FCC 47 CFR PART 22H, 24E, 27L AND 90S
CERTIFICATION TEST REPORT

FOR

Tablet with cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA /CDMA 1xRTT /1x Advanced/EV-DO Rev 0, A, B/LTE/IEEE 802.11a/b/g/n (MIMO 2x2) and Bluetooth radio

MODEL: A1475

FCC ID: BCGA1475

REPORT NUMBER: 13U15555-7

ISSUE DATE: SEPTEMBER 12, 2013

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

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

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	09/12/13	Initial Issue	T. Chan

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: Tablet with cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/CDMA1xRTT/1x Advanced/EV-DO Rev 0, A, B/LTE/IEEE 802.11a/b/g/n (MIMO 2x2) and Bluetooth radio

MODEL: A1475

SERIAL NUMBER: DLXKM008FK9Y

DATE TESTED: JULY 28 – SEPTEMBER 12, 2013

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

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

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

Approved & Released For
UL Verification Services Inc. By:

Thu Chan
WiSE Operations Manager
UL Verification Services Inc.

Tested By:

roy zheng

Roy Zheng
WiSE Lab Technician
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2009, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

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

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

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The Apple iPad Model A1475 is a Tablet with cellular GSM/GPRS/EGPRS/WCDMA/HSPA+ DC-HSDPA/ CDMA 1xRTT/1x Advanced/EV-DO Rev 0, A, B/LTE/IEEE 802.11a/b/g/n (MIMO 2x2) and Bluetooth radio.

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:

GSM

Part 22 /24					
Frequency range (MHz)	Modulation	Conducted(Peak)		ERP/EIRP (Peak)	
		dBm	mW	dBm	mW
824.2 - 848.8	GPRS	33.60	2290.9	32.65	1840.8
	EGPRS	31.85	1531.1	26.61	458.1
1850.2-1909.8	GPRS	31.30	1349.0	30.75	1188.5
	EGPRS	30.44	1106.6	28.25	668.3

WCDMA

Part 22/24 /27		Conducted				ERP/EIRP			
Frequency range (MHz)	Modulation	Peak		Average		Peak		Average	
		dBm	mW	dBm	mW	dBm	mW	dBm	mW
826.4-846.6	REL 99			24.42	276.7			25.51	355.6
826.4-846.6	HSDPA			23.42	219.8			25.01	317.0
1852.4 - 1907.6	REL 99	27.08	510.5			28.26	669.9		
1852.4 - 1907.6	HSDPA	26.20	416.9			27.16	520.0		

Part 22/24 /27		Conducted				EIRP			
Frequency range (MHz)	Modulation	Peak		Average		Peak		Average	
		dBm	mW	dBm	mW	dBm	mW	dBm	mW
1712.4 - 1752.6	REL 99	27.70	588.8			28.90	776.2		
1712.4 - 1752.7	HSDPA	26.80	478.6			28.05	638.3		

CDMA2000

Part 22/90 Bands						
Frequency range (MHz)	Modulation		Conducted(Average)		ERP (Average)	
			dBm	mW	dBm	mW
817.9-823.1	BC10	1xRTT	25.00	316.2	26.71	468.8
		EVDO, A	24.94	311.9	27.65	582.1
824.7-848.31	BC0	1xRTT	24.49	281.2	25.71	372.4
		EVDO, A	24.49	281.2	26.51	447.7

Part 24/27 Bands						
Frequency range (MHz)	Modulation		Conducted(PEAK)		EIRP (PEAK)	
			dBm	mW	dBm	mW
1851.25 - 1908.75	BC1	1xRTT	27.30	537.0	30.26	1061.7
		EVDO, A	27.90	616.6	31.06	1276.4
1711.25 - 1753.75	BC15	1xRTT	27.20	524.8	28.28	673.0
		EVDO, A	28.00	631.0	29.20	831.8

EVDO REV B

Part 22 Band					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP (Average)	
		dBm	mW	dBm	mW
824.7-848.31	EVDO B 2 Min, BC0	22.00	158.5	20.01	100.2
824.7-848.31	EVDO B 2 Max, BC0	22.00	158.5	19.91	97.9
824.7-848.31	EVDO B 3 Min, BC0	22.00	158.5	19.91	97.9

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

Frequency (MHz)	Gain (dBi)
BC10, 817 - 824	-1.67
Cell, 824 - 849	-1.13
PCS, 1850 - 1910	1.78
AWS, 1710 - 1754	1.27

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was version 11B433

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

5.5. WORST-CASE CONFIGURATION AND MODE

For the fundamental investigation, since the EUT is a portable device that has three orientations; an X, Y and Z orientations and with AC/DC adapter and headset have been investigated. The worst case was found to be at X-position without AC/DC adapter and headset for Cell and Z-Position for PCS band.

For the device, all tests were performed as below,
Both conducted and radiated emissions measurement with all bands.

- For Cellular and PCS band: 1xRTT (RC2 SO9)
- For Cellular and PCS band: CDMA2000 1xEV-DO Rev. A.
- For Cellular and PCS band: GPRS and EGPRS
- For Cellular and PCS band: UMTS, REL 99 and HSDPA

5.6. DESCRIPTION OF TEST SETUP

I/O CABLES (RF CONDUCTED TEST)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Un-Shielded	0.5m	NA
2	RF In/Out	1	Directional Coupler	Un-Shielded	0.2m	NA
3	RF In/Out	1	Spectrum Analyzer	Un-Shielded	1m	NA
4	RF In/Out	1	Call Box	Un-Shielded	None	NA

I/O CABLES (RF RADIATED TEST)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Un-Shielded	1.2m	NA
2	Jack	1	Headset	Un-Shielded	1m	NA
3	RF In/Out	1	Horn	Un-Shielded	5m	NA

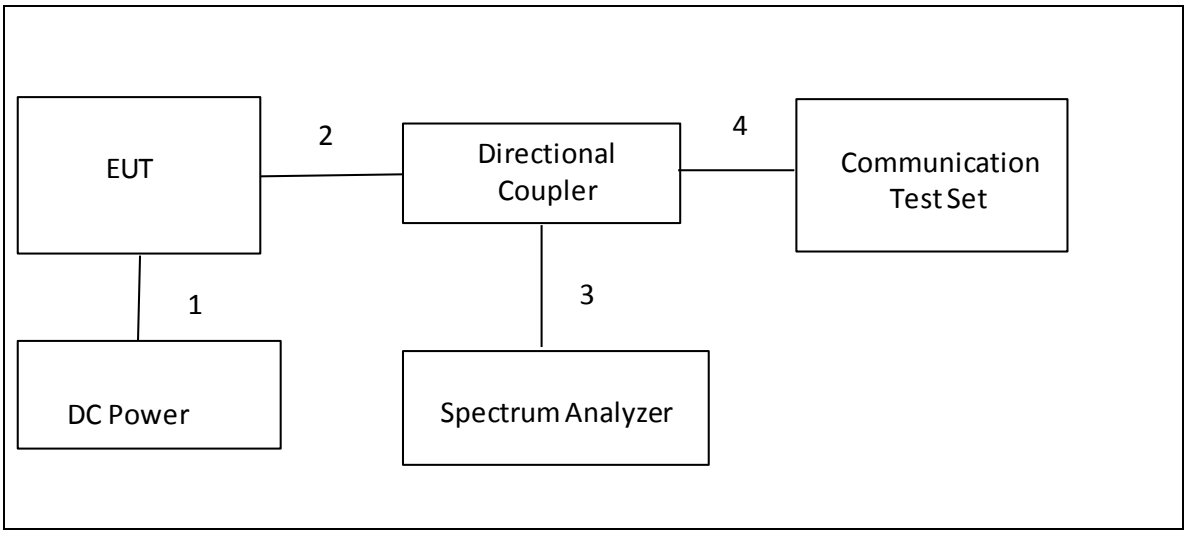
SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
AC/DC Adapter	Apple	A1401	60812
DC Power Supply	Sorensen	XT 15-4	1319A02780

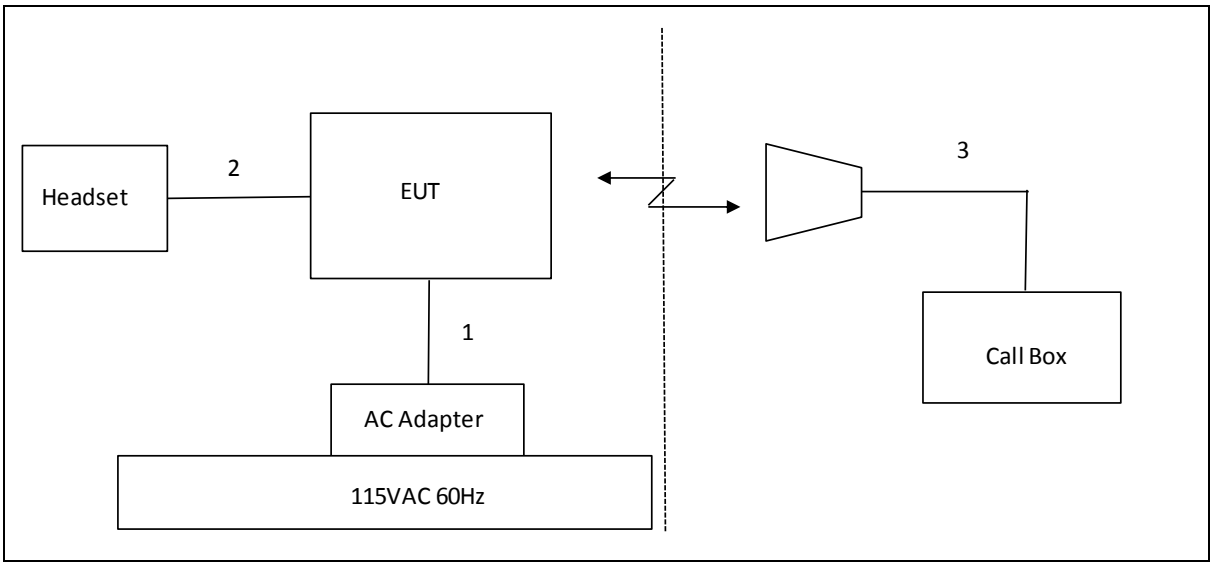
TEST SETUP

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

SETUP DIAGRAM FOR RF CONDUCTED TESTS



RADIATED SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Directional Coupler	Krytar	1817	N02656	CNR
Communication Test Set	Agilent / HP	E5515C	C01086	11/10/13
Communication Test Set	R & S	CMW500	F00014	02/21/14
Spectrum Analyzer, 44GHz	Agilent	N9030A	F00129	02/21/14
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/14
Bilog, 30-1GHz	Sunol Science	A0222813-1	F00168	03/07/14
Horn Antenna	ETS Lindgren	3117	C00872	02/19/14
Signal generator, 6 GHz	Agilent / HP	8665B	F00066	05/07/14
Antenna, Horn, 18 GHz	EMCO	3115	C01218/1000614	01/18/14
Antenna, Tuned Dipole 400~1000 MHz	ETS Lindgren	3121C DB4	C00994	07/12/14
Peak Power Meter	Boonton	4541	C01189	06/20/14
Peak Power Sensor	Boonton	57006	C01202	05/29/14
Vector signal generator, 6 GHz	Agilent / HP	E4438C	F00037	07/06/14
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02686	CNR
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02688	CNR
PreAmp 1-18GHz	Agilent/HP	8449B	F0018	03/18/14
PreAmp 30-1000MHz	Sonama	310	F0009	11/06/13

7. RF POWER OUTPUT VERIFICATION

7.1. GSM

TEST PROCEDURE

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

GPRS / EGPRS

Mode	Ch.	f (MHz)	1 time slots		2 time slots	
			Peak	Average	Peak	Average
GPRS	128	824.2	33.60	33.40	32.62	32.46
	190	836.6	33.53	33.35	32.63	32.47
	251	848.8	33.60	33.40	32.63	32.47
EGPRS	128	824.2	31.85	29.00	31.52	28.97
	190	836.6	31.85	29.00	31.51	28.96
	251	848.8	31.85	29.00	31.47	28.90

Mode	Ch.	f (MHz)	1 time slots		2 time slots	
			Peak	Average	Peak	Average
GPRS	512	1850.2	31.30	30.99	29.69	29.52
	661	1880.0	31.20	31.00	29.78	29.50
	810	1909.8	31.30	31.00	30.00	29.80
EGPRS	512	1850.2	30.40	27.92	30.22	27.84
	661	1880.0	30.36	27.90	30.20	27.83
	810	1909.8	30.44	28.00	30.28	27.86

7.2. UMTS (REL99, HSDPA)

REL99 BAND 5

Band	Mode	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
Band 5 UMTS 850	REL 99	4132	4357	826.4	27.26	24.40
		4180	4405	836.0	27.39	**24.42**
		4230	4455	846.6	27.40	24.38

HSDPA, 850MHz

Band	*Mode*	*Subtest*	*UL Ch*	*DL Ch*	*Frequency*	Conducted output power (dBm)	
						Peak	*Average*
UMTS850 (Band V)	HSDPA	*1**	4132	4357	826.4	27.21	23.30
			4180	4405	836.0	27.38	**23.42**
			4230	4455	846.6	27.42	23.34
		2	4132	4357	826.4	27.26	23.29
			4180	4405	836.0	27.37	23.36
			4230	4455	846.6	27.36	23.23
		3	4132	4357	826.4	27.34	23.20
			4180	4405	836.0	27.33	23.40
			4230	4455	846.6	27.39	23.29
		4	4132	4357	826.4	27.20	23.38
			4180	4405	836.0	27.38	23.41
			4230	4455	846.6	27.29	23.24

REL99 BAND 2

Band	Mode	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
Band 2 UMTS 1900	REL 99	9262	9662	1852.4	26.81	22.24
		9400	9800	1880.0	27.06	22.40
		9538	9938	1907.6	**27.08**	22.30

HSDPA, 1900MHz

Band	Mode	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
						Peak	Average
UMTS1900 (Band II))	HSDPA	1*	9262	9662	1852.4	26.10	21.25
			9400	9800	1880.0	26.15	21.41
			9538	9938	1907.6	26.11	21.35
		2	9262	9662	1852.4	26.20	21.24
			9400	9800	1880.0	26.17	21.40
			9538	9938	1907.6	26.11	21.31
		3	9262	9662	1852.4	26.10	21.22
			9400	9800	1880.0	26.17	21.39
			9538	9938	1907.6	26.10	21.30
		4	9262	9662	1852.4	26.05	21.25
			9400	9800	1880.0	26.15	21.40
			9538	9938	1907.6	26.14	21.32

REL99 BAND 4

Band	Mode	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
Band 4 UMTS 1700	REL 99	1312	1537	1712.4	**27.70**	23.00
		1413	1638	1732.6	27.60	23.00
		1513	1738	1752.6	27.40	22.90

HSDPA, Band 4

Band	Mode	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
						Peak	Average
UMTS1700 (Band IV)	HSDPA	1*	1312	1537	1712.4	26.55	22.00
			1413	1638	1732.6	26.30	22.20
			1513	1738	1752.6	26.30	22.14
		2	1312	1537	1712.4	26.80	22.11
			1413	1638	1732.6	26.50	22.17
			1513	1738	1752.6	26.50	22.16
		3	1312	1537	1712.4	26.60	21.73
			1413	1638	1732.6	26.30	21.76
			1513	1738	1752.6	26.30	21.87
		4*	1312	1537	1712.4	26.70	21.73
			1413	1638	1732.6	26.40	21.74
			1513	1738	1752.6	26.30	21.74

7.3. 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

7.4. UMTS Rel 5 HSDPA

TEST PROCEDURE

The following summary of these settings are illustrated below:

	Mode	Rel5 HSDPA	Rel5 HSDPA	Rel5 HSDPA	Rel5 HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	HSUPA Test	Not Applicable			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βec	-	-	-	-
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	βed	Not Applicable			
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			

7.5. UMTS Rel 6 HSPA (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

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	27.10	23.31
		4180	4405	836.0	27.20	**23.38**
		4230	4455	846.0	27.22	23.29
	2	4132	4357	826.4	27.16	22.45
		4180	4405	836.0	27.23	22.46
		4230	4455	846.0	27.31	22.47
	3	4132	4357	826.4	27.24	23.23
		4180	4405	836.0	27.23	23.24
		4230	4455	846.0	27.24	23.18
	4	4132	4357	826.4	27.17	22.47
		4180	4405	836.0	27.18	22.45
		4230	4455	846.0	27.20	22.41
	5	4132	4357	826.4	27.14	23.33
		4180	4405	836.0	27.20	23.30
		4230	4455	846.0	27.21	23.32
UMTS1900 (Band II)	1*	9262	9662	1852.4	26.13	21.23
		9400	9800	1880.0	26.15	21.21
		9538	9938	1907.6	26.17	21.27
	2	9262	9662	1852.4	26.13	20.87
		9400	9800	1880.0	26.09	20.86
		9538	9938	1907.6	26.13	20.87
	3	9262	9662	1852.4	25.95	21.16
		9400	9800	1880.0	25.97	21.13
		9538	9938	1907.6	25.98	21.10
	4	9262	9662	1852.4	26.05	20.95
		9400	9800	1880.0	26.06	20.89
		9538	9938	1907.6	26.09	20.92
	5	9262	9662	1852.4	26.09	21.24
		9400	9800	1880.0	26.07	21.30
		9538	9938	1907.6	26.11	21.28

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS1700 (Band IV)	1*	1312	1537	1712.4	26.30	21.80
		1413	1638	1732.6	26.50	21.70
		1513	1738	1752.6	26.70	21.74
	2	1312	1537	1712.4	26.50	21.20
		1413	1638	1732.6	26.50	21.10
		1513	1738	1752.6	26.60	20.98
	3	1312	1537	1712.4	26.50	21.46
		1413	1638	1732.6	26.42	21.42
		1513	1738	1752.6	26.50	21.40
	4	1312	1537	1712.4	26.35	21.07
		1413	1638	1732.6	26.50	21.00
		1513	1738	1752.6	26.60	21.06
	5	1312	1537	1712.4	26.32	21.65
		1413	1638	1732.6	26.35	21.54
		1513	1738	1752.6	26.42	21.60

7.6. UMTS DUAL CARRIER HSDPA

TEST PROCEDURE

In DC-HSDPA operation, there are dual carriers that are spaced 5 MHz apart in the downlink. The UE must be capable of processing these carriers simultaneously along with a single carrier in the uplink. This poses new requirements for testing the UE's ability to process two carriers in the downlink; consequently, it results in new test cases for characterizing the UE's receiver

UE that supports DC-HSDPA must meet both minimum requirements as well as additional requirements for DC-HSDPA. For all additional requirements for DCHSDPA, as included in chapter 6 of 34.121, "Fixed Reference Channel H-Set 12" is to be used unless otherwise specified

The properties of H-Set 12 are described in detail in C.8.1.12 of TS 34.121, and the physical channel is setup in line with table E.5.4B of TS 34.121. The cells are to transmit with identical parameters, and the maximum number of transmissions is to be limited to 1 (i.e. no retransmissions are allowed).

Fixed reference channel H-Set 12		
Parameter	**Unit**	**Value**
Nominal avg. inf. bit rate	kbps	600
Inter-TTI distance	TTIs	1
Number of HARQ processes	Processes	6
Information bit payload (NINF)	Bits	120
Number of code blocks	Blocks	1
Binary channel bits per TTI	Bits	960
Total available SMLs in UE		19200
Number of SMLs per HARQ proc.	SMLs	3200
Coding rate		0.15
Number of physical channel codes	codes	1
Modulation		QPSK

The following steps prepare the CMW500 for DC-HSDPA testing:

1. Configure the R&S®CMW500 to transmit on adjacent dual carriers that are 5 MHz apart.
2. Set the operating band, frequency and levels for different physical channels, for both carriers.
3. The two DL carriers from the R&S®CMW500 are routed through the two RF ports, which are combined using an external combiner.* The external attenuation due to the combiner and RF cables needs to be compensated appropriately for both ports.
4. Set the relevant H-Set to enable DC-HSDPA operation.
5. Prepare the “Go to” soft keys to navigate to the "Receiver Measurement" application to check the BLER results for both the carriers

UMTS DUAL CARRIER HSDPA

RESULT

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS850 (Band 5)	1*	4132	4357	826.4	27.12	23.23
		4180	4405	836.0	27.18	23.31
		4230	4455	846.0	27.16	23.14
	2	4132	4357	826.4	27.11	22.35
		4180	4405	836.0	27.17	22.31
		4230	4455	846.0	27.24	22.36
	3	4132	4357	826.4	27.18	23.09
		4180	4405	836.0	27.16	23.10
		4230	4455	846.0	27.19	23.07
	4	4132	4357	826.4	27.06	22.36
		4180	4405	836.0	27.08	22.31
		4230	4455	846.0	27.13	22.29
UMTS1900 (Band 2)	1	9262	9662	1852.4	26.45	21.11
		9400	9800	1880.0	26.42	21.13
		9538	9938	1907.6	26.44	21.19
	2*	9262	9662	1852.4	26.43	20.72
		9400	9800	1880.0	26.31	20.75
		9538	9938	1907.6	26.38	20.73
	3	9262	9662	1852.4	26.24	20.91
		9400	9800	1880.0	26.22	21.02
		9538	9938	1907.6	26.26	20.90
	4	9262	9662	1852.4	26.31	20.69
		9400	9800	1880.0	26.33	20.73
		9538	9938	1907.6	26.34	20.79

Band	Subtest	UL Ch	Frequency	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS1700 (Band 4)	1	1312	1537	1712.4	26.63	21.77
		1413	1638	1732.6	26.60	21.89
		1513	1738	1752.6	26.51	21.85
	2*	1312	1537	1712.4	26.72	21.84
		1413	1638	1732.6	26.61	21.91
		1513	1738	1752.6	26.64	22.00
	3	1312	1537	1712.4	26.54	21.49
		1413	1638	1732.6	26.41	21.47
		1513	1738	1752.6	26.50	21.51
	4	1312	1537	1712.4	26.58	21.42
		1413	1638	1732.6	26.22	21.43
		1513	1738	1752.6	26.20	21.40

7.7. CDMA2000 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

1xRTT, BC10

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)	28.30	24.97	28.30	24.96	28.20	24.80
	55 (Loopback)	28.30	24.96	28.20	24.94	28.20	24.76
RC2	9 (Loopback)	28.20	25.00	28.40	25.00	28.30	25.00
	55 (Loopback)	28.20	24.80	28.40	25.00	28.20	24.98
RC3	2 (Loopback)	27.60	25.00	27.80	25.00	28.70	24.82
	55 (Loopback)	27.60	24.90	28.20	24.94	28.80	24.81
	32 (+ F-SCH)	28.00	24.81	28.30	24.90	28.80	24.81
	32 (+ SCH)	28.20	24.83	28.40	24.92	28.70	24.83
RC4	2 (Loopback)	28.10	24.83	28.27	24.92	28.70	24.80
	55 (Loopback)	28.00	24.77	28.26	24.90	28.60	24.79
	32 (+ F-SCH)	28.00	24.78	28.30	24.87	28.50	24.78
	32 (+ SCH)	27.90	24.79	28.40	24.88	28.60	24.78
RC5	9 (Loopback)	28.00	24.90	28.30	24.88	28.70	24.80
	55 (Loopback)	28.10	24.80	28.20	24.87	28.70	24.76
RC11	2 (Loopback)	28.17	24.83	28.40	24.91	28.79	24.80
	75 (Loopback)	28.20	24.85	28.50	24.91	28.90	24.86
	32 (+ F-SCH)	28.10	24.84	28.40	24.87	28.73	24.82
	32 (+ SCH)	28.10	24.83	28.40	24.90	28.76	24.84

1xRTT, BC0, CELL BAND

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)					
		Ch.1013/824.7MHz		Ch.384/836.52MHz		Ch.777/848.31MHz	
		Peak	Average	Peak	Average	Peak	Average
RC1	2 (Loopback)	28.50	24.40	28.10	24.43	28.40	24.45
	55 (Loopback)	28.40	24.39	28.00	24.42	28.30	24.42
RC2	9 (Loopback)	28.50	24.49	28.20	24.47	28.40	24.48
	55 (Loopback)	28.40	24.45	28.10	24.45	28.40	24.47
RC3	2 (Loopback)	28.10	24.48	28.10	24.46	28.30	24.47
	55 (Loopback)	28.00	24.45	28.00	24.40	28.20	24.60
	32 (+ F-SCH)	28.00	24.44	28.20	24.42	28.20	24.44
	32 (+ SCH)	28.20	24.43	28.10	24.40	28.30	24.40
RC4	2 (Loopback)	27.90	24.42	28.00	24.45	28.20	24.47
	55 (Loopback)	27.60	24.40	27.80	24.42	28.00	24.46
	32 (+ F-SCH)	27.73	24.42	28.00	24.43	28.30	24.45
	32 (+ SCH)	27.70	24.41	28.00	24.40	28.20	24.44
RC5	9 (Loopback)	28.10	24.40	28.10	24.44	28.20	24.45
	55 (Loopback)	28.00	24.38	28.00	24.30	28.10	24.43
RC11	2 (Loopback)	28.40	24.41	28.20	24.42	28.00	24.41
	75 (Loopback)	28.30	24.39	28.10	24.40	28.00	24.40
	32 (+ F-SCH)	28.20	24.41	28.20	24.41	28.20	24.42
	32 (+ SCH)	28.10	24.40	28.10	24.41	28.10	24.40

BC1, 1xRTT PCS BAND

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)					
		Ch.25/1851.25MHz		Ch.600/1880MHz		Ch.1175/1908.75MHz	
		Peak	Average	Peak	Average	Peak	Average
RC1	2 (Loopback)	27.15	22.48	27.15	22.50	27.05	22.50
	55 (Loopback)	27.20	22.47	27.20	22.49	27.15	22.50
RC2	9 (Loopback)	27.30	22.50	27.25	22.50	27.25	22.48
	55 (Loopback)	27.15	22.50	27.15	22.50	27.25	22.50
RC3	2 (Loopback)	27.05	22.49	27.15	22.50	27.15	22.50
	55 (Loopback)	27.05	22.49	27.10	22.49	27.15	22.50
	32 (+ F-SCH)	27.15	22.50	27.00	22.49	27.15	22.47
	32 (+ SCH)	27.29	22.50	26.95	22.50	27.05	22.46
RC4	2 (Loopback)	27.25	22.45	26.95	22.47	27.05	22.50
	55 (Loopback)	27.05	22.45	27.05	22.49	27.15	22.50
	32 (+ F-SCH)	26.95	22.50	26.95	22.50	27.10	22.50
	32 (+ SCH)	26.85	22.50	27.05	22.50	27.15	22.50
RC5	9 (Loopback)	26.95	22.49	27.05	22.50	27.05	22.45
	55 (Loopback)	26.95	22.47	27.05	22.50	27.10	22.49
RC11	2 (Loopback)	27.05	22.50	27.15	22.45	27.15	22.50
	75 (Loopback)	26.95	22.45	27.05	22.46	27.15	22.43
	32 (+ F-SCH)	27.00	22.40	27.05	22.44	27.20	22.45
	32 (+ SCH)	26.95	22.45	27.05	22.47	27.15	22.44

BC15, 1xRTT AWS BAND

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)					
		Ch. 25/1711.25 MHz		Ch. 450/1732.5 MHz		Ch.875/1753.75 MHz	
		Peak	Average	Peak	Average	Peak	Average
RC1	2 (Loopback)	27.10	22.98	27.05	23.00	27.10	22.98
	55 (Loopback)	27.10	22.98	27.05	23.00	27.10	22.99
RC2	9 (Loopback)	27.20	23.00	27.15	23.00	27.17	23.00
	55 (Loopback)	27.05	23.00	27.13	23.00	27.05	23.00
RC3	2 (Loopback)	27.05	22.95	27.07	22.99	27.10	23.00
	55 (Loopback)	27.05	22.97	27.06	22.98	27.08	22.99
	32 (+ F-SCH)	27.10	22.98	27.08	22.99	27.09	22.98
	32 (+ SCH)	27.07	22.96	27.10	22.95	27.15	22.99
RC4	2 (Loopback)	27.05	22.98	27.00	22.98	27.10	23.00
	55 (Loopback)	27.08	22.98	26.95	23.00	27.05	23.00
	32 (+ F-SCH)	27.00	22.99	27.05	22.99	27.00	22.96
	32 (+ SCH)	27.02	23.00	27.00	23.00	27.11	22.98
RC5	9 (Loopback)	27.05	23.00	26.95	23.00	27.08	22.95
	55 (Loopback)	27.06	23.00	27.00	22.95	27.05	22.94
RC11	2 (Loopback)	27.10	23.00	27.05	22.94	27.00	22.99
	75 (Loopback)	27.08	22.95	26.95	22.95	27.05	23.00
	32 (+ F-SCH)	27.10	22.98	27.05	22.98	27.04	23.00
	32 (+ SCH)	27.00	22.96	27.01	23.00	27.15	22.98

7.8. CDMA2000 1xEV-DO Rel. 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

BC10

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
307.2 kbps (2 slot, QPSK)	153.6 kbps	476	817.90	28.70	24.91
		526	819.15	29.00	24.83
		684	823.10	29.20	24.75

BC0

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
307.2 kbps (2 slot, QPSK)	153.6 kbps	1013	824.70	28.50	24.47
		384	836.52	28.70	24.40
		777	848.31	28.40	24.45

BC1

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	27.60	22.49
		600	1880.00	27.70	22.50
		1175	1908.75	27.50	22.50

BC15

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1711.25	27.70	23.00
		450	1732.50	28.00	23.00
		875	1753.75	27.95	23.00

7.9. CDMA2000 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

REV A

BC10

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	476	817.90	29.00	24.94
		526	819.15	29.20	24.83
		684	823.10	29.60	24.70

BC0

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	28.70	24.49
		384	836.52	28.60	24.44
		777	848.31	28.73	24.48

BC1

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	27.60	22.50
		600	1880.00	27.90	22.50
		1175	1908.75	27.60	22.50

BC15

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	1711.25	27.70	23.00
		450	1732.50	28.00	23.00
		875	1753.75	27.95	23.00

7.10. CDMA2000 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: -70 dBm
  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

REV B

Two Carrier Min Separation

	MODE	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
Rev B	CDMA	1013+31	824.70+825.93	27.16	21.96
		384+425	836.52+837.75	27.64	22.00
		736+777	847.08+848.31	27.70	21.80

Two Carrier Max Separation

	Mode	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
Rev B	CDMA	1013+156	824.70+829.68	25.04	21.97
		384+550	836.52+841.50	24.96	21.63
		611+777	843.33+848.31	24.75	22.00

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	26.83	21.92
		384+425+466	836.52+837.75+838.98	27.20	22.00
		695+736+777	845.85+847.08+848.31	26.95	21.81

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 HSDPA
- CDMA2000, BC0, BC10, BC1 and BC15
-

RESULTS

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
Cellular	GPRS	128	824.20	243.580	285.600
		190	836.60	255.650	290.000
		251	848.80	251.590	309.600
	EGPRS	128	824.20	247.590	307.400
		190	836.60	247.400	292.900
		251	848.80	252.360	298.700

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Cellular	UMTS, REL 99	4357	826.4	4.1904	4.608
		4405	836.0	4.1988	4.590
		4455	846.0	4.2017	4.619
	UMTS, HSDPA	4357	826.4	4.1956	4.644
		4405	836.0	4.1985	4.574
		4455	846.0	4.1859	4.608

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
PCS	GPRS	512	1850.2	244.450	275.900
		661	1880.0	245.050	319.200
		810	1909.8	241.640	289.100
	EGPRS	512	1850.2	253.190	290.500
		661	1880.0	255.110	300.000
		810	1909.8	252.590	297.100

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
PCS	UMTS, REL 99	9662	1852.4	4.2109	4.610
		9800	1880.0	4.2072	4.570
		9938	1907.6	4.2129	4.582
	UMTS, HSDPA	9662	1852.4	4.1872	4.561
		9800	1880.0	4.1952	4.596
		9938	1907.6	4.1943	4.603

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
AWS	UMTS, REL 99	1312	1712.4	4.1270	4.522
		1413	1732.6	4.1283	4.581
		1513	1752.6	4.1274	4.665
	UMTS, HSDPA	1312	1712.4	4.1461	4.592
		1413	1732.6	4.1738	4.569
		1513	1752.6	4.1967	4.524

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
BC0	1xRTT	1013	824.70	1.2721	1.382
		384	836.52	1.2692	1.399
		777	848.31	1.2748	1.413
	CDMA2000 1xEV-DO (Rev. A)	1013	824.70	1.2758	1.370
		384	836.52	1.2789	1.414
		777	848.31	1.2777	1.389

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
EVDO Rev B, BC0	2 Carrier Min	1013+31	825.3	2.4496	2.666
		384+425	837.2	2.4749	2.641
		736+777	847.6	2.4696	2.636
	2 Carrier Max	1013+156	826.5	6.3082	6.522
		384+550	838.8	6.3379	6.573
		611+777	844.9	6.3445	6.529
	3 Carrier Min	1013+31+72	825.9	3.7090	3.901
		384+425+466	837.7	3.6938	3.903
		695+736+777	846.7	3.6980	3.949

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
BC10	1xRTT	476	817.90	1.2662	1.384
		526	819.15	1.2761	1.396
		684	823.10	1.2795	1.398
	EVDO	476	817.90	1.2789	1.397
		526	819.15	1.2728	1.388
		684	823.10	1.2765	1.394

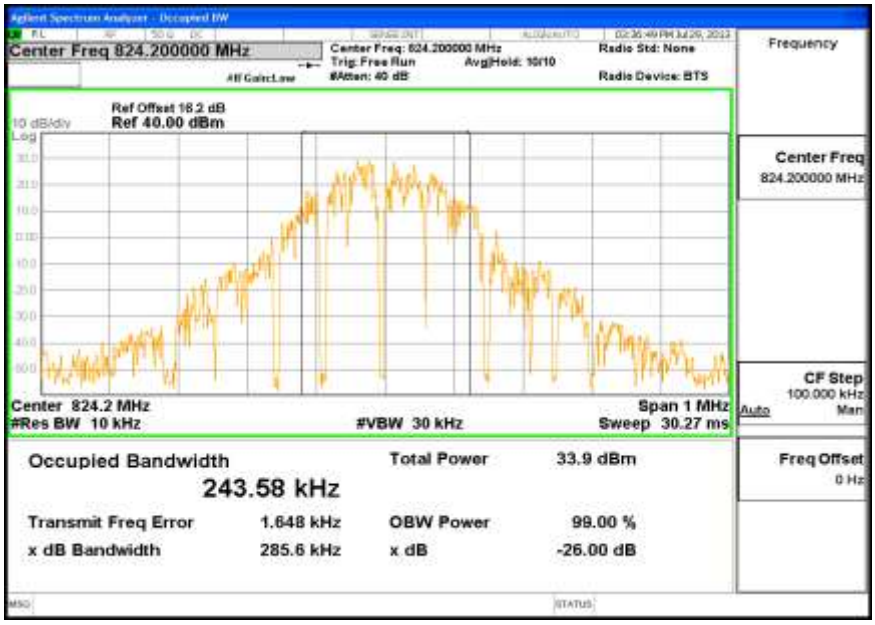
Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
BC1	1xRTT	25	1851.25	1.2825	1.407
		600	1880.0	1.2797	1.415
		1175	1908.75	1.2837	1.417
	CDMA2000 1xEV-DO (Rev. A)	25	1851.25	1.2744	1.408
		600	1880.00	1.2715	1.380
		1175	1908.75	1.2712	1.388

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
BC15	1xRTT	25	1711.25	1.2875	1.393
		450	1732.50	1.2772	1.352
		875	1753.75	1.2814	1.418
	CDMA2000 1xEV-DO (Rev. A)	25	1711.25	1.2710	1.381
		450	1732.50	1.2736	1.399
		875	1753.75	1.2967	1.384

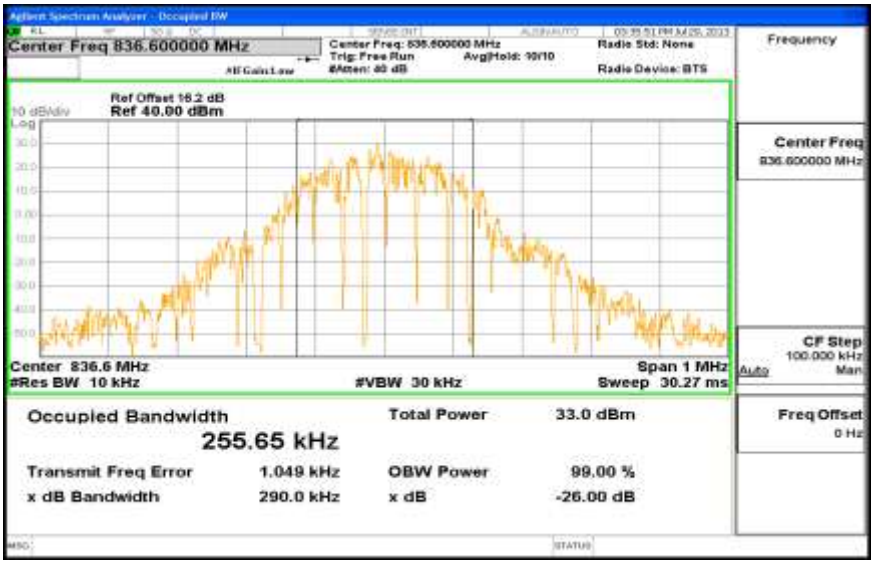
GPRS850

Cellular Band

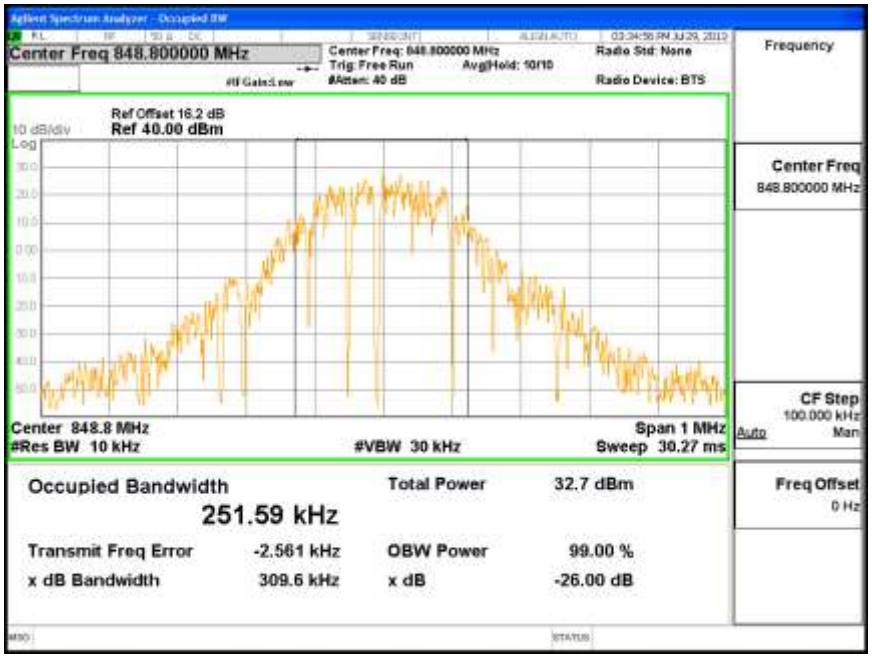
LOW CH



MID CH



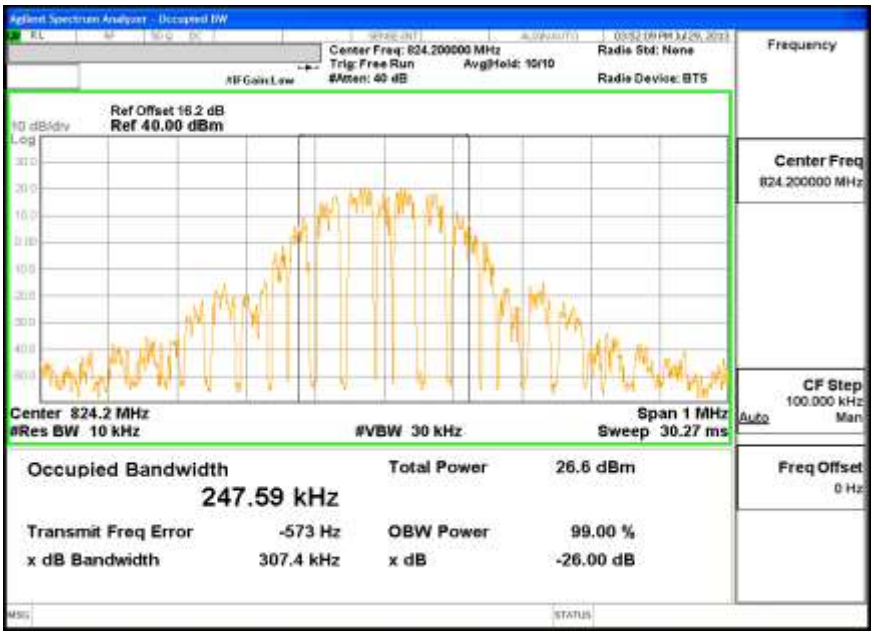
HIGH CH



EGPRS850

Cellular Band

LOW CH



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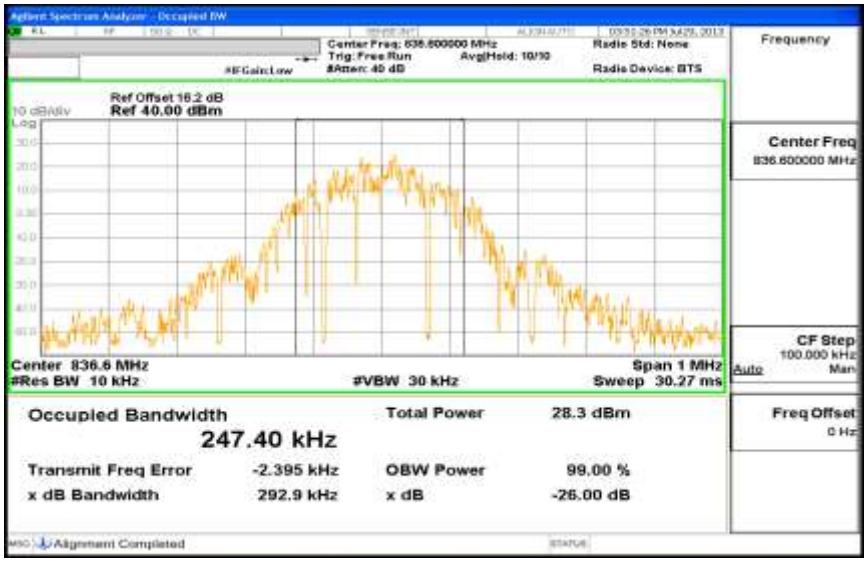

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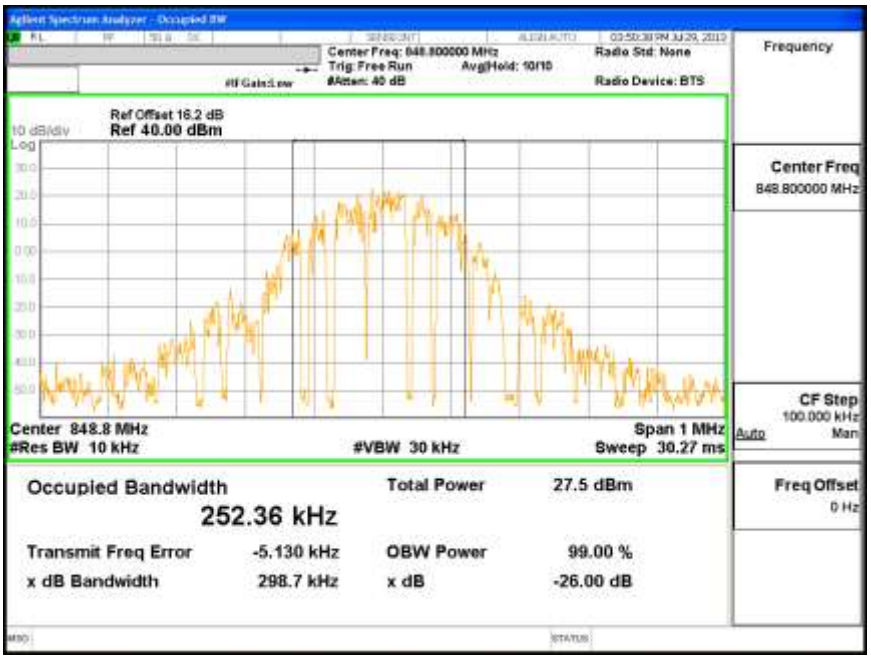
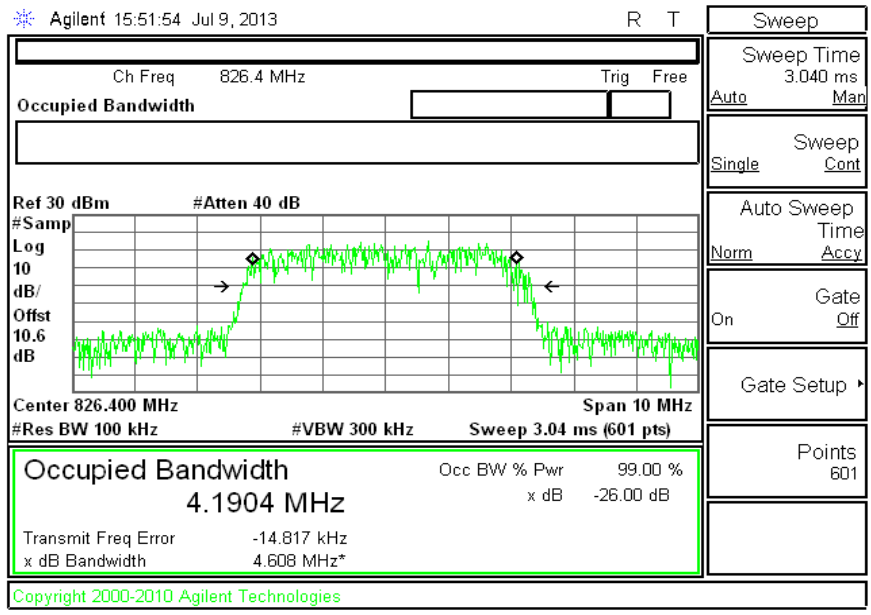


WCDMA850

Rel 99 (Cellular Band)

LOW CH



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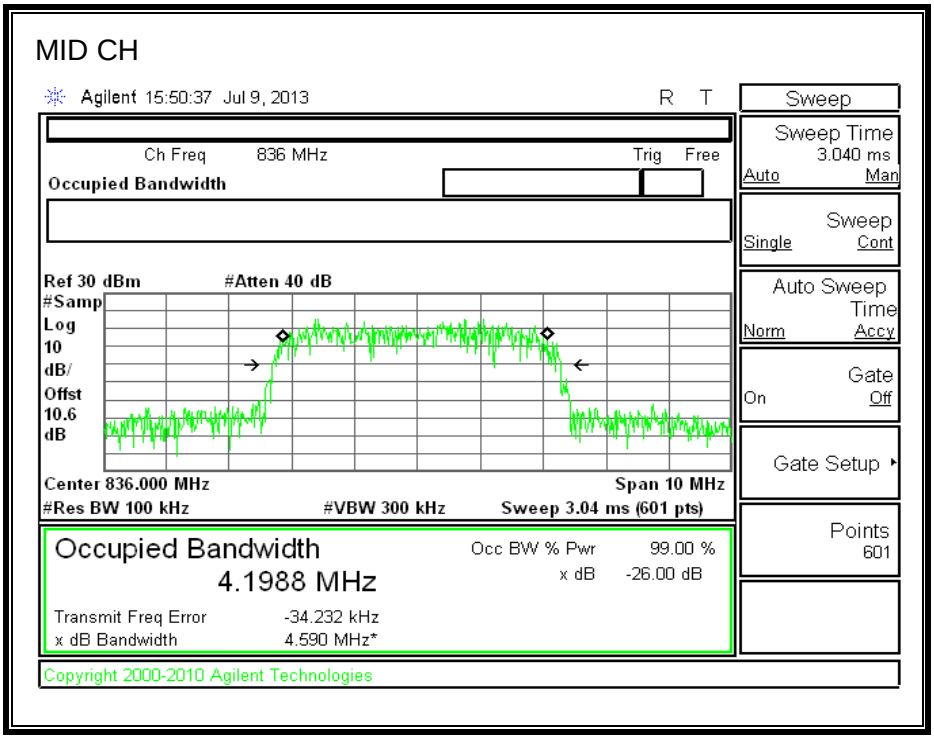
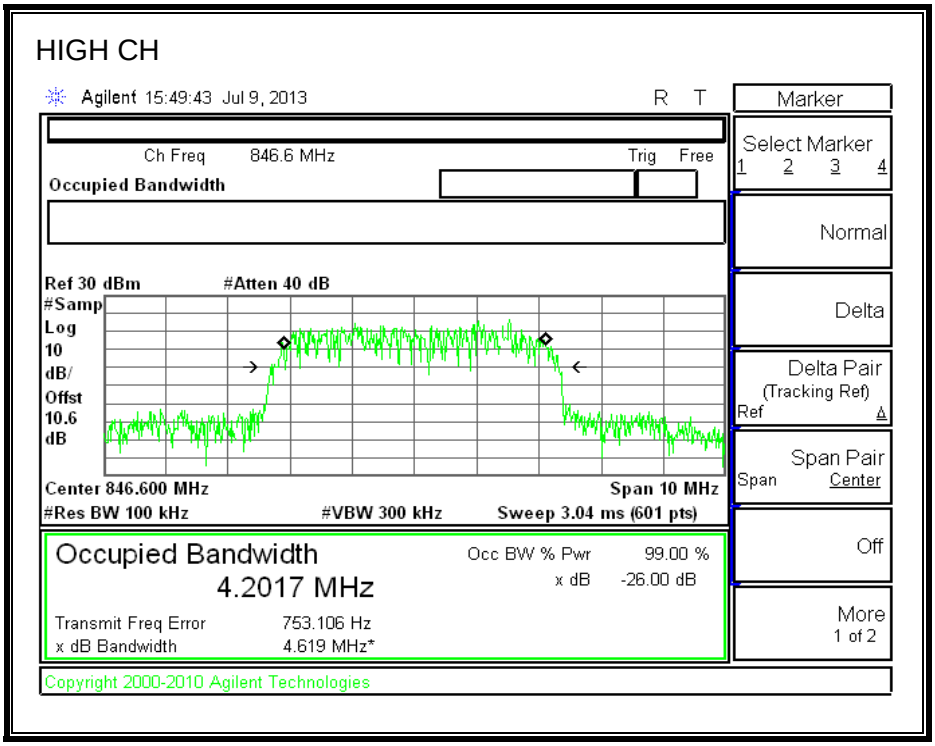
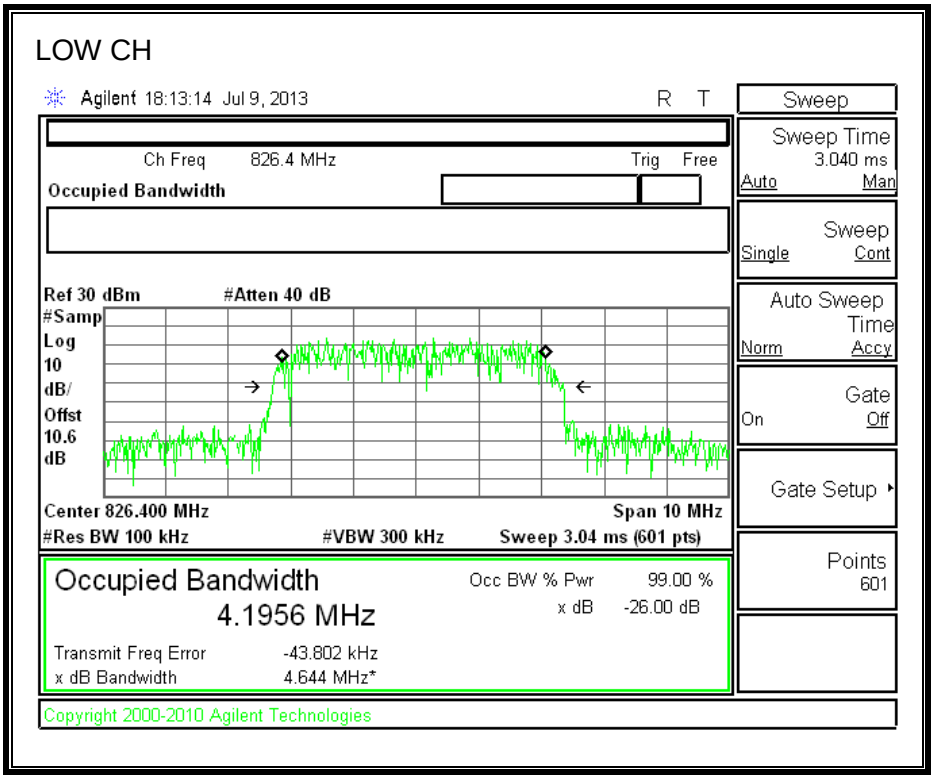


HIGH CH

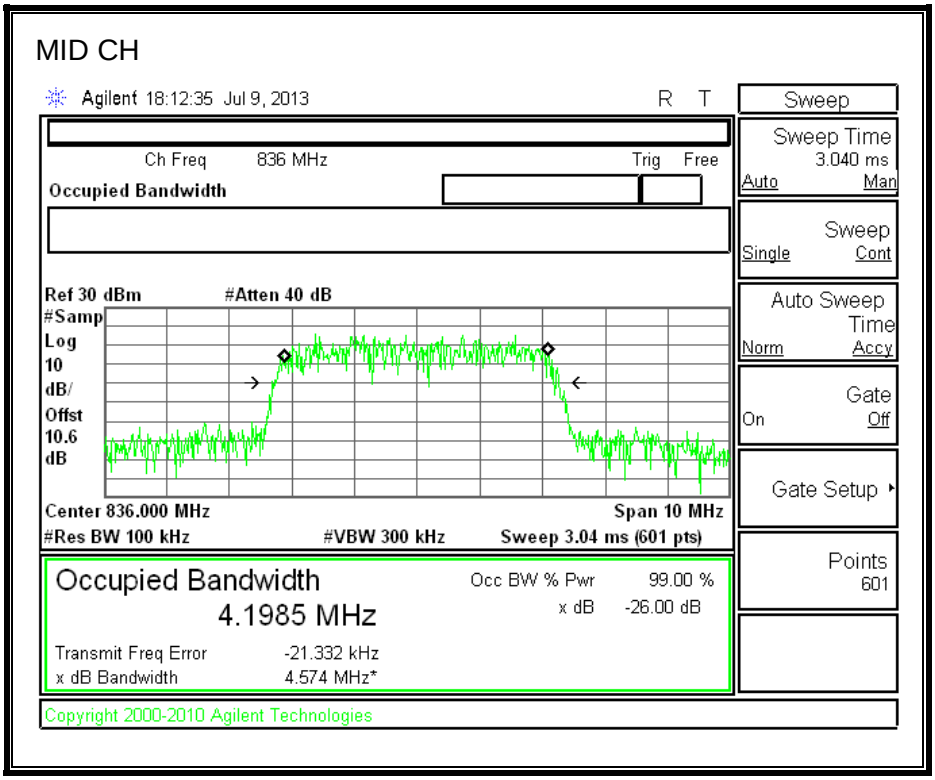


HSDPA (Cellular Band)

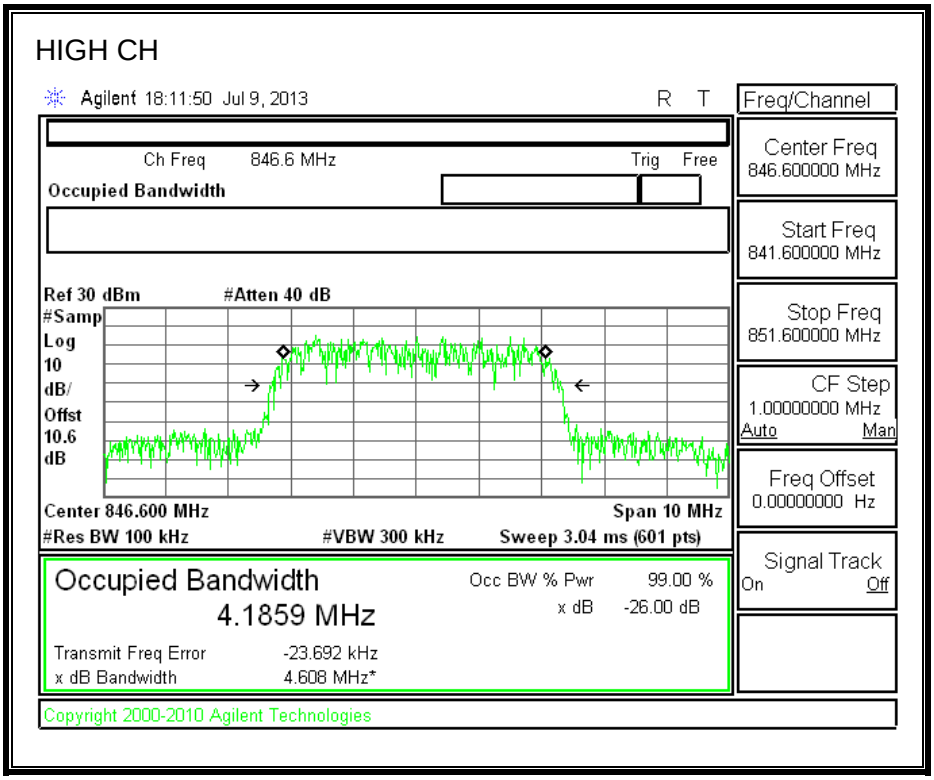
LOW CH



MID CH



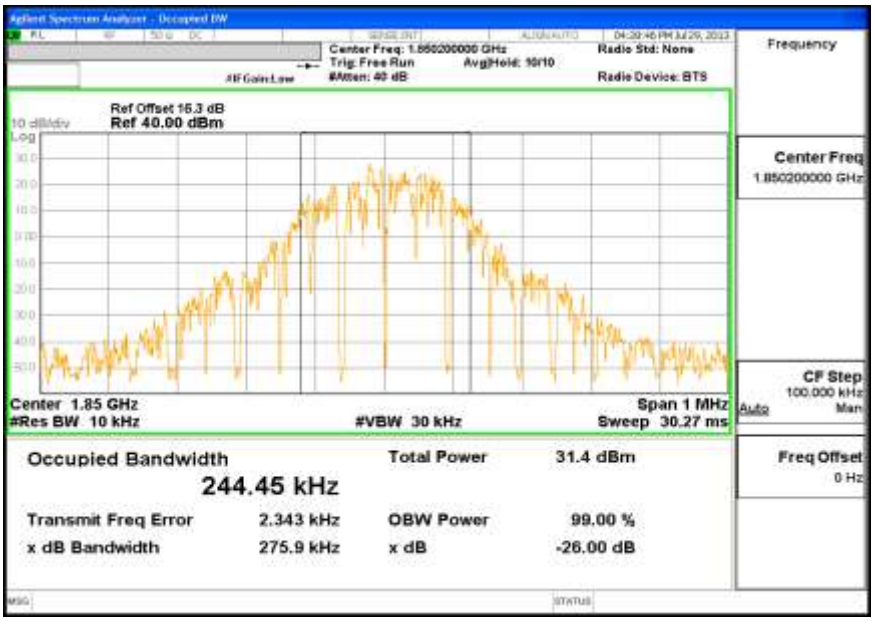
HIGH CH



GPRS 1900

PCS 1900 Band

LOW CH



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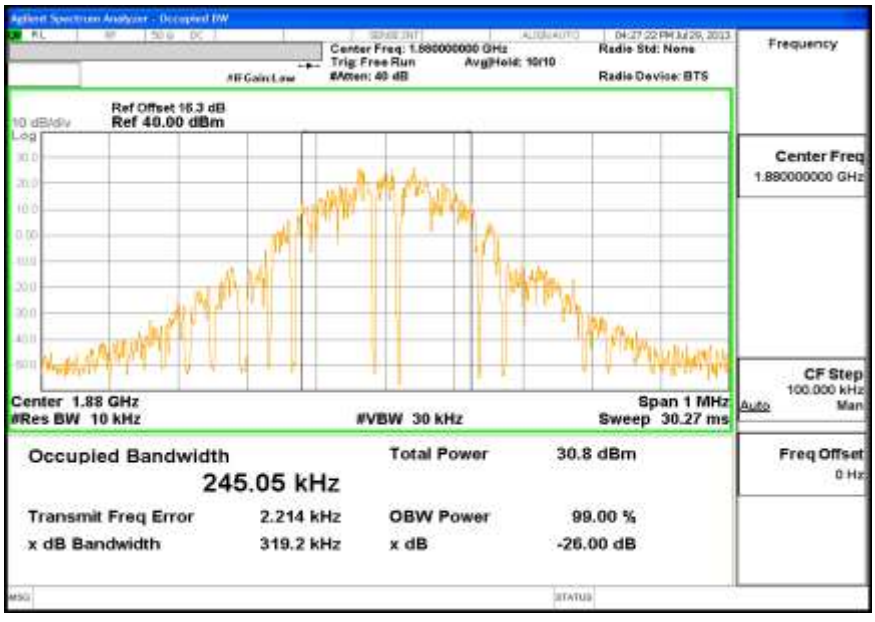

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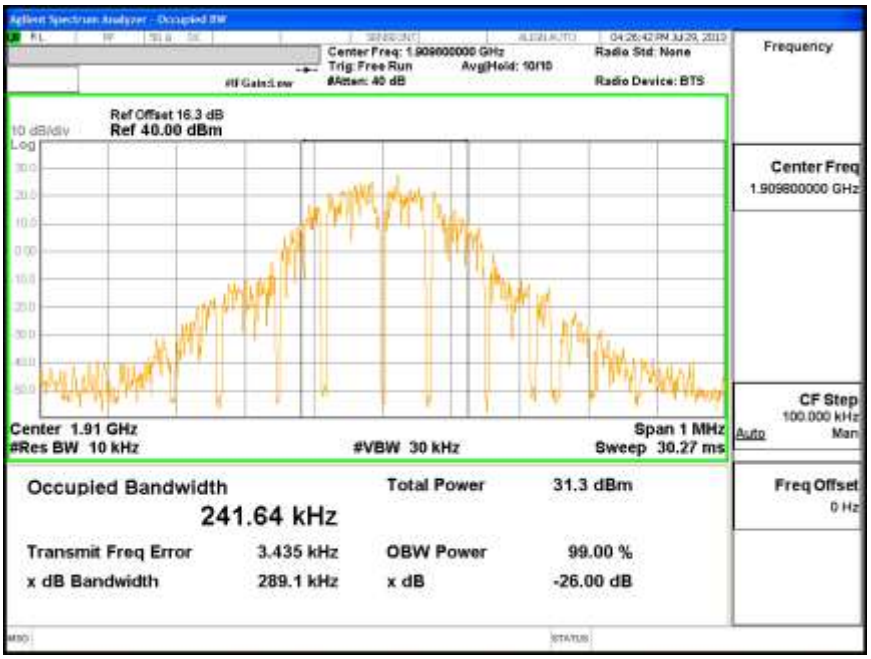
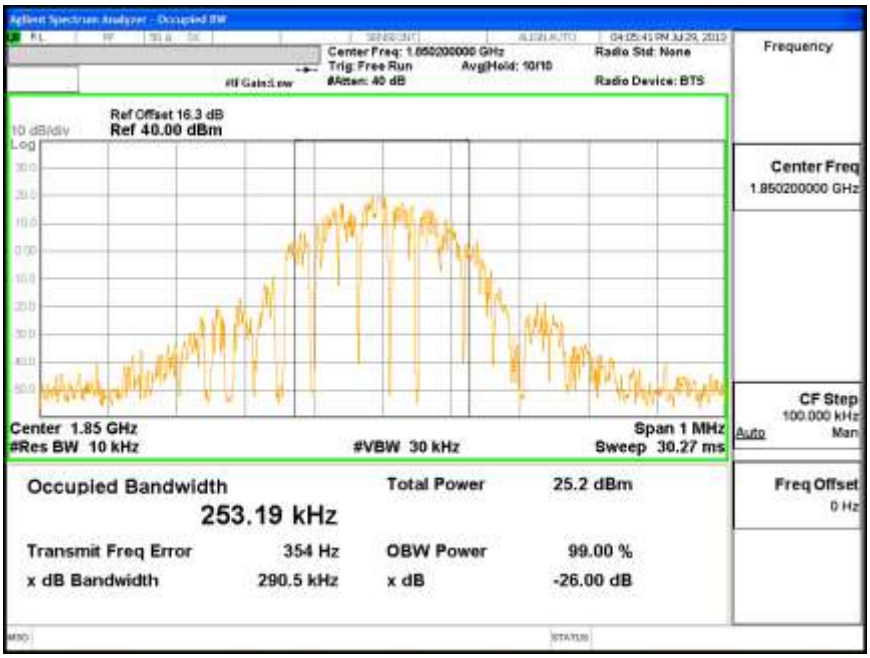


EGPRS 1900

LOW CH



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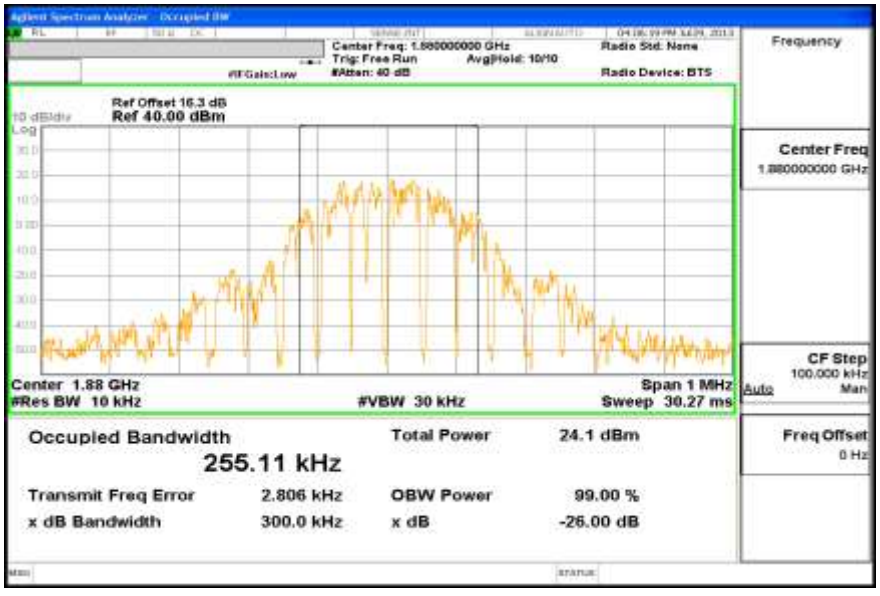

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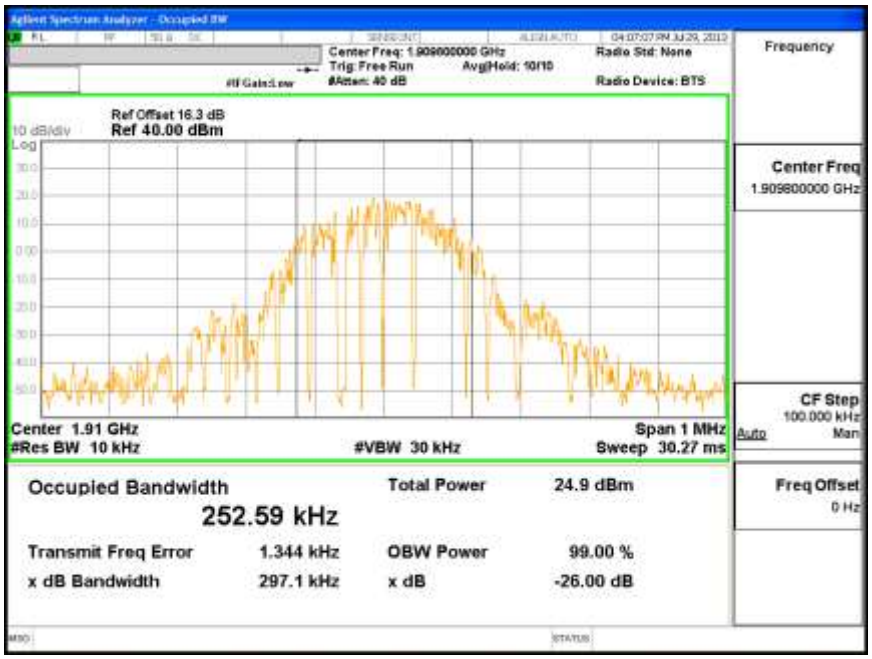
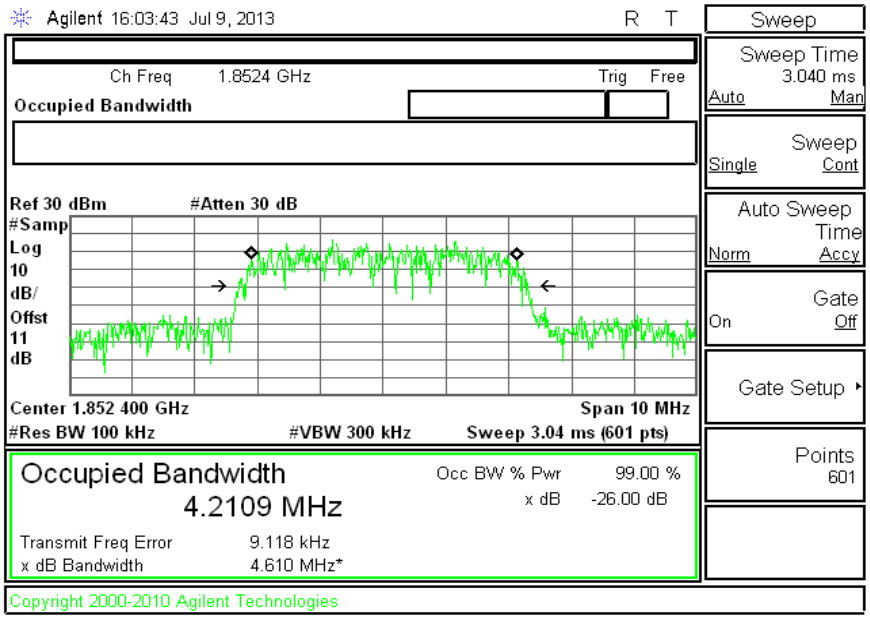


WCDMA1900

REL 99 (PCS Band)

LOW CH



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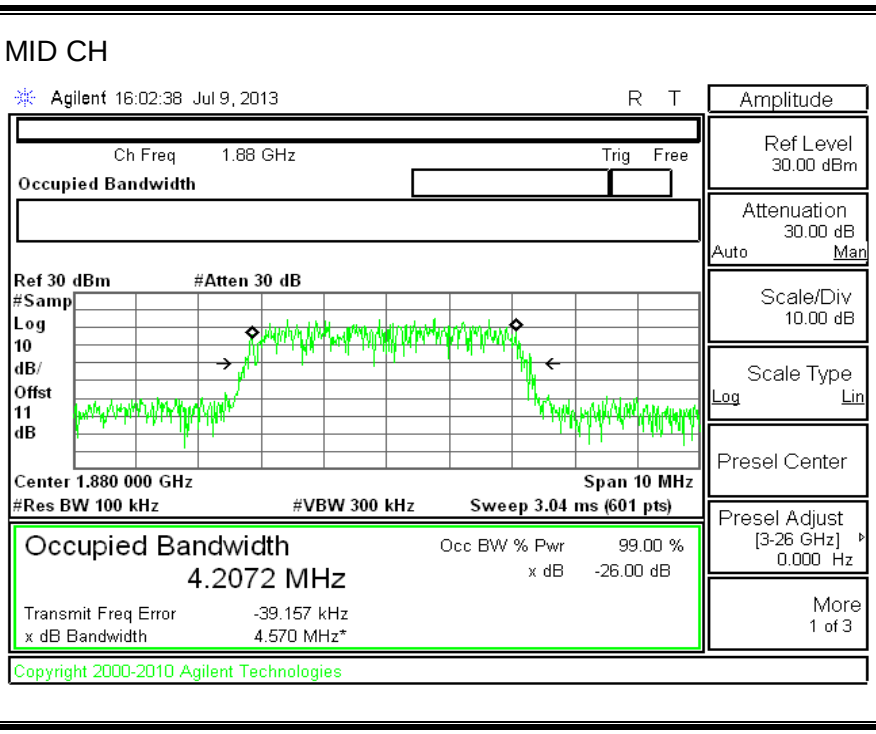

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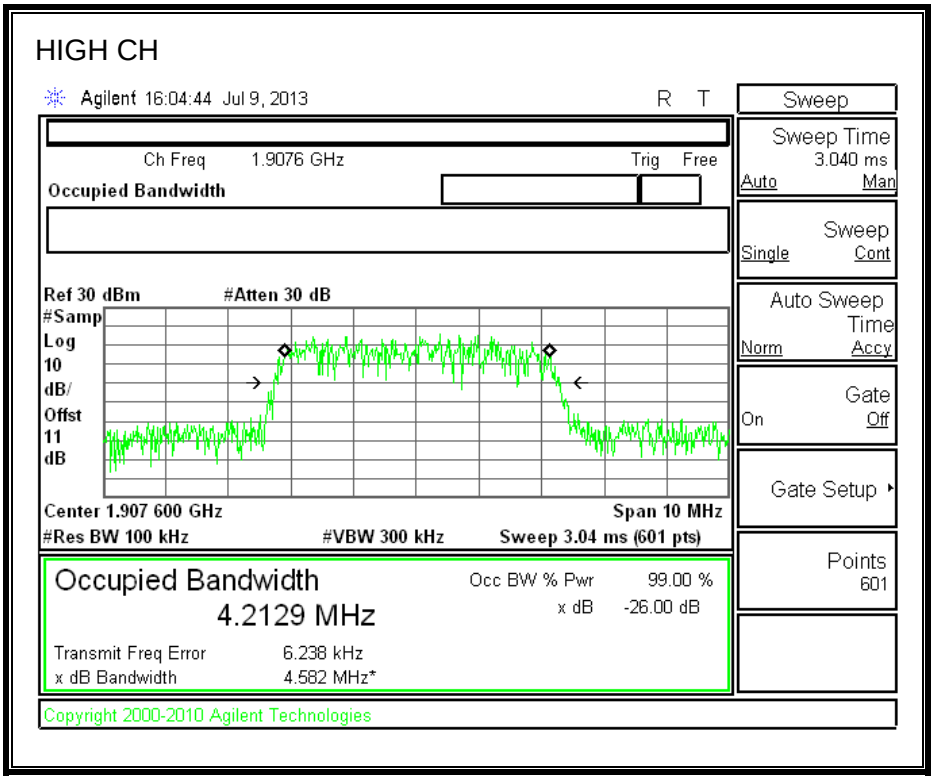
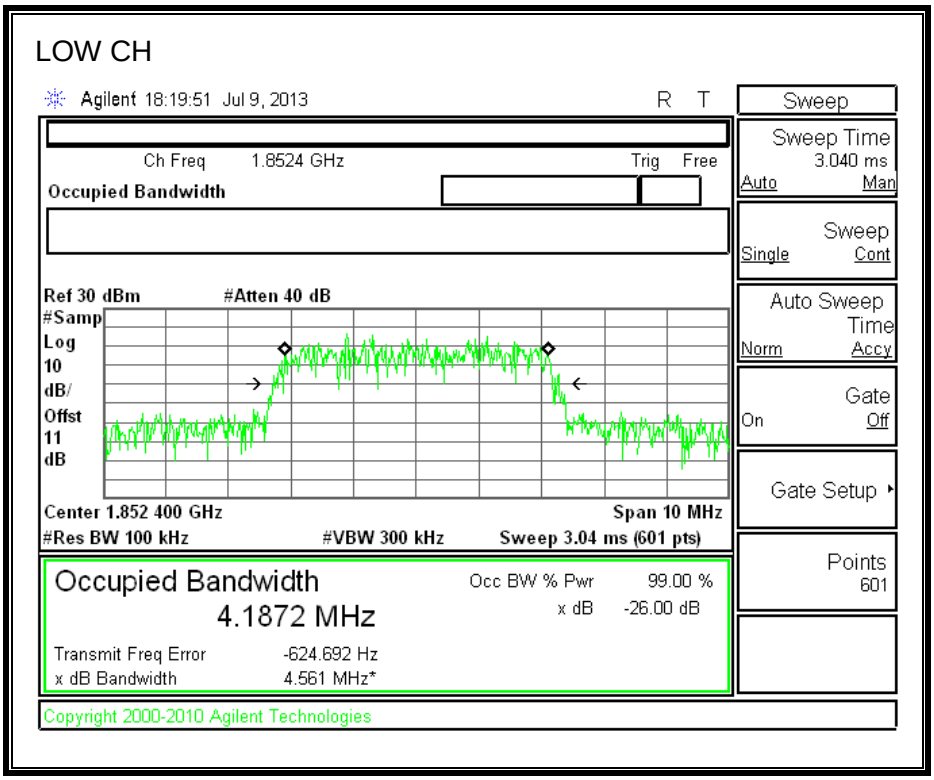
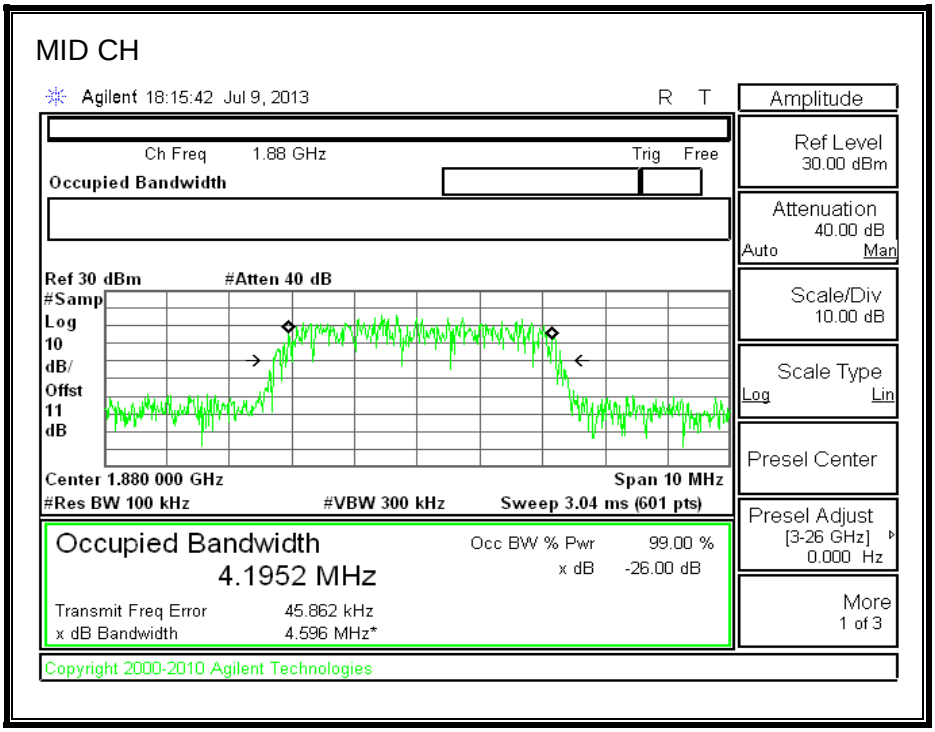


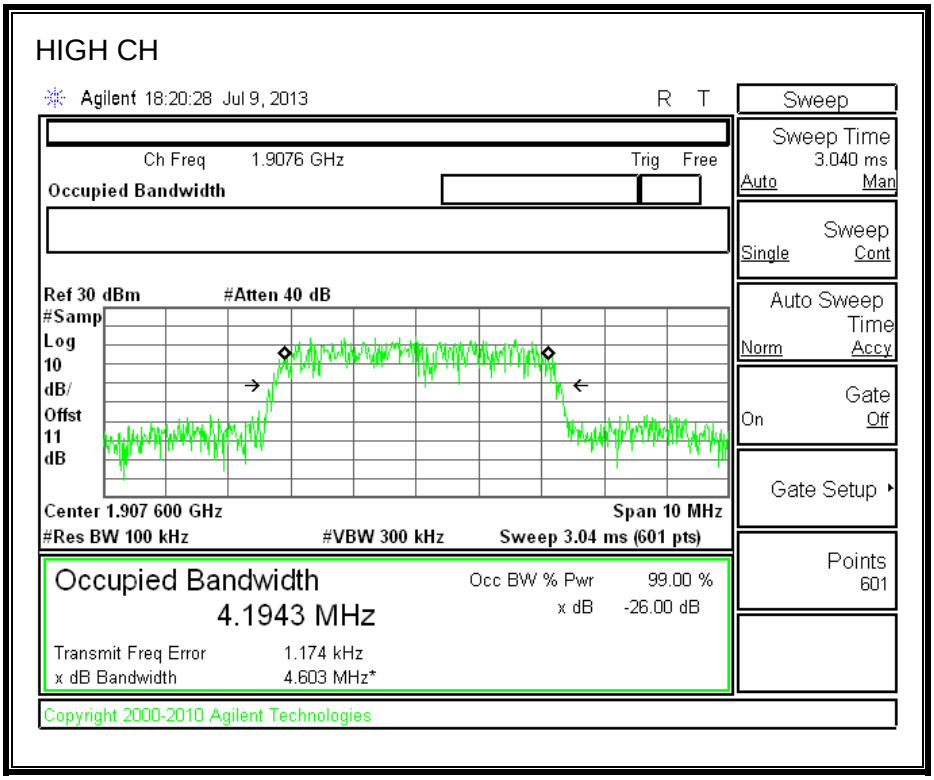
HSDPA Mode (PCS Band)

LOW CH



MID CH

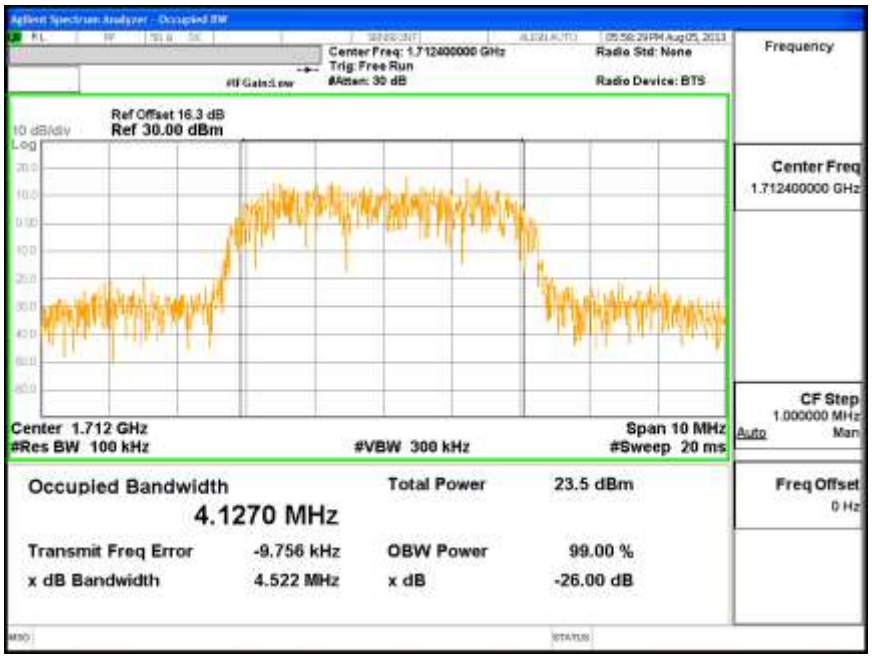




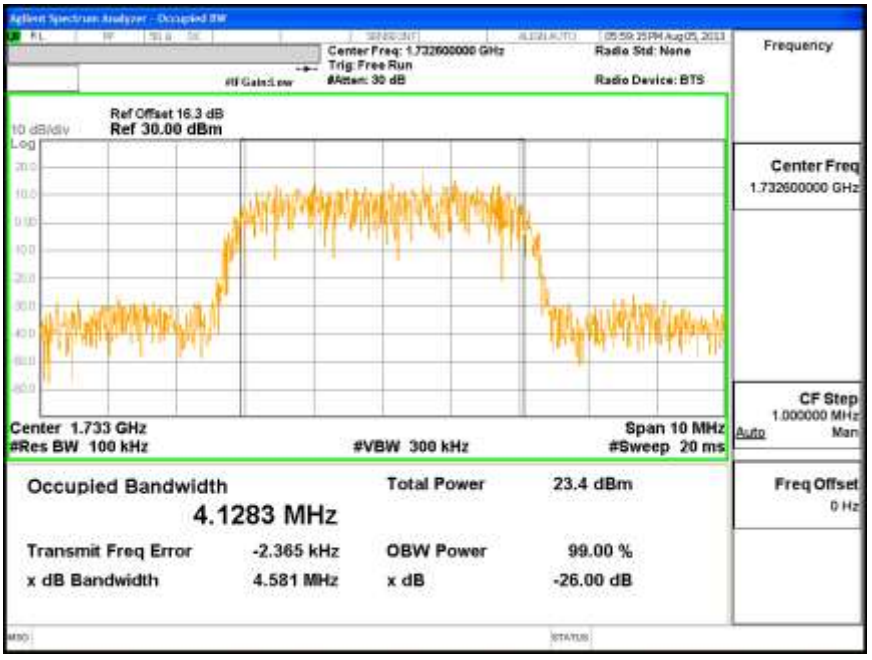
WCDMA1700

Rel 99 (AWS Band)

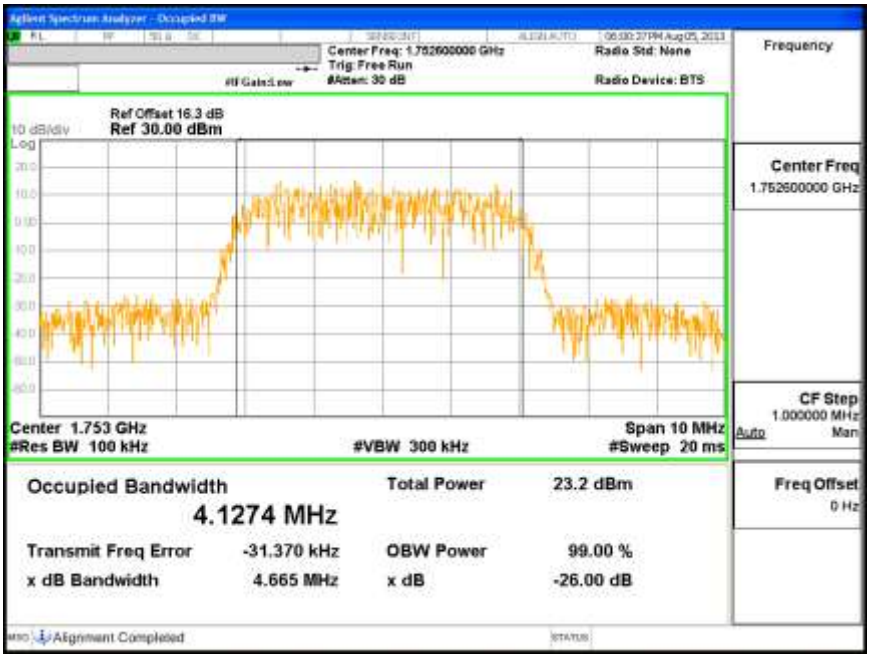
LOW CH



MID CH

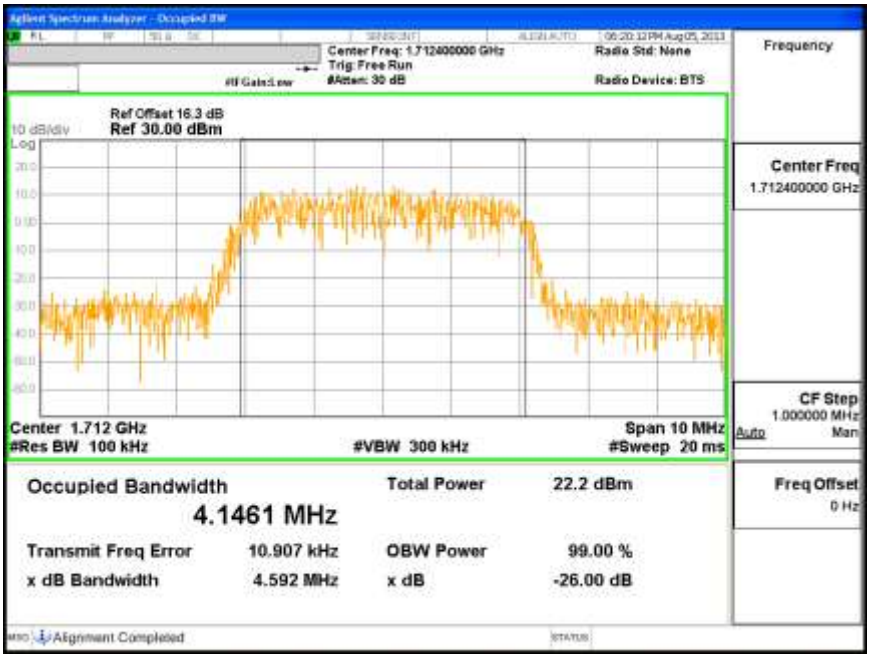


HIGH CH

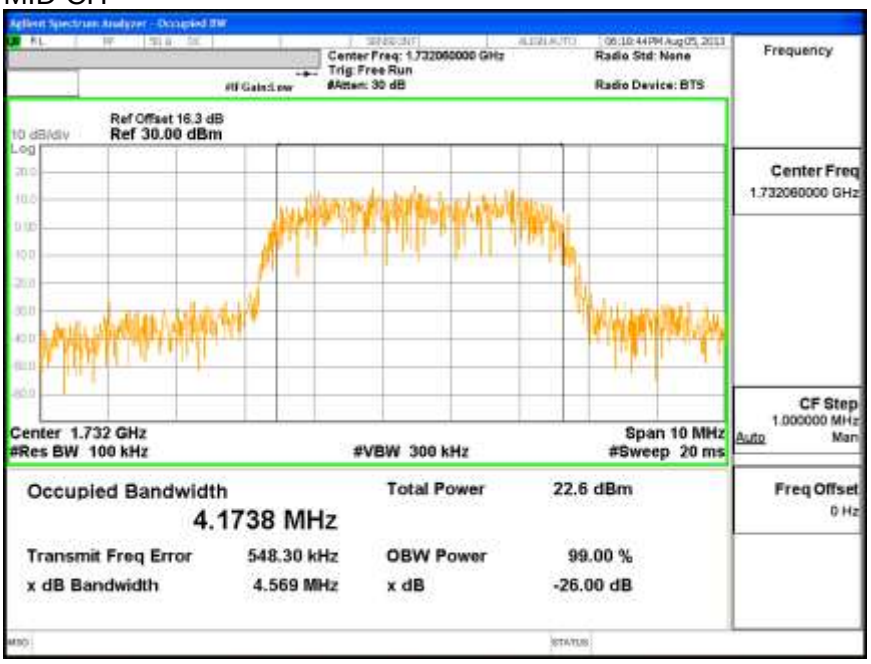


HSDPA (AWS Band)

LOW CH



MID CH



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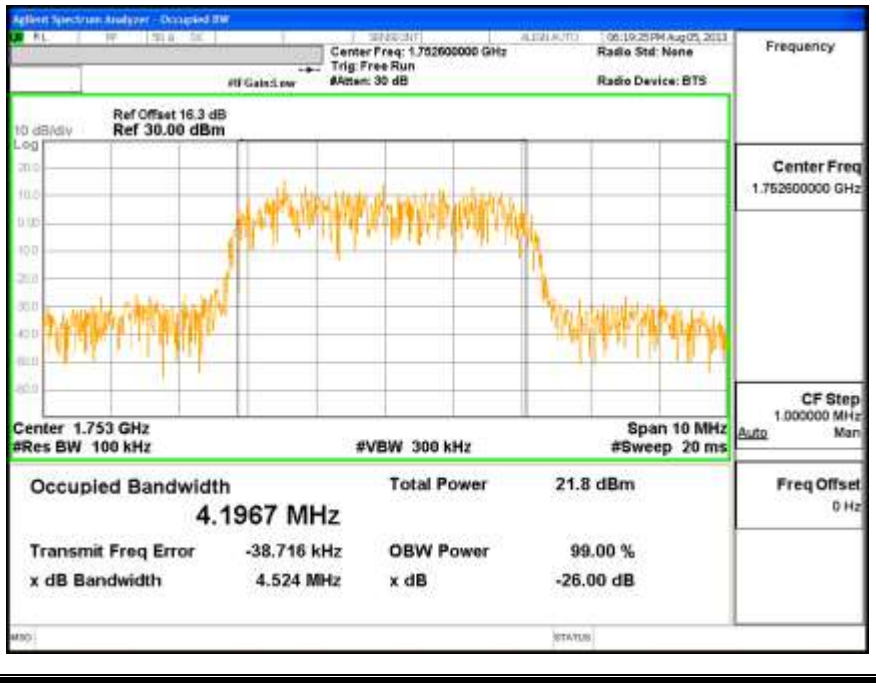
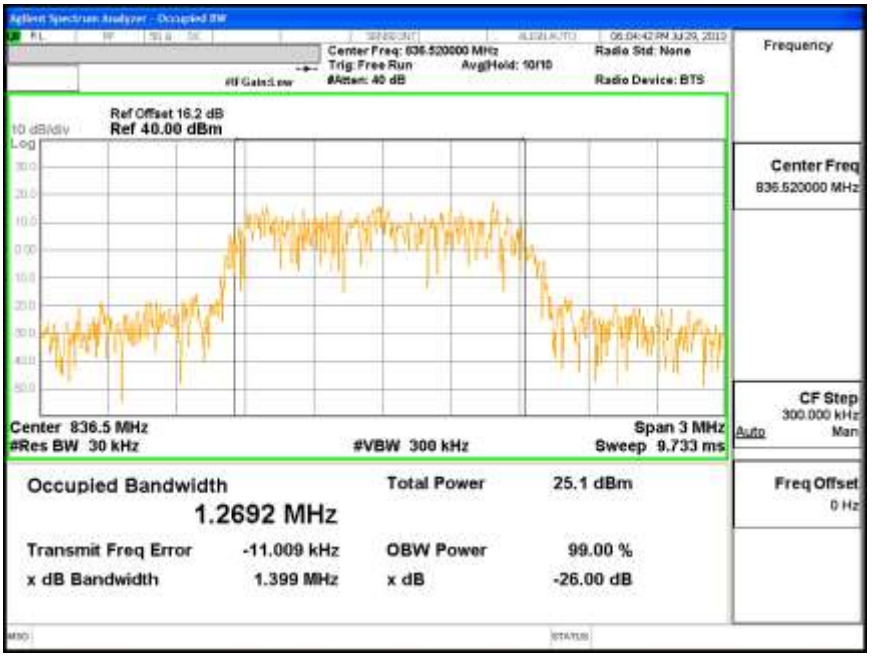


CDMA2000 1xRTT, BC0

LOW CH

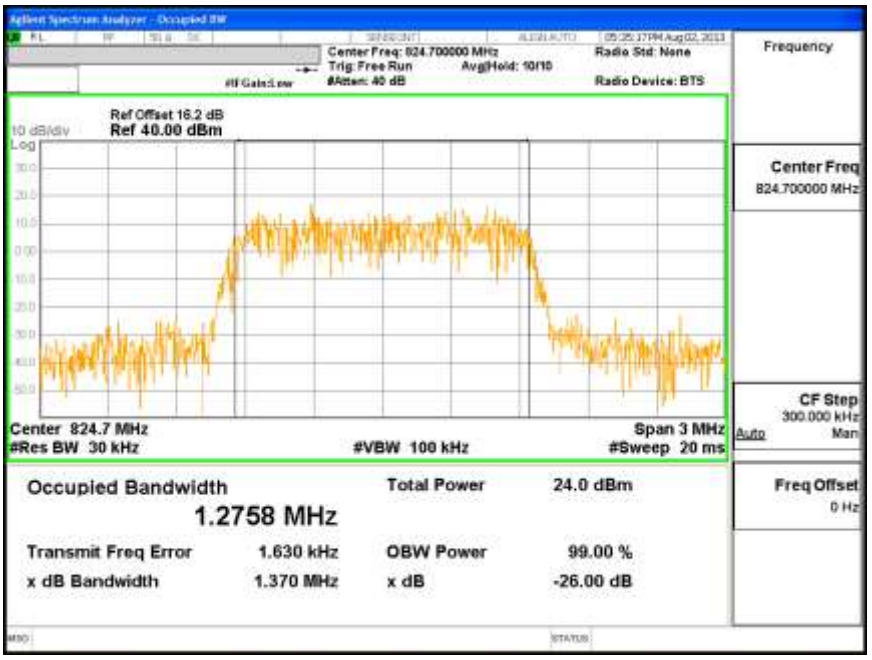
MID CH



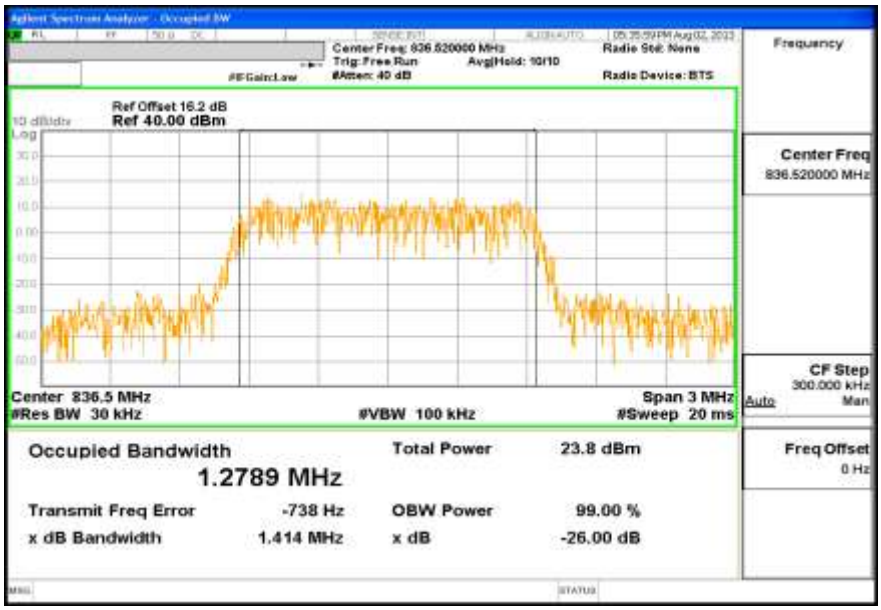
HIGH CH

1xEV-DO Rev A, BC 0

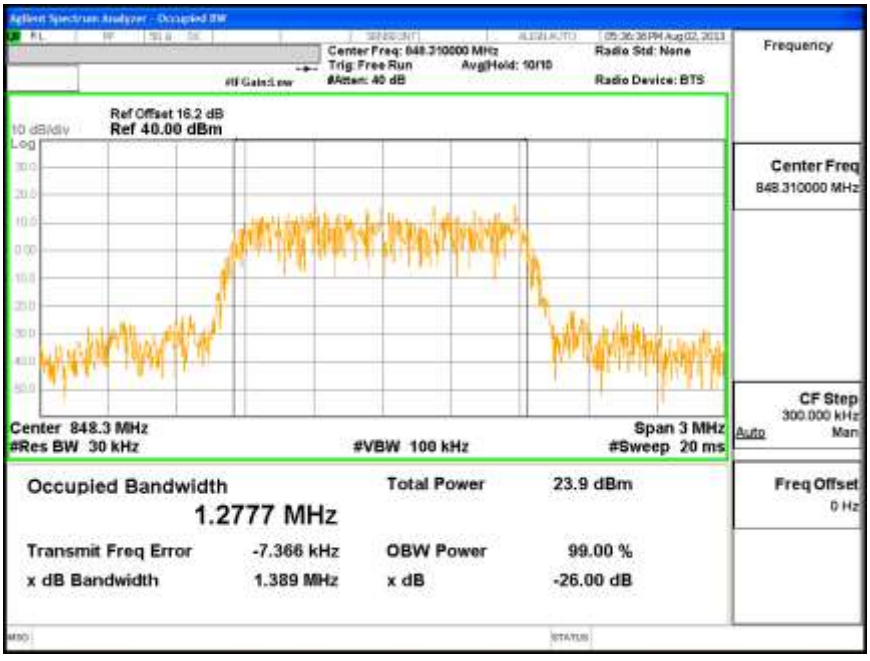
LOW CH



MID CH

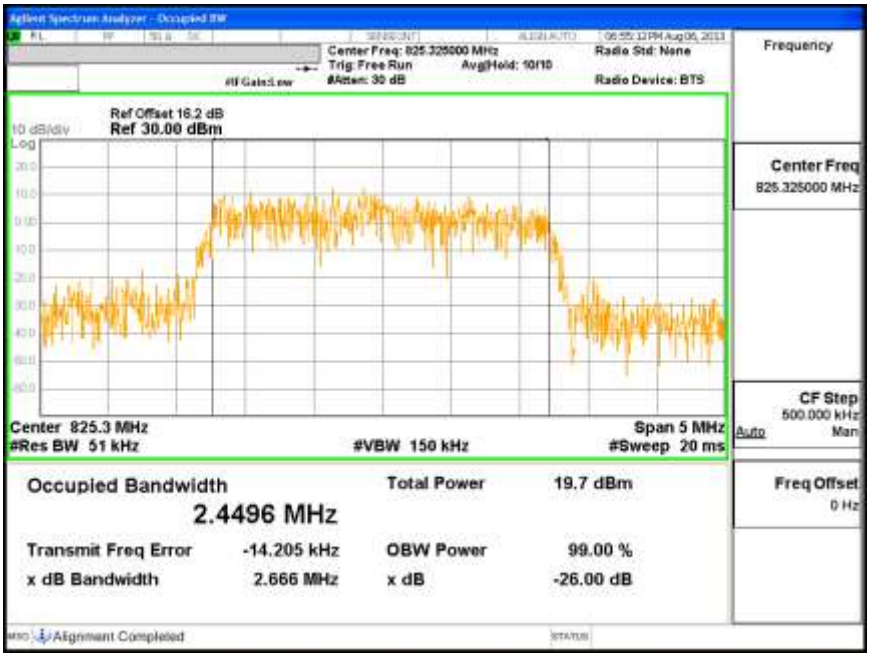


HIGH CH

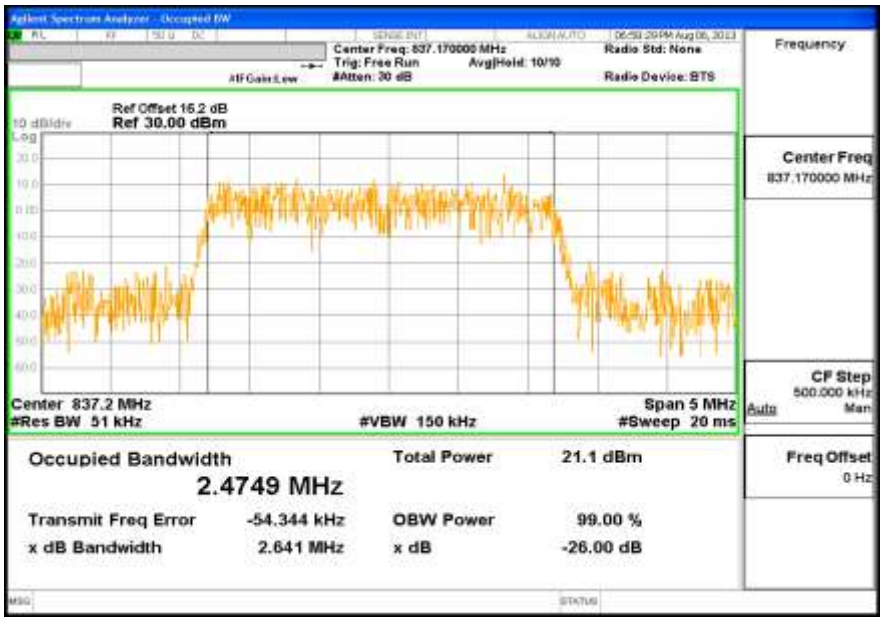


1xEV-DO Rev B, 2 Carrier Min, BC 0

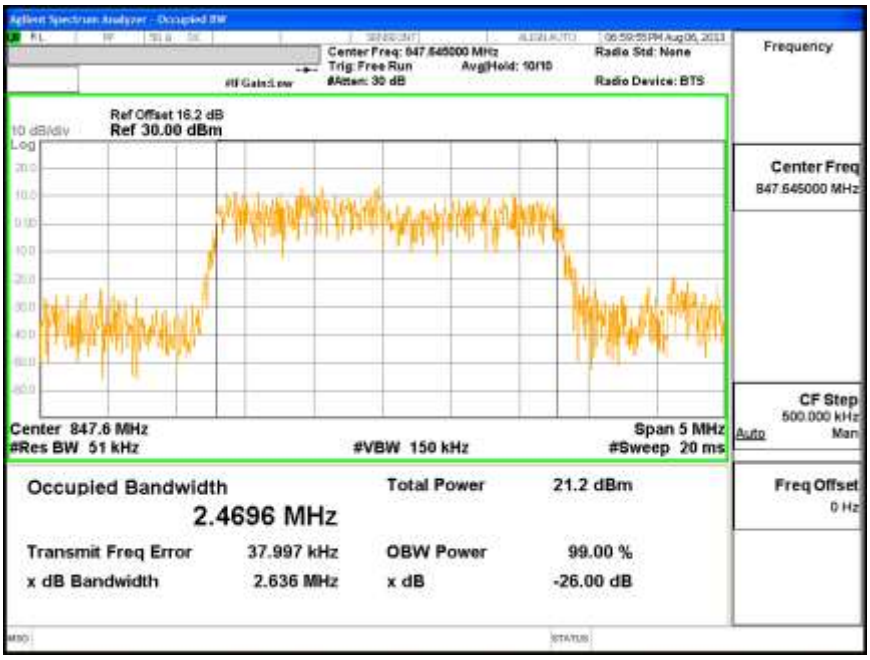
LOW CH



MID CH

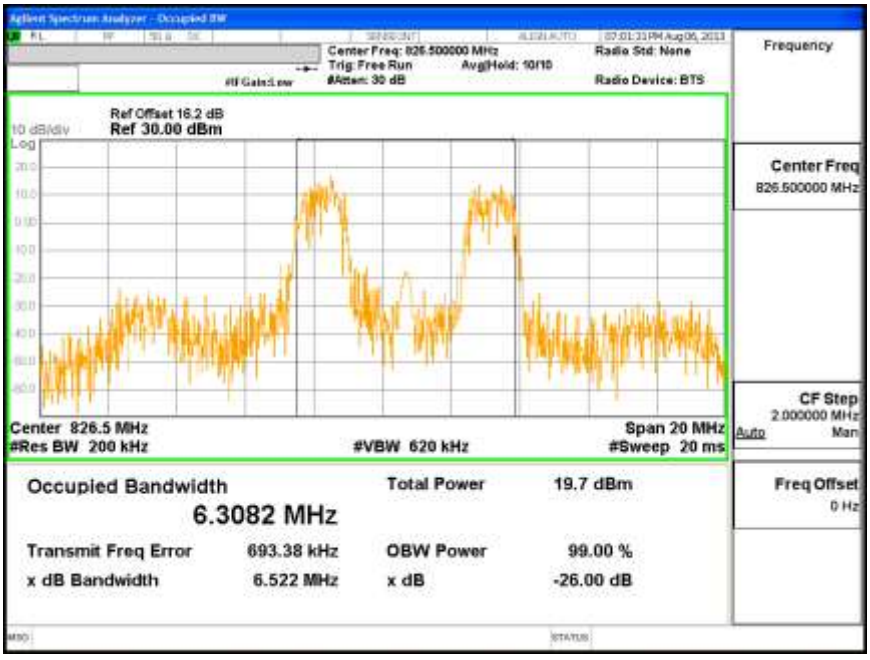


HIGH CH



1xEV-DO Rev B, 2 Carrier Max, BC 0

LOW CH



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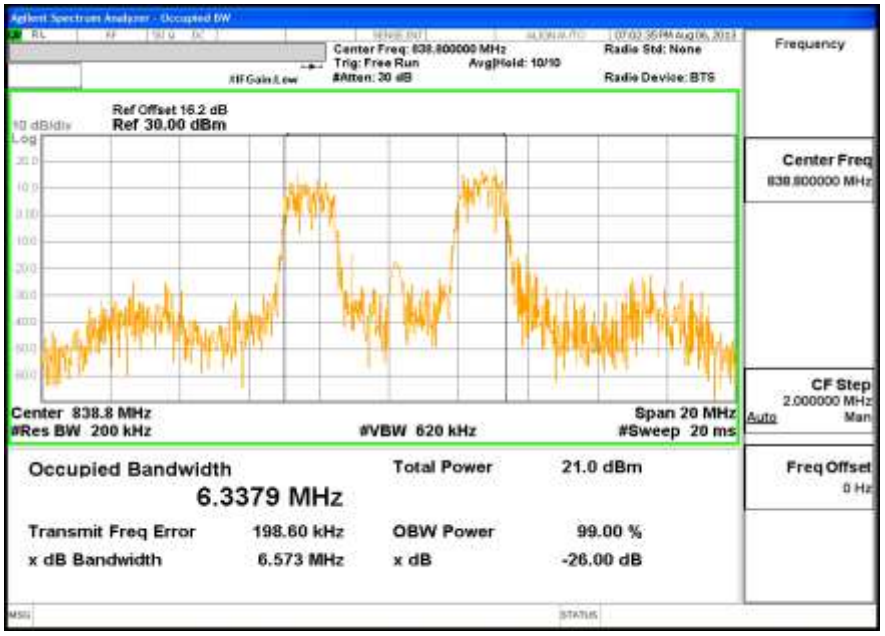

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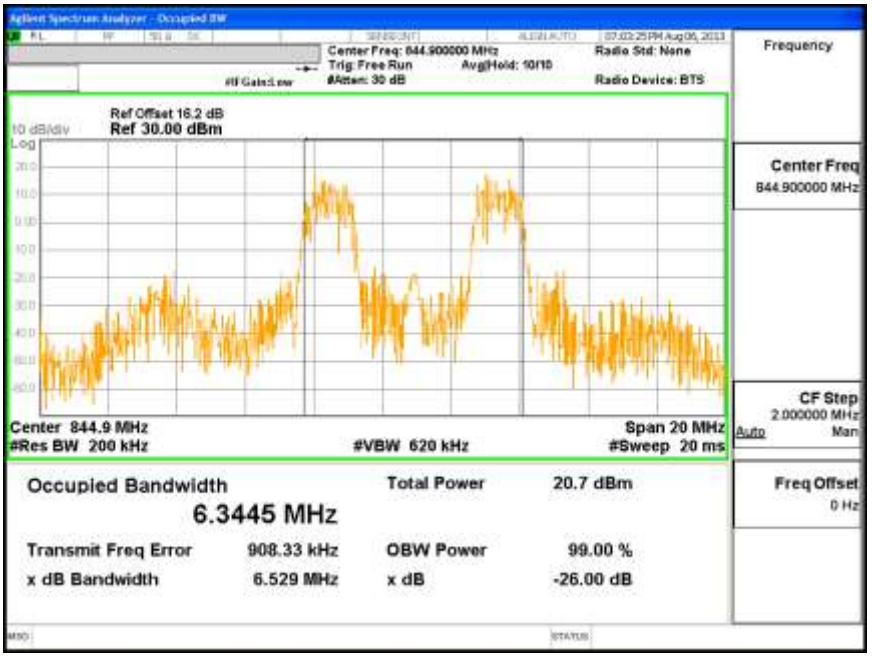
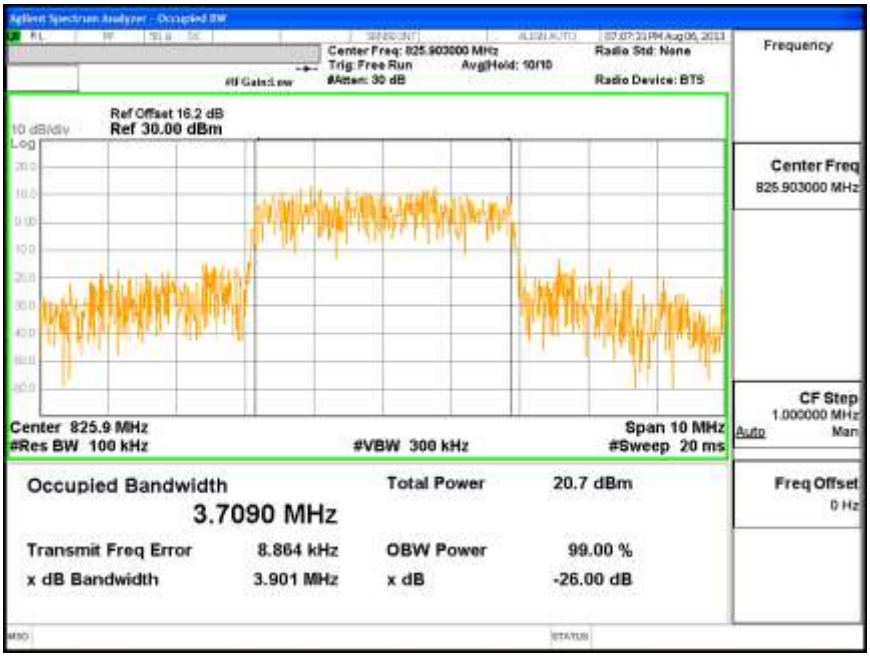


1xEV-DO Rev B, 3 Carrier Min, BC 0

LOW CH



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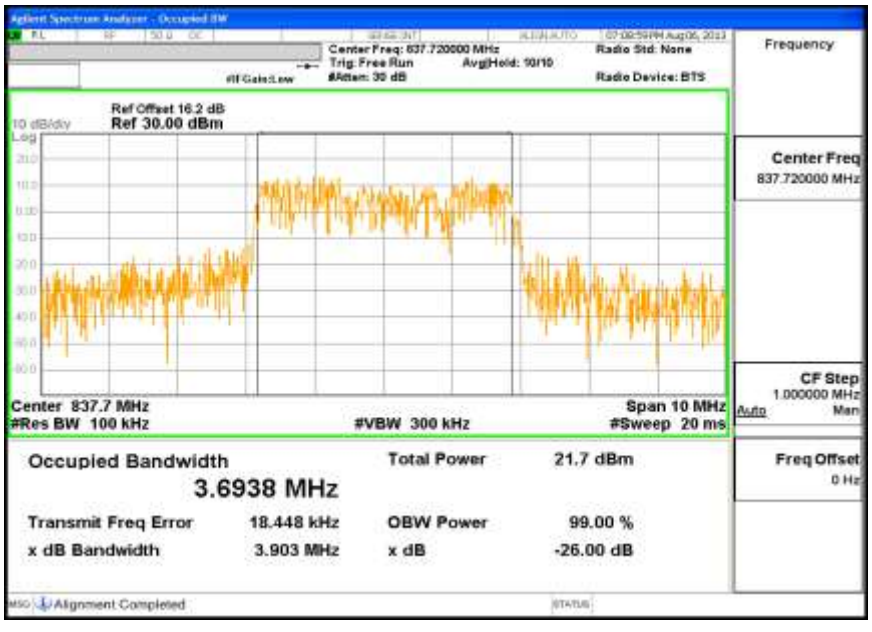

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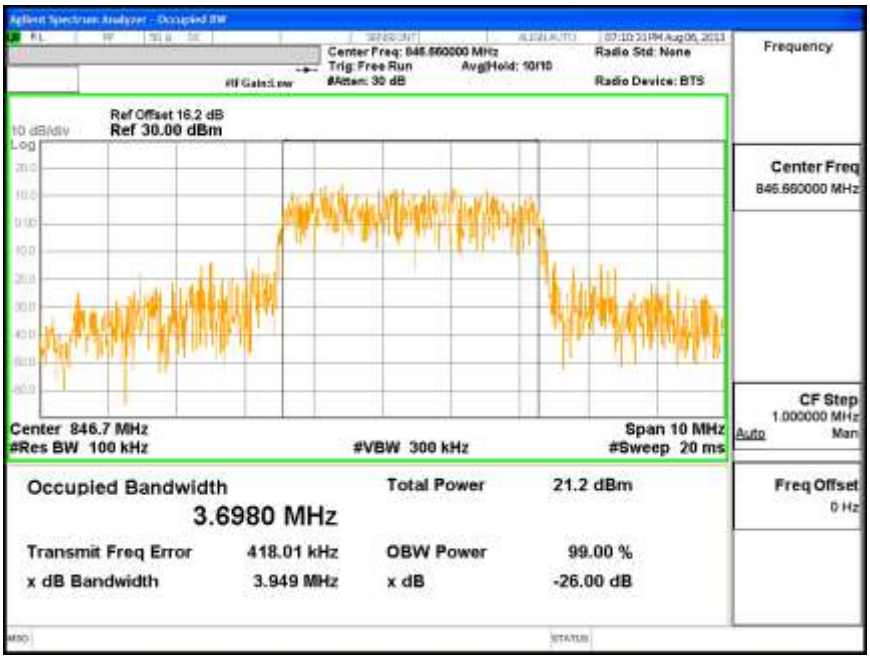
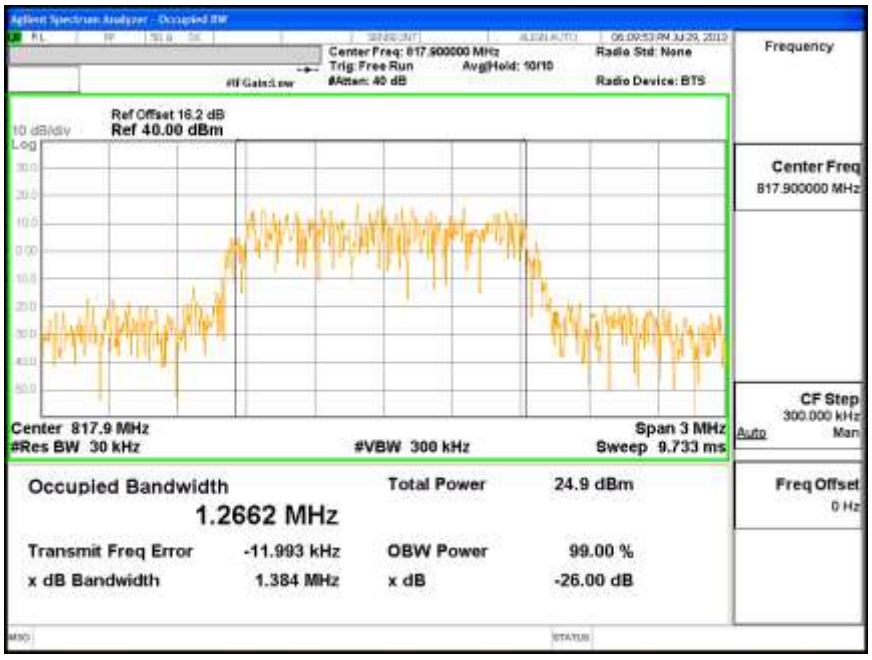


1xRTT Mode, BC 10

LOW CH



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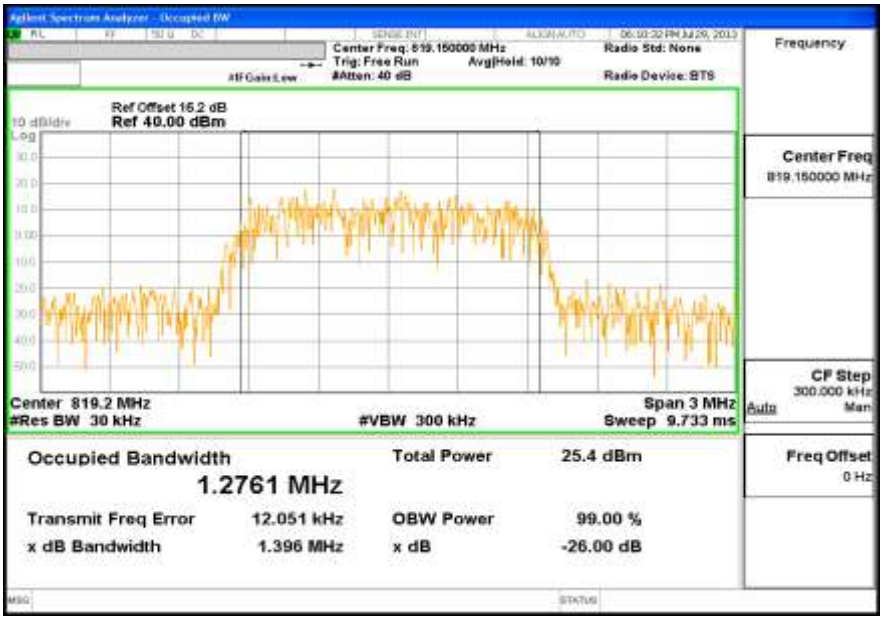

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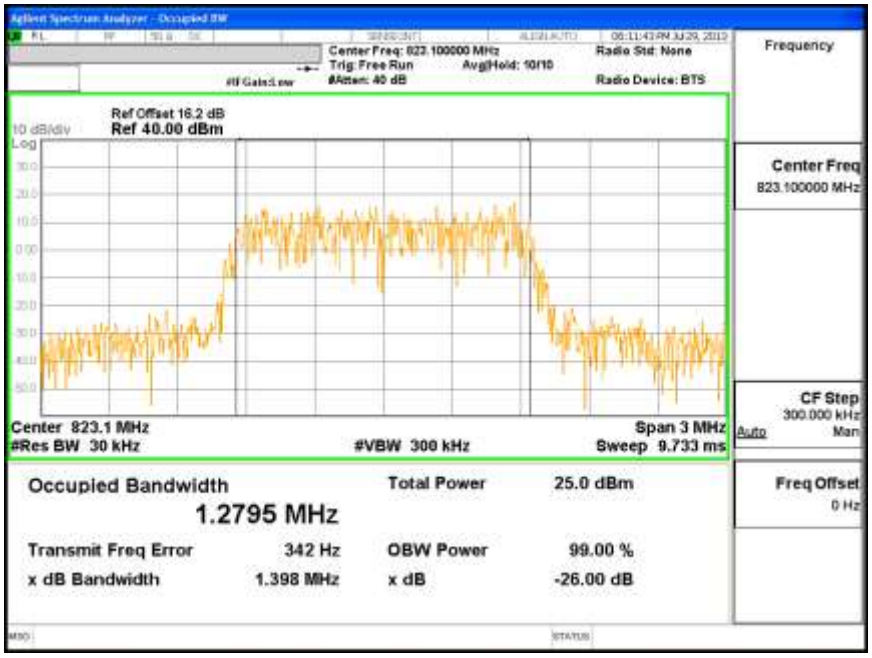
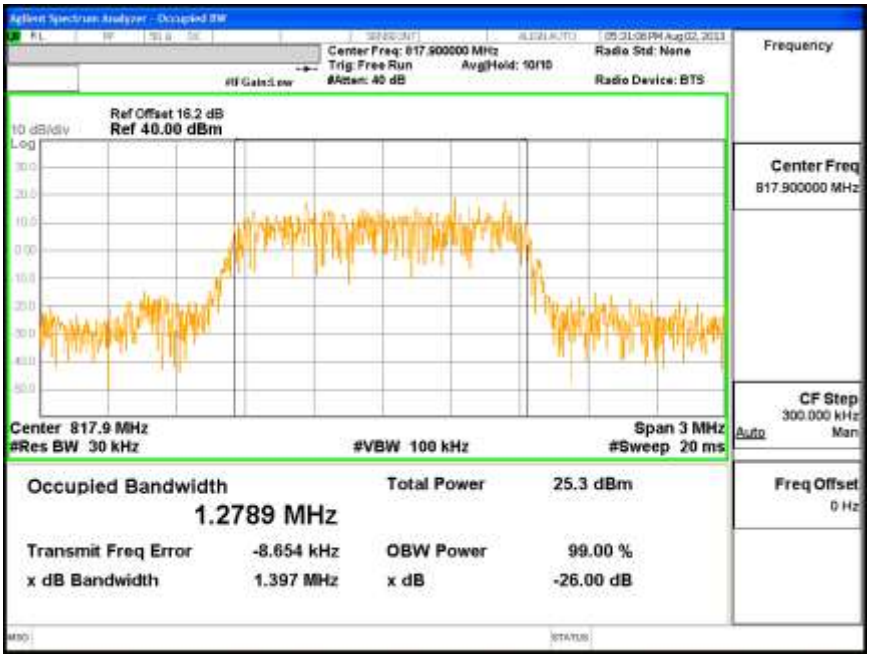
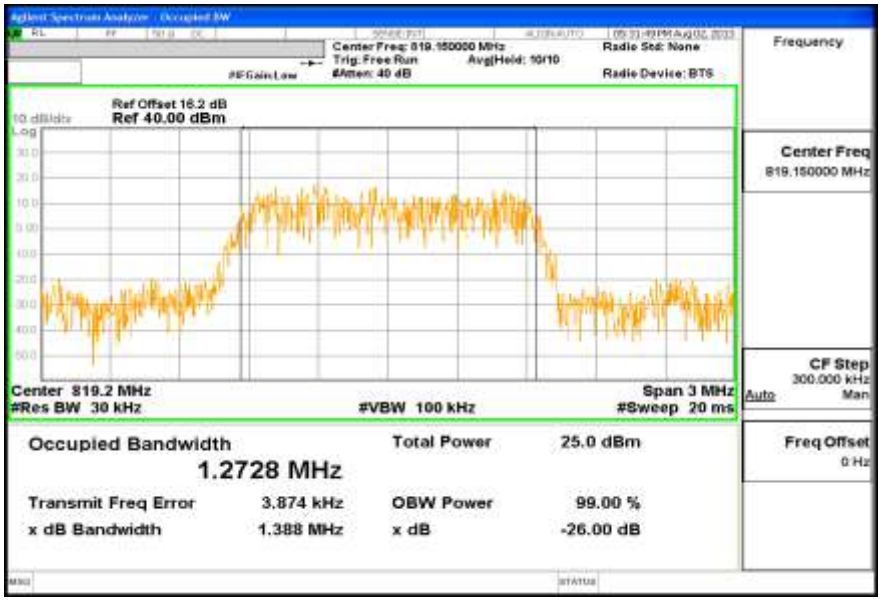


1xEV-DO Rev A, BC 10

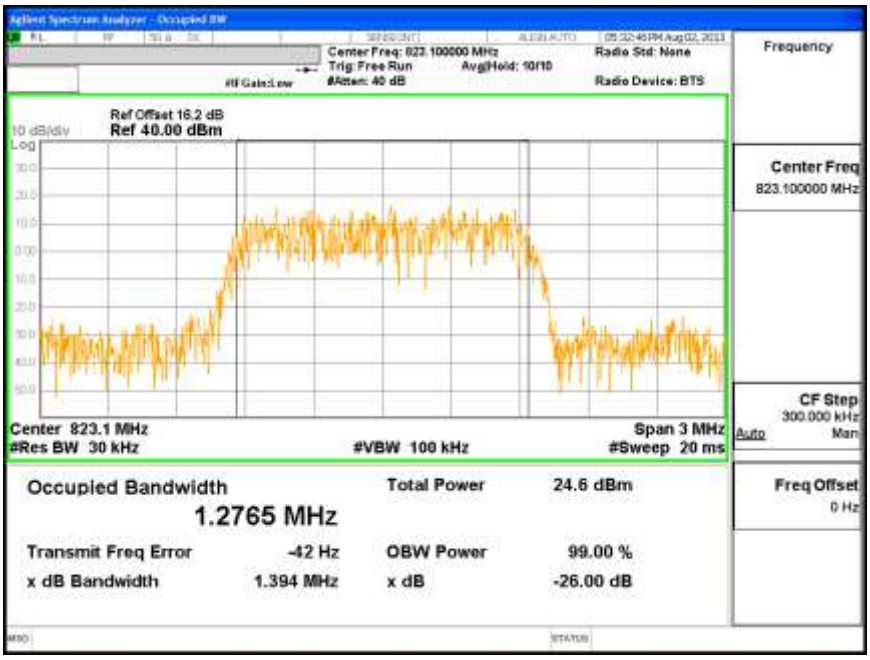
LOW CH



MID CH

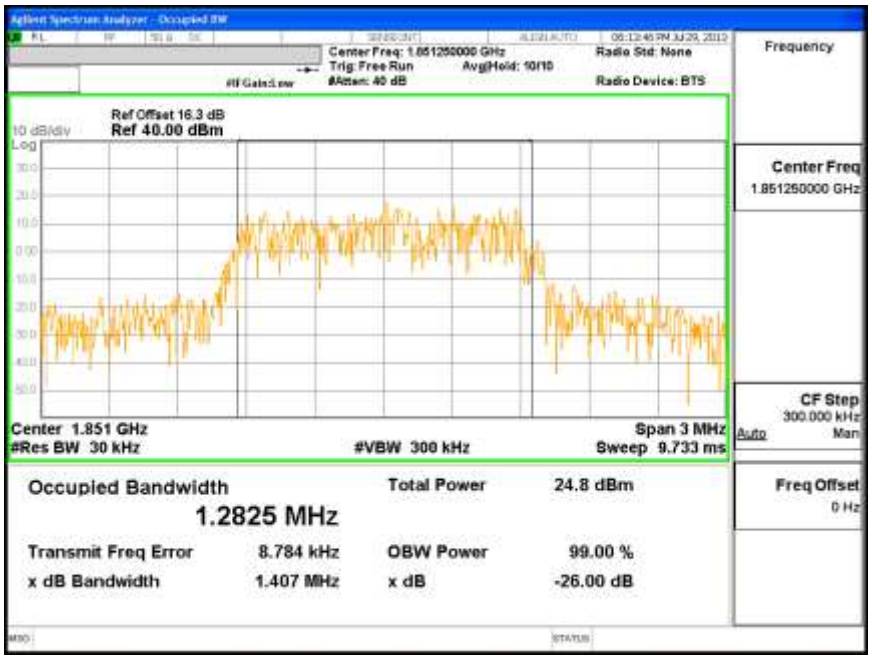


HIGH CH

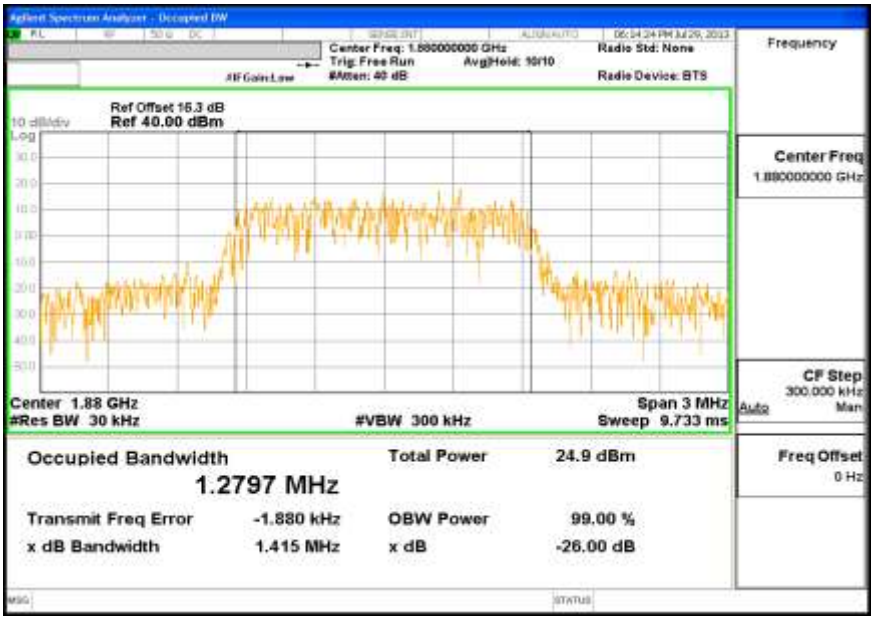


1xRTT Mode, BC 1

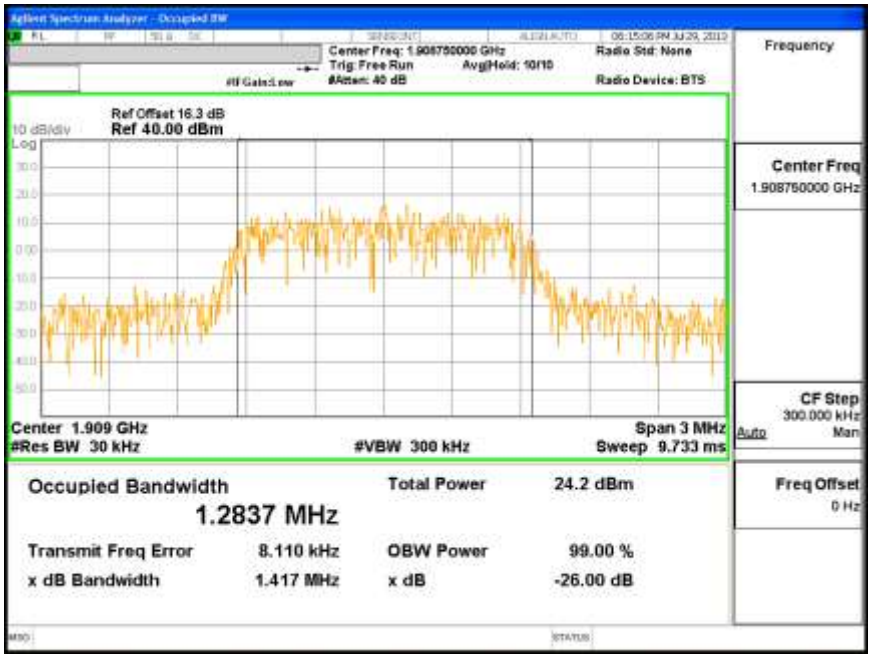
LOW CH



MID CH

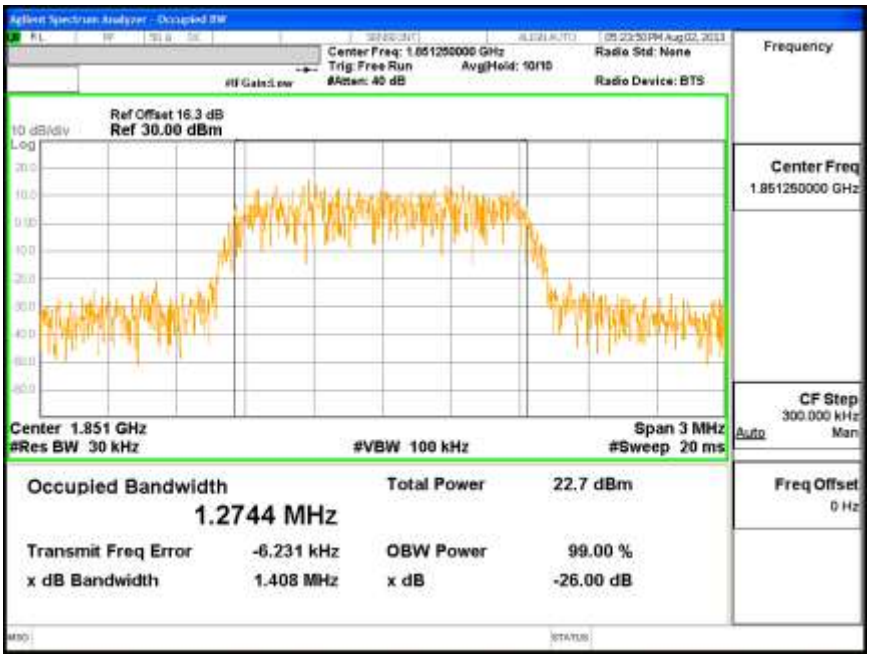


HIGH CH

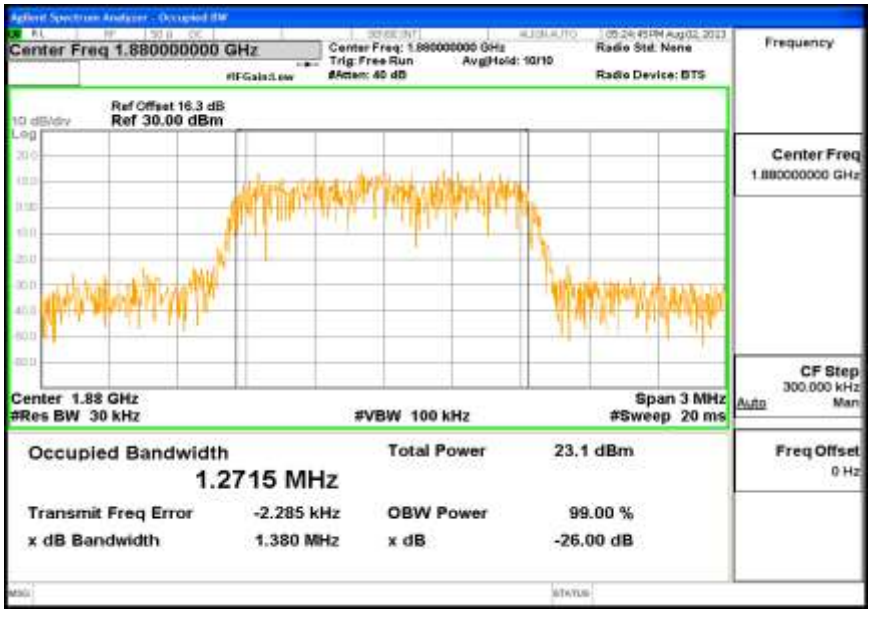


1xEV-DO Rev A, BC 1

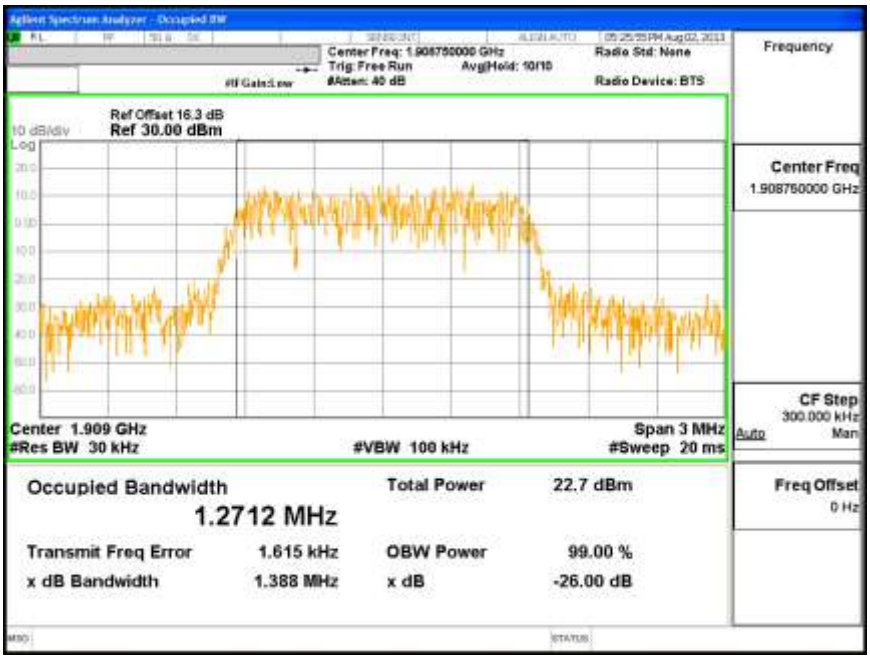
LOW CH



MID CH

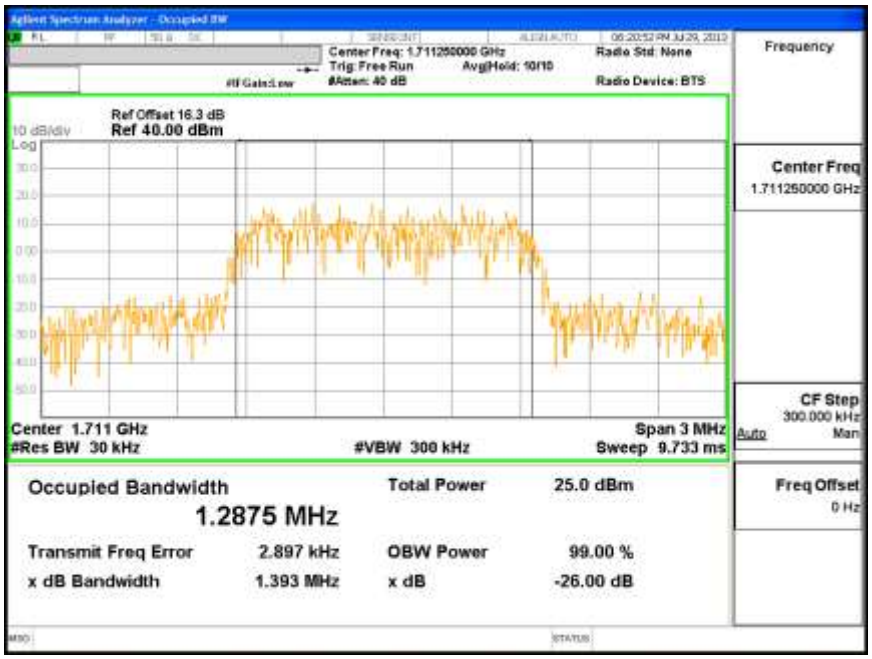


HIGH CH

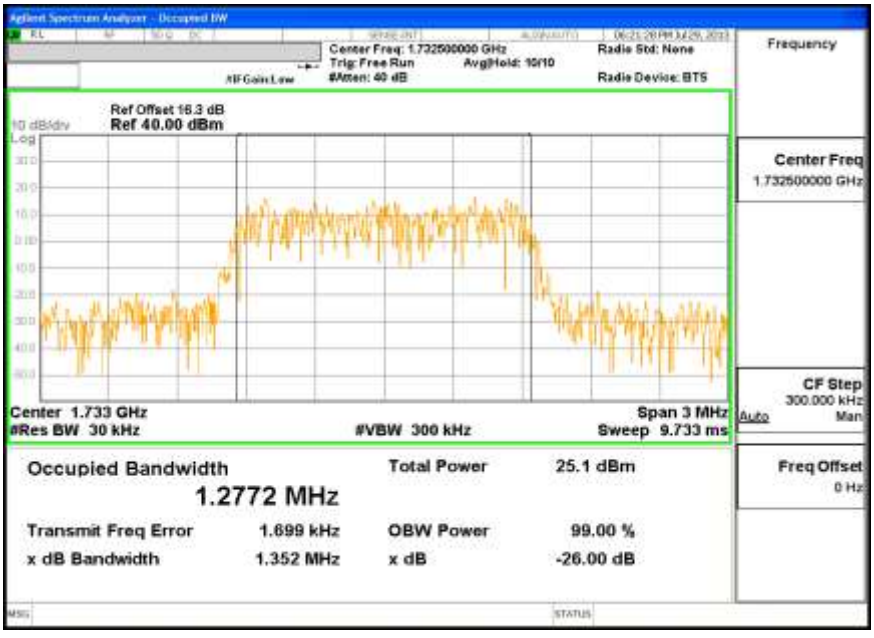


1xRTT Mode, BC 15

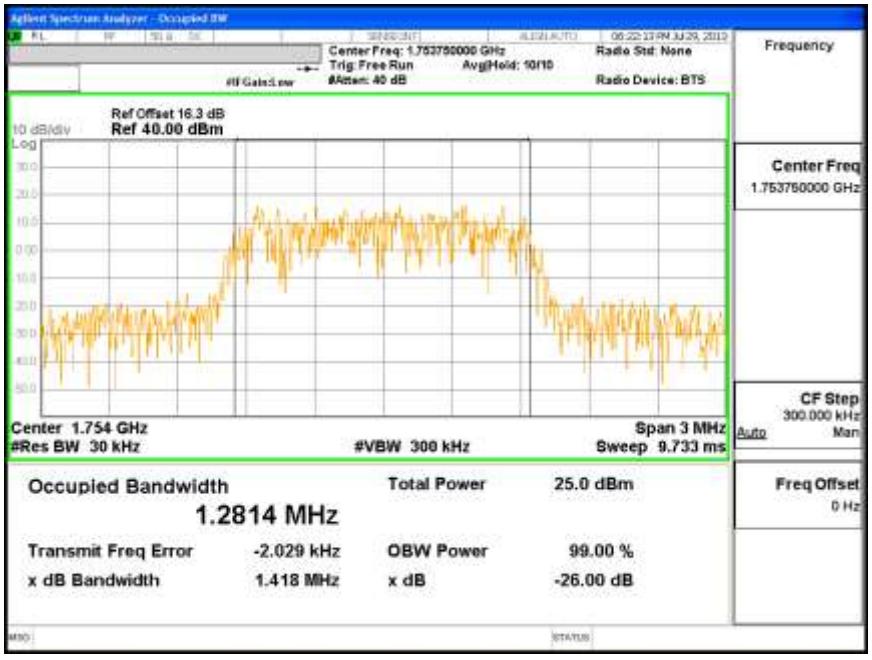
LOW CH



MID CH

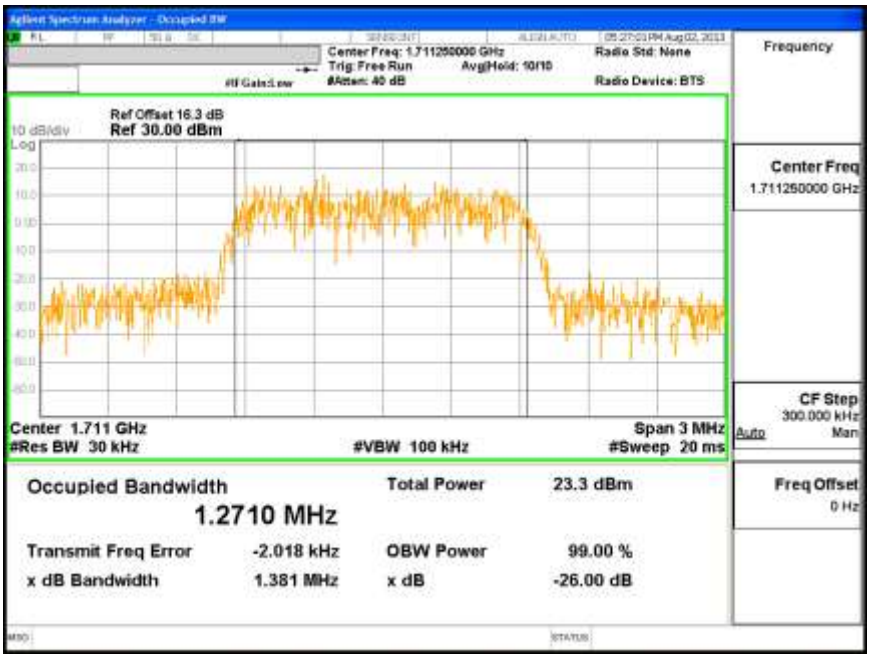


HIGH CH

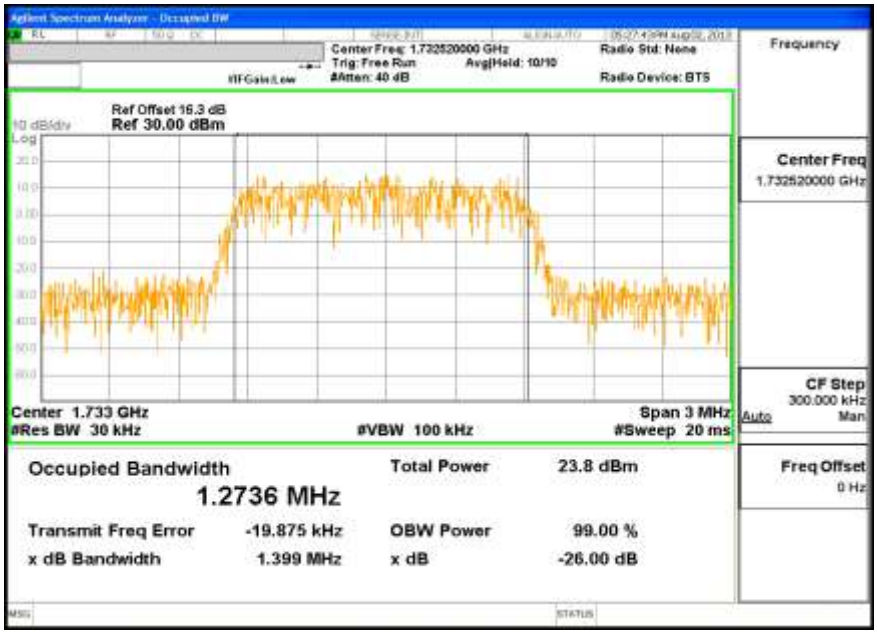


1xEV-DO, Rev A BC 15

LOW CH



MID CH



HIGH CH

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

MODES TESTED

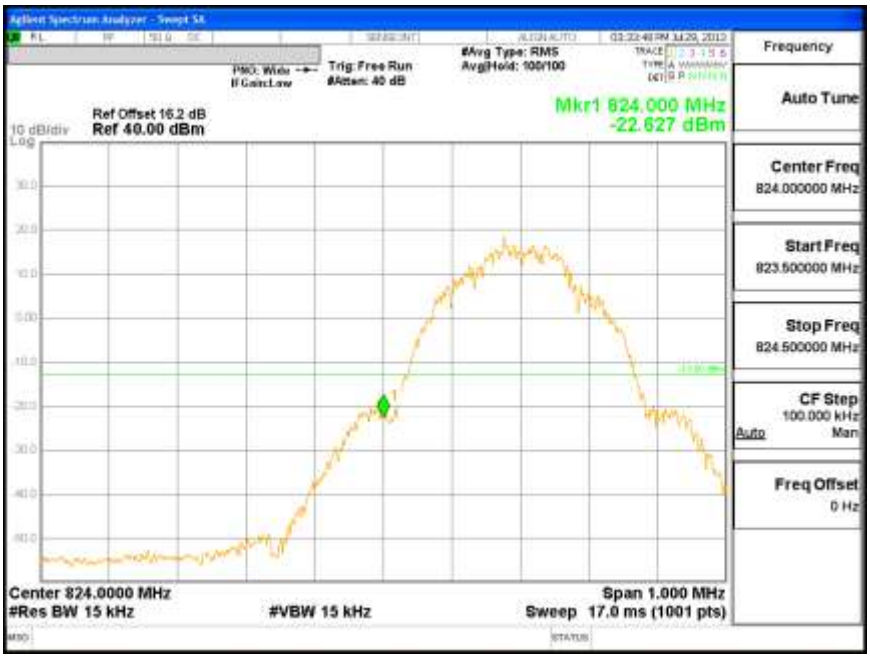
- GPRS and EGPRS
- UMTS, REL 99 and HSDPA
- CDMA2000, BC0, BC10, BC1 and BC15

RESULTS

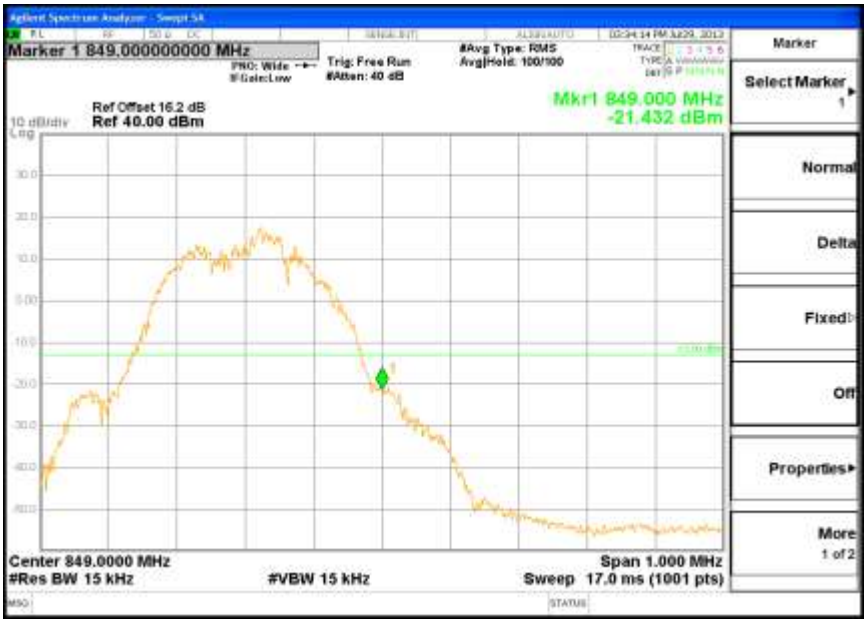
8.2.1. GPRS850

CELL BAND

LOW CH

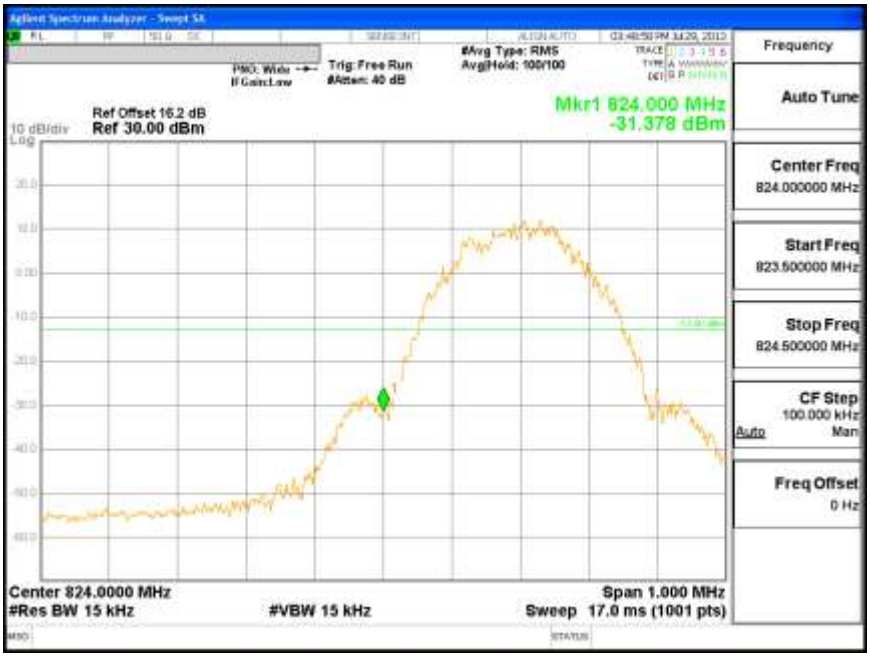


HIGH CH

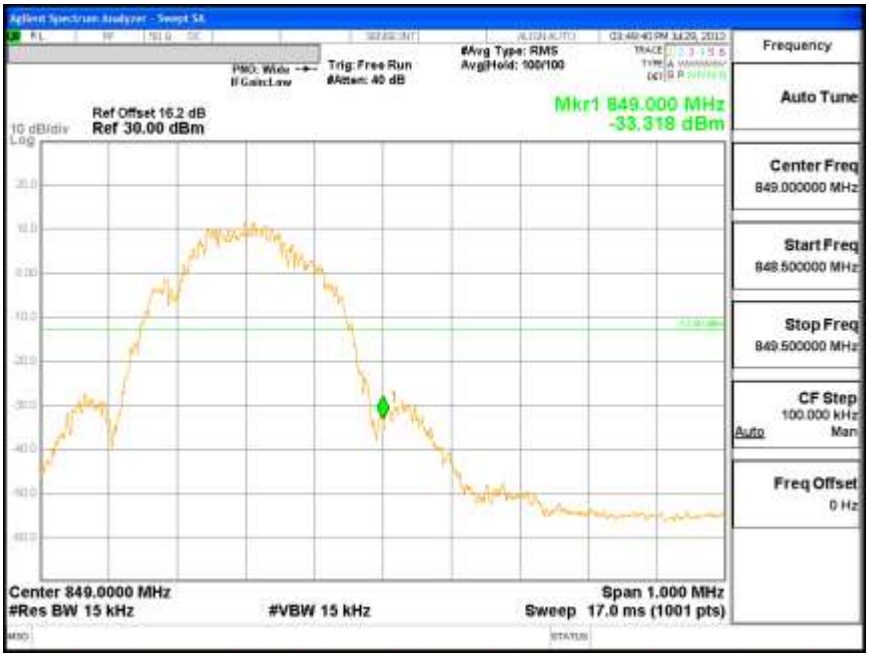


8.2.2. EGPRS850

LOW CH



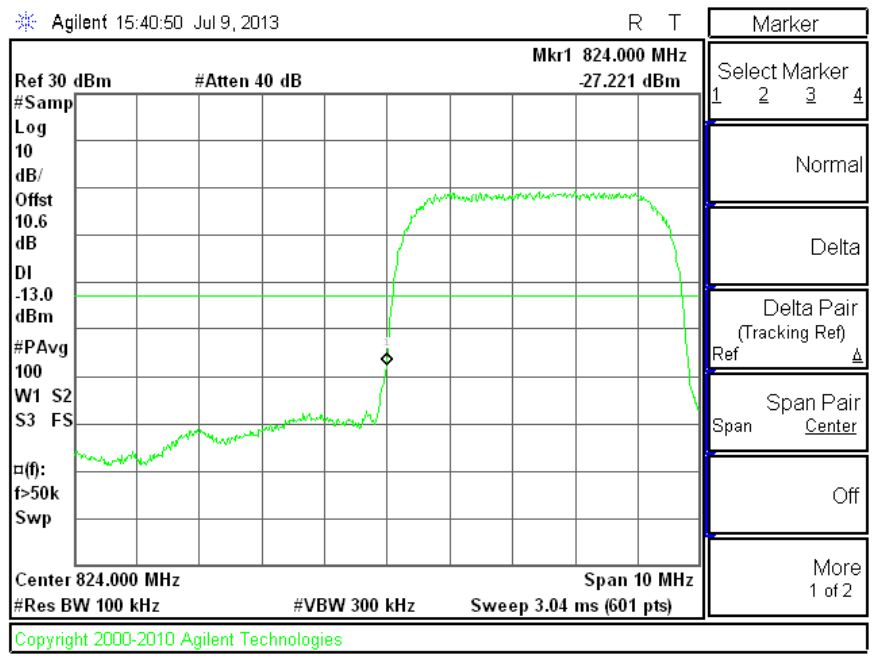
HIGH CH



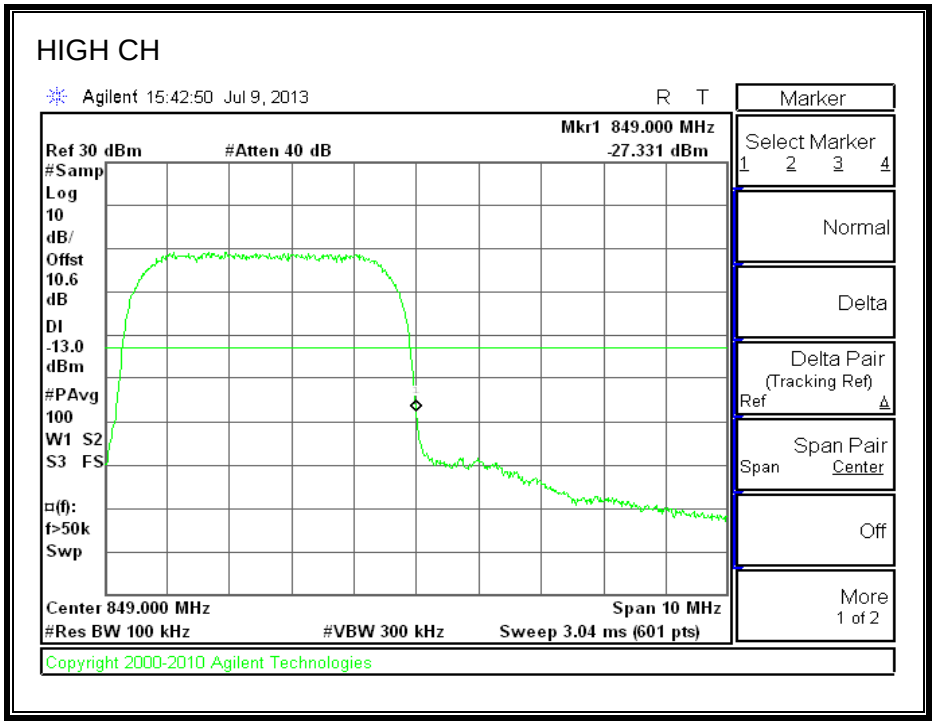
8.2.3. UMTS850

REL99 (Cell Band)

LOW CH

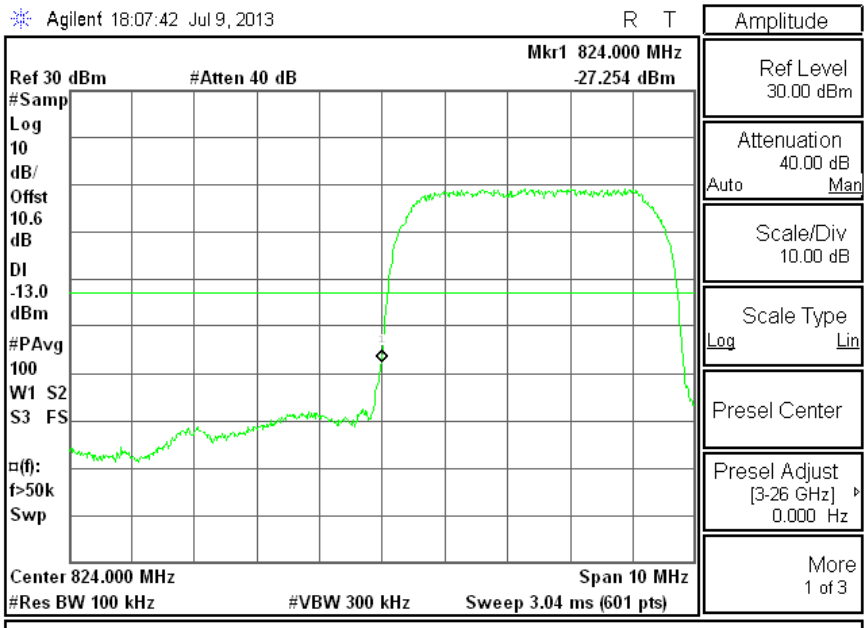


HIGH CH

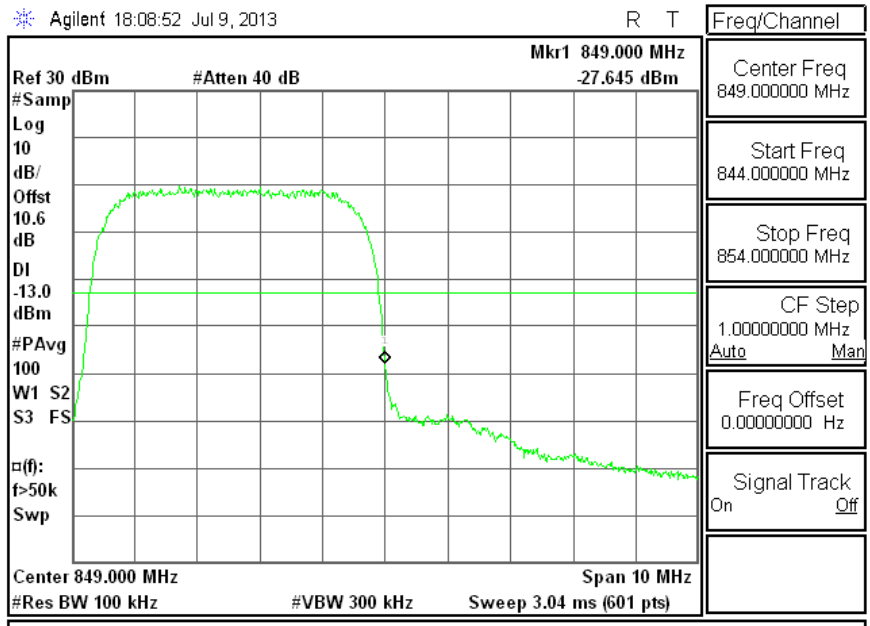


HSDPA (Cell Band)

LOW CH

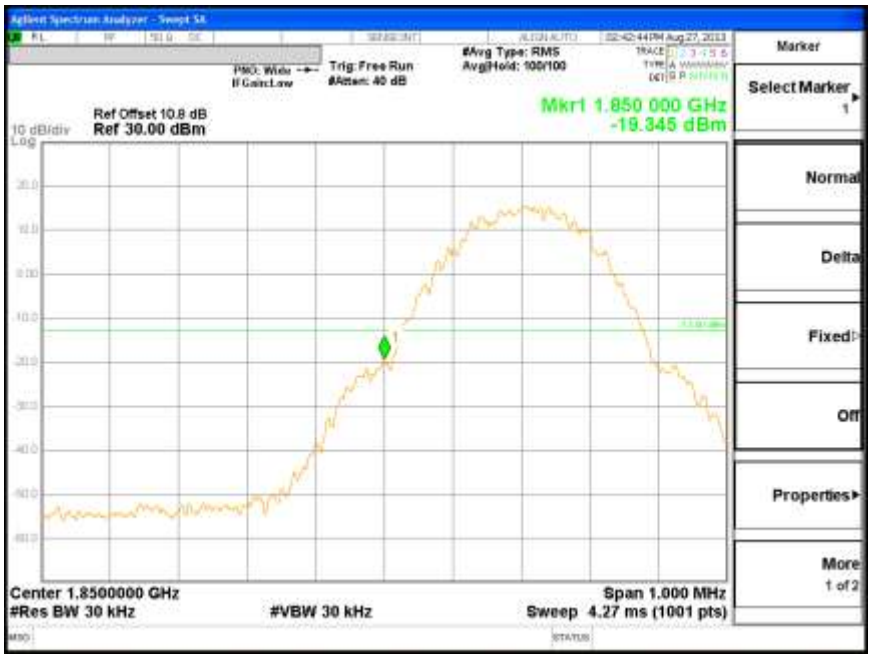


HIGH CH

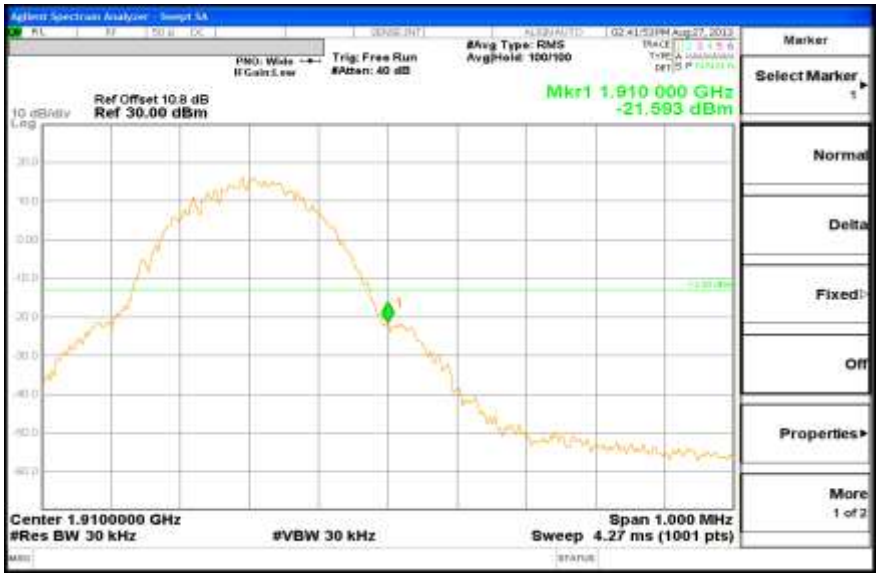


8.2.4. GPRS1900

LOW CH

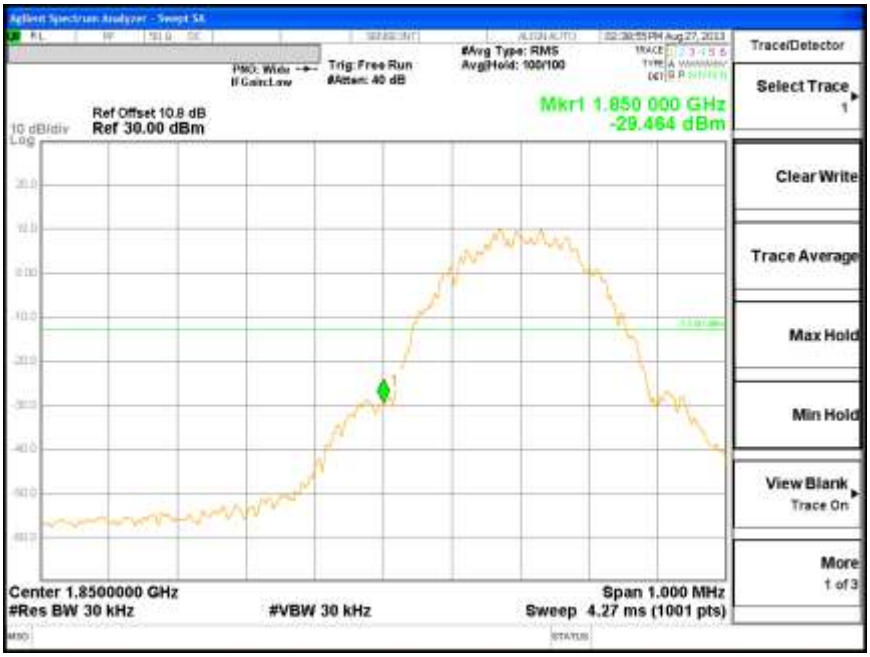


HIGH CH

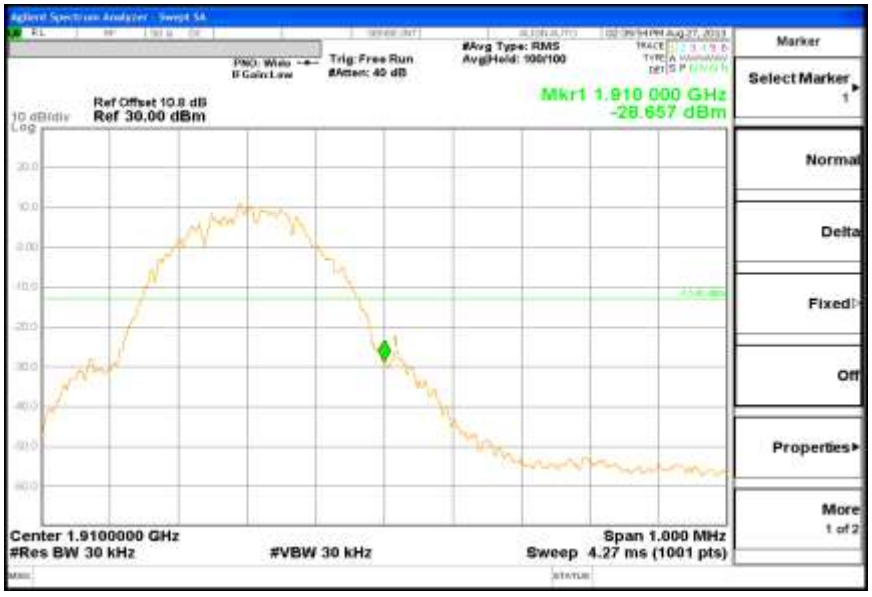


8.2.5. EGPRS1900

LOW CH



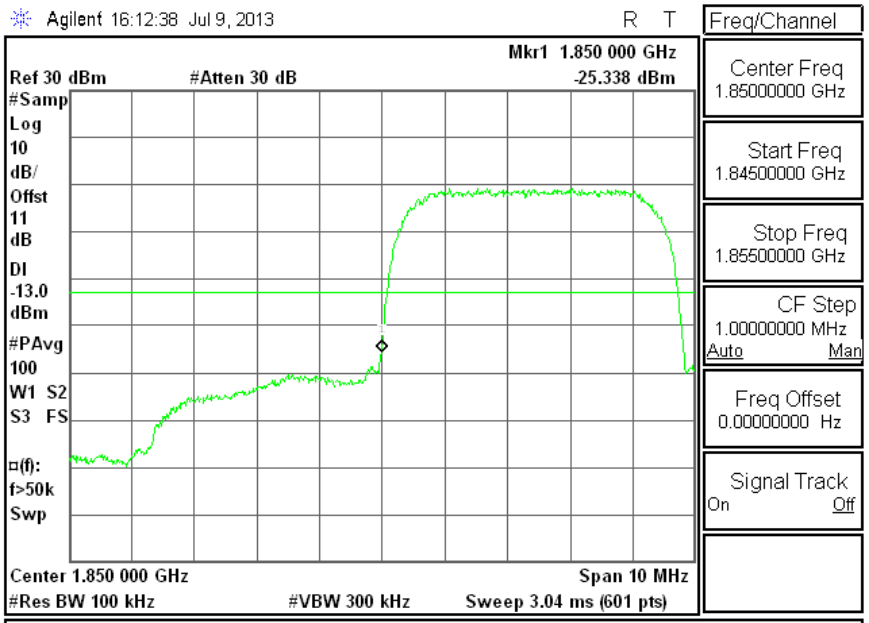
HIGH CH



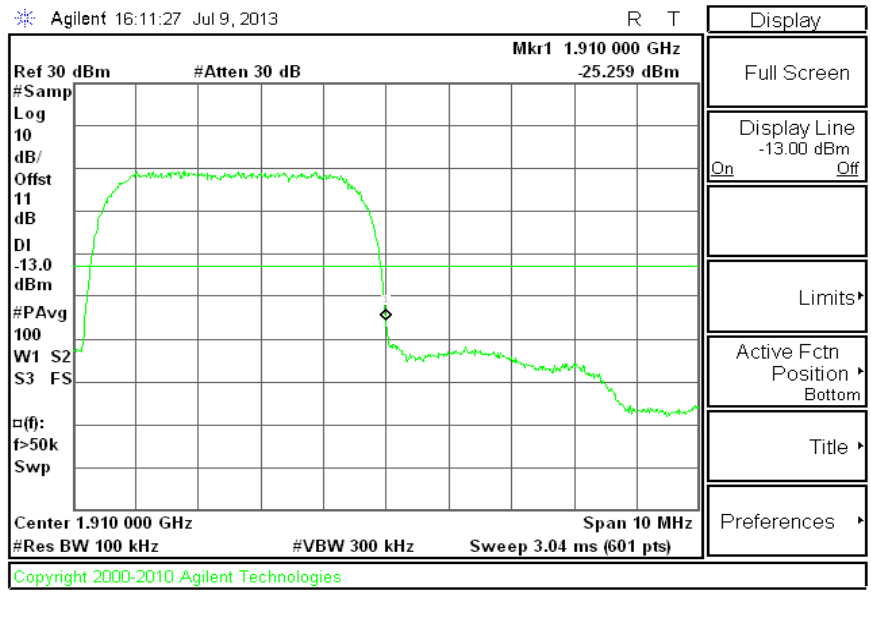
UMTS1900

REL99 (PCS Band)

LOW CH

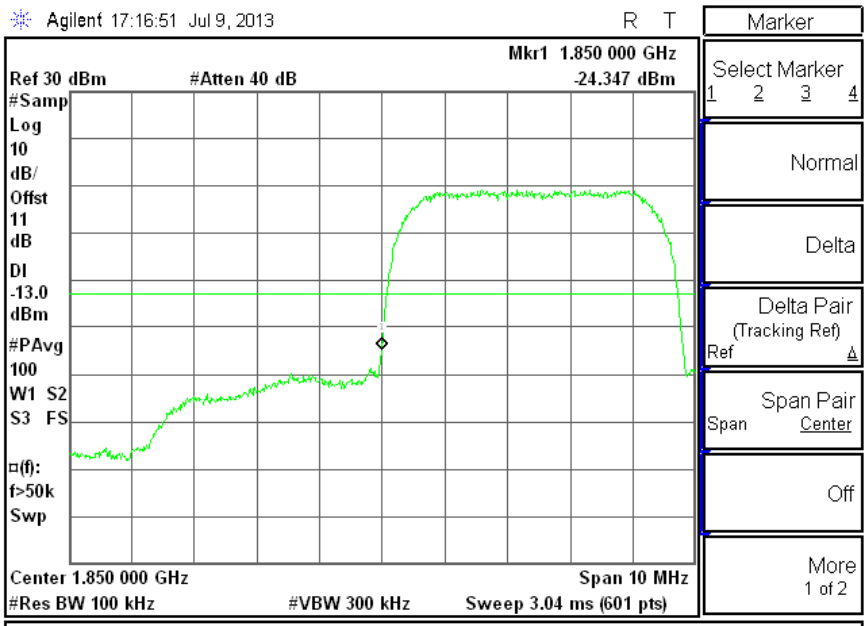


HIGH CH

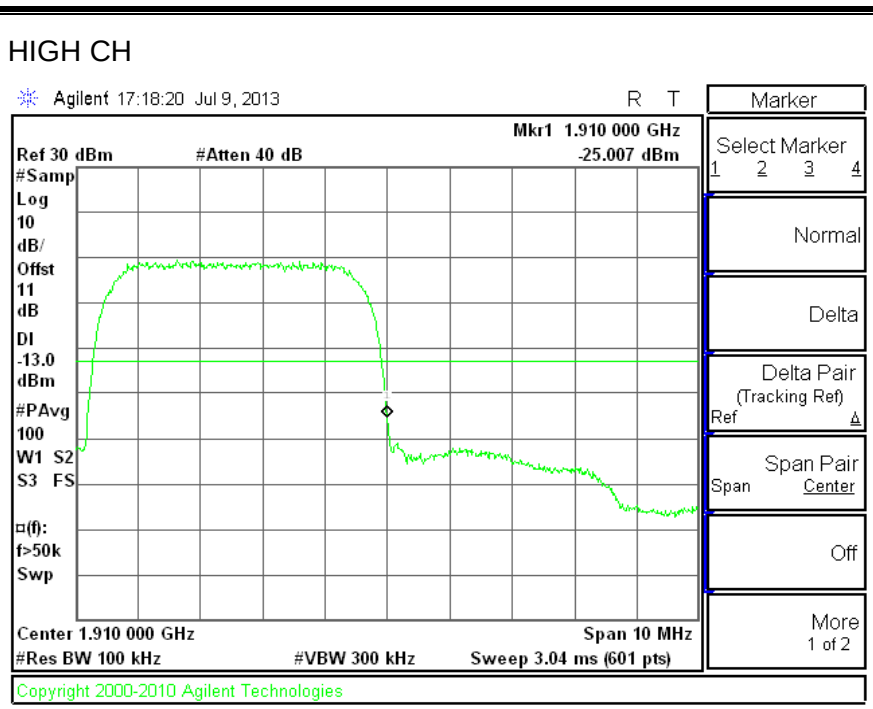


HSDPA (PCS Band)

LOW CH



HIGH CH



8.2.6. UMTS1700

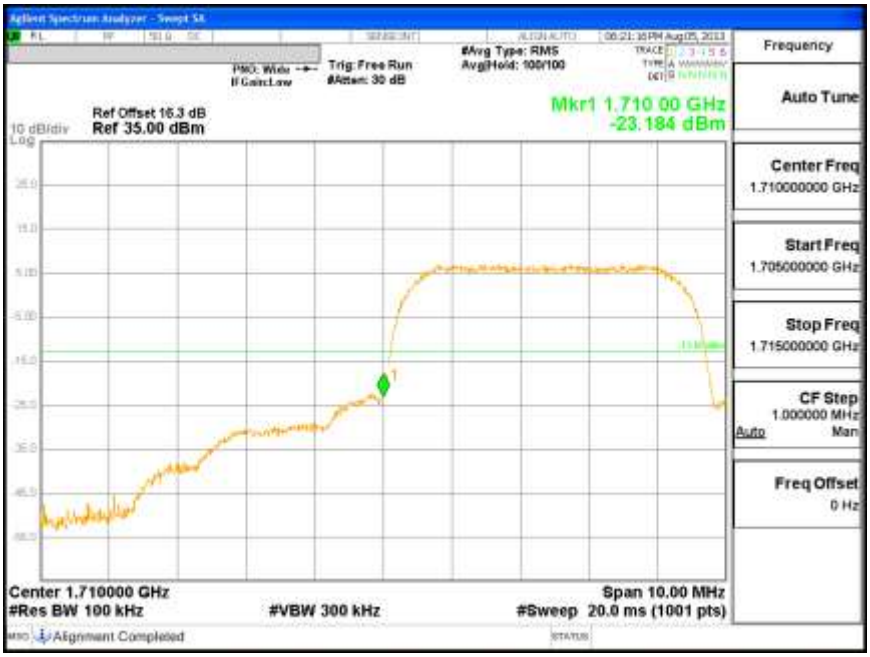
REL99 (AWS Band)

LOW CH

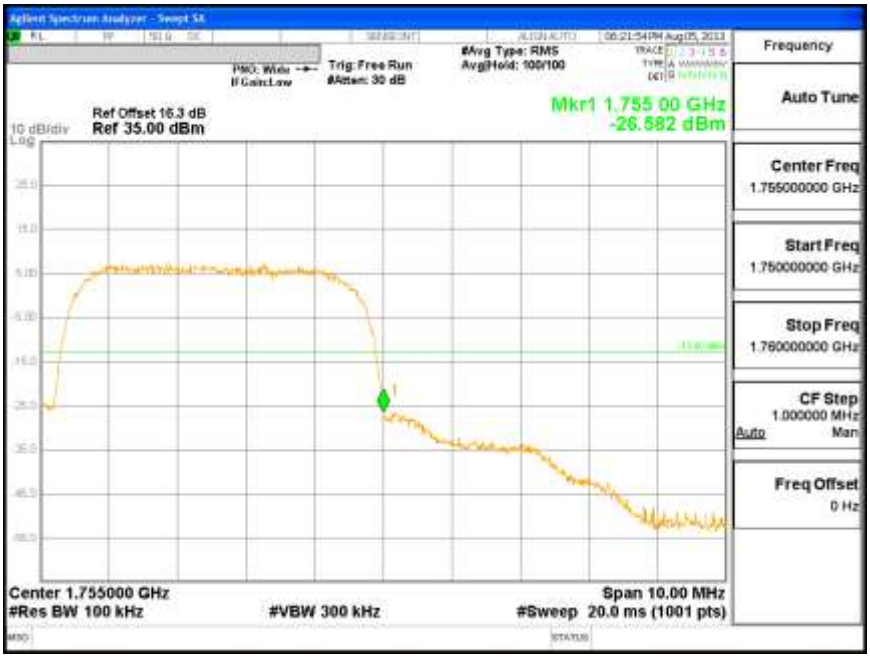
HIGH CH

HSDPA (AWS Band)

LOW CH

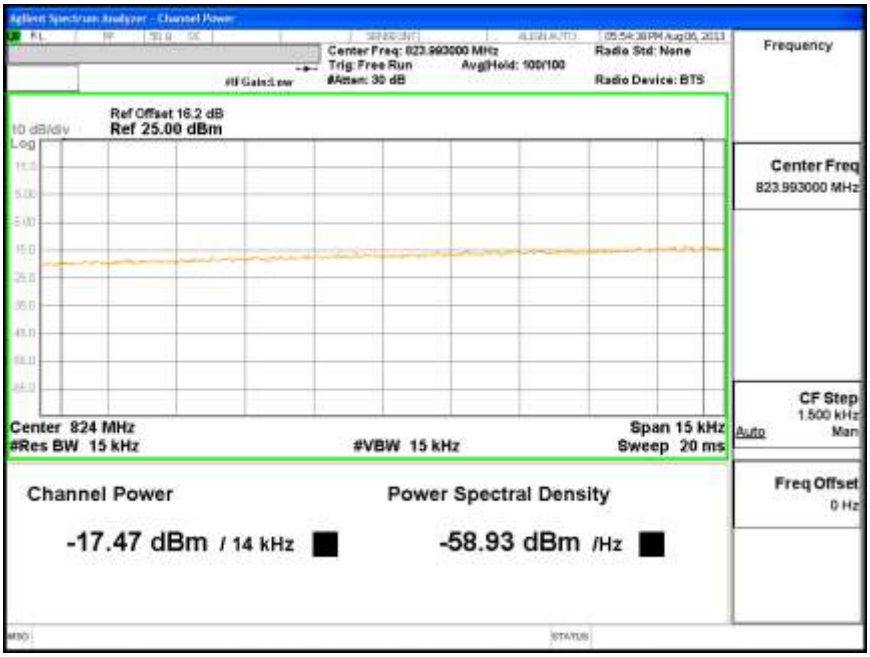


HIGH CH

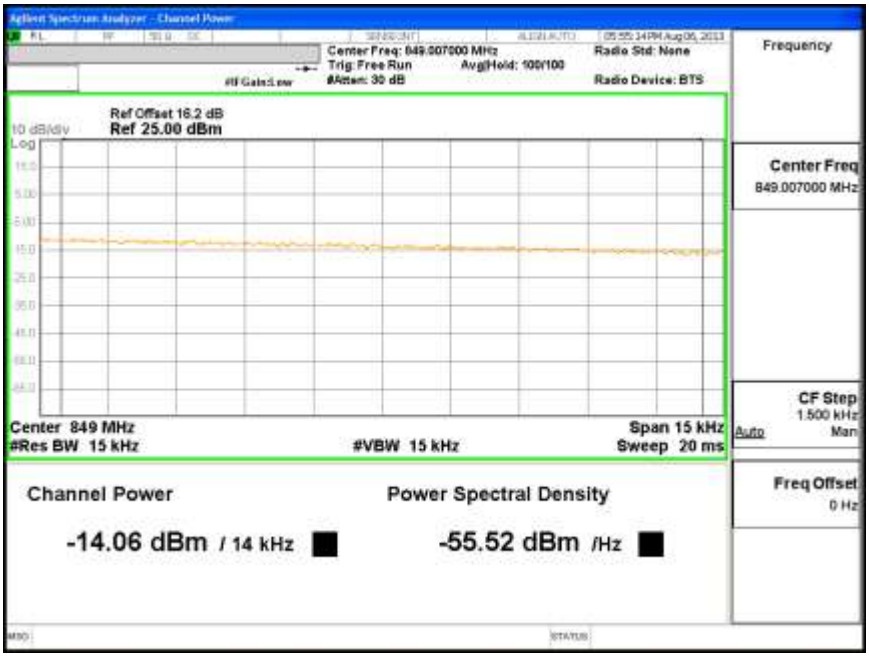


8.2.7. 1xRTT mode BC 0

LOW CH

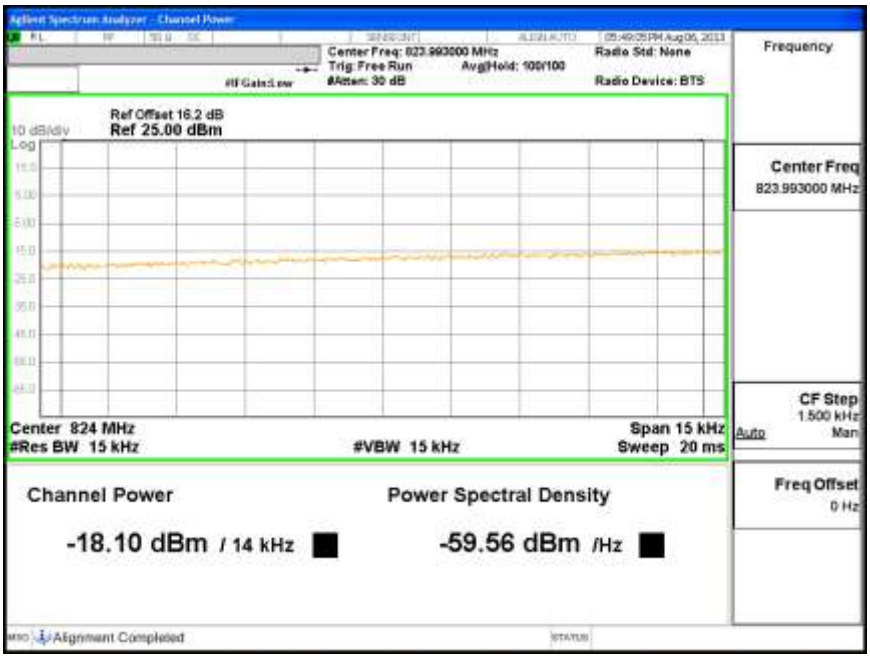


HIGH CH



8.2.8. EVDO Rev A, BC 0

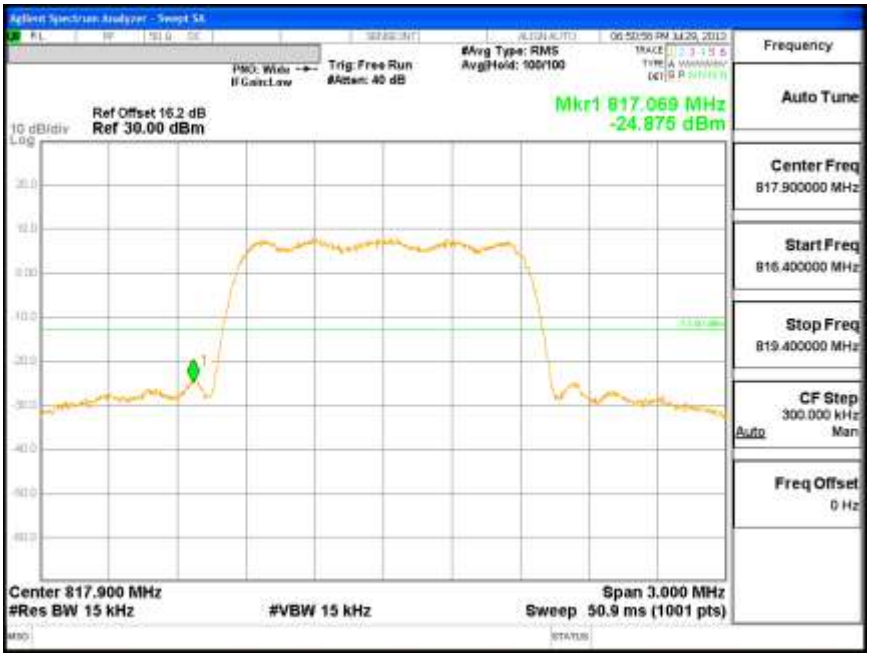
LOW CH



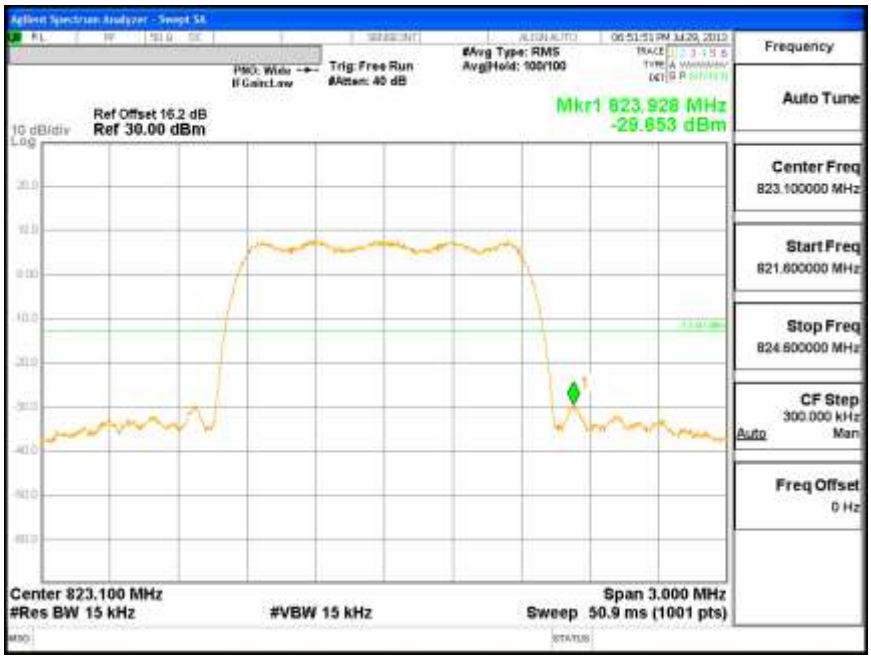
HIGH CH

8.2.9. 1xRTT BC 10

LOW CH

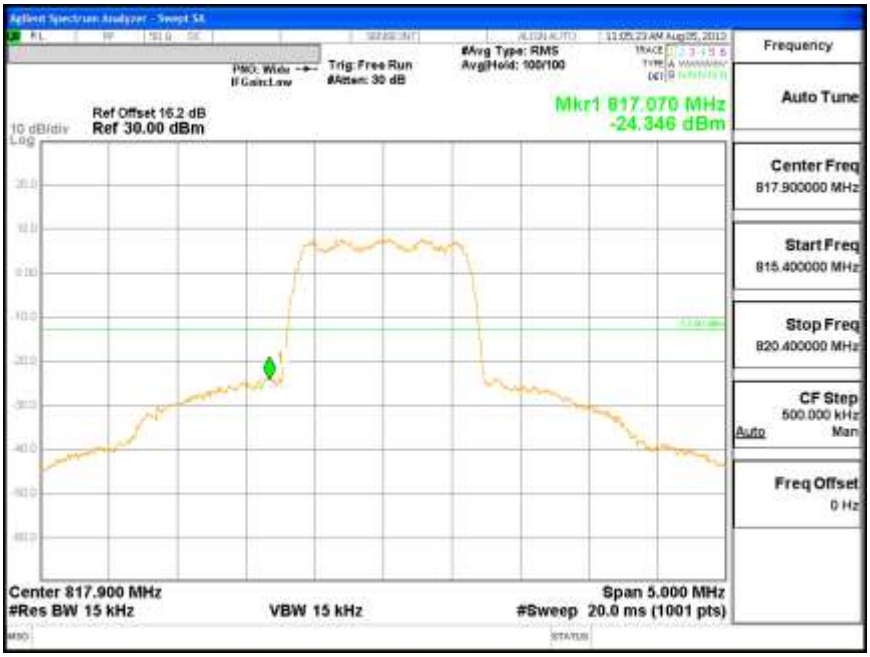


HIGH CH

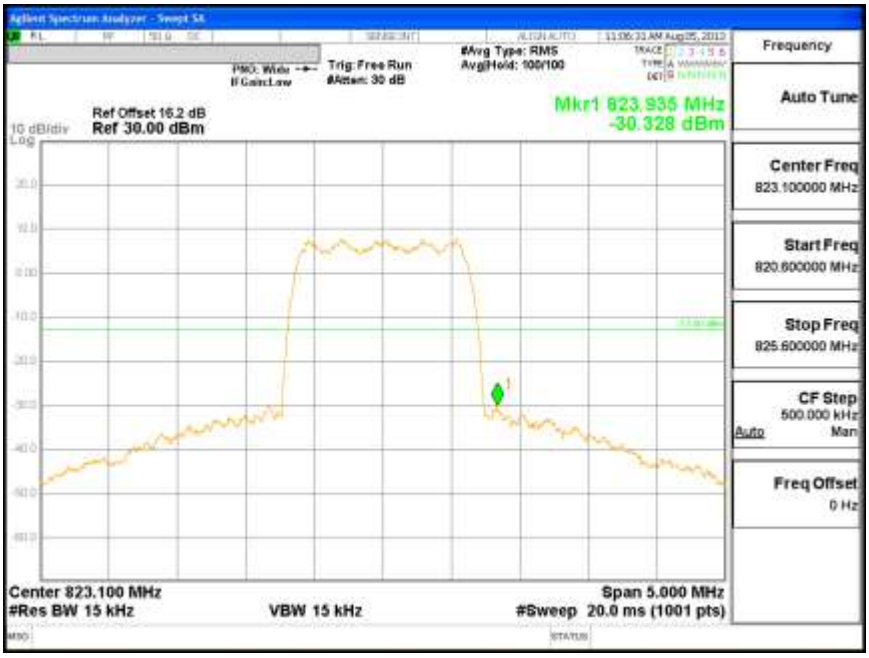


8.2.10. EVDO Rev A, BC 10

LOW CH

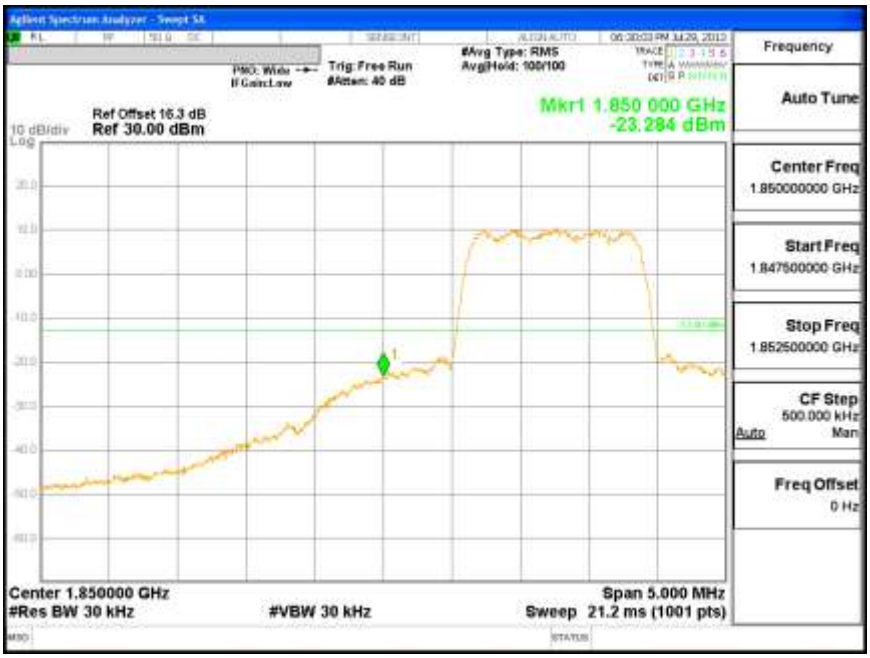


HIGH CH

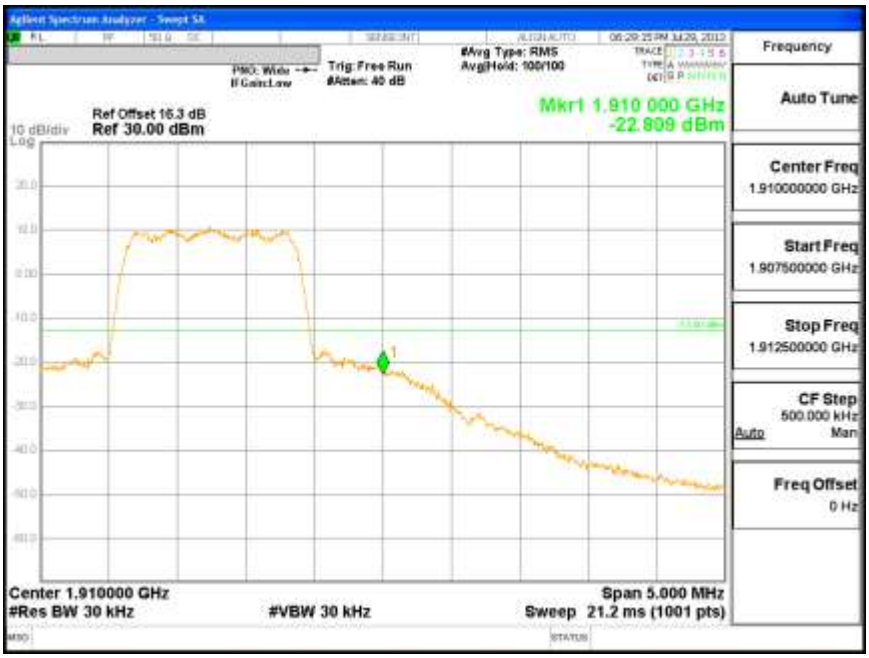


8.2.11. 1xRTT mode BC 1

LOW CH

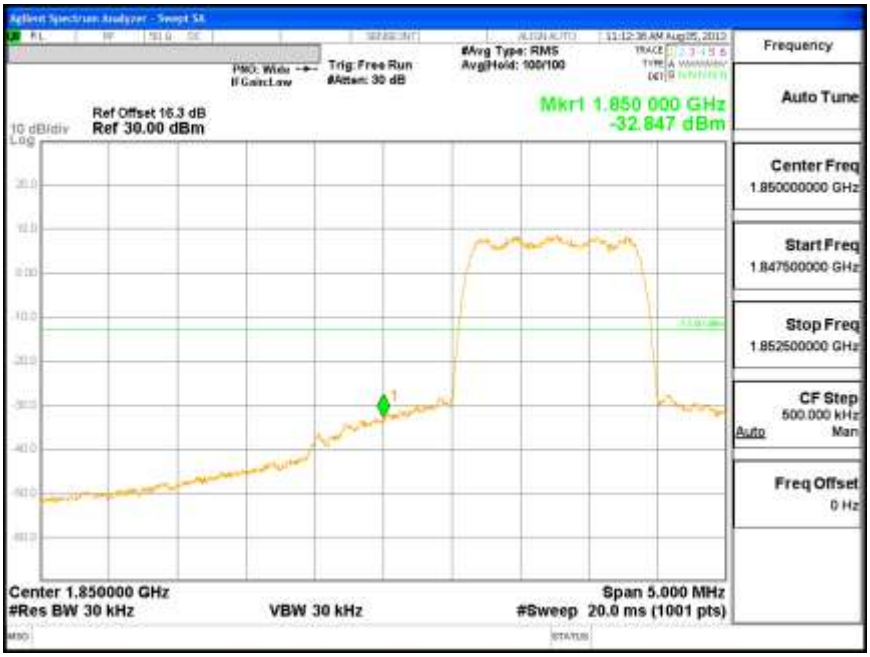


HIGH CH

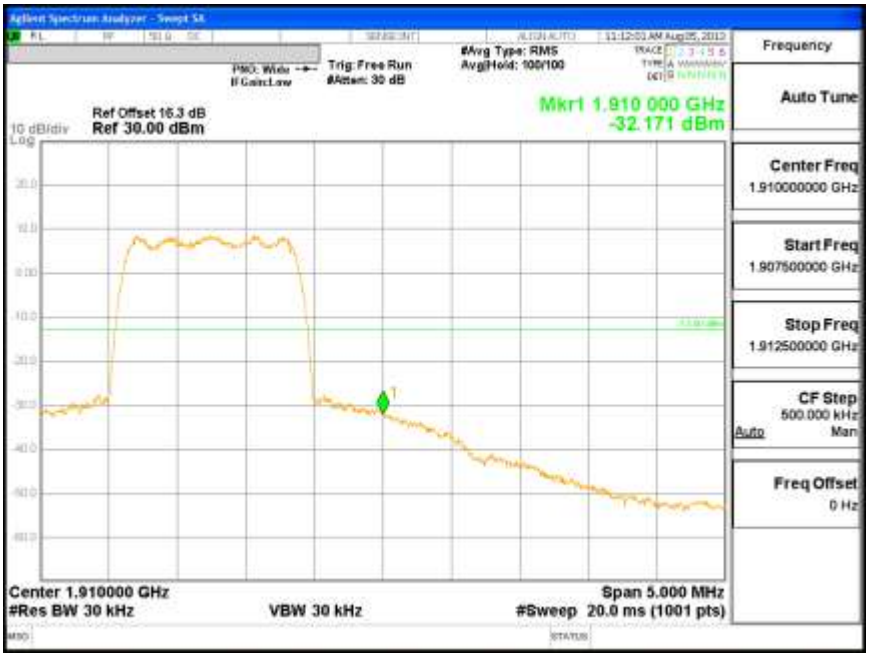


8.2.12. EVDO REV A, BC 1

LOW CH



HIGH CH



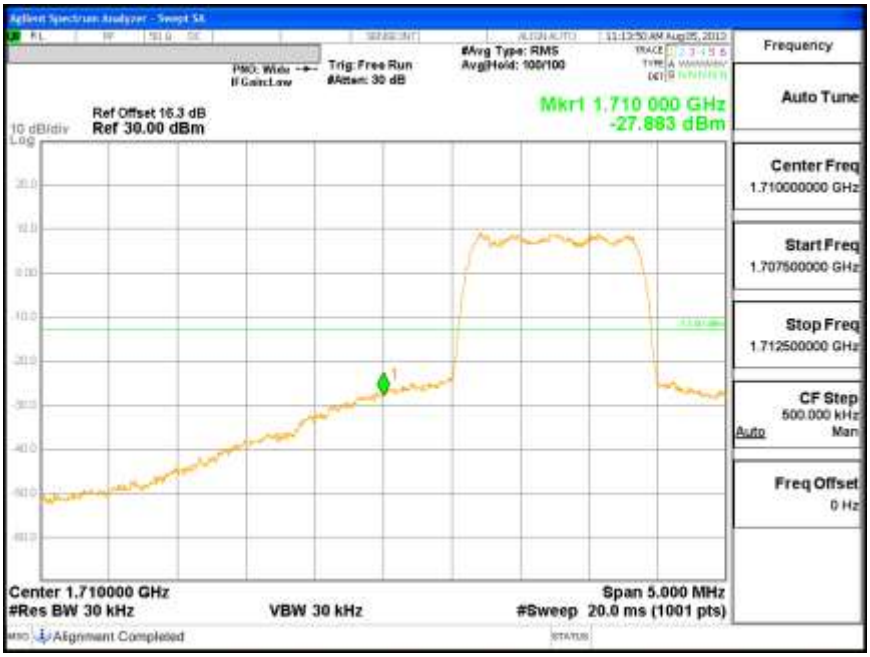
8.2.13. 1XRTT BC15

LOW CH

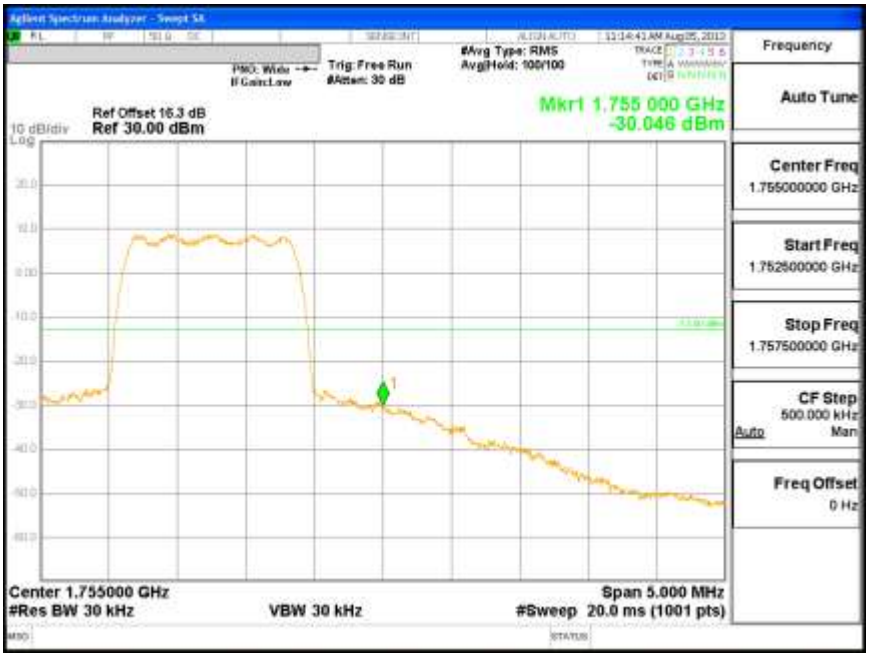
HIGH CH

8.2.14. EVDO Rev A, BC 15

LOW CH



HIGH CH



8.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53 §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 RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

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

MODES TESTED

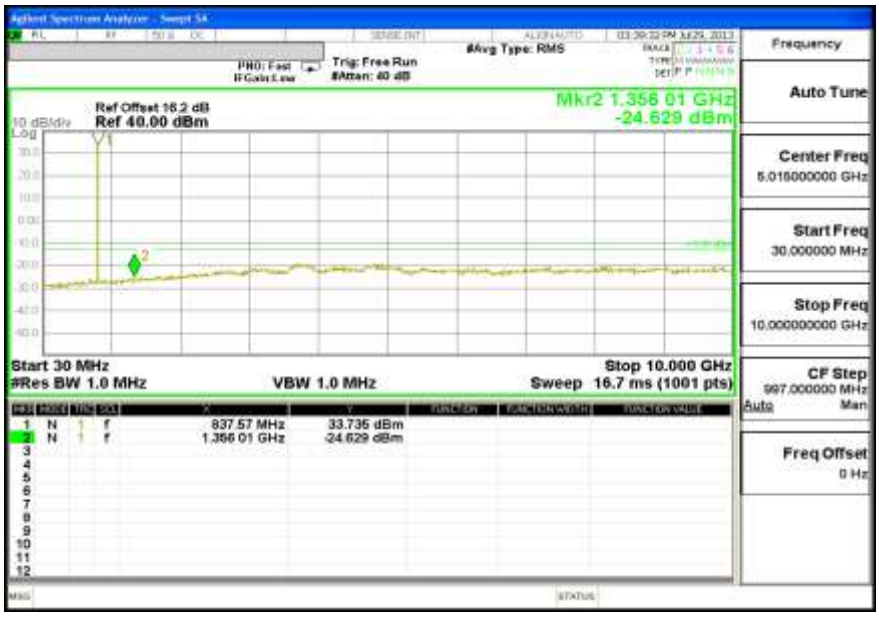
- GPRS and EGPRS
- UMTS, REL 99 and HSDPA
- CDMA2000, BC0, BC10, BC1 and BC15

RESULTS

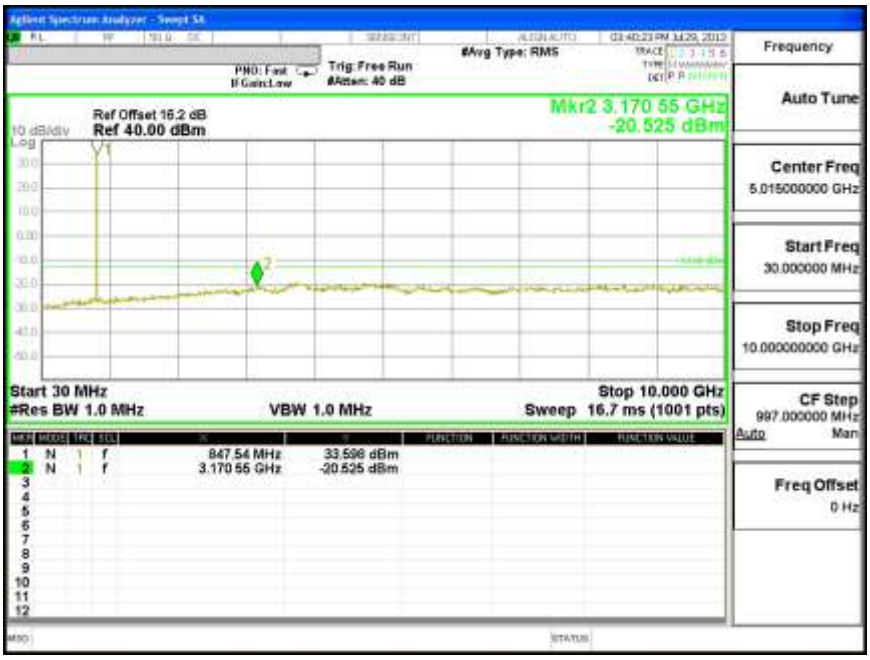
GPRS850

LOW CH

MID CH

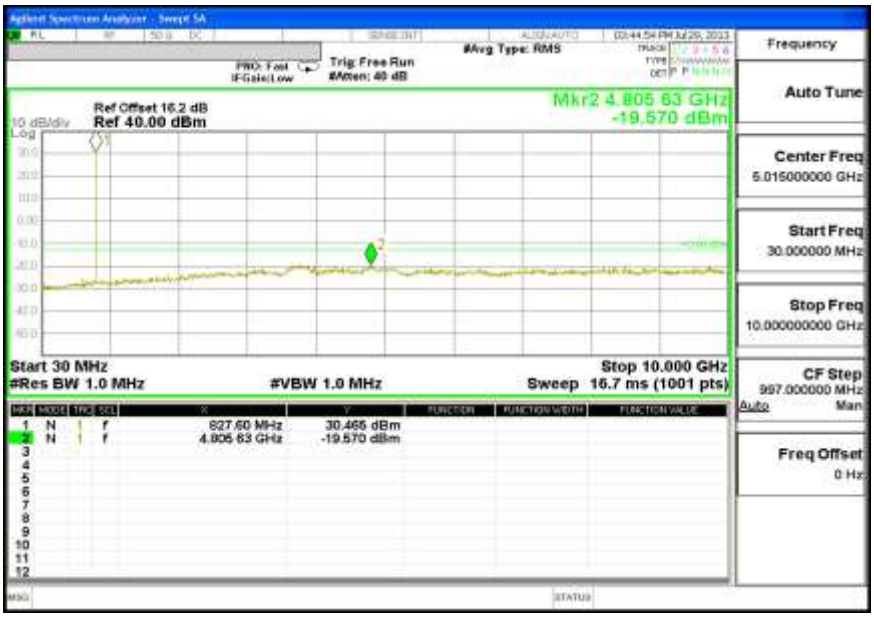


HIGH CH

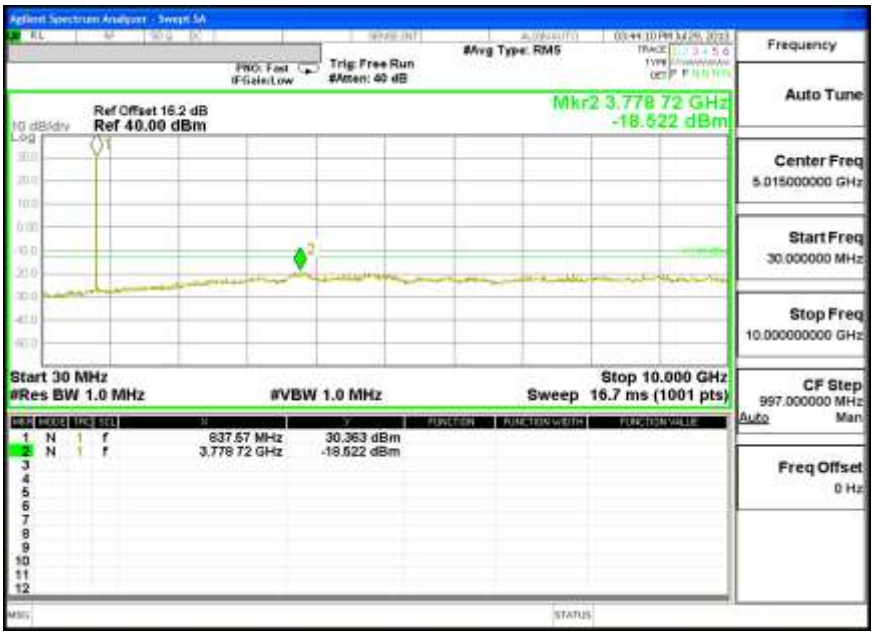


EGPRS850

LOW CH



MID CH

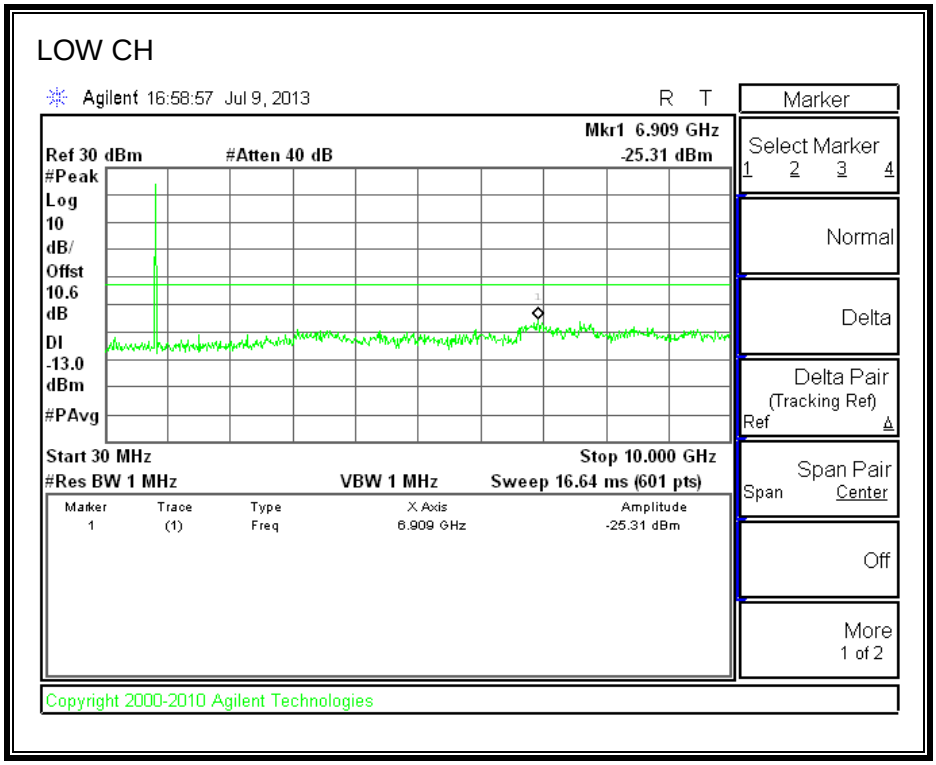


HIGH CH

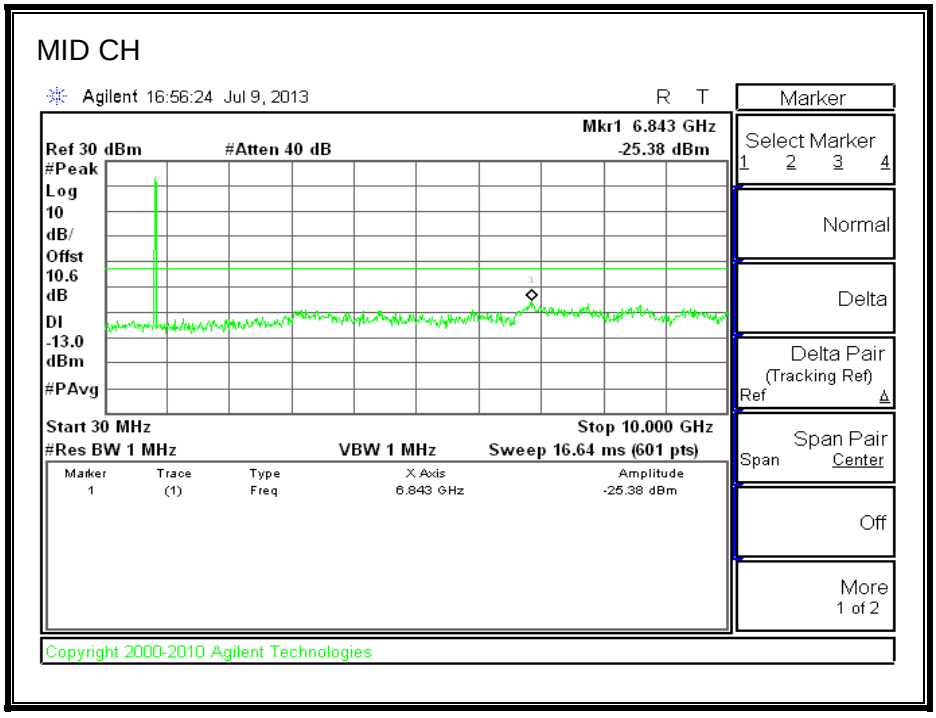
UMTS850

REL 99 (Cell Band)

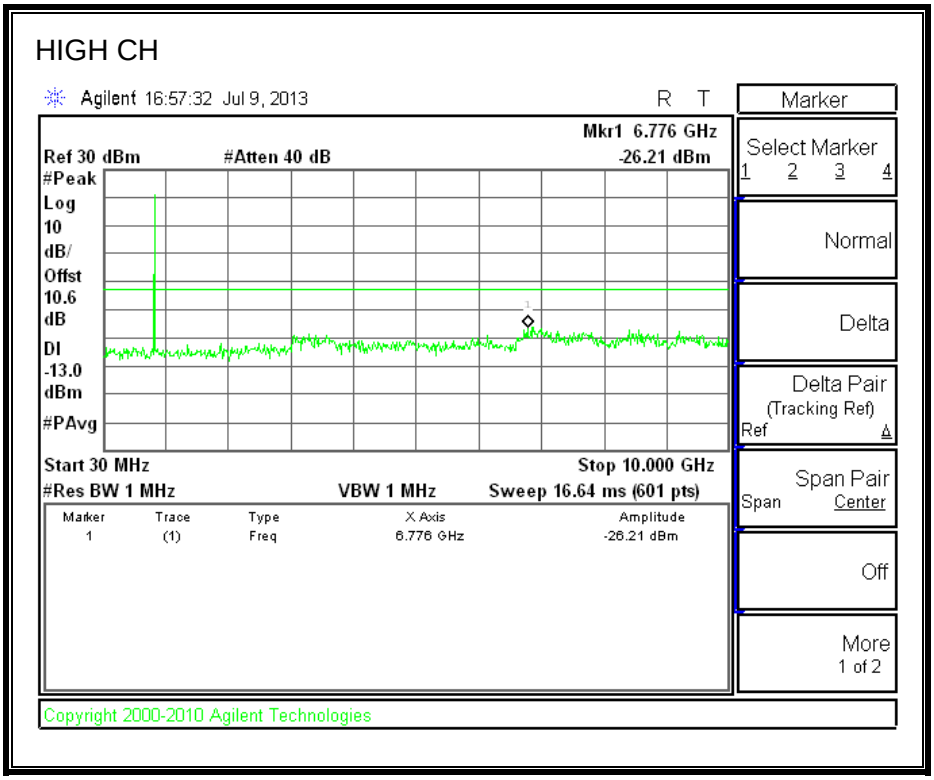
LOW CH



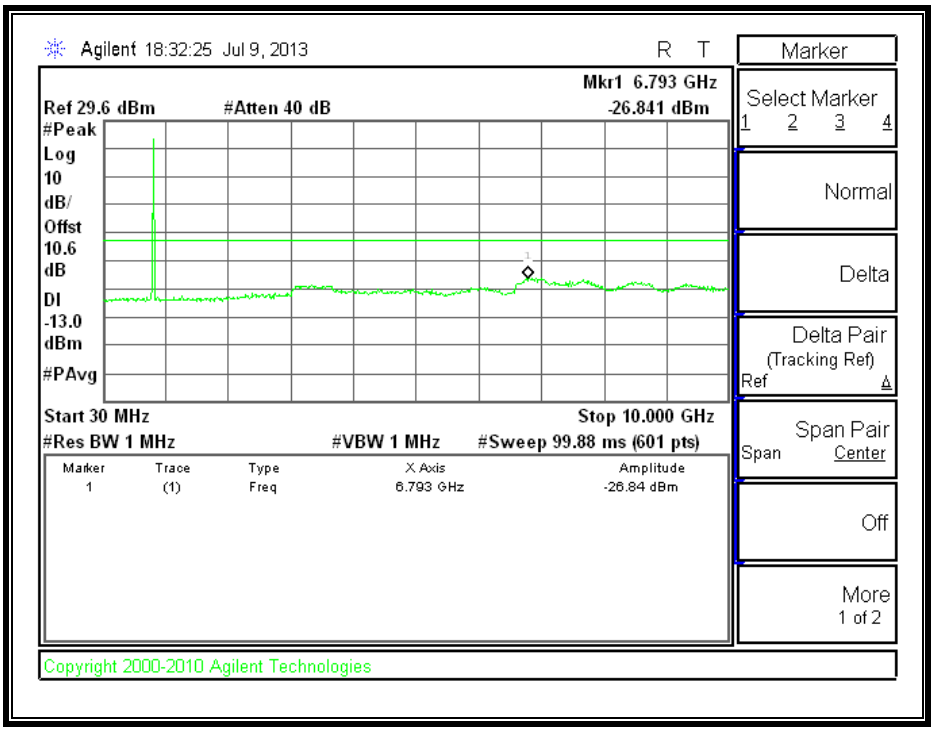
MID CH

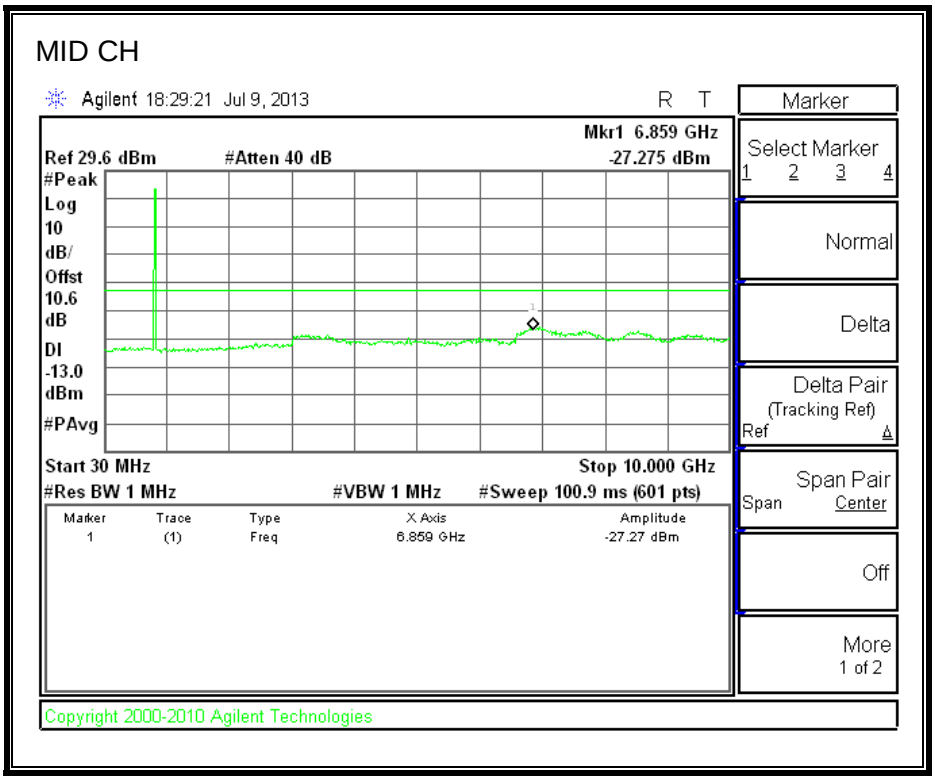


HIGH CH

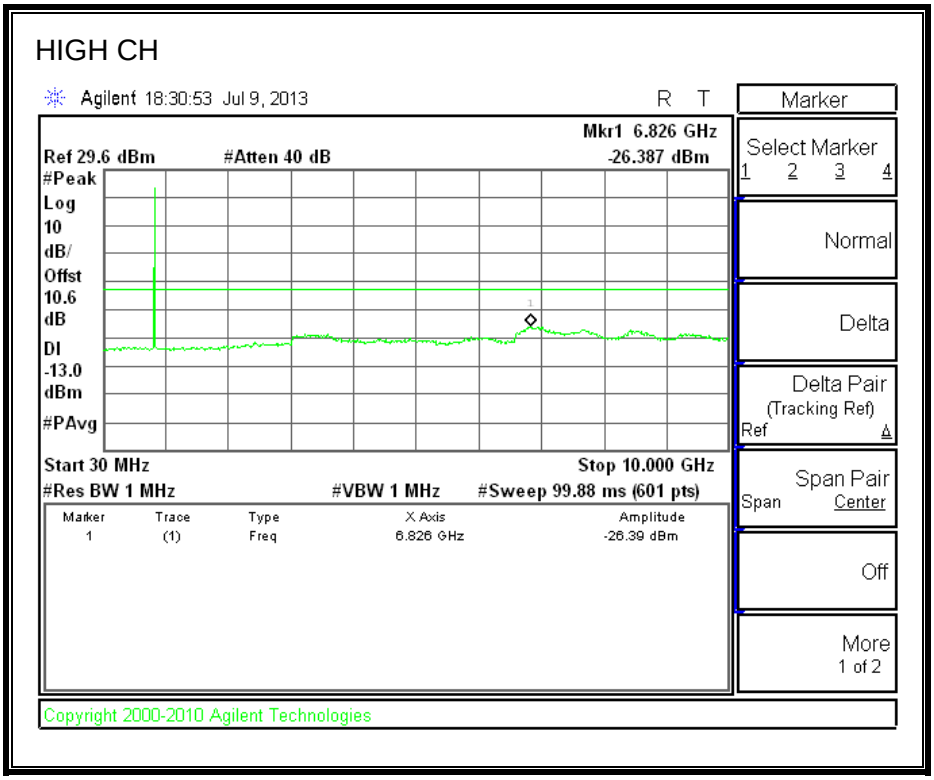


HSDPA (Cell Band)



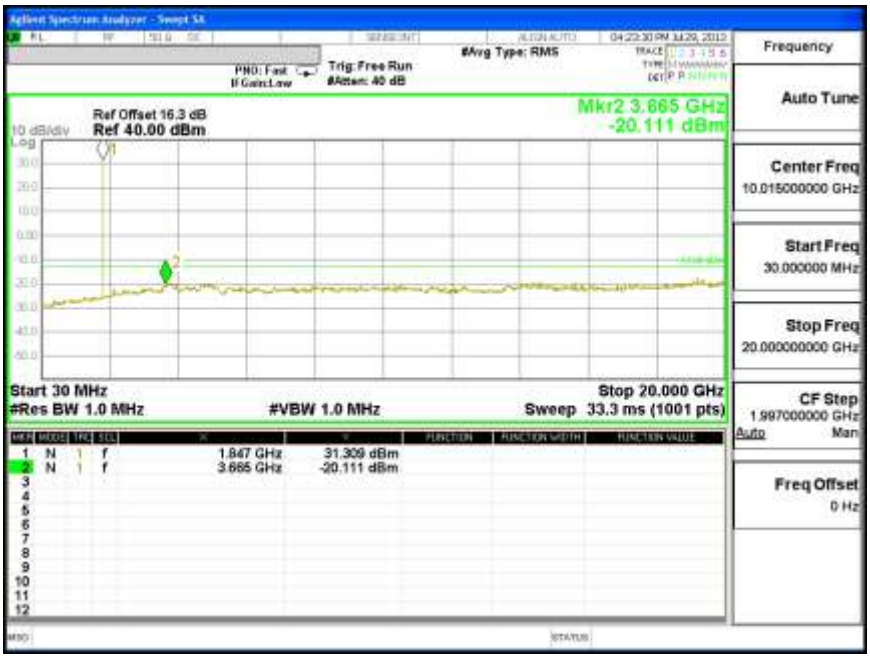


HIGH CH

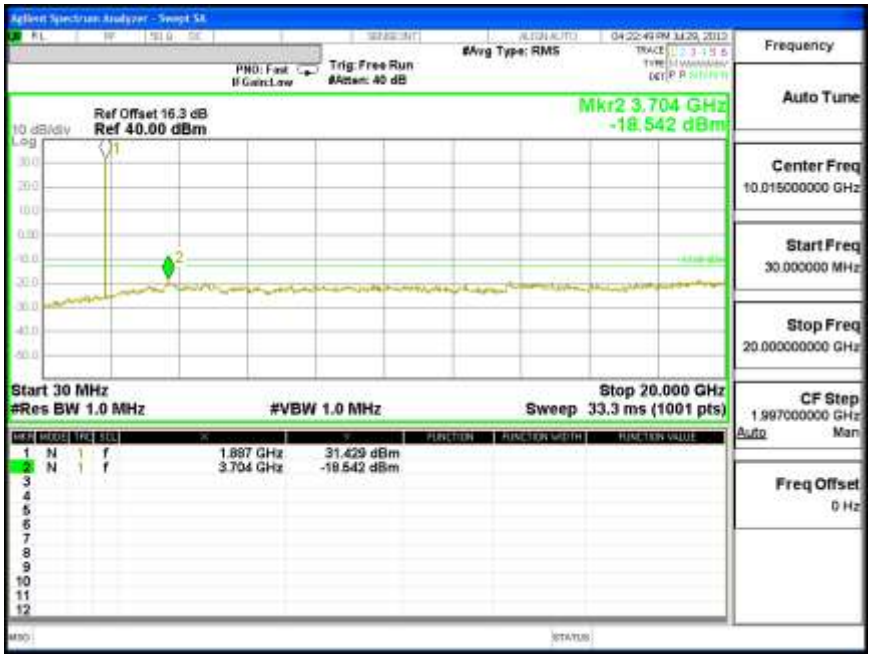


GPRS1900

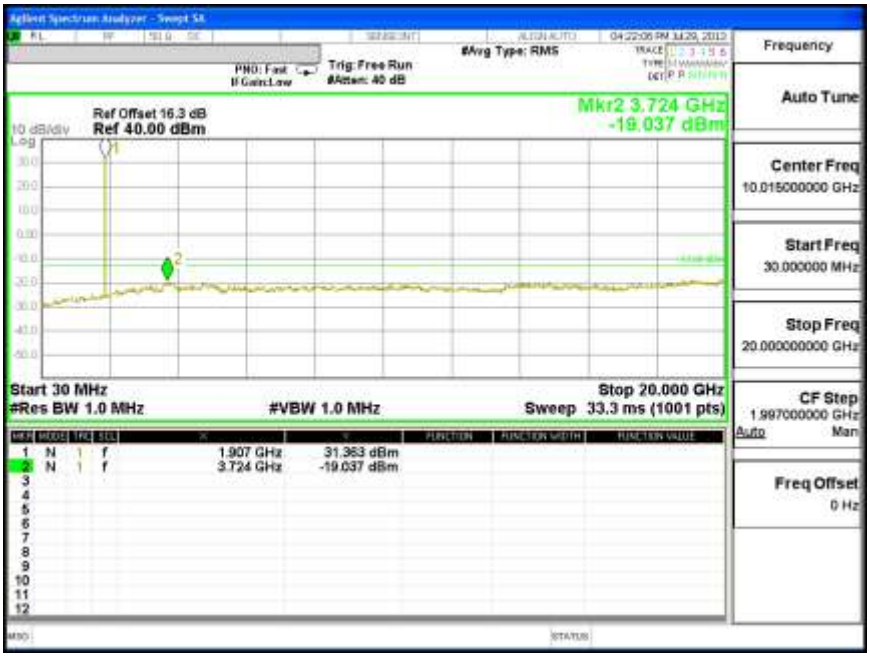
LOW CH



MID CH

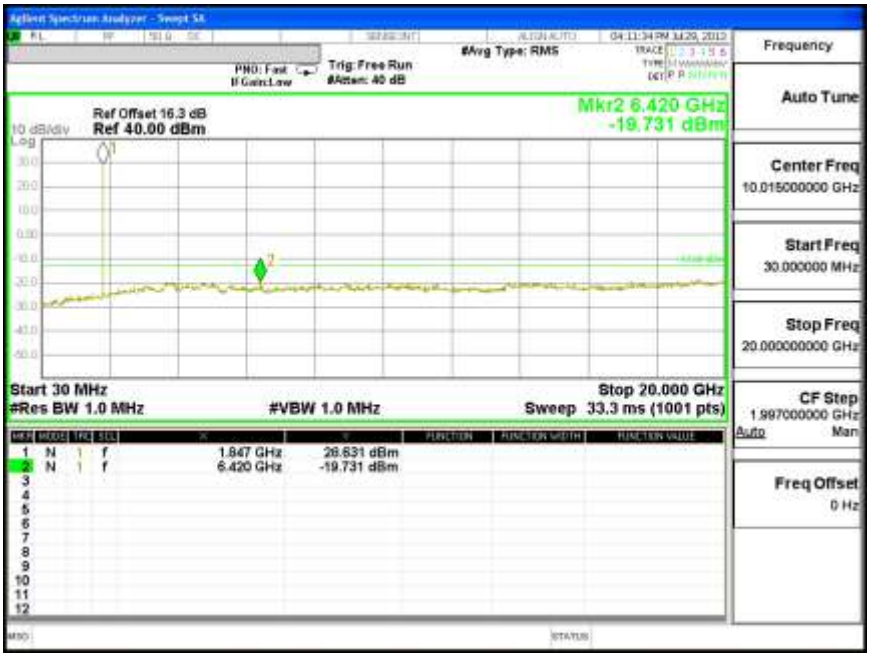


HIGH CH



EGPRS 1900

LOW CH



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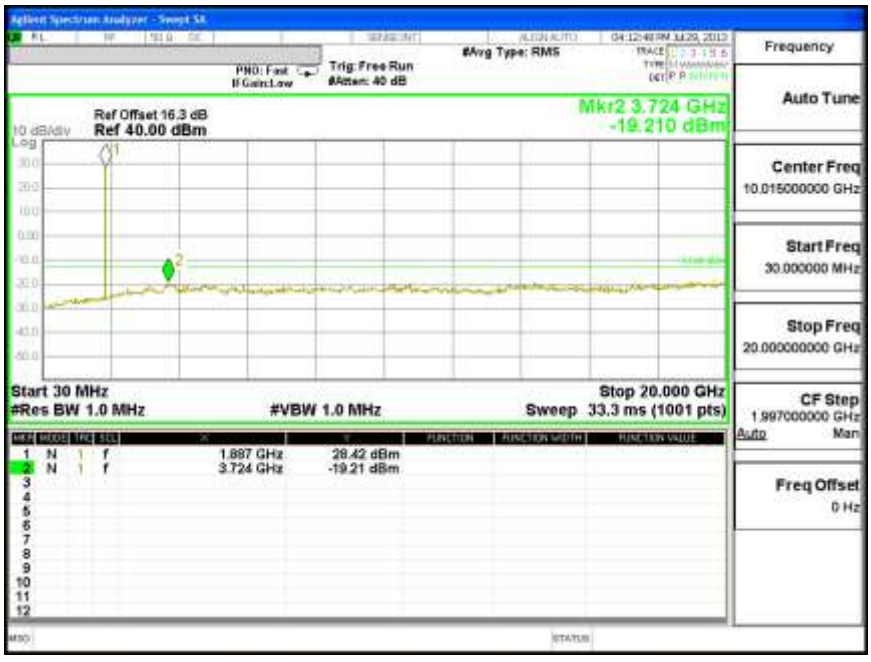
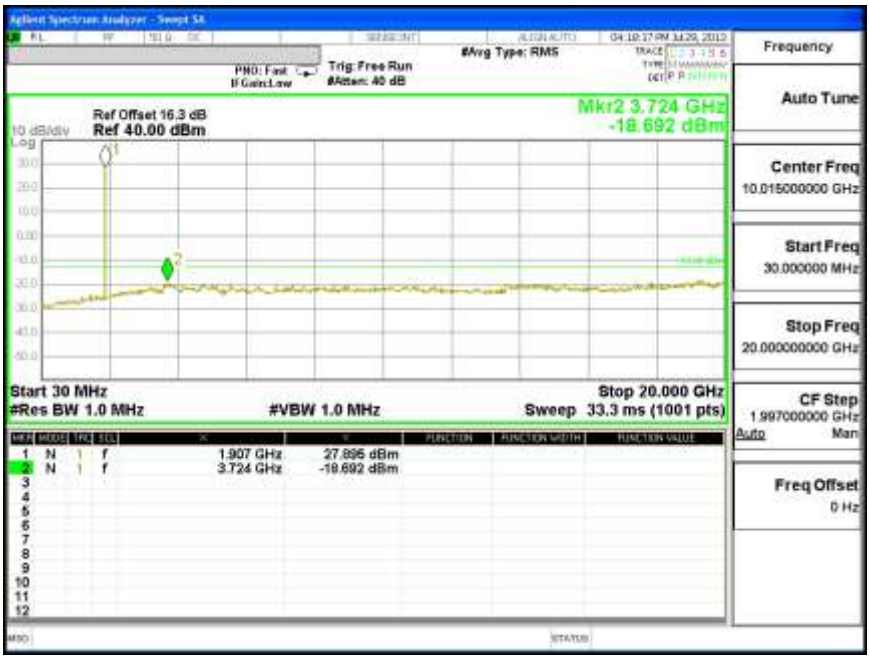


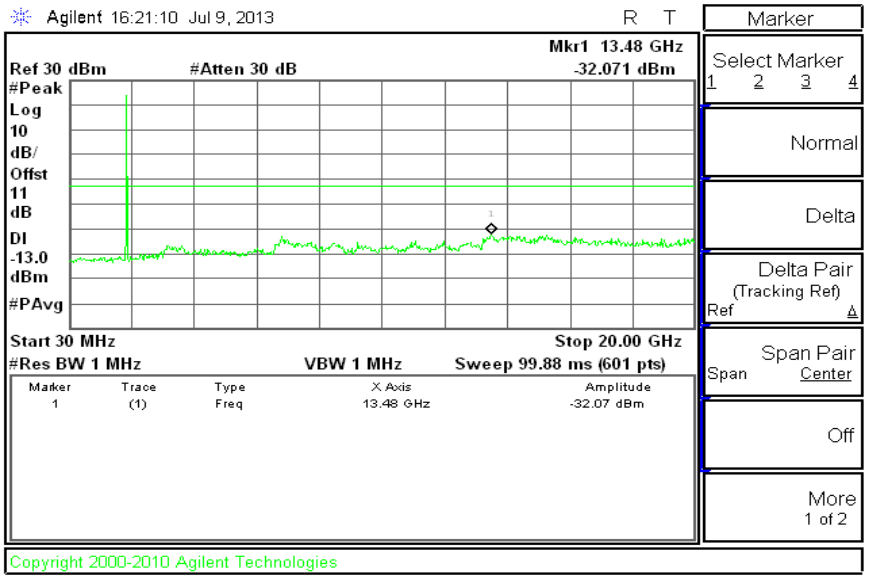
HIGH CH



UMTS1900

REL 99 (PCS Band)

LOW CH



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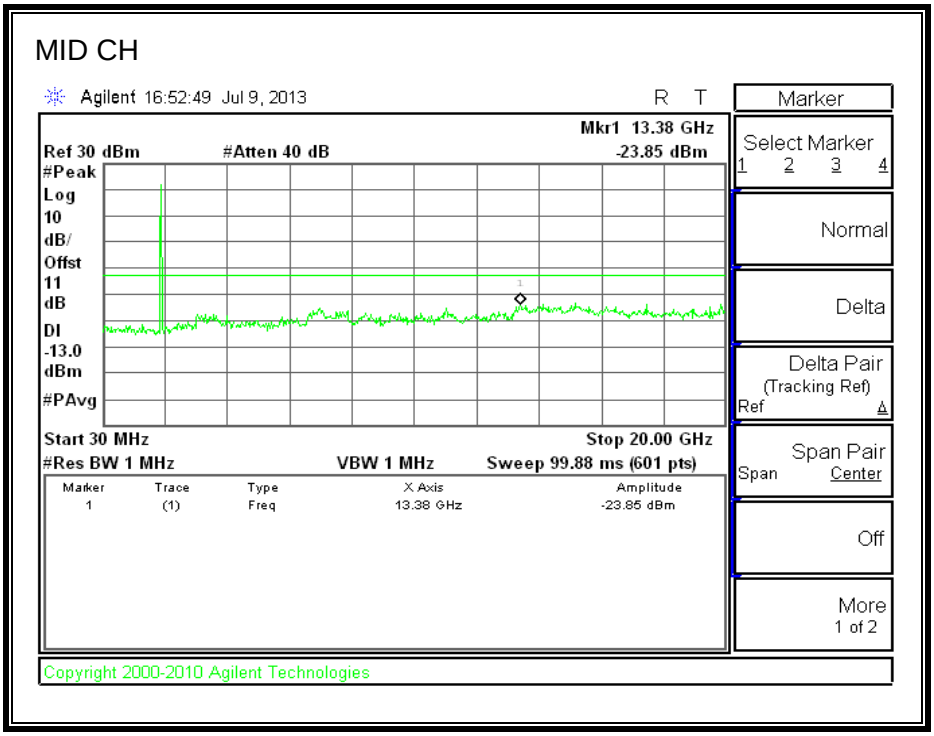

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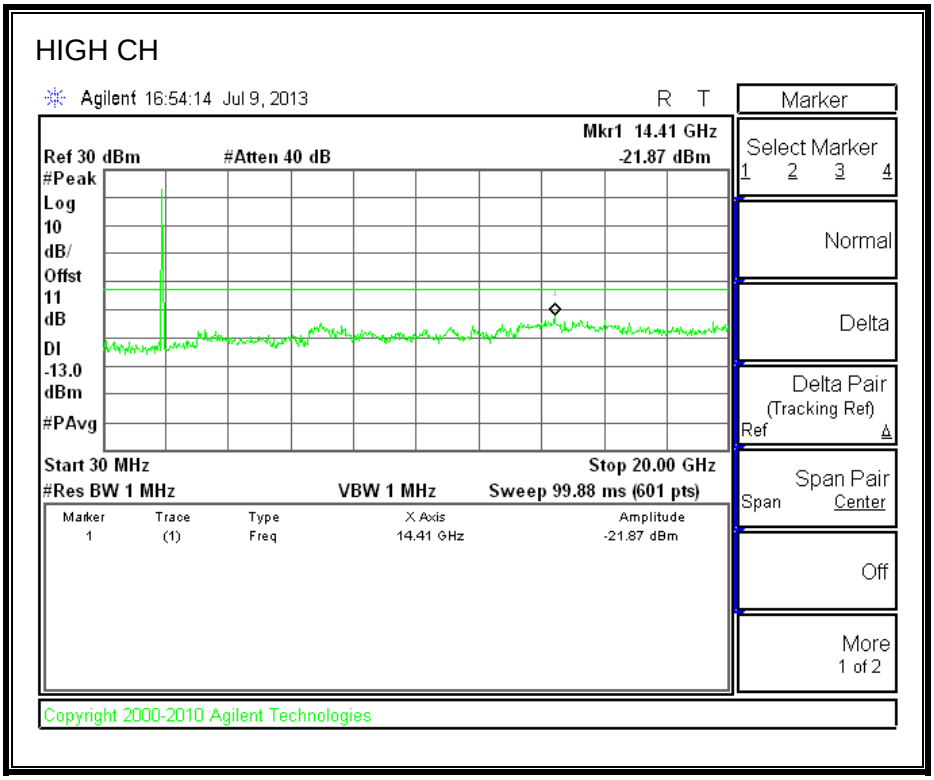
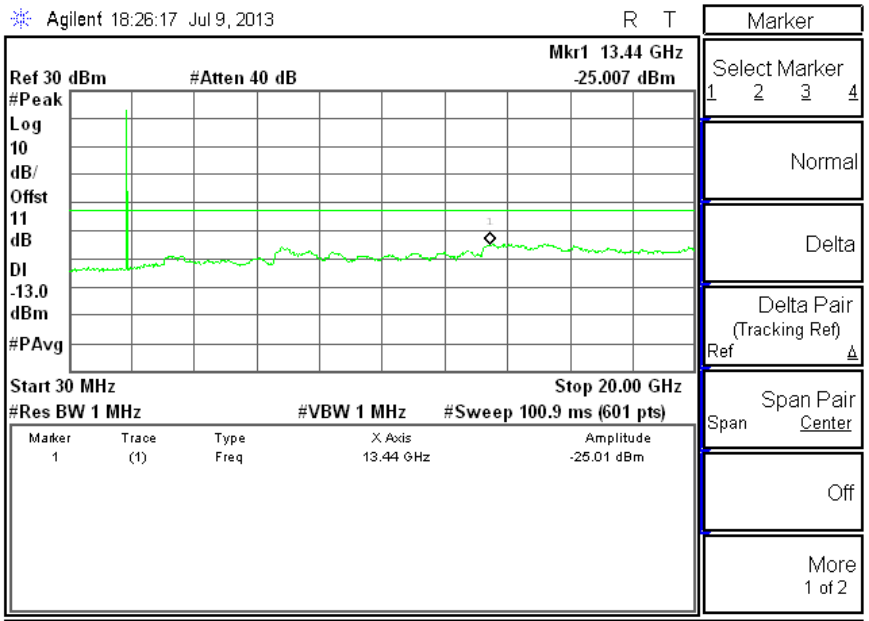
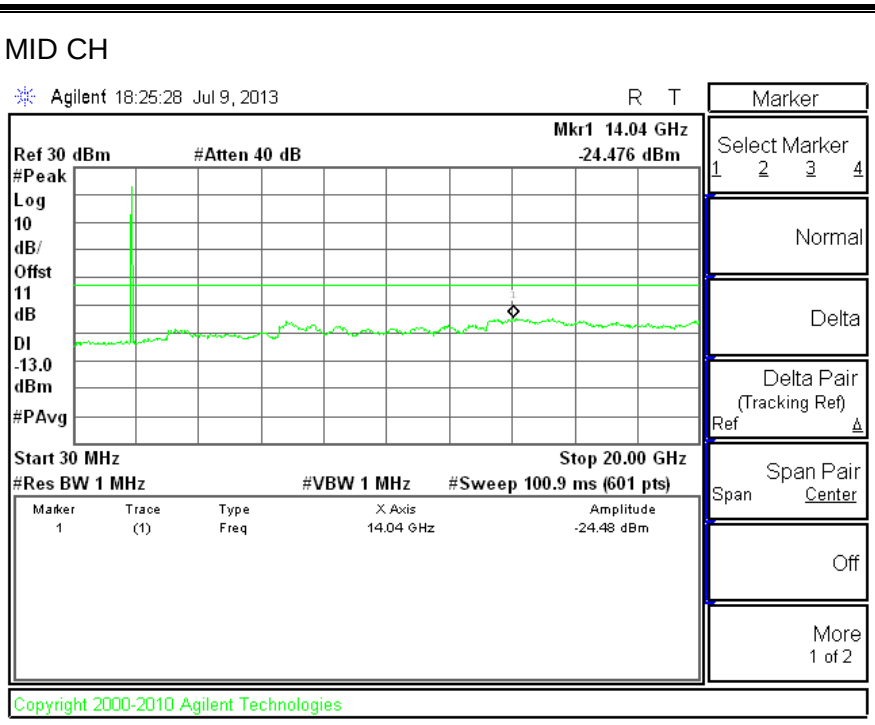


HSDPA (PCS Band)

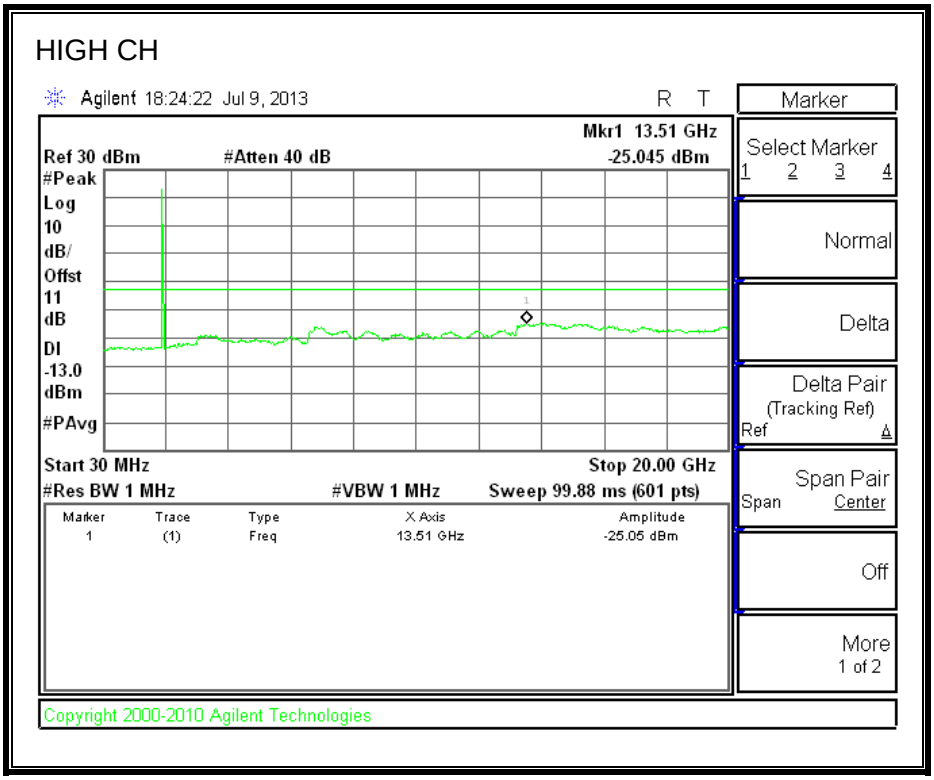
LOW CH



MID CH



HIGH CH



UMTS1700, REL 99 (AWS Band)

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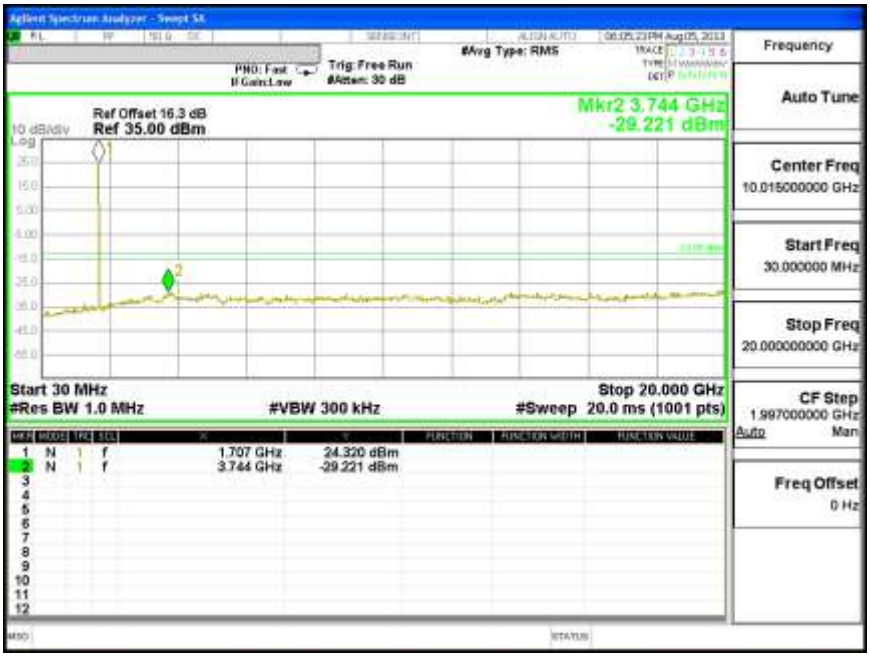
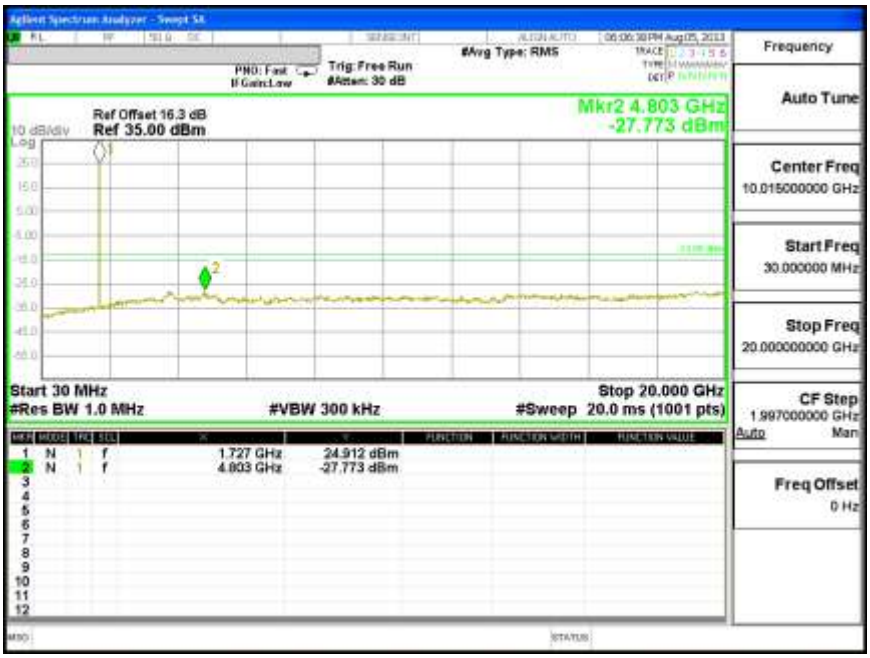


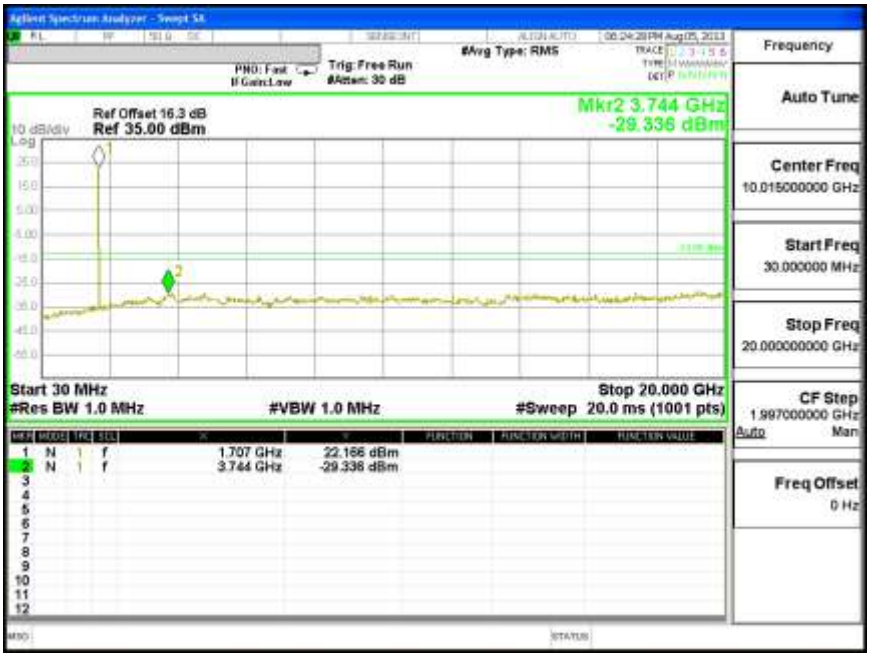
MID CH



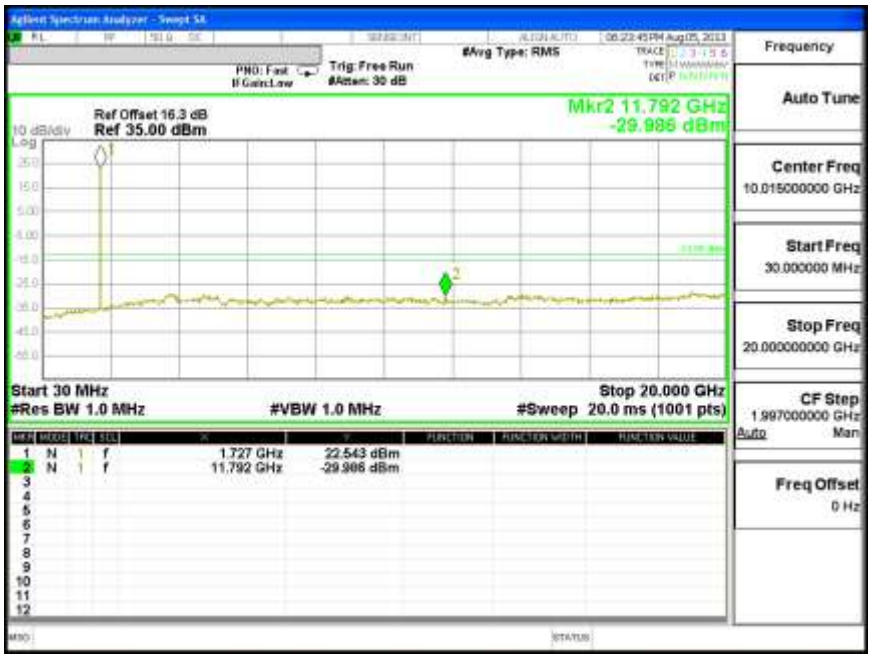
HIGH CH

HSDPA (AWS Band)

LOW CH



MID CH

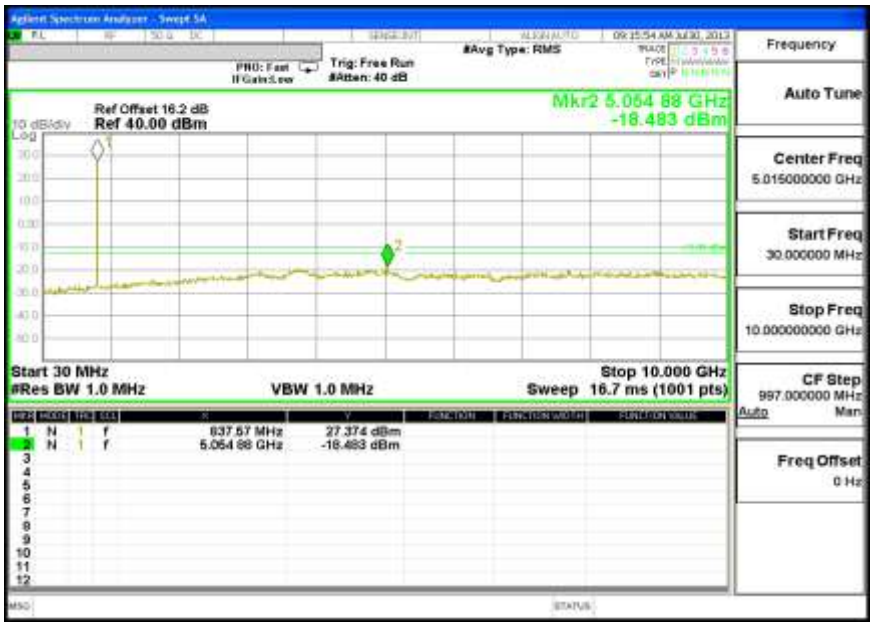


HIGH CH

CDMA2000 1xRTT, BC 0

LOW CH

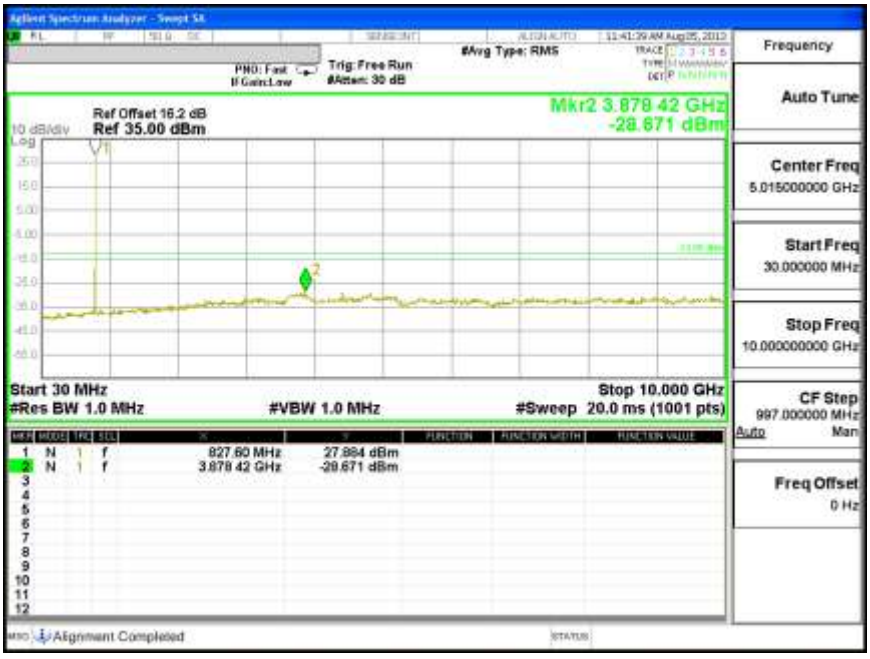
MID CH



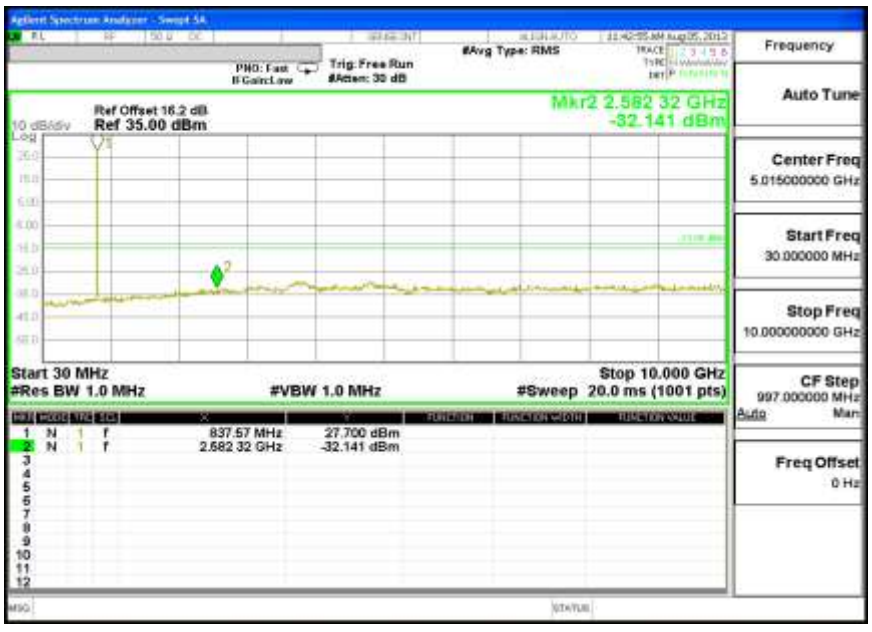
HIGH CH

EVDO Rev A, BC 0

LOW CH



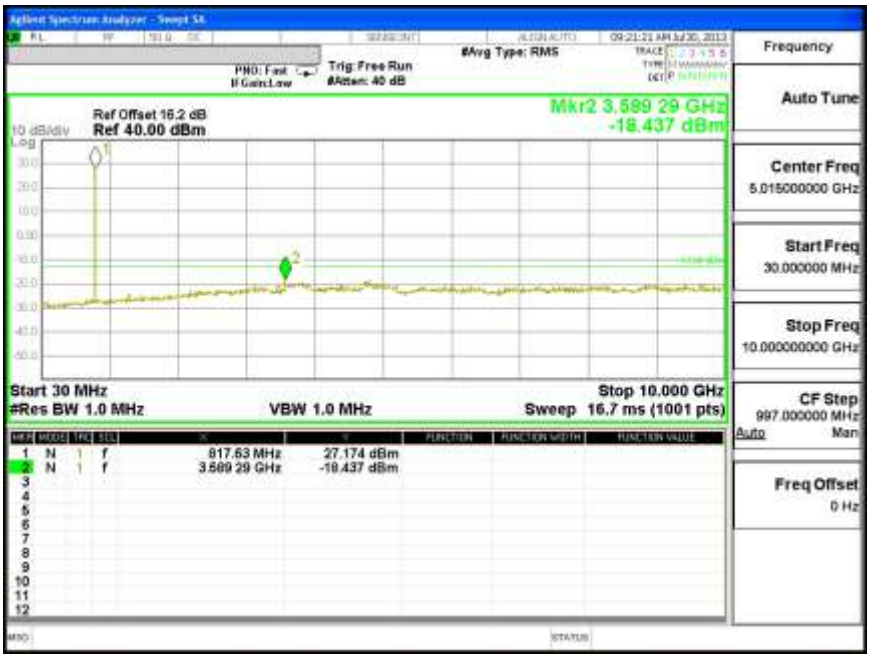
MID CH



HIGH CH

1xRTT, BC 10

LOW CH



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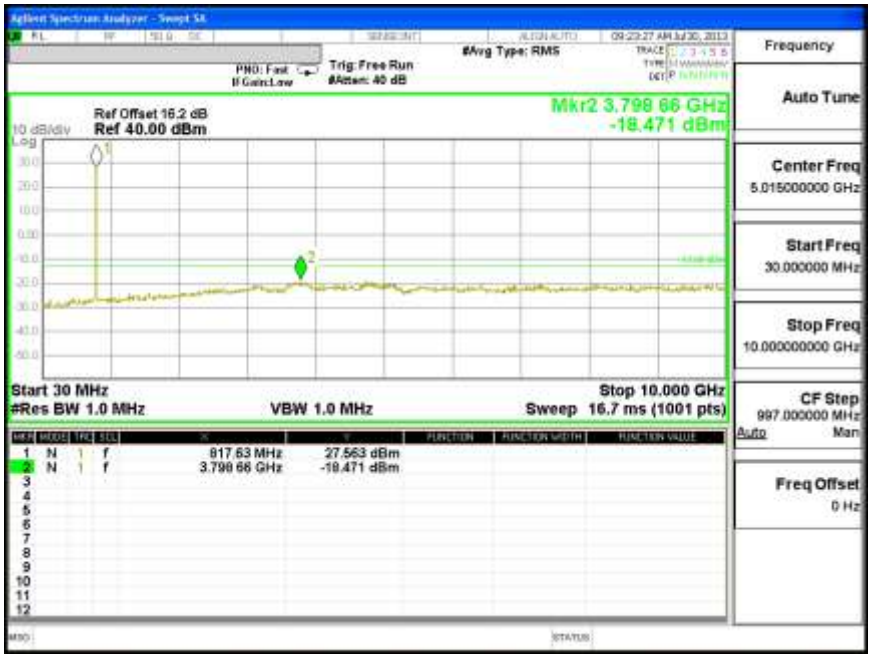
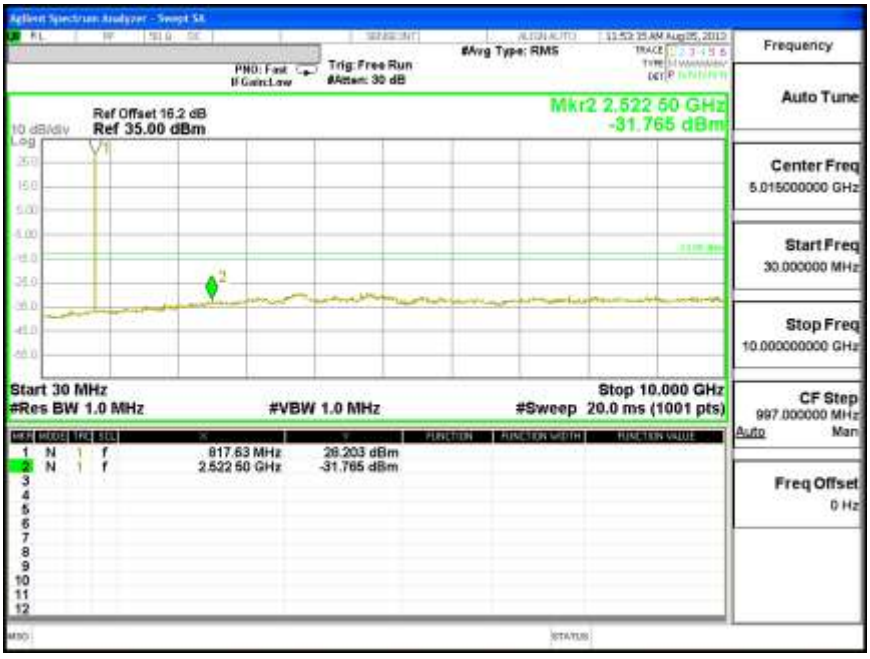


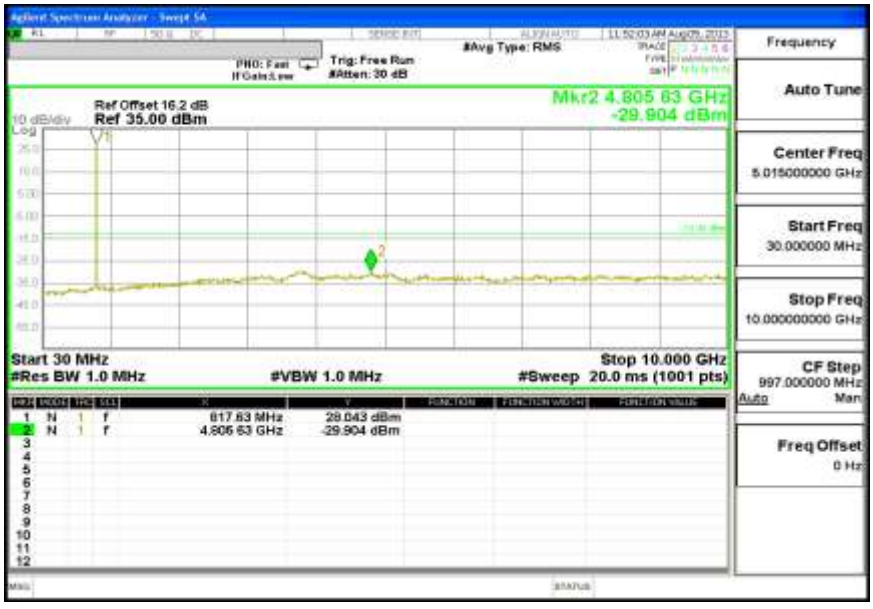
HIGH CH

EVDO Rev A, BC 10

LOW CH



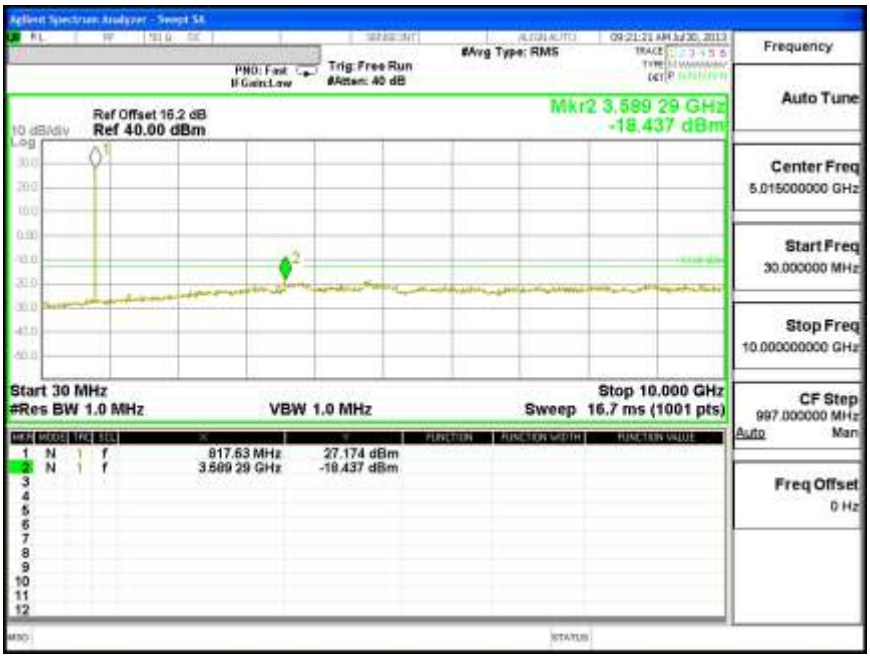
MID CH



HIGH CH

1xRTT, BC 1

LOW CH



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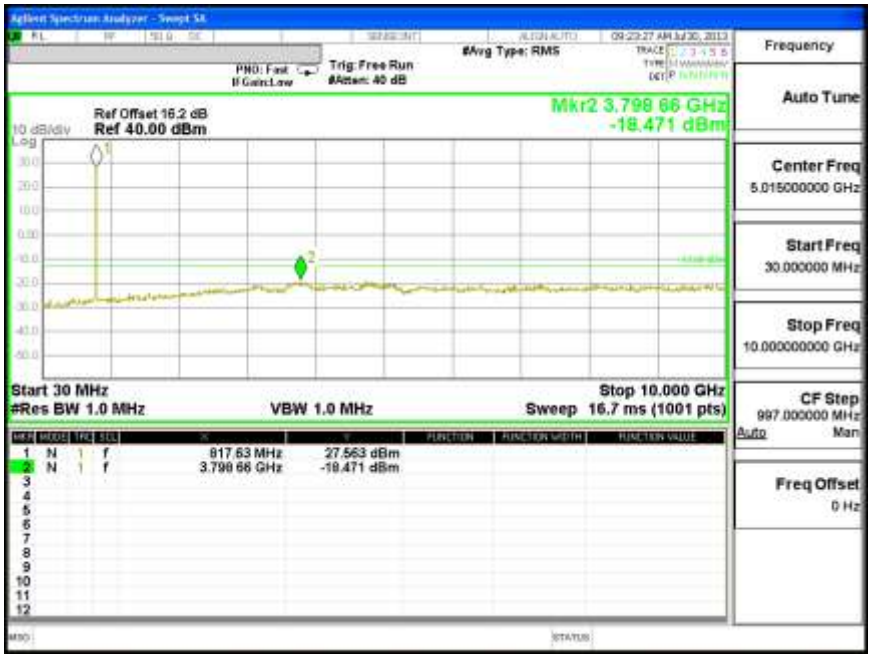
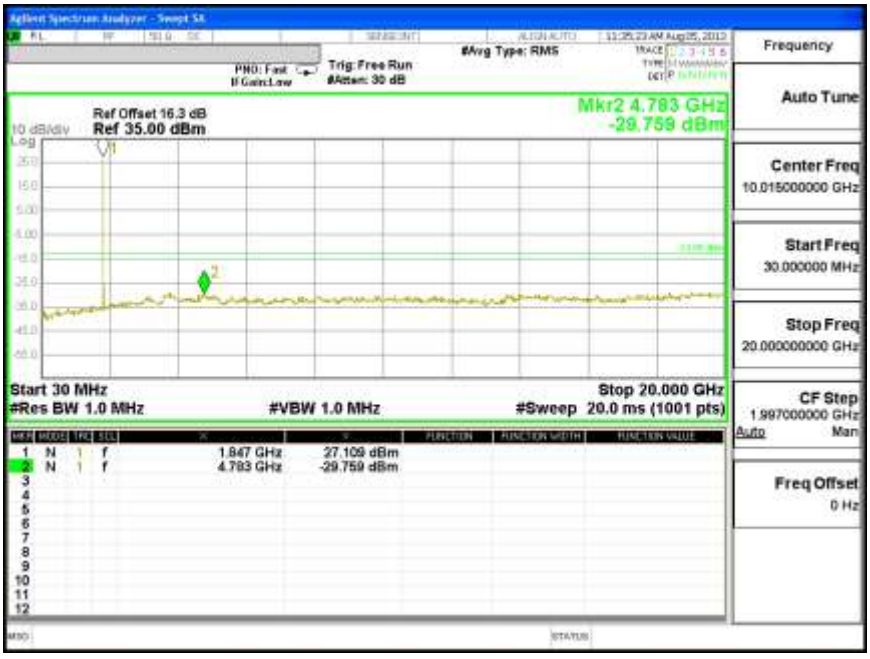


HIGH CH

EVDO Rev A, BC 1

LOW CH



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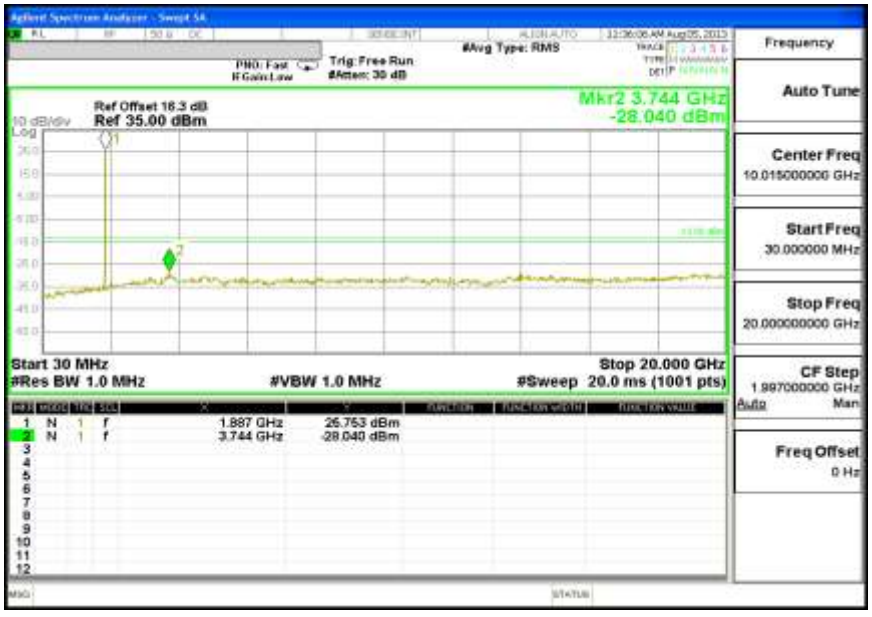
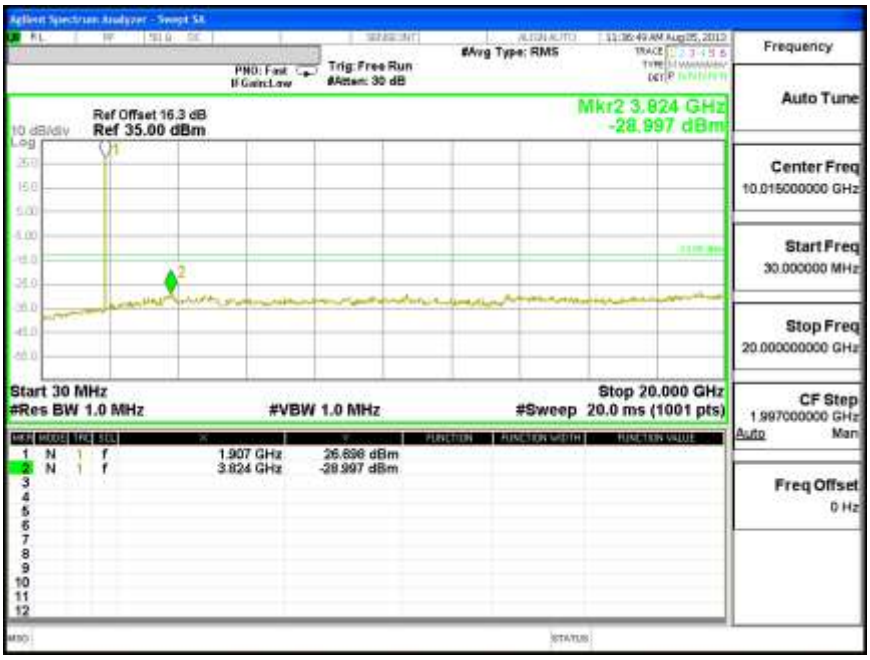
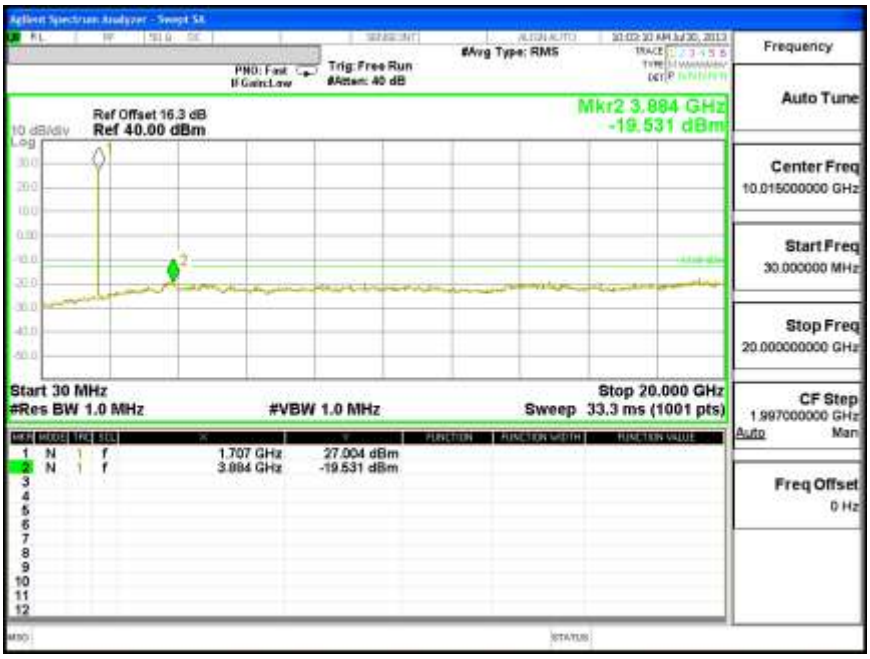


HIGH CH

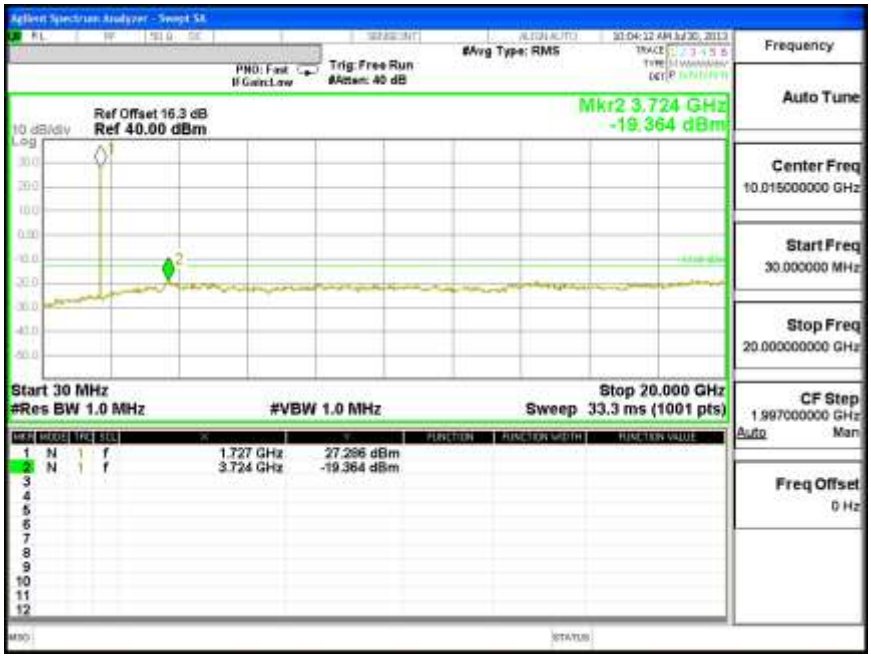


1xRTT, BC 15

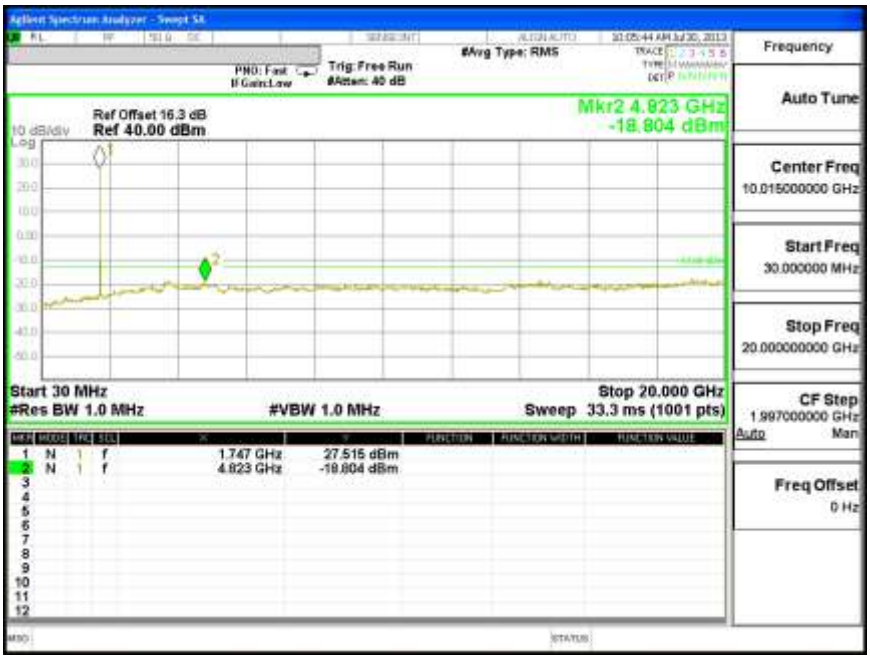
LOW CH



MID CH

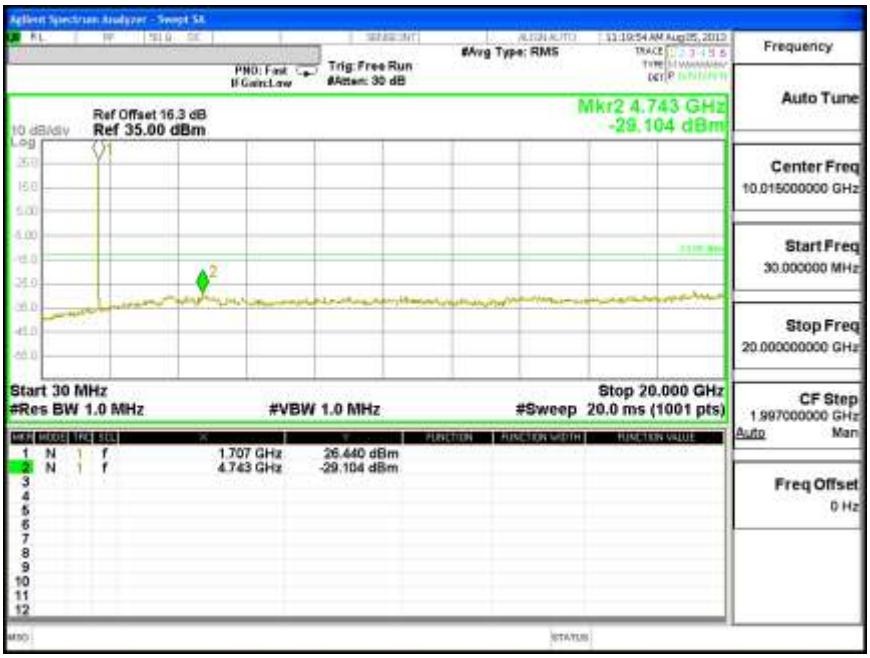


HIGH CH

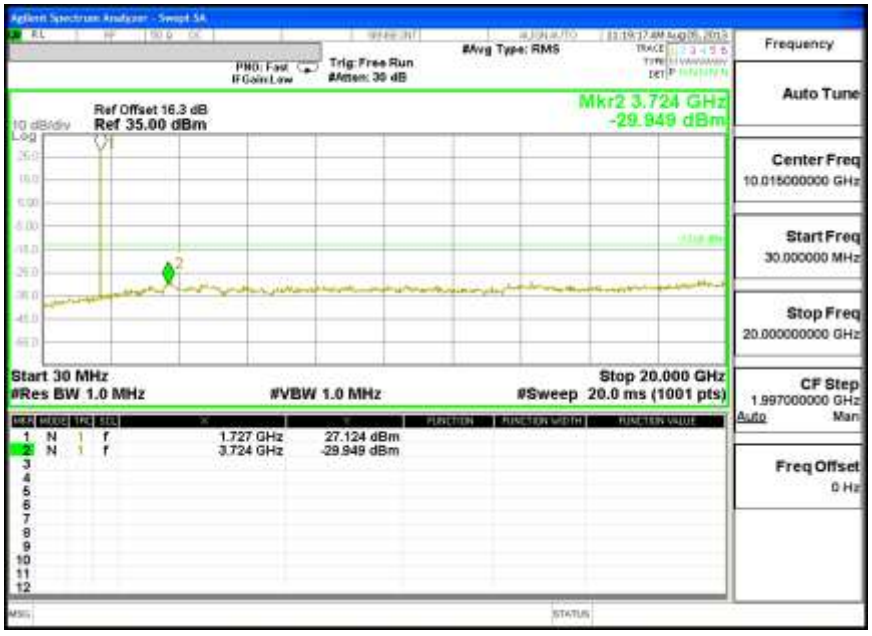


EVDO Rev A, BC 15

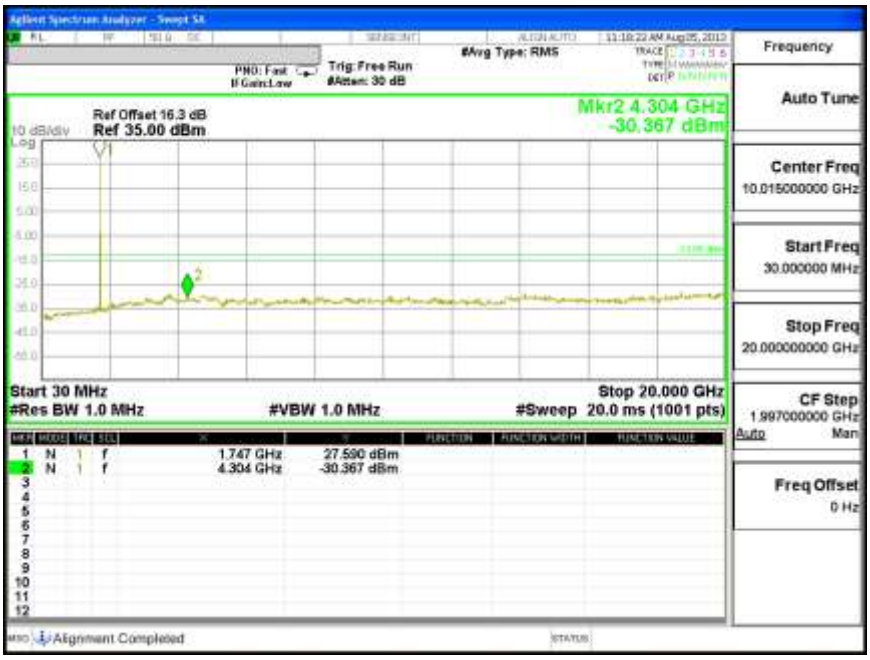
LOW CH



MID CH



HIGH CH



8.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54

LIMITS

- §22.355 - The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

- §24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

- §27.54 - The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation

TEST PROCEDURE

Use Agilent 8960 and CMW 500 with Frequency Error measurement capability.

- Temp. = −30° to +50°C
- Voltage = (85% - 115%)

Frequency Stability vs Temperature:
The EUT is place inside a temperature chamber. The temperature is set to 20ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.

Frequency Stability vs Voltage:
The peak frequency error is recorded (worst-case).

MODES TESTED

- GPRS;EGPRS 850MHz, 1900MHz
- CDMA BC0, BC1, BC10 and BC15
- WCDMA ; HSDPA

RESULTS

See the following pages.

CELL, GPRS MODULATION – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.600007 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.599999	0.010	2.5
3.80	40	836.600011	-0.005	2.5
3.80	30	836.600014	-0.008	2.5
3.80	***20***	**836.600007**	***0***	***2.5***
3.80	10	836.600017	-0.012	2.5
3.80	0	836.600016	-0.011	2.5
3.80	-10	836.600018	-0.013	2.5
3.80	-20	836.600014	-0.008	2.5
3.80	-30	836.600000	0.008	2.5

Reference Frequency: Cellular Mid Channel 836.600007MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	**836.600007**	***0***	***2.5***
4.20	20	836.600015	*-0.010*	2.5
3.40	20	836.600011	*-0.005*	2.5
End Volt(3.2)	20	836.600010	*-0.004*	2.5

PCS, GPRS MODULATION – MID CHANNEL

Reference Frequency: PCS Mid Channel 1879.999985 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.999967	0.010	2.5
3.80	40	1879.999969	0.009	2.5
3.80	30	1879.999972	0.007	2.5
3.80	***20***	**1879.999985**	***0***	***2.5***
3.80	10	1879.999994	-0.005	2.5
3.80	0	1879.999974	0.006	2.5
3.80	-10	1880.000065	-0.043	2.5
3.80	-20	1879.999967	0.010	2.5
3.80	-30	1879.999966	0.010	2.5

Reference Frequency: PCS Mid Channel 1879.999985 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1879.999985***	***0.00000***	***2.5***
4.20	20	1879.999973	*0.00638*	2.5
3.40	20	1879.999971	*0.00745*	2.5
End Volt(3.2)	20	1879.999969	*0.00851*	2.5

CELL, EGPRS MODULATION – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.600005 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.599993	0.014	2.5
3.80	40	836.600006	-0.001	2.5
3.80	30	836.600008	-0.004	2.5
3.80	***20***	**836.600005**	***0***	***2.5***
3.80	10	836.600007	-0.002	2.5
3.80	0	836.600006	-0.001	2.5
3.80	-10	836.600008	-0.004	2.5
3.80	-20	836.600011	-0.007	2.5
3.80	-30	836.600007	-0.002	2.5

Reference Frequency: Cellular Mid Channel 836.600005MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	**836.600005**	***0***	***2.5***
4.20	20	836.600008	*-0.004*	2.5
3.40	20	836.600009	*-0.005*	2.5
End Volt(3.2)	20	836.600006	*-0.001*	2.5

PCS, EGPRS MODULATION – MID CHANNEL

Reference Frequency: PCS Mid Channel 1879.999982 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.999965	0.009	2.5
3.80	40	1879.999967	0.008	2.5
3.80	30	1879.999970	0.006	2.5
3.80	***20***	**1879.999982**	***0***	***2.5***
3.80	10	1879.999996	-0.007	2.5
3.80	0	1879.999973	0.005	2.5
3.80	-10	1879.999997	-0.008	2.5
3.80	-20	1879.999968	0.007	2.5
3.80	-30	1879.999970	0.006	2.5

Reference Frequency: PCS Mid Channel 1879.999982 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1879.999982***	***0.00000***	***2.5***
4.20	20	1879.999972	*0.00532*	2.5
3.40	20	1879.999973	*0.00479*	2.5
End Volt(3.2)	20	1879.999968	*0.00745*	2.5

CELL WCDMA – MID

Reference Frequency: CELL Mid Channel 835.999998 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 2090.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	835.999999	-0.001	2.5
3.80	40	836.000000	-0.002	2.5
3.80	30	835.999999	-0.001	2.5
3.80	***20***	**835.999998**	***0***	***2.5***
3.80	10	836.000000	-0.002	2.5
3.80	0	835.999997	0.001	2.5
3.80	-10	835.999999	-0.001	2.5
3.80	-20	836.000000	-0.002	2.5
3.80	-30	835.999996	0.002	2.5

Reference Frequency: CELL Mid Channel 835.999998 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 2090.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
			Delta (ppm)	Limit (ppm)
3.80	***20***	***835.999998***	***0.00000***	***2.5***
4.20	20	835.999996	*0.00239*	2.5
3.40	20	836.000000	*-0.00239*	2.5
End Volt(3.2)	20	835.999995	*0.00359*	2.5

PCS, WCDMA – MID CHANNEL

Reference Frequency: PCS Mid Channel 1879.999991 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.999982	0.005	2.5
3.80	40	1879.999981	0.005	2.5
3.80	30	1879.99998	0.006	2.5
3.80	***20***	**1879.999991**	***0***	***2.5***
3.80	10	1879.999981	0.005	2.5
3.80	0	1879.999983	0.004	2.5
3.80	-10	1879.999985	0.003	2.5
3.80	-20	1879.999983	0.004	2.5
3.80	-30	1879.999984	0.004	2.5

Reference Frequency: PCS Mid Channel 1879.999991 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
			Delta (ppm)	Limit (ppm)
3.80	***20***	***1879.999991***	***0.00000***	***2.5***
4.20	20	1879.999979	*0.00638*	2.5
3.40	20	1879.999981	*0.00532*	2.5
End Volt(3.2)	20	1879.999980	*0.00585*	2.5

CDMA BC 0

Reference Frequency: Cellular Mid Channel 836.519992 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.300 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.519984	0.010	2.5
3.80	40	836.519985	0.008	2.5
3.80	30	836.519981	0.013	2.5
3.80	***20***	***836.519992***	***0***	2.5
3.80	10	836.519983	0.011	2.5
3.80	0	836.519980	0.014	2.5
3.80	-10	836.519983	0.011	2.5
3.80	-20	836.519984	0.010	2.5
3.80	-30	836.519982	0.012	2.5
Reference Frequency: Cellular Mid Channel 836.519992 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.300 Hz				
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
3.80	***20***	***836.519992***	***0***	***2.5***
4.20	20	836.519981	*0.013*	2.5
3.40	20	836.519983	*0.011*	2.5
End Voltage(3.2V)	20	836.519980	*0.014*	2.5

CDMA BC 10

Reference Frequency: Cellular Mid Channel 819.150016 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2047.875 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	819.149996	0.024	2.5
3.80	40	819.149999	0.021	2.5
3.80	30	819.149997	0.023	2.5
3.80	***20***	***819.150016***	***0***	2.5
3.80	10	819.150066	-0.061	2.5
3.80	0	819.150007	0.011	2.5
3.80	-10	819.150003	0.016	2.5
3.80	-20	819.150026	-0.012	2.5
3.80	-30	819.150066	-0.061	2.5
Reference Frequency: Cellular Mid Channel 819.150016 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2047.875 Hz				
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
3.80	***20***	***819.150016***	***0***	***2.5***
4.20	20	819.149998	*0.022*	2.5
3.40	20	819.150024	*-0.010*	2.5
End Voltage(3.2V)	20	819.150007	*0.011*	2.5

CDMA BC 1

Reference Frequency: PCS Mid Channel 1880.000008 MHz @ 20°C Limit: to stay +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000015	-0.004	2.5
3.80	40	1880.000014	-0.003	2.5
3.80	30	1880.000013	-0.003	2.5
3.80	***20***	***1880.000008***	***0***	2.5
3.80	10	1880.000017	-0.005	2.5
3.80	0	1880.000015	-0.004	2.5
3.80	-10	1880.000016	-0.004	2.5
3.80	-20	1880.000014	-0.003	2.5
3.80	-30	1880.000015	-0.004	2.5
Reference Frequency: PCS Mid Channel 1880.000008 MHz @ 20°C Limit: to stay +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse (MHz)**	**Delta (ppm)**	**Limit (ppm)**
3.80	***20***	***1880.000008***	***0***	***2.5***
4.20	20	1880.000011	*-0.002*	2.5
3.40	20	1880.000016	*-0.004*	2.5
End Voltage(3.2V)	20	1880.000009	*-0.001*	2.5

CDMA BC 15

Reference Frequency: AWS Mid Channel 1732.500011 MHz @ 20°C Limit: to stay +- 2.5 ppm = 4331.250 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1732.500020	-0.005	2.5
3.80	40	1732.500021	-0.006	2.5
3.80	30	1732.500023	-0.007	2.5
3.80	***20***	***1732.500011***	***0***	2.5
3.80	10	1732.500022	-0.006	2.5
3.80	0	1732.500018	-0.004	2.5
3.80	-10	1732.500020	-0.005	2.5
3.80	-20	1732.500021	-0.006	2.5
3.80	-30	1732.500024	-0.008	2.5
Reference Frequency: AWS Mid Channel 1732.500011 MHz @ 20°C Limit: to stay +- 2.5 ppm = 4331.250 Hz				
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse (MHz)**	**Delta (ppm)**	**Limit (ppm)**
3.80	***20***	***1732.500011***	***0***	***2.5***
4.20	20	1732.500018	*-0.004*	2.5
3.40	20	1732.500021	*-0.006*	2.5
End Voltage(3.2V)	20	1732.500017	*-0.003*	2.5

9. RADIATED TEST RESULTS

9.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, § 90.635.

LIMITS

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

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

§ 90.635 Limitations on power and antenna height.

(a) The effective radiated power and antenna height for base stations may not exceed 1 kilowatt (30 dBw) and 304 m. (1,000 ft.) above average terrain (AAT), respectively, or the equivalent thereof as determined from the Table. These are maximum values, and applicants will be required to justify power levels and antenna heights requested.

(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

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

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

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

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

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

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

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17

KDB 971168 v02r01 RF Power output using broadband peak and average power meter method

MODES TESTED

- GPRS and EGPRS
- UMTS, REL 99 and HSDPA
- CDMA2000, 1xRTT and EVDO, Rev A, BC0, BC1
- BC10, BC15

Mode	Channel	f (MHz)	ERP	
			dBm	mW
GPRS	128	824.20	31.91	1552.39
	190	836.60	32.21	1663.41
	251	848.80	32.65	1840.77
EGPRS	128	824.20	26.61	458.14
	190	836.60	25.81	381.07
	251	848.80	25.65	367.28

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
GPRS	512	1850.20	30.75	1188.50
	661	1880.00	30.13	1030.39
	810	1909.80	30.32	1076.47
EGPRS	512	1850.20	28.25	668.34
	661	1880.00	27.83	606.74
	810	1909.80	28.22	663.74

Mode	Channel	f (MHz)	ERP	
			dBm	mW
UMTS,REL 99	4357	826.40	25.51	355.63
	4405	836.00	24.61	289.07
	4455	846.00	24.85	305.49
UMTS, HSDPA	4357	826.40	25.01	316.96
	4405	836.00	24.01	251.77
	4455	846.00	24.15	260.02

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
UMTS, REL 99	9662	1852.40	27.71	590.20
	9800	1880.00	28.26	669.88
	9938	1907.60	28.16	654.64
UMTS, HSDPA	9662	1852.40	27.11	514.04
	9800	1880.00	27.06	508.16
	9938	1907.60	27.16	520.00

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
UMTS, REL 99	1537	1712.40	28.41	693.43
	1638	1732.60	28.38	688.65
	1738	1752.50	28.90	776.25
UMTS, HSDPA	1537	1712.40	27.46	557.19
	1638	1732.60	27.33	540.75
	1738	1752.50	28.05	638.26

Mode	Channel	f (MHz)	ERP	
			dBm	mW
BC10, 1xRTT	476	817.90	26.71	468.81
	526	819.15	26.31	427.56
	684	823.10	26.45	441.57
BC 0, 1xRTT	1013	824.70	25.71	372.39
	384	836.52	25.61	363.92
	777	848.31	24.75	298.54

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
BC1, 1xRTT	25	1851.25	29.78	950.60
	600	1880.00	30.26	1061.70
	1175	1908.75	29.16	824.14
BC15, 1xRTT	25	1711.25	28.28	672.98
	450	1732.50	28.26	669.88
	875	1753.75	28.06	639.73

Mode	Channel	f (MHz)	ERP	
			dBm	mW
BC10, EVDO A	476	817.90	27.61	576.77
	526	819.15	27.51	563.64
	684	823.10	27.65	582.10
BC 0, EVDO Rev A	1013	824.70	26.51	447.71
	384	836.52	26.31	427.56
	777	848.31	25.65	367.28

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
BC1, EVDO REV A	25	1851.25	30.98	1253.14
	600	1880.00	31.06	1276.44
	1175	1908.75	29.96	990.83
BC15, EVDO, REV A	25	1711.25	28.92	779.83
	450	1732.50	29.20	831.76
	875	1753.75	28.50	707.95

Mode	Channel	f (MHz)	ERP	
			dBm	mW
EVDO Rev B Two Carriers Min.	1013+31	825.30	20.01	100.23
	384+425	837.20	19.51	89.33
	736+777	847.60	19.55	90.16
EVDO Rev B Two Carriers Max	1013+156	826.50	19.91	97.95
	384+550	838.80	19.51	89.33
	611+777	844.90	18.85	76.74
EVDO Rev B Three Carriers Min.	1013+31+72	825.90	19.91	97.95
	384+425+466	837.70	19.41	87.30
	695+736+777	846.70	19.45	88.10

GPRS (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber E

Company: Apple
Project #: 13U15555
Date: 08/20/13
Test Engineer: ROY Zheng
Configuration: EUT Only
Mode: Cell Band, GPRS

Test Equipment:
Receiving: Sunol T407, and Chamber E Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 245185004) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	27.00	V	0.7	0.0	26.35	38.5	-12.1	
824.20	32.56	H	0.7	0.0	31.91	38.5	-6.5	
Mid Ch								
836.60	26.60	V	0.7	0.0	25.95	38.5	-12.5	
836.60	32.86	H	0.7	0.0	32.21	38.5	-6.2	
High Ch								
848.80	26.25	V	0.7	0.0	25.60	38.5	-12.8	
848.80	33.30	H	0.7	0.0	32.65	38.5	-5.8	

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EGPRS (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber E

Company: Apple
Project #: 13U15555
Date: 08/20/13
Test Engineer: ROY Zheng
Configuration: EUT Only
Mode: Cell Band, EGPRS

Test Equipment:
Receiving: Sunol T407, and Chamber E Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 245185004) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	22.50	V	0.7	0.0	21.85	38.5	-16.6	
824.20	27.26	H	0.7	0.0	26.61	38.5	-11.8	
Mid Ch								
836.60	22.40	V	0.7	0.0	21.75	38.5	-16.7	
836.60	26.46	H	0.7	0.0	25.81	38.5	-12.6	
High Ch								
848.80	23.25	V	0.7	0.0	22.60	38.5	-15.8	
848.80	26.30	H	0.7	0.0	25.65	38.5	-12.8	

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GPRS (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15555
Date: 08/27/13
Test Engineer: R Zheng
Configuration: EUT Only
Mode: GPRS 1900MHz

Test Equipment:
Receiving: T344, and Chamber D SMA Cables
Substitution: Horn T60 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.850	23.0	V	0.85	7.94	30.09	33.0	-2.9	
1.850	22.8	H	0.85	8.80	30.75	33.0	-2.3	
Mid Ch								
1.880	22.8	V	0.85	7.95	29.85	33.0	-3.2	
1.880	22.3	H	0.85	8.68	30.13	33.0	-2.9	
High Ch								
1.910	23.1	V	0.85	7.97	30.25	33.0	-2.8	
1.910	22.6	H	0.85	8.57	30.32	33.0	-2.7	

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EGPRS (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15555
Date: 08/27/13
Test Engineer: R Zheng
Configuration: EUT Only
Mode: EGPRS 1900MHz

Test Equipment:
Receiving: T344, and Chamber D SMA Cables
Substitution: Horn T60 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.850	17.7	V	0.85	7.94	24.76	33.0	-8.2	
1.850	20.3	H	0.85	8.80	28.25	33.0	-4.8	
Mid Ch								
1.880	14.8	V	0.85	7.95	21.85	33.0	-11.2	
1.880	20.0	H	0.85	8.68	27.83	33.0	-5.2	
High Ch								
1.910	13.6	V	0.85	7.97	20.75	33.0	-12.3	
1.910	20.5	H	0.85	8.57	28.22	33.0	-4.8	

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UMTS REL 99 (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber E

Company: Apple
Project #: 13U15555
Date: 08/20/13
Test Engineer: ROY Zheng
Configuration: EUT Only
Mode: Cell Band, REL 99

Test Equipment:
Receiving: Sunol T407, and Chamber E Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 245185004) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	19.90	V	0.7	0.0	19.25	38.5	-19.2	
826.40	26.16	H	0.7	0.0	25.51	38.5	-12.9	
Mid Ch								
836.60	19.00	V	0.7	0.0	18.35	38.5	-20.1	
836.60	25.26	H	0.7	0.0	24.61	38.5	-13.8	
High Ch								
846.60	18.95	V	0.7	0.0	18.30	38.5	-20.1	
846.60	25.50	H	0.7	0.0	24.85	38.5	-13.6	

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UMTS HSDPA (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber E

Company: Apple
Project #: 13U15555
Date: 08/20/13
Test Engineer: ROY Zheng
Configuration: EUT Only
Mode: Cell Band, HSDPA

Test Equipment:
Receiving: Sunol T407, and Chamber E Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 245185004) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	18.90	V	0.7	0.0	18.25	38.5	-20.2	
826.40	25.66	H	0.7	0.0	25.01	38.5	-13.4	
Mid Ch								
836.60	18.20	V	0.7	0.0	17.55	38.5	-20.9	
836.60	24.66	H	0.7	0.0	24.01	38.5	-14.4	
High Ch								
846.60	18.25	V	0.7	0.0	17.60	38.5	-20.8	
846.60	24.80	H	0.7	0.0	24.15	38.5	-14.3	

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UMTS REL 99 (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber E

Company: Apple
Project #: 13U15555
Date: 08/20/13
Test Engineer: R. Z
Configuration: EUT
Mode: Rell 99 PCS

Test Equipment:
Receiving: Horn T346, and Chamber E SMA Cables
Substitution: Horn T60 Substitution, 8ft SMA Cable (245185004) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.851	20.6	V	1.00	7.94	27.54	33.0	-5.5	
1.851	19.9	H	1.00	8.83	27.71	33.0	-5.3	
Mid Ch								
1.880	19.8	V	1.00	7.95	26.75	33.0	-6.3	
1.880	20.6	H	1.00	8.68	28.26	33.0	-4.7	
High Ch								
1.910	20.1	V	1.00	7.97	27.07	33.0	-5.9	
1.910	20.6	H	1.00	8.57	28.16	33.0	-4.8	

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UMTS HSDPA (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber E

Company: Apple
Project #: 13U15555
Date: 08/20/13
Test Engineer: R. Z
Configuration: EUT
Mode: HSDPA PCS

Test Equipment:
Receiving: Horn T346, and Chamber E SMA Cables
Substitution: Horn T60 Substitution, 8ft SMA Cable (245185004) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.851	19.5	V	1.00	7.94	26.44	33.0	-6.6	
1.851	19.3	H	1.00	8.83	27.11	33.0	-5.9	
Mid Ch								
1.880	18.7	V	1.00	7.95	25.65	33.0	-7.4	
1.880	19.4	H	1.00	8.68	27.06	33.0	-5.9	
High Ch								
1.910	18.9	V	1.00	7.97	25.87	33.0	-7.1	
1.910	19.6	H	1.00	8.57	27.16	33.0	-5.8	

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UMTS REL 99 (AWS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber E

Company: Apple
Project #: 13U15555
Date: 08/20/13
Test Engineer: ROY Zheng
Configuration: EUT Only
Mode: AWS Band, REL99

Test Equipment:
Receiving: Horn T346, and Chamber E SMA Cables
Substitution: Horn T60 Substitution, 8ft SMA Cable (245185004) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.712	16.2	V	0.90	8.16	23.48	30.0	-6.5	
1.712	20.7	H	0.90	8.59	28.41	30.0	-1.6	
Mid Ch								
1.733	16.9	V	0.90	8.11	24.13	30.0	-5.9	
1.733	20.6	H	0.90	8.69	28.38	30.0	-1.6	
High Ch								
1.753	16.8	V	0.90	8.07	23.99	30.0	-6.0	
1.753	21.0	H	0.90	8.79	28.90	30.0	-1.1	

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UMTS HSDPA (AWS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber E

Company: Apple
Project #: 13U15555
Date: 08/20/13
Test Engineer: ROY Zheng
Configuration: EUT Only
Mode: AWS Band, HSDPA

Test Equipment:
Receiving: Horn T346, and Chamber E SMA Cables
Substitution: Horn T60 Substitution, 8ft SMA Cable (245185004) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.712	15.6	V	0.90	8.16	22.83	30.0	-7.2	
1.712	19.8	H	0.90	8.59	27.46	30.0	-2.5	
Mid Ch								
1.733	16.8	V	0.90	8.11	23.98	30.0	-6.0	
1.733	19.5	H	0.90	8.69	27.33	30.0	-2.7	
High Ch								
1.753	16.5	V	0.90	8.07	23.64	30.0	-6.4	
1.753	20.2	H	0.90	8.79	28.05	30.0	-2.0	

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CDMA2000, 1xRTT, BC10

High Frequency Substitution Measurement
Compliance Certification Services Chamber E

Company: Apple
Project #: 13U15555
Date: 08/20/13
Test Engineer: ROY Zheng
Configuration: EUT Only
Mode: BC 10 1xRTT

Test Equipment:
Receiving: Sunol T407, and Chamber E Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 245185004) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
817.90	20.50	V	0.7	0.0	19.85	38.5	-18.6	
817.90	27.36	H	0.7	0.0	26.71	38.5	-11.7	
Mid Ch								
819.15	20.70	V	0.7	0.0	20.05	38.5	-18.4	
819.15	26.96	H	0.7	0.0	26.31	38.5	-12.1	
High Ch								
823.10	20.95	V	0.7	0.0	20.30	38.5	-18.1	
823.10	27.10	H	0.7	0.0	26.45	38.5	-12.0	

Rev. 3.17.11

CDMA2000, EVDO A, BC10

High Frequency Substitution Measurement
Compliance Certification Services Chamber E

Company: Apple Inc.
Project #: 13U15555
Date: 08/21/13
Test Engineer: R.Z
Configuration: EUT only
Mode: EVDO BC10

Test Equipment:
Receiving: Sunol T407, and Chamber E Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 245185004) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
817.90	21.30	V	0.7	0.0	20.65	38.5	-17.8	
817.90	28.26	H	0.7	0.0	27.61	38.5	-10.8	
Mid Ch								
819.15	21.60	V	0.7	0.0	20.95	38.5	-17.5	
819.15	28.16	H	0.7	0.0	27.51	38.5	-10.9	
High Ch								
823.10	22.05	V	0.7	0.0	21.40	38.5	-17.0	
823.10	28.30	H	0.7	0.0	27.65	38.5	-10.8	

Rev. 3.17.11

CDMA2000, 1xRTT, BC0

High Frequency Substitution Measurement
Compliance Certification Services Chamber E

Company: Apple
Project #: 13U15555
Date: 08/20/13
Test Engineer: ROY Zheng
Configuration: EUT Only
Mode: BC 0 1xRTT

Test Equipment:
Receiving: Sunol T407, and Chamber E Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 245185004) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	20.40	V	0.7	0.0	19.75	38.5	-18.7	
824.70	26.36	H	0.7	0.0	25.71	38.5	-12.7	
Mid Ch								
836.52	19.80	V	0.7	0.0	19.15	38.5	-19.3	
836.52	26.26	H	0.7	0.0	25.61	38.5	-12.8	
High Ch								
848.31	19.65	V	0.7	0.0	19.00	38.5	-19.4	
848.31	25.40	H	0.7	0.0	24.75	38.5	-13.7	

Rev. 3.17.11

CDMA2000, EVDO REV A, BC0

High Frequency Substitution Measurement
Compliance Certification Services Chamber E

Company: Apple Inc.
Project #: 13U15555
Date: 08/21/13
Test Engineer: R.Z
Configuration: EUT only
Mode: EVDO BC0

Test Equipment:
Receiving: Sunol T407, and Chamber E Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 245185004) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	21.60	V	0.7	0.0	20.95	38.5	-17.5	
824.70	27.16	H	0.7	0.0	26.51	38.5	-11.9	
Mid Ch								
836.52	21.00	V	0.7	0.0	20.35	38.5	-18.1	
836.52	26.96	H	0.7	0.0	26.31	38.5	-12.1	
High Ch								
848.31	20.75	V	0.7	0.0	20.10	38.5	-18.3	
848.31	26.30	H	0.7	0.0	25.65	38.5	-12.8	

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CDMA2000, 1xRTT, BC1

High Frequency Fundamental Measurement
Compliance Certification Services Chamber E

Company: Apple Inc.
Project #: 13U15555
Date: 08/21/13
Test Engineer: R.Z
Configuration: EUT only
Mode: 1xRTT BC1 PCS

Test Equipment:
Receiving: Horn T346 and Chamber E SMA Cables
Substitution: Horn T60 Substitution, 8ft SMA Cable (245185004) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.851	21.4	V	1.00	7.94	28.34	33.0	-4.7	
1.851	22.0	H	1.00	8.80	29.78	33.0	-3.2	
Mid Ch								
1.880	21.8	V	1.00	7.95	28.75	33.0	-4.3	
1.880	22.6	H	1.00	8.68	30.26	33.0	-2.7	
High Ch								
1.909	21.9	V	1.00	7.97	28.87	33.0	-4.1	
1.909	21.6	H	1.00	8.57	29.16	33.0	-3.8	

Rev. 3.17.11

CDMA2000, EVDO A, BC1

High Frequency Fundamental Measurement
Compliance Certification Services Chamber E

Company: Apple Inc.
Project #: 13U15555
Date: 08/21/13
Test Engineer: R.Z
Configuration: EUT only
Mode: EVDO BC1 PCS

Test Equipment:
Receiving: Horn T346 and Chamber E SMA Cables
Substitution: Horn T60 Substitution, 8ft SMA Cable (245185004) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.851	23.1	V	1.00	7.94	30.04	33.0	-3.0	
1.851	23.2	H	1.00	8.80	30.98	33.0	-2.0	
Mid Ch								
1.880	23.1	V	1.00	7.95	30.05	33.0	-3.0	
1.880	23.4	H	1.00	8.68	31.06	33.0	-1.9	
High Ch								
1.909	22.6	V	1.00	7.97	29.57	33.0	-3.4	
1.909	22.4	H	1.00	8.57	29.96	33.0	-3.0	

Rev. 3.17.11

CDMA2000, 1xRTT, BC15

High Frequency Fundamental Measurement
Compliance Certification Services Chamber E

Company: Apple Inc.
Project #: 13U15555
Date: 08/21/13
Test Engineer: R.Z
Configuration: EUT only
Mode: 1xRTT BC15 AWS

Test Equipment:
Receiving: Horn T346 and Chamber E SMA Cables
Substitution: Horn T60 Substitution, 8ft SMA Cable (245185004) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.711	19.7	V	1.00	7.94	26.64	30.0	-3.4	
1.711	20.5	H	1.00	8.80	28.28	30.0	-1.7	
Mid Ch								
1.733	20.3	V	1.00	7.95	27.25	30.0	-2.8	
1.733	20.6	H	1.00	8.68	28.26	30.0	-1.7	
High Ch								
1.754	19.7	V	1.00	7.97	26.67	30.0	-3.3	
1.754	20.5	H	1.00	8.57	28.06	30.0	-1.9	

Rev. 3.17.11

CDMA2000, EVDO A, BC15

High Frequency Fundamental Measurement
Compliance Certification Services Chamber E

Company: Apple Inc.
Project #: 13U15555
Date: 08/21/13
Test Engineer: R.Z
Configuration: EUT only
Mode: EVDO BC15 AWS

Test Equipment:
Receiving: Horn T346 and Chamber E SMA Cables
Substitution: Horn T60 Substitution, 8ft SMA Cable (245185004) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.851	17.2	V	1.00	7.94	24.18	30.0	-5.8	
1.851	21.1	H	1.00	8.80	28.92	30.0	-1.1	
Mid Ch								
1.880	17.4	V	1.00	7.95	24.39	30.0	-5.6	
1.880	21.5	H	1.00	8.68	29.20	30.0	-0.8	
High Ch								
1.909	16.8	V	1.00	7.97	23.81	30.0	-6.2	
1.909	20.9	H	1.00	8.57	28.50	30.0	-1.5	

Rev. 3.17.11

CDMA2000 CELL BAND, EVDO REV B

Two Carriers Minimum Separation

High Frequency Substitution Measurement
Compliance Certification Services Chamber E

Company: Apple Inc.
Project #: 13U15555
Date: 08/22/13
Test Engineer: R. Zheng
Configuration: EUT only
Mode: EDVO Rev.B BC0 2 min

Test Equipment:
Receiving: Sunol T407, and Chamber E Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 245185004) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
825.30	13.90	V	0.7	0.0	13.25	38.5	-25.2	
825.30	20.66	H	0.7	0.0	20.01	38.5	-18.4	
Mid Ch								
837.20	13.80	V	0.7	0.0	13.15	38.5	-25.3	
837.20	20.16	H	0.7	0.0	19.51	38.5	-18.9	
High Ch								
847.60	13.25	V	0.7	0.0	12.60	38.5	-25.8	
847.60	20.20	H	0.7	0.0	19.55	38.5	-18.9	

Rev. 3.17.11

CDMA2000 CELL BAND, EVDO REV B

Two Carriers Maximum Separation

High Frequency Substitution Measurement
Compliance Certification Services Chamber E

Company: Apple Inc.
Project #: 13U15555
Date: 08/22/13
Test Engineer: R. Zheng
Configuration: EUT only
Mode: EDVO Rev.B BC0 2 max

Test Equipment:
Receiving: Sunol T407, and Chamber E Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 245185004) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.50	13.10	V	0.7	0.0	12.45	38.5	-26.0	
826.50	20.56	H	0.7	0.0	19.91	38.5	-18.5	
Mid Ch								
838.80	13.00	V	0.7	0.0	12.35	38.5	-26.1	
838.80	20.16	H	0.7	0.0	19.51	38.5	-18.9	
High Ch								
844.90	13.05	V	0.7	0.0	12.40	38.5	-26.0	
844.90	19.50	H	0.7	0.0	18.85	38.5	-19.6	

Rev. 3.17.11

CDMA2000 CELL BAND, EVDO REV B

Three Carriers Minimum Separation

High Frequency Substitution Measurement
Compliance Certification Services Chamber E

Company: Apple Inc.
Project #: 13U15555
Date: 08/22/13
Test Engineer: R. Zheng
Configuration: EUT only
Mode: EDVO Rev.B BC0 3 min

Test Equipment:
Receiving: Sunol T407, and Chamber E Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 245185004) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
825.90	14.30	V	0.7	0.0	13.65	38.5	-24.8	
825.90	20.56	H	0.7	0.0	19.91	38.5	-18.5	
Mid Ch								
837.70	14.00	V	0.7	0.0	13.35	38.5	-25.1	
837.70	20.06	H	0.7	0.0	19.41	38.5	-19.0	
High Ch								
846.70	14.05	V	0.7	0.0	13.40	38.5	-25.0	
846.70	20.10	H	0.7	0.0	19.45	38.5	-19.0	

Rev. 3.17.11

9.2. PEAK-TO-AVERAGE RATIO

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

Peak-To-Average Ratio:

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
UMTS B5	REL99	28	24.53	3.47

Mode	Ch. No.	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
UMTS B5	HSDPA	28.13	22.7	5.43

*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
BC0	1xRTT	28.38	24.39	3.99

Mode	Ch. No.	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
BC10	1xRTT	29	24.98	4.02

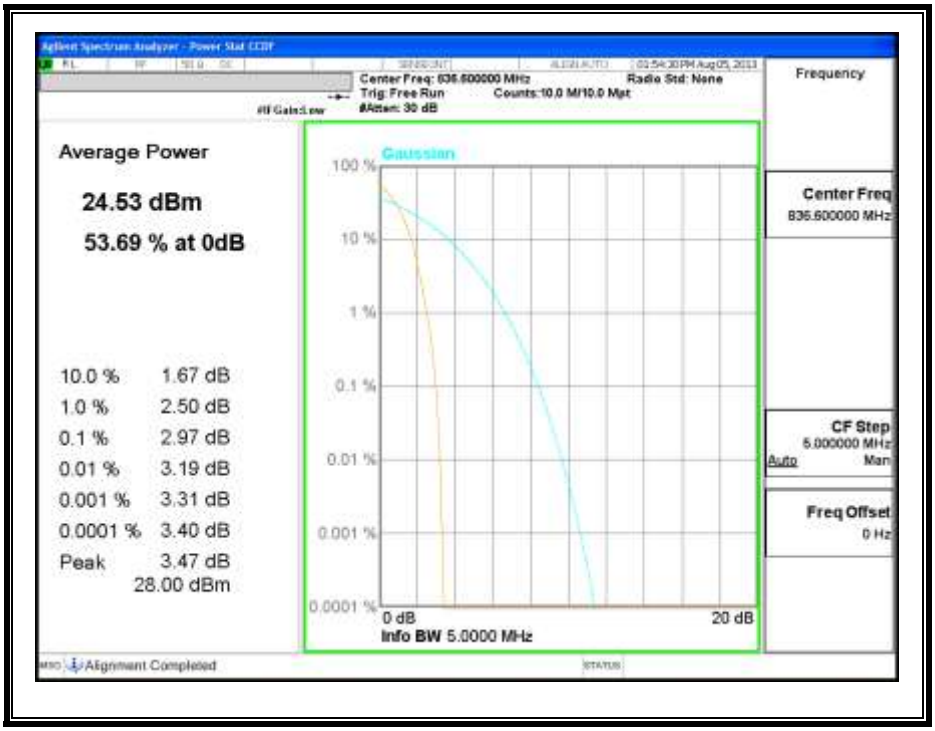
*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
BC0	EVDO	28.5	24.33	4.13

Mode	Ch. No.	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
BC10	EVDO	29.34	25	4.34

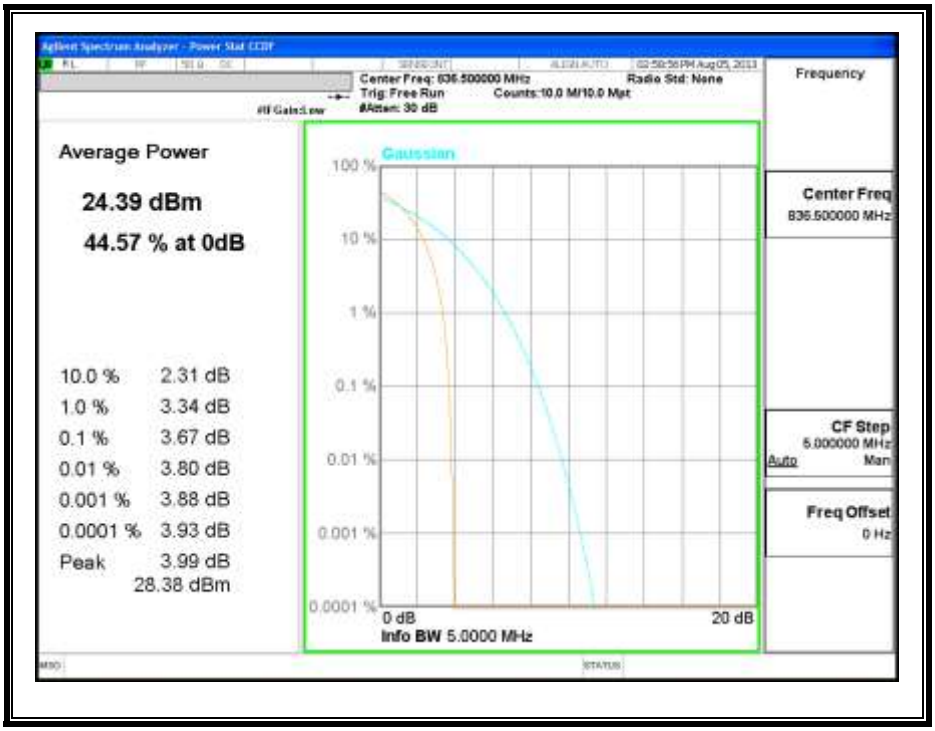
*Peak Reading = Average Reading + Peak-to-Average Ratio

UMTS850, REL 99

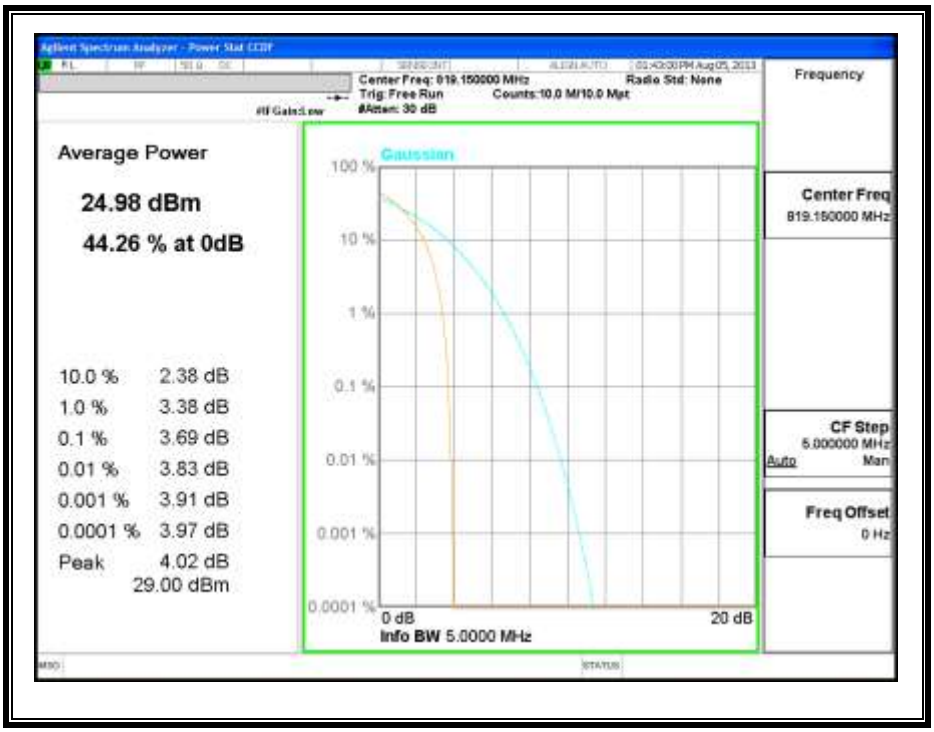


UMTS850, HSDPA

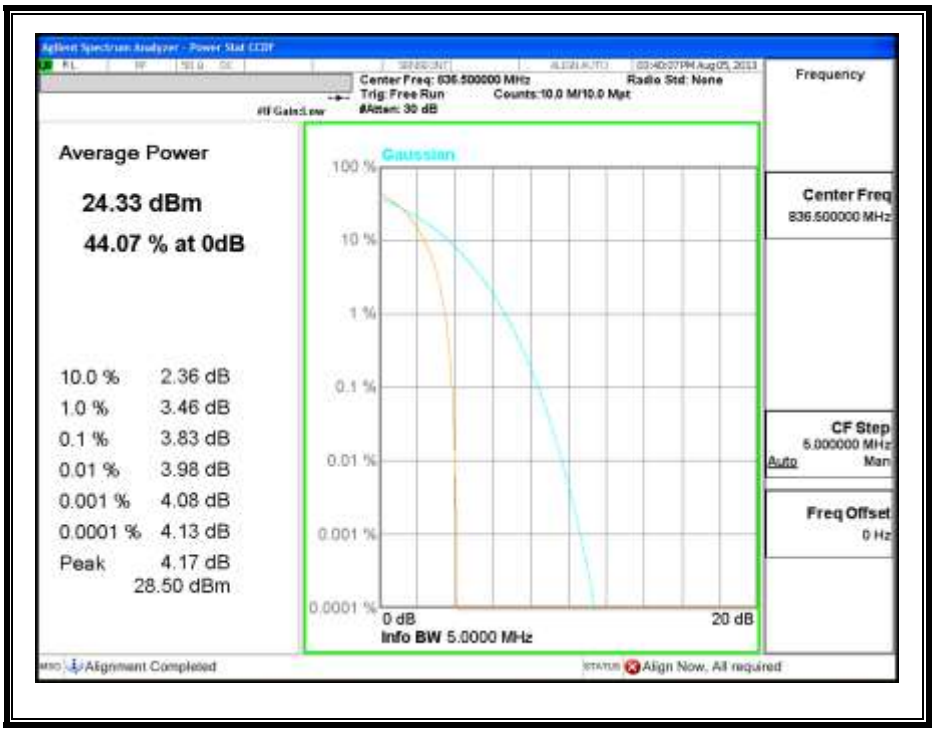
BC 0, 1xRTT



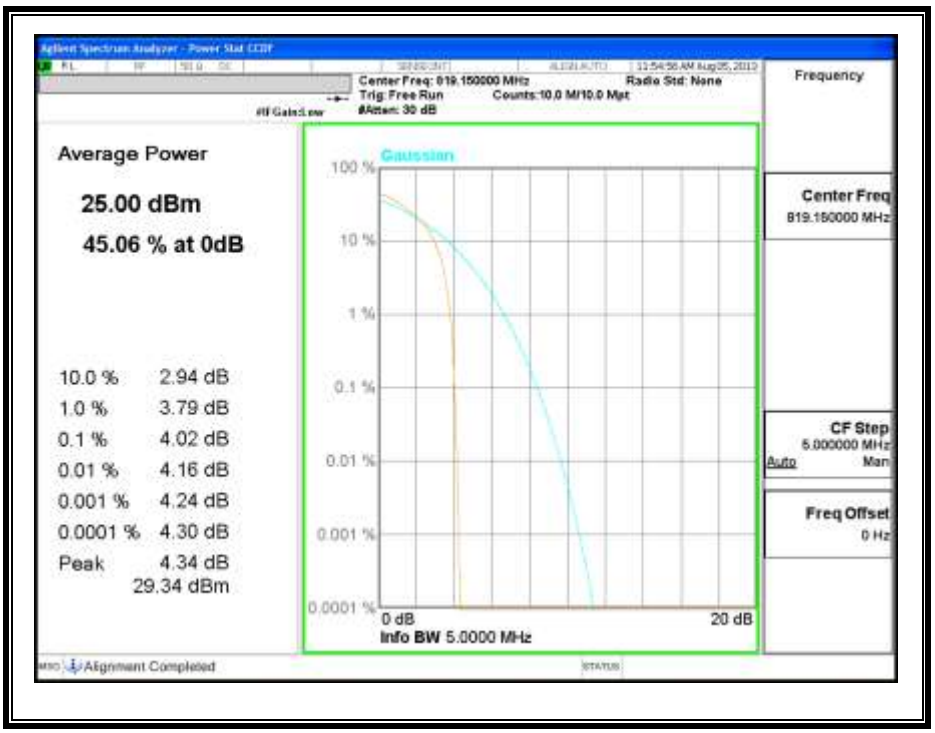
BC10, 1xRTT



BC 0, EVDO



BC10, EVDO



9.3. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238 & § 90.691

LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

§ 90.691 Emission mask requirements for EA-based systems.

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10 (f/6.1) decibels or 50 + 10 Log10 (P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10 (P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

TEST PROCEDURE

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

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

MODES TESTED:

- GPRS and EGPRS
- UMTS, REL 99 and HSDPA
- CDMA2000, BC0,BC1, BC10 and BC15

RESULTS

GPRS (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	Roy Zheng
Configuration:	EUT only
Mode:	GPRS CELL

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-10.7	V	3.0	32.7	1.0	-42.4	-13.0	-29.4	
2.473	-12.6	V	3.0	31.4	1.0	-43.0	-13.0	-30.0	
1.648	-15.5	H	3.0	32.7	1.0	-47.2	-13.0	-34.2	
2.473	-14.2	H	3.0	31.4	1.0	-44.6	-13.0	-31.6	
Mid Ch, (836.6MHz)									
1.673	-25.5	V	3.0	32.6	1.0	-57.1	-13.0	-44.1	
2.510	-10.2	V	3.0	31.5	1.0	-40.7	-13.0	-27.7	
1.673	-17.7	H	3.0	32.6	1.0	-49.3	-13.0	-36.3	
2.510	-13.1	H	3.0	31.5	1.0	-43.6	-13.0	-30.6	
High Ch, (848.8MHz)									
1.698	-19.7	V	3.0	32.5	1.0	-51.2	-13.0	-38.2	
2.546	-7.3	V	3.0	31.4	1.0	-37.8	-13.0	-24.8	
1.698	-16.0	H	3.0	32.5	1.0	-47.5	-13.0	-34.5	
2.546	-15.6	H	3.0	31.4	1.0	-46.0	-13.0	-33.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

EGPRS (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	Roy Zheng
Configuration:	EUT only
Mode:	EGPRS CELL

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-26.9	V	3.0	32.7	1.0	-58.6	-13.0	-45.6	
2.473	-24.0	V	3.0	31.4	1.0	-54.4	-13.0	-41.4	
1.648	-29.5	H	3.0	32.7	1.0	-61.2	-13.0	-48.2	
2.473	-27.5	H	3.0	31.4	1.0	-57.9	-13.0	-44.9	
Mid Ch, (836.6MHz)									
1.673	-20.7	V	3.0	32.6	1.0	-52.3	-13.0	-39.3	
2.510	-15.8	V	3.0	31.5	1.0	-46.3	-13.0	-33.3	
1.673	-25.0	H	3.0	32.6	1.0	-56.6	-13.0	-43.6	
2.510	-16.0	H	3.0	31.5	1.0	-46.5	-13.0	-33.5	
High Ch, (848.8MHz)									
1.698	-20.1	V	3.0	32.5	1.0	-51.6	-13.0	-38.6	
2.546	-16.4	V	3.0	31.4	1.0	-46.9	-13.0	-33.9	
1.698	-24.0	H	3.0	32.5	1.0	-55.5	-13.0	-42.5	
2.546	-17.6	H	3.0	31.4	1.0	-48.0	-13.0	-35.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UMTS REL 99 (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	Roy Zheng
Configuration:	EUT only
Mode:	REL 99 CELL

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.4MHz)									
1.653	-26.6	V	3.0	32.7	1.0	-58.3	-13.0	-45.3	
2.479	-25.6	V	3.0	31.4	1.0	-56.0	-13.0	-43.0	
1.653	-29.2	H	3.0	32.7	1.0	-60.8	-13.0	-47.8	
2.479	-28.0	H	3.0	31.4	1.0	-58.4	-13.0	-45.4	
Mid Ch, (836.6MHz)									
1.673	-27.5	V	3.0	32.6	1.0	-59.1	-13.0	-46.1	
2.510	-25.8	V	3.0	31.5	1.0	-56.3	-13.0	-43.3	
1.673	-29.4	H	3.0	32.6	1.0	-61.0	-13.0	-48.0	
2.510	-27.5	H	3.0	31.5	1.0	-58.0	-13.0	-45.0	
High Ch, (846.6MHz)									
1.688	-27.8	V	3.0	32.6	1.0	-59.3	-13.0	-46.3	
2.532	-26.6	V	3.0	31.5	1.0	-57.1	-13.0	-44.1	
1.688	-29.8	H	3.0	32.6	1.0	-61.4	-13.0	-48.4	
2.532	-28.0	H	3.0	31.5	1.0	-58.5	-13.0	-45.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UMTS HSDPA (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	R Zheng
Configuration:	EUT only
Mode:	HSDPA CELL

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.4MHz)									
1.653	-27.0	V	3.0	32.7	1.0	-58.7	-13.0	-45.7	
2.479	-25.6	V	3.0	31.4	1.0	-56.0	-13.0	-43.0	
1.653	-28.7	H	3.0	32.7	1.0	-60.3	-13.0	-47.3	
2.479	-27.2	H	3.0	31.4	1.0	-57.6	-13.0	-44.6	
Mid Ch, (836.6MHz)									
1.673	-26.4	V	3.0	32.6	1.0	-58.0	-13.0	-45.0	
2.510	-26.2	V	3.0	31.5	1.0	-56.7	-13.0	-43.7	
1.673	-29.2	H	3.0	32.6	1.0	-60.8	-13.0	-47.8	
2.510	-27.0	H	3.0	31.5	1.0	-57.5	-13.0	-44.5	
High Ch, (846.6MHz)									
1.688	-26.7	V	3.0	32.6	1.0	-58.2	-13.0	-45.2	
2.532	-26.5	V	3.0	31.5	1.0	-57.0	-13.0	-44.0	
1.688	-27.4	V	3.0	32.6	1.0	-58.9	-13.0	-45.9	
2.532	-26.1	V	3.0	31.5	1.0	-56.6	-13.0	-43.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

GPRS (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	Roy Zheng
Configuration:	EUT only
Mode:	GPRS PCS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.2 MHz)									
3.700	-26.6	V	3.0	30.2	1.0	-55.8	-13.0	-42.8	
7.401	-26.3	V	3.0	26.5	1.0	-51.8	-13.0	-38.8	
3.700	-25.7	H	3.0	30.2	1.0	-54.9	-13.0	-41.9	
7.401	-26.2	H	3.0	26.5	1.0	-51.7	-13.0	-38.7	
Mid Ch, (1880 MHz)									
3.760	-25.9	V	3.0	30.1	1.0	-55.1	-13.0	-42.1	
7.520	-21.1	V	3.0	26.3	1.0	-46.4	-13.0	-33.4	
3.760	-27.2	H	3.0	30.1	1.0	-56.3	-13.0	-43.3	
7.520	-26.6	H	3.0	26.3	1.0	-51.9	-13.0	-38.9	
High Ch, (1909.8 MHz)									
3.819	-27.1	V	3.0	30.1	1.0	-56.2	-13.0	-43.2	
7.639	-27.5	V	3.0	26.2	1.0	-52.6	-13.0	-39.6	
3.819	-28.1	H	3.0	30.1	1.0	-57.2	-13.0	-44.2	
7.639	-27.1	H	3.0	26.2	1.0	-52.3	-13.0	-39.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

EGPRS (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	Roy Zheng
Configuration:	EUT only
Mode:	EGPRS PCS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.2 MHz)									
3.700	-25.7	V	3.0	30.2	1.0	-54.9	-13.0	-41.9	
7.401	-22.3	V	3.0	26.5	1.0	-47.8	-13.0	-34.8	
3.700	-27.5	H	3.0	30.2	1.0	-56.7	-13.0	-43.7	
7.401	-26.0	H	3.0	26.5	1.0	-51.5	-13.0	-38.5	
Mid Ch, (1880 MHz)									
3.760	-27.2	V	3.0	30.1	1.0	-56.4	-13.0	-43.4	
7.520	-22.9	V	3.0	26.3	1.0	-48.2	-13.0	-35.2	
3.760	-26.3	H	3.0	30.1	1.0	-55.4	-13.0	-42.4	
7.520	-25.7	H	3.0	26.3	1.0	-51.0	-13.0	-38.0	
High Ch, (1909.8 MHz)									
3.819	-27.1	V	3.0	30.1	1.0	-56.2	-13.0	-43.2	
7.639	-27.8	V	3.0	26.2	1.0	-52.9	-13.0	-39.9	
3.819	-28.0	H	3.0	30.1	1.0	-57.1	-13.0	-44.1	
7.639	-26.2	H	3.0	26.2	1.0	-51.4	-13.0	-38.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UMTS REL 99 (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	Roy Zheng
Configuration:	EUT only
Mode:	REL 99 PCS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1852.4 MHz)									
3.705	-26.8	V	3.0	30.2	1.0	-56.0	-13.0	-43.0	
7.410	-28.1	V	3.0	26.5	1.0	-53.5	-13.0	-40.5	
3.705	-27.1	H	3.0	30.2	1.0	-56.3	-13.0	-43.3	
7.410	-27.2	H	3.0	26.5	1.0	-52.7	-13.0	-39.7	
Mid Ch, (1880 MHz)									
3.760	-27.0	V	3.0	30.1	1.0	-56.2	-13.0	-43.2	
7.520	-27.7	V	3.0	26.3	1.0	-53.0	-13.0	-40.0	
3.760	-27.0	H	3.0	30.1	1.0	-56.1	-13.0	-43.1	
7.520	-26.4	H	3.0	26.3	1.0	-51.7	-13.0	-38.7	
High Ch, (1907.6 MHz)									
3.815	-26.5	V	3.0	30.1	1.0	-55.6	-13.0	-42.6	
7.630	-27.6	V	3.0	26.2	1.0	-52.8	-13.0	-39.8	
3.815	-27.1	H	3.0	30.1	1.0	-56.2	-13.0	-43.2	
7.630	-26.3	H	3.0	26.2	1.0	-51.5	-13.0	-38.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UMTS HSDPA (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	R Zheng
Configuration:	EUT only
Mode:	HSDPA PCS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1852.4 MHz)									
3.705	-27.1	V	3.0	30.2	1.0	-56.3	-13.0	-43.3	
7.410	-27.6	V	3.0	26.5	1.0	-53.0	-13.0	-40.0	
3.705	-27.6	H	3.0	30.2	1.0	-56.8	-13.0	-43.8	
7.410	-27.0	H	3.0	26.5	1.0	-52.5	-13.0	-39.5	
Mid Ch, (1880 MHz)									
3.760	-27.3	V	3.0	30.1	1.0	-56.5	-13.0	-43.5	
7.520	-27.3	V	3.0	26.3	1.0	-52.6	-13.0	-39.6	
3.760	-27.5	H	3.0	30.1	1.0	-56.6	-13.0	-43.6	
7.520	-26.0	H	3.0	26.3	1.0	-51.3	-13.0	-38.3	
High Ch, (1907.6 MHz)									
3.815	-27.5	V	3.0	30.1	1.0	-56.6	-13.0	-43.6	
7.630	-27.4	V	3.0	26.2	1.0	-52.6	-13.0	-39.6	
3.815	-27.7	H	3.0	30.1	1.0	-56.8	-13.0	-43.8	
7.630	-26.2	H	3.0	26.2	1.0	-51.4	-13.0	-38.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000 1xRTT, BC0

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	R Zheng
Configuration:	EUT only
Mode:	CDMA 2000, 1xRTT, BC0

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.7MHz)									
1.649	-14.6	V	3.0	32.7	1.0	-46.3	-13.0	-33.3	
2.474	-17.9	V	3.0	31.4	1.0	-48.3	-13.0	-35.3	
1.649	-21.1	H	3.0	32.7	1.0	-52.8	-13.0	-39.8	
2.474	-18.2	H	3.0	31.4	1.0	-48.6	-13.0	-35.6	
Mid Ch, (836.52MHz)									
1.673	-17.9	V	3.0	32.6	1.0	-49.5	-13.0	-36.5	
2.510	-12.7	V	3.0	31.5	1.0	-43.2	-13.0	-30.2	
1.673	-21.2	H	3.0	32.6	1.0	-52.8	-13.0	-39.8	
2.510	-16.9	H	3.0	31.5	1.0	-47.4	-13.0	-34.4	
High Ch, (848.31MHz)									
1.697	-19.9	V	3.0	32.6	1.0	-51.4	-13.0	-38.4	
2.545	-19.8	V	3.0	31.4	1.0	-50.3	-13.0	-37.3	
1.697	-21.7	H	3.0	32.6	1.0	-53.2	-13.0	-40.2	
2.545	-20.5	H	3.0	31.4	1.0	-50.9	-13.0	-37.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000, EVDO A, BC0

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	R Zheng
Configuration:	EUT only
Mode:	CDMA 2000, EVDO Rev A, BC0

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.7MHz)									
1.649	-23.9	V	3.0	32.7	1.0	-55.6	-13.0	-42.6	
2.474	-13.8	V	3.0	31.4	1.0	-44.2	-13.0	-31.2	
1.649	-23.5	H	3.0	32.7	1.0	-55.2	-13.0	-42.2	
2.474	-15.7	H	3.0	31.4	1.0	-46.1	-13.0	-33.1	
Mid Ch, (836.52MHz)									
1.673	-25.9	V	3.0	32.6	1.0	-57.5	-13.0	-44.5	
2.510	-15.8	V	3.0	31.5	1.0	-46.3	-13.0	-33.3	
1.673	-22.0	H	3.0	32.6	1.0	-53.6	-13.0	-40.6	
2.510	-15.9	H	3.0	31.5	1.0	-46.4	-13.0	-33.4	
High Ch, (848.31MHz)									
1.697	-26.0	V	3.0	32.6	1.0	-57.5	-13.0	-44.5	
2.545	-17.2	V	3.0	31.4	1.0	-47.7	-13.0	-34.7	
1.697	-21.3	H	3.0	32.6	1.0	-52.8	-13.0	-39.8	
2.545	-15.4	H	3.0	31.4	1.0	-45.8	-13.0	-32.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000 1xRTT, BC1

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple Inc.
Project #: 13U15555
Date: 08/22/13
Test Engineer: R Zheng
Configuration: EUT only
Mode: CDMA 2000, 1xRTT, BC1

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1851.25MHz)									
3.703	-28.2	V	3.0	30.2	1.0	-57.4	-13.0	-44.4	
5.554	-31.9	V	3.0	28.4	1.0	-59.3	-13.0	-46.3	
3.703	-29.0	H	3.0	30.2	1.0	-58.1	-13.0	-45.1	
5.554	-30.6	H	3.0	28.4	1.0	-58.0	-13.0	-45.0	
Mid Ch, (1880MHz)									
3.760	-28.8	V	3.0	30.1	1.0	-57.9	-13.0	-44.9	
5.640	-30.5	V	3.0	28.3	1.0	-57.8	-13.0	-44.8	
3.760	-29.5	H	3.0	30.1	1.0	-58.6	-13.0	-45.6	
5.640	-30.8	H	3.0	28.3	1.0	-58.1	-13.0	-45.1	
High Ch, (1908.75MHz)									
3.818	-28.0	V	3.0	30.1	1.0	-57.1	-13.0	-44.1	
5.726	-31.9	V	3.0	28.2	1.0	-59.1	-13.0	-46.1	
3.818	-28.8	H	3.0	30.1	1.0	-57.9	-13.0	-44.9	
5.726	-30.6	H	3.0	28.2	1.0	-57.8	-13.0	-44.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000 EVDO REV A, BC1

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	R Zheng
Configuration:	EUT only
Mode:	CDMA 2000, EVDO Rev A, BC1

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1851.25MHz)									
3.703	-26.5	V	3.0	30.2	1.0	-55.7	-13.0	-42.7	
5.554	-25.4	V	3.0	28.4	1.0	-52.8	-13.0	-39.8	
3.703	-28.5	H	3.0	30.2	1.0	-57.6	-13.0	-44.6	
5.554	-26.5	H	3.0	28.4	1.0	-53.9	-13.0	-40.9	
Mid Ch, (1880MHz)									
3.760	-27.5	V	3.0	30.1	1.0	-56.6	-13.0	-43.6	
5.640	-27.1	V	3.0	28.3	1.0	-54.4	-13.0	-41.4	
3.760	-26.1	H	3.0	30.1	1.0	-55.2	-13.0	-42.2	
5.640	-26.8	H	3.0	28.3	1.0	-54.1	-13.0	-41.1	
High Ch, (1908.75MHz)									
3.818	-27.5	V	3.0	30.1	1.0	-56.6	-13.0	-43.6	
5.726	-29.0	V	3.0	28.2	1.0	-56.2	-13.0	-43.2	
3.818	-28.1	H	3.0	30.1	1.0	-57.2	-13.0	-44.2	
5.726	-27.8	H	3.0	28.2	1.0	-55.0	-13.0	-42.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000 1xRTT, BC10

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	R Zheng
Configuration:	EUT only
Mode:	CDMA 2000, 1xRTT, BC10

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 90

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (817.9MHz)									
1.636	-21.3	V	3.0	32.7	1.0	-53.0	-13.0	-40.0	
2.454	-9.2	V	3.0	31.3	1.0	-39.5	-13.0	-26.5	
1.636	-23.3	H	3.0	32.7	1.0	-55.0	-13.0	-42.0	
2.454	-16.4	H	3.0	31.3	1.0	-46.6	-13.0	-33.6	
Mid Ch, (819.15MHz)									
1.638	-20.1	V	3.0	32.7	1.0	-51.8	-13.0	-38.8	
2.457	-8.7	V	3.0	31.3	1.0	-39.0	-13.0	-26.0	
1.638	-23.1	H	3.0	32.7	1.0	-54.8	-13.0	-41.8	
2.457	-16.9	H	3.0	31.3	1.0	-47.2	-13.0	-34.2	
High Ch, (823.1MHz)									
1.646	-19.2	V	3.0	32.7	1.0	-50.9	-13.0	-37.9	
2.469	-9.2	V	3.0	31.3	1.0	-39.5	-13.0	-26.5	
1.646	-22.5	H	3.0	32.7	1.0	-54.2	-13.0	-41.2	
2.469	-16.3	H	3.0	31.3	1.0	-46.6	-13.0	-33.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000 EVDO A, BC10

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	R Zheng
Configuration:	EUT only
Mode:	CDMA 2000, EVDO Rev A, BC10

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 90

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (817.9MHz)									
1.636	-25.0	V	3.0	32.7	1.0	-56.7	-13.0	-43.7	
2.454	-13.7	V	3.0	31.3	1.0	-44.0	-13.0	-31.0	
1.636	-24.1	H	3.0	32.7	1.0	-55.8	-13.0	-42.8	
2.454	-16.5	H	3.0	31.3	1.0	-46.7	-13.0	-33.7	
Mid Ch, (819.15MHz)									
1.638	-23.9	V	3.0	32.7	1.0	-55.6	-13.0	-42.6	
2.457	-15.0	V	3.0	31.3	1.0	-45.3	-13.0	-32.3	
1.638	-22.8	H	3.0	32.7	1.0	-54.5	-13.0	-41.5	
2.457	-15.6	H	3.0	31.3	1.0	-45.9	-13.0	-32.9	
High Ch, (823.1MHz)									
1.646	-22.5	V	3.0	32.7	1.0	-54.2	-13.0	-41.2	
2.469	-13.1	V	3.0	31.3	1.0	-43.4	-13.0	-30.4	
1.646	-20.4	H	3.0	32.7	1.0	-52.1	-13.0	-39.1	
2.469	-16.3	H	3.0	31.3	1.0	-46.6	-13.0	-33.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000 1xRTT, BC15

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	R Zheng
Configuration:	EUT only
Mode:	CDMA 2000, 1xRTT, BC15

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1711.25MHz)									
3.423	-25.8	V	3.0	30.4	1.0	-55.2	-13.0	-42.2	
5.134	-26.3	V	3.0	28.8	1.0	-54.1	-13.0	-41.1	
3.423	-24.7	H	3.0	30.4	1.0	-54.2	-13.0	-41.2	
5.134	-28.8	H	3.0	28.8	1.0	-56.6	-13.0	-43.6	
Mid Ch, (1732.5MHz)									
3.465	-25.9	V	3.0	30.4	1.0	-55.3	-13.0	-42.3	
5.198	-26.9	V	3.0	28.7	1.0	-54.6	-13.0	-41.6	
3.465	-29.7	H	3.0	30.4	1.0	-59.1	-13.0	-46.1	
5.198	-28.4	H	3.0	28.7	1.0	-56.1	-13.0	-43.1	
High Ch, (1753.75MHz)									
3.508	-25.3	V	3.0	30.4	1.0	-54.7	-13.0	-41.7	
5.261	-31.2	V	3.0	28.6	1.0	-58.8	-13.0	-45.8	
3.508	-25.9	H	3.0	30.4	1.0	-55.3	-13.0	-42.3	
5.261	-28.4	H	3.0	28.6	1.0	-56.1	-13.0	-43.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000, EVDO A, BC15

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15555
Date:	08/22/13
Test Engineer:	R Zheng
Configuration:	EUT only
Mode:	CDMA 2000, EVDO Rev A, BC15

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1711.25MHz)									
3.423	-27.0	V	3.0	30.4	1.0	-56.4	-13.0	-43.4	
5.134	-24.3	V	3.0	28.8	1.0	-52.1	-13.0	-39.1	
3.423	-26.8	H	3.0	30.4	1.0	-56.3	-13.0	-43.3	
5.134	-24.7	H	3.0	28.8	1.0	-52.5	-13.0	-39.5	
Mid Ch, (1732.5MHz)									
3.465	-27.3	V	3.0	30.4	1.0	-56.7	-13.0	-43.7	
5.198	-30.5	V	3.0	28.7	1.0	-58.2	-13.0	-45.2	
3.465	-25.0	H	3.0	30.4	1.0	-54.4	-13.0	-41.4	
5.198	-27.9	H	3.0	28.7	1.0	-55.6	-13.0	-42.6	
High Ch, (1753.75MHz)									
3.508	-22.3	V	3.0	30.4	1.0	-51.7	-13.0	-38.7	
5.261	-27.4	V	3.0	28.6	1.0	-55.0	-13.0	-42.0	
3.508	-26.0	H	3.0	30.4	1.0	-55.4	-13.0	-42.4	
5.261	-26.3	H	3.0	28.6	1.0	-54.0	-13.0	-41.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000, EVDO B 2 MIN, BC0

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	13U15555
Date:	08/22/13
Test Engineer:	R Zheng
Configuration:	EUT only
Mode:	CDMA 2000, EVDO Rev B 2 Min Carrier, BC0

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (825.3MHz)									
1.651	-26.9	V	3.0	32.7	1.0	-58.6	-13.0	-45.6	
2.476	-16.2	V	3.0	31.4	1.0	-46.6	-13.0	-33.6	
1.651	-28.1	H	3.0	32.7	1.0	-59.8	-13.0	-46.8	
2.476	-19.5	H	3.0	31.4	1.0	-49.9	-13.0	-36.9	
Mid Ch, (837.2MHz)									
1.674	-26.9	V	3.0	32.6	1.0	-58.5	-13.0	-45.5	
2.512	-16.7	V	3.0	31.5	1.0	-47.2	-13.0	-34.2	
1.674	-28.0	H	3.0	32.6	1.0	-59.6	-13.0	-46.6	
2.512	-19.5	H	3.0	31.5	1.0	-50.0	-13.0	-37.0	
High Ch, (847.6MHz)									
1.695	-26.4	V	3.0	32.6	1.0	-57.9	-13.0	-44.9	
2.543	-15.9	V	3.0	31.4	1.0	-46.3	-13.0	-33.3	
1.695	-29.2	H	3.0	32.6	1.0	-60.7	-13.0	-47.7	
2.543	-18.7	H	3.0	31.4	1.0	-49.1	-13.0	-36.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000, EVDO B 2 MAX, BC0

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	13U15555
Date:	08/22/13
Test Engineer:	R Zheng
Configuration:	EUT only
Mode:	CDMA 2000, EVDO Rev B 2 Max Carrier, BC0

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.5MHz)									
1.653	-26.9	V	3.0	32.7	1.0	-58.6	-13.0	-45.6	
2.480	-17.0	V	3.0	31.4	1.0	-47.4	-13.0	-34.4	
1.653	-29.4	H	3.0	32.7	1.0	-61.0	-13.0	-48.0	
2.480	-19.8	H	3.0	31.4	1.0	-50.2	-13.0	-37.2	
Mid Ch, (838.8MHz)									
1.686	-25.9	V	3.0	32.6	1.0	-57.5	-13.0	-44.5	
2.534	-18.5	V	3.0	31.5	1.0	-49.0	-13.0	-36.0	
1.686	-29.0	H	3.0	32.6	1.0	-60.6	-13.0	-47.6	
2.534	-18.3	H	3.0	31.5	1.0	-48.8	-13.0	-35.8	
High Ch, (844.9MHz)									
1.690	-26.4	V	3.0	32.6	1.0	-57.9	-13.0	-44.9	
2.535	-19.6	V	3.0	31.5	1.0	-50.1	-13.0	-37.1	
1.690	-27.3	H	3.0	32.6	1.0	-58.9	-13.0	-45.9	
2.535	-19.1	H	3.0	31.5	1.0	-49.6	-13.0	-36.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000, EVDO B 3 MIN, BC0

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	13U15555
Date:	08/22/13
Test Engineer:	R.Zheng
Configuration:	EUT only
Mode:	CDMA 2000, EVDO Rev B 3 Min Carrier, BC0

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (825.9MHz)									
1.652	-30.7	V	3.0	32.7	1.0	-62.4	-13.0	-49.4	
2.478	-15.0	V	3.0	31.4	1.0	-45.4	-13.0	-32.4	
1.652	-29.1	H	3.0	32.7	1.0	-60.7	-13.0	-47.7	
2.478	-19.8	H	3.0	31.4	1.0	-50.2	-13.0	-37.2	
Mid Ch, (837.7MHz)									
1.675	-26.9	V	3.0	32.6	1.0	-58.5	-13.0	-45.5	
2.513	-16.5	V	3.0	31.5	1.0	-46.9	-13.0	-33.9	
1.675	-29.2	H	3.0	32.6	1.0	-60.8	-13.0	-47.8	
2.513	-20.7	H	3.0	31.5	1.0	-51.2	-13.0	-38.2	
High Ch, (846.7MHz)									
1.693	-27.0	V	3.0	32.6	1.0	-58.5	-13.0	-45.5	
2.540	-17.3	V	3.0	31.4	1.0	-47.7	-13.0	-34.7	
1.693	-29.0	H	3.0	32.6	1.0	-60.5	-13.0	-47.5	
2.540	-20.2	H	3.0	31.4	1.0	-50.7	-13.0	-37.7	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.