FCC CFR47 PART 22H, 24E, 27L AND 90S
CERTIFICATION TEST REPORT

FOR

GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/CDMA 1xRTT/EV-DO Rev 0, A, B /LTE radio, WIFI 802.11a/b/g/n and Bluetooth

MODEL NUMBER: A1455

FCC ID: BCGA1455

REPORT NUMBER: 12U14526-1A

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Prepared for

APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

Prepared by

UL CCS
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
---	09/24/12	Initial Issue	T. Chan
A	10/1/12	Removed CDMA2000 1xAdvanced Data	C. Pang

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/CDMA 1xRTT/EV-DO Rev 0, A, B /LTE radio, WIFI 802.11a/b/g/n and Bluetooth

MODEL: A1455

SERIAL NUMBER: C8THR018F1PM (CONDUCTED UNIT), C8TJ800PF1PT (RADIATED UNIT)

DATE TESTED: SEPTEMBER 03-24, 2012

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 22H, 24E, 27L and 90S	Pass

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

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

Approved & Released For UL CCS By:

THU CHAN
ENGINEERING MANAGER
UL CCS

Tested By:

CHIN PANG
EMC ENGINEER
UL CCS

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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, Part 24, Part 27 and FCC part 90.

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%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The Apple iPad Model A1455 is a tablet device with multimedia functions (music, application support, and video), cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/CDMA 1xRTT/EV-DO Rev 0, A, B /LTE radio, WIFI 802.11a/b/g/n and Bluetooth. The rechargeable battery is not user accessible.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted and ERP / EIRP output powers; average detector is used for UMTS/CDMA mode of Cellular band, while peak detector is used for GSM mode of Cellular and all GSM/CDMA/UMTS PCS bands as follows:

Part 22/24/90							
Frequency Range (MHz)	Modulation	Conducted			ERP/EIRP		
		Peak	Average	mW	Peak	Average	mW
824.2 - 848.8	GPRS	33.80		2398.8	33.19		2084.5
824.2 - 848.8	EGPRS	32.50		1778.3	30.89		1227.4
1850.2-1909.8	GPRS	30.60		1148.2	30.97		1250.3
1850.2-1909.8	EGPRS	30.60		1148.2	30.97		1250.3
826.4 - 846.0	Rel 99		24.50	281.8		22.81	191.0
1852.4-1907.6	Rel 99	26.38		434.5	26.47		443.6
826.4 - 846.0	HSUPA		23.70	234.4		22.11	162.6
1852.4-1907.6	HSUPA	27.50		562.3	26.91		490.9
817.9-823.10	BC10, 1xRTT		24.49	281.2		22.67	184.9
824.7 - 848.31	BC0, 1xRTT		24.50	281.8		22.67	184.9
1851.25-1908.75	BC1, 1xRTT	27.75		595.7	29.11		814.7
817.9-823.11	BC10, EVDO A		24.46	279.3		22.47	176.6
824.7 - 848.31	BC0, EVDO A		24.50	281.8		22.91	195.4
1851.25-1908.75	BC1, EVDO A	28.69		739.6	29.67		926.8

Part 22 Cellular Band					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP (Average)	
		dBm	mW	dBm	mW
824.7 - 848.31	EVDO Rev B, Two Carrier Min Sep	21.50	141.3	22.19	165.6
824.7 - 848.31	EVDO Rev B, Two Carrier Max Sep	21.50	141.3	21.54	142.6
824.7 - 848.31	EVDO Rev B, Three Carrier Min Sep	20.90	123.0	22.14	163.7

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LTE BAND 5

Part 22 LTE Band 5 MODE (1.4 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP(Average)	
		dBm	mW	dBm	mW
824.7 - 848.3	QPSK RB1-0	24.00	251.2	23.14	206.1
824.7 - 848.3	16QAM, RB1-0	23.04	201.4	22.44	175.4

Part 22 LTE Band 5 MODE (3.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP(Average)	
		dBm	mW	dBm	mW
825.5 - 847.5	QPSK RB1-0	24.00	251.2	22.14	163.7
825.5 - 847.5	16QAM, RB1-0	23.10	204.2	21.34	136.1

Part 22 LTE Band 5 MODE (5.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP(Average)	
		dBm	mW	dBm	mW
826.5 - 846.5	QPSK RB1-0	24.00	251.2	21.84	152.8
826.5 - 846.5	16QAM, RB1-0	23.00	199.5	20.94	124.2

Part 22 LTE Band 5 MODE (10 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP(Average)	
		dBm	mW	dBm	mW
829 - 844	QPSK RB1-0	24.00	251.2	22.34	171.4
829 - 844	16QAM, RB1-0	23.05	201.8	21.44	139.3

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LTE BAND 13

Part 27 LTE Band 13 MODE (5 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP(Average)	
		dBm	mW	dBm	mW
779.5 - 784.5	QPSK RB1-0	24.00	251.2	21.82	152.1
779.5 - 784.5	16QAM, RB1-0	23.00	199.5	19.92	98.2

Part 27 LTE Band 13 MODE (10 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP(AVERAGE)	
		dBm	mW	dBm	mW
782.00	QPSK RB1-0	23.97	249.5	21.42	138.7
782.00	16QAM, RB1-0	23.00	199.5	20.52	112.7

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LTE BAND 25

Part 24 LTE Band 25 MODE (1.4 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Peak)		EIRP(PEAK)	
		dBm	mW	dBm	mW
1850.7 - 1914.3	QPSK RB6-0	28.19	659.2	29.86	968.3
1850.7 - 1914.3	16QAM, RB6-0	28.59	722.8	28.86	769.1

Part 24 LTE Band 25 MODE (3.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Peak)		EIRP(PEAK)	
		dBm	mW	dBm	mW
1851.5 - 1913.5	QPSK RB15-0	28.00	631.0	30.16	1037.5
1851.5 - 1913.5	16QAM, RB15-0	28.10	645.7	29.16	824.1

Part 24 LTE Band 25 MODE (5.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Peak)		EIRP(PEAK)	
		dBm	mW	dBm	mW
1852.5 - 1912.5	QPSK RB25-0	28.05	638.3	30.16	1037.5
1852.5 - 1912.5	16QAM, RB25-0	28.20	660.7	29.20	831.8

Part 24 LTE Band 25 MODE (10.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Peak)		EIRP(PEAK)	
		dBm	mW	dBm	mW
1855 - 1910	QPSK RB50-0	28.00	631.0	30.30	1071.5
1855 - 1910	16QAM, RB50-0	28.20	660.7	29.50	891.3

Part 24 LTE Band 25 MODE (15.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Peak)		EIRP(PEAK)	
		dBm	mW	dBm	mW
1857.5 - 1907.5	QPSK RB75-0	28.33	680.8	30.60	1148.2
1857.5 - 1907.5	16QAM, RB75-0	28.90	776.2	29.60	912.0

Part 24 LTE Band 25 MODE (20.0 MHz BANDWIDTH)					
Frequency range (MHz)	Modulation	Conducted(Peak)		EIRP(PEAK)	
		dBm	mW	dBm	mW
1860 - 1905	QPSK RB100-0	28.31	677.6	30.76	1191.2
1860 - 1905	16QAM, RB100-0	28.00	631.0	29.60	912.0

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5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a band gap type integral antenna with a maximum peak gain as follow:

Frequency (MHz)	Gain (dBi)
BC10, 817 – 824MHz	-1.81
GSM, Cell 824 – 849MHz	-1.52
GSM, PCS 1850 – 1910MHz	1.41
LTE Band 5 824.7-848MHz	-1.52
LTE Band 13 779.5-784.5MHz	-2.61
LTE Band 25, 1850-1915MHZ	1.41

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 2.00.01_Debug

The EUT software installed during testing was 10A8396 and 10A8397.

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

5.5. WORST-CASE CONFIGURATION AND MODE

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

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

Worst-case modes below:

- For Cellular and PCS band: 1xRTT (RC1 SO55)
- For Cellular and PCS band: CDMA2000 1xEV-DO Rev. A. (BC0, BC1 and BC10)
- For Cellular and PCS band: GPRS and EGPRS
- For Cellular and PCS band: UMTS, REL 99 and HSUPA.

Both conducted and radiated emissions measurement with all bands.

The EUT has been investigated on X, Y and Z position, the worst-case was determined on Z-position for CELL and PCS band by comparing the fundamental ERP / EIRP output power.

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5.6. DESCRIPTION OF TEST SETUP

I/O CABLES (RF CONDUCTED TEST)

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

I/O CABLES (RF RADIATED TEST)

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	2	US 115V	Un-shielded	2m	NA
2	DC	1	DC	Un-shielded	1m	NA
3	Jack	1	Earphone	Un-shielded	0.5m	NA
4	RF In/Out	1	Horn	Un-shielded	2m	NA

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Apple	A1385	D292066H2T2DHLHAC	DoC
DC Power Supply	Xantrex	XHR-60-18	27519	NA

TEST SETUP

The EUT is a stand-alone device. The Communication test set exercised the EUT.

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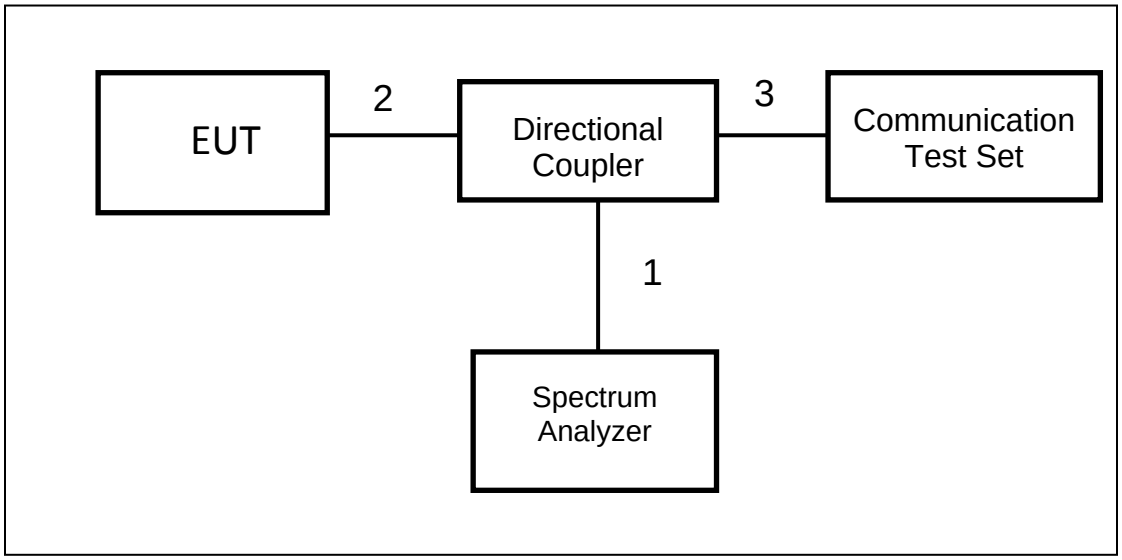
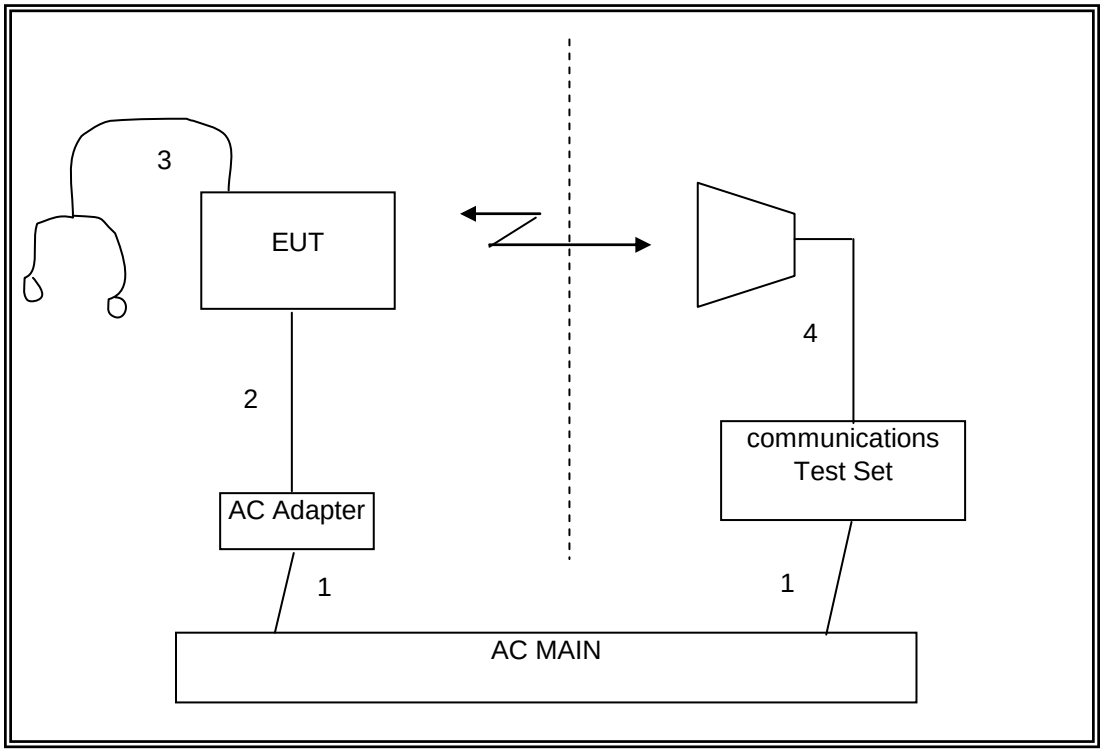
SETUP DIAGRAM FOR RF CONDUCTED TESTS



SETUP DIAGRAM FOR RF RADIATED TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01159	04/09/13
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	11/11/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	11/11/12
Communications Test Set	Agilent / HP	E5515C	1000732	09/27/12
Communication Test Set	R & S	CMU 200	None	06/06/13
Wideband Communication Test Set	R & S	CMW 500	None	12/16/12
Antenna, Horn, 18 GHz	EMCO	3115	C00872	09/20/13
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	02/07/13
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02689`	CNR
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Temperature / Humidity Chamber	WATLOW Controls	SK-3102	None	CNR
Dual Channel Thermometer	Tektronix	DTM920	CCS-0048	05/21/13
Directional Coupler	Krytar	1817	N02656	CNR
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	07/06/13

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7. RF POWER OUTPUT VERIFICATION

7.1. GSM

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 ≥ RBW.≥ 26dB BW, typically 3MHz.
- Set a marker to point the corresponding peak value.

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PROCEDURE USED TO ESTABLISH TEST SIGNAL

GPRS/EGPRS

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

Press Connection control to choose the different menus

Press RESET > choose all to reset all settings

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

Network Support > GSM+GPRS or GSM+EGPRS

Main Service > Packet Data

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

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

> Slot configuration > Uplink/Gamma

> 33 dBm for GPRS 850/900

> 27 dBm for EGPRS 850/900

> 30 dBm for GPRS1800/1900

> 26 dBm for EGPRS1800/1900

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

Frequency Offset > + 0 Hz

Mode > BCCH and TCH

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

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

Channel Type > Off

P0> 4 dB

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

TCH > choose desired test channel

Hopping > Off

Main Timeslot > 3 (Default)

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

Bit Stream > 2E9-1PSR Bit Pattern

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

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

RESULTS

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GPRS/EGPRS

	Ch.	f (MHz)	1 time slots		2 time slots	
			Peak	Average	Peak	Average
GPRS	128	824.2	33.60	33.30	33.10	32.90
	190	836.6	33.70	33.40	33.20	33.00
	251	848.8	**33.80**	33.50	33.30	32.92
EGPRS	128	824.2	32.50	28.80	32.50	28.80
	190	836.6	**32.50**	28.80	32.60	29.00
	251	848.8	32.40	28.85	32.50	28.90

	Ch.	f (MHz)	1 time slots		2 time slots	
			Peak	Average	Peak	Average
GPRS	512	1850.2	**30.60**	29.90	29.77	29.40
	661	1880.0	30.40	29.90	29.60	29.40
	810	1909.8	30.20	29.75	29.37	29.30
EGPRS	512	1850.2	30.50	28.00	30.50	28.00
	661	1880.0	**30.60**	28.00	30.60	27.98
	810	1909.8	30.50	27.99	30.40	27.70

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7.2. UMTS MODE

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 ≥ RBW.≥ 26dB BW, typically 5MHz.
- Set a marker to point the corresponding peak value.

7.2.1. REL99

TEST PROCEDURE

The following summary of these settings are illustrated below:

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

RESULTS

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UMTS REL99

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
				Peak	Average
UMTS 850	4132	4357	826.4	27.77	**24.50**
	4180	4405	836.0	27.80	24.45
	4230	4455	846.0	27.78	24.40

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
				Peak	Average
UMTS 1900	9262	9662	1852.4	**26.38**	23.00
	9400	9800	1880.0	26.25	23.00
	9538	9938	1907.6	26.23	22.91

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7.2.2. HSDPA REL 5

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

Summary of settings are illustrated below:

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

Result

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Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	Conducted output power (dBm)
					Peak	Average
UMTS850 (Band V)	1	4132	4357	826.4	26.90	23.60
		4180	4405	836.0	26.60	23.50
		4230	4455	846.0	26.50	23.50
	2*	4132	4357	826.4	**27.50**	23.70
		4180	4405	836.0	27.20	23.70
		4230	4455	846.0	27.40	23.50
	3	4132	4357	826.4	27.40	23.20
		4180	4405	836.0	26.90	23.00
		4230	4455	846.0	27.20	23.10
	4	4132	4357	826.4	27.40	23.20
		4180	4405	836.0	27.00	23.00
		4230	4455	846.0	27.30	23.12
UMTS1900 (Band II)	1	9262	9662	1852.4	26.40	22.90
		9400	9800	1880.0	26.45	22.80
		9538	9938	1907.6	26.20	22.80
	2*	9262	9662	1852.4	**26.90**	23.00
		9400	9800	1880.0	26.80	23.00
		9538	9938	1907.6	26.70	22.80
	3	9262	9662	1852.4	26.60	22.60
		9400	9800	1880.0	26.90	22.70
		9538	9938	1907.6	26.70	22.68
	4	9262	9662	1852.4	26.80	22.60
		9400	9800	1880.0	26.90	22.70
		9538	9938	1907.6	26.80	22.60

Note 1: Asterisk (*) represents the worst case

Note 2: Maximum output power levels that are possible for all subtests reported.

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7.2.3. HSPA REL 6 (HSDPA & 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				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	-
	βhs	22/15	12/15	30/15	4/15	5/15
	βed	1309/225	94/75	47/15 47/15	56/75	47/15
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	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

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Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS850 (Band V)	1*	4132	4357	826.4	27.40	23.40
		4180	4405	836.0	28.00	23.60
		4230	4455	846.0	**28.10**	**23.70**
	2	4132	4357	826.4	27.90	22.10
		4180	4405	836.0	27.60	22.10
		4230	4455	846.0	27.80	22.20
	3	4132	4357	826.4	27.90	22.80
		4180	4405	836.0	27.95	22.90
		4230	4455	846.0	28.00	22.80
	4	4132	4357	826.4	27.85	22.10
		4180	4405	836.0	27.58	22.18
		4230	4455	846.0	27.79	22.20
	5	4132	4357	826.4	27.50	23.60
		4180	4405	836.0	27.30	23.65
		4230	4455	846.0	27.40	23.70
UMTS1900 (Band II)	1*	9262	9662	1852.4	27.40	22.88
		9400	9800	1880.0	**27.50**	**22.90**
		9538	9938	1907.6	27.30	22.80
	2	9262	9662	1852.4	26.45	20.40
		9400	9800	1880.0	26.50	20.45
		9538	9938	1907.6	26.40	20.40
	3	9262	9662	1852.4	27.40	22.20
		9400	9800	1880.0	27.38	22.09
		9538	9938	1907.6	27.30	21.99
	4	9262	9662	1852.4	26.26	20.50
		9400	9800	1880.0	26.33	20.47
		9538	9938	1907.6	26.40	20.40
	5	9262	9662	1852.4	26.95	22.96
		9400	9800	1880.0	26.67	22.89
		9538	9938	1907.6	26.55	22.80

Note 1: Asterisk (*) represents the worst case

Note 2: Maximum output power levels that are possible for all subtests reported.

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7.2.4. DUAL CARRIER HSDPA

DC-HSDPA (Rel 8, CAT 24)

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/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH _Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	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	Proces ses	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.		

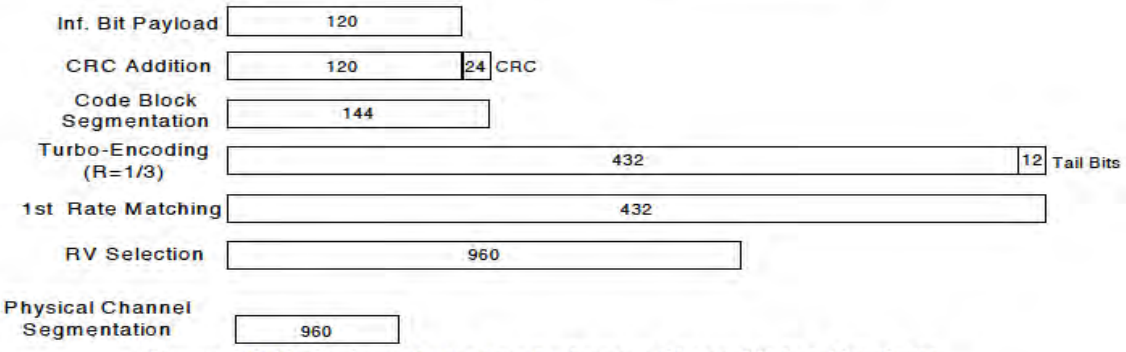

Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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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			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	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			
	Ahs = βhs/ βc	30/15			

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RESULT

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS850 (Band V)	1	4132	4357	826.4	27.09	23.48
		4180	4405	836.0	27.00	23.50
		4230	4455	846.0	27.00	23.50
	2*	4132	4357	826.4	**27.15**	23.50
		4180	4405	836.0	27.10	23.50
		4230	4455	846.0	27.10	23.47
	3	4132	4357	826.4	27.06	23.04
		4180	4405	836.0	26.90	23.04
		4230	4455	846.0	27.02	23.02
	4	4132	4357	826.4	26.90	23.02
		4180	4405	836.0	26.80	23.03
		4230	4455	846.0	27.00	23.01
UMTS1900 (Band II)	1	9262	9662	1852.4	26.40	22.90
		9400	9800	1880.0	26.80	23.00
		9538	9938	1907.6	26.80	22.95
	2*	9262	9662	1852.4	26.56	23.00
		9400	9800	1880.0	**26.90**	22.90
		9538	9938	1907.6	26.74	22.90
	3	9262	9662	1852.4	26.70	22.65
		9400	9800	1880.0	26.72	22.70
		9538	9938	1907.6	26.80	22.60
	4	9262	9662	1852.4	26.68	22.60
		9400	9800	1880.0	26.75	22.65
		9538	9938	1907.6	26.70	22.63

Note 1: Asterisk (*) represents the worst case

Note 2: Maximum output power levels that are possible for all subtests reported.

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7.3. CDMA2000

7.3.1. 1xRTT

TEST PROCEDURE

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

Application	Rev, License
CDMA2000 Mobile Test	B.13.08, L

- Call Setup > Shift & Preset
- Cell Info > Cell Parameters > System ID (SID) > 18
  > Network ID (NID) > 65535
- Protocol Rev > 6 (IS-2000-0)
- Radio Config (RC) > Please see following table or details
- FCH Service Option (SO) Setup > Please see following table or details
- Traffic Data Rate > Full
- TDSO SCH Info > F-SCH Parameters > F-SCH Data Rate > 153.6 kbps
  > R-SCH Parameters > R-SCH Data Rate > 153.6 kbps
- Rvs Power Ctrl > Active bits
  - Rvs Power Ctrl > All Up bits (Maximum TxPout)

RESULT

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BC10, 1xRTT, CELL BAND

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)					
		Ch.476 / 817.9 MHz		Ch.526 / 819.15 MHz		Ch. 684 /823.1 MHz	
		Peak	Average	Peak	Average	Peak	Average
RC1	2 (Loopback)	28.18	24.41	28.55	24.48	28.14	24.49
	55 (Loopback)	28.60	24.42	28.42	24.46	28.23	**24.49**
RC2	9 (Loopback)	27.98	24.42	28.13	24.45	27.75	24.46
	55 (Loopback)	28.10	24.40	28.40	24.47	27.78	24.45
RC3	2 (Loopback)	27.43	24.40	27.67	24.45	27.35	24.43
	55 (Loopback)	27.40	24.40	27.86	24.46	27.63	24.45
	32 (+ F-SCH)	27.19	24.40	27.42	24.46	27.33	24.42
	32 (+ SCH)	27.17	24.39	27.25	24.45	27.23	24.44
RC4	2 (Loopback)	27.19	24.39	27.80	24.46	27.50	24.45
	55 (Loopback)	27.11	24.42	27.85	24.47	27.45	24.46
	32 (+ F-SCH)	27.24	24.40	27.80	24.48	27.55	24.45
	32 (+ SCH)	27.30	24.40	27.40	24.45	27.34	24.45
RC5	9 (Loopback)	27.10	24.40	27.60	24.47	27.31	24.45
	55 (Loopback)	27.37	24.43	27.80	24.45	27.60	24.47

BC0, 1xRTT CELL BAND

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)					
		Ch.1013/824.7 MHz		Ch384/836.52 MHz		Ch.777/848.31 MHz	
		Peak	Average	Peak	Average	Peak	Average
RC1	2 (Loopback)	28.15	24.50	28.35	24.40	28.18	24.40
	55 (Loopback)	28.31	**24.50**	28.09	24.47	28.10	24.45
RC2	9 (Loopback)	28.19	24.50	28.22	24.45	28.06	24.41
	55 (Loopback)	28.24	24.49	28.27	24.44	28.15	24.42
RC3	2 (Loopback)	27.88	24.48	28.07	24.42	27.78	24.42
	55 (Loopback)	27.80	24.46	28.12	24.42	27.76	24.45
	32 (+ F-SCH)	27.78	24.48	27.79	24.42	28.03	24.46
	32 (+ SCH)	27.77	24.47	27.99	24.41	27.66	24.46
RC4	2 (Loopback)	27.94	24.48	27.95	24.41	27.69	24.42
	55 (Loopback)	27.75	24.45	27.93	24.40	27.79	24.40
	32 (+ F-SCH)	28.01	24.47	27.81	24.40	27.66	24.43
	32 (+ SCH)	27.85	24.47	27.50	24.40	27.77	24.42
RC5	9 (Loopback)	27.94	24.48	27.98	24.41	27.75	24.44
	55 (Loopback)	27.85	24.46	28.10	24.42	27.87	24.41

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BC1, 1xRTT, PCS BAND

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)					
		Ch. 25 / 1851.25 MHz		Ch. 600 / 1880 MHz		Ch. 1175 / 1908.75 MHz	
		Peak	Average	Peak	Average	Peak	Average
RC1	2 (Loopback)	27.61	23.00	27.65	22.96	27.35	22.80
	55 (Loopback)	**27.75**	23.00	27.15	22.97	27.59	22.83
RC2	9 (Loopback)	27.62	23.00	27.67	22.96	27.35	22.80
	55 (Loopback)	27.45	22.98	27.39	22.95	27.50	22.81
RC3	2 (Loopback)	26.88	22.98	26.80	22.94	26.69	22.80
	55 (Loopback)	26.70	22.96	26.70	22.90	27.00	22.78
	32 (+ F-SCH)	26.75	22.96	26.70	22.92	26.55	22.79
	32 (+ SCH)	26.80	22.97	26.65	22.94	26.67	22.81
RC4	2 (Loopback)	26.80	22.95	26.56	22.94	26.80	22.80
	55 (Loopback)	27.00	22.97	26.80	22.94	26.85	22.80
	32 (+ F-SCH)	26.75	22.97	26.70	22.95	26.80	22.78
	32 (+ SCH)	26.80	22.97	26.54	22.94	26.75	22.80
RC5	9 (Loopback)	26.76	22.95	26.73	22.93	26.67	22.80
	55 (Loopback)	26.85	22.96	26.51	22.93	26.55	22.82

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7.3.2. 1xEV-DO Release 0

TEST PROCEDURE

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 Release 0 - RTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 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 > 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 > 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)

RESULTS

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BC10, EV-DO REV 0

Radio Configuration	Service Option	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
BC10	EVDO REV 0 (4096)	476	817.90	28.25	24.45
		526	819.15	28.30	**24.46**
		684	823.10	28.20	24.32

BC0, Cell Band

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
307.2 kbps (2 slot, QPSK)	153.6 kbps	1013	824.70	28.21	**24.44**
		384	836.52	27.95	24.30
		777	848.31	28.23	24.35

BC1, PCS Band

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	**28.00**	22.98
		600	1880.00	27.88	22.85
		1175	1908.75	27.70	22.80

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7.3.3. 1xEV-DO Rev. A

TEST PROCEDURE

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 Release 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 > 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 Release 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 > 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)

RESULTS

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BC10, EV-DO Rev A

Radio Configuration	Service Option	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
BC10	EVDO REV A (4096)	476	817.90	28.78	**24.46**
		526	819.15	28.74	24.45
		684	823.10	28.70	24.43

BC0, Cell Band

FETAP-Traffic Format	RETAP-Data Payload Size	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	1013	824.70	28.60	**24.50**
		384	836.52	28.51	24.46
		777	848.31	28.31	24.45

BC1, PCS Band

FETAP-Traffic Format	RETAP-Data Payload Size	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	**28.69**	23.00
		600	1880.00	28.52	22.96
		1175	1908.75	28.30	22.83

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7.3.4. 1xEV-DO Rev. B

TEST PROCEDURE

This procedure assumes the Rohde & Schwarz CMW 500 CDMA Rev. B Test Set has the following applications installed and with valid license.

Application	Rev, License
1xEV-DO Terminal Test	V.2.1.25

1xEV-DO Release B –

- CMW 500 Signal Generator > 1xEV-DO Taskbar Enable
- CMW 500 1xEV-DO Signaling Configuration Window >
- 1xEV-DO Signaling On Window:
  Under Access Network Control:
  Band Class: BC0: US Cellular
  RF Channel: 31
  1xEV-DP Power: -70dBm
  Release B

- 1xEV-DO Signaling Configuration Window

  Under RF Frequency Band / Channel: Enter Ch. Frequency
  - Under Carrier Configuration: RF Frequency

    For Two Carriers: Low Channel (1013)

	RF Channel	RF Channel Offset
Carrier [0]	31	0
Carrier [1]	1013	982

  - Under Carrier Configuration: RF Pilot

	Carrier Sector	Active on AN	Assigned to AT
Pilot [0]	C0/S0	□	□
	CA/S1	□	□

    For Three Carriers: Low Channel (1013)

	RF Channel	RF Channel Offset
Carrier [0]	72	0
Carrier [1]	31	-41
Carrier [2]	1013	941

  - Under Carrier Configuration: RF Pilot

	Carrier Sector	Active on AN	Assigned to AT
Pilot [0]	C0/S0	□	□
Pilot [1]	C1/S1	□	□
Pilot [2]	C2/S2	□	□

- Rvs Power Ctrl > All Up bits (to get the maximum power)

RESULTS

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EVDO REV B

Two Carrier Mini Separation

	MODE	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
Rev B	CDMA	1013+31	824.70+825.93	27.66	21.40
		384+425	836.52+837.75	27.75	**21.50**
		736+777	847.08+848.31	27.59	21.35

Two Carrier Max Separation

	Mode	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
Rev B	CDMA	1013+156	824.70+829.68	28.96	21.5
		384+550	836.52+841.50	29.00	**21.50**
		611+777	843.33+848.31	28.87	21.47

Three Carrier Min Separation

	Mode	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
Rev B	CDMA	1013+31+72	824.70+825.93+827.16	27.67	21.00
		384+425+466	836.52+837.75+838.98	27.70	**20.90**
		695+736+777	845.85+847.08+848.31	27.80	21.00

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7.4. LTE BAND 5

Output power for LTE Band 5 (1.4MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Peak Power (dBm)	Average
824.7	20407	QPSK	1.4	1	0	29.00	**24.00**
				1	5	28.60	24.00
				3	2	29.00	23.92
				6	0	28.6	23.00
		16-QAM		1	0	28.90	23.00
				1	5	28.90	22.98
				3	2	29.00	23.30
				6	0	29.00	22.30
836.5	20525	QPSK		1	0	29.12	24.00
				1	5	29.10	24.00
				3	2	29.00	23.95
				6	0	28.70	22.90
		16-QAM		1	0	28.80	**23.04**
				1	5	29.88	23.00
				3	2	28.60	22.90
				6	0	29.30	22.10
848.3	20643	QPSK		1	0	28.90	24.00
				1	5	28.70	24.00
				3	2	28.70	23.70
				6	0	28.30	22.90
		16-QAM		1	0	28.03	22.97
				1	5	28.39	22.80
				3	2	28.93	23.15
				6	0	28.90	22.20

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Output power for LTE Band 5 (3 MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)	Average
825.5	20415	QPSK	3.0	1	0	28.61	**24.00**
				1	14	28.56	23.97
				8	4	28.54	23.20
				15	0	28.83	23.18
		16-QAM		1	0	28.74	**23.10**
				1	14	28.74	22.94
				8	4	28.86	22.72
				15	0	28.56	22.44
836.5	20525	QPSK		1	0	28.30	24.00
				1	14	28.23	24.00
				8	4	29.00	23.17
				15	0	29.10	23.11
		16-QAM		1	0	29.03	22.97
				1	14	28.91	23.00
				8	4	29.05	22.46
				15	0	29.00	22.35
847.5	20635	QPSK		1	0	28.02	23.84
				1	14	28.02	23.80
				8	4	28.85	23.14
				15	0	28.81	22.98
		16-QAM		1	0	28.50	22.70
				1	14	28.54	22.70
				8	4	28.70	22.50
				15	0	28.52	22.06

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Output power for LTE Band 5 (5 MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Peak Power (dBm)	Average
826.5	20425	QPSK	5.0	1	0	28.92	**24.00**
				1	24	29.25	24.00
				12	6	28.77	23.17
				25	0	29.00	23.08
		16-QAM		1	0	28.99	23.00
				1	24	29.18	23.00
				12	6	29.07	22.07
				25	0	29.00	22.10
836.5	20525	QPSK		1	0	28.94	24.00
				1	24	28.64	24.00
				12	6	28.60	23.17
				25	0	28.99	23.12
		16-QAM		1	0	29.11	22.80
				1	24	28.63	23.00
				12	6	28.69	22.04
				25	0	28.80	22.00
846.5	20625	QPSK		1	0	29.01	24.00
				1	24	29.28	24.00
				12	6	28.74	23.17
				25	0	29.19	23.11
		16-QAM		1	0	29.00	**23.00**
				1	24	29.24	22.95
				12	6	29.21	22.06
				25	0	28.96	22.09

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Output power for LTE Band 5 (10 MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)	Average
829	20405	QPSK	10.0	1	0	28.24	**24.00**
				1	49	28.46	23.97
				25	12	29.08	23.05
				50	0	29.13	23.06
		16-QAM		1	0	28.90	**23.05**
				1	49	28.71	22.80
				25	12	29.33	22.17
				50	0	29.50	22.15
836.5	20525	QPSK		1	0	28.36	24.00
				1	49	28.29	23.98
				25	12	28.82	23.09
				50	0	28.92	23.01
		16-QAM		1	0	28.87	23.02
				1	49	28.71	22.87
				25	12	29.09	22.15
				50	0	29.11	22.24
844	20600	QPSK		1	0	28.51	24.00
				1	49	28.50	23.98
				25	12	28.66	23.11
				50	0	28.76	23.00
		16-QAM		1	0	28.85	23.01
				1	49	28.54	22.80
				25	12	28.52	22.26
				50	0	28.70	22.01

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7.5. LTE BAND 13

Output power for LTE Band 13 (5 MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)	Average
779.5	23205	QPSK	5	1	0	27.63	**24.00**
				1	24	28.10	23.99
				12	6	2.7.60	23.10
				25	0	28.00	22.88
		16-QAM		1	0	27.70	**23.00**
				1	24	28.10	22.92
				12	6	27.70	21.93
				25	0	28.20	21.90
782	23230	QPSK		1	0	27.90	**24.00**
				1	24	28.15	24.00
				12	6	28.10	23.00
				25	0	28.50	23.00
		16-QAM		1	0	27.90	**23.00**
				1	24	28.20	22.95
				12	6	28.20	21.93
				25	0	28.46	22.00
784.5	23255	QPSK		1	0	28.20	**24.00**
				1	24	27.86	23.66
				12	6	28.00	22.85
				25	0	28.20	22.81
		16-QAM		1	0	28.30	**23.00**
				1	24	28.00	22.85
				12	6	28.20	21.71
				25	0	28.20	21.86

10MHz Bandwidth

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)	Average
782	23230	QPSK	10	1	0	27.30	**23.97**
				1	49	27.70	23.58
				25	12	28.10	22.99
				50	0	28.20	22.85
		16-QAM		1	0	27.65	**23.00**
				1	49	28.10	22.65
				25	12	28.00	22.05
				50	0	28.40	22..00

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7.6. LTE BAND 25

Output power for LTE Band 25 (1.4MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)	Average
1850.7	26047	QPSK	1.4	1	0	28.00	23.00
				1	5	27.99	23.00
				3	2	28.16	22.86
				6	0	**28.19**	22.00
		16-QAM		1	0	28.05	22.12
				1	5	28.06	22.37
				3	2	28.40	21.90
				6	0	**28.59**	21.23
1882.5	26365	QPSK		1	0	27.80	23.00
				1	5	27.95	23.00
				3	2	27.80	22.79
				6	0	28.00	21.78
		16-QAM		1	0	27.71	21.75.
				1	5	27.80	21.81
				3	2	28.00	22.06
				6	0	28.16	21.12
1914.3	26683	QPSK		1	0	27.55	22.60
				1	5	27.45	22.61
				3	2	27.40	22.63
				6	0	27.32	21.73
		16-QAM		1	0	27.45	22.00
				1	5	27.40	22.10
				3	2	27.70	21.96
				6	0	27.50	20.95

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Output power for LTE Band 25 (3.0MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)	Average
1851.5	26055	QPSK	3	1	0	27.70	23.00
				1	14	27.60	23.00
				8	4	27.65	22.10
				15	0	**28.00**	22.12
		16-QAM		1	0	28.00	22.00
				1	14	27.90	22.00
				8	4	27.70	21.80
				15	0	**28.10**	21.20
1882.5	26365	QPSK		1	0	27.30	22.88
				1	14	27.30	22.90
				8	4	27.80	21.93
				15	0	27.70	21.87
		16-QAM		1	0	27.60	21.62
				1	14	27.60	21.60
				8	4	28.00	21.35
				15	0	27.60	21.02
1913.5	26675	QPSK		1	0	27.80	22.80
				1	14	27.30	22.73
				8	4	27.40	21.91
				15	0	27.40	21.86
		16-QAM		1	0	27.80	21.99
				1	14	27.00	21.50
				8	4	27.60	21.00
				15	0	27.50	20.96

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Output power for LTE Band 25 (5.0MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)	Average
1852.5	26065	QPSK	5	1	0	28.00	23.00
				1	24	27.96	23.00
				12	6	27.90	22.17
				25	0	**28.05**	22.20
		16-QAM		1	0	28.00	22.00
				1	24	28.00	22.00
				12	6	28.02	21.10
				25	0	**28.20**	21.10
1882.5	26365	QPSK		1	0	27.81	22.98
				1	24	27.77	22.94
				12	6	27.55	21.89
				25	0	28.00	21.90
		16-QAM		1	0	27.73	22.00
				1	24	27.73	21.92
				12	6	27.16	20.83
				25	0	27.93	21.00
1912.5	26665	QPSK		1	0	27.70	22.95
				1	24	27.10	22.90
				12	6	27.30	21.80
				25	0	27.70	21.94
		16-QAM		1	0	27.80	21.80
				1	24	27.30	21.74
				12	6	27.60	20.73
				25	0	27.60	20.99

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Output power for LTE Band 25 (10.0MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)	Average
1855	26090	QPSK	10	1	0	27.60	23.00
				1	49	27.60	23.00
				25	12	27.80	22.20
				50	0	**28.00**	22.05
		16-QAM		1	0	27.90	22.00
				1	49	28.00	22.00
				25	12	28.20	21.20
				50	0	**28.20**	21.11
1882.5	26365	QPSK		1	0	27.50	23.00
				1	49	27.30	22.90
				25	12	27.60	21.96
				50	0	28.12	21.98
		16-QAM		1	0	27.70	22.00
				1	49	27.60	22.00
				25	12	28.10	21.02
				50	0	28.06	20.98
1910	26640	QPSK		1	0	27.20	22.96
				1	49	26.85	22.62
				25	12	27.95	21.87
				50	0	28.10	21.80
		16-QAM		1	0	27.60	22.00
				1	49	27.00	21.60
				25	12	27.60	20.92
				50	0	27.80	21.00

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Output power for LTE Band 25 (15.0MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)	Average
1857.5	26115	QPSK	15	1	0	27.46	22.94
				1	74	27.30	22.58
				36	18	27.84	22.06
				75	0	28.17	22.05
		16-QAM		1	0	28.04	22.00
				1	74	28.04	21.96
				36	18	28.03	21.10
				75	0	28.12	20.95
1882.5	26365	QPSK		1	0	27.80	23.00
				1	74	27.67	22.86
				36	18	27.80	22.00
				75	0	28.23	22.00
		16-QAM		1	0	27.72	22.10
				1	74	27.58	22.06
				36	18	27.28	20.87
				75	0	**28.90**	21.05
1907.5	26615	QPSK		1	0	27.47	22.92
				1	74	27.14	22.78
				36	18	27.54	21.91
				75	0	**28.33**	21.88
		16-QAM		1	0	27.70	22.00
				1	74	27.28	21.87
				36	18	27.34	21.97
				75	0	27.99	20.95

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Output power for LTE Band 25 (20.0MHz)

Freq. (MHz)	UL Channel	Modulation	BW (MHz)	RB Size	RB Offset	Max Peak Power (dBm)	Average
1860	26140	QPSK	20	1	0	28.00	23.00
				1	99	27.52	22.80
				50	24	28.00	22.00
				100	0	28.05	22.00
		16-QAM		1	0	28.00	22.00
				1	99	27.89	21.88
				50	24	28.00	21.09
				100	0	28.10	21.08
1882.5	26365	QPSK		1	0	27.75	22.90
				1	99	27.59	22.86
				50	24	28.05	22.00
				100	0	28.21	22.05
		16-QAM		1	0	27.77	22.00
				1	99	27.71	21.96
				50	24	28.00	21.00
				100	0	28.00	21.13
1905	26590	QPSK		1	0	27.57	22.91
				1	99	27.19	22.90
				50	24	27.80	21.85
				100	0	**28.31**	22.00
		16-QAM		1	0	27.80	22.02
				1	99	27.91	22.00
				50	24	27.65	20.72
				100	0	**28.00**	21.10

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8. CONDUCTED TEST RESULTS

8.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049
IC: RSS-132, 4.5; RSS-133, 6.5

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

MODES TESTED

- GPRS and EGPRS
- UMTS, REL 99 and HSUPA
- CDMA BC10, BC0, BC1
- LTE Band 5
- LTE Band 13
- LTE Band 25

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RESULTS

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
Cellular	GPRS	128	824.20	247.3840	310.617
		190	836.60	246.6911	319.243
		251	848.80	245.9014	316.675
	EGPRS	128	824.20	245.1414	312.492
		190	836.60	246.0567	308.743
		251	848.80	245.0703	312.533

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
PCS	GPRS	512	1850.2	242.1583	311.901
		661	1880.0	244.2665	309.076
		810	1909.8	243.6986	312.348
	EGPRS	512	1850.2	242.4835	306.170
		661	1880.0	241.4707	307.882
		810	1909.8	246.2706	306.114

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Cellular	UMTS, REL 99	4357	826.4	4.1845	4.574
		4405	836.0	4.1946	4.504
		4455	846.0	4.2027	4.551
	UMTS, HSUPA	4357	826.4	4.2033	4.655
		4405	836.0	4.2045	4.596
		4455	846.0	4.1885	4.536

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
PCS	UMTS, REL 99	9662	1852.4	4.1950	4.512
		9800	1880.0	4.1885	4.587
		9938	1907.6	4.1668	4.639
	UMTS, HSUPA	9662	1852.4	4.2136	4.581
		9800	1880.0	4.2065	4.568
		9938	1907.6	4.1923	4.564

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Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
BC10	1xRTT	476	817.9	1.2682	1.394
		526	819.15	1.2638	1.387
		684	823.1	1.2659	1.415
BC10	EVDO	476	817.9	1.2696	1.387
		526	819.15	1.2678	1.387
		684	823.1	1.2650	1.395

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
BC0, Cellular	1xRTT	1013	824.70	1.2649	1.367
		384	836.52	1.2614	1.422
		777	848.31	1.2640	1.389
	CDMA2000 1xEV-DO (Rev. A)	1013	824.70	1.2677	1.377
		384	836.52	1.2692	1.378
		777	848.31	1.2646	1.389

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
BC1, PCS	1xRTT	25	1851.25	1.2676	1.406
		600	1880.0	1.2608	1.386
		1175	1908.75	1.2691	1.401
	CDMA2000 1xEV-DO (Rev. A)	25	1851.25	1.2650	1.379
		600	1880.0	1.2697	1.380
		1175	1908.75	1.2694	1.406

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Band	Mode	Two Carriers Minimum Separation	f (MHz)	99% BW (MHz)	-26dB BW MHz)
Cellular	EVDO REV B	1013+31	824.70+825.93	2.4852	2.976
		384+425	836.52+837.75	2.4489	2.633
		736+777	847.08+848.31	2.4581	2.632

Band	Mode	Two Carriers Maximum Separation	f (MHz)	99% BW (MHz)	-26dB BW MHz)
Cellular	EVDO REV B	1013+156	824.70+829.68	6.3506	6.612
		384+550	836.52+841.50	6.3785	7.159
		611+777	843.33+848.31	6.3450	6.652

Band	Mode	Three Carriers Minimum Separation	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Cellular	EVDO REV B	1013+31+72	824.70+825.93+827.16	3.7557	5.221
		384+425+466	836.52+837.75+838.98	3.6910	4.307
		695+736+777	845.85+847.08+848.31	3.7214	4.365

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BAND 5

Band	Mode	RB/RB SIZE	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 5	1.4 MHz BAND QPSK	3/2	824.7	0.5673576	0.844060
		6/0		1.0829	1.224
	1.4 MHz BAND QPSK	3/2	836.5	0.5565596	0.850591
		6/0		1.0750	1.215
	1.4 MHz BAND QPSK	3/2	848.3	0.5656548	0.698472
		6/0		1.0776	1.149
	1.4 MHz BAND 16QAM	3/2	824.7	0.5649621	0.716399
		6/0		1.0810	1.267
	1.4 MHz BAND 16QAM	3/2	836.5	0.5556318	0.708776
		6/0		1.0844	1.207
	1.4 MHz BAND 16QAM	3/2	848.3	0.5534701	0.716302
		6/0		1.0771	1.198
	3.0 MHz BAND QPSK	8/4	825.5	1.4435	1.803
		15/0		2.6744	2.867
	3.0 MHz BAND QPSK	8/4	836.5	1.4169	1.590
		15/0		2.6954	2.812
	3.0 MHz BAND QPSK	8/4	847.5	1.4418	1.793
		15/0		2.6863	2.778
	3.0 MHz BAND 16QAM	8/4	825.5	1.4376	1.805
		15/0		2.6798	2.897
	3.0 MHz BAND 16QAM	8/4	836.5	1.4429	1.740
		15/0		2.6665	2.870
	3.0 MHz BAND 16QAM	8/4	847.5	1.4343	1.870
		15/0		2.6826	2.807
	5.0 MHz BAND QPSK	12/6	826.5	2.1693	2.417
		25/0		4.4343	4.798
	5.0 MHz BAND QPSK	12/6	836.5	2.1308	2.648
		25/0		4.3425	4.660
	5.0 MHz BAND QPSK	12/6	846.5	2.1245	2.633
		25/0		4.4748	4.669
	5.0 MHz BAND 16QAM	12/6	826.5	2.1771	2.651
		25/0		4.4749	4.659
	5.0 MHz BAND 16QAM	12/6	836.5	2.1562	2.756
		25/0		4.4402	4.706
	5.0 MHz BAND 16QAM	12/6	846.5	2.1341	2.520
		25/0		4.4323	4.654
	10.0 MHz AND QPSK	25/12	829	4.4407	5.304
		50/0		8.9877	9.460
	10.0 MHz AND QPSK	25/12	836.5	4.4447	5.265
		50/0		8.8355	9.281
	10.0 MHz AND QPSK	25/12	844	4.4808	5.514
		50/0		8.,9197	9.368
	10.0 MHz AND 16QAM	25/12	829	4.4855	5.517
		50/0		8.9876	9.628
	10.0 MHz AND 16QAM	25/12	836.5	4.4850	4.817
		50/0		8.9493	9.373
	10.0 MHz AND 16QAM	25/12	844	4.407	5.261
		50/0		8.9547	9.285

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BAND 13

Band	Mode	RB/RB SIZE	f (MHz)	99% BW (kHz)	-26dB BW (kHz)
LTE BAND 13	5 MHz BAND QPSK	12/6	779.5	2.1727	2.507
		25/0		4.4491	4.681
	5 MHz BAND QPSK	12/6	782.0	2.1755	2.399
		25/0		4.4205	4.672
	5 MHz BAND QPSK	12/6	784.5	2.1457	2.519
		25/0		4.4532	4.733
	5 MHz BAND 16QAM	12/6	779.5	2.1533	2.510
		25/0		4.4814	4.800
	5 MHz BAND 16QAM	12/6	782.0	2.1424	2.526
		25/0		4.4957	4.674
	5 MHz BAND 16QAM	12/6	784.5	2.1496	2.631
		25/0		4.5060	4.694
	10 MHz BAND QPSK	25/12	782.0	4.4384	5.295
		50/0		8.8306	9.269
	10 MHz BAND 16QAM	25/12		4.4975	4.774
		50/0		8.8913	9.256

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BAND 25

Band	Mode	RB/RB SIZE	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 25	1.4 MHz BAND QPSK	3/2	1850.7	0.5814172	0.909602
		6/0		1.0934	1.222
	1.4 MHz BAND QPSK	3/2	1882.5	0.5534169	0.852116
		6/0		1.0864	1.143
	1.4 MHz BAND QPSK	3/2	1914.3	0.5569348	0.754119
		6/0		1.0926	1.160
	1.4 MHz BAND 16QAM	3/2	1850.7	0.5588931	0.838331
		6/0		1.0874	1.195
	1.4 MHz BAND 16QAM	3/2	1882.5	0.5686482	0.803203
		6/0		1.0858	1.225
	1.4 MHz BAND 16QAM	3/2	1914.3	0.5572561	0.753004
		6/0		1.0700	1.213
	3.0 MHz BAND QPSK	8/4	1851.5	1.4406	1.824
		15/0		2.7138	2.799
	3.0 MHz BAND QPSK	8/4	1882.5	1.4251	1.736
		15/0		2.6749	2.870
	3.0 MHz BAND QPSK	8/4	1913.5	1.4436	1.887
		15/0		2.6705	2.895
	3.0 MHz BAND 16QAM	8/4	1851.5	1.4390	1.652
		15/0		2.6794	2.787
	3.0 MHz BAND 16QAM	8/4	1882.5	1.4434	1.727
		15/0		2.6918	2.898
	3.0 MHz BAND 16QAM	8/4	1913.5	1.4477	1.746
		15/0		2.6985	2.805
	5.0 MHz BAND QPSK	12/6	1852.5	2.1723	2.627
		25/0		4.4914	4.615
	5.0 MHz BAND QPSK	12/6	1882.5	2.1550	2.775
		25/0		4.4376	4.699
	5.0 MHz BAND QPSK	12/6	1912.5	2.1403	2.417
		25/0		4.4807	4.770
	5.0 MHz BAND 16QAM	12/6	1852.5	2.1613	2.652
		25/0		4.4795	4.665
	5.0 MHz BAND 16QAM	12/6	1882.5	2.1418	2.894
		25/0		4.4464	4.802
	5.0 MHz BAND 16QAM	12/6	1912.5	2.1778	2.410
		25/0		4.4781	4.665

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Band	Mode	RB/RB SIZE	f (MHz)	99% BW (kHz)	-26dB BW (kHz)
LTE BAND 25	10 MHz BAND QPSK	25/12	1855	4.4682	5.023
		50/0		9.0020	9.407
	10 MHz BAND QPSK	25/12	1882.5	4.4699	5.517
		50/0		8.9738	9.551
	10 MHz BAND QPSK	25/12	1910	4.4416	4.673
		50/0		8.9162	9.556
	10 MHz BAND 16QAM	25/12	1855	4.5046	5.048
		50/0		8.9642	9.354
	10 MHz BAND 16QAM	25/12	1882.5	4.4552	4.685
		50/0		8.9973	9.333
	10 MHz BAND 16QAM	25/12	1910	4.4306	5.269
		50/0		8.8938	9.262
	15 MHz BAND QPSK	36/18	1857.5	6.4446	7.159
		75/0		13.3372	13.976
	15 MHz BAND QPSK	36/18	1882.5	6.3817	7.185
		75/0		13.3897	14.096
	15 MHz BAND QPSK	36/18	1907.5	6.4676	6.804
		75/0		13.3933	13.980
	15 MHz BAND 16QAM	36/18	1857.5	6.4696	7.520
		75/0		13.3630	14.113
	15 MHz BAND 16QAM	36/18	1882.5	6.4851	7.893
		75/0		13.5726	14.095
	15 MHz BAND 16QAM	36/18	1907.5	6.4672	7.167
		75/0		13.3455	13.983
	20 MHz BAND QPSK	50/19	1860	8.9865	9.366
		100/0		17.8143	18.999
	20 MHz BAND QPSK	50/19	1882.5	9.0097	10.037
		100/0		17.8162	18.35
	20 MHz BAND QPSK	50/19	1905	8.9950	10.033
		100/0		17.7149	18.701
	20 MHz BAND 16QAM	50/19	1860	8.8914	9.392
		100/0		17.8411	18.795
	20 MHz BAND 16QAM	50/19	1882.5	8.9465	9.436
		100/0		17.7480	18.718
	20 MHz BAND 16QAM	50/19	1905	8.8286	9.233
		100/0		17.8191	19.153

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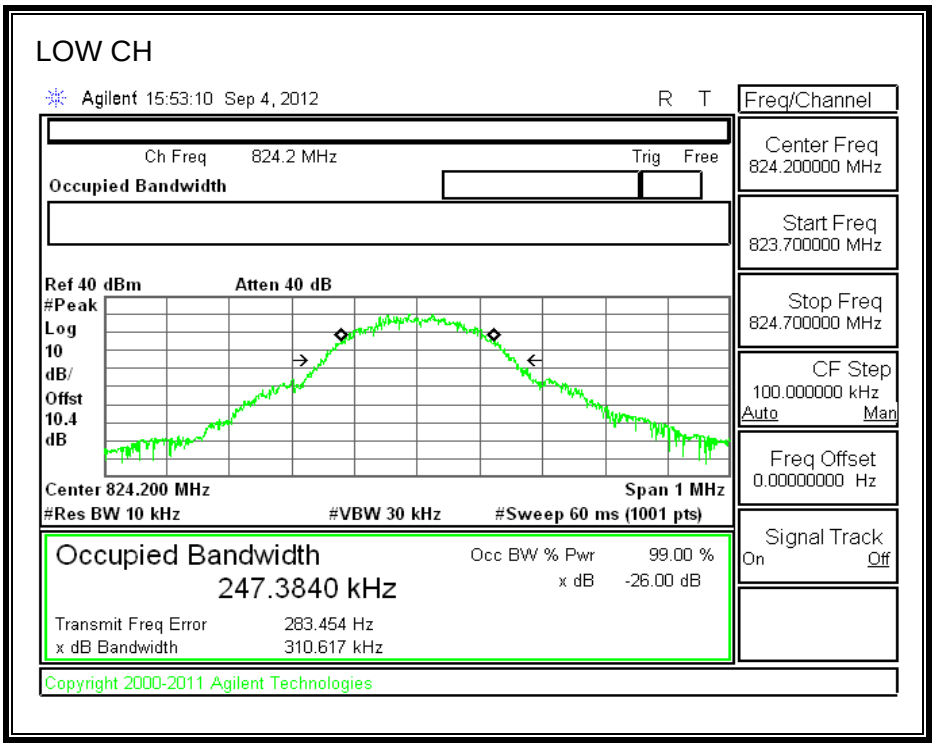
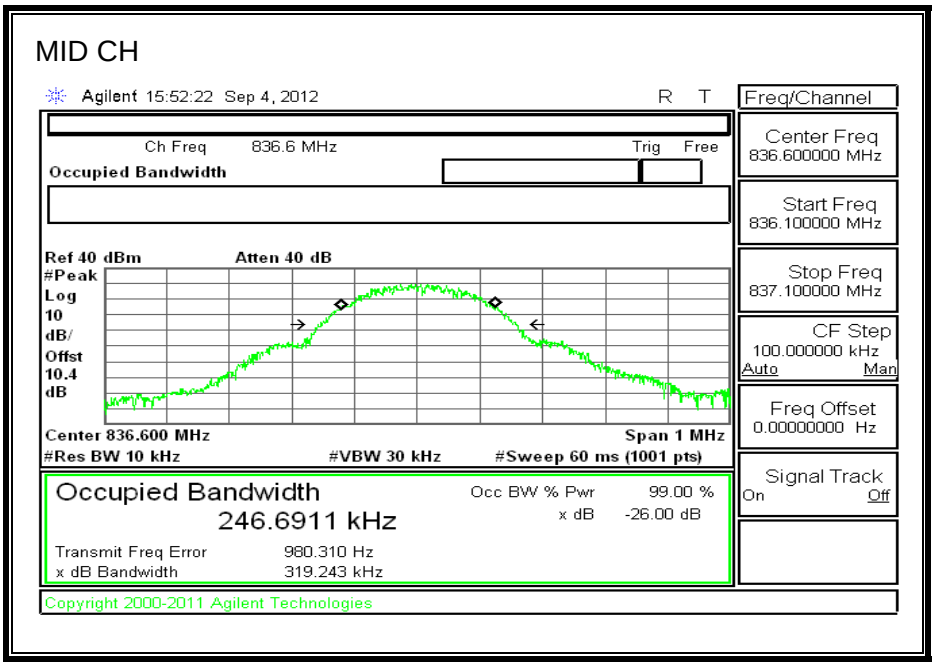
8.1.1. GSM

Cellular Band





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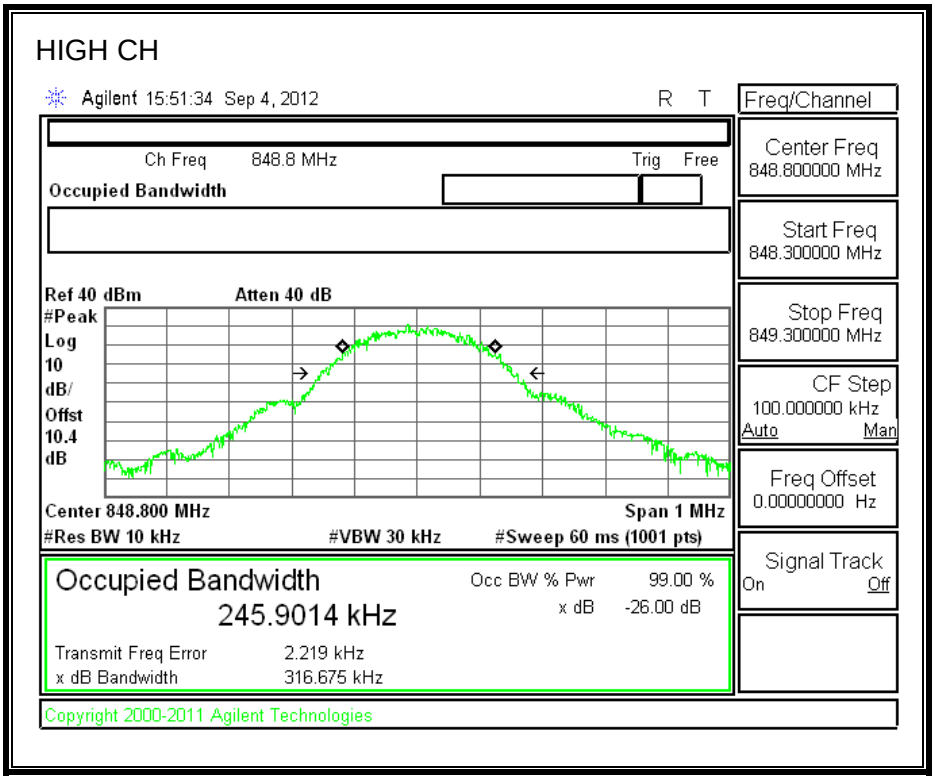
HIGH CH



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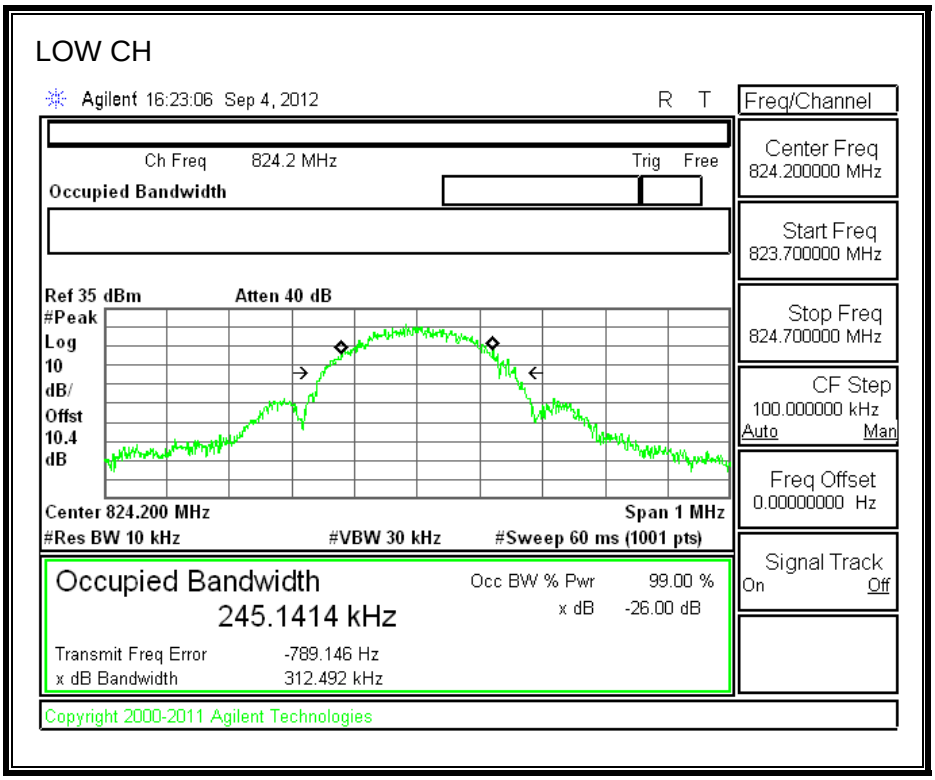
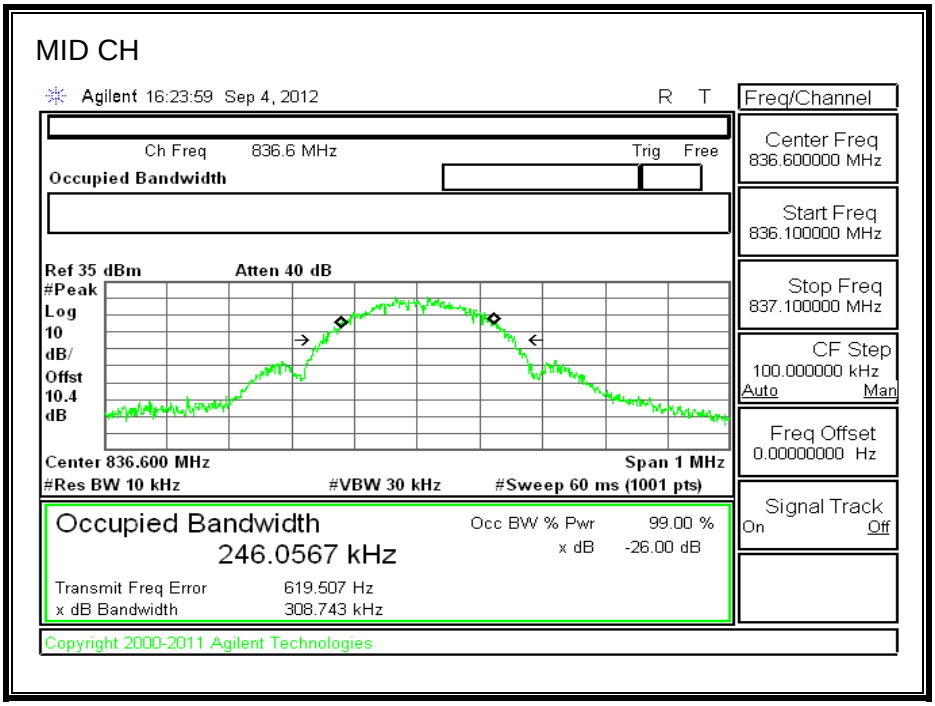
EGPRS Cellular Band





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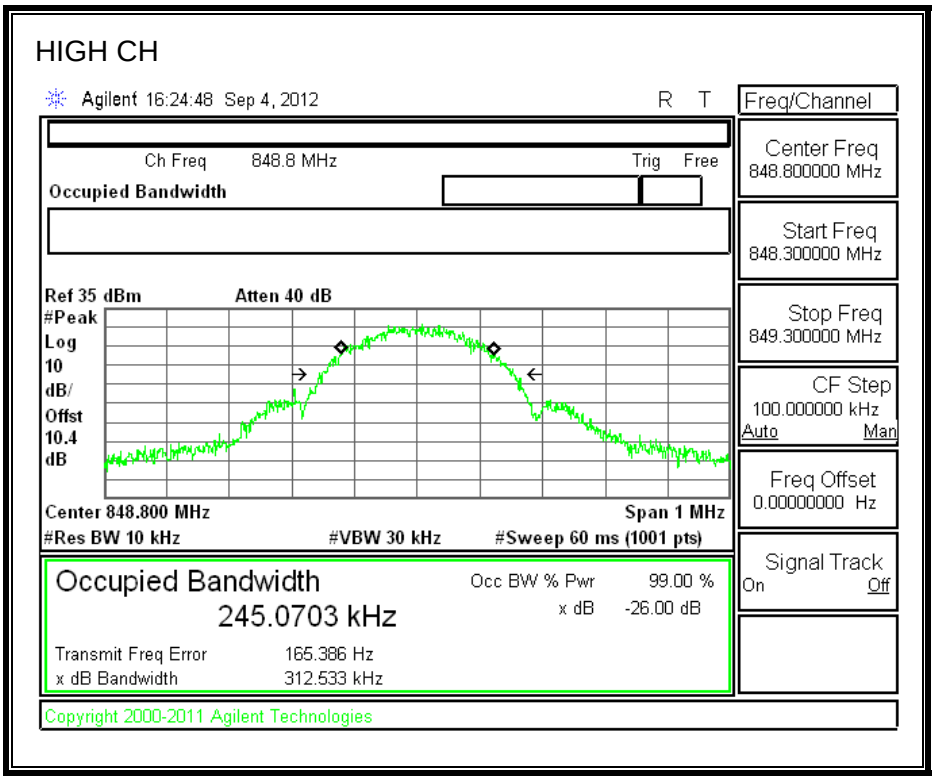

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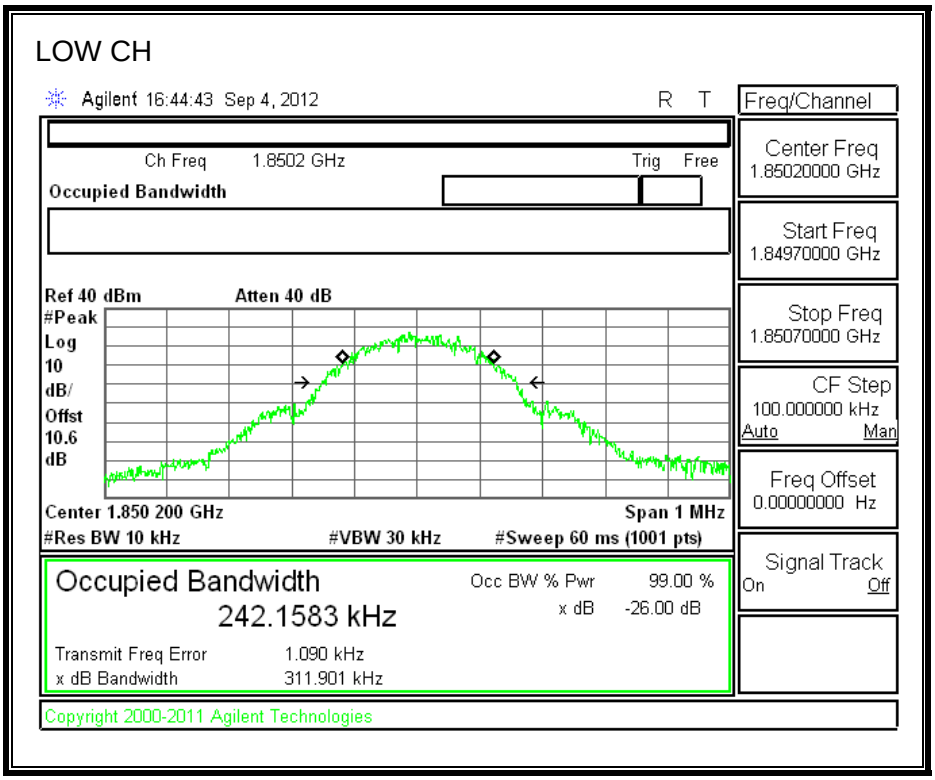
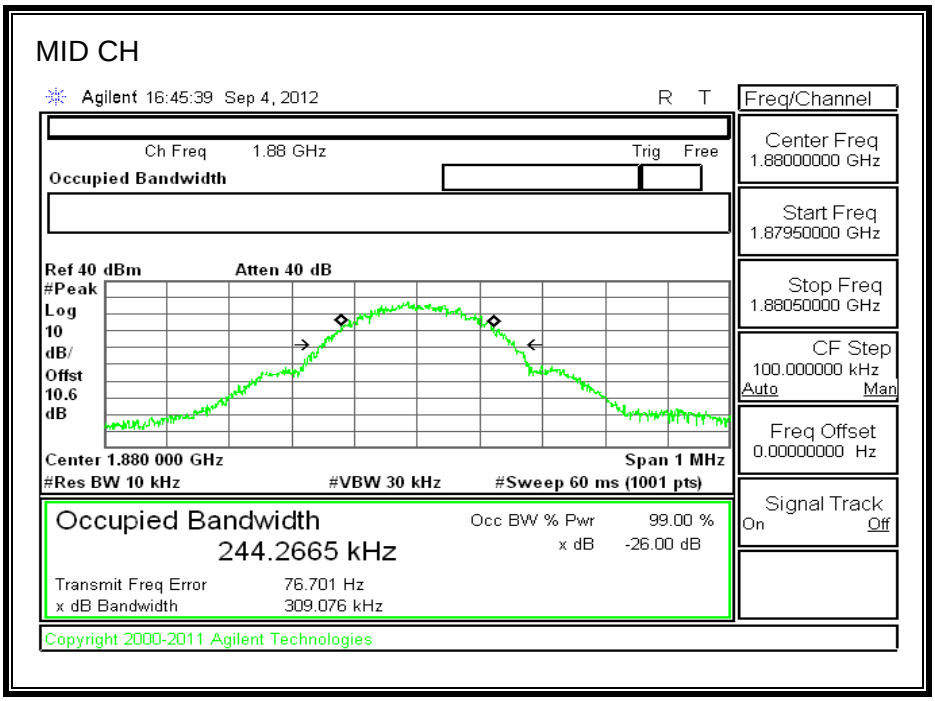
GPRS 1900 Mode (PCS Band)





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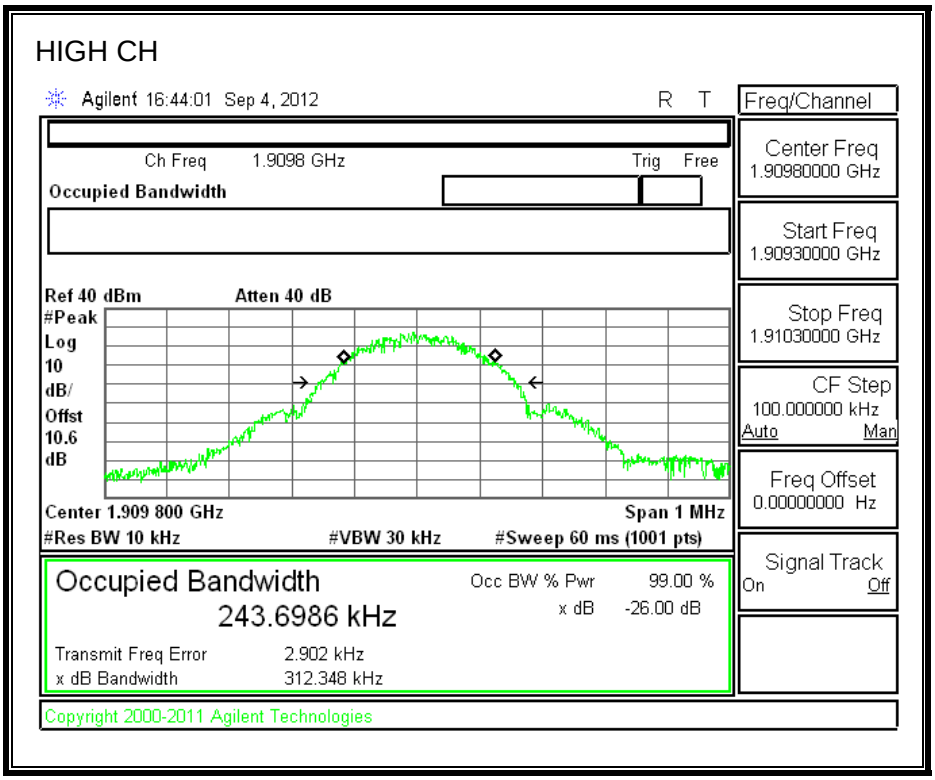
HIGH CH



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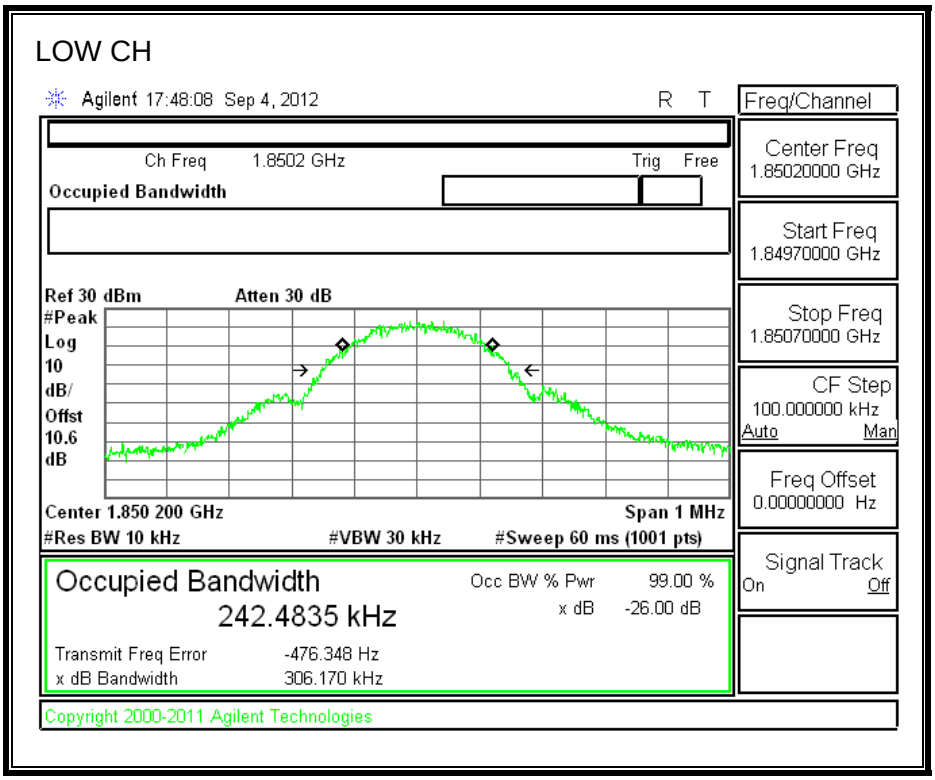
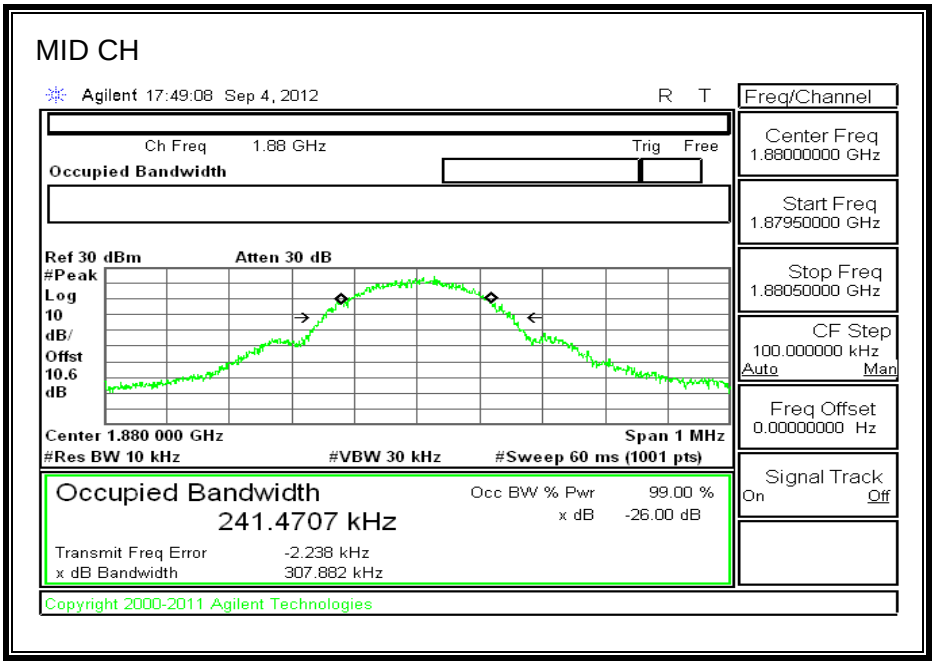
EGPRS 1900 Mode (PCS Band)

LOW CH



MID CH



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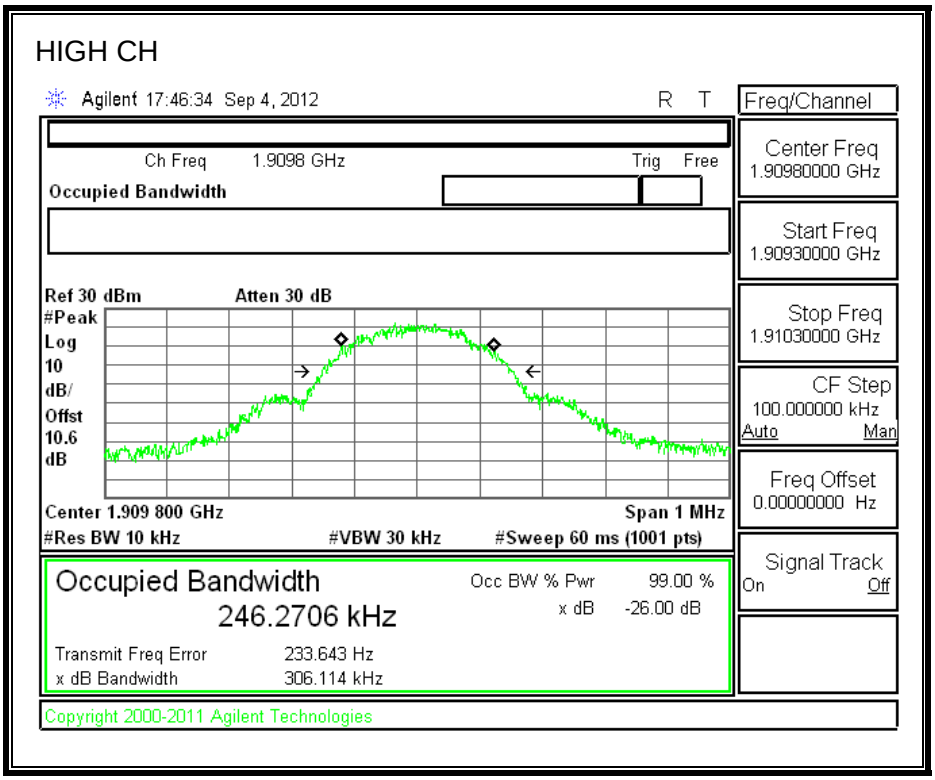
HIGH CH



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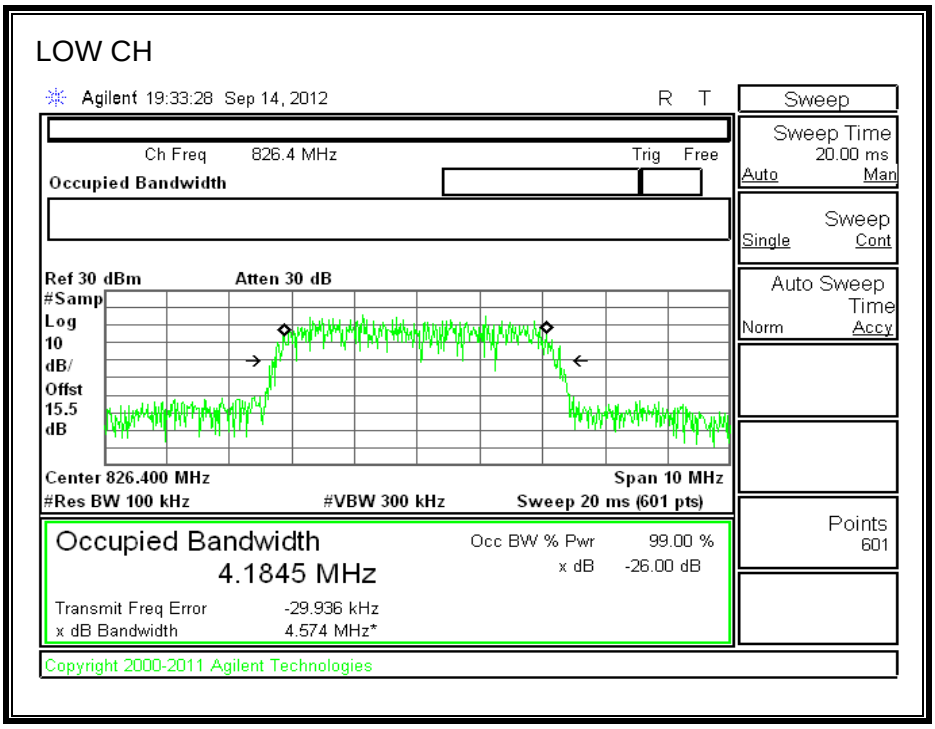
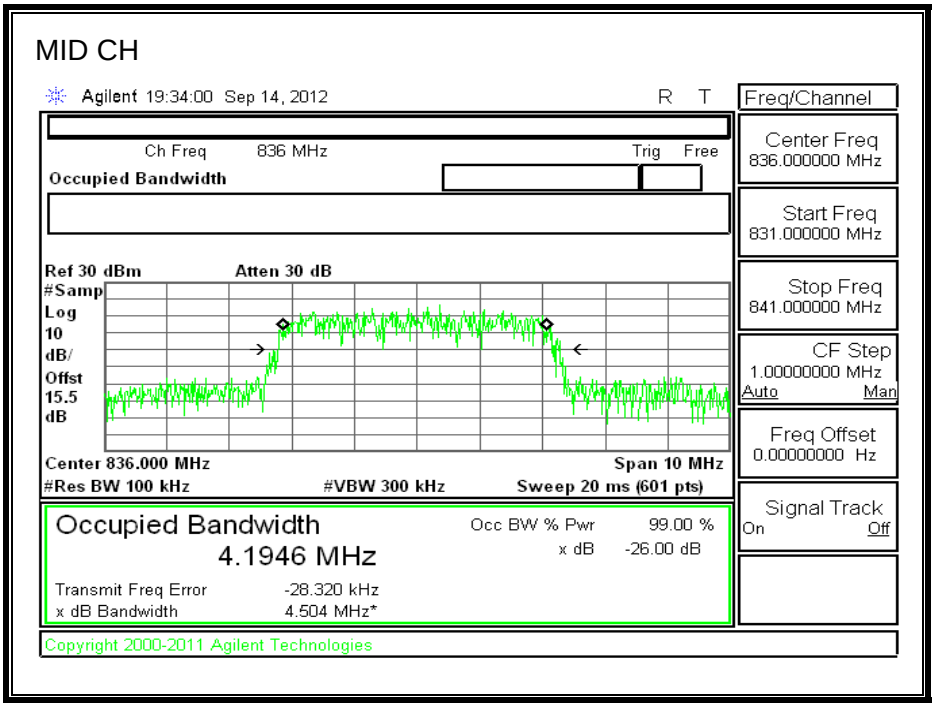
8.1.2. WCDMA

Rel 99 (Cellular Band)

LOW CH



MID CH



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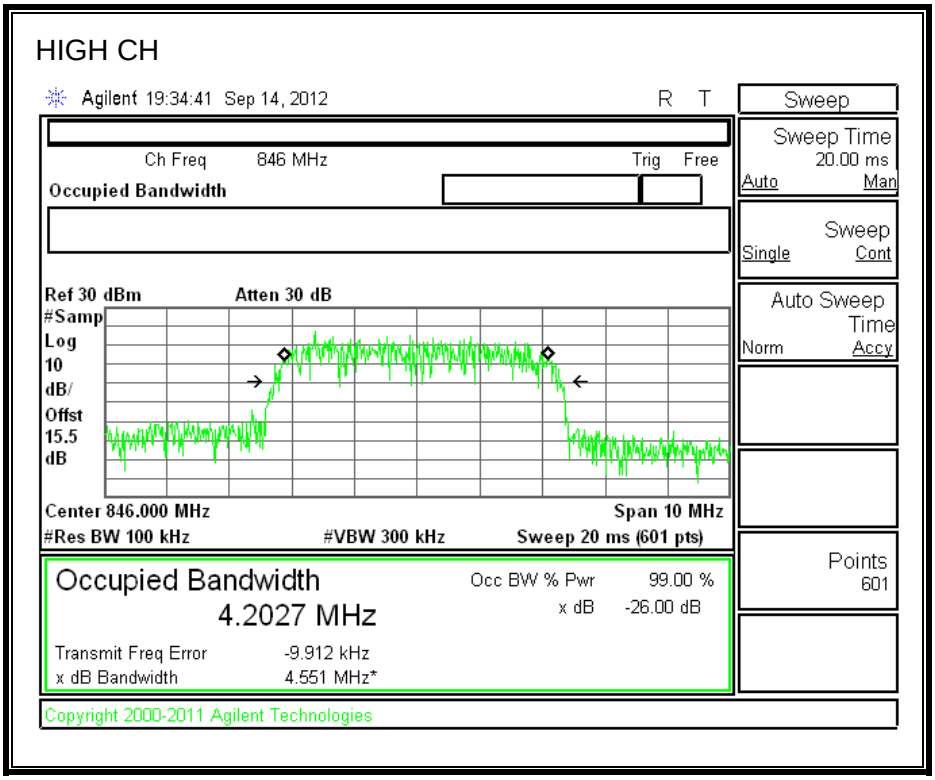
HIGH CH



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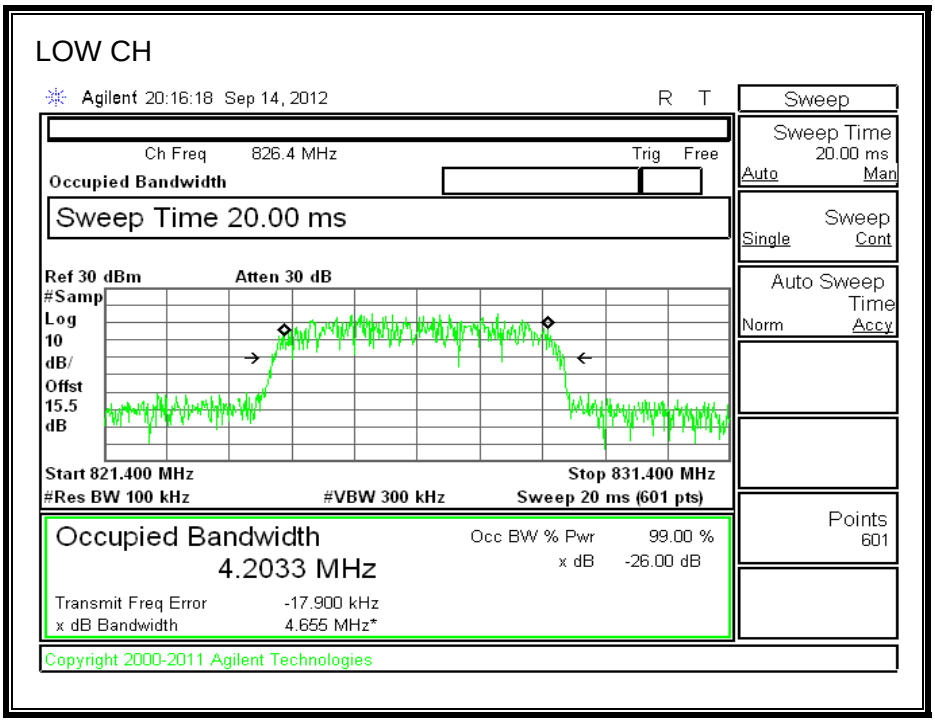
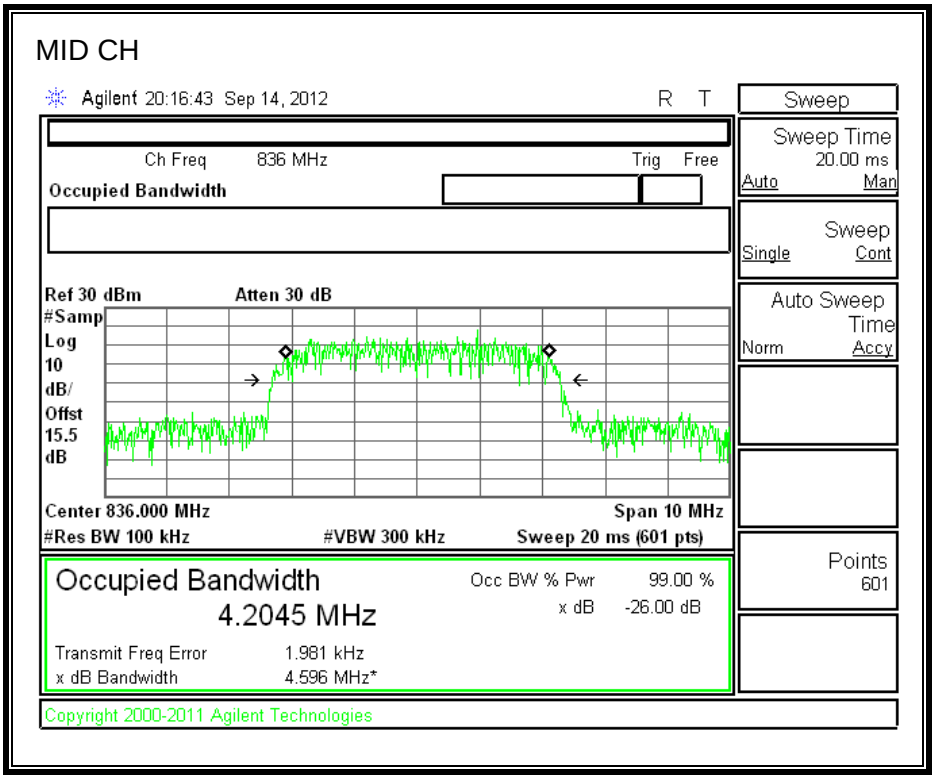
WCDMA HSUPA (Cellular Band)

LOW CH



MID CH



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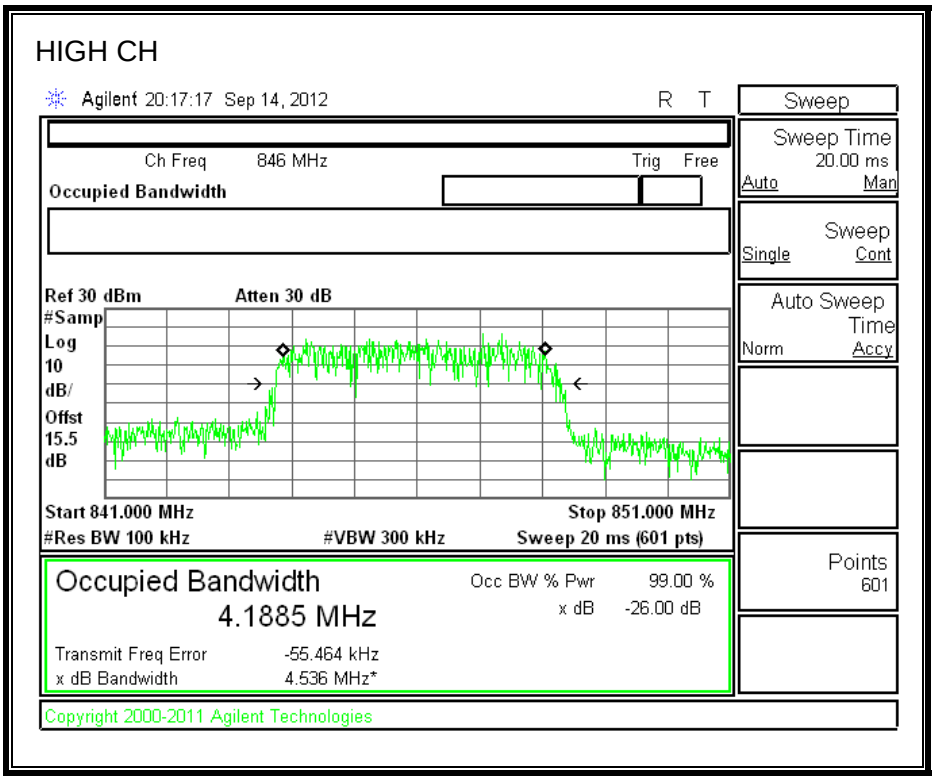
HIGH CH



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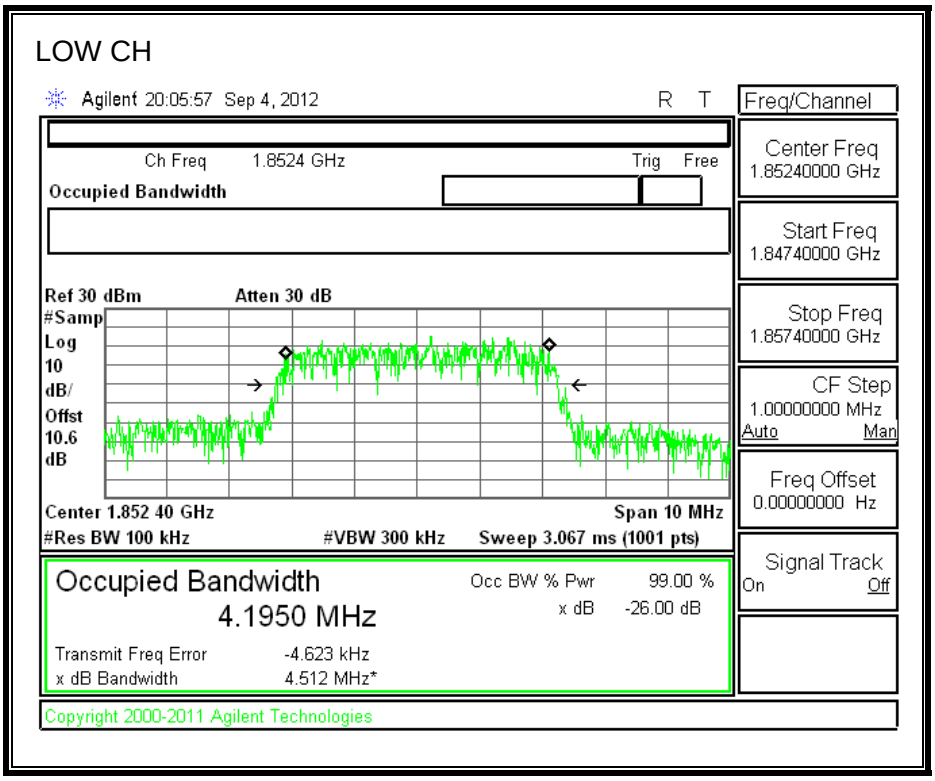
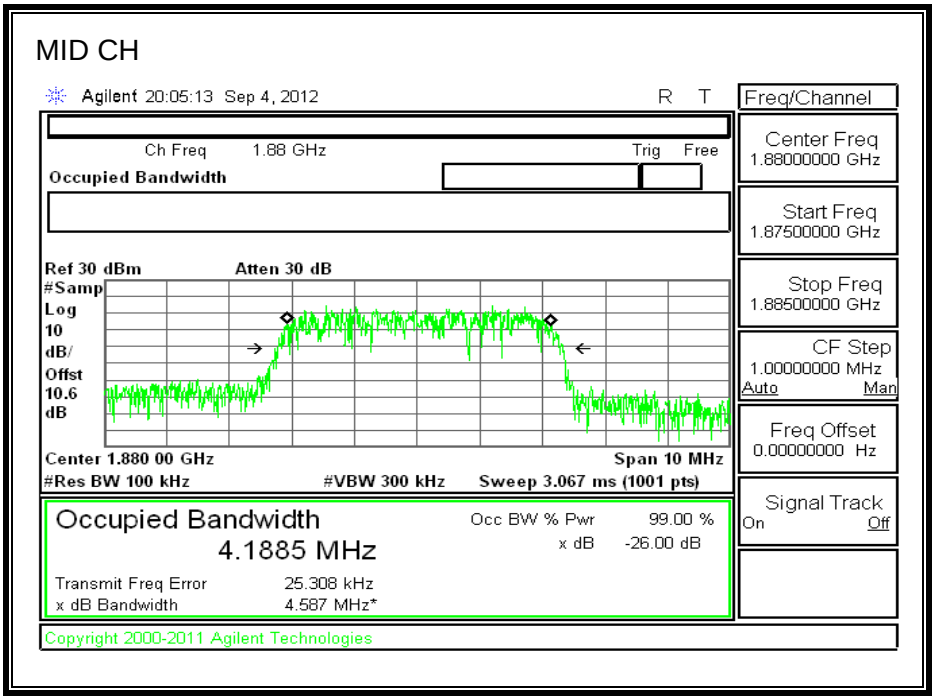
WCDMA REL 99 Mode (PCS Band)

LOW CH



MID CH



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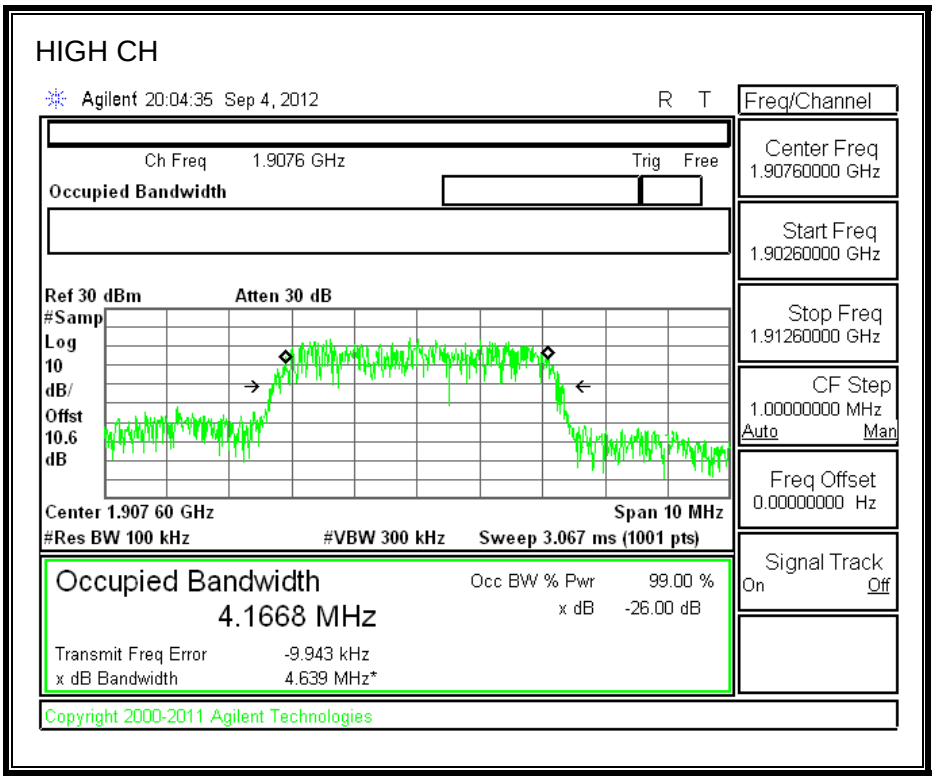

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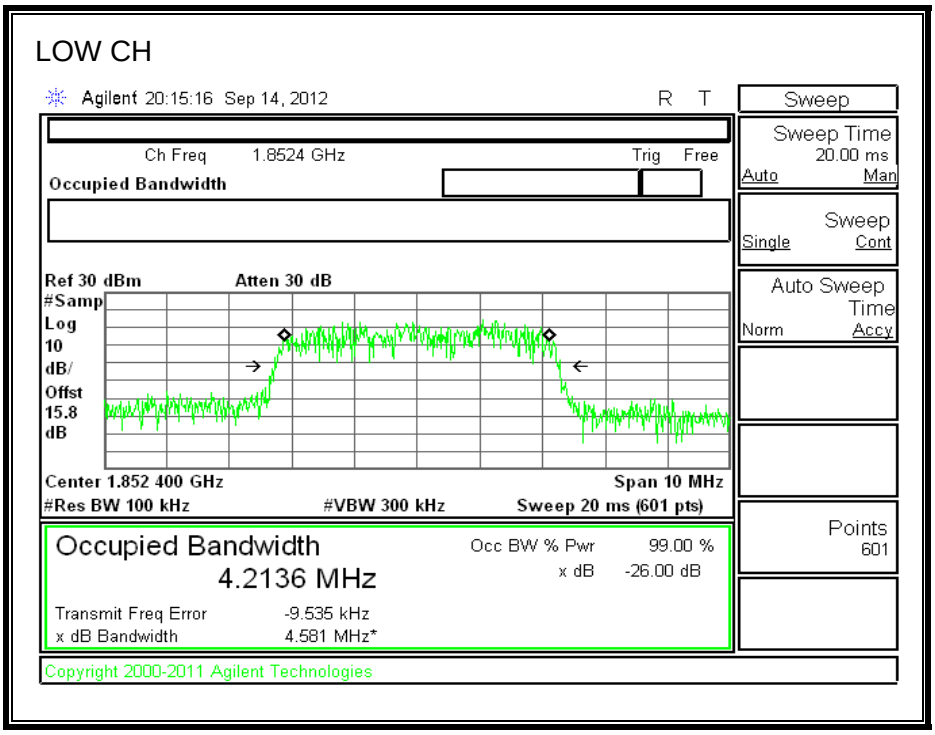
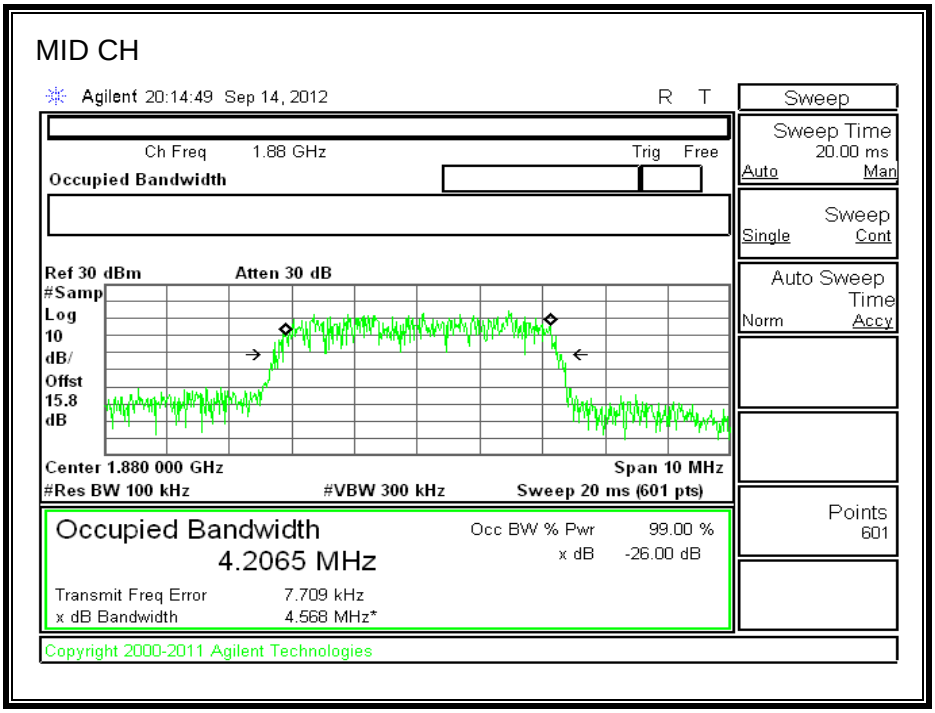
WCDMA HSUPA Mode (PCS Band)

LOW CH



MID CH



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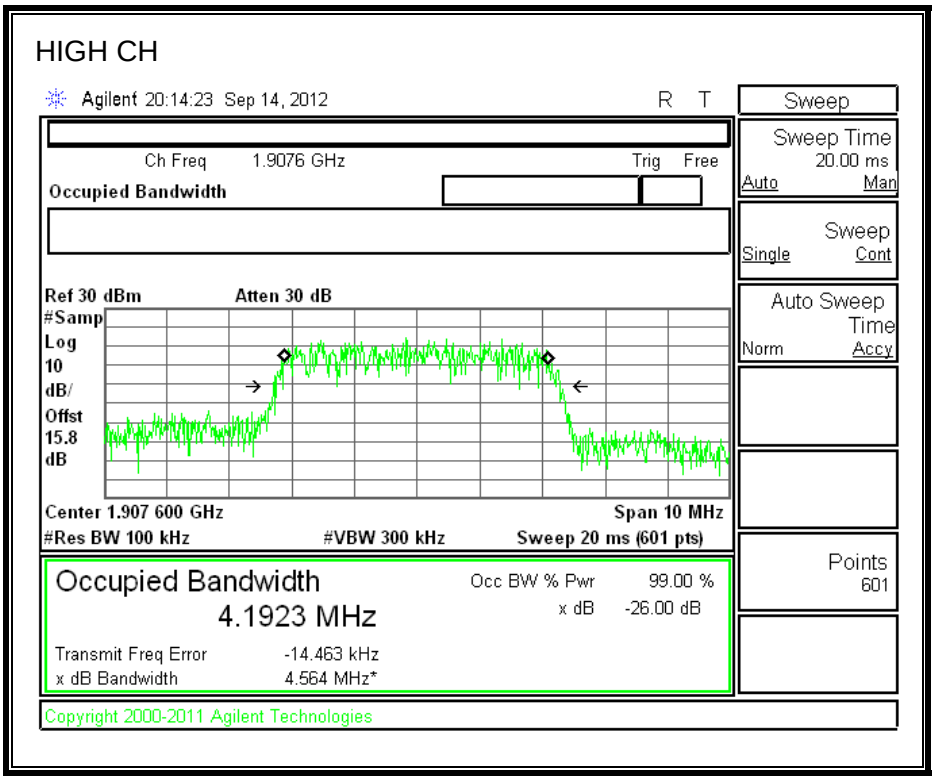
HIGH CH



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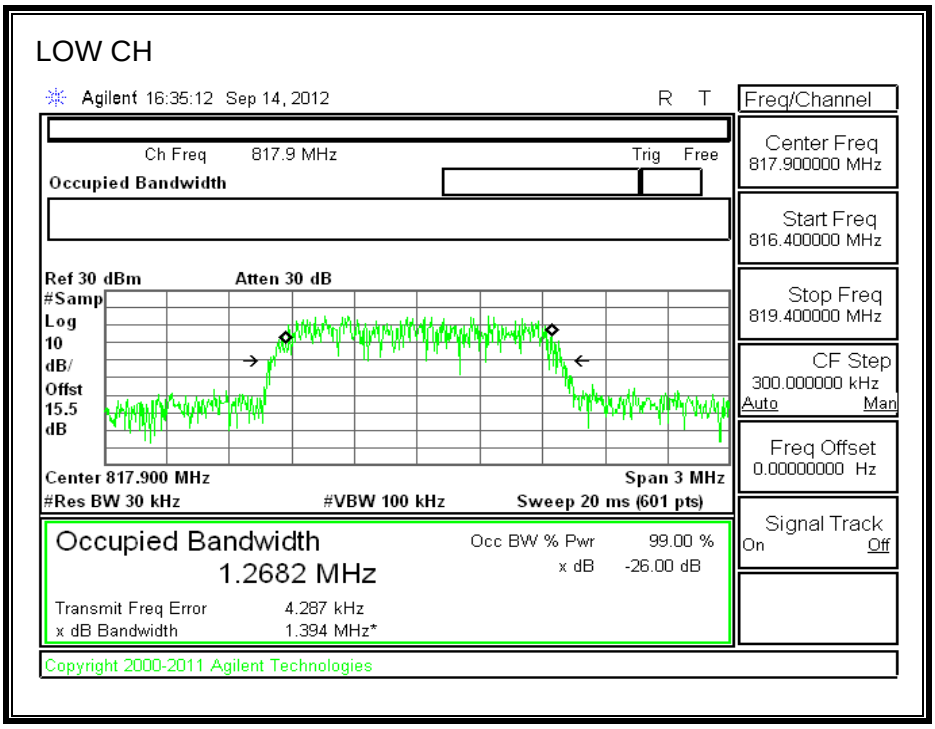
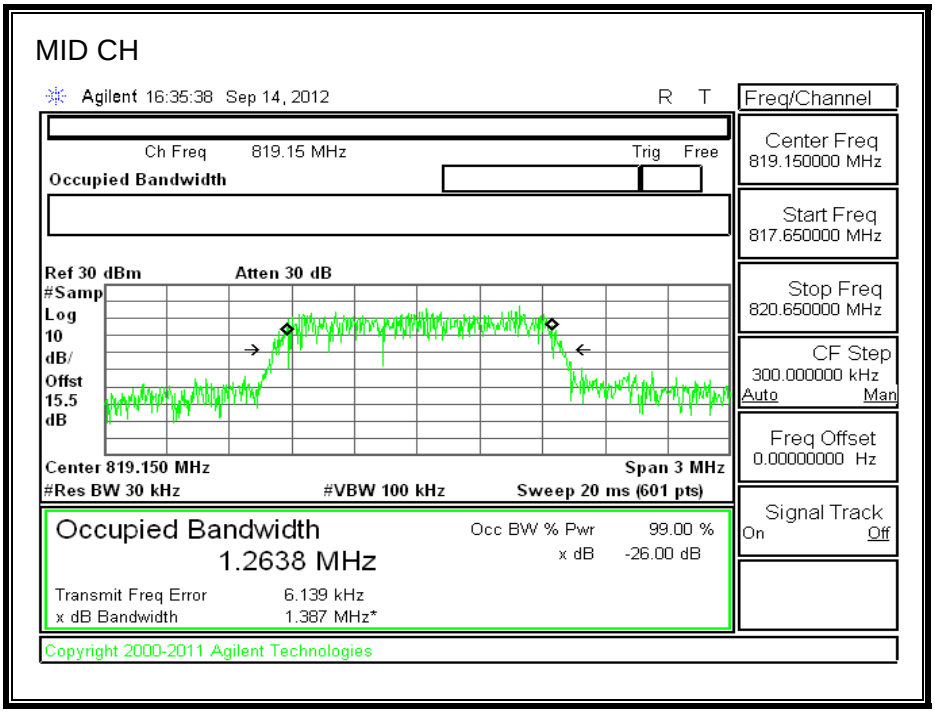
8.1.3. CDMA, BC10

1xRTT

LOW CH



MID CH



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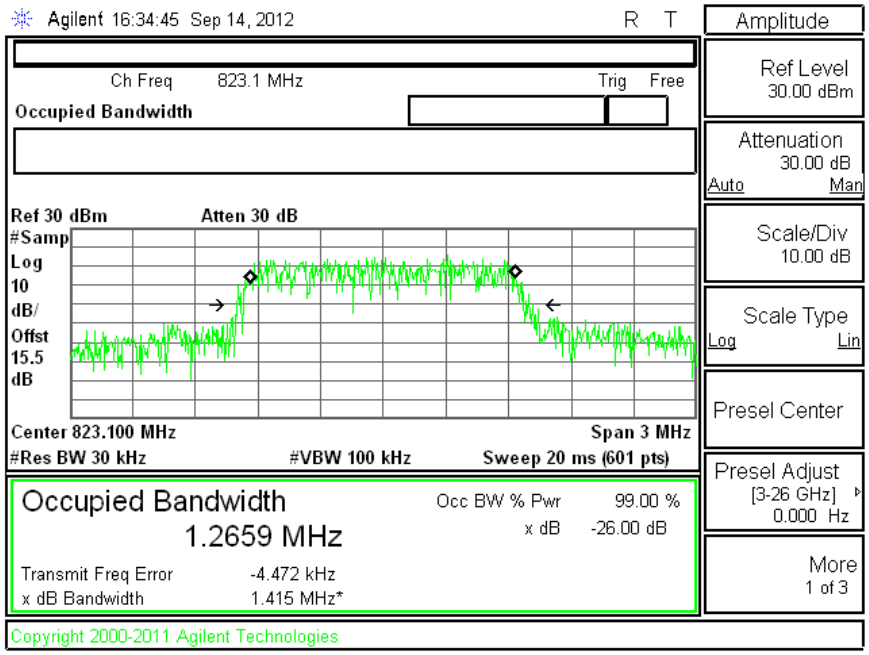
HIGH CH



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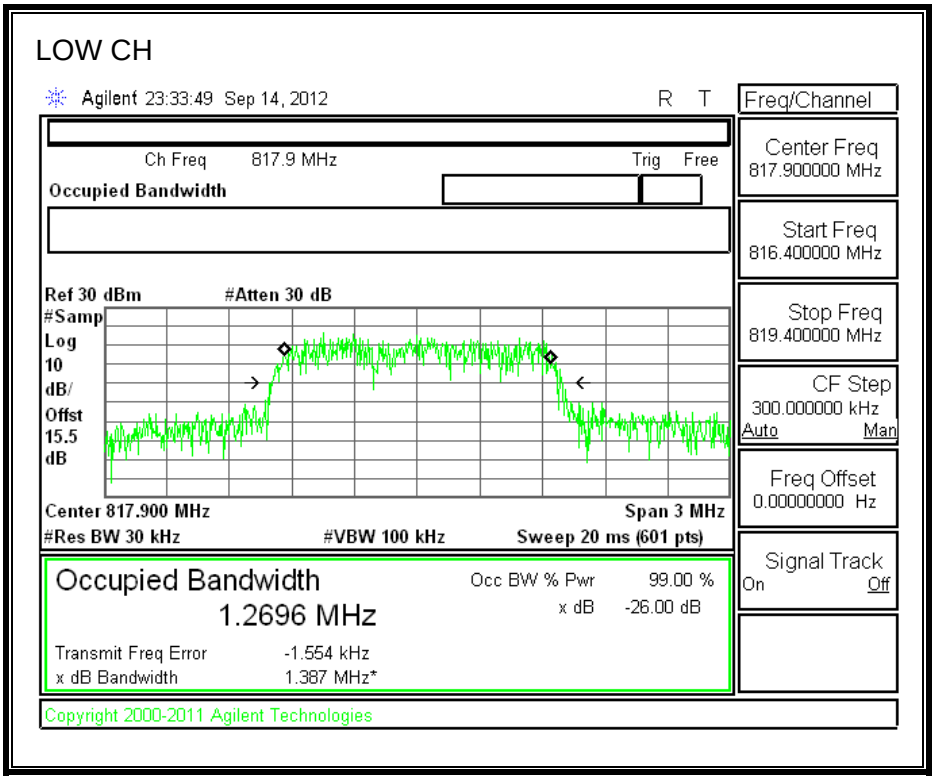
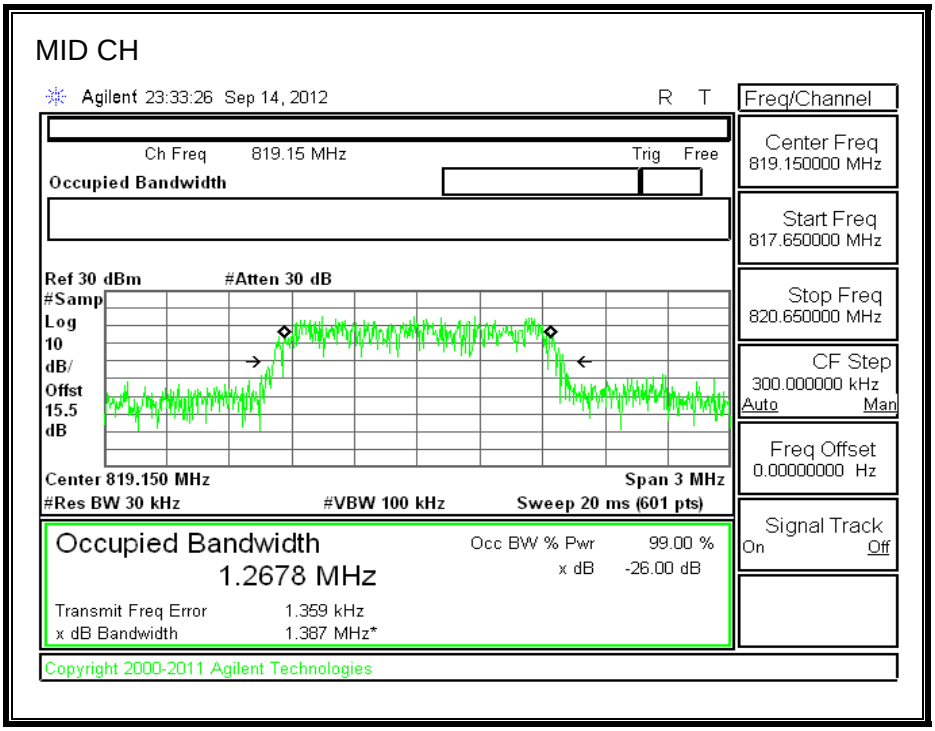
EVDO, BC10

LOW CH



MID CH



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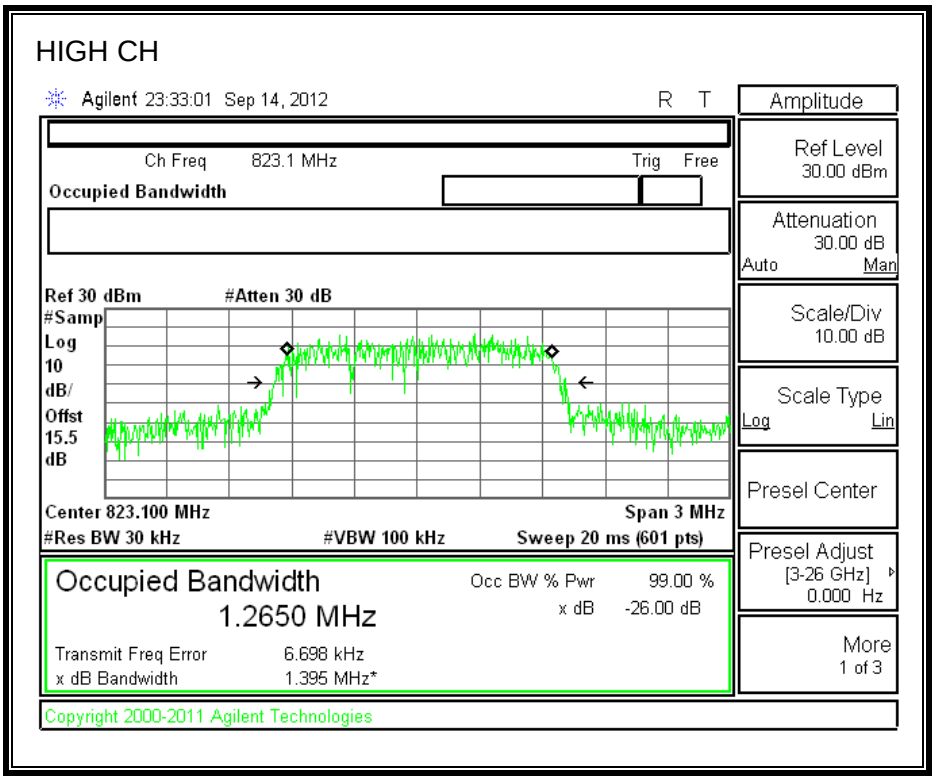
HIGH CH



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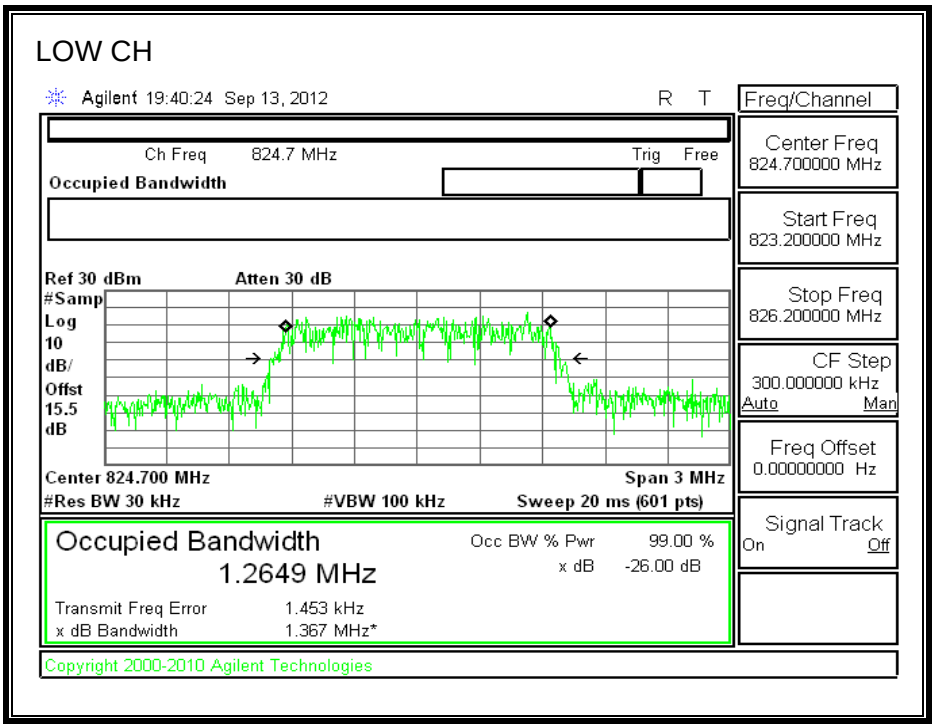
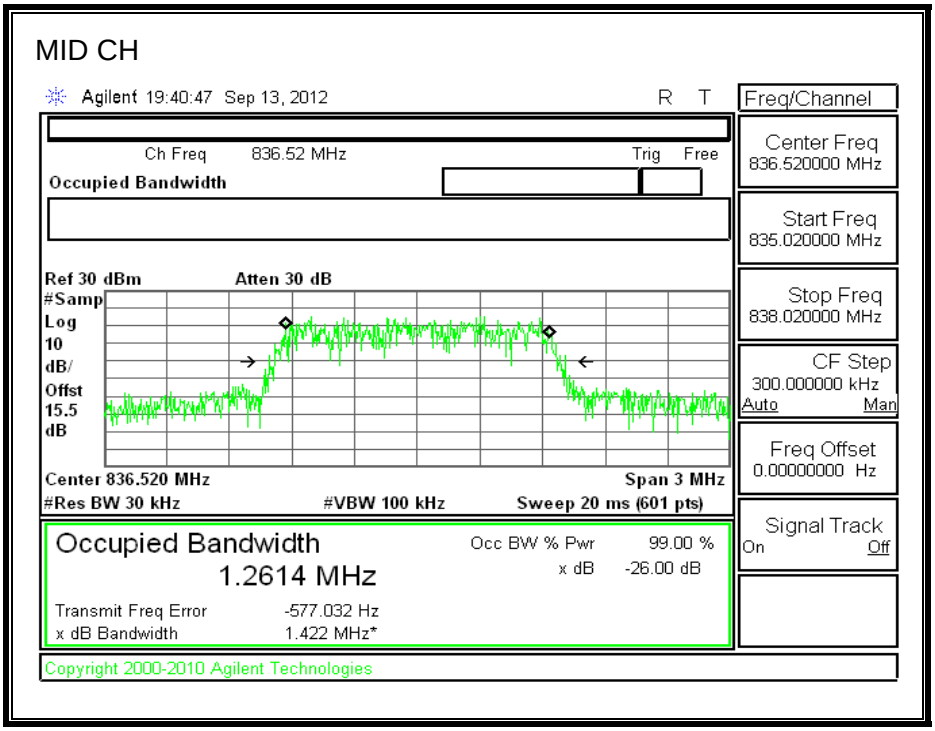
8.1.4. CDMA, BC0 and BC1

1xRTT Mode (Cellular Band)

LOW CH



MID CH



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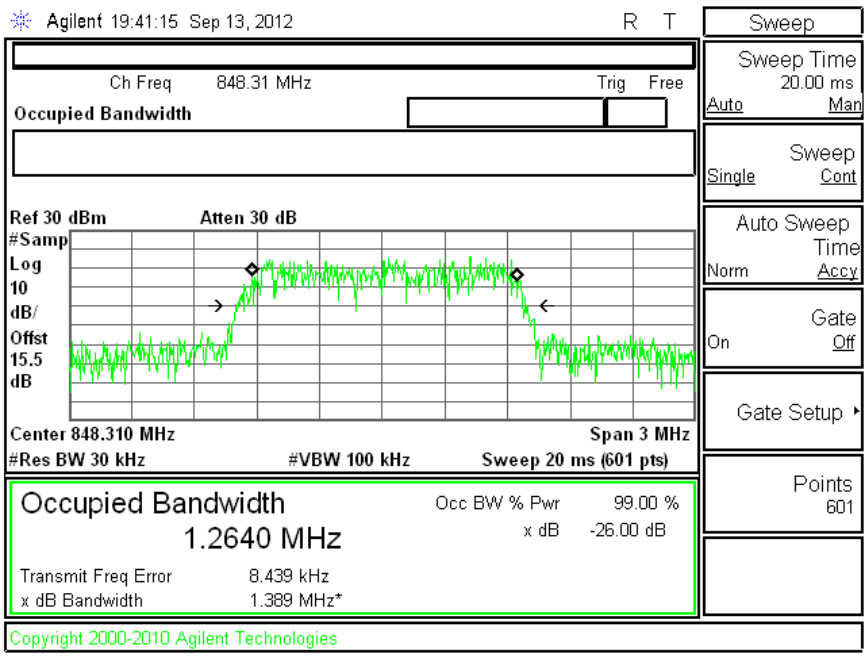
HIGH CH



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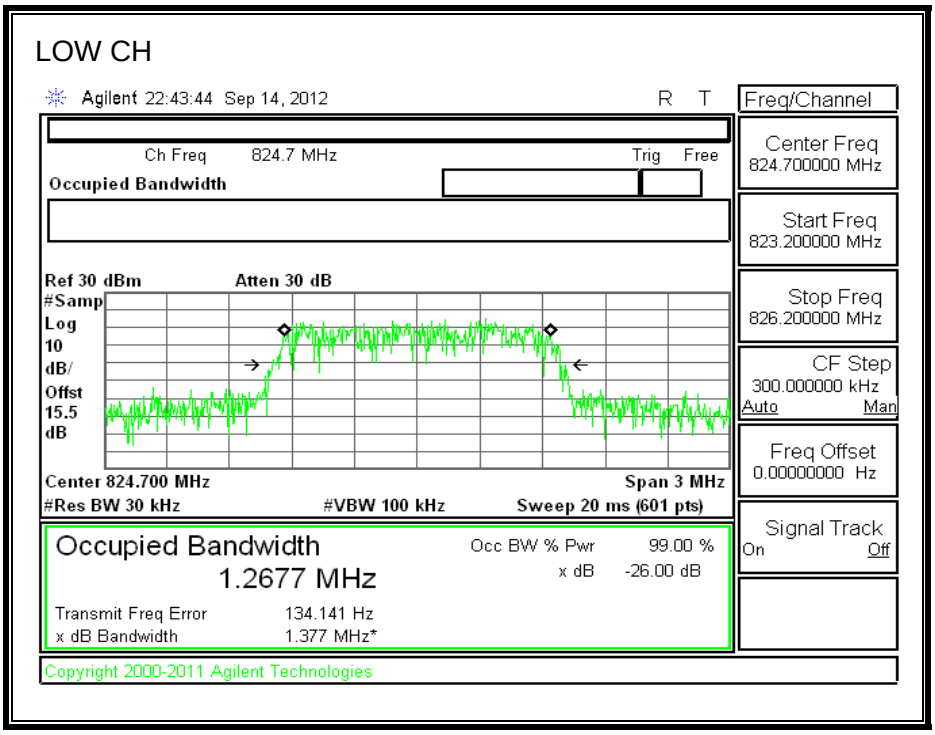
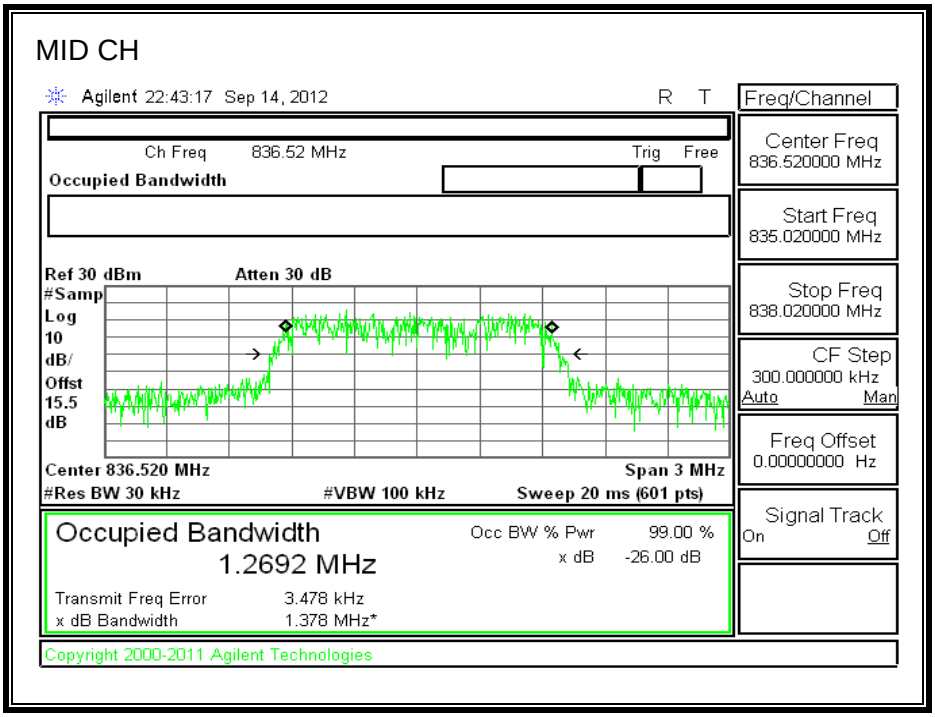
1xEV-DO Rev. A, Cellular Band

LOW CH



MID CH



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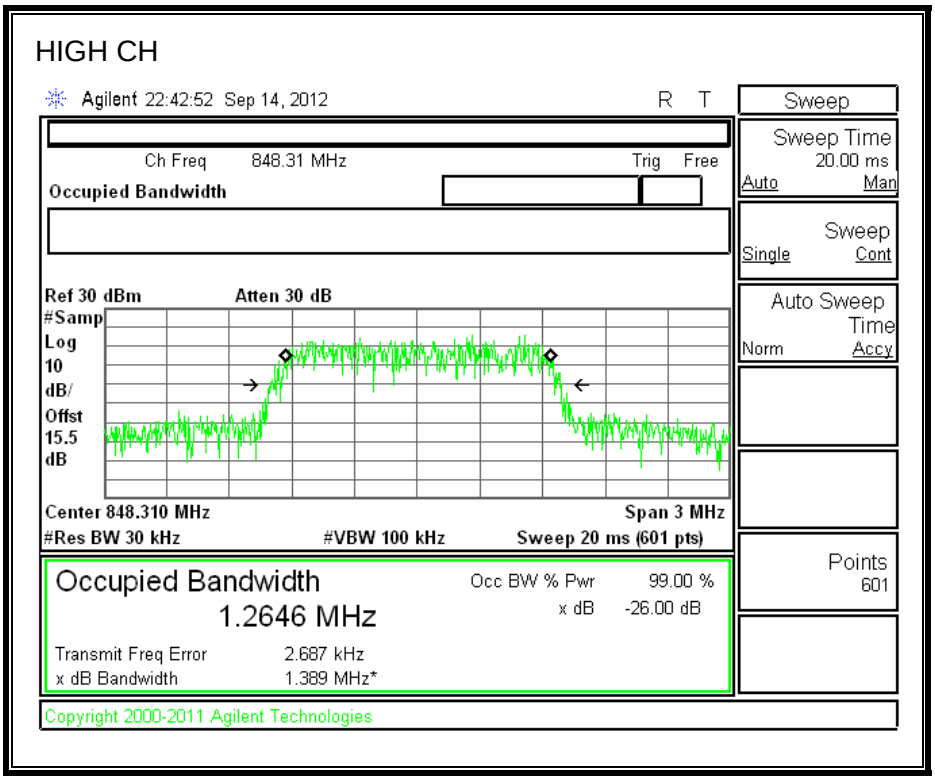

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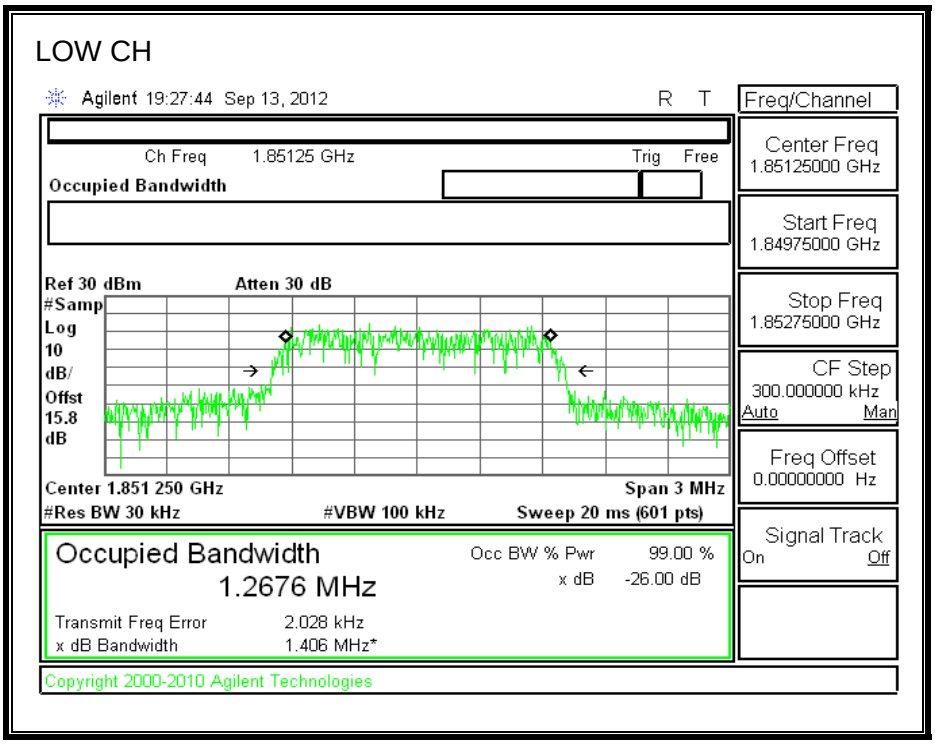
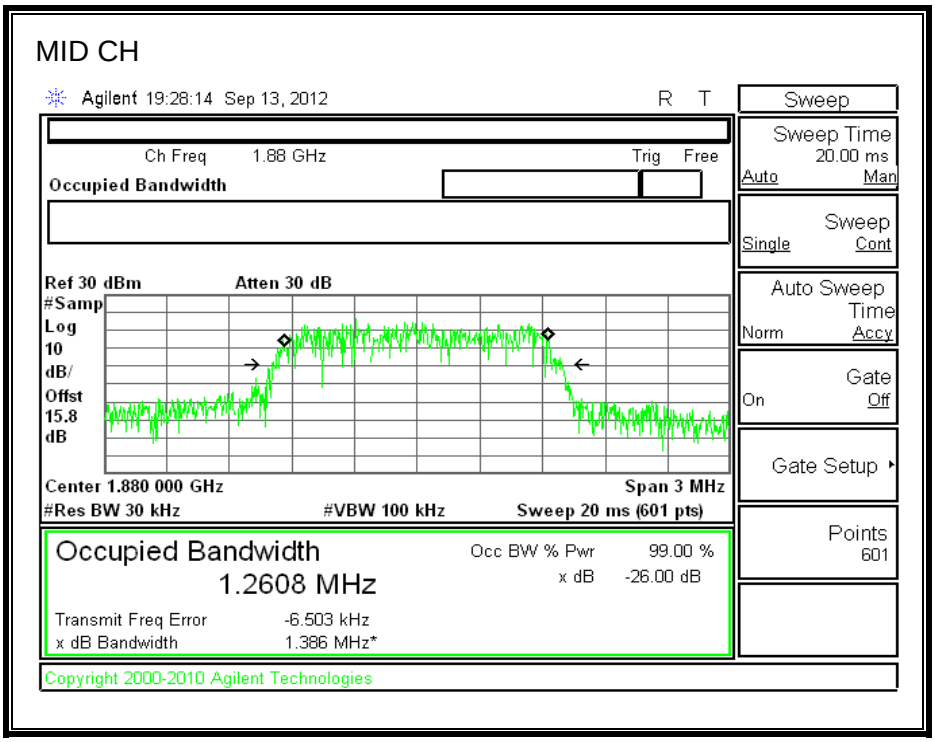
1xRTT Mode (PCS Band)





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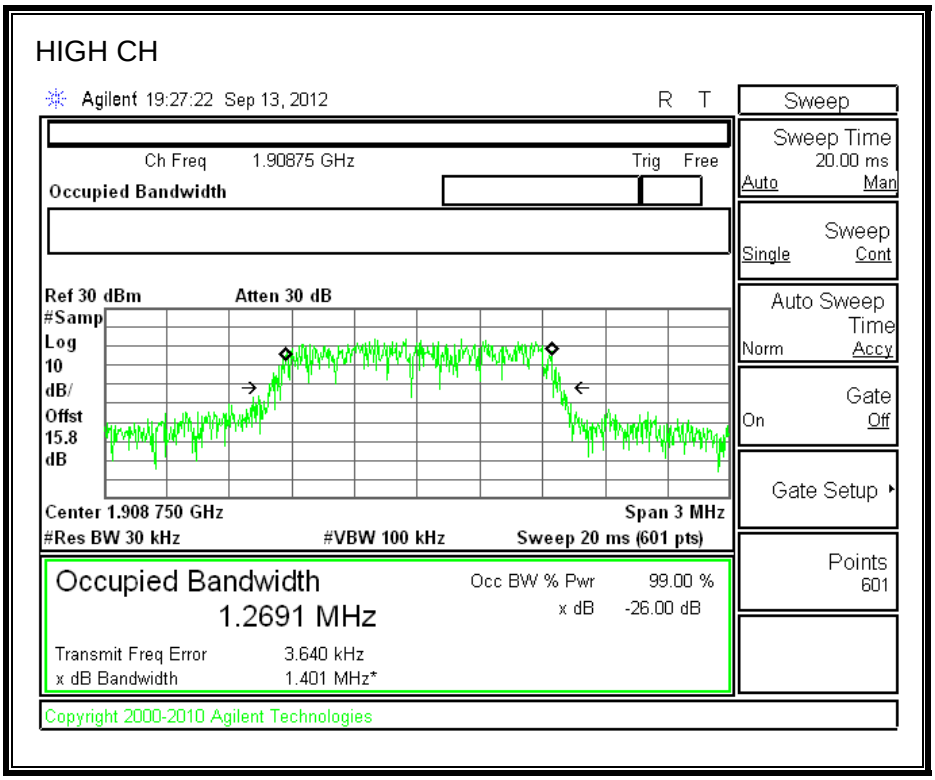
HIGH CH



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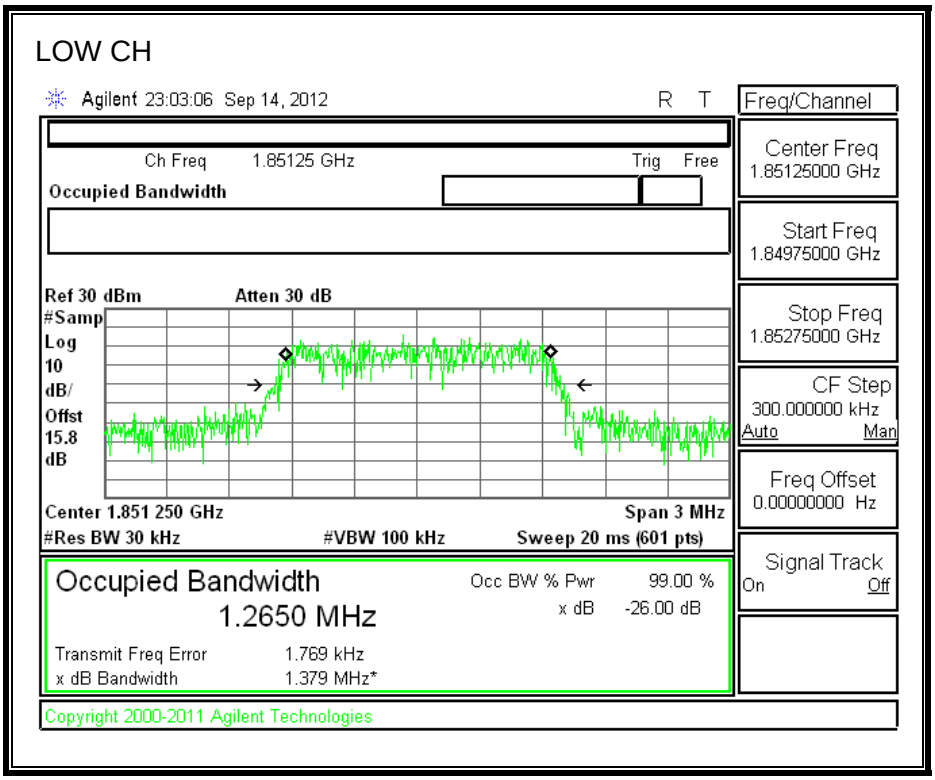
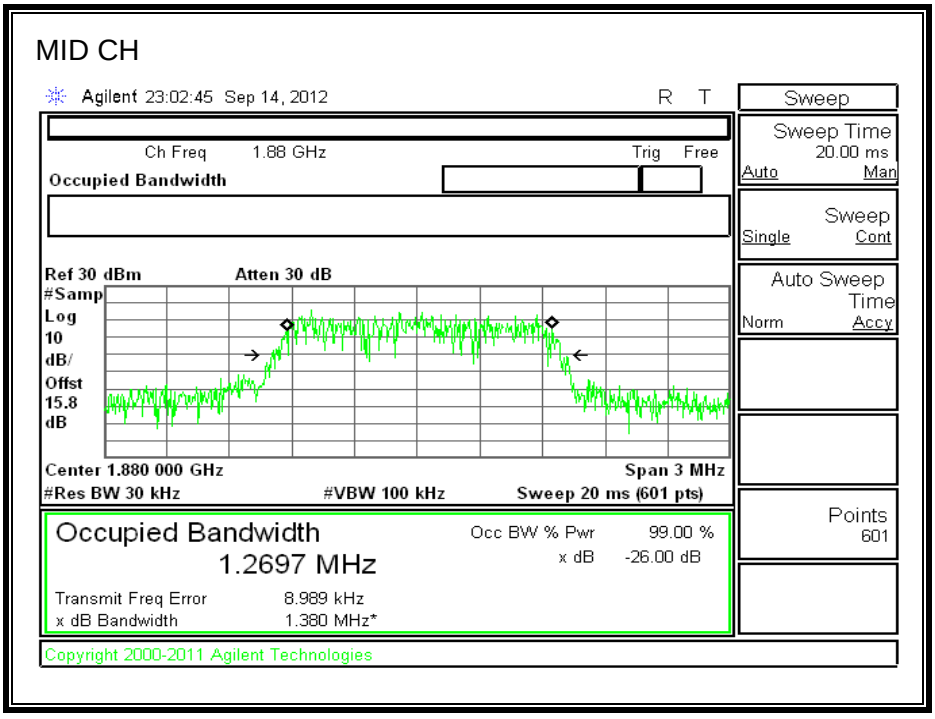
EV-DO Rev. A Mode (PCS Band)

LOW CH



MID CH



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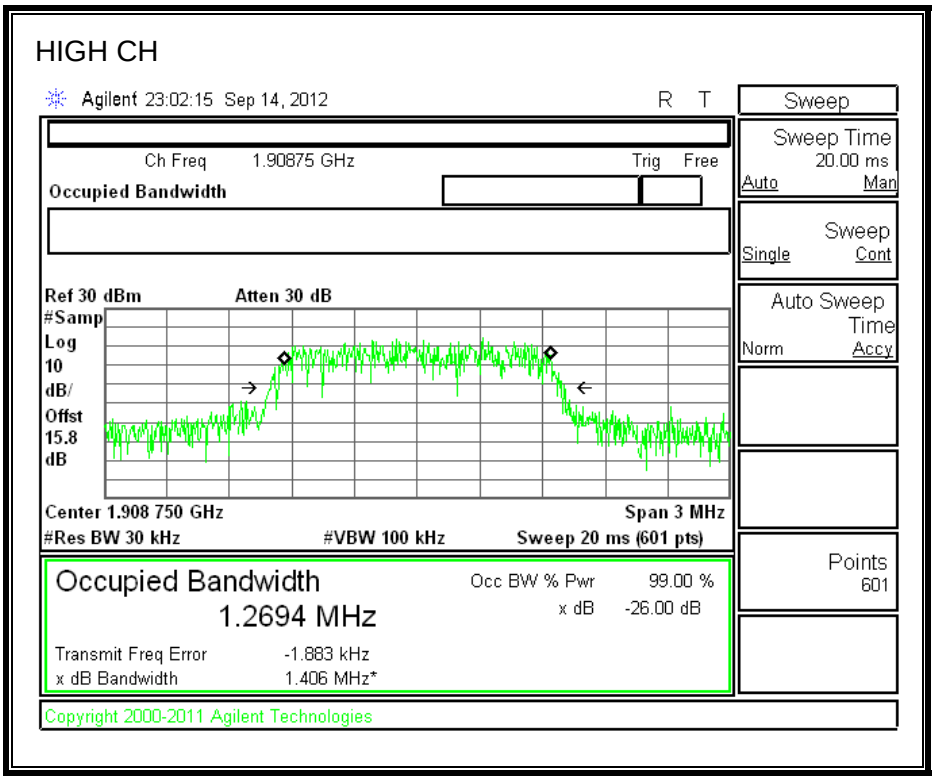
HIGH CH



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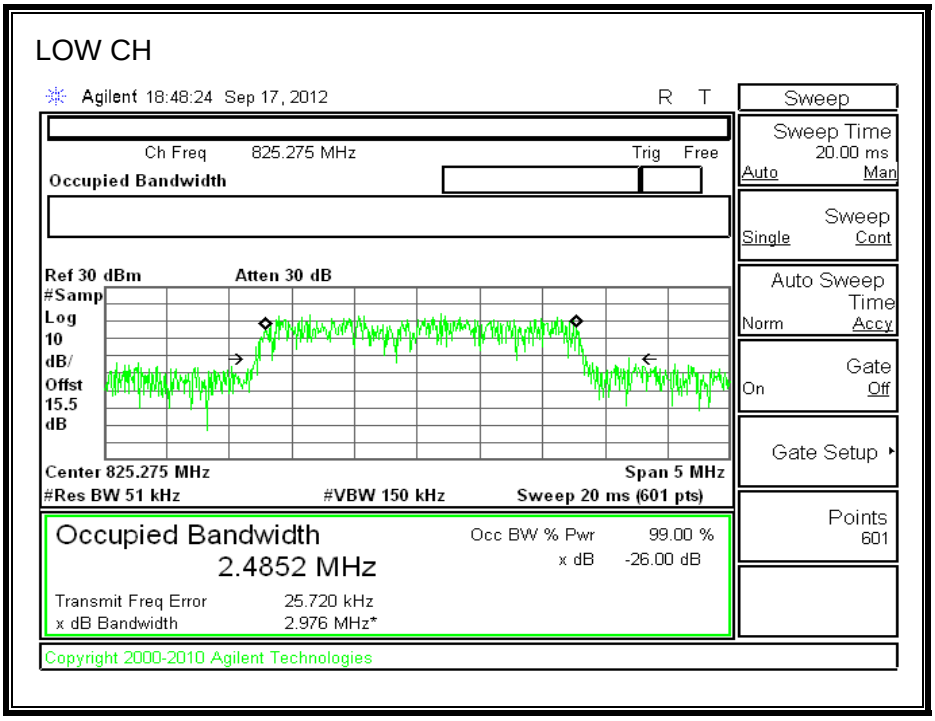
8.1.5. CDMA, BC0, EV-DO REV B

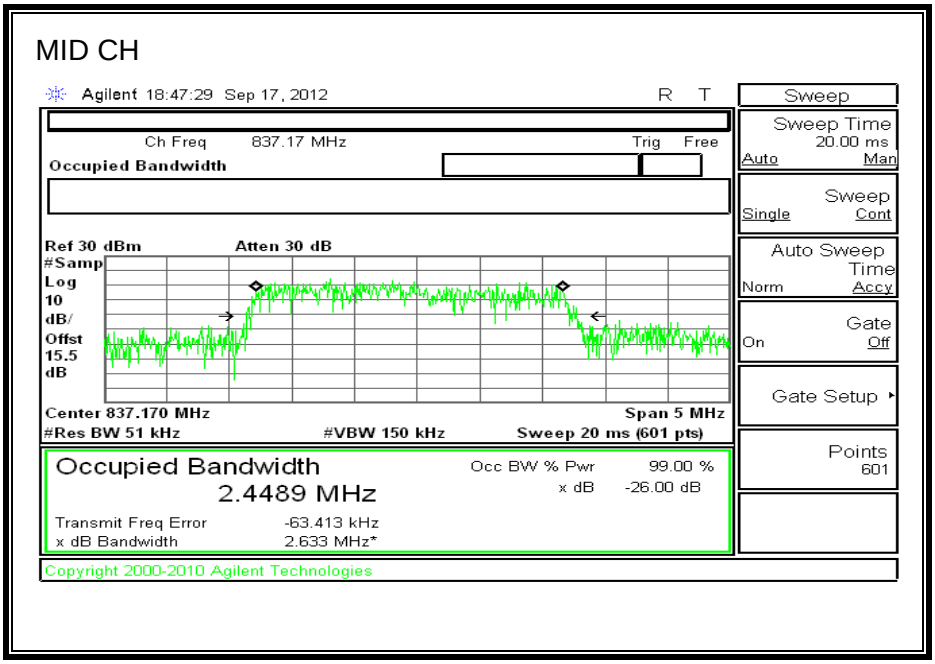
Cellular Band

Two Carriers Minimum Separation

LOW CH



MID CH



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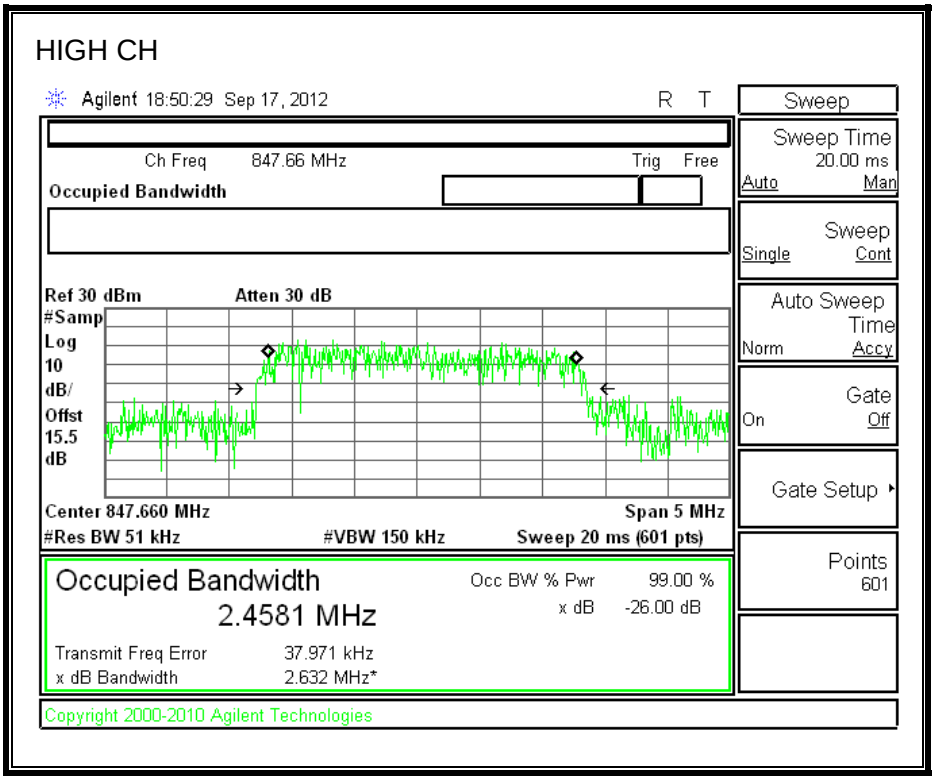
HIGH CH



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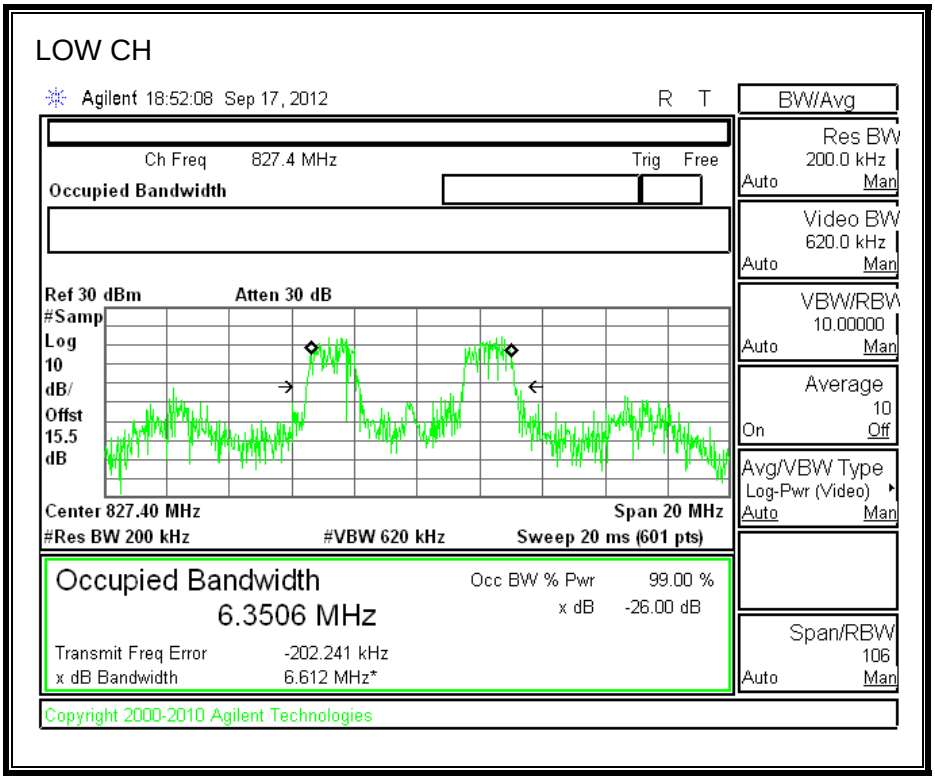
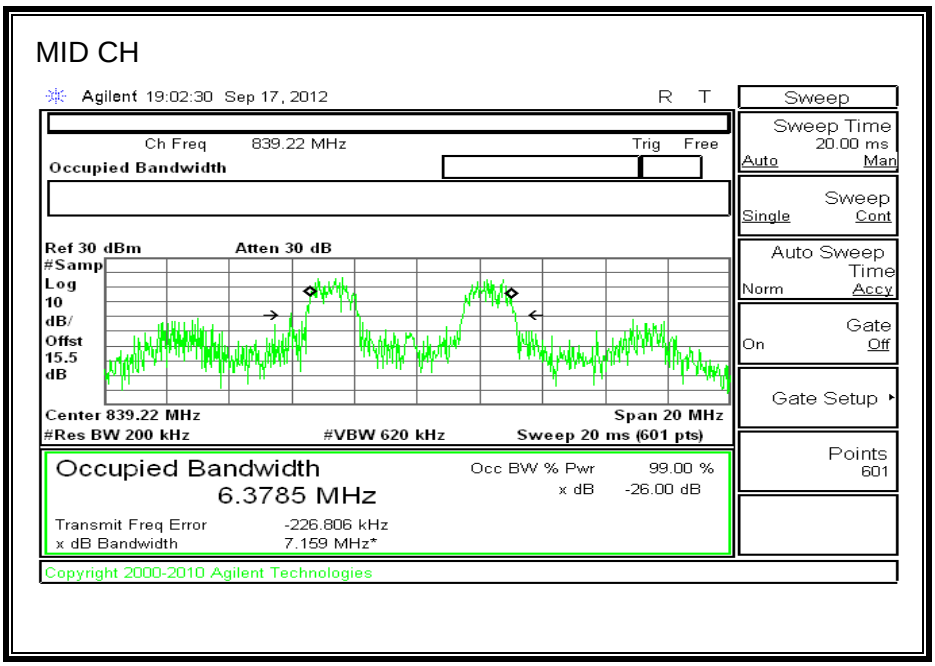
EV-DO REV B CELLULAR BAND

Two Carriers Maximum Separation

LOW CH



MID CH



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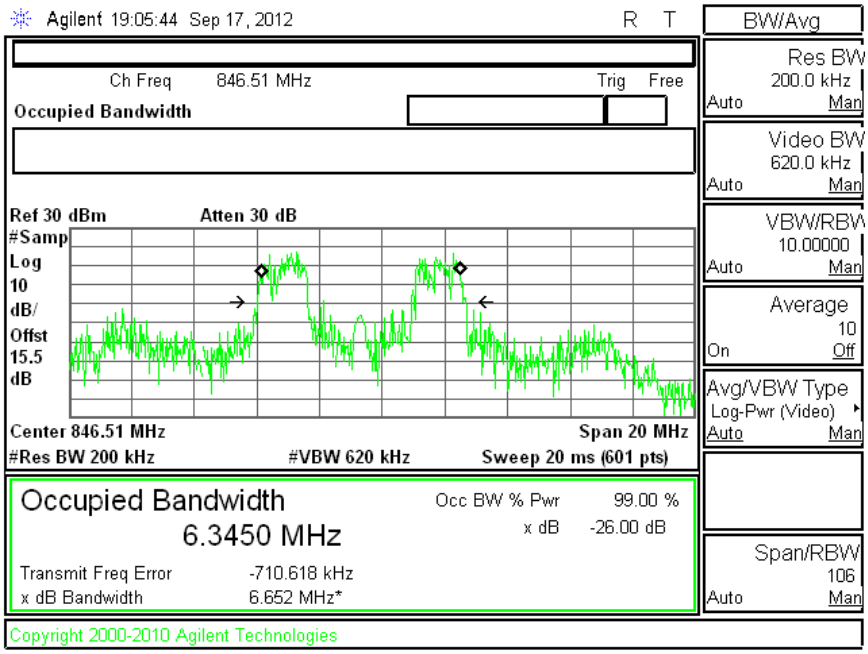
HIGH CH



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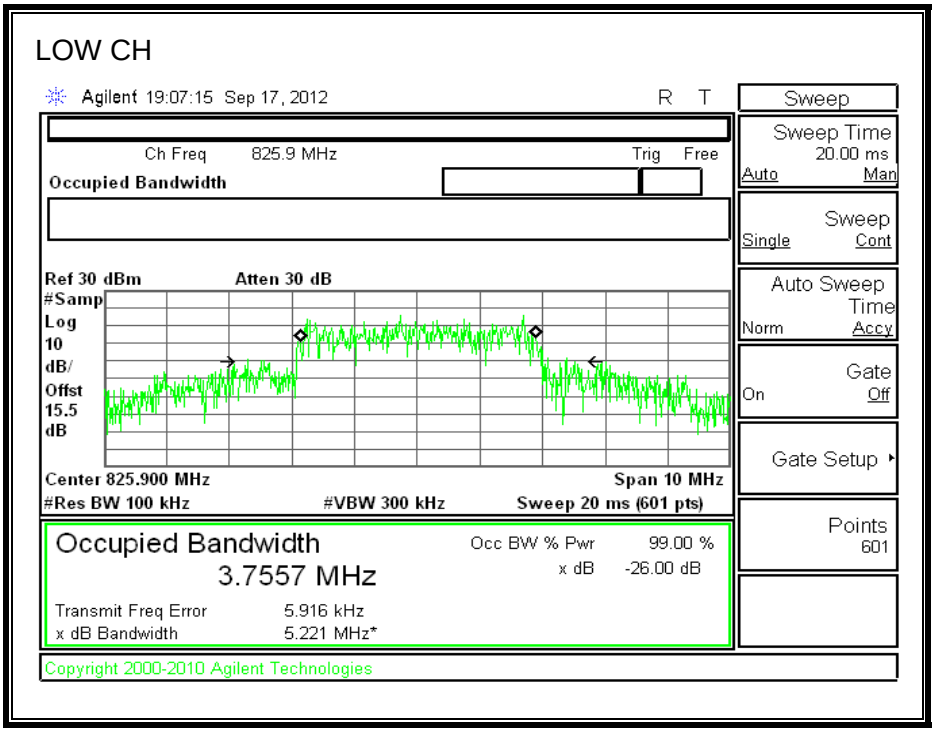
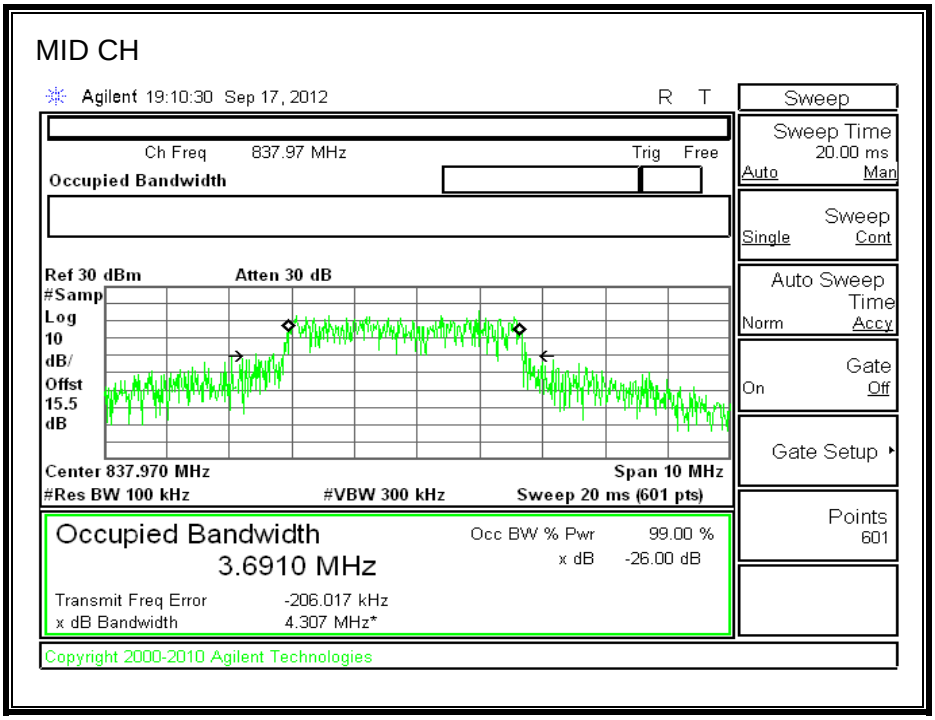
EV-DO REV B CELLULAR BAND

Three Carriers Minimum Separation

LOW CH



MID CH



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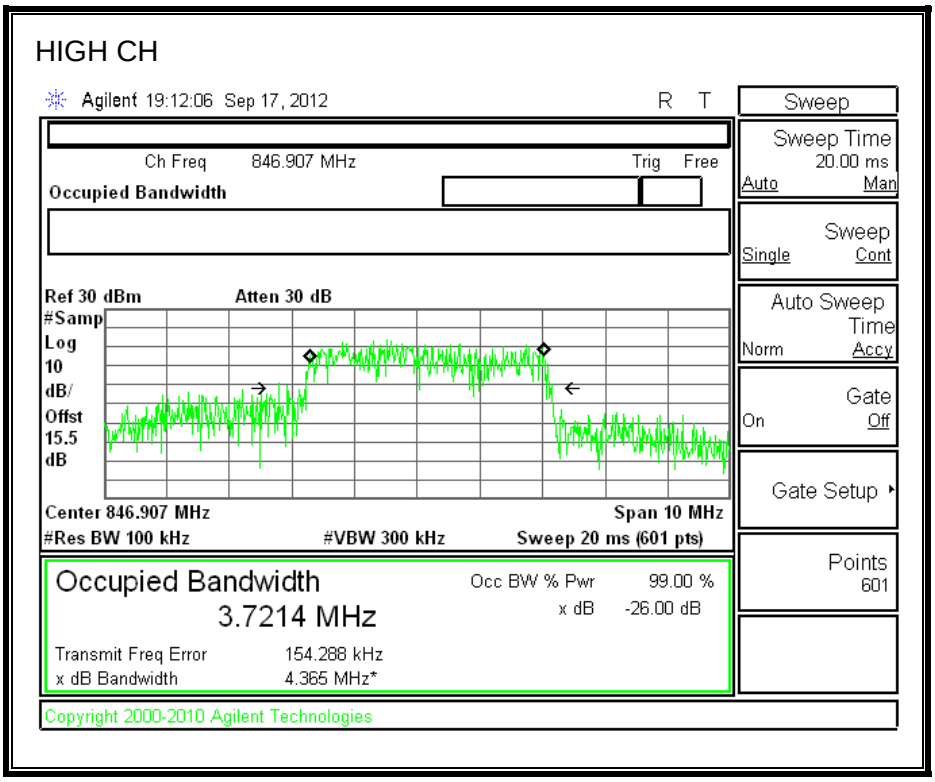
HIGH CH



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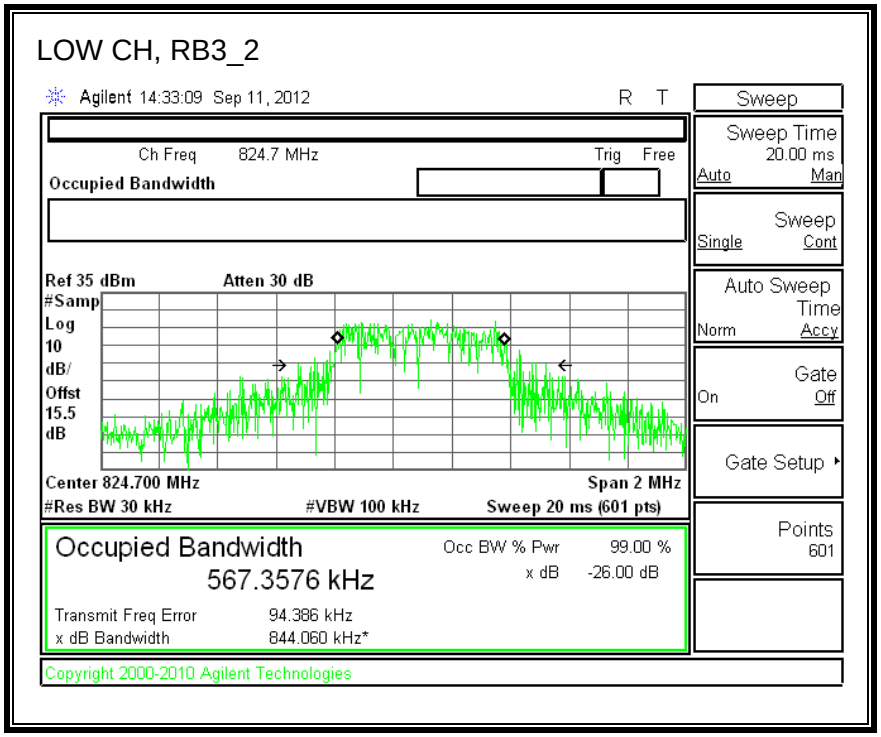
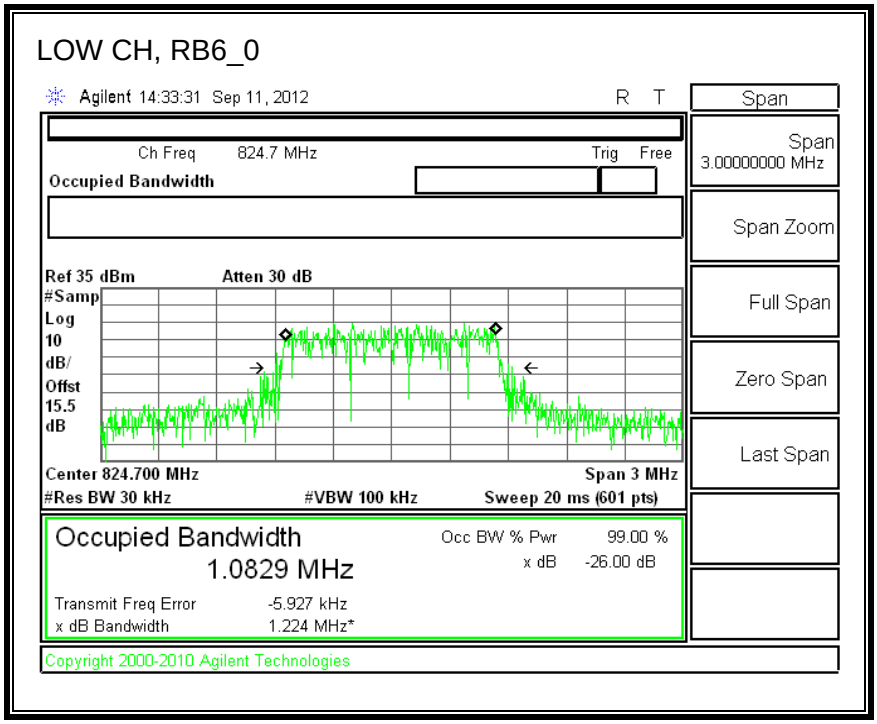
8.1.6. LTE BAND 5

QPSK, (1.4 MHz BAND WIDTH)





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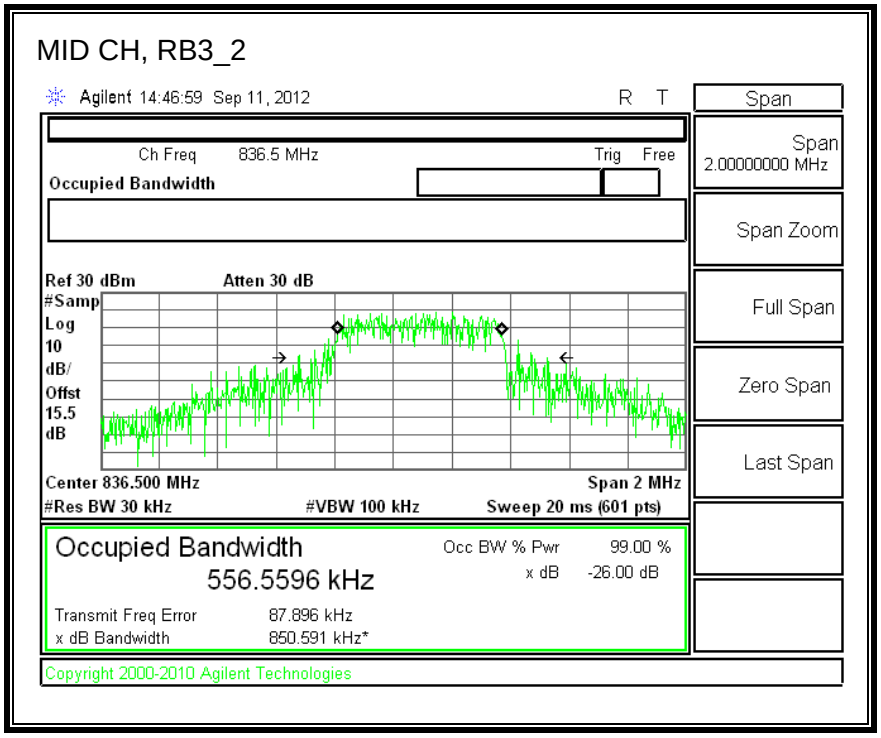
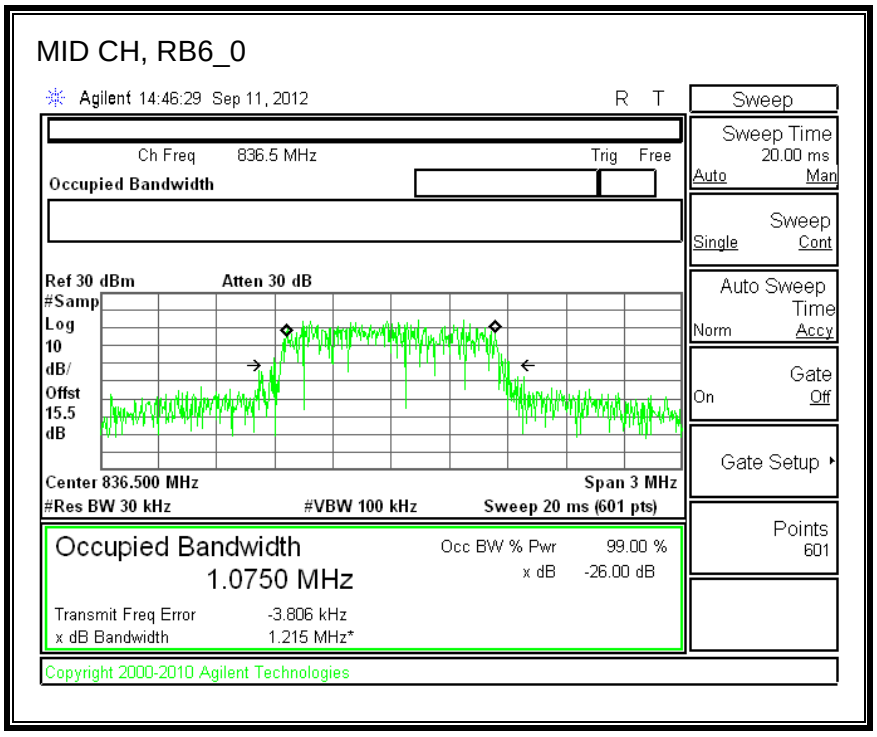
MID CH, RB3_2



MID CH, RB6_0



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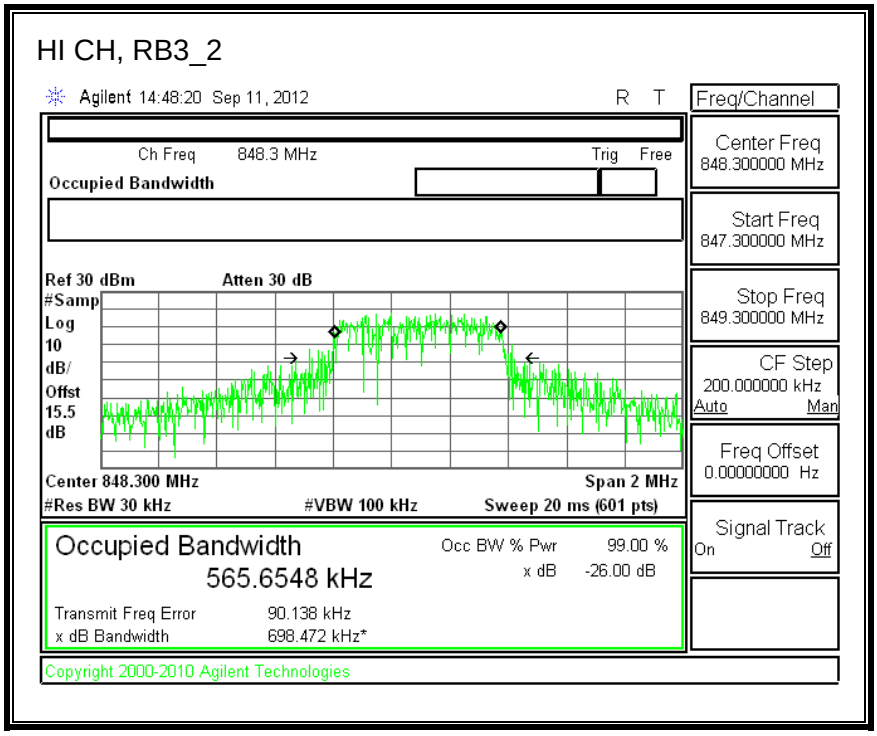
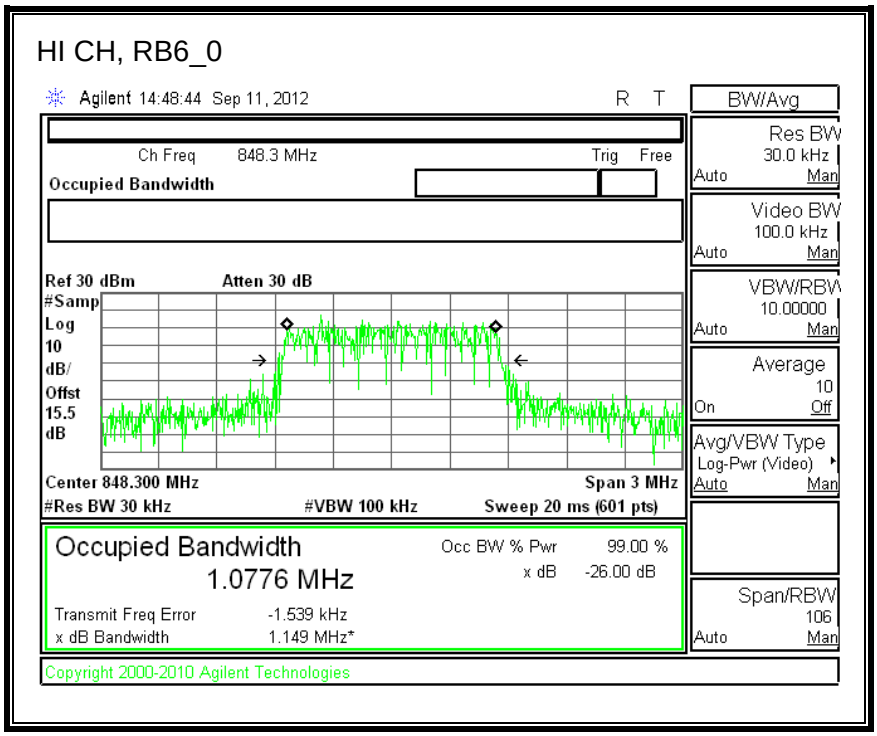
HI CH, RB3_2



HI CH, RB6_0



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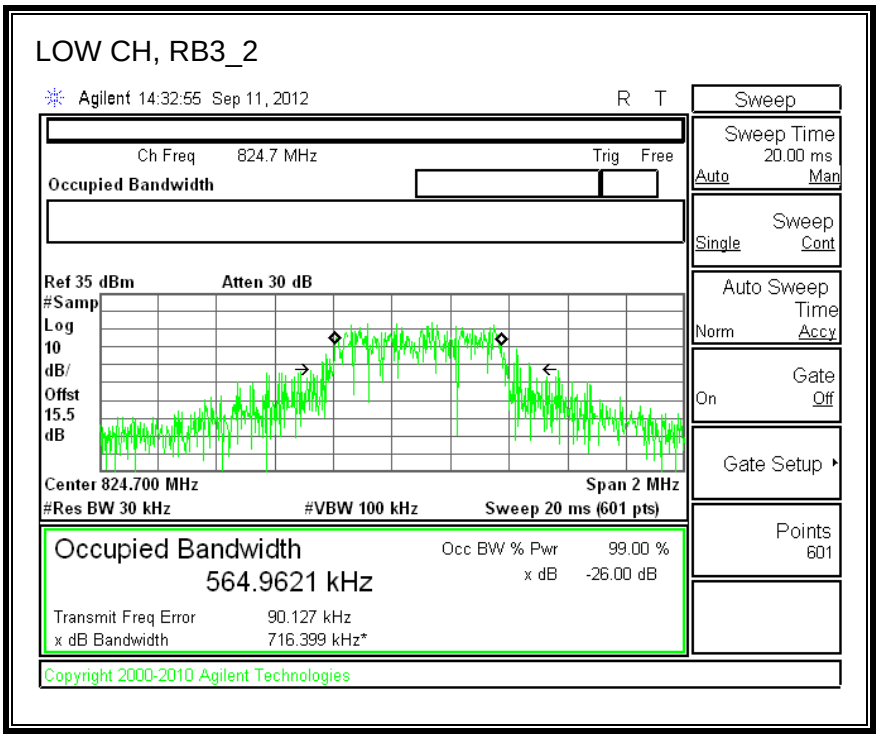
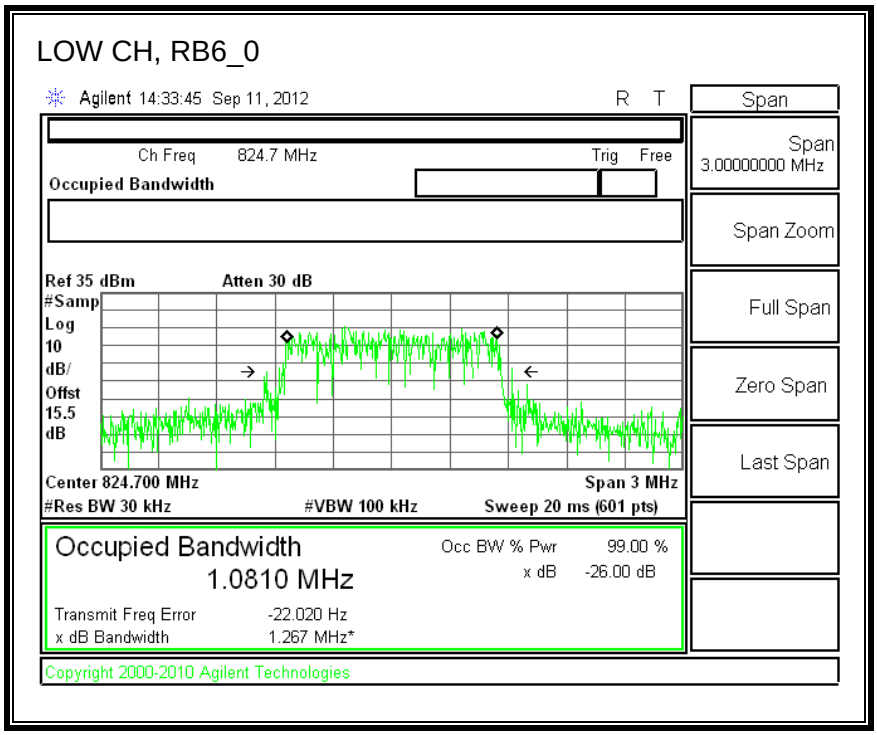
16QAM (1.4 MHz BAND WIDTH)





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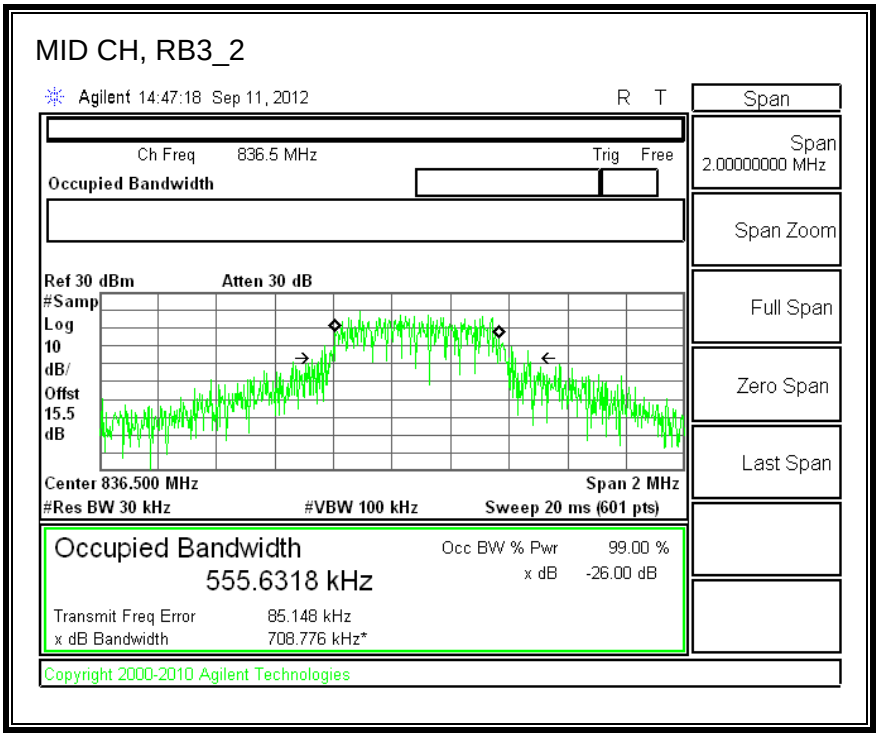

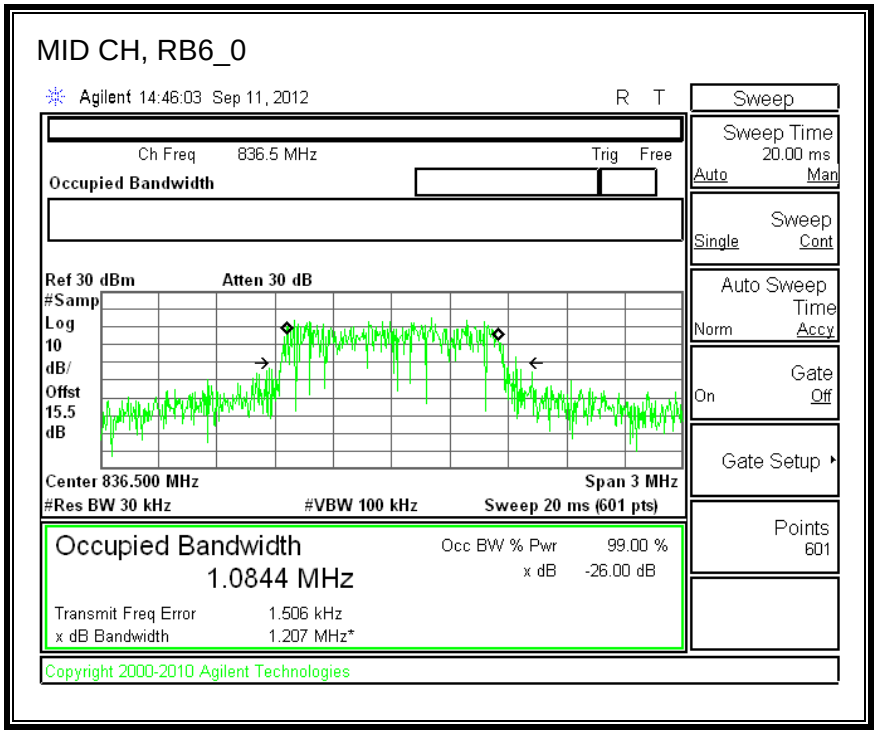

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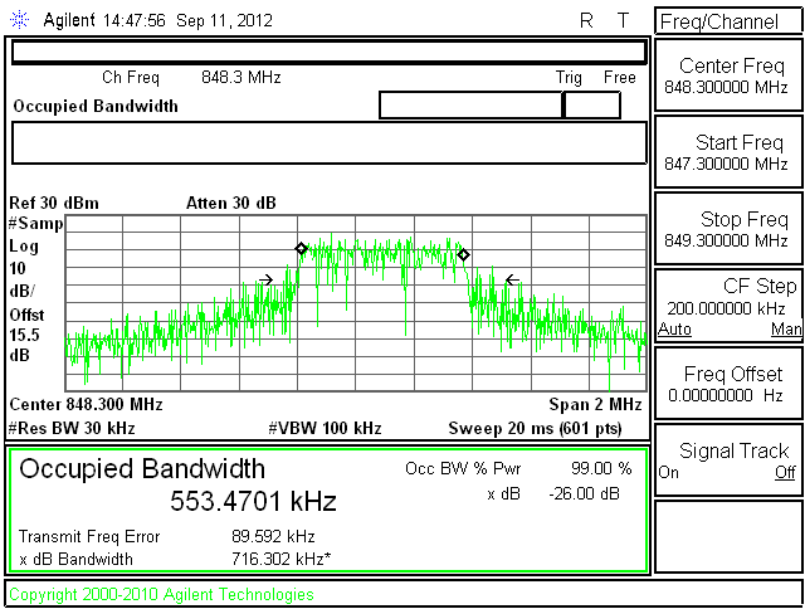
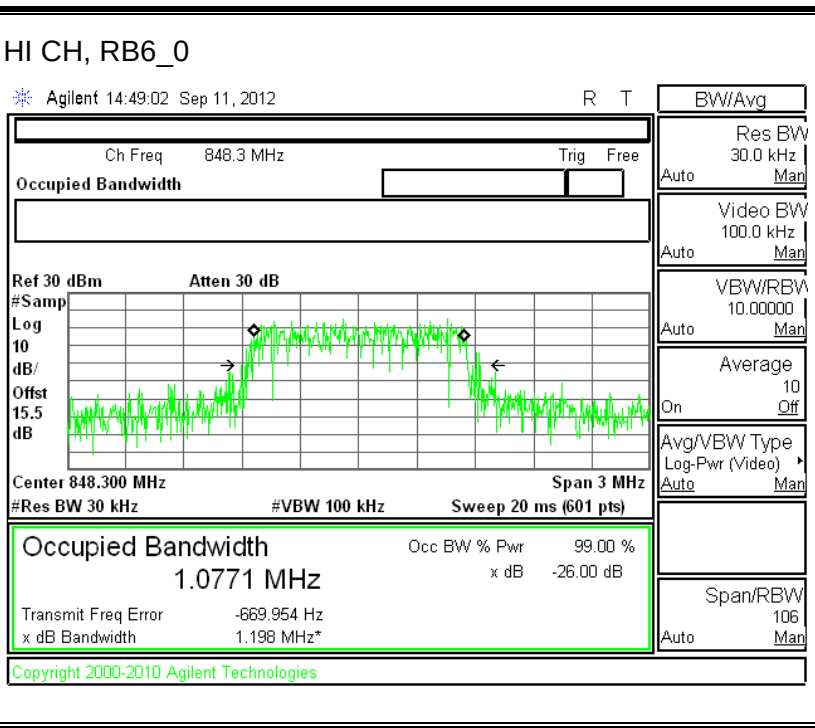
HI CH, RB3_2



HI CH, RB6_0



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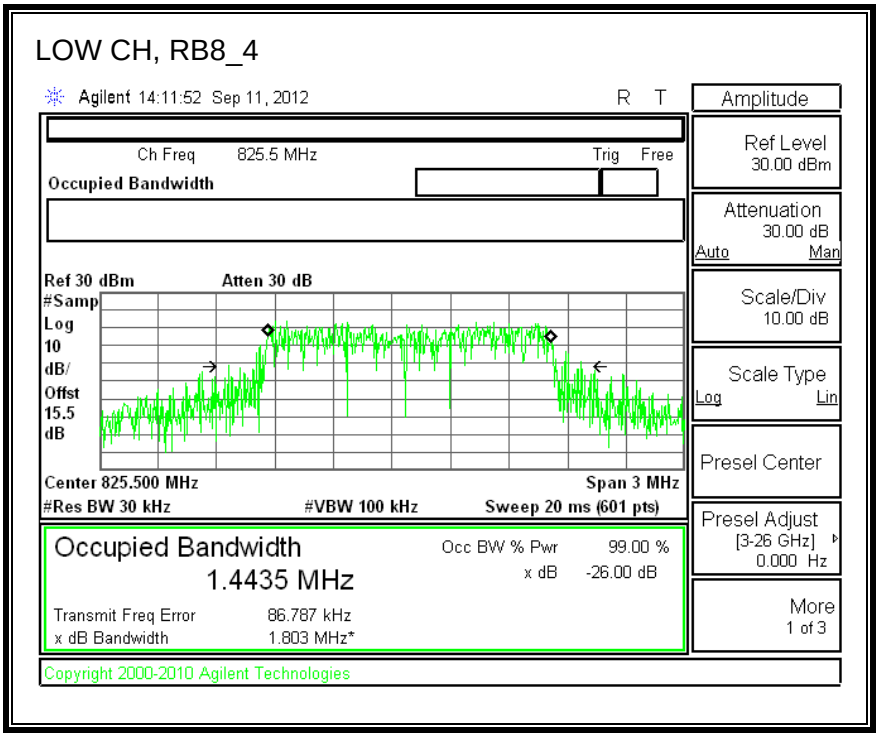
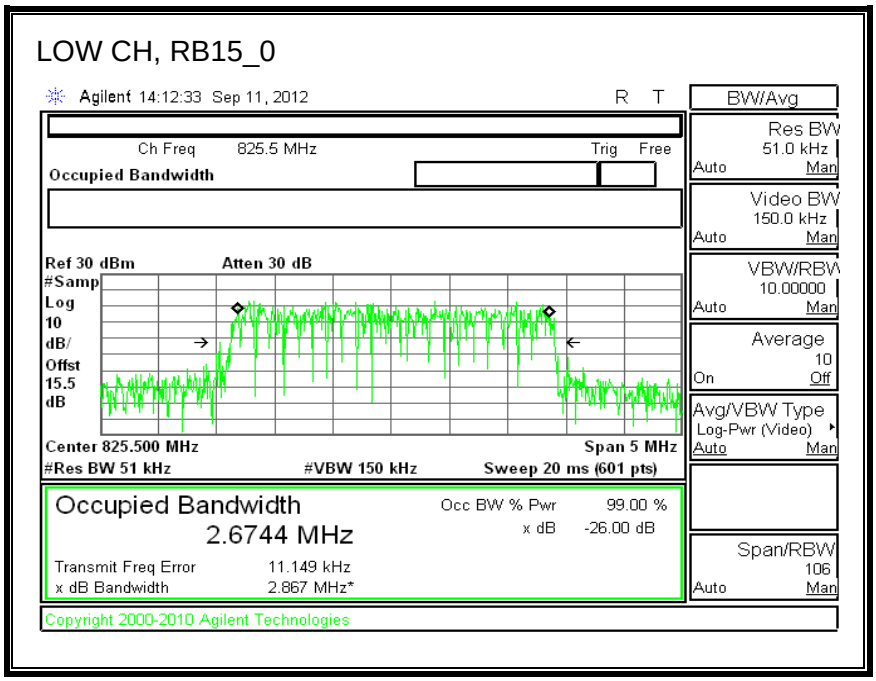
QPSK (3.0 MHz BAND WIDTH)





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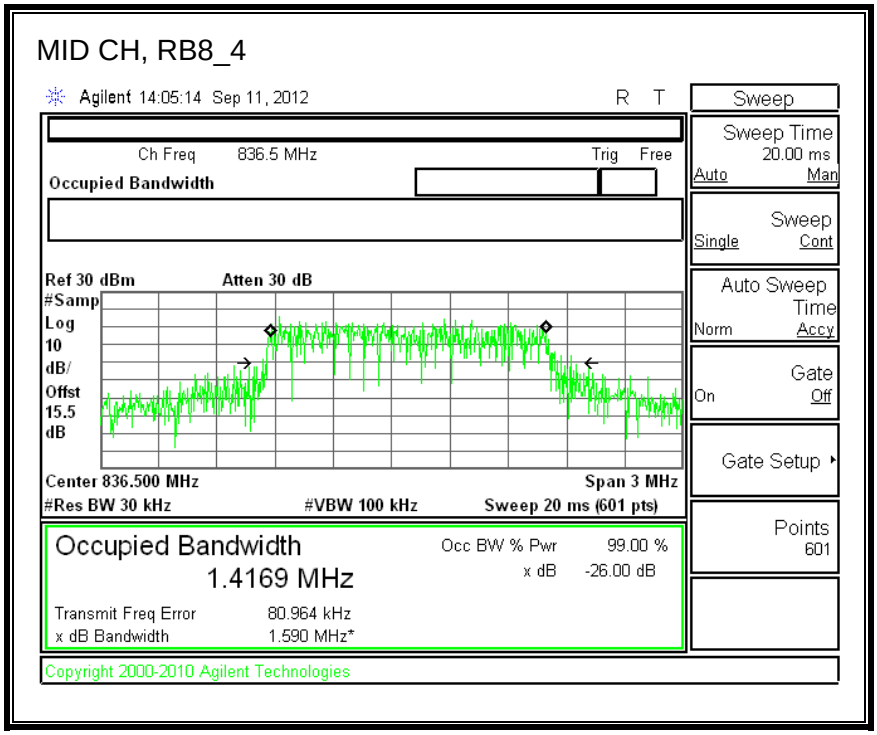
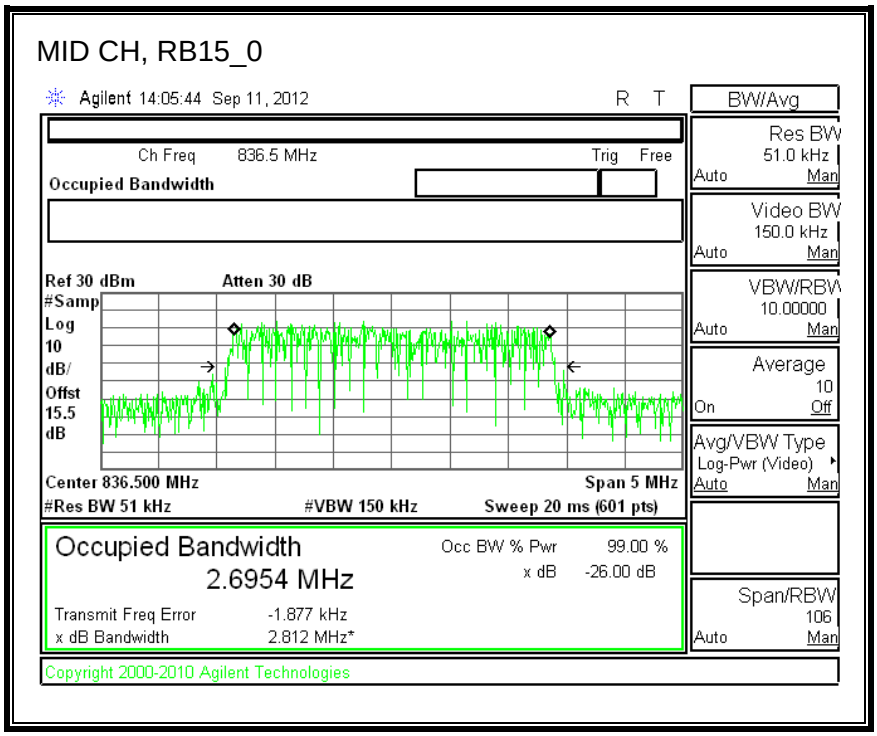
MID CH, RB8_4



MID CH, RB15_0



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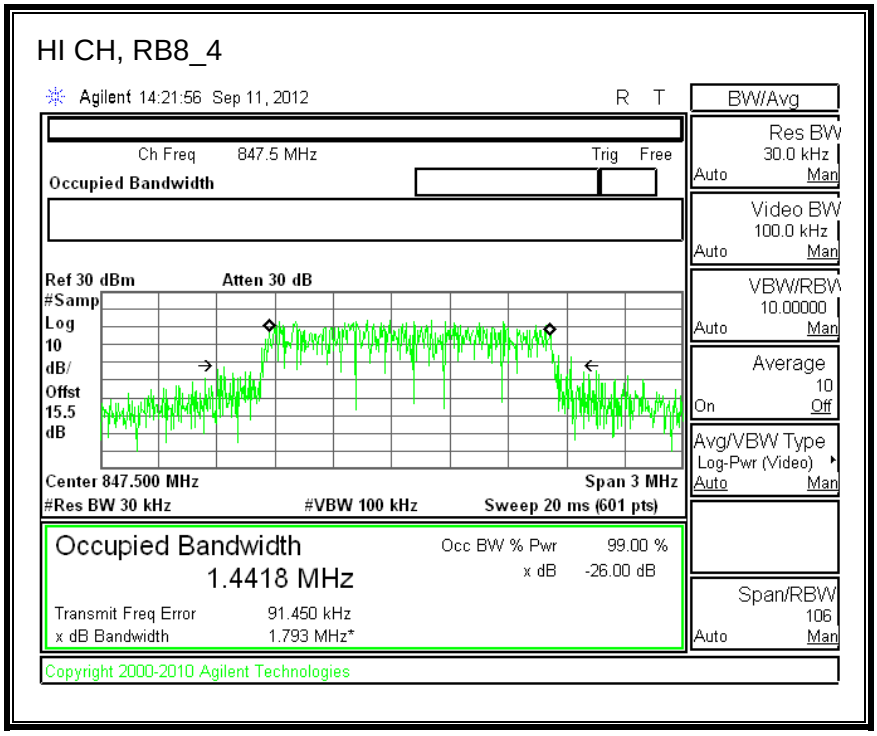
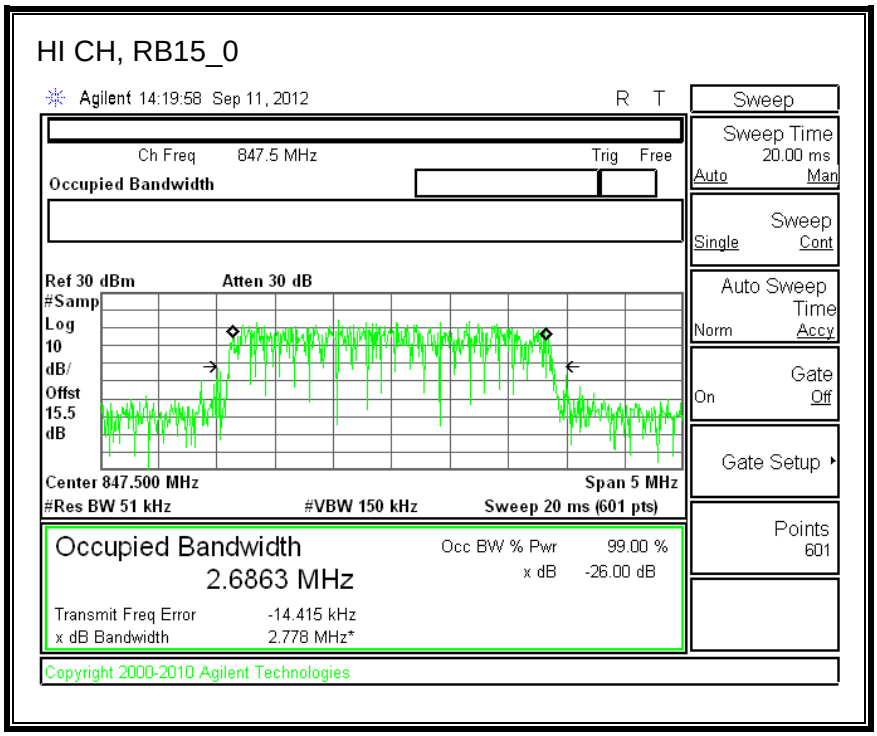
HI CH, RB8_4



HI CH, RB15_0



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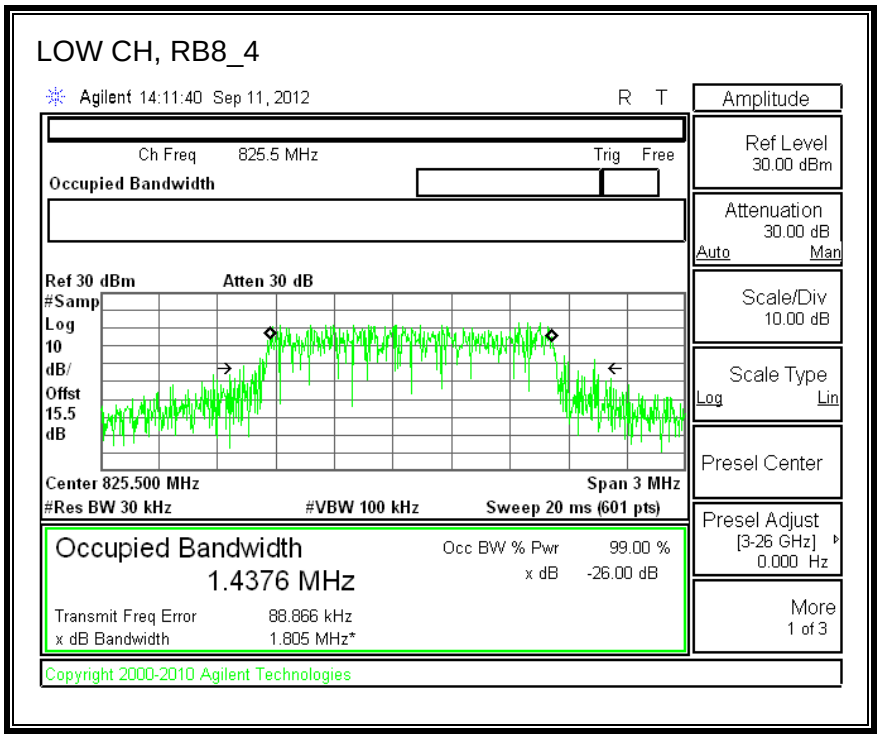
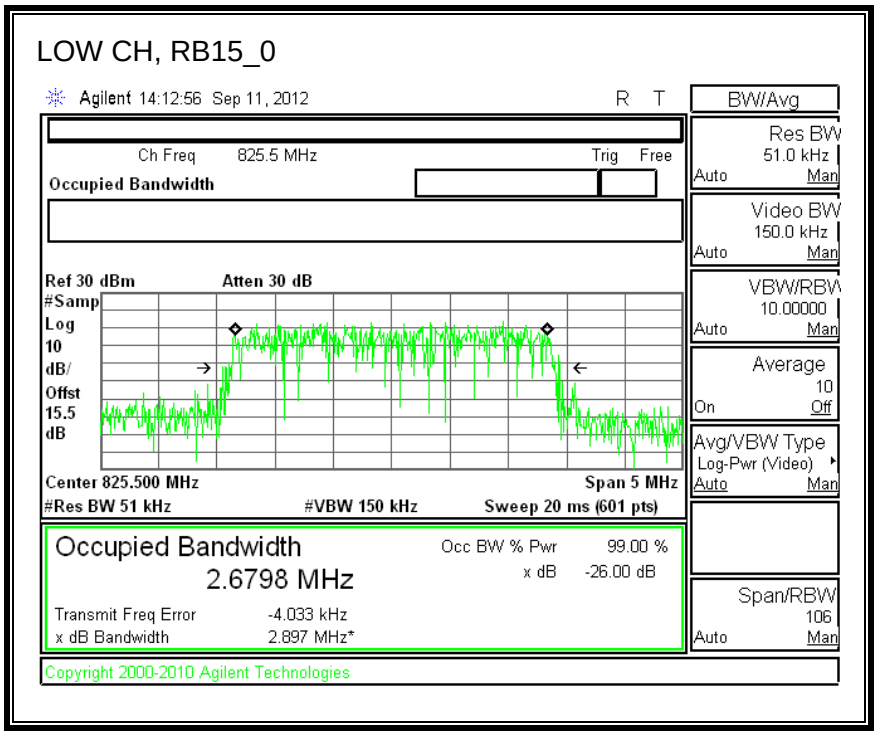
16QAM (3.0 MHz BAND WIDTH)





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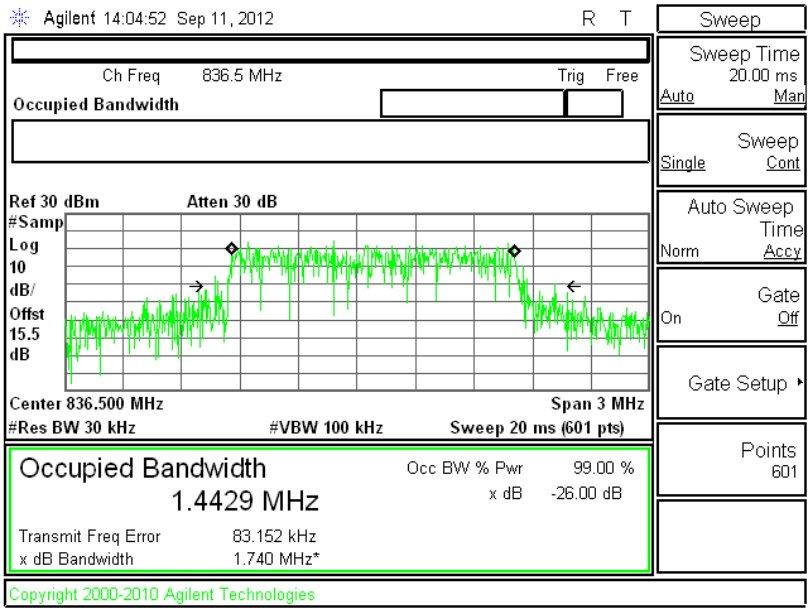
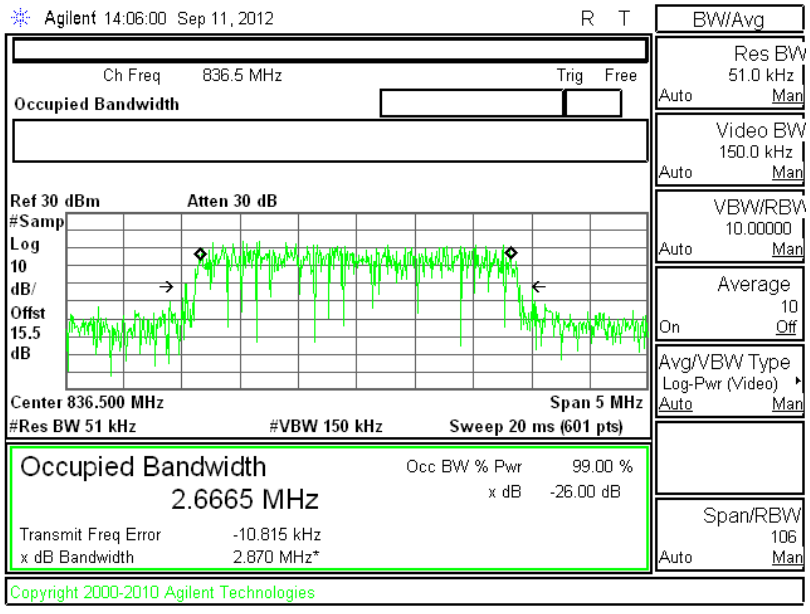
MID CH, RB8_4



MID CH, RB15_0



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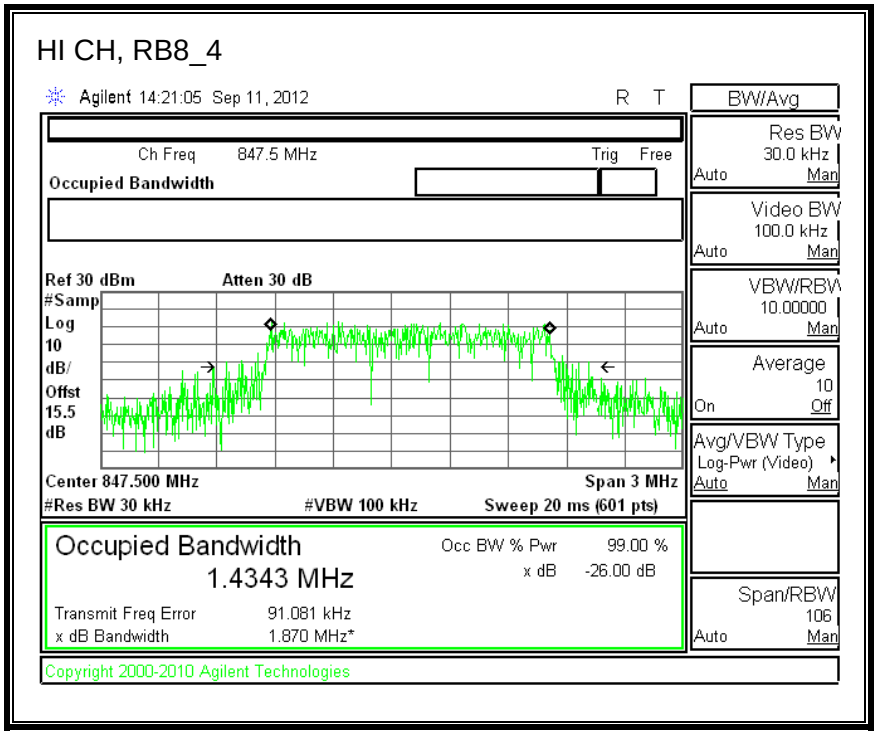
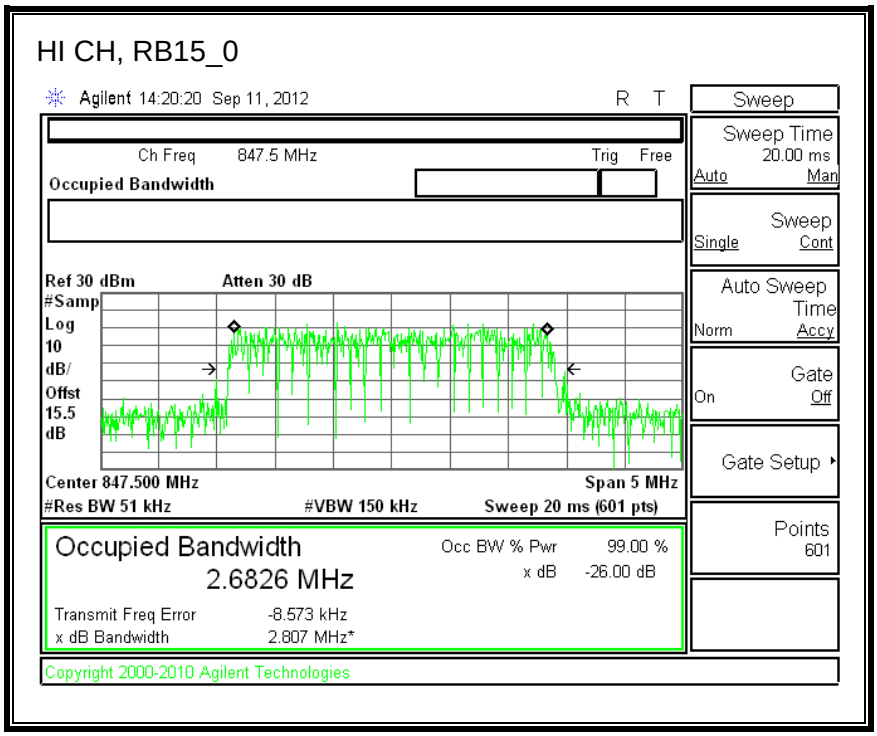
HI CH, RB8_4



HI CH, RB15_0



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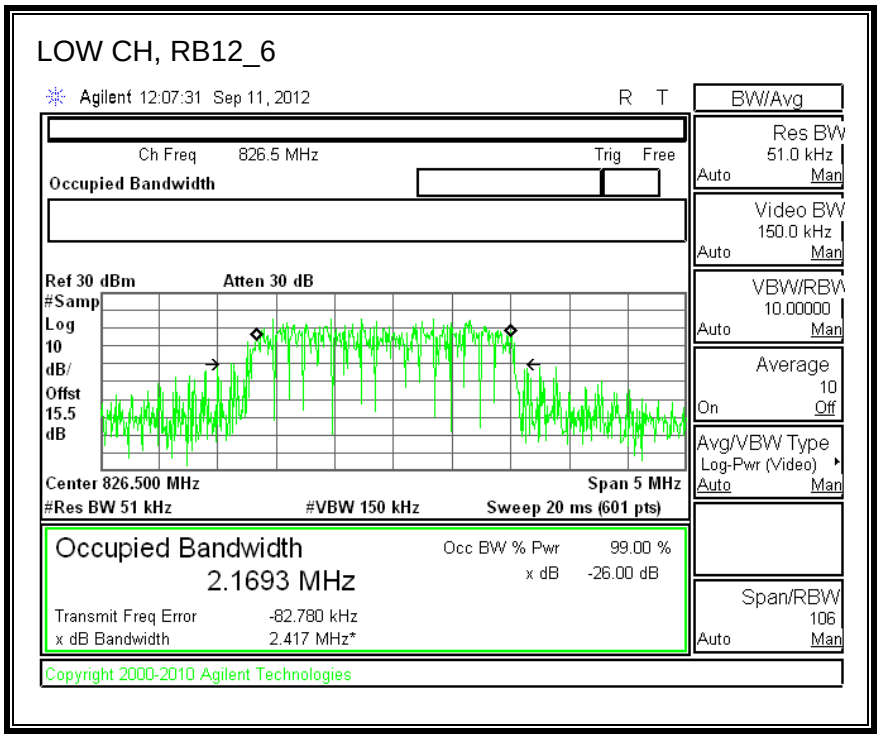
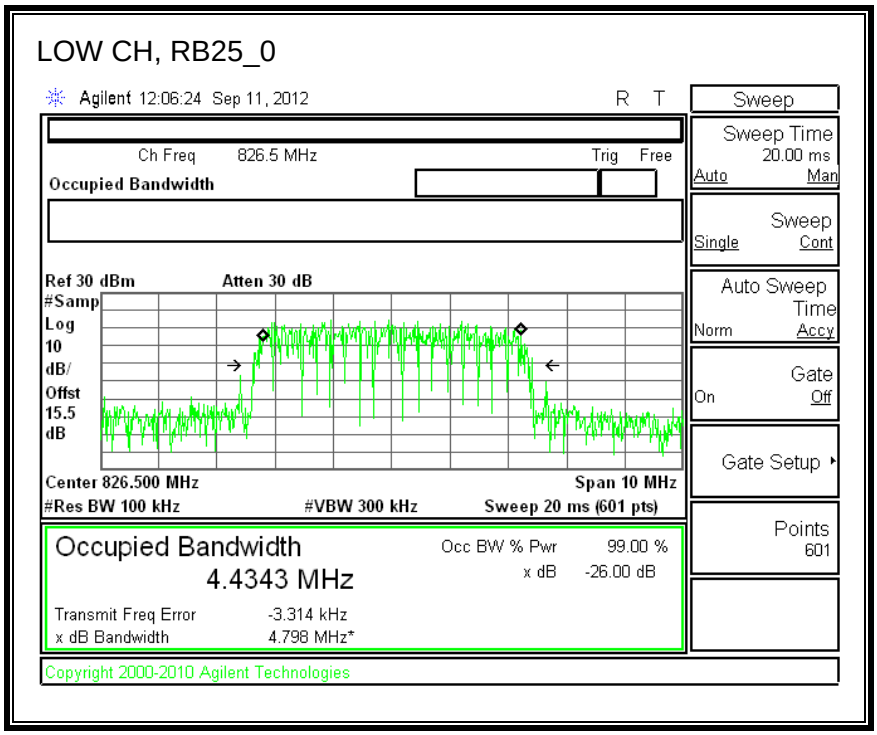
LTE QPSK (5.0 MHz BAND WIDTH)





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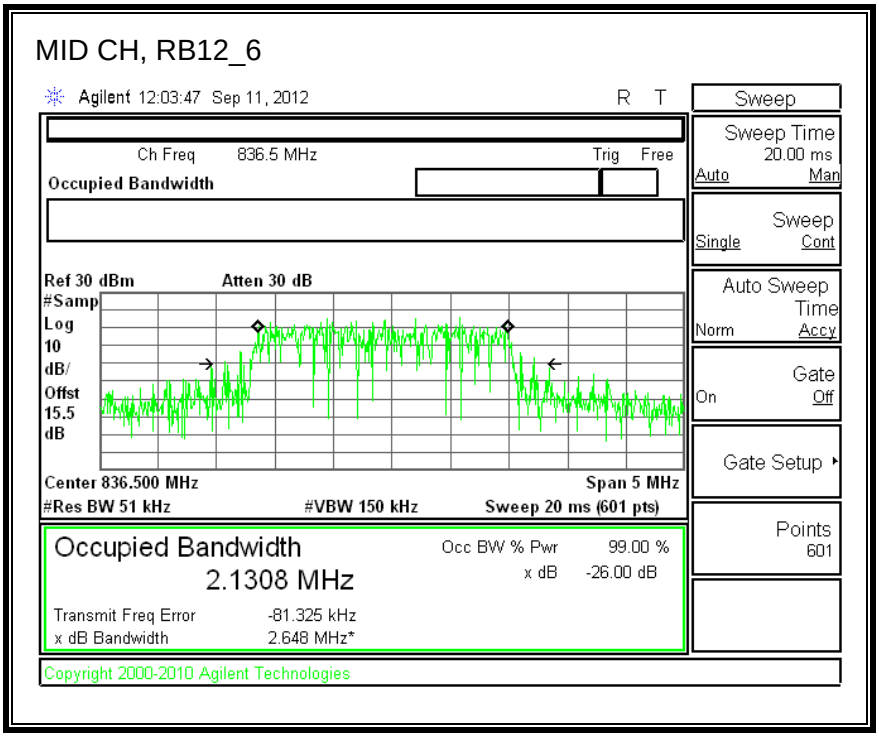
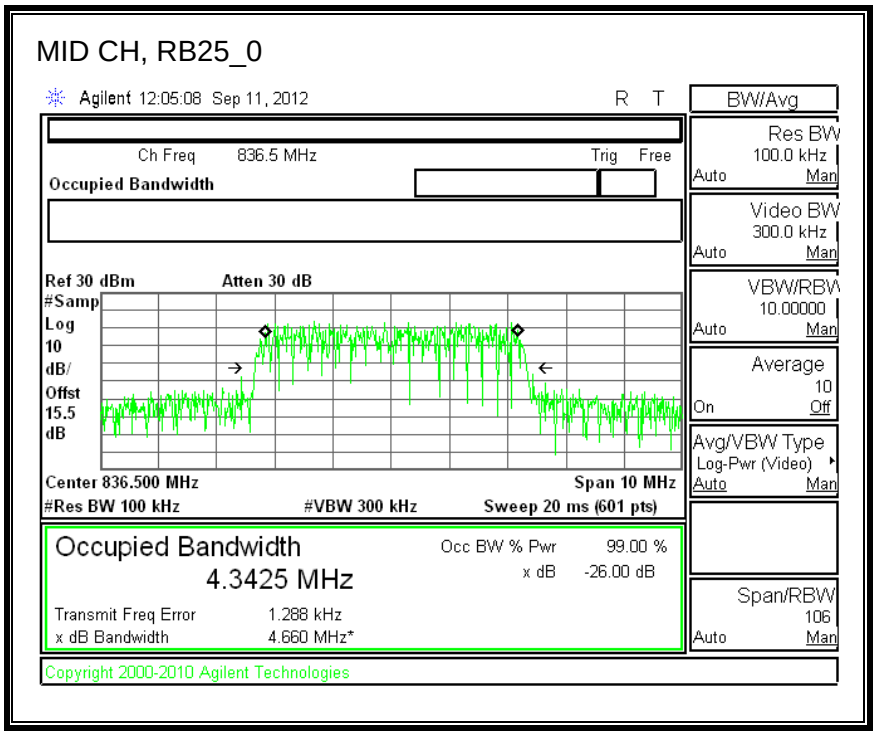
MID CH, RB12_6



MID CH, RB25_0



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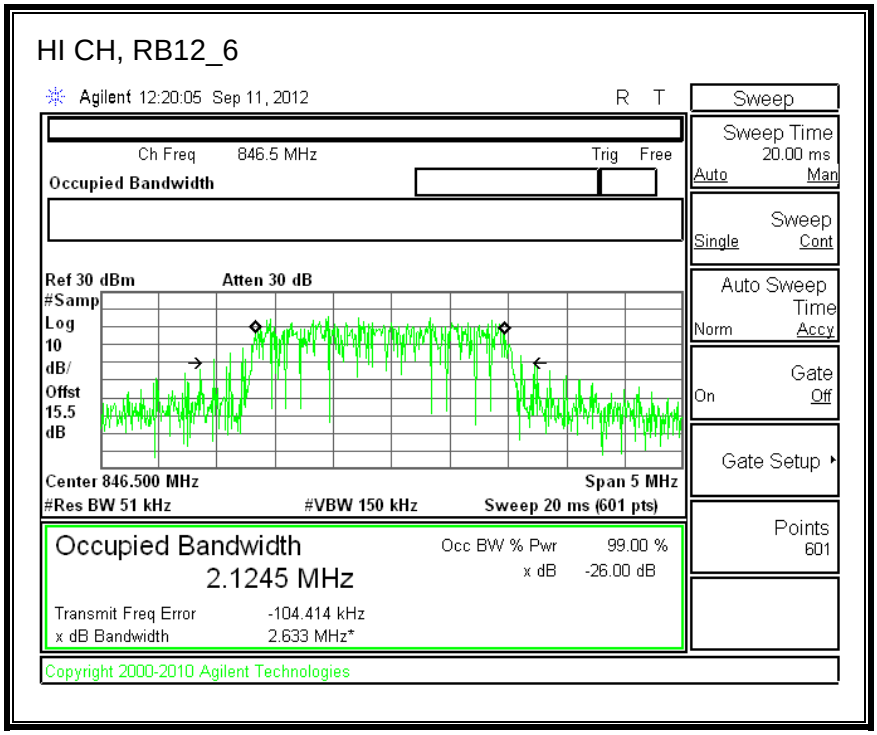
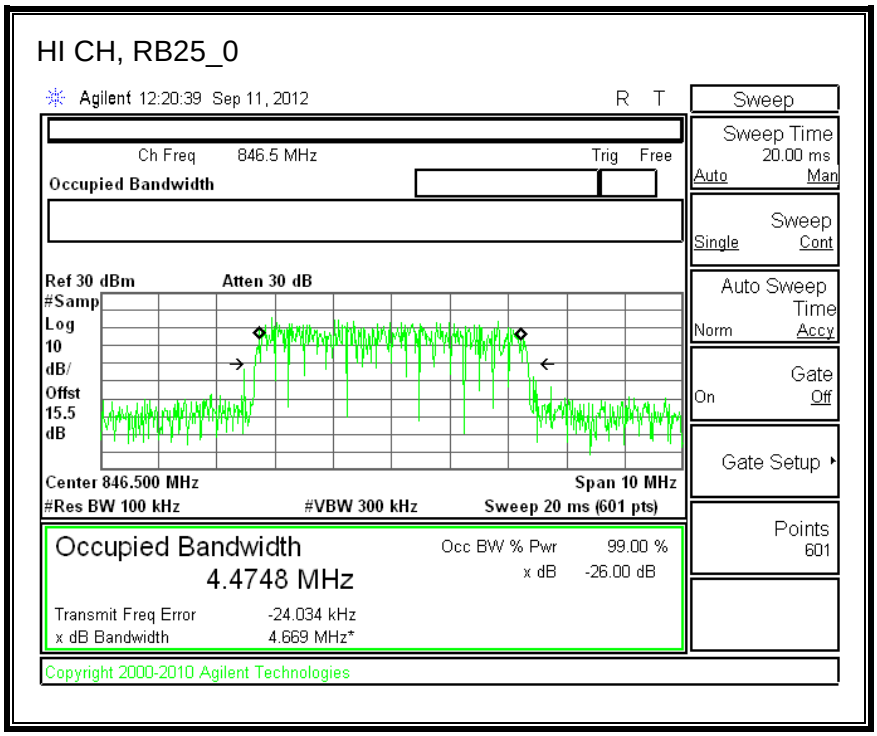
HI CH, RB12_6



HI CH, RB25_0



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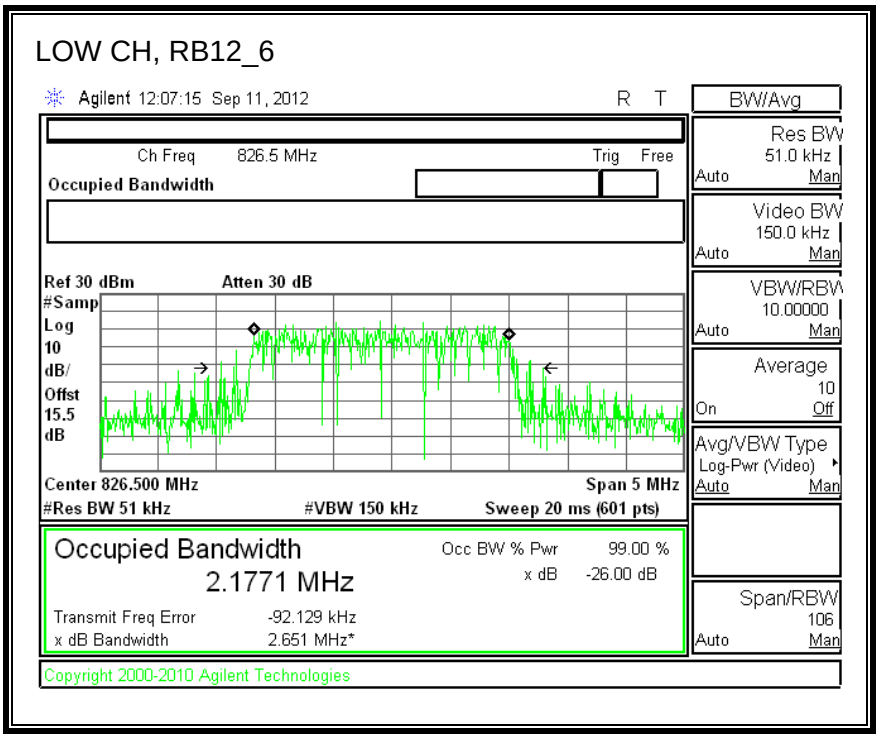
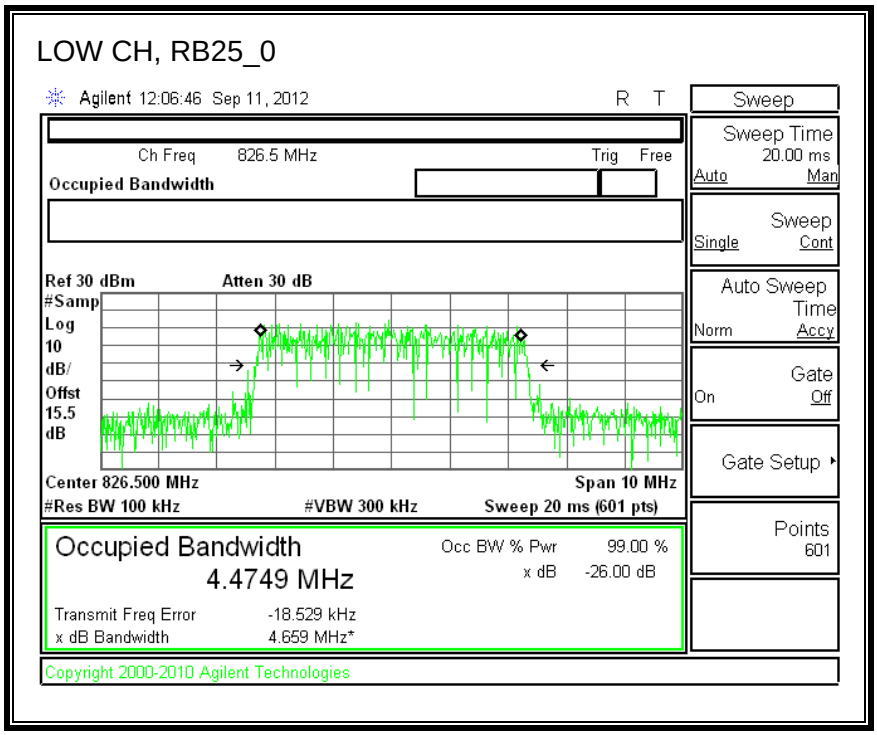
16QAM (5 MHz BAND WIDTH)





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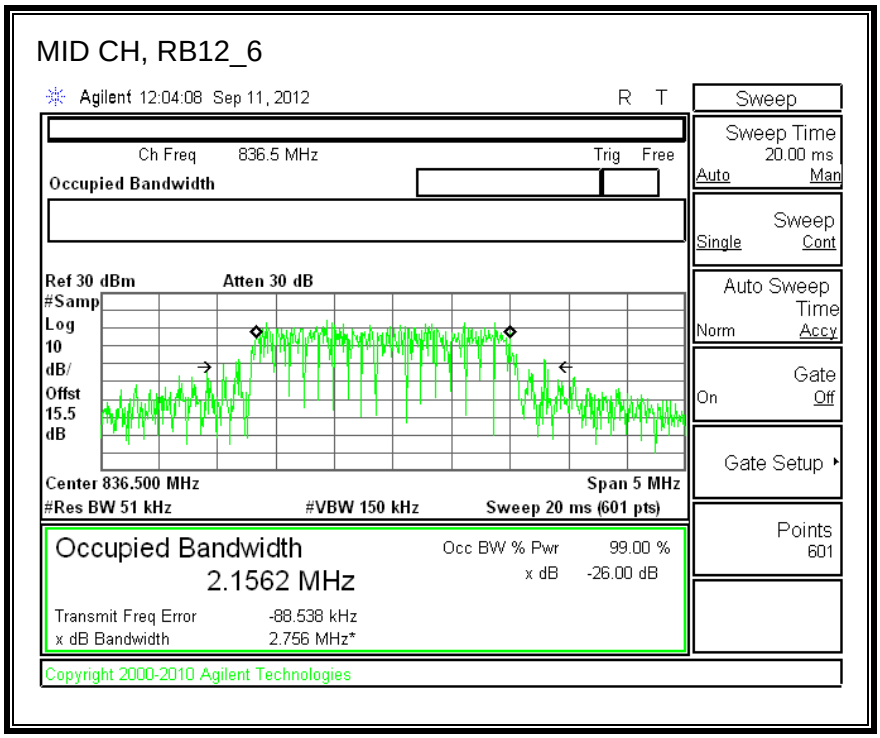
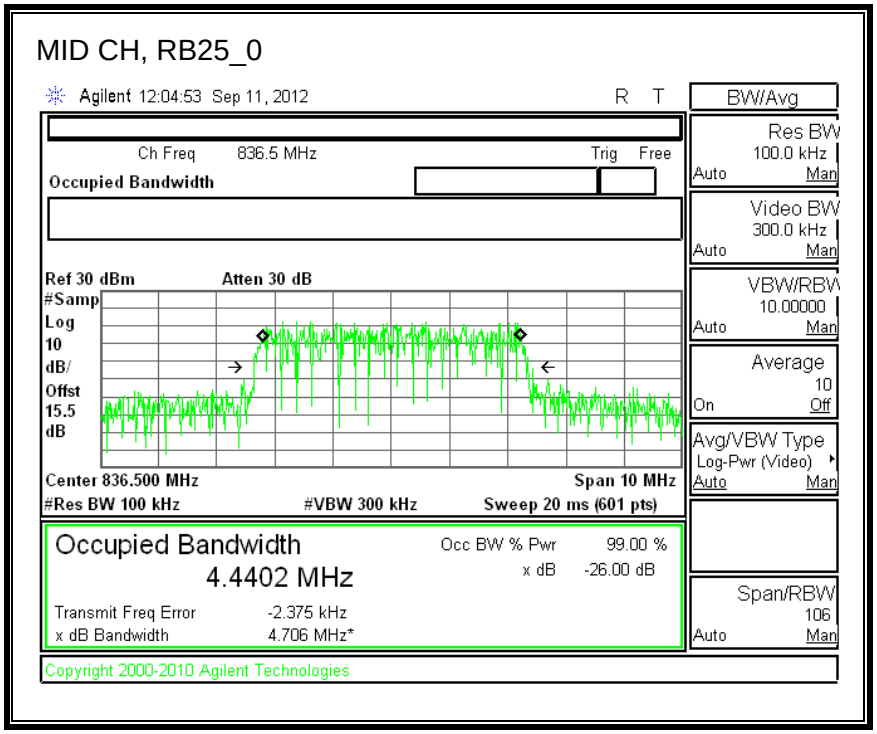
MID CH, RB12_6



MID CH, RB25_0



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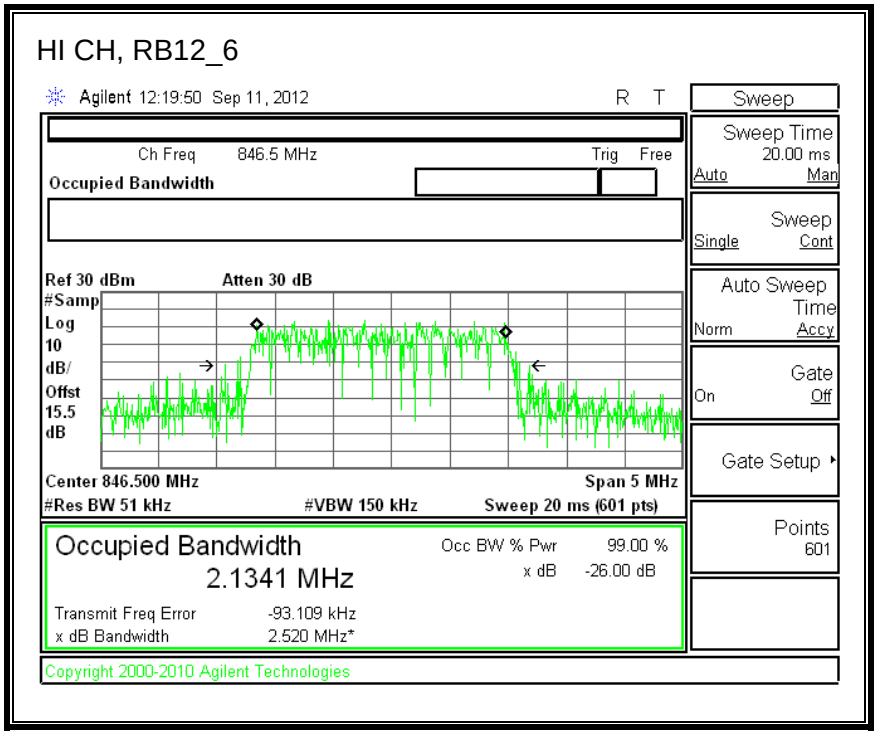
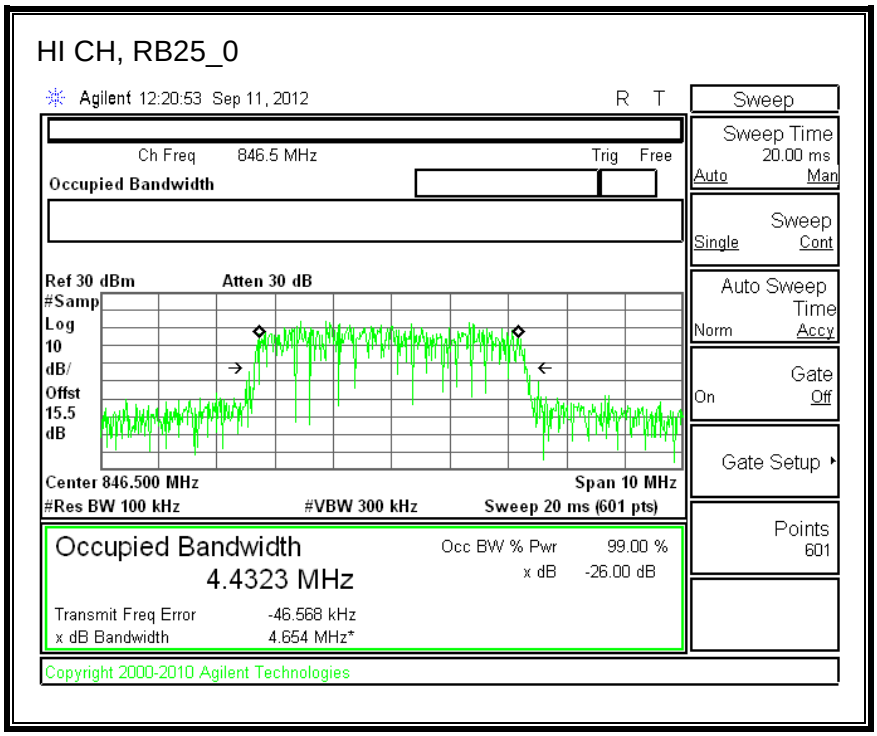
HI CH, RB12_6



HI CH, RB25_0



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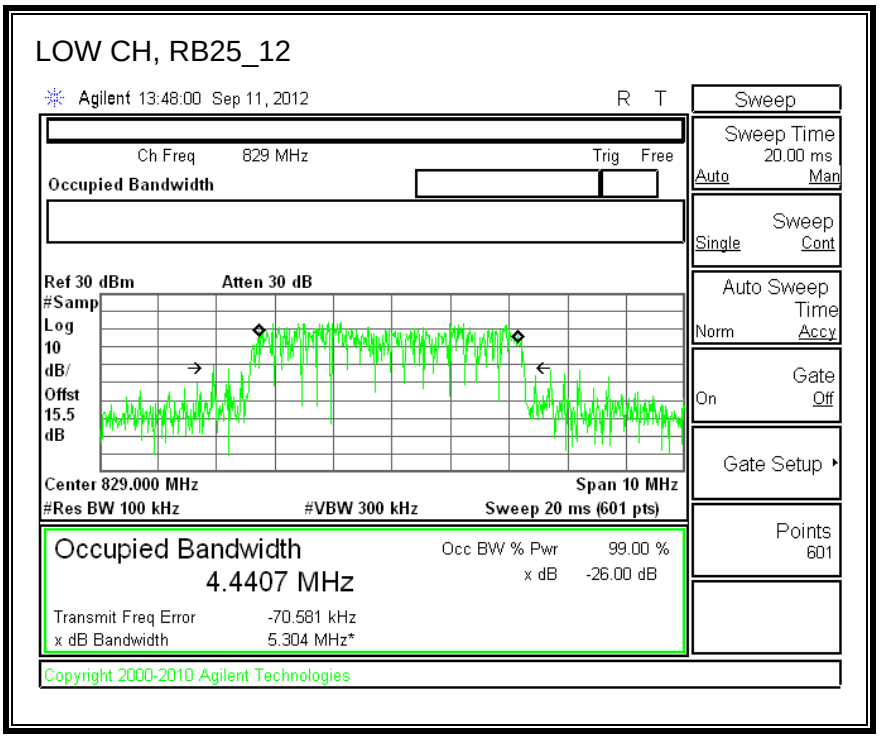
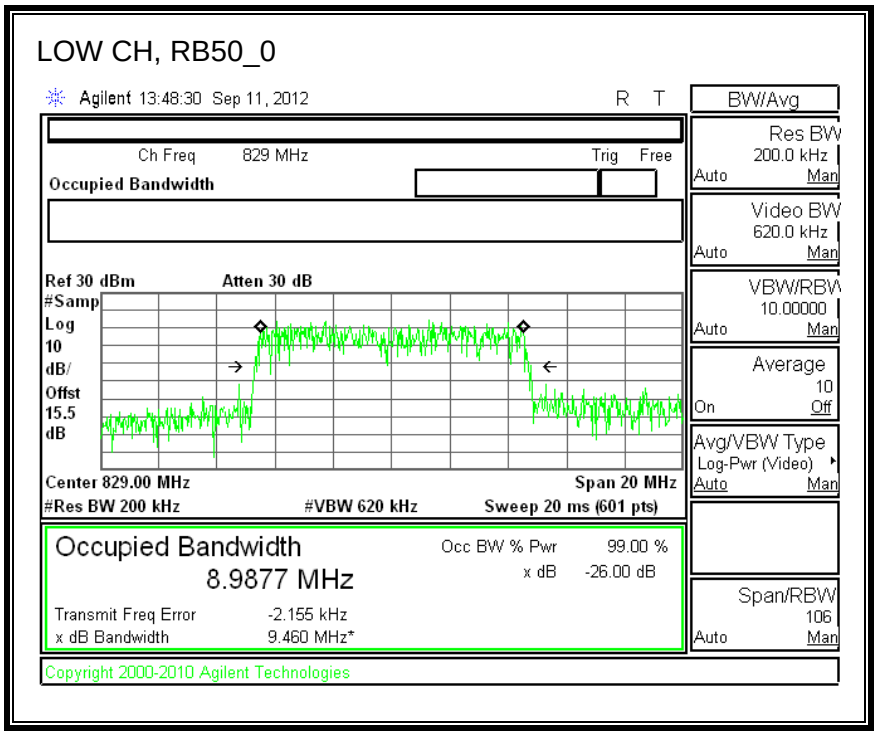
QPSK (10.0 MHz BAND WIDTH)





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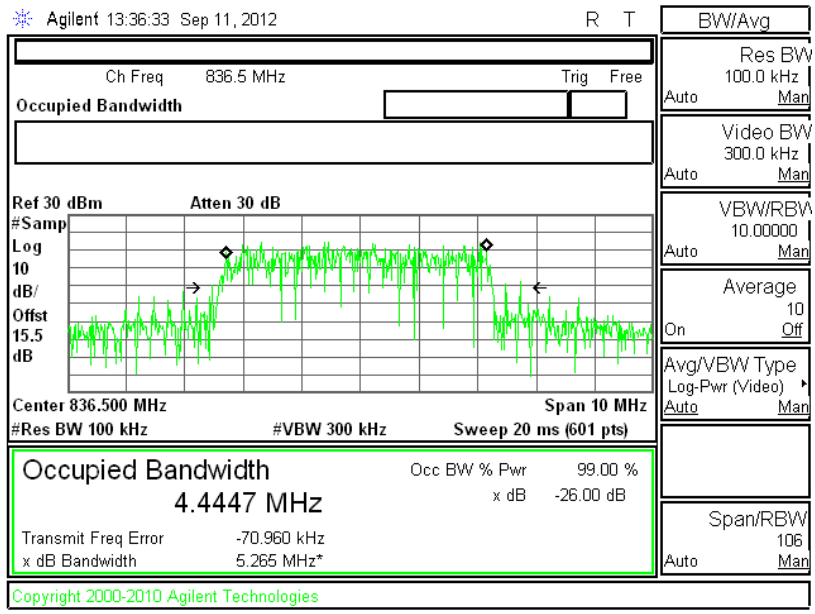
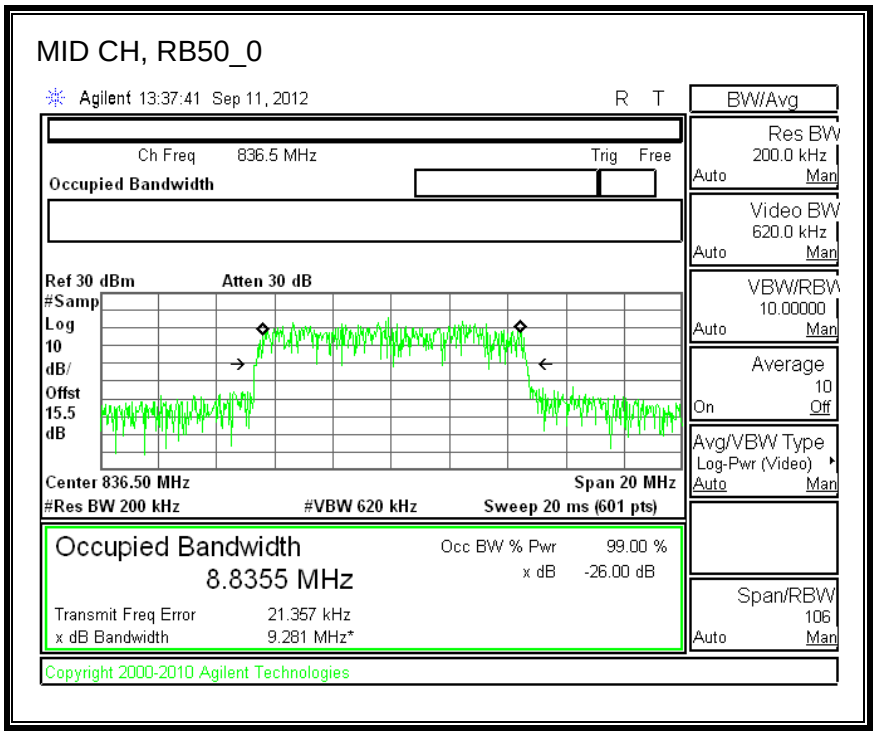
MID CH, RB25_12



MID CH, RB50_0



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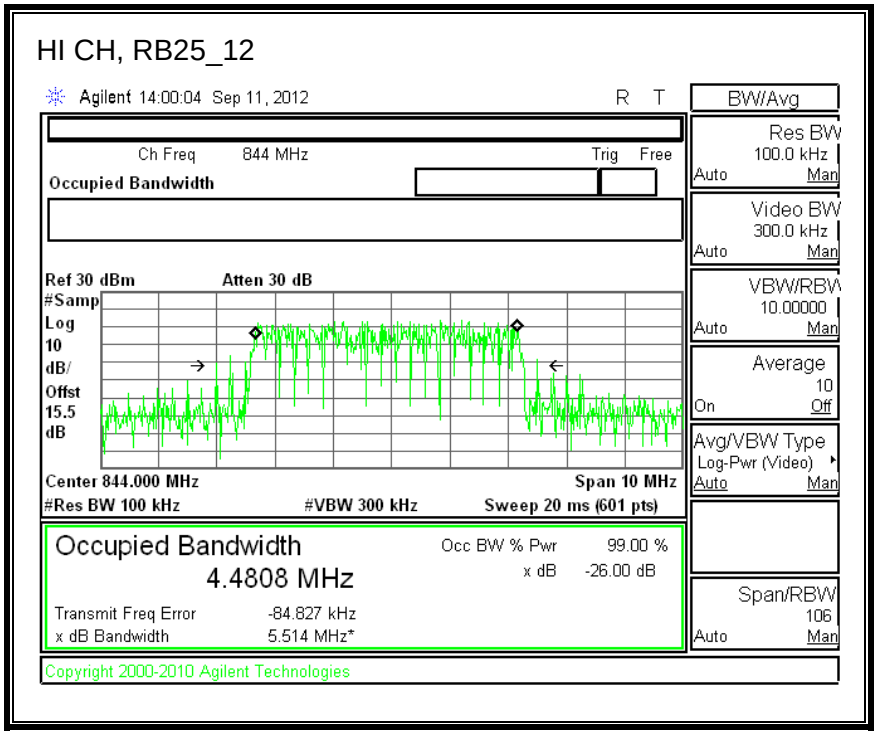
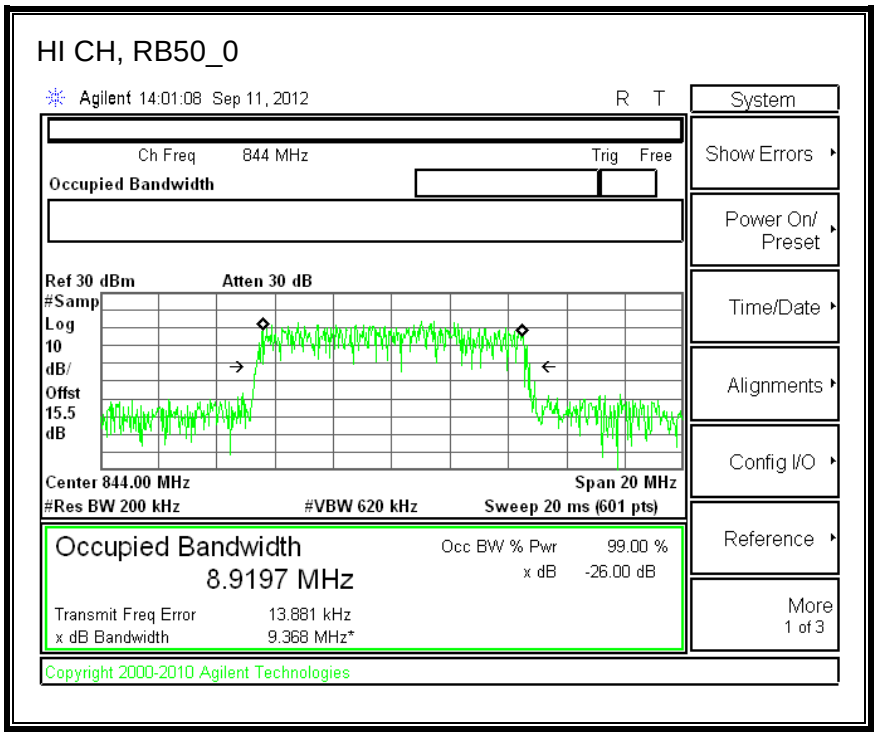
HI CH, RB25_12



HI CH, RB50_0



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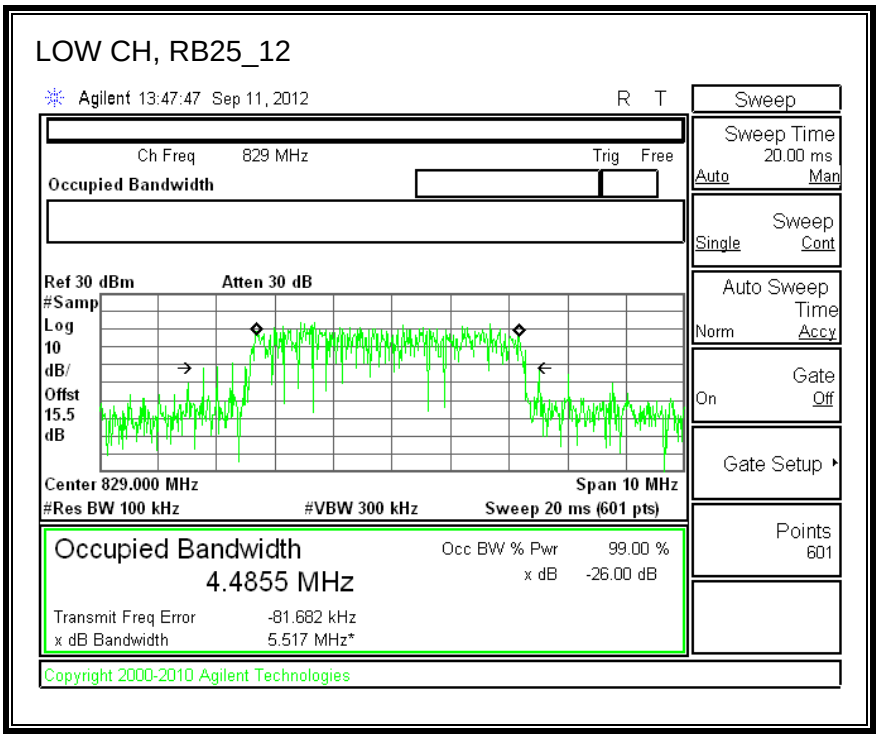
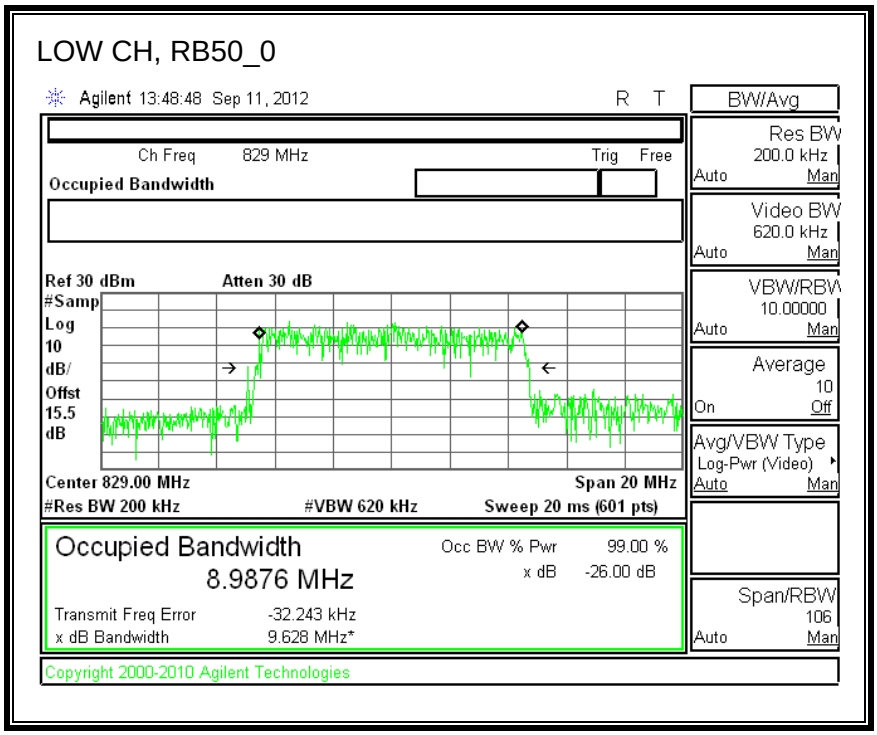
16QAM (10 MHz BAND WIDTH)





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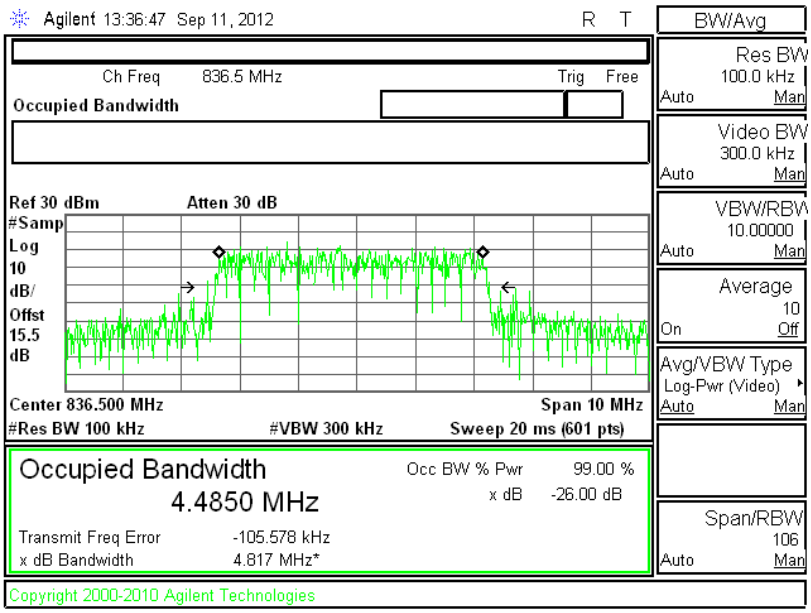
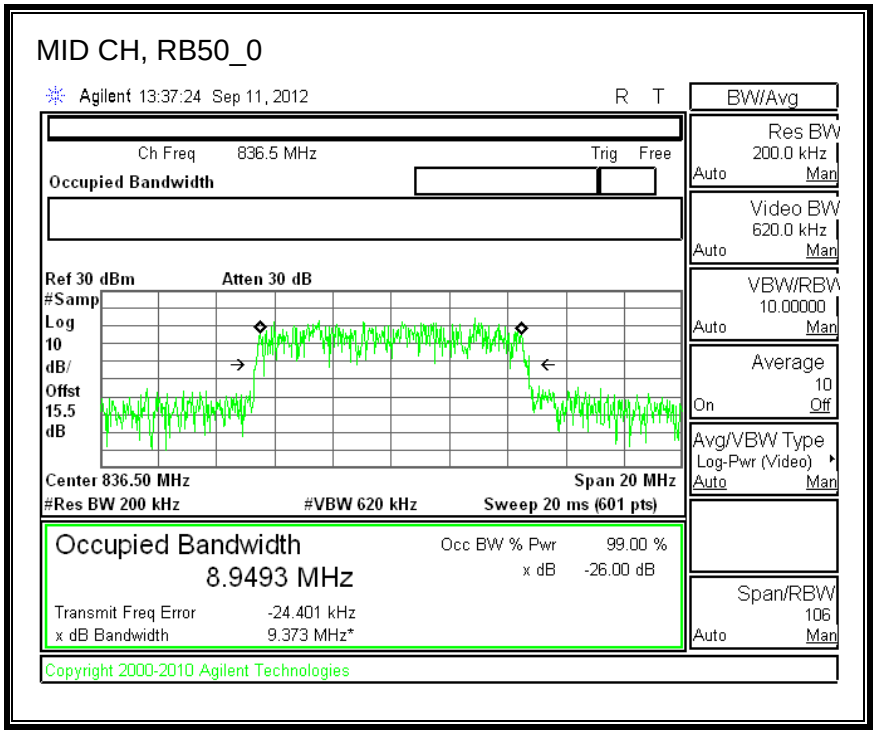
MID CH, RB25_12



MID CH, RB50_0



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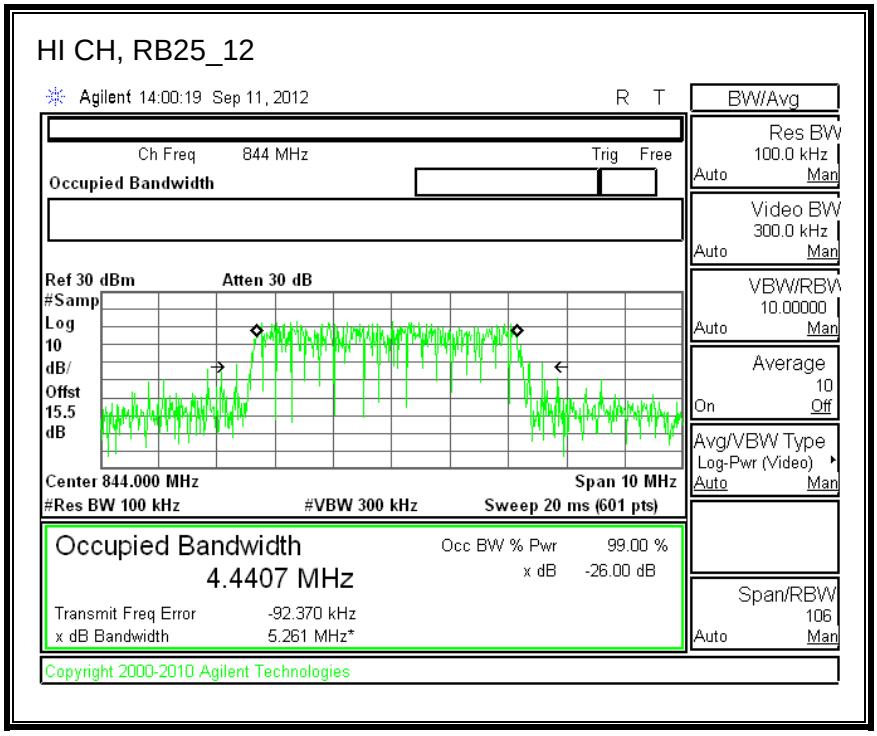
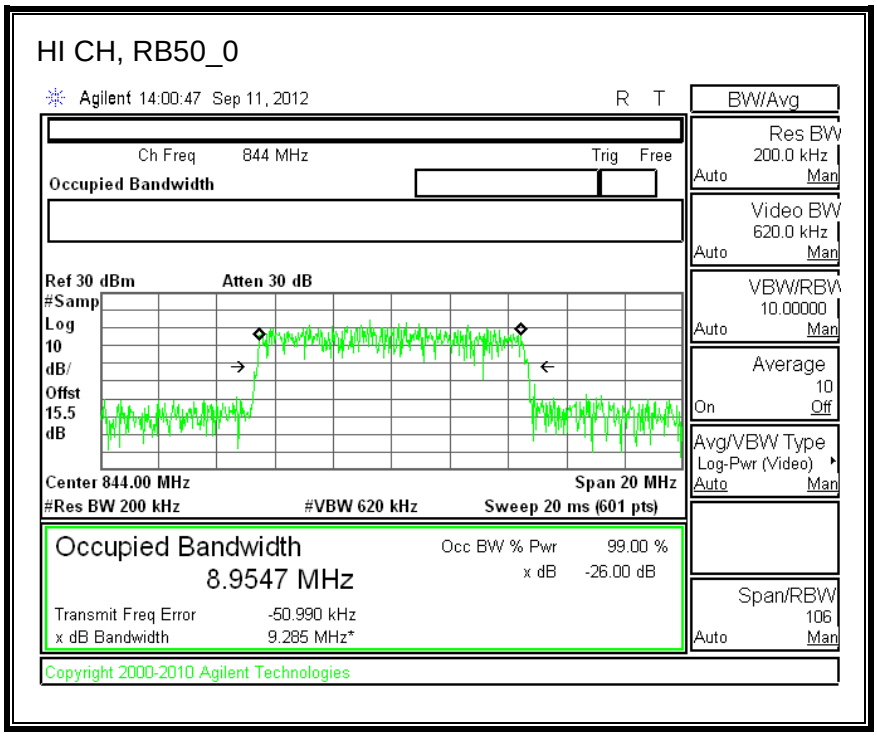
HI CH, RB25_12



HI CH, RB50_0



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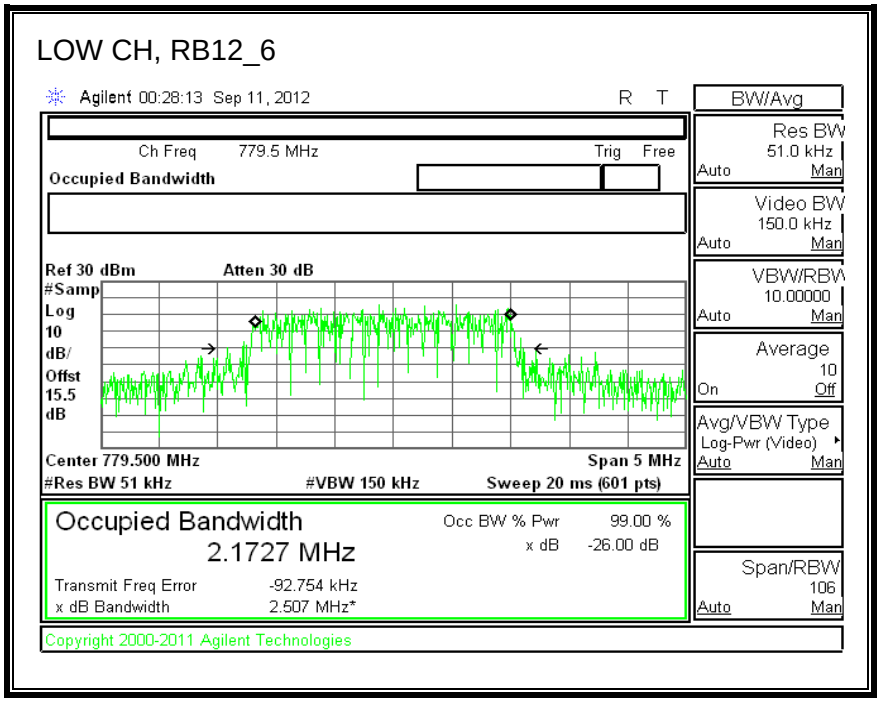
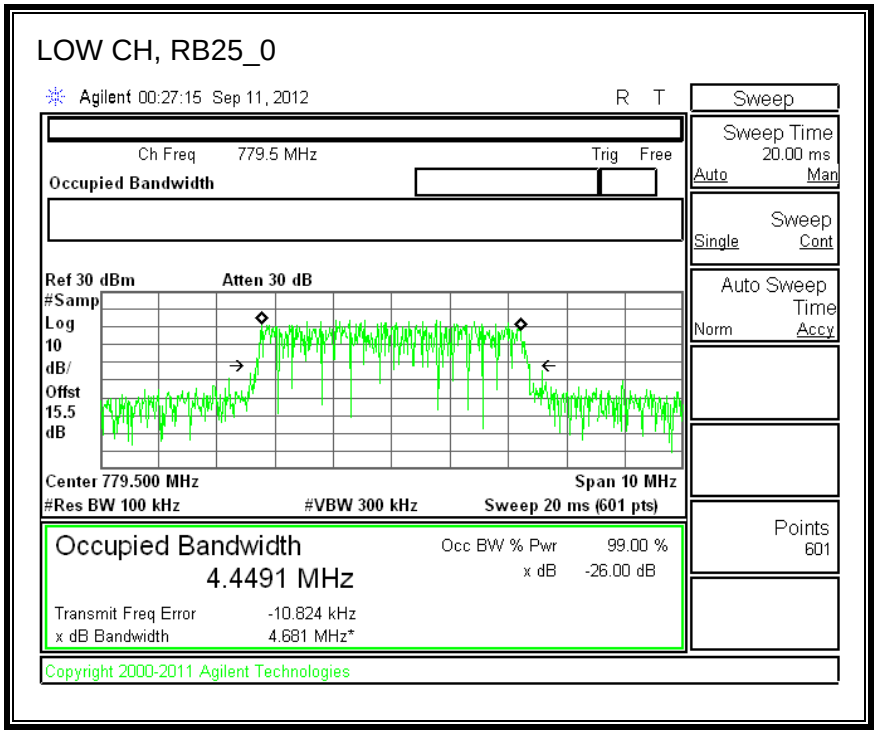
8.1.7. LTE BAND 13

QPSK Band 13 (5.0 MHz BAND WIDTH)





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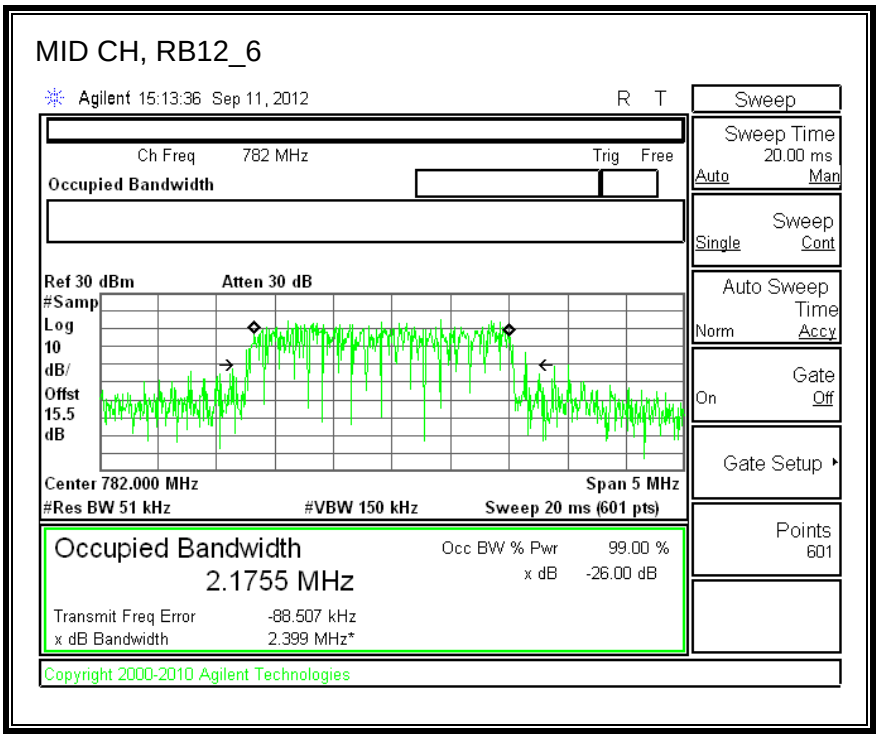
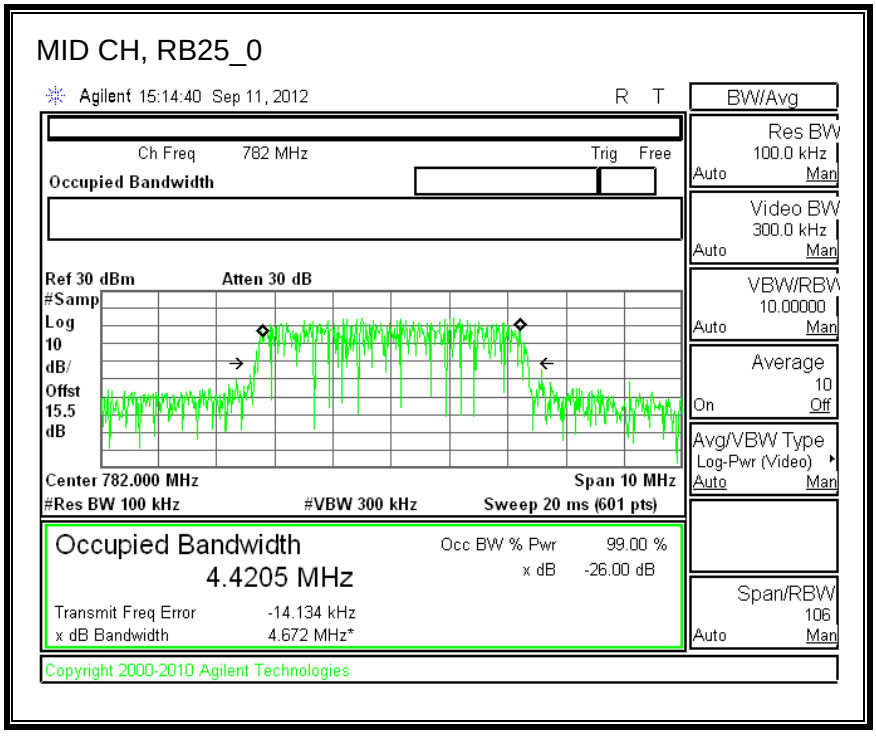
MID CH, RB12_6



MID CH, RB25_0



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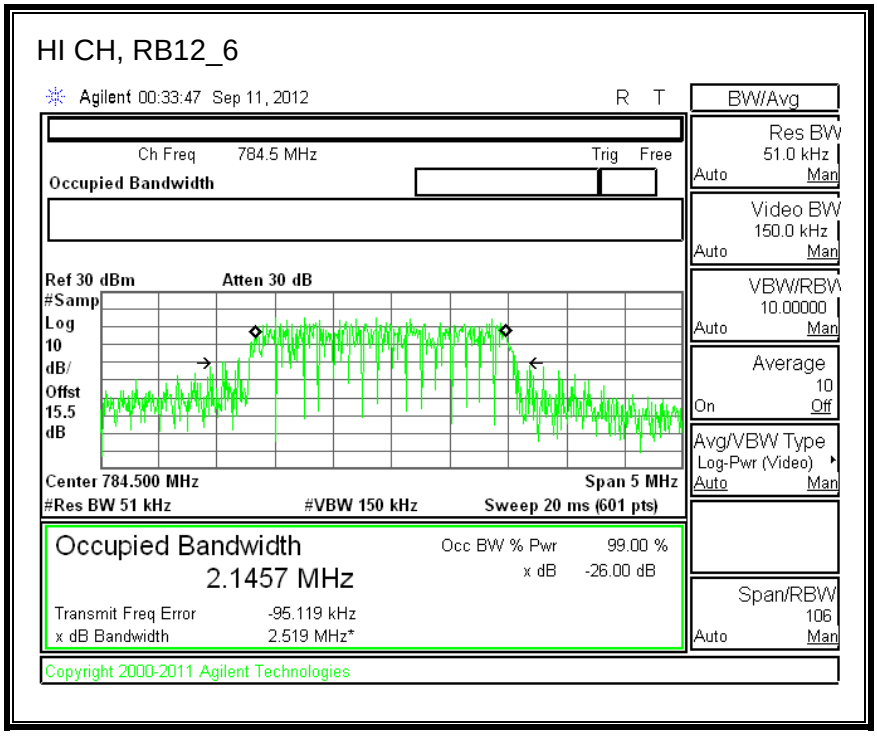
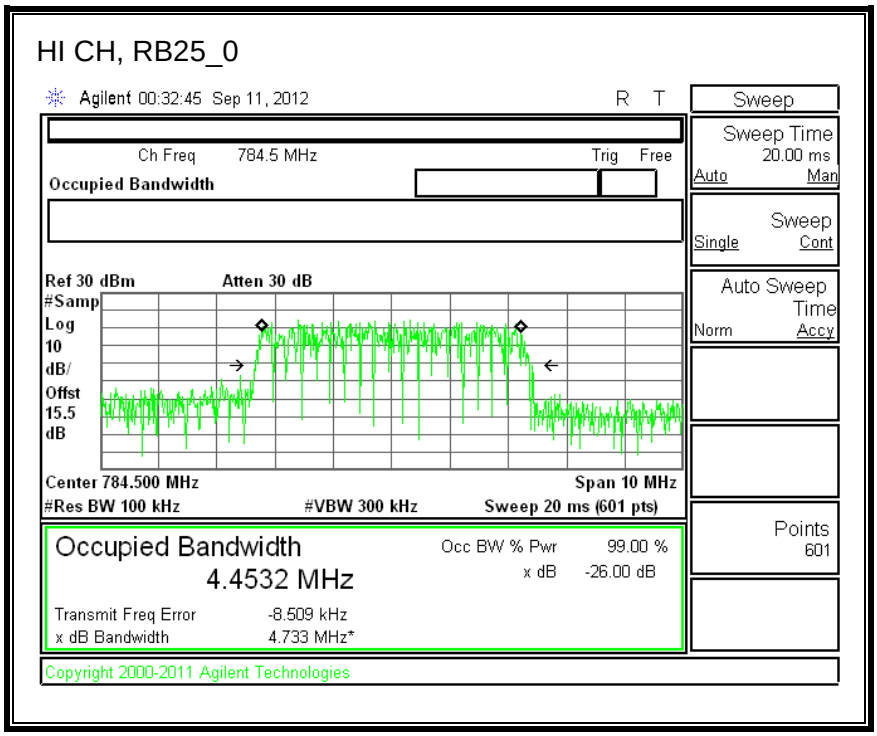
HI CH, RB12_6



HI CH, RB25_0



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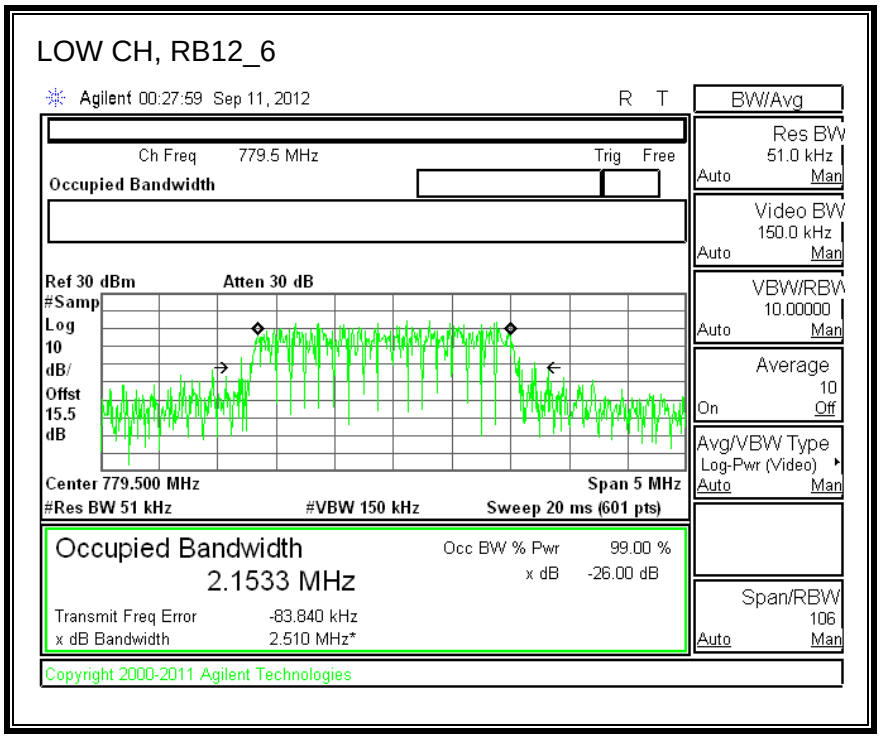
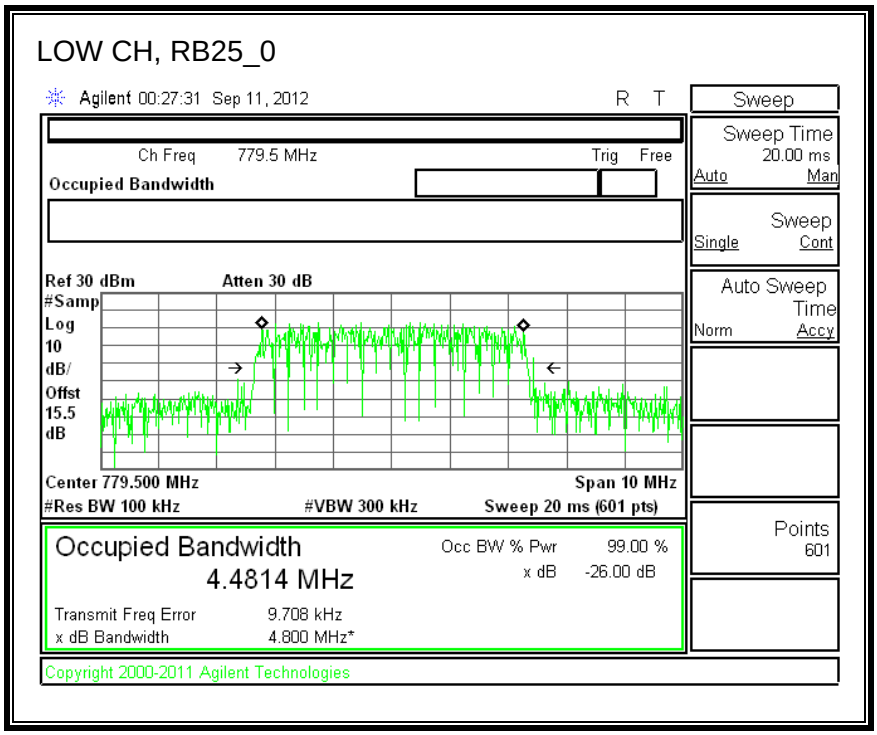
16QAM Band 13 (5 MHz BAND WIDTH)





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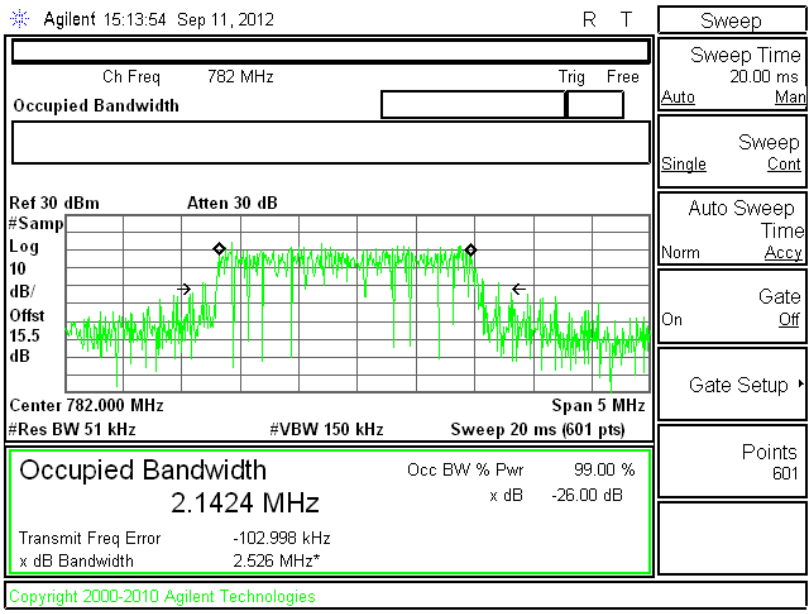
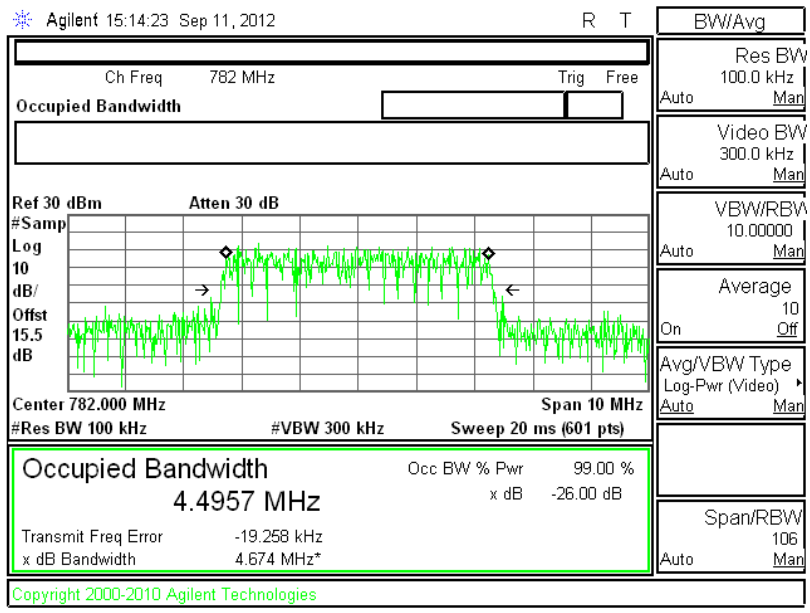
MID CH, RB12_6



MID CH, RB25_0



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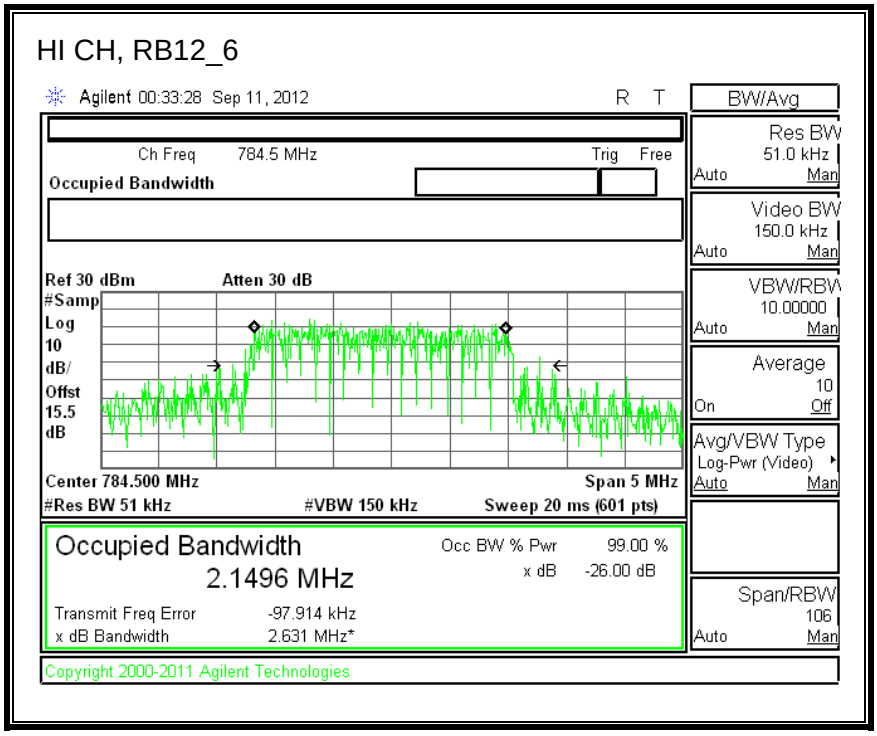
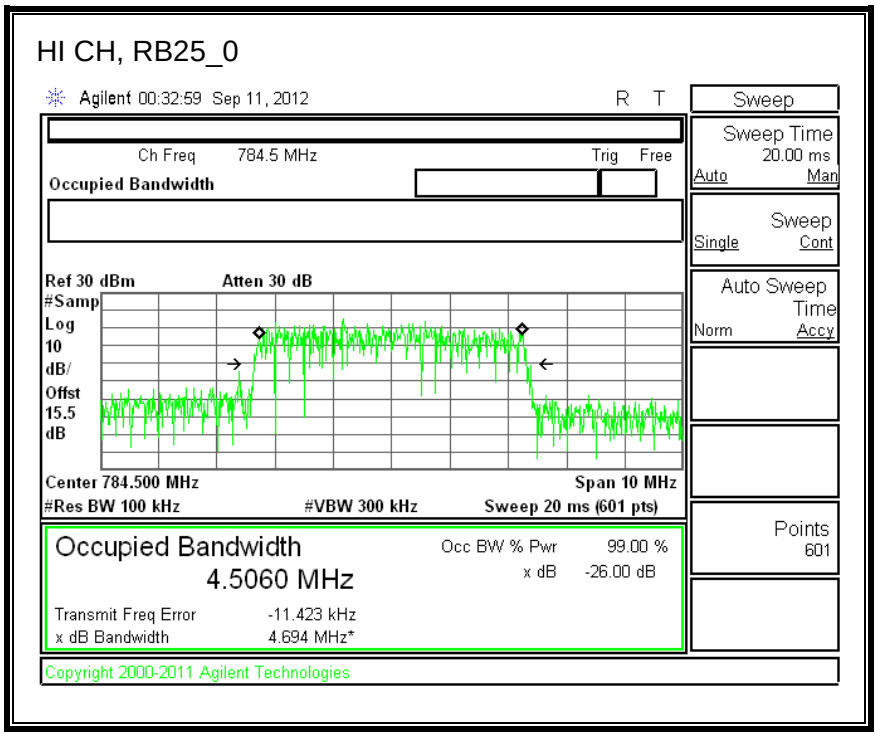
HI CH, RB12_6



HI CH, RB25_0



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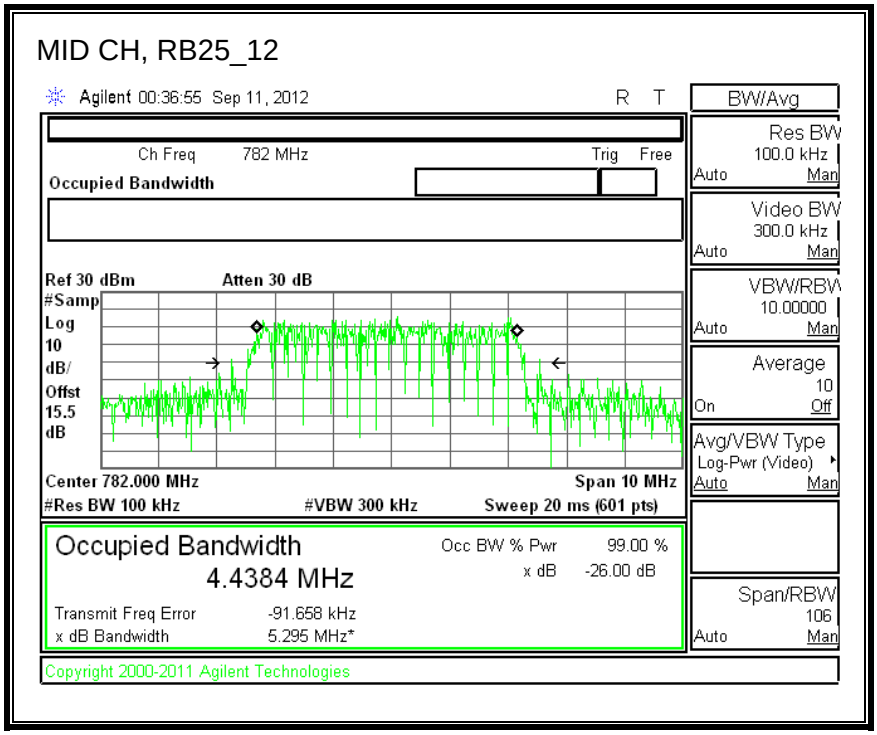
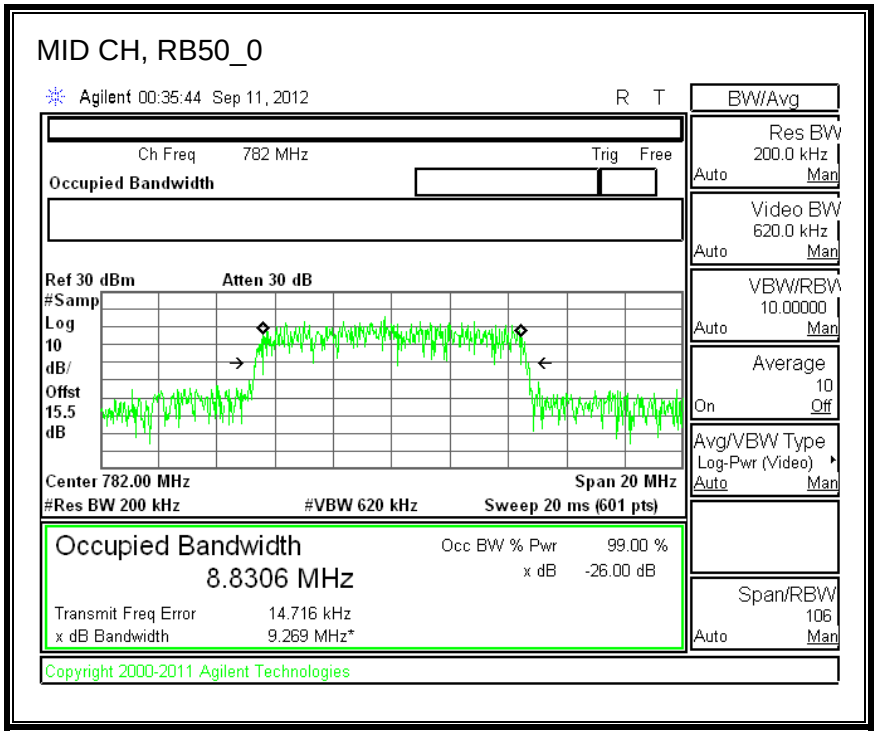
QPSK Band 13 (10.0 MHz BAND WIDTH)





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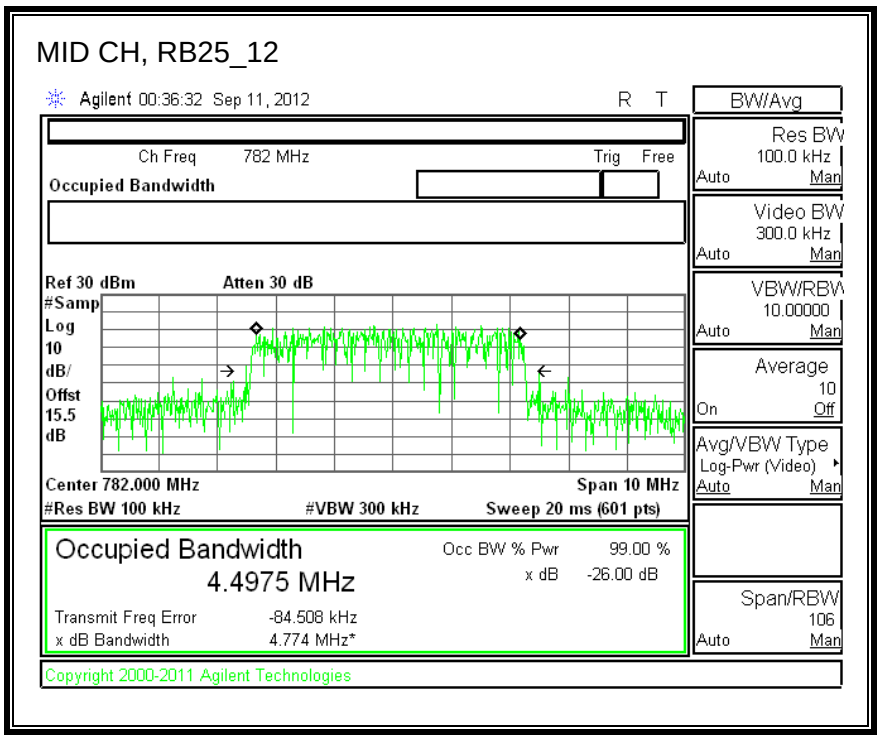
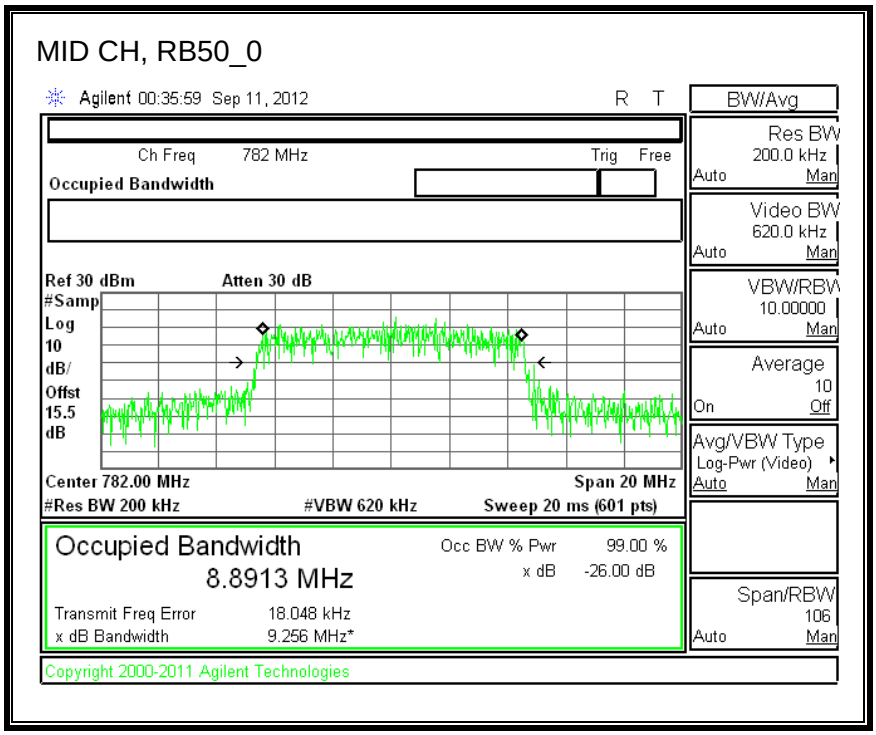
16QAM Band 13 (10 MHz BAND WIDTH)





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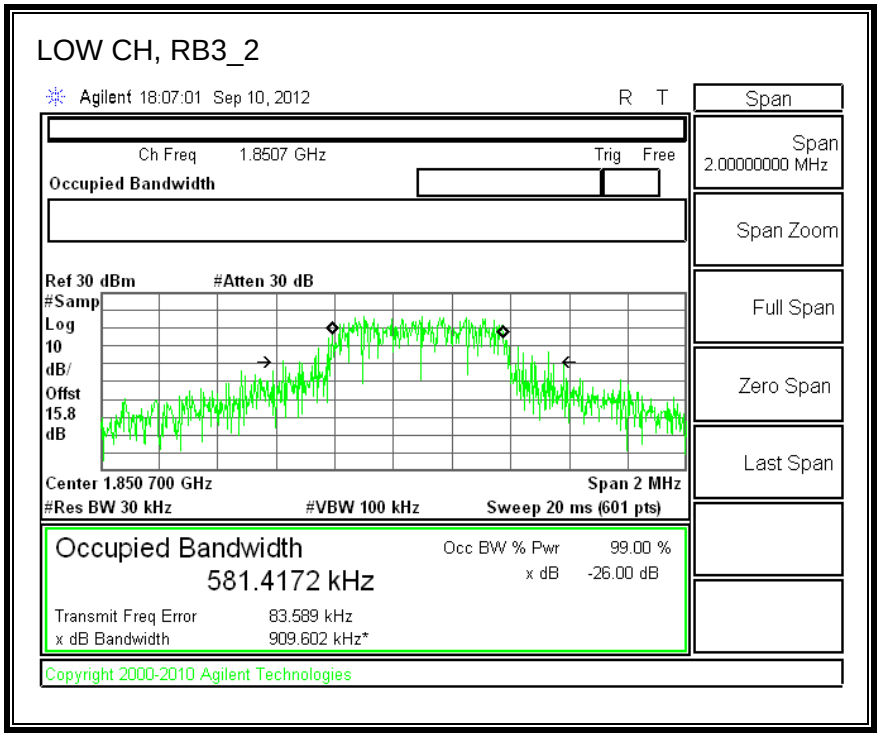
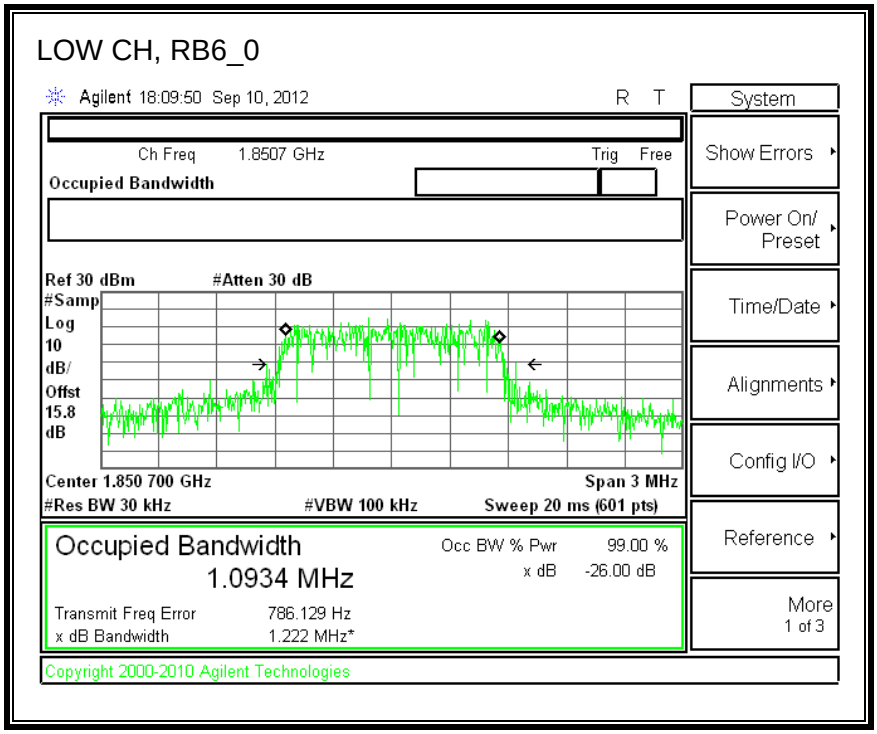
8.1.8. LTE BAND 25

QPSK Band 25 (1.4 MHz BAND WIDTH)





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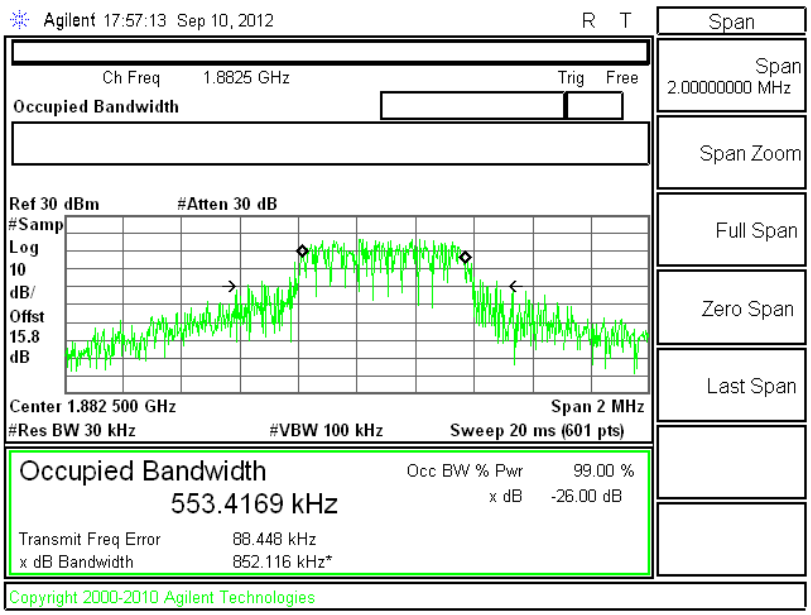
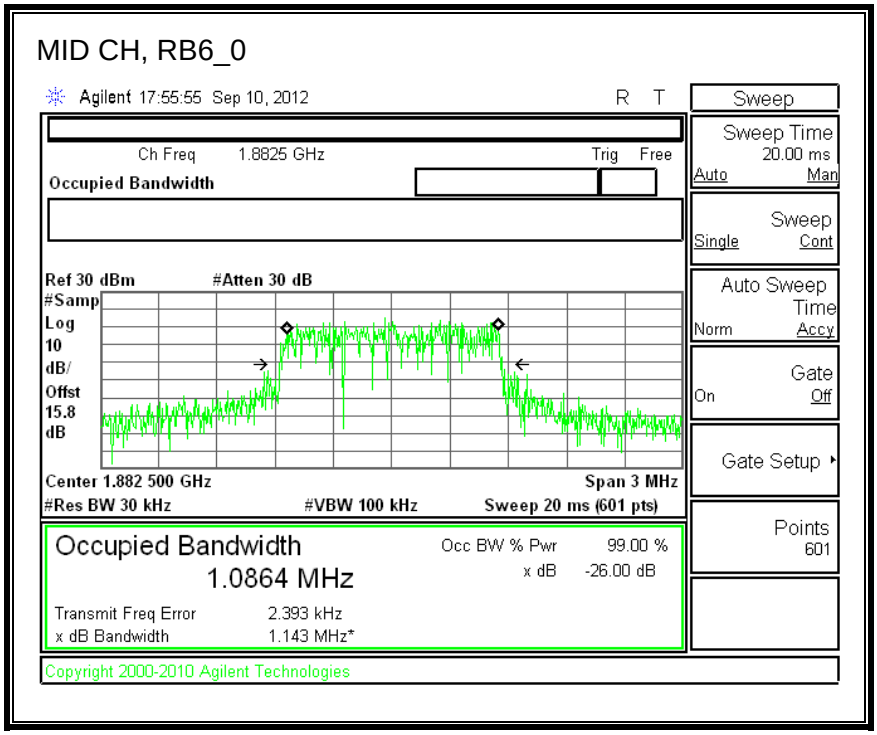
MID CH, RB3_2



MID CH, RB6_0



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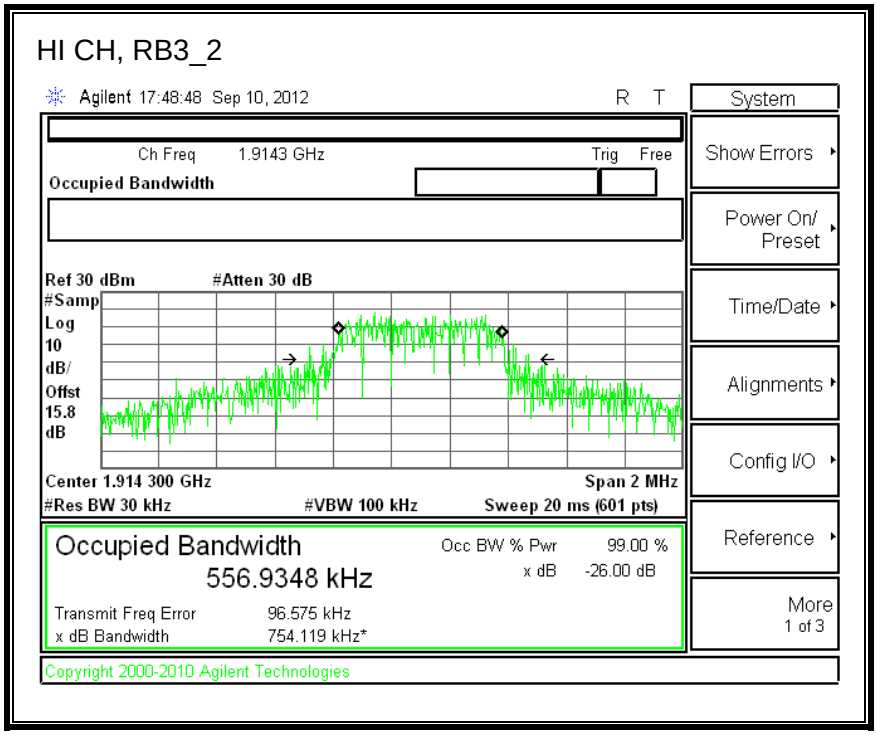
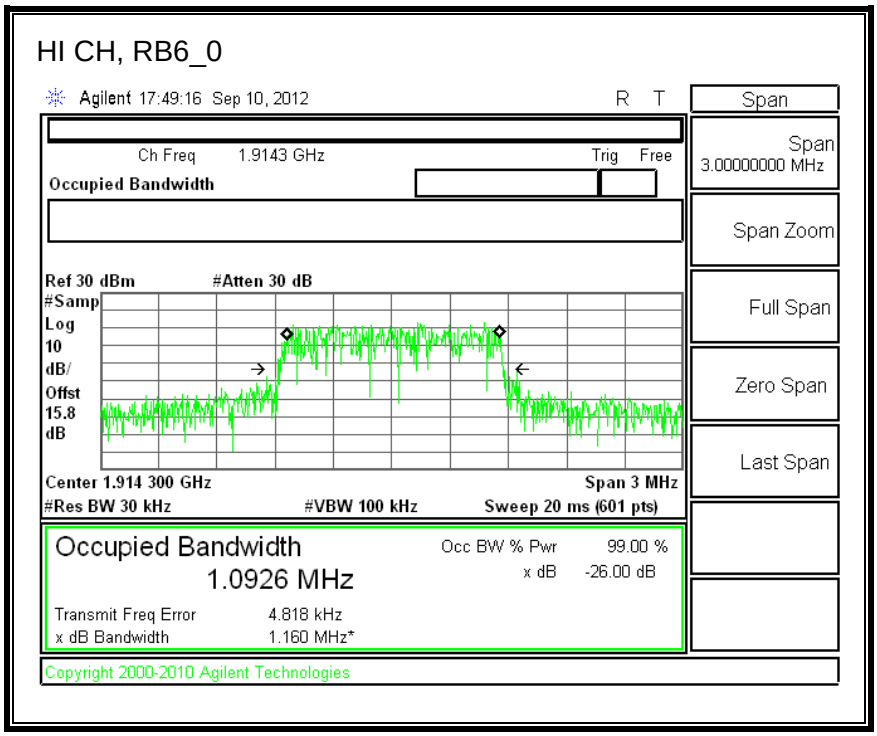
HI CH, RB3_2



HI CH, RB6_0



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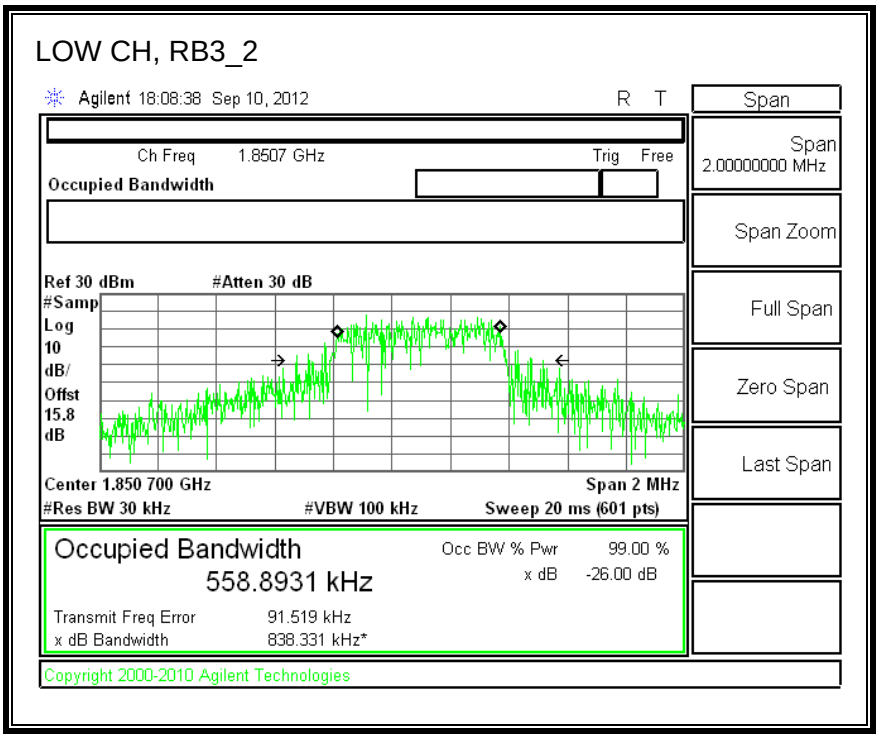
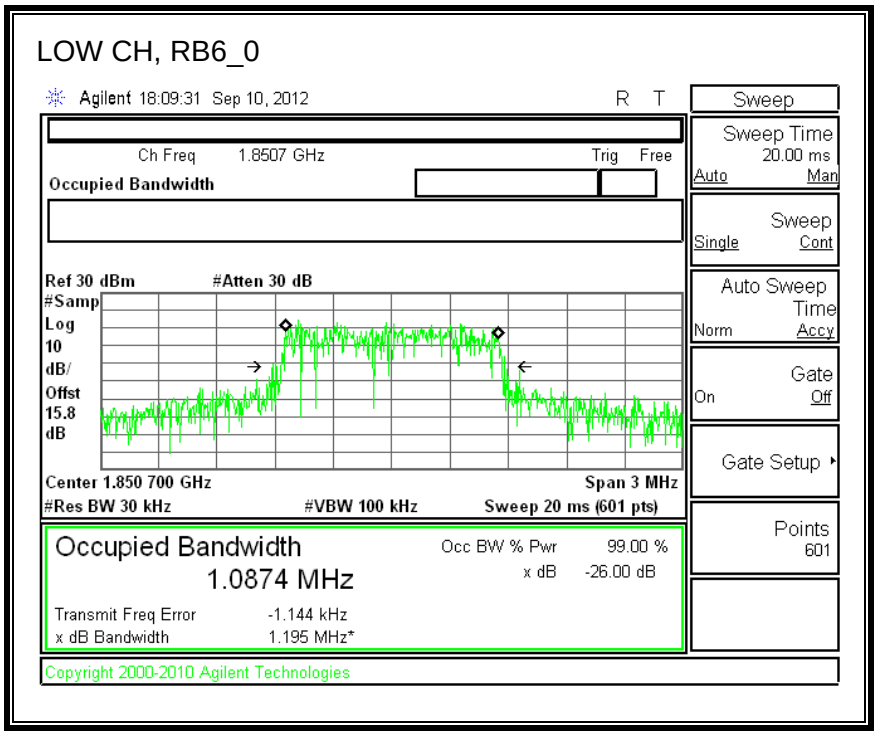
16QAM Band 25 (1.4 MHz BAND WIDTH)





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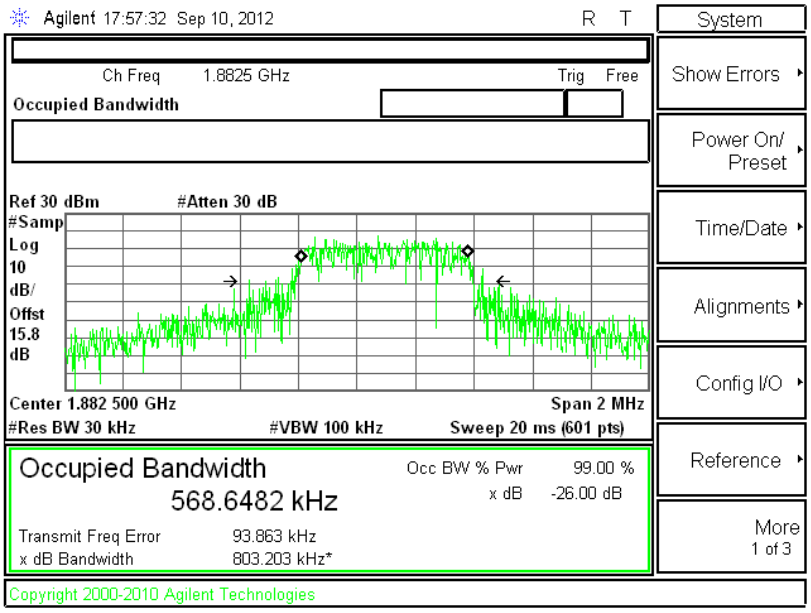
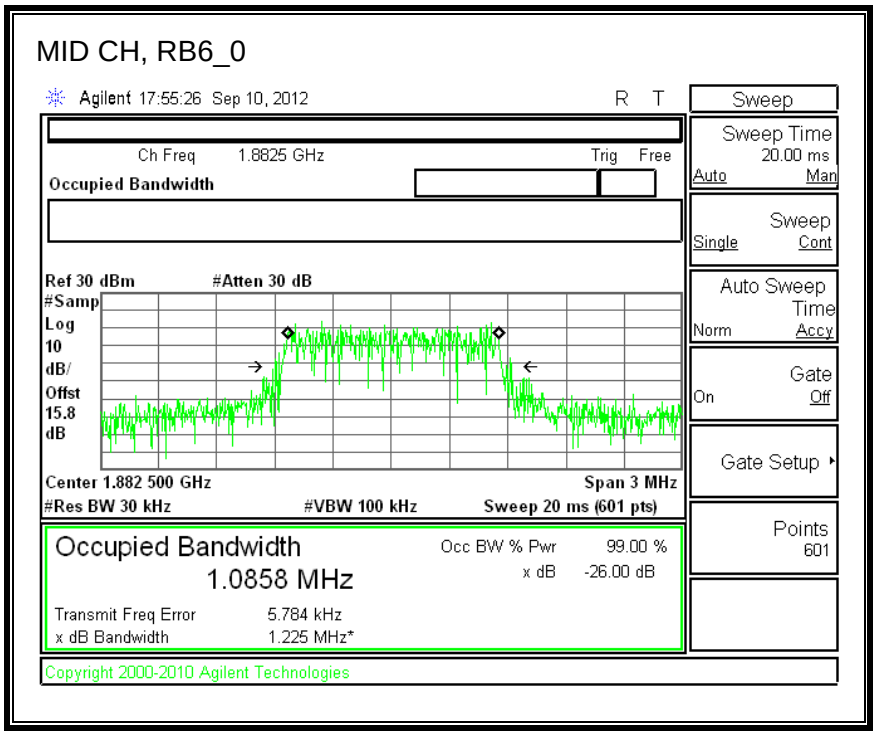
MID CH, RB3_2



MID CH, RB6_0



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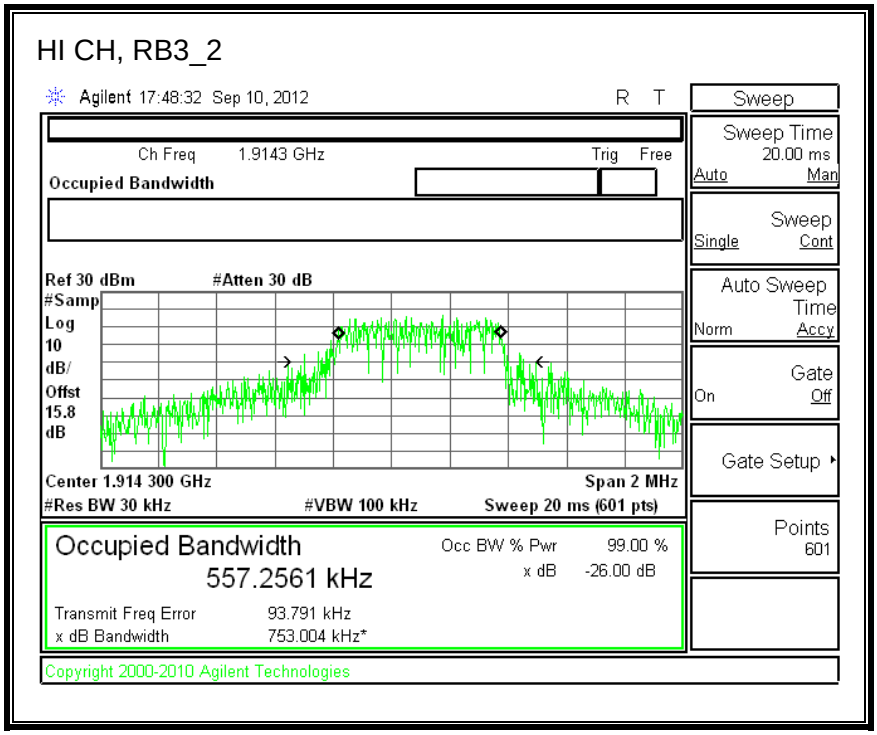
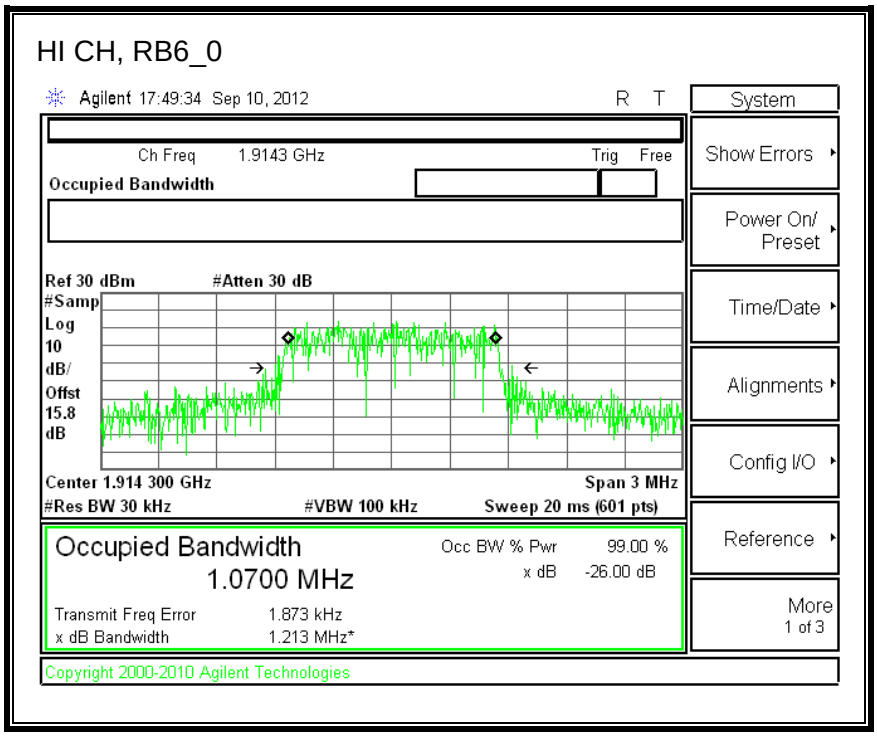
HI CH, RB3_2



HI CH, RB6_0



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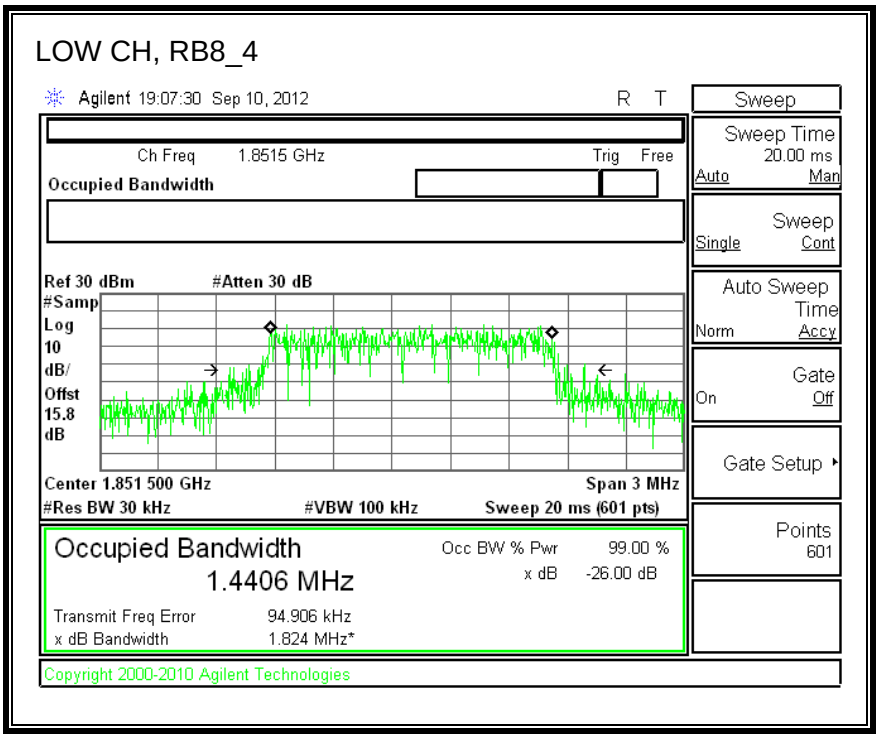
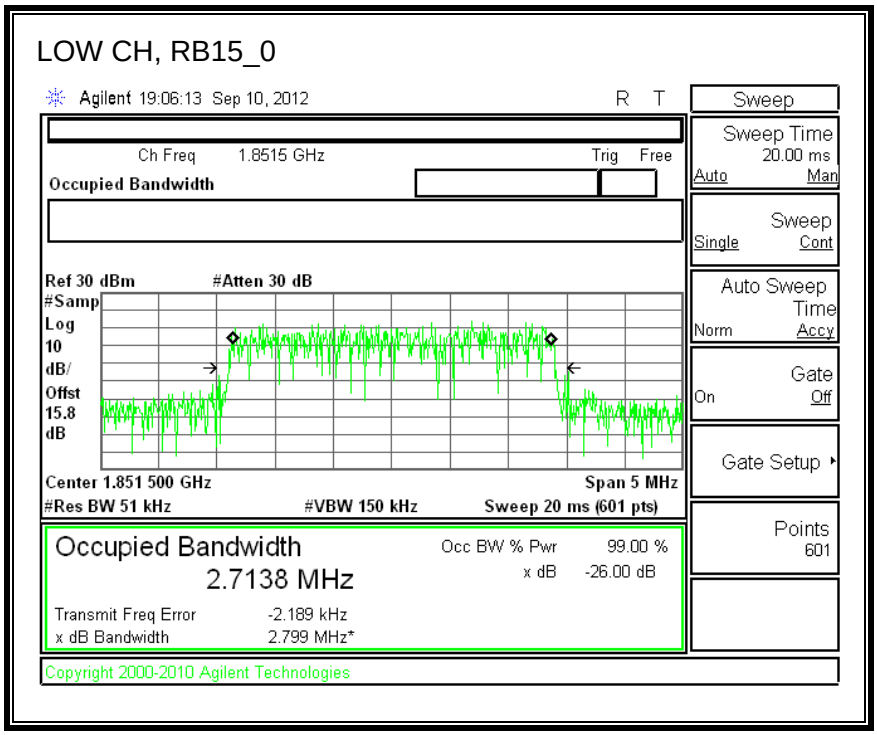
QPSK Band 25 (3.0 MHz BAND WIDTH)





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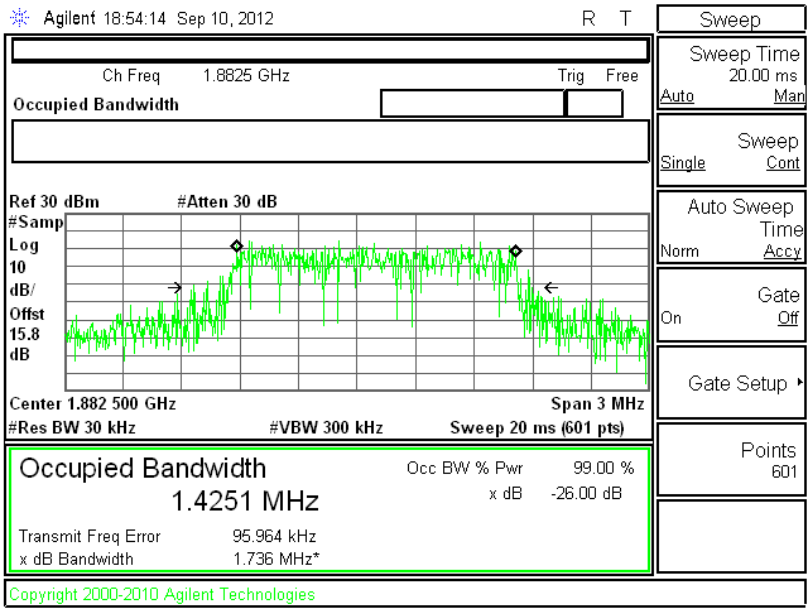
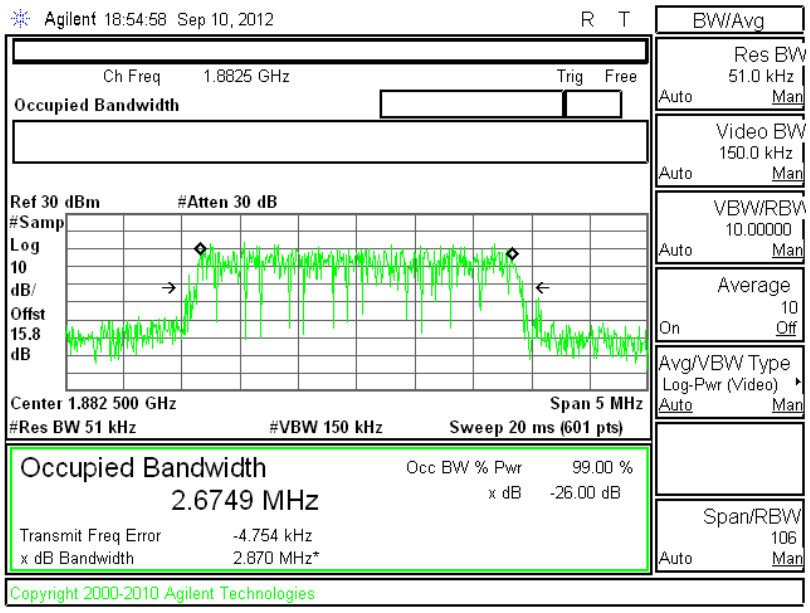
MID CH, RB8_4



MID CH, RB15_0



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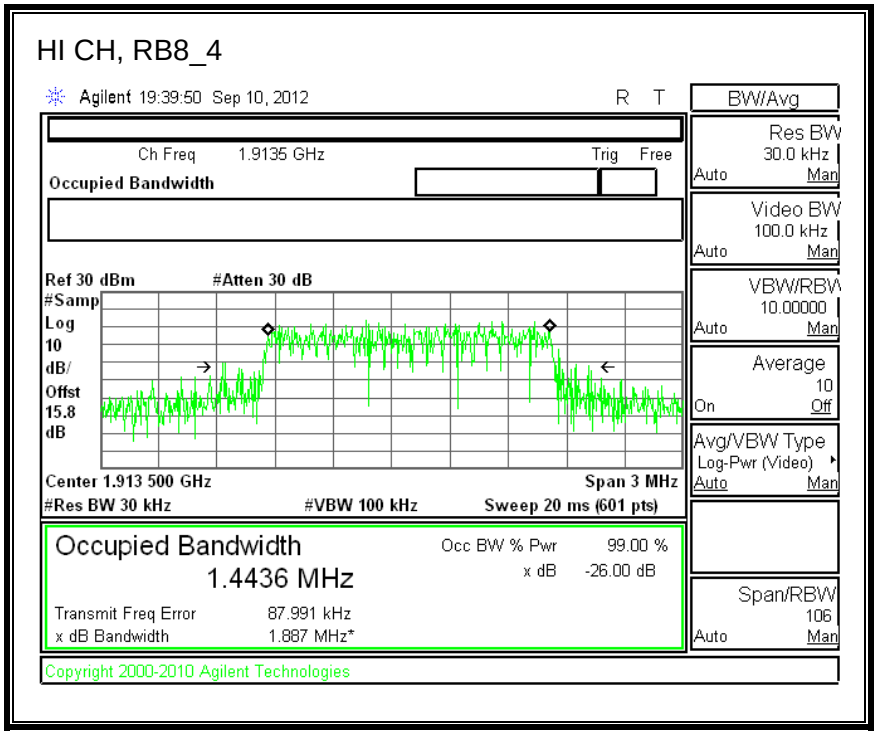
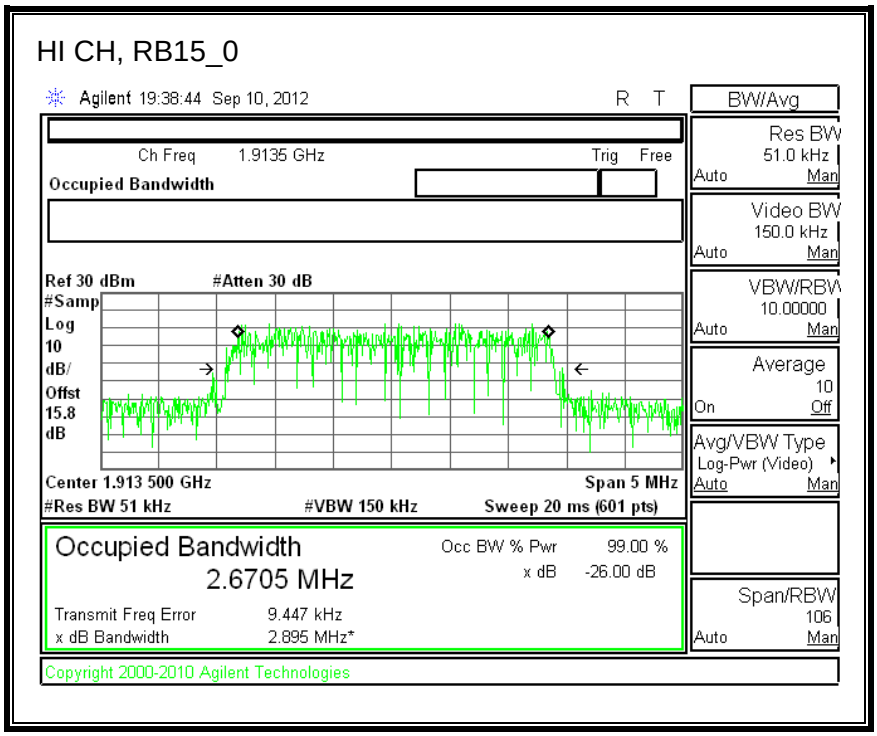
HI CH, RB8_4



HI CH, RB15_0



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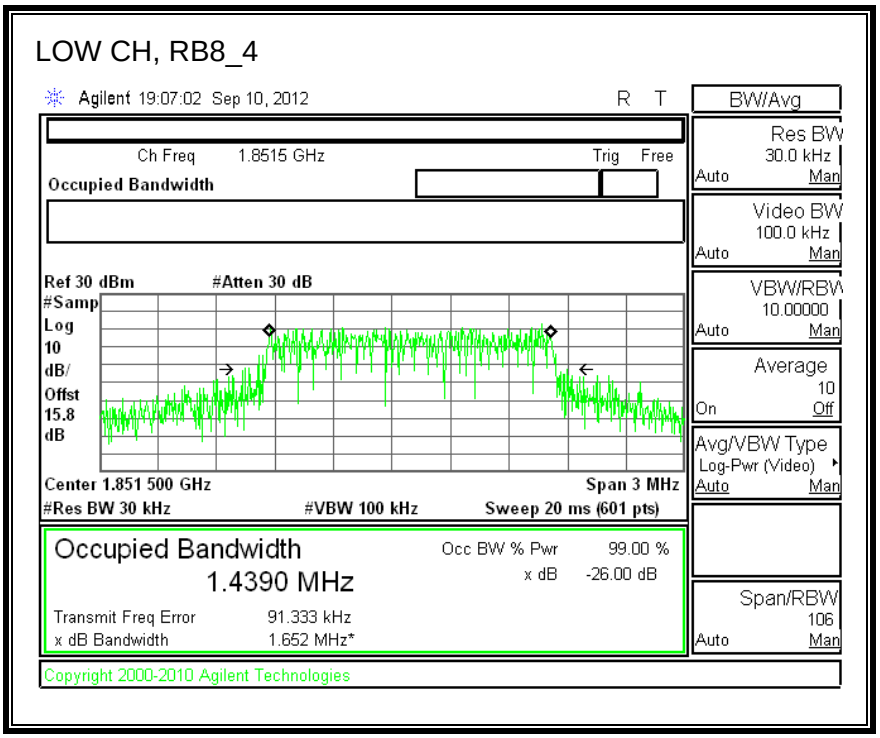
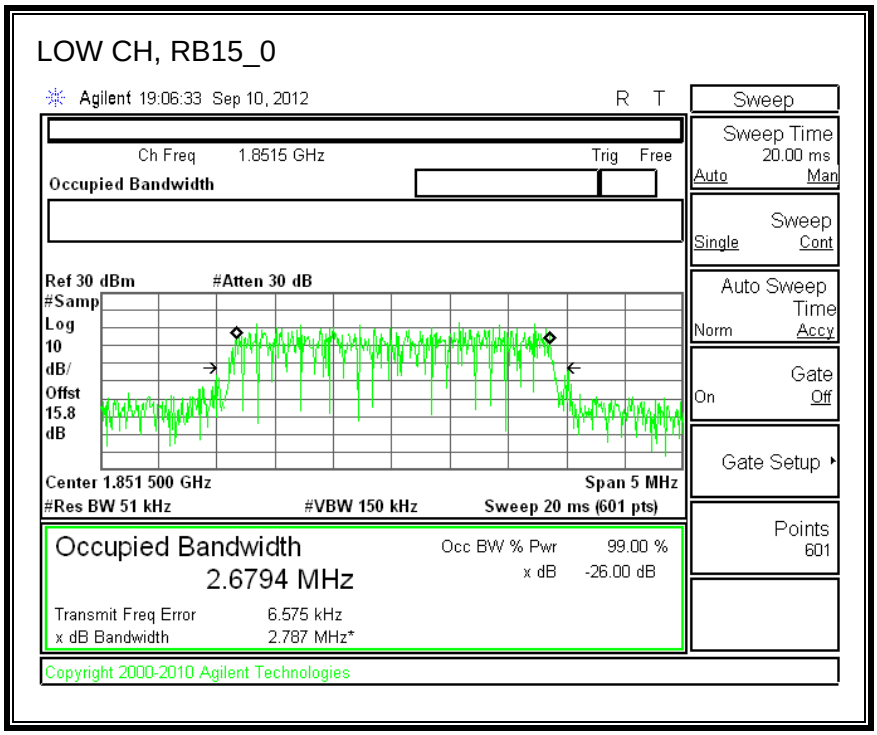
16QAM Band 25 (3.0 MHz BAND WIDTH)





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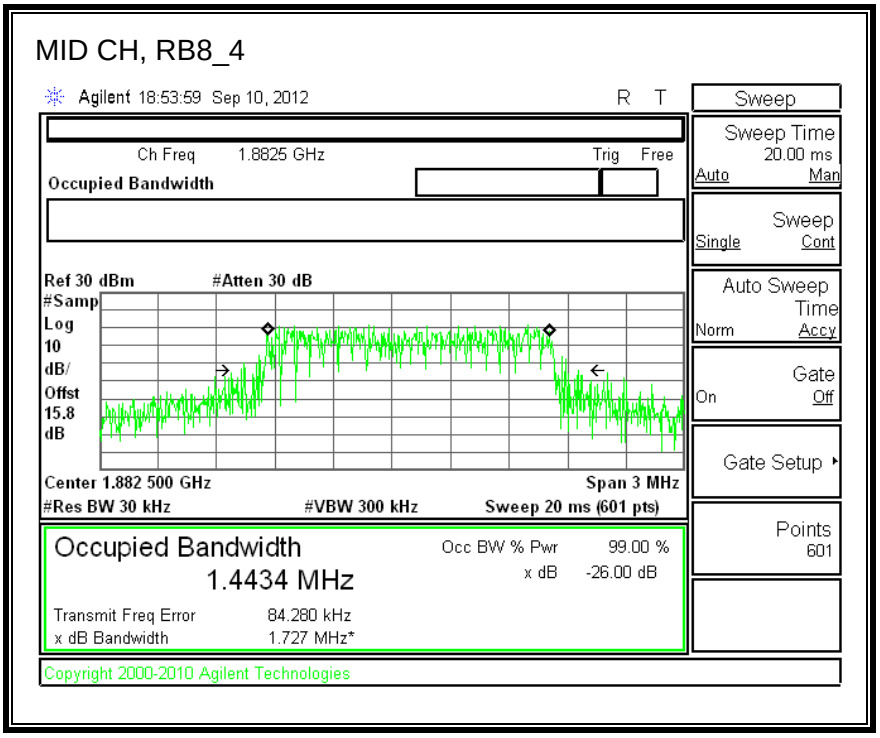
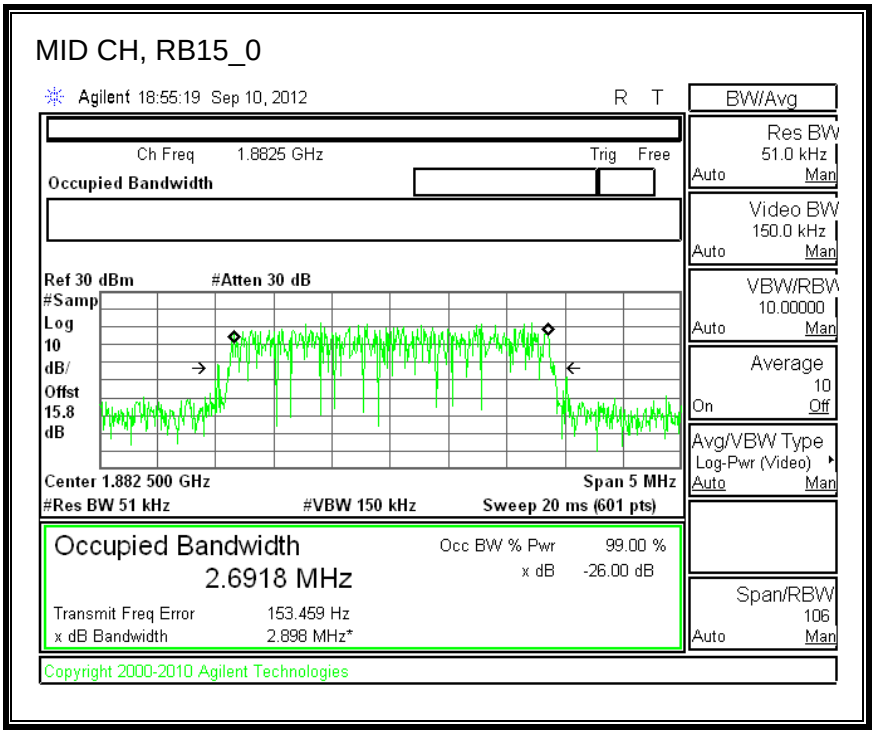
MID CH, RB8_4



MID CH, RB15_0



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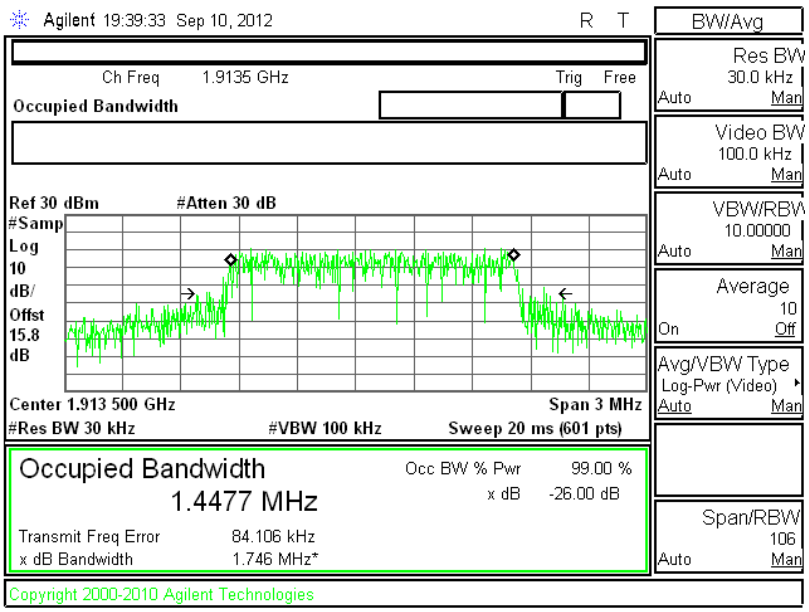
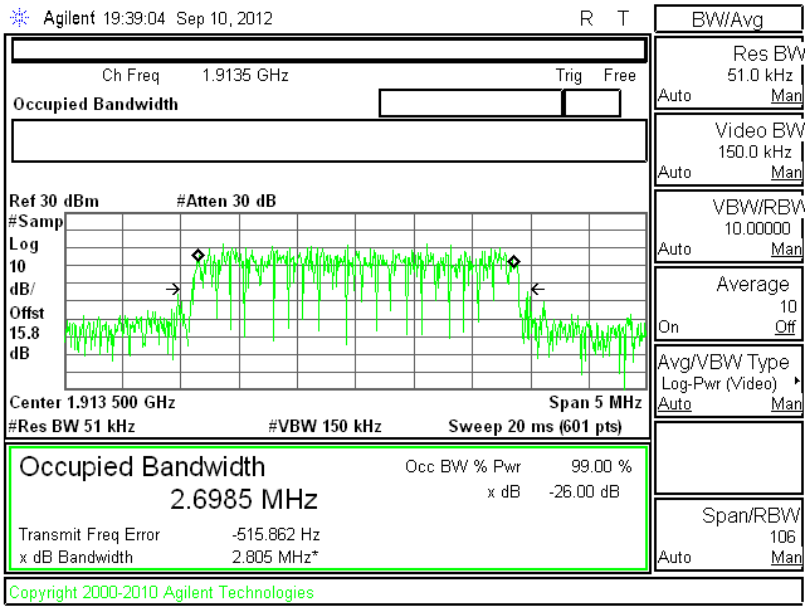
HI CH, RB8_4



HI CH, RB15_0



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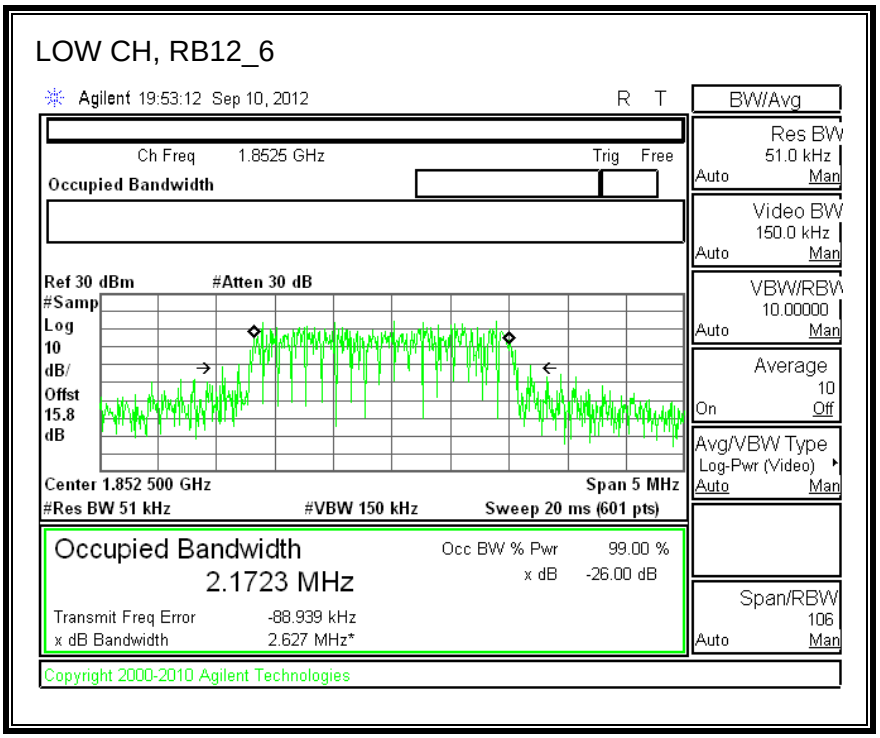
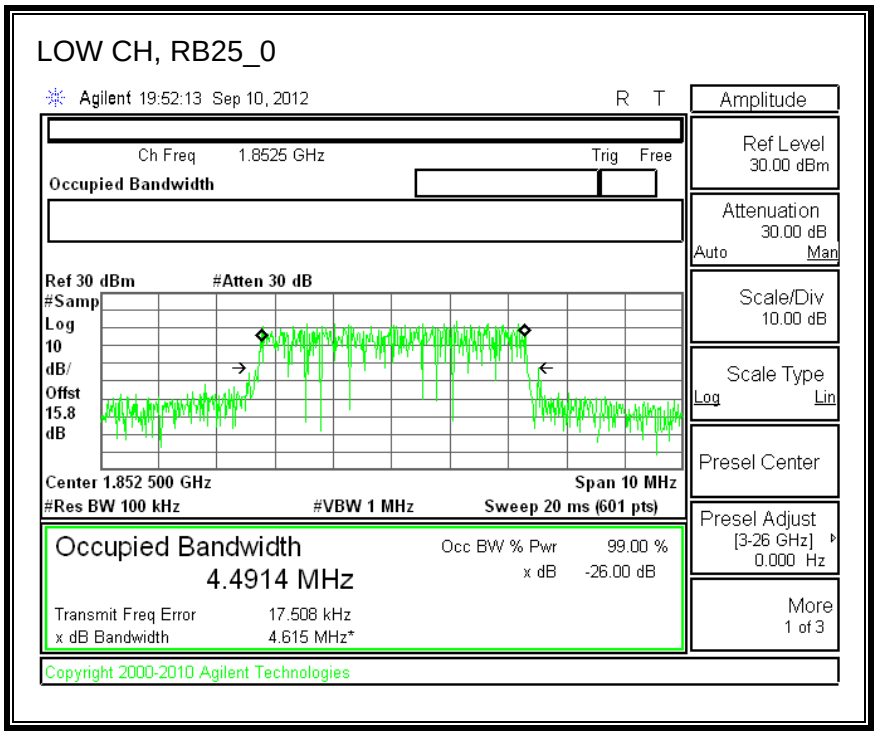
QPSK Band 25 (5.0 MHz BAND WIDTH)





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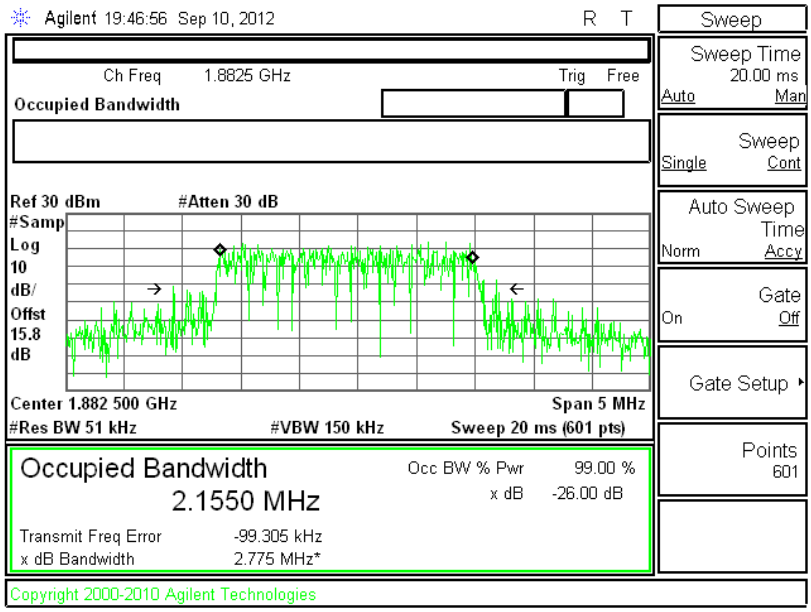
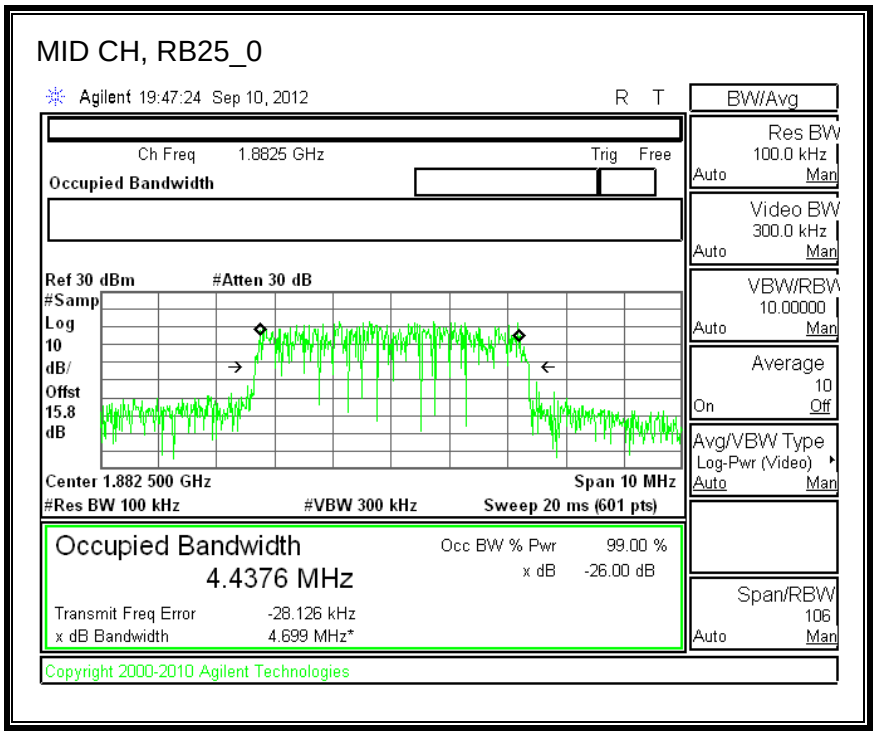
MID CH, RB12_6



MID CH, RB25_0



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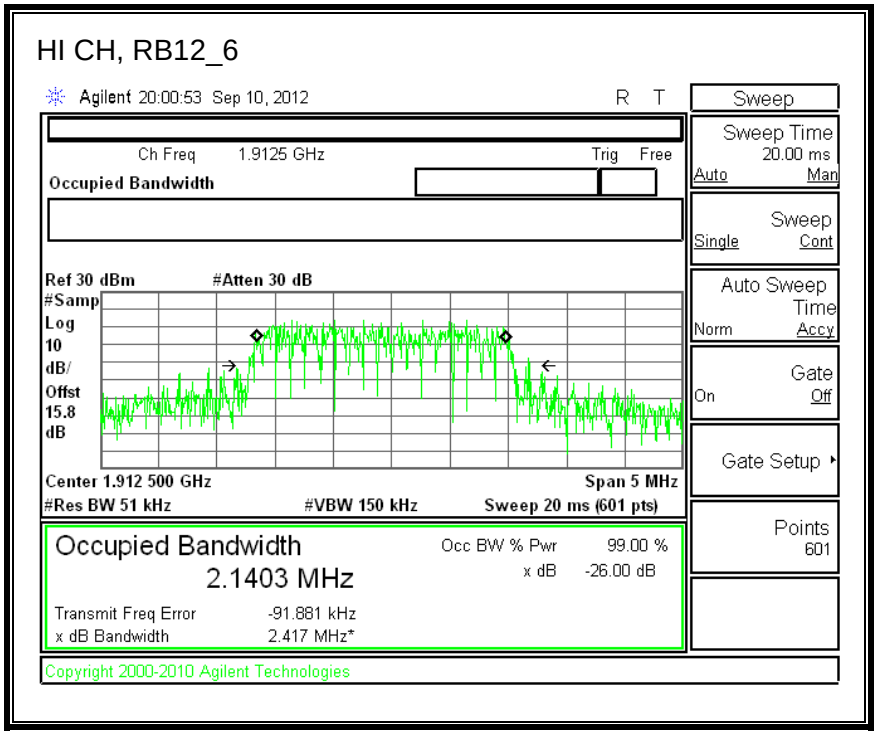
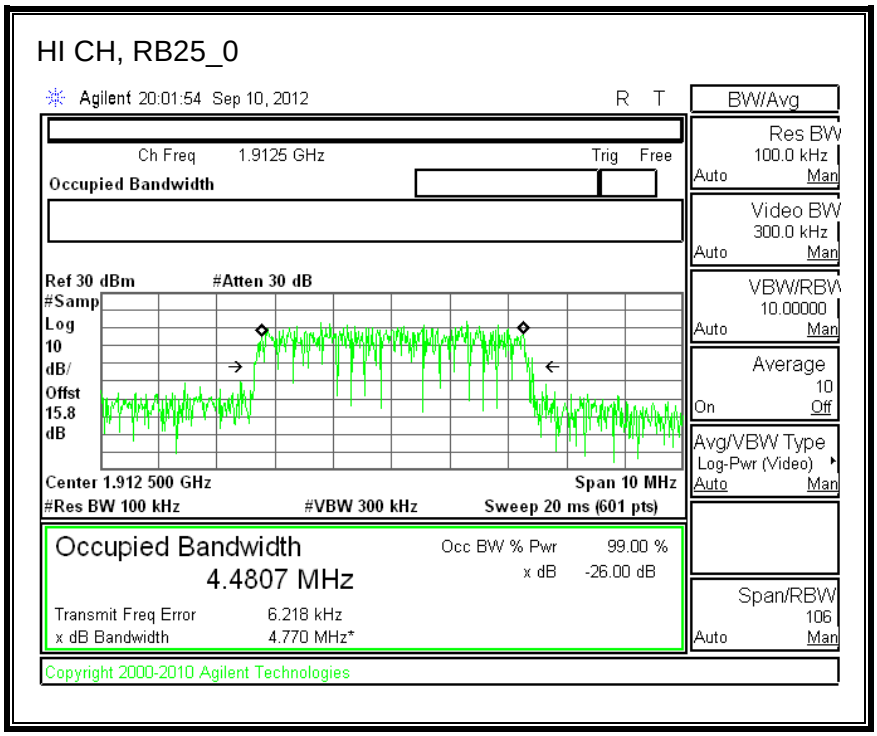
HI CH, RB12_6



HI CH, RB25_0



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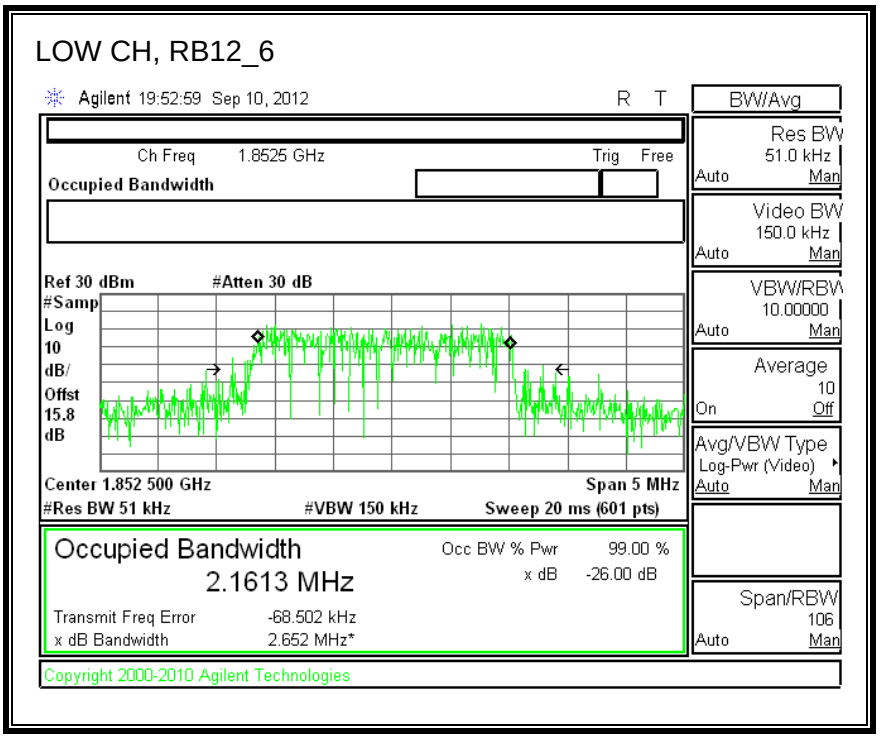
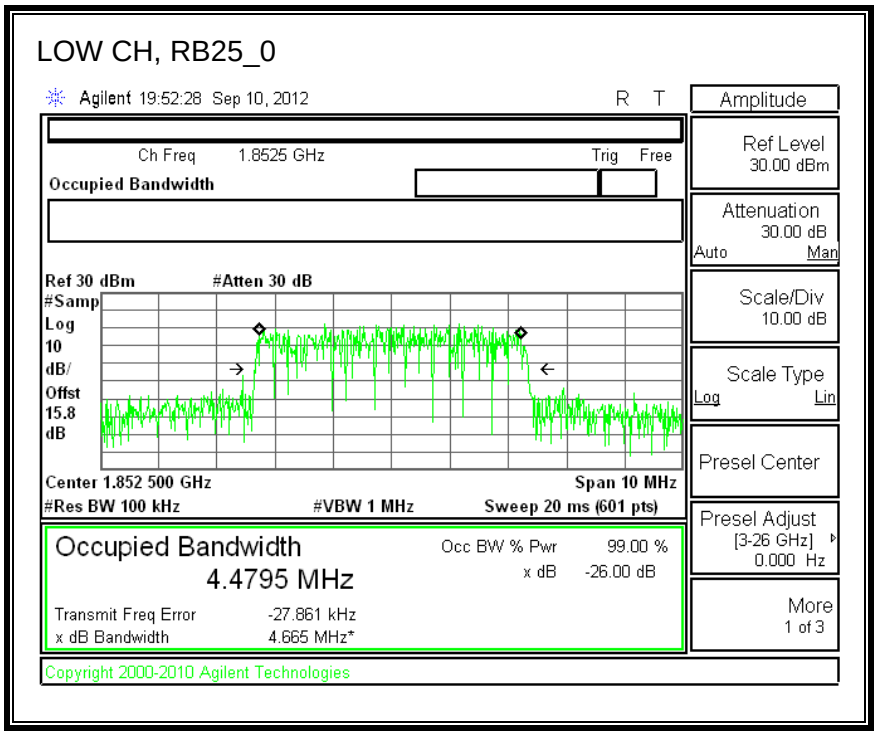
16QAM Band 25 (5 MHz BAND WIDTH)





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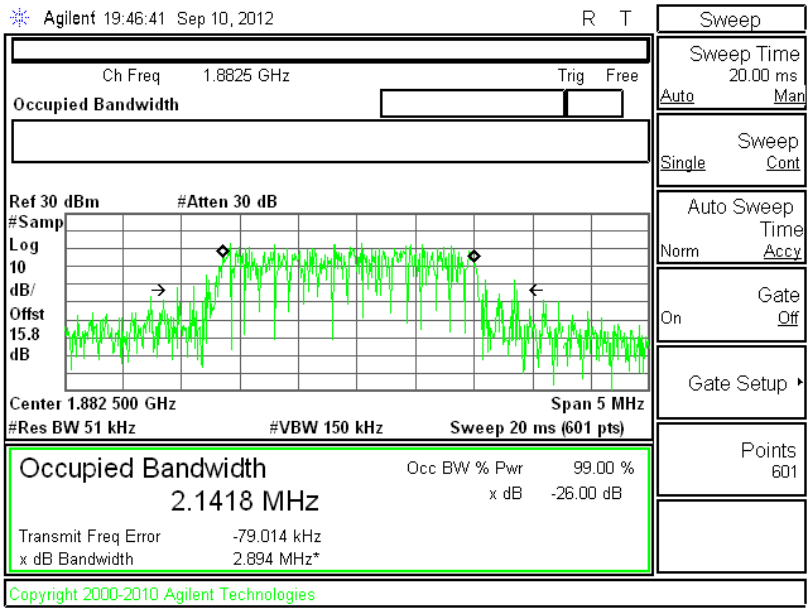
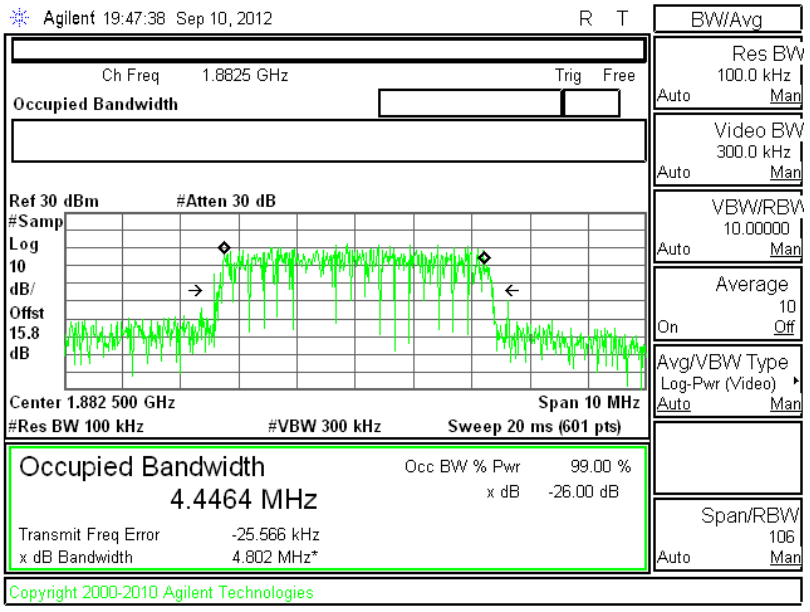
MID CH, RB12_6



MID CH, RB25_0



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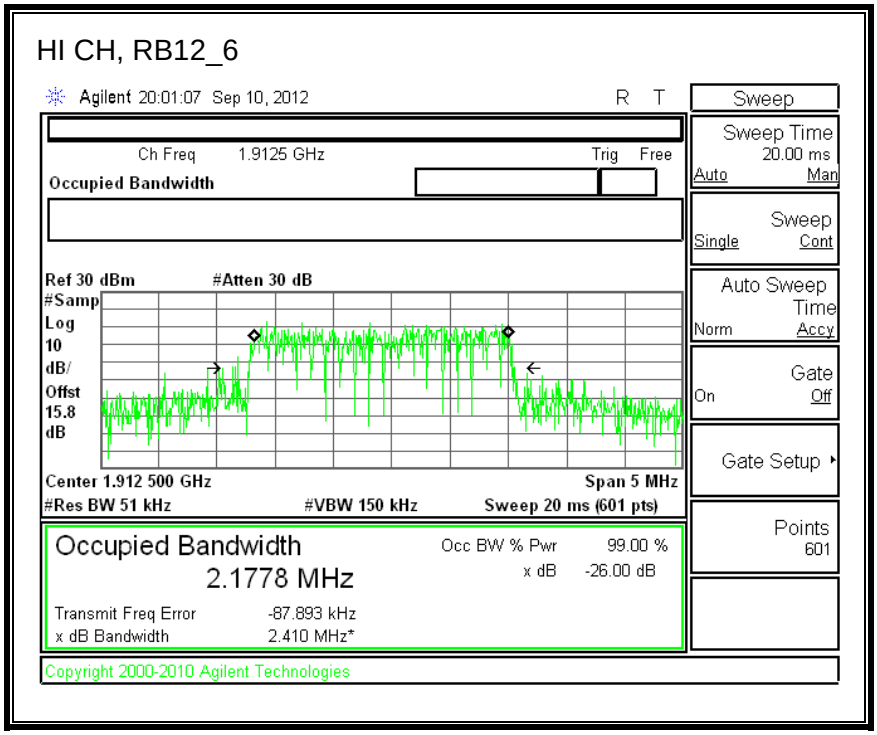
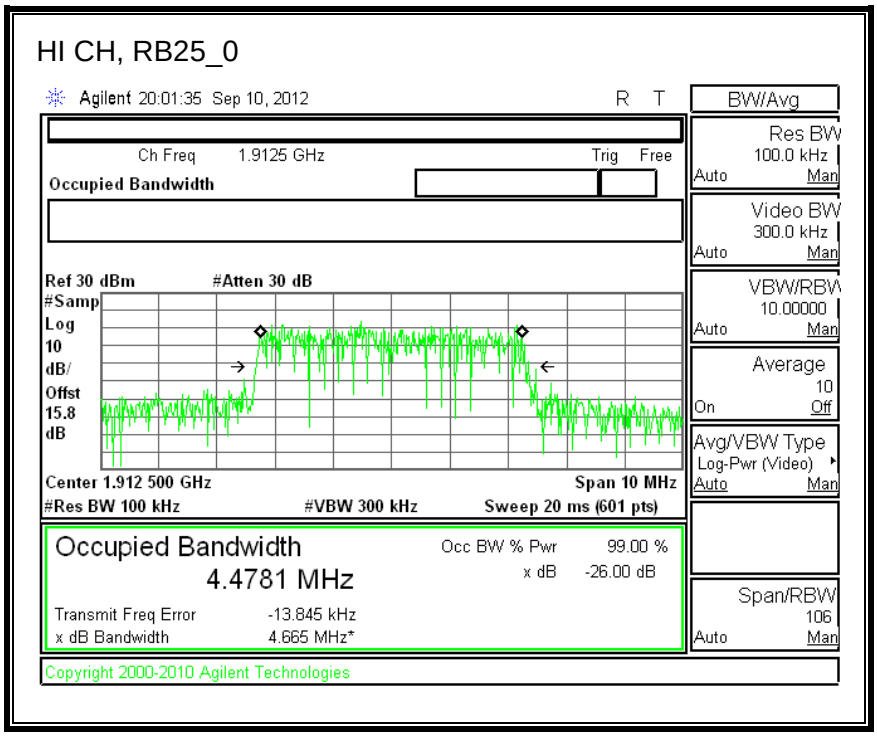
HI CH, RB12_6



HI CH, RB25_0



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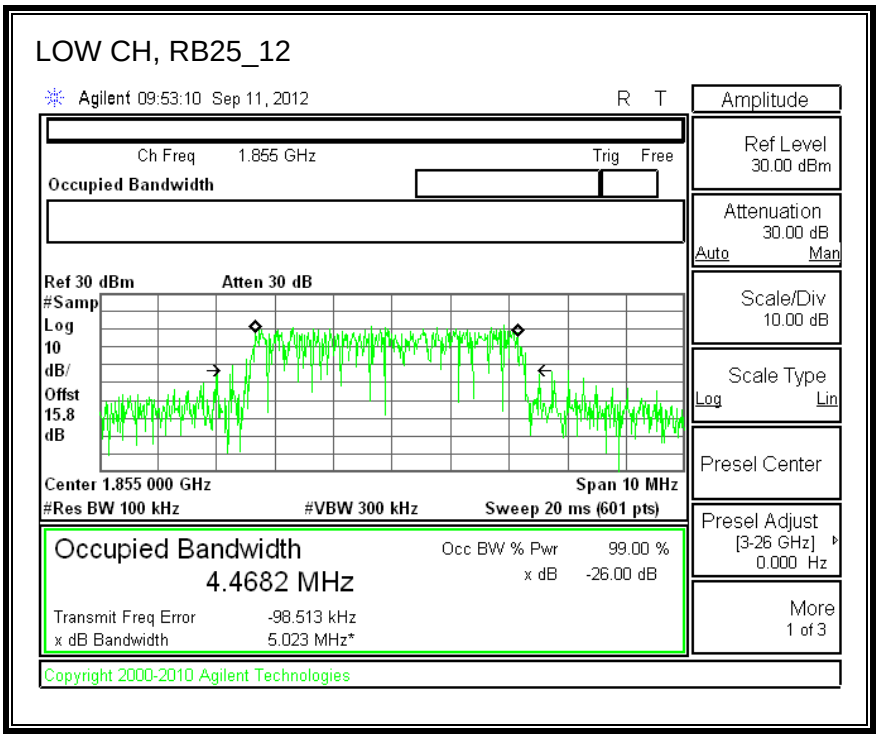
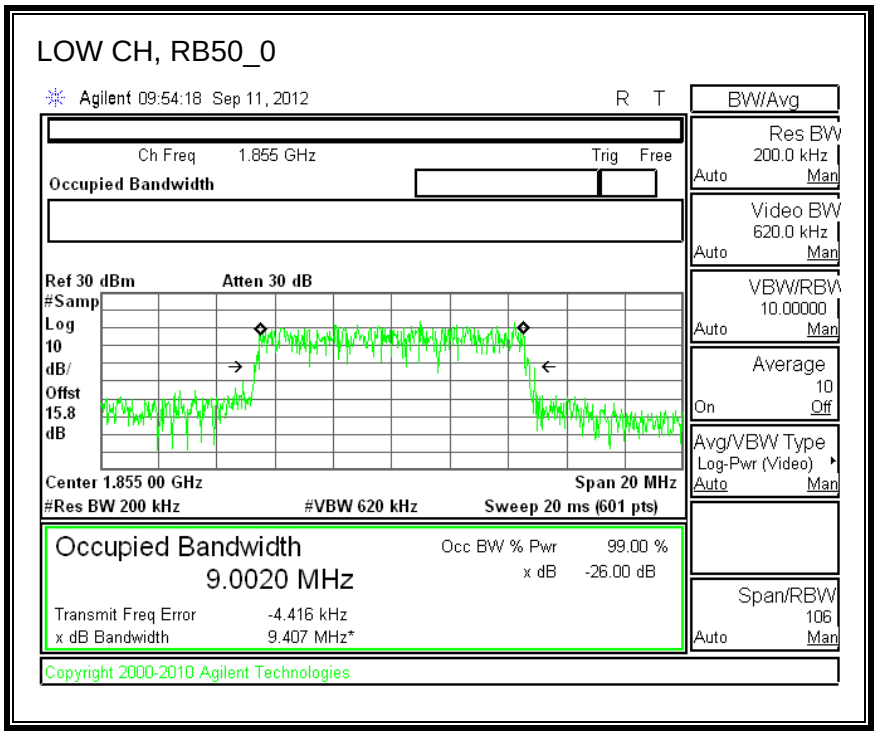
QPSK Band 25 (10.0 MHz BAND WIDTH)





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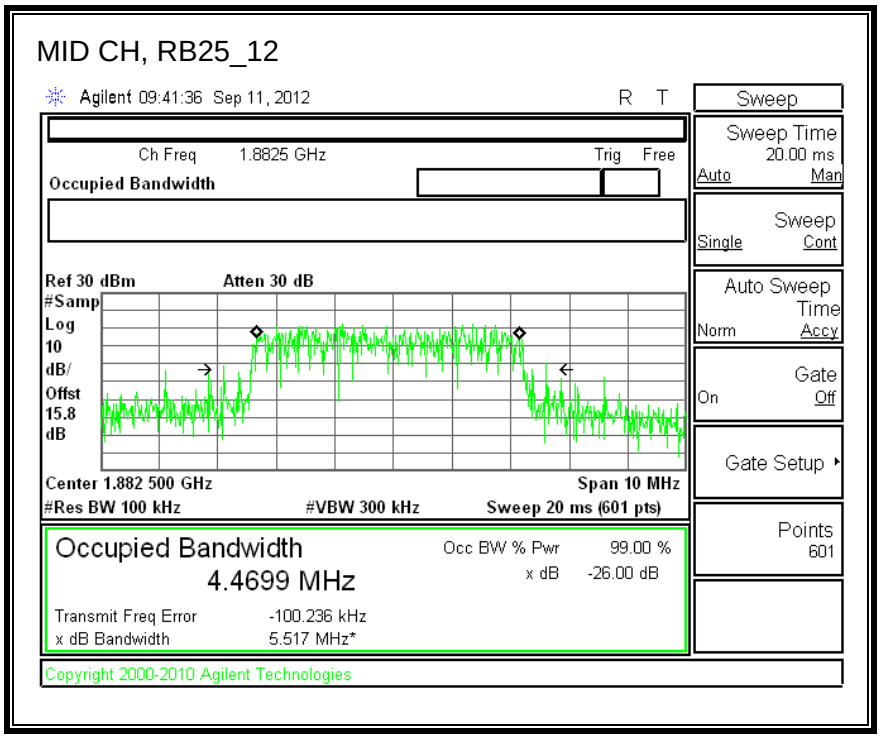

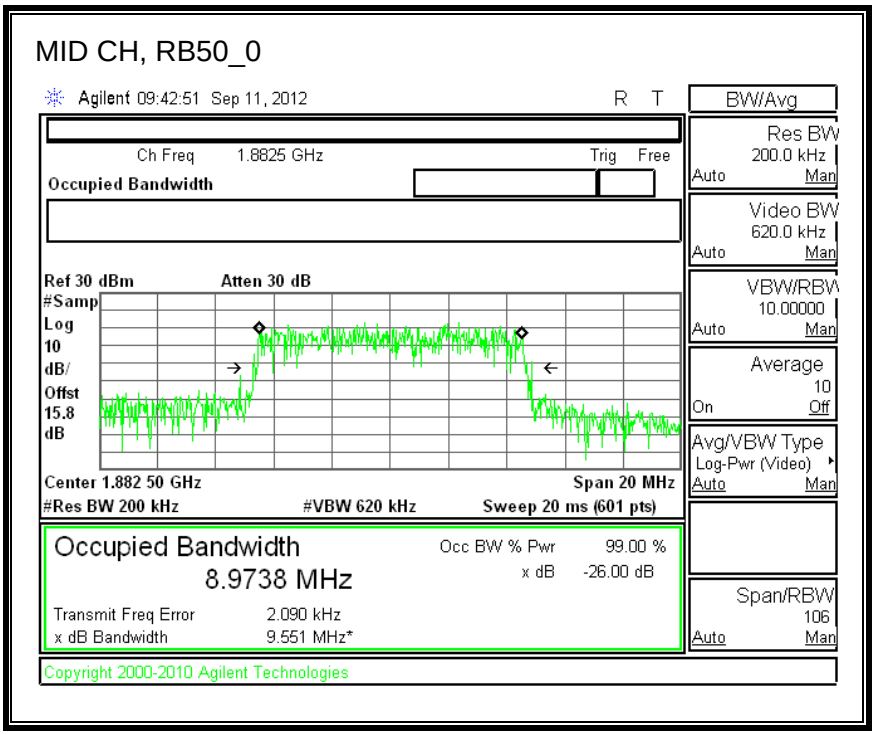

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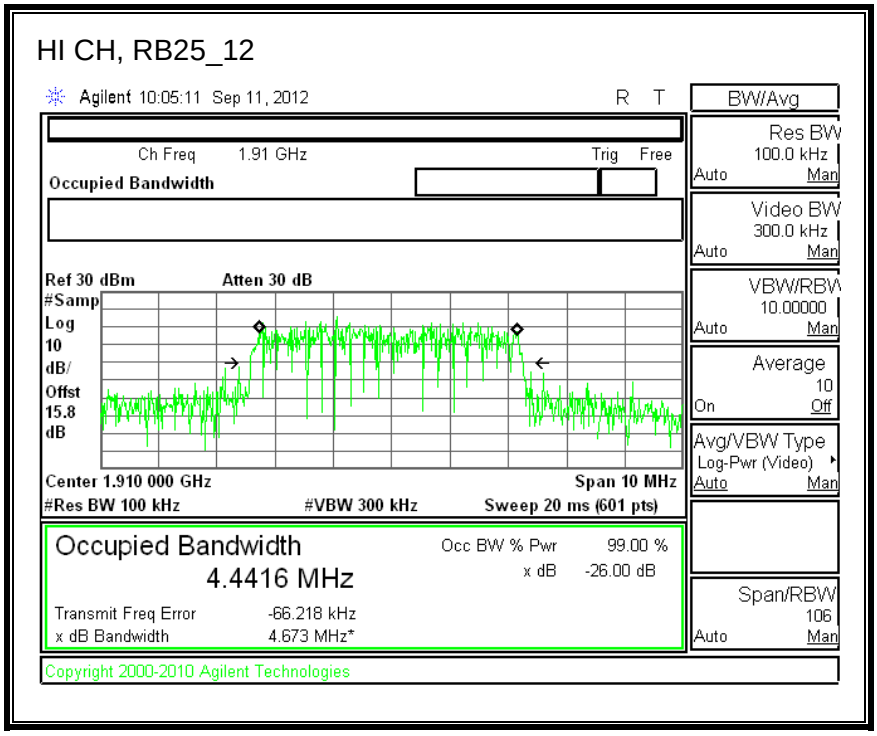
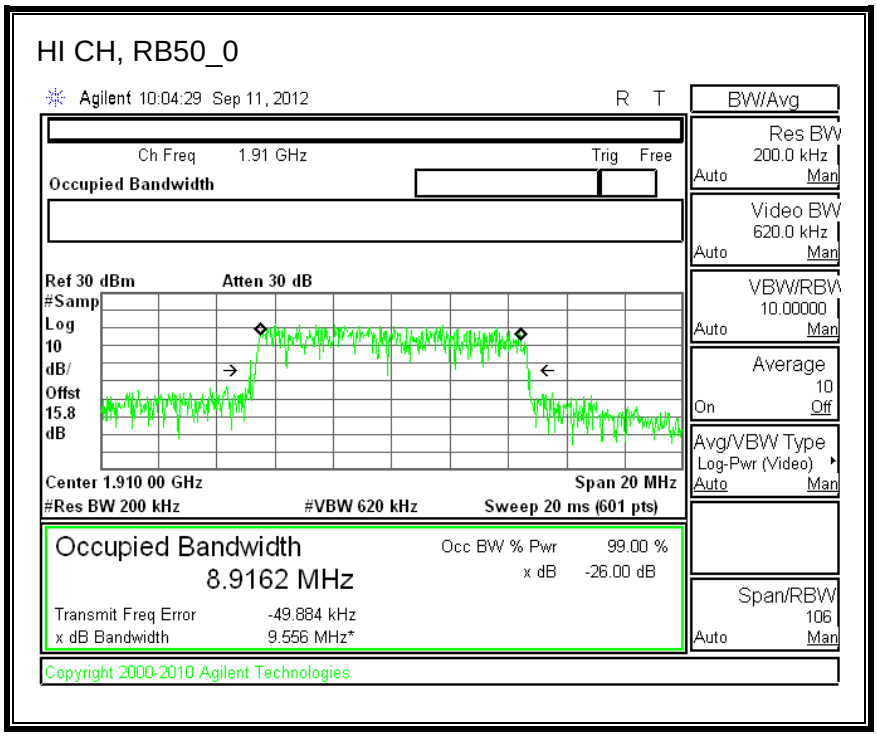
HI CH, RB25_12



HI CH, RB50_0



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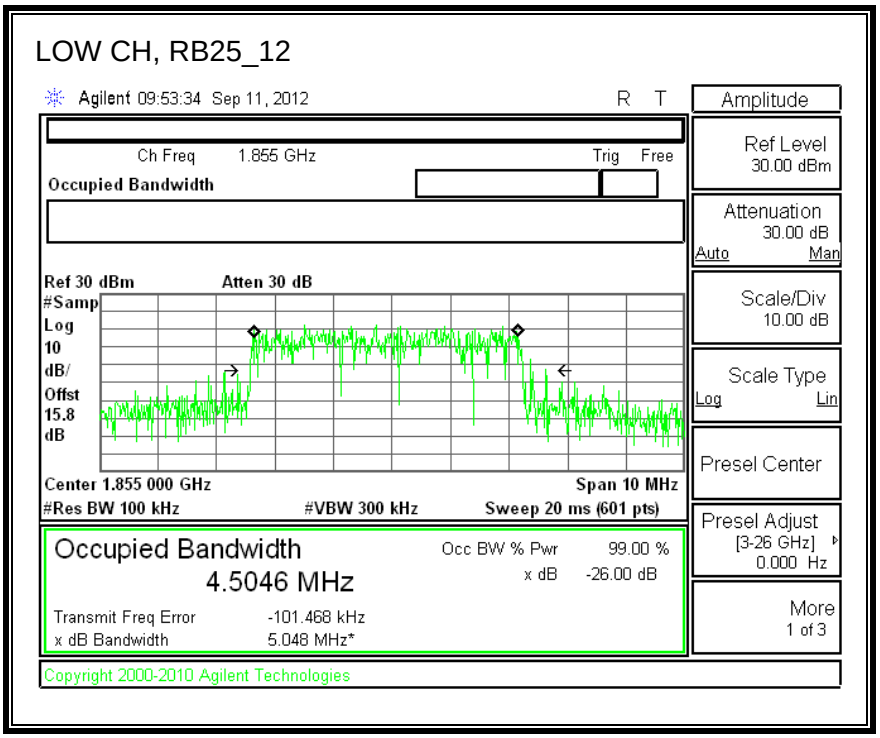
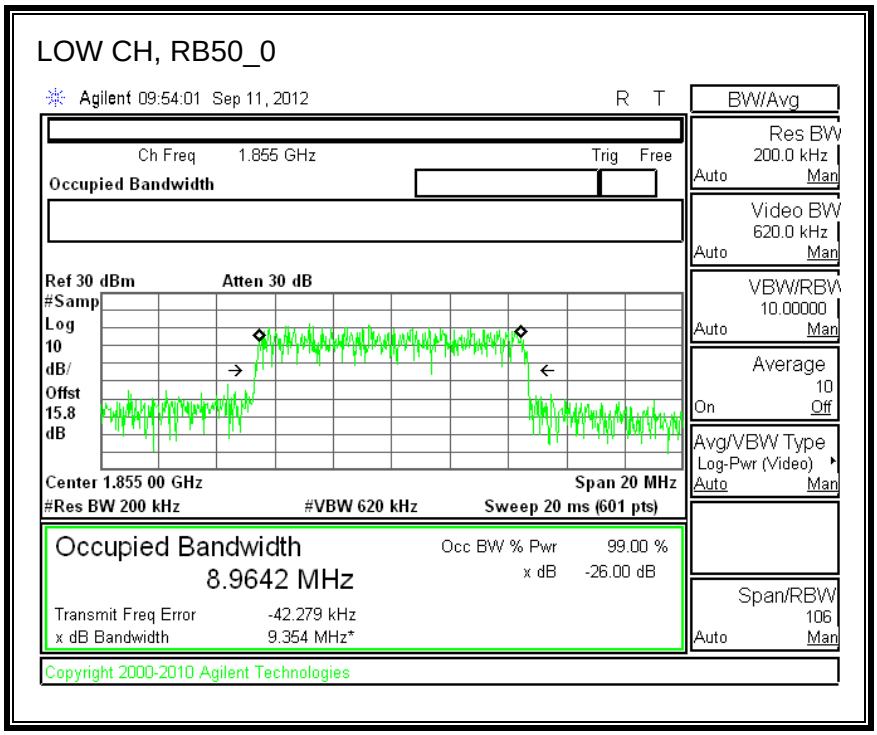
16QAM Band 25 (10 MHz BAND WIDTH)





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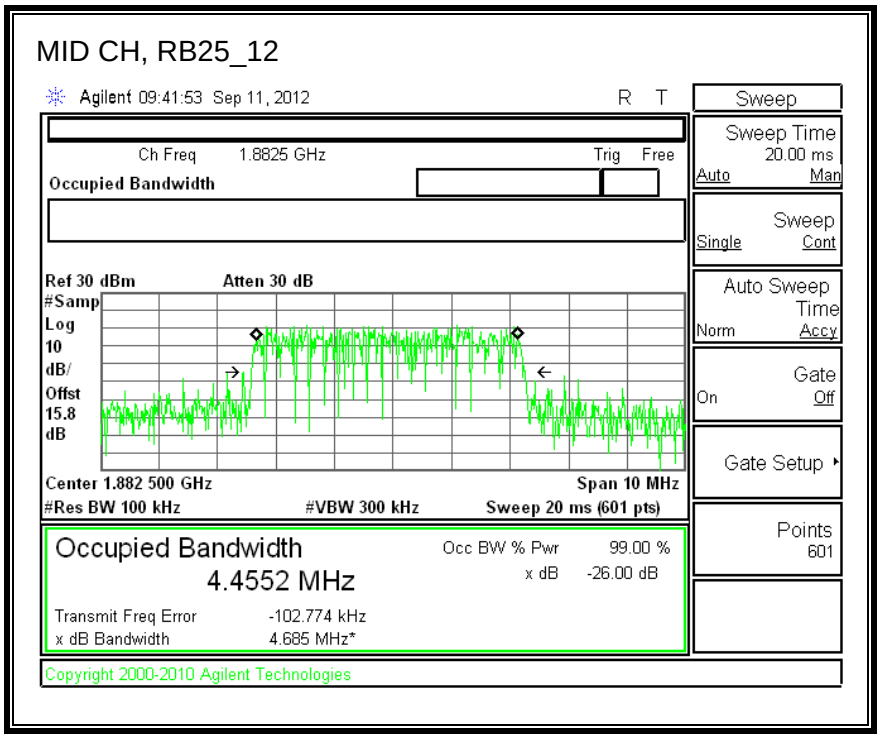
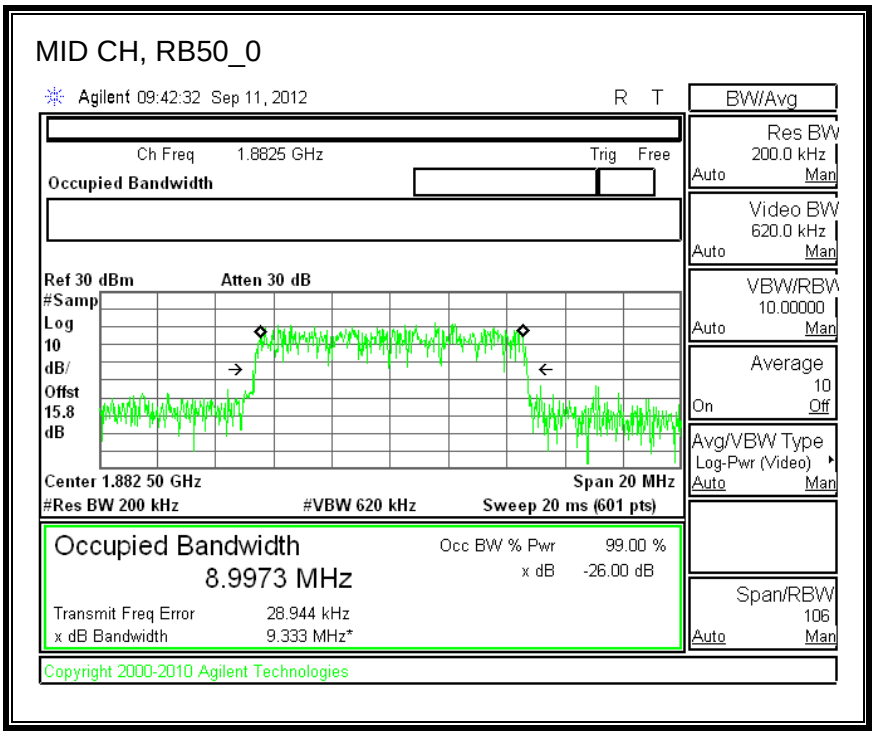
MID CH, RB25_12



MID CH, RB50_0



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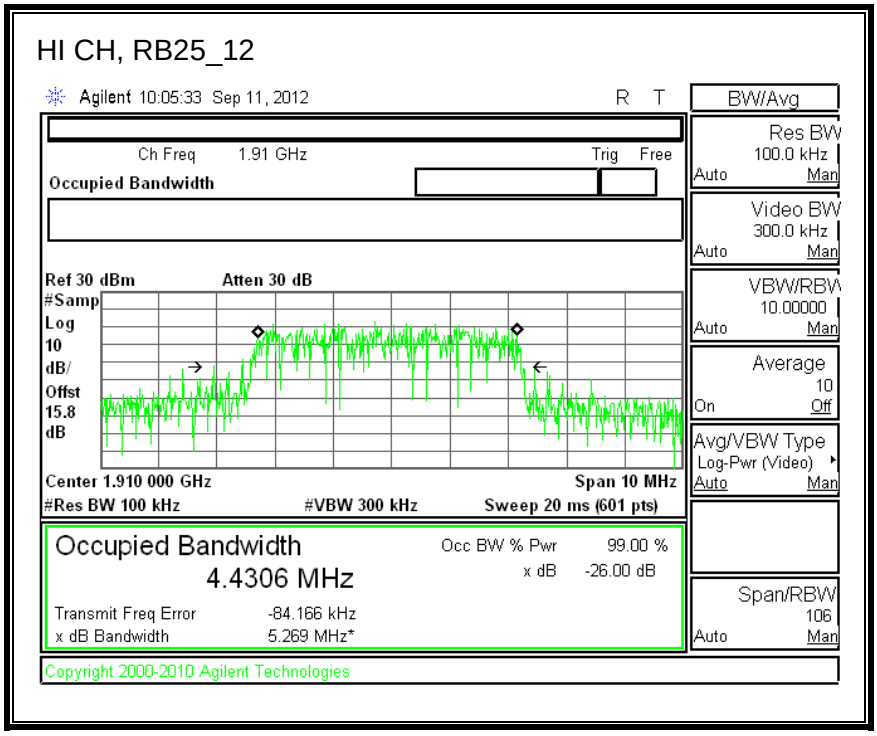
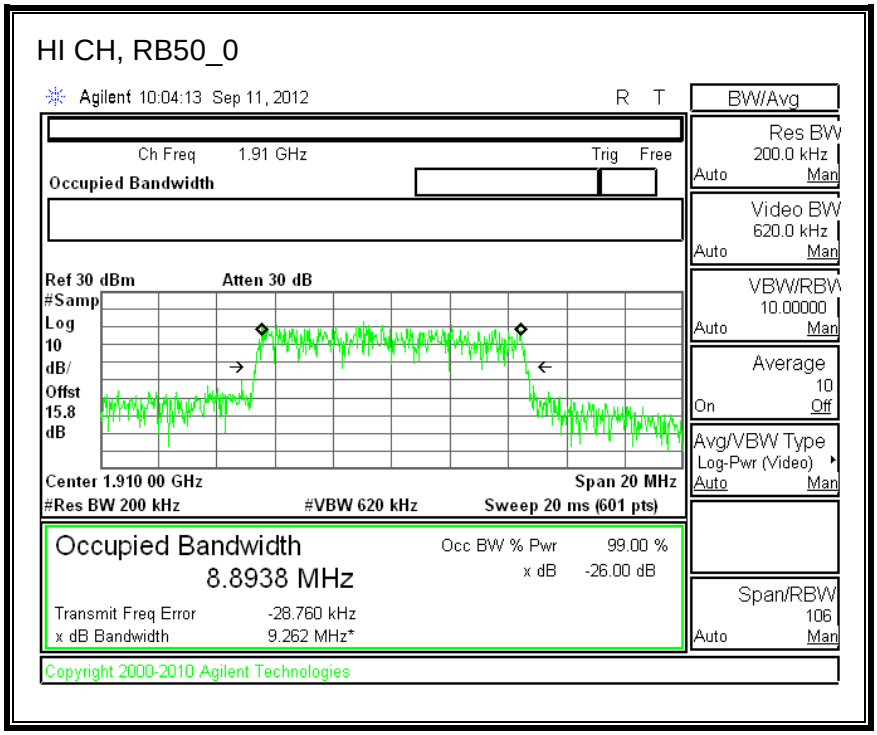
HI CH, RB25_12



HI CH, RB50_0



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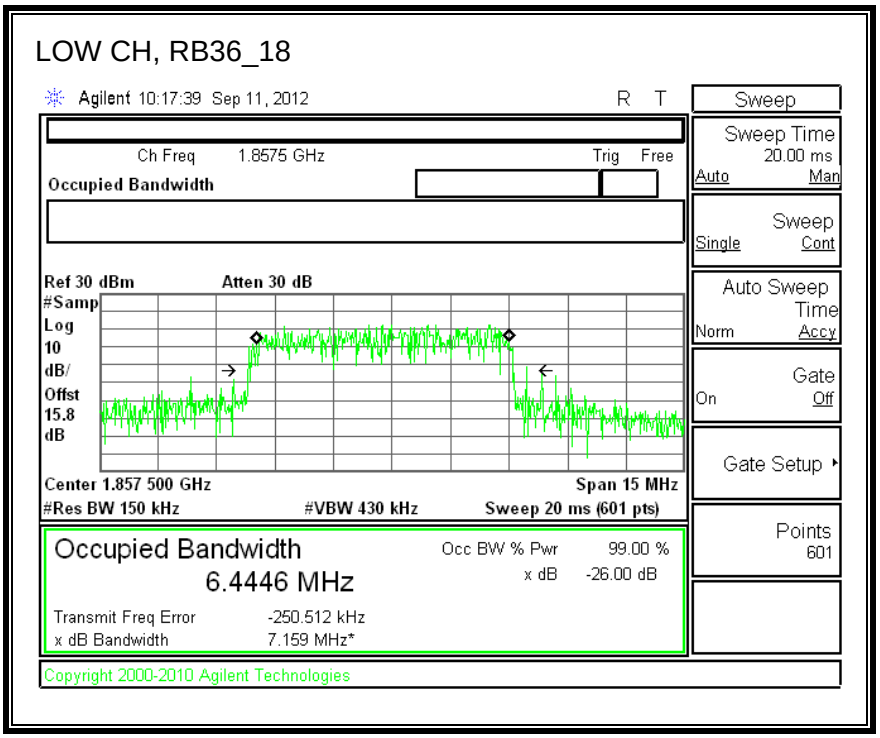
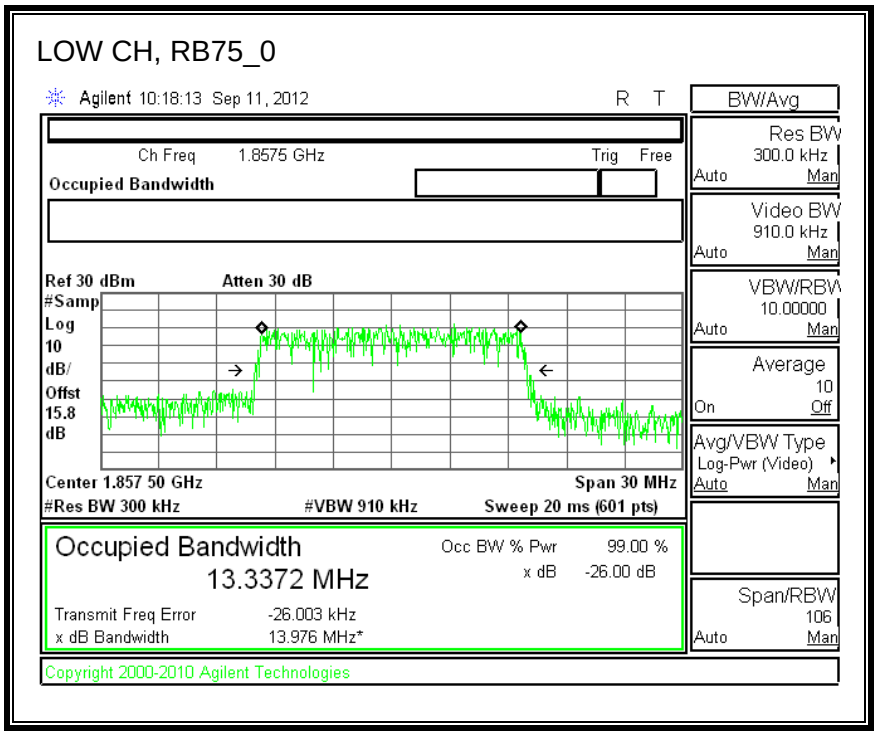
QPSK Band 25 (15.0 MHz BAND WIDTH)





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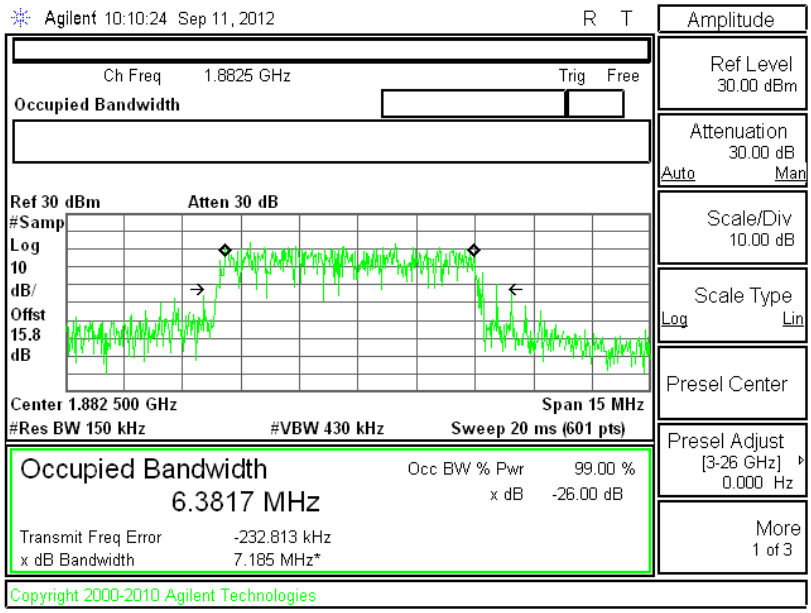
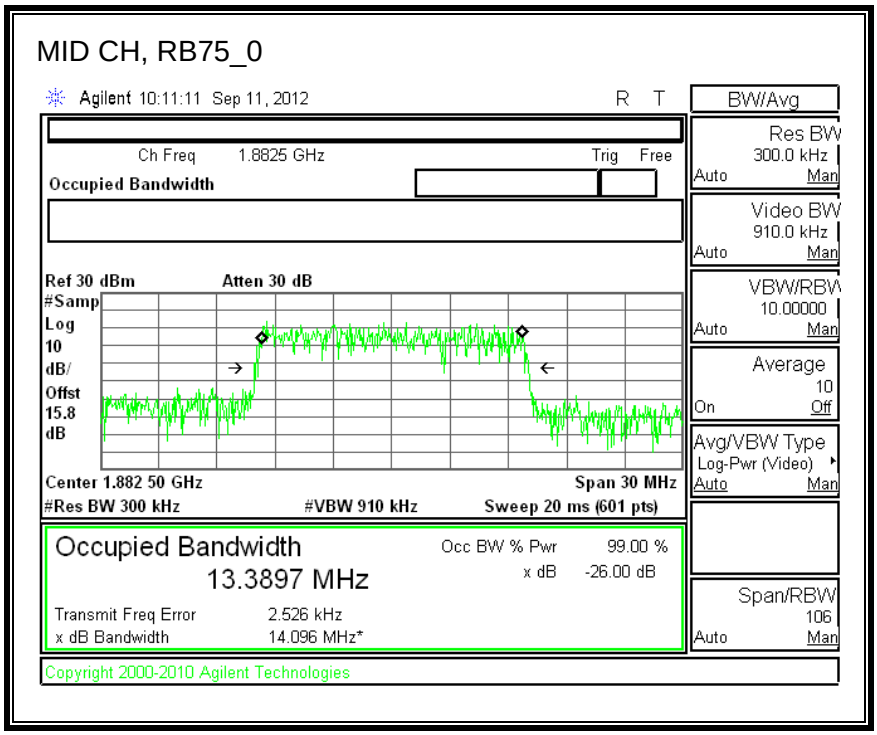
MID CH, RB36_18



MID CH, RB75_0



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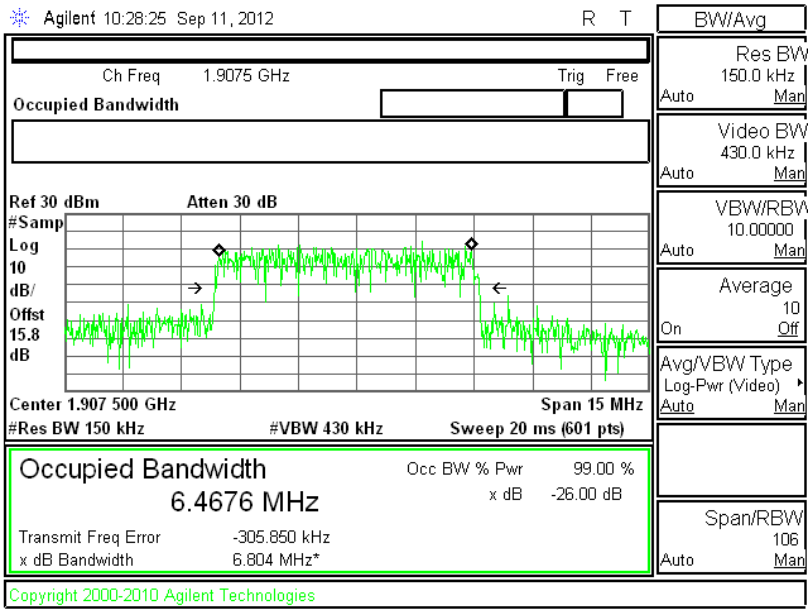
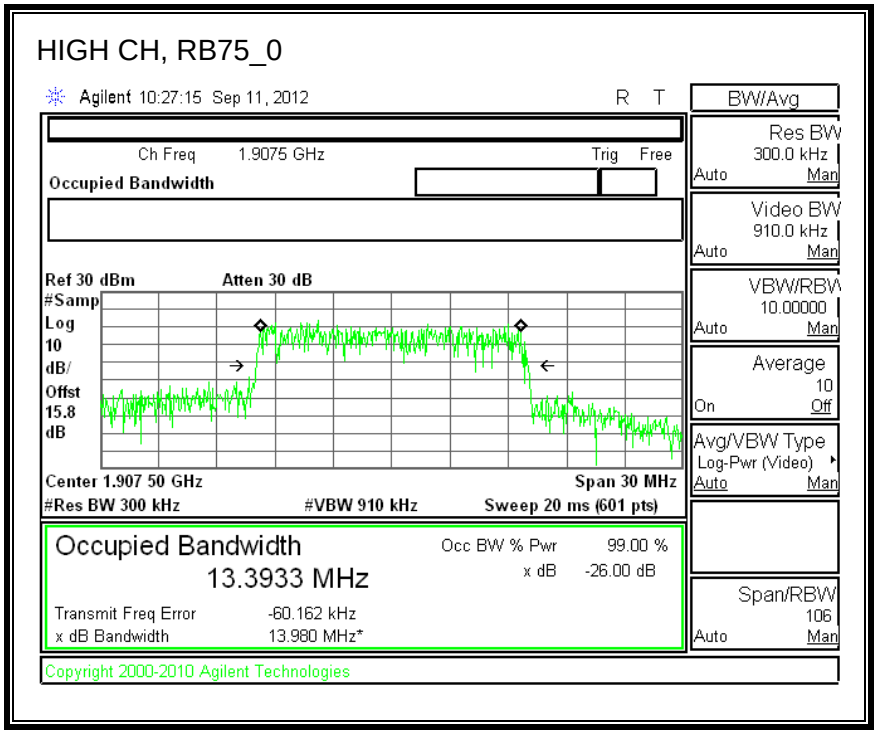
HIGH CH, RB36_18



HIGH CH, RB75_0



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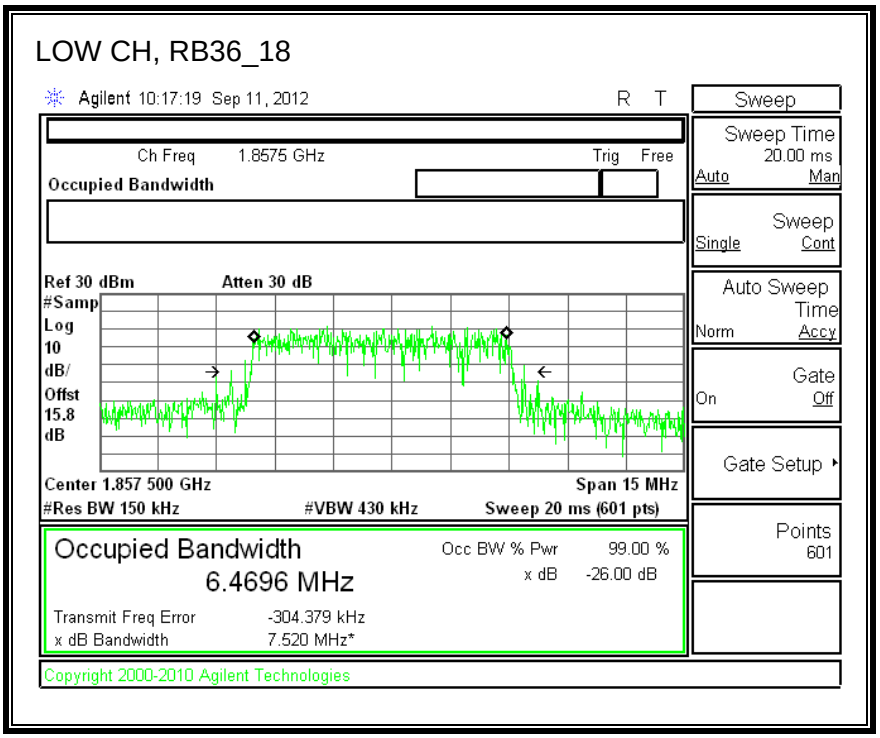
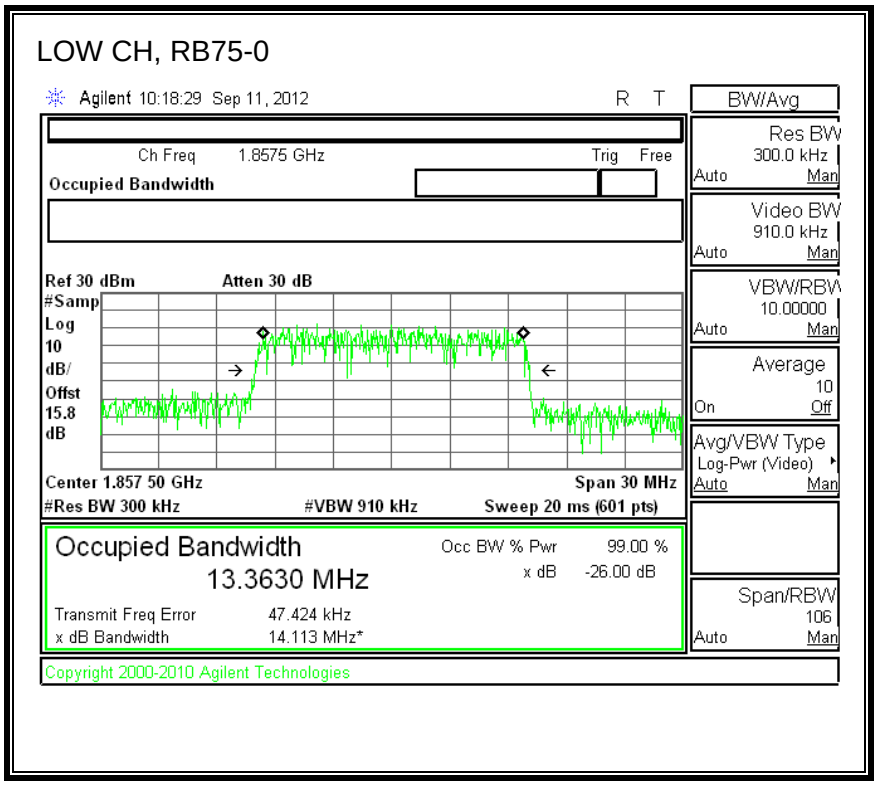
16QAM Band 25 (15.0 MHz BAND WIDTH)





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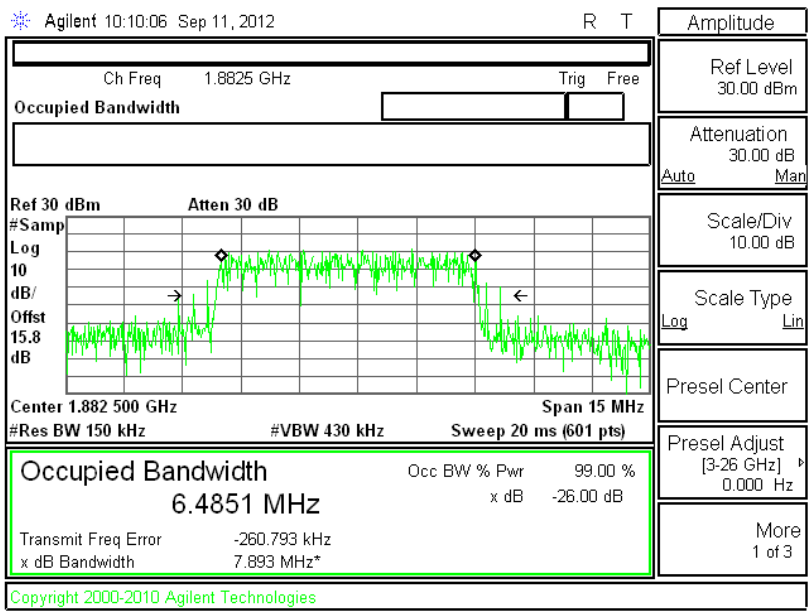
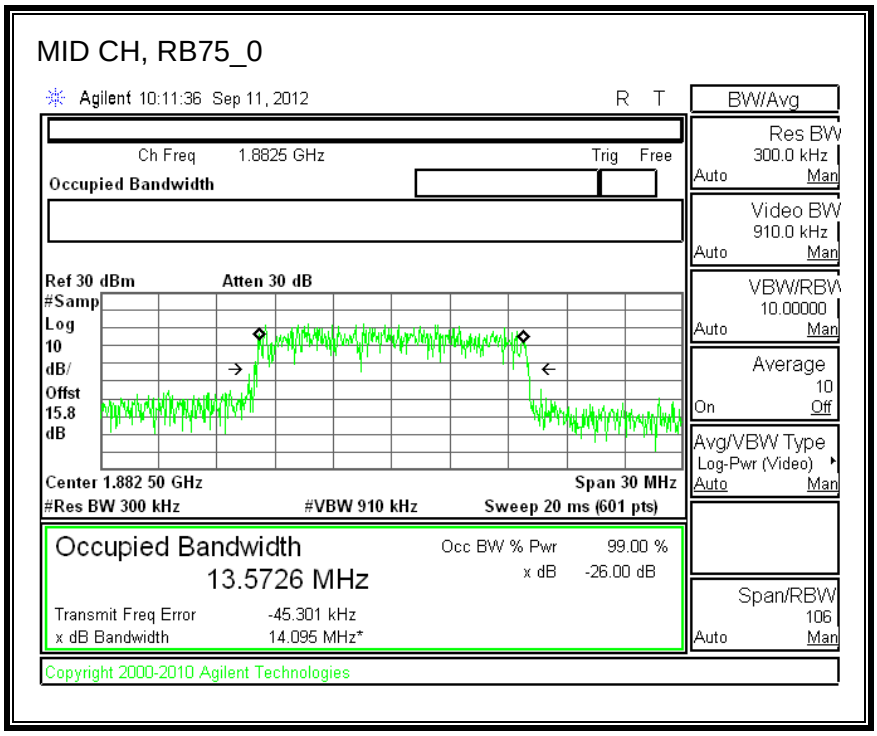
MID CH, RB36_18



MID CH, RB75_0



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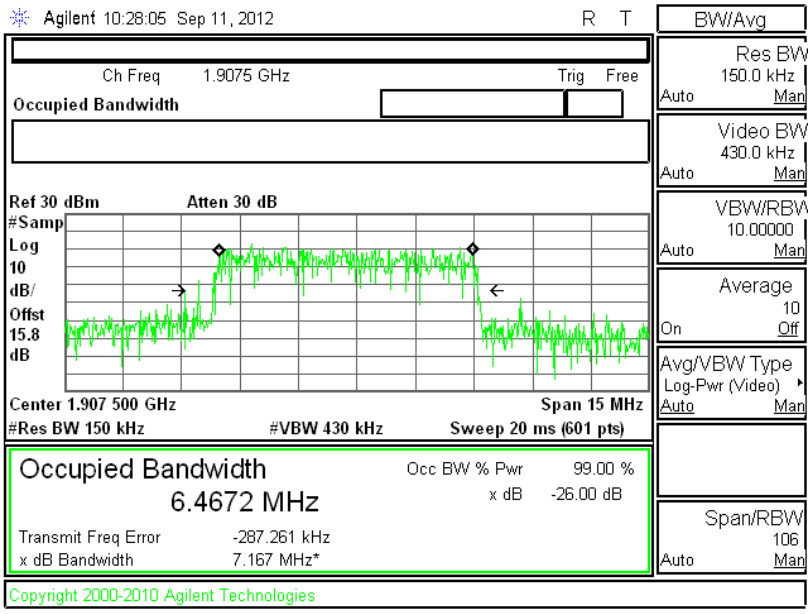
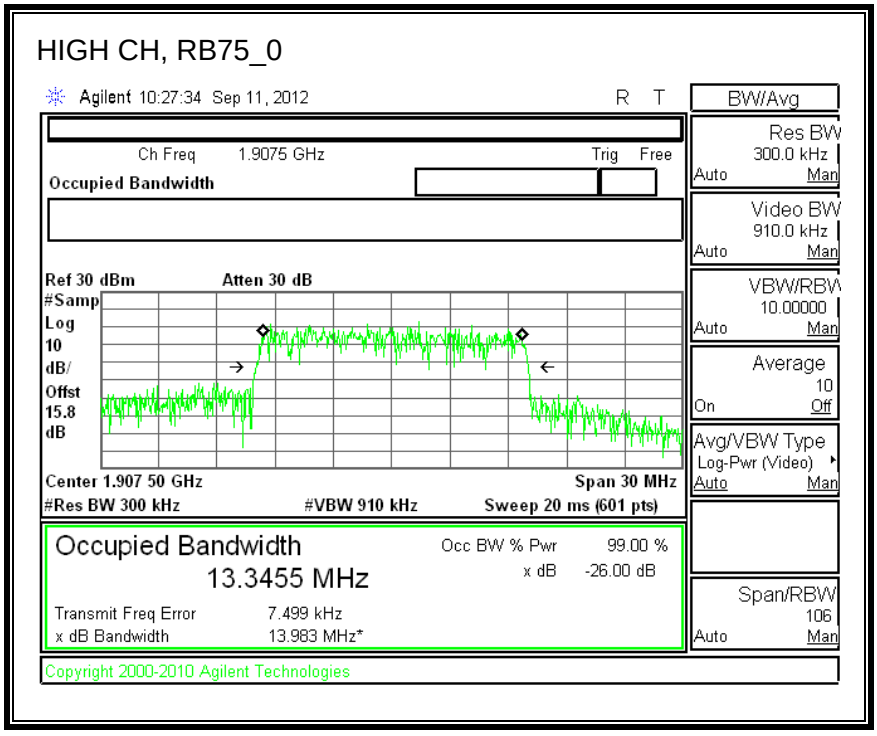
HIGH CH, RB36_18



HIGH CH, RB75_0



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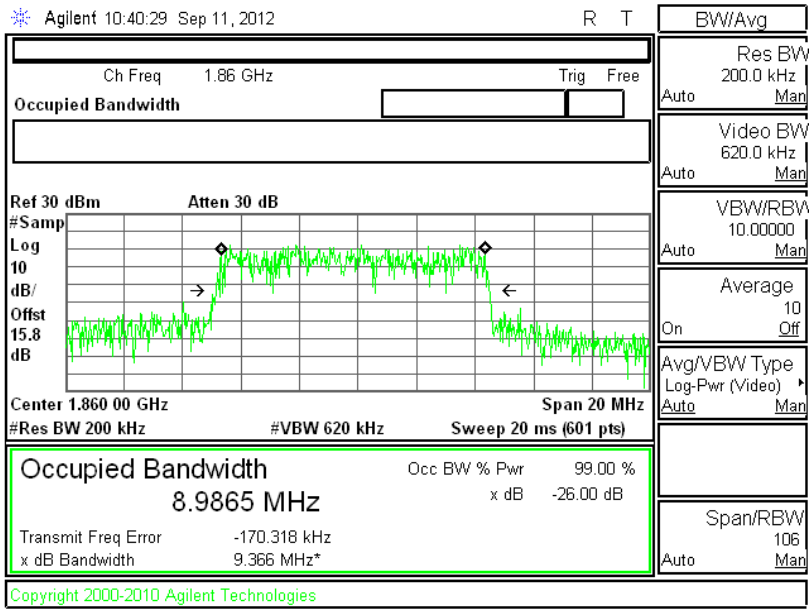
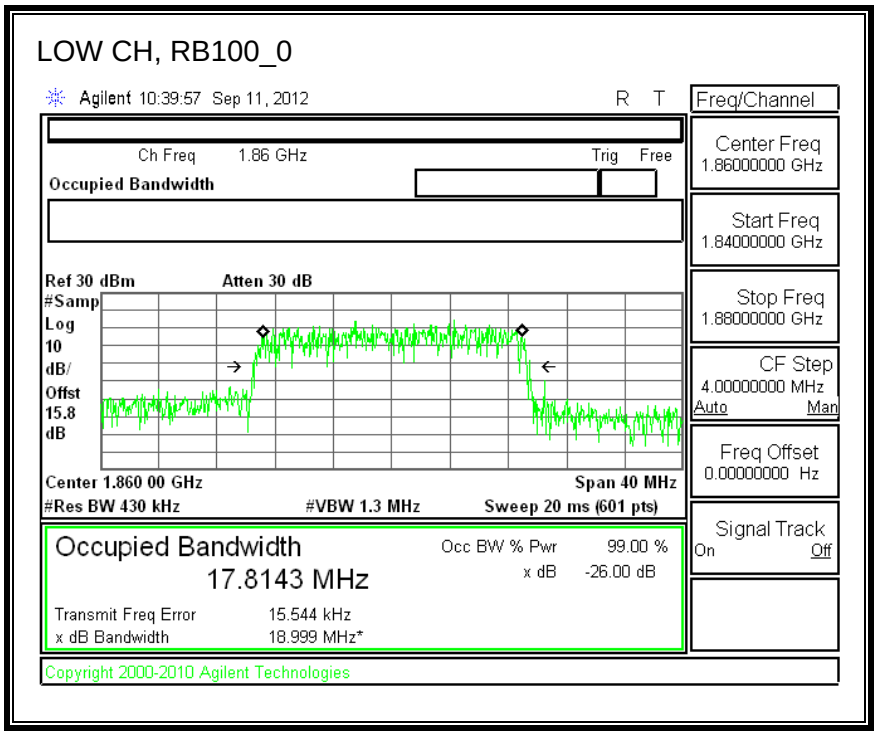
QPSK Band 25 (20.0 MHz BAND WIDTH)

LOW CH, RB50_19



LOW CH, RB100_0



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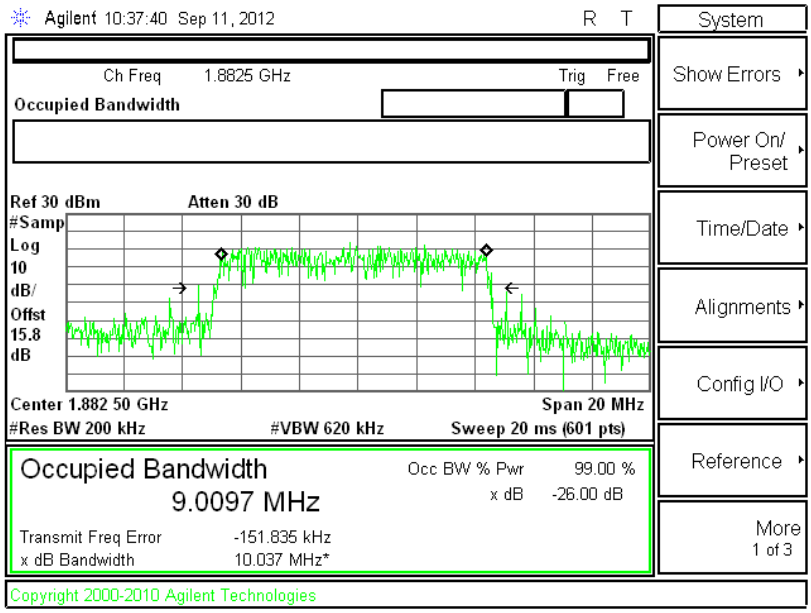
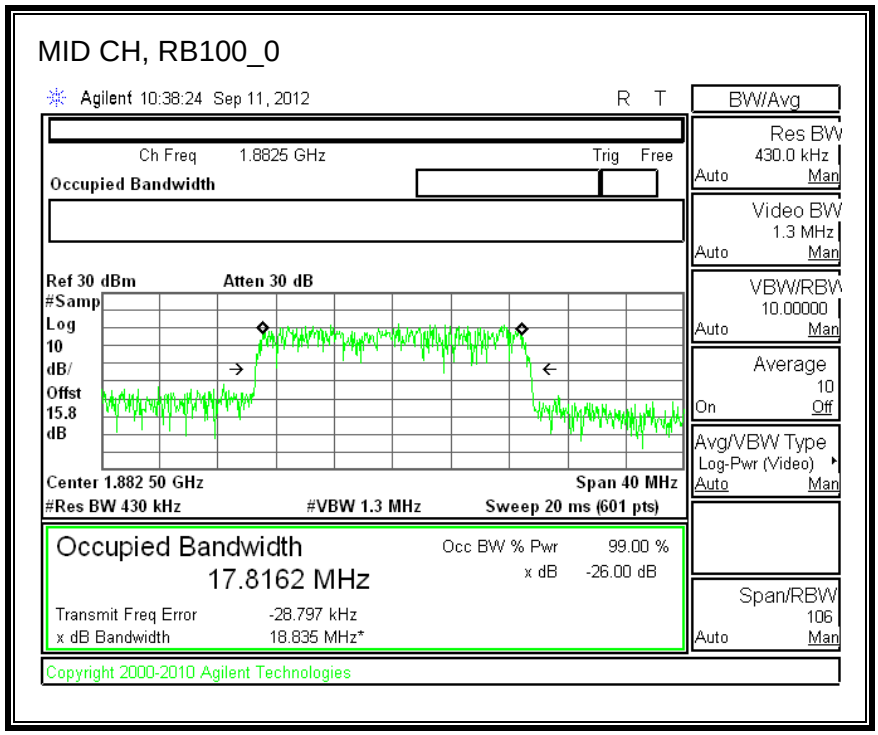
MID CH, RB50_19



MID CH, RB100_0



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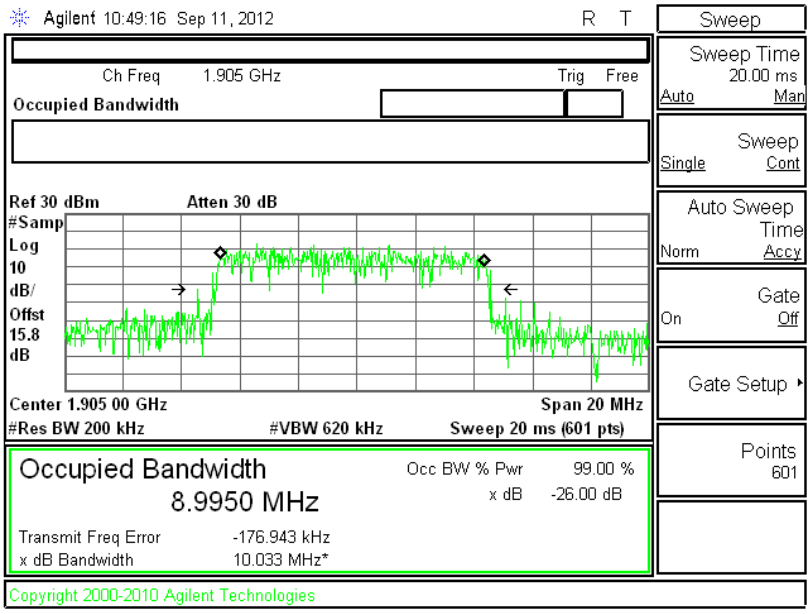
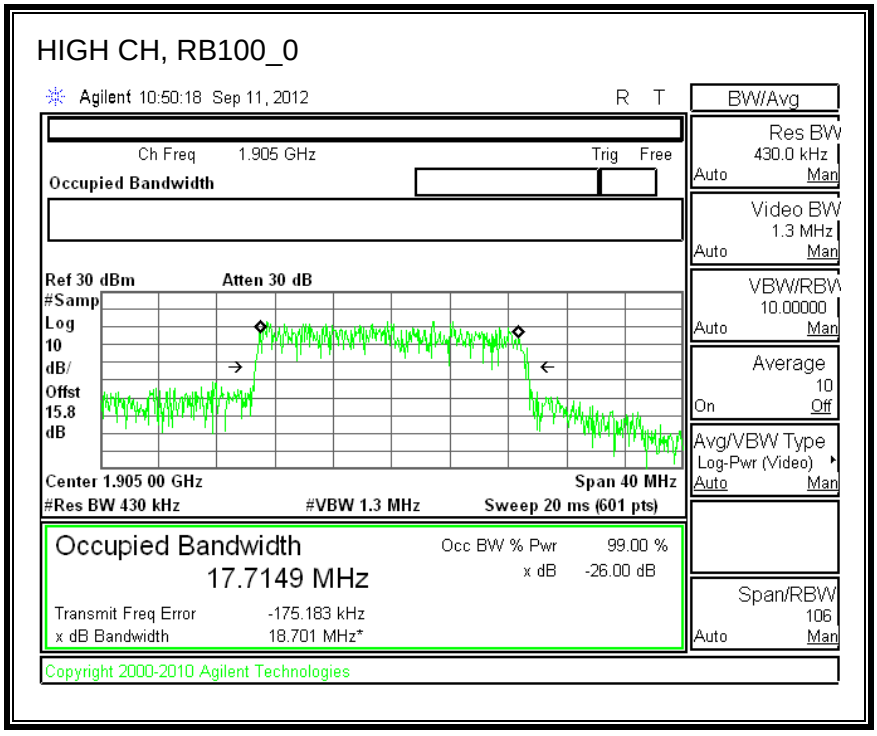
HIGH CH, RB50_19



HIGH CH, RB100_0



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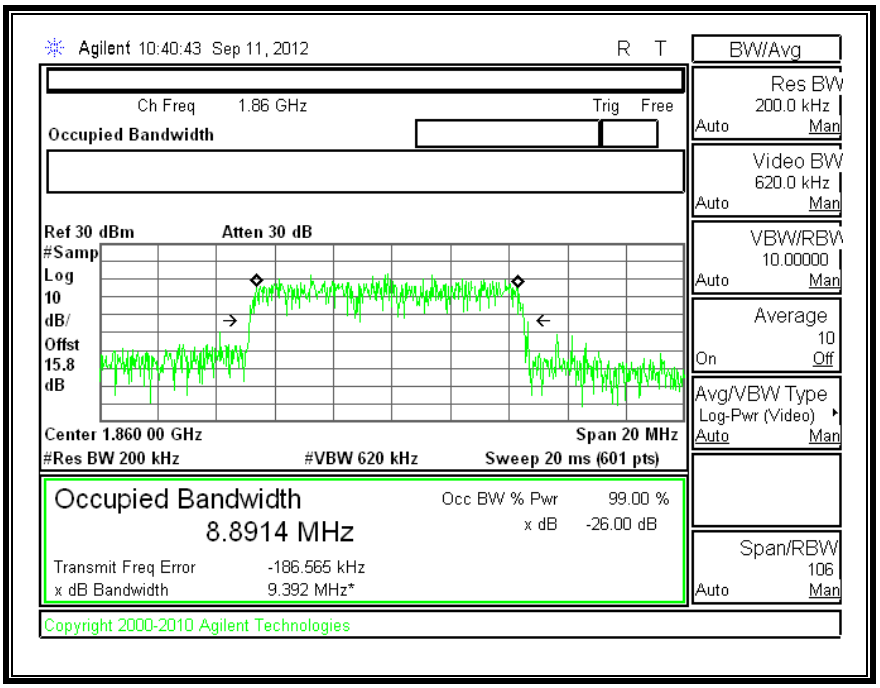
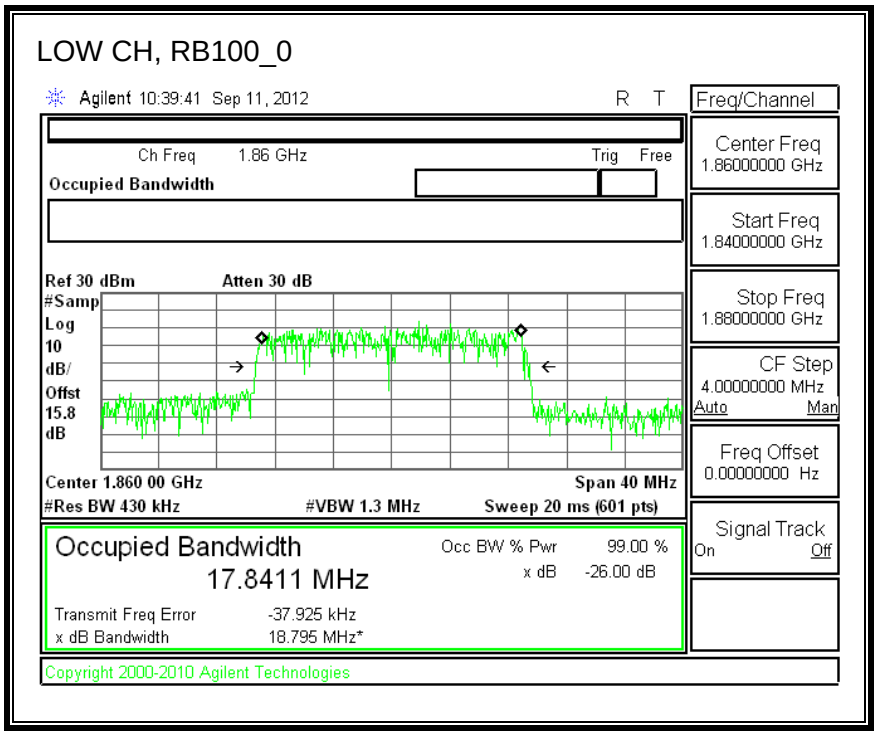
16QAM Band 25 (20.0 MHz BAND WIDTH)





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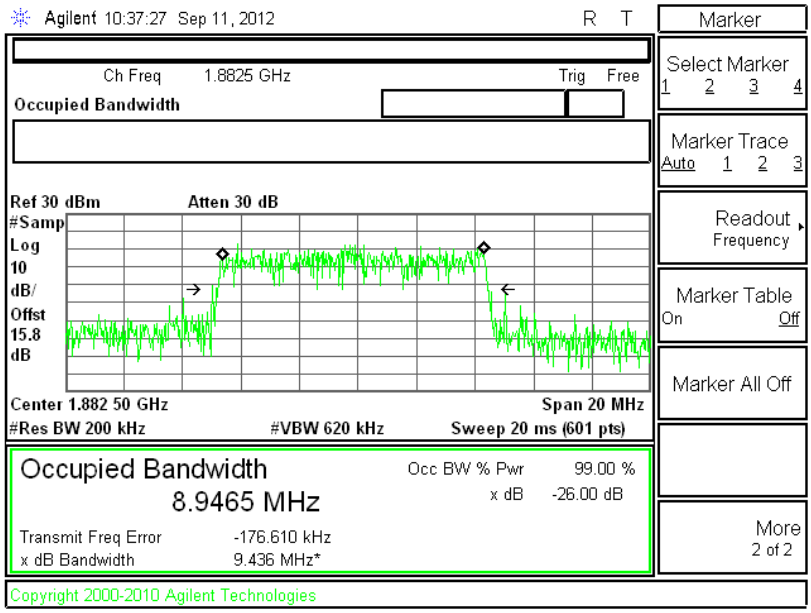
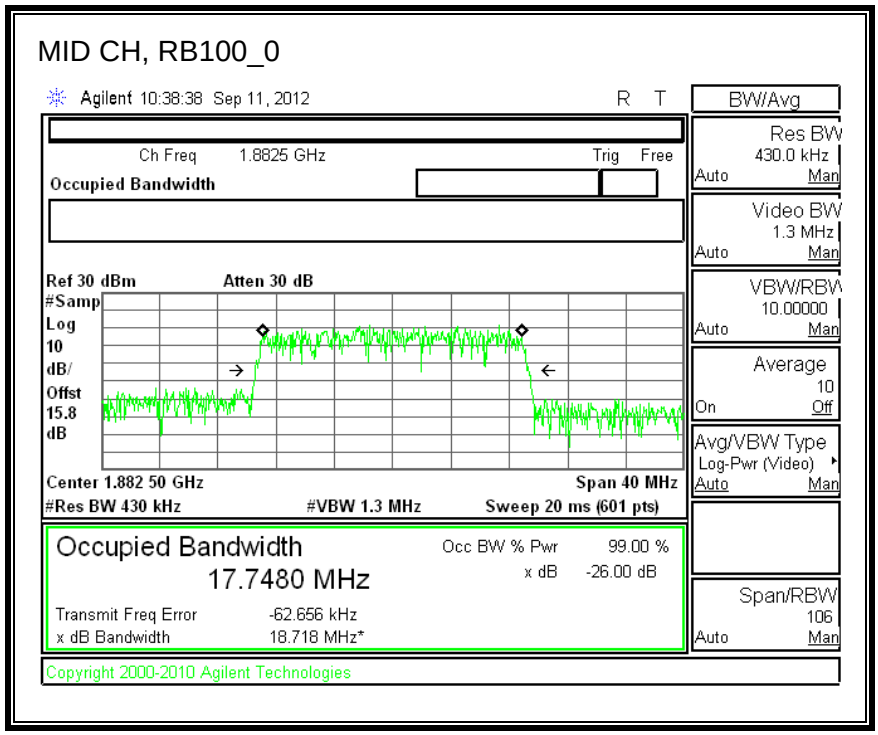
MID CH, RB50_19



MID CH, RB100_0



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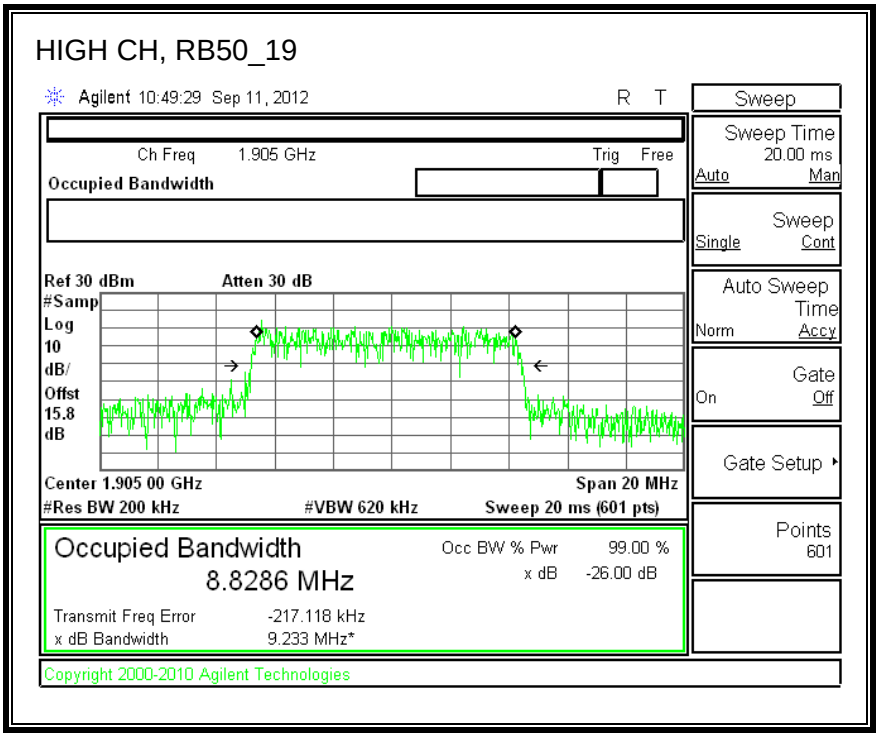
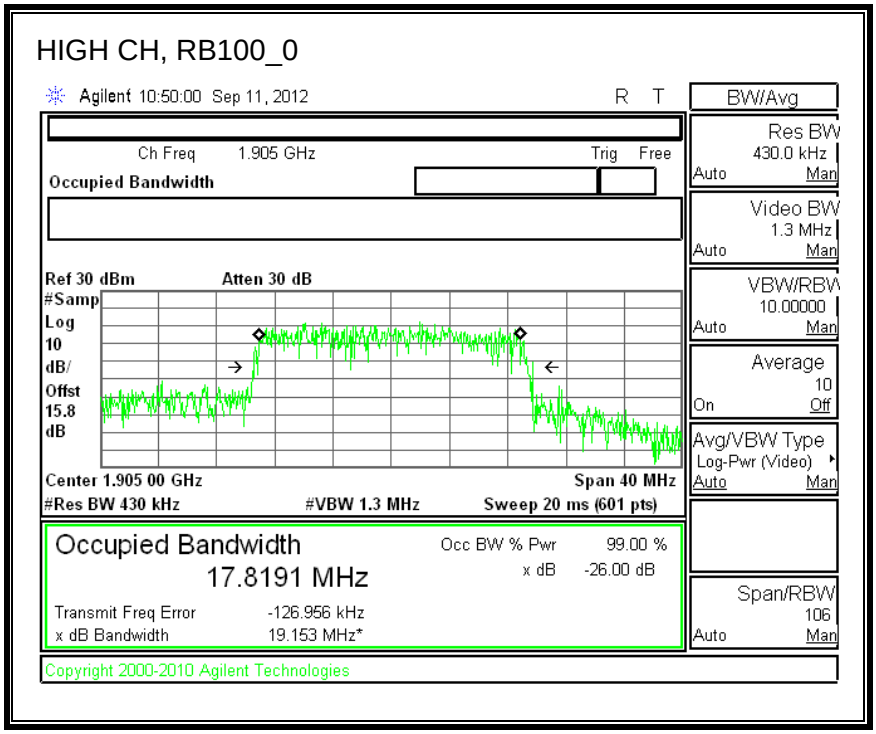
HIGH CH, RB50_19



HIGH CH, RB100_0



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8.2. BAND EDGE

RULE PART(S)

FCC: §22.359, 24.238 §27.53 and § 90.691

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.

LIMITS

On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

Compliance with the provisions of paragraphs above of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

TEST PROCEDURE

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.
For each band edge measurement:

- Set the spectrum analyzer span to include the block edge frequency.
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

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MODES TESTED

- GPRS and EGPRS
- UMTS, REL 99 and HSDPA
- CDMA2000, BC10
- CDMA2000, BC0, BC1
- LTE BAND 5
- LTE BAND 13
- LTE BAND 25

RESULTS

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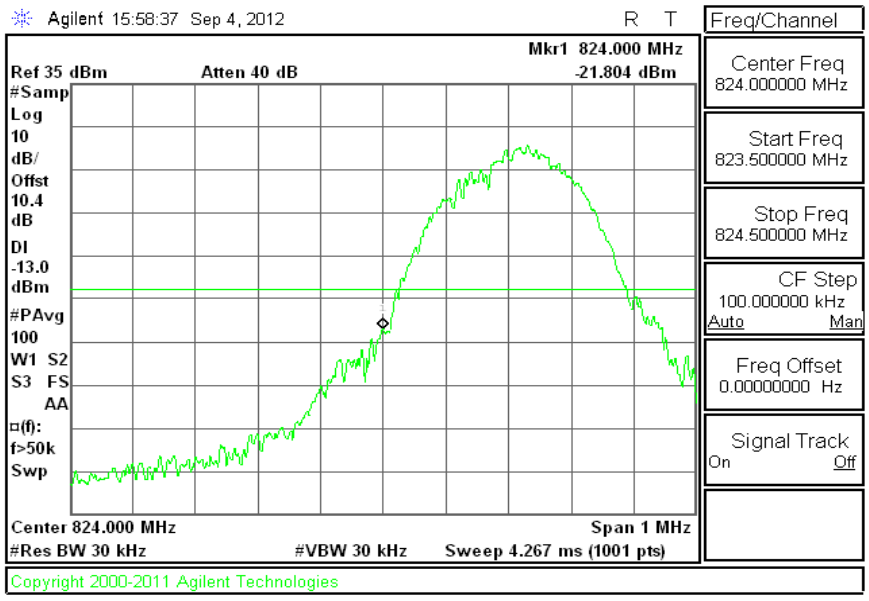
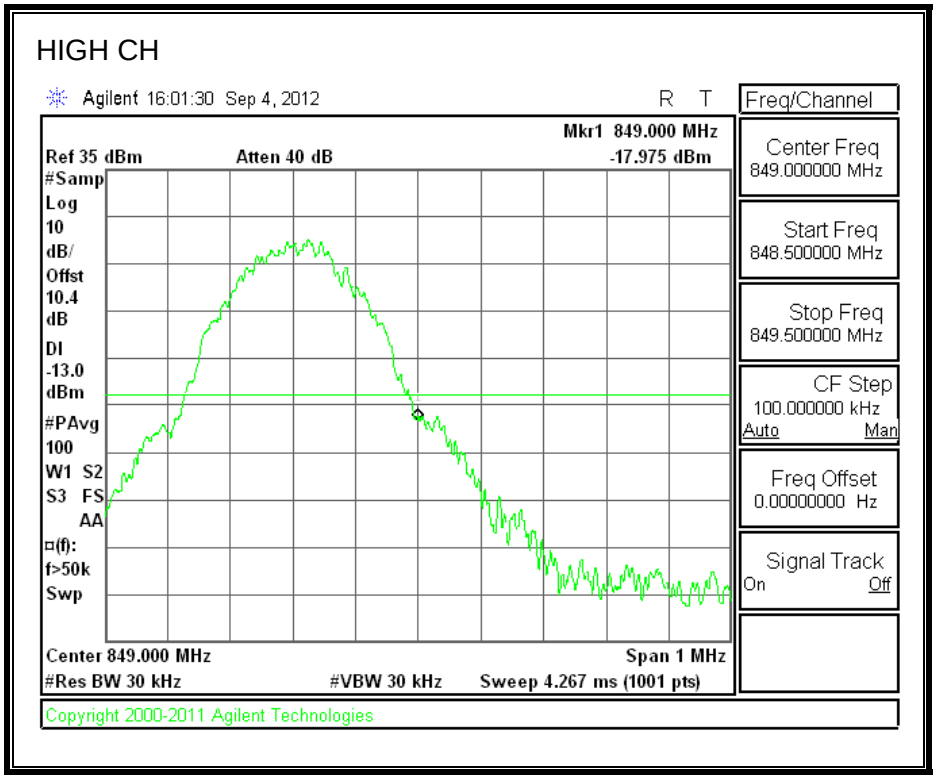
8.2.1. GSM

GPRS mode (Cellular Band)

LOW CH



HIGH CH



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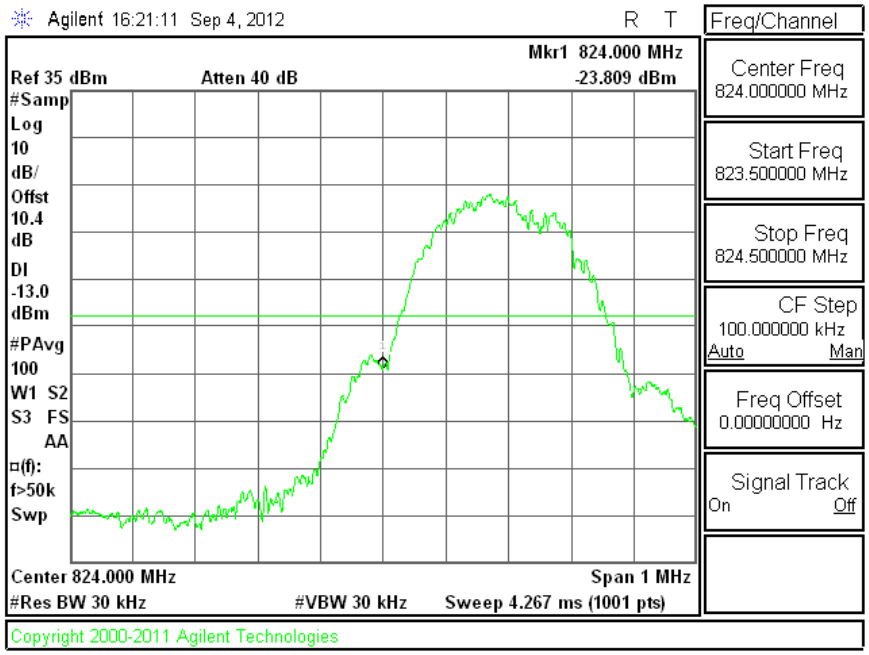
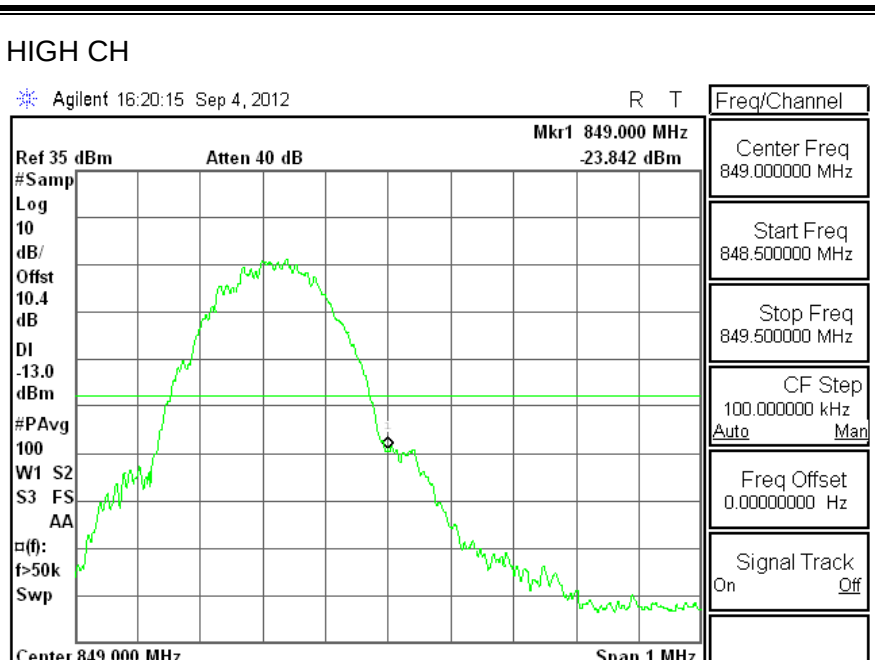
EGPRS850

LOW CH



HIGH CH



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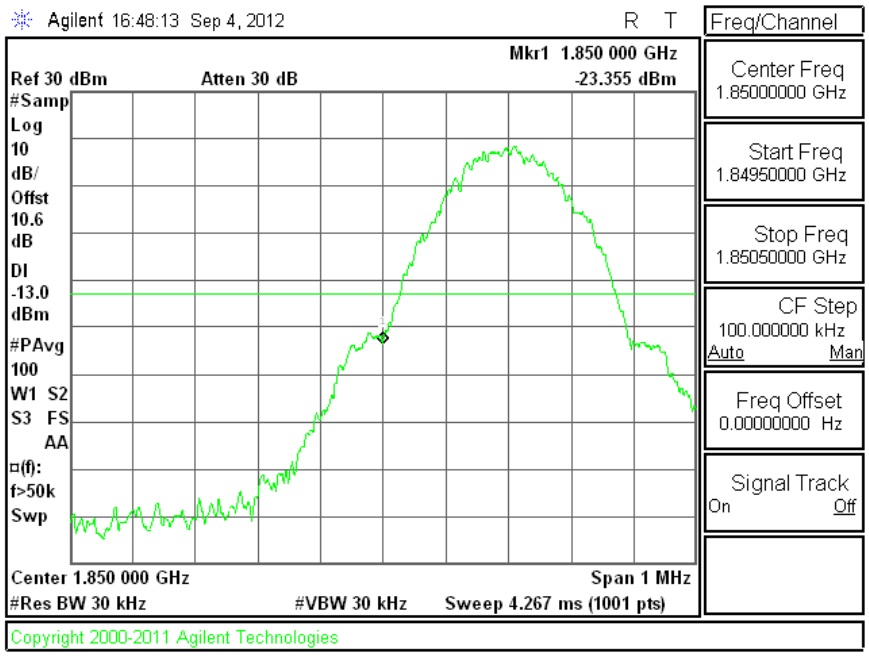
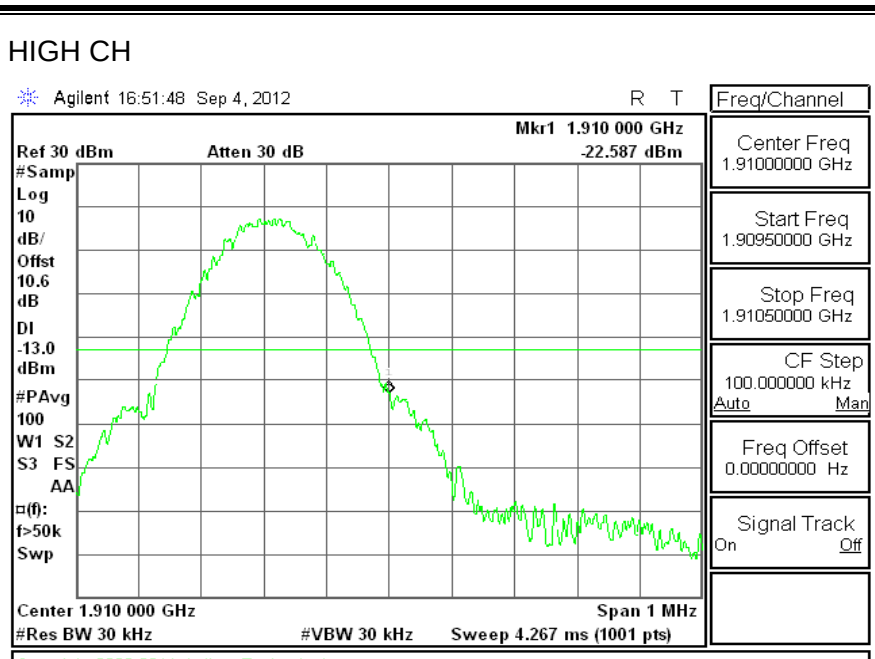
GPRS1900

LOW CH



HIGH CH



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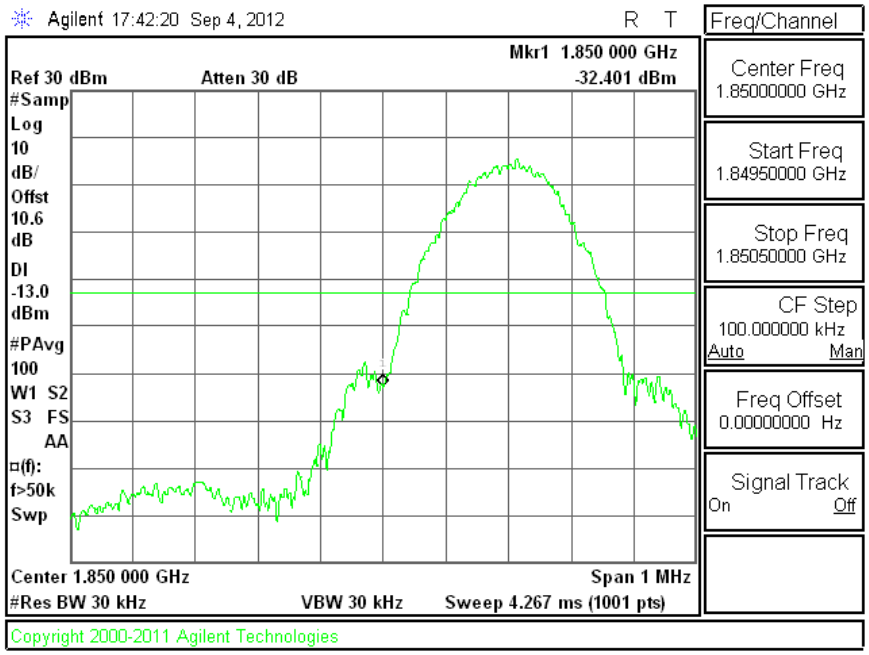
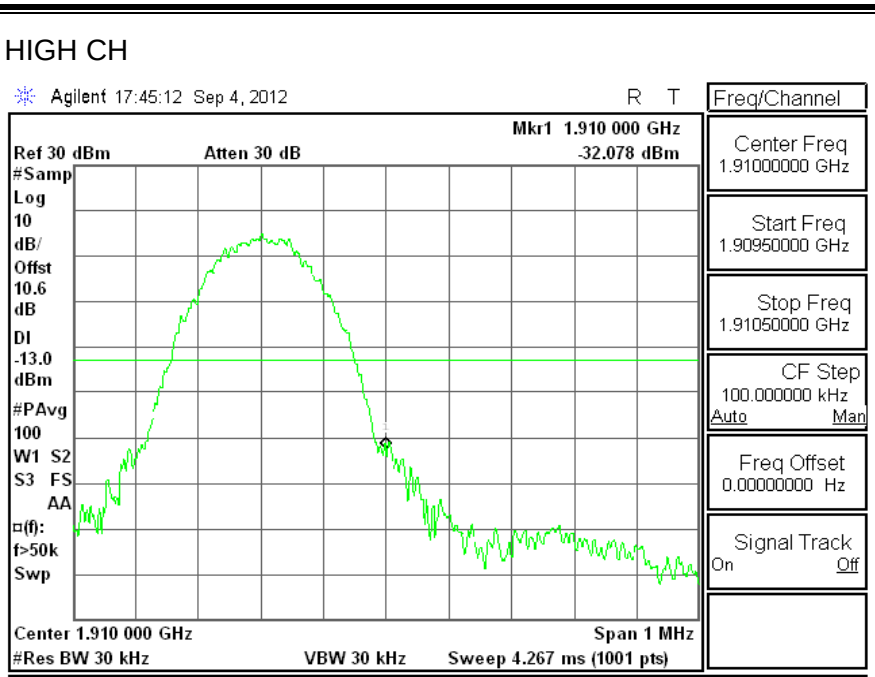
EGPRS1900 BAND

LOW CH



HIGH CH



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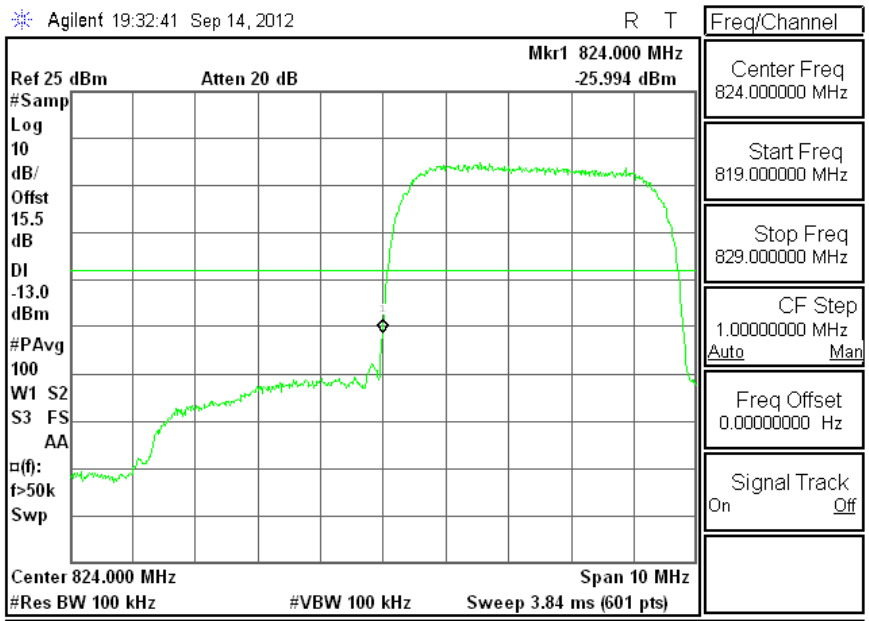
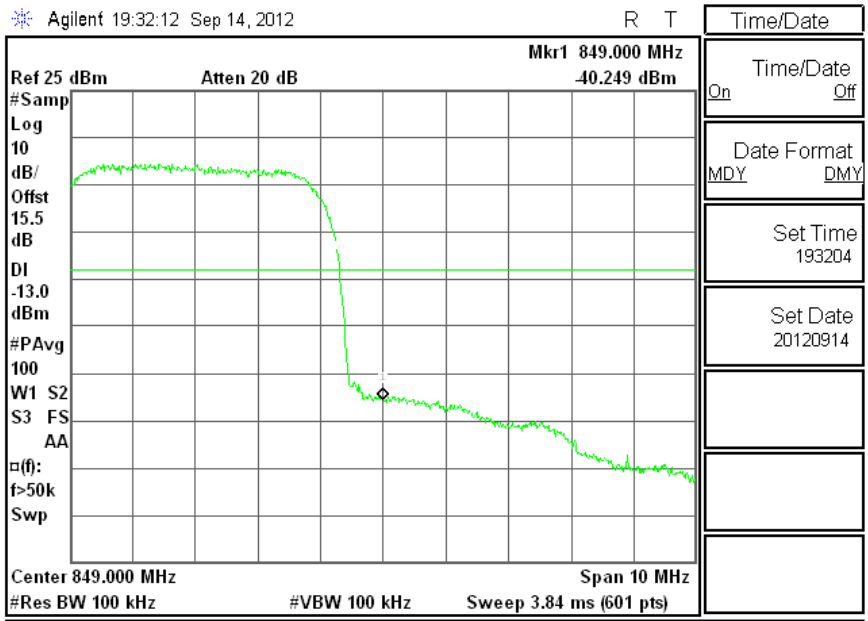
8.2.2. WCDMA

UMTS850, REL99

LOW CH



HIGH CH



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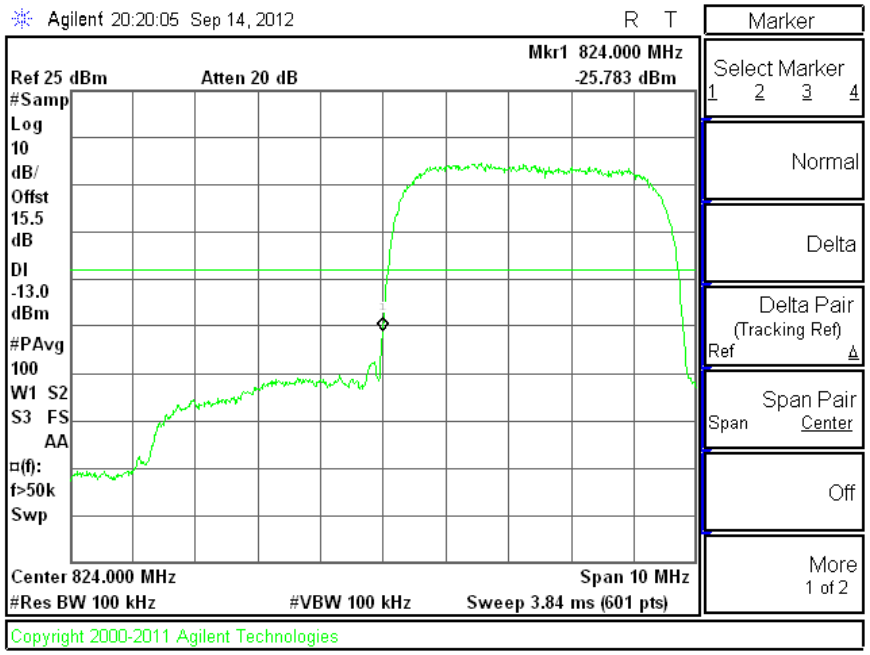
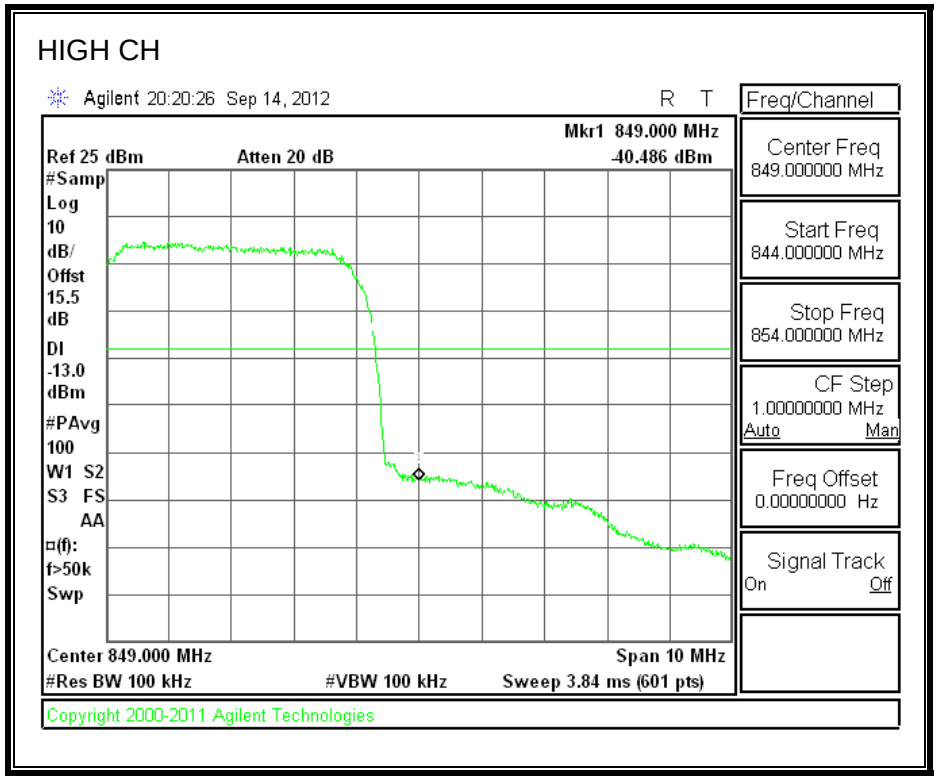
UMTS850, HSUPA

LOW CH



HIGH CH



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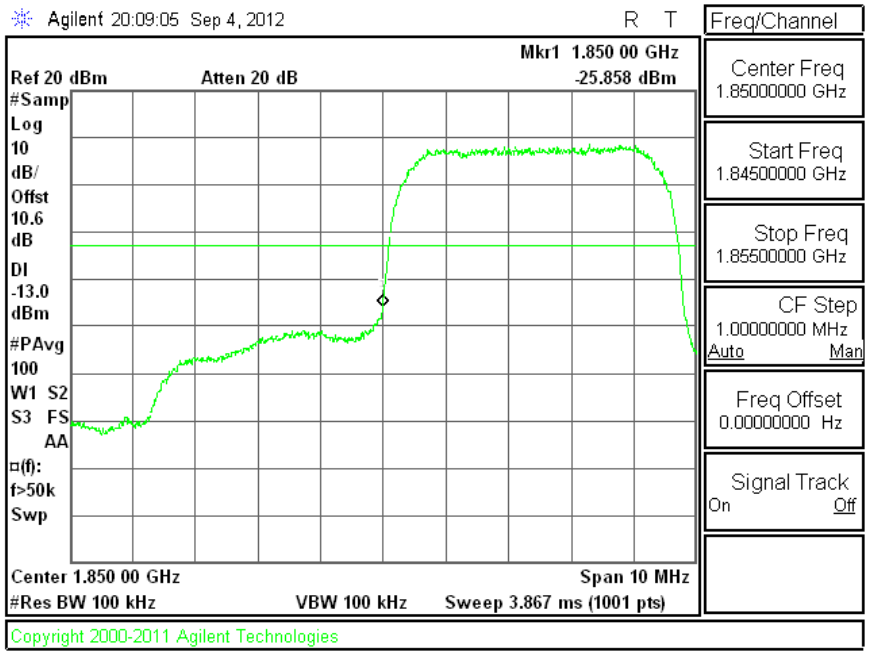
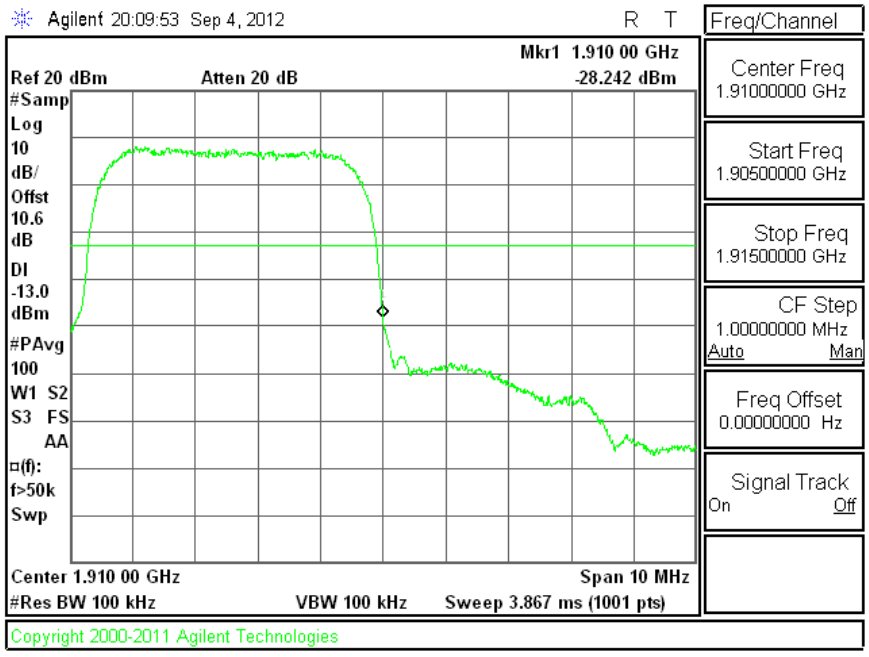
UMTS1900, REL99

LOW CH



HIGH CH



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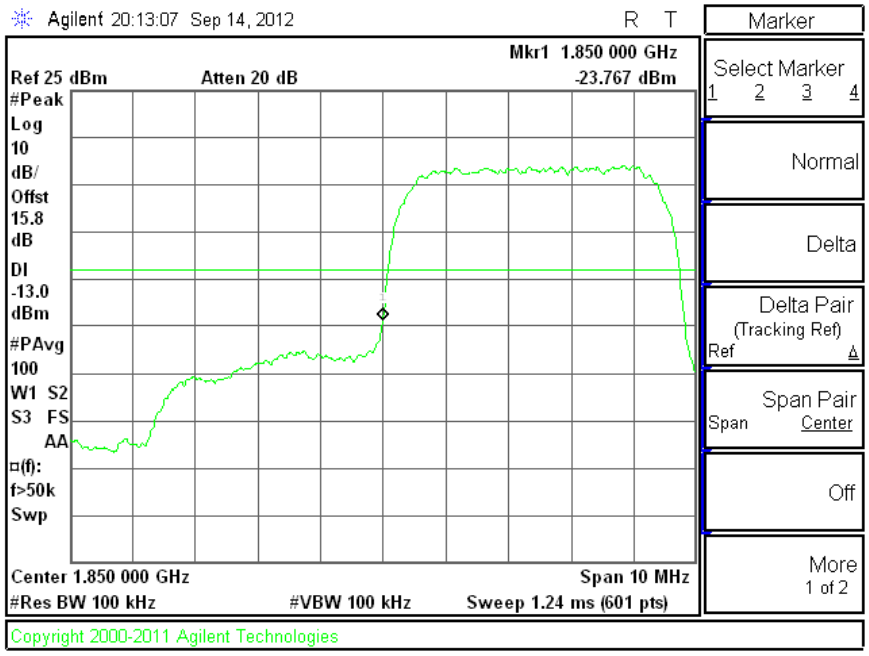
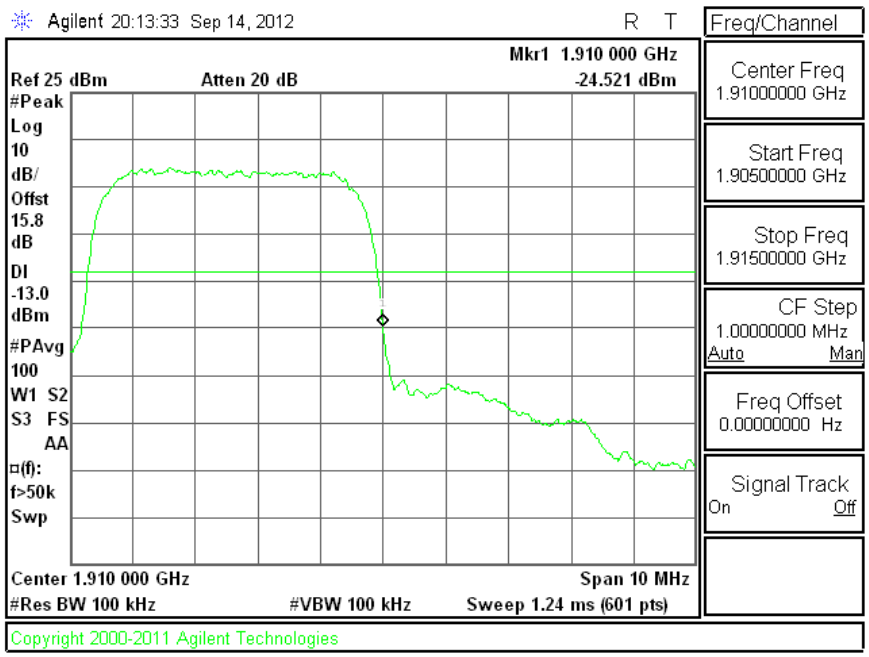
UMTS1900, HSUPA

LOW CH



HIGH CH



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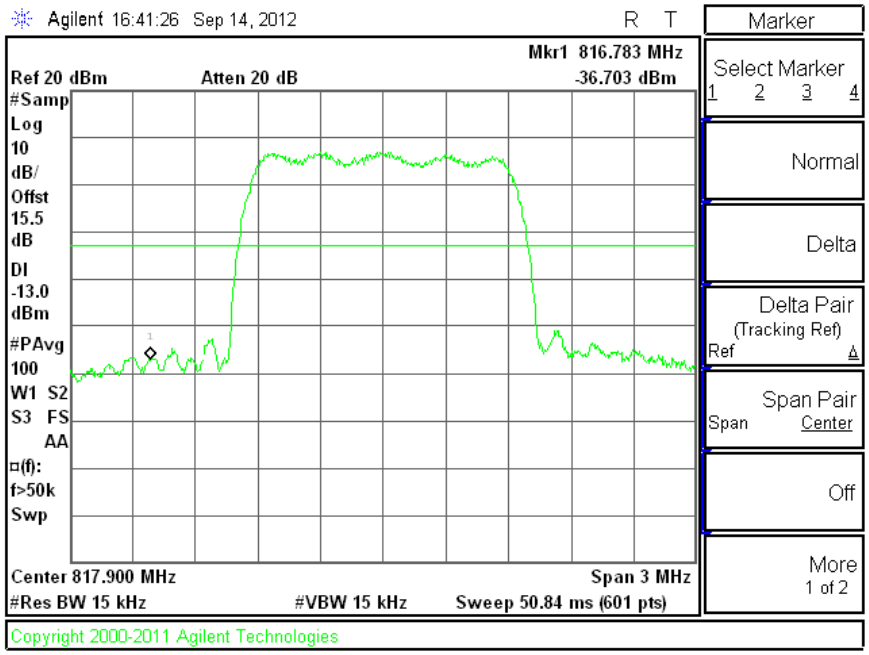
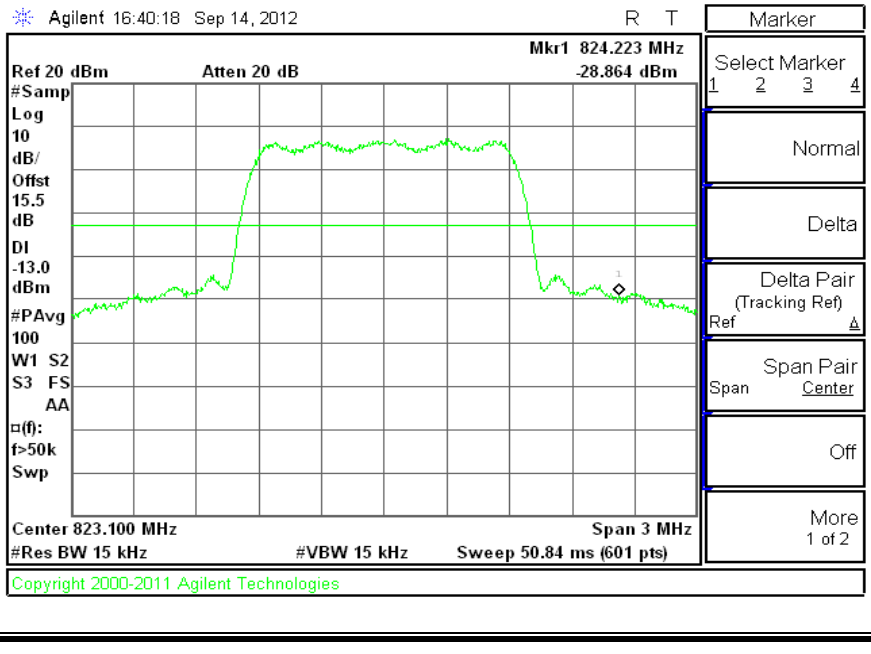
8.2.3. CDMA, BC10

1xRTT

LOW CH



HIGH CH



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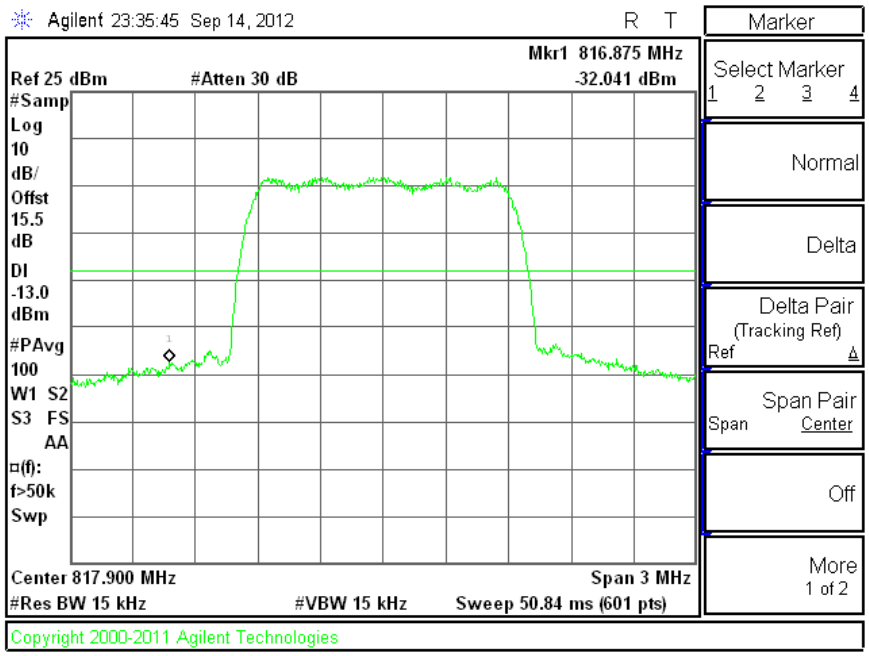
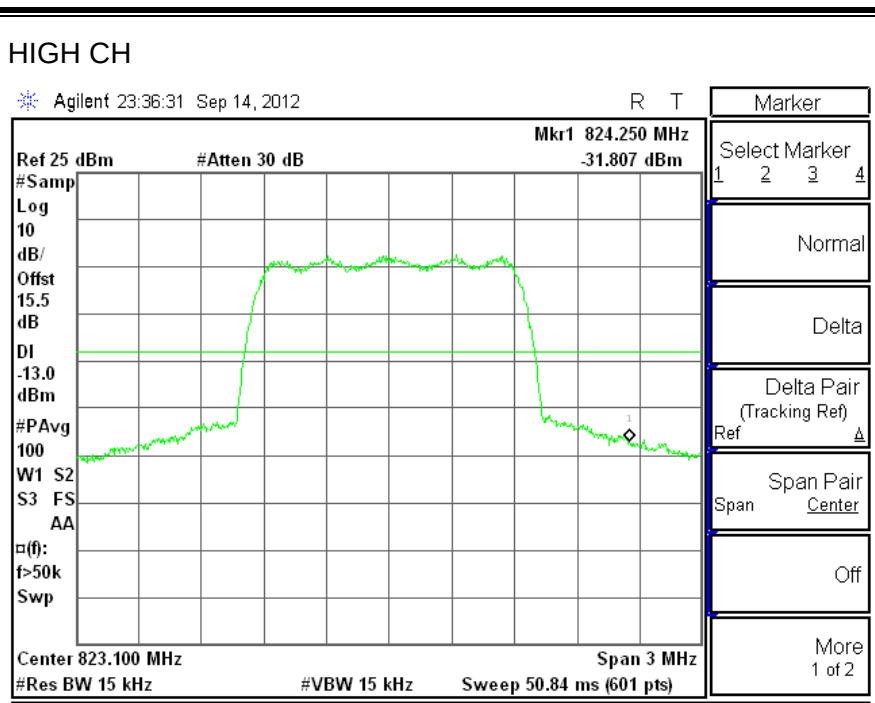
EVDO

LOW CH



HIGH CH



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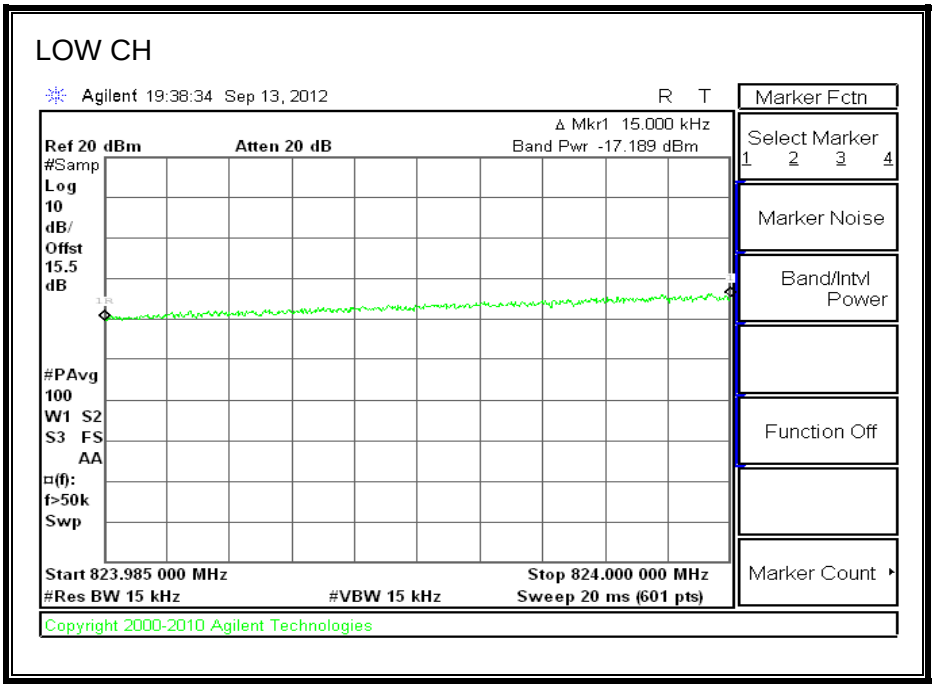
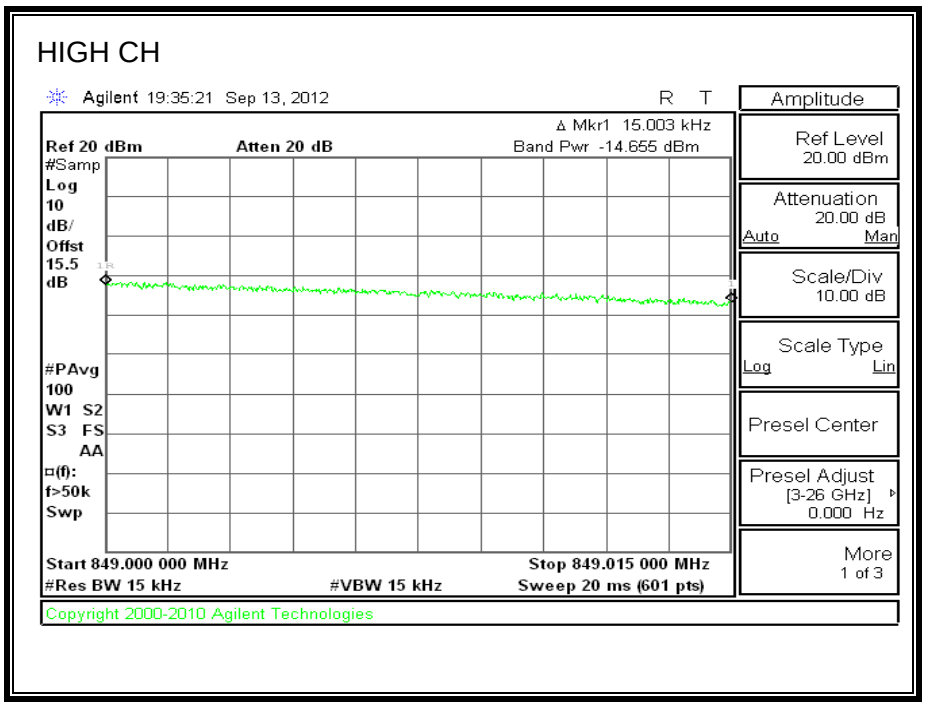
8.2.4. CDMA, BC0 and BC1

CDMA2000 1xRTT mode (Cellular Band)

LOW CH



HIGH CH



* Power is integrated over the 1 percent of emission bandwidth.

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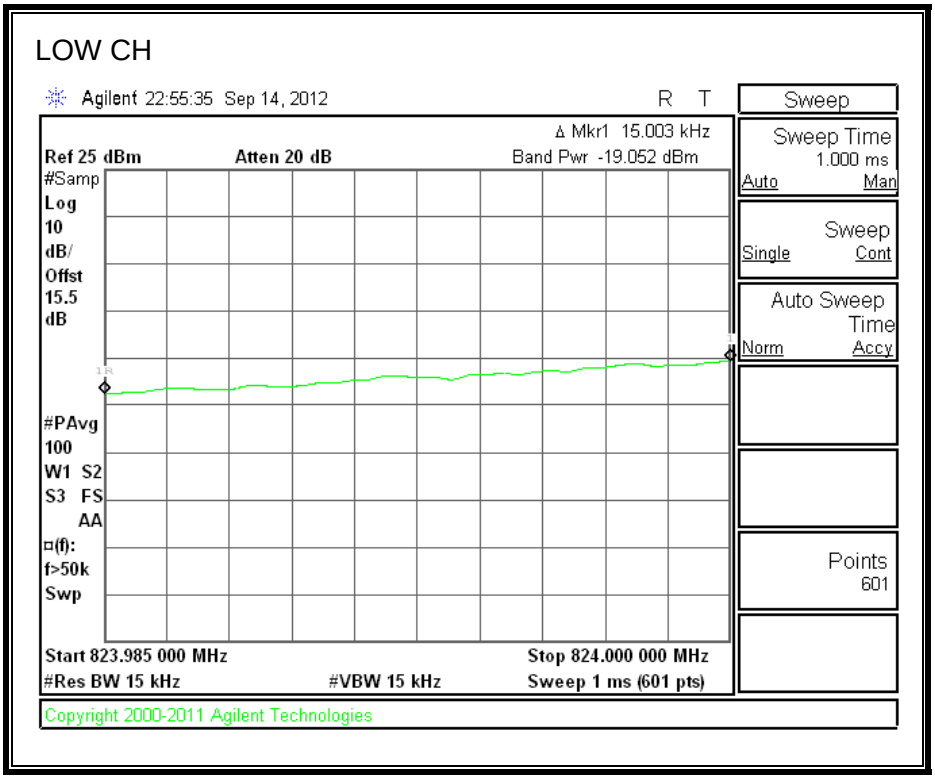
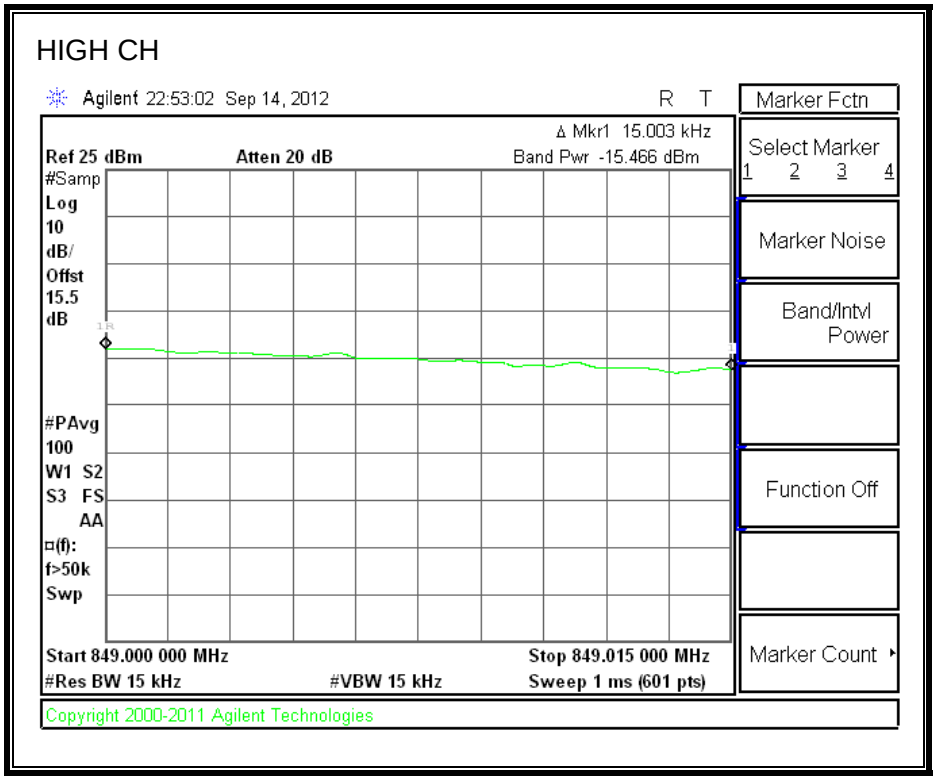
CDMA2000 EVDO Rev A mode (Cellular Band)

LOW CH



HIGH CH



* Power is integrated over the 1 percent of emission bandwidth.

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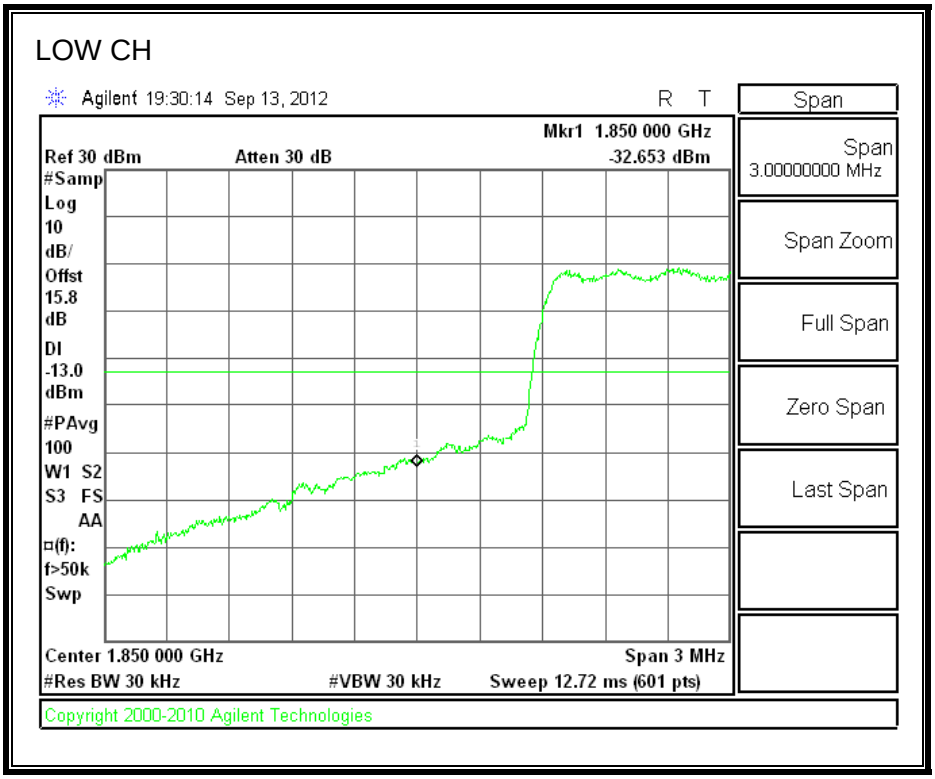
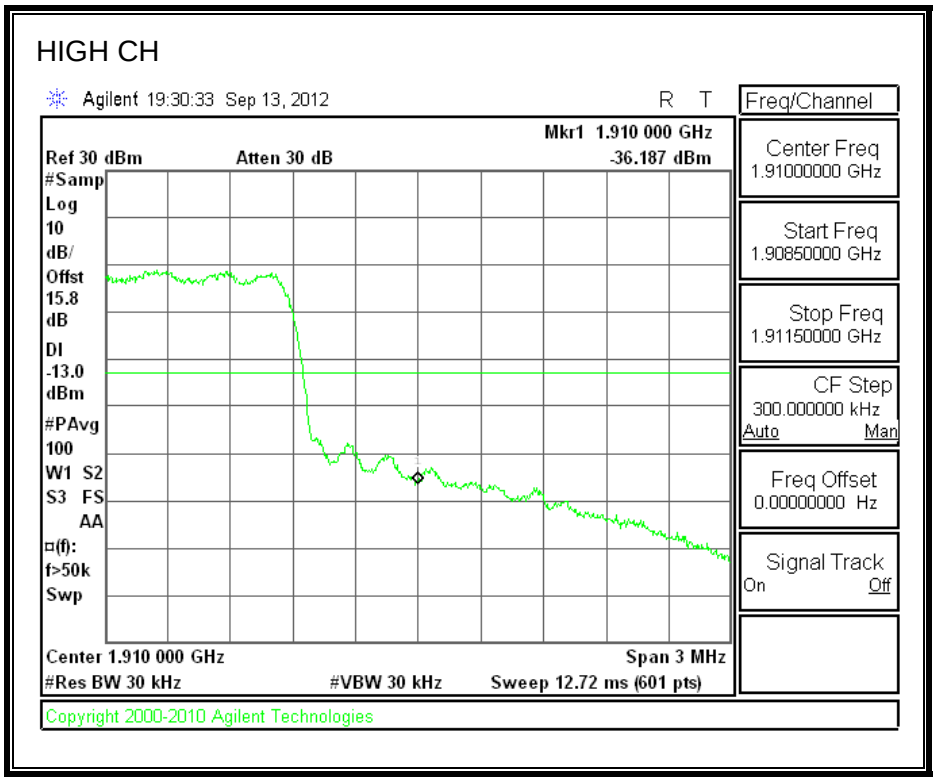
CDMA2000 1xRTT mode (PCS Band)

LOW CH



HIGH CH



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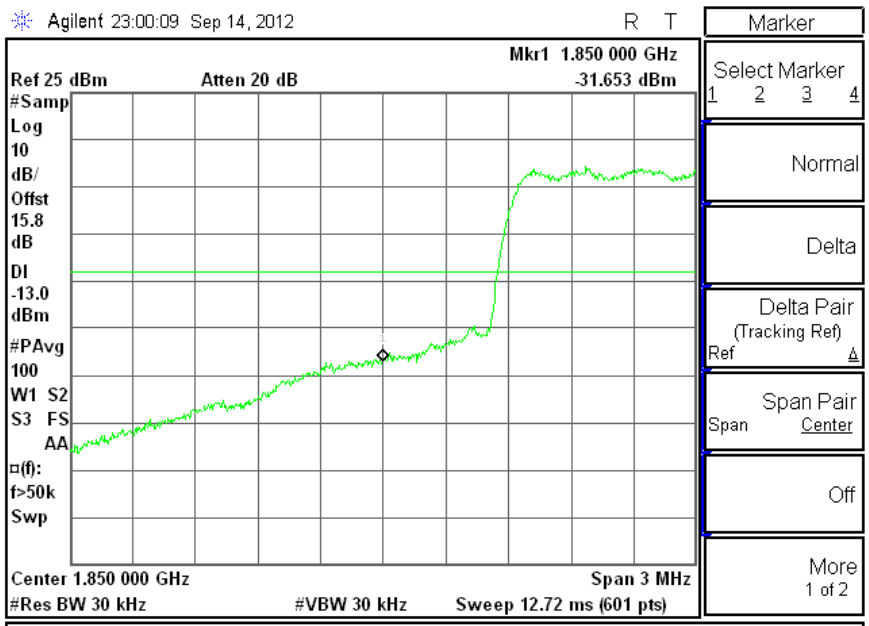
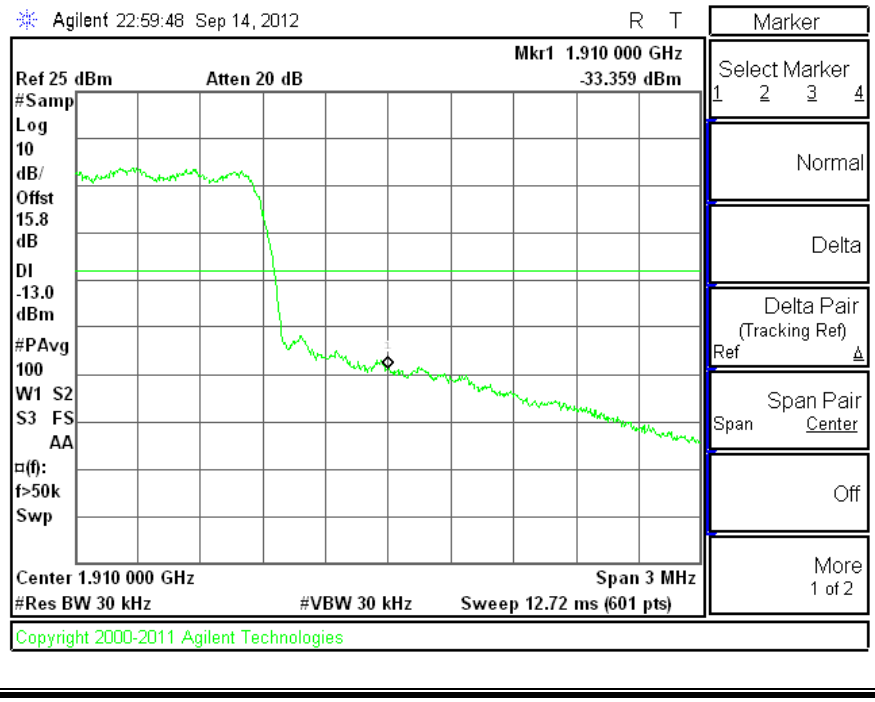
CDMA2000 EVDO Rev A mode (PCS Band)

LOW CH



HIGH CH



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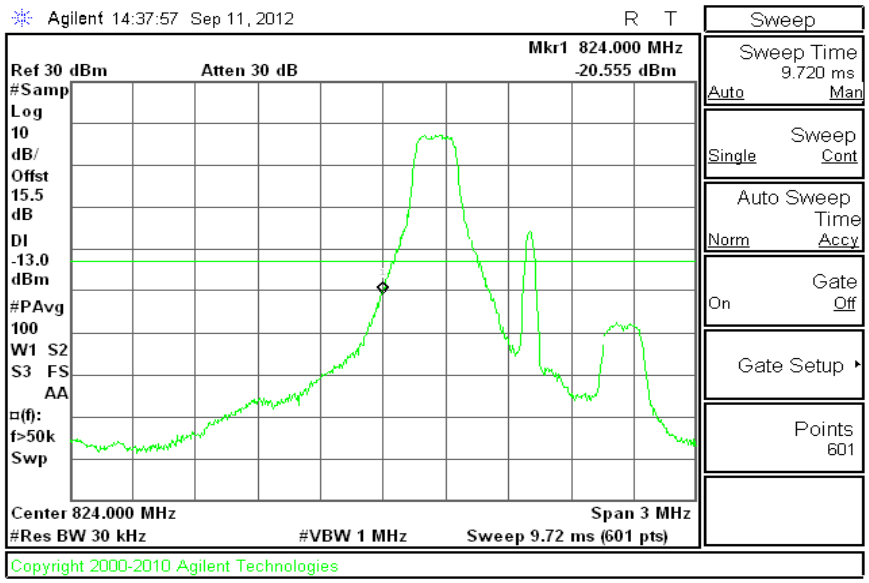
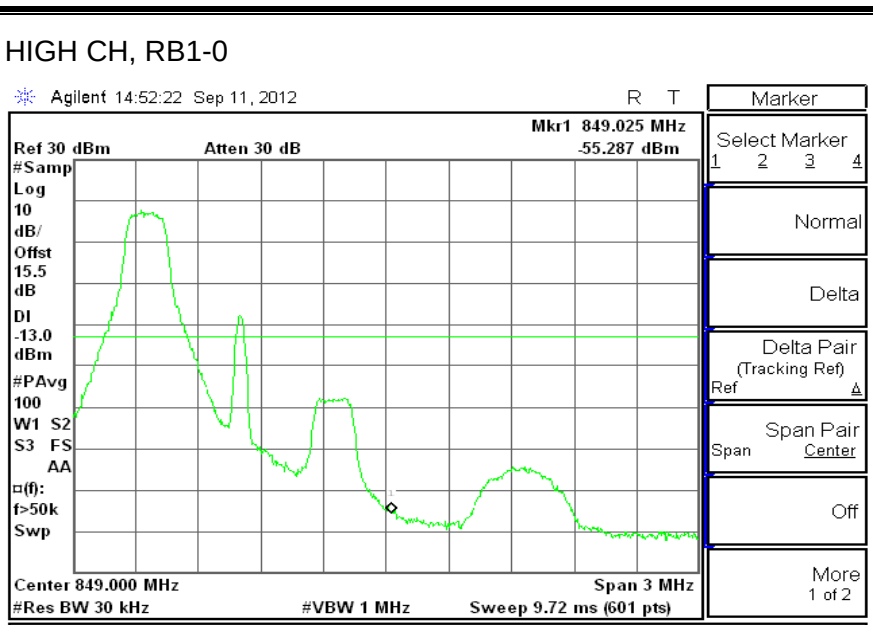
8.2.5. LTE BAND 5

LTE QPSK Band 5 (1.4 MHz BAND WIDTH)

LOW CH, RB1-0

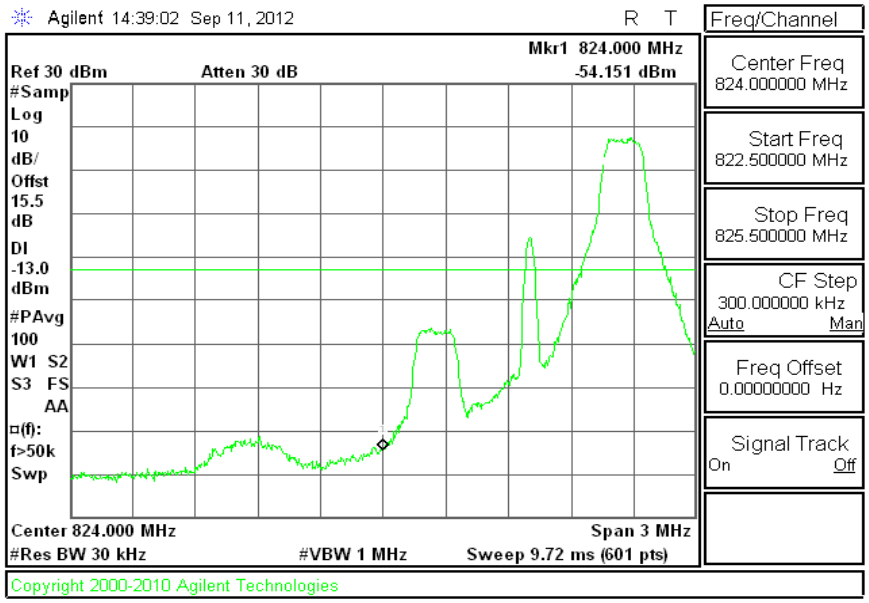


HIGH CH, RB1-0

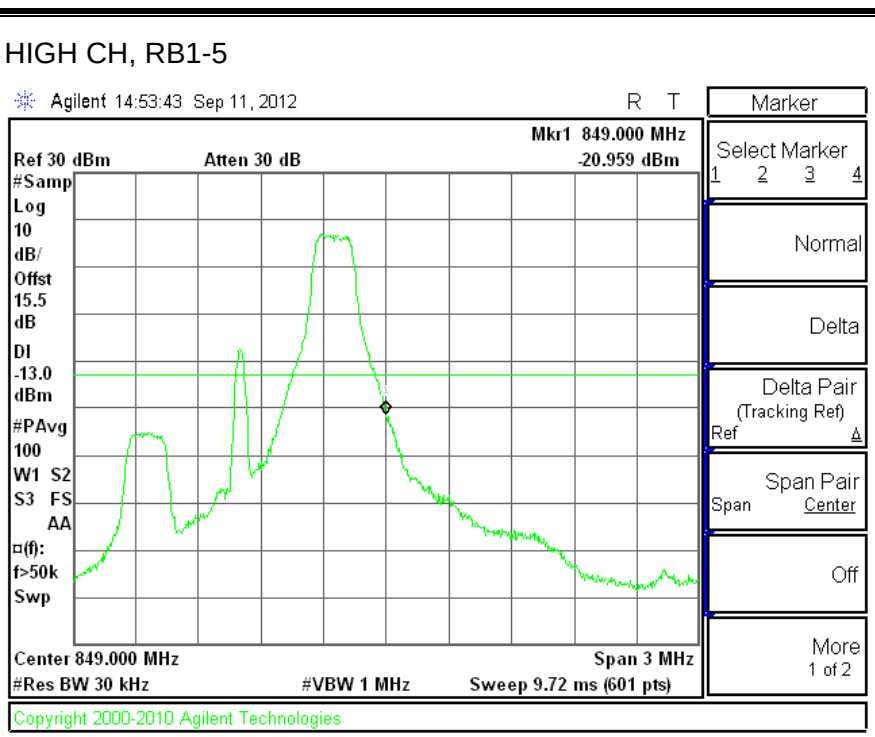


This report shall not be reproduced except in full, without the written approval of UL.CCS.

LOW CH, RB1-5

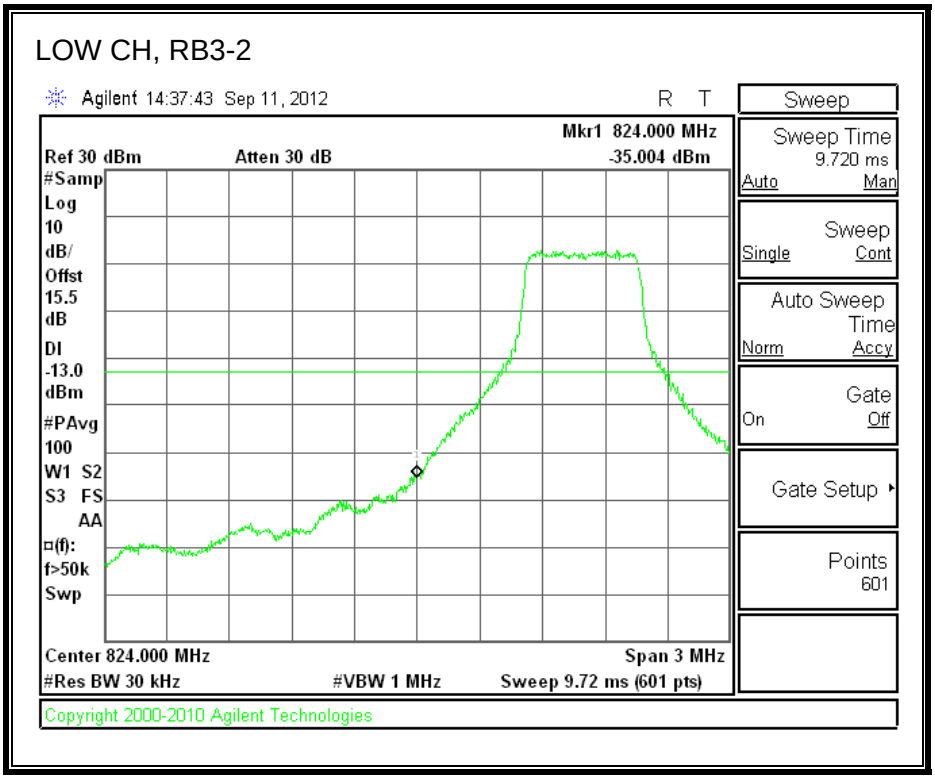


HIGH CH, RB1-5

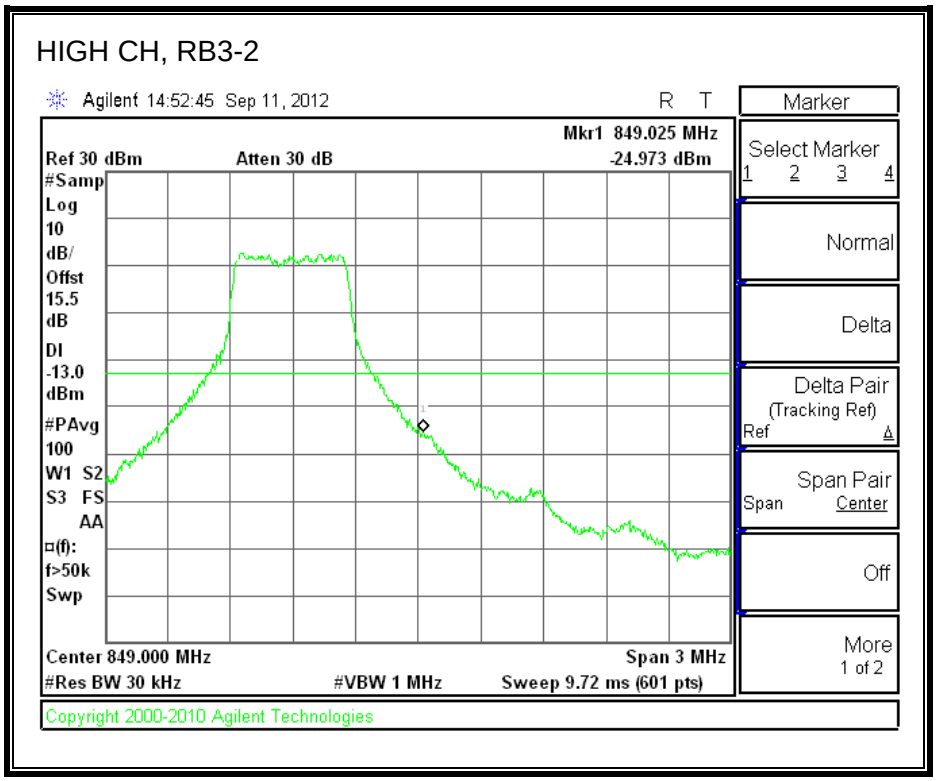


This report shall not be reproduced except in full, without the written approval of UL.CCS.

LOW CH, RB3-2



HIGH CH, RB3-2



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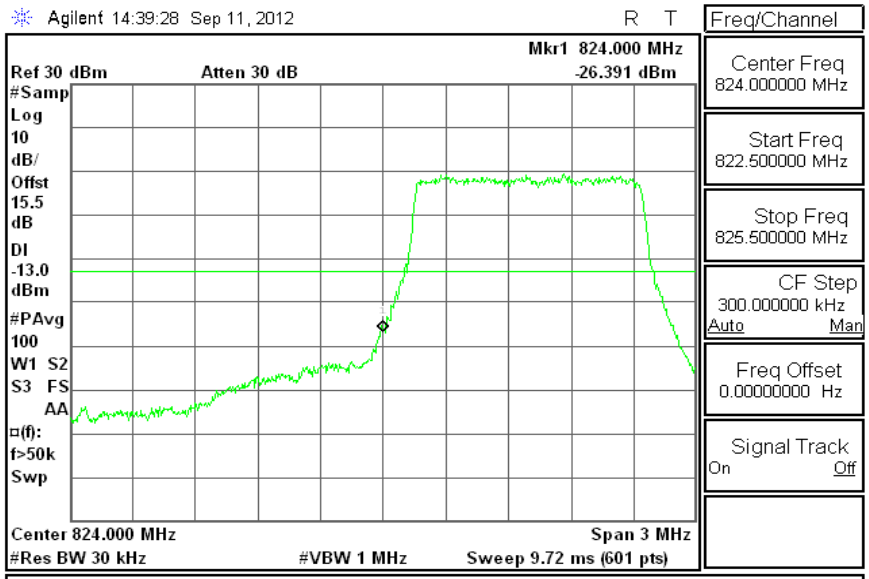
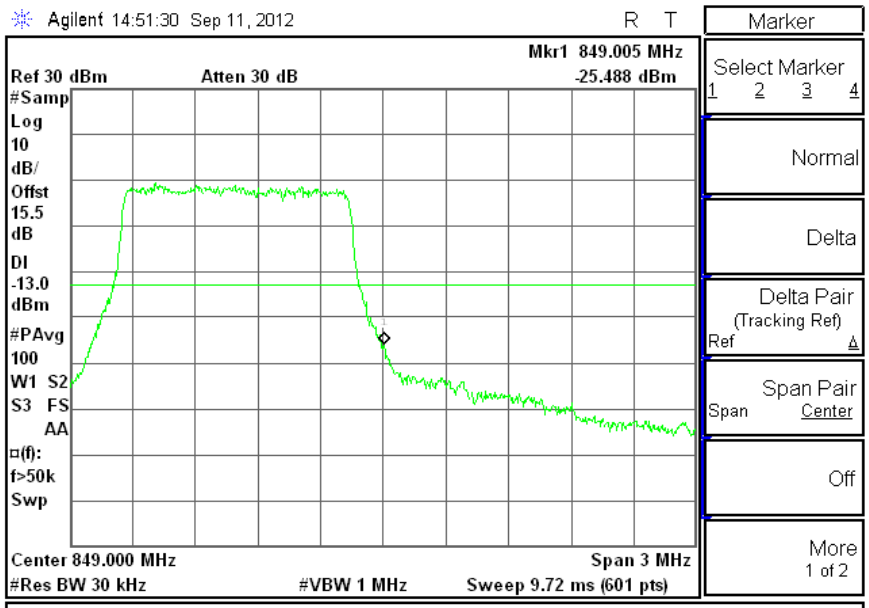
LOW CH, RB6-0



HIGH CH, RB6-0



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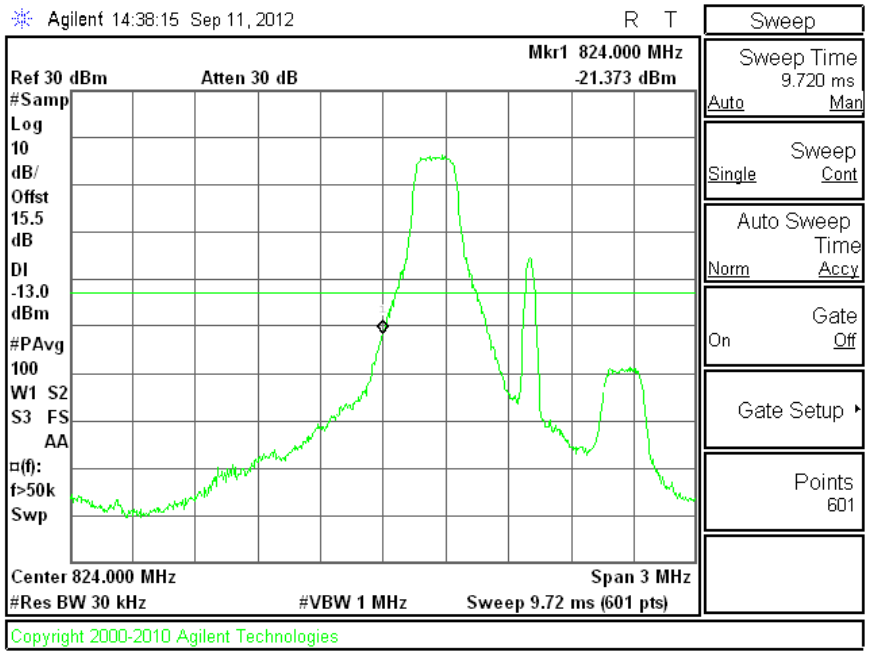
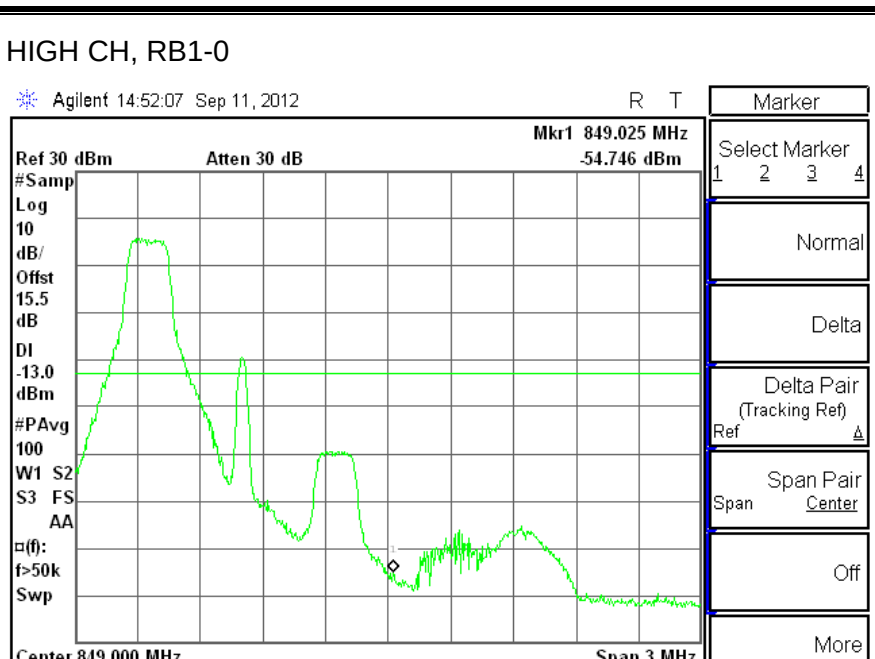
LTE 16QAM Band 5 (1.4 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-0



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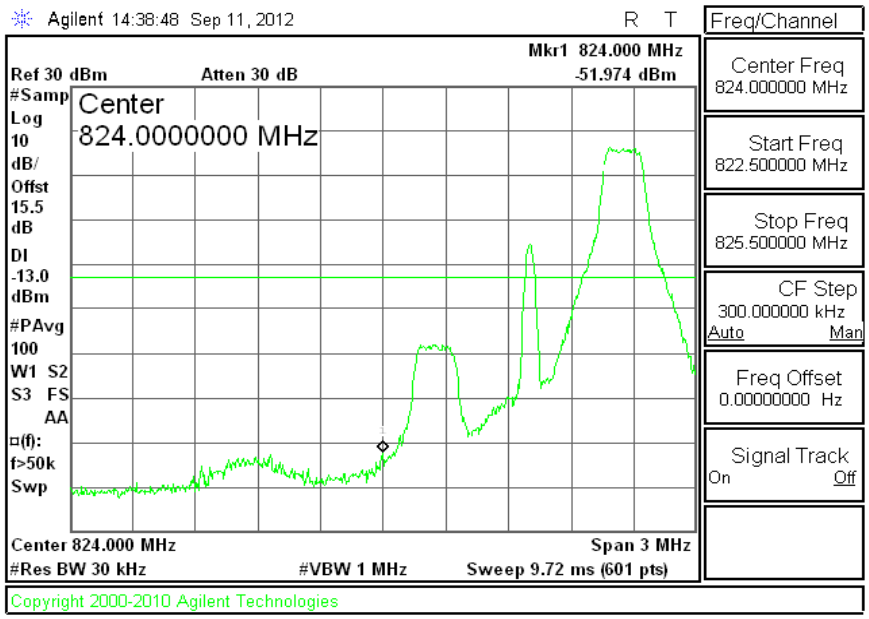
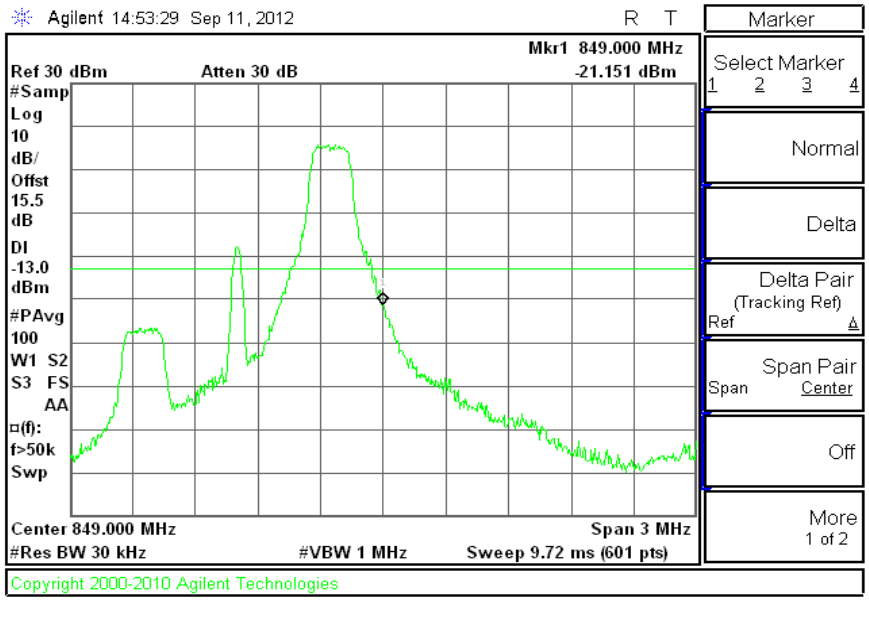
LOW CH, RB1-5



HIGH CH, RB1-5



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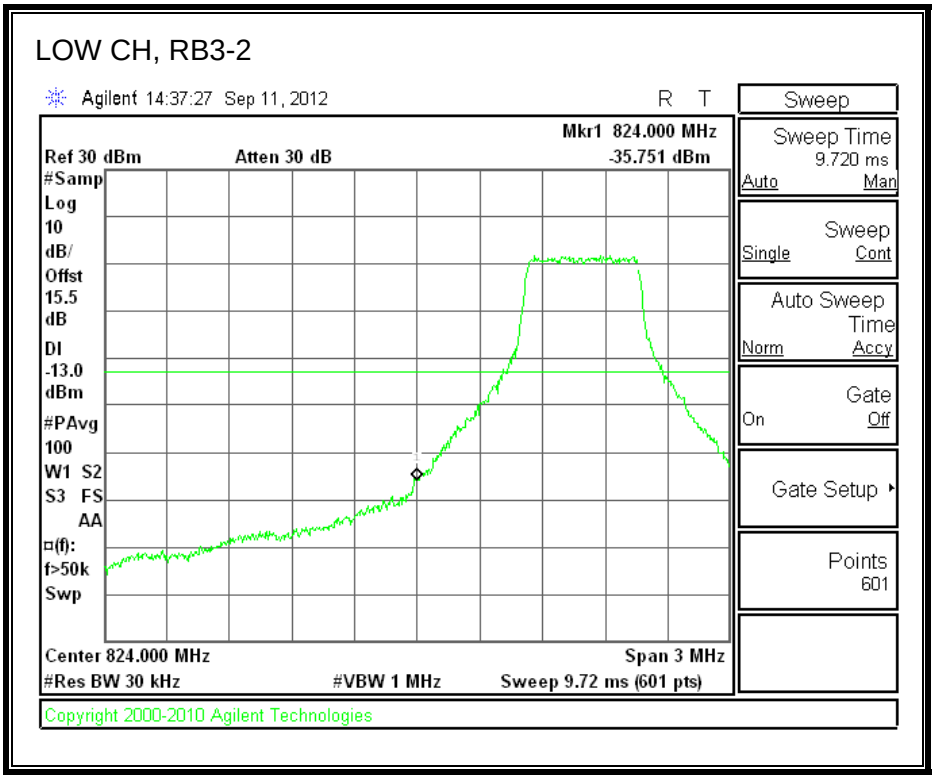
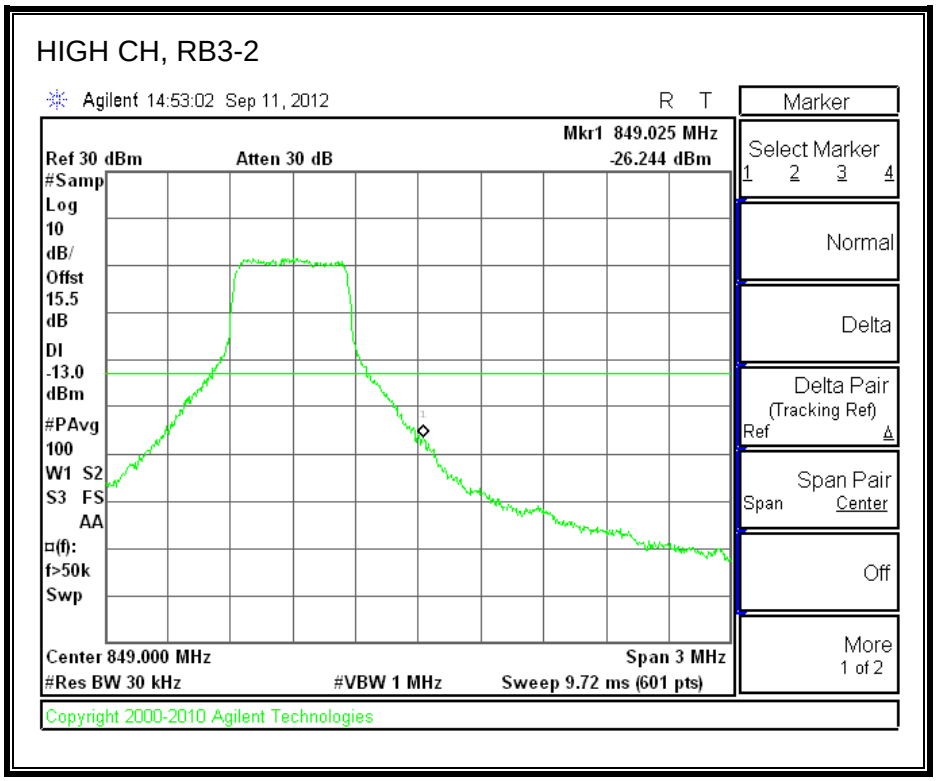
LOW CH, RB3-2



HIGH CH, RB3-2



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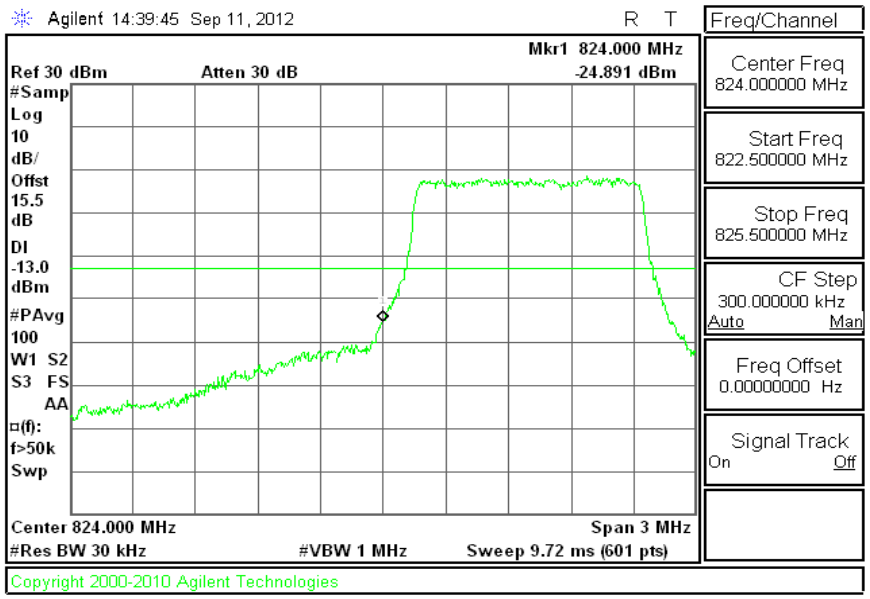
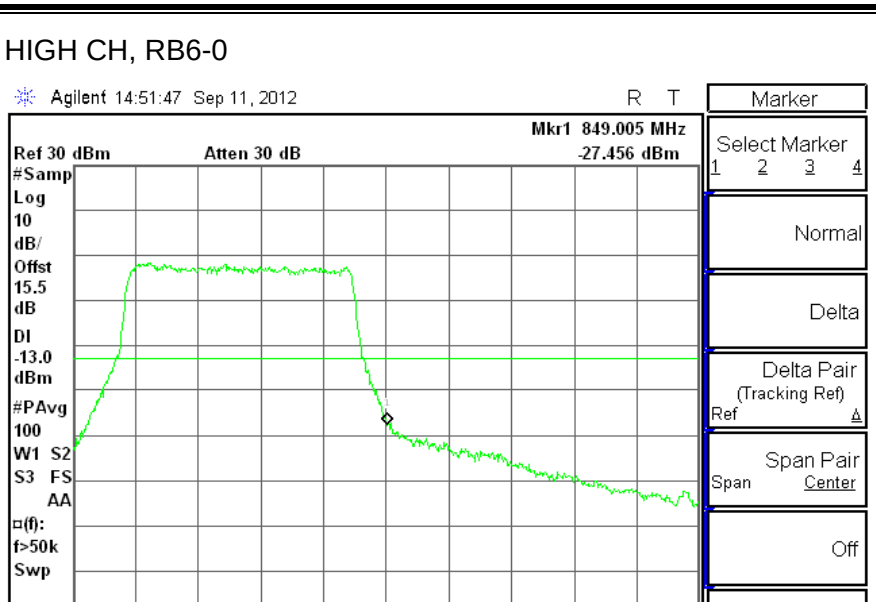
LOW CH, RB6-0



HIGH CH, RB6-0



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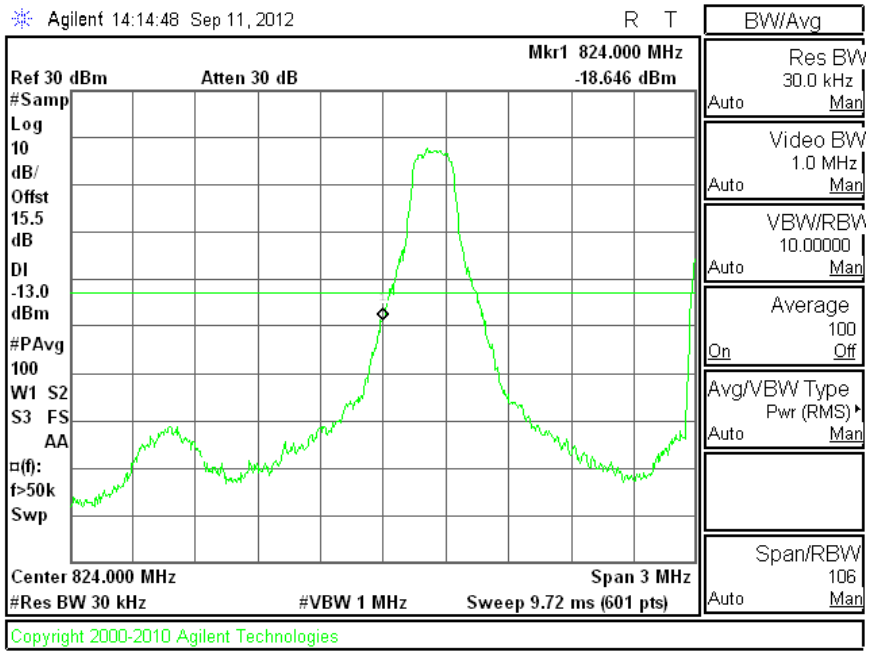
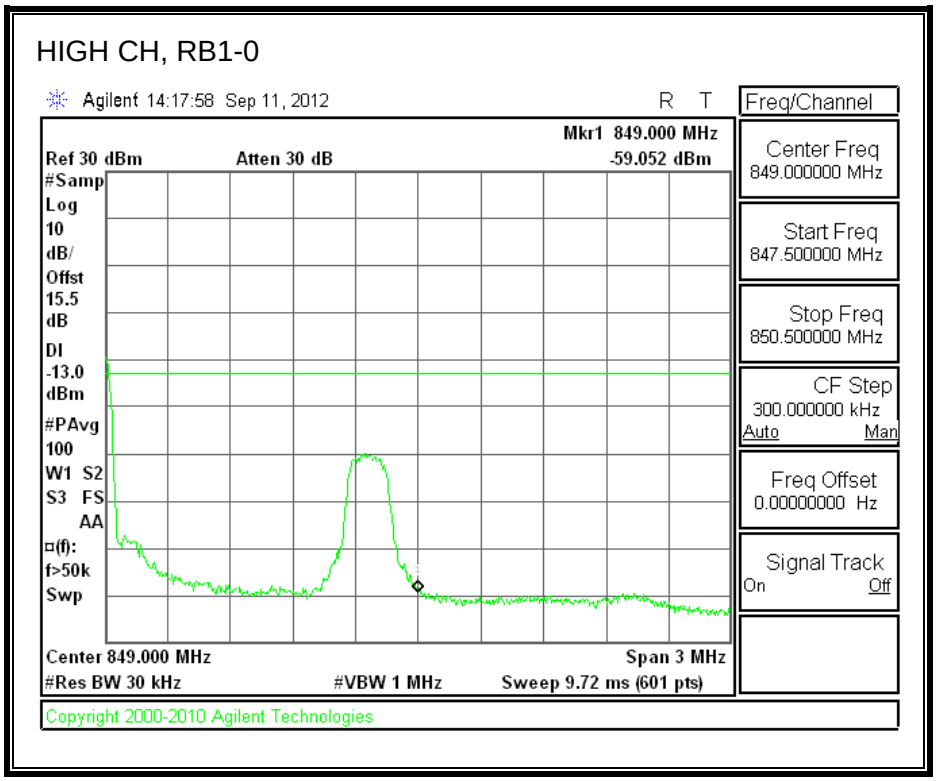
LTE QPSK Band 5 (3 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-0



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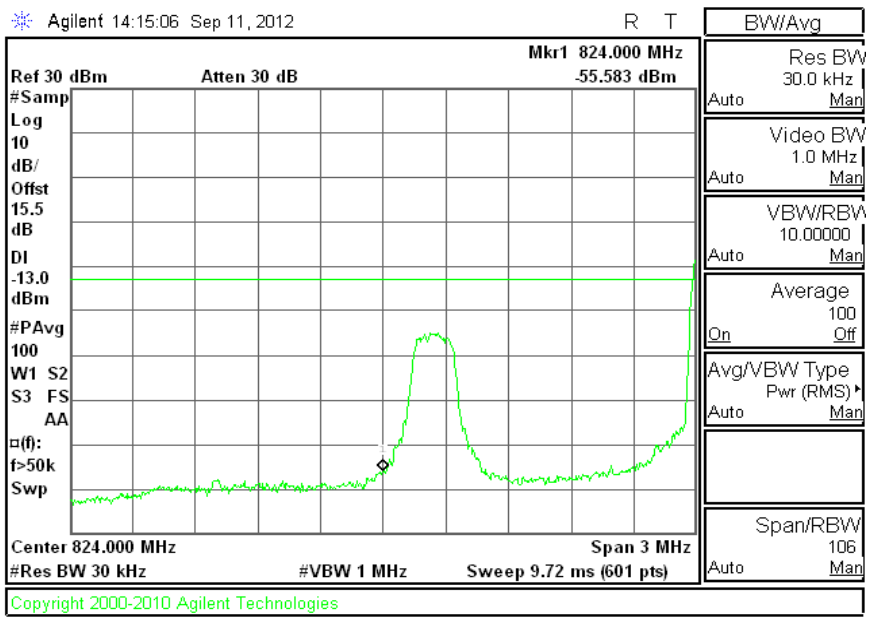
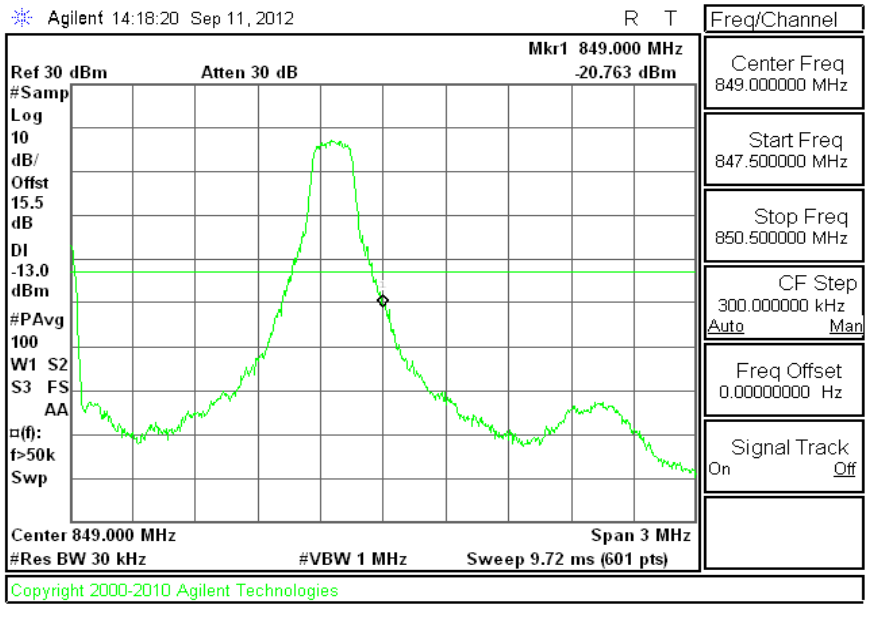
LOW CH, RB1-14



HIGH CH, RB1-14



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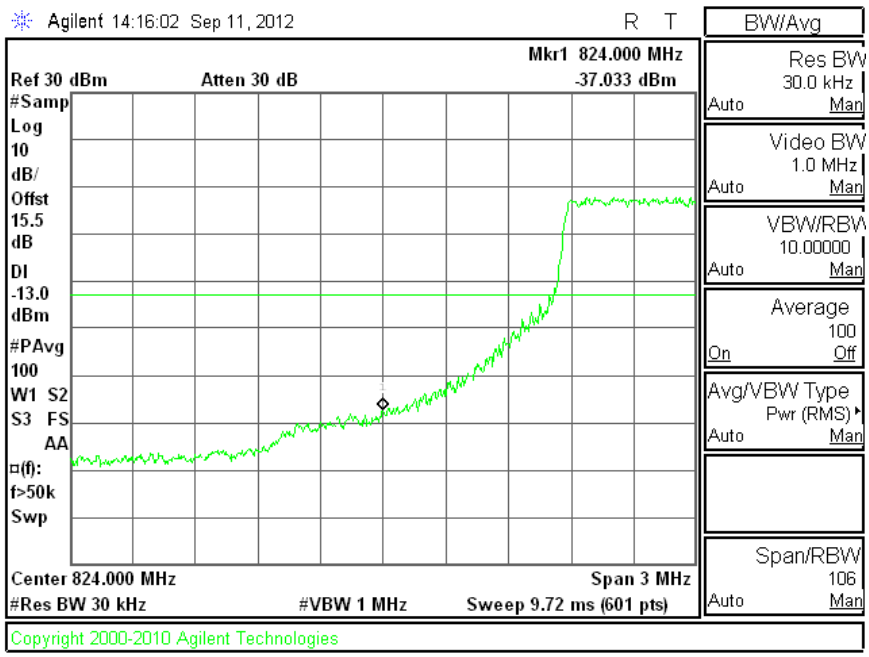
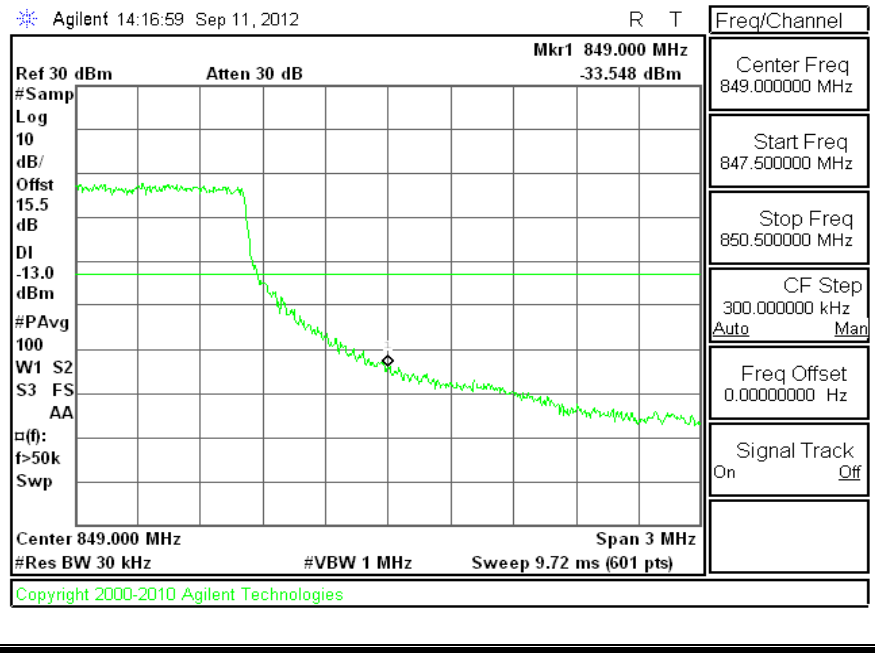
LOW CH, RB8-4



HIGH CH, RB8-4



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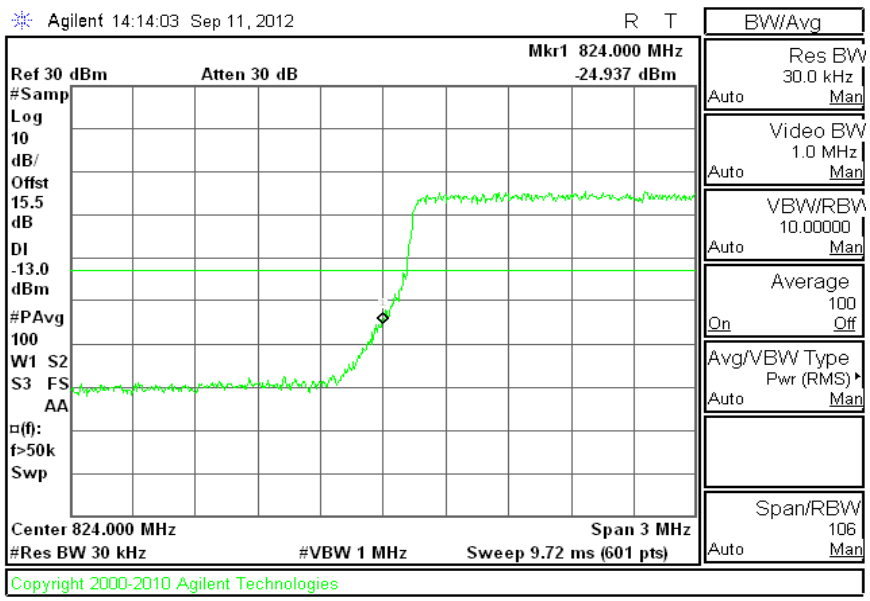
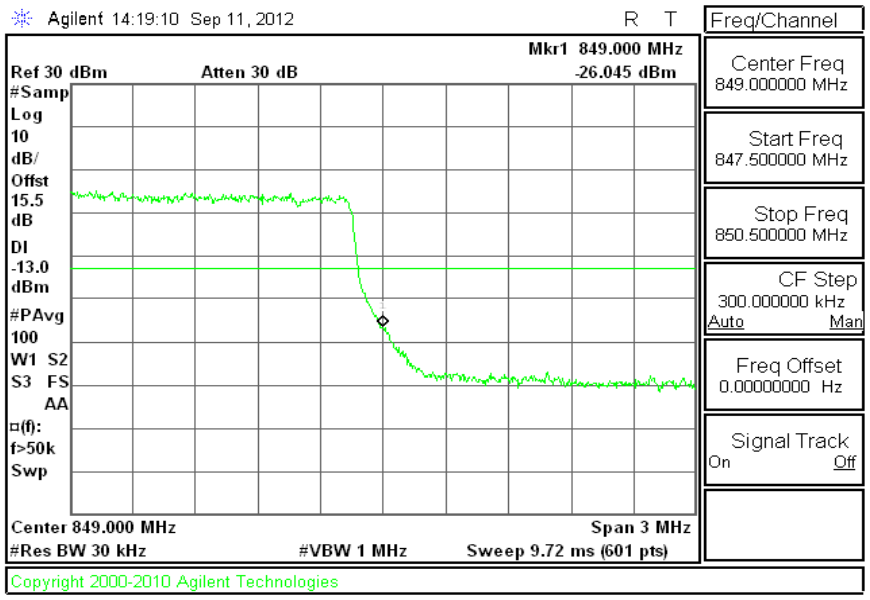
LOW CH, RB15-0



HIGH CH, RB15-0



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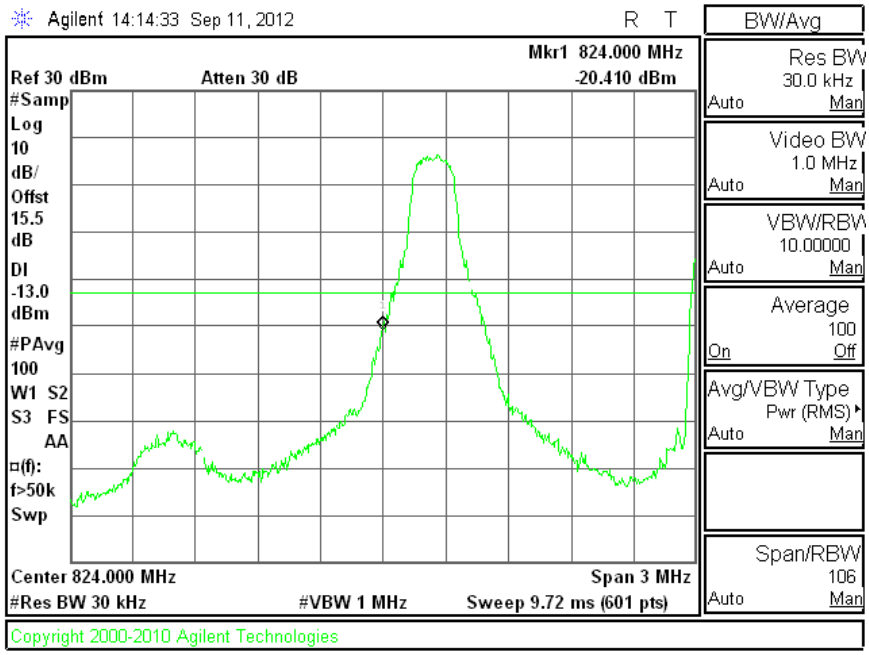
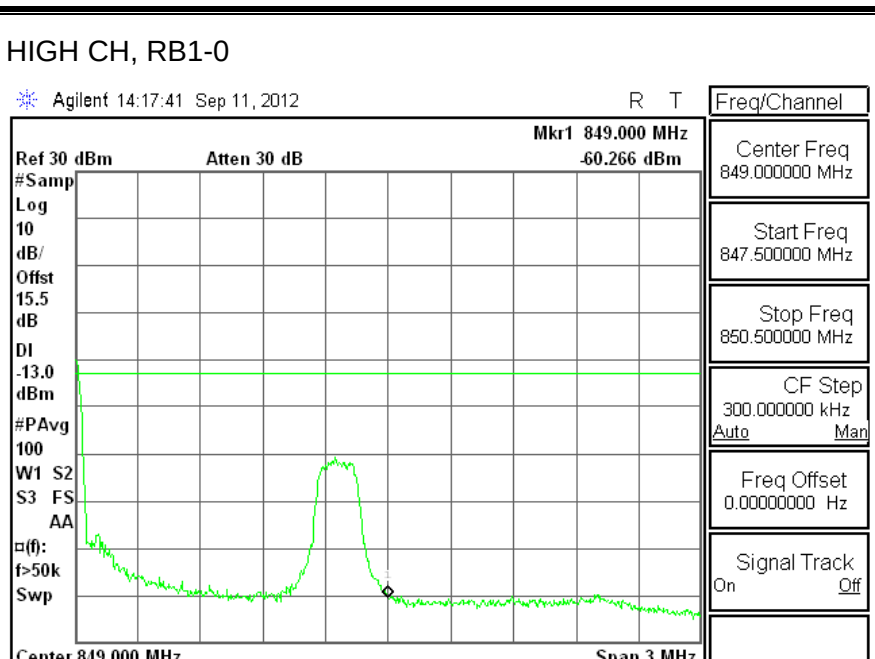
LTE 16QAM Band 5 (3 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-0



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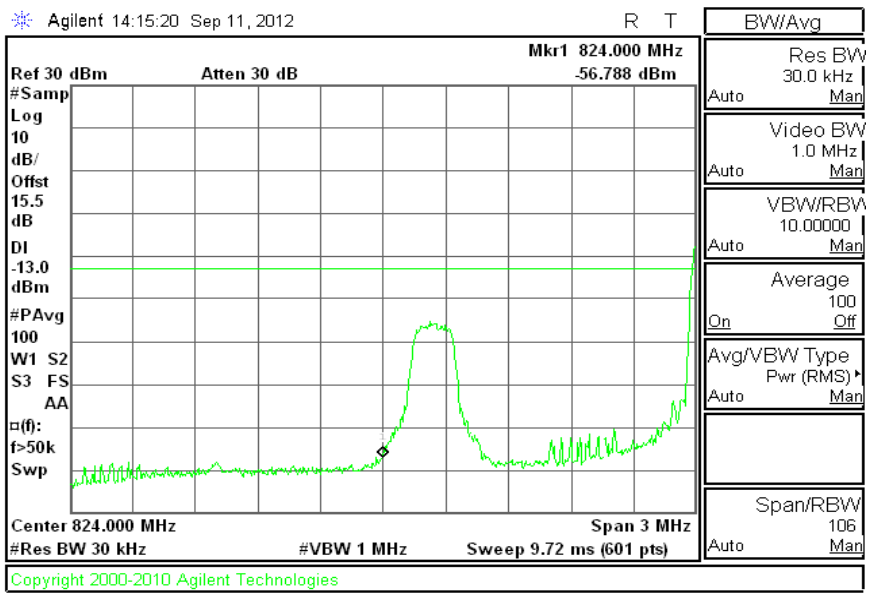
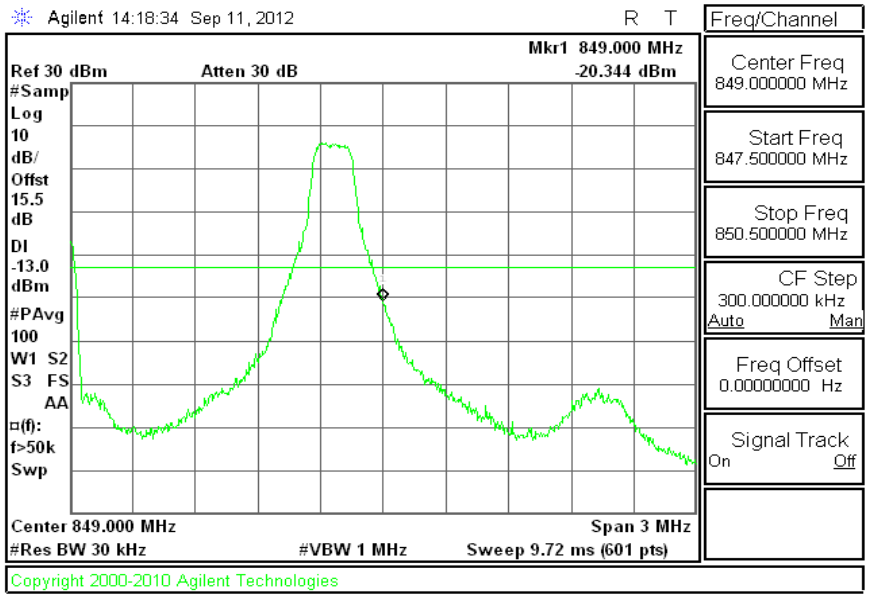
LOW CH, RB1-14



HIGH CH, RB1-14



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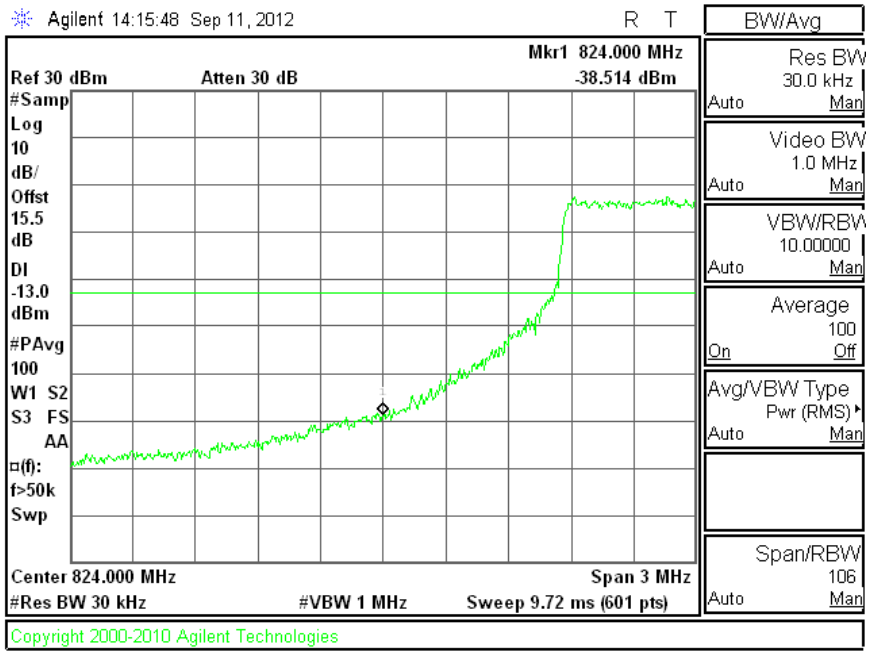
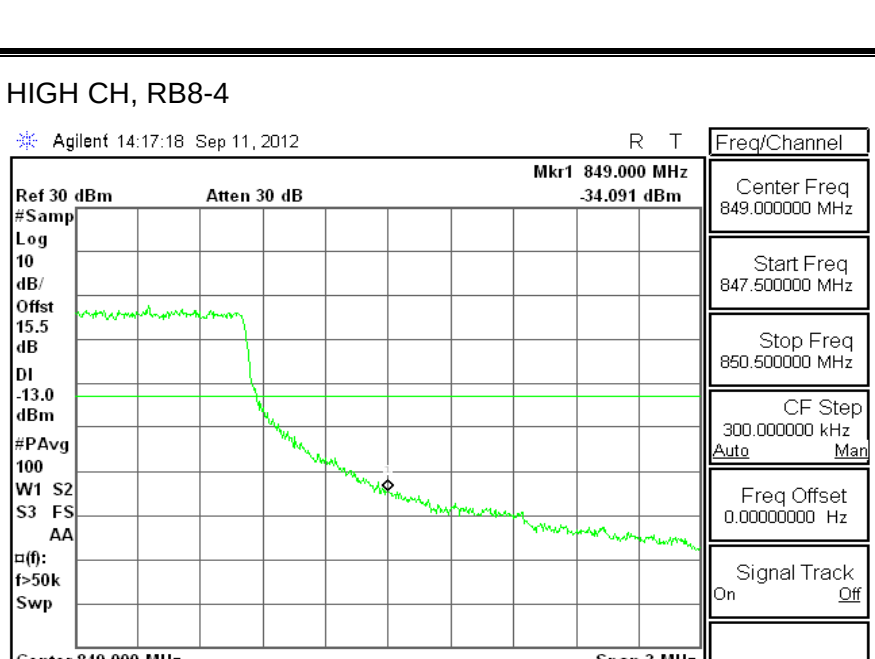
LOW CH, RB8-4



HIGH CH, RB8-4



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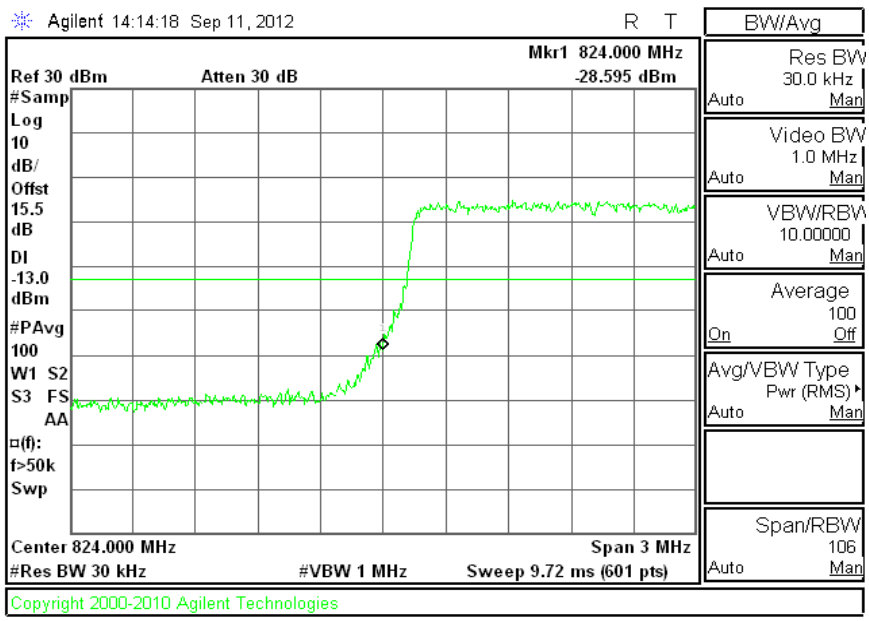
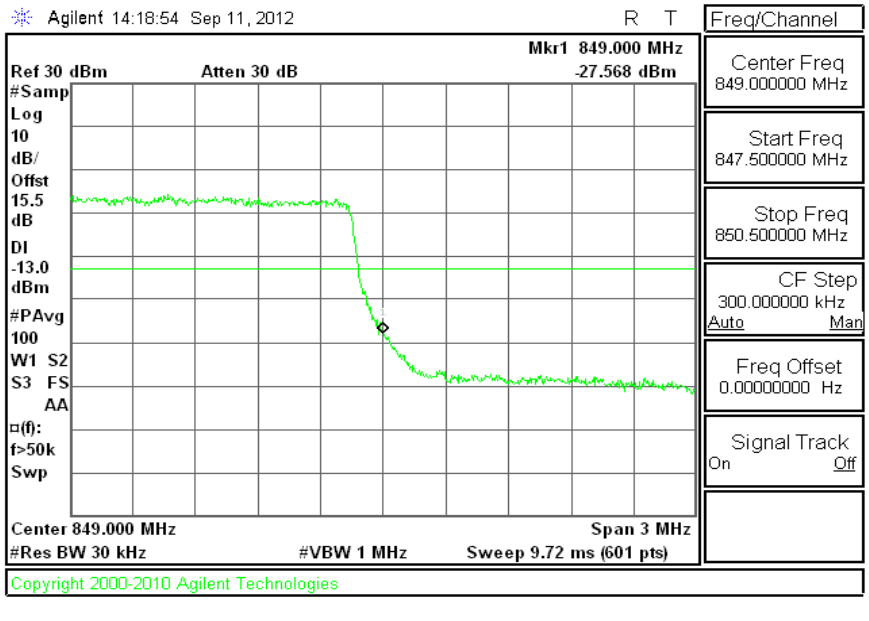
LOW CH, RB15-0



HIGH CH, RB15-0



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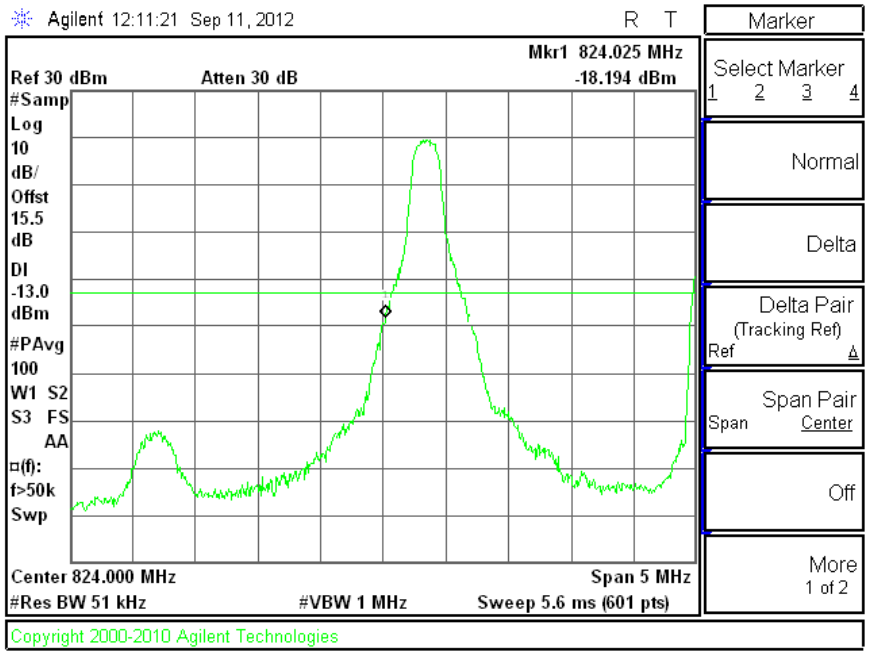
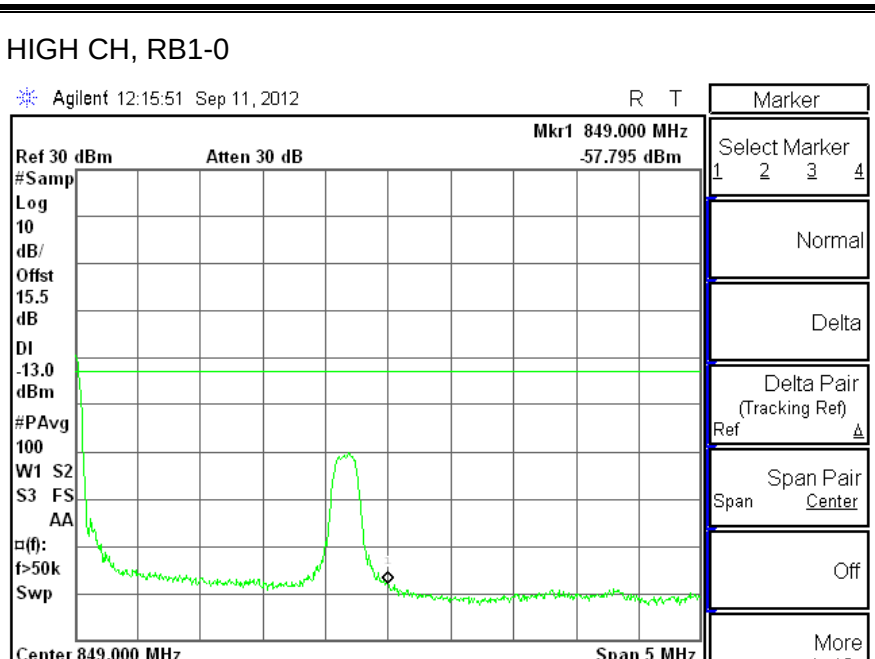
LTE QPSK Band 5 (5 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-0



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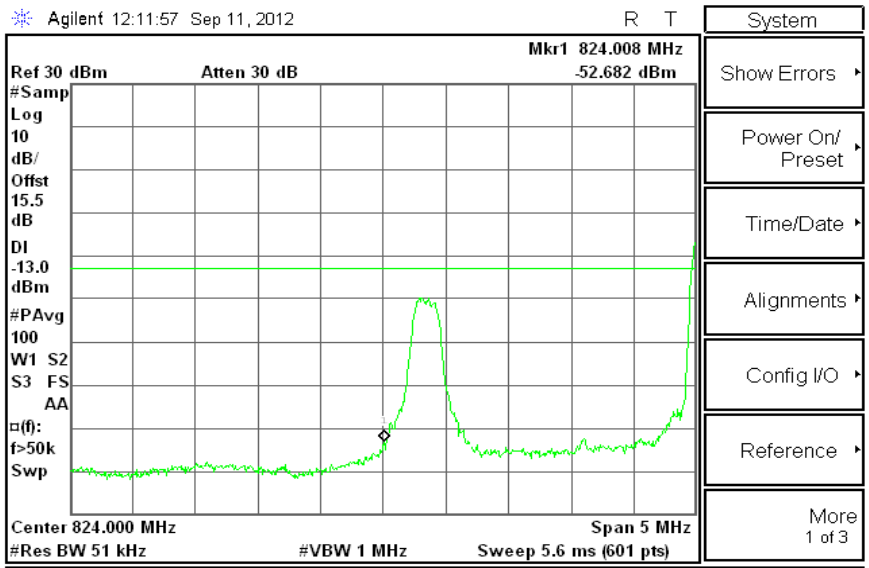
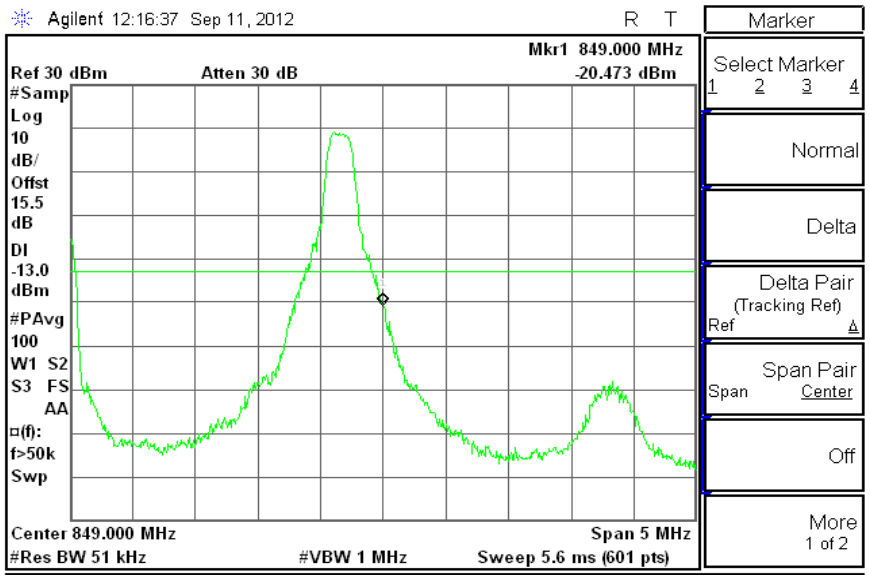
LOW CH, RB1-24



HIGH CH, RB1-24



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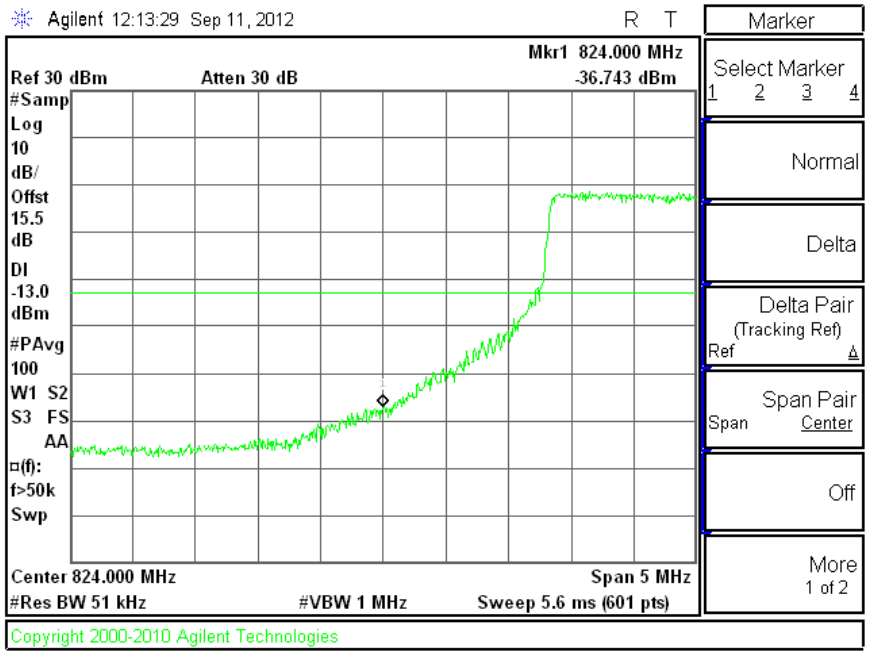
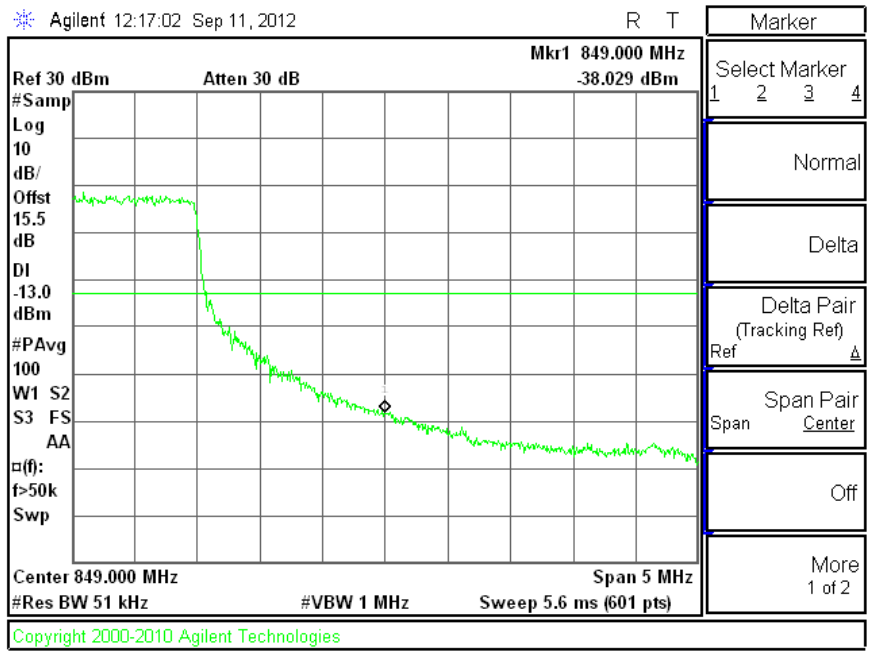
LOW CH, RB12-6



HIGH CH, RB12-6



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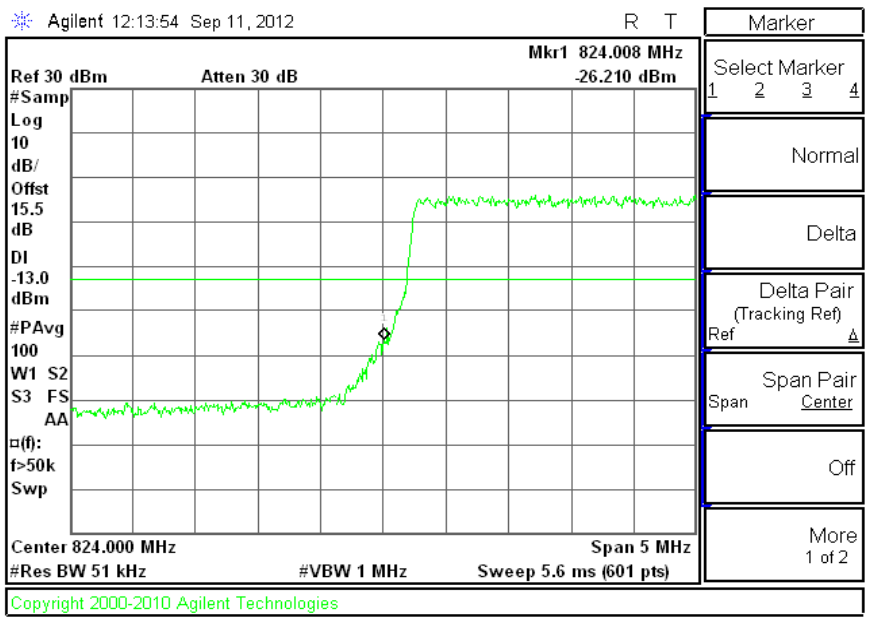
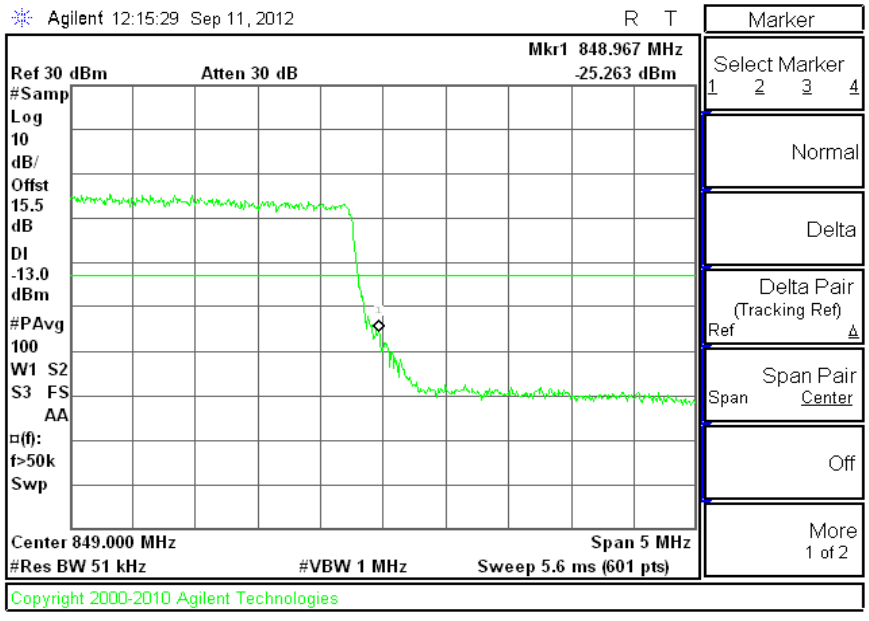
LOW CH, RB25-0



HIGH CH, RB25-0



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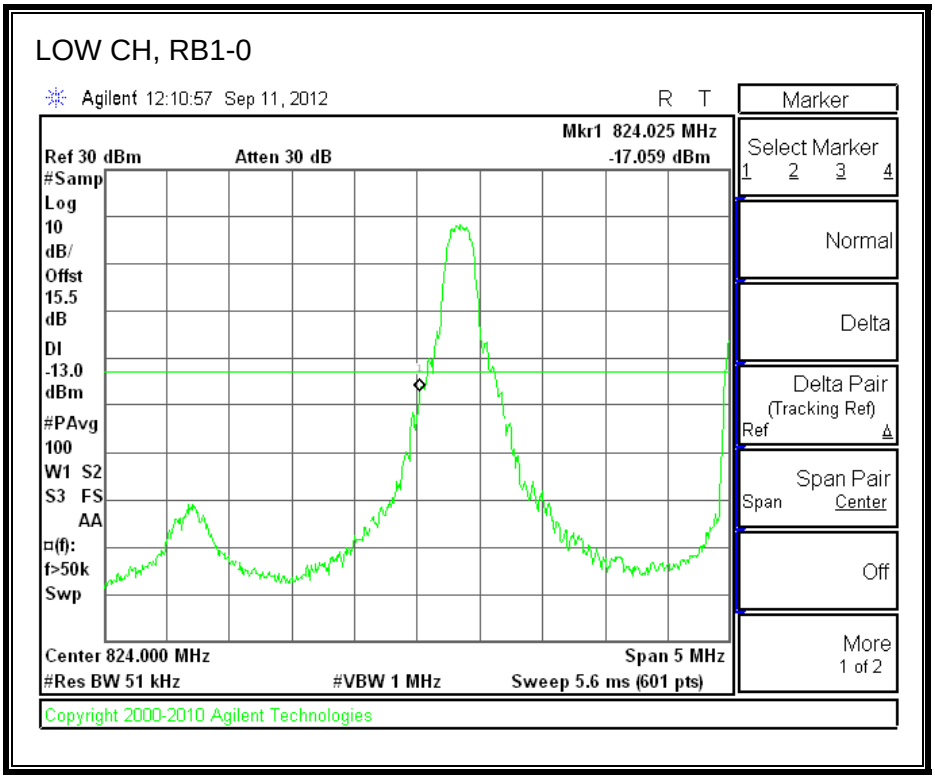
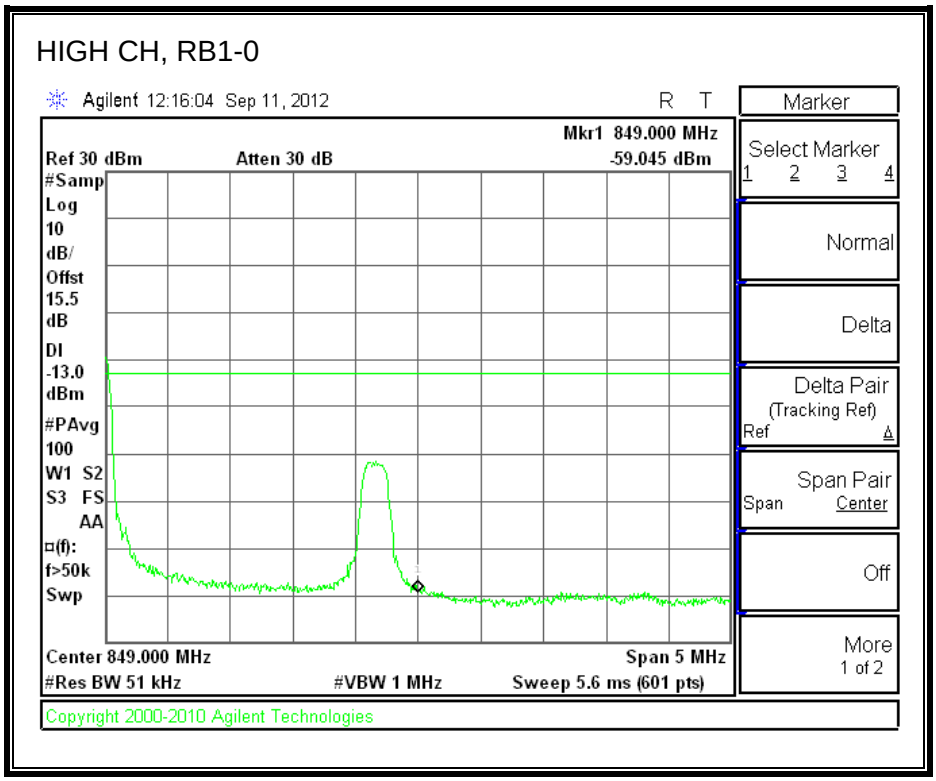
LTE 16QAM Band 5 (5 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-0



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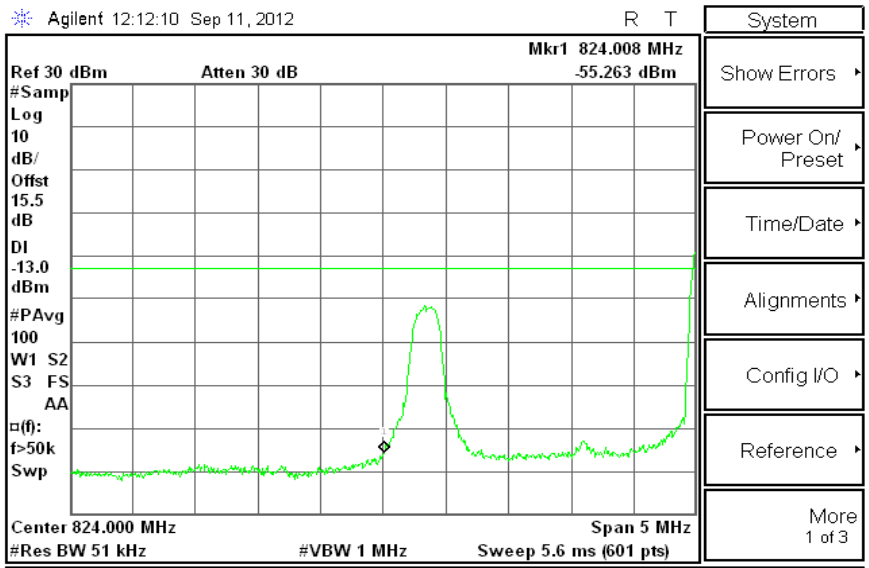
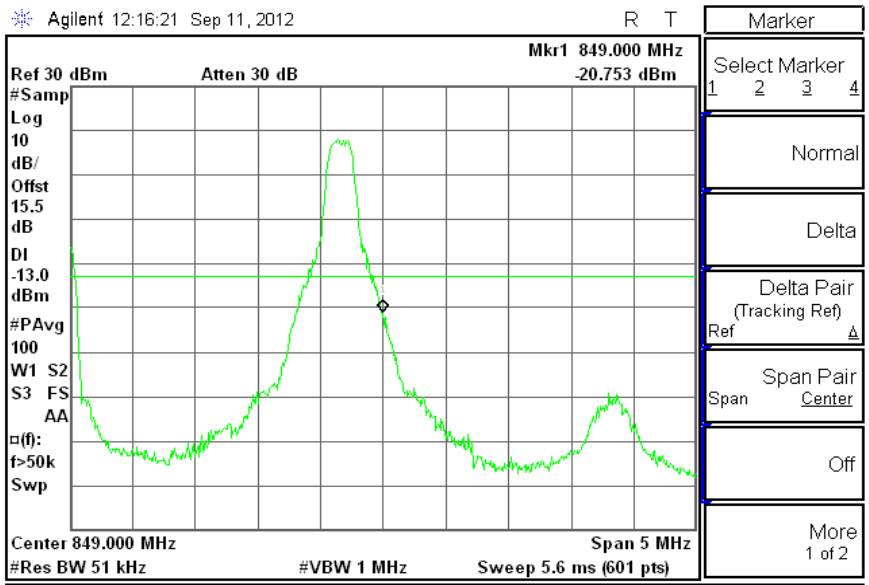
LOW CH, RB1-24



HIGH CH, RB1-24



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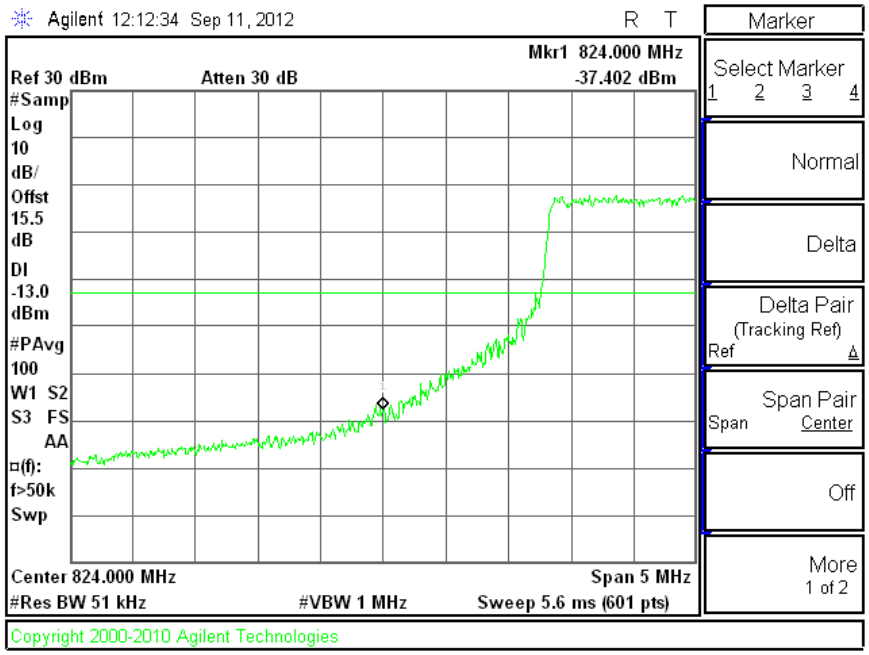
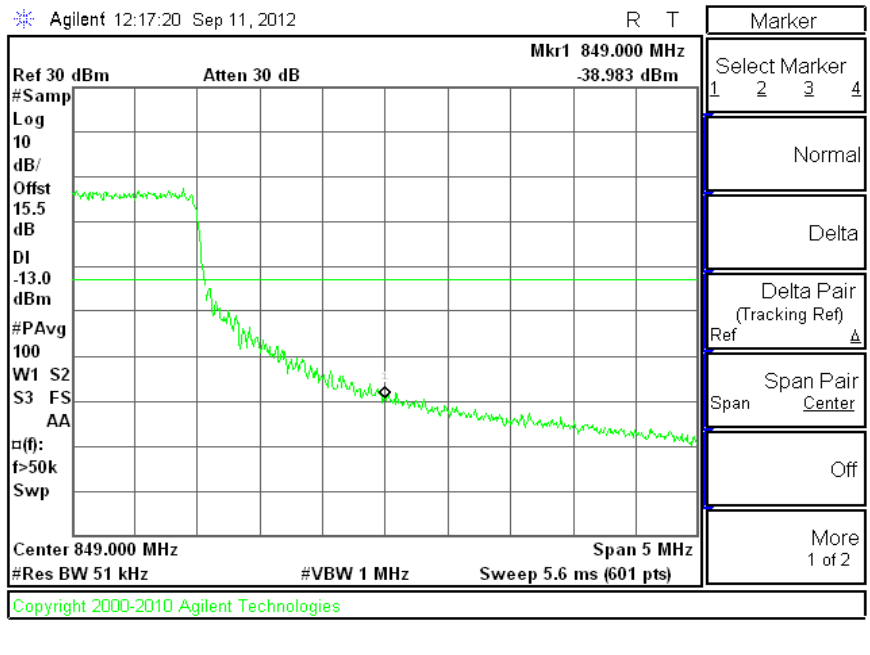
LOW CH, RB12-6



HIGH CH, RB12-6



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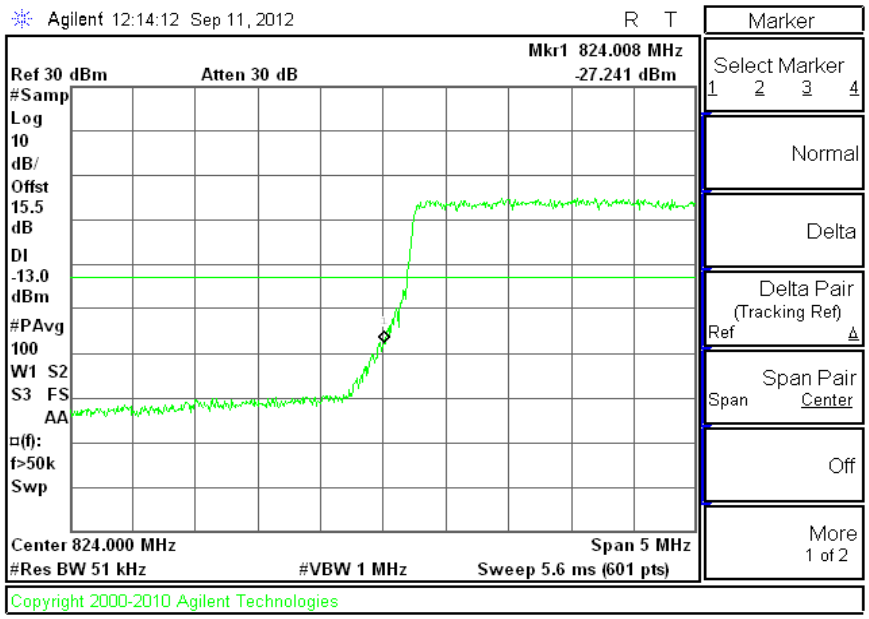
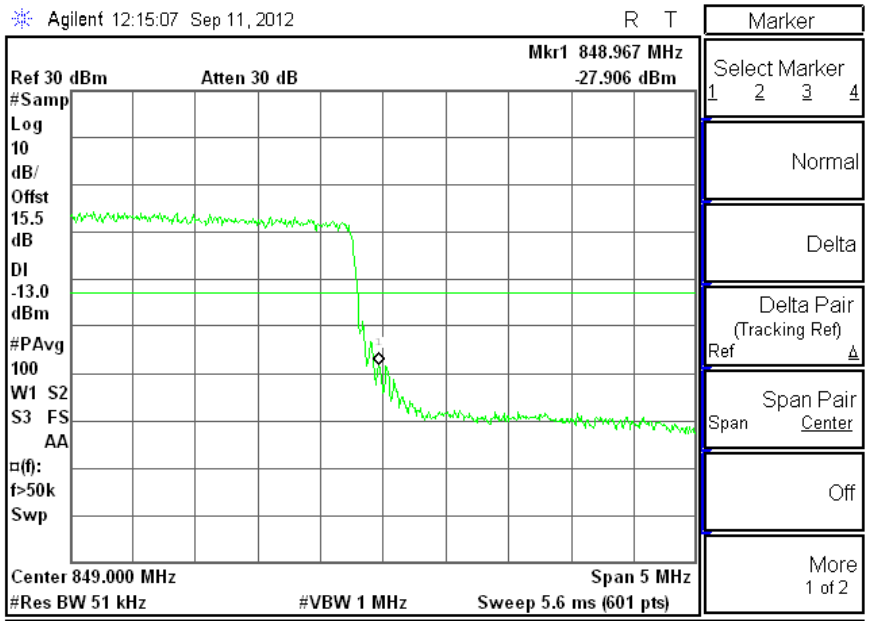
LOW CH, RB25-0



HIGH CH, RB25-0



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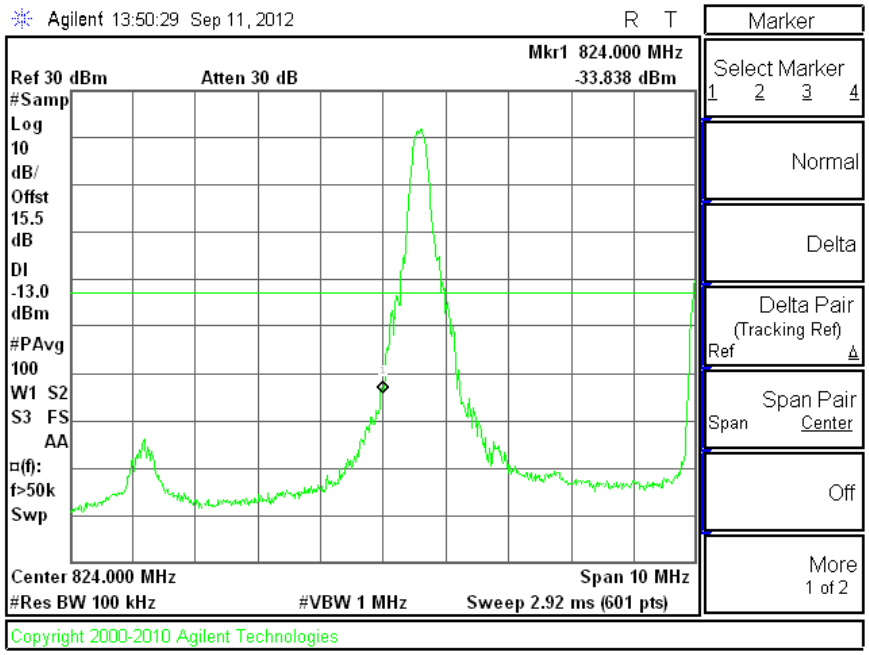
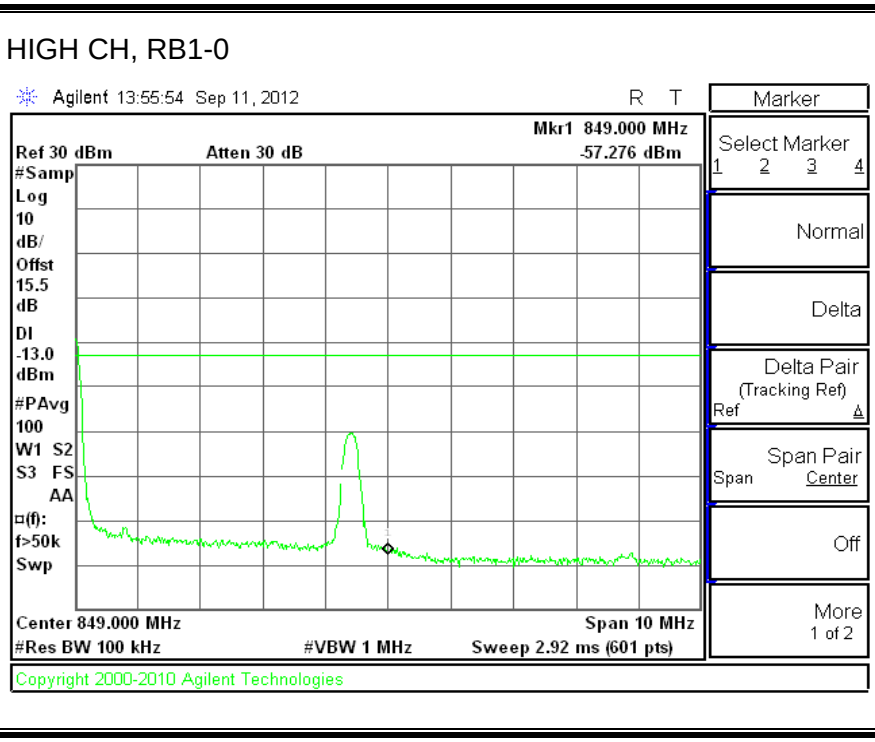
LTE QPSK Band 5 (10 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-0



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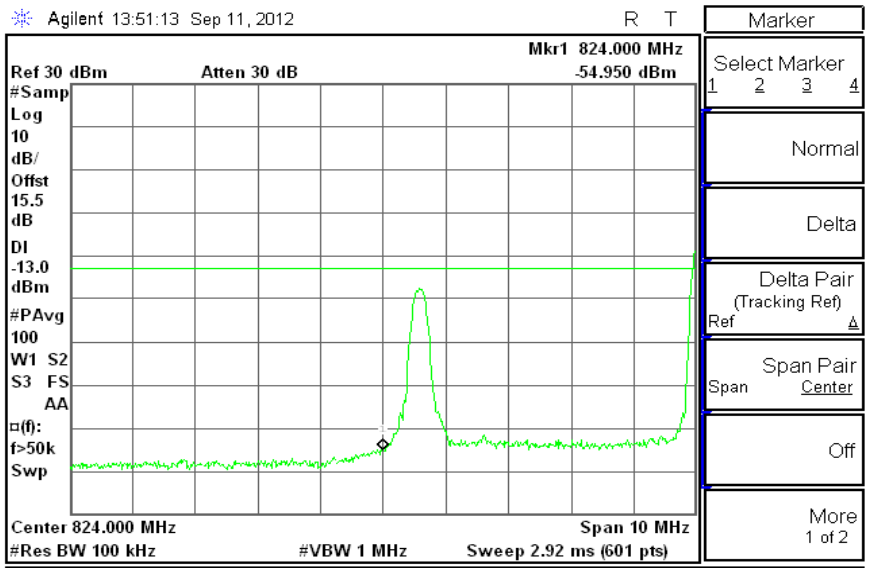
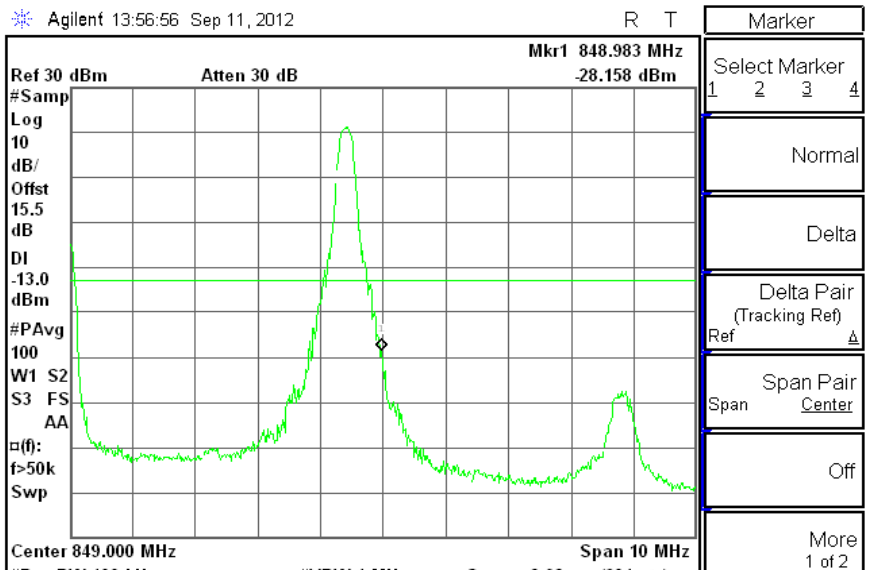
LOW CH, RB1-49



HIGH CH, RB1-49



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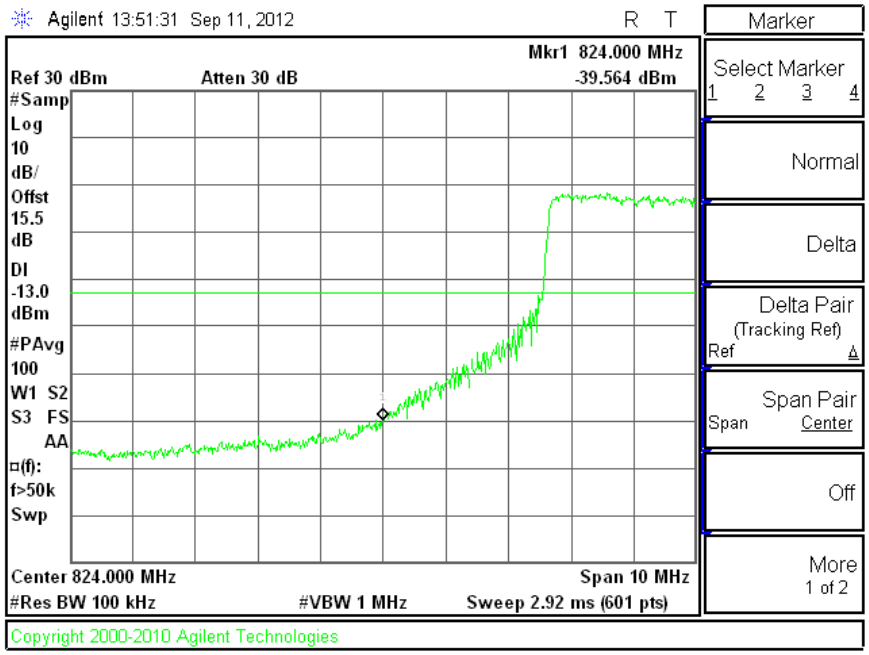
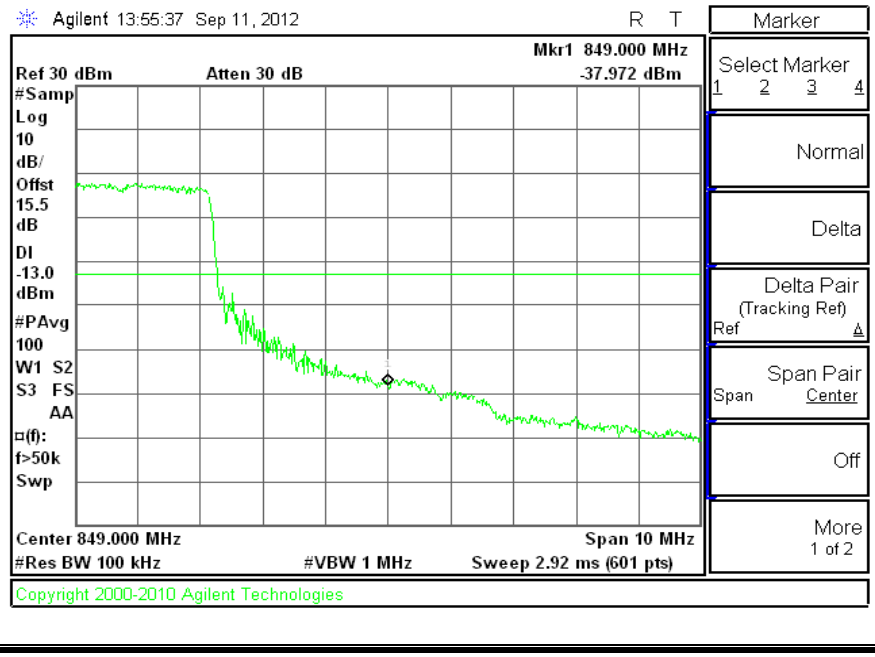
LOW CH, RB25-12



HIGH CH, RB25-12



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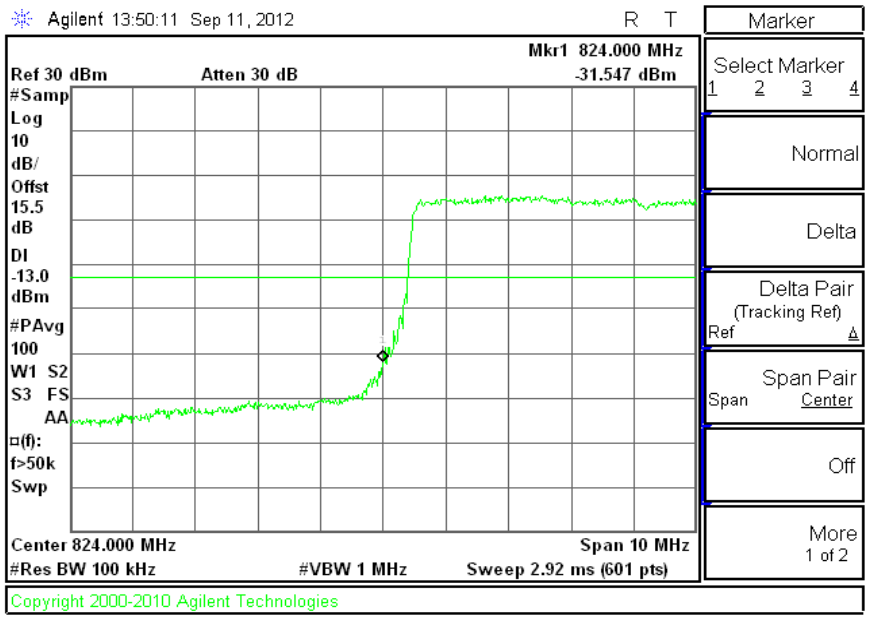
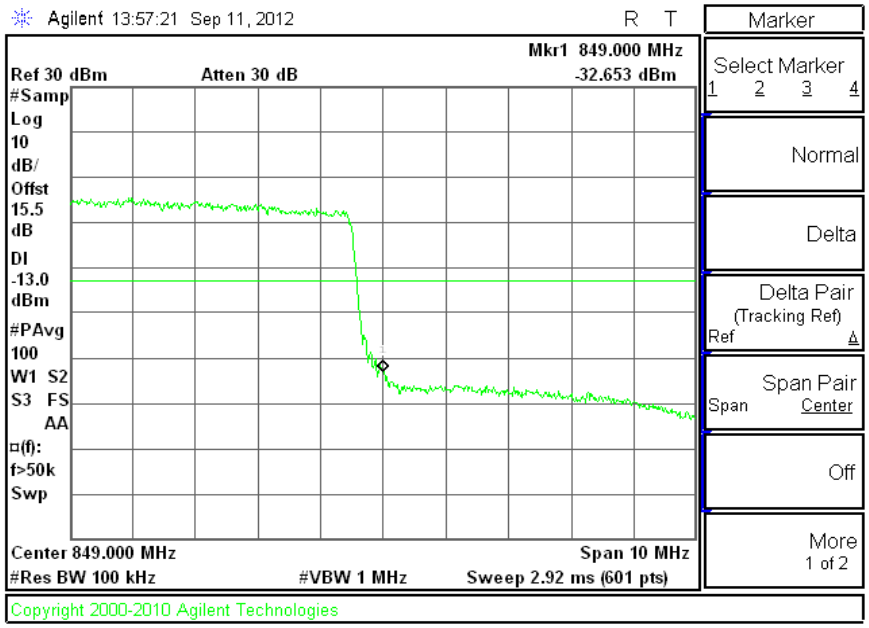
LOW CH, RB50-0



HIGH CH, RB50-0



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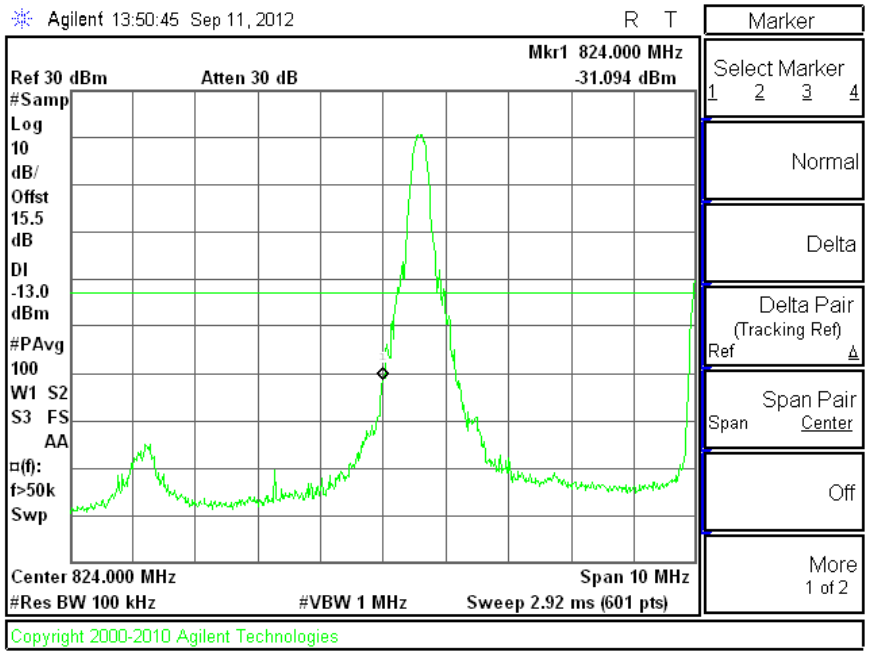
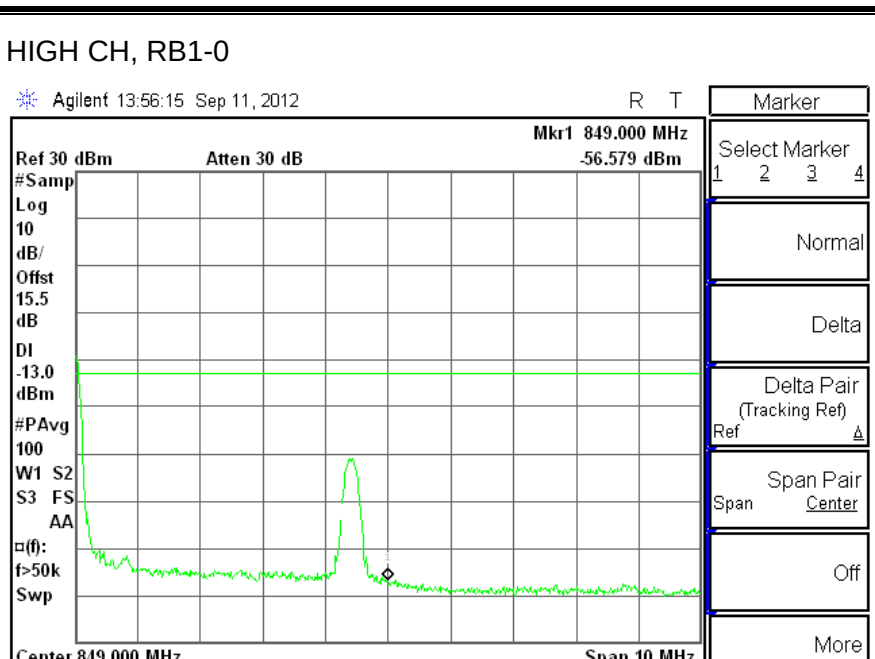
LTE 16QAM Band 5 (10 MHz BAND WIDTH)

LOW CH, RB1-0

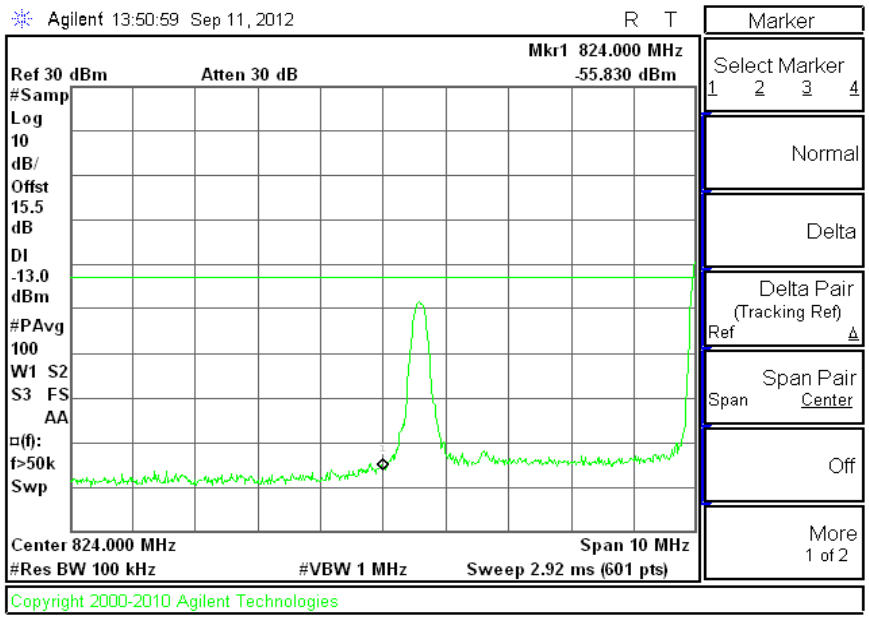


HIGH CH, RB1-0

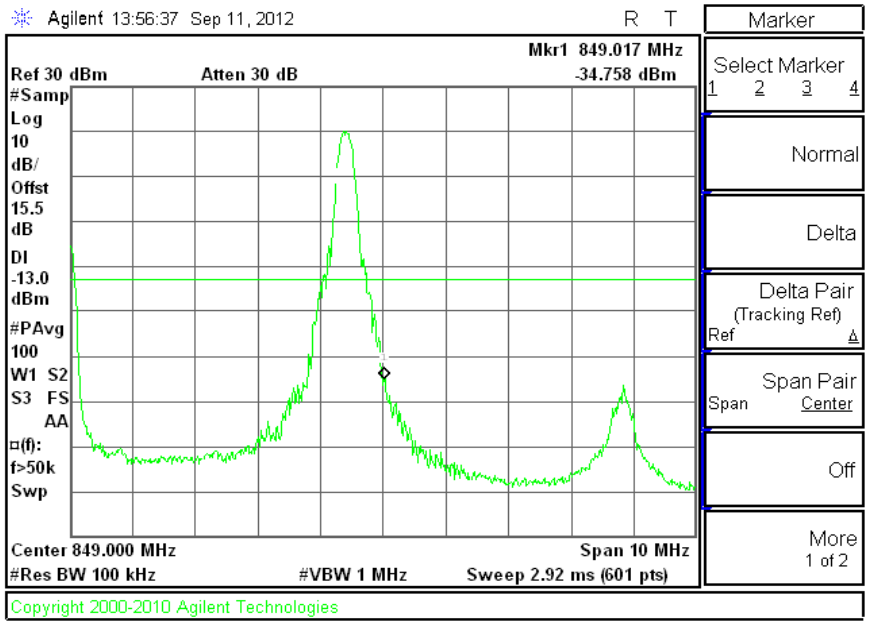


This report shall not be reproduced except in full, without the written approval of UL.CCS.

LOW CH, RB1-49



HIGH CH, RB1-49



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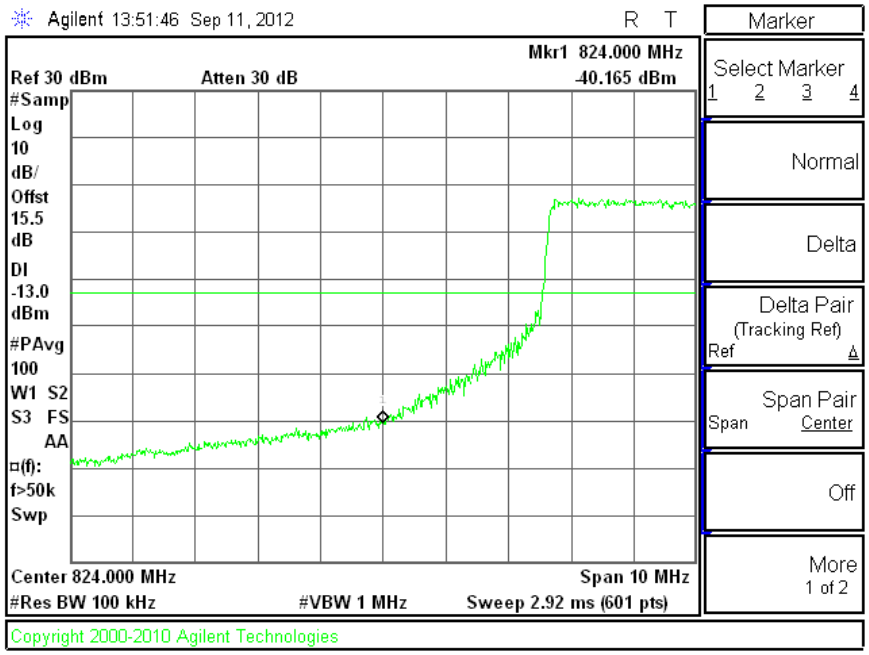
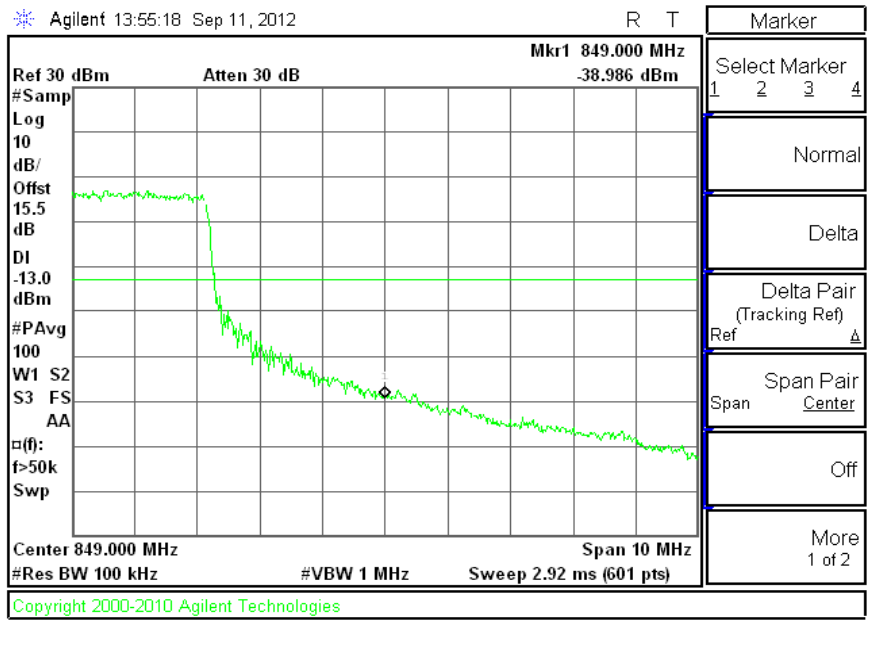
LOW CH, RB25-12

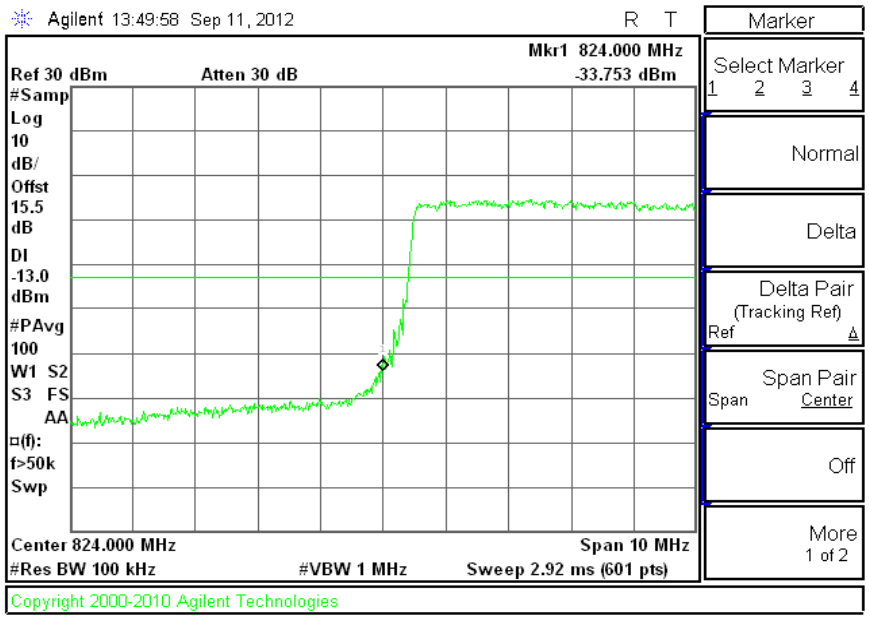


HIGH CH, RB25-12

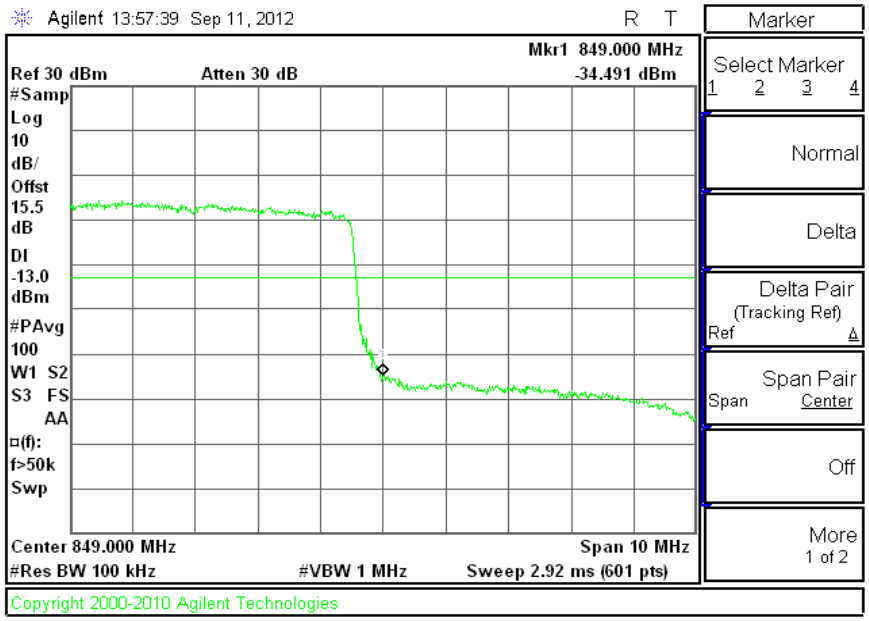


This report shall not be reproduced except in full, without the written approval of UL.CCS.

LOW CH, RB50-0



HIGH CH, RB50-0



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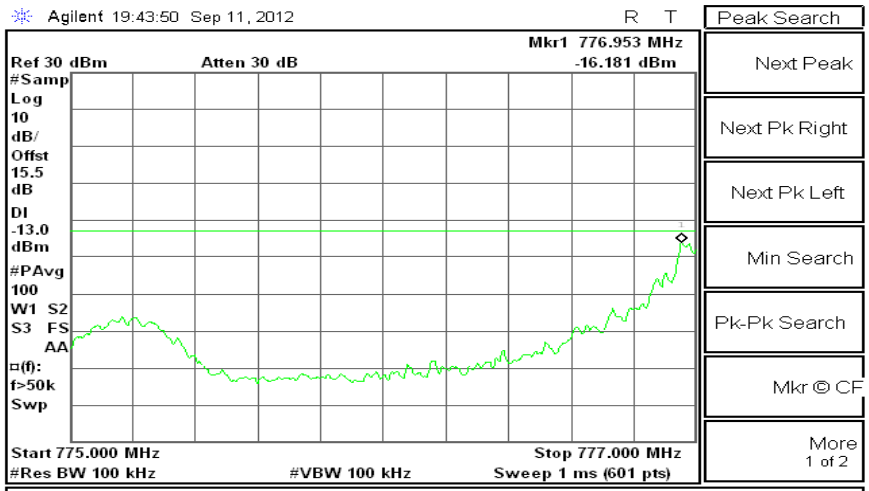
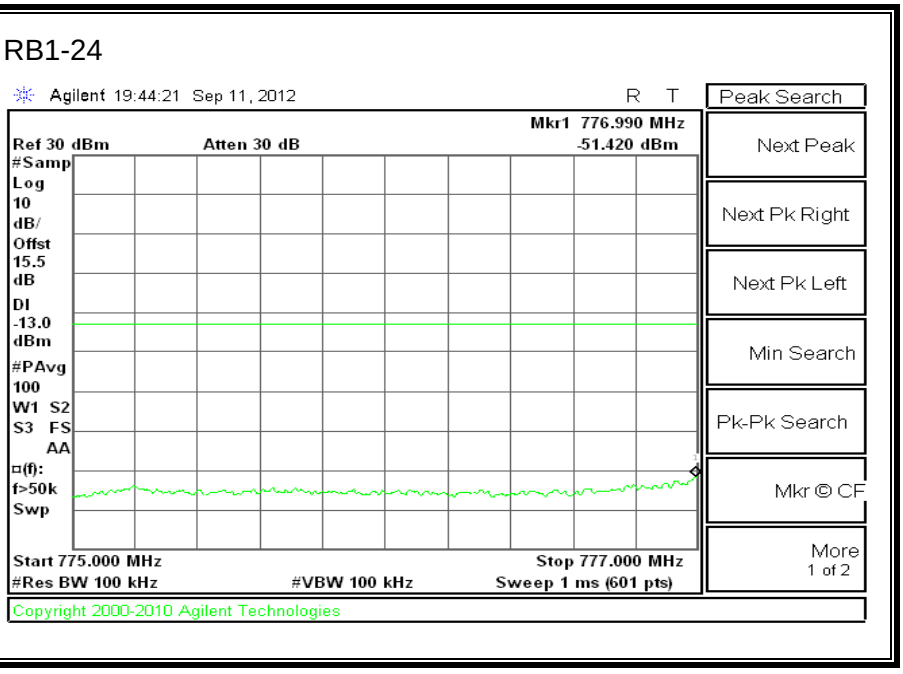
8.2.6. LTE BAND 13

LTE QPSK 779.5 MHz Band 13, 775 – 777MHz (5MHz Bandwidth)

RB1-0,



RB1-24



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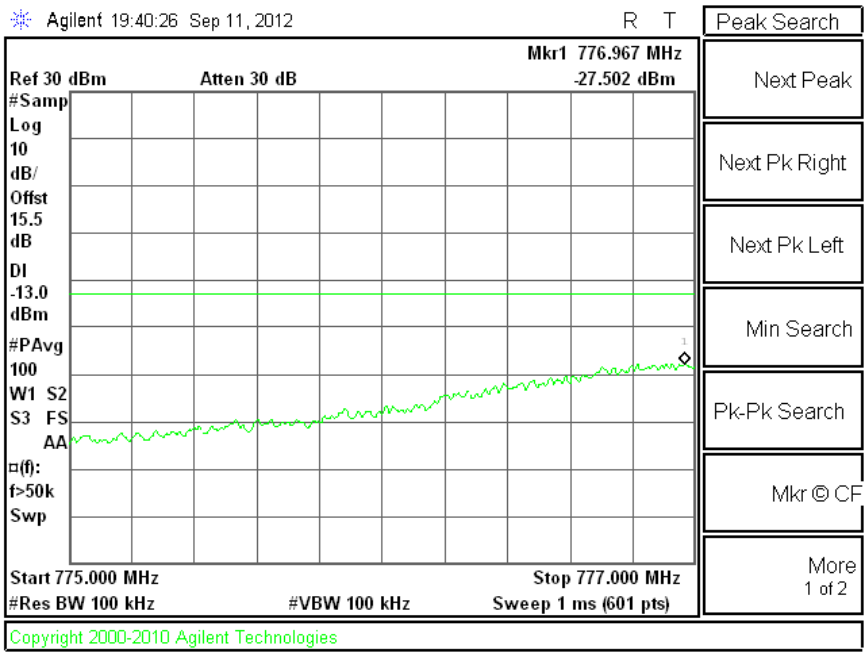
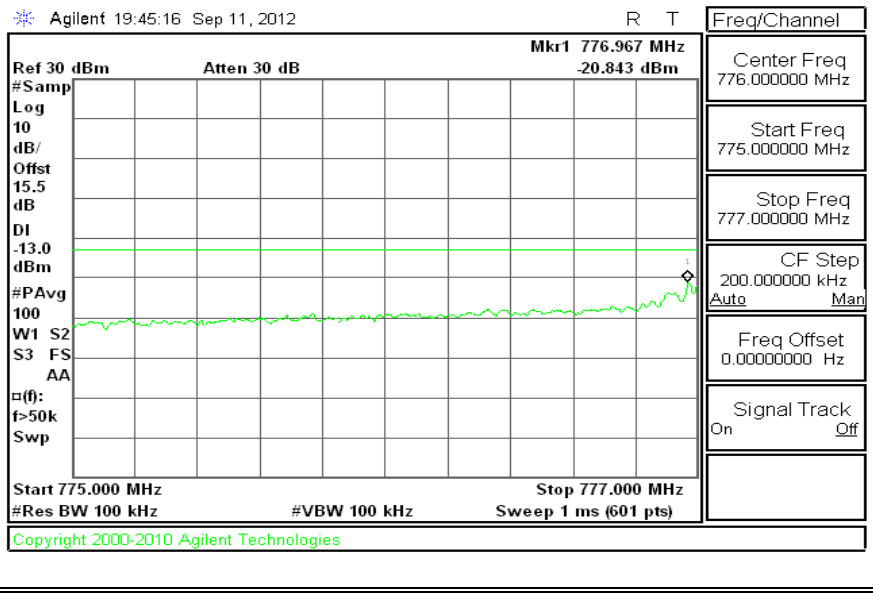
RB12-6



RB25-0



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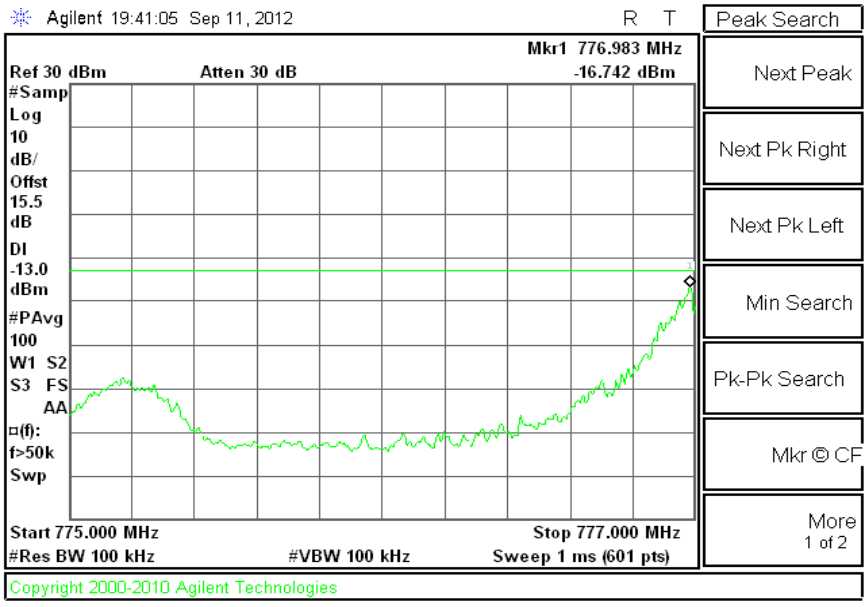
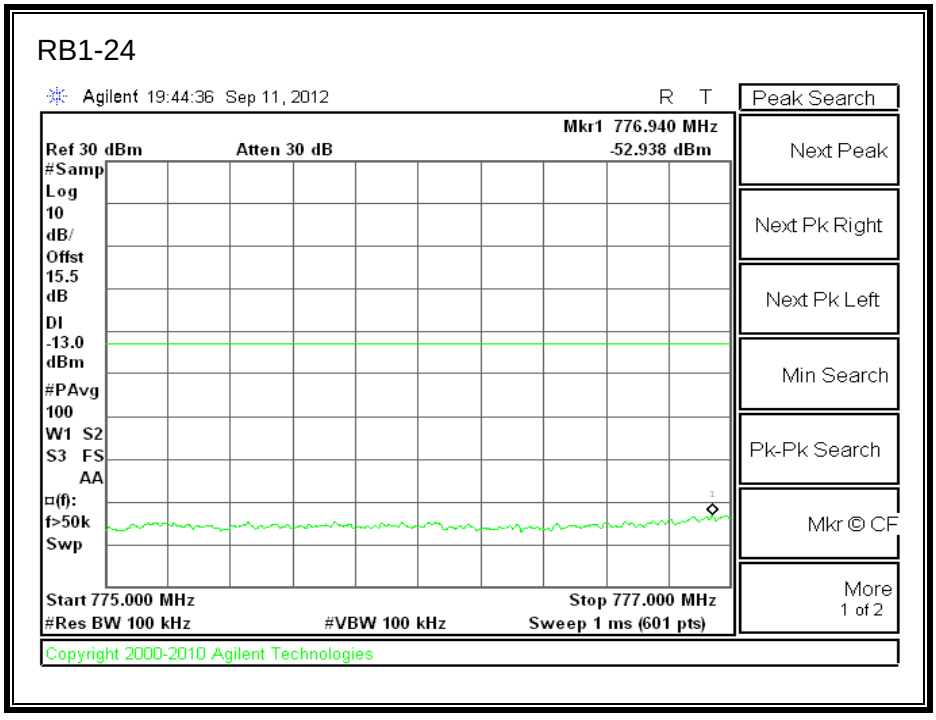
LTE 16QAM 779.5MHz Band 13, 775 - 777MHz (5MHz Bandwidth)

RB1-0



RB1-24



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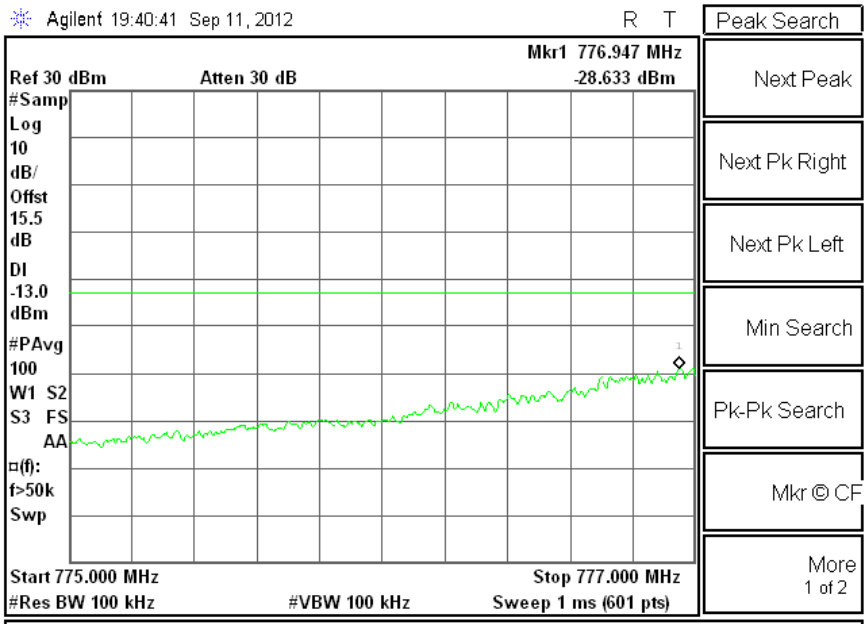
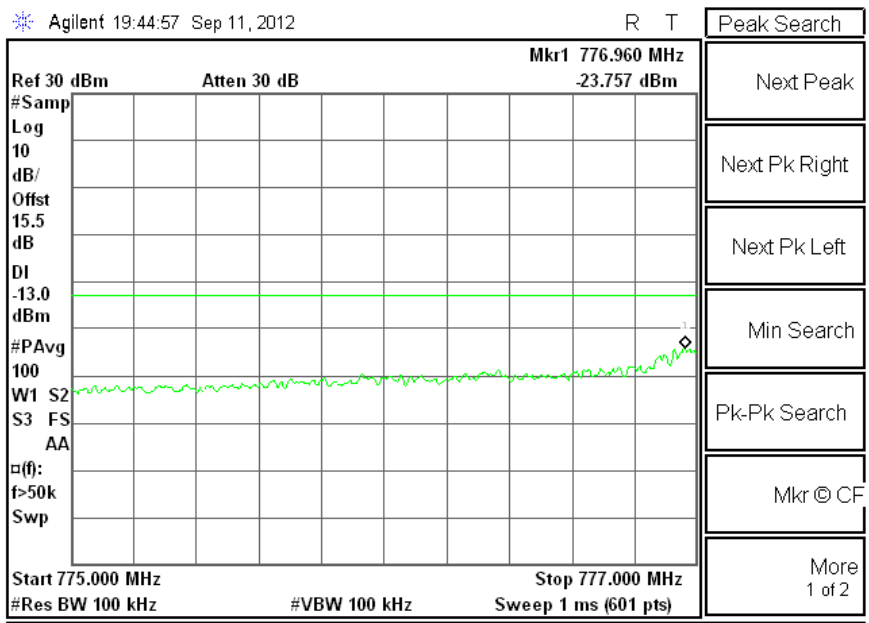
RB12-6



RB25-0



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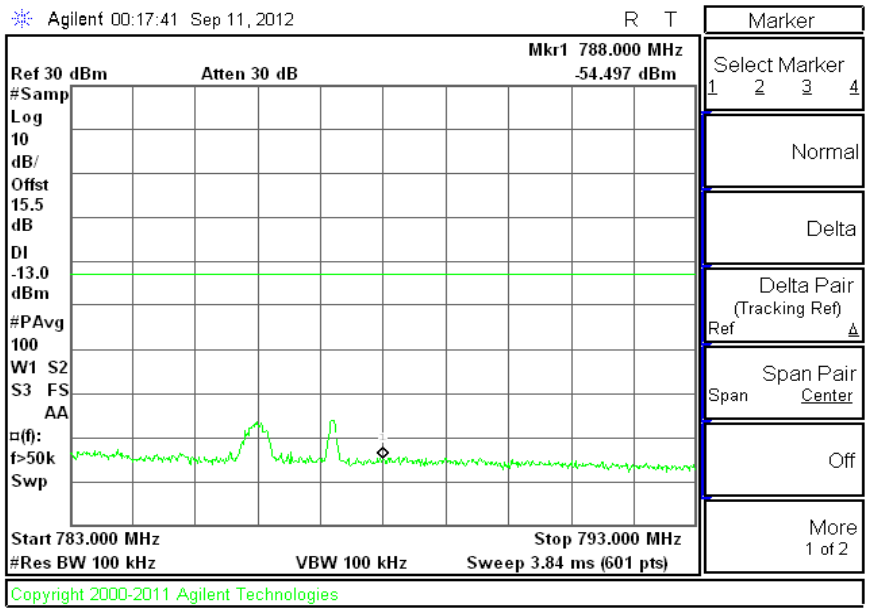
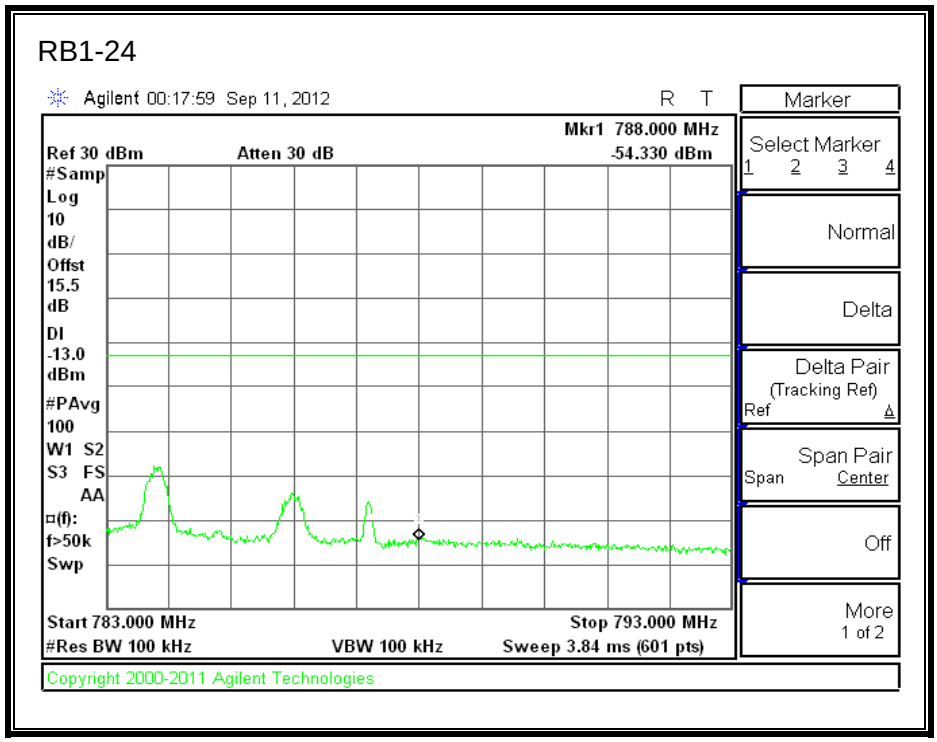
LTE QPSK 779.5MHz Band 13, 783 - 793MHz (5MHz Bandwidth)

RB1-0



RB1-24



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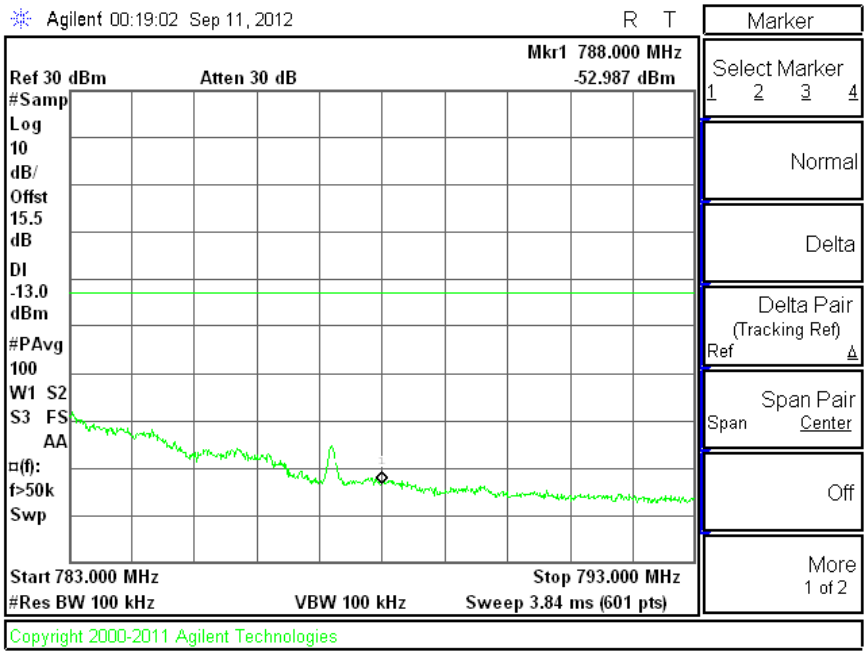
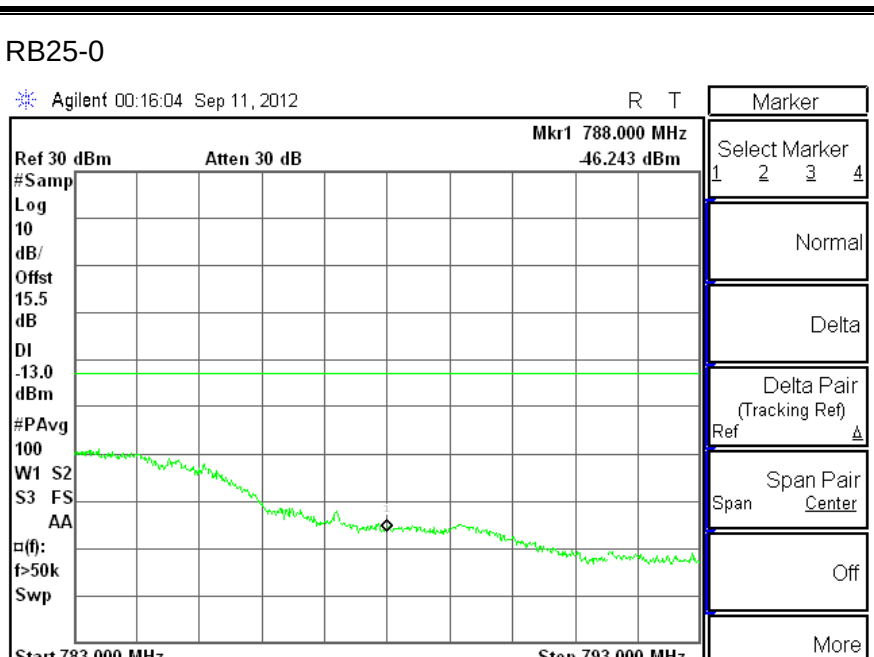
RB12-6



RB25-0



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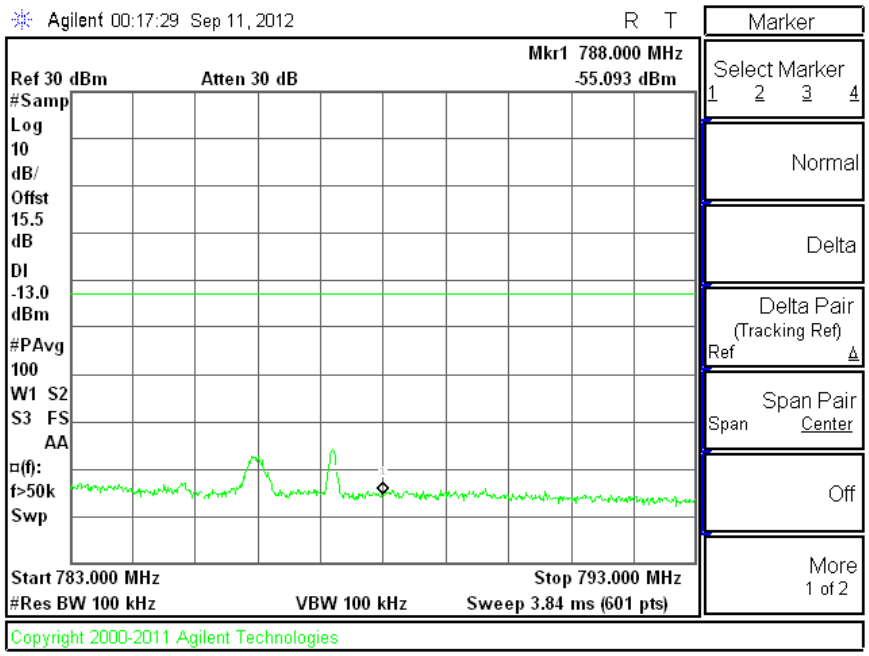
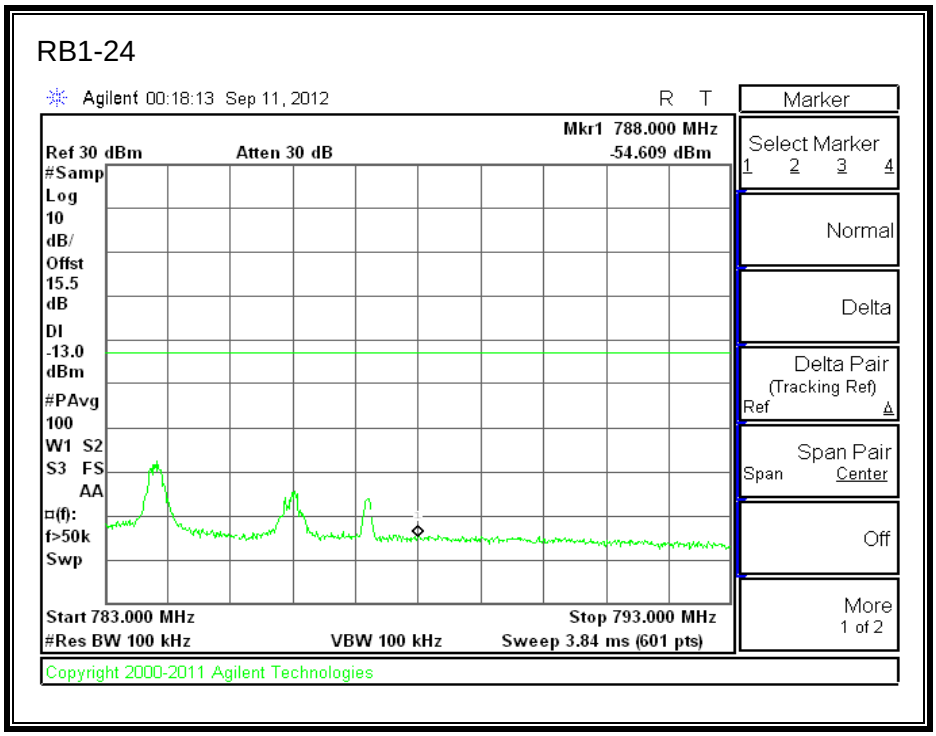
LTE 16QAM 779.5MHz Band 13, 783 - 793MHz (5MHz Bandwidth)

RB1-0



RB1-24



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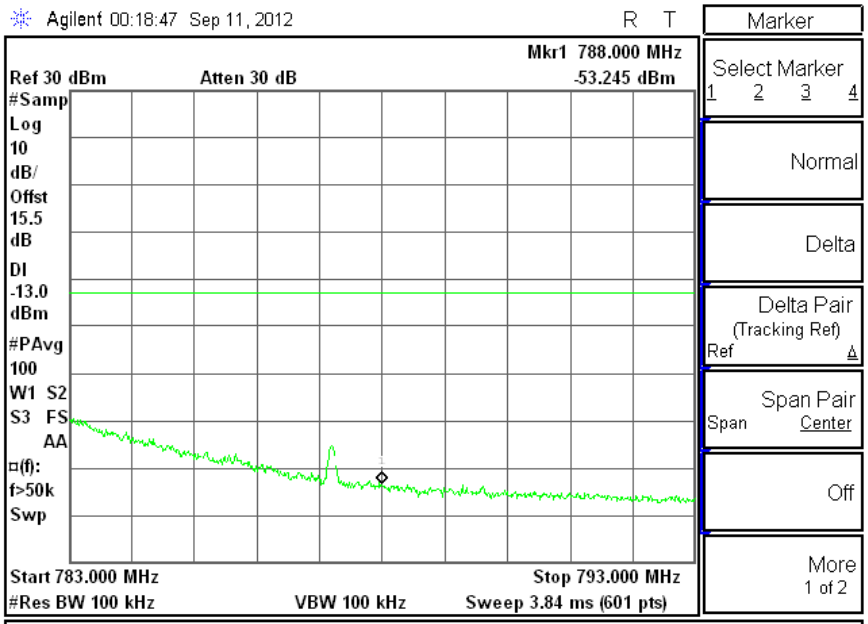
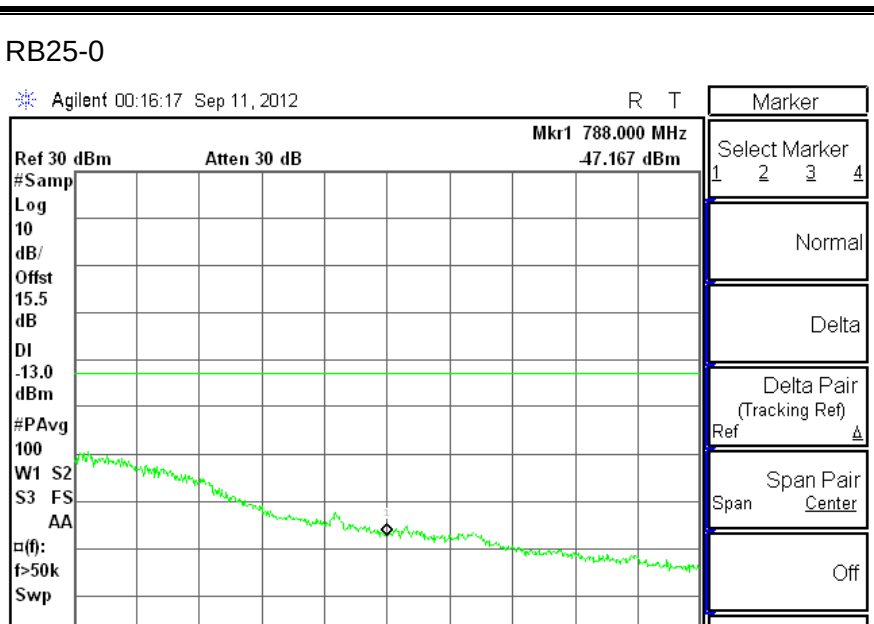
RB12-6



RB25-0



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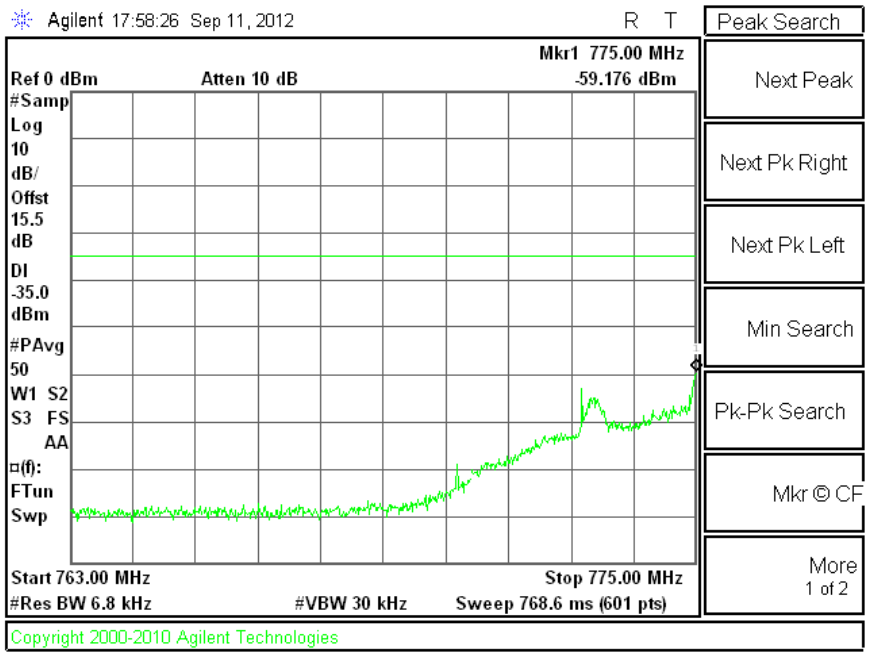
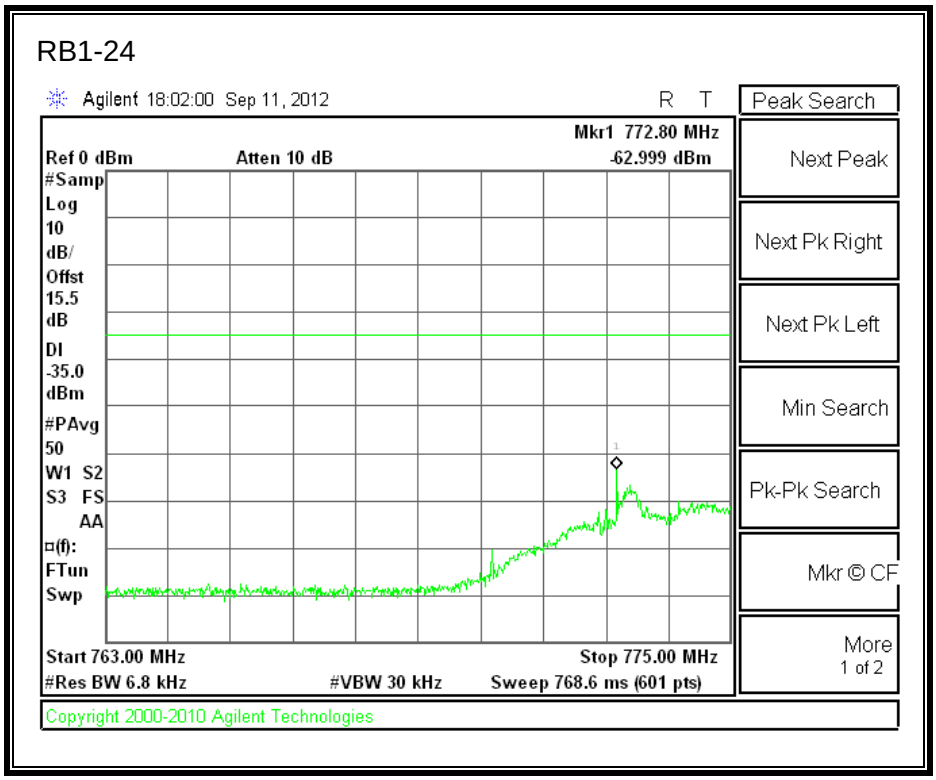
LTE QPSK 779.5MHz Band 13, 763 - 775MHz (5MHz Bandwidth)

RB1-0



RB1-24



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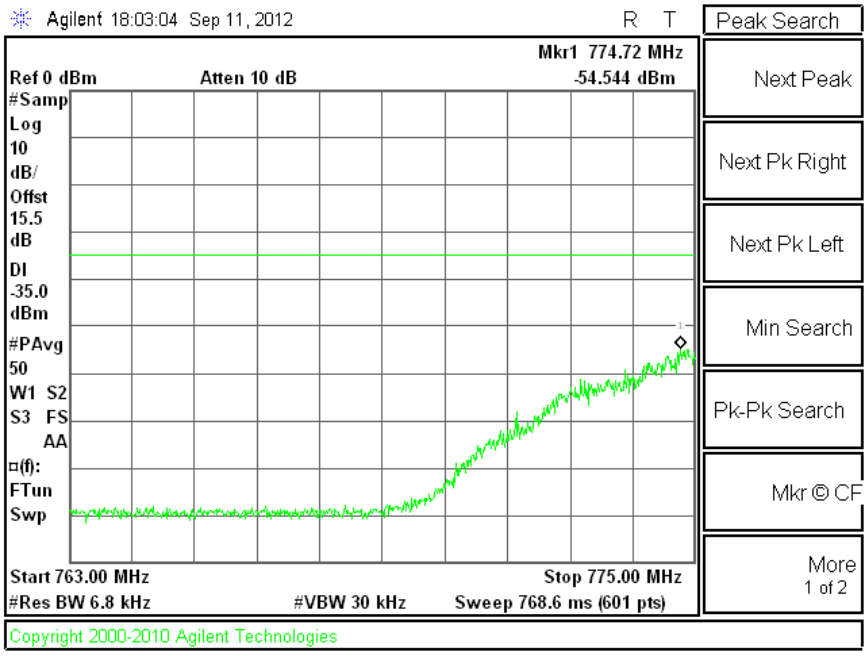
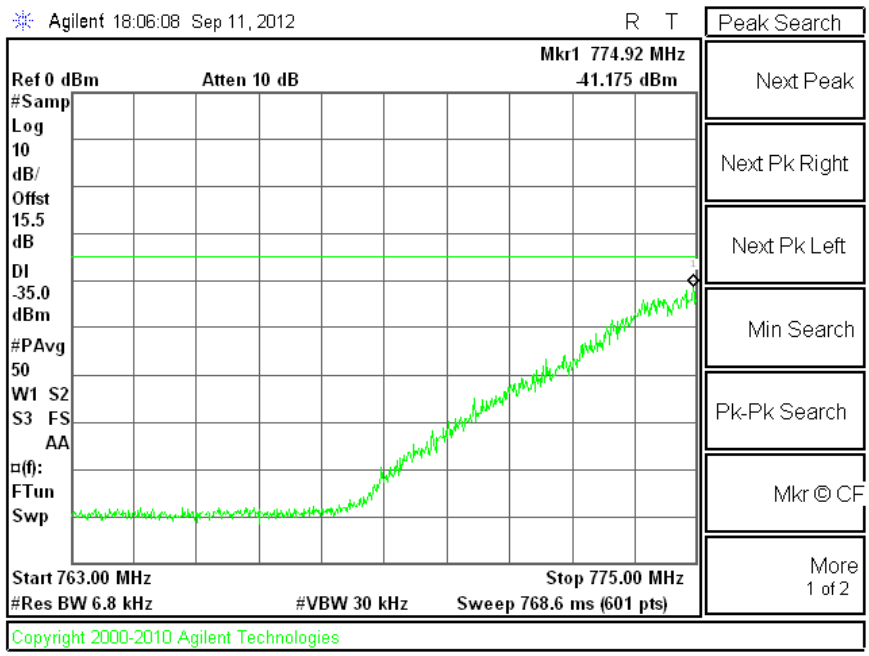
RB12-6



RB25-0



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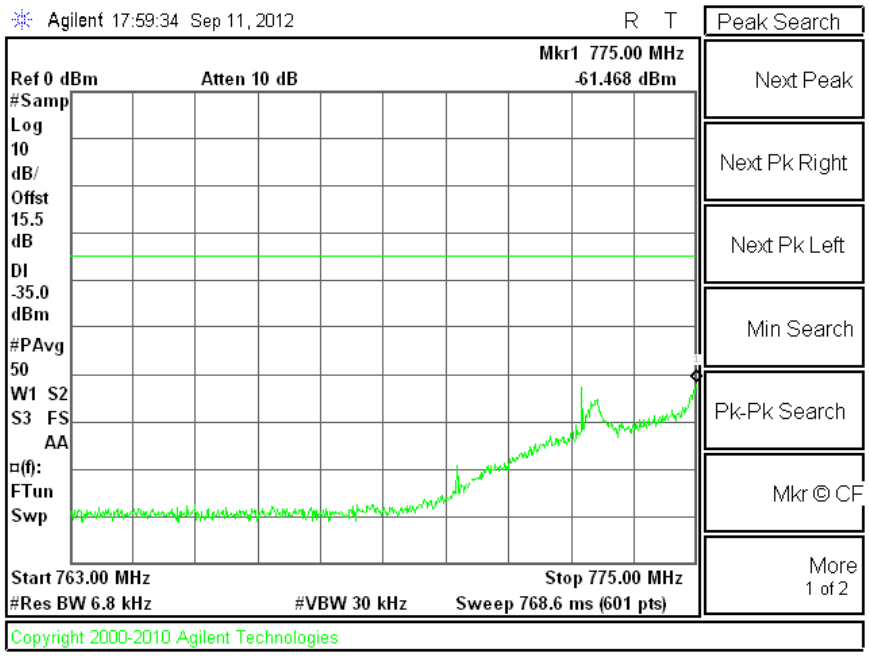
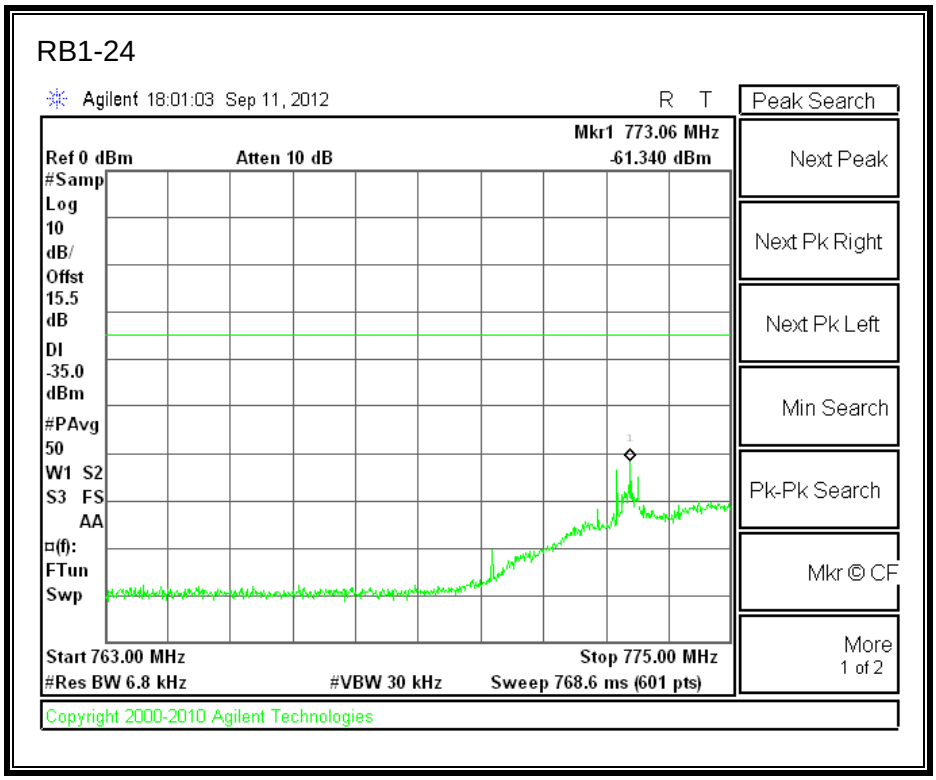
LTE 16QAM 779.5MHz Band 13, 763-775MHz (5MHz Bandwidth)

RB1-0



RB1-24



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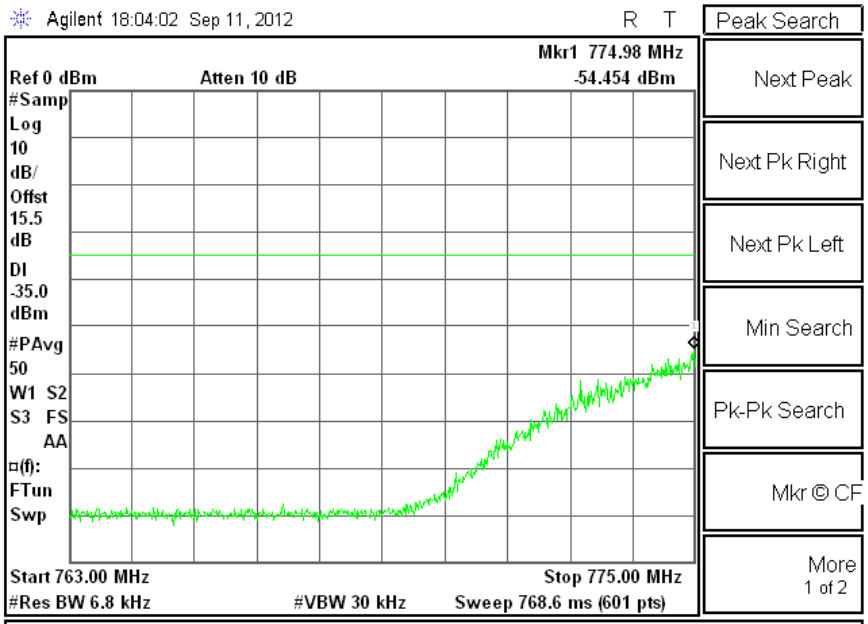
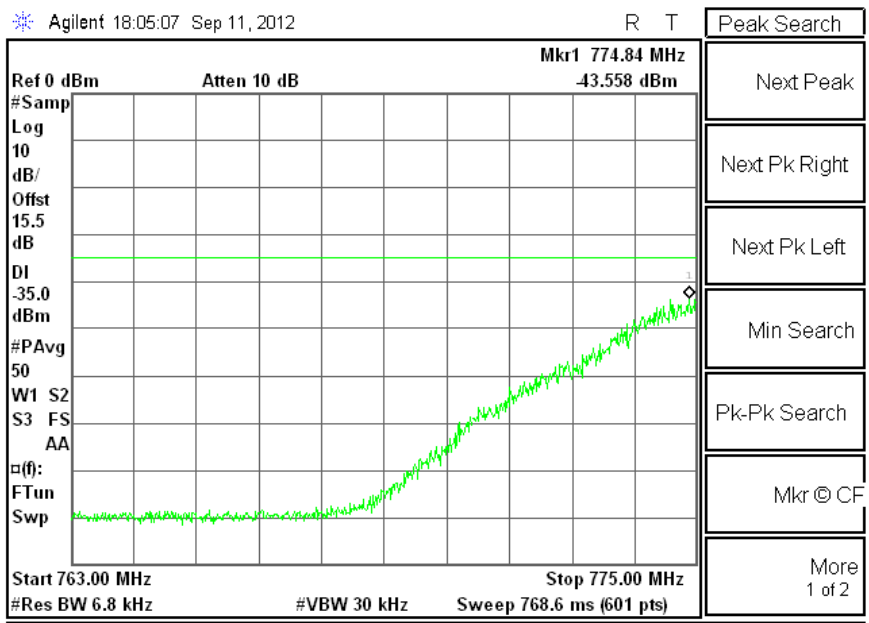
RB12-6



RB25-0



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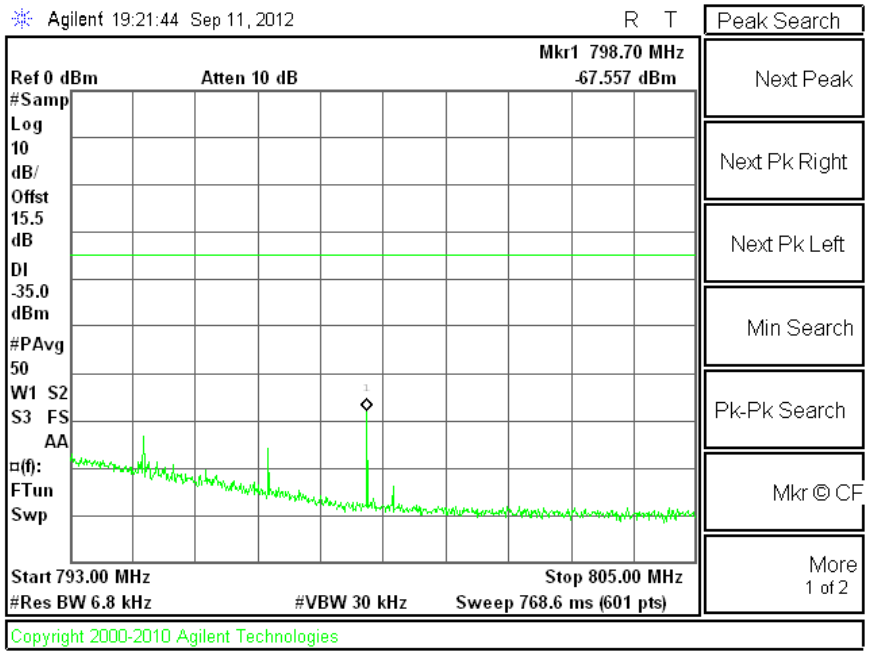
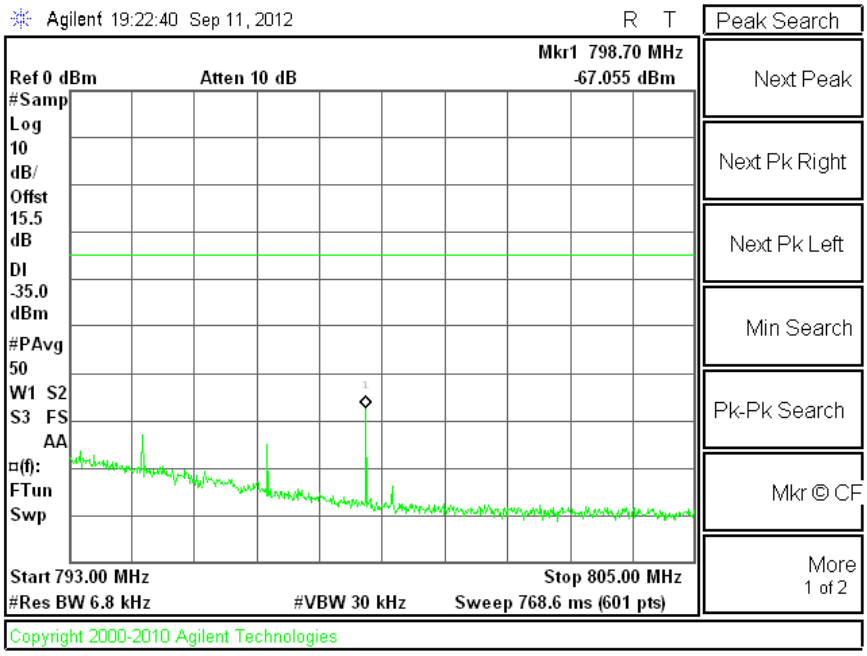
LTE QPSK 779.5MHz Band 13, 793 - 805MHz (5MHz Bandwidth)

RB1-0



RB1-24



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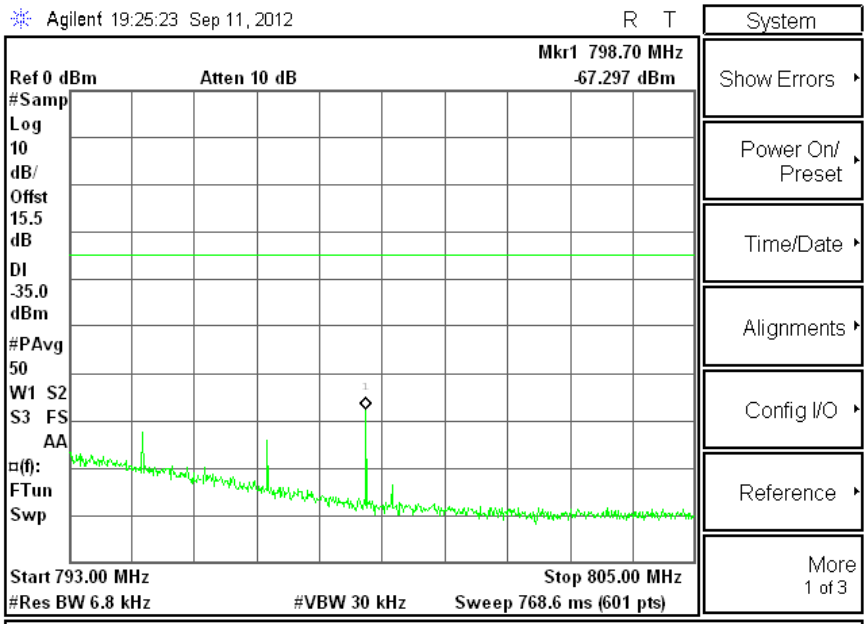
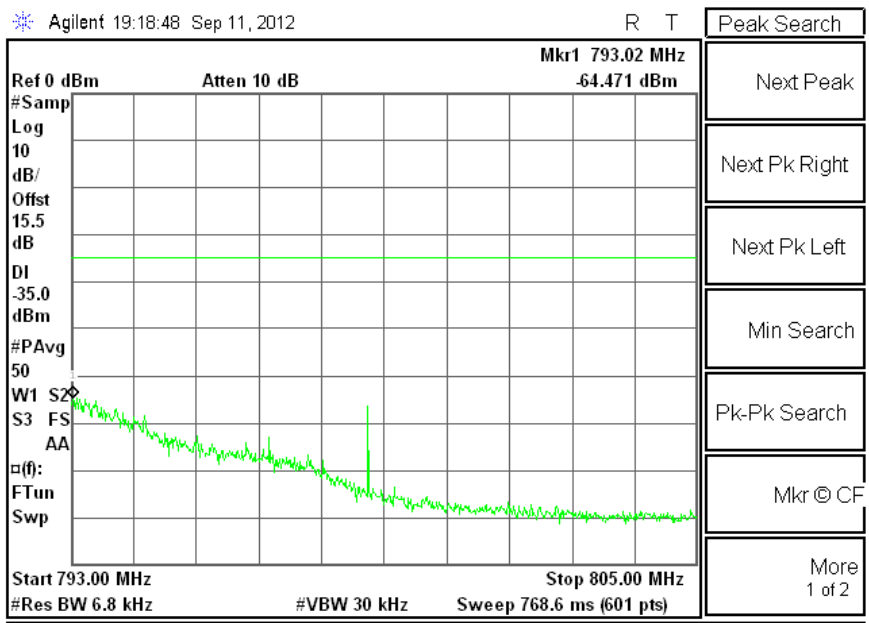
RB12-6



RB25-0



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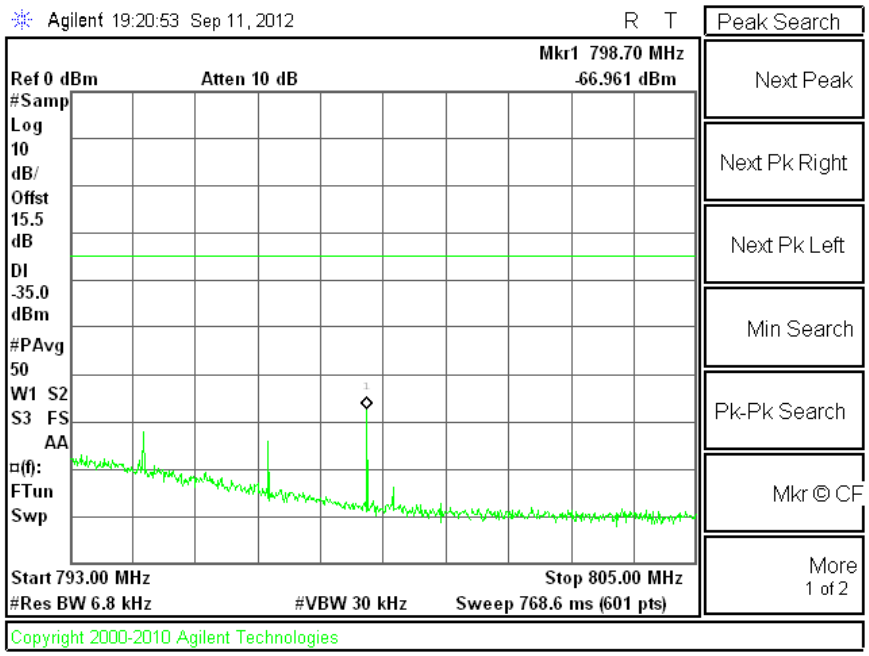
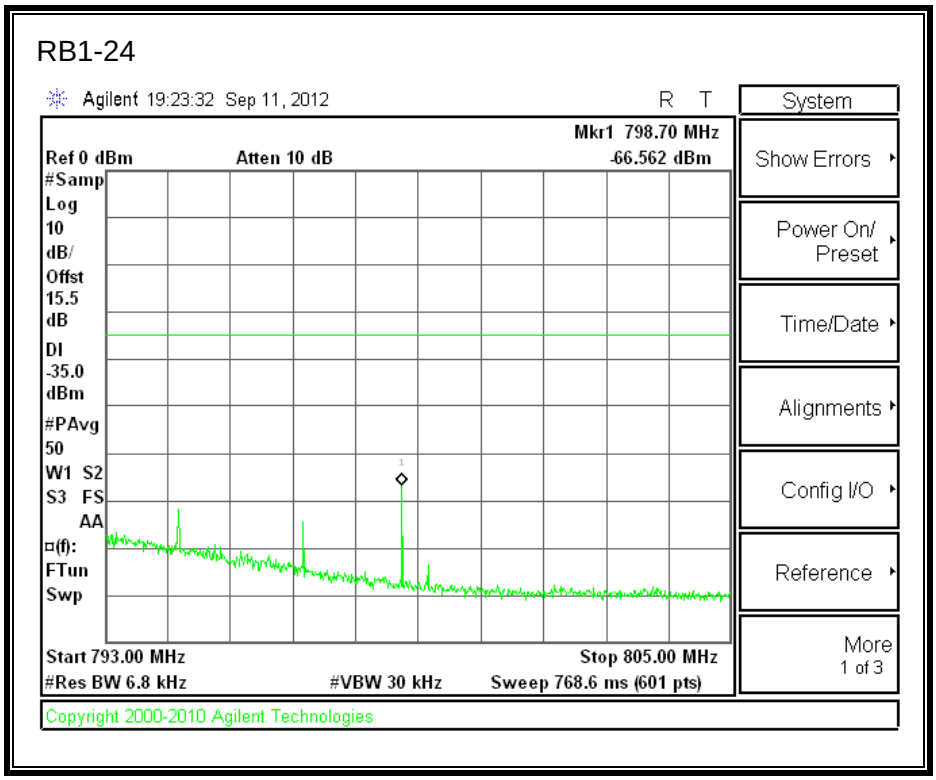
LTE 16QAM 779.5MHz Band 13, 793 - 805MHz (5MHz Bandwidth)

RB1-0



RB1-24



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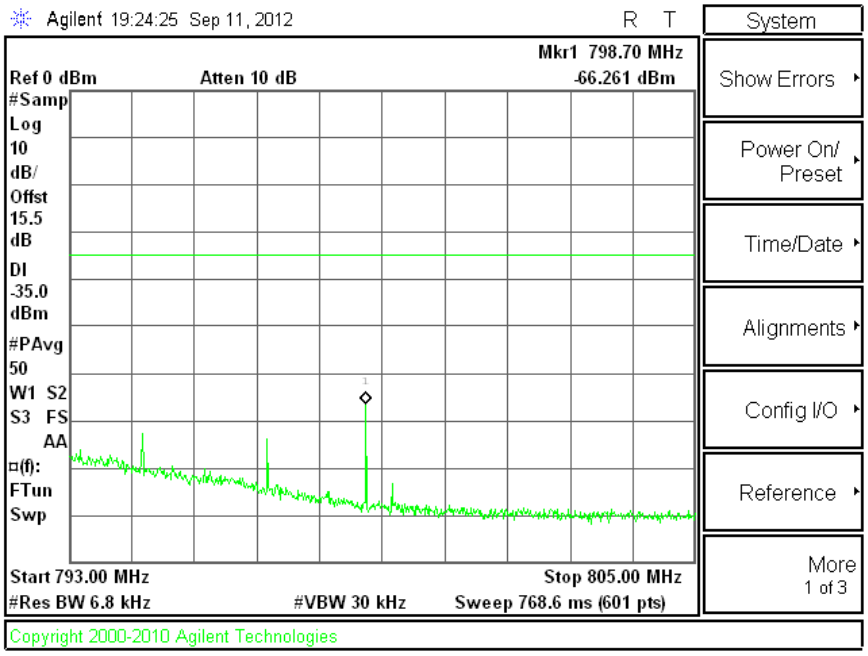
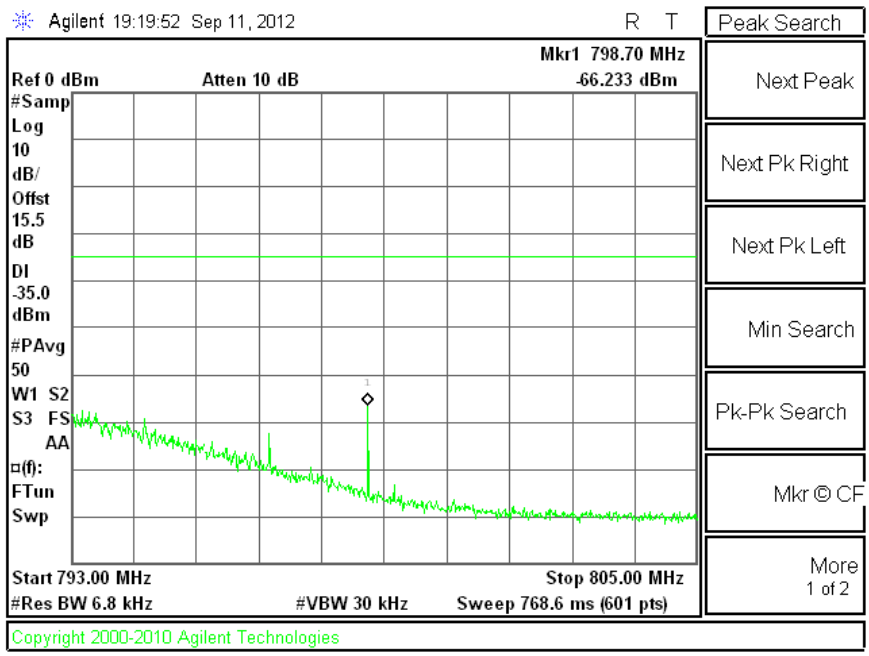
RB12-6



RB25-0



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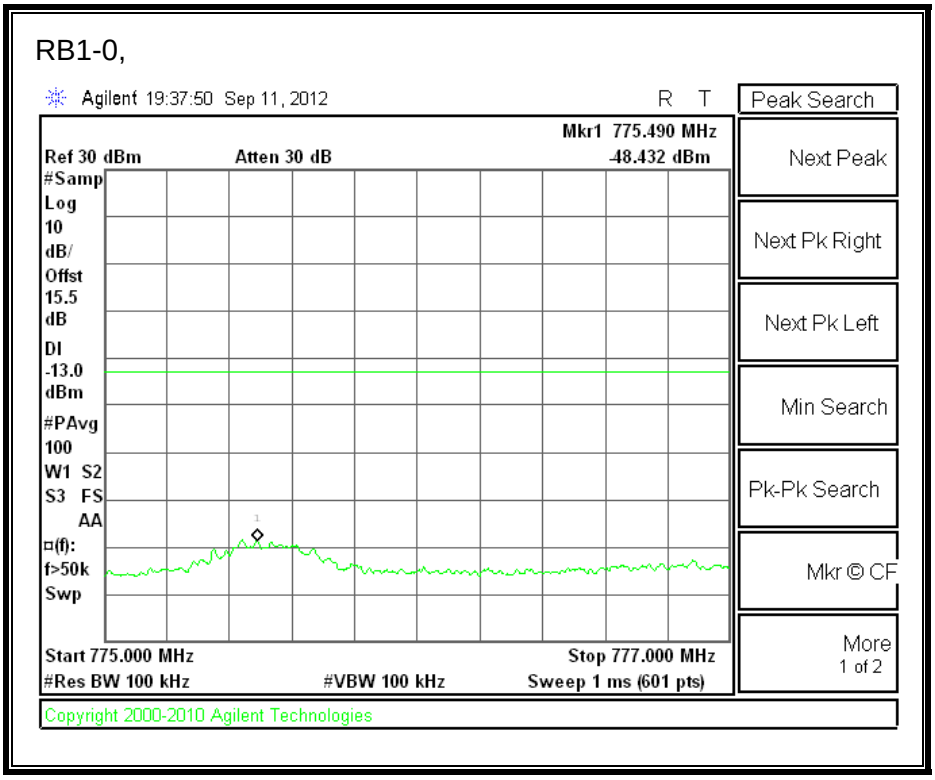
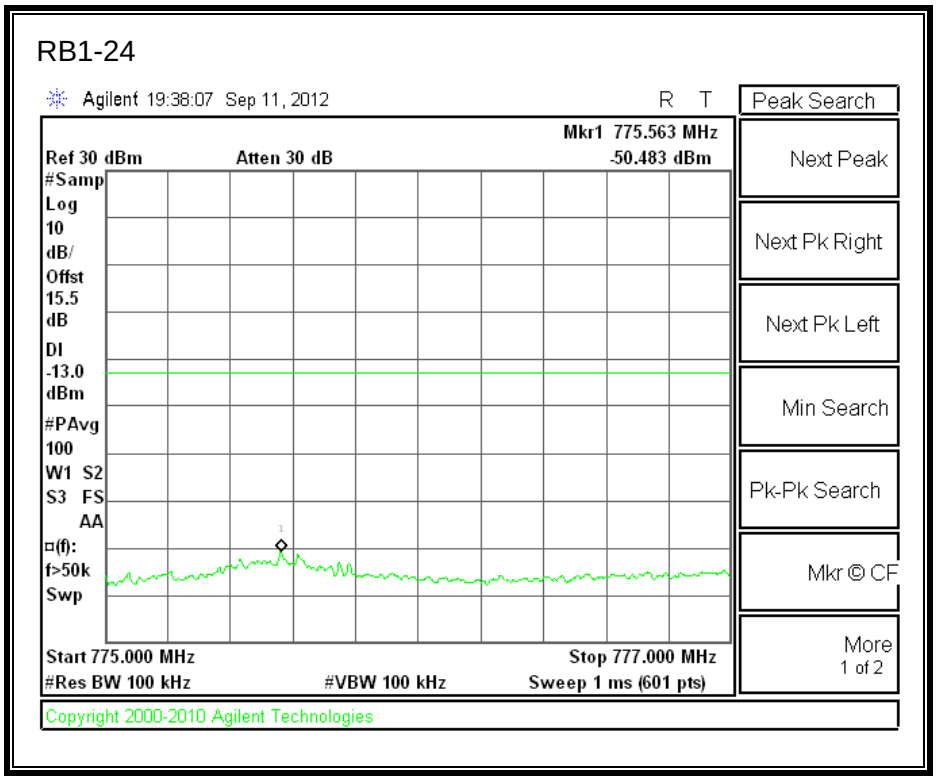
LTE QPSK 782 MHz Band 13, 775 - 777MHz (5MHz Bandwidth)

RB1-0,



RB1-24



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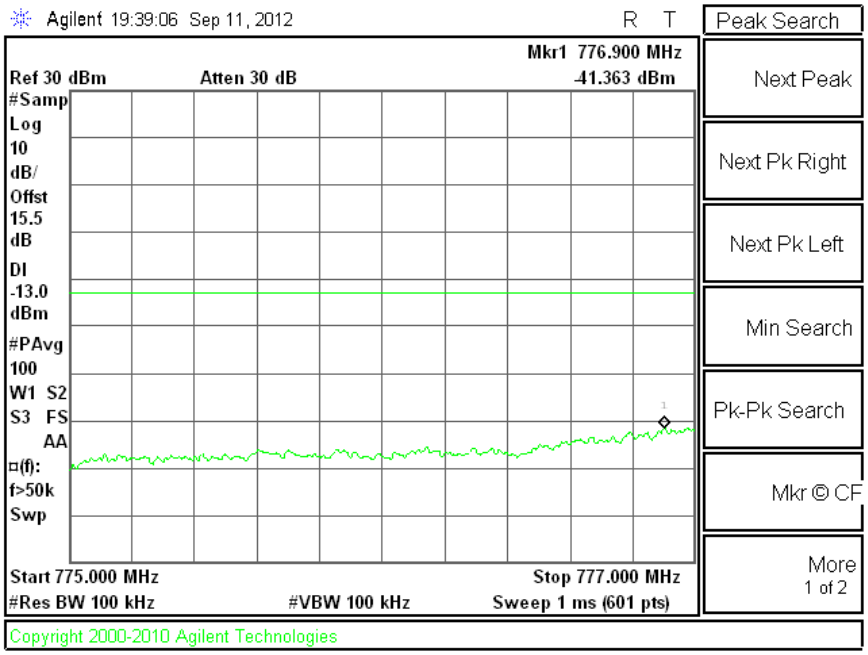
RB12-6



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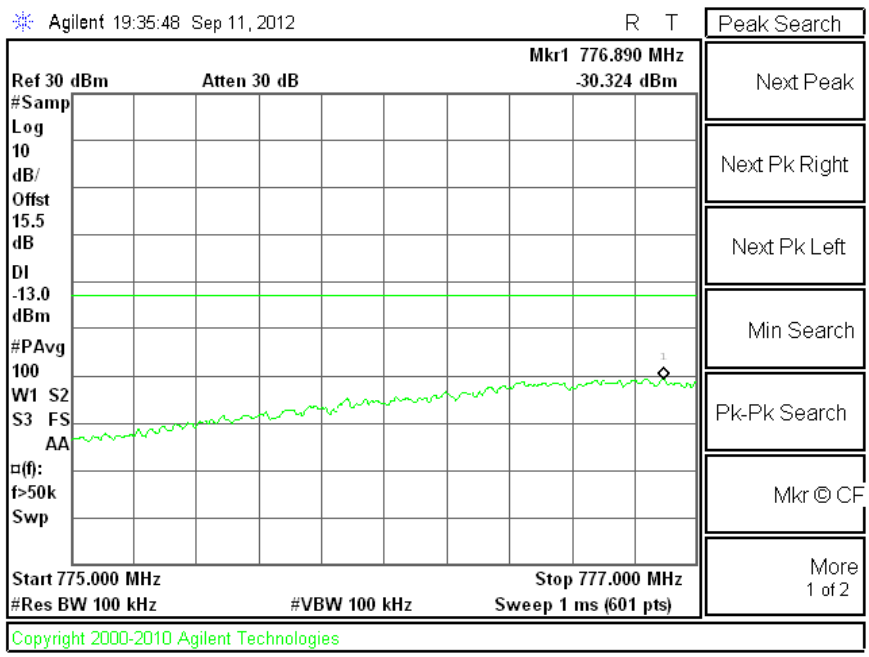

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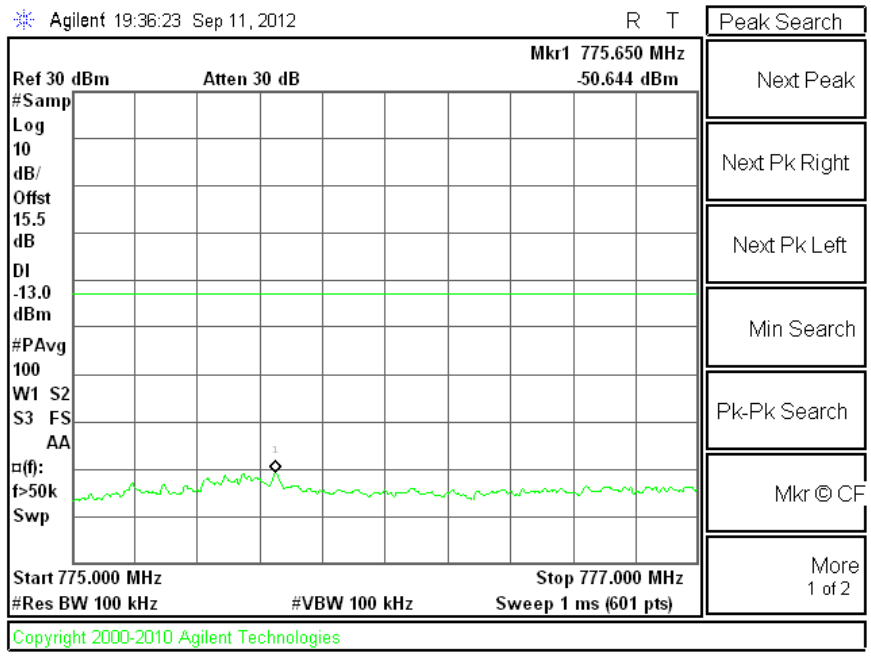
LTE 16QAM 782MHz Band 13, 775 - 777MHz (5MHz Bandwidth)

RB1-0



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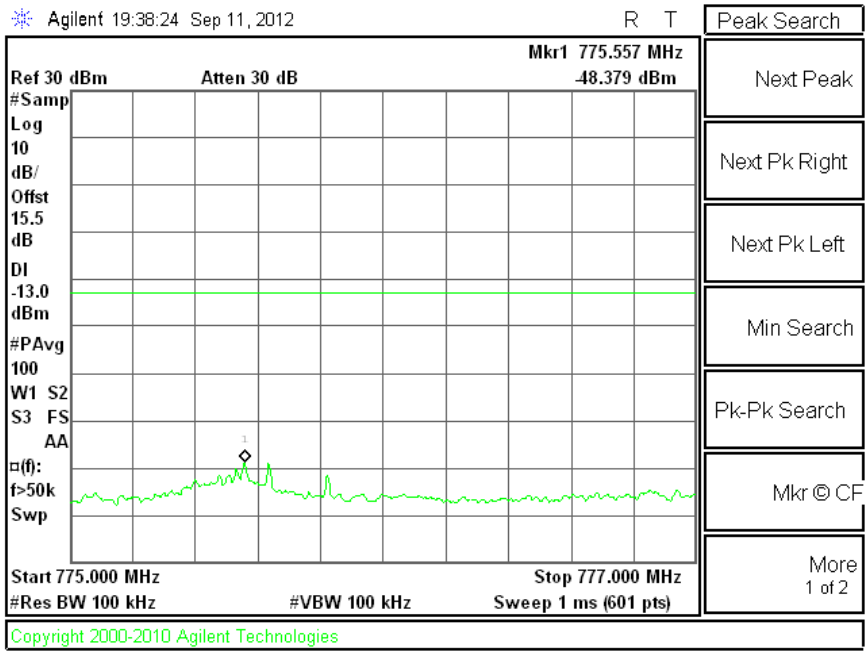

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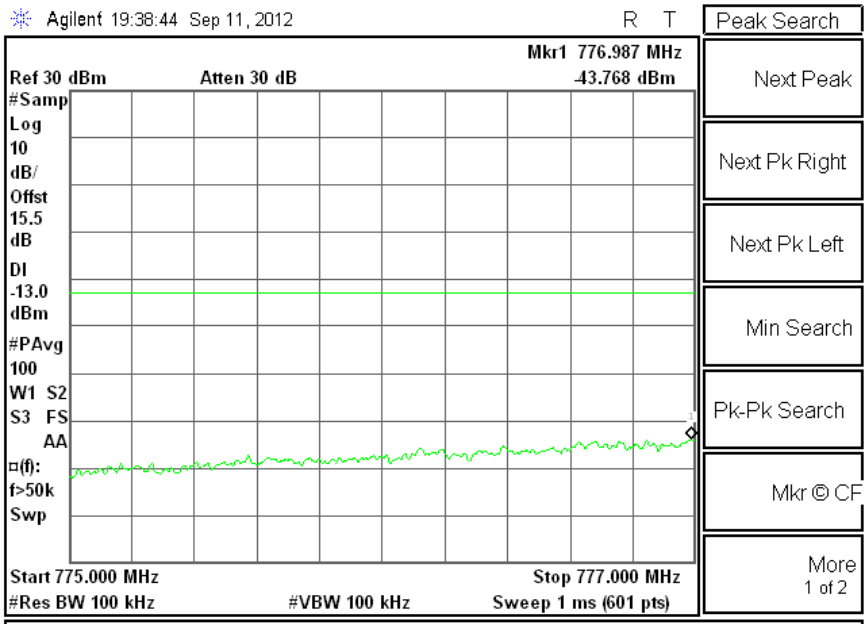
RB12-6



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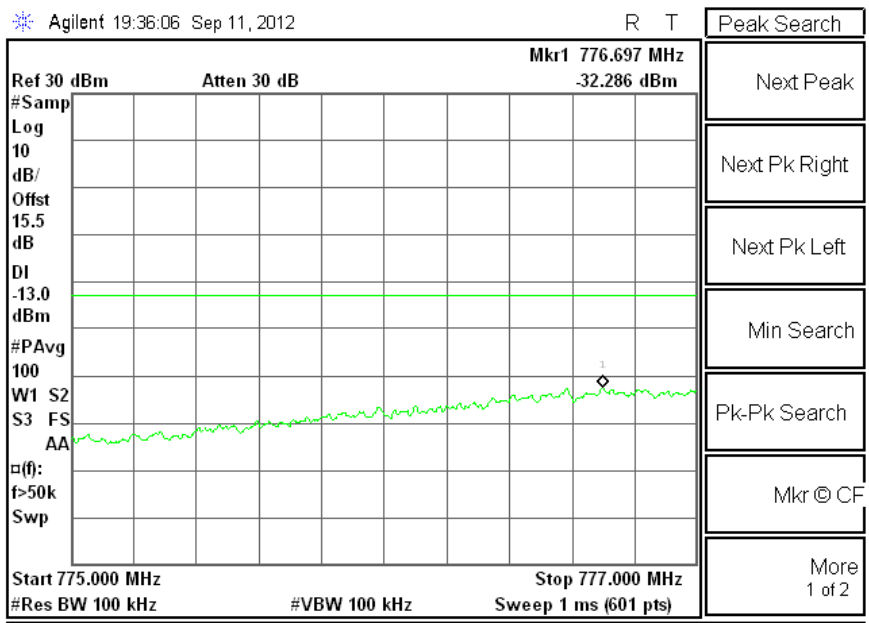

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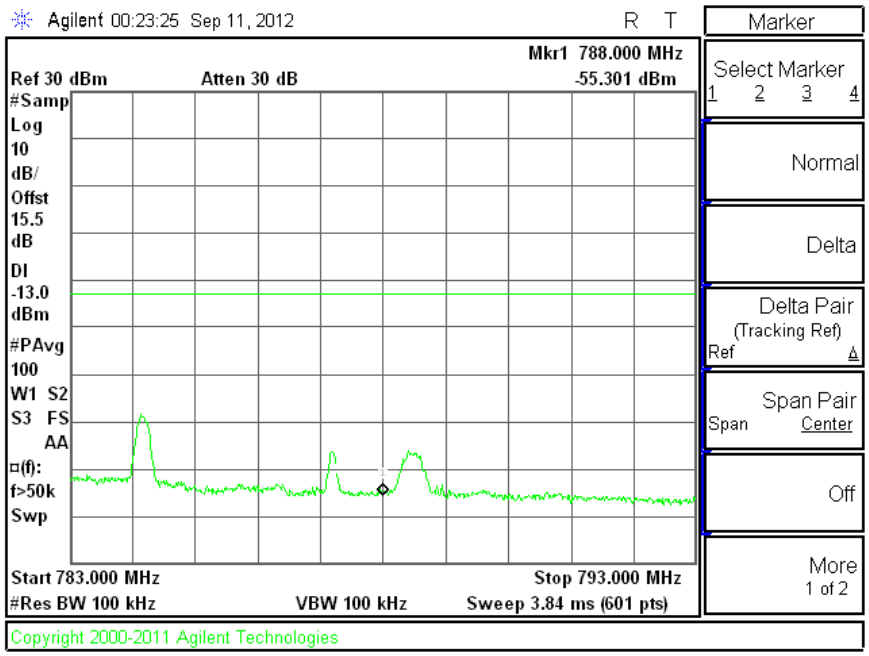
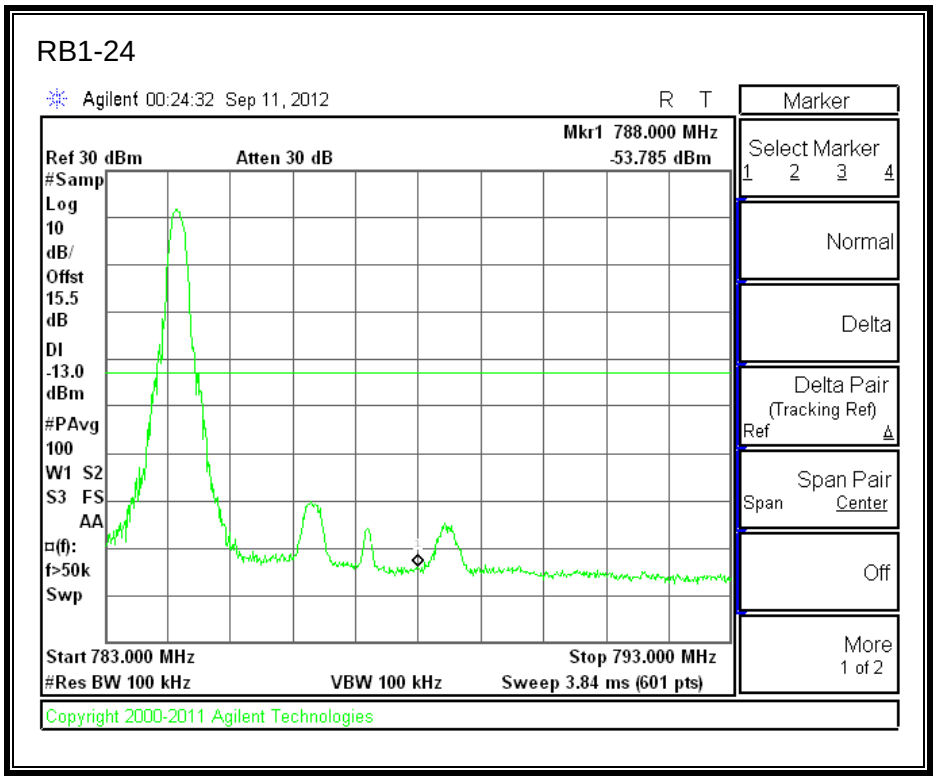
LTE QPSK 782MHz Band 13, 783 - 793MHz (5MHz Bandwidth)

RB1-0



RB1-24



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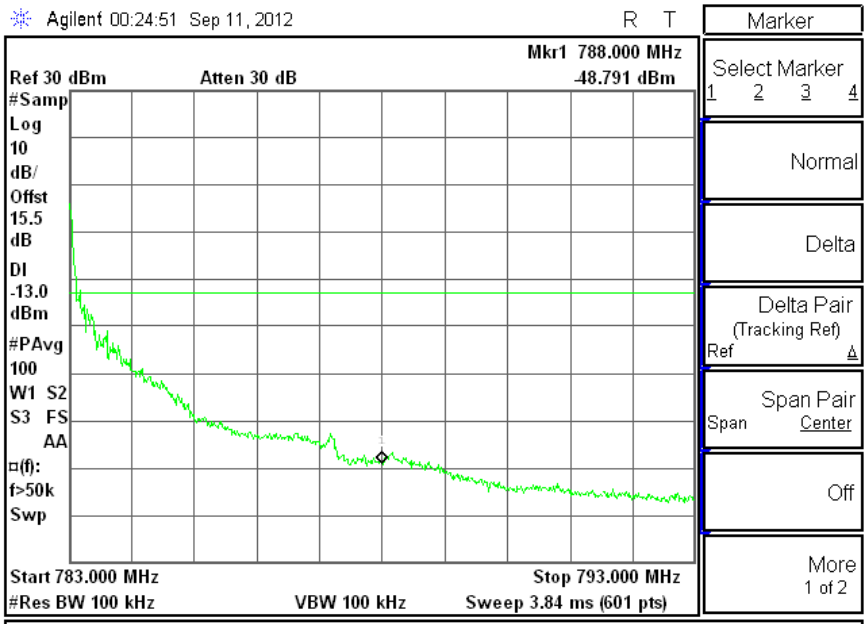
RB12-6



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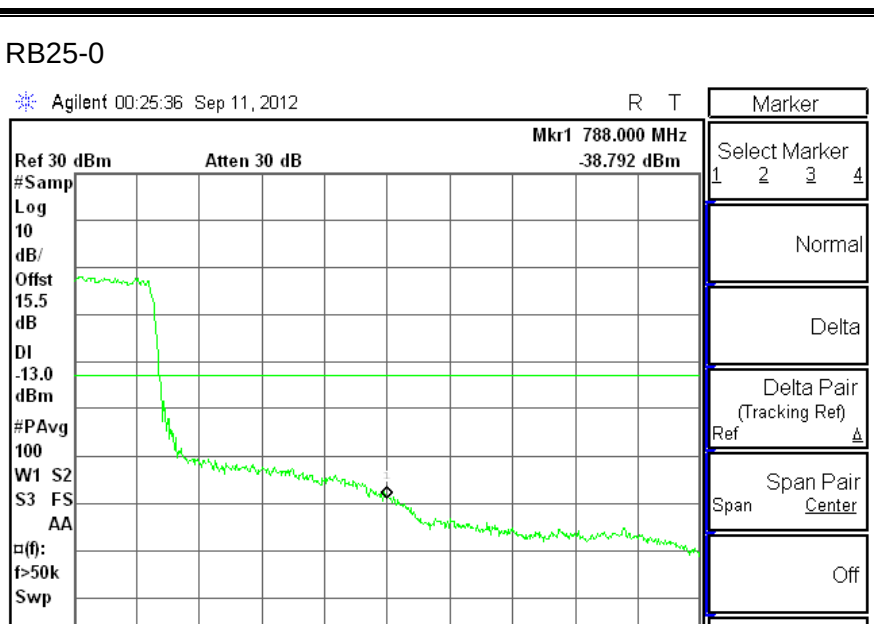

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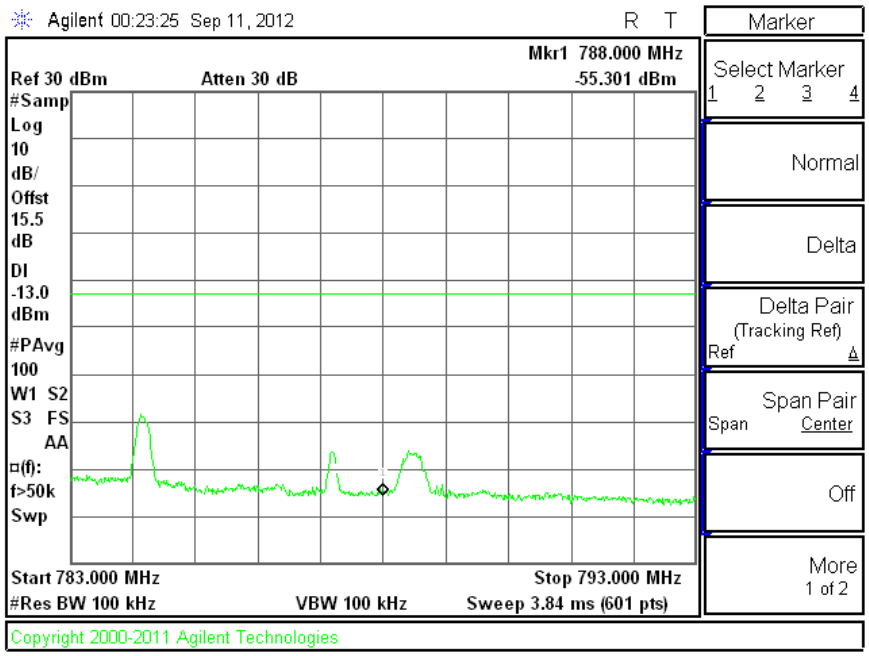
LTE 16QAM 782MHz Band 13, 783 - 793MHz (5MHz Bandwidth)

RB1-0



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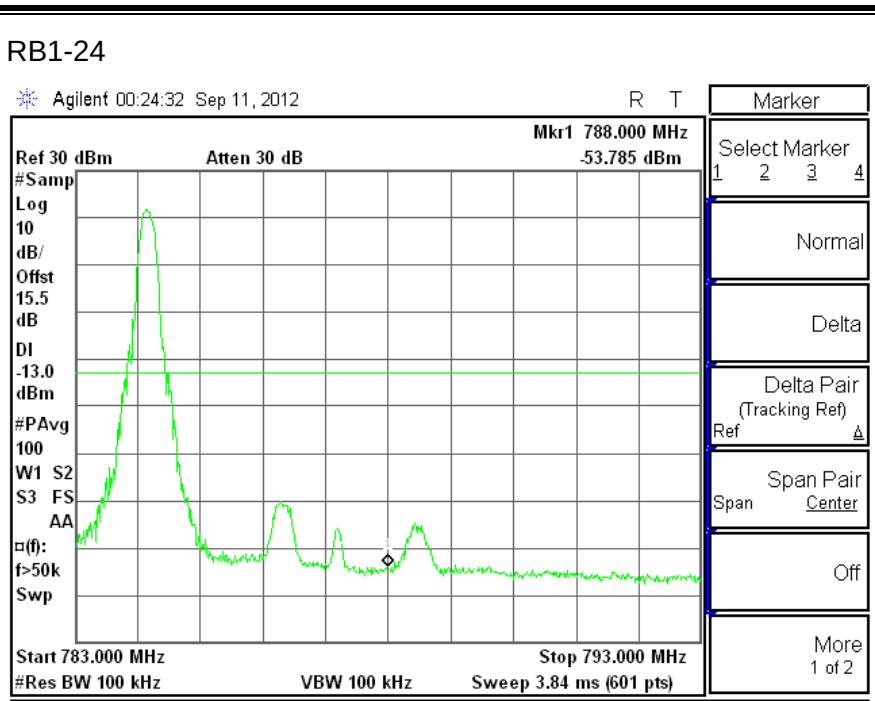

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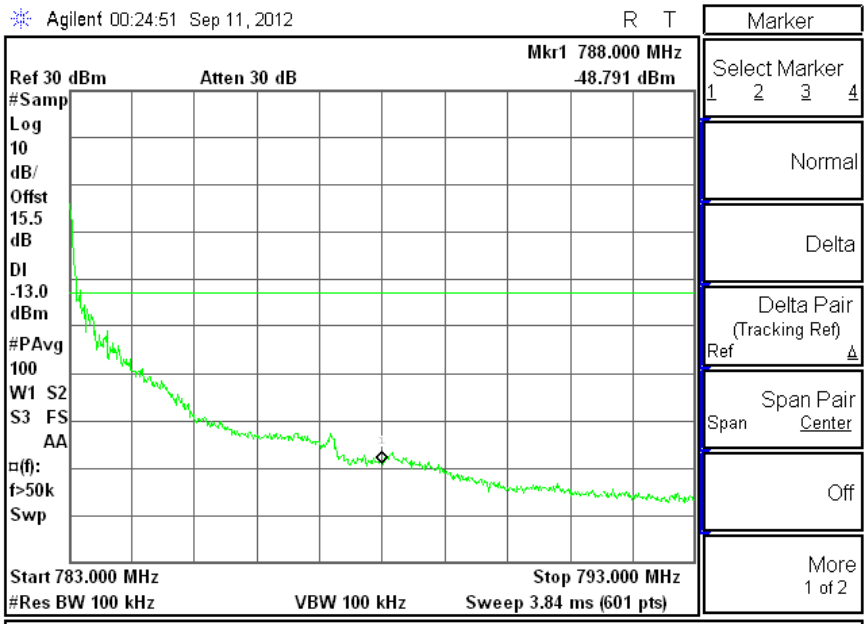
RB12-6



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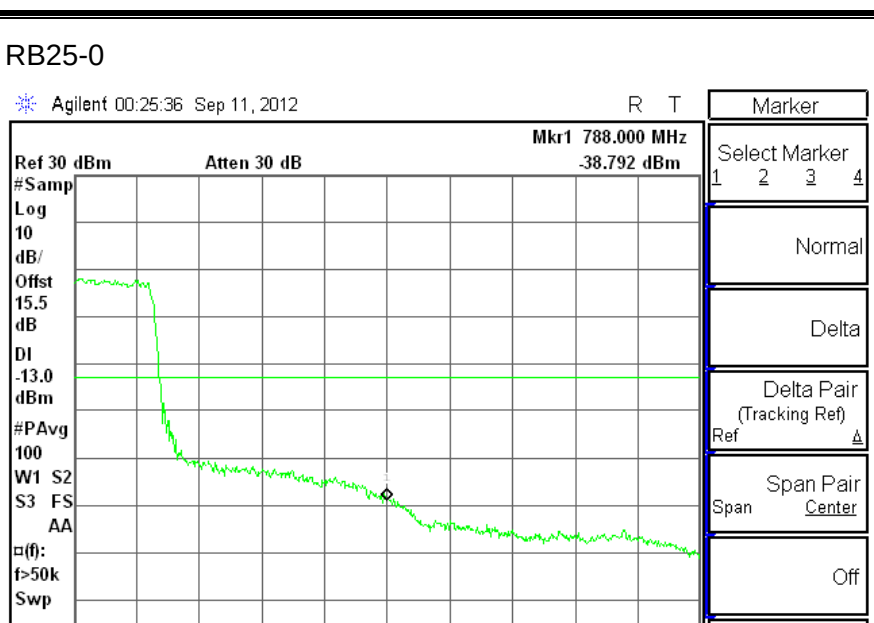

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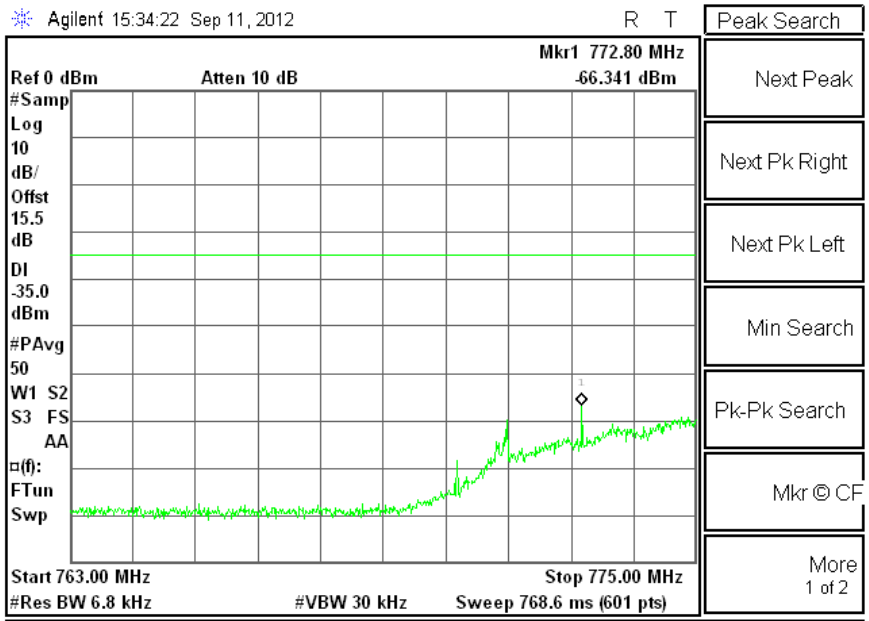
LTE QPSK 782MHz Band 13, 763 - 775MHz (5MHz Bandwidth)

RB1-0



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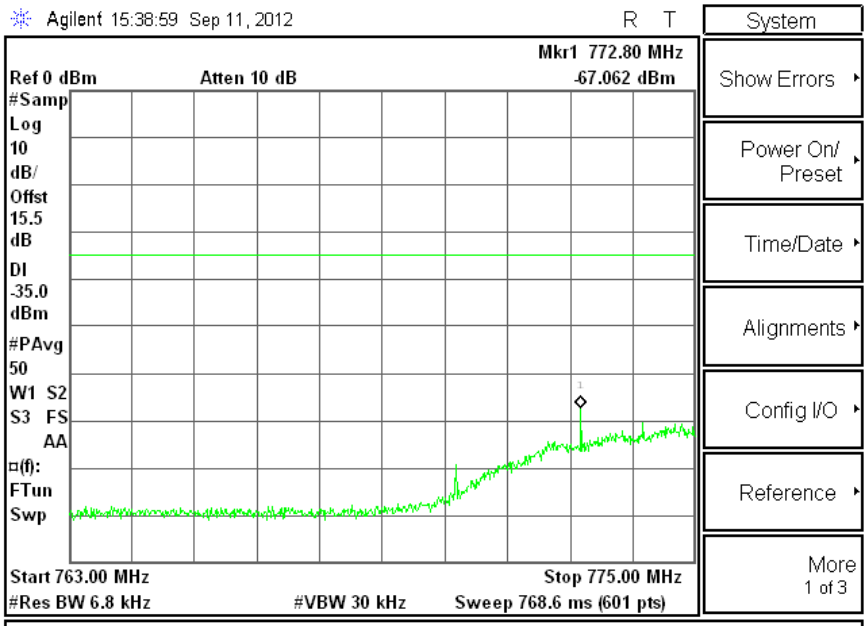

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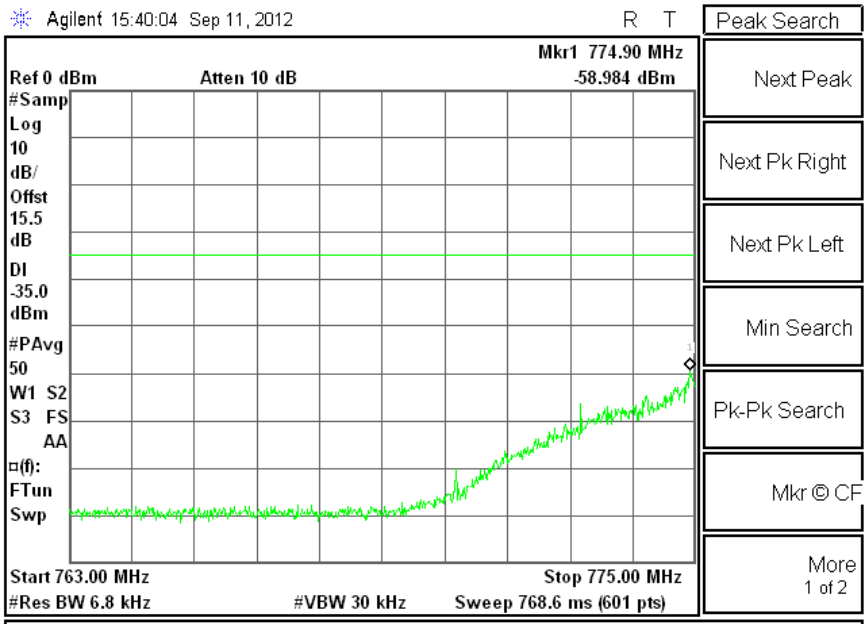
RB12-6



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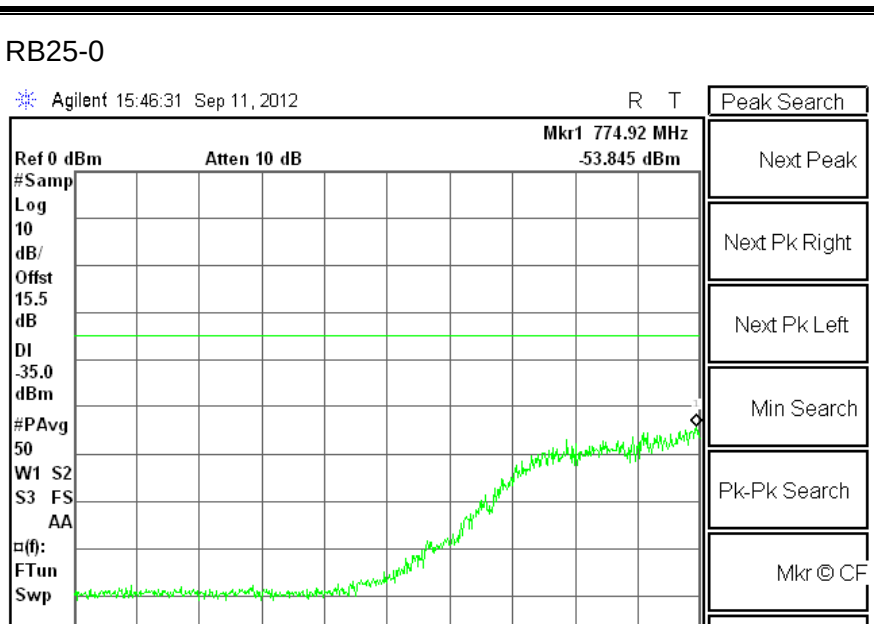

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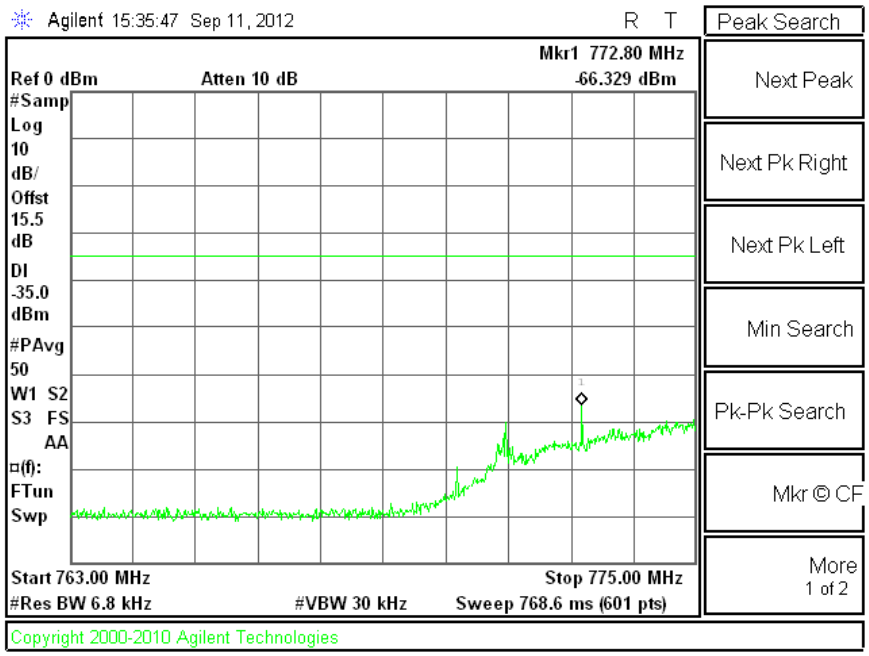
LTE 16QAM 782MHz Band 13, 763-775MHz (5MHz Bandwidth)

RB1-0



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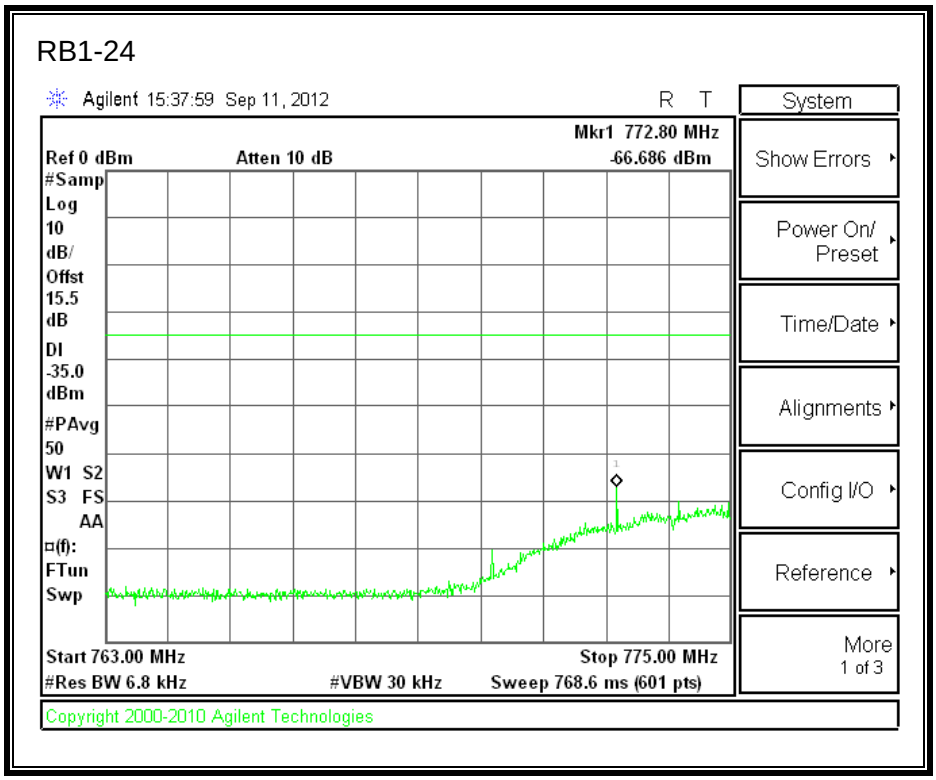

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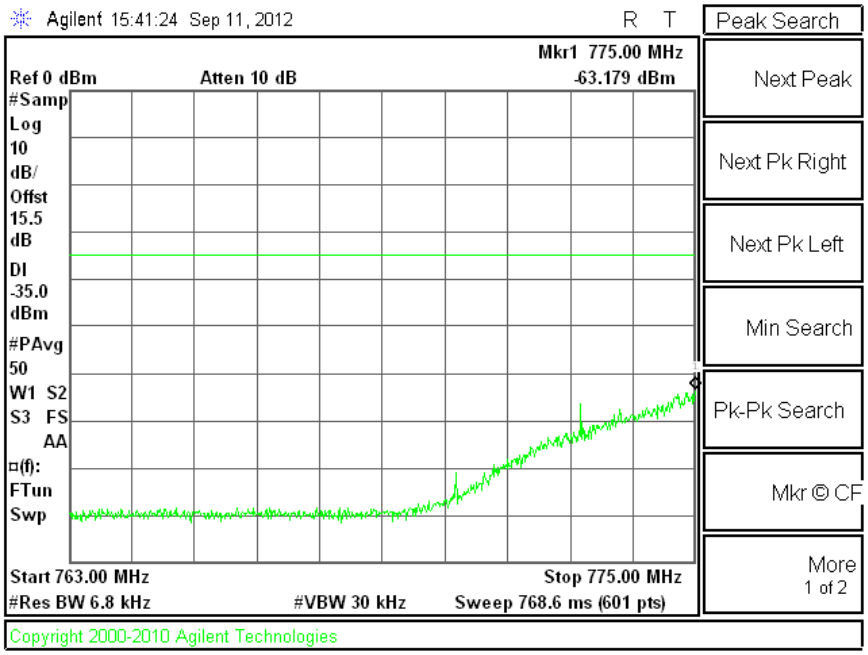
RB12-6



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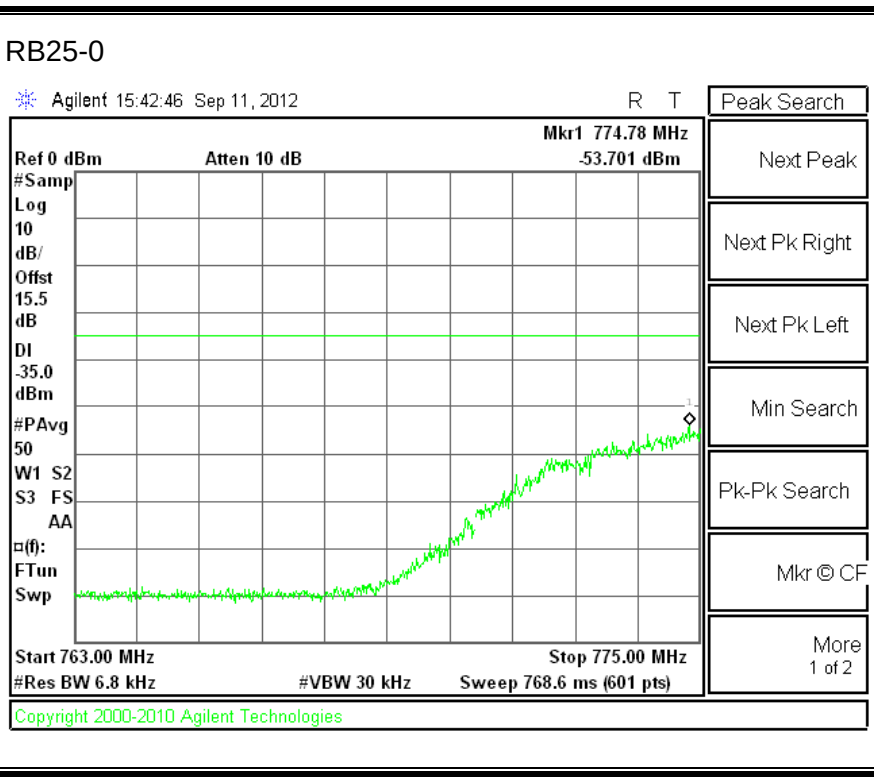

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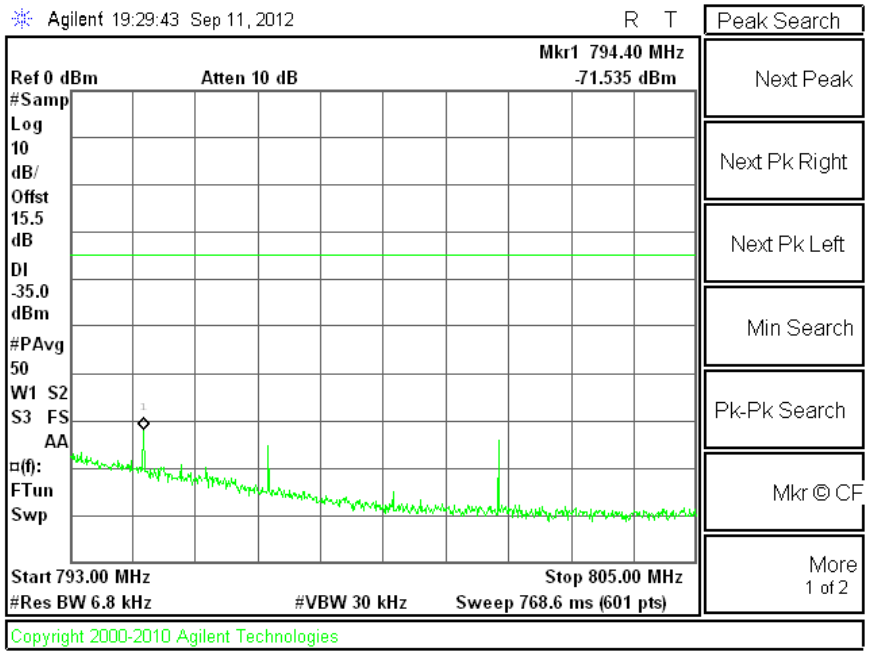
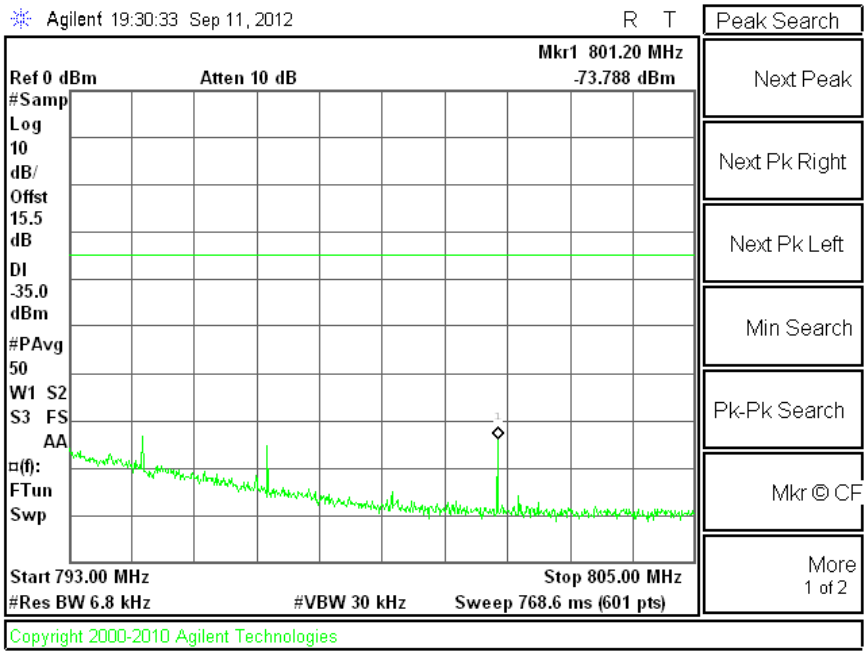
LTE QPSK 782MHz Band 13, 793 - 805MHz (5MHz Bandwidth)

RB1-0



RB1-24



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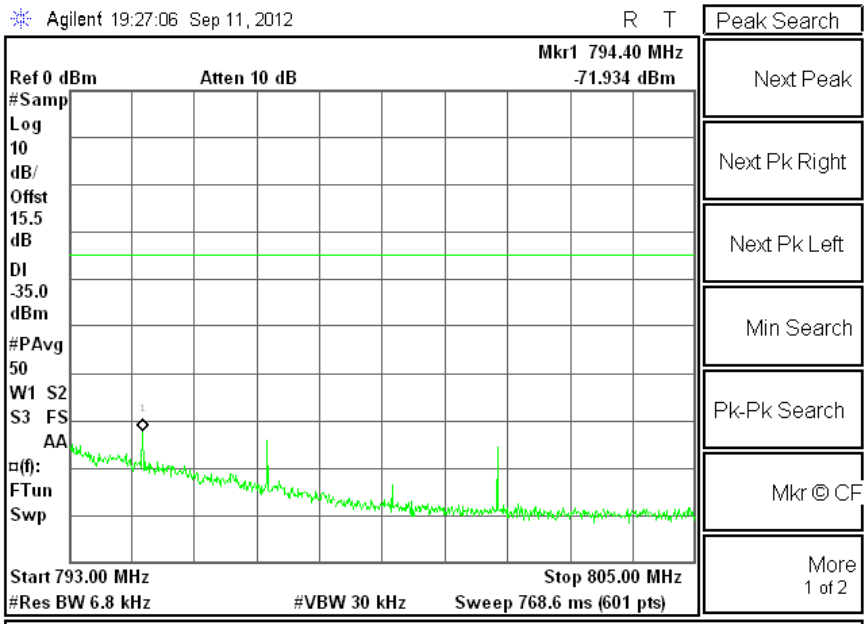
RB12-6



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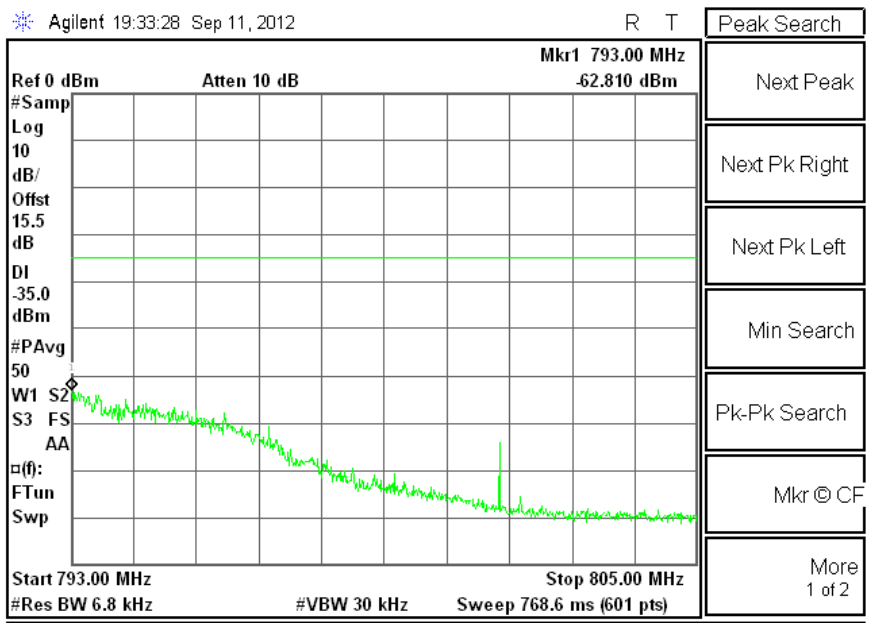

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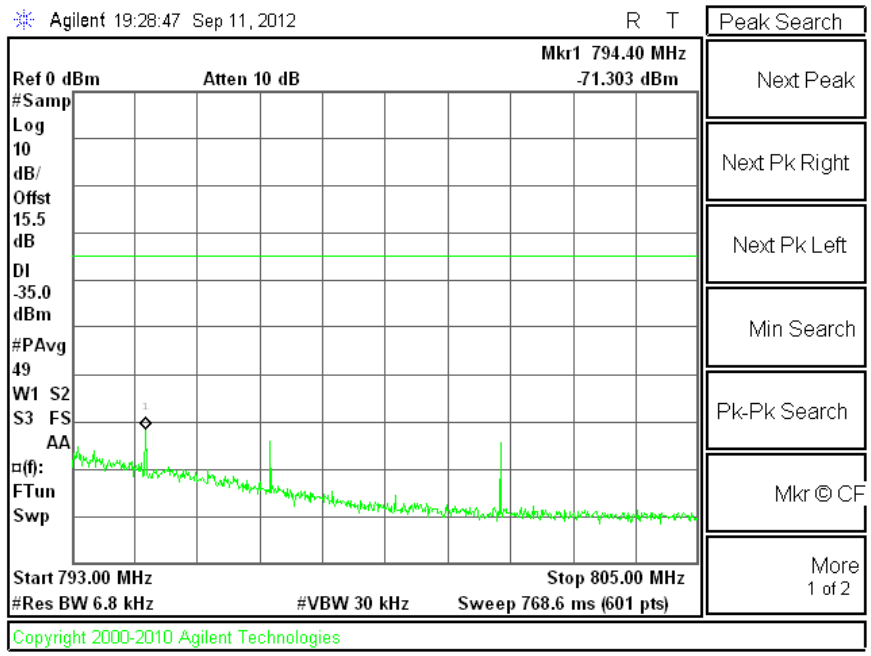
LTE 16QAM 782MHz Band 13, 793 - 805MHz (5MHz Bandwidth)

RB1-0



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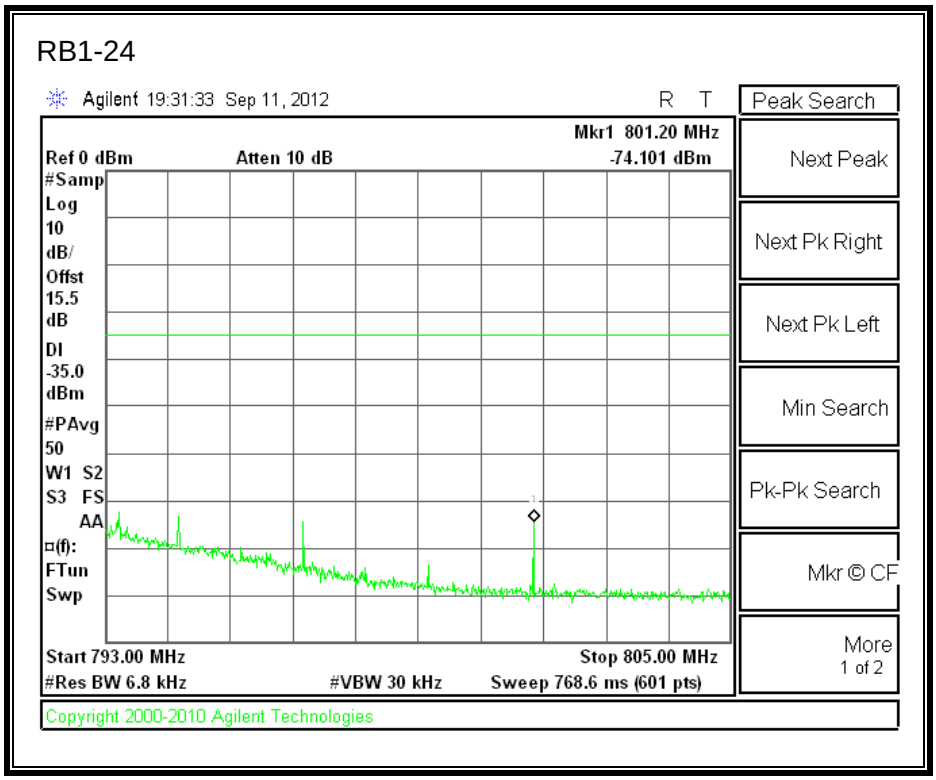

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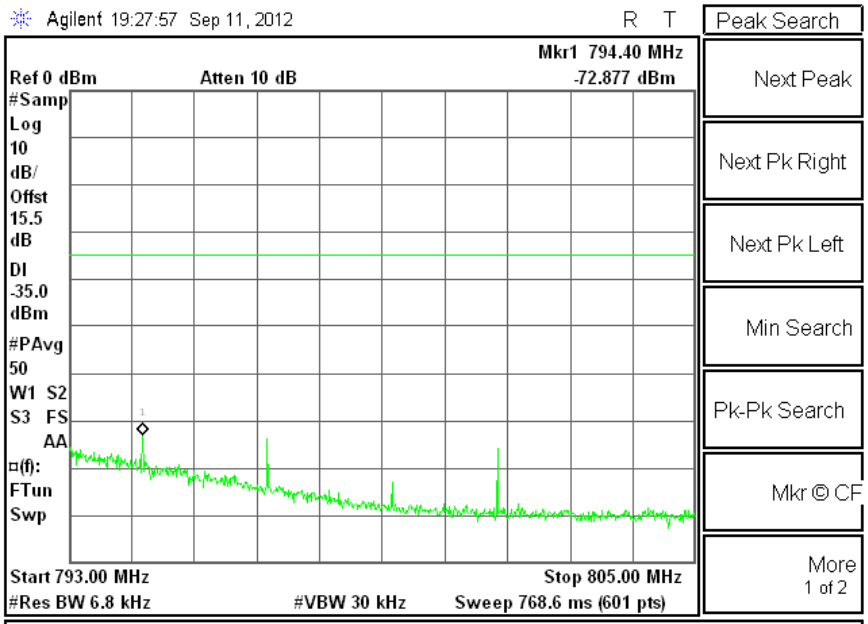
RB12-6



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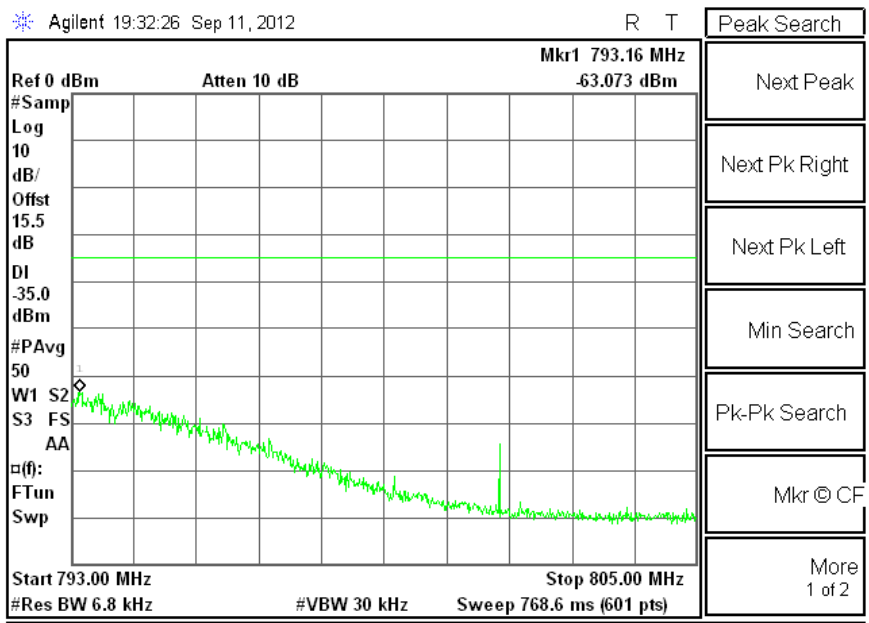

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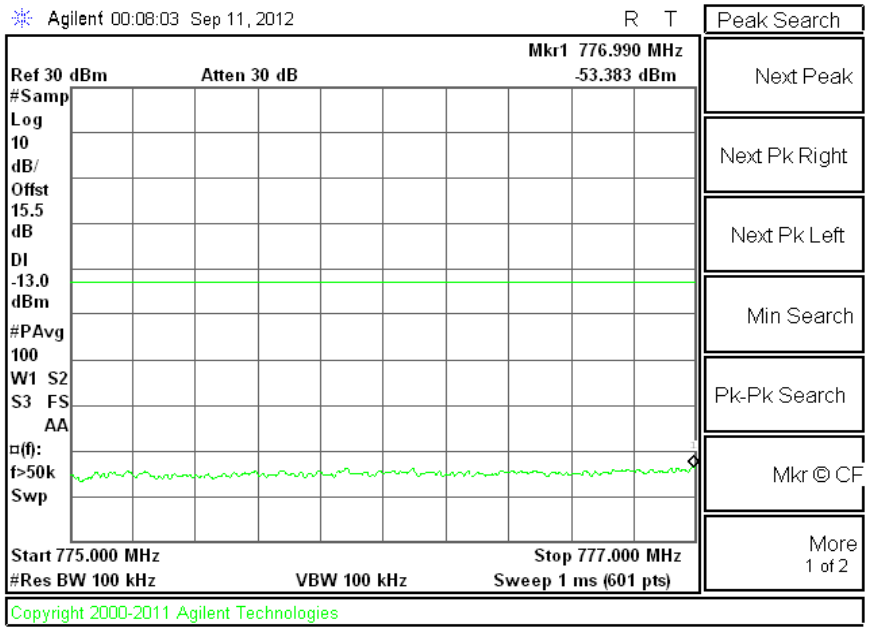
LTE QPSK 784.5 MHz Band 13, 775 - 777MHz (5MHz Bandwidth)

RB1-0



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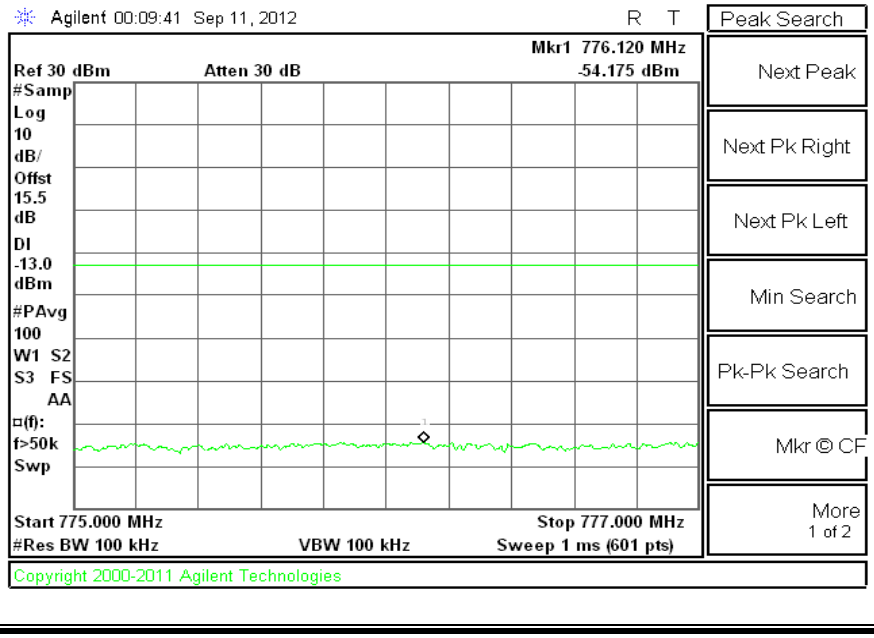

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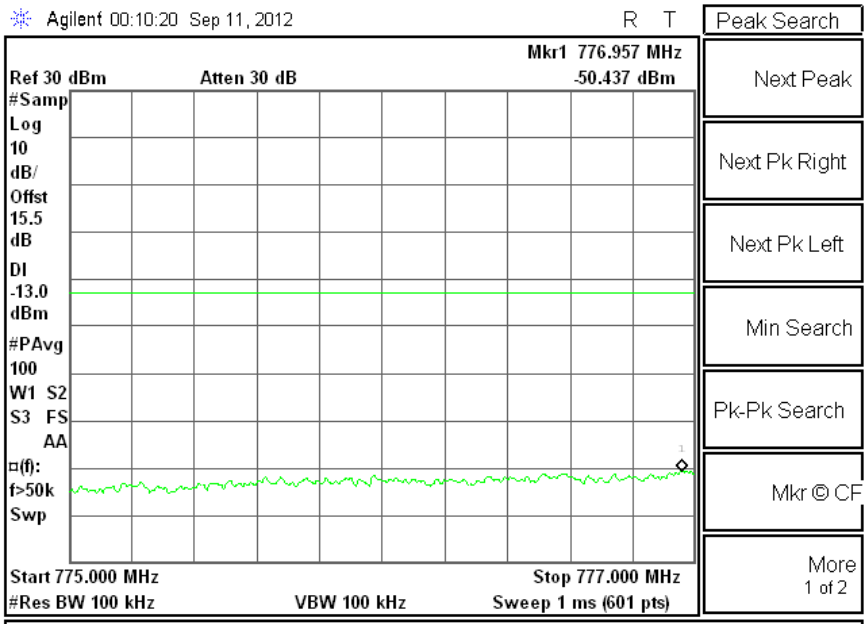
RB12-6



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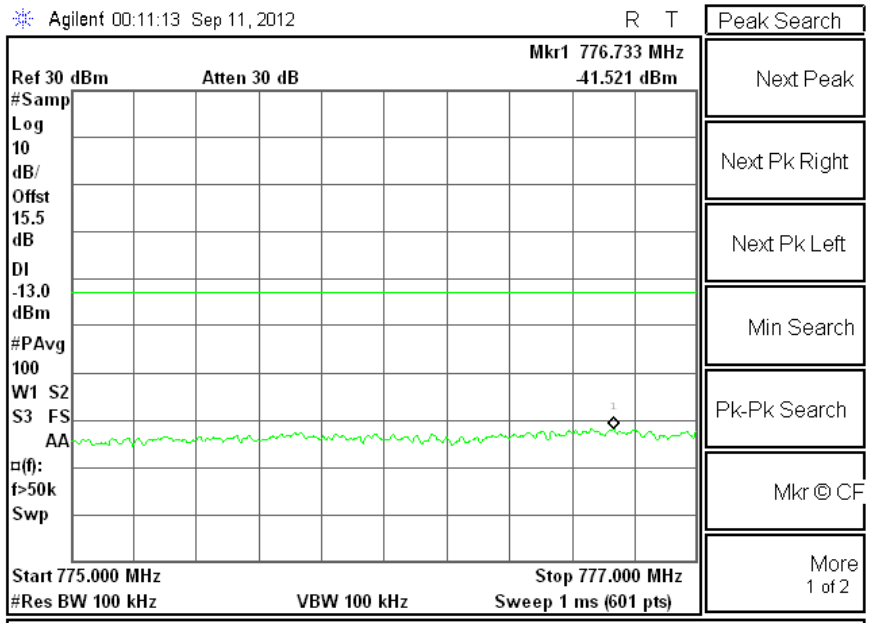

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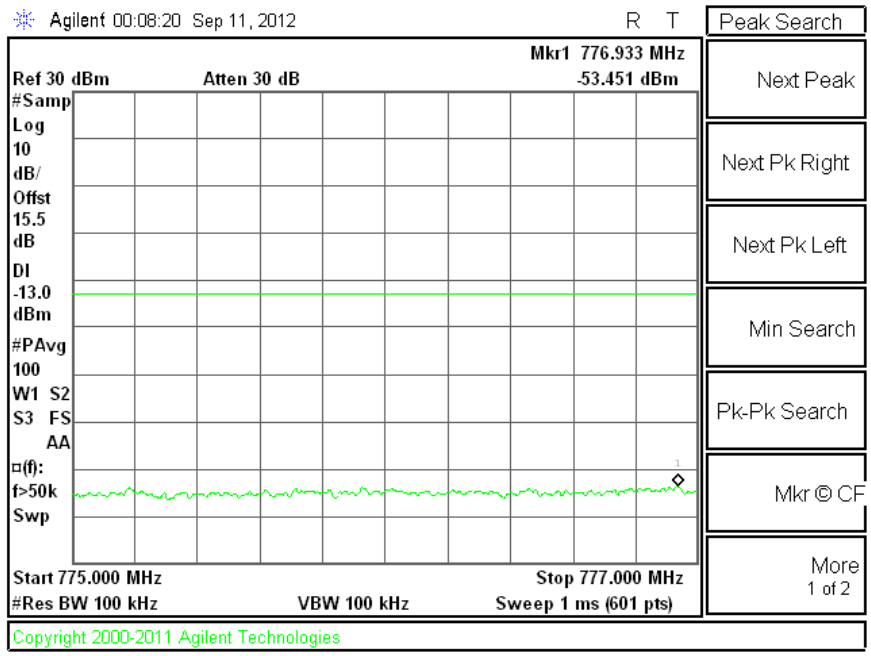
LTE 16QAM 784.5MHz Band 13, 775 - 777MHz (5MHz Bandwidth)

RB1-0



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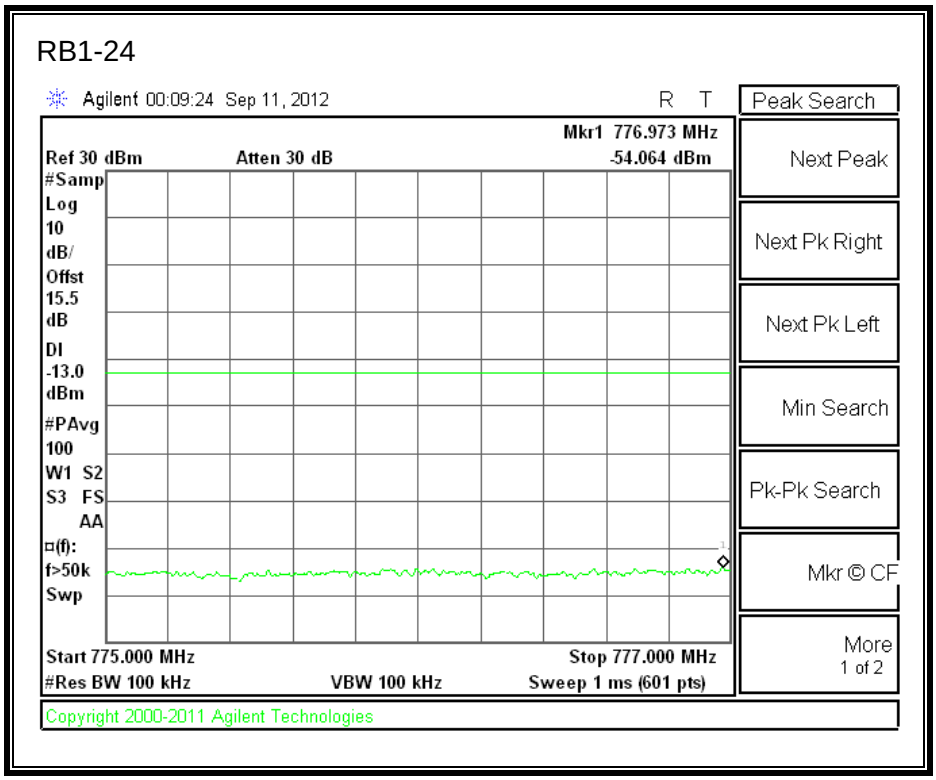

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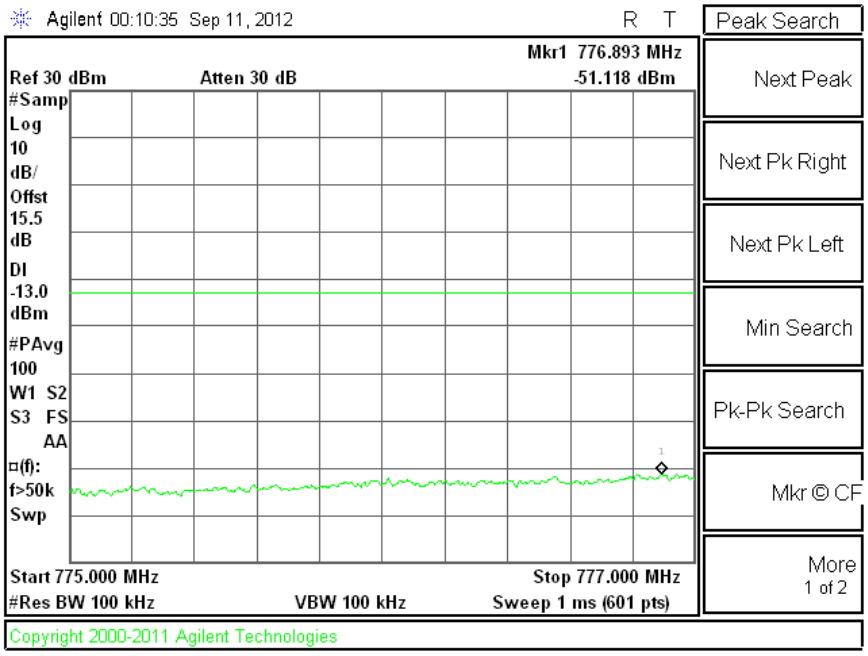
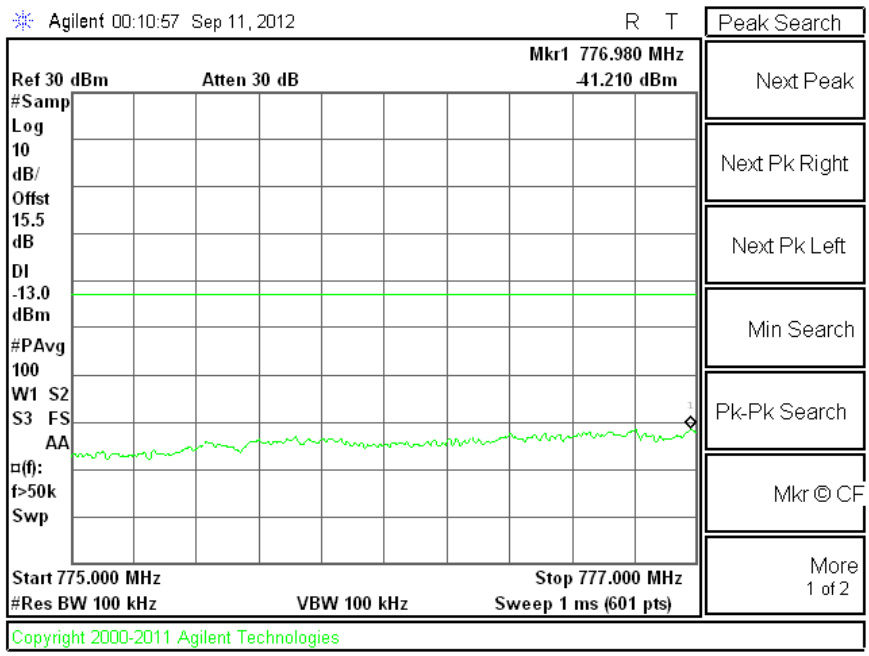
RB12-6



RB25-0



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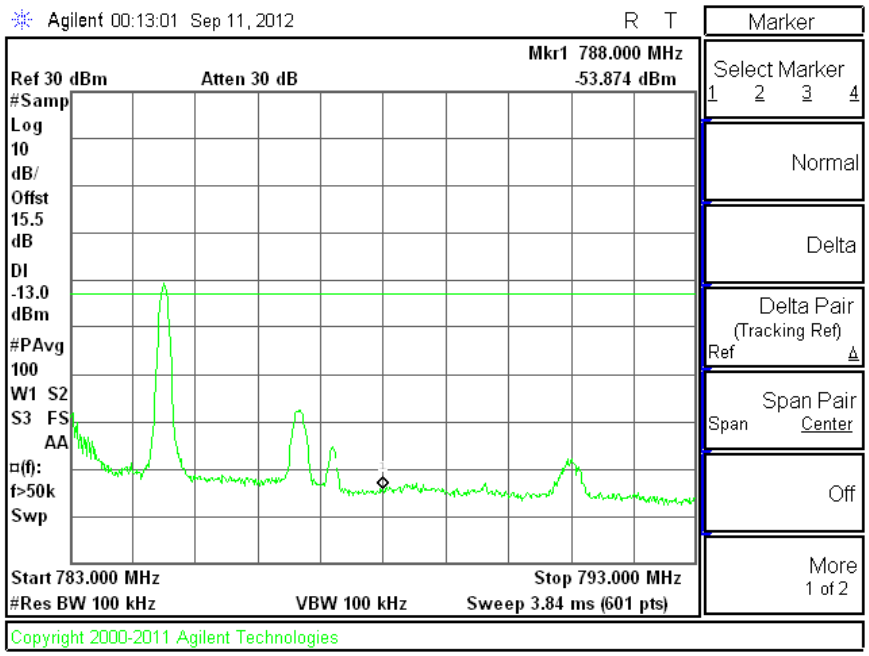
LTE QPSK 784.5MHz Band 13, 783 - 793MHz (5MHz Bandwidth)

RB1-0



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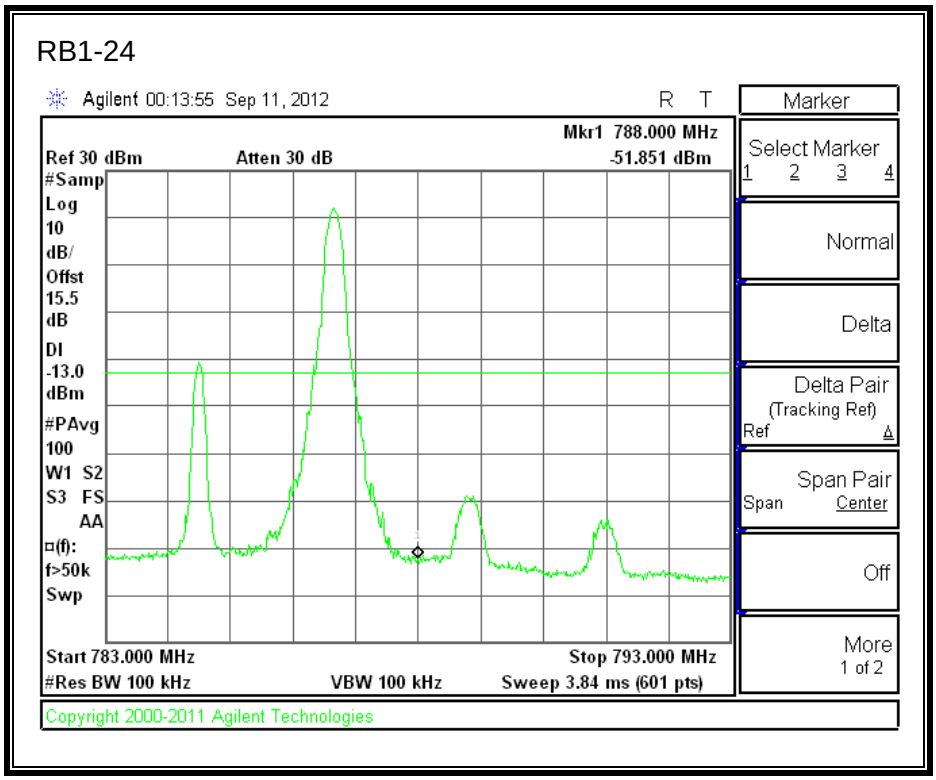

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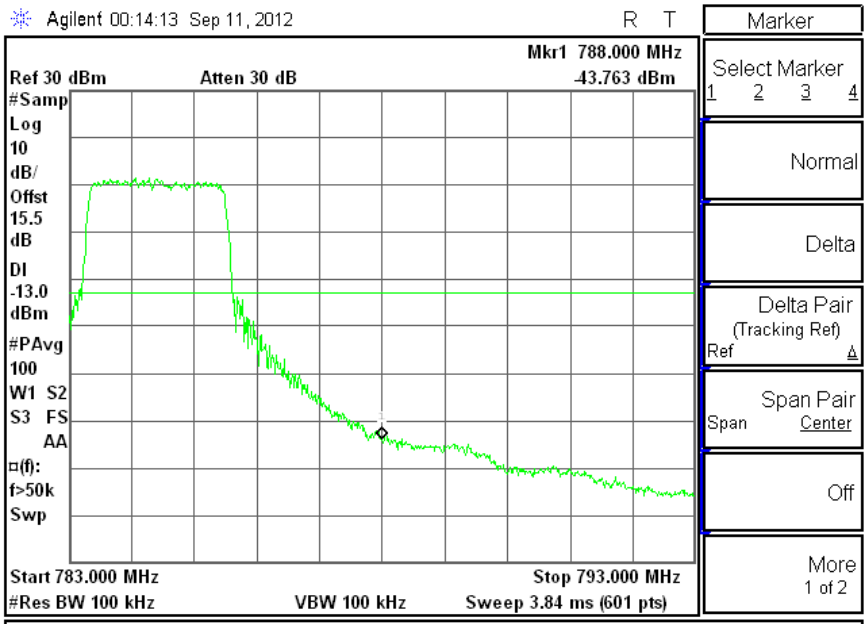
RB12-6



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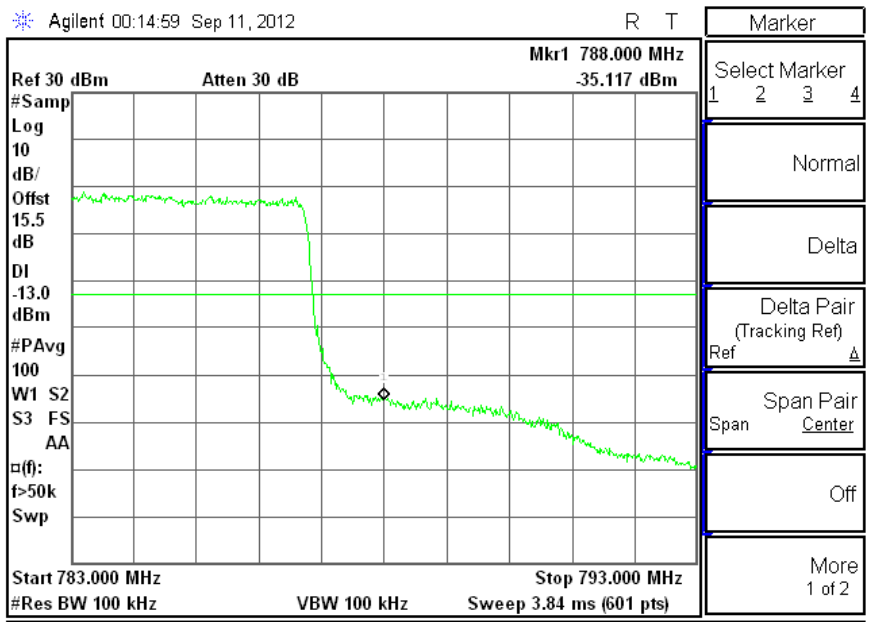

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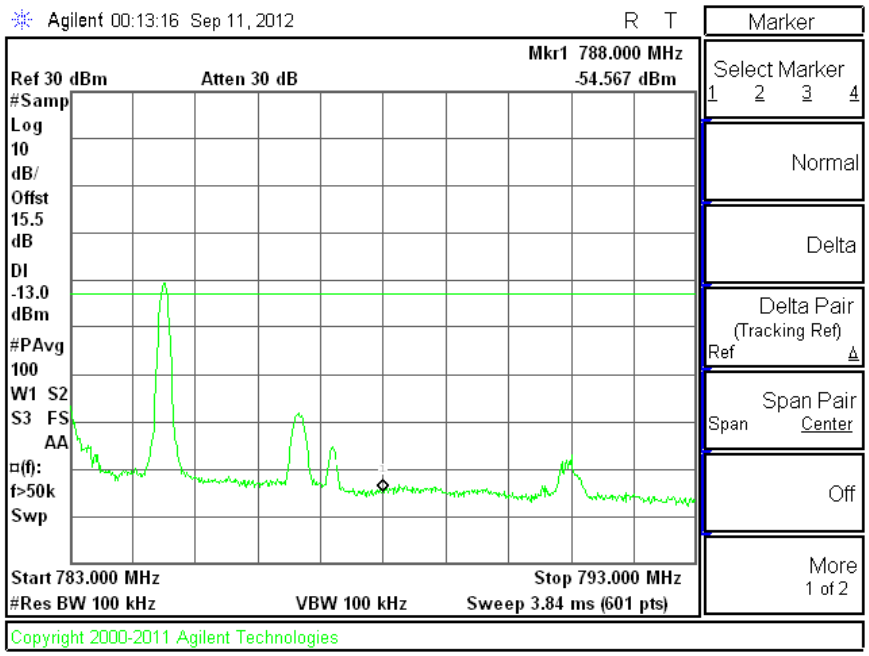
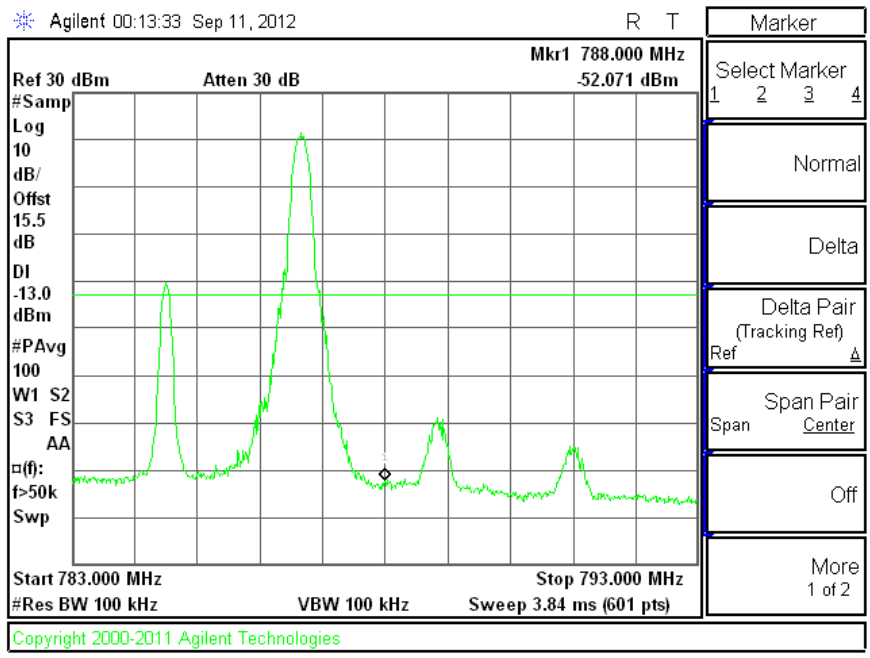
LTE 16QAM 784.5MHz Band 13, 783 - 793MHz (5MHz Bandwidth)

RB1-0



RB1-24



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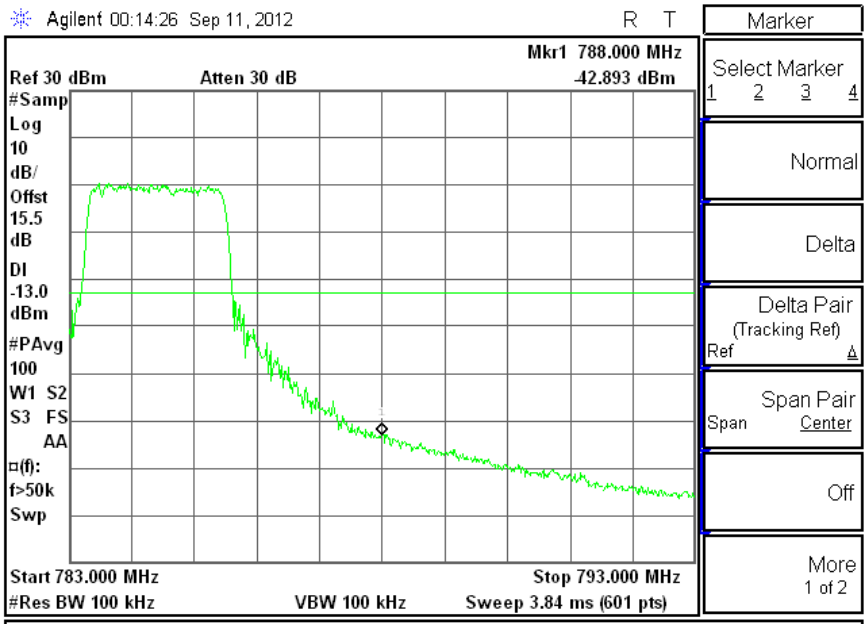
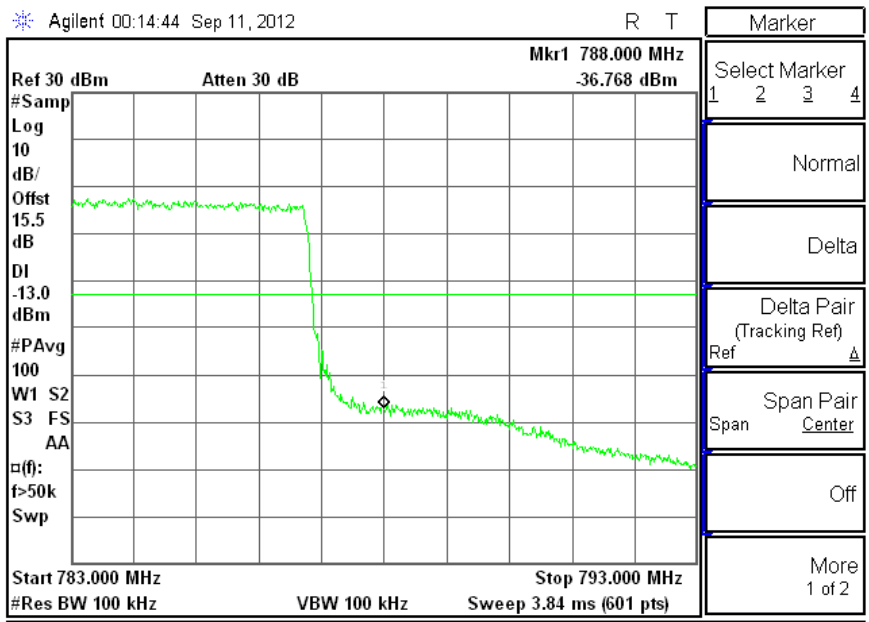
RB12-6



RB25-0



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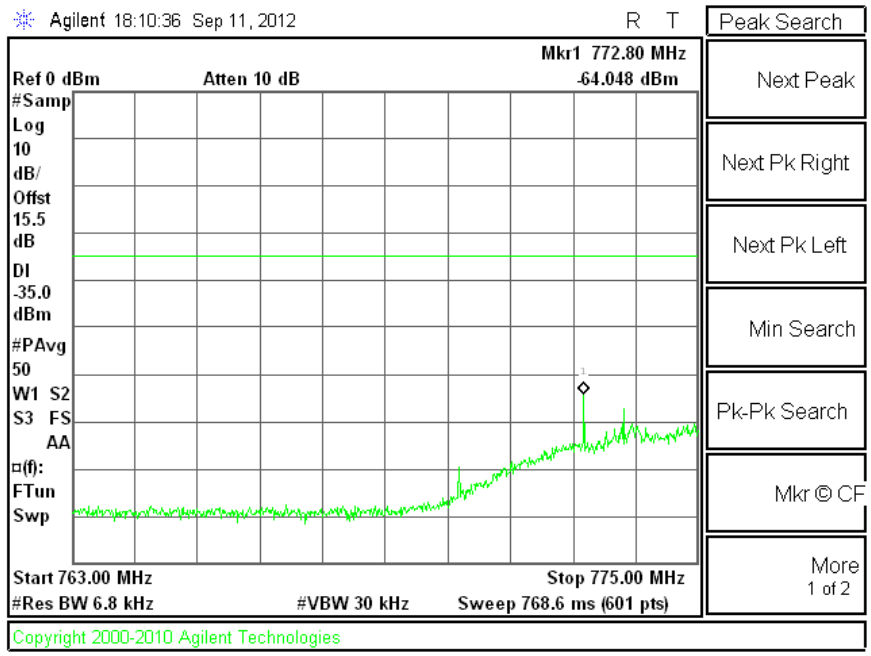
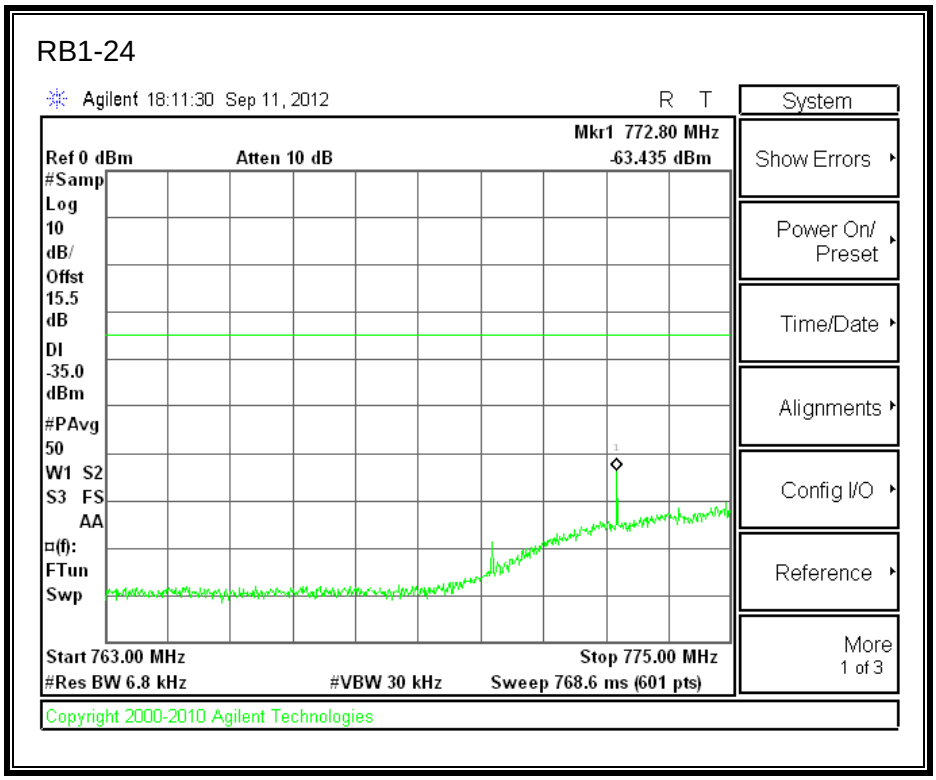
LTE QPSK 784.5MHz Band 13, 763 - 775MHz (5MHz Bandwidth)

RB1-0



RB1-24



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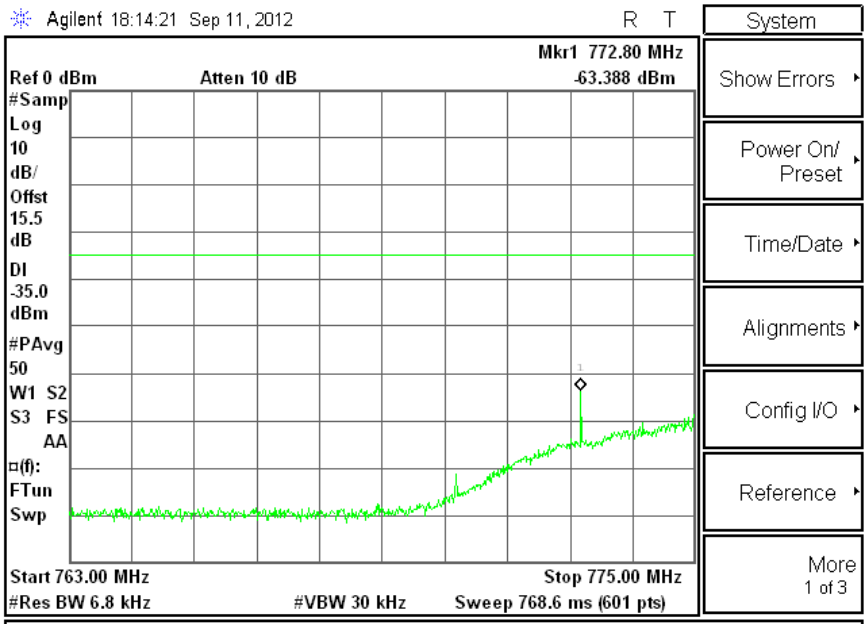
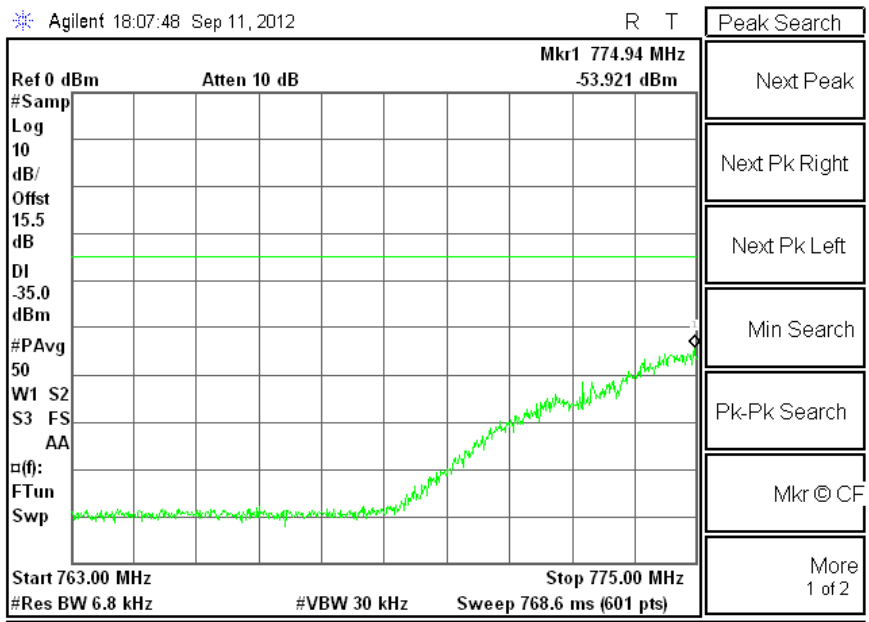
RB12-6



RB25-0



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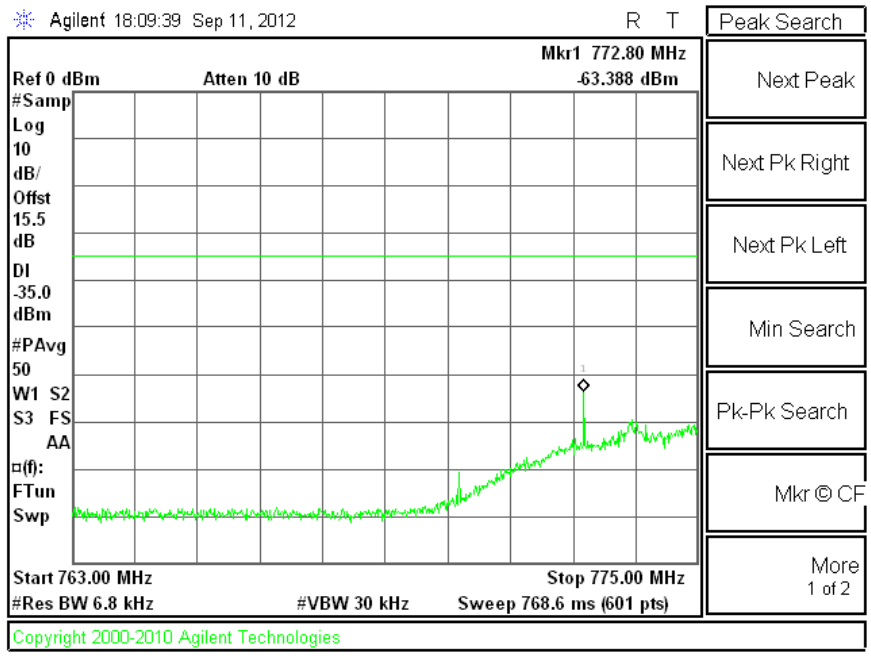
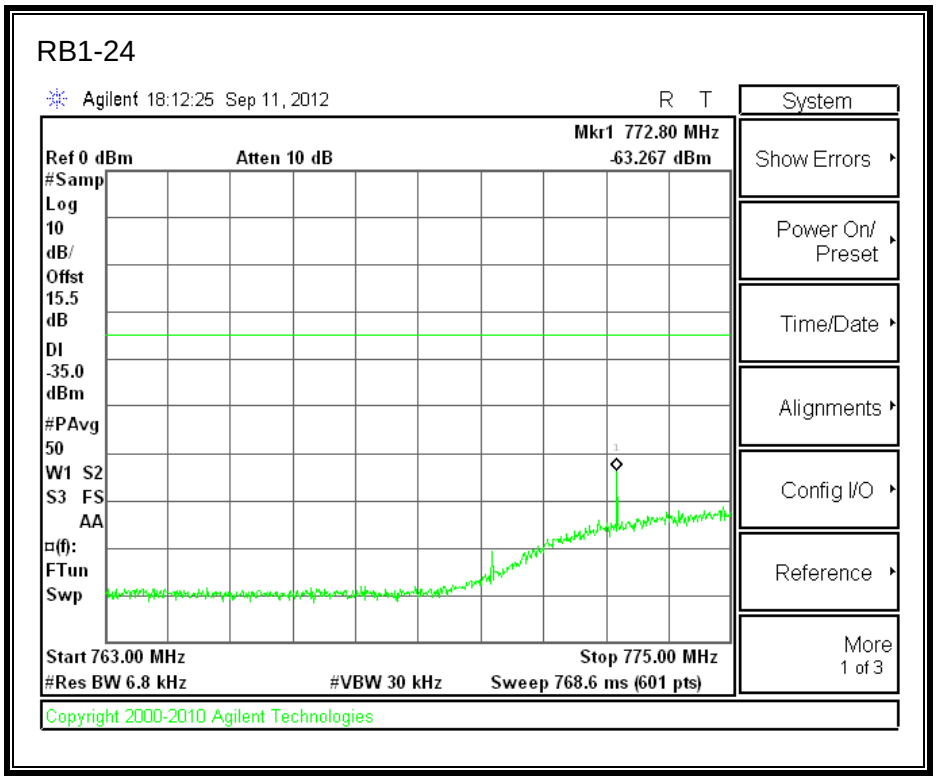
LTE 16QAM 784.5MHz Band 13, 763-775MHz (5MHz Bandwidth)

RB1-0



RB1-24



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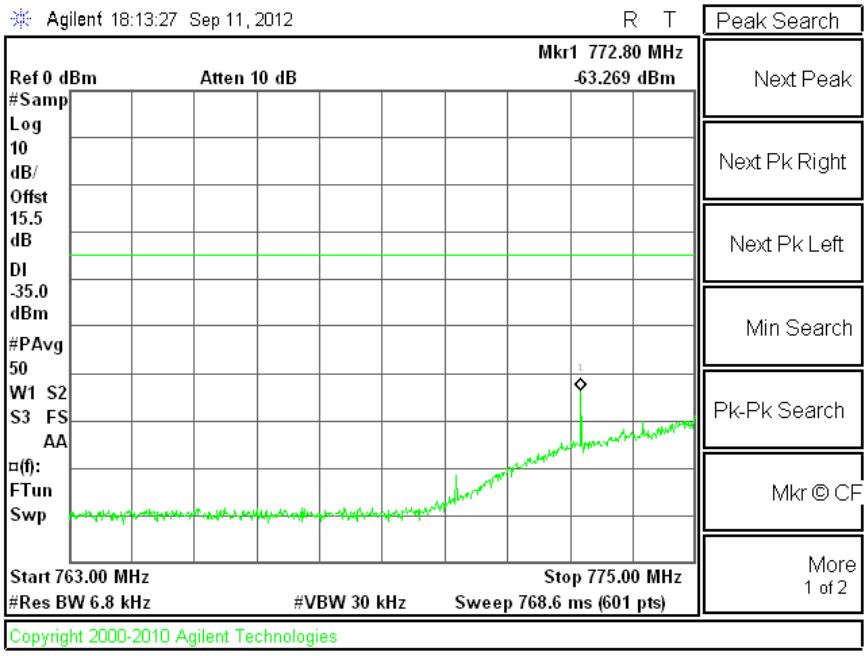
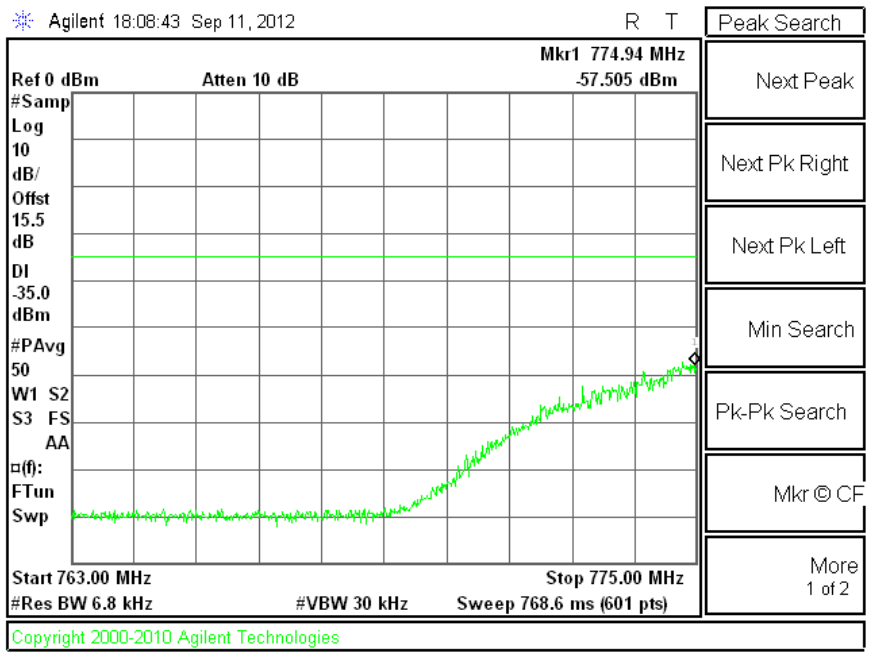
RB12-6



RB25-0



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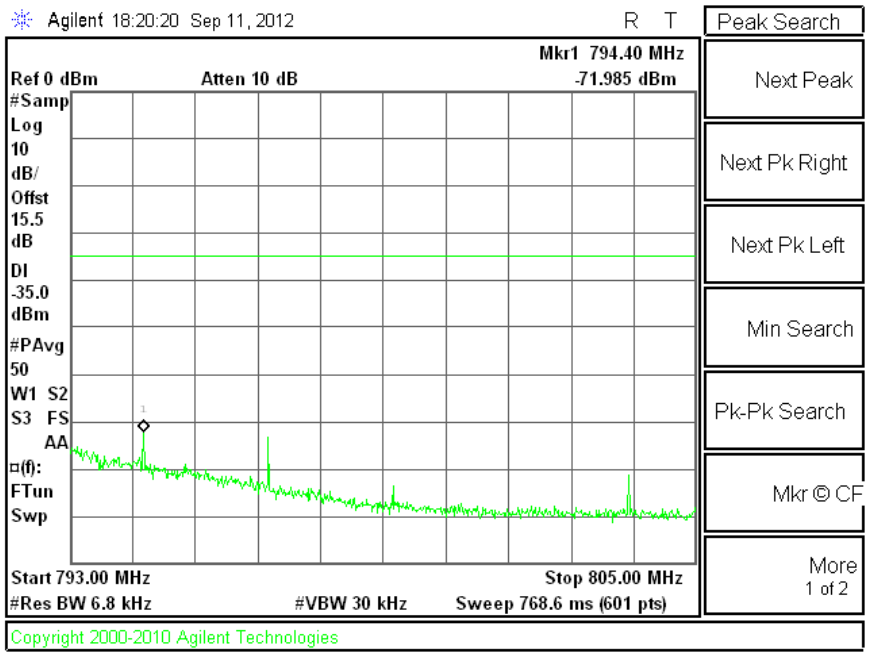
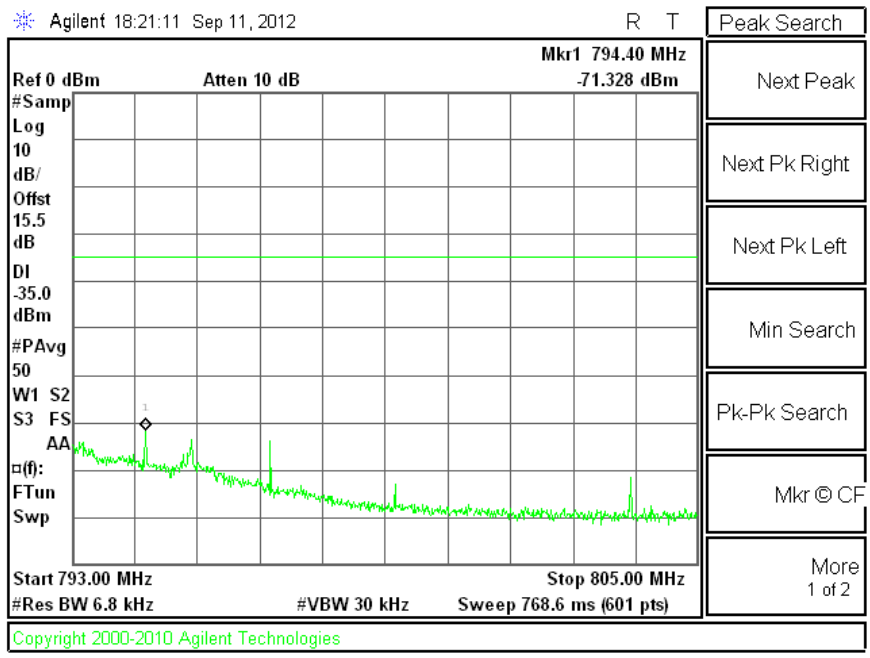
LTE QPSK 784.5MHz Band 13, 793 - 805MHz (5MHz Bandwidth)

RB1-0



RB1-24



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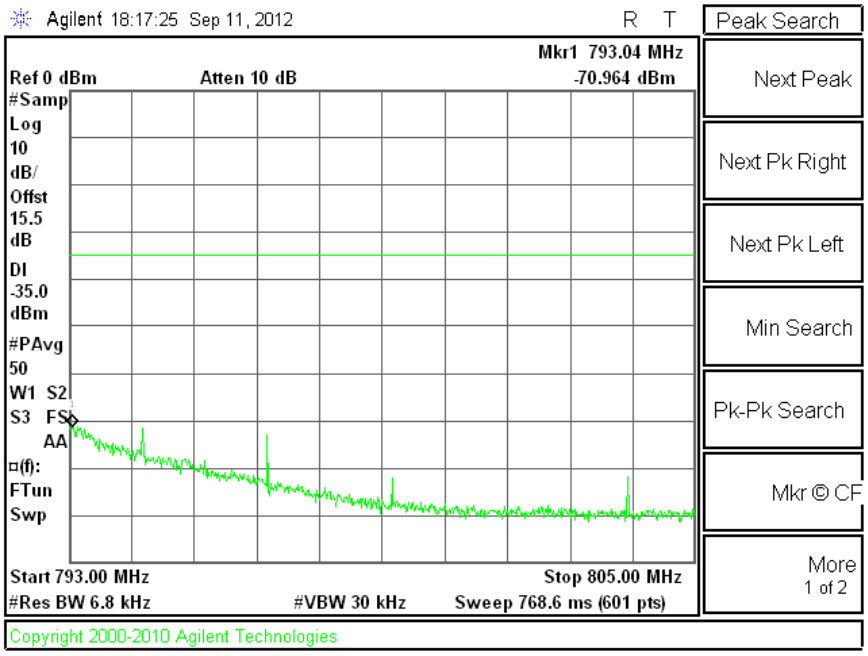
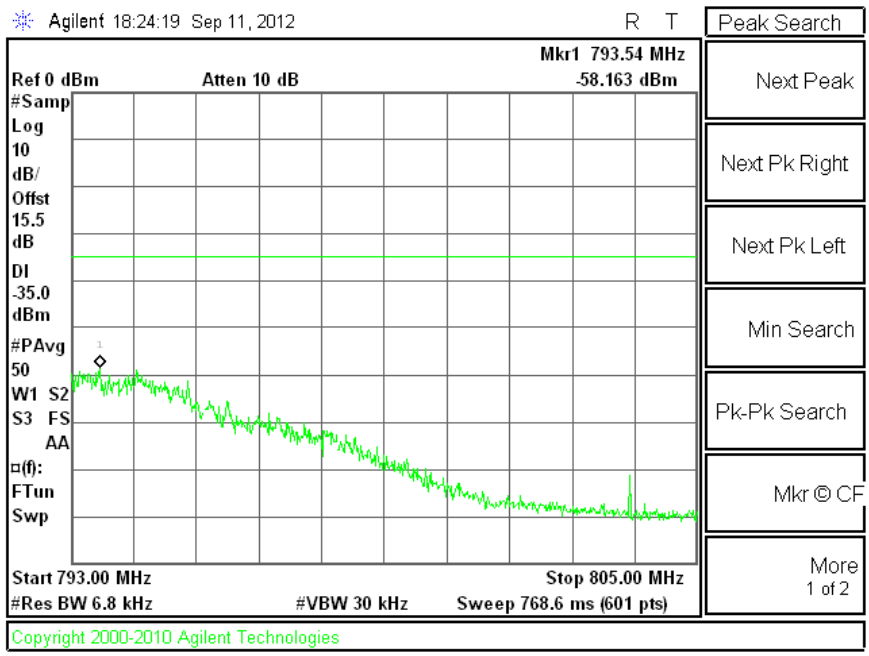
RB12-6



RB25-0



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