



**FCC CFR47 PART 22H, 24E, AND 27L
CERTIFICATION TEST REPORT
FOR
UMTS (850/1900) / (E) GPRS (850/1900) w/ 1TX ANT + LTE (B2/4/5/17, 1 TX ANT)
USB MODEM**

MODEL NUMBER: AC340U

FCC ID: N7NAC340U

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SIERRA WIRELESS

EUT DESCRIPTION: UMTS (850/1900)/ (E) GPRS (850/1900) w/ 1TX ANT + LTE
(B2/4/5/17, 1 TX ANT) USB MODEM

MODEL: AC340U

SERIAL NUMBER: FCC#1

DATE TESTED: SEPTEMBER 30 ~ OCTOBER 24, 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H, 24E and 27L	Pass

UL CCS 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 CCS 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 CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS 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 CCS By:

Tested By:



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WISE ENGINEER
UL CCS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-C, FCC CFR 47 Part 2, FCC CFR 47 Part 22, FCC CFR Part 24 and FCC part 27.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

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:

$$\text{Field Strength (dBuV/m)} = \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Preamp Gain (dB)}$$

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

This EUT is a UMTS (850/1900)/ (E) GPRS (850/1900) w/ 1TX antenna + LTE (B2/4/5/17, 1 TX antenna) USB modem.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum average conducted and ERP / EIRP output powers as below:

Part 22/24					
Frequency range (MHz)	Modulation	Conducted		ERP/EIRP	
		Average	mW	Average	mW
824.2 - 848.8	GPRS	32.50	1778.3	31.22	1324.3
824.2 - 848.8	EGPRS	27.00	501.2	30.94	1241.7
1850.2-1909.8	GPRS	30.00	1000.0	32.11	1625.5
1850.2-1909.8	EGPRS	26.00	398.1	31.29	1345.9
826.4 - 846.0	Rel 99	23.50	223.9	21.85	153.1
1852.4-1907.6	Rel 99	22.50	177.8	24.60	288.4
826.4 - 846.0	HSDPA	22.40	173.8	23.07	202.8
1852.4-1907.6	HSDPA	21.70	147.9	24.28	267.9

LTE BAND 2

Part 24 LTE Band 2 MODE (5.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1852.5 - 1907.5	QPSK RB1-0	22.80	190.5	25.10	323.6
1852.5 - 1907.5	16QAM, RB1-0	21.70	147.9	23.70	234.4

Part 24 LTE Band 2 MODE (10.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1855 - 1905	QPSK RB1-0	22.90	195.0	24.90	309.0
1855 - 1905	16QAM, RB1-0	22.40	173.8	23.20	208.9

LTE BAND 4

Part 27 LTE Band 4 MODE (5.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1712.5 - 1752.5	QPSK RB1-0	22.60	182.0	24.01	251.8
1712.5 - 1752.5	16QAM, RB1-0	21.50	141.3	22.37	172.6

Part 27 LTE Band 4 MODE (10.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1715 - 1750	QPSK RB1-0	22.40	173.8	23.81	240.4
1715 - 1750	16QAM, RB1-0	21.20	131.8	21.67	146.9

LTE BAND 5

Part 22 LTE Band 5 MODE (5.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP (Average)	
		dBm	mW	dBm	mW
826.5 - 846.5	QPSK RB1-0	23.10	204.2	23.54	225.9
826.5 - 846.5	16QAM, RB1-0	22.00	158.5	22.44	175.4

Part 22 LTE Band 5 MODE (10.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP (Average)	
		dBm	mW	dBm	mW
829 - 844	QPSK RB1-0	23.10	204.2	22.97	198.2
829 - 844	16QAM, RB1-0	21.90	154.9	20.14	103.3

LTE BAND 17

Part 27 LTE Band 17 MODE (5.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP (Average)	
		dBm	mW	dBm	mW
706.5 - 713.5	QPSK RB1-0	23.20	208.9	23.92	246.6
706.5 - 713.5	16QAM, RB1-0	21.90	154.9	21.92	155.6

Part 27 LTE Band 17 MODE (10.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP (Average)	
		dBm	mW	dBm	mW
709 - 711	QPSK RB1-0	22.90	195.0	23.77	238.2
709 - 711	16QAM, RB1-0	21.50	141.3	21.62	145.2

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a permanent attached antenna with a maximum peak gain as follow:

Frequency Band	Antenna Gain (dBi)
GSM850/WCDMA850/LTE band 2/LTE band 17	1
GSM1900/WCDMA1900/ LTE band 2/ LTE band 4	3.5

5.4. SOFTWARE AND FIRMWARE

The Utility software installed during testing was Watcher.

The EUT is linked with Agilent 8960 Communication, CMU200 and CMW500 Test Set.

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel for RF radiated emissions below 1GHz and AC conducted emissions are determined as the channel with the AC Power Adapter Source

Based on the investigation results, the highest peak power and enhanced data rate is the worst-case scenario for all measurements.

Worst-case modes below:

- For Cellular and PCS band: GPRS and EGPRS
- For Cellular and PCS band: WCDMA, REL 99 and HSDPA.
- FOR LTE band 2, 4, 5 and 17.

Both conducted and radiated emissions measurement with all bands.

For the fundamental investigation of radiated emissions, the EUT is investigated for vertical and horizontal antenna orientations and X Y and Z orientation and the worst case was determined to be at X position on Cell and PCS Band.

5.6. DESCRIPTION OF TEST SETUP

I/O CABLES (RF CONDUCTED TEST)

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Un-shielded	1m	N/A
2	RF In/Out	1	Directional Coupler	Un-shielded	1m	N/A
3	RF In/Out	1	Communication Test Set	Un-shielded	None	N/A
4	USB	1	LAPTOP	Un-shielded	None	N/A

I/O CABLES (RF RADIATED TEST)

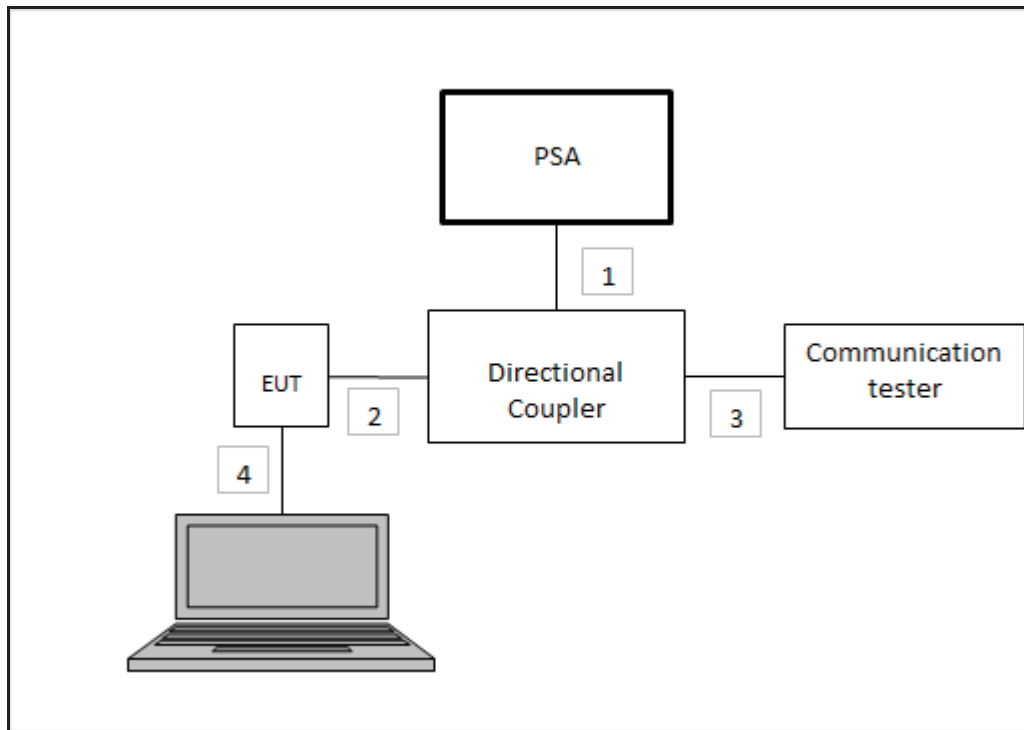
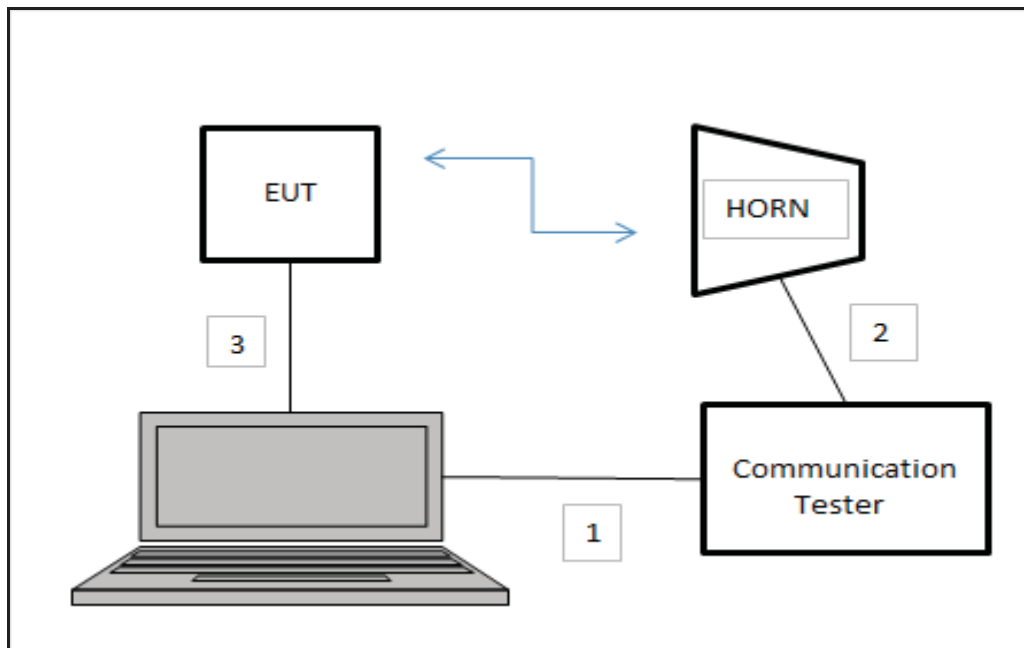
I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF In/Out	1	Communication Test set	Un-shielded	2m	NA
2	RF In/Out	1	Horn	Un-shielded	2m	NA
3	USB	1	LAPTOP	Un-shielded	2m	NA

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Dell	PA-1900-02D2	NA	NA
Laptop	Dell	PP18L	0HY385	NA

TEST SETUP

The EUT is a wireless device. The Communication test set exercised the EUT.

SETUP DIAGRAM FOR RF CONDUCTED TESTS**SETUP DIAGRAM FOR RF RADIATED TESTS**

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	Asset	Cal Due
Antenna, Horn, 18 GHz	EMCO	3115	C00872	09/20/13
Antenna, Horn, 18 GHz	EMCO	3115	C01218/100061	09/20/13
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	02/07/13
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	11/11/12
Communication Test Set	R & S	CMU 200	None	06/06/13
Wideband Communication Test Set	R & S	CMW 500	None	12/16/12
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01159	04/09/13
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	11/11/12
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02689`	CNR
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	12/20/12
Directional Coupler	RF-LAMBDA	RFDC5M06G15	None	CNR
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	07/06/13
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121C DB4	C00993	07/16/13

7. RF POWER OUTPUT VERIFICATION

TEST PROCEDURE

The transmitter output was connected to the input terminal of Directional Coupler via calibrated coaxial cable. The output coupling terminal of the Directional Coupler was directly connected to a spectrum analyzer while the output through terminal connected to the communication test set via calibrated coaxial cable.

The average output power was obtained from the communication test set at the low, middle and high channel in each band.

7.1. GSM

PROCEDURE USED TO ESTABLISH TEST SIGNAL

GPRS/EGPRS

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

> 27 dBm for EGPRS 850/900

> 30 dBm for GPRS1800/1900

> 26 dBm for EGPRS1800/1900

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 MCS9 (EGPRS)

Bit Stream > 2E9-1PSR Bit Pattern

AF/RF
Connection

Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
Press Signal On to turn on the signal and change settings

RESULTS

GPRS/EGPRS

Mode	Ch.	f (MHz)	1 time slot	2 time slots	3 time slots	4 time slots
			Average	Average	Average	Average
GPRS	128	824.2	32.50	30.90		
	190	836.6	32.40	31.30		
	251	848.8	32.40	31.40		
EGPRS	128	824.2	27.00	26.90	26.8	26.6
	190	836.6	27.00	26.90	26.8	26.6
	251	848.8	27.00	27.00	26.8	26.7

	Ch.	f (MHz)	1 time slot	2 time slots	3 time slots	4 time slots
			Average	Average	Average	Average
GPRS	512	1850.2	29.80	29.30		
	661	1880.0	29.60	29.60		
	810	1909.8	30.00	29.50		
EGPRS	512	1850.2	26.00	25.80	25.70	25.60
	661	1880.0	26.00	25.80	25.60	25.50
	810	1909.8	26.00	25.80	25.60	25.50

7.2. UMTS MODE

7.2.1. REL99

PROCEDURE USED TO ESTABLISH TEST SIGNAL

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
	β_c	Not Applicable
	β_d	Not Applicable
	β_{ec}	Not Applicable
	β_c/β_d	8/15
	β_{hs}	Not Applicable
	β_{ed}	Not Applicable

RESULTS

WCDMA REL99**Results**

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA (UMTS) Band V	Rel 99 (RMC, 12.2 kbps)	4132	826.4	23.4
		4182	836.6	23.4
		4233	846.6	23.5

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA (UMTS) Band II	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	22.5
		9400	1880.0	22.4
		9538	1907.6	22.5

7.2.2. HSDPA REL 5**PROCEDURE USED TO ESTABLISH TEST SIGNAL**

The following 4 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121.

Summary of 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			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
HSDPA Specific Settings	MPR (dB)	0	0	0.5	0.5
	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			
	A _{hs} = β_{hs}/β_c	30/15			

Result

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA (UMTS) Band V	Subtest 1	4132	826.4	22.4
		4182	836.6	22.4
		4233	846.6	22.4
	Subtest 2	4132	826.4	22.4
		4182	836.6	22.4
		4233	846.6	22.3
	Subtest 3	4132	826.4	21.7
		4182	836.6	21.9
		4233	846.6	21.8
	Subtest 4	4132	826.4	21.9
		4182	836.6	21.9
		4233	846.6	21.8

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA (UMTS) Band II	Subtest 1	9262	1852.4	21.5
		9400	1880.0	21.5
		9538	1907.6	21.7
	Subtest 2	9262	1852.4	21.5
		9400	1880.0	21.5
		9538	1907.6	21.7
	Subtest 3	9262	1852.4	21.0
		9400	1880.0	20.9
		9538	1907.6	21.0
	Subtest 4	9262	1852.4	20.9
		9400	1880.0	20.9
		9538	1907.6	21.0

7.2.3. HSPA REL 6 (HSDPA & HSUPA)

PROCEDURE USED TO ESTABLISH TEST SIGNAL

The following summary of these settings are illustrated below:

	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				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	-
	β_{hs}	22/15	12/15	30/15	4/15	5/15
HSDPA Specific Settings	β_{ed}	1309/225	94/75	47/15 47/15	56/75	47/15
	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				
HSUPA Specific Settings	$A_{hs} = \beta_{hs}/\beta_c$	30/15				
	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	12
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	67
	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	

RESULTS

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
WCDMA (UMTS) Band V	Subtest 1	4132	826.4	21.2
		4182	836.6	21.1
		4233	846.6	21.4
	Subtest 2	4132	826.4	21.1
		4182	836.6	21.1
		4233	846.6	21.2
	Subtest 3	4132	826.4	20.4
		4182	836.6	20.4
		4233	846.6	20.6
	Subtest 4	4132	826.4	21.6
		4182	836.6	22.0
		4233	846.6	22.0
	Subtest 5	4132	826.4	20.7
		4182	836.6	20.8
		4233	846.6	20.8

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
WCDMA (UMTS) Band II	Subtest 1	9262	1852.4	20.9
		9400	1880.0	20.9
		9538	1907.6	20.7
	Subtest 2	9262	1852.4	20.4
		9400	1880.0	20.3
		9538	1907.6	20.4
	Subtest 3	9262	1852.4	19.6
		9400	1880.0	20.3
		9538	1907.6	20.3
	Subtest 4	9262	1852.4	20.9
		9400	1880.0	20.4
		9538	1907.6	21.0
	Subtest 5	9262	1852.4	21.1
		9400	1880.0	21.0
		9538	1907.6	21.0

7.3. LTE BAND 2**Output power for LTE Band 2 (5 MHz)**

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)
5	18625	1855.0	QPSK	1	0	0	22.8
				1	24	0	22.8
				12	6	1	21.9
				25	0	1	21.8
			16QAM	1	0	1	21.4
				1	24	1	21.4
				12	6	2	20.8
				25	0	2	20.8
	18900	1880.0	QPSK	1	0	0	22.5
				1	24	0	22.6
				12	6	1	21.8
				25	0	1	21.7
			16QAM	1	0	1	21.7
				1	24	1	21.7
				12	6	2	20.8
				25	0	2	20.8
	19175	1907.5	QPSK	1	0	0	22.3
				1	24	0	22.4
				12	6	1	21.8
				25	0	1	21.7
			16QAM	1	0	1	21.6
				1	24	1	21.7
				12	6	2	20.8
				25	0	2	20.8

Output power for LTE Band 2 (10 MHz)

BW	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Target MPR	Avg Pwr (dBm)
10	18650	1855.0	QPSK	1	0	0	22.9
				1	49	0	22.8
				25	12	1	21.8
				50	0	1	21.8
			16QAM	1	0	1	22.4
				1	49	1	22.4
				25	12	2	20.8
				50	0	2	20.8
	18900	1880.0	QPSK	1	0	0	22.9
				1	49	0	22.8
				25	12	1	21.7
				50	0	1	21.8
			16QAM	1	0	1	21.7
				1	49	1	21.7
				25	12	2	20.8
				50	0	2	20.7
	19150	1905.0	QPSK	1	0	0	22.7
				1	49	0	22.9
				25	12	1	21.8
				50	0	1	21.8
			16QAM	1	0	1	21.5
				1	49	1	21.5
				25	12	2	20.6
				50	0	2	20.5

7.4. LTE BAND 4**Output power for LTE Band 4 (5 MHz)**

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)
5	20000	1715.0	QPSK	1	0	0	22.4
				1	24	0	22.4
				12	6	1	21.4
				25	0	1	21.3
			16QAM	1	0	1	21.0
				1	24	1	21.0
				12	6	2	20.3
				25	0	2	20.3
	20175	1732.5	QPSK	1	0	0	22.4
				1	24	0	22.6
				12	6	1	21.5
				25	0	1	21.4
			16QAM	1	0	1	21.5
				1	24	1	21.5
				12	6	2	20.5
				25	0	2	20.5
	20350	1750.0	QPSK	1	0	0	22.4
				1	24	0	22.4
				12	6	1	21.4
				25	0	1	21.3
			16QAM	1	0	1	20.9
				1	24	1	20.9
				12	6	2	20.6
				25	0	2	20.4

Output power for LTE Band 4 (10 MHz)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)
10	20000	1715.0	QPSK	1	0	0	22.4
				1	49	0	22.4
				25	12	1	21.4
				50	0	1	21.3
			16QAM	1	0	1	20.9
				1	49	1	20.9
				25	12	2	20.4
				50	0	2	20.4
	20175	1732.5	QPSK	1	0	0	22.5
				1	49	0	22.6
				25	12	1	21.4
				50	0	1	21.3
			16QAM	1	0	1	21.2
				1	49	1	21.2
				25	12	2	20.4
				50	0	2	20.3
	20350	1750.0	QPSK	1	0	0	22.6
				1	49	0	22.5
				25	12	1	21.3
				50	0	1	21.3
			16QAM	1	0	1	21.1
				1	49	1	21.1
				25	12	2	20.2
				50	0	2	20.2

7.5. LTE BAND 5

Output power for LTE Band 5 (5 MHz)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)
5	20425	826.5	QPSK	1	0	0	23.1
				1	24	0	23.1
				12	6	1	22.1
				25	0	1	22.1
			16QAM	1	0	1	22.0
				1	24	1	21.9
				12	6	2	21.1
				25	0	2	21.1
	20525	836.5	QPSK	1	0	0	23.0
				1	24	0	23.1
				12	6	1	22.2
				25	0	1	22.1
			16QAM	1	0	1	21.5
				1	24	1	21.6
				12	6	2	21.1
				25	0	2	21.1
	20625	846.5	QPSK	1	0	0	22.8
				1	24	0	22.7
				12	6	1	22.1
				25	0	1	22.0
			16QAM	1	0	1	21.5
				1	24	1	21.4
				12	6	2	21.2
				25	0	2	21.0

Output power for LTE Band 5 (10 MHz)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)
10	20450	829.0	QPSK	1	0	0	23.1
				1	49	0	23.0
				25	12	1	22.0
				50	0	1	22.0
			16QAM	1	0	1	21.6
				1	49	1	21.5
				25	12	2	21.0
				50	0	2	21.0
	20525	836.5	QPSK	1	0	0	23.2
				1	49	0	23.0
				25	12	1	22.1
				50	0	1	22.1
			16QAM	1	0	1	21.9
				1	49	1	21.8
				25	12	2	21.1
				50	0	2	21.1
	20600	844.0	QPSK	1	0	0	23.1
				1	49	0	22.9
				25	12	1	22.0
				50	0	1	21.9
			16QAM	1	0	1	21.6
				1	49	1	21.6
				25	12	2	20.8
				50	0	2	20.8

7.6. LTE BAND 17**5 MHz BANDWIDTH**

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)
5	23755	706.5	QPSK	1	0	0	22.7
				1	24	0	23.0
				12	6	1	21.8
				25	0	1	21.8
			16QAM	1	0	1	21.2
				1	24	1	21.4
				12	6	2	21.1
				25	0	2	21.3
	23790	710.0	QPSK	1	0	0	22.9
				1	24	0	23.1
				12	6	1	22.2
				25	0	1	22.1
			16QAM	1	0	1	21.9
				1	24	1	21.9
				12	6	2	21.2
				25	0	2	21.1
	23825	713.5	QPSK	1	0	0	23.2
				1	24	0	22.4
				12	6	1	21.9
				25	0	1	21.8
			16QAM	1	0	1	21.6
				1	24	1	21.3
				12	6	2	20.8
				25	0	2	20.8

10 MHz BANDWIDTH

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)
10	23780	709.0	QPSK	1	0	0	22.6
				1	49	0	22.9
				25	12	1	21.9
				50	0	1	21.8
			16QAM	1	0	1	21.1
				1	49	1	21.4
				25	12	2	20.7
				50	0	2	20.9
	23790	710.0	QPSK	1	0	0	22.6
				1	49	0	22.7
				25	12	1	21.8
				50	0	1	21.7
			16QAM	1	0	1	21.4
				1	49	1	21.5
				25	12	2	20.8
				50	0	2	20.7
	23800	711.0	QPSK	1	0	0	22.9
				1	49	0	22.4
				25	12	1	22.1
				50	0	1	21.9
			16QAM	1	0	1	21.5
				1	49	1	20.9
				25	12	2	21.0
				50	0	2	20.9

8. CONDUCTED TEST RESULTS

8.1. 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.

MODES TESTED

- GPRS and EGPRS
- WCDMA, REL 99 and HSDPA
- LTE BAND 2
- LTE BAND 4
- LTE BAND 5
- LTE BAND 17

RESULTS

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
GSM	CELL, GPRS	128	824.20	242.9568	314.383
		190	836.60	243.1027	306.727
		251	848.80	242.6020	310.821
	PCS, GPRS	512	1852.4	247.0679	308.152
		661	1880.0	247.6332	307.029
		810	1909.8	241.0453	319.849

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
GSM	CELL, EGPRS	128	824.20	246.4668	307.737
		190	836.60	244.0471	310.093
		251	848.80	240.5576	301.232
	PCS, EGPRS	512	1852.4	243.2235	298.265
		661	1880.0	249.9667	309.595
		810	1909.8	242.9198	307.171

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
WCDMA	CELL, REL 99	4357	826.4	4.1616	4.571
		4405	836.0	4.2296	4.567
		4455	846.0	4.1648	4.591
	CELL, HSDPA	4357	826.4	4.2320	4.578
		4405	836.0	4.1840	4.531
		4455	846.0	4.2738	4.580

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
WCDMA	PCS, REL 99	9662	1852.4	4.1998	4.611
		9800	1880.0	4.1902	4.561
		9938	1907.6	4.1930	4.596
	PCS, HSDPA	9662	1852.4	4.1241	4.602
		9800	1880.0	4.1675	4.610
		9938	1907.6	4.0990	4.621

RESULTS

Band	Mode	RB/RB SIZE	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 2	5 MHz BAND QPSK	12/6	1852.5	2.1649	2.576
		25/0		4.4691	4.763
	5 MHz BAND 16QAM	12/6		2.1649	2.593
		25/0		4.4753	4.763
	5 MHz BAND QPSK	12/6	1880.0	2.1493	2.558
		25/0		4.4586	4.757
	5 MHz BAND 16QAM	12/6		2.1593	2.504
		25/0		4.4880	4.679
	5 MHz BAND QPSK	12/6	1907.5	2.1521	2.630
		25/0		4.4624	4.789
	5 MHz BAND 16QAM	12/6		2.1559	2.630
		25/0		4.4791	4.770

Band	Mode	RB/RB SIZE	f (MHz)	99% BW (kHz)	-26dB BW (kHz)
LTE BAND 2	10 MHz BAND QPSK	25/12	1855	4.4835	4.896
		50/0		8.9362	9.313
	10 MHz BAND 16QAM	25/12		4.4645	4.761
		50/0		8.9089	9.364
	10 MHz BAND QPSK	25/12	1880.0	4.4703	4.778
		50/0		8.9676	9.345
	10 MHz BAND 16QAM	25/12		4.4922	4.873
		50/0		8.9288	9.336
	10 MHz BAND QPSK	25/12	1905	4.4793	4.836
		50/0		8.9187	9.392
	10 MHz BAND 16QAM	25/12		4.4868	4.798
		50/0		8.9647	9.417

LTE BAND 4

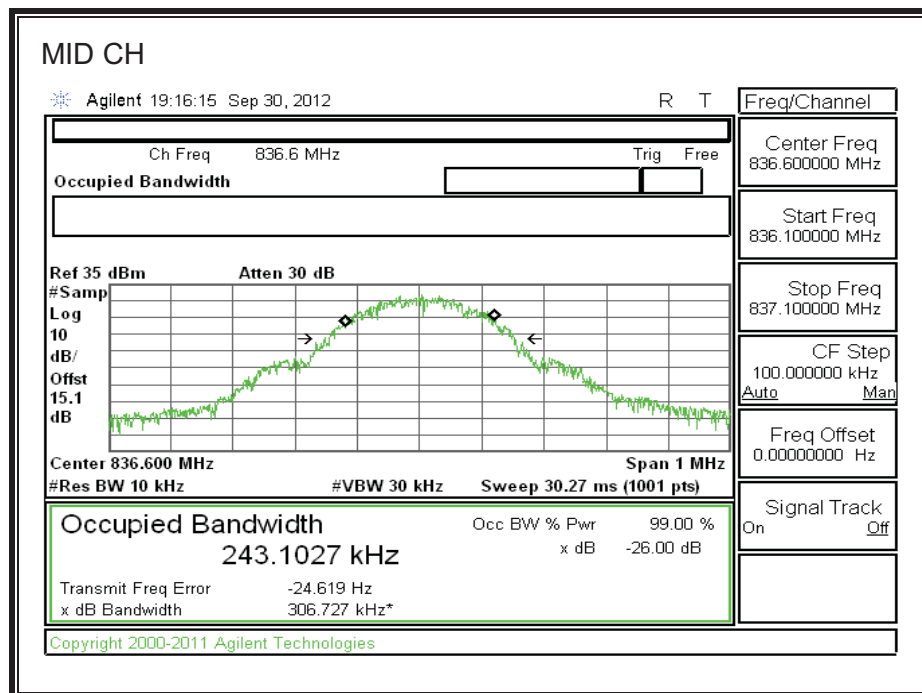
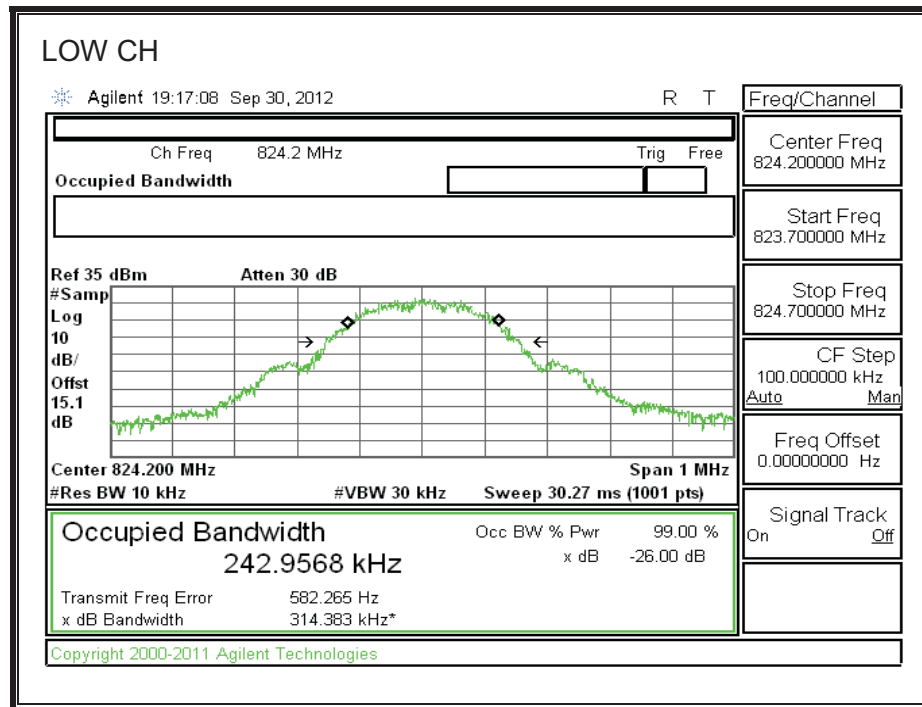
Band	Mode	RB/RB SIZE	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 4	5 MHz BAND QPSK	12/6	1712.5	2.1596	2.718
		25/0		4.4683	4.763
	5 MHz BAND 16QAM	12/6		2.1688	2.789
		25/0		4.4242	4.669
	5 MHz BAND QPSK	12/6	1732.5	2.1655	2.718
		25/0		4.5041	4.767
	5 MHz BAND 16QAM	12/6		2.1545	2.629
		25/0		4.4781	4.762
	5 MHz BAND QPSK	12/6	1752.5	2.1673	2.470
		25/0		4.4975	4.780
	5 MHz BAND 16QAM	12/6		2.1595	2.629
		25/0		4.4844	4.768
	10 MHz BAND QPSK	25/12	17150	4.4702	4.834
		50/0		8.9377	9.386
	10 MHz BAND 16QAM	25/12		4.4434	4.761
		50/0		8.8364	9.335
	10 MHz BAND QPSK	25/12	1732.50	4.4735	4.760
		50/0		8.9301	9.525
	10 MHz BAND 16QAM	25/12		4.5108	4.826
		50/0		9.0090	9.507
	10 MHz BAND QPSK	25/12	1750.00	4.4895	4.992
		50/0		8.9612	9.514
	10 MHz BAND 16QAM	25/12		4.5035	4.760
		50/0		8.9862	9.528

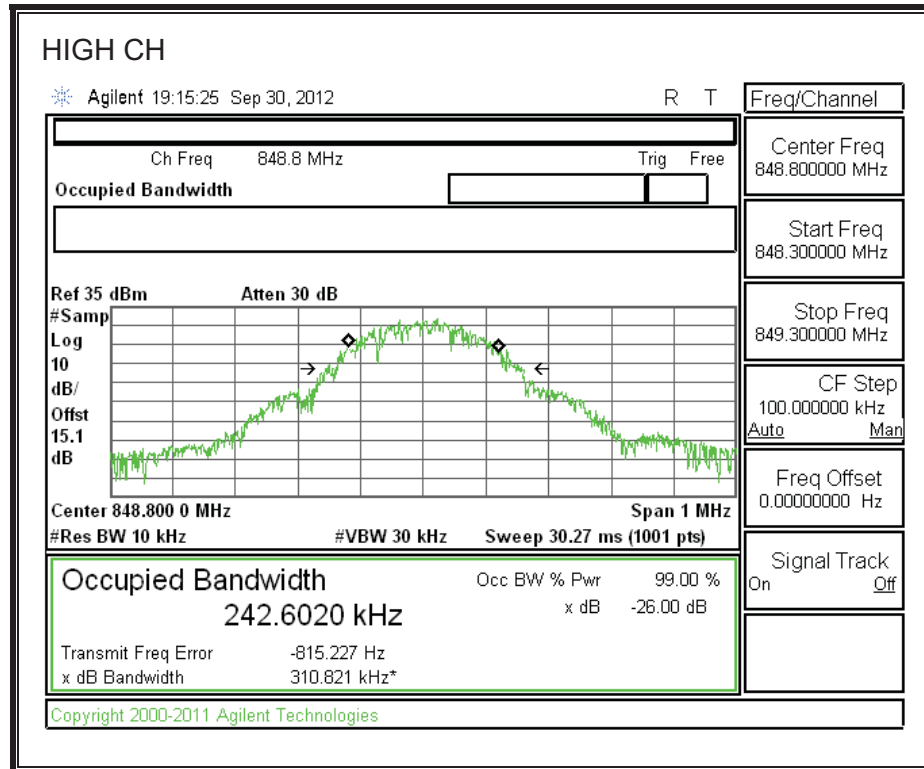
LTE Band 5

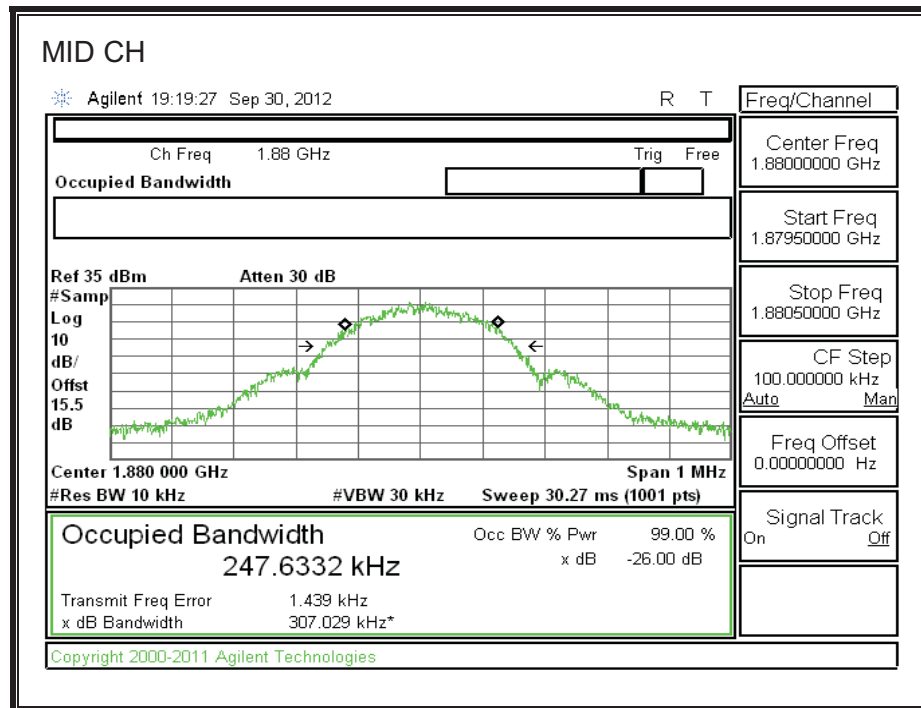
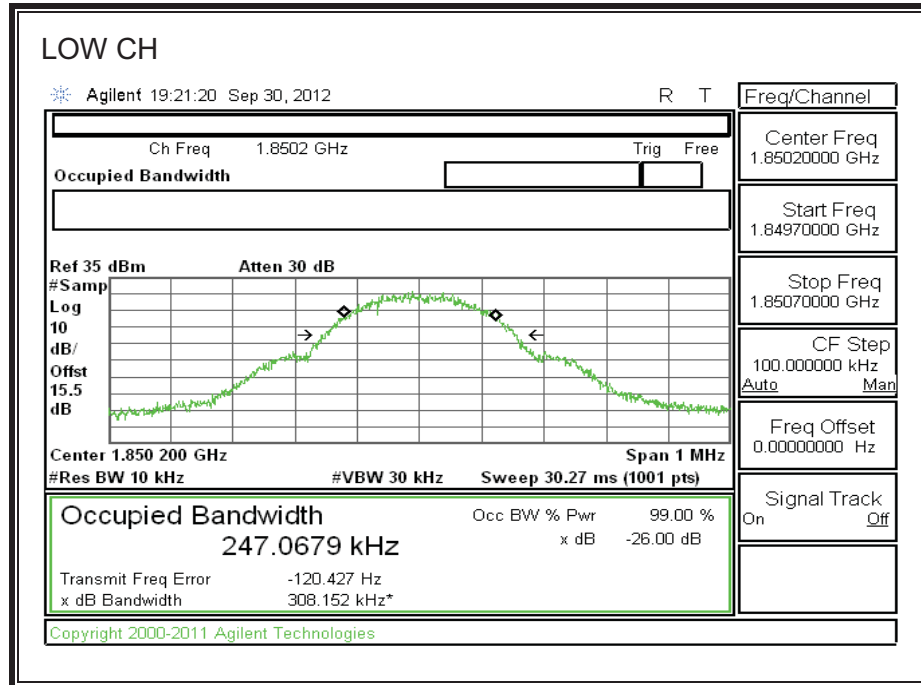
Band	Mode	RB/RB SIZE	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 5	5 MHz BAND QPSK	12/6	821.5	2.1630	2.718
		25/0		4.4586	4.735
	5 MHz BAND 16QAM	12/6		2.1433	2.629
		25/0		4.5002	4.717
	5 MHz BAND QPSK	12/6	836.5	2.1571	2.718
		25/0		4.4602	4.774
	5 MHz BAND 16QAM	12/6		2.1622	2.664
		25/0		4.4619	4.761
	5 MHz BAND QPSK	12/6	846.5	2.1552	2.628
		25/0		4.4822	4.763
	5 MHz BAND 16QAM	12/6		2.1733	2.787
		25/0		4.5041	4.765
	10 MHz BAND QPSK	25/12	829	4.4904	4.763
		50/0		8.8649	9.528
	10 MHz BAND 16QAM	25/12		4.5052	4.835
		50/0		8.9772	9.532
	10 MHz BAND QPSK	25/12	836.5	4.4708	4.826
		50/0		8.8974	9.429
	10 MHz BAND 16QAM	25/12		4.4942	4.763
		50/0		8.9893	9.526
	10 MHz BAND QPSK	25/12	844	4.4767	4.667
		50/0		8.9096	9.478
	10 MHz BAND 16QAM	25/12		4.4683	4.785
		50/0		8.9676	9.398

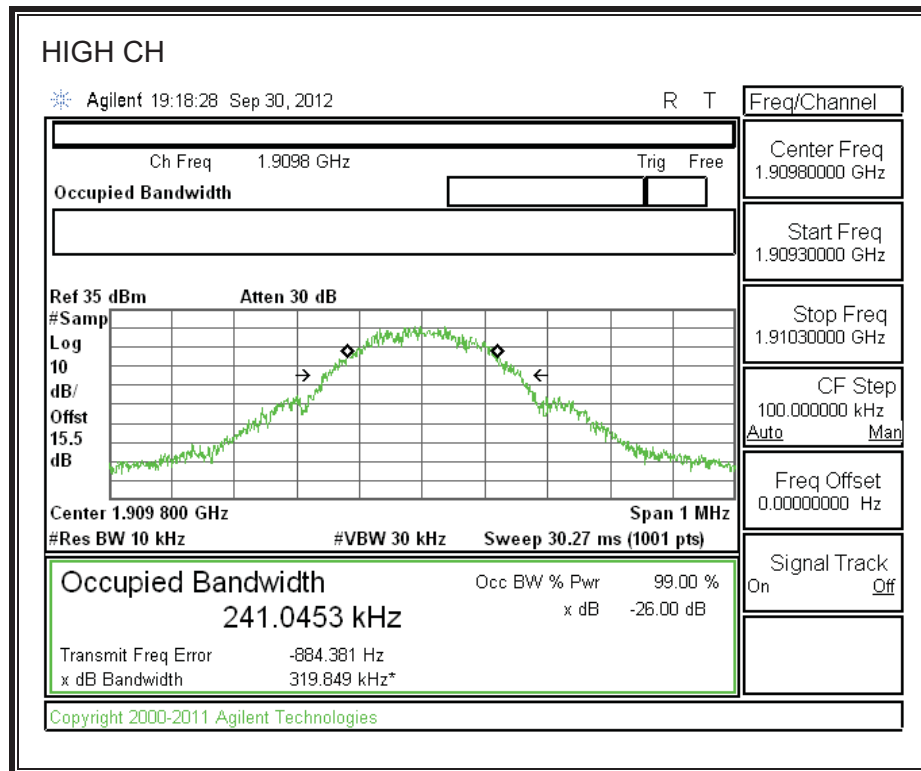
LTE Band 17

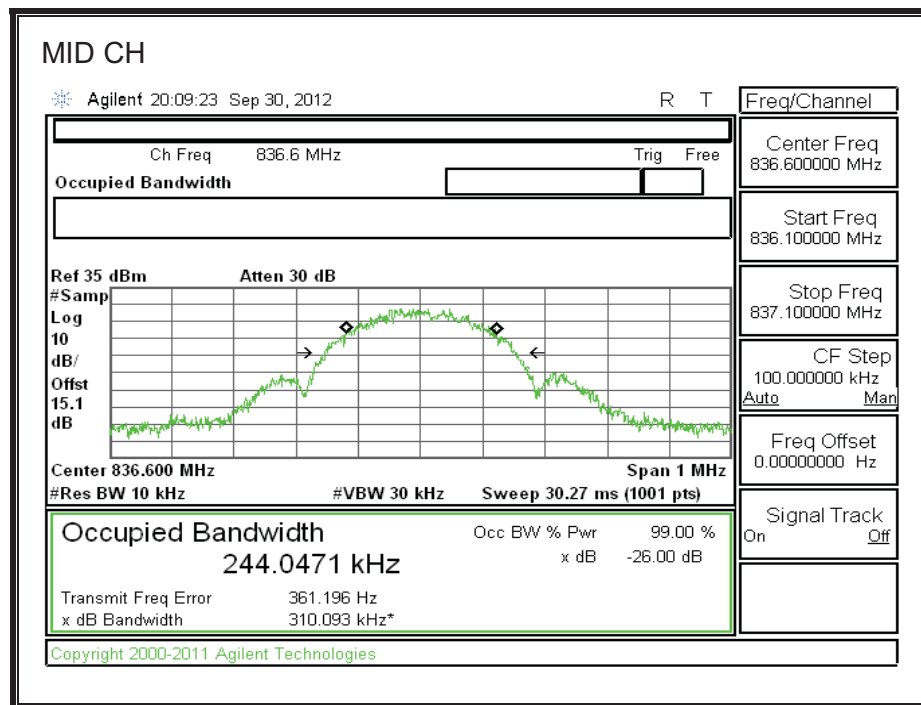
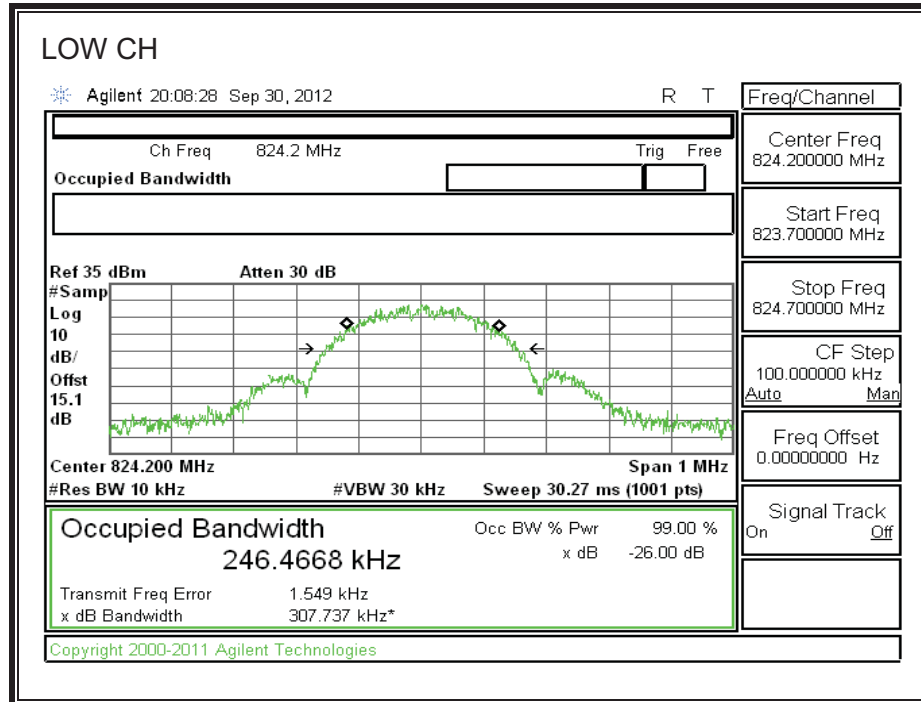
Band	Mode	RB/RB SIZE	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 17	5 MHz BAND QPSK	12/6	706.5	2.1544	2.435
		25/0		4.5256	4.836
	5 MHz BAND 16QAM	12/6		2.1588	2.502
		25/0		4.4890	4.764
	5 MHz BAND QPSK	12/6	710	2.1685	2.630
		25/0		4.5126	4.824
	5 MHz BAND 16QAM	12/6		2.1462	2.537
		25/0		4.4733	4.781
	5 MHz BAND QPSK	12/6	713.5	2.1706	2.505
		25/0		4.4645	4.744
	5 MHz BAND 16QAM	12/6		2.1411	2.559
		25/0		4.4676	4.769
	10 MHz BAND QPSK	25/12	709	4.4668	4.789
		50/0		8.9095	9.430
	10 MHz BAND 16QAM	25/12		4.4549	4.697
		50/0		8.9343	9.421
	10 MHz BAND QPSK	25/12	710	4.4882	4.693
		50/0		8.8989	9.544
	10 MHz BAND 16QAM	25/12		4.4610	4.841
		50/0		8.9851	9.526
	10 MHz BAND QPSK	25/12	711	4.4494	4.738
		50/0		8.8903	9.527
	10 MHz BAND 16QAM	25/12		4.4906	4.761
		50/0		8.9410	9.523

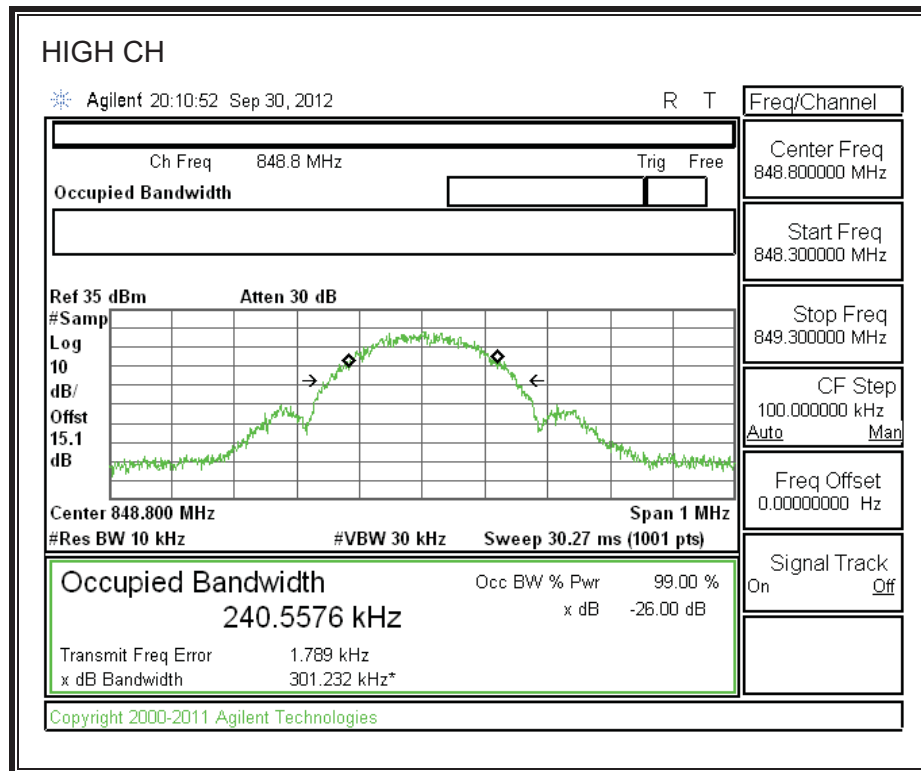
8.1.1. GSM**GPRS MODE (CELLULAR BAND)**

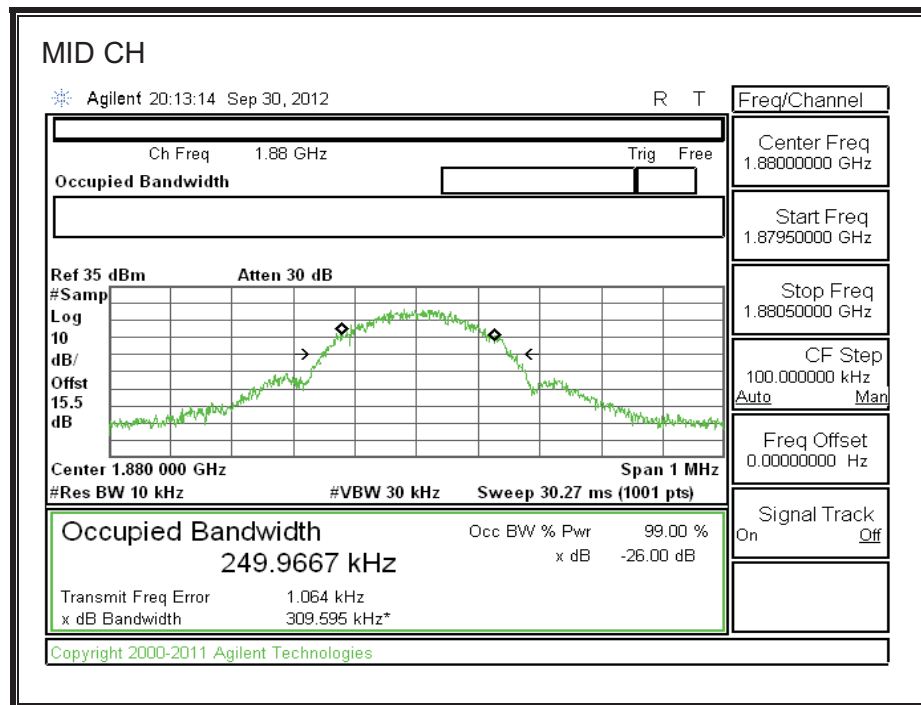
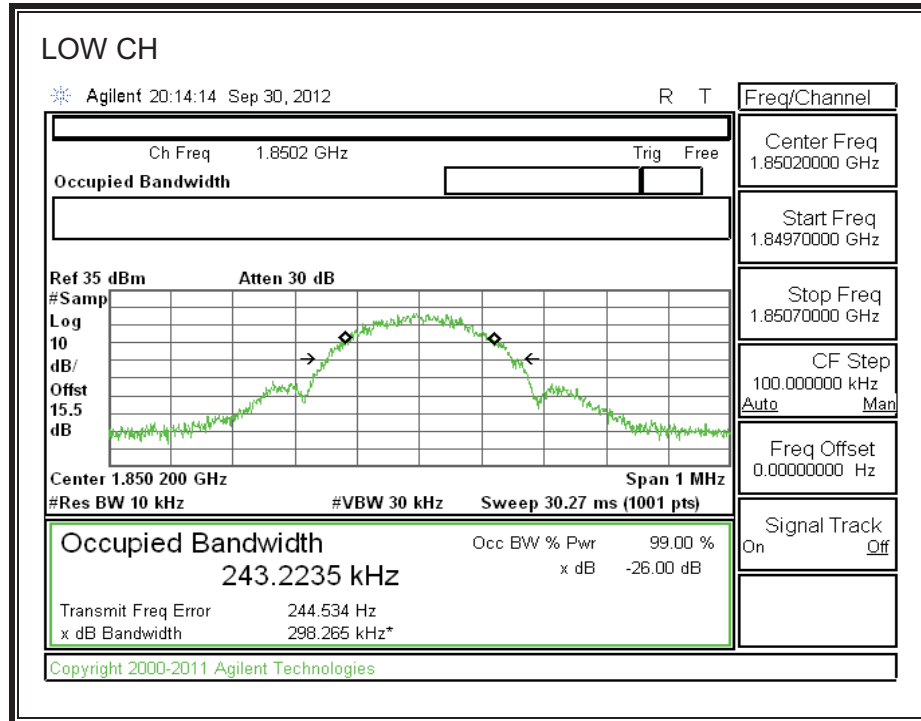


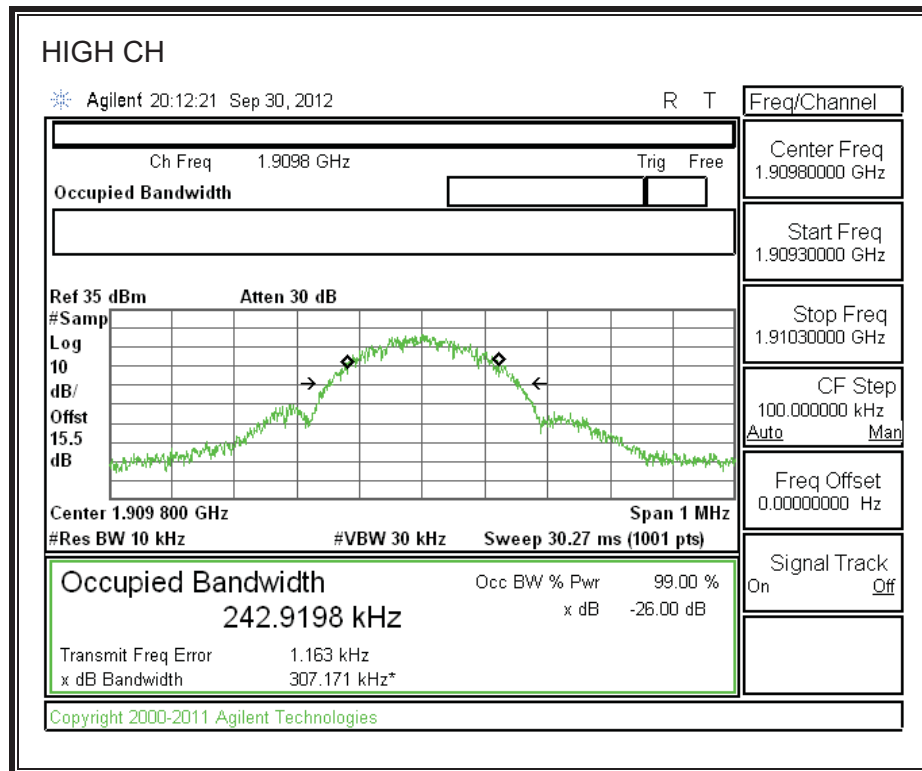
GPRS 1900 MODE (PCS BAND)

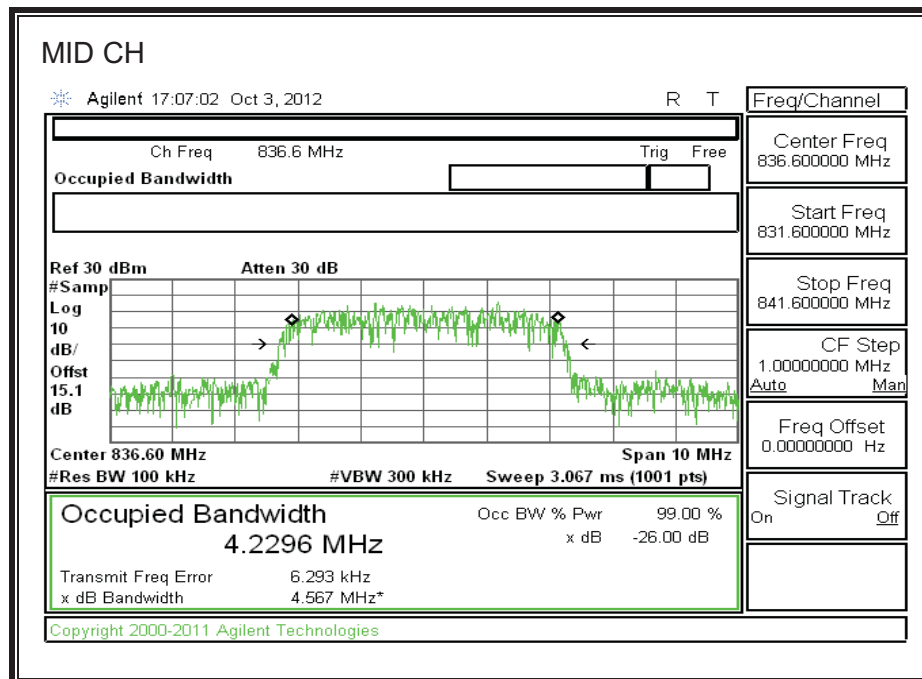
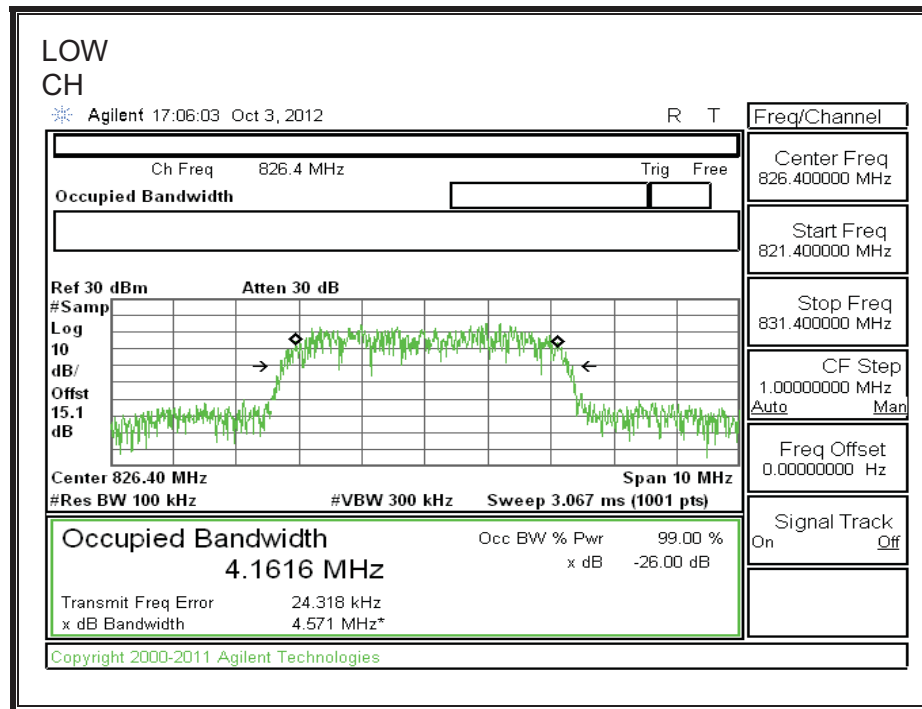


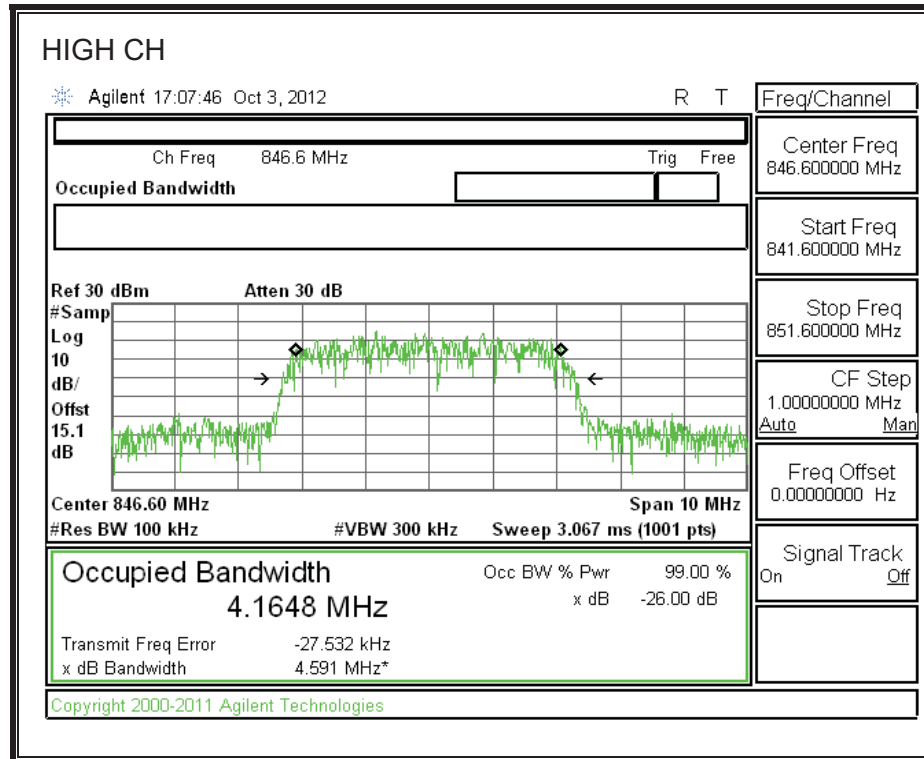
EGPRS CELLULAR BAND

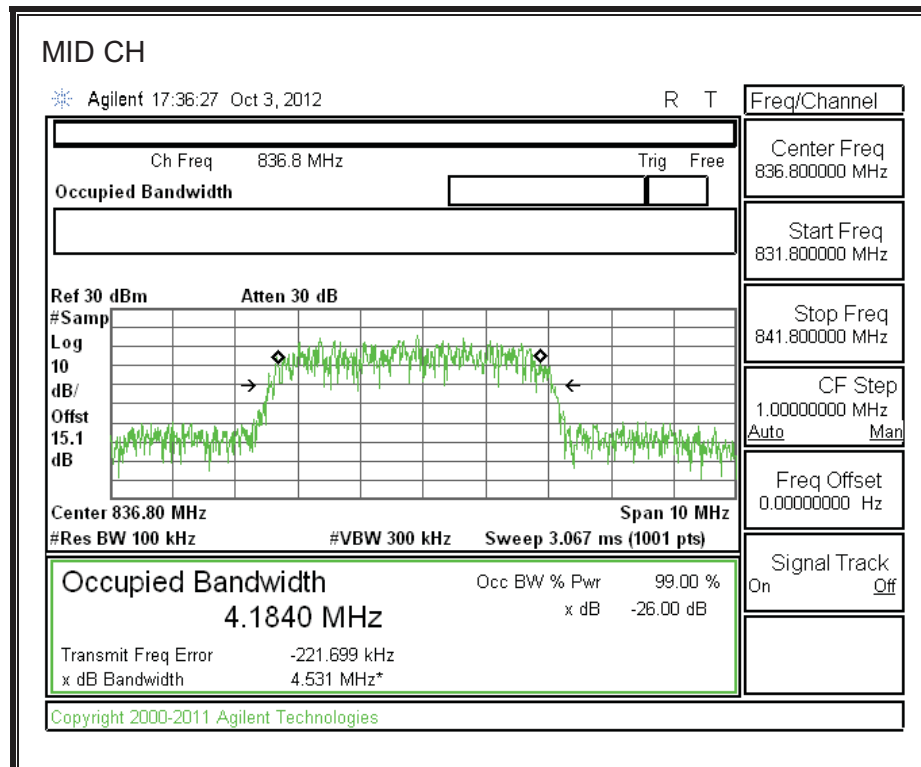
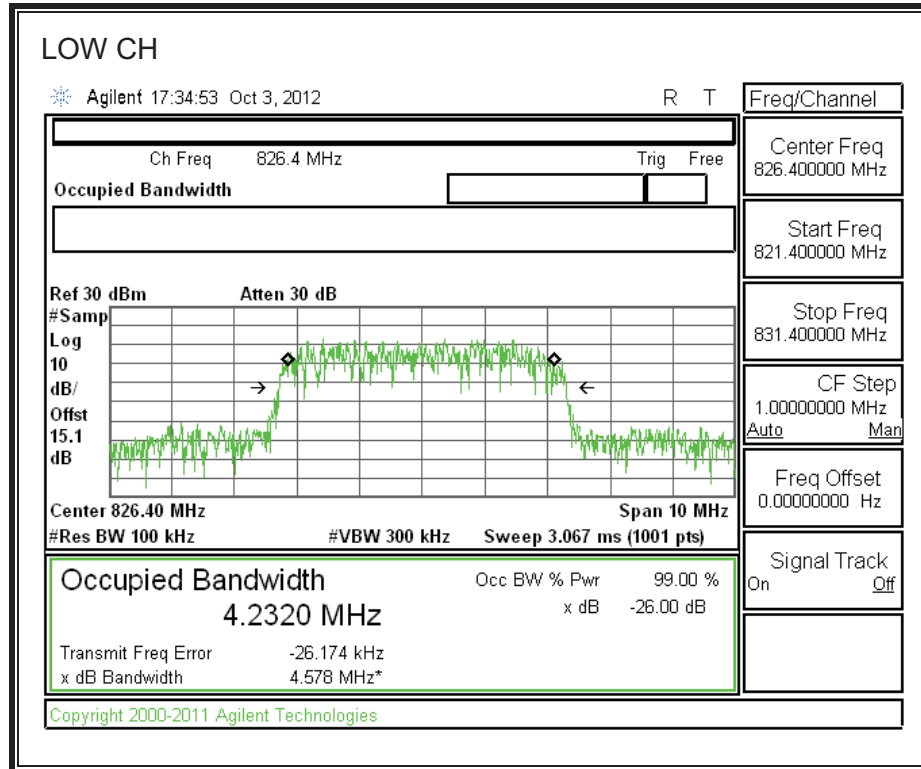


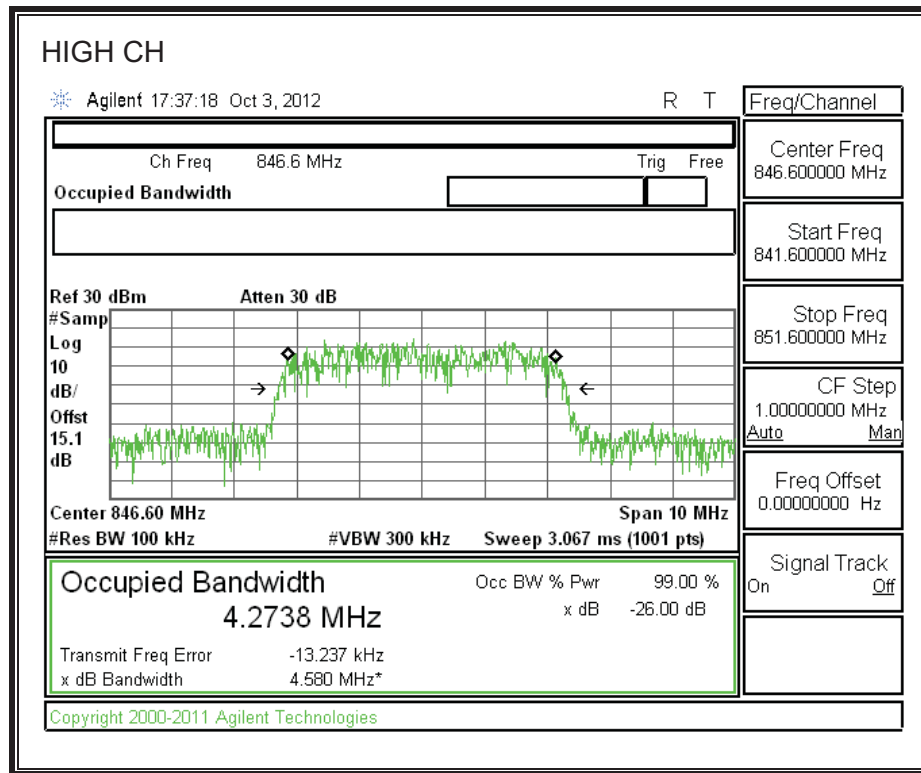
EGPRS 1900 MODE (PCS BAND)

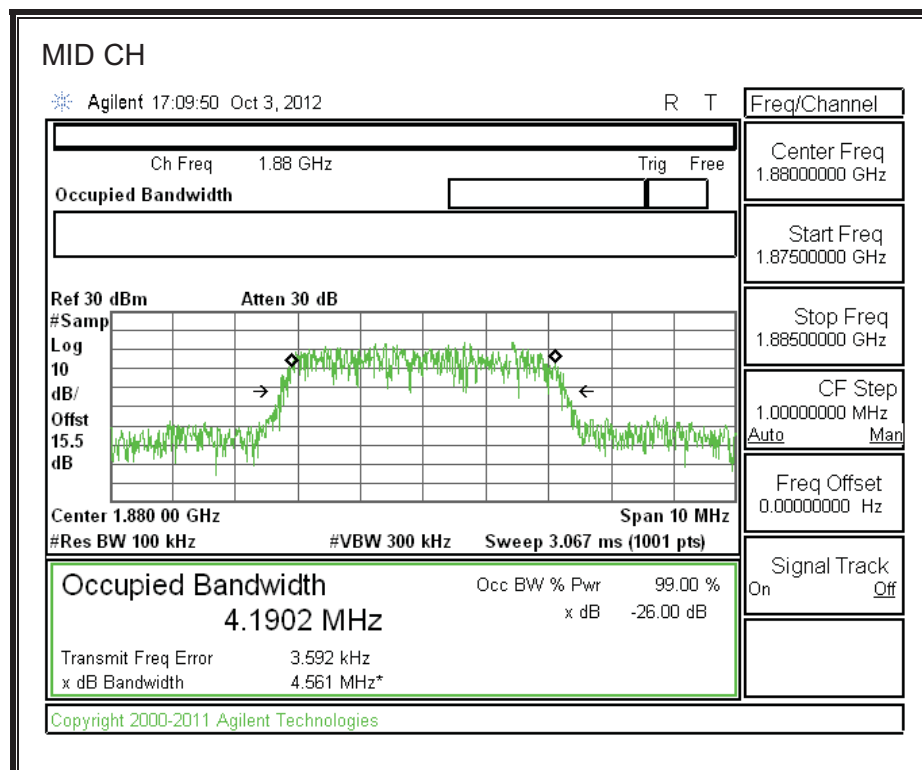
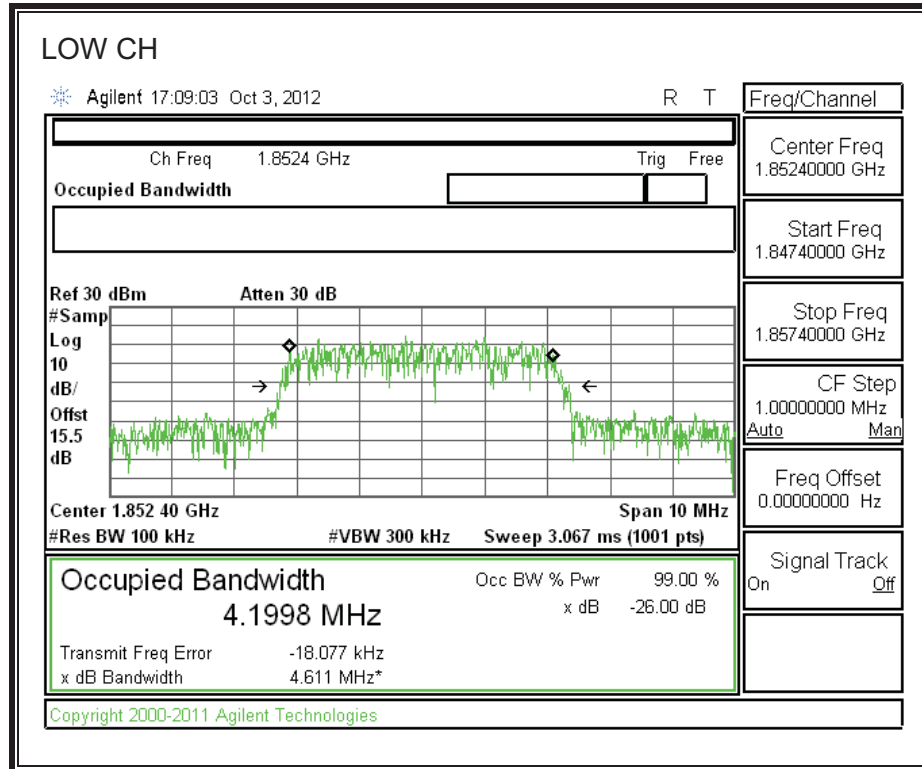


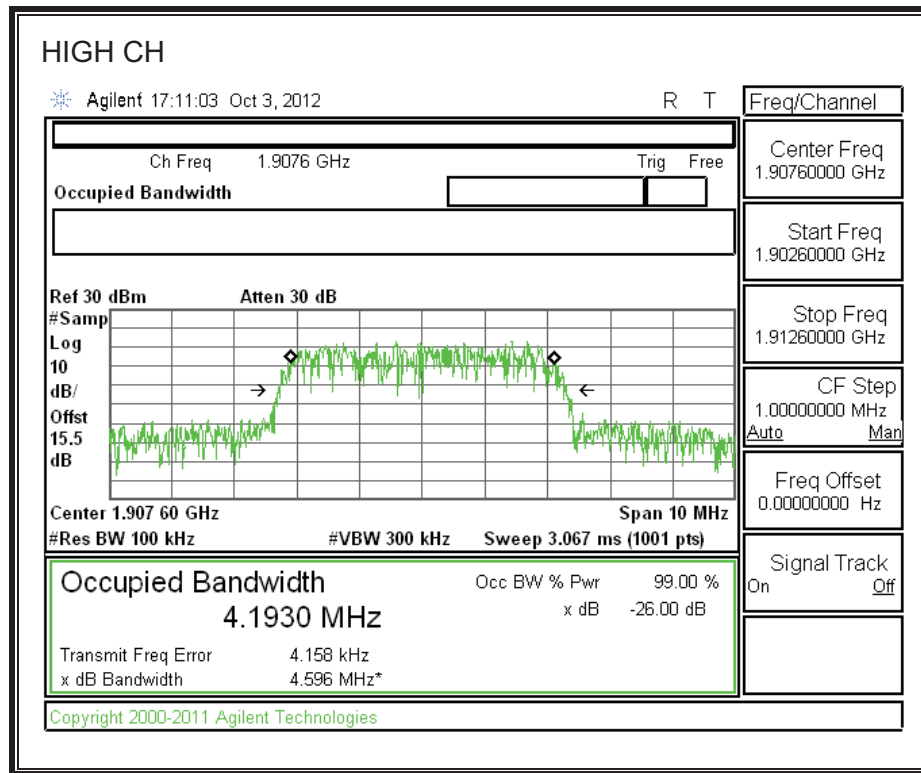
8.1.2. WCDMA**REL 99 (CELLULAR BAND)**

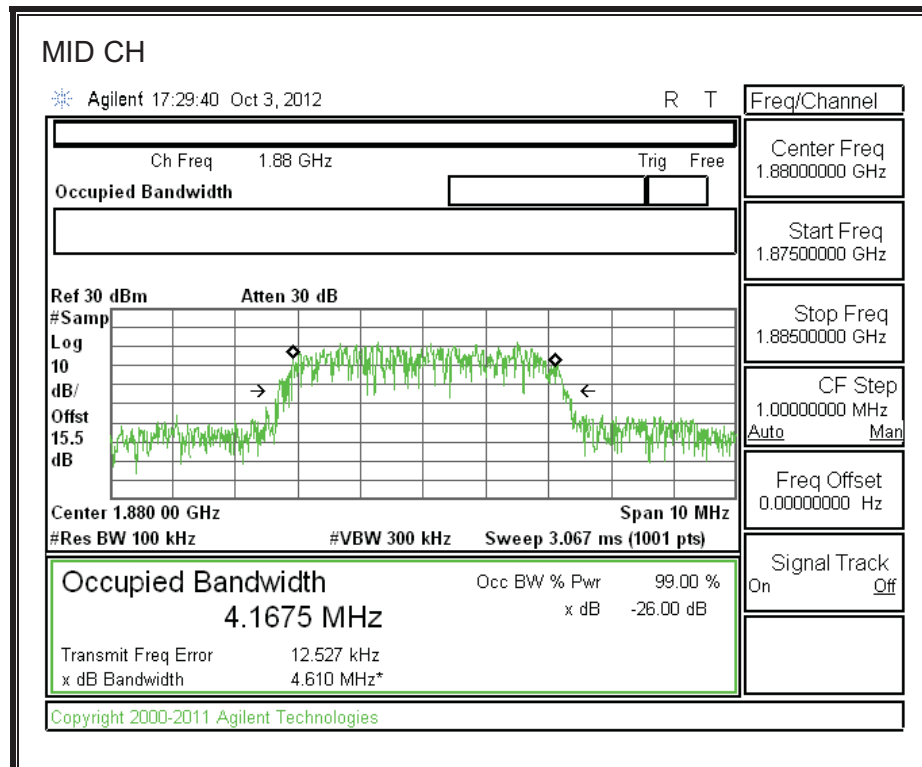
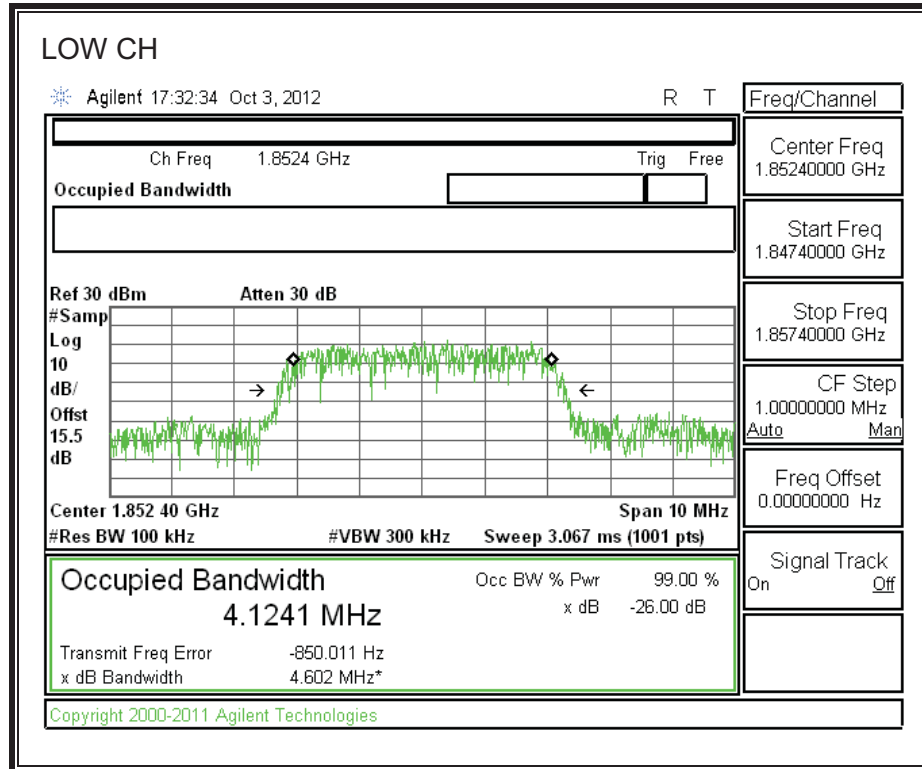


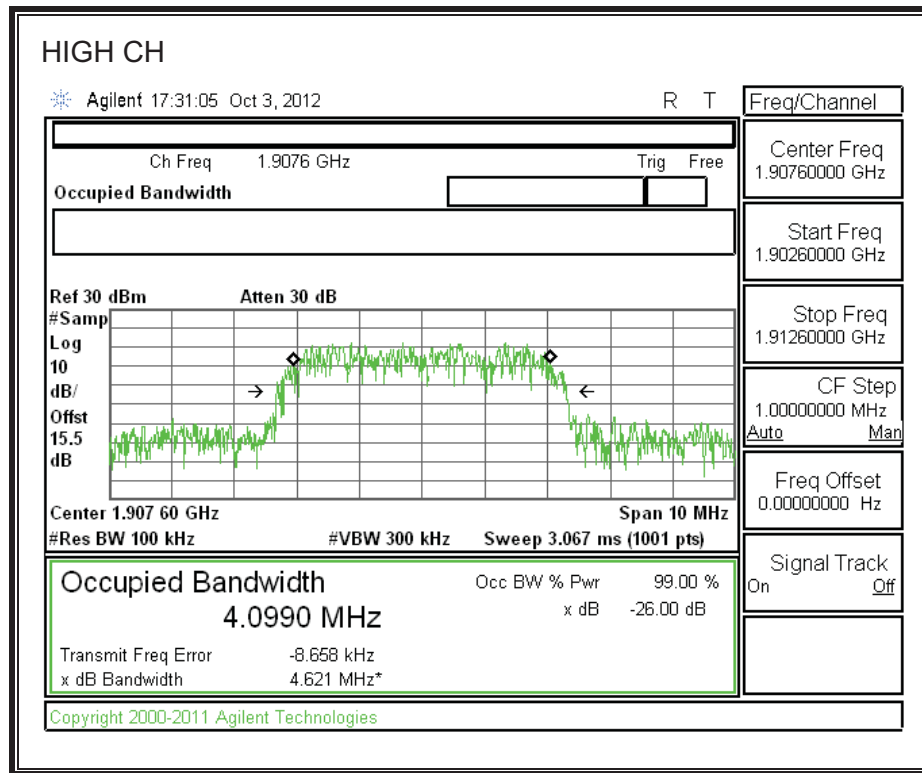
WCDMA HSDPA (CELLULAR BAND)

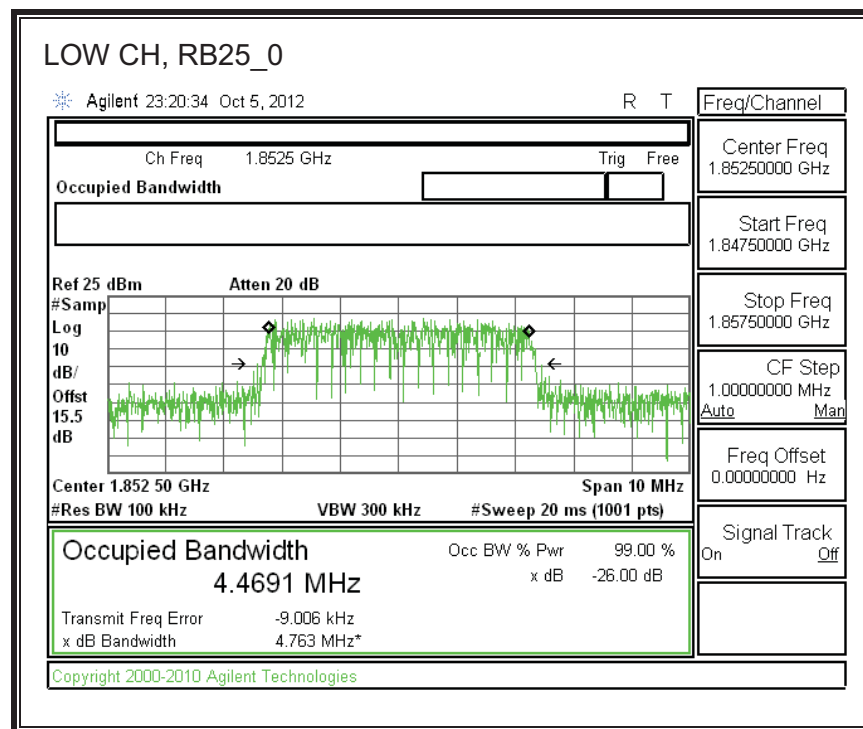
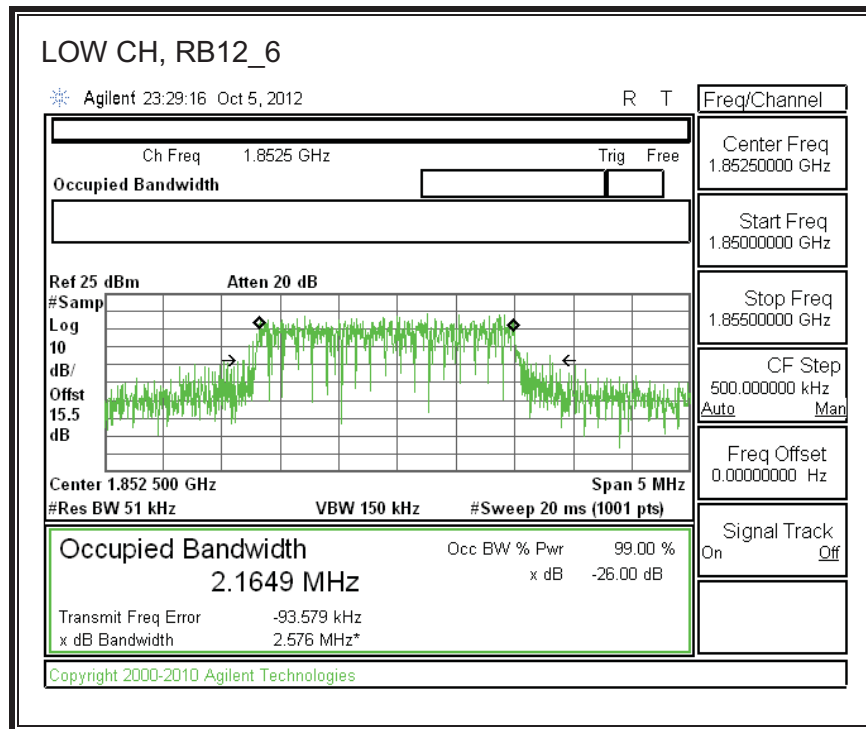


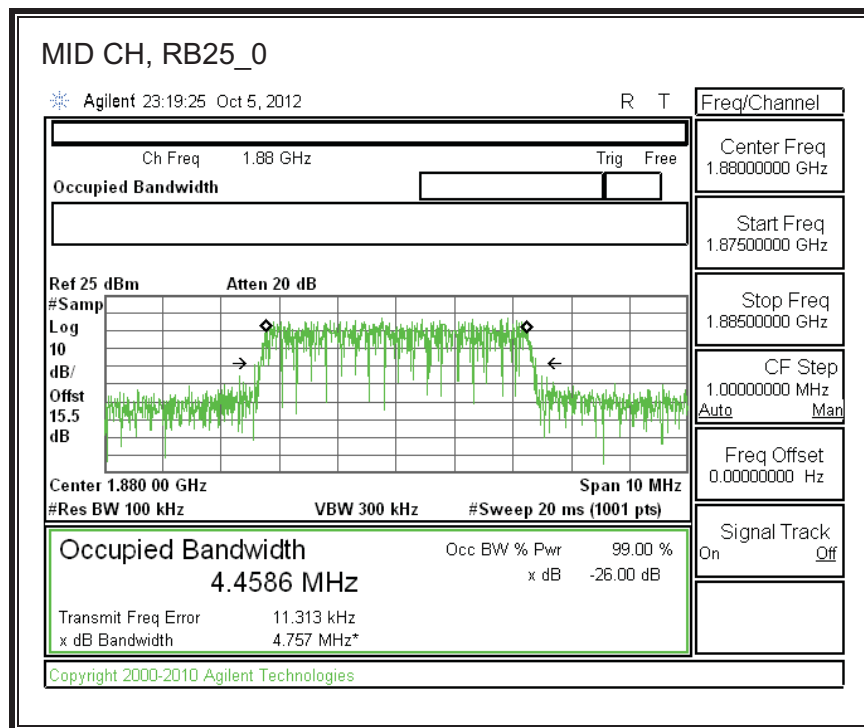
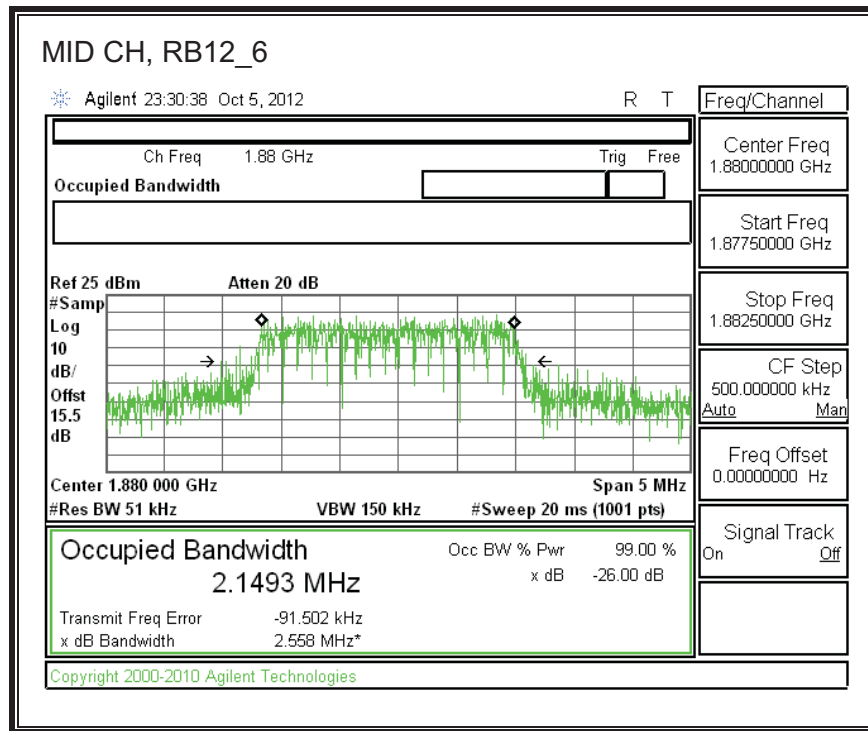
REL 99 MODE (PCS BAND)

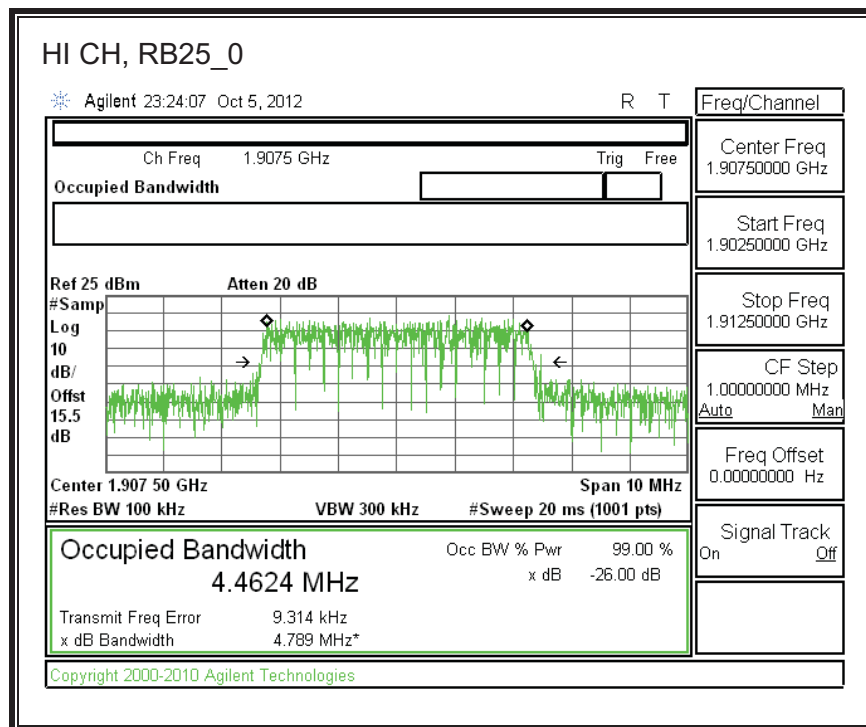
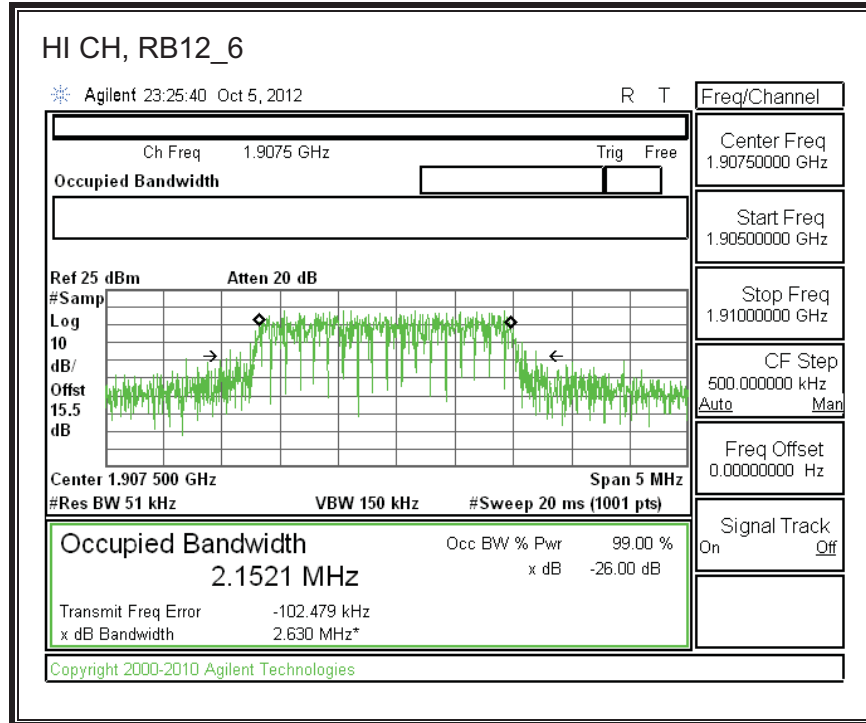


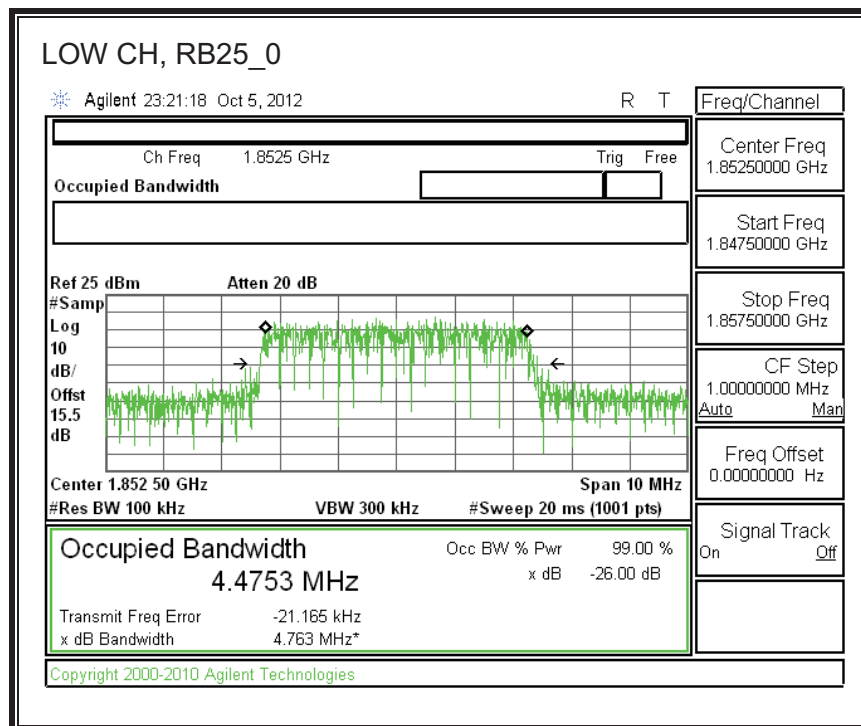
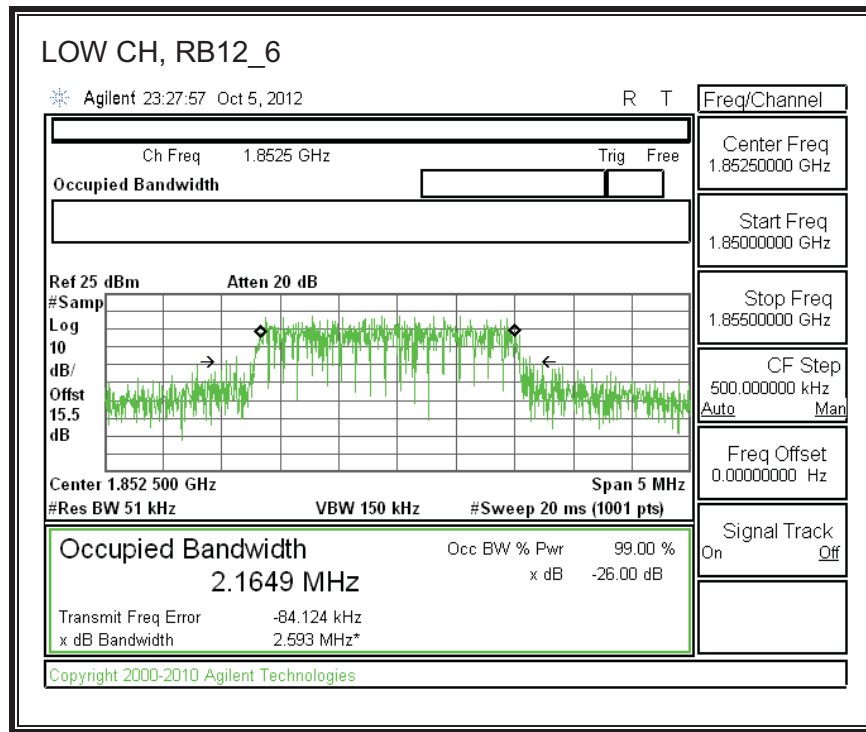
WCDMA HSDPA MODE (PCS BAND)

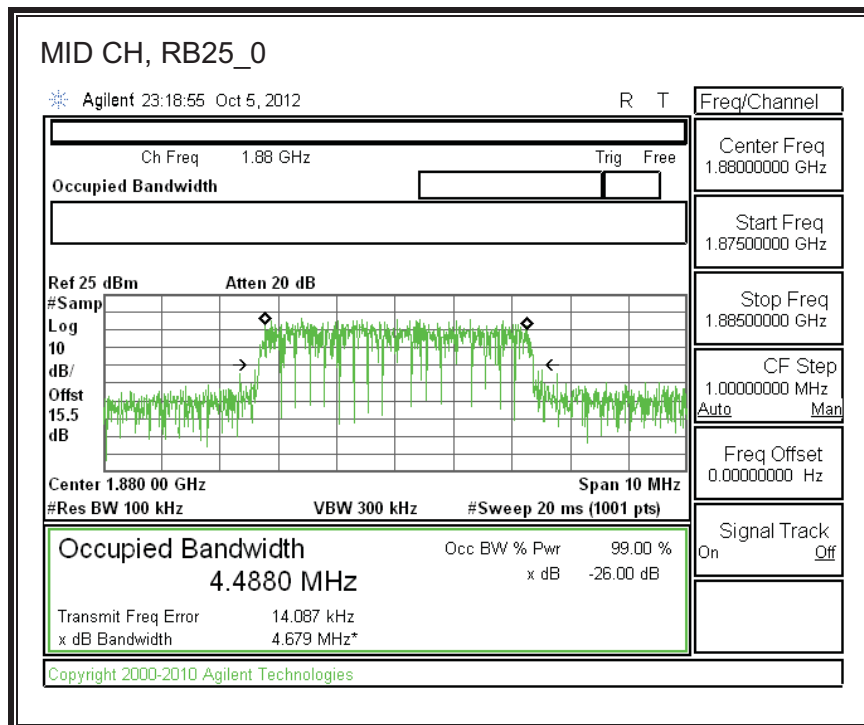
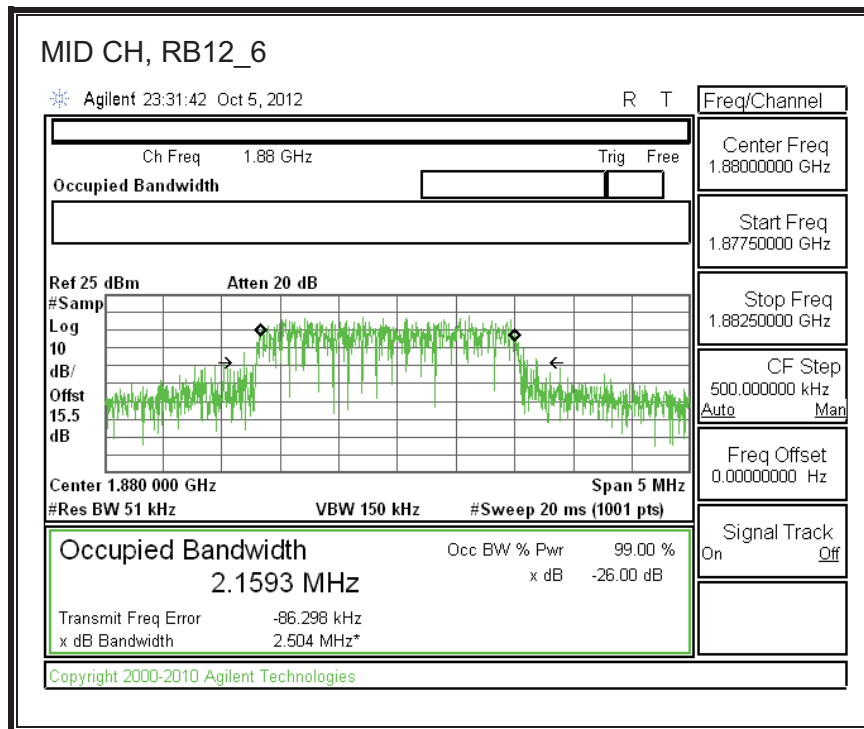


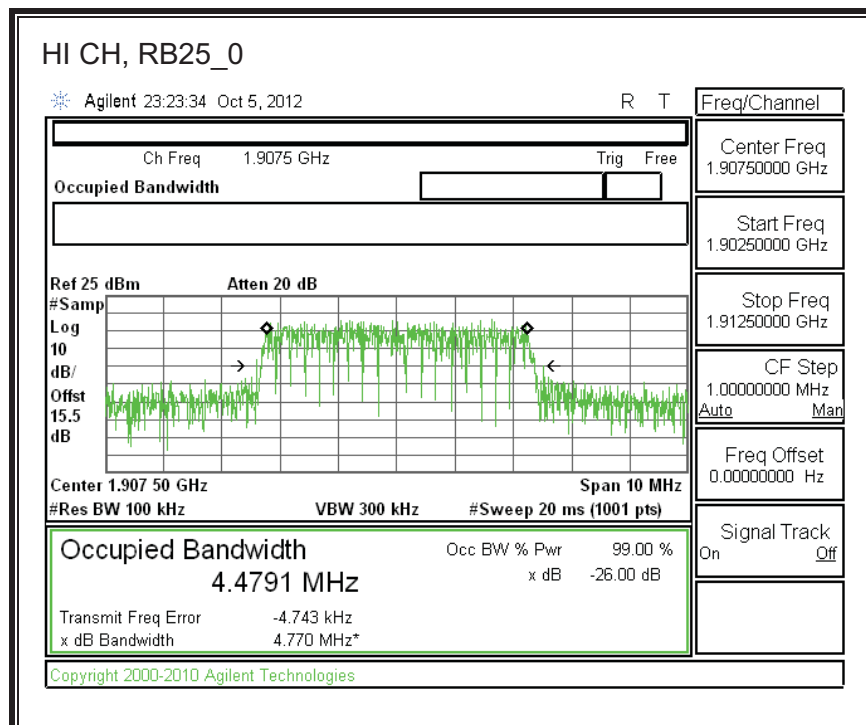
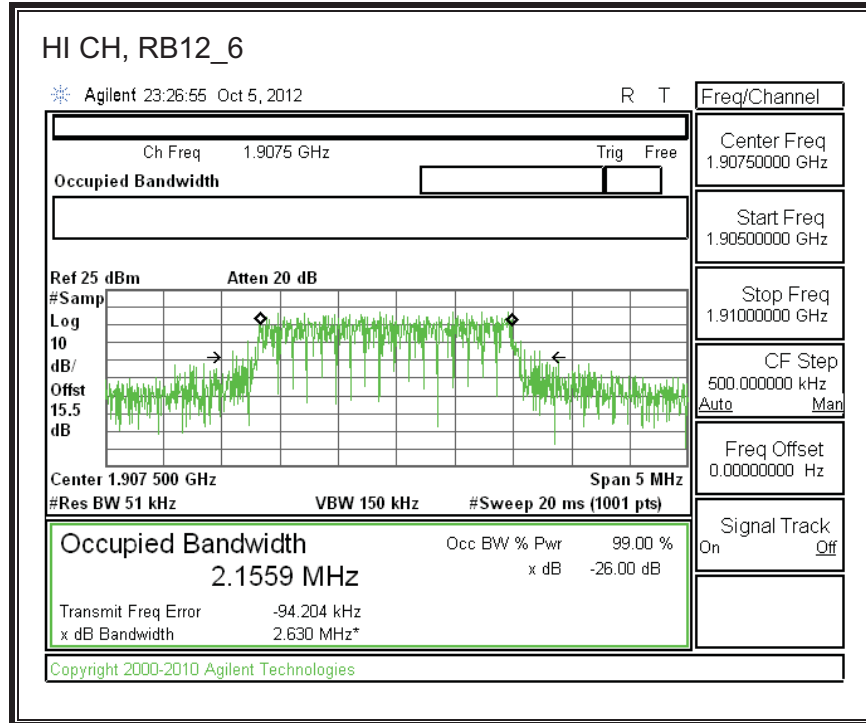
8.1.3. LTE BAND 2**LTE QPSK (5MHZ BANDWIDTH)**

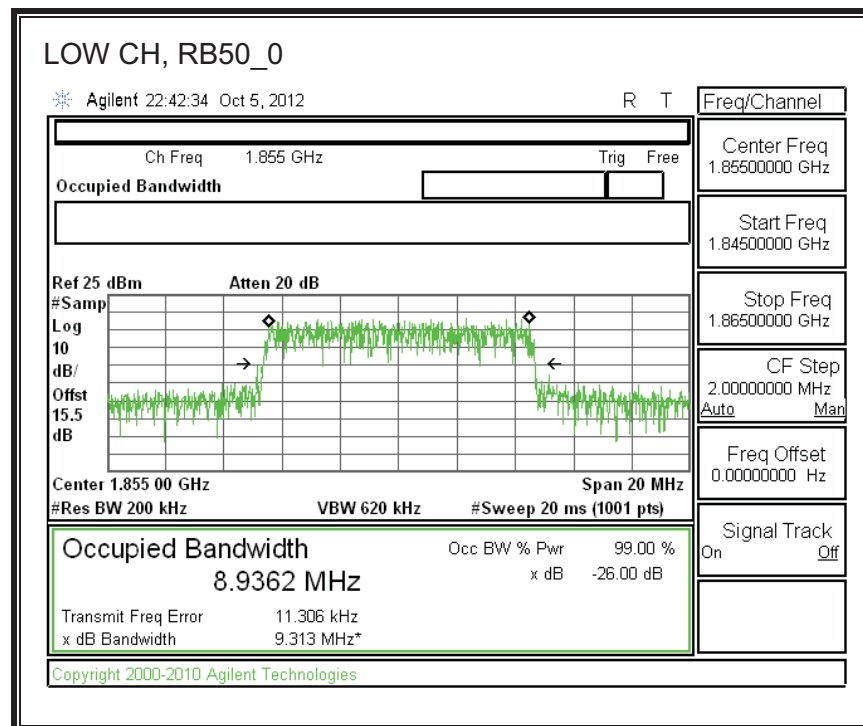
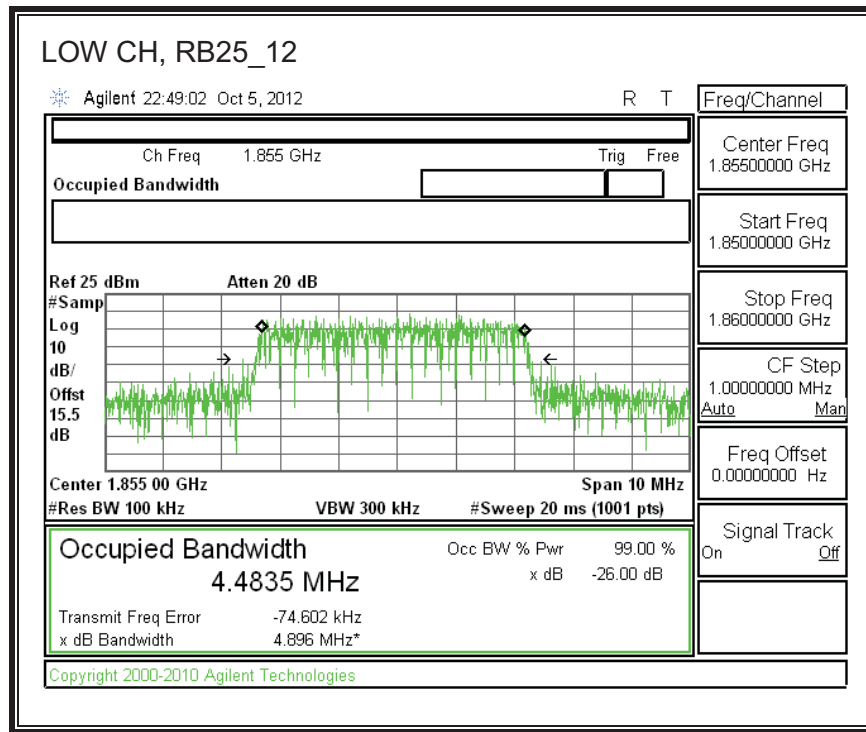


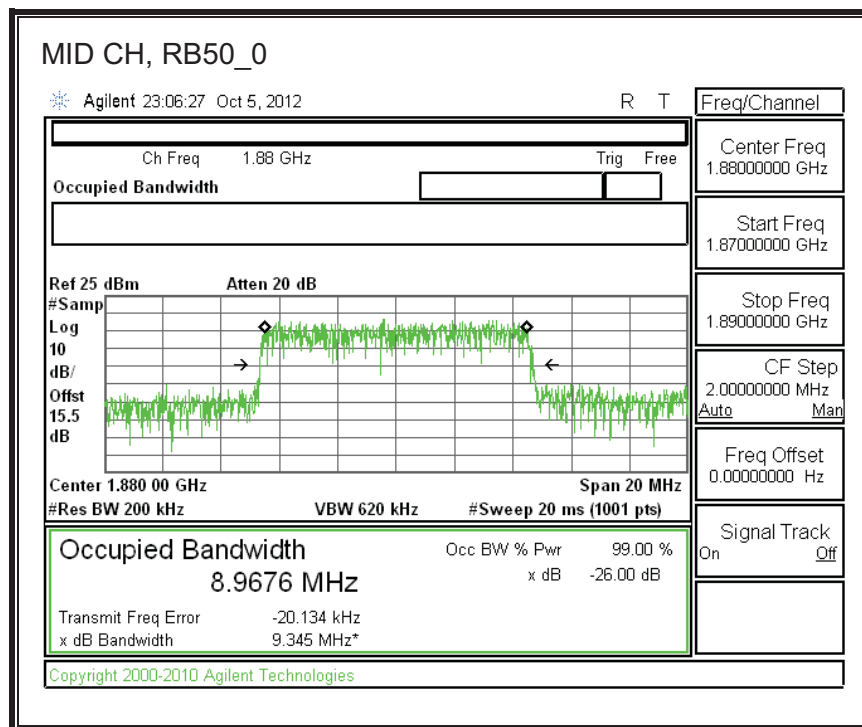
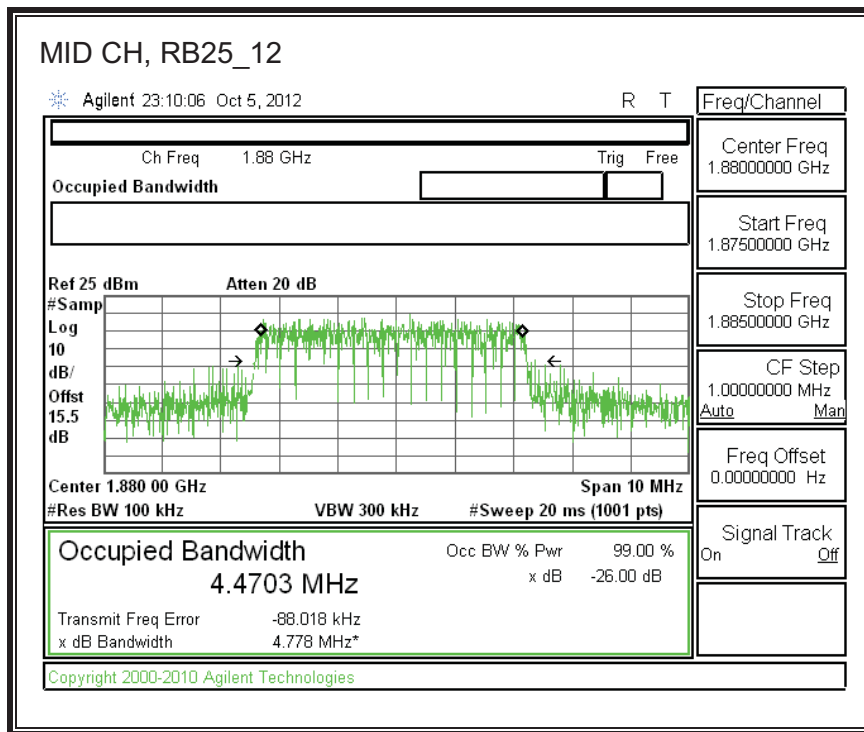


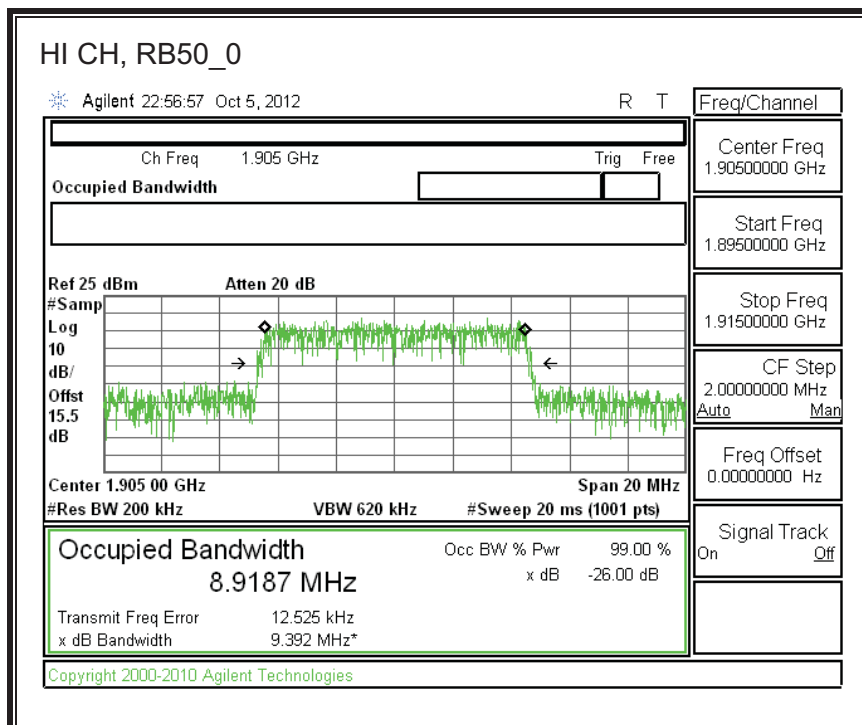
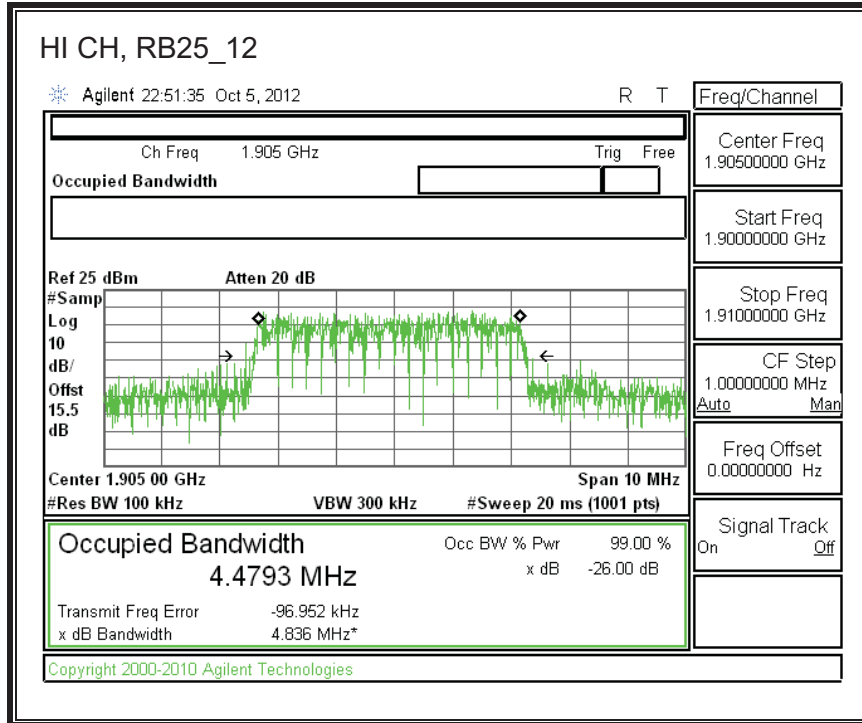
LTE 16QAM (5MHZ BANDWIDTH)

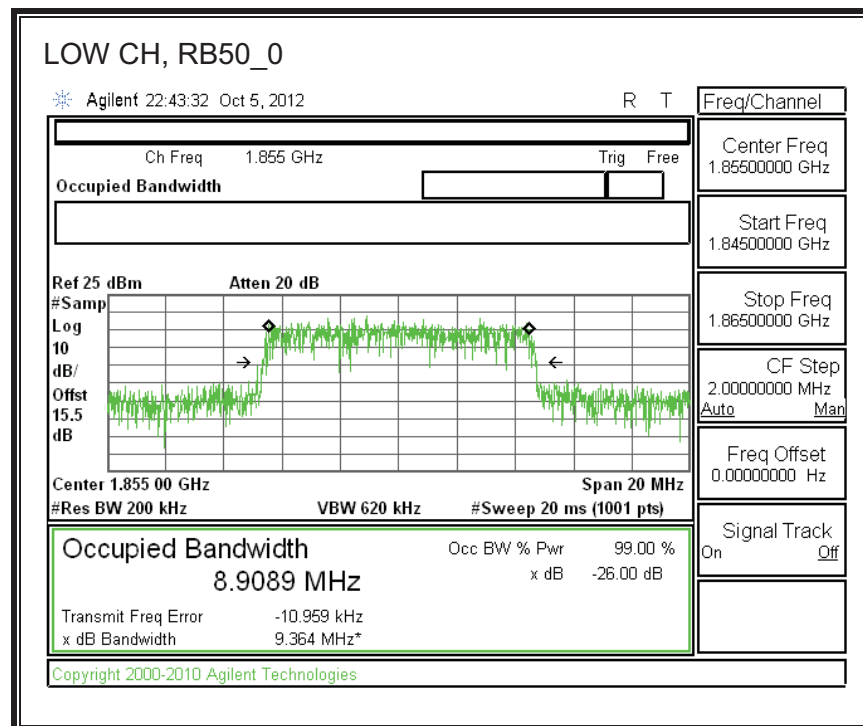
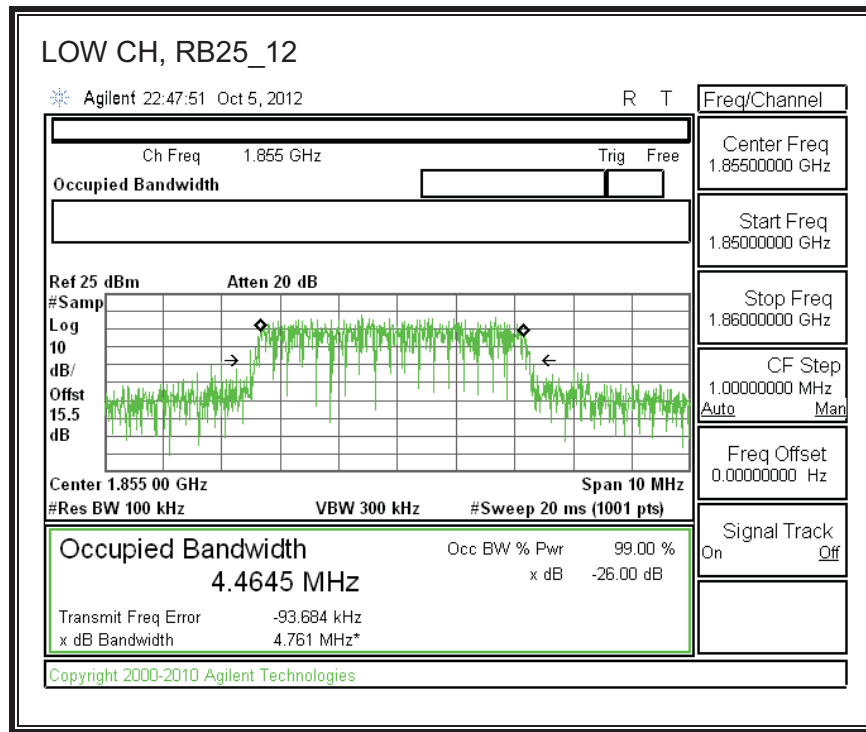


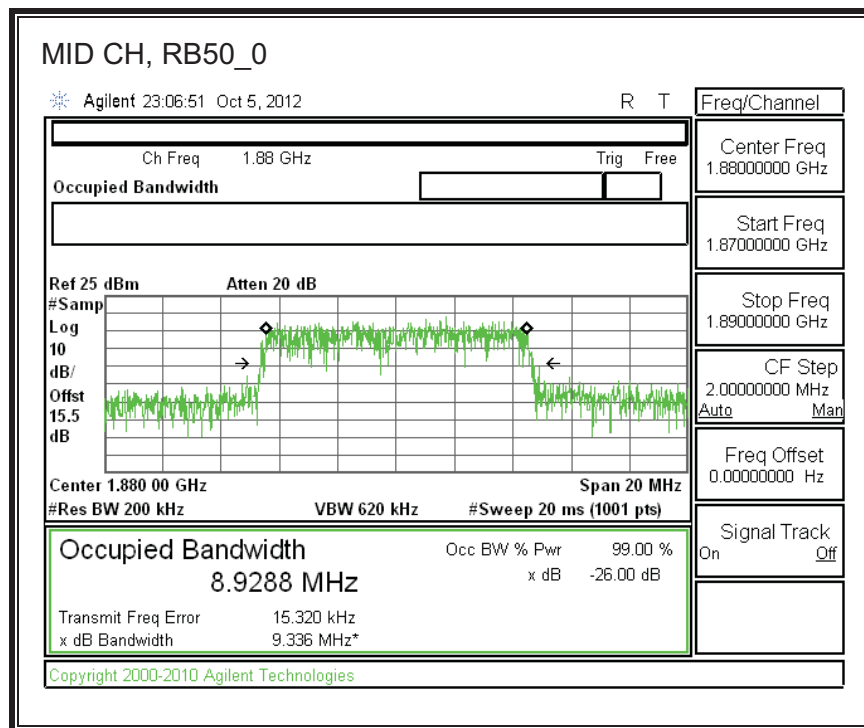
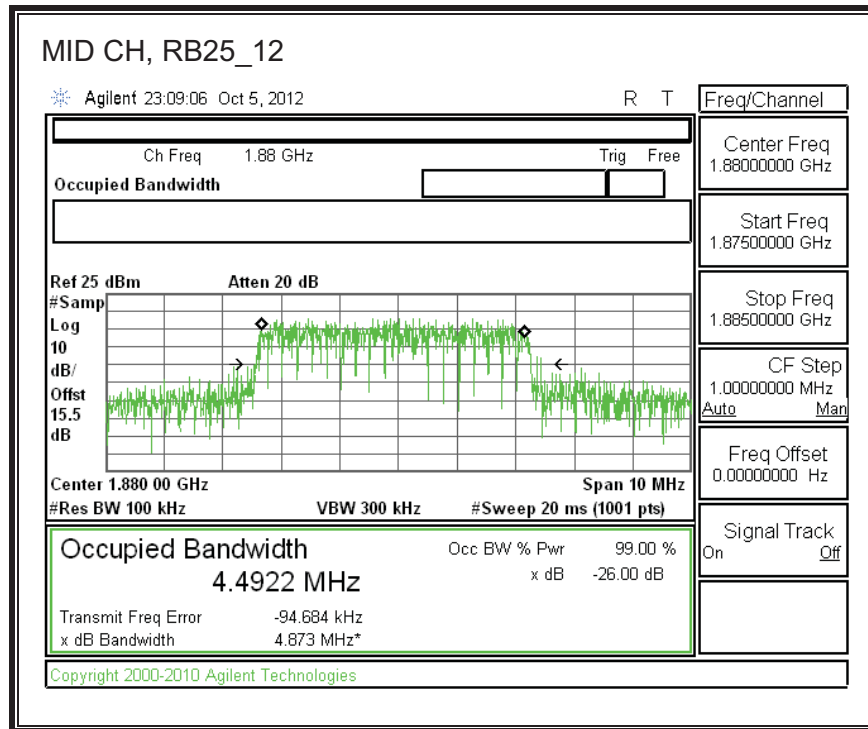


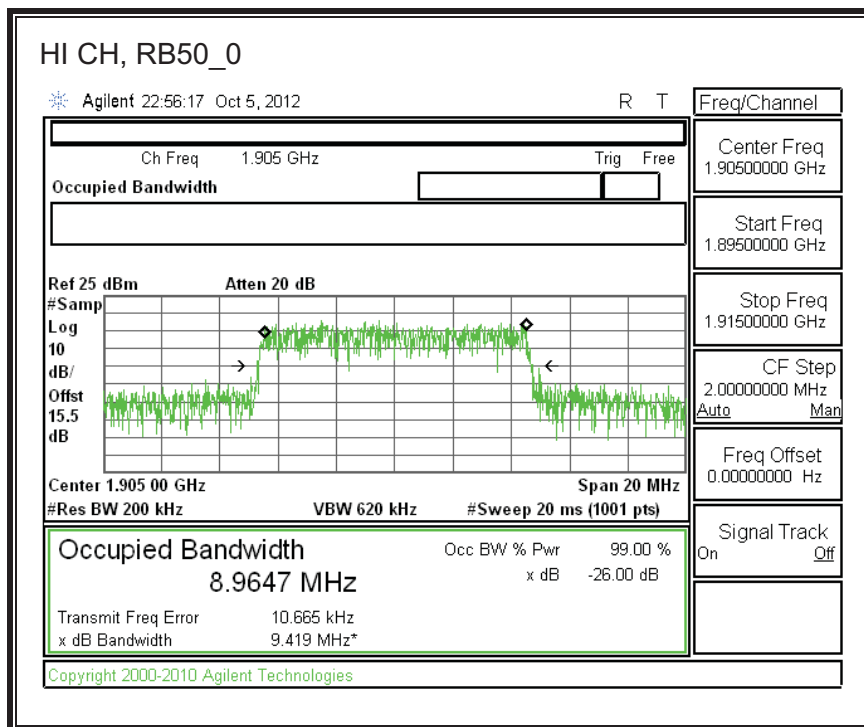
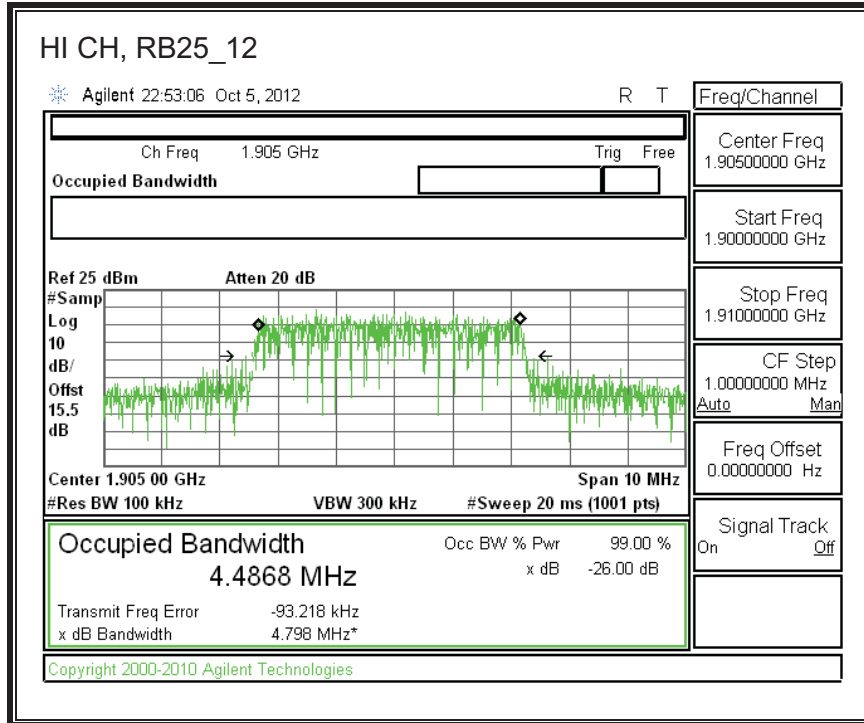
LTE QPSK (10MHZ BANDWIDTH)

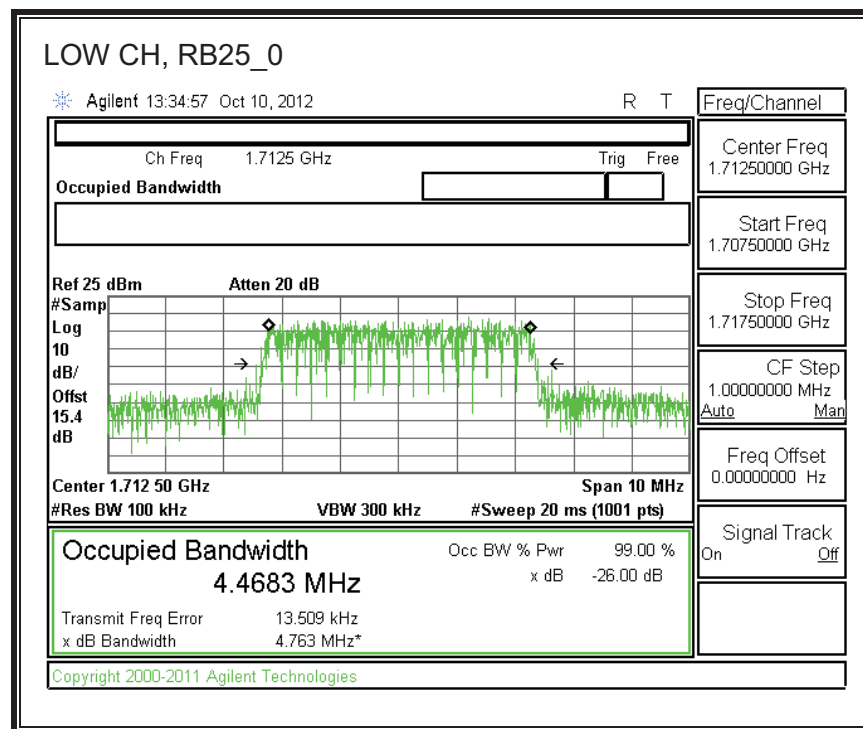
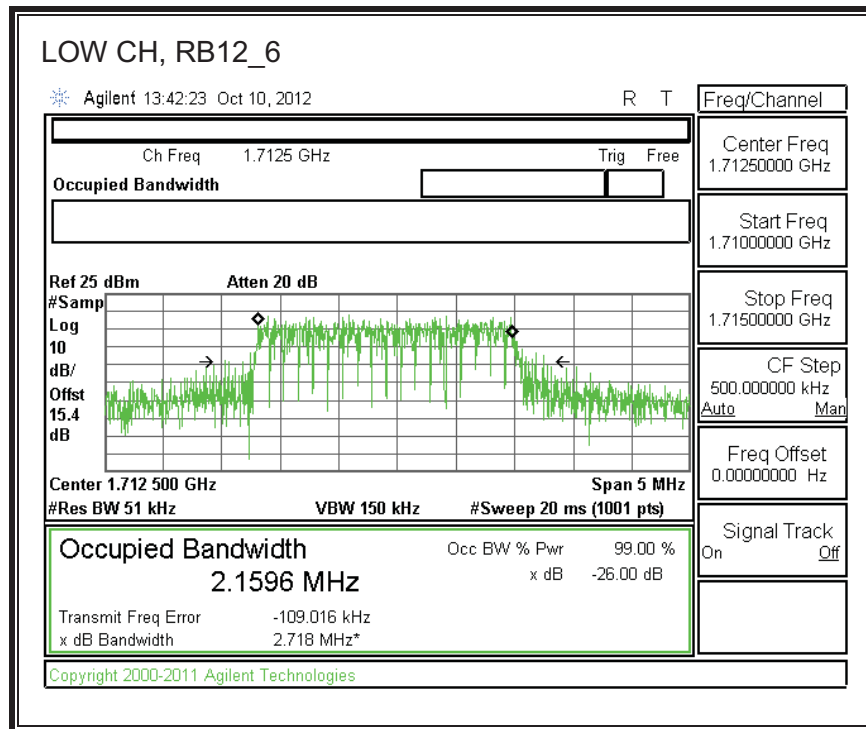


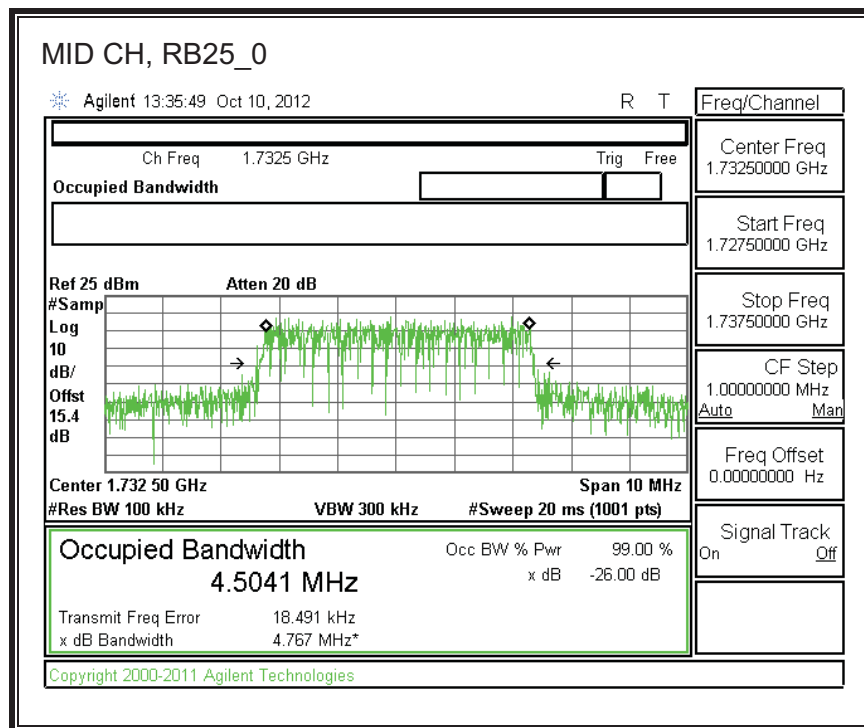
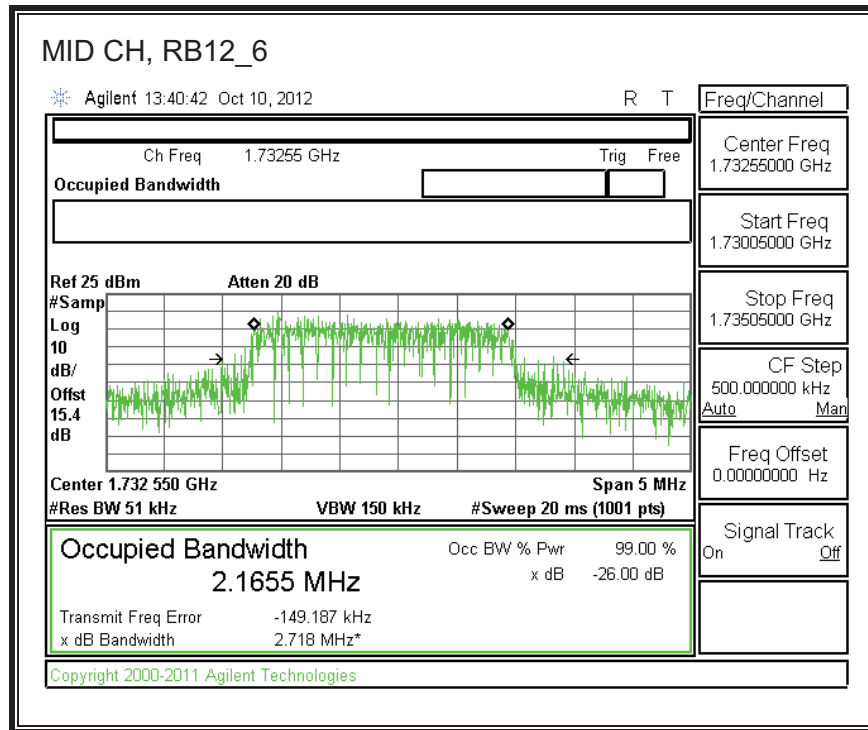


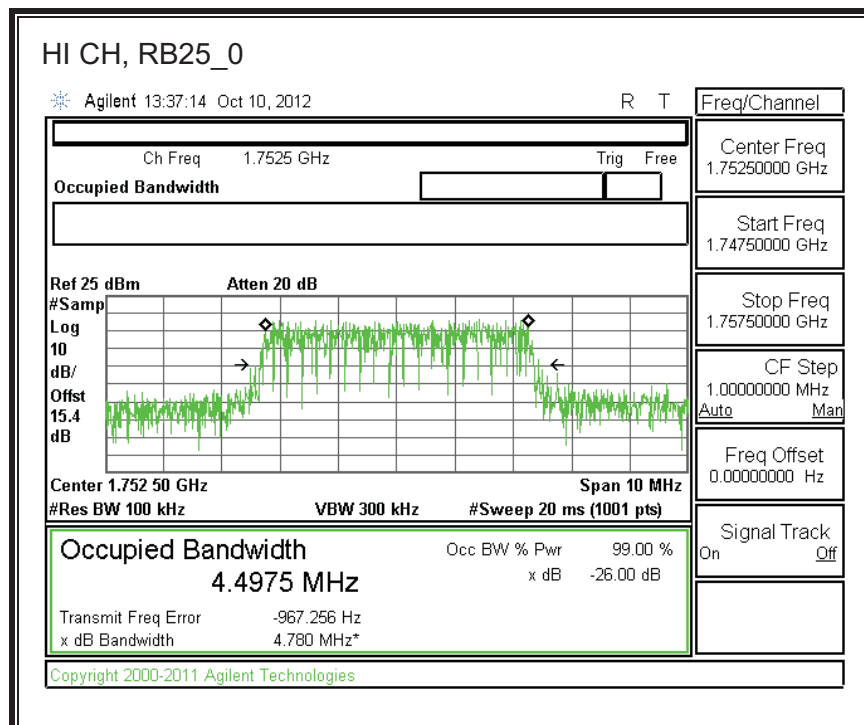
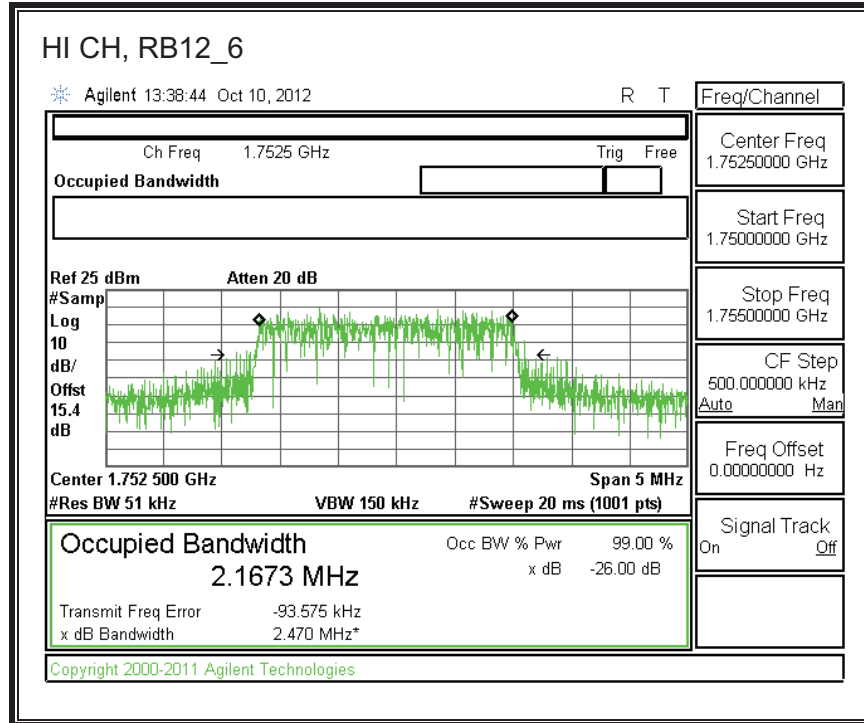
LTE 16QAM (10MHZ BANDWIDTH)

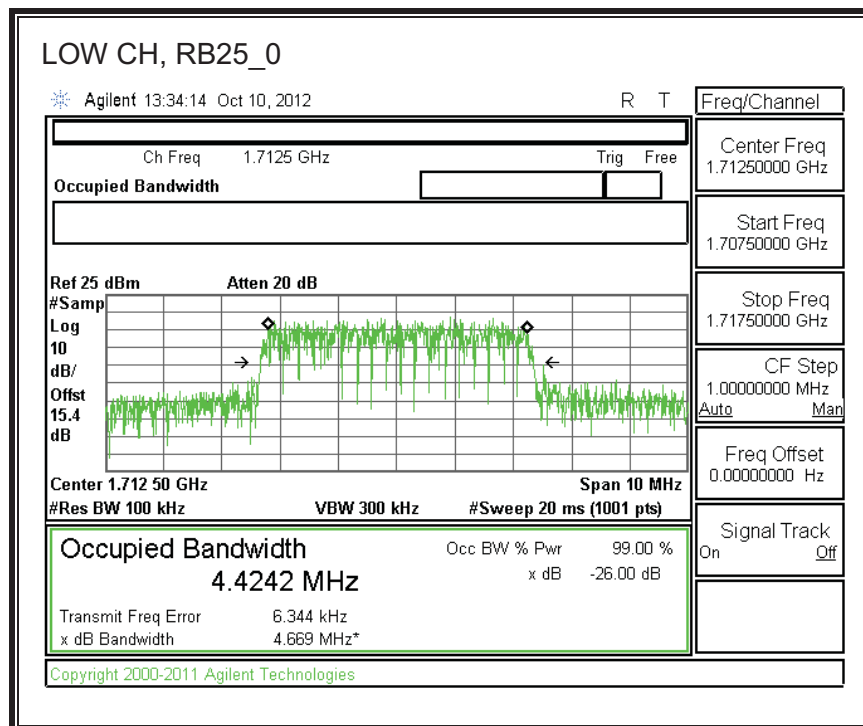
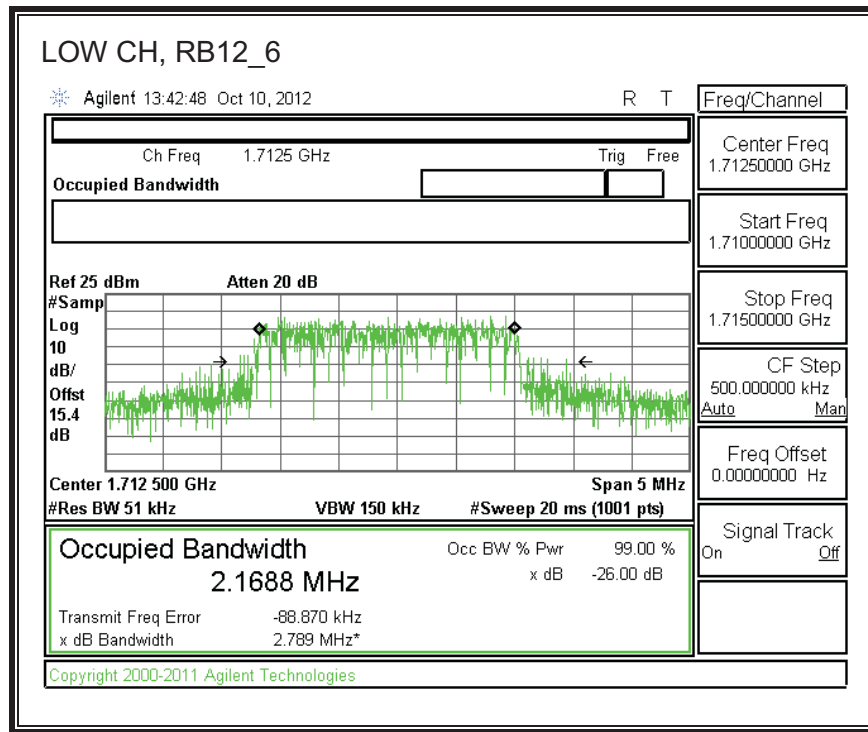


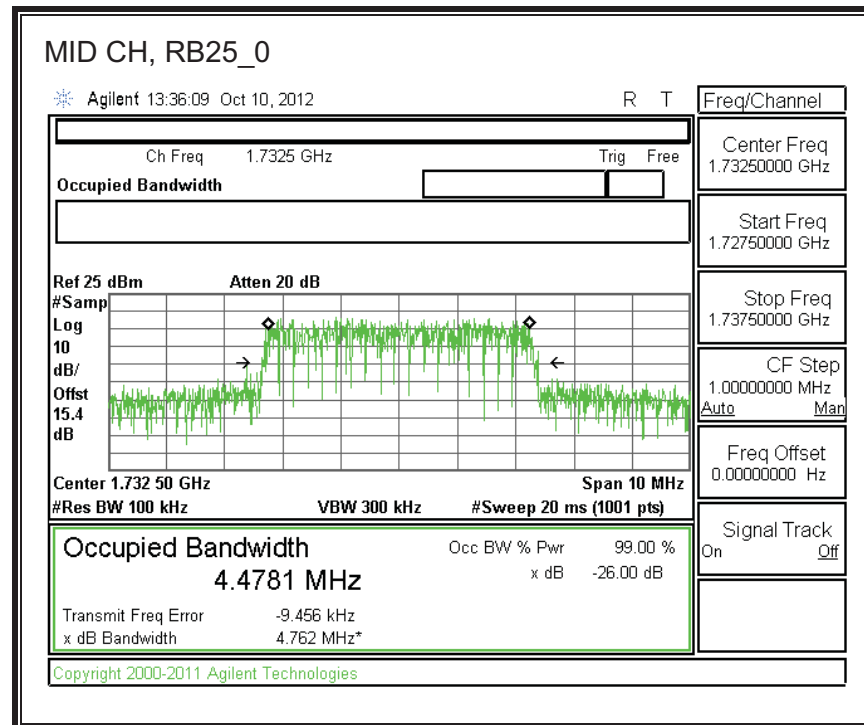
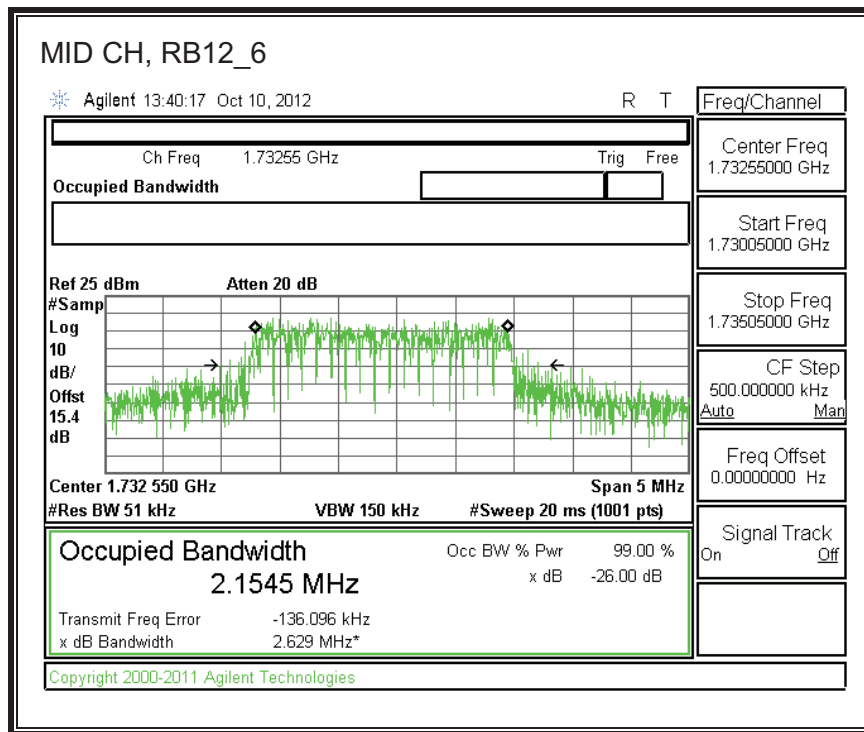


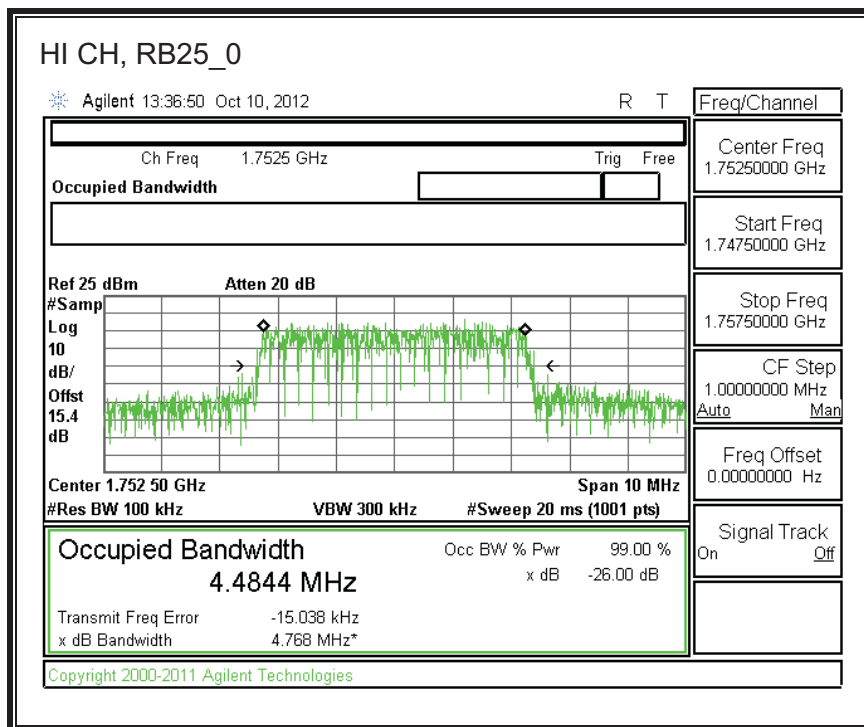
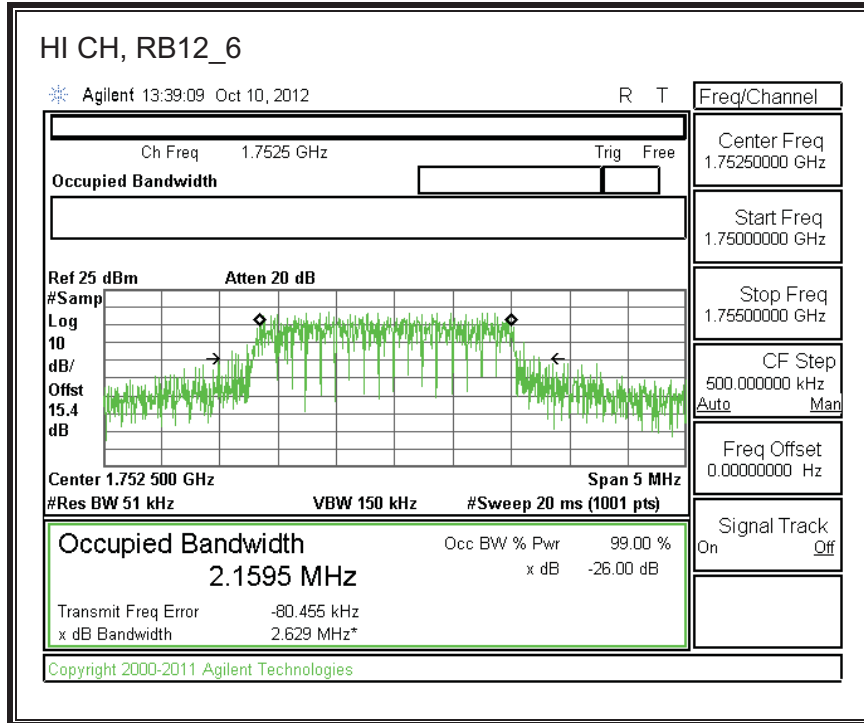
8.1.4. LTE BAND 4**LTE QPSK (5MHZ BANDWIDTH)**

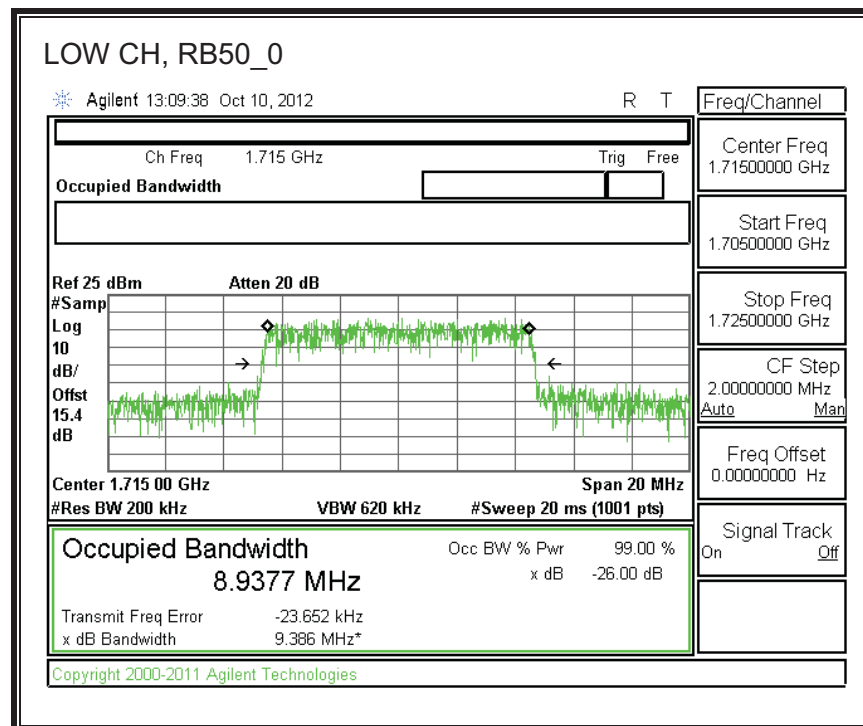
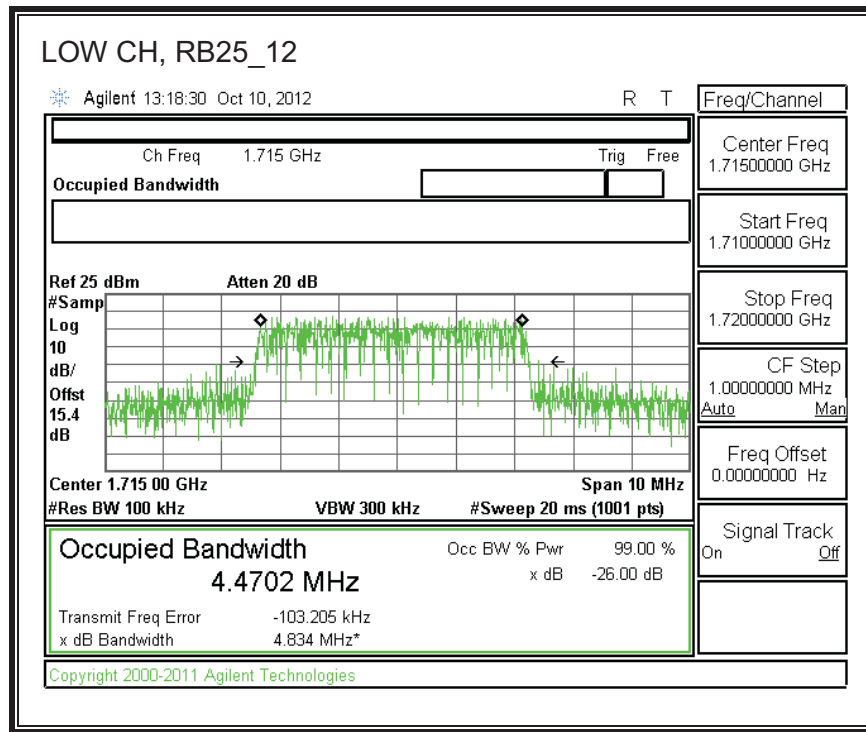


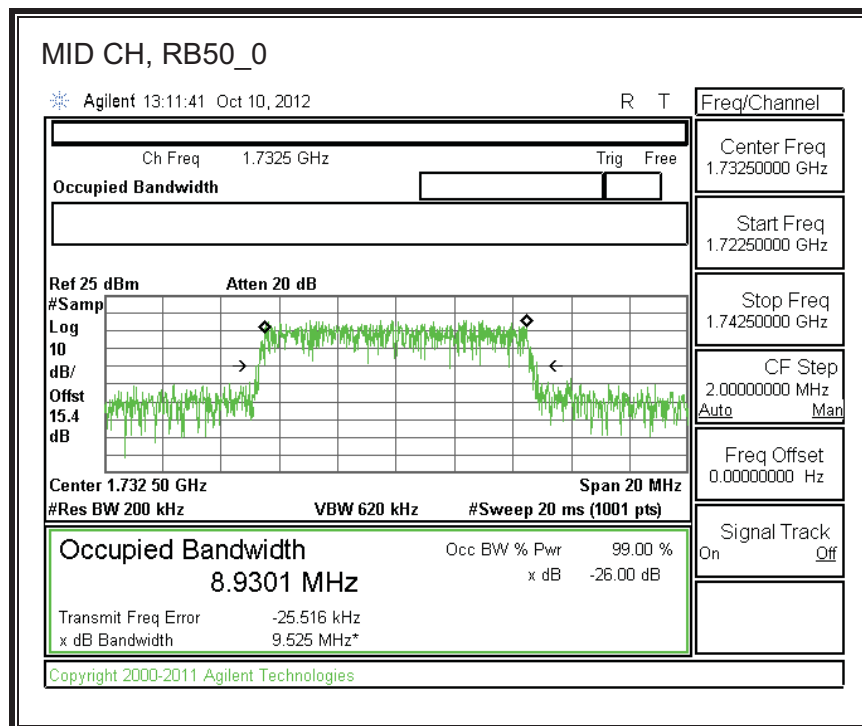
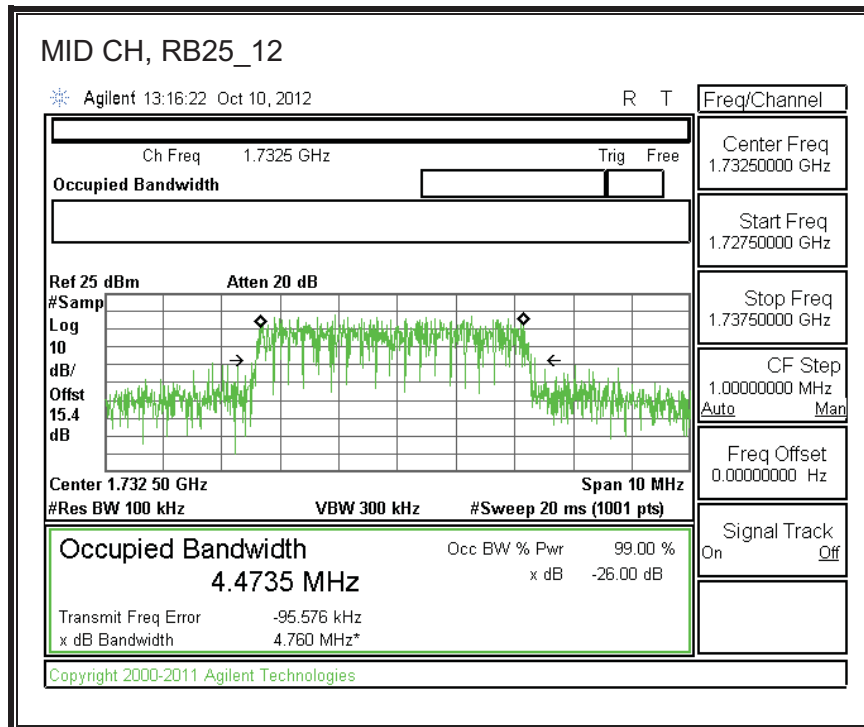


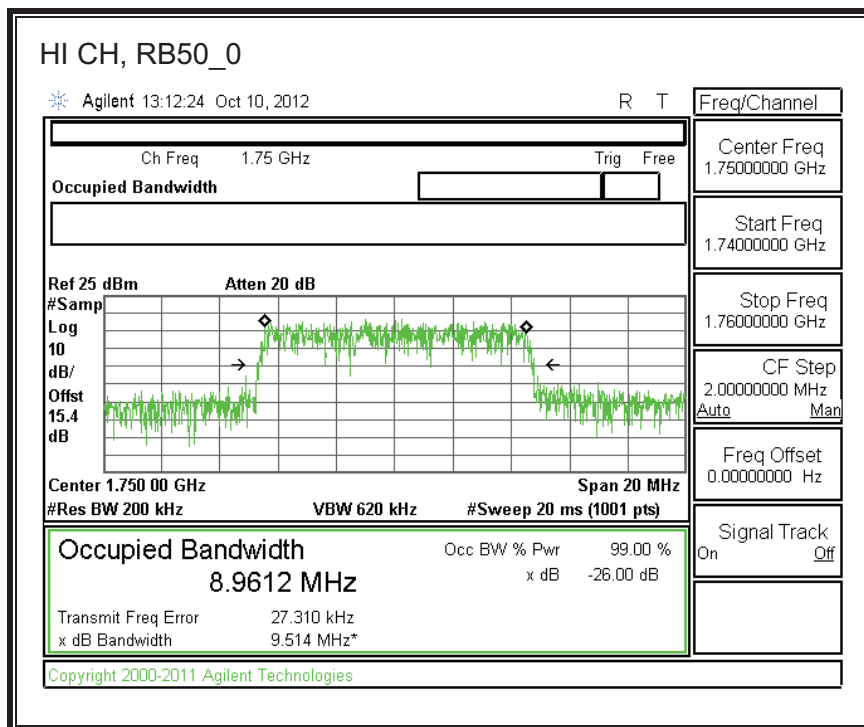
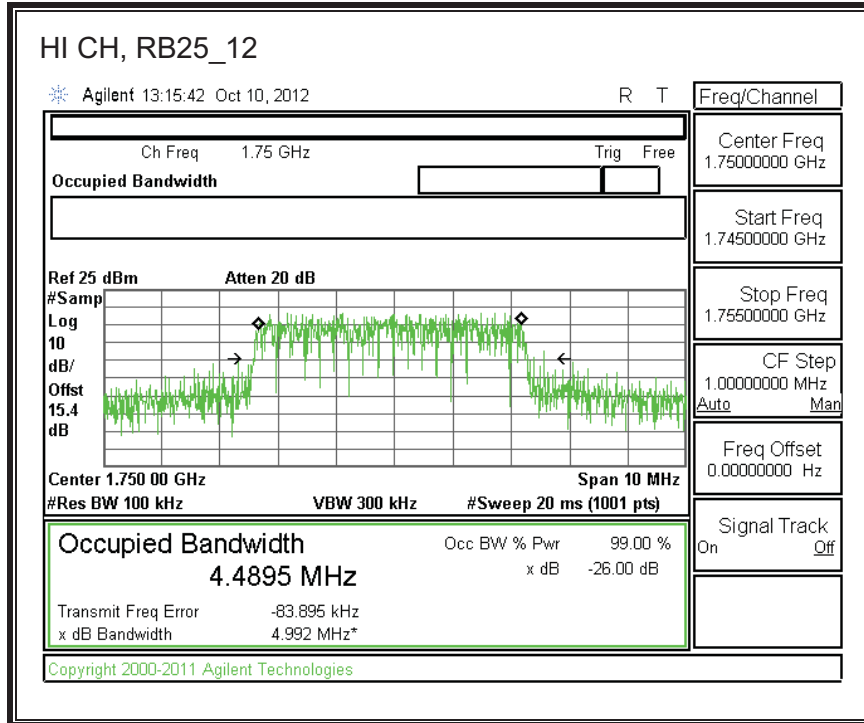
LTE 16QAM (5MHZ BANDWIDTH)

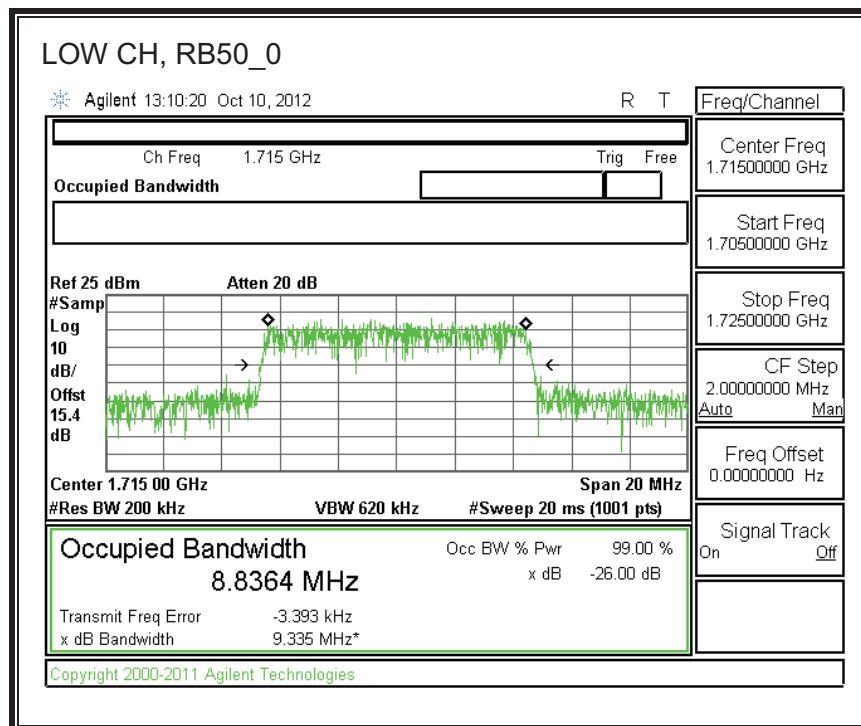
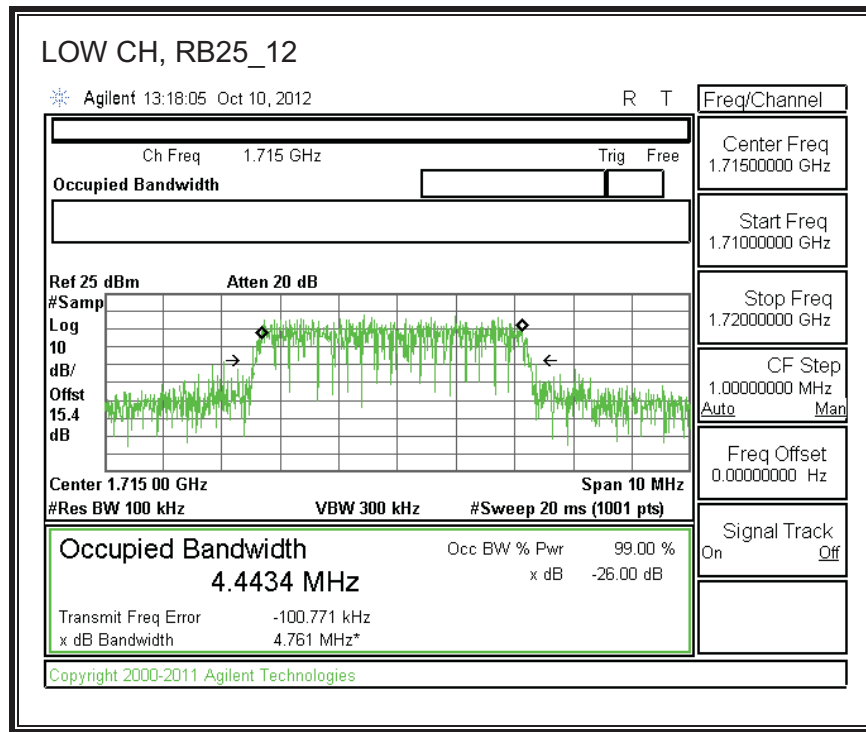


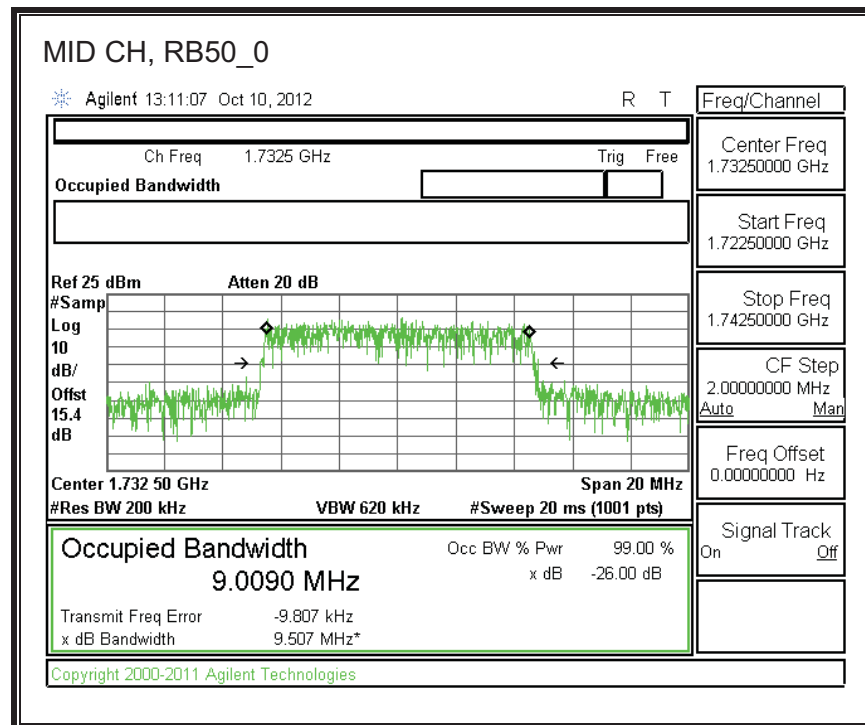
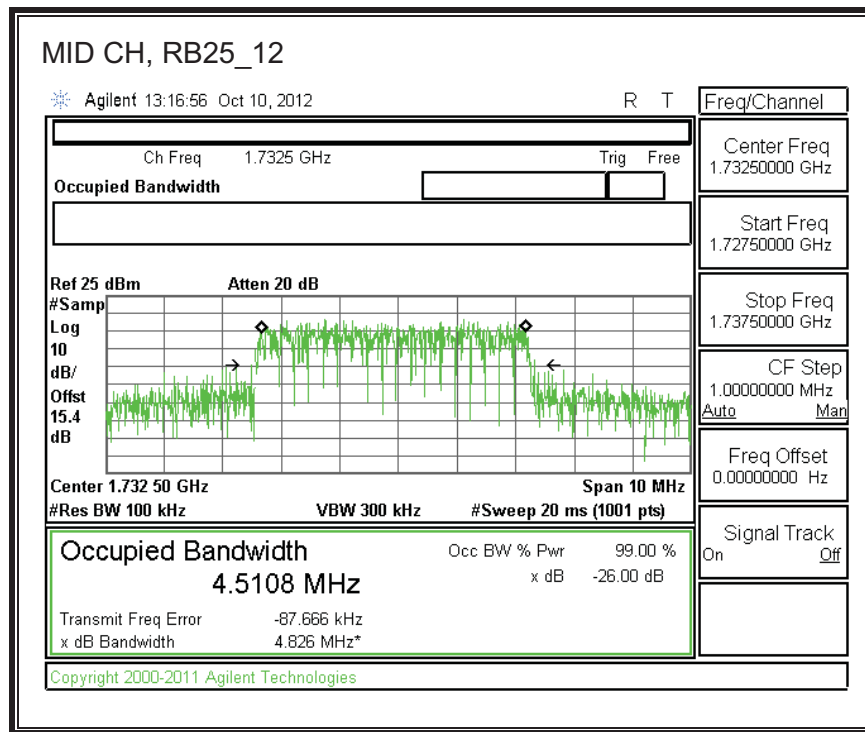


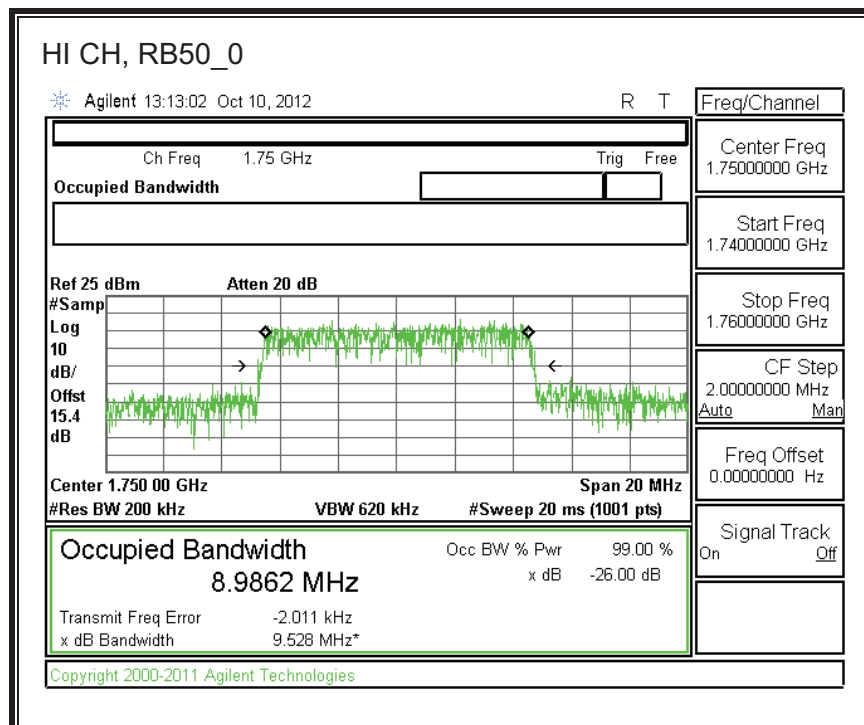
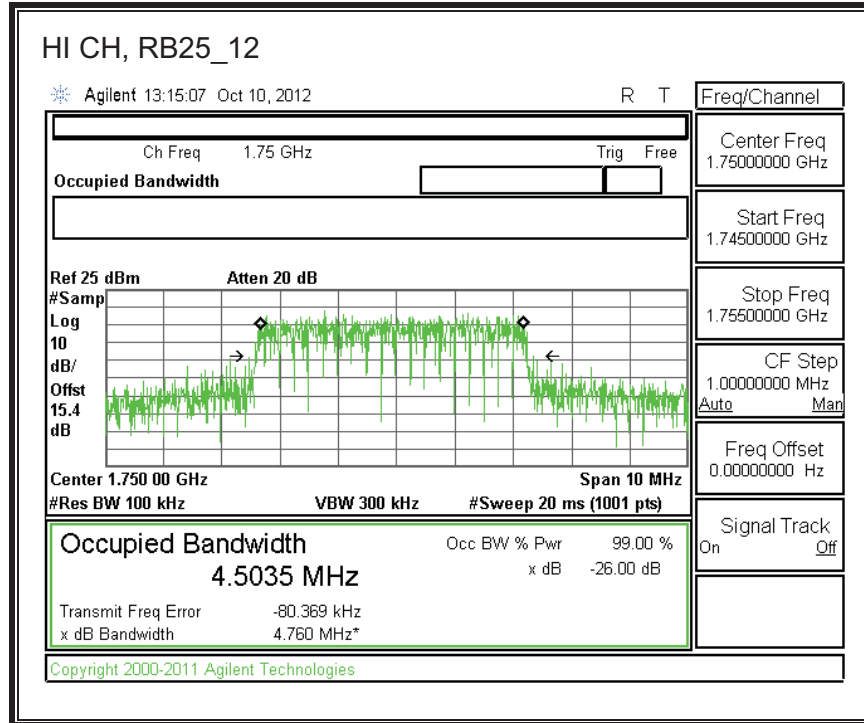
LTE QPSK (10MHZ BANDWIDTH)





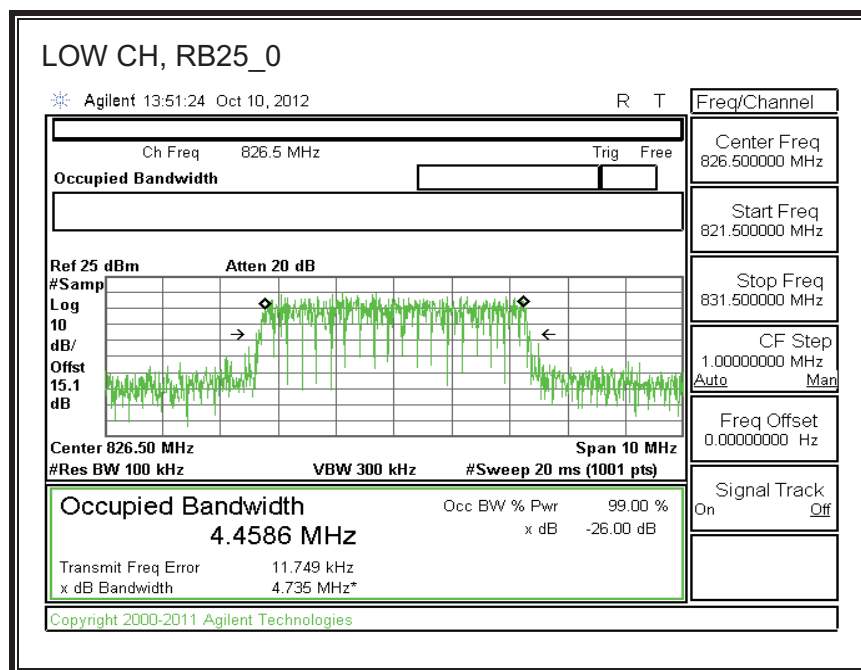
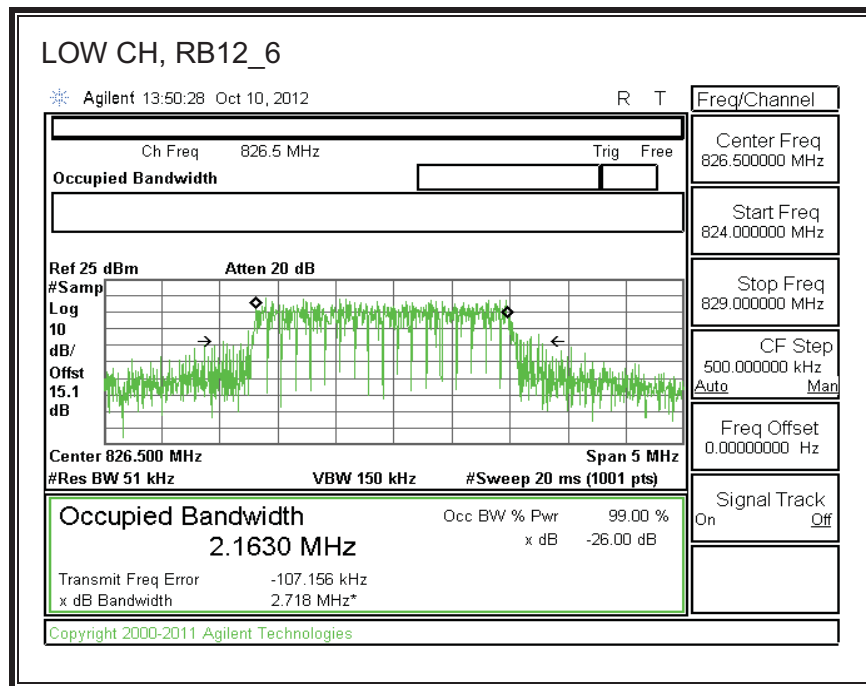
LTE 16QAM (10MHZ BANDWIDTH)

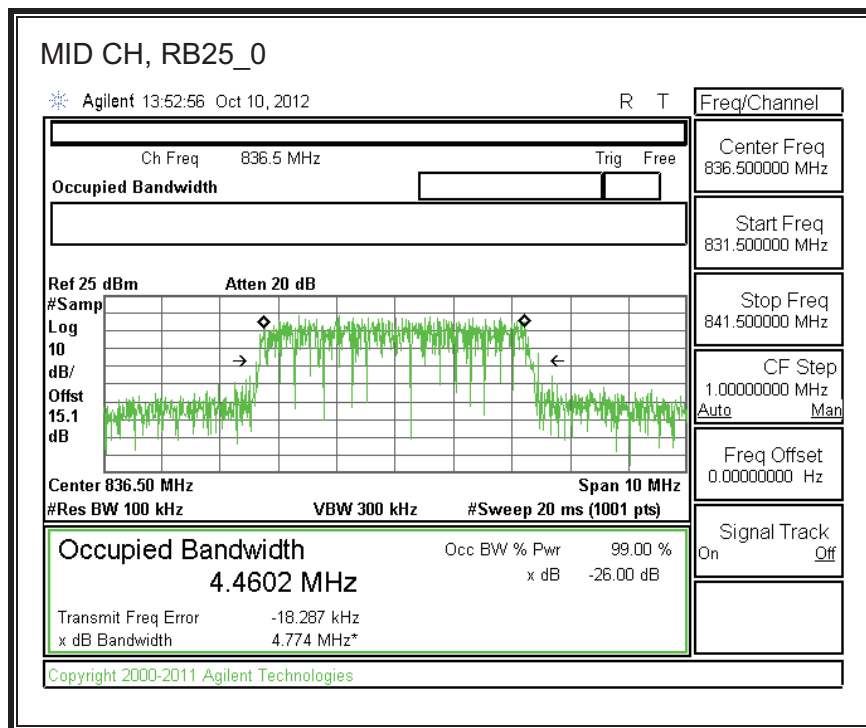
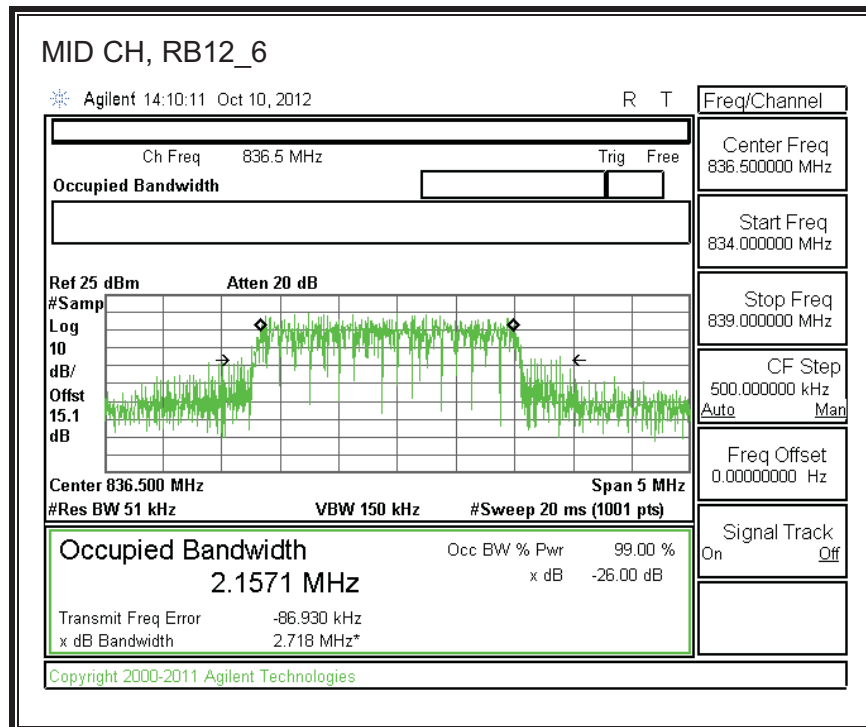


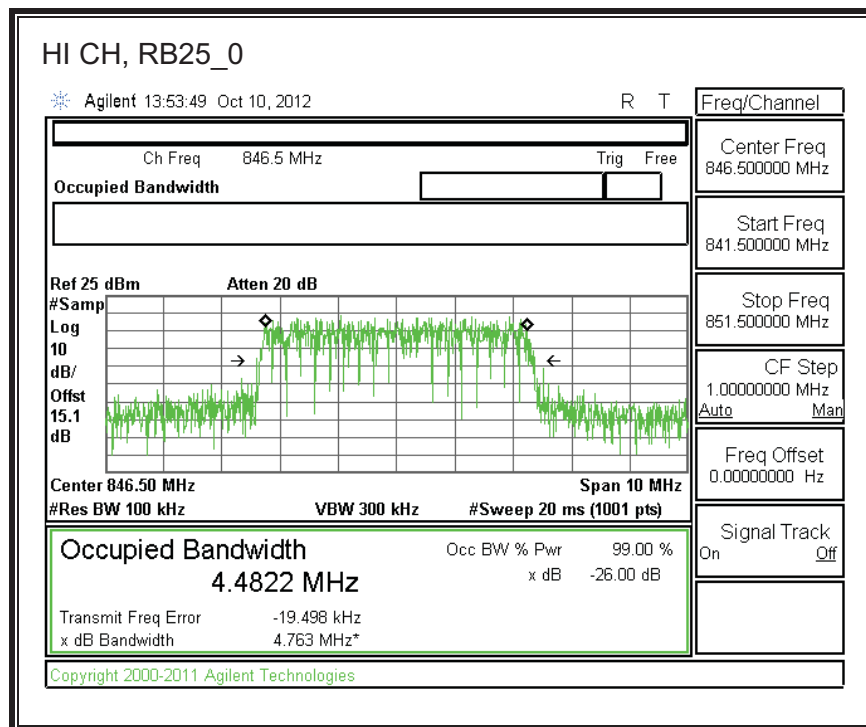
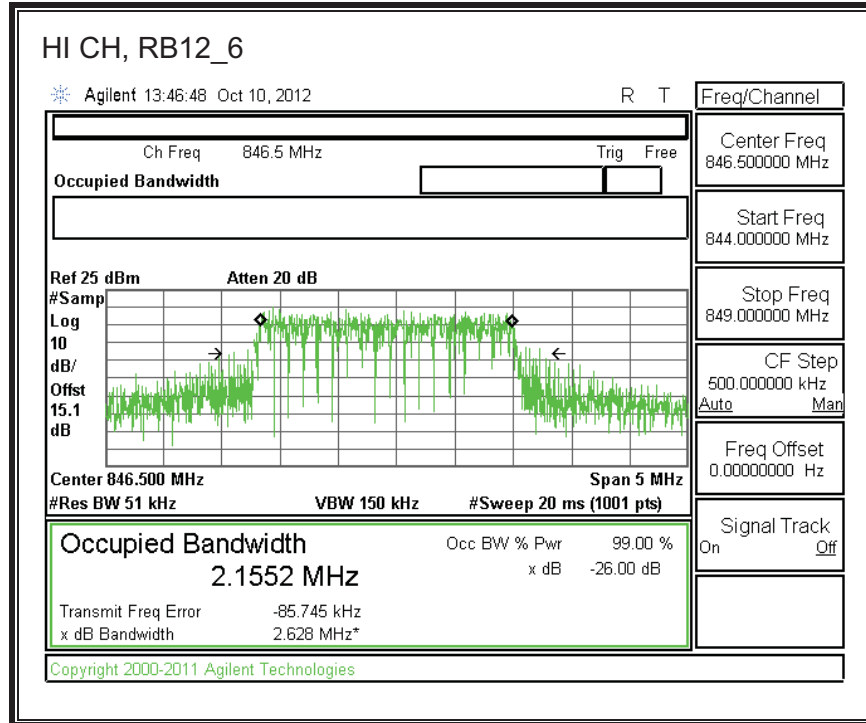


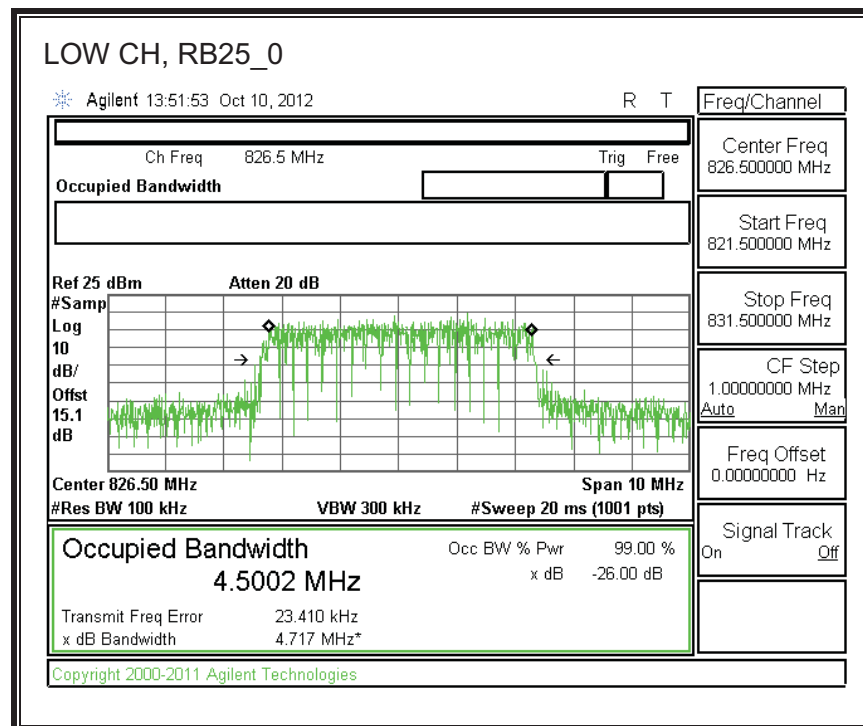
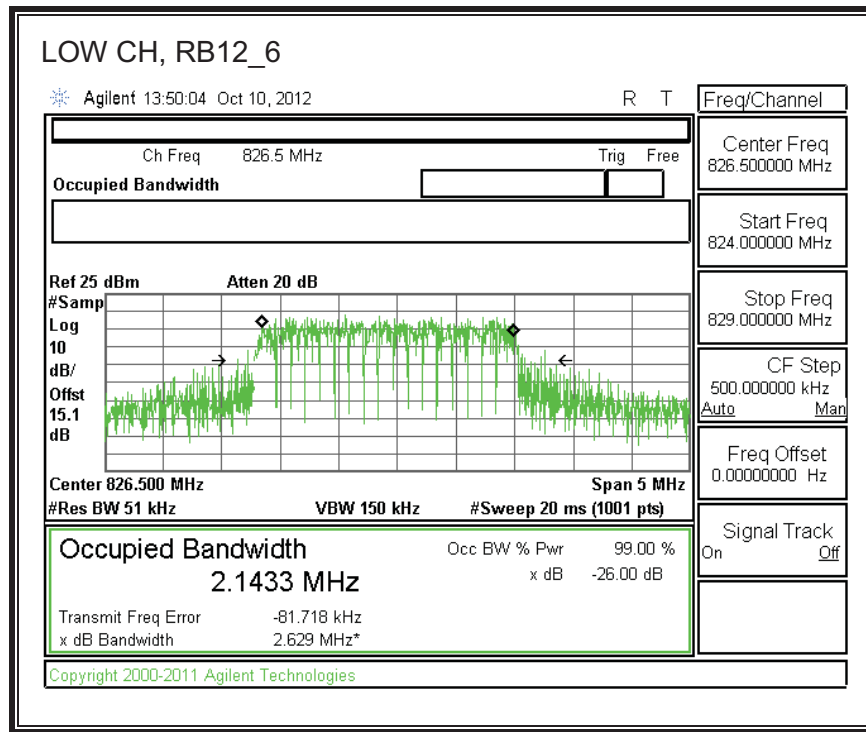
8.1.5. LTE BAND 5

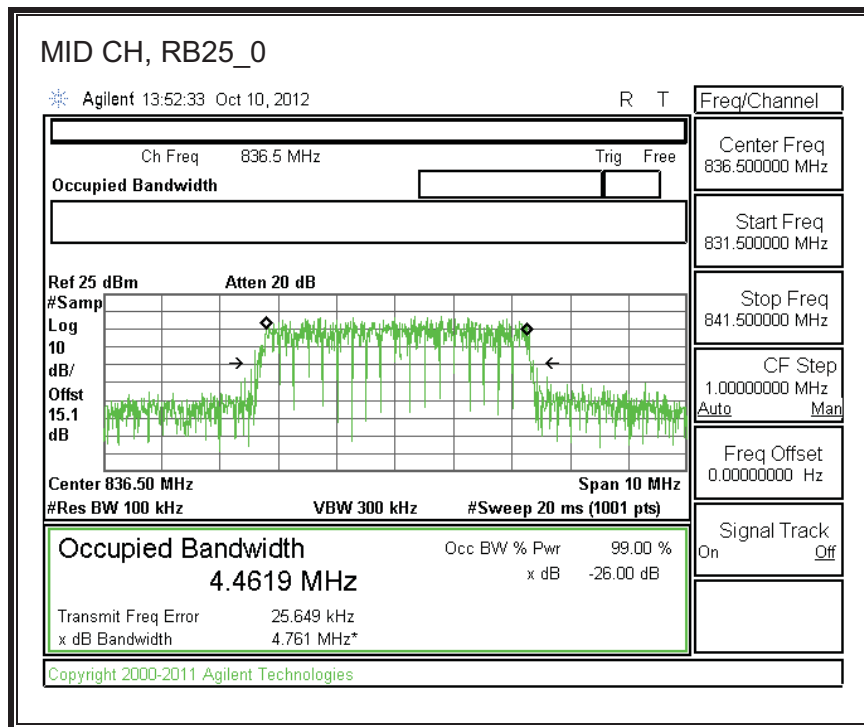
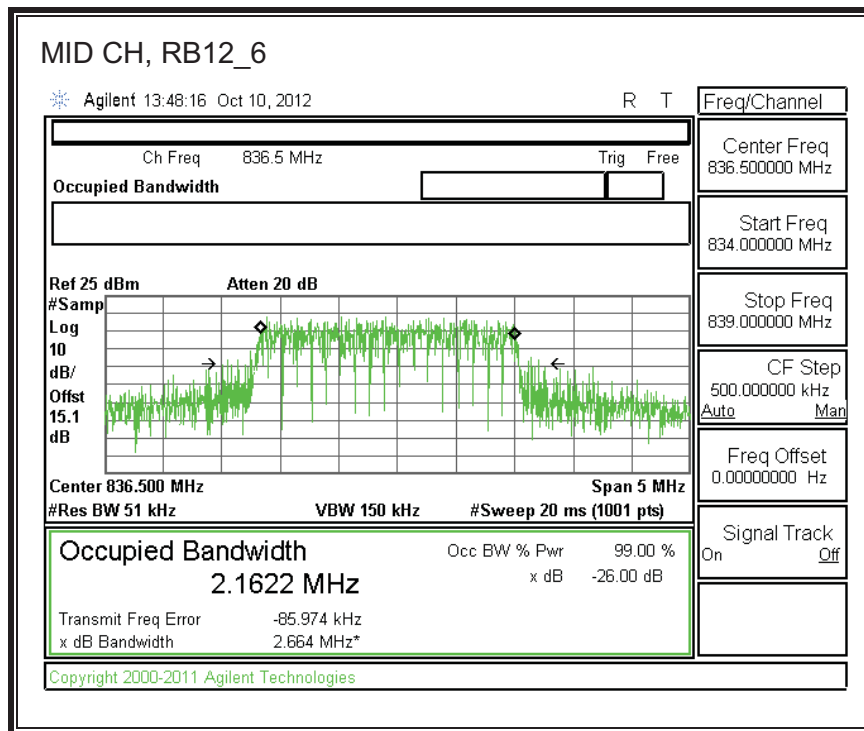
LTE QPSK (5MHZ BANDWIDTH)

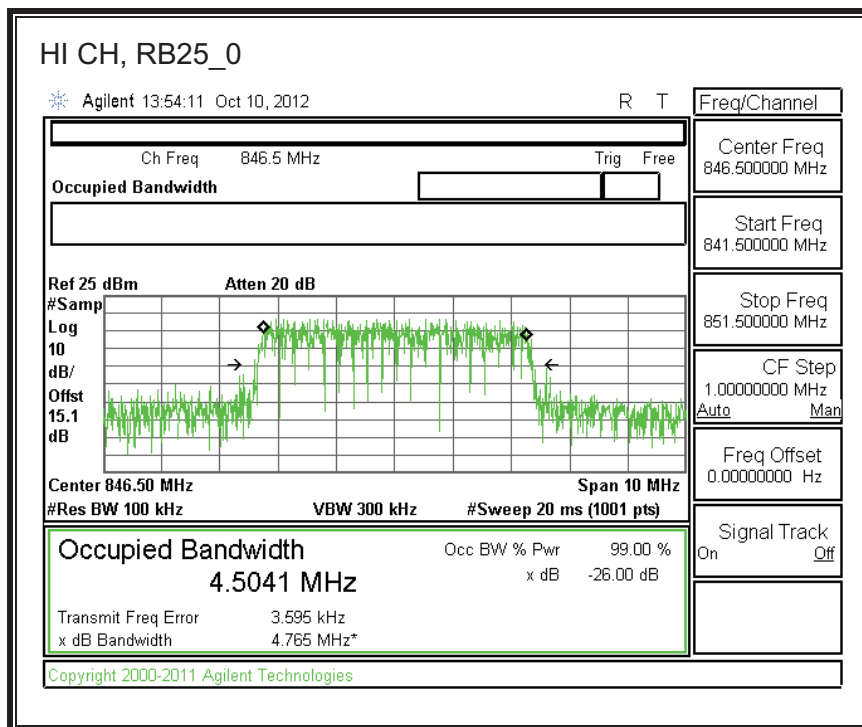
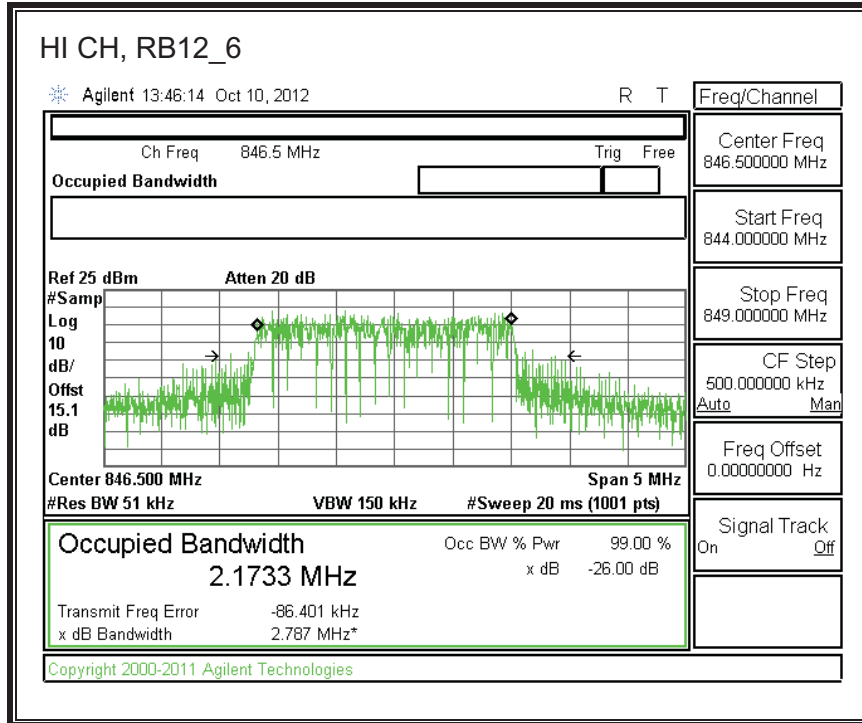


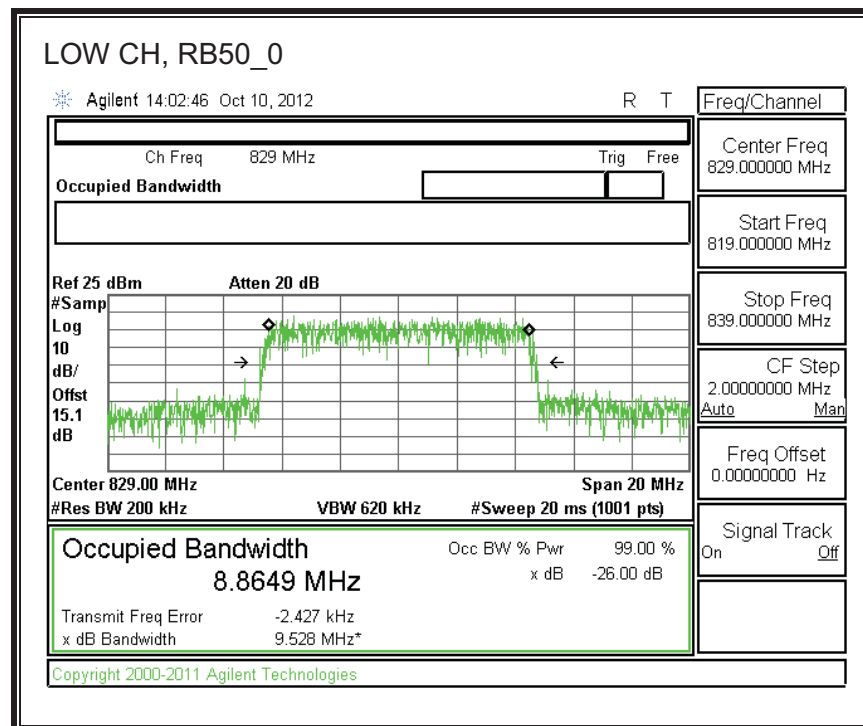
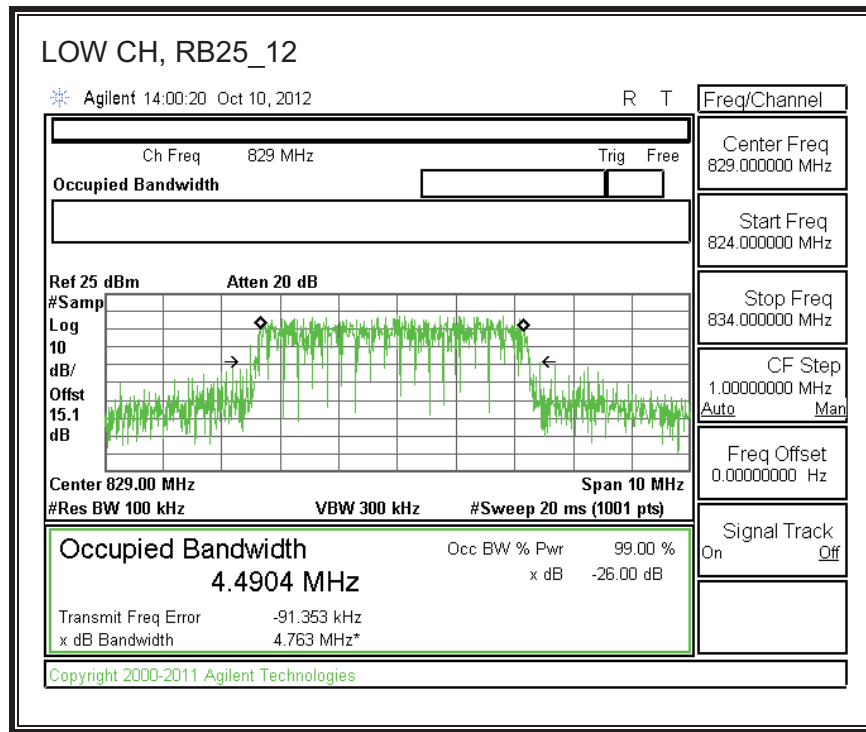


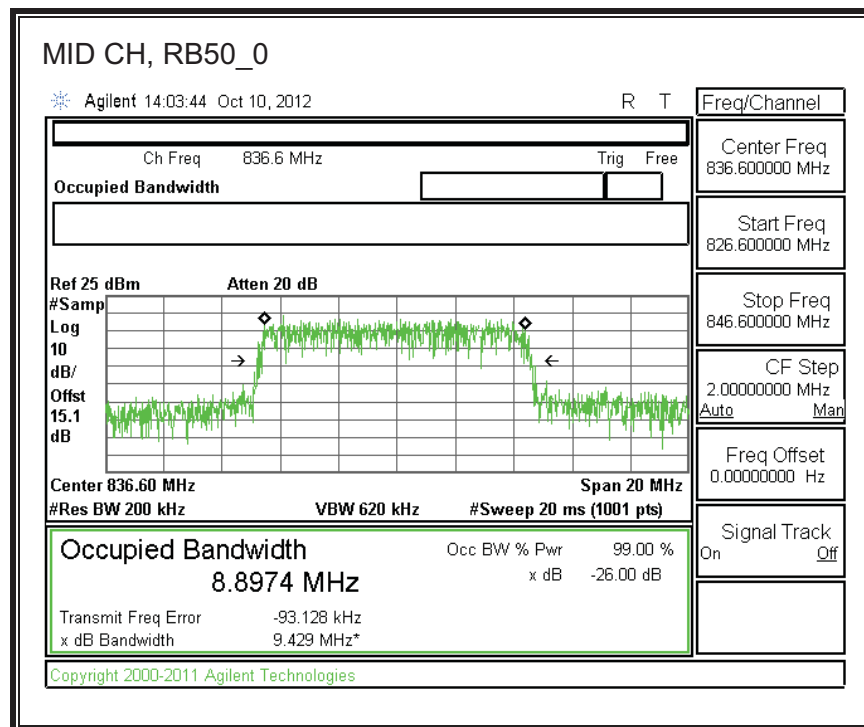
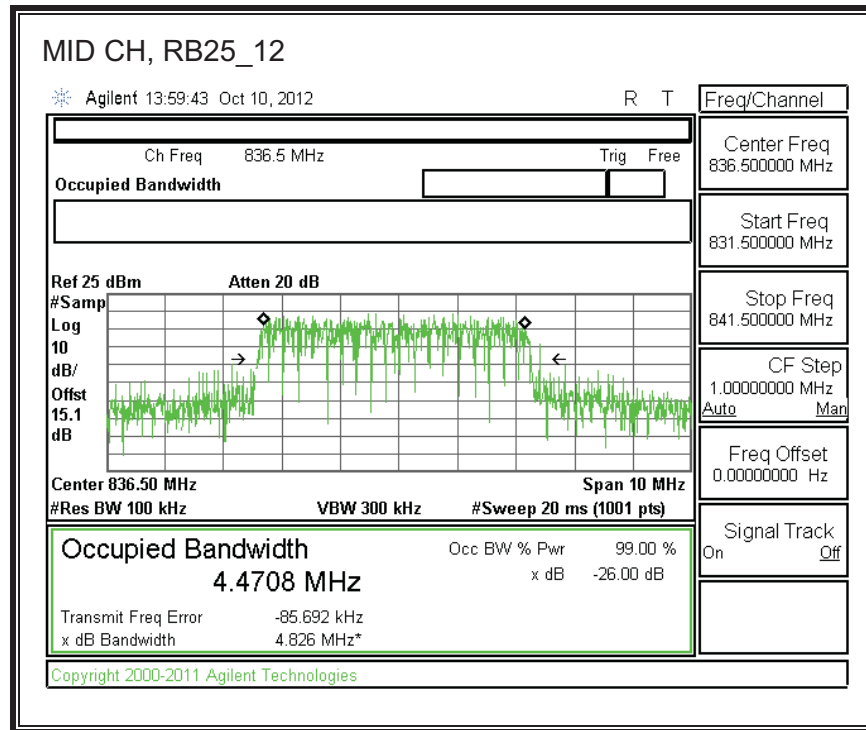


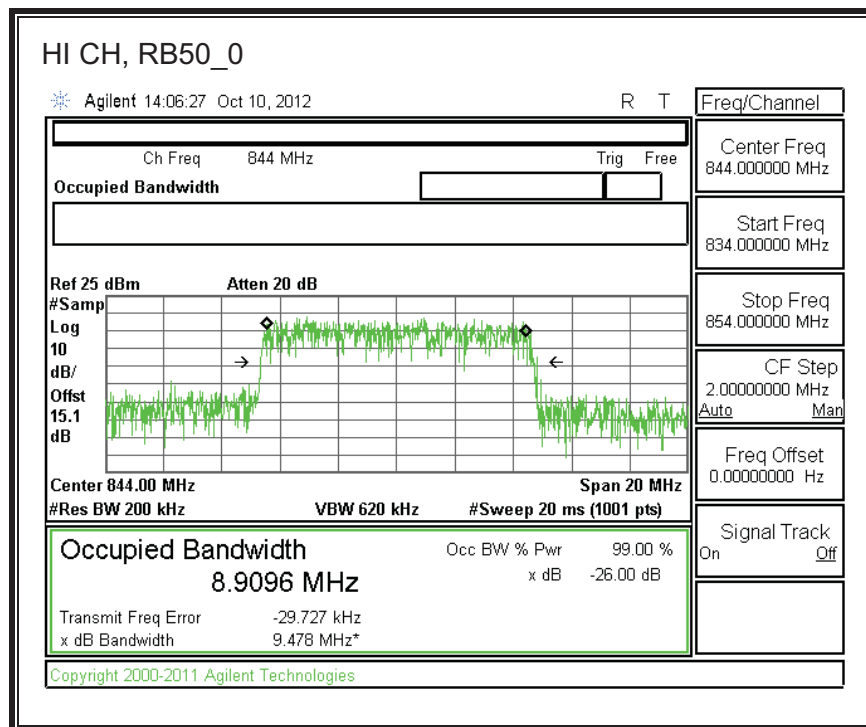
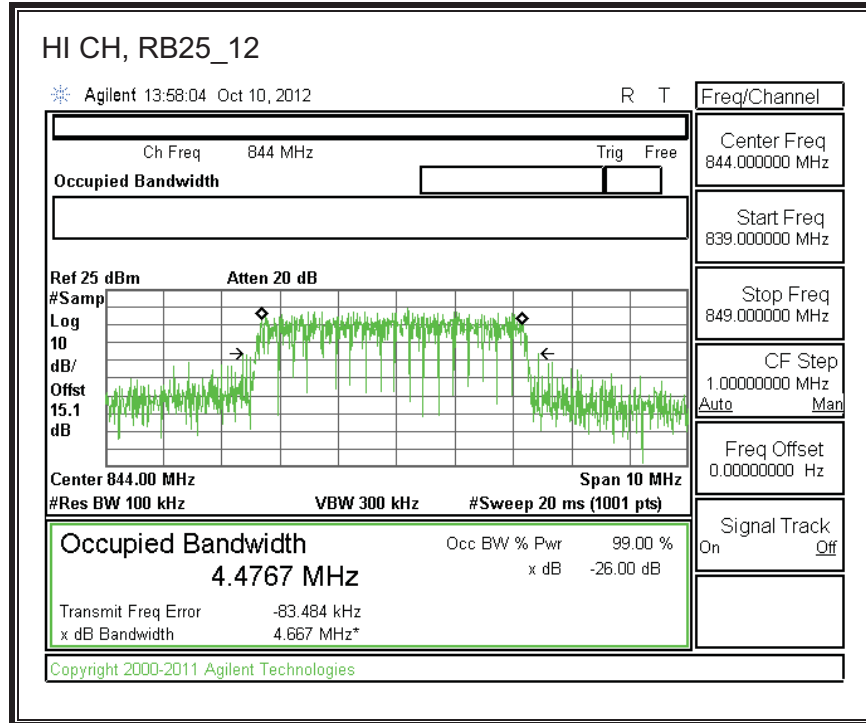
LTE 16QAM (5MHZ BANDWIDTH)

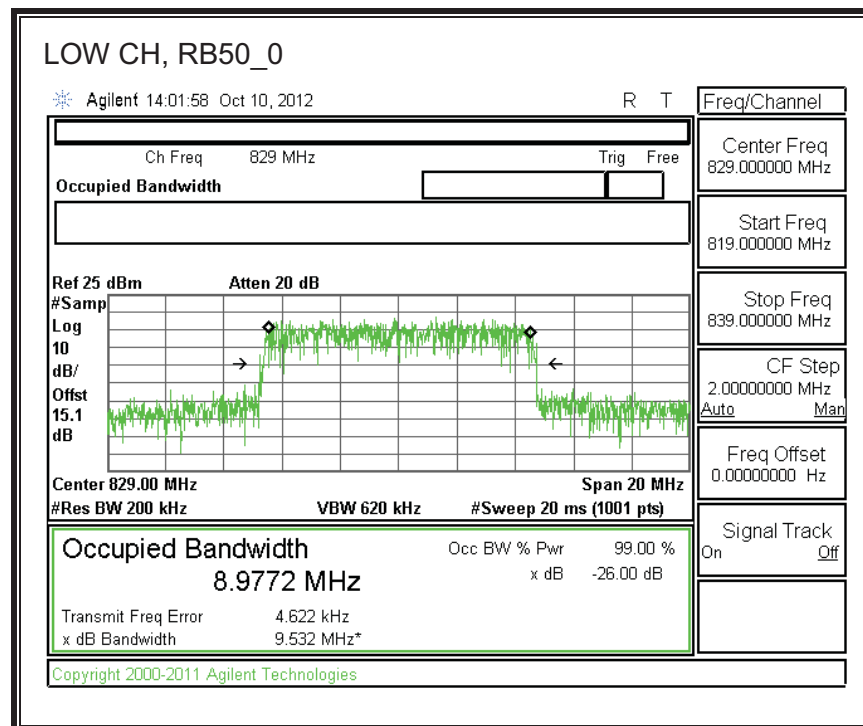
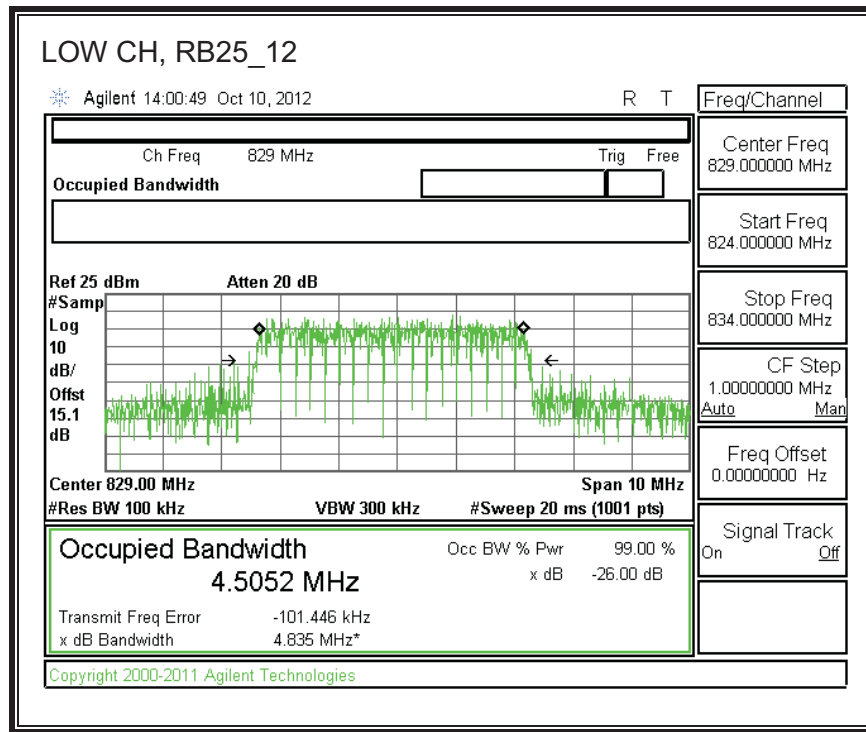


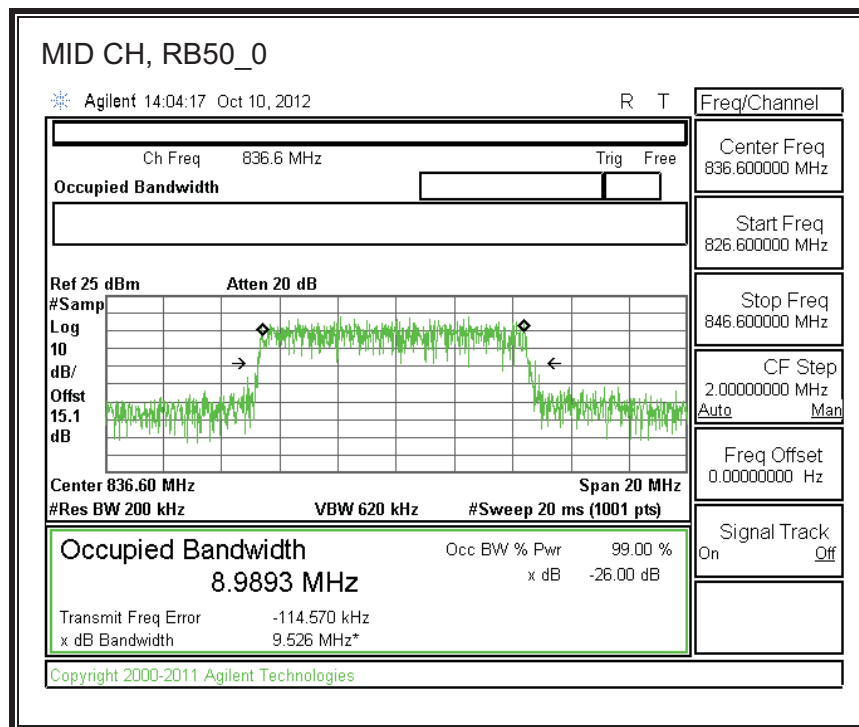
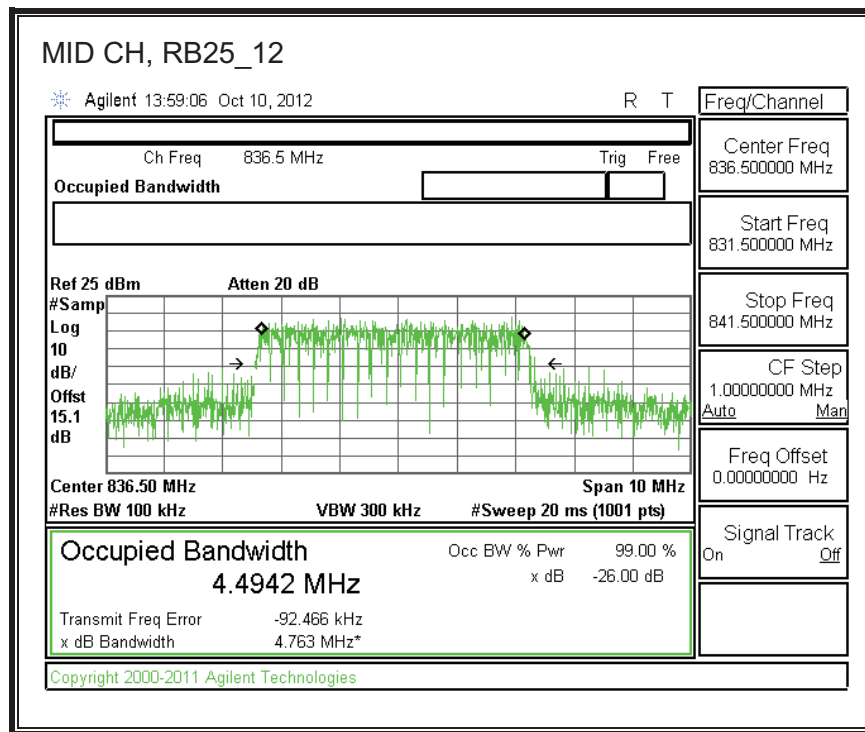


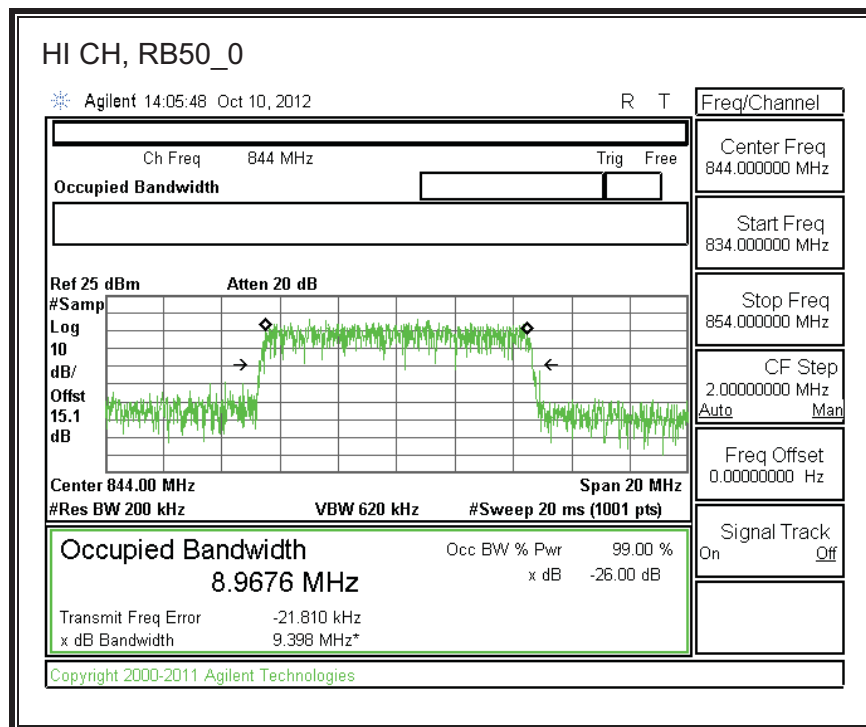
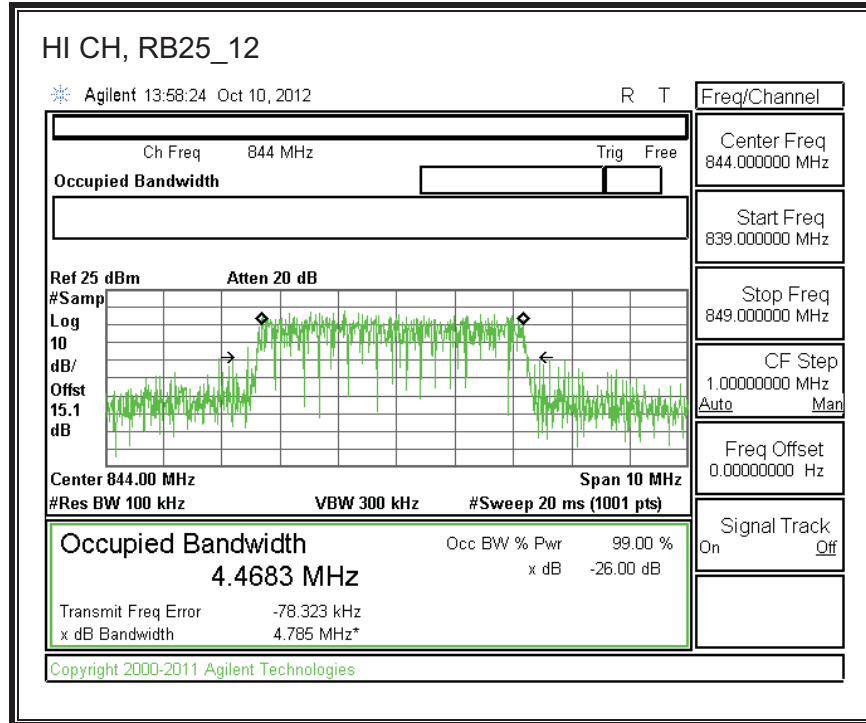
LTE QPSK (10MHZ BANDWIDTH)





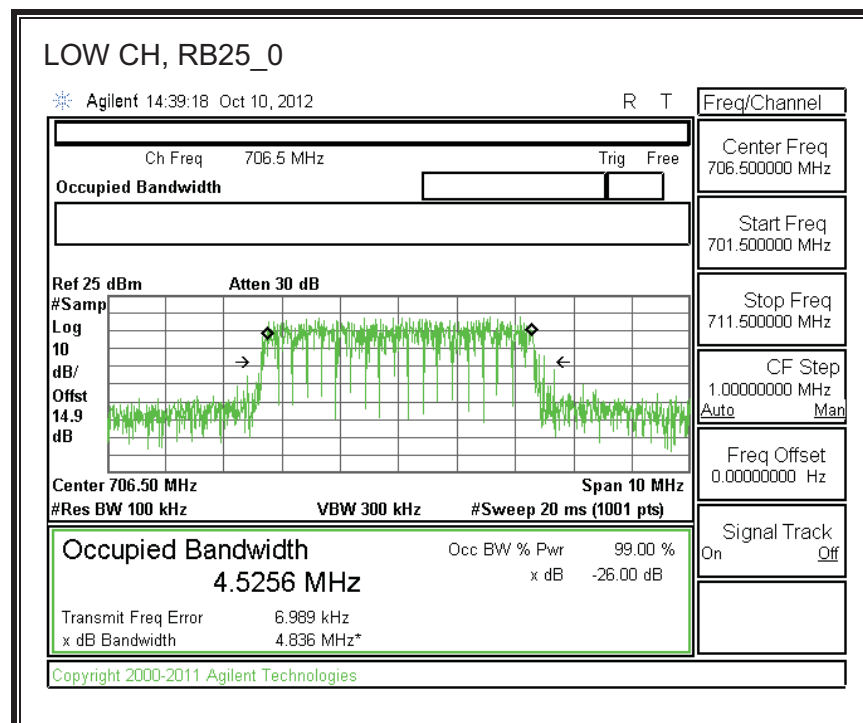
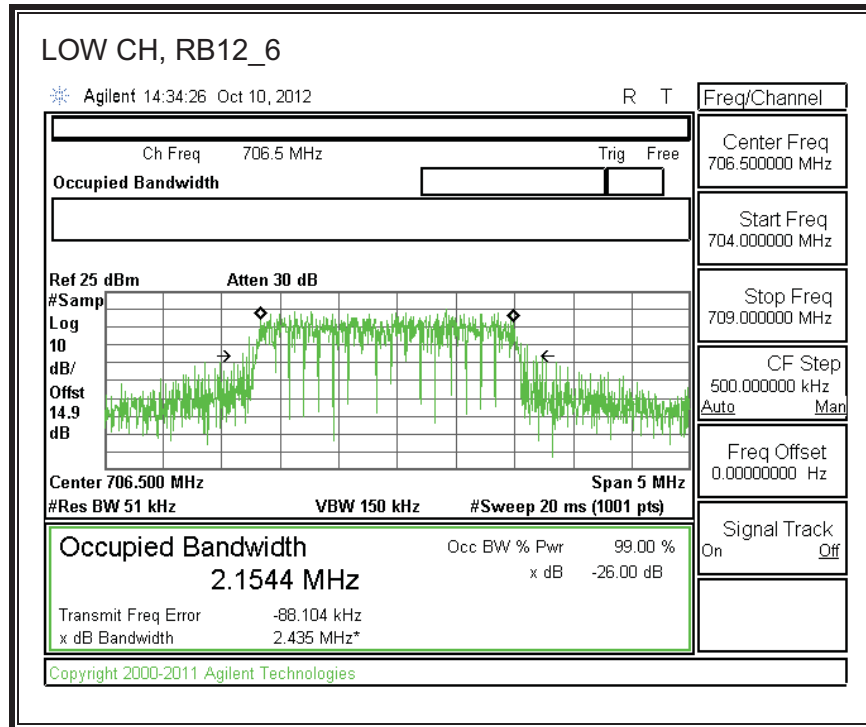
LTE 16QAM (10MHZ BANDWIDTH)

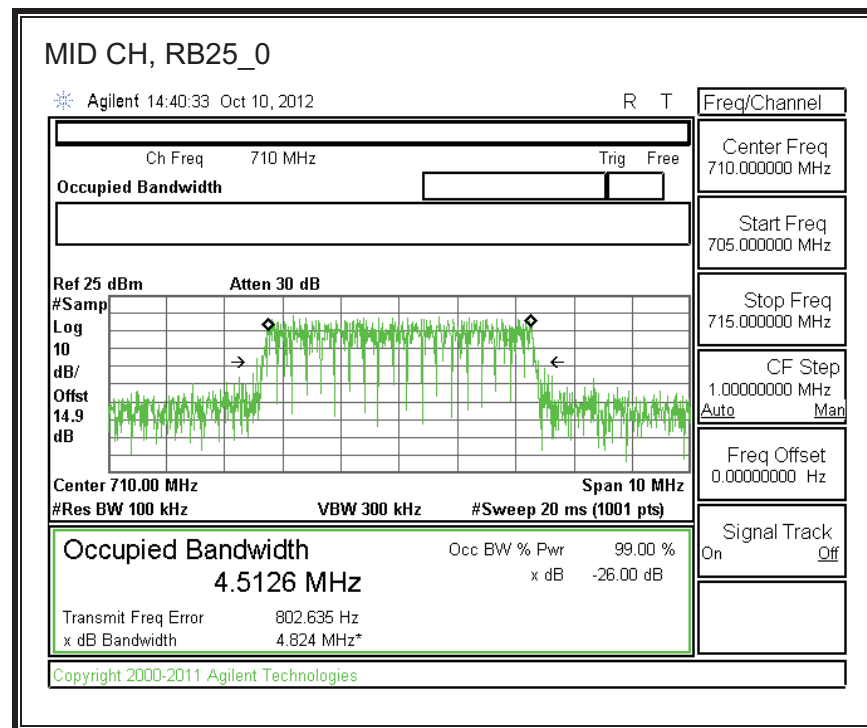
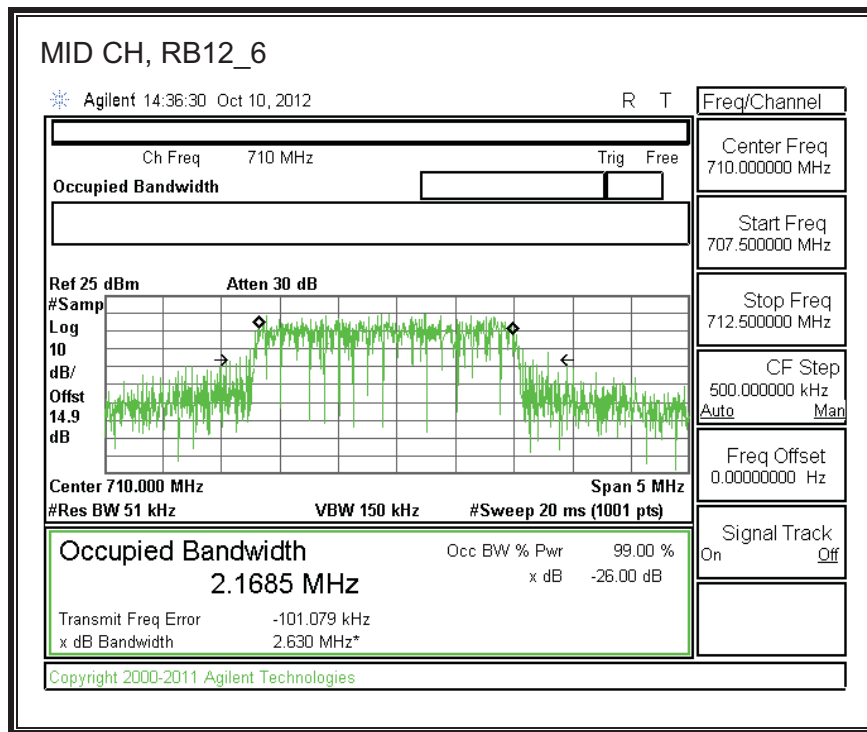


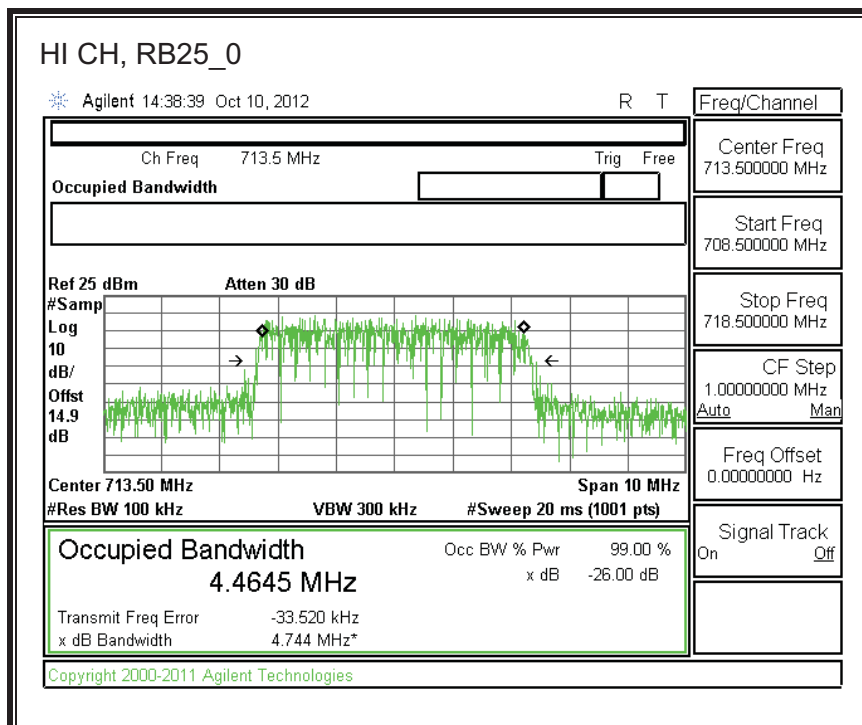
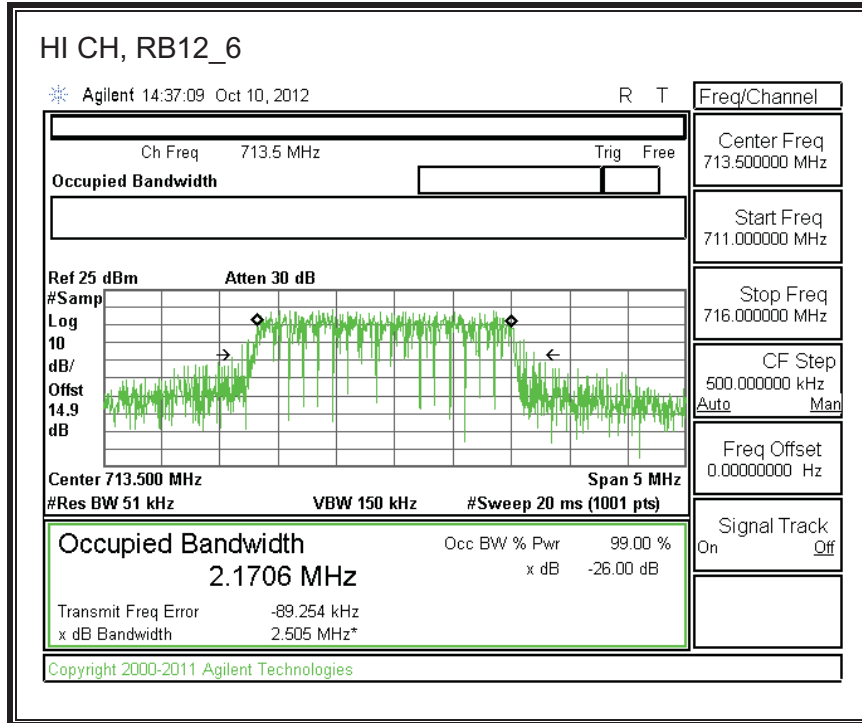


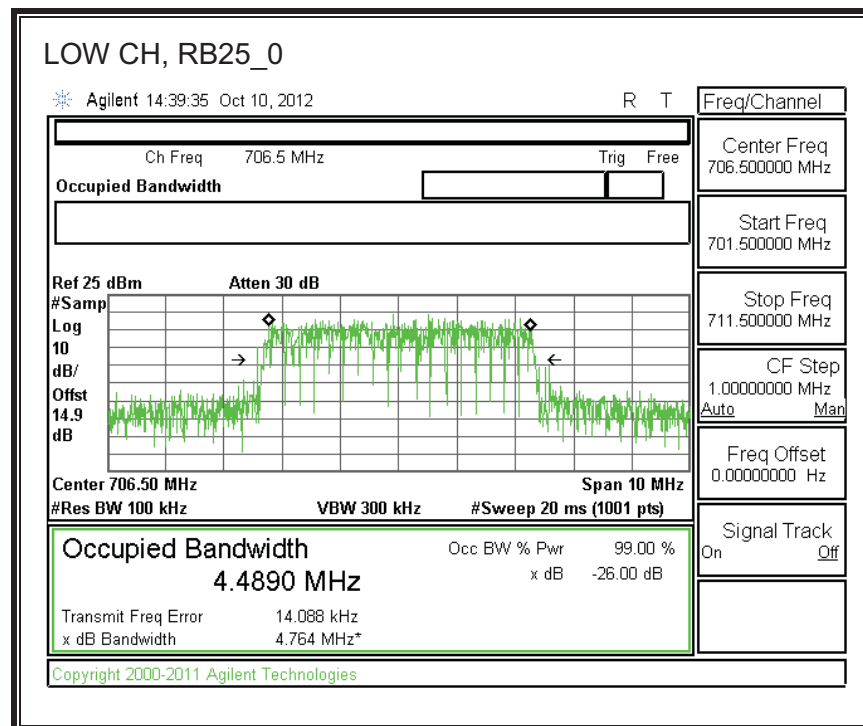
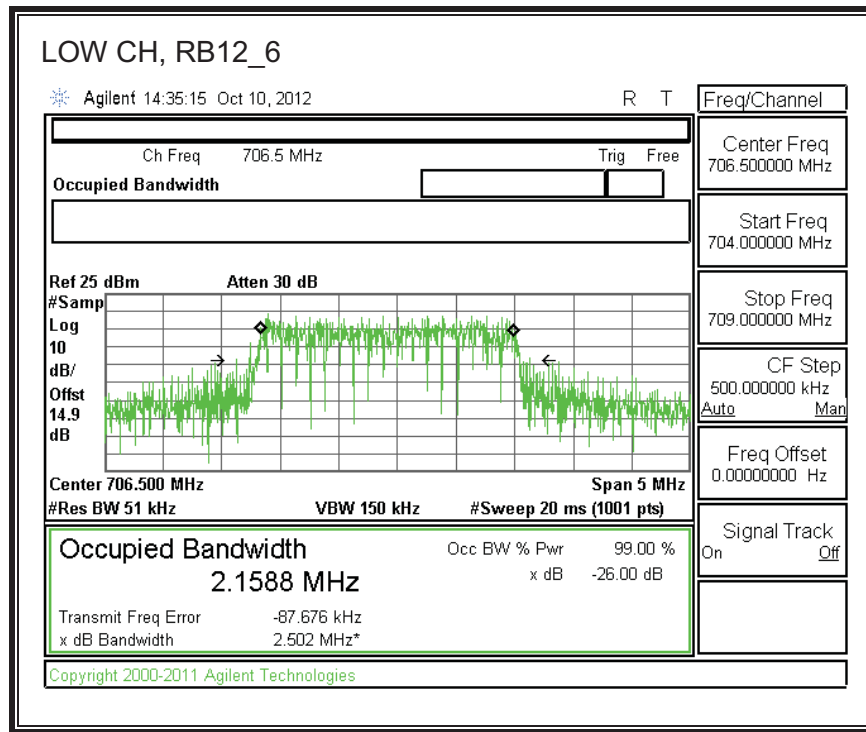
8.1.6. LTE BAND 17

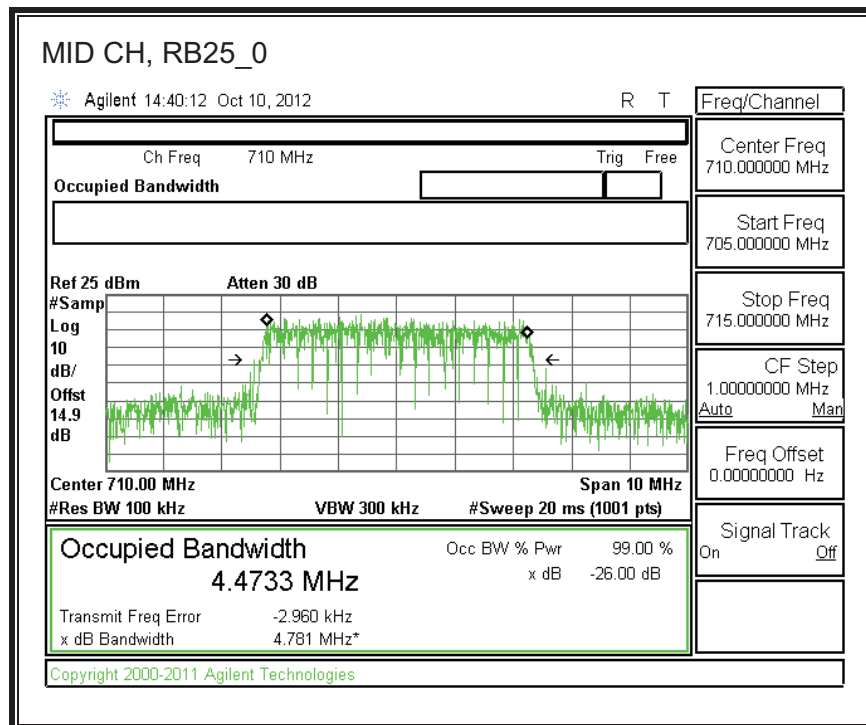
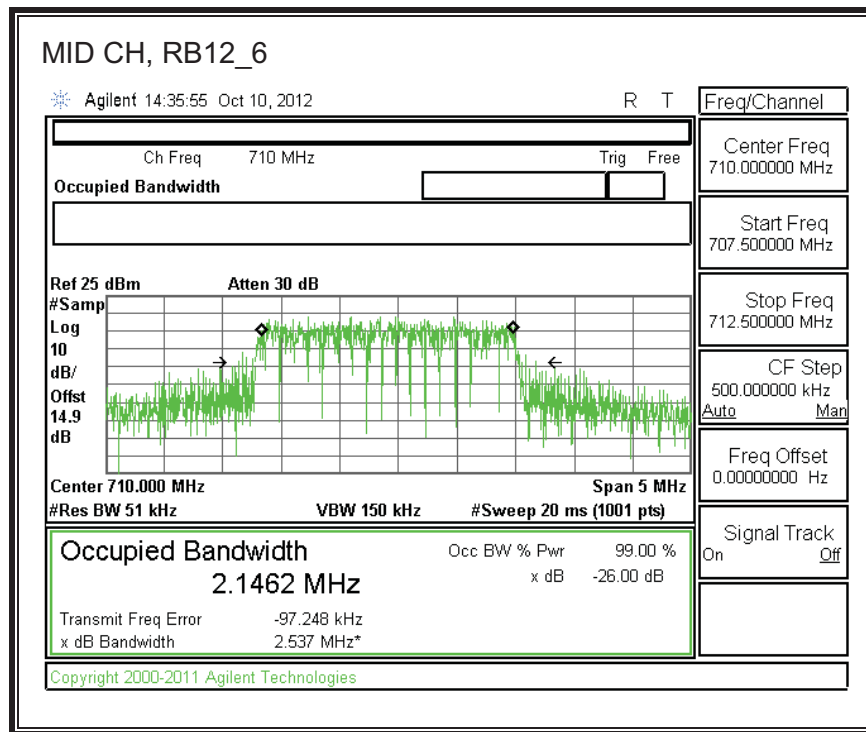
QPSK (5 MHz BANDWIDTH)

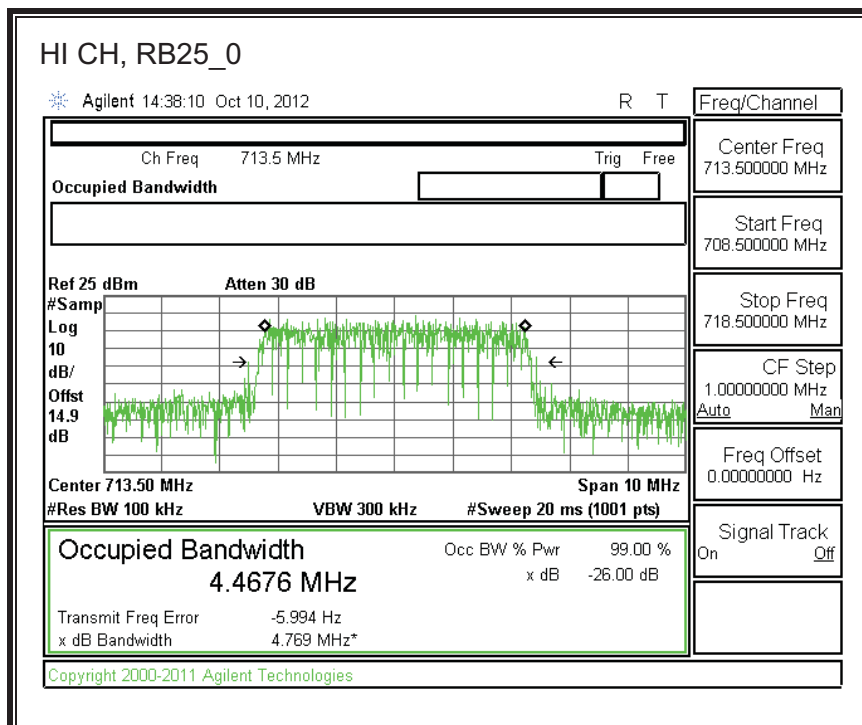
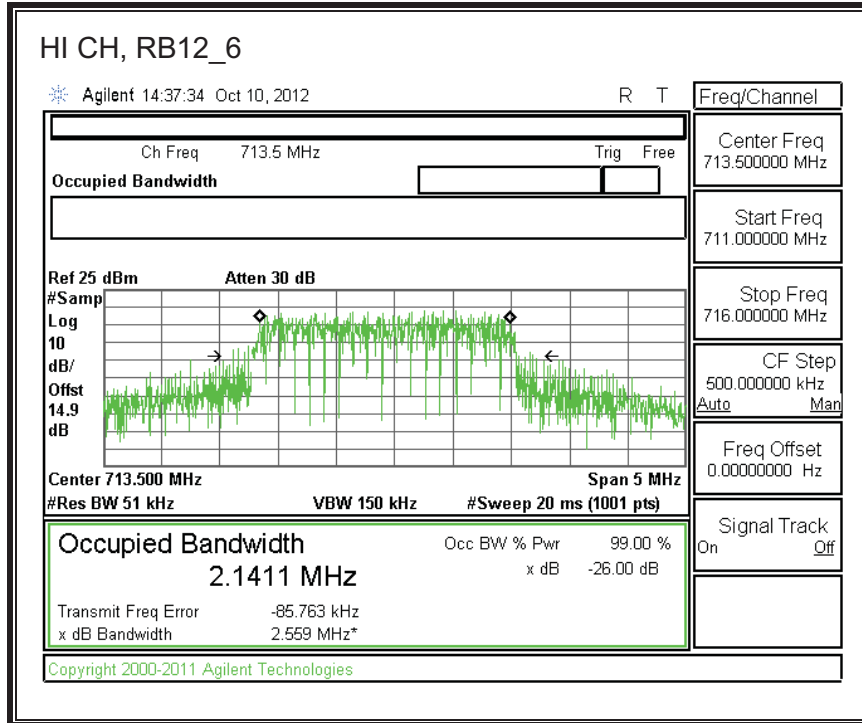


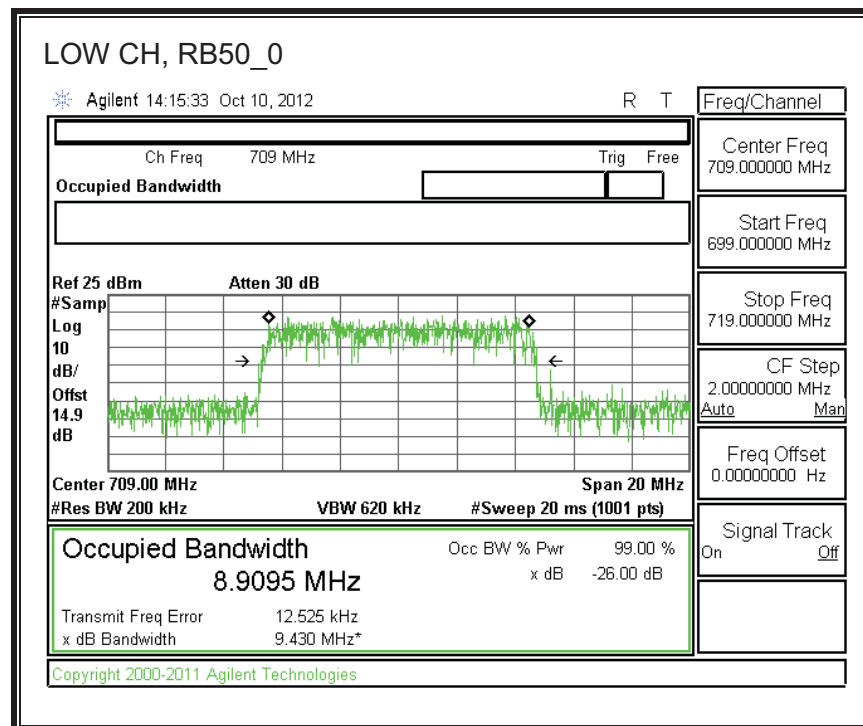
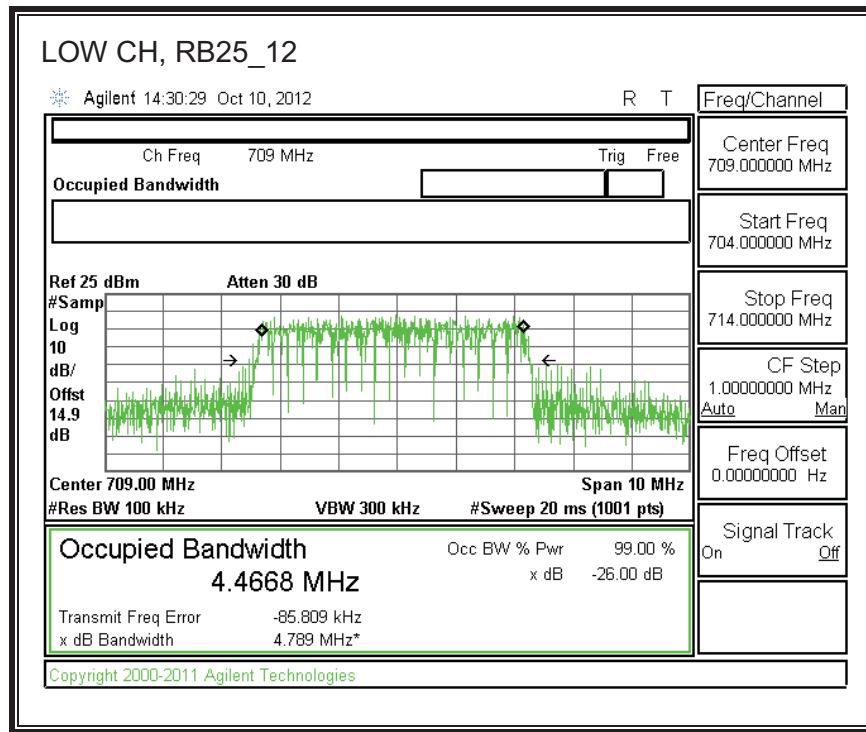


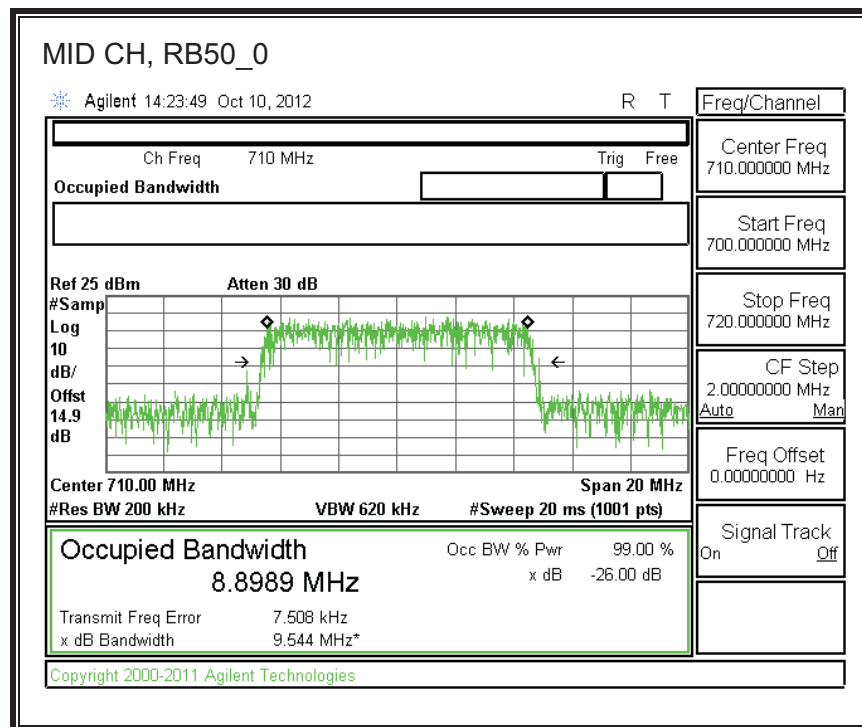
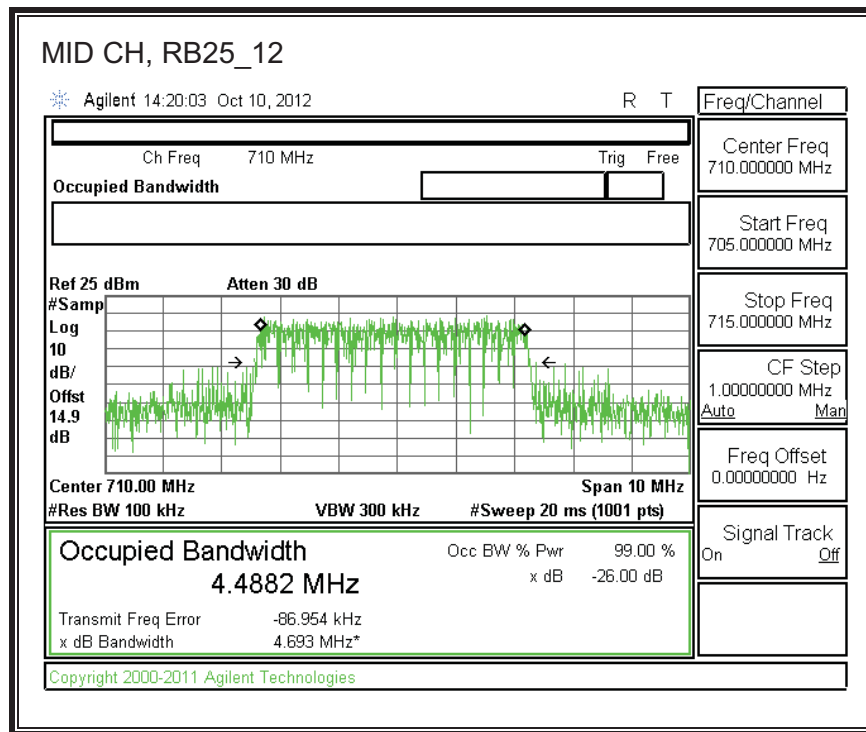


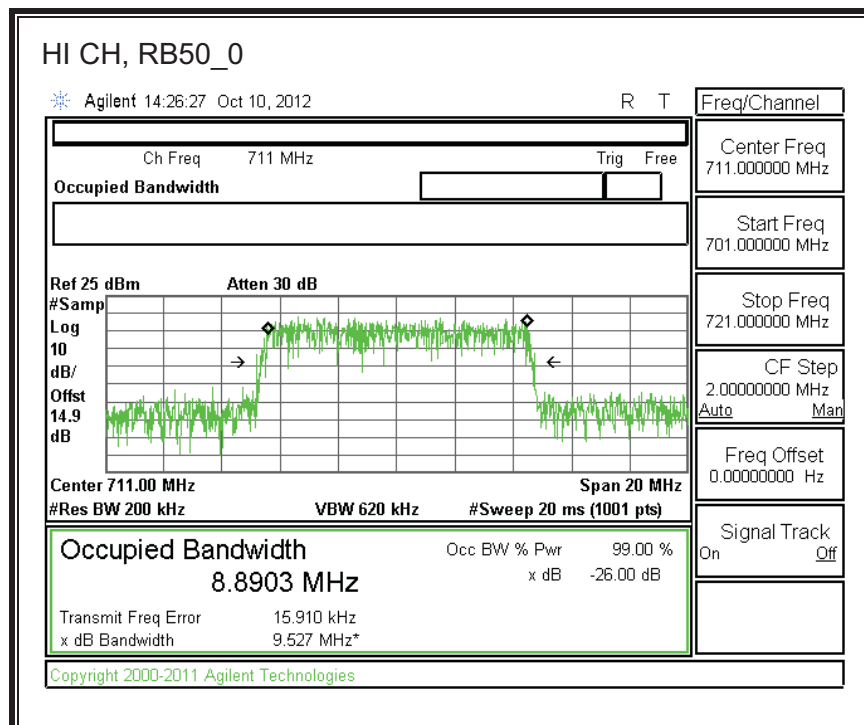
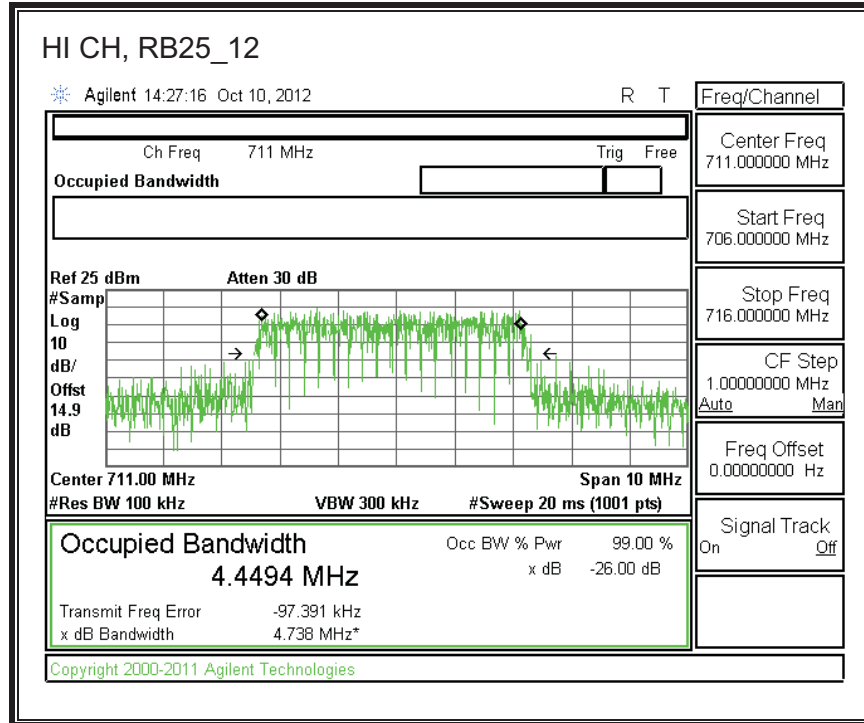
LTE 16QAM (5MHZ BANDWIDTH)

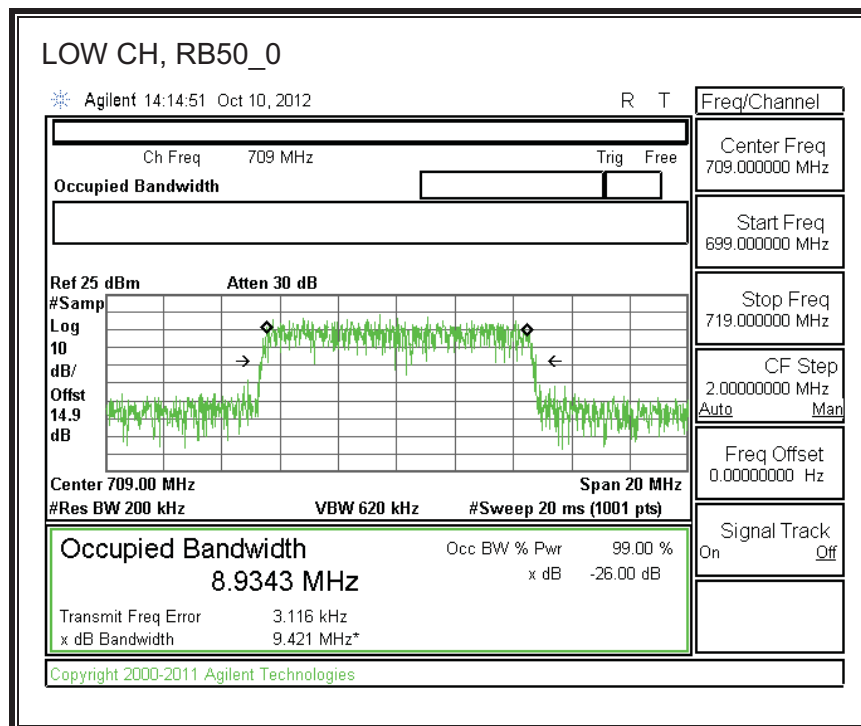
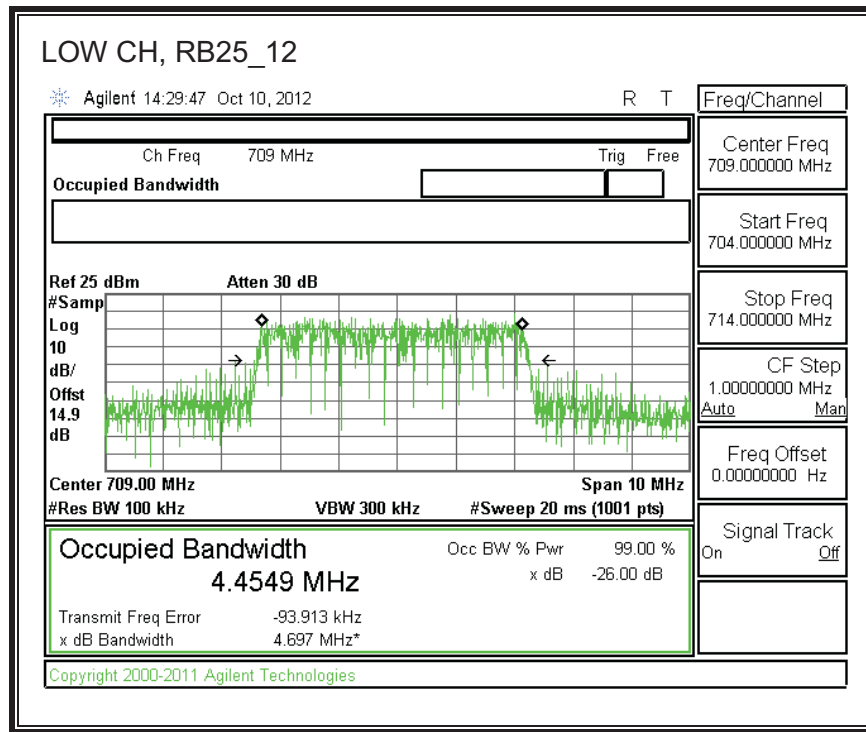


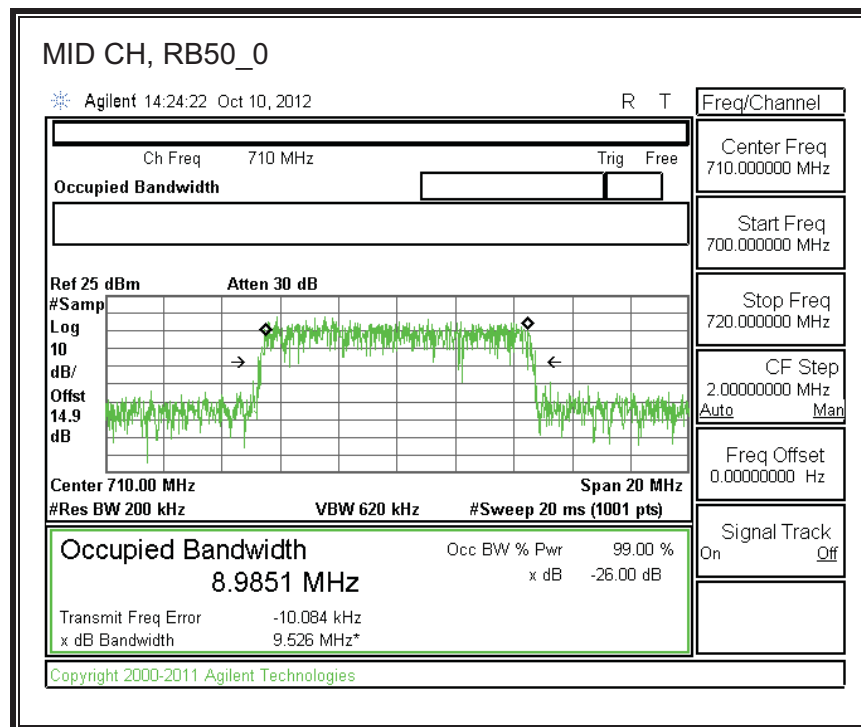
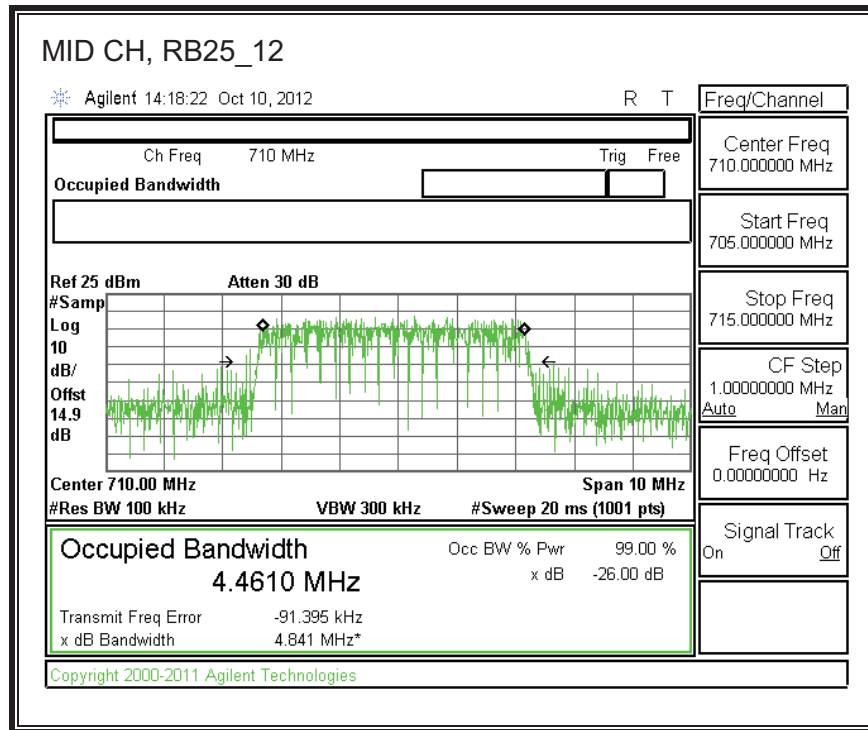


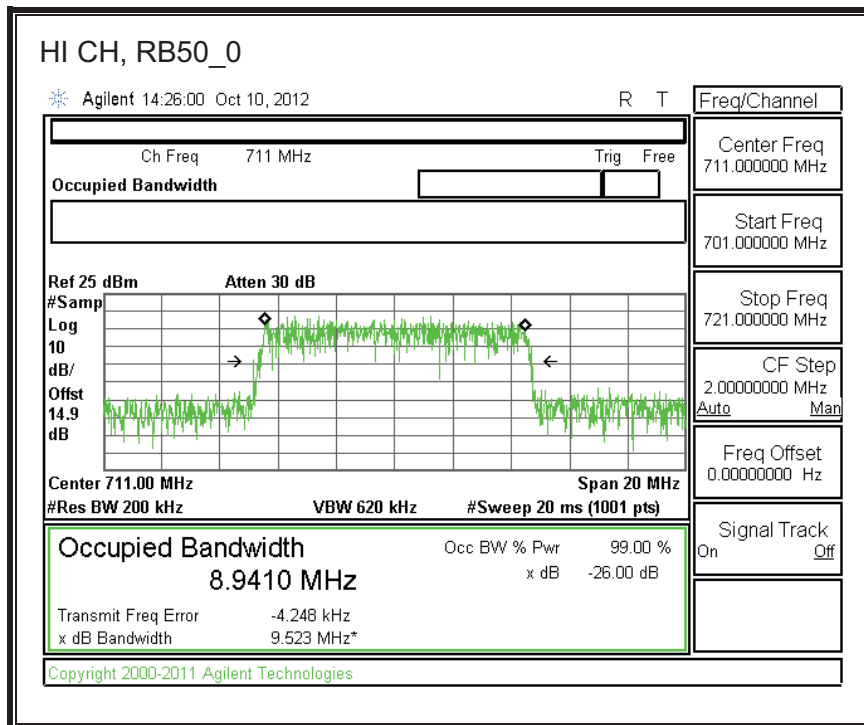
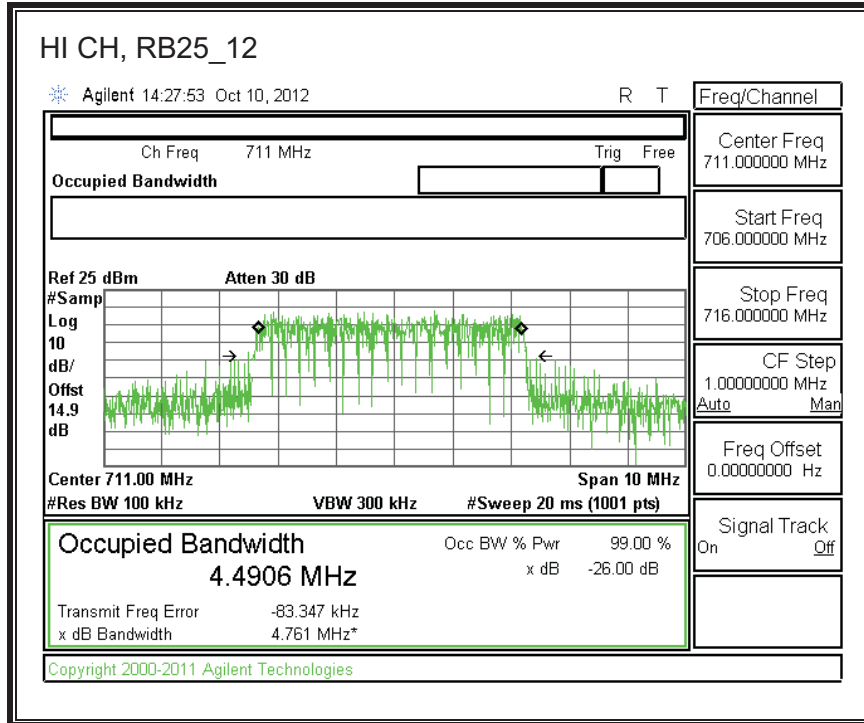
LTE QPSK (10MHZ BANDWIDTH)





LTE 16QAM (10MHZ BANDWIDTH)





8.2. BAND EDGE

RULE PART(S)

FCC: §22.359, 24.238 and §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

The transmitter output was connected to an Agilent 8960 and 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.

For each band edge measurement:

- Set the spectrum analyzer span to include the block edge frequency (704, 716, 824, 849, 1710, 1755, 1850, 1910MHz)
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

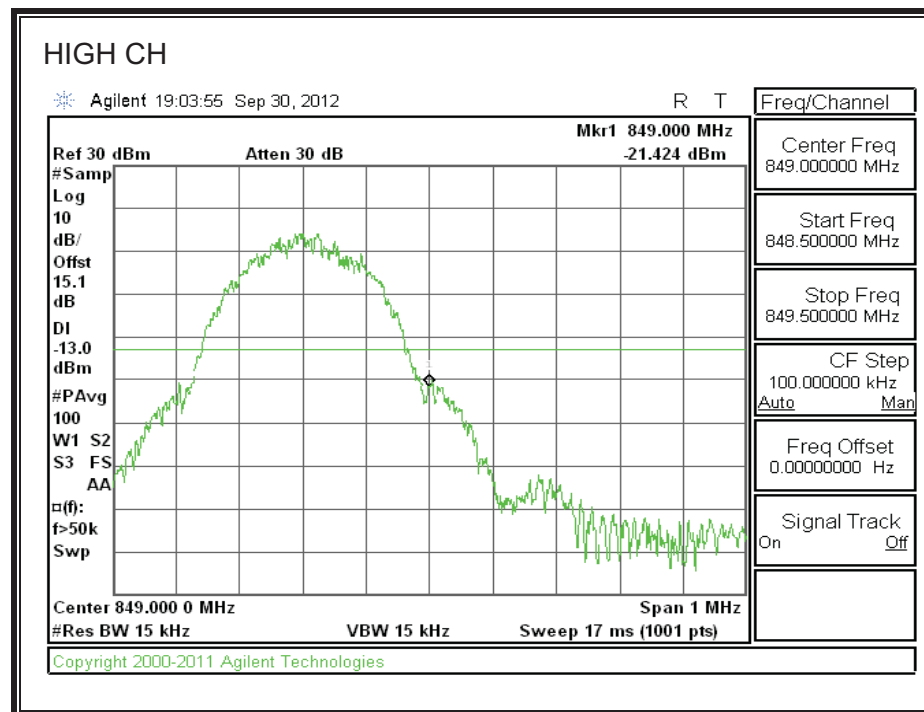
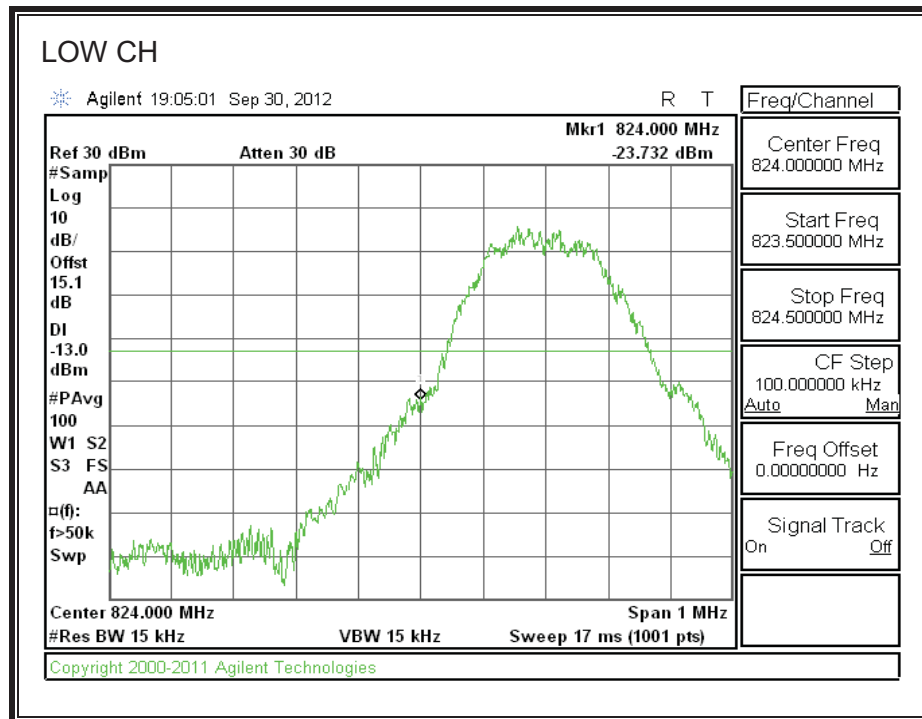
MODES TESTED

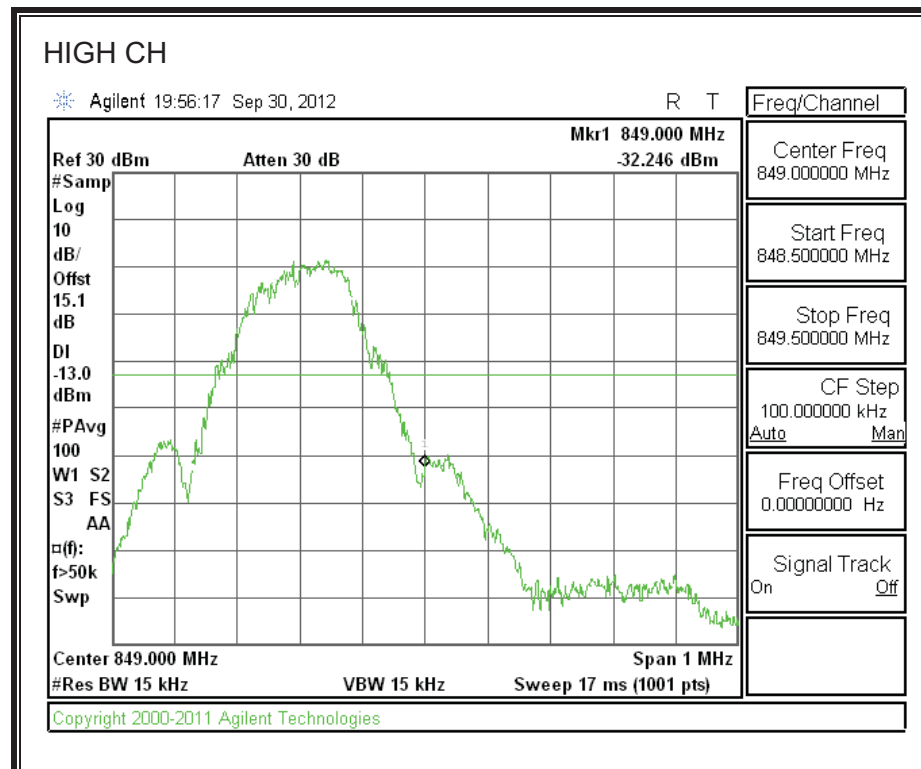
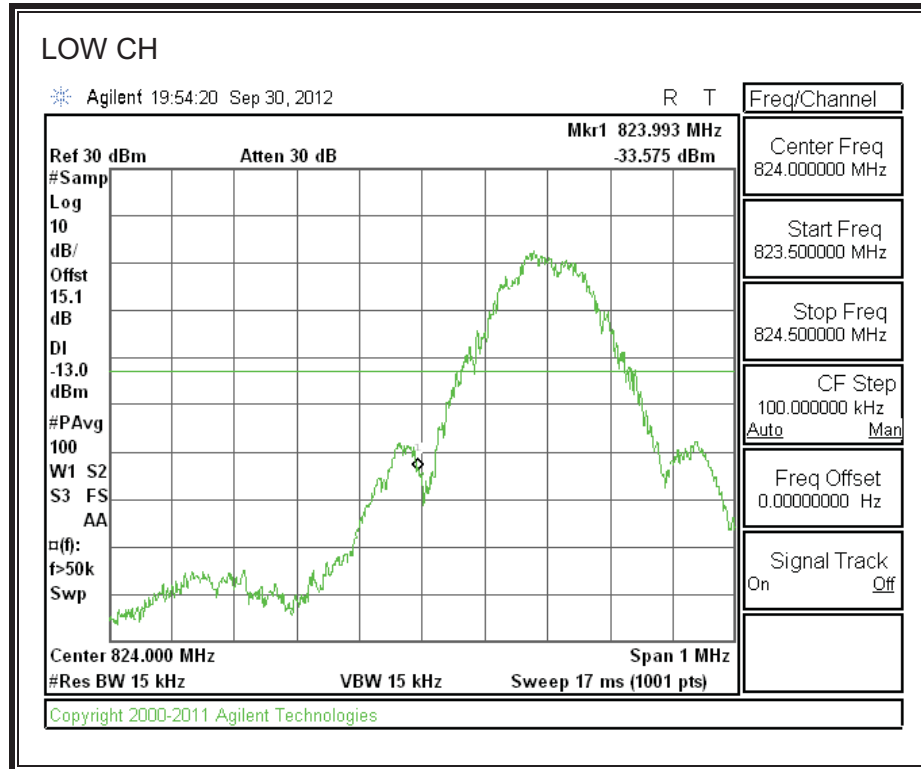
- GPRS and EGPRS
- WCDMA, REL 99 and HSDPA
- LTE BAND 2
- LTE BAND 4
- LTE BAND 5
- LTE BAND 17

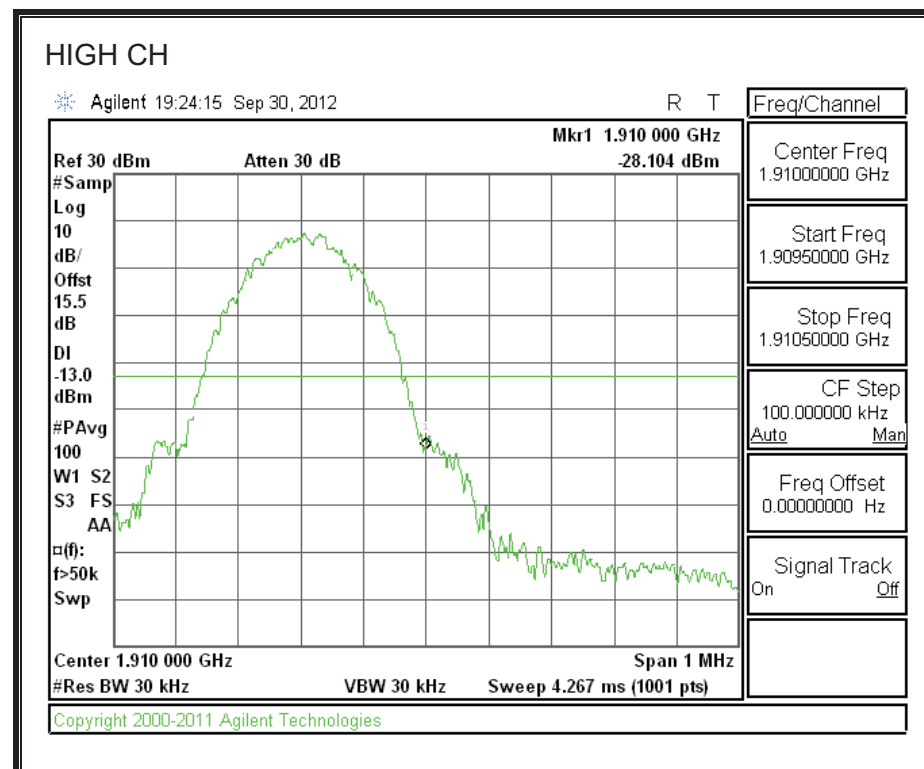
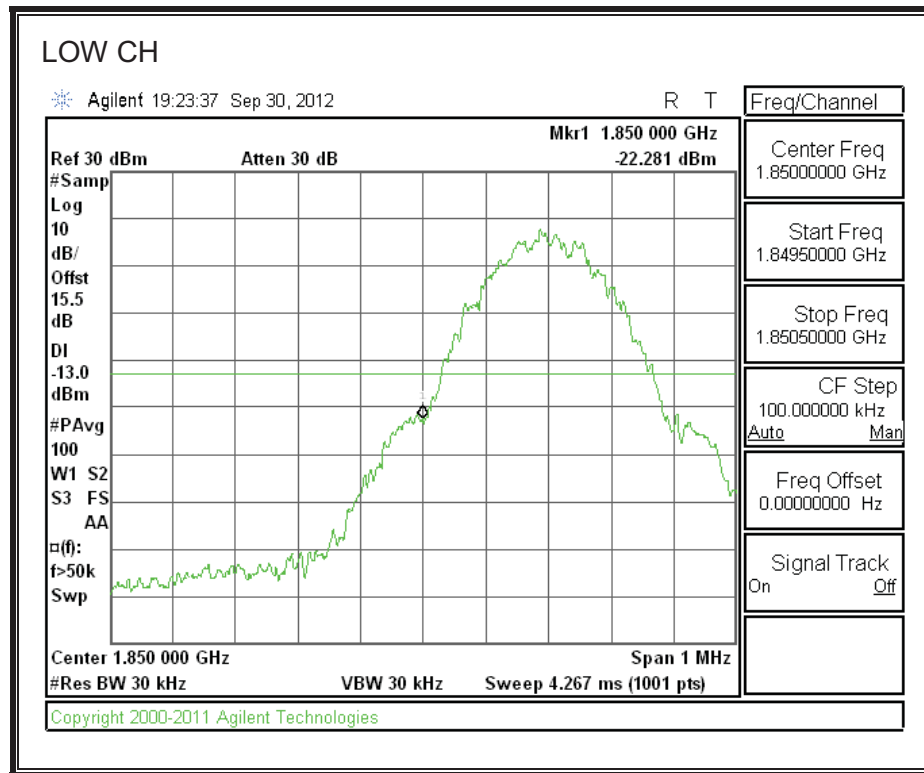
RESULTS

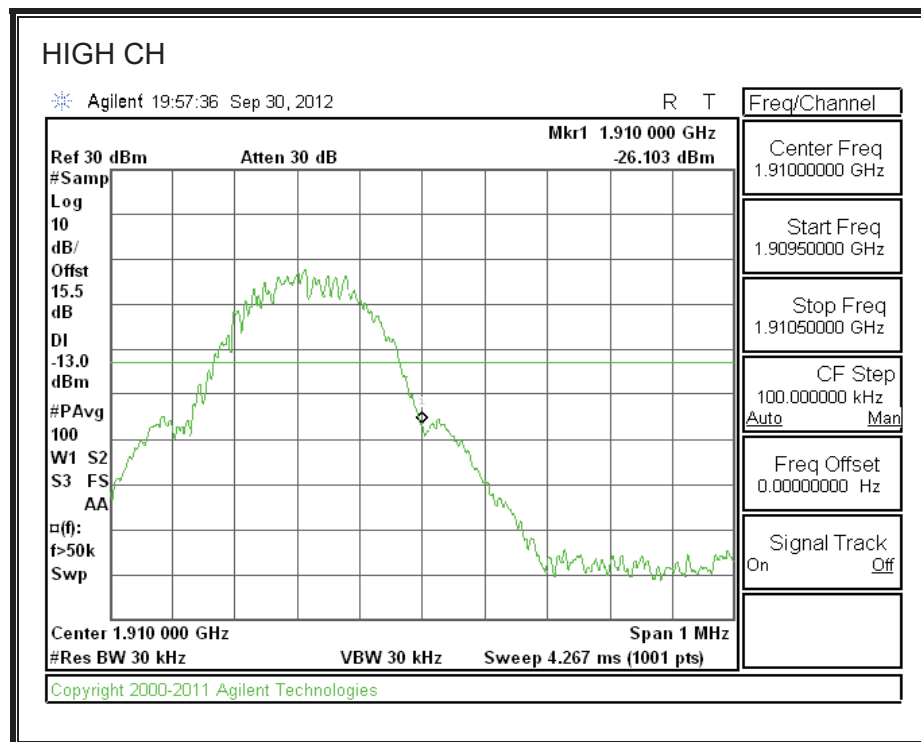
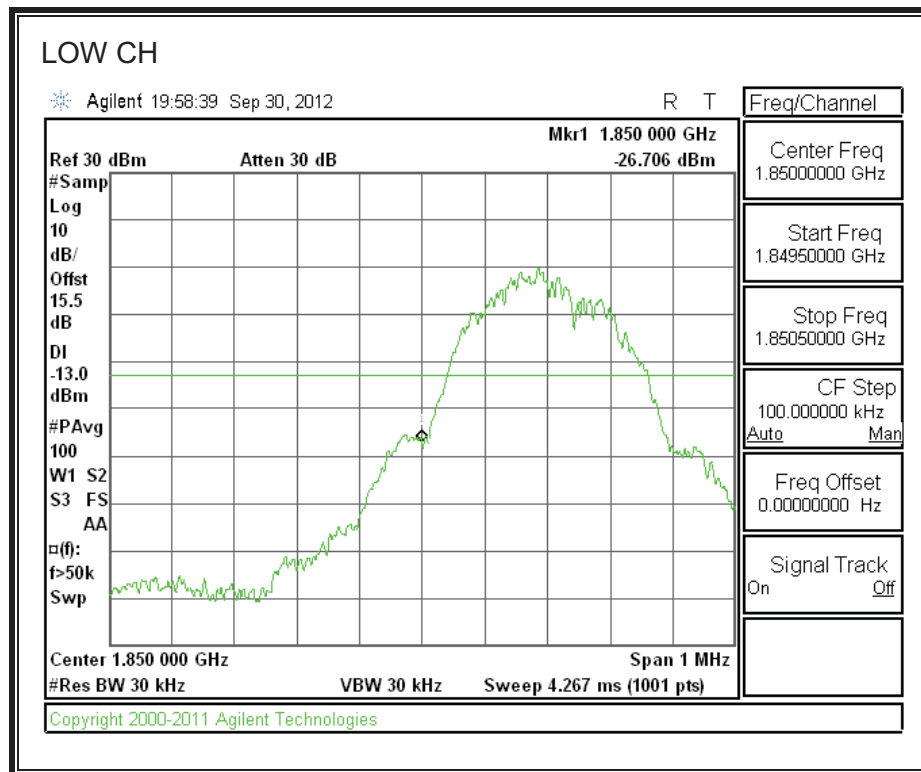
8.2.1. GSM

GPRS mode (Cellular Band)



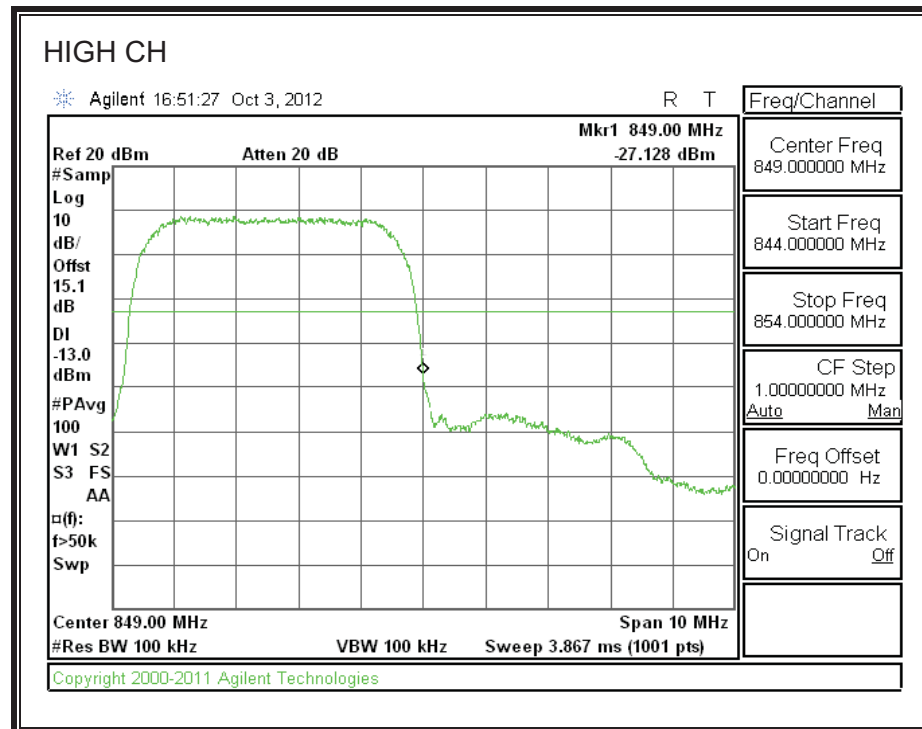
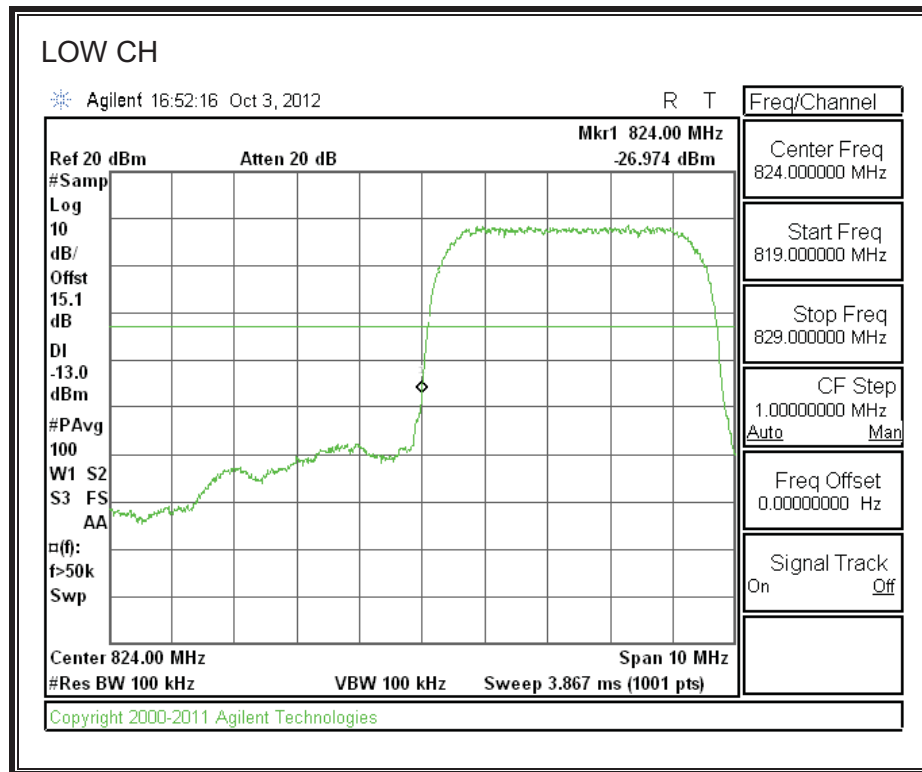
EGPRS850

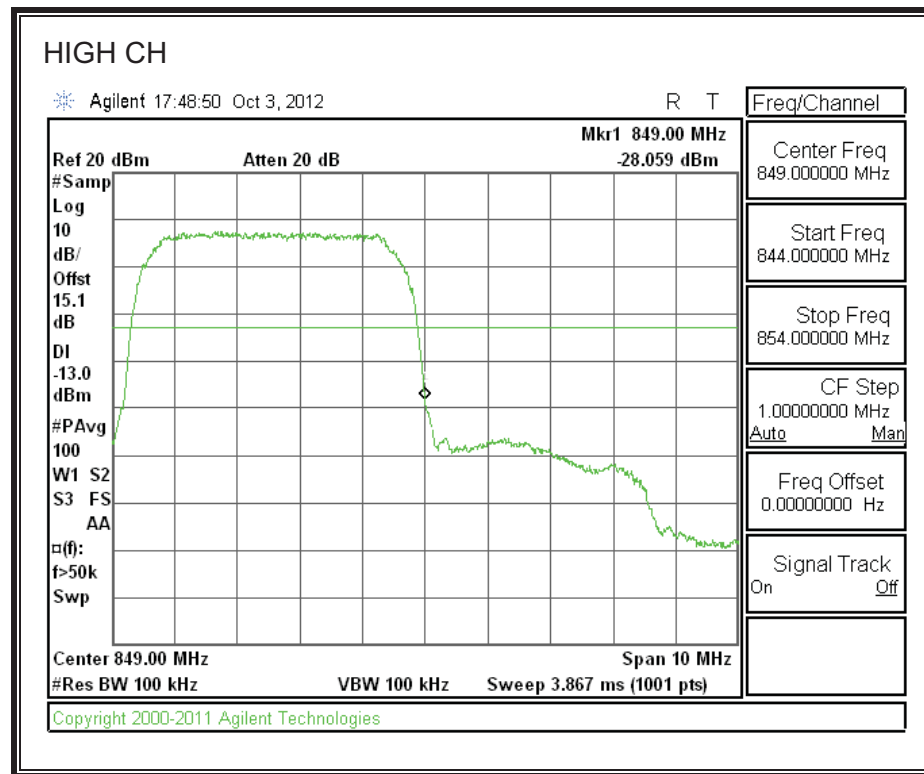
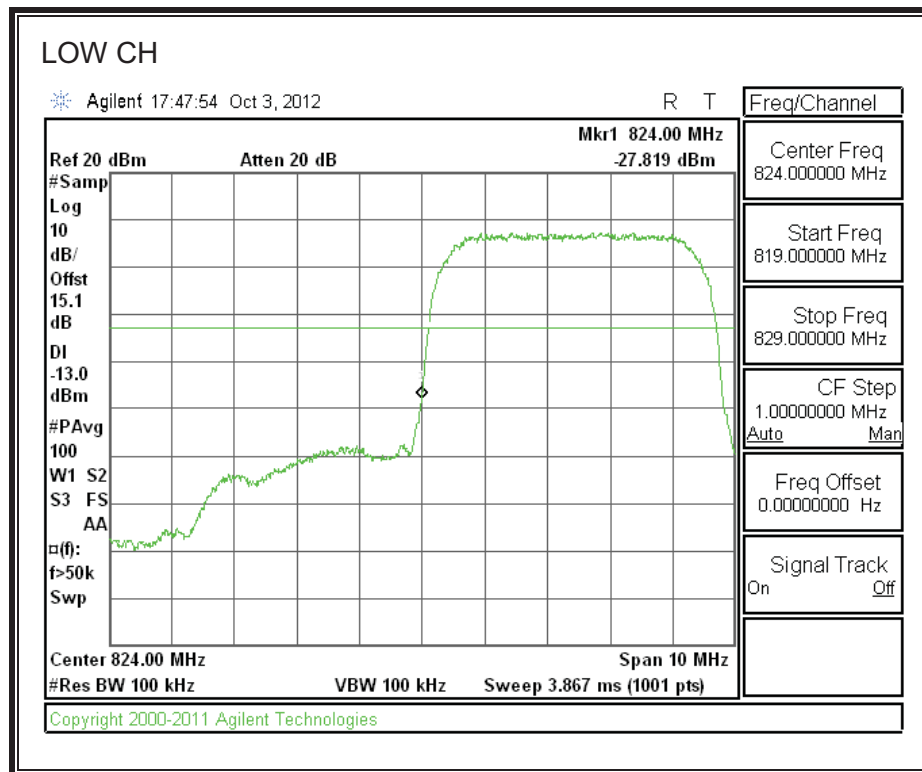
GPRS1900

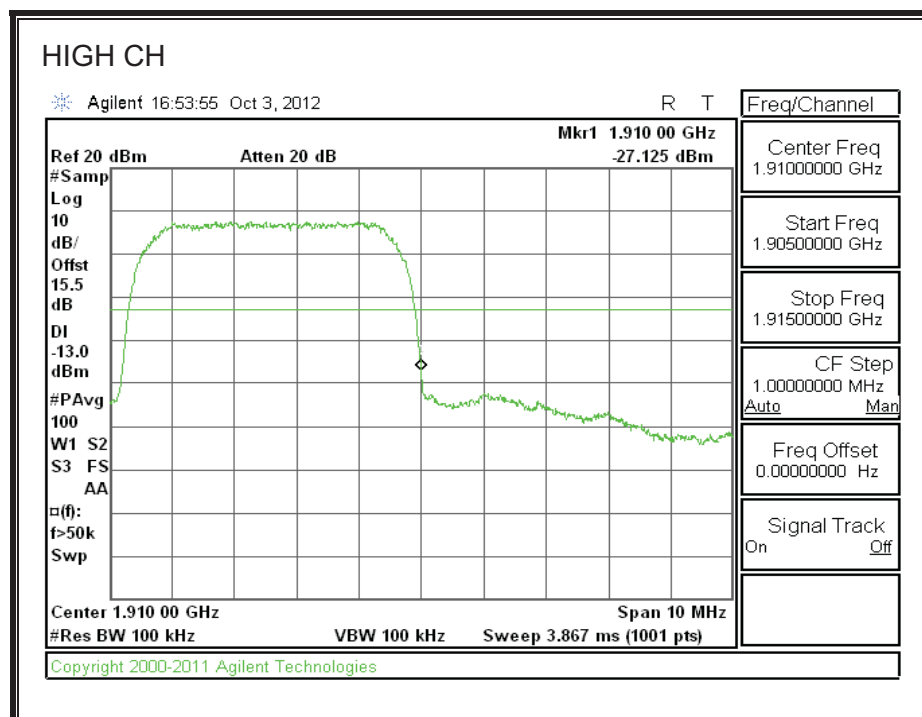
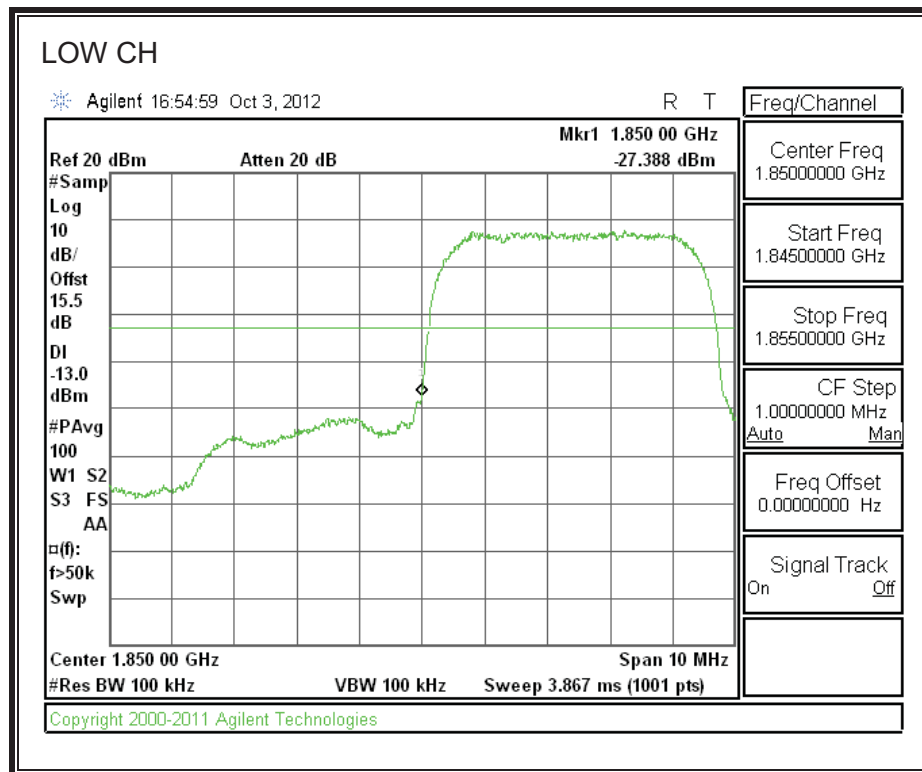
EGPRS1900 BAND

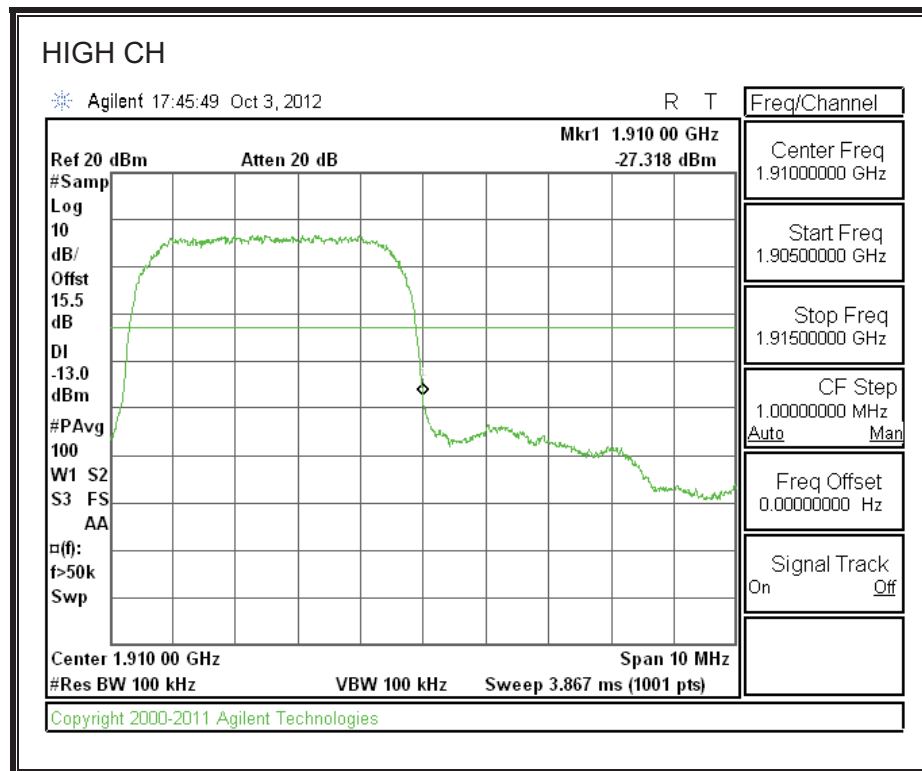
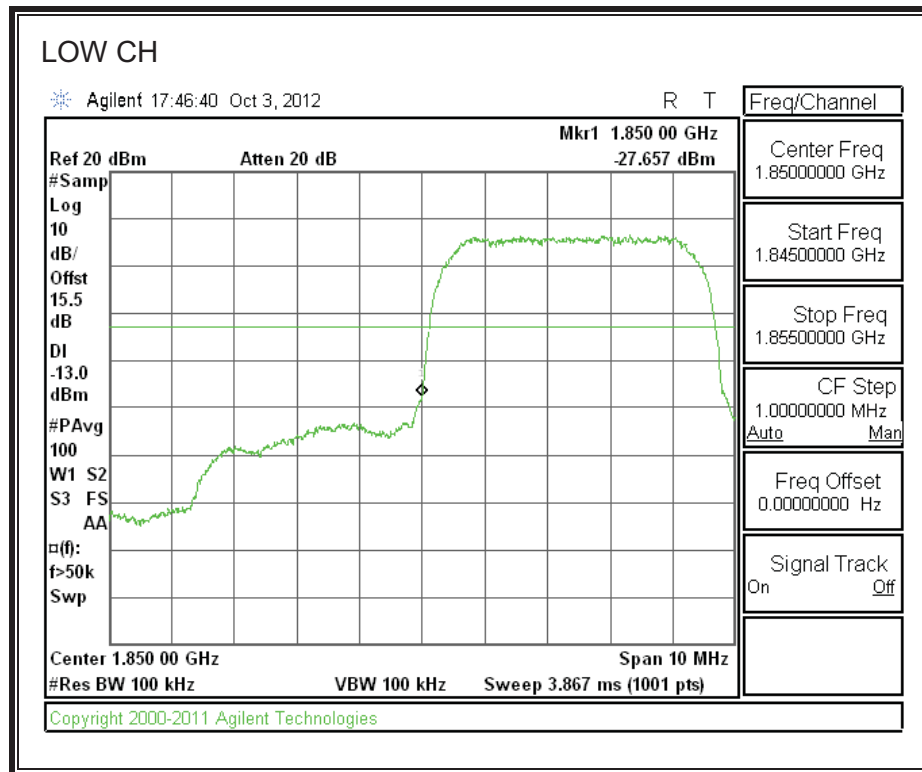
8.2.2. WCDMA

WCDMA850, REL99



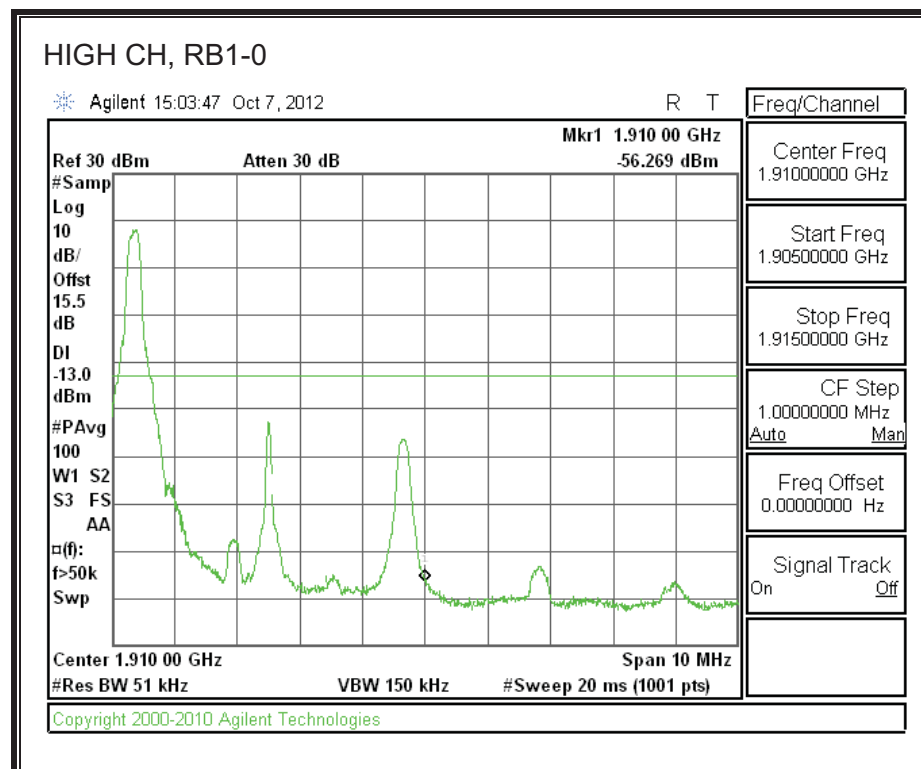
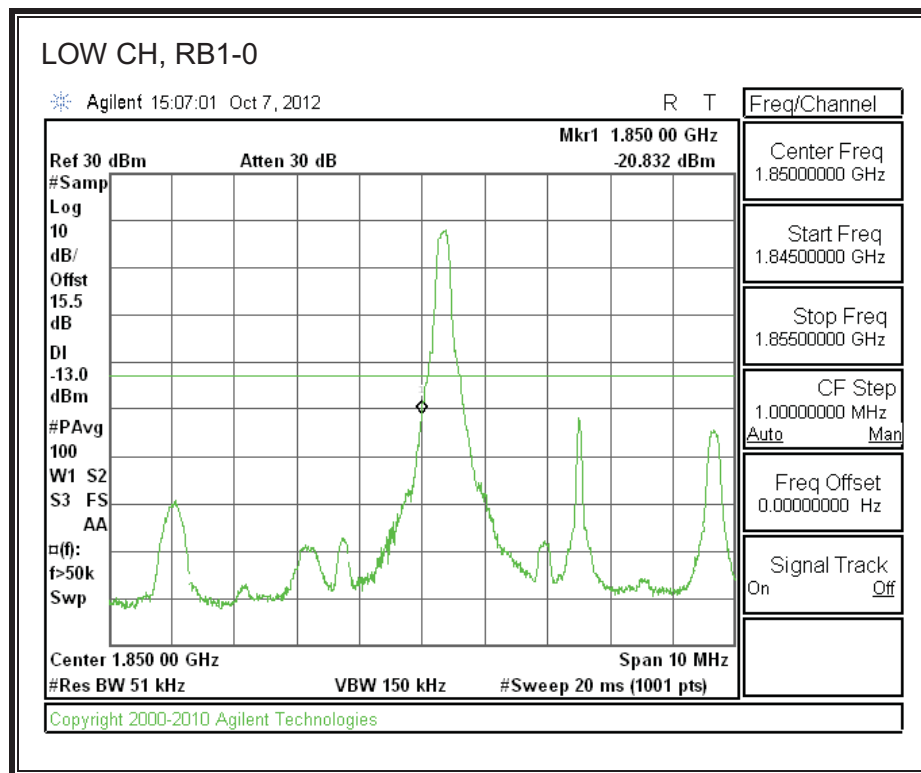
WCDMA850, HSDPA

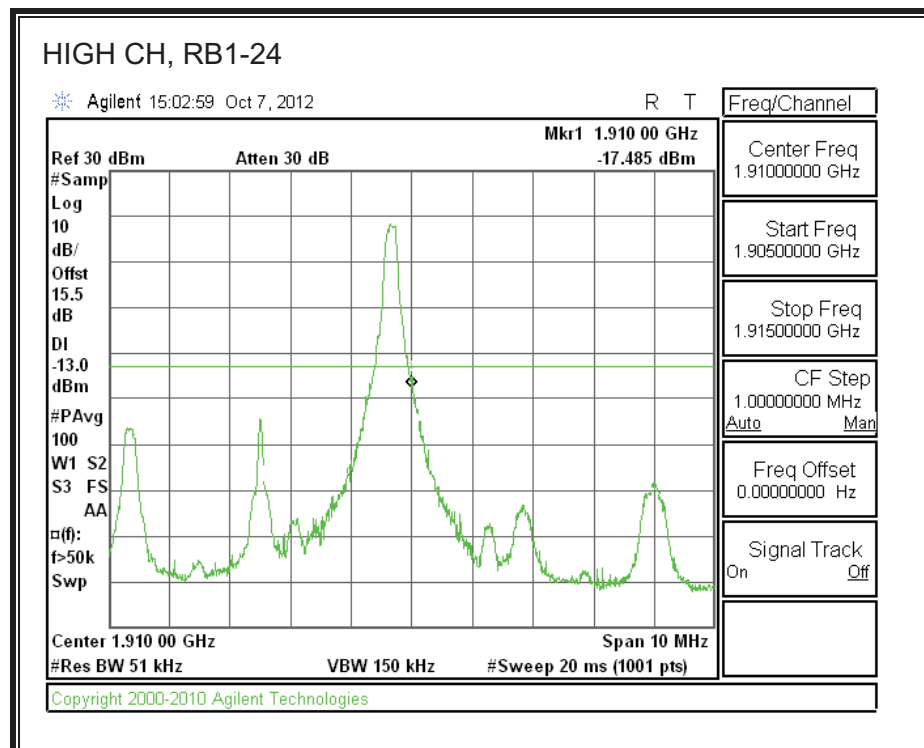
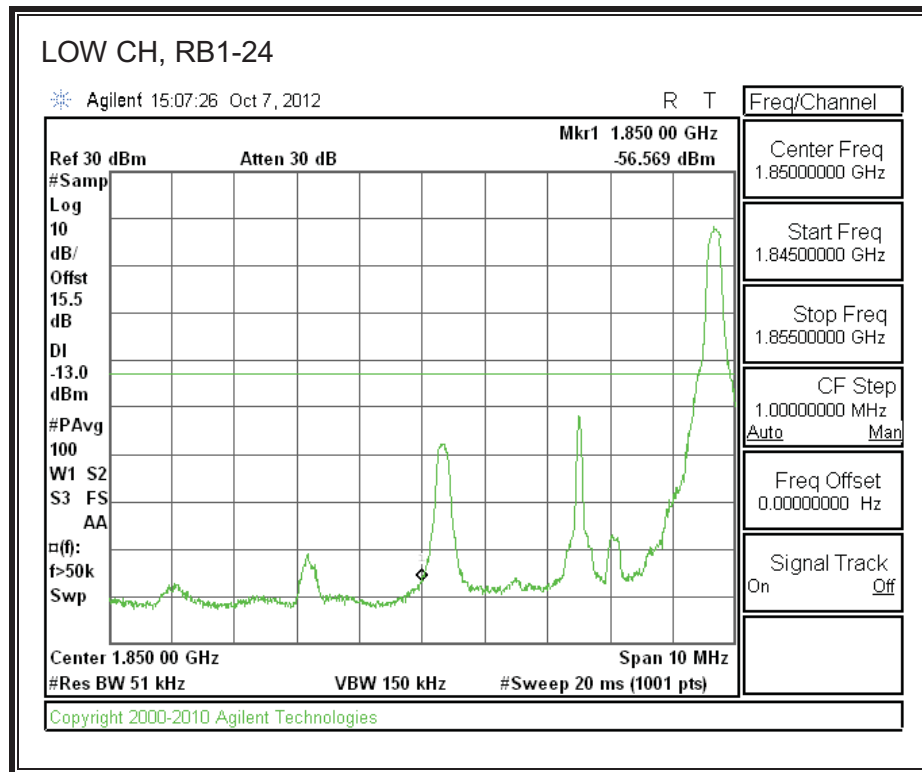
WCDMA1900, REL99

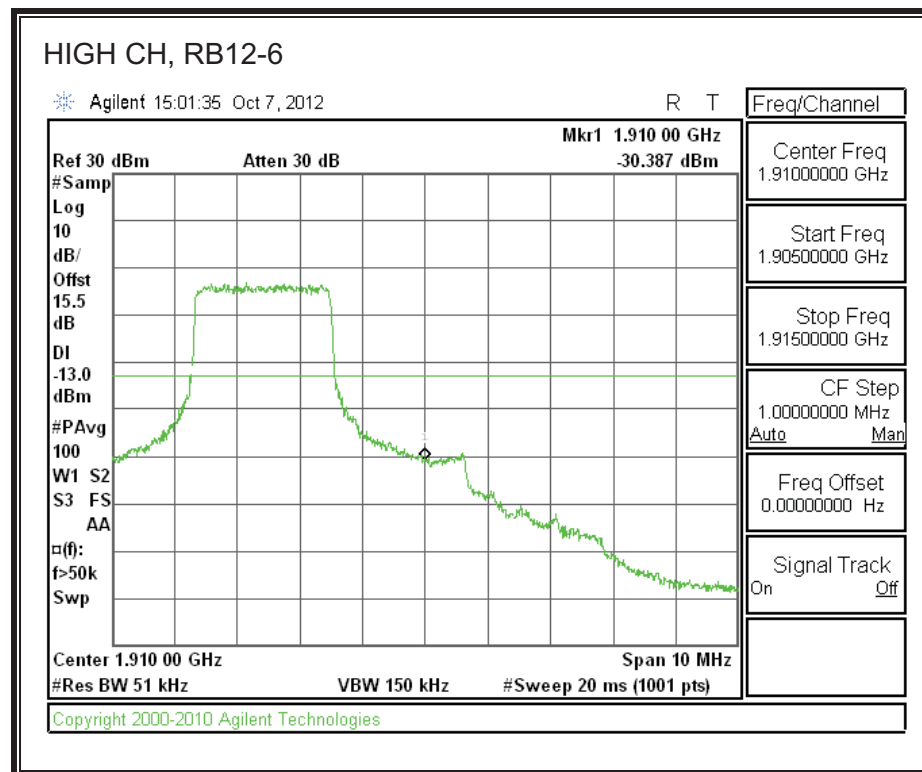
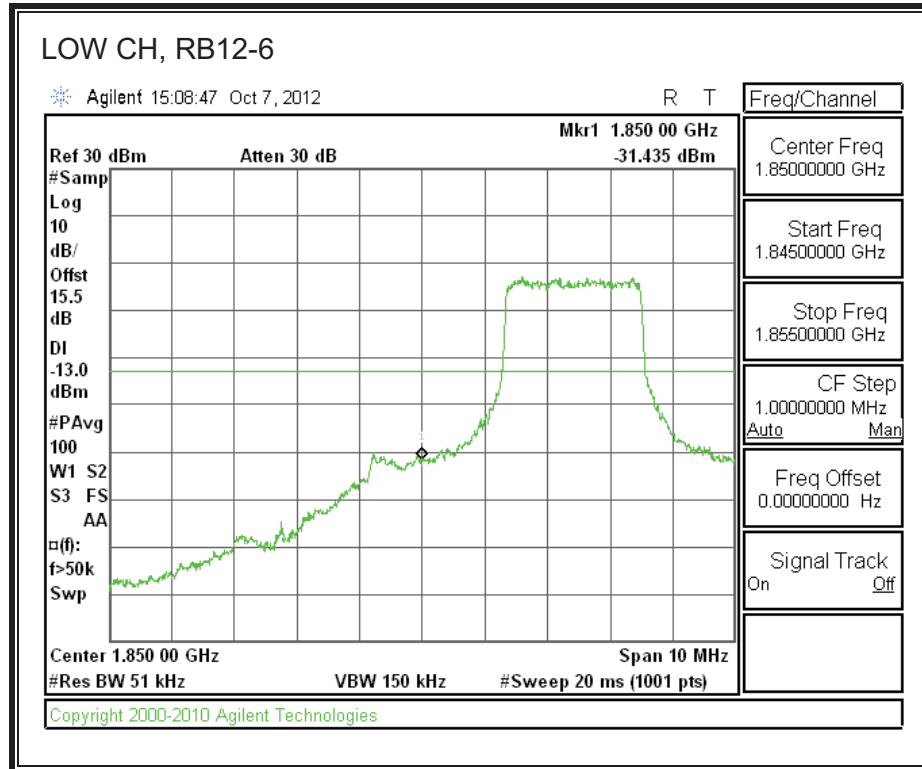
WCDMA1900, HSDPA

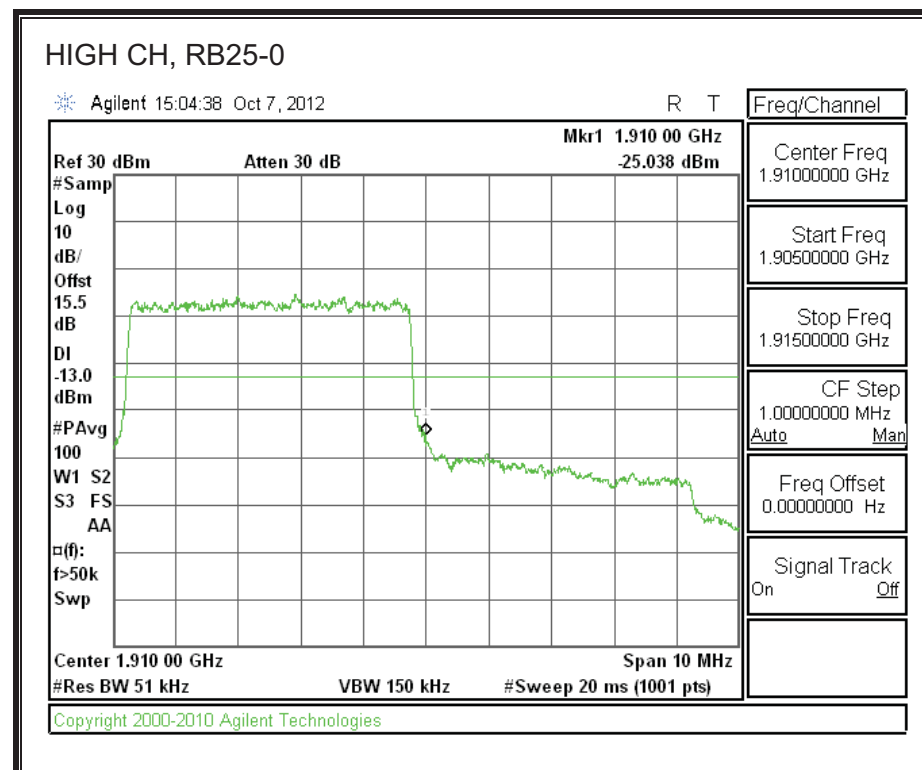
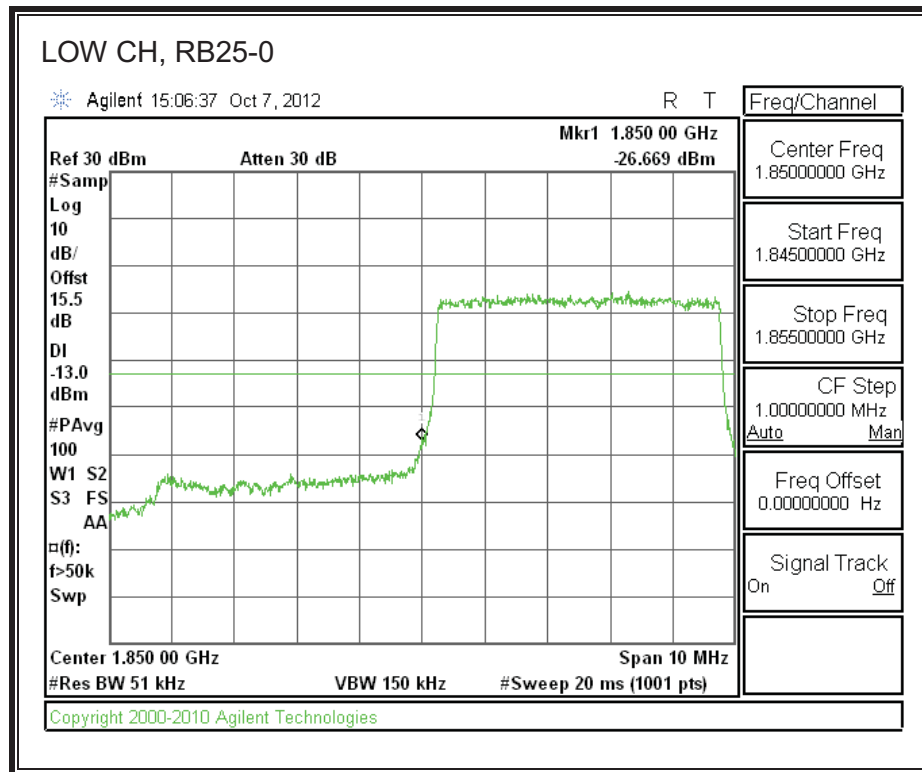
8.2.3. LTE BAND 2

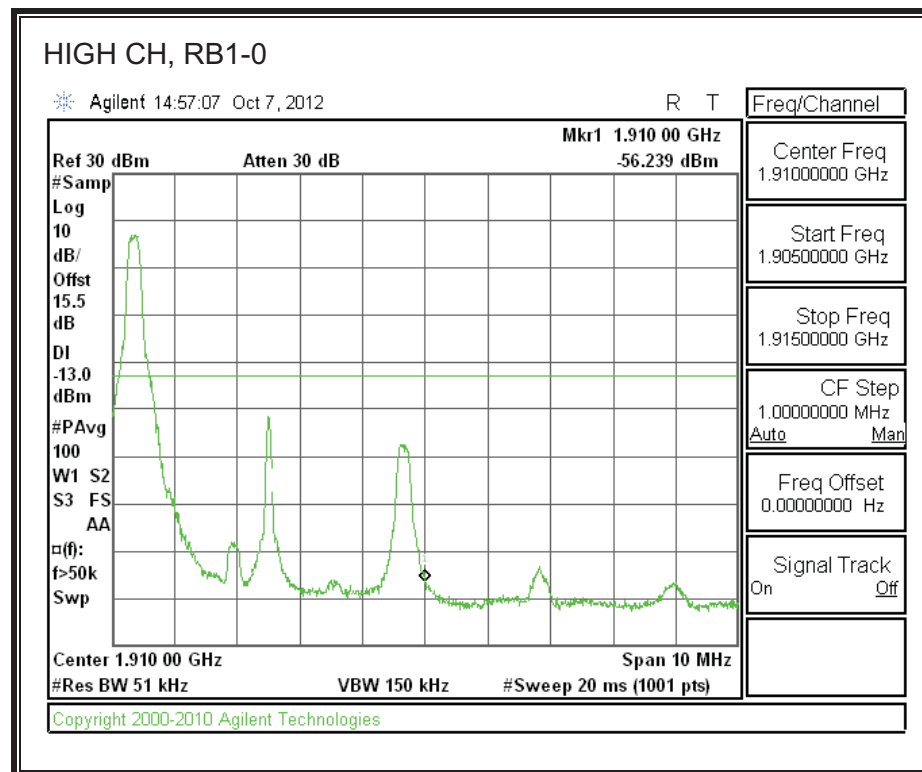
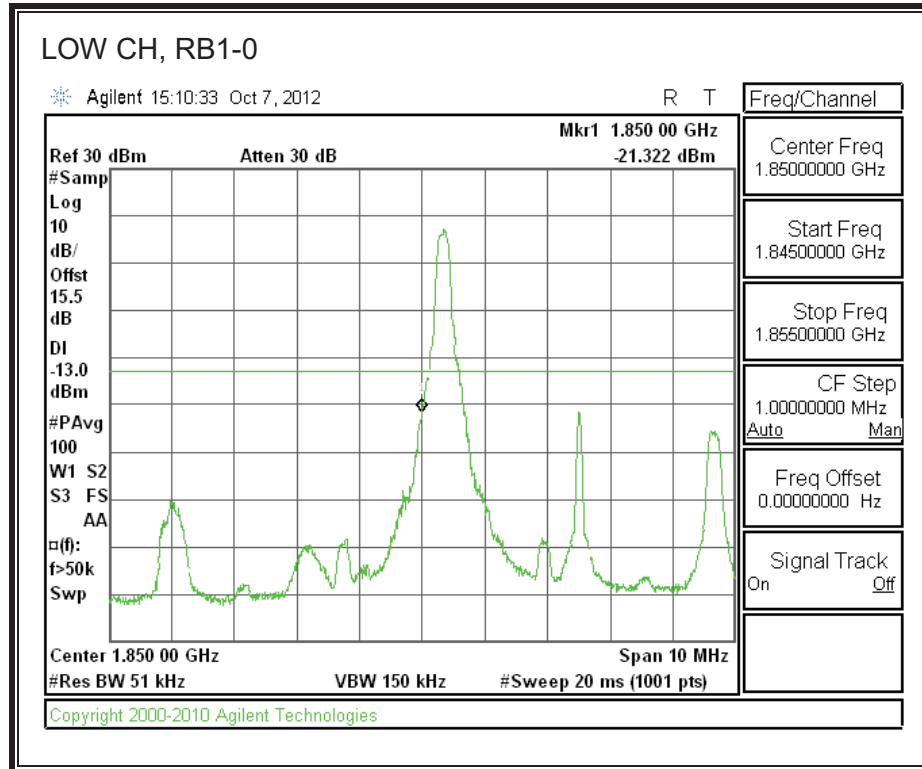
LTE QPSK Band 2 (5 MHz BANDWIDTH)

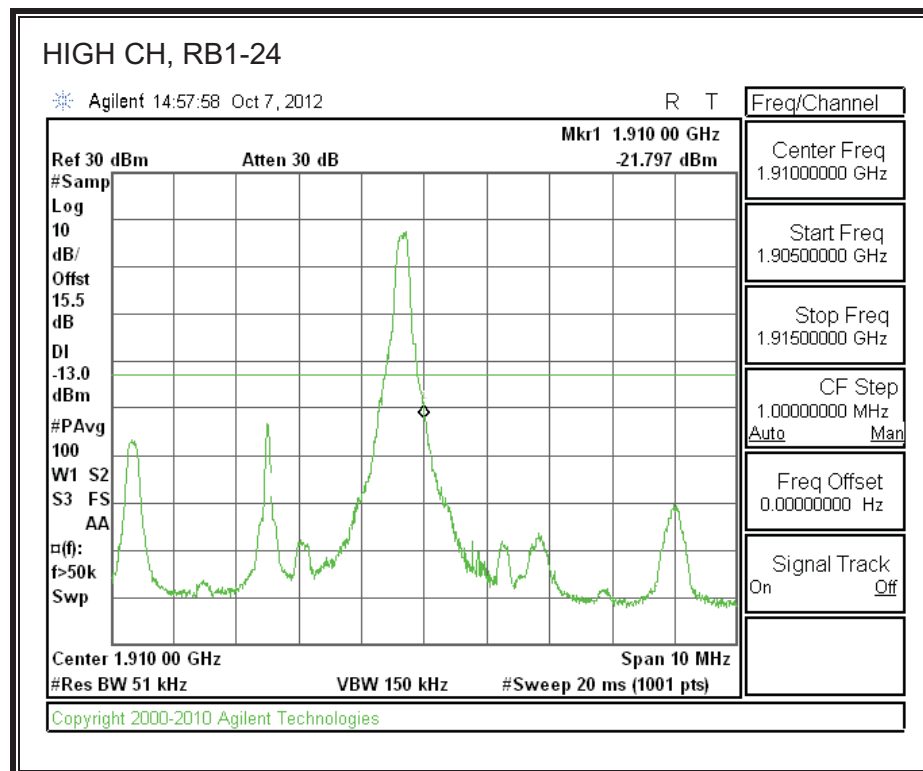
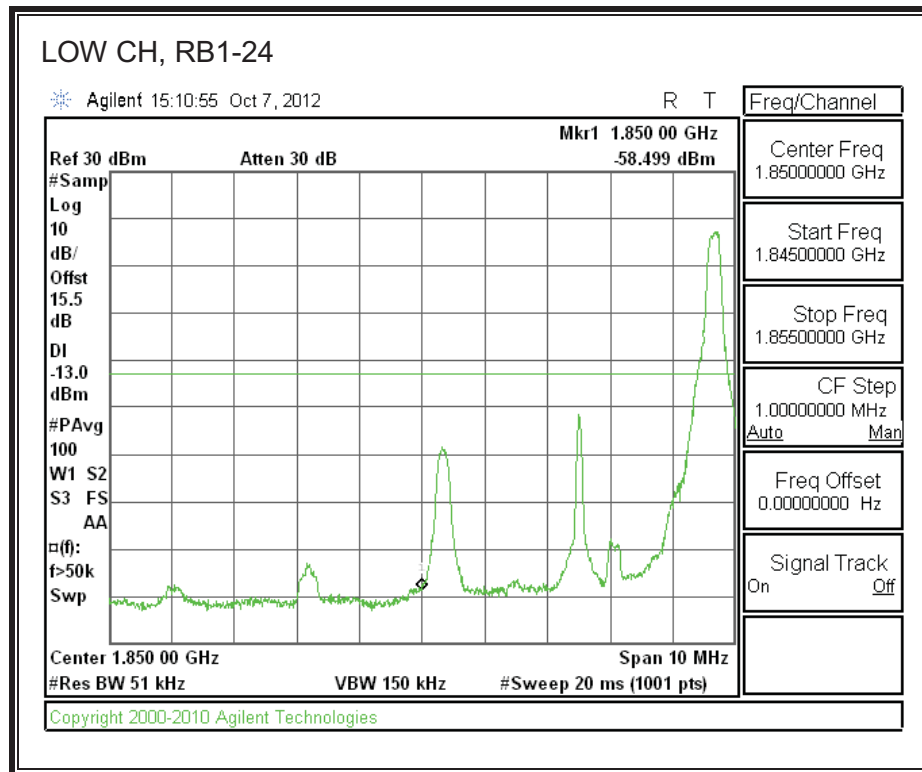


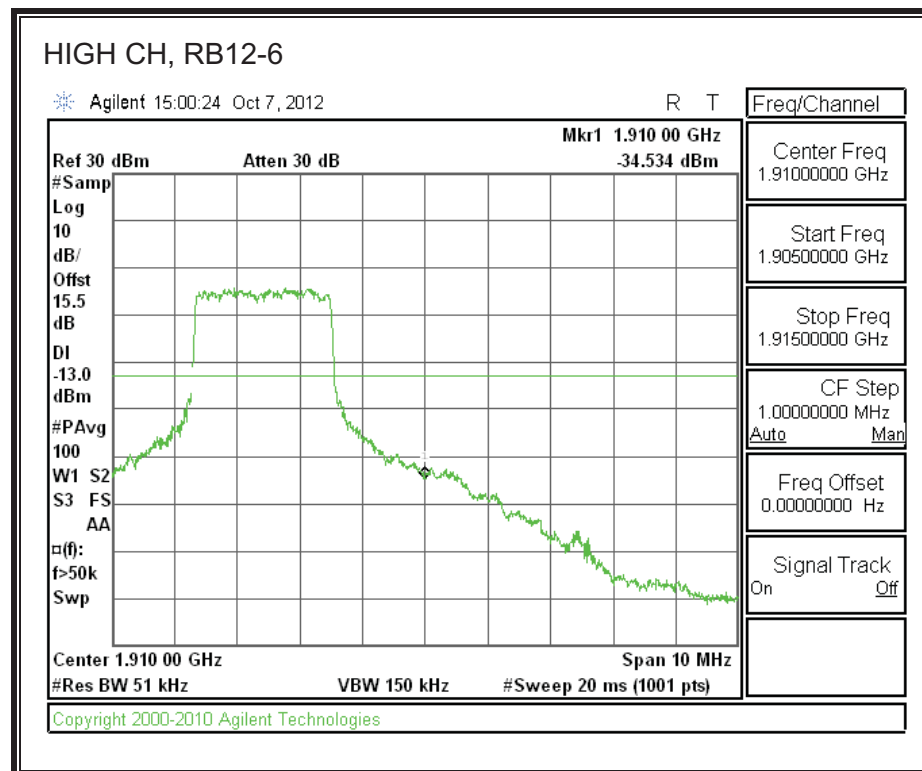
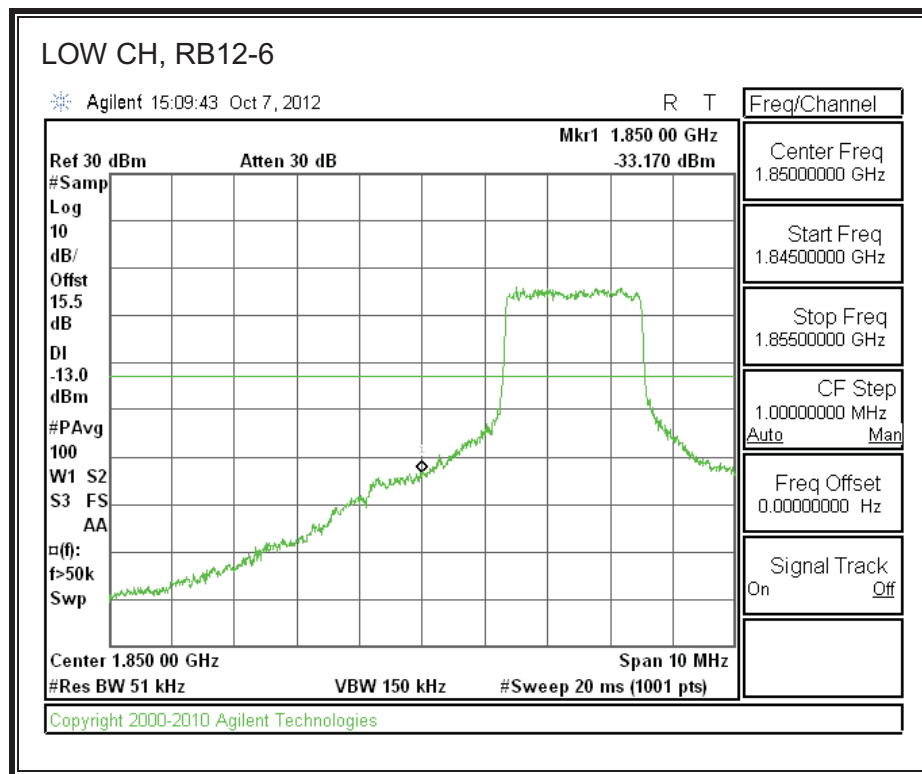


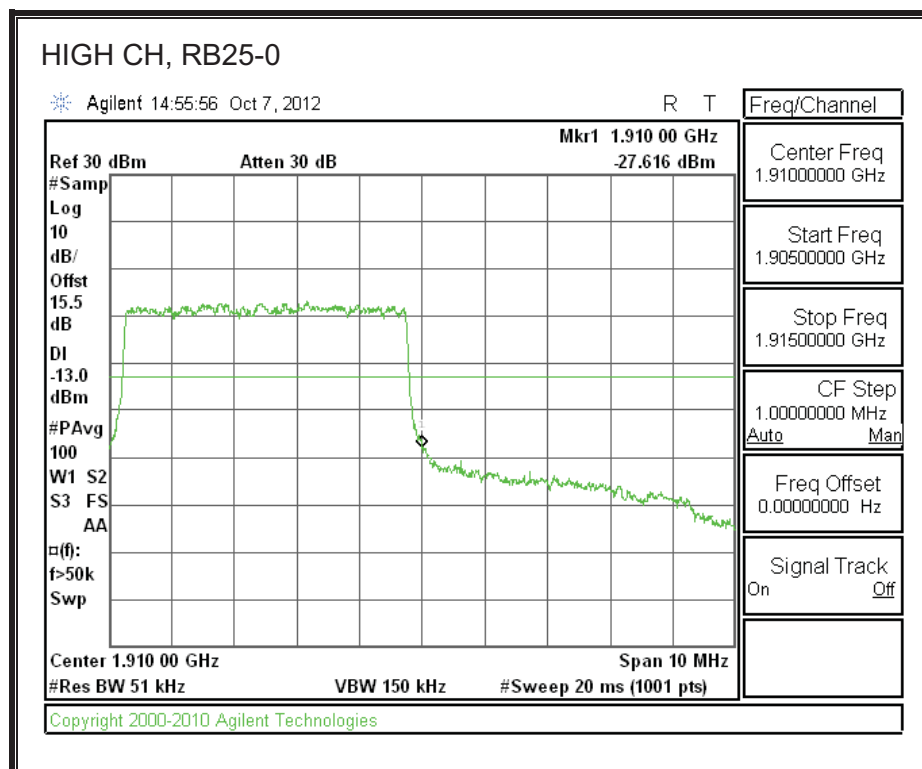
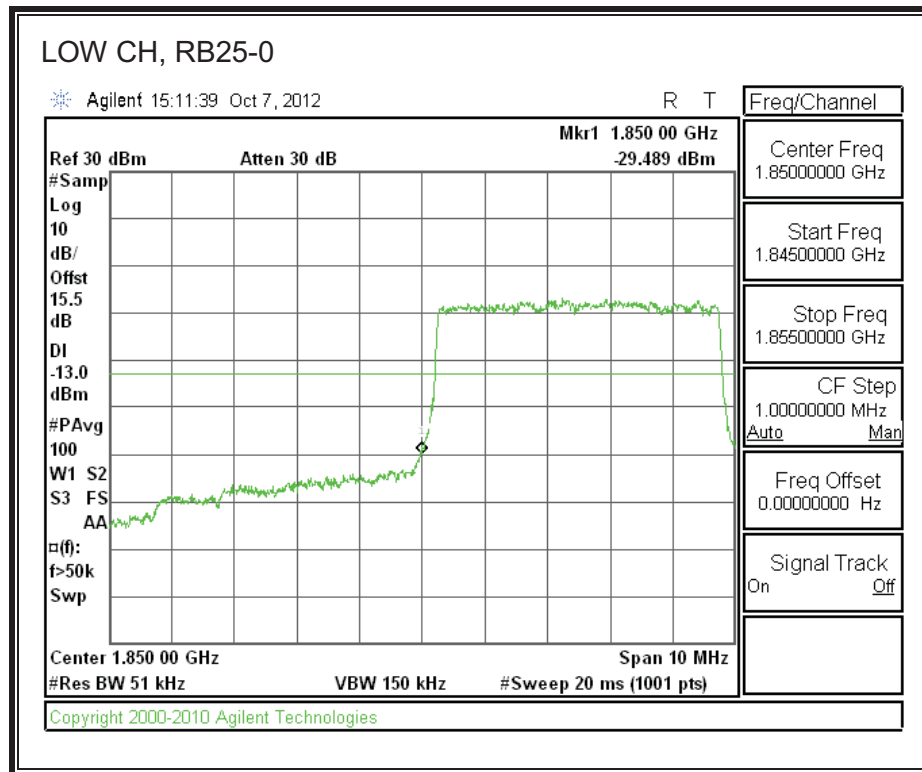


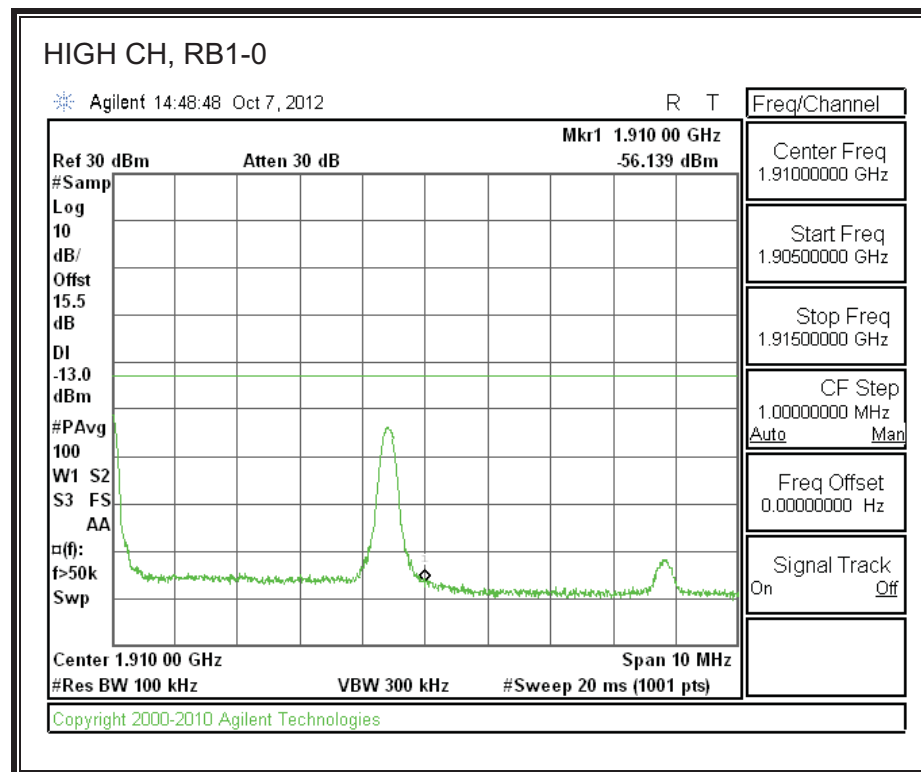
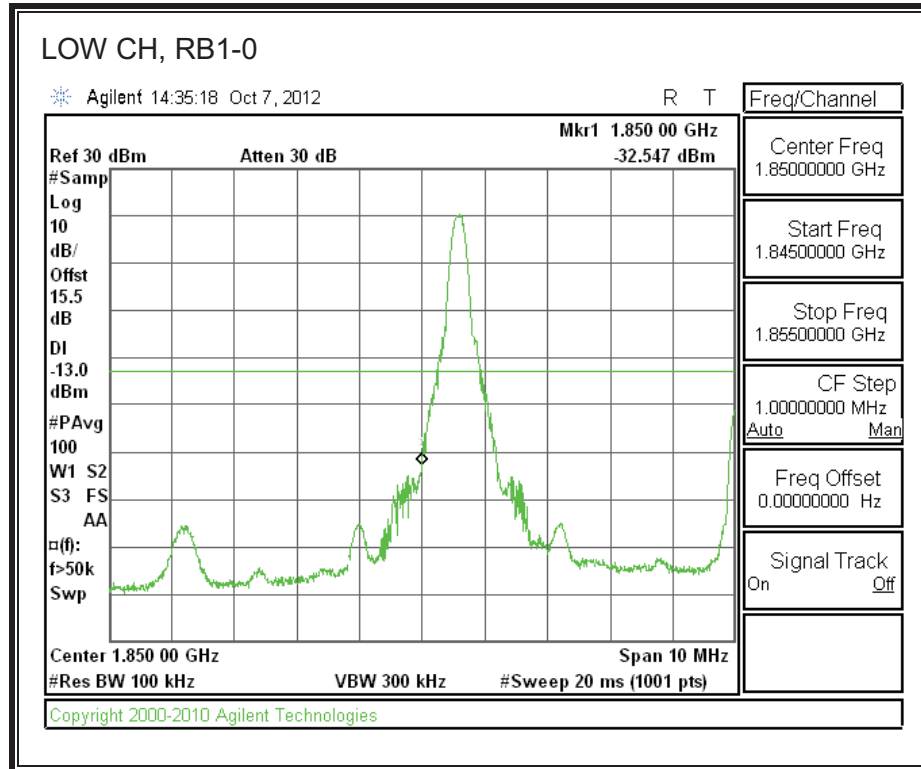


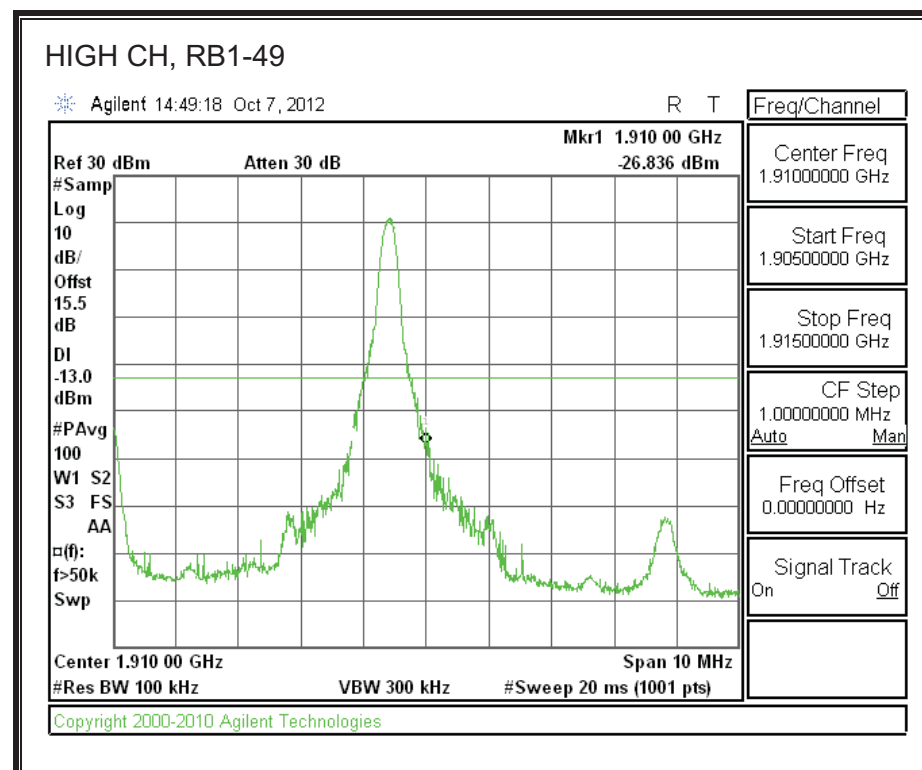
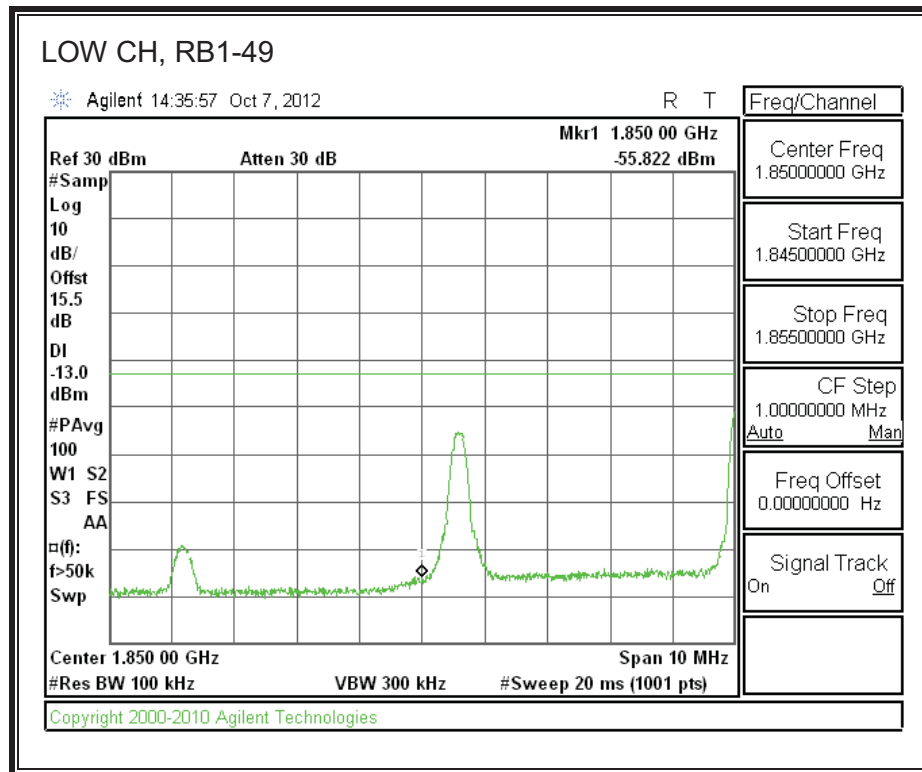
LTE 16QAM Band 2 (5 MHz BANDWIDTH)

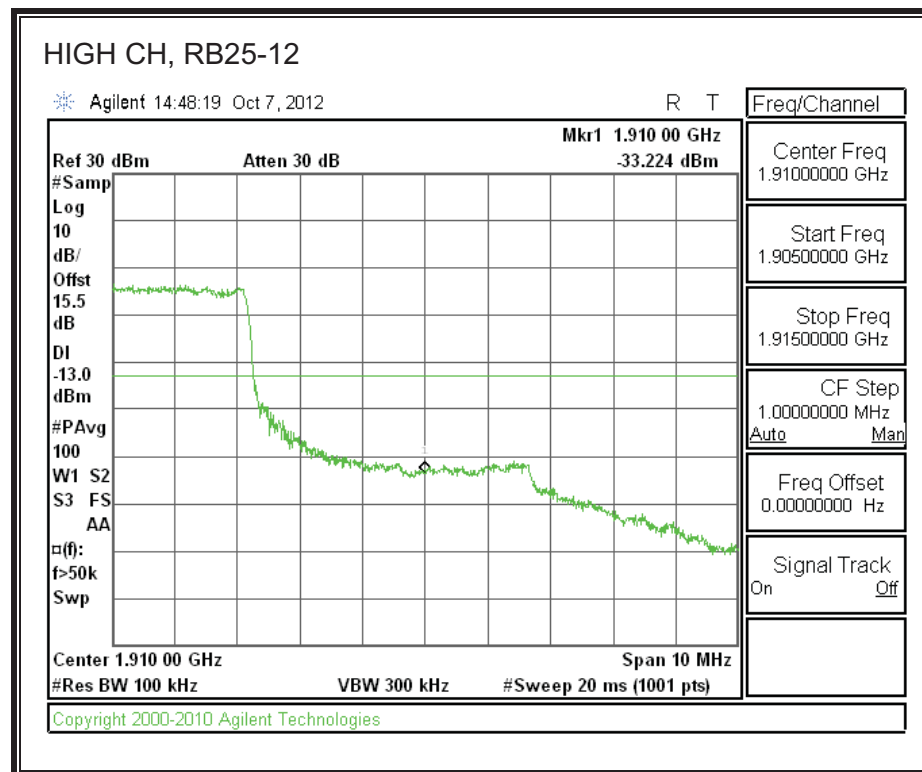
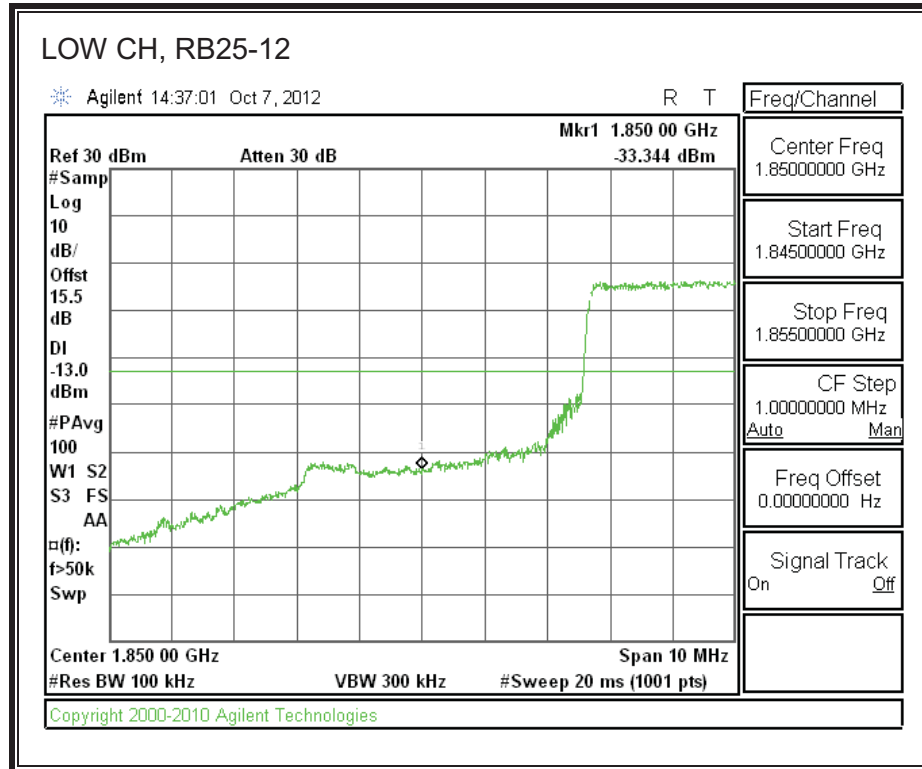


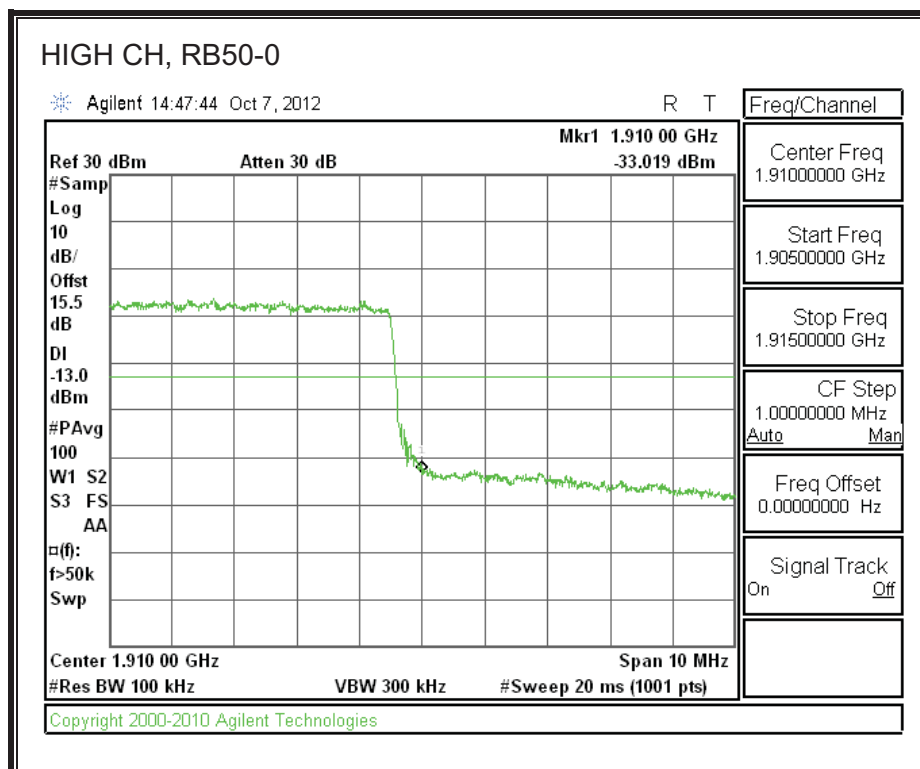
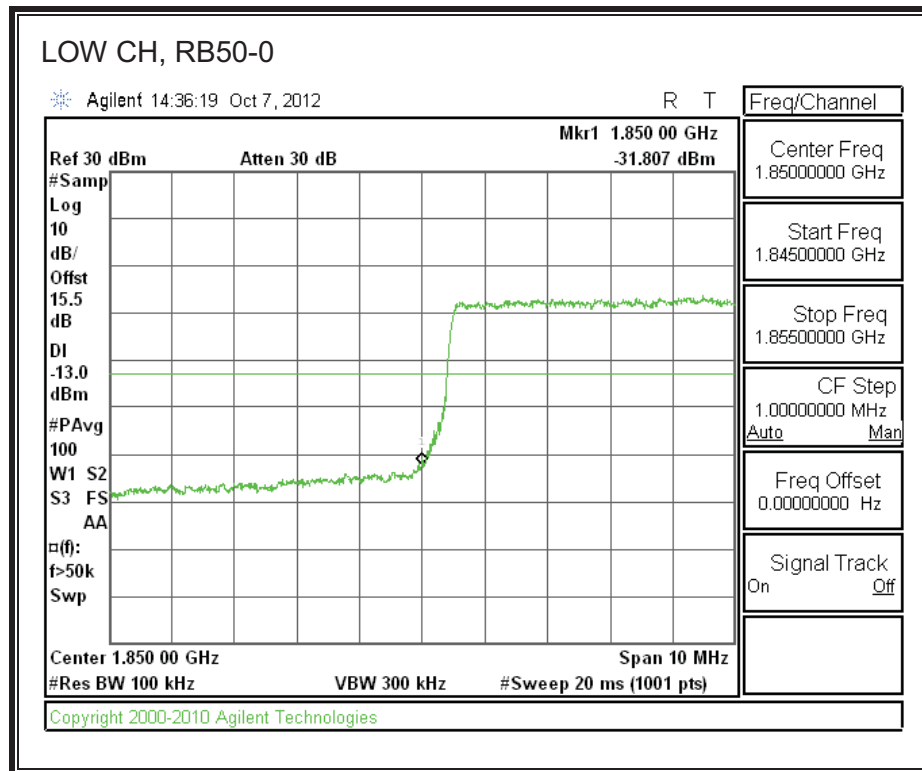


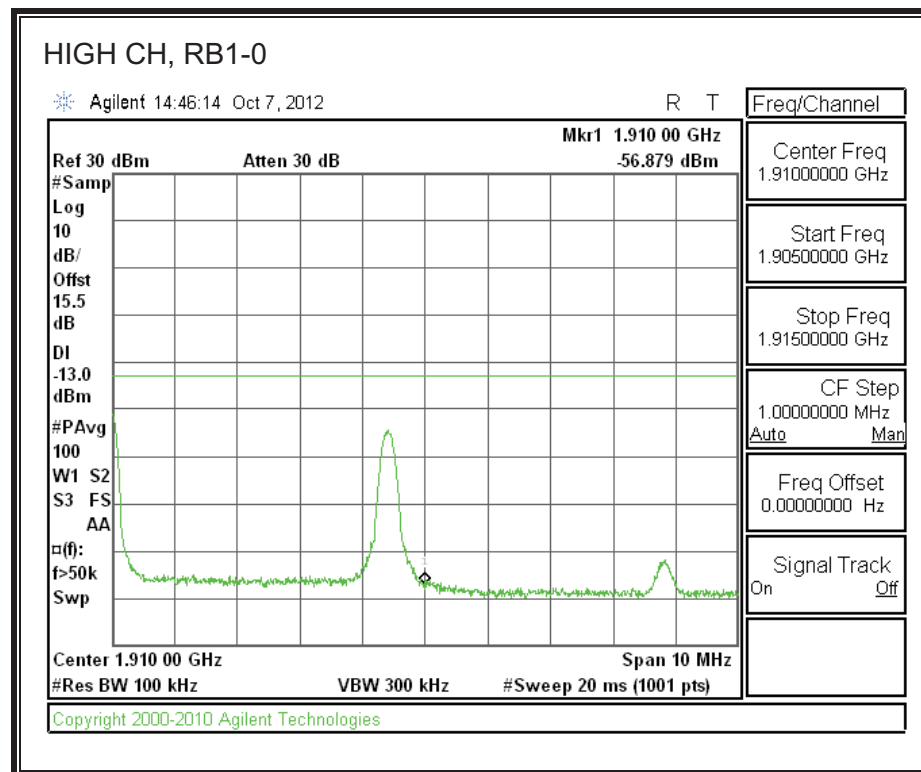
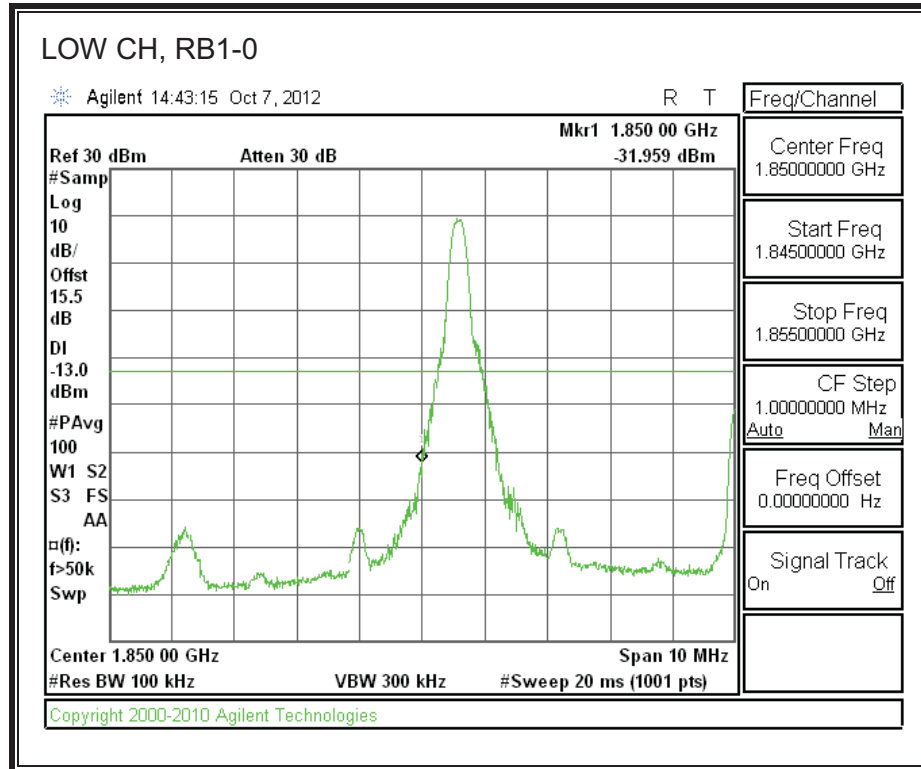


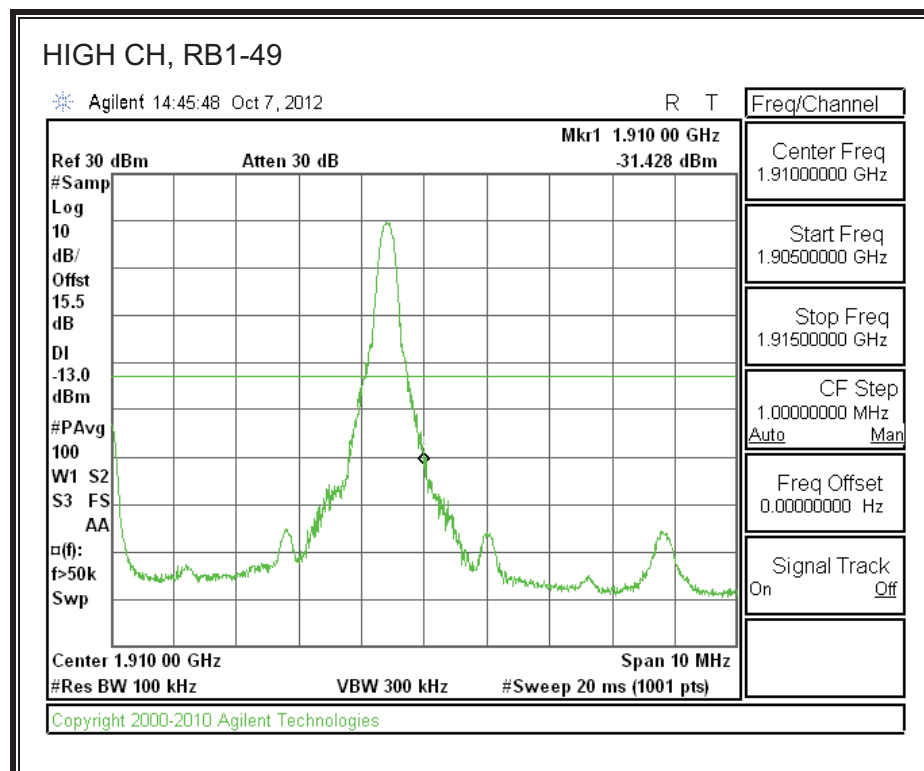
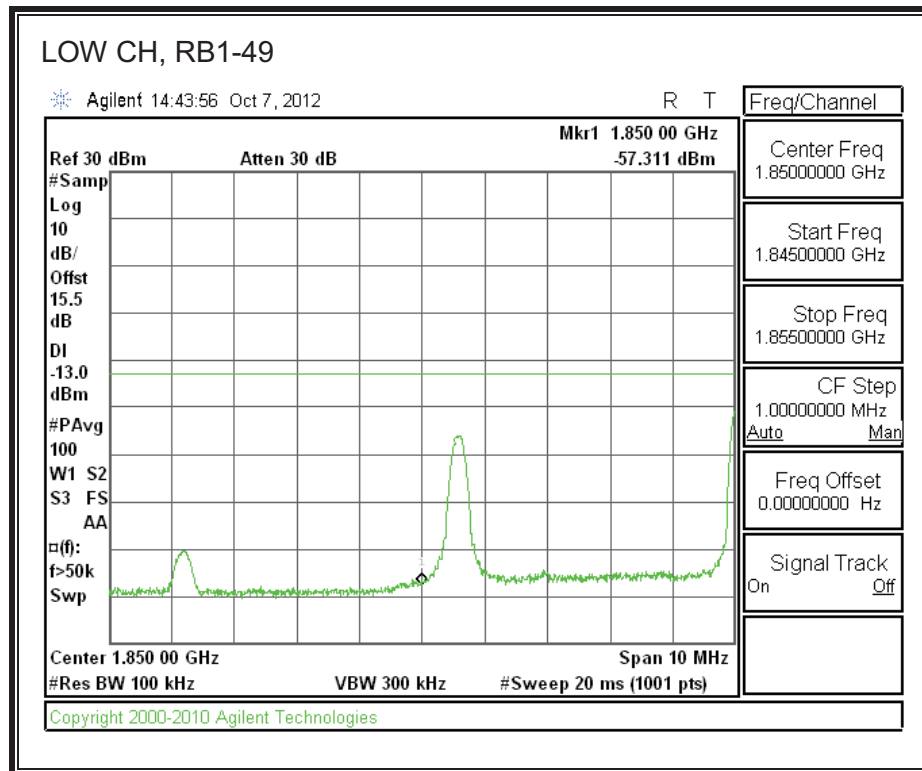
LTE QPSK Band 2 (10 MHz BANDWIDTH)

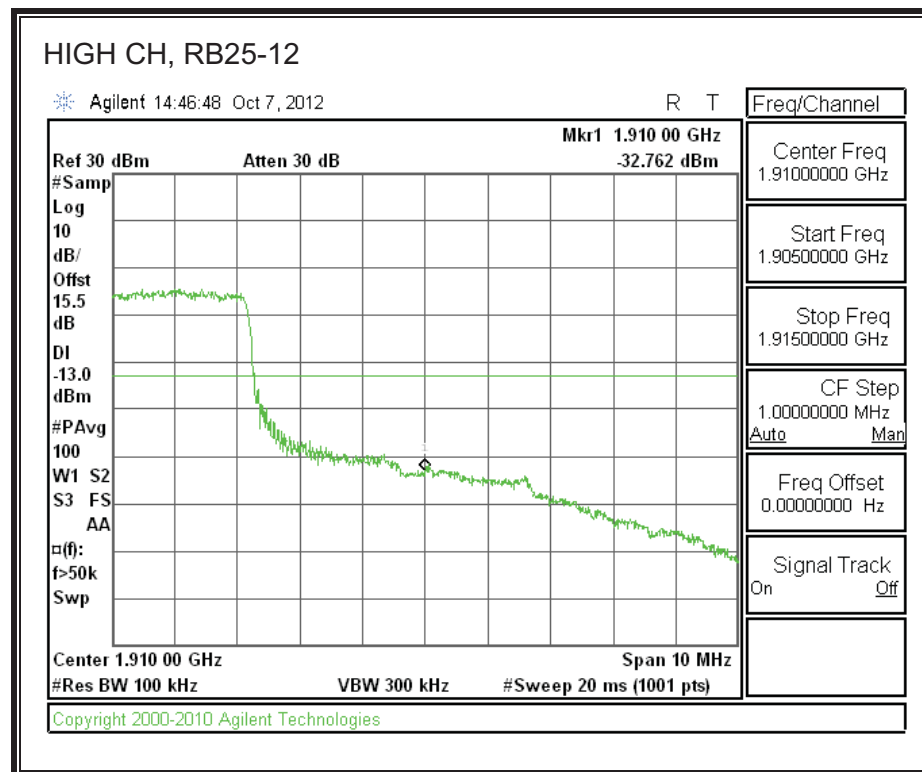
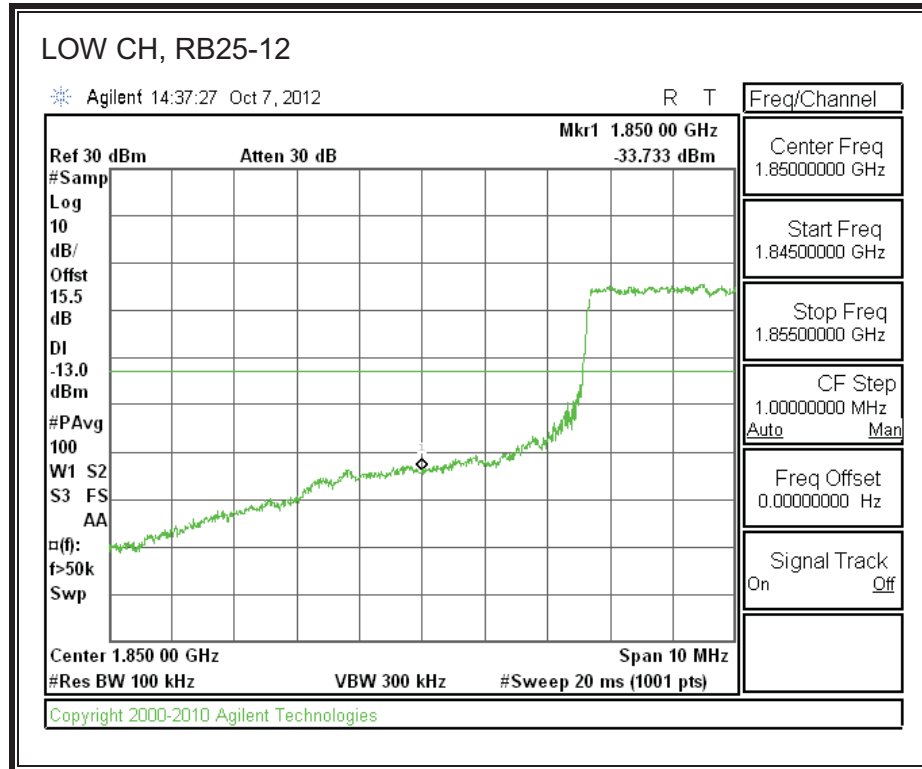


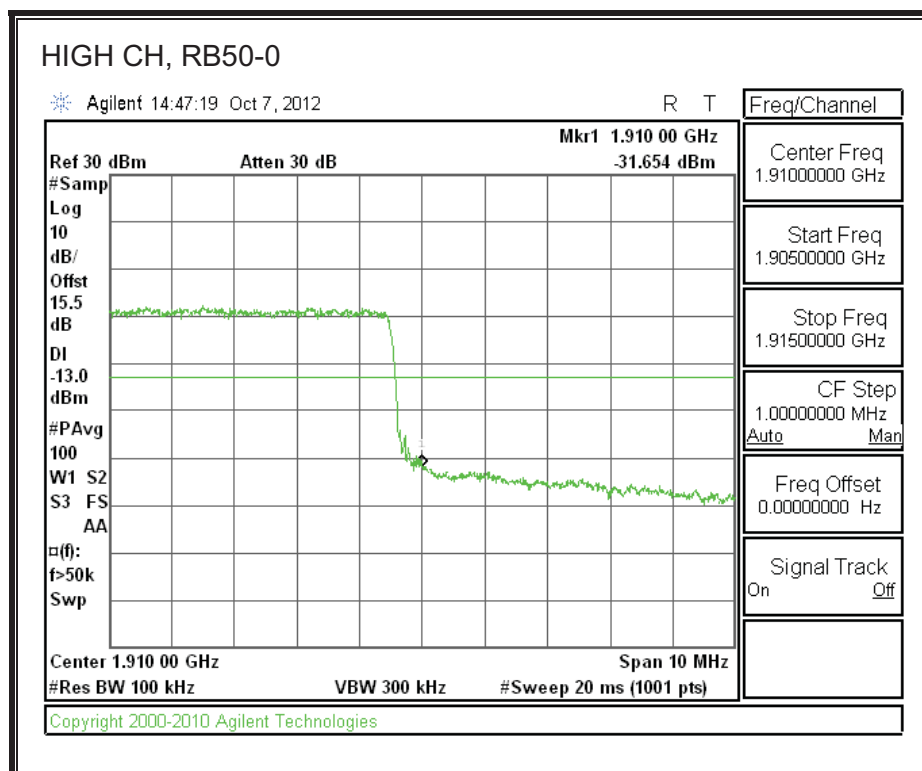
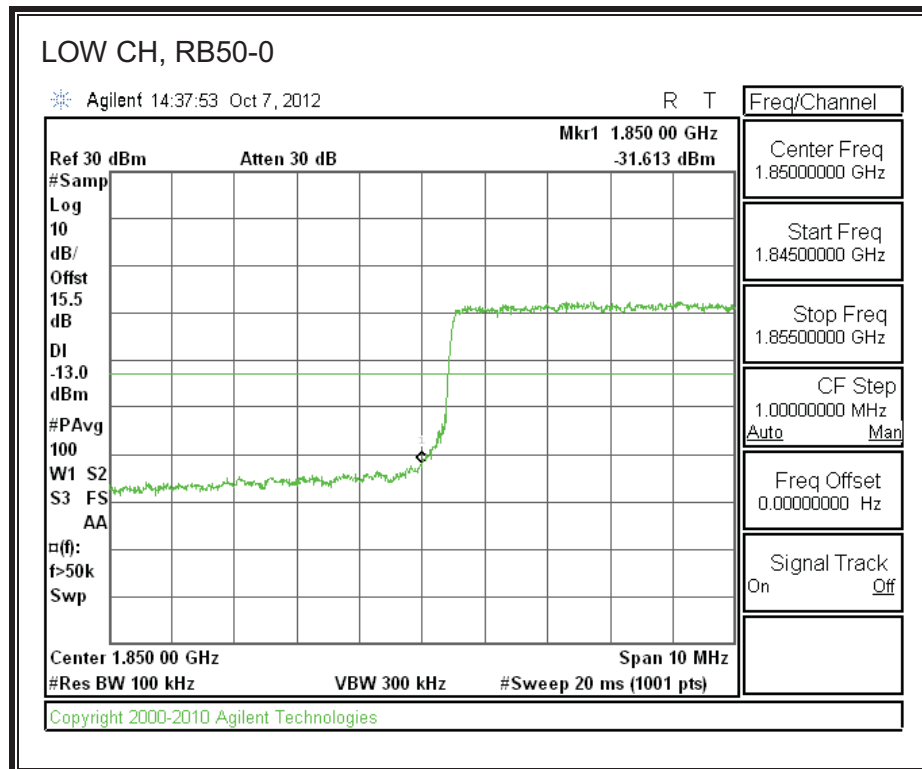




LTE 16QAM Band 2 (10 MHz BANDWIDTH)

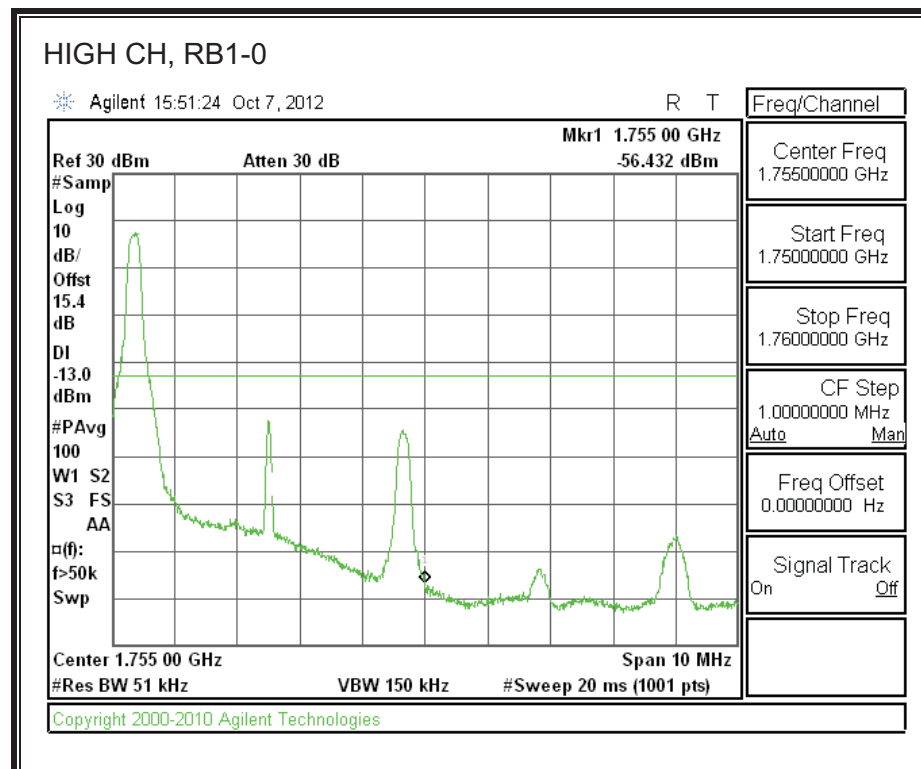
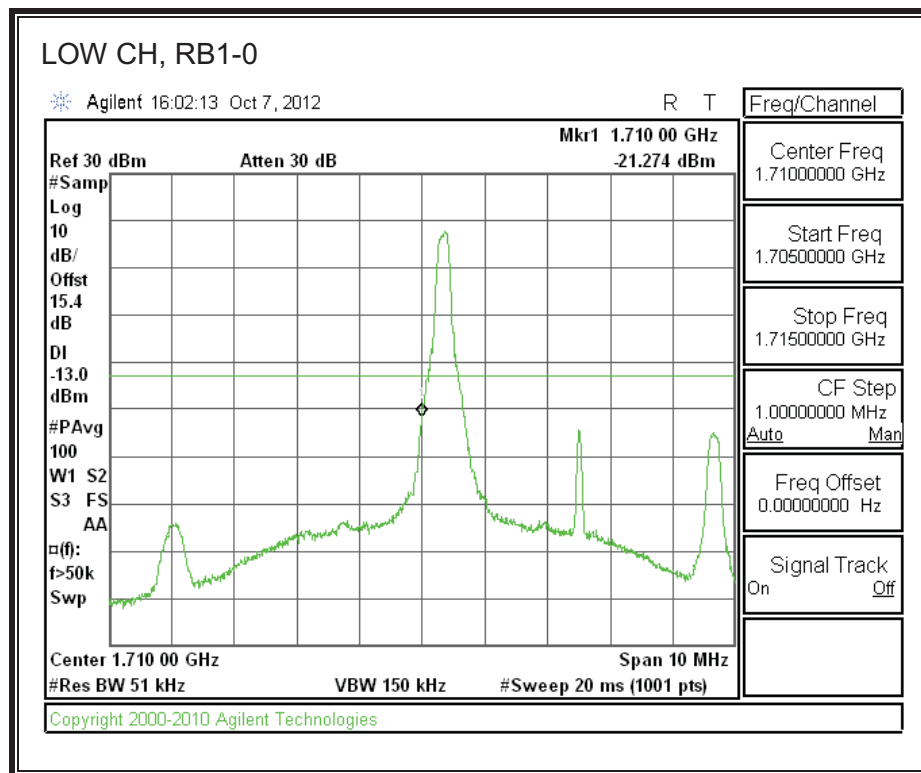


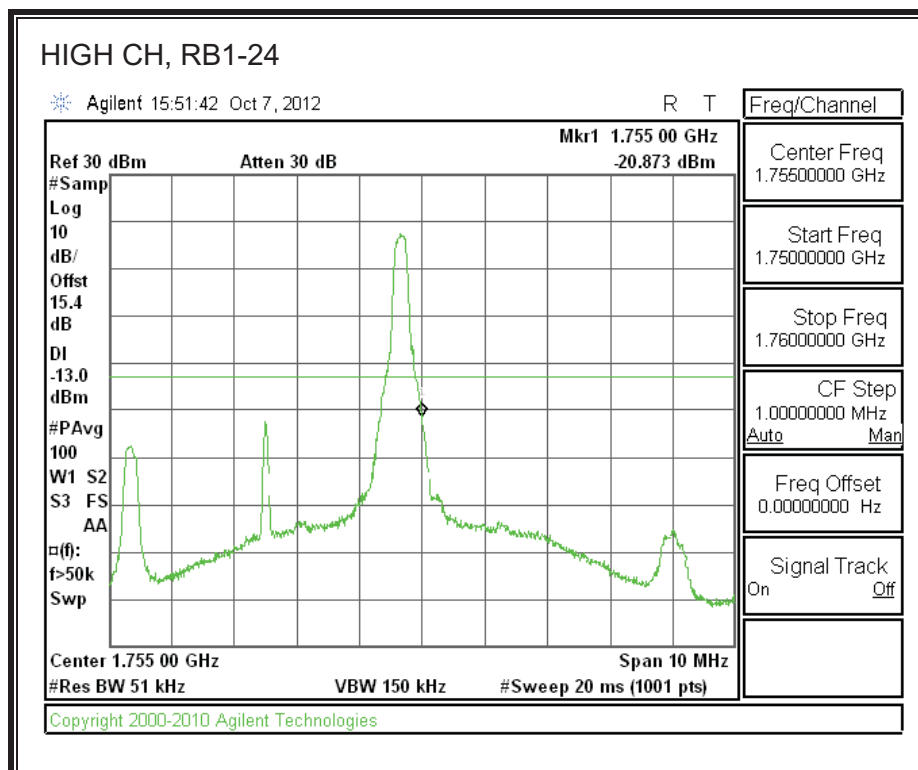
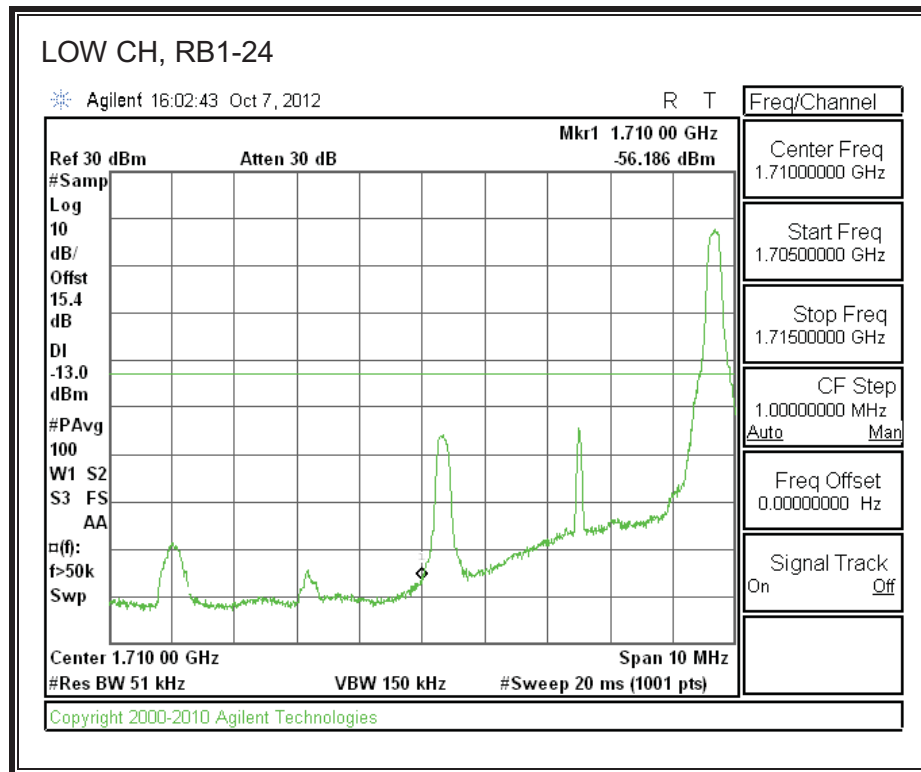


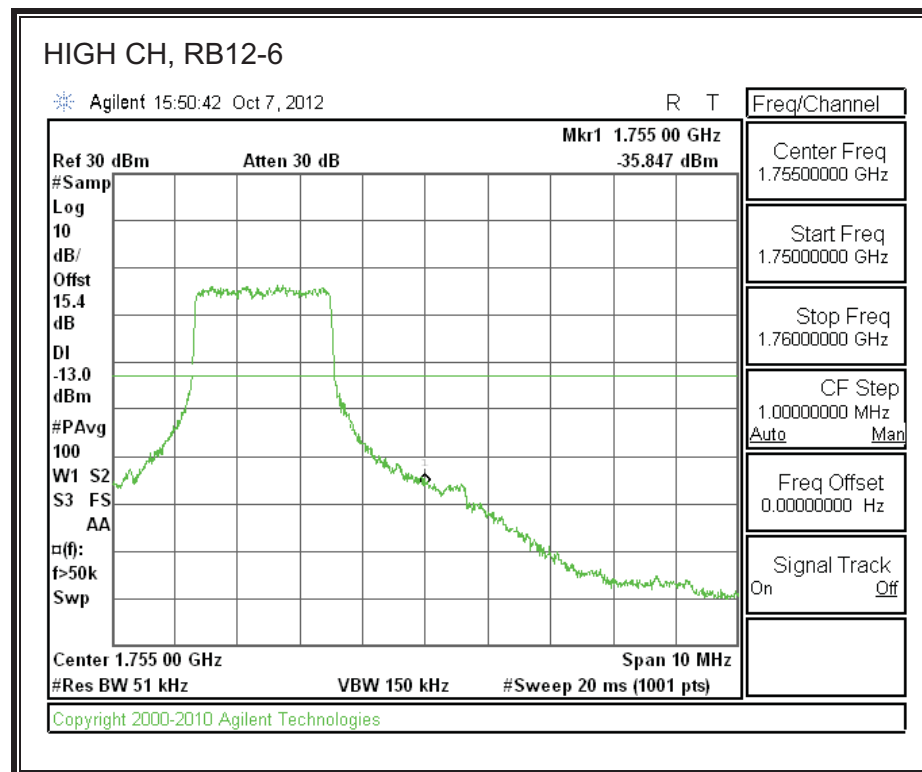
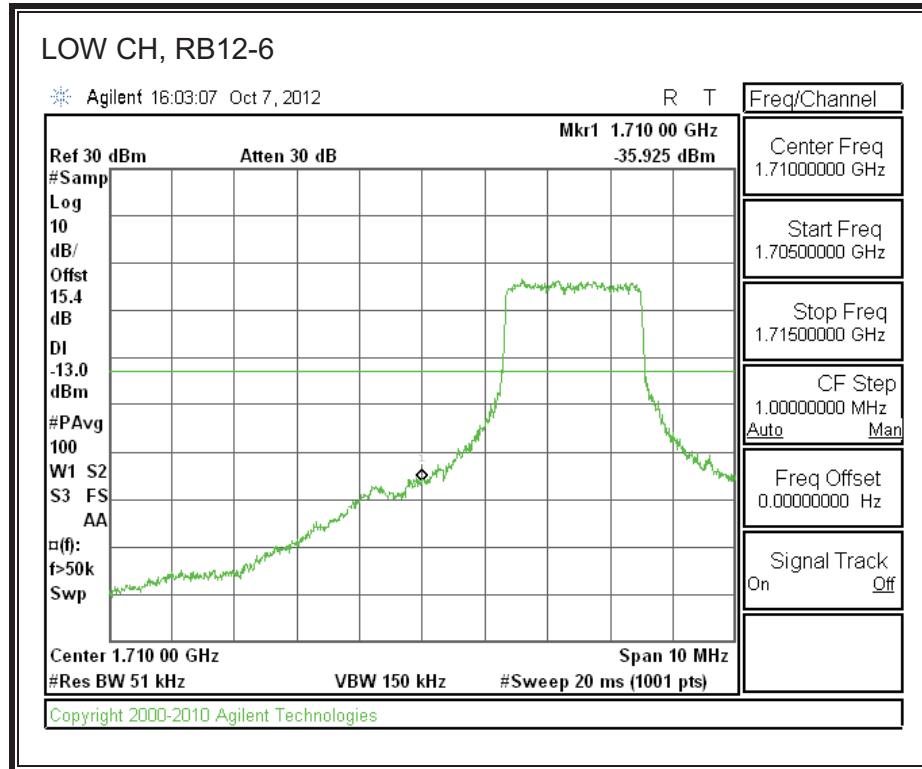


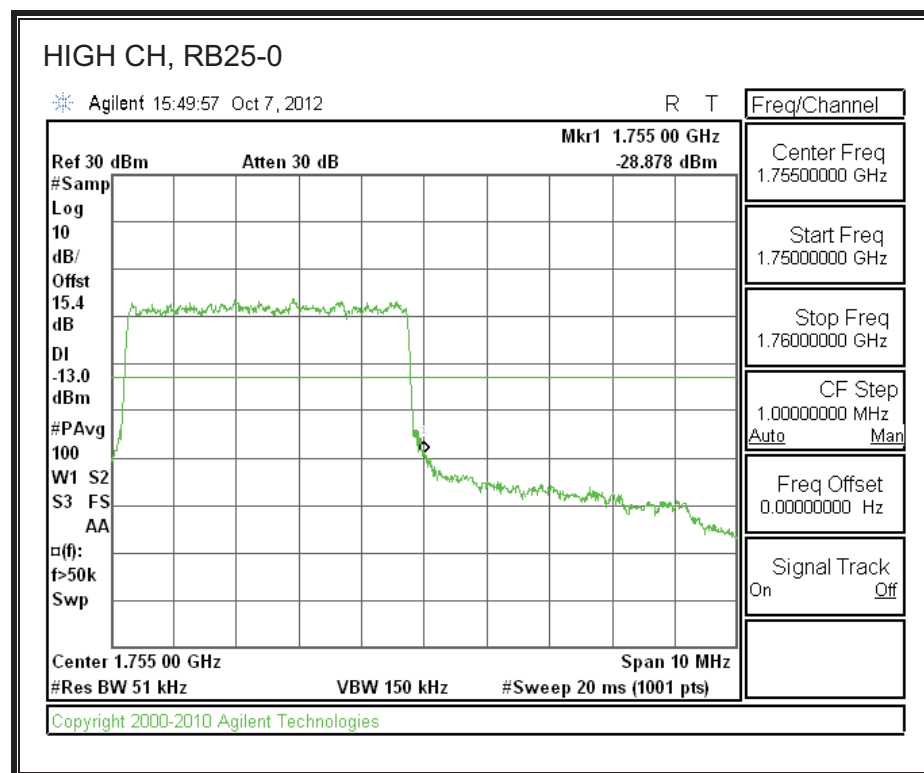
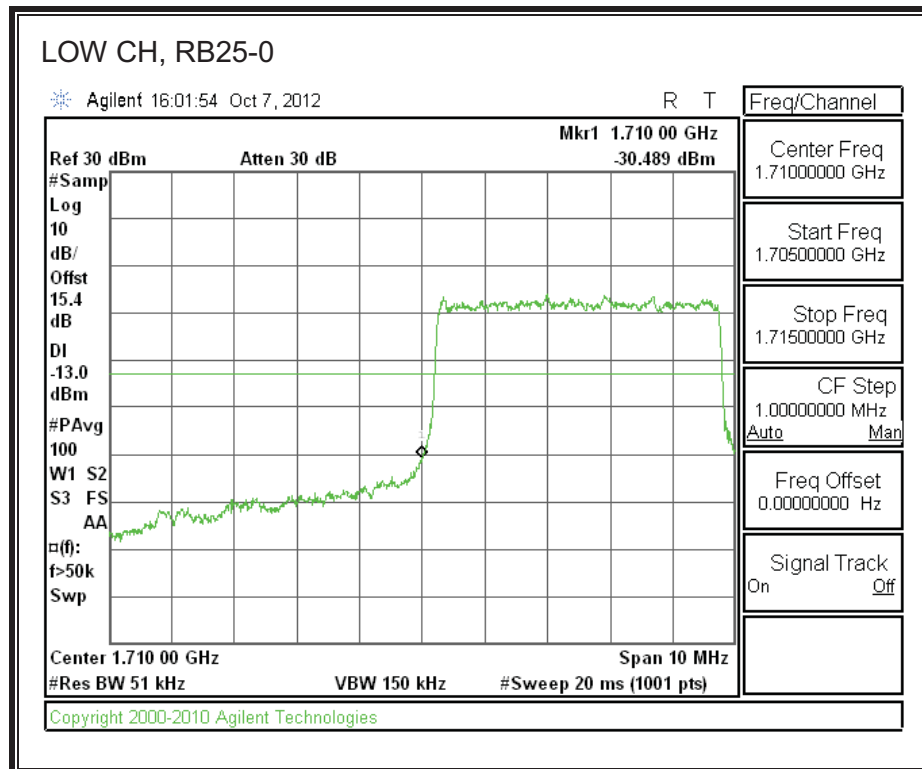
8.2.4. LTE BAND 4

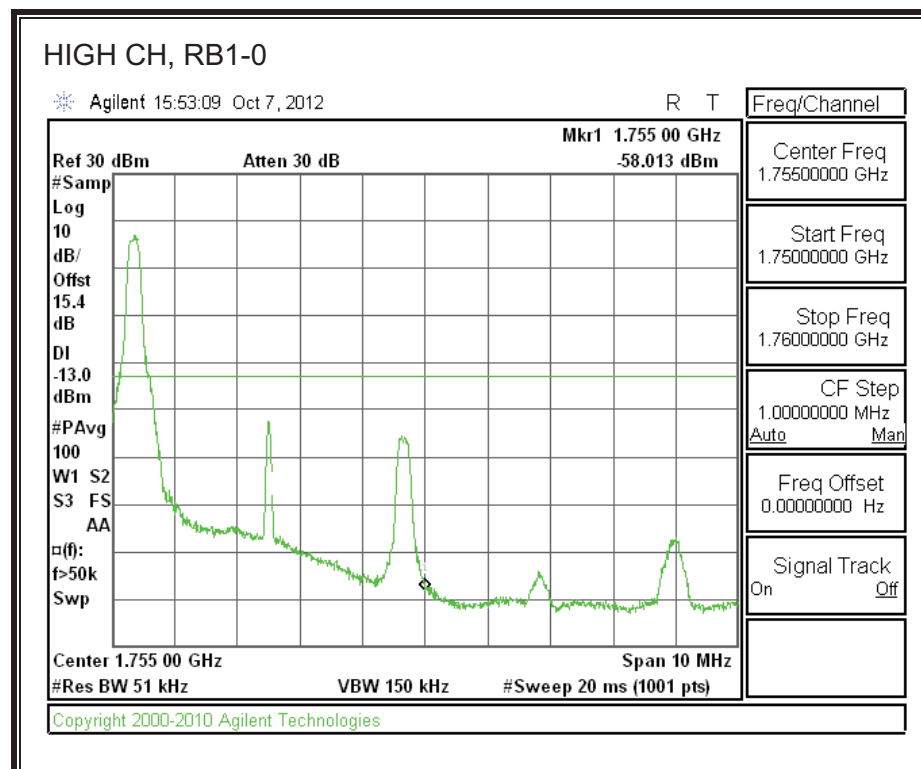
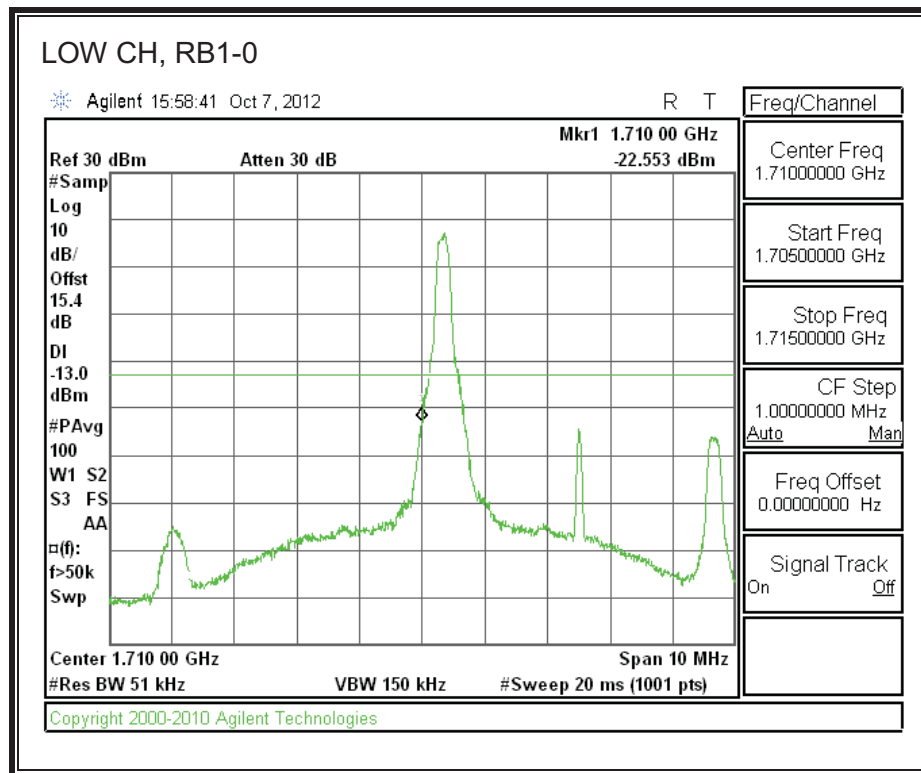
LTE QPSK Band 4 (5 MHz BANDWIDTH)

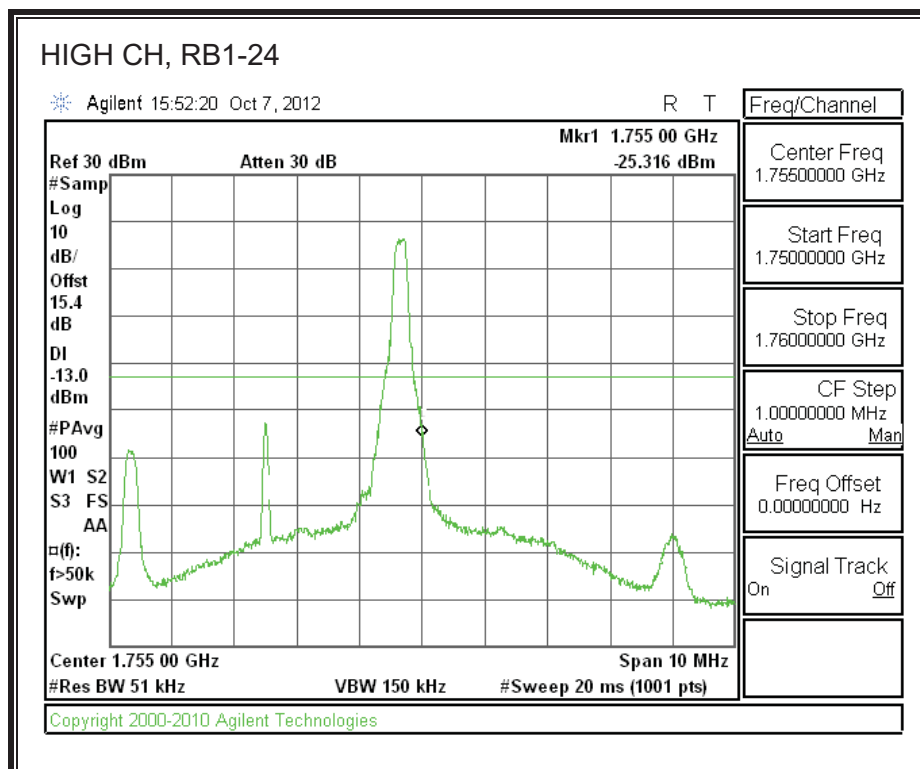
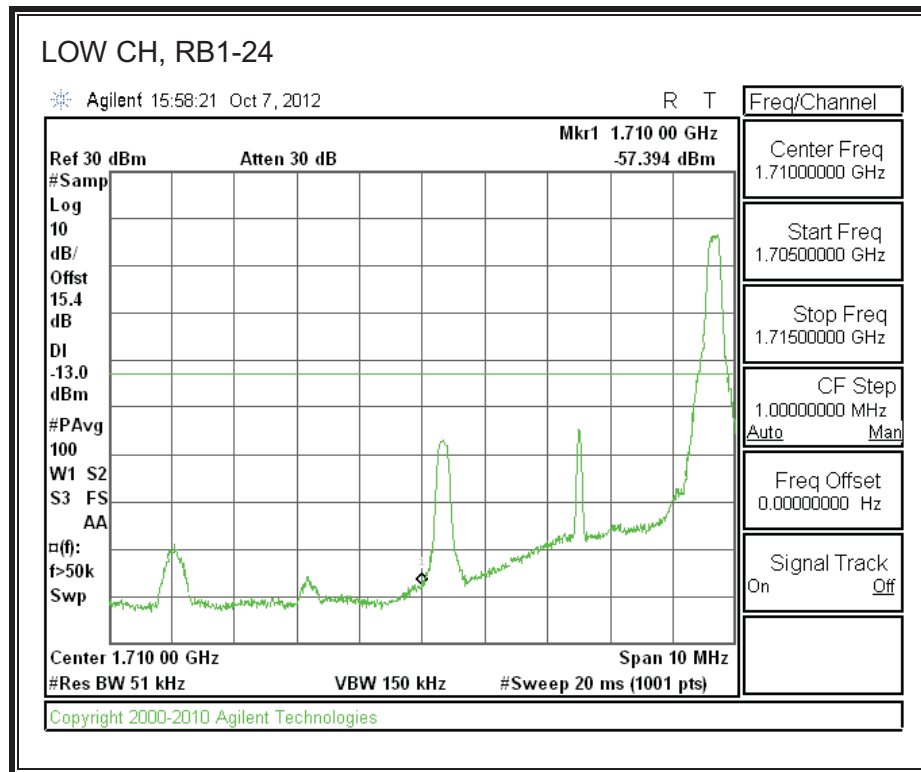


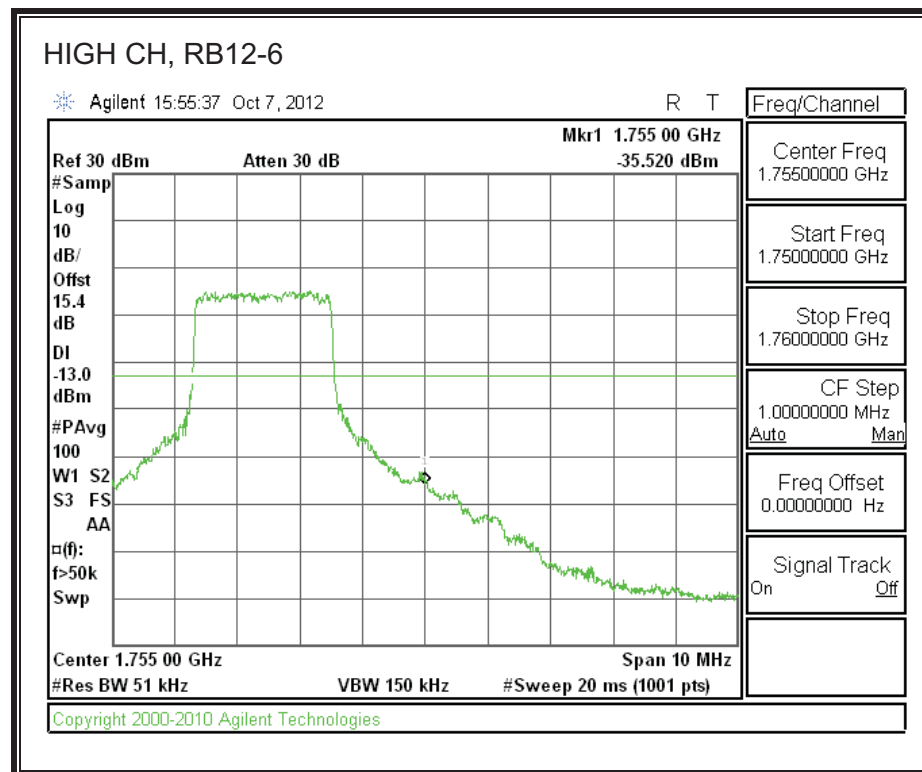
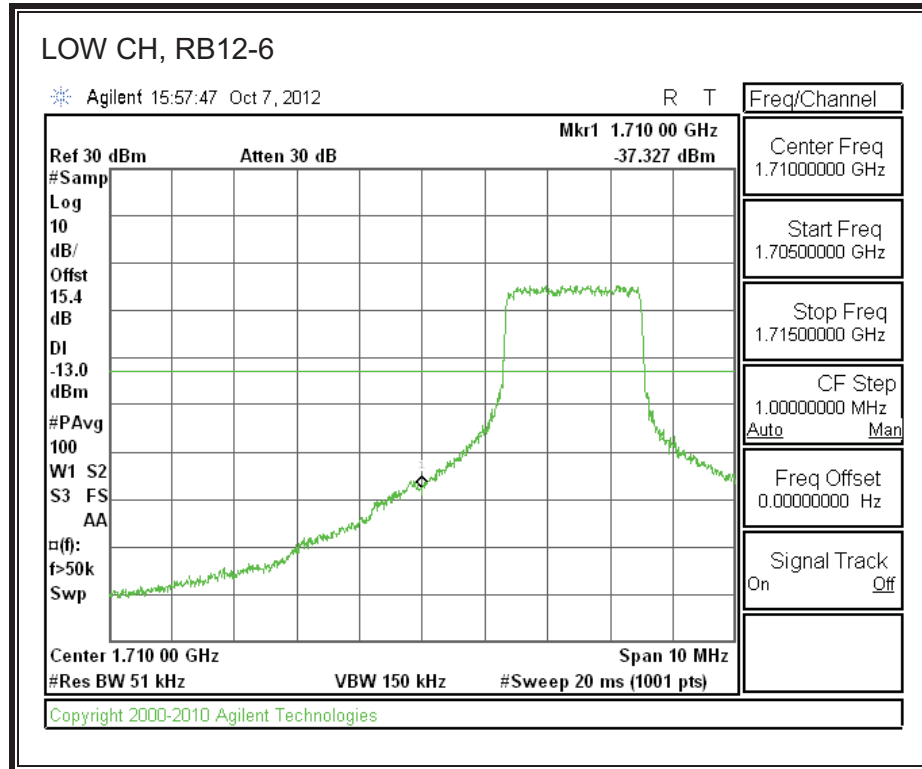


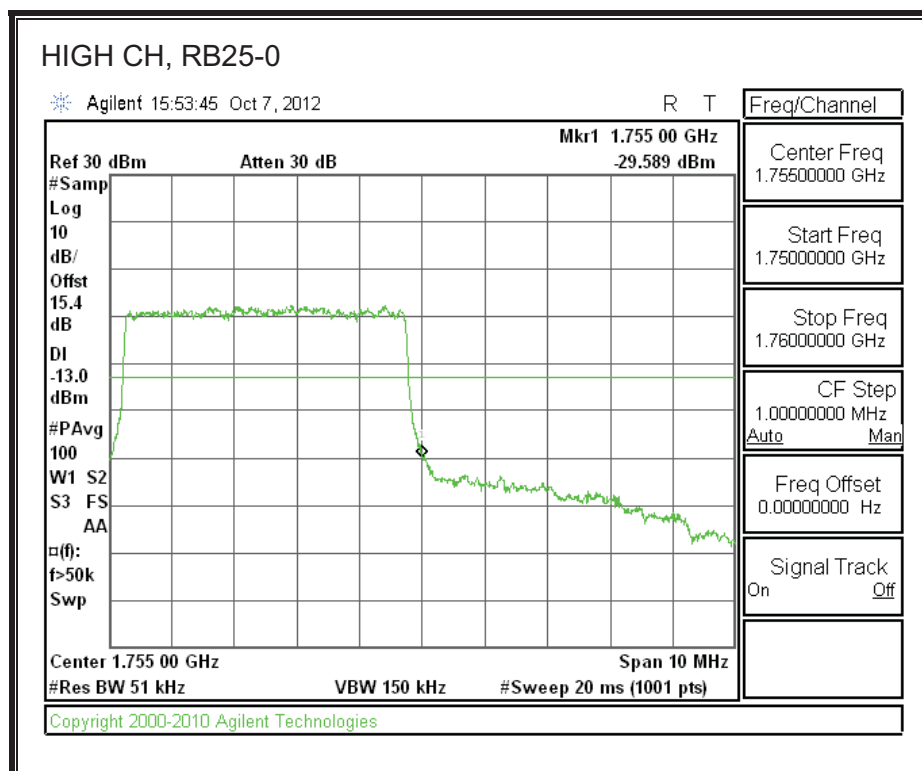
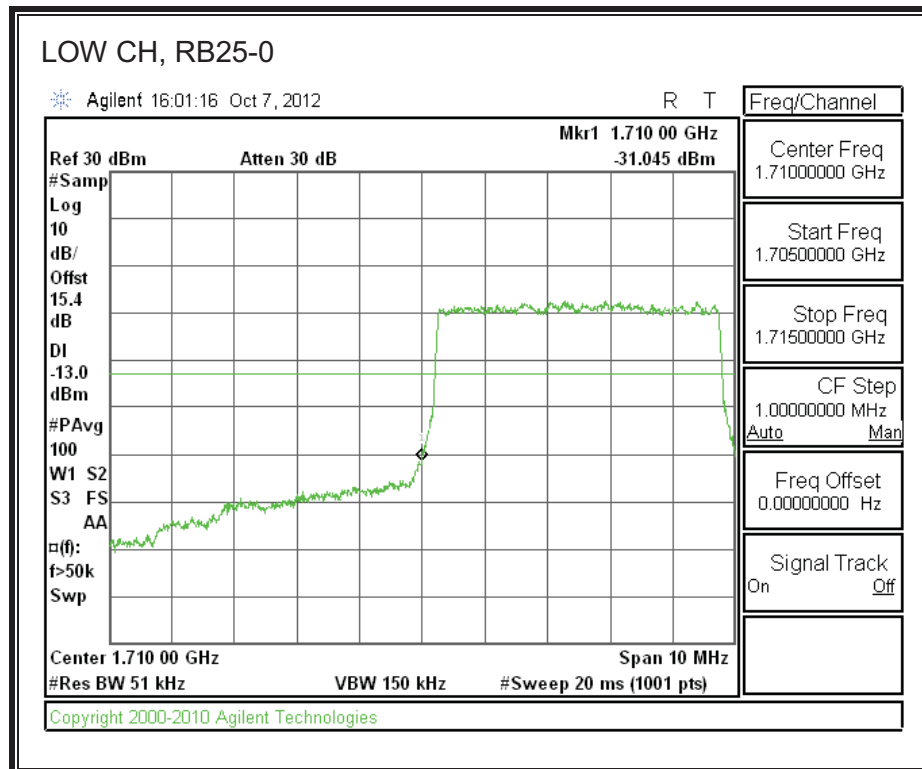


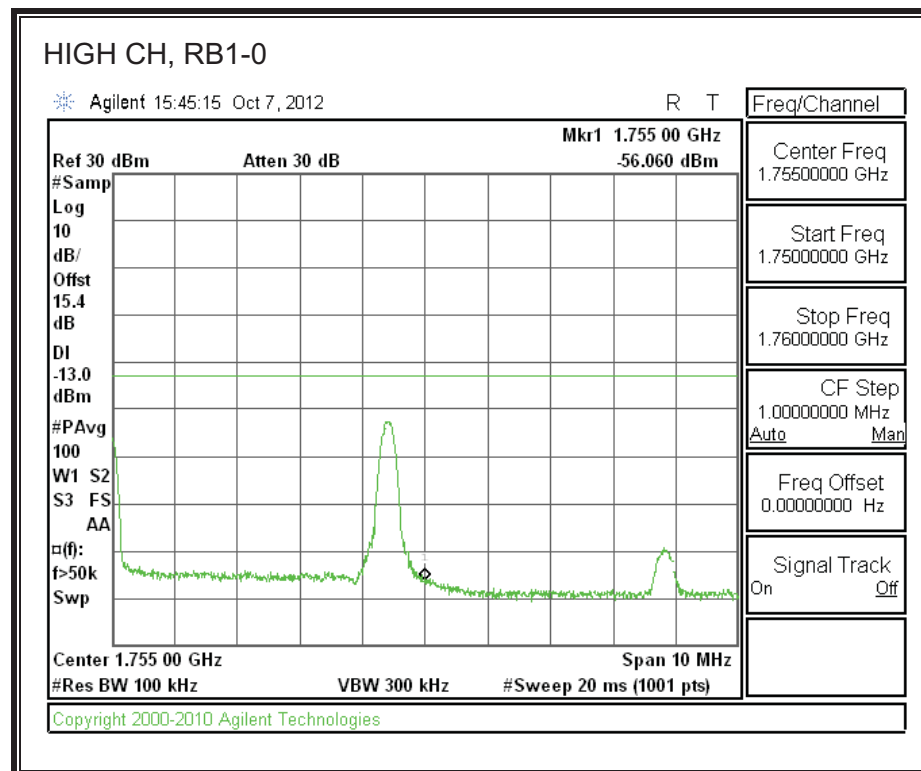
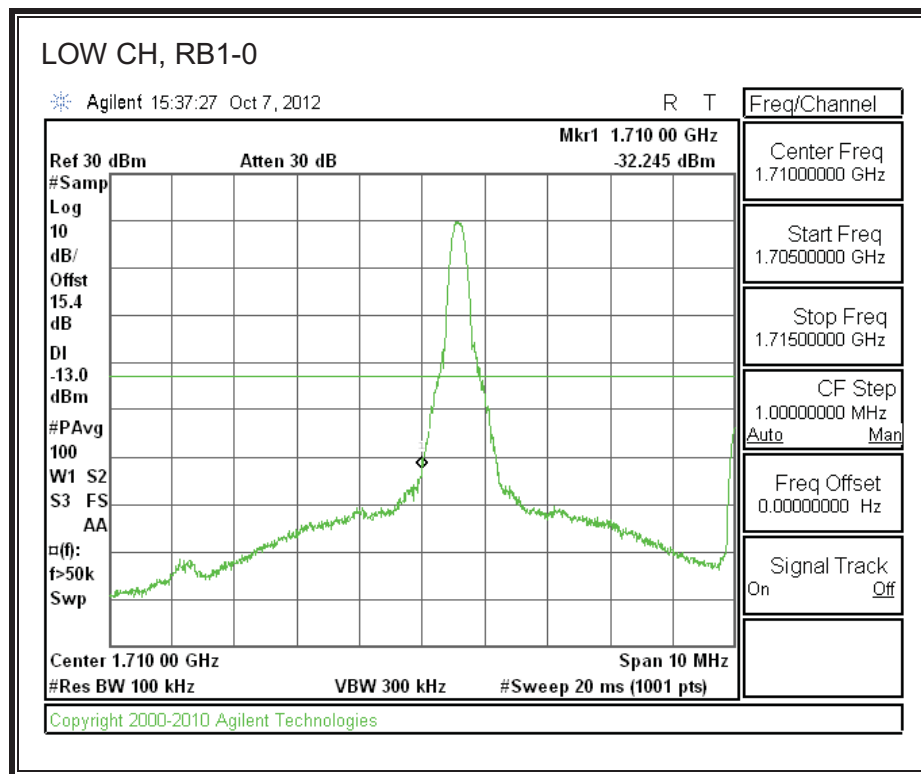


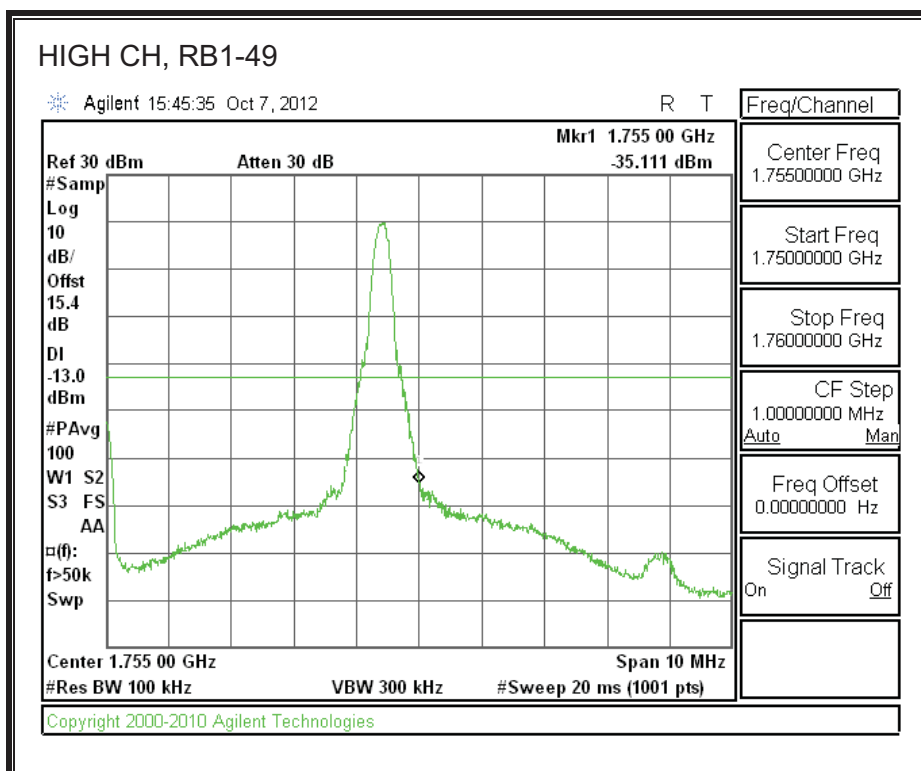
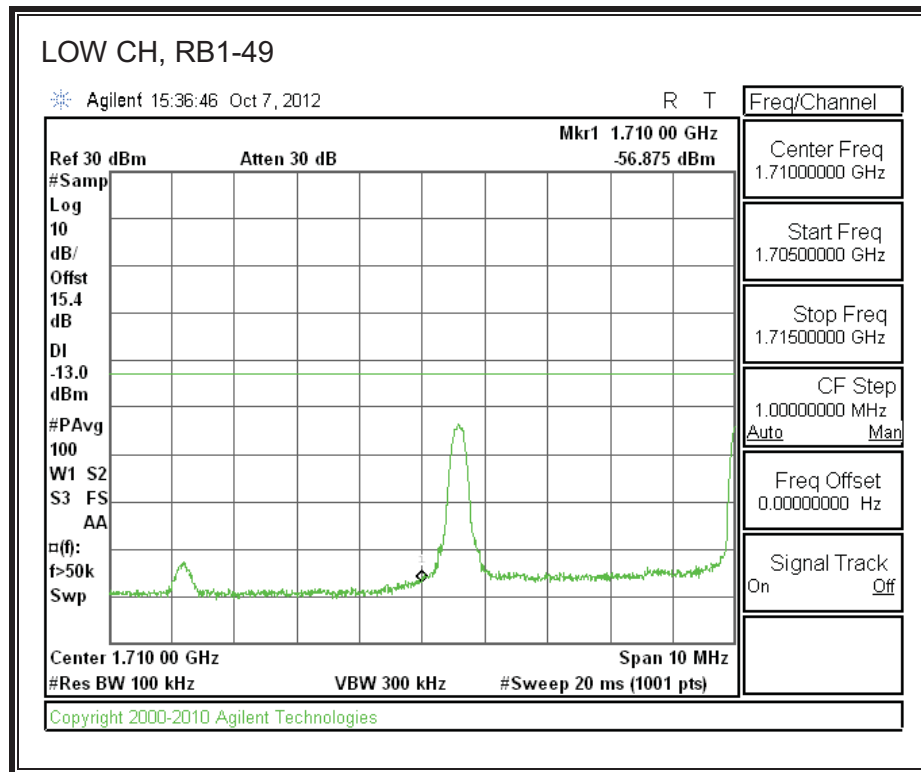
LTE 16QAM Band 4 (5 MHz BANDWIDTH)

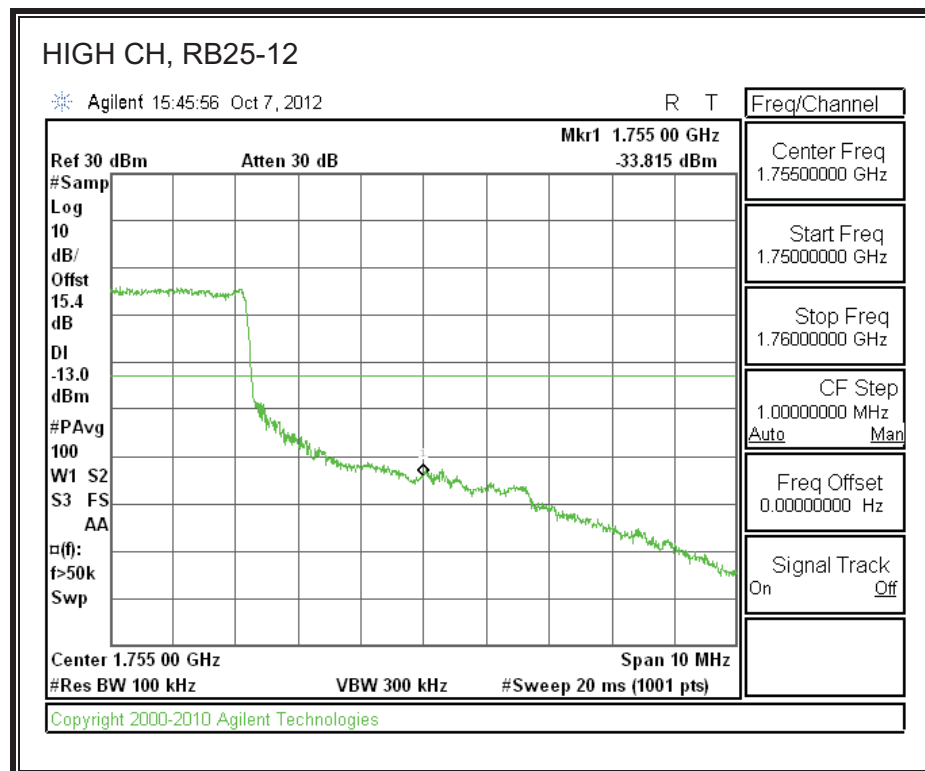
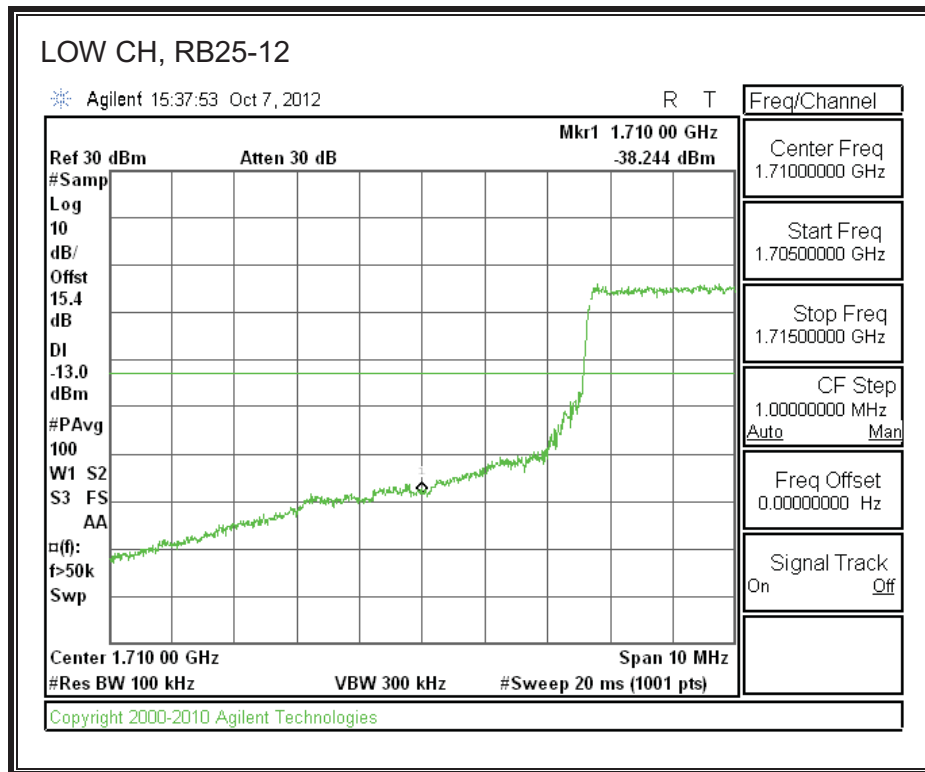


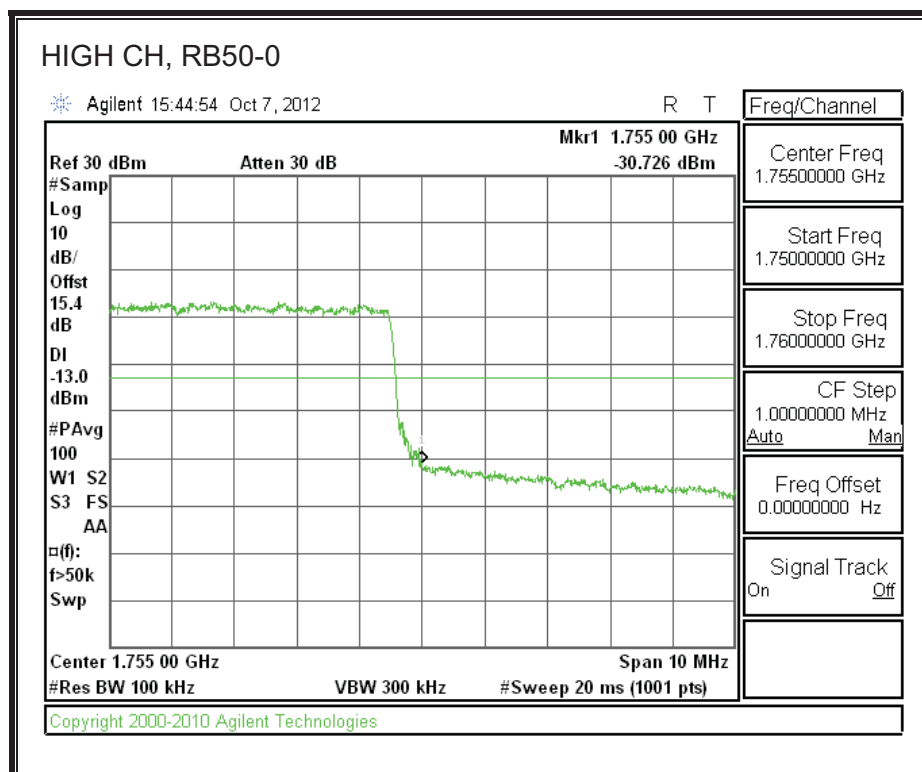
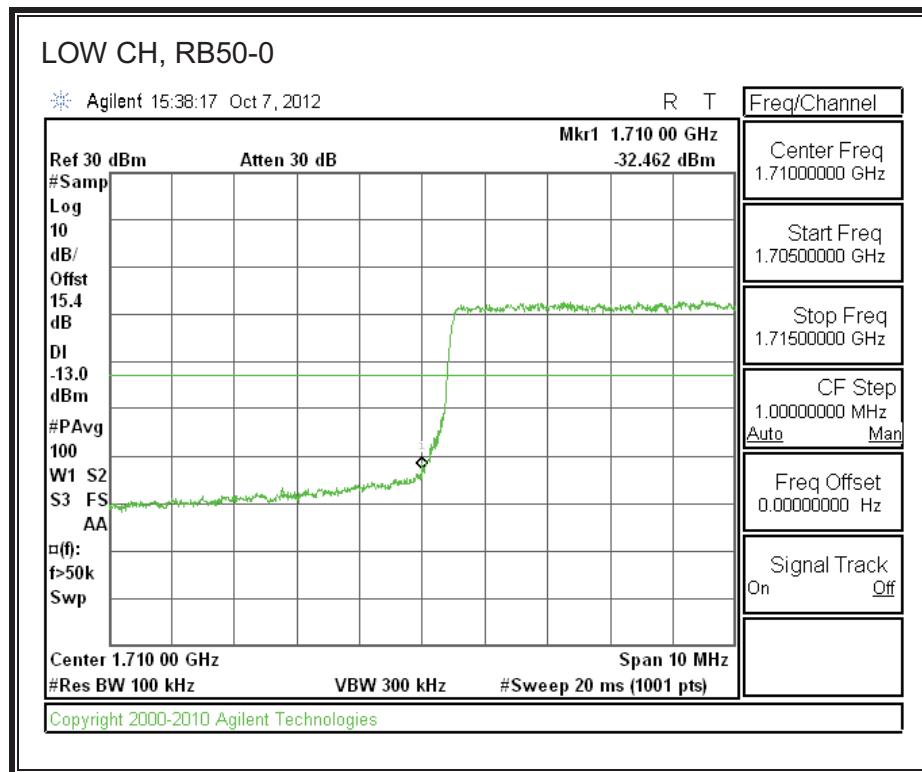


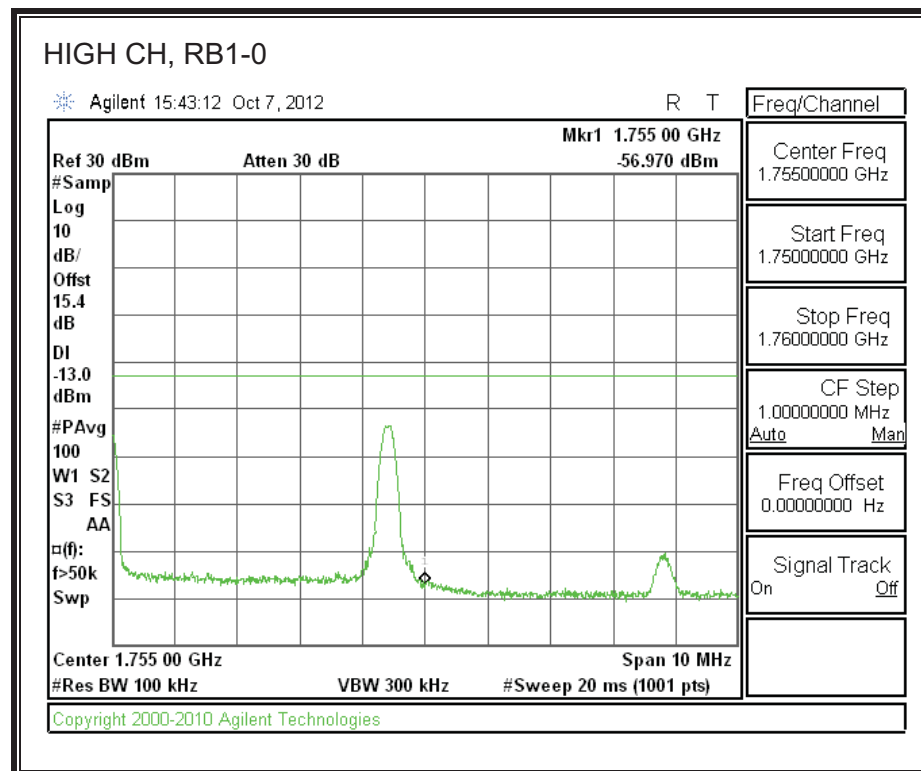
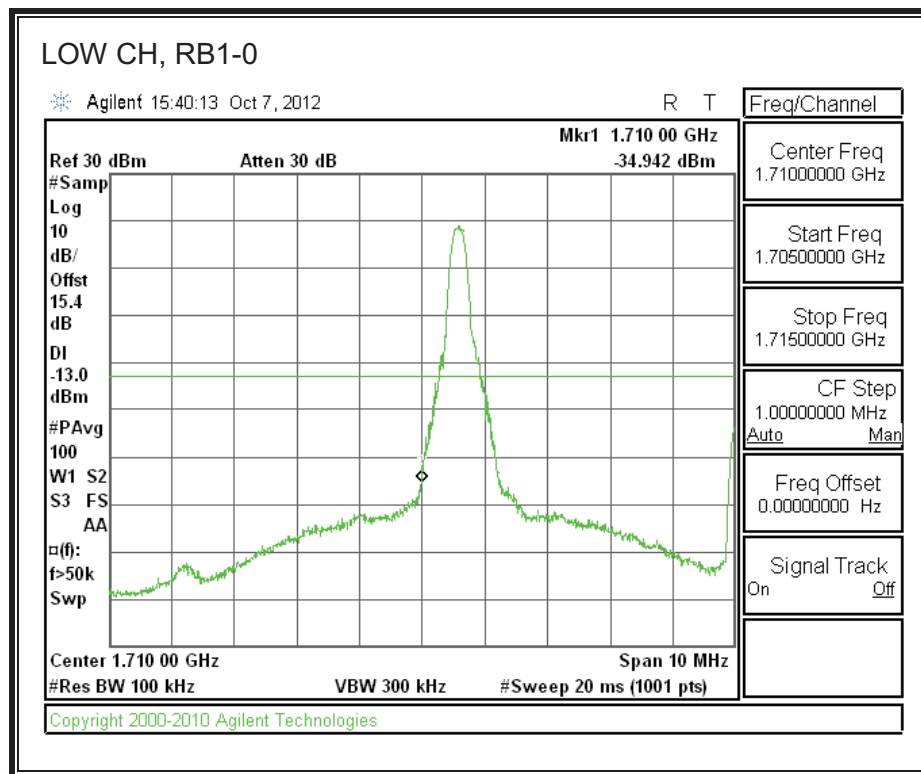


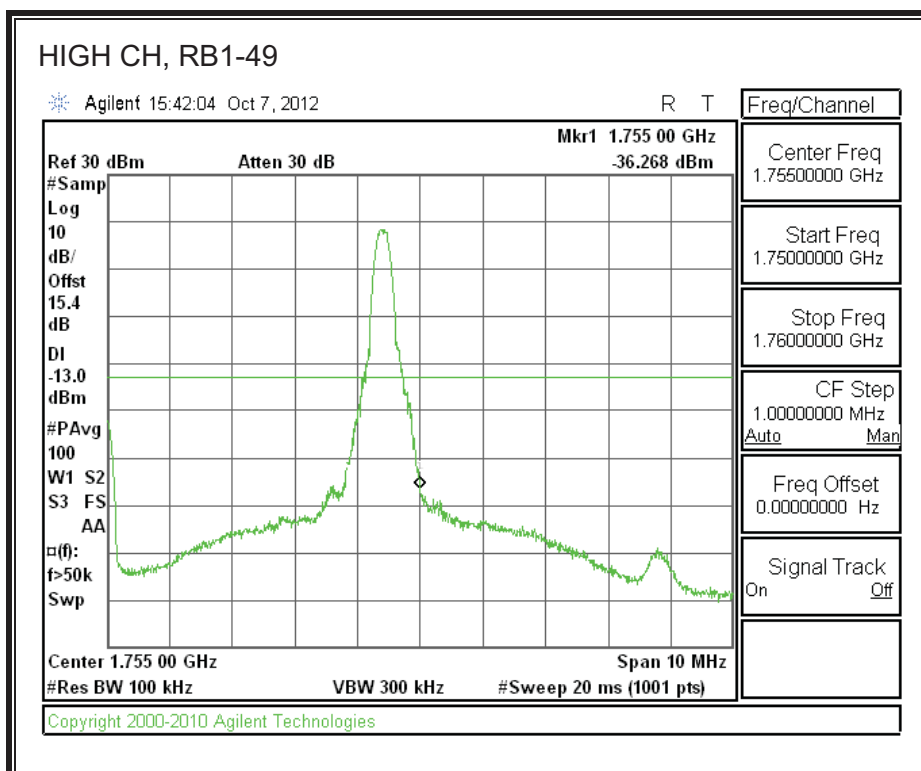
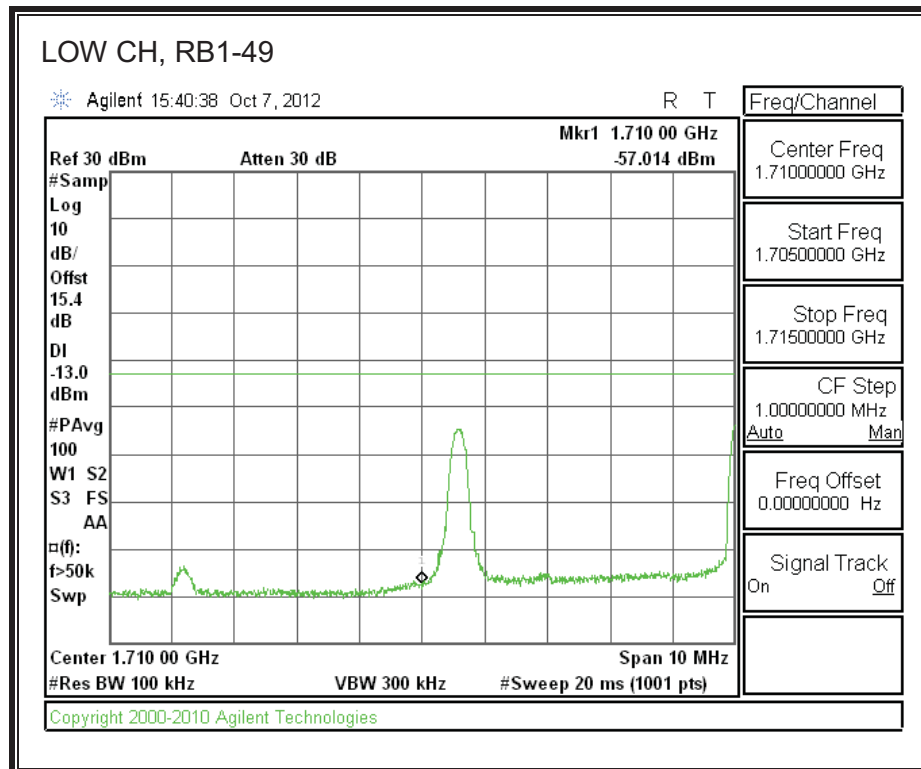
LTE QPSK Band 4 (10 MHz BANDWIDTH)

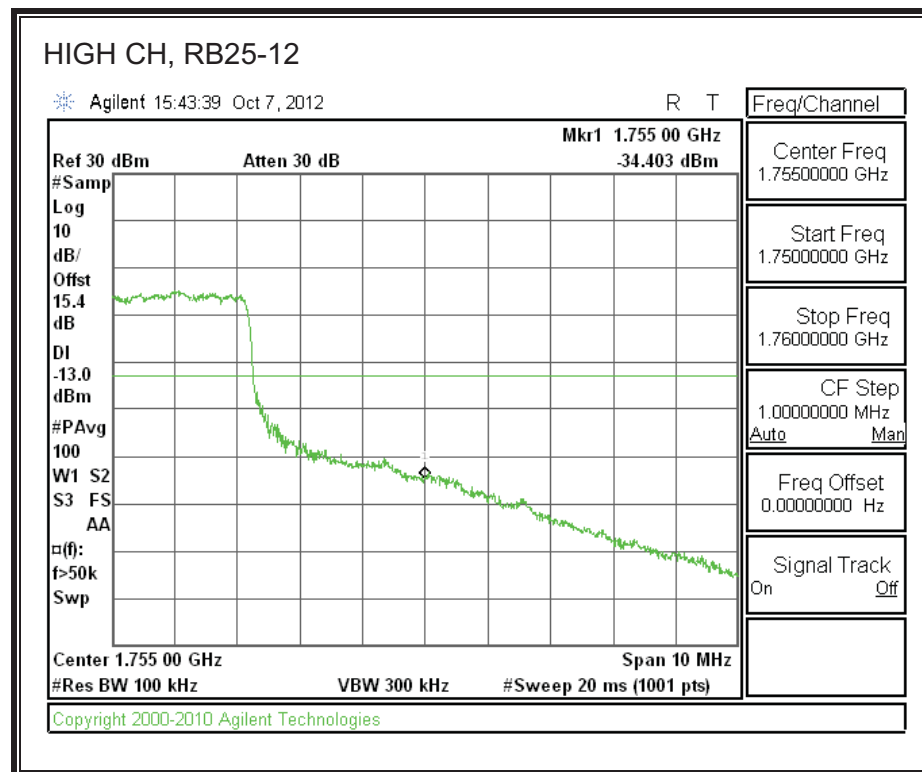
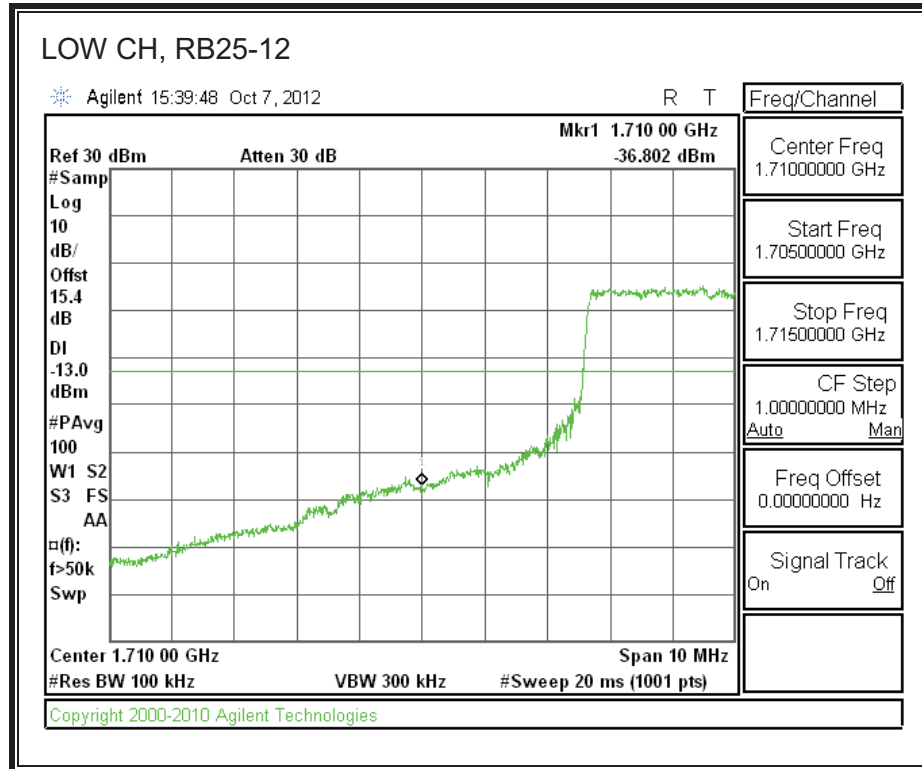


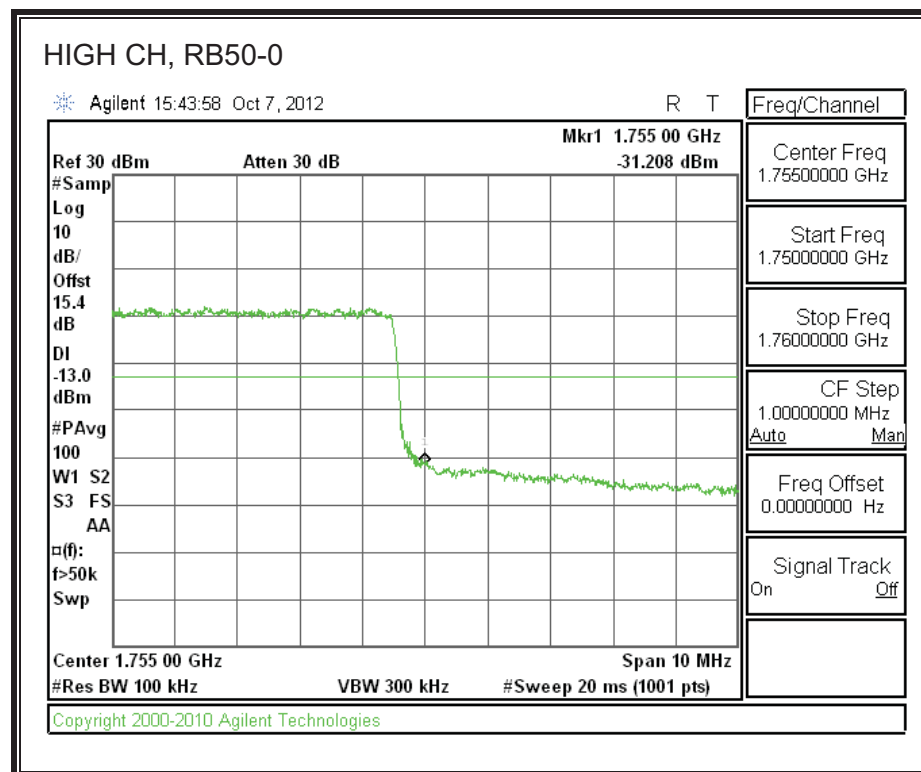
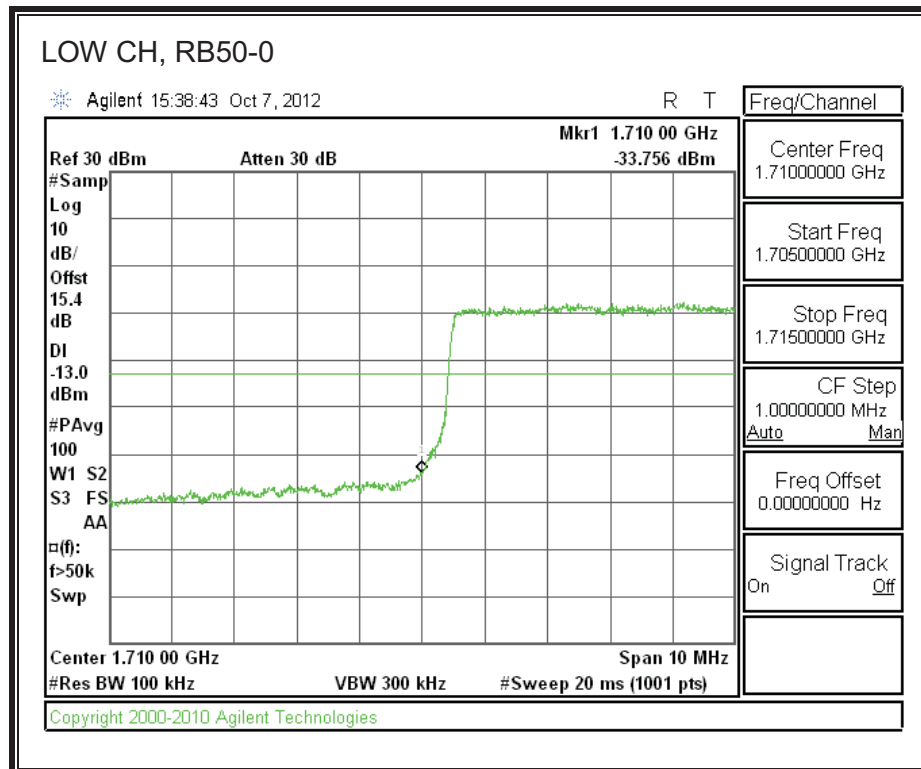




LTE 16QAM Band 4 (10 MHz BANDWIDTH)

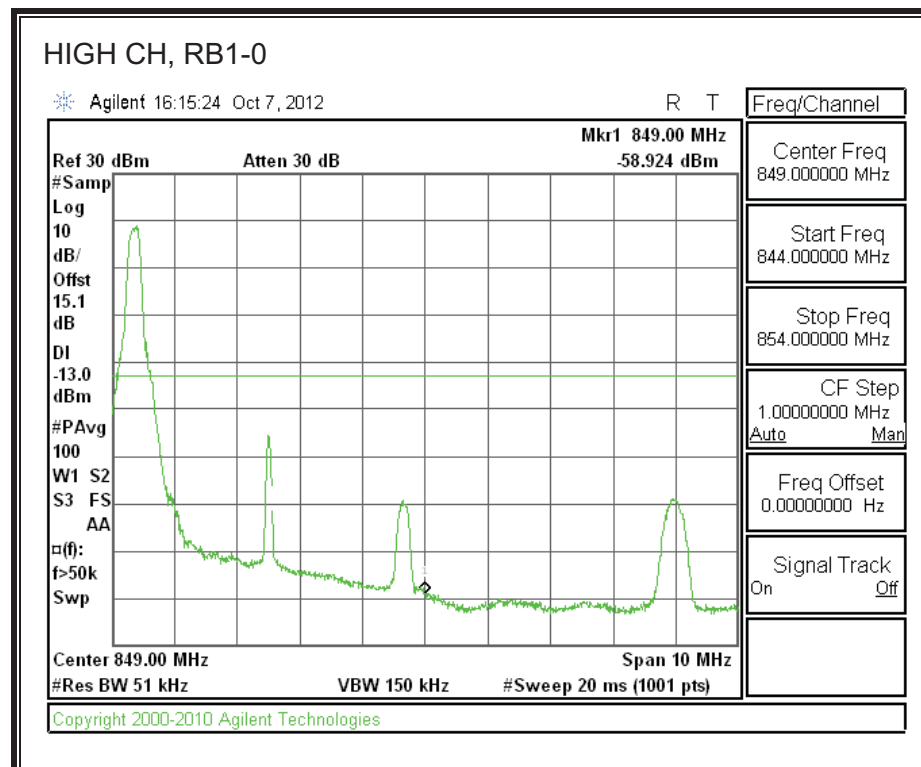
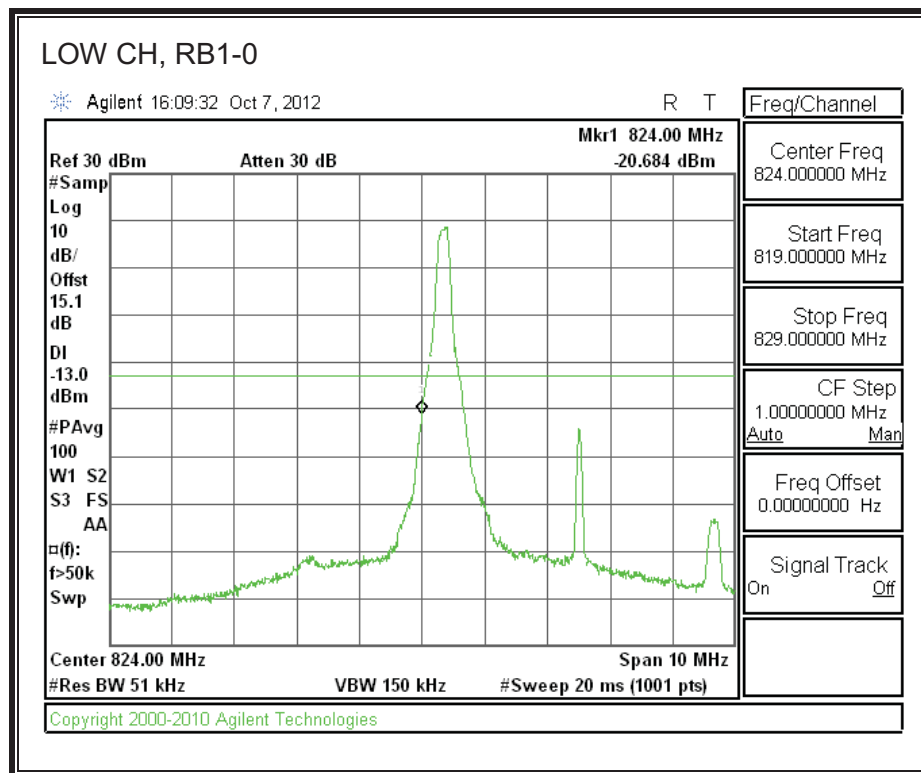


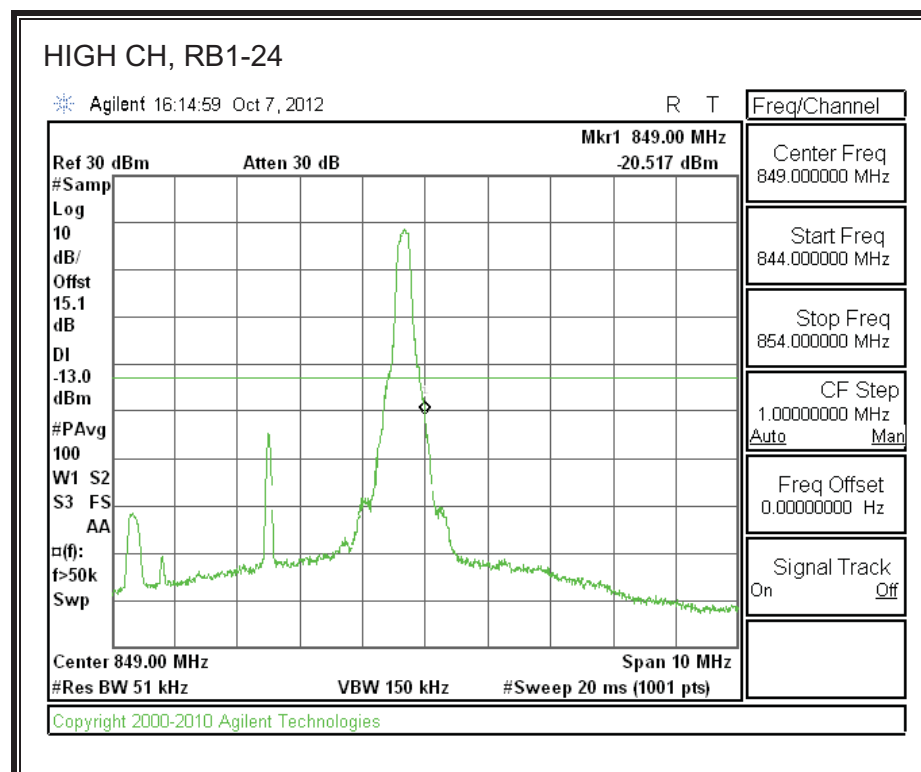
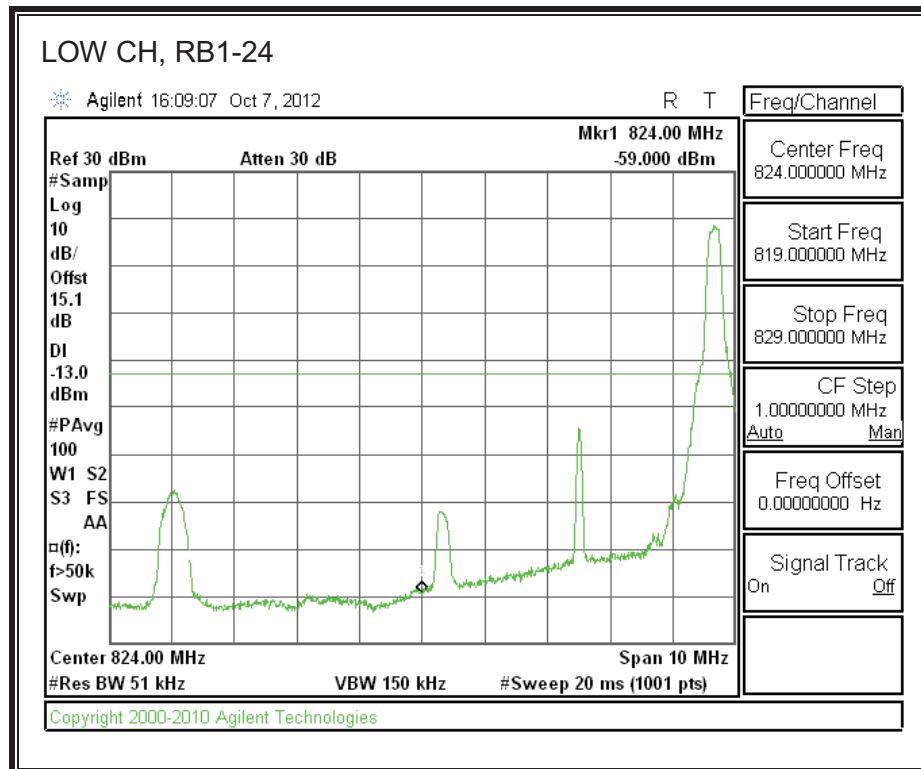


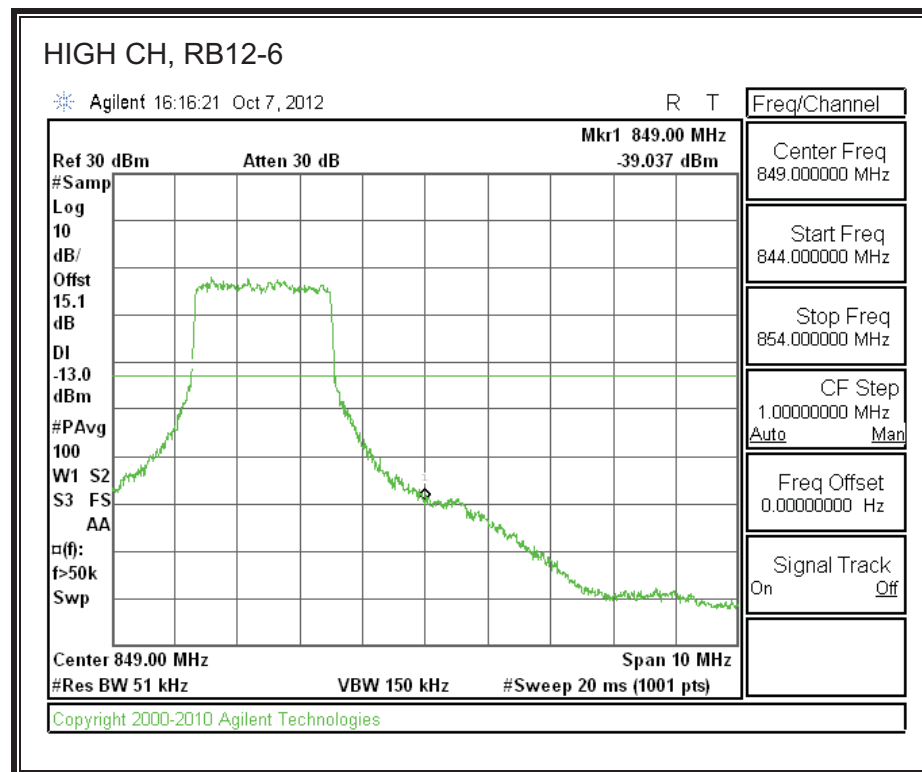
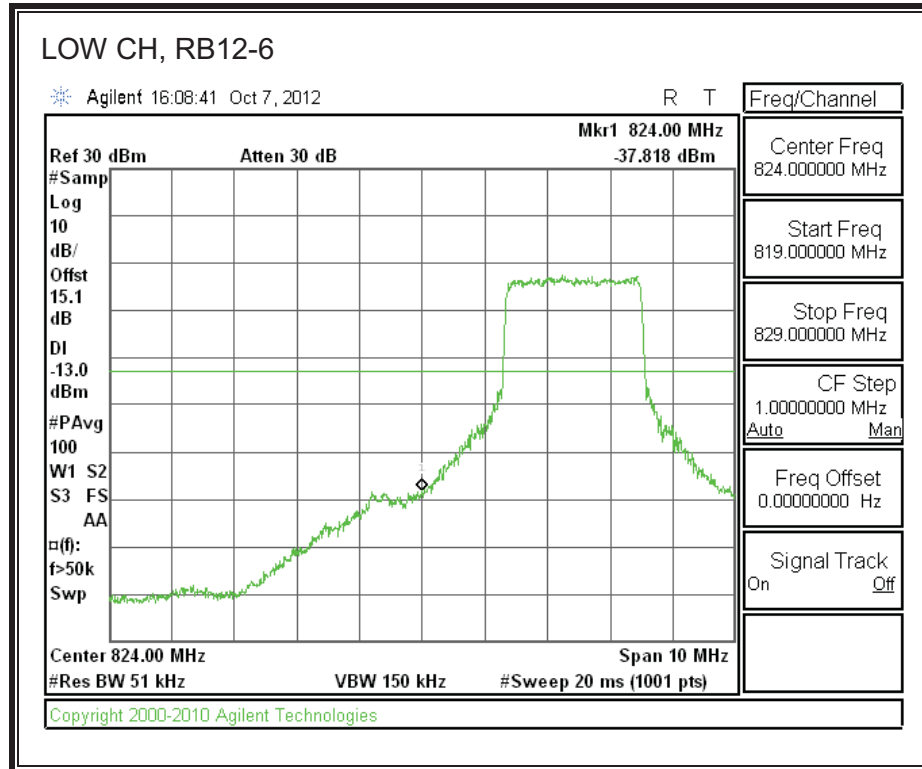


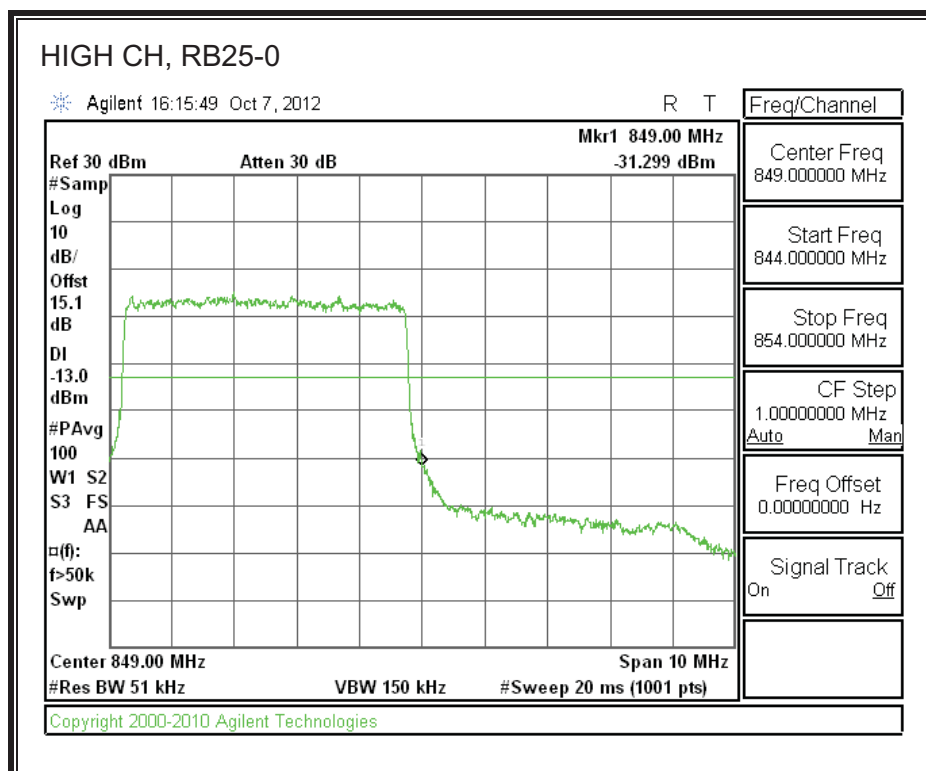
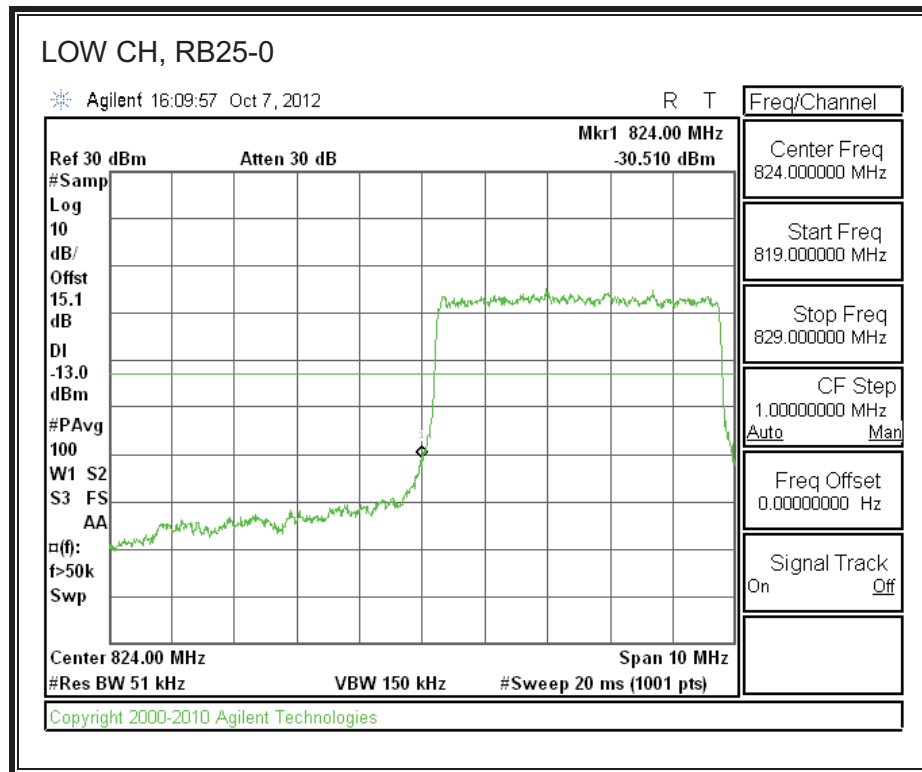
8.2.5. LTE BAND 5

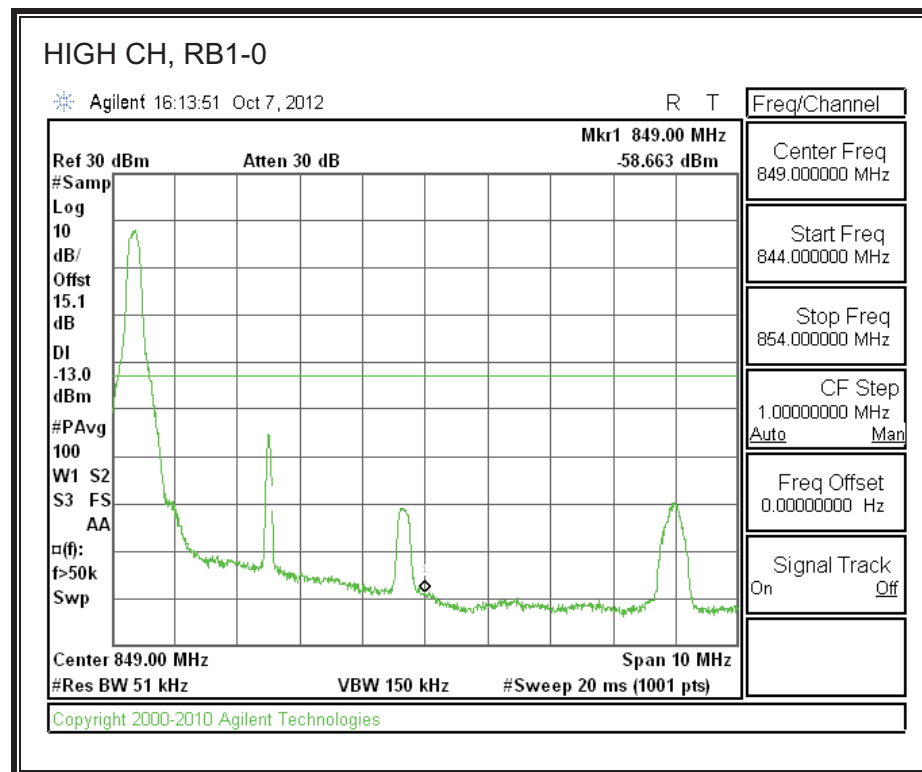
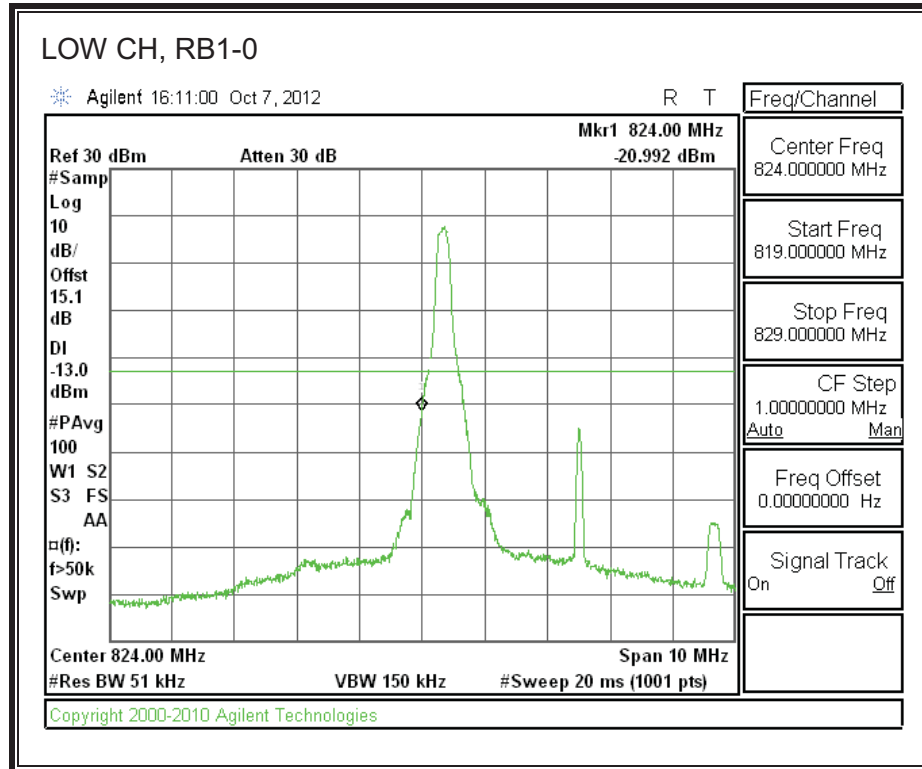
LTE QPSK Band 5 (5 MHz BANDWIDTH)

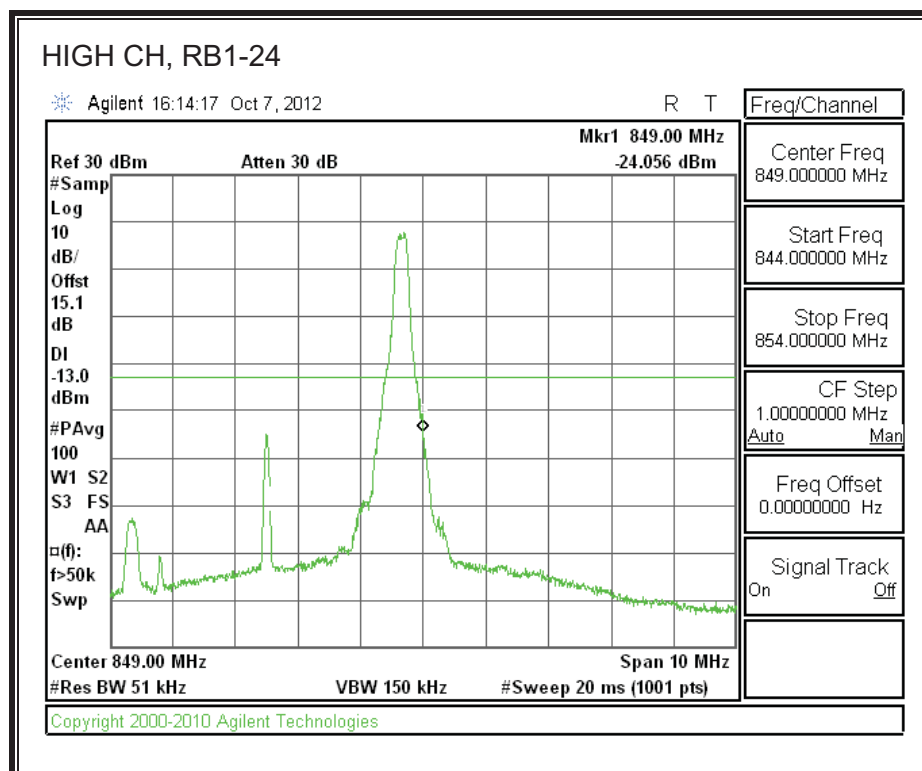
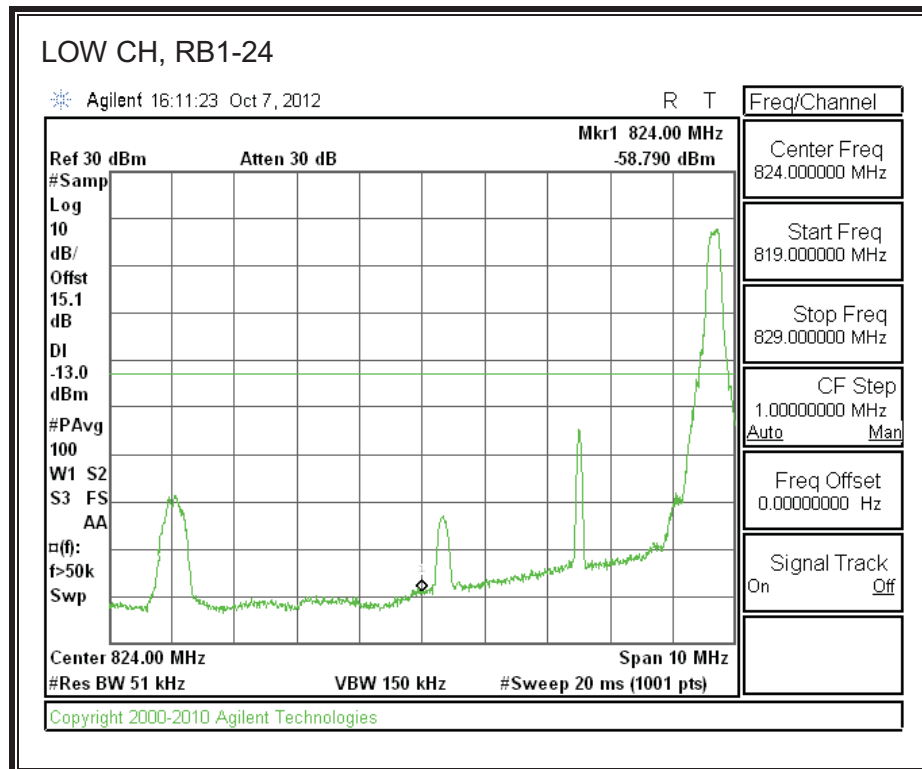


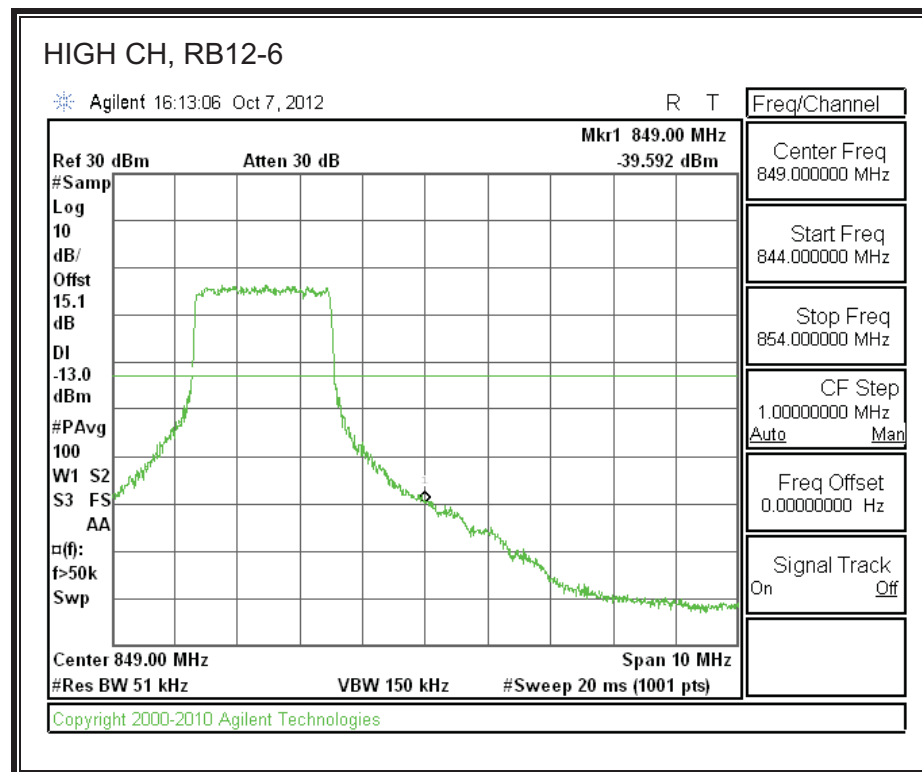
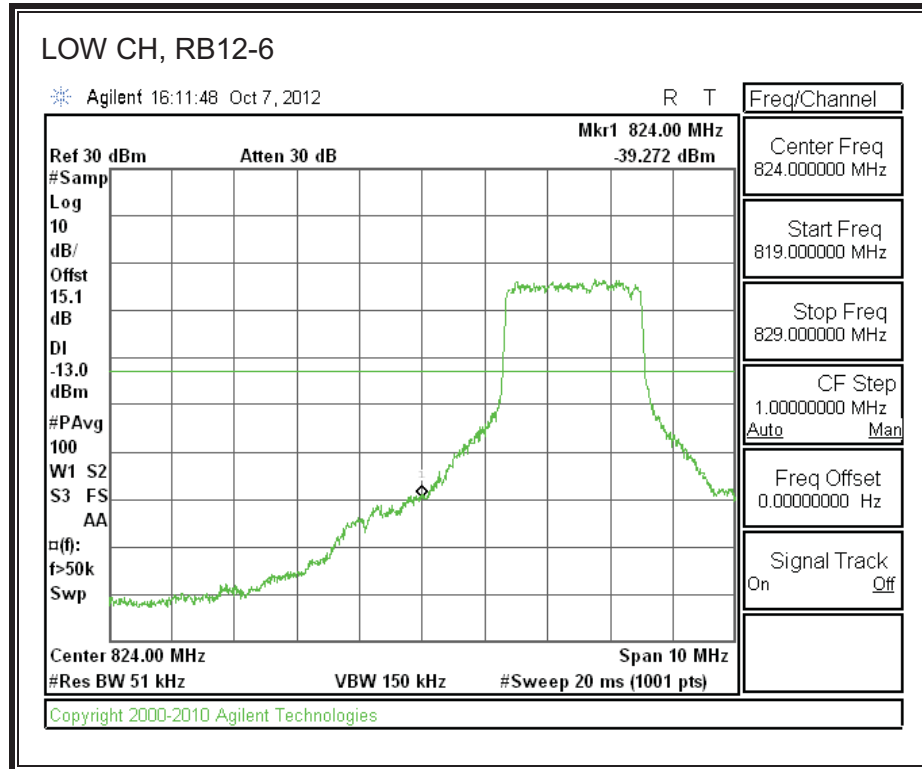


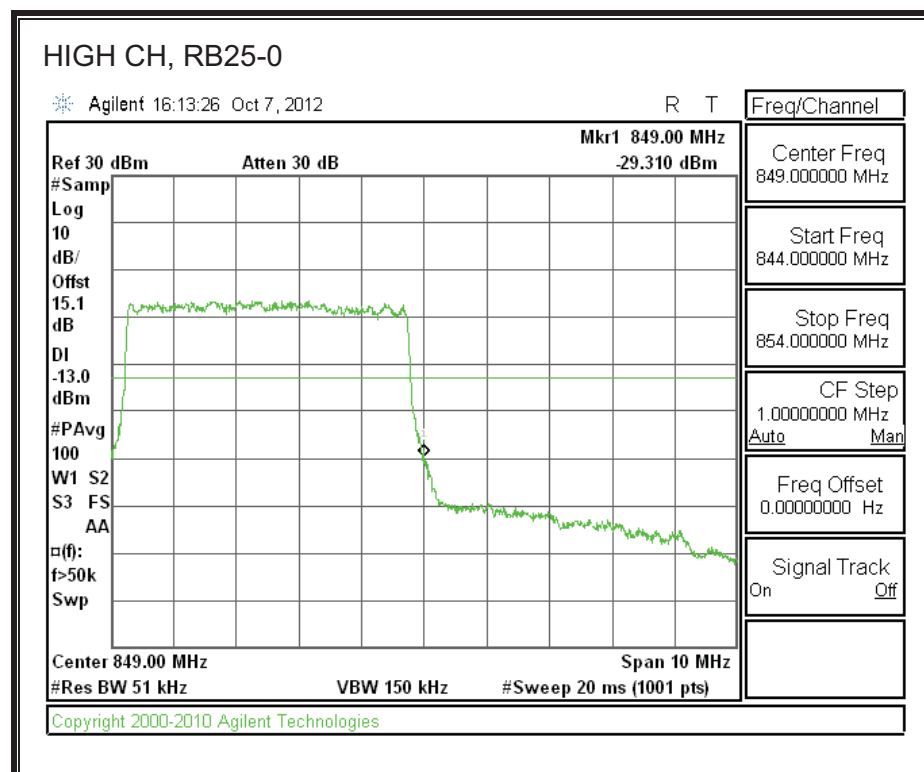
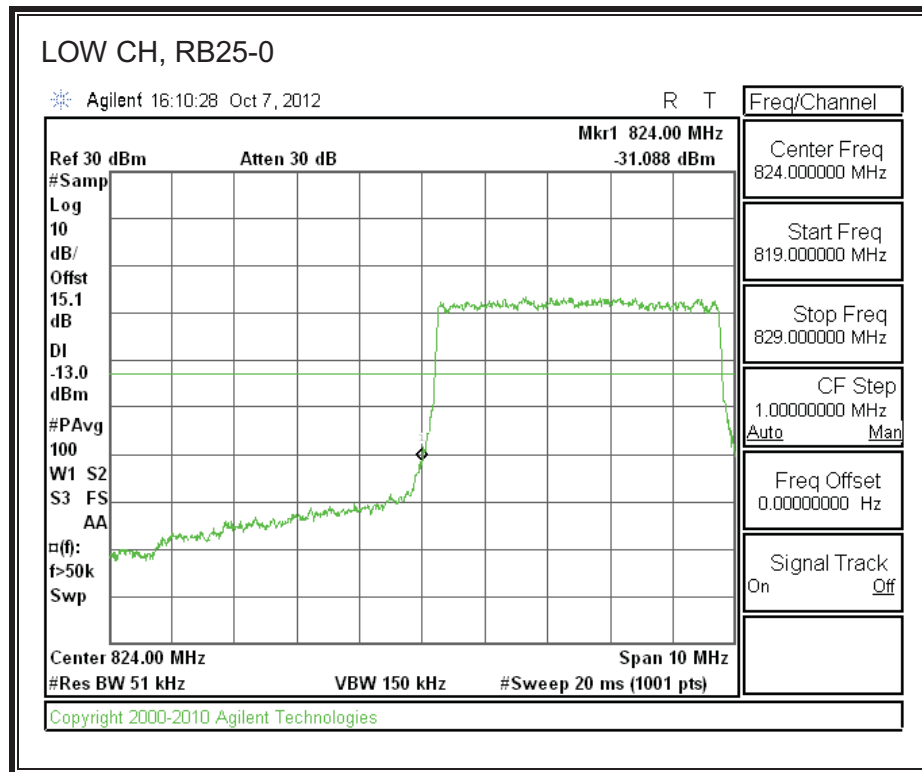


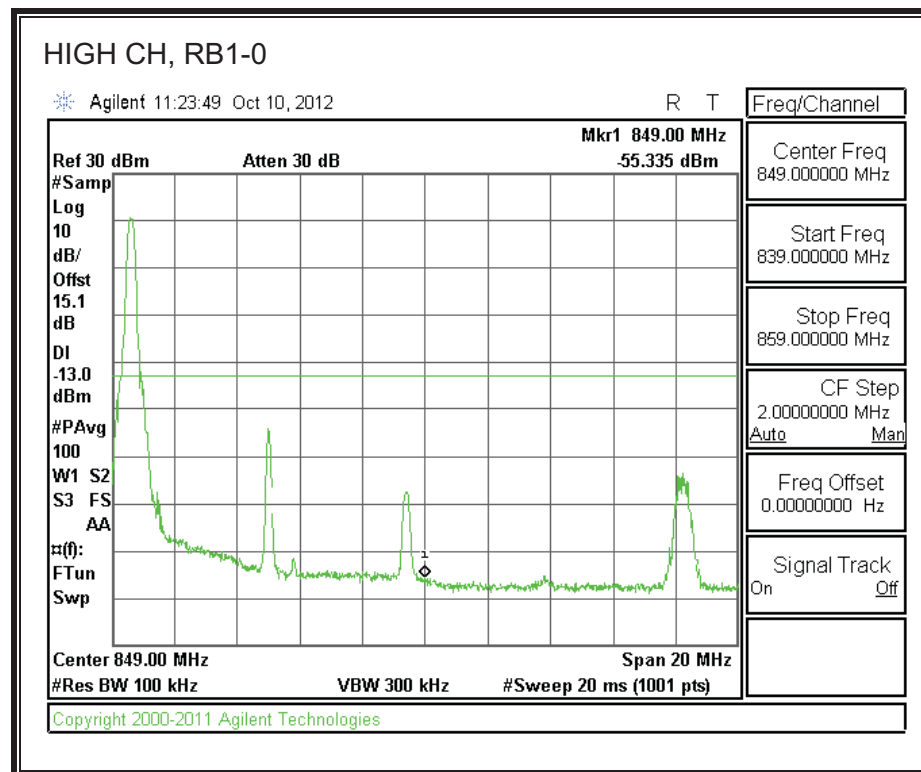
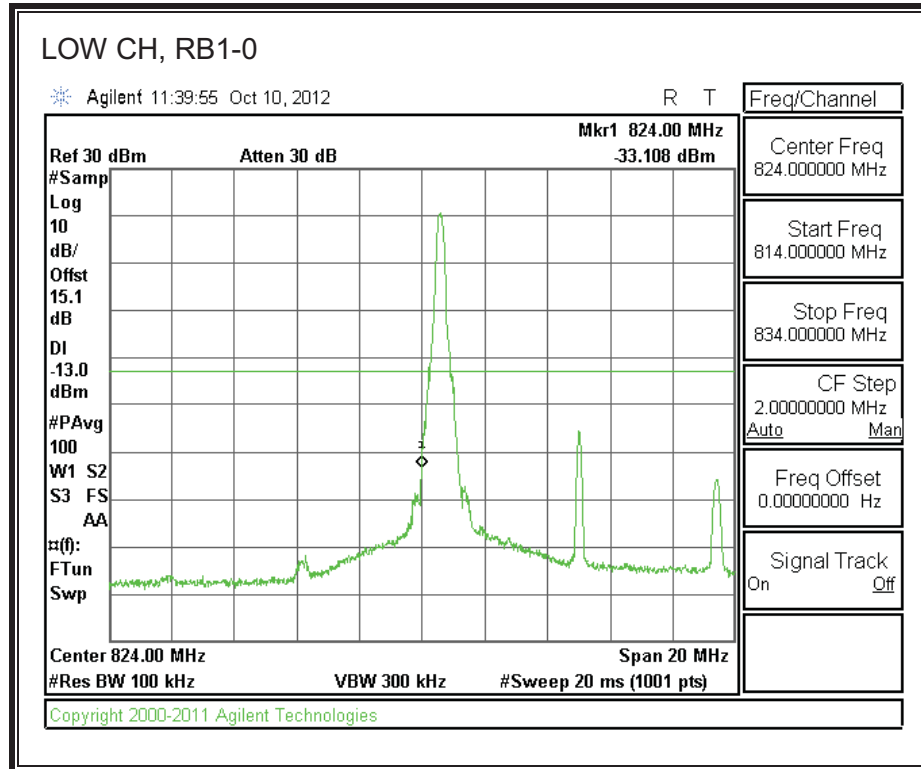


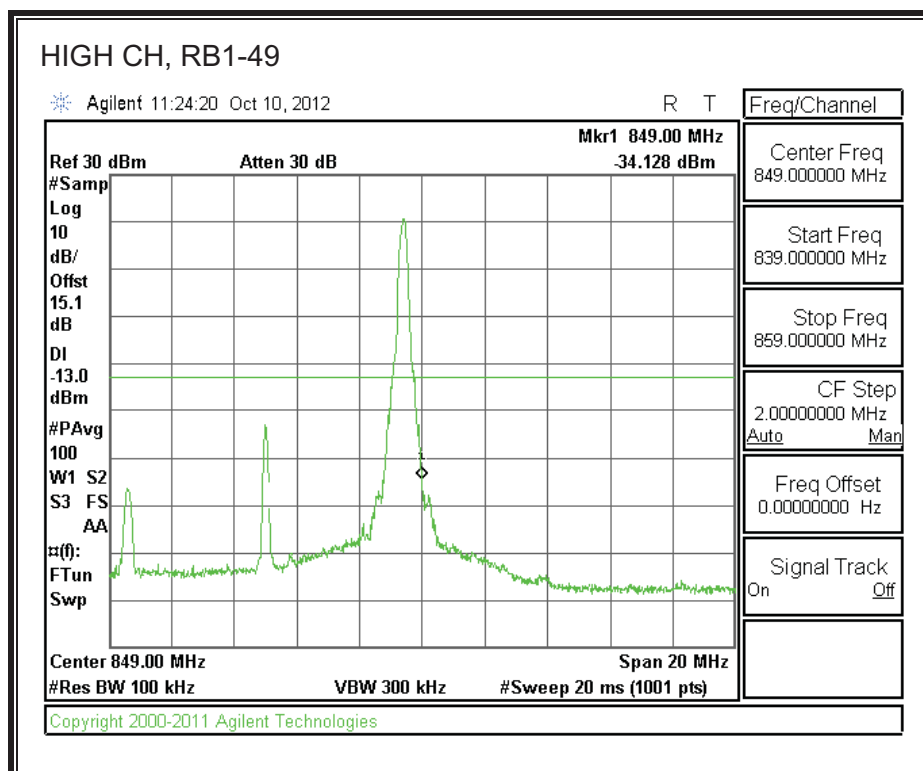
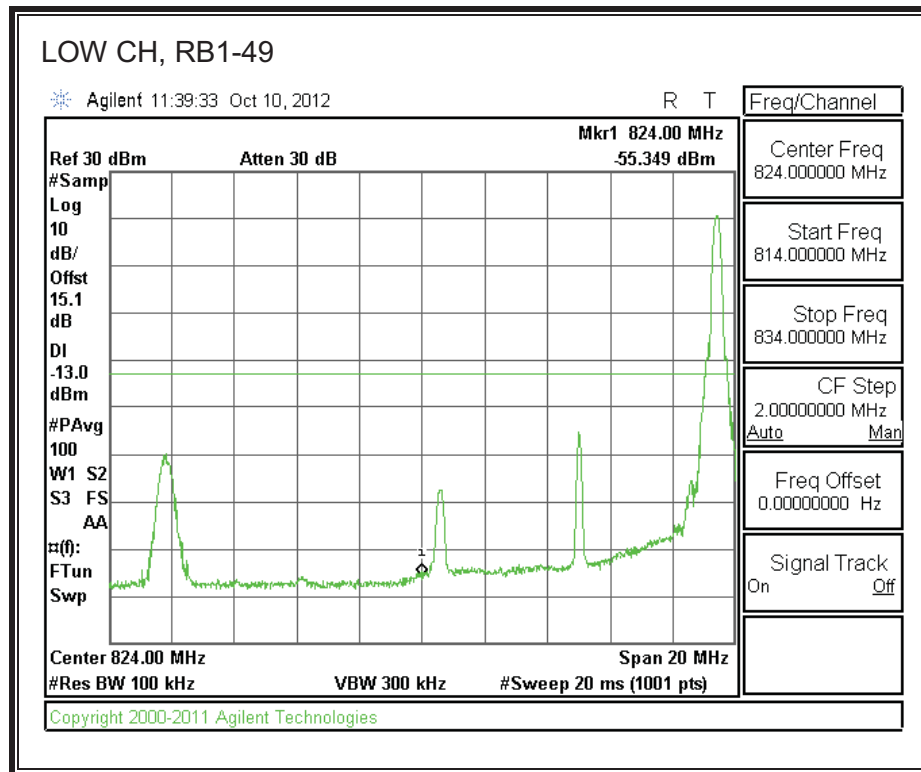
LTE 16QAM Band 5 (5 MHz BANDWIDTH)

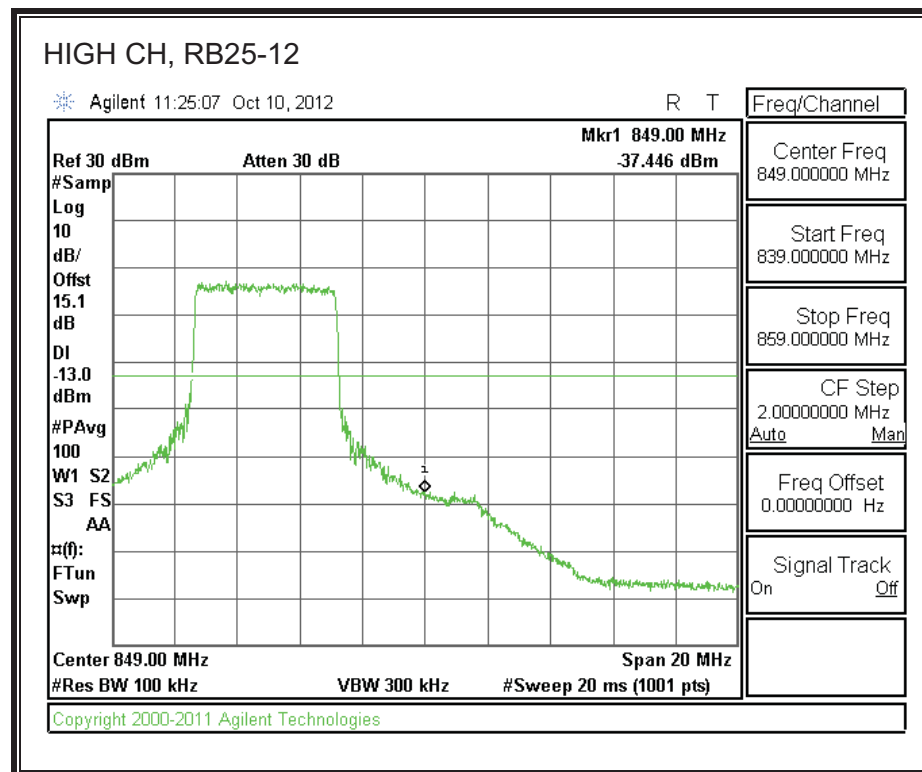
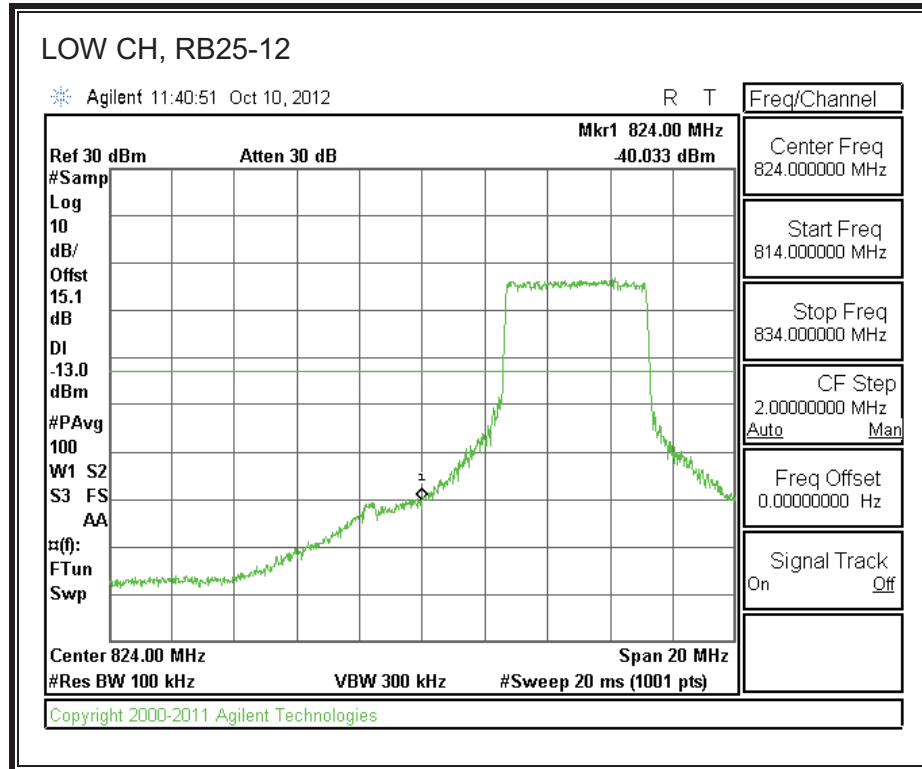


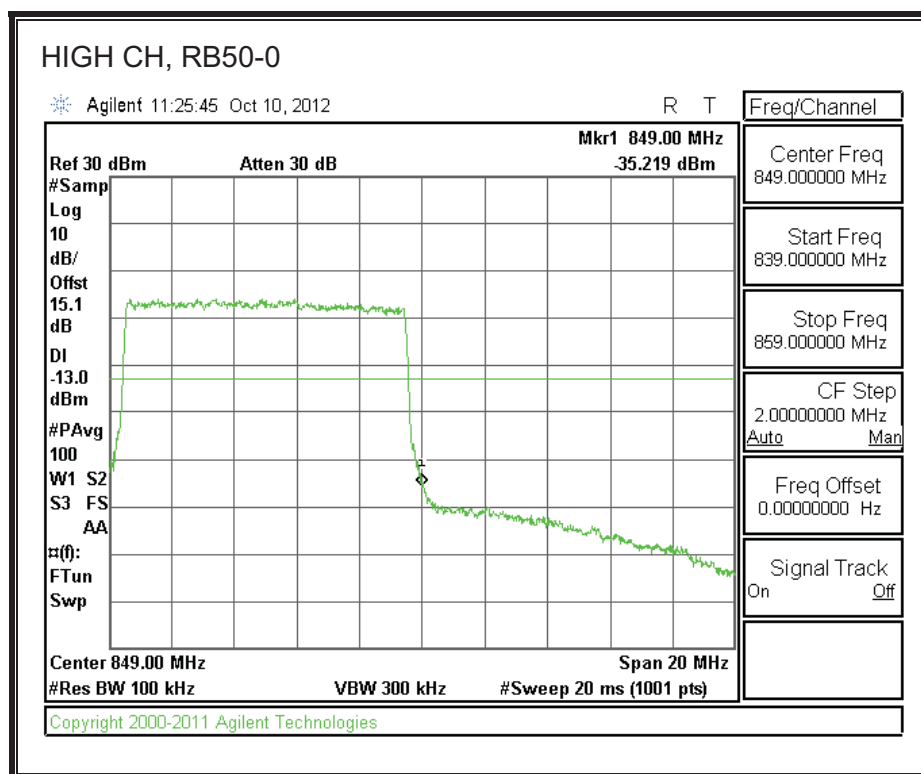
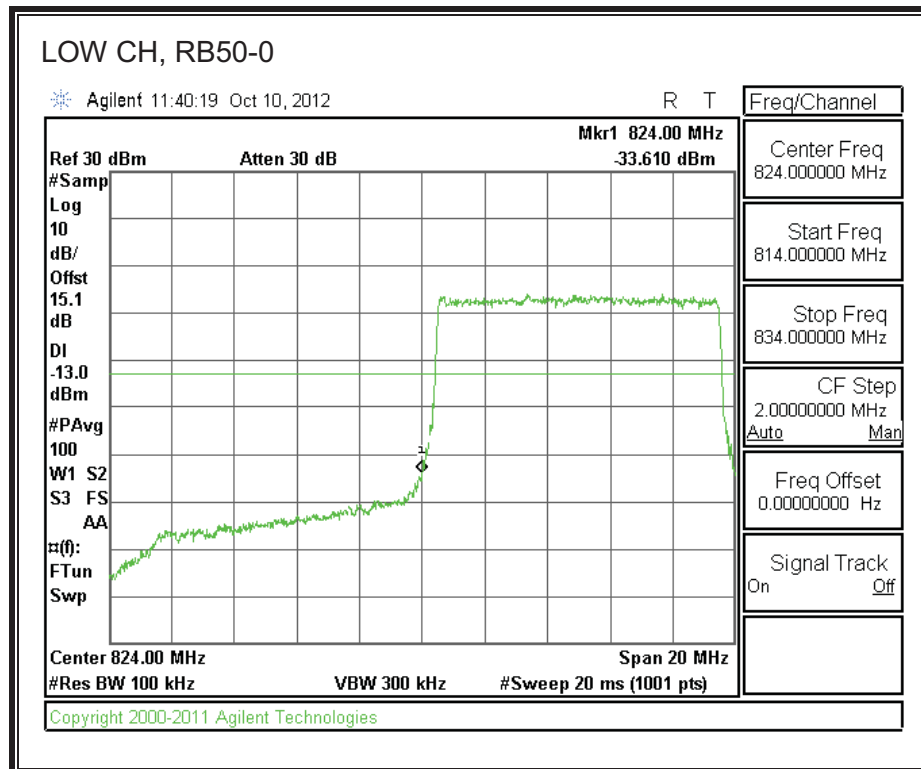


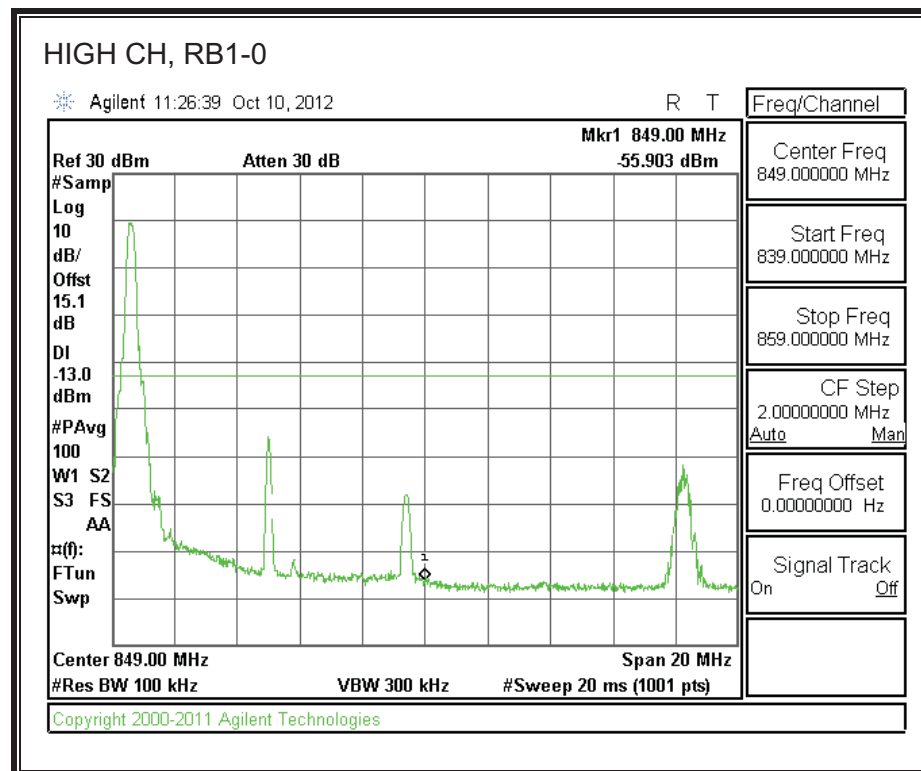
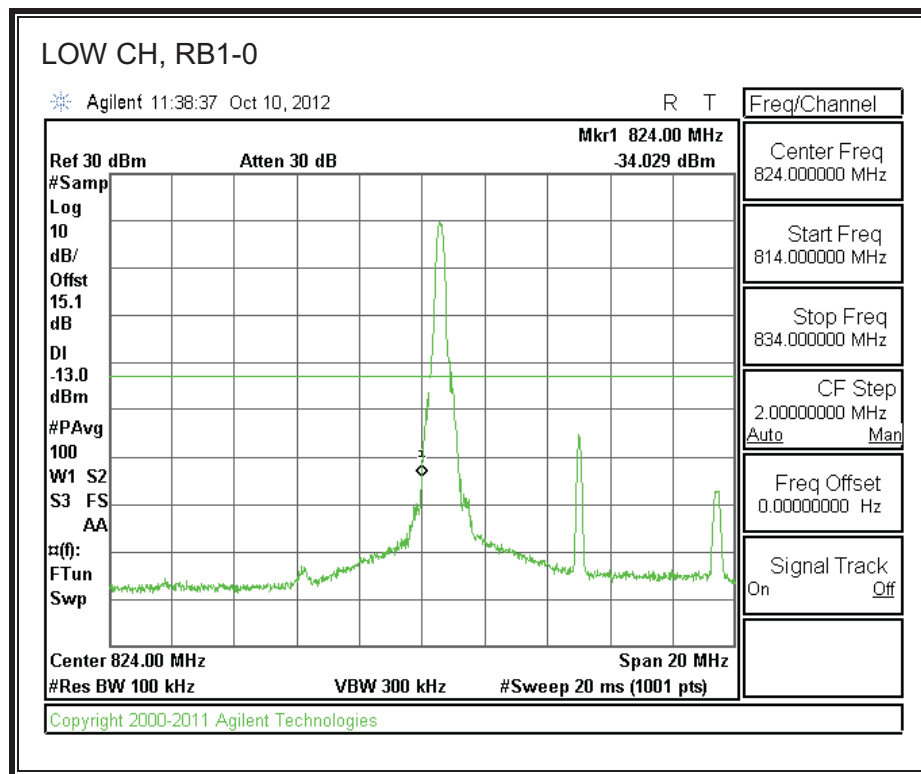


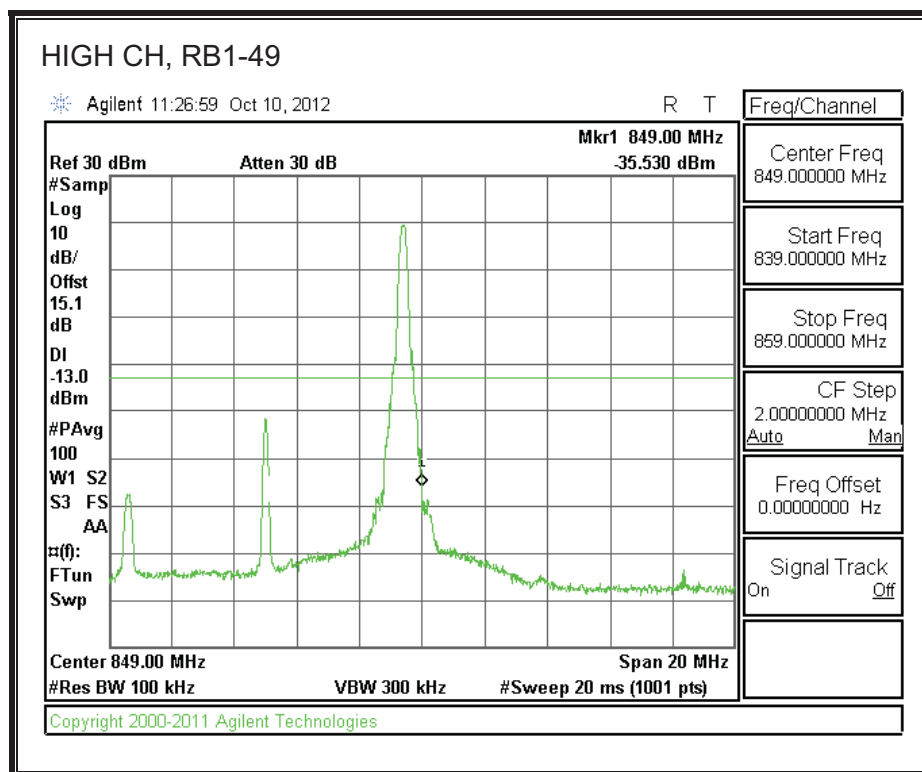
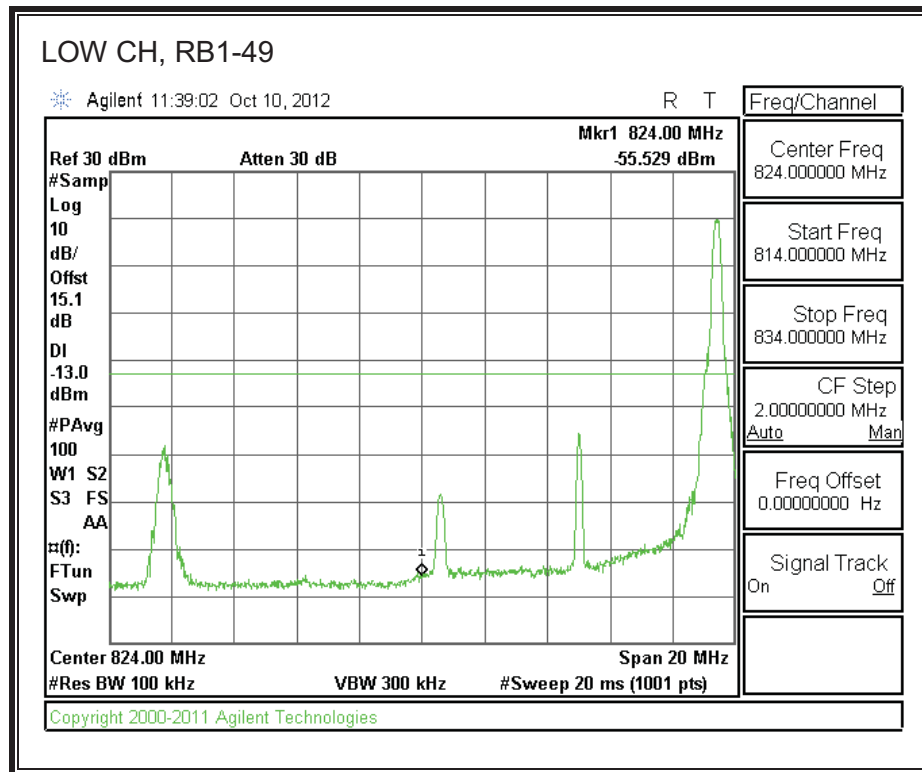
LTE QPSK Band 5 (10 MHz BANDWIDTH)

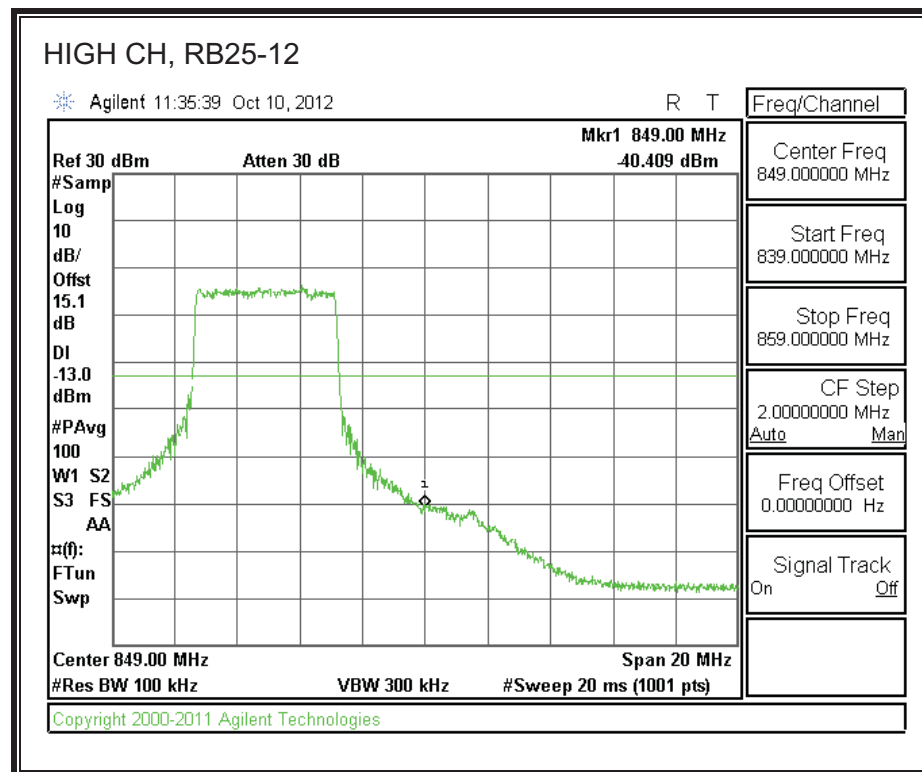
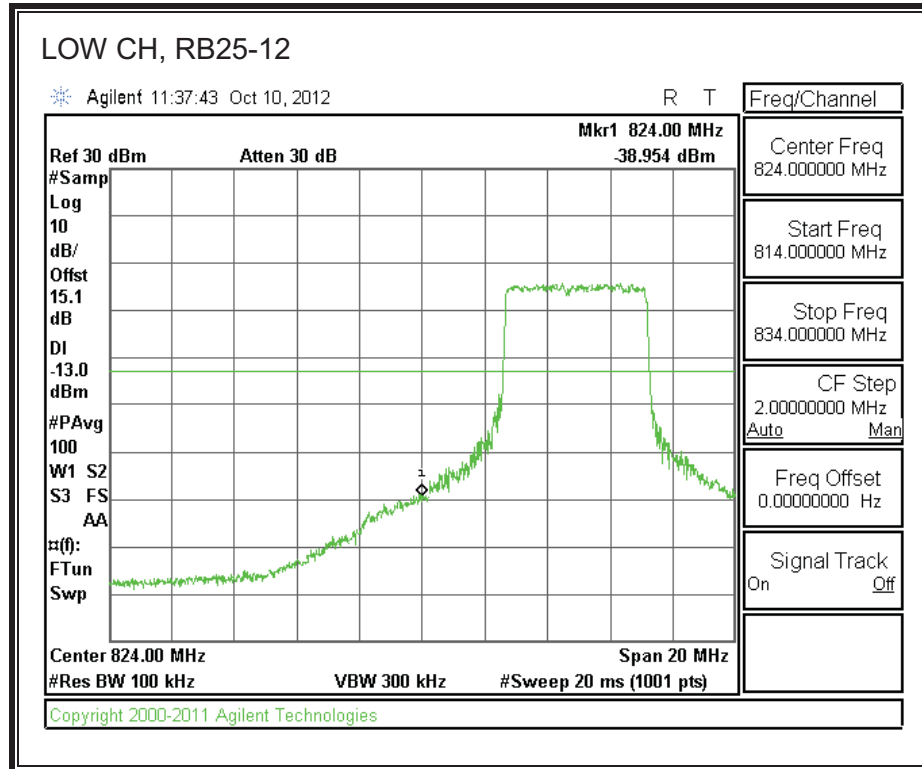


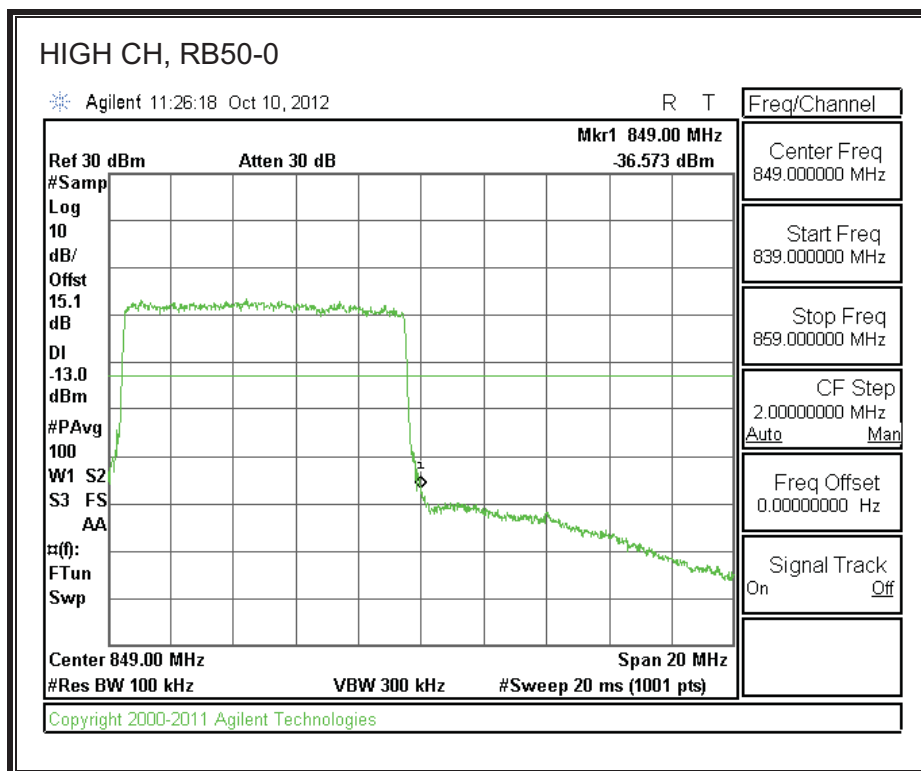
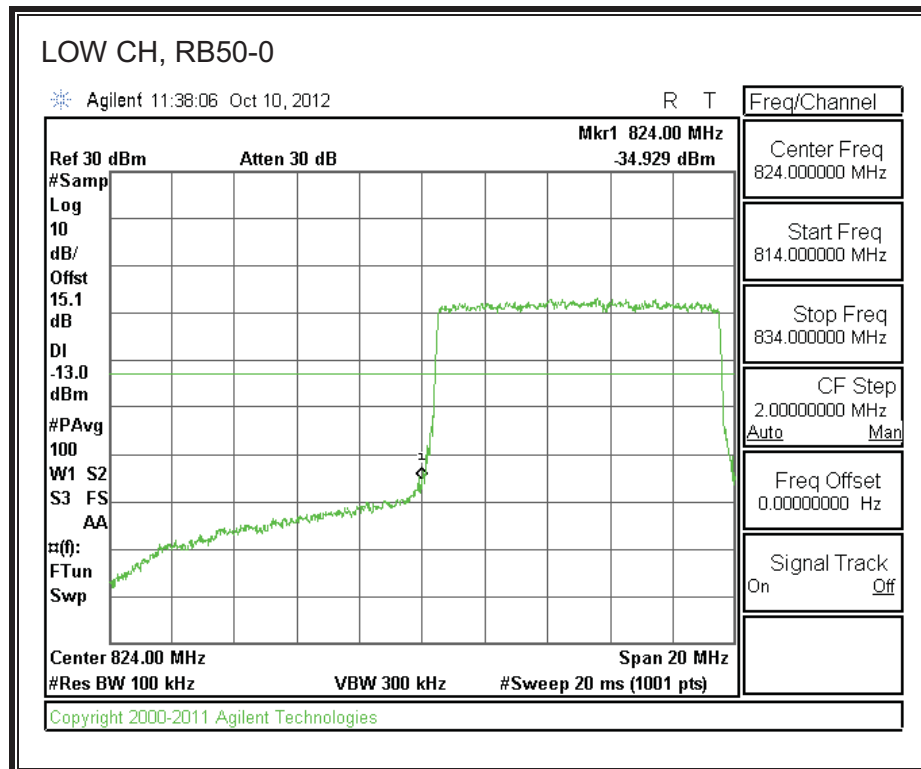




LTE 16QAM Band 5 (10 MHz BANDWIDTH)

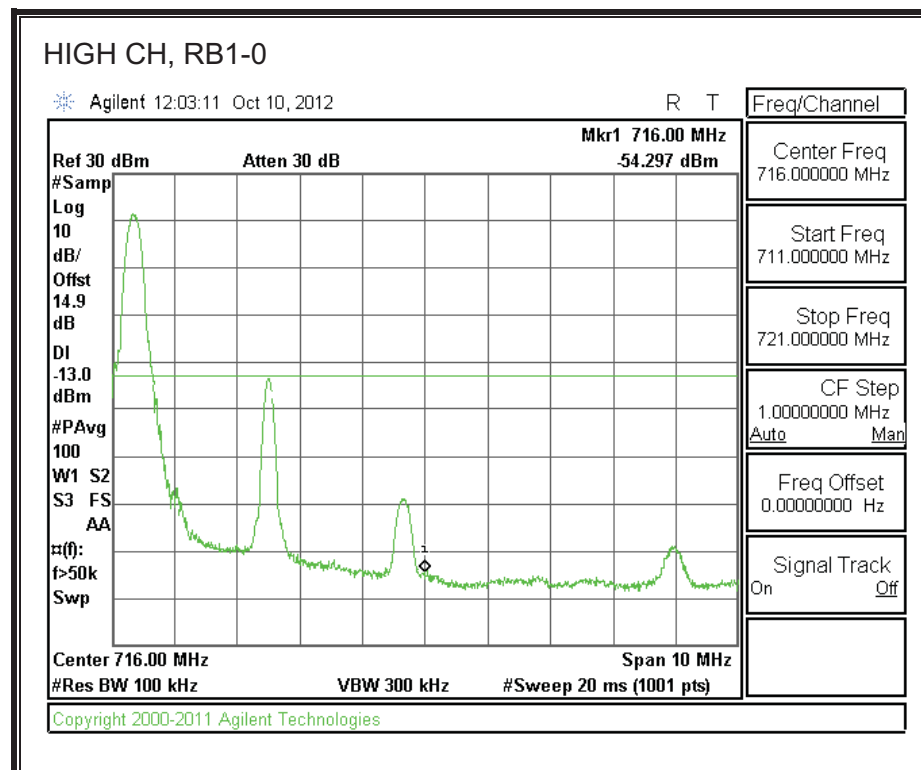
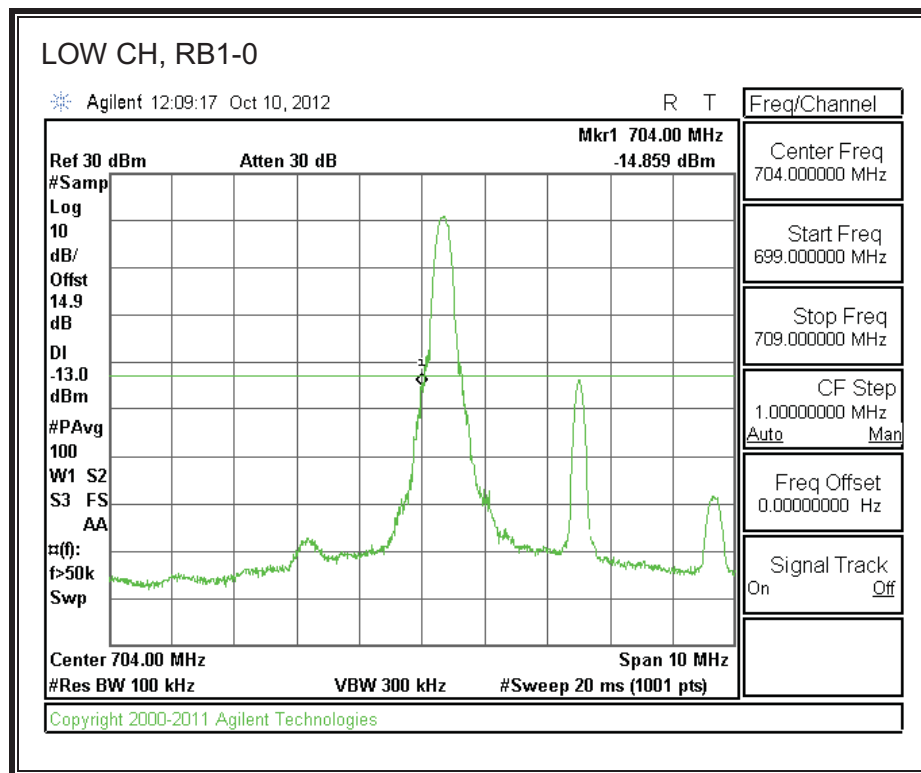


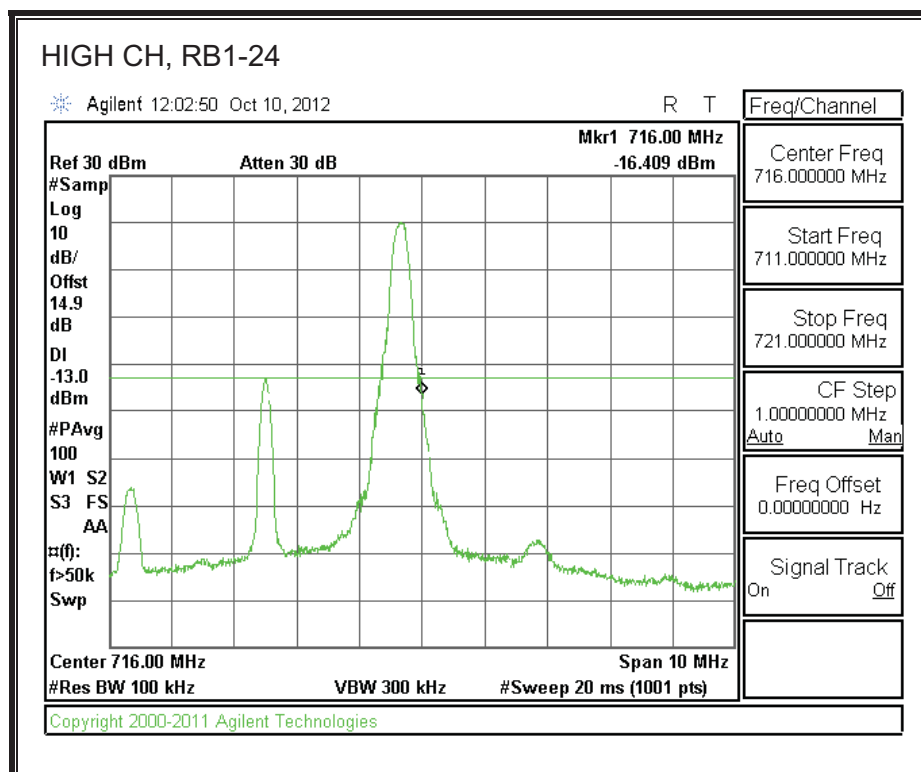
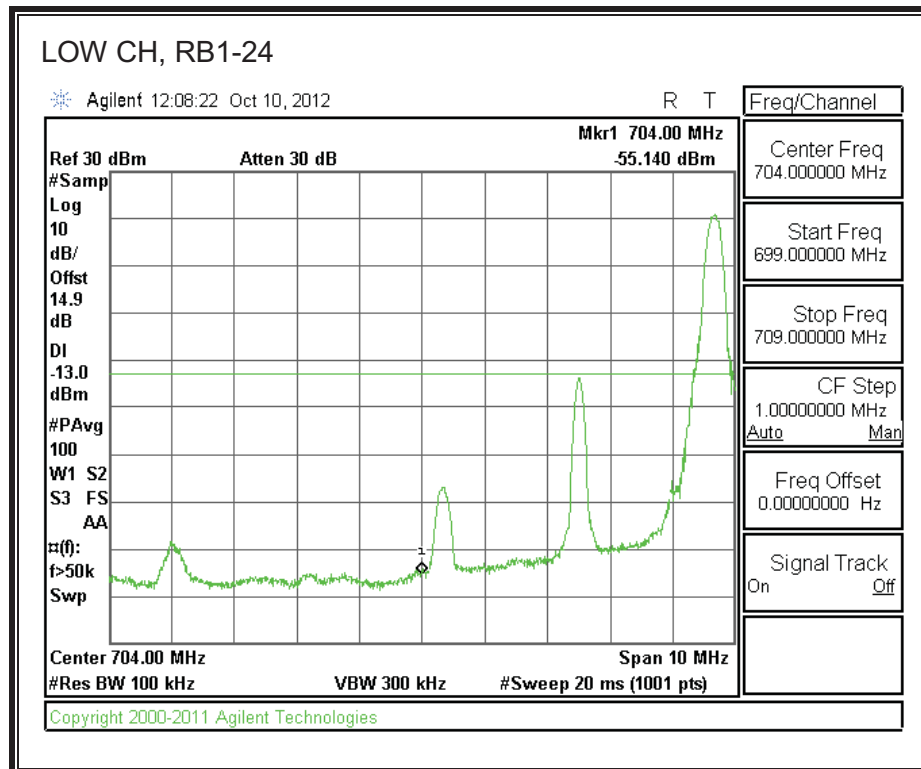


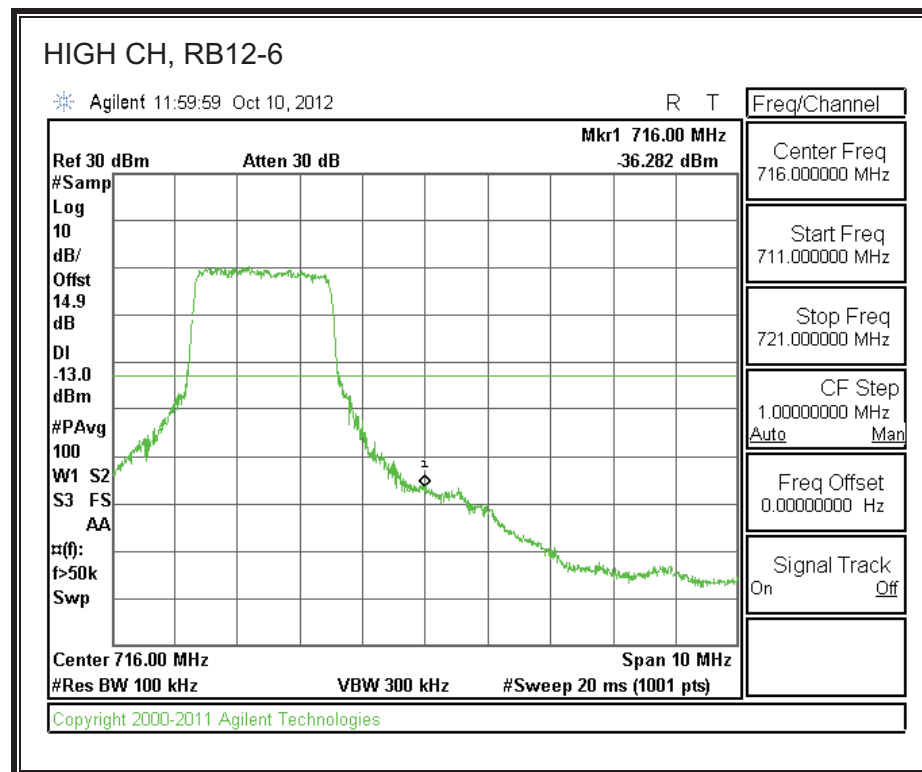
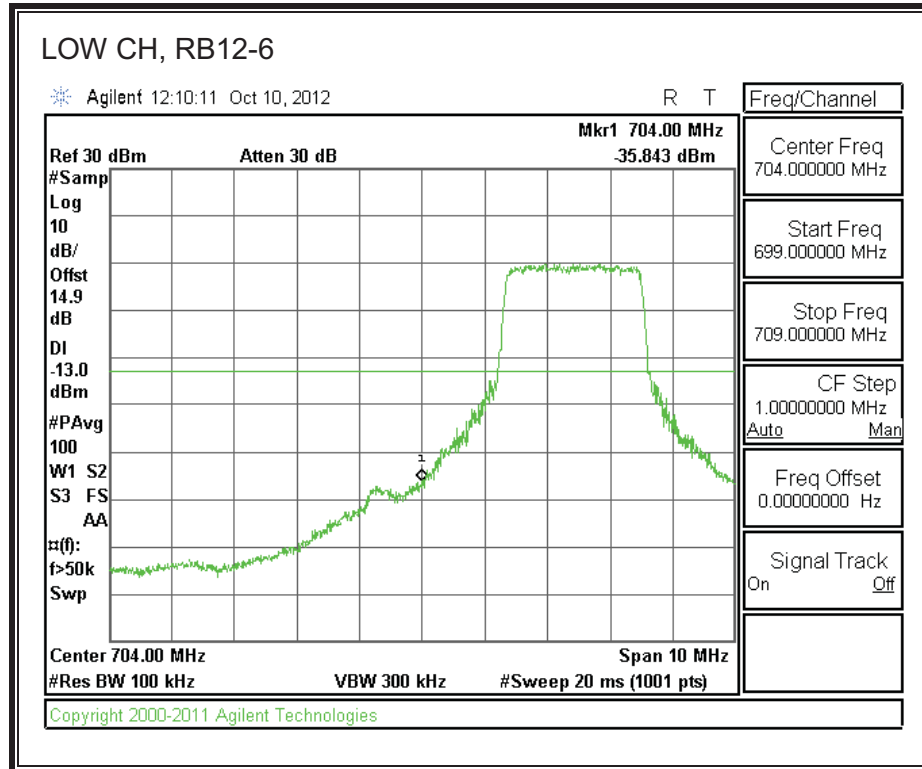


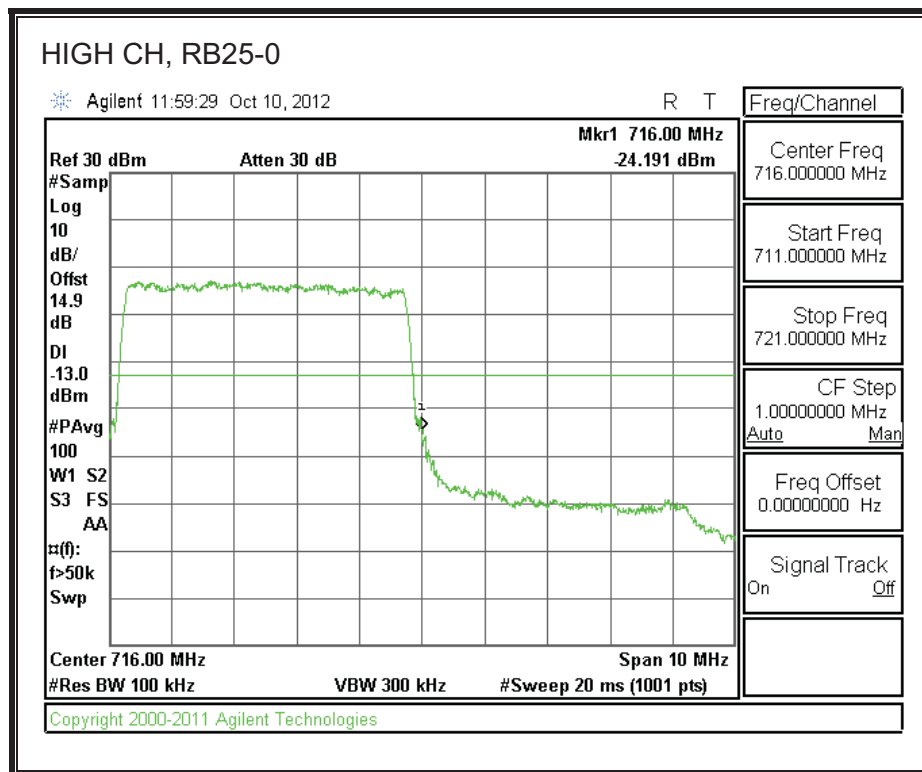
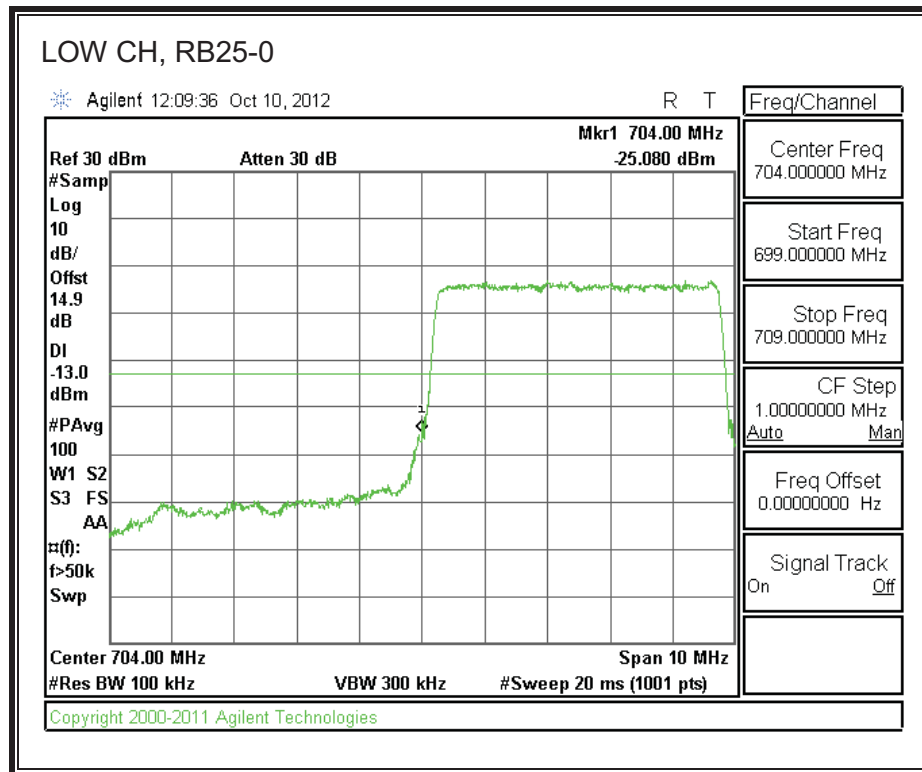
8.2.6. LTE BAND 17

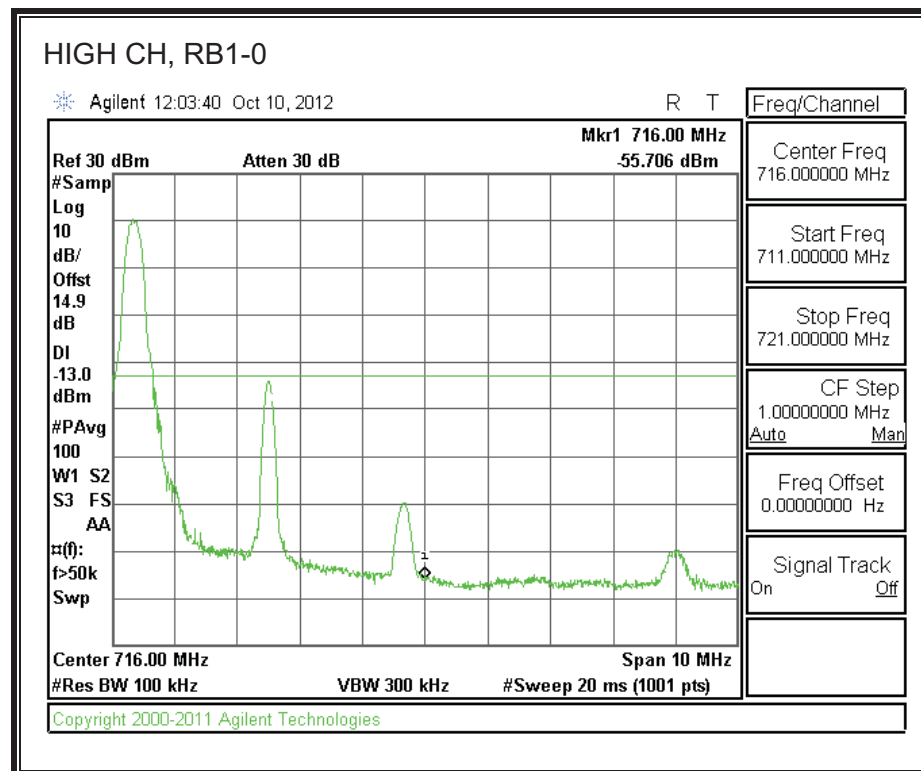
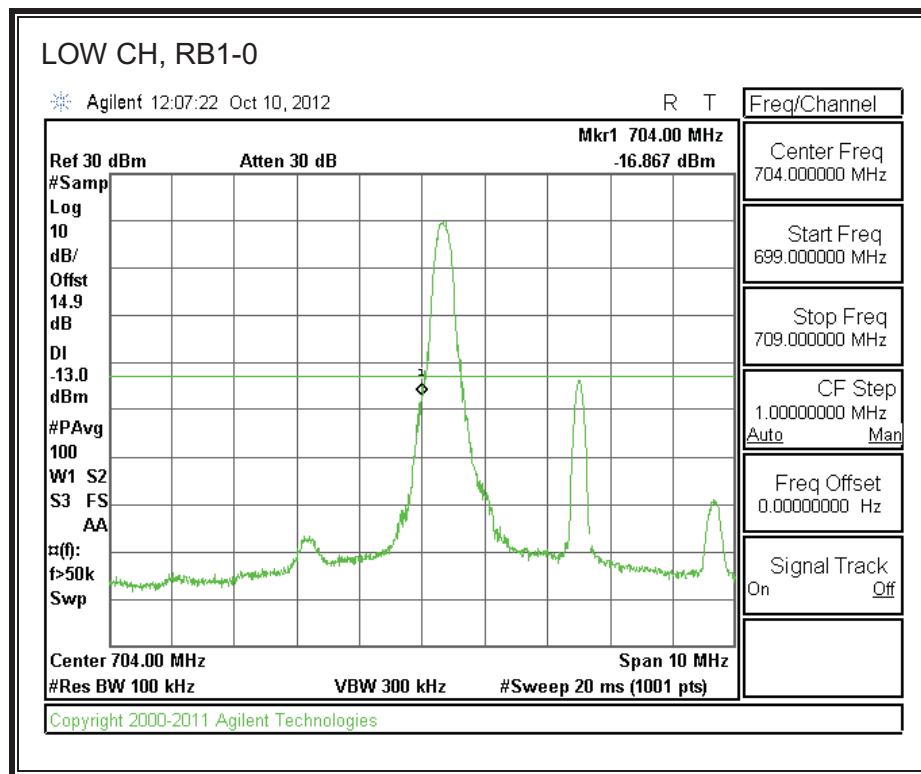
LTE QPSK Band 17 (5 MHz BANDWIDTH)

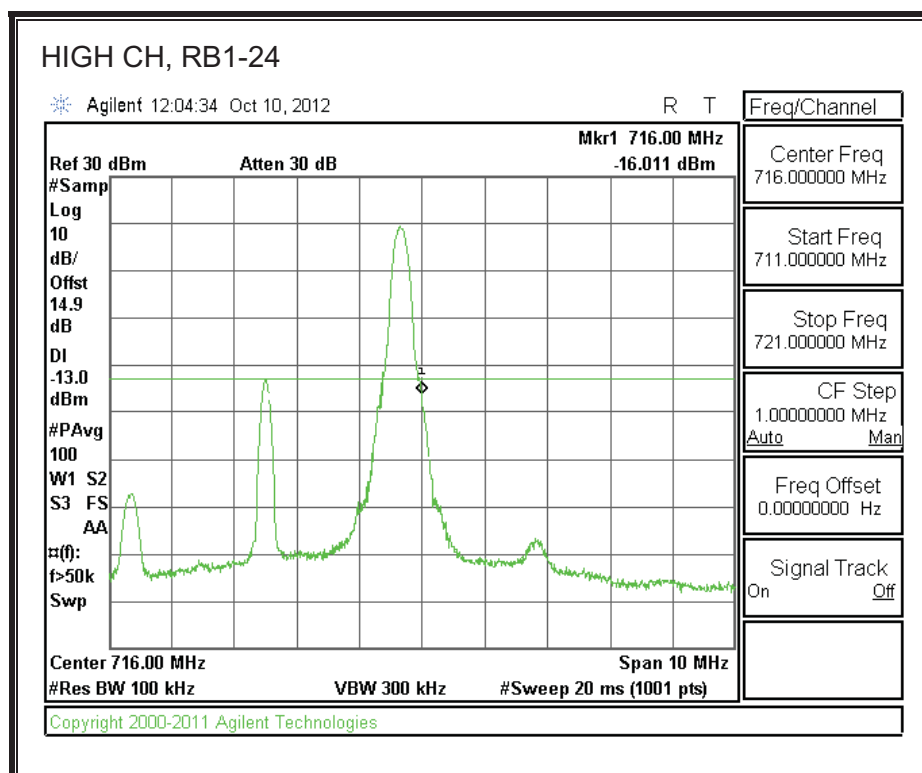
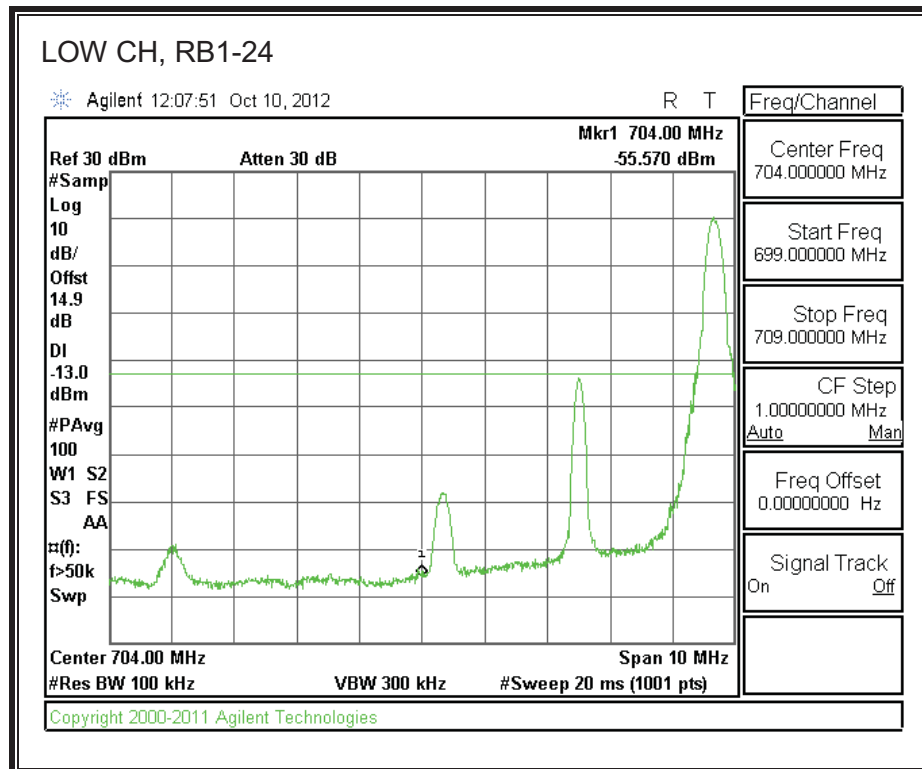


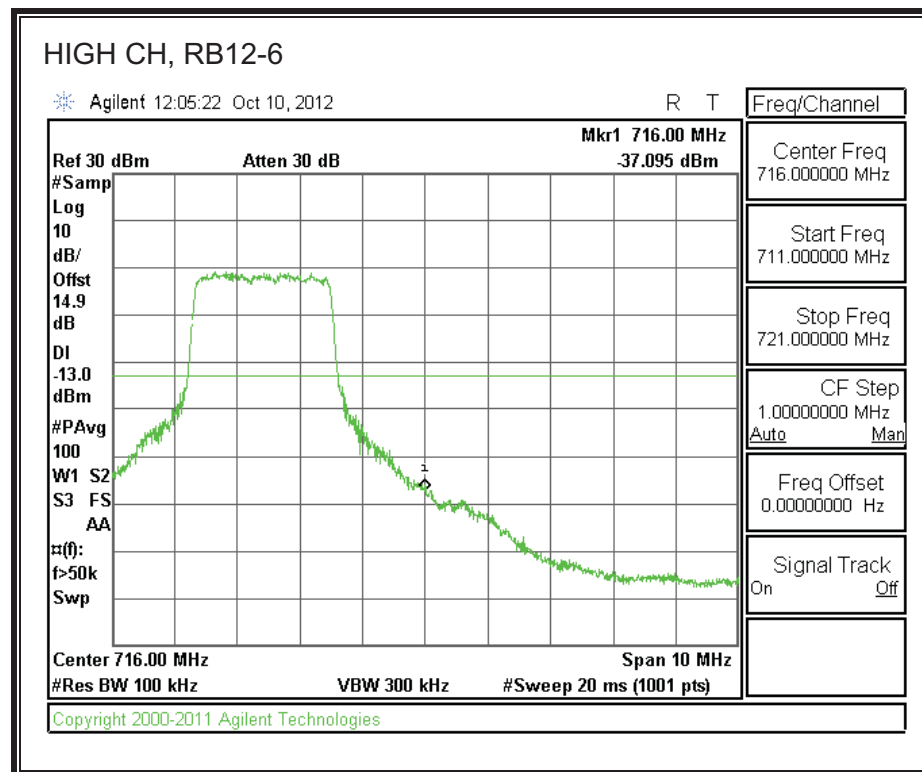
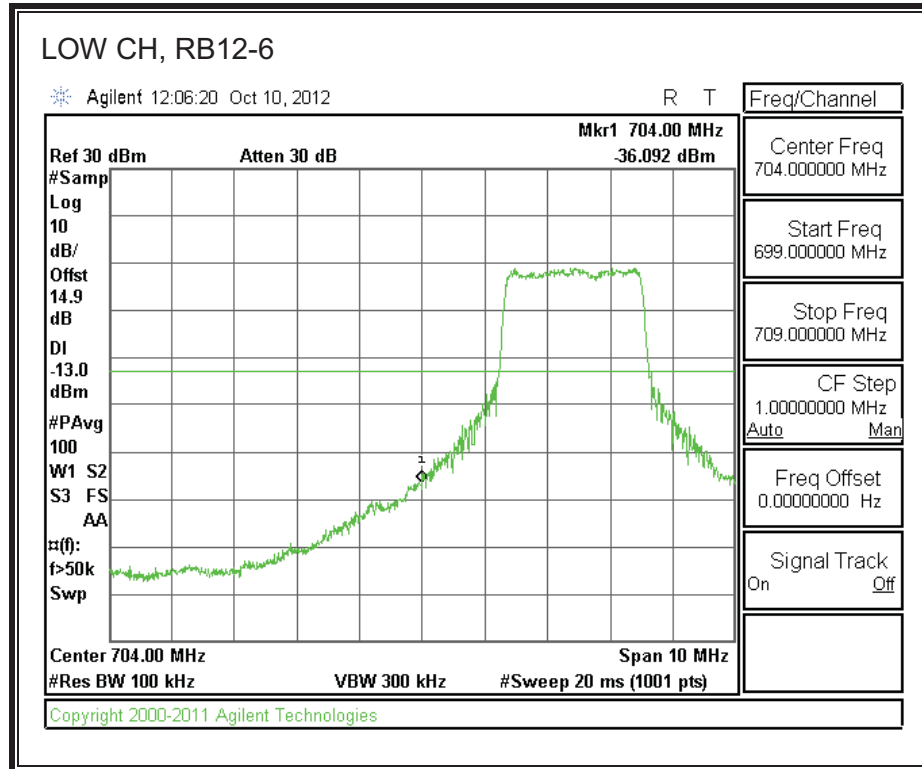


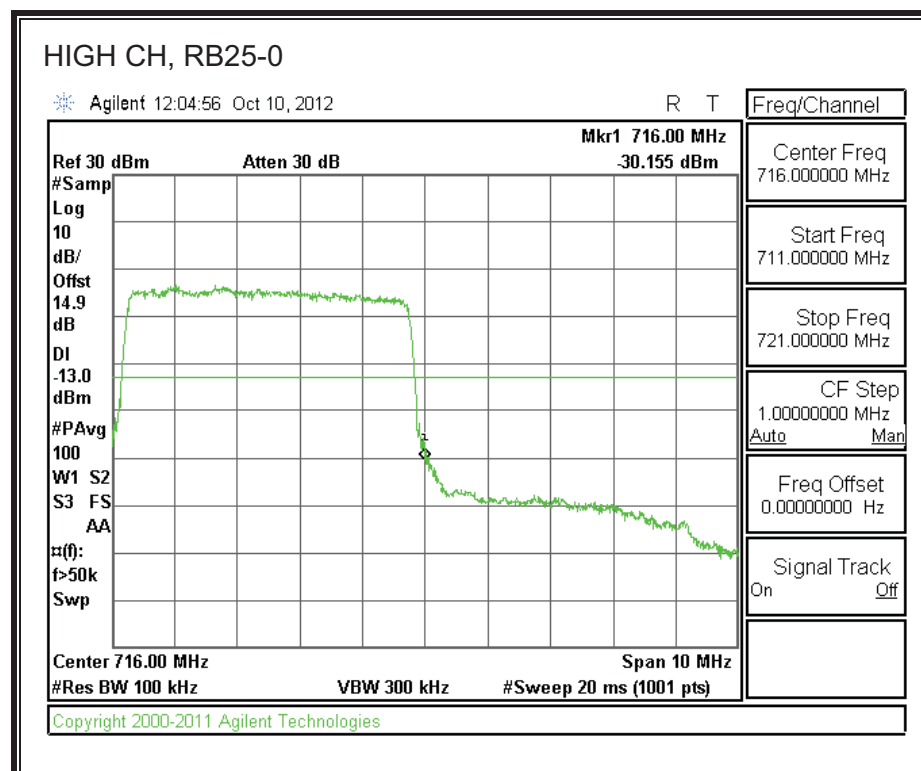
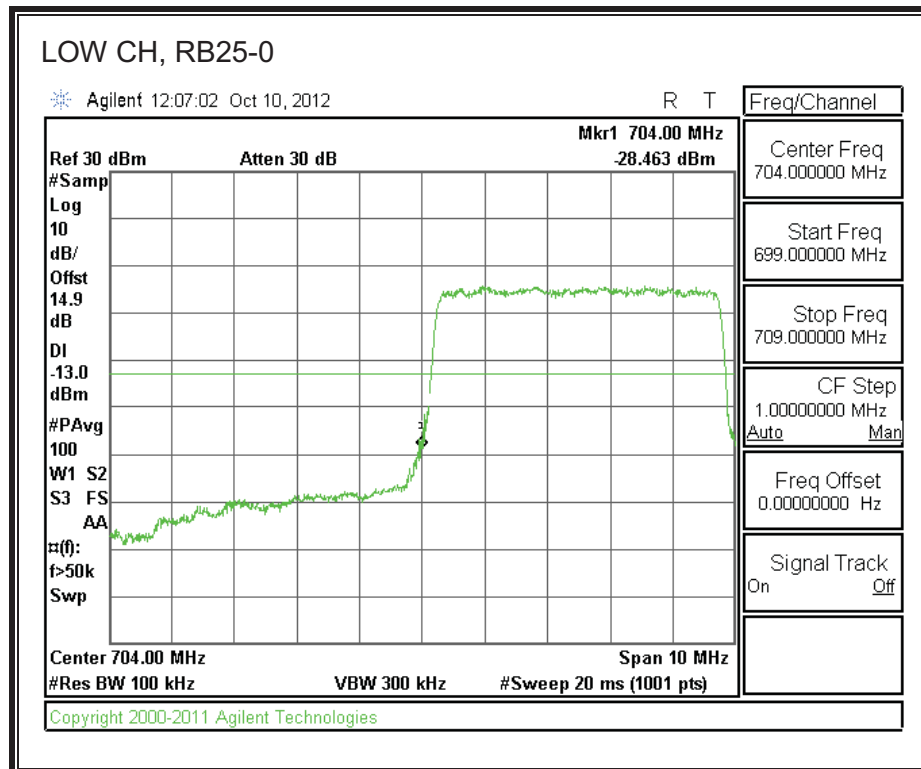


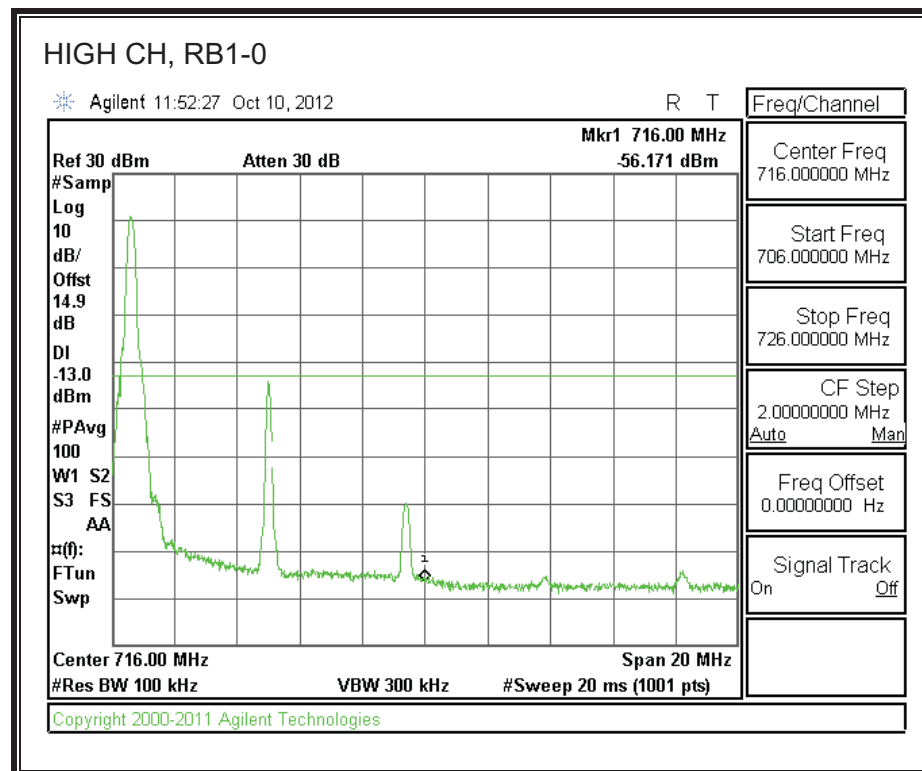
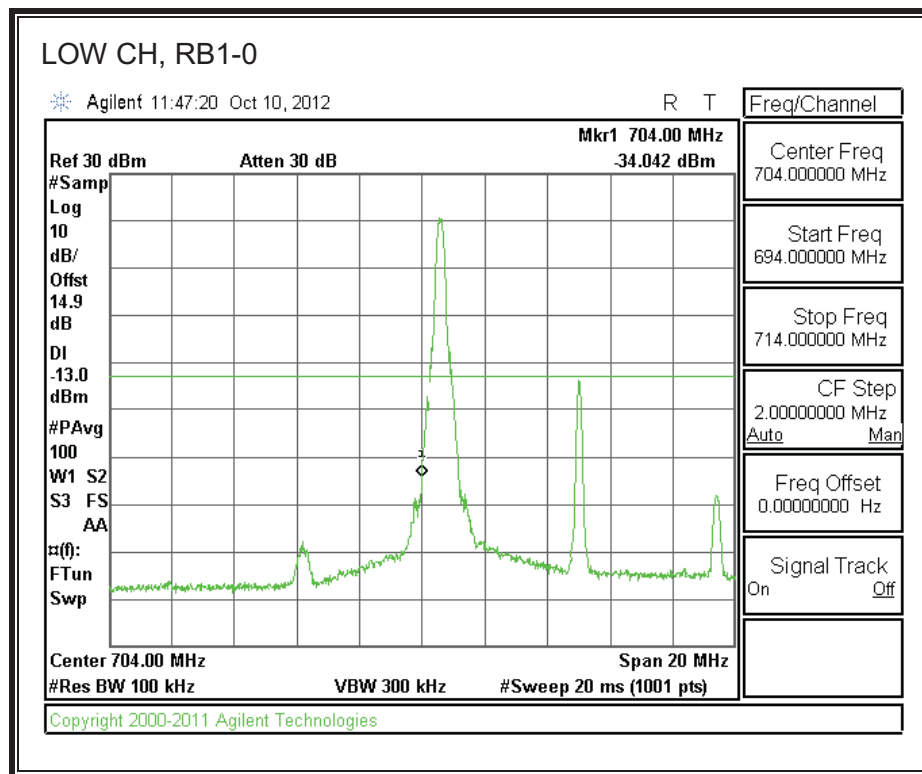


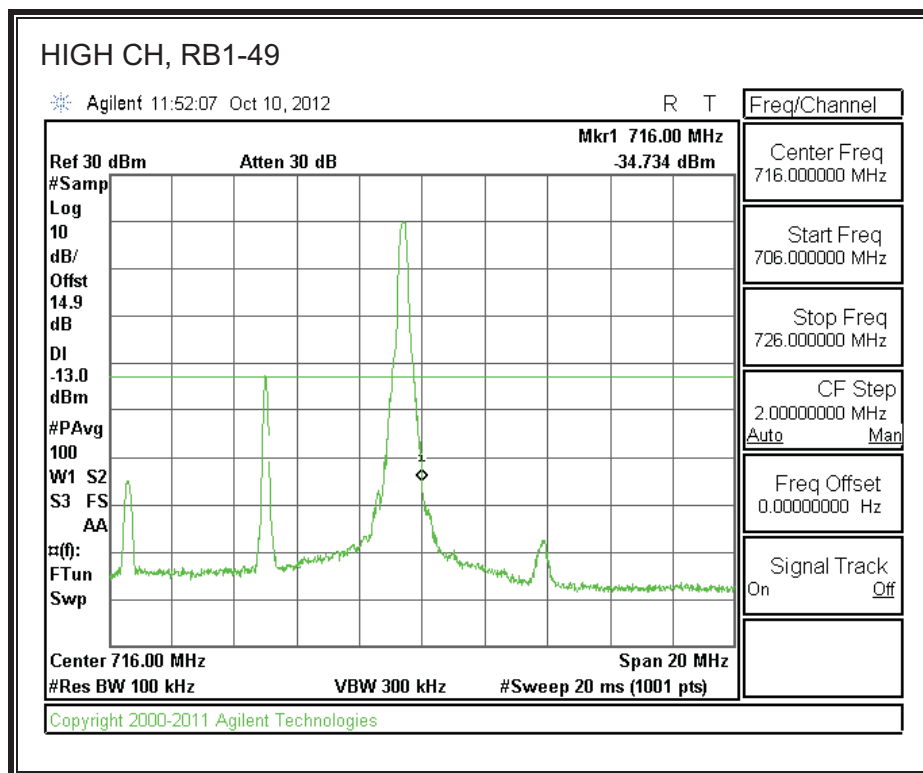
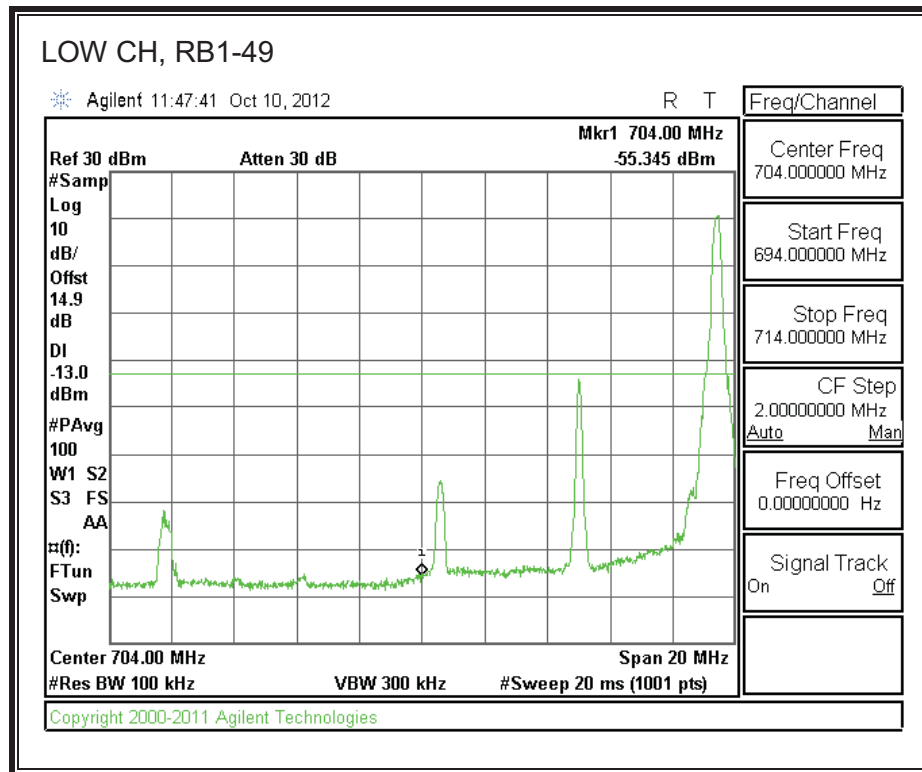
LTE 16QAM Band 17 (5 MHz BANDWIDTH)

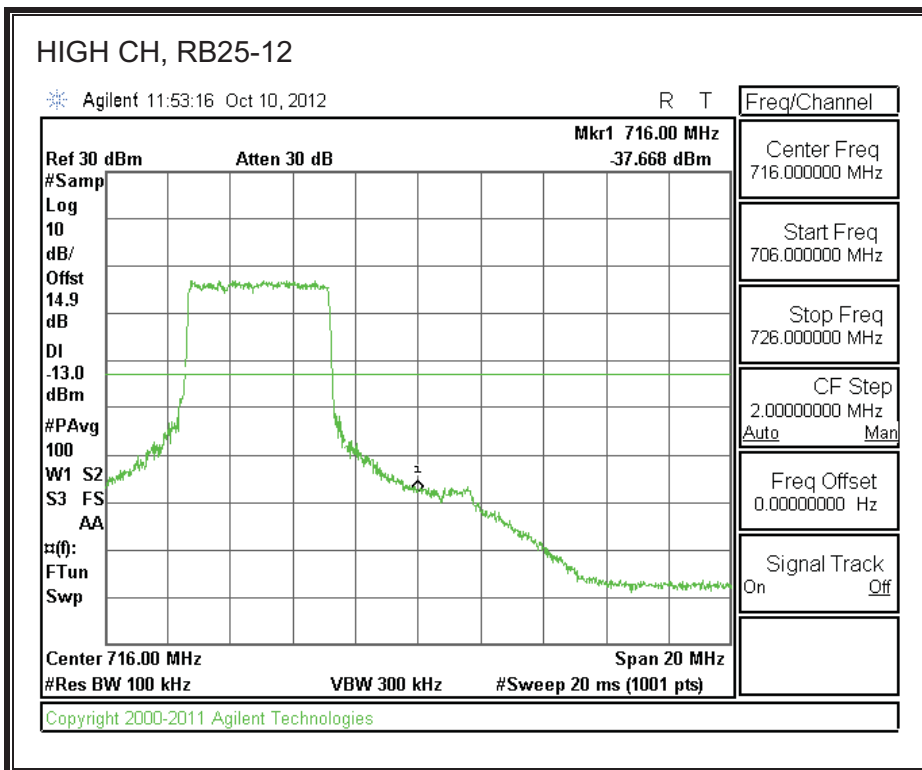
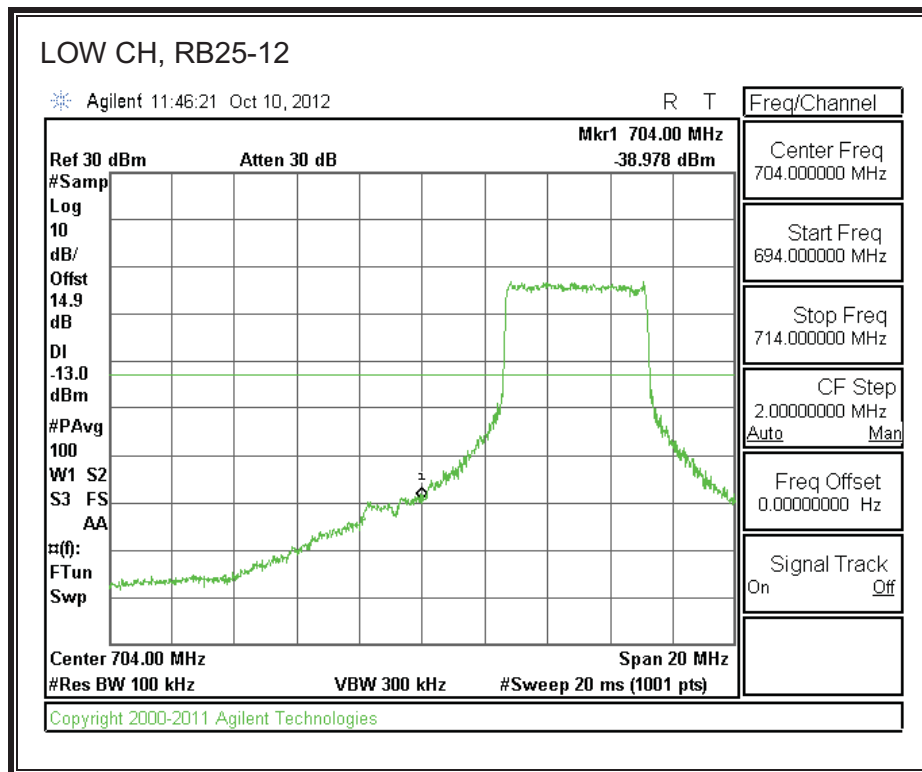


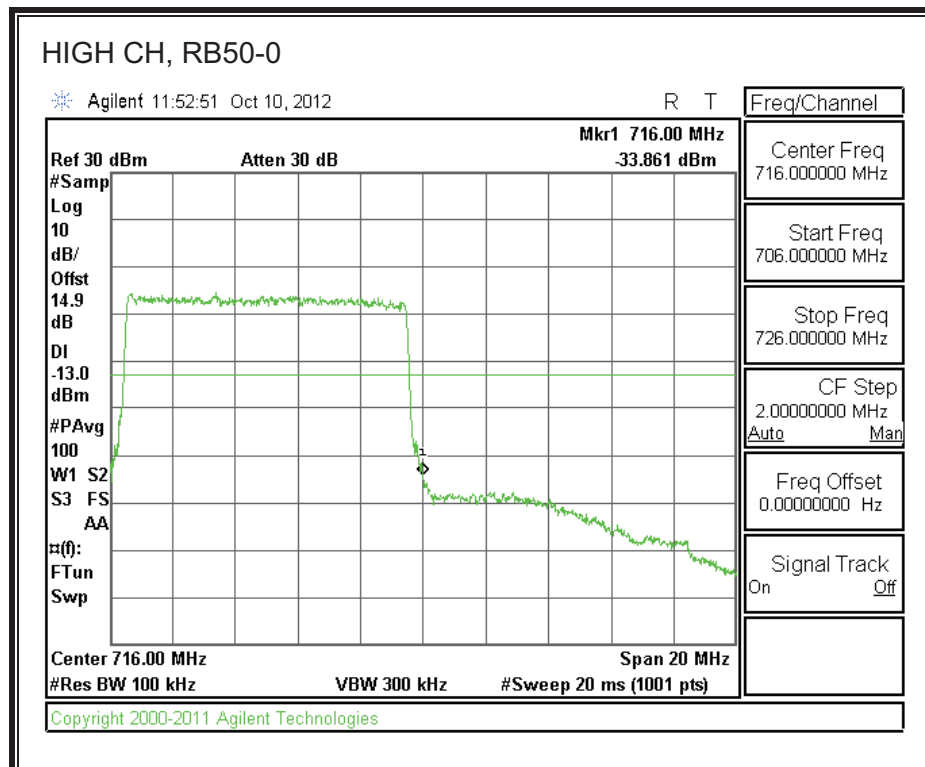
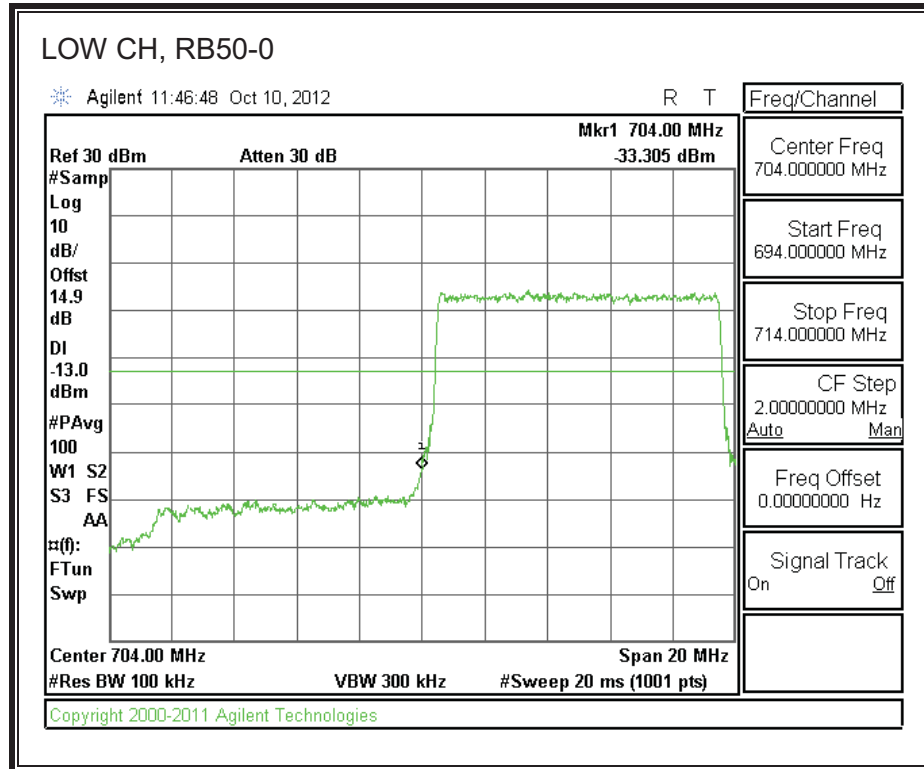


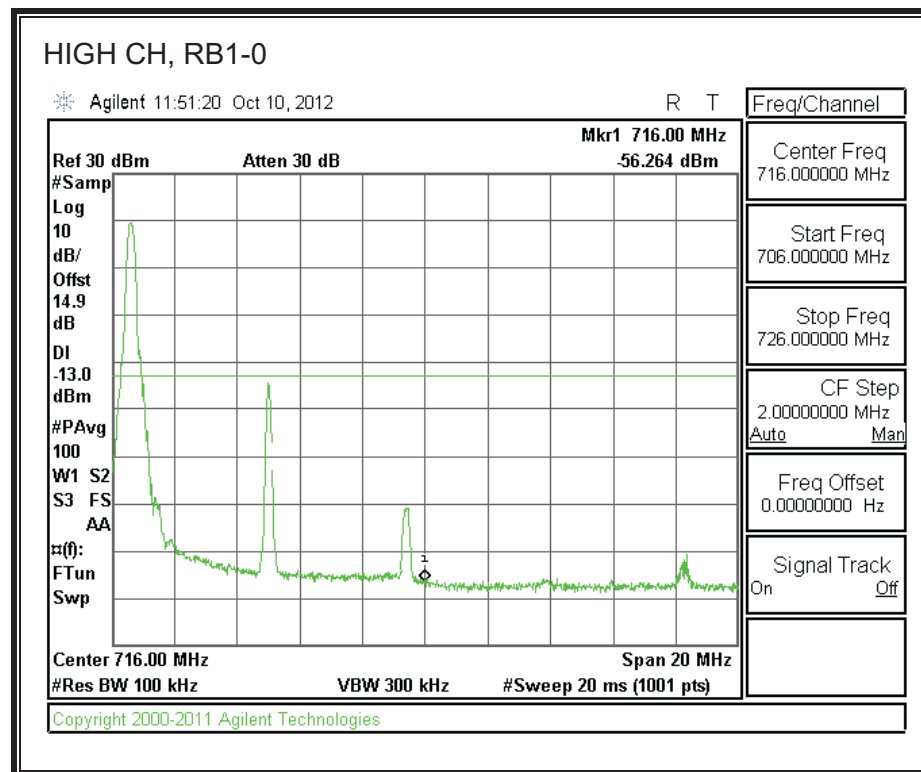
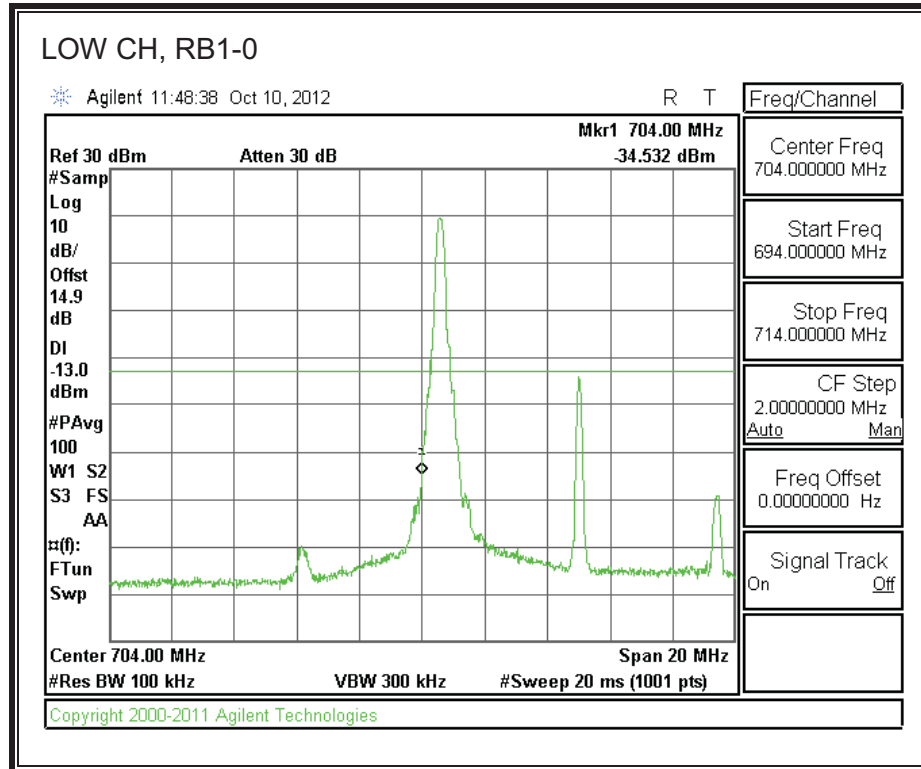


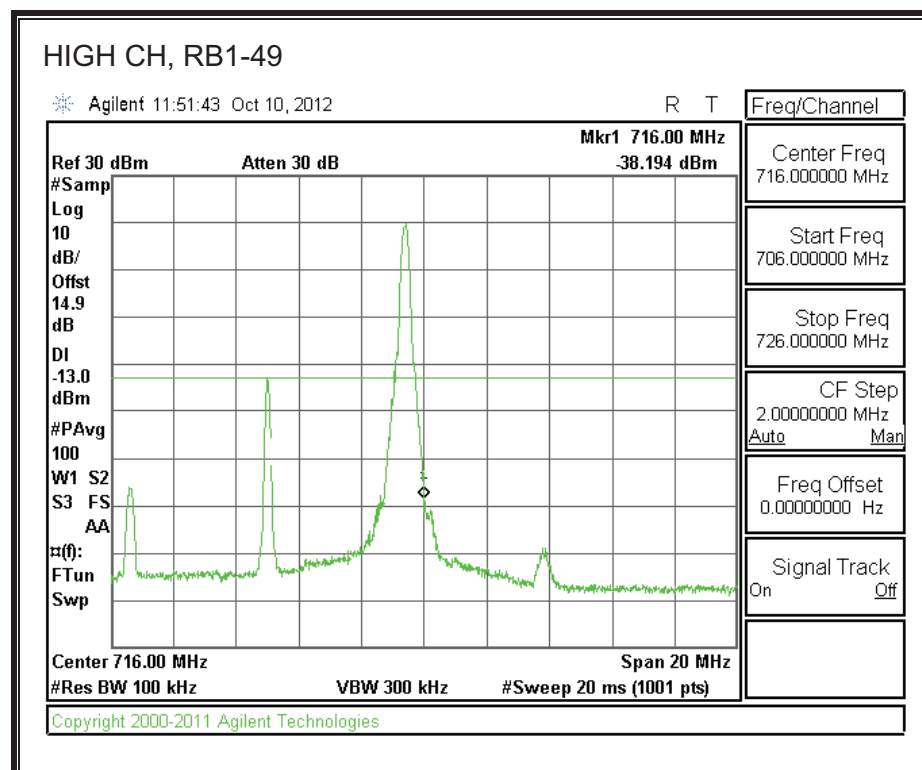
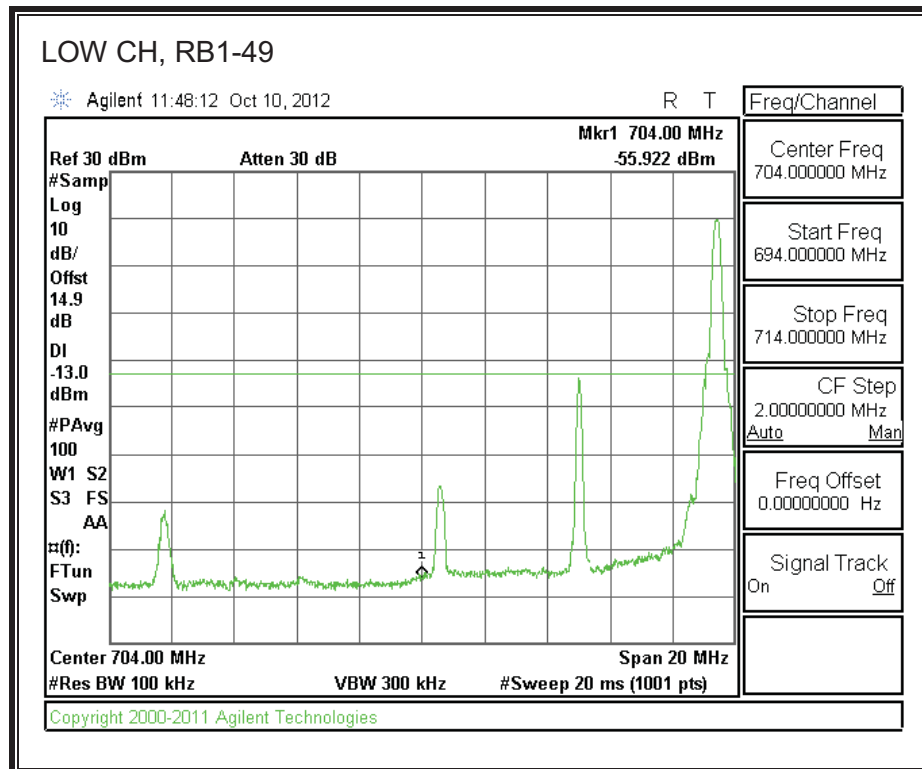
LTE QPSK Band 17 (10 MHz BANDWIDTH)

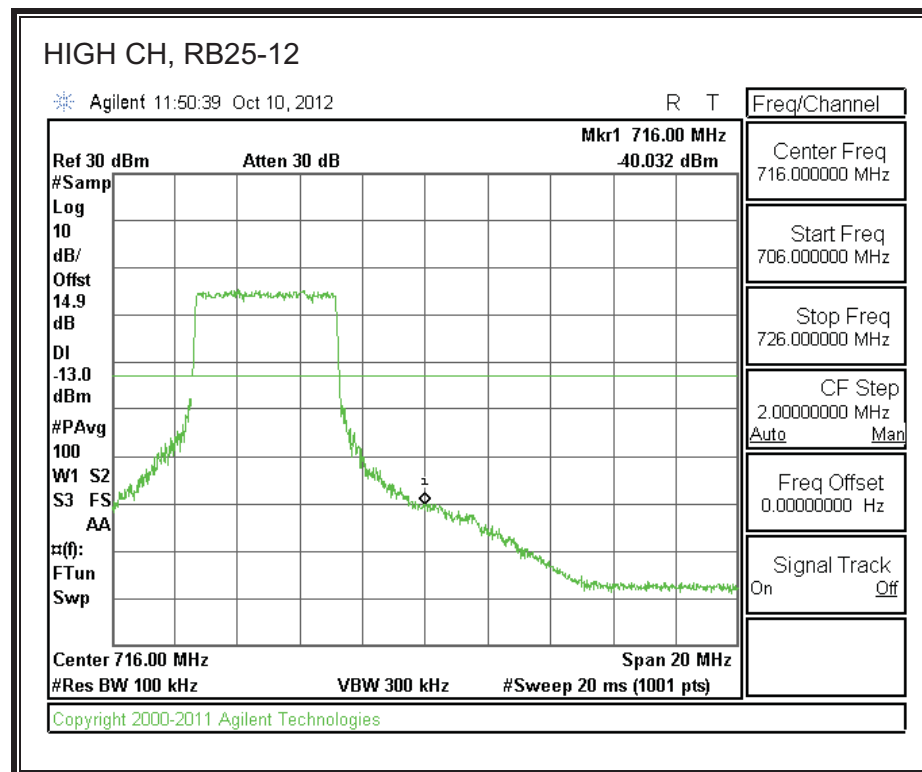
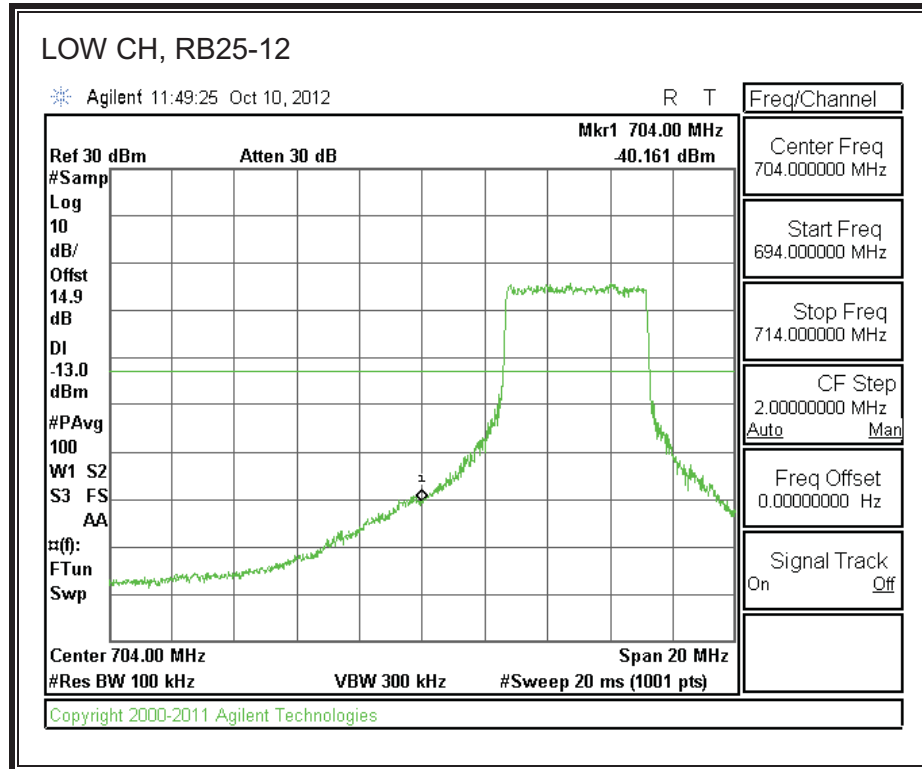


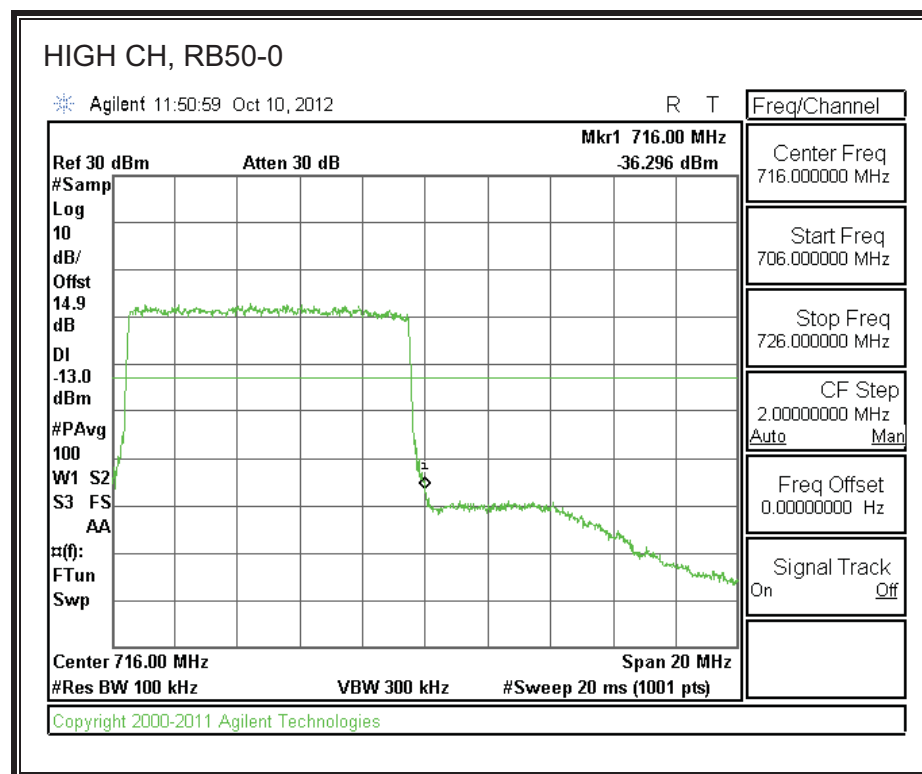
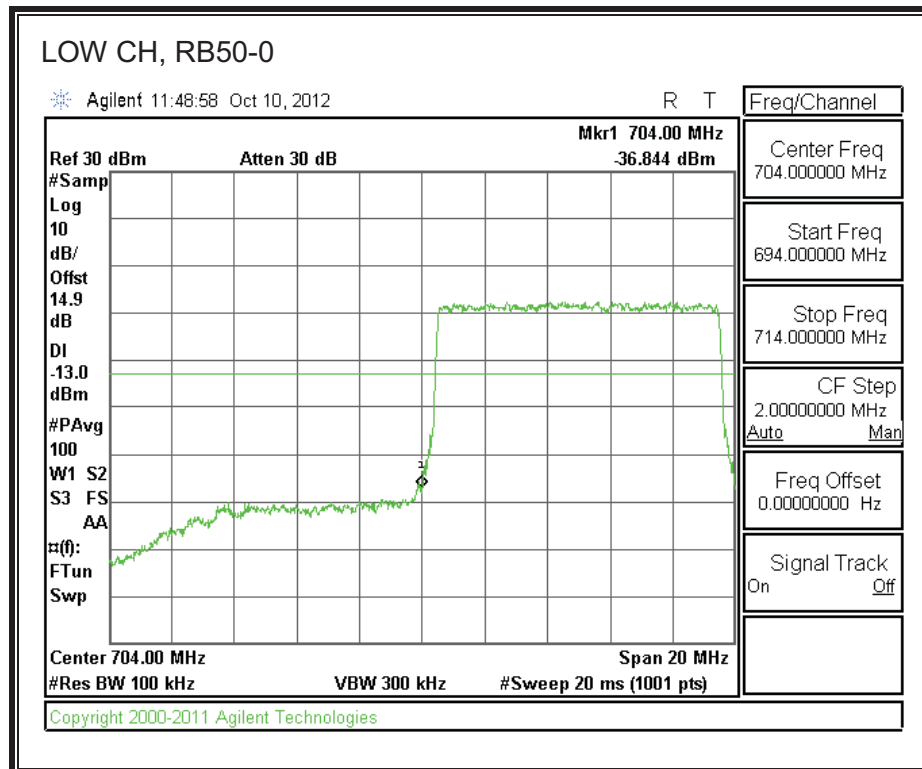




LTE 16QAM Band 17 (10 MHz BANDWIDTH)







8.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238

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

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.

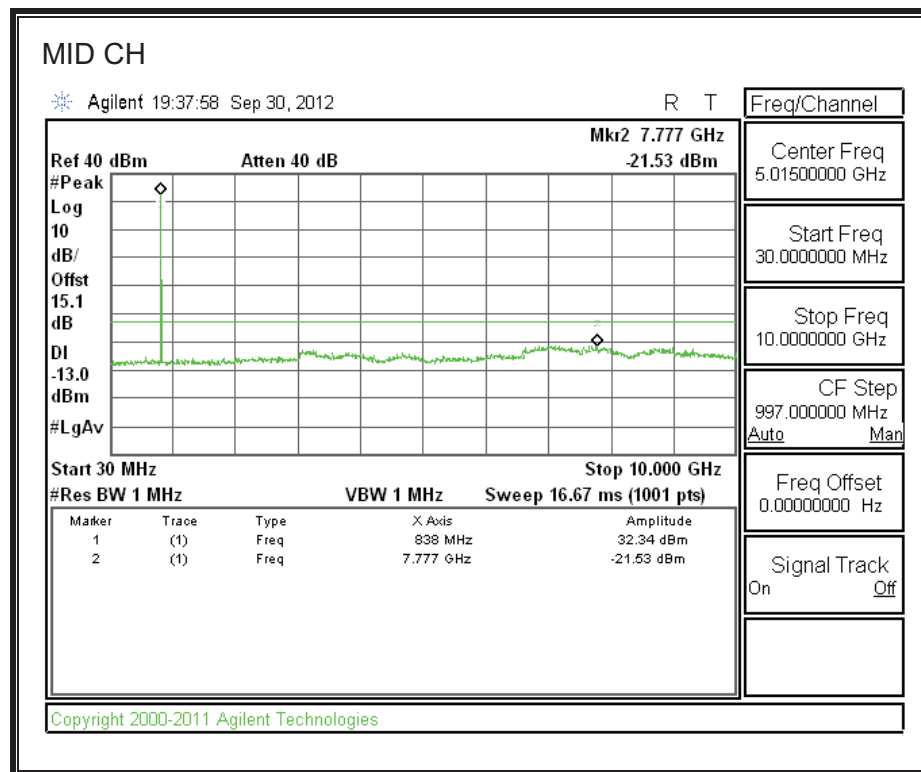
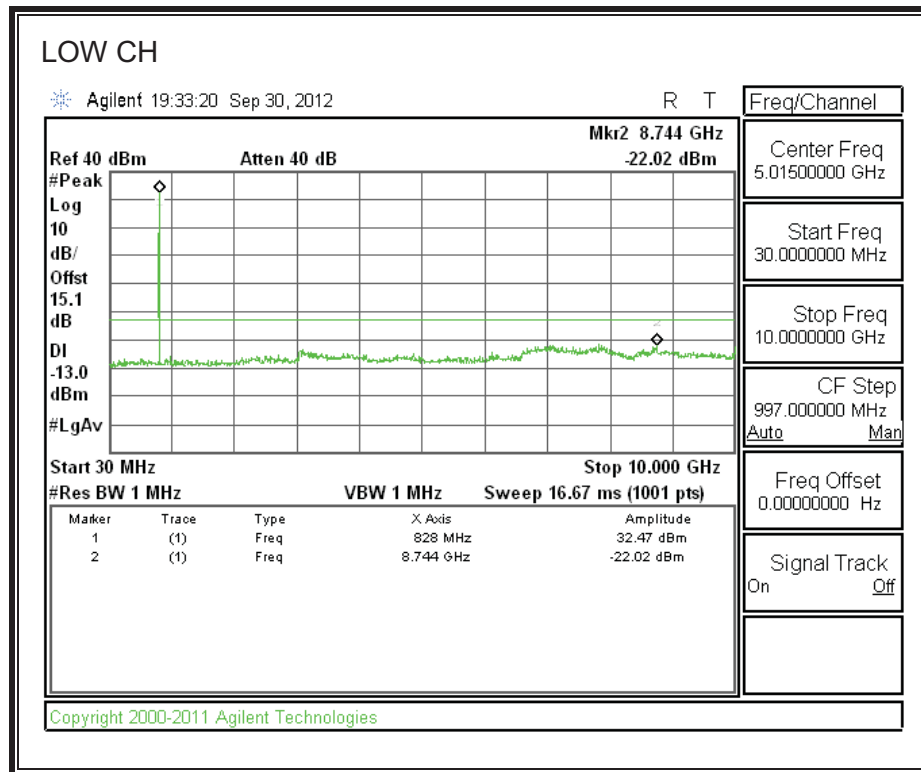
For each out of band emissions measurement:

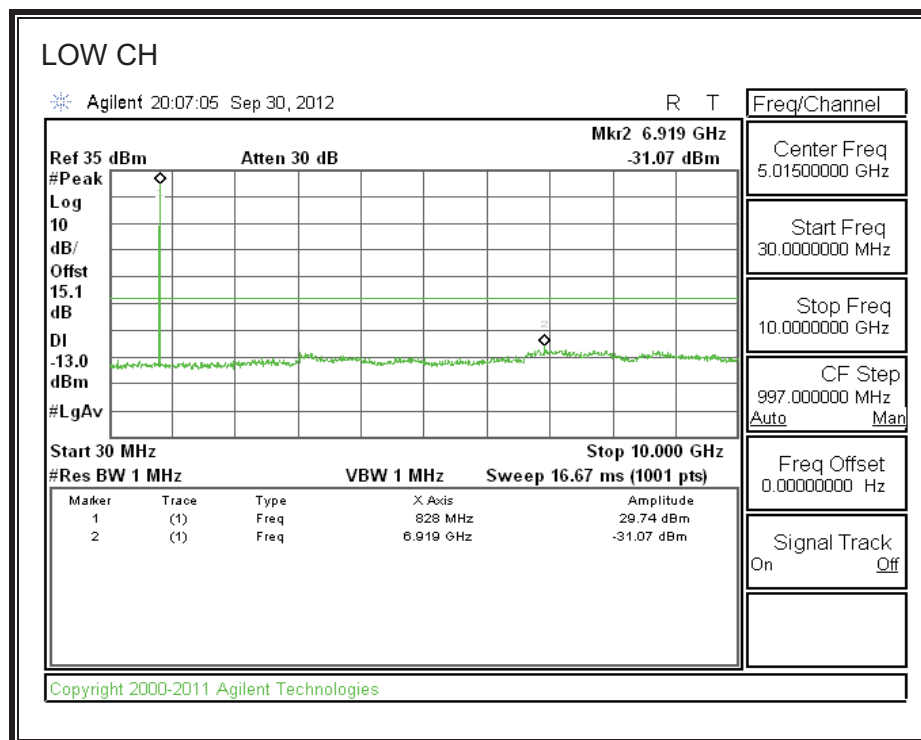
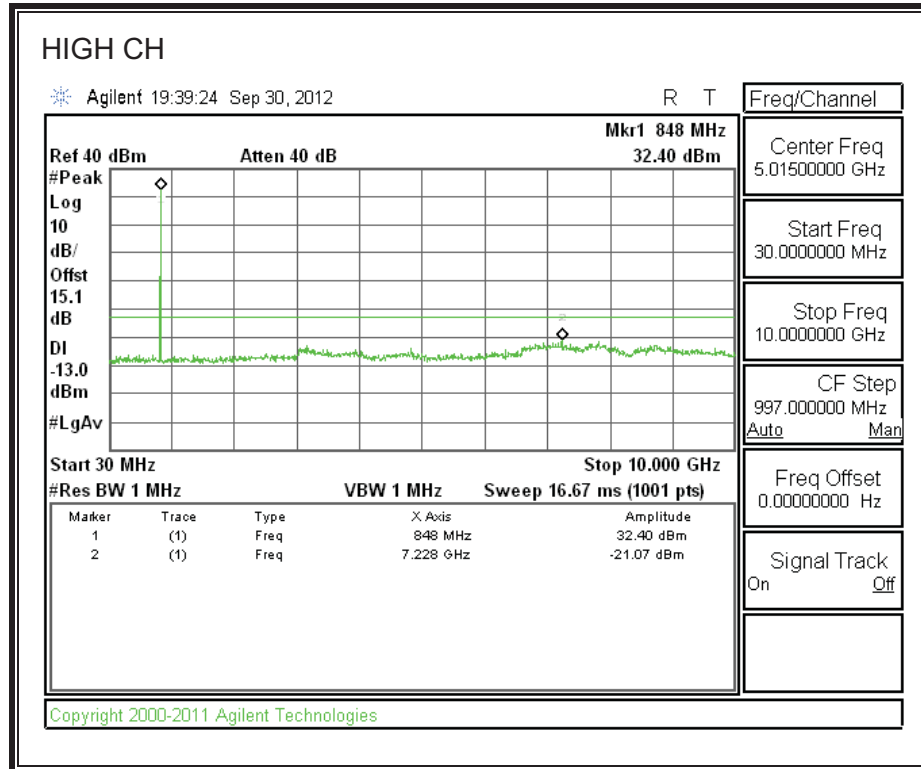
- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

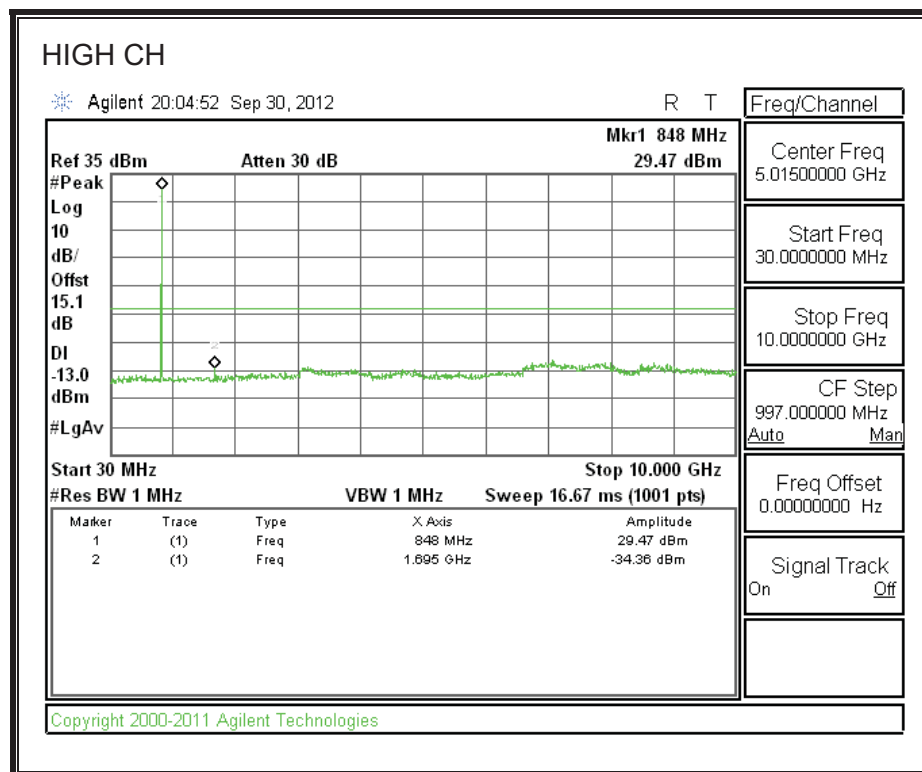
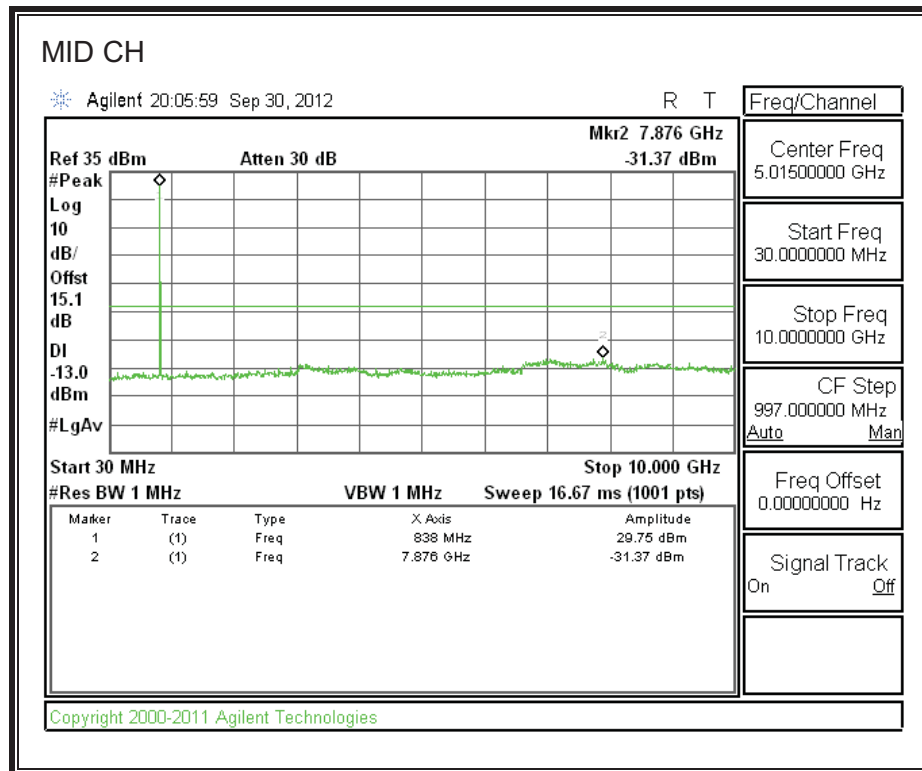
MODES TESTED

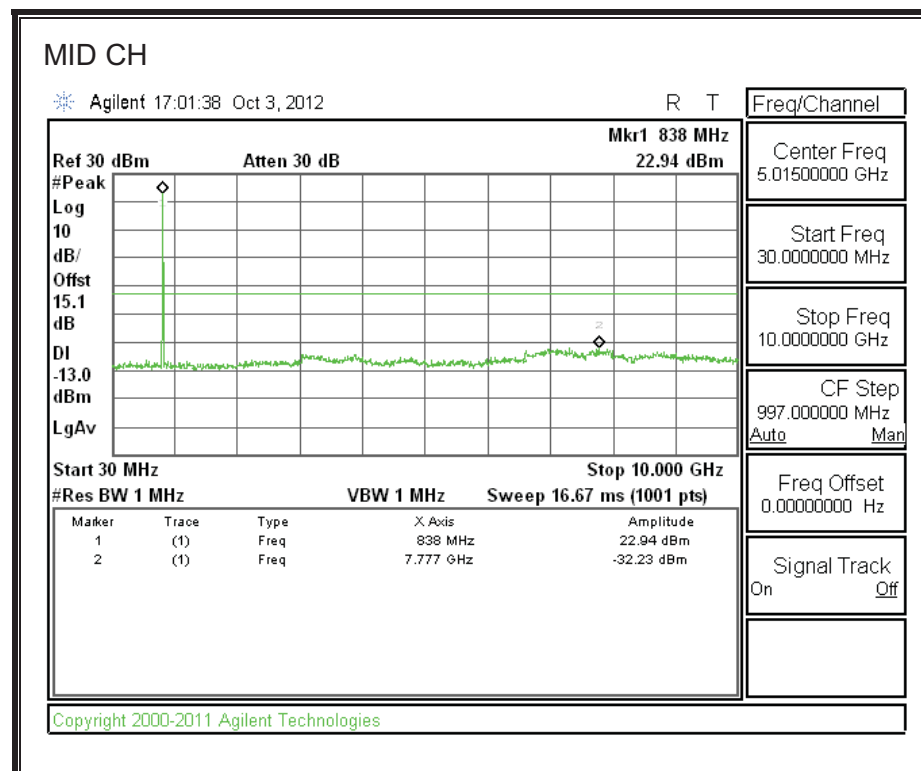
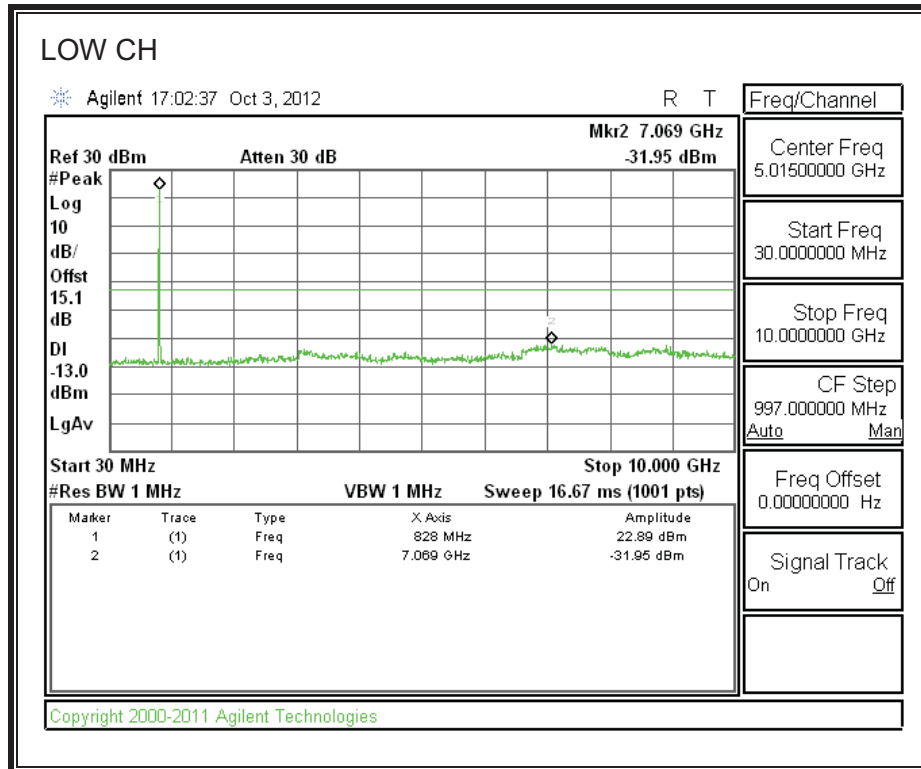
- GPRS and EGPRS
- WCDMA, REL 99 and HSDPA
- LTE BAND 2, 4, 5 and 17

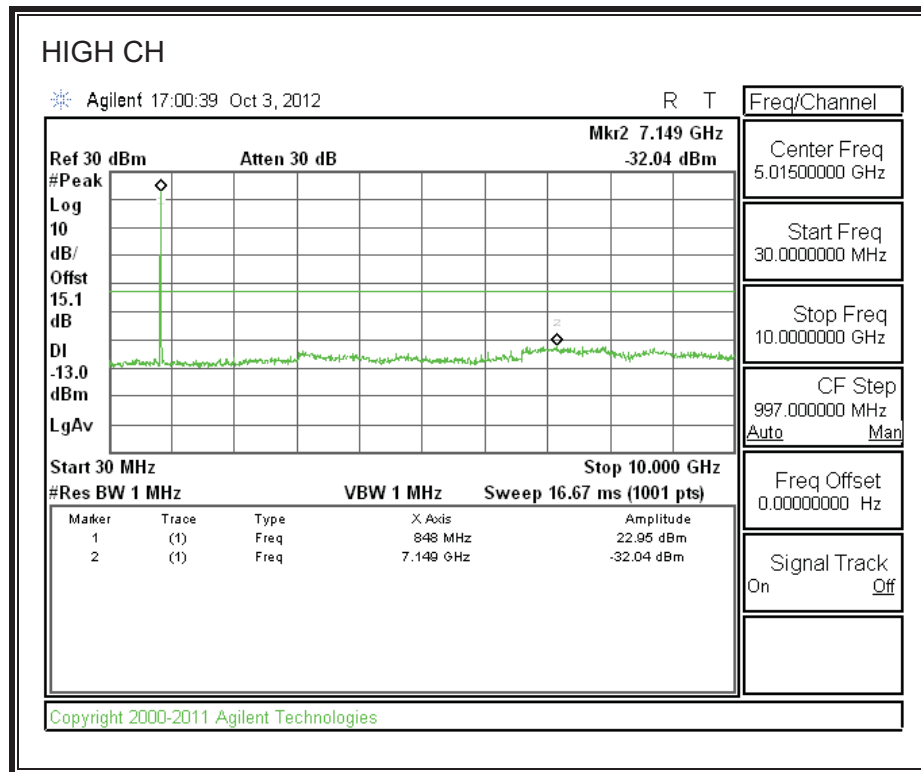
RESULTS

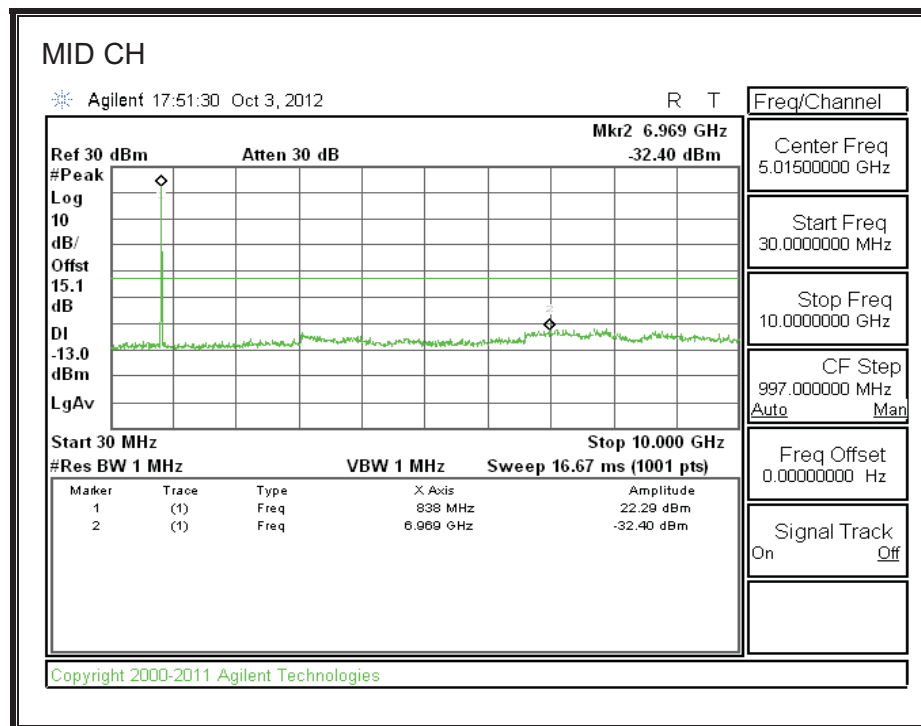
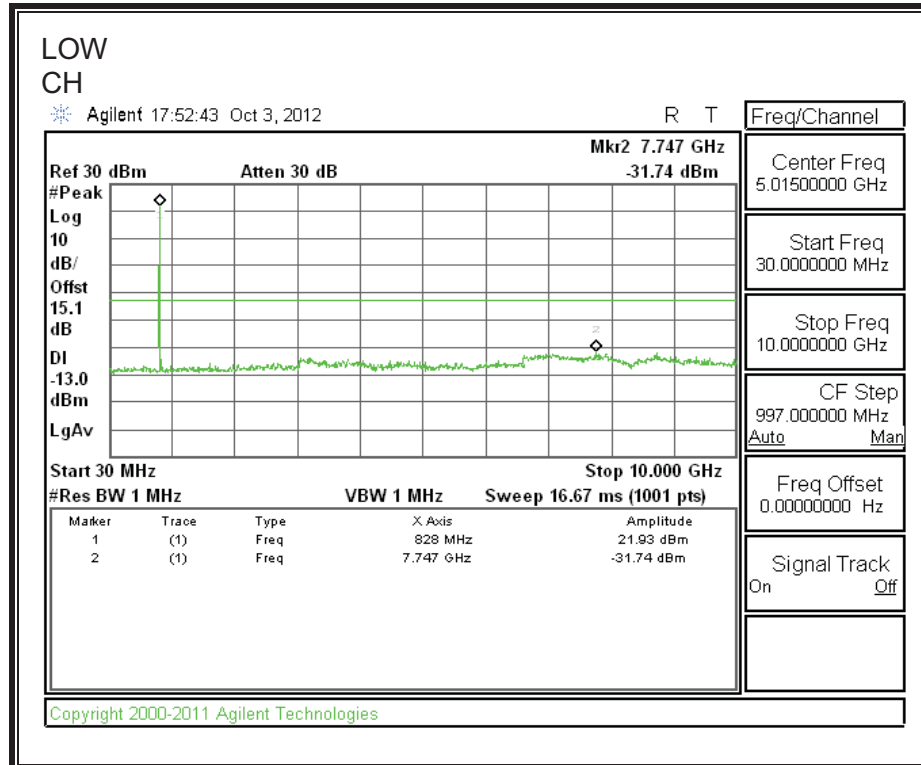
GPRS Mode (Cellular Band)

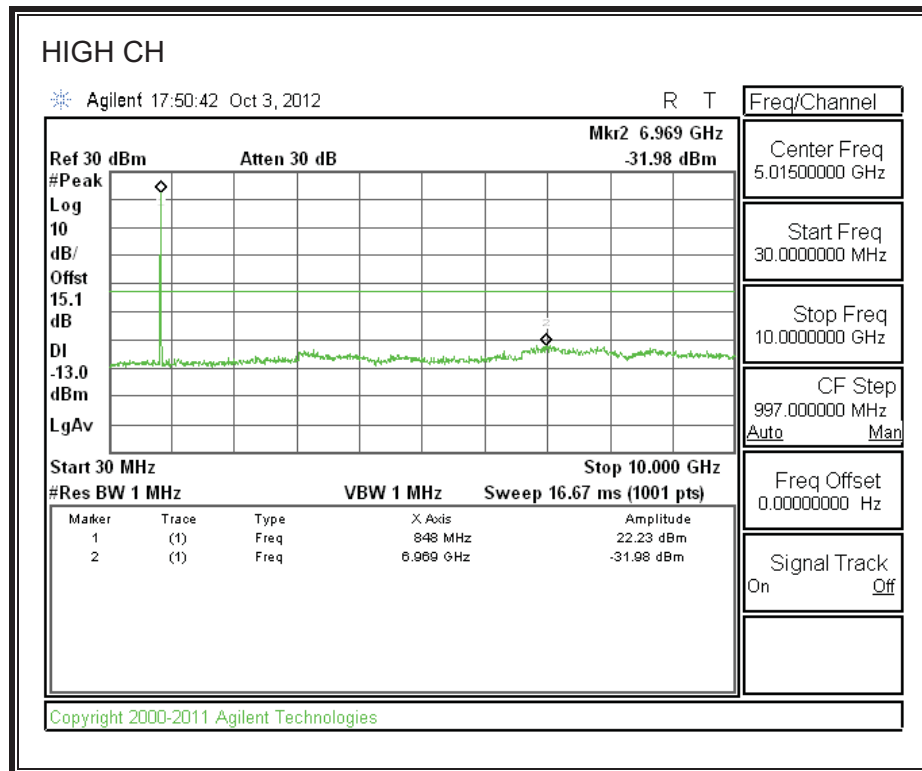
EGPRS Mode (Cellular Band)

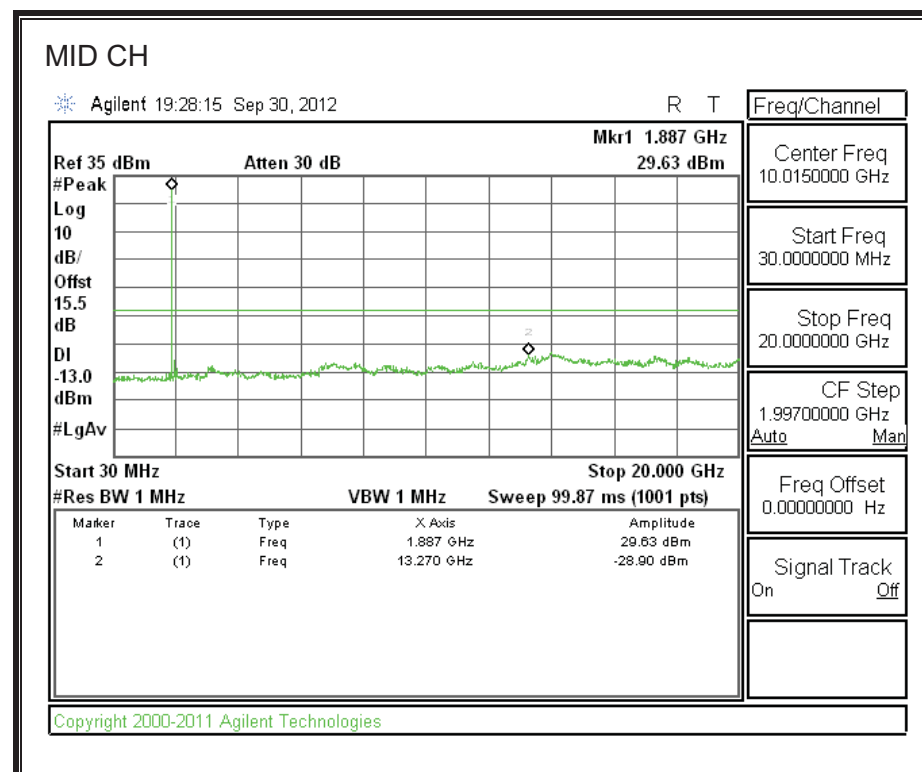
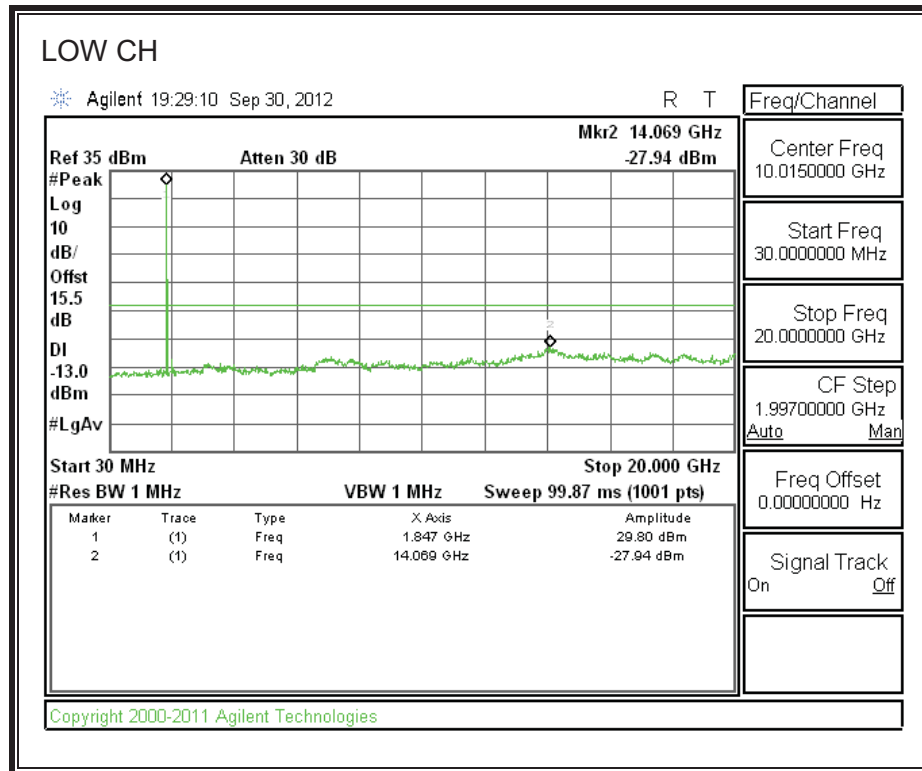


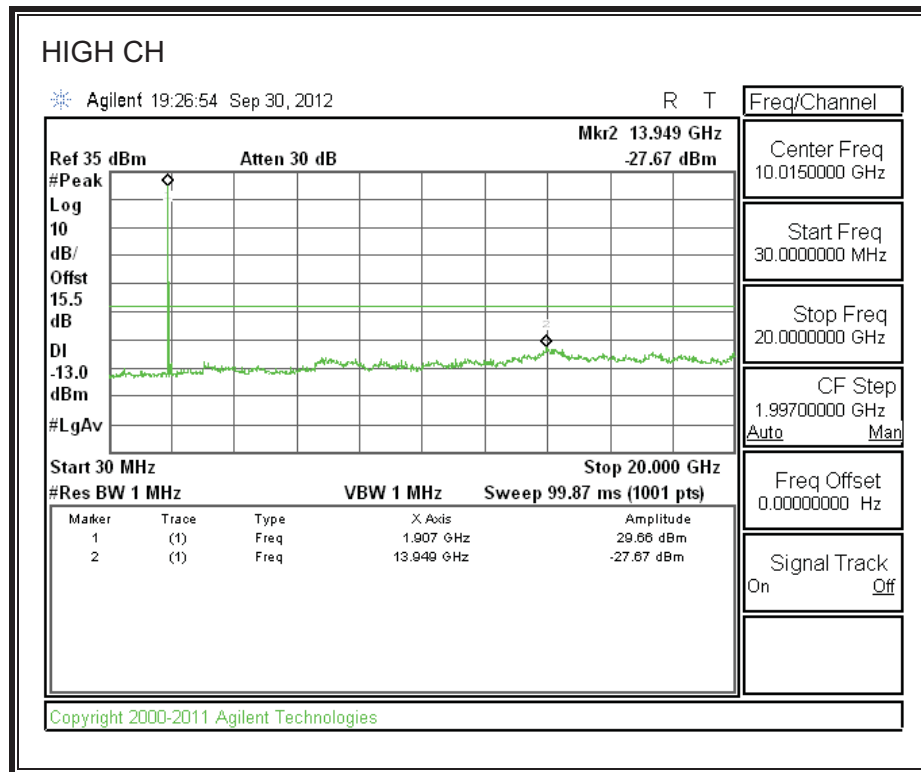
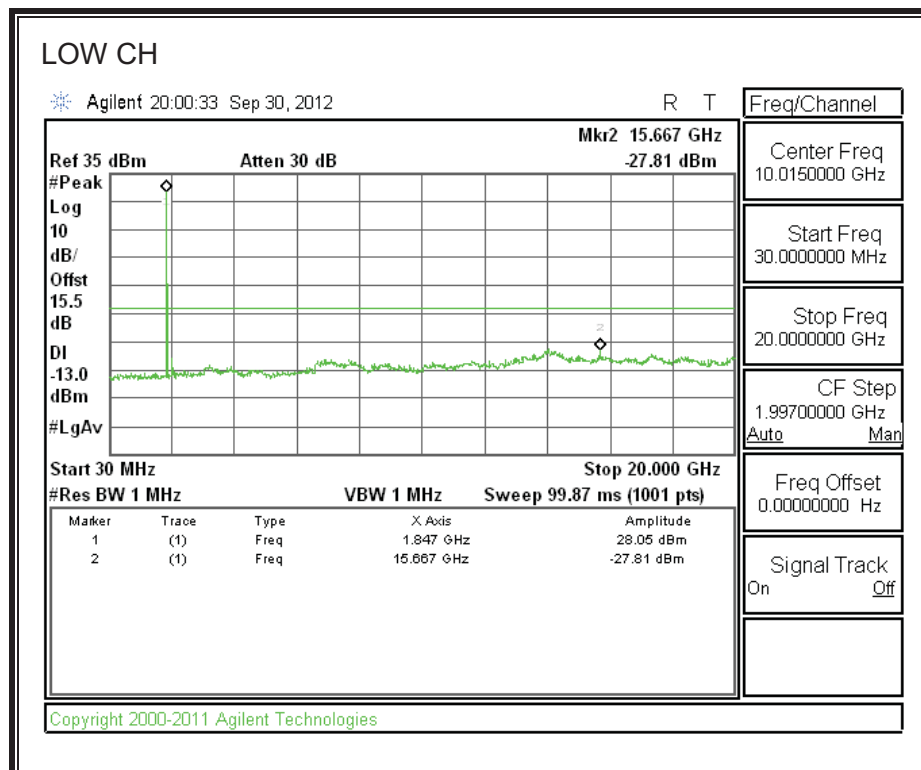
WCDMA CELL BAND, REL 99

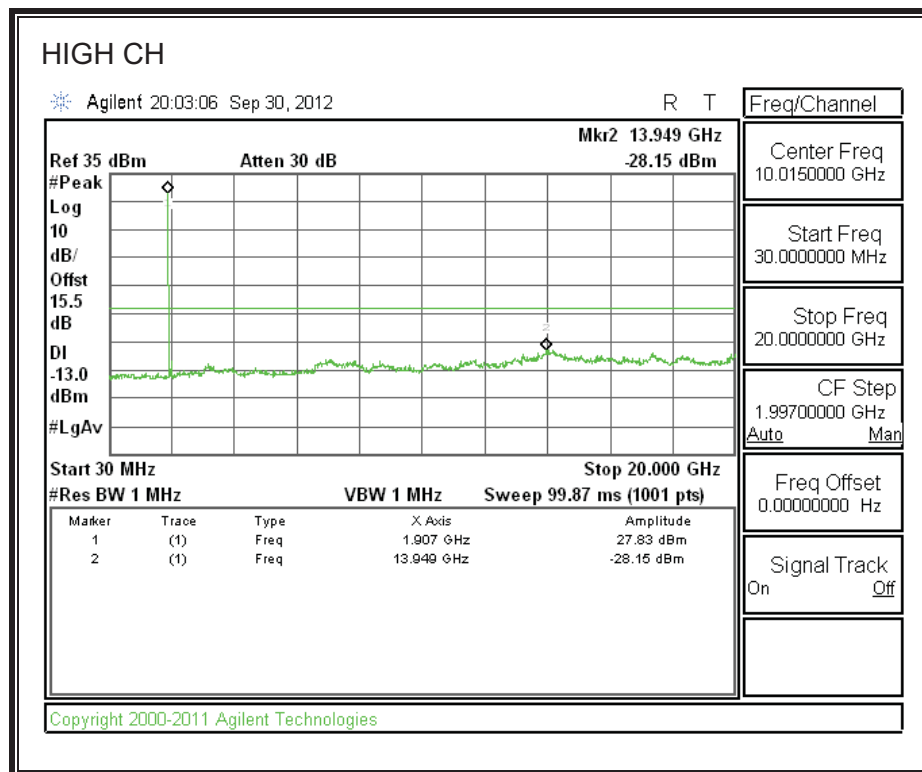
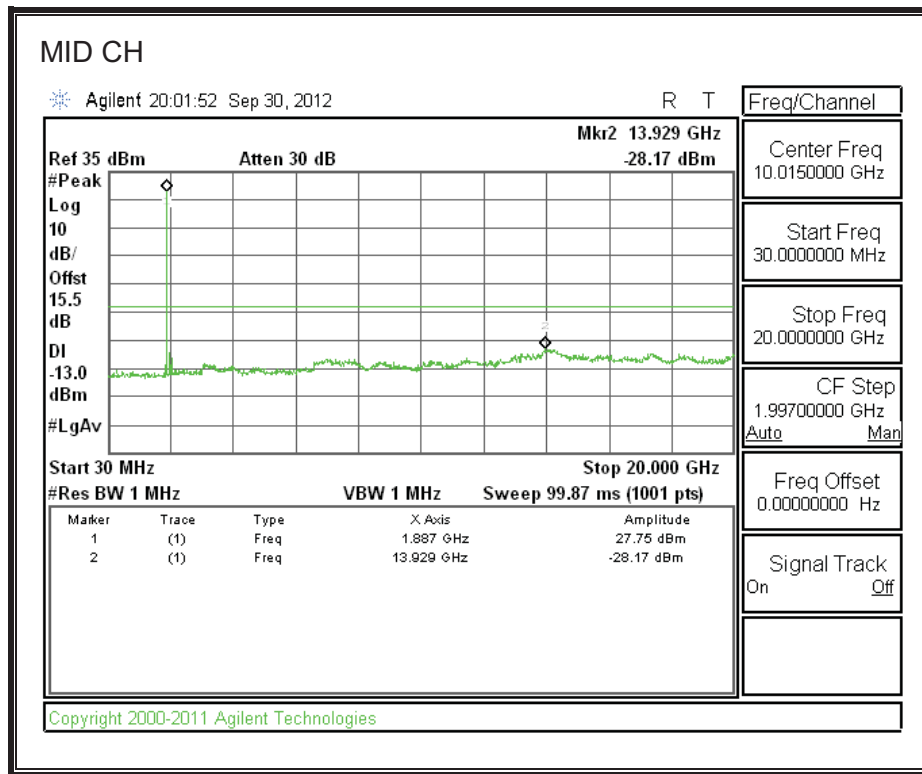


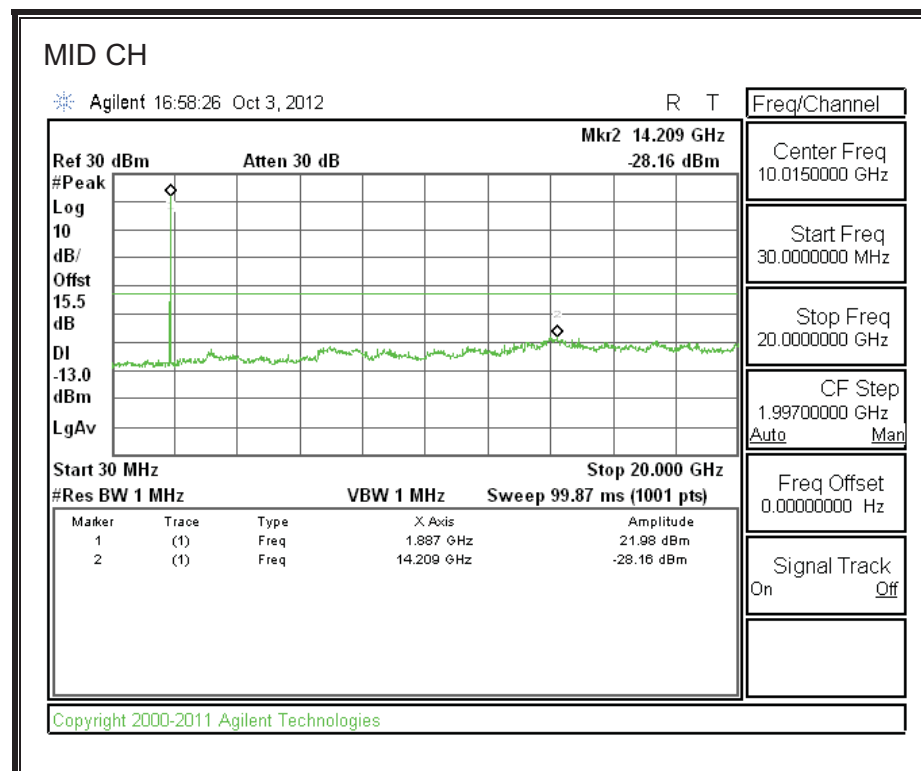
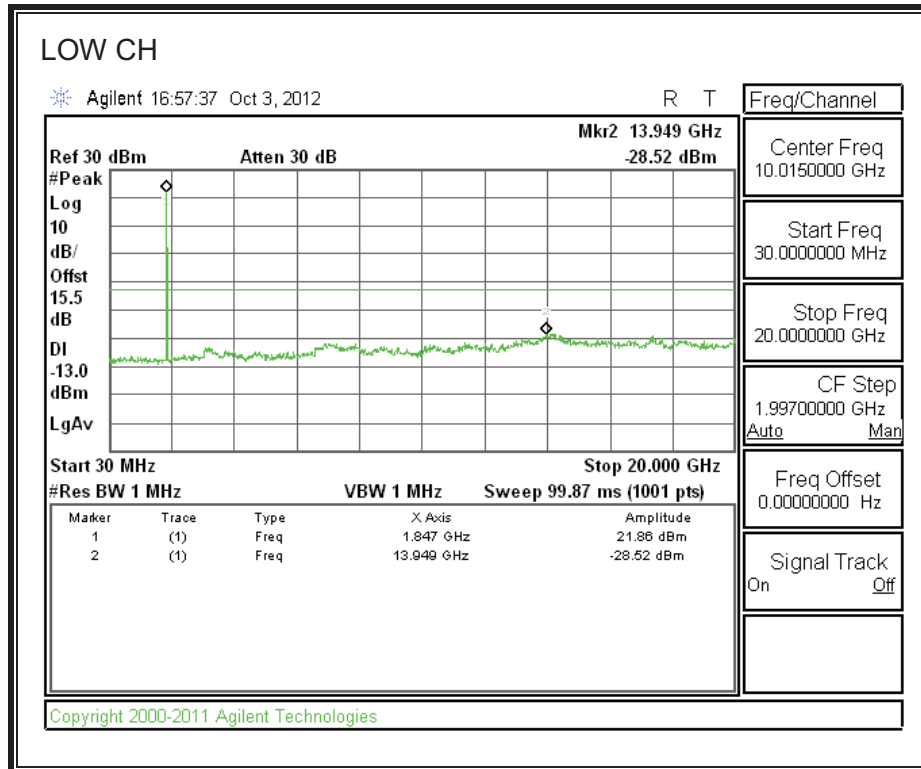
WCDMA CELL BAND, HSDPA,

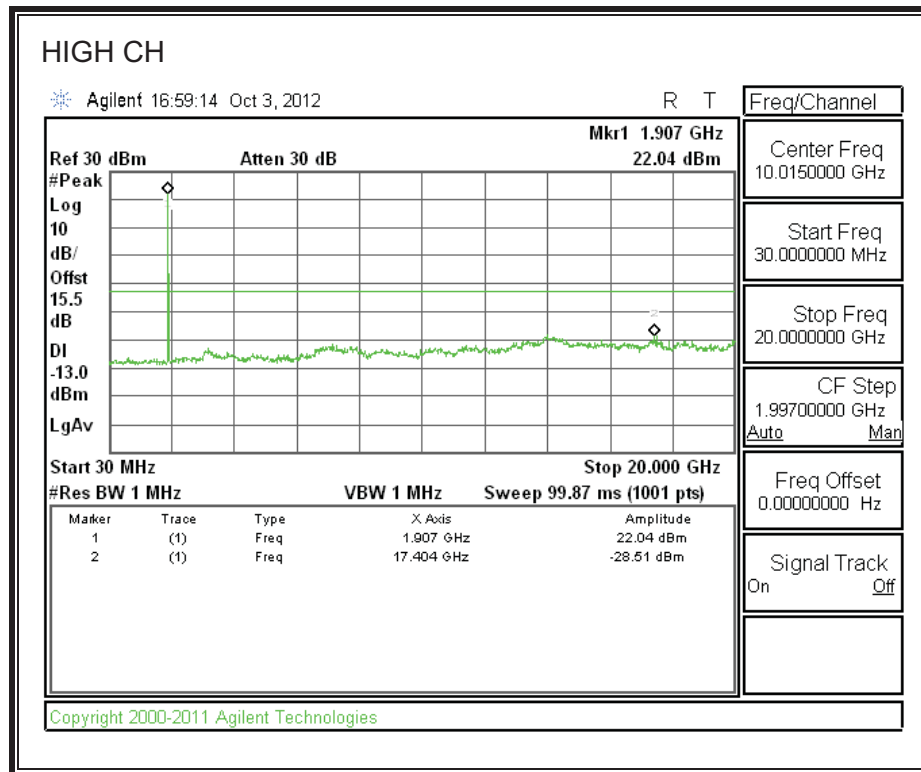


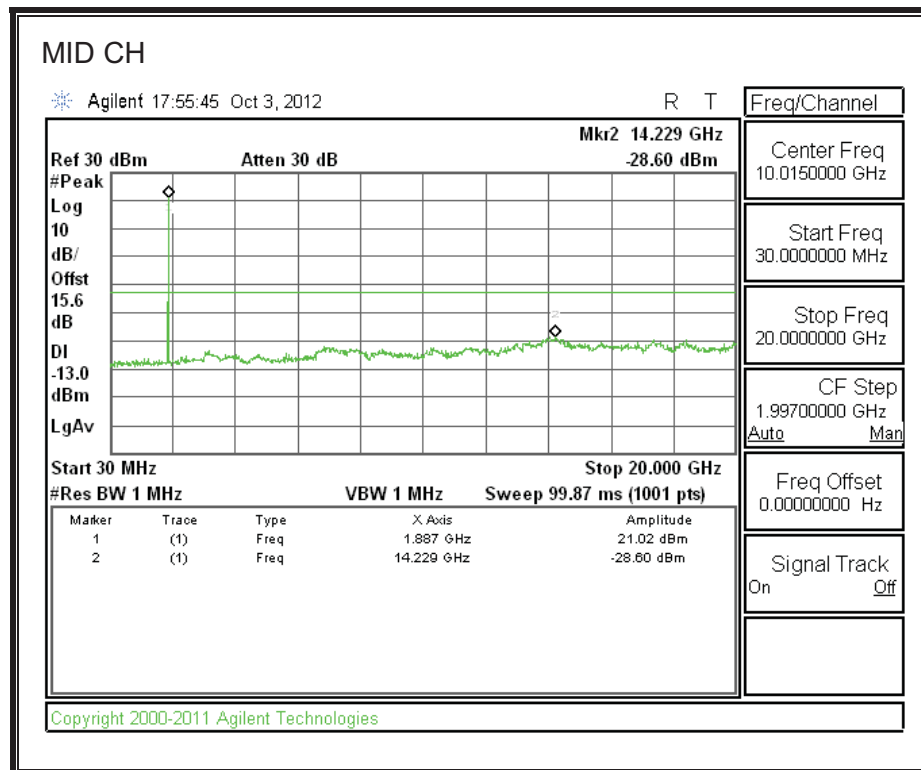
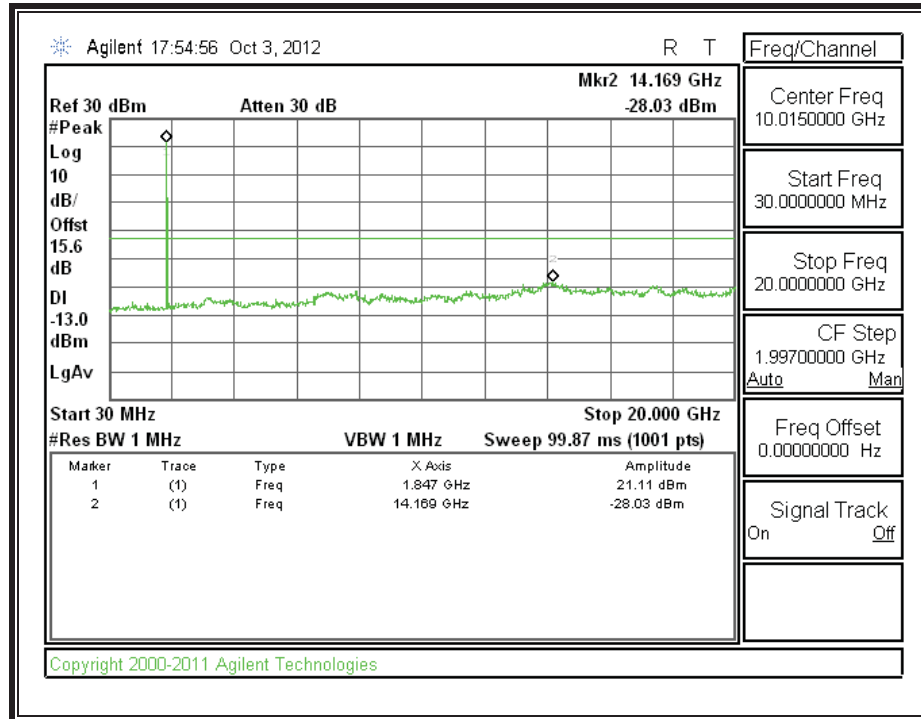
GPRS PCS BAND

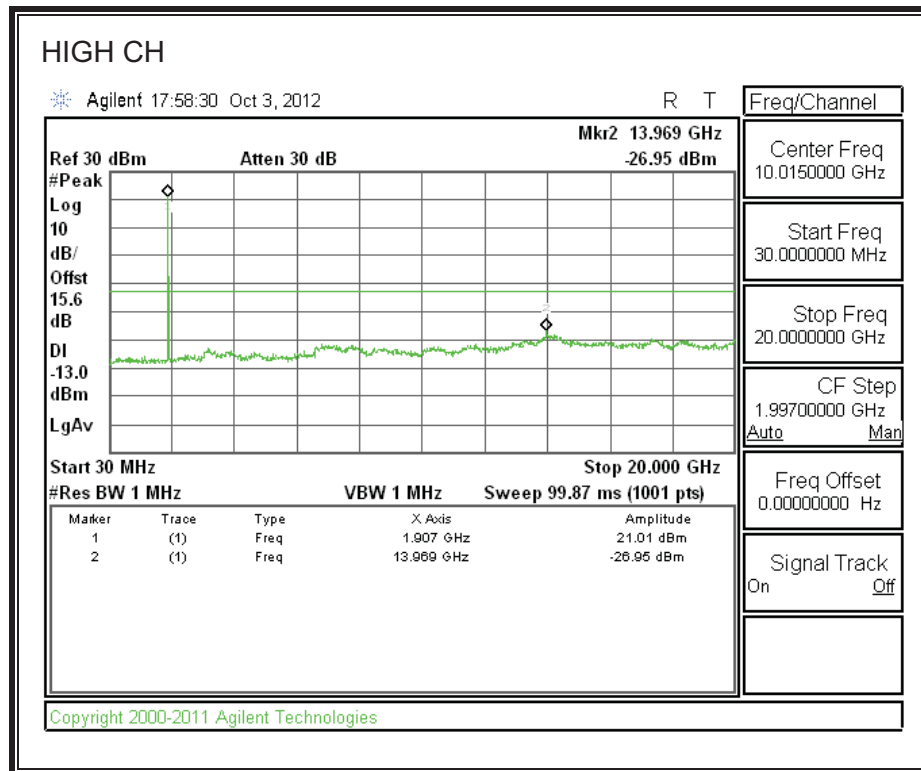
**EGPRS PCS Band**

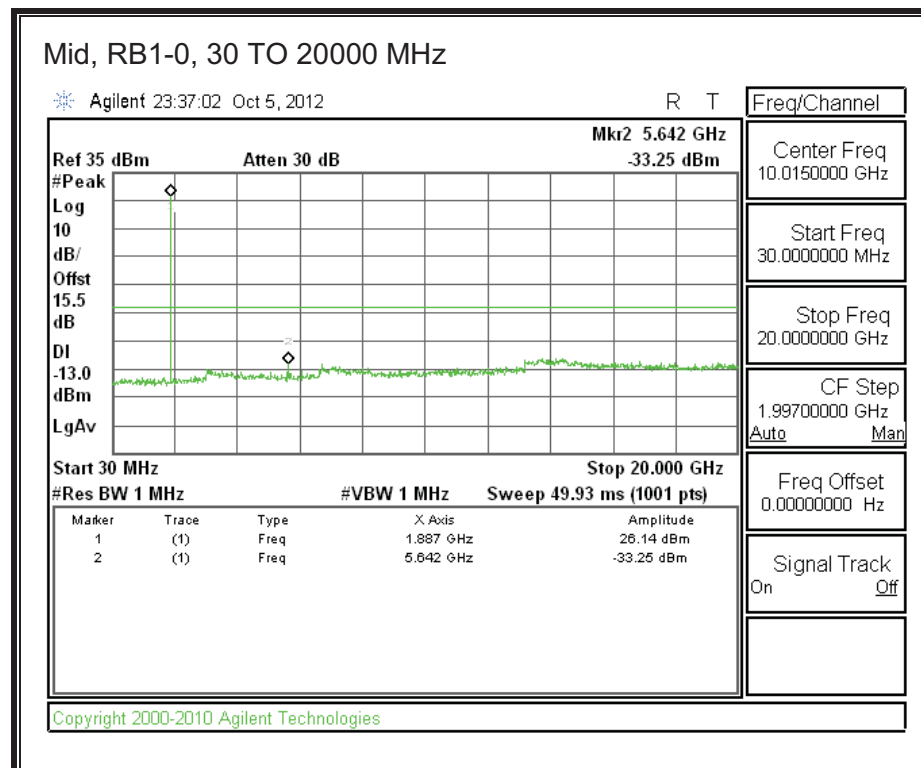
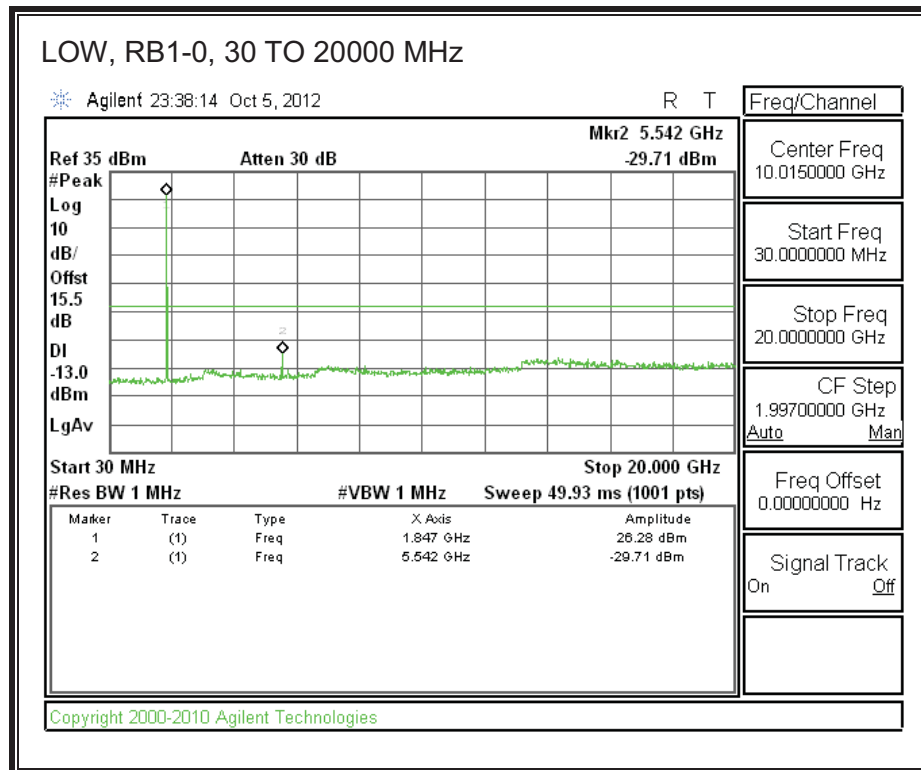


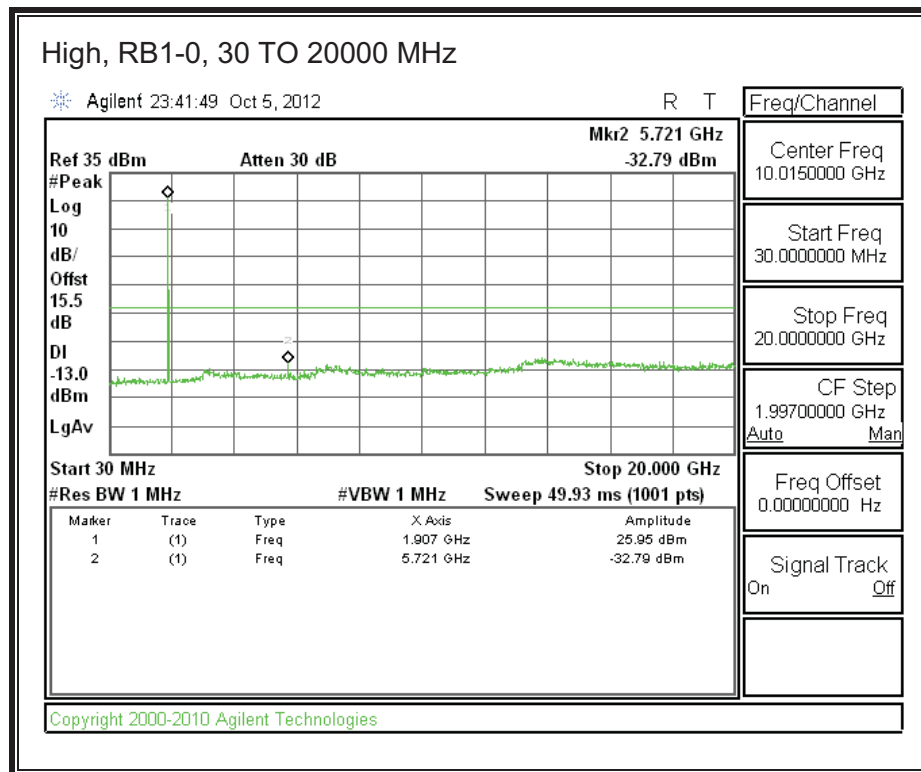
WCDMA PCS BAND, REL 99



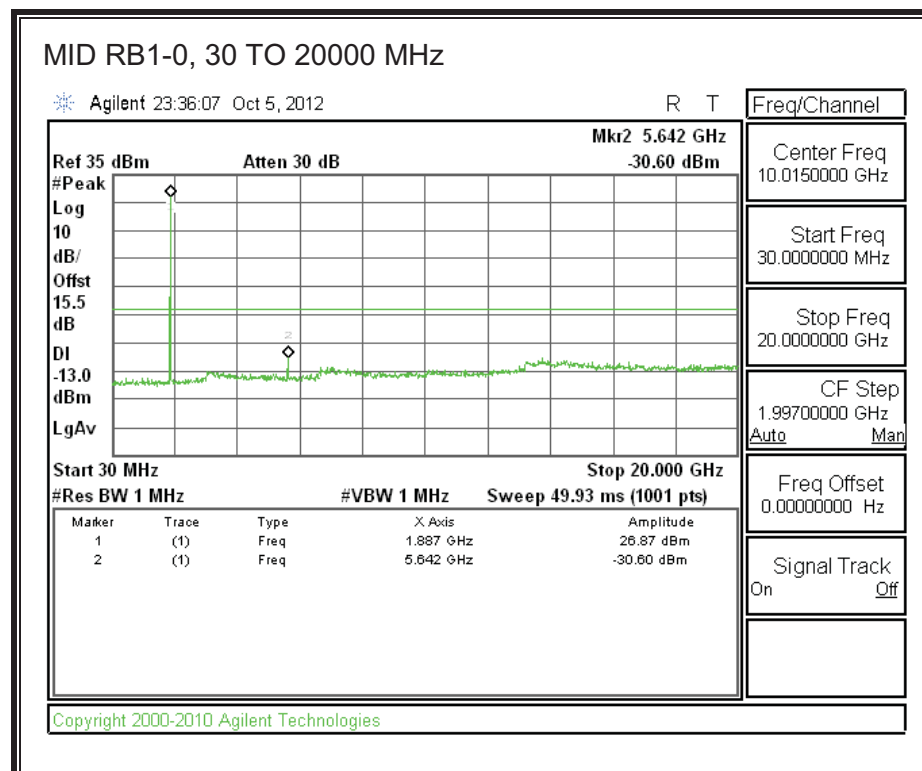
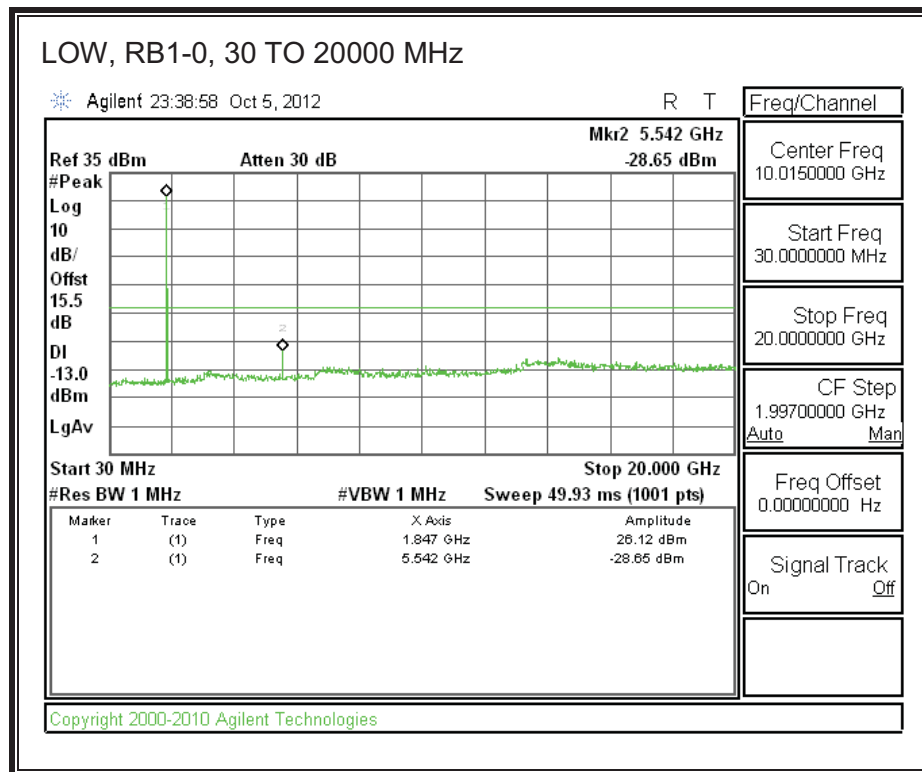
WCDMA PCS BAND, HSDPA.

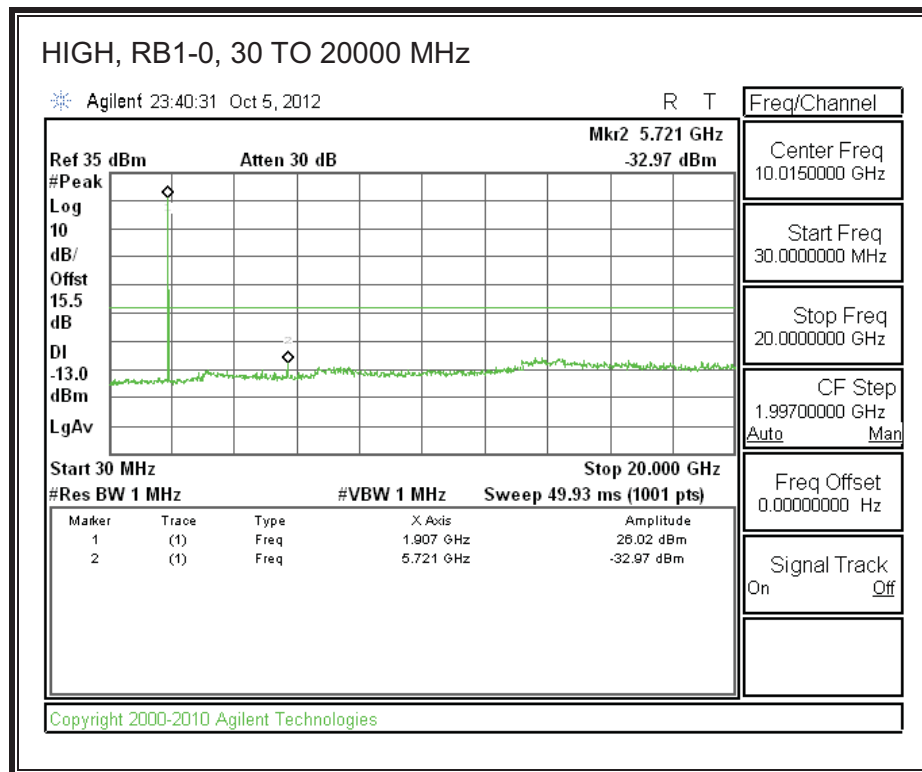


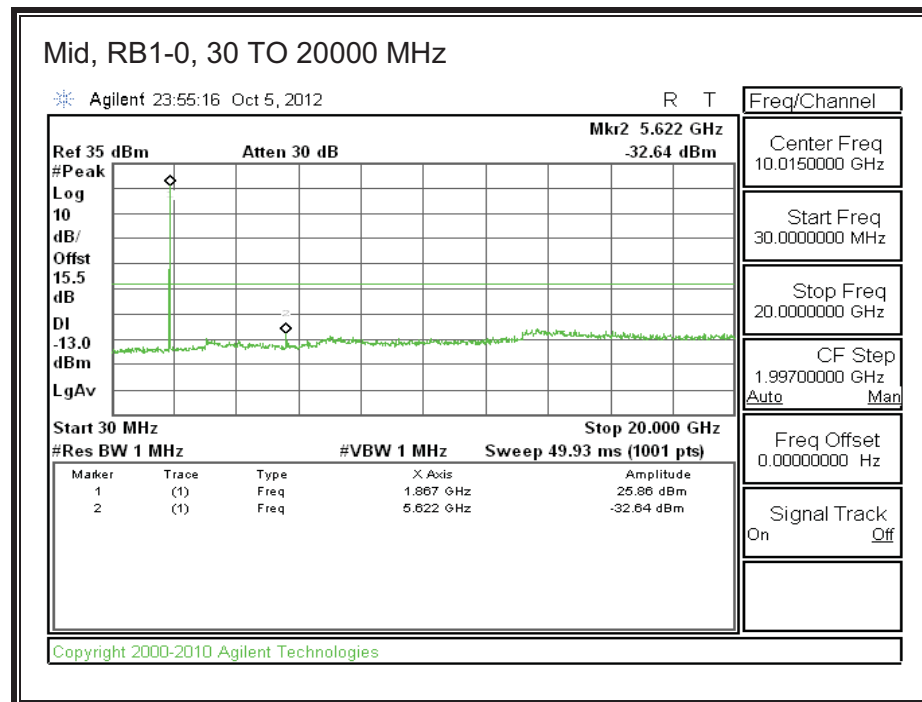
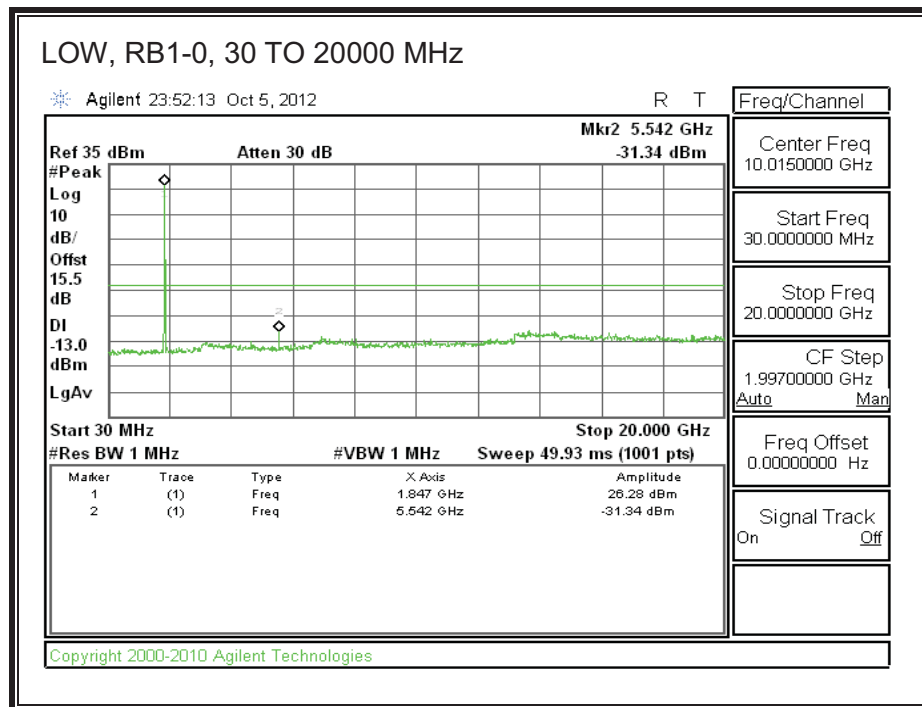
8.3.1. LTE BAND 2**Band 2 (5 MHz BANDWIDTH) LTE QPSK**

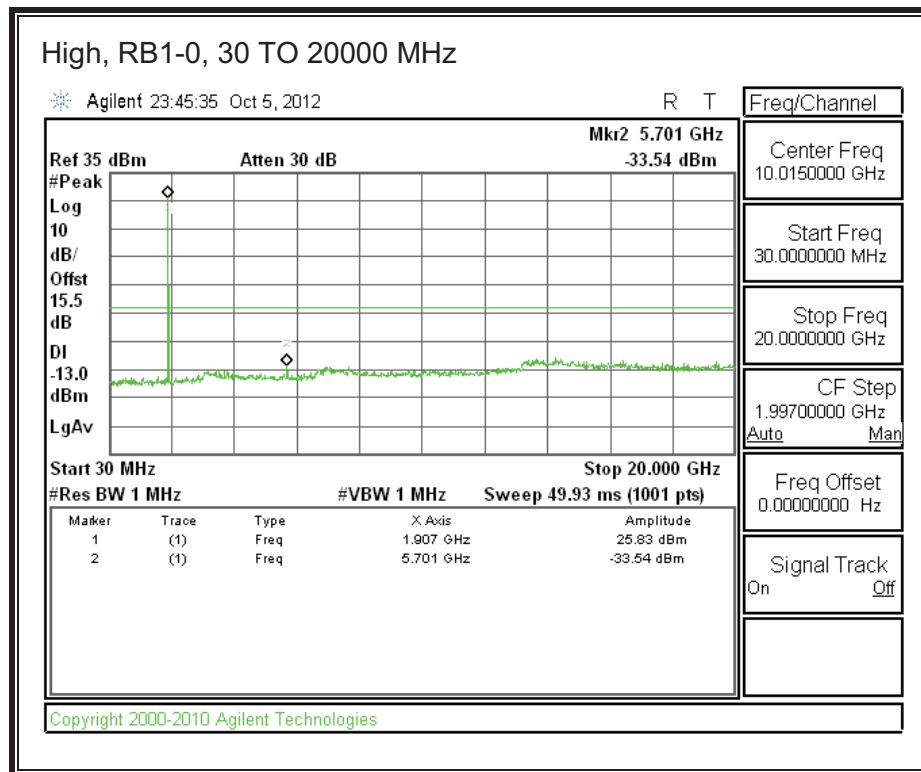


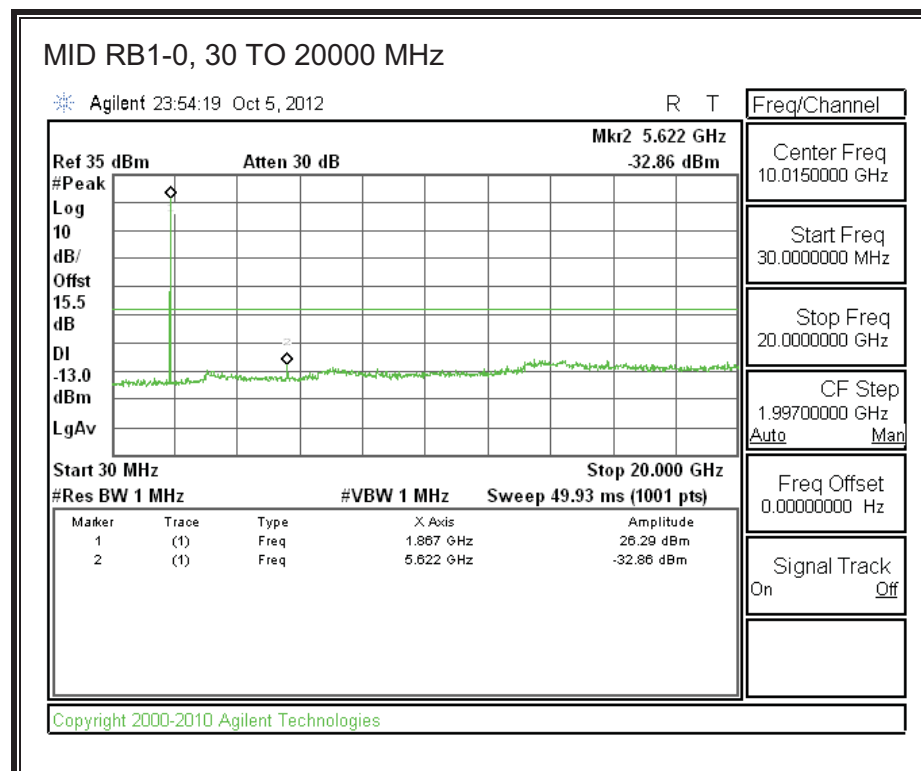
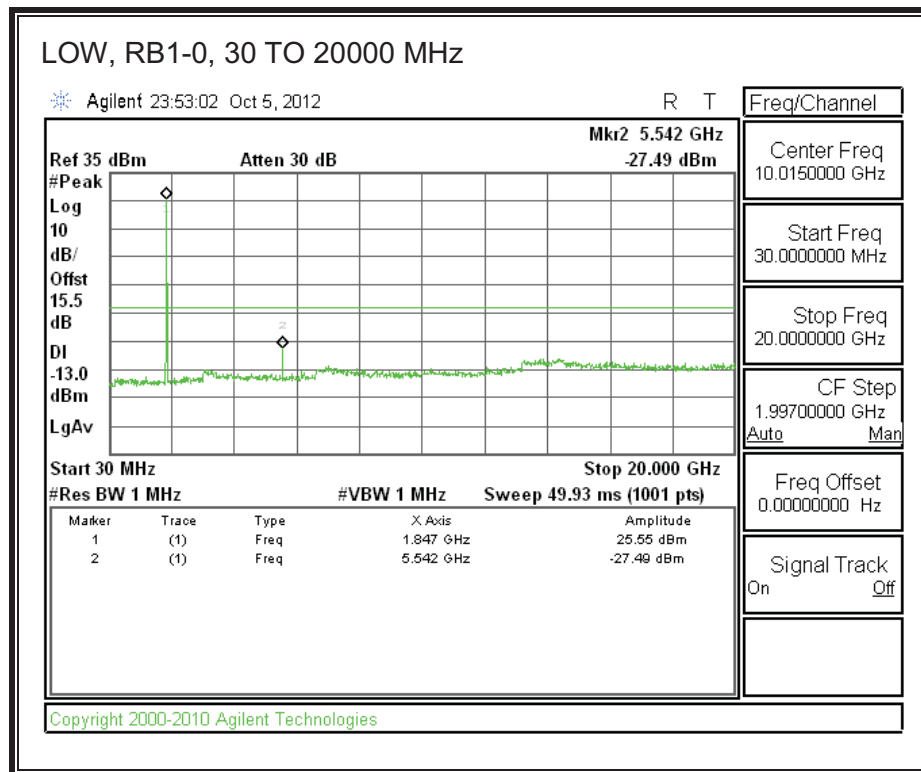
LTE 16QAM

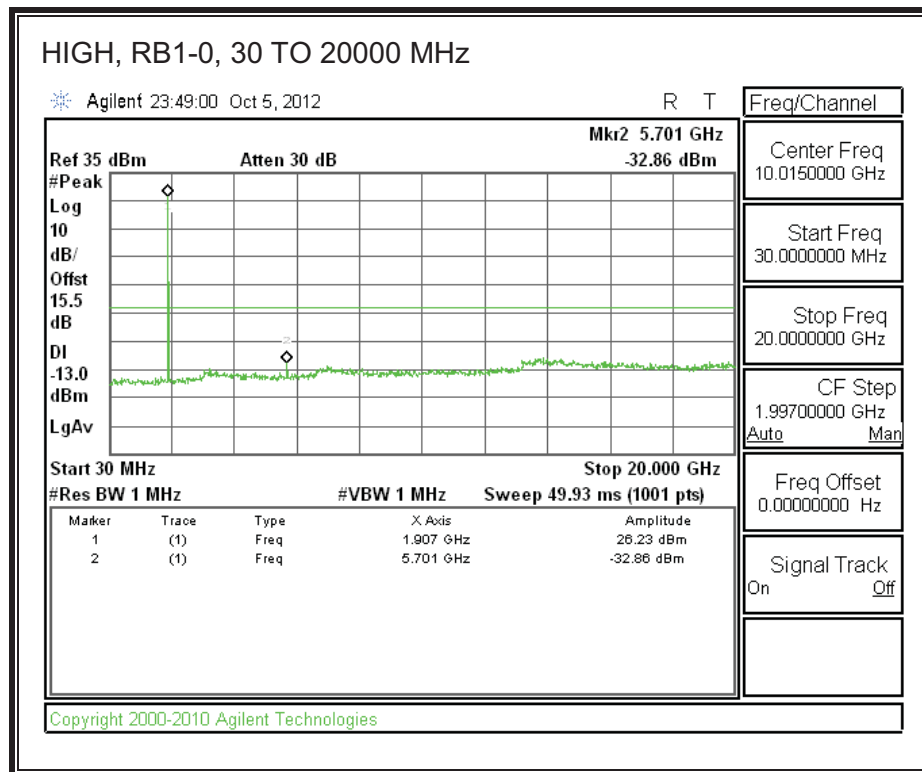


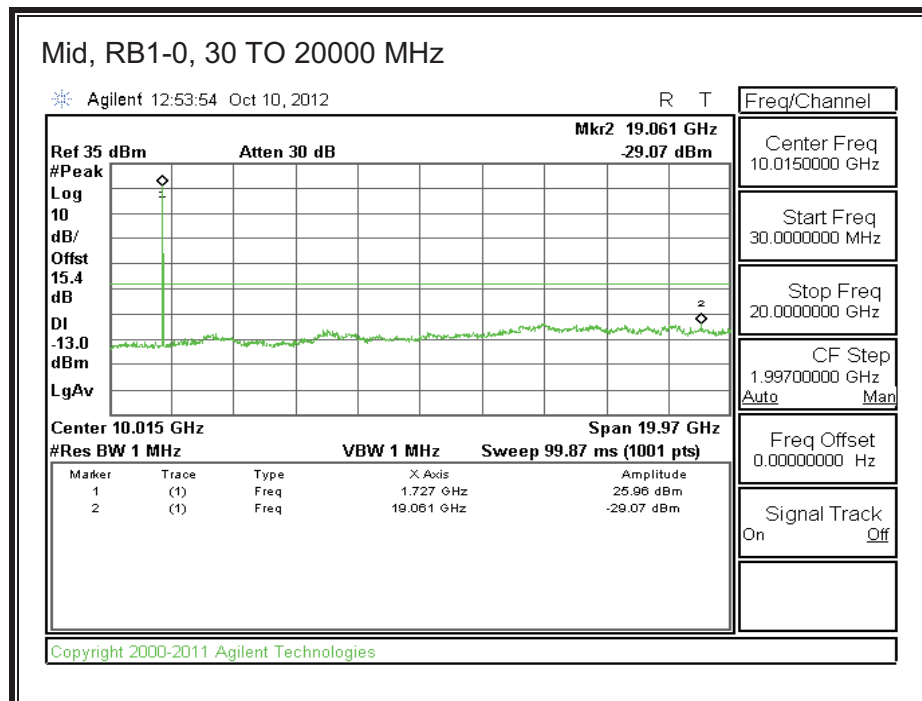
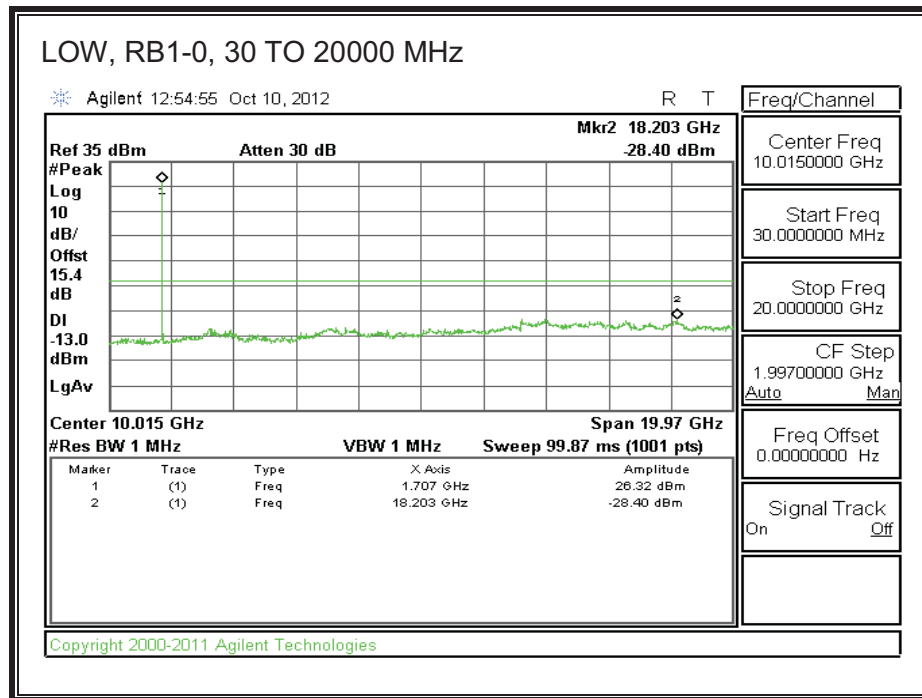


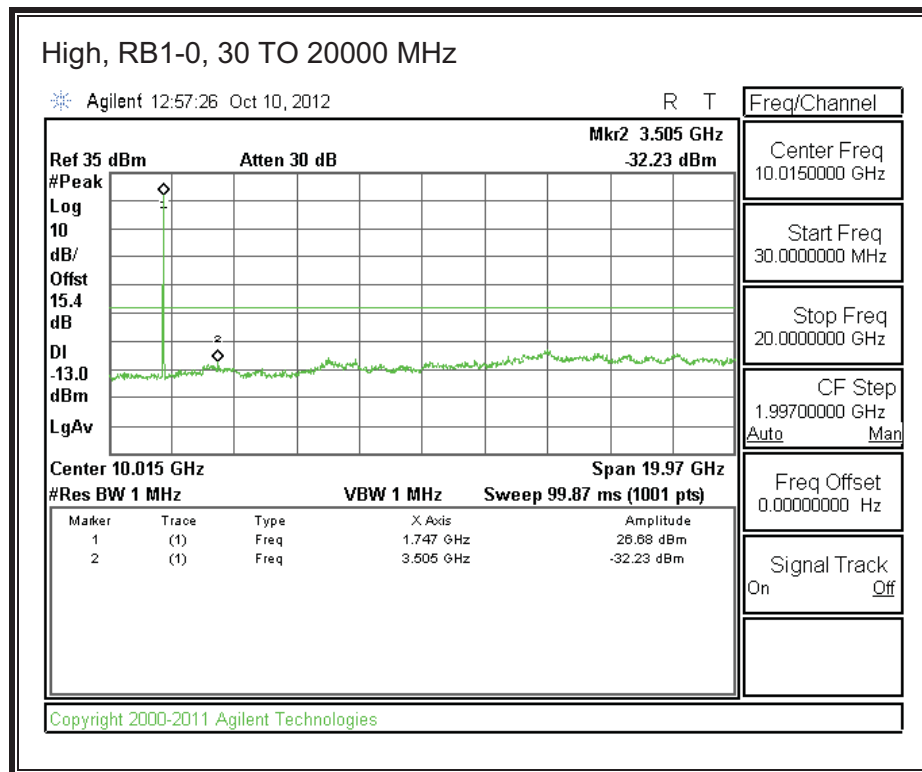
Band 2 (10 MHz BANDWIDTH)**LTE QPSK**

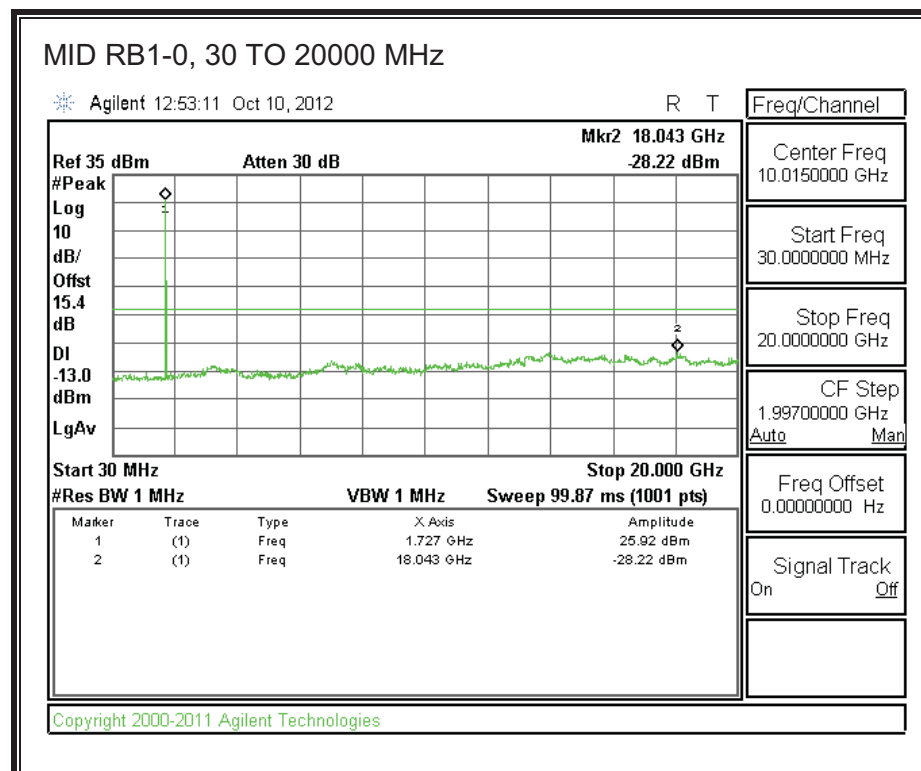
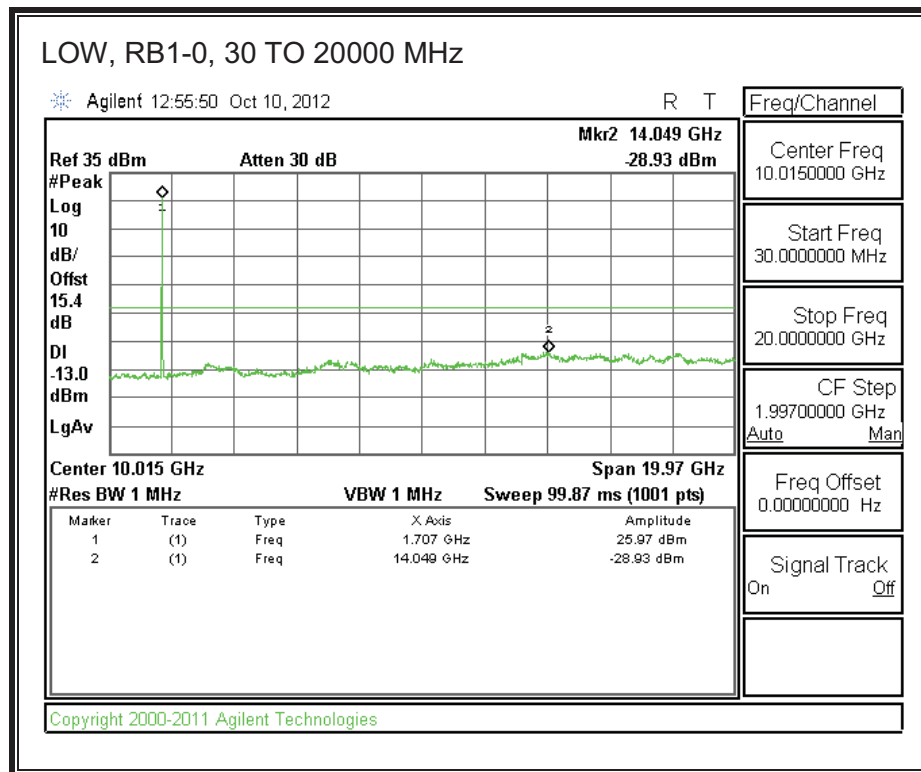


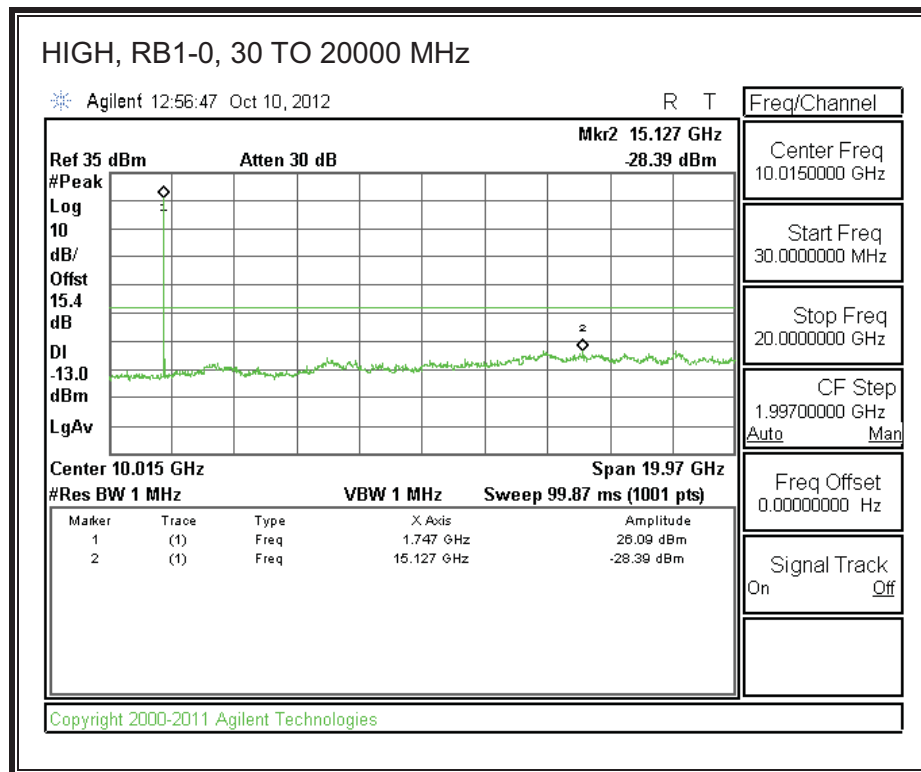
LTE 16QAM

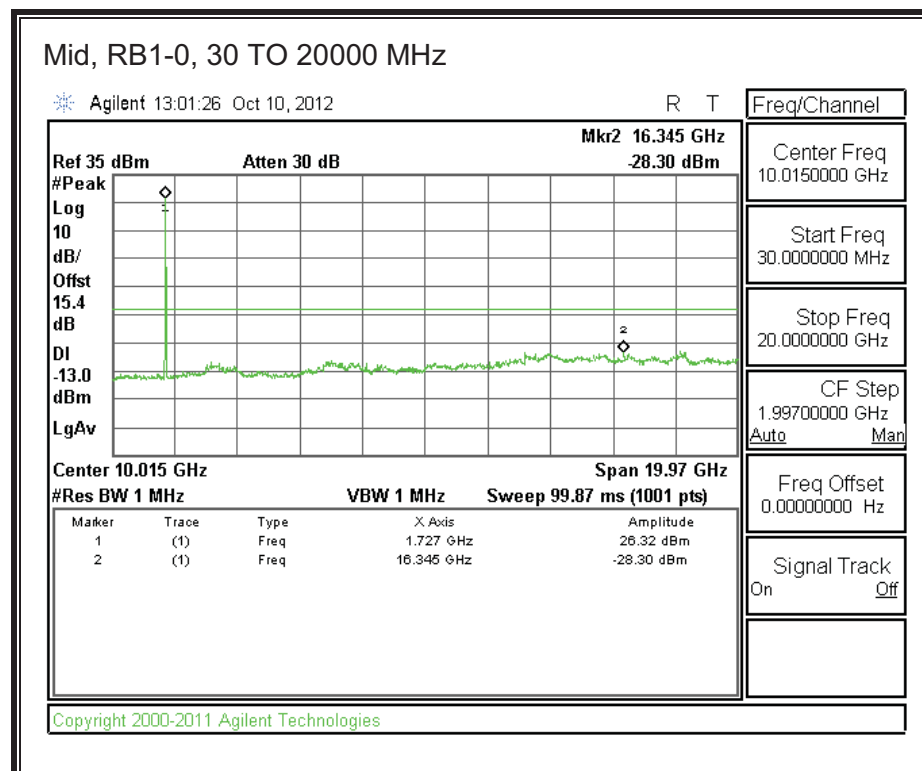
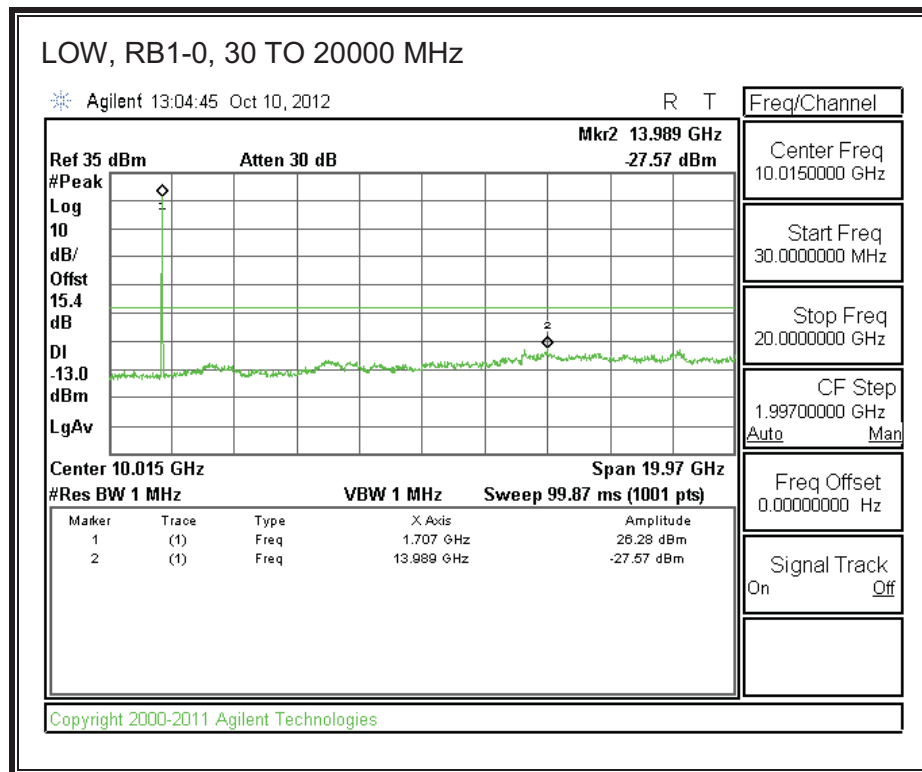


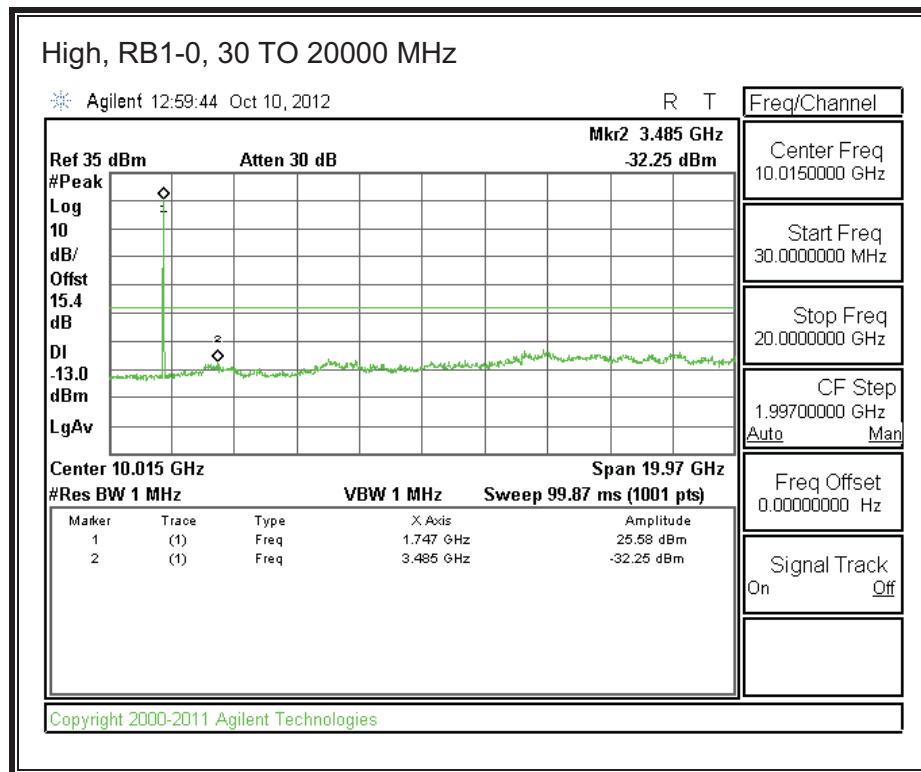
LTE BAND 4**Band 4 (5 MHz BANDWIDTH)****LTE QPSK**

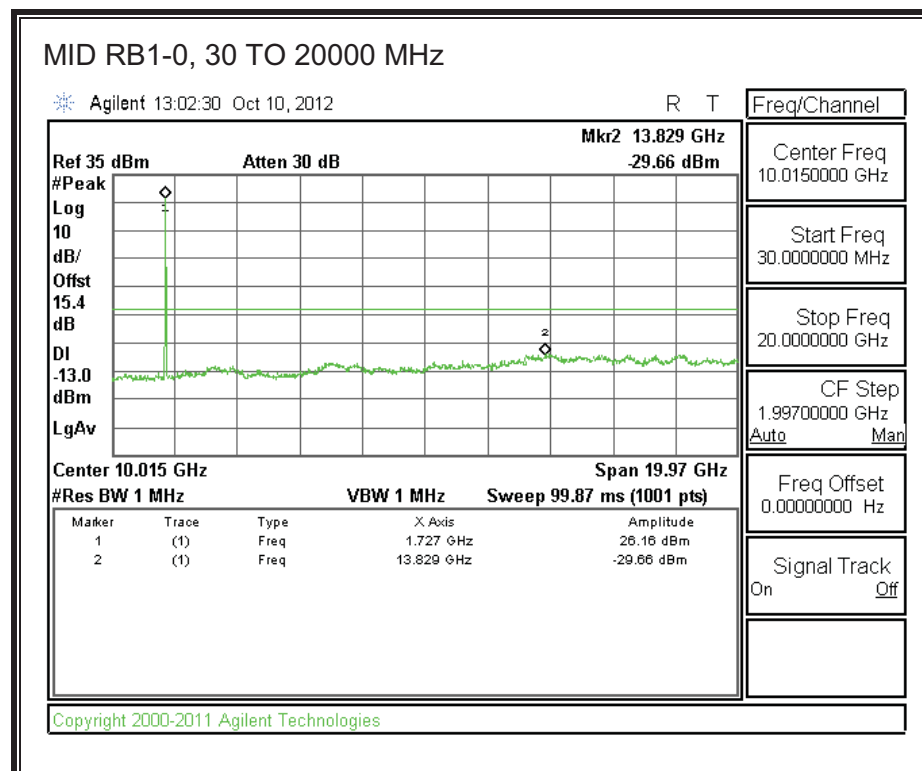
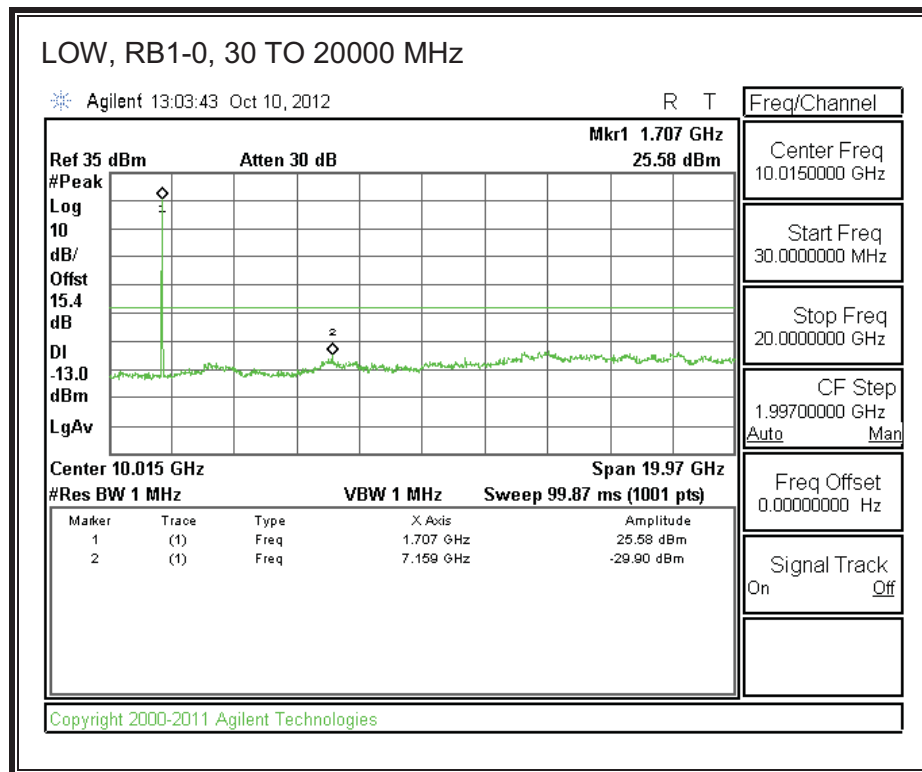


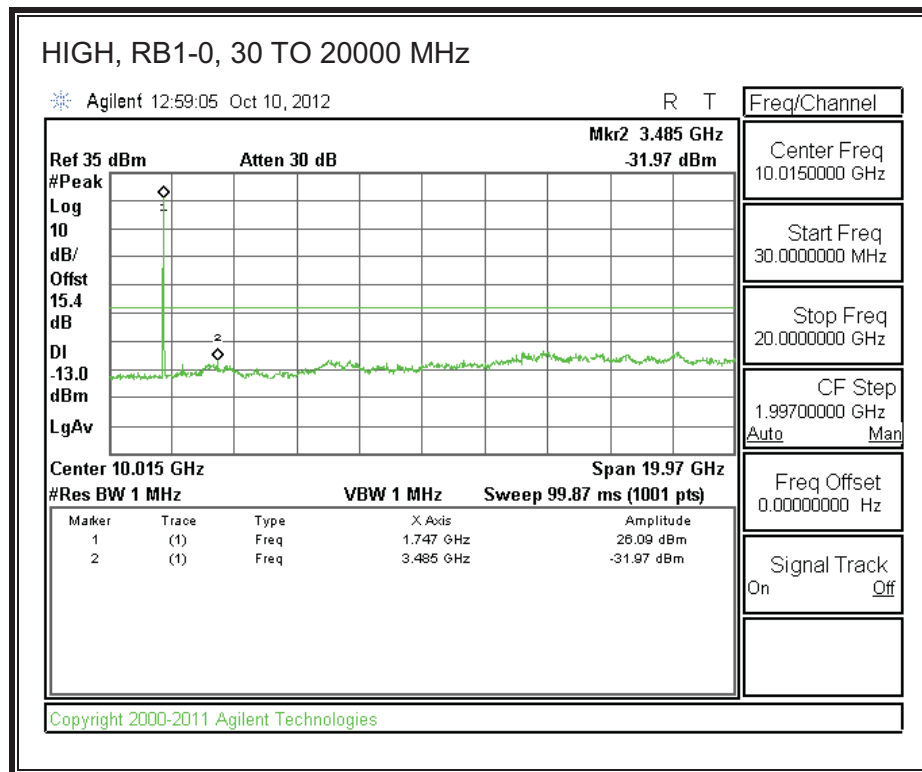
LTE 16QAM

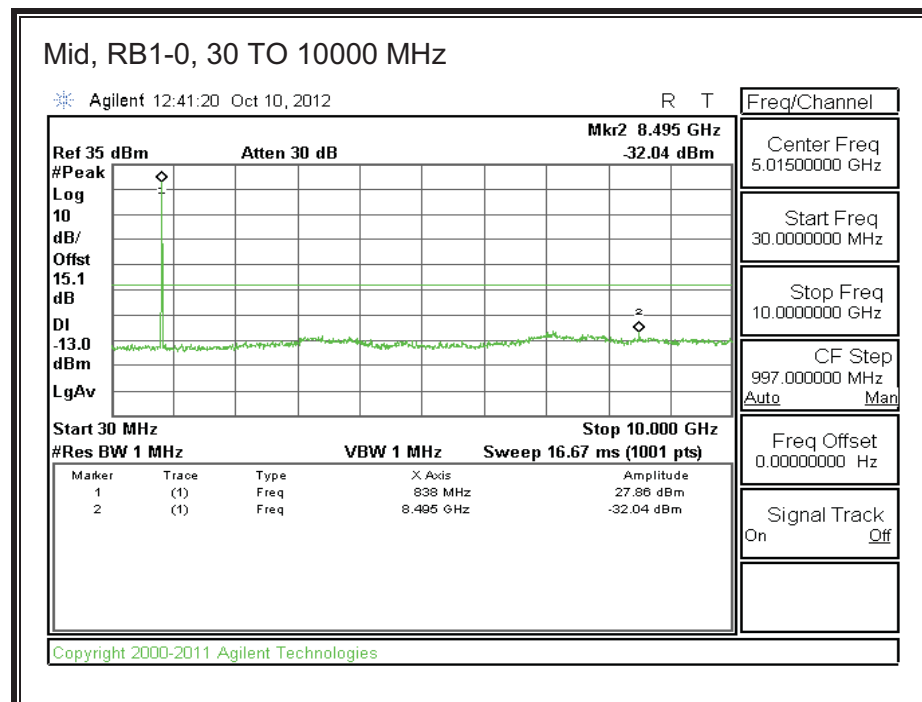
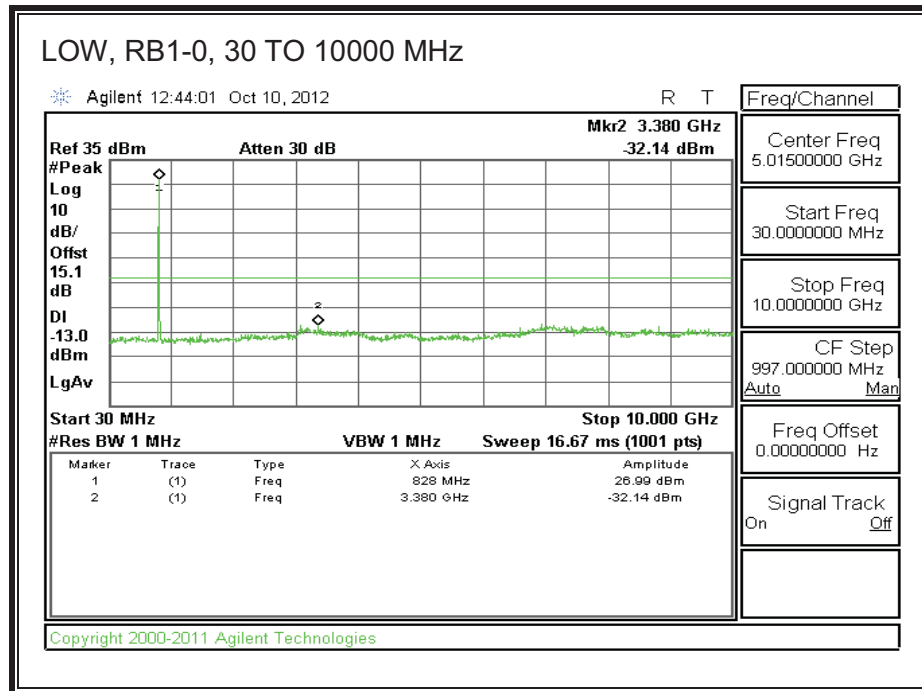


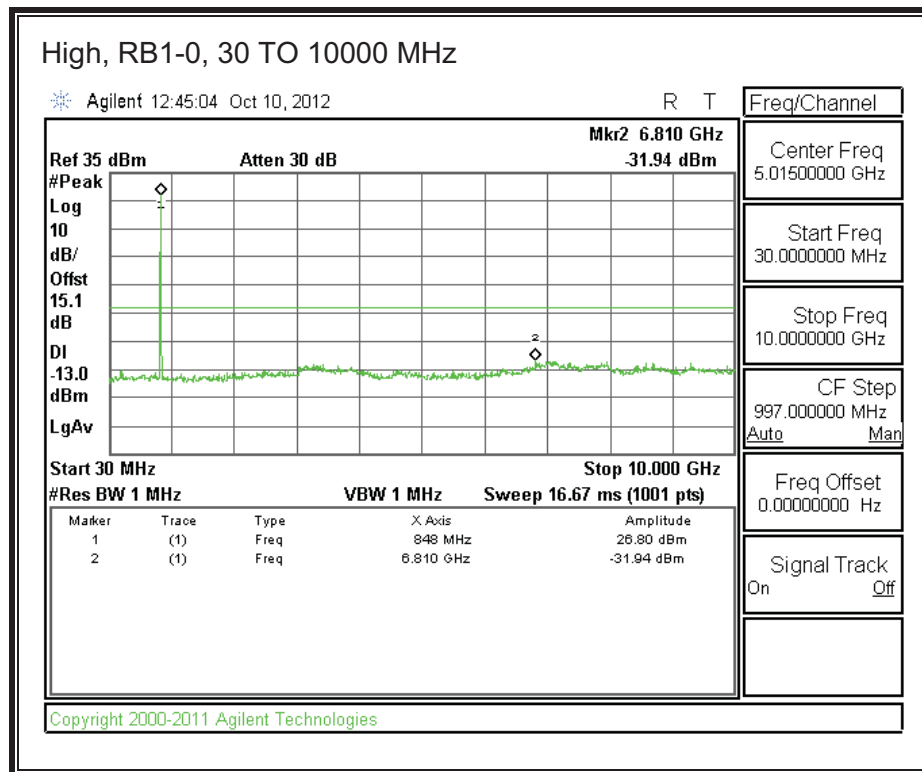
Band 4 (10 MHz BANDWIDTH) LTE QPSK

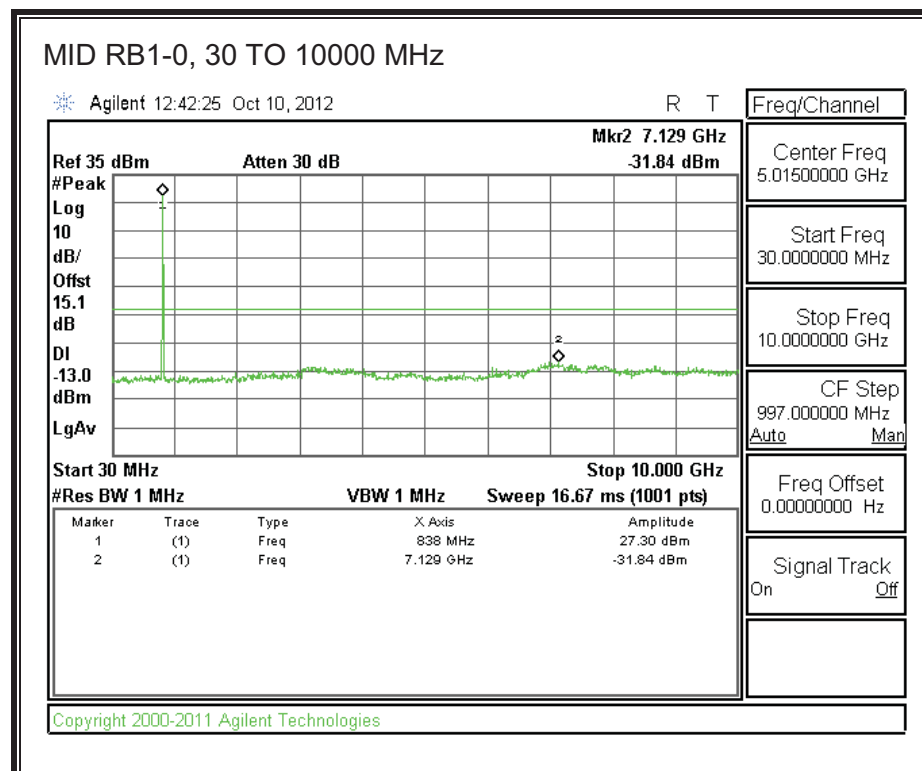
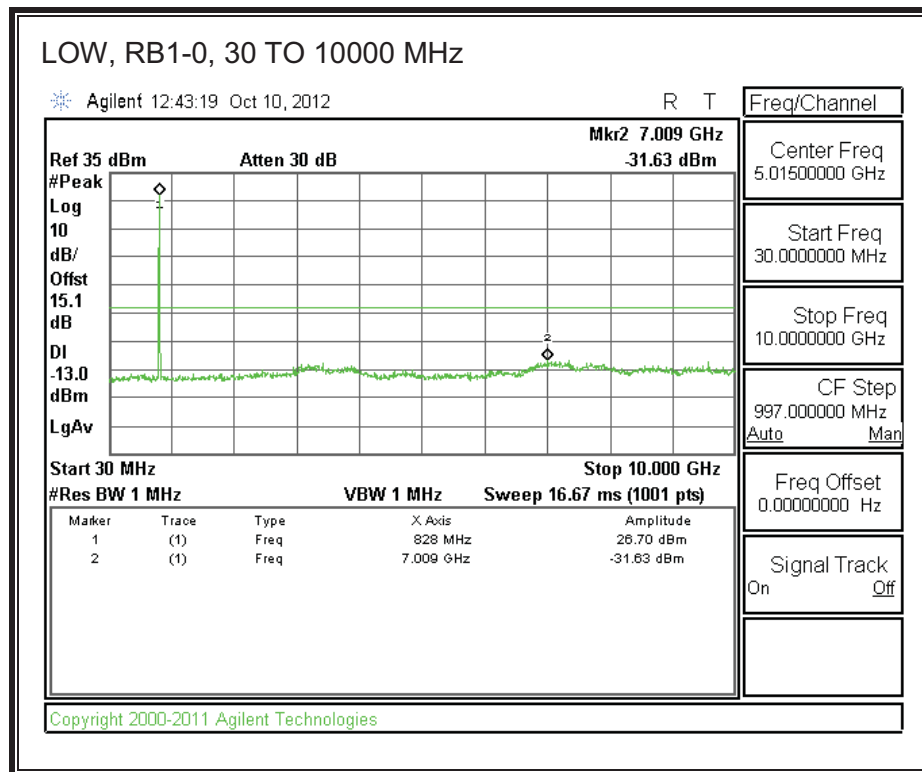


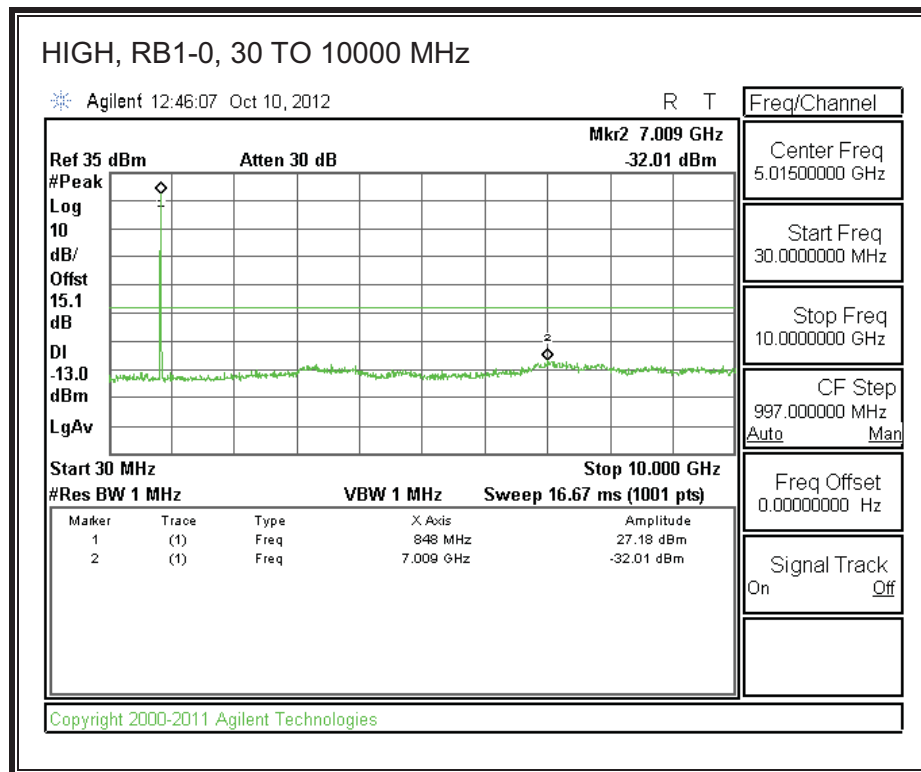
LTE 16QAM

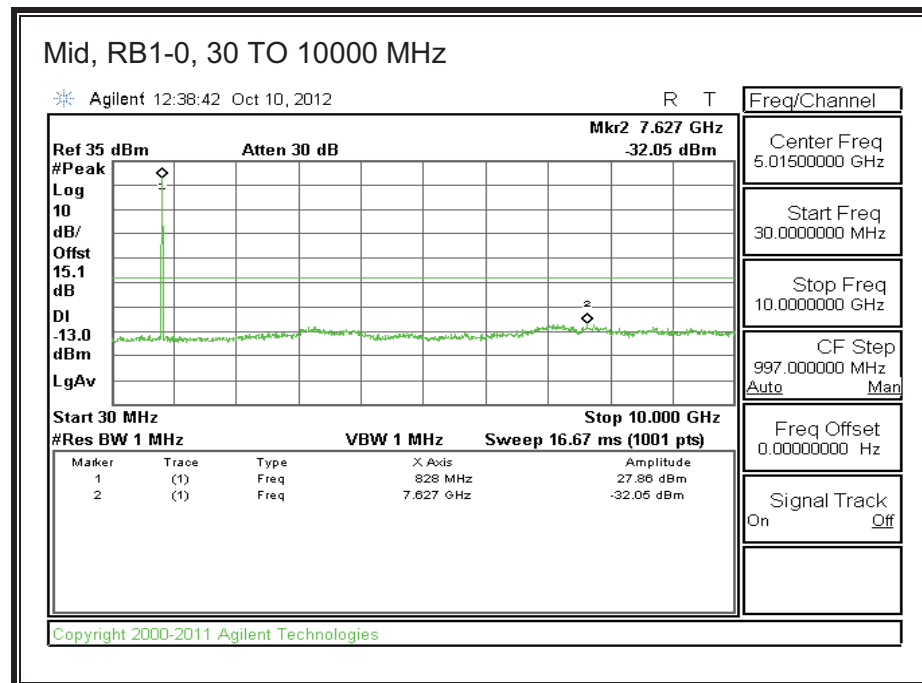
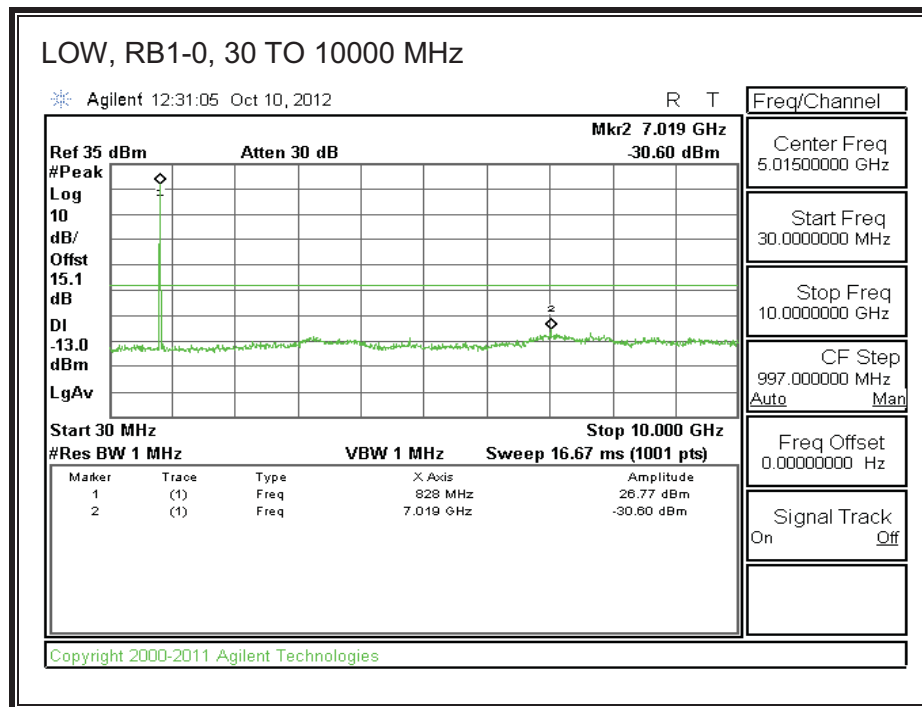


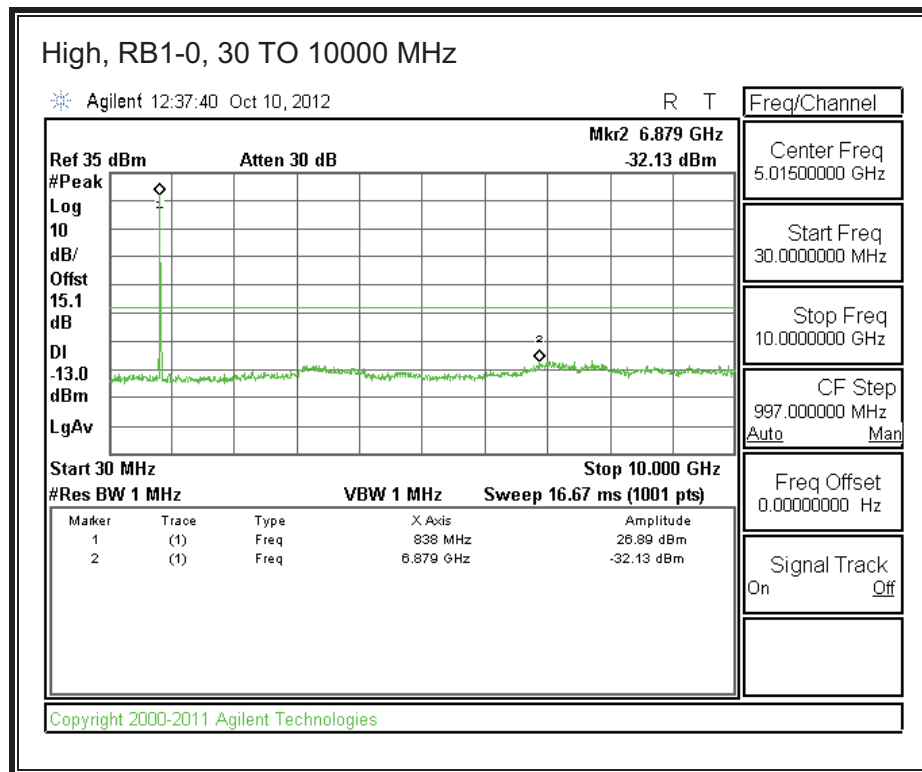
LTE BAND 5**Band 5 (5 MHz BANDWIDTH)****LTE QPSK**

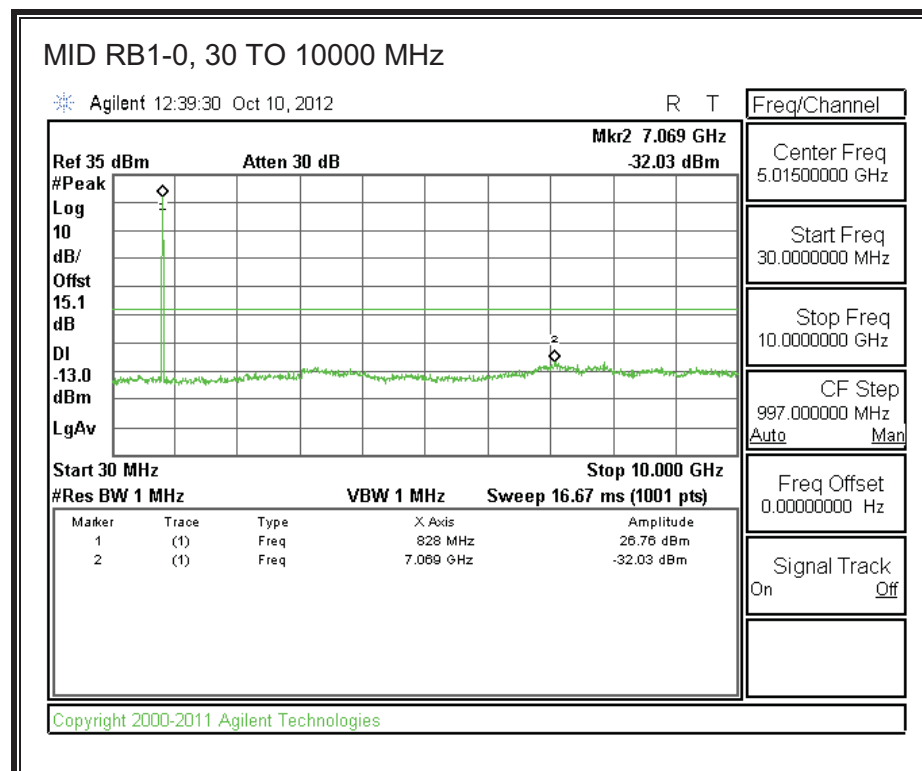
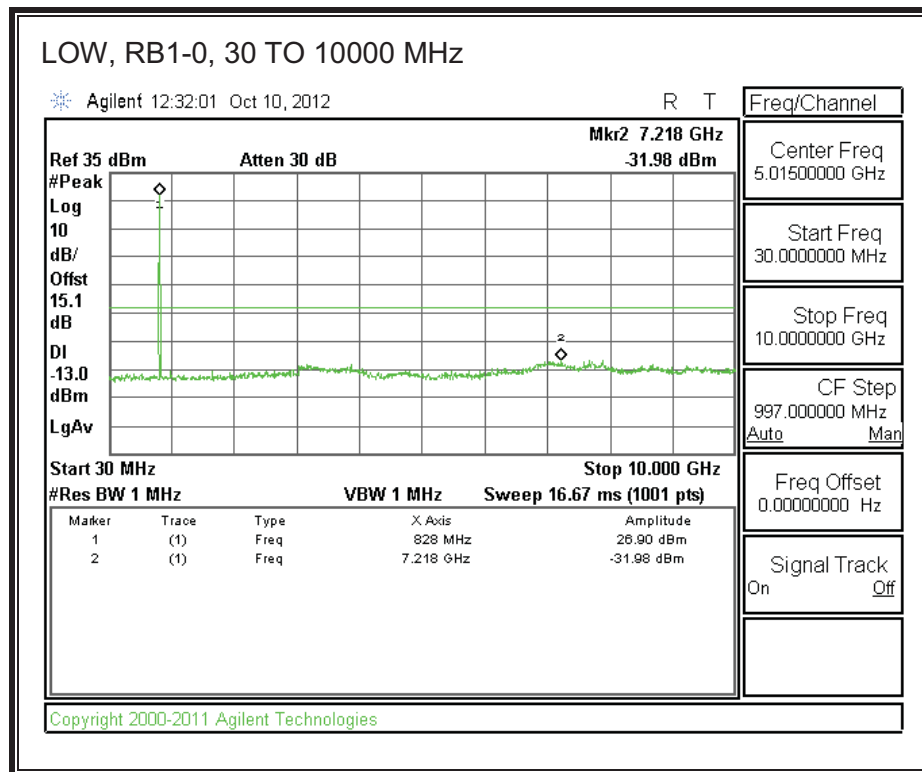


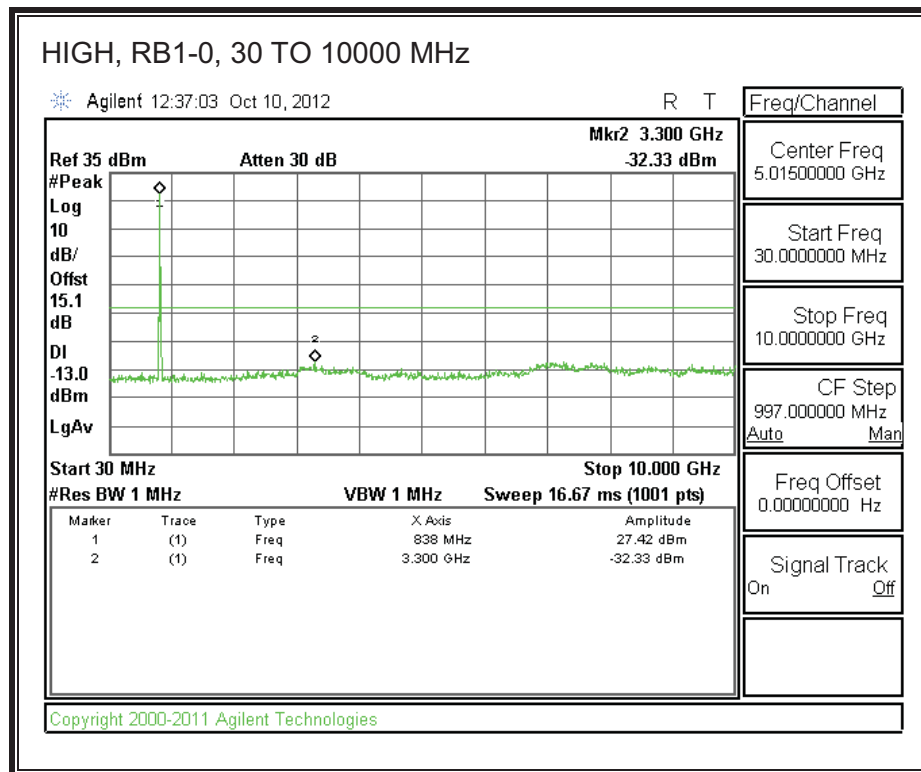
LTE 16QAM

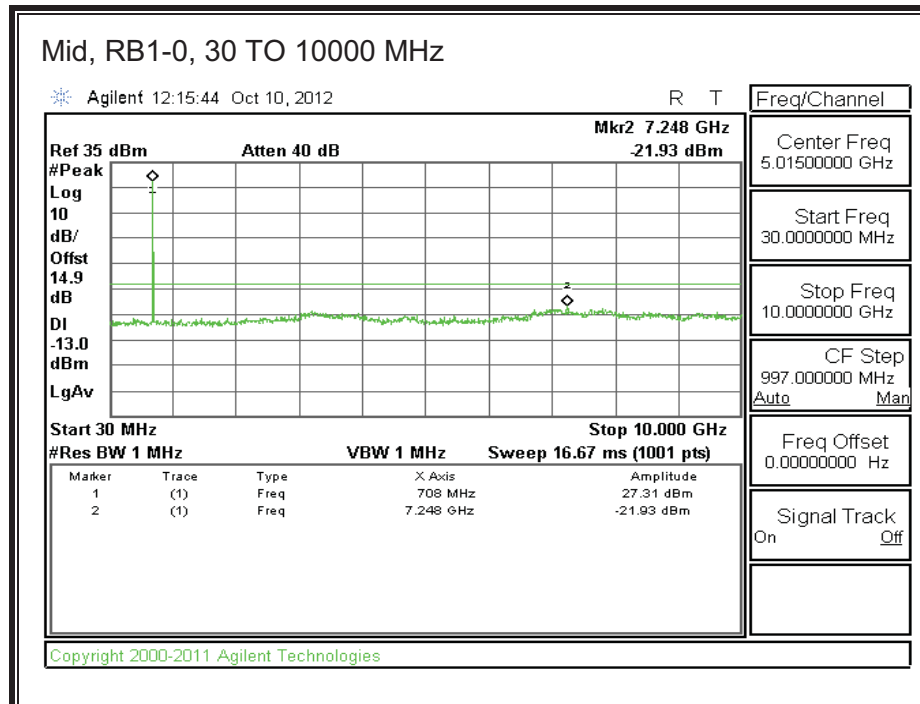
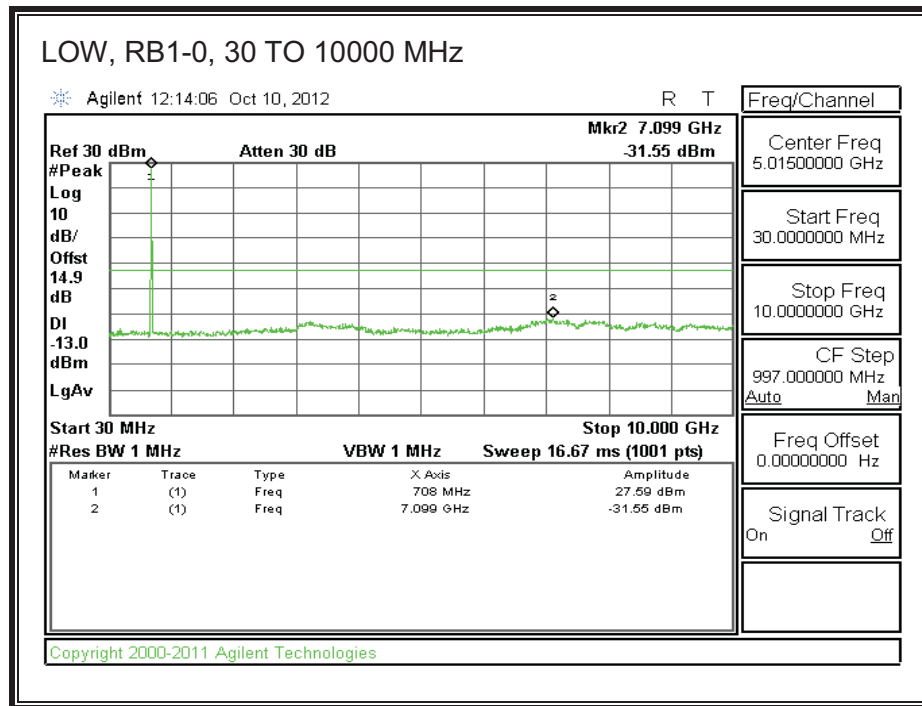


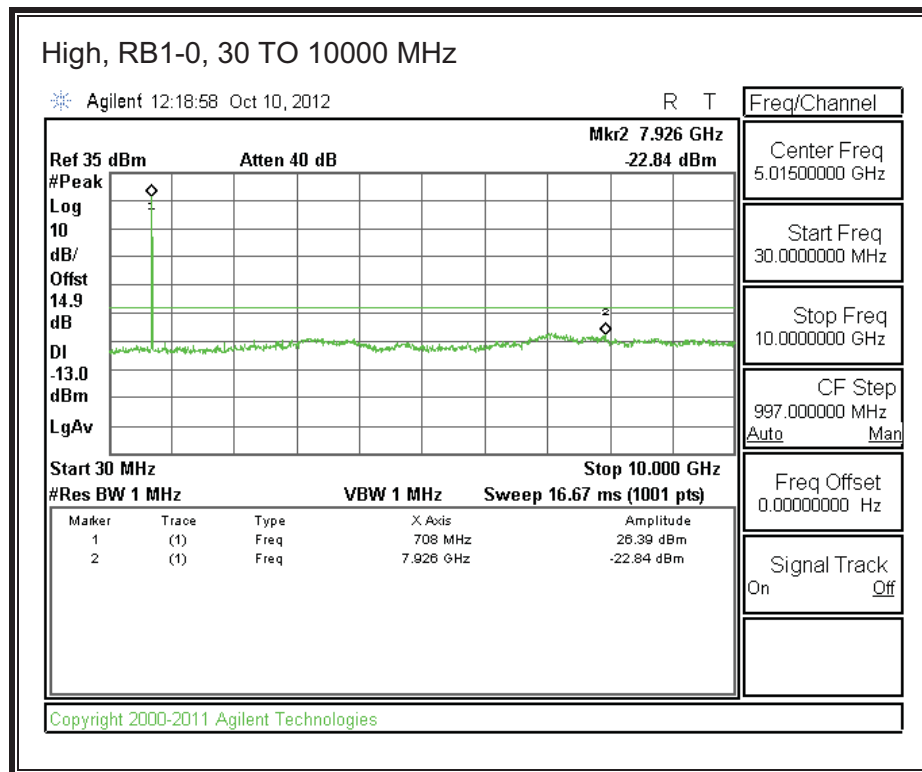
Band 5 (10 MHz BANDWIDTH)**LTE QPSK**

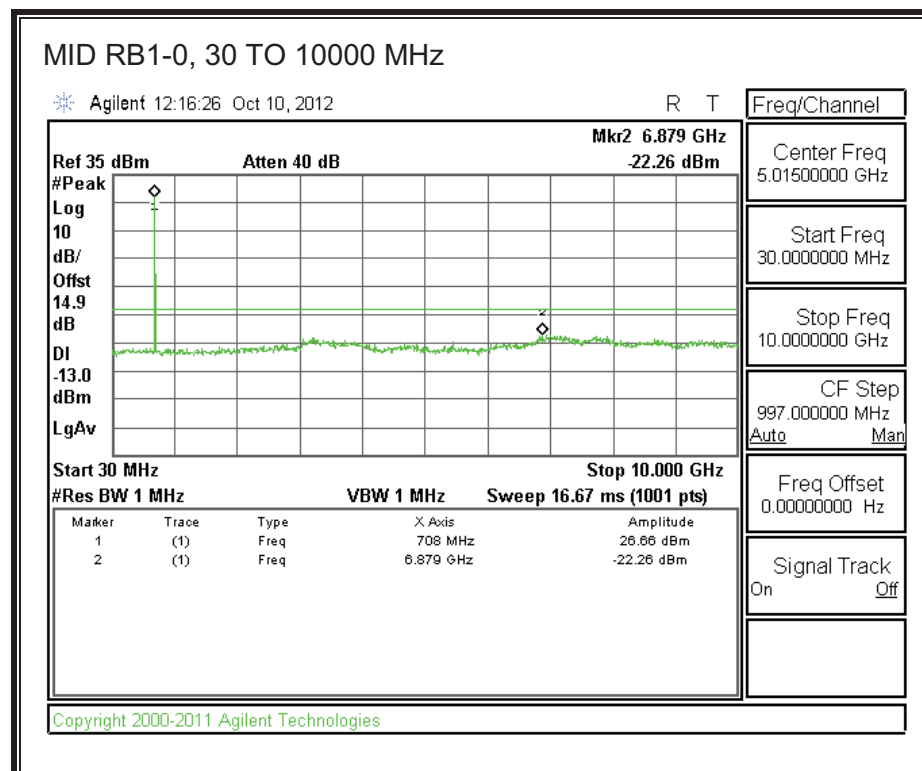
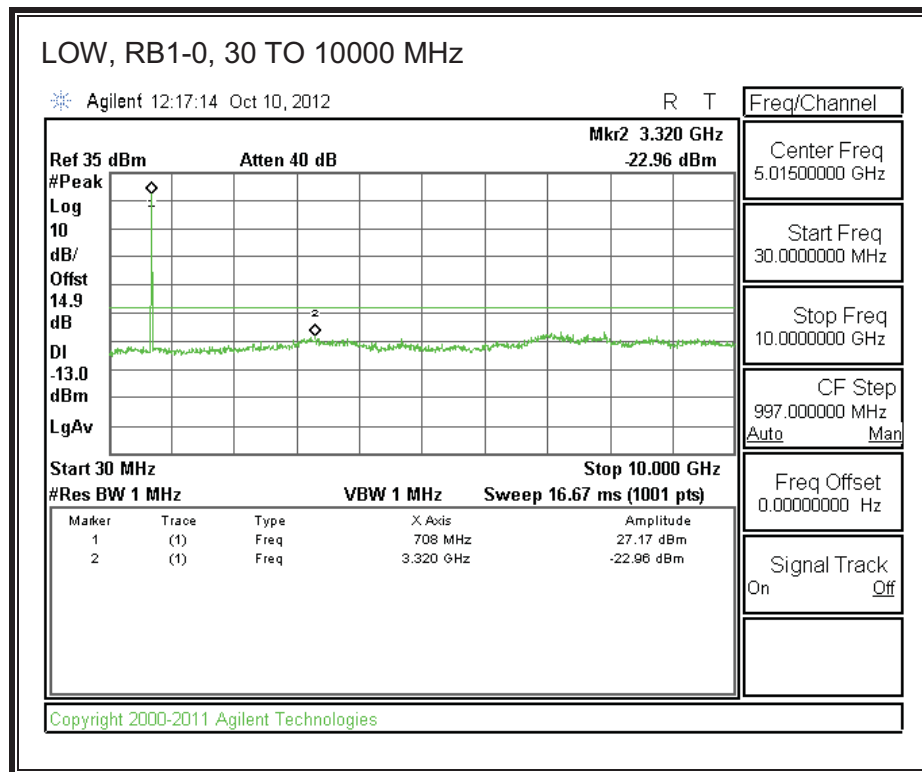


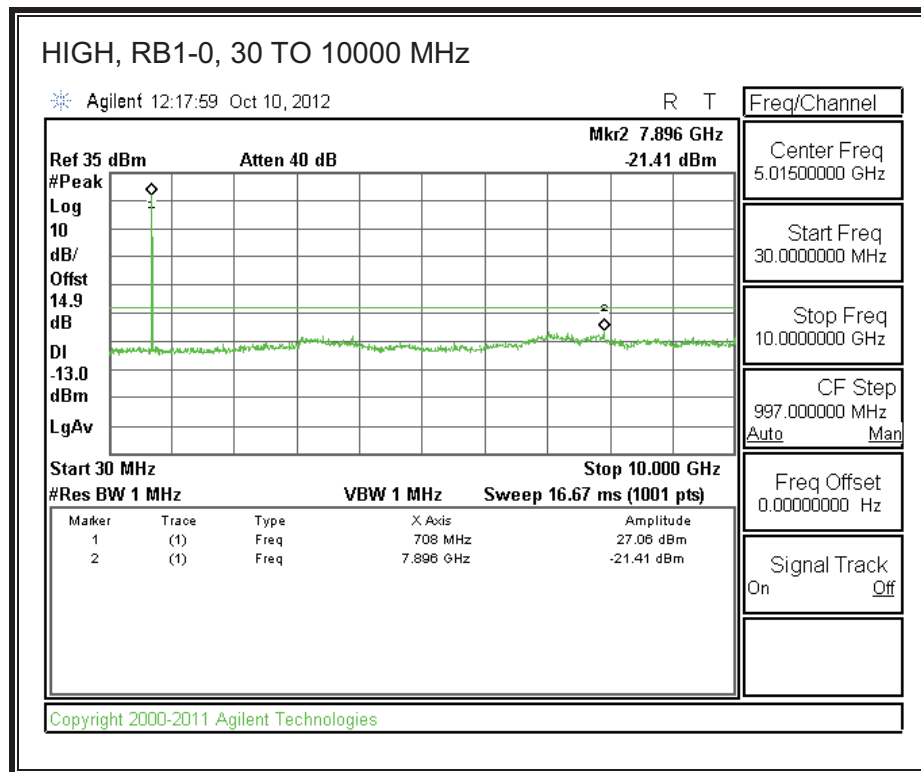
LTE 16QAM

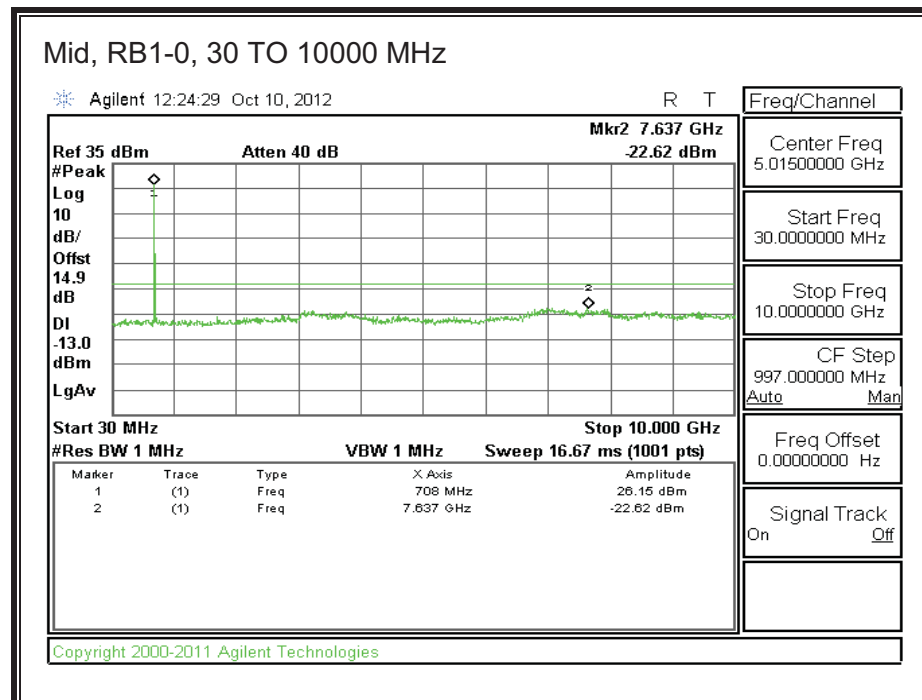
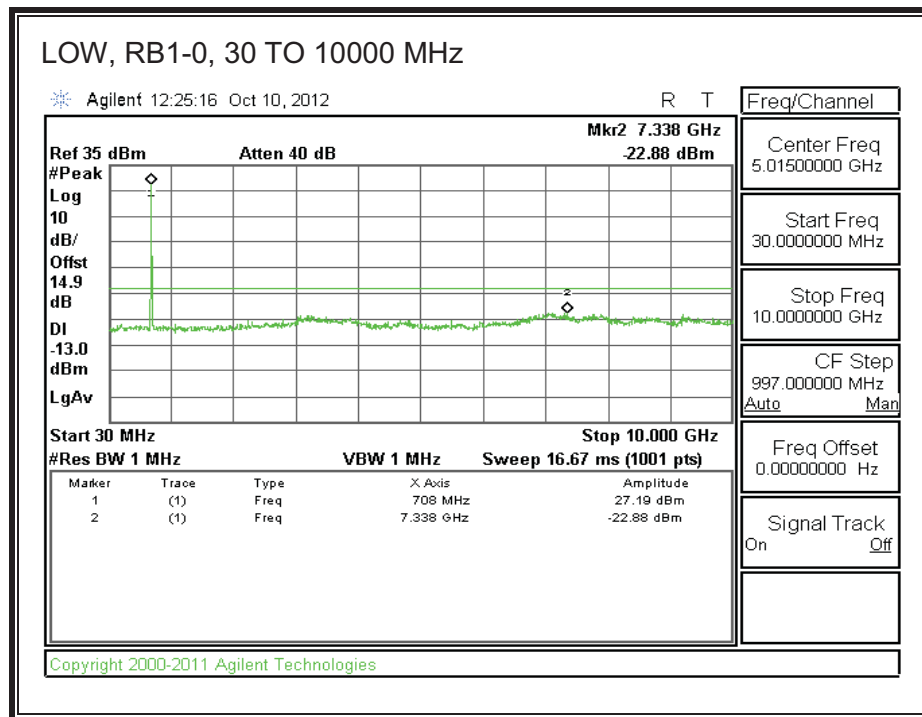


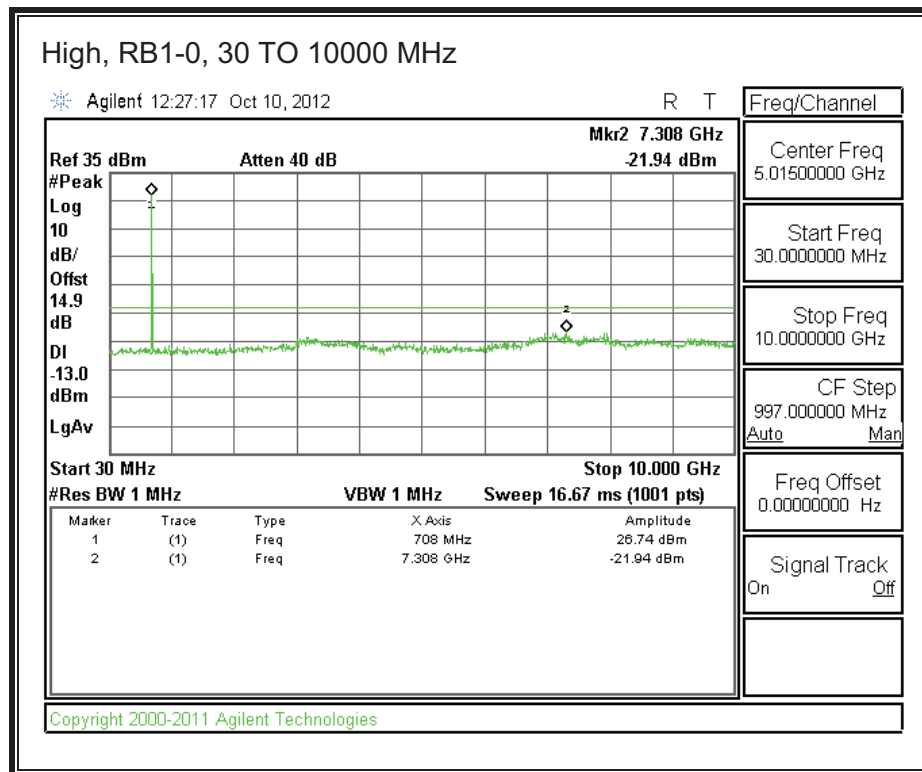
8.3.2. LTE BAND 17**LTE QPSK (5 MHz BANDWIDTH)**

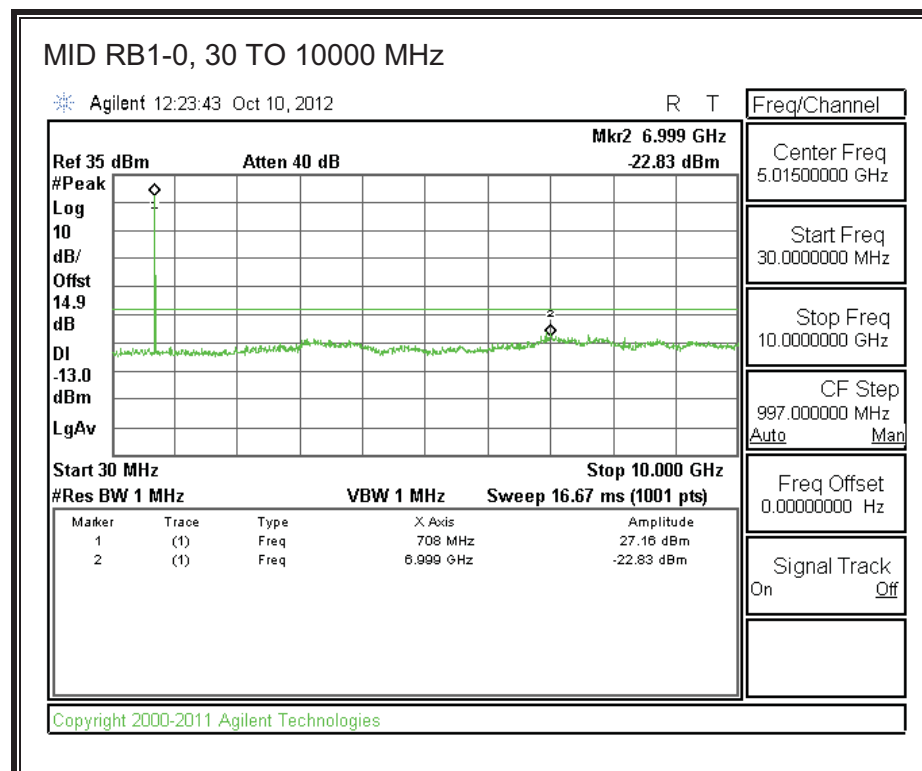
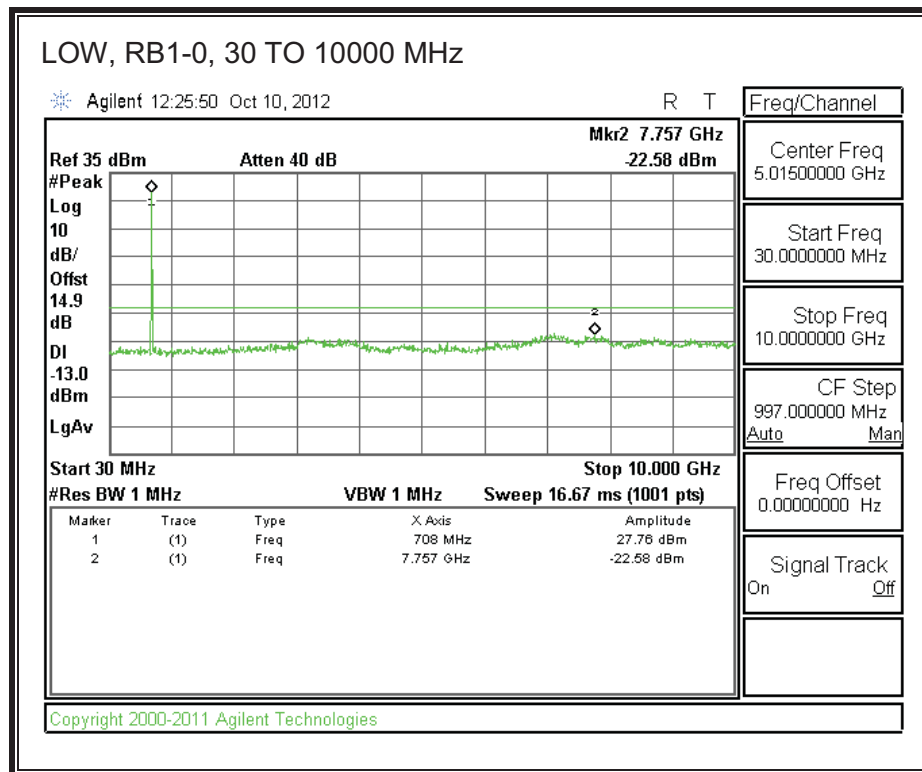


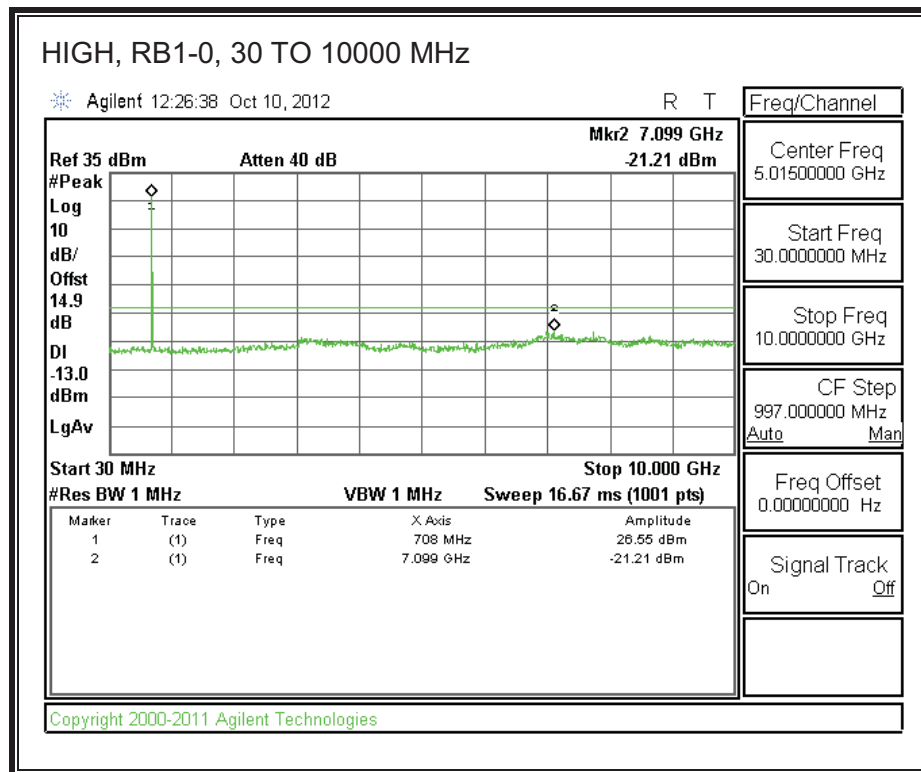
LTE 16QAM



Band 17 (10 MHz BANDWIDTH)**LTE QPSK**



LTE 16QAM



8.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235

LIMITS

- §22.355 - The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.
- §24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

TEST PROCEDURE

Use Agilent 8960 with Frequency Error measurement capability.

- Temp. = -30° to $+50^{\circ}\text{C}$
- Voltage = Low, 97.75VAC, Normal, 115vac and High, 132.25VAC.

Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to 20°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until $+50^{\circ}\text{C}$ is reached.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

MODES TESTED

- GPRS, EGPRS
- WCDMA, HSDPA
- LTE BAND 2
- LTE BAND 4
- LTE BAND 5
- LTE BAND 17
-

RESULTS

CELL, GSM MODULATION – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.599995MHz @ 20°C				
Limit: to stay +/- 2.5 ppm = 2091.500 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	836.599985	0.012	2.5
115.00	40	836.599973	0.026	2.5
115.00	30	836.599966	0.035	2.5
115.00	20	836.599995	0	2.5
115.00	10	836.599840	0.185	2.5
115.00	0	836.599979	0.019	2.5
115.00	-10	836.599964	0.037	2.5
115.00	-20	836.599949	0.055	2.5
115.00	-30	836.600006	-0.013	2.5
Reference Frequency: Cellular Mid Channel 836.599995MHz @ 20°C				
Limit: to stay +/- 2.5 ppm = 2091.500 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	20	836.599995	0	2.5
97.75	20	836.599993	0.002	2.5
132.25	20	836.599977	0.022	2.5

PCS, GSM MODULATION – MID CHANNEL

Reference Frequency: PCS Mid Channel 1880.000020MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	1879.999974	0.024	2.5
115.00	40	1880.000007	0.007	2.5
115.00	30	1880.000013	0.004	2.5
115.00	20	1880.000020	0	2.5
115.00	10	1880.000020	0.000	2.5
115.00	0	1880.000021	-0.001	2.5
115.00	-10	1880.000022	-0.001	2.5
115.00	-20	1879.999911	0.058	2.5
115.00	-30	1879.999971	0.026	2.5

Reference Frequency: PCS Mid Channel 1880.000020MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	20	1880.000020	0	2.5
97.75	20	1880.000021	-0.001	2.5
132.25	20	1880.000032	-0.006	2.5

CELL WCDMA – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.600002MHz @ 20°C				
Limit: to stay +/- 2.5 ppm = 2091.500 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	836.600002	0.000	2.5
115.00	40	836.600002	0.000	2.5
115.00	30	836.600002	0.000	2.5
115.00	20	836.600002	0	2.5
115.00	10	836.600002	0.000	2.5
115.00	0	836.600002	0.000	2.5
115.00	-10	836.600002	0.000	2.5
115.00	-20	836.600002	0.000	2.5
115.00	-30	836.600001	0.001	2.5

Reference Frequency: Cellular Mid Channel 836.600002MHz @ 20°C				
Limit: to stay +/- 2.5 ppm = 2091.500 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	20	836.600002	0	2.5
97.75	20	836.600002	0.000	2.5
132.25	20	836.600001	0.001	2.5

PCS, WCDMA – MID CHANNEL

Reference Frequency: PCS Mid Channel 1879.999991MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	1879.999991	0.000	2.5
115.00	40	1879.999991	0.000	2.5
115.00	30	1879.999991	0.000	2.5
115.00	20	1879.999991	0	2.5
115.00	10	1879.999991	0.000	2.5
115.00	0	1879.999991	0.000	2.5
115.00	-10	1879.999991	0.000	2.5
115.00	-20	1879.999991	0.000	2.5
115.00	-30	1879.999992	-0.001	2.5

Reference Frequency: PCS Mid Channel 1879.999991MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	20	1879.999991	0	2.5
97.75	20	1879.999991	0.000	2.5
132.25	20	1879.999990	0.001	2.5

QPSK, LTE BAND 2 – 1880.0 MHz

Reference Frequency: LTE Band 2, Mid Channel 1879.999970 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	1879.999969	0.001	2.5
115.00	40	1879.999971	0.000	2.5
115.00	30	1879.999971	0.000	2.5
115.00	20	1879.999970	0	2.5
115.00	10	1879.999968	0.001	2.5
115.00	0	1879.999968	0.001	2.5
115.00	-10	1879.999971	-0.001	2.5
115.00	-20	1879.999971	-0.001	2.5
115.00	-30	1879.999970	0.000	2.5

Reference Frequency: LTE Band 2, Mid Channel 1879.999970 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	20	1879.999970	0	2.5
97.75	20	1879.999954	0.009	2.5
132.25	20	1879.999995	-0.013	2.5

16QAM-LTE BAND 2 – 1880.0 MHz

Reference Frequency: LTE Band 2, Mid Channel 1879.999971 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	1879.999970	0.001	2.5
115.00	40	1879.999969	0.001	2.5
115.00	30	1879.999969	0.001	2.5
115.00	20	1879.999971	0	2.5
115.00	10	1879.999969	0.001	2.5
115.00	0	1879.999968	0.002	2.5
115.00	-10	1879.999969	0.001	2.5
115.00	-20	1879.999970	0.001	2.5
115.00	-30	1879.999972	-0.001	2.5

Reference Frequency: LTE Band 2, Mid Channel 1879.999971 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	20	1879.999971	0	2.5
97.75	20	1879.999969	0.001	2.5
132.25	20	1879.999993	-0.012	2.5

LTE BAND 4 – 1732.5 MHz QPSK

Reference Frequency: LTE Band 4_Mid Channel 1732.500013 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 4331.250 Hz				
Power Supply	Environment	Frequency Deviation Measured with Time Elapse		
(Vac)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	1732.500016	-0.0018	2.5
115.00	40	1732.500018	-0.0033	2.5
115.00	30	1732.500016	-0.0022	2.5
115.00	20	1732.500013	0	2.5
115.00	10	1732.500016	-0.0022	2.5
115.00	0	1732.500019	-0.0040	2.5
115.00	-10	1732.500019	-0.0040	2.5
115.00	-20	1732.500018	-0.0031	2.5
115.00	-30	1732.500019	-0.0038	2.5

Reference Frequency: LTE Band 4_Mid Channel 1732.500013 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 4331.250 Hz				
Power Supply	Environment	Frequency Deviation Measured with Time Elapse		
(Vac)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
115.00	20	1732.500013	0	2.5
97.75	20	1732.500002	0.0061	2.5
132.50	20	1732.500018	-0.0031	2.5

LTE BAND 4 – 1732.5 MHz, 16QAM

Reference Frequency: LTE Band 4_Mid Channle 1732.499976 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 4331.250 Hz				
Power Supply	Environment	Frequency Deviation Measured with Time Elapse		
(Vac)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	1732.500015	-0.0226	2.5
115.00	40	1732.500019	-0.0248	2.5
115.00	30	1732.499995	-0.0110	2.5
115.00	20	1732.499976	0	2.5
115.00	10	1732.500000	-0.0138	2.5
115.00	0	1732.500020	-0.0255	2.5
115.00	-10	1732.500019	-0.0250	2.5
115.00	-20	1732.500017	-0.0239	2.5
115.00	-30	1732.500018	-0.0239	2.5

Reference Frequency: LTE Band 4_Mid Channel 1732.499976MHz @ 20°C Limit: to stay +/- 2.5 ppm = 4331.250 Hz				
Power Supply	Environment	Frequency Deviation Measured with Time Elapse		
(Vac)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
115.00	20	1732.499976	0	2.5
97.75	20	1732.499965	0.0064	2.5
132.25	20	1732.500005	-0.0164	2.5

LTE BAND 5 – 836.5MHz, QPSK

Reference Frequency: LTE Band 5_Mid Channel 836.500008 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2091.250 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	836.500010	-0.003	2.5
115.00	40	836.499991	0.020	2.5
115.00	30	836.500000	0.009	2.5
115.00	20	836.500008	0	2.5
115.00	10	836.500008	0.000	2.5
115.00	0	836.500008	0.000	2.5
115.00	-10	836.499992	0.018	2.5
115.00	-20	836.499979	0.034	2.5
115.00	-30	836.500009	-0.002	2.5

Reference Frequency: LTE Band 5_Mid channel 836.500008 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2091.250 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	20	836.500008	0	2.5
97.75	20	836.500000	0.010	2.5
132.25	20	836.500010	-0.002	2.5

LTE BAND 5 – 836.5 MHz, 16QAM

Reference Frequency: LTE Band 5_Mid Channel 836.500006 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2091.250 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	836.500009	-0.003	2.5
115.00	40	836.500010	-0.005	2.5
115.00	30	836.500008	-0.002	2.5
115.00	20	836.500006	0	2.5
115.00	10	836.500008	-0.002	2.5
115.00	0	836.500009	-0.003	2.5
115.00	-10	836.500009	-0.003	2.5
115.00	-20	836.500009	-0.003	2.5
115.00	-30	836.500010	-0.005	2.5

Reference Frequency: LTE Band 5_Mid Channel 836.500006 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2091.250 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	20	836.500006	0	2.5
97.75	20	836.500006	0.001	2.5
132.25	20	836.500008	-0.002	2.5

LTE BAND 17 – 710 MHz, QPSK

Reference Frequency: LTE Band 17_Mid Channe 709.999994 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 1775.000 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	709.999991	0.004	2.5
115.00	40	709.999991	0.005	2.5
115.00	30	709.999994	0.000	2.5
115.00	20	709.999994	0	2.5
115.00	10	709.999991	0.004	2.5
115.00	0	709.999991	0.004	2.5
115.00	-10	709.999992	0.003	2.5
115.00	-20	709.999992	0.003	2.5
115.00	-30	710.000010	-0.023	2.5

Reference Frequency: LTE Band 17_Mid channel 709.999994 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 1775.000 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	20	709.999994	0	2.5
97.75	20	709.999994	0.000	2.5
132.25	20	709.999999	-0.007	2.5

LTE BAND 17 – 710 MHz, 16QAM

Reference Frequency: LTE Band 17_Mid Channel 709.999993 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 1775.000 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	709.999992	0.000	2.5
115.00	40	709.999992	0.001	2.5
115.00	30	709.999993	0.000	2.5
115.00	20	709.999993	0	2.5
115.00	10	709.999991	0.002	2.5
115.00	0	709.999991	0.002	2.5
115.00	-10	709.999993	-0.001	2.5
115.00	-20	709.999993	-0.001	2.5
115.00	-30	709.999993	0.000	2.5

Reference Frequency: LTE Band 17_Mid Channel 709.999993MHz @ 20°C Limit: to stay +/- 2.5 ppm = 1775.000 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	20	709.999993	0	2.5
97.75	20	709.999991	0.002	2.5
132.25	20	709.999995	-0.003	2.5

9. RADIATED TEST RESULTS

9.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, and §27.50.

LIMITS

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232(c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.

27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.

27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

Table—Equivalent Power and Antenna Heights for Base Stations in the 851–869 MHz and 935–940 MHz Bands Which Have a Requirement for a 32 km (20 mi) Service Area Radius

Antenna height (ATT) meters (feet)	Effective radiated power (watts) ^{1,2,4}
Above 1,372 (4,500)	65
Above 1,220 (4,000) to 1,372 (4,500)	70
Above 1,067 (3,500) to 1,220 (4,000)	75
Above 915 (3,000) to 1,067 (3,500)	100
Above 763 (2,500) to 915 (3,000)	140
Above 610 (2,000) to 763 (2,500)	200
Above 458 (1,500) to 610 (2,000)	350
Above 305 (1,000) to 458 (1,500)	600
Up to 305 (1,000)	31,000

1Power is given in terms of effective radiated power (ERP).

2Applicants in the Los Angeles, CA, area who demonstrate a need to serve both the downtown and fringe areas will be permitted to utilize an ERP of 1 kw at the following mountaintop sites: Santiago Park, Sierra Peak, Mount Lukens, and Mount Wilson.

3Stations with antennas below 305 m (1,000 ft) (AAT) will be restricted to a maximum power of 1 kw (ERP).

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

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17

The ERP/EIRP power was measured with the spectrum analyzer which attached with receiver antenna via calibrated cable. The measurements have been taken at the low, middle and high channel in each band.

GSM/WCDMA/LTE Bands with 5MHz Bandwidth or Less:

- Set the spectrum analyzer span wide enough or greater than the modulated signal BW.
- Set a spectrum analyzer at peak or average detection mode with VBW $\geq$ RBW $\geq$ 26dB BW, typically 3MHz for GSM and 5MHz for WCDMA modes respectively.
- Set a marker to point the corresponding peak value.

LTE Bands of 10MHz Bandwidth or Greater:

- Detector: Peak or Average
- Average Type: Power (RMS) if average reading
- RBW=1% of EBW, VBW $\geq$ 3RBW
- Sweep time = 100ms
- Use the PSA Integrated Channel Power with Integrated Bandwidth set equal to the EBW.

MODES TESTED

- GPRS and EGPRS
- WCDMA, REL 99 and HSDPA
- LTE BAND 2
- LTE BAND 4
- LTE BAND 5
- LTE BAND 17

Mode	Channel	f (MHz)	ERP (Average)	
			dBm	mW
GPRS	128	824.20	31.22	1324.34
	190	836.60	31.04	1270.57
	251	848.80	29.51	893.31
EGPRS	128	824.20	30.67	1166.81
	190	836.60	30.94	1241.65
	251	848.80	30.31	1073.99

Mode	Channel	f (MHz)	EIRP (Average)	
			dBm	mW
GPRS	512	1852.40	31.21	1321.30
	661	1880.00	32.11	1625.55
	810	1909.80	31.72	1485.94
EGPRS	512	1852.40	30.31	1073.99
	661	1880.00	31.29	1345.86
	810	1909.80	31.22	1324.34

Mode	Channel	f (MHz)	ERP (AVERAGE)	
			dBm	mW
UMTS,REL 99	4357	826.40	21.85	153.11
	4405	836.00	21.66	146.55
	4455	846.00	20.36	108.64

Mode	Channel	f (MHz)	EIRP (Average)	
			dBm	mW
UMTS,REL 99	9662	1852.40	24.42	276.69
	9800	1880.00	24.36	272.90
	9938	1907.60	24.60	288.40

Mode	Channel	f (MHz)	ERP (AVERAGE)	
			dBm	mW
UMTS, HSDPA	4357	826.40	23.07	202.77
	4405	836.00	22.93	196.34
	4455	846.00	23.01	199.99

Mode	Channel	f (MHz)	EIRP (Average)	
			dBm	mW
UMTS, HSDPA	9662	1852.40	24.11	257.63
	9800	1880.00	24.28	267.92
	9938	1907.60	24.22	264.24

LTE Band 2 (5MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	EIRP(Average)	
			dBm	mW
5.0 MHZ BAND QPSK	1/0	1852.5	24.02	252.35
		1880.0	24.56	285.76
		1907.5	25.10	323.59
5.0 MHZ BAND 16QAM	1/0	1852.5	22.72	187.07
		1880.0	23.66	232.27
		1907.5	23.70	234.42

LTE Band 2 (10MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	EIRP(Average)	
			dBm	mW
10.0 MHZ BAND QPSK	1/0	1855.0	24.22	264.24
		1880.0	24.66	292.42
		1905.0	24.90	309.03
10.0 MHZ BAND 16QAM	1/0	1855.0	22.52	178.65
		1880.0	23.06	202.30
		1905.0	23.20	208.93

LTE Band 4 (5 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	EIRP(Average)	
			dBm	mW
5.0 MHZ BAND QPSK	1/0	1712.5	22.96	197.70
		1732.5	24.01	251.77
		1752.5	23.67	232.81
5.0 MHZ BAND 16QAM	1/0	1712.5	22.16	164.44
		1732.5	22.21	166.34
		1752.5	22.37	172.58

LTE Band 4 (10 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	EIRP(Average)	
			dBm	mW
10.0 MHZ BAND QPSK	1/0	1715.0	23.66	232.27
		1732.5	23.81	240.44
		1750.0	23.67	232.81
10.0 MHZ BAND 16QAM	1/0	1715.0	21.46	139.96
		1732.5	21.61	144.88
		1750.0	21.67	146.89

LTE Band 5 (5 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	ERP (Average)	
			dBm	mW
5MHz Band QASK	1/0	826.5	23.47	222.33
		836.5	23.54	225.94
		846.5	22.81	190.99
5MHz Band 16QAM	1/0	826.5	21.97	157.40
		836.5	22.44	175.39
		846.5	21.11	129.12

LTE Band 5 (10 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	ERP (Average)	
			dBm	mW
10.0 MHZ BAND QPSK	1/0	829.0	22.97	198.15
		836.5	22.84	192.31
		844.0	22.11	162.55
10.0 MHZ BAND 16QAM	1/0	829.0	19.97	99.31
		836.5	20.14	103.28
		844.0	19.61	91.41

LTE Band 17 (5 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	ERP (Average)	
			dBm	mW
5MHz Band QASK	1/0	706.5	23.92	246.60
		710.0	23.82	240.99
		713.5	23.72	235.50
5MHz Band 16QAM	1/0	706.5	21.92	155.60
		710.0	21.92	155.60
		713.5	21.52	141.91

LTE Band 17 (10 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	ERP (Average)	
			dBm	mW
10.0 MHZ BAND QPSK	1/0	709.0	23.62	230.14
		710.0	23.72	235.50
		711.0	23.77	238.23
10.0 MHZ BAND 16QAM	1/0	709.0	21.42	138.68
		710.0	21.32	135.52
		711.0	21.62	145.21

9.1.1. GSM**GPRS (Cellular Band)****High Frequency Substitution Measurement
Compliance Certification Services Chamber B**

Company: Serria Wireless
Project #: 12U14542
Date: 10/15/12
Test Engineer: Roy Zheng
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850 MHz BAND_GPRS MODE

Test Equipment:

Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)

Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	31.72	V	0.5	0.0	31.22	38.5	-7.2	
824.20	28.68	H	0.5	0.0	28.18	38.5	-10.3	
Mid Ch								
836.60	31.54	V	0.5	0.0	31.04	38.5	-7.4	
836.60	25.80	H	0.5	0.0	25.30	38.5	-13.2	
High Ch								
848.80	30.01	V	0.5	0.0	29.51	38.5	-8.9	
848.80	25.50	H	0.5	0.0	25.00	38.5	-13.4	

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EGPRS (Cellular Band)**High Frequency Substitution Measurement
Compliance Certification Services Chamber B**

Company: Serria Wireless
Project #: 12U14542
Date: 10/15/12
Test Engineer: Roy Zheng
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850 MHz BAND_EGPRS MODE

Test Equipment:

Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)

Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	31.17	V	0.5	0.0	30.67	38.5	-7.8	
824.20	29.00	H	0.5	0.0	28.50	38.5	-9.9	
Mid Ch								
836.60	31.44	V	0.5	0.0	30.94	38.5	-7.5	
836.60	26.90	H	0.5	0.0	26.40	38.5	-12.1	
High Ch								
848.80	30.81	V	0.5	0.0	30.31	38.5	-8.1	
848.80	26.50	H	0.5	0.0	26.00	38.5	-12.4	

Rev. 3.17.11

GPRS (PCS Band)**High Frequency Fundamental Measurement
Compliance Certification Services Chamber B**

Company: Serria Wireless
Project #: 12U14542
Date: 10/15/12
Test Engineer: Roy Zheng
Configuration: EUT WITH AC ADAPTER
Mode: TX, 1900 MHz BAND_GPRS MODE

Test Equipment:

Receiving: Horn T59, and Camber B SMA Cables

Substitution: Horn T217 Substitution, 4ft SMA Cable (245182002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.850	15.4	V	0.85	8.62	23.18	33.0	-9.8	
1.850	23.6	H	0.85	8.47	31.21	33.0	-1.8	
Mid Ch								
1.880	16.0	V	0.85	8.46	23.60	33.0	-9.4	
1.880	24.6	H	0.85	8.36	32.11	33.0	-0.9	
High Ch								
1.910	14.9	V	0.85	8.30	22.38	33.0	-10.6	
1.910	24.3	H	0.85	8.25	31.72	33.0	-1.3	

Rev. 3.17.11

EGPRS (PCS Band)**High Frequency Fundamental Measurement
Compliance Certification Services Chamber B**

Company: Serria Wireless
Project #: 12U14542
Date: 10/15/12
Test Engineer: Roy Zheng
Configuration: EUT WITH AC ADAPTER
Mode: TX, 1900 MHz BAND_EGPRS MODE

Test Equipment:

Receiving: Horn T59, and Chamber B SMA Cables

Substitution: Horn T217 Substitution, 4ft SMA Cable (245182002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.850	15.1	V	0.85	8.62	22.89	33.0	-10.1	
1.850	22.7	H	0.85	8.47	30.31	33.0	-2.7	
Mid Ch								
1.880	14.3	V	0.85	8.46	21.95	33.0	-11.1	
1.880	23.8	H	0.85	8.36	31.29	33.0	-1.7	
High Ch								
1.910	14.4	V	0.85	8.30	21.83	33.0	-11.2	
1.910	23.8	H	0.85	8.25	31.22	33.0	-1.8	

Rev. 3.17.11

9.1.2. WCDMA**REL 99 (Cellular Band)****High Frequency Substitution Measurement
Compliance Certification Services Chamber A**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/17/12
Test Engineer: Roy Zheng
Configuration: EUT and AC Adapter
Mode: TX, 850MHz BAND WCDMA Ref 99
 Avg

Test Equipment:

Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)

Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	21.49	V	0.5	0.0	20.99	38.5	-17.5	
826.40	22.35	H	0.5	0.0	21.85	38.5	-16.6	
Mid Ch								
836.00	22.16	V	0.5	0.0	21.66	38.5	-16.8	
836.00	20.71	H	0.5	0.0	20.21	38.5	-18.2	
High Ch								
846.00	20.86	V	0.5	0.0	20.36	38.5	-18.1	
846.00	20.72	H	0.5	0.0	20.22	38.5	-18.2	

Rev. 3.17.11

REL 99 (PCS Band)High Frequency Fundamental Measurement
Compliance Certification Services Chamber A

Company: Sierra Wireless
 Project #: 12U14542
 Date: 10/16/12
 Test Engineer: Roy Zheng
 Configuration: EUT with AC adapter
 Mode: TX, 1900MHz BAND WCDMA Ref 99

Test Equipment:

Receiving: Horn T73, and Chamber A SMA Cables

Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.852	8.04	V	0.85	8.62	15.81	33.00	-17.19	
1.852	16.80	H	0.85	8.47	24.42	33.00	-8.58	
Mid Ch								
1.880	9.90	V	0.85	8.46	17.51	33.00	-15.49	
1.880	16.85	H	0.85	8.36	24.36	33.00	-8.64	
High Ch								
1.908	9.22	V	0.85	8.30	16.67	33.00	-16.33	
1.908	17.20	H	0.85	8.25	24.60	33.00	-8.40	

Rev. 3.17.11

HSDPA (Cellular Band)**High Frequency Substitution Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/19/12
Test Engineer: Roy Zheng
Configuration: EUT with Charger and laptop
Mode: TX, 850 MHz BAND, HSDPA MODE
 Avg

Test Equipment:

Receiving: Sunol T122, and 5m Chamber B N-type Cable (Setup this one for testing EUT)

Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	23.57	V	0.5	0.0	23.07	38.5	-15.4	
826.40	17.54	H	0.5	0.0	17.04	38.5	-21.4	
Mid Ch								
836.60	23.43	V	0.5	0.0	22.93	38.5	-15.5	
836.60	17.25	H	0.5	0.0	16.75	38.5	-21.7	
High Ch								
846.60	23.51	V	0.5	0.0	23.01	38.5	-15.4	
846.60	16.30	H	0.5	0.0	15.80	38.5	-22.6	

Rev. 3.17.11

HSDPA (PCS Band)High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Sierra Wireless
 Project #: 12U14542
 Date: 10/19/12
 Test Engineer: Roy Zheng
 Configuration: EUT with Charger and laptop
 Mode: TX, 1900 MHz BAND, HSDPA MODE

Test Equipment:

Receiving: Horn T59, and Chamber B SMA Cables

Substitution: Horn T217 Substitution, 4ft SMA Cable (245182002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.852	9.8	V	0.85	8.62	17.58	33.0	-15.4	
1.852	16.5	H	0.85	8.47	24.11	33.0	-8.9	
Mid Ch								
1.880	10.0	V	0.85	8.46	17.64	33.0	-15.4	
1.880	16.8	H	0.85	8.36	24.28	33.0	-8.7	
High Ch								
1.908	10.1	V	0.85	8.30	17.58	33.0	-15.4	
1.908	16.8	H	0.85	8.25	24.22	33.0	-8.8	

Rev. 3.17.11

9.1.3. LTE BAND 2**LTE QPSK Band 2 (5 MHz BANDWIDTH)****High Frequency Fundamental Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/10/12
Test Engineer: Chin Pang
Configuration: EUT only
Mode: TX, LTE band 2, 5.0MHz BW_QPSK MODE

Test Equipment:

Receiving: Horn T59, and Chamber B SMA Cables

Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.853	9.2	V	0.85	8.62	16.97	33.0	-16.0	
1.853	16.4	H	0.85	8.47	24.02	33.0	-9.0	
1.880	9.5	V	0.85	8.46	17.11	33.0	-15.9	
1.880	17.1	H	0.85	8.36	24.56	33.0	-8.4	
1.908	8.3	V	0.85	8.30	15.75	33.0	-17.3	
1.908	17.7	H	0.85	8.25	25.10	33.0	-7.9	

Rev. 3.17.11

LTE 16QAM Band 2 (5 MHz BANDWIDTH)**High Frequency Fundamental Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/10/12
Test Engineer: Chin Pang
Configuration: EUT only
Mode: TX, LTE band 2, 5.0MHz BW_16QAM MODE

Test Equipment:

Receiving: Horn T59, and Chamber B SMA Cables

Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.853	8.2	V	0.85	8.62	15.97	33.0	-17.0	
1.853	15.1	H	0.85	8.47	22.72	33.0	-10.3	
1.880	7.5	V	0.85	8.46	15.11	33.0	-17.9	
1.880	16.2	H	0.85	8.36	23.66	33.0	-9.3	
1.908	7.0	V	0.85	8.30	14.45	33.0	-18.6	
1.908	16.3	H	0.85	8.25	23.70	33.0	-9.3	

Rev. 3.17.11

LTE QPSK Band 2 (10 MHz BANDWIDTH)**High Frequency Fundamental Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/10/12
Test Engineer: Chin Pang
Configuration: EUT Only
Mode: TX, LTE band 2, 10.0MHz BW_QPSK MODE

Test Equipment:

Receiving: Horn T59, and Chamber B SMA Cables

Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.855	8.2	V	0.85	8.62	15.97	33.0	-17.0	
1.855	16.6	H	0.85	8.47	24.22	33.0	-8.8	
1.880	8.5	V	0.85	8.46	16.11	33.0	-16.9	
1.880	17.2	H	0.85	8.36	24.66	33.0	-8.3	
1.905	8.3	V	0.85	8.30	15.75	33.0	-17.3	
1.905	17.5	H	0.85	8.25	24.90	33.0	-8.1	

Rev. 3.17.11

LTE 16QAM Band 2 (10 MHz BANDWIDTH)**High Frequency Fundamental Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/10/12
Test Engineer: Chin Pang
Configuration: EUT Only
Mode: TX, LTE band 2, 10.0MHz BW_16QAM MODE

Test Equipment:

Receiving: Horn T59, and Chamber B SMA Cables

Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.855	6.7	V	0.85	8.62	14.47	33.0	-18.5	
1.855	14.9	H	0.85	8.47	22.52	33.0	-10.5	
1.880	7.1	V	0.85	8.46	14.71	33.0	-18.3	
1.880	15.6	H	0.85	8.36	23.06	33.0	-9.9	
1.905	7.0	V	0.85	8.30	14.45	33.0	-18.6	
1.905	15.8	H	0.85	8.25	23.20	33.0	-9.8	

Rev. 3.17.11

9.1.4. LTE BAND 4**LTE QPSK Band 4 (5 MHz BANDWIDTH)**

High Frequency Fundamental Measurement Compliance Certification Services Chamber B								
Company:		Sierra Wireless						
Project #:		12U14542						
Date:		10/10/12						
Test Engineer:		Chin Pang						
Configuration:		EUT only						
Mode:		TX, LTE BAND 4, 5MHz BW_QPSK						
Test Equipment:								
Receiving: Horn T59, and Chamber B SMA Cables								
Substitution: Horn T217 Substitution, 6ft SMA Cable (244640002) Warehouse								
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.7125	7.4	V	0.67	8.56	15.29	30.0	-14.7	
1.7125	15.2	H	0.67	8.43	22.96	30.0	-7.0	
1.7325	7.1	V	0.67	8.64	15.07	30.0	-14.9	
1.7325	16.2	H	0.67	8.48	24.01	30.0	-6.0	
1.7525	7.1	V	0.67	8.73	15.16	30.0	-14.8	
1.7525	15.8	H	0.67	8.54	23.67	30.0	-6.3	
Rev. 1.24.7								

LTE 16QAM Band 4 (5 MHz BANDWIDTH)**High Frequency Fundamental Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/10/12
Test Engineer: Chin Pang
Configuration: EUT only
Mode: TX, LTE BAND 4, 5MHz BW_16QAM

Test Equipment:

Receiving: Horn T59, and Chamber B SMA Cables

Substitution: Horn T217 Substitution, 6ft SMA Cable (244640002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.7125	6.4	V	0.67	8.56	14.29	30.0	-15.7	
1.7125	14.4	H	0.67	8.43	22.16	30.0	-7.8	
1.7325	6.1	V	0.67	8.64	14.07	30.0	-15.9	
1.7325	14.4	H	0.67	8.48	22.21	30.0	-7.8	
1.7525	6.1	V	0.67	8.73	14.16	30.0	-15.8	
1.7525	14.5	H	0.67	8.54	22.37	30.0	-7.6	

Rev. 1.24.7

LTE QPSK Band 4 (10 MHz BANDWIDTH)**High Frequency Fundamental Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/10/12
Test Engineer: Chin Pang
Configuration: EUT only
Mode: TX, LTE BAND 4, 10MHz BW_QPSK

Test Equipment:

Receiving: Horn T59, and Chamber B SMA Cables

Substitution: Horn T217 Substitution, 6ft SMA Cable (244640002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.7125	6.4	V	0.67	8.56	14.29	30.0	-15.7	
1.7125	15.9	H	0.67	8.43	23.66	30.0	-6.3	
1.7325	5.7	V	0.67	8.64	13.67	30.0	-16.3	
1.7325	16.0	H	0.67	8.48	23.81	30.0	-6.2	
1.7525	5.7	V	0.67	8.73	13.76	30.0	-16.2	
1.7525	15.8	H	0.67	8.54	23.67	30.0	-6.3	

Rev. 1.24.7

LTE 16QAM Band 4 (10 MHz BANDWIDTH)**High Frequency Fundamental Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/10/12
Test Engineer: Chin Pang
Configuration: EUT only
Mode: TX, LTE BAND 4, 10MHz BW_16QAM

Test Equipment:

Receiving: Horn T59, and Chamber B SMA Cables

Substitution: Horn T217 Substitution, 6ft SMA Cable (244640002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.7125	5.4	V	0.67	8.56	13.29	30.0	-16.7	
1.7125	13.7	H	0.67	8.43	21.46	30.0	-8.5	
1.7325	5.1	V	0.67	8.64	13.07	30.0	-16.9	
1.7325	13.8	H	0.67	8.48	21.61	30.0	-8.4	
1.7525	5.1	V	0.67	8.73	13.16	30.0	-16.8	
1.7525	13.8	H	0.67	8.54	21.67	30.0	-8.3	

Rev. 1.24.7

9.1.5. LTE BAND 5**LTE QPSK Band 5 (5 MHz BANDWIDTH)**

High Frequency Substitution Measurement Compliance Certification Services Chamber B								
Company:	Sierra Wireless							
Project #:	12U14542							
Date:	10/12/12							
Test Engineer:	Chin Pang							
Configuration:	EUT only							
Mode:	LTE BAND 5, 5MHz BW AND QPSK MODE							
Test Equipment:								
Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.50	23.97	V	0.5	0.0	23.47	38.5	-15.0	
826.50	16.10	H	0.5	0.0	15.60	38.5	-22.8	
Mid Ch								
836.50	24.04	V	0.5	0.0	23.54	38.5	-14.9	
836.50	16.00	H	0.5	0.0	15.50	38.5	-23.0	
High Ch								
846.50	23.31	V	0.5	0.0	22.81	38.5	-15.6	
846.50	17.20	H	0.5	0.0	16.70	38.5	-21.7	
Rev. 3.17.11								

LTE 16QAM Band 5 (5 MHz BANDWIDTH)**High Frequency Substitution Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/12/12
Test Engineer: Chin Pang
Configuration: EUT only
Mode: LTE BAND 5, 5MHz BW AND 16QAM MODE

Test Equipment:

Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)

Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.50	22.47	V	0.5	0.0	21.97	38.5	-16.5	
826.50	15.15	H	0.5	0.0	14.65	38.5	-23.8	
Mid Ch								
836.50	22.94	V	0.5	0.0	22.44	38.5	-16.0	
836.50	15.00	H	0.5	0.0	14.50	38.5	-24.0	
High Ch								
846.50	21.61	V	0.5	0.0	21.11	38.5	-17.3	
846.50	16.25	H	0.5	0.0	15.75	38.5	-22.7	

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LTE QPSK Band 5 (10 MHz BANDWIDTH)**High Frequency Substitution Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/11/12
Test Engineer: Chin Pang
Configuration: EUT only
Mode: LTE BAND 5, 10MHz BW AND QPSK MODE

Test Equipment:

Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)

Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
829.00	23.47	V	0.5	0.0	22.97	38.5	-15.5	
829.00	19.50	H	0.5	0.0	19.00	38.5	-19.4	
Mid Ch								
836.50	23.34	V	0.5	0.0	22.84	38.5	-15.6	
836.50	19.20	H	0.5	0.0	18.70	38.5	-19.8	
High Ch								
844.00	22.61	V	0.5	0.0	22.11	38.5	-16.3	
844.00	19.60	H	0.5	0.0	19.10	38.5	-19.3	

Rev. 3.17.11

LTE 16QAM Band 5 (10 MHz BANDWIDTH)**High Frequency Substitution Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/11/12
Test Engineer: Chin Pang
Configuration: EUT only
Mode: LTE BAND 5, 10MHz BW AND 16QAM MODE

Test Equipment:

Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)

Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
829.00	20.47	V	0.5	0.0	19.97	38.5	-18.5	
829.00	18.57	H	0.5	0.0	18.07	38.5	-20.4	
Mid Ch								
836.50	20.64	V	0.5	0.0	20.14	38.5	-18.3	
836.50	18.20	H	0.5	0.0	17.70	38.5	-20.8	
High Ch								
844.00	20.11	V	0.5	0.0	19.61	38.5	-18.8	
844.00	18.65	H	0.5	0.0	18.15	38.5	-20.3	

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9.1.6. LTE BAND 17**LTE QPSK, Band 17 (5 MHz BANDWIDTH)****AVERAGE**

High Frequency Substitution Measurement Compliance Certification Services Chamber B								
Company:	Sierra Wireless							
Project #:	12U14542							
Date:	10/12/12							
Test Engineer:	Roy Zheng							
Configuration:	EUT Only							
Mode:	TX, LTE band 17, 5.0MHz BW_QPSK MODE Average							
Test Equipment:								
Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
706.50	24.42	V	0.5	0.0	23.92	34.8	-10.9	
706.50	16.95	H	0.5	0.0	16.45	34.8	-18.4	
Mid Chan								
710.00	24.32	V	0.5	0.0	23.82	34.8	-11.0	
710.00	16.95	H	0.5	0.0	16.45	34.8	-18.4	
High Ch								
713.50	24.22	V	0.5	0.0	23.72	34.8	-11.1	
713.50	17.15	H	0.5	0.0	16.65	34.8	-18.2	
Rev. 3.17.11								

LTE 16QAM Band 17 (5 MHz BANDWIDTH)**High Frequency Substitution Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/12/12
Test Engineer: Roy Zheng
Configuration: EUT WITH AC ADAPTER
Mode: TX, LTE band 17, 5.0MHz BW_16QAM MODE
 Average

Test Equipment:

Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)

Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
706.50	22.42	V	0.5	0.0	21.92	34.8	-12.9	
706.50	14.95	H	0.5	0.0	14.45	34.8	-20.4	
Mid Ch								
710.00	22.42	V	0.5	0.0	21.92	34.8	-12.9	
710.00	15.25	H	0.5	0.0	14.75	34.8	-20.1	
High Ch								
713.50	22.02	V	0.5	0.0	21.52	34.8	-13.3	
713.50	15.35	H	0.5	0.0	14.85	34.8	-20.0	

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LTE QPSK Band 17 (10 MHz BANDWIDTH)**High Frequency Substitution Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/12/12
Test Engineer: Roy Zheng
Configuration: EUT WITH AC ADAPTER
Mode: TX, LTE band 17, 10.0MHz BW_QPSK MODE
 Average

Test Equipment:

Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)
 Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
709.00	24.12	V	0.5	0.0	23.62	34.8	-11.2	
709.00	17.35	H	0.5	0.0	16.85	34.8	-18.0	
Mid Ch								
710.00	24.22	V	0.5	0.0	23.72	34.8	-11.1	
710.00	16.85	H	0.5	0.0	16.35	34.8	-18.5	
High Ch								
711.00	24.27	V	0.5	0.0	23.77	34.8	-11.0	
711.00	16.35	H	0.5	0.0	15.85	34.8	-19.0	

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LTE 16QAM Band 17 (10 MHz BANDWIDTH)**High Frequency Substitution Measurement
Compliance Certification Services Chamber B**

Company: Sierra Wireless
Project #: 12U14542
Date: 10/12/12
Test Engineer: Roy Zheng
Configuration: EUT WITH AC ADAPTER
Mode: TX, LTE band 17, 10.0MHz BW_16QAM MODE
 Average

Test Equipment:

Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)

Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
709.00	21.92	V	0.5	0.0	21.42	34.8	-13.4	
709.00	14.35	H	0.5	0.0	13.85	34.8	-21.0	
Mid Ch								
710.00	21.82	V	0.5	0.0	21.32	34.8	-13.5	
710.00	14.15	H	0.5	0.0	13.65	34.8	-21.2	
High Ch								
711.00	22.12	V	0.5	0.0	21.62	34.8	-13.2	
711.00	13.95	H	0.5	0.0	13.45	34.8	-21.4	

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9.2. PEAK-TO-AVERAGE RATIO

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.

GSM

Mode	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	**Average	
GPRS	836.6	33.06	32.50	0.56
Mode	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	**Average	
EGPRS	836.6	28.78	27.00	1.78
*Peak Reading = Average Reading + Peak-to-Average Ratio ** Average reading from the call box which is Including Duty Cycle				

WCDMA

Mode	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
REL99	836	26.28	22.76	3.52
Mode	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
		*Peak	Average	
HSDPA	836	27.21	22.85	4.36
*Peak Reading = Average Reading + Peak-to-Average Ratio				

LTE BAND 2

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	5	RB1 0	1880	27.51	22.51	5
Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5	RB1 0	1880	27.52	21.48	6.04
*Peak Reading = Average Reading + Peak-to-Average Ratio						

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	10	RB1 0	1880	27.48	22.55	4.93
Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	10	RB1 0	1880	27.47	21.47	6
*Peak Reading = Average Reading + Peak-to-Average Ratio						

LTE BAND 4

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	5	RB1 0	1732.5	28.38	23	5.38
Mode	Channel Band-width	Ch. No.	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5	RB1 0	1732.5	28.78	22.08	6.7
*Peak Reading = Average Reading + Peak-to-Average Ratio						

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	10	RB1 0	1732.5	28.71	22.99	5.72
Mode	Channel Band-width	Ch. No.	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	10	RB1 0	1732.5	28.85	21.75	7.1
*Peak Reading = Average Reading + Peak-to-Average Ratio						

LTE BAND 5

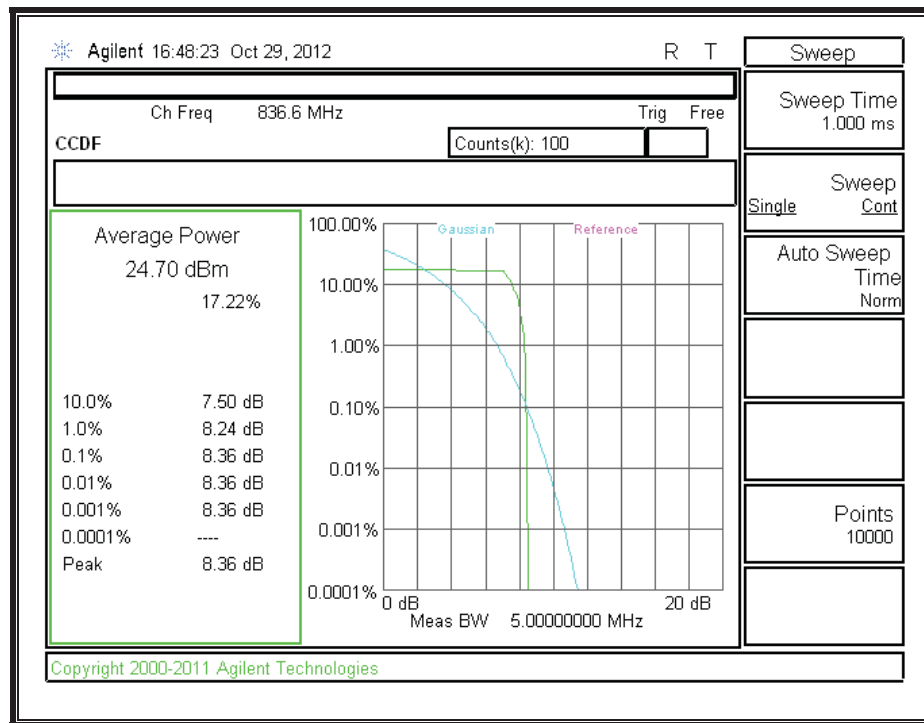
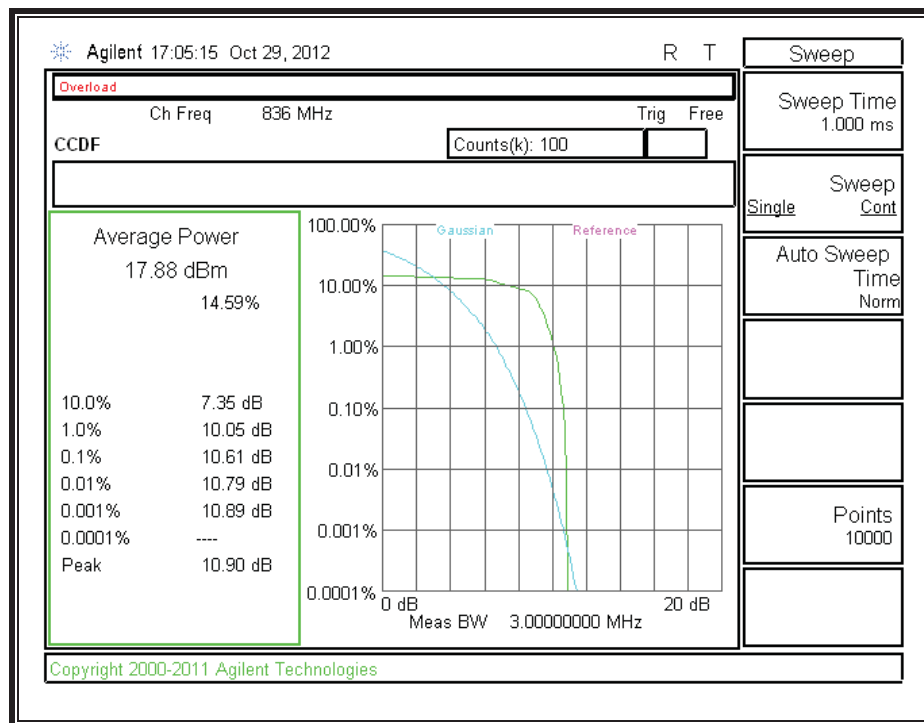
Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	5	RB1 0	836.5	30.2	23.85	6.35
Mode	Channel Band-width	Ch. No.	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5	RB1 0	836.5	30.25	23	7.25
*Peak Reading = Average Reading + Peak-to-Average Ratio						

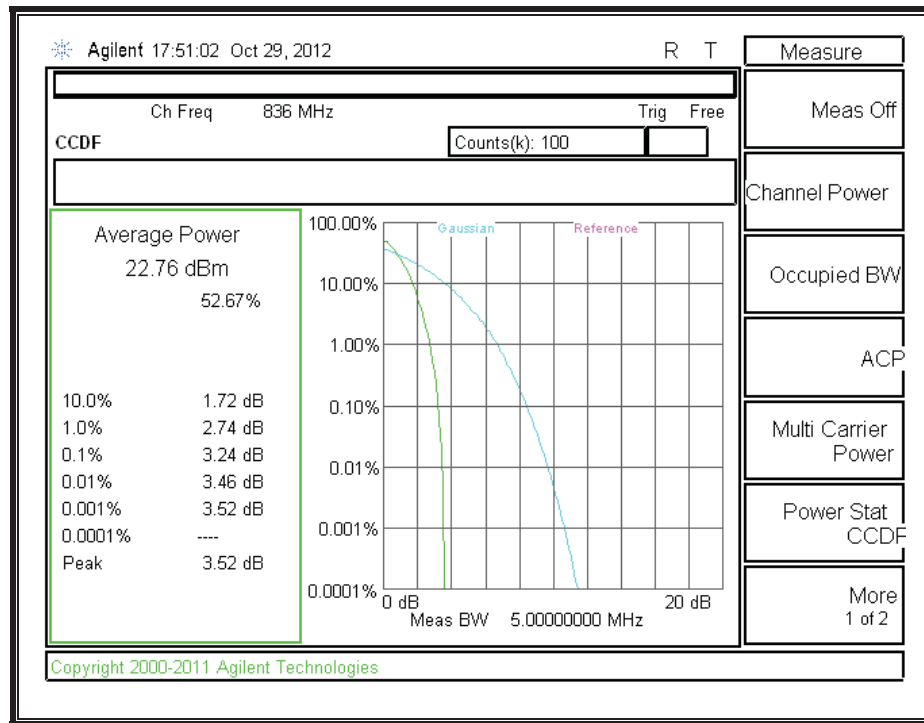
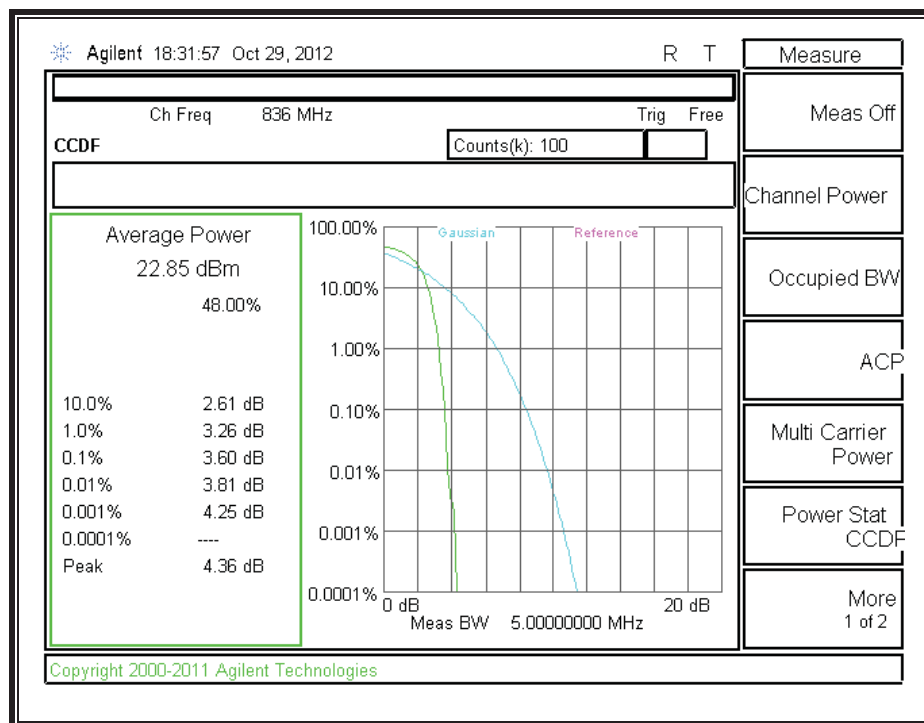
Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	10	RB1 0	836.5	30.08	23.91	6.17
Mode	Channel Band-width	Ch. No.	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	10	RB1 0	836.5	29.99	22.64	7.35
*Peak Reading = Average Reading + Peak-to-Average Ratio						

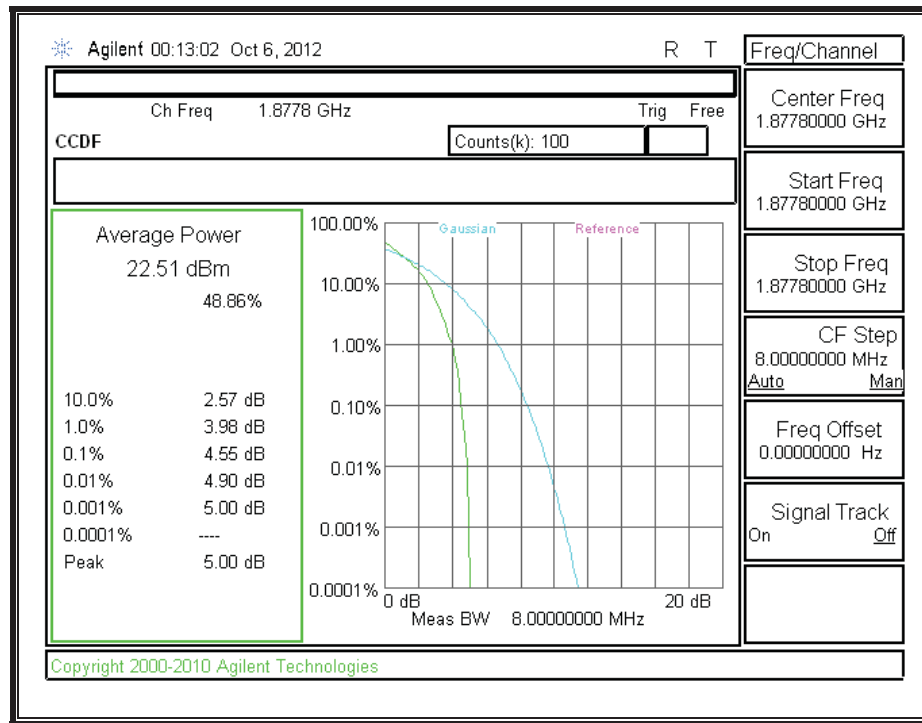
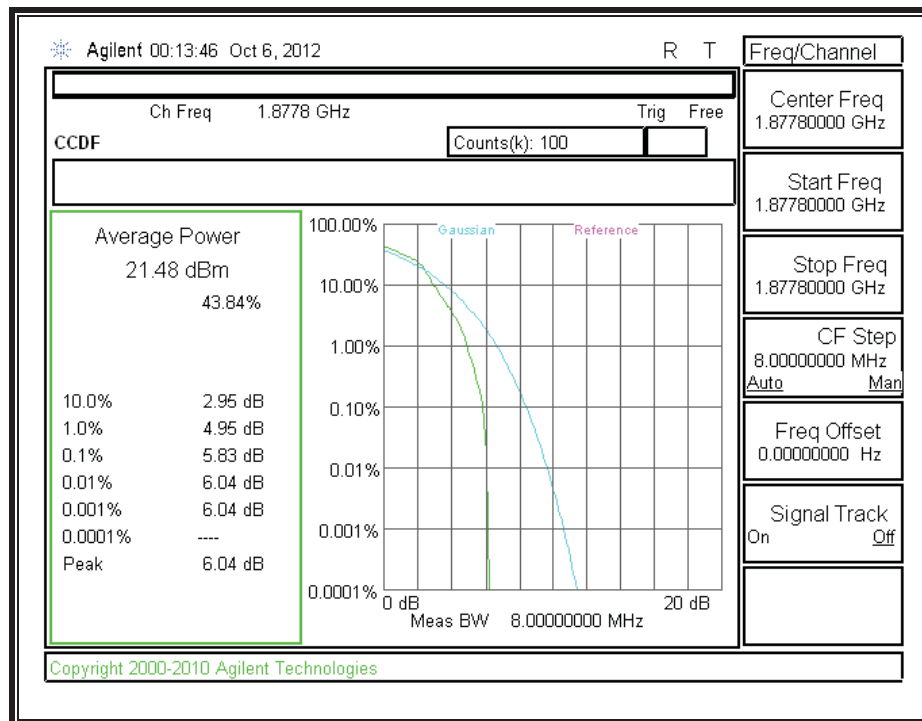
LTE BAND 17

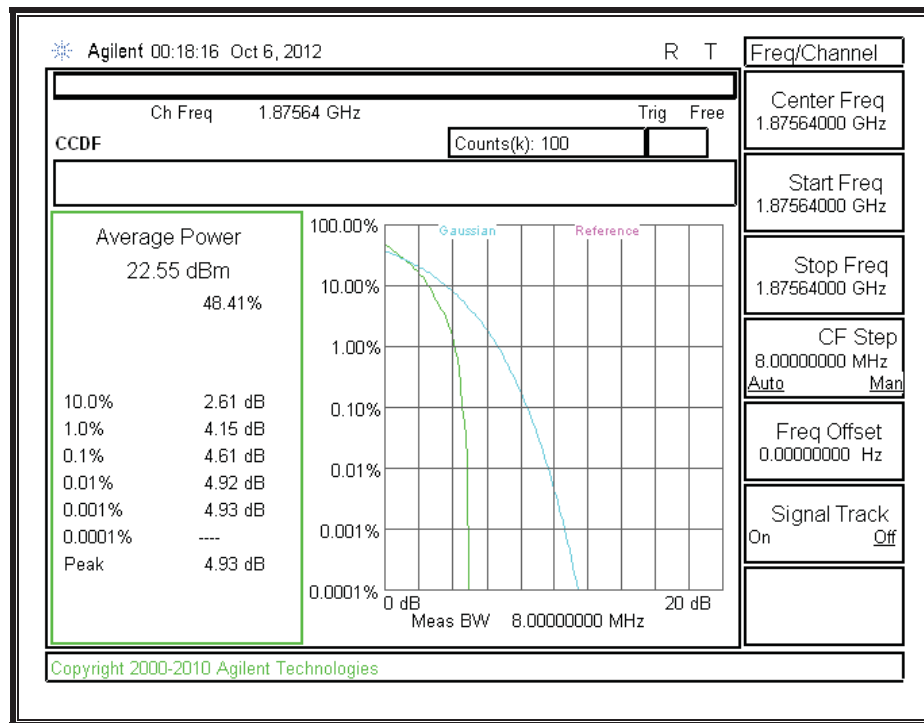
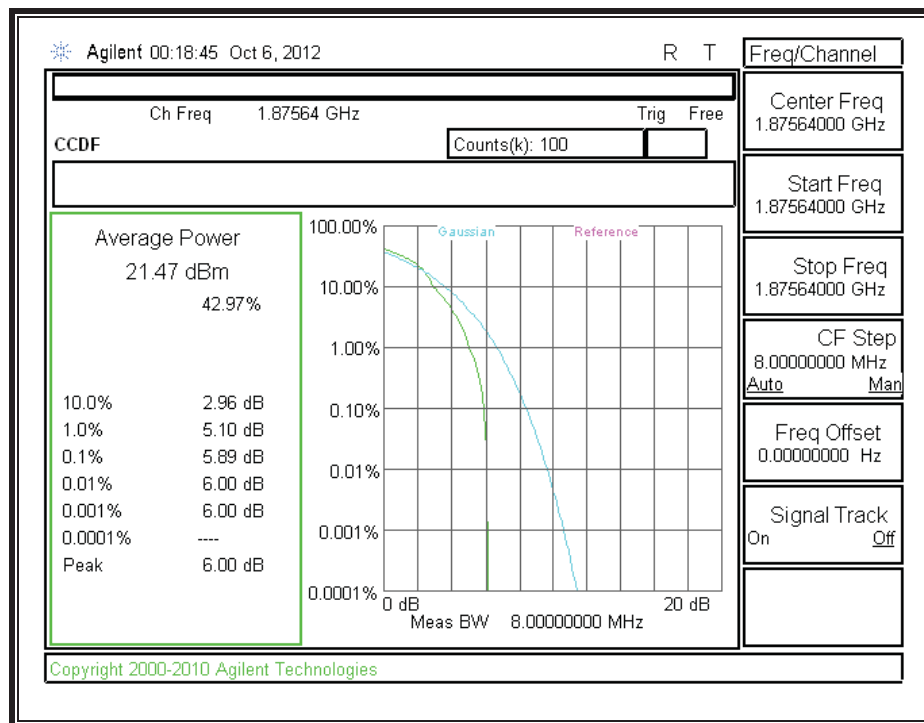
Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	5	RB1 0	710	27.56	23.97	3.59
Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5	RB1 0	710	27.57	23.07	4.5
*Peak Reading = Average Reading + Peak-to-Average Ratio						

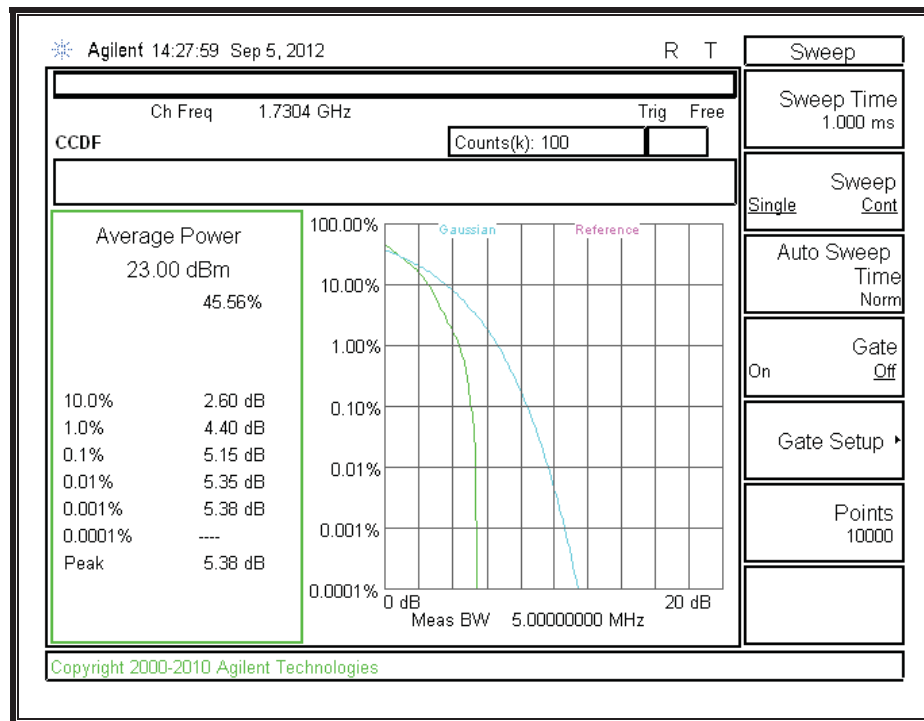
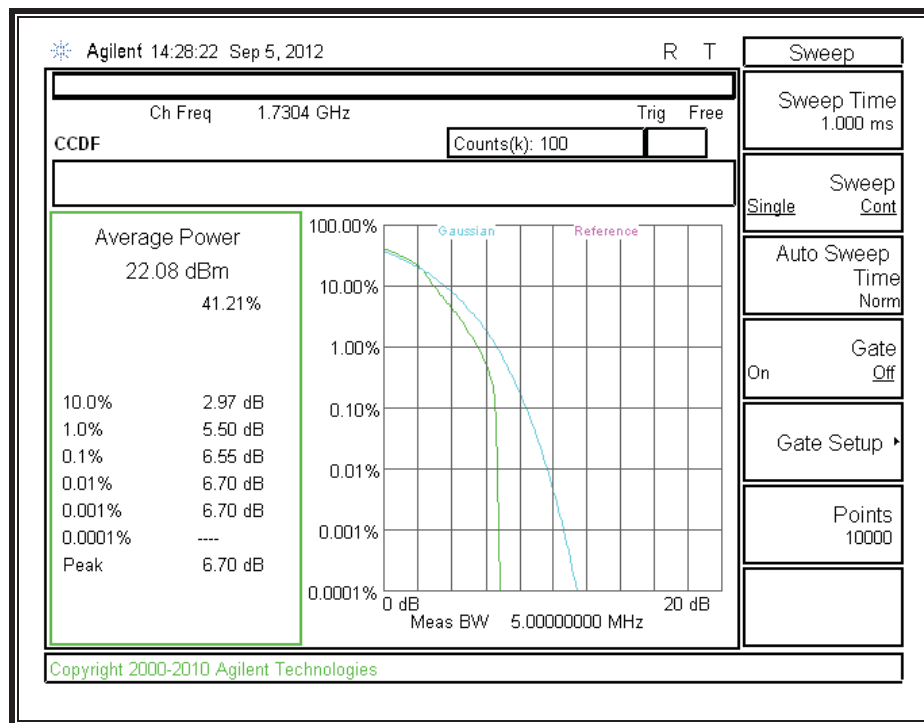
Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	10	RB1 0	710	28.17	22.69	5.48
Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	10	RB1 0	710	28.28	21.94	6.34
*Peak Reading = Average Reading + Peak-to-Average Ratio						

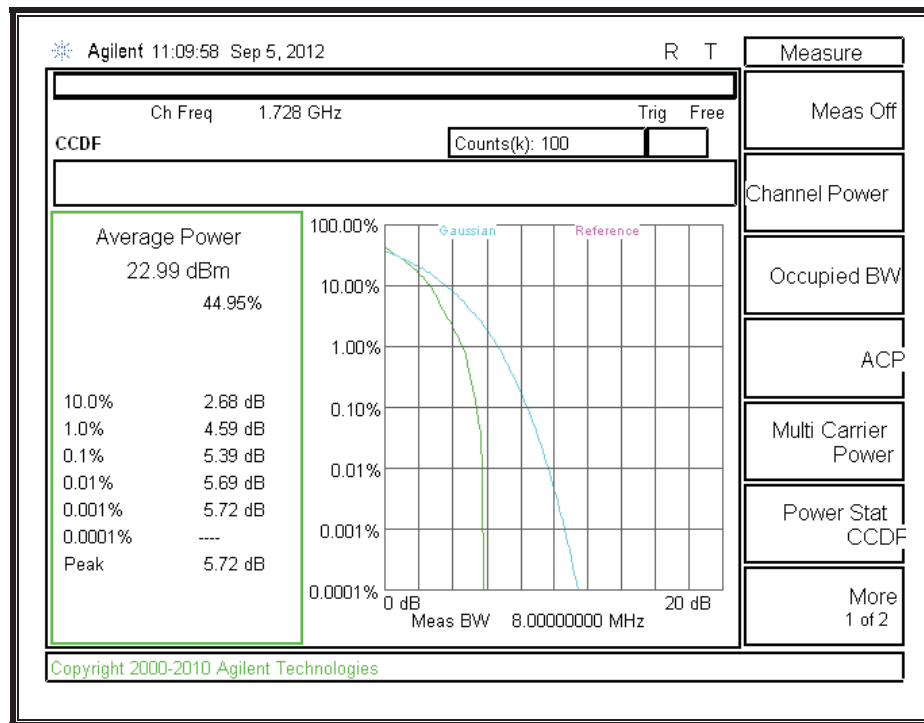
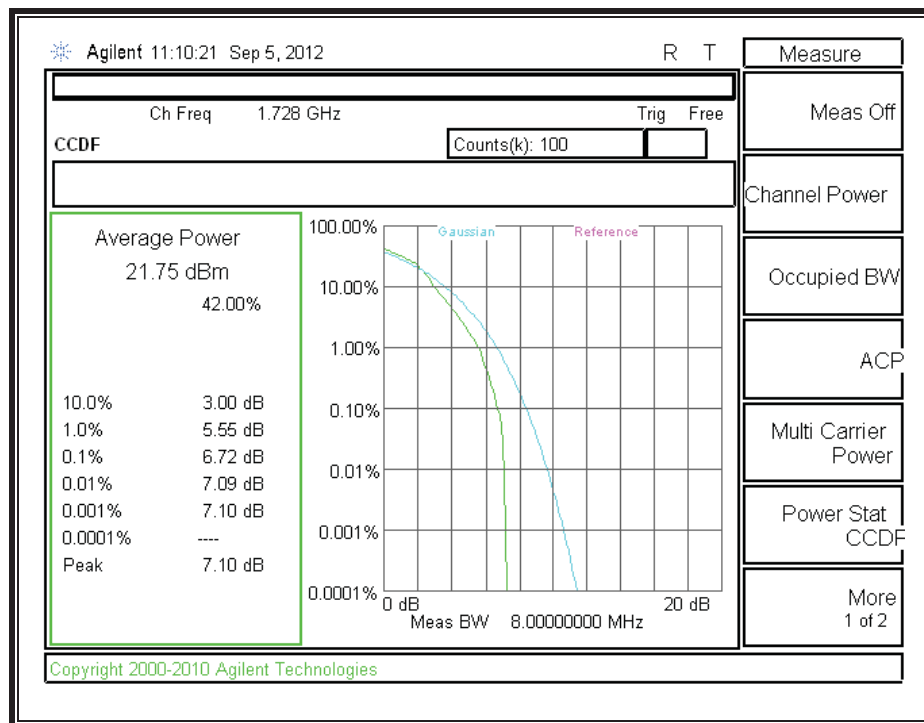
GPRS (CELL)**EGPRS (CELL)**

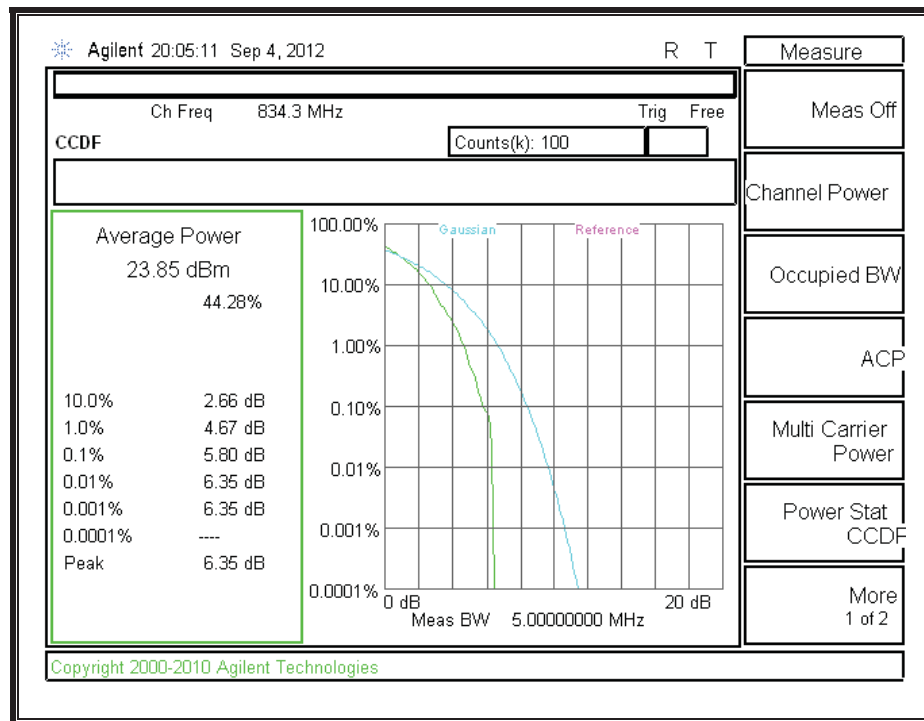
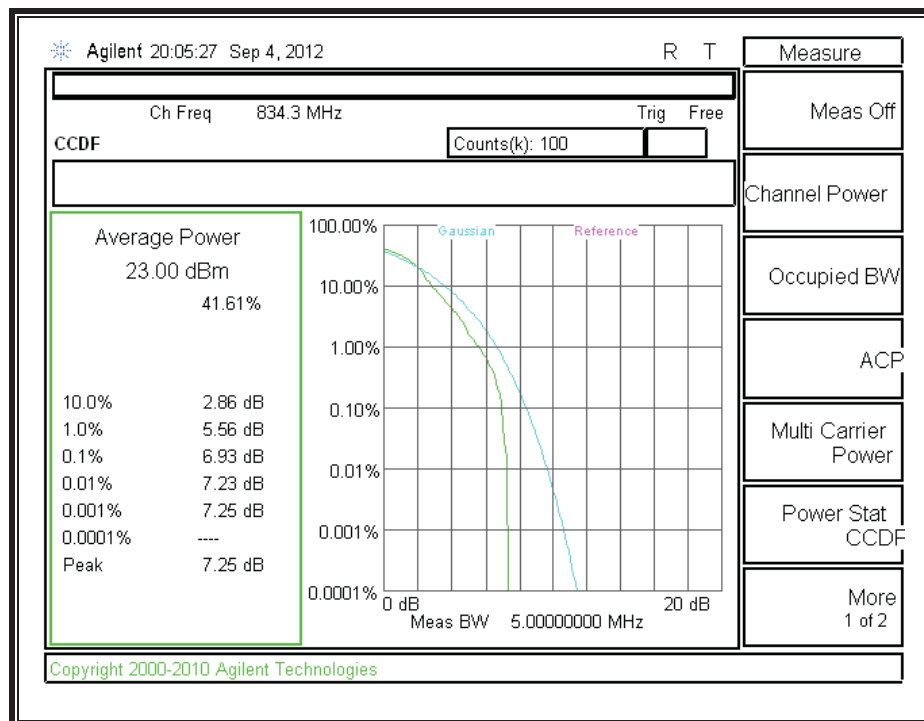
REL99 (CELL)**HSDPA (CELL)**

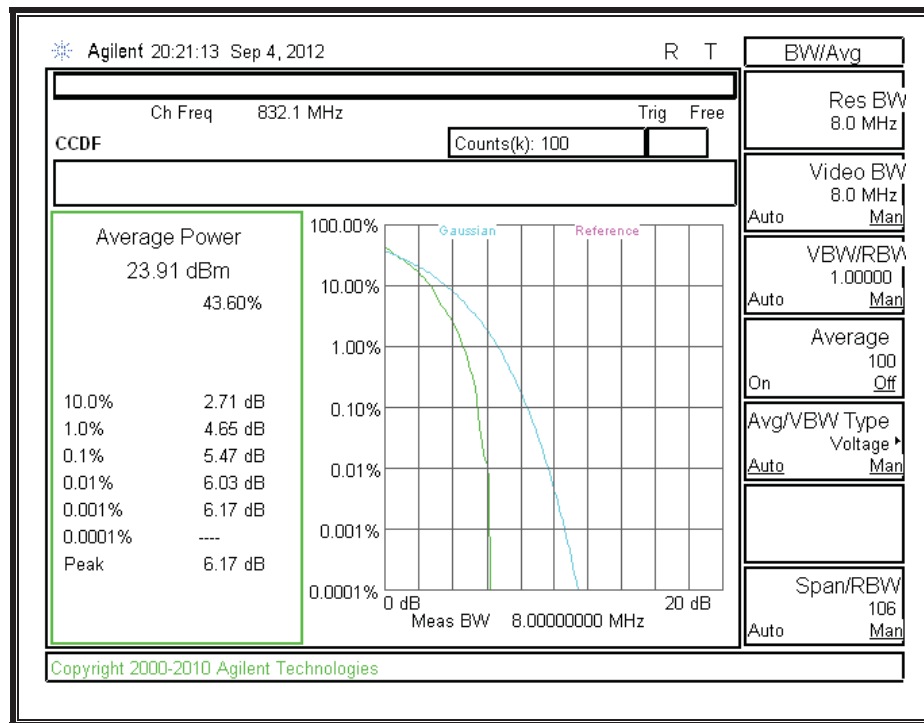
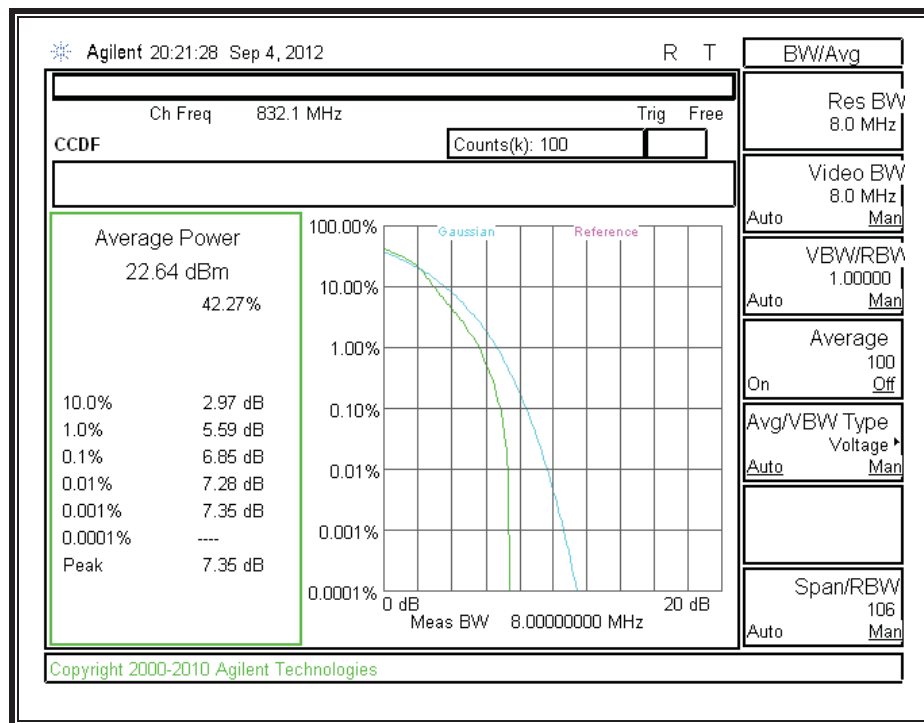
LTE BAND 2**5MHz QPSK****5MHz 16QAM**

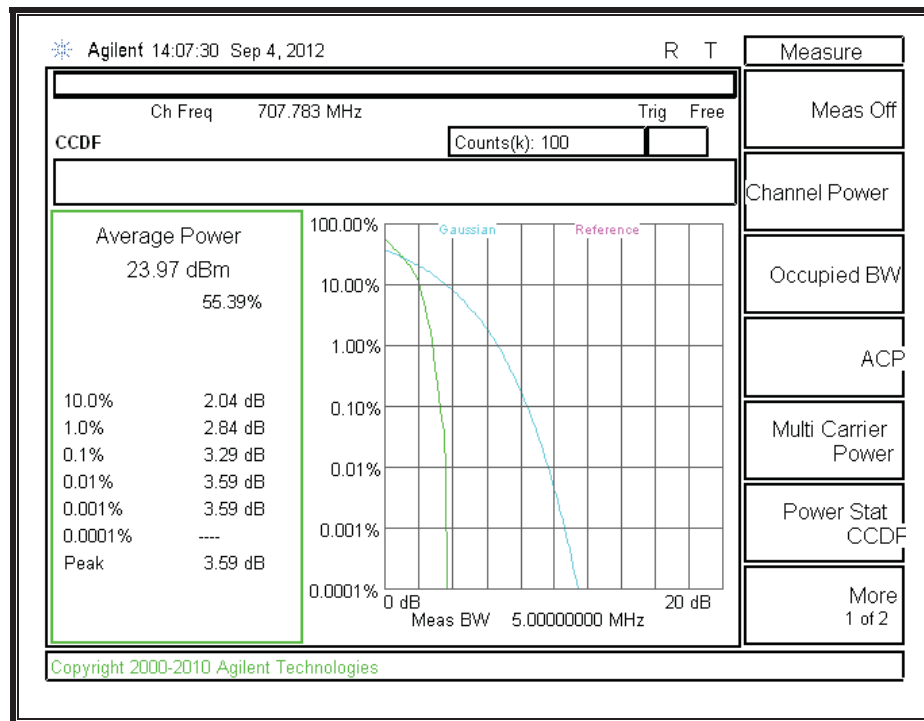
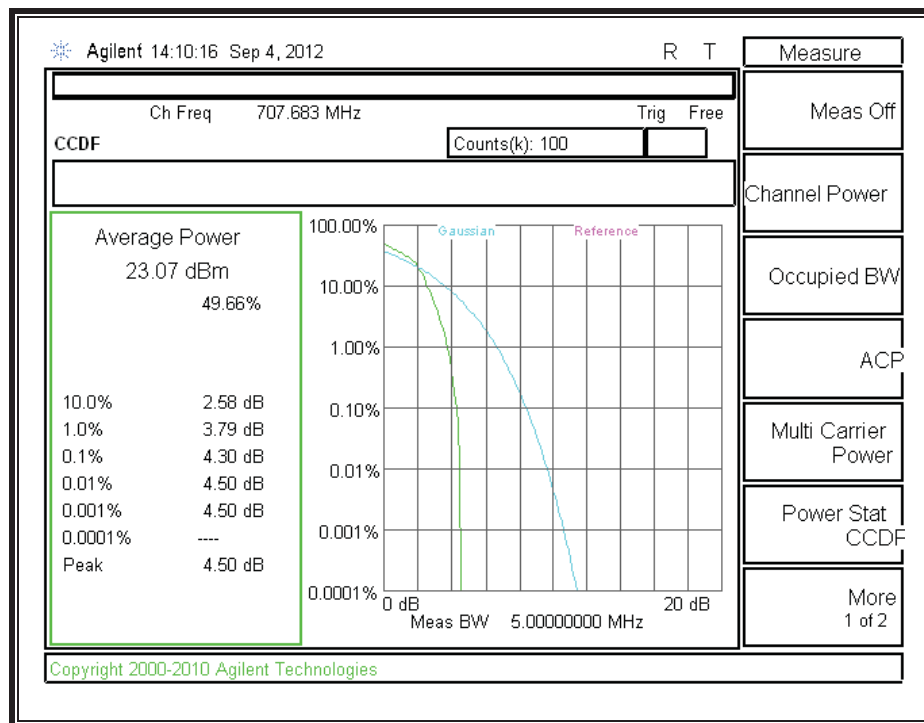
10MHz QPSK**10MHz 16QAM**

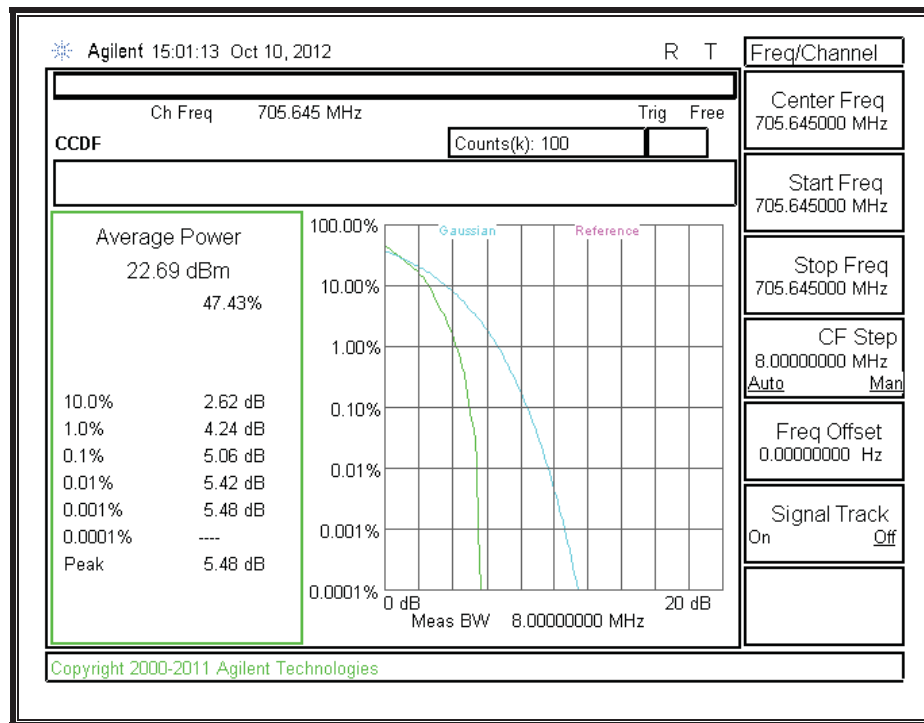
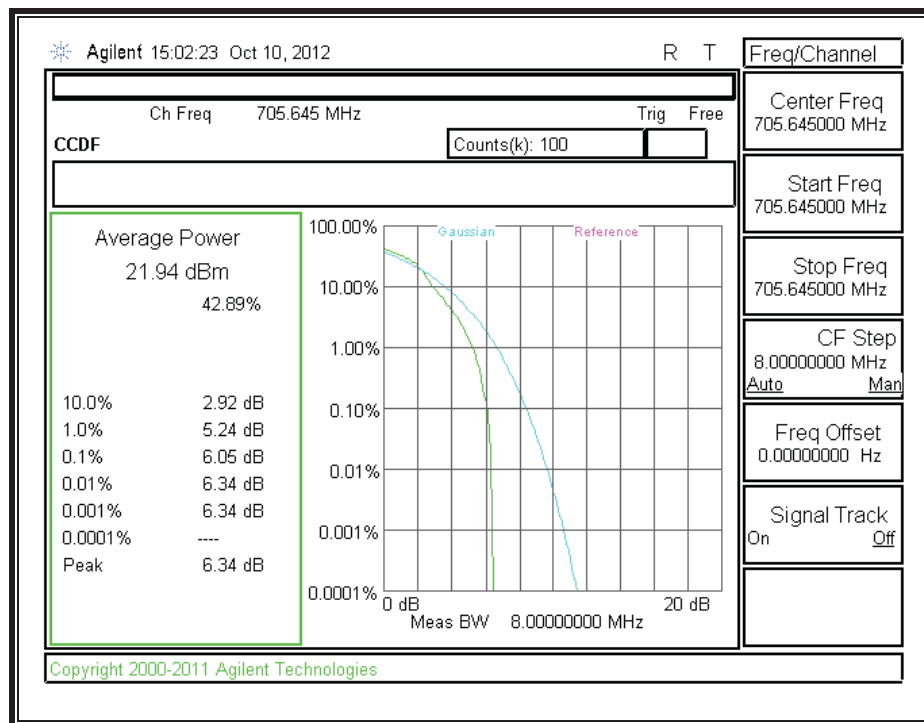
LTE BAND 4**5MHz QPSK****5MHz 16QAM**

10MHz QPSK**10MHz 16QAM**

LTE BAND 5**5MHz QPSK****5MHz 16QAM**

10MHz QPSK**10MHz 16QAM**

LTE BAND 17**5MHz QPSK****5MHz 16QAM**

10MHz QPSK, RB1-0**10MHz 16QAM**

9.3. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, and §27.53

LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. 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.

§27.53 (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

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

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

MODES TESTED:

- GPRS and EGPRS
- WCDMA, REL 99 and HSDPA
- LTE BAND 2
- LTE BAND 4
- LTE BAND 5
- LTE BAND 17

RESULTS

GPRS (Cellular Band)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Project #:		12U14542							
Date:		09/01/12							
Test Engineer:		Chin Pang							
Configuration:		EUT and Laptop							
Mode:		TX, CELL BAND GPRS MODE							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 22			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-10.2	V	3.0	35.5	1.0	-44.8	-13.0	-31.8	
2.473	-2.3	V	3.0	35.4	1.0	-36.7	-13.0	-23.7	
1.648	-7.8	H	3.0	35.5	1.0	-42.3	-13.0	-29.3	
2.473	-12.2	H	3.0	35.4	1.0	-46.6	-13.0	-33.6	
Mid Ch, (836.6MHz)									
1.673	-5.9	V	3.0	35.5	1.0	-40.4	-13.0	-27.4	
2.510	-0.2	V	3.0	35.4	1.0	-34.6	-13.0	-21.6	
1.673	-7.5	H	3.0	35.5	1.0	-42.1	-13.0	-29.1	
2.510	-10.1	H	3.0	35.4	1.0	-44.5	-13.0	-31.5	
High Ch, (848.8MHz)									
1.698	2.4	V	3.0	35.5	1.0	-32.1	-13.0	-19.1	
2.546	-6.0	V	3.0	35.4	1.0	-40.5	-13.0	-27.5	
1.698	-1.3	H	3.0	35.5	1.0	-35.8	-13.0	-22.8	
2.546	-13.9	H	3.0	35.4	1.0	-48.3	-13.0	-35.3	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

EGPRS (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Sierra Wireless
Project #: 12U14542
Date: 09/01/12
Test Engineer: Chin Pang
Configuration: EUT and Laptop
Mode: TX, CELL BAND EGPRS MODE

Chamber	Pre-amplifier	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-16.2	V	3.0	35.5	1.0	-50.8	-13.0	-37.8	
2.473	-13.3	V	3.0	35.4	1.0	-47.7	-13.0	-34.7	
1.648	-12.8	H	3.0	35.5	1.0	-47.3	-13.0	-34.3	
2.473	-15.2	H	3.0	35.4	1.0	-49.6	-13.0	-36.6	
Mid Ch, (836.6MHz)									
1.673	-12.9	V	3.0	35.5	1.0	-47.4	-13.0	-34.4	
2.510	-13.2	V	3.0	35.4	1.0	-47.6	-13.0	-34.6	
1.673	-12.5	H	3.0	35.5	1.0	-47.1	-13.0	-34.1	
2.510	-12.1	H	3.0	35.4	1.0	-46.5	-13.0	-33.5	
High Ch, (848.8MHz)									
1.698	-2.6	V	3.0	35.5	1.0	-37.1	-13.0	-24.1	
2.546	-10.0	V	3.0	35.4	1.0	-44.5	-13.0	-31.5	
1.698	-7.3	H	3.0	35.5	1.0	-41.8	-13.0	-28.8	
2.546	-13.9	H	3.0	35.4	1.0	-48.3	-13.0	-35.3	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

WCDMA REL 99 (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Sierra Wireless
Project #: 12U14542
Date: 09/01/12
Test Engineer: Chin Pang
Configuration: EUT and Laptop
Mode: TX, WCDMA 850MHz, Rel 99

Chamber	Pre-amplifier	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	FCC Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (826.4MHz)									
1.653	-15.2	V	3.0	35.5	1.0	-49.7	-13.0	-36.7	
2.479	-8.3	V	3.0	35.4	1.0	-42.7	-13.0	-29.7	
1.653	-17.7	H	3.0	35.5	1.0	-52.3	-13.0	-39.3	
2.479	-12.2	H	3.0	35.4	1.0	-46.6	-13.0	-33.6	
Mid Channel (836MHz)									
1.672	-14.9	V	3.0	35.5	1.0	-49.4	-13.0	-36.4	
2.508	-13.2	V	3.0	35.4	1.0	-47.6	-13.0	-34.6	
1.672	-19.5	H	3.0	35.5	1.0	-54.1	-13.0	-41.1	
2.508	-16.1	H	3.0	35.4	1.0	-50.5	-13.0	-37.5	
High Channel (846MHz)									
1.692	-13.6	V	3.0	35.5	1.0	-48.1	-13.0	-35.1	
2.538	-8.1	V	3.0	35.4	1.0	-42.5	-13.0	-29.5	
1.692	-17.4	H	3.0	35.5	1.0	-51.9	-13.0	-38.9	
2.538	-9.9	H	3.0	35.4	1.0	-44.4	-13.0	-31.4	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

WCDMA HSDPA (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Sierra Wireless
Project #: 12U14542
Date: 09/01/12
Test Engineer: Chin Pang
Configuration: EUT and Laptop
Mode: TX, WCDMA 850MHz, HSDPA

Chamber	Pre-amplifier	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	FCC Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (826.4MHz)									
1.653	-18.2	V	3.0	35.5	1.0	-52.7	-13.0	-39.7	
2.479	-15.3	V	3.0	35.4	1.0	-49.7	-13.0	-36.7	
1.653	-20.7	H	3.0	35.5	1.0	-55.3	-13.0	-42.3	
2.479	-16.2	H	3.0	35.4	1.0	-50.6	-13.0	-37.6	
Mid Channel (836MHz)									
1.672	-17.9	V	3.0	35.5	1.0	-52.4	-13.0	-39.4	
2.508	-17.2	V	3.0	35.4	1.0	-51.6	-13.0	-38.6	
1.672	-20.7	H	3.0	35.5	1.0	-55.3	-13.0	-42.3	
2.508	-18.1	H	3.0	35.4	1.0	-52.5	-13.0	-39.5	
High Channel (846MHz)									
1.692	-15.6	V	3.0	35.5	1.0	-50.1	-13.0	-37.1	
2.538	-16.1	V	3.0	35.4	1.0	-50.5	-13.0	-37.5	
1.692	-16.4	H	3.0	35.5	1.0	-50.9	-13.0	-37.9	
2.538	-17.9	H	3.0	35.4	1.0	-52.4	-13.0	-39.4	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

GPRS (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Sierra Wireless
Project #: 12U14542
Date: 09/01/12
Test Engineer: Chin Pang
Configuration: EUT and Laptop
Mode: TX, PCS BAND GPRS

Chamber	Pre-amplifier	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.2MHz)									
3.700	-12.9	V	3.0	35.4	1.0	-47.2	-13.0	-34.2	
5.551	-9.8	V	3.0	35.4	1.0	-44.2	-13.0	-31.2	
7.400	-8.7	V	3.0	35.7	1.0	-43.4	-13.0	-30.4	
3.700	-14.7	H	3.0	35.4	1.0	-49.0	-13.0	-36.0	
5.551	-8.0	H	3.0	35.4	1.0	-42.4	-13.0	-29.4	
7.400	-8.0	H	3.0	35.7	1.0	-42.7	-13.0	-29.7	
Mid Ch, (1880.0MHz)									
3.760	-12.7	V	3.0	35.3	1.0	-47.1	-13.0	-34.1	
5.640	-9.7	V	3.0	35.4	1.0	-44.1	-13.0	-31.1	
7.520	-9.6	V	3.0	35.7	1.0	-44.3	-13.0	-31.3	
3.760	-12.5	H	3.0	35.3	1.0	-46.8	-13.0	-33.8	
5.640	-9.8	H	3.0	35.4	1.0	-44.3	-13.0	-31.3	
High Ch, (1909.8MHz)									
3.820	-10.6	V	3.0	35.3	1.0	-44.9	-13.0	-31.9	
5.729	-9.6	V	3.0	35.4	1.0	-44.1	-13.0	-31.1	
7.639	-7.4	V	3.0	35.7	1.0	-42.1	-13.0	-29.1	
3.820	-10.3	H	3.0	35.3	1.0	-44.6	-13.0	-31.6	
5.729	-9.7	H	3.0	35.4	1.0	-44.1	-13.0	-31.1	
7.639	-7.8	H	3.0	35.7	1.0	-42.5	-13.0	-29.5	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

EGPRS (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Sierra Wireless
Project #: 12U14542
Date: 09/01/12
Test Engineer: Chin Pang
Configuration: EUT and Laptop
Mode: TX, PCS BAND EGPRS

Chamber	Pre-amplifier	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.2MHz)									
3.700	-14.9	V	3.0	35.4	1.0	-49.2	-13.0	-36.2	
5.551	-11.8	V	3.0	35.4	1.0	-46.2	-13.0	-33.2	
3.700	-15.7	H	3.0	35.4	1.0	-50.0	-13.0	-37.0	
5.551	-13.0	H	3.0	35.4	1.0	-47.4	-13.0	-34.4	
Mid Ch, (1880.0MHz)									
3.760	-14.7	V	3.0	35.3	1.0	-49.1	-13.0	-36.1	
5.640	-11.7	V	3.0	35.4	1.0	-46.1	-13.0	-33.1	
3.760	-14.5	H	3.0	35.3	1.0	-48.8	-13.0	-35.8	
5.640	-11.8	H	3.0	35.4	1.0	-46.3	-13.0	-33.3	
High Ch, (1909.8MHz)									
3.820	-14.6	V	3.0	35.3	1.0	-48.9	-13.0	-35.9	
5.729	-11.6	V	3.0	35.4	1.0	-46.1	-13.0	-33.1	
3.820	-14.3	H	3.0	35.3	1.0	-48.6	-13.0	-35.6	
5.729	-11.7	H	3.0	35.4	1.0	-46.1	-13.0	-33.1	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

WCDMA REL 99 (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Sierra Wireless
Project #: 12U14542
Date: 09/01/12
Test Engineer: Chin Pang
Configuration: EUT and Laptope
Mode: TX, PCS BAND WCDMA, Rel 99

Chamber	Pre-amplifier	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.704	-4.9	V	3.0	35.4	1.0	-39.2	-13.0	-26.2	
5.557	0.2	V	3.0	35.4	1.0	-34.2	-13.0	-21.2	
3.704	-2.7	H	3.0	35.4	1.0	-37.0	-13.0	-24.0	
5.557	8.0	H	3.0	35.4	1.0	-26.4	-13.0	-13.4	
Mid Ch, 1880.0MHz									
3.760	-1.7	V	3.0	35.3	1.0	-36.1	-13.0	-23.1	
5.640	1.3	V	3.0	35.4	1.0	-33.1	-13.0	-20.1	
3.760	2.5	H	3.0	35.3	1.0	-31.8	-13.0	-18.8	
5.640	5.2	H	3.0	35.4	1.0	-29.3	-13.0	-16.3	
High Ch, 1907.6MHz									
3.815	0.4	V	3.0	35.3	1.0	-33.9	-13.0	-20.9	
5.723	1.4	V	3.0	35.4	1.0	-33.1	-13.0	-20.1	
3.815	-3.3	H	3.0	35.3	1.0	-37.6	-13.0	-24.6	
5.723	7.3	H	3.0	35.4	1.0	-27.1	-13.0	-14.1	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

WCDMA HSDPA (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Sierra Wireless
Project #: 12U14542
Date: 09/01/12
Test Engineer: Chin Pang
Configuration: EUT and Laptope
Mode: TX, PCS BAND WCDMA, HSDPA

Chamber	Pre-amplifier	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.704	-2.9	V	3.0	35.4	1.0	-37.2	-13.0	-24.2	
5.557	1.2	V	3.0	35.4	1.0	-33.2	-13.0	-20.2	
3.704	-2.7	H	3.0	35.4	1.0	-37.0	-13.0	-24.0	
5.557	7.8	H	3.0	35.4	1.0	-26.6	-13.0	-13.6	
Mid Ch, 1880.0MHz									
3.760	2.3	V	3.0	35.3	1.0	-32.1	-13.0	-19.1	
5.640	2.3	V	3.0	35.4	1.0	-32.1	-13.0	-19.1	
3.760	2.5	H	3.0	35.3	1.0	-31.8	-13.0	-18.8	
5.640	6.2	H	3.0	35.4	1.0	-28.3	-13.0	-15.3	
High Ch, 1907.6MHz									
3.815	0.6	V	3.0	35.3	1.0	-33.7	-13.0	-20.7	
5.723	1.9	V	3.0	35.4	1.0	-32.6	-13.0	-19.6	
3.815	-2.3	H	3.0	35.3	1.0	-36.6	-13.0	-23.6	
5.723	8.3	H	3.0	35.4	1.0	-26.1	-13.0	-13.1	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

LTE QPSK Band 2 (5 MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Project #:		12U14542							
Date:		10/12/12							
Test Engineer:		Chin Pang							
Configuration:		EUT and Laptop							
Mode:		TX, LTE Band 2, 5MHz BW QPSK							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 24			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.5MHz									
3.710	-10.1	V	3.0	35.4	1.0	-44.4	-13.0	-31.4	
5.551	-4.8	V	3.0	35.4	1.0	-39.2	-13.0	-26.2	
7.410	-5.7	V	3.0	35.7	1.0	-40.4	-13.0	-27.4	
3.710	-12.2	H	3.0	35.4	1.0	-46.6	-13.0	-33.6	
5.551	-5.0	H	3.0	35.4	1.0	-39.4	-13.0	-26.4	
7.410	-6.5	H	3.0	35.7	1.0	-41.2	-13.0	-28.2	
Mid Ch, (1880.0MHz)									
3.760	-10.2	V	3.0	35.3	1.0	-44.6	-13.0	-31.6	
5.626	-6.5	V	3.0	35.4	1.0	-41.0	-13.0	-28.0	
7.501	-7.6	V	3.0	35.7	1.0	-42.3	-13.0	-29.3	
3.760	-12.5	H	3.0	35.3	1.0	-46.8	-13.0	-33.8	
5.626	-3.4	H	3.0	35.4	1.0	-37.8	-13.0	-24.8	
7.501	-6.9	H	3.0	35.7	1.0	-41.6	-13.0	-28.6	
High Ch, 1907.5MHz									
3.810	-9.6	V	3.0	35.3	1.0	-43.9	-13.0	-30.9	
5.706	-5.6	V	3.0	35.4	1.0	-40.1	-13.0	-27.1	
7.622	-6.4	V	3.0	35.7	1.0	-41.1	-13.0	-28.1	
3.810	-11.3	H	3.0	35.3	1.0	-45.6	-13.0	-32.6	
5.706	-4.7	H	3.0	35.4	1.0	-39.2	-13.0	-26.2	
7.622	-6.8	H	3.0	35.7	1.0	-41.5	-13.0	-28.5	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

LTE 16QAM Band 2 (5 MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Project #:		12U14542							
Date:		10/12/12							
Test Engineer:		Chin Pang							
Configuration:		EUT and Laptop							
Mode:		TX, LTE Band 2, 5MHz BW 16QAM							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 24			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.5MHz									
3.705	-10.1	V	3.0	35.4	1.0	-44.4	-13.0	-31.4	
5.551	-5.8	V	3.0	35.4	1.0	-40.2	-13.0	-27.2	
7.410	-5.7	V	3.0	35.7	1.0	-40.4	-13.0	-27.4	
3.705	-14.7	H	3.0	35.4	1.0	-49.0	-13.0	-36.0	
5.551	-4.0	H	3.0	35.4	1.0	-38.4	-13.0	-25.4	
7.410	-4.0	H	3.0	35.7	1.0	-38.7	-13.0	-25.7	
Mid Ch, 1880.0MHz									
3.760	-10.2	V	3.0	35.3	1.0	-44.6	-13.0	-31.6	
5.626	-6.5	V	3.0	35.4	1.0	-41.0	-13.0	-28.0	
7.501	-7.6	V	3.0	35.7	1.0	-42.3	-13.0	-29.3	
3.760	-12.5	H	3.0	35.3	1.0	-46.8	-13.0	-33.8	
5.626	-3.4	H	3.0	35.4	1.0	-37.8	-13.0	-24.8	
7.501	-6.9	H	3.0	35.7	1.0	-41.6	-13.0	-28.6	
High Ch, 1907.5MHz									
3.810	-11.6	V	3.0	35.3	1.0	-45.9	-13.0	-32.9	
5.720	-5.6	V	3.0	35.4	1.0	-40.1	-13.0	-27.1	
7.623	-7.4	V	3.0	35.7	1.0	-42.1	-13.0	-29.1	
3.810	-10.3	H	3.0	35.3	1.0	-44.6	-13.0	-31.6	
5.720	-6.7	H	3.0	35.4	1.0	-41.1	-13.0	-28.1	
7.623	-6.8	H	3.0	35.7	1.0	-41.5	-13.0	-28.5	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

LTE QPSK Band 2 (10 MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Project #:		12U14542							
Date:		08/28/12							
Test Engineer:		Chin Pang							
Configuration:		EUT and Laptop							
Mode:		TX, LTE Band 2, 10MHz BW QPSK							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 24			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1855MHz									
3.710	-4.9	V	3.0	35.4	1.0	-39.2	-13.0	-26.2	
5.551	1.2	V	3.0	35.4	1.0	-33.2	-13.0	-20.2	
7.402	-1.7	V	3.0	35.7	1.0	-36.4	-13.0	-23.4	
3.710	-9.6	H	3.0	35.4	1.0	-44.0	-13.0	-31.0	
5.551	5.0	H	3.0	35.4	1.0	-29.4	-13.0	-16.4	
7.402	-2.0	H	3.0	35.7	1.0	-36.7	-13.0	-23.7	
Mid Ch, (1880.0MHz)									
3.760	-0.7	V	3.0	35.3	1.0	-35.1	-13.0	-22.1	
5.626	4.3	V	3.0	35.4	1.0	-30.2	-13.0	-17.2	
7.501	6.4	V	3.0	35.7	1.0	-28.3	-13.0	-15.3	
3.760	-6.5	H	3.0	35.3	1.0	-40.8	-13.0	-27.8	
5.626	5.1	H	3.0	35.4	1.0	-29.3	-13.0	-16.3	
7.501	3.1	H	3.0	35.7	1.0	-31.6	-13.0	-18.6	
High Ch, 1905MHz									
3.811	-3.6	V	3.0	35.3	1.0	-37.9	-13.0	-24.9	
5.706	3.4	V	3.0	35.4	1.0	-31.1	-13.0	-18.1	
7.622	1.6	V	3.0	35.7	1.0	-33.1	-13.0	-20.1	
3.811	-7.3	H	3.0	35.3	1.0	-41.6	-13.0	-28.6	
5.706	5.3	H	3.0	35.4	1.0	-29.2	-13.0	-16.2	
7.622	0.2	H	3.0	35.7	1.0	-34.5	-13.0	-21.5	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

LTE 16QAM Band 2 (10MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Project #:		12U14542							
Date:		10/12/12							
Test Engineer:		Chin Pang							
Configuration:		EUT and Laptop							
Mode:		TX, LTE Band 2, 10MHz BW 16QAM							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 24			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1855MHz									
3.710	-7.5	V	3.0	35.4	1.0	-41.8	-13.0	-28.8	
5.551	-2.8	V	3.0	35.4	1.0	-37.2	-13.0	-24.2	
7.402	-4.7	V	3.0	35.7	1.0	-39.4	-13.0	-26.4	
3.710	-9.9	H	3.0	35.4	1.0	-44.3	-13.0	-31.3	
5.551	-2.0	H	3.0	35.4	1.0	-36.4	-13.0	-23.4	
7.402	-4.5	H	3.0	35.7	1.0	-39.2	-13.0	-26.2	
Mid Ch, (1880.0MHz)									
3.760	-9.7	V	3.0	35.3	1.0	-44.1	-13.0	-31.1	
5.626	-5.7	V	3.0	35.4	1.0	-40.2	-13.0	-27.2	
7.501	-6.6	V	3.0	35.7	1.0	-41.3	-13.0	-28.3	
3.760	-9.5	H	3.0	35.3	1.0	-43.8	-13.0	-30.8	
5.626	-4.9	H	3.0	35.4	1.0	-39.3	-13.0	-26.3	
7.501	-2.9	H	3.0	35.7	1.0	-37.6	-13.0	-24.6	
High Ch, 1905MHz									
3.811	-8.6	V	3.0	35.3	1.0	-42.9	-13.0	-29.9	
5.706	-0.6	V	3.0	35.4	1.0	-35.1	-13.0	-22.1	
7.622	-4.7	V	3.0	35.7	1.0	-39.4	-13.0	-26.4	
3.811	-10.8	H	3.0	35.3	1.0	-45.1	-13.0	-32.1	
5.706	0.3	H	3.0	35.4	1.0	-34.2	-13.0	-21.2	
7.622	-6.8	H	3.0	35.7	1.0	-41.5	-13.0	-28.5	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

LTE QPSK Band 4 (5 MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Date:		10/12/12							
Test Engineer:		Chin Pang							
Configuration:		EUT only							
Mode:		LTE Band 4, 5MHz BW							
		QPSK							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 27			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.5MHz									
3.425	-13.5	V	3.0	35.5	1.0	-48.0	-13.0	-35.0	
5.195	-9.2	V	3.0	35.3	1.0	-43.6	-13.0	-30.6	
3.425	-15.6	H	3.0	35.5	1.0	-50.1	-13.0	-37.1	
5.195	-12.6	H	3.0	35.3	1.0	-46.9	-13.0	-33.9	
Mid Ch, 1732.50MHz									
3.465	-12.9	V	3.0	35.5	1.0	-47.4	-13.0	-34.4	
5.198	-10.2	V	3.0	35.3	1.0	-44.6	-13.0	-31.6	
3.465	-13.5	H	3.0	35.5	1.0	-47.9	-13.0	-34.9	
5.198	-12.6	H	3.0	35.3	1.0	-46.9	-13.0	-33.9	
High Ch, 1752.5MHz									
3.505	-15.4	V	3.0	35.4	1.0	-49.8	-13.0	-36.8	
5.258	-11.1	V	3.0	35.3	1.0	-45.5	-13.0	-32.5	
3.505	-16.3	H	3.0	35.4	1.0	-50.8	-13.0	-37.8	
5.258	-12.5	H	3.0	35.3	1.0	-46.8	-13.0	-33.8	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

LTE 16QAM Band 4 (5 MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Date:		10/12/12							
Test Engineer:		Chin Pang							
Configuration:		EUT only							
Mode:		LTE Band 4, 5MHz BW 16QAM							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 27			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.5MHz									
3.425	-15.0	V	3.0	35.5	1.0	-49.5	-13.0	-36.5	
5.195	-11.2	V	3.0	35.3	1.0	-45.6	-13.0	-32.6	
3.425	-16.2	H	3.0	35.5	1.0	-50.7	-13.0	-37.7	
5.195	-12.6	H	3.0	35.3	1.0	-46.9	-13.0	-33.9	
Mid Ch, 1732.50MHz									
3.465	-13.4	V	3.0	35.5	1.0	-47.9	-13.0	-34.9	
5.198	-11.2	V	3.0	35.3	1.0	-45.6	-13.0	-32.6	
3.465	-14.4	H	3.0	35.5	1.0	-48.8	-13.0	-35.8	
5.198	-12.8	H	3.0	35.3	1.0	-47.1	-13.0	-34.1	
High Ch, 1752.5MHz									
3.505	-16.6	V	3.0	35.4	1.0	-51.0	-13.0	-38.0	
5.258	-13.1	V	3.0	35.3	1.0	-47.5	-13.0	-34.5	
3.505	-15.3	H	3.0	35.4	1.0	-49.8	-13.0	-36.8	
5.258	-13.0	H	3.0	35.3	1.0	-47.3	-13.0	-34.3	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

LTE QPSK Band 4 (10 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Sierra Wireless
Project #: 12U14542
Date: 08/29/12
Test Engineer: Chin Pang
Configuration: EUT/Laptop
Mode: LTE Band 4, 10MHz BW
 QPSK, RB1-0

Chamber	Pre-amplifier	Filter	Limit
5m Chamber B	T144 8449B	Filter 1	Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1715MHz									
3.421	-9.6	V	3.0	37.0	1.0	-45.6	-13.0	-32.6	
5.145	-1.3	V	3.0	36.3	1.0	-36.6	-13.0	-23.6	
6.842	-5.4	V	3.0	36.5	1.0	-40.8	-13.0	-27.8	
3.421	-10.6	H	3.0	37.0	1.0	-46.7	-13.0	-33.7	
5.145	-1.7	H	3.0	36.3	1.0	-37.0	-13.0	-24.0	
6.842	-6.8	H	3.0	36.5	1.0	-42.2	-13.0	-29.2	
Mid Ch, 1732.50MHz									
3.457	-9.5	V	3.0	37.0	1.0	-45.5	-13.0	-32.5	
5.185	-5.3	V	3.0	36.3	1.0	-40.5	-13.0	-27.5	
6.913	-2.3	V	3.0	36.5	1.0	-37.8	-13.0	-24.8	
3.457	-10.5	H	3.0	37.0	1.0	-46.5	-13.0	-33.5	
5.185	-1.6	H	3.0	36.3	1.0	-36.9	-13.0	-23.9	
6.913	-4.6	H	3.0	36.5	1.0	-40.1	-13.0	-27.1	
High Ch, 1750MHz									
3.491	-12.4	V	3.0	37.0	1.0	-48.4	-13.0	-35.4	
5.237	-3.2	V	3.0	36.3	1.0	-38.4	-13.0	-25.4	
6.982	-6.2	V	3.0	36.5	1.0	-41.7	-13.0	-28.7	
3.491	-9.4	H	3.0	37.0	1.0	-45.4	-13.0	-32.4	
5.237	-1.5	H	3.0	36.3	1.0	-36.8	-13.0	-23.8	
6.982	-5.5	H	3.0	36.5	1.0	-41.0	-13.0	-28.0	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

LTE 16QAM Band 4 (10 MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Project #:		12U14542							
Date:		10/12/12							
Test Engineer:		Chin Pang							
Configuration:		EUT/Laptop							
Mode:		LTE Band 4, 10MHz BW 16QAM, RB1-0							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T144 8449B		Filter 1		Part 27			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1715MHz									
3.421	-13.6	V	3.0	37.0	1.0	-49.6	-13.0	-36.6	
5.145	-6.3	V	3.0	36.3	1.0	-41.6	-13.0	-28.6	
6.842	-8.4	V	3.0	36.5	1.0	-43.8	-13.0	-30.8	
3.421	-11.6	H	3.0	37.0	1.0	-47.7	-13.0	-34.7	
5.145	-7.7	H	3.0	36.3	1.0	-43.0	-13.0	-30.0	
6.842	-7.8	H	3.0	36.5	1.0	-43.2	-13.0	-30.2	
Mid Ch, 1732.50MHz									
3.457	-13.5	V	3.0	37.0	1.0	-49.5	-13.0	-36.5	
5.185	-8.3	V	3.0	36.3	1.0	-43.5	-13.0	-30.5	
6.913	-8.3	V	3.0	36.5	1.0	-43.8	-13.0	-30.8	
3.457	-11.3	H	3.0	37.0	1.0	-47.3	-13.0	-34.3	
5.185	-4.6	H	3.0	36.3	1.0	-39.9	-13.0	-26.9	
6.913	-6.6	H	3.0	36.5	1.0	-42.1	-13.0	-29.1	
High Ch, 1750MHz									
3.491	-13.4	V	3.0	37.0	1.0	-49.4	-13.0	-36.4	
5.520	-2.9	V	3.0	36.3	1.0	-38.1	-13.0	-25.1	
6.982	-8.2	V	3.0	36.5	1.0	-43.7	-13.0	-30.7	
3.491	-11.4	H	3.0	37.0	1.0	-47.4	-13.0	-34.4	
5.520	-5.0	H	3.0	36.3	1.0	-40.3	-13.0	-27.3	
6.982	-5.5	H	3.0	36.5	1.0	-41.0	-13.0	-28.0	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

LTE QPSK Band 5 (5 MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Project #:		12U14542							
Date:		10/12/12							
Test Engineer:		Chin Pang							
Configuration:		EUT only							
Mode:		TX, LTE Band 5, 5MHz QPSK							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 22			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.5MHz)									
1.648	-15.2	V	3.0	35.5	1.0	-49.8	-13.0	-36.8	
2.480	-12.3	V	3.0	35.4	1.0	-46.7	-13.0	-33.7	
1.653	-17.7	H	3.0	35.5	1.0	-52.3	-13.0	-39.3	
2.480	-16.2	H	3.0	35.4	1.0	-50.6	-13.0	-37.6	
Mid Ch, (836.5MHz)									
1.648	-14.2	V	3.0	35.5	1.0	-48.8	-13.0	-35.8	
2.473	-16.3	V	3.0	35.4	1.0	-50.7	-13.0	-37.7	
1.648	-17.8	H	3.0	35.5	1.0	-52.3	-13.0	-39.3	
2.473	-14.2	H	3.0	35.4	1.0	-48.6	-13.0	-35.6	
High Ch, (846.5MHz)									
1.693	-12.6	V	3.0	35.5	1.0	-47.1	-13.0	-34.1	
2.532	-15.1	V	3.0	35.4	1.0	-49.5	-13.0	-36.5	
1.693	-16.3	H	3.0	35.5	1.0	-50.9	-13.0	-37.9	
2.540	-14.9	H	3.0	35.4	1.0	-49.3	-13.0	-36.3	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

LTE 16QAM Band 5 (5 MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Project #:		12U14542							
Date:		10/12/12							
Test Engineer:		Chin Pang							
Configuration:		EUT only							
Mode:		TX, LTE Band 5, 5MHz 16QAM							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 22			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.5MHz)									
1.648	-14.7	V	3.0	35.5	1.0	-49.3	-13.0	-36.3	
2.480	-14.3	V	3.0	35.4	1.0	-48.7	-13.0	-35.7	
1.653	-19.7	H	3.0	35.5	1.0	-54.3	-13.0	-41.3	
2.480	-18.7	H	3.0	35.4	1.0	-53.1	-13.0	-40.1	
Mid Ch, (836.5MHz)									
1.648	-15.8	V	3.0	35.5	1.0	-50.4	-13.0	-37.4	
2.473	-16.8	V	3.0	35.4	1.0	-51.2	-13.0	-38.2	
1.648	-18.4	H	3.0	35.5	1.0	-52.9	-13.0	-39.9	
2.473	-15.2	H	3.0	35.4	1.0	-49.6	-13.0	-36.6	
High Ch, (846.5MHz)									
1.693	-14.6	V	3.0	35.5	1.0	-49.1	-13.0	-36.1	
2.532	-15.7	V	3.0	35.4	1.0	-50.1	-13.0	-37.1	
1.693	-17.3	H	3.0	35.5	1.0	-51.9	-13.0	-38.9	
2.540	-17.9	H	3.0	35.4	1.0	-52.3	-13.0	-39.3	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

LTE QPSK Band 5 (10 MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Project #:		12U14542							
Date:		08/28/12							
Test Engineer:		Chin Pang							
Configuration:		EUT and Laptop							
Mode:		TX, LTE Band 5, 10MHz QPSK							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 22			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamplifier (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (829MHz)									
1.650	-19.2	V	3.0	35.5	1.0	-53.7	-13.0	-40.7	
2.474	-18.3	V	3.0	35.4	1.0	-52.7	-13.0	-39.7	
1.650	-19.8	H	3.0	35.5	1.0	-54.3	-13.0	-41.3	
2.474	-20.2	H	3.0	35.4	1.0	-54.6	-13.0	-41.6	
Mid Ch, (836.5MHz)									
1.666	-9.0	V	3.0	35.5	1.0	-43.5	-13.0	-30.5	
2.499	-10.2	V	3.0	35.4	1.0	-44.6	-13.0	-31.6	
1.666	-12.6	H	3.0	35.5	1.0	-47.1	-13.0	-34.1	
2.499	-17.2	H	3.0	35.4	1.0	-51.6	-13.0	-38.6	
High Ch, (844MHz)									
1.684	-16.7	V	3.0	35.5	1.0	-51.3	-13.0	-38.3	
2.532	-14.1	V	3.0	35.4	1.0	-48.5	-13.0	-35.5	
1.684	-18.4	H	3.0	35.5	1.0	-53.0	-13.0	-40.0	
2.527	-20.0	H	3.0	35.4	1.0	-54.4	-13.0	-41.4	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

LTE 16QAM Band 5 (10 MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Project #:		12U14542							
Date:		10/12/12							
Test Engineer:		Chin Pang							
Configuration:		EUT and Laptop							
Mode:		TX, LTE Band 5, 10MHz 16QAM							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 22			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (829MHz)									
1.650	-20.0	V	3.0	35.5	1.0	-54.5	-13.0	-41.5	
2.474	-19.0	V	3.0	35.4	1.0	-53.4	-13.0	-40.4	
1.650	-20.3	H	3.0	35.5	1.0	-54.8	-13.0	-41.8	
2.474	-20.7	H	3.0	35.4	1.0	-55.1	-13.0	-42.1	
Mid Ch, (836.5MHz)									
1.664	-11.0	V	3.0	35.5	1.0	-45.5	-13.0	-32.5	
2.499	-10.2	V	3.0	35.4	1.0	-44.6	-13.0	-31.6	
1.664	-13.6	H	3.0	35.5	1.0	-48.2	-13.0	-35.2	
2.499	-18.2	H	3.0	35.4	1.0	-52.6	-13.0	-39.6	
High Ch, (844MHz)									
1.684	-17.7	V	3.0	35.5	1.0	-52.3	-13.0	-39.3	
2.532	-15.1	V	3.0	35.4	1.0	-49.5	-13.0	-36.5	
1.684	-19.4	H	3.0	35.5	1.0	-54.0	-13.0	-41.0	
2.527	-20.0	H	3.0	35.4	1.0	-54.4	-13.0	-41.4	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

LTE QPSK Band 17 (5 MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Project #:		12U14542							
Date:		10/12/12							
Test Engineer:		Chin Pang							
Configuration:		EUT only							
Mode:		TX, LTE band 17, 5MHz BW							
		QPSK							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 27			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch (706.5 MHz)									
1.413	-25.9	V	3.0	35.8	1.0	-60.7	-13.0	-47.7	
2.120	-16.5	V	3.0	35.4	1.0	-50.9	-13.0	-37.9	
2.826	-17.1	V	3.0	35.6	1.0	-51.7	-13.0	-38.7	
1.413	-22.9	H	3.0	35.8	1.0	-57.6	-13.0	-44.6	
2.120	-15.6	H	3.0	35.4	1.0	-50.0	-13.0	-37.0	
2.826	-18.1	H	3.0	35.6	1.0	-52.7	-13.0	-39.7	
Mid Ch (710.0 MHz)									
1.420	-23.9	V	3.0	35.7	1.0	-58.6	-13.0	-45.6	
2.130	-17.5	V	3.0	35.4	1.0	-51.9	-13.0	-38.9	
2.840	-17.1	V	3.0	35.6	1.0	-51.7	-13.0	-38.7	
1.420	-28.8	H	3.0	35.7	1.0	-63.6	-13.0	-50.6	
2.130	-13.6	H	3.0	35.4	1.0	-48.0	-13.0	-35.0	
2.840	-17.1	H	3.0	35.6	1.0	-51.6	-13.0	-38.6	
High Ch, (713.5MHz)									
1.427	-23.8	V	3.0	35.7	1.0	-58.5	-13.0	-45.5	
2.140	-18.6	V	3.0	35.4	1.0	-52.9	-13.0	-39.9	
2.854	-17.1	V	3.0	35.6	1.0	-51.6	-13.0	-38.6	
1.427	-19.8	H	3.0	35.7	1.0	-54.5	-13.0	-41.5	
2.140	-15.7	H	3.0	35.4	1.0	-50.0	-13.0	-37.0	
2.854	-18.0	H	3.0	35.6	1.0	-52.6	-13.0	-39.6	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

LTE 16QAM Band 17 (5 MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Project #:		12U14542							
Date:		10/12/12							
Test Engineer:		Chin Pang							
Configuration:		EUT only							
Mode:		TX, LTE band 17, 5MHz BW 16QAM							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 27			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch (706.5 MHz)									
1.413	-26.3	V	3.0	35.8	1.0	-61.1	-13.0	-48.1	
2.120	-15.5	V	3.0	35.4	1.0	-49.9	-13.0	-36.9	
2.826	-16.1	V	3.0	35.6	1.0	-50.7	-13.0	-37.7	
1.413	-23.2	H	3.0	35.8	1.0	-57.9	-13.0	-44.9	
2.120	-16.6	H	3.0	35.4	1.0	-51.0	-13.0	-38.0	
2.826	-18.1	H	3.0	35.6	1.0	-52.7	-13.0	-39.7	
Mid Ch (710.0 MHz)									
1.420	-23.3	V	3.0	35.7	1.0	-58.0	-13.0	-45.0	
2.130	-18.5	V	3.0	35.4	1.0	-52.9	-13.0	-39.9	
2.840	-17.1	V	3.0	35.6	1.0	-51.7	-13.0	-38.7	
1.420	-26.8	H	3.0	35.7	1.0	-61.6	-13.0	-48.6	
2.130	-15.6	H	3.0	35.4	1.0	-50.0	-13.0	-37.0	
2.840	-18.1	H	3.0	35.6	1.0	-52.6	-13.0	-39.6	
High Ch, (713.5MHz)									
1.427	-24.4	V	3.0	35.7	1.0	-59.1	-13.0	-46.1	
2.140	-18.6	V	3.0	35.4	1.0	-52.9	-13.0	-39.9	
2.854	-19.1	V	3.0	35.6	1.0	-53.6	-13.0	-40.6	
1.427	-20.8	H	3.0	35.7	1.0	-55.5	-13.0	-42.5	
2.140	-17.1	H	3.0	35.4	1.0	-51.4	-13.0	-38.4	
2.854	-19.0	H	3.0	35.6	1.0	-53.6	-13.0	-40.6	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

LTE QPSK Band 17 (10 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Sierra Wireless
Project #: 12U14542
Date: 08/28/12
Test Engineer: Chin Pang
Configuration: EUT and Laptop
Mode: TX, LTE band 17, 10MHz BW
 QPSK

Chamber	Pre-amplifier	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch (710.0 MHz)									
1.411	-23.9	V	3.0	35.8	1.0	-58.7	-13.0	-45.7	
2.118	-18.5	V	3.0	35.4	1.0	-52.9	-13.0	-39.9	
2.840	-17.1	V	3.0	35.6	1.0	-51.7	-13.0	-38.7	
1.411	-22.9	H	3.0	35.8	1.0	-57.6	-13.0	-44.6	
2.118	-19.6	H	3.0	35.4	1.0	-54.0	-13.0	-41.0	
2.824	-20.2	H	3.0	35.6	1.0	-54.7	-13.0	-41.7	

Rev. 03.03.09

Note: No other emissions were detected above the system noise floor.

LTE 16QAM Band 17 (10 MHz BANDWIDTH)

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Sierra Wireless							
Project #:		12U14542							
Date:		08/28/12							
Test Engineer:		Chin Pang							
Configuration:		EUT and Laptop							
Mode:		TX, LTE band 17, 10MHz BW 16QAM							
Chamber		Pre-amplifier		Filter		Limit			
5m Chamber B		T145 8449B		Filter 1		Part 27			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch (710.0 MHz)									
1.411	-24.9	V	3.0	35.8	1.0	-59.7	-13.0	-46.7	
2.118	-19.5	V	3.0	35.4	1.0	-53.9	-13.0	-40.9	
2.840	-19.1	V	3.0	35.6	1.0	-53.7	-13.0	-40.7	
1.411	-21.9	H	3.0	35.8	1.0	-56.6	-13.0	-43.6	
2.118	-20.6	H	3.0	35.4	1.0	-55.0	-13.0	-42.0	
2.824	-20.2	H	3.0	35.6	1.0	-54.7	-13.0	-41.7	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									