FCC CFR47 PART 22H, 24E, AND 27L
CERTIFICATION TEST REPORT

FOR

CELL PHONE WITH CDMA LTE 2 AND 4+BT LE+802.11BGN (HT20); NO PWR REDUCTION

MODEL NUMBER: MS770, LG-MS770, LGMS770

FCC ID: ZNFMS770

REPORT NUMBER: 12U14406-4, Revision A

ISSUE DATE: JUNE 07, 2012

Prepared for

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

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
---	05/14/2012	Initial Issue	T. Chan
A	06/07/2012	Addressed TCB Questions	T. Chan

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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: Cell Phone with CDMA LTE 2 and 4+BT LE+802.11bgn (HT20); NO PWR reduction.

MODEL: MS770, LG-MS770, LGMS770

SERIAL NUMBER: 99000077000282

DATE TESTED: APRIL 20 to MAY 09 and JUNE 07, 2012

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

Compliance Certification Services (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:

THU CHAN
ENGINEERING MANAGER
UL CCS

Tested By:

CHIN PANG
EMC 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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 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

The EUT is Cell Phone with CDMA LTE 2 and 4+BT LE+802.11bgn (HT20); NO PWR reduction.

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
824.7 – 848.31	CDMA 2000 1xRTT	29.99	997.7	27.94	622.3

Part 24 PCS Band					
Frequency range (MHz)	Modulation	Conducted		EIRP	
		dBm	mW	dBm	mW
1851.25-1908.75	CDMA 2000 1xRTT	29.13	818.5	31.02	1264.7
	CDMA 2000 EVDO REV. A	29.02	798.0	29.31	853.1

Part 27 AWS Band					
Frequency range (MHz)	Modulation	Conducted		EIRP	
		dBm	mW	dBm	mW
1711.25-1753.75	CDMA 2000 1xRTT	29.49	889.2	29.78	950.6
	CDMA 2000 EVDO REV. A	29.42	875.0	26.39	435.5

Part 27 LTE Band 4 MODE (1.4 MHz BANDWIDTH)						
Frequency range (MHz)	Modulation	Start RB and RB offset	Conducted		EIRP	
			dBm	mW	dBm	mW
1710.7 - 1754.3	QPSK	1/0	27.81	603.9	27.09	511.7
		1/5	27.67	584.8	27.49	561.0
		3/2	27.64	580.8	27.49	561.0
		6/0	27.68	586.1	27.29	535.8
	16QAM	1/0	28.47	703.1	27.29	535.8
		1/5	28.12	648.6	27.29	535.8
		3/2	27.86	610.9	27.29	535.8
		6/0	28.50	707.9	27.19	523.6

Part 27 LTE Band 4 MODE (3.0 MHz BANDWIDTH)						
Frequency range (MHz)	Modulation	Start RB and RB offset	Conducted		EIRP	
			dBm	mW	dBm	mW
1711.5 - 1753.5	QPSK	1/0	27.32	539.5	26.79	477.5
		1/14	27.43	553.4	27.67	584.8
		8/4	27.67	584.8	27.57	571.5
		15/0	27.85	609.5	27.87	612.4
	16QAM	1/0	27.77	598.4	26.26	422.7
		1/14	27.67	584.8	27.57	571.5
		8/4	28.00	631.0	27.07	509.3
		15/0	27.89	615.2	27.57	571.5

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	1/0	27.58	572.8	27.19	523.6
		1/24	27.57	571.5	26.67	464.5
		12/6	27.71	590.2	25.98	396.3
		25/0	28.34	682.3	25.98	396.3
	16QAM	1/0	27.82	605.3	27.07	509.3
		1/24	27.77	598.4	26.57	453.9
		12/6	28.00	631.0	25.87	386.4
		25/0	28.73	746.4	26.07	404.6

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
1715-1750	QPSK	1/0	27.29	535.8	26.07	404.6
		1/49	27.25	530.9	26.97	497.7
		25/12	28.15	653.1	27.97	626.6
		50/0	28.11	647.1	27.87	612.4
	16QAM	1/0	27.79	601.2	26.00	398.1
		1/49	27.62	578.1	27.06	508.2
		25/12	28.22	663.7	27.25	530.9
		50/0	28.21	662.2	27.28	534.6

Part 27 LTE Band 2 MODE (1.4 MHz BANDWIDTH)						
Frequency range (MHz)	Modulation	Start RB and RB offset	Conducted		EIRP	
			dBm	mW	dBm	mW
1850.7 - 1909.3	QPSK	1/0	28.67	736.2	27.37	545.8
		1/5	28.80	758.6	27.27	533.3
		3/2	28.63	729.5	26.97	497.7
		6/0	27.99	629.5	26.87	486.4
	16QAM	1/0	28.13	650.1	27.17	521.2
		1/5	28.12	648.6	27.07	509.3
		3/2	28.42	695.0	26.91	490.9
		6/0	28.63	729.5	26.87	486.4

Part 27 LTE Band 2 MODE (3.0 MHz BANDWIDTH)						
Frequency range (MHz)	Modulation	Start RB and RB offset	Conducted		EIRP	
			dBm	mW	dBm	mW
1851.5 - 1908.5	QPSK	1/0	28.81	760.3	26.67	464.5
		1/14	28.76	751.6	27.77	598.4
		8/4	28.15	653.1	27.17	521.2
		15/0	28.25	668.3	26.21	417.8
	16QAM	1/0	28.45	699.8	26.97	497.7
		1/14	28.23	665.3	27.11	514.0
		8/4	28.42	695.0	26.97	497.7
		15/0	28.19	659.2	26.07	404.6

Part 27 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	1/0	28.71	743.0	26.47	443.6
		1/24	28.81	760.3	26.51	447.7
		12/6	28.67	736.2	27.27	533.3
		25/0	29.05	803.5	27.07	509.3
	16QAM	1/0	28.12	648.6	26.45	441.6
		1/24	28.53	712.9	27.17	521.2
		12/6	28.88	772.7	27.37	545.8
		25/0	29.00	794.3	27.37	545.8

Part 27 LTE Band 2 MODE (10.0 MHz BANDWIDTH)						
Frequency range (MHz)	Modulation	Start RB and RB offset	Conducted		EIRP	
			dBm	mW	dBm	mW
1855-1905	QPSK	1/0	28.14	651.6	27.07	509.3
		1/49	28.34	682.3	27.47	558.5
		25/12	28.65	732.8	28.57	719.4
		50/0	29.23	837.5	28.37	687.1
	16QAM	1/0	28.27	671.4	26.97	497.7
		1/49	28.70	741.3	27.72	591.6
		25/12	28.74	748.2	28.47	703.1
		50/0	29.25	841.4	27.97	626.6

5.3. SOFTWARE AND FIRMWARE

The EUT software installed during testing was LAP8960IR120417.

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

5.4. 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:
- CDMA 2000 1xRTT
- CDMA 2000 EVDO REV. A
- LTE Band 2 and 4

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. The worst case was found to be a Y-position with AC/DC adapter and headset for 1xRTT Cell and PCS bands and Z-Position for EVDO PCS band without AC Adapter. And on LTE bands, the worst case was at Z position.

5.5. DESCRIPTION OF TEST SETUP

RADIATED TESTS SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST			
Description	**Manufacturer**	**Model**	**Serial Number**
AC ADAPTER	LG ELECTRONICS	MCS-01WT	TA1Z0000455
HEADSET	LG ELECTRONICS	NA	N/A

I/O CABLES (RF Conducted Test)

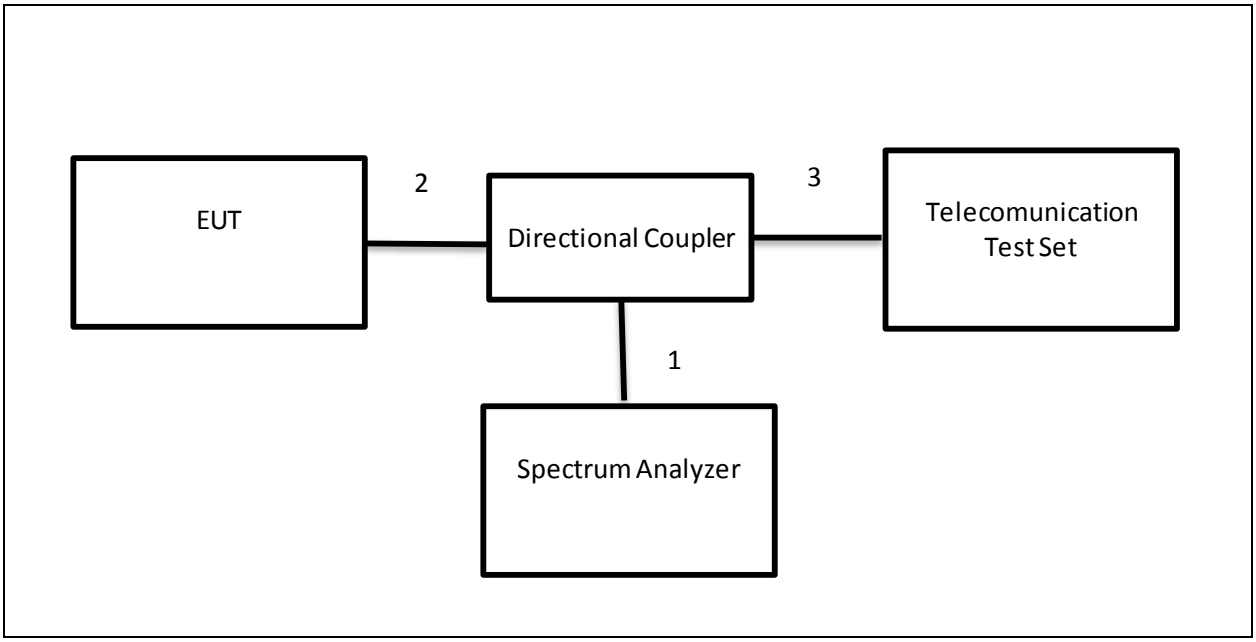
I/O CABLE LIST						
Cable No.	**Port**	**# of Identica Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	RF In/Out	1	Spectrum Analyzer	UN-SHELDED	None	N/A
2	RF out	1	Directional Coupler	UN-SHELDED	0.1m	N/A
3	RF In/Out	1	Communication Call box	UN-SHELDED	0.5m	N/A

I/O CABLES (RF Radiated Test)

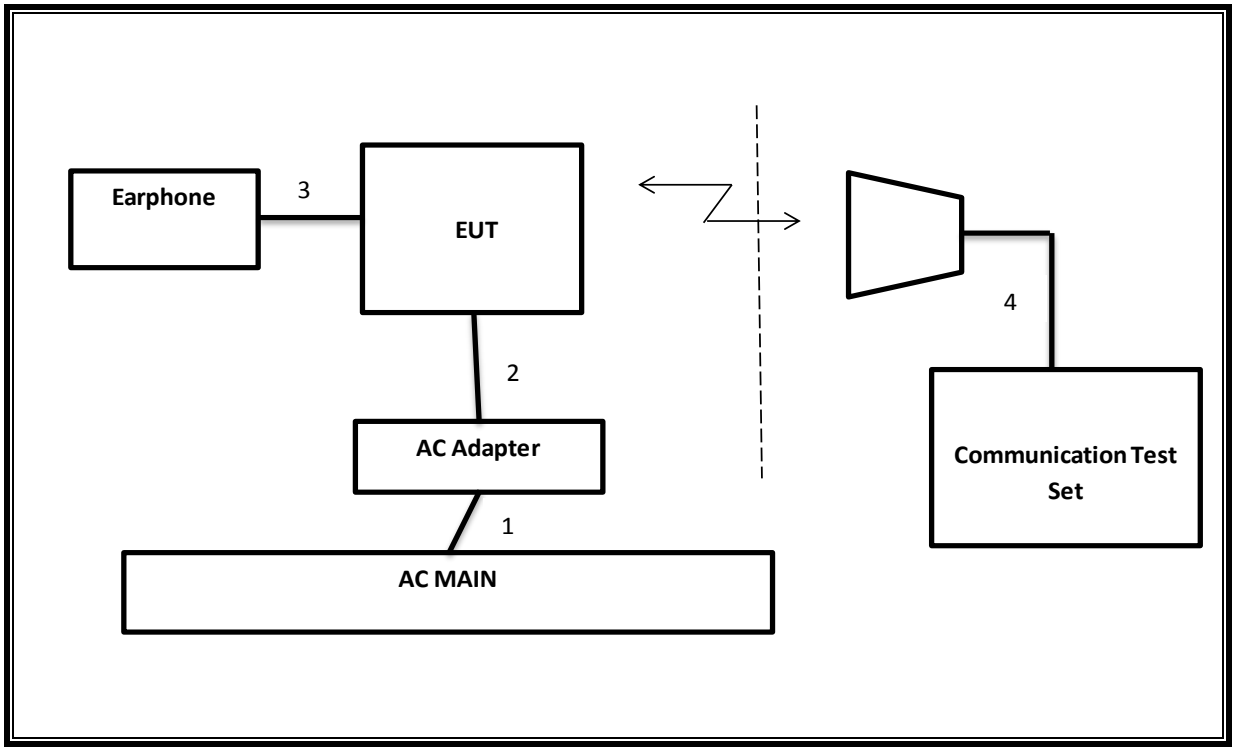
I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	115VAC	UN-SHELDED	1.0m	N/A
2	DC	1	DC	UN-SHELDED	1.0m	Volume control on
3	Audio	1	Earphone	UN-SHELDED	1.0m	NA
4	RF In/Out	1	Horn	UN-SHELDED	5m	NA

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	02/16/13
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/15/12
Antenna, Horn, 18 GHz	EMCO	3115	C00783	06/29/12
Antenna, Horn, 18 GHz	EMCO	3115	C00945	06/29/12
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	02/07/13
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	07/12/12
Communication Test Set	Agilent / HP	E5515C	C01086	06/17/12
Communication Test Set	R & S	CMW500	None	12/16/12
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	10/20/12
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
Sleeve Dipole 1730~2030 MHz	ETS	3126-1880	C01157	08/01/12
Signal Generator, 20 GHz	Agilent / HP	83732B	C00774	07/14/12
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121C DB4	C00993	07/16/12

7. RF POWER OUTPUT VERIFICATION

Maximum output power is verified on the Low, Middle and High channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E for 1xRTT, section 3.1.2.3.4 of 3GPP2 C.S0033-0/TIA-866 for Rel. 0 and section 4.3.4 of 3GPP2 C.S0033-A for Rev. A

7.1. CDMA2000

CDMA2000 1xRTT

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

Application	Rev, License
CDMA2000 Mobile Test	B.15.18, L

- Protocol Rev > 6 (IS-2000-0)
- System ID: 7; NID: 1, Reg. Ch. #.: 610 for Cell, 600 for PCS & 450 for AWS
- Radio Config (RC) > RC1 or RC3
- Service Option (SO) Setup > SO55 or SO32
- Traffic Data Rate > Full
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

RF Output Power for Cellular Band

Radio Configuration (RC)	Service Option (SO)	RF Pwr (dBm)					
		Ch. 1013/824.7 MHz		Ch.384/836.52 MHz		Ch.777/848.31 MHz	
		Average	Peak	Average	Peak	Average	Peak
RC1	2 (Loopback)		29.98		**29.99**		29.89
	55 (Loopback)		29.93		29.91		29.72
RC2	9 (Loopback)		29.83		29.85		29.58
	55 (Loopback)		29.86		29.90		29.70
RC3	2 (Loopback)		29.42		29.72		29.17
	55 (Loopback)		29.47		29.64		29.24
	32 (+F-SCH)		29.42		29.40		29.13
	32 (+SCH)		29.35		29.65		29.13
RC4	2 (Loopback)		29.48		29.48		29.35
	55 (Loopback)		29.64		29.59		29.36
	32 (+F-SCH)		29.37		29.56		29.29
	32 (+SCH)		29.28		29.40		29.16
RC5	9 (Loopback)		29.52		29.61		29.26
	55 (Loopback)		29.54		29.56		29.24
RC11	2 (Loopback)		29.49		29.56		28.89
	75 (Loopback)		29.47		29.54		29.34
	32 (+F-SCH)		29.39		29.52		29.23
	32 (+SCH)		29.83		29.60		29.44

RF Output Power for PCS Band

Radio Configuration (RC)	Service Option (SO)	RF Pwr (dBm)		
		Ch. 25/1851.25 MHz	Ch.600/1880 MHz	Ch.1175/1908.75 MHz
		Peak	Peak	Peak
RC1	2 (Loopback)	28.74	**29.13**	28.82
	55 (Loopback)	28.60	29.00	28.54
RC2	9 (Loopback)	29.50	29.09	28.75
	55 (Loopback)	28.37	28.98	28.55
RC3	2 (Loopback)	28,09	28.55	28.33
	55 (Loopback)	28.12	28.59	28.24
	32 (+F-SCH)	28.34	28.72	28.53
	32 (+SCH)	28.28	28.63	28.36
RC4	2 (Loopback)	28.09	28.62	28.30
	55 (Loopback)	28.13	28.48	28.34
	32 (+F-SCH)	28.21	28.48	28.17
	32 (+SCH)	28.20	28.60	28.25
RC5	9 (Loopback)	28.80	28.58	28.31
	55 (Loopback)	28.03	28.53	28.21
RC11	2 (Loopback)	28.02	28.40	28.15
	75 (Loopback)	28.25	28.61	28.23
	32 (+F-SCH)	28.26	28.72	28.26
	32 (+SCH)	28.10	28.63	28.23

RF Output Power for AWS Band

Radio Configuration (RC)	Service Option (SO)	RF Pwr (dBm)		
		Ch.25/1711.25 MHz	Ch.450/1732.5 MHz	Ch.875/1754.75 MHz
		Peak	Peak	Peak
RC1	2 (Loopback)	29.11	**29.49**	29.29
	55 (Loopback)	29.04	29.19	29.18
RC2	9 (Loopback)	28.71	28.94	29.10
	55 (Loopback)	29.06	29.06	29.28
RC3	2 (Loopback)	28.69	28.42	28.65
	55 (Loopback)	28.69	28.45	28.39
	32 (+F-SCH)	28.74	28.36	28.41
	32 (+SCH)	28.61	28.57	28.51
RC4	2 (Loopback)	28.25	28.69	28.56
	55 (Loopback)	28.52	28.58	28.57
	32 (+F-SCH)	28.47	28.48	28.63
	32 (+SCH)	28.42	28.26	28.68
RC5	9 (Loopback)	28.61	28.54	28.45
	55 (Loopback)	28.65	28.38	28.50
RC11	2 (Loopback)	28.51	28.44	28.53
	75 (Loopback)	28.50	28.55	28.68
	32 (+F-SCH)	28.41	28.40	28.46
	32 (+SCH)	28.47	28.40	28.46

1xEv-Do - Release 0 (Rel. 0)

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

EVDO Release 0 - RTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00000000 : 00000000 : 00000000 : 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Parms:
  - Cell Power > -105.5 dBm/1.23 MHz
  - System ID: 7; NID: 1, Reg. Ch. #.: 610 for Cell, 600 for PCS & 450 for AWS
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > RTAP
  - RTAP Rate > 153.6 kbps
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press “Start Data Connection” when “Session Open” appear in “Active Cell”
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

EVDO Release 0 - FTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00000000 : 00000000 : 00000000 : 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Parms:
  - Cell Power > -105.5 dBm/1.23 MHz
  - Cell Band > (Select US Cellular or US PCS)
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > FTAP (default)
  - FTAP Rate > 307.2 kbps (2 Slot, QPSK)
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press “Start Data Connection” when “Session Open” appear in “Active Cell”
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

PCS Band

FTAP Rate	RTAP Rate	Channel	f (MHz)	RF Pwr (dBm)
				Peak
307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	28.44
		600	1880.00	28.91
		1175	1908.75	28.00

AWS Band

FTAP Rate	RTAP Rate	Channel	f (MHz)	RF Pwr (dBm)
				Peak
307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1711.25	28.80
		450	1732.50	29.11
		875	1753.75	28.62

1xEv-Do - Revision A (Rev. A)

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

Application	Rev, License
1xEV-DO Terminal Test	A.09.13

EVDO Rev. A – RETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > RETAP
- R-Data Pkt Size > 4096
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2 > PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000: 00000000: 00000000: 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

EVDO Rev. A - FETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > FETAP
- F-Traffic Format > 4 (1024, 2,128) Canonical (307.2k, QPSK)
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2 > PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000: 00000000: 00000000: 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

PCS Band

FETAP Traffic Format	RETAP Data Payload Size	Channel	f (MHz)	RF Pwr (dBm) Peak
307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	28.64
		600	1880.00	29.02
		1175	1908.75	28.21

AWS Band

FETAP Traffic Format	RETAP Data Payload Size	Channel	f (MHz)	RF Pwr (dBm) Peak
307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1711.25	29.01
		450	1732.50	29.42
		875	1753.75	28.67

7.2. LTE Band 2 & Band 4

Output power for LTE Band 4 (1.4MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)
1710.7	19957	QPSK	1.4	1	0	27.33
				1	5	27.26
				3	2	27.62
				6	0	27.41
		16-QAM		1	0	28.47
				1	5	28.12
				3	2	27.74
				6	0	28.43
1732.5	20175	QPSK		1	0	27.81
				1	5	27.67
				3	2	27.64
				6	0	27.64
		16-QAM		1	0	27.79
				1	5	27.71
				3	2	27.86
				6	0	28.50
1754.3	20393	QPSK		1	0	27.29
				1	5	27.21
				3	2	27.40
				6	0	27.68
		16-QAM		1	0	27.32
				1	5	27.39
				3	2	27.53
				6	0	28.13

Output power for LTE Band 4 (3 MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)
1711.5	19965	QPSK	3.0	1	0	27.04
				1	14	27.02
				8	4	27.39
				15	0	27.75
		16-QAM		1	0	27.38
				1	14	27.31
				8	4	27.72
				15	0	27.64
1732.5	20175	QPSK		1	0	27.32
				1	14	27.43
				8	4	27.67
				15	0	27.85
		16-QAM		1	0	27.77
				1	14	27.67
				8	4	28.00
				15	0	27.89
1753.5	20385	QPSK		1	0	27.00
				1	14	26.98
				8	4	27.22
				15	0	27.56
		16-QAM		1	0	27.35
				1	14	27.33
				8	4	27.60
				15	0	27.64

Output power for LTE Band 4 (5 MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)
1712.5	19975	QPSK	5.0	1	0	27.34
				1	24	27.36
				12	6	27.43
				25	0	27.99
		16-QAM		1	0	27.47
				1	24	27.77
				12	6	27.75
				25	0	28.61
1732.5	20175	QPSK		1	0	27.58
				1	24	27.57
				12	6	27.71
				25	0	28.34
		16-QAM		1	0	27.82
				1	24	27.75
				12	6	28.00
				25	0	28.73
1752.5	20375	QPSK		1	0	27.28
				1	24	27.23
				12	6	27.48
				25	0	28.06
		16-QAM		1	0	27.45
				1	24	27.43
				12	6	27.56
				25	0	28.35

Output power for LTE Band 4 (10 MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)
1715	20000	QPSK	10.0	1	0	27.11
				1	49	27.19
				25	12	27.68
				50	0	28.11
		16-QAM		1	0	27.45
				1	49	27.61
				25	12	27.68
				50	0	28.12
1732.5	20175	QPSK		1	0	27.29
				1	49	27.25
				25	12	28.15
				50	0	27.96
		16-QAM		1	0	27.79
				1	49	27.62
				25	12	28.22
				50	0	28.16
1750	20350	QPSK		1	0	27.00
				1	49	26.92
				25	12	27.27
				50	0	27.95
		16-QAM		1	0	27.27
				1	49	27.26
				25	12	27.38
				50	0	28.21

Output power for LTE Band 2 (1.4MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)
1850.7	18607	QPSK	1.4	1	0	28.12
				1	5	28.36
				3	2	28.63
				6	0	27.95
		16-QAM		1	0	28.13
				1	5	28.12
				3	2	28.42
				6	0	28.63
1880.0	18900	QPSK		1	0	28.67
				1	5	28.80
				3	2	27.79
				6	0	27.99
		16-QAM		1	0	27.93
				1	5	27.92
				3	2	28.14
				6	0	28.28
1909.3	19193	QPSK		1	0	27.97
				1	5	27.81
				3	2	28.12
				6	0	27.65
		16-QAM		1	0	27.34
				1	5	27.74
				3	2	28.05
				6	0	28.15

Output power for LTE Band 2 (3 MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)
1851.5	18615	QPSK	3.0	1	0	28.19
				1	14	28.42
				8	4	28.15
				15	0	28.25
		16-QAM		1	0	28.45
				1	14	28.23
				8	4	28.42
				15	0	28.19
1880.0	18900	QPSK		1	0	28.81
				1	14	28.76
				8	4	27.98
				15	0	27.91
		16-QAM		1	0	27.77
				1	14	27.68
				8	4	27.43
				15	0	27.45
1908.5	19185	QPSK		1	0	27.45
				1	14	27.17
				8	4	27.64
				15	0	27.81
		16-QAM		1	0	27.96
				1	14	27.54
				8	4	28.08
				15	0	27.88

Output power for LTE Band 2 (5 MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)
1852.5	18625	QPSK	5.0	1	0	28.42
				1	24	28.81
				12	6	28.67
				25	0	29.05
		16-QAM		1	0	27.96
				1	24	28.53
				12	6	28.88
				25	0	29.00
1880.0	18900	QPSK		1	0	28.71
				1	24	28.74
				12	6	27.77
				25	0	27.71
		16-QAM		1	0	27.69
				1	24	27.79
				12	6	27.68
				25	0	27.78
1907.5	19175	QPSK		1	0	28.04
				1	24	27.14
				12	6	27.81
				25	0	28.22
		16-QAM		1	0	28.12
				1	24	27.35
				12	6	28.16
				25	0	27.46

Output power for LTE Band 2 (10 MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)
1855	18650	QPSK	10.0	1	0	27.91
				1	49	28.13
				25	12	28.65
				50	0	29.23
		16-QAM		1	0	28.22
				1	49	28.70
				25	12	28.74
				50	0	29.25
1880.0	18900	QPSK		1	0	27.99
				1	49	28.34
				25	12	27.68
				50	0	27.71
		16-QAM		1	0	27.43
				1	49	27.14
				25	12	26.43
				50	0	26.12
1905	19150	QPSK		1	0	28.14
				1	49	28.04
				25	12	27.99
				50	0	28.14
		16-QAM		1	0	28.27
				1	49	28.29
				25	12	28.12
				50	0	28.07

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

- CDMA 2000 1xRTT, RC1 S02.
- CDMA 2000 EVDO REV. A
- LTE Band 2 and 4

RESULTS

Mode	Band	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
CDMA 2000 1xRTT	CELL	1013	824.70	1.2710	1.405
		384	836.52	1.2769	1.394
		777	848.31	1.2844	1.386
	PCS	25	1851.25	1.2748	1.408
		600	1880.00	1.2702	1.380
		1175	1908.75	1.2835	1.386
	AWS	25	1711.25	1.2782	1.384
		450	1732.50	1.2778	1.371
		875	1753.75	1.2833	1.382

Mode	Band	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
CDMA 2000 EVDO REV.A	PCS	25	1851.25	1.2828	1.412
		600	1880.00	1.2893	1.409
		1175	1908.75	1.2770	1.438
	AWS	25	1711.25	1.2738	1.430
		450	1732.50	1.2792	1.382
		875	1753.75	1.2740	1.415

Band	Mode	RB/RB SIZE	f (MHz)	99% BW (kHz)	-26dB BW (kHz)
LTE BAND 4	1.4 MHz BAND QPSK	3/2	1710.7	563.4921	847.498
		6/0		1091.800	1244.000
	1.4 MHz BAND 16QAM	3/2		554.6036	828.118
		6/0		1105.100	1267.000
	1.4 MHz BAND QPSK	3/2	1732.5	567.5483	895.745
		6/0		1092.900	1331.000
	1.4 MHz BAND 16QAM	3/2		557.7877	862.235
		6/0		1083.200	1223.000
	1.4 MHz BAND QPSK	3/2	1754.3	569.6120	826.885
		6/0		1082.900	1257.000
	1.4 MHz BAND 16QAM	3/2		567.2532	868.295
		6/0		1079.700	1331.000
	3.0 MHz BAND QPSK	8/4	1711.5	1720.700	2031.000
		15/0		2881.800	3338.000
	3.0 MHz BAND 16QAM	8/4		1760.900	2145.000
		15/0		2924.500	3259.000
	3.0 MHz BAND QPSK	8/4	1732.5	1765.200	2132.000
		15/0		2914.600	3316.000
	3.0 MHz BAND 16QAM	8/4		1765.900	2322.000
		15/0		2934.100	3314.000
	3.0 MHz BAND QPSK	8/4	1753.5	1753.100	2059.000
		15/0		2905.700	3277.000
	3.0 MHz BAND 16QAM	8/4		1738.300	2110.000
		15/0		2892.500	3311.000
	5.0 MHz BAND QPSK	12/6	1712.5	2704.100	3197.000
		25/0		4894.900	5551.000
	5.0 MHz BAND 16QAM	12/6		2725.700	3335.000
		25/0		4914.000	5581.000
	5.0 MHz BAND QPSK	12/6	1732.5	2719.400	3264.000
		25/0		4919.900	5573.000
	5.0 MHz BAND 16QAM	12/6		2720.600	3206.000
		25/0		4885.900	5612.000
	5.0 MHz BAND QPSK	12/6	1752.5	2704.600	3226.000
		25/0		4833.900	5499.000
	5.0 MHz BAND 16QAM	12/6		2750.500	3392.000
		25/0		4931.000	5552.000

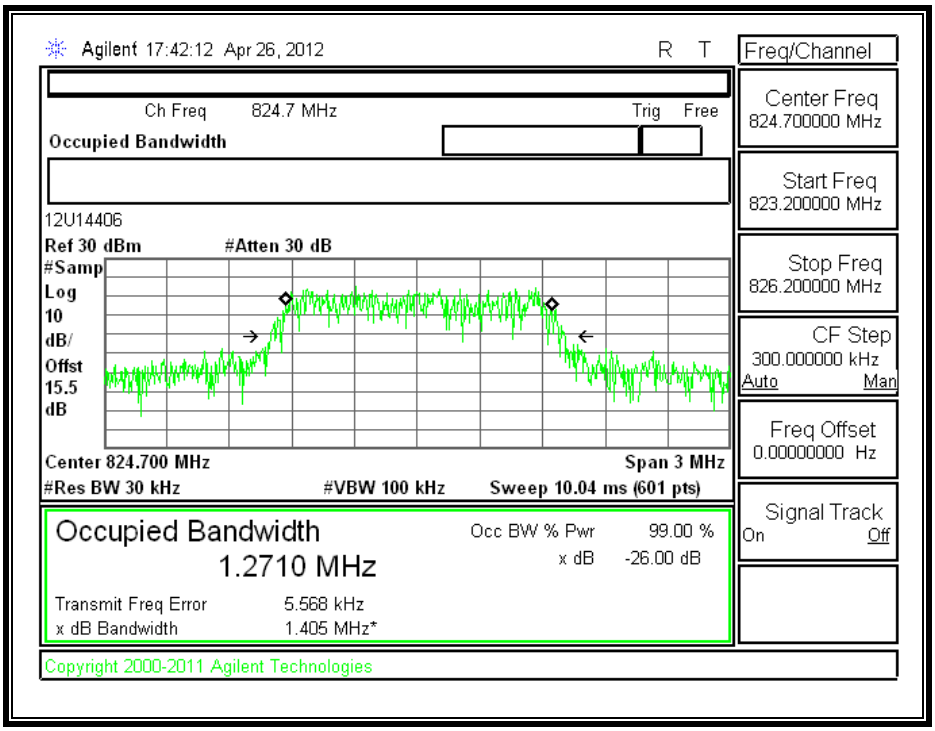
Band	Mode	RB/RB SIZE	f (MHz)	99% BW (kHz)	-26dB BW (kHz)
LTE Band 4	10 MHz BAND QPSK	25/12	1715	4467.0	4631.0
		50/0		8959.6	9445.0
	10 MHz BAND 16QAM	25/12		4479.3	5213.0
		50/0		8976.7	9400.0
	10 MHz BAND QPSK	25/12	1732.5	4479.3	4681.0
		50/0		8929.4	9337.0
	10 MHz BAND 16QAM	25/12		4412.6	4684.0
		50/0		8939.7	9360.0
	10 MHz BAND QPSK	25/12	1750	4482.2	4665.0
		50/0		8938.7	9354.0
	10 MHz BAND 16QAM	25/12		4462.9	4694.0
		50/0		8783.0	9291.0

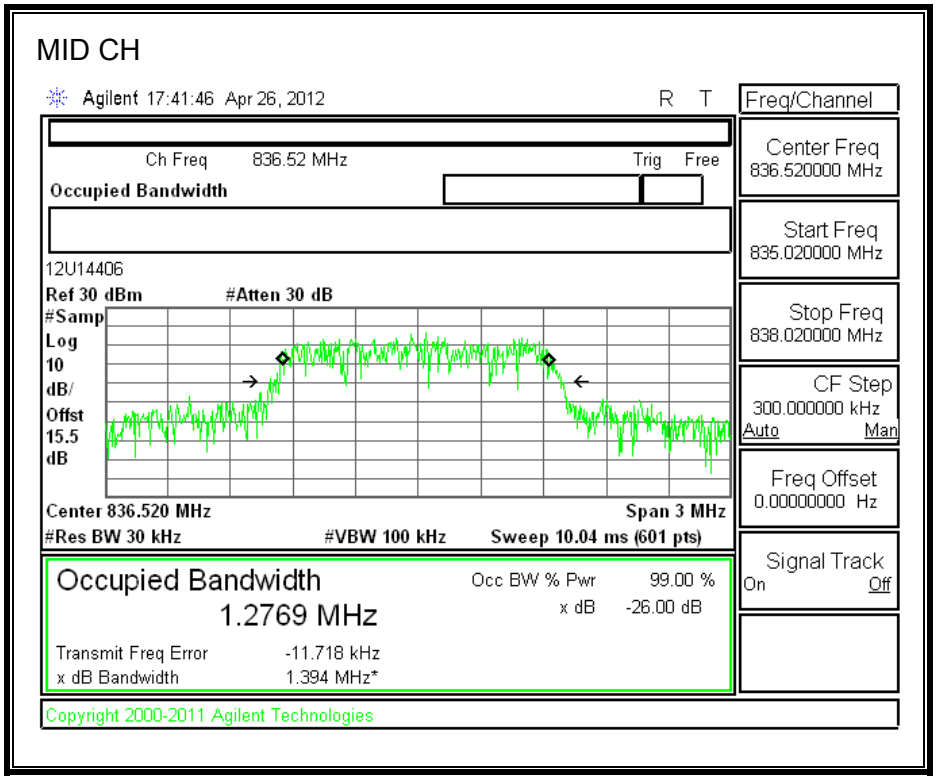
Band	Mode	RB/RB SIZE	f (MHz)	99% BW (kHz)	-26dB BW (kHz)
LTE BAND 2	1.4 MHz BAND QPSK	3/2	1850.7	561.1704	879.554
		6/0		1192.900	1448.000
	1.4 MHz BAND 16QAM	3/2		557.2910	815.692
		6/0		1221.100	1428.000
	1.4 MHz BAND QPSK	3/2	1880.0	563.7397	829.272
		6/0		1194.100	1381.000
	1.4 MHz BAND 16QAM	3/2		556.3851	859.466
		6/0		1201.600	1472.000
	1.4 MHz BAND QPSK	3/2	1909.3	573.0293	869.056
		6/0		1215.500	1408.000
	1.4 MHz BAND 16QAM	3/2		581.8607	879.656
		6/0		1209.800	1427.000
	3.0 MHz BAND QPSK	8/4	1851.5	1749.200	2044.000
		15/0		2933.700	3295.000
	3.0 MHz BAND 16QAM	8/4		1749.100	2127.000
		15/0		2959.700	3258.000
	3.0 MHz BAND QPSK	8/4	1880.0	1728.900	2183.000
		15/0		2934.600	3297.000
	3.0 MHz BAND 16QAM	8/4		1742.400	2023.000
		15/0		2902.100	3279.000
	3.0 MHz BAND QPSK	8/4	1908.5	1748.100	2055.000
		15/0		2953.100	3268.000
	3.0 MHz BAND 16QAM	8/4		1741.200	2144.000
		15/0		2897.400	3367.000
	5.0 MHz BAND QPSK	12/6	1852.5	2704.600	3302.000
		25/0		4899.800	5618.000
	5.0 MHz BAND 16QAM	12/6		2693.800	3347.000
		25/0		4841.800	5550.000
	5.0 MHz BAND QPSK	12/6	1880.0	2668.300	3216.000
		25/0		4933.400	5606.000
	5.0 MHz BAND 16QAM	12/6		2688.600	3119.000
		25/0		4910.200	5484.000
	5.0 MHz BAND QPSK	12/6	1907.5	2686.000	3303.000
		25/0		4837.200	5485.000
	5.0 MHz BAND 16QAM	12/6		2693.800	3347.000
		25/0		4841.800	5550.000

Band	Mode	RB/RB SIZE	f (MHz)	99% BW (kHz)	-26dB BW (kHz)
LTE Band 2	10 MHz BAND QPSK	25/12	1855	4469.3	4679.0
		50/0		8961.8	9336.0
	10 MHz BAND 16QAM	25/12		4461.2	4692.0
		50/0		8922.4	9476.0
	10 MHz BAND QPSK	25/12	1880	4460.8	4686.0
		50/0		8957.1	9396.0
	10 MHz BAND 16QAM	25/12		4453.1	4672.0
		50/0		8894.5	9446.0
	10 MHz BAND QPSK	25/12	1905	4464.6	5302.0
		50/0		8971.9	9395.0
	10 MHz BAND 16QAM	25/12		4412.1	5514.0
		50/0		9013.1	9450.0

99% BANDWIDTH and 26dB

1xRTT 850 BAND





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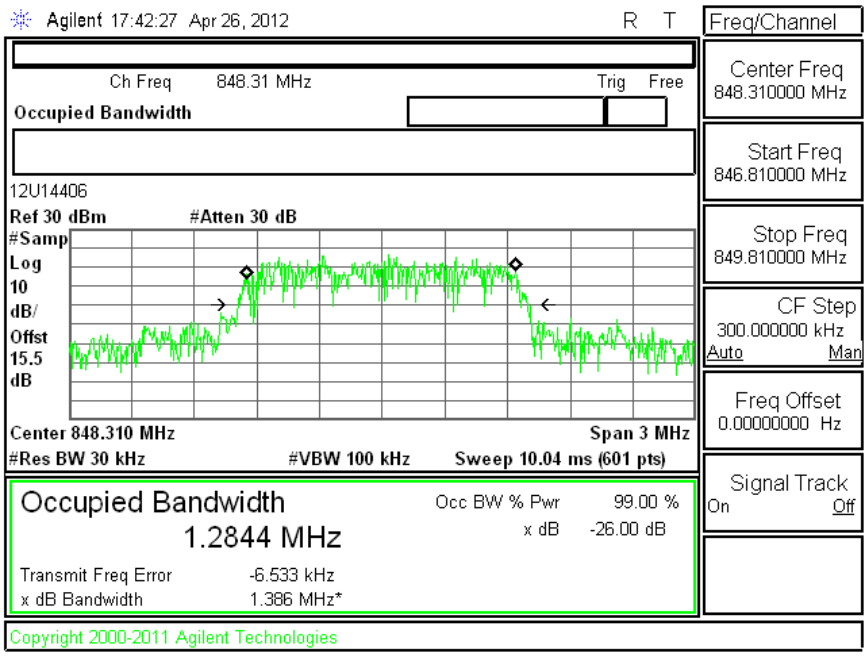
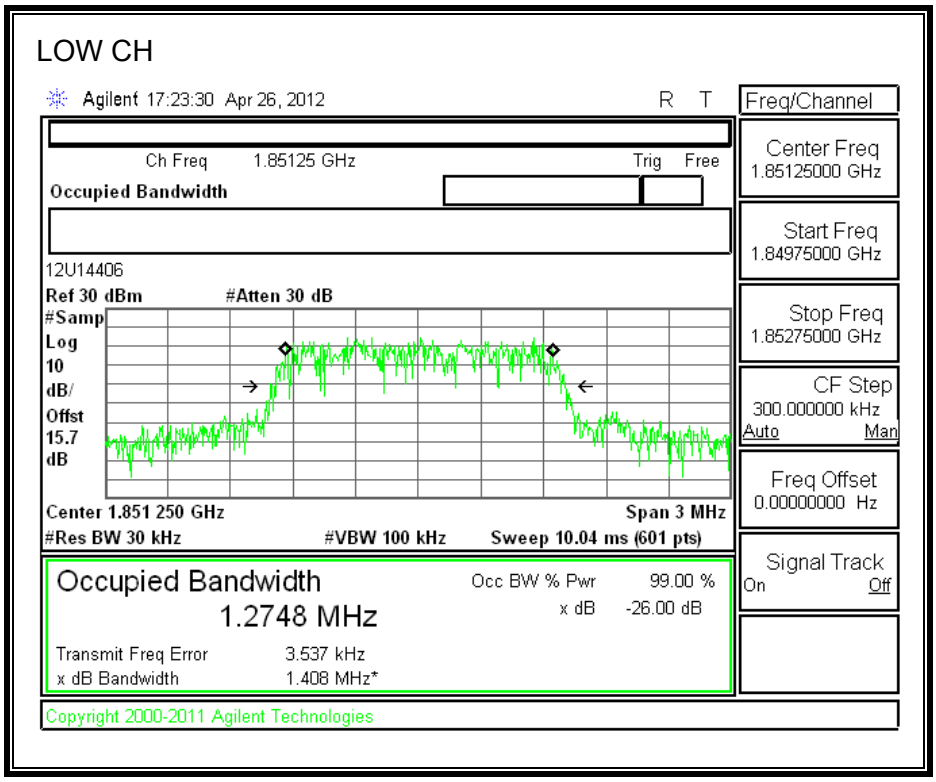


1xRTT 1900 BAND

LOW CH



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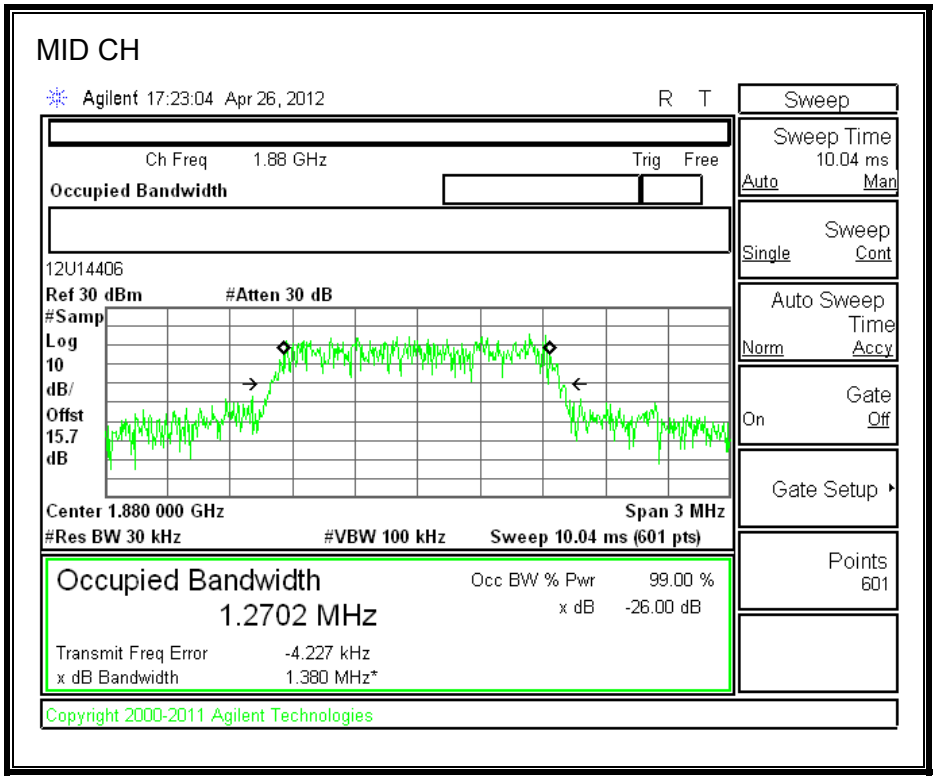

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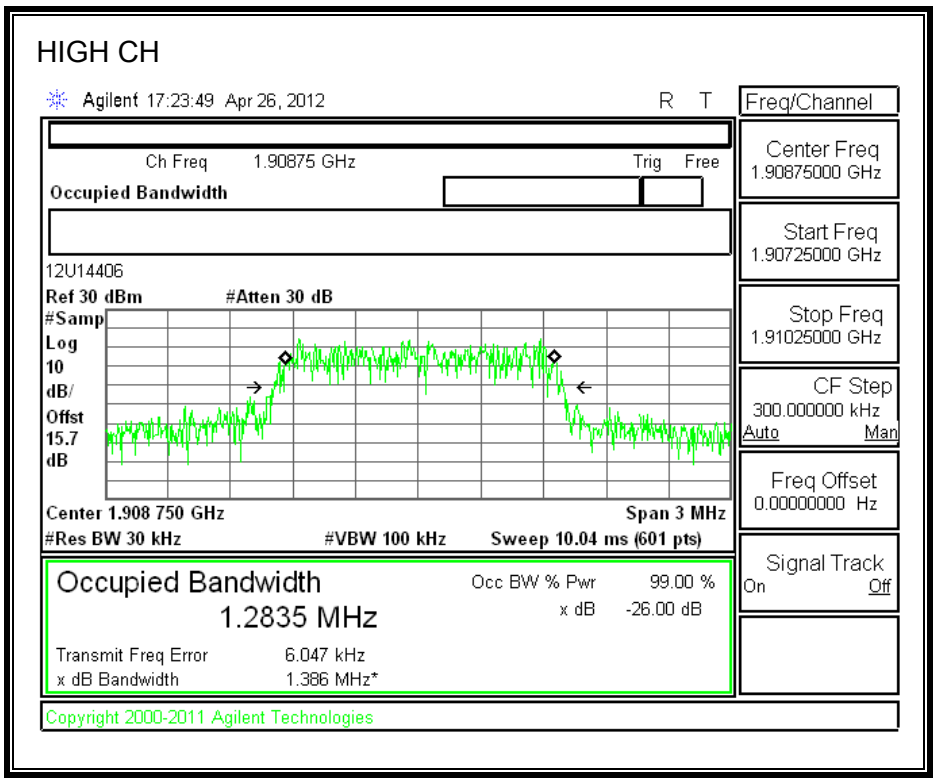

1xRTT 1700 BAND

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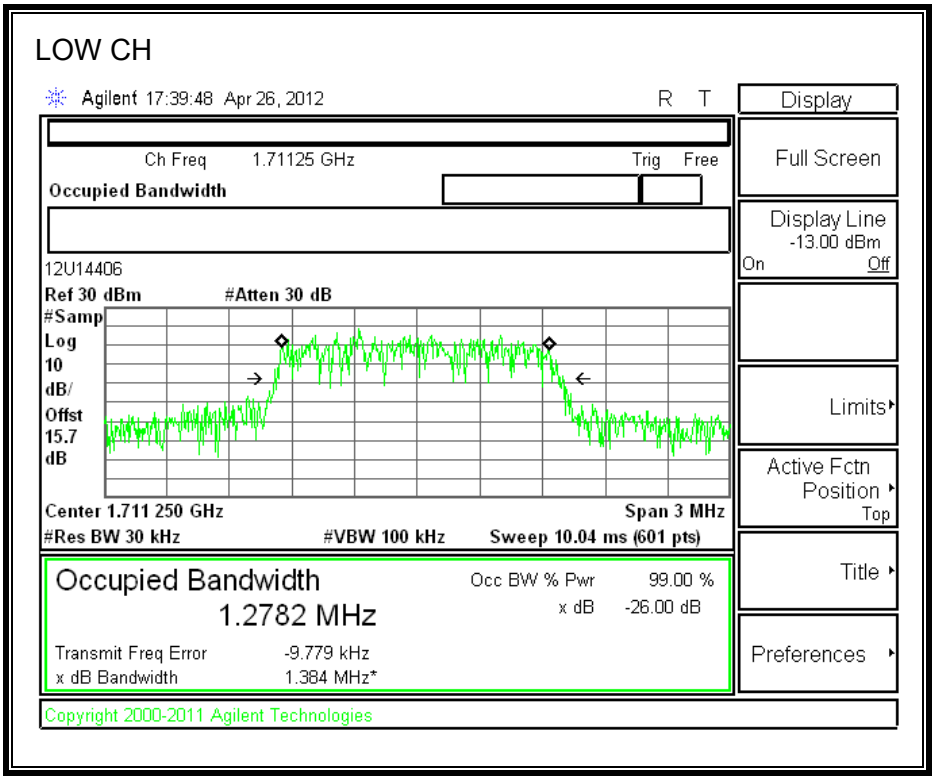

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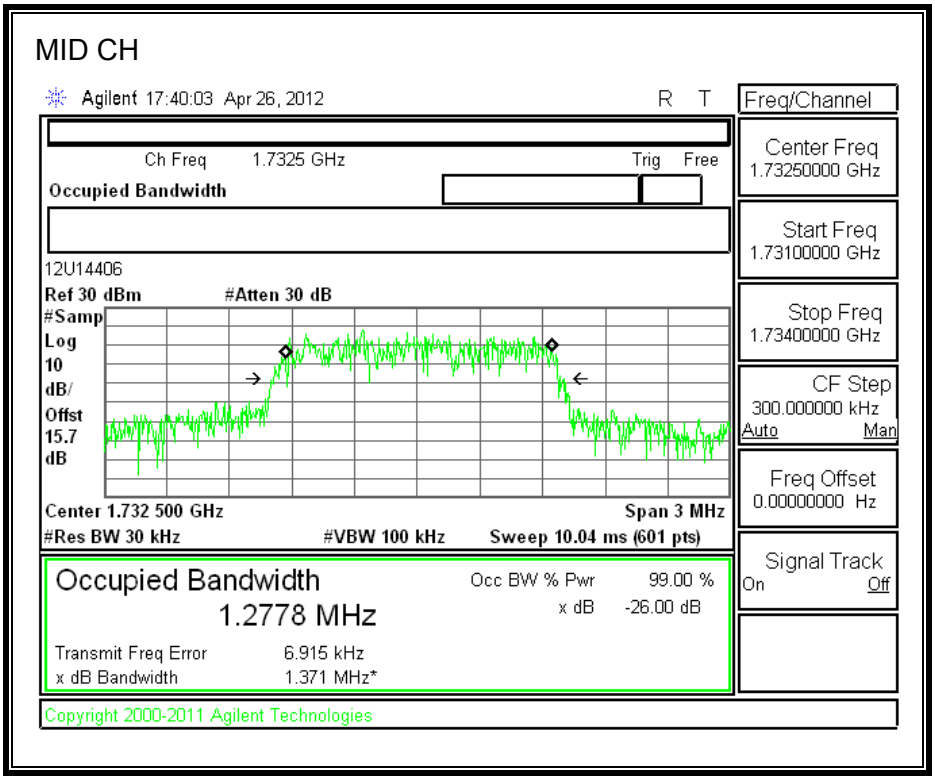

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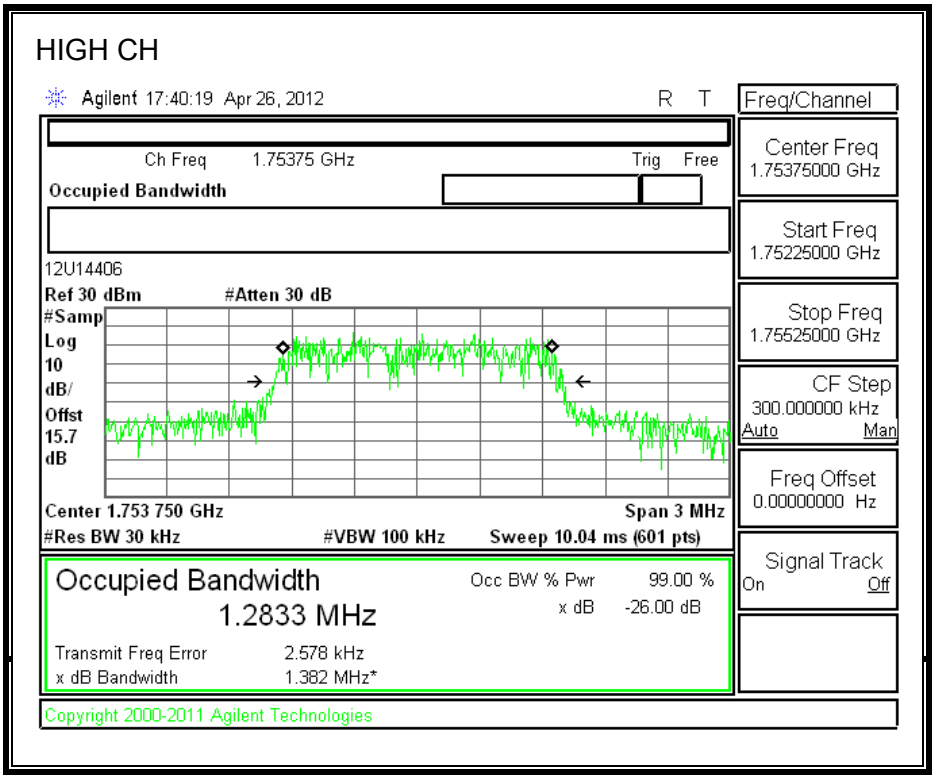
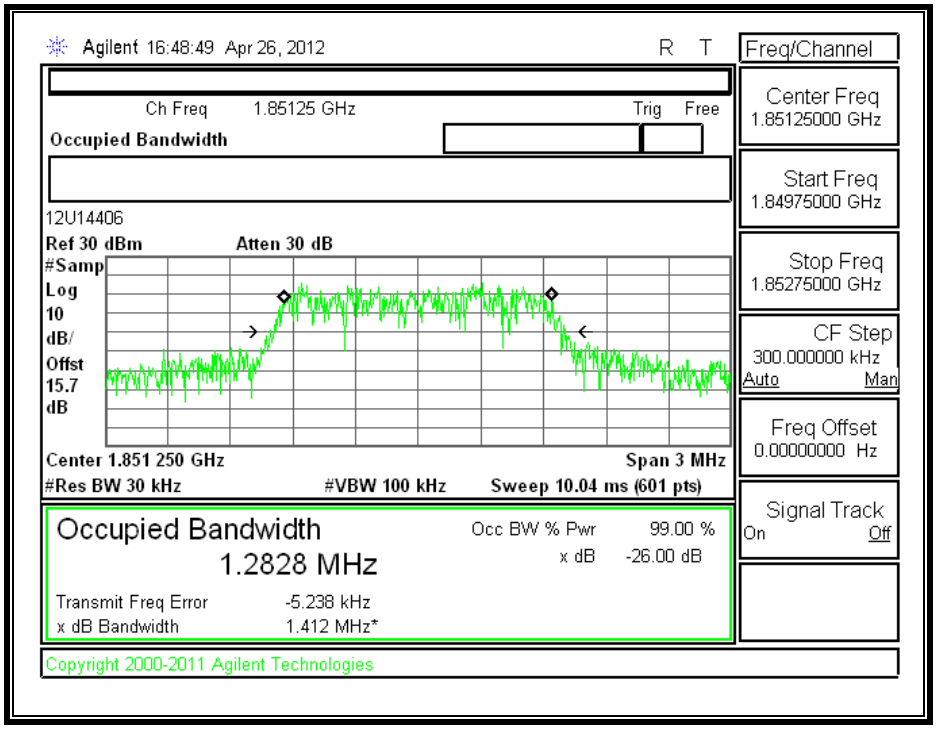
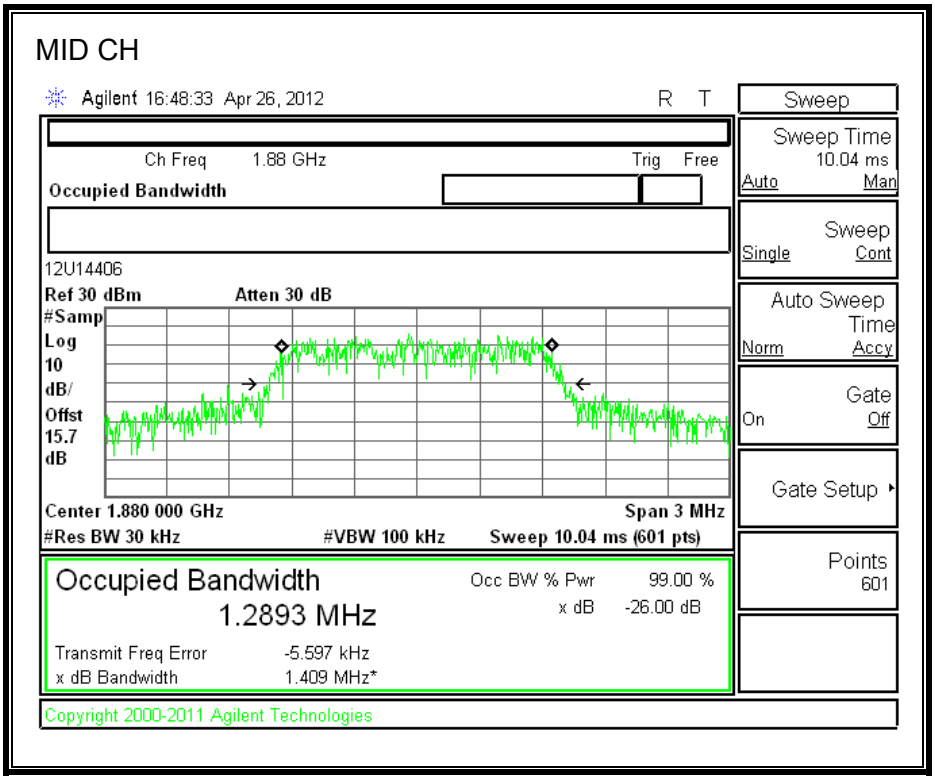


EVDO REV A.1900 BAND





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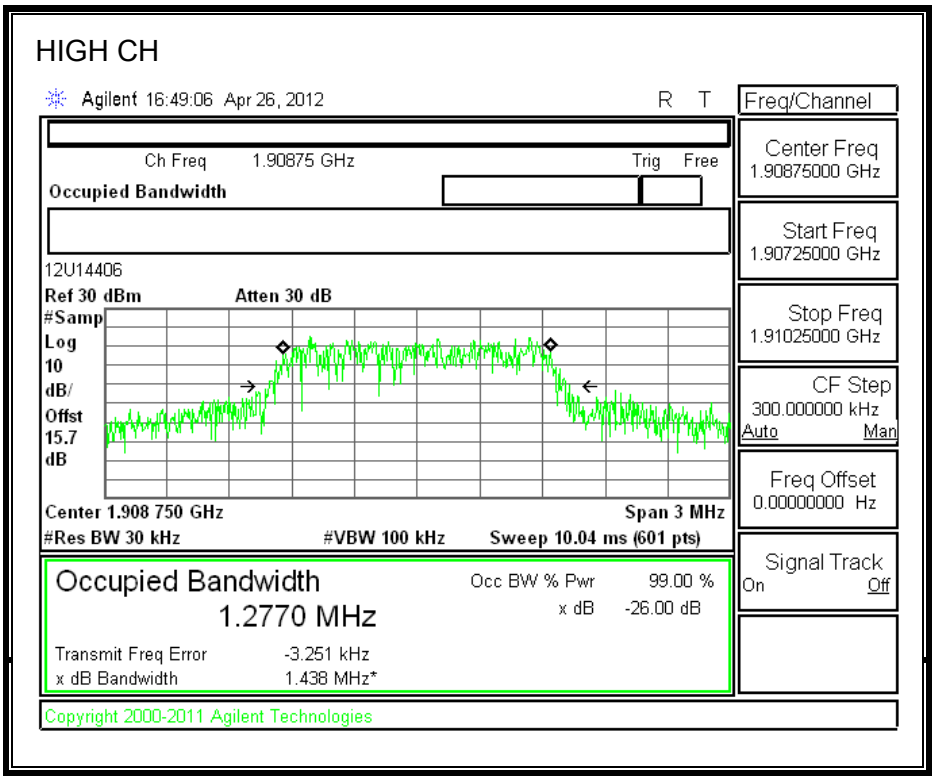
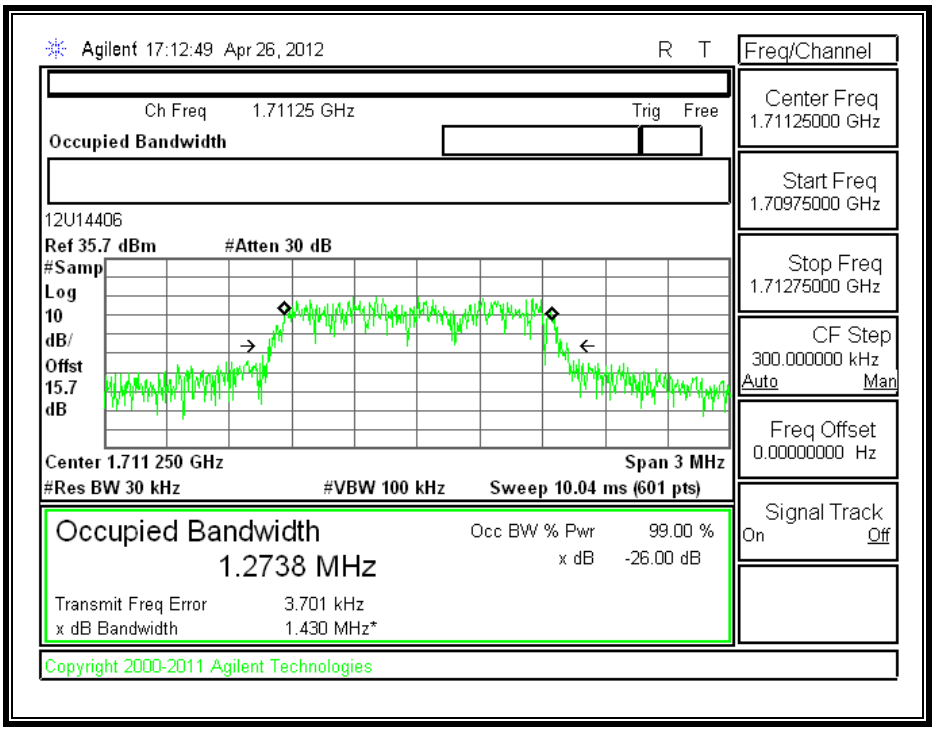
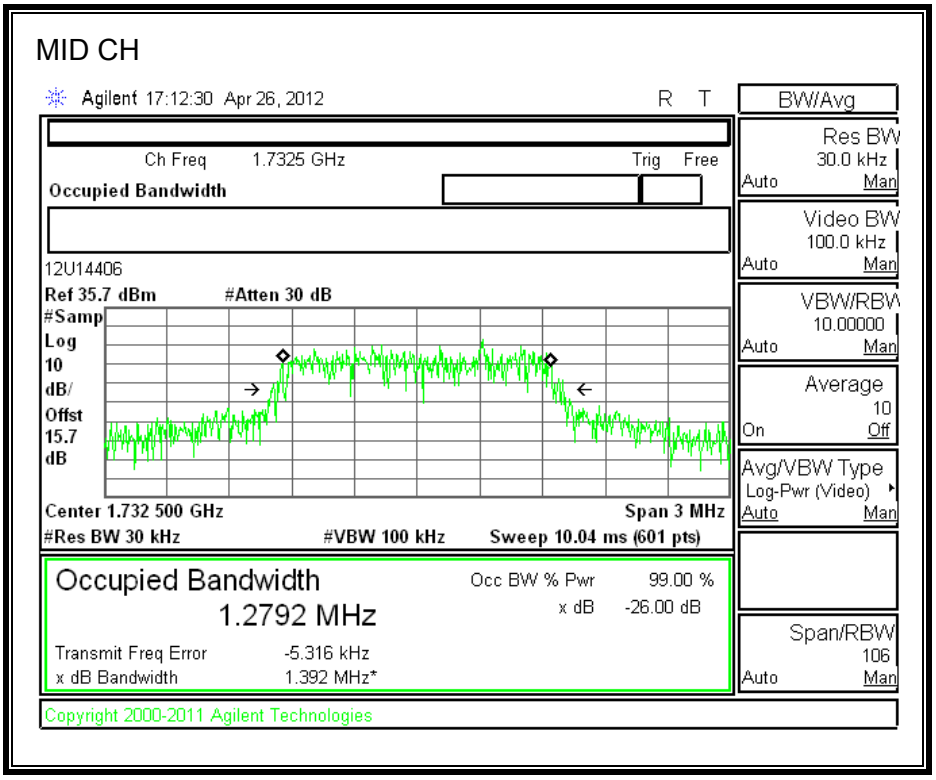


AWS EVDO REV A.1700 BAND





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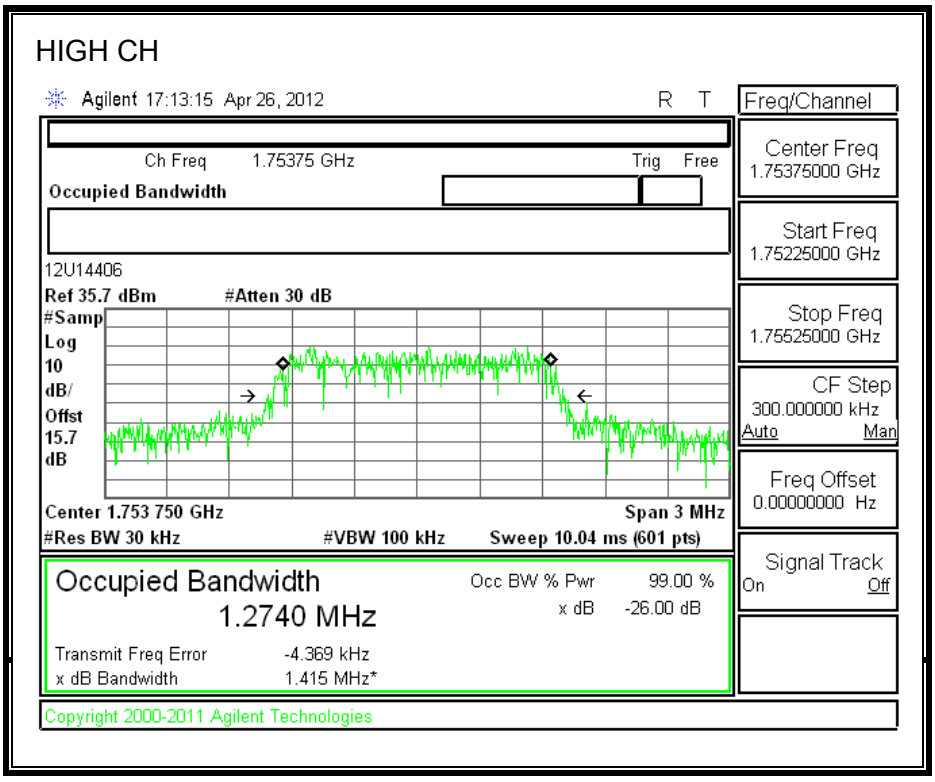
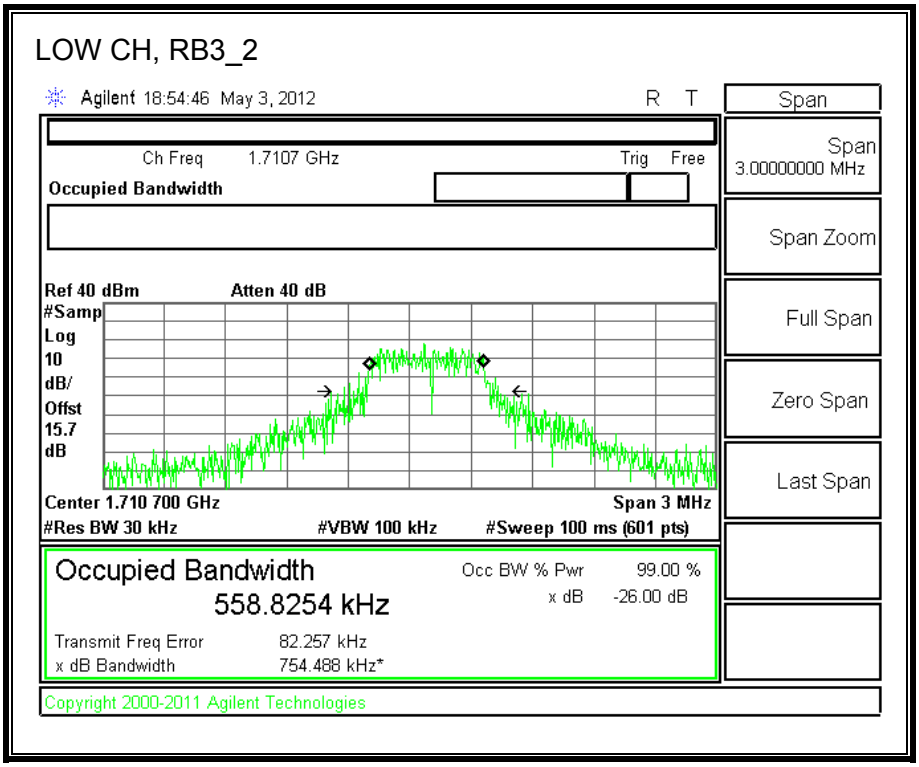
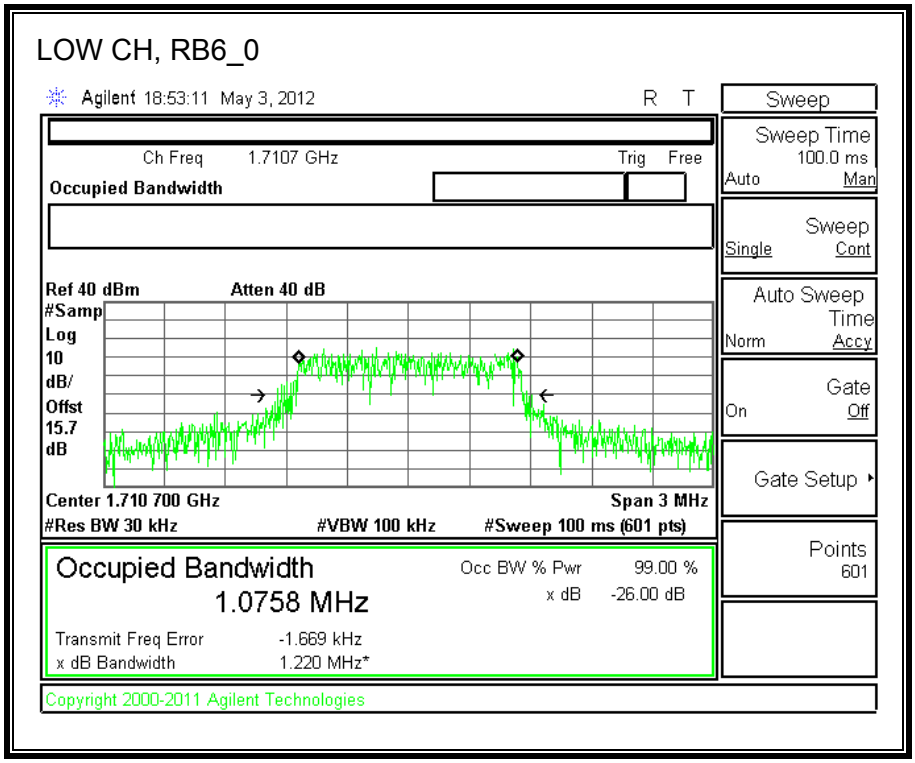


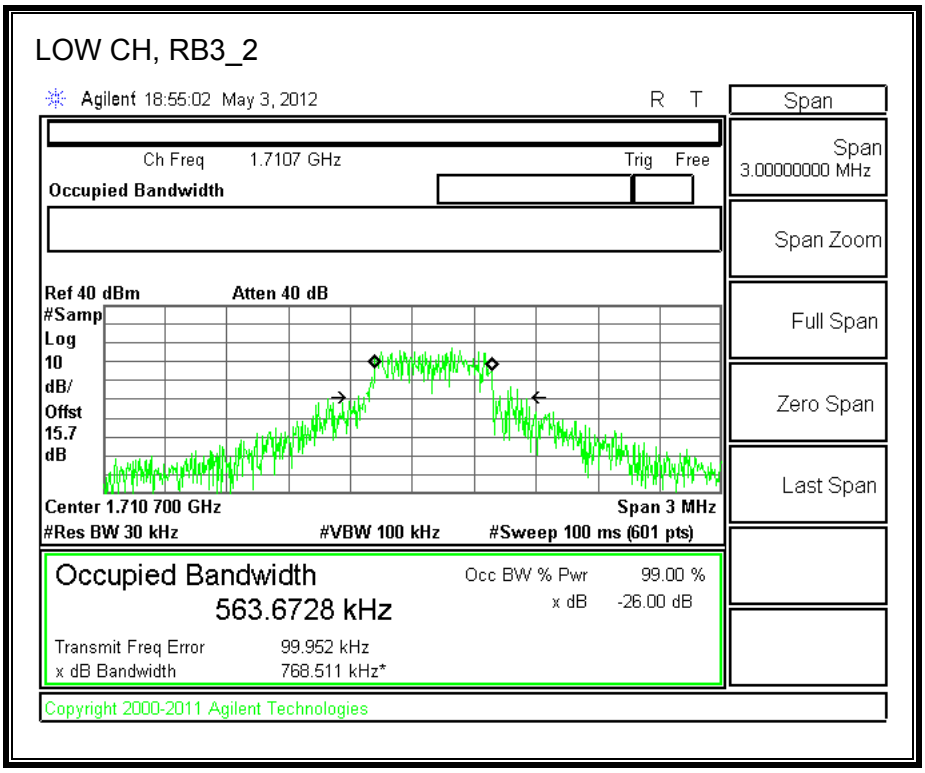
LTE, Band 4 (1.4MHz BAND WIDTH)

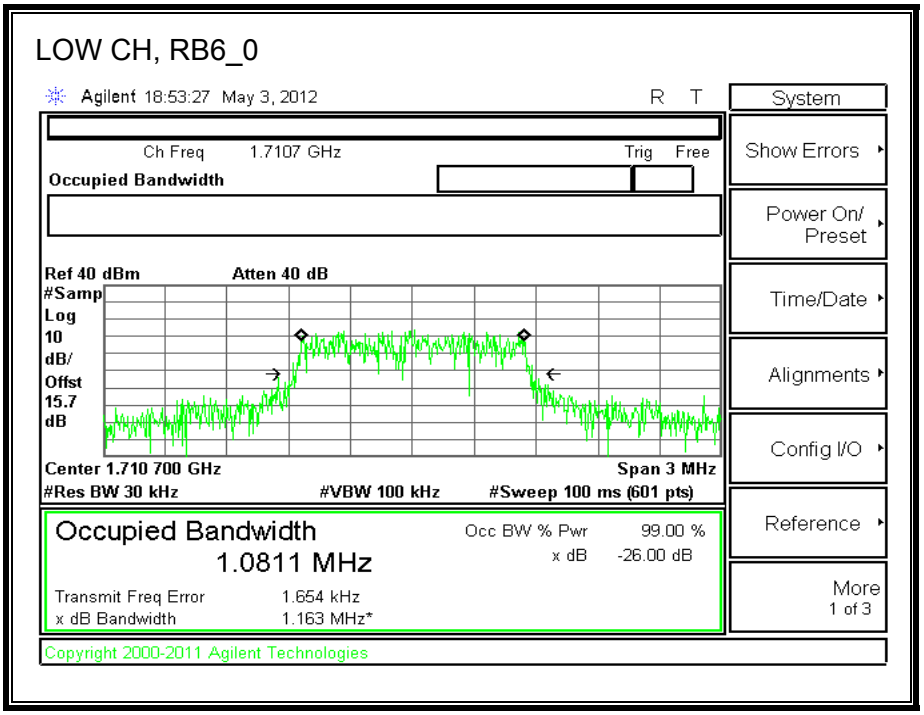
QPSK



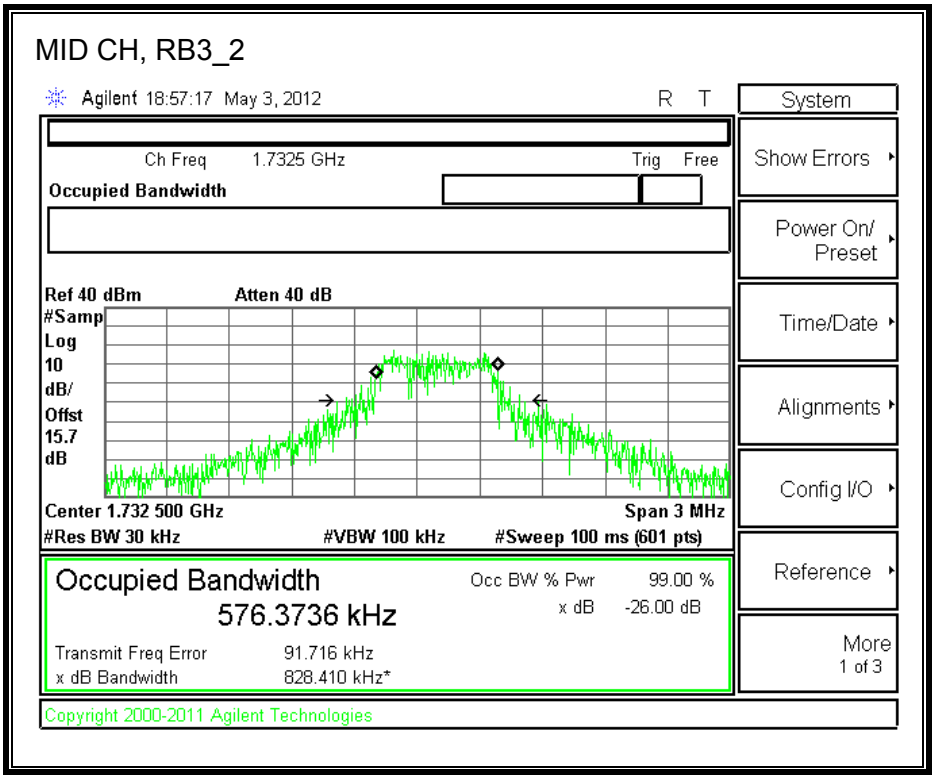


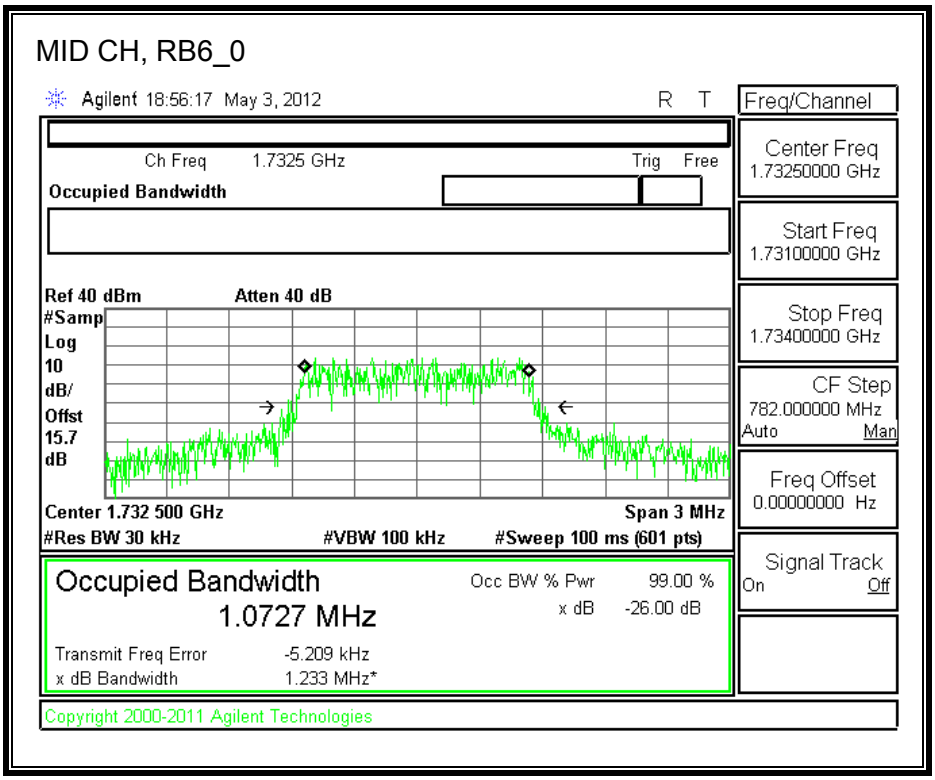
16QAM



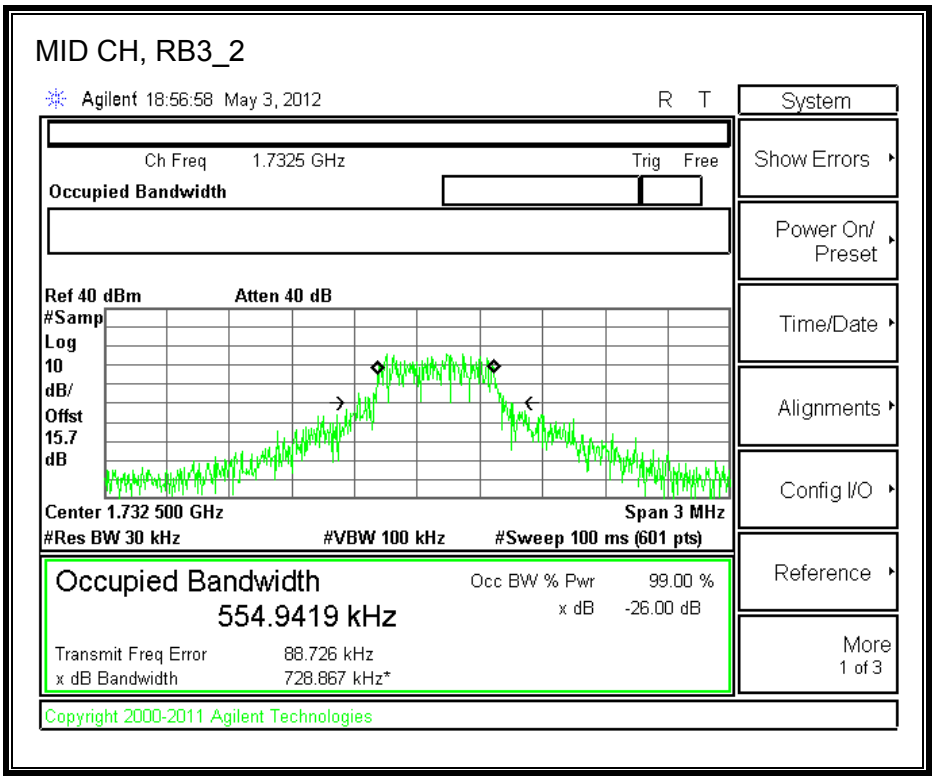


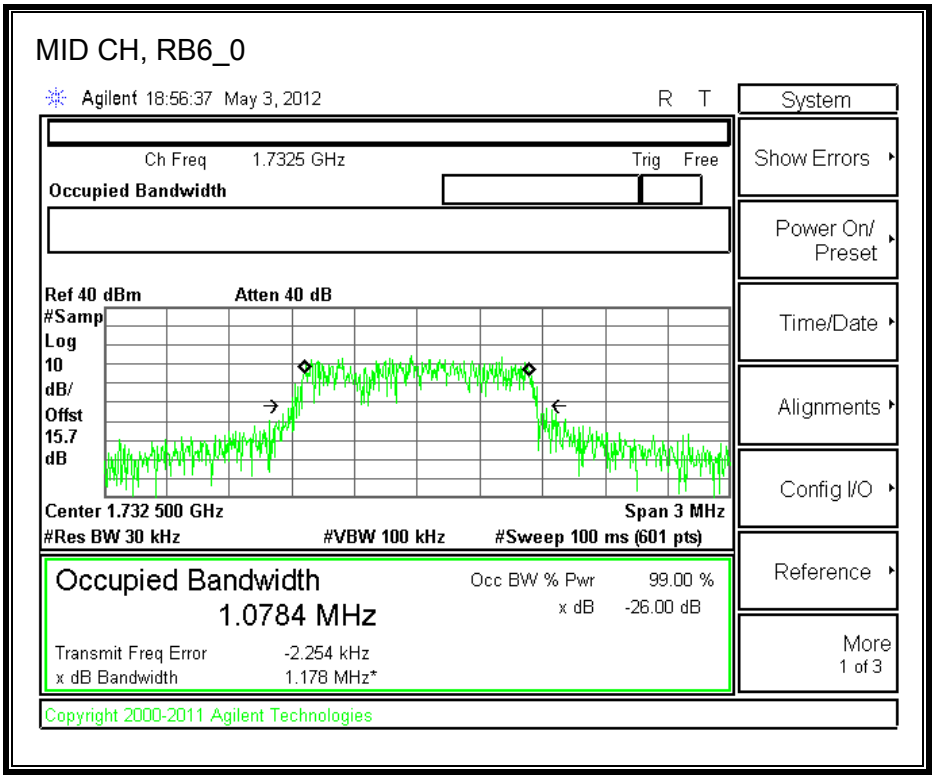
QPSK





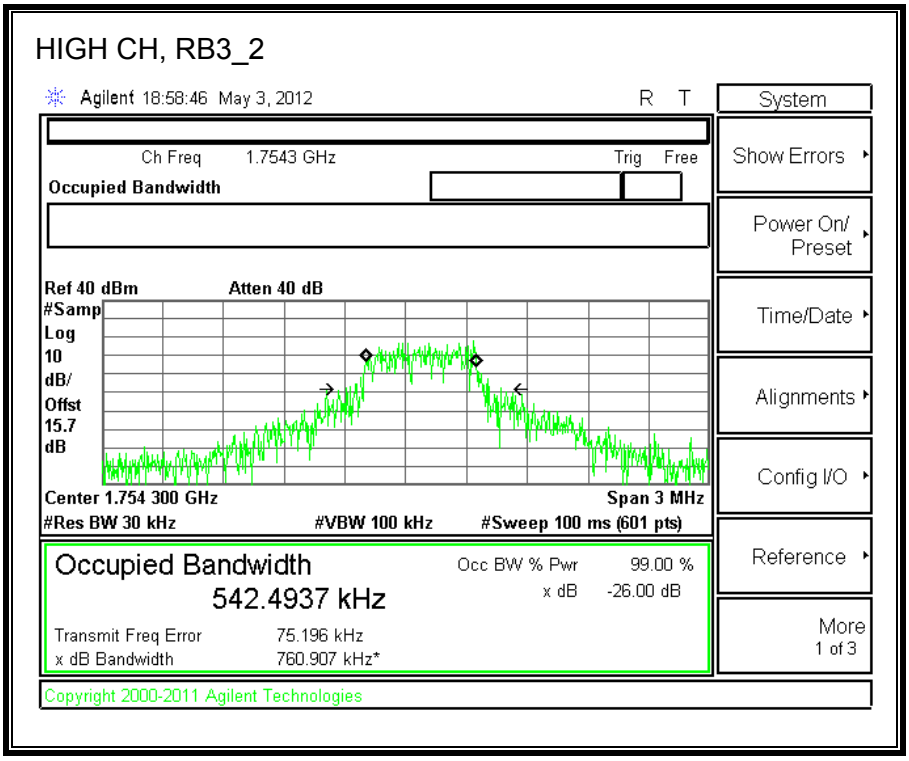
16QAM



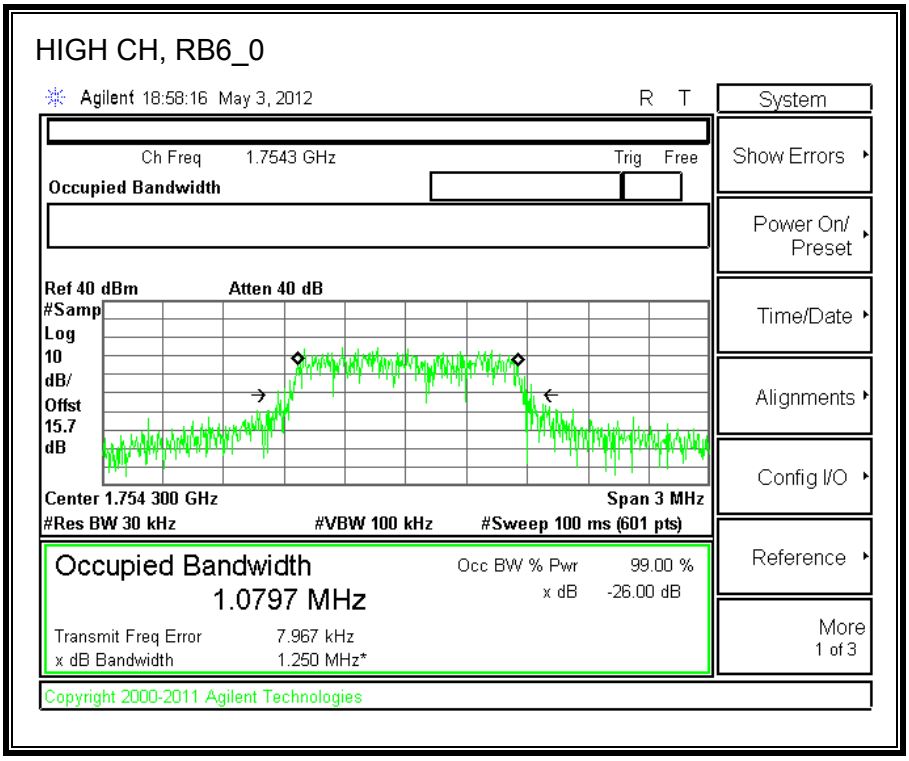


QPSK

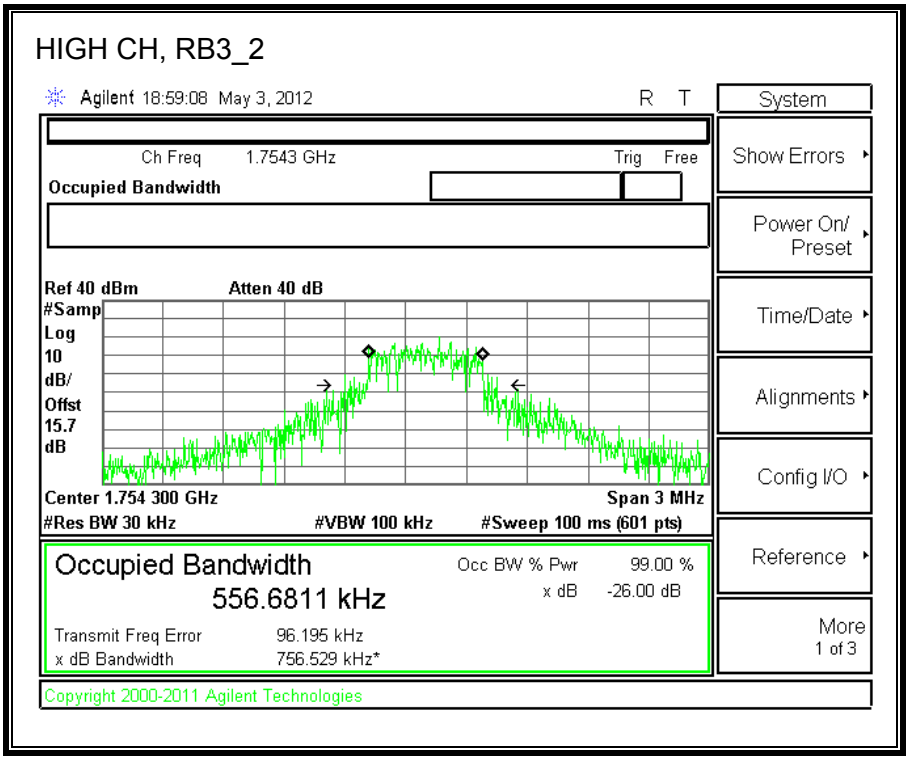
HIGH CH, RB3_2

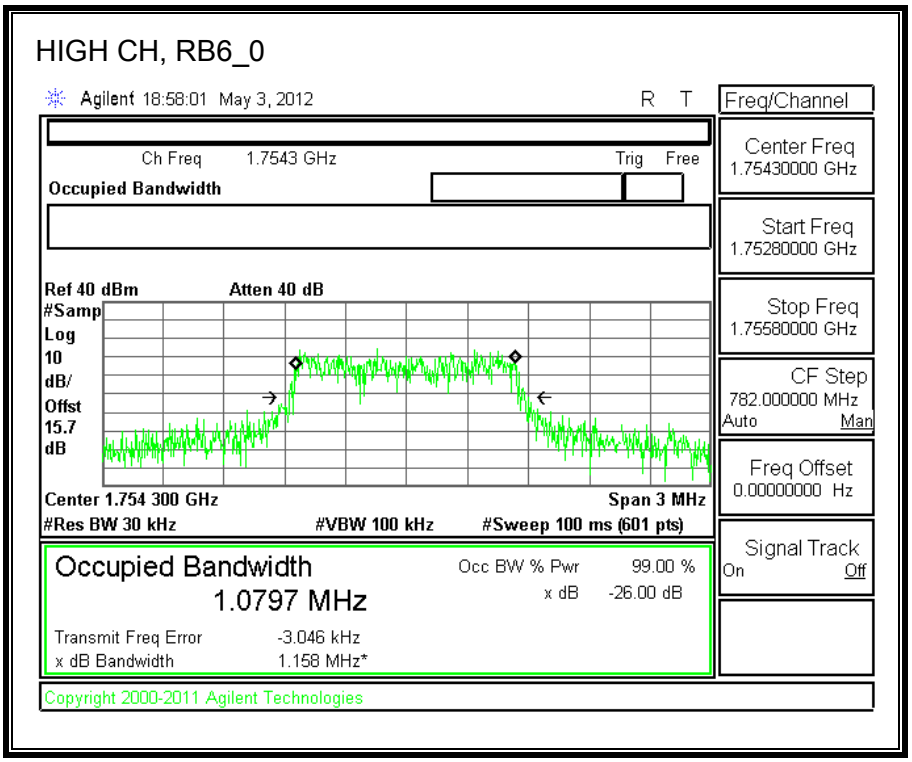


HIGH CH, RB6_0



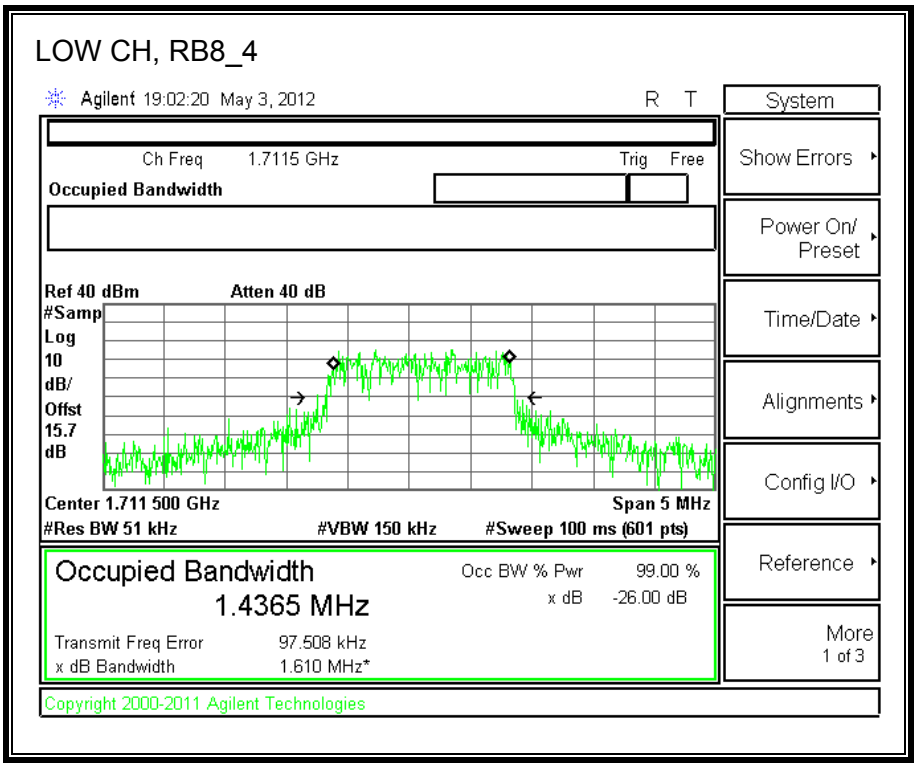
16QAM

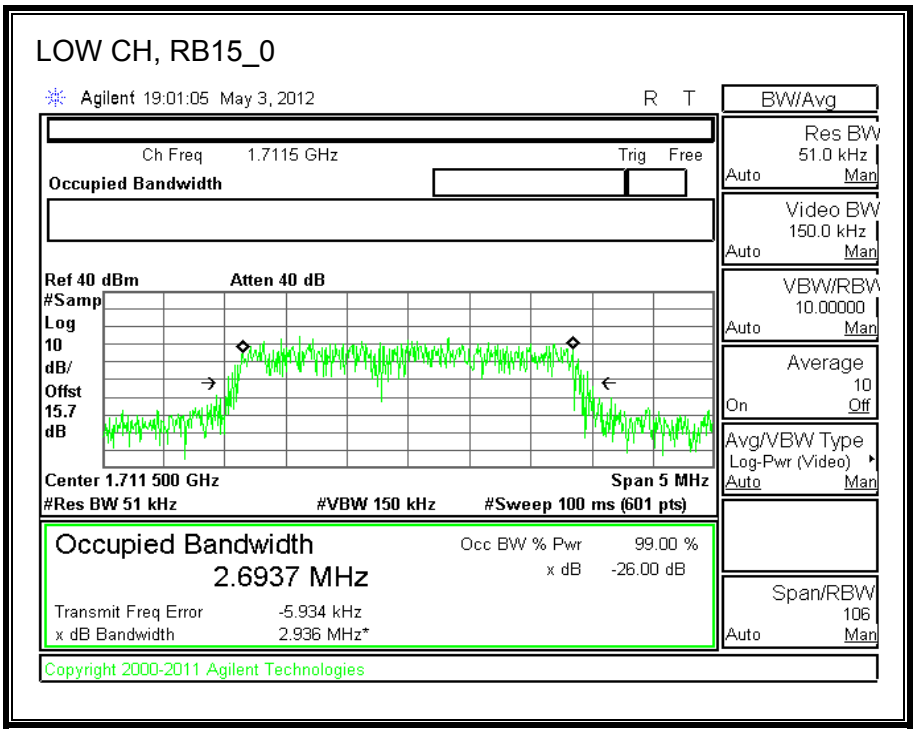




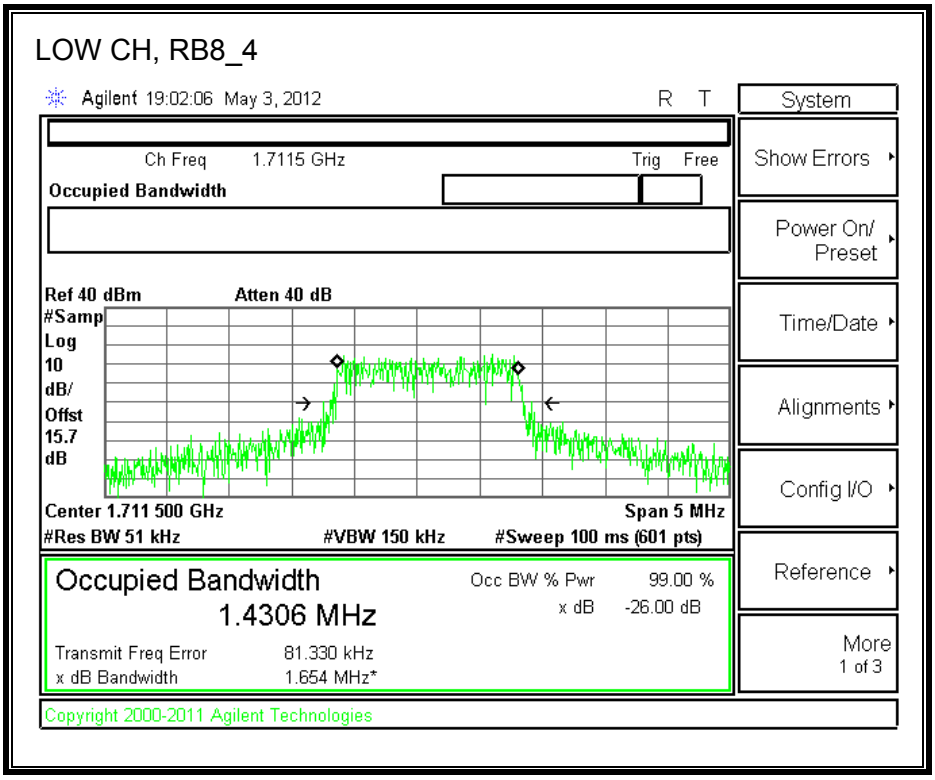
LTE, Band 4 (3.0MHz BAND WIDTH)

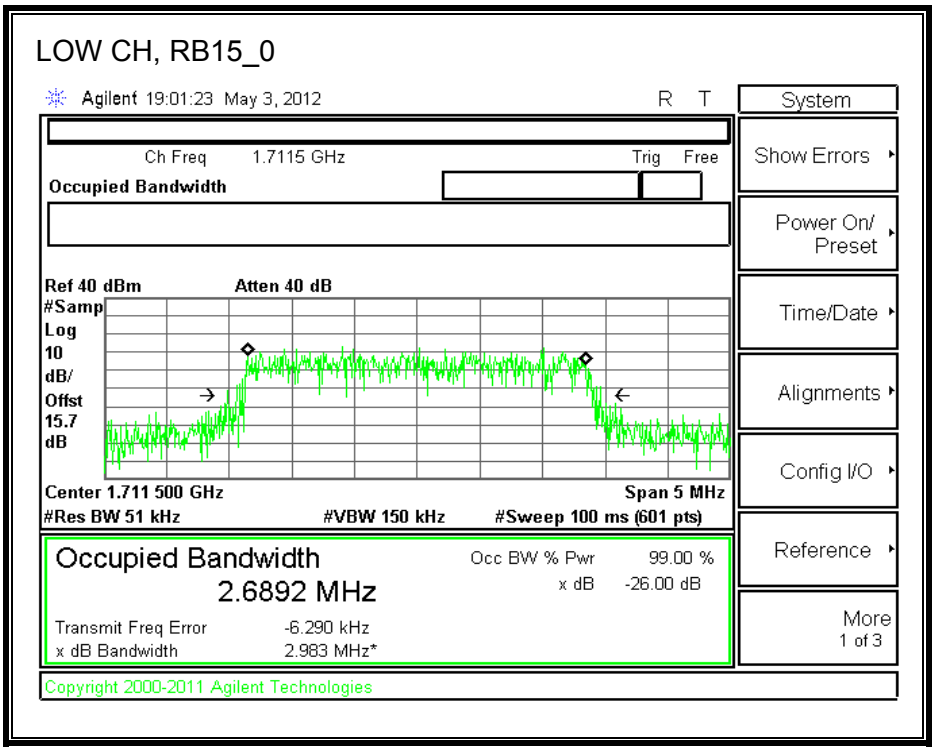
QPSK



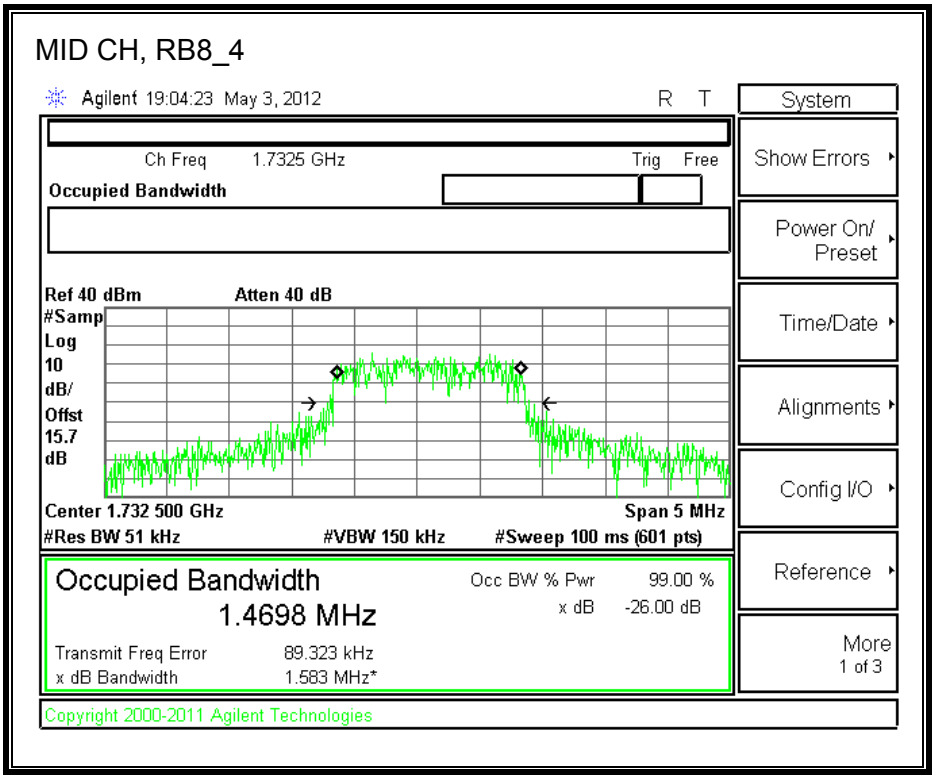


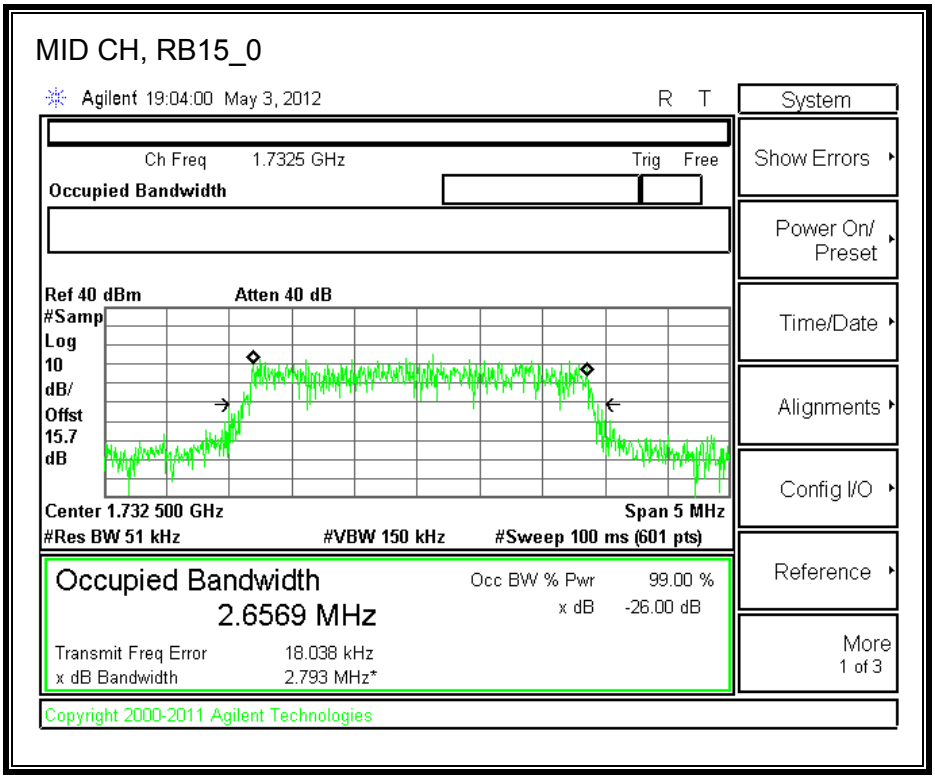
16QAM



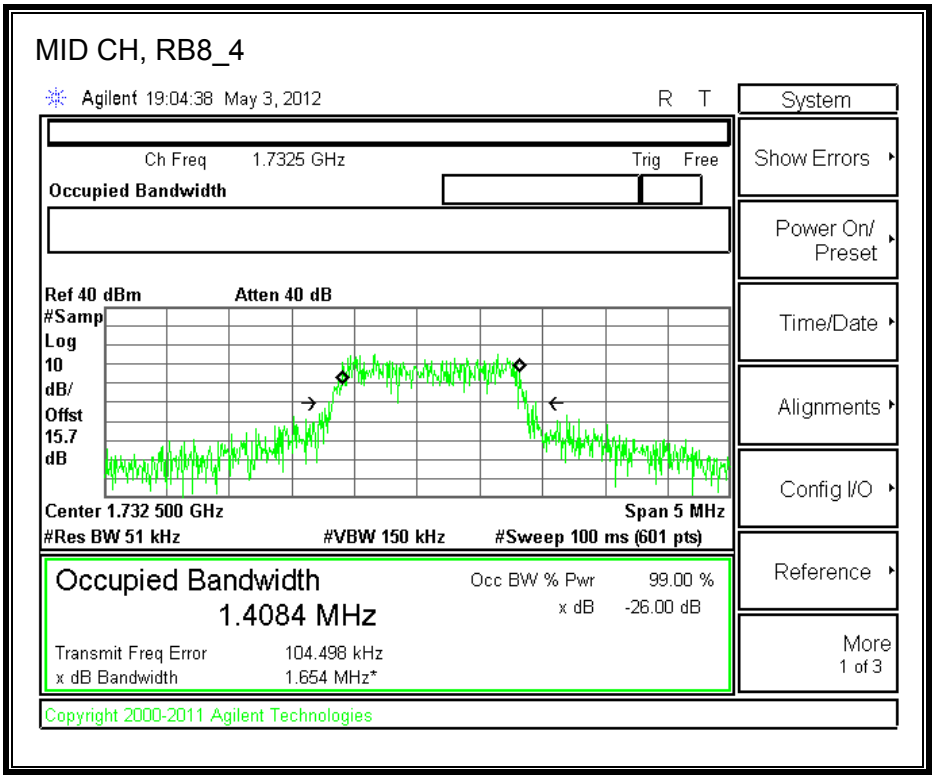


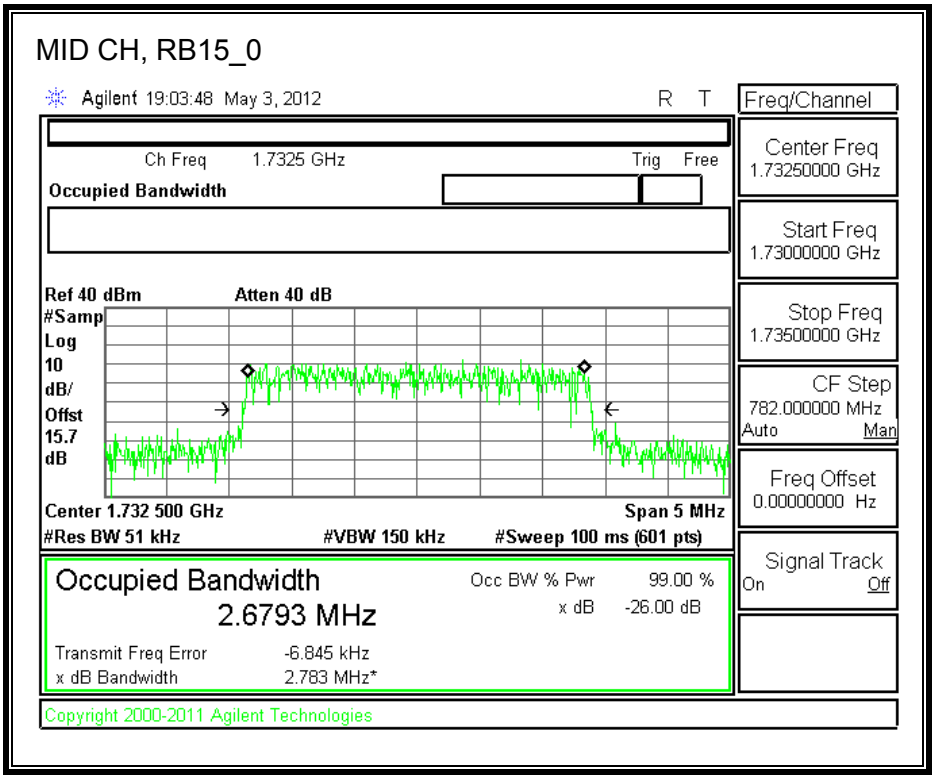
QPSK



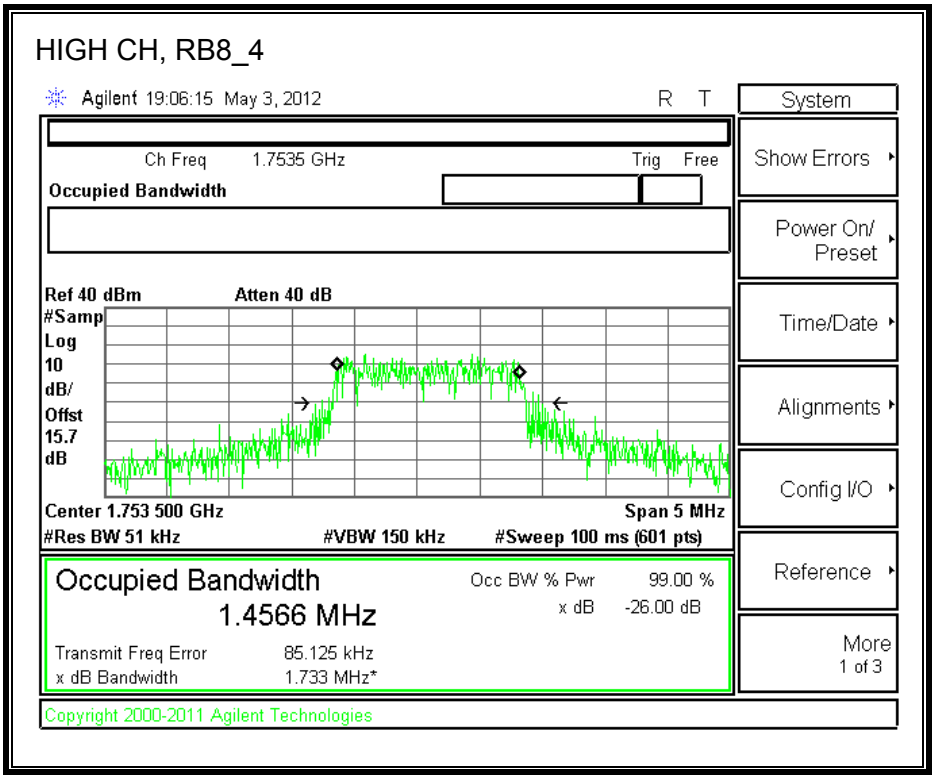


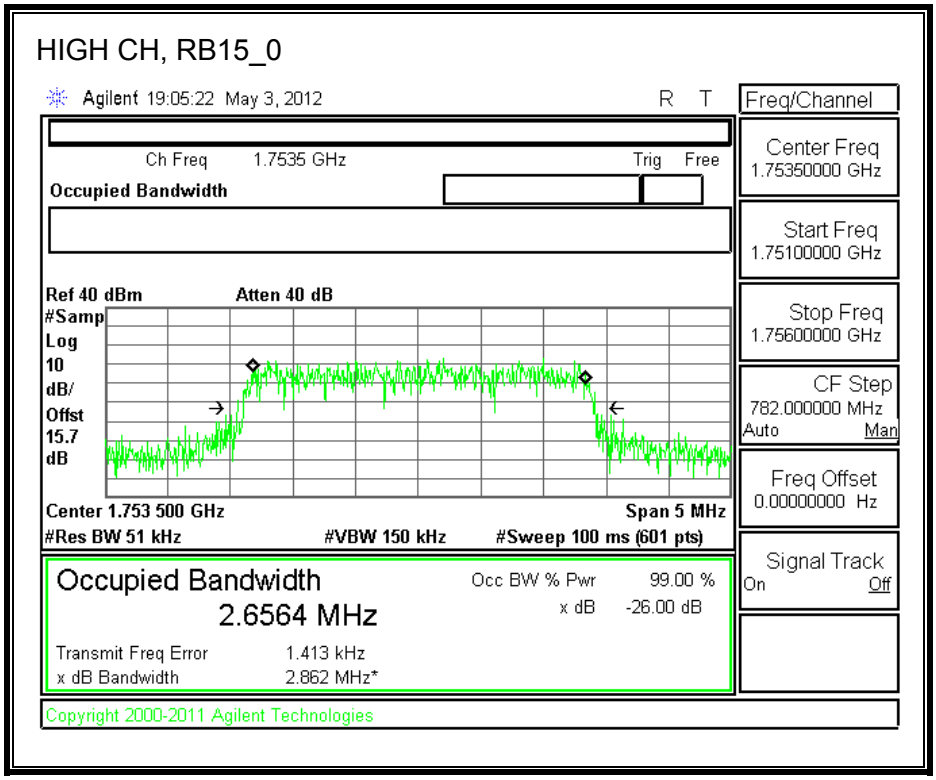
16QAM



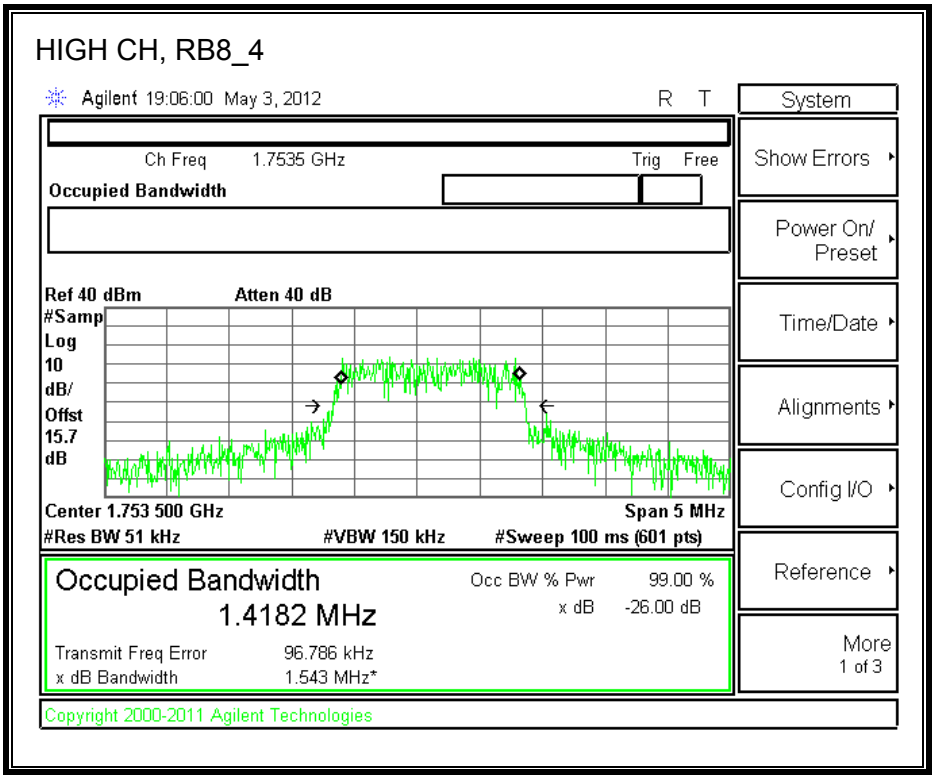


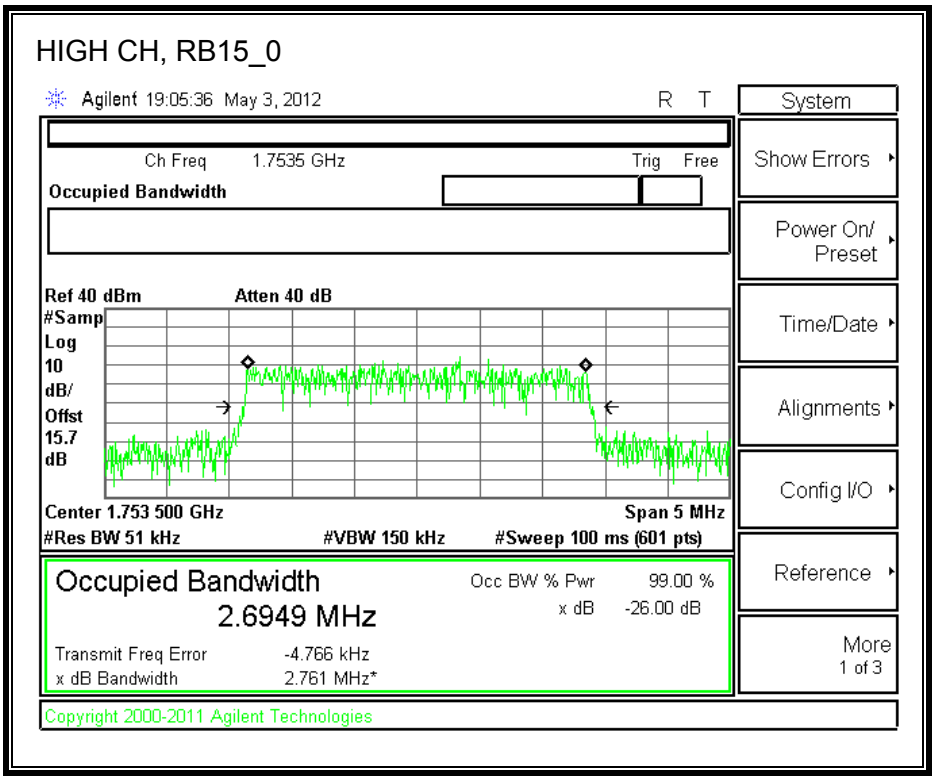
QPSK





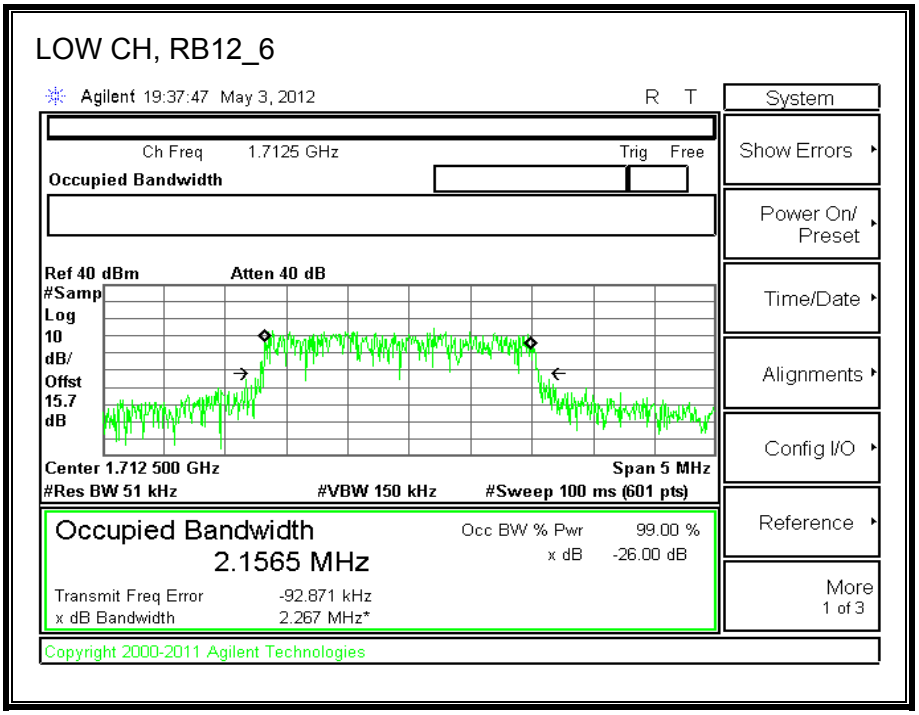
16QAM

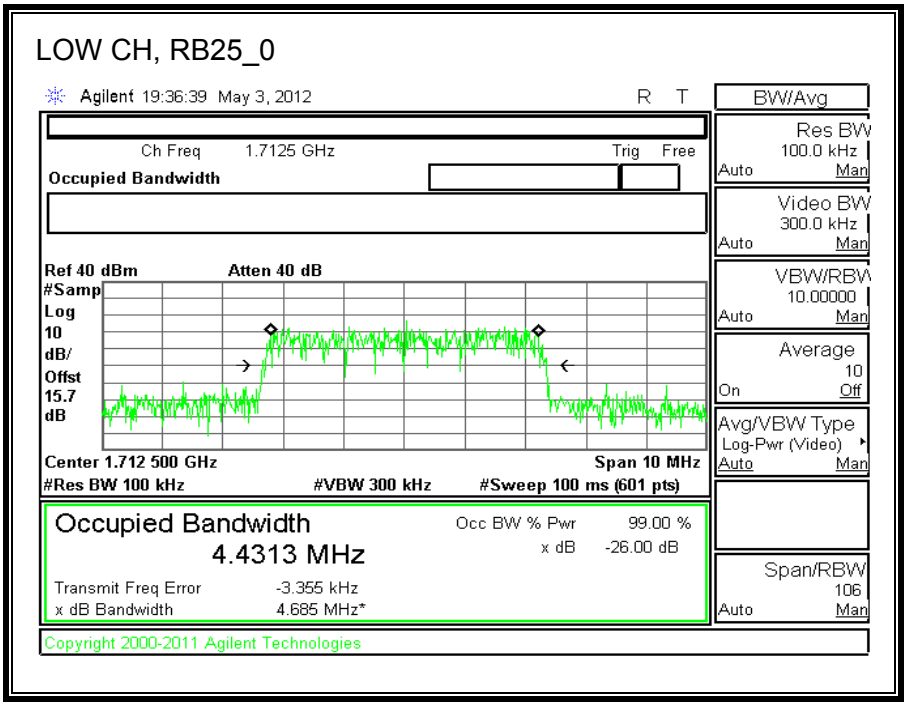




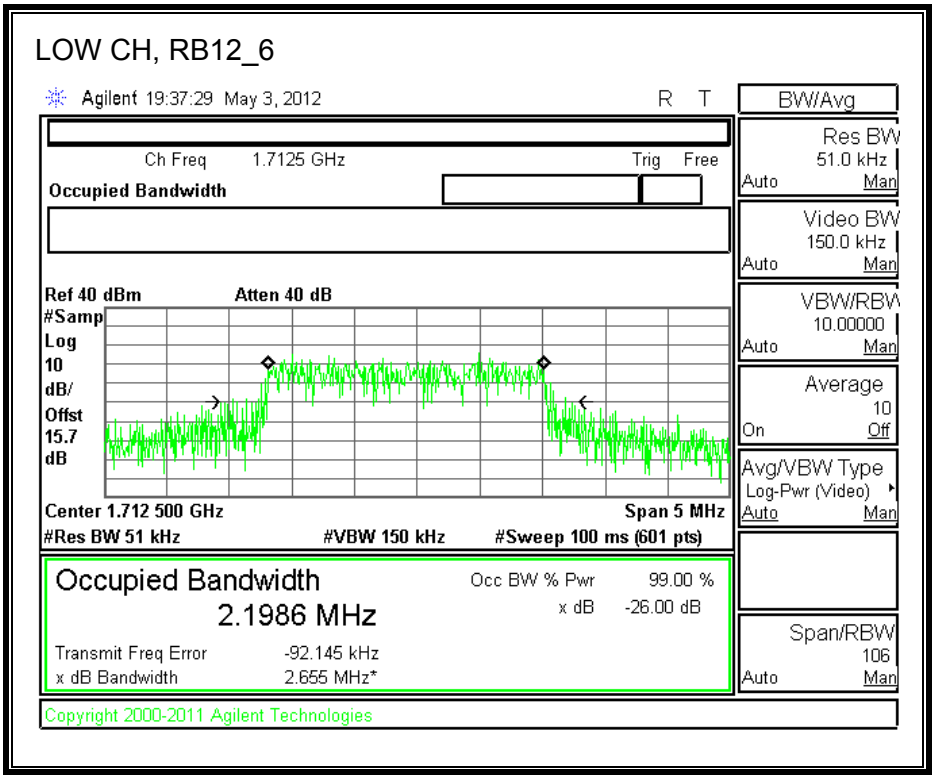
LTE, Band 4 (5.0MHz BAND WIDTH)

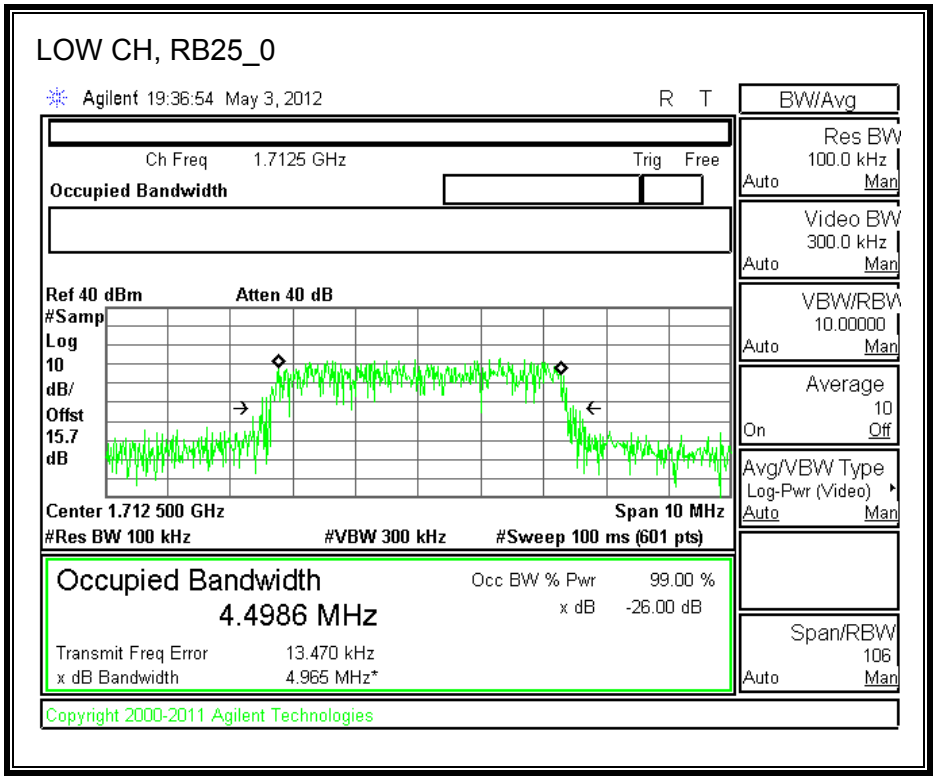
QPSK



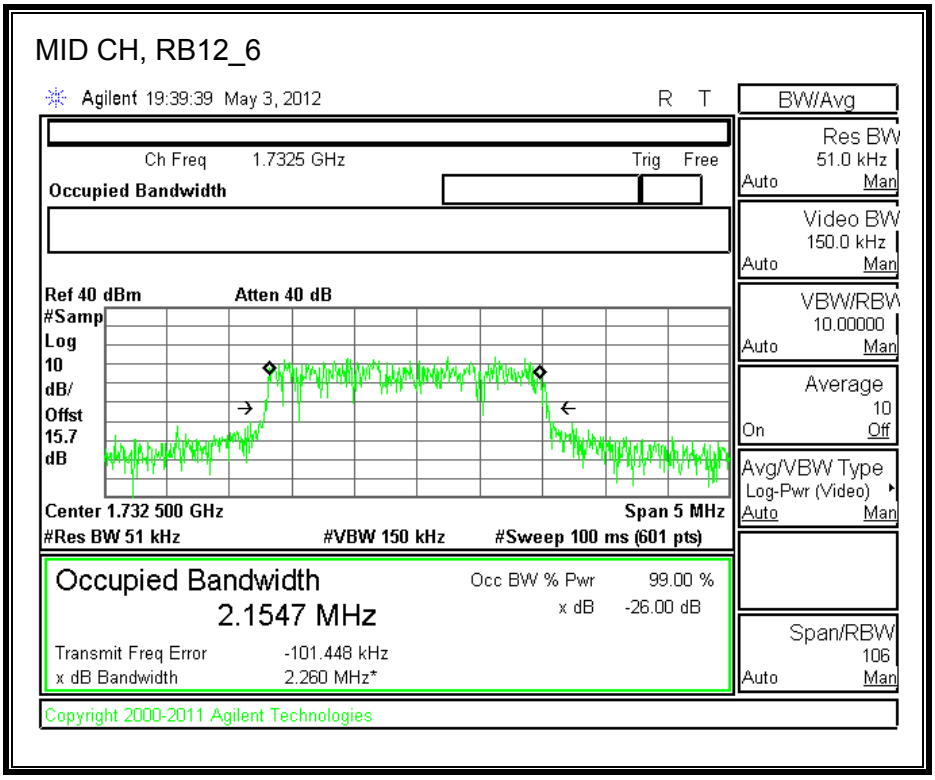


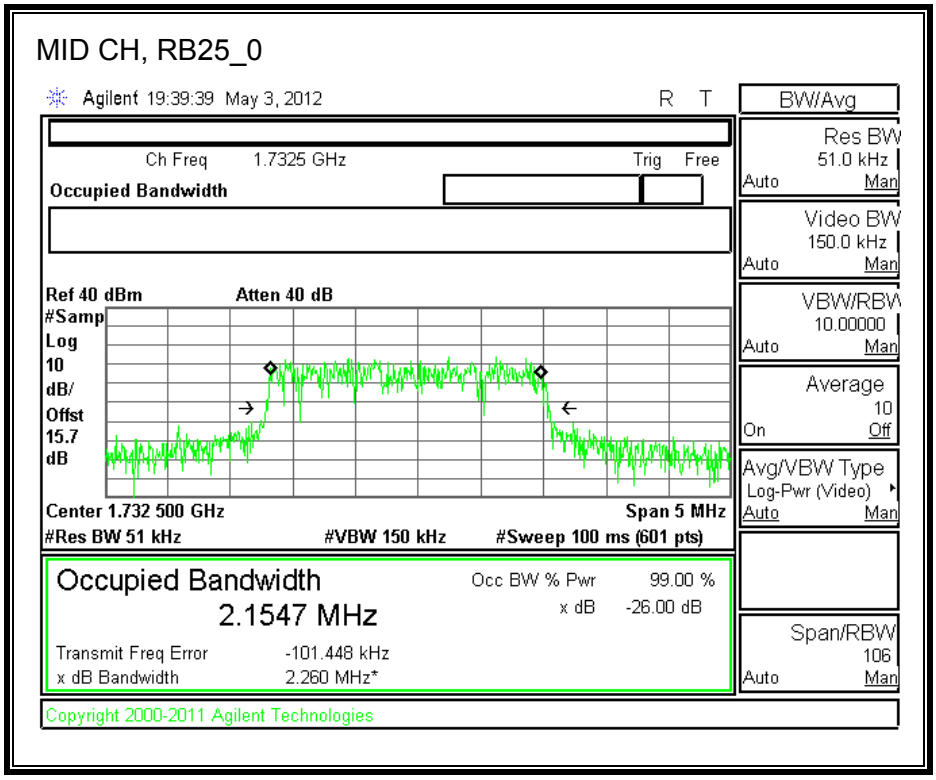
16QAM





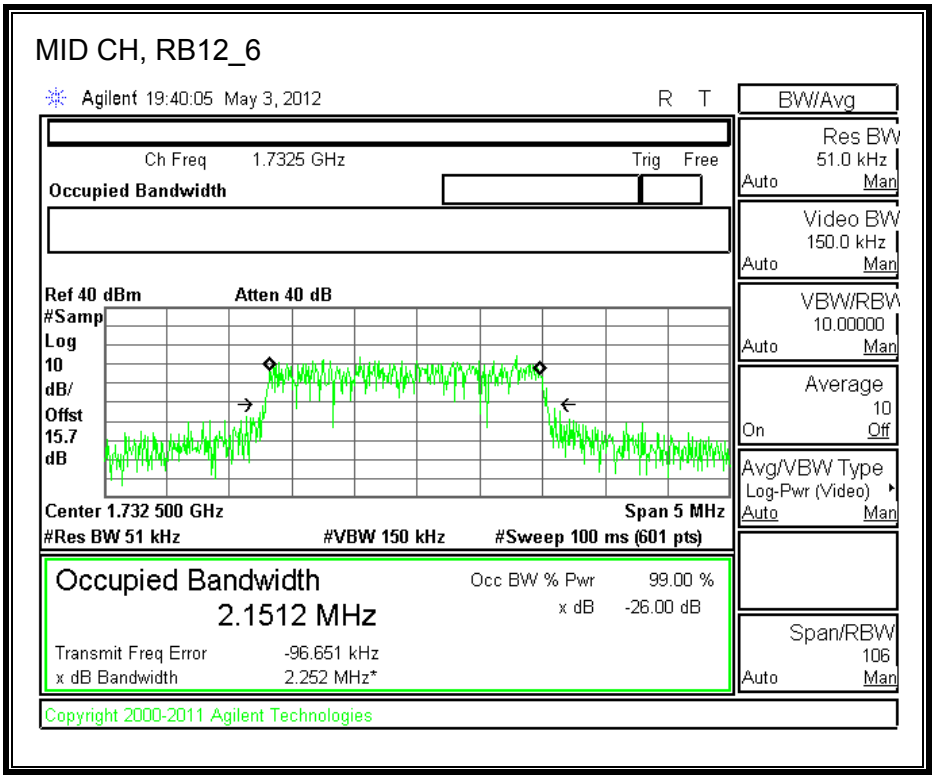
QPSK



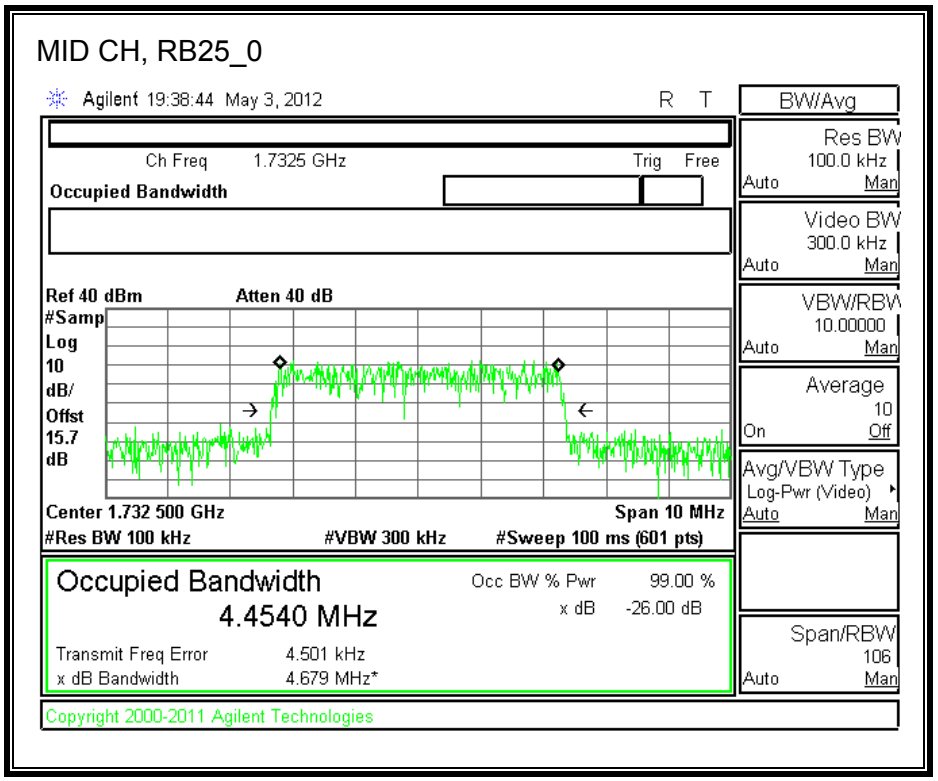


16QAM

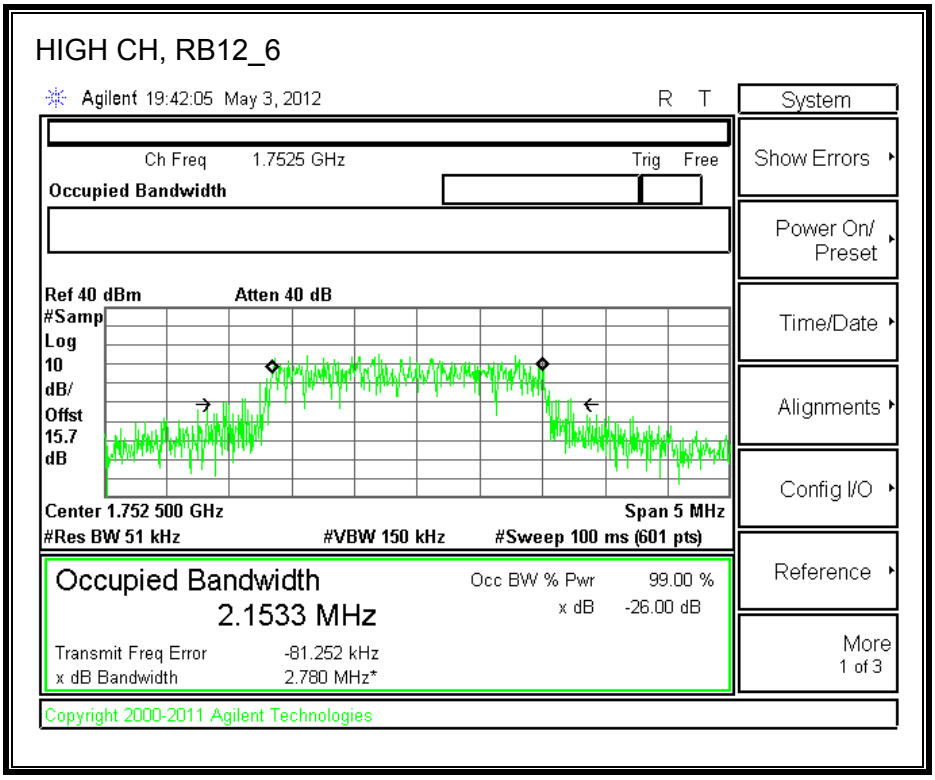
MID CH, RB12_6

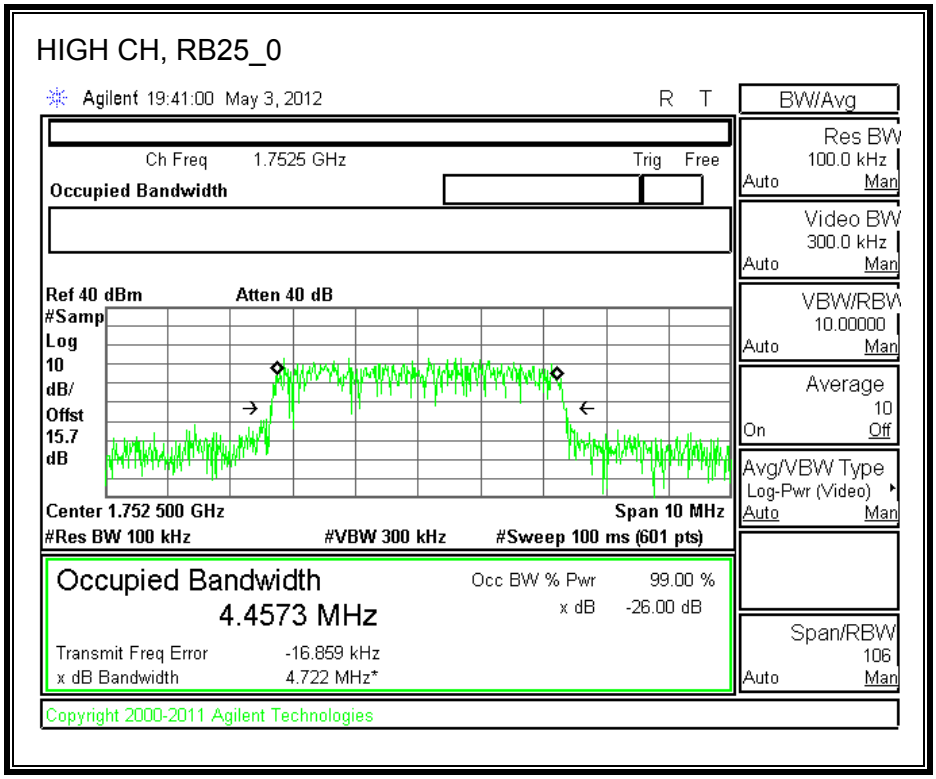


MID CH, RB25_0



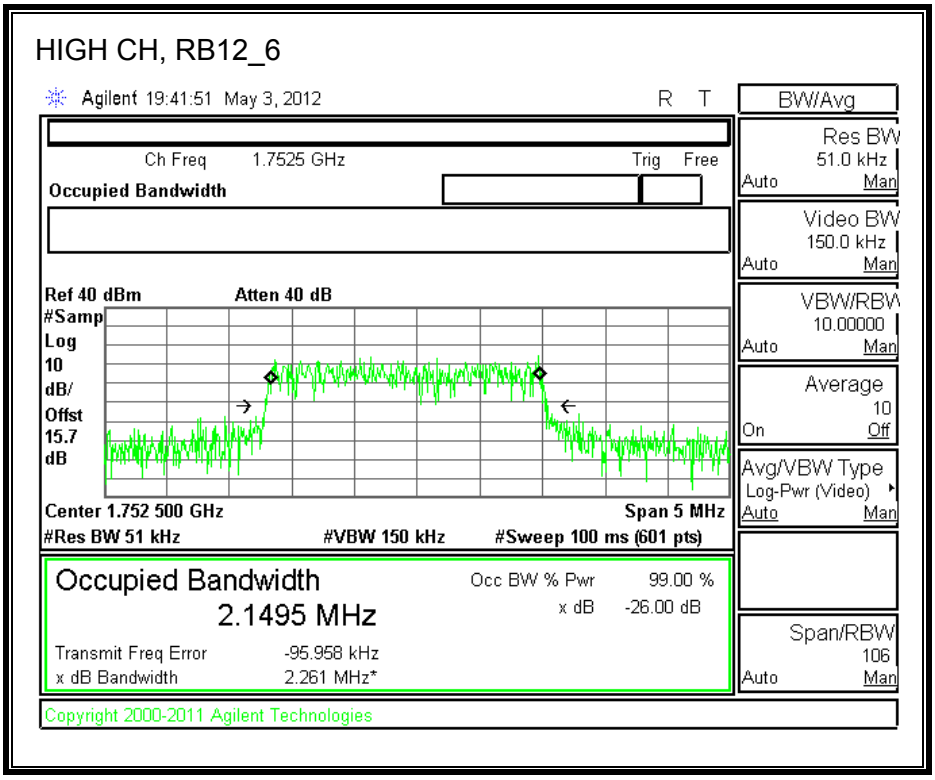
QPSK



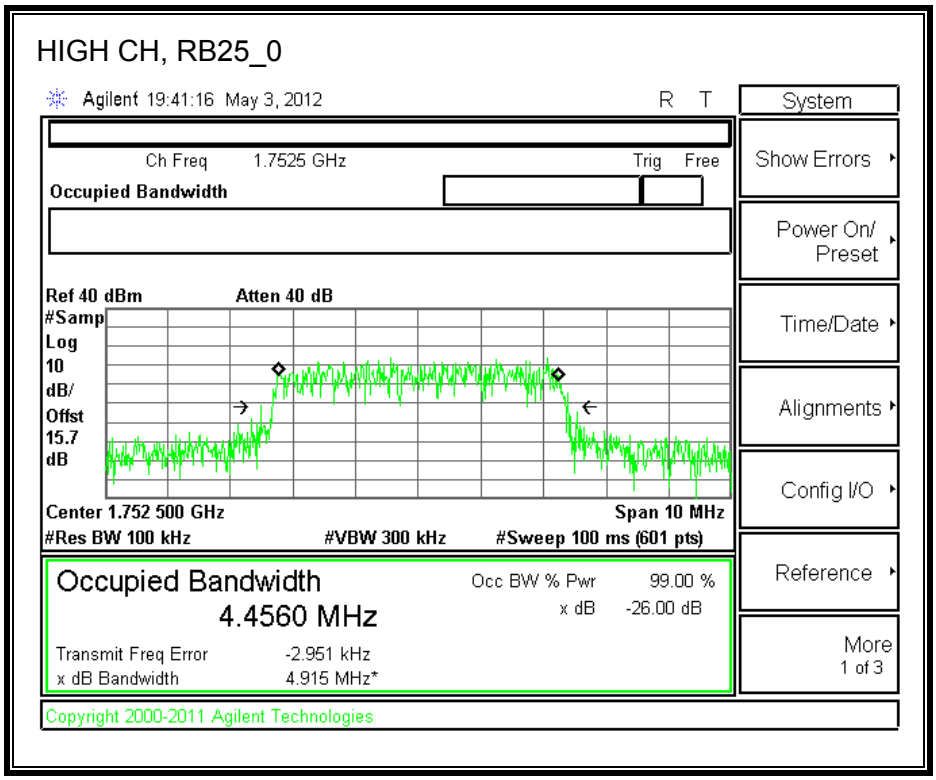


16QAM

HIGH CH, RB12_6

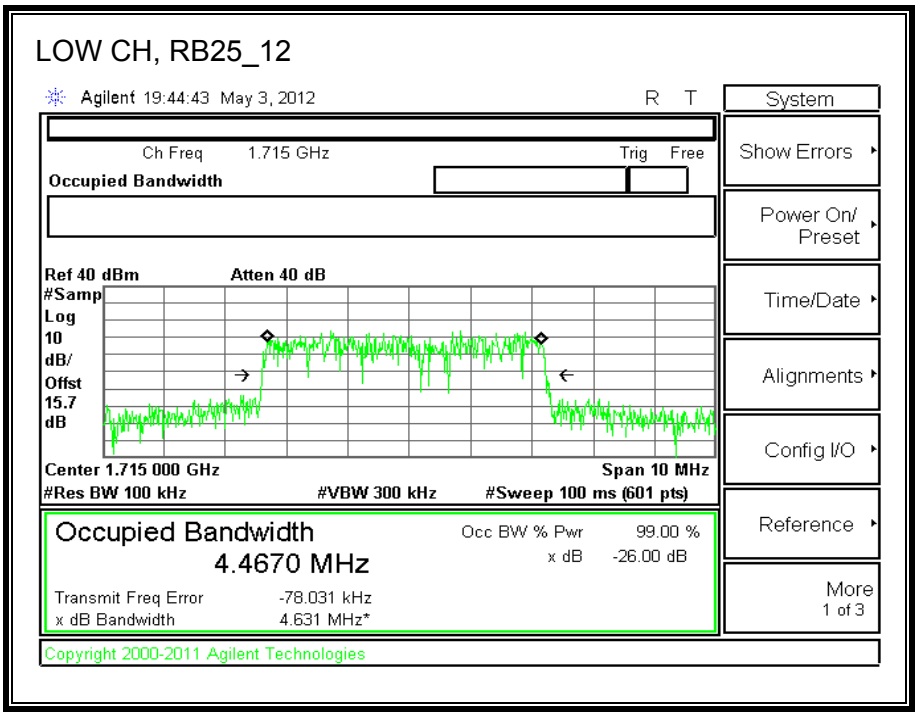


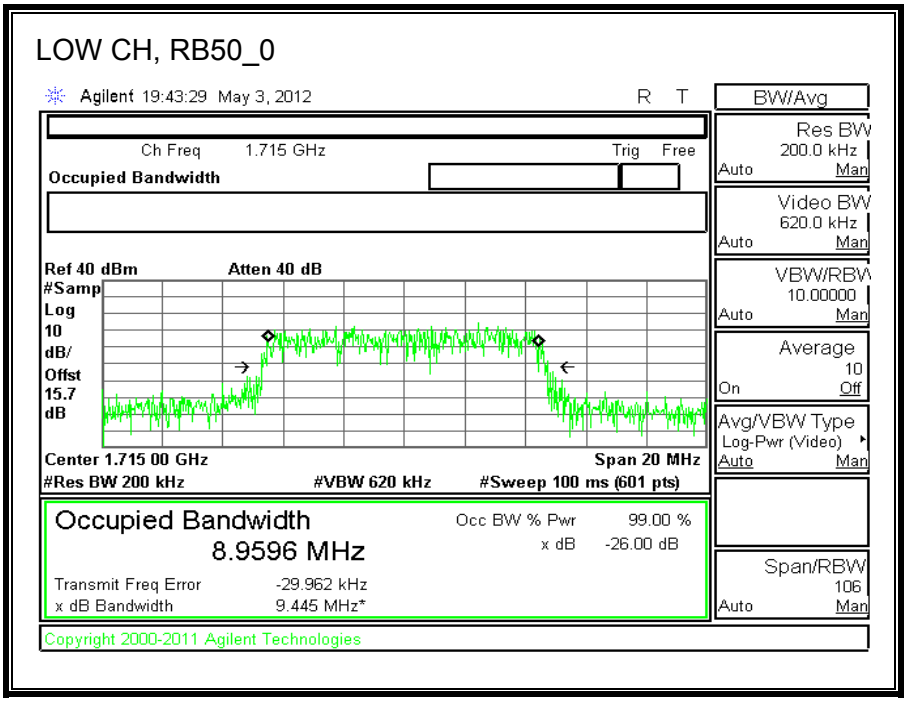
HIGH CH, RB25_0



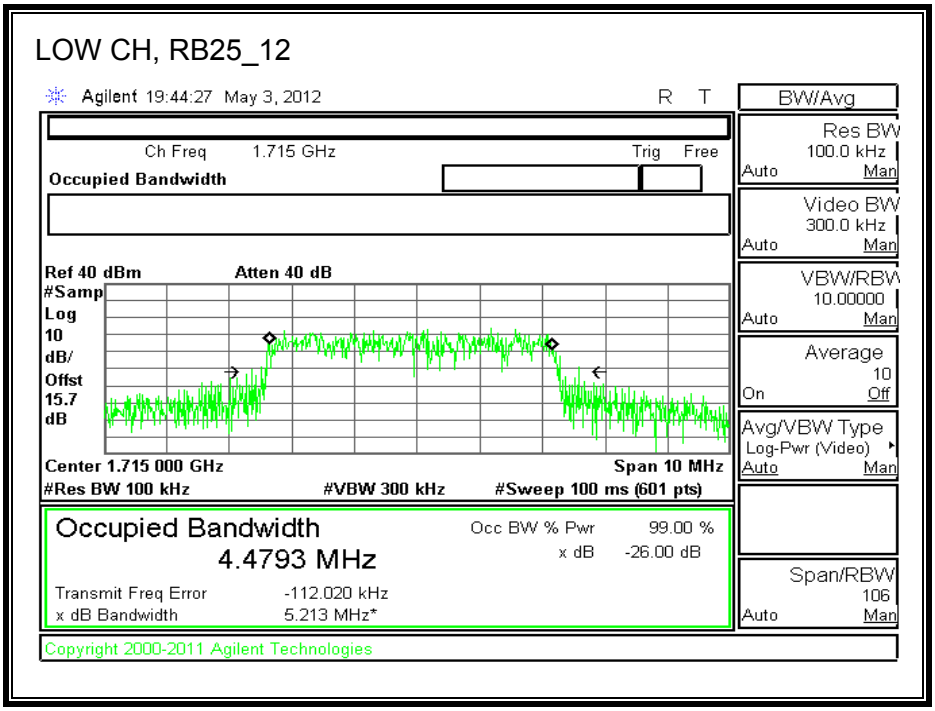
LTE, Band 4 (10.0MHz BAND WIDTH)

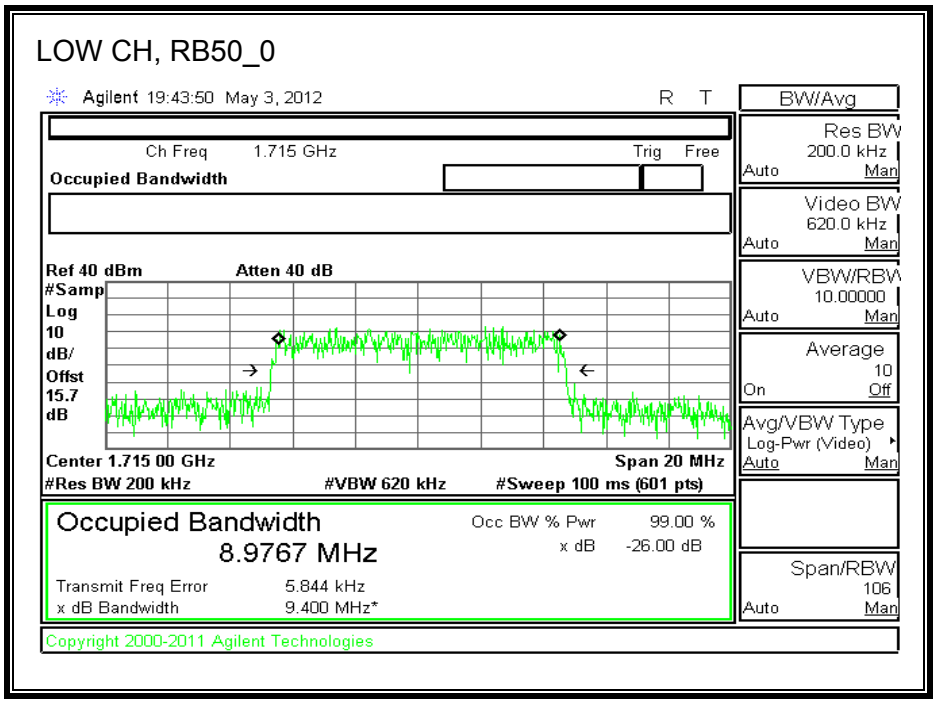
QPSK



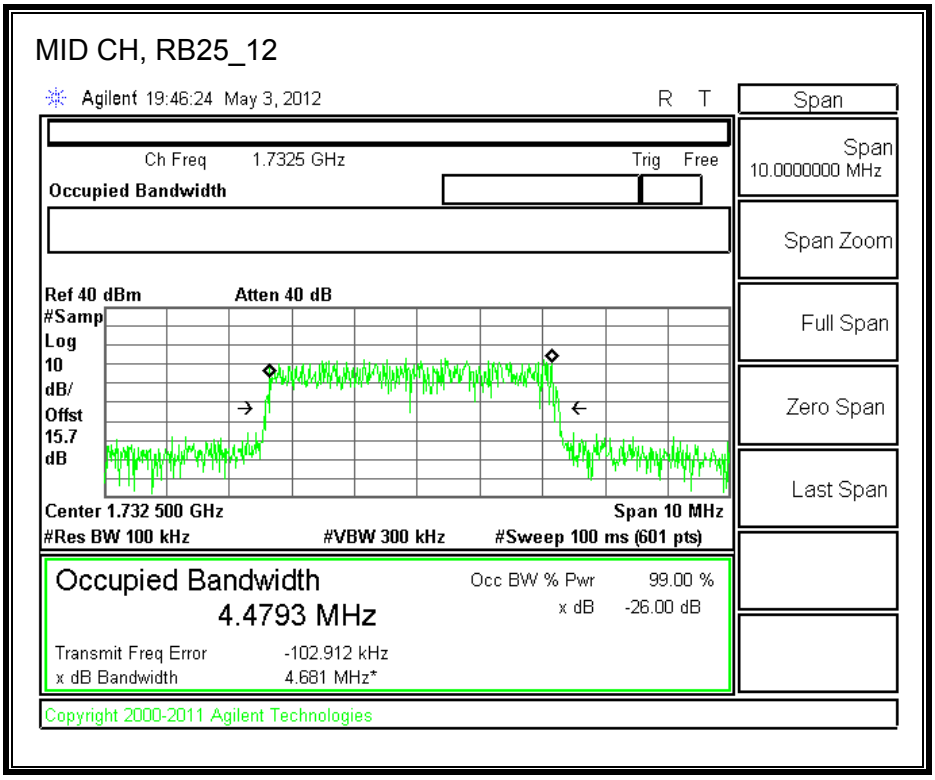


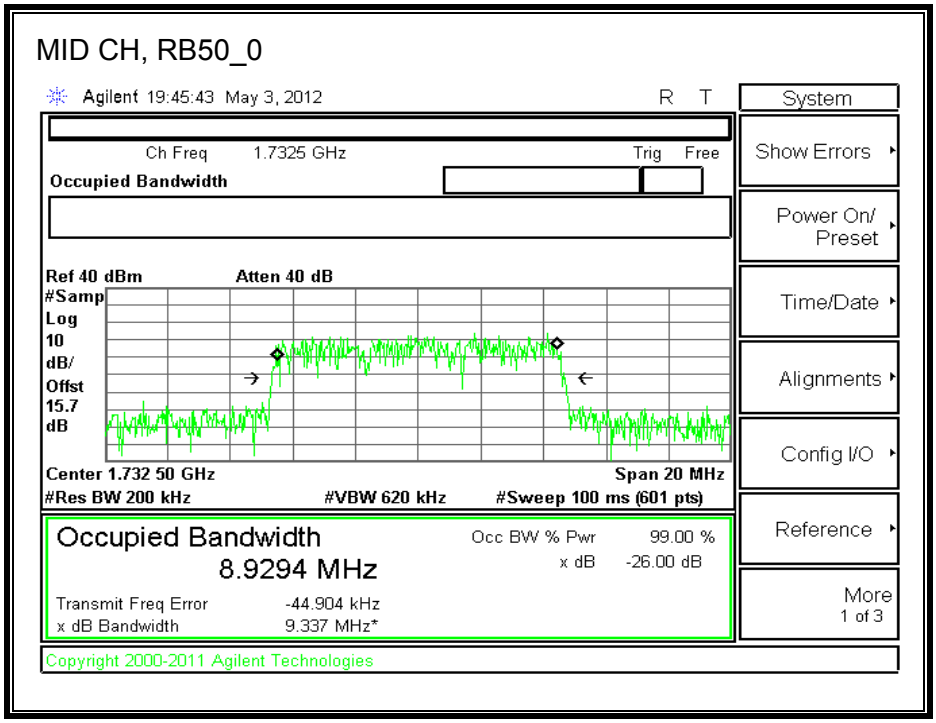
16QAM



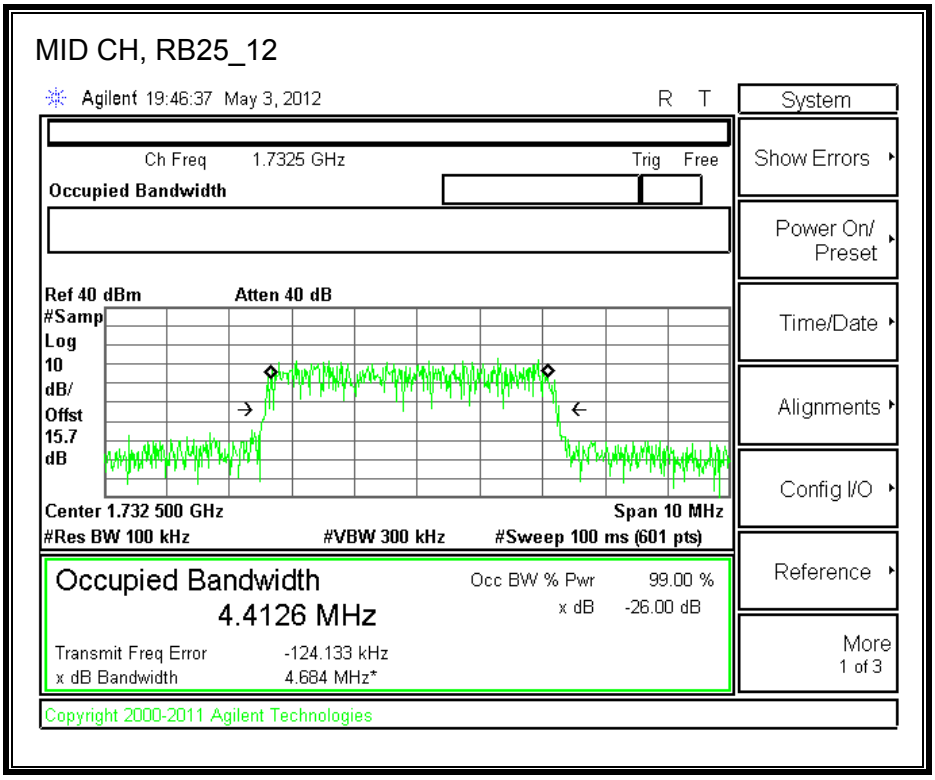


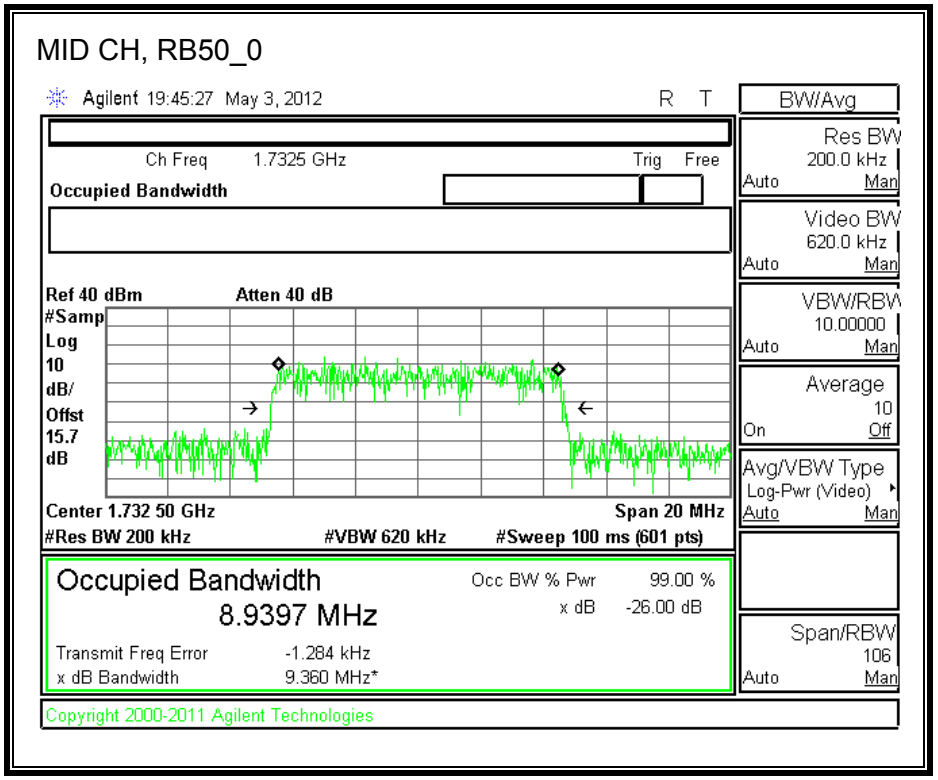
QPSK



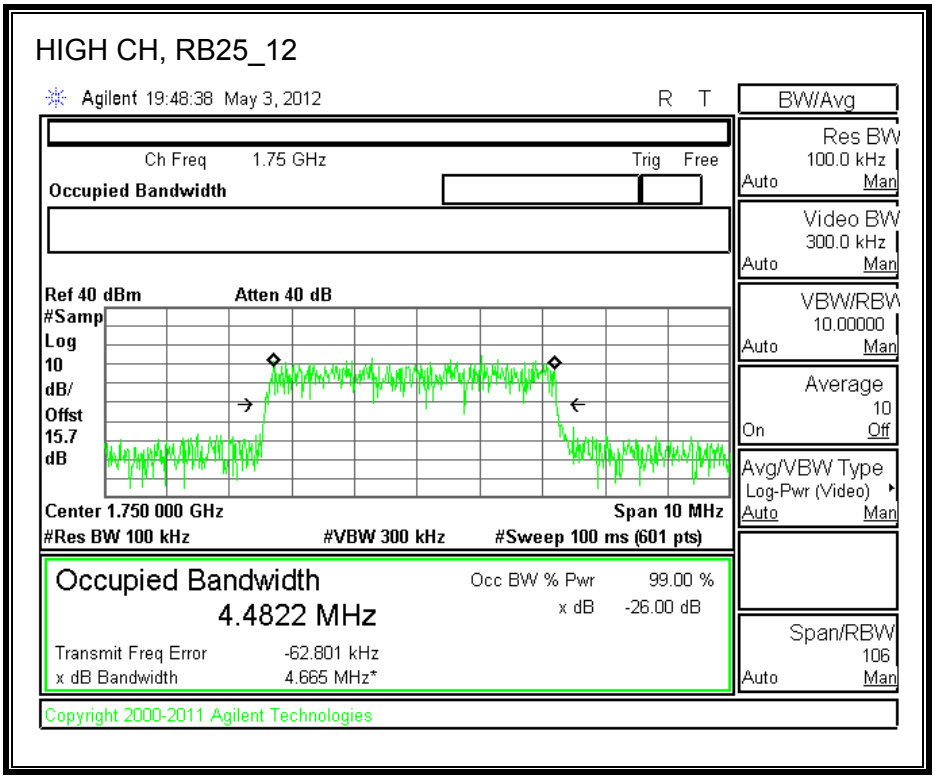


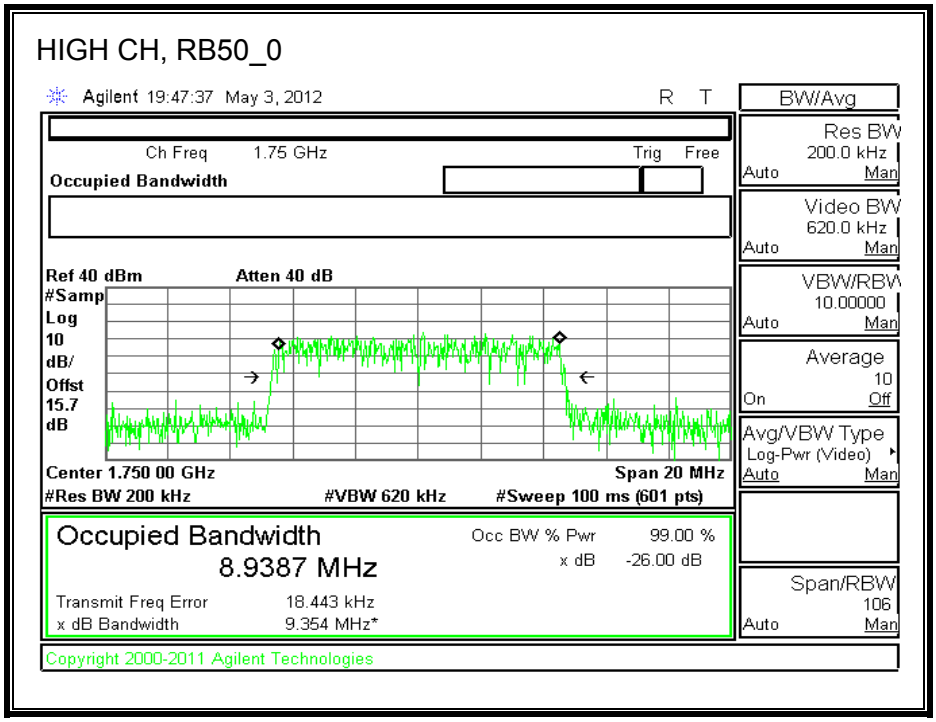
16QAM



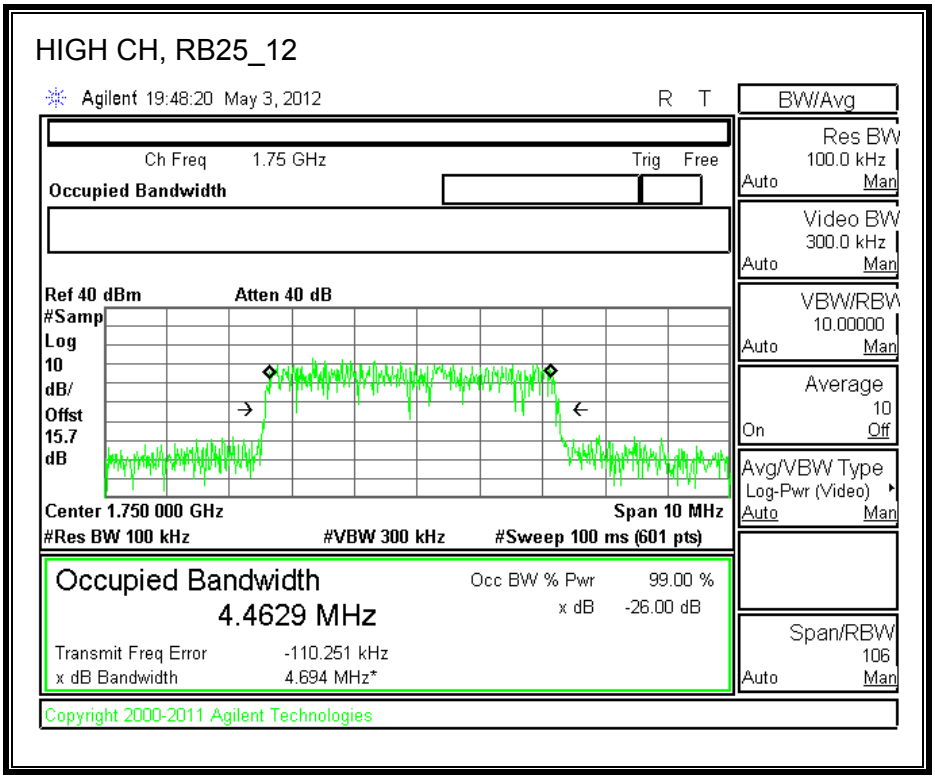


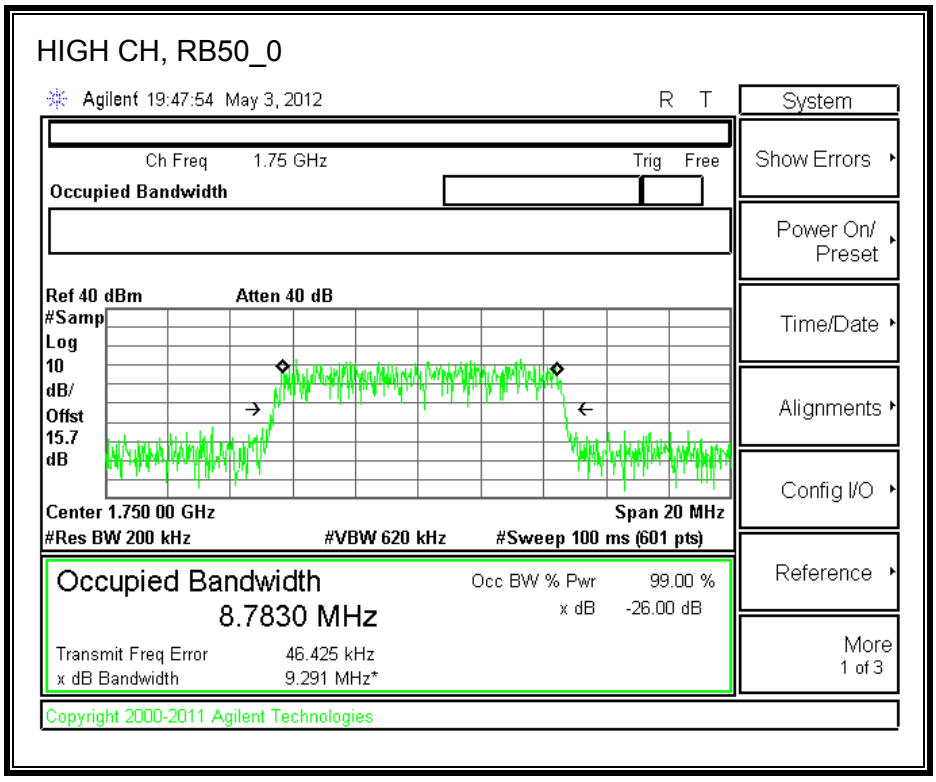
QPSK





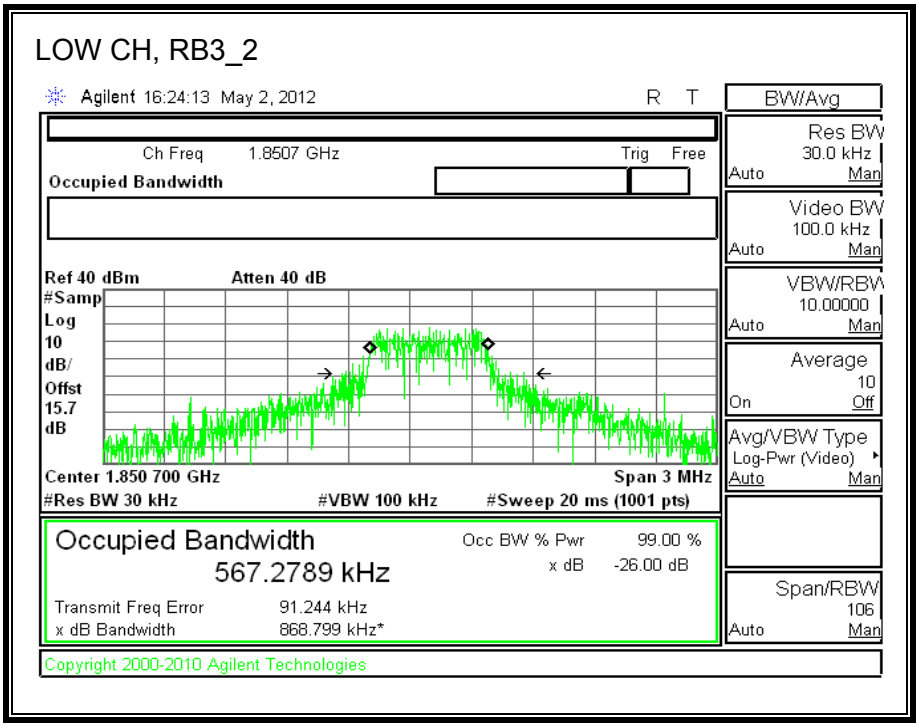
16QAM

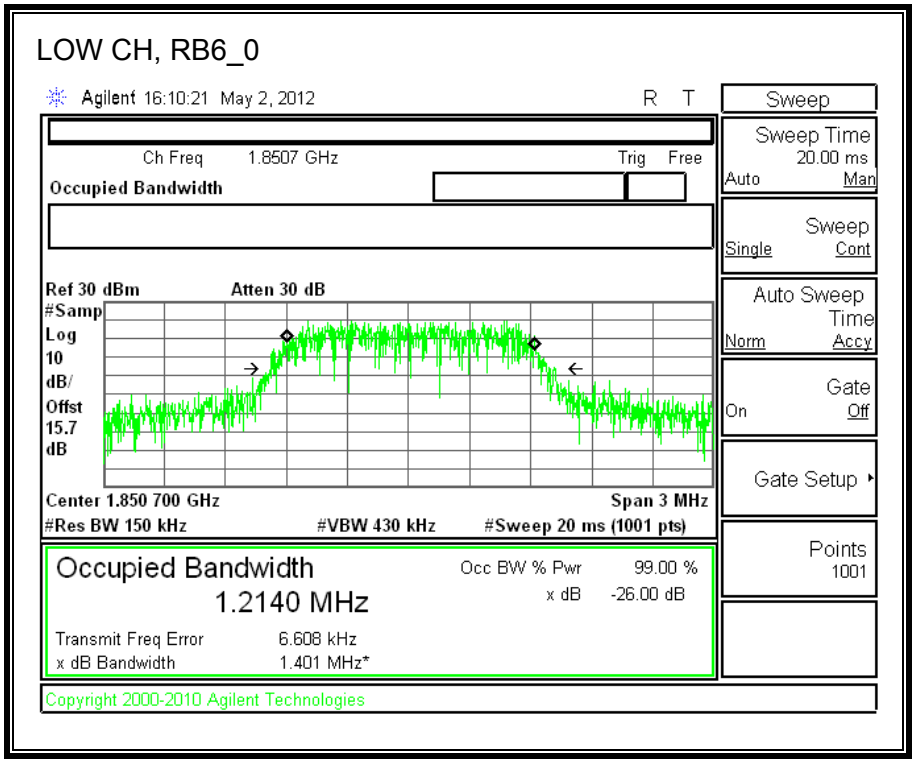




LTE, Band 2 (1.4MHz BAND WIDTH)

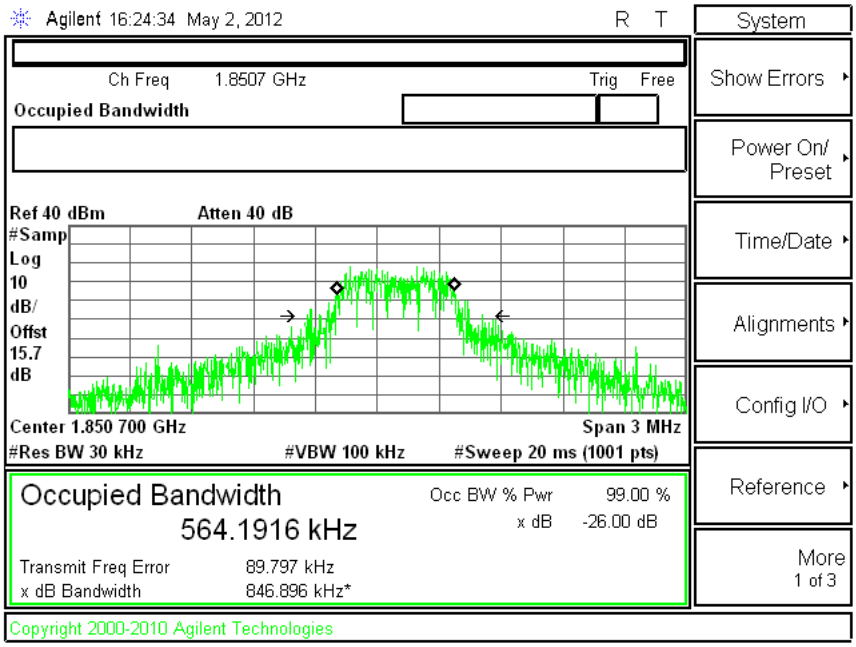
QPSK





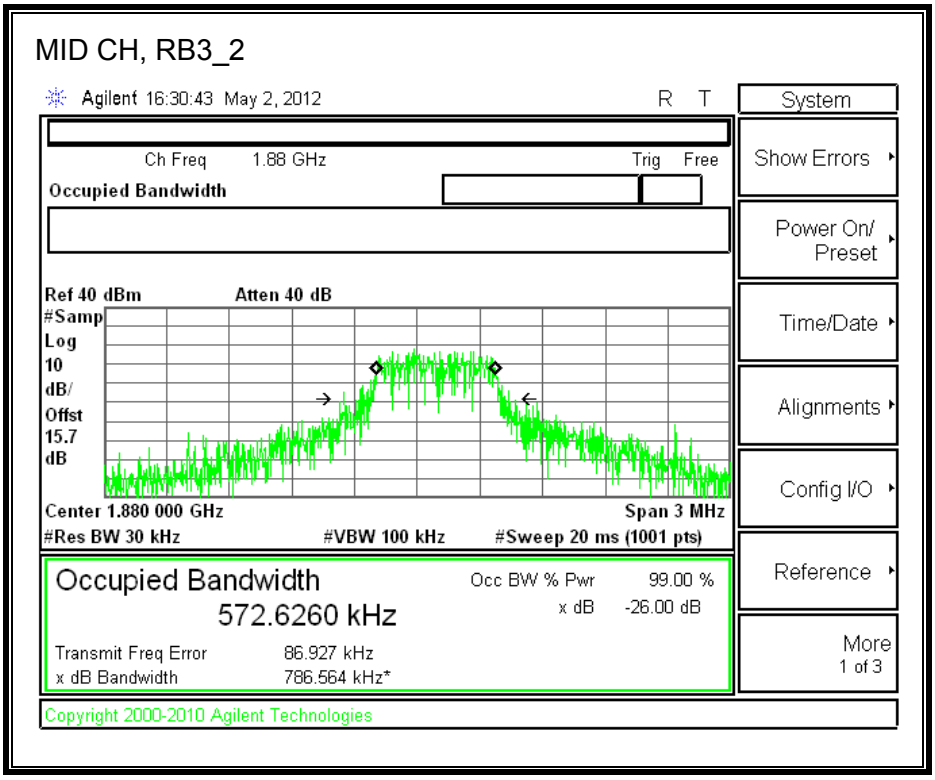
16QAM

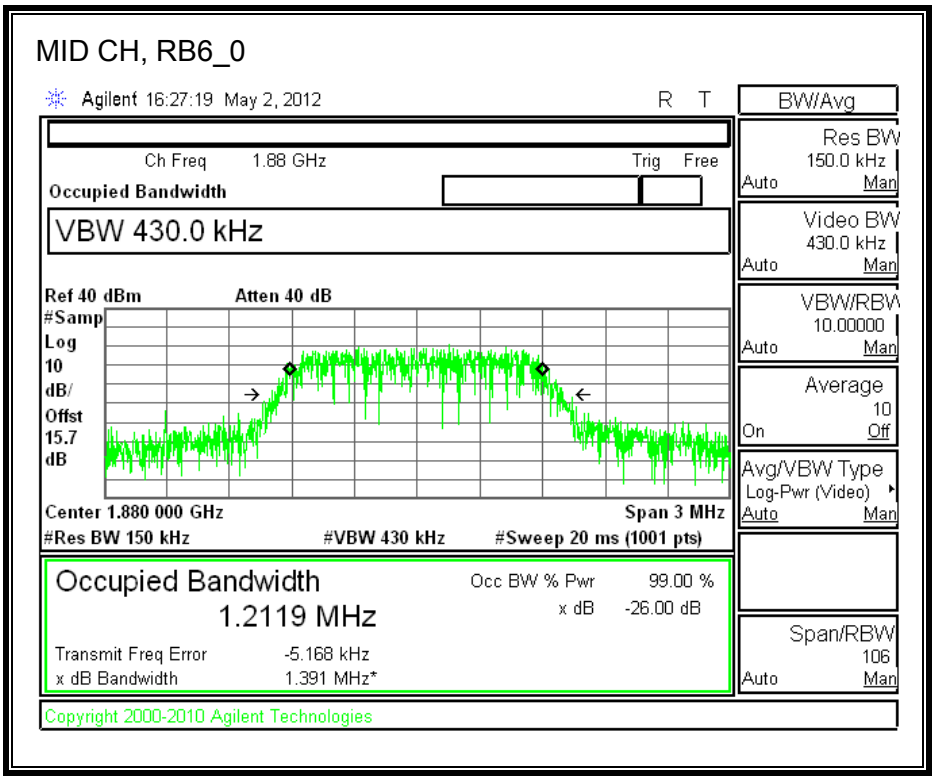
LOW CH, RB3_2



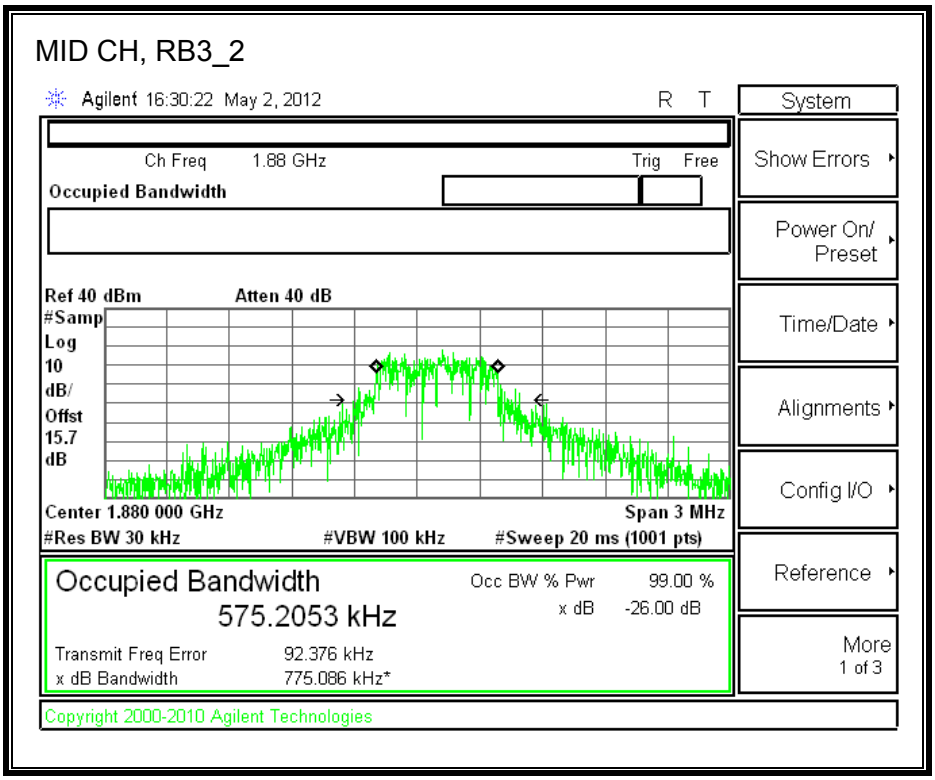
LOW CH, RB6_0

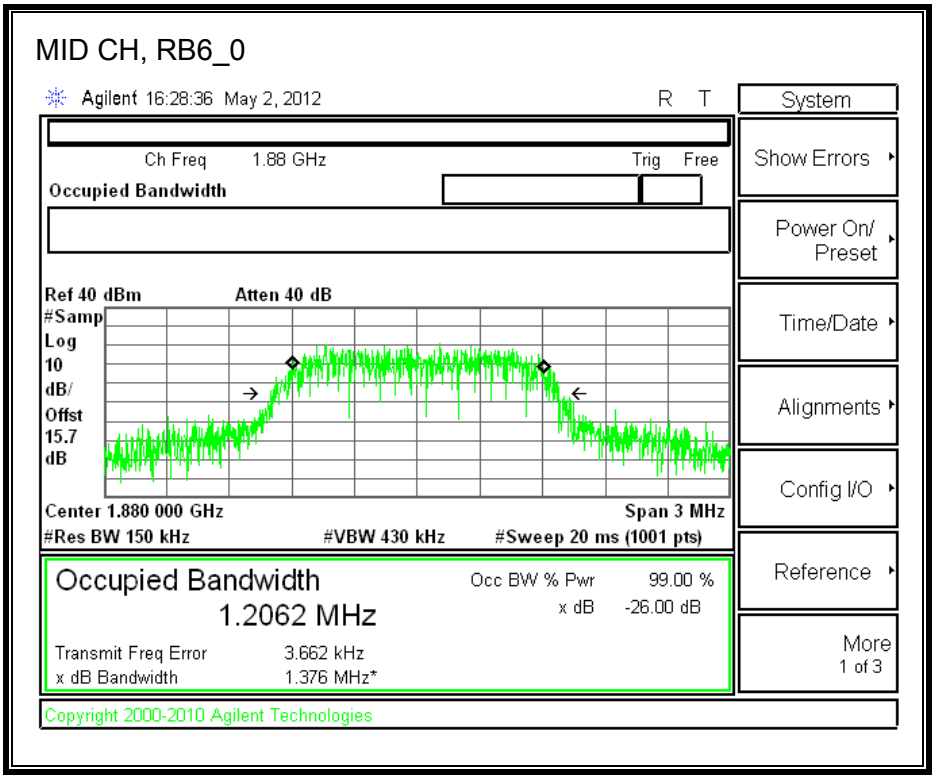
QPSK





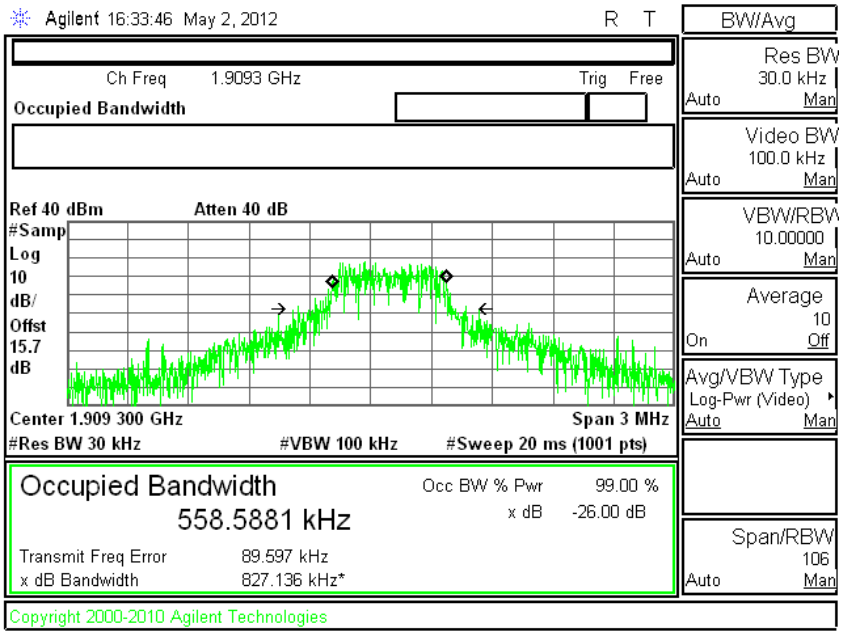
16QAM



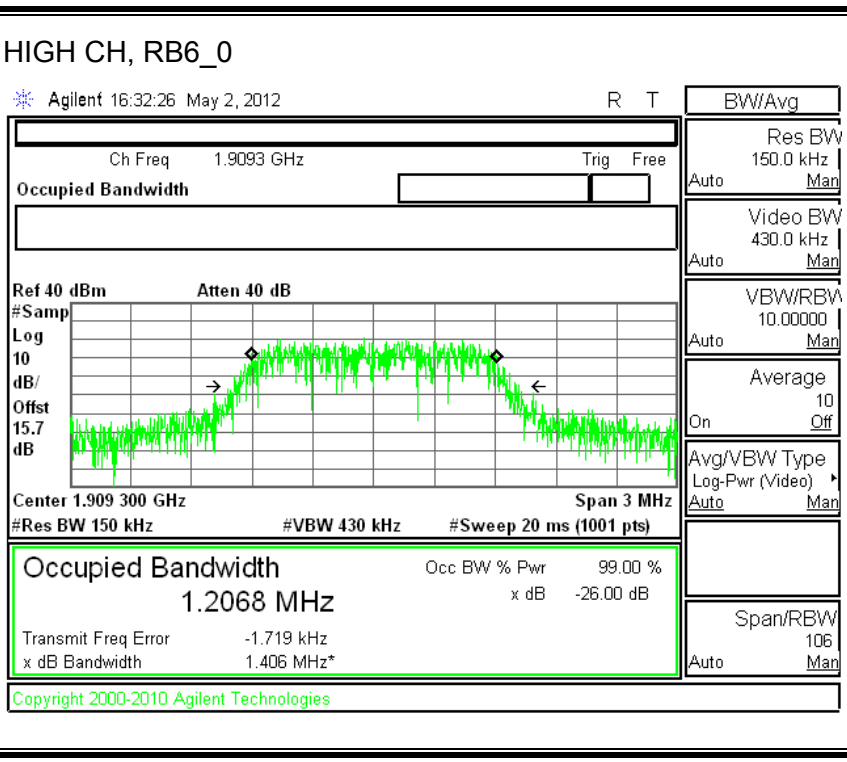


QPSK

HIGH CH, RB3_2

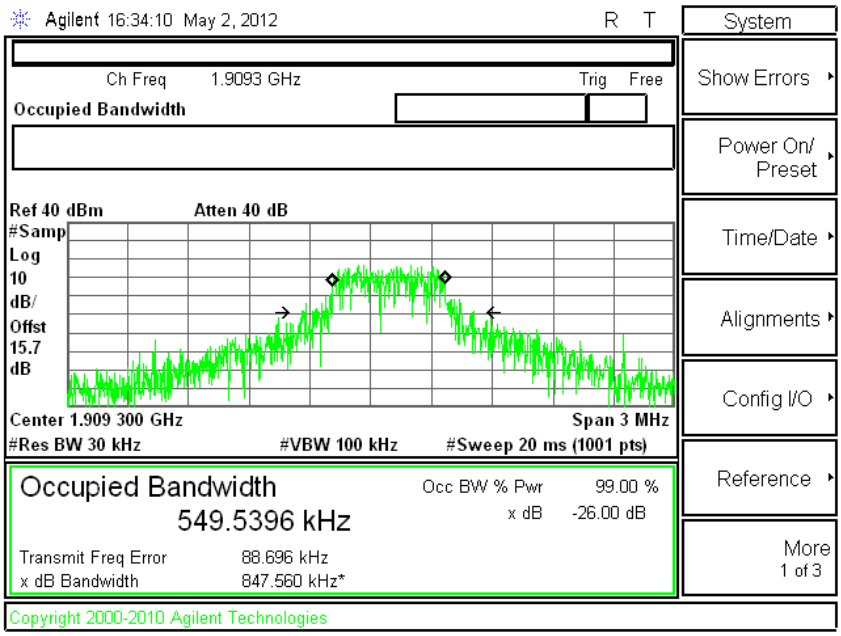


HIGH CH, RB6_0

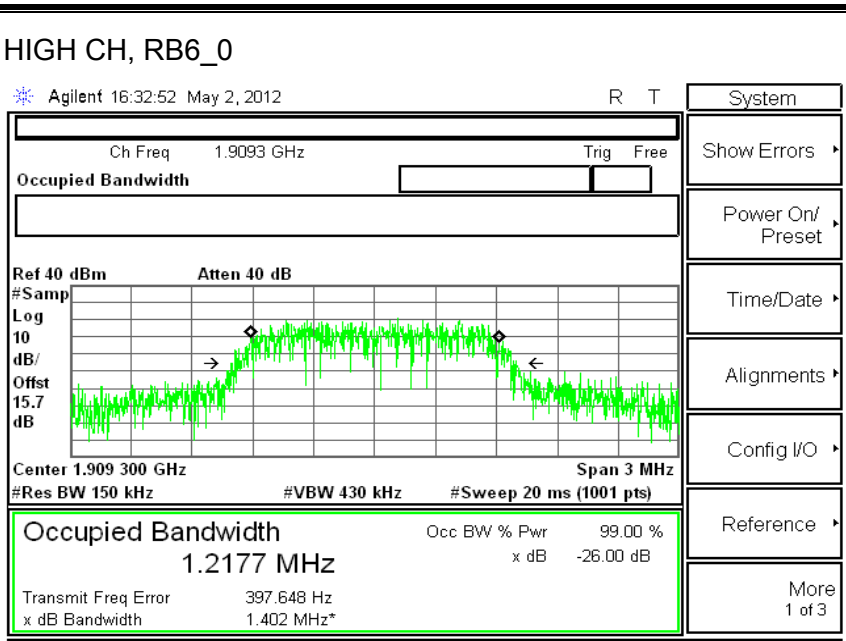


16QAM

HIGH CH, RB3_2

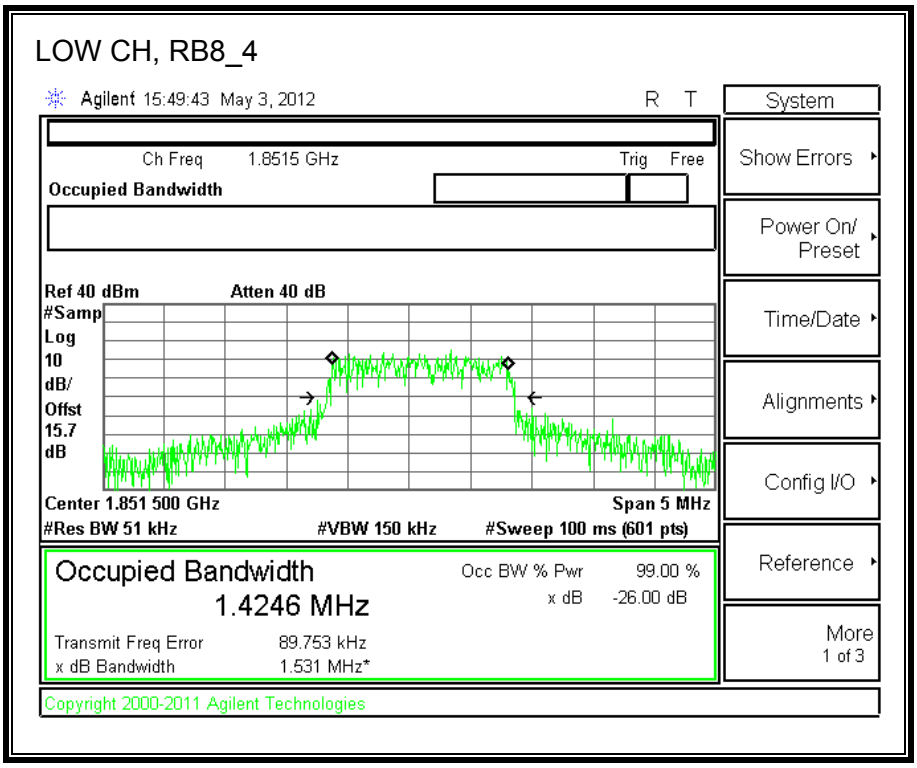


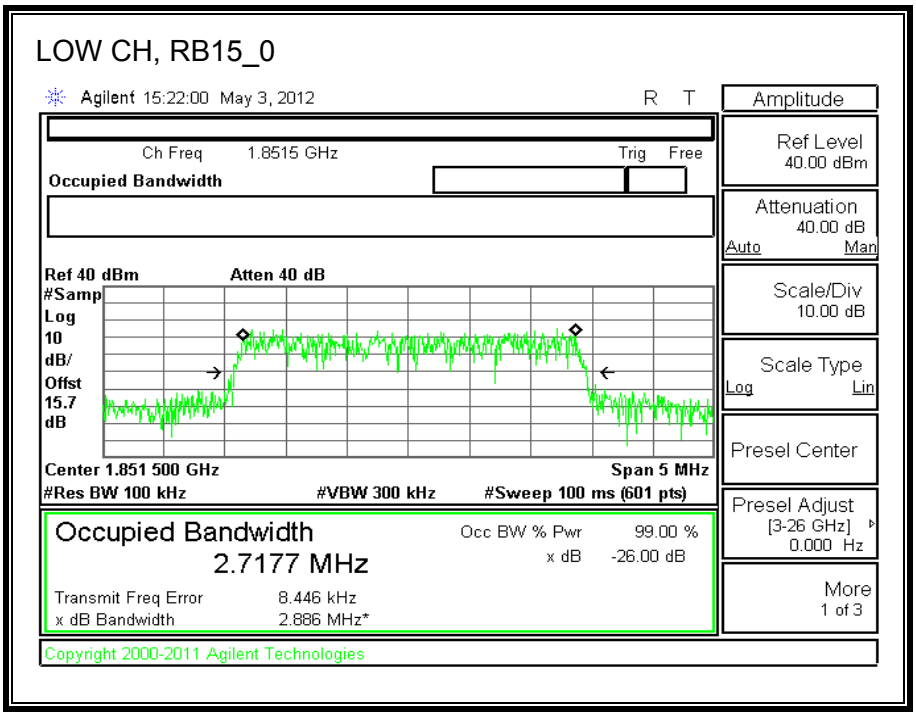
HIGH CH, RB6_0



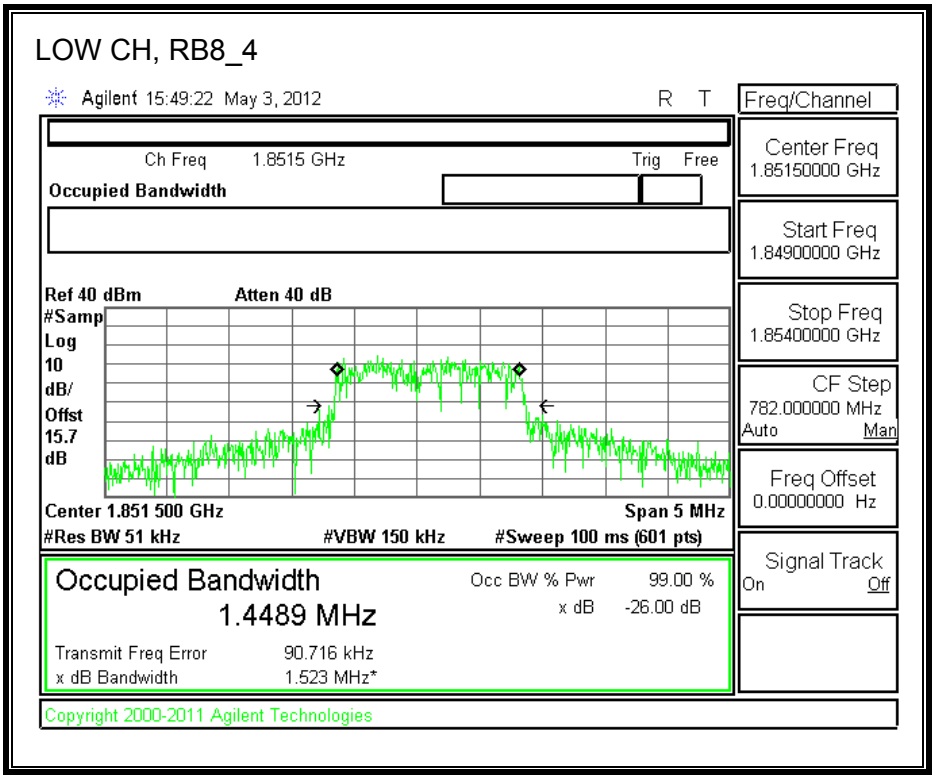
LTE, Band 2 (3.0MHz BAND WIDTH)

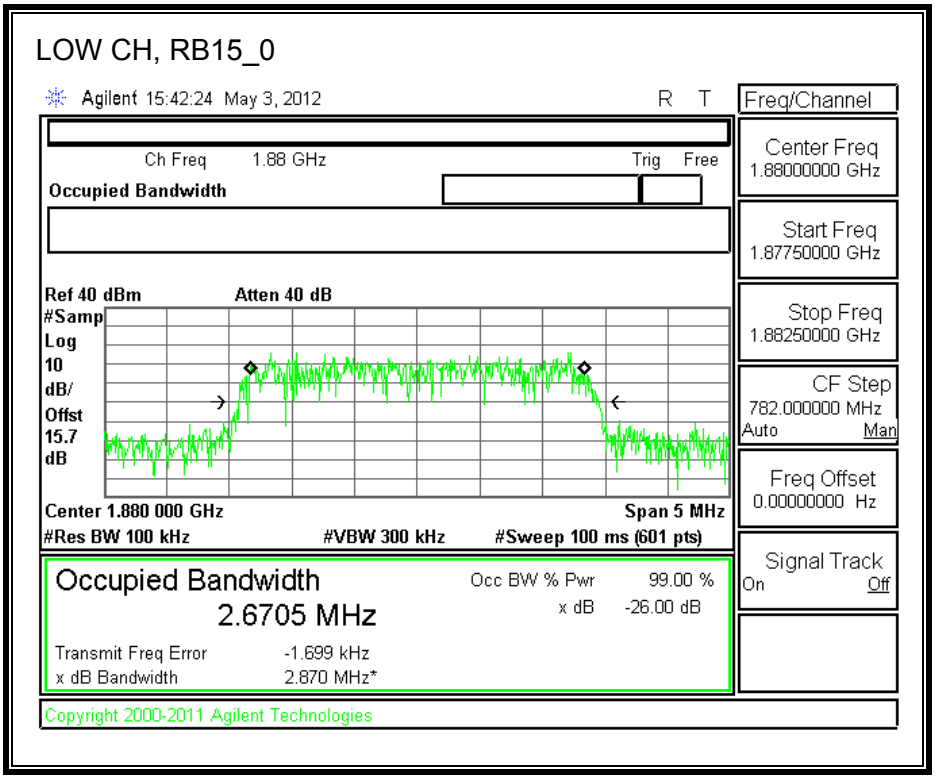
QPSK





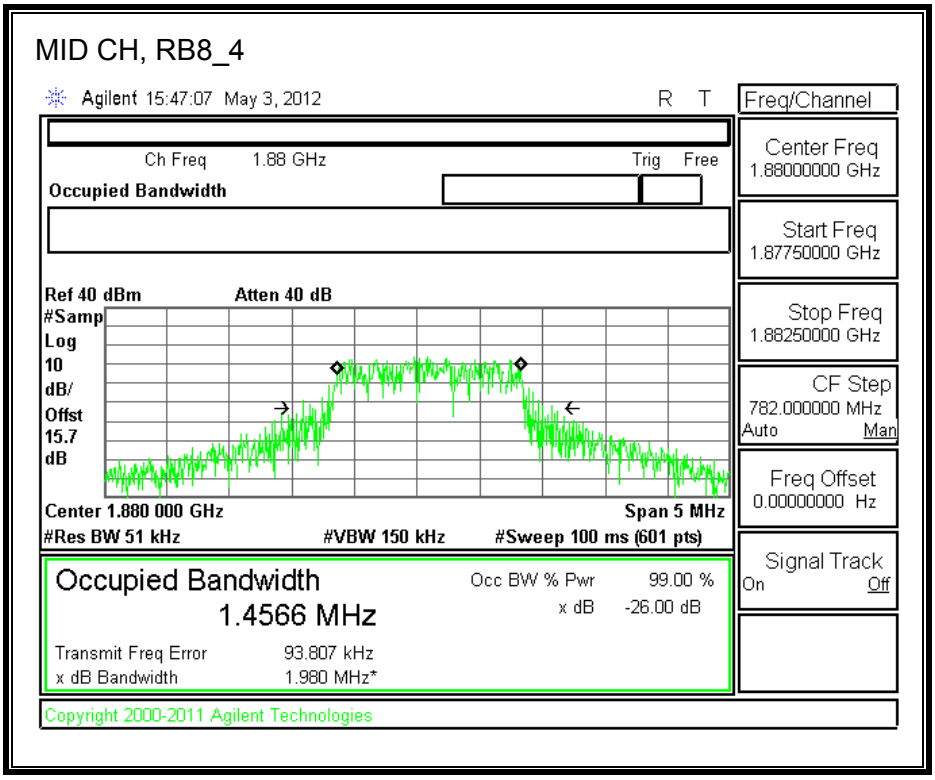
16QAM



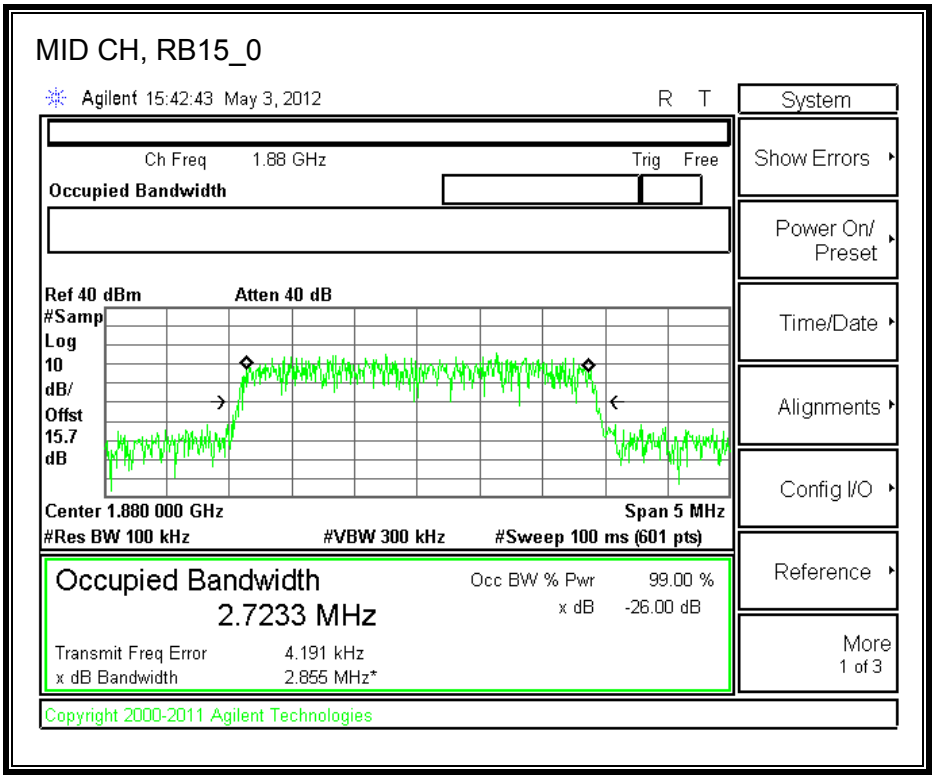


QPSK

MID CH, RB8_4

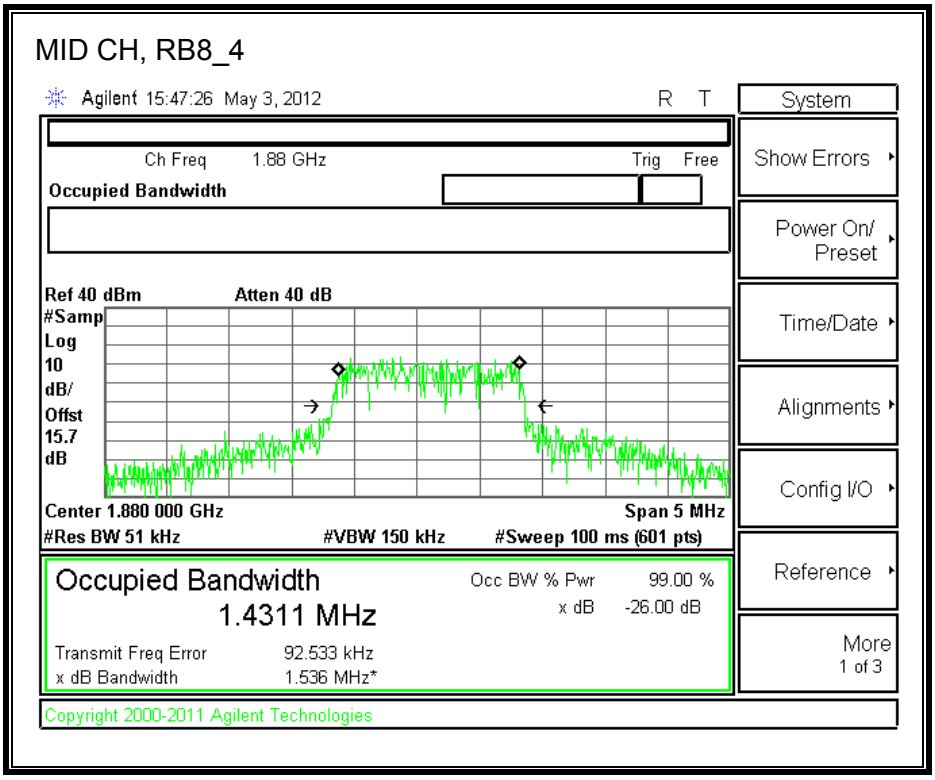


MID CH, RB15_0

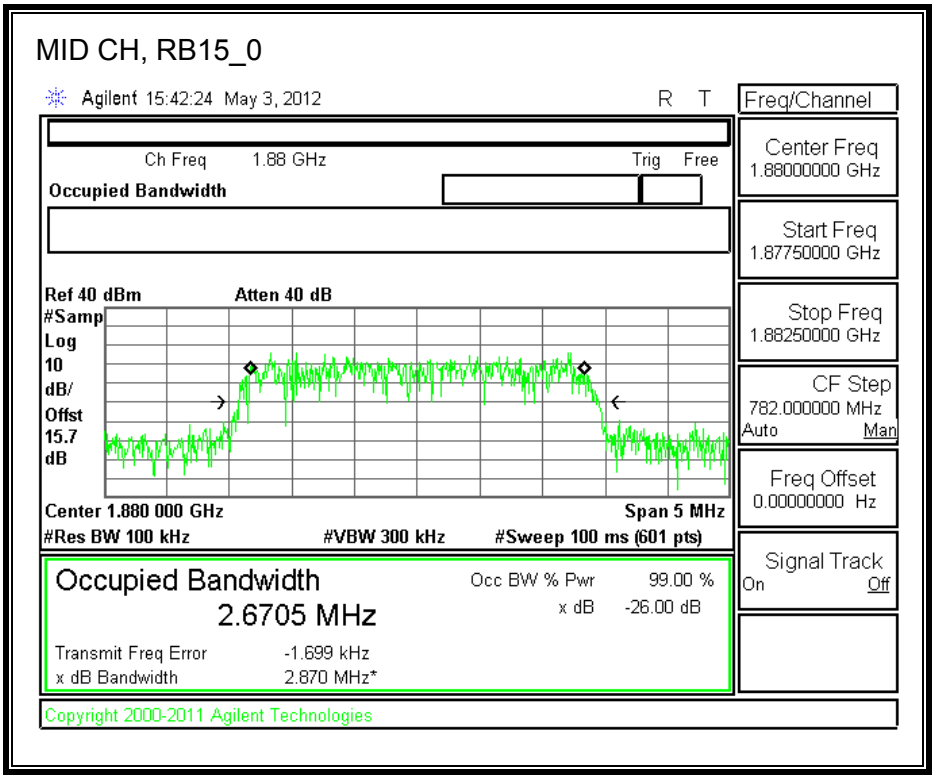


16QAM

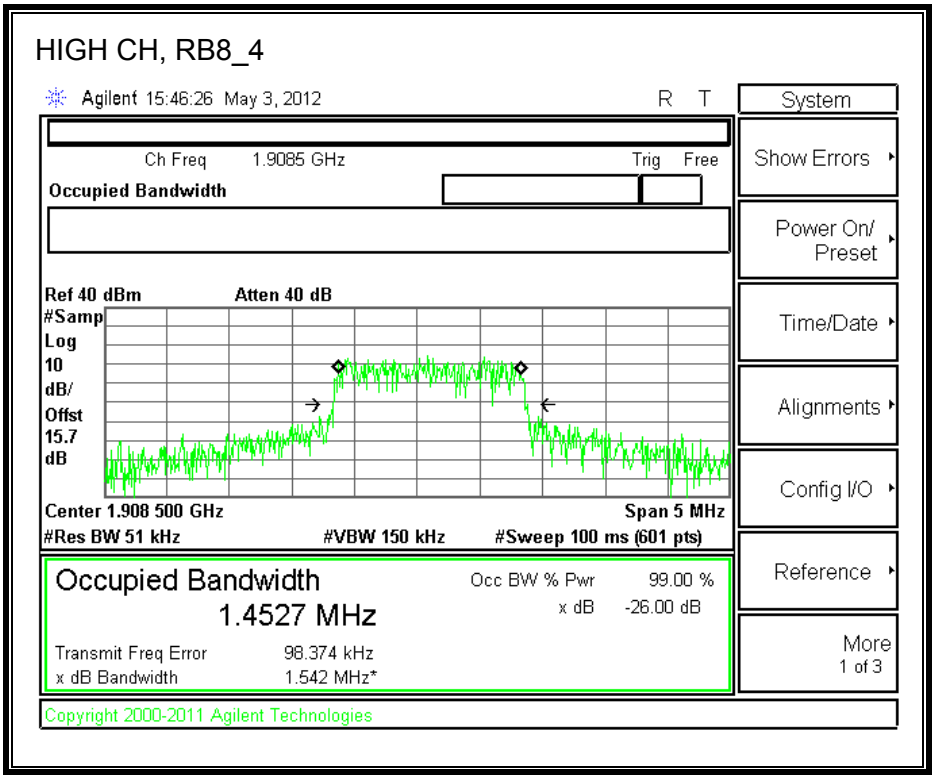
MID CH, RB8_4

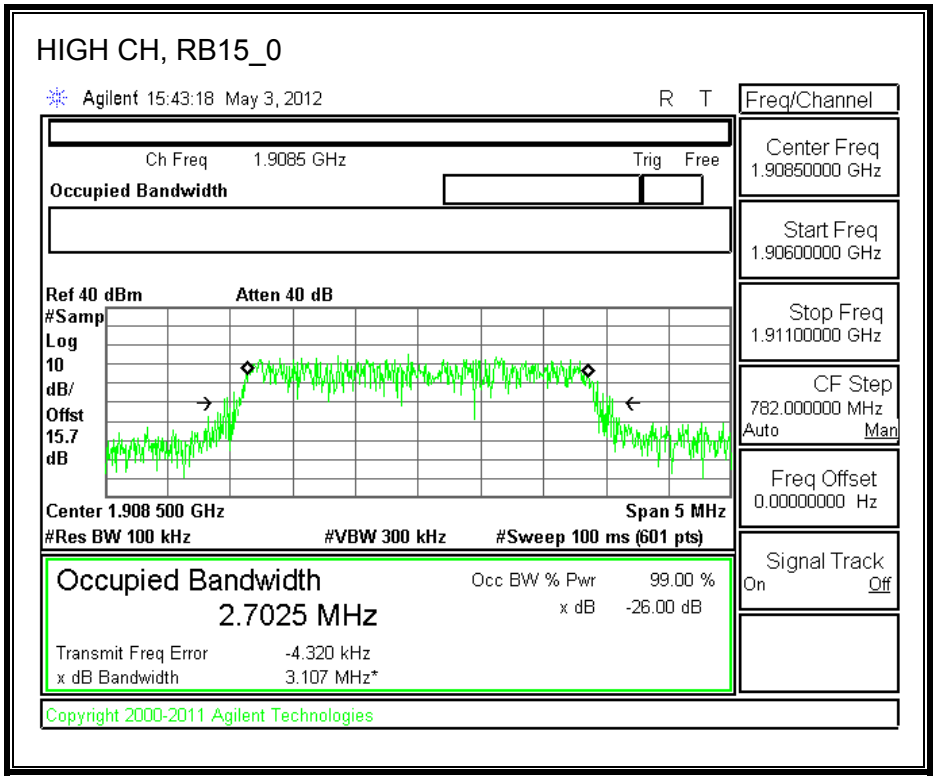


MID CH, RB15_0

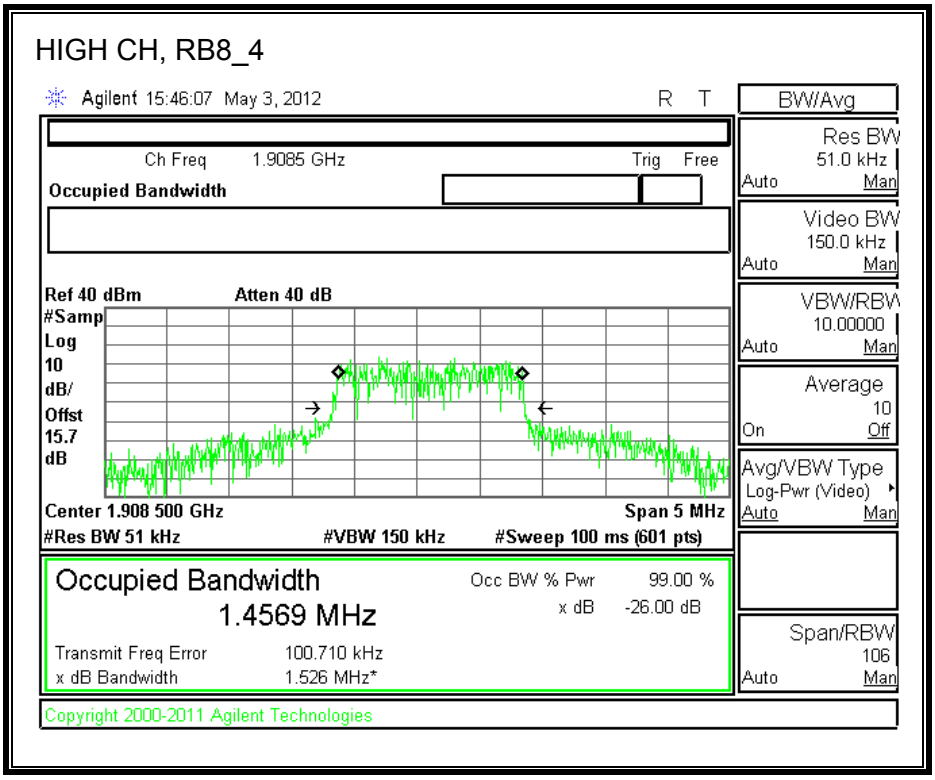


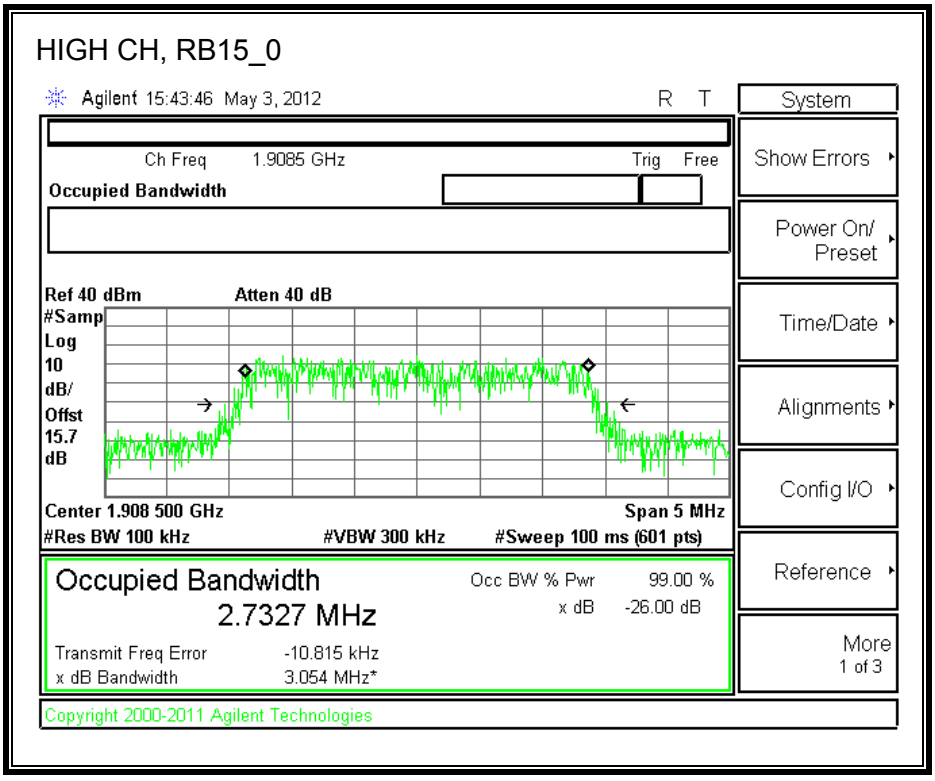
QPSK





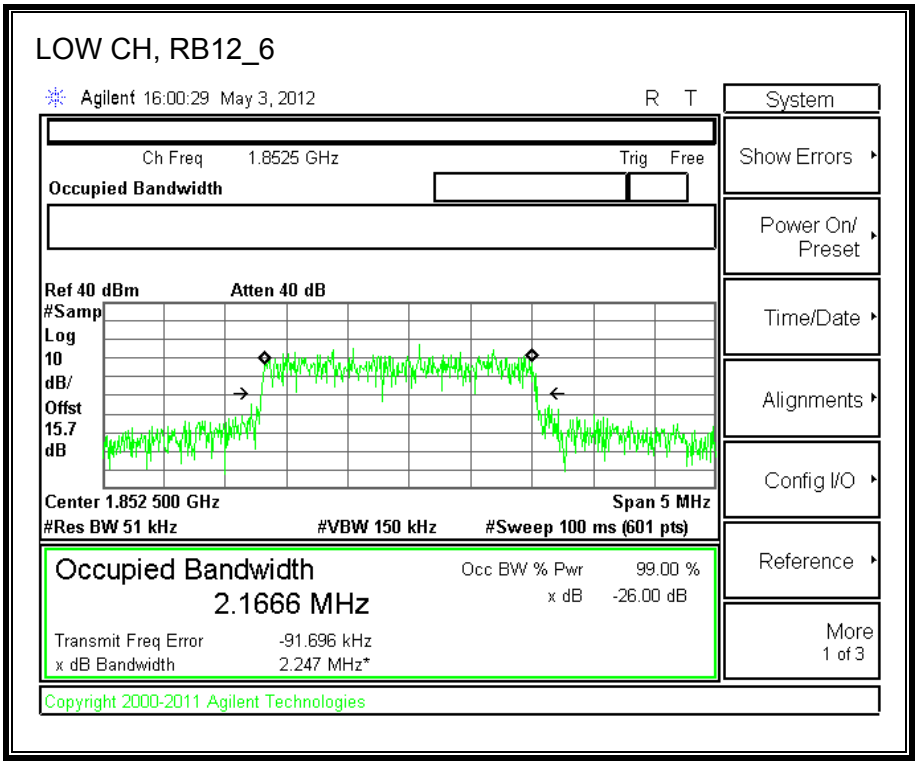
16QAM

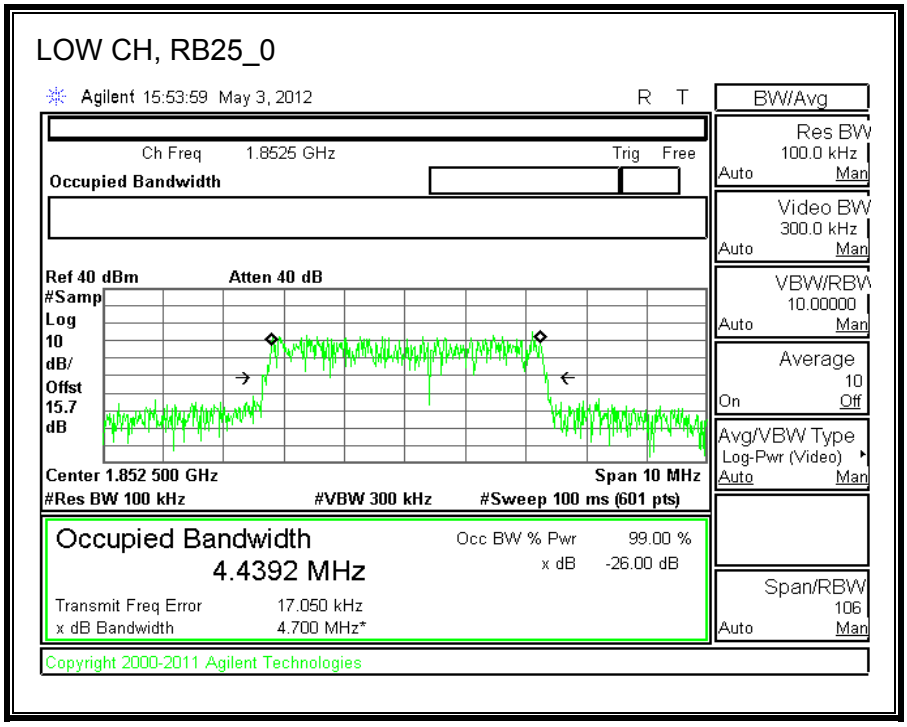




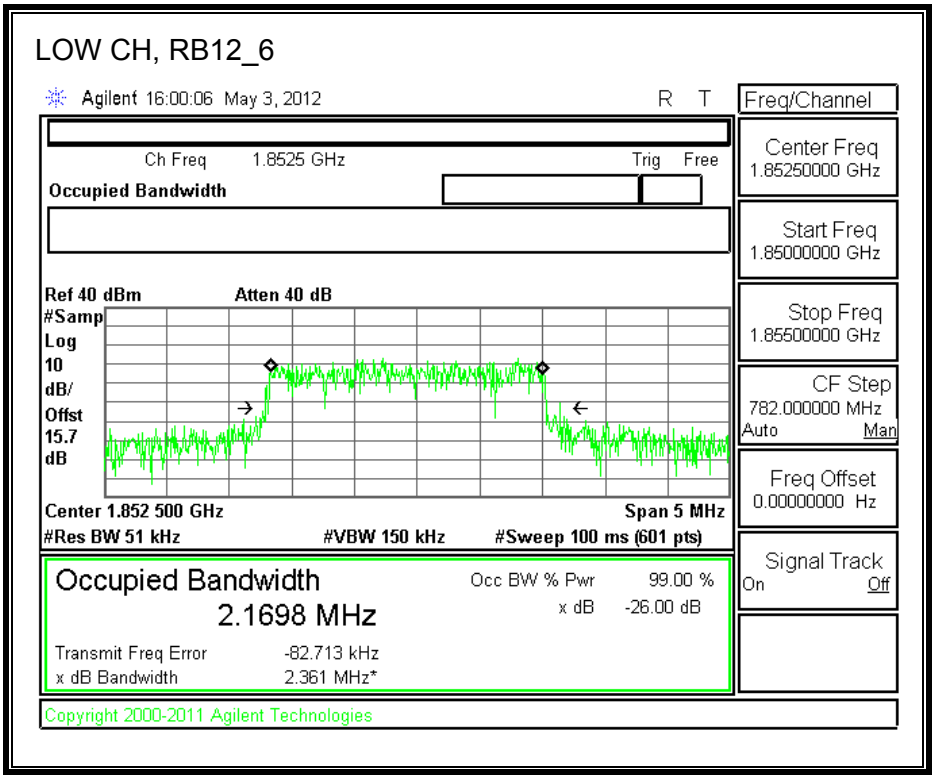
LTE, Band 2 (5.0MHz BAND WIDTH)

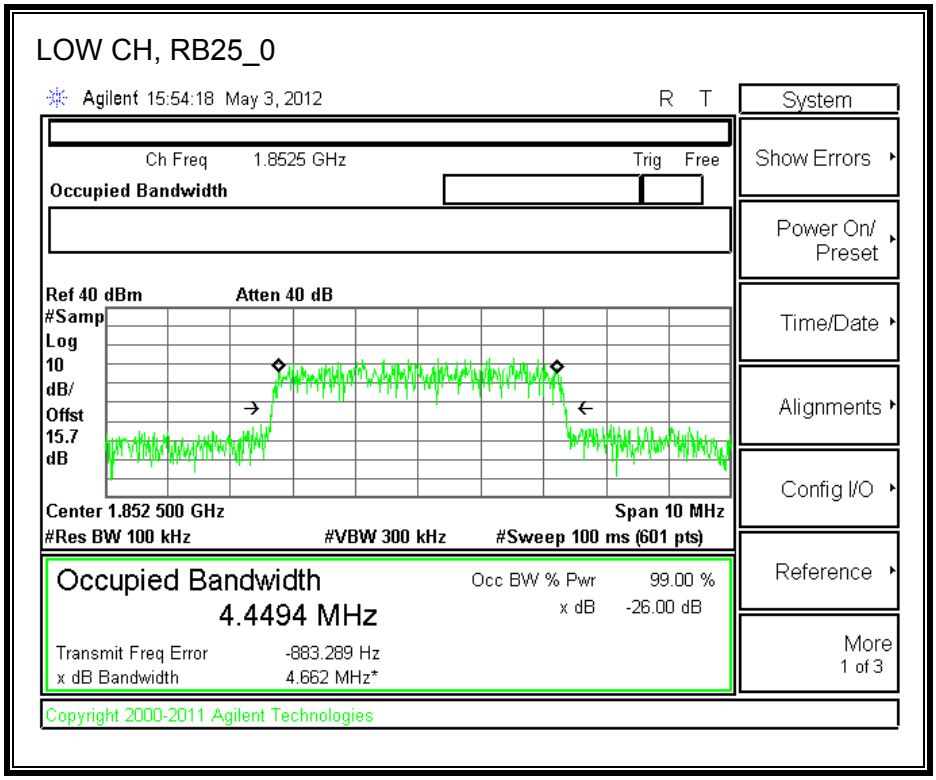
QPSK



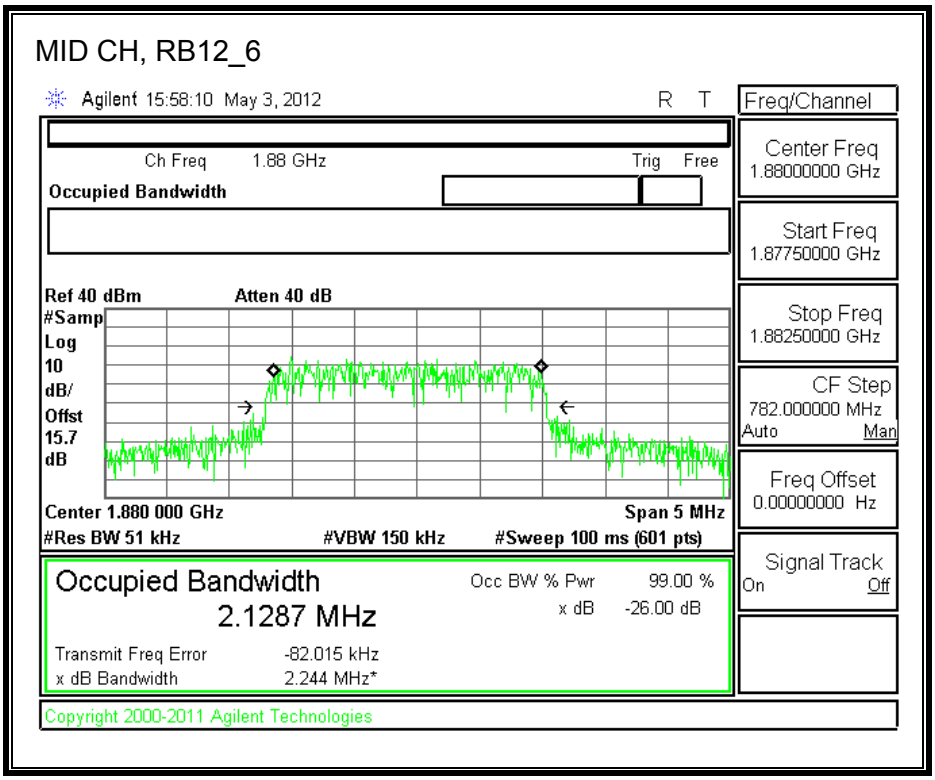


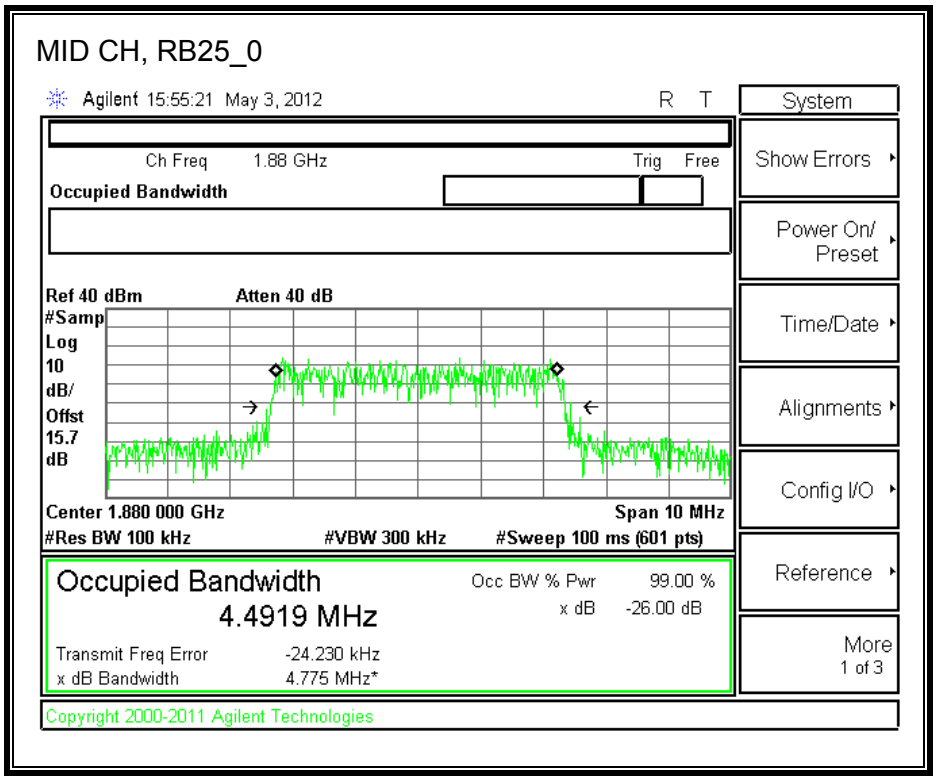
16QAM



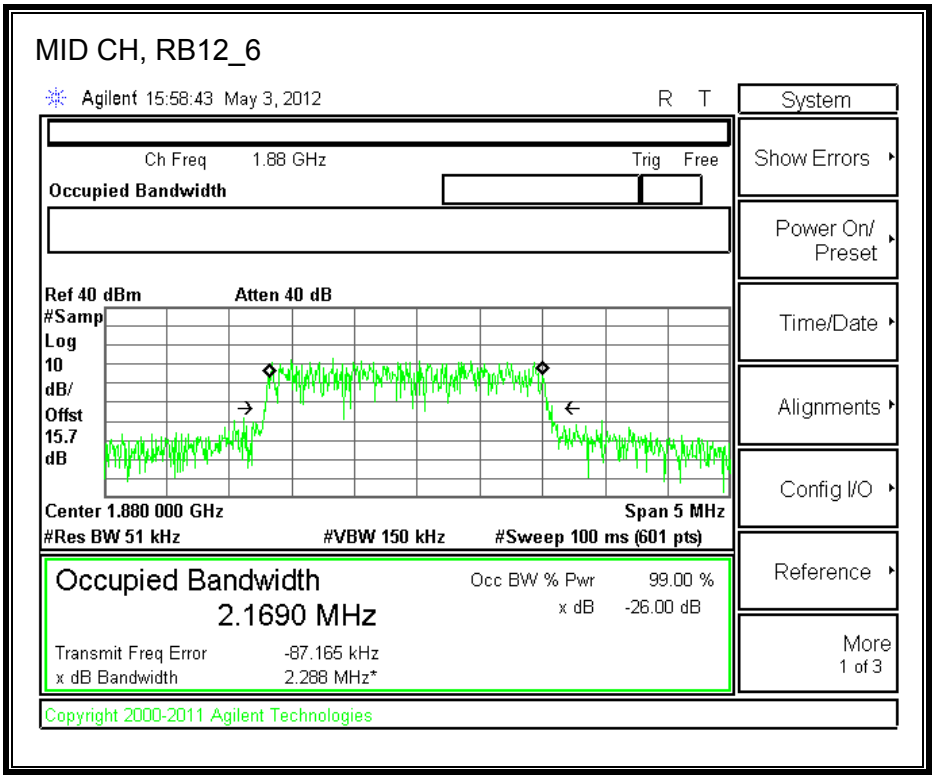


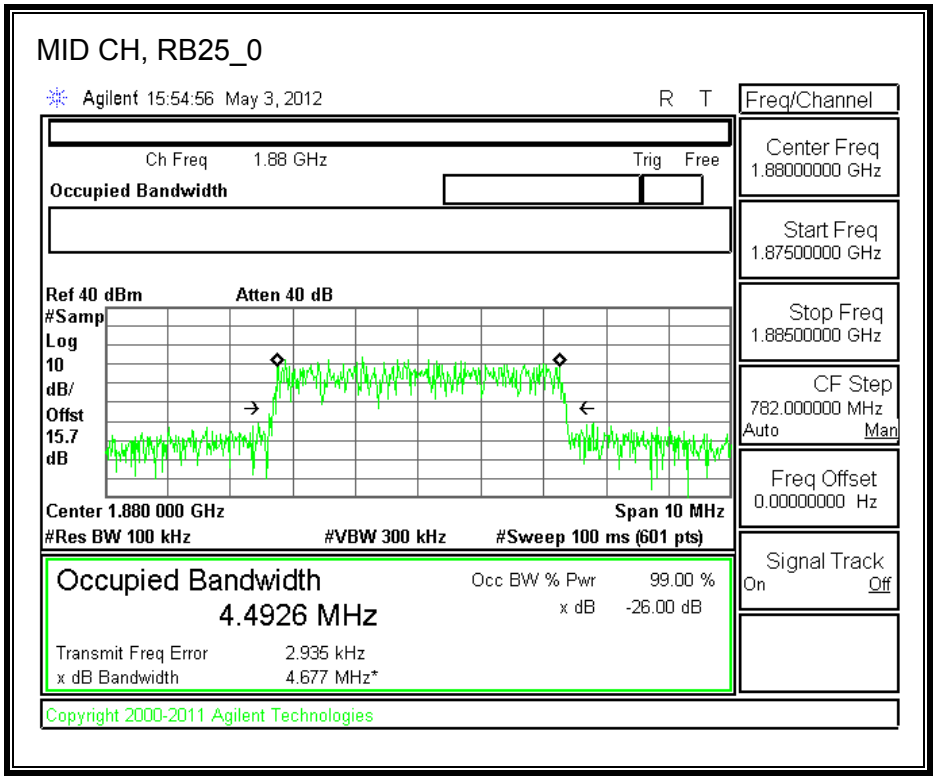
QPSK



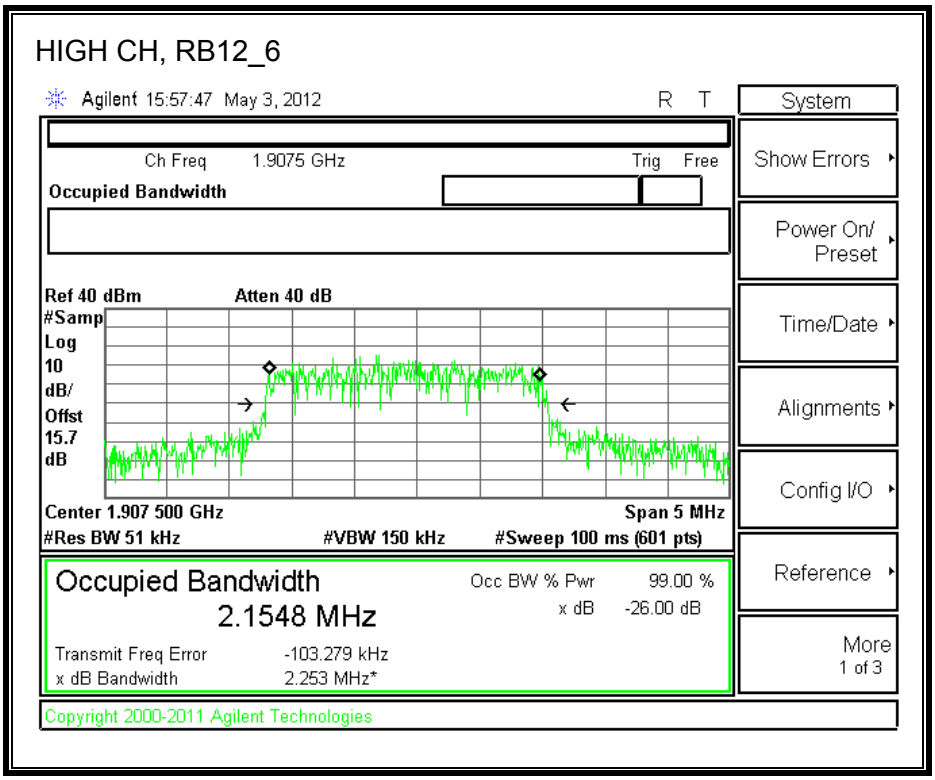


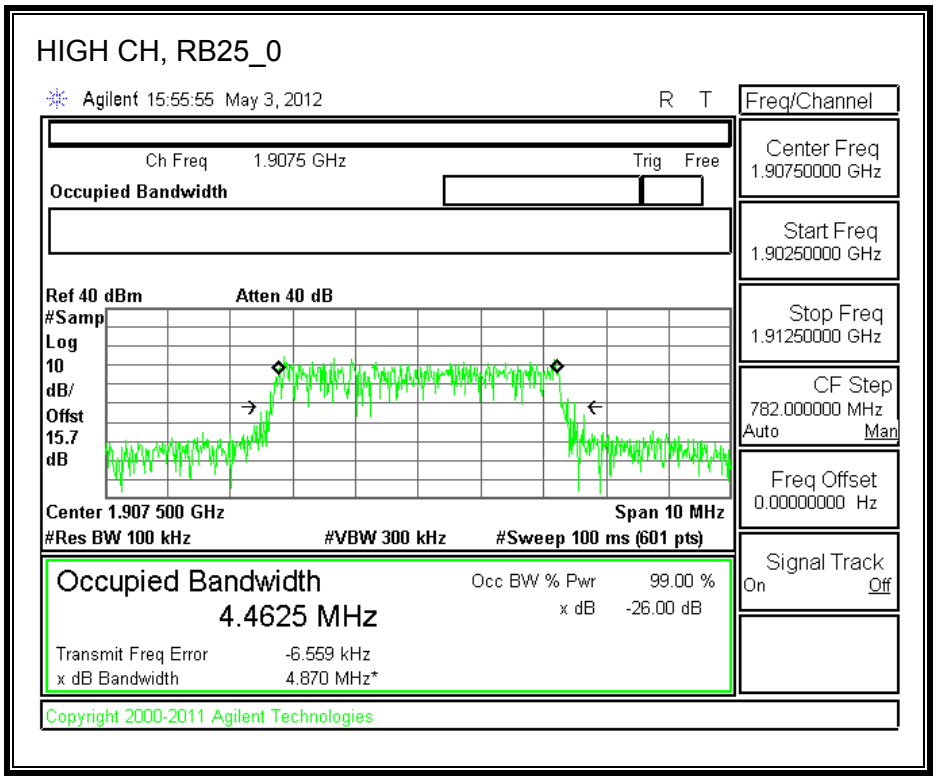
16QAM



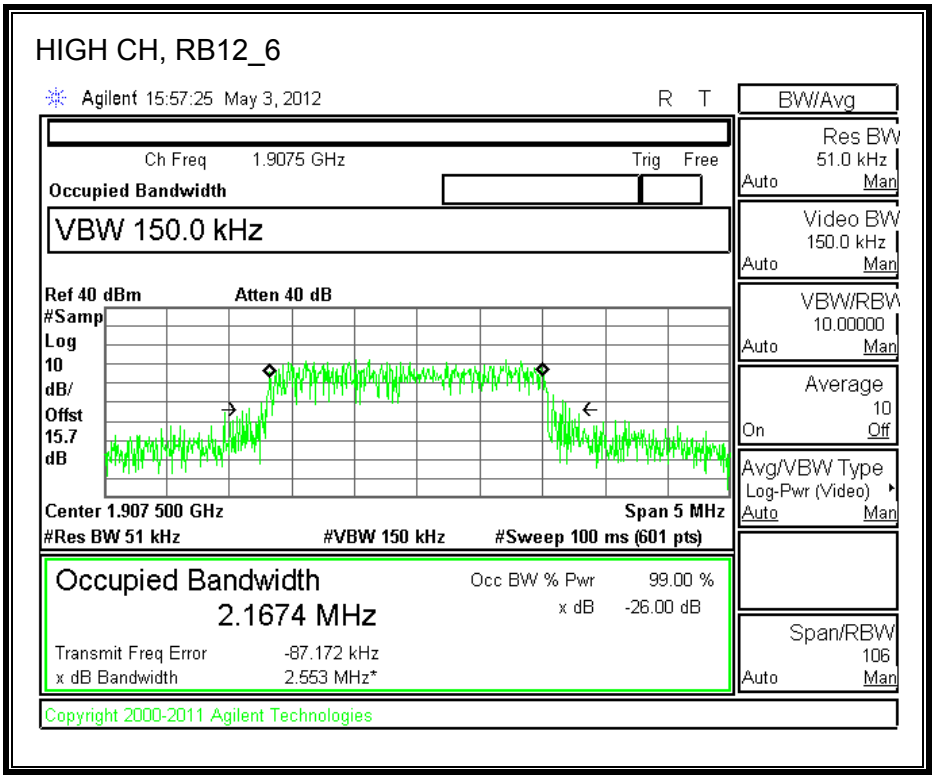


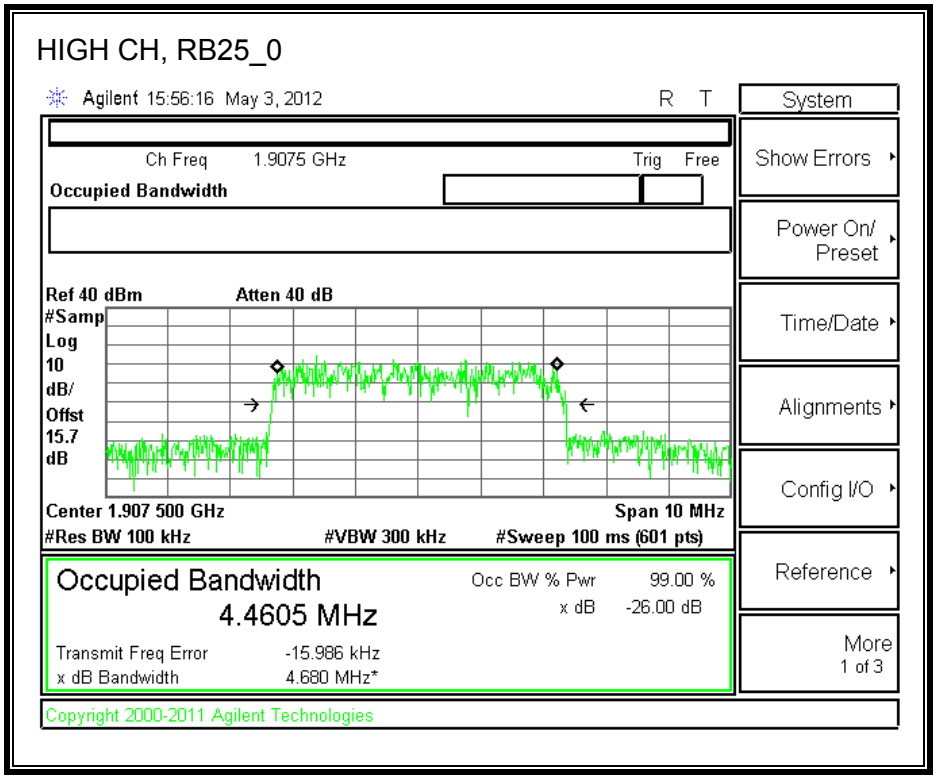
QPSK





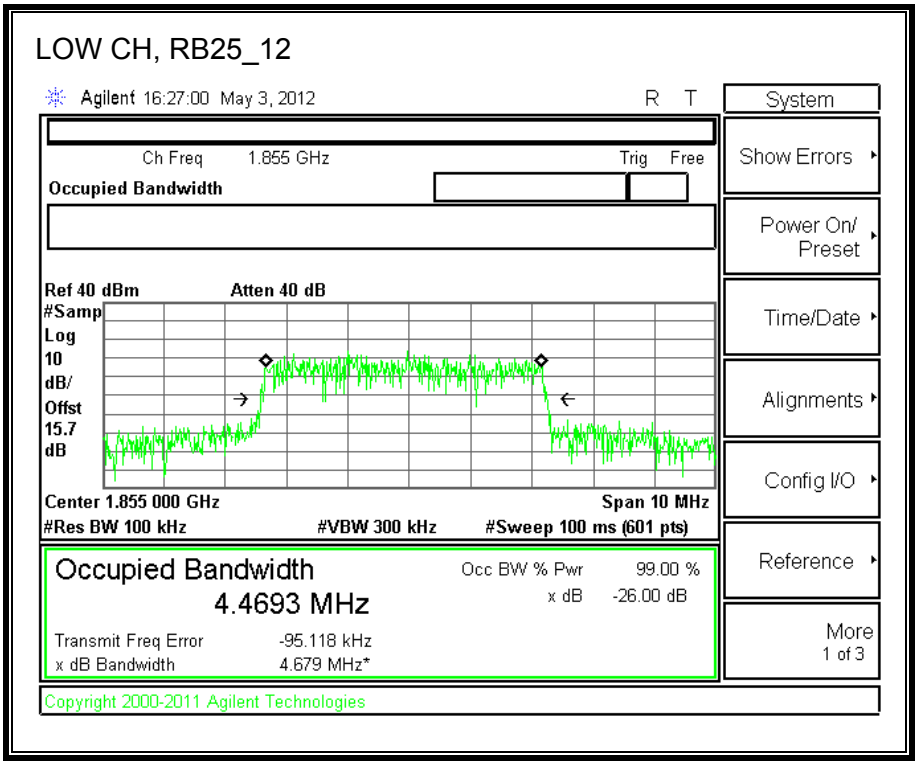
16QAM

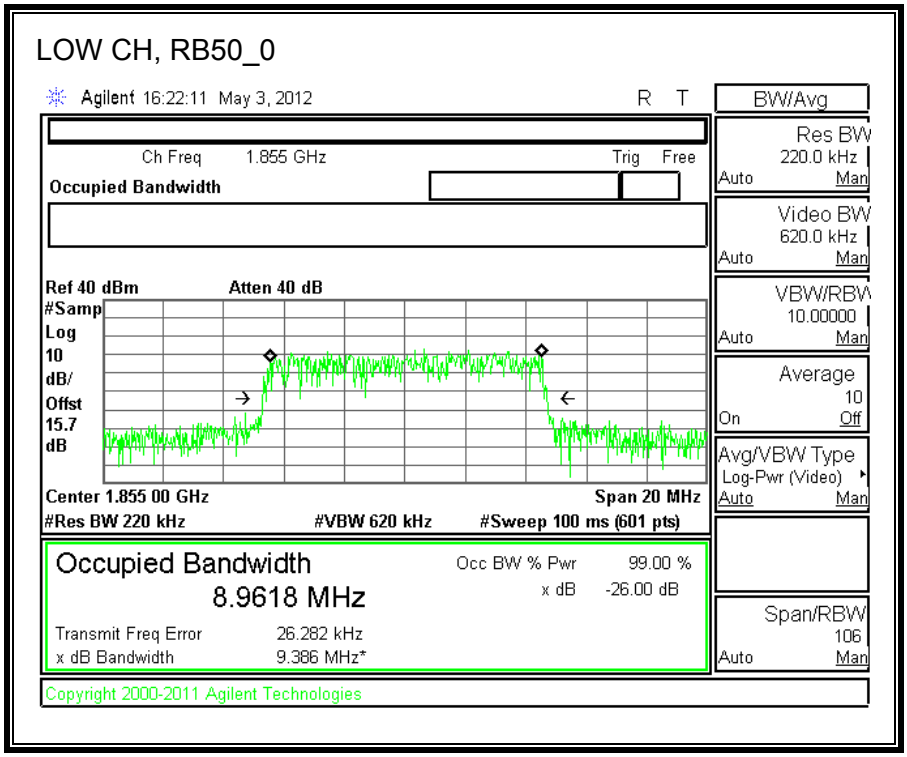




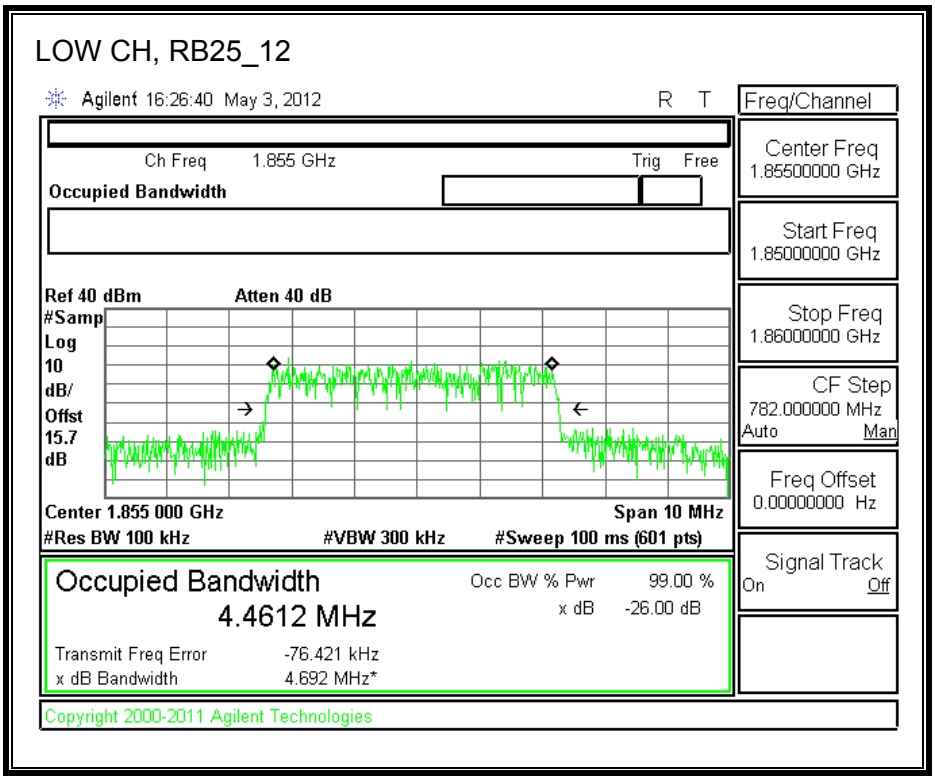
LTE, Band 2 (10.0MHz BAND WIDTH)

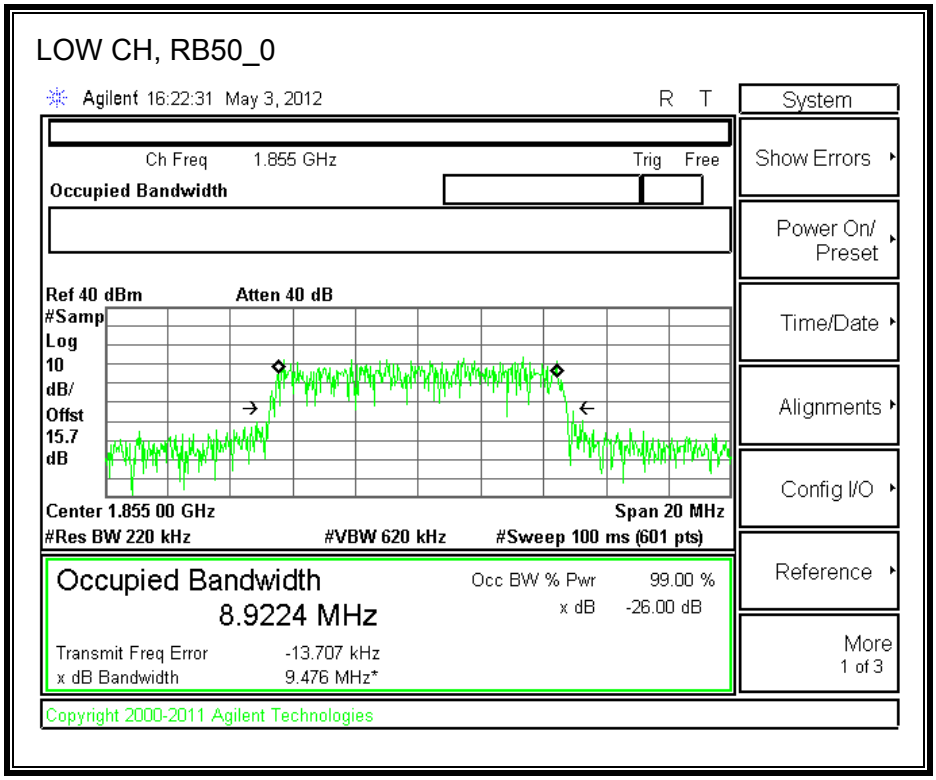
QPSK



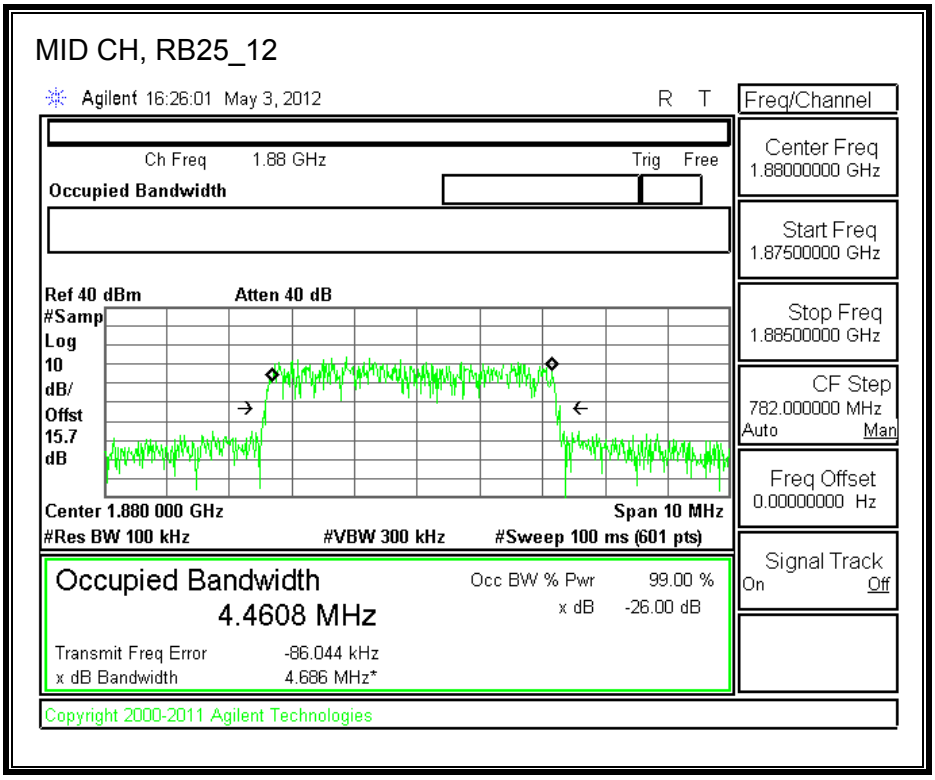


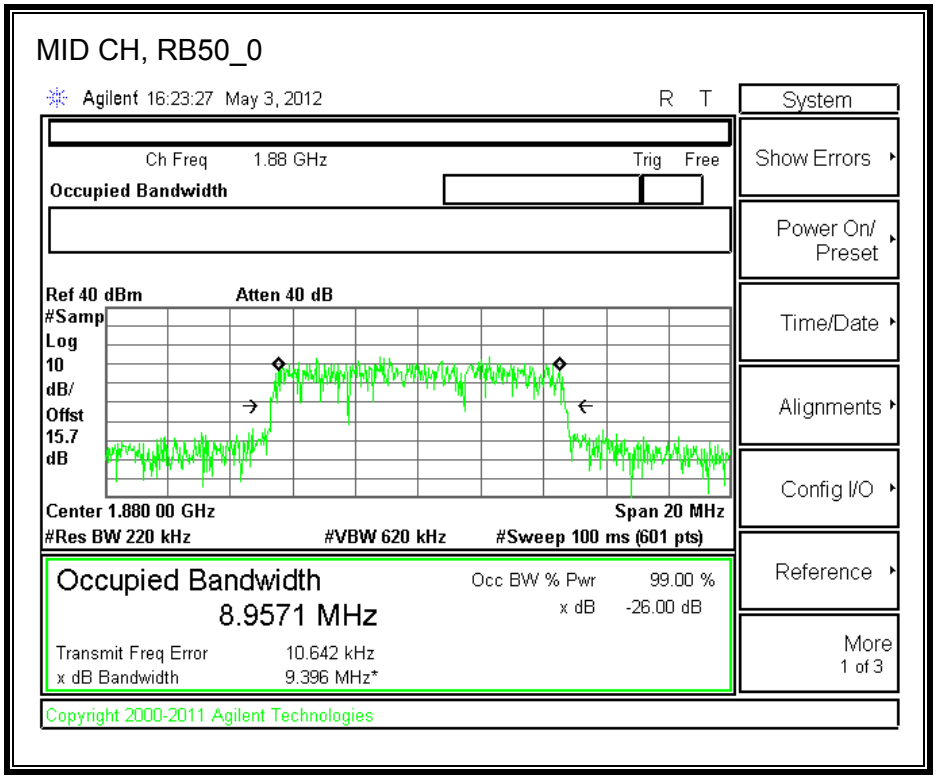
16QAM





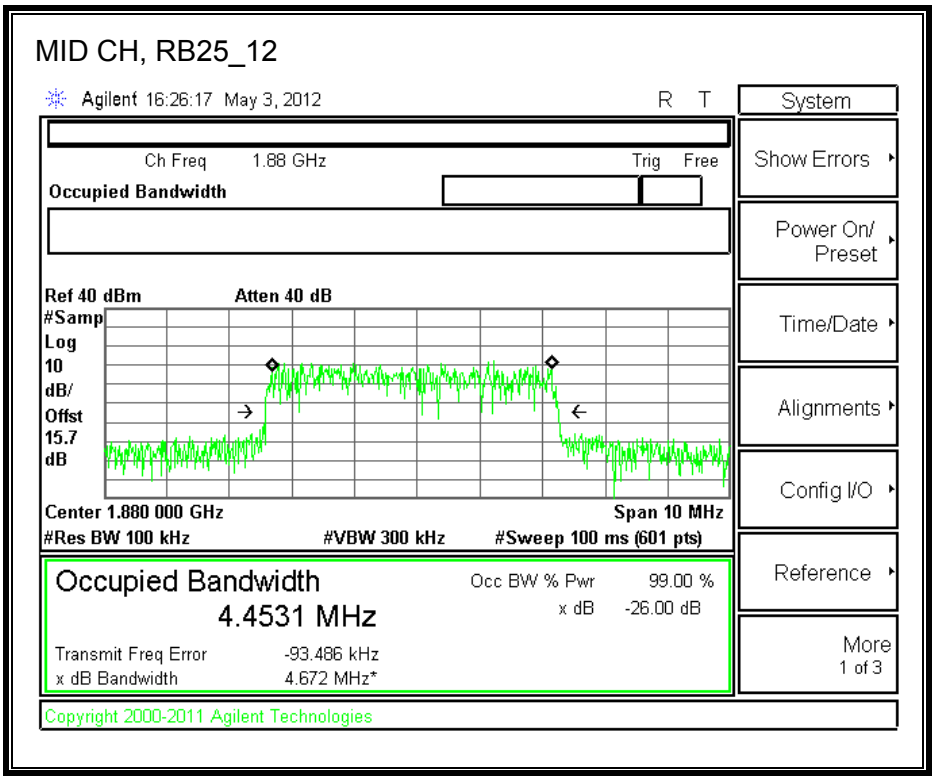
QPSK



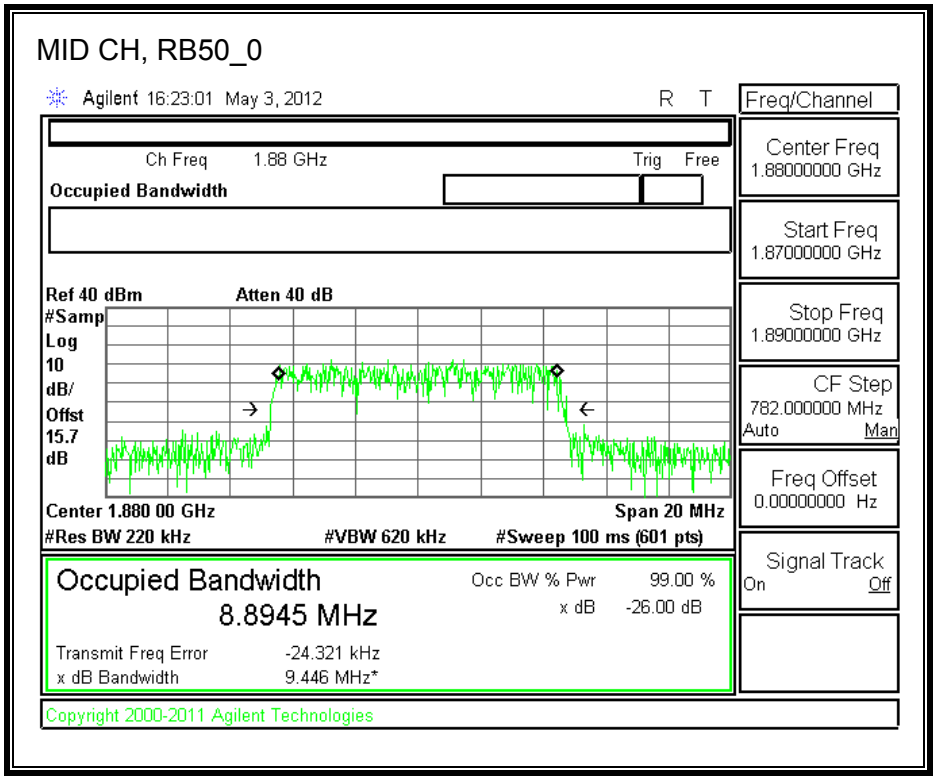


16QAM

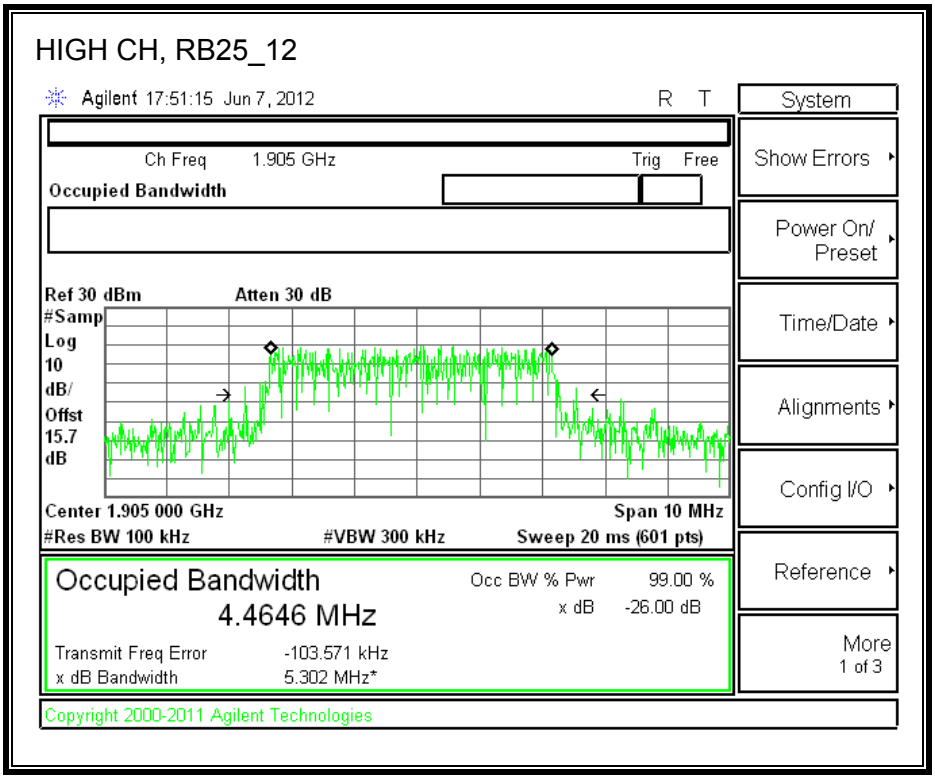
MID CH, RB25_12

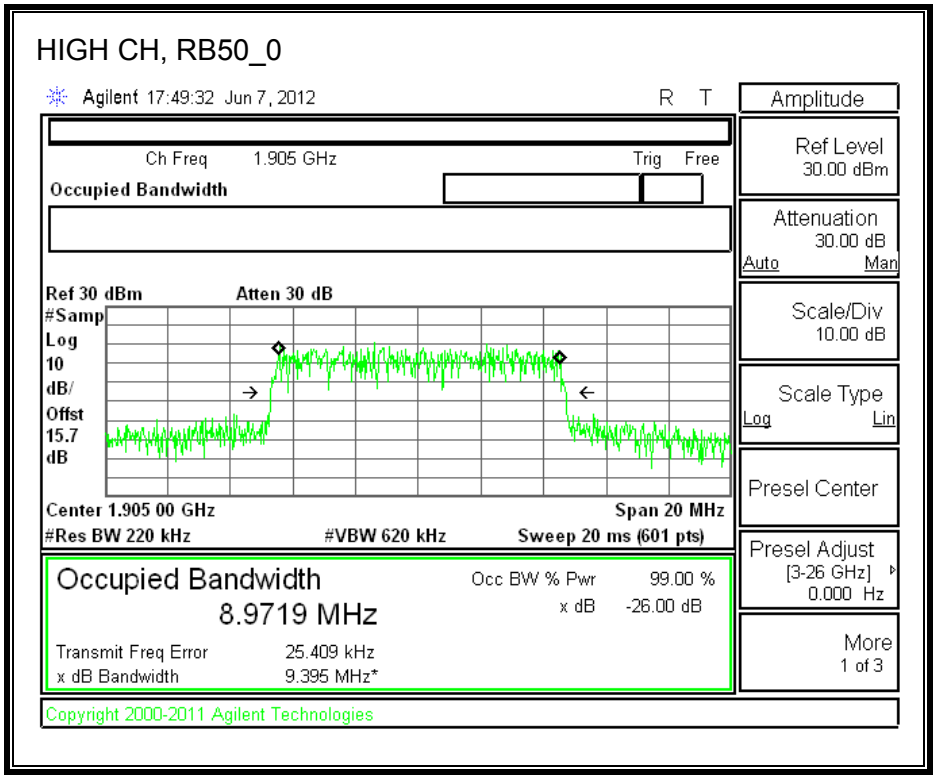


MID CH, RB50_0



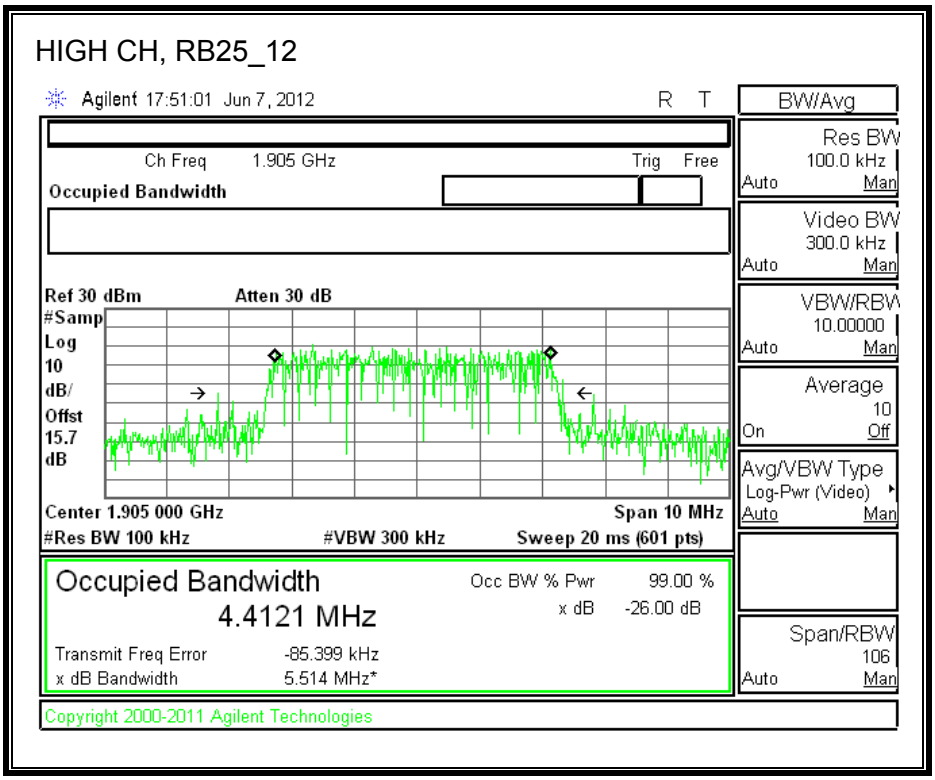
QPSK



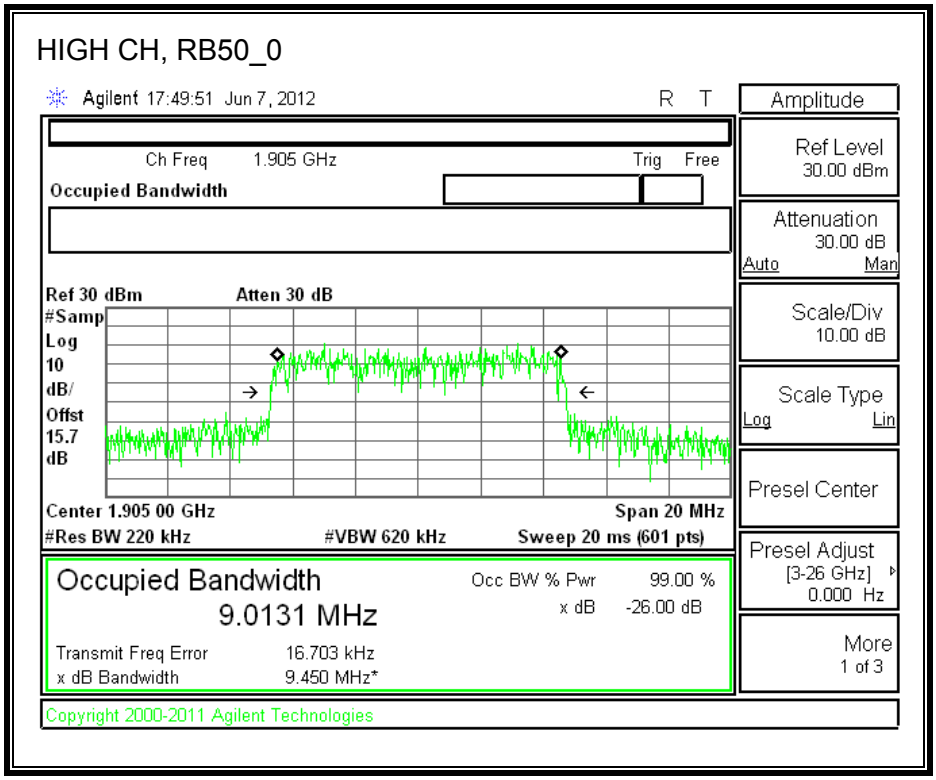


16QAM

HIGH CH, RB25_12



HIGH CH, RB50_0



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

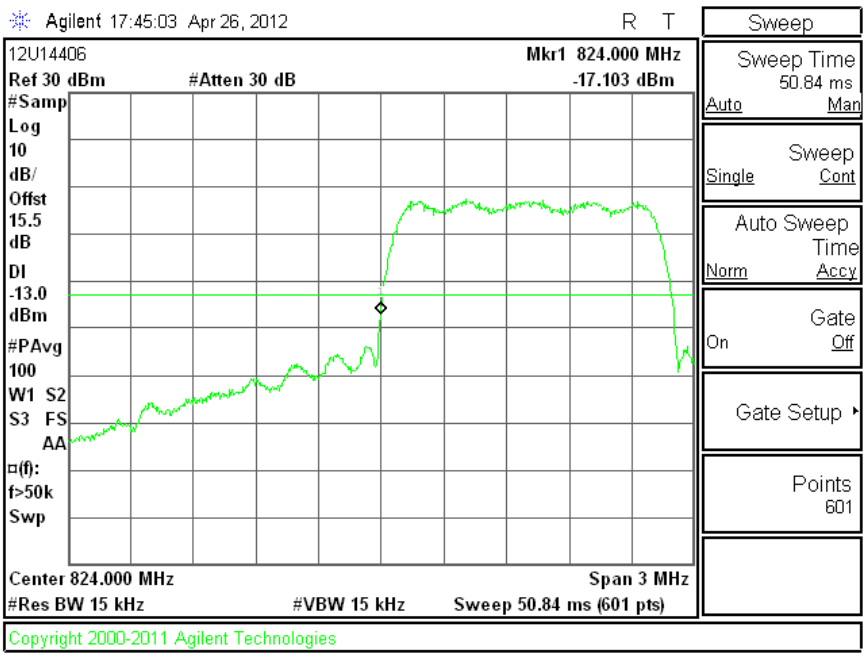
- CDMA 2000 1xRTT, RC1 SO2.
- CDMA 2000 EVDO REV. A
- LTE Band 2 and 4

RESULTS

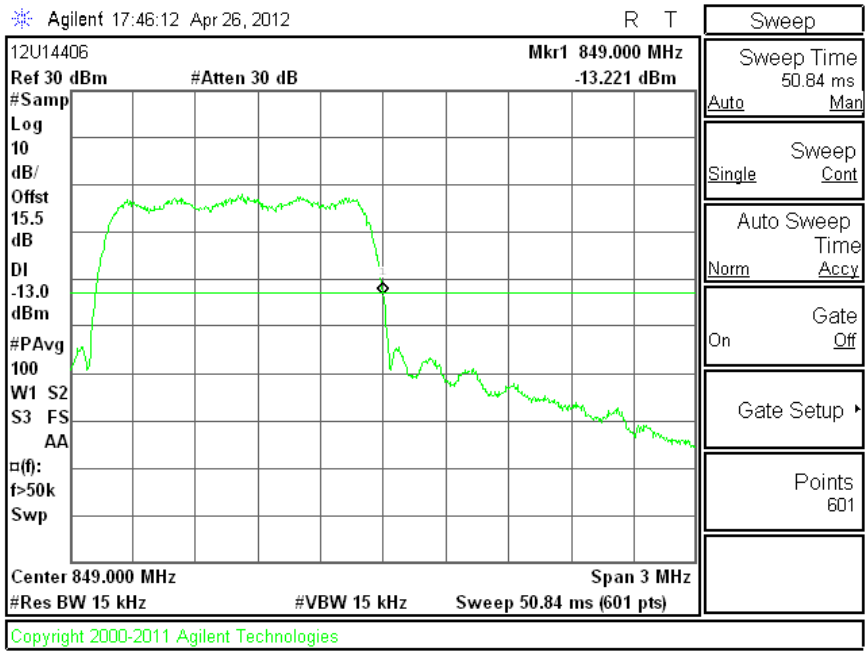
BANDEDGE

1xRTT 850 BAND

LOW CH

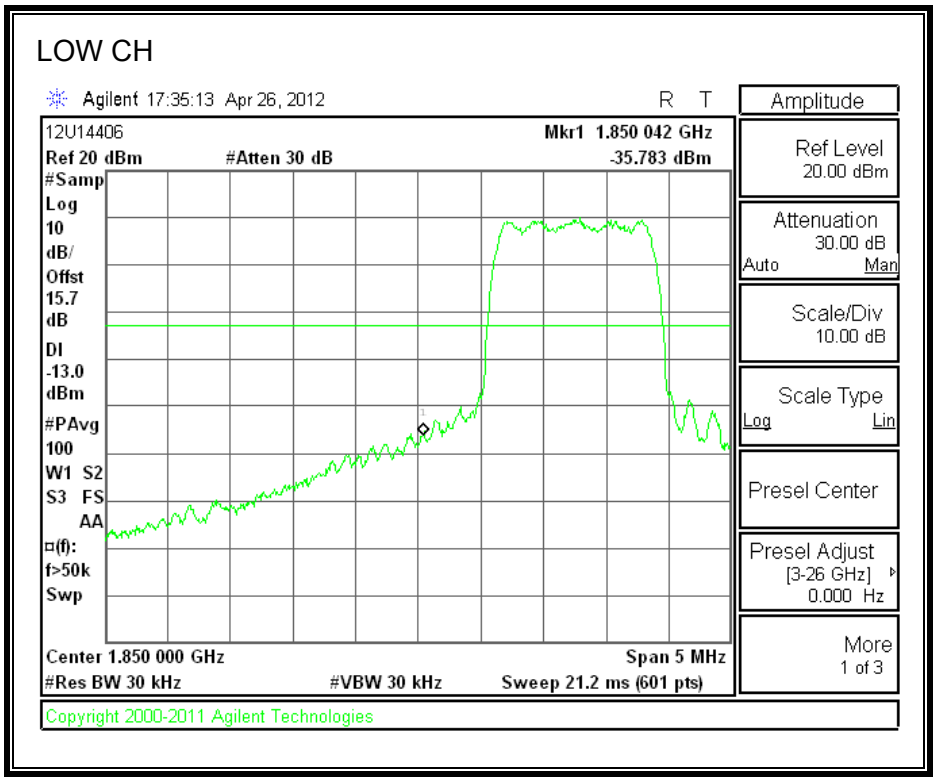


HIGH CH

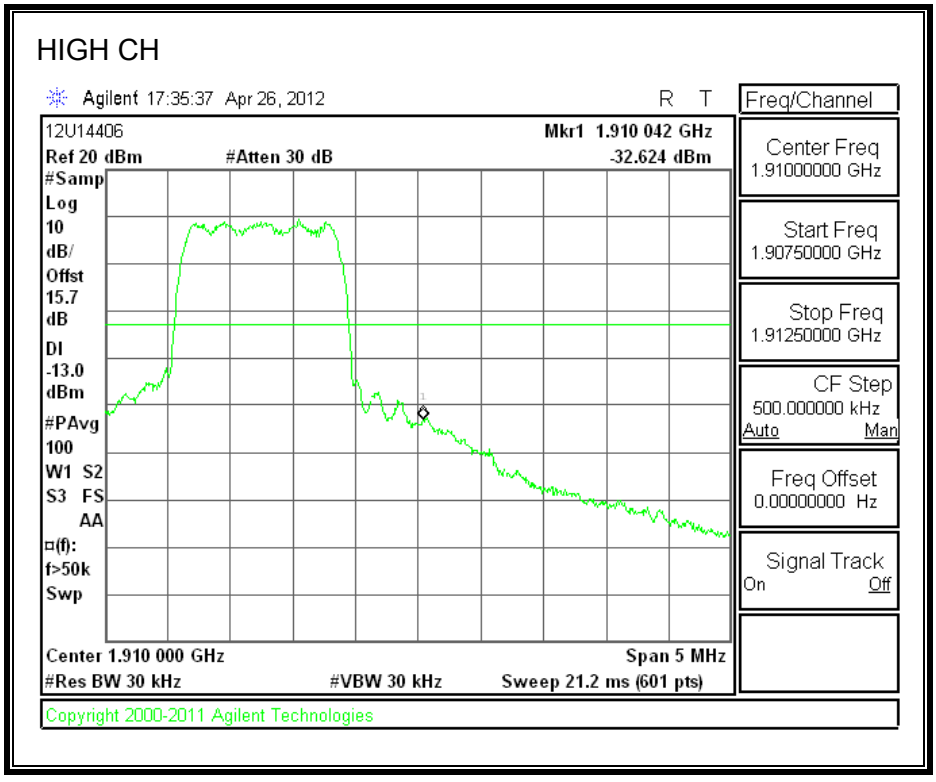


1xRTT 1900 BAND

LOW CH

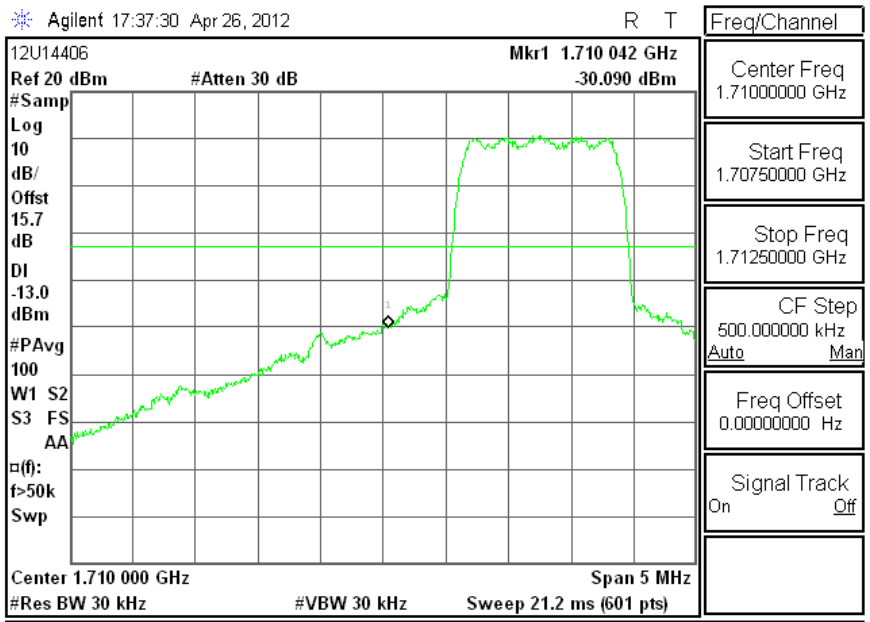


HIGH CH

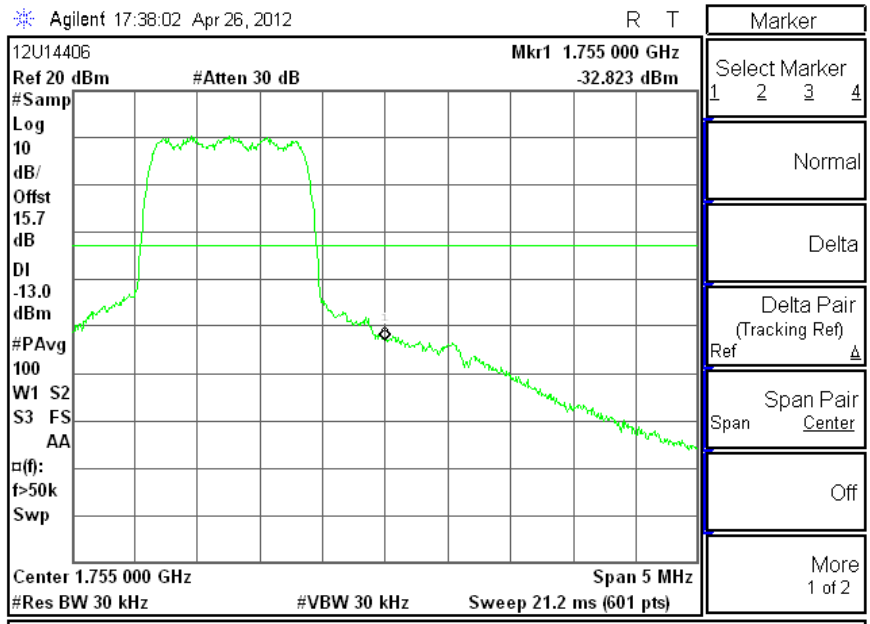


1xRTT 1700 BAND

LOW CH

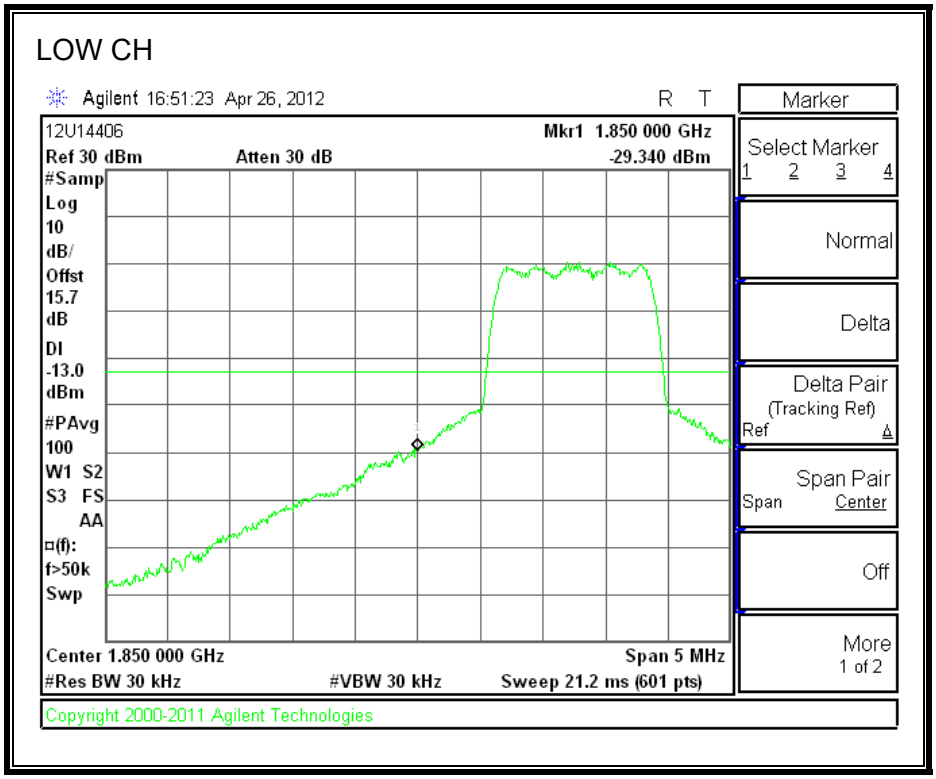


HIGH CH

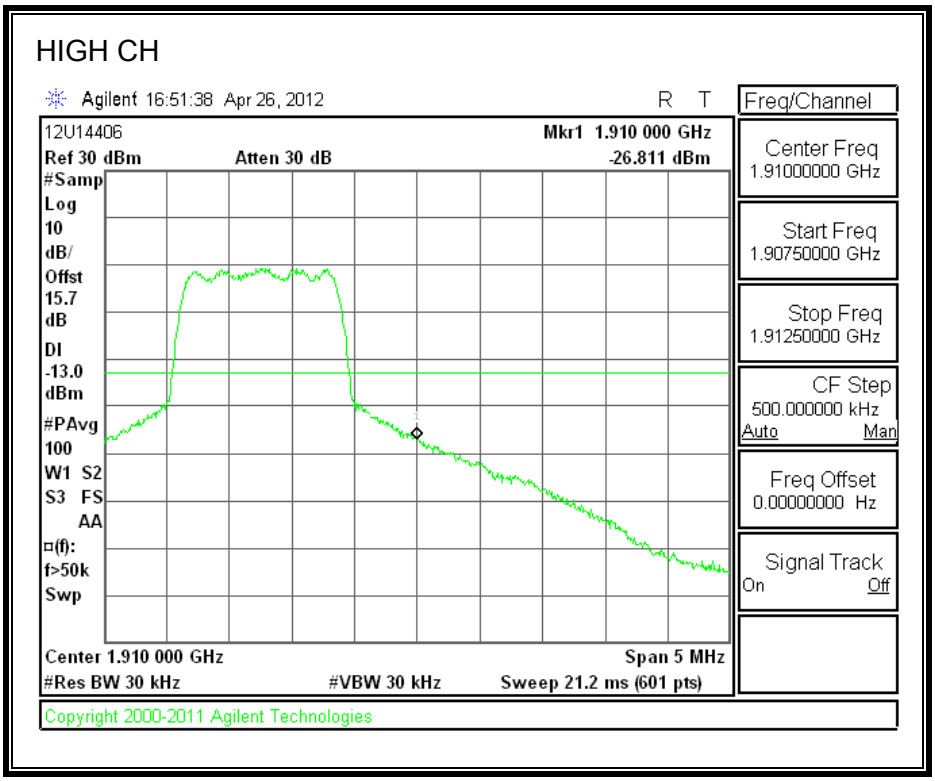


EVDO REV A.1900 BAND

LOW CH

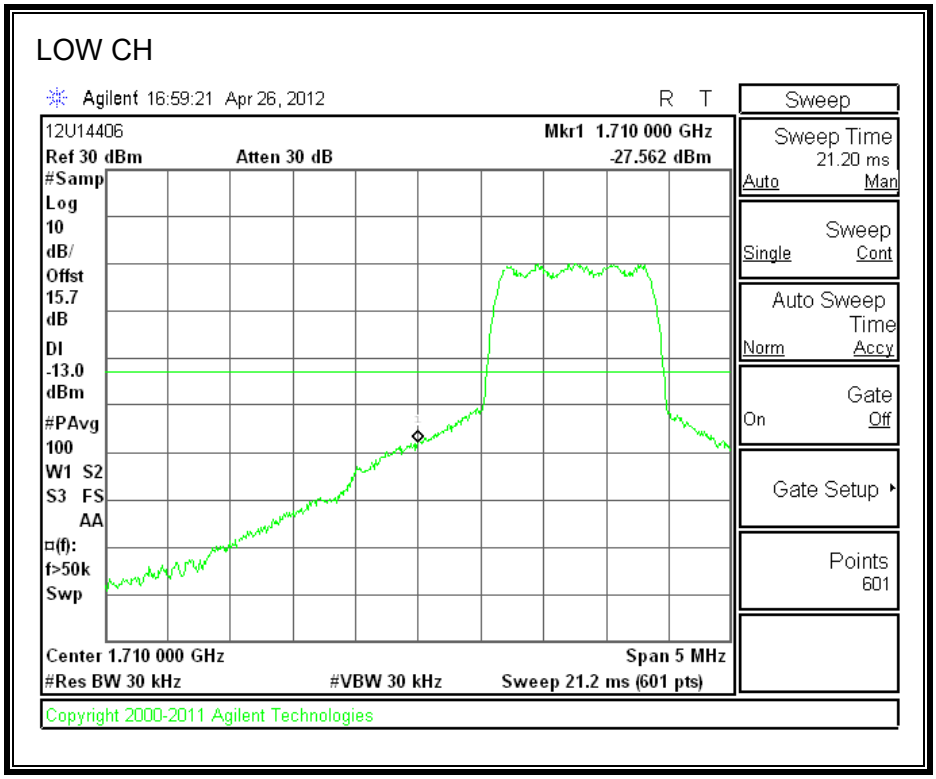


HIGH CH

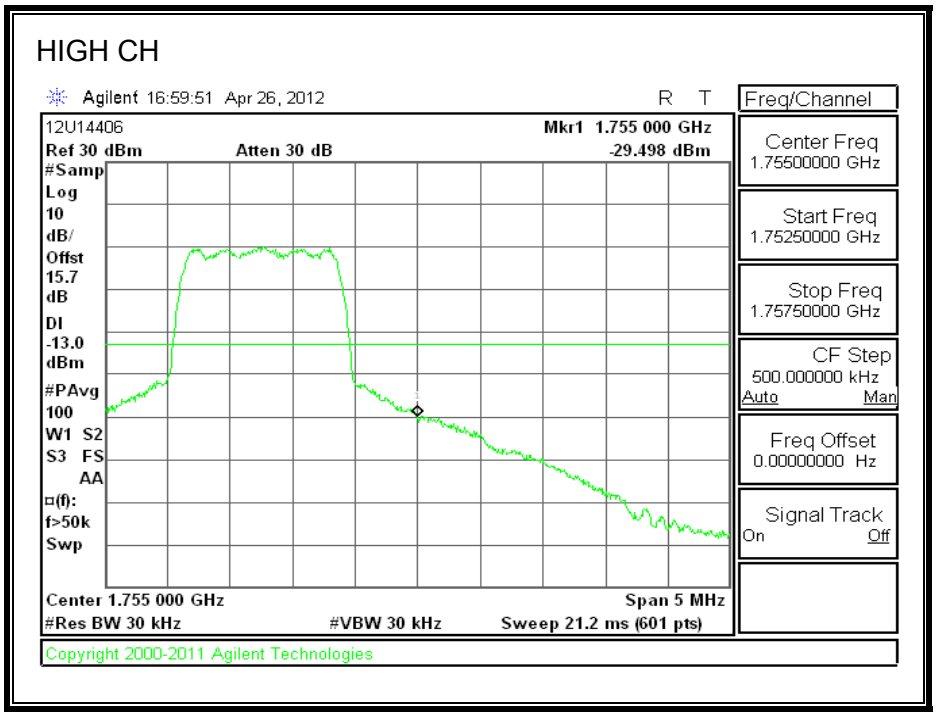


AWS EVDO REV A.1700 BAND

LOW CH

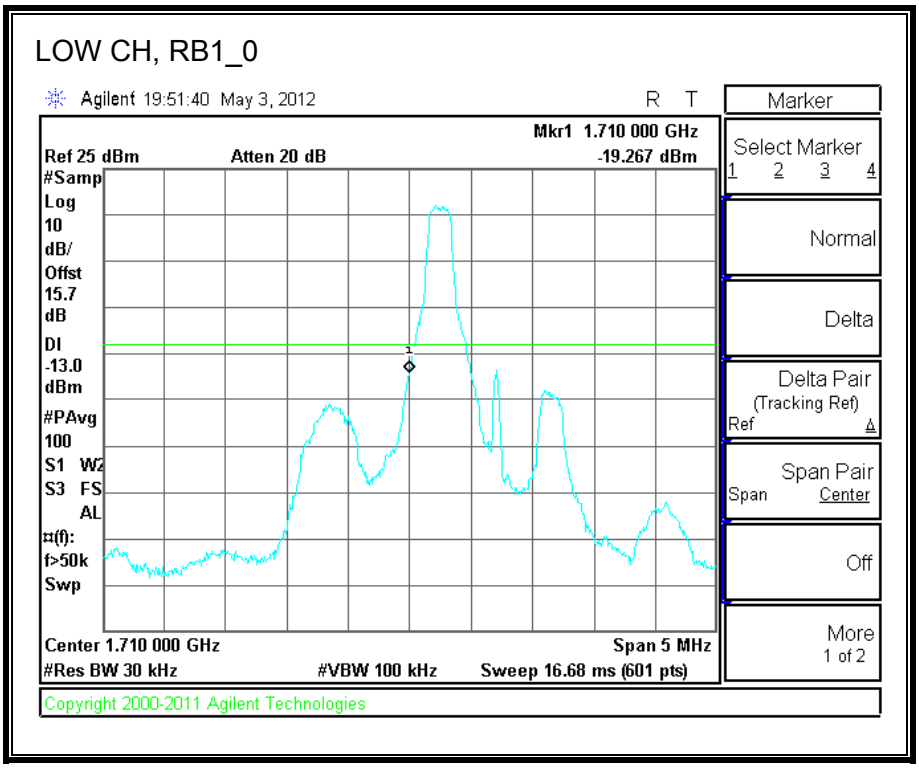


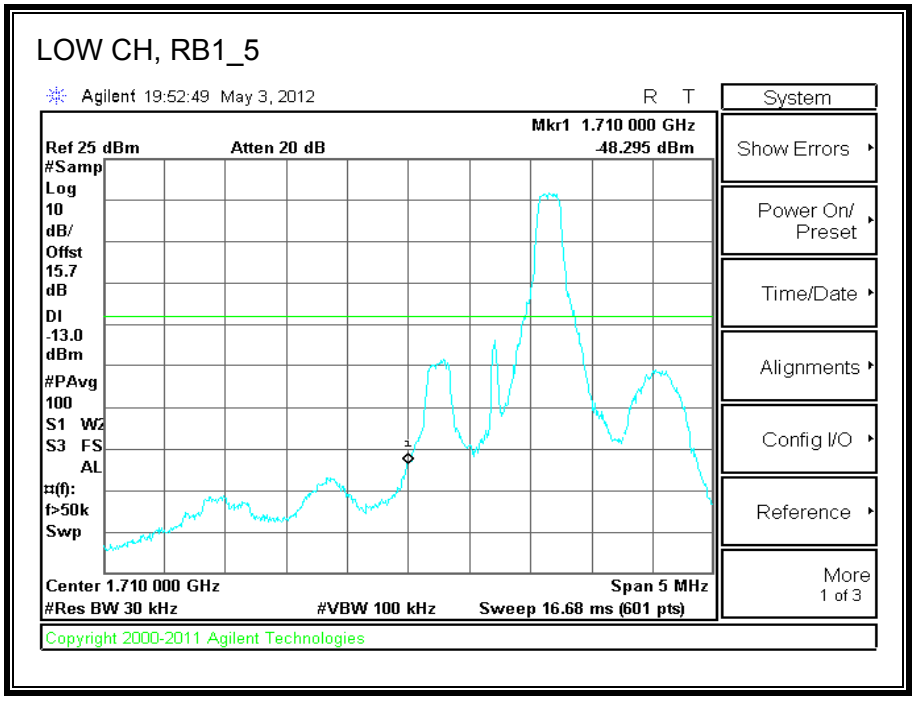
HIGH CH



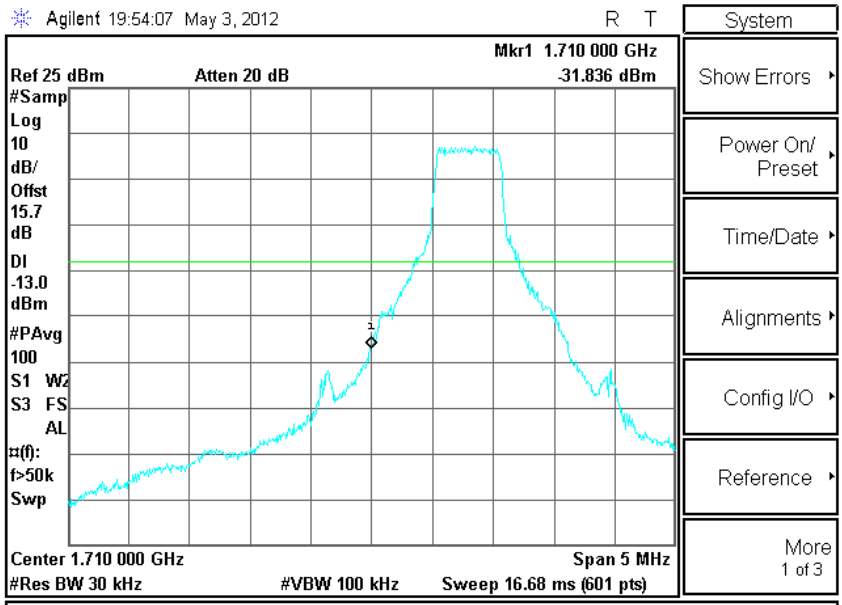
LTE, Band 4 (1.4MHz BAND WIDTH)

QPSK

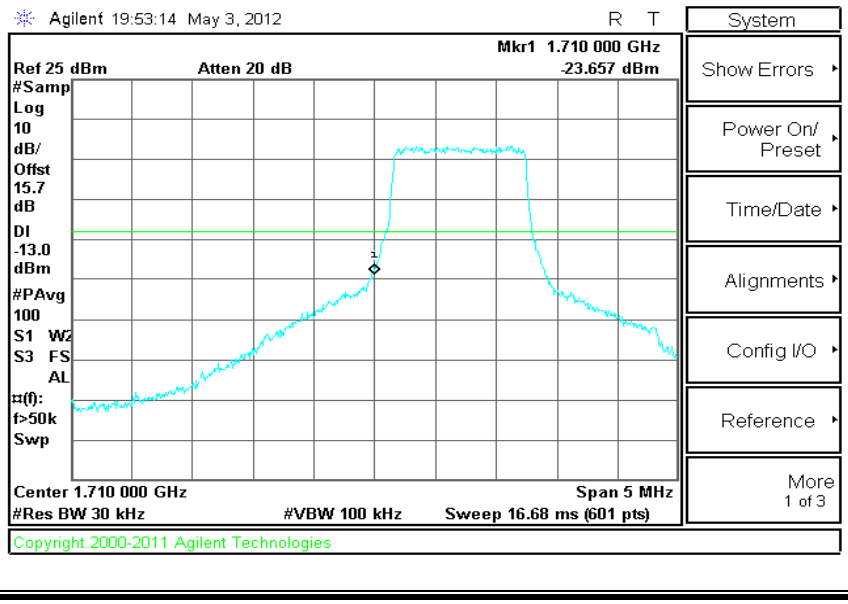




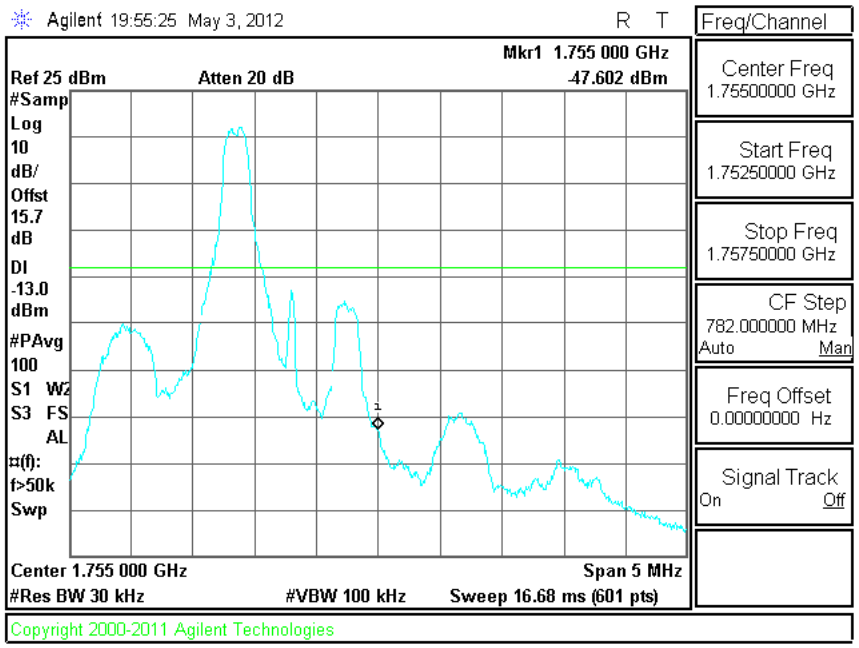
LOW CH, RB3_2



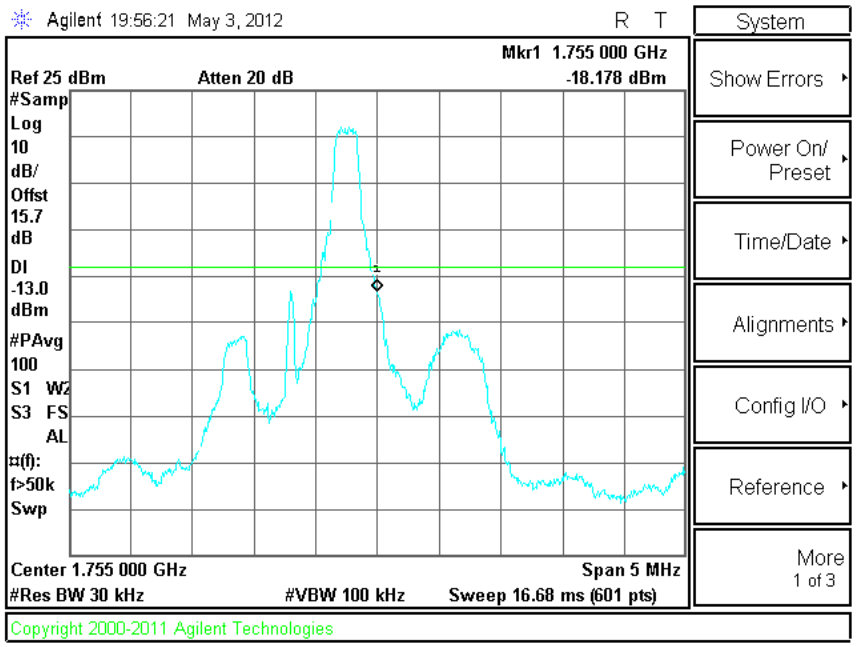
LOW CH, RB6_0



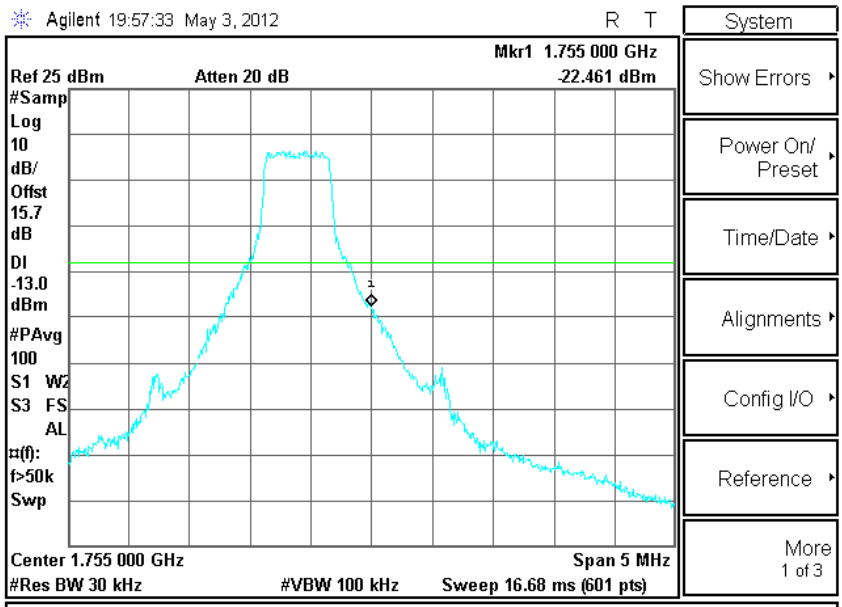
HIGH CH, RB1_0



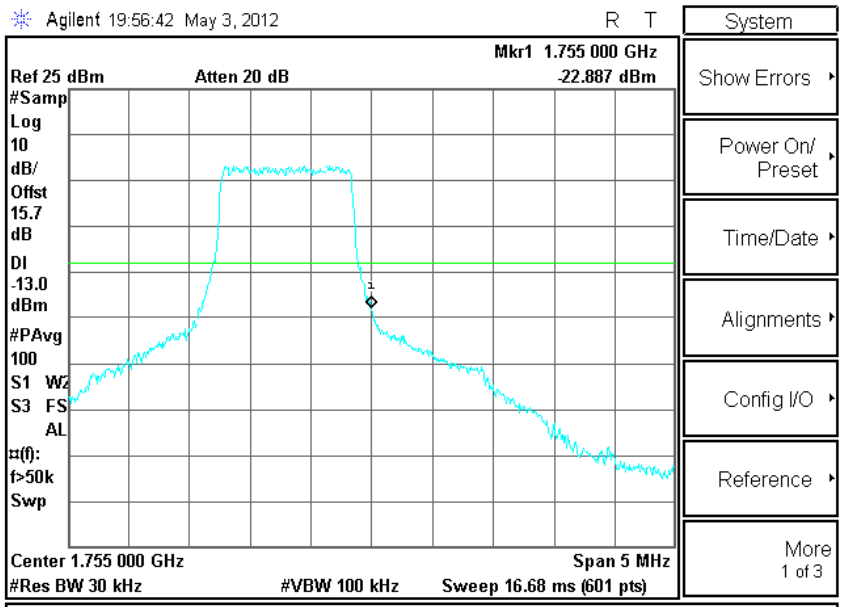
HIGH CH, RB1_5



HIGH CH, RB3_2

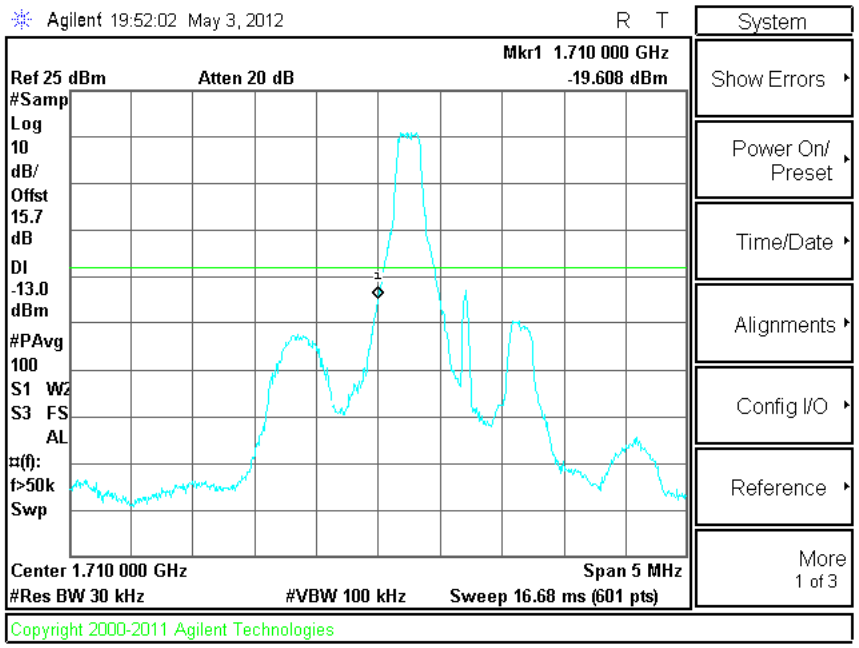


HIGH CH, RB6_0

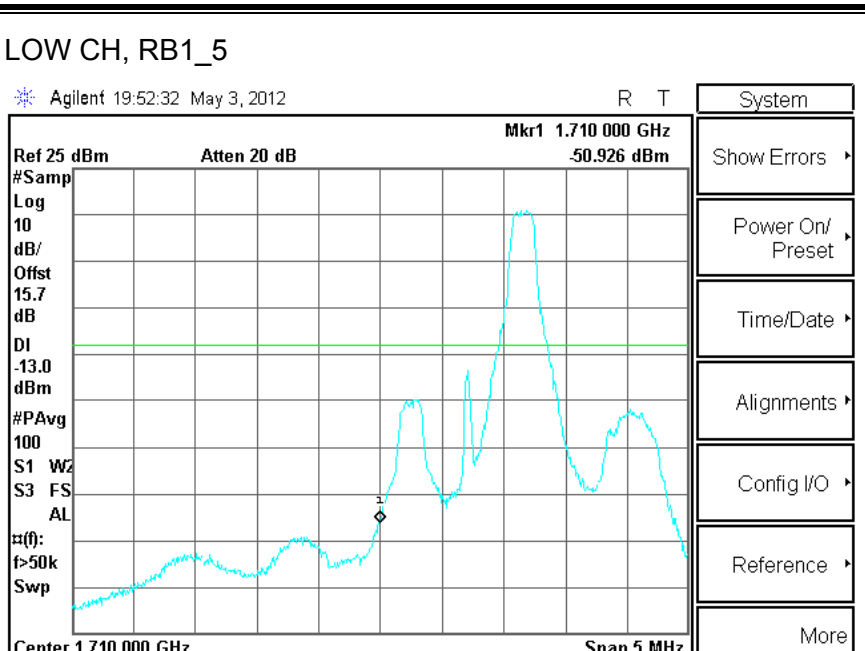


16QAM

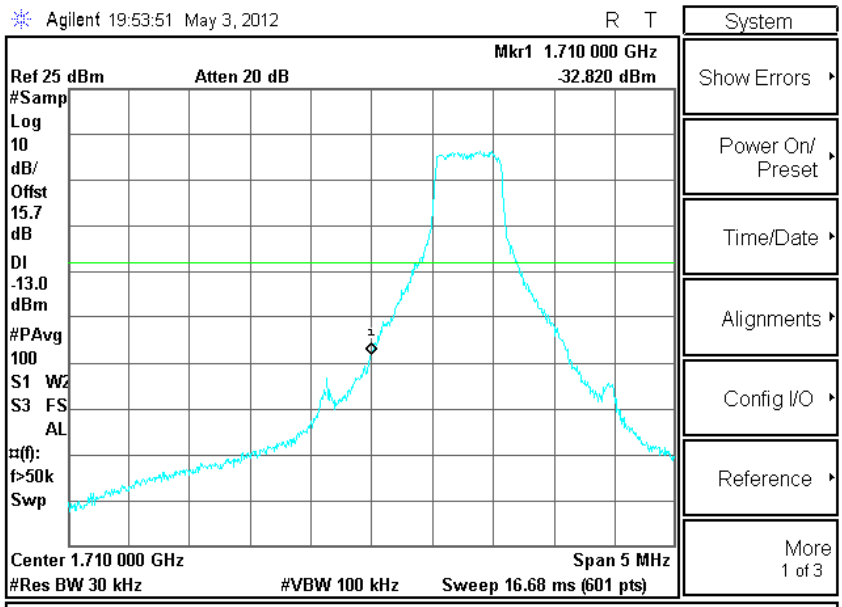
LOW CH, RB1_0



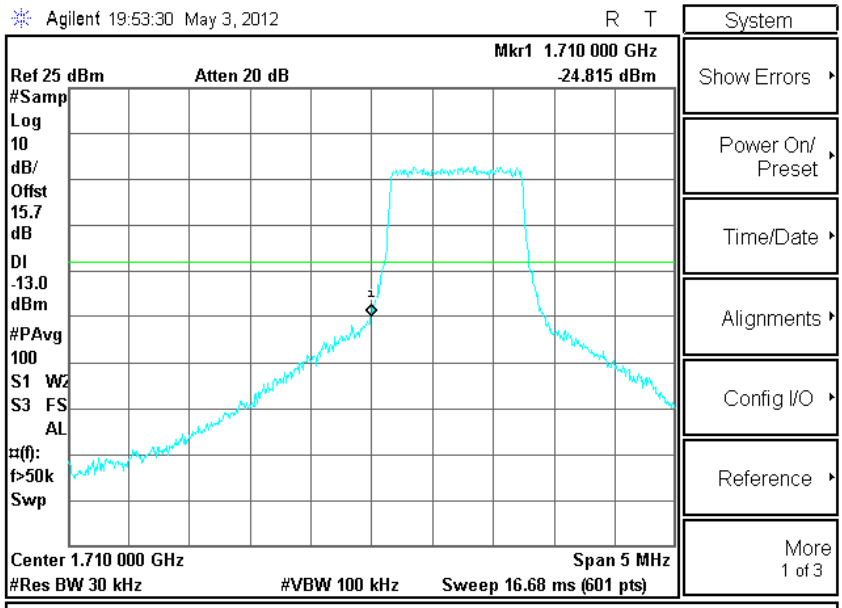
LOW CH, RB1_5



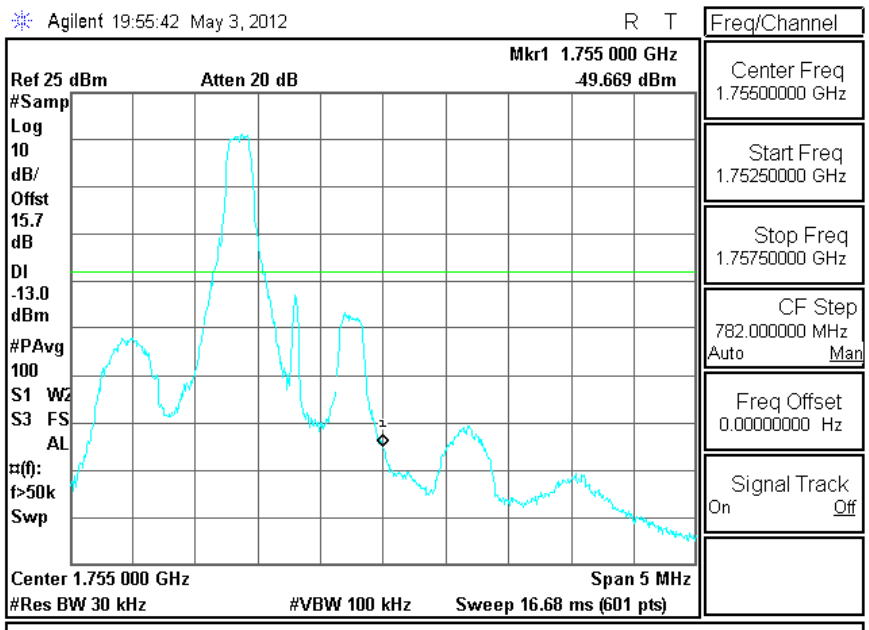
LOW CH, RB3_2



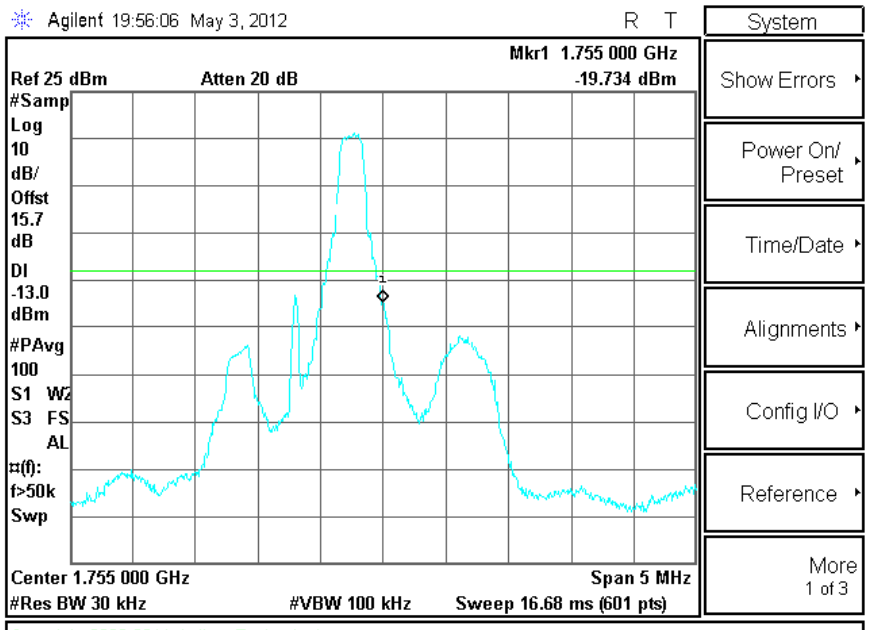
LOW CH, RB6_0



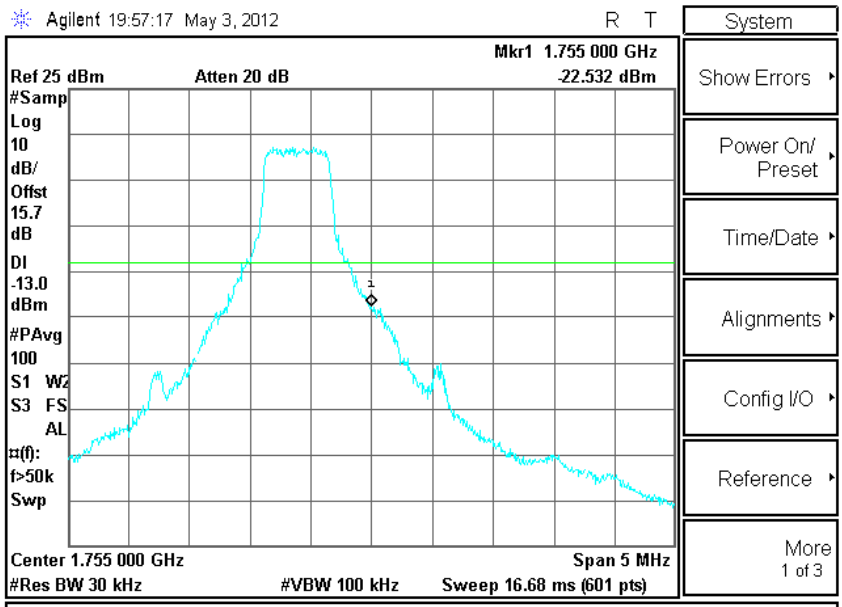
HIGH CH, RB1_0



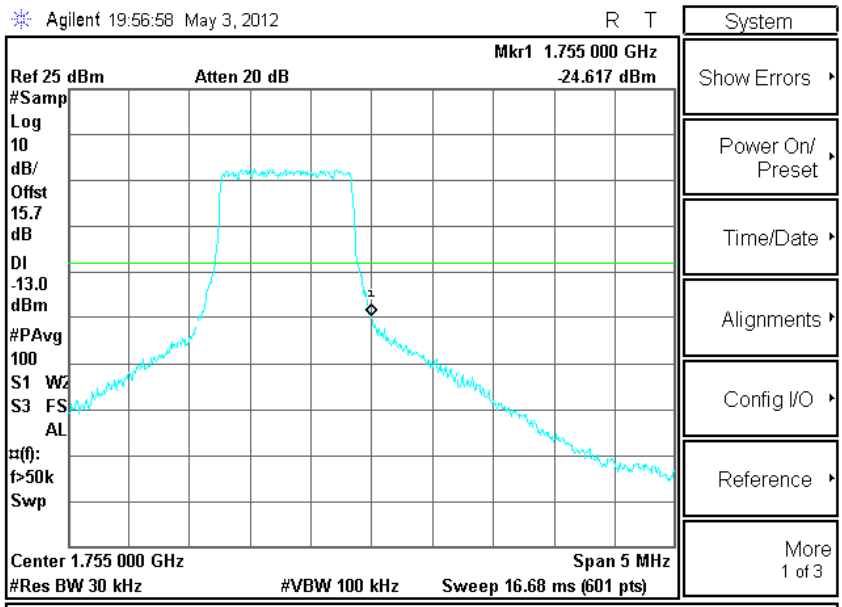
HIGH CH, RB1_5



HIGH CH, RB3_2

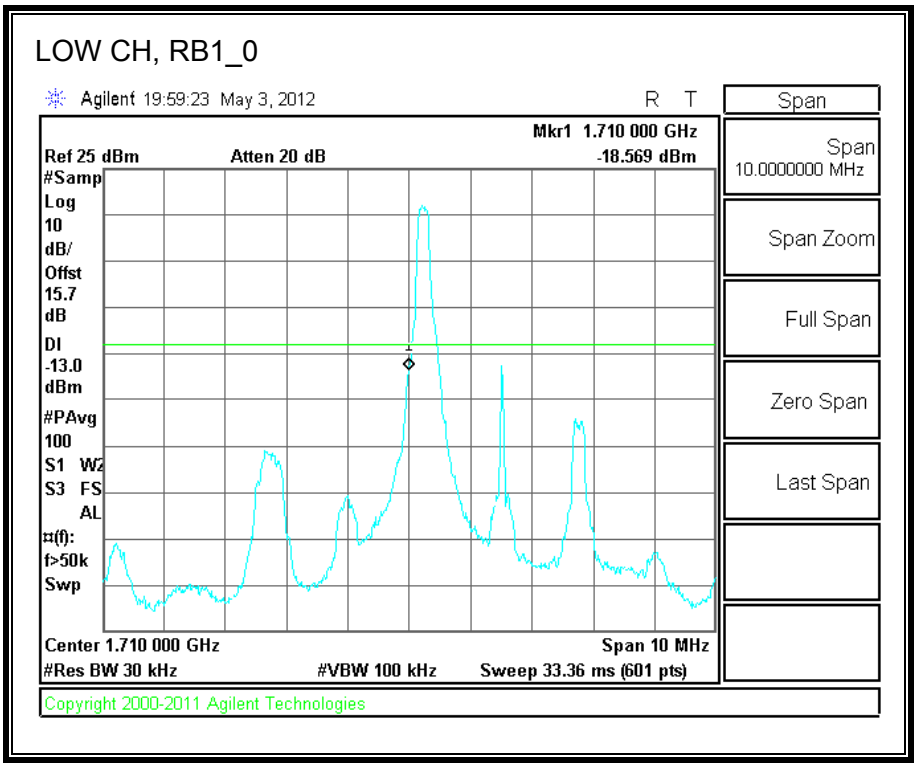


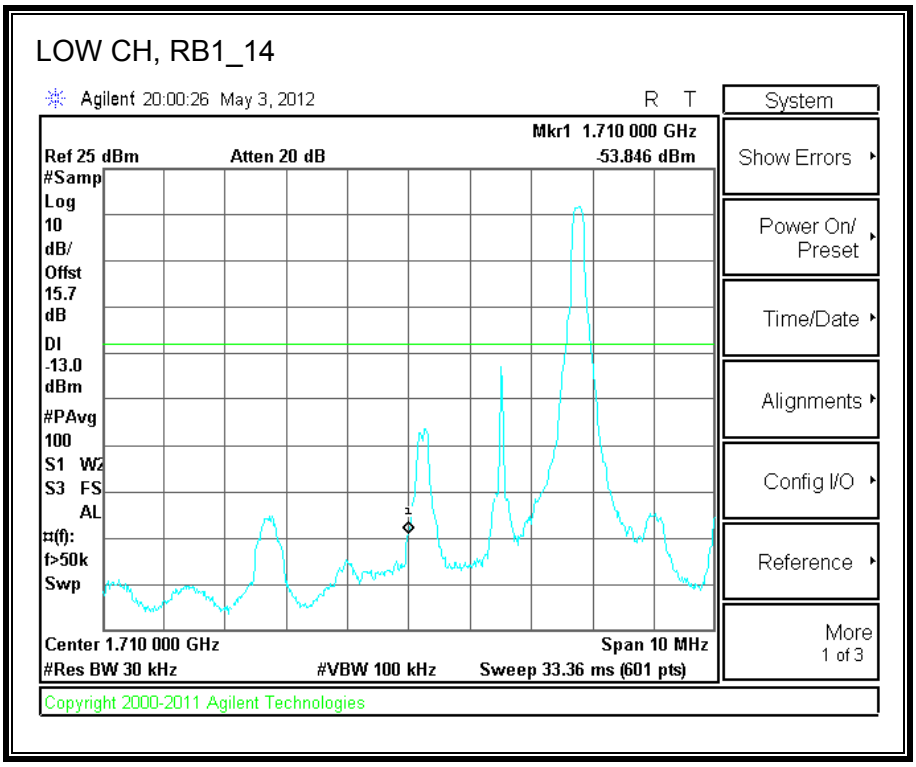
HIGH CH, RB6_0



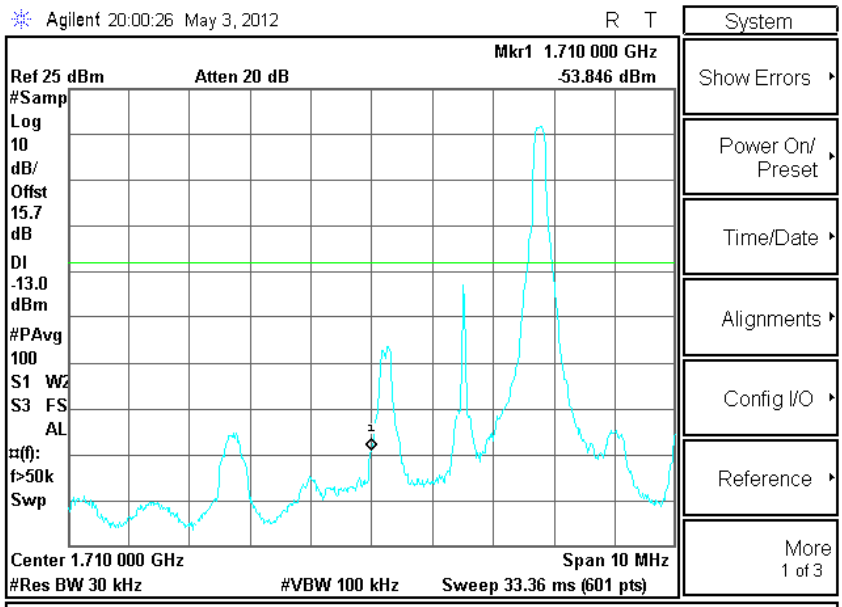
LTE, Band 4 (3.0MHz BAND WIDTH)

QPSK

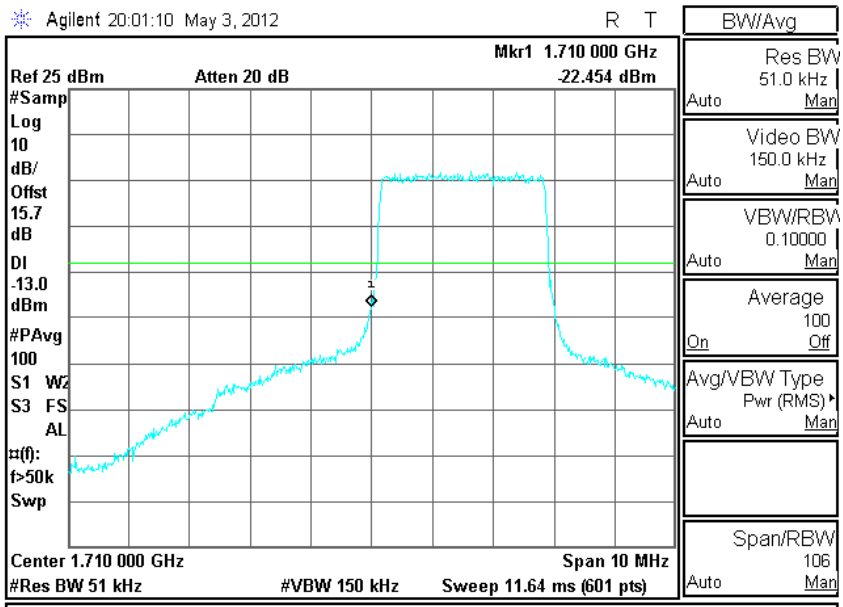




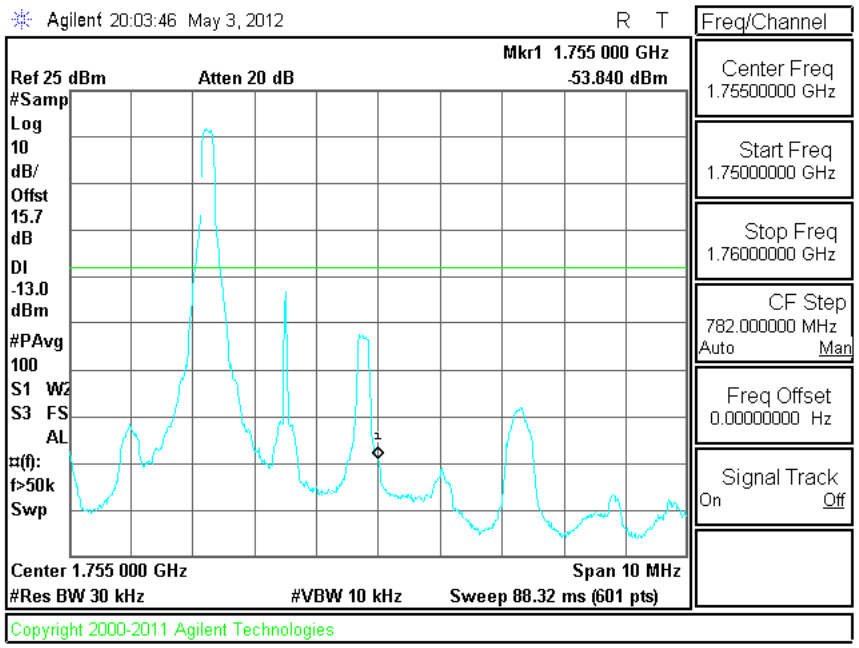
LOW CH, RB8_4



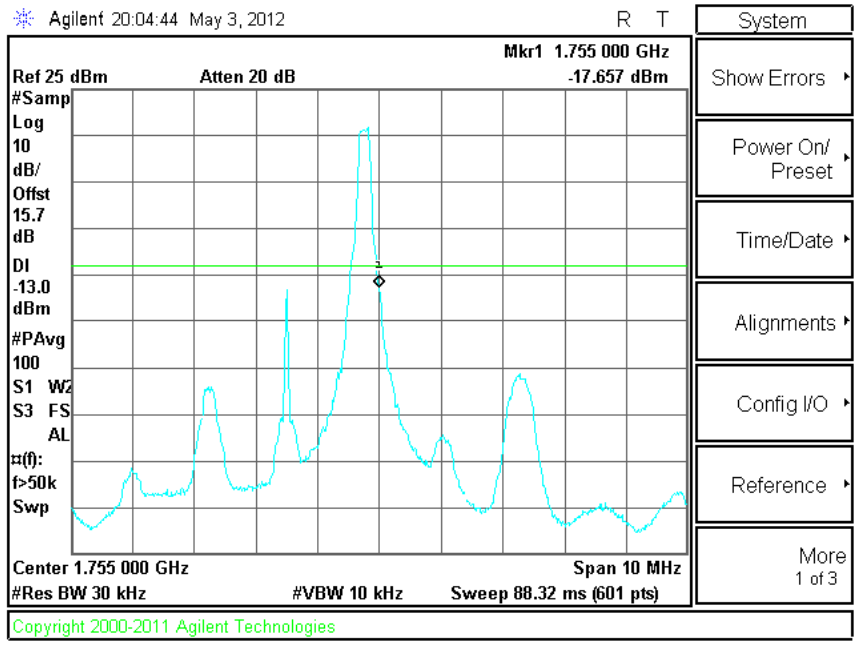
LOW CH, RB15_0



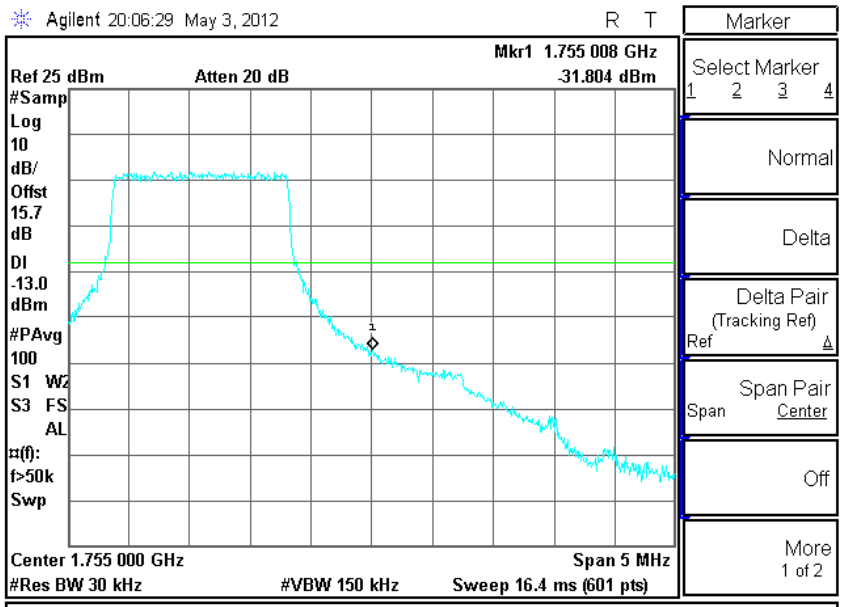
HIGH CH, RB1_0



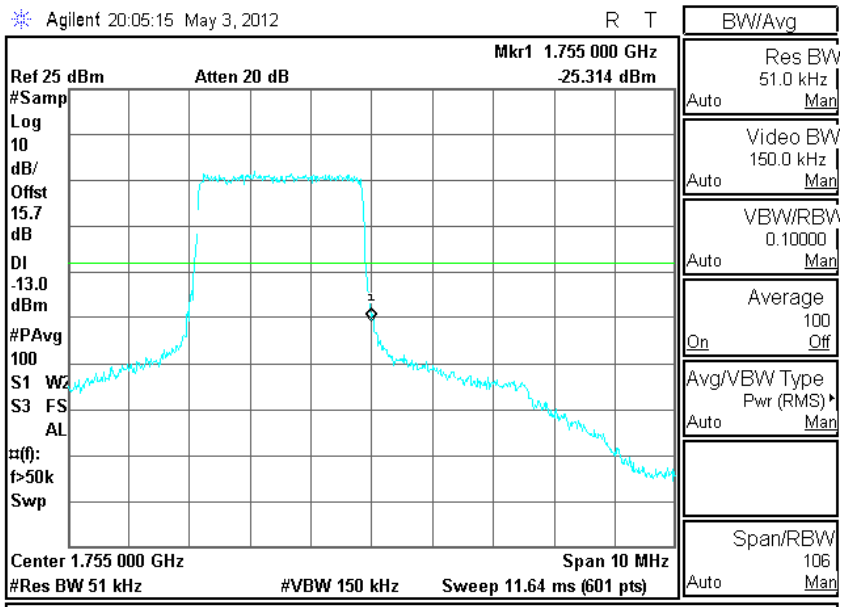
HIGH CH, RB1_14



HIGH CH, RB8_4

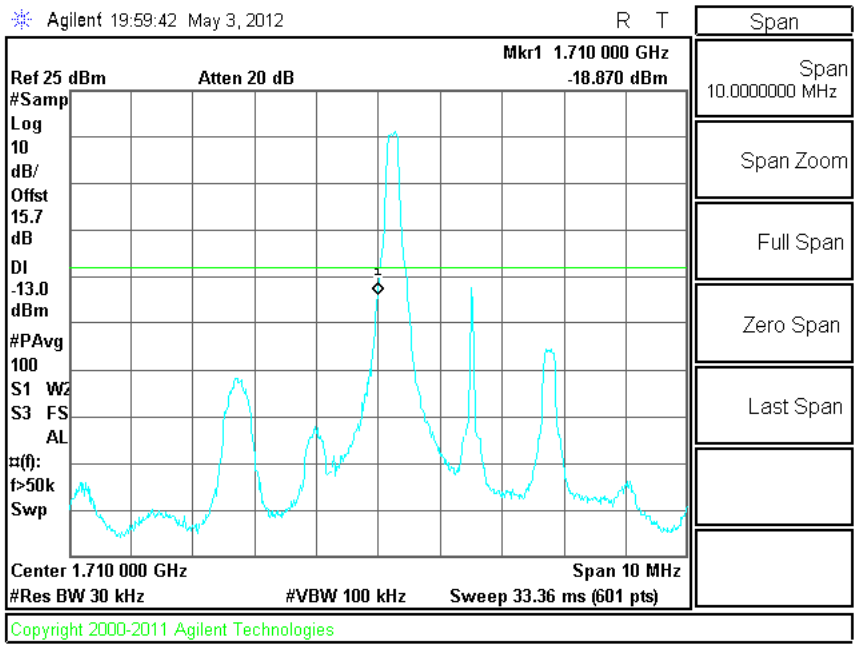


HIGH CH, RB15_0

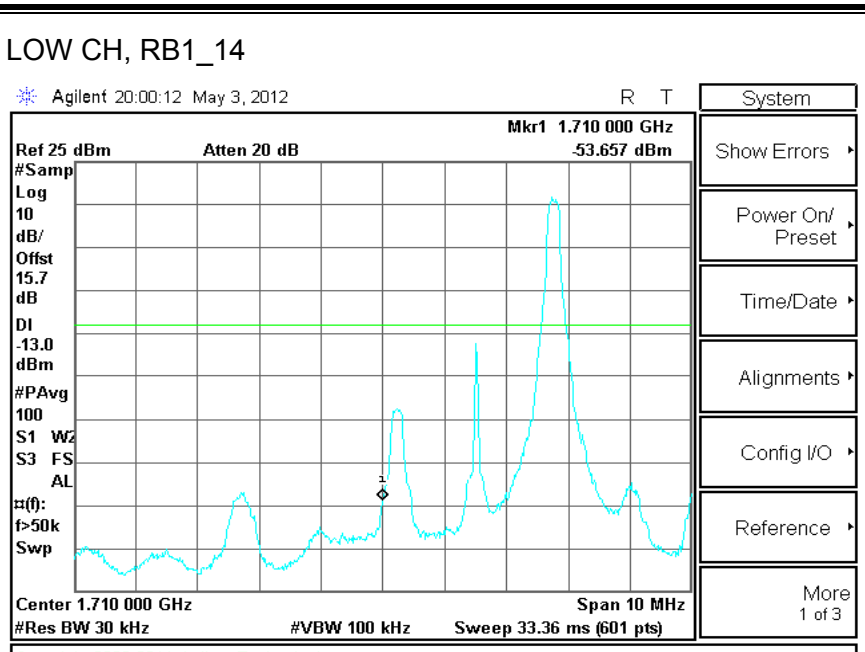


16QAM

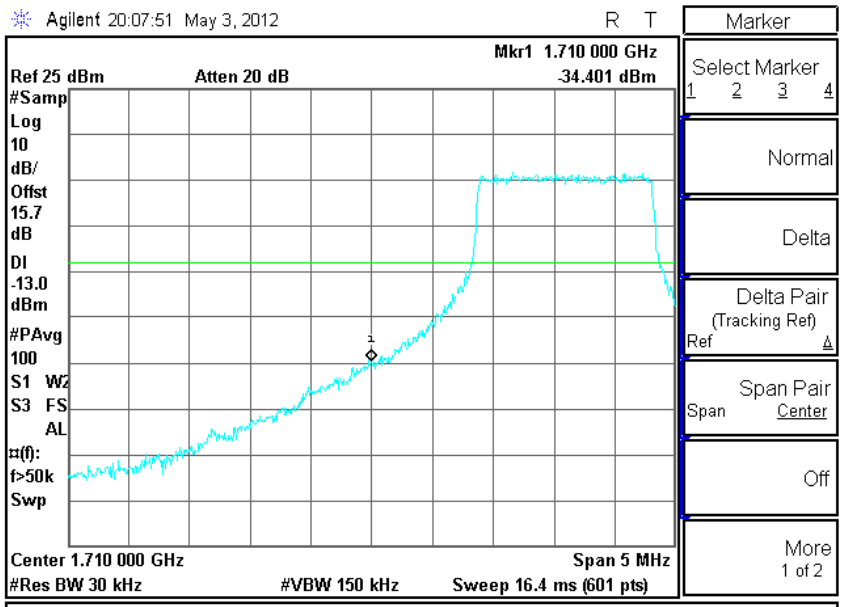
LOW CH, RB1_0



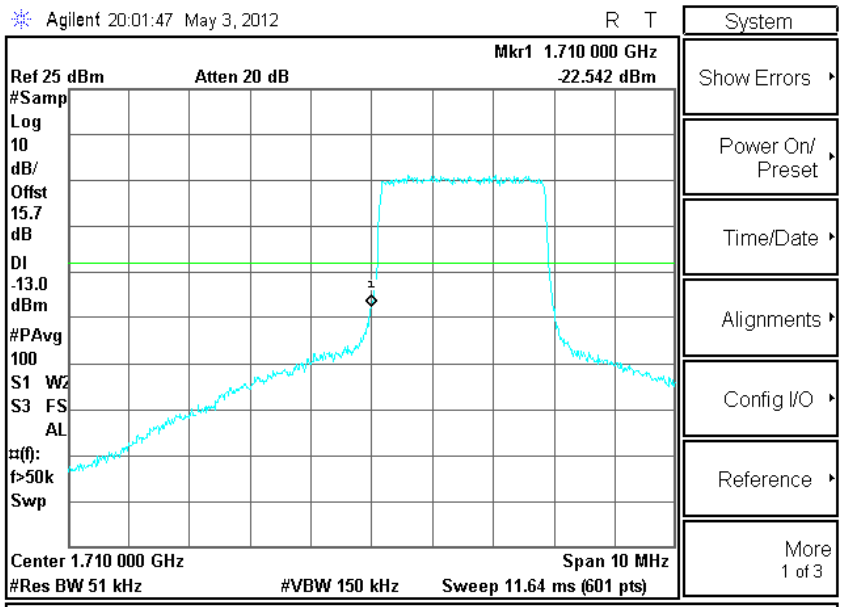
LOW CH, RB1_14



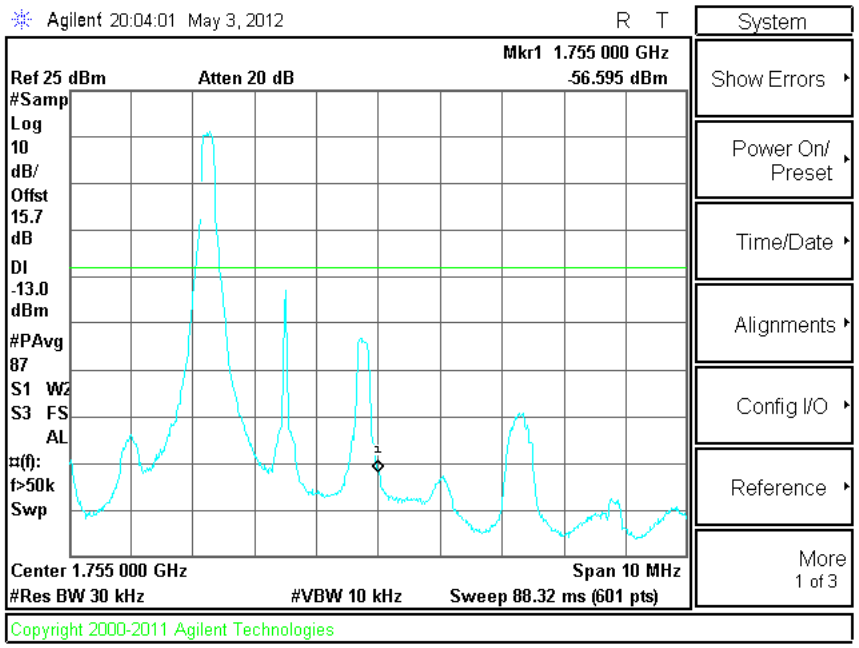
LOW CH, RB8_4



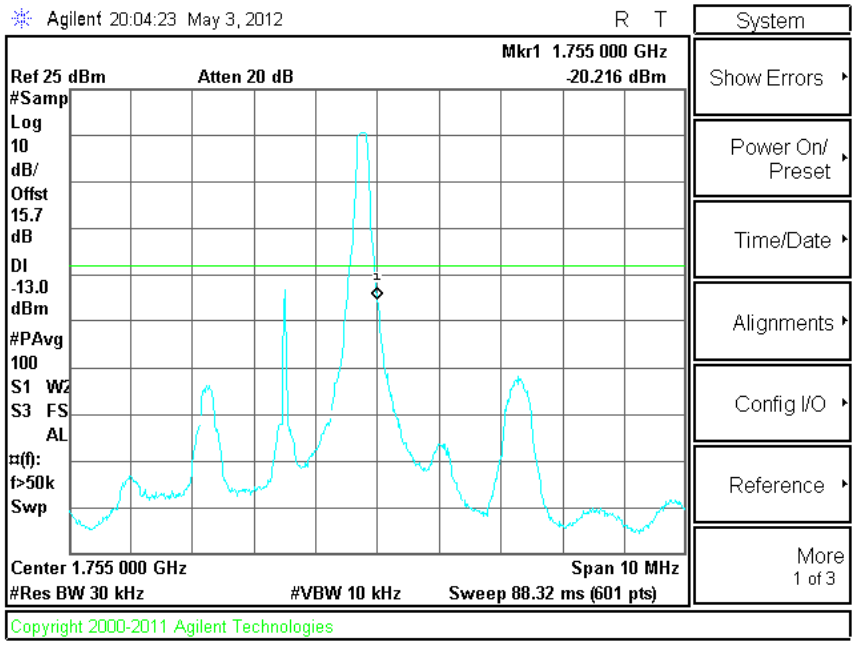
LOW CH, RB15_0



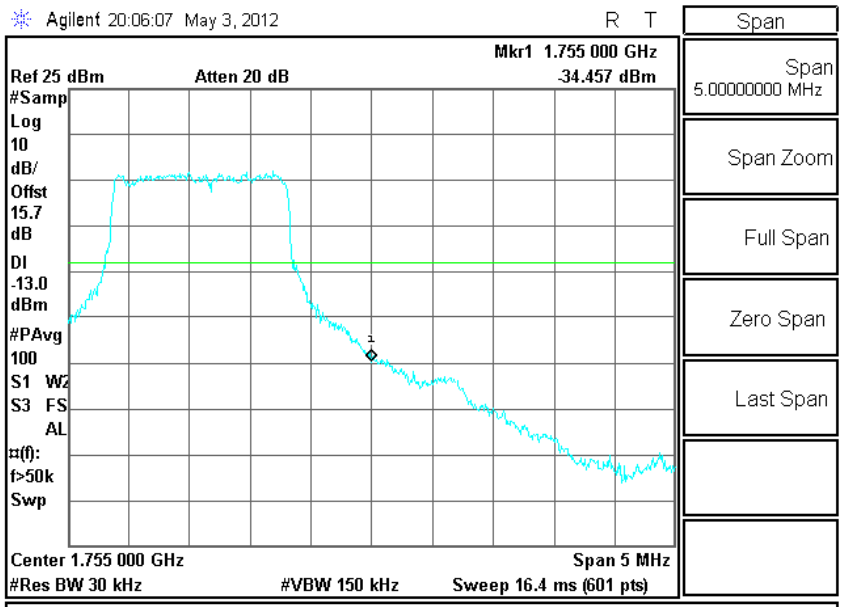
HIGH CH, RB1_0



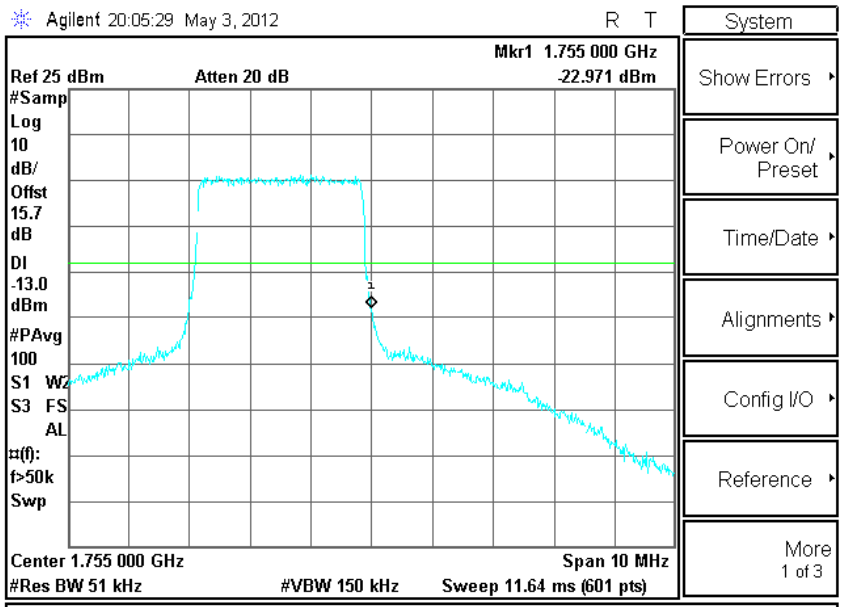
HIGH CH, RB1_14



HIGH CH, RB8_4



HIGH CH, RB15_0



LTE, Band 4 (5.0MHz BAND WIDTH)

QPSK