



**FCC 47 CFR PART 22H, 24E AND 27L
CERTIFICATION TEST REPORT**

FOR

LTE PHONE BLUETOOTH, WLAN (2.4GHZ & 5GHZ) AND NFC

MODEL NUMBER: LG-D500, LGD500, D500, LGMS500, LG-MS500, MS500

FCC ID: ZNFD500

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Prepared for
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC.
1000 SYLVAN AVE.
ENGLEWOODS CLIFFS, NJ 07632

EUT DESCRIPTION: LTE PHONE BLUETOOTH, WLAN (2.4GHZ & 5GHZ) AND NFC

MODEL: LG-D500, LGD500, D500, LGMS500, LG-MS500, MS500

SERIAL NUMBER: 303KPYR337170 (GSM & UMTS) AND 303KPUH337167 (LTE)

DATE TESTED: APRIL 15 TO MAY19, 2013

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 22H, 24E AND 27L	Pass

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL 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.

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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, FCC Part 27, RSS-132 Issue 2, RSS-133 Issue 4 and RSS-139 Issue 2.

3. FACILITIES AND ACCREDITATION

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

UL Verification Services Inc. 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:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

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

The EUT is a LTE Phone with Bluetooth, WLAN(2.4GHz & 5GHz) and NFC capabilities.

5.2. MAXIMUM OUTPUT POWER

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

Part 22 Cellular Band					
Frequency range (MHz)	Modulation	Conducted		ERP	
		dBm	mW	dBm	mW
824.2 - 848.8	GPRS	34.00	2511.9	28.82	762.1
824.2 - 848.8	EGPRS	30.70	1174.9	25.44	349.9

Part 24 PCS Band					
Frequency range (MHz)	Modulation	Conducted		EIRP	
		dBm	mW	dBm	mW
1850.2 - 1909.8	GPRS	31.59	1442.1	29.35	861.0
1850.2 - 1909.8	EGPRS	31.69	1475.7	27.06	508.2

Part 22/24 Band					
Frequency range (MHz)	Modulation	Conducted		ERP/EIRP	
		dBm	mW	dBm	mW
826.4 - 846	REL 99	27.70	588.8	22.53	179.1
1852.4 - 1907.6		27.48	559.8	25.87	386.4

Part 22/24 Band					
Frequency range (MHz)	Modulation	Conducted		ERP/EIRP	
		dBm	mW	dBm	mW
826.4 - 846	HSDPA	28.00	631.0	23.72	235.5
1852.4 - 1907.6		27.82	605.3	26.72	469.9

Part 27 Band					
Frequency range (MHz)	Modulation	Conducted		EIRP	
		dBm	mW	dBm	mW
1712.4-1752.6	AWS Rel 99	27.37	545.8	26.55	451.9
	AWS HSDPA	27.54	567.5	27.36	544.5

Part 24 LTE Band 2 MODE (5.0 MHz BANDWIDTH)						
Frequency range (MHz)	Modulation	Start RB and RB offset	Conducted		EIRP	
			dBm	mW	dBm	mW
1852.5-1907.5	QPSK	25/0	28.30	676.1	28.07	641.2
	16QAM		28.26	669.9	27.17	521.2

Part 24 LTE Band 2 MODE (10.0 MHz BANDWIDTH)						
Frequency range (MHz)	Modulation	Start RB and RB offset	Conducted		EIRP	
			dBm	mW	dBm	mW
1855.0-1905	QPSK	50/0	28.31	677.6	29.07	807.2
	16QAM		28.01	632.4	28.67	736.2

Part 27 LTE Band 4 MODE (5.0 MHz BANDWIDTH)						
Frequency range (MHz)	Modulation	Start RB and RB offset	Conducted		EIRP	
			dBm	mW	dBm	mW
1712.5-1752.5	QPSK	25/0	28.28	673.0	27.61	576.8
	16QAM		27.48	559.8	26.91	490.9

Part 27 LTE Band 4 MODE (10.0 MHz BANDWIDTH)						
Frequency range (MHz)	Modulation	Start RB and RB offset	Conducted		EIRP	
			dBm	mW	dBm	mW
1715.0-1750.0	QPSK	50/0	27.95	623.7	28.01	632.4
	16QAM		27.73	592.9	27.01	502.3

Part 27 LTE Band 4 MODE (15.0 MHz BANDWIDTH)						
Frequency range (MHz)	Modulation	Start RB and RB offset	Conducted		EIRP	
			dBm	mW	dBm	mW
1717.5-1747.5	QPSK	75/0	28.08	642.7	28.65	732.8
	16QAM		28.34	682.3	27.85	609.5

Part 27 LTE Band 4 MODE (20.0 MHz BANDWIDTH)						
Frequency range (MHz)	Modulation	Start RB and RB offset	Conducted		EIRP	
			dBm	mW	dBm	mW
1720.0-1745.0	QPSK	100/0	28.04	636.8	27.61	576.8
	16QAM		28.38	688.7	27.11	514.0

Part 27 LTE Band 17 MODE (5.0 MHz BANDWIDTH)						
Frequency range (MHz)	Modulation	Start RB and RB offset	Conducted		EIRP	
			dBm	mW	dBm	mW
706.5-713.5	QPSK	25/0	28.70	741.3	20.36	108.6
	16QAM		27.97	626.6	19.07	80.7

Part 27 LTE Band 17 MODE (10.0 MHz BANDWIDTH)						
Frequency range (MHz)	Modulation	Start RB and RB offset	Conducted		EIRP	
			dBm	mW	dBm	mW
709.0-711.0	QPSK	50/0	28.48	704.7	21.02	126.5
	16QAM		27.89	615.2	20.10	102.3

5.3. SOFTWARE AND FIRMWARE

The EUT is linked with Agilent 8960 and CMW500 Communication Test Sets.

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integral antenna with a maximum peak gain as follow:

BAND	Gain (dBi)
GSM850/WCDMA B5(824-894MHz)	-4.7
PCS/WCDMA B2 (1850-1990MHz)	0.35
WCDMA B4/LTE B4(1710-2155MHz)	1.1
LTE band 17 (704-746MHz)	-3.2

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case is EUT on the highest power. Based on Peak Power measurement investigations, the following modes should be considered as worst-case scenario for all other measurements.

Worst-case modes:

- GSM: GPRS and EGPRS
- UMTS: WCDMA and HSDPA
- LTE: Band 2, 4, and 17

For the fundamental investigation, since the EUT is a portable device that has three orientations; an X, Y and Z orientations and the worst among X, Y, and Z with AC/DC adapter and headset have been investigated. After the investigation the worst case was found to be X-Position with an AC Adapter for Cell bands and Z-position with an AC Adapter and headset for PCS bands respectively

5.6. DESCRIPTION OF TEST SETUP

RADIATED TESTS SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
AC Adapter	LG	MCS-01WR	RB320071516
Headset	LG	NA	NA

I/O CABLES (RF Conducted Test)

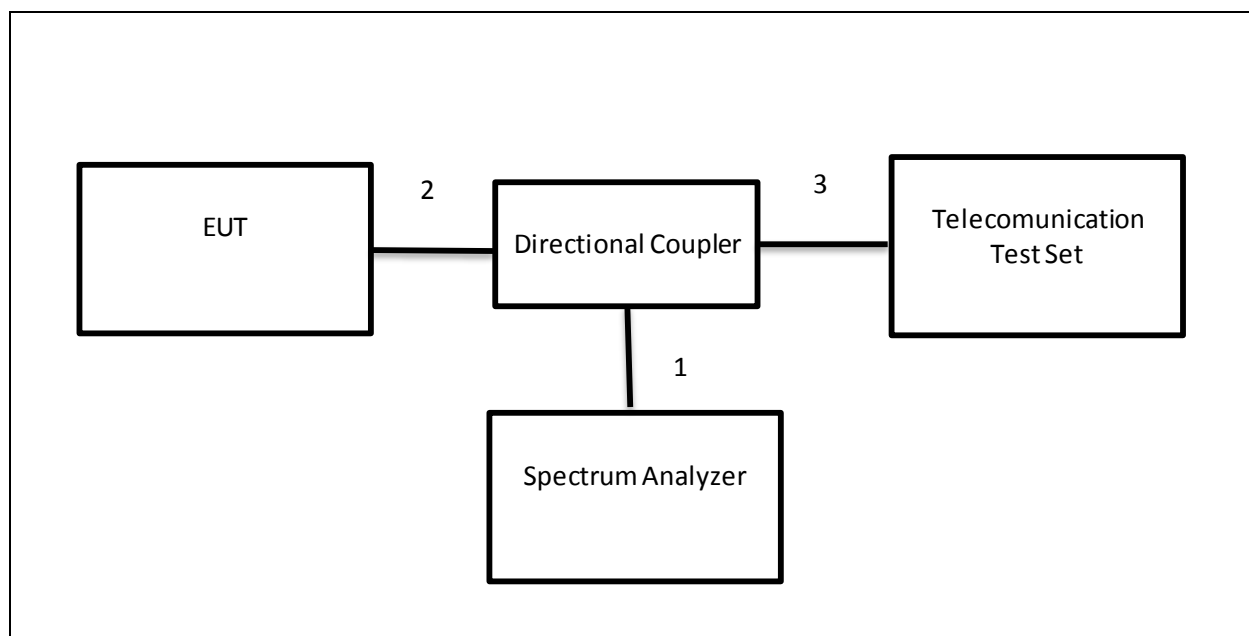
I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	RF In/Out	1	Spectrum Analyzer	UN-SHELDED	None	N/A
2	RF out	1	Directional Coupler	UN-SHELDED	0.1m	N/A
3	RF In/Out	1	Communication Call box	UN-SHELDED	0.5m	N/A

I/O CABLES (RF Radiated Test)

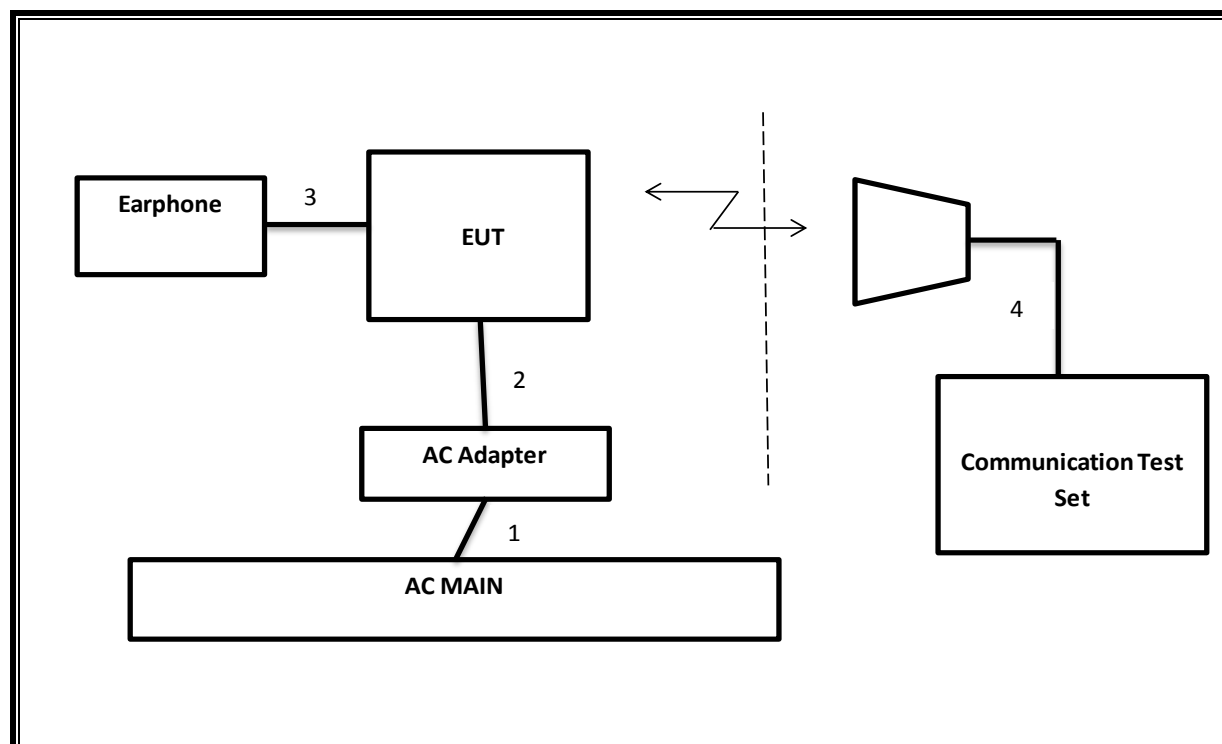
I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	115VAC	UN-SHELDED	1.0m	N/A
2	DC	1	DC	UN-SHELDED	1.0m	Volume control on
3	Audio	1	Earphone	UN-SHELDED	1.0m	NA
4	RF In/Out	1	Horn	UN-SHELDED	5m	NA

TEST SETUP

CONDUCTED SETUP



RADIATED SETUP



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
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	02/26/14
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/13
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/25/13
Antenna, Horn, 18 GHz	EMCO	3115	C00945	12/11/13
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	03/28/14
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/22/13
Communication Test Set	Agilent / HP	E5515C	C01086	11/10/13
Communication Test Set	R & S	CMW500	None	06/28/13
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/14
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02689`	CNR
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Directional Coupler, 4.2 GHz, 40 dB	A-R	DC7144A	C00983	CNR
Vector Signal Generator	Agilent / HP	E4438C	None	07/06/13
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121C DB4	C00993	02/01/14

7. RF POWER OUTPUT VERIFICATION

7.1. GSM MODES

7.1.1. GSM/GPRS/EGPRS

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 output power was measured with the spectrum analyzer at the low, middle and high channel in each band.

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

TEST PROCEDURE

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 > CS1 (GPRS) and MCS5 (EGPRS)
Bit Stream > 2E9-1PSR Bit Pattern
AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
Connection Press Signal On to turn on the signal and change settings

RESULTS

CELL BAND

Mode	Ch.	f (MHz)	1 time slots	
			Peak	Avg
GSM	128	824.2	32.9	32.9
	190	836.6	32.9	32.9
	251	848.8	32.9	32.8

Mode	Ch.	f (MHz)	1 time slots		2 time slots		3 time slots		4 time slots	
			Peak	Avg	Peak	Avg	Peak	Avg	Peak	Avg
GPRS	128	824.2	34.00	33.62	31.82	31.75	30.38	30.31	29.82	29.6
	190	836.6	33.98	33.6	31.76	31.53	30.49	30.15	29.8	29.49
	251	848.8	33.96	33.2	31.6	31.45	30.43	30.07	29.75	29.51

Mode	Ch.	f (MHz)	1 time slots		2 time slots		3 time slots		4 time slots	
			Peak	Avg	Peak	Avg	Peak	Avg	Peak	Avg
EGPRS	128	824.2	30.6	27.4	29.9	26.7	28.9	25.7	28.0	24.8
	190	836.6	30.7	27.5	30.0	26.8	28.9	25.7	28.1	24.9
	251	848.8	30.6	27.4	29.9	26.7	28.7	25.5	28.0	24.8

PCS BAND

Mode	Ch.	f (MHz)	1 time slots	
			Peak	Avg
GSM	512	1850.2	30.0	29.9
	661	1880.0	30.1	30.0
	810	1909.8	30.0	29.8

Mode	Ch.	f (MHz)	1 time slots		2 time slots		3 time slots		4 time slots	
			Peak	Avg	Peak	Avg	Peak	Avg	Peak	Avg
GPRS	512	1850.2	31.59	31.50	28.76	28.11	27.59	27.01	26.66	25.86
	661	1880.0	31.34	31.25	28.75	28.13	27.53	27.00	26.51	25.80
	810	1909.8	31.58	31.25	28.82	28.08	27.66	27.13	26.58	25.84

Mode	Ch.	f (MHz)	1 time slots		2 time slots		3 time slots		4 time slots	
			Peak	Avg	Peak	Avg	Peak	Avg	Peak	Avg
EGPRS	512	1850.2	31.69	26.23	29.55	25.55	29.46	25.35	28.75	24.86
	661	1880.0	31.48	26.19	29.46	25.53	29.34	25.41	28.68	24.83
	810	1909.8	31.45	25.71	29.44	25.5	29.37	25.43	28.7	24.84

7.2. UMTS MODES

7.2.1. UMTS-REL 99

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 output power was measured with the spectrum analyzer at the low, middle and high channel in each band.

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

TEST PROCEDURE

The following summary of these settings are illustrated below:

	Mode	Rel99
	Subtest	-
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	HSDPA FRC	Not Applicable
	HSUPA Test	Not Applicable
	Power Control Algorithm	Algorithm2
	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

Band	UL Ch	DL Ch	Frequency	Peak Conducted Output Power (dBm)	Average Conducted Output Power (dBm)
UMTS 850	4132	4357	826.4	27.70	24.19
	4180	4405	836.0	27.48	24.20
	4230	4455	846.0	27.60	24.17

Band	UL Ch	DL Ch	Frequency	Peak Conducted Output Power (dBm)	Average Conducted Output Power (dBm)
UMTS 1900	9262	9662	1852.4	27.10	24.00
	9400	9800	1880.0	27.48	24.10
	9538	9938	1907.6	27.44	24.13

Band	UL Ch	DL Ch	Frequency	Peak Conducted Output Power (dBm)	Average Conducted Output Power (dBm)
UMTS 1700	1312	1537	1712.4	27.37	23.98
	1413	1638	1732.6	27.31	24.10
	1513	1738	1752.6	26.89	23.85

7.2.2. UMTS-HSDPA

TEST PROCEDURE

The following summary of these settings are illustrated below:

	Mode	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	HSUPA Test	Not Applicable			
	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
	β_{ec}	-	-	-	-
	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	β_{ed}	Not Applicable			
	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			
	$A_{hs} = \beta_{hs}/\beta_c$	30/15			

RESULTS

Band	Subtest	UL Ch	DL Ch	Frequency	Peak power (dBm)	Average Power dBm
UMTS850 (Band V)	1	4132	4357	826.4	28.00	23.80
		4180	4405	836.0	27.90	23..6
		4230	4455	846.0	27.86	23.59
	2	4132	4357	826.4	27.95	23.72
		4180	4405	836.0	27.90	23.56
		4230	4455	846.0	27.95	23.73
	3	4132	4357	826.4	27.98	23.73
		4180	4405	836.0	27.97	23.53
		4230	4455	846.0	27.80	23.65
	4	4132	4357	826.4	27.85	23.71
		4180	4405	836.0	27.72	23.54
		4230	4455	846.0	27.62	23.67
UMTS1900 (Band II)	1	9262	9662	1852.4	27.10	23.51
		9400	9800	1880.0	27.06	23.48
		9538	9938	1907.6	27.15	23.50
	2	9262	9662	1852.4	27.00	23.54
		9400	9800	1880.0	27.10	23.58
		9538	9938	1907.6	27.82	23.57
	3	9262	9662	1852.4	27.20	23.55
		9400	9800	1880.0	27.35	23.40
		9538	9938	1907.6	27.54	23.50
	4	9262	9662	1852.4	27.12	23.51
		9400	9800	1880.0	27.65	23.56
		9538	9938	1907.6	27.33	23.60

Note 1: Maximum output power levels that are possible for all subtests reported.

Band	Subtest	UL Ch	DL Ch	Frequency	Peak power (dBm)	Average Power dBm
UMTS 1700 (Band IV)	1	1312	1537	1712.4	27.43	23.91
		1413	1638	1732.6	27.50	24.10
		1513	1738	1752.6	27.00	23.98
	2	1312	1537	1712.4	27.47	23.86
		1413	1638	1732.6	27.46	24.07
		1513	1738	1752.6	27.02	23.89
	3	1312	1537	1712.4	27.37	23.90
		1413	1638	1732.6	27.54	23.97
		1513	1738	1752.6	27.26	23.86
	4	1312	1537	1712.4	27.42	23.95
		1413	1638	1732.6	27.35	24.02
		1513	1738	1752.6	27.32	23.81

7.2.3. UMTS-HSUPA

TEST PROCEDURE

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				
	$A_{hs} = \beta_{hs}/\beta_c$	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	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	Subtest	UL Ch	DL Ch	Frequency	Peak power (dBm)	Average power (dBm)
UMTS850 (Band V)	1	4132	4357	826.4	27.9	23.2
		4180	4405	836.0	27.8	23.5
		4230	4455	846.0	27.7	23.2
	2	4132	4357	826.4	27.7	22.3
		4180	4405	836.0	27.7	22.5
		4230	4455	846.0	27.6	22.4
	3	4132	4357	826.4	27.6	22.5
		4180	4405	836.0	27.8	22.9
		4230	4455	846.0	27.5	22.5
	4	4132	4357	826.4	27.9	22.3
		4180	4405	836.0	27.7	22.8
		4230	4455	846.0	27.7	22.8
UMTS1900 (Band II)	1	4132	4357	826.4	28.0	23.4
		4180	4405	836.0	27.5	23.5
		4230	4455	846.0	27.4	23.2
	2	9262	9662	1852.4	27.1	23.4
		9400	9800	1880.0	27.7	23.7
		9538	9938	1907.6	27.3	23.6
	3	9262	9662	1852.4	27.1	22.3
		9400	9800	1880.0	27.6	22.4
		9538	9938	1907.6	27.4	22.1
	4	9262	9662	1852.4	27.1	22.5
		9400	9800	1880.0	27.6	22.6
		9538	9938	1907.6	27.7	22.7
UMTS1700 (Band IV)	1	9262	9662	1852.4	27.0	22.4
		9400	9800	1880.0	27.8	22.5
		9538	9938	1907.6	27.6	22.7
	2	9262	9662	1852.4	27.2	23.5
		9400	9800	1880.0	27.7	23.8
		9538	9938	1907.6	27.6	23.6
	3	1312	1537	1712.4	27.8	23.4
		1413	1638	1732.6	27.2	23.6
		1513	1738	1752.6	27.7	22.9
	4	1312	1537	1712.4	27.0	21.9
		1413	1638	1732.6	27.0	21.8
		1513	1738	1752.6	27.8	22.2
UMTS1900 (Band II)	1	1312	1537	1712.4	27.7	22.5
		1413	1638	1732.6	27.6	22.5
		1513	1738	1752.6	26.9	21.9
	2	1312	1537	1712.4	27.7	21.9
		1413	1638	1732.6	27.2	22.0
		1513	1738	1752.6	26.6	22.0
	3	1312	1537	1712.4	28.0	23.4
		1413	1638	1732.6	27.6	23.7
		1513	1738	1752.6	27.4	23.5
	4	9262	9662	1852.4	27.1	22.5
		9400	9800	1880.0	27.6	22.6
		9538	9938	1907.6	27.7	22.7

Note 1: Maximum output power levels that are possible for all subtests reported.

Band	Subtest	UL Ch	DL Ch	Frequency	Peak power (dBm)	Average power (dBm)
UMTS1700 (Band IV)	1	1312	1537	1712.4	27.8	23.4
		1413	1638	1732.6	27.2	23.6
		1513	1738	1752.6	27.7	22.9
	2	1312	1537	1712.4	27.0	21.9
		1413	1638	1732.6	27.0	21.8
		1513	1738	1752.6	27.8	22.2
	3	1312	1537	1712.4	27.7	22.5
		1413	1638	1732.6	27.6	22.5
		1513	1738	1752.6	26.9	21.9
	4	1312	1537	1712.4	27.7	21.9
		1413	1638	1732.6	27.2	22.0
		1513	1738	1752.6	26.6	22.0
UMTS1900 (Band II)	1	1312	1537	1712.4	28.0	23.4
		1413	1638	1732.6	27.6	23.7
		1513	1738	1752.6	27.4	23.5
	2	9262	9662	1852.4	27.1	22.5
		9400	9800	1880.0	27.6	22.6
		9538	9938	1907.6	27.7	22.7
	3	9262	9662	1852.4	27.1	22.5
		9400	9800	1880.0	27.6	22.6
		9538	9938	1907.6	27.7	22.7
	4	9262	9662	1852.4	27.0	22.4
		9400	9800	1880.0	27.8	22.5
		9538	9938	1907.6	27.6	22.7

7.2.4. DC-HSDPA

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/lor	dB	-10
P-CCPCH and SCH_Ec/lor	dB	-12
PICH_Ec/lor	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/lor	dB	-5
OCNS_Ec/lor	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.		
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

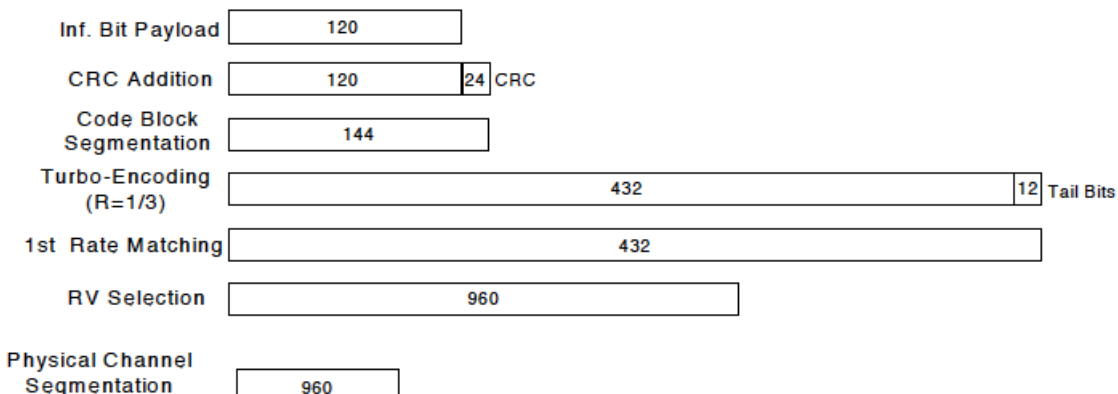


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

	Mode	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA	Rel6 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	Algorithm2			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
	MPR	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	$A_{hs} = \beta_{hs} / \beta_c$	30/15			

Up commands are set continuously to set the UE to Max power.

Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	23.9
		9400	1880.0	24.0
		9538	1907.6	24.0
	Subtest 2	9262	1852.4	23.6
		9400	1880.0	23.6
		9538	1907.6	23.5
	Subtest 3	9262	1852.4	23.4
		9400	1880.0	23.5
		9538	1907.6	23.4
	Subtest 4	9262	1852.4	23.5
		9400	1880.0	23.6
		9538	1907.6	23.4

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., CAT 6 Rel 6. Therefore, the RF conducted power is not measured.

7.3. LTE BANDS

7.3.1. LTE BAND 2-5MHz BANDWIDTH

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Avg Pwr (dBm)	Peak Pwr (dBm)
5	18625	1852.5	QPSK	1	0	23.52	26.84
				1	12	23.54	26.61
				1	24	23.50	26.56
				12	0	22.60	26.39
				12	6	22.62	26.11
				12	11	22.67	26.31
				25	0	22.43	27.15
			16QAM	1	0	22.50	26.22
				1	12	22.37	26.09
				1	24	22.33	26.06
				12	0	21.55	26.45
				12	6	21.46	26.12
				12	11	21.54	26.31
				25	0	21.59	27.01
	18900	1880.0	QPSK	1	0	23.59	27.97
				1	12	23.68	27.78
				1	24	23.64	27.69
				12	0	22.66	27.28
				12	6	22.68	27.15
				12	11	22.61	27.24
				25	0	22.55	28.02
			16QAM	1	0	22.50	27.14
				1	12	22.47	27.11
				1	24	22.47	27.02
				12	0	21.60	27.32
				12	6	21.54	27.20
				12	11	21.60	27.26
				25	0	21.66	28.01
	19175	1907.5	QPSK	1	0	23.54	28.18
				1	12	23.51	28.04
				1	24	23.55	28.10
				12	0	22.67	27.87
				12	6	22.68	27.71
				12	11	22.58	27.74
				25	0	22.72	28.30
			16QAM	1	0	22.52	27.77
				1	12	22.58	27.65
				1	24	22.24	27.42
				12	0	21.60	28.07
				12	6	21.60	27.93
				12	11	21.54	28.00
				25	0	21.70	28.26

7.3.2. LTE BAND 2-10MHz BANDWIDTH

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Avg Pwr (dBm)	Peak Pwr (dBm)
10	18650	1855.0	QPSK	1	0	23.43	26.86
				1	24	23.53	26.58
				1	49	23.57	26.86
				25	0	22.60	26.54
				25	12	22.59	26.16
				25	24	22.53	26.38
				50	0	22.48	27.13
			16QAM	1	0	22.42	26.25
				1	24	22.25	26.11
				1	49	22.35	26.14
				25	0	21.62	26.51
				25	12	21.63	26.18
				25	24	21.60	26.34
				50	0	21.70	27.27
	18900	1880.0	QPSK	1	0	23.50	28.23
				1	24	23.64	27.90
				1	49	23.61	27.70
				25	0	22.67	27.28
				25	12	22.70	27.29
				25	24	22.60	27.31
				50	0	22.70	27.91
			16QAM	1	0	22.37	27.06
				1	24	22.38	27.09
				1	49	22.26	26.95
				25	0	21.72	27.51
				25	12	21.71	27.30
				25	24	21.60	27.31
				50	0	21.57	28.00
	19150	1905.0	QPSK	1	0	23.56	28.65
				1	24	23.60	28.29
				1	49	23.54	27.90
				25	0	22.62	28.03
				25	12	22.73	28.00
				25	24	22.58	27.84
				50	0	22.58	28.31
			16QAM	1	0	21.71	27.50
				1	24	22.13	27.76
				1	49	21.96	27.50
				25	0	21.72	27.39
				25	12	21.82	27.23
				25	24	21.80	27.40
				50	0	21.70	28.01

7.3.3. LTE BAND 4-5MHz BANDWIDTH

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Avg Pwr (dBm)	Peak Pwr (dBm)
5	19975	1712.5	QPSK	1	0	23.66	27.81
				1	12	23.65	27.79
				1	24	23.60	27.78
				12	0	22.52	27.56
				12	6	22.49	27.60
				12	11	22.52	27.61
				25	0	22.42	28.21
			16QAM	1	0	22.36	27.38
				1	12	22.35	27.48
				1	24	22.44	27.61
				12	0	21.42	27.10
				12	6	21.46	27.03
				12	11	21.47	27.12
				25	0	21.53	28.03
	20175	1732.5	QPSK	1	0	23.66	27.31
				1	12	23.51	27.24
				1	24	23.35	27.22
				12	0	22.51	27.11
				12	6	22.43	26.91
				12	11	22.39	27.00
				25	0	22.53	28.28
			16QAM	1	0	22.30	27.02
				1	12	22.31	26.95
				1	24	22.23	26.81
				12	0	21.34	26.61
				12	6	21.30	26.22
				12	11	21.23	26.36
				25	0	21.35	27.48
	20375	1752.5	QPSK	1	0	23.25	26.93
				1	12	23.16	26.73
				1	24	23.20	26.78
				12	0	22.42	27.03
				12	6	22.36	26.95
				12	11	22.33	27.04
				25	0	22.10	27.37
			16QAM	1	0	22.01	26.86
				1	12	22.09	26.89
				1	24	22.00	26.90
				12	0	21.26	26.51
				12	6	21.25	26.30
				12	11	21.32	26.45
				25	0	21.48	27.43

7.3.4. LTE BAND 4-10MHz BANDWIDTH

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Avg Pwr (dBm)	Peak Pwr (dBm)
10	20000	1715.0	QPSK	1	0	23.60	27.91
				1	24	23.51	27.77
				1	49	23.66	27.68
				25	0	22.53	27.35
				25	12	22.56	27.21
				25	24	22.58	27.15
				50	0	22.53	27.92
			16QAM	1	0	22.00	26.70
				1	24	22.04	27.73
				1	49	22.11	27.59
				25	0	21.63	27.24
				25	12	21.65	27.09
				25	24	21.69	27.35
				50	0	21.67	27.41
	20175	1732.5	QPSK	1	0	23.70	27.36
				1	24	23.56	27.30
				1	49	23.41	27.36
				25	0	22.58	27.30
				25	12	22.37	27.21
				25	24	22.41	27.22
				50	0	22.52	27.95
			16QAM	1	0	22.14	26.45
				1	24	22.01	27.15
				1	49	22.14	27.12
				25	0	21.39	26.73
				25	12	21.38	26.34
				25	24	21.31	26.41
				50	0	21.39	27.34
	20350	1750.0	QPSK	1	0	23.29	27.00
				1	24	23.20	26.92
				1	49	23.20	26.83
				25	0	22.34	27.60
				25	12	22.32	27.44
				25	24	22.29	27.45
				50	0	22.12	27.16
			16QAM	1	0	21.88	27.05
				1	24	21.98	27.10
				1	49	21.90	26.18
				25	0	21.35	26.50
				25	12	21.44	26.21
				25	24	21.34	26.46
				50	0	21.48	27.23

7.3.5. LTE BAND 4-15MHz BANDWIDTH

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Avg Pwr (dBm)	Peak Pwr (dBm)
15	20025	1717.5	QPSK	1	0	23.53	27.91
				1	37	23.61	27.64
				1	74	23.64	27.42
				36	0	22.54	28.00
				36	16	22.64	27.85
				36	35	22.63	27.82
				75	0	22.64	28.08
			16QAM	1	0	22.24	27.51
				1	37	22.20	27.56
				1	74	22.13	27.16
				36	0	21.70	28.15
				36	16	21.72	28.01
				36	35	21.51	27.95
				75	0	21.52	28.34
	20175	1732.5	QPSK	1	0	23.65	27.39
				1	37	23.42	27.29
				1	74	23.42	27.31
				36	0	22.46	27.37
				36	16	22.42	27.04
				36	35	22.33	27.01
				75	0	22.51	27.91
			16QAM	1	0	22.43	27.27
				1	37	22.35	26.90
				1	74	22.18	26.66
				36	0	21.51	26.85
				36	16	21.43	26.35
				36	35	21.34	26.30
				75	0	21.50	27.78
	20325	1747.5	QPSK	1	0	23.46	27.41
				1	37	23.31	27.08
				1	74	23.22	26.87
				36	0	22.32	27.25
				36	16	22.36	27.07
				36	35	22.31	27.25
				75	0	22.23	27.53
			16QAM	1	0	22.22	26.78
				1	37	22.09	26.81
				1	74	21.98	26.91
				36	0	21.47	26.53
				36	16	21.44	26.21
				36	35	21.42	26.45
				75	0	21.31	27.20

7.3.6. LTE BAND 4-20MHz BANDWIDTH

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Avg Pwr (dBm)	Peak Pwr (dBm)
20	20050	1720.0	QPSK	1	0	23.60	27.93
				1	49	23.68	27.59
				1	99	23.70	27.36
				50	0	22.68	28.04
				50	24	22.55	27.88
				50	49	22.51	27.70
				100	0	22.61	28.00
			16QAM	1	0	22.51	27.80
				1	49	22.52	27.86
				1	99	22.34	27.50
				50	0	21.71	28.12
				50	24	21.59	27.73
				50	49	21.46	27.61
				100	0	21.71	28.38
	20175	1732.5	QPSK	1	0	23.70	27.46
				1	49	23.54	27.31
				1	99	23.45	27.35
				50	0	22.47	27.50
				50	24	22.51	27.22
				50	49	22.38	27.11
				100	0	22.45	27.79
			16QAM	1	0	22.29	27.71
				1	49	22.20	27.10
				1	99	22.17	26.96
				50	0	21.42	26.77
				50	24	21.44	26.22
				50	49	21.35	26.34
				100	0	21.65	27.89
	20300	1745.0	QPSK	1	0	23.36	27.31
				1	49	23.29	27.09
				1	99	23.24	26.92
				50	0	22.34	27.30
				50	24	22.38	27.04
				50	49	22.34	27.39
				100	0	22.32	27.45
			16QAM	1	0	22.36	27.07
				1	49	22.34	27.05
				1	99	22.22	27.13
				50	0	21.35	26.51
				50	24	21.36	26.16
				50	49	21.23	26.52
				100	0	21.44	28.03

7.3.7. LTE BAND 17-5MHz BANDWIDTH

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Avg Pwr (dBm)	Peak Pwr (dBm)
5	23755	706.5	QPSK	1	0	23.54	27.61
				1	12	23.60	27.67
				1	24	23.50	27.61
				12	0	22.68	27.09
				12	6	22.66	26.98
				12	11	22.64	27.17
				25	0	22.56	28.03
			16QAM	1	0	22.42	26.88
				1	12	22.42	27.01
				1	24	22.32	26.63
				12	0	21.70	26.77
				12	6	21.73	26.44
				12	11	21.63	26.74
				25	0	21.75	27.40
	23790	710.0	QPSK	1	0	23.50	27.73
				1	12	23.63	27.75
				1	24	23.49	27.83
				12	0	22.73	27.50
				12	6	22.69	27.50
				12	11	22.58	27.58
				25	0	22.50	28.02
			16QAM	1	0	22.40	27.10
				1	12	22.65	27.68
				1	24	22.37	27.53
				12	0	21.74	27.23
				12	6	21.76	27.17
				12	11	21.66	27.38
				25	0	21.73	27.91
	23825	713.5	QPSK	1	0	23.50	27.87
				1	12	23.63	28.23
				1	24	23.45	28.24
				12	0	22.59	27.54
				12	6	22.73	27.32
				12	11	22.76	27.30
				25	0	22.48	28.70
			16QAM	1	0	22.44	27.59
				1	12	22.71	27.45
				1	24	22.24	27.27
				12	0	21.66	27.41
				12	6	21.78	27.01
				12	11	21.83	27.64
				25	0	21.81	27.97

7.3.8. LTE BAND 17-10MHz BANDWIDTH

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	Avg Pwr (dBm)	Peak Pwr (dBm)
10	23780	709.0	QPSK	1	0	23.49	27.79
				1	24	23.61	27.74
				1	49	23.61	28.48
				25	0	22.58	27.41
				25	12	22.62	27.32
				25	24	22.62	27.57
				50	0	22.44	27.70
			16QAM	1	0	22.41	26.88
				1	24	22.48	27.35
				1	49	22.42	27.37
				25	0	21.81	26.92
				25	12	21.78	27.01
				25	24	21.81	27.44
				50	0	21.75	27.77
	23790	710.0	QPSK	1	0	23.65	27.91
				1	24	23.63	27.85
				1	49	23.66	28.28
				25	0	22.58	27.58
				25	12	22.57	27.66
				25	24	22.60	27.50
				50	0	22.60	27.76
			16QAM	1	0	22.48	26.95
				1	24	22.43	27.58
				1	49	22.51	27.15
				25	0	21.81	27.24
				25	12	21.76	27.10
				25	24	21.73	27.41
				50	0	21.74	27.70
	23800	711.0	QPSK	1	0	23.46	27.83
				1	24	23.52	27.95
				1	49	23.44	28.39
				25	0	22.65	27.85
				25	12	22.49	27.41
				25	24	22.63	27.70
				50	0	22.49	27.75
			16QAM	1	0	22.20	27.00
				1	24	21.93	26.92
				1	49	21.94	26.77
				25	0	21.76	27.11
				25	12	21.70	27.15
				25	24	21.80	27.19
				50	0	21.72	27.89

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

- GSM: GPRS and EGPRS
- UMTS: WCDMA and HSDPA
- LTE: Band 2, 4, and 17

RESULTS

Mode	Band	Channel	f (MHz)	99% BW (kHz)	-26dB BW (kHz)
GPRS	CELL	128	824.2	255.4292	259.520
		190	836.4	254.5846	259.173
		251	848.8	252.1207	258.396
	PCS	512	1850.2	239.6740	244.043
		661	1880.0	238.6739	243.931
		810	1909.8	239.9574	244.028

Mode	Band	Channel	f (MHz)	99% BW (kHz)	-26dB BW (kHz)
EGPRS	CELL	128	824.2	249.9780	306.679
		190	836.4	250.7451	255.379
		251	848.8	254.0657	259.244
	PCS	512	1850.2	238.9544	285.587
		661	1880.0	236.9225	290.822
		810	1909.8	240.5797	244.654

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
UMTS, WCDMA	CELL	4357	826.4	4.2784	4.628
		4405	836.0	4.2230	4.610
		4455	846.0	4.1691	4.565
	PCS	9662	1852.4	4.2362	4.620
		9800	1880.0	4.1526	4.573
		9938	1907.6	4.1143	4.499
	AWS	1312	1712.4	4.0690	4.573
		1413	1732.6	4.2420	4.560
		1513	1752.6	4.2494	4.479

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
UMTS, HSDPA	CELL	4357	826.4	4.0582	4.575
		4405	836.0	4.1681	4.584
		4455	846.0	4.1698	4.539
	PCS	9662	1852.4	4.0744	4.599
		9800	1880.0	3.9316	4.540
		9938	1907.6	4.2254	4.566
	AWS	1312	1712.4	4.0706	4.479
		1413	1732.6	4.1315	4.606
		1513	1752.6	4.1456	4.519

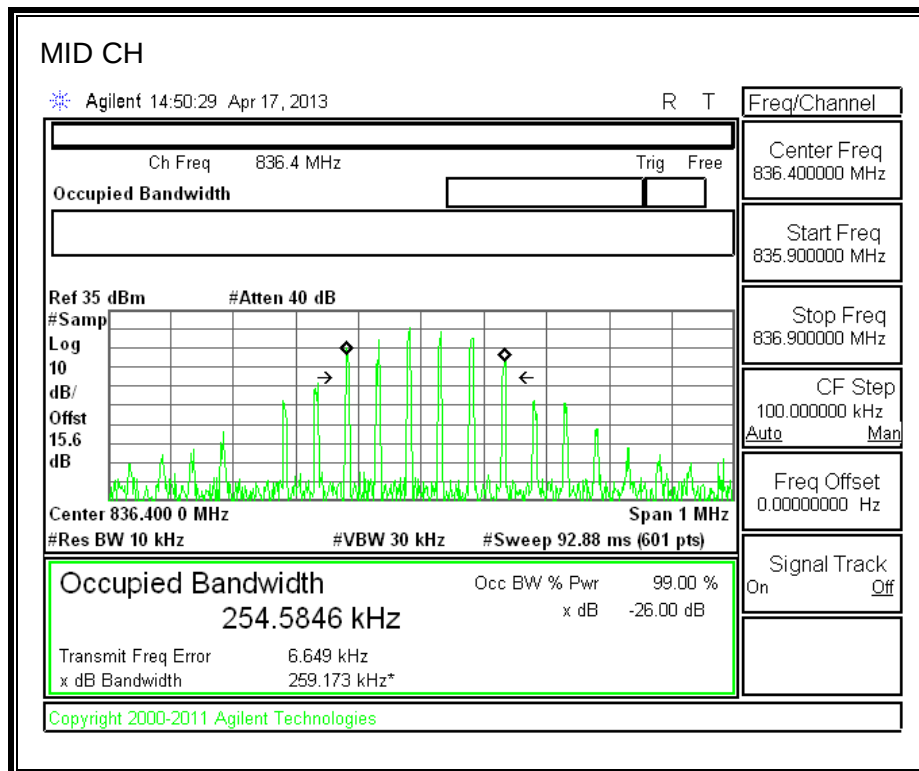
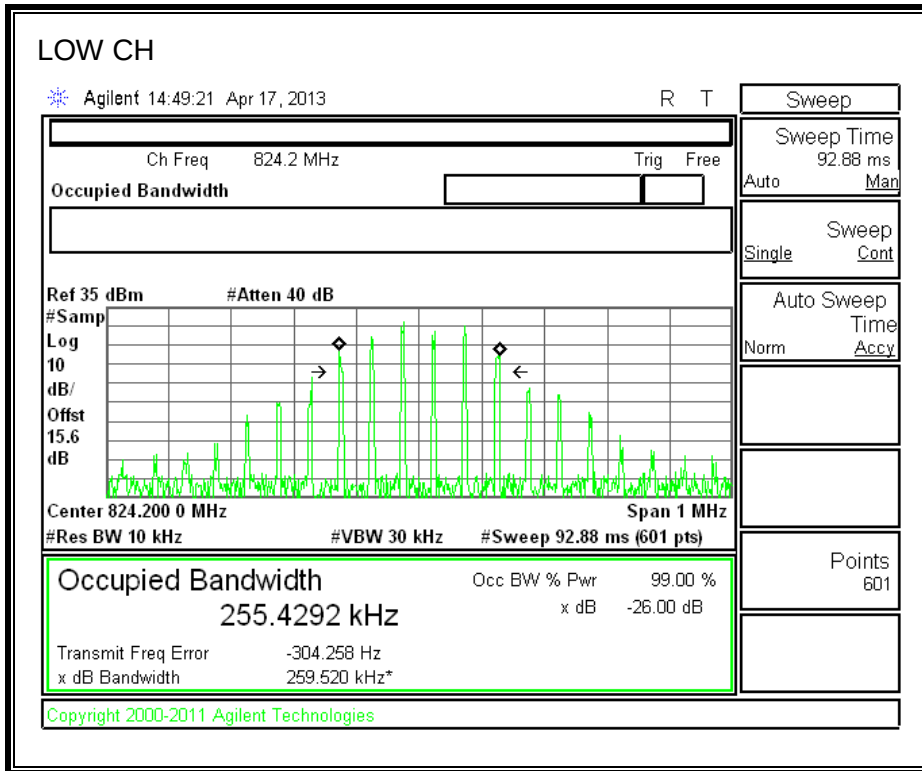
Band	Mode	RB/RB SIZE	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE Band 2	5.0 MHz BAND QPSK	12/6	1852.5	2.1804	2.403
		25/0		4.5029	4.679
	5.0 MHz BAND 16QAM	12/6		2.1606	2.274
		25/0		4.4703	5.970
	5.0 MHz BAND QPSK	12/6	1880.0	2.1578	2.386
		25/0		4.4539	4.853
	5.0 MHz BAND 16QAM	12/6		2.1413	2.760
		25/0		4.4915	4.774
	5.0 MHz BAND QPSK	12/6	1907.5	2.1667	2.506
		25/0		4.4392	4.668
	5.0 MHz BAND 16QAM	12/6		2.1686	2.754
		25/0		4.4702	4.776
	10 MHz BAND QPSK	25/12	1855	4.4529	4.765
		50/0		8.8040	9.380
	10 MHz BAND 16QAM	25/12		4.4632	4.677
		50/0		8.8789	9.542
	10 MHz BAND QPSK	25/12	1880	4.4780	4.946
		50/0		8.9119	9.378
	10 MHz BAND 16QAM	25/12		4.4678	4.730
		50/0		8.9073	9.290
	10 MHz BAND QPSK	25/12	1905	4.4933	5.262
		50/0		9.0008	9.373
	10 MHz BAND 16QAM	25/12		4.5142	5.072
		50/0		9.0030	9.364

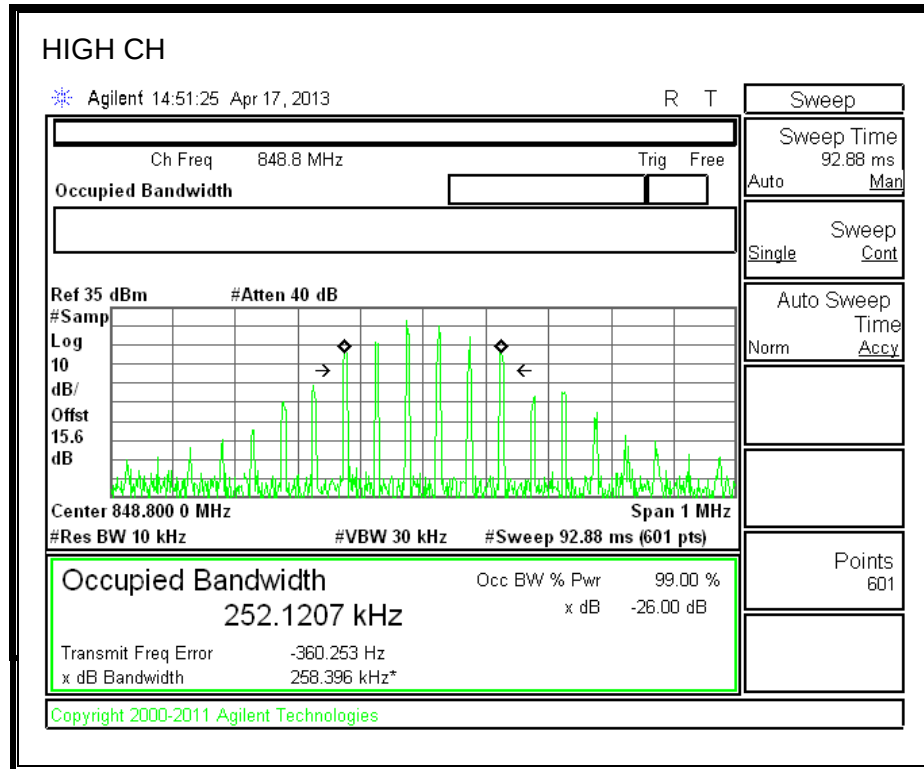
Band	Mode	RB/RB SIZE	f (MHz)	99% BW (kHz)	-26dB BW (kHz)
LTE Band 4	5.0 MHz BAND QPSK	12/6	1712.5	2.1269	2.632
		25/0		4.5089	4.816
	5.0 MHz BAND 16QAM	12/6		2.1581	2.615
		25/0		4.4726	4.777
	5.0 MHz BAND QPSK	12/6	1732.5	2.1515	2.379
		25/0		4.4598	4.824
	5.0 MHz BAND 16QAM	12/6		2.1449	2.486
		25/0		4.4589	4.817
	5.0 MHz BAND QPSK	12/6	1752.5	2.1601	2.521
		25/0		4.4656	4.668
	5.0 MHz BAND 16QAM	12/6		2.1893	2.651
		25/0		4.4656	4.684
	10 MHz BAND QPSK	25/12	1715.0	4.4963	5.761
		50/0		8.8977	9.387
	10 MHz BAND 16QAM	25/12		4.4770	5.102
		50/0		8.9554	9.350
	10 MHz BAND QPSK	25/12	1732.5	4.4705	4.712
		50/0		8.9328	9.532
	10 MHz BAND 16QAM	25/12		4.4522	5.011
		50/0		8.9530	9.286
	10 MHz BAND QPSK	25/12	1750.0	4.4631	5.721
		50/0		8.8333	9.347
	10 MHz BAND 16QAM	25/12		4.4649	5.268
		50/0		8.9797	9.370
	15 MHz BAND QPSK	36/18	1717.5	6.4630	7.905
		75/0		13.4178	14.157
	15 MHz BAND 16QAM	36/18		6.4561	7.150
		75/0		13.2925	14.093
	15 MHz BAND QPSK	36/18	1732.5	6.4142	7.239
		75/0		13.4451	14.038
	15 MHz BAND 16QAM	36/18		6.4440	6.826
		75/0		13.3068	14.070
	15 MHz BAND QPSK	36/18	1747.5	6.4064	6.747
		75/0		13.4758	14.007
	15 MHz BAND 16QAM	36/18		6.4402	7.149
		75/0		13.2222	14.053
	20 MHz BAND QPSK	100/0	1720.0	8.8467	9.349
		50/19		18.0325	18.782
	20 MHz BAND 16QAM	100/0		8.9236	9.401
		50/19		17.7471	18.474
	20 MHz BAND QPSK	100/0	1732.5	8.8301	10.067
		50/19		17.8209	18.609
	20 MHz BAND 16QAM	100/0		8.9730	9.616
		50/19		17.8651	18.672
	20 MHz BAND QPSK	100/0	1745.0	8.8977	9.495
		50/19		18.0289	18.624
	20 MHz BAND 16QAM	50/19		8.8356	9.507
		100/0		17.7960	18.624

Band	Mode	RB/RB SIZE	f (MHz)	99% BW (kHz)	-26dB BW (kHz)
LTE Band 17	5.0 MHz BAND QPSK	12/6	706.5	2.1297	2.769
		25/0		4.4732	4.726
	5.0 MHz BAND 16QAM	12/6		2.1787	2.756
		25/0		4.4707	4.645
	5.0 MHz BAND QPSK	12/6	710.0	2.1597	2.634
		25/0		4.4538	4.850
	5.0 MHz BAND 16QAM	12/6		2.1675	2.617
		25/0		4.4788	4.698
	5.0 MHz BAND QPSK	12/6	713.5	2.1579	2.427
		25/0		4.4652	4.826
	5.0 MHz BAND 16QAM	12/6		2.1777	2.877
		25/0		4.4977	4.752
	10 MHz BAND QPSK	25/12	709.0	4.5161	5.542
		50/0		8.8630	9.298
	10 MHz BAND 16QAM	25/12		4.4210	5.037
		50/0		8.8886	9.312
	10 MHz BAND QPSK	25/12	710.0	4.4508	5.010
		50/0		8.9543	9.365
	10 MHz BAND 16QAM	25/12		4.4342	5.052
		50/0		8.8620	9.404
	10 MHz BAND QPSK	25/12	711.0	4.4719	5.070
		50/0		8.9914	9.545
	10 MHz BAND 16QAM	25/12		4.4867	4.861
		50/0		8.8459	9.326

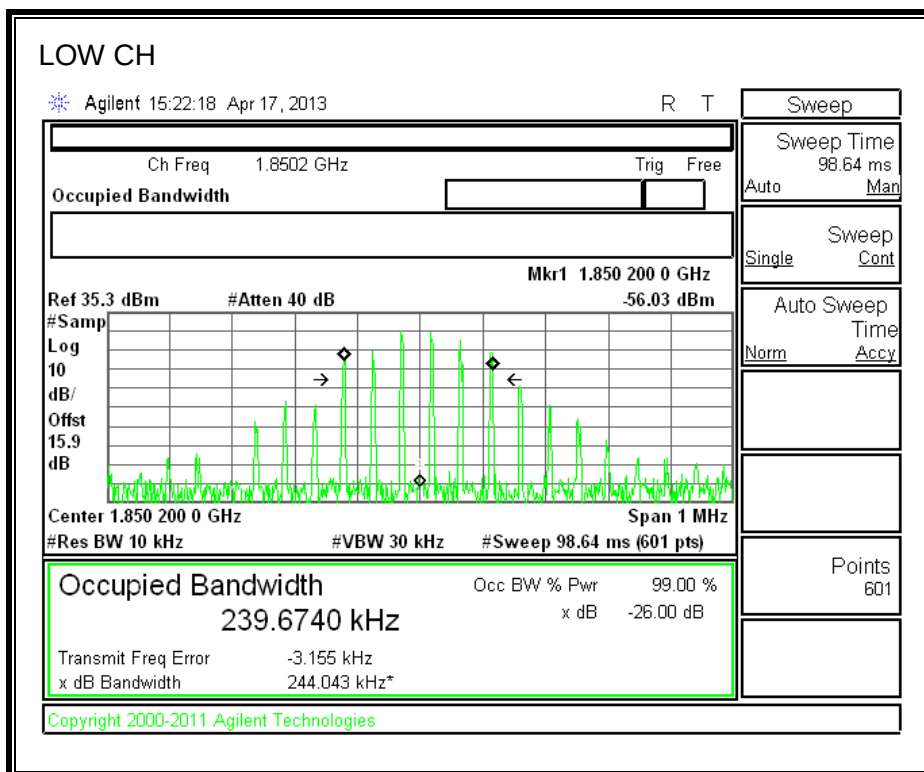
8.1.1. GSM-GPRS

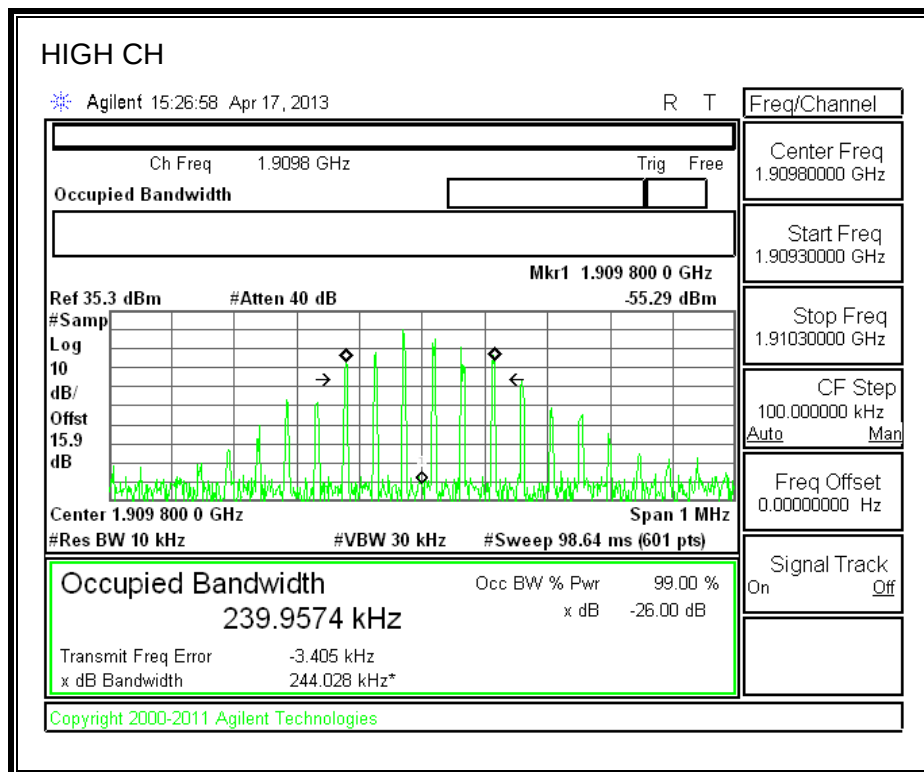
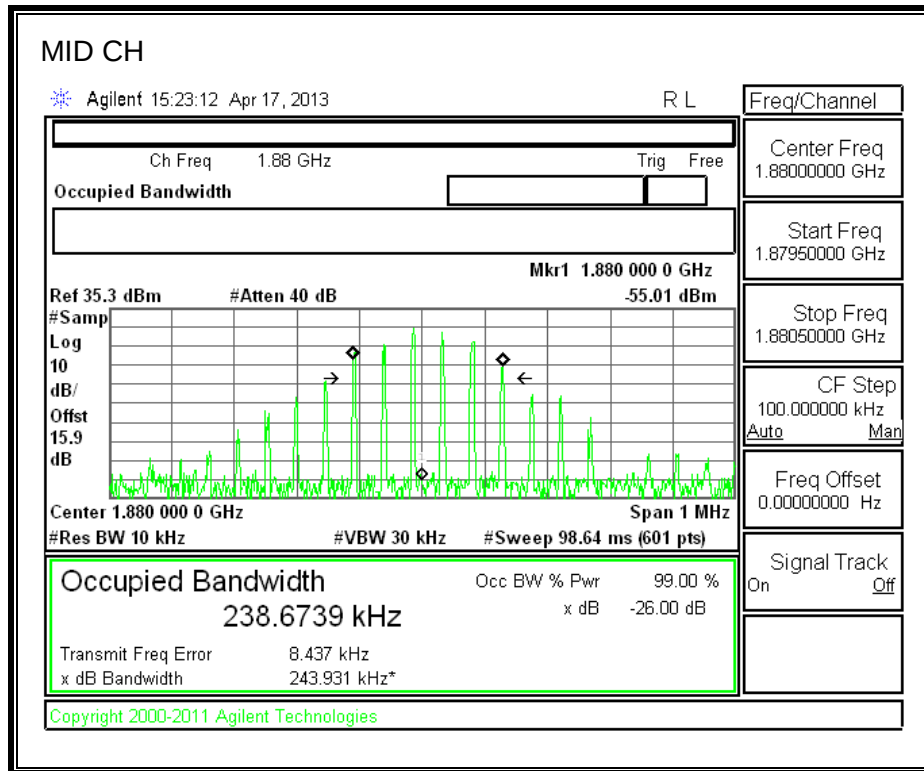
CELL BAND





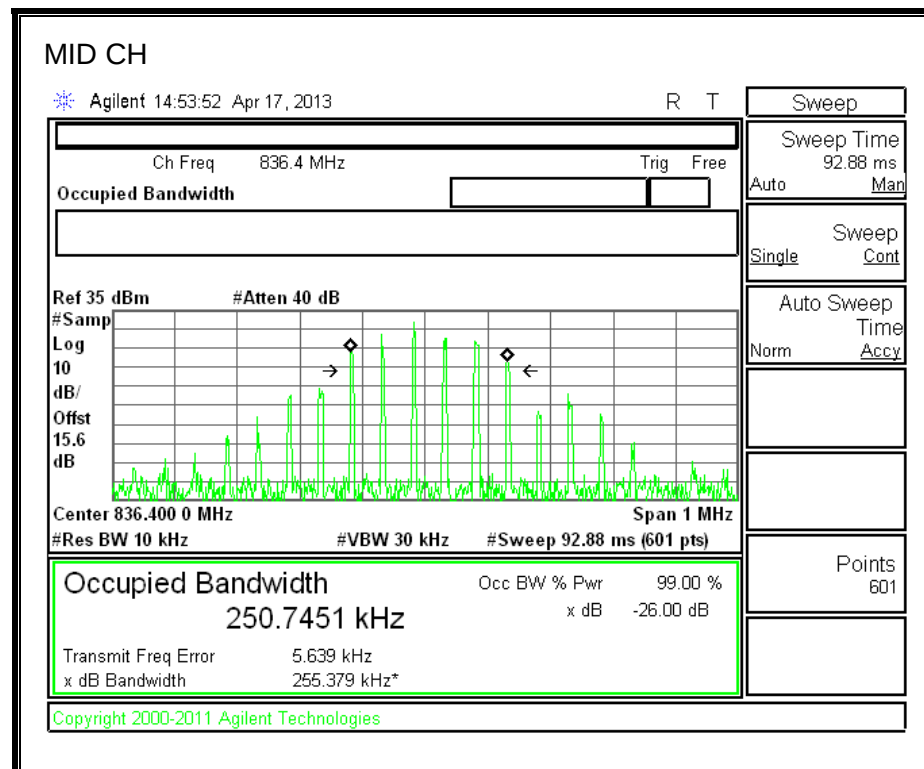
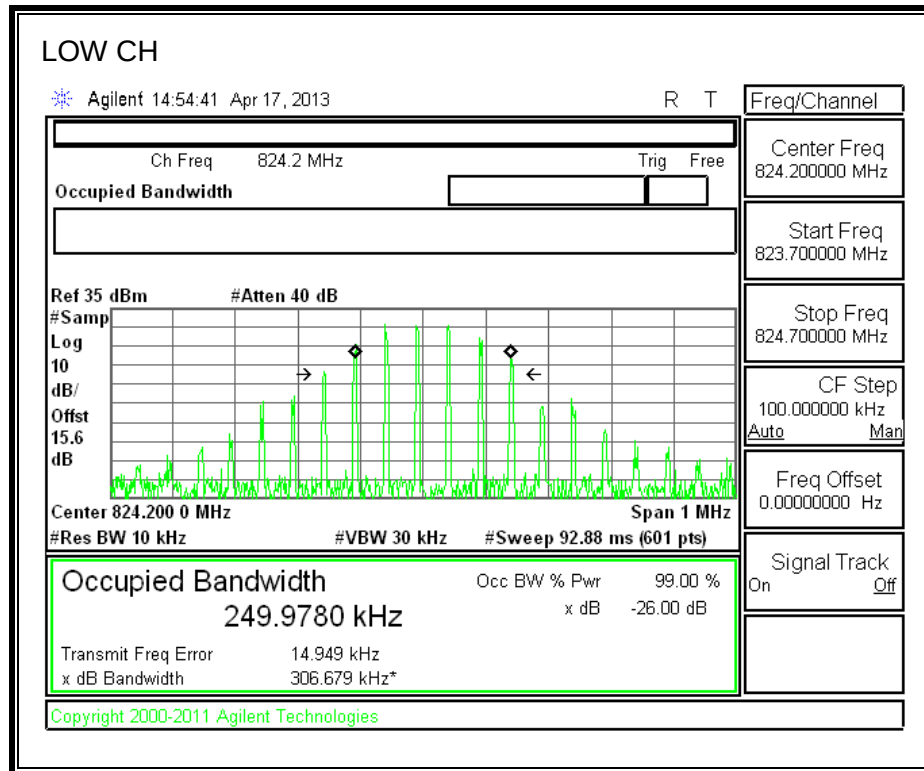
PCS BAND

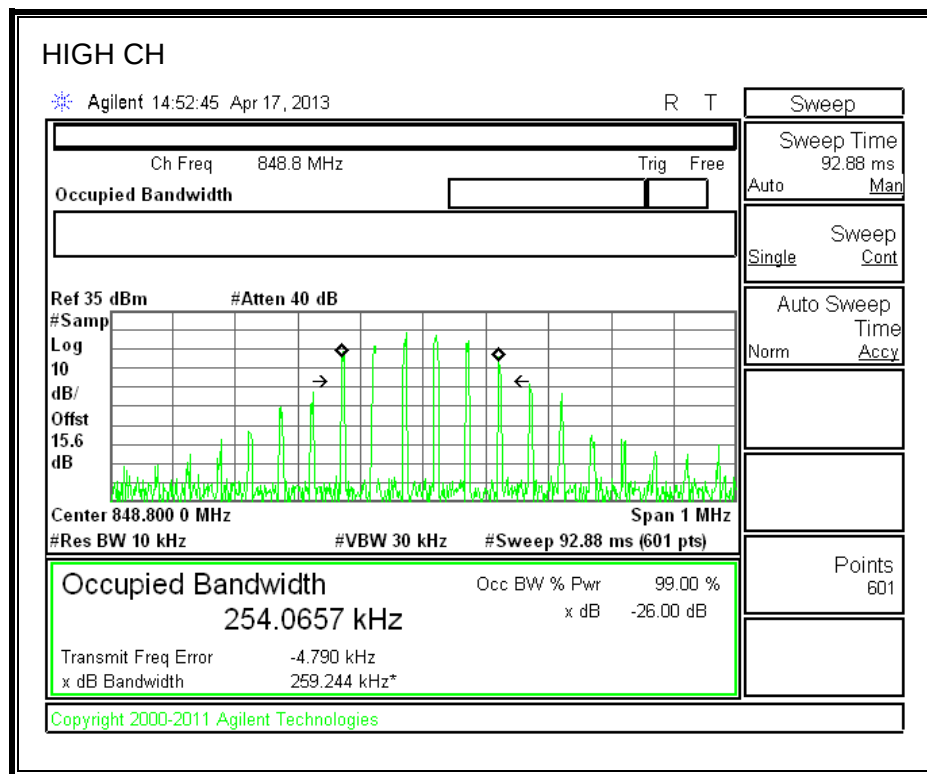




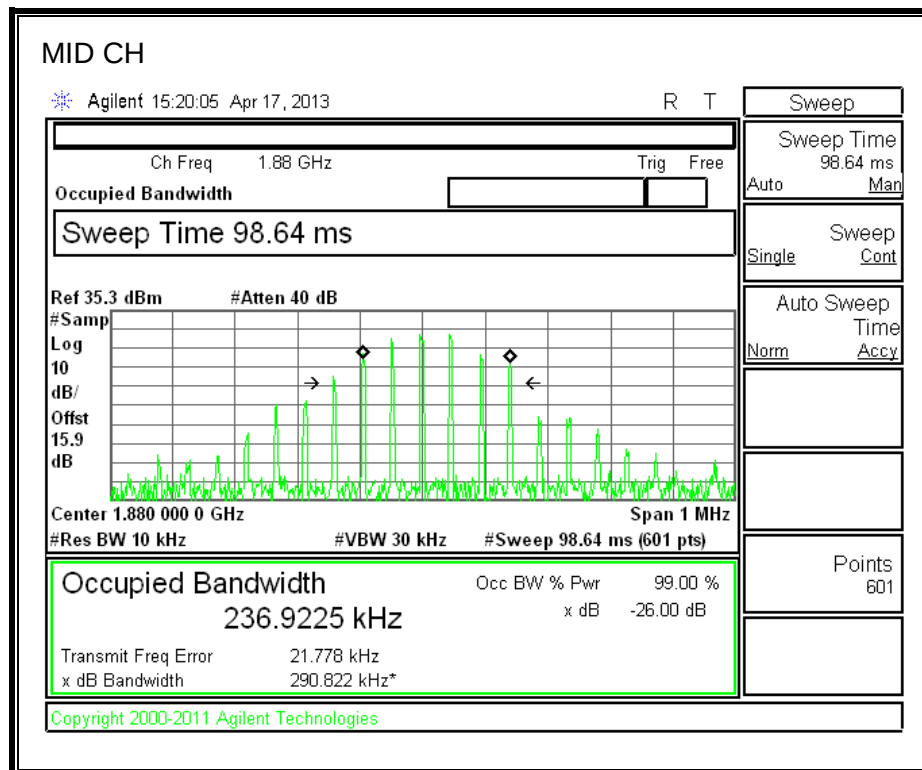
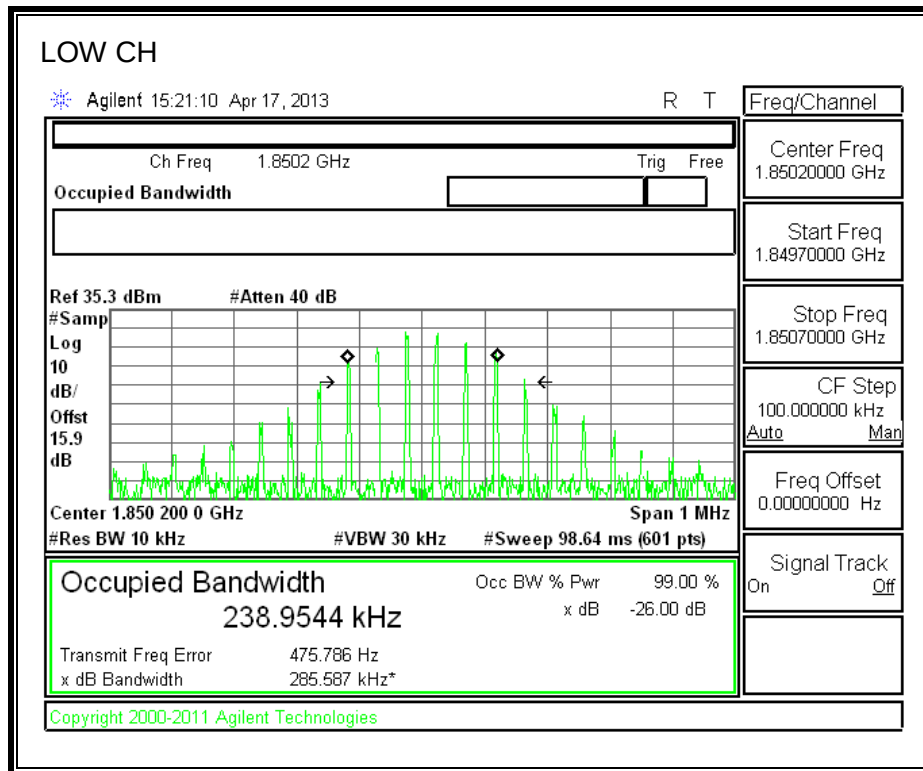
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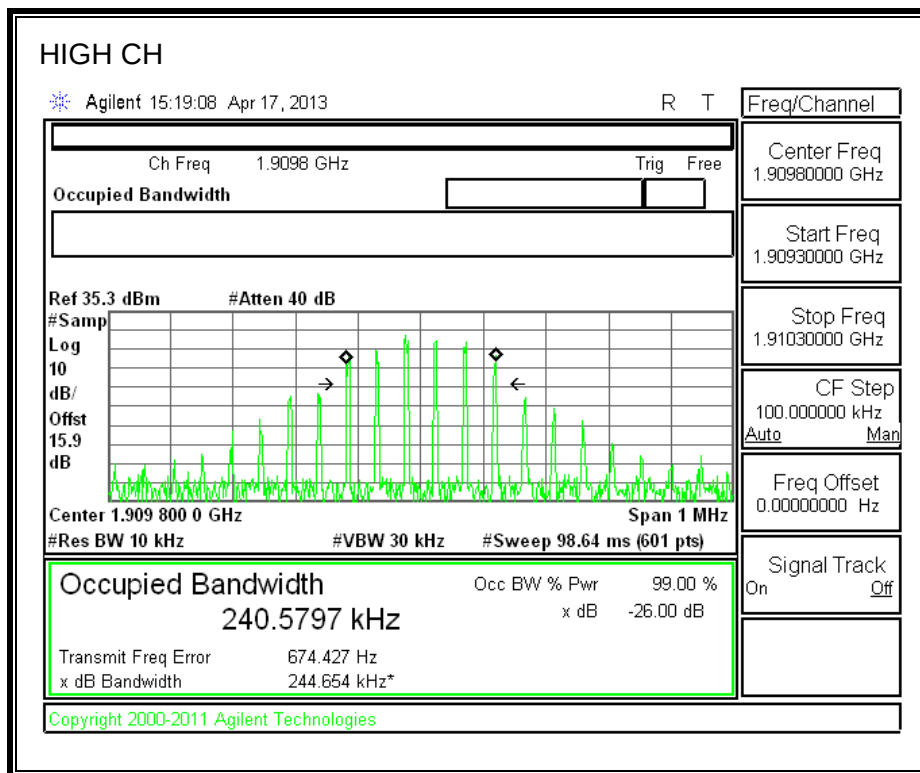
CELL BAND





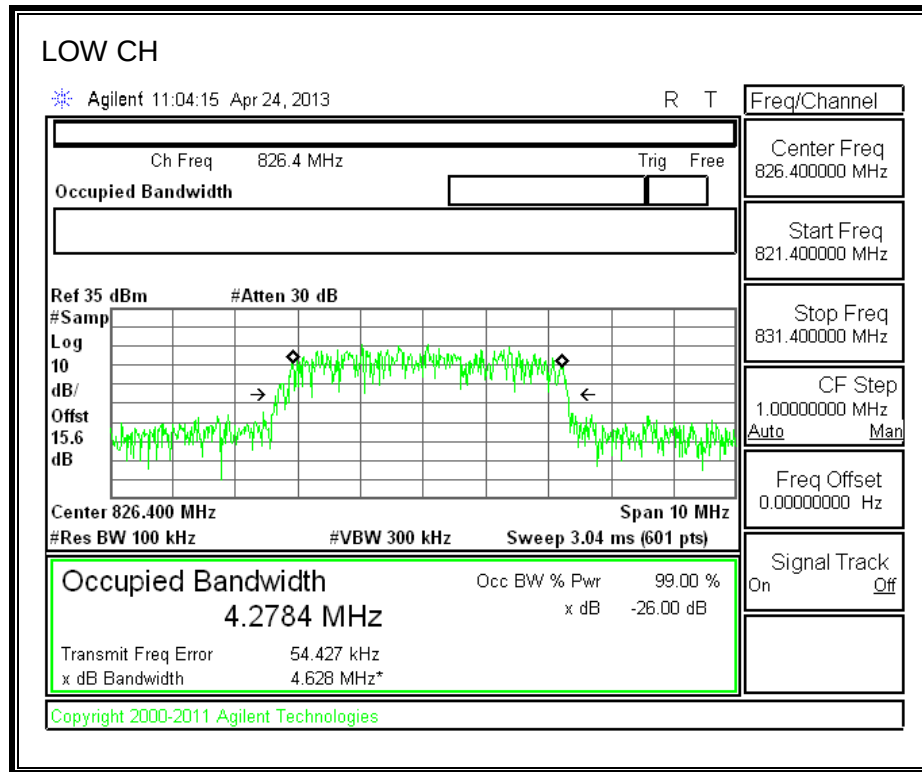
PCS BAND



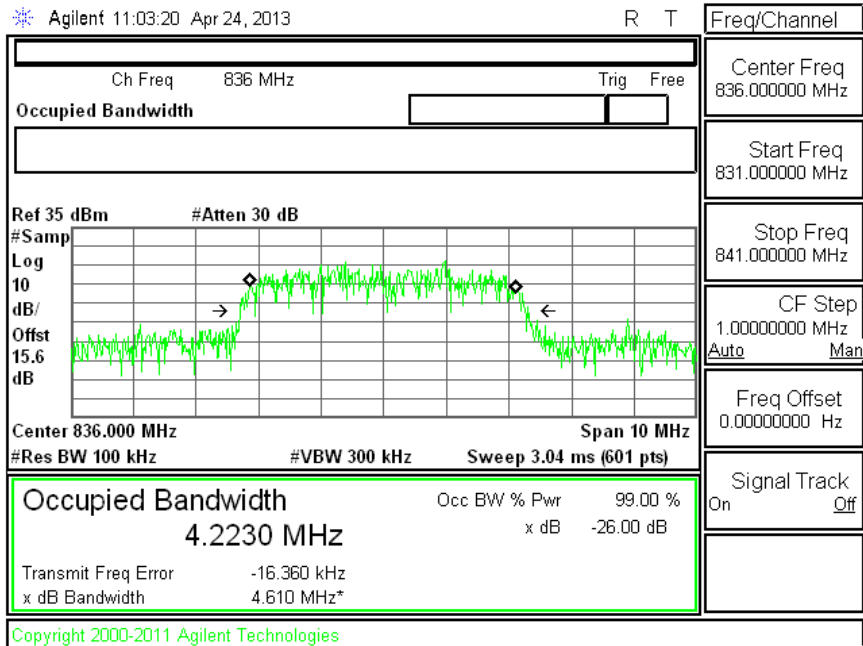


8.1.3. UMTS-REL 99

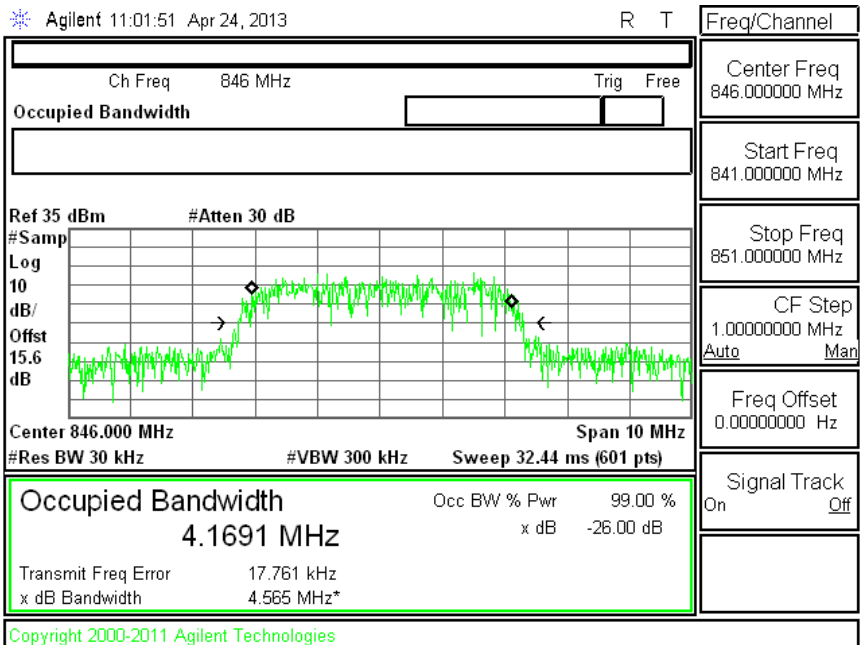
CELL BAND

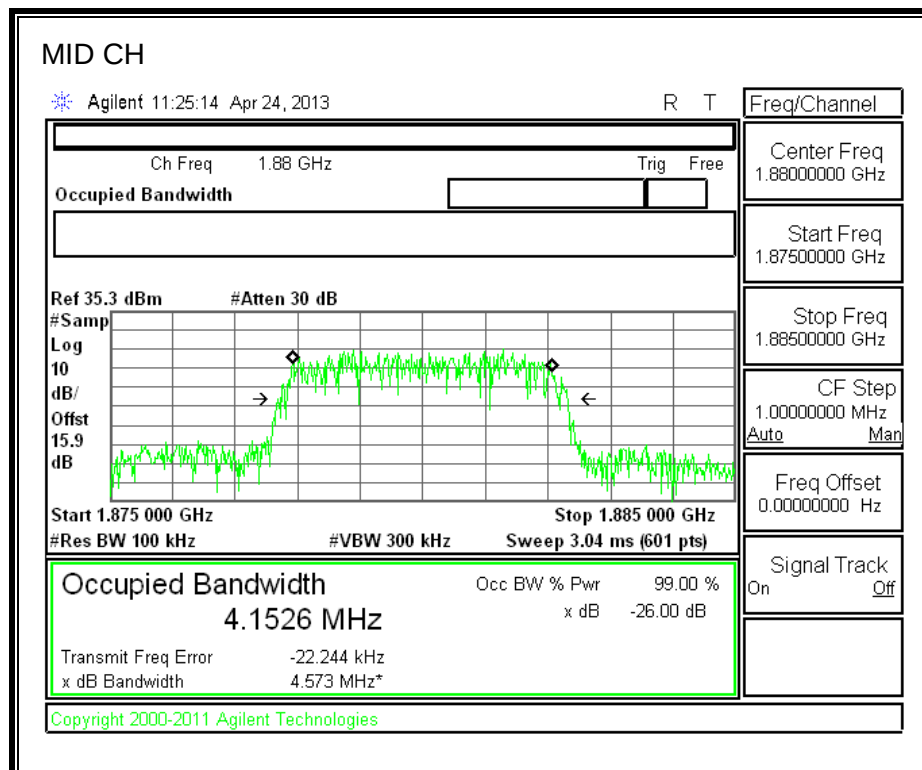
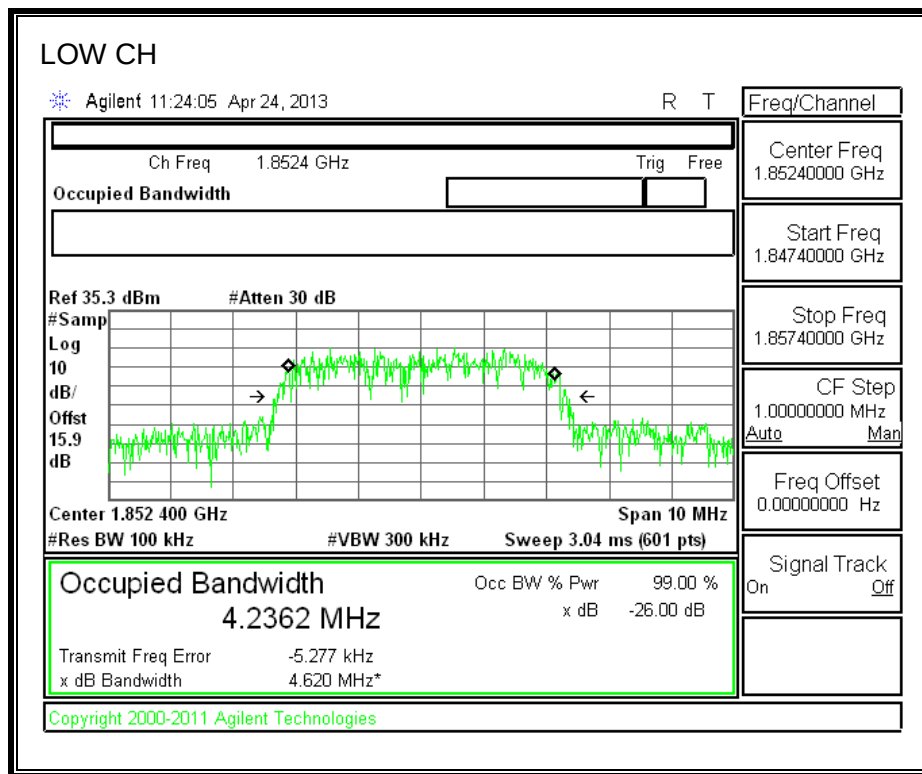


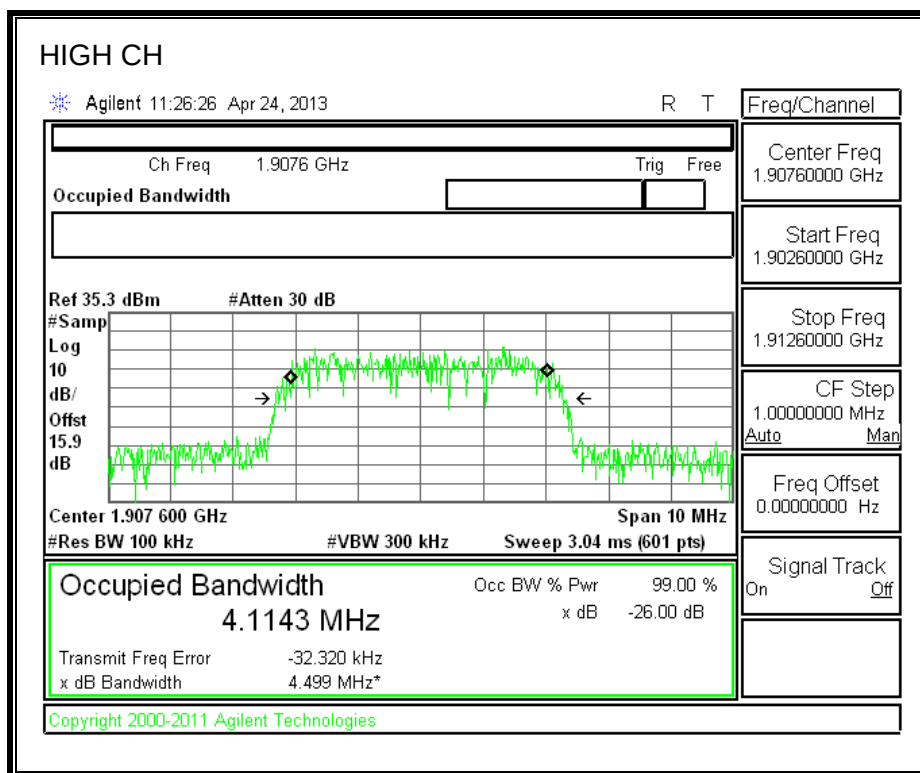
MID CH



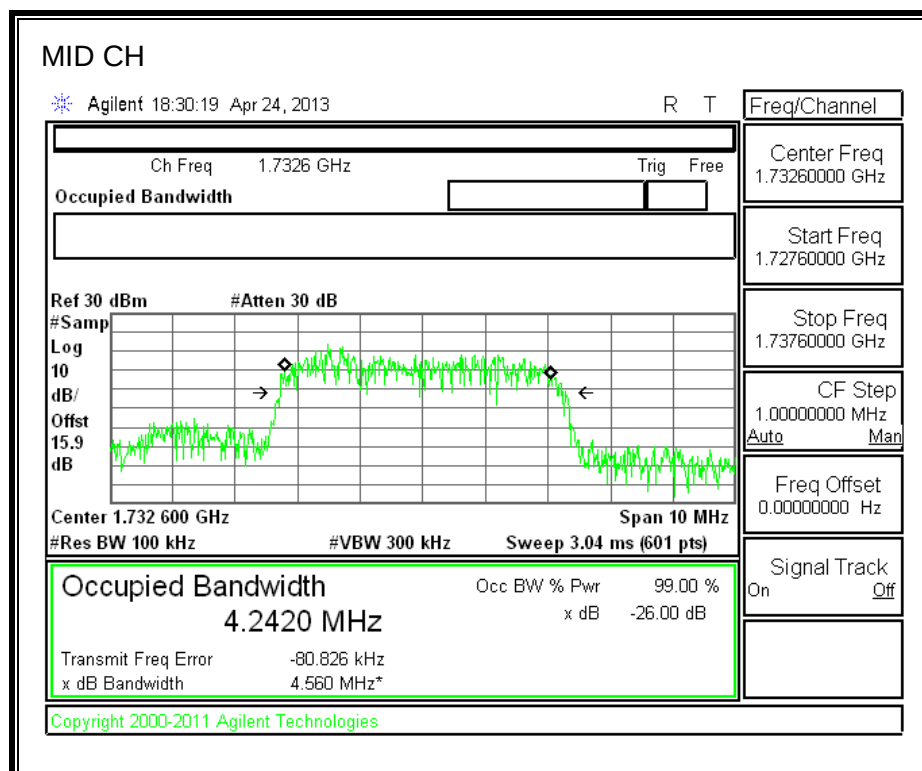
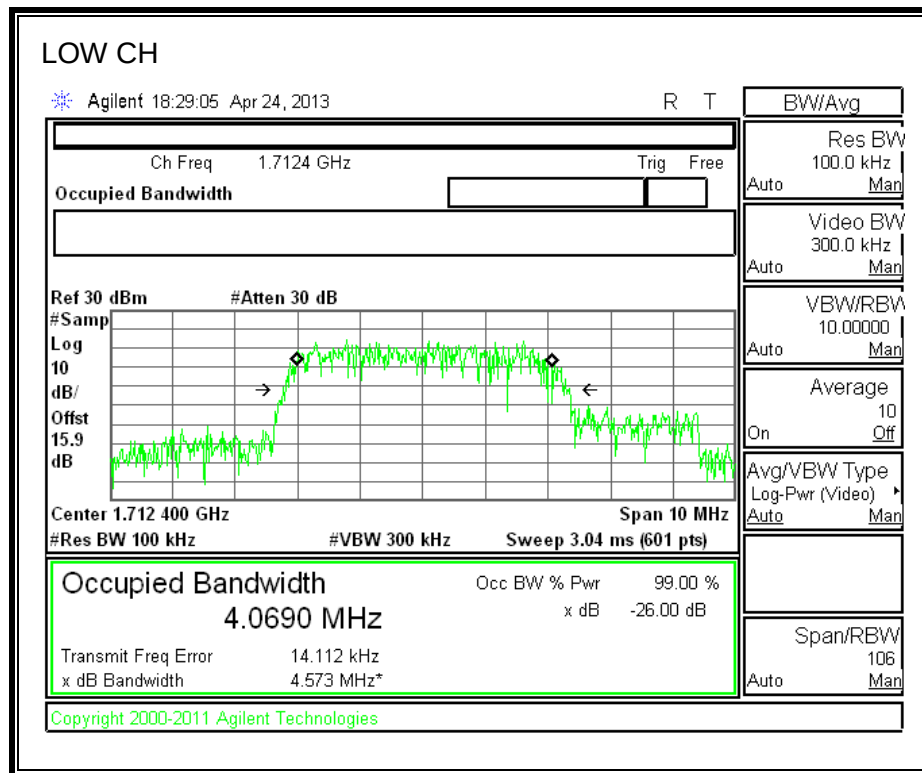
HIGH CH

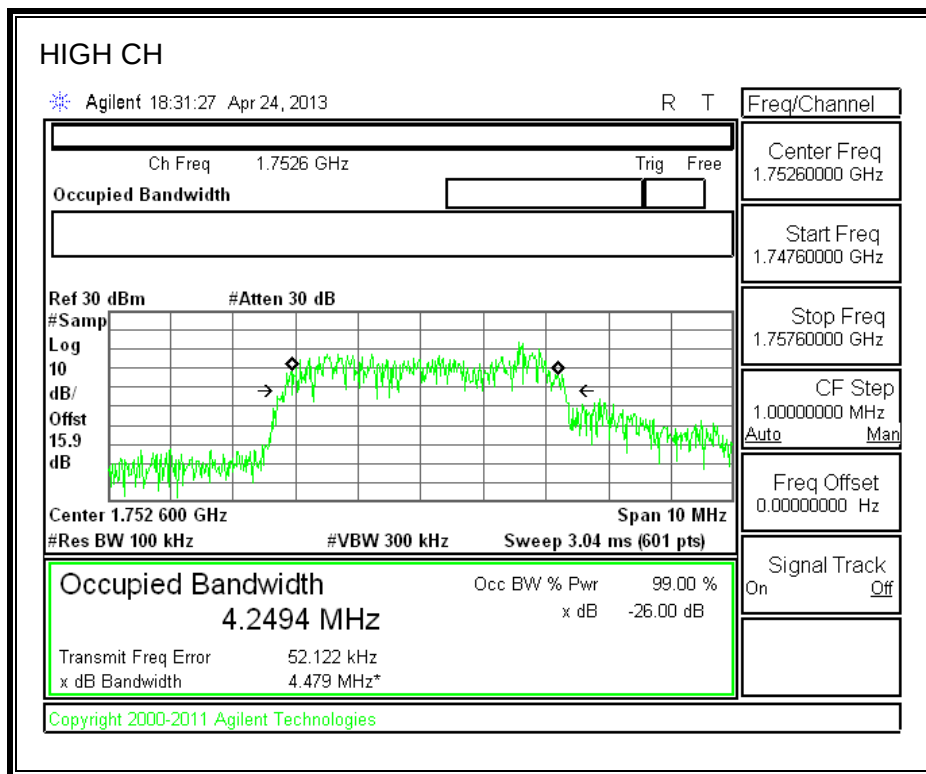






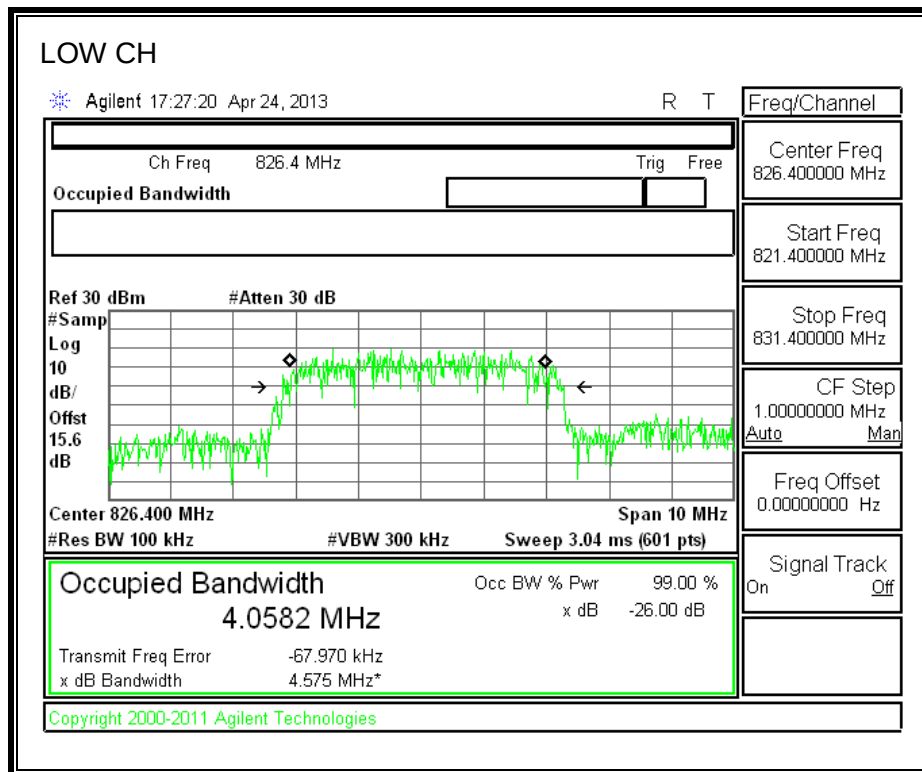
AWS BAND

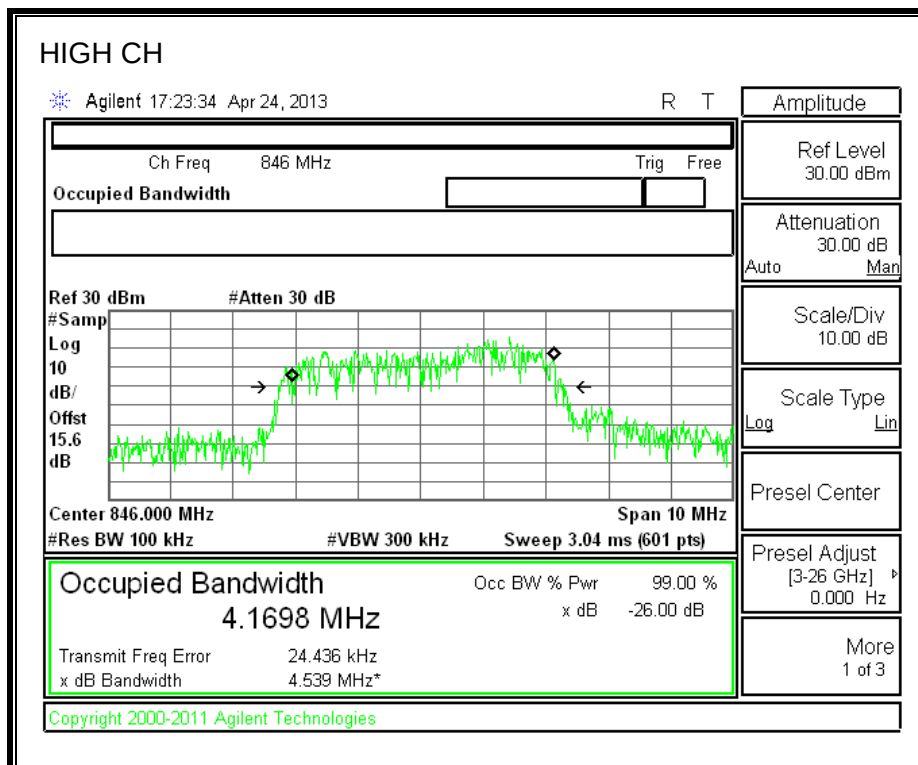
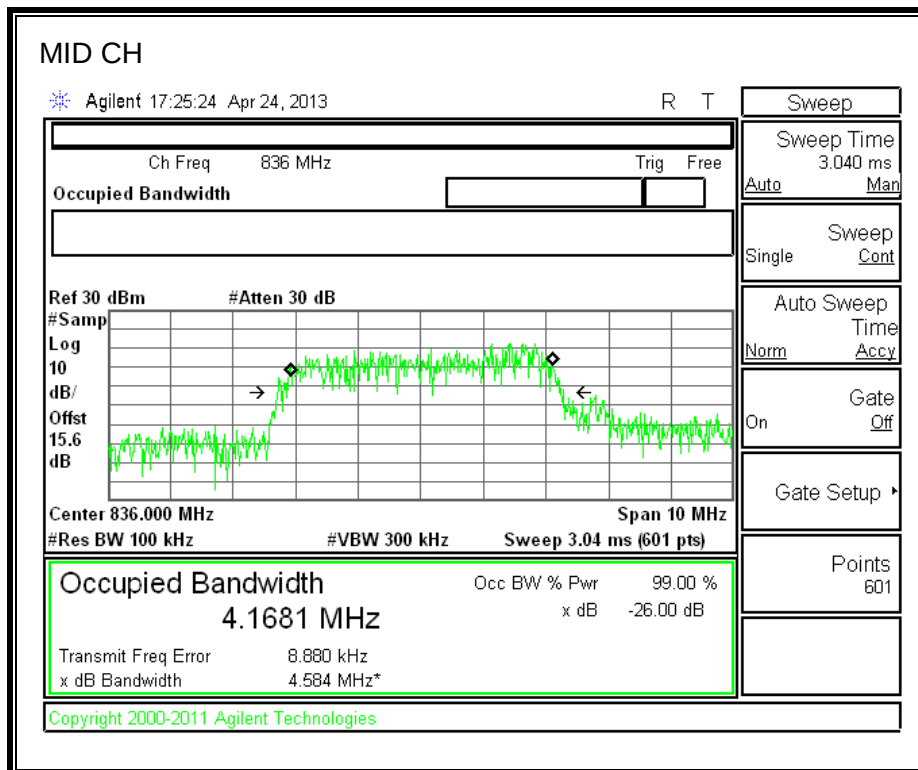


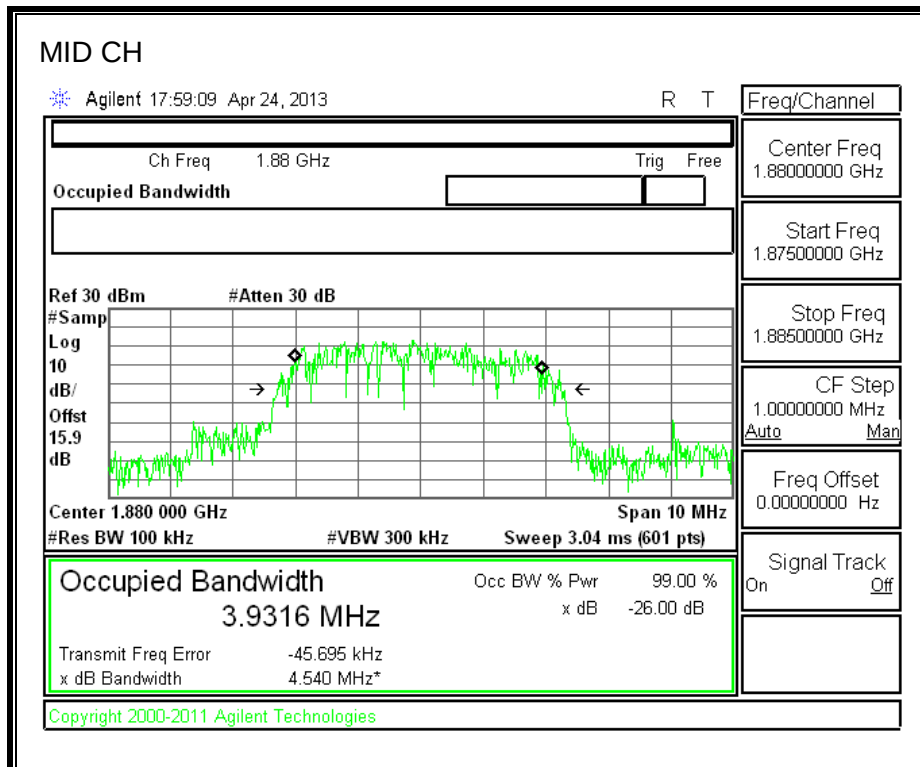
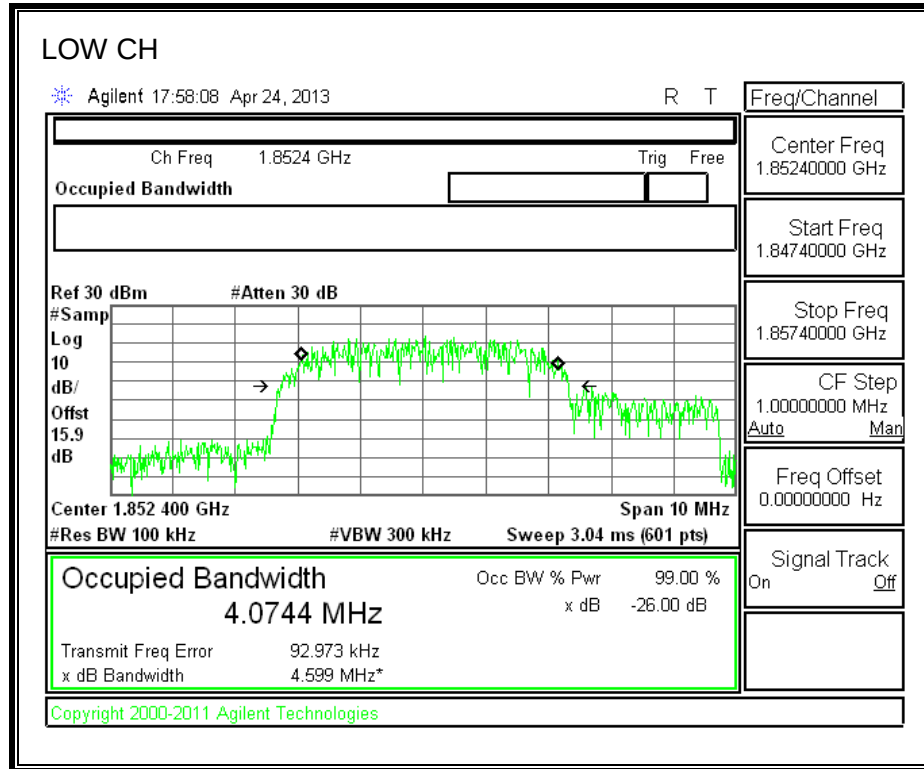


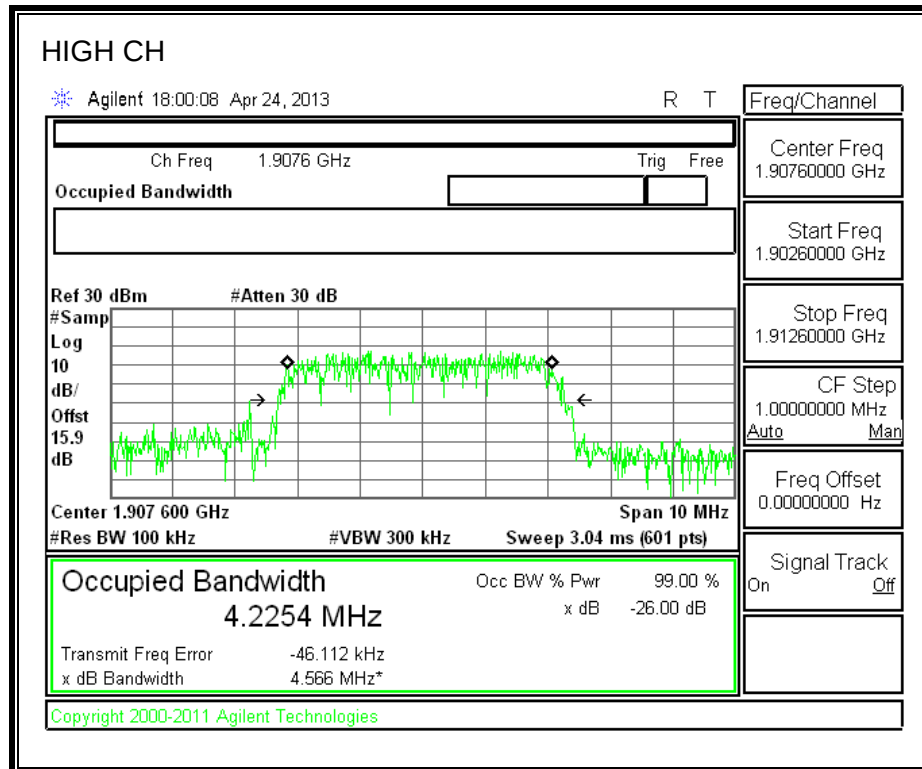
8.1.4. UMTS-HSDPA

CELL BAND

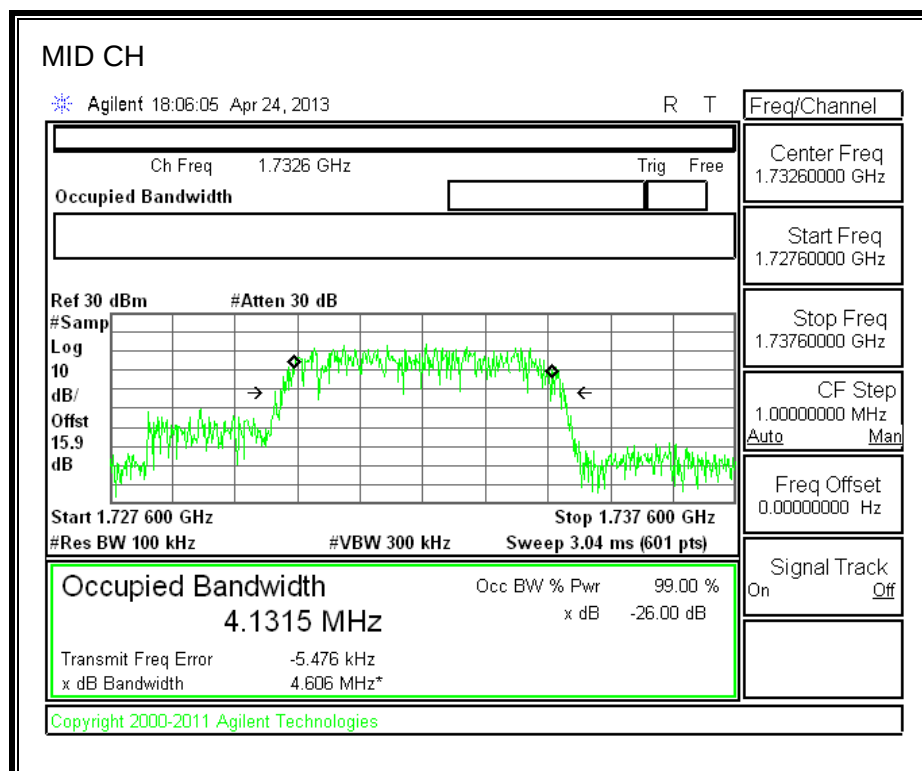
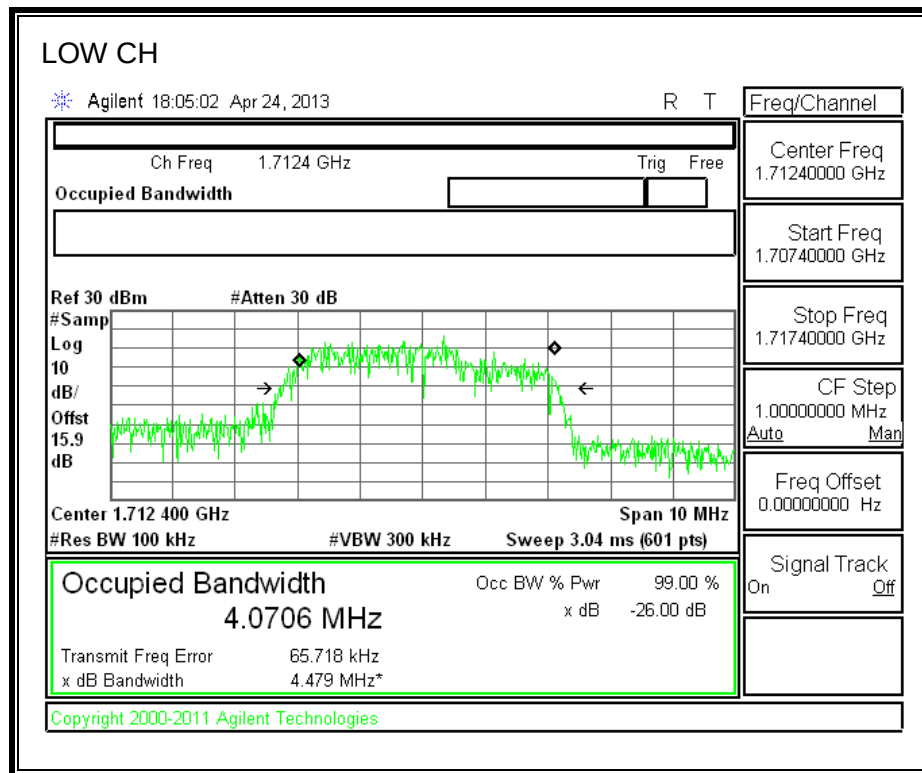


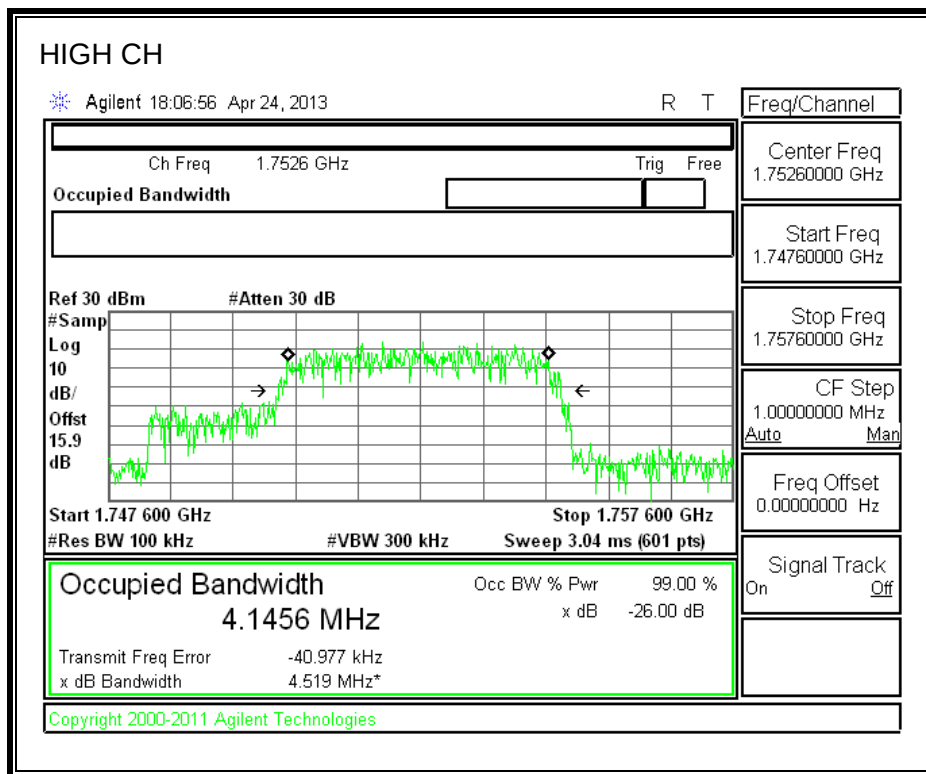






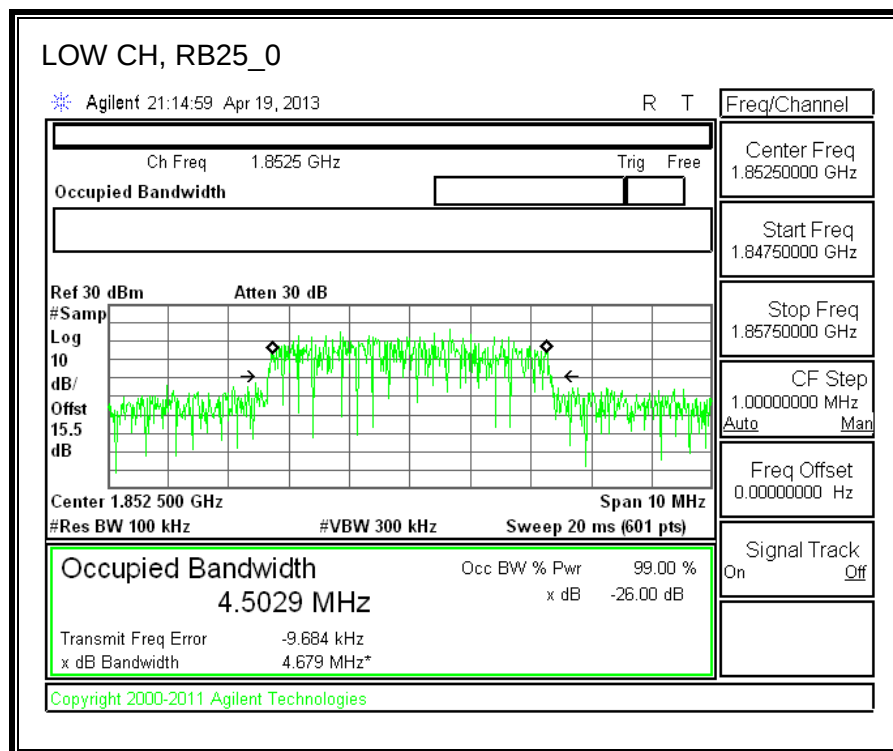
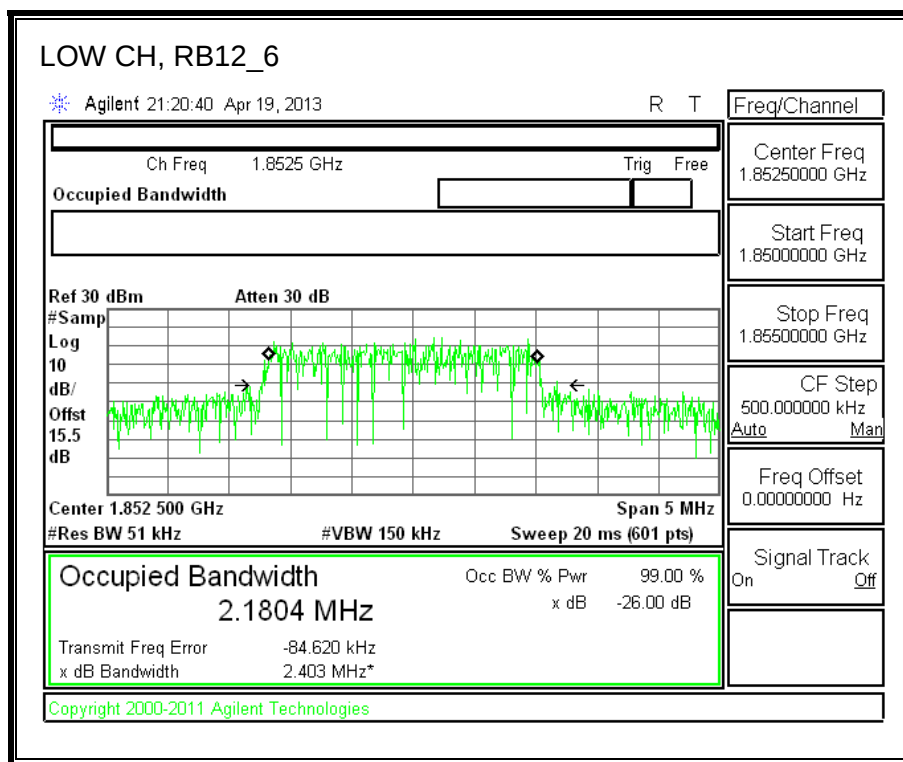
AWS BAND

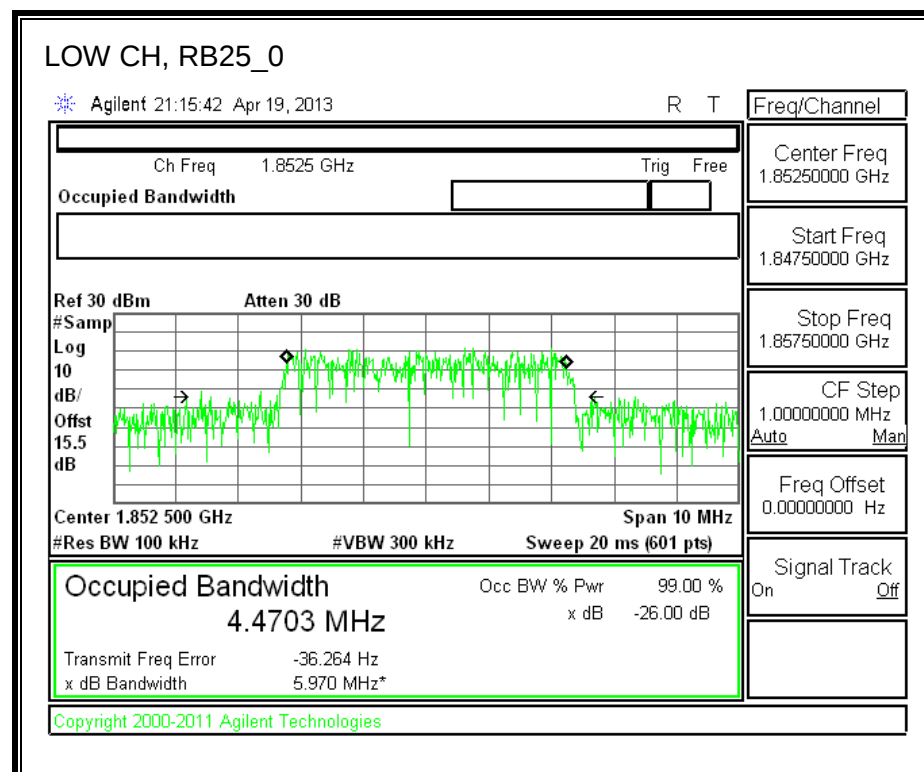
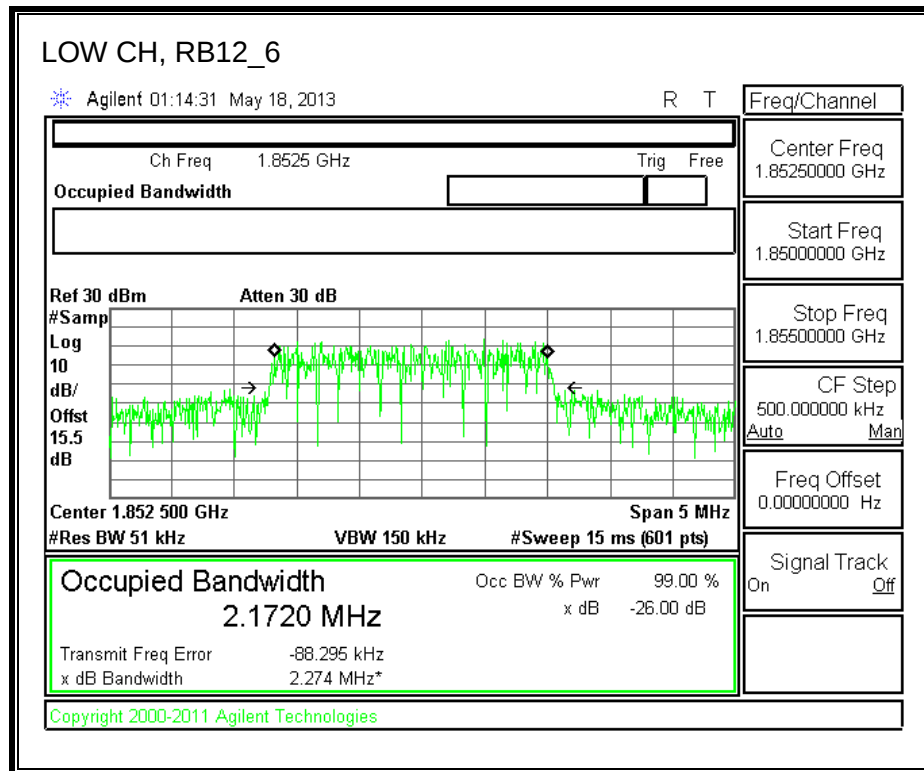


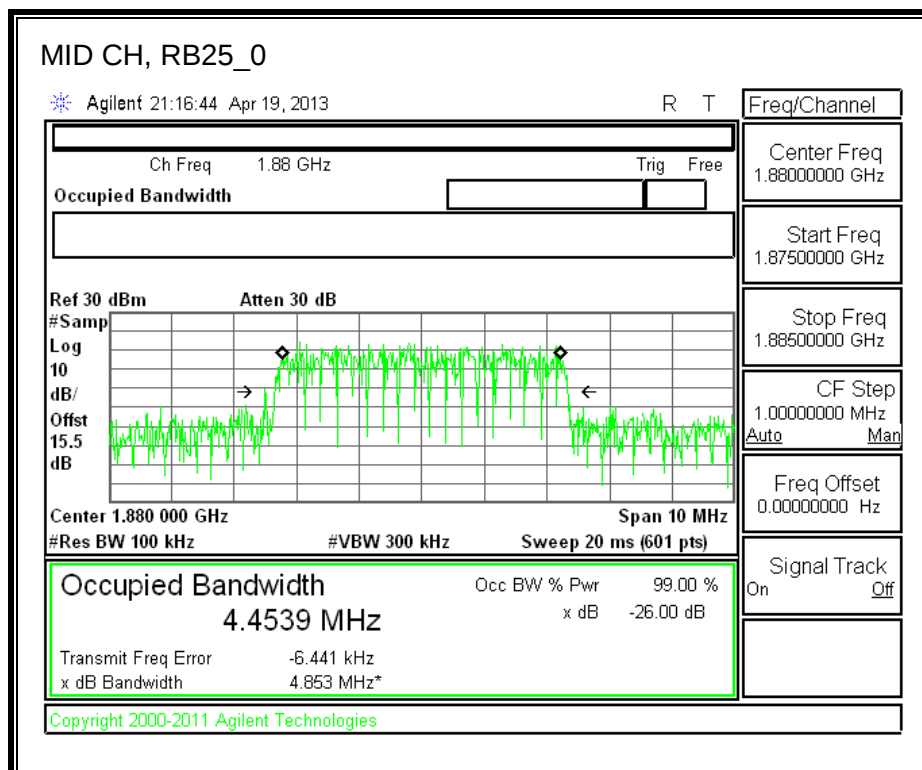
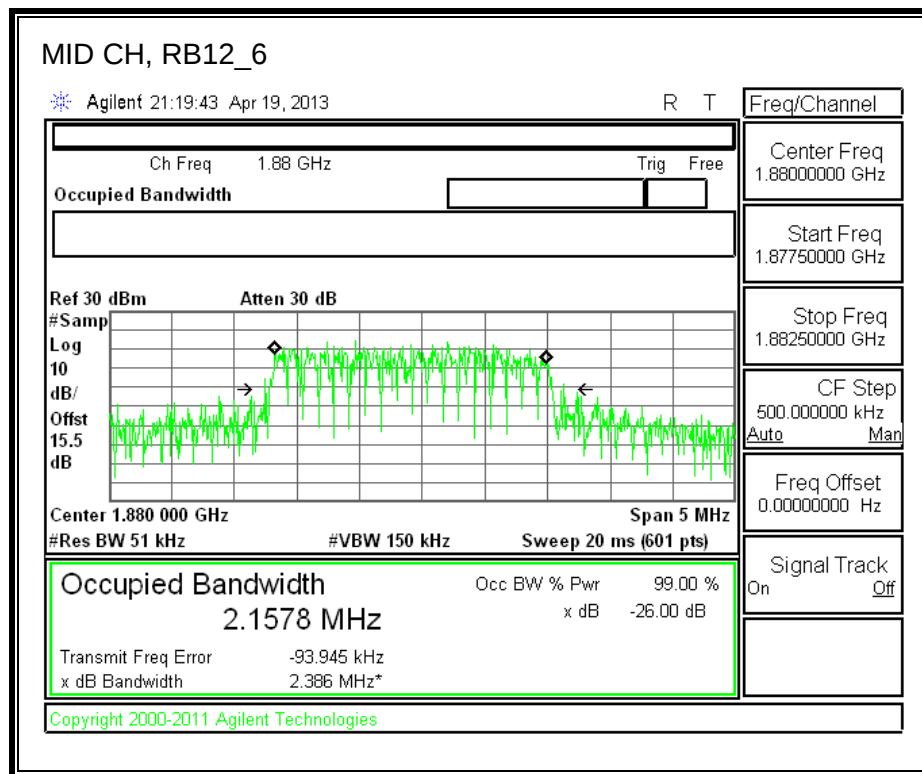


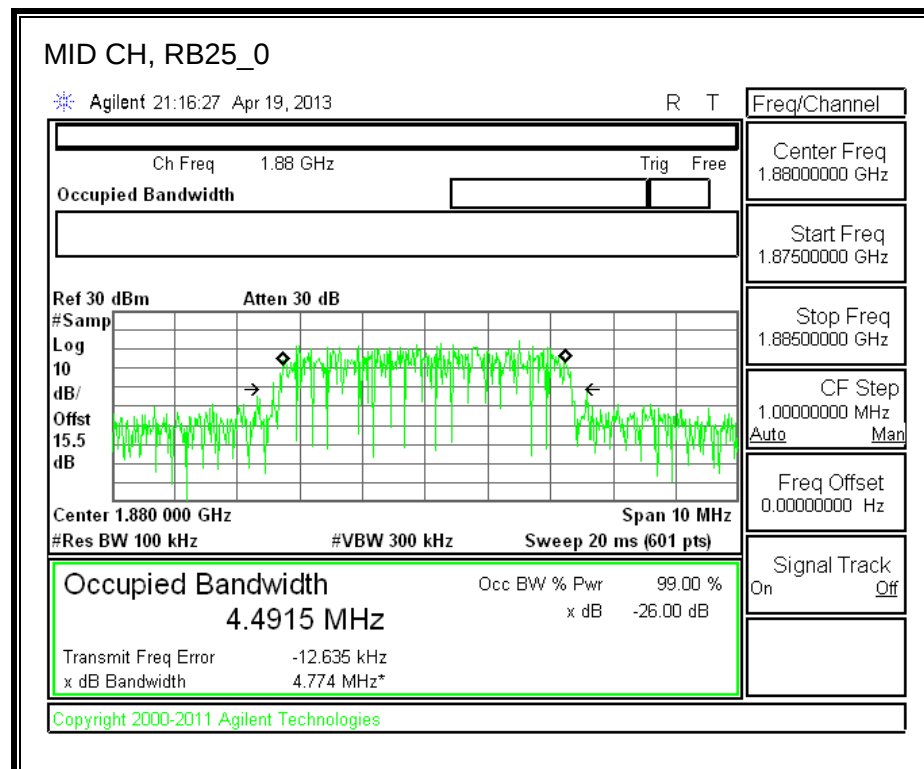
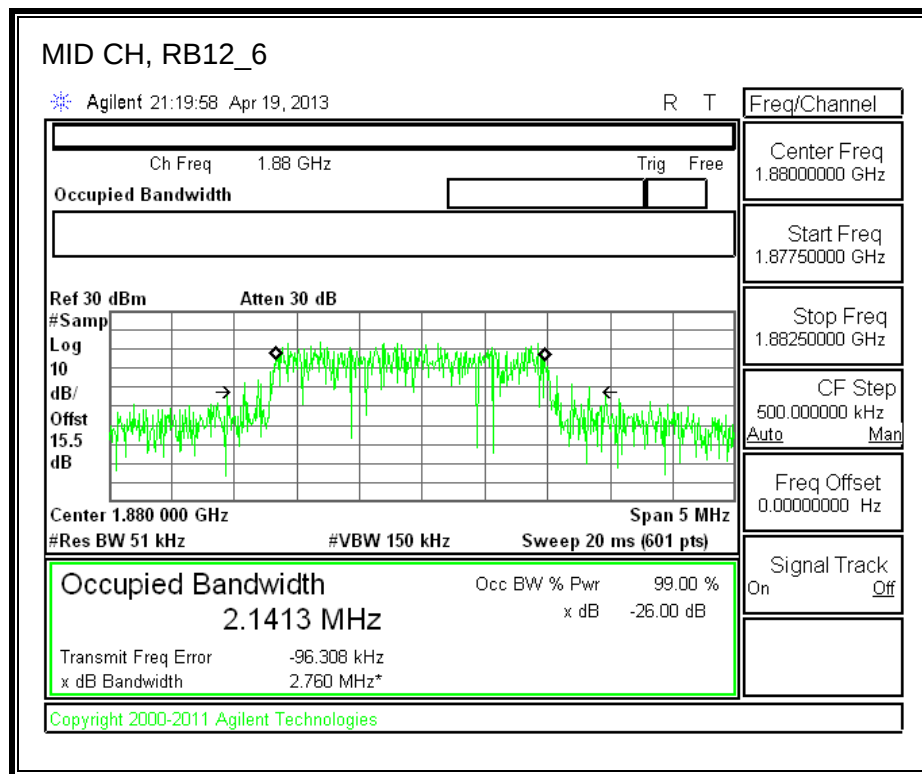
8.1.5. LTE BAND 2-5MHz BNADWIDTH

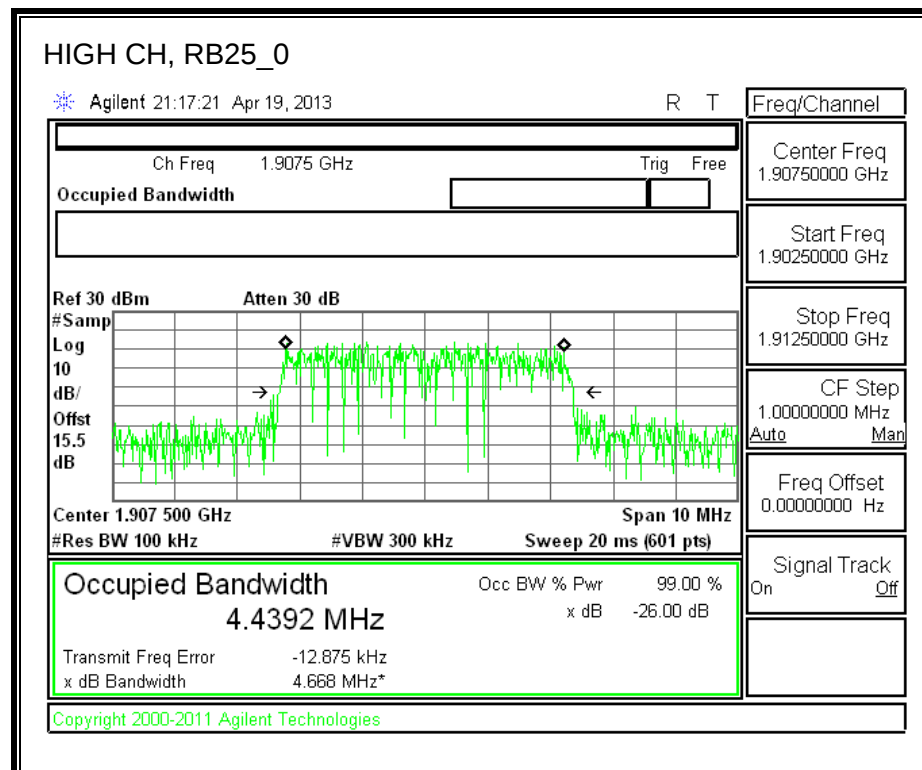
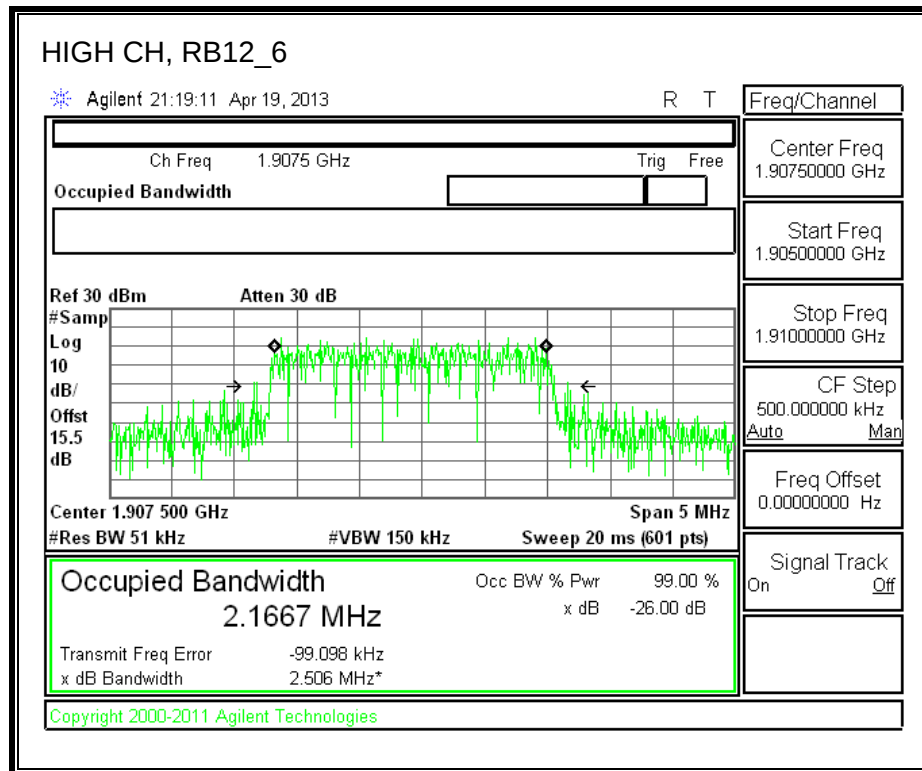
LOW-QPSK



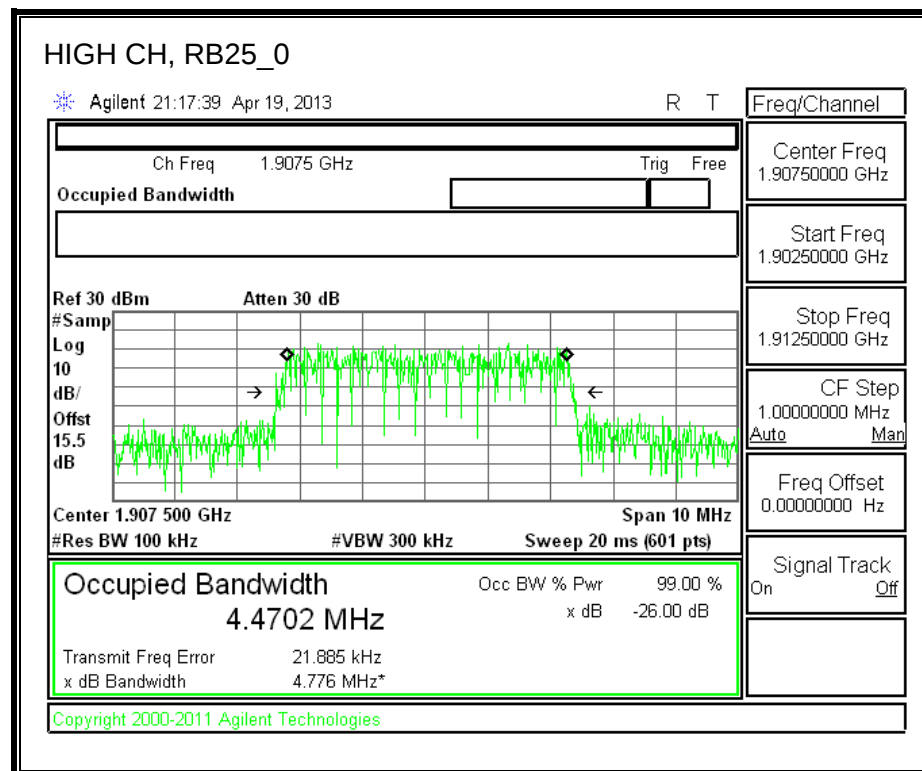
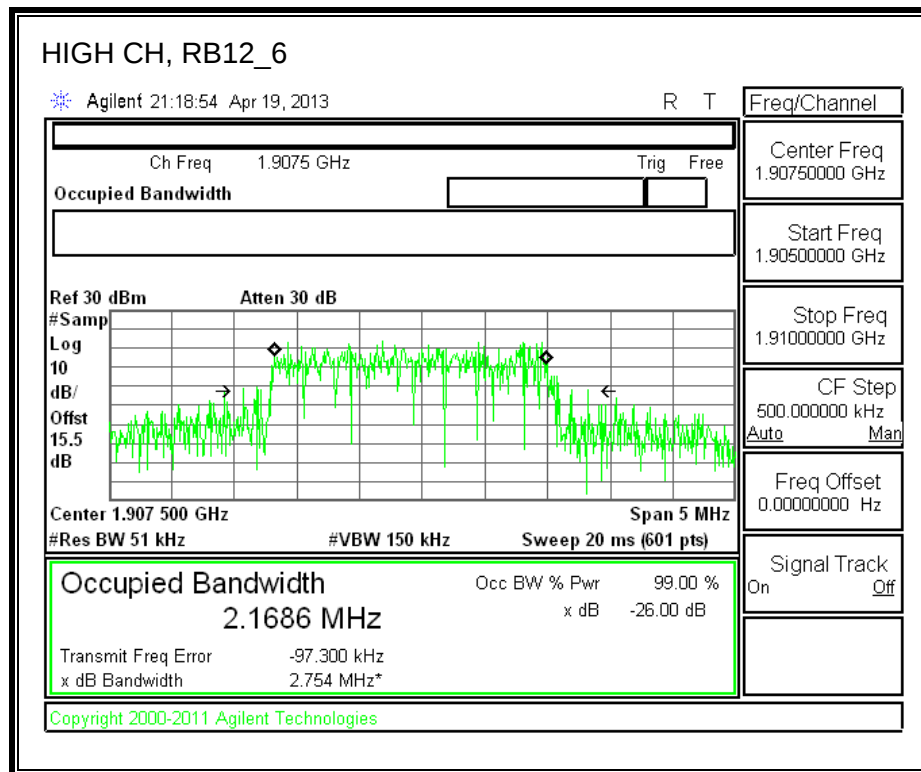






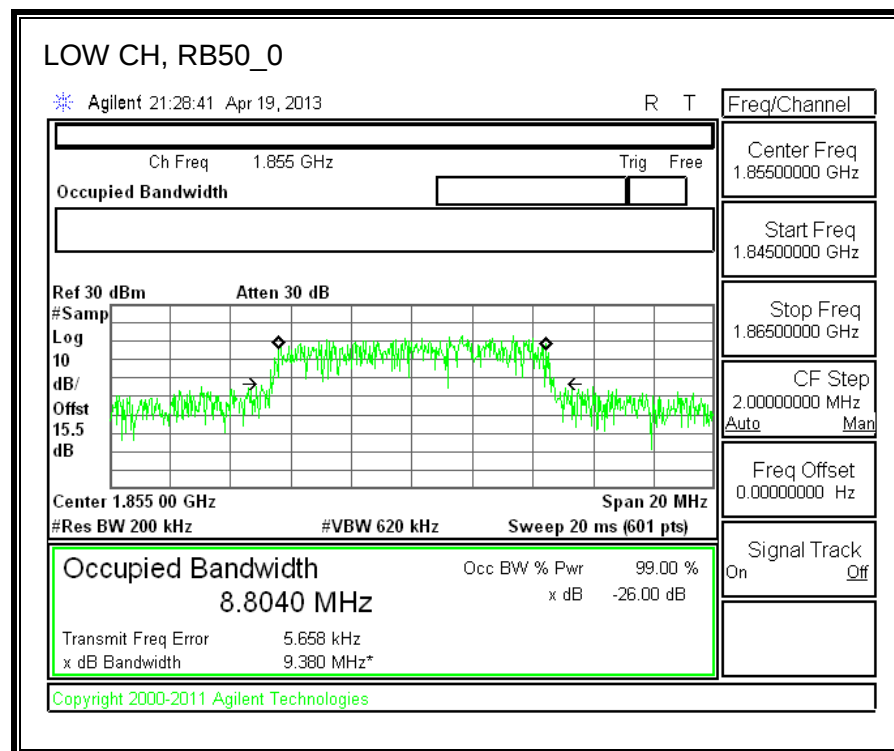
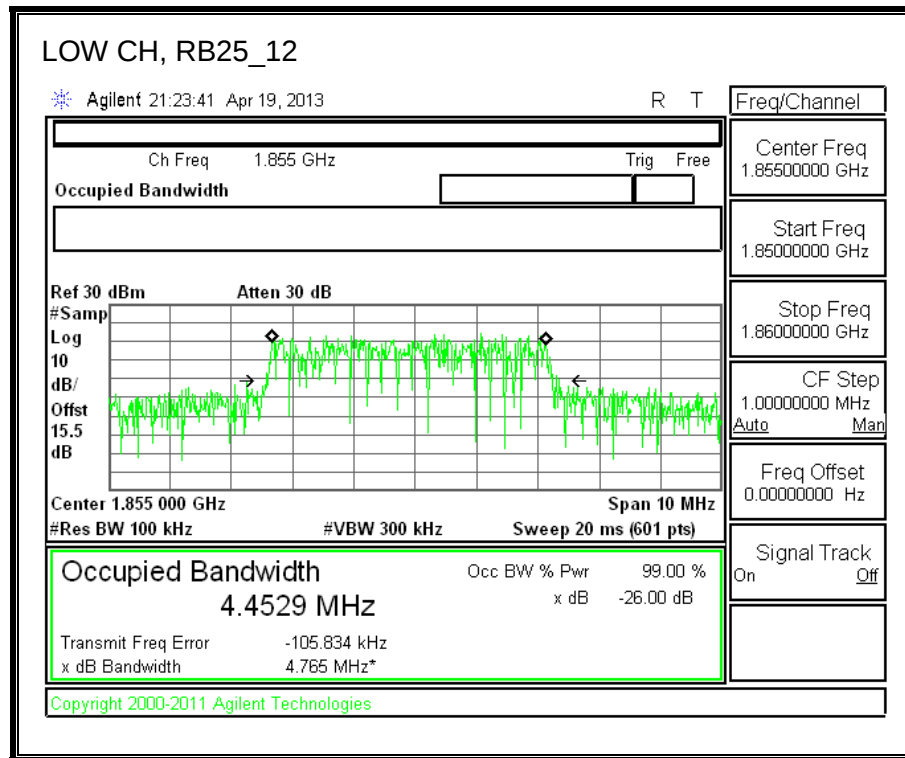


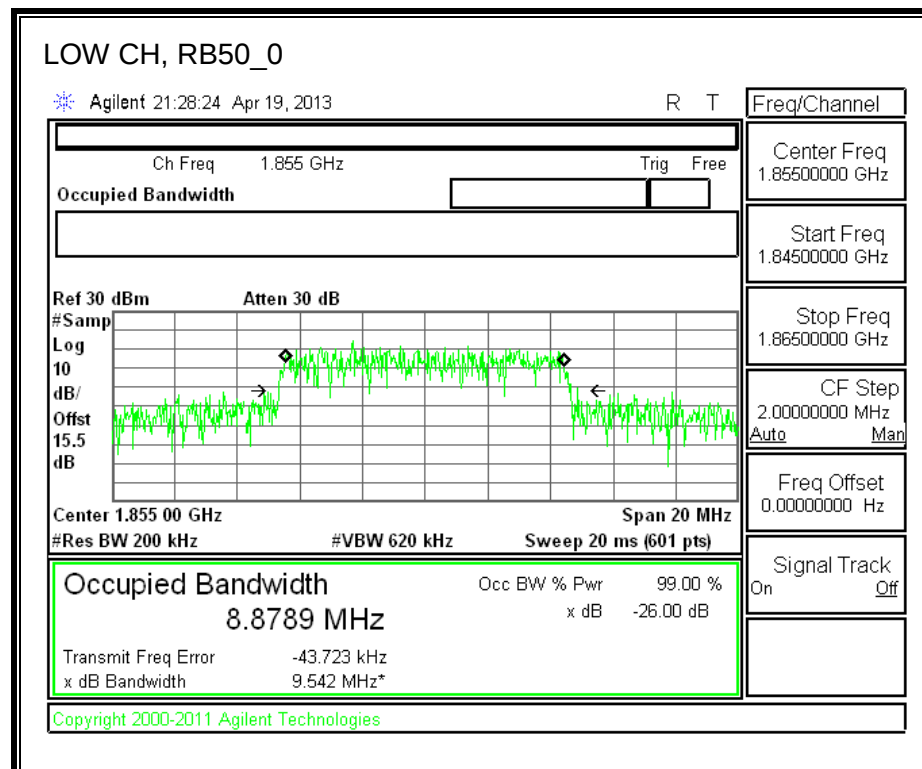
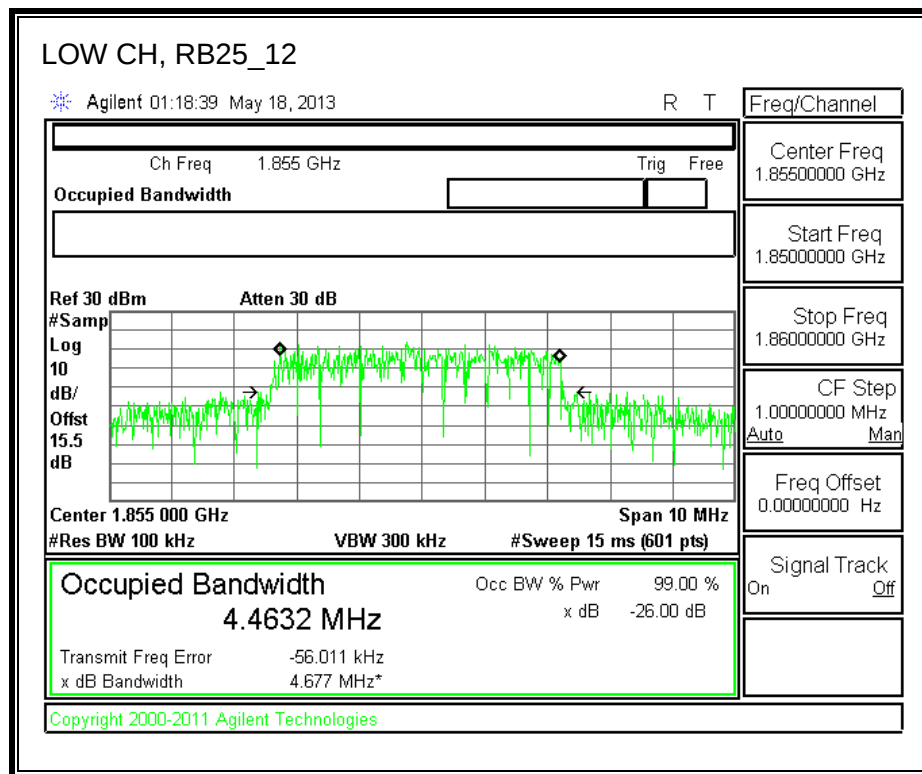
HIGH-16QAM



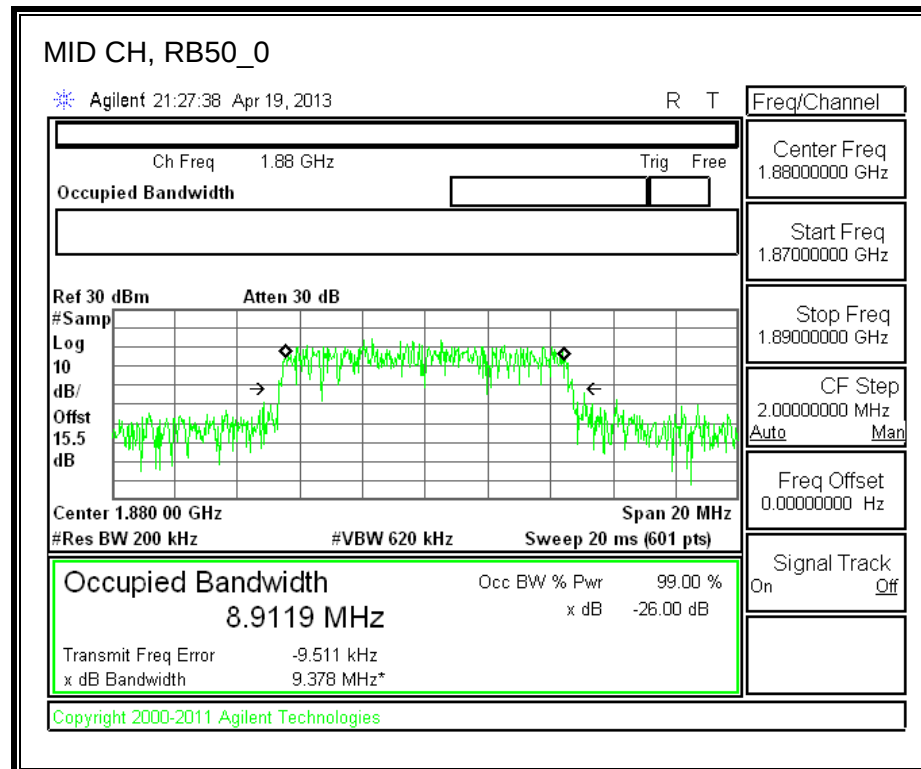
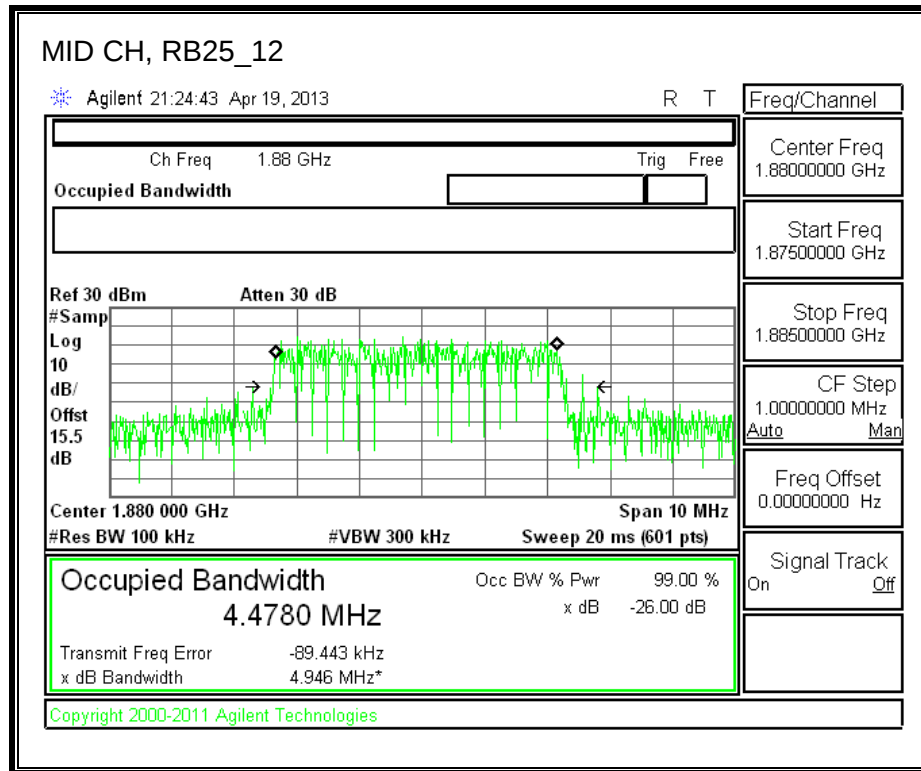
8.1.6. LTE BAND 2-10MHz BANDWIDTH

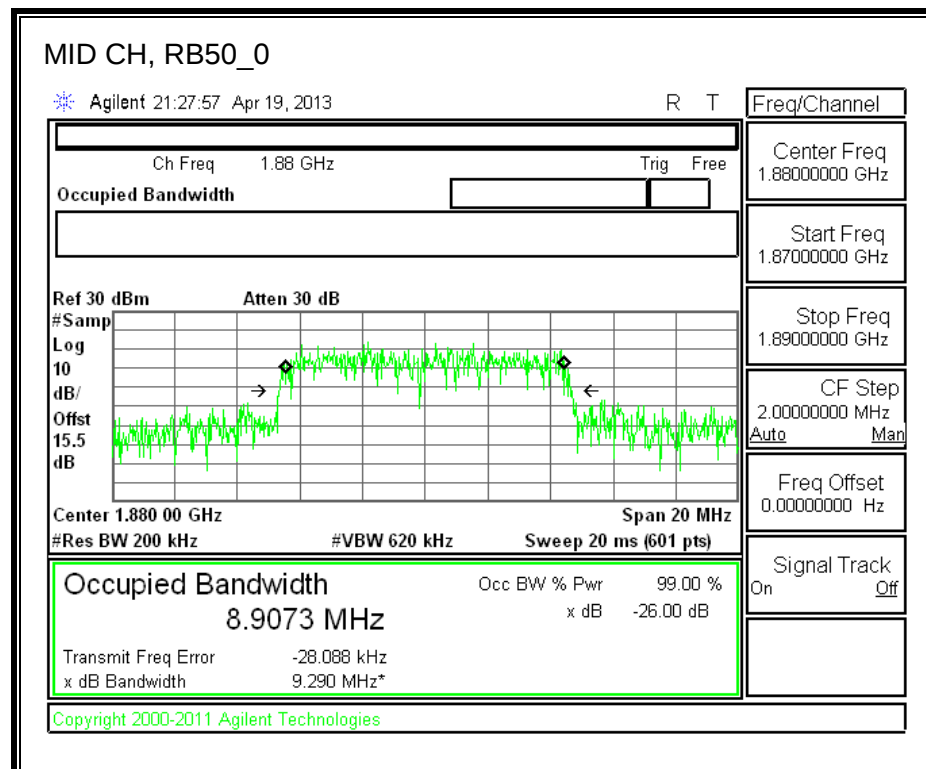
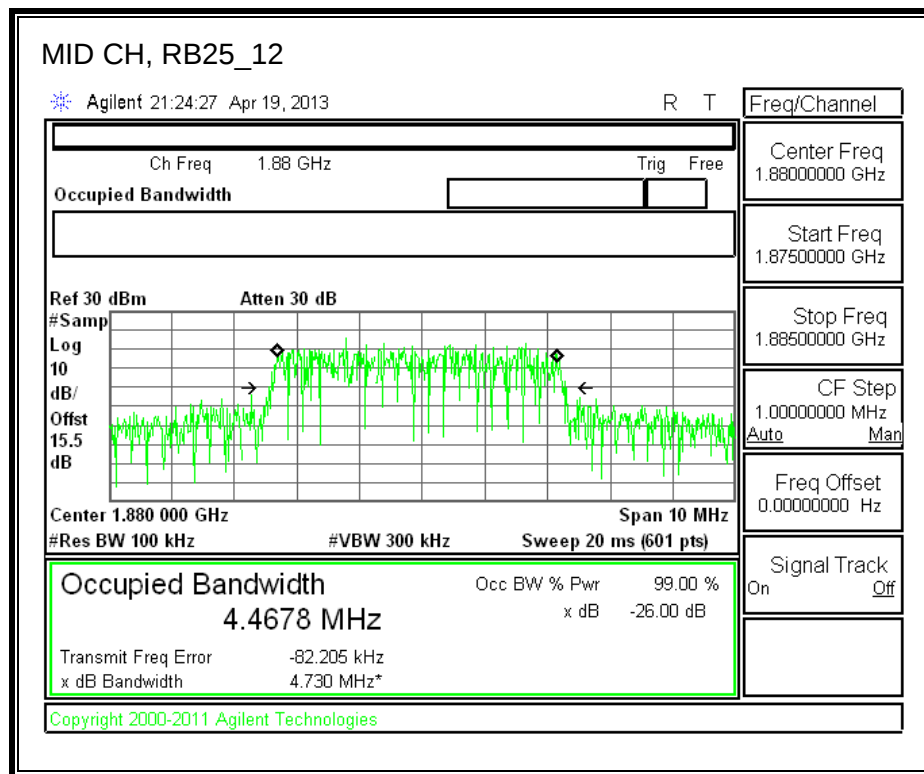
LOW-QPSK



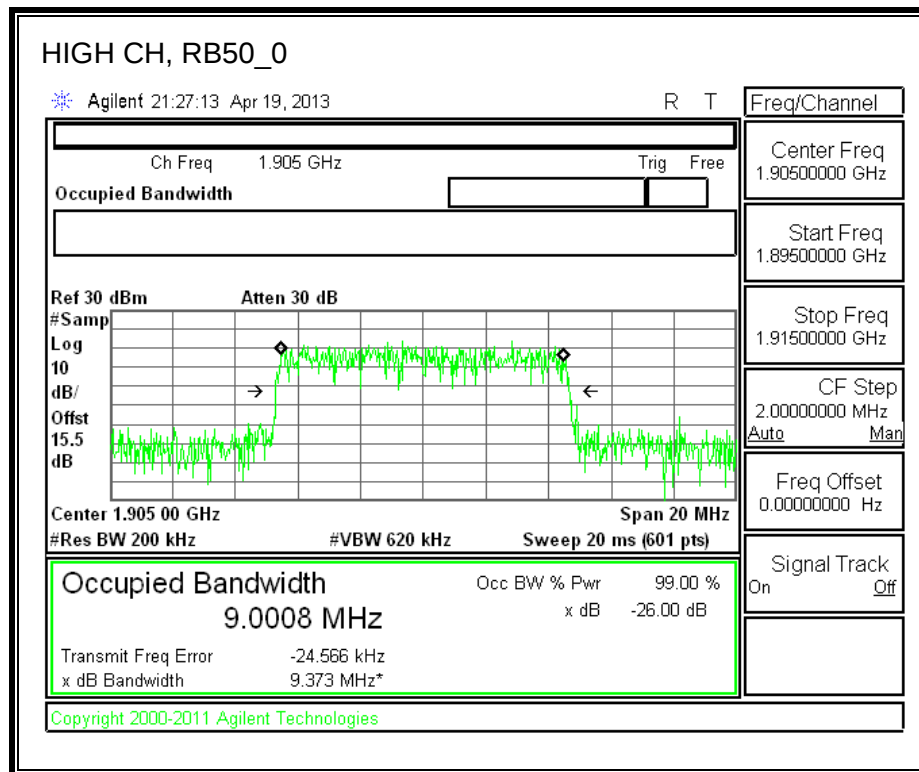
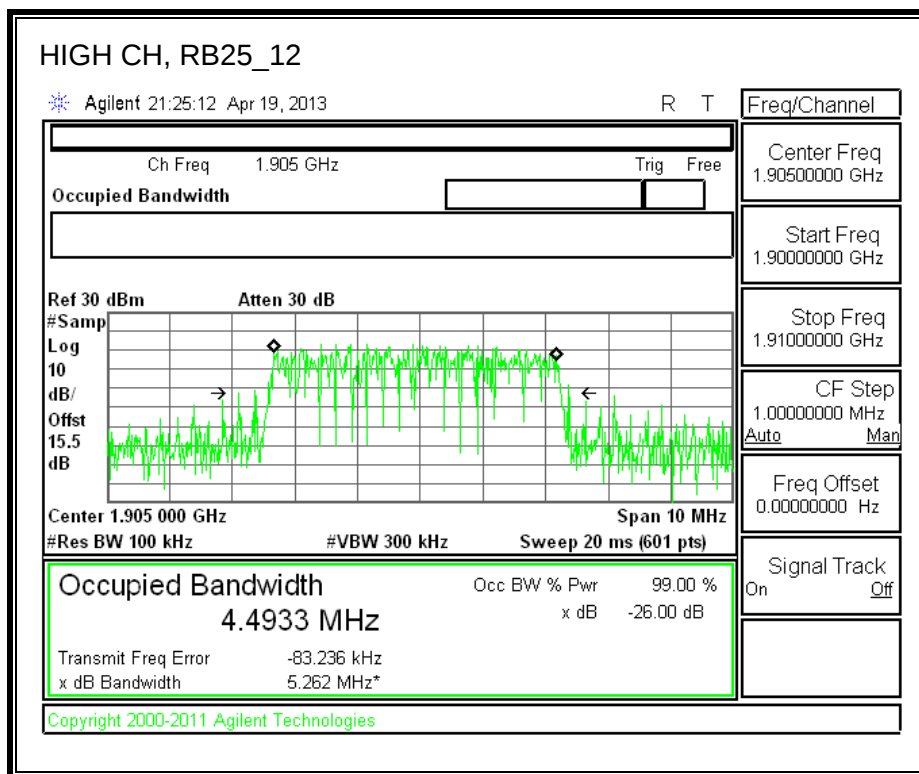


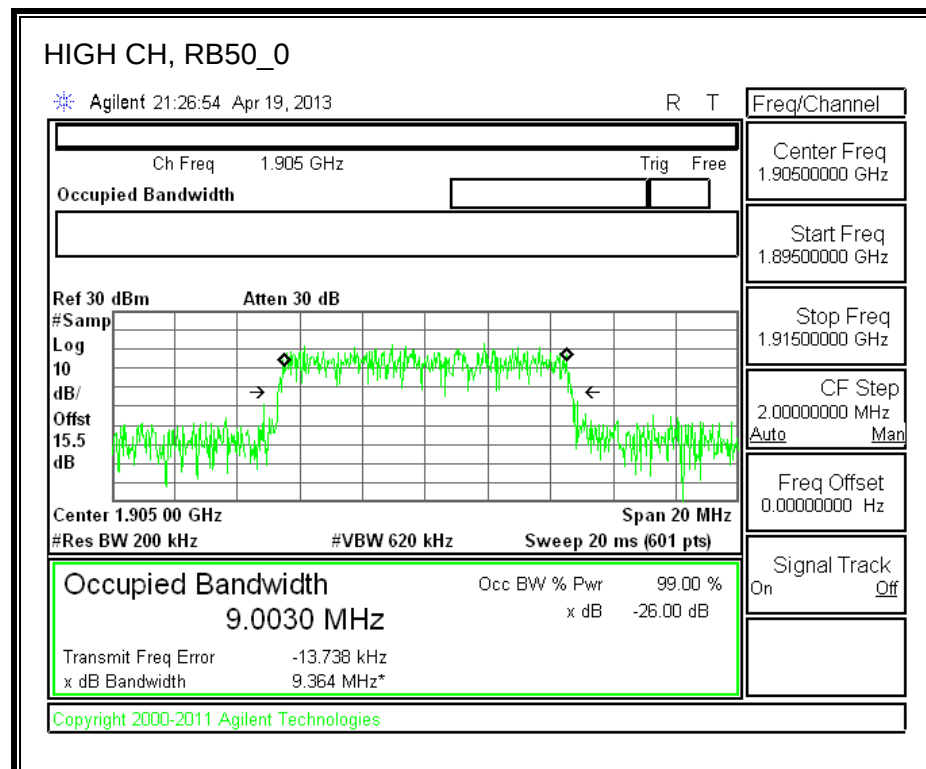
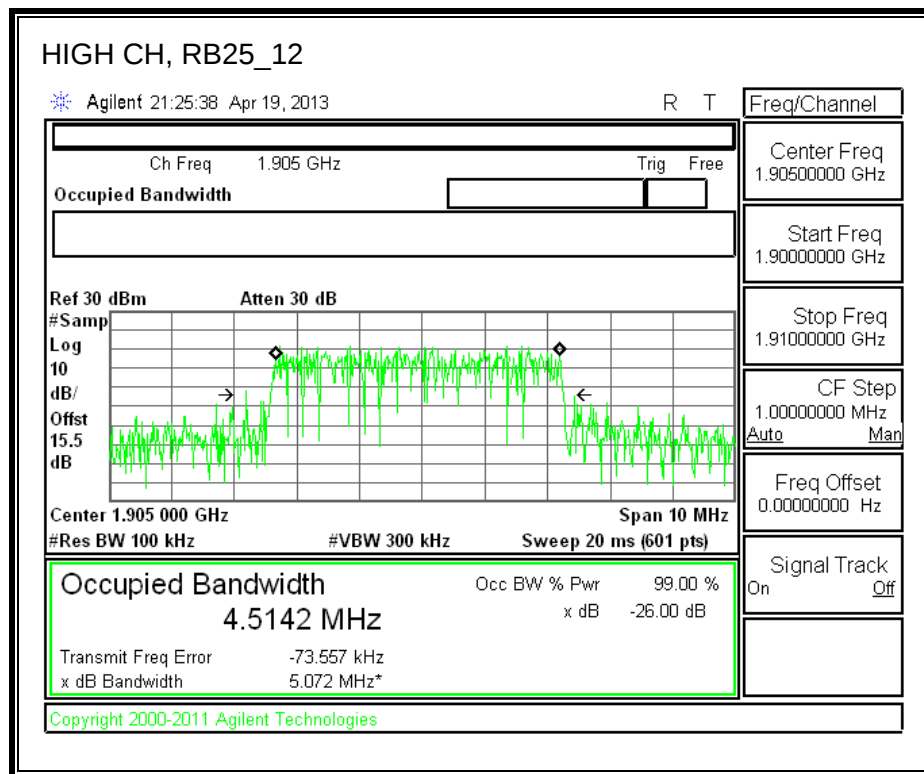
MID-QPSK





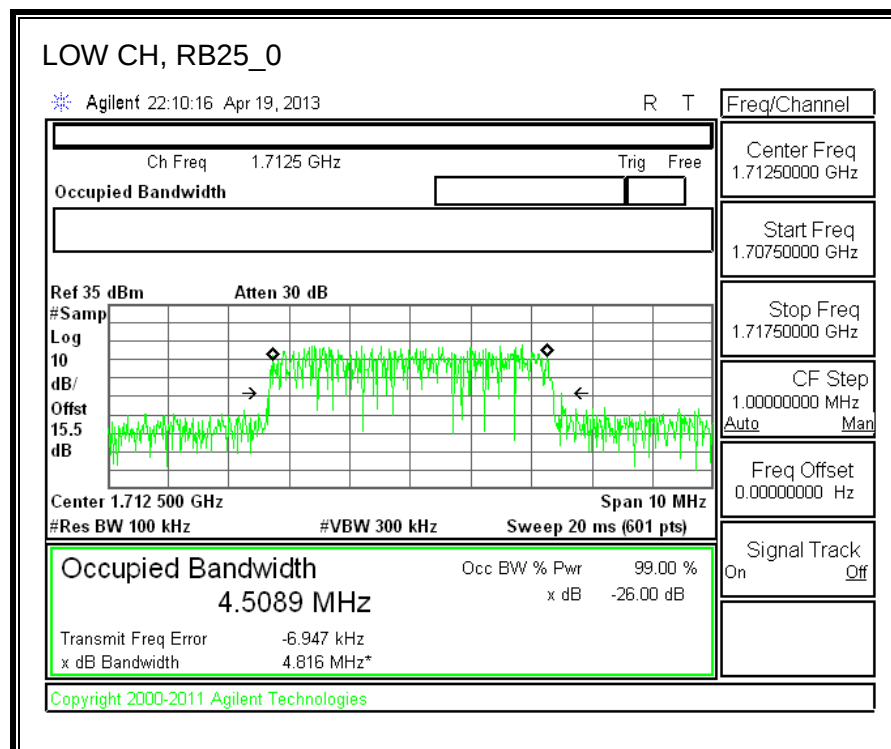
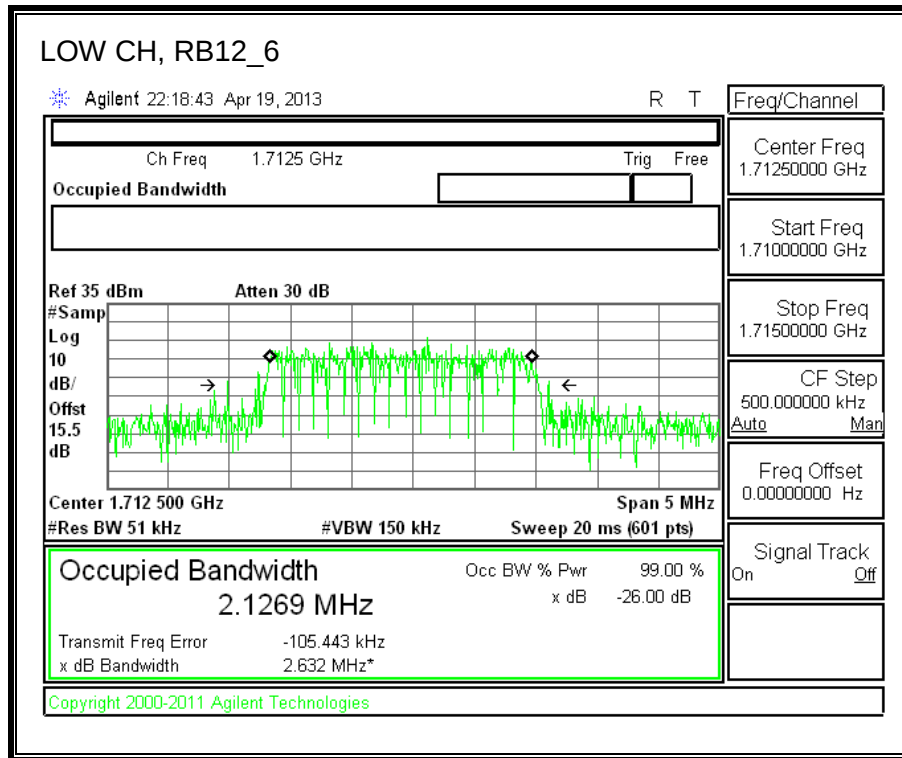
HIGH-QPSK

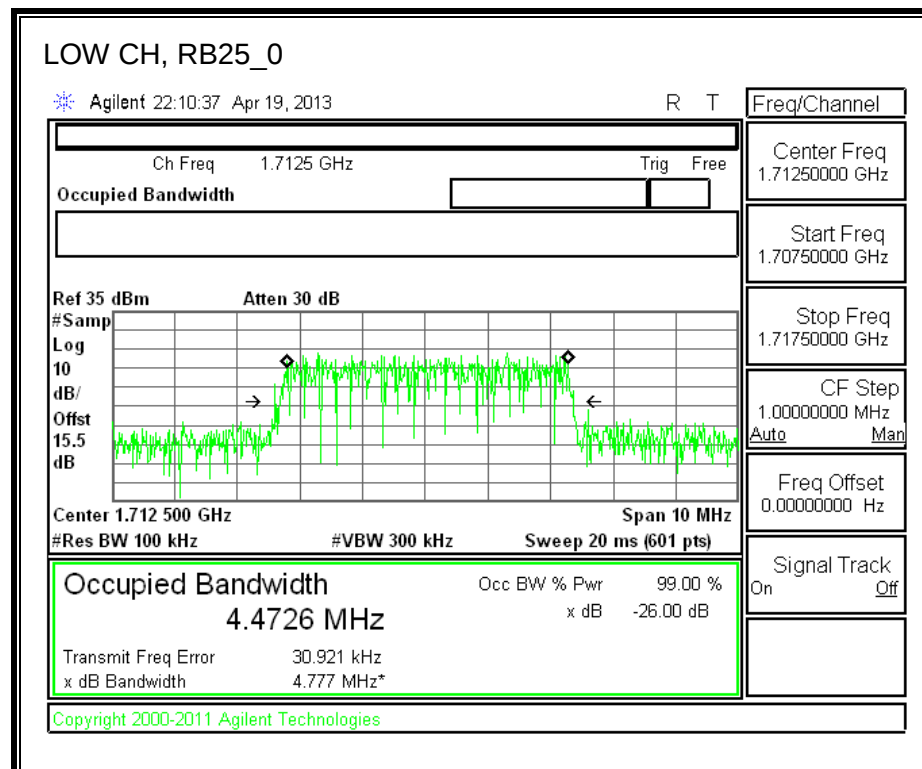
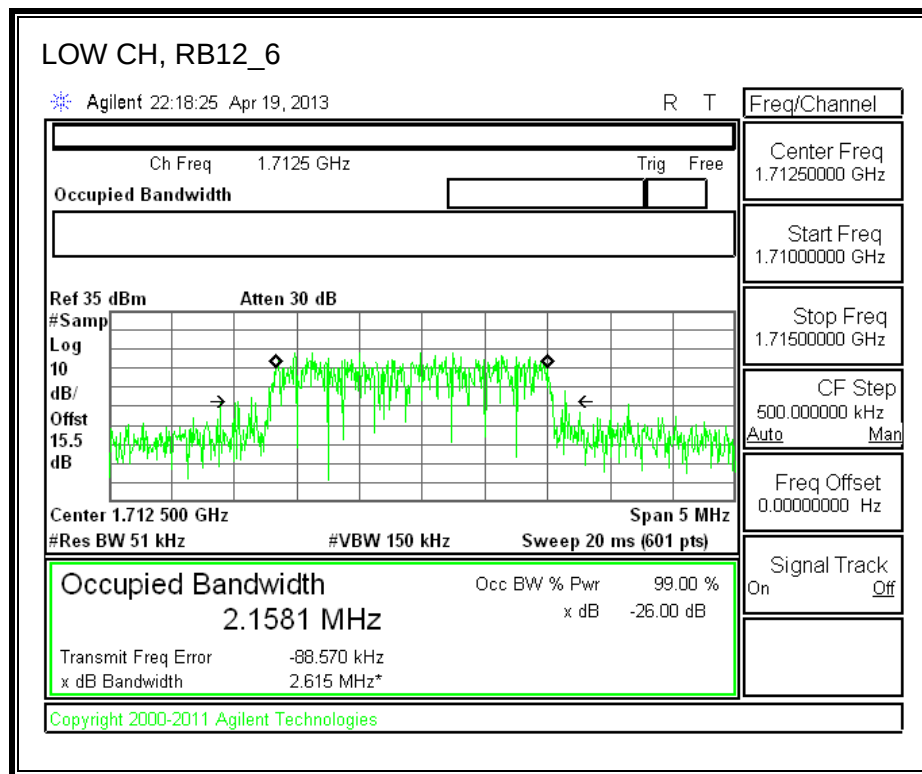




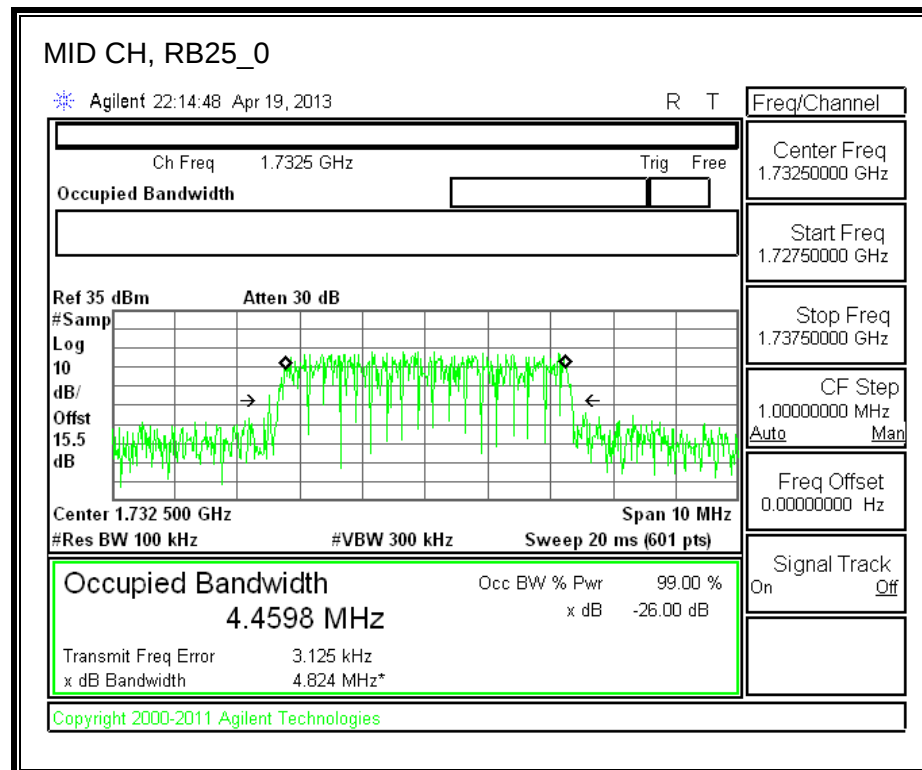
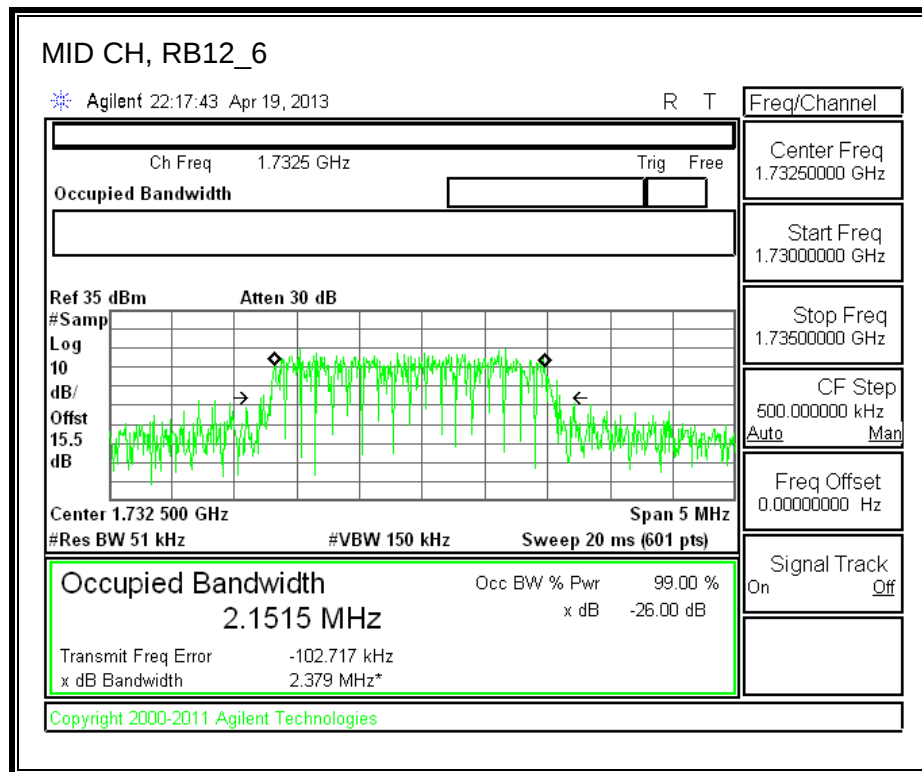
8.1.7. LTE BAND 4-5MHz BANDWIDTH

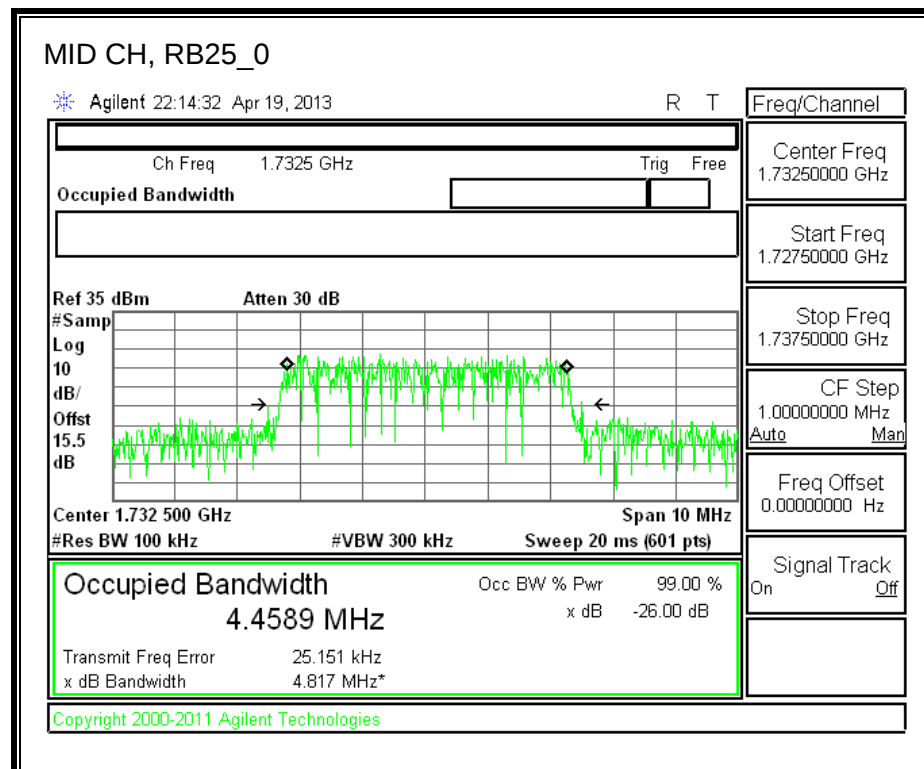
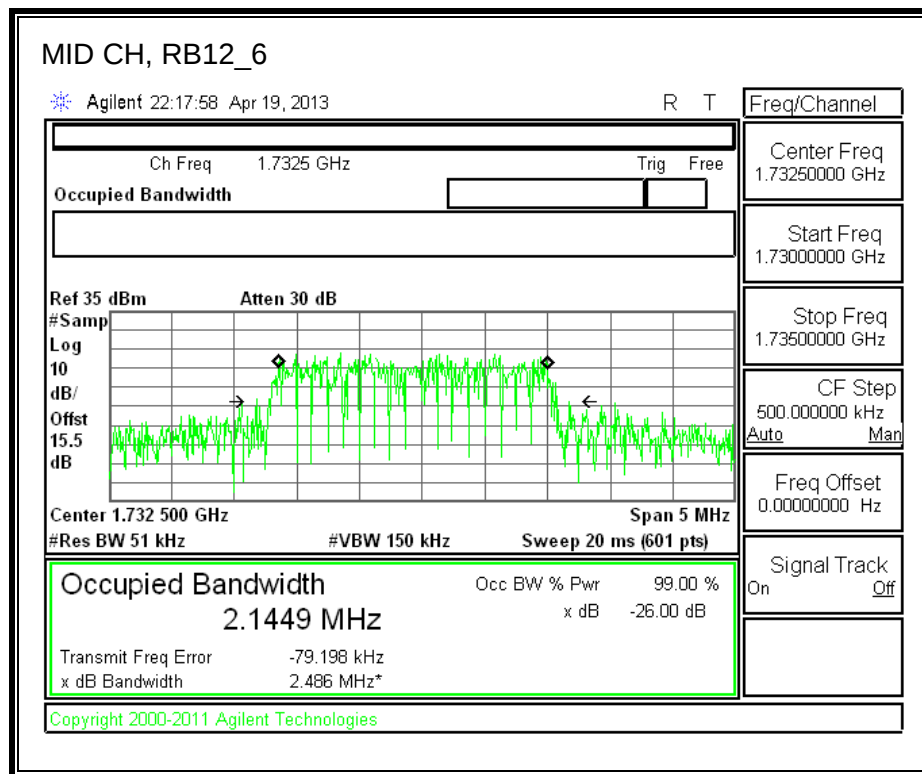
LOW-QPSK



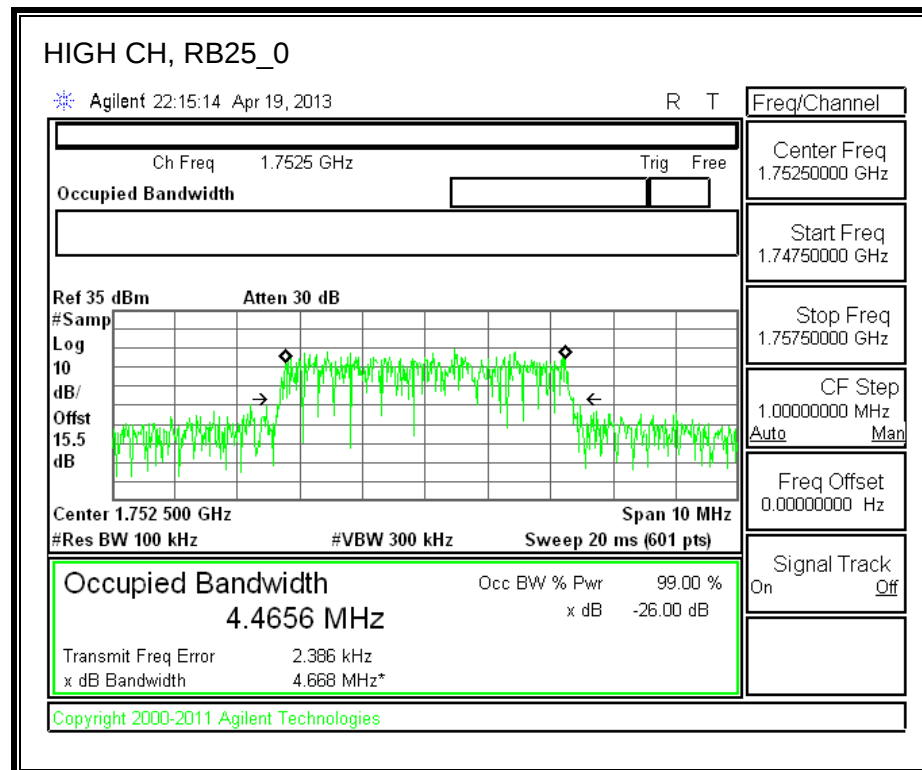
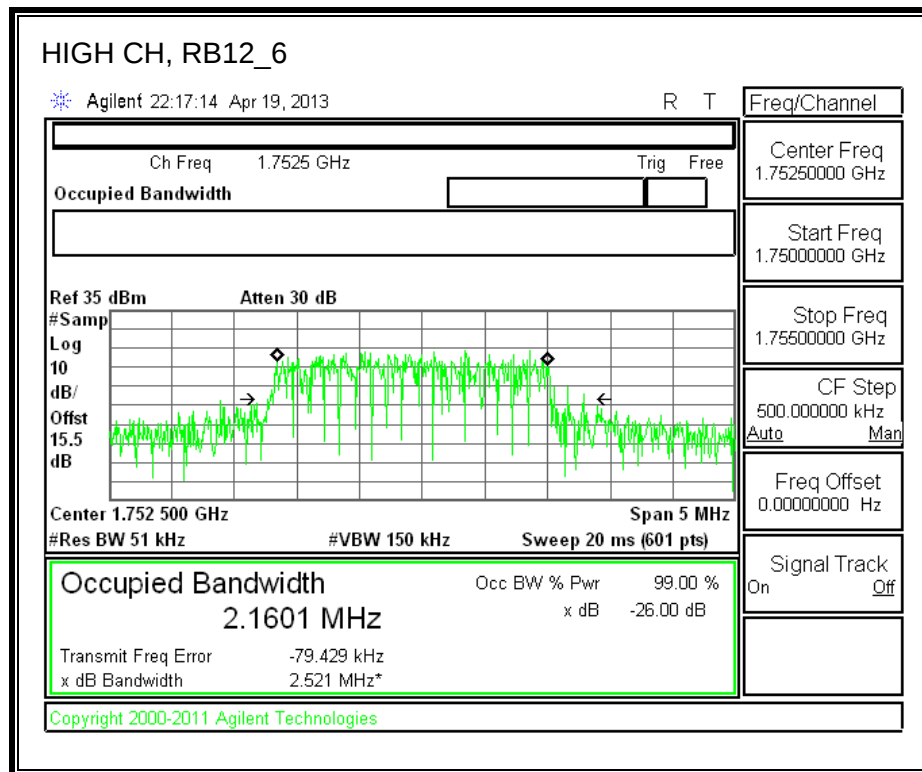


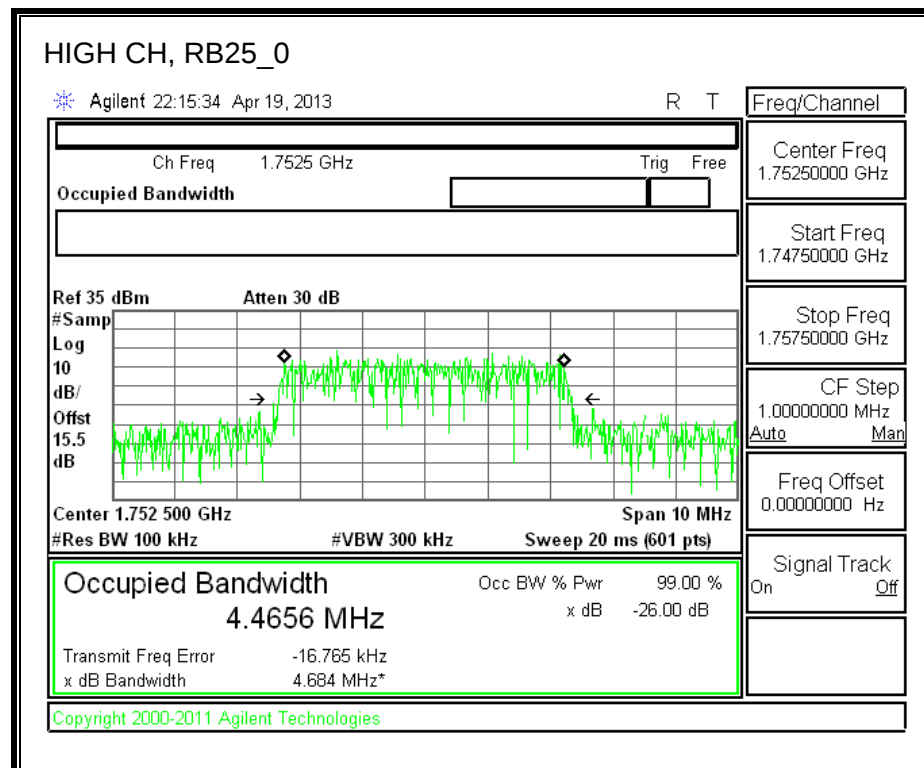
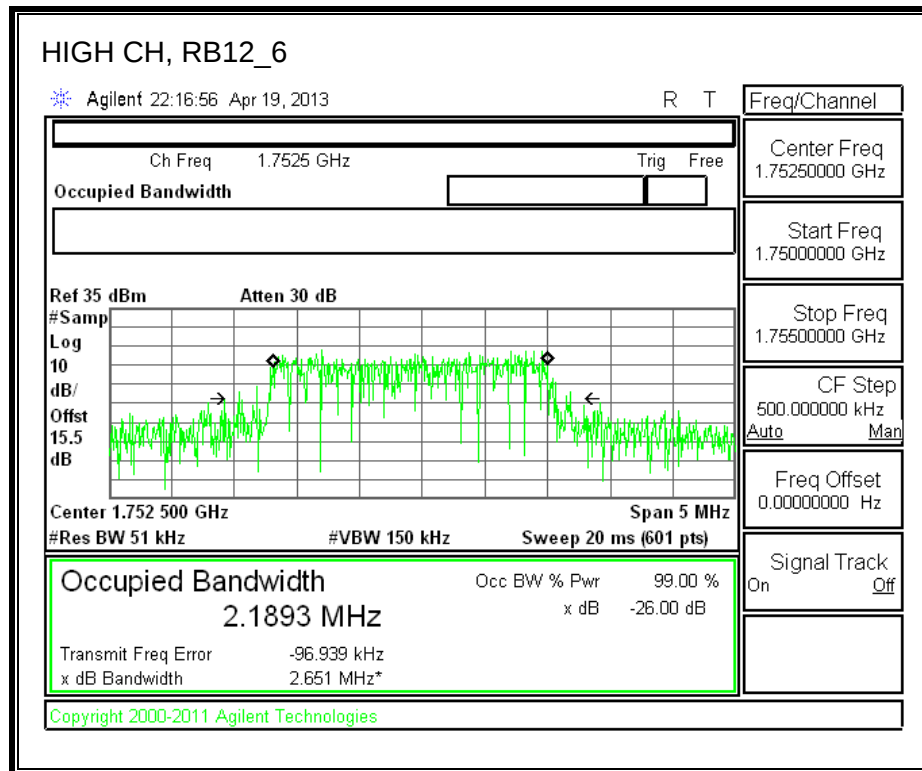
MID-QPSK





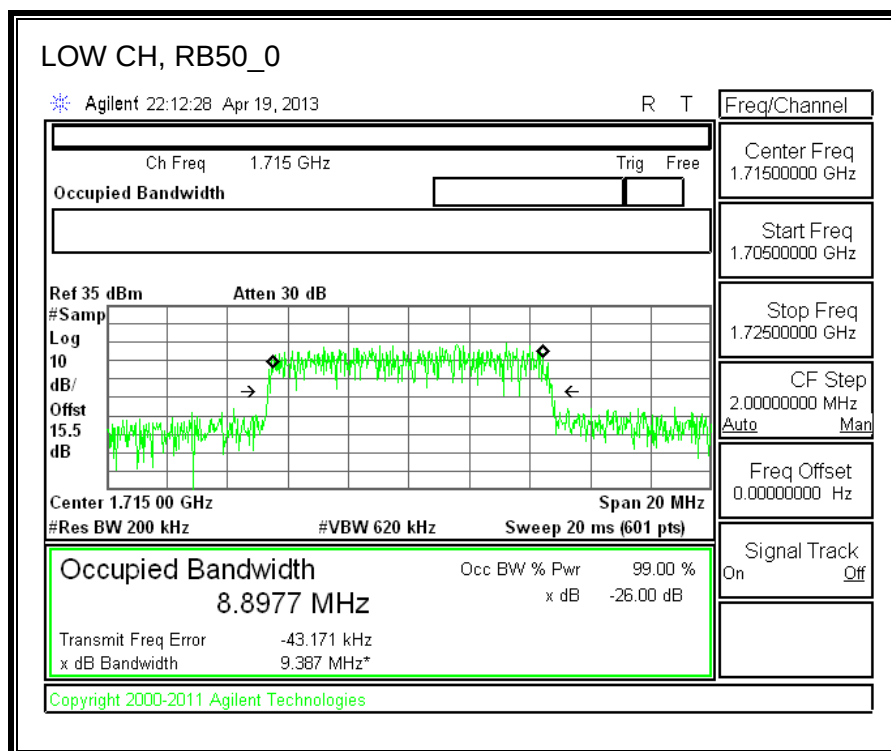
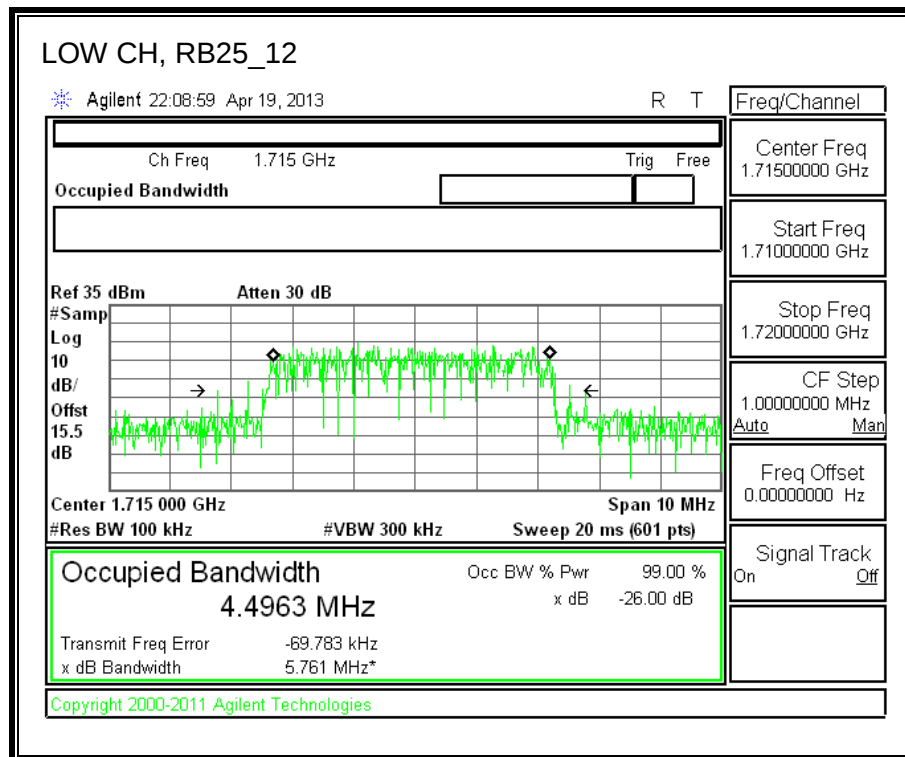
HIGH-QPSK

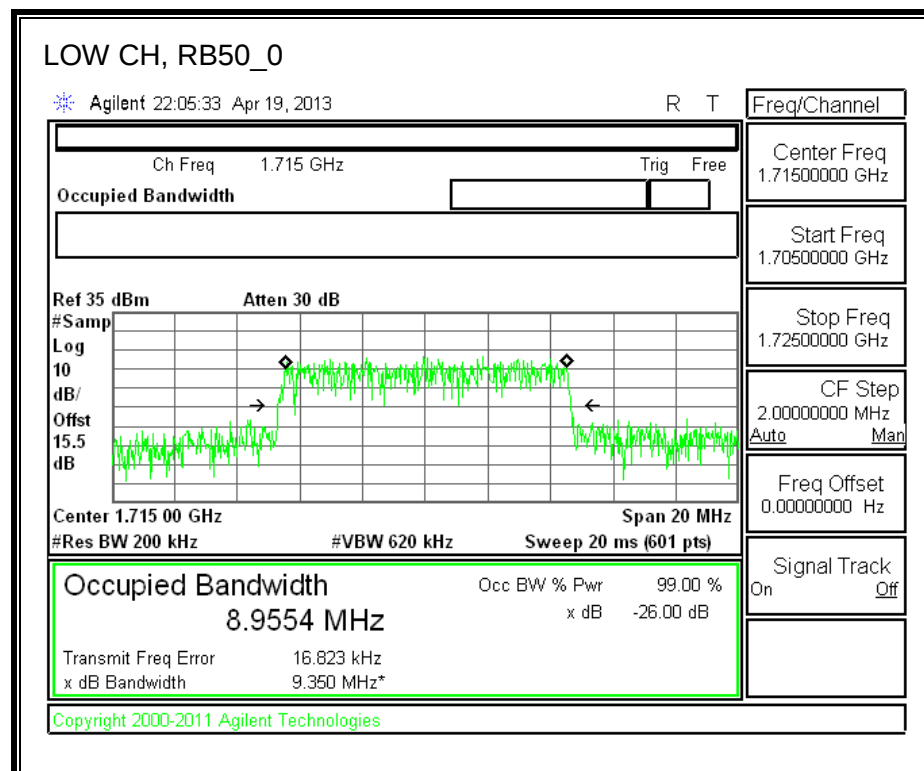
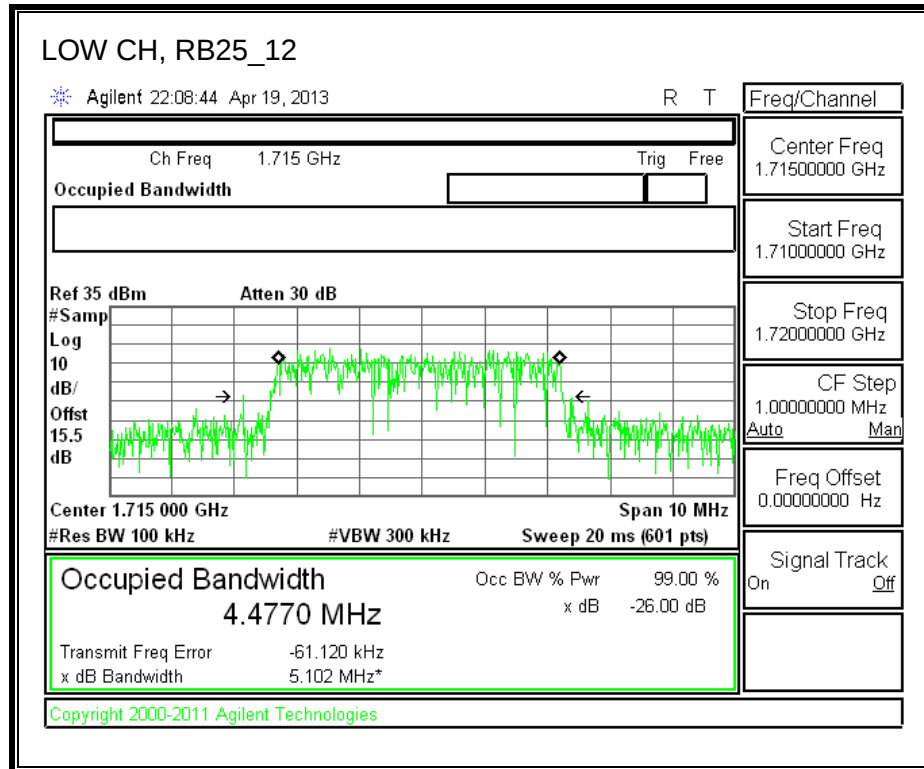




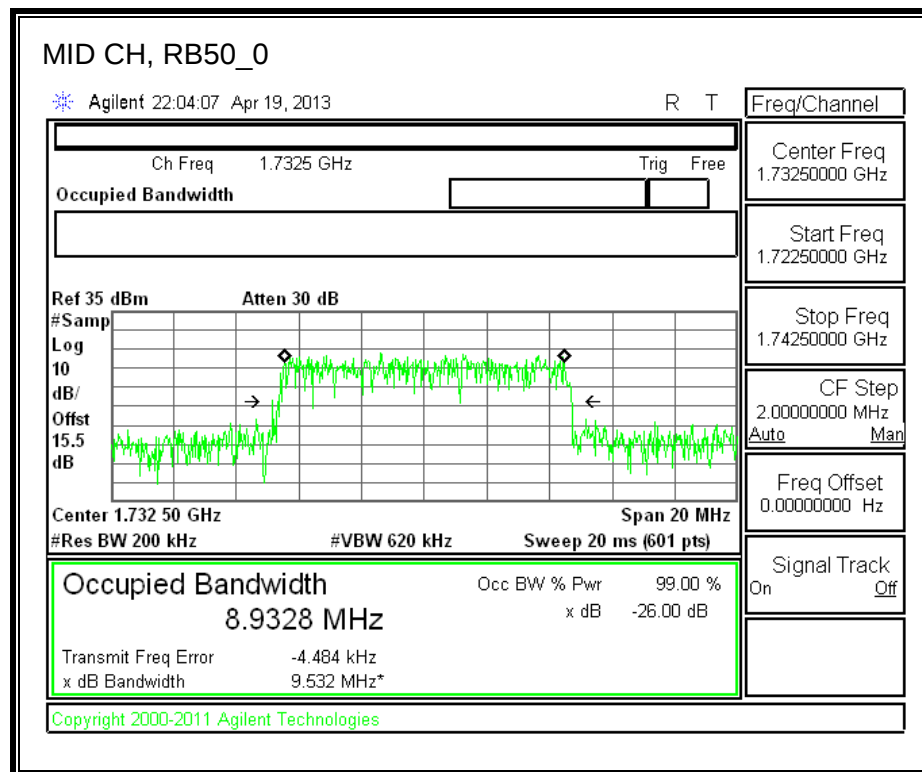
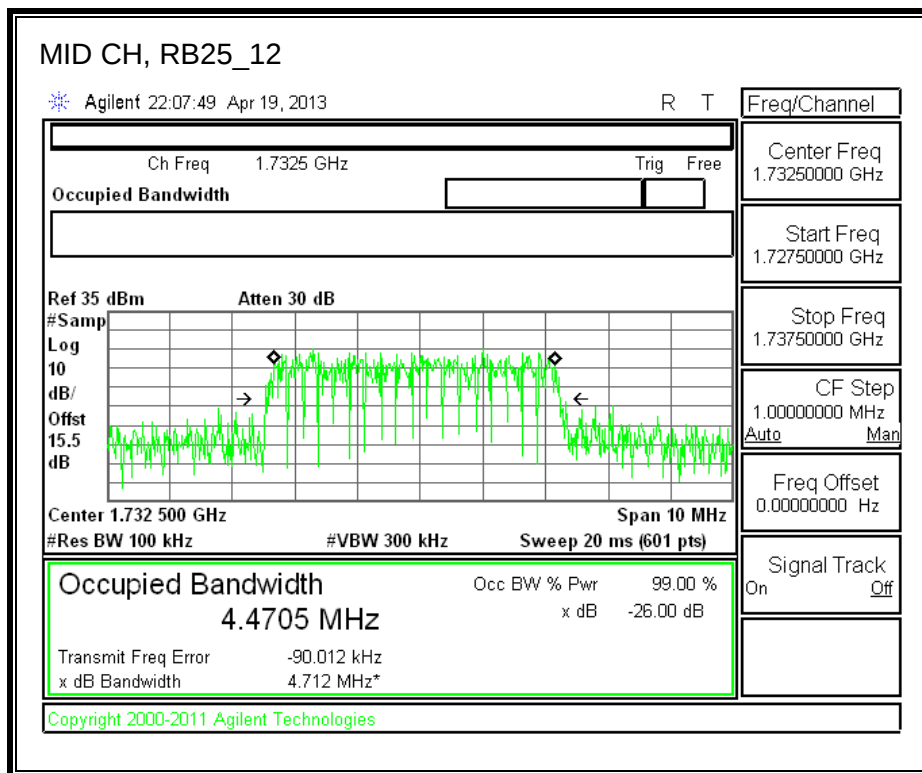
8.1.8. LTE BAND 4-10MHz BANDWIDTH

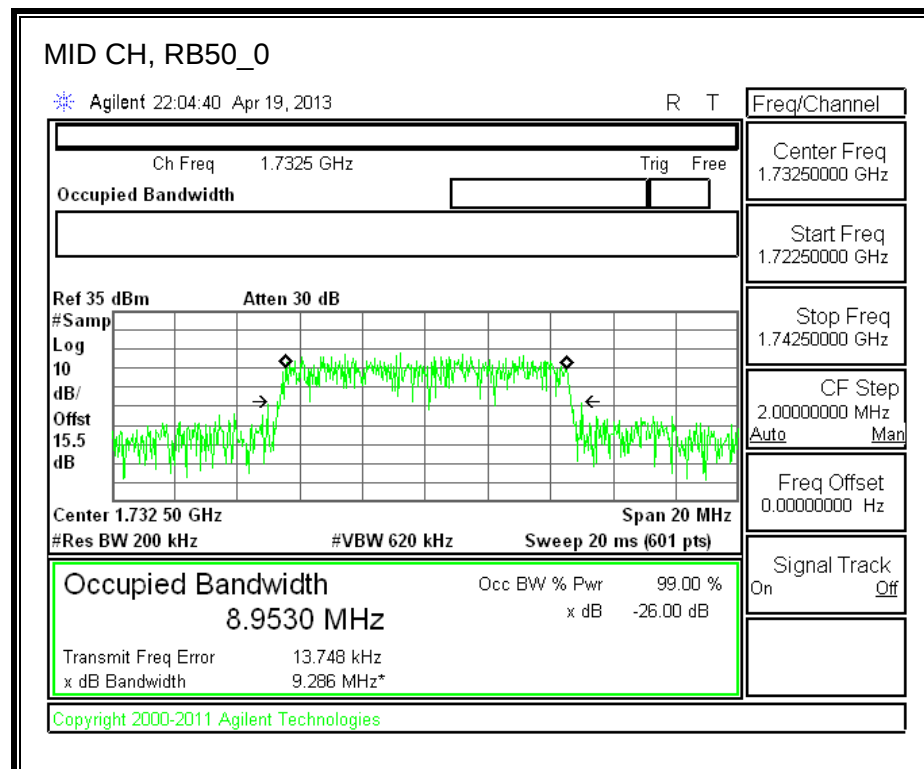
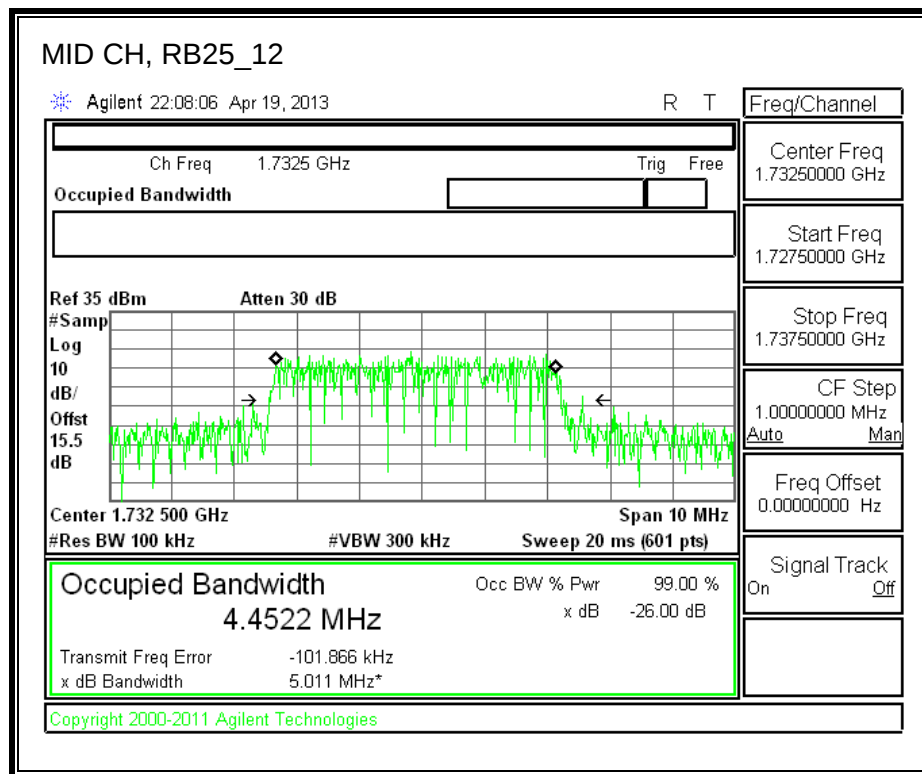
LOW-QPSK



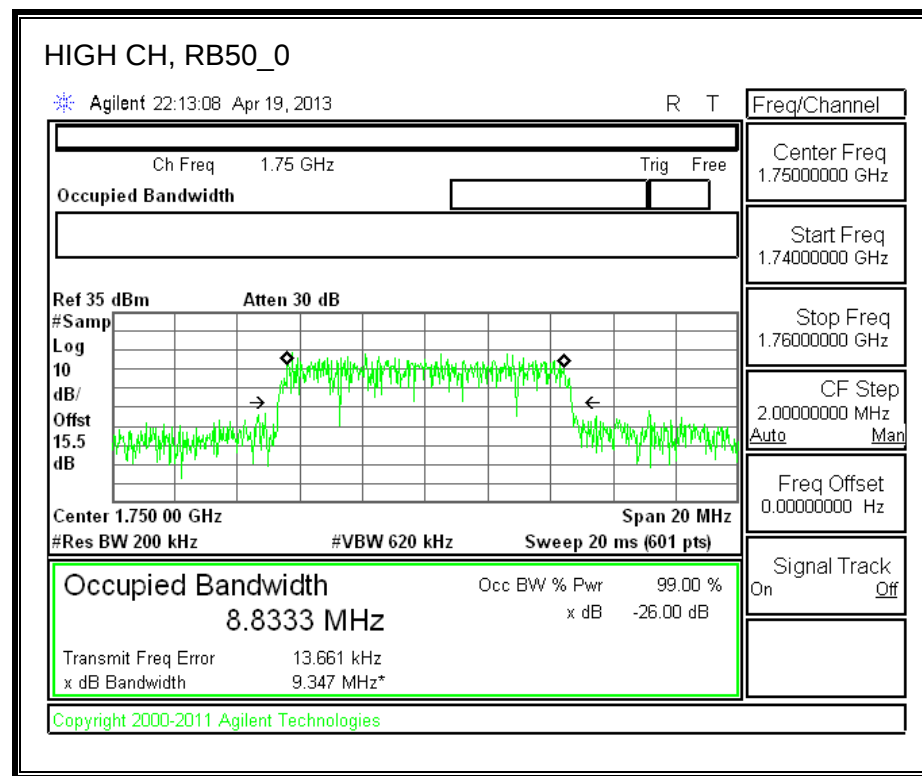
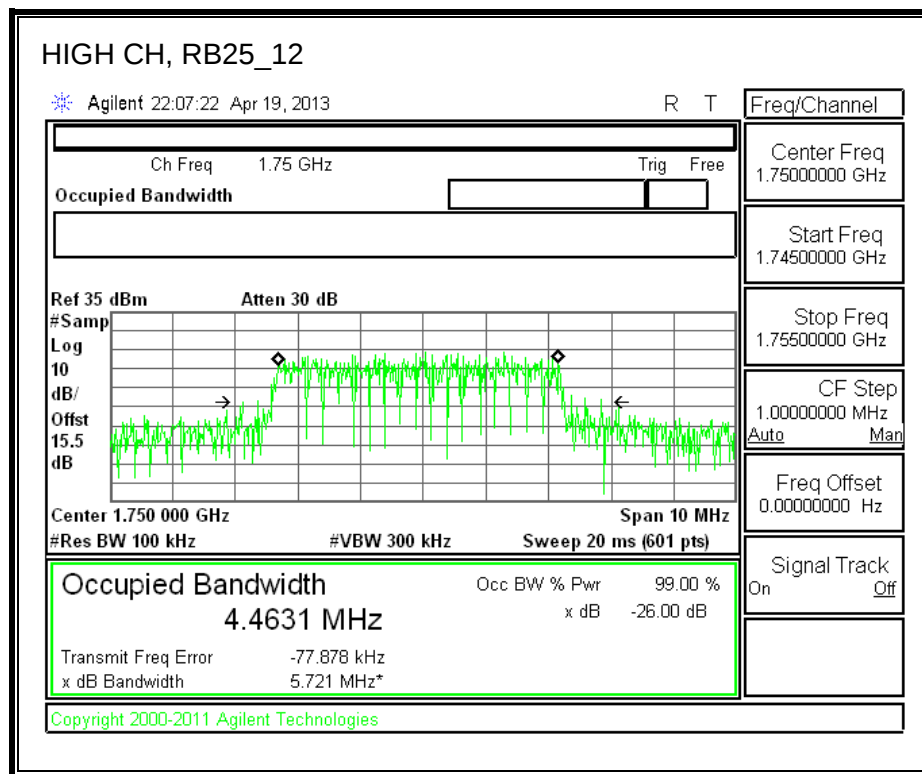


MID-QPSK

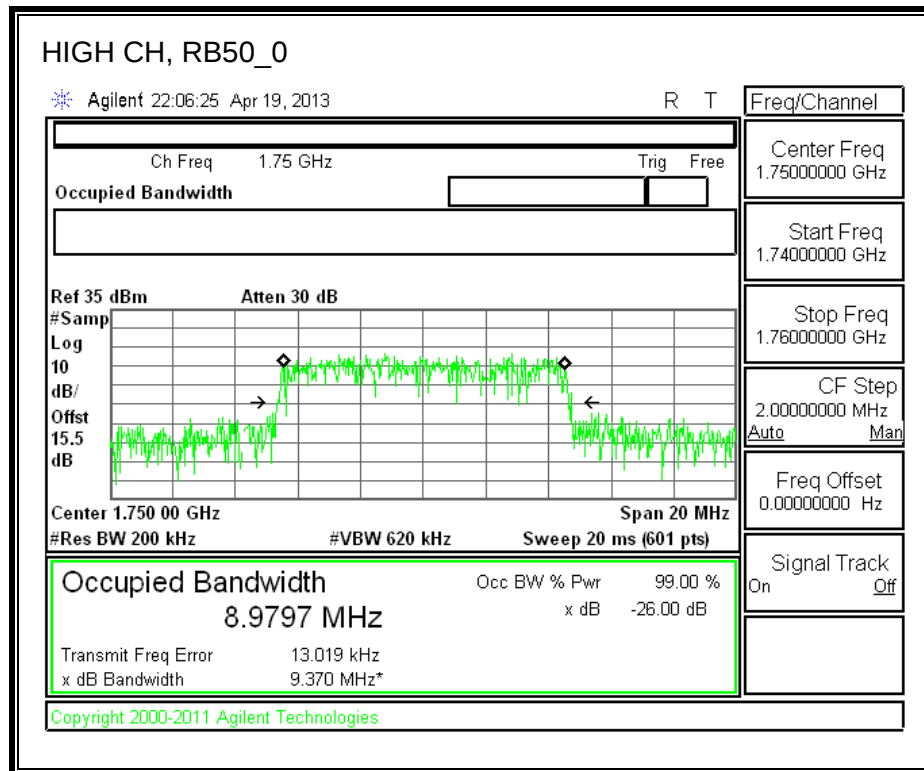
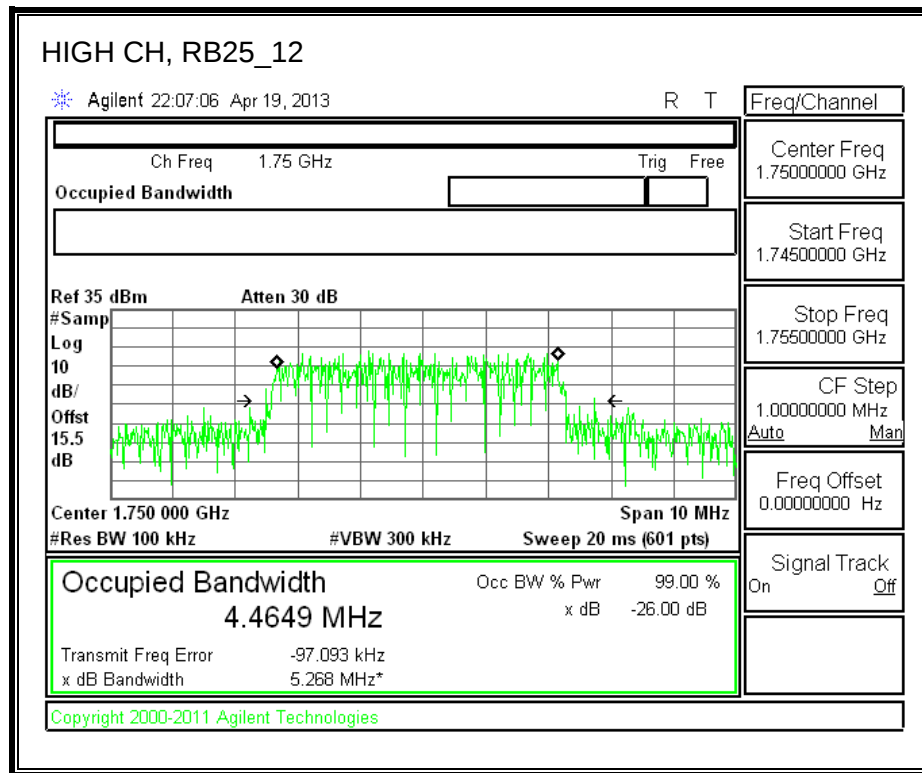




HIGH-QPSK

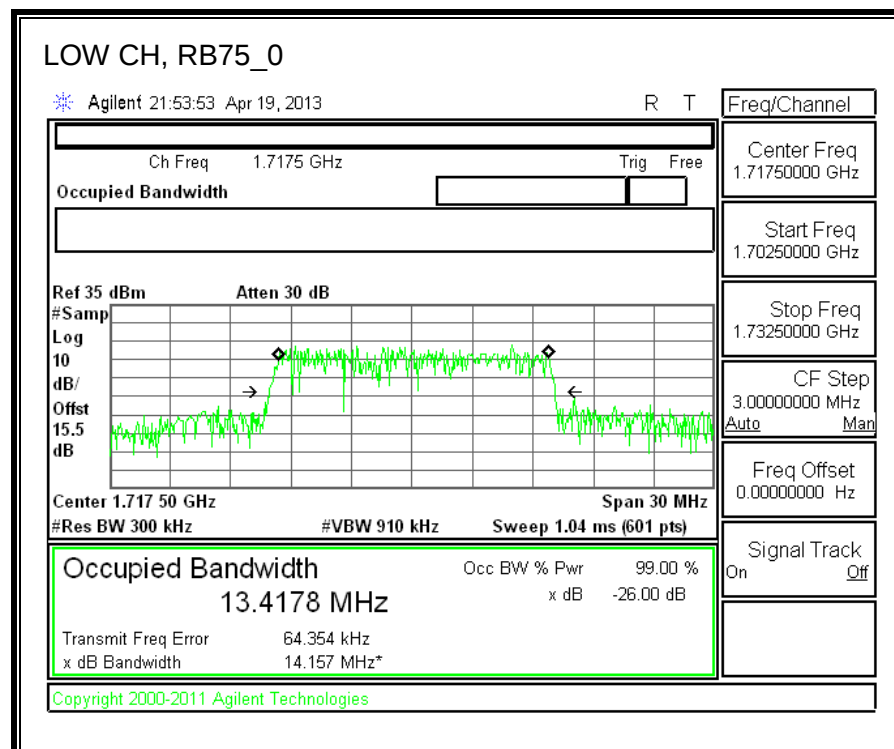
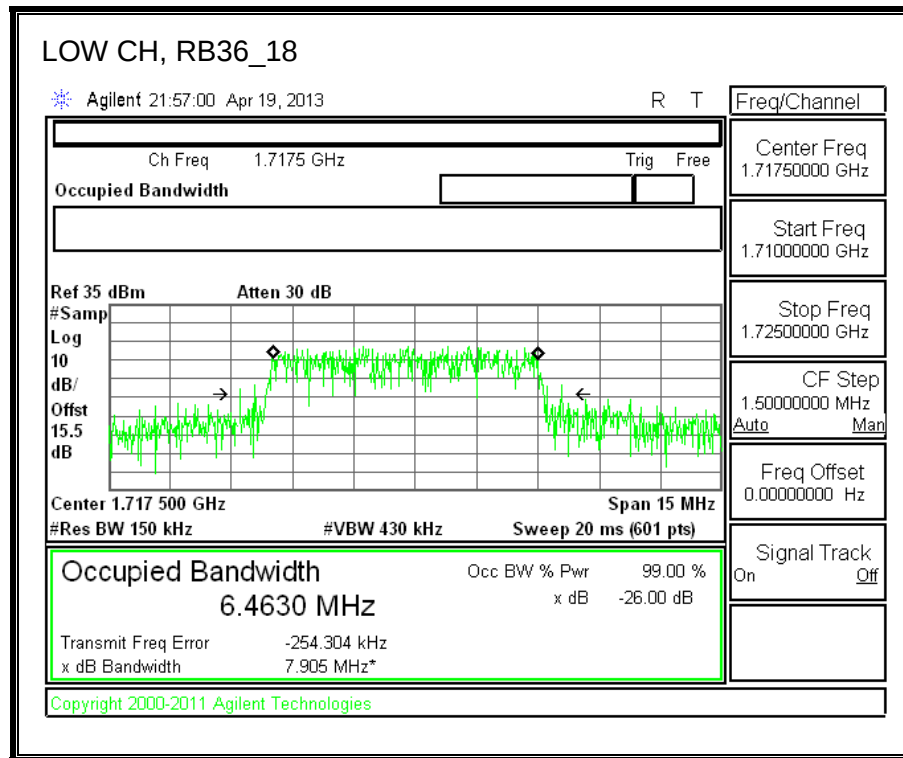


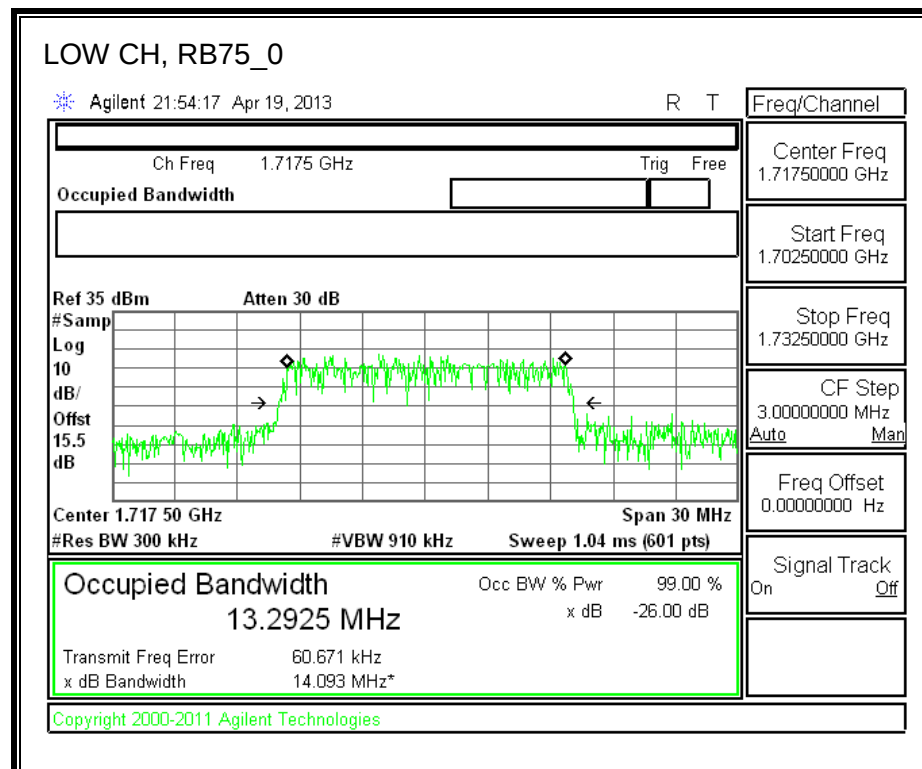
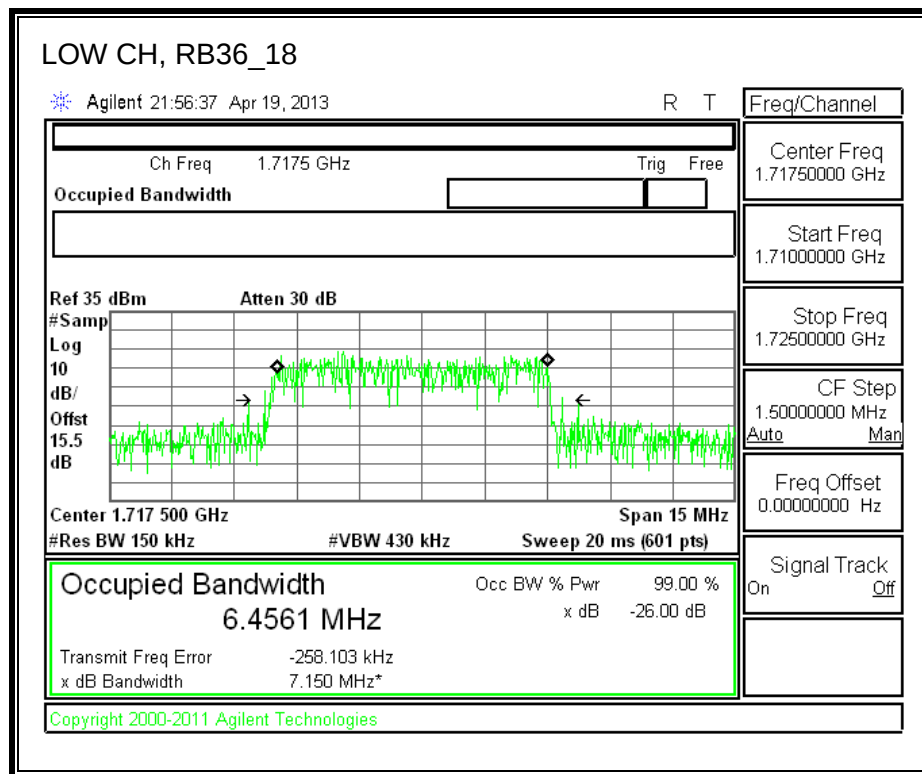
HIGH-16QAM



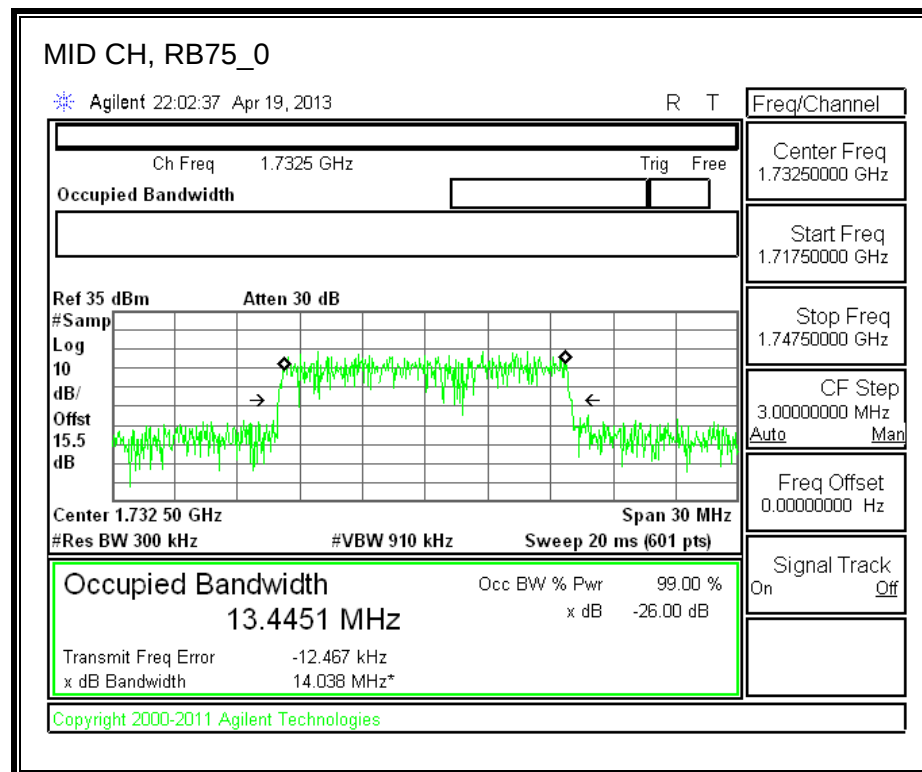
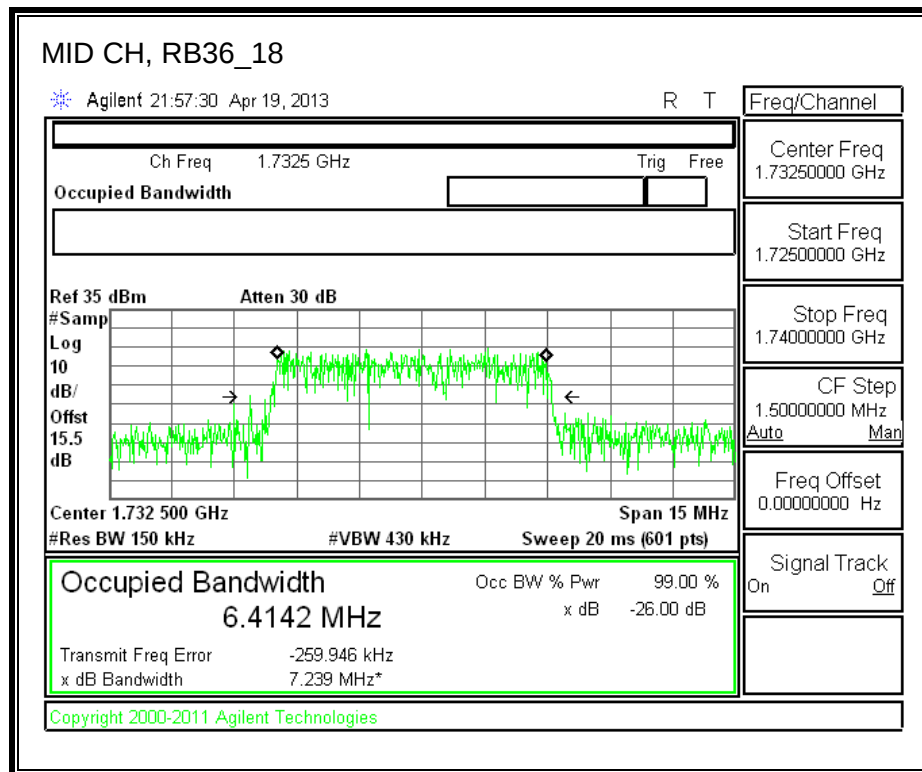
8.1.9. LTE BAND 4-15MHz BANDWIDTH

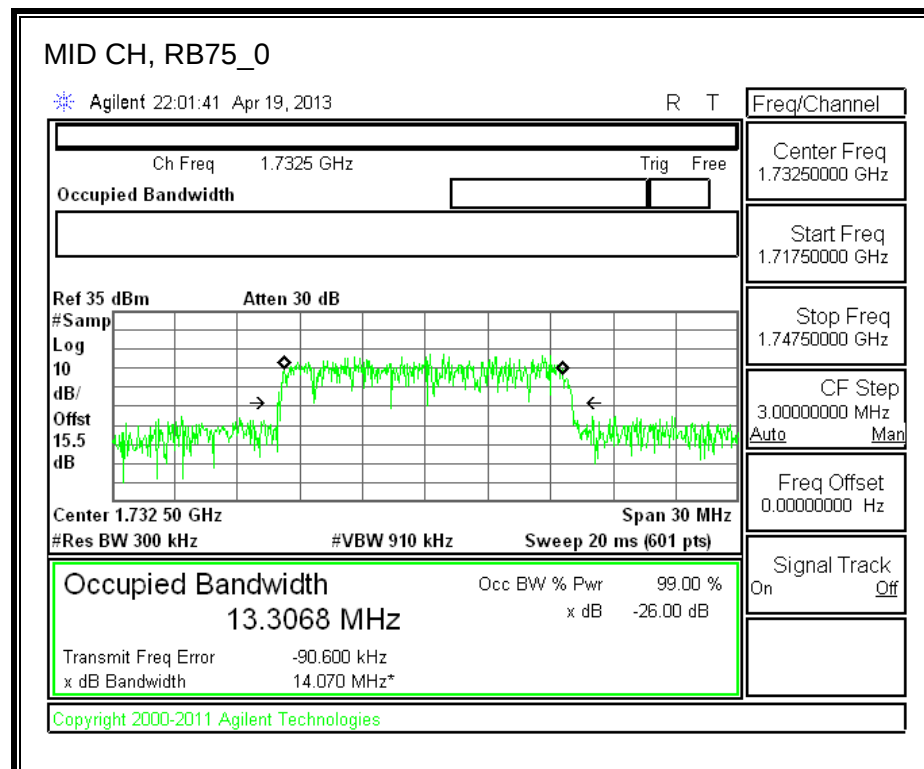
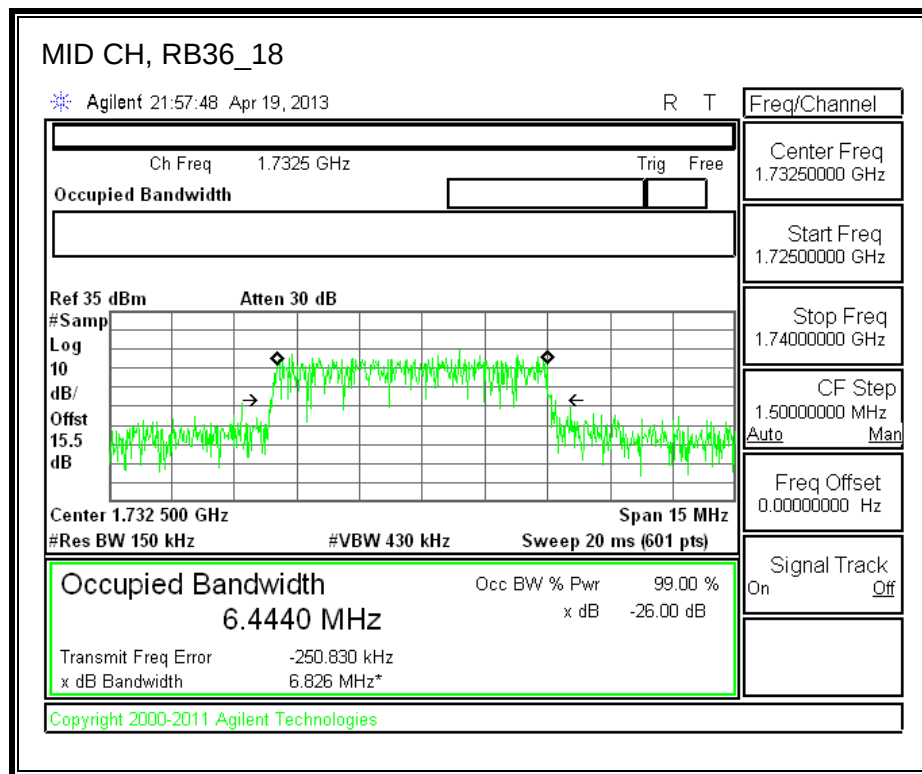
LOW-QPSK



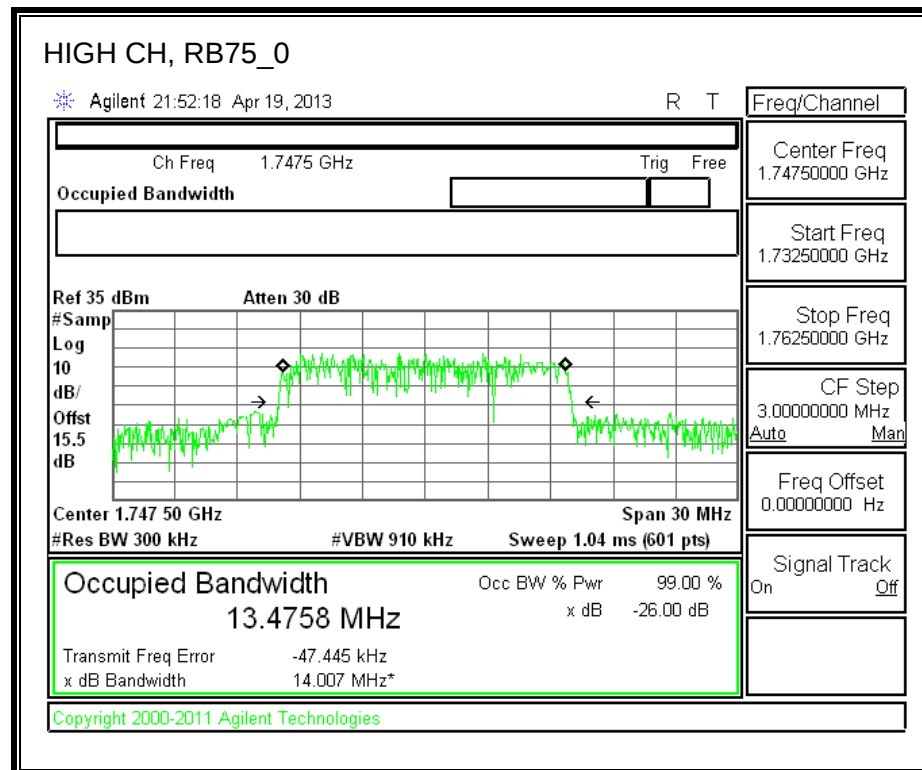
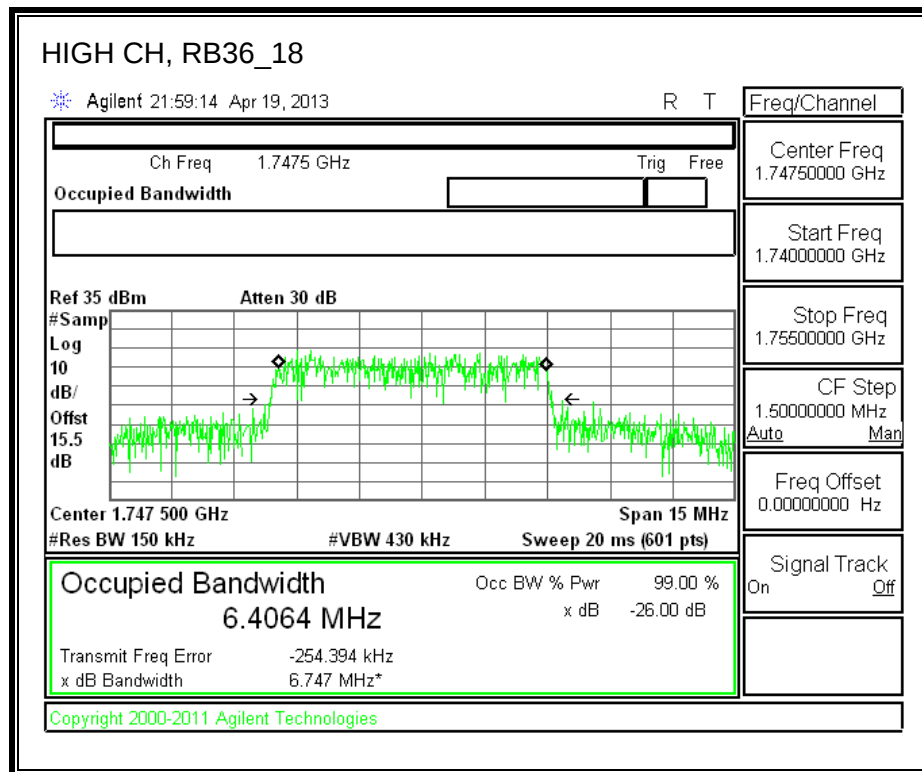


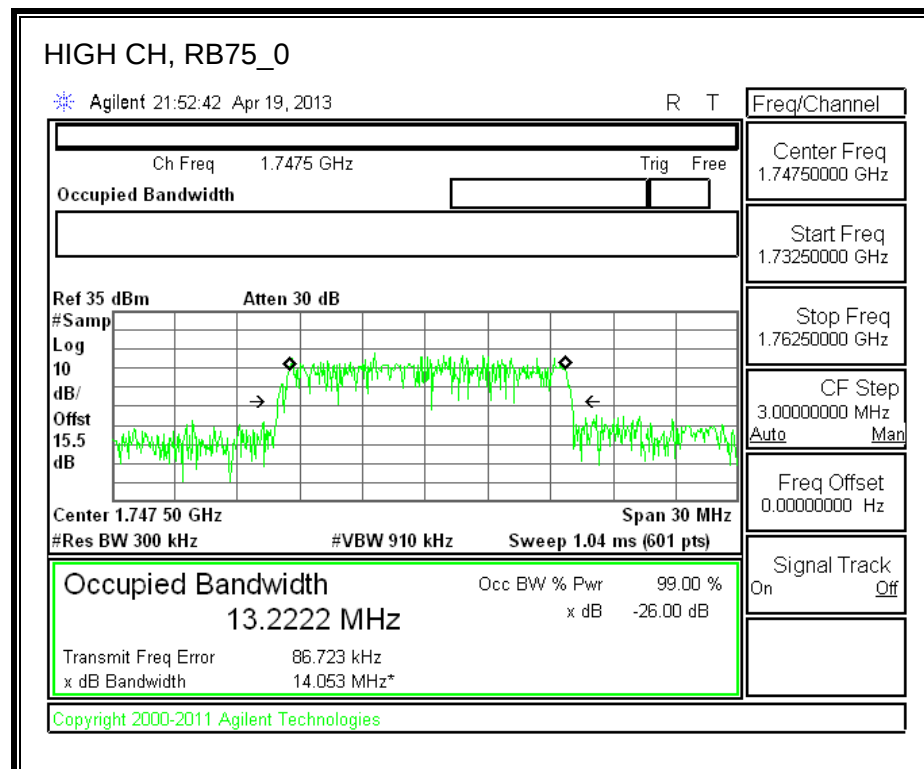
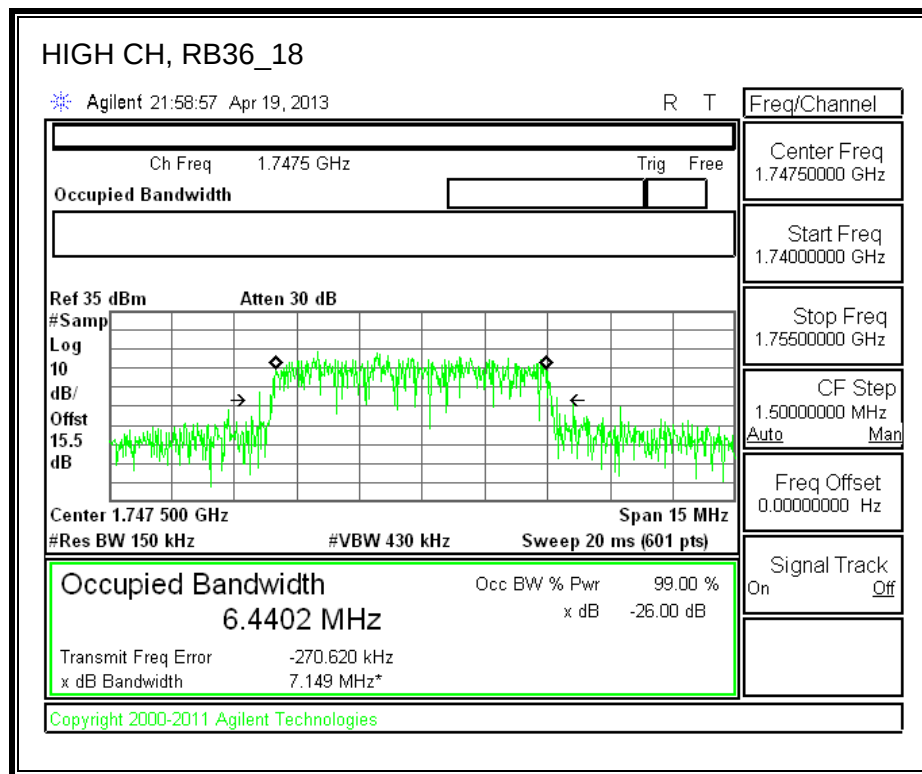
MID-QPSK





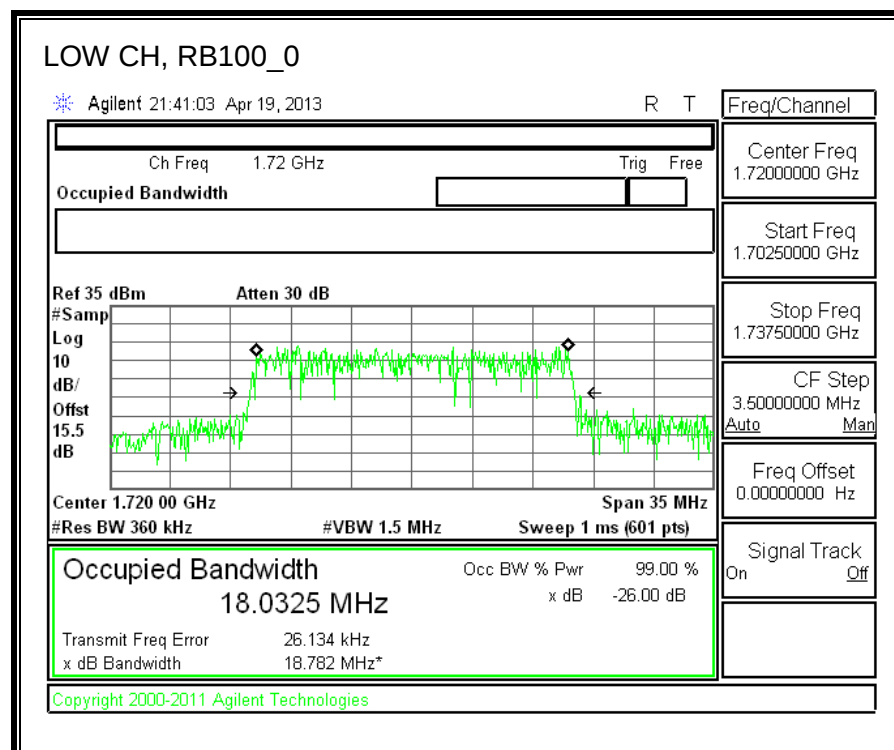
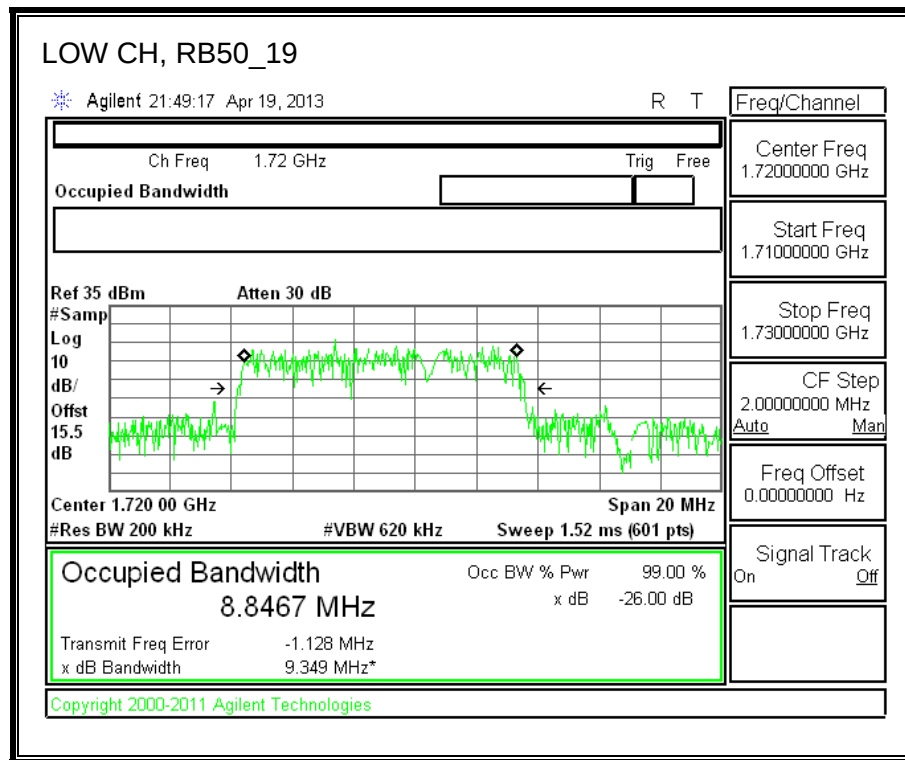
HIGH-QPSK

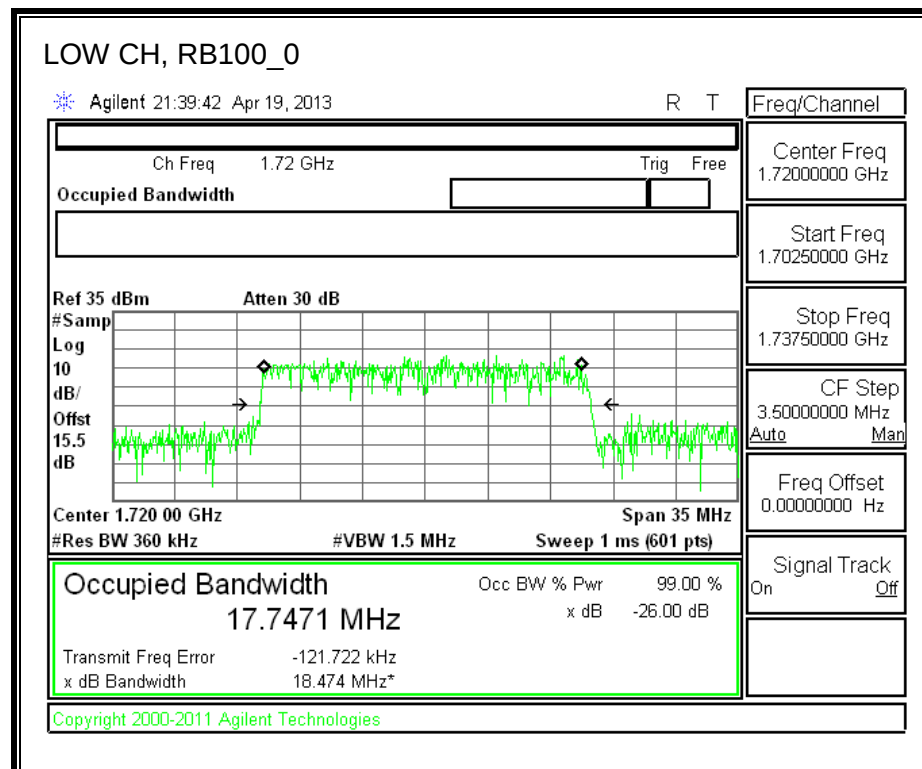
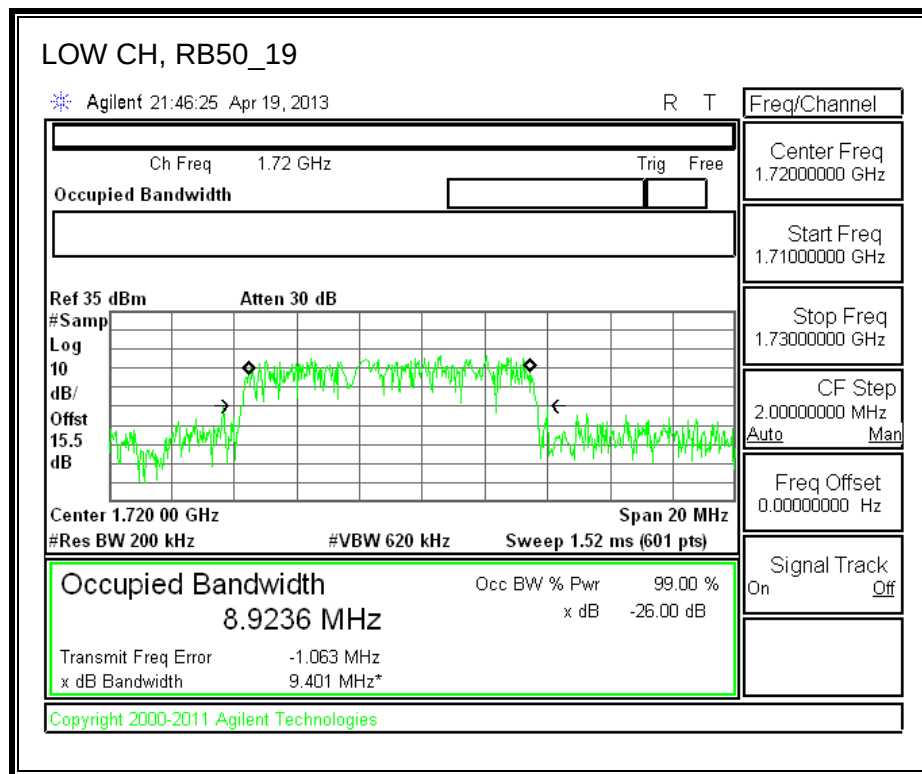


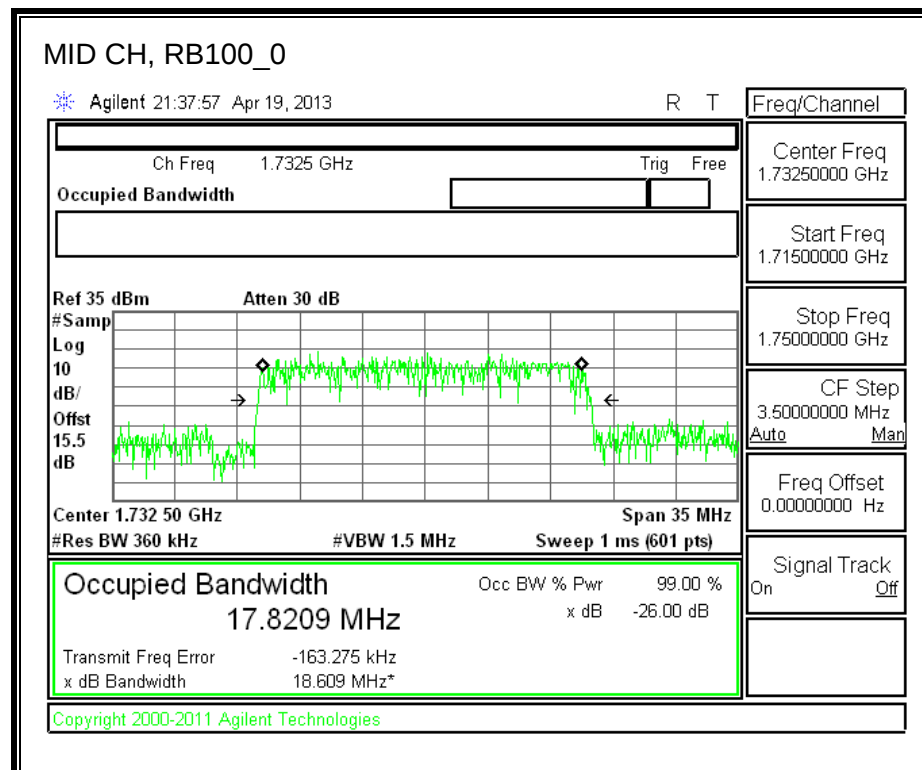
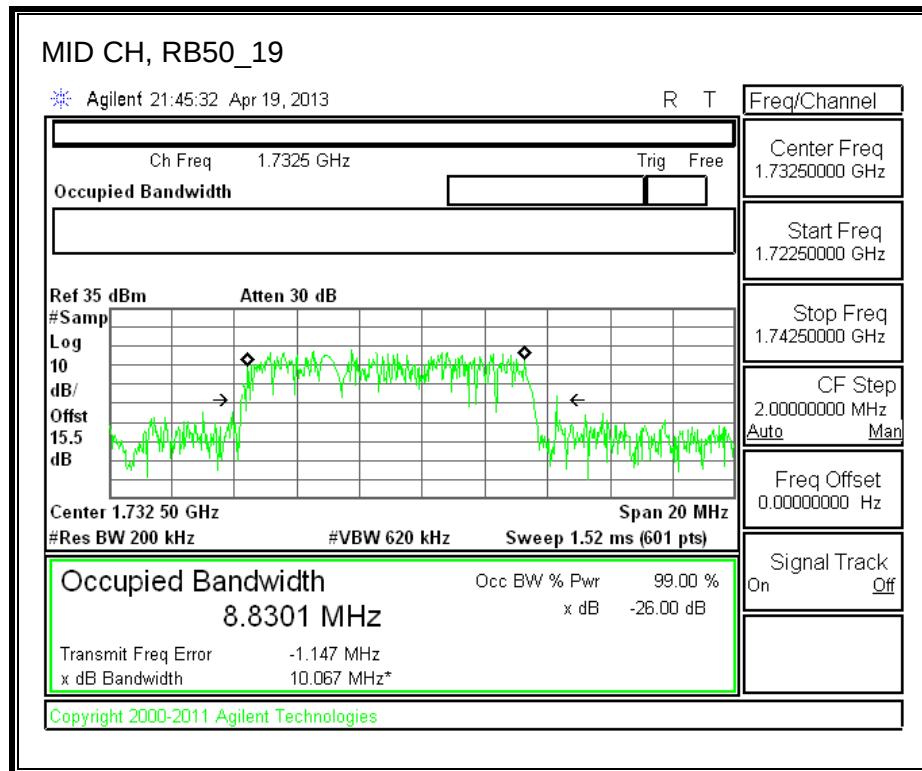


8.1.10. LTE BAND 4-20MHz BANDWIDTH

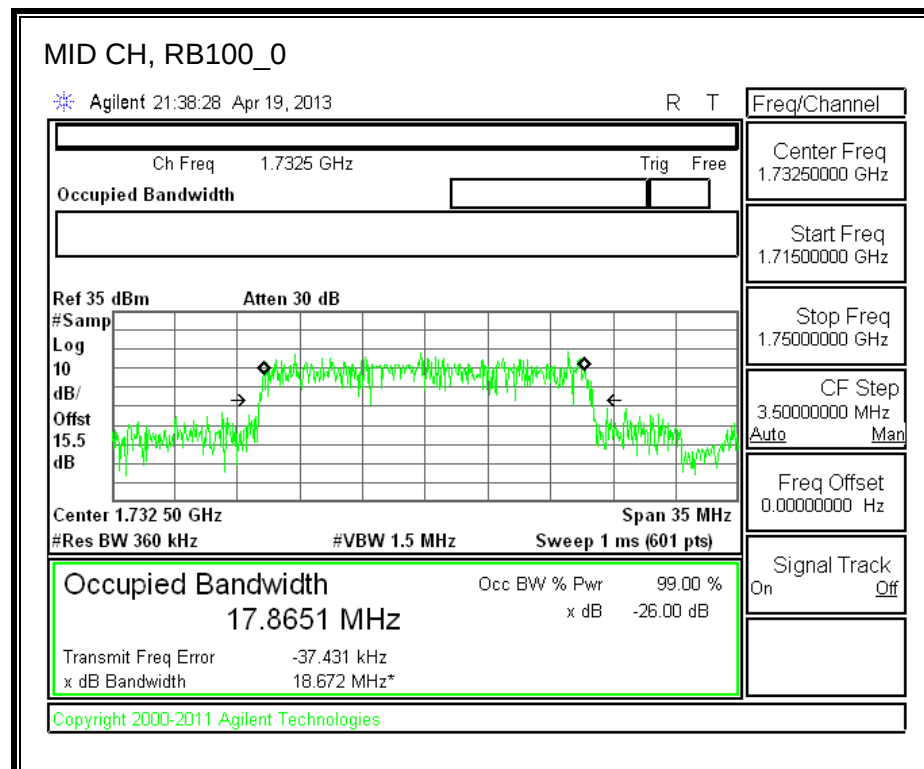
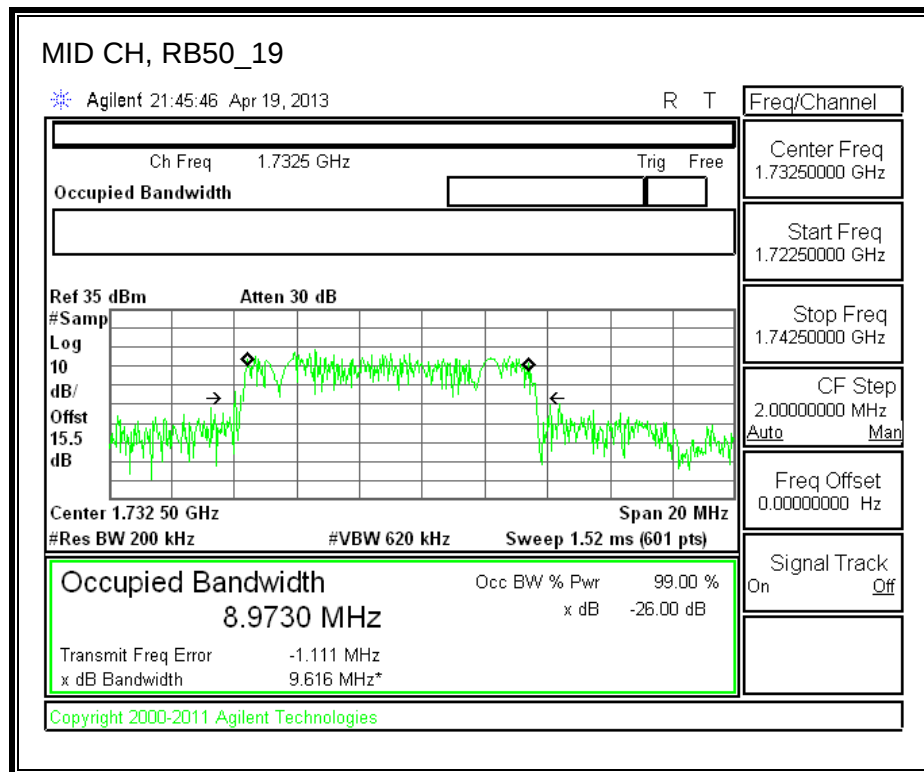
LOW-QPSK



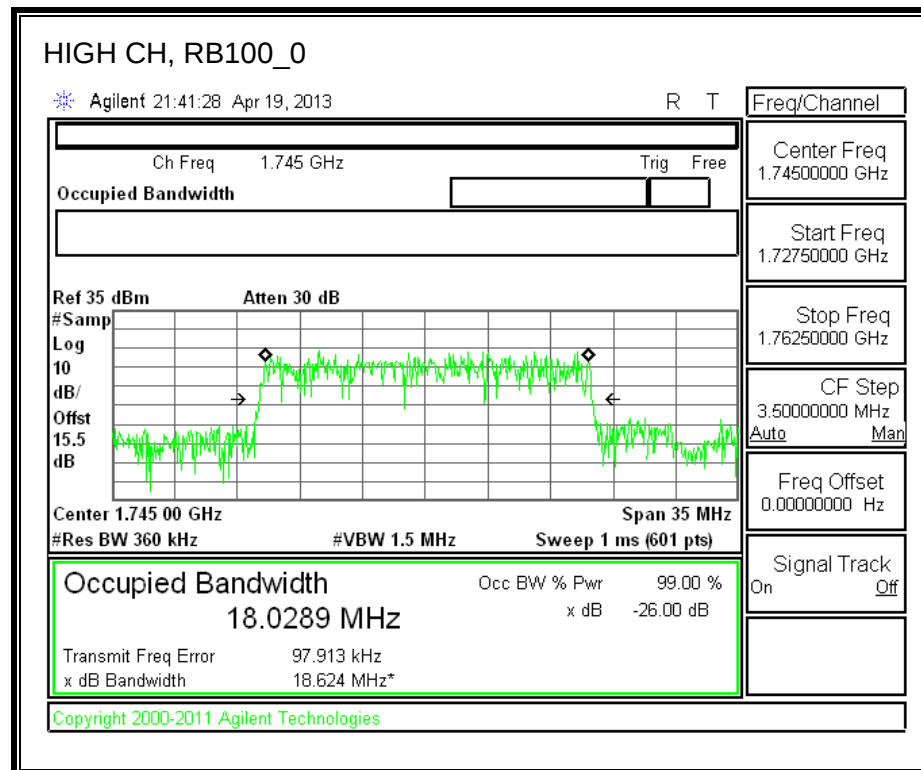
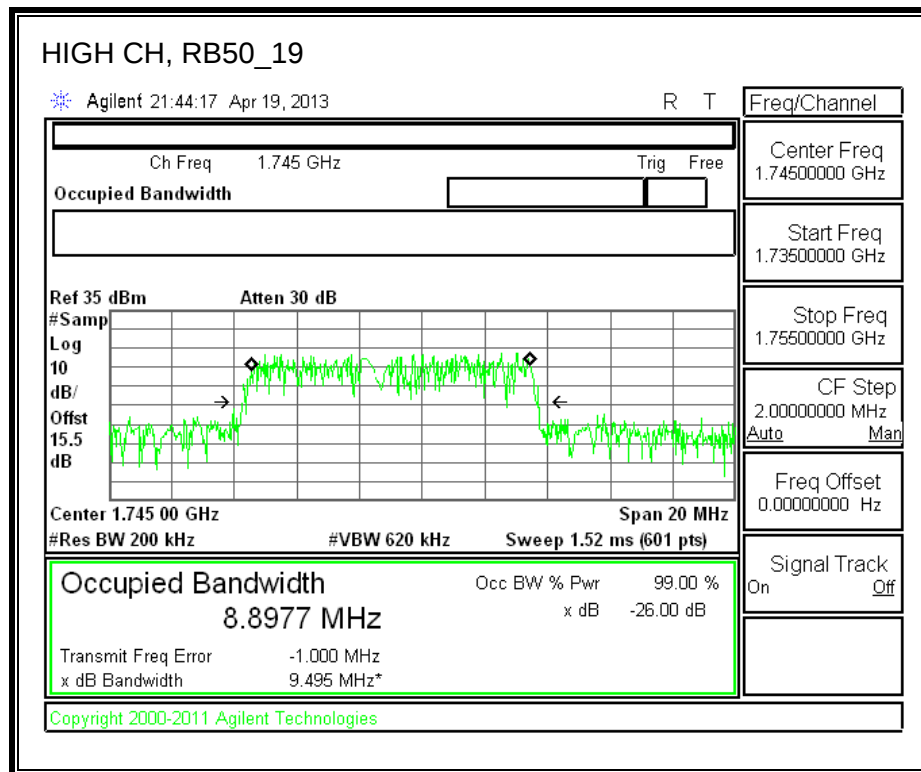


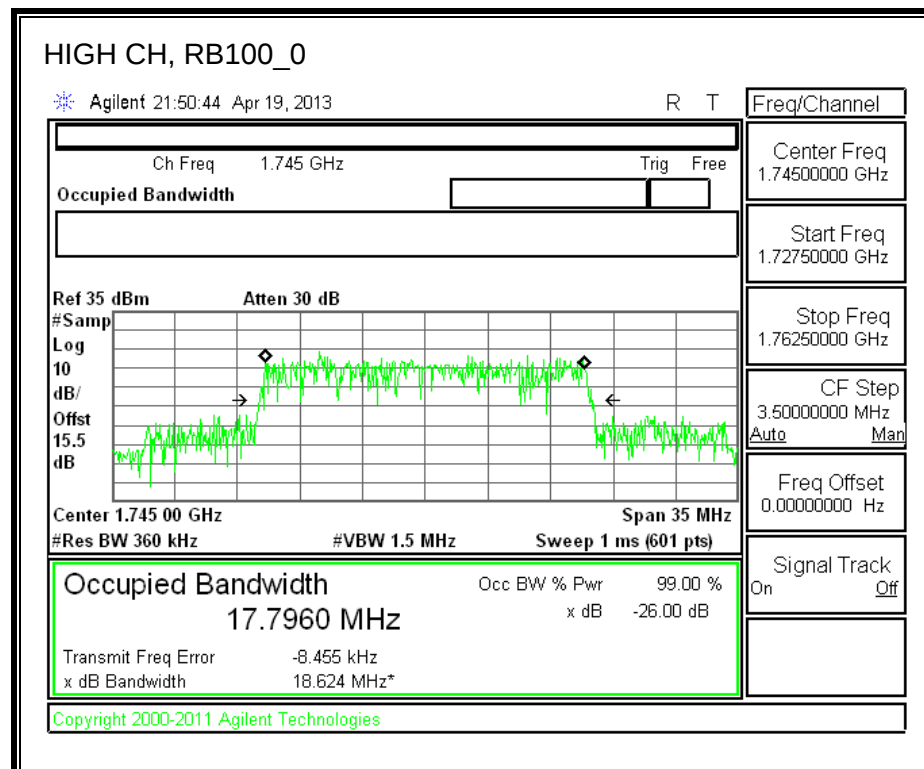
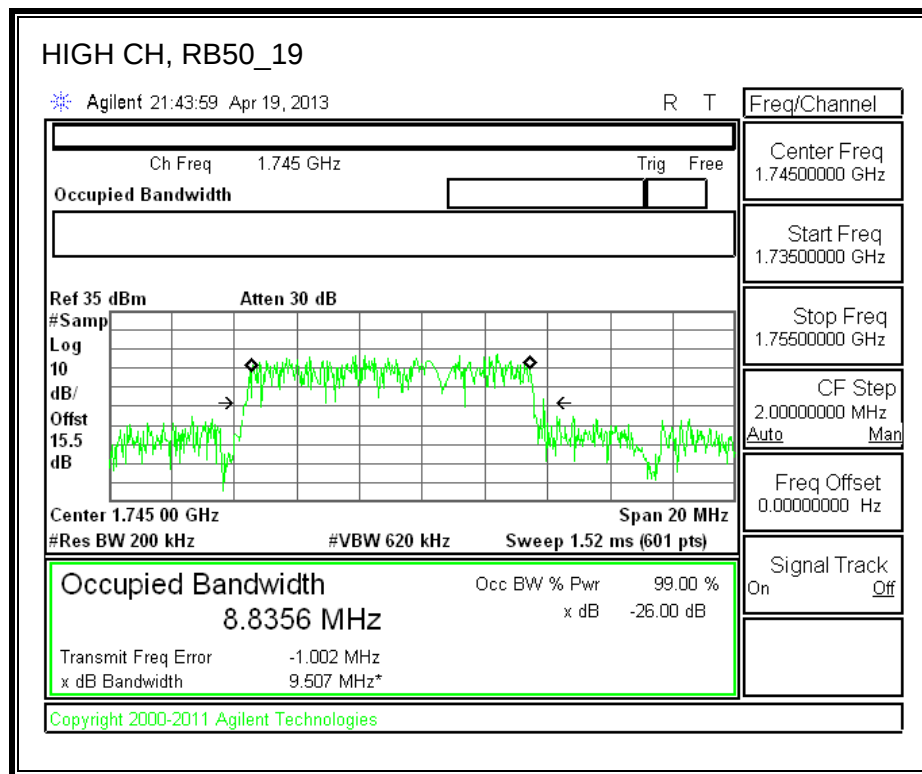


MID-16QAM



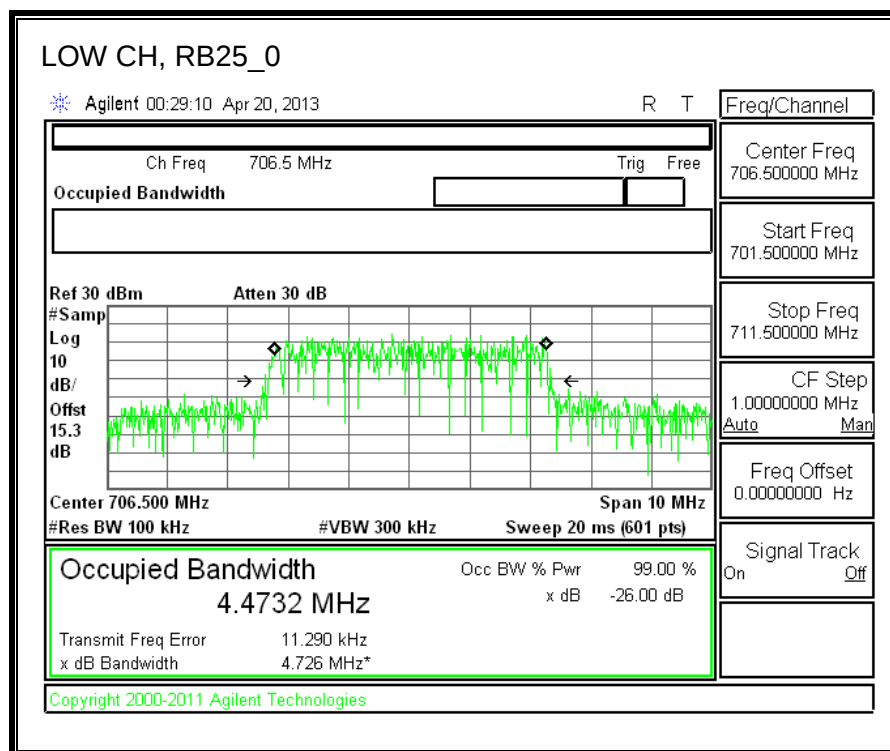
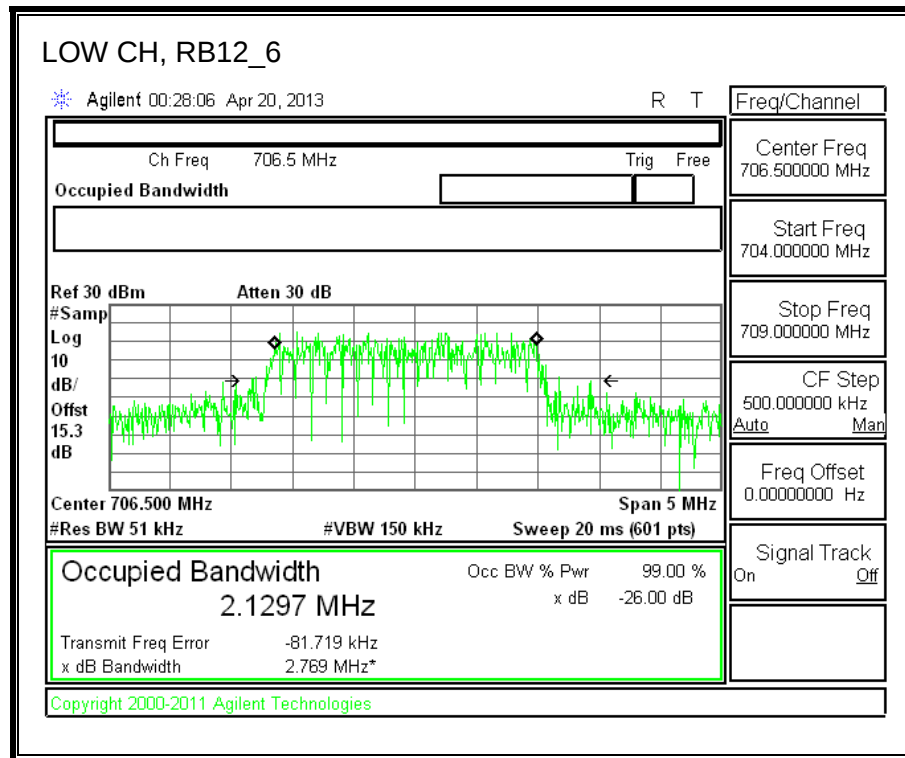
HIGH-QPSK



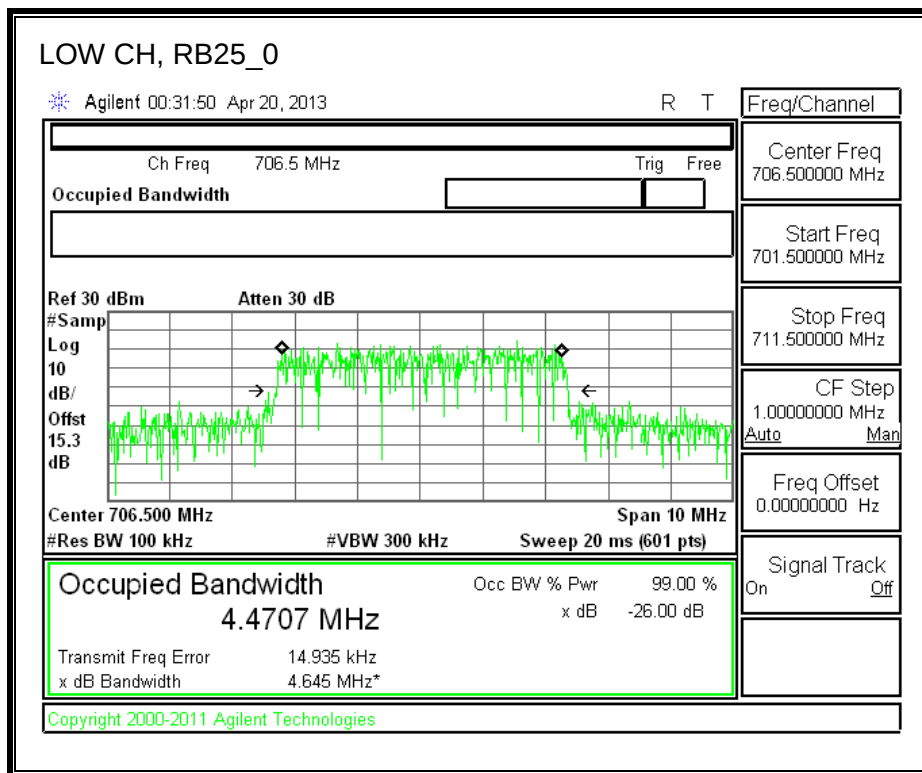
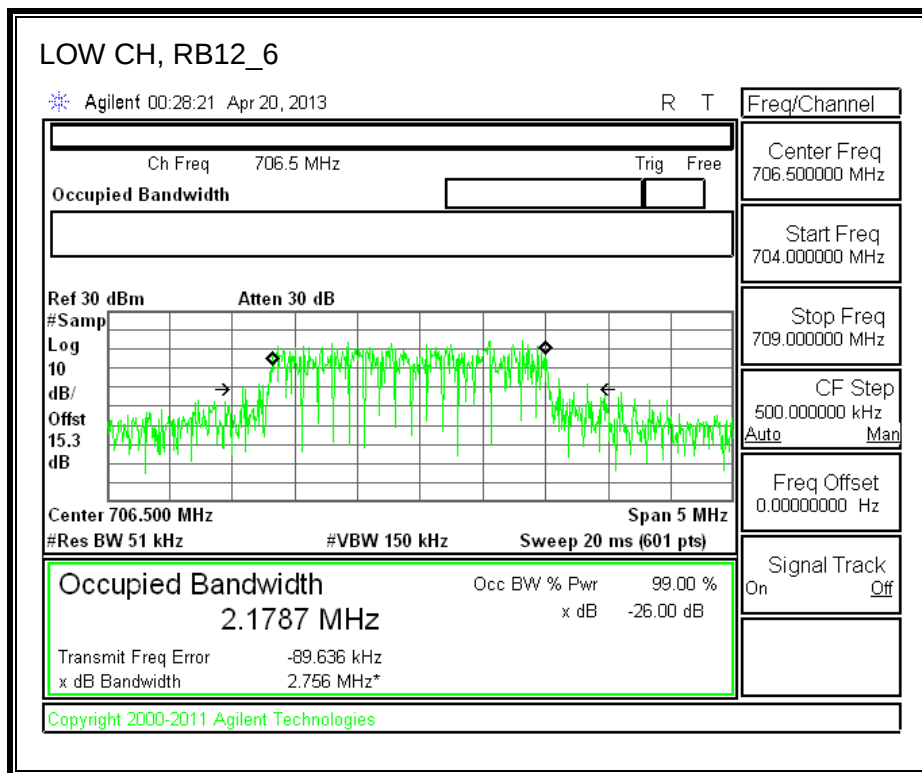


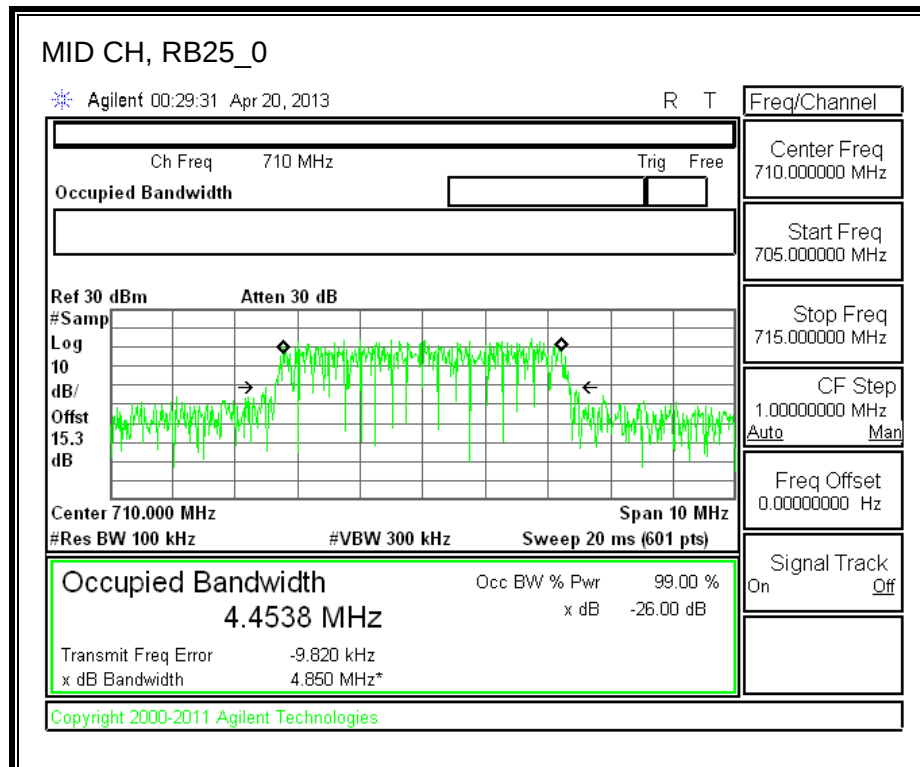
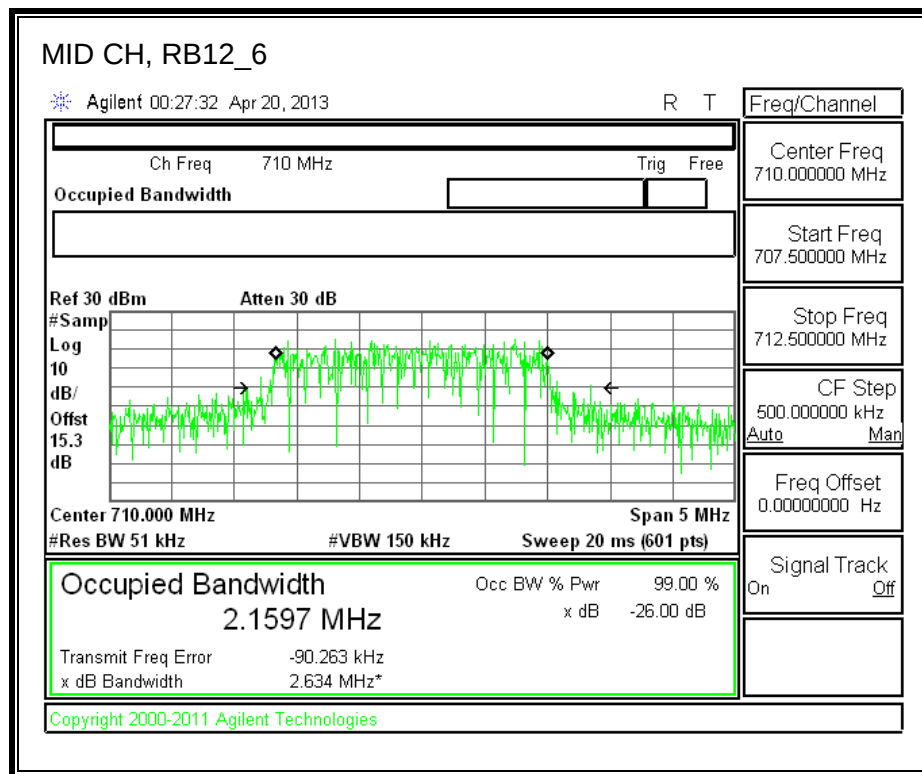
8.1.11. LTE BAND 17-5MHz BANDWIDTH

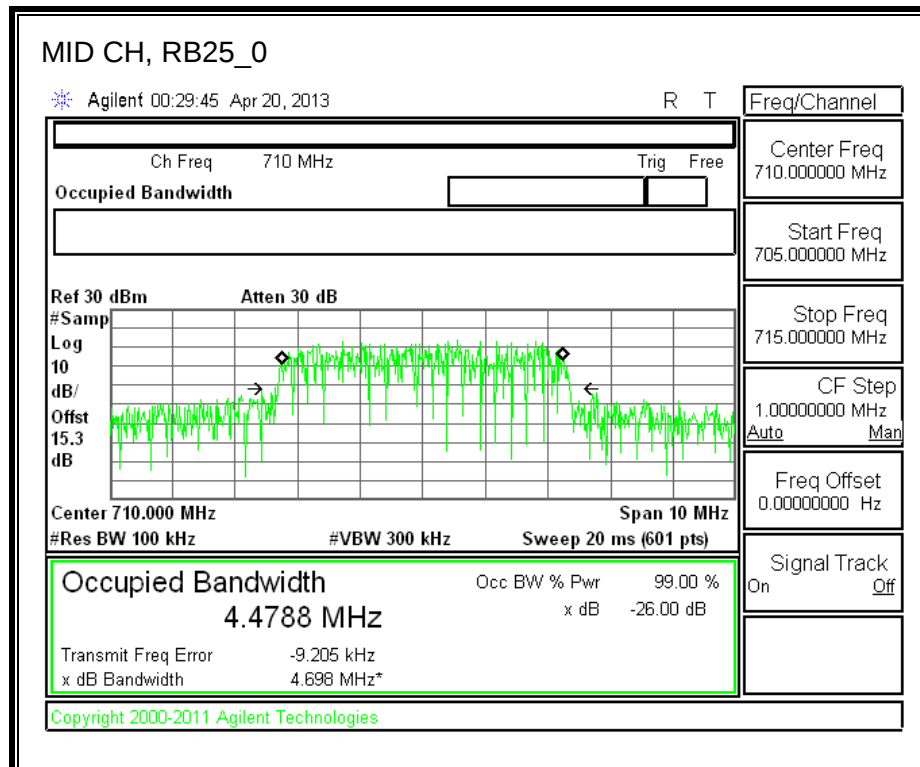
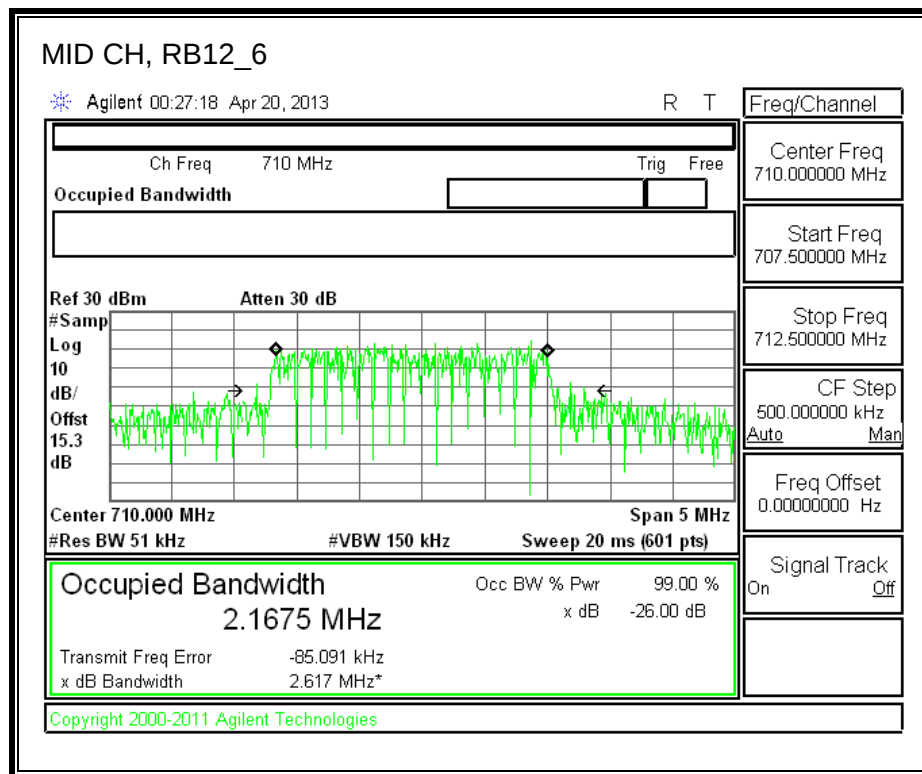
LOW-QPSK

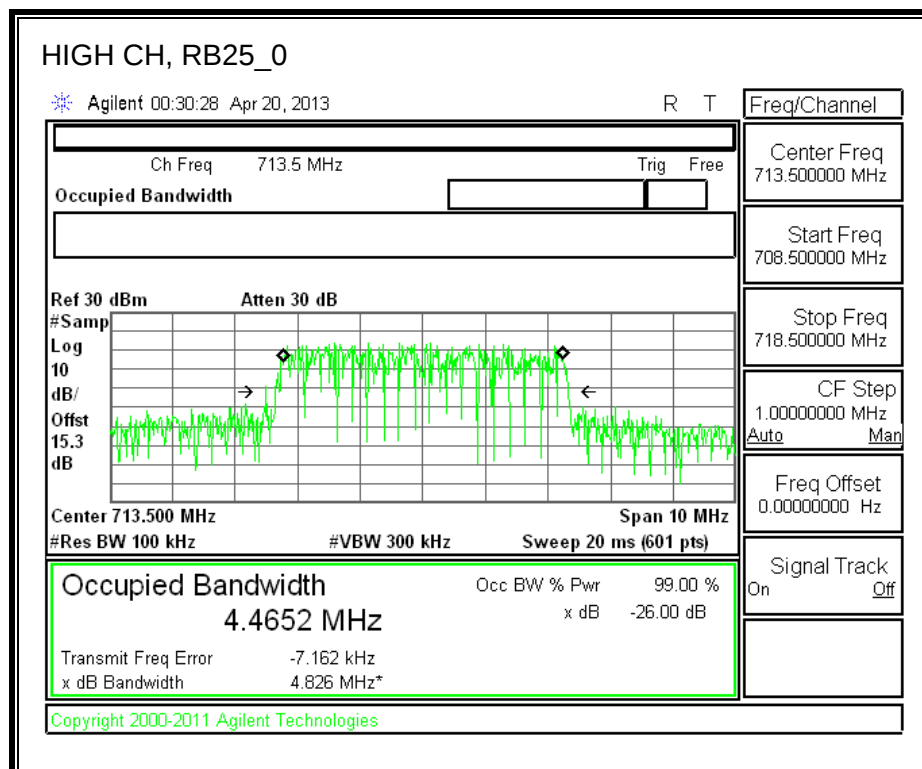
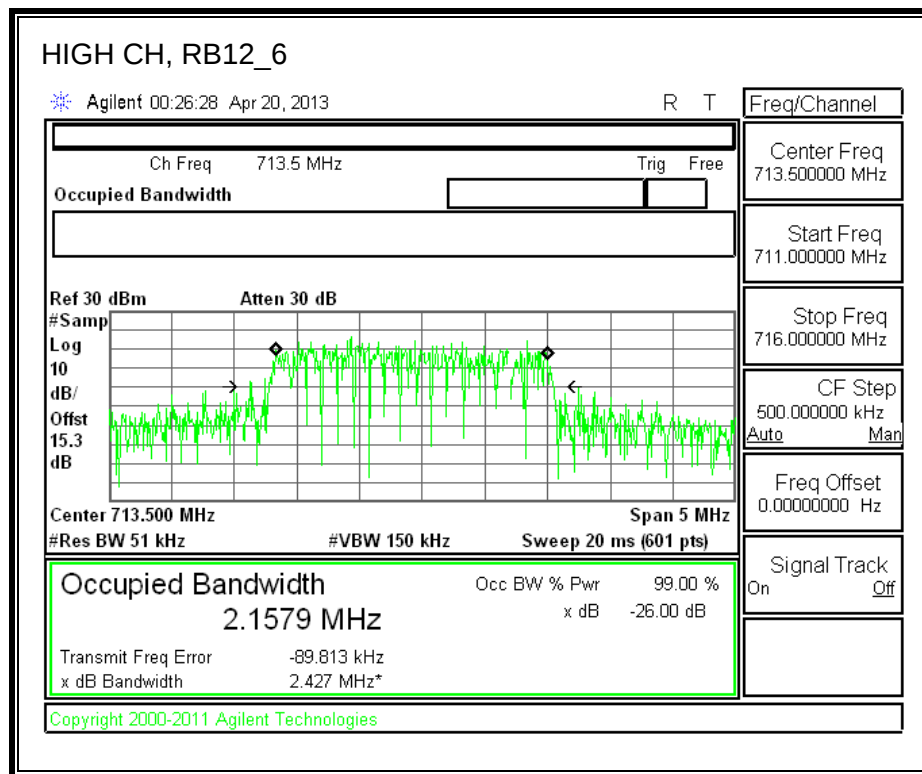


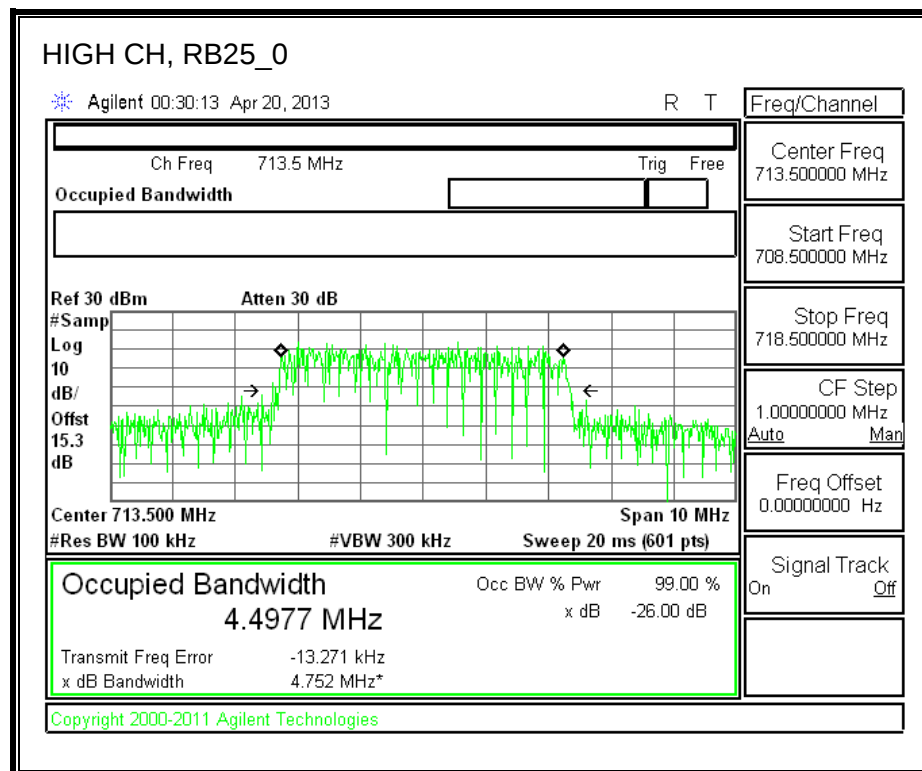
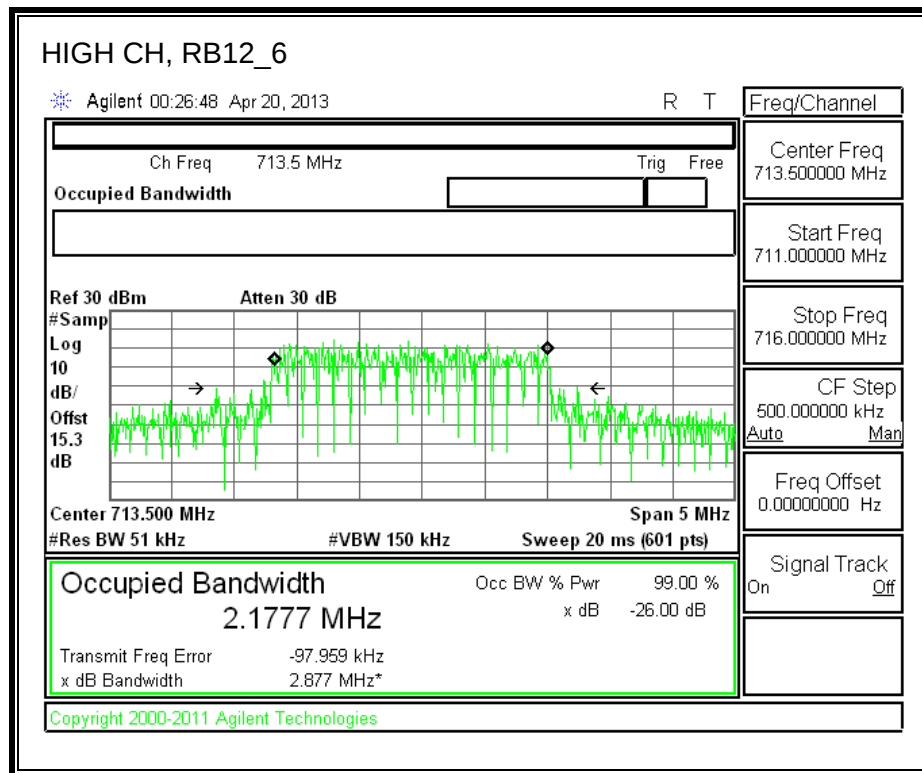
LOW-16QAM





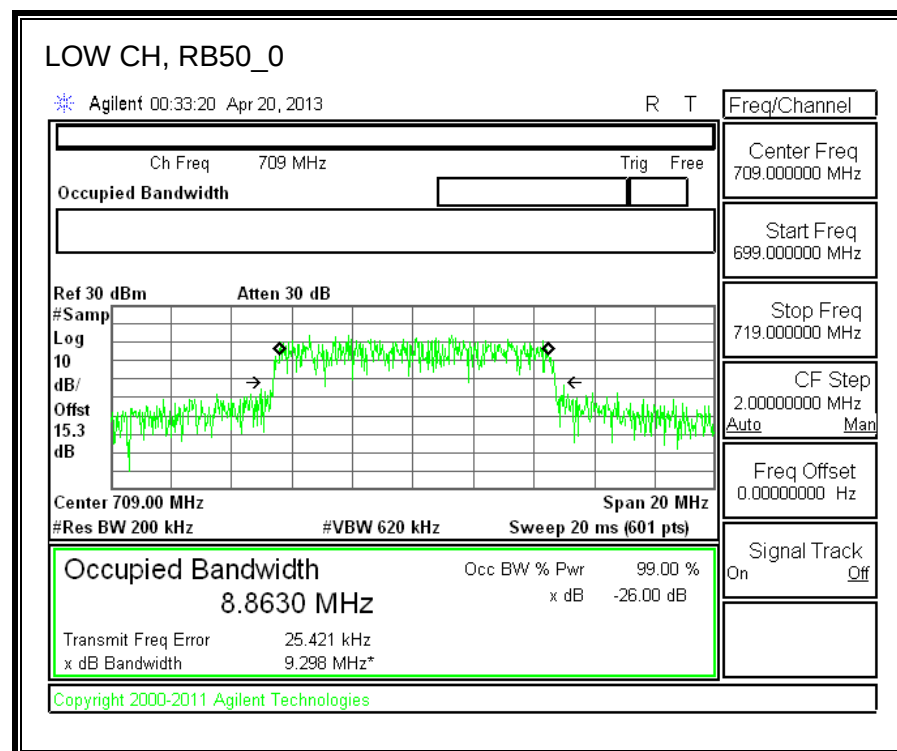
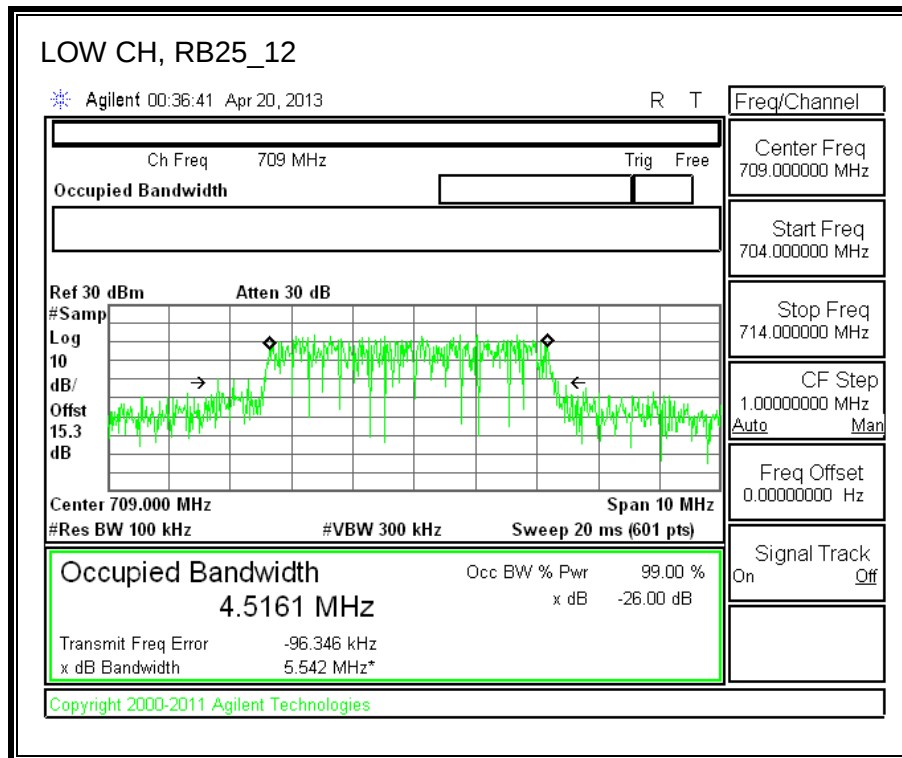


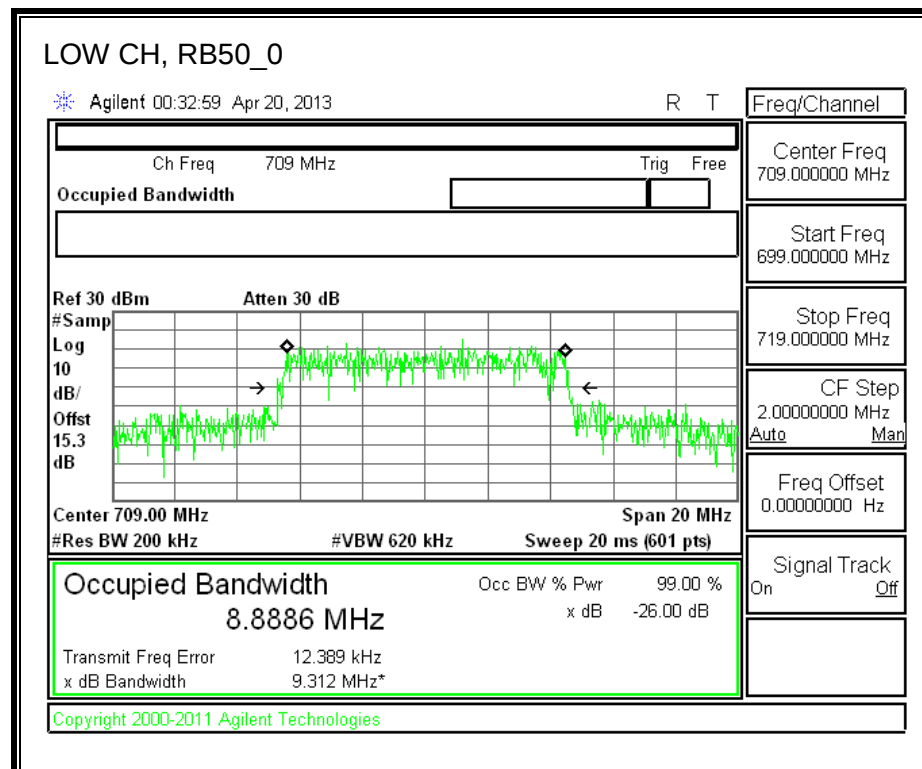
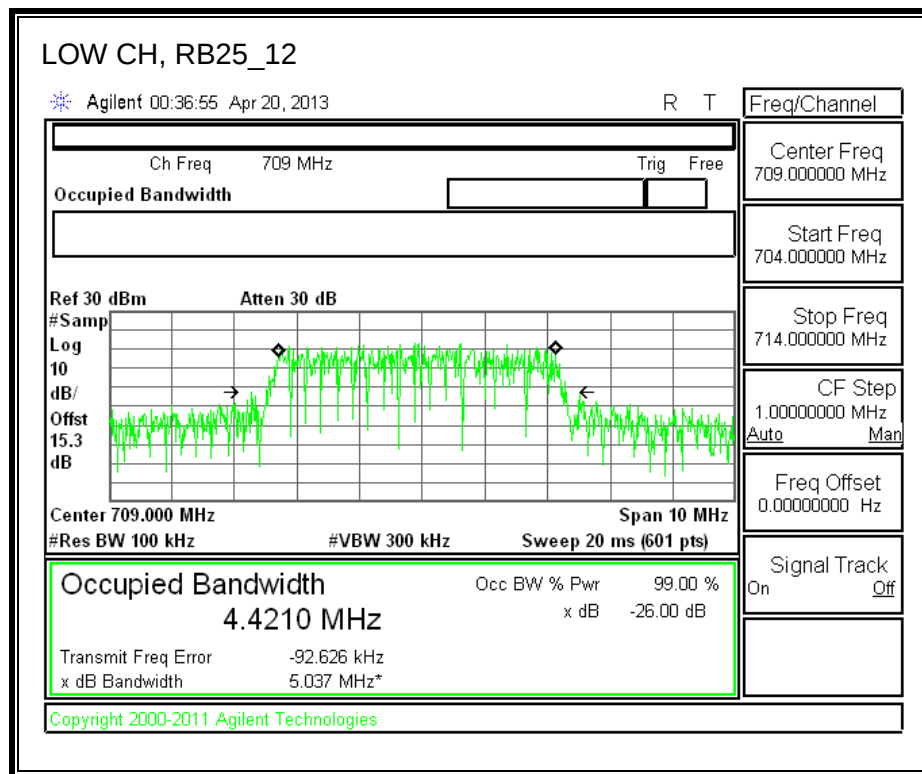




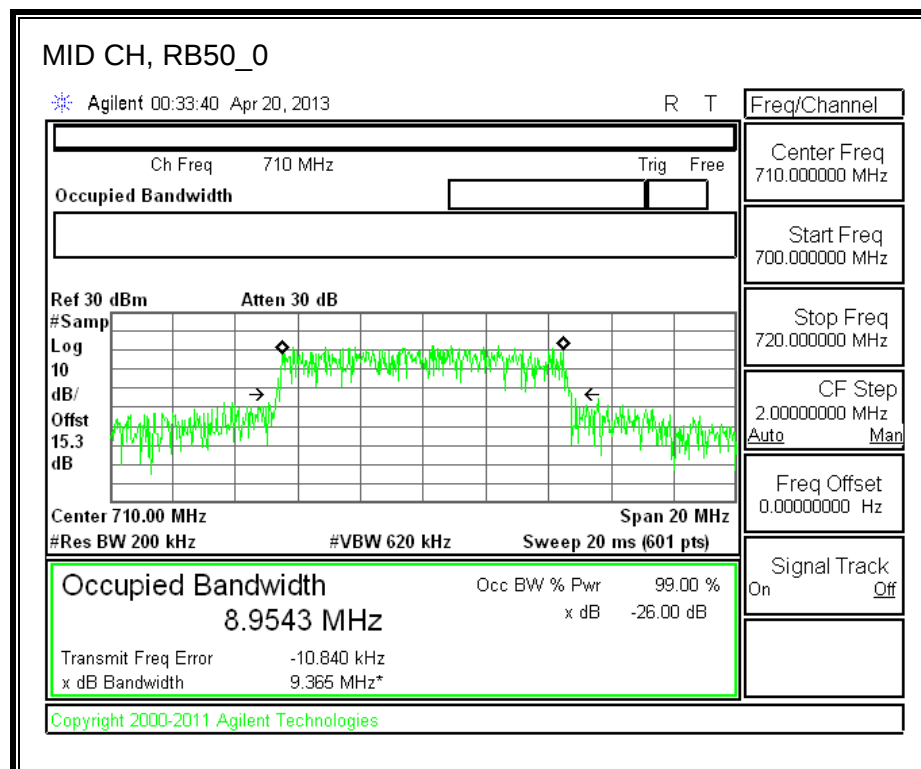
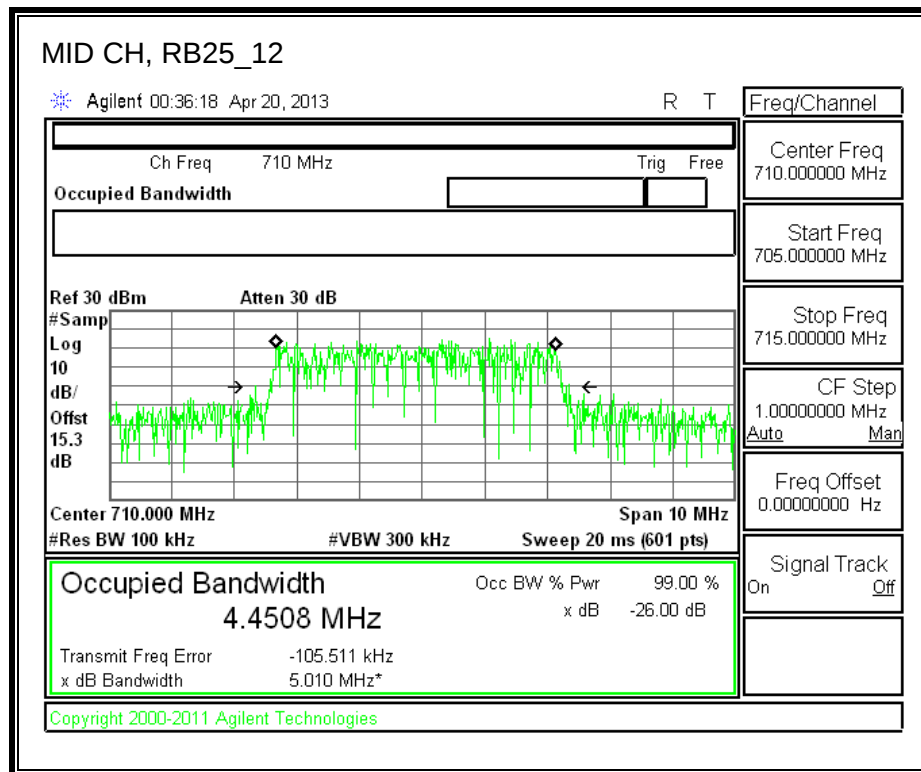
8.1.12. LTE BAND 17-10MHz BANDWIDTH

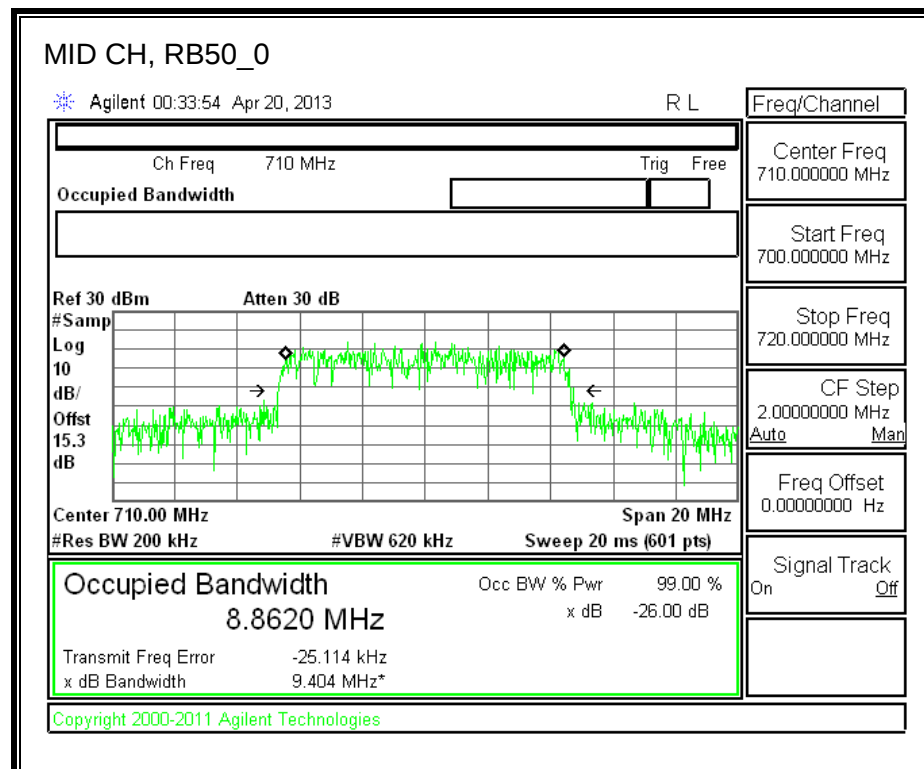
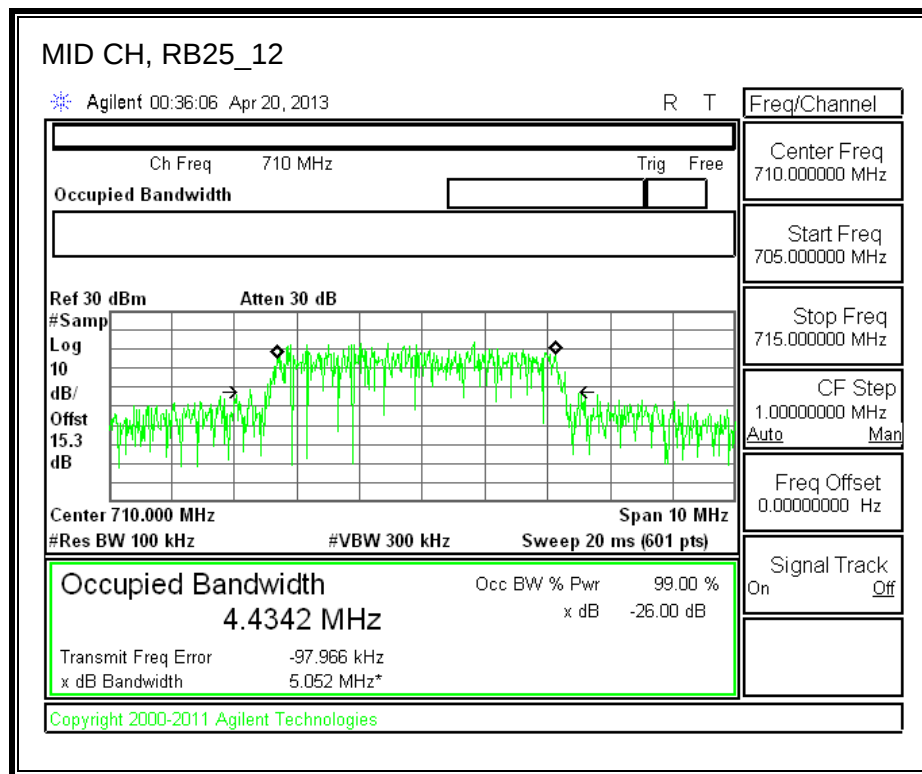
LOW-QPSK



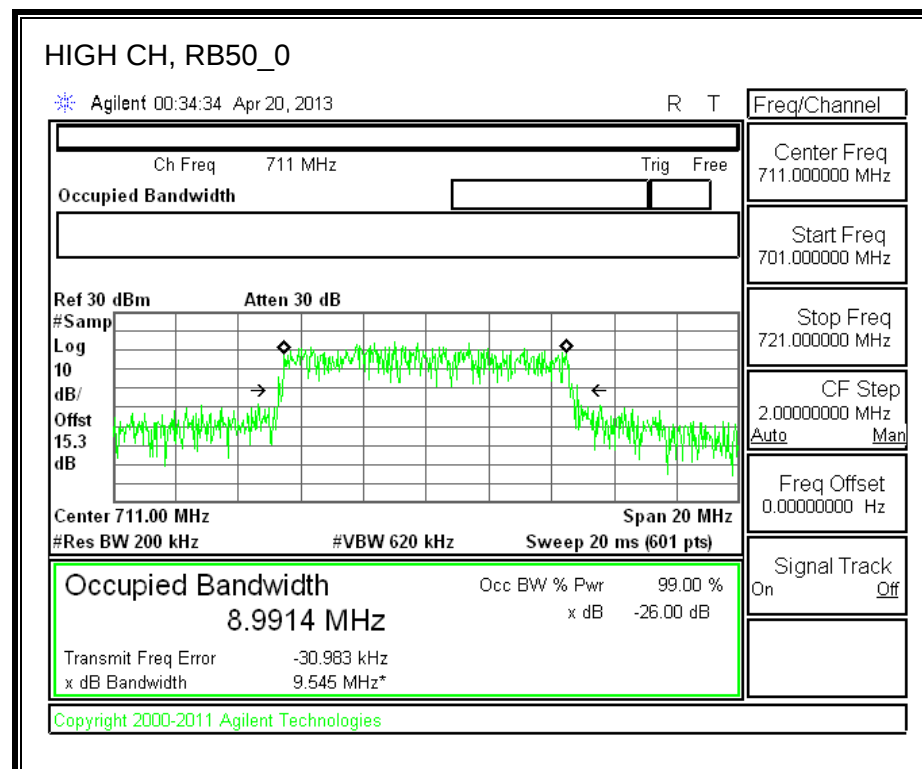
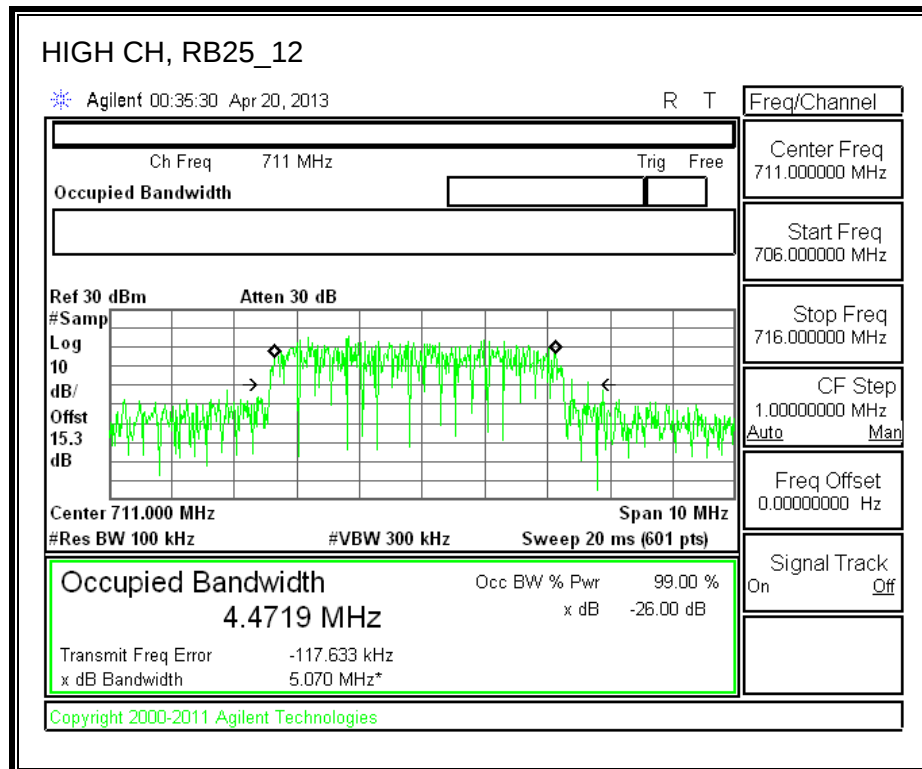


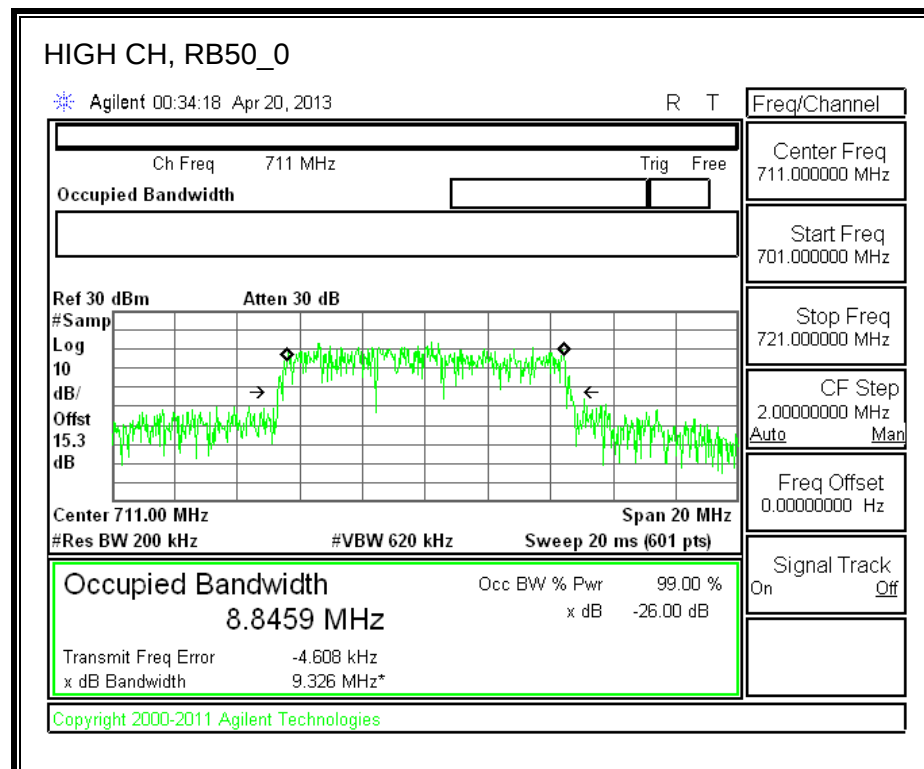
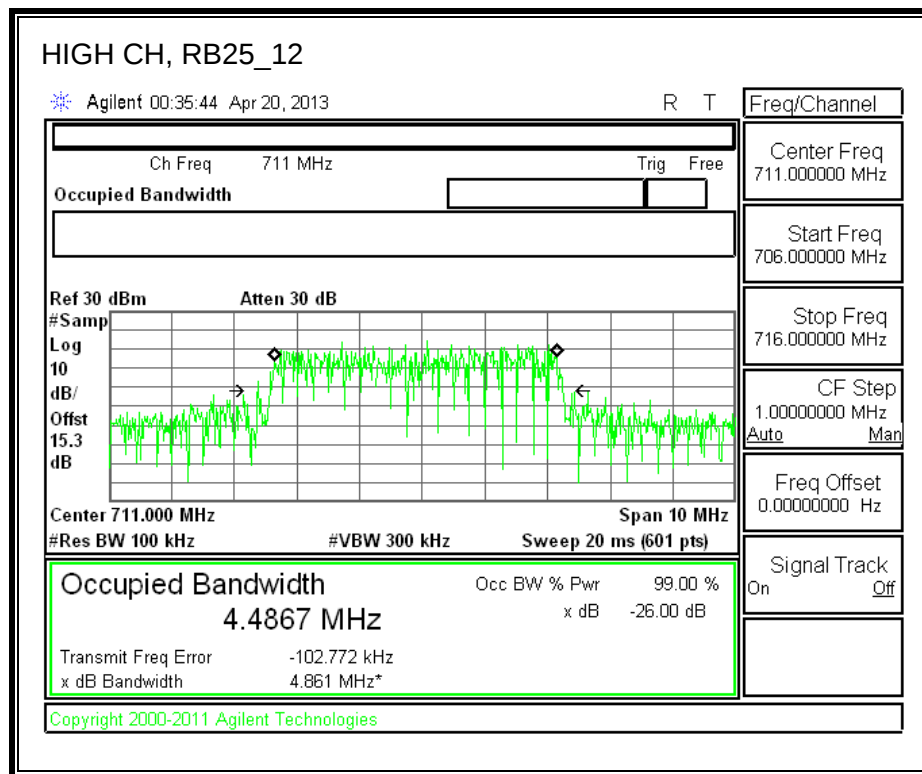
MID-QPSK





HIGH-QPSK





8.2. BAND EDGE

RULE PART(S)

FCC: §22.359, 24.238, and 27.

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 a Agilent 8960 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 (824, 849, 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.

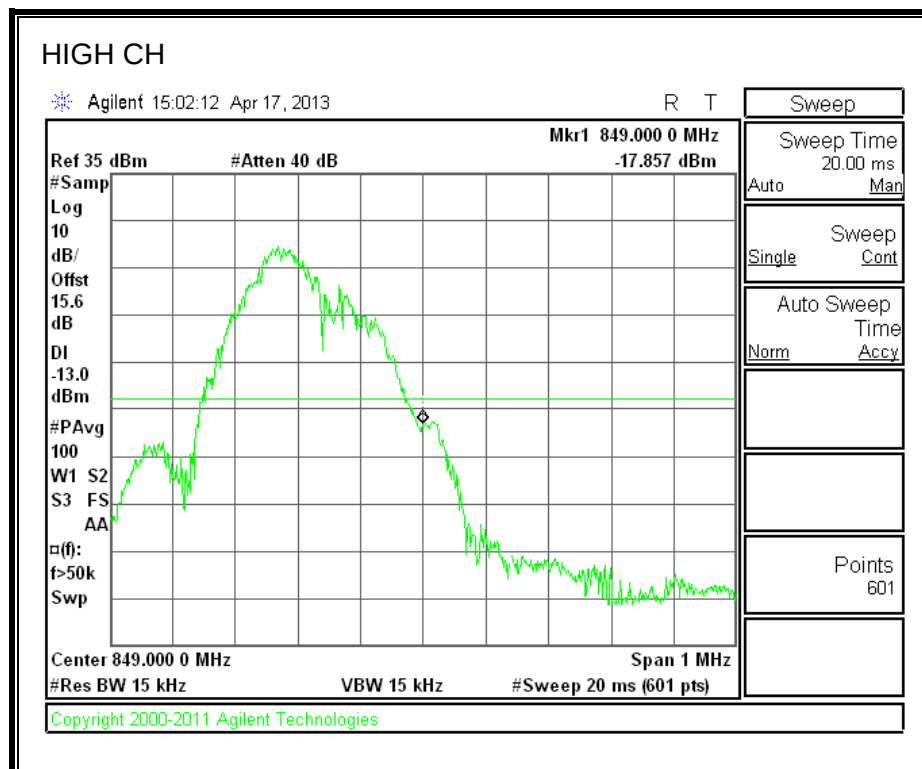
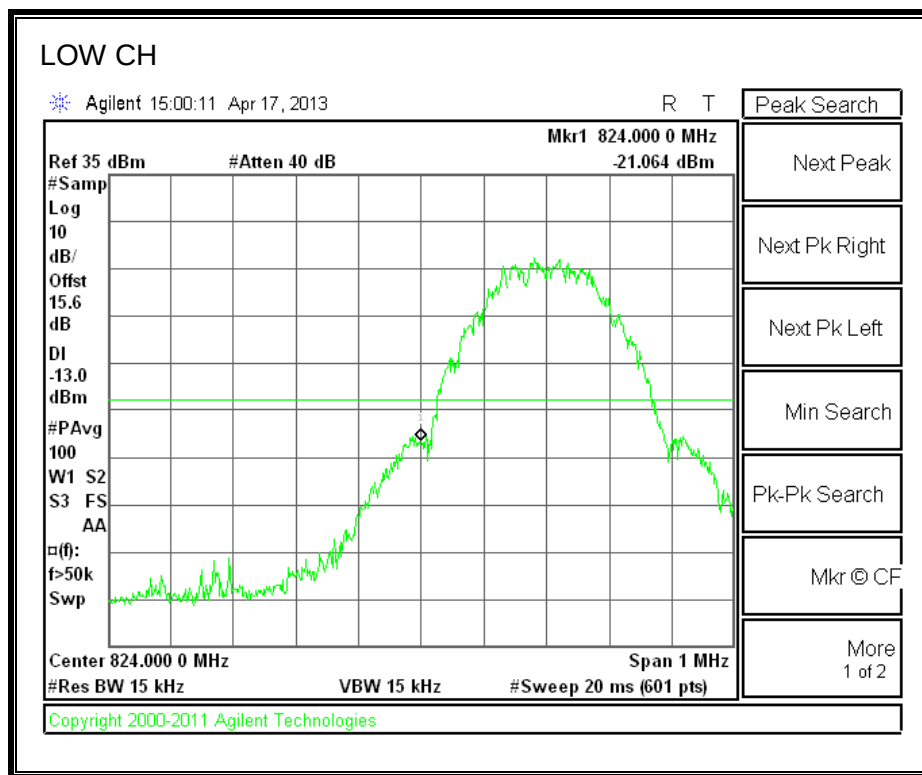
MODES TESTED

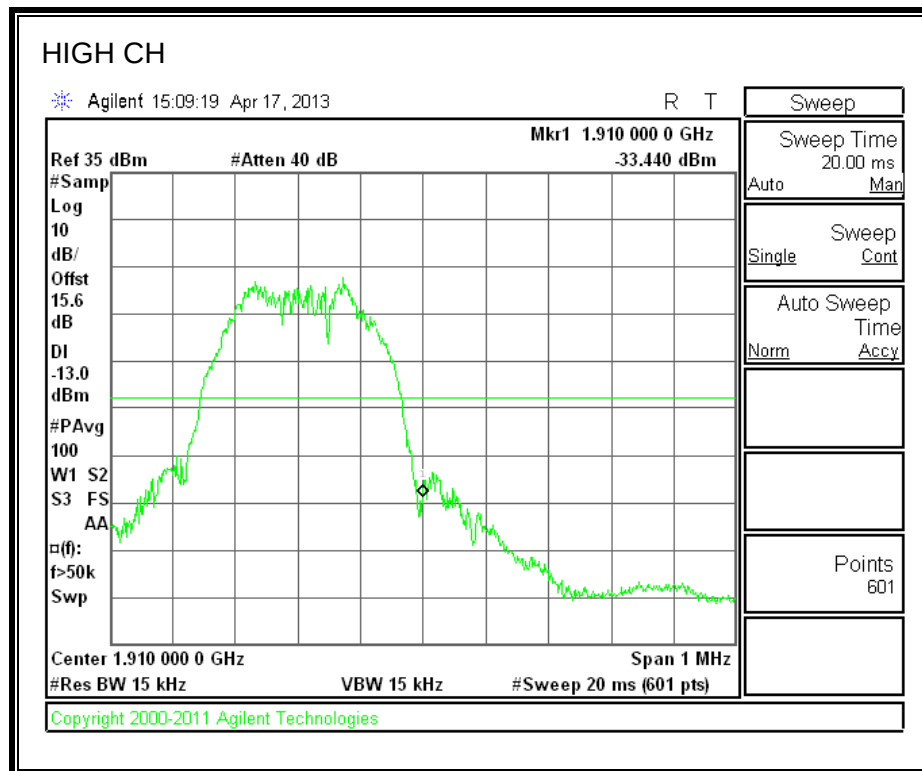
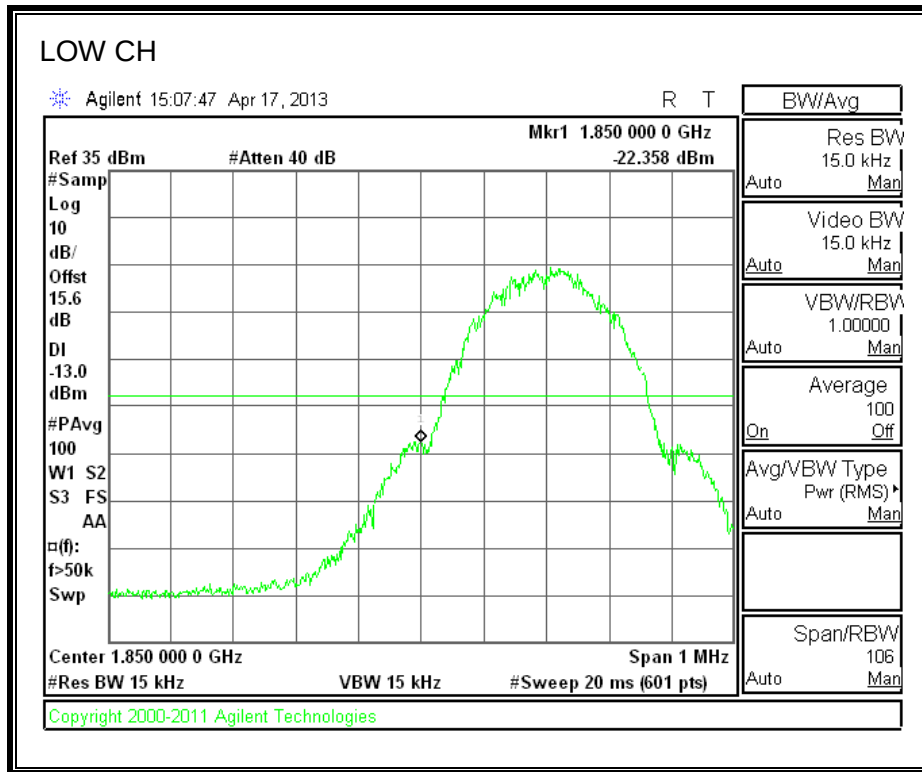
- GSM: GPRS and EGPRS
- UMTS: WCDMA and HSDPA
- LTE: Band 2, 4, and 17

RESULTS

8.2.1. GSM-GPRS

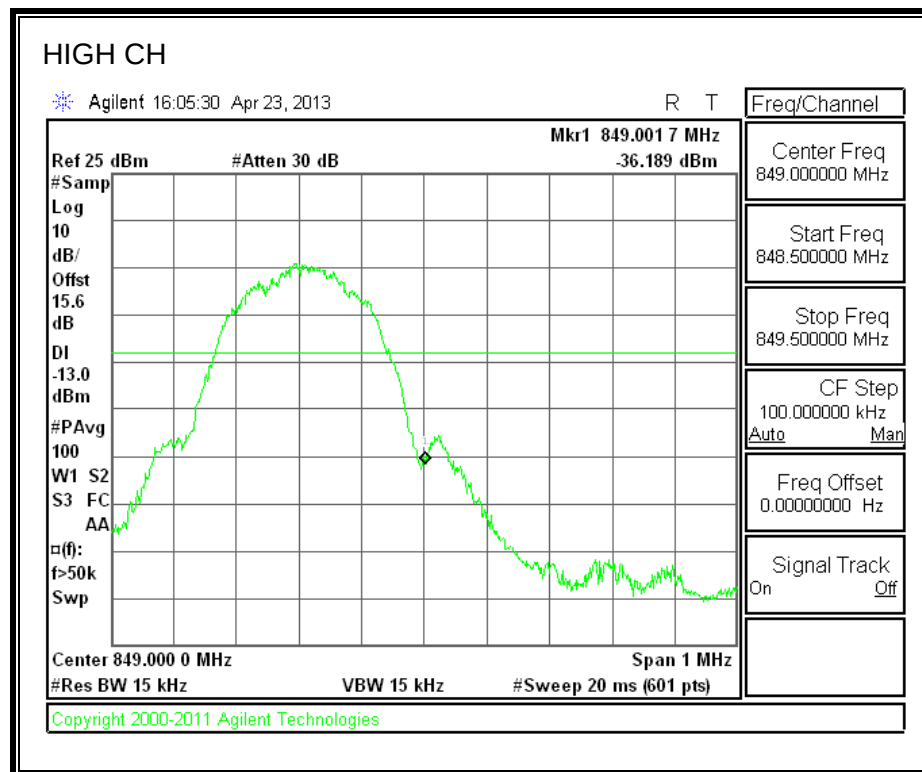
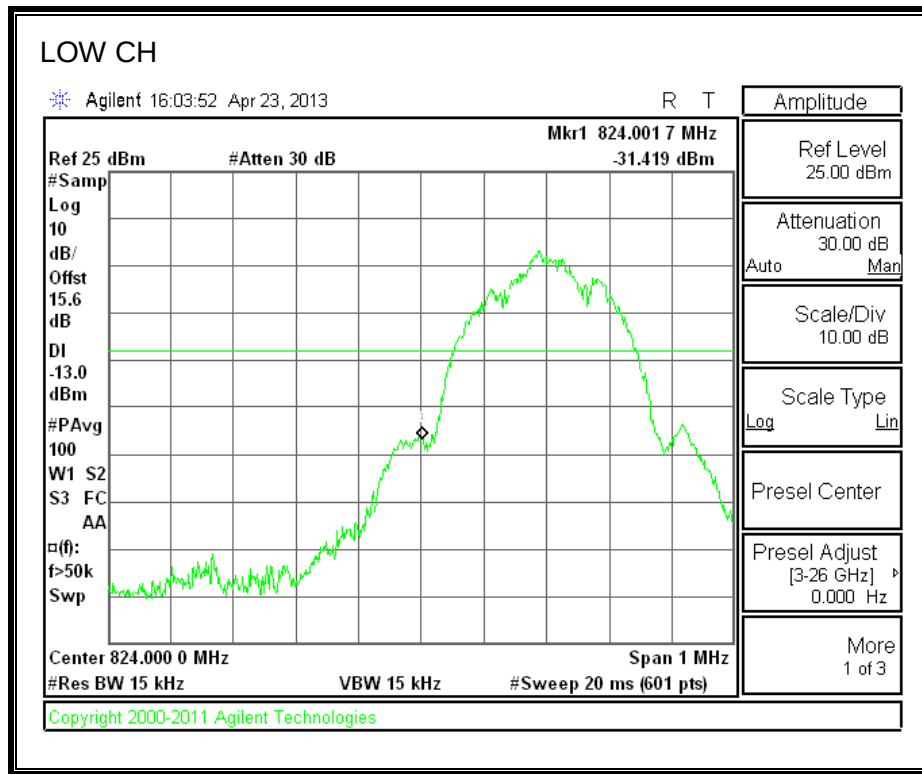
CELL BAND



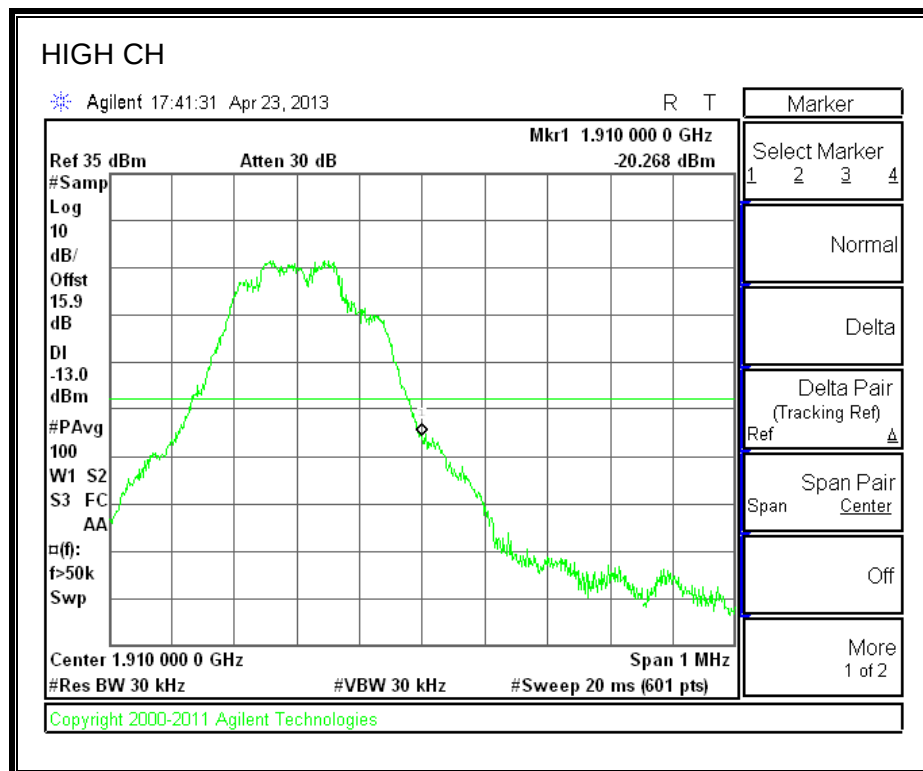
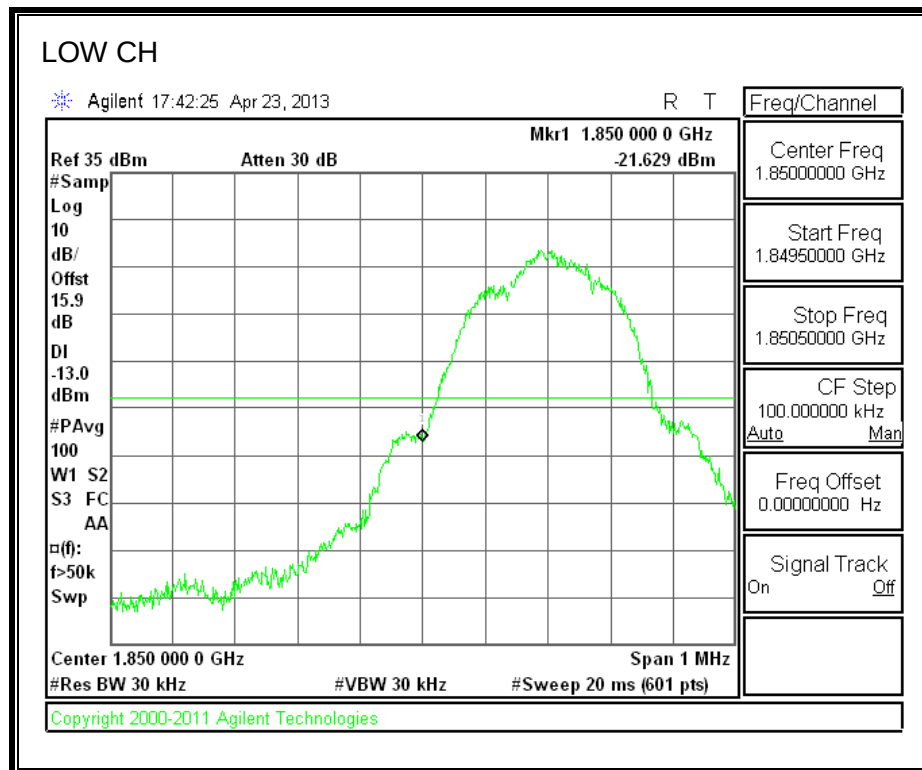


8.2.2. GSM-EGPRS

CELL BAND

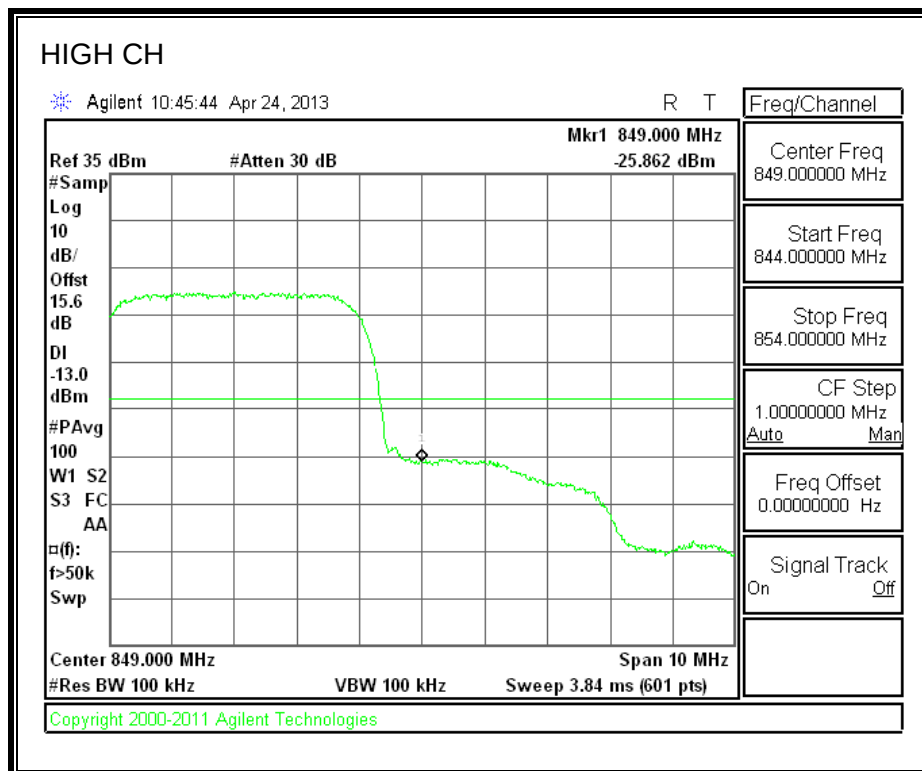
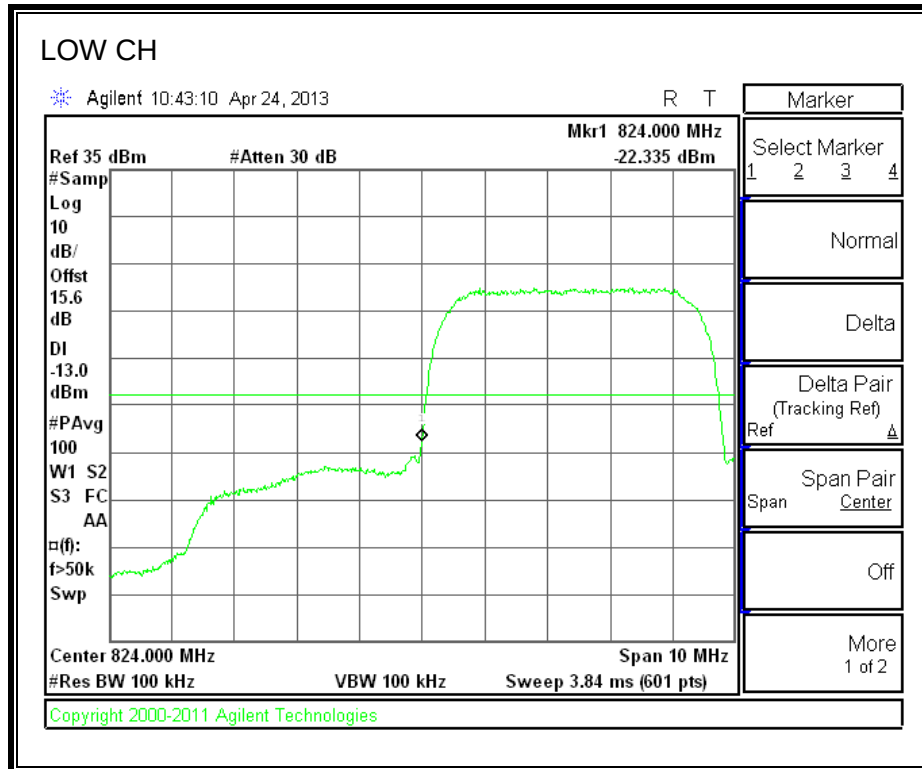


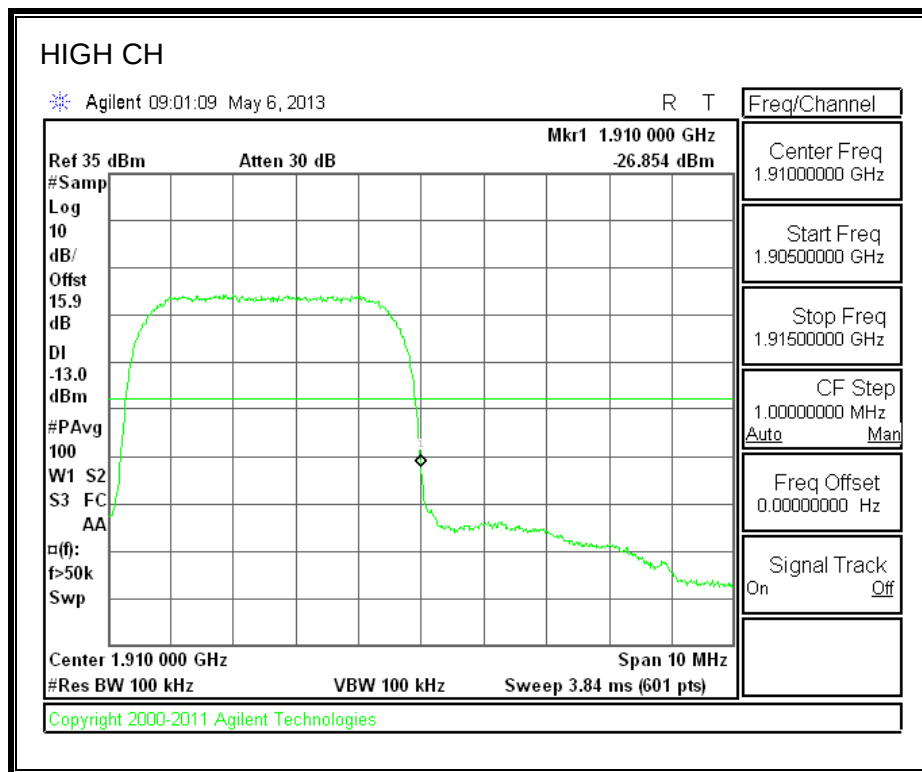
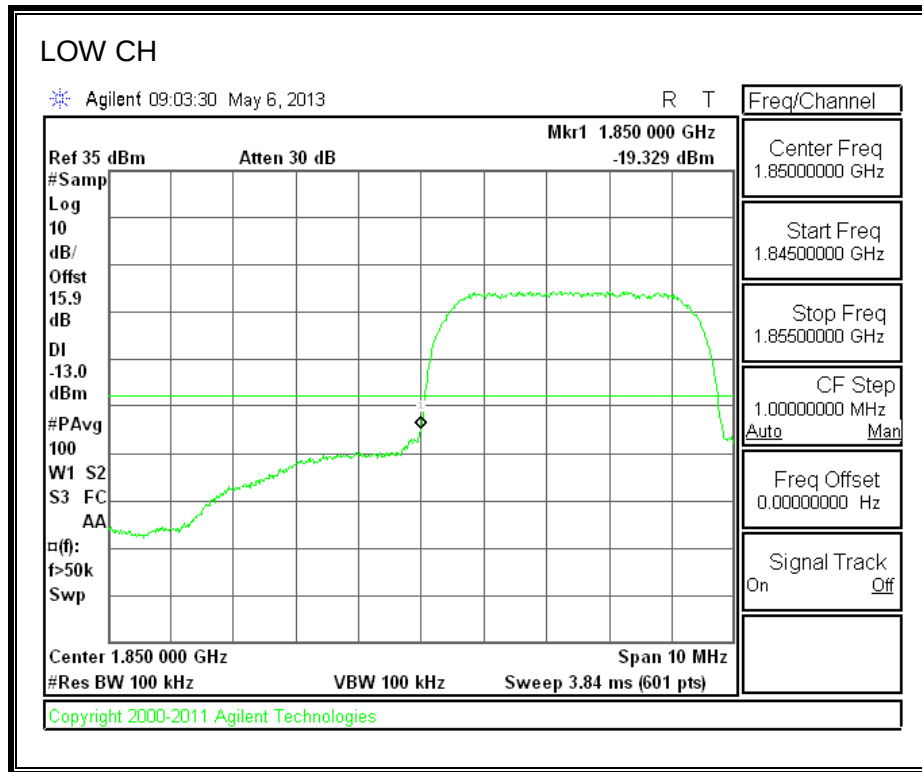
PCS BAND

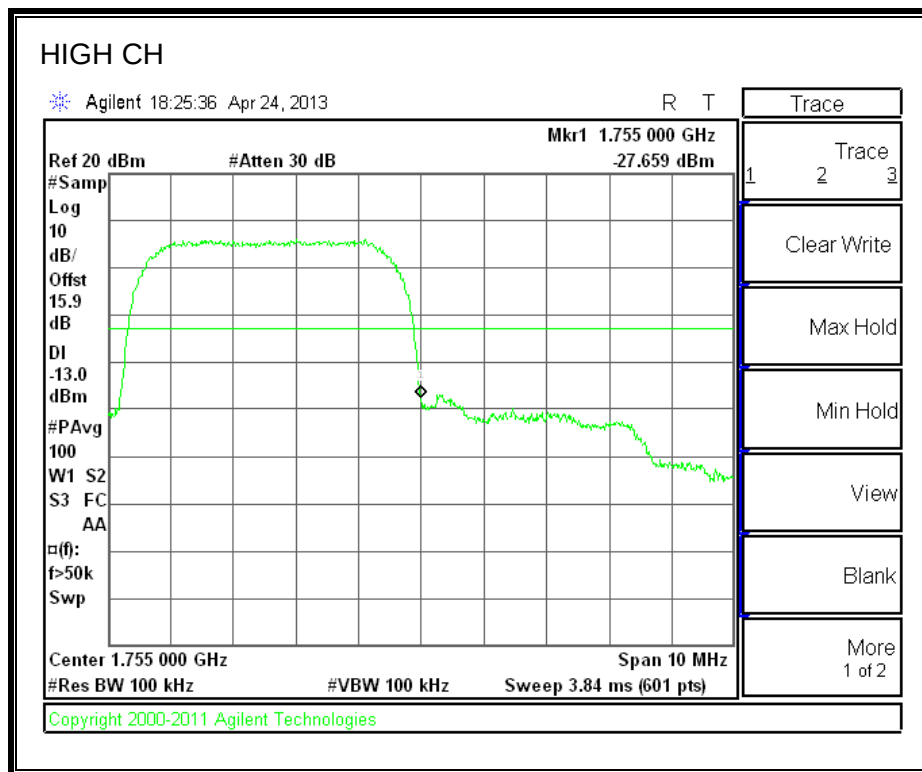
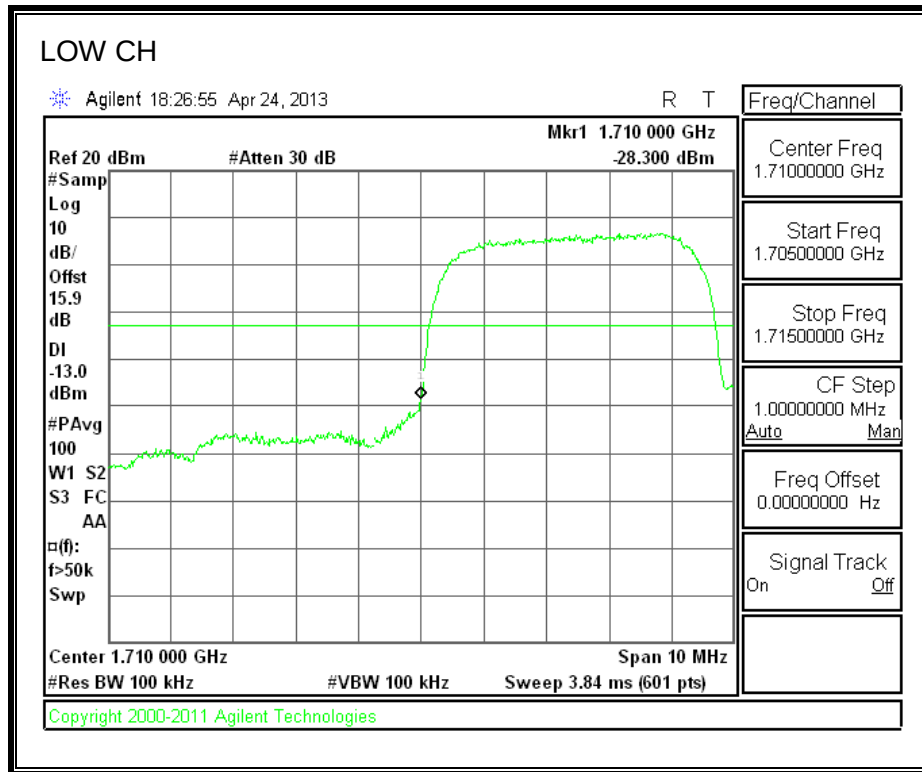


8.2.3. UMTS-REL 99

CELL BAND

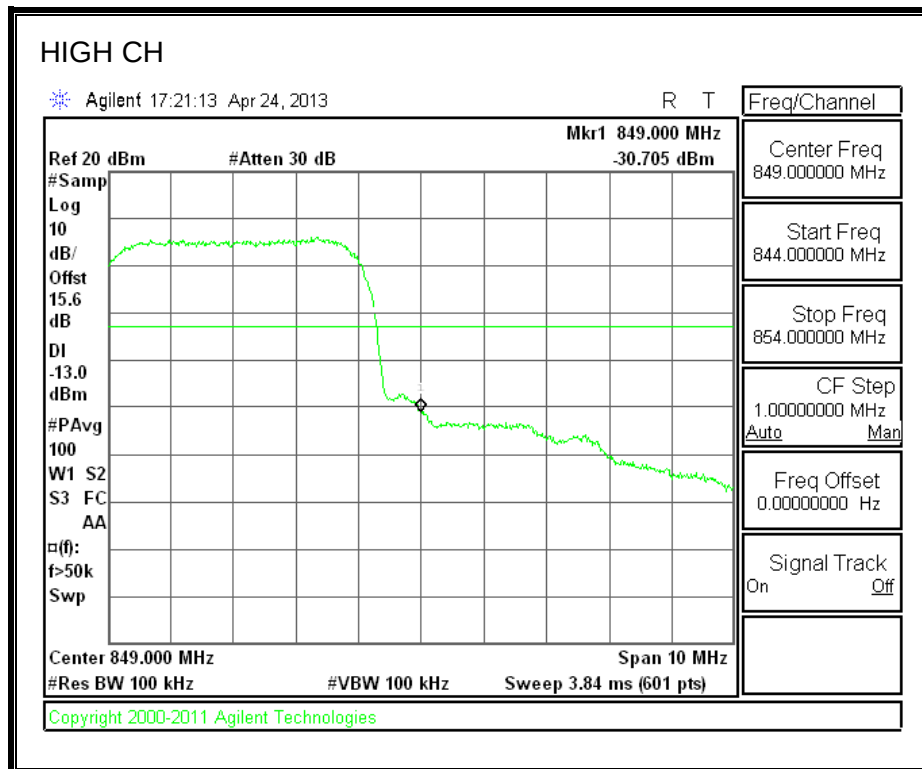
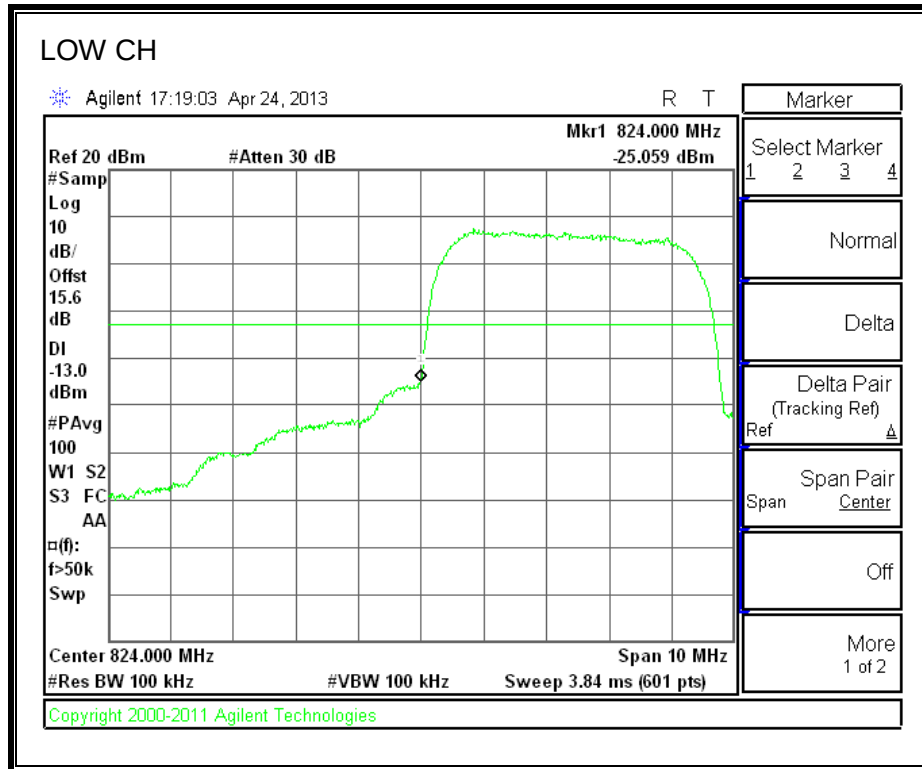


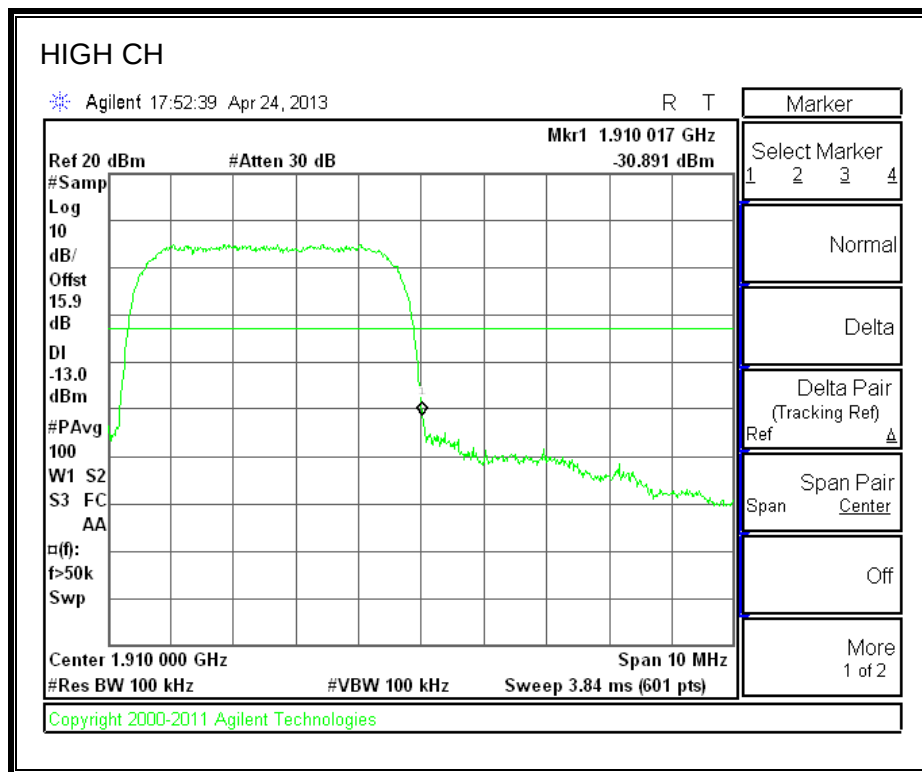
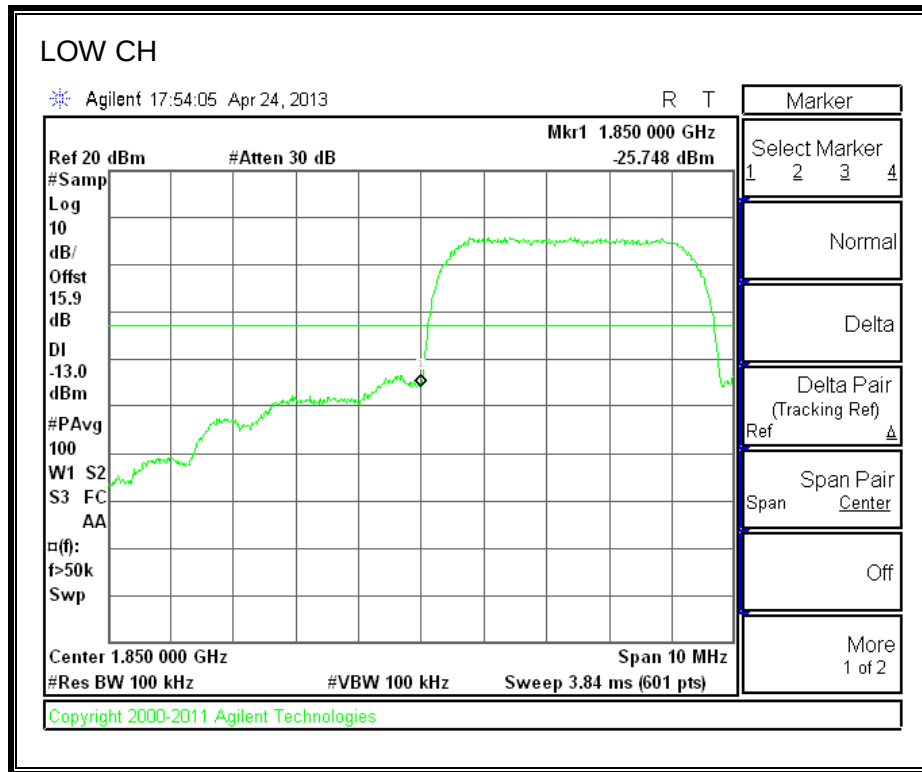


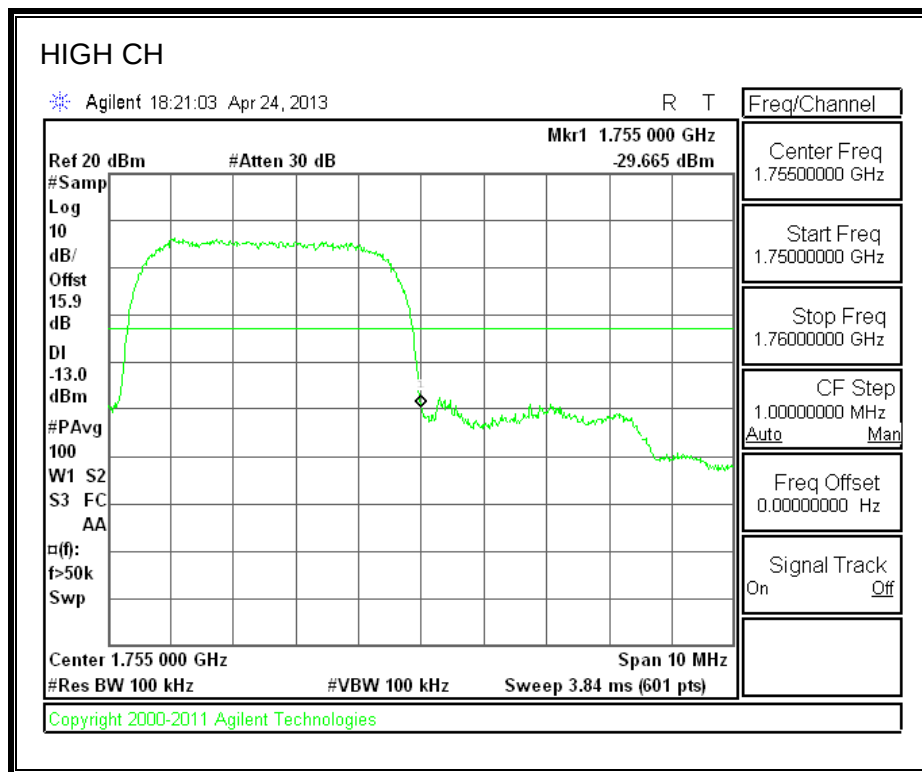
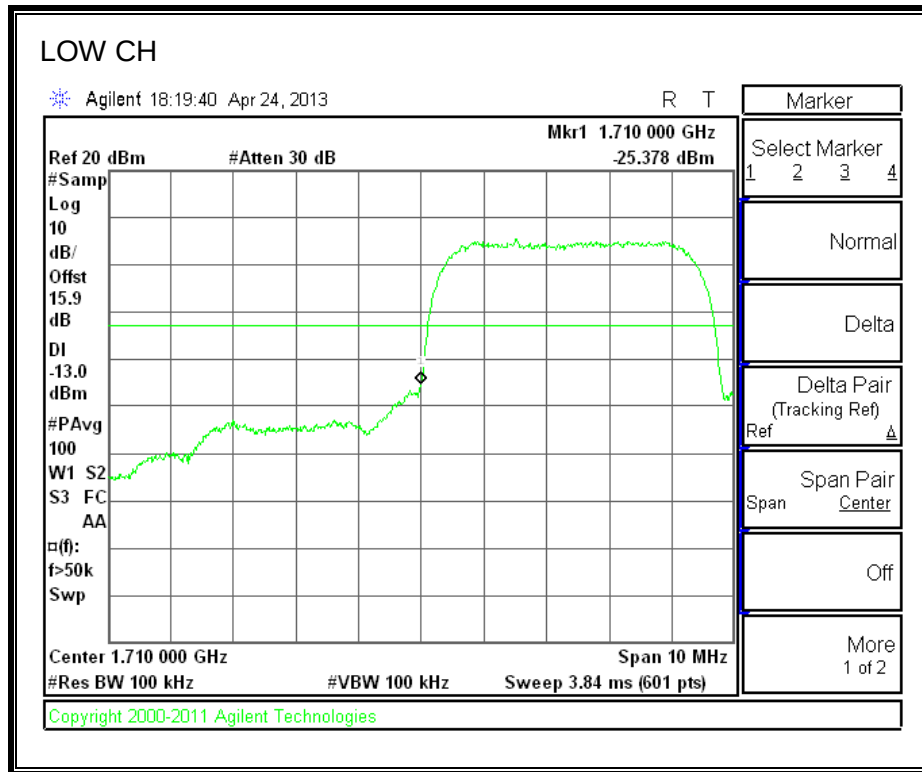


8.2.4. UMTS-HSDPA

CELL BAND

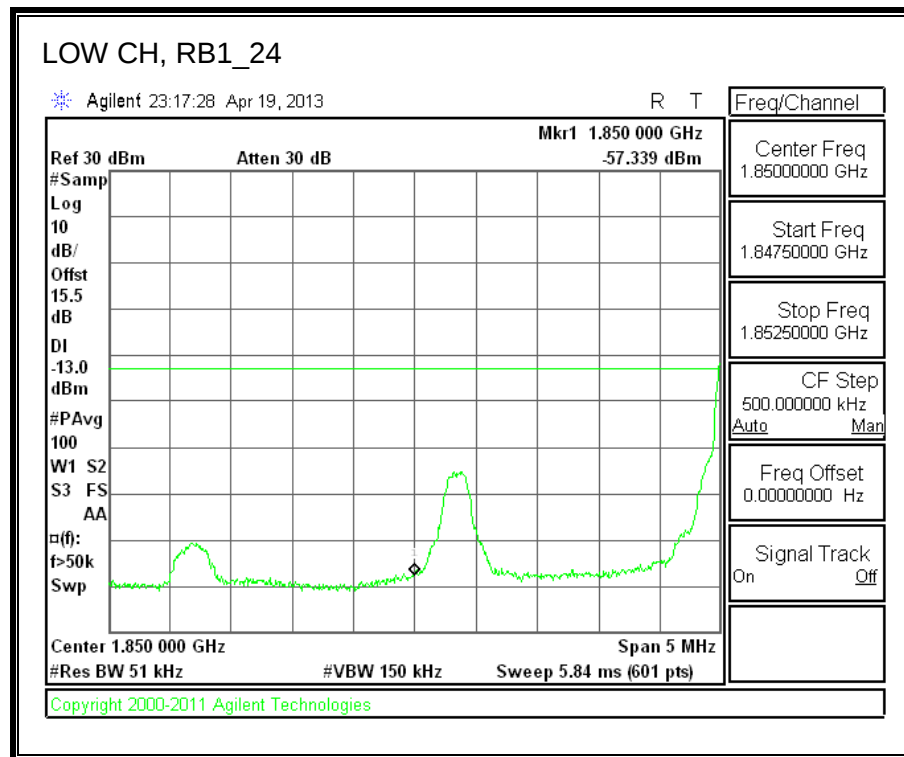
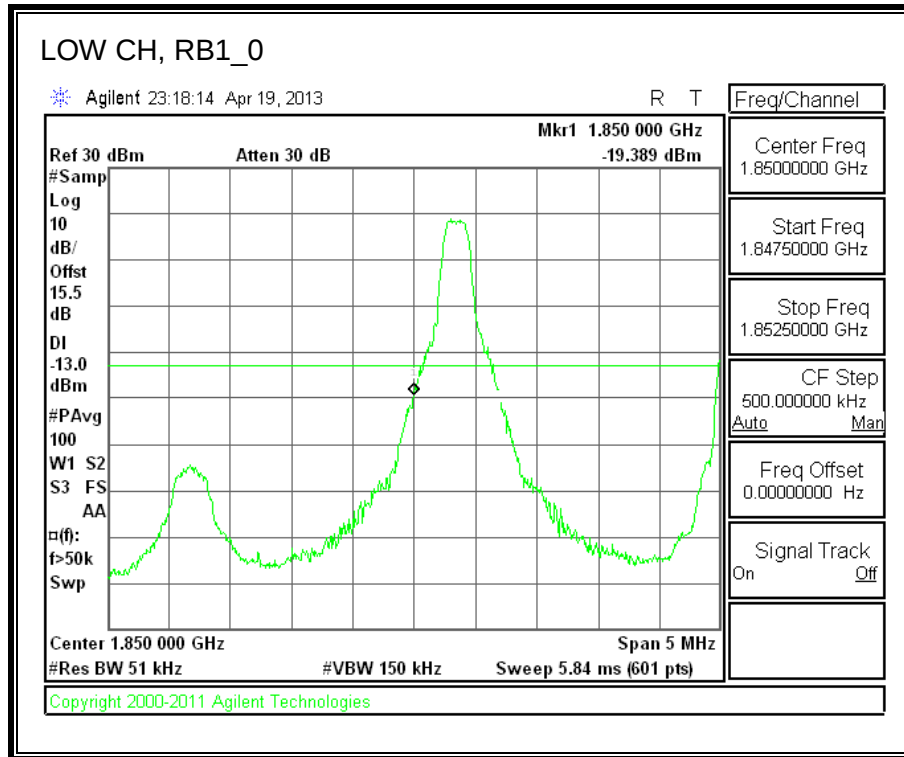


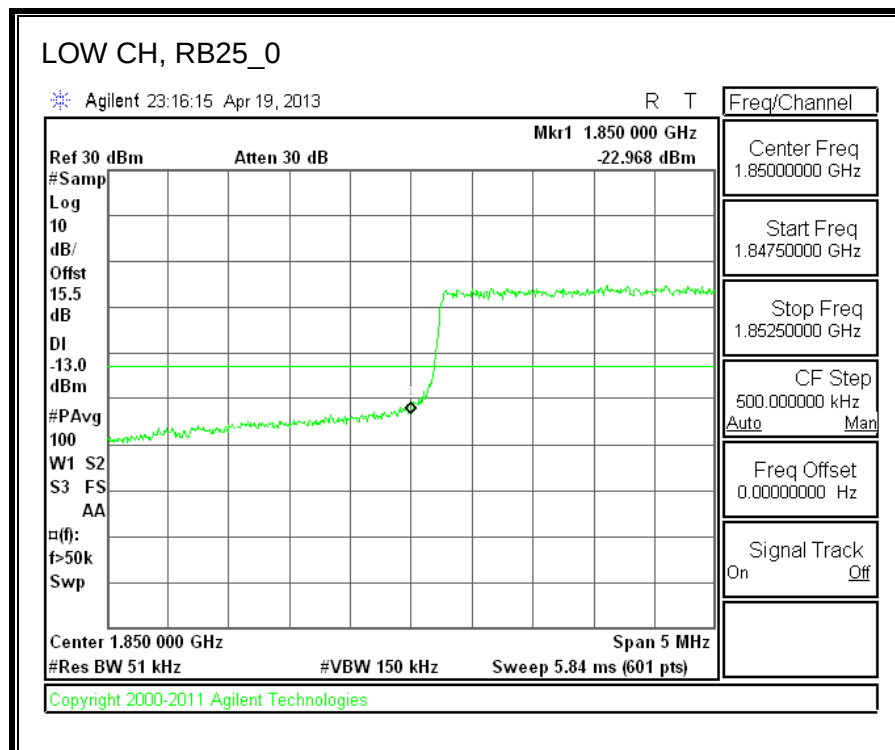
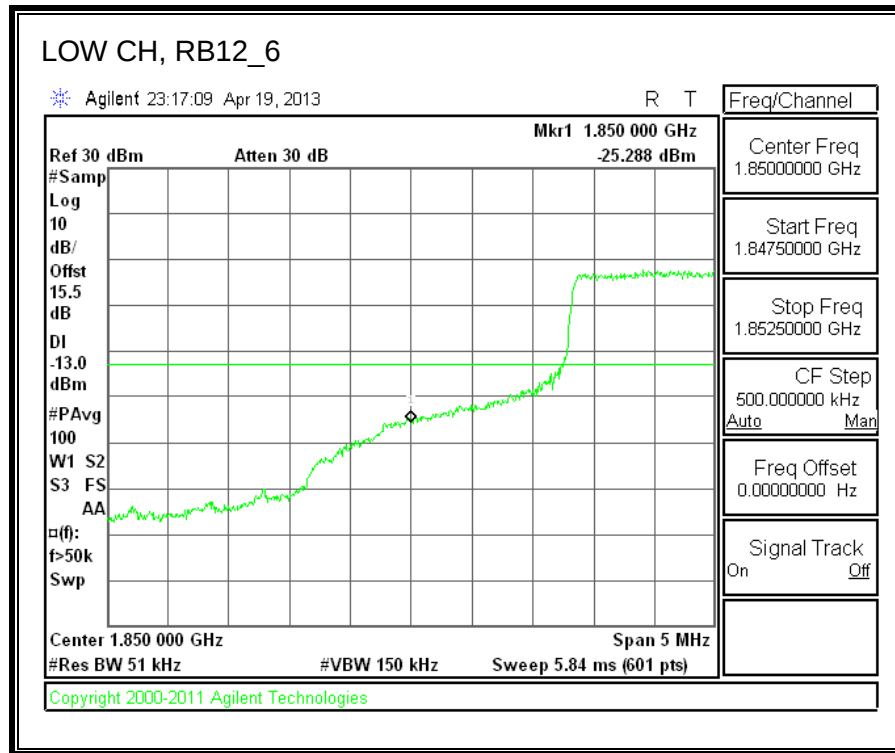




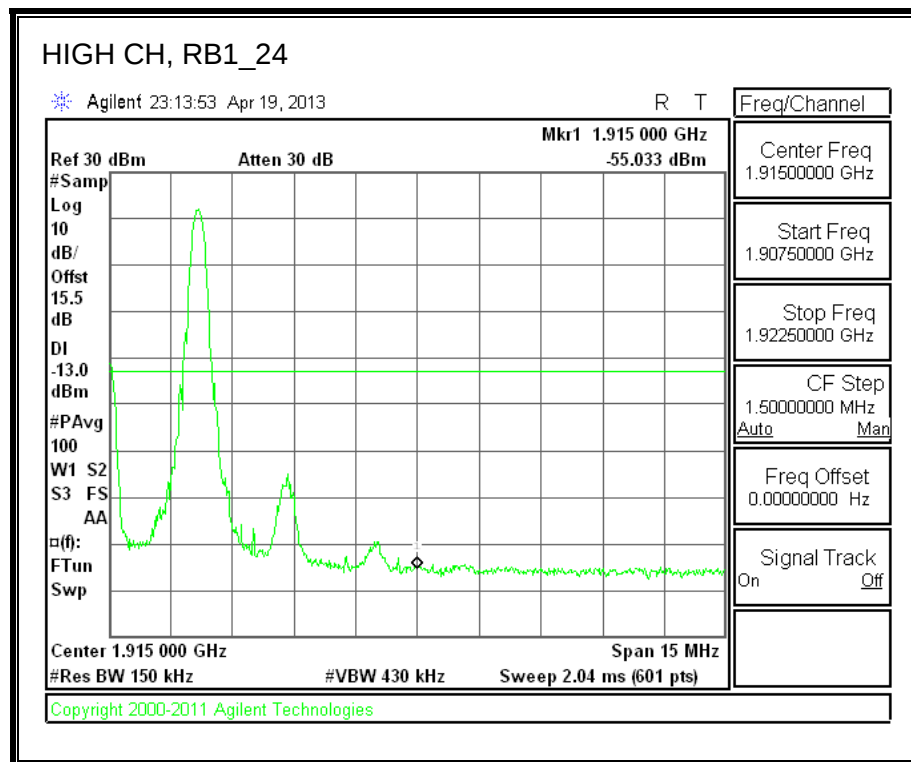
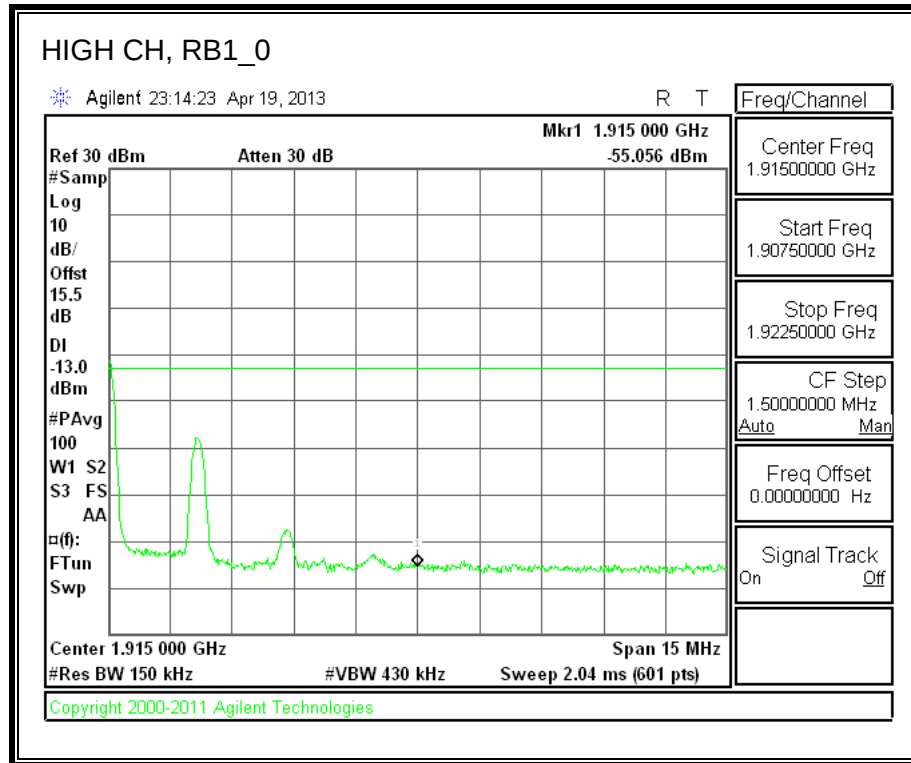
8.2.5. LTE BAND 2-5MHz BANDWIDTH

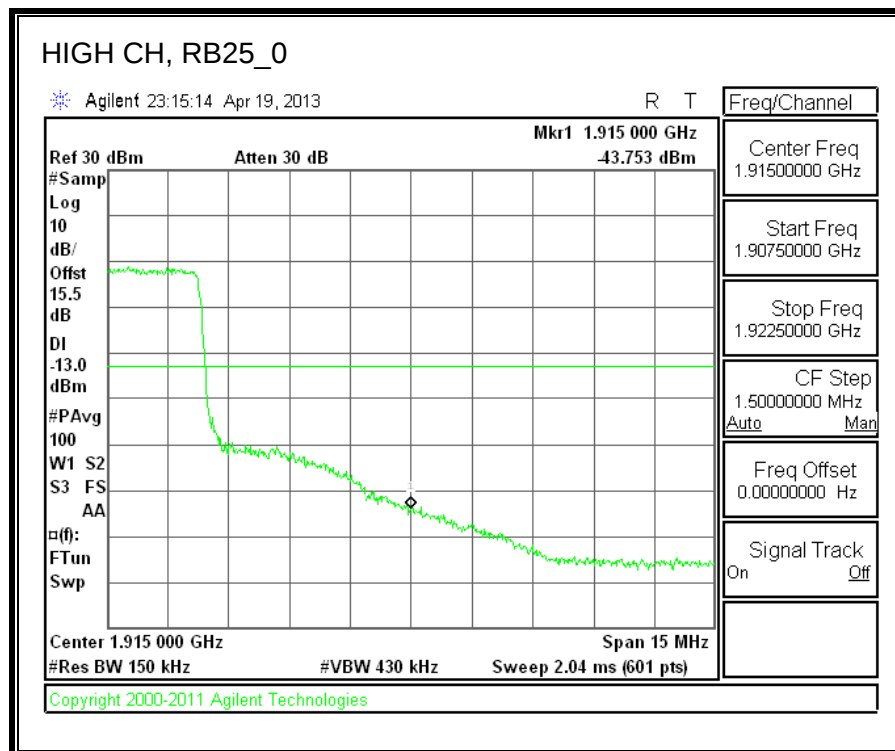
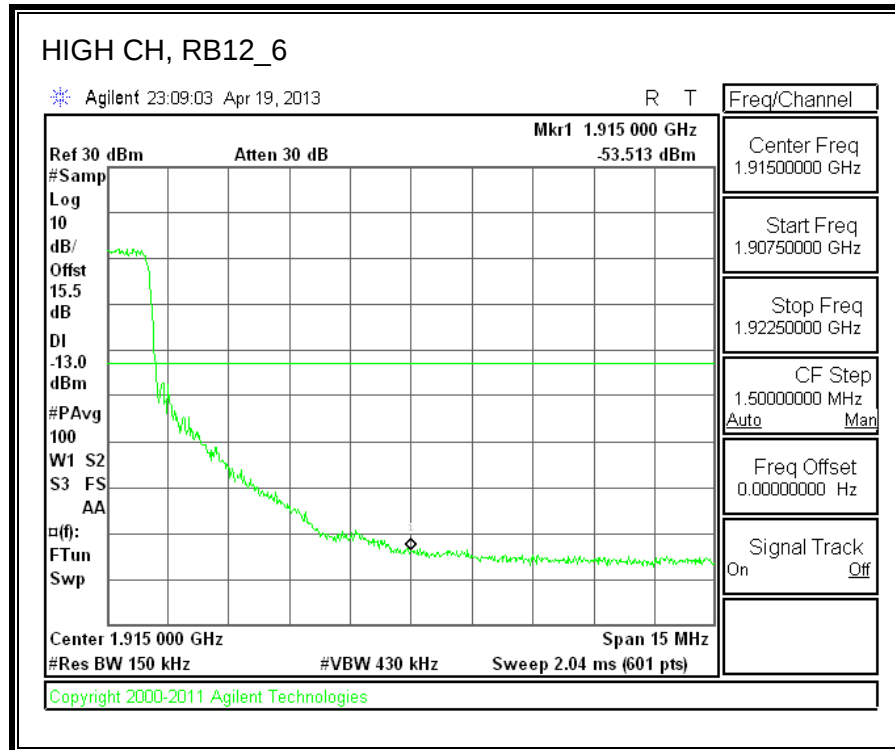
LOW-QPSK



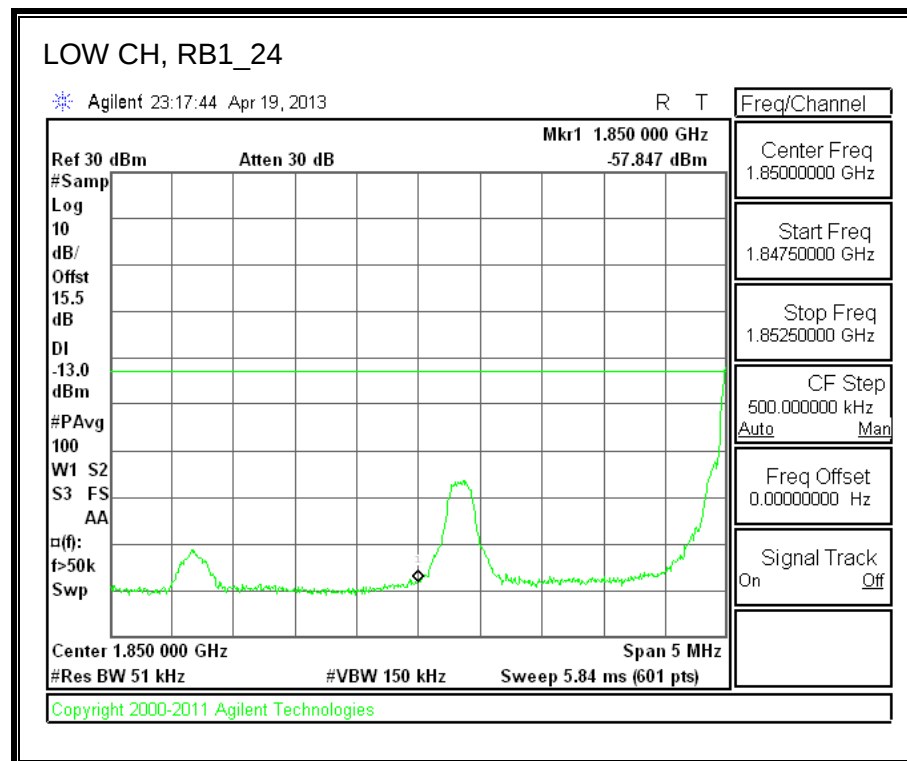
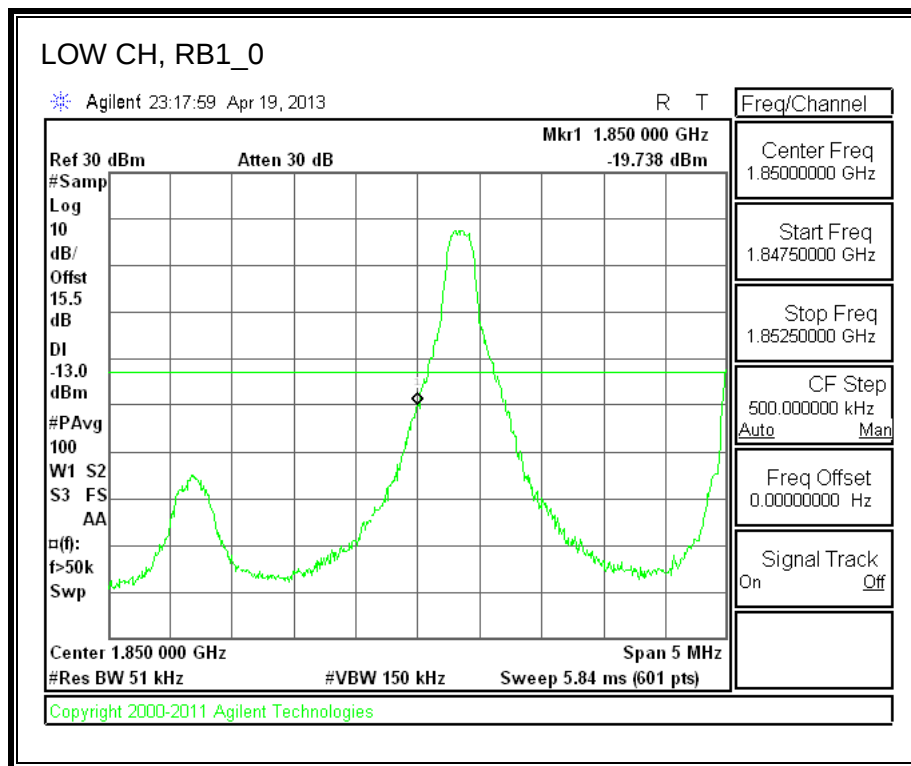


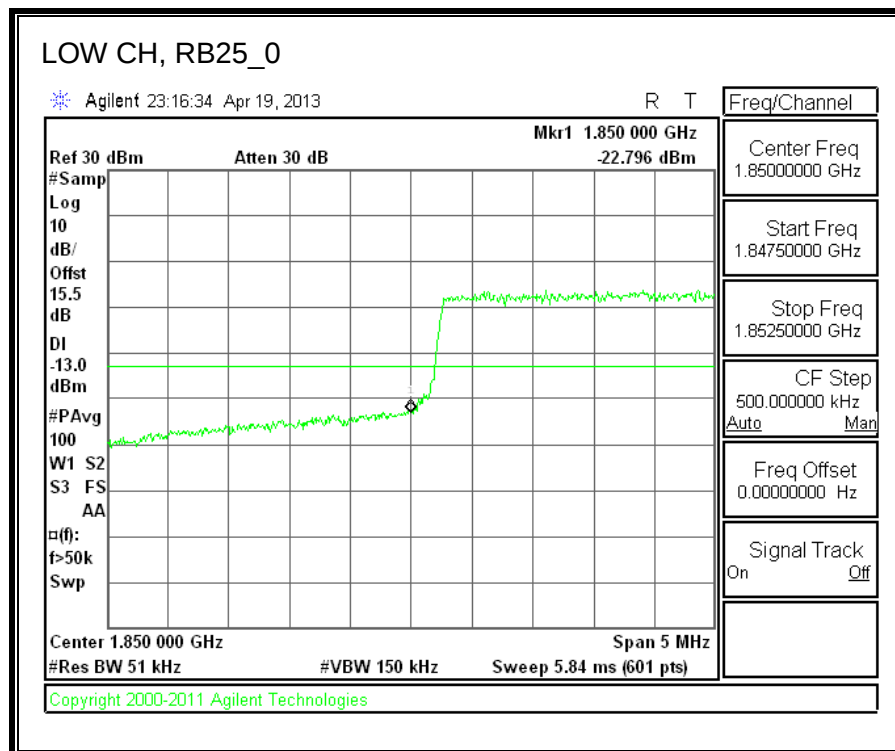
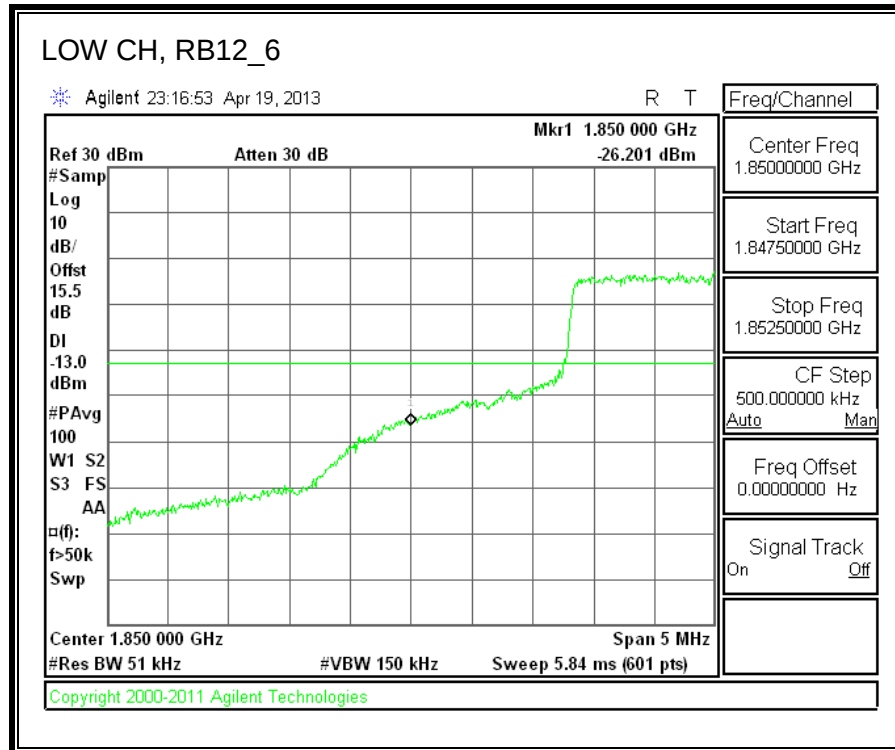
HIGH-QPSK



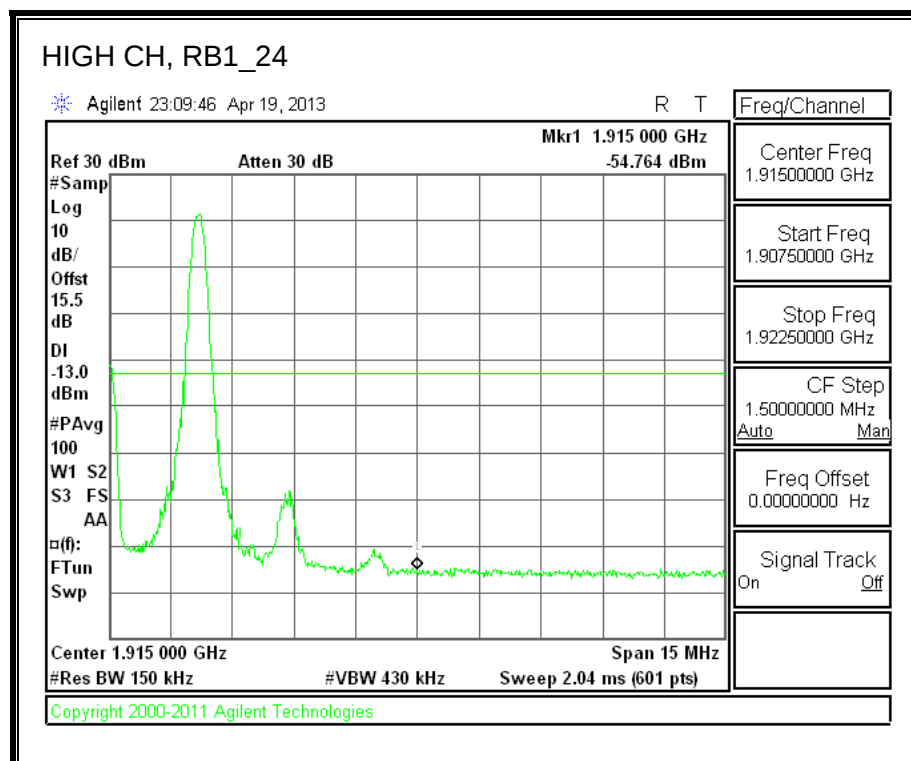
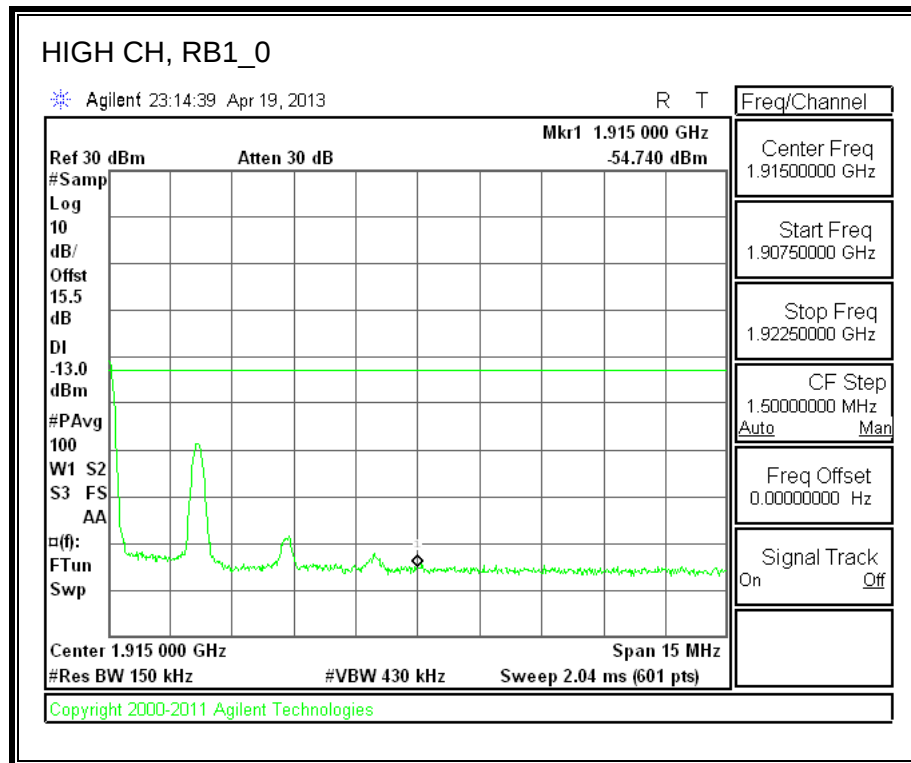


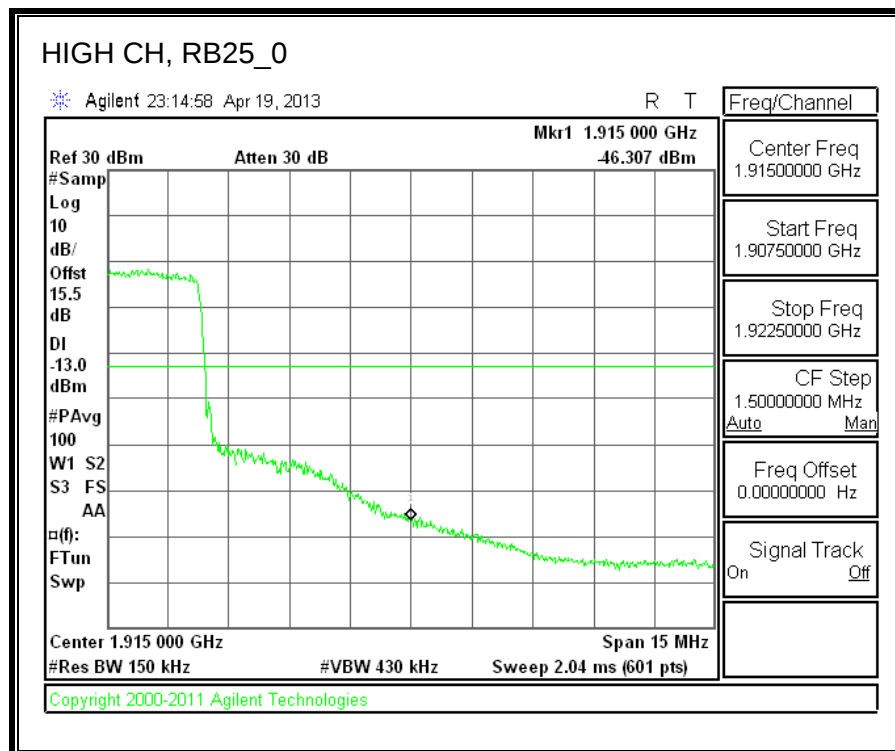
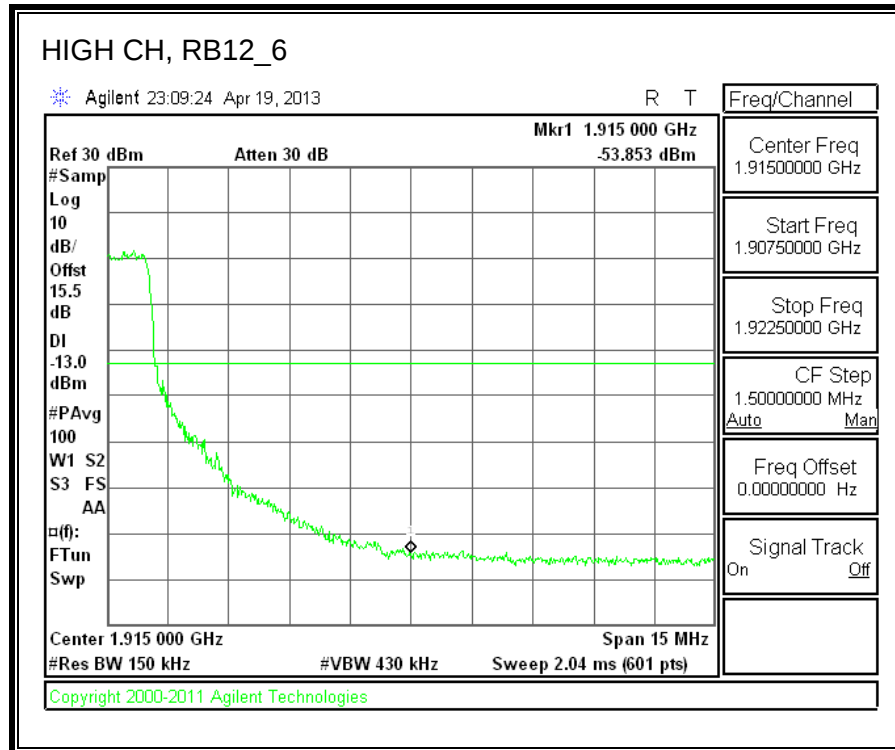
LOW-16QAM





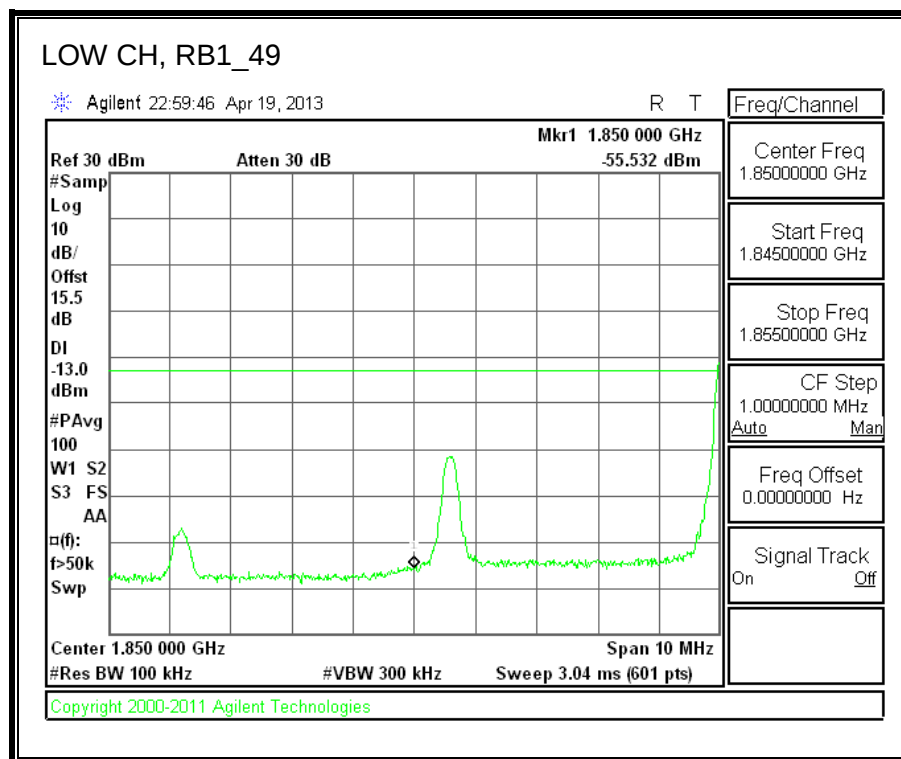
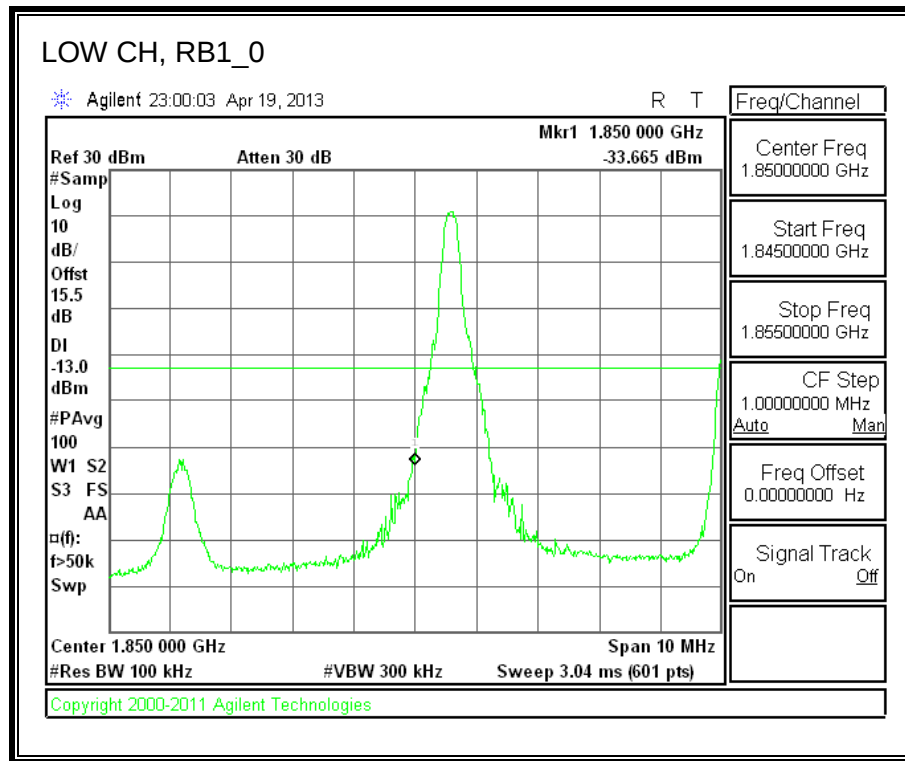
HIGH-16QAM

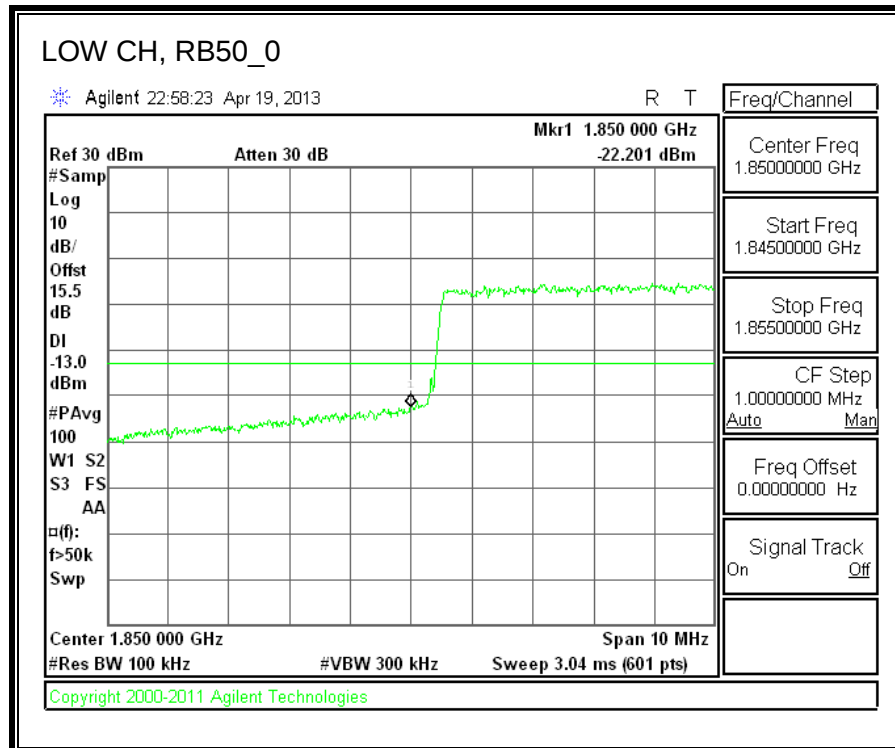
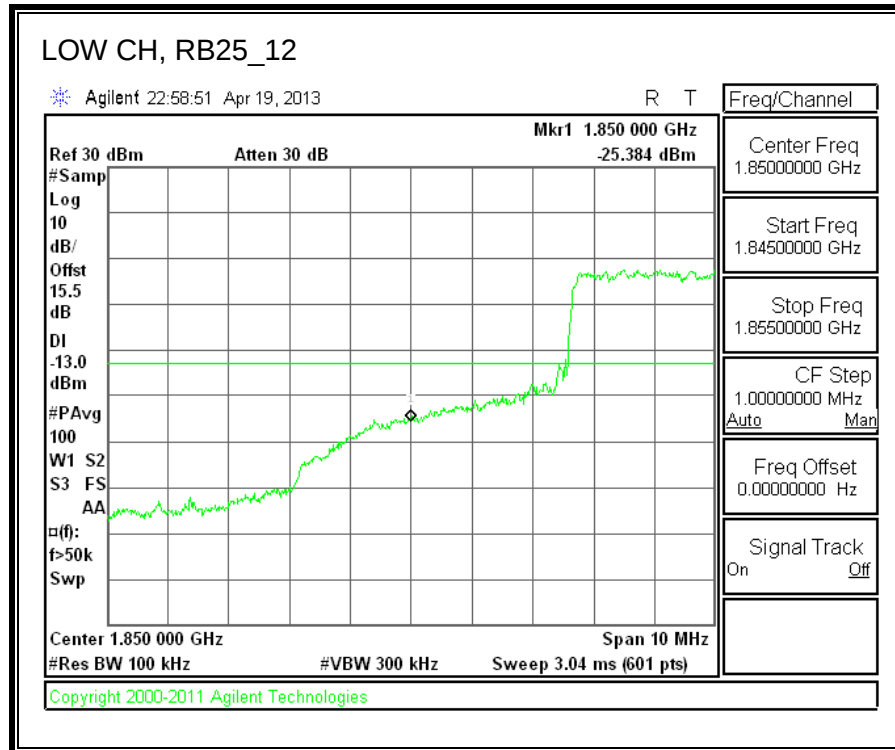




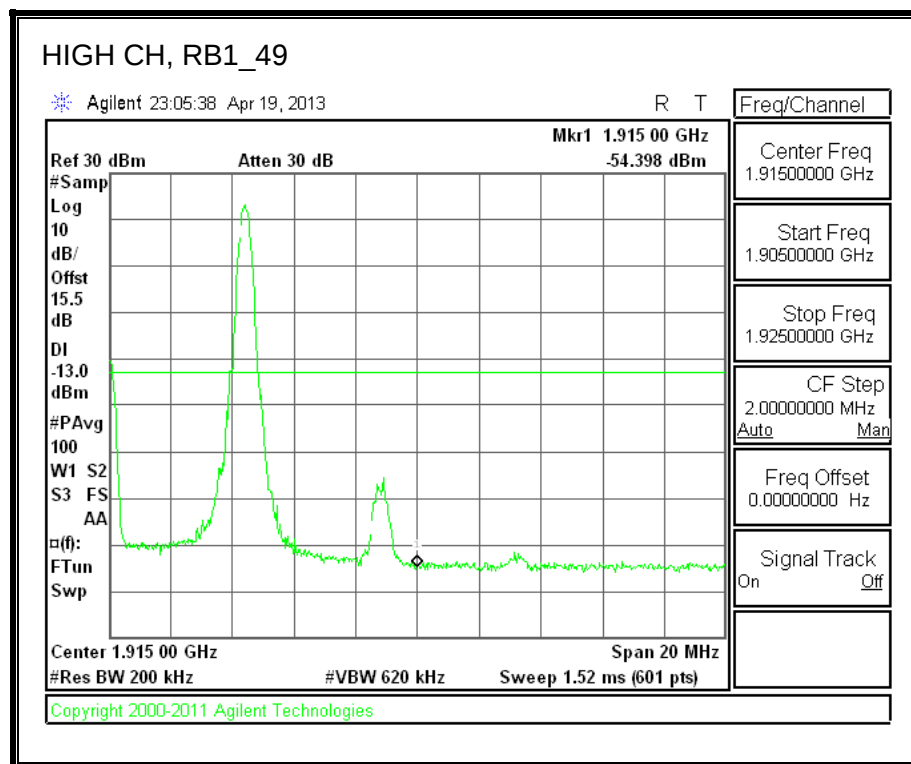
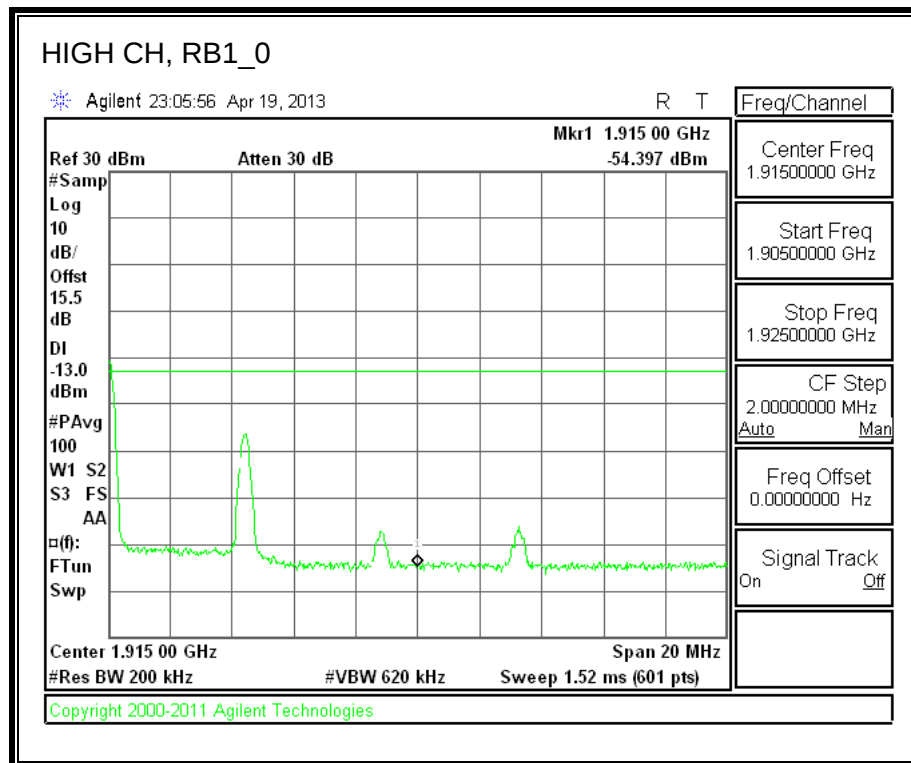
8.2.6. LTE BAND 2-10MHz BANDWIDTH

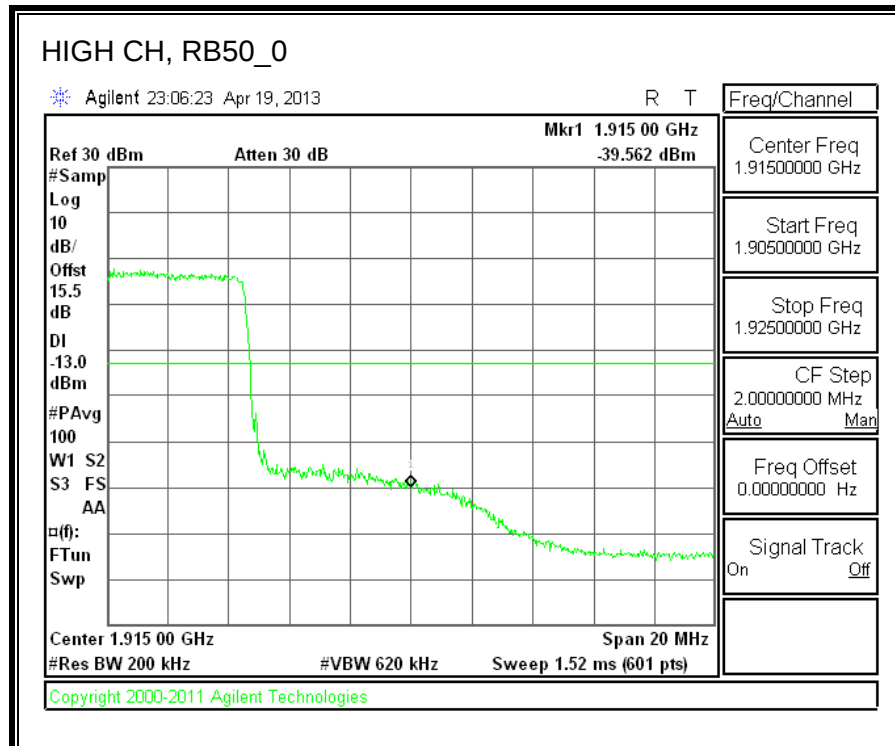
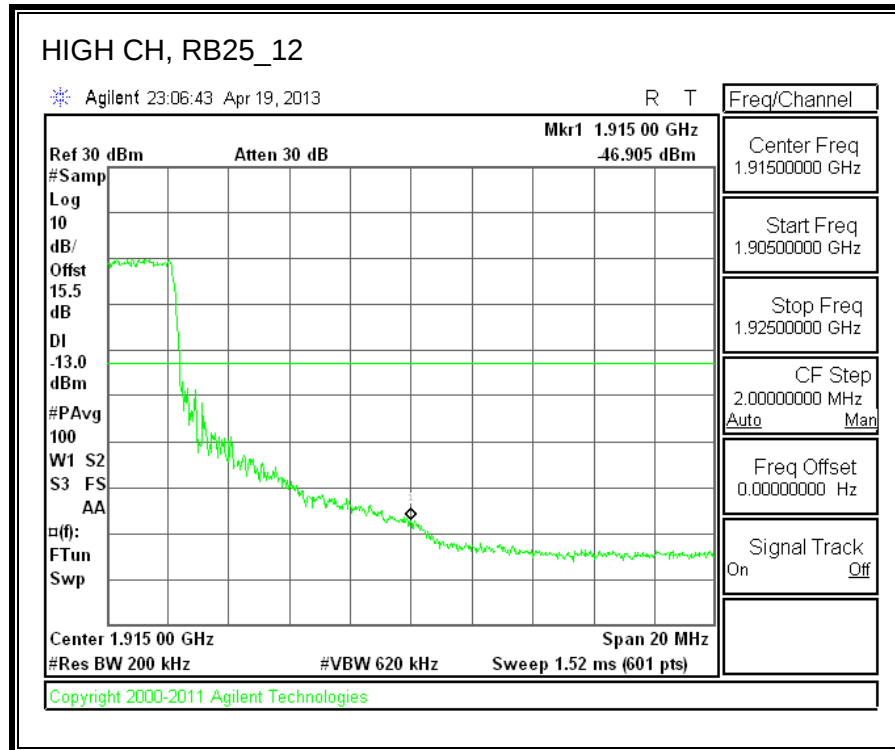
LOW-QPSK



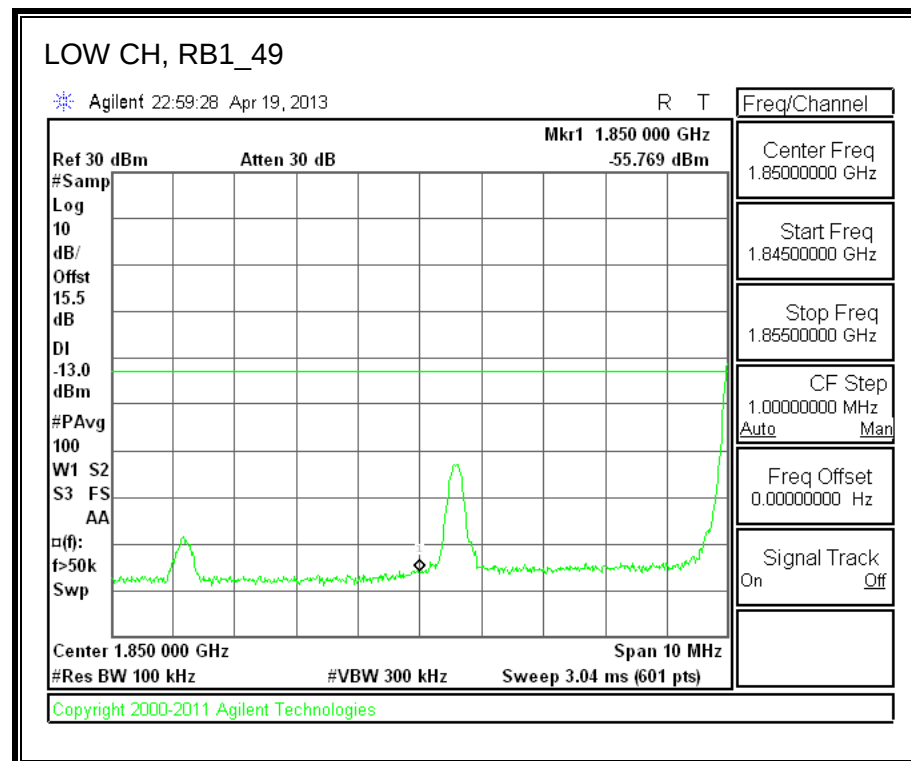
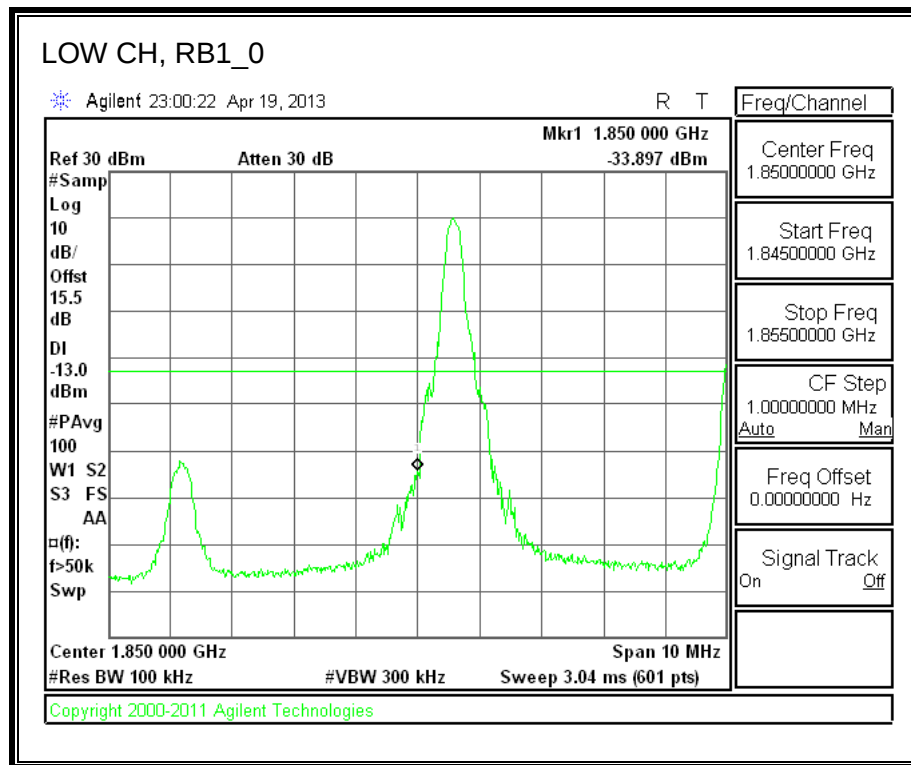


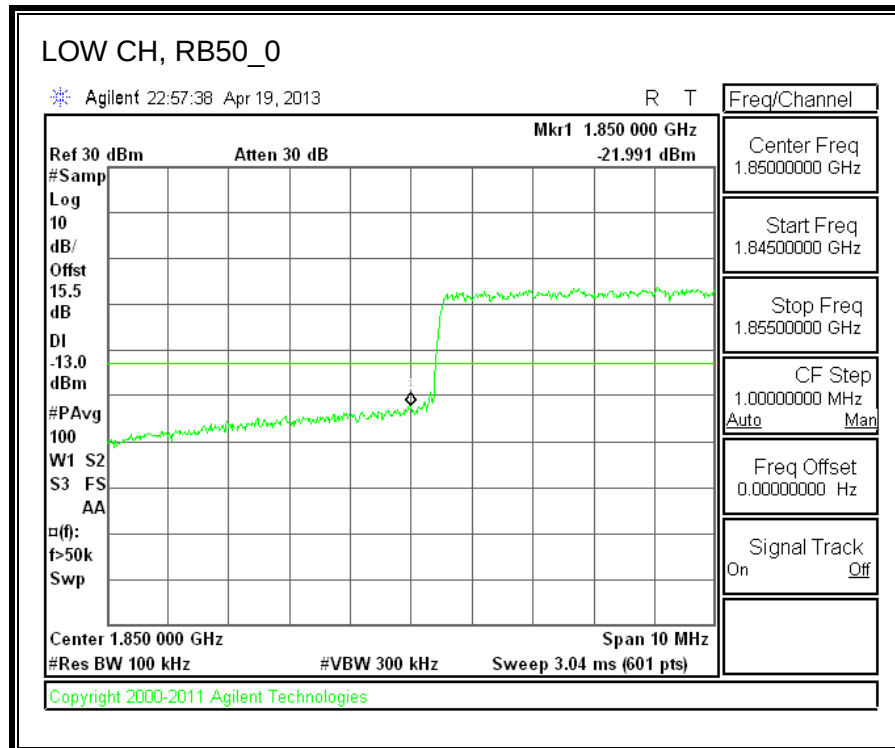
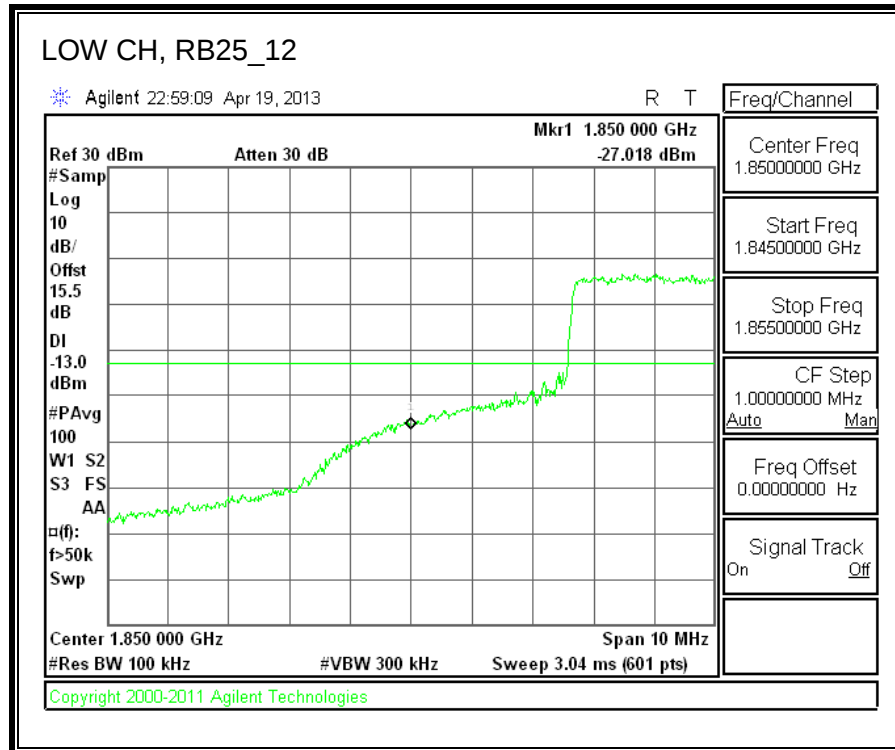
HIGH-QPSK



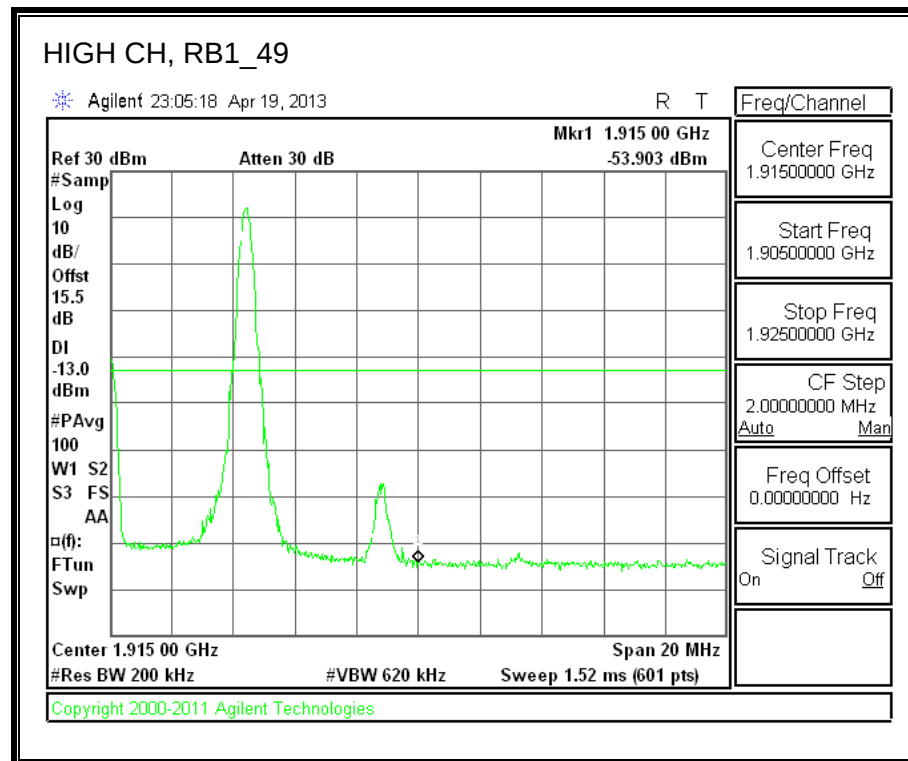
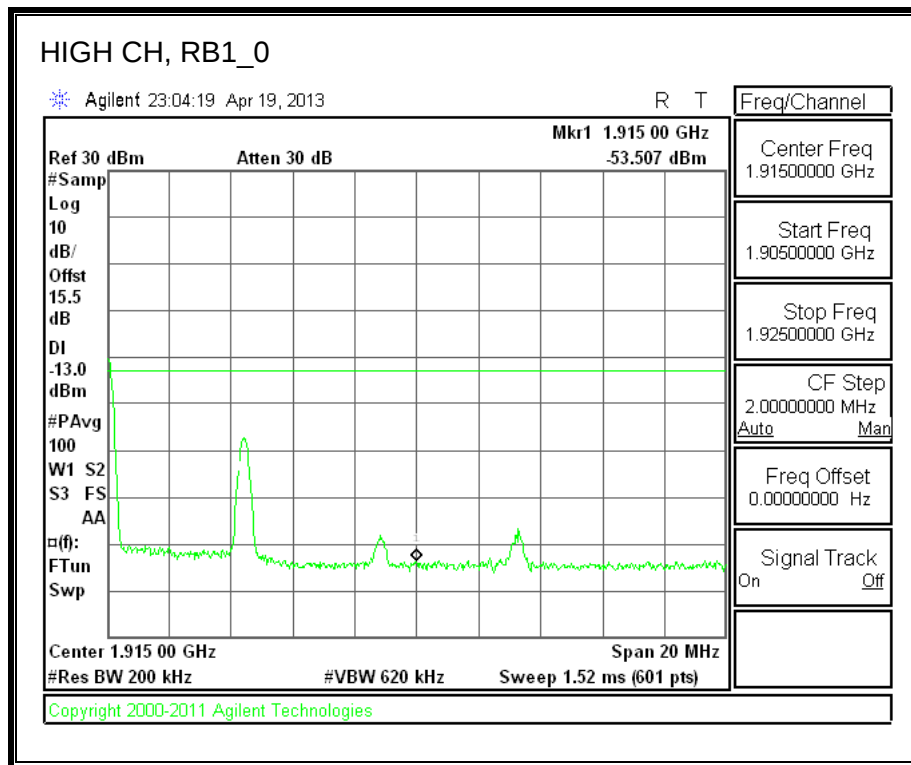


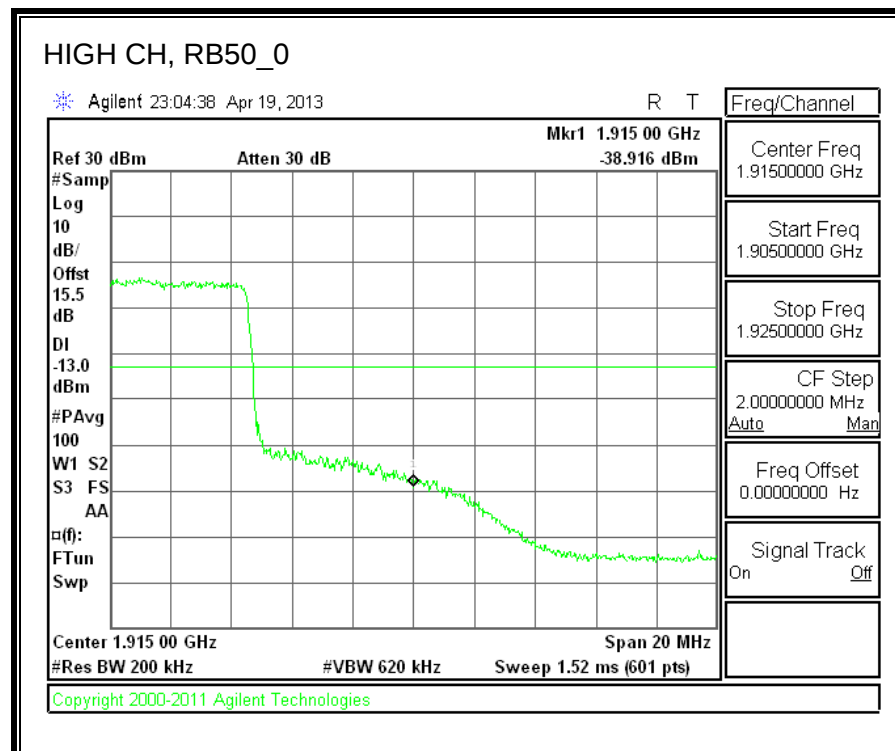
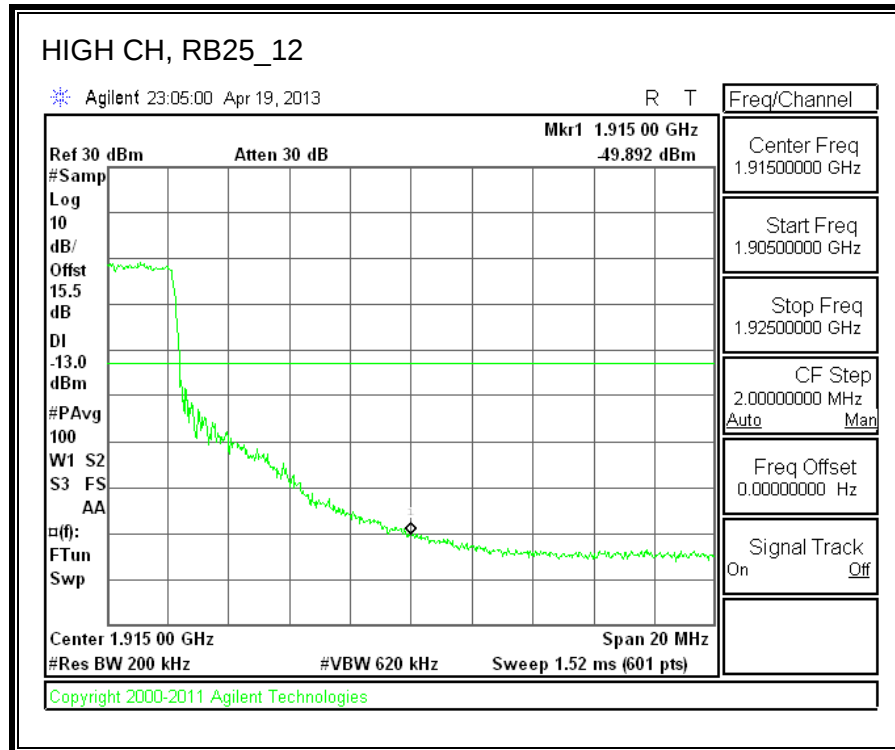
LOW-16QAM





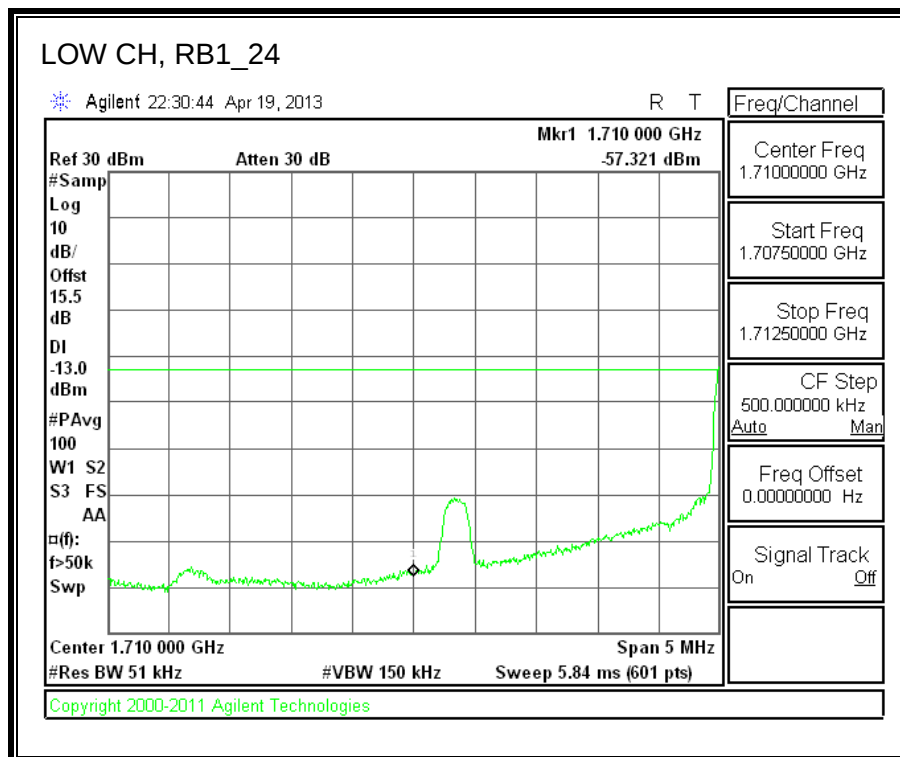
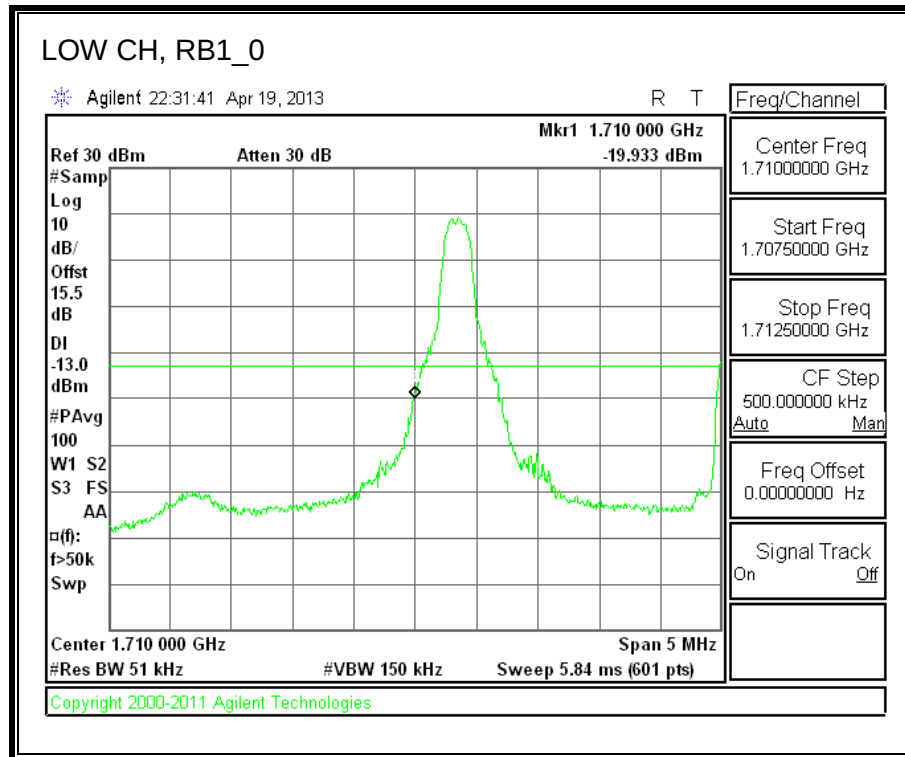
HIGH-16QAM

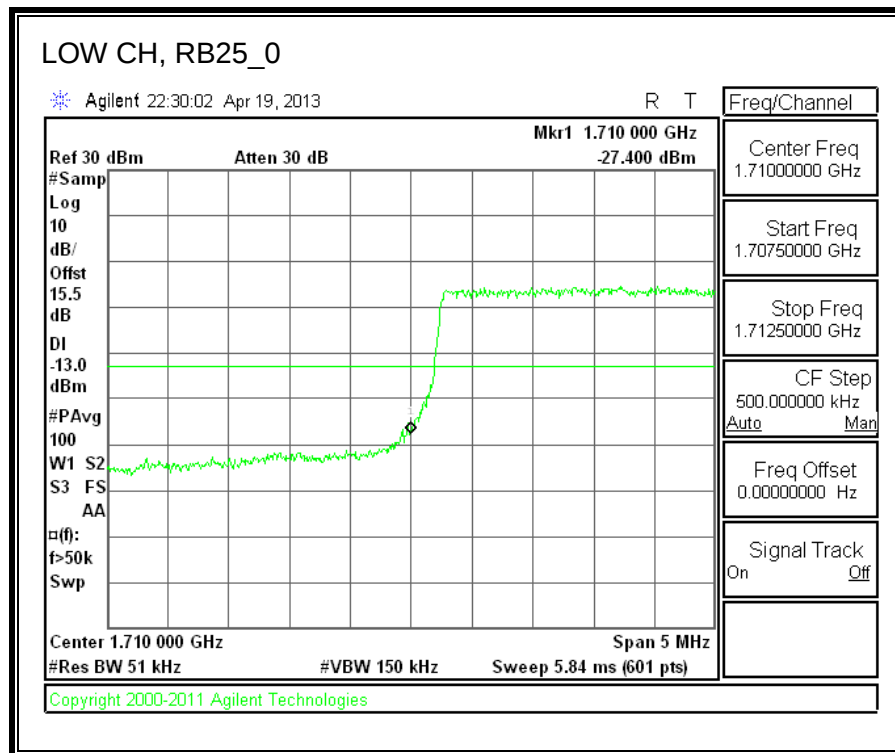
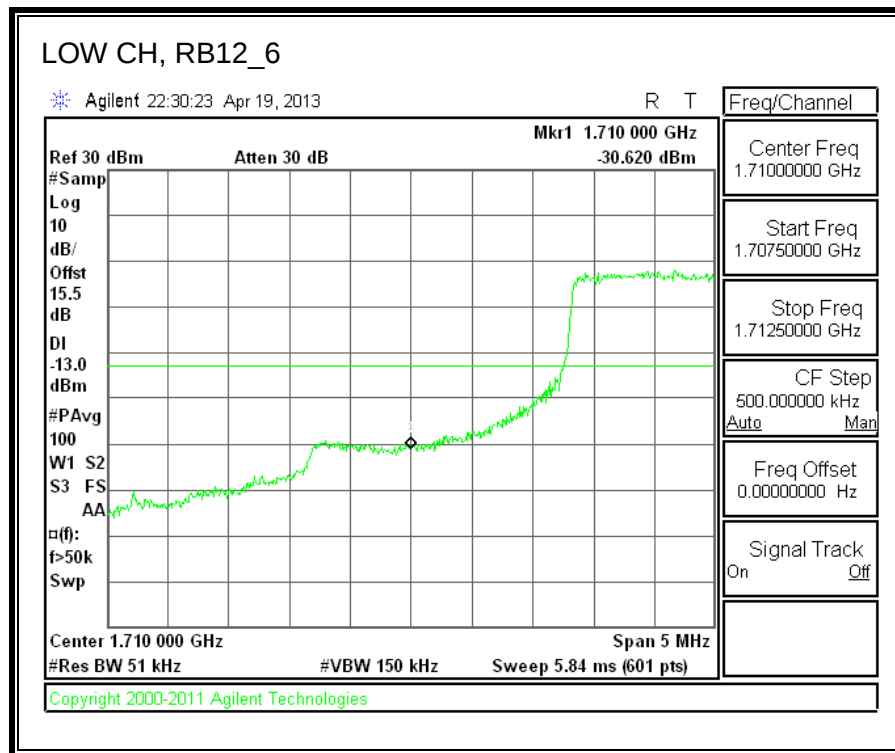




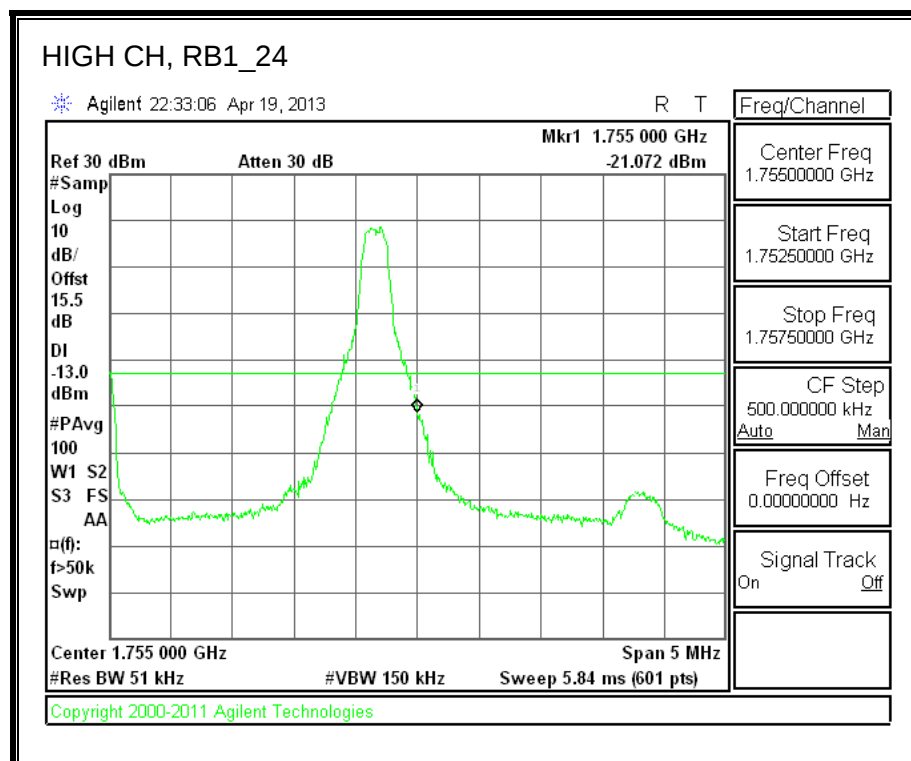
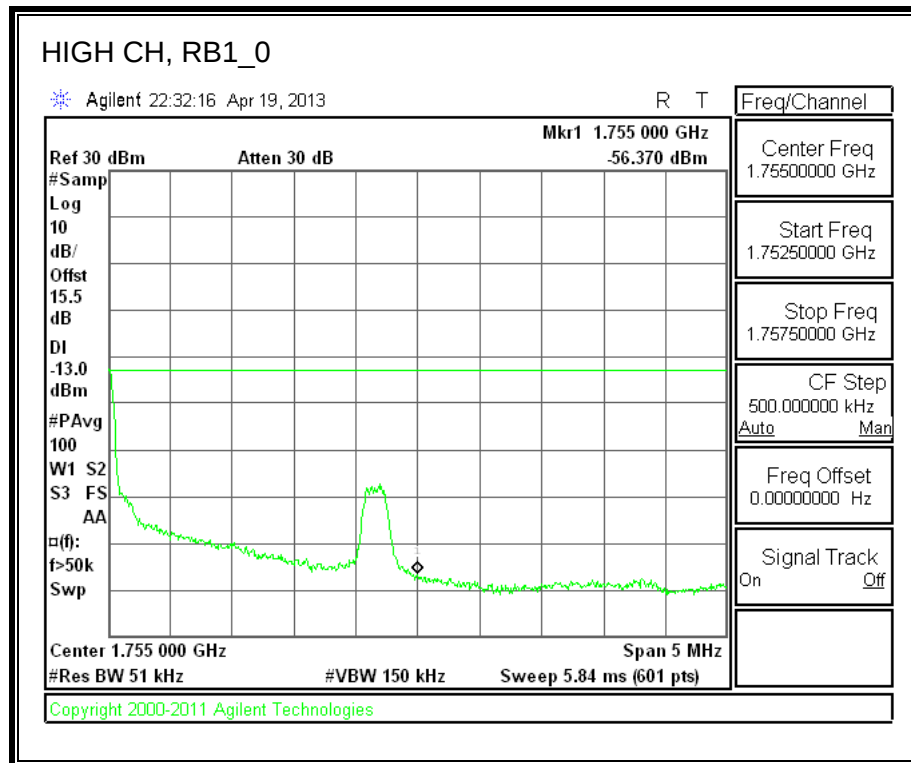
8.2.7. LTE BAND 4-5MHZ BANDWIDTH

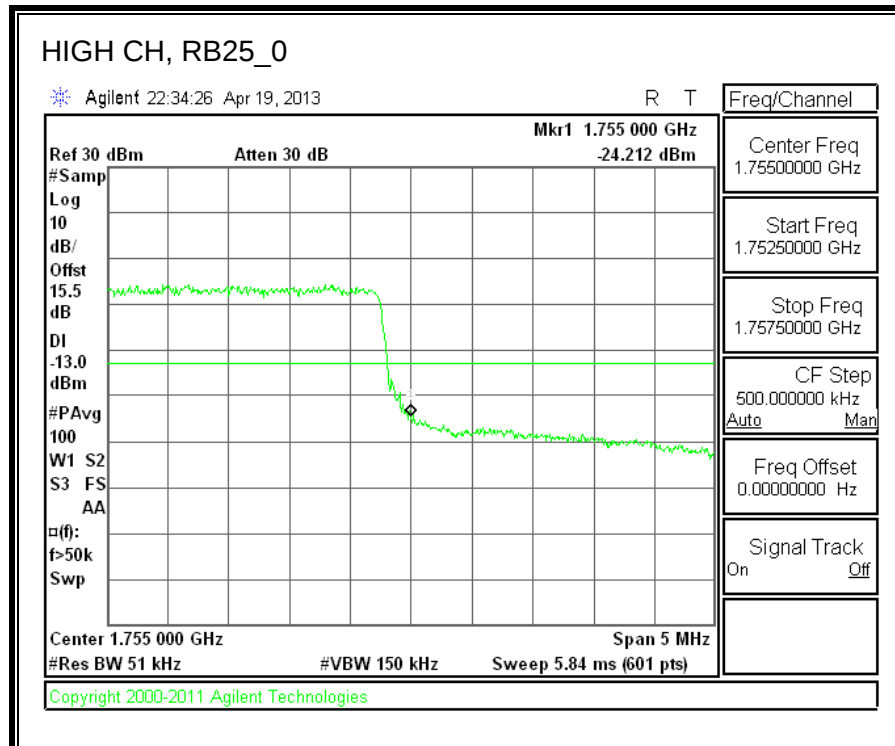
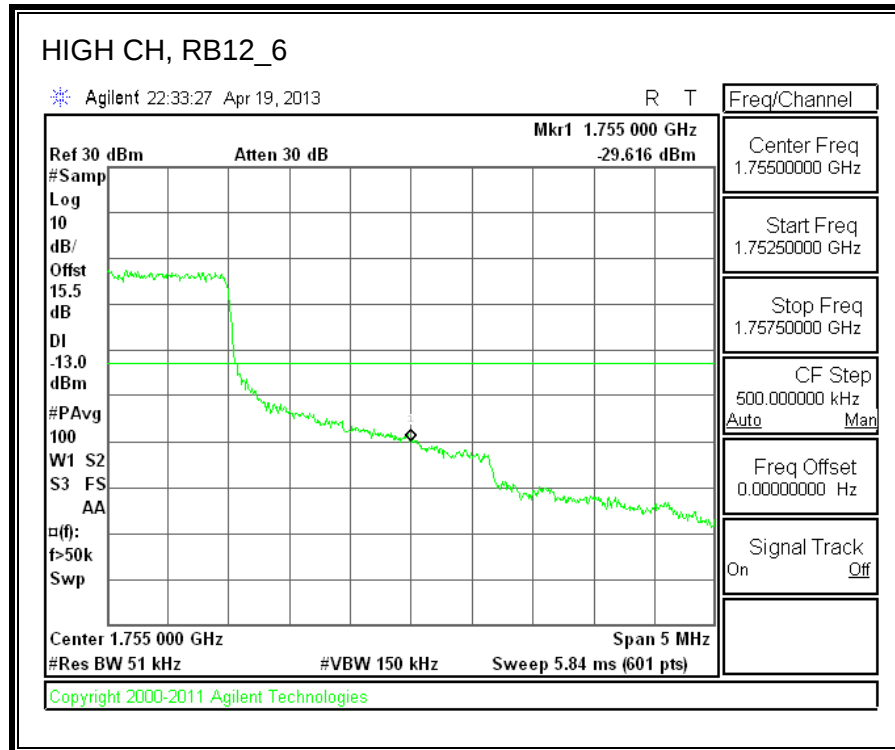
LOW-QPSK



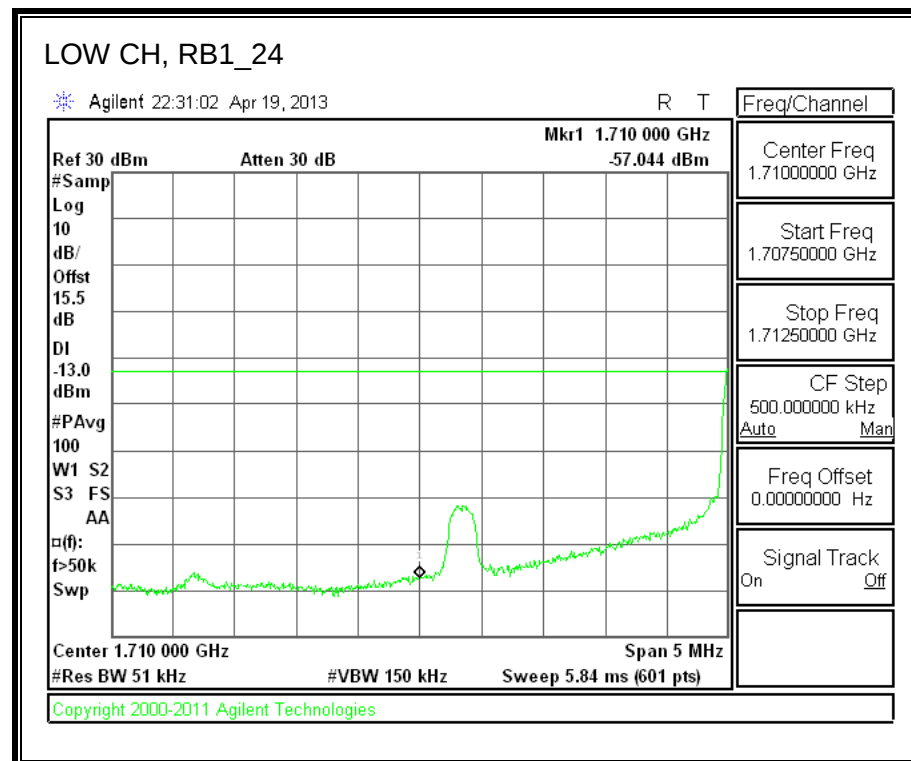
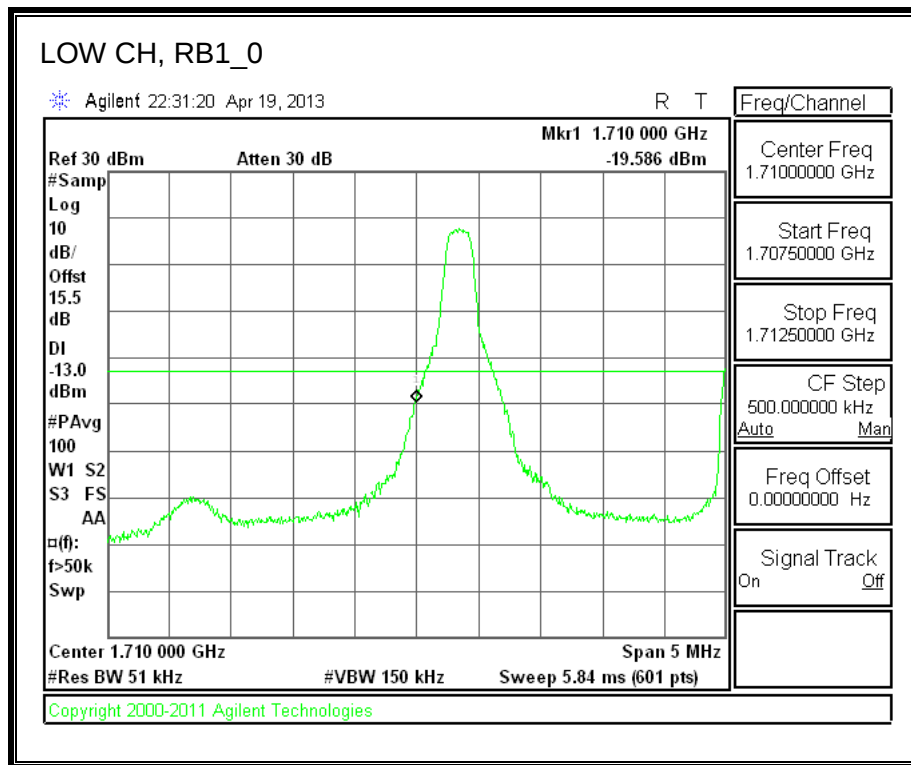


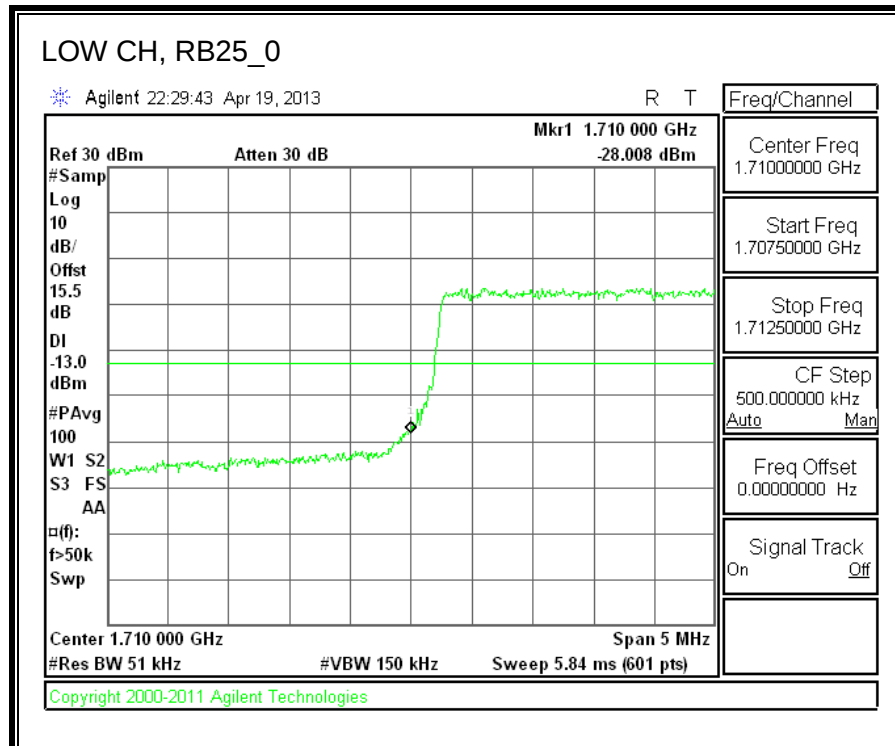
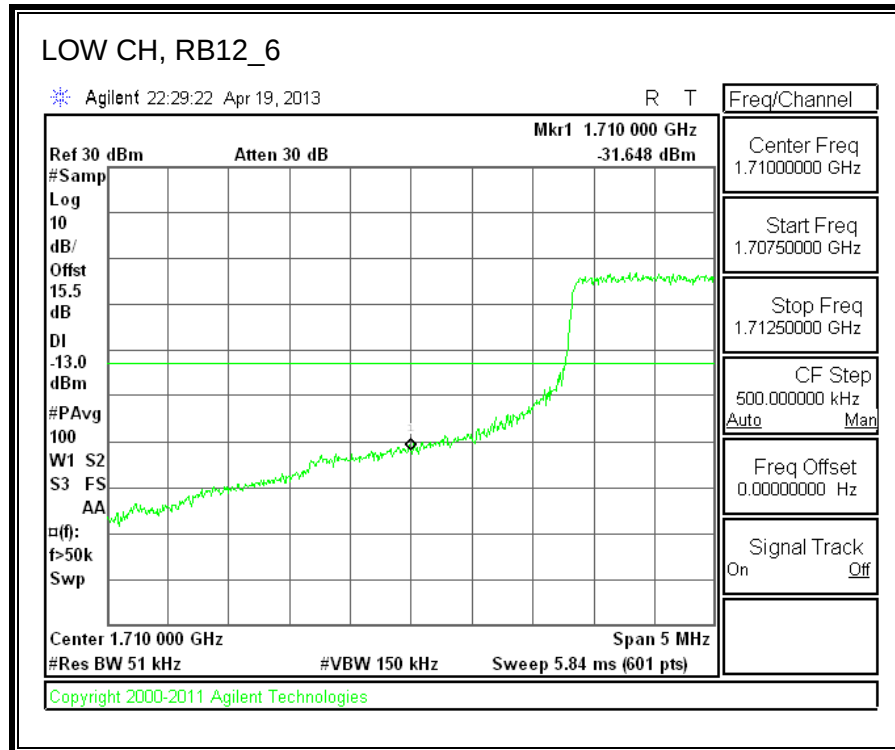
HIGH-QPSK



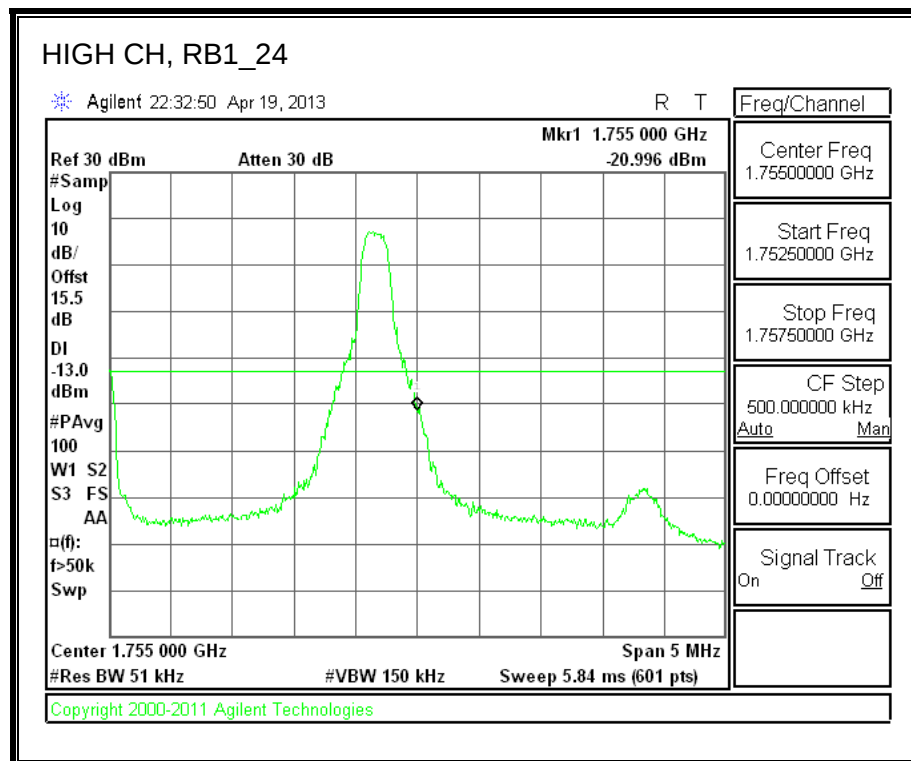
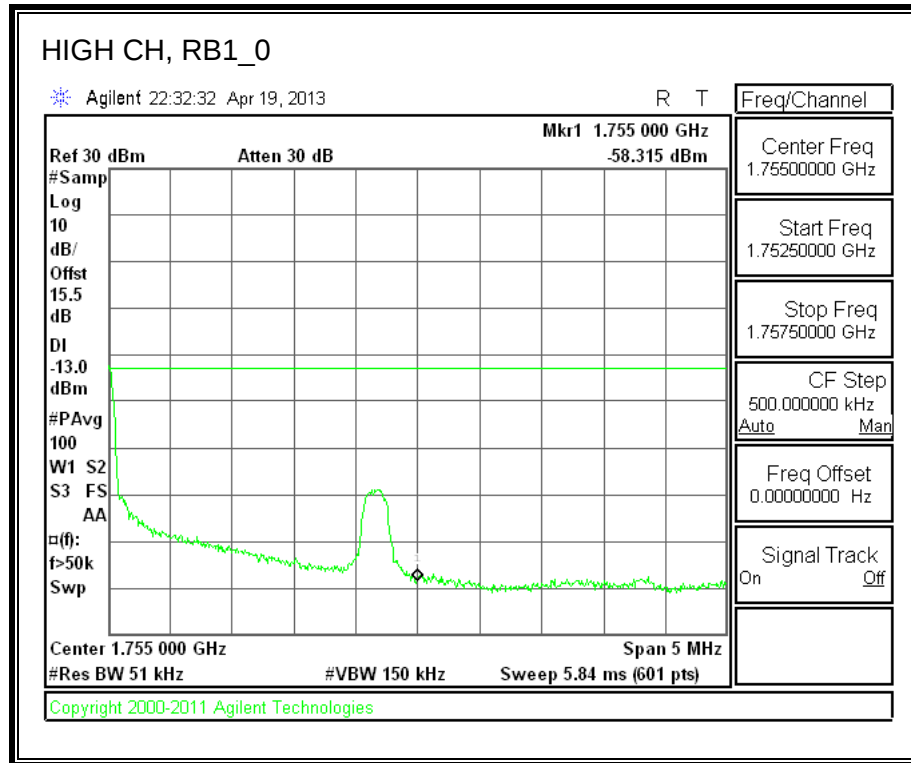


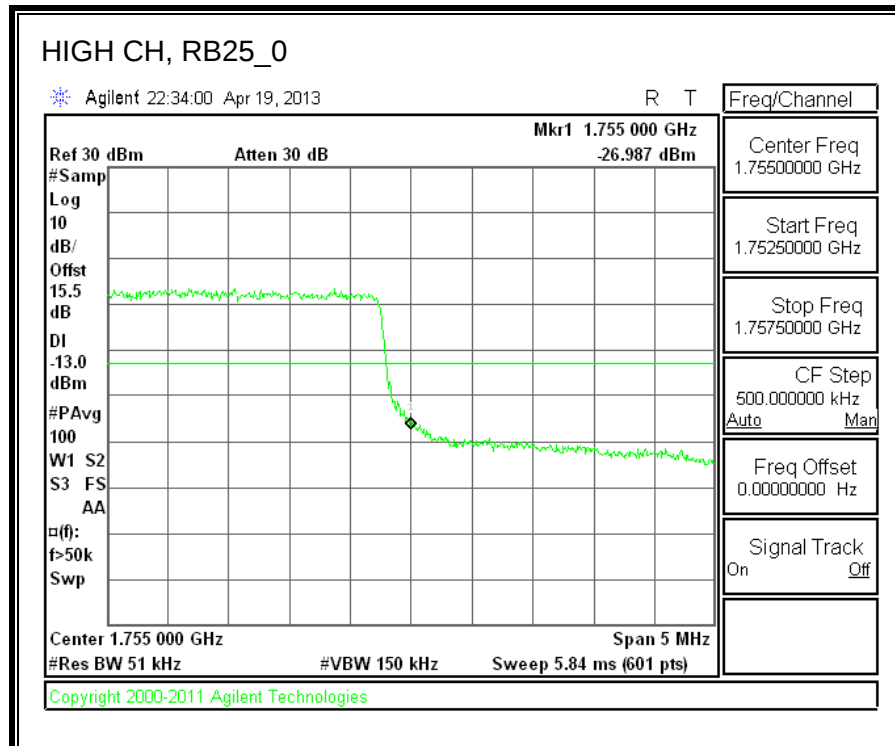
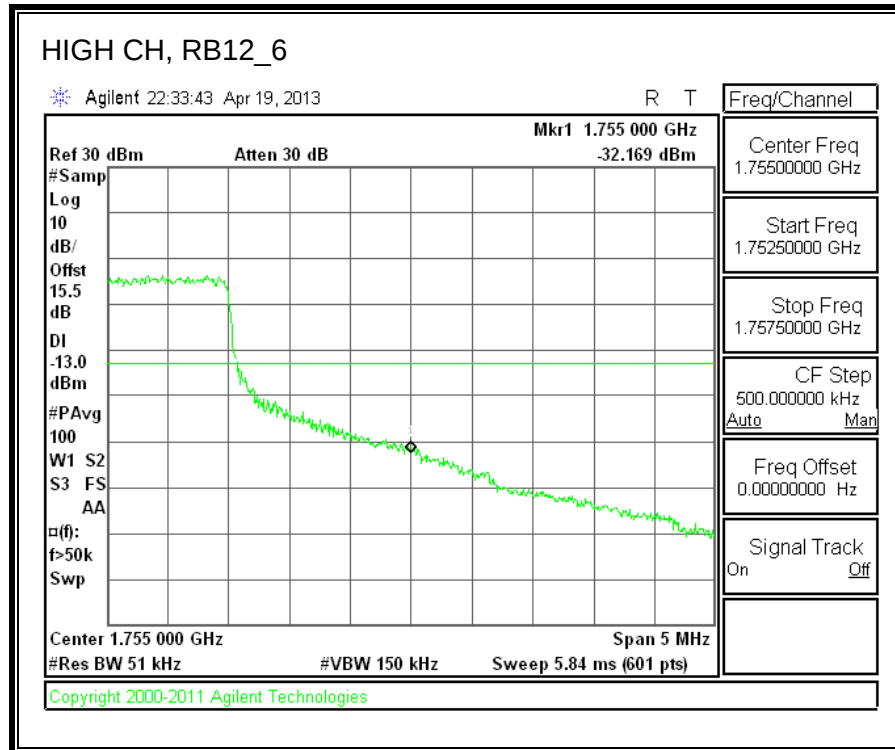
LOW-16QAM





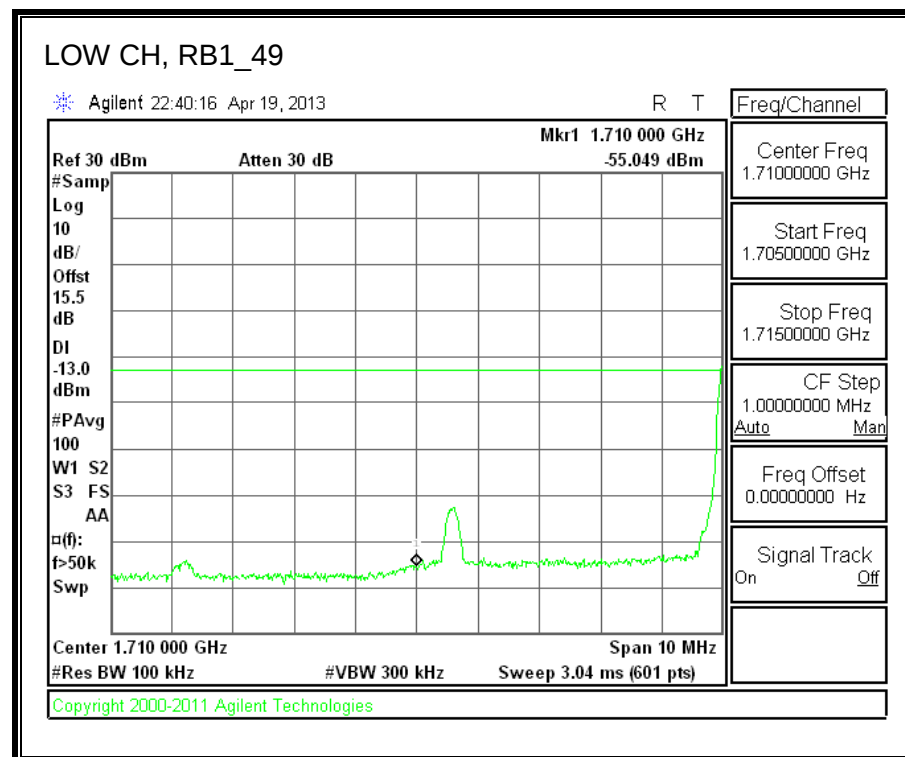
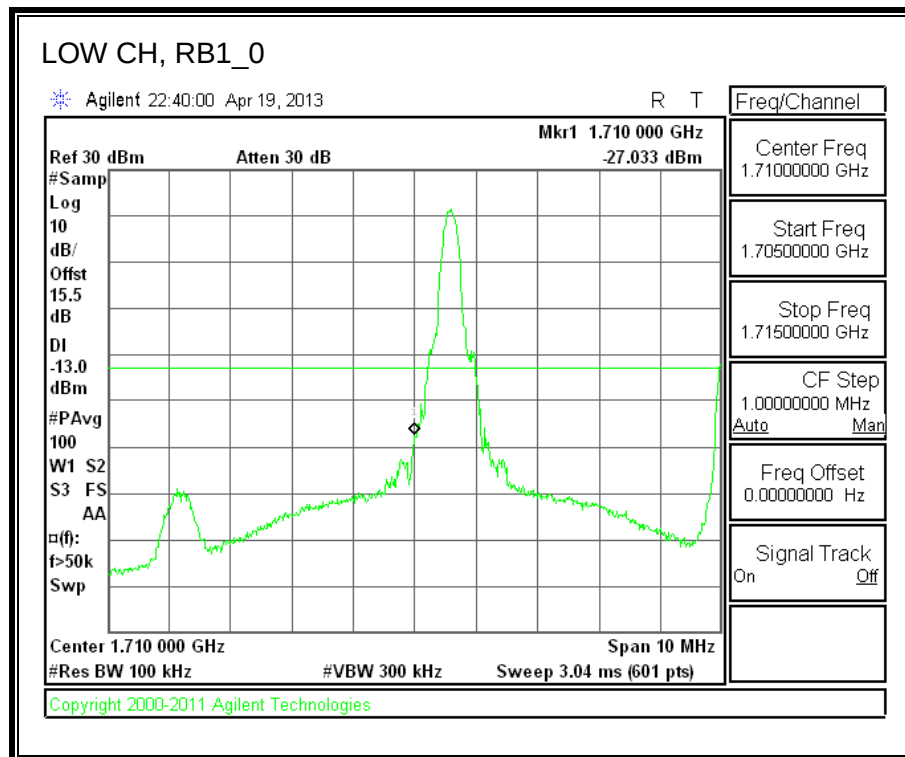
HIGH-16QAM

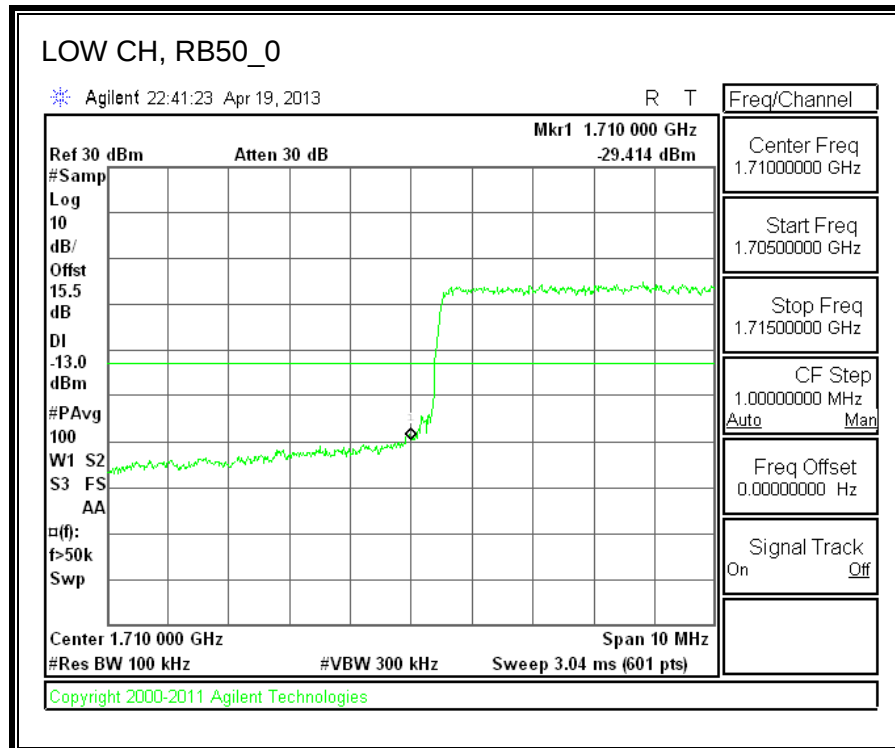
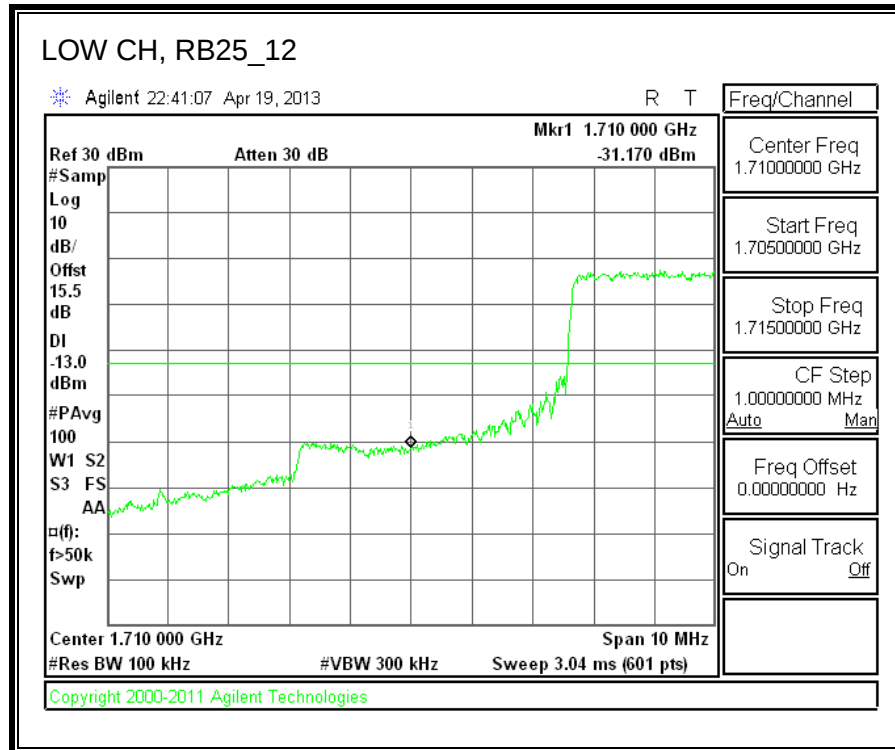




8.2.8. LTE BAND 4-10MHZ BANDWIDTH

LOW-QPSK





HIGH-QPSK

