



**FCC CFR47 PART 22H, 24E, 27L AND 90S
CERTIFICATION TEST REPORT
FOR
QUAD-BAND RADIO WITH WLAN AND BT RADIO**

MODEL NUMBER: A1456, A1532

FCC ID: BCG-E2644A

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Prepared for

**APPLE, INC.
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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: QUAD-BAND RADIO WITH WLAN AND BT RADIO

MODEL: A1456, A1532

SERIAL NUMBER: C7JKP0A0FLTW

DATE TESTED: APRIL 22 ~ JUNE 3 and AUGUST 6, 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
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Tested By:



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WISE LAB ENGINEER
UL VERIFICATION SERVICES INC.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-C, FCC CFR 47 Part 2, FCC CFR 47 Part 22, FCC CFR Part 24, FCC Part 27 and FCC part 90.

3. FACILITIES AND ACCREDITATION

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

UL 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:

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

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT, Model A1456/A1532 is a mobile phone with multimedia functions (music, application support, and video), cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/CDMA/EVDO/LTE radio, IEEE 802.11a/b/g/n, Bluetooth and GPS radio. The rechargeable battery is not user accessible.

5.2. MAXIMUM OUTPUT POWER

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

LAT, GSM

Part 22 /24					
Frequency range (MHz)	Modulation	Conducted(Peak)		ERP/EIRP (Peak)	
		dBm	mW	dBm	mW
824.2 - 848.8	GPRS	33.80	2398.8	30.21	1049.5
1850.2-1909.8	GPRS	31.95	1566.8	32.65	1840.8
824.2 - 848.8	EGPRS	31.56	1432.2	29.94	986.3
1850.2-1909.8	EGPRS	30.60	1148.2	31.83	1524.1

UAT, GSM

Part 22 /24					
Frequency range (MHz)	Modulation	Conducted(Peak)		ERP/EIRP (Peak)	
		dBm	mW	dBm	mW
824.2 - 848.8	GPRS	32.95	1972.4	21.60	144.5
1850.2-1909.8	GPRS	31.48	1406.0	27.65	582.1
824.2 - 848.8	EGPRS	31.60	1445.4	19.24	83.9
1850.2-1909.8	EGPRS	30.60	1148.2	26.32	428.5

LAT, 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			24.20	263.0			23.00	199.5
826.4-846.6	HSDPA			23.20	208.9			22.05	160.3
1712.4 - 1752.6	REL 99	26.58	455.0			27.69	587.5		
1712.4 - 1752.6	HSDPA	26.25	421.7			27.09	511.7		
1852.4 - 1907.6	REL 99	26.70	467.7			29.15	822.2		
1852.4 - 1907.6	HSDPA	26.30	426.6			28.35	683.9		

UAT 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			24.20	263.0			16.80	47.9
826.4-846.6	HSDPA			23.20	208.9			15.84	38.4
1712.4 - 1752.6	REL 99	27.00	501.2			24.39	274.8		
1712.4 - 1752.6	HSDPA	26.90	489.8			23.59	228.6		
1852.4 - 1907.6	REL 99	26.40	436.5			21.02	126.5		
1852.4 - 1907.6	HSDPA	26.45	441.6			20.42	110.2		

LAT, 1xRTT

Part 22/90 Bands					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP (Average)	
		dBm	mW	dBm	mW
817.9-823.1	1xRTT, BC10	25.00	316.2	21.25	133.4
824.7-848.31	1xRTT, BC0	24.50	281.8	21.04	127.1

Part 24/27 Bands					
Frequency range (MHz)	Modulation	Conducted(Peak)		EIRP (Peak)	
		dBm	mW	dBm	mW
1711.25-1753.75	1xRTT, BC15	27.45	555.9	26.35	431.5
1851.25-1908.75	1xRTT, BC1	27.55	568.9	28.33	680.8

UAT, 1xRTT

Part 22/90 Bands					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP/EIRP (Average)	
		dBm	mW	dBm	mW
817.9-823.1	1xRTT, BC10	24.70	295.1	15.90	38.9
824.7-848.31	1xRTT, BC0	24.45	278.6	16.27	42.4

Part 24/27 Bands					
Frequency range (MHz)	Modulation	Conducted(Peak)		EIRP (Peak)	
		dBm	mW	dBm	mW
1711.25-1753.75	1xRTT, BC15	27.90	616.6	25.43	349.1
1851.25-1908.75	1xRTT, BC1	27.75	595.7	23.45	221.3

LAT, EVDO REV A

Part 24/90 Bands					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP (Average)	
		dBm	mW	dBm	mW
817.9-823.1	EVDO A,BC10	25.10	323.6	21.40	138.0
824.7-848.31	EVDO A,BC0	24.20	263.0	20.84	121.3

Part 24/27 Bands					
Frequency range (MHz)	Modulation	Conducted(Peak)		EIRP (Peak)	
		dBm	mW	dBm	mW
1711.25-1753.75	EVDO A, BC15	27.60	575.4	26.42	438.5
1851.25-1908.75	EVDO A, BC1	27.80	602.6	28.45	699.8

UAT, EVDO REV A

Part 22/90 Bands					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP (Average)	
		dBm	mW	dBm	mW
817.9-823.1	EVDO A,BC10	24.65	291.7	16.25	42.2
824.7-848.31	EVDO A,BC0	24.45	278.6	15.74	37.5

Part 24/90 Bands					
Frequency range (MHz)	Modulation	Conducted(Peak)		EIRP (Peak)	
		dBm	mW	dBm	mW
1851.25-1908.75	EVDO A, BC1	27.90	616.6	21.87	153.8
1711.25-1753.75	EVDO A, BC15	27.80	602.6	22.06	160.7

LAT, 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	21.95	156.7	24.93	311.2
824.7-848.31	EVDO B 2 Max, BC0	21.77	150.3	23.81	240.4
824.7-848.31	EVDO B 3 Min, BC0	21.86	153.5	25.74	375.0

UAT, 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	21.50	141.3	16.80	47.9
824.7-848.31	EVDO B 2 Max, BC0	21.56	143.2	14.28	26.8
824.7-848.31	EVDO B 3 Min, BC0	21.62	145.2	17.44	55.5

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a band gap type integral antenna for the 850MHz and 1900MHz bands with a maximum peak gain as follow: LAT: Port A, UAT: Port B.

Frequency (MHz)	LAT GAIN (dBi)	UAT GAIN (dBi)
Cell 824.2-848.8	-1.08	-8.09
PCS 1850.2-1909.8	0.9	-3.62
AWS 1712.4-1752.6	-0.79	-4.77

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was version 11A360 baseband 7.02-16.

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

5.5. WORST-CASE CONFIGURATION AND MODE

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

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

For the device, all tests were performed as below,

_Port A: Both conducted and radiated emissions measurement with all bands.

_Port B: All conducted emissions measurement and only ERP/EIRP radiated emissions on all bands

X-position is the worst-case for all modes below:

- 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

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Apple	A1385	D292066H2T2DHLHAC	DoC
DC Power Supply	Sorensen	XT 15-4	1319A02780	NA

I/O CABLES (RF CONDUCTED TEST)

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	US 115V	Un-shielded	2m	N/A
2	DC	1	DC	Un-shielded	2m	N/A
3	RF In/Out	1	EUT	Un-shielded	1m	N/A
4	RF In/Out	1	Spectrum Analyzer	Un-shielded	1m	N/A
5	RF In/Out	1	Communication Test Set	Un-shielded	None	N/A

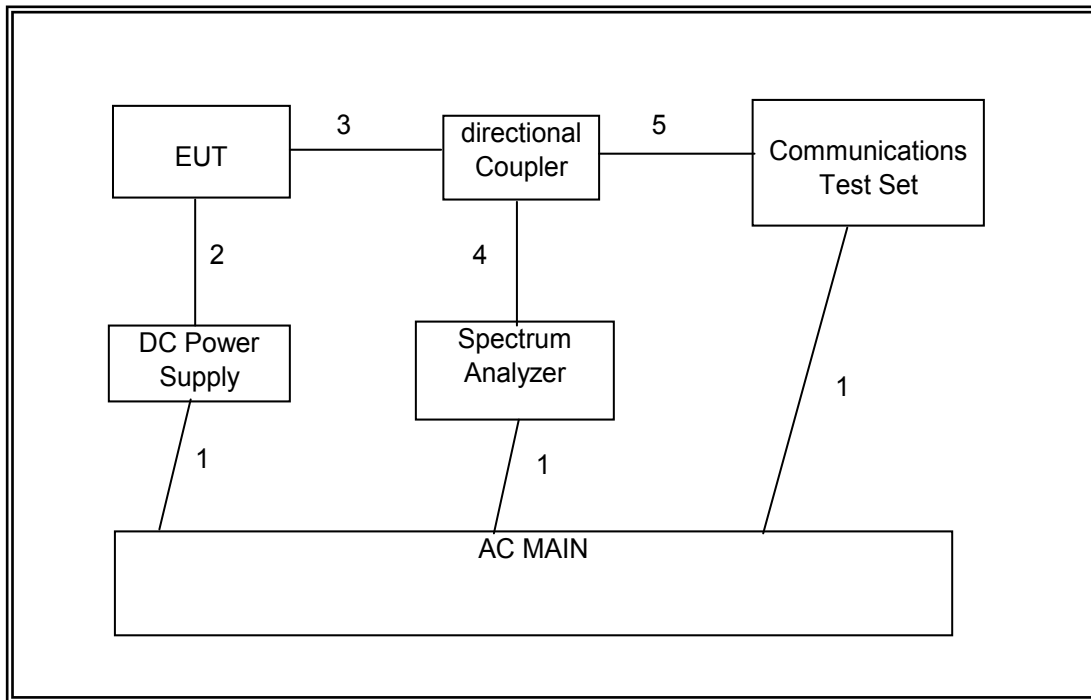
I/O CABLES (RF RADIATED TEST)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	Jack	1	Earphone	Un-shielded	0.5m	NA
2	RF In/Out	1	Antenna	Un-shielded	5m	NA

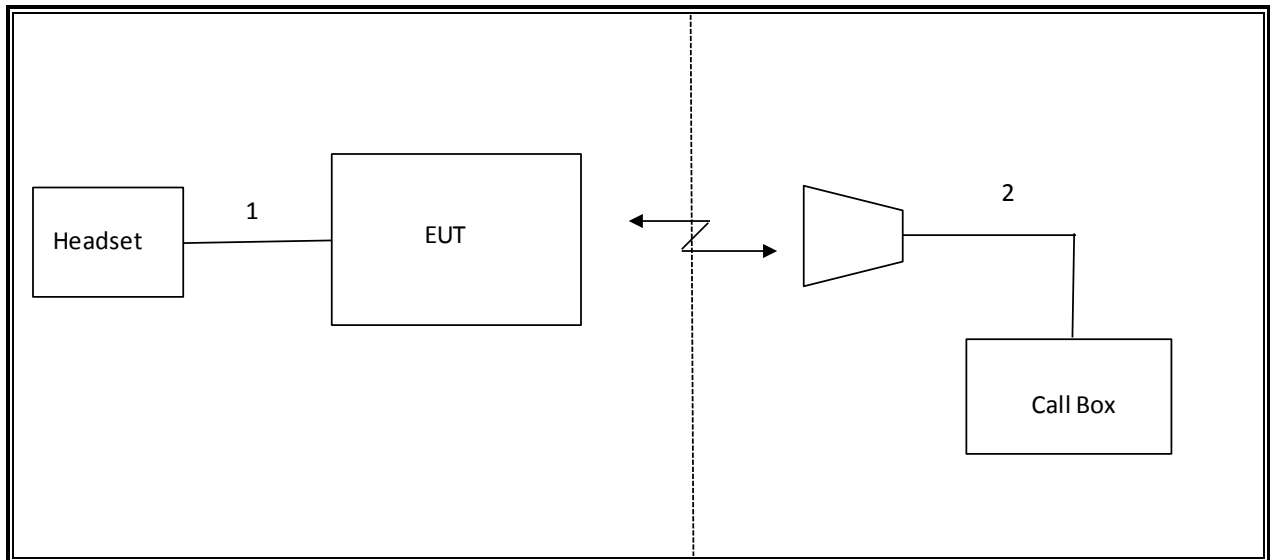
TEST SETUP

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

SETUP DIAGRAM FOR RF CONDUCTED TESTS



SETUP DIAGRAM FOR RF RADIATED TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Spectrum Analyzer, 44GHz	Agilent	N9030A	F00129	02/21/14
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
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/14
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
Bilog, 30-1GHz	Sunol Science	A0222813-1	C01011	03/07/14
Peak Power Meter	Boonton	4541	C01189	06/20/14
Peak Power Sensor	Boonton	57006	C01202	05/29/14
Horn Antenna	ETS Lindgren	3117	F00131	02/19/14
PreAmp 1-18GHz	Agilent/HP	8449B	C01063	03/18/14

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

LAT PORT

GPRS

Mode	Ch.	f (MHz)	1 time slots		2 time slots	
			Peak	Average	Peak	Average
GPRS	128	824.2	33.80	33.50	32.40	32.00
	190	836.6	33.70	33.48	32.30	32.00
	251	848.8	33.70	33.40	32.25	32.00
EGPRS	128	824.2	31.45	28.70	31.05	28.60
	190	836.6	31.56	28.80	31.30	28.70
	251	848.8	31.50	28.75	31.18	28.65

EGPRS

Mode	Ch.	f (MHz)	1 time slots		2 time slots	
			Peak	Average	Peak	Average
GPRS	512	1850.2	31.70	31.40	28.70	28.30
	661	1880.0	31.90	31.50	28.75	28.40
	810	1909.8	31.95	31.50	28.80	28.50
EGPRS	512	1850.2	30.40	27.80	30.30	27.80
	661	1880.0	30.60	28.00	30.40	28.00
	810	1909.8	30.55	27.80	30.20	27.70

UAT (PORT B)

GPRS

Mode	Ch.	f (MHz)	1 time slots		2 time slots	
			Peak	Average	Peak	Average
GPRS	128	824.2	32.86	33.13	32.90	32.20
	190	836.6	32.90	33.20	32.85	32.20
	251	848.8	32.95	33.16	32.75	32.15
EGPRS	128	824.2	31.50	28.62	31.50	28.60
	190	836.6	31.56	28.65	31.60	28.70
	251	848.8	31.60	28.70	31.55	28.64

EGPRS

Mode	Ch.	f (MHz)	1 time slots		2 time slots	
			Peak	Average	Peak	Average
GPRS	512	1850.2	31.40	30.85	30.77	29.85
	661	1880.0	31.48	30.90	30.65	29.90
	810	1909.8	31.43	30.82	30.70	29.90
EGPRS	512	1850.2	30.60	27.40	30.40	27.40
	661	1880.0	30.56	27.35	30.32	27.36
	810	1909.8	30.55	27.36	30.30	27.30

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

RESULTS

LAT PORT

UMTS REL99

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
				Peak	Average
Band 5 UMTS 850	4132	4357	826.4	27.26	24.40
	4180	4405	836.0	27.37	24.31
	4230	4455	846.6	27.24	24.15

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
				Peak	Average
Band 4	1312	1537	1712.4	26.57	22.90
	1413	1638	1732.6	26.58	23.00
	1513	1738	1752.6	26.49	22.96

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
				Peak	Average
Band 2 UMTS 1900	9262	9662	1852.4	26.40	22.90
	9400	9800	1880.0	26.40	22.92
	9538	9938	1907.6	26.70	23.00

UAT PORT

UMTS REL99

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
				Peak	Average
Band 5 UMTS 850	4132	4357	826.4	27.00	24.10
	4180	4405	836.0	27.30	24.20
	4230	4455	846.6	26.90	24.15

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
				Peak	Average
Band 4	1312	1537	1712.4	26.60	23.60
	1413	1638	1732.6	26.60	23.57
	1513	1738	1752.6	27.00	23.80

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
				Peak	Average
Band 2 UMTS 1900	9262	9662	1852.4	26.25	23.70
	9400	9800	1880.0	26.12	23.60
	9538	9938	1907.6	26.40	23.80

7.3. 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			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_{ec}	-	-	-	-
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
β_{ed}	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			
	$A_{hs} = \beta_{hs}/\beta_c$	30/15			

RESULT

LAT PORT

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	27.40	23.16
		4180	4405	836.0	27.50	23.10
		4230	4455	846.0	27.50	23.20
	2	4132	4357	826.4	27.44	23.15
		4180	4405	836.0	27.37	23.13
		4230	4455	846.0	27.50	23.16
	3	4132	4357	826.4	27.23	22.97
		4180	4405	836.0	27.30	22.87
		4230	4455	846.0	27.47	22.93
	4	4132	4357	826.4	27.32	22.86
		4180	4405	836.0	27.27	22.93
		4230	4455	846.0	27.51	22.87
UMTS1900 (Band II)	1*	9262	9662	1852.4	26.22	21.89
		9400	9800	1880.0	26.20	21.80
		9538	9938	1907.6	26.30	21.79
	2	9262	9662	1852.4	26.20	22.00
		9400	9800	1880.0	26.11	21.80
		9538	9938	1907.6	26.30	21.86
	3	9262	9662	1852.4	26.23	21.70
		9400	9800	1880.0	26.00	21.60
		9538	9938	1907.6	26.27	21.65
	4	9262	9662	1852.4	26.24	21.70
		9400	9800	1880.0	26.20	21.61
		9538	9938	1907.6	26.30	21.60

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	Conducted output power (dBm)
					Peak	Average
UMTS1700 (Band IV)	1*	1312	1537	1712.4	26.00	22.12
		1413	1638	1732.6	26.19	22.10
		1513	1738	1752.6	26.25	22.20
	2	1312	1537	1712.4	26.00	22.12
		1413	1638	1732.6	26.13	22.17
		1513	1738	1752.6	26.10	22.10
	3	1312	1537	1712.4	26.10	21.85
		1413	1638	1732.6	26.00	21.86
		1513	1738	1752.6	26.15	22.00
	4*	1312	1537	1712.4	26.10	21.80
		1413	1638	1732.6	26.10	22.00
		1513	1738	1752.6	26.10	21.90

UAT PORT

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	27.21	23.20
		4180	4405	836.0	27.40	23.12
		4230	4455	846.0	27.22	23.00
	2	4132	4357	826.4	27.20	23.11
		4180	4405	836.0	27.25	23.01
		4230	4455	846.0	27.33	22.98
	3	4132	4357	826.4	27.14	22.83
		4180	4405	836.0	27.38	22.74
		4230	4455	846.0	27.23	22.72
	4	4132	4357	826.4	27.31	22.76
		4180	4405	836.0	27.30	22.81
		4230	4455	846.0	27.16	22.65
UMTS1900 (Band II)	1*	9262	9662	1852.4	26.15	22.71
		9400	9800	1880.0	26.25	22.63
		9538	9938	1907.6	26.45	22.80
	2	9262	9662	1852.4	26.32	22.62
		9400	9800	1880.0	26.28	22.54
		9538	9938	1907.6	26.35	22.71
	3	9262	9662	1852.4	26.33	22.46
		9400	9800	1880.0	26.34	22.32
		9538	9938	1907.6	26.32	22.48
	4	9262	9662	1852.4	26.31	21.80
		9400	9800	1880.0	26.30	21.85
		9538	9938	1907.6	26.32	22.34

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	Conducted output power (dBm)
					Peak	Average
UMTS1700 (Band IV)	1	1312	1537	1712.4	26.75	22.70
		1413	1638	1732.6	26.41	22.78
		1513	1738	1752.6	26.72	22.74
	2*	1312	1537	1712.4	26.80	22.61
		1413	1638	1732.6	26.81	22.80
		1513	1738	1752.6	26.90	22.72
	3	1312	1537	1712.4	26.83	21.88
		1413	1638	1732.6	26.72	21.90
		1513	1738	1752.6	26.74	21.75
	4	1312	1537	1712.4	26.75	21.92
		1413	1638	1732.6	26.71	21.90
		1513	1738	1752.6	26.80	21.57

7.4. LAT UMTS DUAL CARRIER HSDPA

LAT UMTS DUAL CARRIER HSDPA

RESULT

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS850 (Band V)	1*	4132	4357	826.4	27.02	23.01
		4180	4405	836.0	26.85	23.09
		4230	4455	846.0	26.72	23.10
	2	4132	4357	826.4	26.75	23.05
		4180	4405	836.0	26.79	23.01
		4230	4455	846.0	27.01	23.00
	3	4132	4357	826.4	26.72	23.00
		4180	4405	836.0	26.94	22.84
		4230	4455	846.0	26.66	22.91
	4	4132	4357	826.4	26.62	22.90
		4180	4405	836.0	26.53	22.99
		4230	4455	846.0	26.62	22.90
UMTS1900 (Band II)	1	9262	9662	1852.4	25.91	21.87
		9400	9800	1880.0	25.89	21.84
		9538	9938	1907.6	25.62	21.83
	2*	9262	9662	1852.4	26.13	22.10
		9400	9800	1880.0	26.08	21.84
		9538	9938	1907.6	25.90	21.80
	3	9262	9662	1852.4	25.84	21.79
		9400	9800	1880.0	25.80	21.65
		9538	9938	1907.6	25.68	21.67
	4	9262	9662	1852.4	25.80	21.78
		9400	9800	1880.0	25.77	21.61
		9538	9938	1907.6	25.70	21.63

Band	Subtest	UL Ch	Frequency	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS1700 (Band IV)	1*	1312	1537	1712.4	26.05	22.10
		1413	1638	1732.6	26.16	22.17
		1513	1738	1752.6	26.25	22.22
	2	1312	1537	1712.4	26.11	22.12
		1413	1638	1732.6	26.10	22.20
		1513	1738	1752.6	26.16	22.12
	3	1312	1537	1712.4	26.12	21.80
		1413	1638	1732.6	26.05	21.84
		1513	1738	1752.6	26.20	22.00
	4	1312	1537	1712.4	26.05	21.75
		1413	1638	1732.6	26.02	21.98
		1513	1738	1752.6	26.00	21.91

UAT UMTS DUAL CARRIER HSDPA

RESULT

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS850 (Band V)	1*	4132	4357	826.4	26.80	23.31
		4180	4405	836.0	26.75	23.30
		4230	4455	846.0	26.72	23.35
	2	4132	4357	826.4	26.71	23.32
		4180	4405	836.0	26.59	23.31
		4230	4455	846.0	26.50	23.30
	3	4132	4357	826.4	26.75	23.00
		4180	4405	836.0	26.60	22.84
		4230	4455	846.0	26.62	22.91
	4	4132	4357	826.4	26.60	22.90
		4180	4405	836.0	26.50	22.99
		4230	4455	846.0	26.62	22.90
UMTS1900 (Band II)	1*	9262	9662	1852.4	26.24	22.70
		9400	9800	1880.0	26.20	22.61
		9538	9938	1907.6	26.25	22.72
	2	9262	9662	1852.4	26.23	22.63
		9400	9800	1880.0	26.10	22.59
		9538	9938	1907.6	26.21	22.72
	3	9262	9662	1852.4	26.26	22.68
		9400	9800	1880.0	26.21	22.27
		9538	9938	1907.6	26.20	22.40
	4	9262	9662	1852.4	26.22	22.30
		9400	9800	1880.0	26.24	22.38
		9538	9938	1907.6	26.20	22.39

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS1700 (Band IV)	1	1312	1537	1712.4	26.70	22.64
		1413	1638	1732.6	26.34	22.50
		1513	1738	1752.6	26.63	22.61
	2*	1312	1537	1712.4	26.71	22.53
		1413	1638	1732.6	26.35	22.70
		1513	1738	1752.6	26.70	22.62
	3	1312	1537	1712.4	26.71	21.73
		1413	1638	1732.6	26.60	21.75
		1513	1738	1752.6	26.65	21.62
	4	1312	1537	1712.4	26.61	21.70
		1413	1638	1732.6	26.68	21.73
		1513	1738	1752.6	26.75	21.75

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				
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	-
	β_{hs}	22/15	12/15	30/15	4/15	5/15
β_{ed}	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				
	$A_{hs} = \beta_{hs}/\beta_c$	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	12
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	67
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18		E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27

RESULTS

LAT PORT

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS850 (Band V)	1*	4132	4357	826.4	27.10	23.00
		4180	4405	836.0	27.32	23.15
		4230	4455	846.0	27.41	23.12
	2	4132	4357	826.4	27.11	22.70
		4180	4405	836.0	26.95	22.32
		4230	4455	846.0	27.39	22.83
	3	4132	4357	826.4	27.08	21.80
		4180	4405	836.0	27.32	22.00
		4230	4455	846.0	27.35	22.60
	4	4132	4357	826.4	27.40	23.10
		4180	4405	836.0	27.37	22.70
		4230	4455	846.0	27.38	22.95
	5	4132	4357	826.4	26.49	22.81
		4180	4405	836.0	26.85	22.80
		4230	4455	846.0	27.06	22.83
UMTS1900 (Band II)	1*	9262	9662	1852.4	25.76	21.97
		9400	9800	1880.0	25.72	22.25
		9538	9938	1907.6	25.69	22.12
	2	9262	9662	1852.4	25.05	21.10
		9400	9800	1880.0	24.92	21.36
		9538	9938	1907.6	25.25	21.25
	3	9262	9662	1852.4	25.10	21.18
		9400	9800	1880.0	25.21	21.31
		9538	9938	1907.6	25.00	21.07
	4	9262	9662	1852.4	25.26	21.65
		9400	9800	1880.0	24.65	21.50
		9538	9938	1907.6	25.15	21.73
	5	9262	9662	1852.4	25.00	21.90
		9400	9800	1880.0	25.19	22.00
		9538	9938	1907.6	25.01	22.06

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS1700 (Band IV)	1*	1312	1537	1712.4	26.22	22.01
		1413	1638	1732.6	26.20	22.18
		1513	1738	1752.6	25.79	21.05
	2	1312	1537	1712.4	25.69	21.13
		1413	1638	1732.6	25.75	21.00
		1513	1738	1752.6	25.61	20.75
	3	1312	1537	1712.4	25.76	21.00
		1413	1638	1732.6	25.56	21.26
		1513	1738	1752.6	25.82	21.07
	4	1312	1537	1712.4	25.87	21.43
		1413	1638	1732.6	25.85	21.18
		1513	1738	1752.6	25.92	21.72
	5	1312	1537	1712.4	25.71	22.01
		1413	1638	1732.6	25.77	21.83
		1513	1738	1752.6	25.83	21.92

UAT PORT

UAT Worst Case

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS850 (Band V)	1	4132	4357	826.4	26.85	22.60
		4180	4405	836.0	27.00	23.15
		4230	4455	846.0	27.13	23.17
UMTS1900 (Band II)	1	9262	9662	1852.4	26.20	22.28
		9400	9800	1880.0	26.17	22.72
		9538	9938	1907.6	26.25	22.62

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS1700 (Band IV)	1	1312	1537	1712.4	26.72	22.70
		1413	1638	1732.6	26.75	22.63
		1513	1738	1752.6	26.80	22.60

7.6. 1xRTT

TEST PROCEDURE

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

<u>Application</u>	<u>Rev, License</u>
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

LAT PORT

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)	28.20	24.90	28.30	24.97	28.60	24.97
	55 (Loopback)	28.25	24.95	28.39	24.97	28.25	24.95
RC2	9 (Loopback)	28.20	24.90	28.43	25.00	28.20	24.98
	55 (Loopback)	28.20	24.94	28.30	24.97	28.20	24.94
RC3	2 (Loopback)	27.95	24.96	28.13	24.98	27.95	24.96
	55 (Loopback)	28.00	24.90	28.16	24.98	28.00	24.90
	32 (+ F-SCH)	28.00	24.96	28.15	24.97	28.00	24.96
	32 (+ SCH)	27.94	24.95	28.15	24.97	27.94	24.95
RC4	2 (Loopback)	27.96	24.95	28.07	24.95	27.96	24.95
	55 (Loopback)	27.90	24.95	28.00	24.95	27.90	24.95
	32 (+ F-SCH)	27.95	24.98	28.00	24.96	27.95	24.98
	32 (+ SCH)	27.99	24.95	28.00	24.97	27.99	24.95
RC5	9 (Loopback)	28.10	24.96	28.10	24.95	28.10	24.96
	55 (Loopback)	27.90	24.95	28.13	24.94	27.90	24.95
RC11	2 (Loopback)	28.10	24.94	28.12	24.94	28.10	24.94
	75 (Loopback)	28.10	24.97	28.18	24.96	28.10	24.97
	32 (+ F-SCH)	28.10	24.95	28.20	24.95	28.10	24.95
	32 (+ SCH)	28.00	24.95	28.23	24.96	28.00	24.95

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)	28.57	24.48	28.40	24.48	27.98	24.48
	55 (Loopback)	28.54	24.48	28.39	24.48	28.00	24.47
RC2	9 (Loopback)	28.60	24.50	28.39	24.46	27.86	24.45
	55 (Loopback)	28.55	24.49	28.44	24.45	27.96	24.48
RC3	2 (Loopback)	27.98	24.45	28.15	24.43	27.60	24.44
	55 (Loopback)	28.13	24.45	28.25	24.43	27.56	24.47
	32 (+ F-SCH)	28.10	24.45	28.15	24.45	27.53	24.46
	32 (+ SCH)	28.10	24.47	28.20	24.42	27.58	24.45
RC4	2 (Loopback)	28.10	24.48	28.10	24.46	27.60	24.42
	55 (Loopback)	28.25	24.45	28.20	24.43	27.67	24.48
	32 (+ F-SCH)	28.10	24.43	28.20	24.49	27.55	24.43
	32 (+ SCH)	28.10	24.43	28.18	24.45	27.62	24.45
RC5	9 (Loopback)	28.10	24.48	28.20	24.48	27.56	24.44
	55 (Loopback)	28.19	24.47	28.15	24.46	27.59	24.47
RC11	2 (Loopback)	28.26	24.48	28.20	24.45	27.57	24.48
	75 (Loopback)	28.23	24.45	28.17	24.45	27.66	24.47
	32 (+ F-SCH)	28.27	24.45	28.20	24.42	27.68	24.40
	32 (+ SCH)	28.28	24.44	28.16	24.45	27.63	24.43

LAT

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)	27.10	22.78	27.45	22.68	27.23	22.93
	55 (Loopback)	27.10	22.73	27.53	22.68	27.34	22.98
RC2	9 (Loopback)	27.10	22.95	27.55	23.00	27.36	23.00
	55 (Loopback)	27.10	22.75	27.50	22.67	27.30	22.90
RC3	2 (Loopback)	27.00	22.80	27.25	22.69	27.25	22.97
	55 (Loopback)	27.00	22.78	27.27	22.72	27.10	22.95
	32 (+ F-SCH)	27.00	22.68	27.36	22.65	27.16	22.95
	32 (+ SCH)	27.00	22.73	27.39	22.63	27.12	22.95
RC4	2 (Loopback)	27.00	22.65	27.40	22.65	27.10	22.70
	55 (Loopback)	27.00	22.71	27.35	22.70	27.25	22.90
	32 (+ F-SCH)	26.98	22.70	27.35	22.68	27.10	22.92
	32 (+ SCH)	26.94	22.75	27.32	22.68	27.16	22.94
RC5	9 (Loopback)	27.00	22.73	27.29	22.70	27.12	24.86
	55 (Loopback)	27.00	22.80	27.00	22.28	27.17	22.97
RC11	2 (Loopback)	26.97	22.83	27.39	22.70	27.16	22.90
	75 (Loopback)	26.98	22.80	27.34	22.73	27.20	22.90
	32 (+ F-SCH)	28.27	22.95	27.20	22.90	27.68	22.90
	32 (+ SCH)	28.28	22.94	27.16	22.95	27.63	22.98

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)	27.35	22.98	27.40	22.98	27.15	22.76
	55 (Loopback)	27.31	22.98	27.36	22.99	27.11	22.72
RC2	9 (Loopback)	27.37	23.00	27.45	23.00	27.10	22.77
	55 (Loopback)	27.30	22.97	27.36	22.98	27.09	22.75
RC3	2 (Loopback)	27.26	22.96	27.30	22.95	27.00	22.65
	55 (Loopback)	27.23	22.96	27.20	22.98	27.00	22.70
	32 (+ F-SCH)	27.26	22.98	27.30	22.98	26.95	22.65
	32 (+ SCH)	27.22	22.98	27.24	22.92	27.00	22.82
RC4	2 (Loopback)	27.17	22.96	27.31	22.90	27.00	22.65
	55 (Loopback)	27.30	22.96	27.22	22.93	26.97	22.63
	32 (+ F-SCH)	27.24	22.97	27.36	22.94	26.98	22.70
	32 (+ SCH)	27.26	22.98	27.23	22.95	27.00	22.80
RC5	9 (Loopback)	27.22	22.98	27.21	22.94	26.95	22.70
	55 (Loopback)	27.20	22.98	27.26	22.98	26.97	22.77
RC11	2 (Loopback)	27.28	22.95	27.32	22.98	27.00	22.78
	75 (Loopback)	27.25	22.98	27.25	22.98	27.00	22.83
	32 (+ F-SCH)	27.30	22.96	27.33	22.98	27.00	22.82
	32 (+ SCH)	27.26	22.96	27.22	22.98	27.00	22.80

UAT PORT

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)	28.80	24.62	28.70	24.62	28.60	24.60
	55 (Loopback)	28.55	24.65	28.50	24.65	28.65	24.65
RC2	9 (Loopback)	28.50	24.65	28.60	24.60	28.60	24.60
	55 (Loopback)	28.55	24.70	28.90	24.65	28.65	24.60
RC3	2 (Loopback)	28.20	24.62	28.60	24.60	28.50	24.60
	55 (Loopback)	28.30	24.62	28.60	24.60	28.55	24.55
	32 (+ F-SCH)	28.25	24.60	28.45	24.65	28.65	24.05
	32 (+ SCH)	28.50	24.60	28.45	24.65	28.55	24.55
RC4	2 (Loopback)	28.60	24.65	28.50	24.60	28.50	24.65
	55 (Loopback)	28.70	24.65	28.40	24.65	28.65	24.65
	32 (+ F-SCH)	28.50	24.60	28.40	24.60	28.60	24.60
	32 (+ SCH)	28.40	24.60	28.50	24.65	28.50	24.60
RC5	9 (Loopback)	28.20	24.65	28.50	24.60	28.75	24.60
	55 (Loopback)	28.30	24.60	28.50	24.60	28.70	24.63
RC11	2 (Loopback)	28.20	24.60	28.50	24.65	28.55	24.62
	75 (Loopback)	28.00	24.65	28.50	24.65	28.40	24.62
	32 (+ F-SCH)	28.15	24.60	28.40	24.60	28.45	24.60
	32 (+ SCH)	28.20	24.60	28.30	24.55	28.40	24.60

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)	28.80	24.15	28.60	24.10	28.00	24.10
	55 (Loopback)	28.90	24.20	28.50	24.10	28.00	24.05
RC2	9 (Loopback)	28.75	24.10	28.60	24.10	28.00	24.05
	55 (Loopback)	28.70	24.45	28.40	24.40	28.20	24.40
RC3	2 (Loopback)	28.20	24.15	28.00	24.10	27.75	24.05
	55 (Loopback)	28.15	24.15	27.95	24.15	27.70	24.10
	32 (+ F-SCH)	28.30	24.40	28.00	24.20	27.70	24.10
	32 (+ SCH)	28.20	24.40	28.00	24.20	27.80	24.10
RC4	2 (Loopback)	28.10	24.15	28.00	24.10	27.70	24.10
	55 (Loopback)	28.40	24.15	28.05	24.10	27.80	24.10
	32 (+ F-SCH)	28.40	24.20	28.10	24.20	27.60	24.15
	32 (+ SCH)	28.40	24.40	28.10	24.15	27.90	24.40
RC5	9 (Loopback)	28.30	24.10	28.00	24.05	27.80	24.10
	55 (Loopback)	28.20	24.15	28.10	24.10	27.85	24.10
RC11	2 (Loopback)	28.50	24.20	28.00	24.15	27.90	24.20
	75 (Loopback)	28.40	24.20	28.00	24.20	27.80	24.40
	32 (+ F-SCH)	28.50	24.30	28.20	24.25	27.80	24.40
	32 (+ SCH)	28.40	24.30	28.20	24.15	27.80	24.30

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)	28.10	24.40	28.10	24.35	28.10	24.35
	55 (Loopback)	28.05	24.40	28.15	24.35	28.10	24.40
RC2	9 (Loopback)	28.05	24.40	28.25	24.40	28.10	24.35
	55 (Loopback)	28.10	24.40	28.10	24.35	28.05	24.35
RC3	2 (Loopback)	28.10	24.40	28.10	24.40	28.00	24.40
	55 (Loopback)	28.10	24.35	28.15	24.40	28.10	24.40
	32 (+ F-SCH)	28.00	24.35	28.15	24.40	28.10	24.35
	32 (+ SCH)	28.05	24.40	28.10	24.40	28.10	24.36
RC4	2 (Loopback)	28.00	24.30	28.10	24.37	28.10	24.40
	55 (Loopback)	28.00	24.30	28.2	24.35	28.00	24.40
	32 (+ F-SCH)	28.10	24.40	28.10	24.35	28.05	24.40
	32 (+ SCH)	28.00	24.40	28.15	24.35	28.00	24.40
RC5	9 (Loopback)	28.10	24.40	28.17	24.40	28.00	24.35
	55 (Loopback)	28.10	24.40	28.16	24.40	28.05	24.35
RC11	2 (Loopback)	28.15	24.40	28.1	24.35	27.90	24.40
	75 (Loopback)	28.10	24.35	28.15	24.36	27.95	24.33
	32 (+ F-SCH)	28.15	24.30	28.15	24.34	27.95	24.35
	32 (+ SCH)	27.90	24.35	28.10	24.37	27.90	24.34

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)	27.85	24.20	27.70	24.30	27.65	24.39
	55 (Loopback)	27.85	24.20	27.70	24.30	27.65	24.39
RC2	9 (Loopback)	27.85	24.25	27.80	24.25	27.70	24.35
	55 (Loopback)	27.90	24.25	27.80	24.30	27.60	24.37
RC3	2 (Loopback)	27.80	24.15	27.50	24.10	27.50	24.36
	55 (Loopback)	27.80	24.15	27.50	24.10	27.55	24.39
	32 (+ F-SCH)	27.75	24.20	27.50	24.30	27.50	24.38
	32 (+ SCH)	27.70	24.30	27.55	24.35	27.60	24.39
RC4	2 (Loopback)	27.70	24.20	27.45	24.10	27.55	24.33
	55 (Loopback)	27.70	24.20	27.40	24.10	27.50	24.38
	32 (+ F-SCH)	27.65	24.30	27.60	24.30	27.65	24.39
	32 (+ SCH)	27.70	24.30	27.45	24.30	27.70	24.38
RC5	9 (Loopback)	27.80	24.20	27.40	24.30	27.60	24.38
	55 (Loopback)	27.80	24.25	27.45	24.15	27.50	24.35
RC11	2 (Loopback)	27.75	24.15	27.50	24.10	27.60	24.37
	75 (Loopback)	27.70	24.25	27.40	24.15	27.60	24.33
	32 (+ F-SCH)	27.85	24.25	27.50	24.15	27.70	24.35
	32 (+ SCH)	27.65	24.20	27.60	24.20	27.60	24.32

7.7. CDMA2000 1xEV-DO Rel. 0

TEST PROCEDURE

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

<u>Application</u>	<u>Rev. License</u>
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 Params:
 - 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 Params:
 - 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

LAT PORT

EV-DO REV 0

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	29.00	24.96
		526	819.15	28.95	24.95
		684	823.10	29.10	25.00

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	28.88	24.47
		384	836.52	28.62	24.45
		777	848.31	28.45	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	27.25	22.70
		600	1880.00	27.78	22.75
		1175	1908.75	27.57	23.00

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	27.35	22.76
		450	1732.50	27.56	22.78
		875	1753.75	27.45	22.95

UAT PORT

EV-DO REV 0

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	27.90	24.60
		526	819.15	28.00	24.65
		684	823.10	28.10	24.65

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	27.60	24.45
		384	836.52	27.50	24.43
		777	848.31	27.40	24.40

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	27.65	24.35
		600	1880.00	27.90	24.40
		1175	1908.75	27.60	24.36

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	27.80	24.40
		450	1732.5	27.70	24.38
		875	1753.75	27.65	24.34

7.8. CDMA2000 1xEV-DO Rev. A

TEST PROCEDURE

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

<u>Application</u>	<u>Rev. License</u>
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

LAT PORT REV A

EV-DO 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	28.70	25.00
		526	819.15	28.90	25.00
		684	823.10	29.00	24.90

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	28.47	24.30
		384	836.52	28.70	24.40
		777	848.31	28.40	24.35

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	27.70	23.00
		600	1880.00	27.35	22.90
		1175	1908.75	27.80	23.00

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	27.00	22.90
		450	1732.50	27.60	23.00
		875	1753.75	27.30	23.00

UAT PORT REV A

EV-DO 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	27.50	24.65
		526	819.15	27.70	24.70
		684	823.10	27.80	24.60

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	27.70	24.45
		384	836.52	27.60	24.40
		777	848.31	27.30	24.35

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	27.40	24.40
		600	1880.00	27.70	24.30
		1175	1908.75	27.20	24.30

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	27.80	24.40
		450	1732.50	27.50	24.40
		875	1753.75	27.60	24.40

7.9. 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.

<u>Application</u>	<u>Rev, License</u>
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	<input type="checkbox"/>	<input type="checkbox"/>
	CA/S1	<input type="checkbox"/>	<input type="checkbox"/>

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	<input type="checkbox"/>	<input type="checkbox"/>
Pilot [1]	C1/S1	<input type="checkbox"/>	<input type="checkbox"/>
Pilot [2]	C2/S2	<input type="checkbox"/>	<input type="checkbox"/>

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

RESULTS

LAT PORT REV B

EVDO REV B

Two Carrier Min Separations

	MODE	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
Rev B	CDMA	1013+31	824.70+825.93	29.20	21.90
		384+425	836.52+837.75	29.30	21.95
		736+777	847.08+848.31	29.00	21.80

Two Carrier Max Separations

	Mode	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
Rev B	CDMA	1013+156	824.70+829.68	25.30	21.70
		384+550	836.52+841.50	25.32	21.73
		611+777	843.33+848.31	25.40	21.77

Three Carrier Min Separations

	Mode	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
Rev B	CDMA	1013+31+72	824.70+825.93+827.16	28.90	21.80
		384+425+466	836.52+837.75+838.98	29.10	21.86
		695+736+777	845.85+847.08+848.31	29.00	21.84

UAT PORT REV B

EVDO REV B

Two Carrier Min Separations

	MODE	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
Rev B	CDMA	1013+31	824.70+825.93	28.70	21.50
		384+425	836.52+837.75	28.66	21.46
		736+777	847.08+848.31	28.60	21.40

Two Carrier Max Separations

	Mode	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
Rev B	CDMA	1013+156	824.70+829.68	25.70	21.52
		384+550	836.52+841.50	25.80	21.56
		611+777	843.33+848.31	25.62	21.50

Three Carrier Min Separations

	Mode	Channel	f (MHz)	Conducted power (dBm)	
				Peak	Average
Rev B	CDMA	1013+31+72	824.70+825.93+827.16	28.80	21.57
		384+425+466	836.52+837.75+838.98	28.75	21.54
		695+736+777	845.85+847.08+848.31	28.94	21.62

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	247.2755	268.746
		190	836.60	250.5902	311.700
		251	848.80	241.9265	307.434
	EGPRS	128	824.20	245.0200	299.400
		190	836.60	252.0100	309.200
		251	848.80	241.0800	303.300

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Cellular	UMTS, REL 99	4357	826.4	4.2263	4.521
		4405	836.0	4.2308	4.618
		4455	846.0	4.2094	4.620
	UMTS, HSDPA	4357	826.4	4.1807	4.641
		4405	836.0	4.1955	4.586
		4455	846.0	4.1826	4.574

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
PCS	GPRS	512	1850.2	246.4754	327.288
		661	1880.0	242.2746	279.891
		810	1909.8	243.5774	276.998
	EGPRS	512	1850.2	251.1800	293.700
		661	1880.0	247.9800	292.200
		810	1909.8	251.5000	296.200

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
PCS	UMTS, REL 99	9662	1852.4	4.2048	4.632
		9800	1880.0	4.2145	4.589
		9938	1907.6	4.2087	4.552
	UMTS, HSDPA	9662	1852.4	4.1883	4.588
		9800	1880.0	4.1798	4.583
		9938	1907.6	4.1716	4.569

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
AWS	UMTS, REL 99	1312	1712.4	4.2248	4.644
		1413	1732.6	4.2048	4.582
		1513	1752.6	4.2386	4.583
	UMTS, HSDPA	1312	1712.4	4.1764	4.629
		1413	1732.6	4.1951	4.613
		1513	1752.6	4.1848	4.631

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
BC0	1xRTT	1013	824.70	1.2505	1.410
		384	836.52	1.2689	1.410
		777	848.31	1.2611	1.390
	CDMA2000 EV-DO (Rev. A)	1013	824.70	1.2625	1.389
		384	836.52	1.2783	1.404
		777	848.31	1.2687	1.411

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
BC0	EVDO Rev. B 2 Min	1013+31	825.3	2.4530	2.656
		384+425	837.2	2.4786	2.614
		736+777	847.6	2.4778	2.635
	EVDO Rev. B 2 Max	1013+156	826.5	6.3579	6.567
		384+550	838.8	6.3479	6.578
		611+777	844.9	6.3023	6.597
	EVDO Rev. B 3 Min	1013+31+72	825.9	3.7130	3.925
		384+425+466	837.7	3.7307	4.981
		695+736+777	846.7	3.7178	6.646

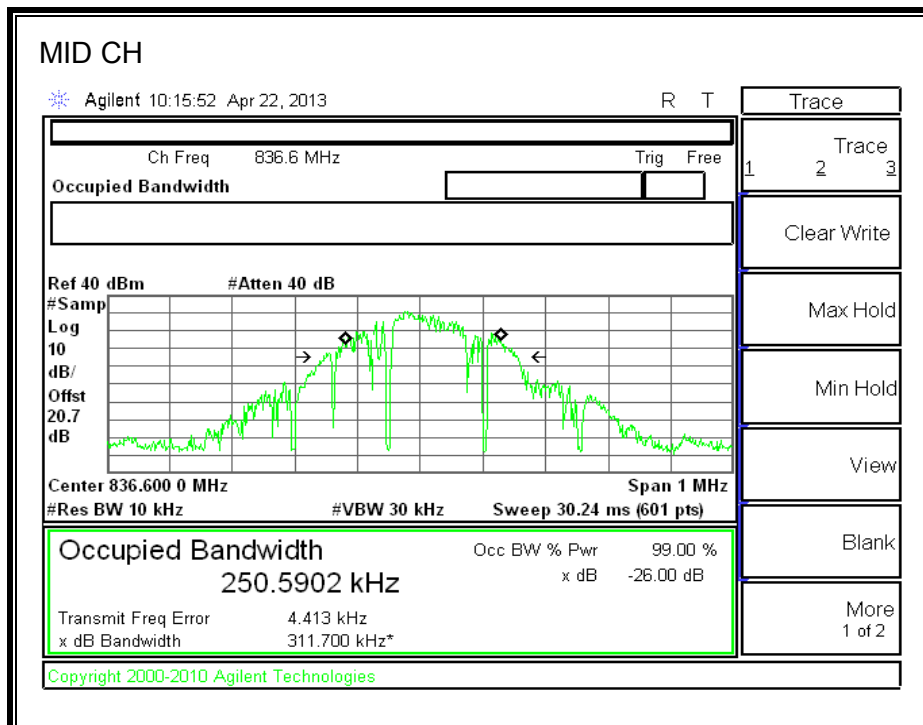
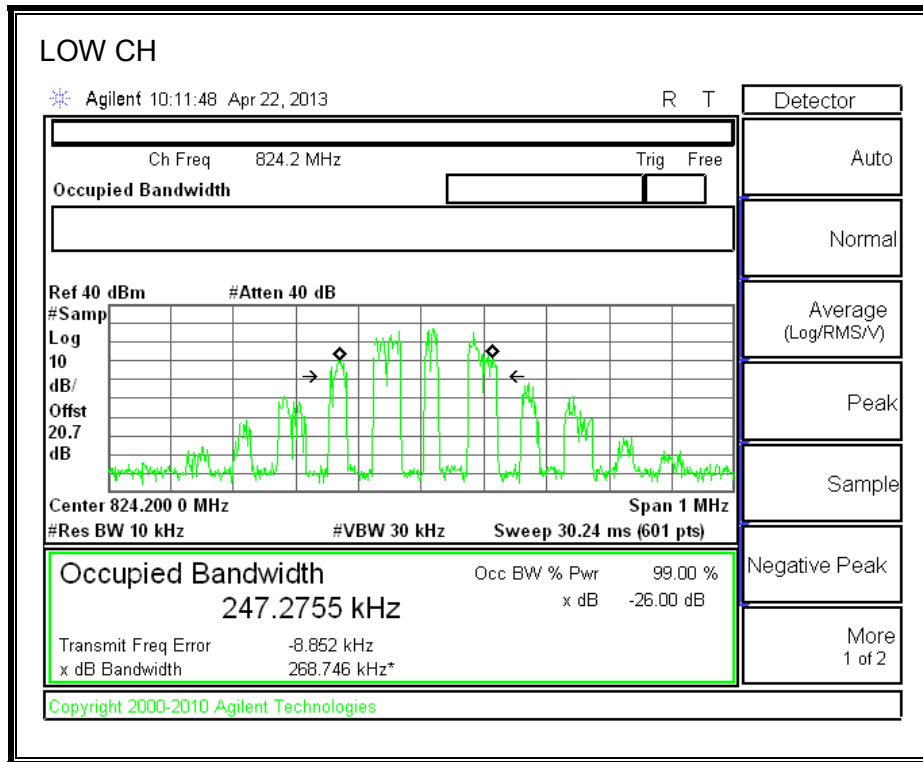
Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
BC10	1xRTT	476	817.90	1.2763	1.386
		526	819.15	1.2808	1.381
		684	823.10	1.2677	1.374
	CDMA2000 EV-DO (Rev. A)	476	817.90	1.2754	1.398
		526	819.15	1.2713	1.409
		684	823.10	1.2586	1.350

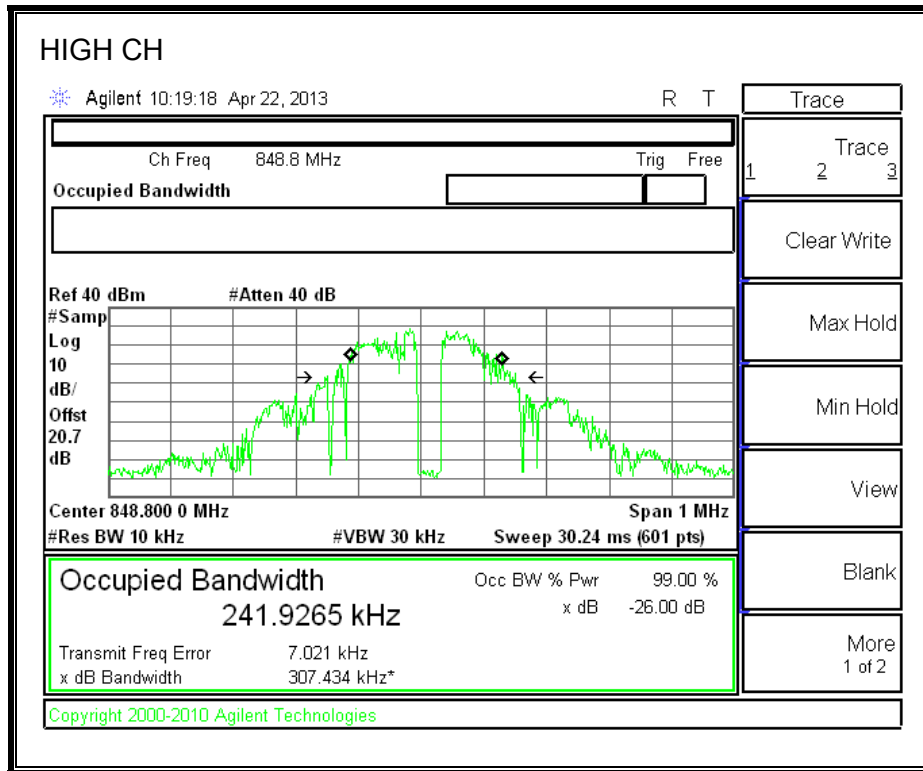
Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
BC1	1xRTT	25	1851.25	1.2616	1.399
		600	1880.0	1.2659	1.383
		1175	1908.75	1.2608	1.411
	CDMA2000 EV-DO (Rev. A)	25	1851.25	1.2741	1.588
		600	1880.00	1.2665	1.387
		1175	1908.75	1.2766	1.392

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
BC15	1xRTT	25	1711.50	1.2560	1.415
		450	1732.50	1.2735	1.374
		875	1753.75	1.2782	1.412
	CDMA2000 EV-DO (Rev. A)	25	1711.50	1.2771	1.421
		450	1732.50	1.2753	1.471
		875	1753.75	1.2723	1.405

GPRS850

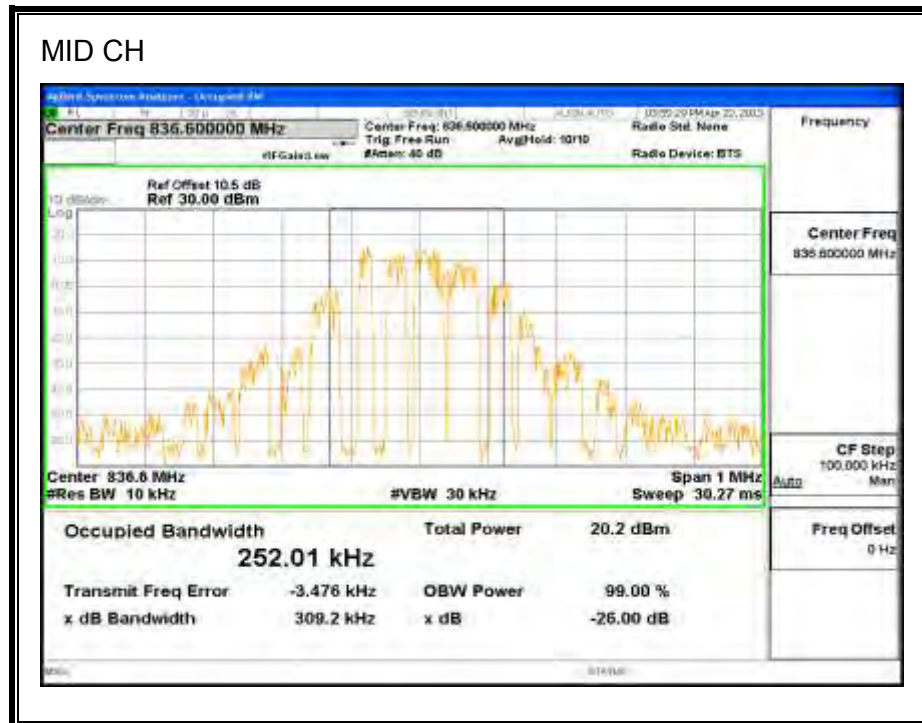
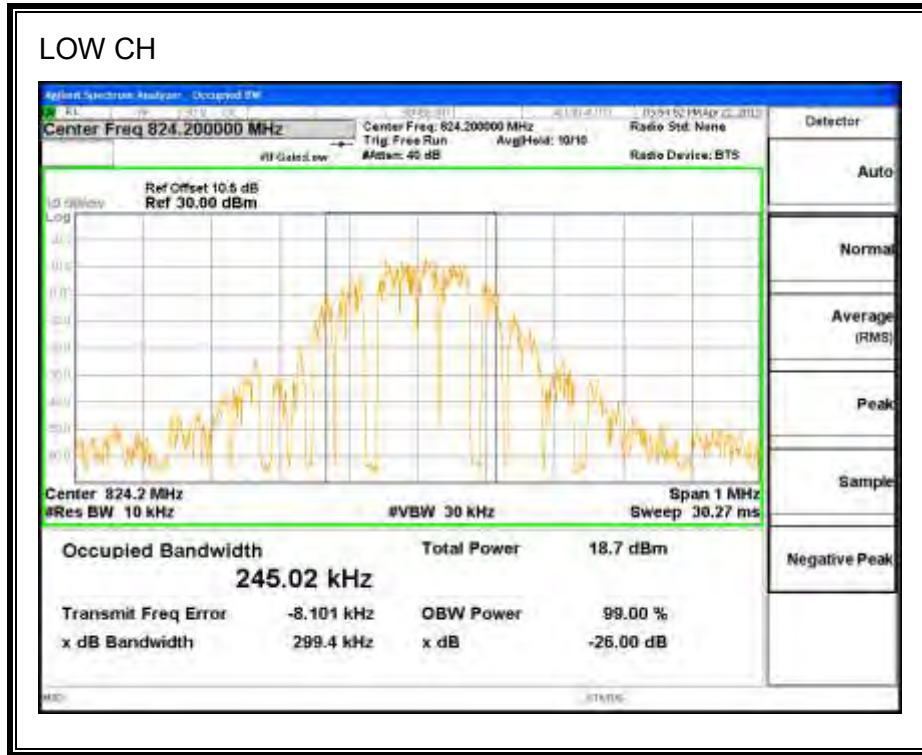
Cellular Band

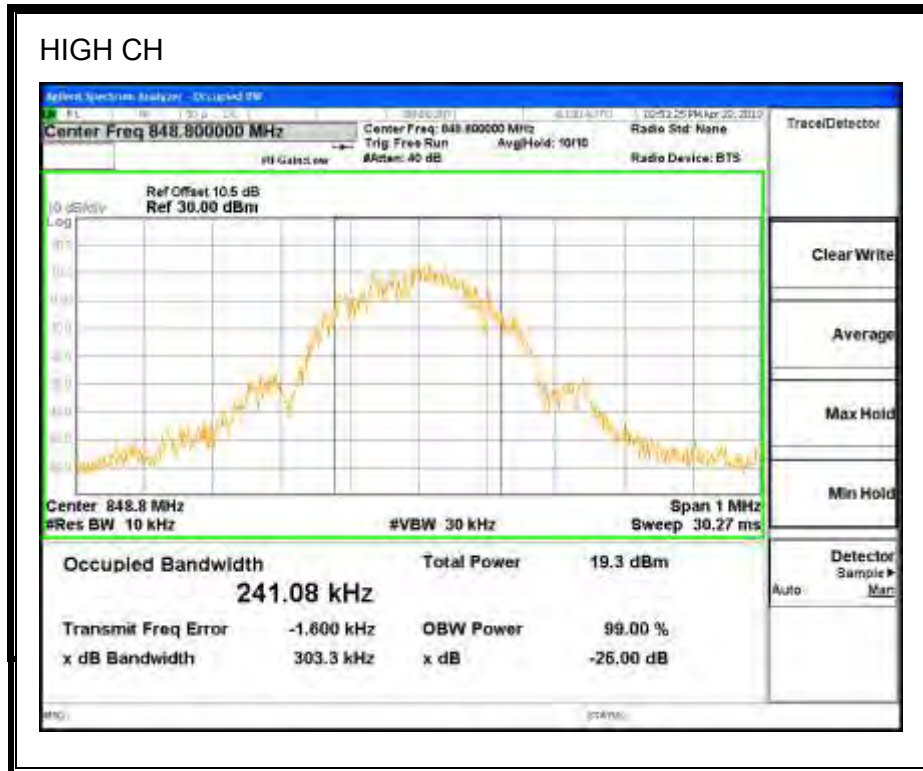




EGPRS850

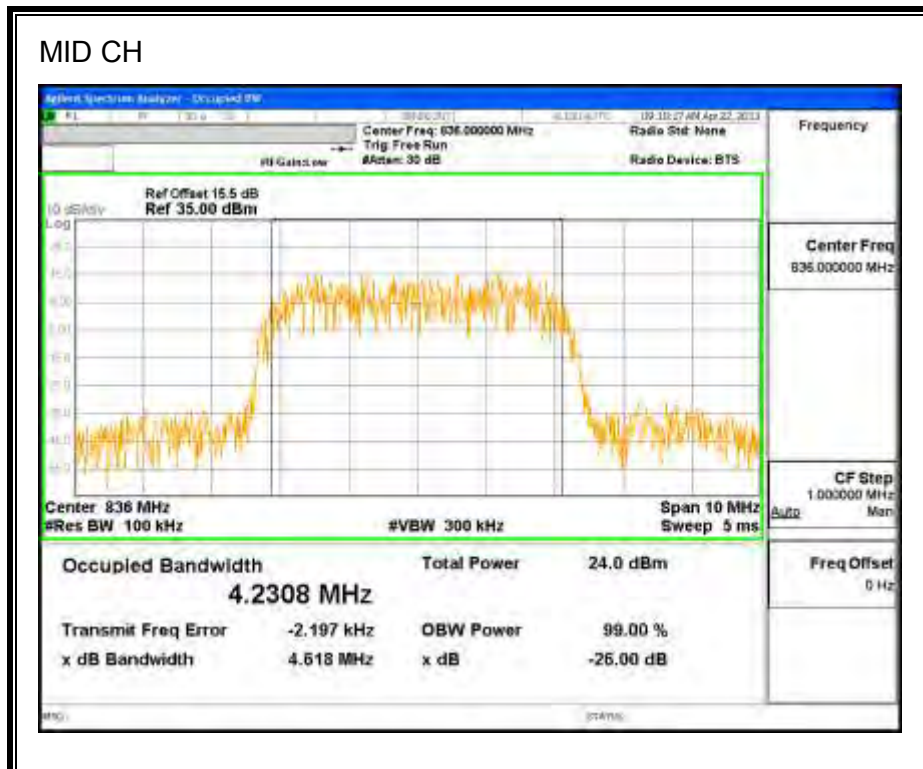
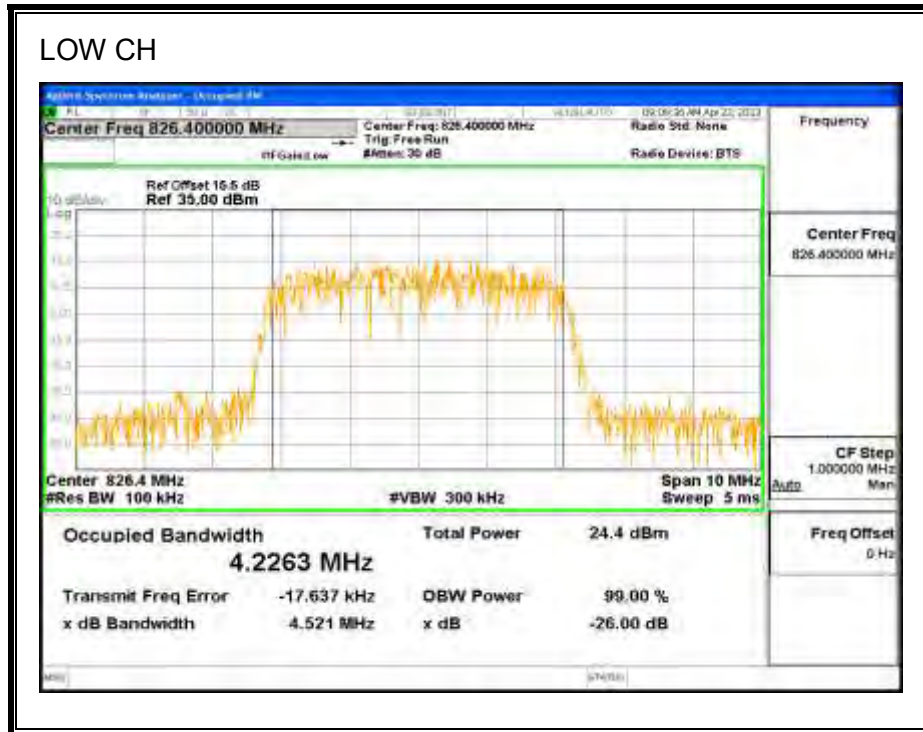
Cellular Band

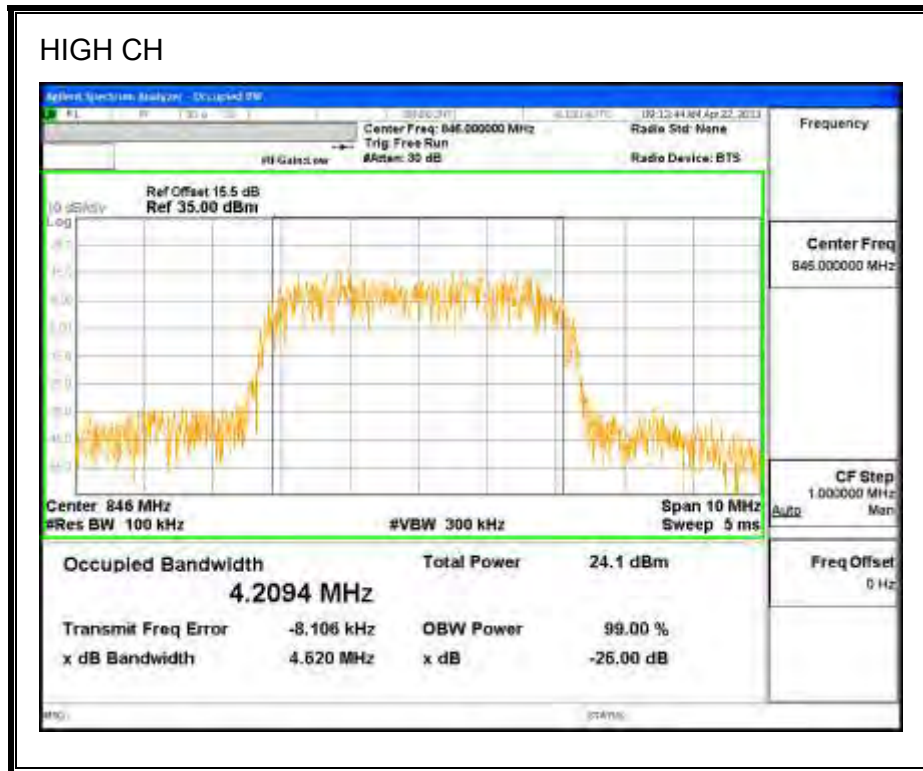




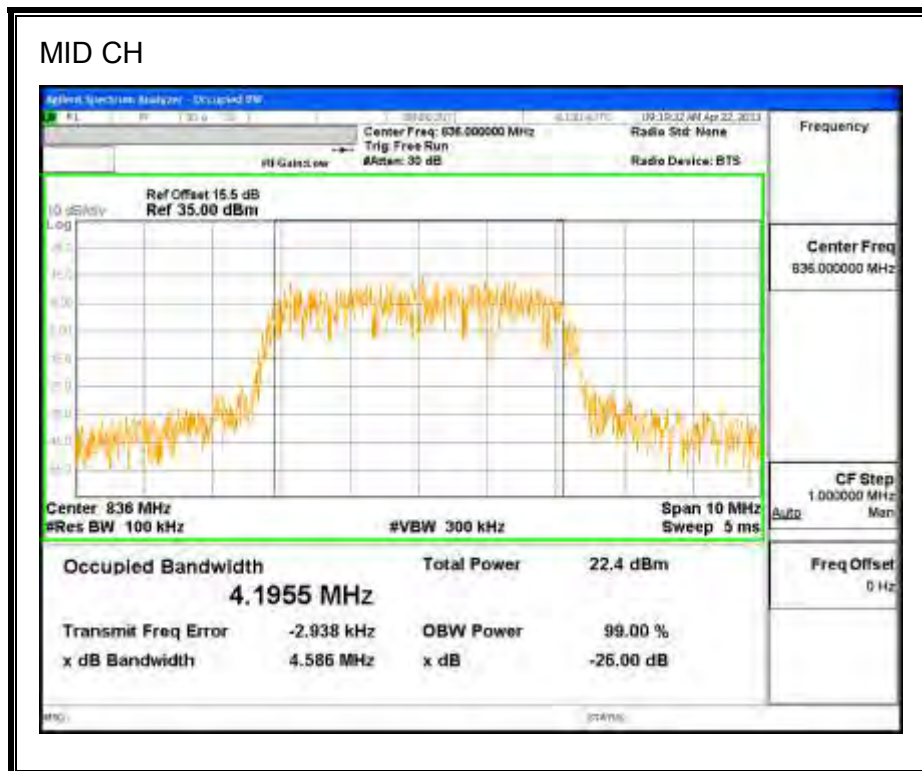
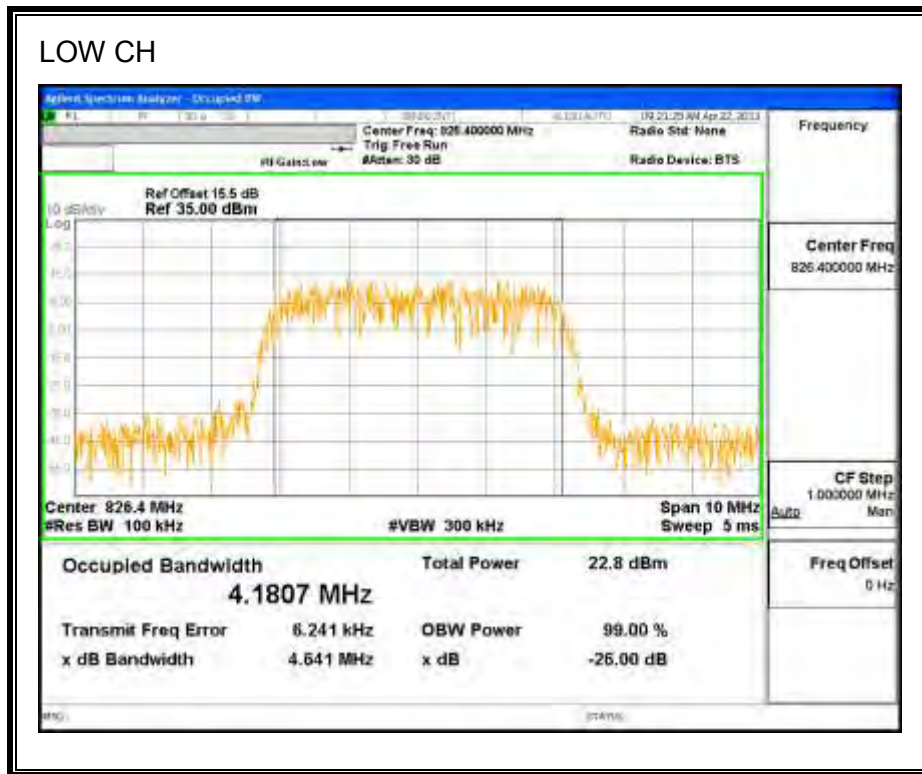
WCDMA850

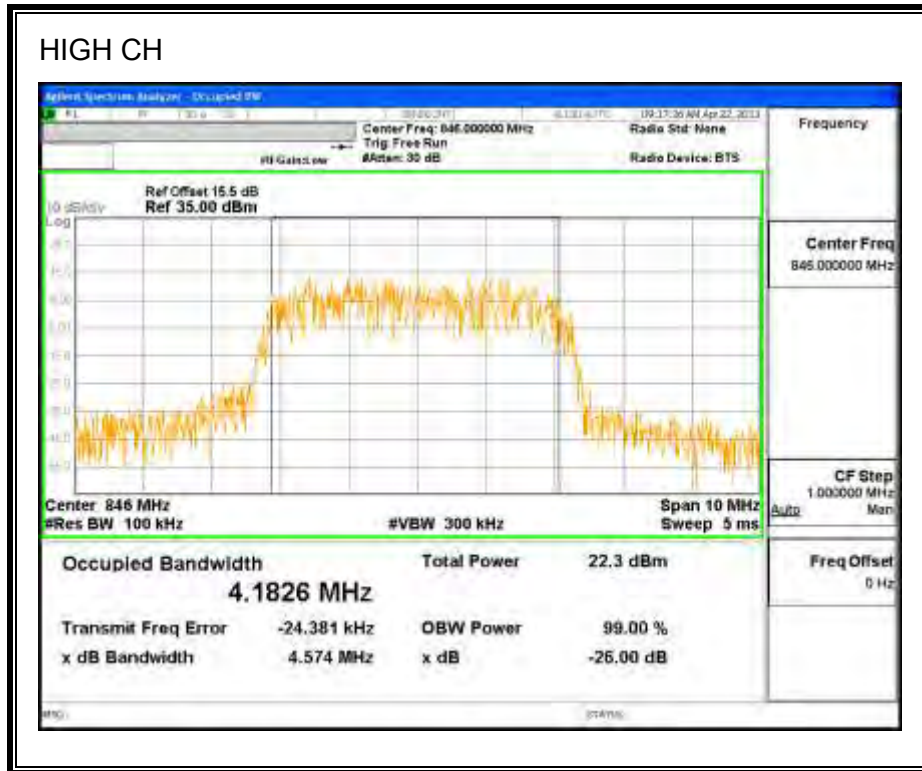
Rel 99 (Cellular Band)





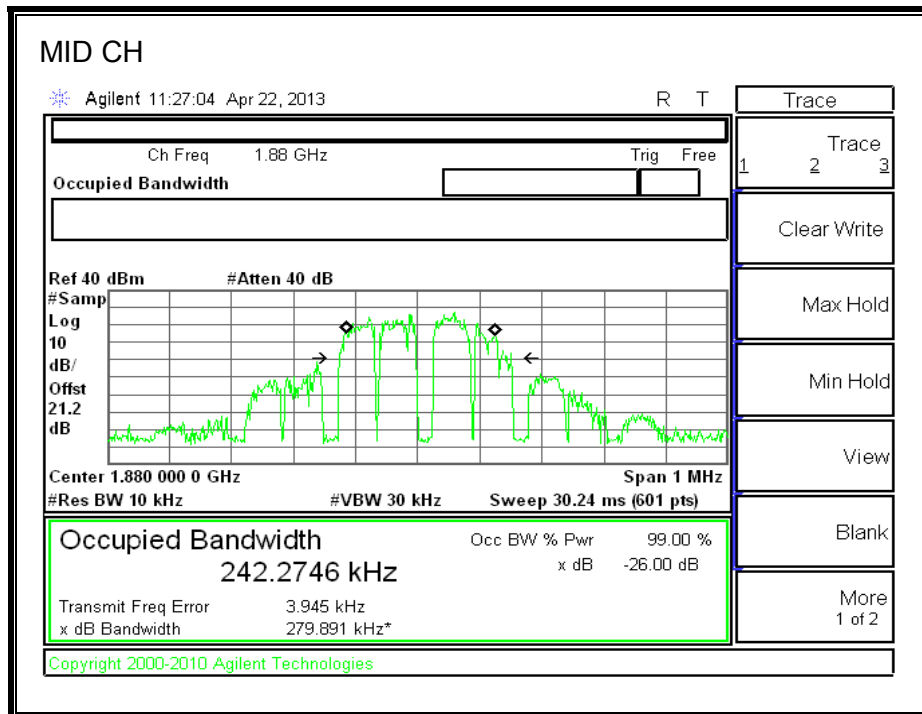
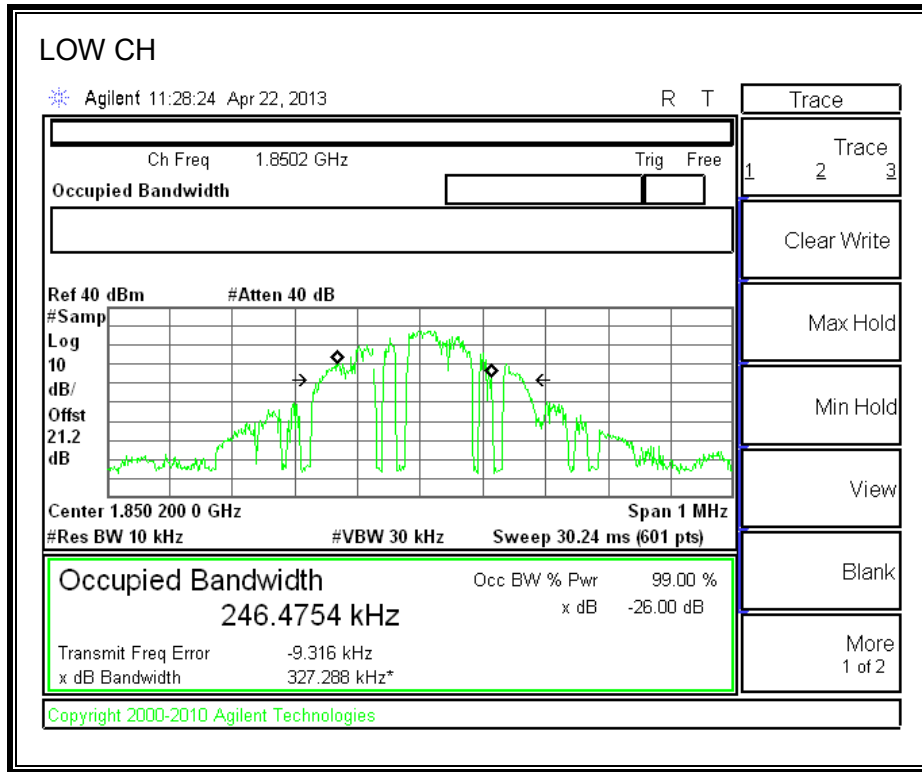
HSDPA (Cellular Band)

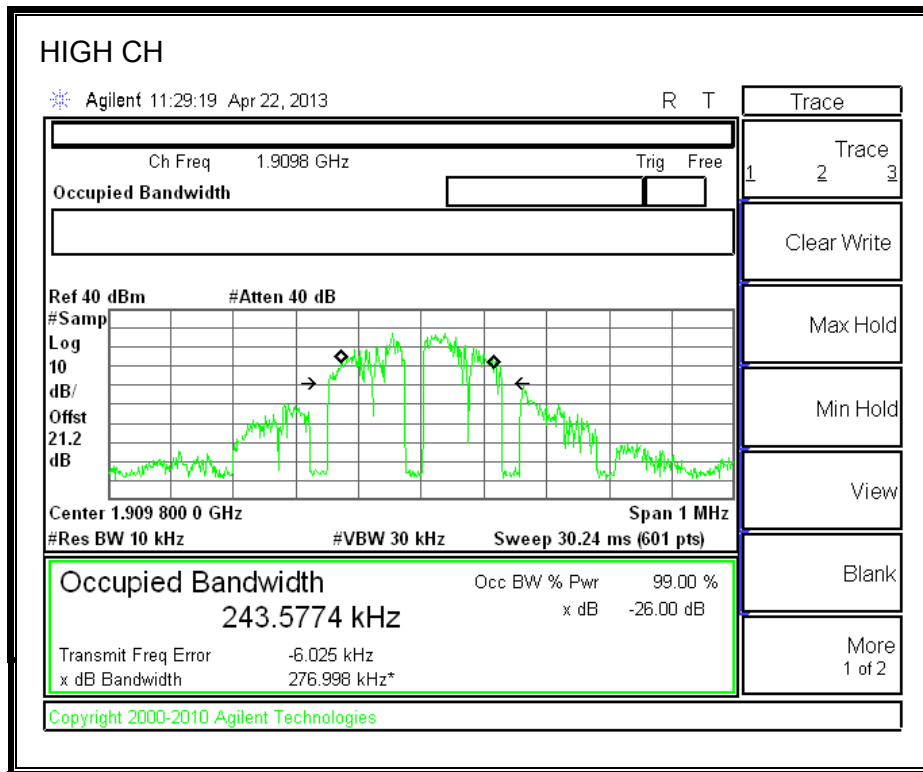




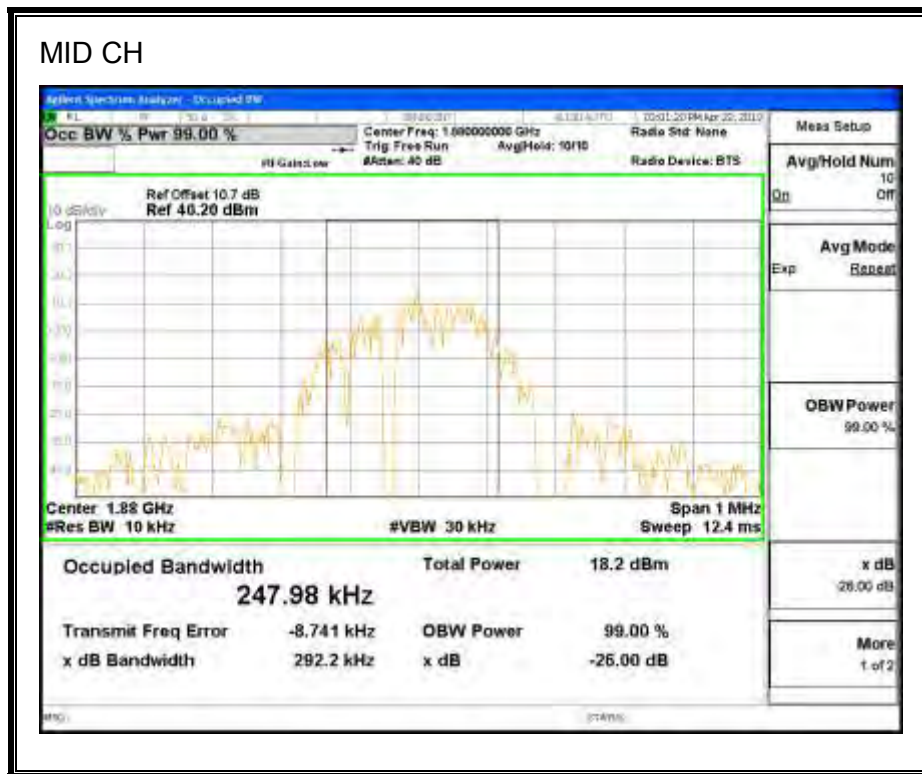
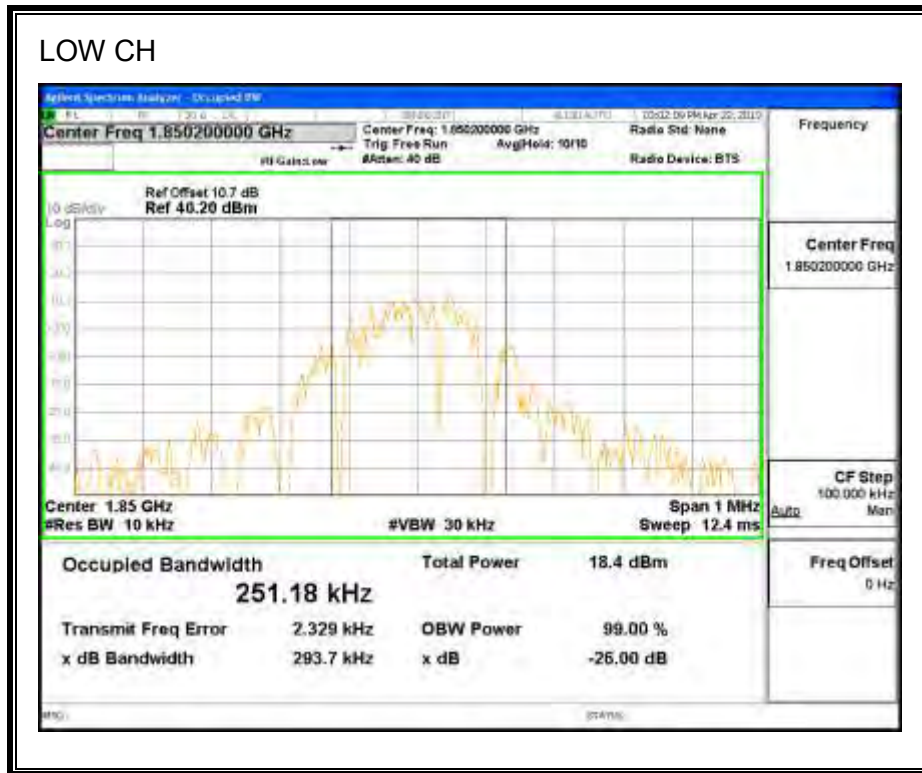
GPRS 1900

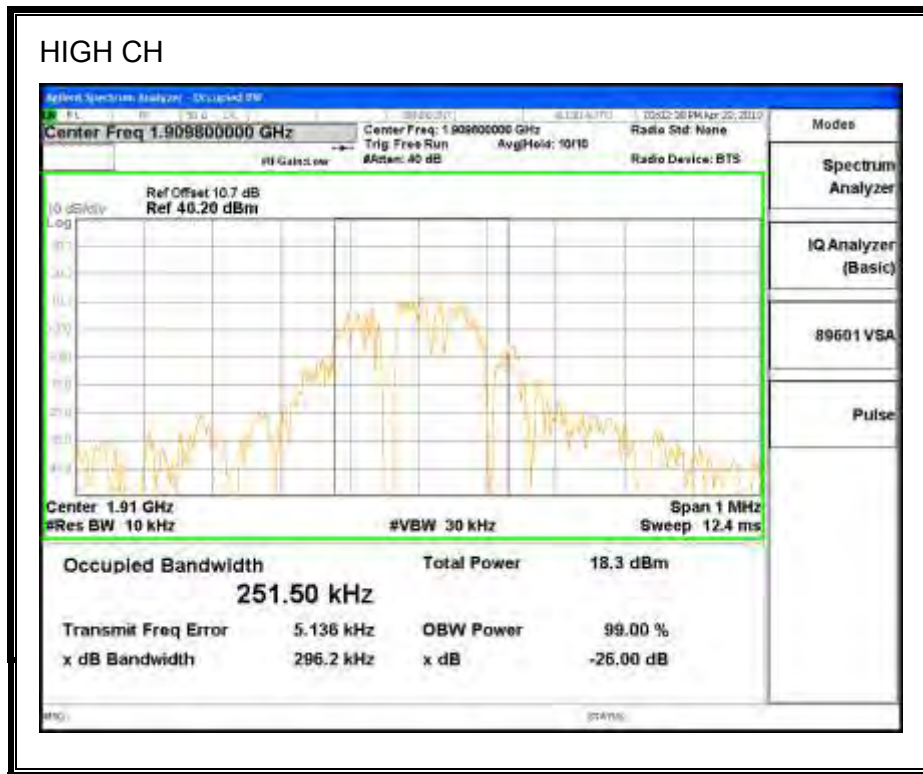
PCS 1900 Band





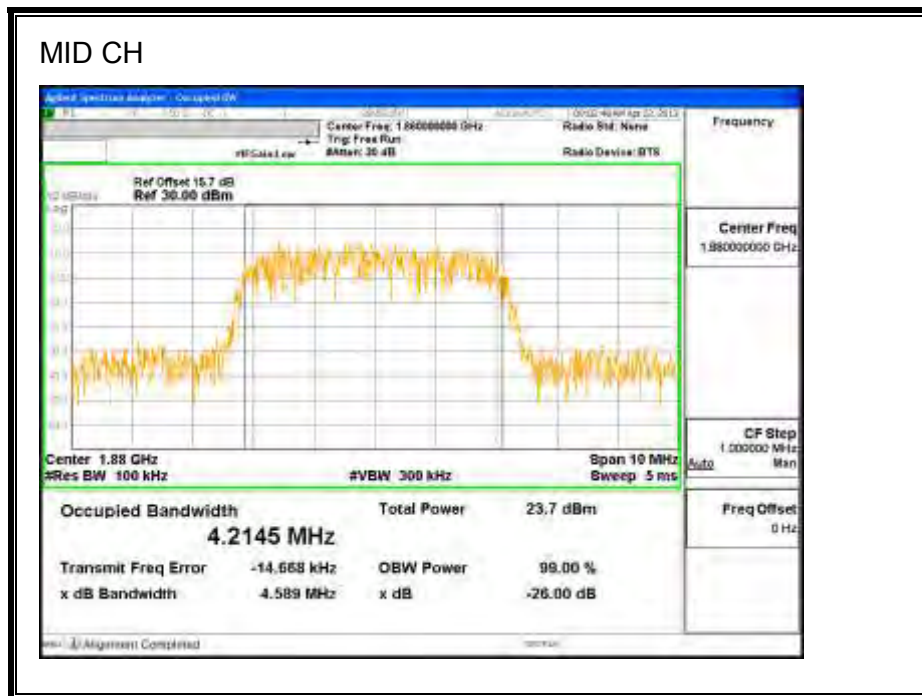
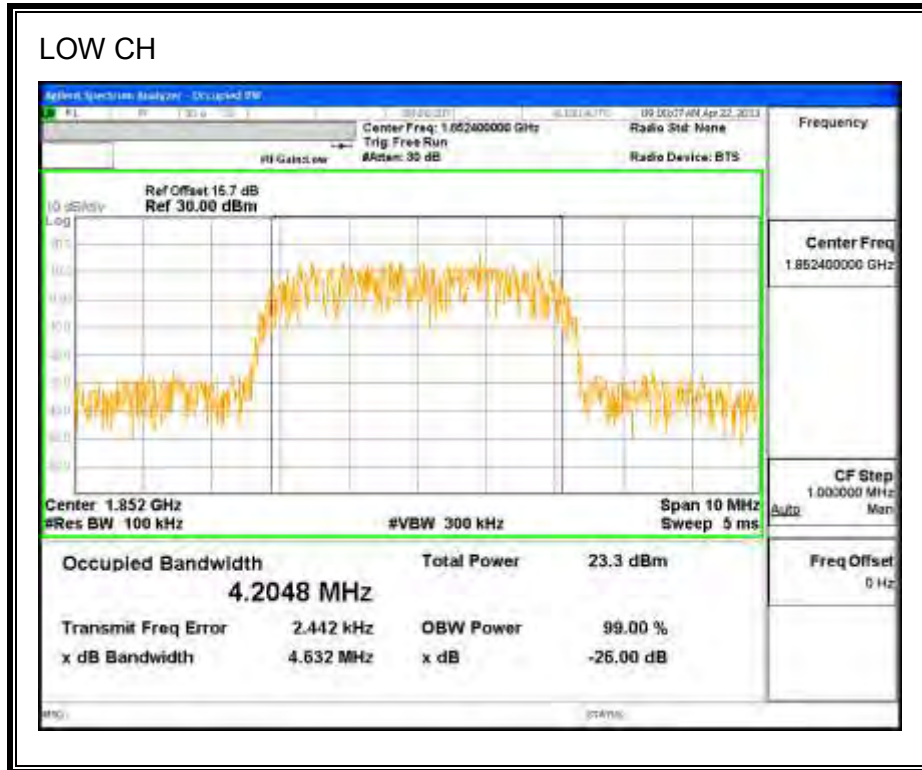
EGPRS 1900

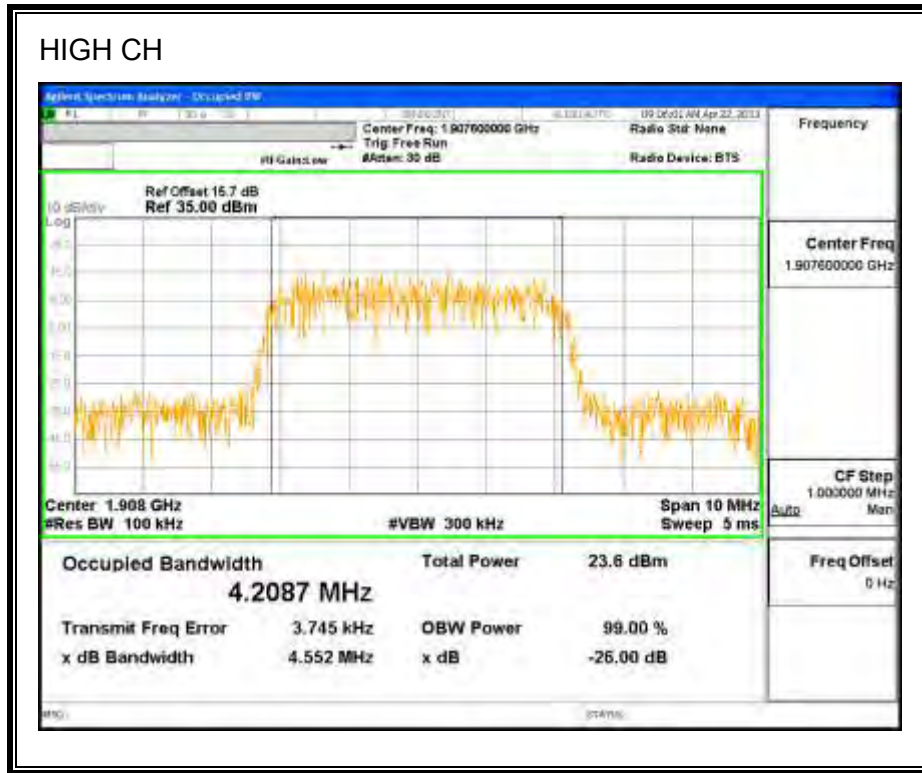




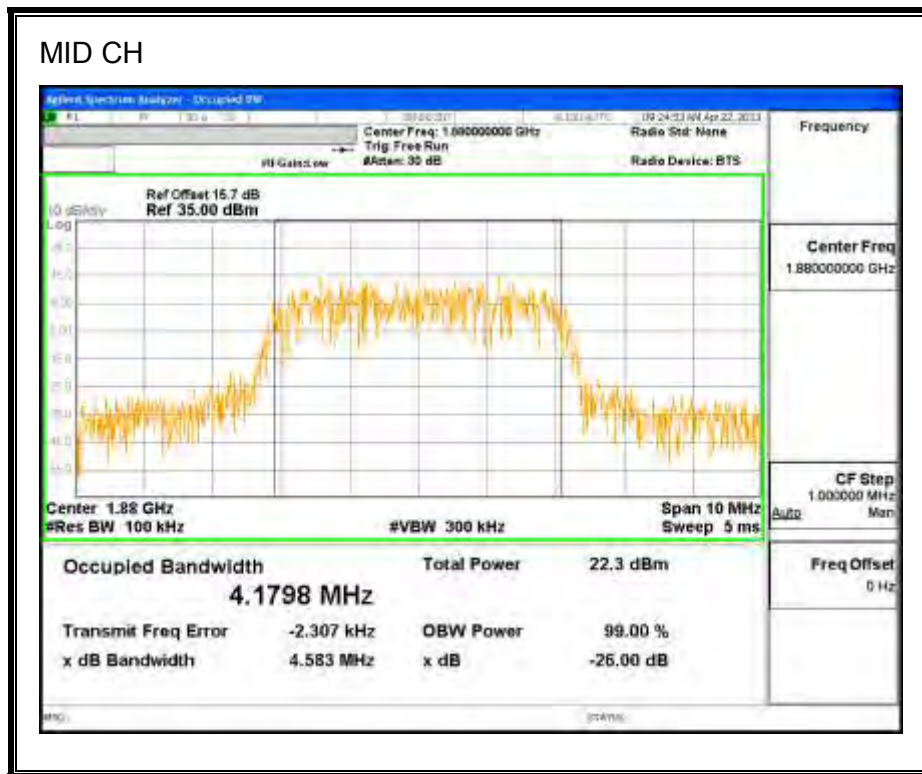
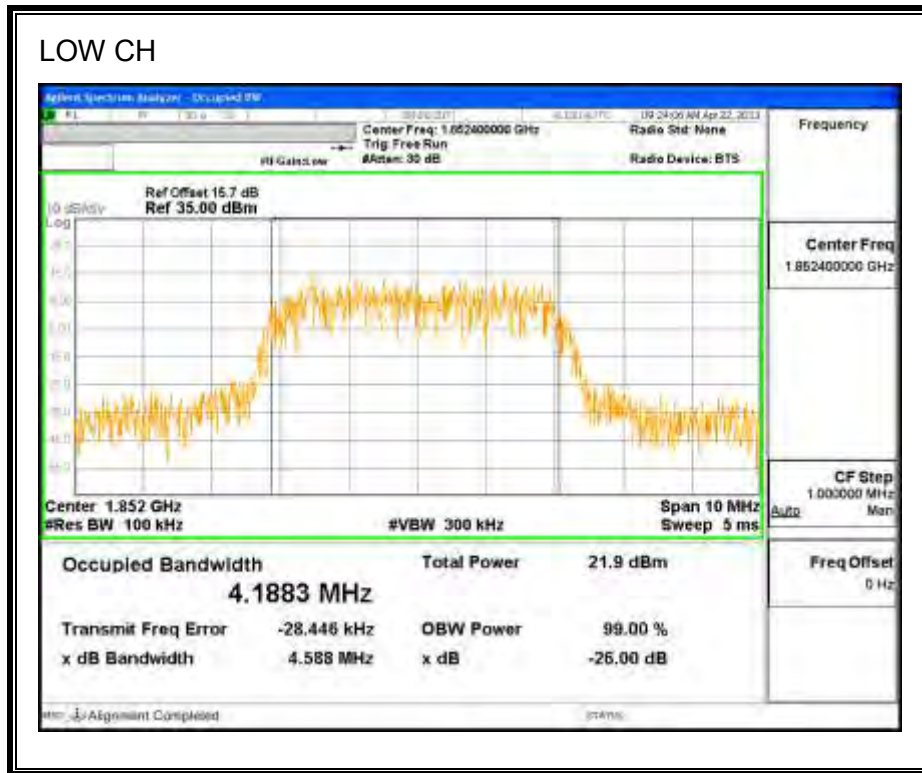
WCDMA1900

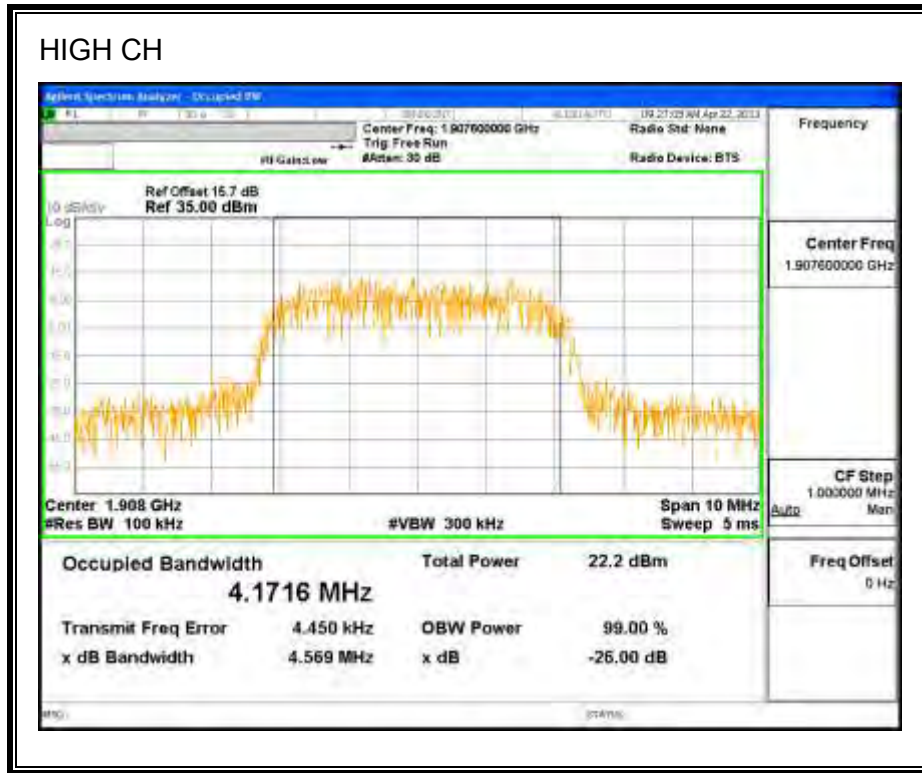
REL 99 (PCS Band)





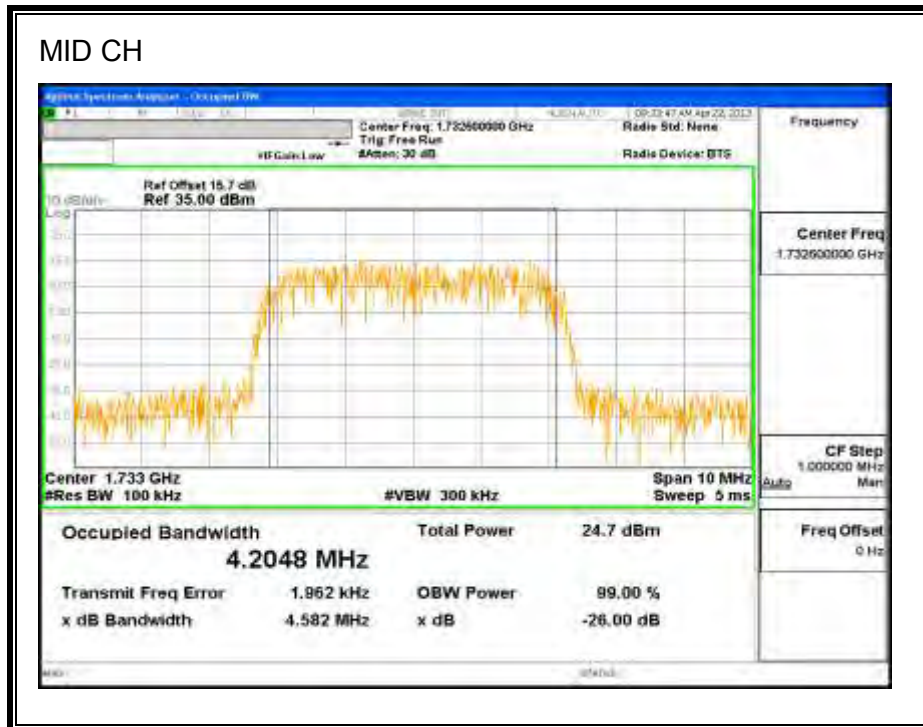
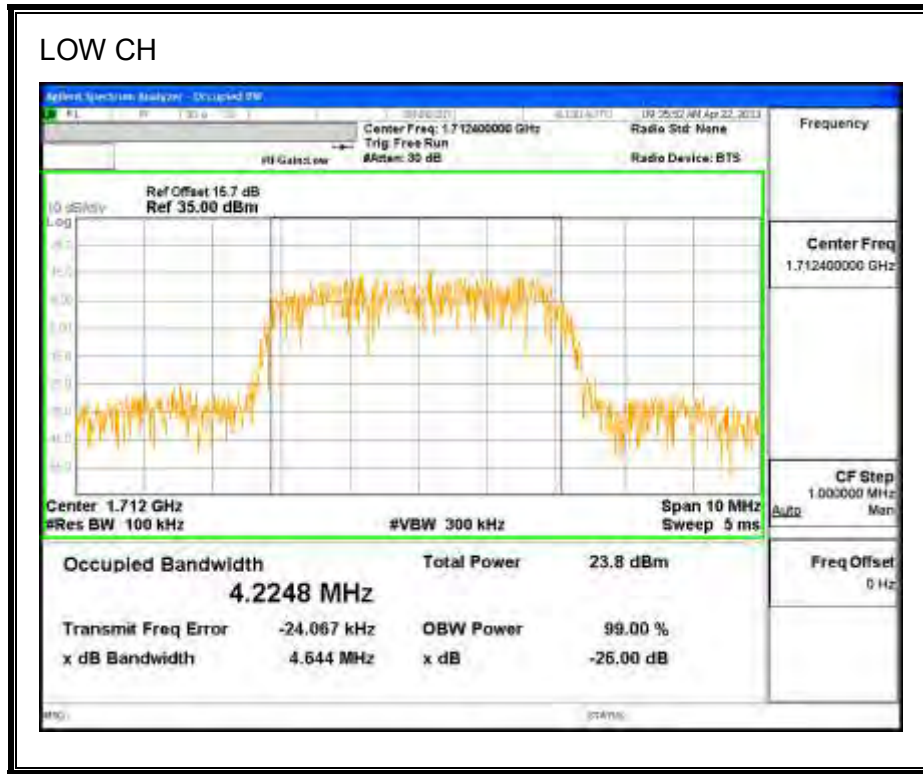
HSDPA Mode (PCS Band)

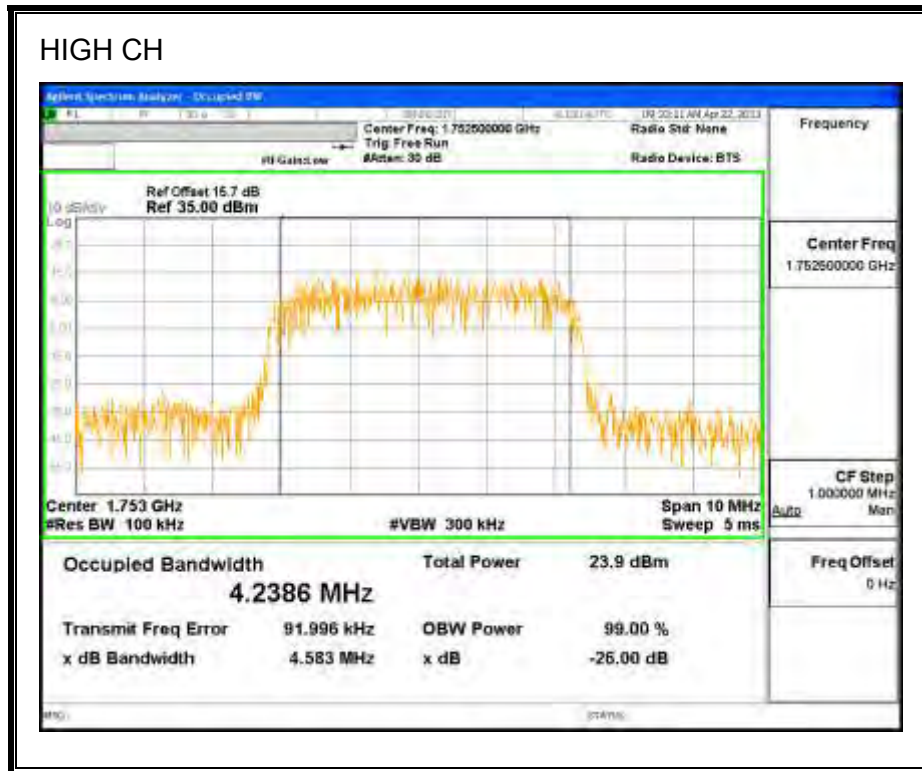




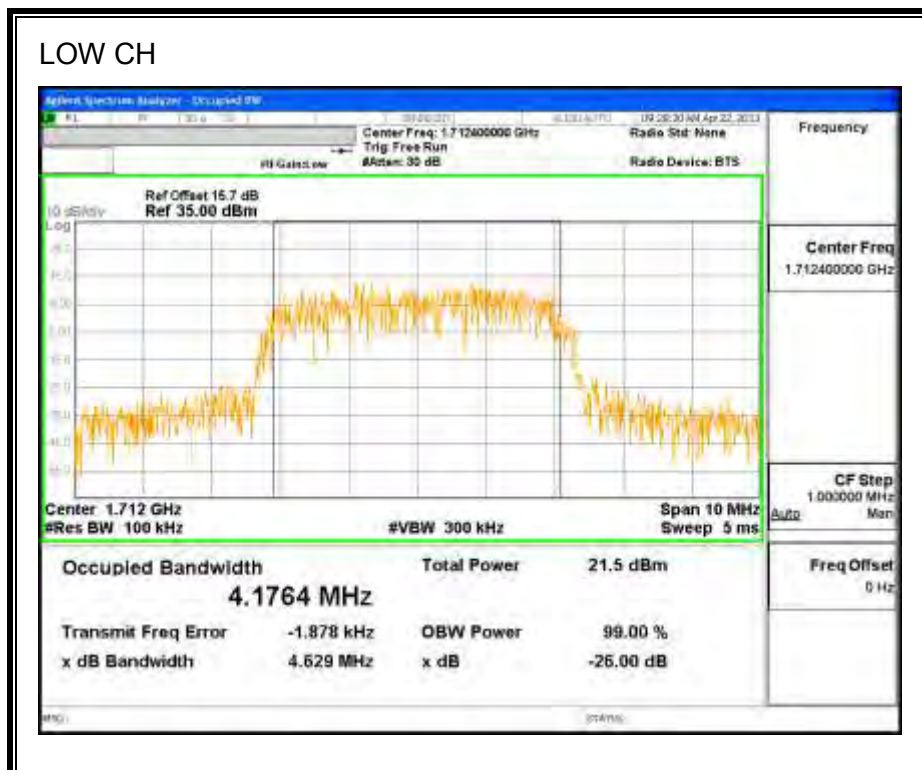
WCDMA1700

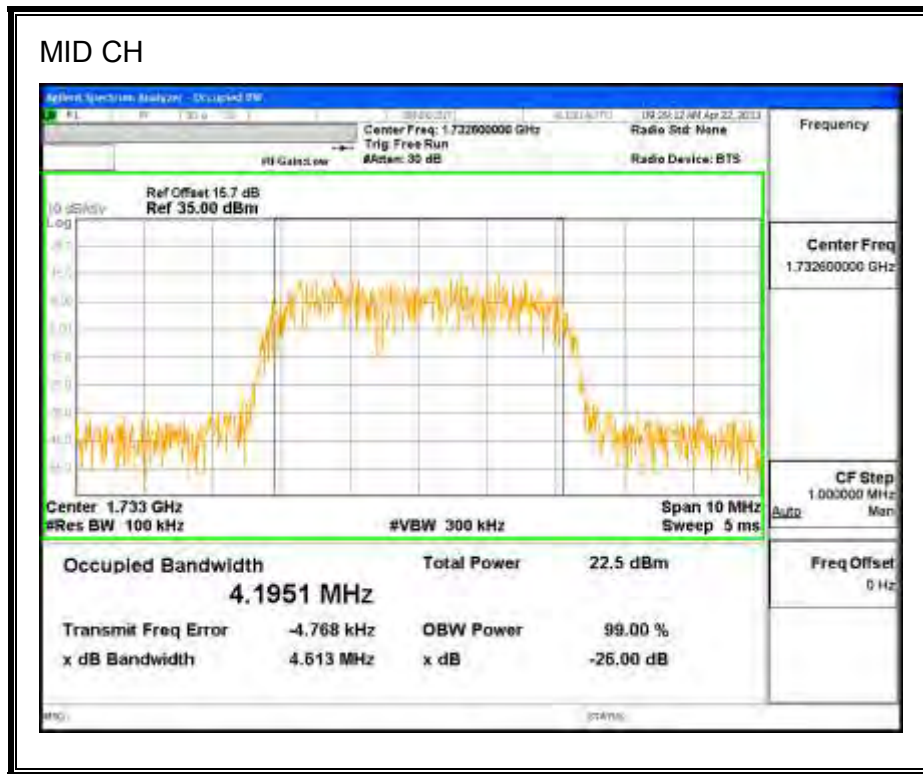
Rel 99 (AWS Band)

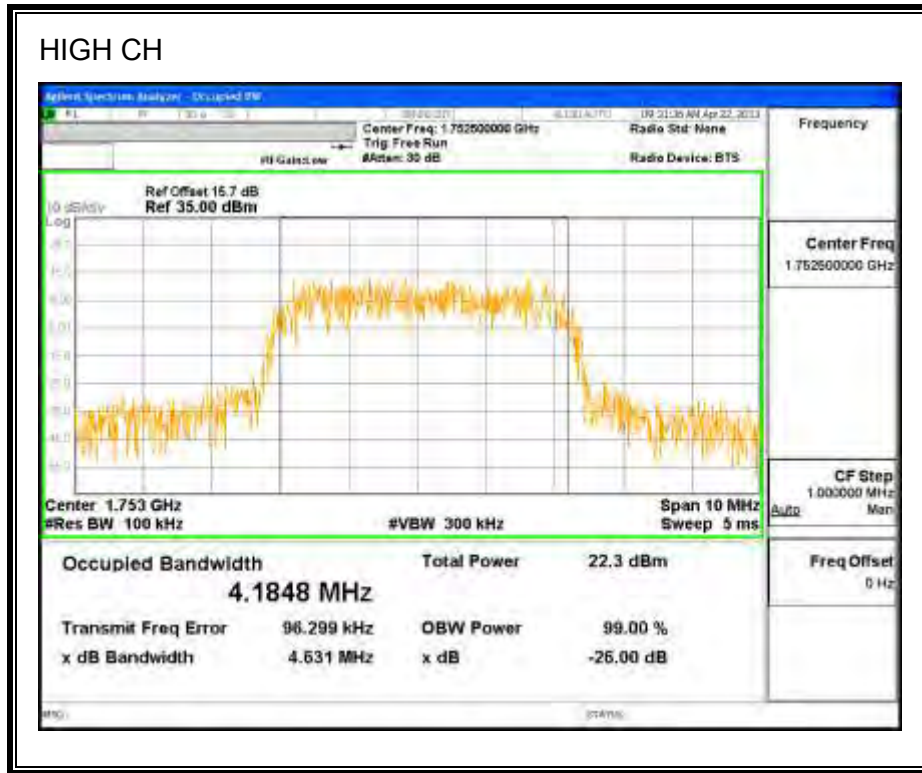




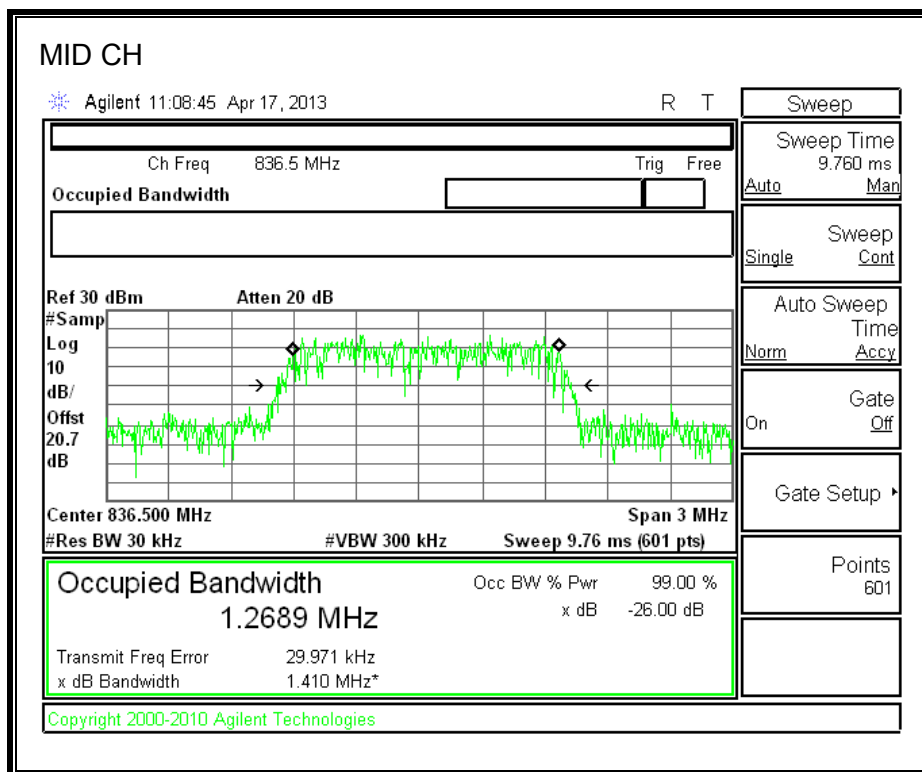
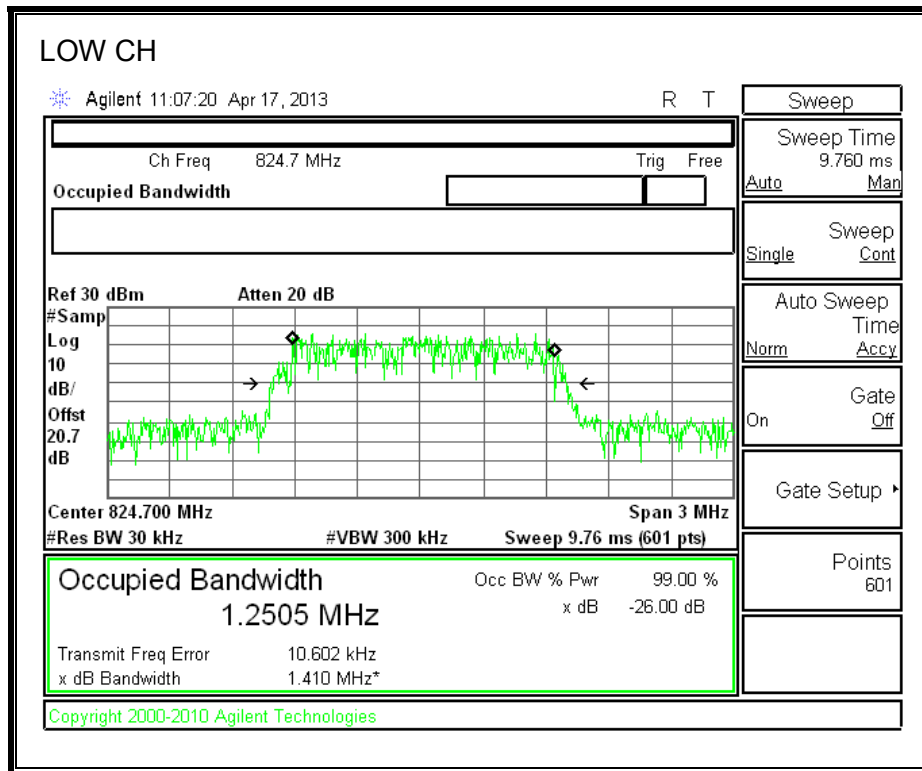
HSDPA (AWS Band)

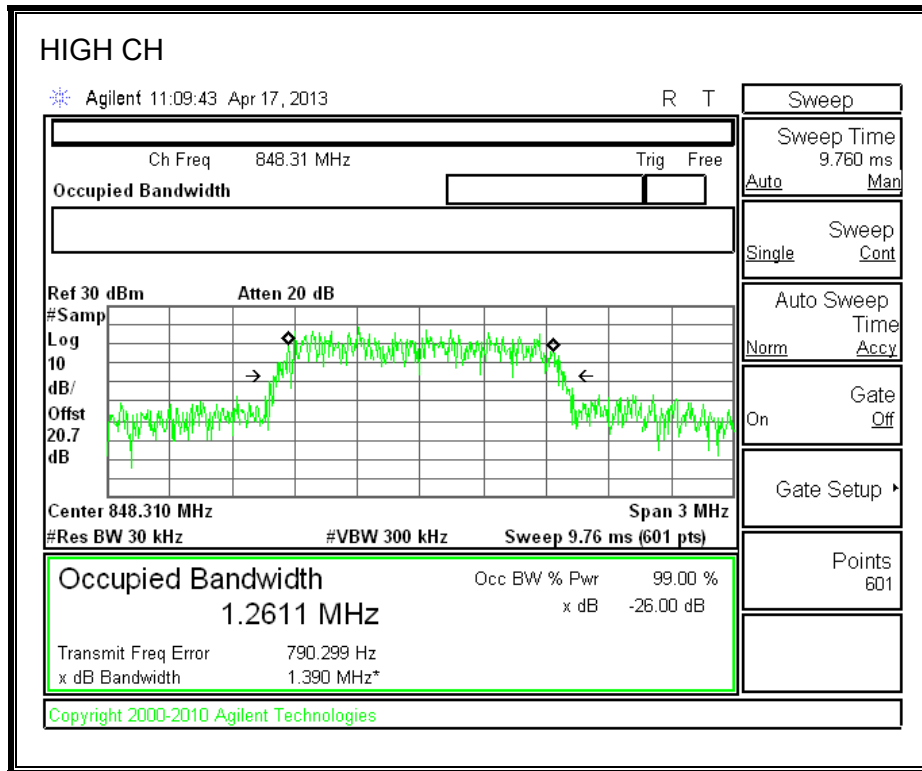




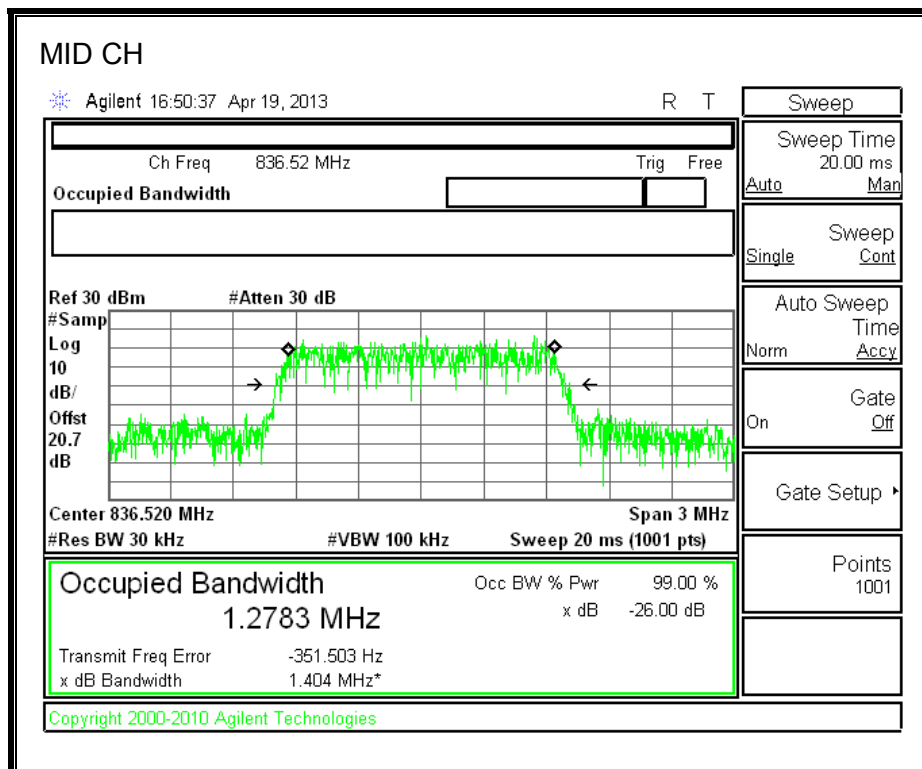
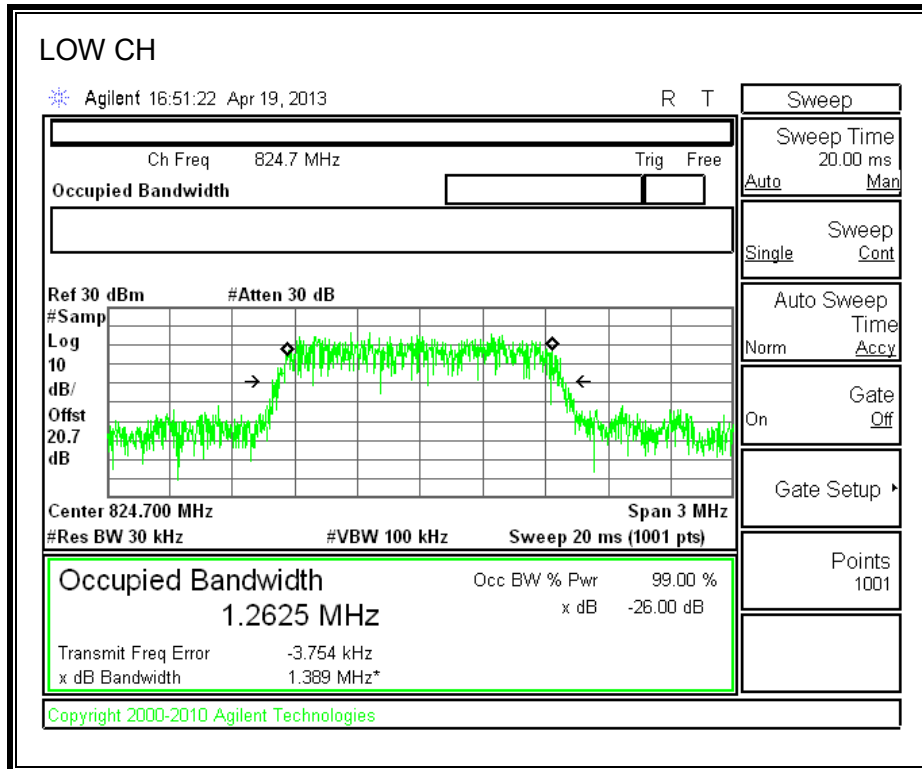


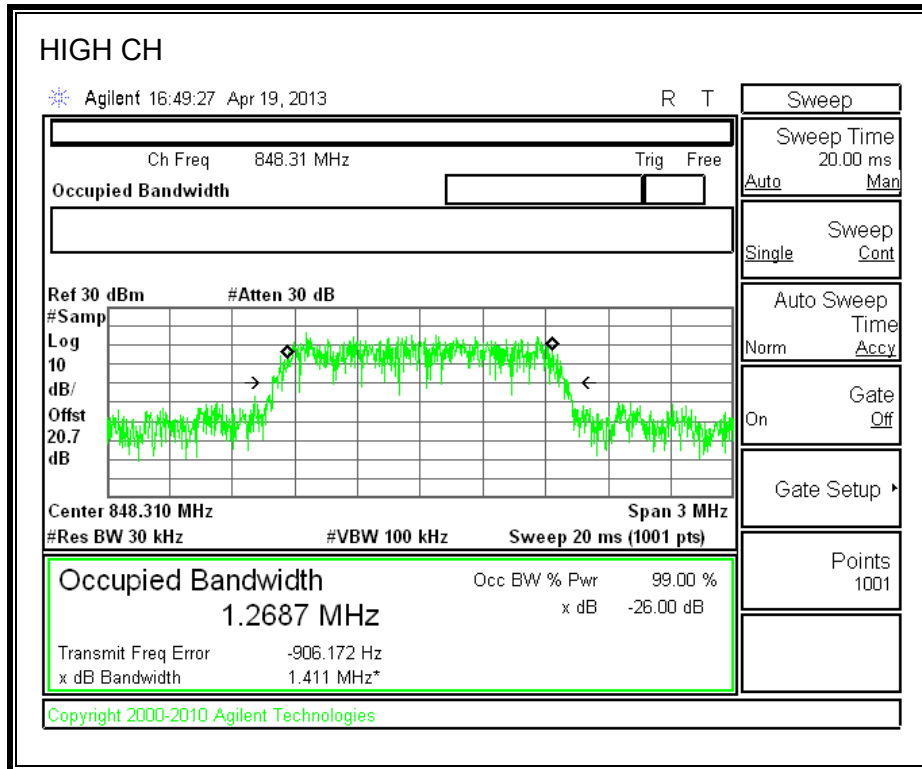
CDMA2000 1xRTT, BC0



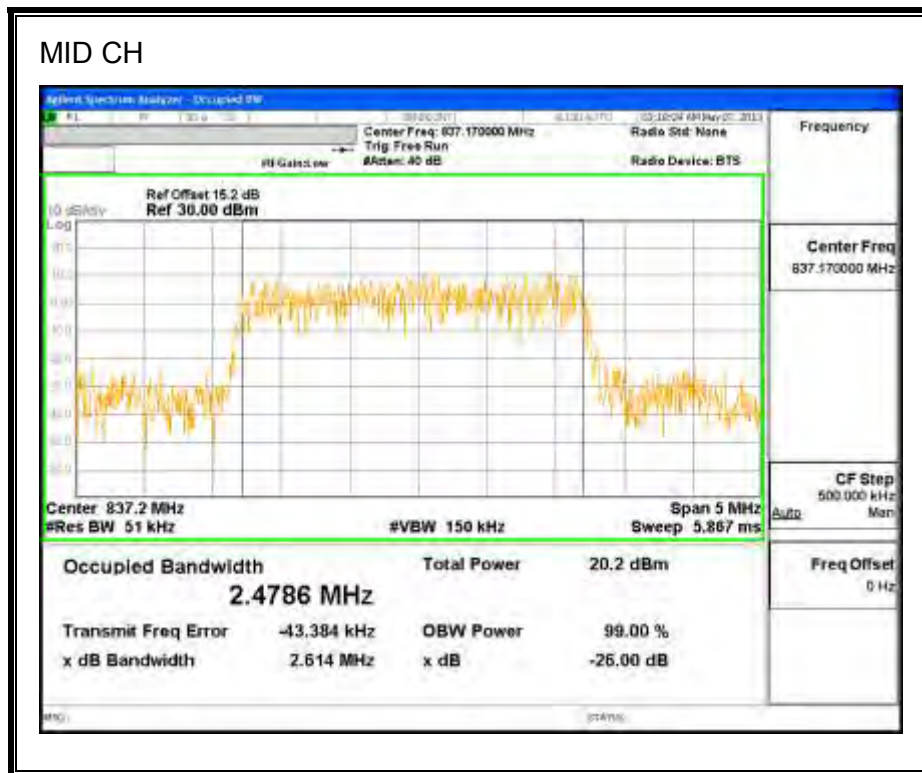
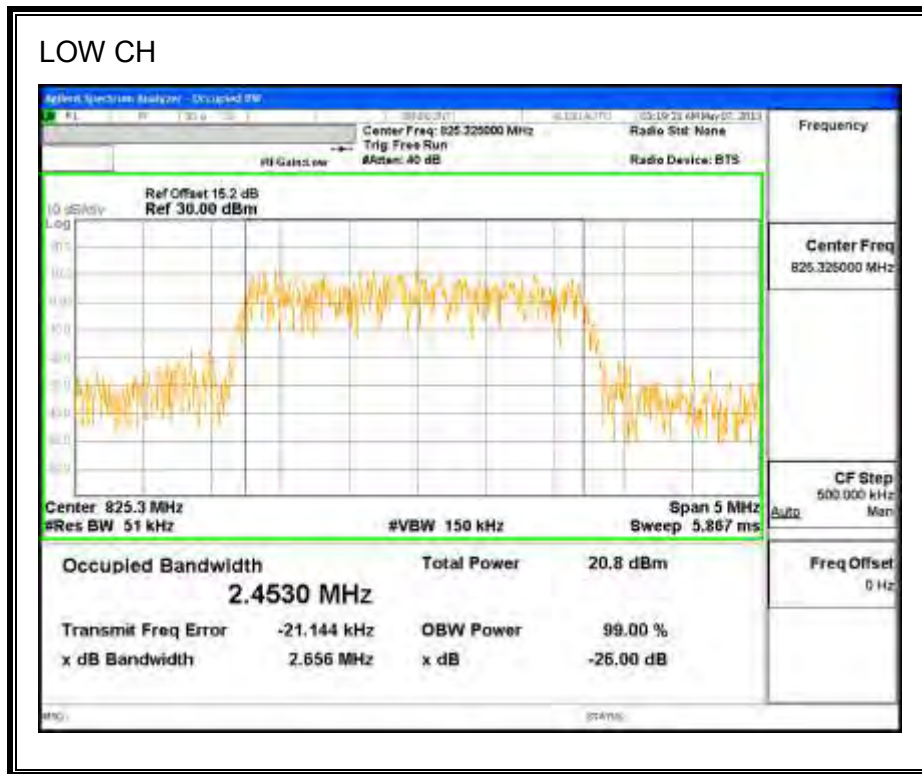


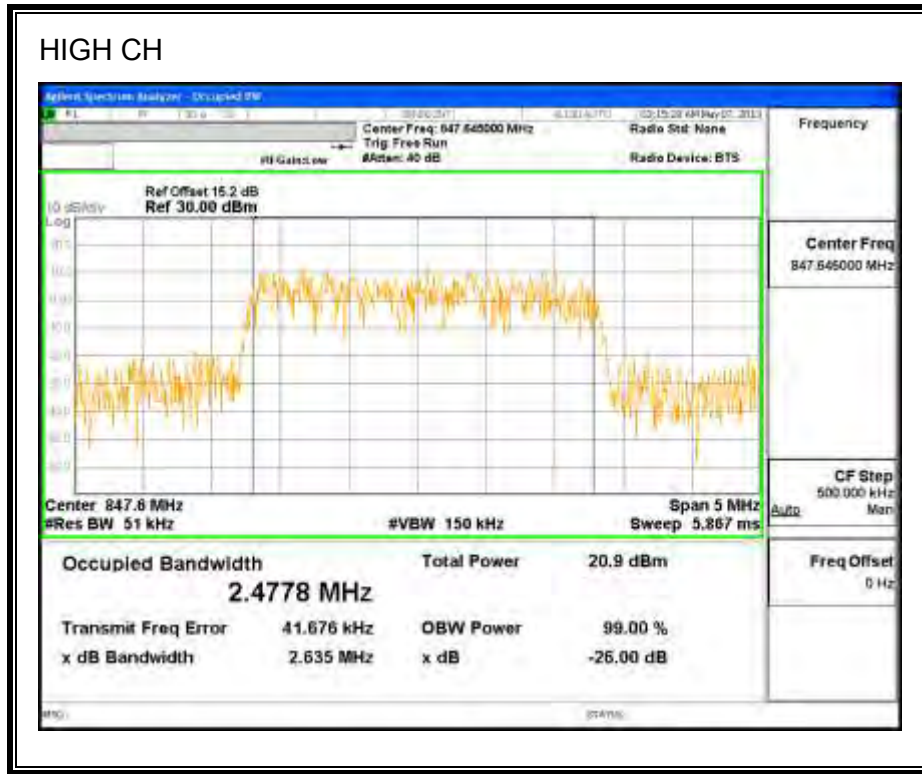
1xEV-DO Rev A, BC 0



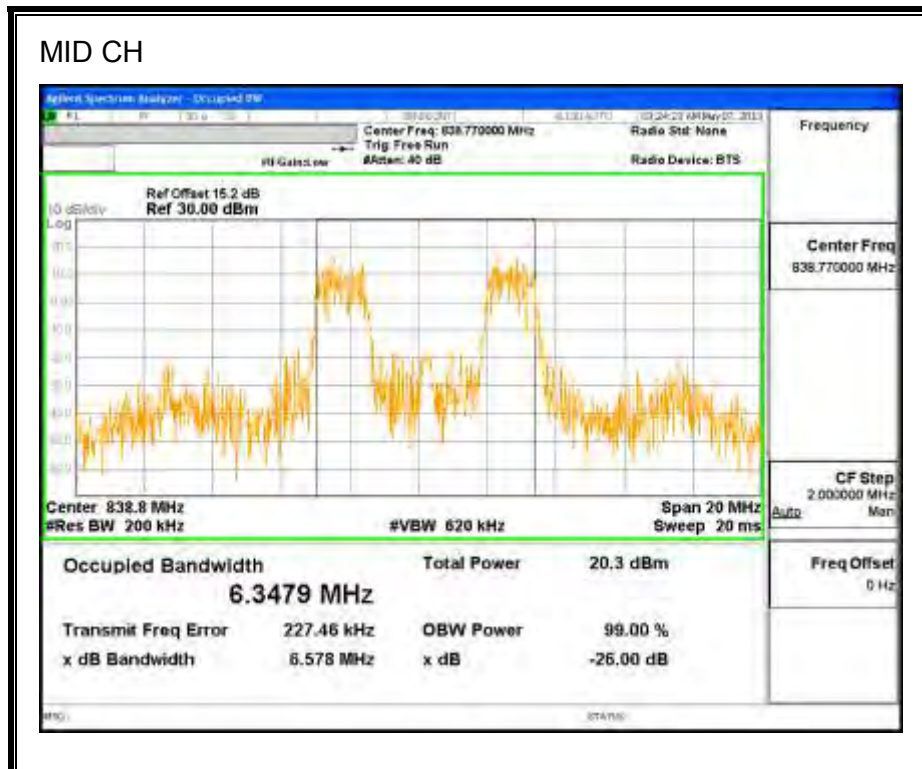
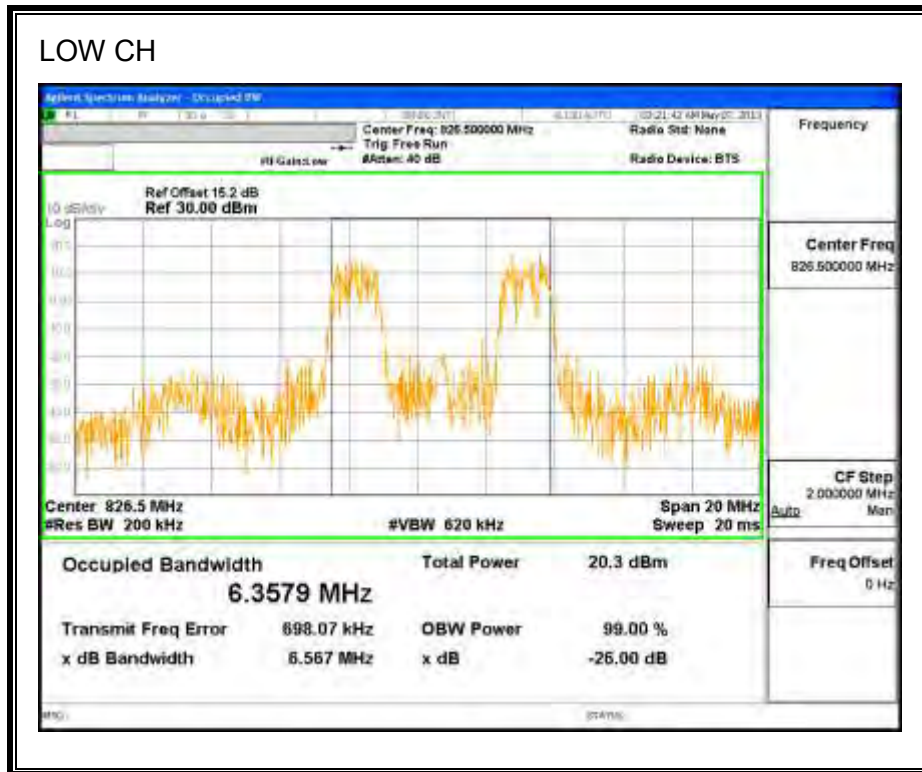


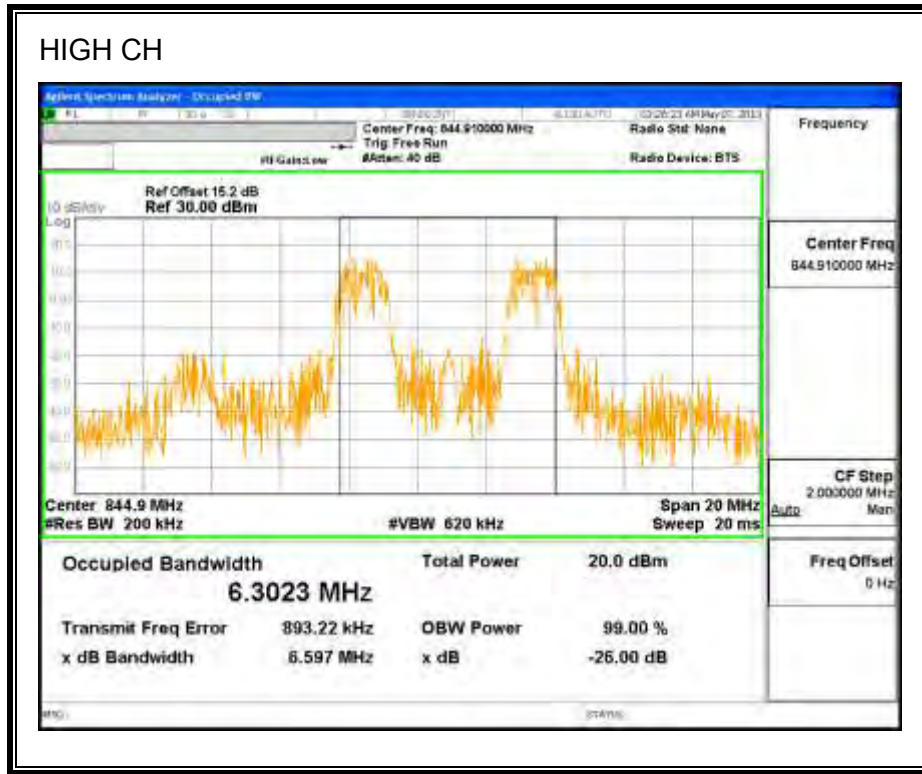
1xEV-DO Rev B, BC 0, 2 Min



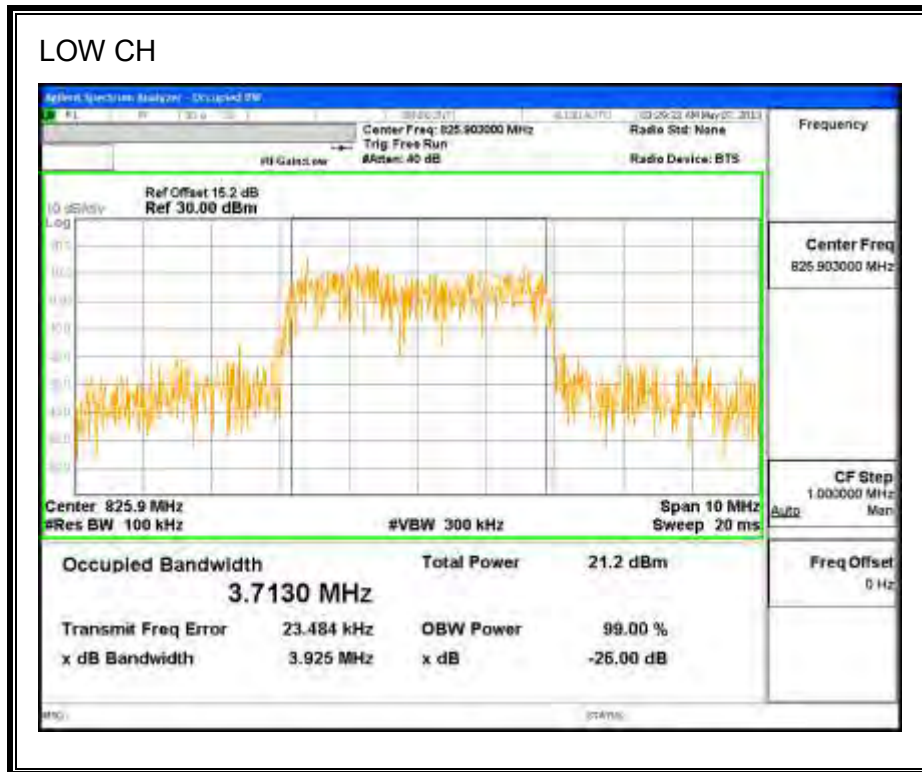


1xEV-DO Rev B, BC 0, 2 Max



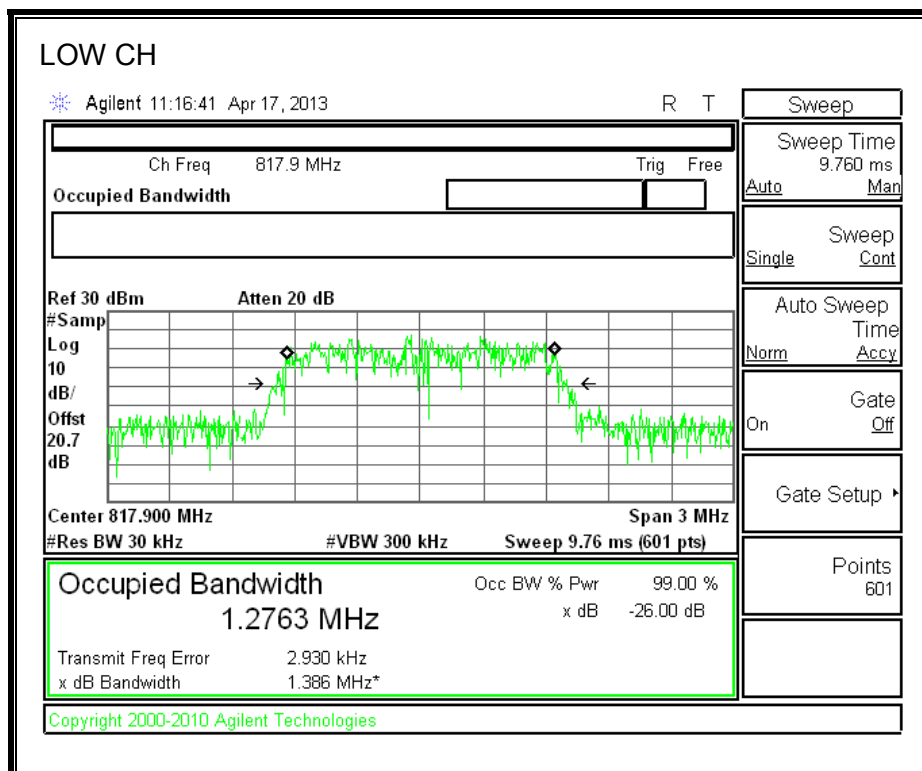


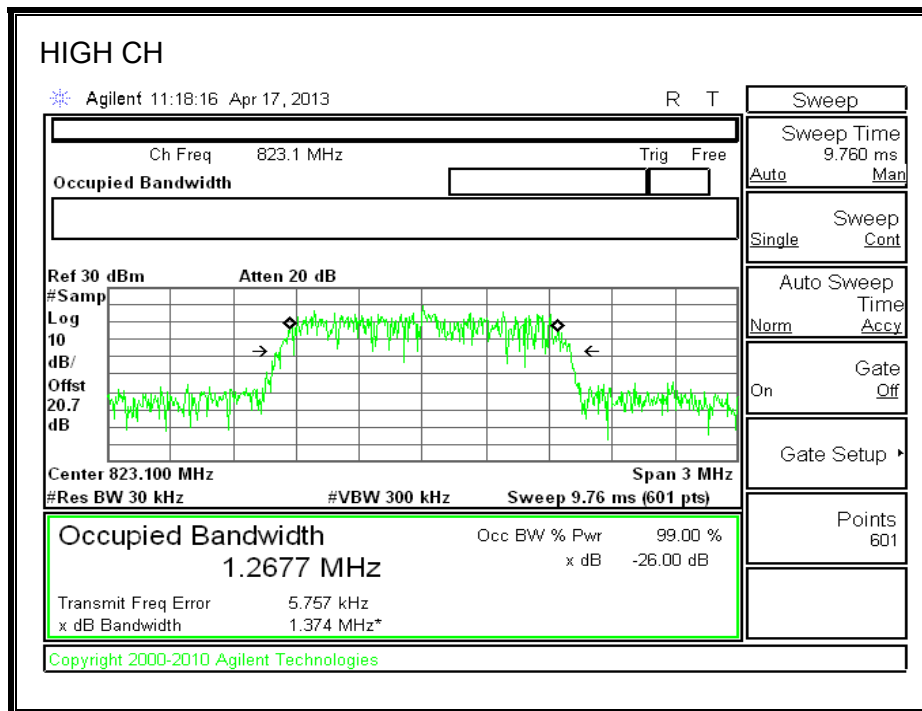
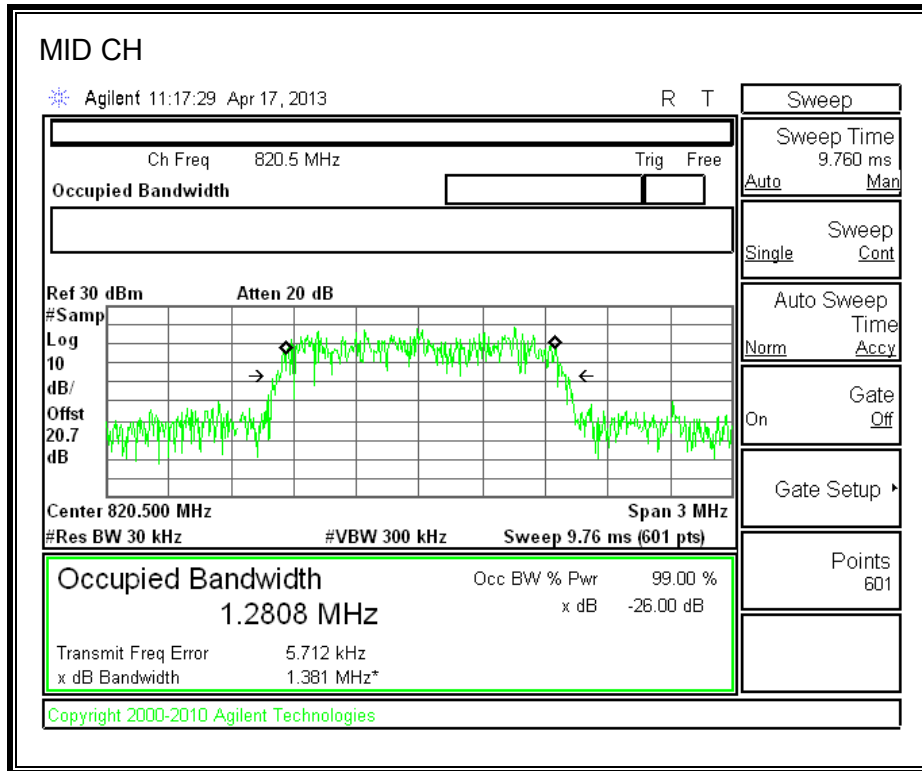
1xEV-DO Rev B, BC 0, 3 Max



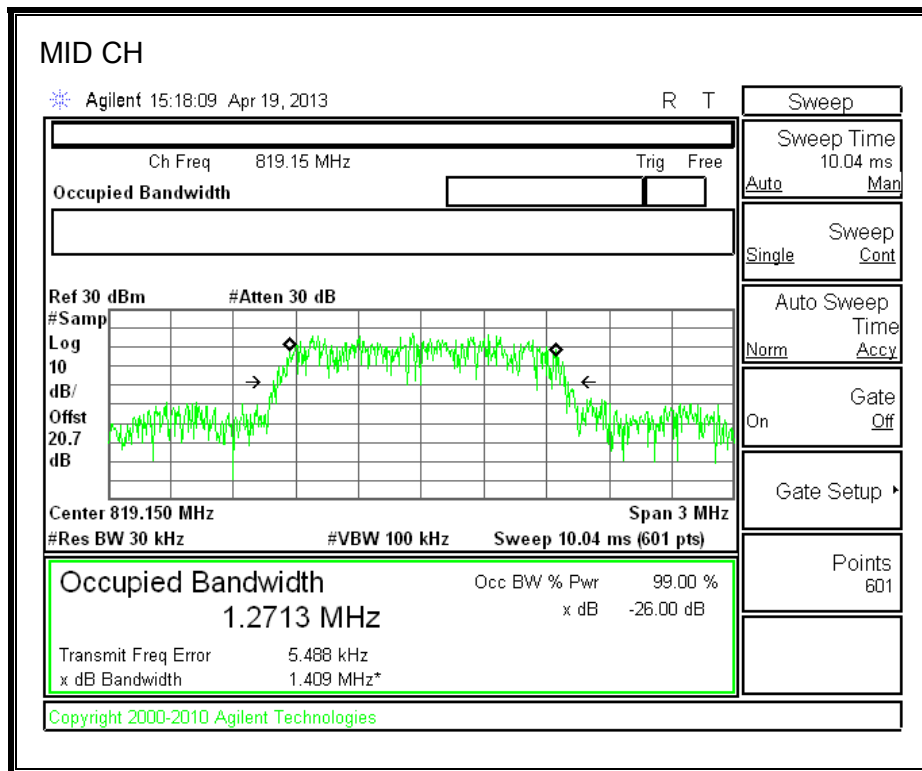
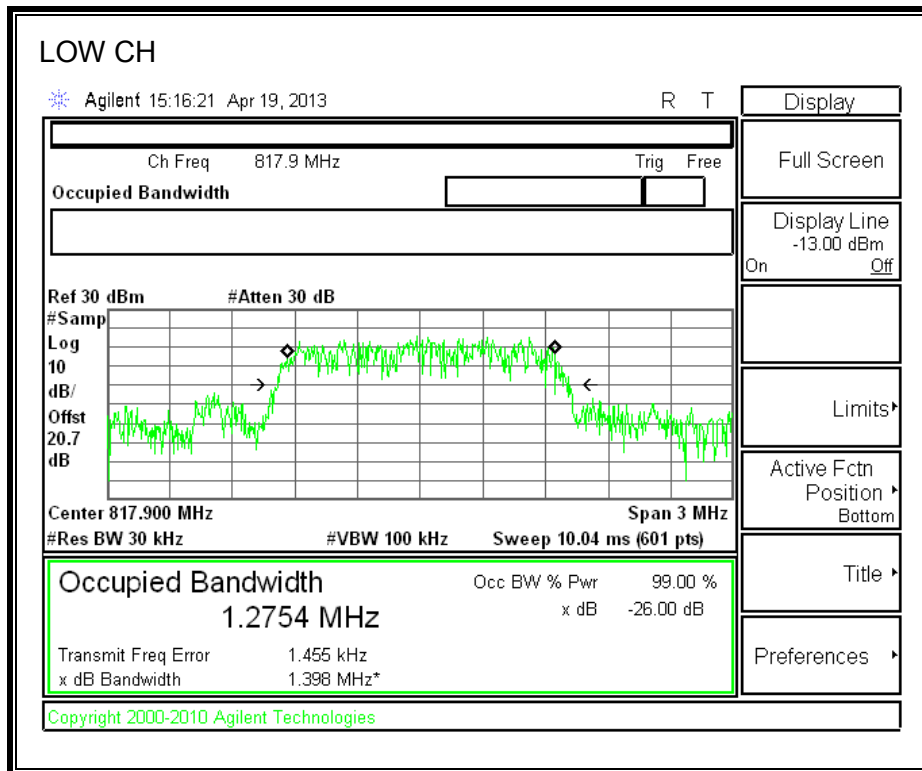


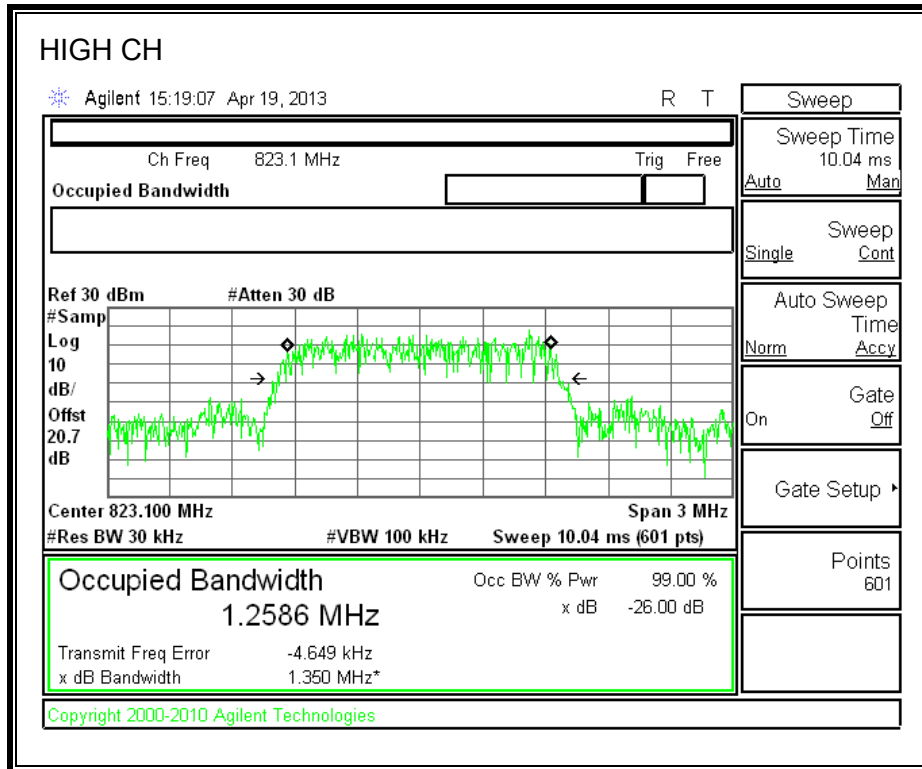
1xRTT Mode, BC 10



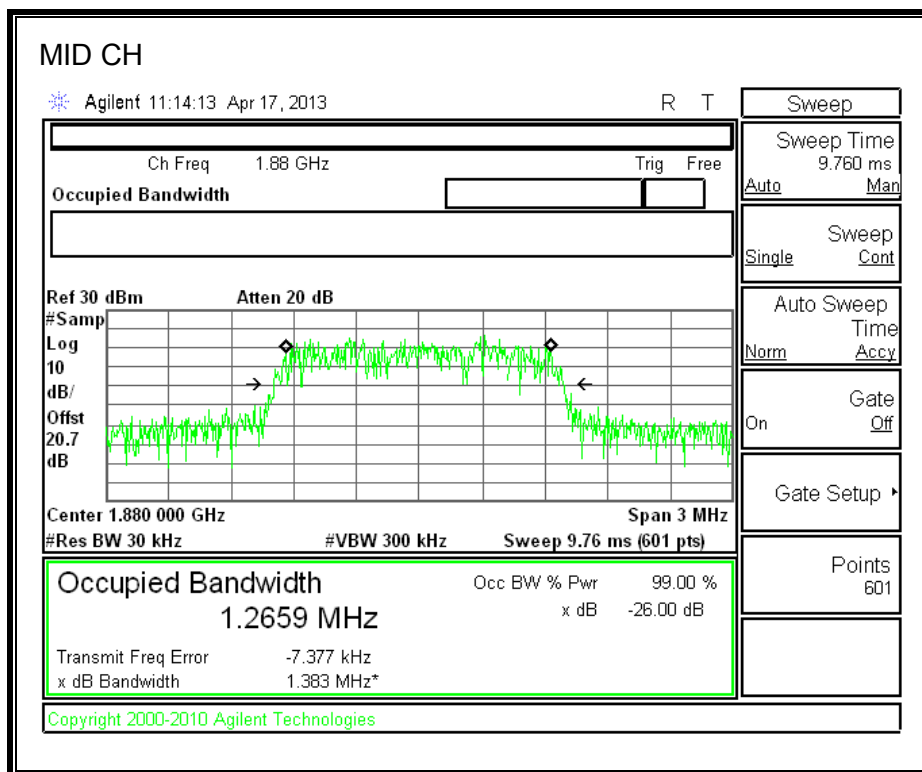
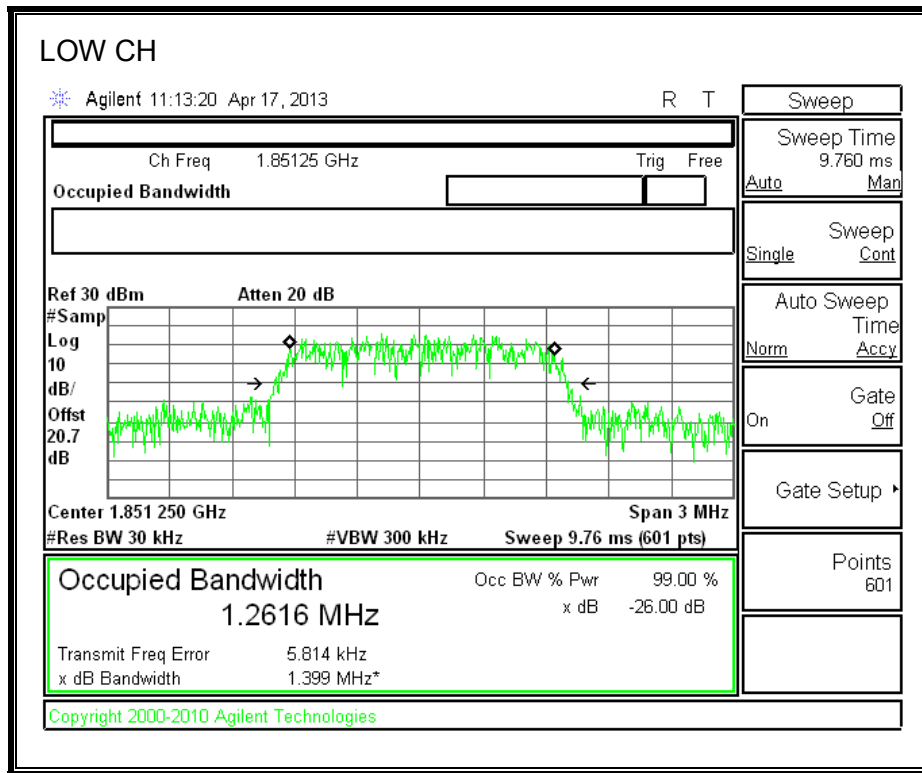


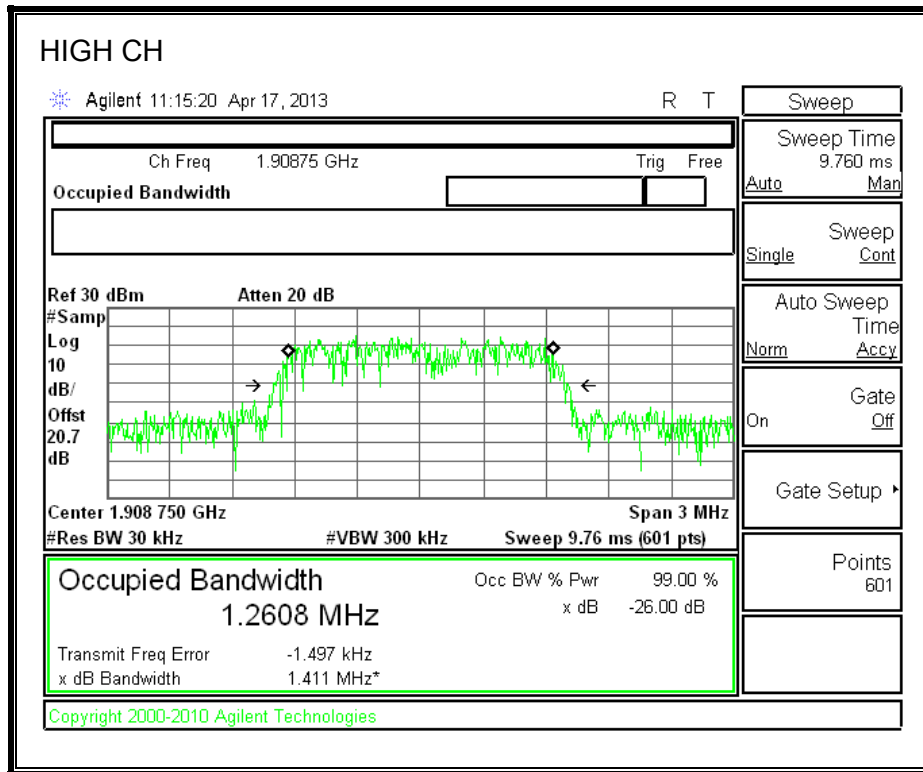
1xEV-DO Rev A, BC 10



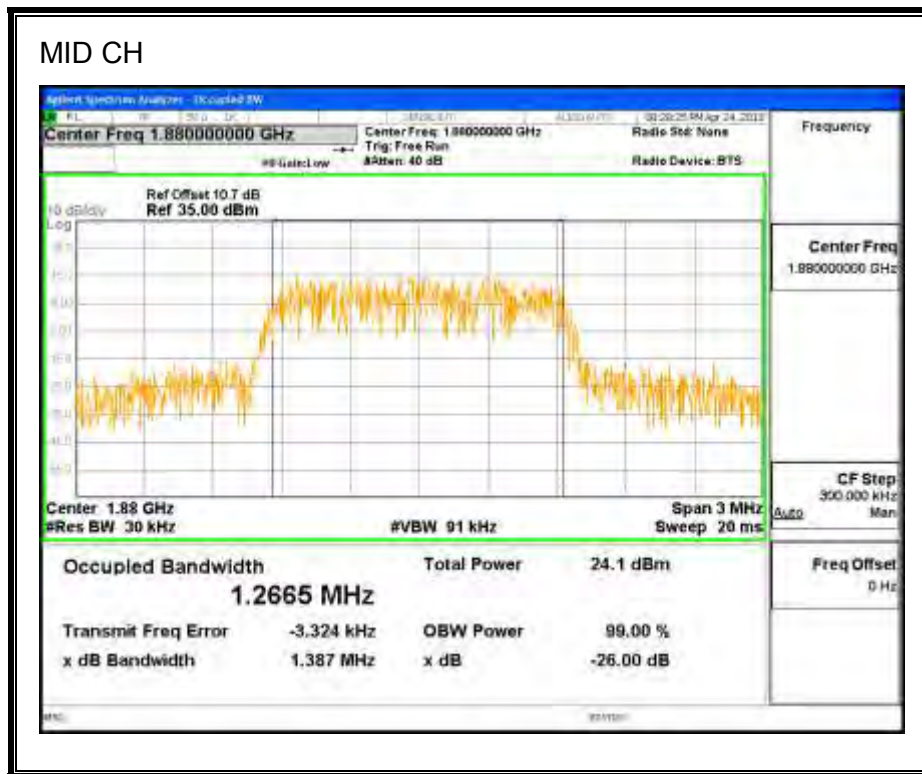
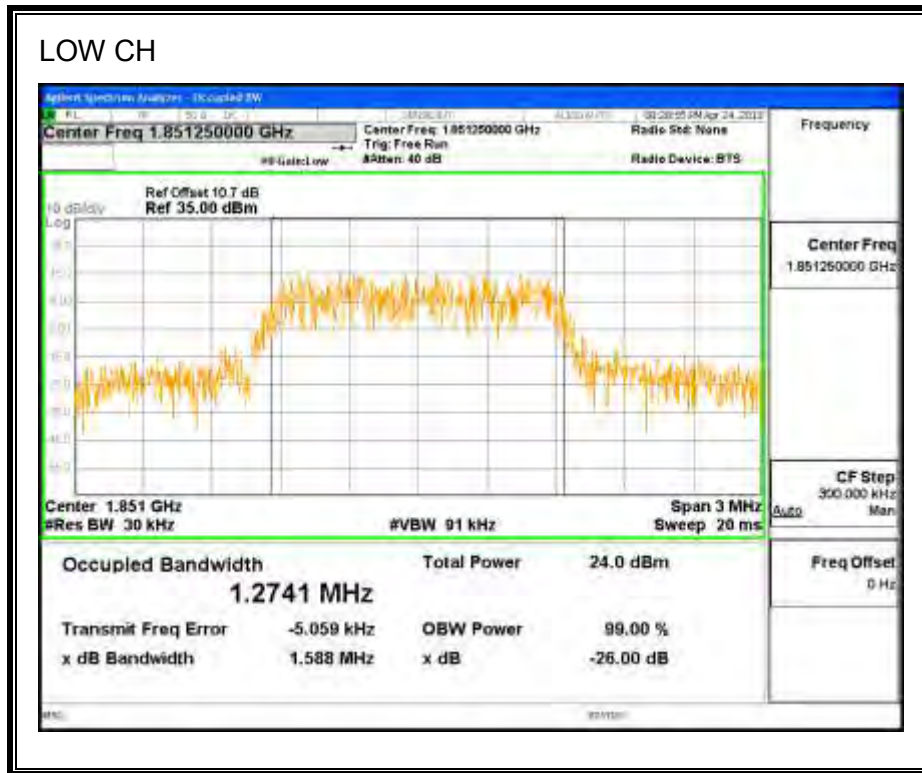


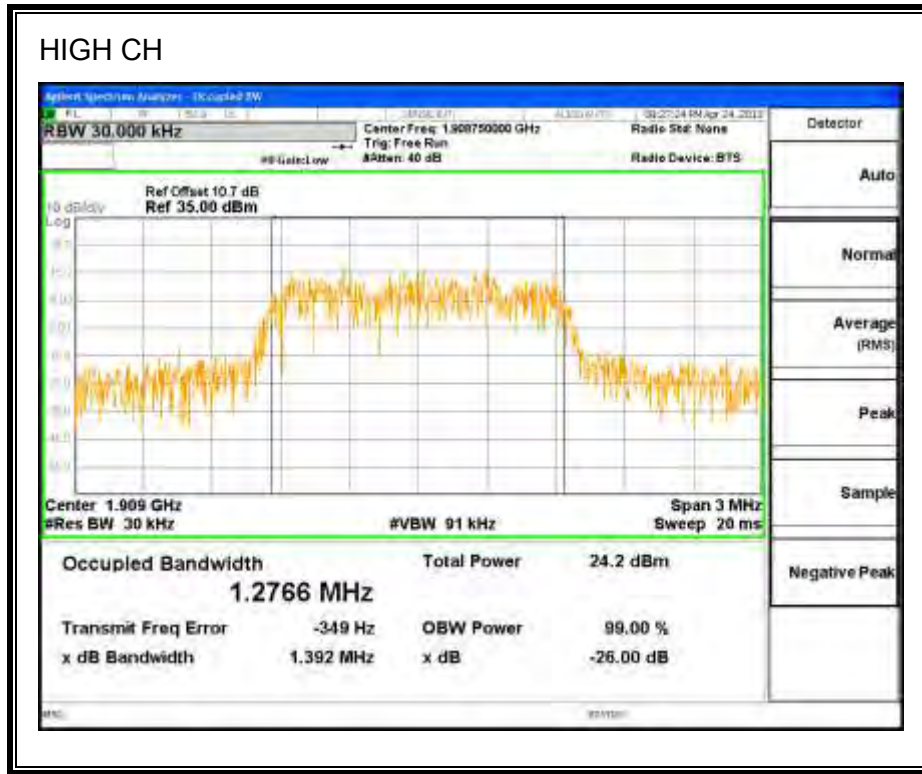
1xRTT Mode, BC 1



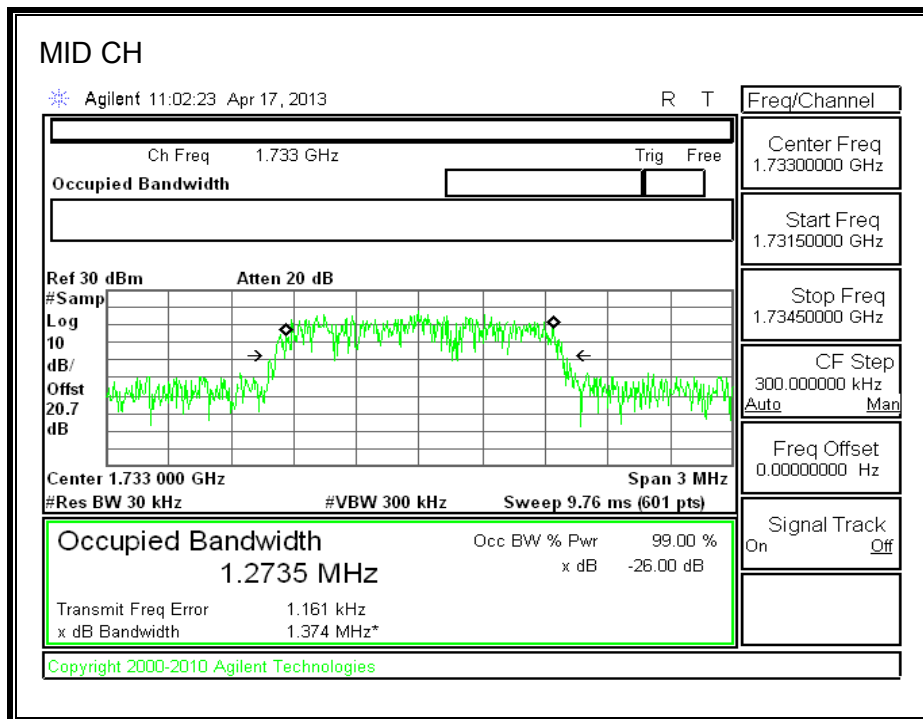
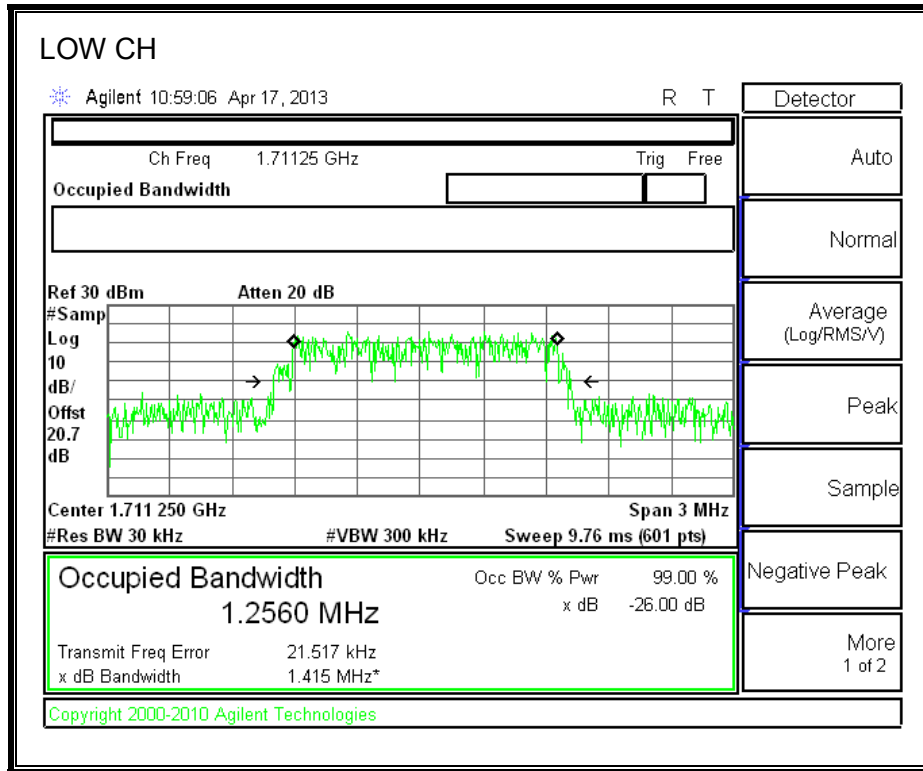


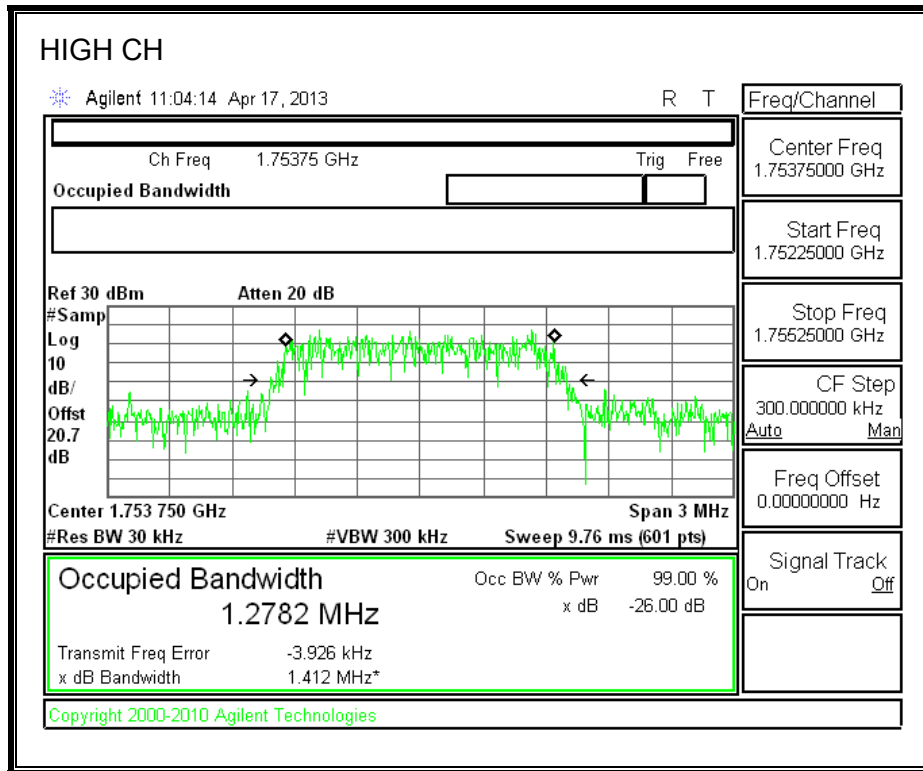
1xEV-DO Rev A, BC 1



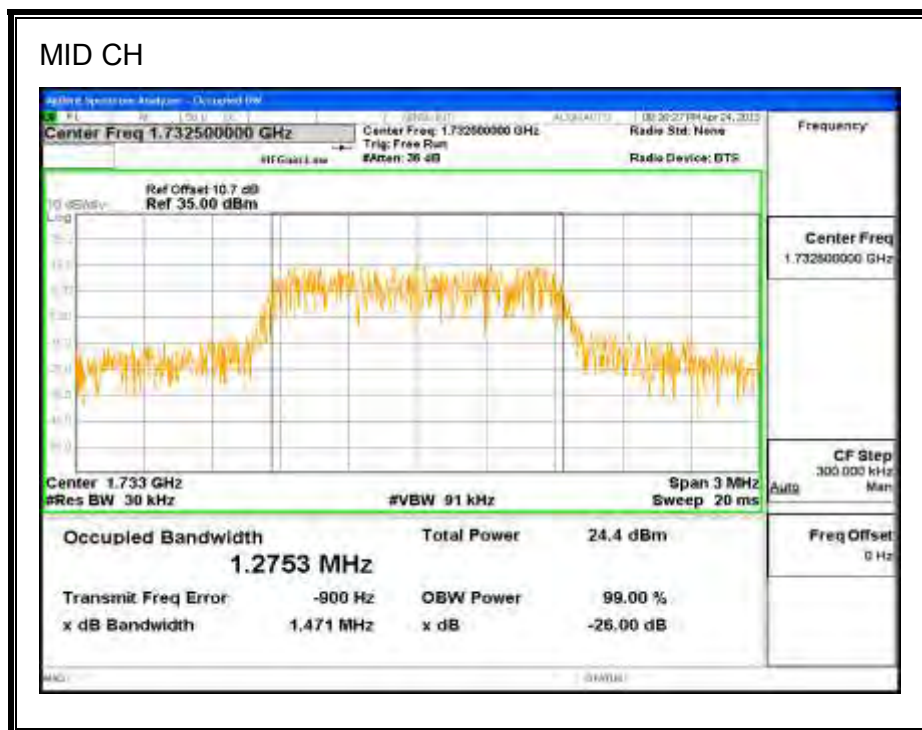
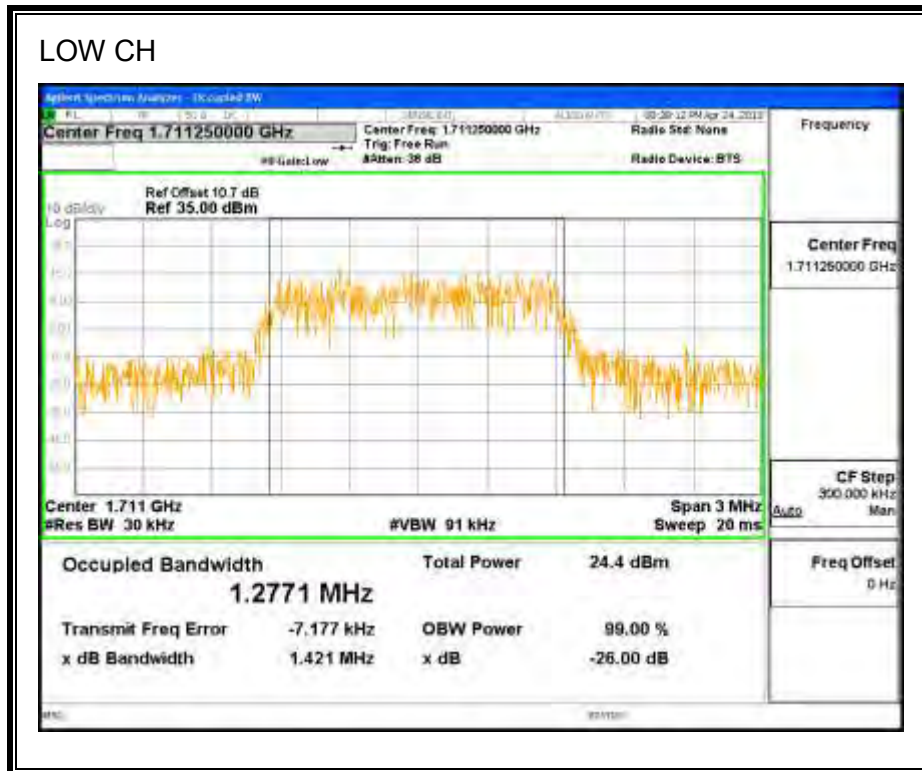


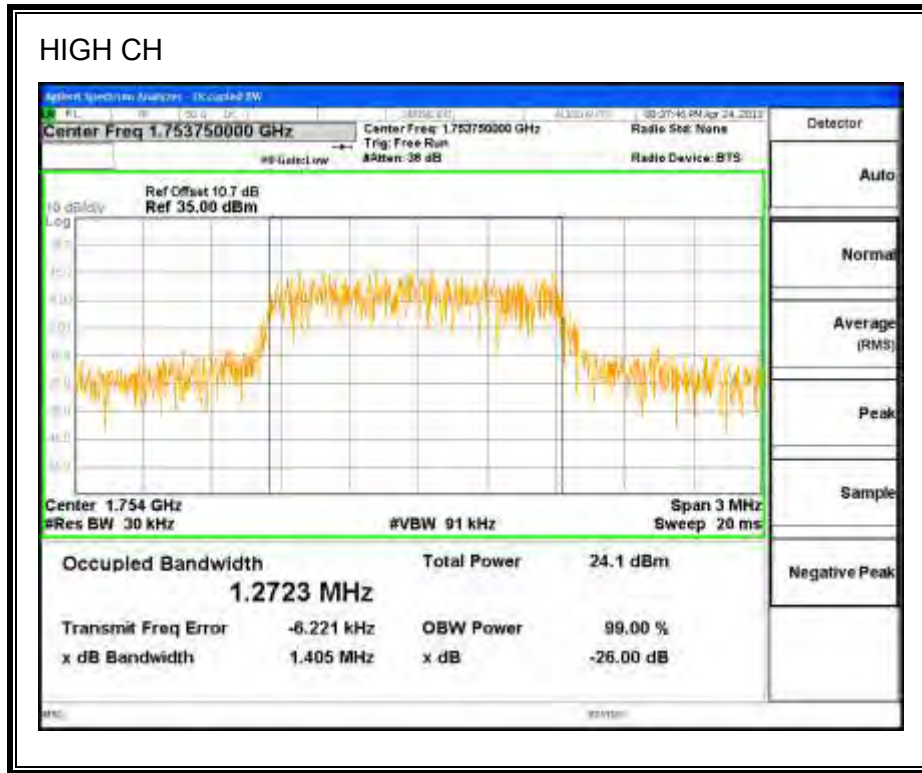
1xRTT Mode, BC 15





1xEV-DO, Rev A BC 15





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.
- .

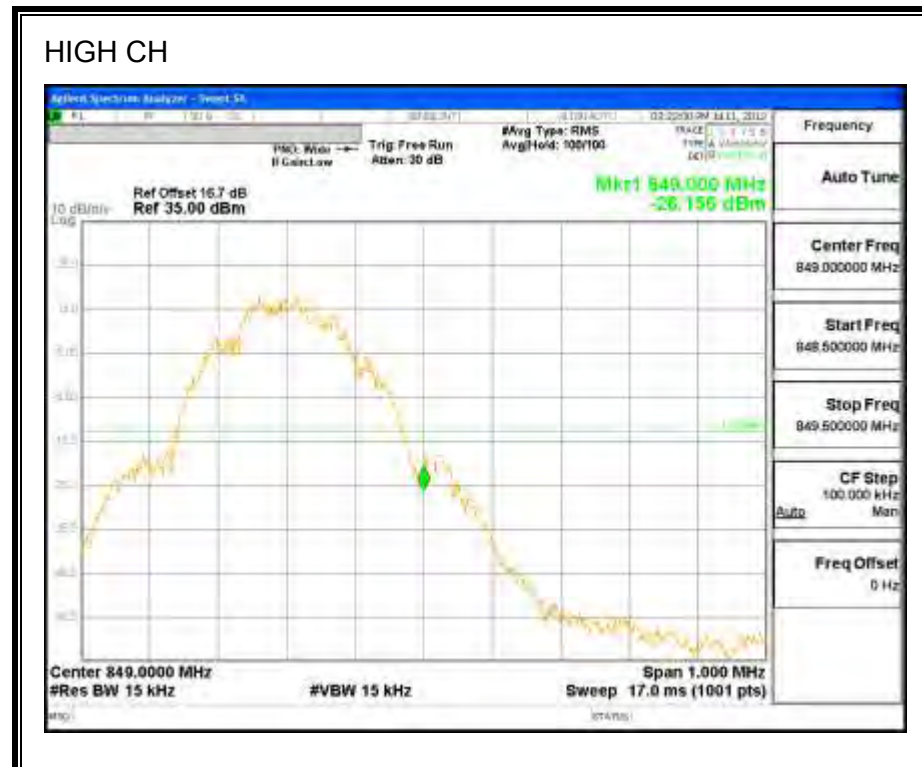
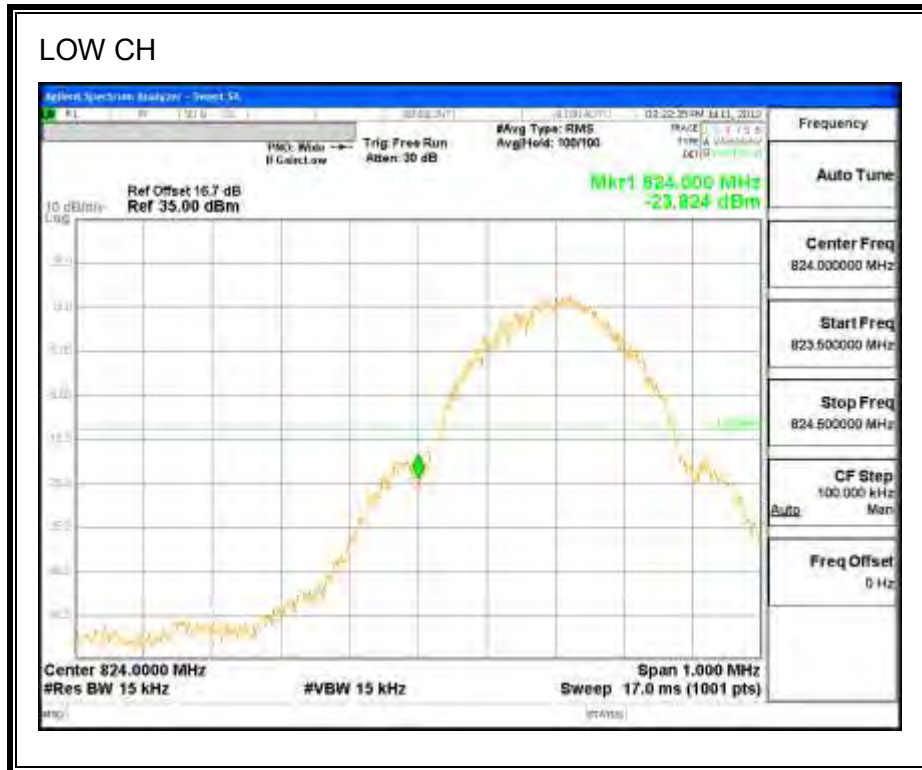
MODES TESTED

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

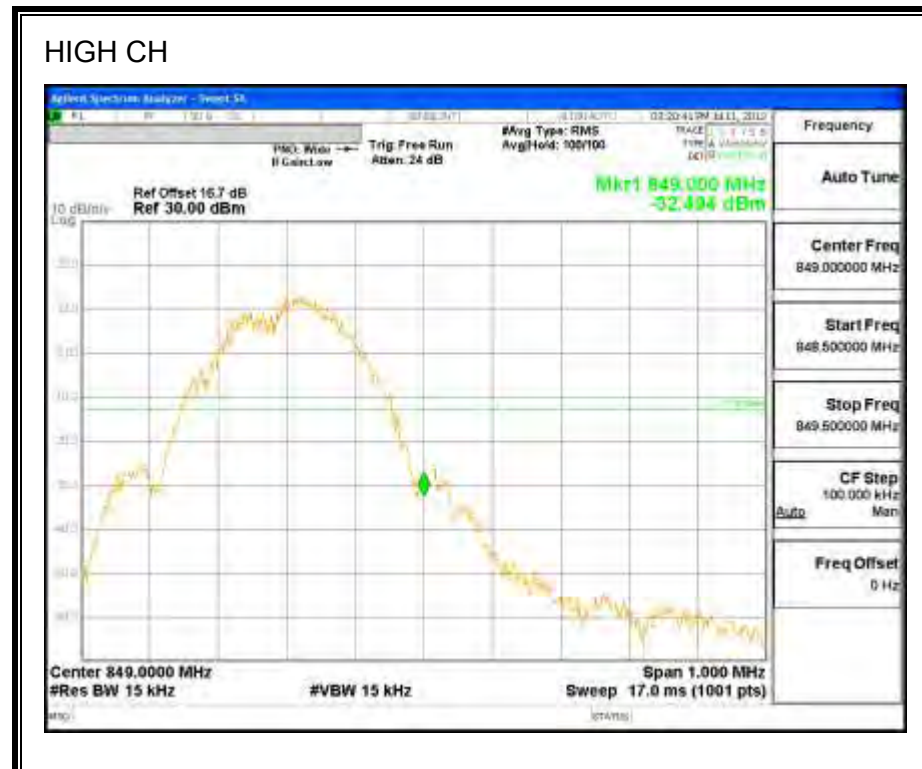
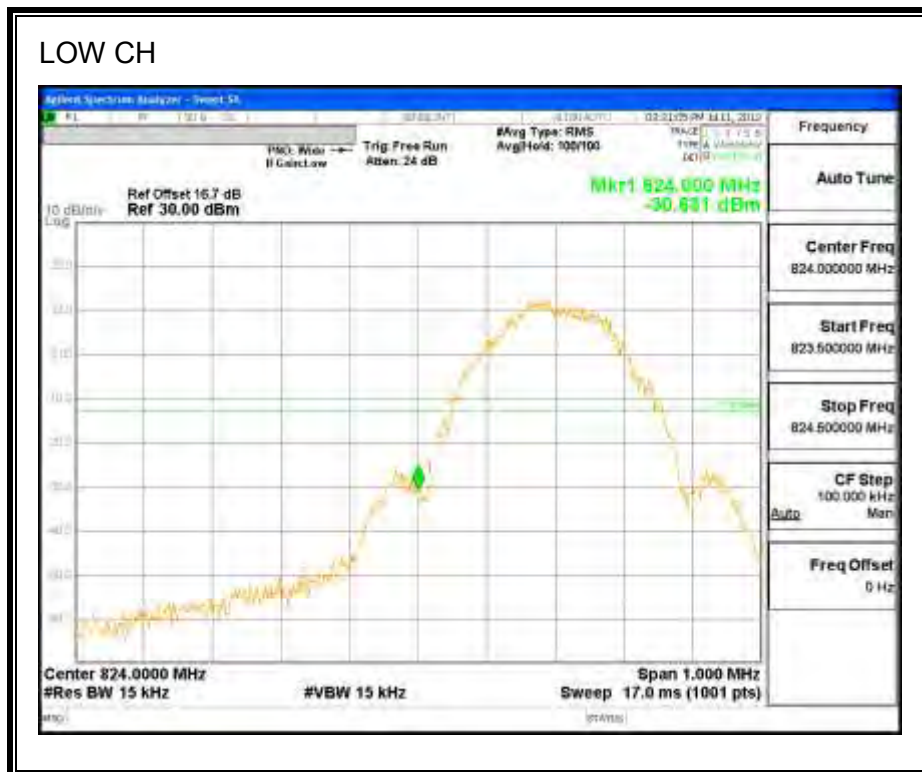
RESULTS

8.2.1. GPRS850

LAT (PORT A) / PRIMARY, CELL BAND

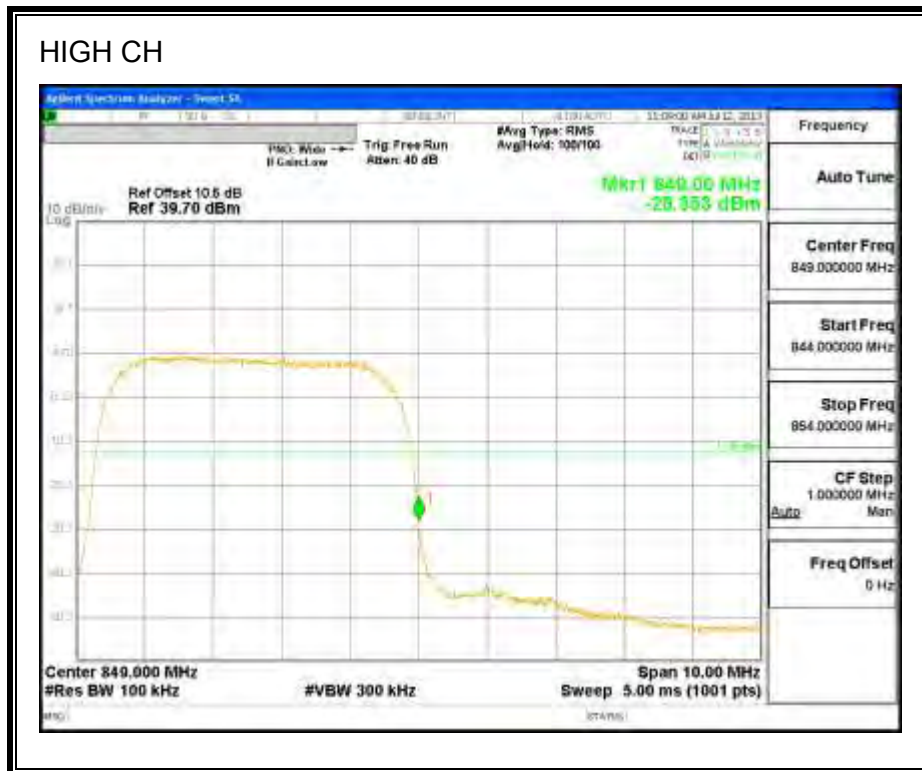
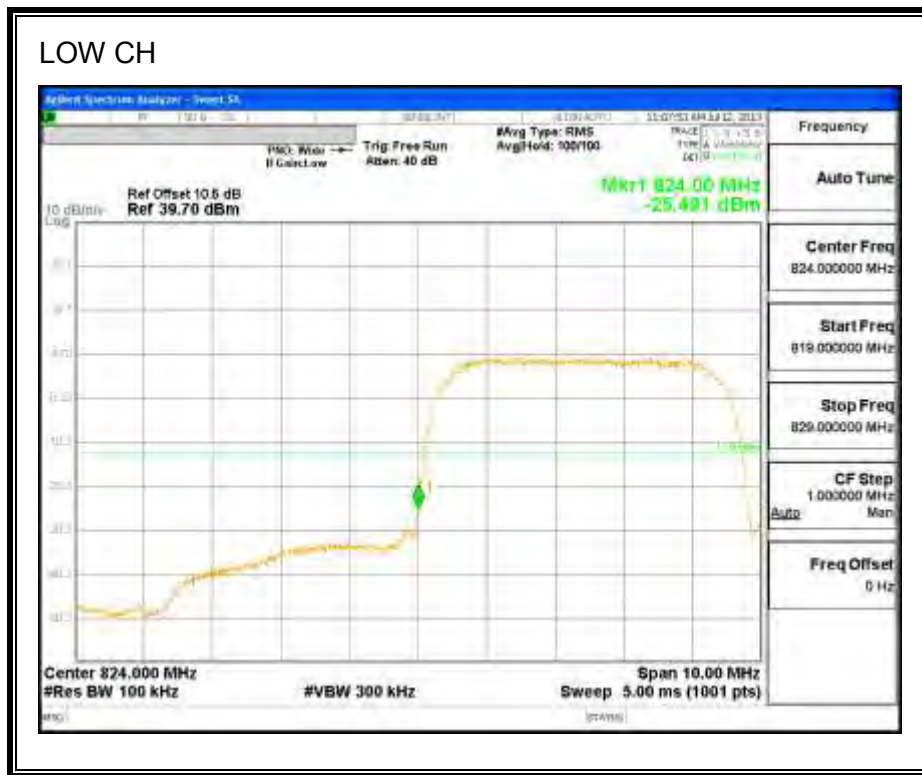


8.2.2. EGPRS850

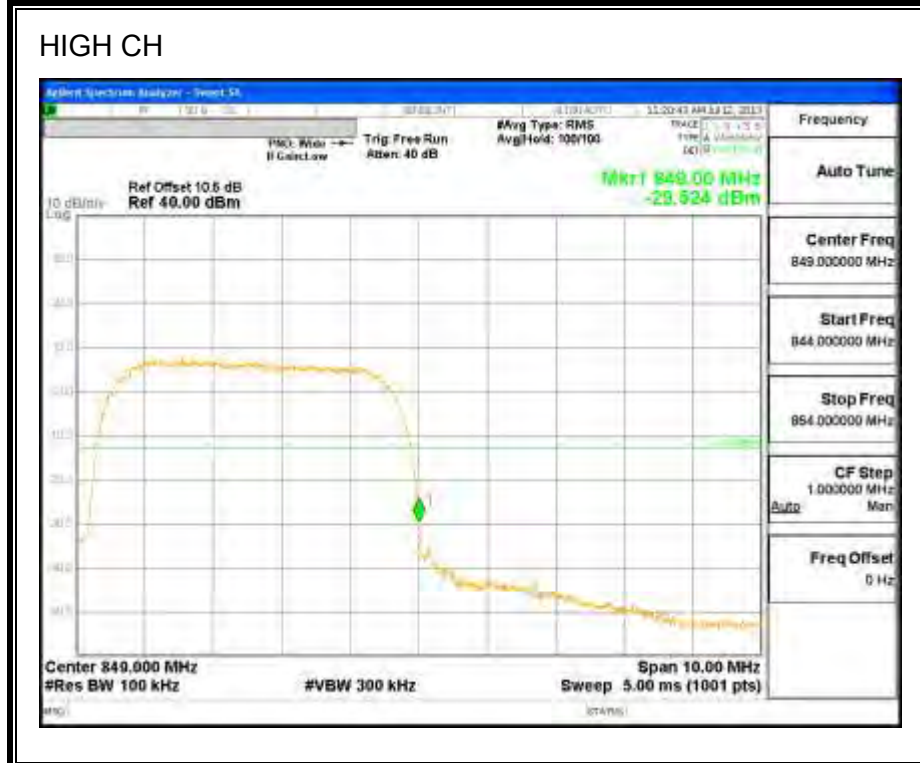
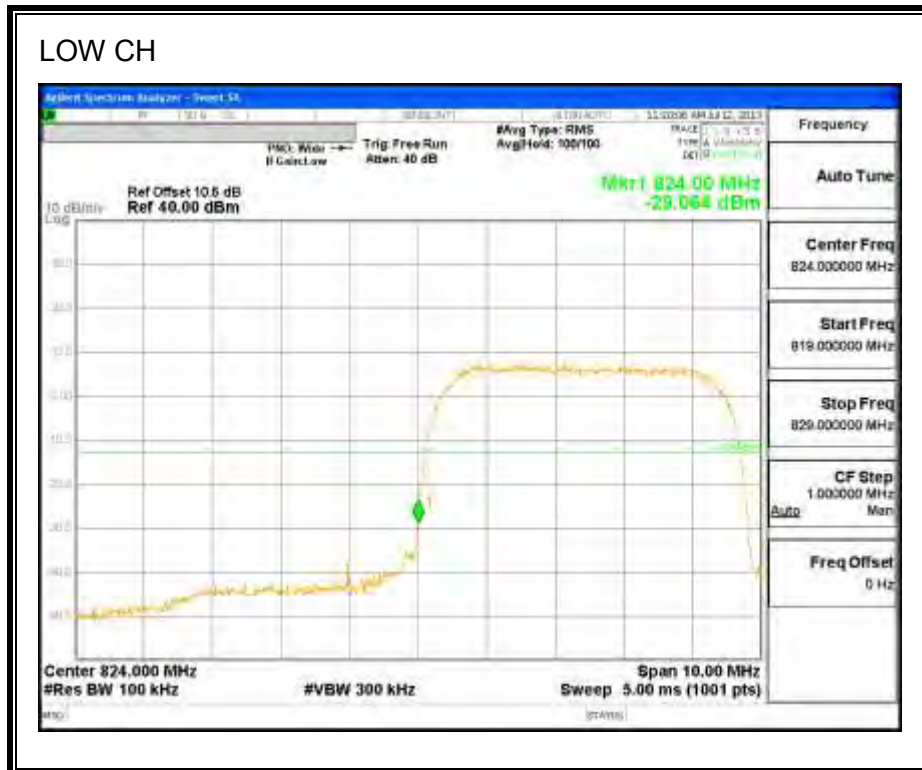


8.2.3. UMTS850

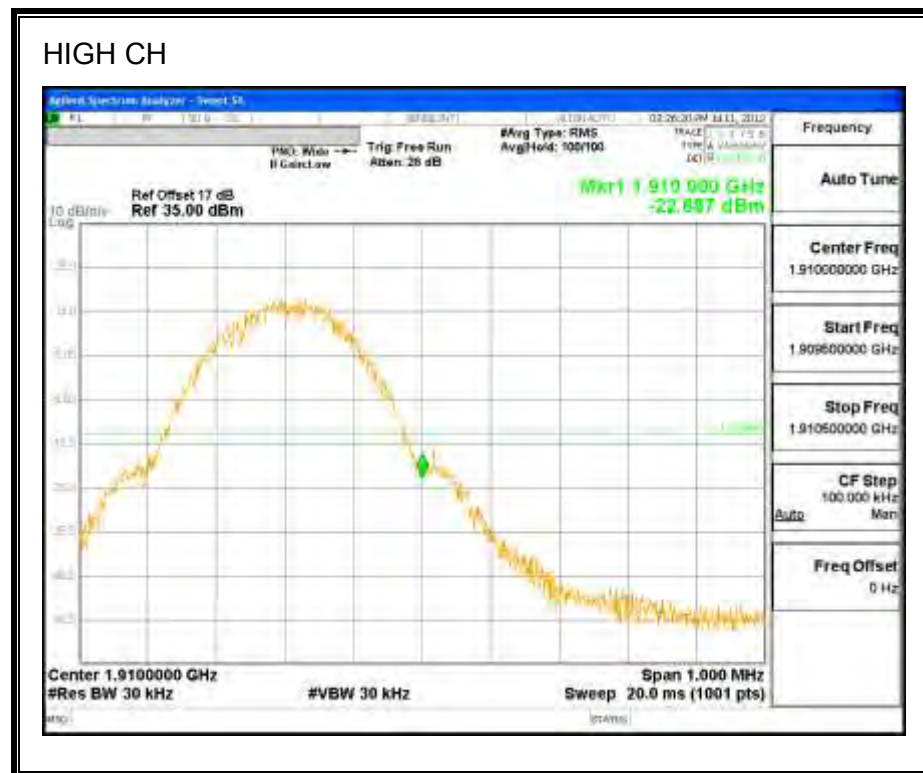
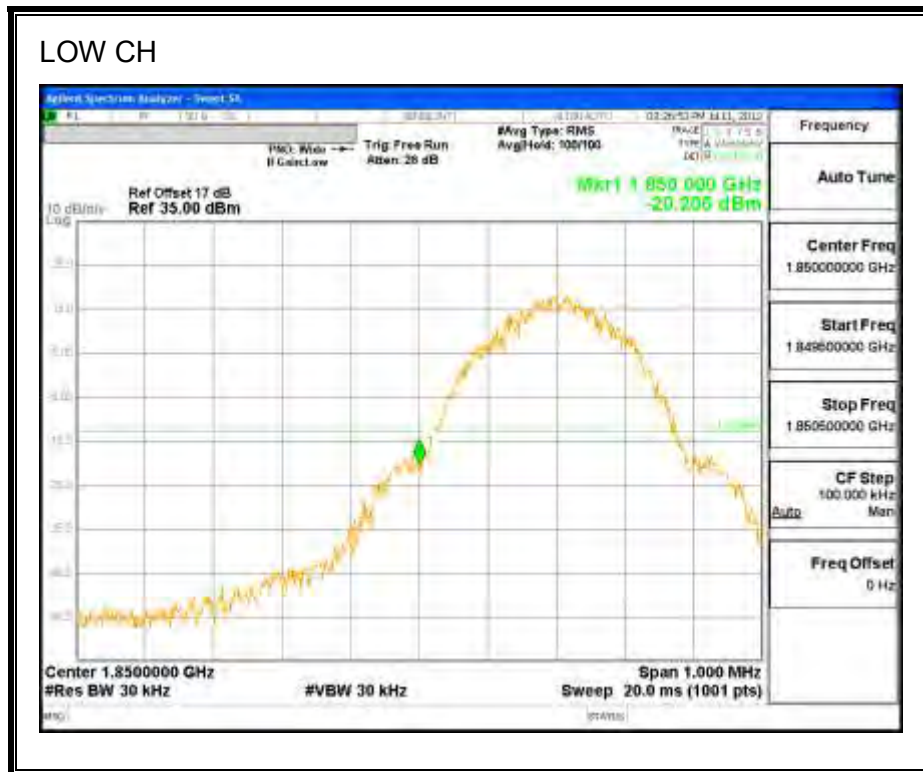
REL99 (Cell Band)



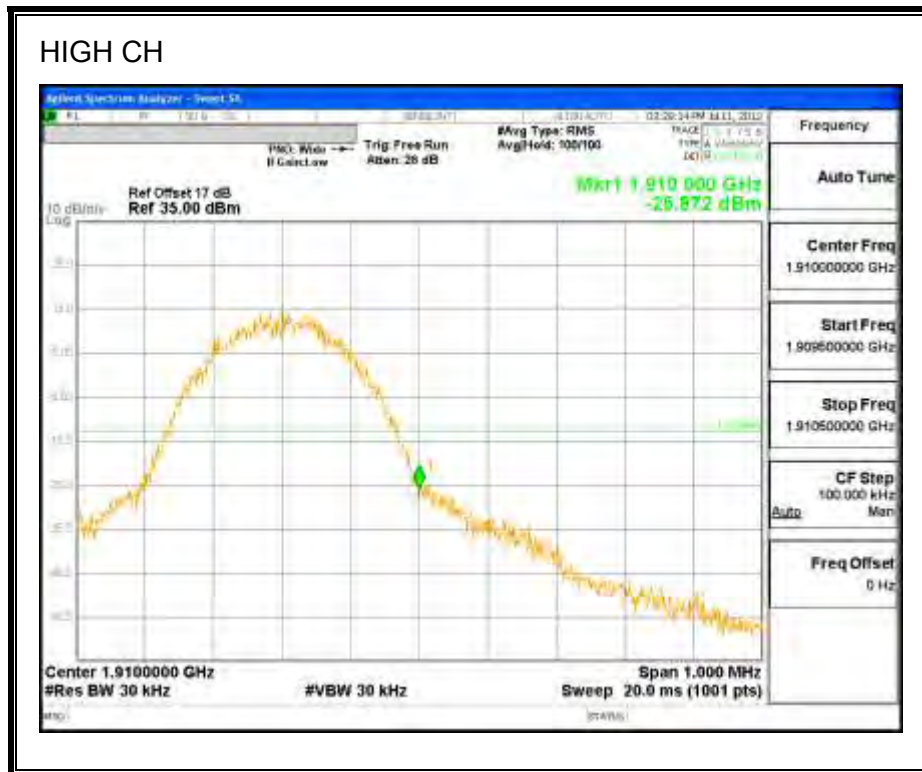
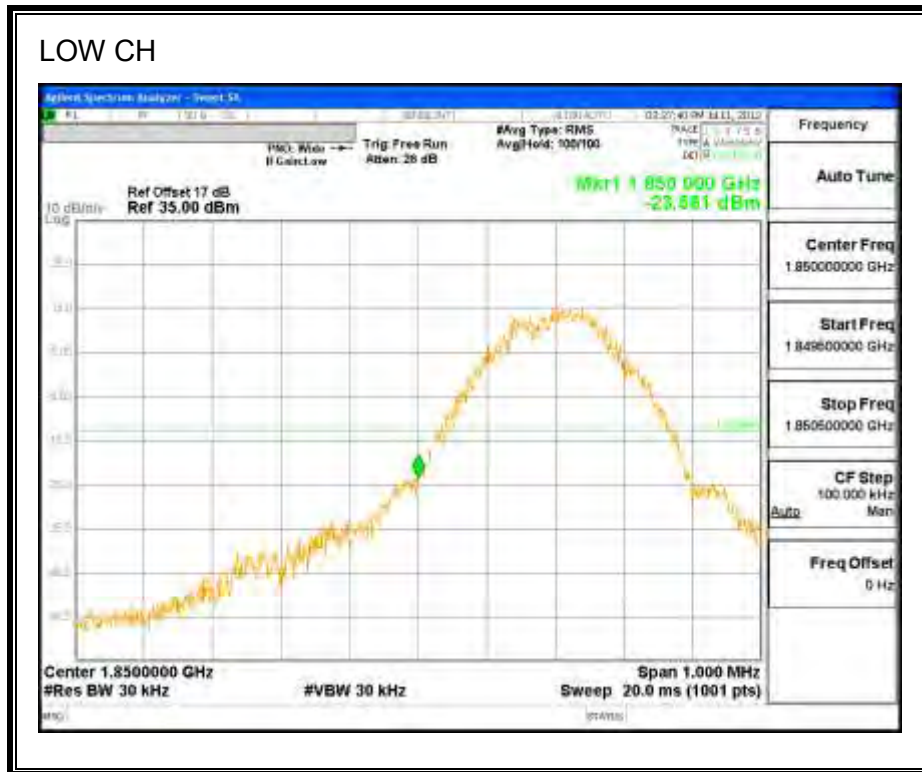
HSDPA (Cell Band)



8.2.4. GPRS1900

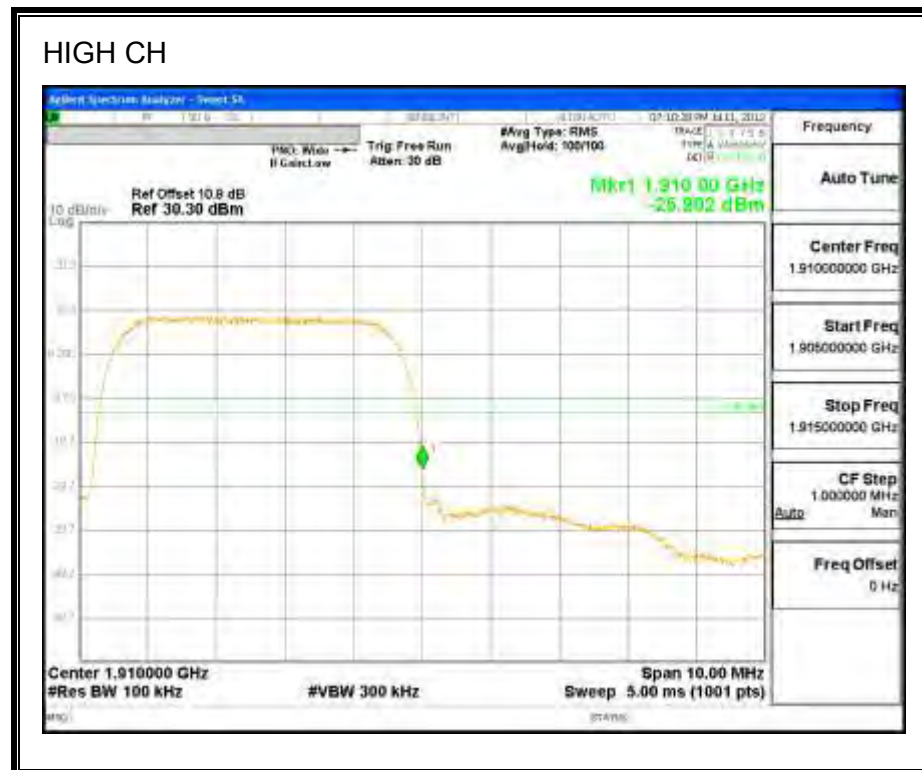
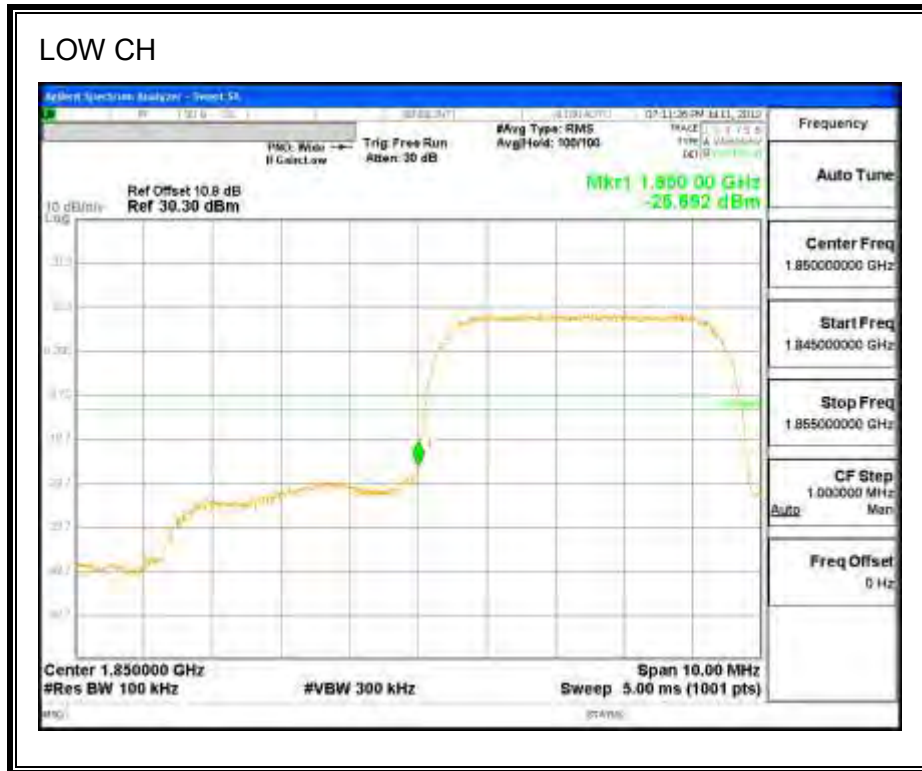


8.2.5. EGPRS1900

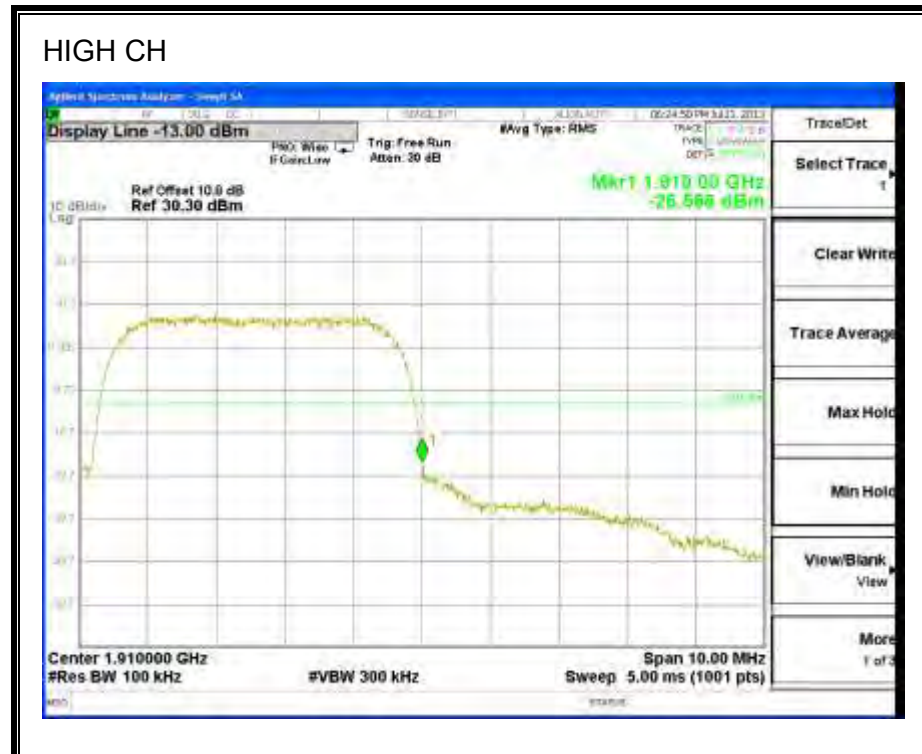
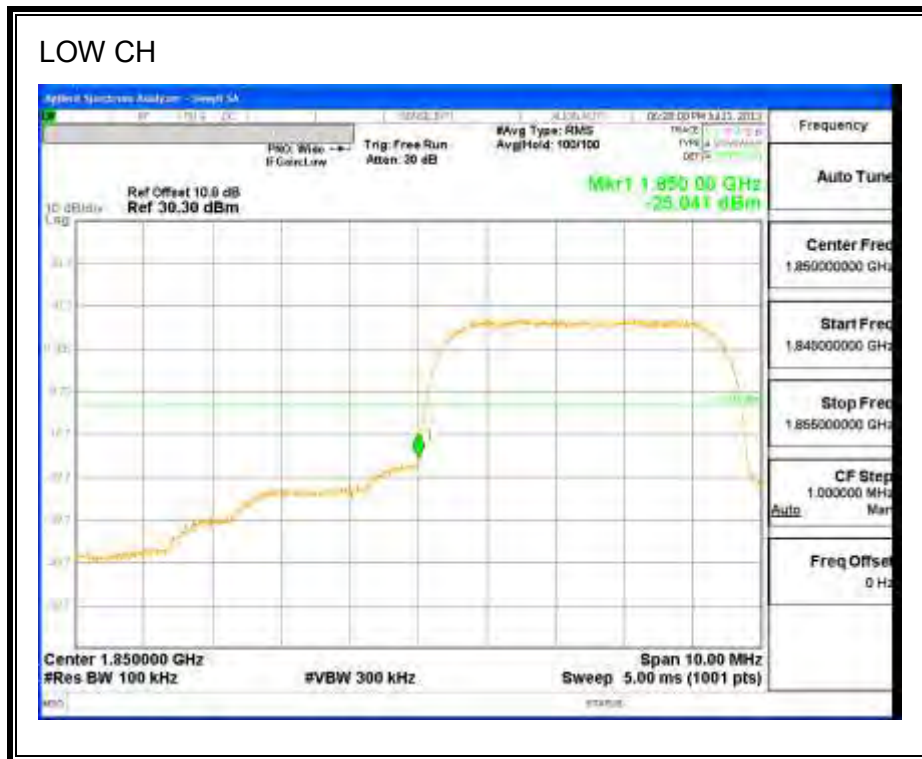


8.2.6. UMTS1900

REL99 (PCS Band)

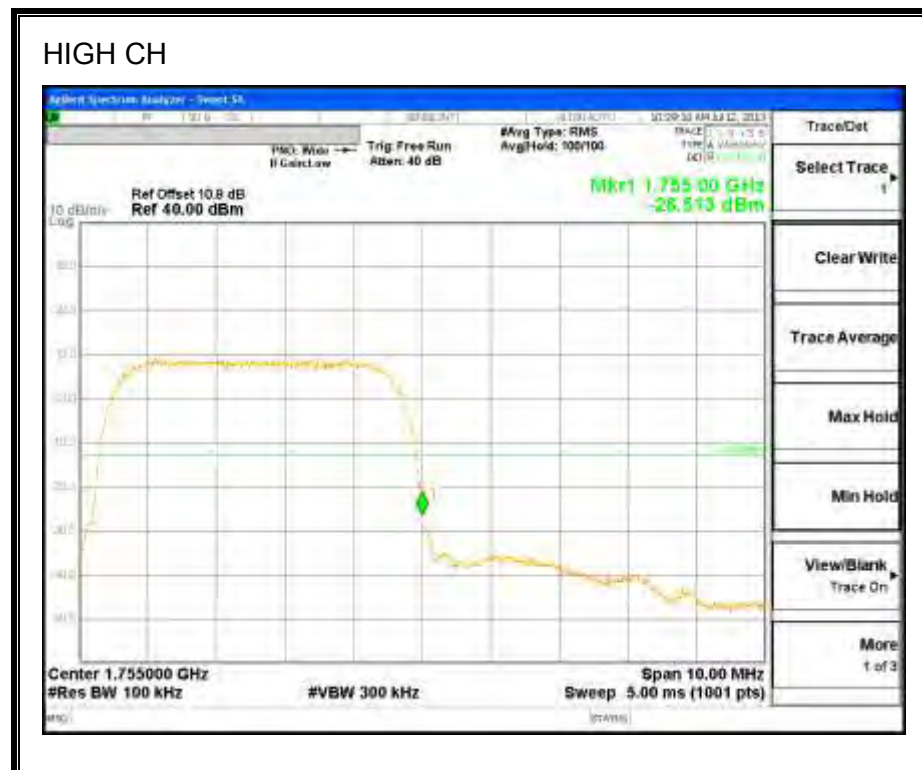
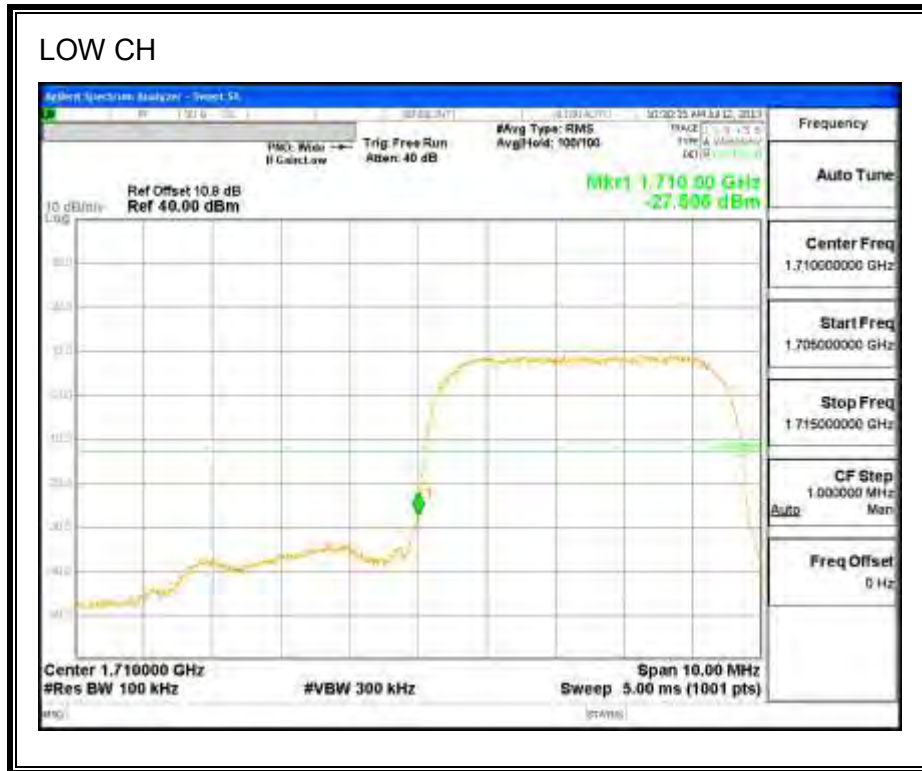


HSDPA (PCS Band)

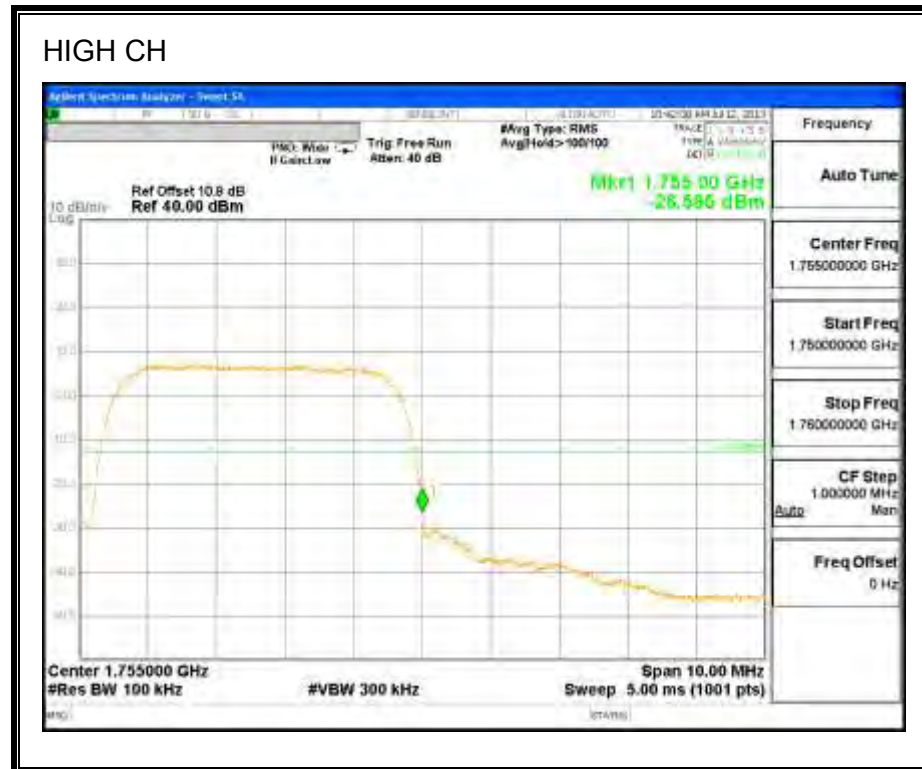
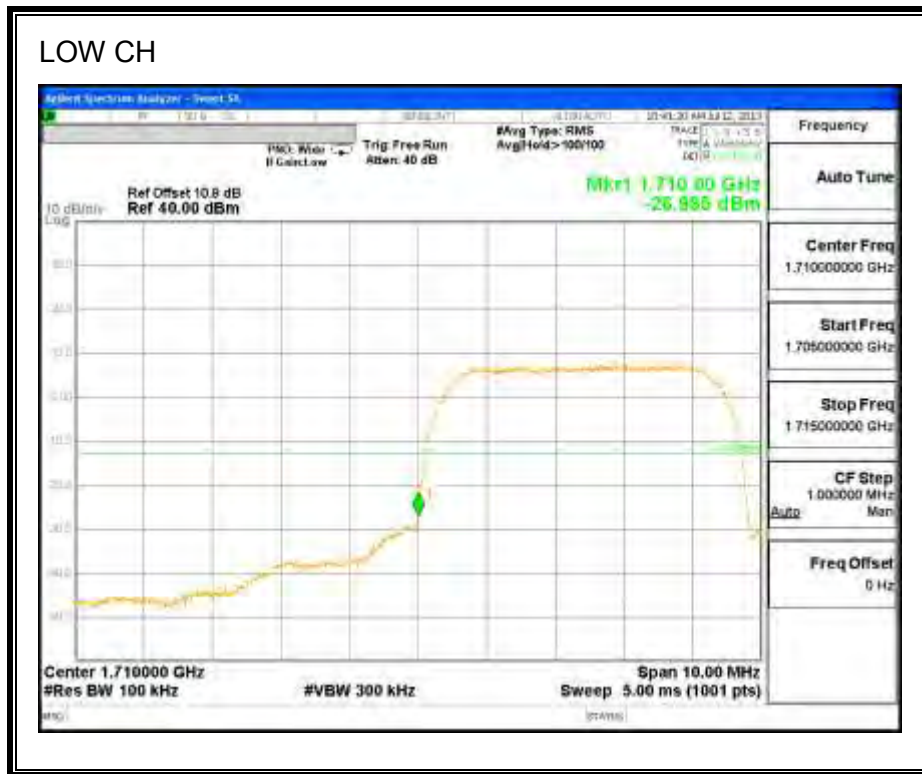


8.2.7. UMTS1700

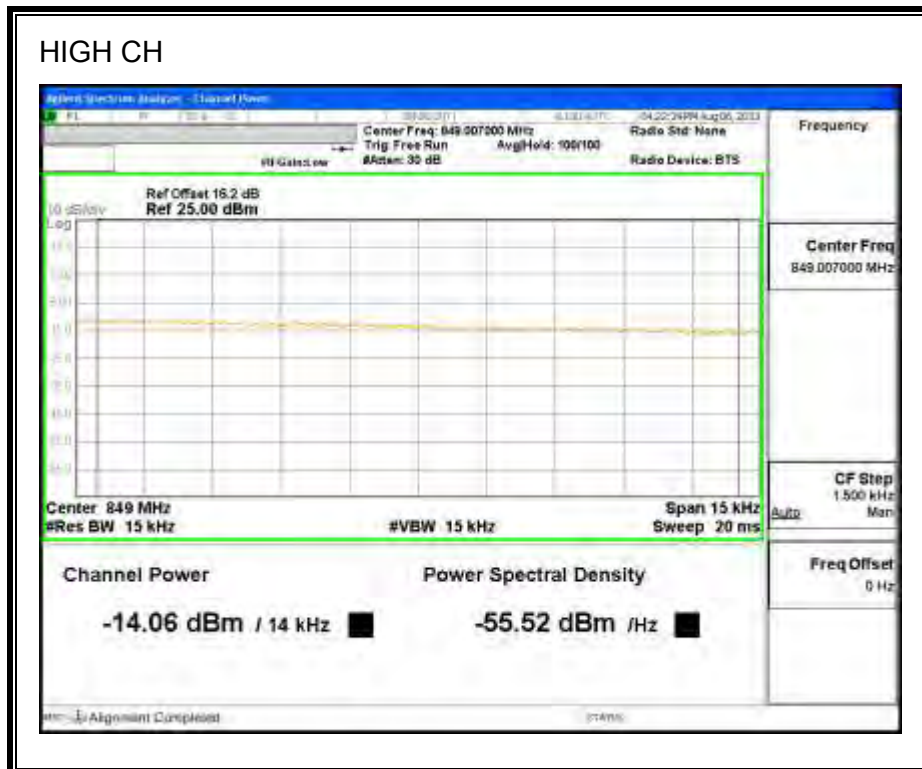
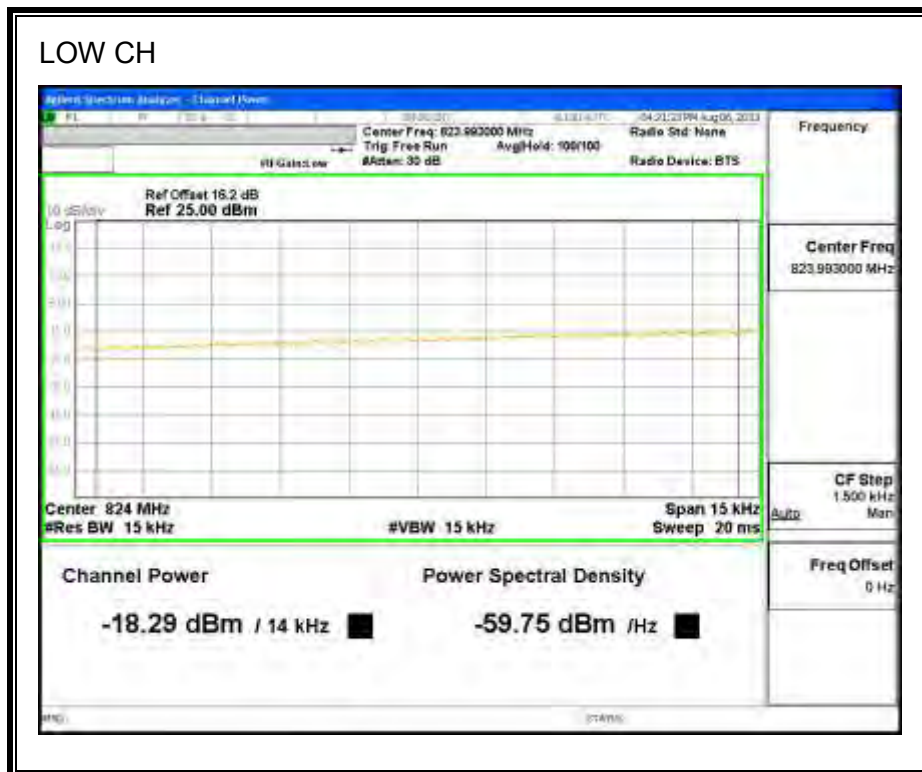
REL99 (AWS Band)



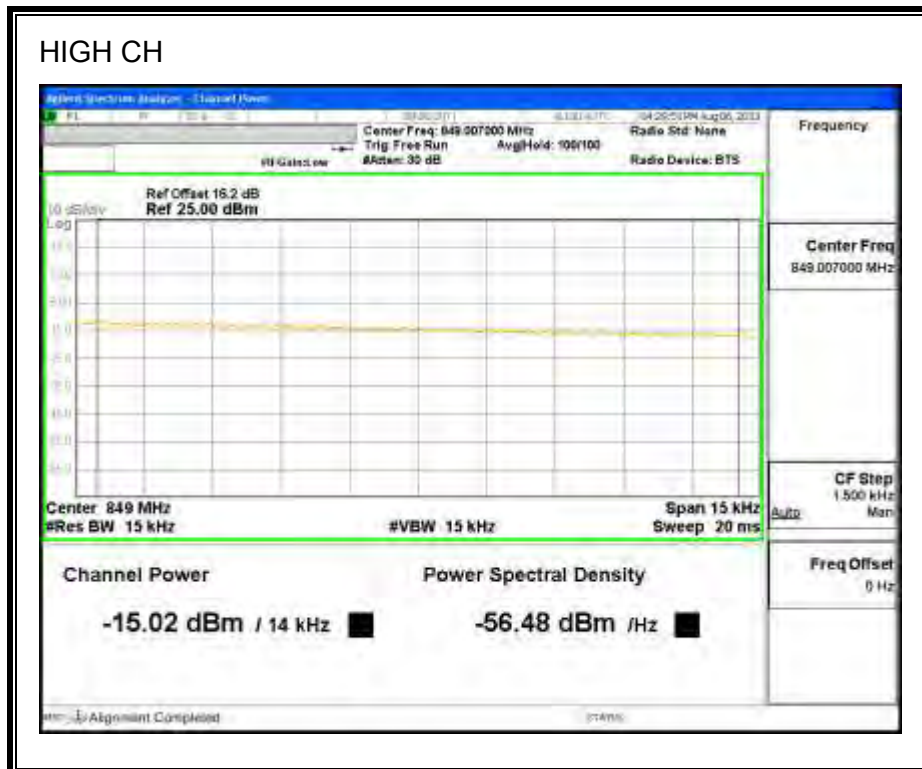
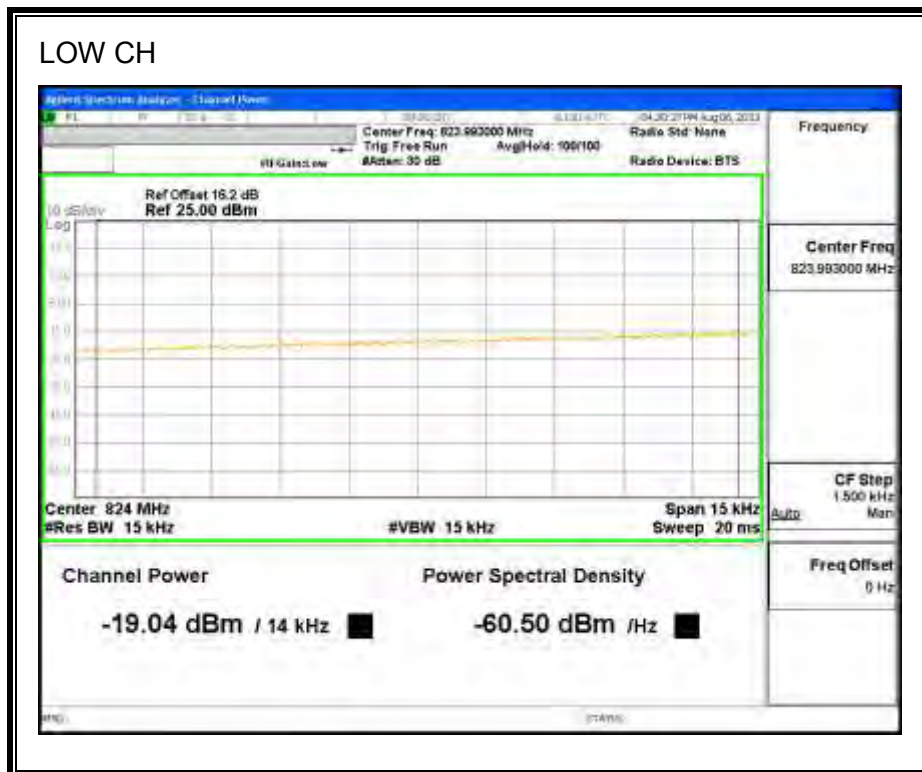
HSDPA (AWS Band)



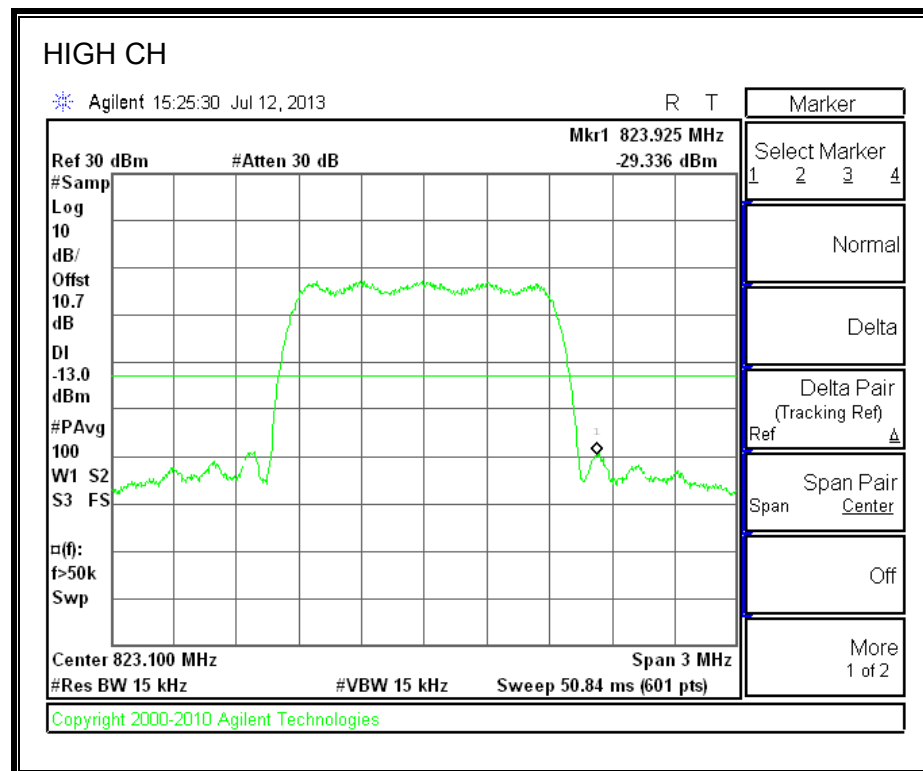
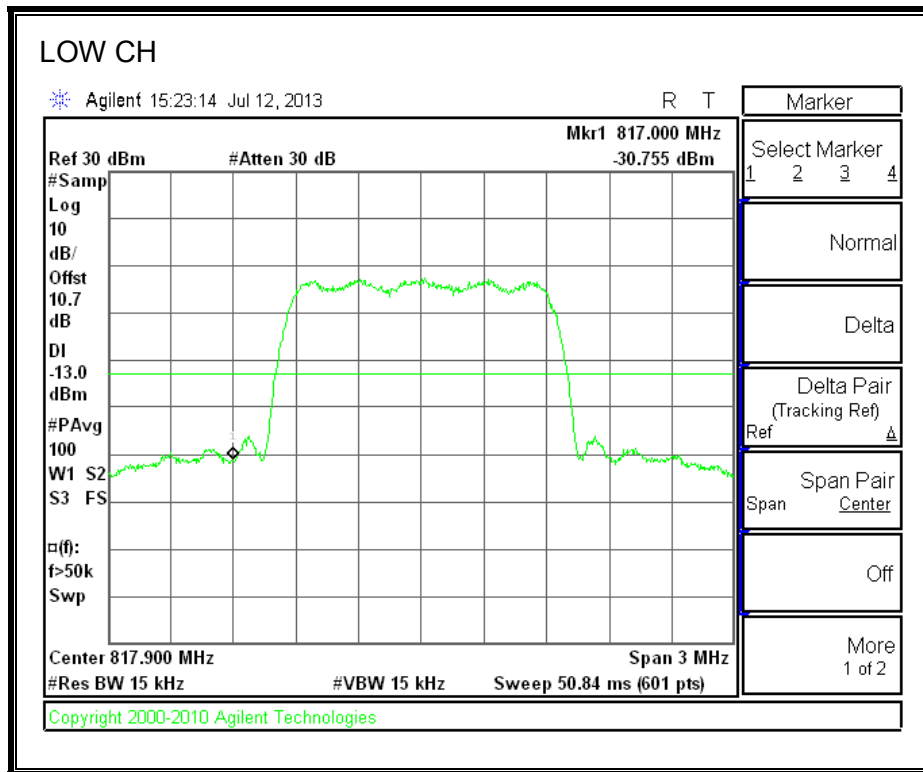
8.2.8. 1xRTT mode BC 0



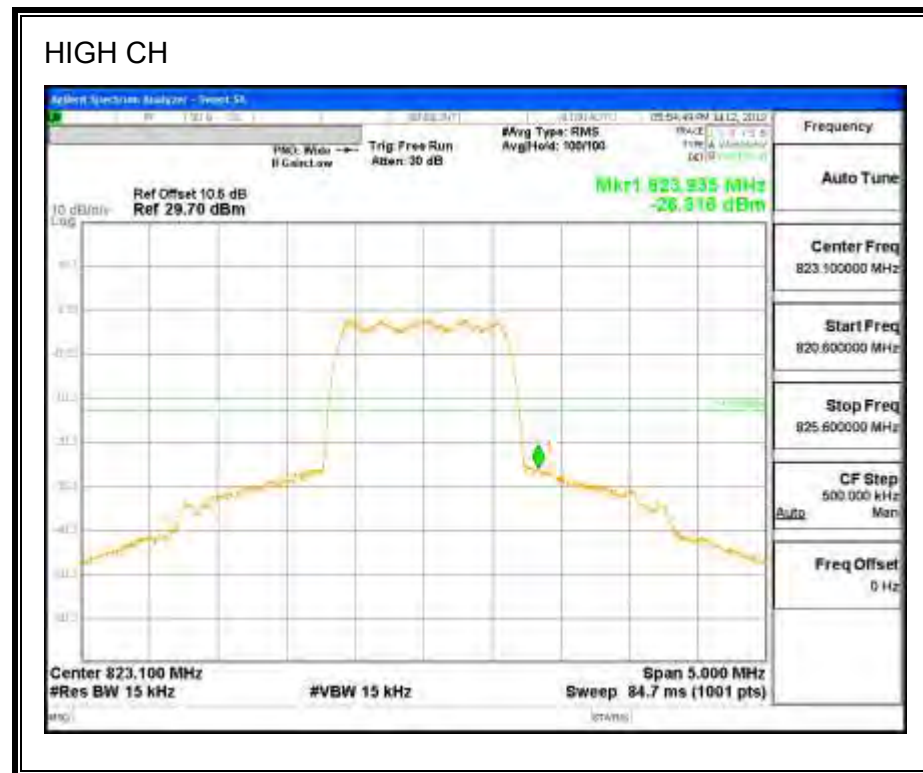
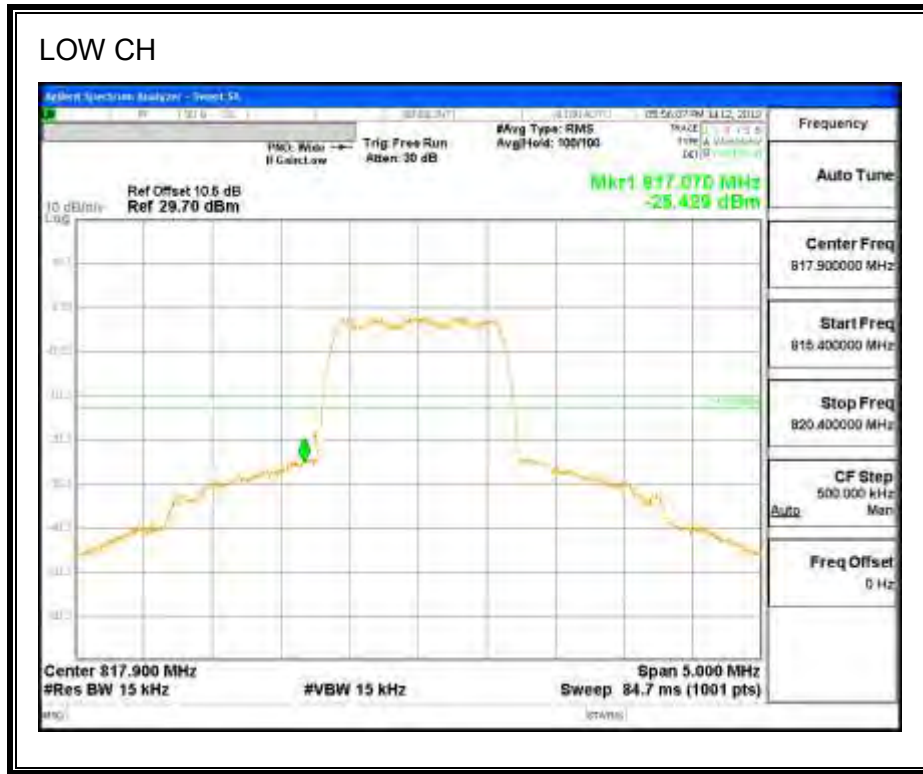
8.2.9. EVDO Rev A, BC 0



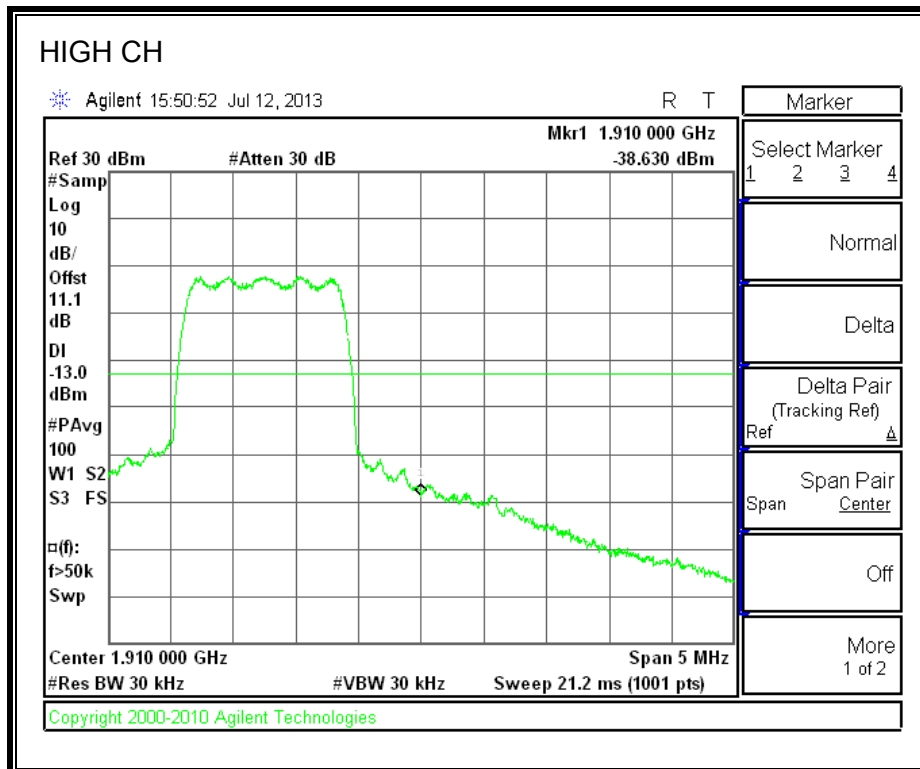
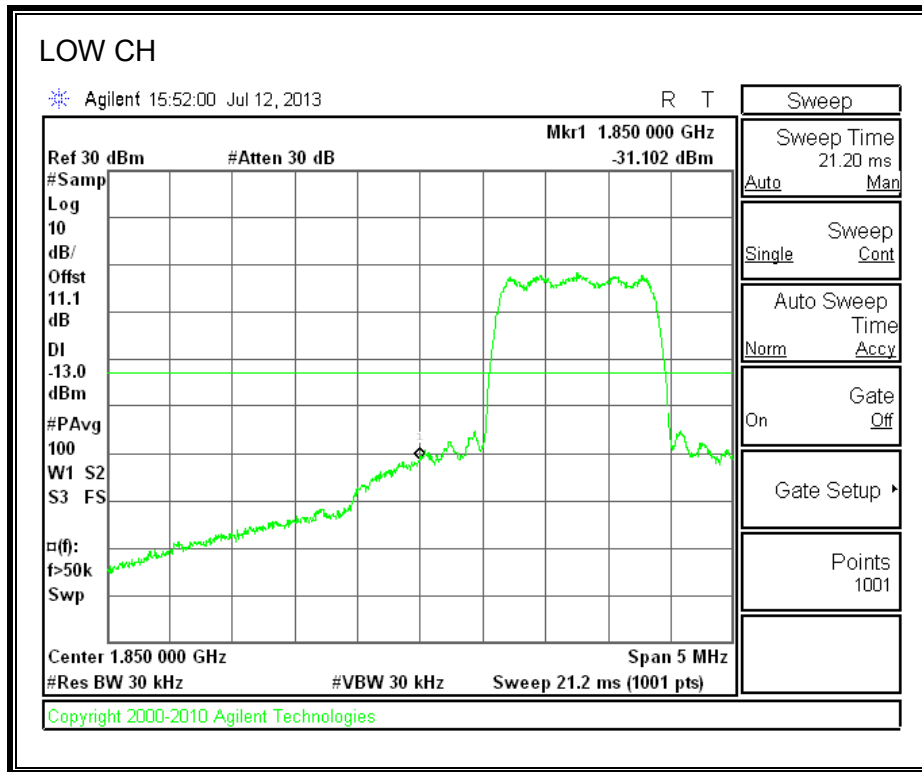
8.2.10. 1xRTT BC 10



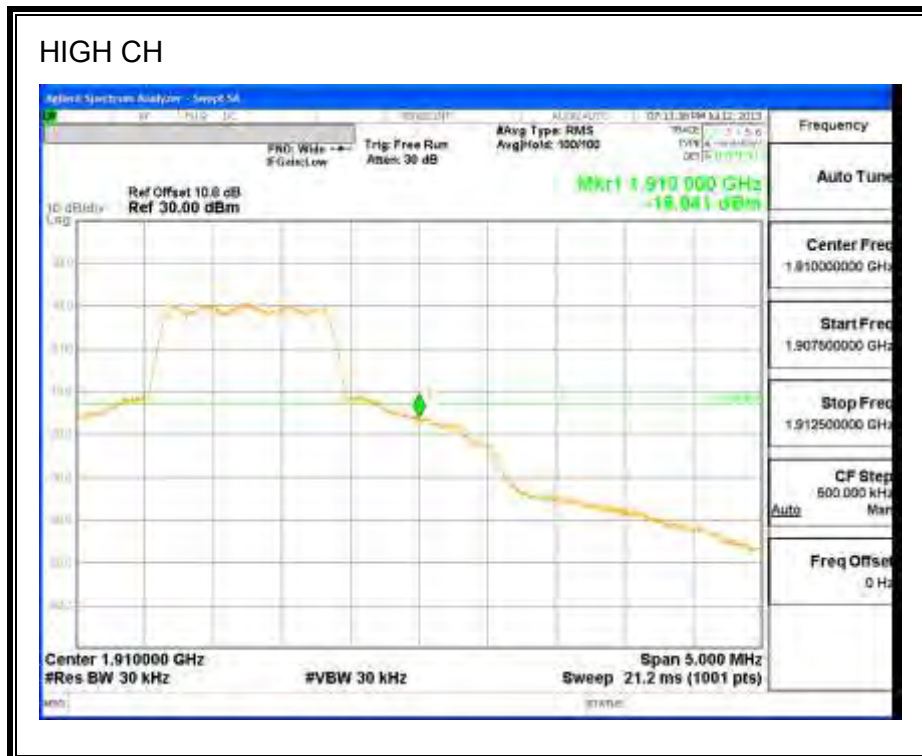
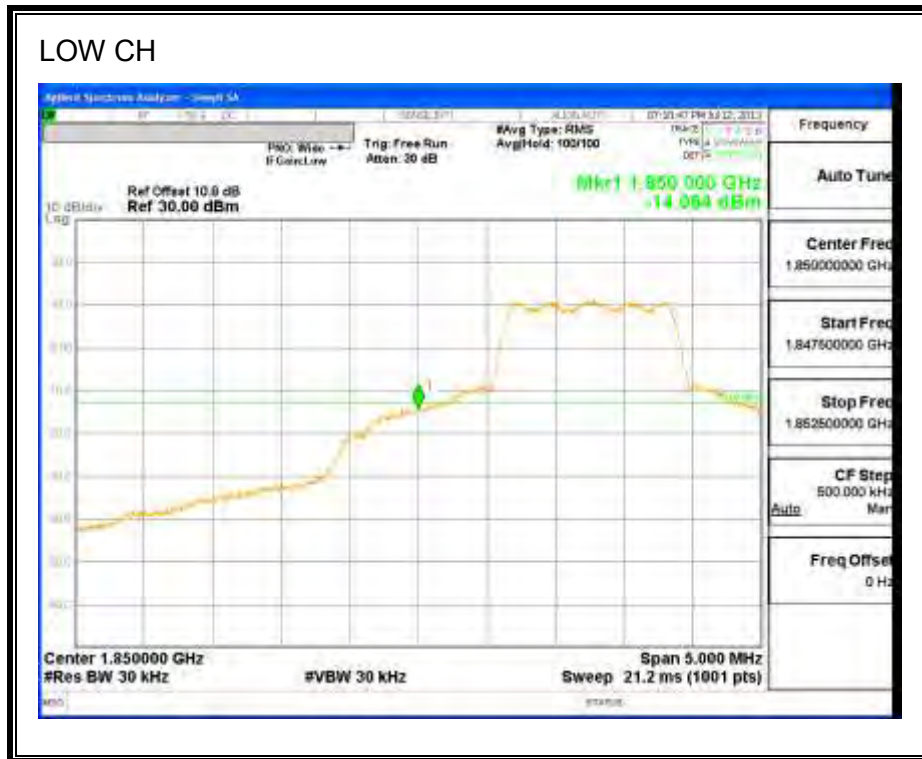
8.2.11. EVDO Rev A, BC 10



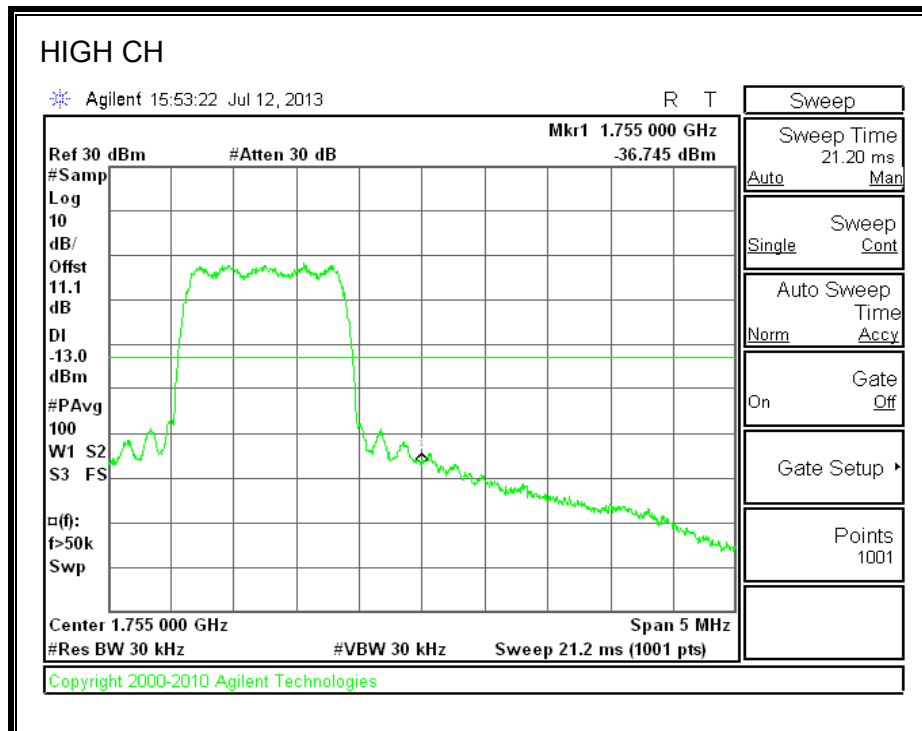
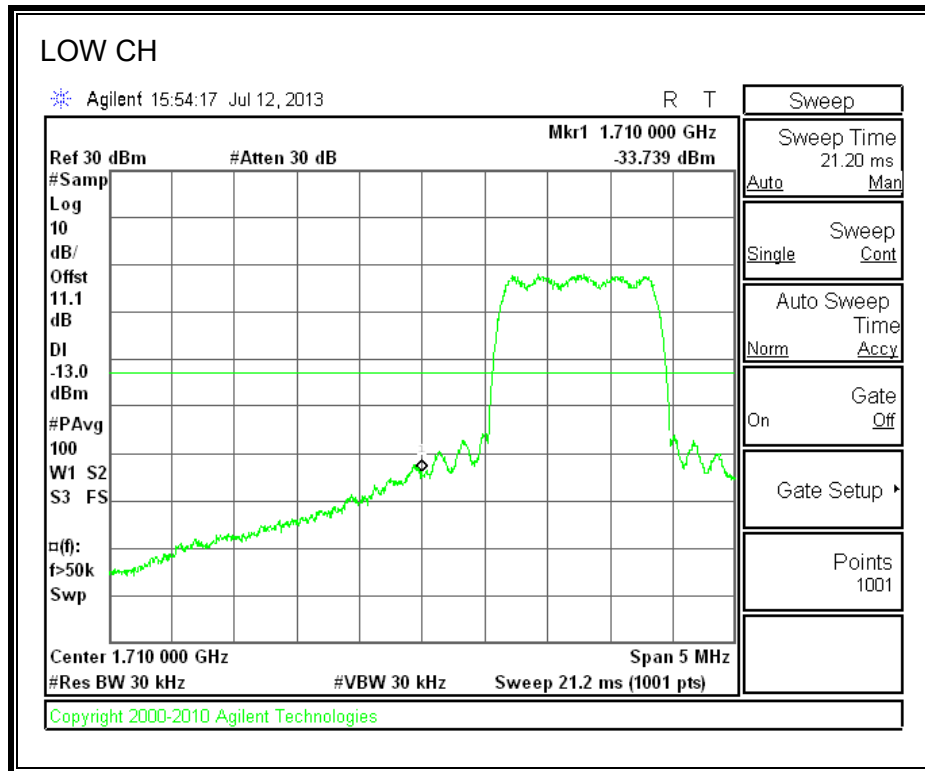
8.2.12. 1xRTT mode BC 1



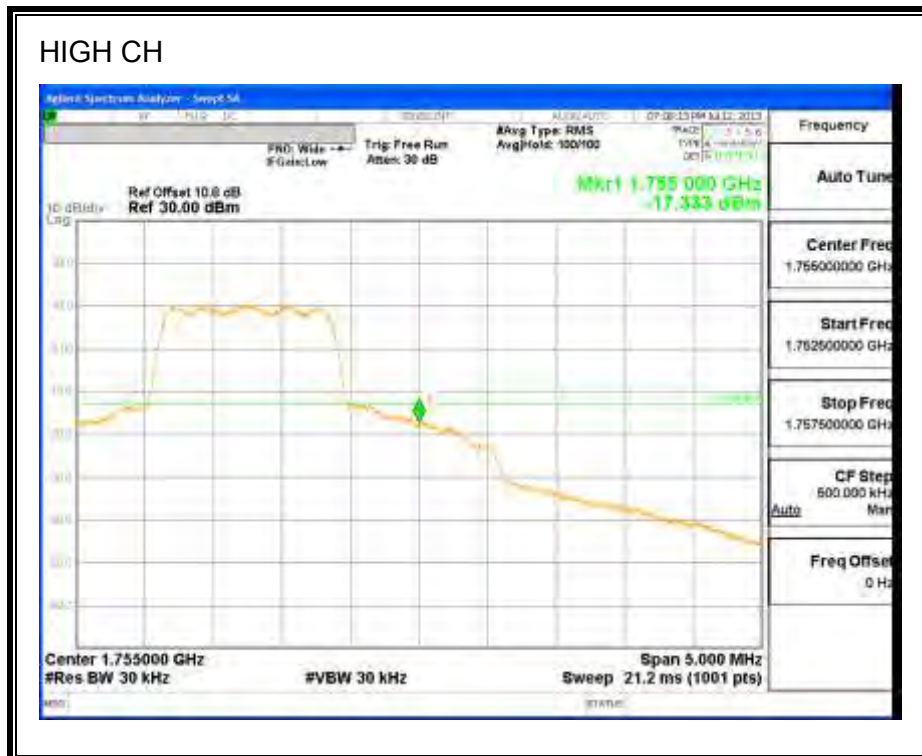
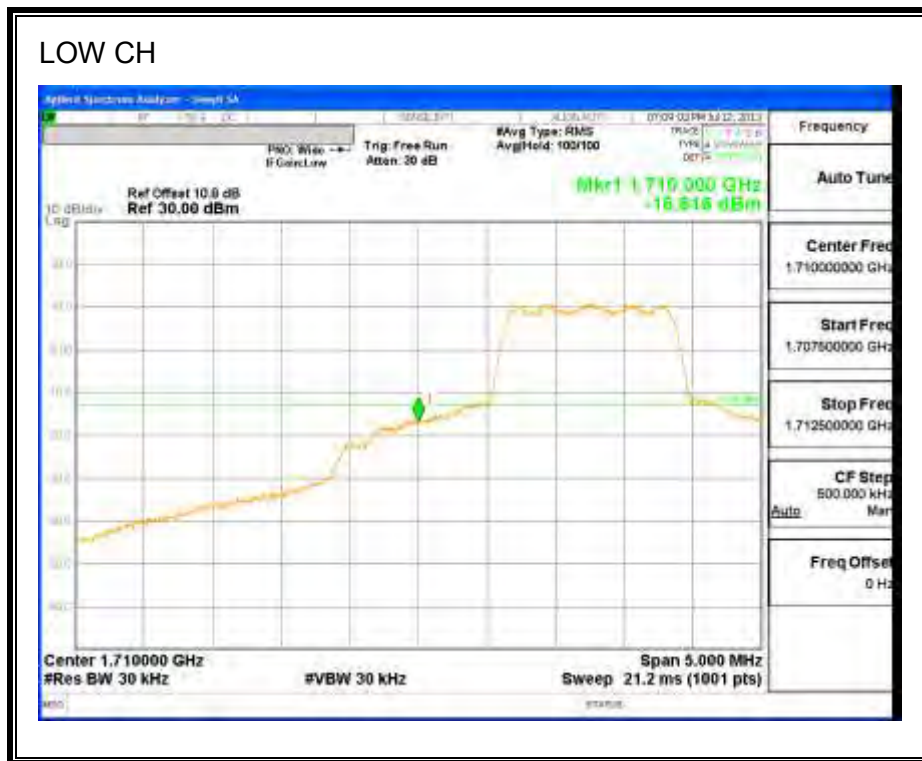
8.2.13. EVDO REV A, BC 1



8.2.14. 1XR TT BC15



8.2.15. EVDO Rev A, BC 15



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

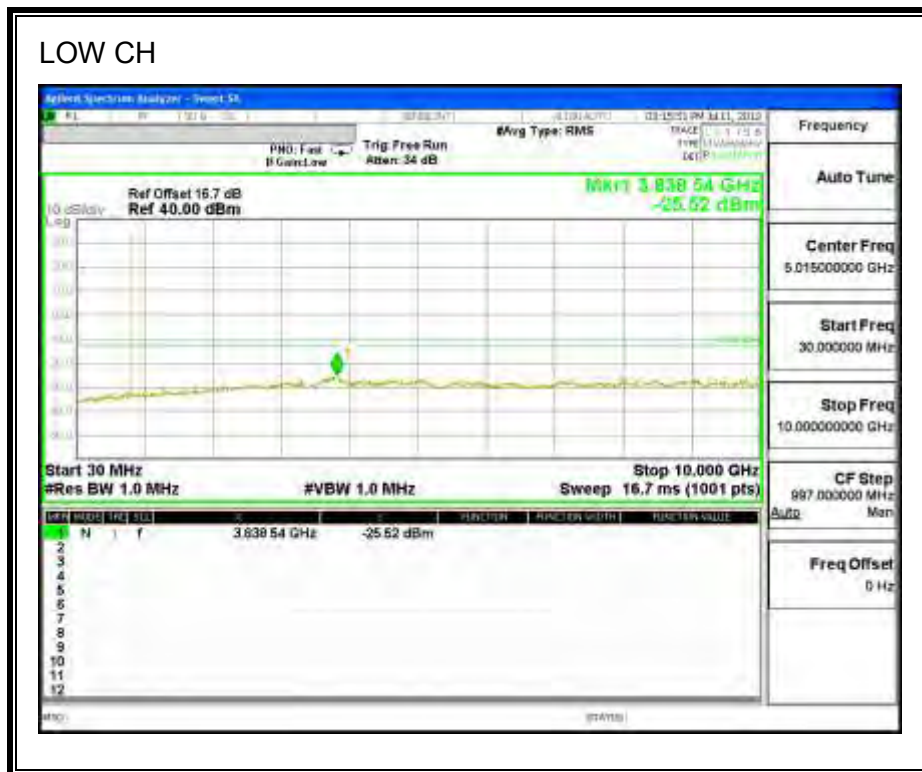
RESULTS

GPRS850



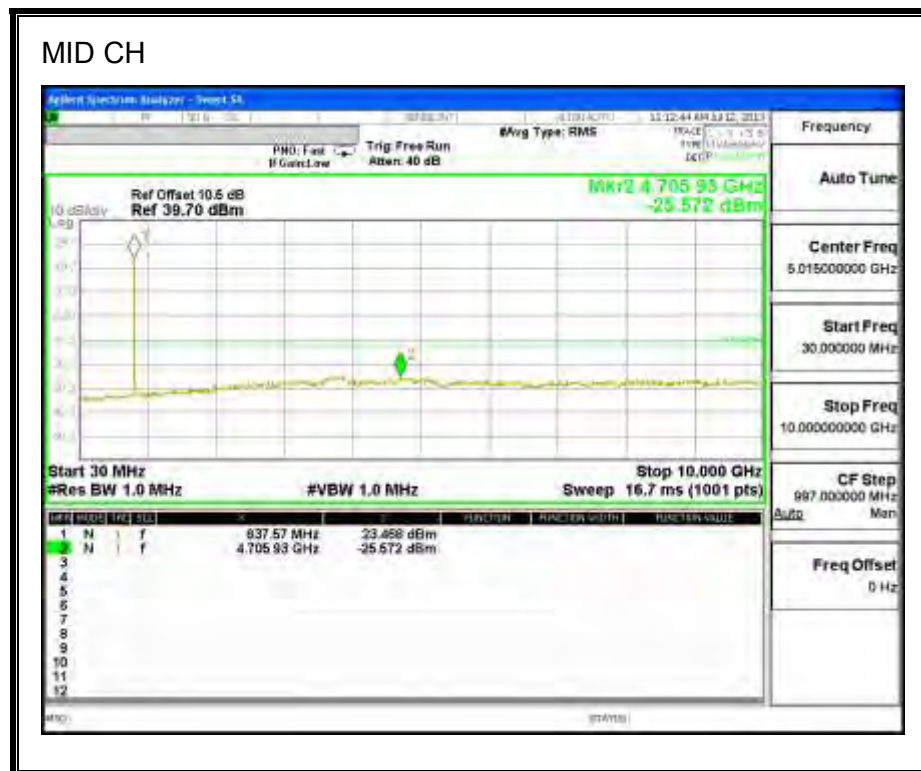
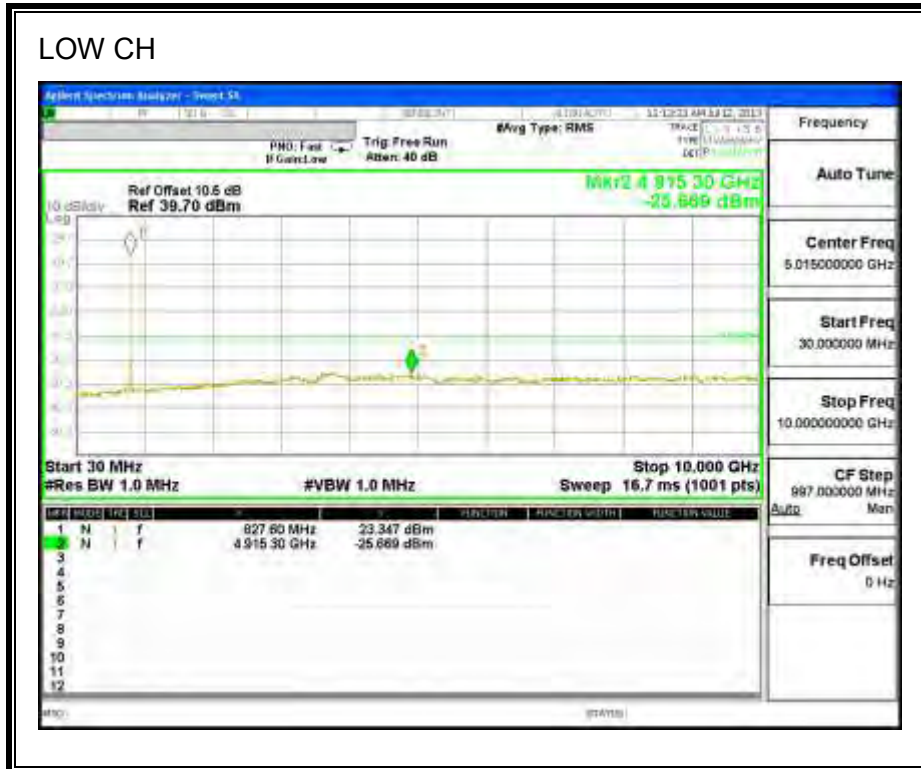


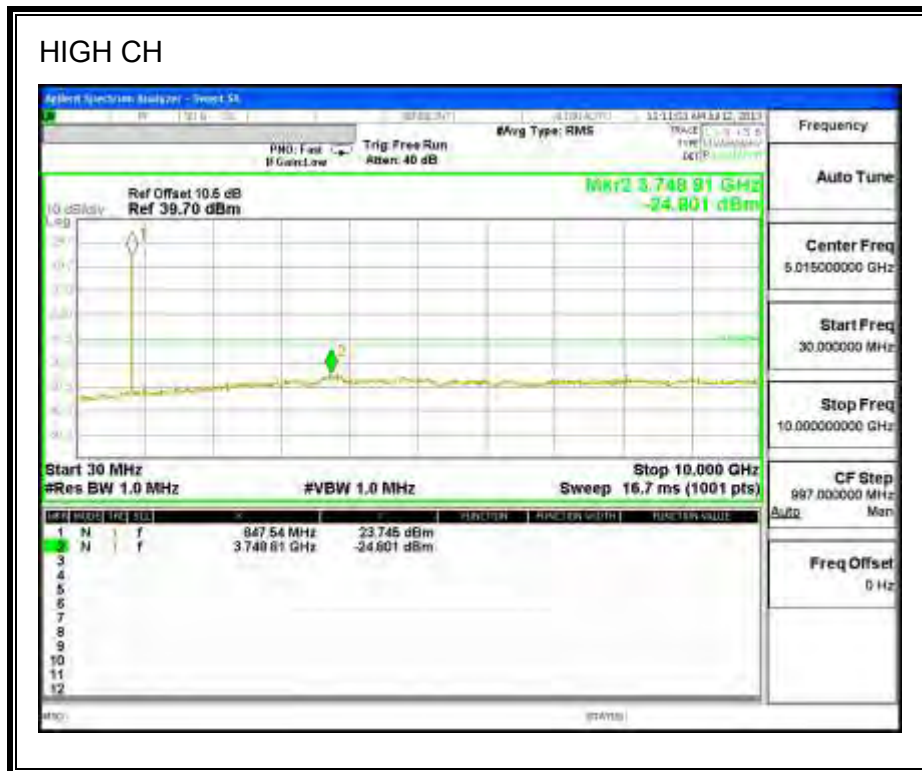
EGPRS850



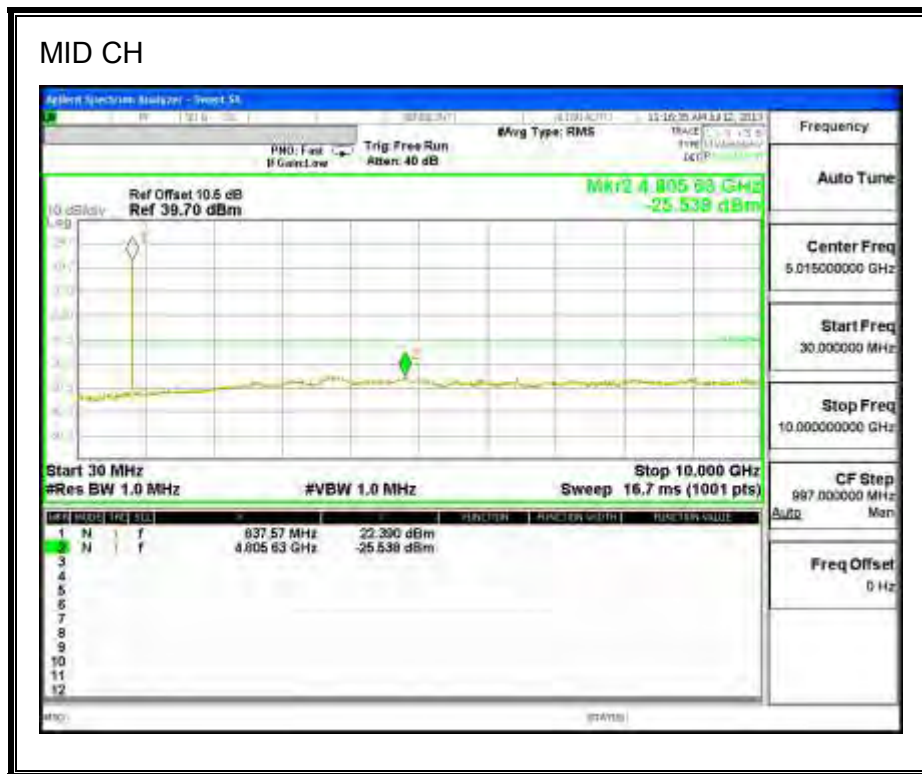
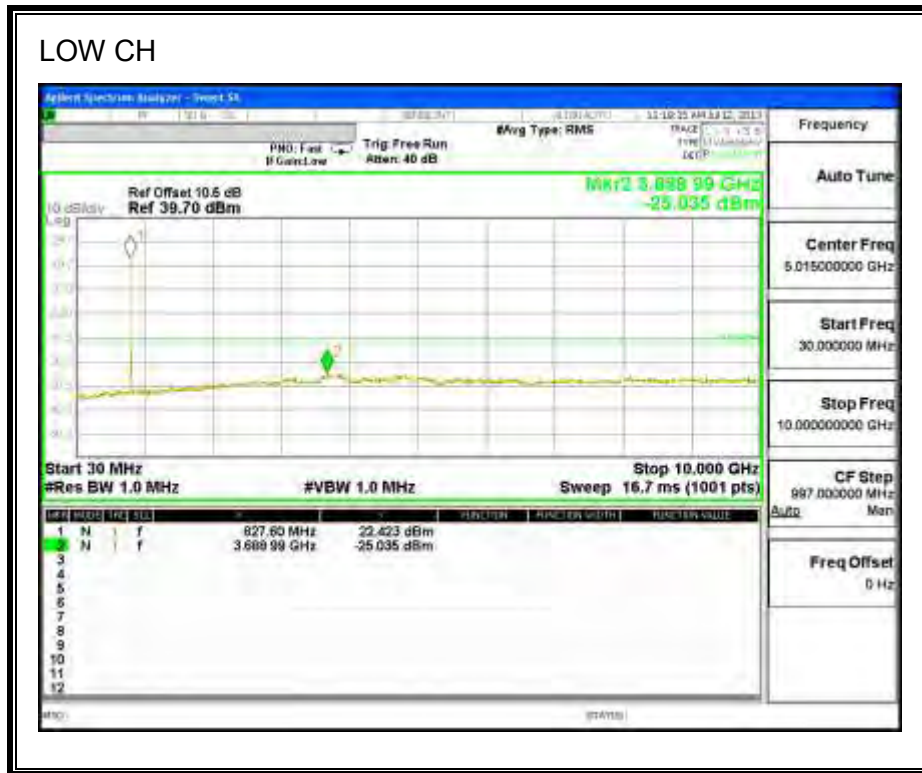


UMTS850, REL 99 (Cell Band)



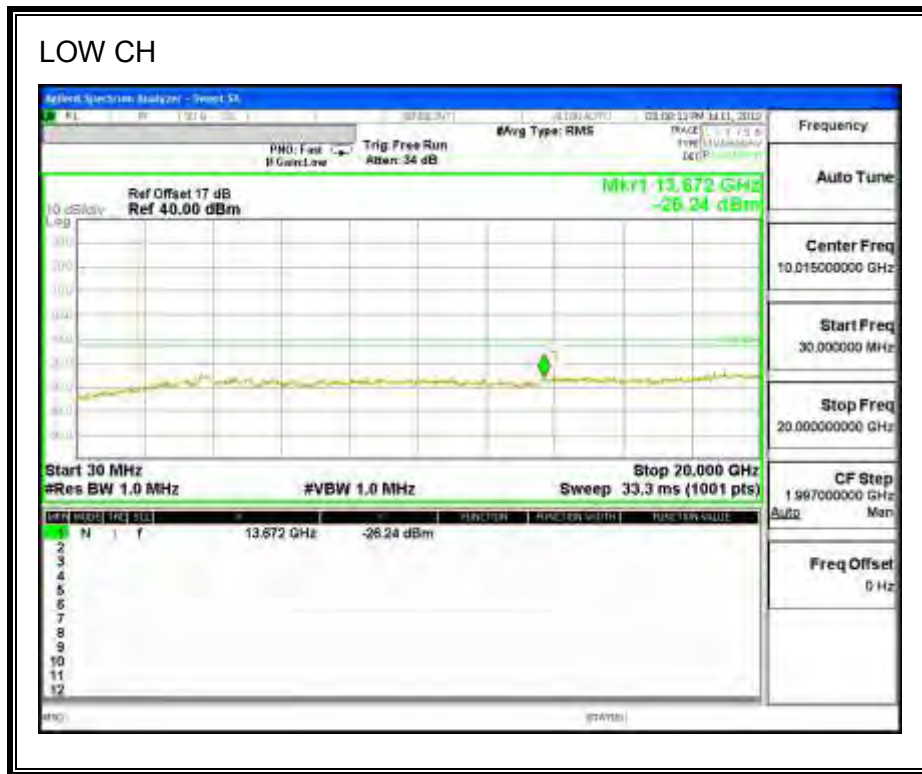


HSDPA (Cell Band)





GPRS1900





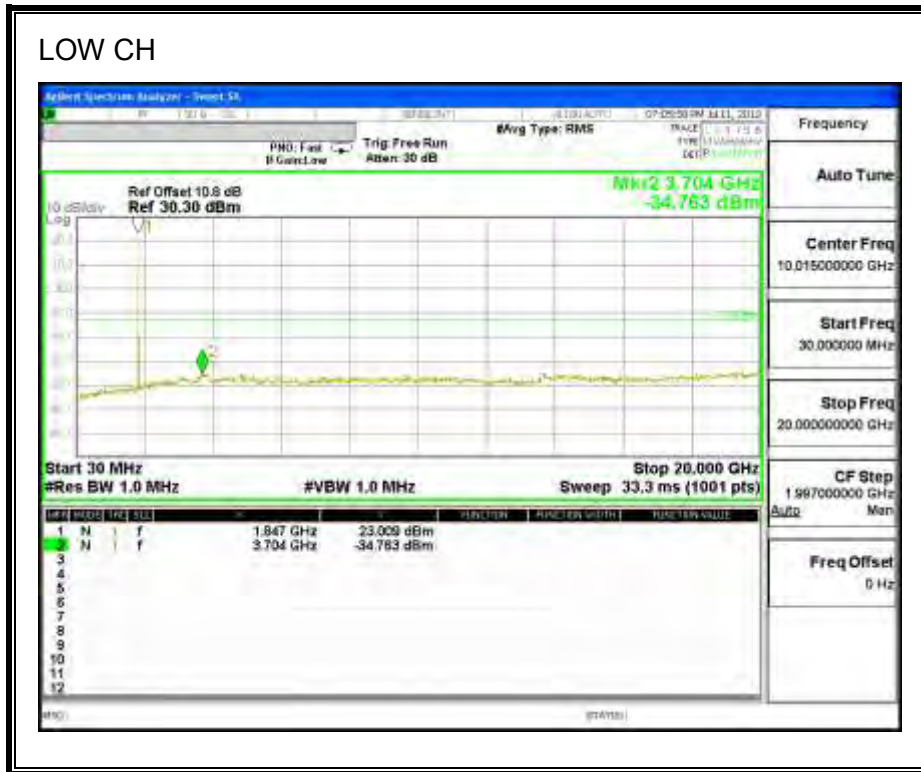
EGPRS1900





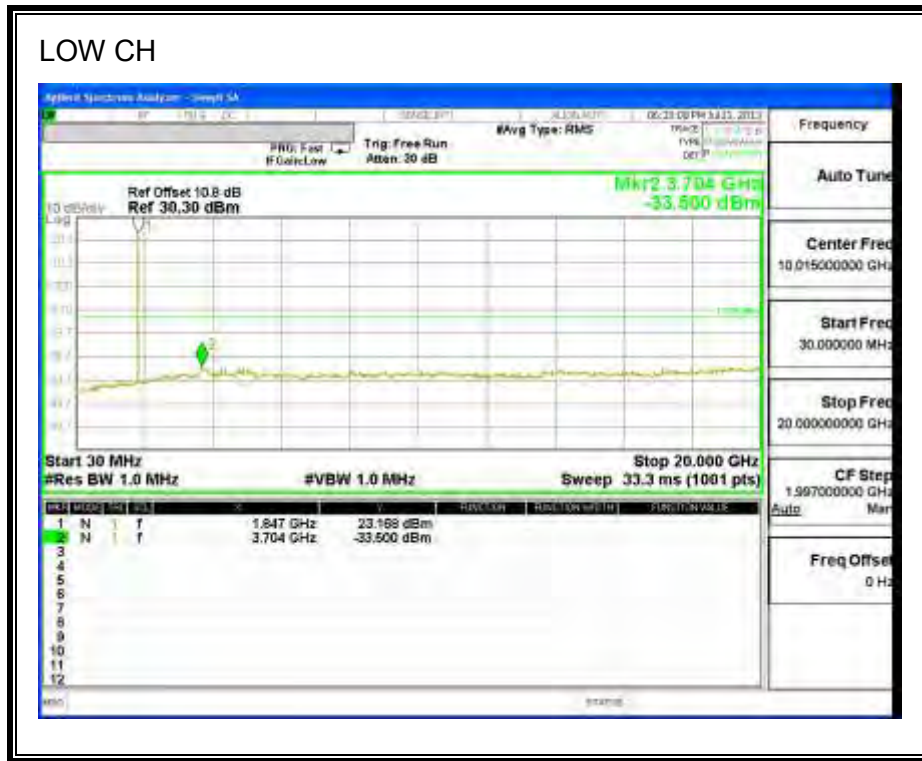
UMTS1900

REL 99 (PCS Band)

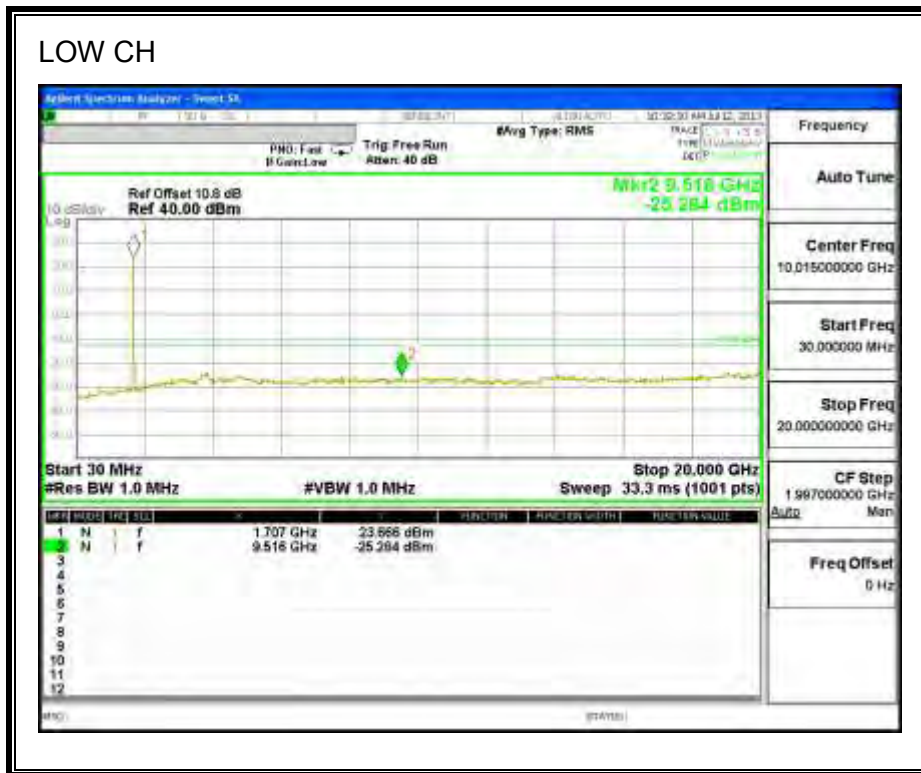




HSDPA (PCS Band)



UMTS1700, REL 99 (AWS Band)



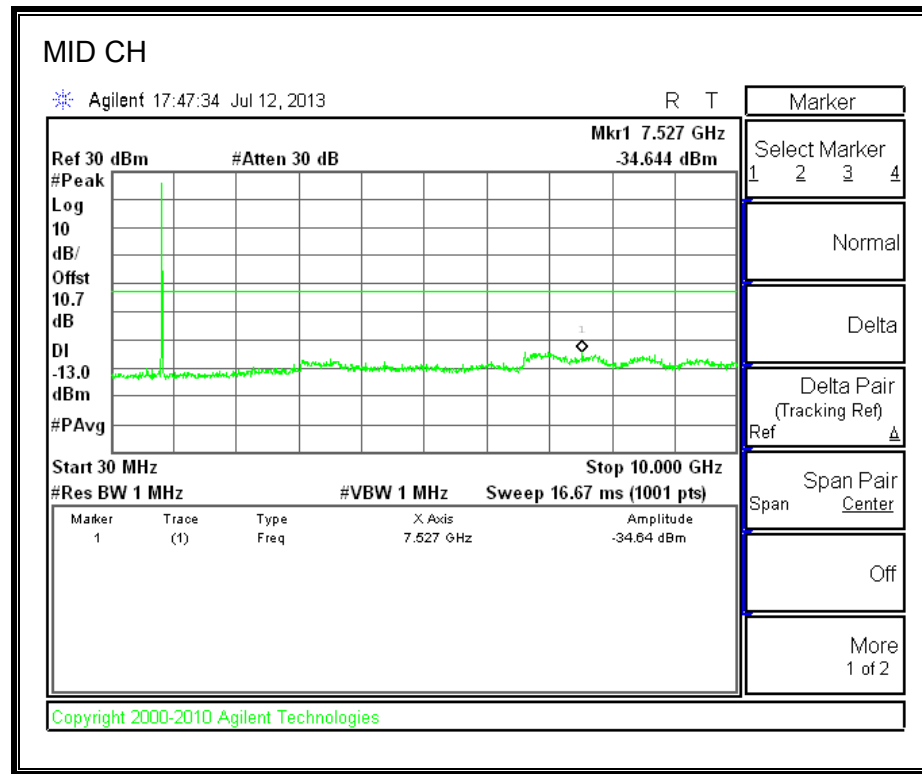
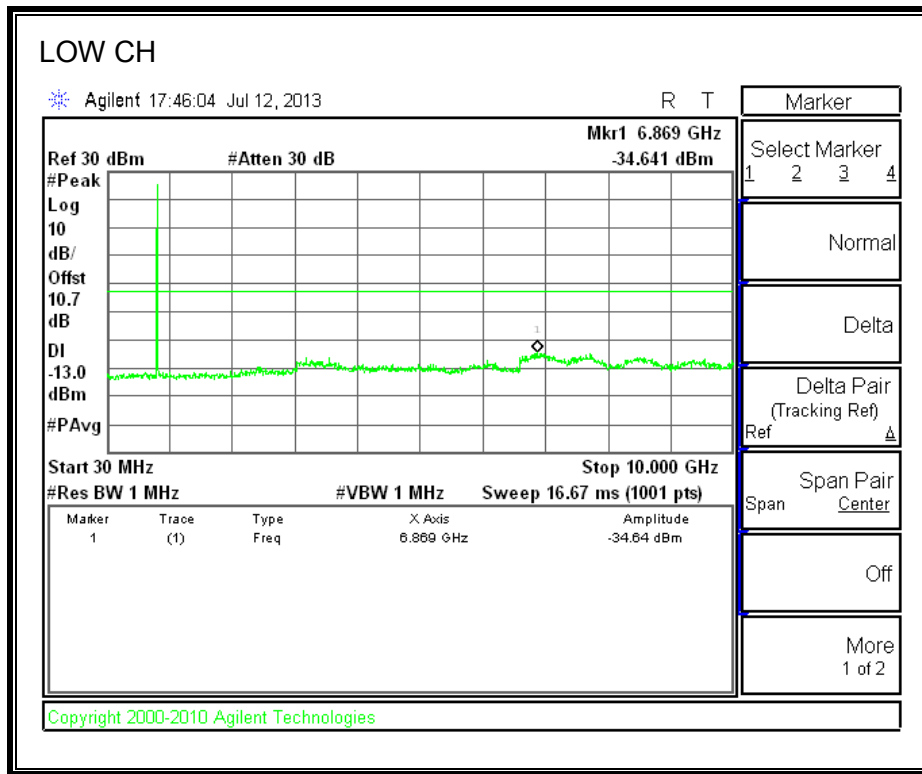


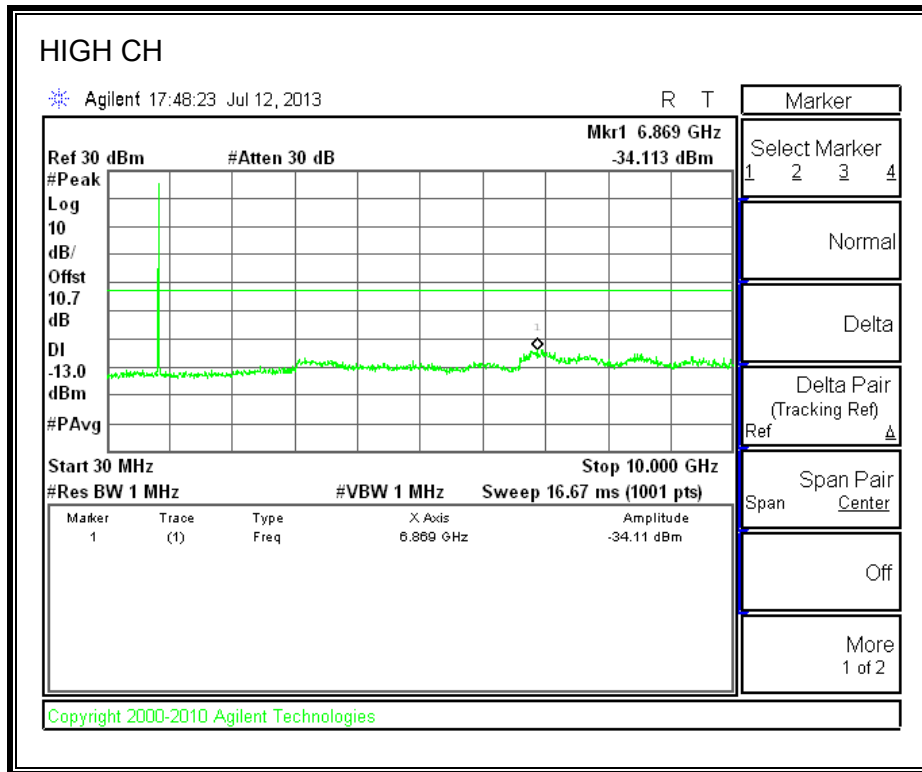
HSDPA (AWS Band)



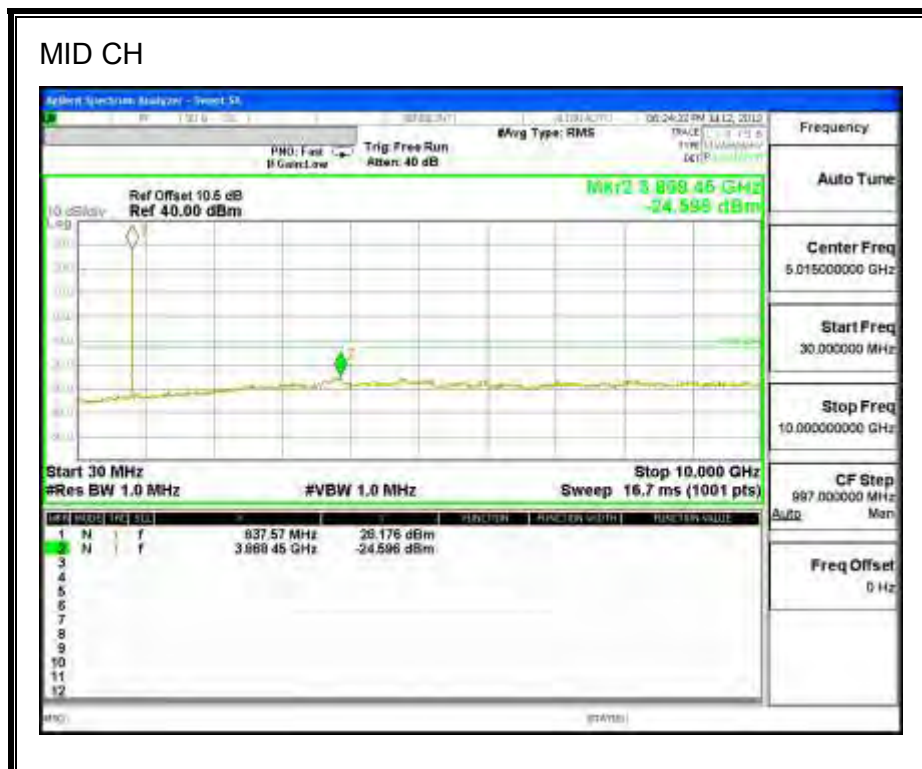
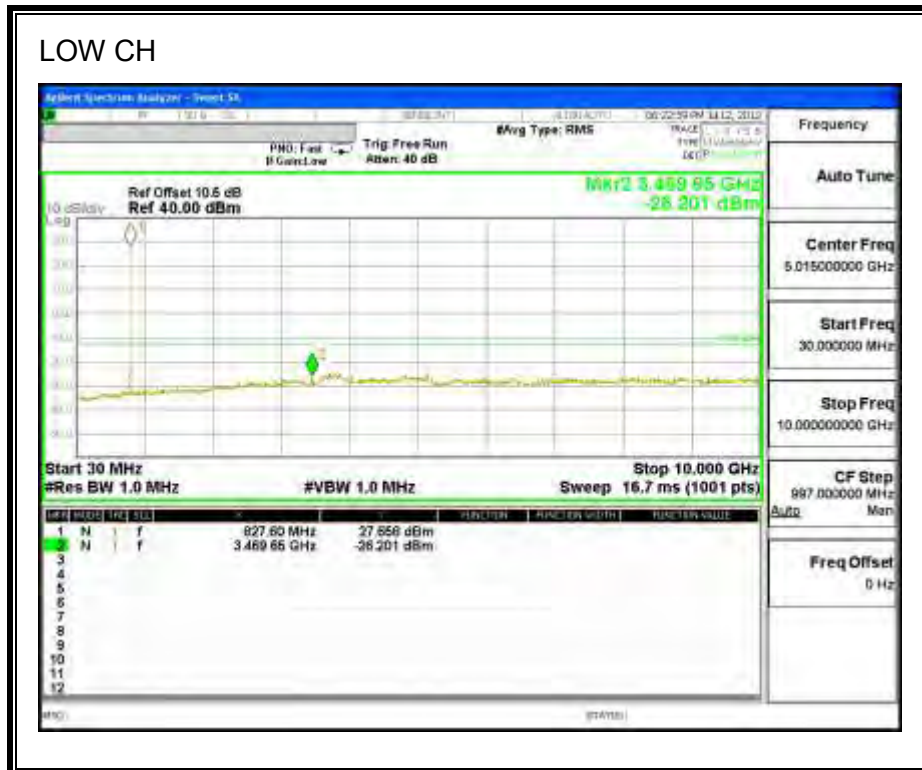


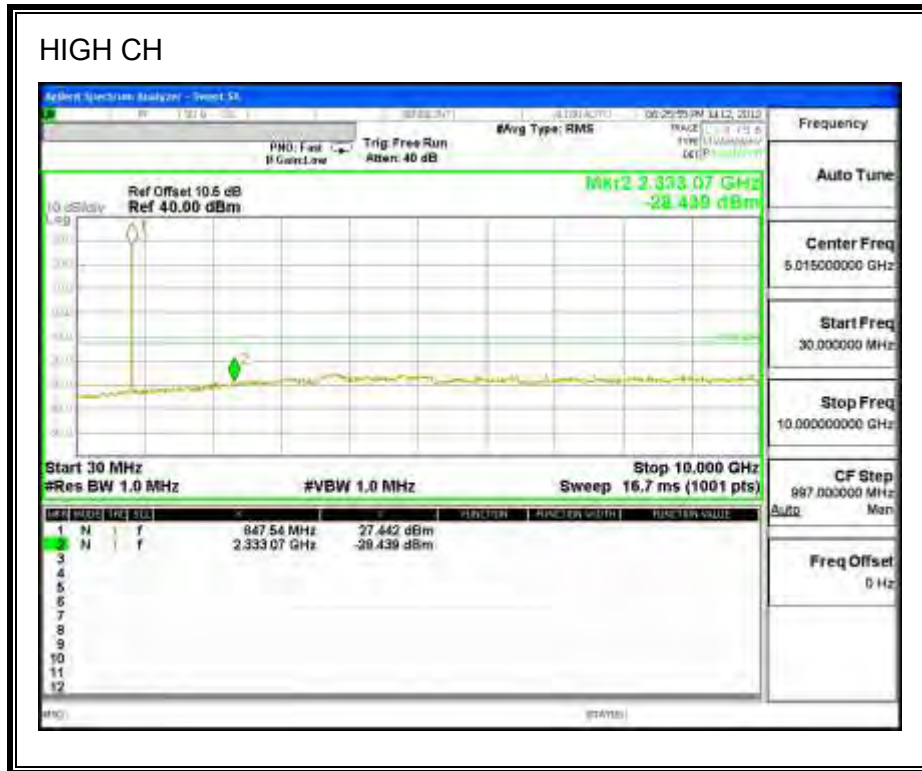
CDMA2000 1xRTT, BC 0



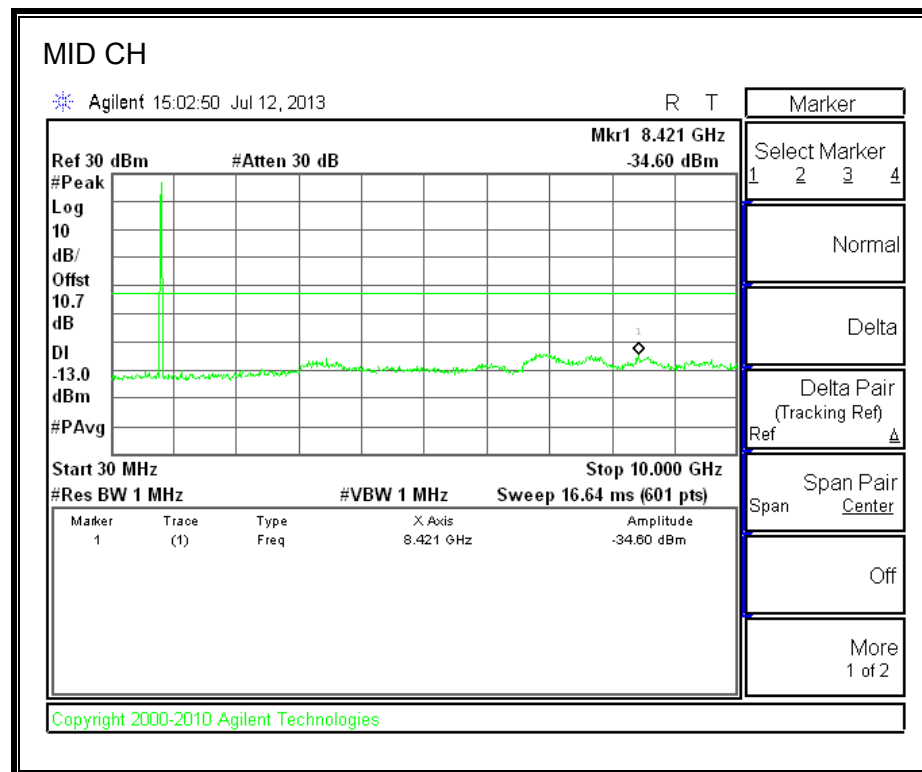
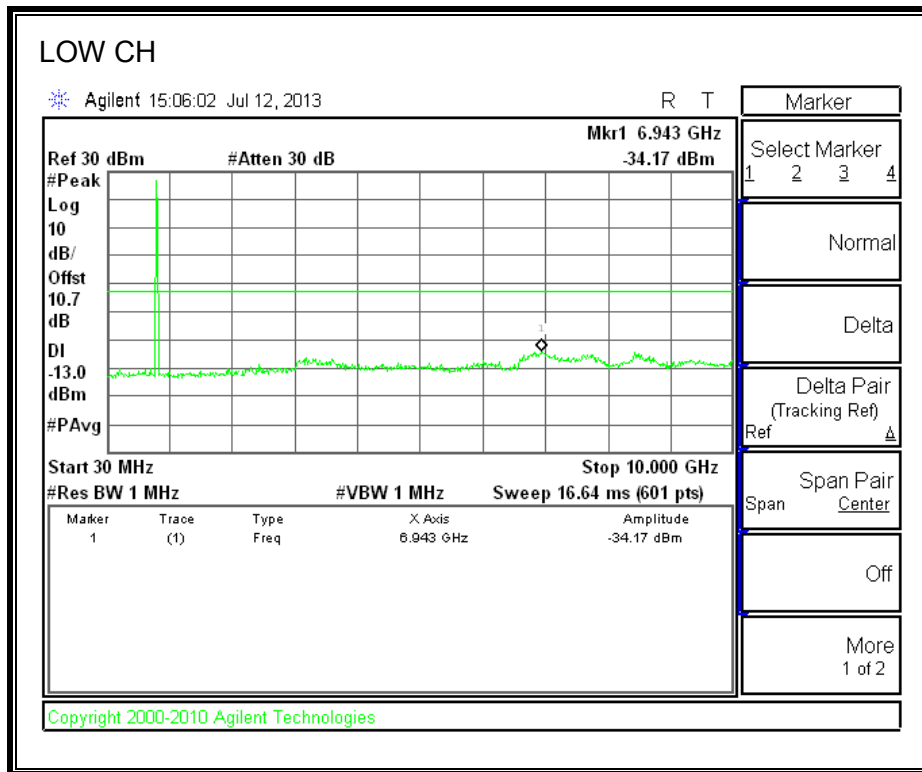


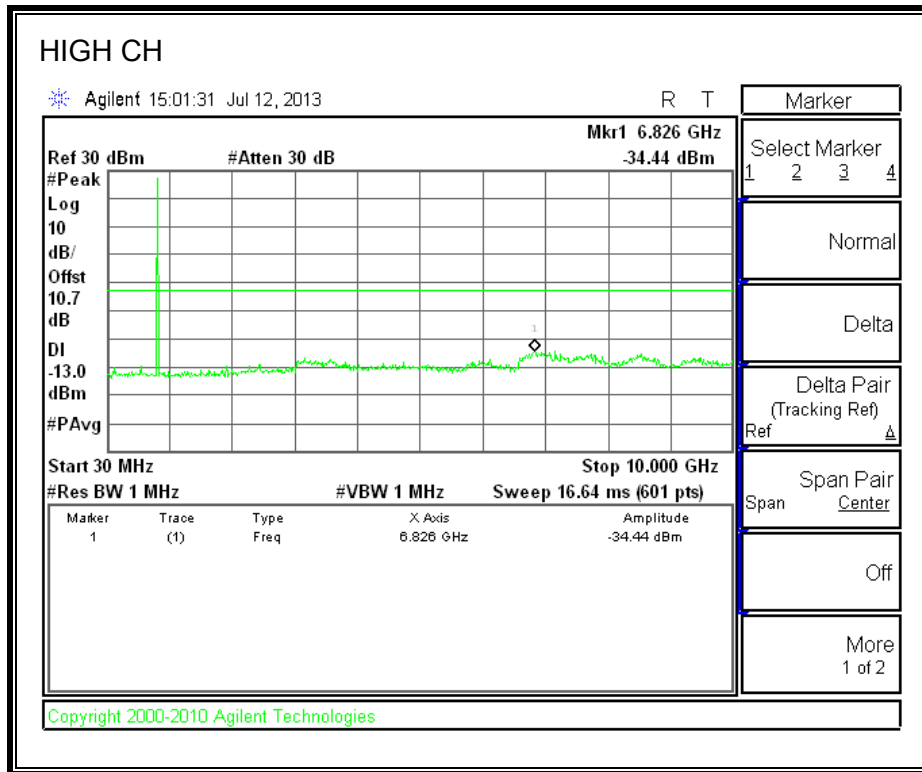
EVDO Rev A, BC 0



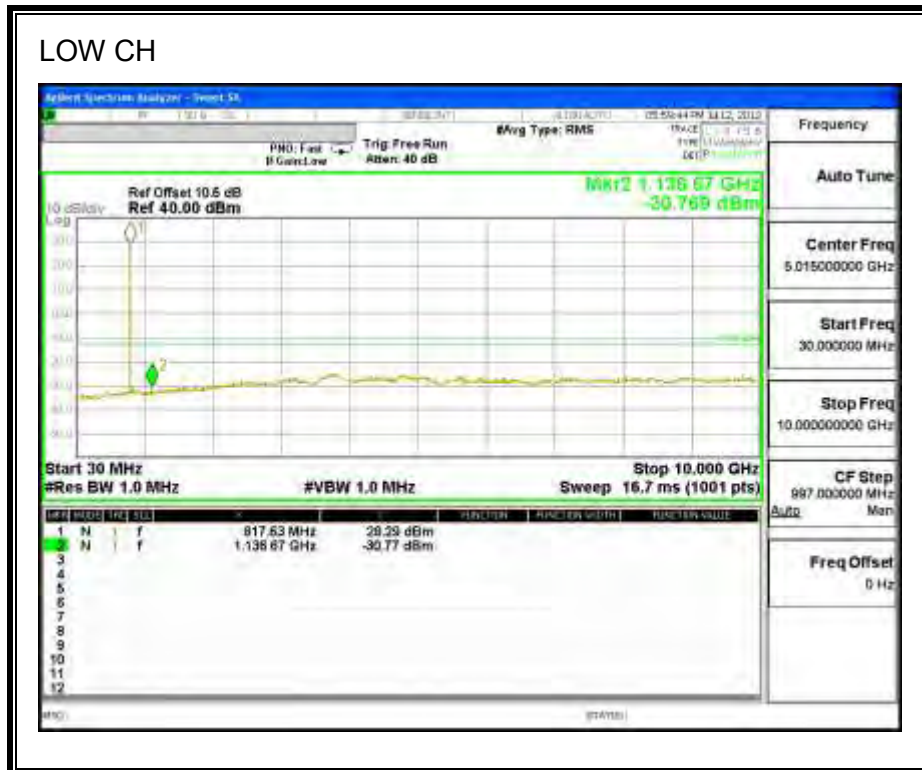


CDMA2000, 1xRTT, BC 10



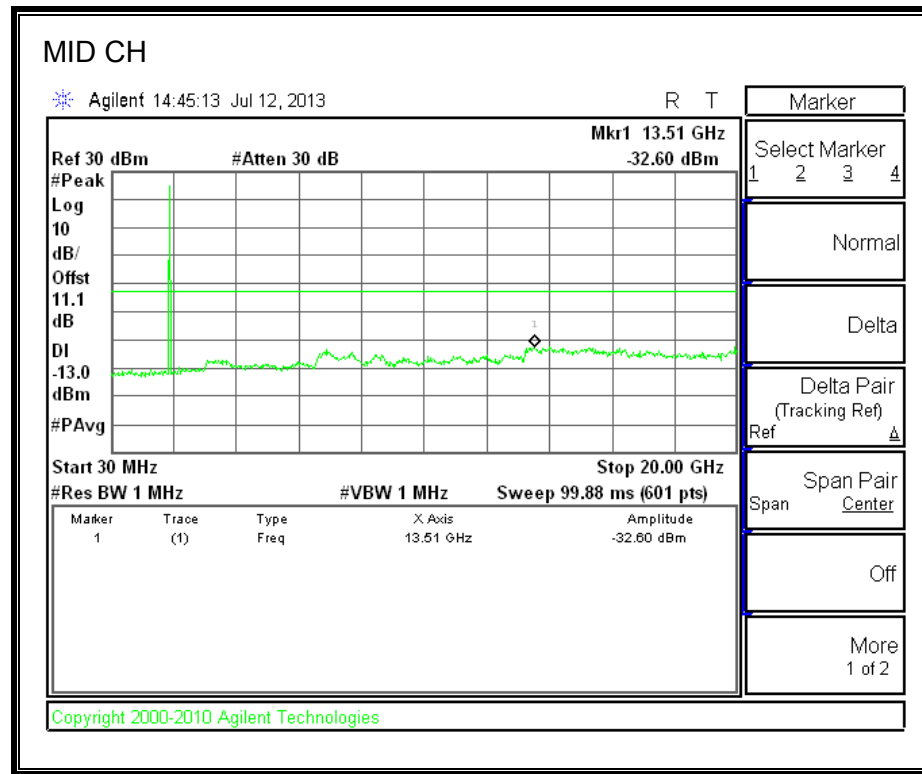
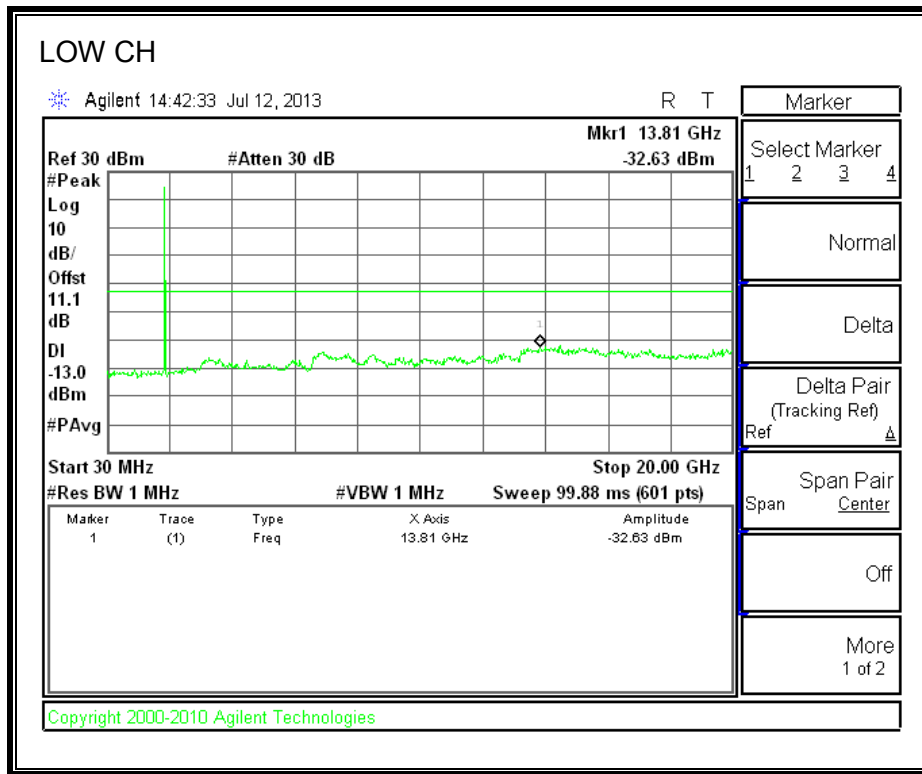


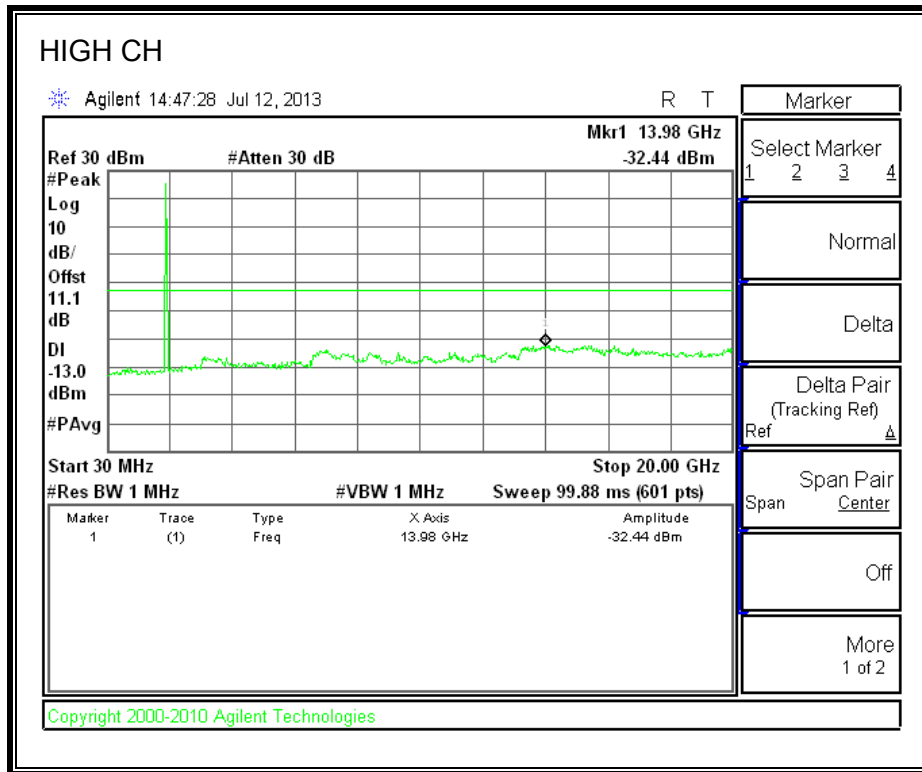
EVDO Rev A, BC 10



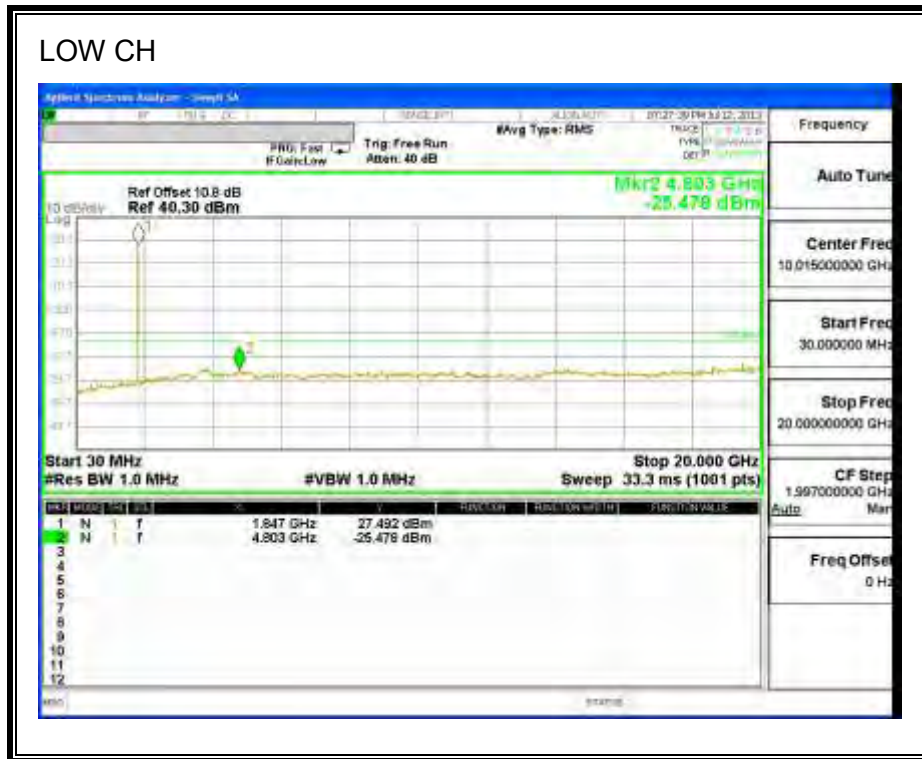


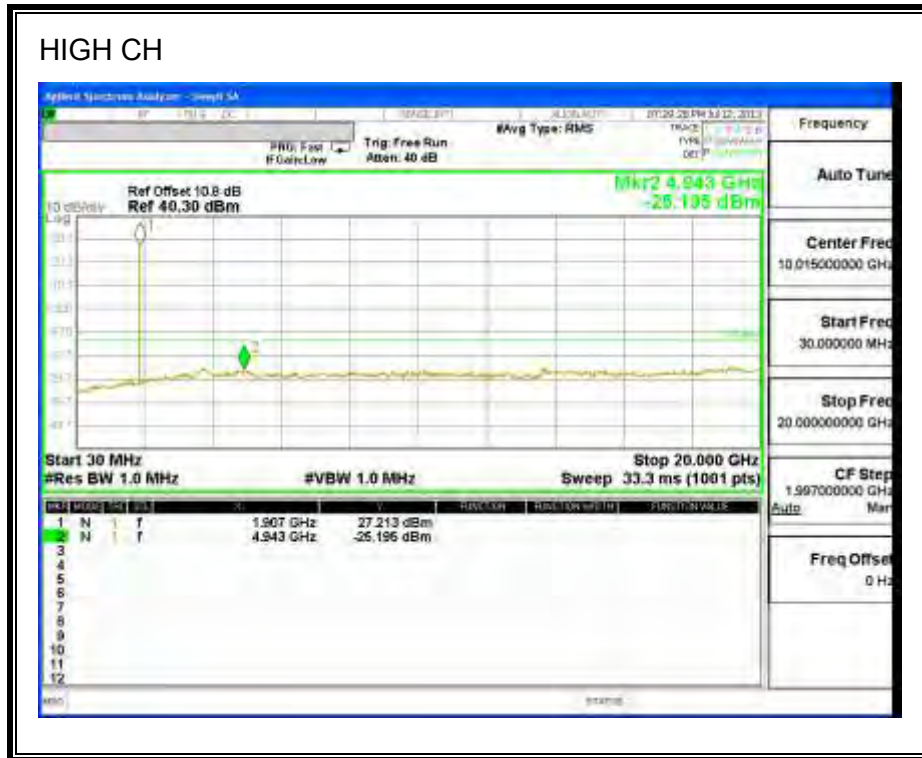
CDMA2000, 1xRTT, BC 1



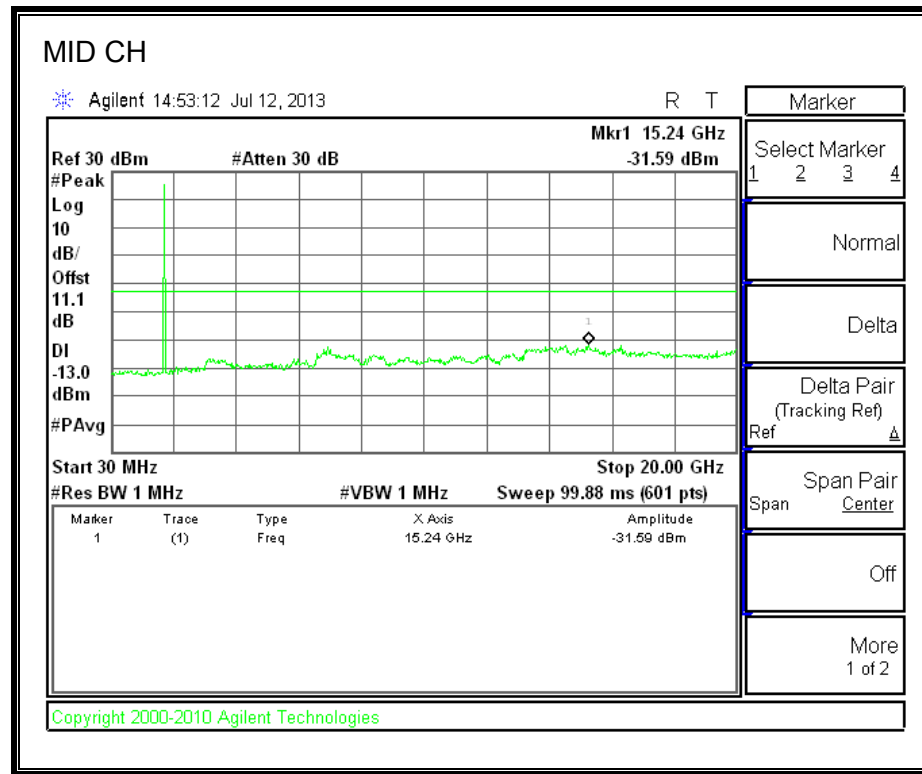
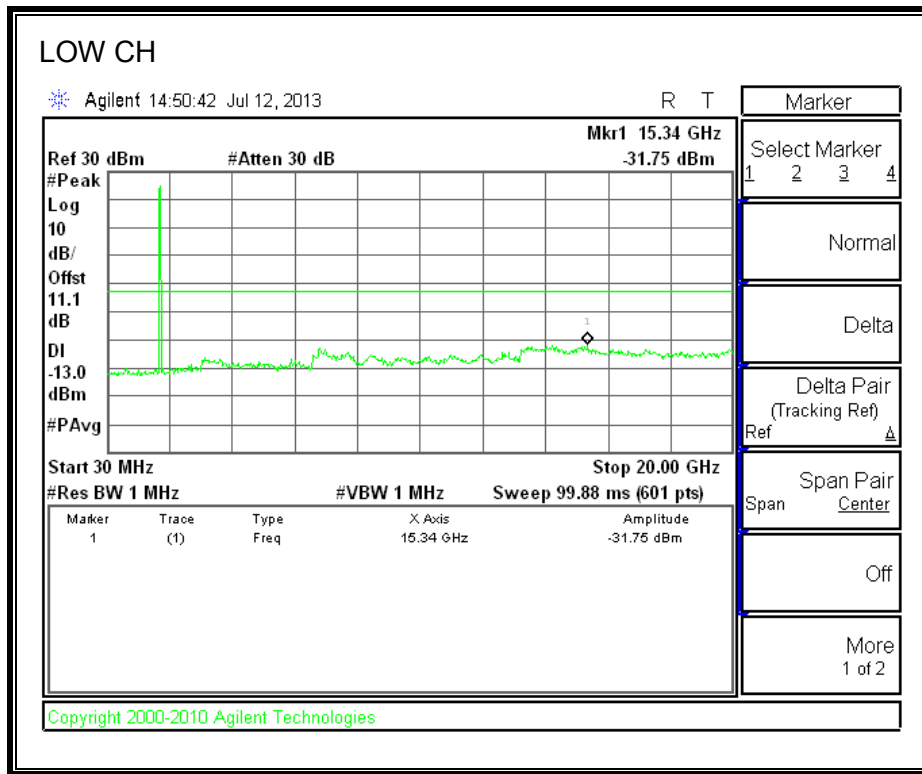


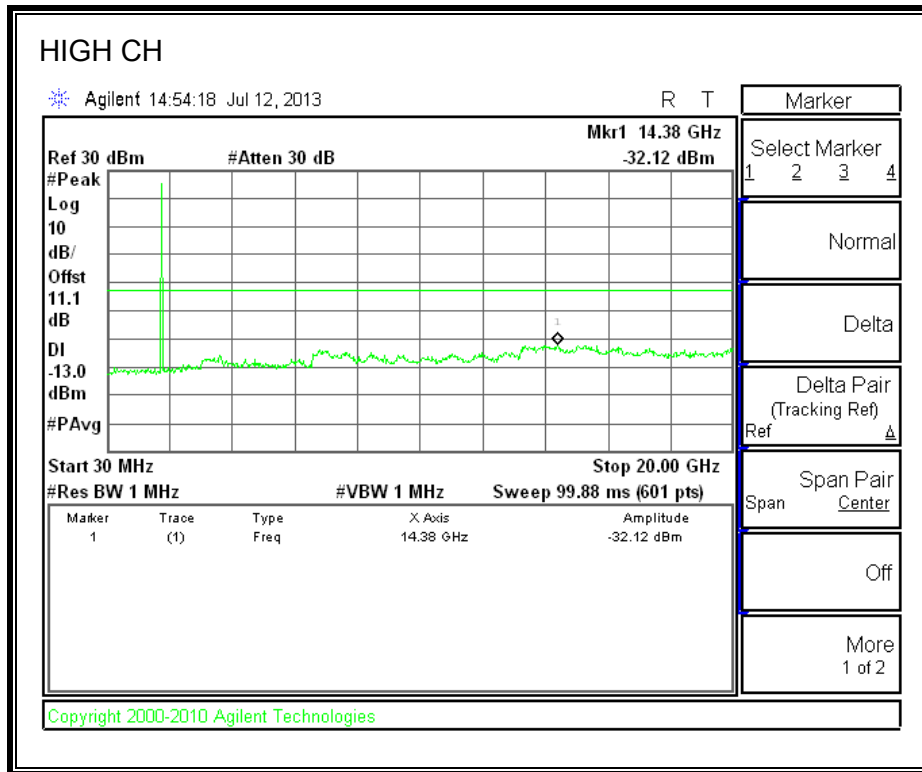
EVDO Rev A, BC 1



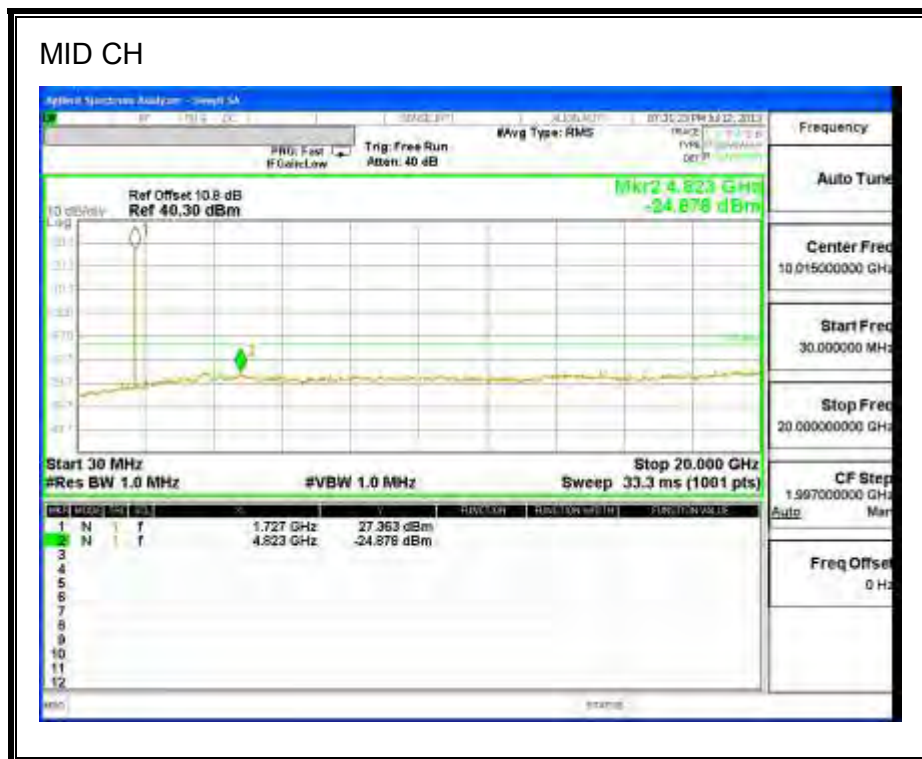
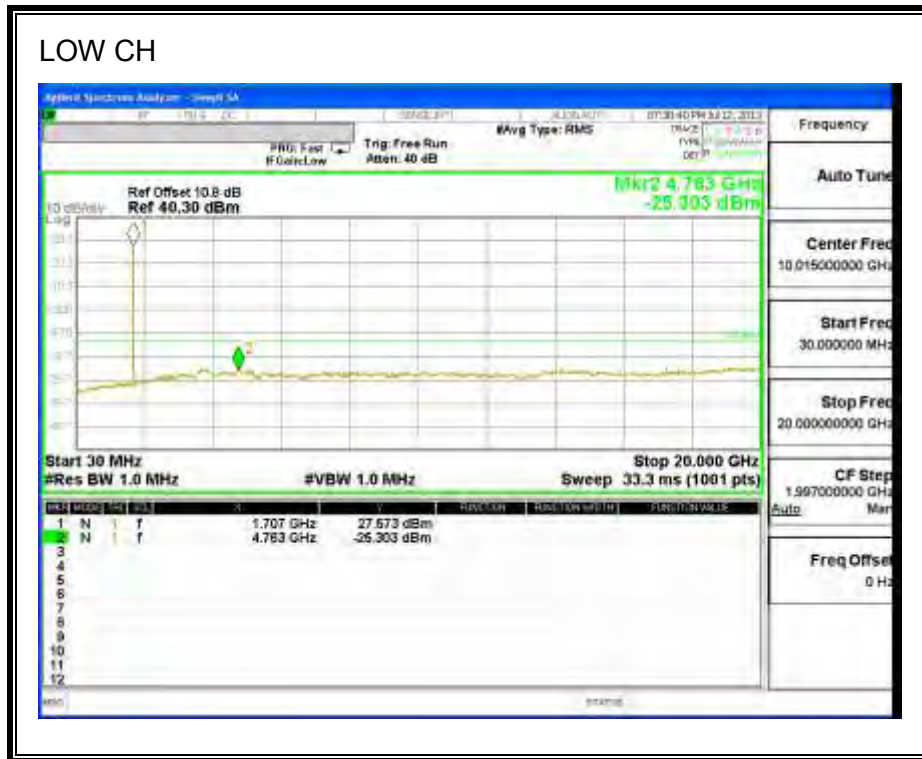


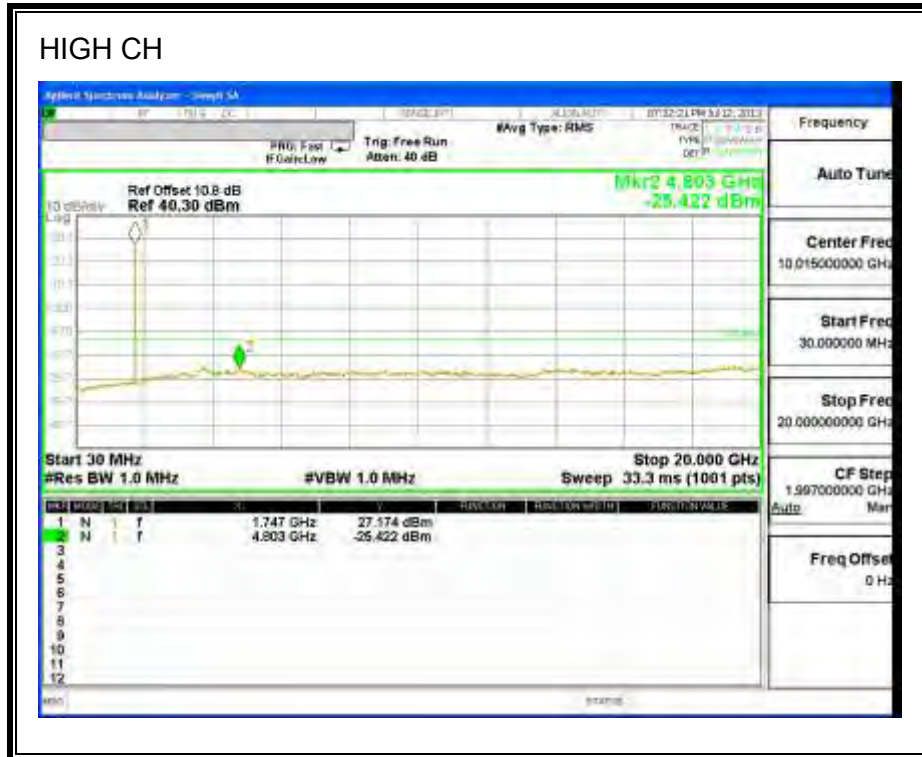
CDMA2000, 1xRTT, BC 15





EVDO Rev A, BC 15





9. 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 $+50^{\circ}\text{C}$
- Voltage = (85% - 115%)

Frequency Stability vs Temperature:

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

Frequency Stability vs Voltage:

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

MODES TESTED

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

RESULTS

CELL, GPRS MODULATION – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.599964 MHz @ 20°C				
Limit: to stay +/- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.599926	0.045	2.5
3.80	40	836.599927	0.044	2.5
3.80	30	836.599930	0.041	2.5
3.80	20	836.599964	0	2.5
3.80	10	836.599933	0.037	2.5
3.80	0	836.599930	0.041	2.5
3.80	-10	836.599942	0.026	2.5
3.80	-20	836.599923	0.049	2.5
3.80	-30	836.599978	-0.017	2.5

Reference Frequency: Cellular Mid Channel 836.599964MHz @ 20°C				
Limit: to stay +/- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	836.599964	0	2.5
4.20	20	836.599930	0.041	2.5
3.40	20	836.599933	0.037	2.5
End Volt(3.2)	20	836.599929	0.042	2.5

PCS, GPRS MODULATION – MID CHANNEL

Reference Frequency: PCS Mid Channel 1880.000017 MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000003	0.007	2.5
3.80	40	1880.000002	0.008	2.5
3.80	30	1880.000005	0.006	2.5
3.80	20	1880.000017	0	2.5
3.80	10	1880.000037	-0.011	2.5
3.80	0	1880.000006	0.006	2.5
3.80	-10	1880.000006	0.006	2.5
3.80	-20	1880.000004	0.007	2.5
3.80	-30	1879.999995	0.012	2.5

Reference Frequency: PCS Mid Channel 1880.000017 MHz @ 20°C				
Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	1880.000017	0.00000	2.5
4.20	20	1880.000003	0.00745	2.5
3.40	20	1879.999995	0.01170	2.5
End Volt(3.2)	20	1880.000002	0.00798	2.5

CELL WCDMA – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.000003 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2089.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	835.600002	0.001	2.5
3.80	40	835.600003	0.000	2.5
3.80	30	835.600004	-0.001	2.5
3.80	20	835.600003	0	2.5
3.80	10	835.600005	-0.002	2.5
3.80	0	835.600003	0.000	2.5
3.80	-10	835.600002	0.001	2.5
3.80	-20	835.600003	0.000	2.5
3.80	-30	835.599997	0.007	2.5

Reference Frequency: Cellular Mid Channel 836.000003 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2089.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	835.600003	0	2.5
4.20	20	835.600002	0.001	2.5
3.40	20	835.600003	0.000	2.5
End Volt(3.2)	20	835.600002	0.001	2.5

PCS, WCDMA – MID CHANNEL

Reference Frequency: PCS Mid Channel 1879.999989 MHz @ 20°C Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.999988	0.0005	2.5
3.80	40	1879.999988	0.0005	2.5
3.80	30	1879.999990	-0.0005	2.5
3.80	20	1879.999989	0	2.5
3.80	10	1879.999987	0.0011	2.5
3.80	0	1879.999991	-0.0011	2.5
3.80	-10	1879.999993	-0.0021	2.5
3.80	-20	1879.999995	-0.0032	2.5
3.80	-30	1879.999995	-0.0032	2.5

Reference Frequency: PCS Mid Channel 1879.999989 MHz @ 20°C Limit: within the authorized block or +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	1879.999989	0	2.5
4.20	20	1879.999994	-0.0027	2.5
3.40	20	1879.999996	-0.0037	2.5
End Volt(3.2)	20	1879.999995	-0.0032	2.5

CDMA BC 0, MID CHANNEL

Reference Frequency: CDMA_BC 0_Mid Channel 836.519987 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2091.300 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.519985	0.002	2.5
3.80	40	836.519985	0.002	2.5
3.80	30	836.519986	0.001	2.5
3.80	20	836.519987	0	2.5
3.80	10	836.519986	0.001	2.5
3.80	0	836.519987	0.000	2.5
3.80	-10	836.519987	0.000	2.5
3.80	-20	836.519985	0.002	2.5
3.80	-30	836.519989	-0.002	2.5

Reference Frequency: CDMA_BC 0_Mid channel 836.519987 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2091.300 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	836.519987	0	2.5
4.20	20	836.519987	0.000	2.5
3.40	20	836.519988	-0.001	2.5
End Volt(3.2)	20	836.519989	-0.002	2.5

CDMA BC 10, MID CHANNEL

Reference Frequency: CDMA_BC 10_Mid Channel 820.500007 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2051.250 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	820.500006	0.001	2.5
3.80	40	820.500007	0.000	2.5
3.80	30	820.500005	0.002	2.5
3.80	20	820.500007	0	2.5
3.80	10	820.500021	-0.017	2.5
3.80	0	820.500009	-0.002	2.5
3.80	-10	820.500007	0.000	2.5
3.80	-20	820.500006	0.001	2.5
3.80	-30	820.499991	0.020	2.5

Reference Frequency: CDMA_BC 10_Mid Channel 820.500007 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2051.250 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	820.500007	0	2.5
4.20	20	836.500006	-19500.303	2.5
3.40	20	836.500005	-19500.302	2.5
End Volt(3.2)	20	836.500005	-19500.302	2.5

CDMA BC 1, MID CHANNEL

Reference Frequency: CDMA_BC 1_Mid Channel 1880.000018 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000018	0.000	2.5
3.80	40	1880.000017	0.001	2.5
3.80	30	1880.000017	0.001	2.5
3.80	20	1880.000018	0	2.5
3.80	10	1880.000015	0.002	2.5
3.80	0	1880.000018	0.000	2.5
3.80	-10	1880.000016	0.001	2.5
3.80	-20	1880.000013	0.003	2.5
3.80	-30	1880.000012	0.003	2.5

Reference Frequency: CDMA_BC 1_Mid channel 1880.000018 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	1880.000018	0	2.5
4.20	20	1880.000015	0.002	2.5
3.40	20	1880.000013	0.003	2.5
End Volt(3.2)	20	1880.000011	0.004	2.5

CDMA BC 15, MID CHANNEL

Reference Frequency: CDMA_BC 15_Mid Channel 1733.000015 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 4332.500 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1733.000024	-0.005	2.5
3.80	40	1733.000024	-0.005	2.5
3.80	30	1733.000015	0.000	2.5
3.80	20	1733.000015	0	2.5
3.80	10	1733.000017	-0.001	2.5
3.80	0	1733.000017	-0.001	2.5
3.80	-10	1733.000016	-0.001	2.5
3.80	-20	1733.000012	0.002	2.5
3.80	-30	1733.000015	0.000	2.5

Reference Frequency:CDMA_BC 15_Mid Channel 1733.000015 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 4332.500 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	1733.000015	0	2.5
4.20	20	1733.000016	-0.001	2.5
3.40	20	1733.000014	0.001	2.5
End Volt(3.2)	20	1733.000013	0.001	2.5

10. RADIATED TEST RESULTS

10.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50(d) (2), § 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.

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

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

§ 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

MODES TESTED

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

LAT / PORT A

Mode	Channel	f (MHz)	ERP	
			dBm	mW
GPRS	128	824.20	29.64	920.45
	190	836.60	30.12	1028.02
	251	848.80	30.21	1049.54
GPRS	512	1850.20	32.65	1840.77
	661	1880.00	32.43	1749.85
	810	1909.80	32.62	1828.10

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
EGPRS	128	824.20	29.90	977.24
	190	836.60	29.94	986.28
	251	848.80	29.50	891.25
EGPRS	512	1850.20	31.75	1496.24
	661	1880.00	31.83	1524.05
	810	1909.80	31.82	1520.55

UAT / PORT B

Mode	Channel	f (MHz)	ERP / EIRP	
			dBm	mW
GPRS850	128	824.20	21.60	144.54
	190	836.60	21.40	138.04
	251	848.80	21.54	142.56
GPRS1900	512	1850.20	27.65	582.10
	661	1880.00	27.53	566.24
	810	1909.80	26.82	480.84

Mode	Channel	f (MHz)	ERP / EIRP	
			dBm	mW
EGPRS850	128	824.20	18.90	77.62
	190	836.60	18.40	69.18
	251	848.80	19.24	83.95
EGPRS1900	512	1850.20	26.09	406.44
	661	1880.00	25.93	391.74
	810	1909.80	26.32	428.55

LAT / PORT A

Mode	Channel	f (MHz)	ERP	
			dBm	mW
UMTS,REL 99	4357	826.40	23.00	199.53
	4405	836.00	22.80	190.55
	4455	846.00	22.44	175.39
UMTS, HSDPA	4357	826.40	22.05	160.32
	4405	836.00	21.90	154.88
	4455	846.00	21.74	149.28

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
UMTS, REL 99	1537	1712.40	25.79	379.31
	1638	1732.60	27.60	575.44
	1738	1752.50	27.69	587.49
UMTS, HSDPA	1537	1712.40	24.99	315.50
	1638	1732.60	26.99	500.03
	1738	1752.50	27.09	511.68

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
UMTS, REL 99	9662	1852.40	29.15	822.24
	9800	1880.00	28.33	680.77
	9938	1907.60	28.32	679.20
UMTS, HSDPA	9662	1852.40	28.35	683.91
	9800	1880.00	27.63	579.43
	9938	1907.60	27.62	578.10

UAT / PORT B

Mode	Channel	f (MHz)	ERP	
			dBm	mW
UMTS850, REL 99	4357	826.40	16.70	46.77
	4405	836.00	16.80	47.86
	4455	846.00	16.44	44.06
UMTS850, HSDPA	4357	826.40	15.64	36.64
	4405	836.00	15.70	37.15
	4455	846.00	15.84	38.37

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
UMTS, REL 99	1537	1712.40	22.59	181.55
	1638	1732.60	23.09	203.70
	1738	1752.50	24.39	274.79
UMTS, HSDPA	1537	1712.40	21.89	154.53
	1638	1732.60	22.39	173.38
	1738	1752.50	23.59	228.56

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
UMTS1900, REL 99	9662	1852.40	20.95	124.45
	9800	1880.00	20.03	100.69
	9938	1907.60	21.02	126.47
UMTS1900, HSDPA	9662	1852.40	20.25	105.93
	9800	1880.00	19.49	88.92
	9938	1907.60	20.42	110.15

LAT / PORT A

Mode	Channel	f (MHz)	ERP	
			dBm	mW
BC10, 1xRTT	476	817.90	21.25	133.35
	526	819.15	21.05	127.35
	684	823.10	20.89	122.74
BC 0, 1xRTT	1013	824.70	20.94	124.17
	384	836.52	21.04	127.06
	777	848.31	20.88	122.46

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
BC15, 1xRTT	25	1711.25	25.95	393.55
	450	1732.50	26.35	431.52
	875	1753.75	26.09	406.44
BC1, 1xRTT	25	1851.25	28.25	668.34
	600	1880.00	28.33	680.77
	1175	1908.75	28.02	633.87

UAT / PORT B

Mode	Channel	f (MHz)	ERP	
			dBm	mW
BC10, 1xRTT	476	817.90	15.80	38.02
	526	819.15	15.90	38.90
	684	823.10	15.24	33.42
BC 0, 1xRTT	1013	824.70	14.80	30.20
	384	836.52	14.15	26.00
	777	848.31	16.27	42.36

UAT / PORT B

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
BC15, 1xRTT	25	1711.25	24.05	254.10
	450	1732.50	24.45	278.61
	875	1753.75	25.43	349.14
BC1, 1xRTT	25	1851.25	23.45	221.31
	600	1880.00	21.65	146.22
	1175	1908.75	21.06	127.64

LAT / PORT A

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
BC10, EVDO A	476	817.90	21.20	131.83
	526	819.15	21.40	138.04
	684	823.10	21.04	127.06
BC 0, EVDO Rev A	1013	824.70	20.60	114.82
	384	836.52	20.80	120.23
	777	848.31	20.84	121.34

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
BC1, EVDO, REV A	25	1711.25	24.27	267.30
	450	1732.50	26.42	438.53
	875	1753.75	25.96	394.46
BC1, EVDO REV A	25	1851.25	28.35	683.91
	600	1880.00	28.45	699.84
	1175	1908.75	26.97	497.74

UAT / PORT B

Mode	Channel	f (MHz)	ERP	
			dBm	mW
BC10, EVDO Rev A	476	817.90	16.00	39.81
	526	819.15	16.25	42.17
	684	823.10	15.94	39.26
CDMA EVDO Rev A	1013	824.70	15.50	35.48
	384	836.52	14.00	42.17
	777	848.31	15.74	39.26

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
BC1, EVDO, REV A	25	1851.25	21.87	153.82
	600	1880.00	20.95	124.45
	1175	1908.75	20.02	100.46
BC15, EVDO, REV A	25	1711.25	20.45	110.92
	450	1732.50	21.68	147.23
	875	1753.75	22.06	160.69

LAT PORT

Mode	Channel	f (MHz)	ERP	
			dBm	mW
EVDO Rev B Two Carriers Min.	1013+31	825.30	24.50	352.37
	384+425	837.20	24.93	364.75
	736+777	847.60	24.34	374.97
EVDO Rev B Two Carriers Max	1013+156	826.50	23.81	281.84
	384+550	838.80	23.55	311.17
	611+777	844.90	22.54	271.64
EVDO Rev B Three Carriers Min.	1013+31+72	825.90	25.62	240.44
	384+425+466	837.70	24.12	226.46
	695+736+777	846.70	25.74	179.47

UAT / PORT B

Mode	Channel	f (MHz)	ERP	
			dBm	mW
EVDO Rev B Two Carriers Min.	1013+31	825.30	16.35	35.48
	384+425	837.20	15.70	25.12
	736+777	847.60	16.80	37.50
EVDO Rev B Two Carriers Max	1013+156	826.50	12.80	43.15
	384+550	838.80	14.00	37.15
	611+777	844.90	14.28	47.86
EVDO Rev B Three Carriers Min.	1013+31+72	825.90	17.17	19.05
	384+425+466	837.70	16.30	25.12
	695+736+777	846.70	17.44	26.79

LAT / PORT A

GPRS (Cellular Band)

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
Configuration:		EUT only						
Mode:		GRPS 850MHz CELL						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	20.30	V	0.6	0.0	19.70	38.5	-18.7	
824.20	30.24	H	0.6	0.0	29.64	38.5	-8.8	
Mid Ch								
836.60	20.70	V	0.6	0.0	20.10	38.5	-18.3	
836.60	30.72	H	0.6	0.0	30.12	38.5	-8.3	
High Ch								
848.80	20.40	V	0.6	0.0	19.80	38.5	-18.6	
848.80	30.81	H	0.6	0.0	30.21	38.5	-8.2	
Rev. 3.17.11								

GPRS (PCS Band)

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
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	21.8	V	0.85	7.94	28.85	33.0	-4.2	
1.850	24.7	H	0.85	8.80	32.65	33.0	-0.4	
Mid Ch								
1.880	20.9	V	0.85	7.95	28.00	33.0	-5.0	
1.880	24.6	H	0.85	8.68	32.43	33.0	-0.6	
High Ch								
1.910	21.5	V	0.85	7.97	28.61	33.0	-4.4	
1.910	24.9	H	0.85	8.57	32.62	33.0	-0.4	
Rev. 3.17.11								

EGPRS (Cellular Band)

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
Configuration:		EUT only						
Mode:		EGRPS 850MHz CELL						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	21.53	V	0.6	0.0	20.93	38.5	-17.5	
824.20	30.50	H	0.6	0.0	29.90	38.5	-8.5	
Mid Ch								
836.60	21.42	V	0.6	0.0	20.82	38.5	-17.6	
836.60	30.54	H	0.6	0.0	29.94	38.5	-8.5	
High Ch								
848.80	21.30	V	0.6	0.0	20.70	38.5	-17.7	
848.80	30.10	H	0.6	0.0	29.50	38.5	-8.9	
Rev. 3.17.11								

EGPRS (PCS Band)

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
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	21.4	V	0.85	7.94	28.49	33.0	-4.5	
1.850	23.8	H	0.85	8.80	31.75	33.0	-1.3	
Mid Ch								
1.880	20.9	V	0.85	7.95	28.00	33.0	-5.0	
1.880	24.0	H	0.85	8.68	31.83	33.0	-1.2	
High Ch								
1.910	21.2	V	0.85	7.97	28.33	33.0	-4.7	
1.910	24.1	H	0.85	8.57	31.82	33.0	-1.2	
Rev. 3.17.11								

UAT (PORT B)

GSM (Cellular Band):

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/29/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT only						
Mode:		GRPS 850MHz CELL						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	13.70	V	0.6	0.0	13.10	38.5	-25.3	
824.20	22.20	H	0.6	0.0	21.60	38.5	-16.8	
Mid Ch								
836.60	15.10	V	0.6	0.0	14.50	38.5	-23.9	
836.60	22.00	H	0.6	0.0	21.40	38.5	-17.0	
High Ch								
848.80	16.55	V	0.6	0.0	15.95	38.5	-22.5	
848.80	22.14	H	0.6	0.0	21.54	38.5	-16.9	
Rev. 3.17.11								

GSM (PCS Band):

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/29/13						
Test Engineer:		Roy 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	19.0	V	0.85	7.94	26.09	33.0	-6.9	
1.850	19.7	H	0.85	8.80	27.65	33.0	-5.4	
Mid Ch								
1.880	18.6	V	0.85	7.95	25.65	33.0	-7.4	
1.880	19.7	H	0.85	8.68	27.53	33.0	-5.5	
High Ch								
1.910	17.8	V	0.85	7.97	24.95	33.0	-8.1	
1.910	19.1	H	0.85	8.57	26.82	33.0	-6.2	
Rev. 3 17.11								

EGPRS (Cellular Band)

**High Frequency Substitution Measurement
 Compliance Certification Services Chamber D**

Company: Apple
Project #: 13U14987
Date: 05/29/13
Test Engineer: Roy Zheng
Configuration: EUT only
Mode: EGRPS 850MHz CELL

Test Equipment:
 Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)
 Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	13.58	V	0.6	0.0	12.98	38.5	-25.5	
824.20	19.50	H	0.6	0.0	18.90	38.5	-19.5	
Mid Ch								
836.60	13.80	V	0.6	0.0	13.20	38.5	-25.2	
836.60	19.00	H	0.6	0.0	18.40	38.5	-20.0	
High Ch								
848.80	13.50	V	0.6	0.0	12.90	38.5	-25.5	
848.80	19.84	H	0.6	0.0	19.24	38.5	-19.2	

Rev. 3.17.11

EGPRS (PCS Band)

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/29/13						
Test Engineer:		Roy 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	19.0	V	0.85	7.94	26.09	33.0	-6.9	
1.850	17.7	H	0.85	8.80	25.65	33.0	-7.4	
Mid Ch								
1.880	18.5	V	0.85	7.95	25.55	33.0	-7.5	
1.880	18.1	H	0.85	8.68	25.93	33.0	-7.1	
High Ch								
1.910	17.8	V	0.85	7.97	24.95	33.0	-8.1	
1.910	18.6	H	0.85	8.57	26.32	33.0	-6.7	
Rev. 3.17.11								

LAT / PORT A

UMTS REL 99 (Cellular Band)

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		07/18/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT only						
Mode:		REL 99, CELL						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	17.00	V	0.6	0.0	16.40	38.5	-22.0	
826.40	23.60	H	0.6	0.0	23.00	38.5	-15.4	
Mid Ch								
836.60	16.70	V	0.6	0.0	16.10	38.5	-22.3	
836.60	23.40	H	0.6	0.0	22.80	38.5	-15.6	
High Ch								
846.60	16.00	V	0.6	0.0	15.40	38.5	-23.0	
846.60	23.04	H	0.6	0.0	22.44	38.5	-16.0	
Rev. 3.17.11								

UMTS HSDPA (Cellular Band)

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		07/18/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT only						
Mode:		HSDPA, CELL						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	14.30	V	0.6	0.0	13.70	38.5	-24.7	
826.40	22.65	H	0.6	0.0	22.05	38.5	-16.4	
Mid Ch								
836.60	14.80	V	0.6	0.0	14.20	38.5	-24.2	
836.60	22.50	H	0.6	0.0	21.90	38.5	-16.5	
High Ch								
846.60	14.40	V	0.6	0.0	13.80	38.5	-24.6	
846.60	22.34	H	0.6	0.0	21.74	38.5	-16.7	
Rev. 3.17.11								

UMTS REL 99 (PCS Band)

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/31/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT Only						
Mode:		Rel 99, PCS						
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								
1.852	19.8	V	0.85	7.94	26.89	33.0	-6.1	
1.852	21.2	H	0.85	8.80	29.15	33.0	-3.9	
Mid Ch								
1.880	18.9	V	0.85	7.95	25.95	33.0	-7.1	
1.880	20.5	H	0.85	8.68	28.33	33.0	-4.7	
High Ch								
1.908	18.9	V	0.85	7.97	26.05	33.0	-7.0	
1.908	20.6	H	0.85	8.57	28.32	33.0	-4.7	
Rev. 3.17.11								

UMTS HSDPA (PCS Band)

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/31/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT Only						
Mode:		HSDPA, PCS						
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								
1.852	19.0	V	0.85	7.94	26.09	33.0	-6.9	
1.852	20.4	H	0.85	8.80	28.35	33.0	-4.7	
Mid Ch								
1.880	18.4	V	0.85	7.95	25.45	33.0	-7.6	
1.880	19.8	H	0.85	8.68	27.63	33.0	-5.4	
High Ch								
1.908	18.4	V	0.85	7.97	25.55	33.0	-7.5	
1.908	19.9	H	0.85	8.57	27.62	33.0	-5.4	
Rev. 3.17.11								

UMTS REL 99 (Band 4)

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/20/13						
Test Engineer:		Mona Hua						
Configuration:		EUT Only						
Mode:		Rel 99, Band 4						
Test Equipment:								
Receiving: T344, and Chamber D SMA Cables								
Substitution: Horn T60 Substitution, 4ft SMA Cable 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	13.8	V	1.50	8.16	20.46	30.0	-9.5	
1.712	18.7	H	1.50	8.59	25.79	30.0	-4.2	
Mid Ch								
1.733	14.3	V	1.50	8.11	20.91	30.0	-9.1	
1.733	20.4	H	1.50	8.69	27.60	30.0	-2.4	
High Ch								
1.753	14.3	V	1.50	8.07	20.87	30.0	-9.1	
1.753	20.4	H	1.50	8.79	27.69	30.0	-2.3	
Rev. 3.17.11								

UMTS HSDPA (Band 4)

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/20/13						
Test Engineer:		Mona Hua						
Configuration:		EUT Only						
Mode:		HSDPA, Band 4						
Test Equipment:								
Receiving: T344, and Chamber D SMA Cables								
Substitution: Horn T60 Substitution, 4ft SMA Cable 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	13.0	V	1.50	8.16	19.66	30.0	-10.3	
1.712	17.9	H	1.50	8.59	24.99	30.0	-5.0	
Mid Ch								
1.733	13.5	V	1.50	8.11	20.11	30.0	-9.9	
1.733	19.8	H	1.50	8.69	26.99	30.0	-3.0	
High Ch								
1.753	13.6	V	1.50	8.07	20.17	30.0	-9.8	
1.753	19.8	H	1.50	8.79	27.09	30.0	-2.9	
Rev. 3.17.11								

UAT / PORT B

UMTS, REL 99 (Cellular Band)

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/29/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT only						
Mode:		REL 99, CELL						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	8.70	V	0.6	0.0	8.10	38.5	-30.3	
826.40	17.30	H	0.6	0.0	16.70	38.5	-21.7	
Mid Ch								
836.60	8.70	V	0.6	0.0	8.10	38.5	-30.3	
836.60	17.40	H	0.6	0.0	16.80	38.5	-21.6	
High Ch								
846.60	8.80	V	0.6	0.0	8.20	38.5	-30.2	
846.60	17.04	H	0.6	0.0	16.44	38.5	-22.0	
Rev. 3.17.11								

UMTS, HSDPA (Cellular Band)

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/29/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT only						
Mode:		HSDPA, CELL						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	6.30	V	0.6	0.0	5.70	38.5	-32.7	
826.40	16.24	H	0.6	0.0	15.64	38.5	-22.8	
Mid Ch								
836.60	6.60	V	0.6	0.0	6.00	38.5	-32.4	
836.60	16.30	H	0.6	0.0	15.70	38.5	-22.7	
High Ch								
846.60	6.30	V	0.6	0.0	5.70	38.5	-32.7	
846.60	16.44	H	0.6	0.0	15.84	38.5	-22.6	
Rev. 3.17.11								

UMTS REL 99 (Band 4)

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/20/13						
Test Engineer:		Mona Hua						
Configuration:		EUT Only						
Mode:		Rel 99, Band 4						
Test Equipment:								
Receiving: T344, and Chamber D SMA Cables								
Substitution: Horn T60 Substitution, 4ft SMA Cable 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	11.6	V	1.50	8.16	18.26	30.0	-11.7	
1.712	15.5	H	1.50	8.59	22.59	30.0	-7.4	
Mid Ch								
1.733	11.2	V	1.50	8.11	17.81	30.0	-12.2	
1.733	15.9	H	1.50	8.69	23.09	30.0	-6.9	
High Ch								
1.753	12.1	V	1.50	8.07	18.63	30.0	-11.4	
1.753	17.1	H	1.50	8.79	24.39	30.0	-5.6	
Rev. 3.17.11								

UMTS HSDPA (Band 4)

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/20/13						
Test Engineer:		Mona Hua						
Configuration:		EUT Only						
Mode:		HSDPA, Band 4						
Test Equipment:								
Receiving: T344, and Chamber D SMA Cables								
Substitution: Horn T60 Substitution, 4ft SMA Cable 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	10.9	V	1.50	8.16	17.56	30.0	-12.4	
1.712	14.8	H	1.50	8.59	21.89	30.0	-8.1	
Mid Ch								
1.733	10.4	V	1.50	8.11	17.01	30.0	-13.0	
1.733	15.2	H	1.50	8.69	22.39	30.0	-7.6	
High Ch								
1.753	11.4	V	1.50	8.07	17.97	30.0	-12.0	
1.753	16.3	H	1.50	8.79	23.59	30.0	-6.4	
Rev. 3.17.11								

UMTS, REL 99 (PCS Band)

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/29/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT Only						
Mode:		Rel 99, PCS						
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								
1.852	10.3	V	0.85	7.94	17.39	33.0	-15.6	
1.852	12.9	H	0.85	8.80	20.85	33.0	-12.2	
Mid Ch								
1.880	11.4	V	0.85	7.95	18.45	33.0	-14.6	
1.880	12.2	H	0.85	8.68	20.03	33.0	-13.0	
High Ch								
1.908	11.6	V	0.85	7.97	18.75	33.0	-14.3	
1.908	13.3	H	0.85	8.57	21.02	33.0	-12.0	
Rev. 3.17.11								

UMTS, HSDPA (PCS Band)

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/29/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT Only						
Mode:		HSDPA, PCS						
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								
1.852	10.0	V	0.85	7.94	17.09	33.0	-15.9	
1.852	12.3	H	0.85	8.80	20.25	33.0	-12.8	
Mid Ch								
1.880	10.8	V	0.85	7.95	17.85	33.0	-15.2	
1.880	11.6	H	0.85	8.68	19.43	33.0	-13.6	
High Ch								
1.908	10.6	V	0.85	7.97	17.75	33.0	-15.3	
1.908	12.7	H	0.85	8.57	20.42	33.0	-12.6	
Rev. 3.17.11								

LAT / PORT A

CDMA2000, 1xRTT, BC10

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
Configuration:		EUT only						
Mode:		BC10 1xRTT LAT						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
817.90	13.85	V	0.6	0.0	13.25	38.5	-25.2	
817.90	21.85	H	0.6	0.0	21.25	38.5	-17.2	
Mid Ch								
819.15	14.05	V	0.6	0.0	13.45	38.5	-25.0	
819.15	21.65	H	0.6	0.0	21.05	38.5	-17.4	
High Ch								
823.10	13.65	V	0.6	0.0	13.05	38.5	-25.4	
823.10	21.49	H	0.6	0.0	20.89	38.5	-17.6	
Rev. 3.17.11								

CDMA2000, 1xRTT, BC0

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
Configuration:		EUT only						
Mode:		BC0 1xRTT LAT						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	13.64	V	0.6	0.0	13.04	38.5	-25.4	
824.70	21.54	H	0.6	0.0	20.94	38.5	-17.5	
Mid Ch								
836.52	14.14	V	0.6	0.0	13.54	38.5	-24.9	
836.52	21.64	H	0.6	0.0	21.04	38.5	-17.4	
High Ch								
848.31	13.39	V	0.6	0.0	12.79	38.5	-25.7	
848.31	21.48	H	0.6	0.0	20.88	38.5	-17.6	
Rev. 3.17.11								

CDMA2000, 1xRTT, BC15

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
Configuration:		EUT Only						
Mode:		BC15 AWS 1xRTT LAT						
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								
1.711	15.6	V	0.85	7.94	22.71	33.0	-10.3	
1.711	18.0	H	0.85	8.80	25.95	33.0	-7.1	
Mid Ch								
1.733	14.8	V	0.85	7.95	21.93	33.0	-11.1	
1.733	18.5	H	0.85	8.68	26.35	33.0	-6.7	
High Ch								
1.754	14.9	V	0.85	7.97	22.01	33.0	-11.0	
1.754	18.4	H	0.85	8.57	26.09	33.0	-6.9	
Rev. 3 17 11								

CDMA2000, 1xRTT, BC1

High Frequency Fundamental Measurement Compliance Certification Services Chamber D									
Company:		Apple							
Project #:		13U14987							
Date:		05/30/13							
Test Engineer:		Mona Hua							
Configuration:		EUT Only							
Mode:		BC1 1xRTT LAT							
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									
1.851	18.7	V	0.85	7.94	25.79	33.0	-7.2		
1.851	20.3	H	0.85	8.80	28.25	33.0	-4.8		
Mid Ch									
1.880	18.4	V	0.85	7.95	25.45	33.0	-7.6		
1.880	20.5	H	0.85	8.68	28.33	33.0	-4.7		
High Ch									
1.909	18.0	V	0.85	7.97	25.15	33.0	-7.9		
1.909	20.3	H	0.85	8.57	28.02	33.0	-5.0		
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UAT / PORT B

CDMA2000, 1xRTT, BC10

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/27/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT only						
Mode:		BC10 1xRTT						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
817.90	8.20	V	0.6	0.0	7.60	38.5	-30.8	
817.90	16.40	H	0.6	0.0	15.80	38.5	-22.6	
Mid Ch								
819.15	8.30	V	0.6	0.0	7.70	38.5	-30.7	
819.15	16.50	H	0.6	0.0	15.90	38.5	-22.5	
High Ch								
823.10	8.00	V	0.6	0.0	7.40	38.5	-31.0	
823.10	15.84	H	0.6	0.0	15.24	38.5	-23.2	
Rev. 3.17.11								

CDMA2000, 1xRTT, BC0

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/27/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT only						
Mode:		BC0 1xRTT						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	7.60	V	0.6	0.0	7.00	38.5	-31.4	
824.70	15.40	H	0.6	0.0	14.80	38.5	-23.6	
Mid Ch								
836.52	9.40	V	0.6	0.0	8.80	38.5	-29.6	
836.52	14.75	H	0.6	0.0	14.15	38.5	-24.3	
High Ch								
848.31	10.30	V	0.6	0.0	9.70	38.5	-28.7	
848.31	16.87	H	0.6	0.0	16.27	38.5	-22.2	
Rev. 3.17.11								

CDMA2000, 1xRTT, BC15

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT Only						
Mode:		BC15 AWS 1xRTT						
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								
1.711	13.4	V	0.85	7.94	20.51	33.0	-12.5	
1.711	16.1	H	0.85	8.80	24.05	33.0	-9.0	
Mid Ch								
1.733	13.8	V	0.85	7.95	20.89	33.0	-12.1	
1.733	16.6	H	0.85	8.68	24.45	33.0	-8.6	
High Ch								
1.754	14.6	V	0.85	7.97	21.71	33.0	-11.3	
1.754	17.7	H	0.85	8.57	25.43	33.0	-7.6	
Rev. 3.17.11								

CDMA2000, 1xRTT, BC1

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT Only						
Mode:		BC1 1xRTT						
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								
1.851	15.1	V	0.85	7.94	22.19	33.0	-10.8	
1.851	15.5	H	0.85	8.80	23.45	33.0	-9.6	
Mid Ch								
1.880	12.9	V	0.85	7.95	19.97	33.0	-13.0	
1.880	13.8	H	0.85	8.68	21.65	33.0	-11.4	
High Ch								
1.909	13.0	V	0.85	7.97	20.08	33.0	-12.9	
1.909	13.3	H	0.85	8.57	21.06	33.0	-11.9	
Rev. 3.17.11								

CDMA2000, EVDO Rev A, BC15

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
Configuration:		EUT Only						
Mode:		BC15 AWS EVDO Rev A LAT						
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								
1.711	12.1	V	0.85	7.94	19.18	33.0	-13.8	
1.711	16.3	H	0.85	8.80	24.27	33.0	-8.7	
Mid Ch								
1.733	14.0	V	0.85	7.95	21.10	33.0	-11.9	
1.733	18.6	H	0.85	8.68	26.42	33.0	-6.6	
High Ch								
1.754	13.1	V	0.85	7.97	20.18	33.0	-12.8	
1.754	18.2	H	0.85	8.57	25.96	33.0	-7.0	
Rev. 3 17.11								

CDMA2000, EVDO Rev A, BC1

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
Configuration:		EUT Only						
Mode:		BC1, EVDO Rev A LAT						
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								
1.851	18.3	V	0.85	7.94	25.40	33.0	-7.6	
1.851	20.4	H	0.85	8.80	28.35	33.0	-4.7	
Mid Ch								
1.880	18.2	V	0.85	7.95	25.30	33.0	-7.7	
1.880	20.6	H	0.85	8.68	28.45	33.0	-4.6	
High Ch								
1.909	16.9	V	0.85	7.97	24.04	33.0	-9.0	
1.909	19.3	H	0.85	8.57	26.97	33.0	-6.0	
Rev. 3 17 11								

LAT / PORT A

CDMA2000, EVD0, BC10

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/24/13						
Test Engineer:		Mona Hua						
Configuration:		EUT only						
Mode:		BC10 EVDO Rev A LAT						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
817.90	14.40	V	0.6	0.0	13.80	38.5	-24.6	
817.90	21.80	H	0.6	0.0	21.20	38.5	-17.2	
Mid Ch								
819.15	14.68	V	0.6	0.0	14.08	38.5	-24.4	
819.15	22.00	H	0.6	0.0	21.40	38.5	-17.0	
High Ch								
823.10	14.30	V	0.6	0.0	13.70	38.5	-24.7	
823.10	21.64	H	0.6	0.0	21.04	38.5	-17.4	
Rev. 3.17.11								

CDMA2000, EVDO Rev A, BC0

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/26/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT only						
Mode:		BC0 EVDO Rev A LAT						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	13.50	V	0.6	0.0	12.90	38.5	-25.5	
824.70	21.20	H	0.6	0.0	20.60	38.5	-17.8	
Mid Ch								
836.52	13.85	V	0.6	0.0	13.25	38.5	-25.2	
836.52	21.40	H	0.6	0.0	20.80	38.5	-17.6	
High Ch								
848.31	13.30	V	0.6	0.0	12.70	38.5	-25.7	
848.31	21.44	H	0.6	0.0	20.84	38.5	-17.6	
Rev. 3.17.11								

CDMA2000, EVDO Rev A, BC15

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
Configuration:		EUT Only						
Mode:		BC15 AWS EVDO Rev A LAT						
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								
1.711	15.6	V	0.85	7.94	22.71	33.0	-10.3	
1.711	19.9	H	0.85	8.80	27.80	33.0	-5.2	
Mid Ch								
1.733	17.5	V	0.85	7.95	24.63	33.0	-8.4	
1.733	22.1	H	0.85	8.68	29.95	33.0	-3.1	
High Ch								
1.754	16.6	V	0.85	7.97	23.71	33.0	-9.3	
1.754	21.8	H	0.85	8.57	29.49	33.0	-3.5	
Rev. 3.17.11								

CDMA2000, EVDO Rev A, BC1

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
Configuration:		EUT Only						
Mode:		BC1 EVDO Rev A LAT						
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								
1.851	20.5	V	0.85	7.94	27.55	33.0	-5.5	
1.851	22.6	H	0.85	8.80	30.50	33.0	-2.5	
Mid Ch								
1.880	20.4	V	0.85	7.95	27.45	33.0	-5.6	
1.880	22.8	H	0.85	8.68	30.60	33.0	-2.4	
High Ch								
1.909	19.1	V	0.85	7.97	26.19	33.0	-6.8	
1.909	21.4	H	0.85	8.57	29.12	33.0	-3.9	
Rev. 3.17.11								

UAT / PORT A

CDMA2000, EVDO Rev A, BC10

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
Configuration:		EUT only						
Mode:		BC10 EVDO Rev A						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
817.90	10.00	V	0.6	0.0	9.40	38.5	-29.0	
817.90	16.60	H	0.6	0.0	16.00	38.5	-22.4	
Mid Ch								
819.15	10.20	V	0.6	0.0	9.60	38.5	-28.8	
819.15	16.85	H	0.6	0.0	16.25	38.5	-22.2	
High Ch								
823.10	10.10	V	0.6	0.0	9.50	38.5	-28.9	
823.10	16.54	H	0.6	0.0	15.94	38.5	-22.5	
Rev. 3.17.11								

CDMA2000, EVDO Rev A, BC0

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/26/13						
Test Engineer:		Roy Zheng						
Configuration:		EUT only						
Mode:		BC0 EVDO Rev A						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	6.40	V	0.6	0.0	5.80	38.5	-32.6	
824.70	16.10	H	0.6	0.0	15.50	38.5	-22.9	
Mid Ch								
836.52	5.60	V	0.6	0.0	5.00	38.5	-33.4	
836.52	14.60	H	0.6	0.0	14.00	38.5	-24.4	
High Ch								
848.31	7.40	V	0.6	0.0	6.80	38.5	-31.6	
848.31	16.34	H	0.6	0.0	15.74	38.5	-22.7	
Rev. 3.17.11								

CDMA2000, EVDO Rev A, BC15

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
Configuration:		EUT Only						
Mode:		BC15 AWS EVDO Rev A						
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								
1.711	9.8	V	0.85	7.94	16.91	33.0	-16.1	
1.711	12.5	H	0.85	8.80	20.45	33.0	-12.6	
Mid Ch								
1.733	10.4	V	0.85	7.95	17.53	33.0	-15.5	
1.733	13.9	H	0.85	8.68	21.68	33.0	-11.3	
High Ch								
1.754	11.2	V	0.85	7.97	18.31	33.0	-14.7	
1.754	14.3	H	0.85	8.57	22.06	33.0	-10.9	
Rev: 3 17 11								

CDMA2000, EVDO Rev A, BC1

High Frequency Fundamental Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		05/30/13						
Test Engineer:		Mona Hua						
Configuration:		EUT Only						
Mode:		BC1 EVDO Rev A						
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								
1.851	14.4	V	0.85	7.94	21.49	33.0	-11.5	
1.851	13.9	H	0.85	8.80	21.87	33.0	-11.1	
Mid Ch								
1.880	12.9	V	0.85	7.95	19.95	33.0	-13.1	
1.880	13.1	H	0.85	8.68	20.95	33.0	-12.1	
High Ch								
1.909	11.9	V	0.85	7.97	19.05	33.0	-14.0	
1.909	12.3	H	0.85	8.57	20.02	33.0	-13.0	
Rev. 3.17.11								

LAT / PORT A

CDMA2000 CELL BAND, EVDO REV B

Two Carriers Minimum Separation

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/19/13						
Test Engineer:		Mona Hua						
Configuration:		EUT only						
Mode:		BC0 EVDO Rev B, 2 Carrier Mini Separation						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable 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	18.70	V	0.6	0.0	18.10	38.5	-20.3	
825.30	25.10	H	0.6	0.0	24.50	38.5	-13.9	
Mid Ch								
837.20	19.13	V	0.6	0.0	18.53	38.5	-19.9	
837.20	25.53	H	0.6	0.0	24.93	38.5	-13.5	
High Ch								
847.60	18.88	V	0.6	0.0	18.28	38.5	-20.2	
847.60	24.94	H	0.6	0.0	24.34	38.5	-14.1	
Rev. 3.17.11								

CDMA2000 CELL BAND, EVDO REV B

Two Carriers Maximum Separation

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/19/13						
Test Engineer:		Mona Hua						
Configuration:		EUT only						
Mode:		BC0 EVDO Rev B, 2 Carrier Max Separation						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable 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	17.29	V	0.6	0.0	16.69	38.5	-21.8	
826.50	24.41	H	0.6	0.0	23.81	38.5	-14.6	
Mid Ch								
838.80	16.87	V	0.6	0.0	16.27	38.5	-22.2	
838.80	24.15	H	0.6	0.0	23.55	38.5	-14.9	
High Ch								
844.90	17.58	V	0.6	0.0	16.98	38.5	-21.5	
844.90	23.14	H	0.6	0.0	22.54	38.5	-15.9	
Rev. 3.17.11								

CDMA2000 CELL BAND, EVDO REV B

Three Carriers Minimum Separation

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/19/13						
Test Engineer:		Mona Hua						
Configuration:		EUT only						
Mode:		BC0 EVDO Rev B, 3 Carrier Min Separation						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable 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	19.41	V	0.6	0.0	18.81	38.5	-19.6	
825.90	26.22	H	0.6	0.0	25.62	38.5	-12.8	
Mid Ch								
837.70	19.80	V	0.6	0.0	19.20	38.5	-19.2	
837.70	24.72	H	0.6	0.0	24.12	38.5	-14.3	
High Ch								
846.70	19.41	V	0.6	0.0	18.81	38.5	-19.6	
846.70	26.34	H	0.6	0.0	25.74	38.5	-12.7	
Rev. 3.17.11								

UAT / PORT B

CDMA2000 CELL BAND, EVDO, REV B

TWO CARRIERS MINIMUM SEPARATION

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/19/13						
Test Engineer:		Mona Hua						
Configuration:		EUT only						
Mode:		BC0 EVDO Rev B, 2 Carrier Min Separation						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable 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	9.91	V	0.6	0.0	9.31	38.5	-29.1	
825.30	16.95	H	0.6	0.0	16.35	38.5	-22.1	
Mid Ch								
837.20	8.97	V	0.6	0.0	8.37	38.5	-30.1	
837.20	16.30	H	0.6	0.0	15.70	38.5	-22.7	
High Ch								
847.60	10.33	V	0.6	0.0	9.73	38.5	-28.7	
847.60	17.40	H	0.6	0.0	16.80	38.5	-21.6	
Rev. 3.17.11								

CDMA2000 CELL BAND, EVDO, REV B

TWO CARRIERS MAXIMUM SEPARATION

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/19/13						
Test Engineer:		Mona Hua						
Configuration:		EUT only						
Mode:		BC0 EVDO Rev B, 2 Carrier Max Separation						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable 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	6.30	V	0.6	0.0	5.70	38.5	-32.7	
826.50	13.40	H	0.6	0.0	12.80	38.5	-25.6	
Mid Ch								
838.80	7.56	V	0.6	0.0	6.96	38.5	-31.5	
838.80	14.60	H	0.6	0.0	14.00	38.5	-24.4	
High Ch								
844.90	7.87	V	0.6	0.0	7.27	38.5	-31.2	
844.90	14.88	H	0.6	0.0	14.28	38.5	-24.2	
Rev. 3.17.11								

CDMA2000 CELL BAND, EVDO, REV B

THREE CARRIERS MNIMUM SEPARATION

High Frequency Substitution Measurement Compliance Certification Services Chamber D								
Company:		Apple						
Project #:		13U14987						
Date:		06/19/13						
Test Engineer:		Mona Hua						
Configuration:		EUT only						
Mode:		BC0 EVDO Rev B, 3 Carrier Min Separation						
Test Equipment:								
Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT)								
Substitution: Dipole S/N: 00022117, 4ft SMA Cable 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	9.00	V	0.6	0.0	8.40	38.5	-30.0	
825.90	17.77	H	0.6	0.0	17.17	38.5	-21.3	
Mid Ch								
837.70	9.99	V	0.6	0.0	9.39	38.5	-29.1	
837.70	16.90	H	0.6	0.0	16.30	38.5	-22.1	
High Ch								
846.70	11.00	V	0.6	0.0	10.40	38.5	-28.0	
846.70	18.04	H	0.6	0.0	17.44	38.5	-21.0	
Rev. 3.17.11								

10.2. 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.

A1428

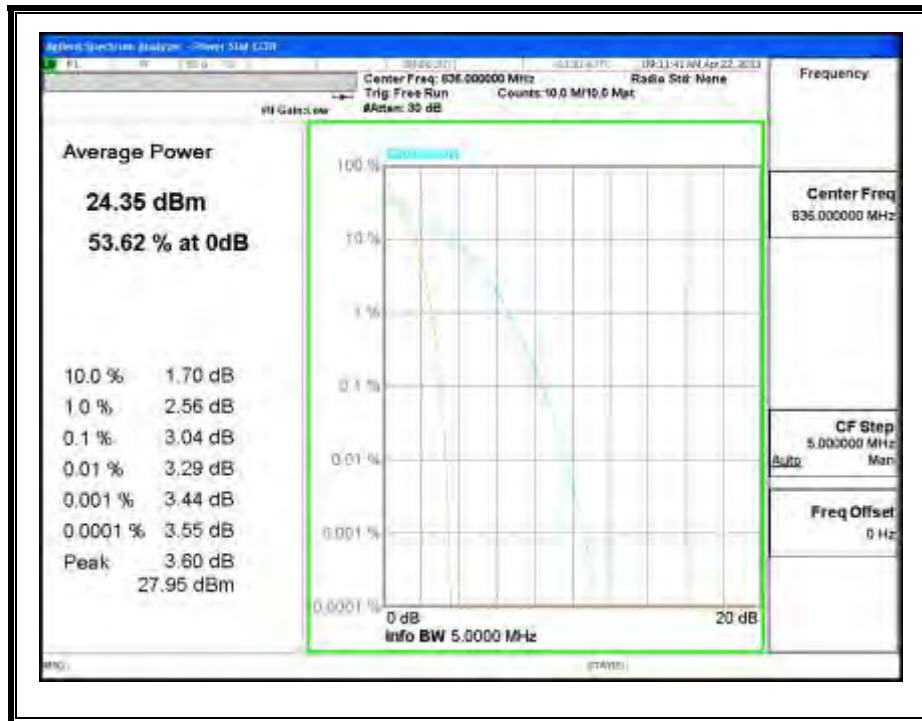
Peak-To-Average Ratio:

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
UMTS	REL99	27.95	24.35	3.6
Mode	Ch. No.	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
UMTS	HSDPA	28.33	22.99	5.34
*Peak Reading = Average Reading + Peak-to-Average Ratio				

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
BC0	1xRTT	27.85	23.63	4.22
Mode	Ch. No.	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
BC10	1xRTT	28.36	23.69	4.67
*Peak Reading = Average Reading + Peak-to-Average Ratio				

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
BC0	EVDO	28.2	23.55	4.65
Mode	Ch. No.	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
BC15	EVDO	28.66	23.52	5.14
*Peak Reading = Average Reading + Peak-to-Average Ratio				

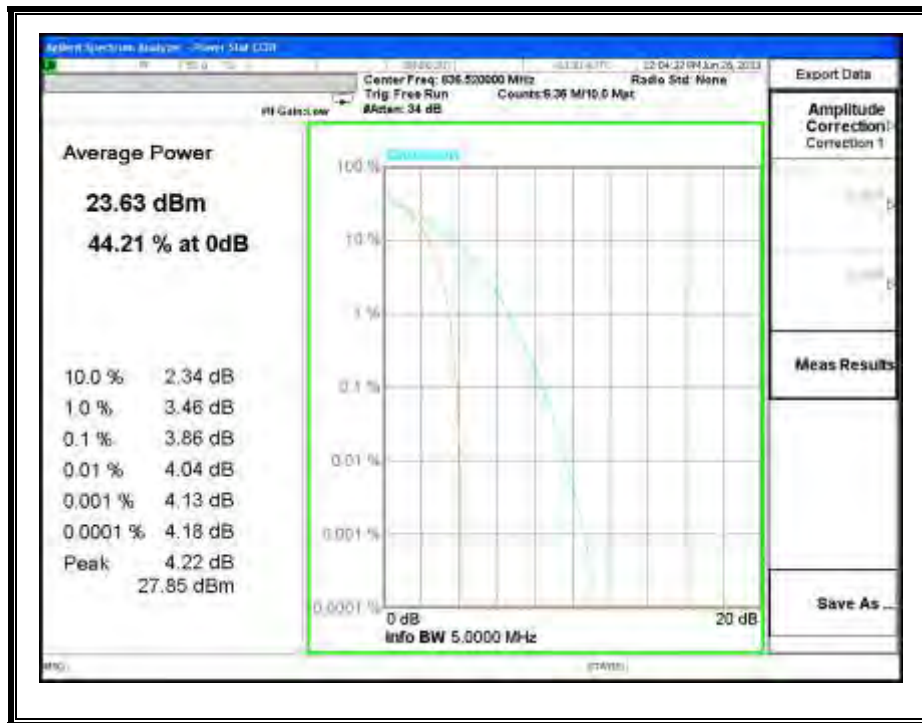
UMTS850, REL 99



UMTS850, HSDPA



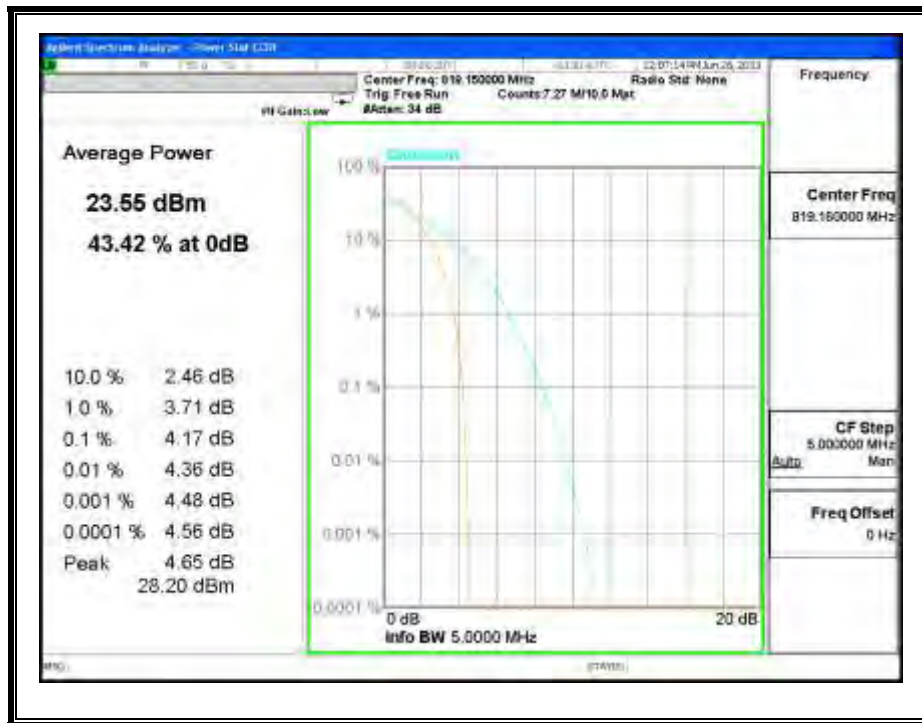
BC 0, 1xRTT



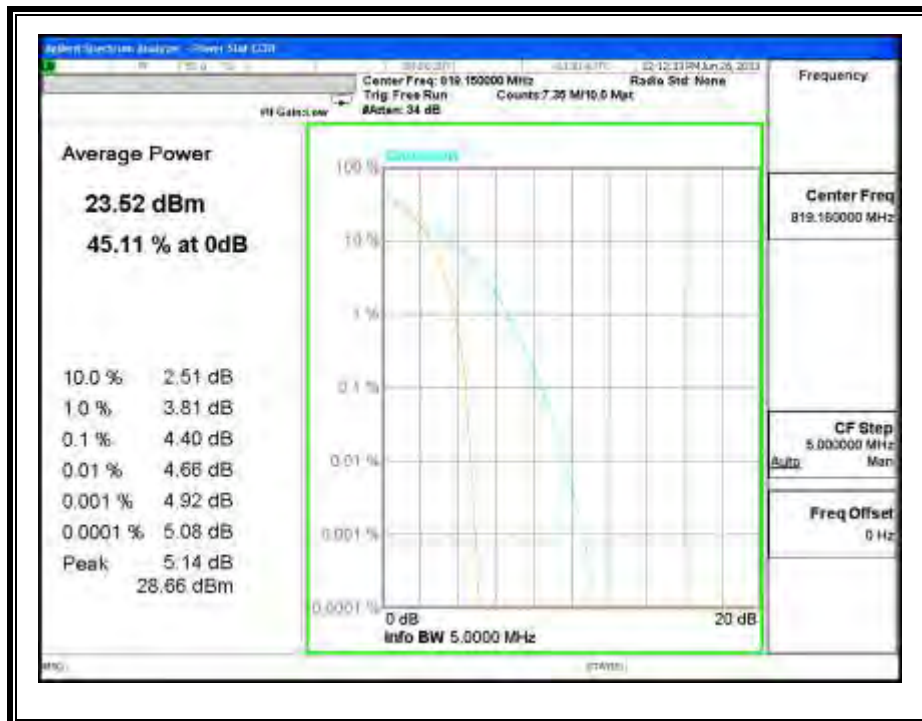
BC10, 1xRTT



BC 0, EVDO



BC10, EVDO



10.3. 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 $116 \log_{10} (f/6.1)$ decibels or $50 + 10 \log_{10} (P)$ 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 $43 + 10 \log_{10} (P)$ 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:

LAT PORT and UAT PORT

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

RESULTS

LAT / PORT A

GPRS850

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U14987
Date: 06/03/13
Test Engineer: Roy Zheng
Configuration: EUT only
Mode: GPRS CELL

Chamber	Pre-amplifier	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	-19.9	V	3.0	32.7	1.0	-51.6	-13.0	-38.6	
2.473	-24.0	V	3.0	31.4	1.0	-54.4	-13.0	-41.4	
1.648	-18.5	H	3.0	32.7	1.0	-50.2	-13.0	-37.2	
2.473	-28.8	H	3.0	31.4	1.0	-59.2	-13.0	-46.2	
Mid Ch, (836.6MHz)									
1.673	-19.1	V	3.0	32.6	1.0	-50.7	-13.0	-37.7	
2.510	-23.5	V	3.0	31.5	1.0	-54.0	-13.0	-41.0	
1.673	-22.6	H	3.0	32.6	1.0	-54.2	-13.0	-41.2	
2.510	-22.7	H	3.0	31.5	1.0	-53.2	-13.0	-40.2	
High Ch, (848.8MHz)									
1.698	-21.9	V	3.0	32.5	1.0	-53.4	-13.0	-40.4	
2.546	-21.1	V	3.0	31.4	1.0	-51.6	-13.0	-38.6	
1.698	-29.8	H	3.0	32.5	1.0	-61.3	-13.0	-48.3	
2.546	-26.2	H	3.0	31.4	1.0	-56.6	-13.0	-43.6	

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

EGPRS850

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U14987
Date: 06/03/13
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	-25.8	V	3.0	32.7	1.0	-57.5	-13.0	-44.5	
2.473	-25.4	V	3.0	31.4	1.0	-55.8	-13.0	-42.8	
1.648	-28.2	H	3.0	32.7	1.0	-59.9	-13.0	-46.9	
2.473	-29.3	H	3.0	31.4	1.0	-59.7	-13.0	-46.7	
Mid Ch, (836.6MHz)									
1.673	-26.8	V	3.0	32.6	1.0	-58.4	-13.0	-45.4	
2.510	-27.3	V	3.0	31.5	1.0	-57.8	-13.0	-44.8	
1.673	-28.4	H	3.0	32.6	1.0	-60.0	-13.0	-47.0	
2.510	-29.1	H	3.0	31.5	1.0	-59.6	-13.0	-46.6	
High Ch, (848.8MHz)									
1.698	-27.0	V	3.0	32.5	1.0	-58.5	-13.0	-45.5	
2.546	-27.3	V	3.0	31.4	1.0	-57.8	-13.0	-44.8	
1.698	-30.5	H	3.0	32.5	1.0	-62.0	-13.0	-49.0	
2.546	-28.8	H	3.0	31.4	1.0	-59.2	-13.0	-46.2	

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

UMTS850, REL 99

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U14987
Date: 06/03/13
Test Engineer: Roy Zheng hh
Configuration: EUT only
Mode: REL 99 CELL

Chamber

3m Chamber D

Pre-amplifier

T145 8449B

Filter

Filter 1

Limit

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	-29.8	V	3.0	32.7	1.0	-61.5	-13.0	-48.5	
2.479	-26.9	V	3.0	31.4	1.0	-57.3	-13.0	-44.3	
1.653	-31.9	H	3.0	32.7	1.0	-63.5	-13.0	-50.5	
2.479	-28.3	H	3.0	31.4	1.0	-58.7	-13.0	-45.7	
Mid Ch, (836.6MHz)									
1.673	-29.4	V	3.0	32.6	1.0	-61.0	-13.0	-48.0	
2.510	-28.8	V	3.0	31.5	1.0	-59.3	-13.0	-46.3	
1.673	-30.7	H	3.0	32.6	1.0	-62.3	-13.0	-49.3	
2.510	-28.2	H	3.0	31.5	1.0	-58.7	-13.0	-45.7	
High Ch, (846.6MHz)									
1.688	-29.6	V	3.0	32.6	1.0	-61.1	-13.0	-48.1	
2.532	-27.8	V	3.0	31.5	1.0	-58.3	-13.0	-45.3	
1.688	-32.1	H	3.0	32.6	1.0	-63.7	-13.0	-50.7	
2.532	-29.6	H	3.0	31.5	1.0	-60.1	-13.0	-47.1	

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

HSDPA

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
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	-26.5	V	3.0	32.7	1.0	-58.2	-13.0	-45.2	
2.479	-27.2	V	3.0	31.4	1.0	-57.6	-13.0	-44.6	
1.653	-23.7	H	3.0	32.7	1.0	-55.3	-13.0	-42.3	
2.479	-28.6	H	3.0	31.4	1.0	-59.0	-13.0	-46.0	
Mid Ch, (836.6MHz)									
1.673	-26.3	V	3.0	32.6	1.0	-57.9	-13.0	-44.9	
2.510	-27.1	V	3.0	31.5	1.0	-57.6	-13.0	-44.6	
1.673	-24.2	H	3.0	32.6	1.0	-55.8	-13.0	-42.8	
2.510	-27.6	H	3.0	31.5	1.0	-58.1	-13.0	-45.1	
High Ch, (846.6MHz)									
1.688	-23.3	V	3.0	32.6	1.0	-54.9	-13.0	-41.9	
2.532	-27.3	V	3.0	31.5	1.0	-57.7	-13.0	-44.7	
1.688	-18.4	V	3.0	32.6	1.0	-49.9	-13.0	-36.9	
2.532	-26.5	V	3.0	31.5	1.0	-57.0	-13.0	-44.0	

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

GPRS1900

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Apple							
Project #:		13U14987							
Date:		06/03/13							
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	-27.2	V	3.0	30.2	1.0	-56.4	-13.0	-43.4	
7.401	-28.6	V	3.0	26.5	1.0	-54.1	-13.0	-41.1	
3.700	-27.4	H	3.0	30.2	1.0	-56.6	-13.0	-43.6	
7.401	-28.1	H	3.0	26.5	1.0	-53.6	-13.0	-40.6	
Mid Ch, (1880 MHz)									
3.760	-27.1	V	3.0	30.1	1.0	-56.3	-13.0	-43.3	
7.520	-28.9	V	3.0	26.3	1.0	-54.2	-13.0	-41.2	
3.760	-27.8	H	3.0	30.1	1.0	-56.9	-13.0	-43.9	
7.520	-28.0	H	3.0	26.3	1.0	-53.3	-13.0	-40.3	
High Ch, (1909.8 MHz)									
3.819	-26.7	V	3.0	30.1	1.0	-55.8	-13.0	-42.8	
7.639	-28.5	V	3.0	26.2	1.0	-53.6	-13.0	-40.6	
3.819	-27.3	H	3.0	30.1	1.0	-56.4	-13.0	-43.4	
7.639	-28.2	H	3.0	26.2	1.0	-53.4	-13.0	-40.4	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

EGPRS1900

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U14987
Date: 06/03/13
Test Engineer: Roy Zheng
Configuration: EUT only
Mode: EGPRS PCS

Chamber

3m Chamber D

Pre-amplifier

T145 8449B

Filter

Filter 1

Limit

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	-27.5	V	3.0	30.2	1.0	-56.7	-13.0	-43.7	
7.401	-29.0	V	3.0	26.5	1.0	-54.5	-13.0	-41.5	
3.700	-27.6	H	3.0	30.2	1.0	-56.8	-13.0	-43.8	
7.401	-28.3	H	3.0	26.5	1.0	-53.8	-13.0	-40.8	
Mid Ch, (1880 MHz)									
3.760	-27.2	V	3.0	30.1	1.0	-56.4	-13.0	-43.4	
7.520	-29.5	V	3.0	26.3	1.0	-54.8	-13.0	-41.8	
3.760	-28.2	H	3.0	30.1	1.0	-57.3	-13.0	-44.3	
7.520	-28.2	H	3.0	26.3	1.0	-53.5	-13.0	-40.5	
High Ch, (1909.8 MHz)									
3.819	-27.0	V	3.0	30.1	1.0	-56.1	-13.0	-43.1	
7.639	-28.7	V	3.0	26.2	1.0	-53.8	-13.0	-40.8	
3.819	-27.5	H	3.0	30.1	1.0	-56.6	-13.0	-43.6	
7.639	-28.6	H	3.0	26.2	1.0	-53.8	-13.0	-40.8	

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

UMTS1900, REL 99

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
 Project #: 13U14987
 Date: 06/03/13
 Test Engineer: Roy Zheng
 Configuration: EUT only
 Mode: REL 99 PCS

Chamber

Pre-amplifier

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	-26.5	V	3.0	30.2	1.0	-55.7	-13.0	-42.7	
7.410	-29.6	V	3.0	26.5	1.0	-55.0	-13.0	-42.0	
3.705	-27.1	H	3.0	30.2	1.0	-56.3	-13.0	-43.3	
7.410	-28.1	H	3.0	26.5	1.0	-53.6	-13.0	-40.6	
Mid Ch, (1880 MHz)									
3.760	-27.1	V	3.0	30.1	1.0	-56.3	-13.0	-43.3	
7.520	-29.3	V	3.0	26.3	1.0	-54.6	-13.0	-41.6	
3.760	-27.3	H	3.0	30.1	1.0	-56.4	-13.0	-43.4	
7.520	-28.2	H	3.0	26.3	1.0	-53.5	-13.0	-40.5	
High Ch, (1907.6 MHz)									
3.815	-26.2	V	3.0	30.1	1.0	-55.3	-13.0	-42.3	
7.630	-28.3	V	3.0	26.2	1.0	-53.5	-13.0	-40.5	
3.815	-25.5	H	3.0	30.1	1.0	-54.6	-13.0	-41.6	
7.630	-27.4	H	3.0	26.2	1.0	-52.6	-13.0	-39.6	

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

HSDPA

**Compliance Certification Services
 Above 1GHz High Frequency Substitution Measurement**

Company: Apple
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: HSDPA PCS

Chamber

Pre-amplifier

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	-25.8	V	3.0	30.2	1.0	-55.0	-13.0	-42.0	
7.410	-27.5	V	3.0	26.5	1.0	-53.0	-13.0	-40.0	
3.705	-25.0	H	3.0	30.2	1.0	-54.2	-13.0	-41.2	
7.410	-26.8	H	3.0	26.5	1.0	-52.3	-13.0	-39.3	
Mid Ch, (1880 MHz)									
3.760	-26.8	V	3.0	30.1	1.0	-56.0	-13.0	-43.0	
7.520	-27.2	V	3.0	26.3	1.0	-52.6	-13.0	-39.6	
3.760	-25.5	H	3.0	30.1	1.0	-54.6	-13.0	-41.6	
7.520	-26.8	H	3.0	26.3	1.0	-52.1	-13.0	-39.1	
High Ch, (1907.6 MHz)									
3.815	-25.4	V	3.0	30.1	1.0	-54.5	-13.0	-41.5	
7.630	-27.8	V	3.0	26.2	1.0	-53.0	-13.0	-40.0	
3.815	-25.7	H	3.0	30.1	1.0	-54.8	-13.0	-41.8	
7.630	-26.3	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.

UMTS1700, REL 99

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Apple							
Project #:		13U14987							
Date:		06/20/13							
Test Engineer:		Mona Hua							
Configuration:		EUT Only							
Mode:		REL 99, Band 4							
Chamber		Pre-amplifier			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, (1712.4 MHz)									
3.425	-28.3	V	3.0	30.4	1.0	-57.8	-13.0	-44.8	
5.137	-31.6	V	3.0	28.8	1.0	-59.4	-13.0	-46.4	
3.425	-24.8	H	3.0	30.4	1.0	-54.2	-13.0	-41.2	
5.137	-30.8	H	3.0	28.8	1.0	-58.5	-13.0	-45.5	
Mid Ch, (1732.6 MHz)									
3.465	-28.0	V	3.0	30.4	1.0	-57.4	-13.0	-44.4	
5.198	-31.5	V	3.0	28.7	1.0	-59.2	-13.0	-46.2	
3.465	-26.5	H	3.0	30.4	1.0	-55.9	-13.0	-42.9	
5.198	-30.1	H	3.0	28.7	1.0	-57.8	-13.0	-44.8	
High Ch, (1752.5 MHz)									
3.505	-28.8	V	3.0	30.4	1.0	-58.2	-13.0	-45.2	
5.258	-32.4	V	3.0	28.6	1.0	-60.0	-13.0	-47.0	
3.505	-26.9	H	3.0	30.4	1.0	-56.2	-13.0	-43.2	
5.258	-30.4	H	3.0	28.6	1.0	-58.1	-13.0	-45.1	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

HSDPA

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Apple							
Project #:		13U14987							
Date:		06/20/13							
Test Engineer:		Mona Hua							
Configuration:		EUT Only							
Mode:		HSDPA, Band 4							
Chamber		Pre-amplifier			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, (1712.4 MHz)									
3.425	-27.8	V	3.0	30.4	1.0	-57.3	-13.0	-44.3	
5.137	-31.3	V	3.0	28.8	1.0	-59.1	-13.0	-46.1	
3.425	-24.3	H	3.0	30.4	1.0	-53.7	-13.0	-40.7	
5.137	-30.2	H	3.0	28.8	1.0	-57.9	-13.0	-44.9	
Mid Ch, (1732.6 MHz)									
3.465	-28.3	V	3.0	30.4	1.0	-57.7	-13.0	-44.7	
5.198	-32.0	V	3.0	28.7	1.0	-59.7	-13.0	-46.7	
3.465	-24.1	H	3.0	30.4	1.0	-53.5	-13.0	-40.5	
5.198	-30.0	H	3.0	28.7	1.0	-57.7	-13.0	-44.7	
High Ch, (1752.5 MHz)									
3.505	-28.1	V	3.0	30.4	1.0	-57.5	-13.0	-44.5	
5.258	-32.2	V	3.0	28.6	1.0	-59.8	-13.0	-46.8	
3.505	-23.8	H	3.0	30.4	1.0	-53.1	-13.0	-40.1	
5.258	-30.1	H	3.0	28.6	1.0	-57.8	-13.0	-44.8	
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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, 1xRTT, BC0

Chamber

Pre-amplifier

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	-24.8	V	3.0	32.7	1.0	-56.5	-13.0	-43.5	
2.474	-26.2	V	3.0	31.4	1.0	-56.6	-13.0	-43.6	
1.649	-23.3	H	3.0	32.7	1.0	-55.0	-13.0	-42.0	
2.474	-27.4	H	3.0	31.4	1.0	-57.7	-13.0	-44.7	
Mid Ch, (836.52MHz)									
1.673	-24.2	V	3.0	32.6	1.0	-55.8	-13.0	-42.8	
2.510	-25.4	V	3.0	31.5	1.0	-55.9	-13.0	-42.9	
1.673	-21.4	H	3.0	32.6	1.0	-53.0	-13.0	-40.0	
2.510	-27.8	H	3.0	31.5	1.0	-58.3	-13.0	-45.3	
High Ch, (848.31MHz)									
1.697	-22.4	V	3.0	32.6	1.0	-54.0	-13.0	-41.0	
2.545	-25.1	V	3.0	31.4	1.0	-55.6	-13.0	-42.6	
1.697	-18.9	H	3.0	32.6	1.0	-50.5	-13.0	-37.5	
2.545	-28.0	H	3.0	31.4	1.0	-58.4	-13.0	-45.4	

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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, EVDO Rev A, BC0

Chamber

Pre-amplifier

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	-25.1	V	3.0	32.7	1.0	-56.8	-13.0	-43.8	
2.474	-25.5	V	3.0	31.4	1.0	-55.9	-13.0	-42.9	
1.649	-21.9	H	3.0	32.7	1.0	-53.6	-13.0	-40.6	
2.474	-28.1	H	3.0	31.4	1.0	-58.5	-13.0	-45.5	
Mid Ch, (836.52MHz)									
1.673	-24.4	V	3.0	32.6	1.0	-56.0	-13.0	-43.0	
2.510	-26.7	V	3.0	31.5	1.0	-57.2	-13.0	-44.2	
1.673	-25.0	H	3.0	32.6	1.0	-56.6	-13.0	-43.6	
2.510	-28.7	H	3.0	31.5	1.0	-59.2	-13.0	-46.2	
High Ch, (848.31MHz)									
1.697	-23.5	V	3.0	32.6	1.0	-55.0	-13.0	-42.0	
2.545	-26.8	V	3.0	31.4	1.0	-57.3	-13.0	-44.3	
1.697	-21.7	H	3.0	32.6	1.0	-53.2	-13.0	-40.2	
2.545	-28.5	H	3.0	31.4	1.0	-58.9	-13.0	-45.9	

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 #:		13U14987							
Date:		06/19/13							
Test Engineer:		Mona Hua							
Configuration:		EUT only							
Mode:		CDMA 2000, EVDO Rev B 2 Min Carrier, BC0							
Chamber		Pre-amplifier			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	-27.4	V	3.0	32.7	1.0	-59.1	-13.0	-46.1	
2.476	-26.2	V	3.0	31.4	1.0	-56.6	-13.0	-43.6	
1.651	-25.2	H	3.0	32.7	1.0	-56.9	-13.0	-43.9	
2.476	-28.6	H	3.0	31.4	1.0	-59.0	-13.0	-46.0	
Mid Ch, (837.2MHz)									
1.674	-25.4	V	3.0	32.6	1.0	-57.0	-13.0	-44.0	
2.512	-25.9	V	3.0	31.5	1.0	-56.4	-13.0	-43.4	
1.674	-23.6	H	3.0	32.6	1.0	-55.2	-13.0	-42.2	
2.512	-29.0	H	3.0	31.5	1.0	-59.5	-13.0	-46.5	
High Ch, (847.6MHz)									
1.695	-24.1	V	3.0	32.6	1.0	-55.7	-13.0	-42.7	
2.543	-26.4	V	3.0	31.4	1.0	-56.9	-13.0	-43.9	
1.695	-20.7	H	3.0	32.6	1.0	-52.3	-13.0	-39.3	
2.543	-28.9	H	3.0	31.4	1.0	-59.3	-13.0	-46.3	
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 #:		13U14987							
Date:		06/19/13							
Test Engineer:		Mona Hua							
Configuration:		EUT only							
Mode:		CDMA 2000, EVDO Rev B 2 Max Carrier, BC0							
Chamber		Pre-amplifier			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	-27.6	V	3.0	32.7	1.0	-59.3	-13.0	-46.3	
2.480	-26.6	V	3.0	31.4	1.0	-57.0	-13.0	-44.0	
1.653	-25.6	H	3.0	32.7	1.0	-57.2	-13.0	-44.2	
2.480	-28.4	H	3.0	31.4	1.0	-58.8	-13.0	-45.8	
Mid Ch, (838.8MHz)									
1.686	-29.1	V	3.0	32.6	1.0	-60.7	-13.0	-47.7	
2.534	-26.4	V	3.0	31.5	1.0	-56.9	-13.0	-43.9	
1.686	-23.8	H	3.0	32.6	1.0	-55.4	-13.0	-42.4	
2.534	-28.6	H	3.0	31.5	1.0	-59.1	-13.0	-46.1	
High Ch, (844.9MHz)									
1.690	-25.4	V	3.0	32.6	1.0	-57.0	-13.0	-44.0	
2.535	-26.0	V	3.0	31.5	1.0	-56.4	-13.0	-43.4	
1.690	-23.3	H	3.0	32.6	1.0	-54.9	-13.0	-41.9	
2.535	-27.5	H	3.0	31.5	1.0	-57.9	-13.0	-44.9	
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 #: 13U14987
Date: 06/19/13
Test Engineer: Mona Hua
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	-26.8	V	3.0	32.7	1.0	-58.5	-13.0	-45.5	
2.478	-27.0	V	3.0	31.4	1.0	-57.3	-13.0	-44.3	
1.652	-26.1	H	3.0	32.7	1.0	-57.7	-13.0	-44.7	
2.478	-28.4	H	3.0	31.4	1.0	-58.8	-13.0	-45.8	
Mid Ch, (837.7MHz)									
1.675	-25.8	V	3.0	32.6	1.0	-57.4	-13.0	-44.4	
2.513	-25.8	V	3.0	31.5	1.0	-56.3	-13.0	-43.3	
1.675	-24.8	H	3.0	32.6	1.0	-56.4	-13.0	-43.4	
2.513	-28.8	H	3.0	31.5	1.0	-59.3	-13.0	-46.3	
High Ch, (846.7MHz)									
1.693	-25.4	V	3.0	32.6	1.0	-57.0	-13.0	-44.0	
2.540	-27.0	V	3.0	31.4	1.0	-57.4	-13.0	-44.4	
1.693	-22.2	H	3.0	32.6	1.0	-53.7	-13.0	-40.7	
2.540	-27.8	H	3.0	31.4	1.0	-58.2	-13.0	-45.2	

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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, 1xRTT, BC1

Chamber

3m Chamber D

Pre-amplifier

T145 8449B

Filter

Filter 1

Limit

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	-28.0	V	3.0	30.2	1.0	-57.2	-13.0	-44.2	
5.554	-33.3	V	3.0	28.4	1.0	-60.7	-13.0	-47.7	
3.703	-21.3	H	3.0	30.2	1.0	-50.5	-13.0	-37.5	
5.554	-31.3	H	3.0	28.4	1.0	-58.6	-13.0	-45.6	
Mid Ch, (1880MHz)									
3.760	-26.2	V	3.0	30.1	1.0	-55.4	-13.0	-42.4	
5.640	-33.4	V	3.0	28.3	1.0	-60.7	-13.0	-47.7	
3.760	-26.2	H	3.0	30.1	1.0	-55.3	-13.0	-42.3	
5.640	-31.7	H	3.0	28.3	1.0	-59.0	-13.0	-46.0	
High Ch, (1908.75MHz)									
3.818	-25.8	V	3.0	30.1	1.0	-54.9	-13.0	-41.9	
5.726	-32.5	V	3.0	28.2	1.0	-59.7	-13.0	-46.7	
3.818	-28.2	H	3.0	30.1	1.0	-57.3	-13.0	-44.3	
5.726	-30.8	H	3.0	28.2	1.0	-58.1	-13.0	-45.1	

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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, EVDO Rev A, BC1

Chamber

Pre-amplifier

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	-23.2	V	3.0	30.2	1.0	-52.4	-13.0	-39.4	
5.554	-32.1	V	3.0	28.4	1.0	-59.5	-13.0	-46.5	
3.703	-24.1	H	3.0	30.2	1.0	-53.2	-13.0	-40.2	
5.554	-30.6	H	3.0	28.4	1.0	-58.0	-13.0	-45.0	
Mid Ch, (1880MHz)									
3.760	-24.7	V	3.0	30.1	1.0	-53.8	-13.0	-40.8	
5.640	-33.2	V	3.0	28.3	1.0	-60.5	-13.0	-47.5	
3.760	-26.5	H	3.0	30.1	1.0	-55.7	-13.0	-42.7	
5.640	-31.6	H	3.0	28.3	1.0	-58.9	-13.0	-45.9	
High Ch, (1908.75MHz)									
3.818	-25.7	V	3.0	30.1	1.0	-54.8	-13.0	-41.8	
5.726	-32.8	V	3.0	28.2	1.0	-60.0	-13.0	-47.0	
3.818	-25.6	H	3.0	30.1	1.0	-54.7	-13.0	-41.7	
5.726	-30.7	H	3.0	28.2	1.0	-57.9	-13.0	-44.9	

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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, 1xRTT, BC10

Chamber

Pre-amplifier

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	-26.4	V	3.0	32.7	1.0	-58.1	-13.0	-45.1	
2.454	-27.8	V	3.0	31.3	1.0	-58.1	-13.0	-45.1	
1.636	-24.1	H	3.0	32.7	1.0	-55.8	-13.0	-42.8	
2.454	-29.5	H	3.0	31.3	1.0	-59.8	-13.0	-46.8	
Mid Ch, (819.15MHz)									
1.638	-26.2	V	3.0	32.7	1.0	-57.9	-13.0	-44.9	
2.457	-27.1	V	3.0	31.3	1.0	-57.4	-13.0	-44.4	
1.638	-24.6	H	3.0	32.7	1.0	-56.3	-13.0	-43.3	
2.457	-29.0	H	3.0	31.3	1.0	-59.3	-13.0	-46.3	
High Ch, (823.1MHz)									
1.646	-25.4	V	3.0	32.7	1.0	-57.1	-13.0	-44.1	
2.469	-27.5	V	3.0	31.3	1.0	-57.8	-13.0	-44.8	
1.646	-23.2	H	3.0	32.7	1.0	-54.9	-13.0	-41.9	
2.469	-28.5	H	3.0	31.3	1.0	-58.8	-13.0	-45.8	

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

CDMA2000 EVDO REV A, BC10

**Compliance Certification Services
 Above 1GHz High Frequency Substitution Measurement**

Company: Apple
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, EVDO Rev A, BC10

Chamber

Pre-amplifier

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	-27.8	V	3.0	32.7	1.0	-59.5	-13.0	-46.5	
2.454	-27.0	V	3.0	31.3	1.0	-57.3	-13.0	-44.3	
1.636	-26.6	H	3.0	32.7	1.0	-58.3	-13.0	-45.3	
2.454	-29.5	H	3.0	31.3	1.0	-59.8	-13.0	-46.8	
Mid Ch, (819.15MHz)									
1.638	-26.4	V	3.0	32.7	1.0	-58.1	-13.0	-45.1	
2.457	-27.8	V	3.0	31.3	1.0	-58.1	-13.0	-45.1	
1.638	-26.9	H	3.0	32.7	1.0	-58.6	-13.0	-45.6	
2.457	-29.7	H	3.0	31.3	1.0	-60.0	-13.0	-47.0	
High Ch, (823.1MHz)									
1.646	-25.1	V	3.0	32.7	1.0	-56.8	-13.0	-43.8	
2.469	-27.5	V	3.0	31.3	1.0	-57.8	-13.0	-44.8	
1.646	-26.6	H	3.0	32.7	1.0	-58.3	-13.0	-45.3	
2.469	-29.8	H	3.0	31.3	1.0	-60.1	-13.0	-47.1	

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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, 1xRTT, BC15

Chamber

Pre-amplifier

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	-20.8	V	3.0	30.4	1.0	-50.3	-13.0	-37.3	
5.134	-29.4	V	3.0	28.8	1.0	-57.2	-13.0	-44.2	
3.423	-24.2	H	3.0	30.4	1.0	-53.6	-13.0	-40.6	
5.134	-29.4	H	3.0	28.8	1.0	-57.2	-13.0	-44.2	
Mid Ch, (1732.5MHz)									
3.465	-21.4	V	3.0	30.4	1.0	-50.8	-13.0	-37.8	
5.198	-27.5	V	3.0	28.7	1.0	-55.2	-13.0	-42.2	
3.465	-21.0	H	3.0	30.4	1.0	-50.4	-13.0	-37.4	
5.198	-30.4	H	3.0	28.7	1.0	-58.1	-13.0	-45.1	
High Ch, (1753.75MHz)									
3.508	-23.7	V	3.0	30.4	1.0	-53.1	-13.0	-40.1	
5.261	-33.4	V	3.0	28.6	1.0	-61.0	-13.0	-48.0	
3.508	-24.4	H	3.0	30.4	1.0	-53.8	-13.0	-40.8	
5.261	-30.6	H	3.0	28.6	1.0	-58.3	-13.0	-45.3	

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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, EVDO Rev A, BC15

Chamber

Pre-amplifier

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	-20.4	V	3.0	30.4	1.0	-49.9	-13.0	-36.9	
5.134	-29.1	V	3.0	28.8	1.0	-56.9	-13.0	-43.9	
3.423	-17.0	H	3.0	30.4	1.0	-46.5	-13.0	-33.5	
5.134	-28.6	H	3.0	28.8	1.0	-56.4	-13.0	-43.4	
Mid Ch, (1732.5MHz)									
3.465	-21.6	V	3.0	30.4	1.0	-51.0	-13.0	-38.0	
5.198	-31.6	V	3.0	28.7	1.0	-59.3	-13.0	-46.3	
3.465	-16.8	H	3.0	30.4	1.0	-46.2	-13.0	-33.2	
5.198	-29.7	H	3.0	28.7	1.0	-57.4	-13.0	-44.4	
High Ch, (1753.75MHz)									
3.508	-21.9	V	3.0	30.4	1.0	-51.3	-13.0	-38.3	
5.261	-27.4	V	3.0	28.6	1.0	-55.0	-13.0	-42.0	
3.508	-21.8	H	3.0	30.4	1.0	-51.2	-13.0	-38.2	
5.261	-31.7	H	3.0	28.6	1.0	-59.4	-13.0	-46.4	

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

UAT / PORT B

GPRS850

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U14987
Date: 05/30/13
Test Engineer: Roy Zheng
Configuration: EUT only
Mode: GPRS CELL

Chamber

3m Chamber D

Pre-amplifier

T145 8449B

Filter

Filter 1

Limit

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	-7.6	V	3.0	32.7	1.0	-39.3	-13.0	-26.3	
2.473	-18.8	V	3.0	31.4	1.0	-49.2	-13.0	-36.2	
1.648	-9.6	H	3.0	32.7	1.0	-41.3	-13.0	-28.3	
2.473	-20.8	H	3.0	31.4	1.0	-51.2	-13.0	-38.2	
Mid Ch, (836.6MHz)									
1.673	-16.9	V	3.0	32.6	1.0	-48.5	-13.0	-35.5	
2.510	-26.4	V	3.0	31.5	1.0	-56.9	-13.0	-43.9	
1.673	-19.6	H	3.0	32.6	1.0	-51.2	-13.0	-38.2	
2.510	-28.0	H	3.0	31.5	1.0	-58.5	-13.0	-45.5	
High Ch, (848.8MHz)									
1.698	-17.4	V	3.0	32.5	1.0	-48.9	-13.0	-35.9	
2.546	-17.9	V	3.0	31.4	1.0	-48.4	-13.0	-35.4	
1.698	-19.3	H	3.0	32.5	1.0	-50.8	-13.0	-37.8	
2.546	-16.8	H	3.0	31.4	1.0	-47.2	-13.0	-34.2	

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

EGPRS850

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U14987
Date: 05/30/13
Test Engineer: Roy Zheng
Configuration: EUT only
Mode: EGPRS CELL

Chamber

Pre-amplifier

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	-17.5	V	3.0	32.7	1.0	-49.2	-13.0	-36.2	
2.473	-17.4	V	3.0	31.4	1.0	-47.8	-13.0	-34.8	
1.648	-22.3	H	3.0	32.7	1.0	-54.0	-13.0	-41.0	
2.473	-18.8	H	3.0	31.4	1.0	-49.2	-13.0	-36.2	
Mid Ch, (836.6MHz)									
1.673	-18.5	V	3.0	32.6	1.0	-50.1	-13.0	-37.1	
2.510	-18.7	V	3.0	31.5	1.0	-49.2	-13.0	-36.2	
1.673	-20.2	H	3.0	32.6	1.0	-51.8	-13.0	-38.8	
2.510	-20.0	H	3.0	31.5	1.0	-50.5	-13.0	-37.5	
High Ch, (848.8MHz)									
1.698	-19.5	V	3.0	32.5	1.0	-51.0	-13.0	-38.0	
2.546	-19.0	V	3.0	31.4	1.0	-49.5	-13.0	-36.5	
1.698	-21.4	H	3.0	32.5	1.0	-52.9	-13.0	-39.9	
2.546	-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.

UMTS850, REL 99

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U14987
Date: 05/30/13
Test Engineer: Roy Zheng
Configuration: EUT only
Mode: REL 99 CELL

Chamber

3m Chamber D

Pre-amplifier

T145 8449B

Filter

Filter 1

Limit

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	-28.8	V	3.0	32.7	1.0	-60.5	-13.0	-47.5	
2.479	-27.2	V	3.0	31.4	1.0	-57.6	-13.0	-44.6	
1.653	-30.7	H	3.0	32.7	1.0	-62.3	-13.0	-49.3	
2.479	-28.9	H	3.0	31.4	1.0	-59.3	-13.0	-46.3	
Mid Ch, (836.6MHz)									
1.673	-26.3	V	3.0	32.6	1.0	-57.9	-13.0	-44.9	
2.510	-26.9	V	3.0	31.5	1.0	-57.4	-13.0	-44.4	
1.673	-27.1	H	3.0	32.6	1.0	-58.7	-13.0	-45.7	
2.510	-29.2	H	3.0	31.5	1.0	-59.7	-13.0	-46.7	
High Ch, (846.6MHz)									
1.688	-28.6	V	3.0	32.6	1.0	-60.1	-13.0	-47.1	
2.532	-26.8	V	3.0	31.5	1.0	-57.3	-13.0	-44.3	
1.688	-28.2	H	3.0	32.6	1.0	-59.8	-13.0	-46.8	
2.532	-29.1	H	3.0	31.5	1.0	-59.6	-13.0	-46.6	

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

HSDPA

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U14987
Date: 05/30/13
Test Engineer: Roy 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	-29.0	V	3.0	32.7	1.0	-60.7	-13.0	-47.7	
2.479	-27.6	V	3.0	31.4	1.0	-58.0	-13.0	-45.0	
1.653	-31.0	H	3.0	32.7	1.0	-62.6	-13.0	-49.6	
2.479	-29.0	H	3.0	31.4	1.0	-59.4	-13.0	-46.4	
Mid Ch, (836.6MHz)									
1.673	-28.8	V	3.0	32.6	1.0	-60.4	-13.0	-47.4	
2.510	-26.9	V	3.0	31.5	1.0	-57.4	-13.0	-44.4	
1.673	-29.8	H	3.0	32.6	1.0	-61.4	-13.0	-48.4	
2.510	-28.9	H	3.0	31.5	1.0	-59.4	-13.0	-46.4	
High Ch, (846.6MHz)									
1.688	-28.2	V	3.0	32.6	1.0	-59.7	-13.0	-46.7	
2.532	-27.1	V	3.0	31.5	1.0	-57.6	-13.0	-44.6	
1.688	-29.6	H	3.0	32.6	1.0	-61.2	-13.0	-48.2	
2.532	-28.8	H	3.0	31.5	1.0	-59.3	-13.0	-46.3	

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

GPRS1900

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U14987
Date: 05/30/13
Test Engineer: Roy Zheng
Configuration: EUT only
Mode: GPRS PCS

Chamber

Pre-amplifier

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	-26.7	V	3.0	30.2	1.0	-55.9	-13.0	-42.9	
7.401	-29.8	V	3.0	26.5	1.0	-55.3	-13.0	-42.3	
3.700	-28.5	H	3.0	30.2	1.0	-57.7	-13.0	-44.7	
7.401	-29.2	H	3.0	26.5	1.0	-54.7	-13.0	-41.7	
Mid Ch, (1880 MHz)									
3.760	-27.0	V	3.0	30.1	1.0	-56.2	-13.0	-43.2	
7.520	-29.8	V	3.0	26.3	1.0	-55.1	-13.0	-42.1	
3.760	-28.1	H	3.0	30.1	1.0	-57.2	-13.0	-44.2	
7.520	-28.8	H	3.0	26.3	1.0	-54.1	-13.0	-41.1	
High Ch, (1909.8 MHz)									
3.819	-26.8	V	3.0	30.1	1.0	-55.9	-13.0	-42.9	
7.639	-29.2	V	3.0	26.2	1.0	-54.3	-13.0	-41.3	
3.819	-27.4	H	3.0	30.1	1.0	-56.5	-13.0	-43.5	
7.639	-28.0	H	3.0	26.2	1.0	-53.2	-13.0	-40.2	

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

EGPRS1900

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U14987
Date: 05/30/13
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	-27.2	V	3.0	30.2	1.0	-56.4	-13.0	-43.4	
7.401	-30.2	V	3.0	26.5	1.0	-55.7	-13.0	-42.7	
3.700	-27.7	H	3.0	30.2	1.0	-56.9	-13.0	-43.9	
7.401	-29.0	H	3.0	26.5	1.0	-54.5	-13.0	-41.5	
Mid Ch, (1880 MHz)									
3.760	-27.6	V	3.0	30.1	1.0	-56.8	-13.0	-43.8	
7.520	-29.9	V	3.0	26.3	1.0	-55.2	-13.0	-42.2	
3.760	-26.6	H	3.0	30.1	1.0	-55.7	-13.0	-42.7	
7.520	-29.1	H	3.0	26.3	1.0	-54.4	-13.0	-41.4	
High Ch, (1909.8 MHz)									
3.819	-26.3	V	3.0	30.1	1.0	-55.4	-13.0	-42.4	
7.639	-29.6	V	3.0	26.2	1.0	-54.7	-13.0	-41.7	
3.819	-27.4	H	3.0	30.1	1.0	-56.5	-13.0	-43.5	
7.639	-26.9	H	3.0	26.2	1.0	-52.1	-13.0	-39.1	

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

UMTS1900, REL 99

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U14987
Date: 05/30/13
Test Engineer: Roy Zheng
Configuration: EUT only
Mode: REL 99 PCS

Chamber
 3m Chamber D

Pre-amplifier
 T145 8449B

Filter
 Filter 1

Limit
 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	-27.4	V	3.0	30.2	1.0	-56.6	-13.0	-43.6	
7.410	-29.7	V	3.0	26.5	1.0	-55.1	-13.0	-42.1	
3.705	-28.0	H	3.0	30.2	1.0	-57.2	-13.0	-44.2	
7.410	-28.7	H	3.0	26.5	1.0	-54.2	-13.0	-41.2	
Mid Ch, (1880 MHz)									
3.760	-27.3	V	3.0	30.1	1.0	-56.5	-13.0	-43.5	
7.520	-28.4	V	3.0	26.3	1.0	-53.7	-13.0	-40.7	
3.760	-27.5	H	3.0	30.1	1.0	-56.6	-13.0	-43.6	
7.520	-27.7	H	3.0	26.3	1.0	-53.0	-13.0	-40.0	
High Ch, (1907.6 MHz)									
3.815	-28.5	V	3.0	30.1	1.0	-57.6	-13.0	-44.6	
7.630	-28.5	V	3.0	26.2	1.0	-53.7	-13.0	-40.7	
3.815	-28.0	H	3.0	30.1	1.0	-57.1	-13.0	-44.1	
7.630	-27.5	H	3.0	26.2	1.0	-52.7	-13.0	-39.7	

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

HSDPA

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U14987
Date: 05/30/13
Test Engineer: Roy Zheng
Configuration: EUT only
Mode: HSDPA PCS

Chamber
 3m Chamber D

Pre-amplifier
 T145 8449B

Filter
 Filter 1

Limit
 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	-26.4	V	3.0	30.2	1.0	-55.6	-13.0	-42.6	
7.410	-28.7	V	3.0	26.5	1.0	-54.1	-13.0	-41.1	
3.705	-28.0	H	3.0	30.2	1.0	-57.2	-13.0	-44.2	
7.410	-27.7	H	3.0	26.5	1.0	-53.2	-13.0	-40.2	
Mid Ch, (1880 MHz)									
3.760	-26.3	V	3.0	30.1	1.0	-55.5	-13.0	-42.5	
7.520	-28.4	V	3.0	26.3	1.0	-53.7	-13.0	-40.7	
3.760	-27.5	H	3.0	30.1	1.0	-56.6	-13.0	-43.6	
7.520	-27.6	H	3.0	26.3	1.0	-52.9	-13.0	-39.9	
High Ch, (1907.6 MHz)									
3.815	-27.6	V	3.0	30.1	1.0	-56.7	-13.0	-43.7	
7.630	-28.5	V	3.0	26.2	1.0	-53.7	-13.0	-40.7	
3.815	-28.0	H	3.0	30.1	1.0	-57.1	-13.0	-44.1	
7.630	-27.8	H	3.0	26.2	1.0	-53.0	-13.0	-40.0	

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

UMTS1700, REL 99

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Apple							
Project #:		13U14987							
Date:		06/20/13							
Test Engineer:		Mona Hua							
Configuration:		EUT Only							
Mode:		REL 99, Band 4							
Chamber		Pre-amplifier			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, (1712.4 MHz)									
3.425	-29.0	V	3.0	30.4	1.0	-58.5	-13.0	-45.5	
5.137	-31.1	V	3.0	28.8	1.0	-58.9	-13.0	-45.9	
3.425	-28.4	H	3.0	30.4	1.0	-57.8	-13.0	-44.8	
5.137	-29.3	H	3.0	28.8	1.0	-57.0	-13.0	-44.0	
Mid Ch, (1732.6 MHz)									
3.465	-29.2	V	3.0	30.4	1.0	-58.6	-13.0	-45.6	
5.198	-31.5	V	3.0	28.7	1.0	-59.2	-13.0	-46.2	
3.465	-27.0	H	3.0	30.4	1.0	-56.4	-13.0	-43.4	
5.198	-29.5	H	3.0	28.7	1.0	-57.2	-13.0	-44.2	
High Ch, (1752.5 MHz)									
3.505	-29.1	V	3.0	30.4	1.0	-58.5	-13.0	-45.5	
5.258	-31.5	V	3.0	28.6	1.0	-59.1	-13.0	-46.1	
3.505	-28.1	H	3.0	30.4	1.0	-57.4	-13.0	-44.4	
5.258	-29.3	H	3.0	28.6	1.0	-57.0	-13.0	-44.0	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

HSDPA

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Apple							
Project #:		13U14987							
Date:		06/20/13							
Test Engineer:		Mona Hua							
Configuration:		EUT Only							
Mode:		HSDPA, Band 4							
Chamber		Pre-amplifier			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, (1712.4 MHz)									
3.425	-28.9	V	3.0	30.4	1.0	-58.4	-13.0	-45.4	
5.137	-31.0	V	3.0	28.8	1.0	-58.8	-13.0	-45.8	
3.425	-29.0	H	3.0	30.4	1.0	-58.4	-13.0	-45.4	
5.137	-29.1	H	3.0	28.8	1.0	-56.8	-13.0	-43.8	
Mid Ch, (1732.6 MHz)									
3.465	-28.8	V	3.0	30.4	1.0	-58.2	-13.0	-45.2	
5.198	-32.0	V	3.0	28.7	1.0	-59.7	-13.0	-46.7	
3.465	-28.7	H	3.0	30.4	1.0	-58.1	-13.0	-45.1	
5.198	-29.6	H	3.0	28.7	1.0	-57.3	-13.0	-44.3	
High Ch, (1752.5 MHz)									
3.505	-28.9	V	3.0	30.4	1.0	-58.2	-13.0	-45.2	
5.258	-31.8	V	3.0	28.6	1.0	-59.4	-13.0	-46.4	
3.505	-26.4	H	3.0	30.4	1.0	-55.7	-13.0	-42.7	
5.258	-30.2	H	3.0	28.6	1.0	-57.9	-13.0	-44.9	
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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, 1xRTT, BC0

Chamber

Pre-amplifier

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	-27.3	V	3.0	32.7	1.0	-59.0	-13.0	-46.0	
2.474	-26.6	V	3.0	31.4	1.0	-57.0	-13.0	-44.0	
1.649	-27.8	H	3.0	32.7	1.0	-59.5	-13.0	-46.5	
2.474	-27.5	H	3.0	31.4	1.0	-57.9	-13.0	-44.9	
Mid Ch, (836.52MHz)									
1.673	-23.3	V	3.0	32.6	1.0	-54.9	-13.0	-41.9	
2.510	-24.1	V	3.0	31.5	1.0	-54.6	-13.0	-41.6	
1.673	-25.1	H	3.0	32.6	1.0	-56.7	-13.0	-43.7	
2.510	-28.2	H	3.0	31.5	1.0	-58.7	-13.0	-45.7	
High Ch, (848.31MHz)									
1.697	-23.5	V	3.0	32.6	1.0	-55.0	-13.0	-42.0	
2.545	-23.4	V	3.0	31.4	1.0	-53.9	-13.0	-40.9	
1.697	-20.3	H	3.0	32.6	1.0	-51.8	-13.0	-38.8	
2.545	-27.3	H	3.0	31.4	1.0	-57.7	-13.0	-44.7	

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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, EVDO Rev A, BC0

Chamber

Pre-amplifier

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	-26.5	V	3.0	32.7	1.0	-58.2	-13.0	-45.2	
2.474	-26.0	V	3.0	31.4	1.0	-56.4	-13.0	-43.4	
1.649	-26.9	H	3.0	32.7	1.0	-58.6	-13.0	-45.6	
2.474	-25.6	H	3.0	31.4	1.0	-56.0	-13.0	-43.0	
3.299	-30.9	H	3.0	30.5	1.0	-60.5	-13.0	-47.5	
Mid Ch, (836.52MHz)									
1.673	-21.6	V	3.0	32.6	1.0	-53.2	-13.0	-40.2	
2.510	-23.3	V	3.0	31.5	1.0	-53.8	-13.0	-40.8	
1.673	-23.5	H	3.0	32.6	1.0	-55.1	-13.0	-42.1	
2.510	-24.3	H	3.0	31.5	1.0	-54.8	-13.0	-41.8	
3.346	-30.3	H	3.0	30.5	1.0	-59.8	-13.0	-46.8	
High Ch, (848.31MHz)									
1.697	-21.0	V	3.0	32.6	1.0	-52.5	-13.0	-39.5	
2.545	-21.3	V	3.0	31.4	1.0	-51.8	-13.0	-38.8	
3.393	-30.5	V	3.0	30.5	1.0	-59.9	-13.0	-46.9	
1.697	-20.5	H	3.0	32.6	1.0	-52.0	-13.0	-39.0	
2.545	-22.8	H	3.0	31.4	1.0	-53.2	-13.0	-40.2	
3.393	-30.5	H	3.0	30.5	1.0	-60.0	-13.0	-47.0	

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 #:		13U14987							
Date:		06/19/13							
Test Engineer:		Mona Hua							
Configuration:		EUT only							
Mode:		CDMA 2000, EVDO Rev B 2 Min Carrier, BC0							
Chamber		Pre-amplifier			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	-28.3	V	3.0	32.7	1.0	-60.0	-13.0	-47.0	
2.476	-26.7	V	3.0	31.4	1.0	-57.1	-13.0	-44.1	
1.651	-27.7	H	3.0	32.7	1.0	-59.3	-13.0	-46.3	
2.476	-28.7	H	3.0	31.4	1.0	-59.1	-13.0	-46.1	
Mid Ch, (837.2MHz)									
1.674	-27.7	V	3.0	32.6	1.0	-59.3	-13.0	-46.3	
2.512	-27.0	V	3.0	31.5	1.0	-57.5	-13.0	-44.5	
1.674	-26.8	H	3.0	32.6	1.0	-58.4	-13.0	-45.4	
2.512	-28.8	H	3.0	31.5	1.0	-59.3	-13.0	-46.3	
High Ch, (847.6MHz)									
1.695	-28.1	V	3.0	32.6	1.0	-59.6	-13.0	-46.6	
2.543	-27.0	V	3.0	31.4	1.0	-57.4	-13.0	-44.4	
1.695	-29.3	H	3.0	32.6	1.0	-60.8	-13.0	-47.8	
2.543	-29.2	H	3.0	31.4	1.0	-59.6	-13.0	-46.6	
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 #:		13U14987							
Date:		06/19/13							
Test Engineer:		Mona Hua							
Configuration:		EUT only							
Mode:		CDMA 2000, EVDO Rev B 2 Max Carrier, BC0							
Chamber		Pre-amplifier			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	-28.1	V	3.0	32.7	1.0	-59.8	-13.0	-46.8	
2.480	-27.4	V	3.0	31.4	1.0	-57.8	-13.0	-44.8	
1.653	-27.0	H	3.0	32.7	1.0	-58.6	-13.0	-45.6	
2.480	-28.1	H	3.0	31.4	1.0	-58.5	-13.0	-45.5	
Mid Ch, (838.8MHz)									
1.686	-28.3	V	3.0	32.6	1.0	-59.9	-13.0	-46.9	
2.534	-26.8	V	3.0	31.5	1.0	-57.2	-13.0	-44.2	
1.686	-27.5	H	3.0	32.6	1.0	-59.1	-13.0	-46.1	
2.534	-27.7	H	3.0	31.5	1.0	-58.2	-13.0	-45.2	
High Ch, (844.9MHz)									
1.690	-26.9	V	3.0	32.6	1.0	-58.4	-13.0	-45.4	
2.535	-26.6	V	3.0	31.5	1.0	-57.1	-13.0	-44.1	
1.690	-28.2	H	3.0	32.6	1.0	-59.8	-13.0	-46.8	
2.535	-28.1	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.									

CDMA2000, EVDO B 3 MIN, BC0

Compliance Certification Services									
Above 1GHz High Frequency Substitution Measurement									
Company:		Apple							
Project #:		13U14987							
Date:		06/19/13							
Test Engineer:		Mona Hua							
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	-28.1	V	3.0	32.7	1.0	-59.8	-13.0	-46.8	
2.478	-27.5	V	3.0	31.4	1.0	-57.9	-13.0	-44.9	
1.652	-26.9	H	3.0	32.7	1.0	-58.5	-13.0	-45.5	
2.478	-28.8	H	3.0	31.4	1.0	-59.2	-13.0	-46.2	
Mid Ch, (837.7MHz)									
1.675	-28.2	V	3.0	32.6	1.0	-59.8	-13.0	-46.8	
2.513	-27.3	V	3.0	31.5	1.0	-57.7	-13.0	-44.7	
1.675	-27.3	H	3.0	32.6	1.0	-58.9	-13.0	-45.9	
2.513	-28.0	H	3.0	31.5	1.0	-58.5	-13.0	-45.5	
High Ch, (846.7MHz)									
1.693	-28.0	V	3.0	32.6	1.0	-59.5	-13.0	-46.5	
2.540	-27.7	V	3.0	31.4	1.0	-58.1	-13.0	-45.1	
1.693	-28.4	H	3.0	32.6	1.0	-59.9	-13.0	-46.9	
2.540	-28.8	H	3.0	31.4	1.0	-59.3	-13.0	-46.3	
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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, 1xRTT, BC1

Chamber

3m Chamber D

Pre-amplifier

T145 8449B

Filter

Filter 1

Limit

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	-25.3	V	3.0	30.2	1.0	-54.5	-13.0	-41.5	
5.554	-32.7	V	3.0	28.4	1.0	-60.1	-13.0	-47.1	
3.703	-28.5	H	3.0	30.2	1.0	-57.6	-13.0	-44.6	
5.554	-31.4	H	3.0	28.4	1.0	-58.8	-13.0	-45.8	
Mid Ch, (1880MHz)									
3.760	-26.0	V	3.0	30.1	1.0	-55.1	-13.0	-42.1	
5.640	-32.7	V	3.0	28.3	1.0	-60.0	-13.0	-47.0	
3.760	-27.2	H	3.0	30.1	1.0	-56.3	-13.0	-43.3	
5.640	-31.7	H	3.0	28.3	1.0	-59.0	-13.0	-46.0	
High Ch, (1908.75MHz)									
3.818	-28.1	V	3.0	30.1	1.0	-57.2	-13.0	-44.2	
5.726	-33.1	V	3.0	28.2	1.0	-60.3	-13.0	-47.3	
3.818	-28.4	H	3.0	30.1	1.0	-57.5	-13.0	-44.5	
5.726	-31.7	H	3.0	28.2	1.0	-58.9	-13.0	-45.9	

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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, EVDO Rev A, BC1

Chamber

Pre-amplifier

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	-27.2	V	3.0	30.2	1.0	-56.4	-13.0	-43.4	
5.554	-32.1	V	3.0	28.4	1.0	-59.5	-13.0	-46.5	
3.703	-25.9	H	3.0	30.2	1.0	-55.0	-13.0	-42.0	
5.554	-30.7	H	3.0	28.4	1.0	-58.1	-13.0	-45.1	
Mid Ch, (1880MHz)									
3.760	-26.2	V	3.0	30.1	1.0	-55.3	-13.0	-42.3	
5.640	-33.1	V	3.0	28.3	1.0	-60.4	-13.0	-47.4	
3.760	-26.8	H	3.0	30.1	1.0	-55.9	-13.0	-42.9	
5.640	-31.2	H	3.0	28.3	1.0	-58.5	-13.0	-45.5	
High Ch, (1908.75MHz)									
3.818	-28.0	V	3.0	30.1	1.0	-57.1	-13.0	-44.1	
5.726	-32.4	V	3.0	28.2	1.0	-59.6	-13.0	-46.6	
3.818	-28.3	H	3.0	30.1	1.0	-57.4	-13.0	-44.4	
5.726	-31.7	H	3.0	28.2	1.0	-58.9	-13.0	-45.9	

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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, 1xRTT, BC10

Chamber

Pre-amplifier

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	-28.0	V	3.0	32.7	1.0	-59.7	-13.0	-46.7	
2.454	-27.9	V	3.0	31.3	1.0	-58.2	-13.0	-45.2	
1.636	-29.6	H	3.0	32.7	1.0	-61.3	-13.0	-48.3	
2.454	-28.8	H	3.0	31.3	1.0	-59.0	-13.0	-46.0	
Mid Ch, (819.15MHz)									
1.638	-28.3	V	3.0	32.7	1.0	-60.0	-13.0	-47.0	
2.457	-27.8	V	3.0	31.3	1.0	-58.1	-13.0	-45.1	
1.638	-28.8	H	3.0	32.7	1.0	-60.5	-13.0	-47.5	
2.457	-29.3	H	3.0	31.3	1.0	-59.6	-13.0	-46.6	
High Ch, (823.1MHz)									
1.646	-28.4	V	3.0	32.7	1.0	-60.1	-13.0	-47.1	
2.469	-27.8	V	3.0	31.3	1.0	-58.1	-13.0	-45.1	
1.646	-29.8	H	3.0	32.7	1.0	-61.5	-13.0	-48.5	
2.469	-29.5	H	3.0	31.3	1.0	-59.8	-13.0	-46.8	

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

CDMA2000 EVDO REV A, BC10

**Compliance Certification Services
 Above 1GHz High Frequency Substitution Measurement**

Company: Apple
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, EVDO Rev A, BC10

Chamber

Pre-amplifier

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	-28.5	V	3.0	32.7	1.0	-60.2	-13.0	-47.2	
2.454	-28.0	V	3.0	31.3	1.0	-58.3	-13.0	-45.3	
1.636	-28.8	H	3.0	32.7	1.0	-60.5	-13.0	-47.5	
2.454	-28.7	H	3.0	31.3	1.0	-58.9	-13.0	-45.9	
Mid Ch, (819.15MHz)									
1.638	-27.2	V	3.0	32.7	1.0	-58.9	-13.0	-45.9	
2.457	-27.4	V	3.0	31.3	1.0	-57.7	-13.0	-44.7	
1.638	-28.5	H	3.0	32.7	1.0	-60.2	-13.0	-47.2	
2.457	-29.2	H	3.0	31.3	1.0	-59.5	-13.0	-46.5	
High Ch, (823.1MHz)									
1.646	-26.8	V	3.0	32.7	1.0	-58.5	-13.0	-45.5	
2.469	-27.1	V	3.0	31.3	1.0	-57.4	-13.0	-44.4	
1.646	-27.0	H	3.0	32.7	1.0	-58.7	-13.0	-45.7	
2.469	-27.3	H	3.0	31.3	1.0	-57.6	-13.0	-44.6	

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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, 1xRTT, BC15

Chamber

Pre-amplifier

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	-30.6	V	3.0	30.4	1.0	-60.0	-13.0	-47.0	
5.134	-32.4	V	3.0	28.8	1.0	-60.2	-13.0	-47.2	
3.423	-30.4	H	3.0	30.4	1.0	-59.9	-13.0	-46.9	
5.134	-30.7	H	3.0	28.8	1.0	-58.5	-13.0	-45.5	
Mid Ch, (1732.5MHz)									
3.465	-30.2	V	3.0	30.4	1.0	-59.6	-13.0	-46.6	
5.198	-32.7	V	3.0	28.7	1.0	-60.4	-13.0	-47.4	
3.465	-30.6	H	3.0	30.4	1.0	-60.0	-13.0	-47.0	
5.198	-31.8	H	3.0	28.7	1.0	-59.5	-13.0	-46.5	
High Ch, (1753.75MHz)									
3.508	-30.3	V	3.0	30.4	1.0	-59.7	-13.0	-46.7	
5.261	-33.4	V	3.0	28.6	1.0	-61.0	-13.0	-48.0	
3.508	-29.2	H	3.0	30.4	1.0	-58.6	-13.0	-45.6	
5.261	-32.7	H	3.0	28.6	1.0	-60.4	-13.0	-47.4	

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
Project #: 13U14987
Date: 06/03/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: CDMA 2000, EVDO Rev A, BC15

Chamber

3m Chamber D

Pre-amplifier

T145 8449B

Filter

Filter 1

Limit

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	-30.4	V	3.0	30.4	1.0	-59.8	-13.0	-46.8	
5.134	-32.5	V	3.0	28.8	1.0	-60.3	-13.0	-47.3	
3.423	-29.4	H	3.0	30.4	1.0	-58.9	-13.0	-45.9	
5.134	-31.4	H	3.0	28.8	1.0	-59.2	-13.0	-46.2	
Mid Ch, (1732.5MHz)									
3.465	-30.0	V	3.0	30.4	1.0	-59.4	-13.0	-46.4	
5.198	-33.5	V	3.0	28.7	1.0	-61.2	-13.0	-48.2	
3.465	-29.9	H	3.0	30.4	1.0	-59.3	-13.0	-46.3	
5.198	-32.2	H	3.0	28.7	1.0	-59.9	-13.0	-46.9	
High Ch, (1753.75MHz)									
3.508	-30.5	V	3.0	30.4	1.0	-59.9	-13.0	-46.9	
5.261	-33.7	V	3.0	28.6	1.0	-61.3	-13.0	-48.3	
3.508	-29.2	H	3.0	30.4	1.0	-58.6	-13.0	-45.6	
5.261	-31.9	H	3.0	28.6	1.0	-59.6	-13.0	-46.6	

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