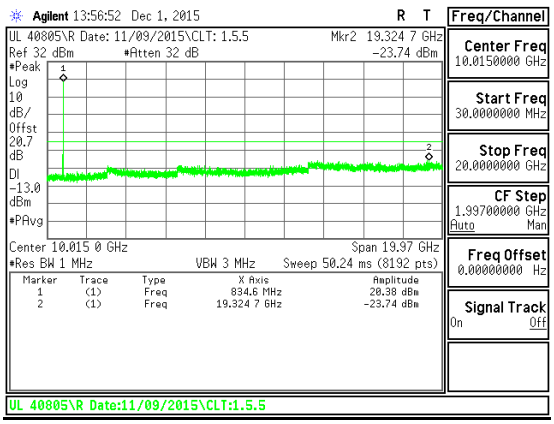
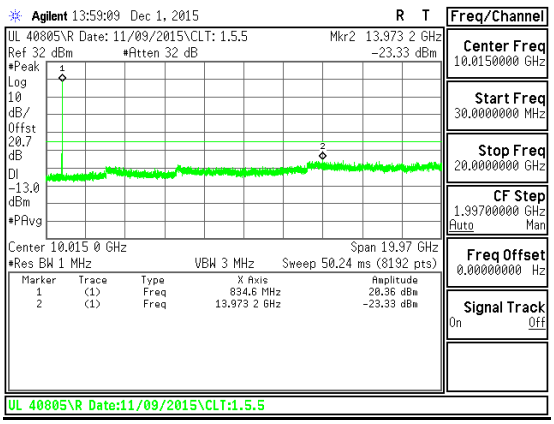
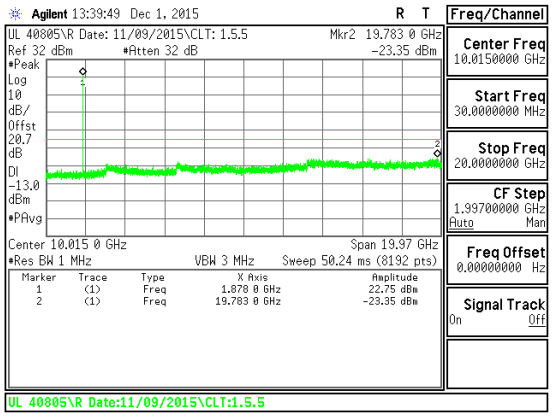


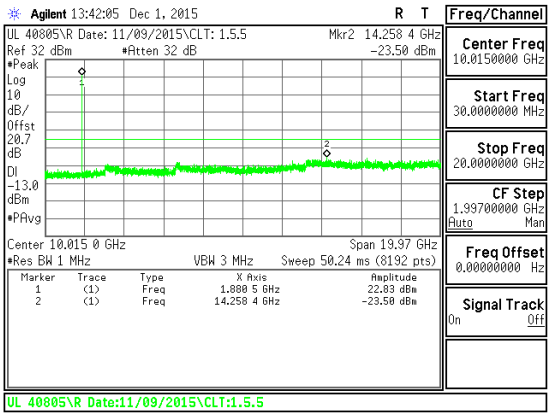
Band B5 REL99 CSE



Band B5 HSDPA CSE



Band B2 REL99 CSE



Band B2 HSDPA CSE

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LTE Band 2

	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
1.4	QPSK	1850.7	-26.576	-13	-13.576
		1880	-26.168	-13	-13.168
		1909.3	-25.898	-13	-12.898
	16QAM	1850.7	-26.304	-13	-13.304
		1880	-27.203	-13	-14.203
		1909.3	-24.199	-13	-11.199
3	QPSK	1851.5	-26.856	-13	-13.856
		1880	-27.049	-13	-14.049
		1908.5	-25.24	-13	-12.24
	16QAM	1851.5	-26.636	-13	-13.636
		1880	-26.913	-13	-13.913
		1908.5	-25.565	-13	-12.565
5	QPSK	1852.5	-26.268	-13	-13.268
		1880	-26.314	-13	-13.314
		1907.5	-26.277	-13	-13.277
	16QAM	1852.5	-26.641	-13	-13.641
		1880	-27.646	-13	-14.646
		1907.5	-27.262	-13	-14.262
10	QPSK	1855	-26.21	-13	-13.21
		1880	-26.78	-13	-13.78
		1905	-26.753	-13	-13.753
	16QAM	1855	-27.509	-13	-14.509
		1880	-27.565	-13	-14.565
		1905	-26.798	-13	-13.798
15	QPSK	1857.5	-27.349	-13	-14.349
		1880	-26	-13	-13
		1902.5	-27.04	-13	-14.04
	16QAM	1857.5	-27.02	-13	-14.02
		1880	-27.26	-13	-14.26
		1902.5	-27.47	-13	-14.47
20	QPSK	1860	-25.84	-13	-12.84
		1880	-26.28	-13	-13.28
		1900	-26.9	-13	-13.9
	16QAM	1860	-26.74	-13	-13.74
		1880	-27.04	-13	-14.04
		1900	-27.19	-13	-14.19

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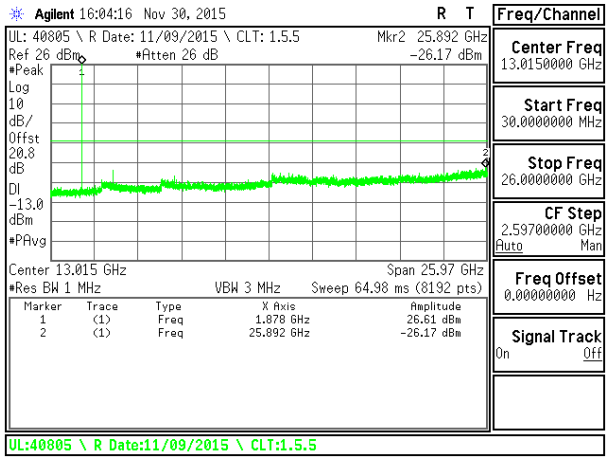
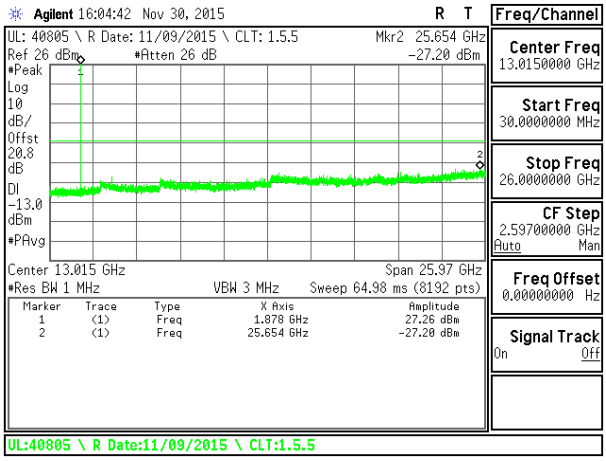
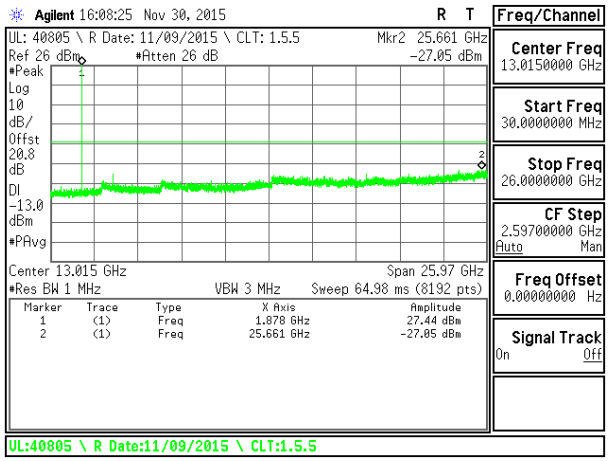


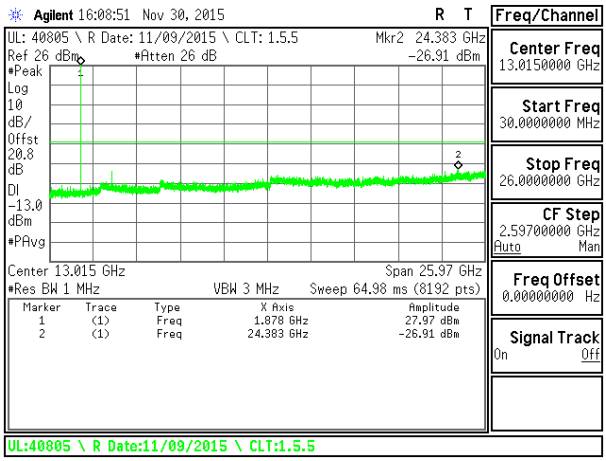
LTE B2 1.4MHz QPSK Mid Channel



LTE B2 1.4MHz 16QAM Mid Channel



LTE B2 3MHz QPSK Mid Channel



LTE B2 3MHz 16QAM Mid Channel

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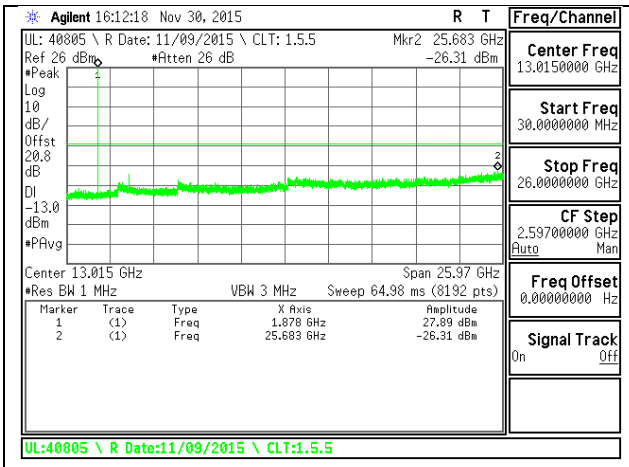
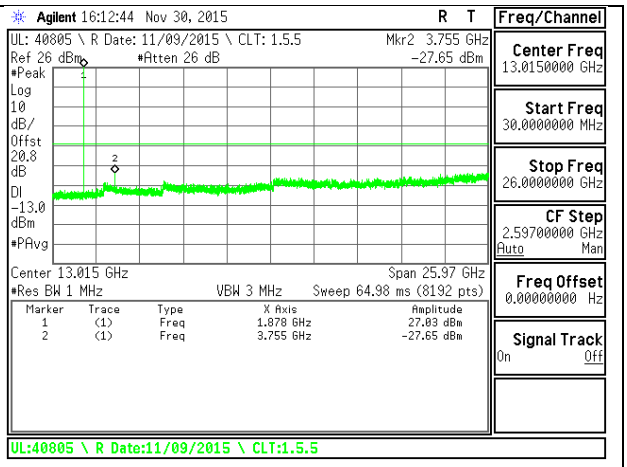
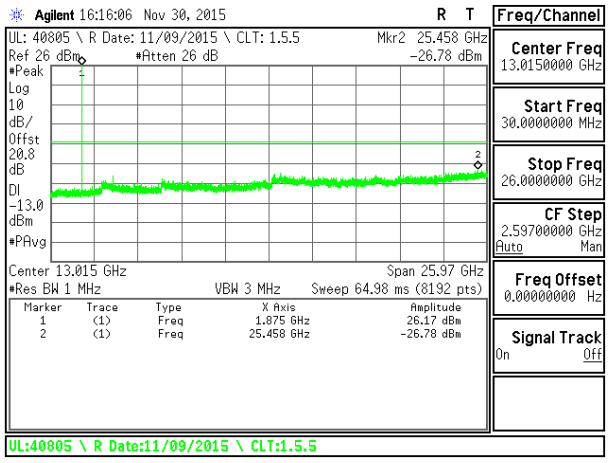


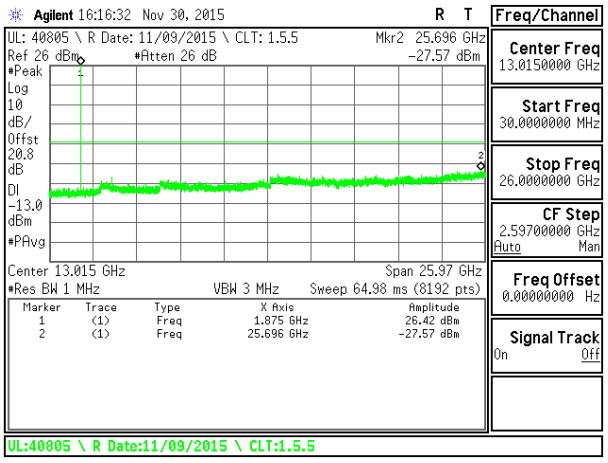
LTE B2 5MHz QPSK Mid Channel



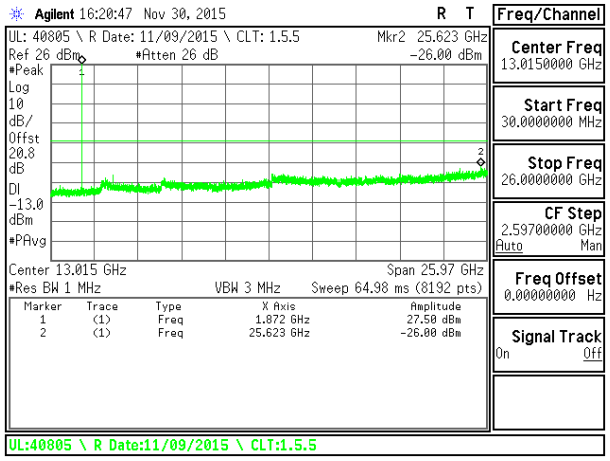
LTE B2 5MHz 16QAM Mid Channel



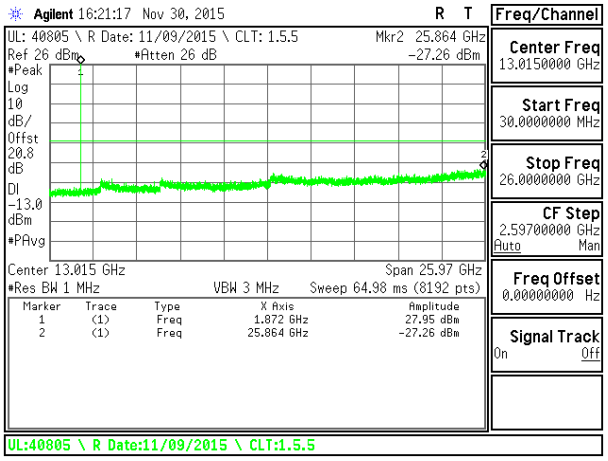
LTE B2 10MHz QPSK Mid Channel



LTE B2 10MHz 16QAM Mid Channel



LTE B2 15MHz QPSK Mid Channel



LTE B2 15MHz 16QAM Mid Channel

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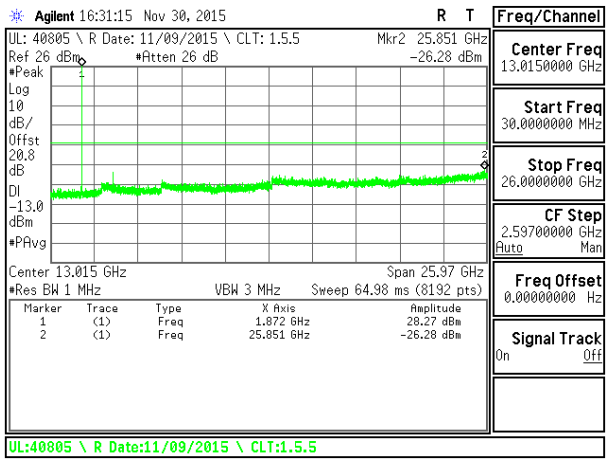
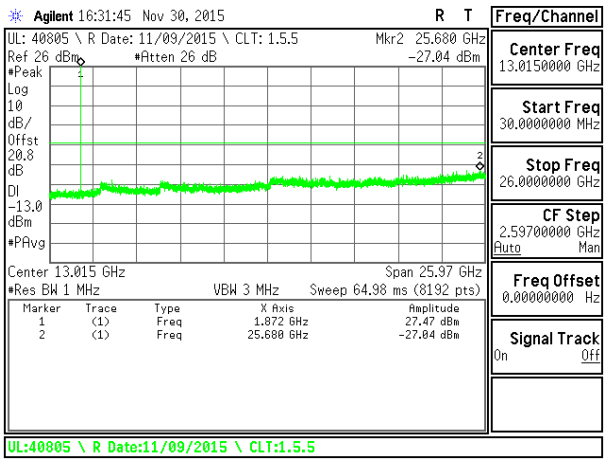


LTE B2 20MHz QPSK Mid Channel



LTE B2 20MHz 16QAM Mid Channel

LTE Band 4

BW(MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
1.4	QPSK	1710.7	-27.369	-13	-14.369
		1732.5	-27.278	-13	-14.278
		1754.3	-26.845	-13	-13.845
	16QAM	1710.7	-26.701	-13	-13.701
		1732.5	-26.972	-13	-13.972
		1754.3	-26.446	-13	-13.446
3	QPSK	1711.5	-27.347	-13	-14.347
		1732.5	-27.531	-13	-14.531
		1753.5	-26.633	-13	-13.633
	16QAM	1711.5	-27.696	-13	-14.696
		1732.5	-27.172	-13	-14.172
		1753.5	-27.622	-13	-14.622
5	QPSK	1712.5	-26.643	-13	-13.643
		1732.5	-26.869	-13	-13.869
		1752.5	-27.267	-13	-14.267
	16QAM	1712.5	-27.265	-13	-14.265
		1732.5	-26.127	-13	-13.127
		1752.5	-27.668	-13	-14.668
10	QPSK	1715	-26.86	-13	-13.86
		1732.5	-26.672	-13	-13.672
		1750	-27.31	-13	-14.31
	16QAM	1715	-26.907	-13	-13.907
		1732.5	-27.448	-13	-14.448
		1750	-27.911	-13	-14.911
15	QPSK	1717.5	-27.372	-13	-14.372

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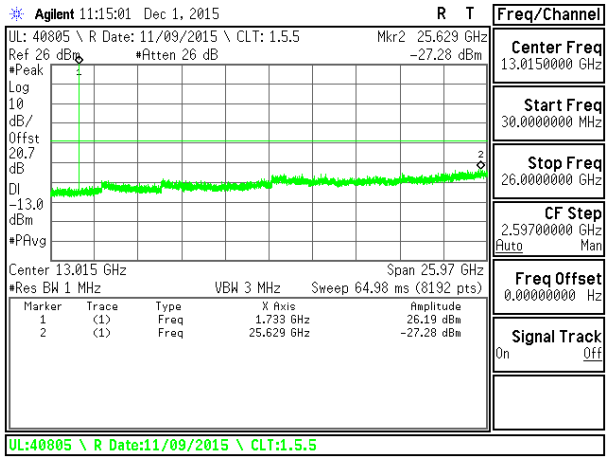
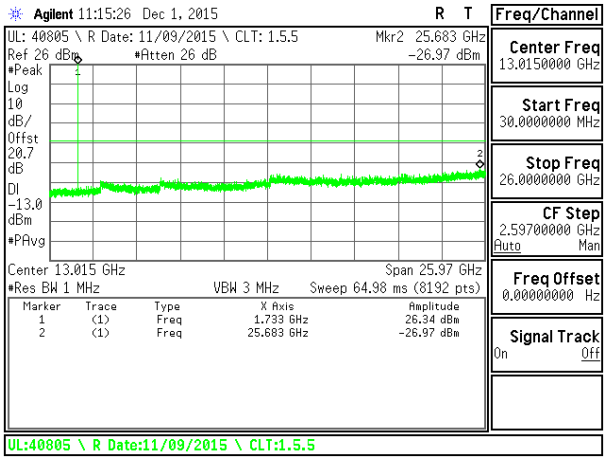
		1732.5	-26.569	-13	-13.569
		1747.5	-26.44	-13	-13.44
	16QAM	1717.5	-27.754	-13	-14.754
		1732.5	-26.111	-13	-13.111
		1747.5	-27.23	-13	-14.23
20	QPSK	1720	-27.17	-13	-14.17
		1732.5	-27.76	-13	-14.76
		1745	-26.73	-13	-13.73
	16QAM	1720	-26.33	-13	-13.33
		1732.5	-26.91	-13	-13.91
		1745	-27.25	-13	-14.25



LTE B4 1.4MHz QPSK Mid Channel



LTE B4 1.4MHz 16QAM Mid Channel

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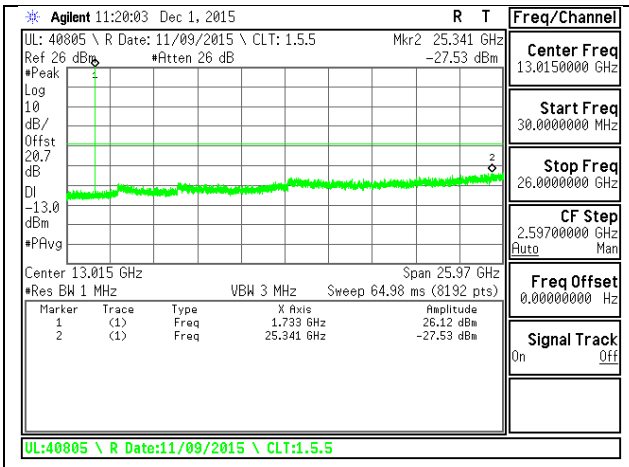
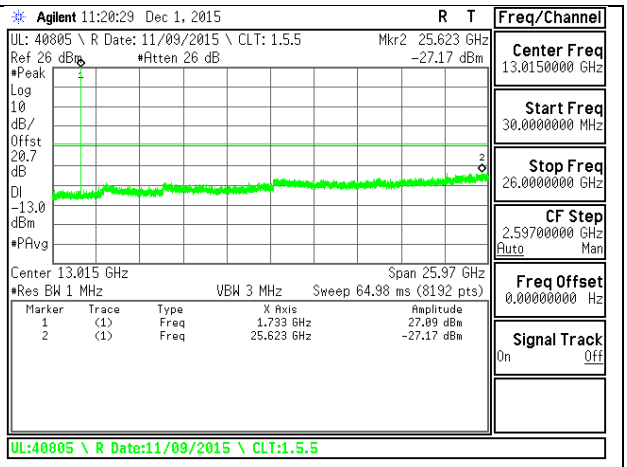
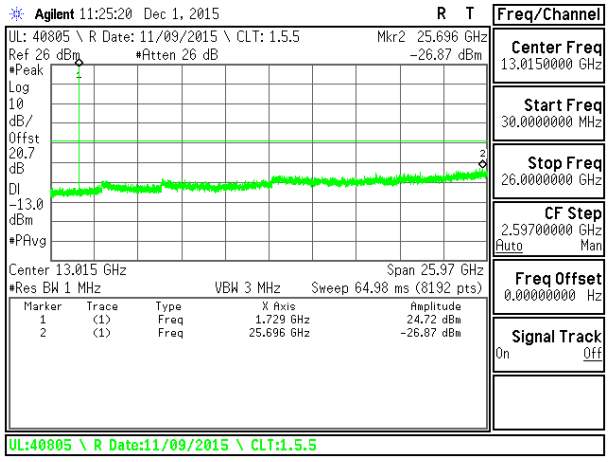


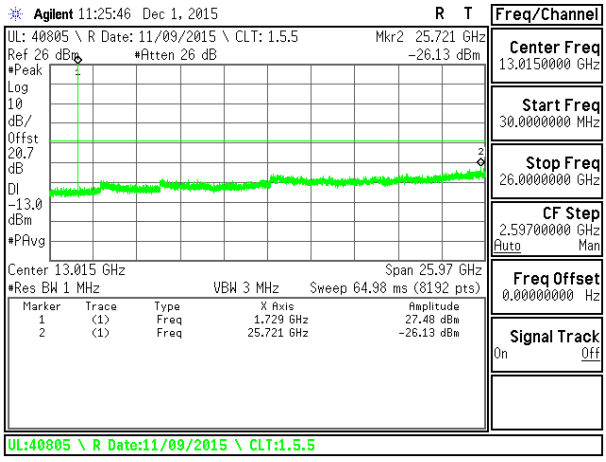
LTE B4 3MHz QPSK Mid Channel



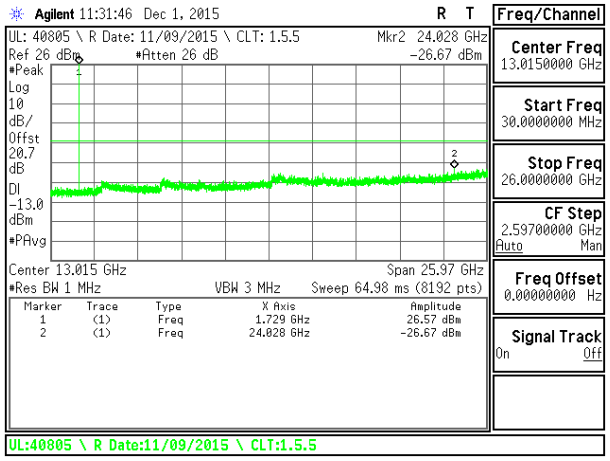
LTE B4 3MHz 16QAM Mid Channel



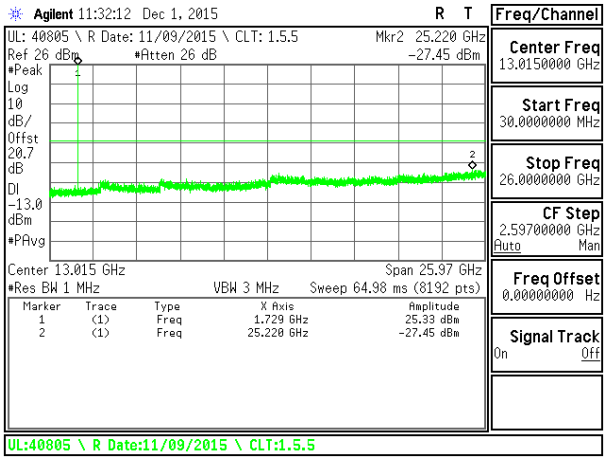
LTE B4 5MHz QPSK Mid Channel



LTE B4 5MHz 16QAM Mid Channel



LTE B4 10MHz QPSK Mid Channel



LTE B4 10MHz 16QAM Mid Channel

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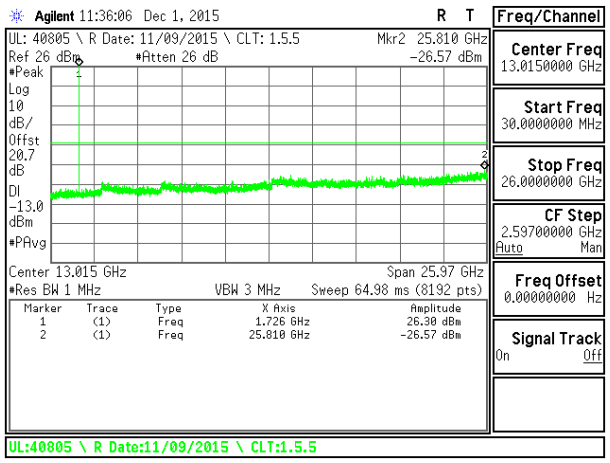
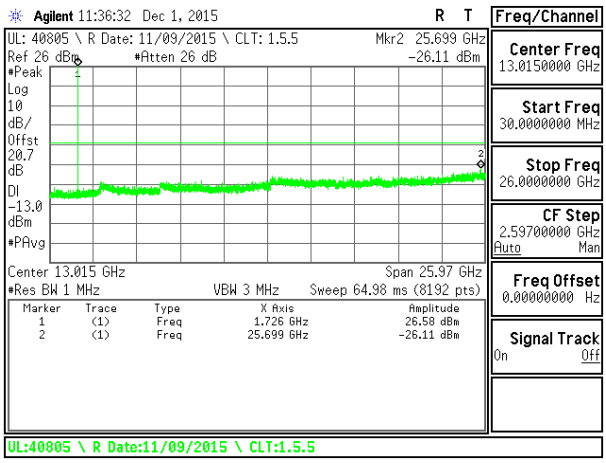
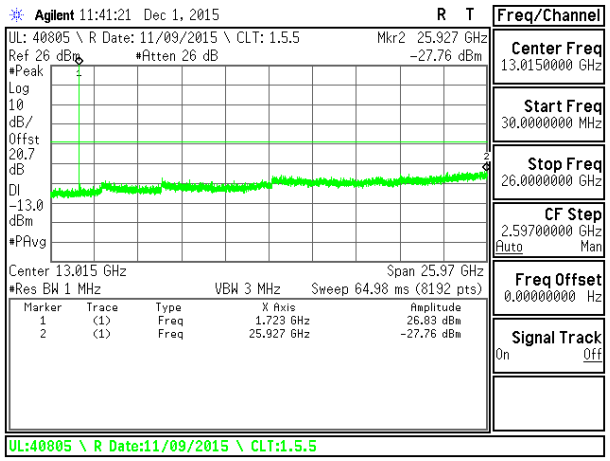


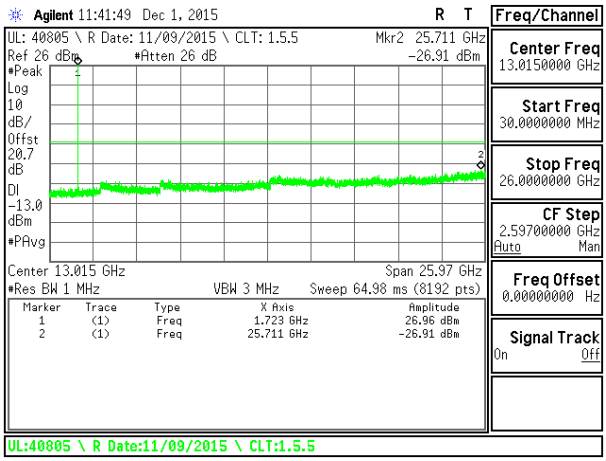
LTE B4 15MHz QPSK Mid Channel



LTE B4 15MHz 16QAM Mid Channel



LTE B4 20MHz QPSK Mid Channel



LTE B4 20MHz 16QAM Mid Channel

LTE Band 5

BW(MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
1.4	QPSK	824.7	-27.343	-13	-14.343
		836.5	-27.176	-13	-14.176
		848.3	-27.14	-13	-14.14
	16QAM	824.7	-27.9	-13	-14.9
		836.5	-27.359	-13	-14.359
		848.3	-27.693	-13	-14.693
3	QPSK	825.5	-27.316	-13	-14.316
		836.5	-27.385	-13	-14.385
		847.5	-26.76	-13	-13.76
	16QAM	825.5	-26.726	-13	-13.726

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		836.5	-26.773	-13	-13.773
		847.5	-26.872	-13	-13.872
5	QPSK	826.5	-27.614	-13	-14.614
		836.5	-27.234	-13	-14.234
		846.5	-27.494	-13	-14.494
	16QAM	826.5	-27.296	-13	-14.296
		836.5	-26.423	-13	-13.423
		846.5	-26.807	-13	-13.807
10	QPSK	829	-27.638	-13	-14.638
		836.5	-27.755	-13	-14.755
		844	-27.13	-13	-14.13
	16QAM	829	-27.648	-13	-14.648
		836.5	-27.675	-13	-14.675
		844	-26.818	-13	-13.818

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