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

FOR

TABLET DEVICE

MODEL NUMBER: A1550

FCC ID: BCGA1550

REPORT NUMBER: 14U19187-E7, REVISION A

ISSUE DATE: MAY 18, 2015

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

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	04/21/2015	Initial Issue	C. Pang
A	05/18/2015	Revised report to address TCB's questions	T. Chu

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: TABLET DEVICE

MODEL: A1550

SERIAL NUMBER: F4KP6037GJK6 (CONDUCTED); F4KP604JGJK5 (RADIATED)

DATE TESTED: FEBRUARY 16, 2015 – MAY 18 2015

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 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:

CHIN PANG
SENIOR ENGINNER
UL VERIFICATION SERVICES INC.

Tested By:

FRANCISCO GUARNERO
LAB TECHNICIAN
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 KDB 971168 D01 v02r02.

3. FACILITIES AND ACCREDITATION

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

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

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, respectively.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	± 3.52 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.94 dB
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a tablet with multimedia functions (music, application support, and video), Cellular GSM/GPRS/EGPRS/CDMA2000 1xRTT/1x Advanced/EVDO Rev.A/EVDO Rev.B /WCDMA /HSPA+/DC-HSDPA/LTE FDD & Carrier Aggregation/TDD/TD-SCDMA radio, IEEE 802.11a/b/g/n/ac radio, and Bluetooth radio. The rechargeable battery is not user accessible.

5.2. MAXIMUM OUTPUT POWER

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

GSM MODES

Part 22/ RSS 132 850MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		ERP (Average)		EIRP (Average)	
		dBm	mW	dBm	mW	dBm	mW
824- 849	GPRS	33.48	2228.4	30.18	1042.3	32.33	1710.0
	EGPRS	27.90	616.6	25.46	351.6	27.61	576.8

Part 24/RSS 133 1900MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1850 - 1910	GPRS	30.49	1119.4	30.18	1042.3
	EGPRS	26.98	498.9	29.95	988.6

CDMA2000 MODES

Part 90 800MHz SECONDARY Band

Frequency range (MHz)	Modulation	Conducted (Average)		ERP (Average)		EIRP (Average)	
		dBm	mW	dBm	mW	dBm	mW
817 – 824	CDMA 2000 1xRTT	24.98	314.8	21.54	142.6	23.69	233.9
	CDMA 2000 EVDO-Rev A	24.99	315.5	21.70	147.9	23.85	242.7

Part 22 / RSS 132 850MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		ERP (Average)		EIRP (Average)	
		dBm	mW	dBm	mW	dBm	mW
824 – 849	CDMA 2000 1xRTT	24.45	278.6	22.89	194.5	25.04	319.2
	CDMA 2000 EVDO-Rev A	24.50	281.8	22.98	198.6	25.13	325.8

Part 24 / RSS 133 1900MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1850 – 1910	CDMA 2000 1xRTT	23.95	248.3	25.78	378.4
	CDMA 2000 EVDO-Rev A	23.99	250.6	25.85	384.6

Part 27 / RSS 139 1700MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1710 – 1755	CDMA 2000 1xRTT	24.50	281.8	25.60	363.1
	CDMA 2000 EVDO-Rev A	24.50	281.8	25.68	369.8

Part 22 RSS 132 850MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		ERP (Average)		EIRP (Avrage)	
		dBm	mW	dBm	mW	dBm	mW
2 CARRIER MIN	CDMA EVDO B	21.94	156.3	19.38	86.7	21.53	142.2
2 CARRIER MAX	CDMA EVDO B	21.92	155.6	19.33	85.7	21.48	140.6
3 CARRIER MIN	CDMAEVDO B	21.95	156.7	19.63	91.8	21.78	150.7

UMTS MODES

Part 22 / RSS 132 850MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		ERP (Average)		EIRP (Average)	
		dBm	mW	dBm	mW	dBm	mW
824 – 849	REL 99	25.00	316.2	22.24	167.5	24.39	274.8
	HSDPA REL 5	24.20	263.0	20.13	103.0	22.28	169.0

Part 27 /RSS 139 1700MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1710– 1755	REL 99	24.50	281.8	25.93	391.7
	HSDPA REL 5	23.68	233.3	24.78	300.6

Part 24 / RSS 133 1900MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1850 – 1910	REL 99	24.00	251.2	25.84	383.7
	HSDPA REL 5	23.32	214.8	25.02	317.7

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency (MHz)	Gain (dBi)
817 - 849	-1.3
1850 - 1910	2.1
1710 - 1754	1.5

5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 12H33 Baseband 2.17.00.

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

5.5. WORST-CASE CONFIGURATION AND MODE

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

Worst-case modes:
- GSM GPRS
- GSM EGPRS
- CDMA 2000 1xRTT
- CDMA 2000 EVDO REV. A
- CDMA 2000 EVDO REV. B
- UMTS REL 99
- UMTS HSDPA

The fundamental of the EUT was investigated in three orthogonal orientations X/Y/Z, it was determined that Z-portrait orientation was worst-case orientation for cell bands; Y-landscape orientation was worst-case orientation for pcs bands without AC/DC adapter and headset.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List			
Description	**Manufacturer**	**Model**	**Serial Number**
AC/DC adapter	Dell	Latitude D630	N/A
Laptop	Dell	PA-1900-02D	N/A
DC power supply	Sorensen	XHR 60-18	N/A

I/O CABLES (RF Conducted Test)

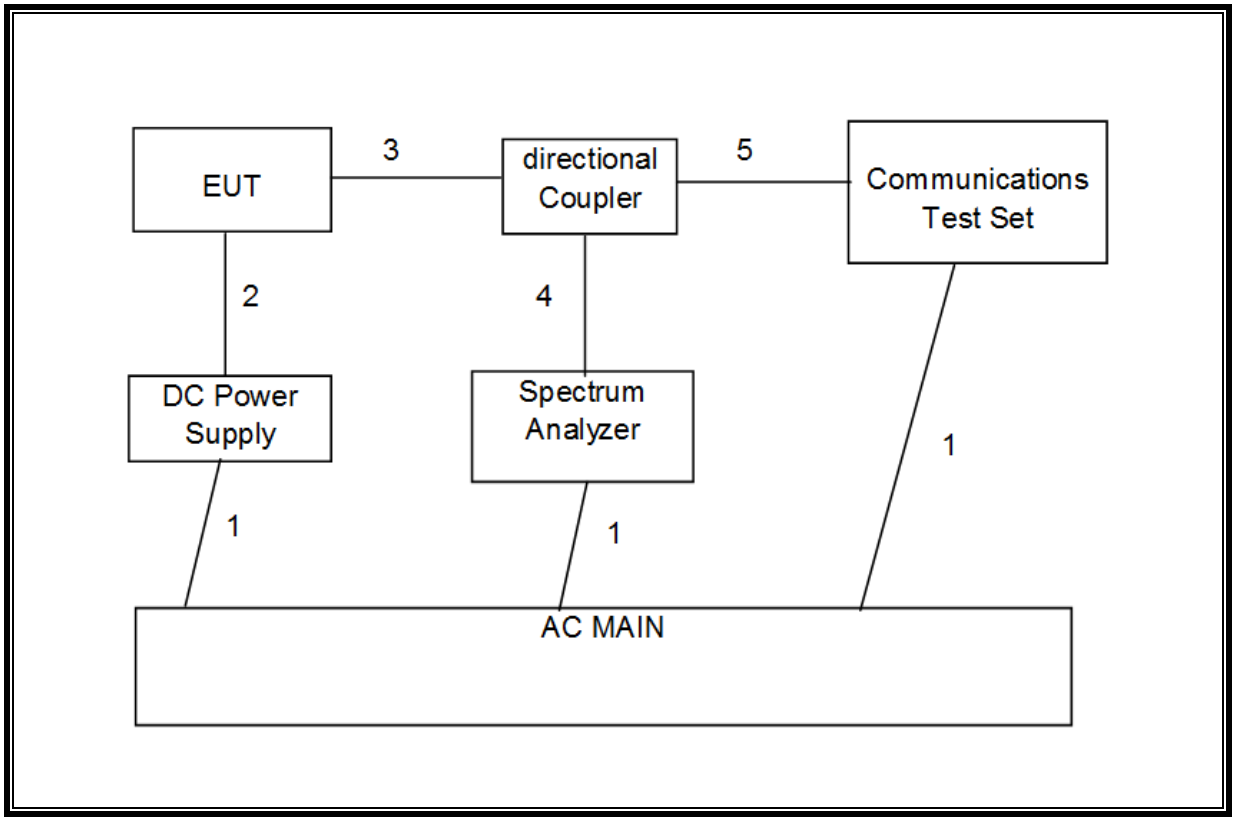
I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	US 115V	Un-shielded	2m	N/A
2	DC	1	DC	Un-shielded	1.4m	N/A
3	RF In/Out	1	EUT	Un-shielded	0.4m	N/A
4	RF In/Out	1	Barrel	N/A	N/A	N/A
5	RF In/Out	1	Communication Test Set	Un-shielded	1m	N/A

I/O CABLES (RF Radiated Test)

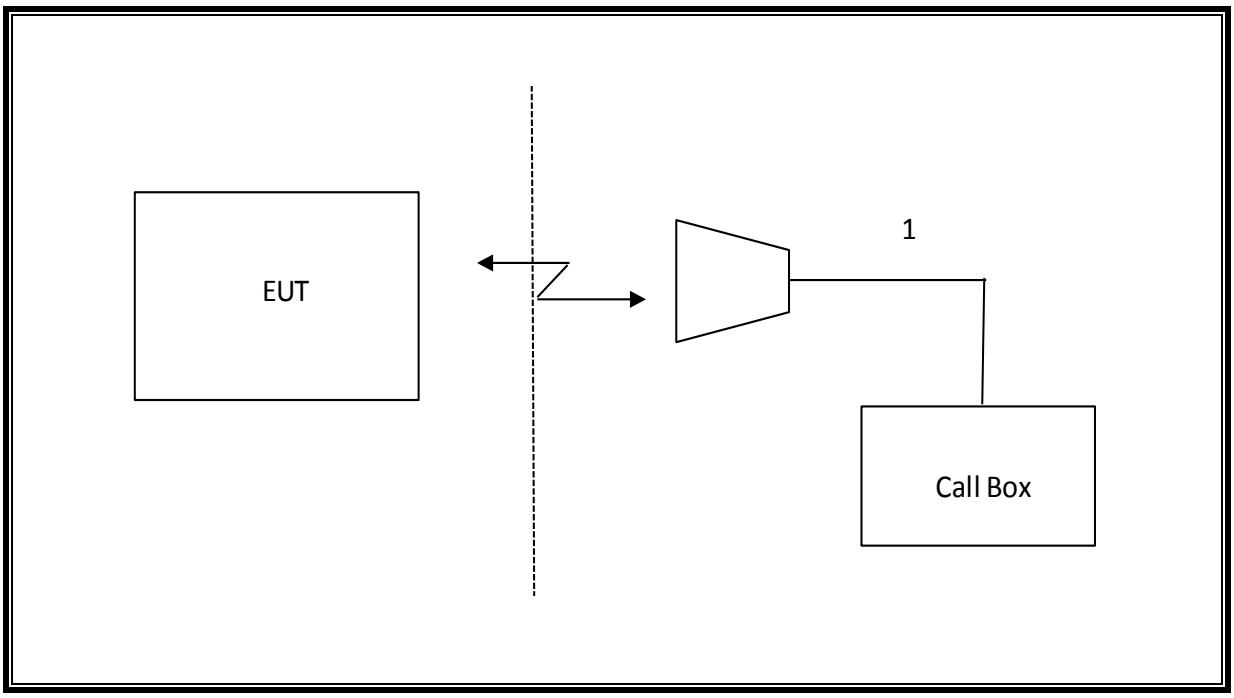
I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	RF In/Out	1	Antenna	Un-shielded	5m	NA

TEST SETUP

CONDUCTED SETUP



RADIATED SETUP



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**T No.**	**Cal Due**
Directional Coupler	Krytar	Directional Coupler	T923	06/07/15
8960 series 10 wireless communicatior	Agilent	E5515C	T211	11/25/15
Spectrum Analyzer, PSA, 3Hz-26.5GHz	Agilent	E4446A	T177	05/07/16
Spectrum Analyzer, PSA, 3Hz-44GHz	Agilent	E4440A	T189	05/13/16
Wideband Radio Communication	R & S	CMW500	T978	07/28/15
Temperature / Humidity Chamber	CSZ	ZPHS-8-3.5-SCT/WC	T754	09/30/15
*Wideband Radio Communication	R & S	CMW500	T958	05/12/15
*Spectrum Analyzer, PXA, 44GHz	Agilent	N9030A	T917	05/08/15
Power Meter	Agilent	N1911A	T382	04/07/16
Power Sensor	Agilent	E9323A	T751	07/12/15
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T120	03/26/16
Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T742	01/31/16
Amplifier 10KHz-1GHz	Sonoma	310N	T173	6/7/2015
Antenna, Biconolog, 30MHz-2 GHz	Sunol Sciences	JB1	T122	02/13/16
Highpass Filter, 3.0 GHz	Micro-Tronics	HPM17543	T427	01/31/16
Highpass Filter, 1.0 GHz	Micro-Tronics	HPM18129	T889	09/03/15
Spectrum Analyzer, PXA, 44GHz	Agilent	N9030A	T341	11/12/15
Antenna, Horn, 18 GHz	EMCO	3115	T59	01/15/16

*equipment was used before expiration date.

7. RF POWER OUTPUT VERIFICATION

7.1. GSM

Using CMU200 Communication Test Set

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 >	CS 4 (GPRS) and MCS5-9 (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	

Using Agilent 8960A Communication Test Set

System Config: GSM/GPRS Mobile Test
E1968A A.06.31

Call Parms: BCH ➔ Cell Band: GSM850/PCS
TCH ➔ Traffic Band: GSM850/PCS
Traffic Channel: 128/192/251 or 512/661/810
MS Tx Level: 0
PDTCH ➔ Traffic Band: GSM850/PCS
Traffic Channel: 128/192/251 512/661/810
MS Tx Level: 0
Coding Scheme: CS-4 (GPRS)
Coding Scheme: MCS-5 to 9 (EGPRS)
MultiSlot Config: 1up, 1 down (Assuming that the highest conducted power)
Control: Active Cell ➔ GSM/GPRS

7.1.1. GPRS/EGPRS

Mode	Ch.	f (MHz)	1 time slot		2 time slots	
			Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)
GPRS	128	824.2	33.40	33.23	32.16	31.94
	190	836.6	33.62	33.40	32.17	31.95
	251	848.8	**33.67**	**33.48**	32.13	31.92
EGPRS	128	824.2	**31.02**	**27.90**	30.91	27.83
	190	836.6	30.76	27.80	30.69	27.78
	251	848.8	30.86	27.88	30.73	27.75
GPRS	512	1850.2	30.53	30.34	29.38	29.20
	661	1880.0	30.61	30.45	29.59	29.40
	810	1909.8	**30.68**	**30.49**	29.69	29.48
EGPRS	512	1850.2	29.24	26.90	29.66	26.84
	661	1880.0	**29.67**	26.95	29.65	26.94
	810	1909.8	29.51	**26.98**	29.37	26.97

7.2. CDMA

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

7.2.1. CDMA2000 1xRTT

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

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

- Protocol Rev > 6 (IS-2000-0)
- System ID: 18; NID: 65535, Reg. Ch. #.: 610 for Cell, 600 for PCS & 450 for AWS
- Radio Config (RC) > RC1 or RC3
- Service Option (SO) Setup > SO55 or SO32
- Traffic Data Rate > Full
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

RESULT

CDMA 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)	29.19	24.22	29.80	24.42	28.84	24.40
	55 (Loopback)	29.17	24.22	**29.82**	**24.45**	28.85	24.39
RC2	9 (Loopback)	29.19	24.25	29.64	24.41	28.95	24.41
	55 (Loopback)	29.14	24.23	29.73	24.43	28.84	24.39
RC3	2 (Loopback)	29.03	24.20	29.09	24.39	28.82	24.39
	55 (Loopback)	29.03	24.20	29.08	24.41	28.79	24.39
	32 (+ F-SCH)	29.05	24.19	29.14	24.38	28.77	24.37
	32 (+ SCH)	29.24	24.33	29.20	24.43	28.91	24.43
RC4	2 (Loopback)	29.01	24.19	29.10	24.38	28.84	24.36
	55 (Loopback)	29.01	24.19	29.14	24.39	28.94	24.39
	32 (+ F-SCH)	29.02	24.20	29.04	24.38	28.81	24.37
	32 (+ SCH)	29.21	24.35	29.30	24.40	29.25	24.40
RC5	9 (Loopback)	29.00	24.20	29.19	24.39	28.82	24.39
	55 (Loopback)	29.05	24.22	29.24	24.40	28.79	24.39
RC11	2 (Loopback)	29.09	24.19	29.08	24.41	28.92	24.41
	75 (Loopback)	29.13	24.21	29.02	24.41	28.82	24.40
	32 (+ F-SCH)	29.43	24.27	29.13	24.42	28.85	24.40
	32 (+ SCH)	29.00	24.22	29.02	24.42	28.83	24.41

CDMA2000 1xRTT, BC1, 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)	28.76	23.79	29.04	23.87	28.70	23.77
	55 (Loopback)	28.65	23.81	**29.40**	**23.95**	28.78	23.82
RC2	9 (Loopback)	28.65	23.81	29.31	23.91	28.79	23.83
	55 (Loopback)	28.60	23.81	29.32	23.89	28.77	23.85
RC3	2 (Loopback)	28.43	23.76	28.62	23.90	28.30	23.79
	55 (Loopback)	28.30	23.78	28.65	23.93	28.21	23.82
	32 (+ F-SCH)	28.31	23.78	28.50	23.92	28.31	23.78
	32 (+ SCH)	28.79	23.83	29.35	23.92	28.93	23.86
RC4	2 (Loopback)	28.34	23.76	28.52	23.90	28.24	23.81
	55 (Loopback)	28.39	23.80	28.64	23.90	28.23	23.83
	32 (+ F-SCH)	28.33	23.77	28.72	23.91	28.26	23.81
	32 (+ SCH)	28.78	23.82	29.30	23.89	28.88	23.87
RC5	9 (Loopback)	28.23	23.78	28.59	23.90	28.32	23.80
	55 (Loopback)	28.35	23.80	28.55	23.92	28.16	23.83
RC11	2 (Loopback)	28.32	23.79	28.70	23.87	28.27	23.81
	75 (Loopback)	28.40	23.83	28.54	23.80	28.34	23.84
	32 (+ F-SCH)	28.49	23.81	28.57	23.94	28.25	23.83
	32 (+ SCH)	28.37	23.80	28.62	23.91	28.29	23.82

CDMA2000 1xRTT, BC15, AWS BAND

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)					
		CH 25 - 1711.25MHz		CH 450 - 1732.5MHz		CH 875 - 1753.75MHz	
		Peak	Average	Peak	Average	Peak	Average
RC1	2 (Loopback)	29.28	24.30	29.46	24..45	29.53	24.21
	55 (Loopback)	29.18	24.35	**29.65**	**24.50**	29.25	24.20
RC2	9 (Loopback)	29.23	24.37	29.31	24.49	29.27	24.18
	55 (Loopback)	29.20	24.38	29.64	24.48	29.16	24.19
RC3	2 (Loopback)	28.77	24.35	28.80	24.42	28.67	24.18
	55 (Loopback)	28.58	24.36	28.71	24.47	28.63	24.20
	32 (+ F-SCH)	28.55	24.30	28.89	24.47	28.64	24.15
	32 (+ SCH)	29.42	24.38	29.42	24.45	29.41	24.22
RC4	2 (Loopback)	28.55	24.33	28.85	24.47	28.68	24.21
	55 (Loopback)	28.75	24.35	28.92	24.49	28.62	24.18
	32 (+ F-SCH)	28.70	24.33	28.90	24.45	28.46	24.14
	32 (+ SCH)	29.32	24.43	29.31	24.49	29.38	24.23
RC5	9 (Loopback)	28.66	24.33	28.87	24.45	28.56	24.16
	55 (Loopback)	28.74	24.35	28.95	24.48	28.64	24.16
*RC11	2 (Loopback)	28.63	24.35	28.78	24.49	28.55	24.17
	75 (Loopback)	28.80	24.38	28.93	24.49	28.63	24.22
	32 (+ F-SCH)	28.79	24.39	28.89	24.48	28.61	24.21
	32 (+ SCH)	28.77	24.40	28.73	24.46	28.60	24.20

CDMA 1xRTT, BC10, SECONDARY 800

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)					
		CH 450 - 817.25MHz		CH 560 - 820MHz		CH 670 - 822.75MHz	
		Peak	Average	Peak	Average	Peak	Average
RC1	2 (Loopback)	29.23	24.87	29.13	24.86	24.99	24.97
	55 (Loopback)	29.21	24.87	29.12	24.87	**29.38**	**24.98**
RC2	9 (Loopback)	29.21	24.86	29.10	24.86	29.34	24.97
	55 (Loopback)	29.21	24.87	29.13	24.87	29.32	24.85
RC3	2 (Loopback)	29.20	24.86	29.09	24.85	29.30	24.90
	55 (Loopback)	29.20	24.85	29.11	24.84	29.31	24.93
	32 (+ F-SCH)	29.21	24.86	29.09	24.85	29.35	24.93
	32 (+ SCH)	29.19	24.85	29.18	24.86	29.36	24.91
RC4	2 (Loopback)	29.17	24.83	29.24	24.87	29.34	24.90
	55 (Loopback)	29.14	24.83	29.09	24.86	29.30	24.93
	32 (+ F-SCH)	29.12	24.84	29.28	24.88	29.27	24.89
	32 (+ SCH)	29.14	24.83	29.21	24.87	29.33	24.92
RC5	9 (Loopback)	29.16	24.83	29.14	24.86	29.35	24.92
	55 (Loopback)	29.10	24.82	29.10	24.85	29.32	24.93
RC11	2 (Loopback)	29.17	24.88	29.18	24.94	29.34	24.95
	75 (Loopback)	29.10	24.85	29.12	24.92	29.37	24.96
	32 (+ F-SCH)	29.13	24.87	29.14	24.93	29.33	24.95
	32 (+ SCH)	29.14	24.88	29.17	24.94	24.31	24.94

7.2.2. CDMA2000 1xEV-DO - Release 0 (REV 0)

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

EVDO Release 0 - RTAP

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

EVDO Release 0 - FTAP

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

RESULTS

CDMA2000 EVDO REV 0 850MHz BAND

FTAP Rate	RTAP Rate	Channel	Frequency (MHz)	Peak Conducted Power (dBm)	Average Conducted Power (dBm)
307.2 Kbps (2 slot QPSK)	153.6 Kbps	1013	824.70	29.20	24.47
		384	836.52	30.04	24.45
		777	848.31	**30.08**	**24.48**

CDMA2000 EVDO REV 0 1900MHz BAND

FTAP Rate	RTAP Rate	Channel	Frequency (MHz)	Peak Conducted Power (dBm)	Average Conducted Power (dBm)
307.2 Kbps (2 slot QPSK)	153.6 Kbps	25	1851.25	28.55	23.85
		600	1880.00	**29.29**	**23.96**
		1175	1908.75	29.07	23.82

CDMA2000 EVDO REV. 0 1700MHz BAND

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted Output Power (dBm)	
				Peak	Average
307.2 kbps (2 Slot QPSK)	153.6 kbps	25	1711.25	29.36	24.28
		450	1732.50	**29.38**	**24.45**
		875	1753.75	29.25	24.18

CDMA2000 EVDO REV. 0 800MHz SECONDARY BAND

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted Output Power (dBm)	
				Peak	Average
307.2 kbps (2 Slot QPSK)	153.6 kbps	450	817.25	29.15	24.90
		560	820.00	29.25	24.92
		670	822.75	**29.45**	**24.95**

7.2.3. CDMA2000 1xEV-DO - Revision A (REV A)

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

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

EVDO Rev. A – RETAP

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

EVDO Rev. A - FETAP

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

RESULTS

CDMA2000 EVDO REV A 850MHz BAND

FETAP Traffic Format	RETAP Data Payload Size	Channel	Frequency (MHz)	Peak Conducted Power (dBm)	Average Conducted Power (dBm)
307.2k, QPSK / ACK channel is transmitted at all the slots	4096	1013	824.70	29.28	24.48
		384	836.52	**30.13**	**24.50**
		777	848.31	28.98	24.49

CDMA2000 EVDO REV A 1900MHz BAND

FETAP Traffic Format	RETAP Data Payload Size	Channel	Frequency (MHz)	Peak Conducted Power (dBm)	Average Conducted Power (dBm)
307.2k, QPSK / ACK channel is transmitted at all the slots	4096	25	1851.25	28.56	23.86
		600	1880.00	**29.38**	**23.99**
		1175	1908.75	28.78	23.91

CDMA2000 EVDO REV A 1700MHz BAND

FETAP - Traffic Format	RETAP - Data Payload Size	Channel	f (MHz)	Conducted Output Power (dBm)	
				Peak	Average
307.2k QPSK/ ACK channel is transmitted at all the slots	4096	25	1711.25	28.85	24.40
		450	1732.50	**29.40**	**24.50**
		875	1753.75	29.30	24.40

CDMA2000 EVDO REV A 800MHz SECONDARY BAND

FETAP Traffic Format	RETAP Data Payload Size	Channel	Frequency (MHz)	Peak Conducted Power (dBm)	Average Conducted Power (dBm)
307.2k, QPSK / ACK channel is transmitted at all the slots	4096	450	817.25	29.21	24.92
		560	820.00	29.30	24.98
		670	822.75	**29.49**	**24.99**

7.2.4. CDMA2000 1xEV-DO - Revision B (REV B)

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

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

1xEV-DO Release B –

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

- 1xEV-DO Signaling Configuration Window

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

For Two Carriers: Low Channel (1013)

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

- Under Carrier Configuration: RF Pilot

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

For Three Carriers: Low Channel (1013)

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

- Under Carrier Configuration: RF Pilot

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

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

RESULTS

2 CARRIER MIN SEPARATION

Mode	Channel	Frequency (MHz)	Peak Conducted Power (dBm)	Average Conducted Power (dBm)
CDMA REV B	1013+31	824.70+825.93	28.40	21.78
	384+425	836.52+837.75	**28.50**	**21.94**
	736+777	847.08+848.31	28.09	21.79

2 CARRIER MAX SEPARATION

Mode	Channel	Frequency (MHz)	Peak Conducted Power (dBm)	Average Conducted Power (dBm)
CDMA REV B	1013+156	824.70+829.68	28.10	21.86
	384+550	836.52+841.50	**28.20**	**21.92**
	611+777	843.33+848.31	28.00	21.90

3 CARRIER MIN SEPARATION

Mode	Channel	Frequency (MHz)	Peak Conducted Power (dBm)	Average Conducted Power (dBm)
CDMA REV B	1013+31+72	824.70+825.93+827.16	28.70	**21.95**
	384+425+466	836.52+837.75+838.98	**28.76**	21.85
	695+736+777	845.85+847.08+848.31	28.62	21.90

7.3. UMTS

TEST PROCEDURE

The transmitter output was connected to the input terminal of Directional Coupler via calibrated coaxial cable. The output coupling terminal of the Directional Coupler was directly connected to a spectrum analyzer while the output through terminal connected to the communication test set via calibrated coaxial cable.

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

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

7.3.1. UMTS REL99

The following summary of these settings are illustrated below:

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

RESULTS

Part 22 / RSS 132 850MHz Band

Band	UL Channel	DL Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)
UMTS Rel. 99 850MHz	4132	4357	826.4	**29.66**	24.91
	4183	4408	836.6	29.21	24.93
	4233	4458	846.6	29.32	**25.00**

Part 27 / RSS 139 1700MHz Band

Band	UL Channel	DL Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)
UMTS Rel. 99 1700MHz	1312	1537	1712.4	**29.35**	24.25
	1413	1638	1732.6	28.60	**24.50**
	1513	1738	1752.6	28.55	24.23

Part 24 / RSS 133 1900MHz Band

Band	UL Channel	DL Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)
UMTS Rel. 99 1900MHz	9262	9662	1852.4	**28.68**	23.83
	9400	9800	1880.0	28.20	**24.00**
	9538	9938	1907.6	28.31	23.95

7.3.2. HSDPA REL 5

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

Summary of settings are illustrated below:

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

Result

Part 22 / RSS 132 850MHz Band

Band	Subtest	UL Channel	DL Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)
UMTS HSDPA 850MHz	1	4132	4357	826.4	28.58	24.11
		4183	4408	836.6	28.78	24.12
		4233	4458	846.6	**28.88**	**24.20**
	2	4132	4357	826.4	28.45	23.62
		4183	4408	836.6	28.53	23.64
		4233	4458	846.6	28.75	23.82
	3	4132	4357	826.4	28.73	23.65
		4183	4408	836.6	28.79	23.65
		4233	4458	846.6	28.45	23.73
	4	4132	4357	826.4	28.73	23.69
		4183	4408	836.6	28.68	23.67
		4233	4458	846.6	28.70	23.77

Part 27 / RSS 139 1700MHz Band

Band	Subtest	UL Channel	DL Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)
UMTS HSDPA 1700MHz	1	1312	1537	1712.4	**28.50**	23.45
		1413	1638	1732.6	28.40	**23.68**
		1513	1738	1752.6	28.45	23.41
	2	1312	1537	1712.4	28.20	22.97
		1413	1638	1732.6	28.25	23.12
		1513	1738	1752.6	28.48	22.85
	3	1312	1537	1712.4	28.20	22.98
		1413	1638	1732.6	27.94	23.17
		1513	1738	1752.6	27.81	22.98
	4	1312	1537	1712.4	28.09	23.12
		1413	1638	1732.6	27.96	23.26
		1513	1738	1752.6	27.80	23.02

Part 24 / RSS 133 1900MHz Band

Band	Subtest	UL Channel	DL Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)
UMTS HSDPA 1900MHz	1	9262	9662	1852.4	28.20	23.15
		9400	9800	1880.0	**28.30**	**23.32**
		9538	9938	1907.6	28.00	23.19
	2	9262	9662	1852.4	27.90	22.69
		9400	9800	1880.0	27.80	22.88
		9538	9938	1907.6	27.80	22.66
	3	9262	9662	1852.4	27.35	22.70
		9400	9800	1880.0	27.84	22.84
		9538	9938	1907.6	27.68	22.65
	4	9262	9662	1852.4	27.42	22.66
		9400	9800	1880.0	27.88	22.89
		9538	9938	1907.6	27.67	22.74

7.3.3. HSPA REL 6 (HSDPA & HSUPA)

TEST PROCEDURE

The following summary of these settings are illustrated below:

	Mode	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	-
	βhs	22/15	12/15	30/15	4/15	5/15
	βed	1309/225	94/75	47/15 47/15	56/75	47/15
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	12
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	67
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27	

RESULTS

Part 22 / RSS 132 850MHz Band

Band	Subtest	UL Channel	DL Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)
UMTS HSUPA 850MHz	1	4132	4357	826.4	28.50	23.97
		4183	4408	836.6	28.72	23.86
		4233	4458	846.6	**28.80**	**24.00**
	2	4132	4357	826.4	28.50	23.37
		4183	4408	836.6	28.64	23.38
		4233	4458	846.6	28.60	23.40
	3	4132	4357	826.4	28.40	23.38
		4183	4408	836.6	28.18	23.28
		4233	4458	846.6	28.19	23.49
	4	4132	4357	826.4	28.03	22.45
		4183	4408	836.6	28.00	22.40
		4233	4458	846.6	28.05	22.30
	5	4132	4357	826.4	28.65	23.85
		4183	4408	836.6	28.05	23.95
		4233	4458	846.6	28.25	23.94

Part 27 / RSS 139 1700MHz Band

Band	Subtest	UL Channel	DL Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)
UMTS HSUPA 1700MHz	1	1312	1537	1712.4	**28.00**	**23.20**
		1413	1638	1732.6	27.80	23.15
		1513	1738	1752.6	27.80	23.09
	2	1312	1537	1712.4	27.30	22.21
		1413	1638	1732.6	27.20	22.20
		1513	1738	1752.6	27.10	22.30
	3	1312	1537	1712.4	27.20	23.04
		1413	1638	1732.6	27.20	22.84
		1513	1738	1752.6	27.50	22.94
	4	1312	1537	1712.4	27.00	22.69
		1413	1638	1732.6	27.10	22.78
		1513	1738	1752.6	27.20	22.63
	5	1312	1537	1712.4	27.50	23.10
		1413	1638	1732.6	27.30	22.98
		1513	1738	1752.6	27.60	23.00

Part 24 / RSS 133 1900MHz Band

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted Output Power (dBm)	
					Peak	Average
UMTS HSUPA 1900MHz (Band 2)	1	9262	9662	1852	**27.50**	**23.10**
		9400	9800	1880	27.40	22.90
		9538	9938	1908	27.30	22.80
	2	9262	9662	1852	27.00	22.23
		9400	9800	1880	26.80	22.20
		9538	9938	1908	26.70	22.36
	3	9262	9662	1852	26.50	21.99
		9400	9800	1880	26.40	21.99
		9538	9938	1908	26.50	22.11
	4	9262	9662	1852	26.30	22.04
		9400	9800	1880	27.00	22.52
		9538	9938	1908	26.70	22.04
	5	9262	9662	1852	27.10	22.60
		9400	9800	1880	27.00	22.75
		9538	9938	1908	27.10	22.70

7.3.4. DUAL CARRIER HSDPA

DC-HSDPA (Rel 8, CAT 24)

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

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

Table E.5.0: Levels for HSDPA connection setup

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

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

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

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

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

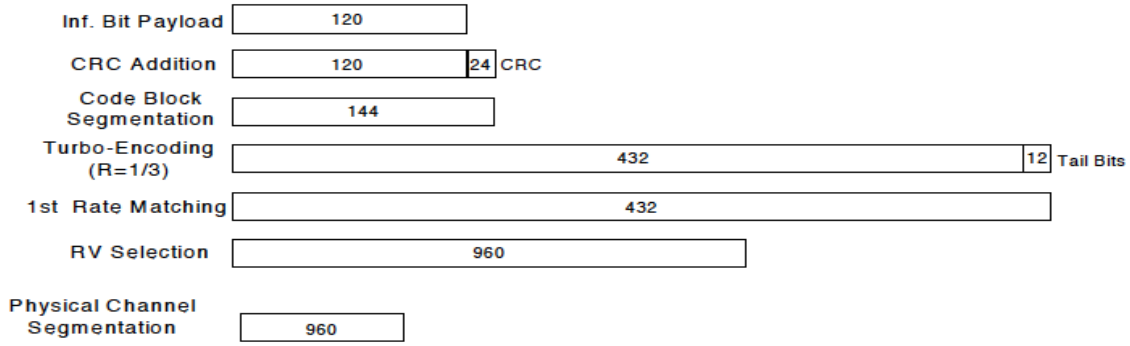


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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

	Mode	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs = βhs/ βc	30/15			

RESULT

Part 22 / RSS 132 850MHz Band

Band	Subtest	UL Channel	DL Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)
UMTS HSDPA 850MHz	1	4132	4357	826.4	**28.40**	23.86
		4183	4408	836.6	28.10	23.78
		4233	4458	846.6	28.20	**23.91**
	2	4132	4357	826.4	28.20	23.75
		4183	4408	836.6	28.00	23.67
		4233	4458	846.6	28.30	23.80
	3	4132	4357	826.4	28.00	23.30
		4183	4408	836.6	28.10	23.40
		4233	4458	846.6	28.00	23.30
	4	4132	4357	826.4	27.80	23.20
		4183	4408	836.6	27.80	23.10
		4233	4458	846.6	28.00	23.20

Part 27 / RSS 139 1700MHz Band

Band	Subtest	UL Channel	DL Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)
UMTS HSDPA 1700MHz	1	1312	1537	1712.4	28.00	23.40
		1413	1638	1732.6	27.80	**23.45**
		1513	1738	1752.6	**28.15**	23.38
	2	1312	1537	1712.4	28.10	22.95
		1413	1638	1732.6	28.10	23.10
		1513	1738	1752.6	27.90	23.00
	3	1312	1537	1712.4	27.40	22.80
		1413	1638	1732.6	27.50	22.90
		1513	1738	1752.6	27.50	22.90
	4	1312	1537	1712.4	27.60	23.00
		1413	1638	1732.6	27.50	22.80
		1513	1738	1752.6	27.80	23.00

Part 24 / RSS 133 1900MHz Band

Band	Subtest	UL Channel	DL Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)
UMTS HSDPA 1900MHz	1	9262	9662	1852.4	28.00	23.09
		9400	9800	1880.0	**28.10**	**23.20**
		9538	9938	1907.6	27.80	23.12
	2	9262	9662	1852.4	27.80	23.10
		9400	9800	1880.0	27.90	23.15
		9538	9938	1907.6	27.80	23.00
	3	9262	9662	1852.4	27.10	22.65
		9400	9800	1880.0	27.40	22.75
		9538	9938	1907.6	27.50	22.70
	4	9262	9662	1852.4	27.20	22.65
		9400	9800	1880.0	27.50	22.80
		9538	9938	1907.6	27.20	22.65

8. CONDUCTED TEST RESULTS

8.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

RESULTS

GSM-GPRS MODE Part 22 / RSS 132 850MHz Band

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
CELL	GPRS	128	824.2	248.9220	302.285
		190	836.6	242.4980	307.567
		251	848.8	243.3804	304.416

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
PCS	GPRS	512	1850.2	240.9993	305.037
		661	1880.0	239.3031	300.064
		810	1909.8	249.7181	320.867

GSM-EGPRS MODE Part 22 / RSS 132 850MHz Band

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
CELL	EGPRS	128	824.2	247.9261	312.847
		190	836.6	245.3561	311.439
		251	848.8	243.5888	309.964

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
PCS	EGPRS	512	1850.2	247.9129	309.314
		661	1880.0	241.3944	303.937
		810	1909.8	248.7553	323.973

CDMA2000 1xRTT, PART 22, 24, 27 AND 90

Band	Mode	Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
CELL	CDMA 2000 1xRTT	1013	824.70	**1.2681**	1.379
		384	836.52	1.2550	1.388
		777	848.31	1.2671	1.412
PCS		25	1851.25	**1.2784**	1.387
		600	1880.00	1.2636	1.375
		1175	1908.75	1.2739	1.396
AWS		25	1711.25	1.2485	1.412
		450	1732.50	**1.2603**	1.380
		875	1753.75	1.2571	1.391
800 MHz Secondary		450	817.25	**1.2676**	1.380
		560	820.00	1.2405	1.418
		670	822.75	1.2513	1.392

CDMA2000 EVDO REV A, PART 22, 24, 27 AND 90

Band	Mode	Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
CELL	CDMA 2000 EVDO Rev. A	1013	824.70	**1.2697**	1.401
		384	836.52	**1.2697**	1.412
		777	848.31	1.2552	1.403
PCS		25	1851.25	1.2575	1.380
		600	1880.00	1.2619	1.379
		1175	1908.75	**1.2777**	1.420
AWS		25	1711.25	1.2706	1.394
		450	1732.50	1.2721	1.368
		875	1753.75	**1.2924**	1.390
800 MHz Secondary		450	817.25	1.2725	1.407
		560	820.00	**1.2816**	1.396
		670	822.75	1.2780	1.431

CDMA2000 EVDO REV B, PART 22

Band	Mode	Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
CELL	CDMA 2000 EVDO Rev. B	1013+31	824.70+825.93	2.4601	2.669
		384+425	836.52+837.75	2.4811	2.632
		736+777	847.08+848.31	**2.4957**	2.644
		1013+156	824.70+829.68	3.2300	6.600
		384+550	836.52+841.50	**3.3700**	6.670
		611+777	843.33+848.31	3.2300	6.570
		1013+31+72	824.70+825.93+827.16	3.6790	3.892
		384+425+466	836.52+837.75+838.98	3.6723	3.965
		695+736+777	845.85+847.08+848.31	**3.7021**	3.888

UMTS REL99 MODE PART 22, 24, AND 27

PART 22, 24, AND 27					
Band	Mode	DL Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
850MHz	UMTS Rel. 99	4357	826.40	4.2451	4.539
		4408	836.60	4.1730	4.559
		4458	846.60	4.1961	4.617
1900MHz		9662	1852.40	4.1502	4.452
		9800	1880.00	4.2079	4.528
		9938	1907.60	4.2221	4.517
1700MHz		1537	1712.40	4.1502	4.601
		1638	1732.60	4.2358	4.591
		1738	1752.60	4.1891	4.531

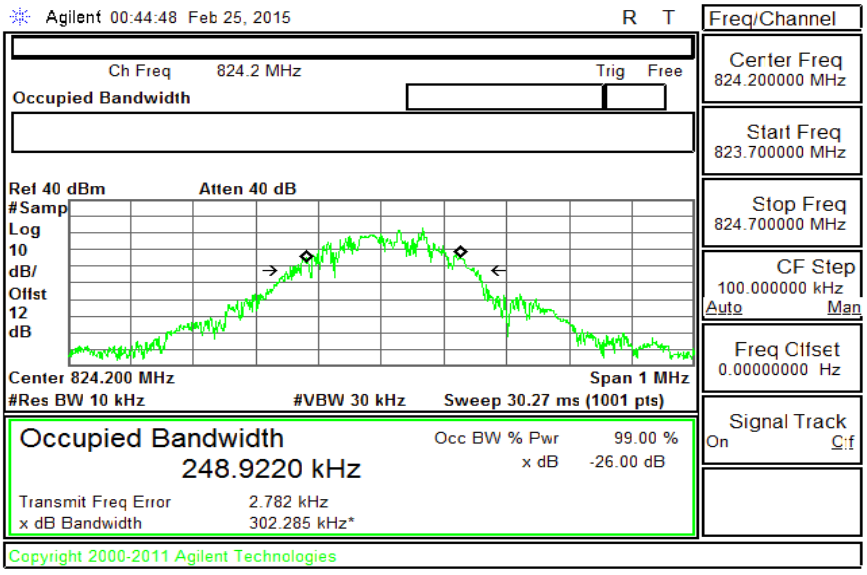
UMTS HSDPA MODE PART 22, 24, AND 27

PART 22, 24, AND 27					
Band	Mode	DL Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
850MHz	UMTS HSDPA	4357	826.40	4.1812	4.551
		4408	836.60	4.1371	4.529
		4458	846.60	4.1820	4.619
1900MHz		9662	1852.40	4.1676	4.578
		9800	1880.00	4.1443	4.646
		9938	1907.60	4.1440	4.606
1700MHz		1537	1712.40	4.2534	4.609
		1638	1732.60	4.1568	4.584
		1738	1752.60	4.1635	4.607

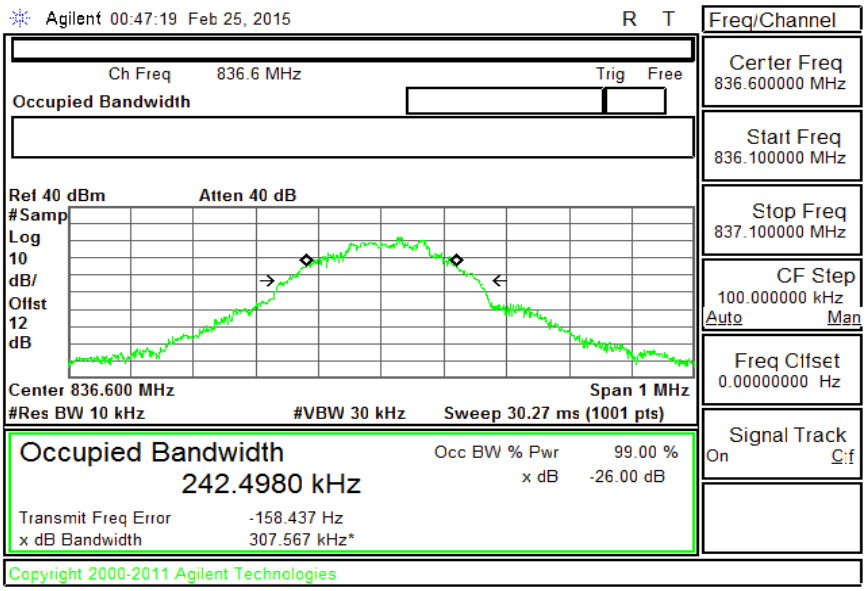
8.1.1. GSM GPRS

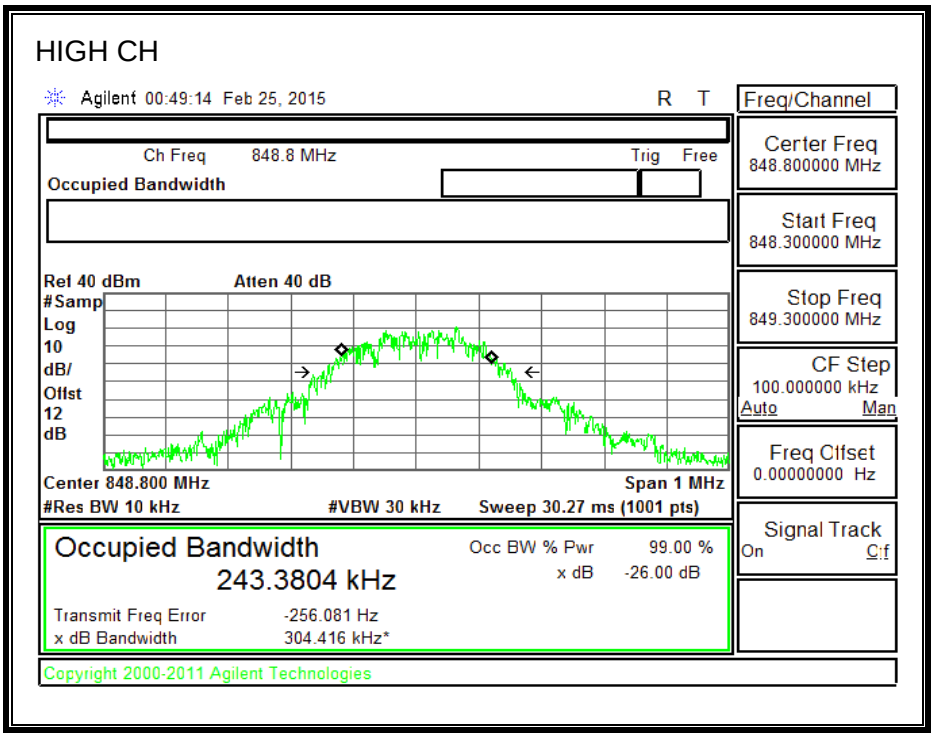
850MHz BAND

LOW CH

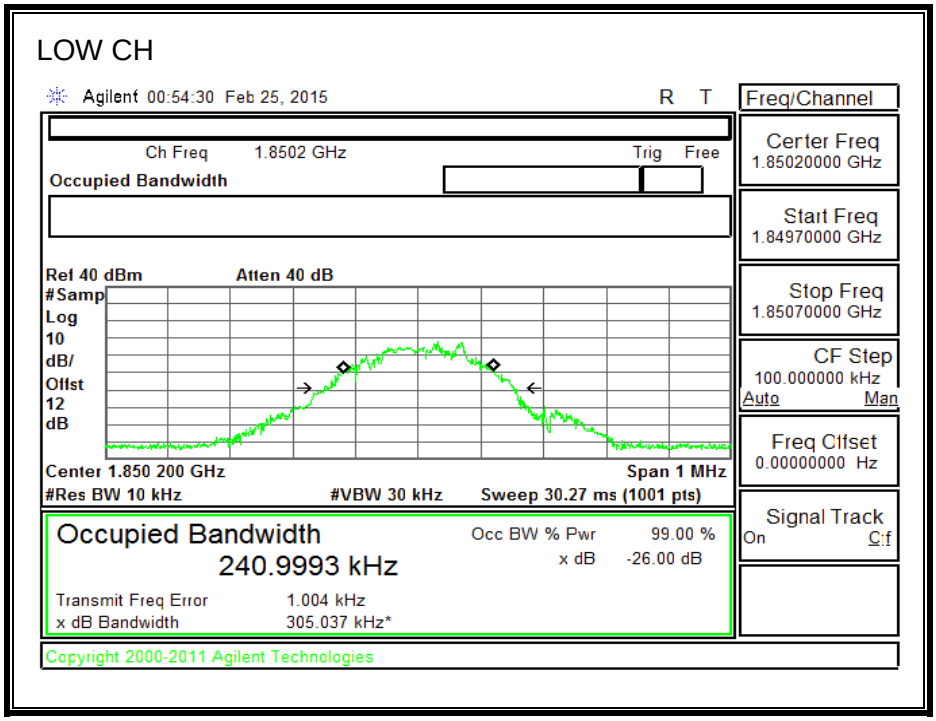


MID CH

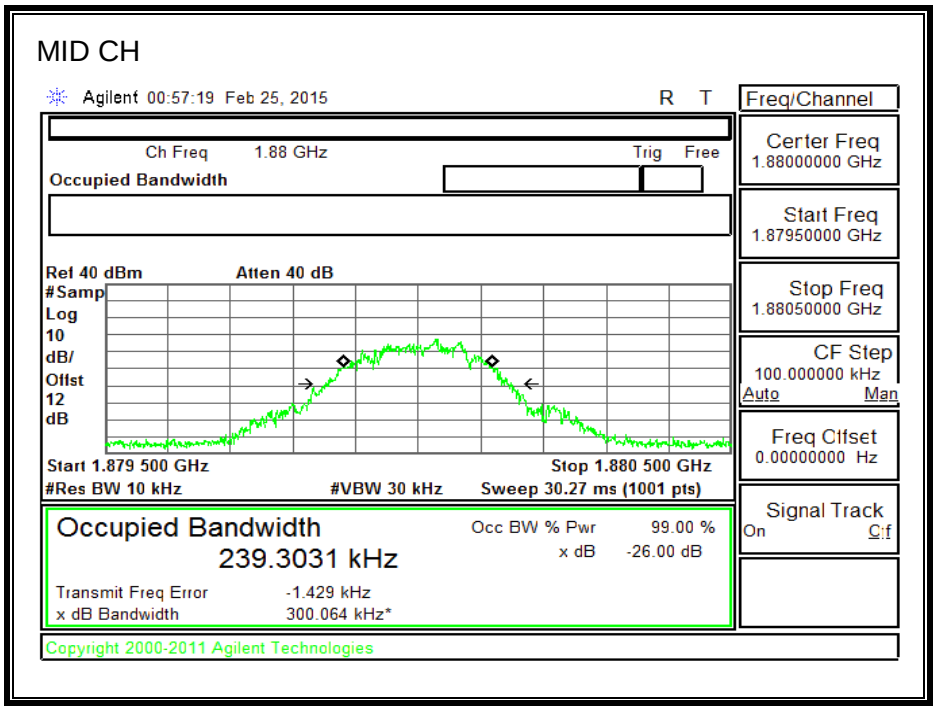




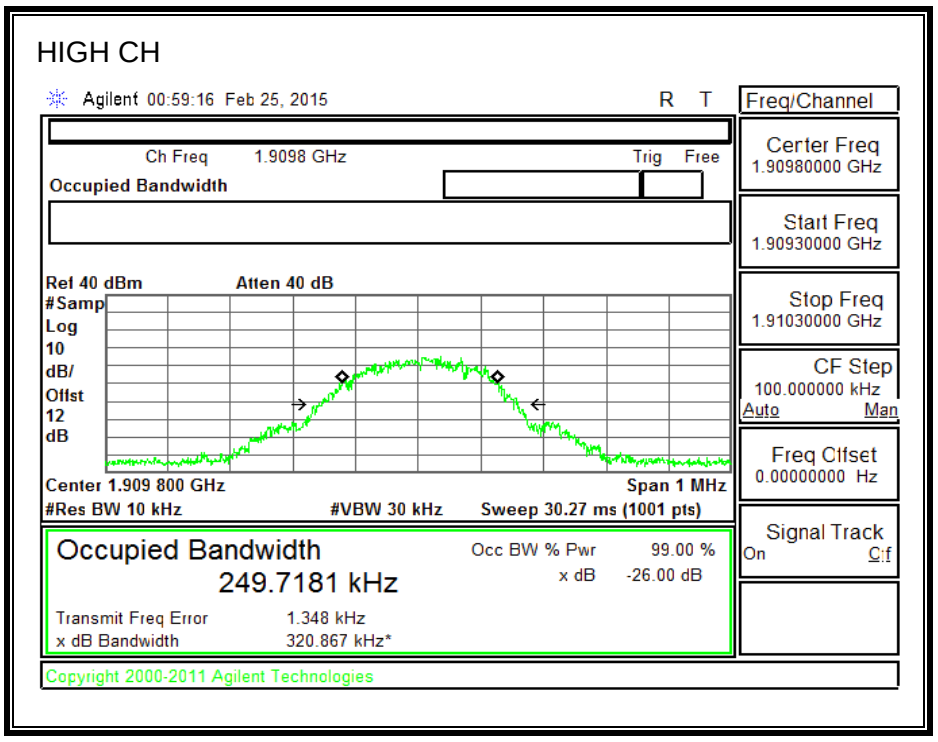
1900MHz BAND



MID CH



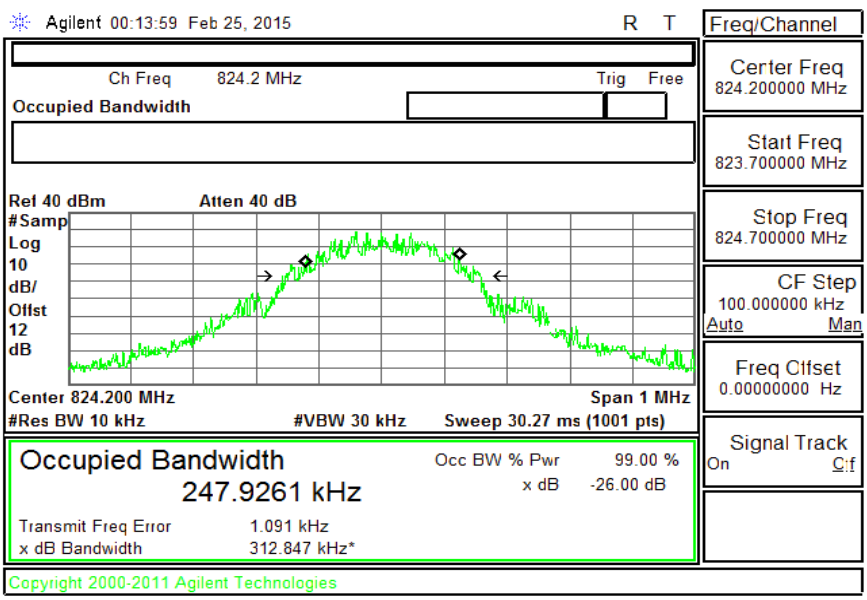
HIGH CH



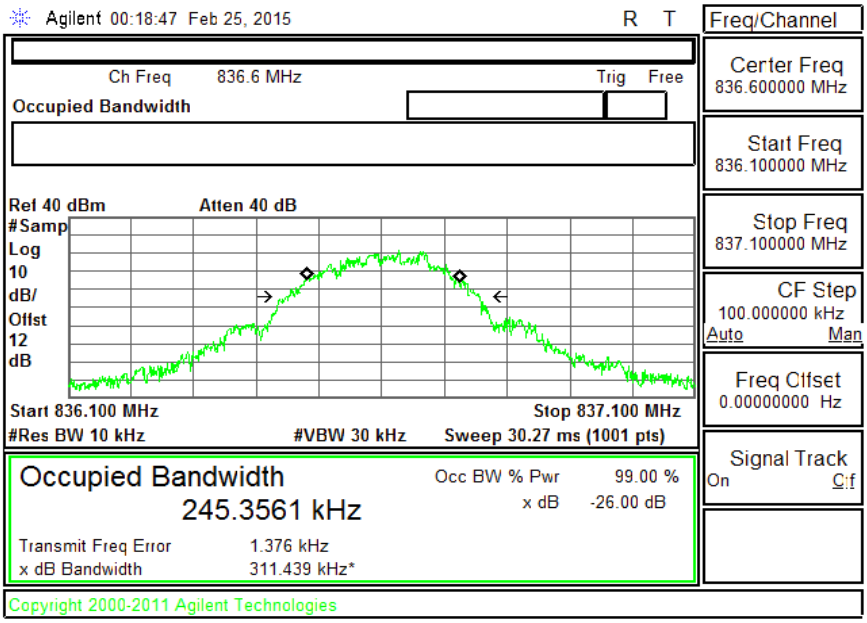
8.1.2. GSM EGPRS

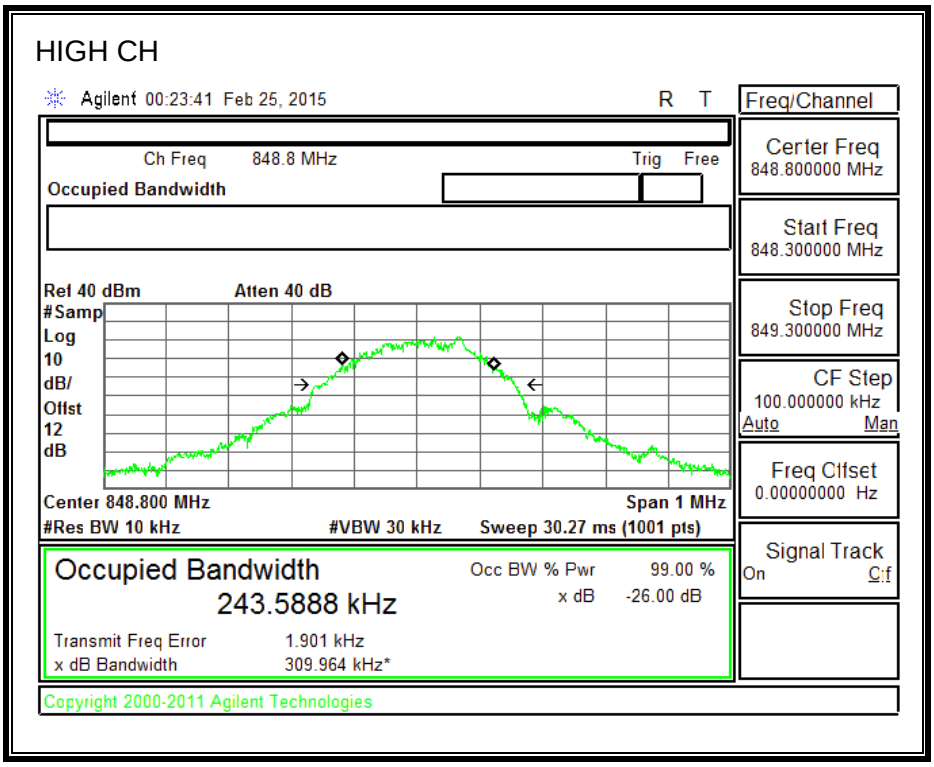
850MHz BAND

LOW CH

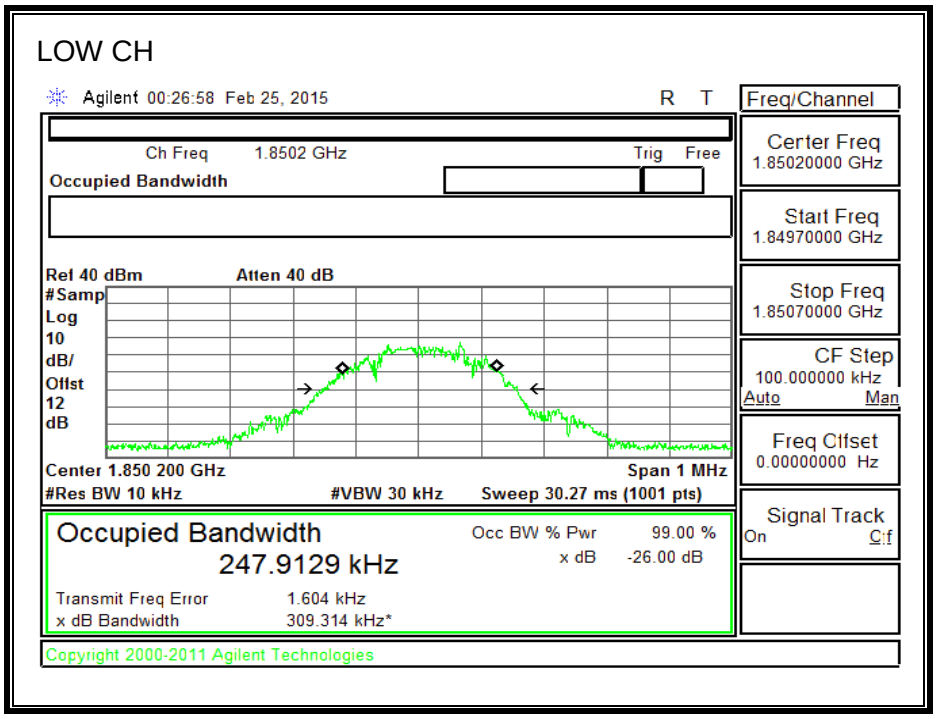


MID CH





1900MHz BAND



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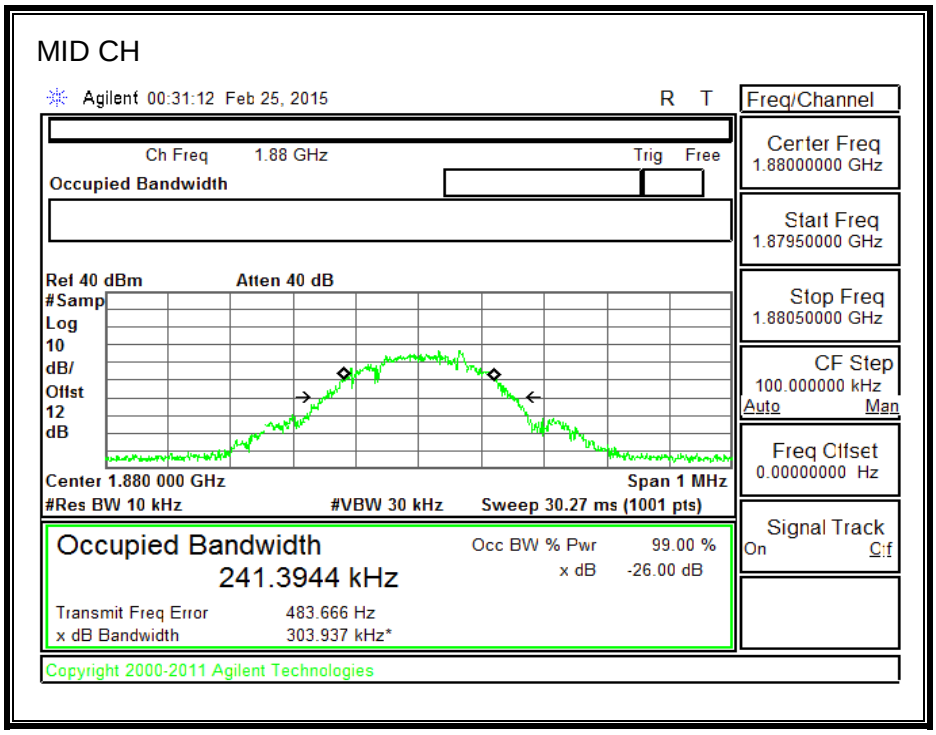
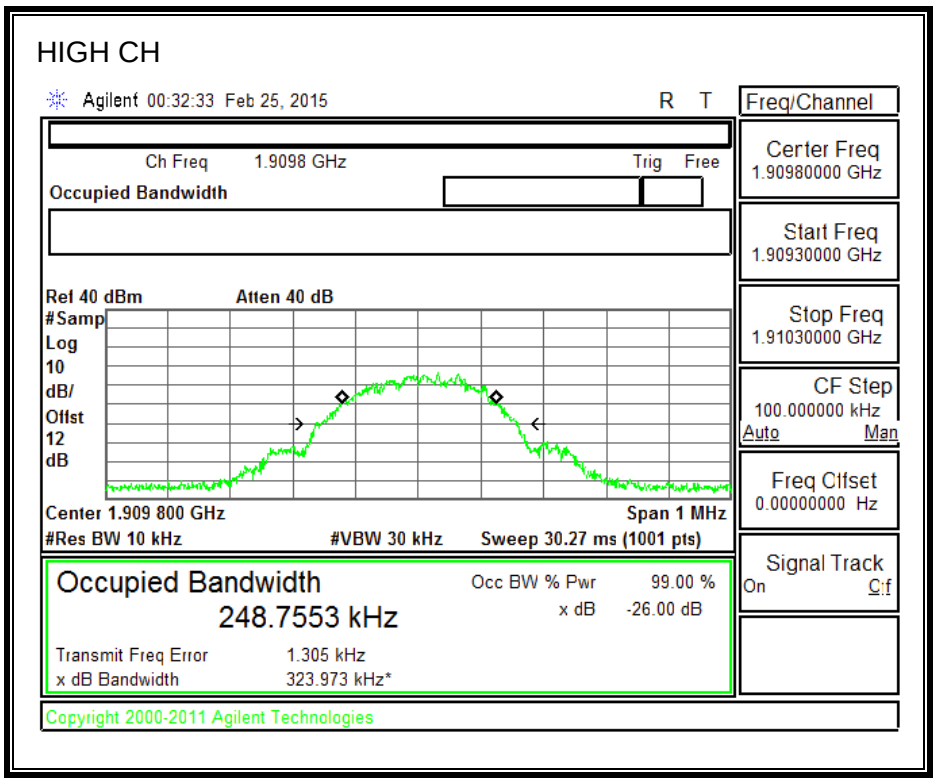


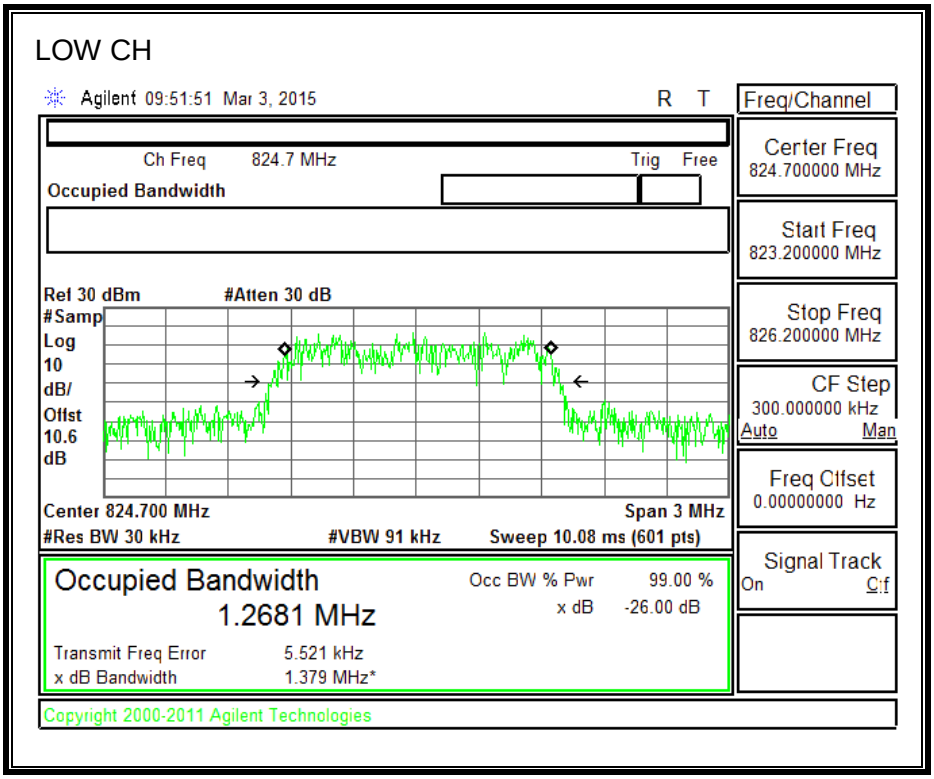
HIGH CH



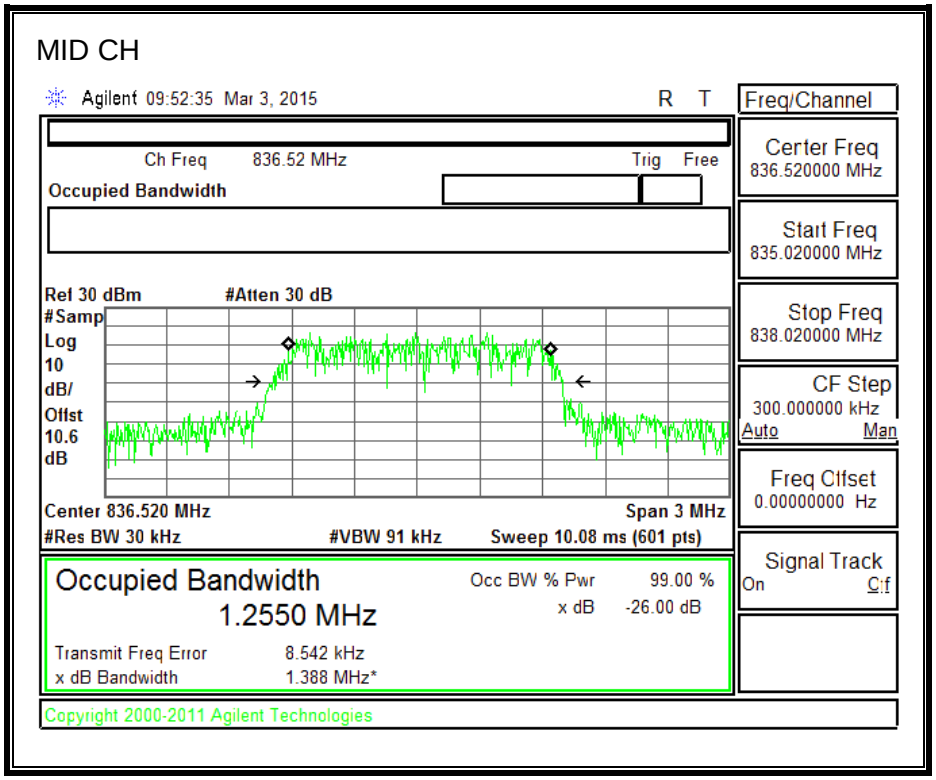
8.1.3. CDMA2000 1xRTT

850MHz BAND

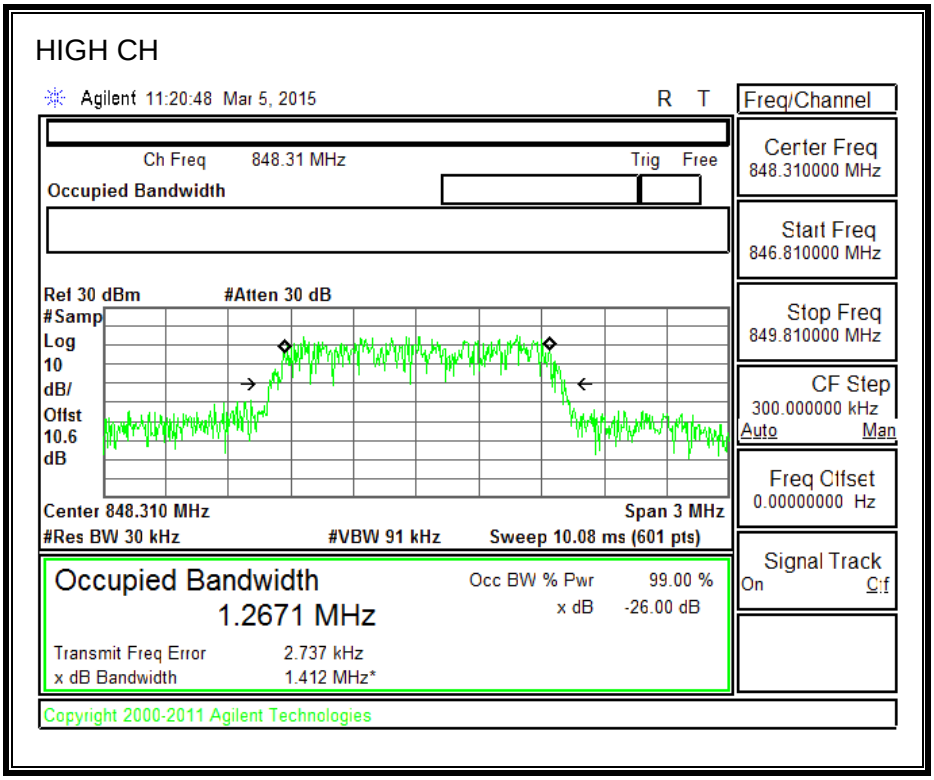
LOW CH



MID CH

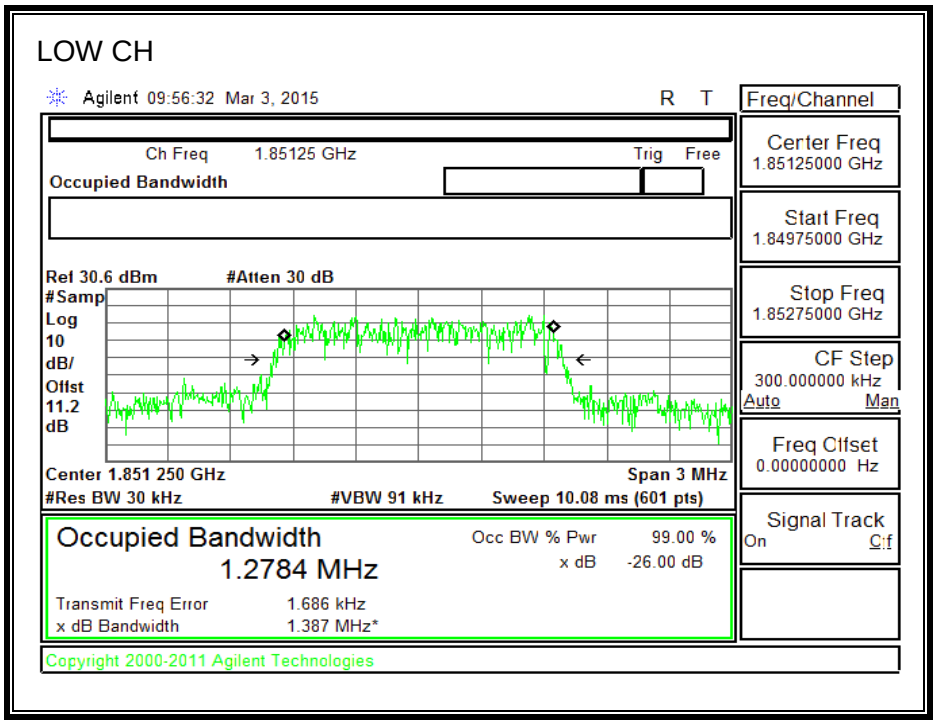


HIGH CH



1900MHz BAND

LOW CH



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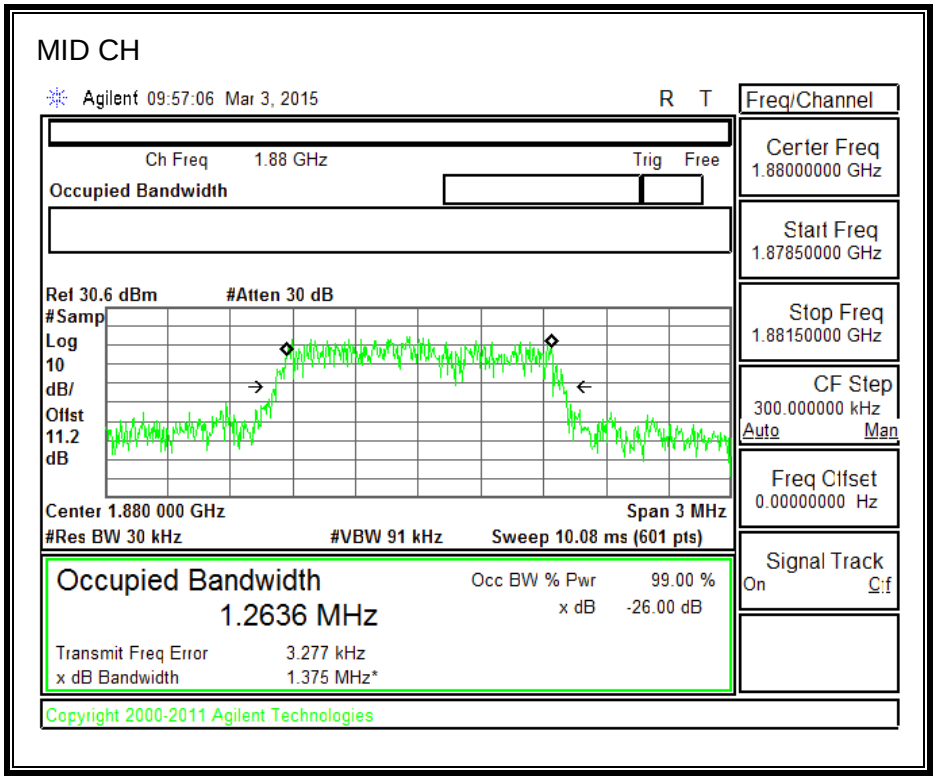
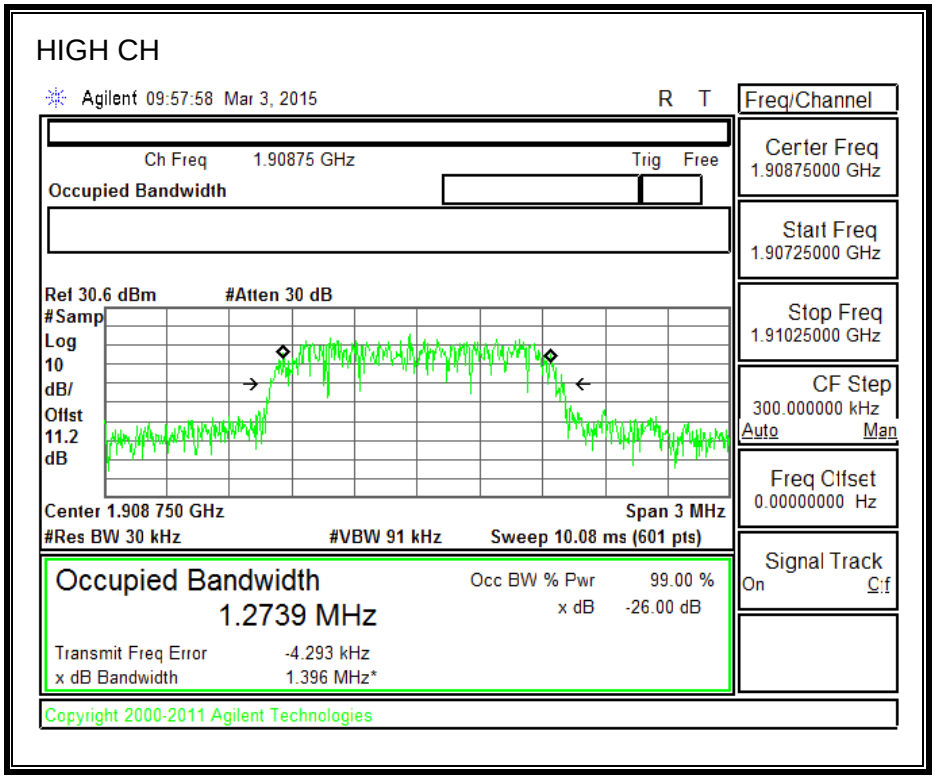
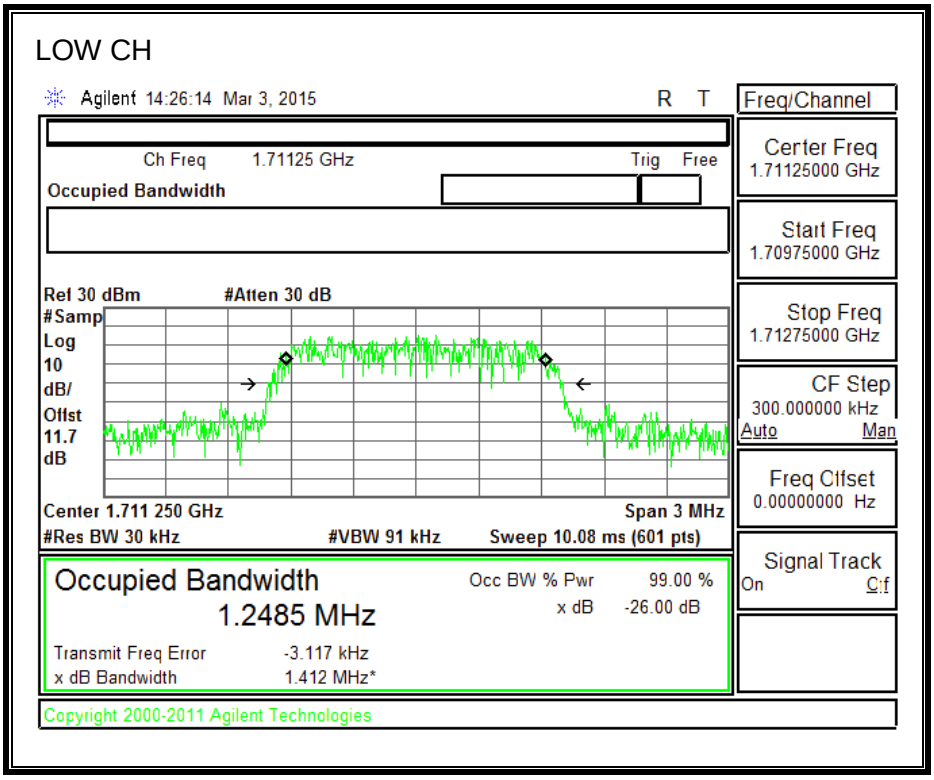


HIGH CH

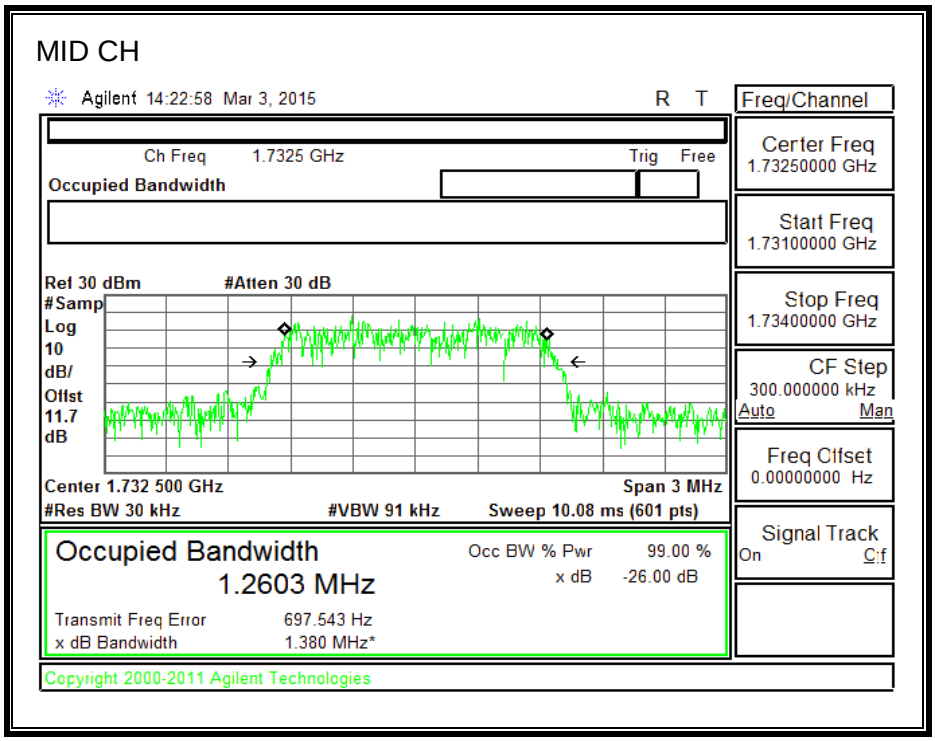


1700MHz BAND

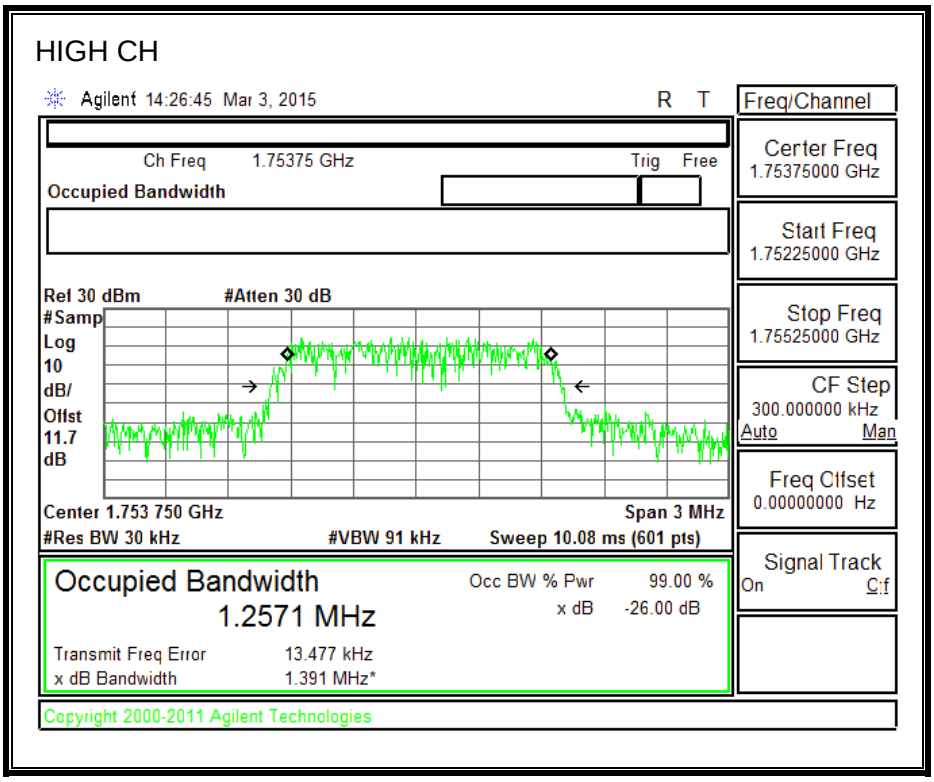
LOW CH



MID CH

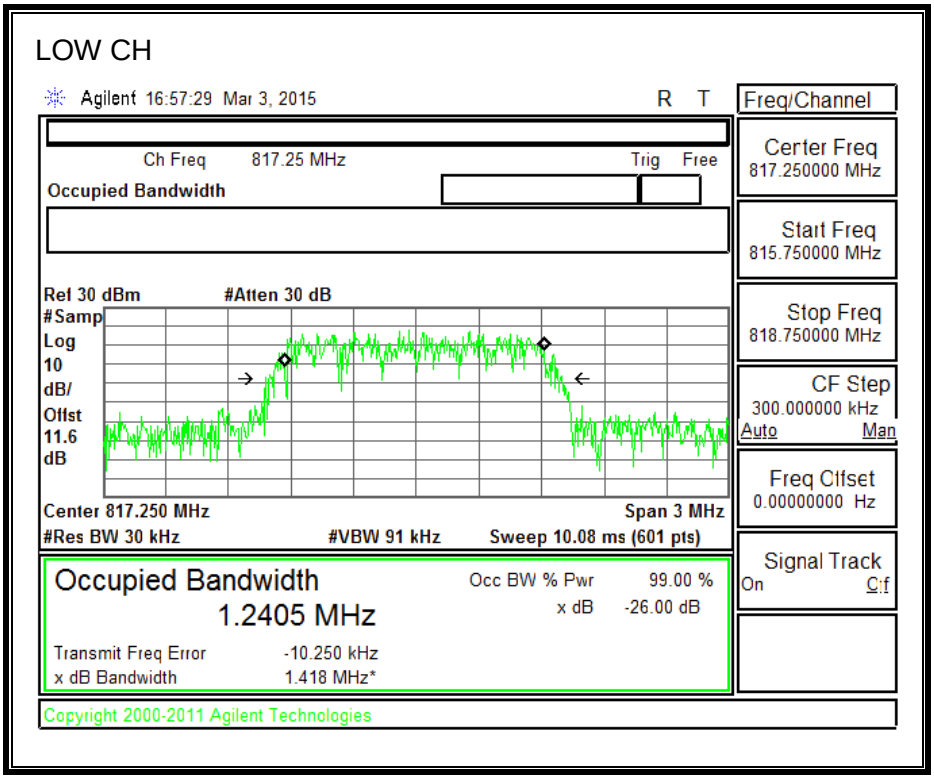


HIGH CH



800MHz SECONDARY BAND

LOW CH



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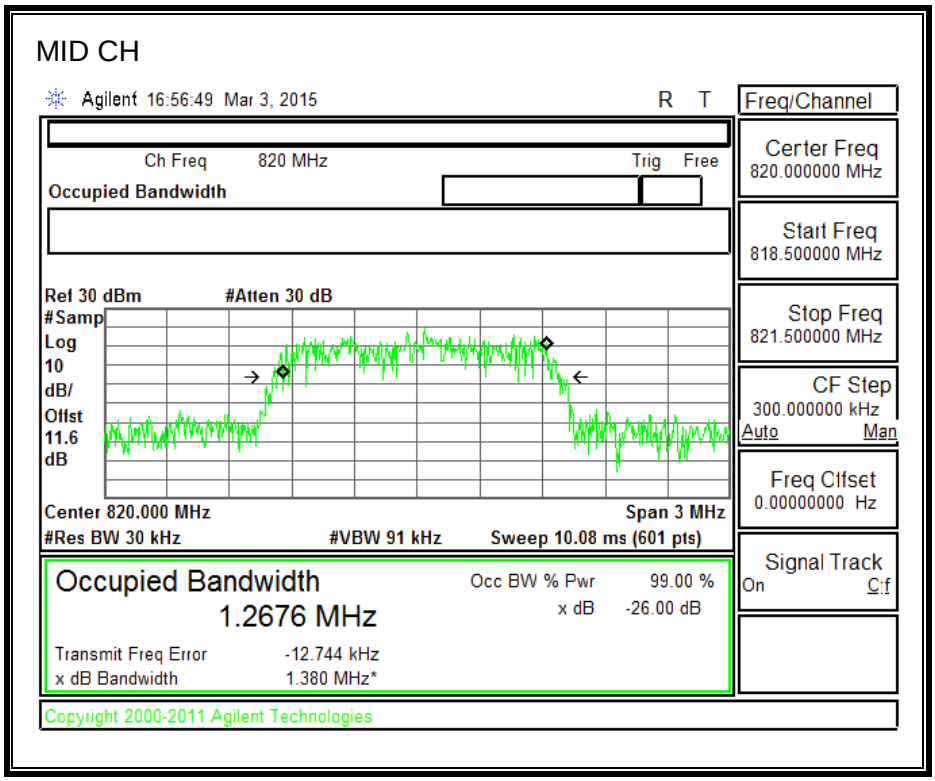
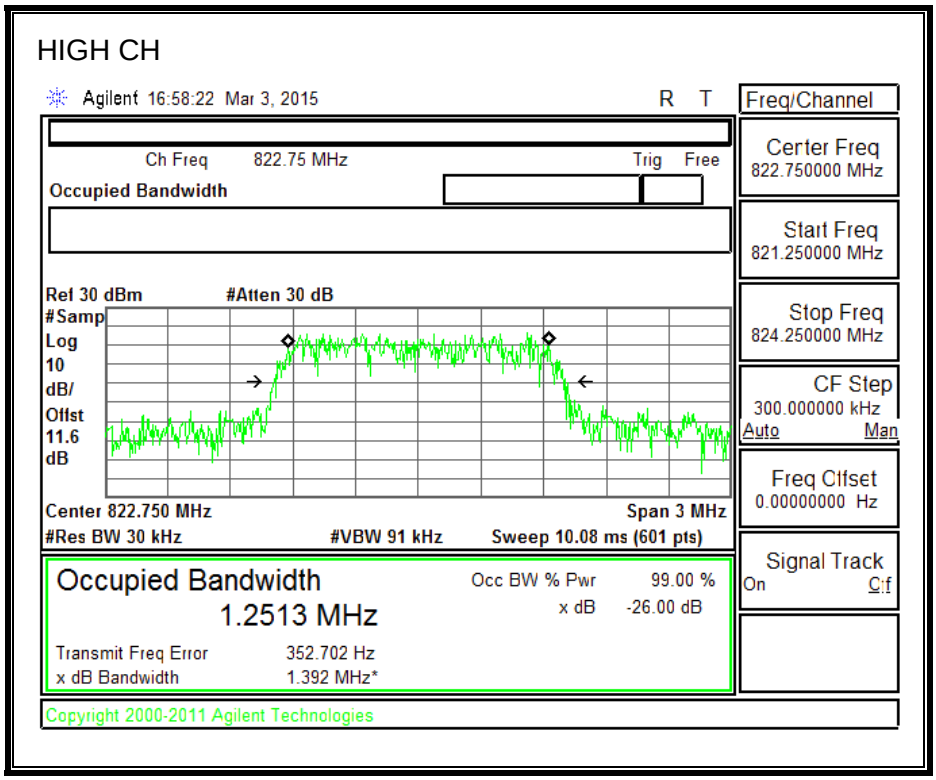


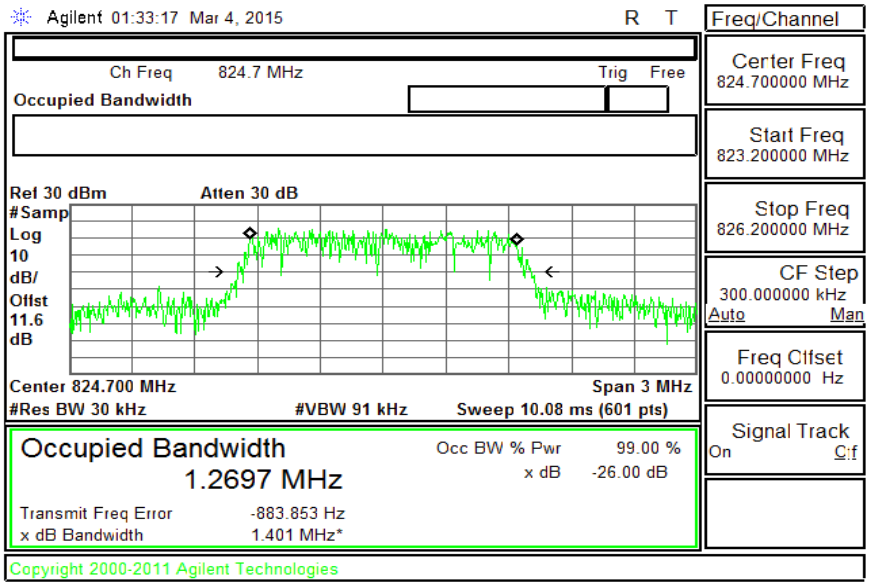
HIGH CH



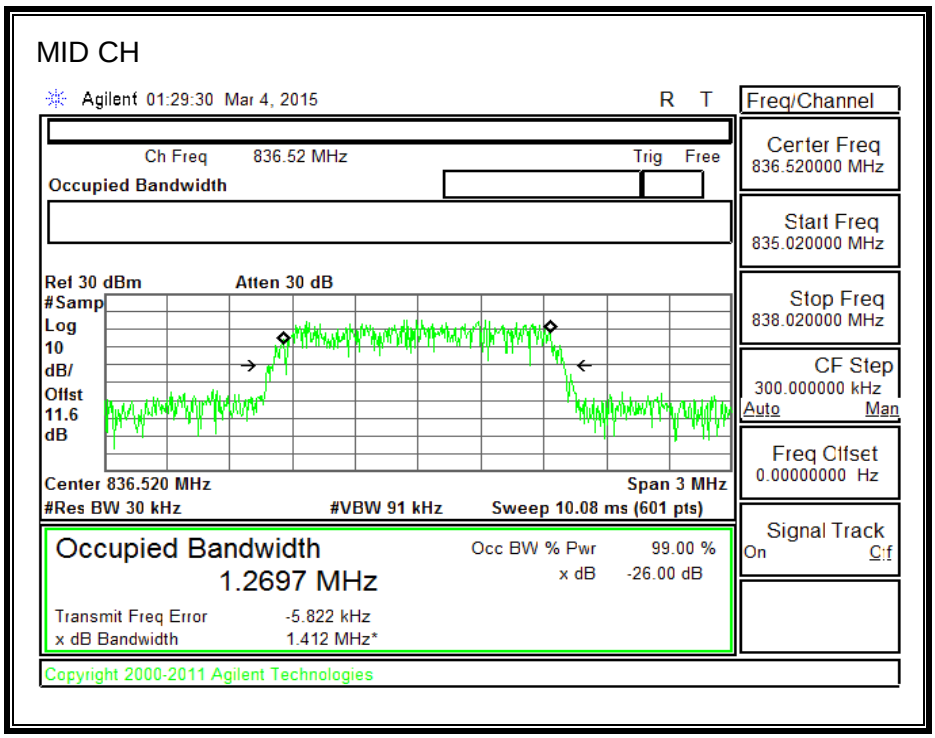
8.1.4. CDMA2000 EVDO Rev. A

850MHz BAND

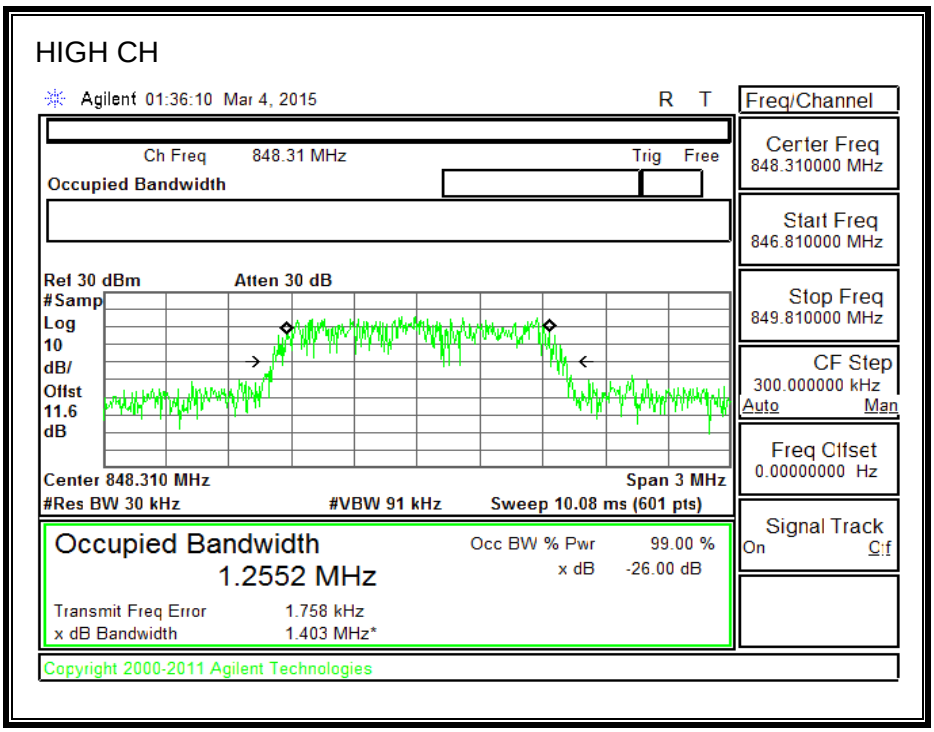
LOW CH



MID CH

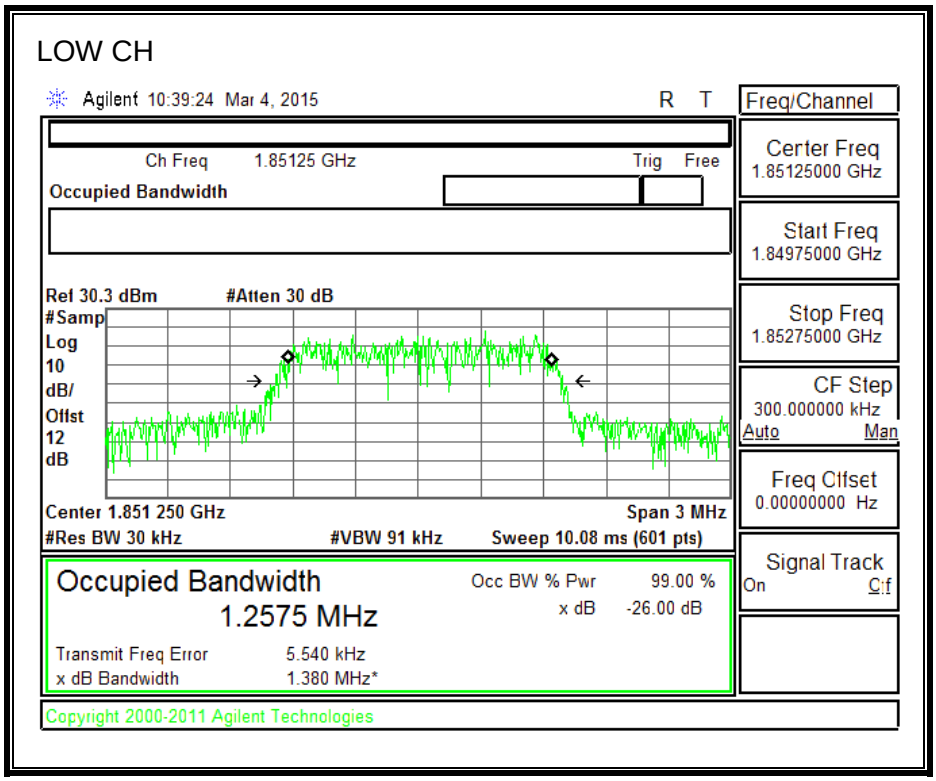


HIGH CH

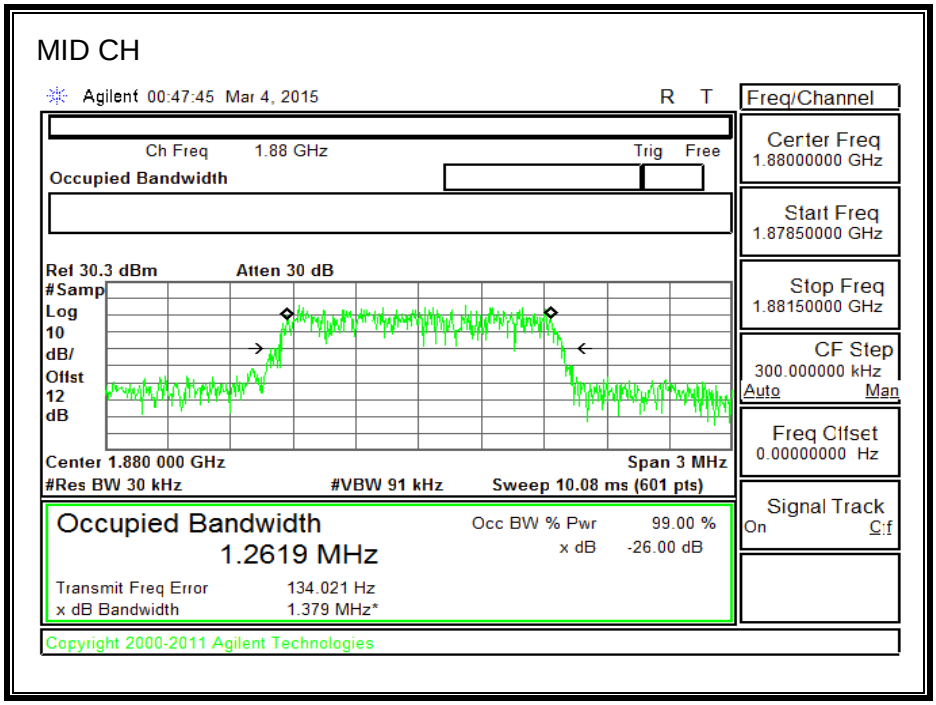


1900MHz BAND

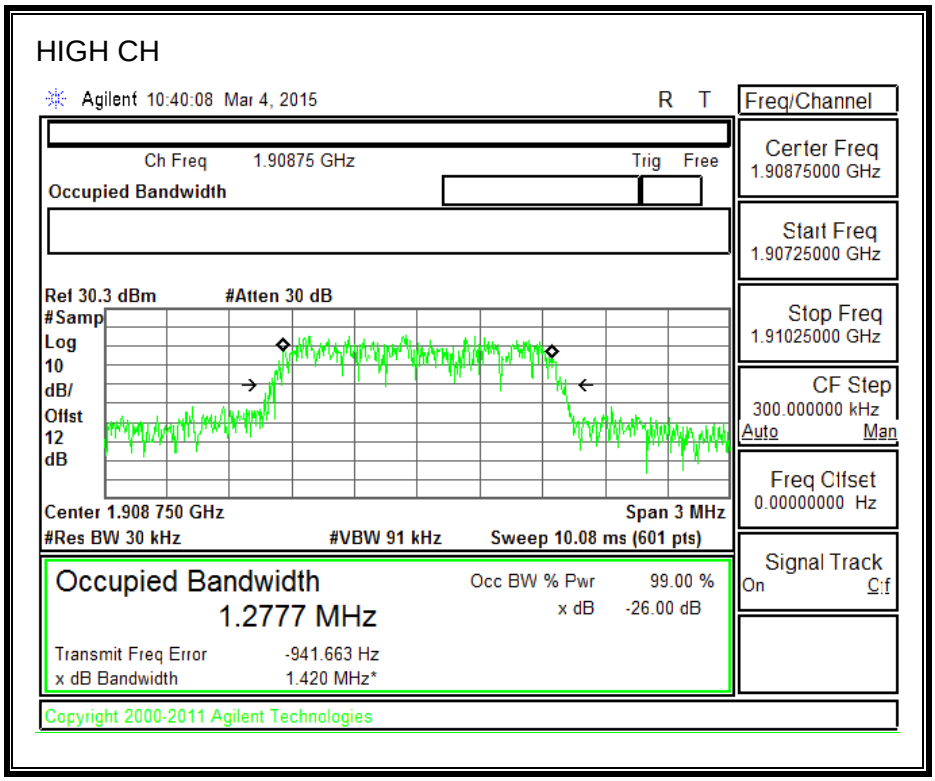
LOW CH



MID CH

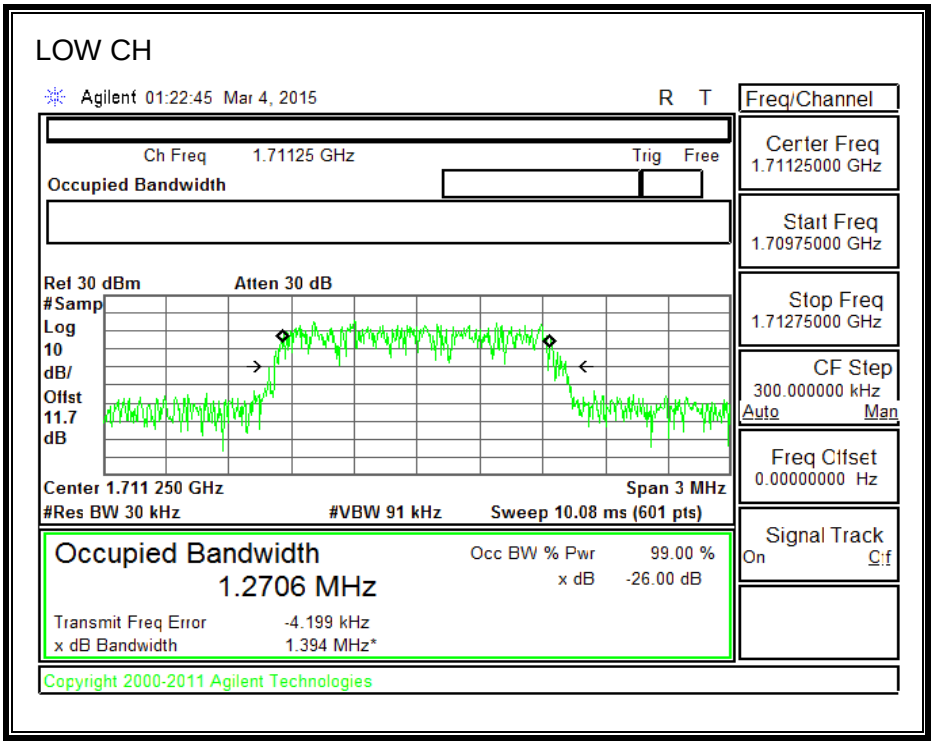


HIGH CH

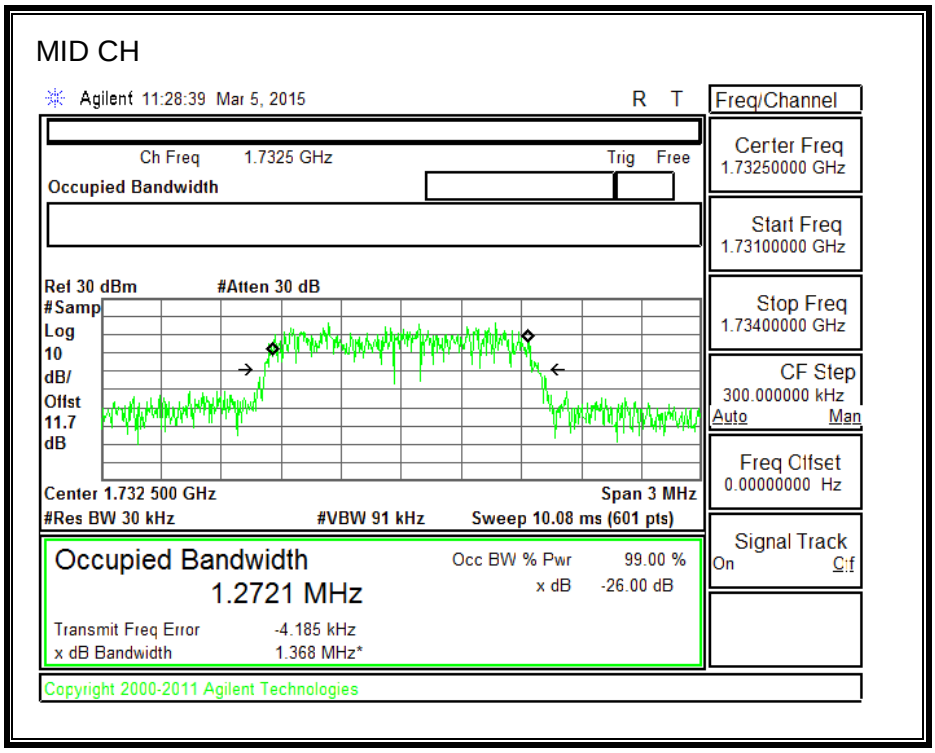


1700MHz BAND

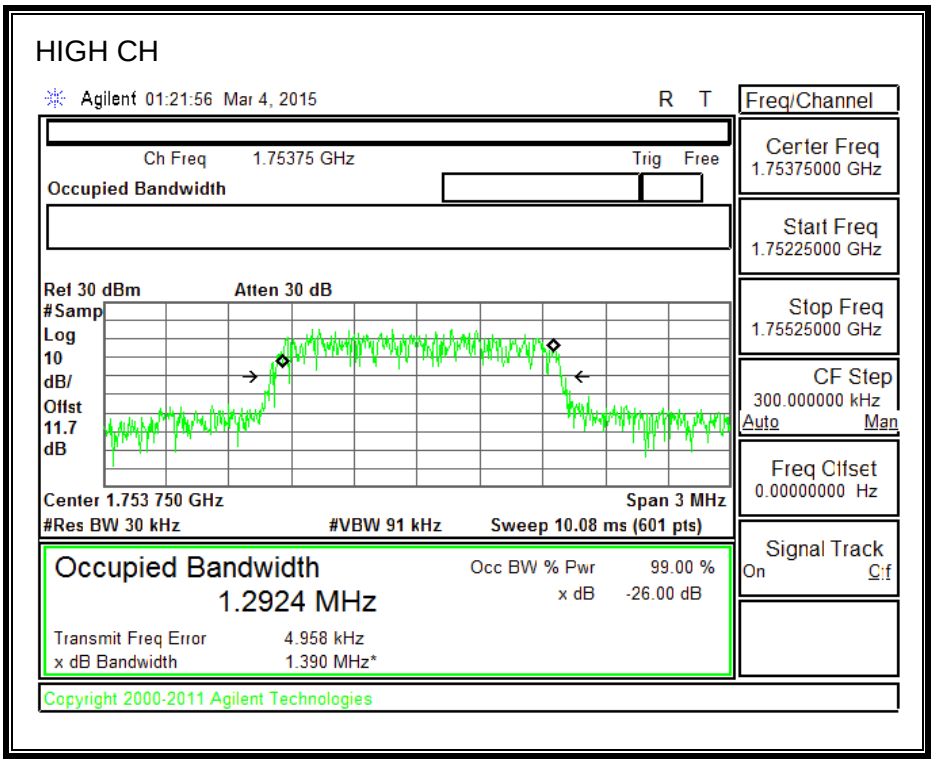
LOW CH



MID CH

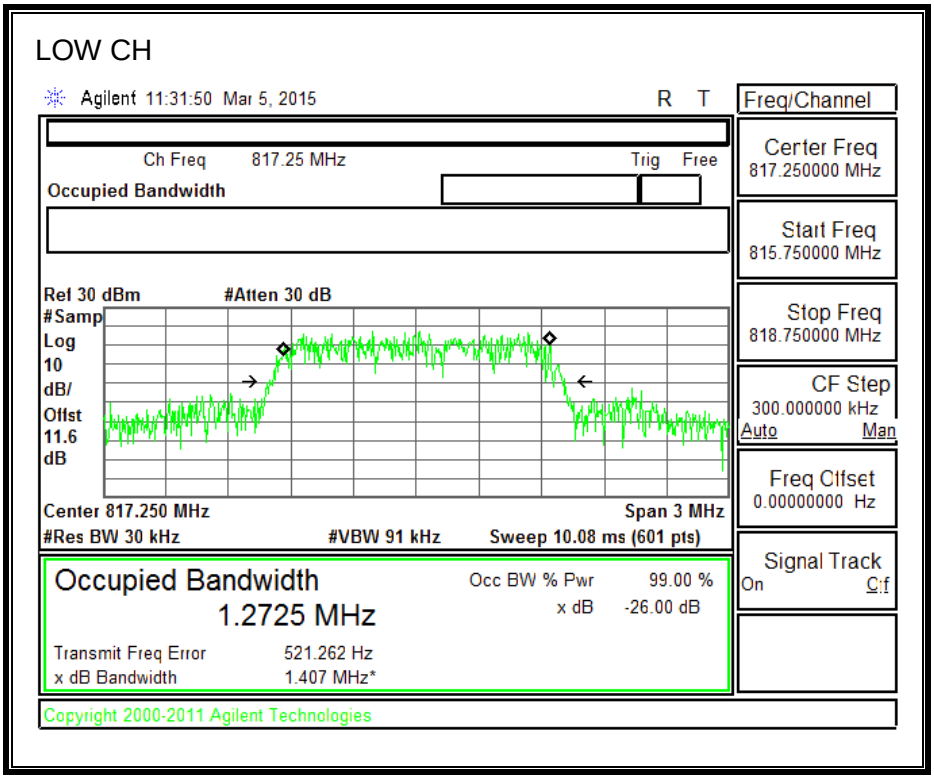


HIGH CH

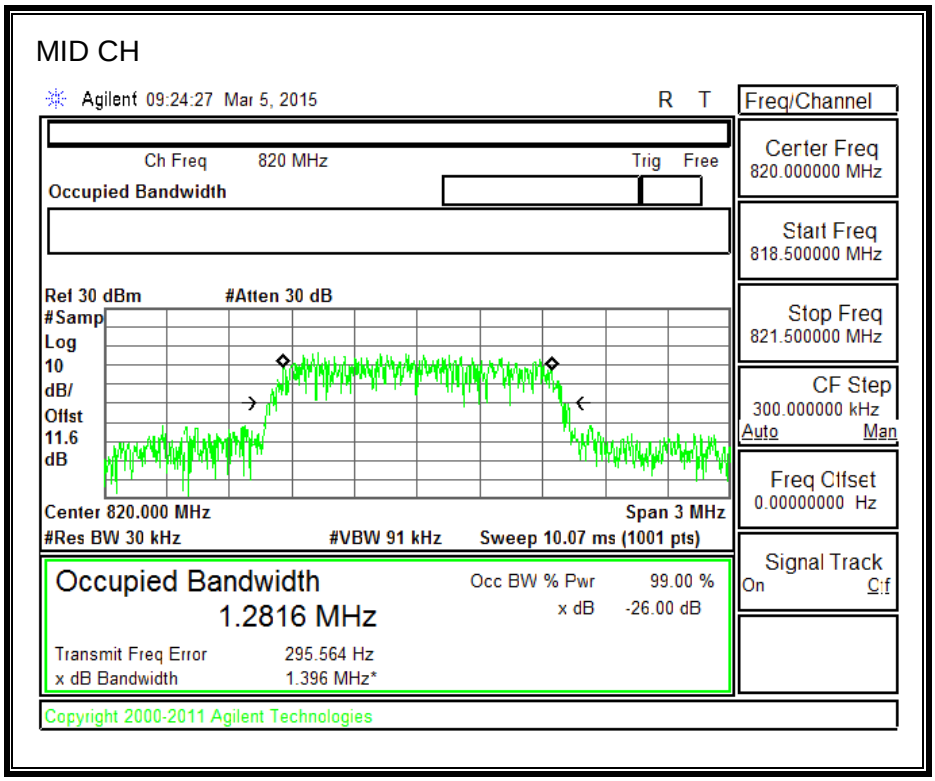


800MHz SECONDARY BAND

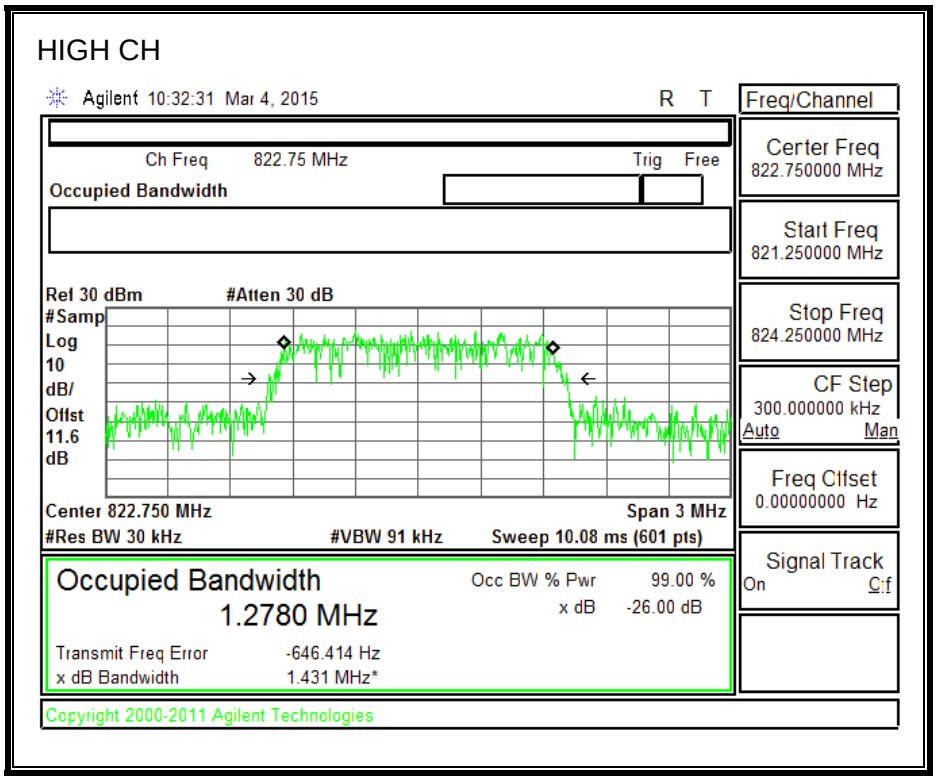
LOW CH



MID CH



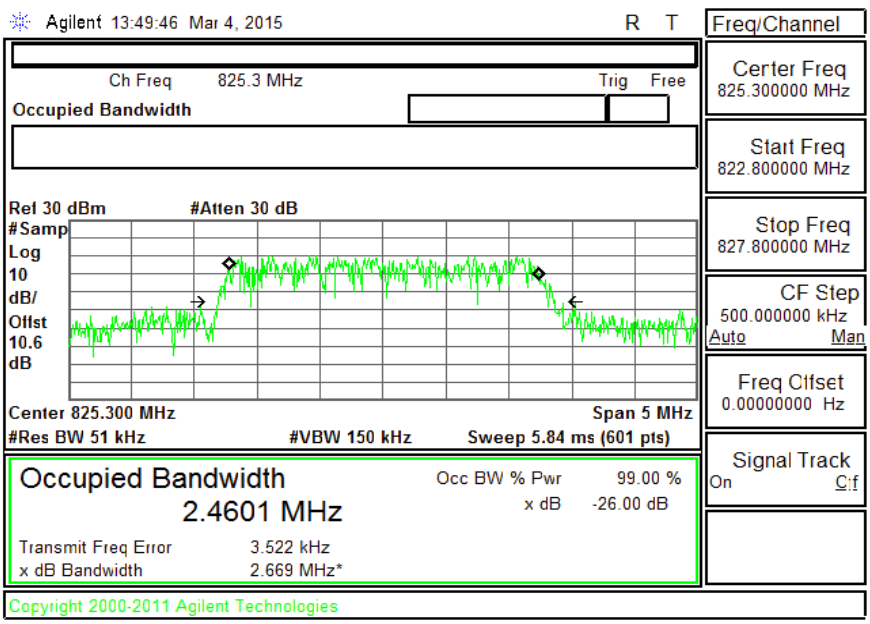
HIGH CH



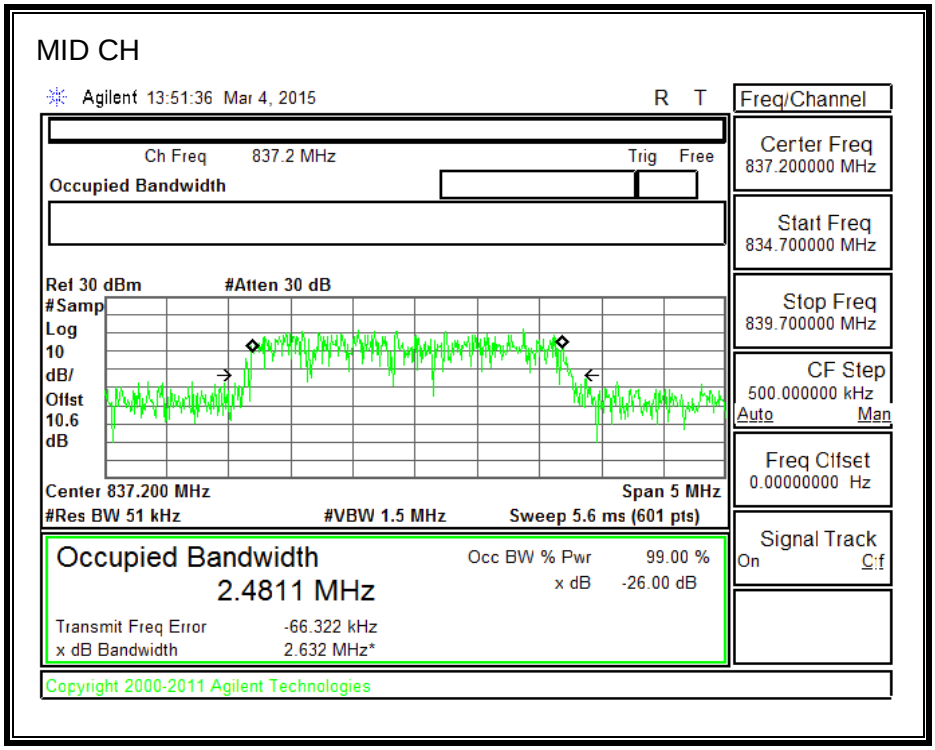
8.1.5. CDMA2000 EVDO Rev. B

2 CARRIER MIN

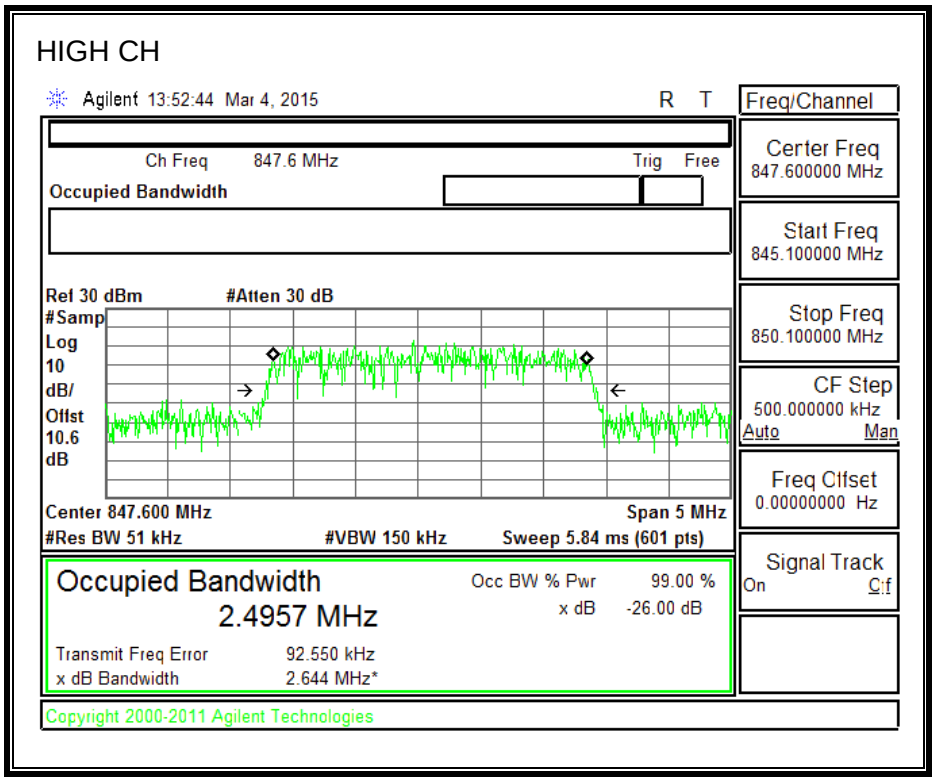
LOW CH



MID CH

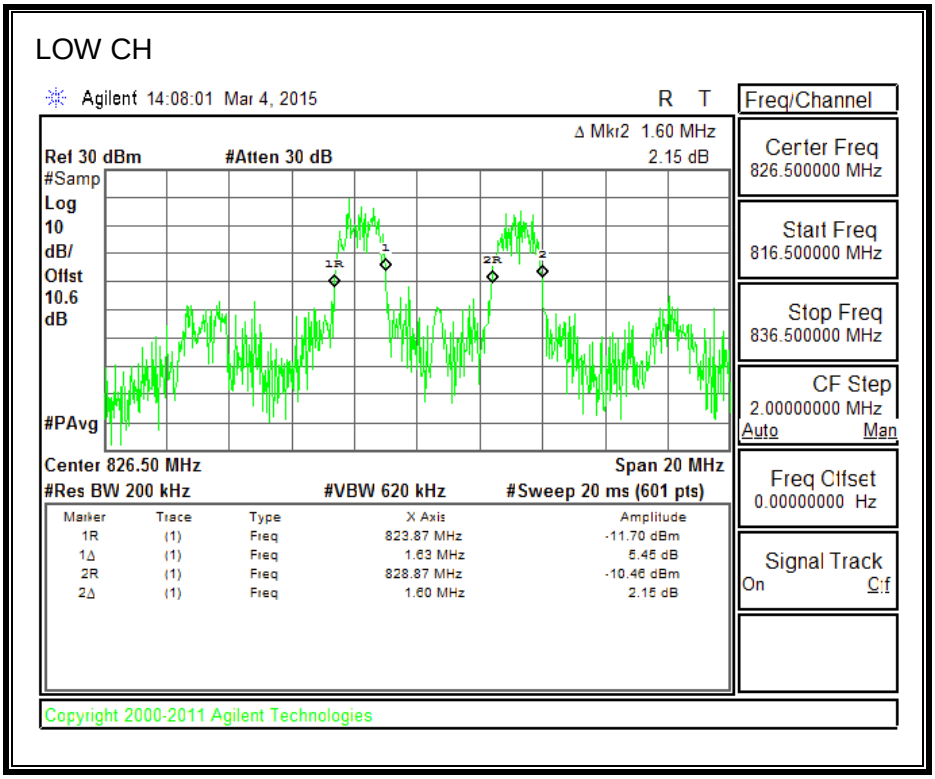


HIGH CH

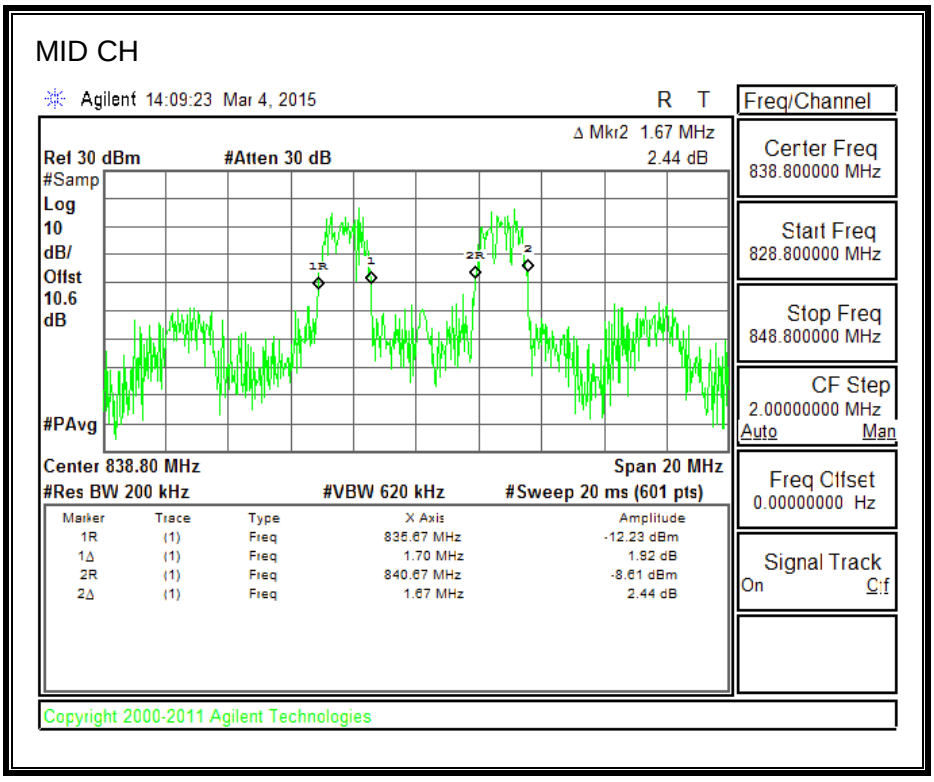


2 CARRIER MAX

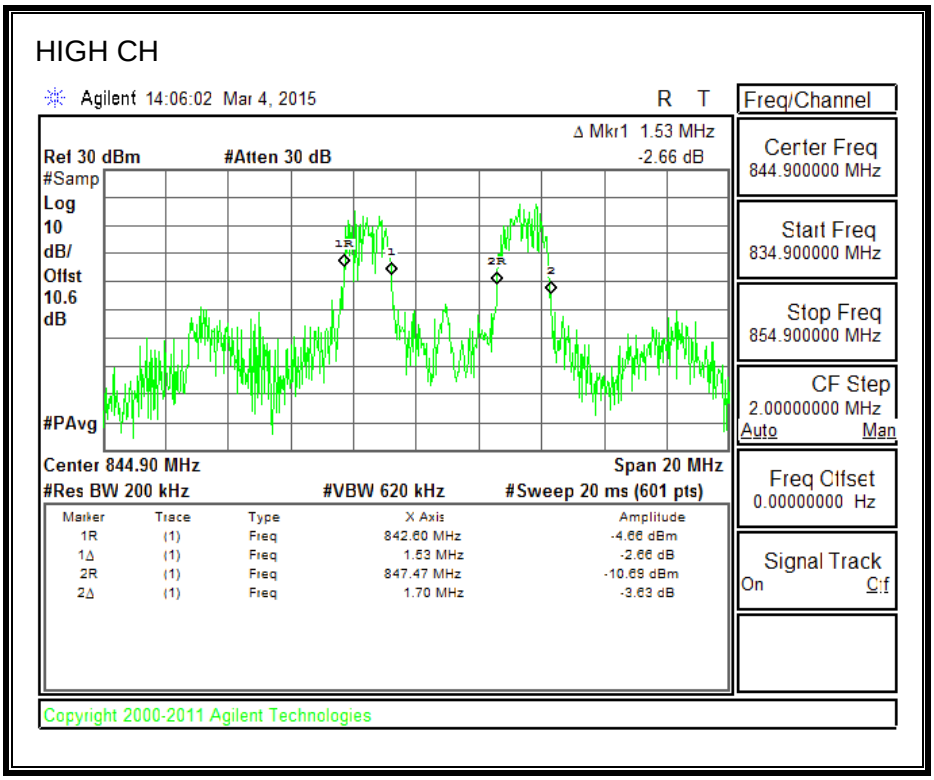
LOW CH



MID CH

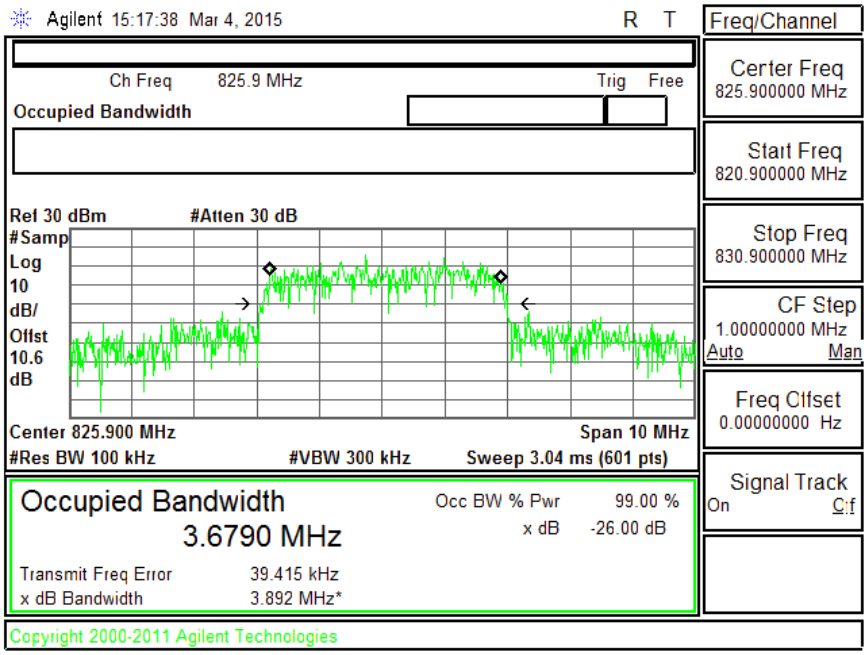


HIGH CH

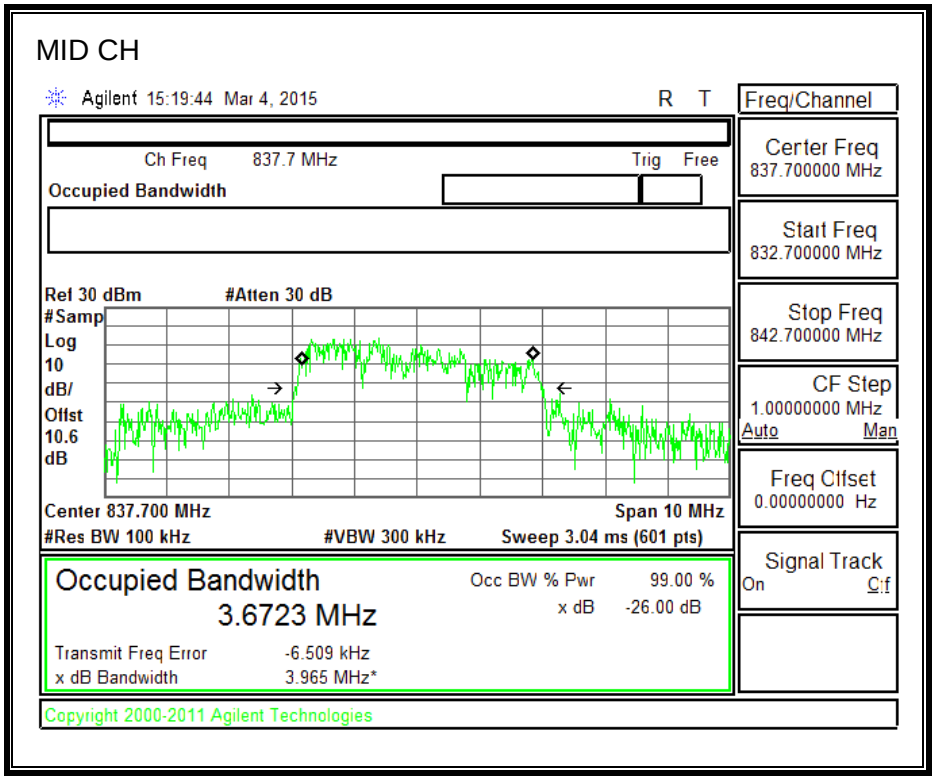


3 CARRIER MIN

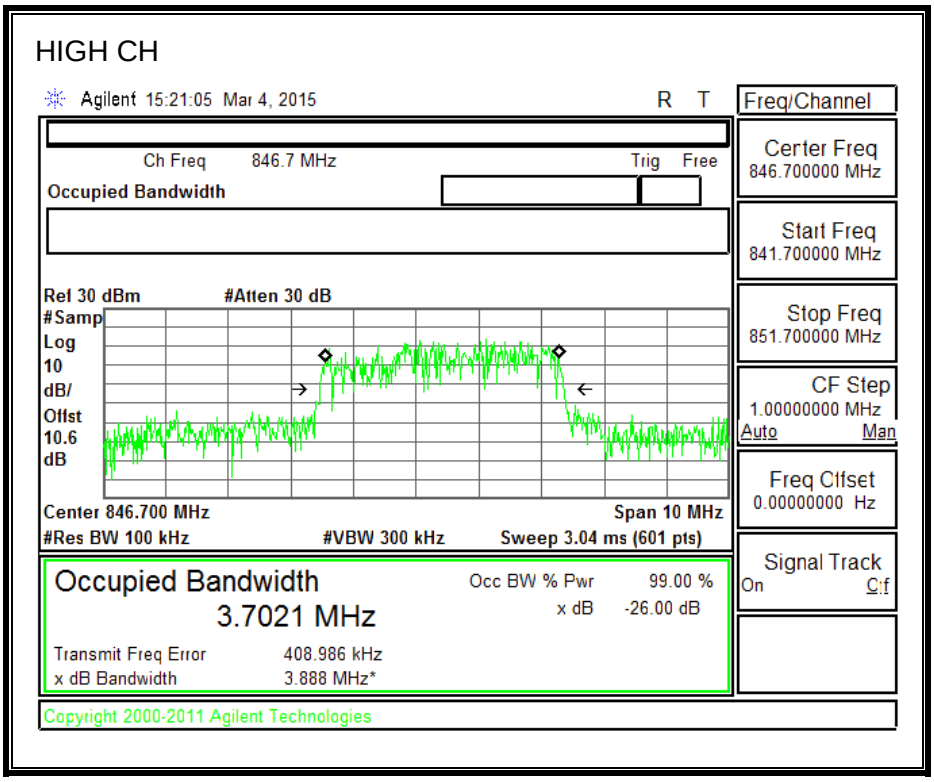
LOW CH



MID CH



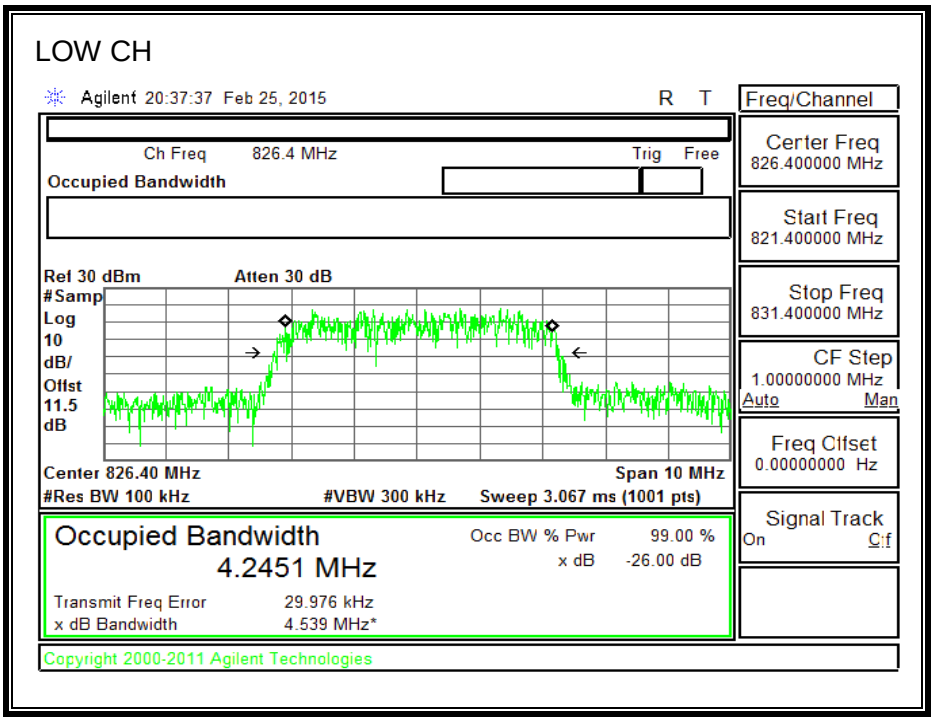
HIGH CH



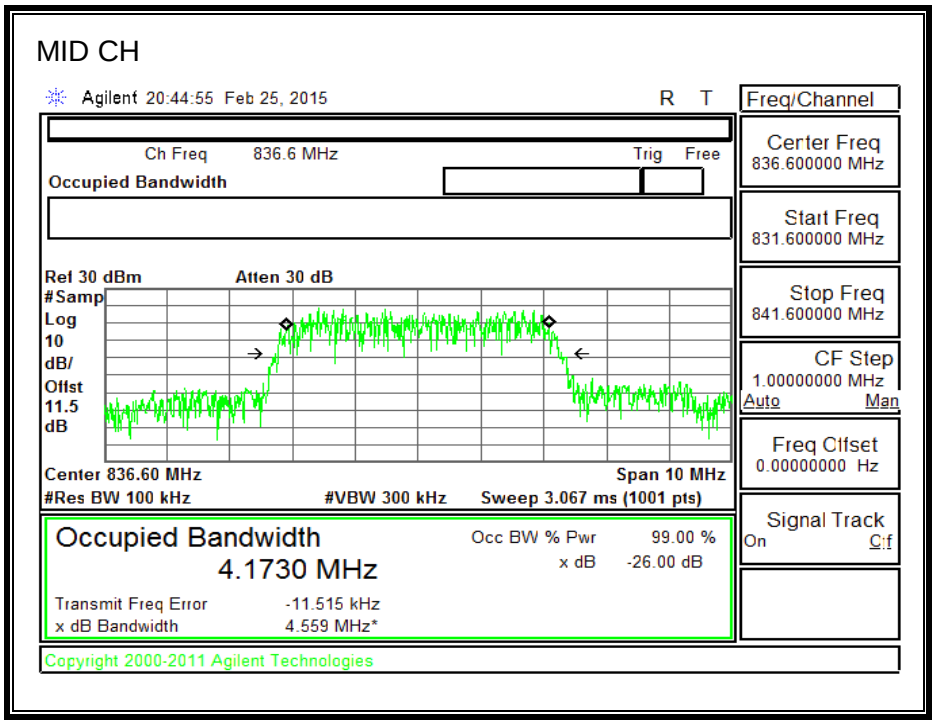
8.1.6. UMTS REL 99

850MHz BAND

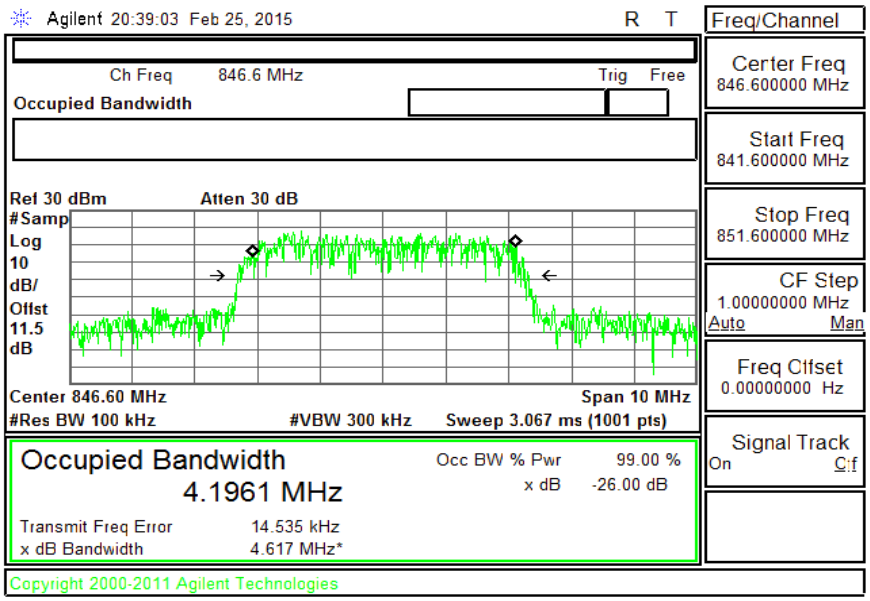
LOW CH



MID CH

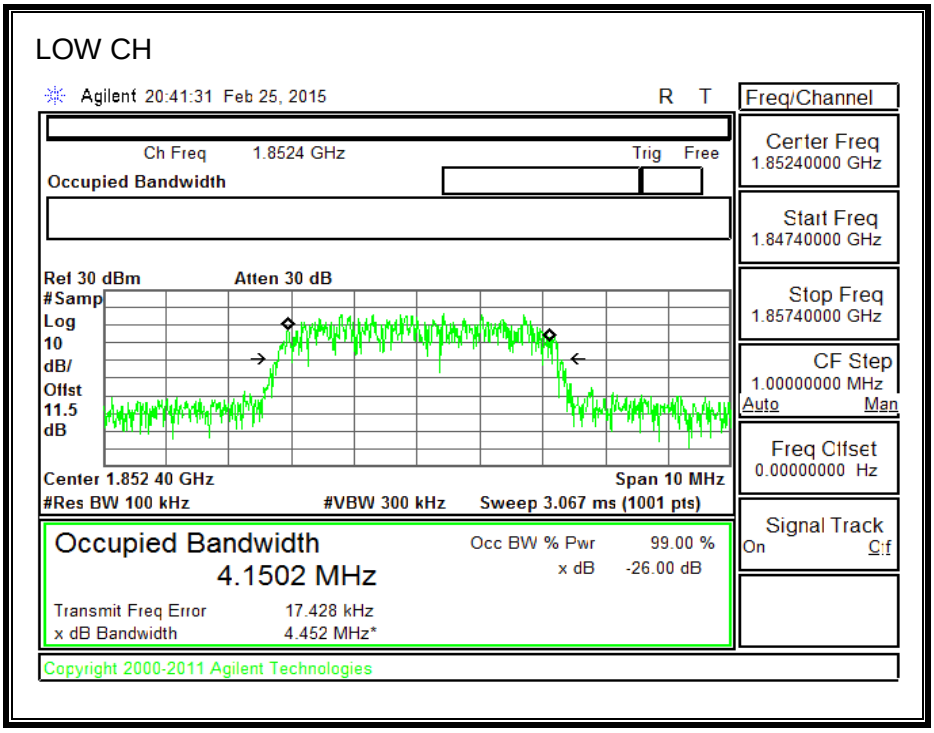


HIGH CH

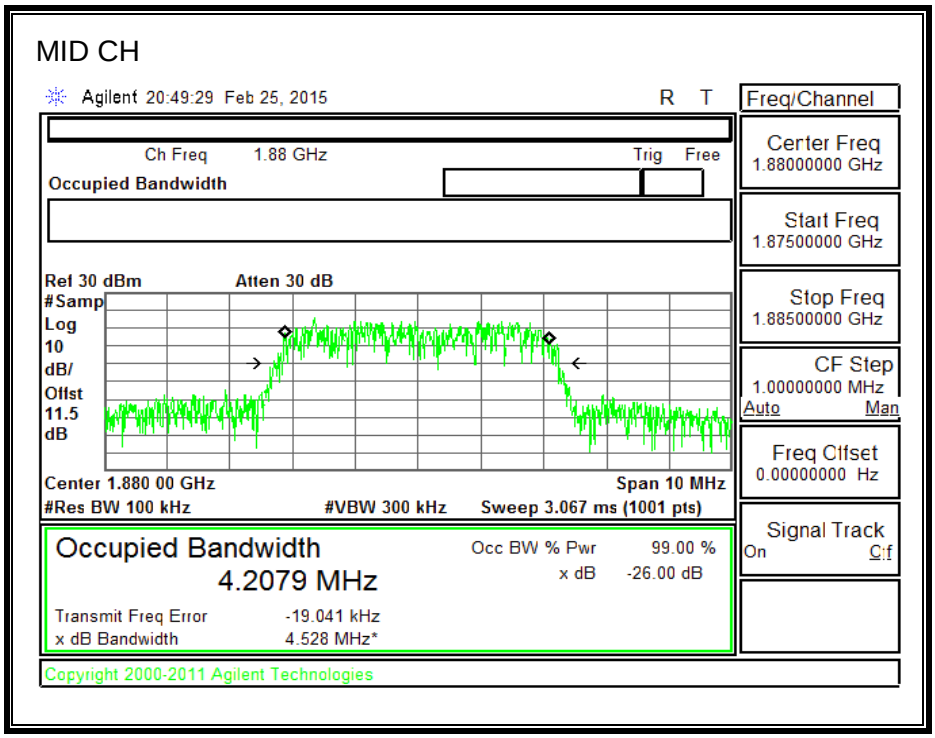


1900MHz BAND

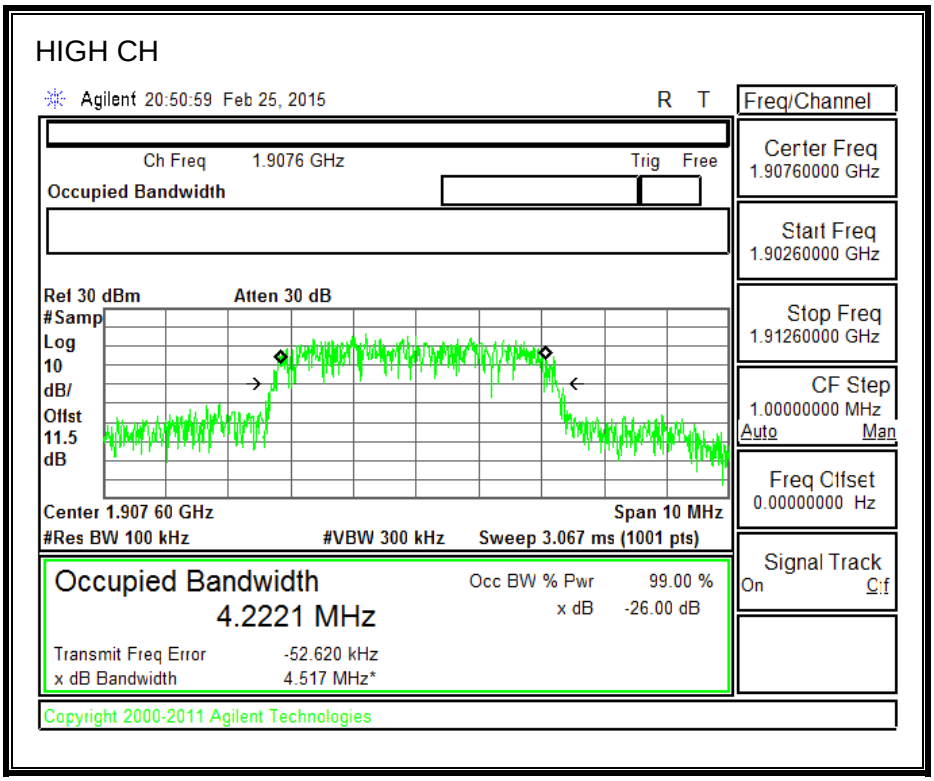
LOW CH



MID CH

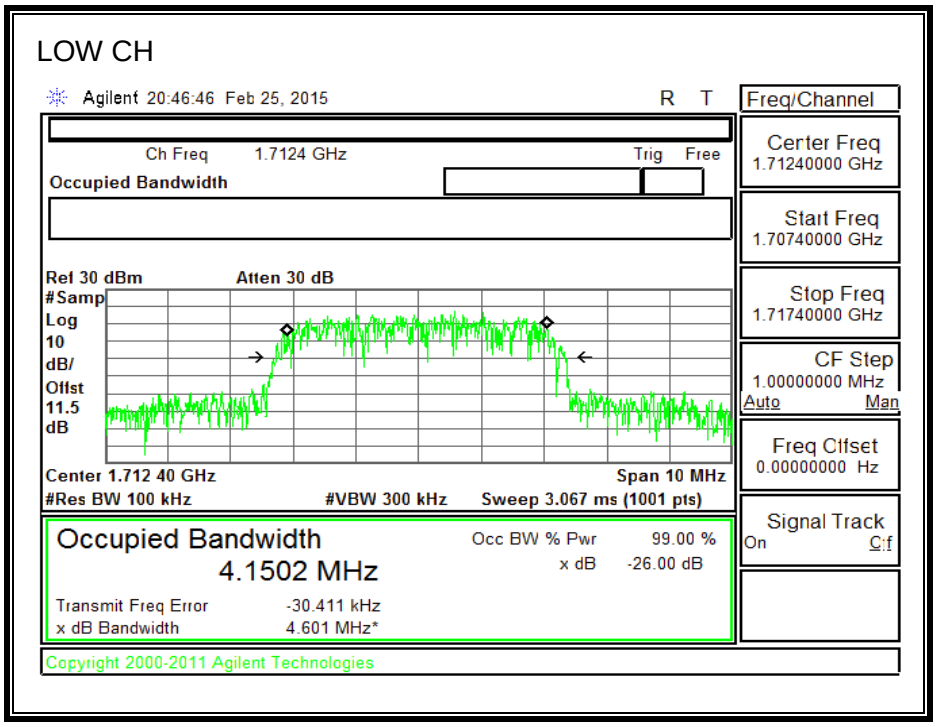


HIGH CH

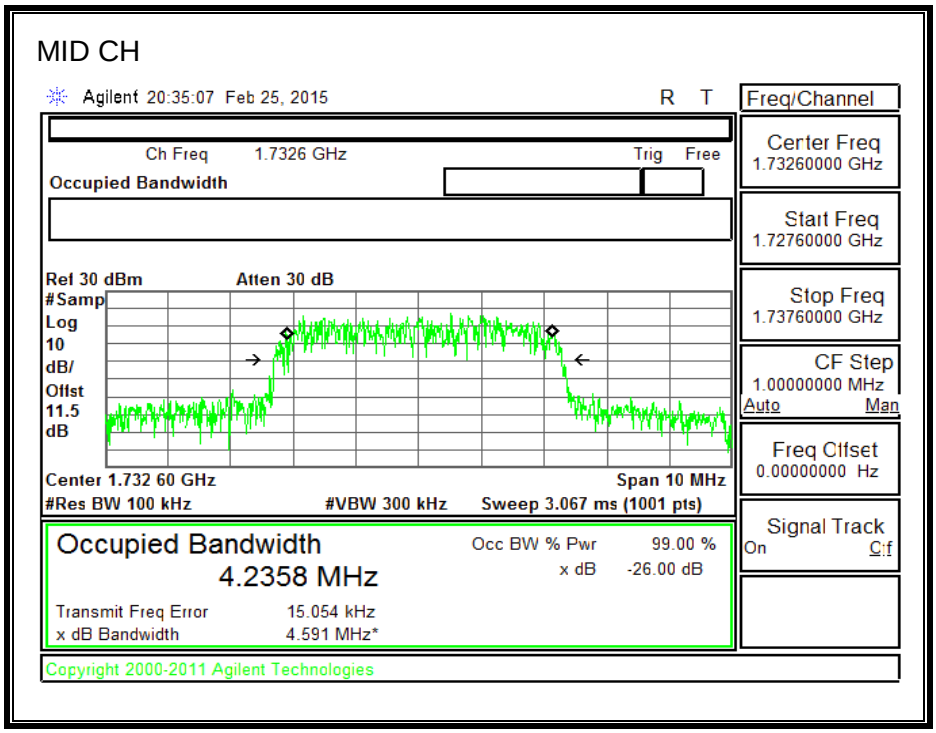


1700MHz BAND

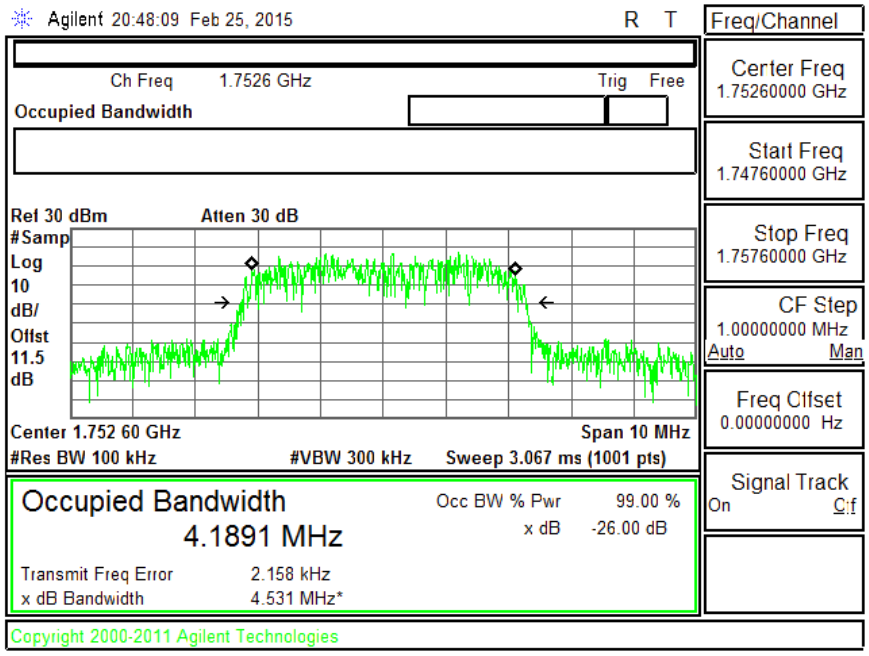
LOW CH



MID CH



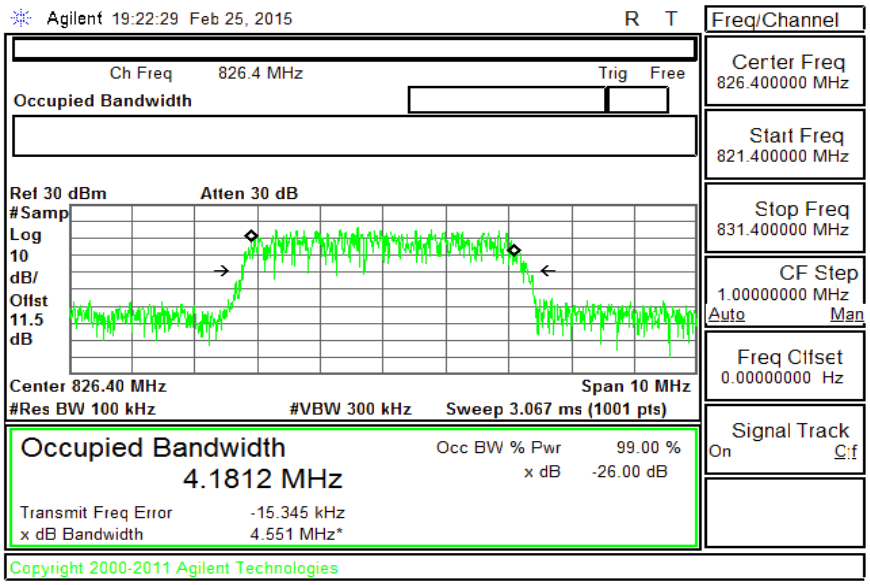
HIGH CH



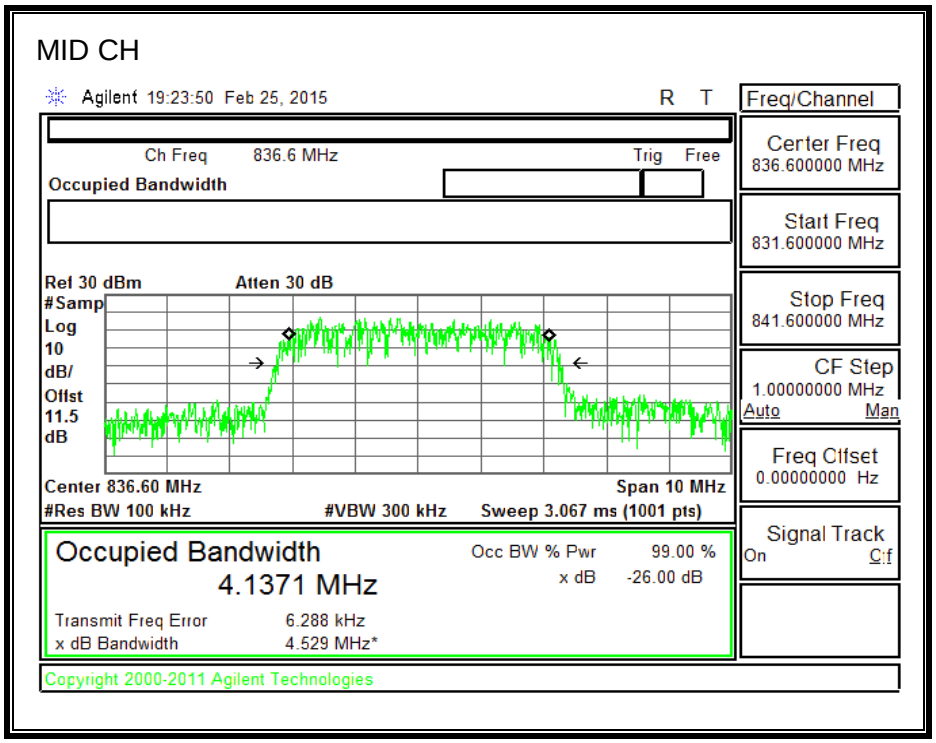
8.1.7. UMTS HSDPA

850MHz BAND

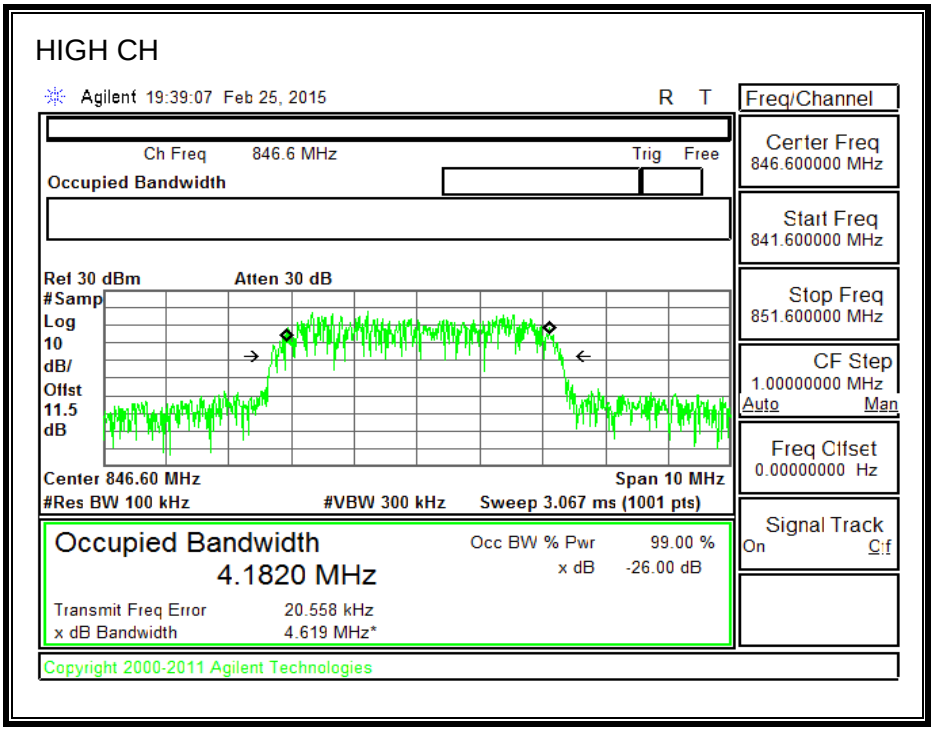
LOW CH



MID CH

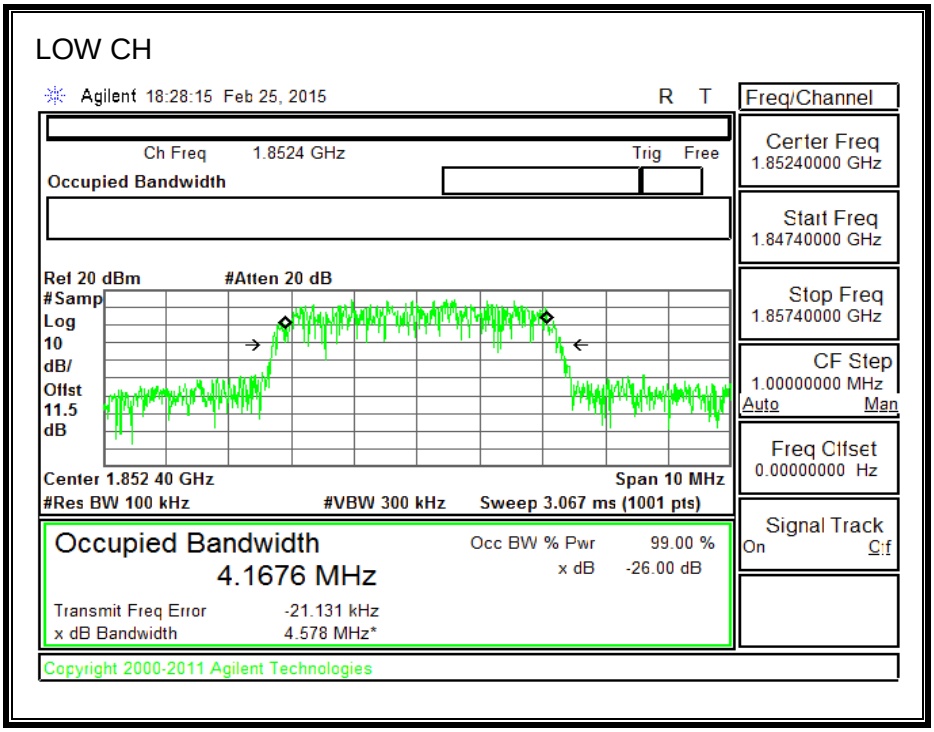


HIGH CH

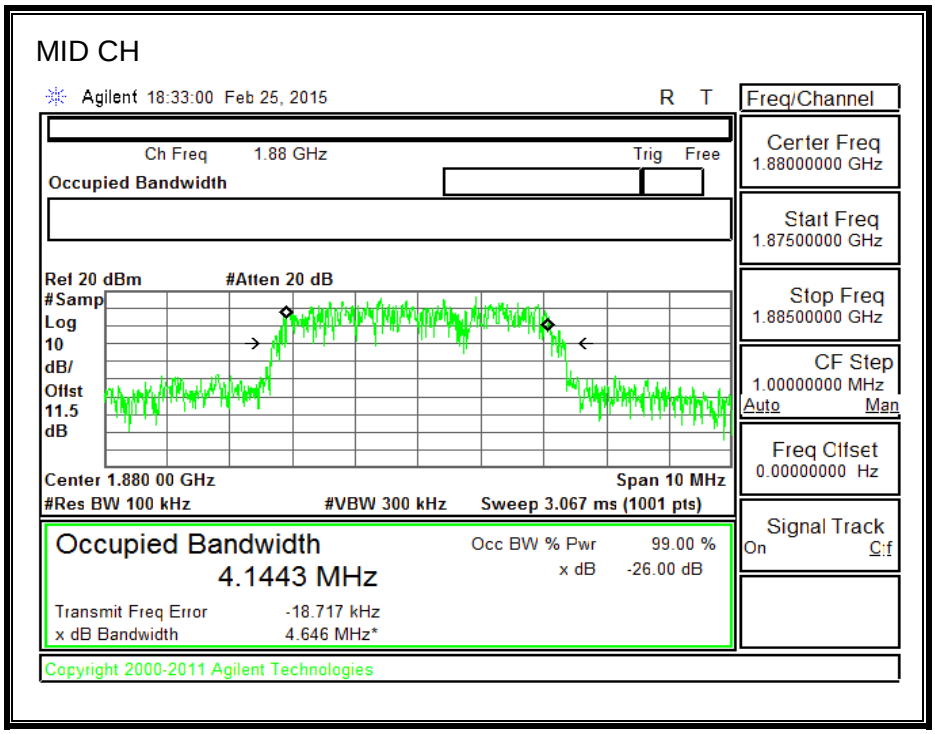


1900MHz BAND

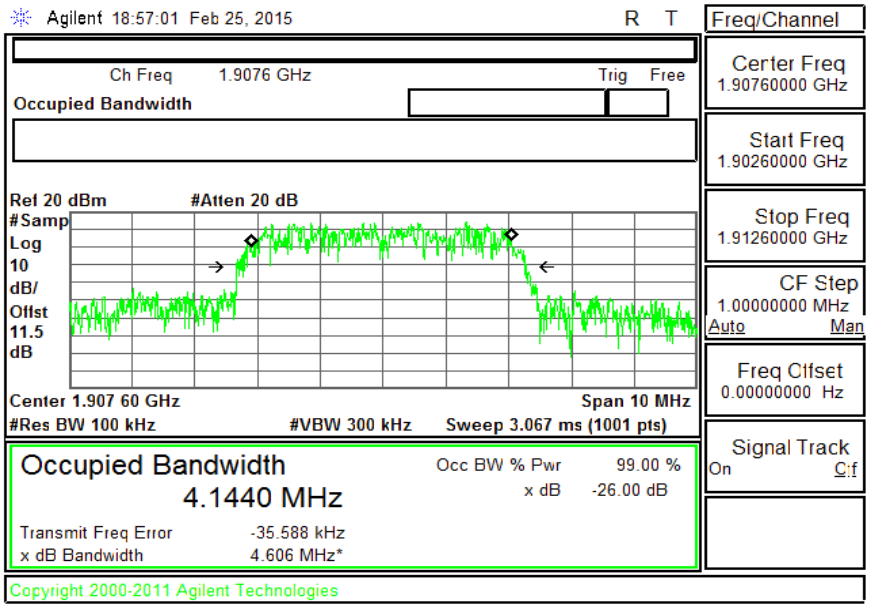
LOW CH



MID CH

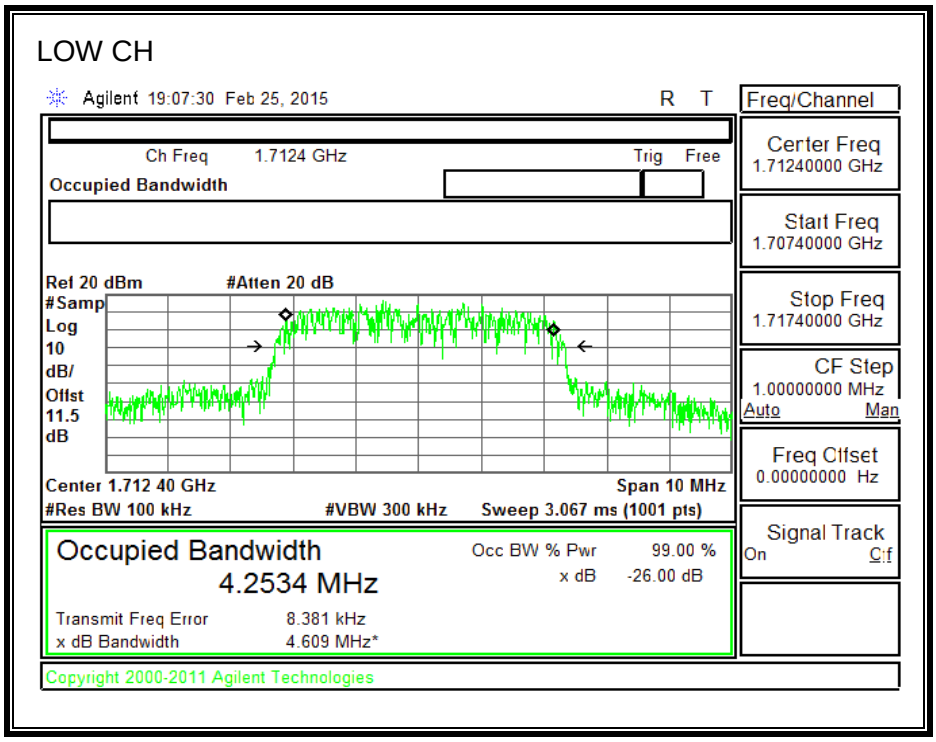


HIGH CH

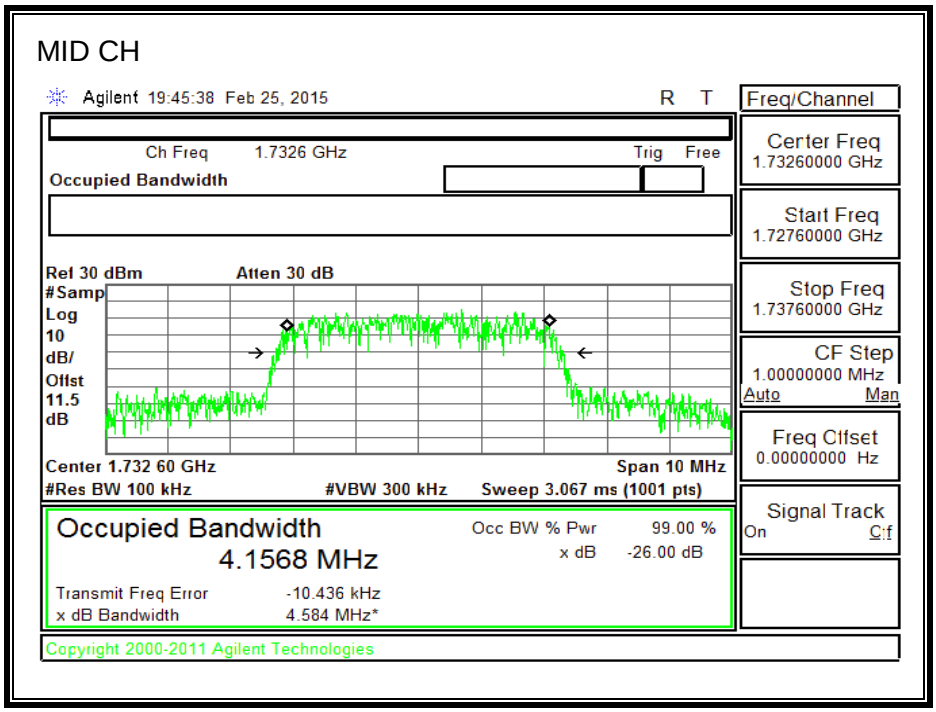


1700MHz BAND

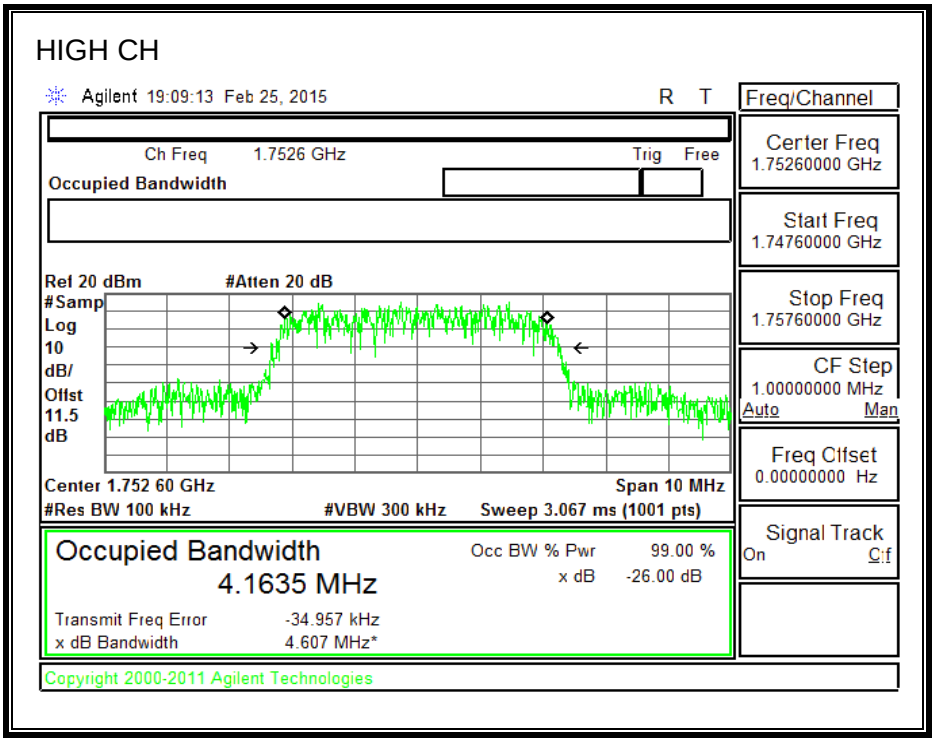
LOW CH



MID CH



HIGH CH



8.2. BAND EDGE

RULE PART(S)

FCC: §22.359, 24.238, §27.53 and §90.691

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

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

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

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

TEST PROCEDURE

The transmitter output was connected to a Agilent 8960 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.
For each band edge measurement:

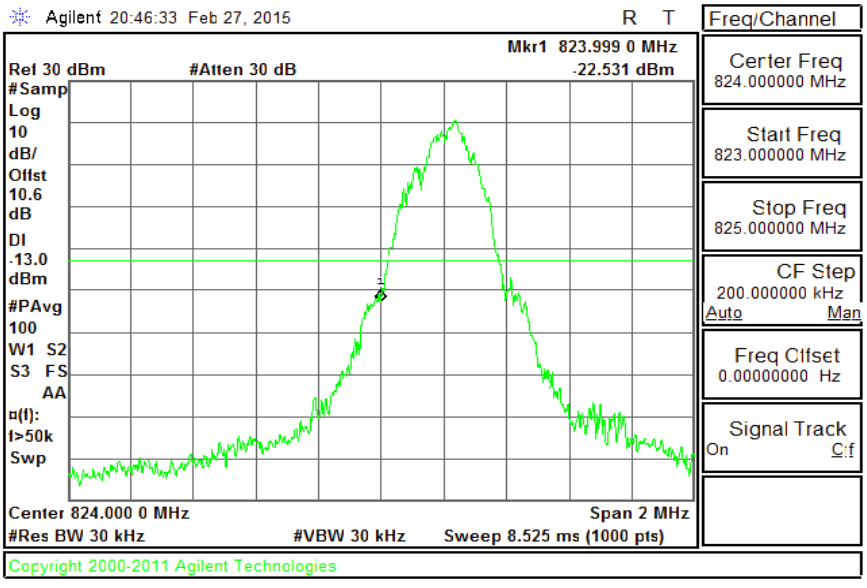
- Set the spectrum analyzer span to include the block edge frequency (824, 849, 1850, 1910MHz)
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

RESULTS

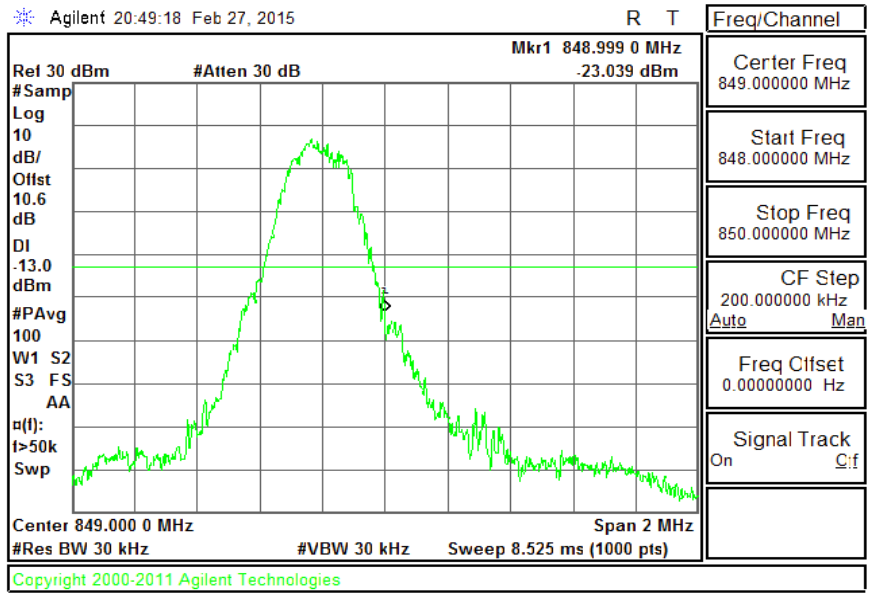
8.2.1. GSM-GPRS

850MHz BAND

LOW CH

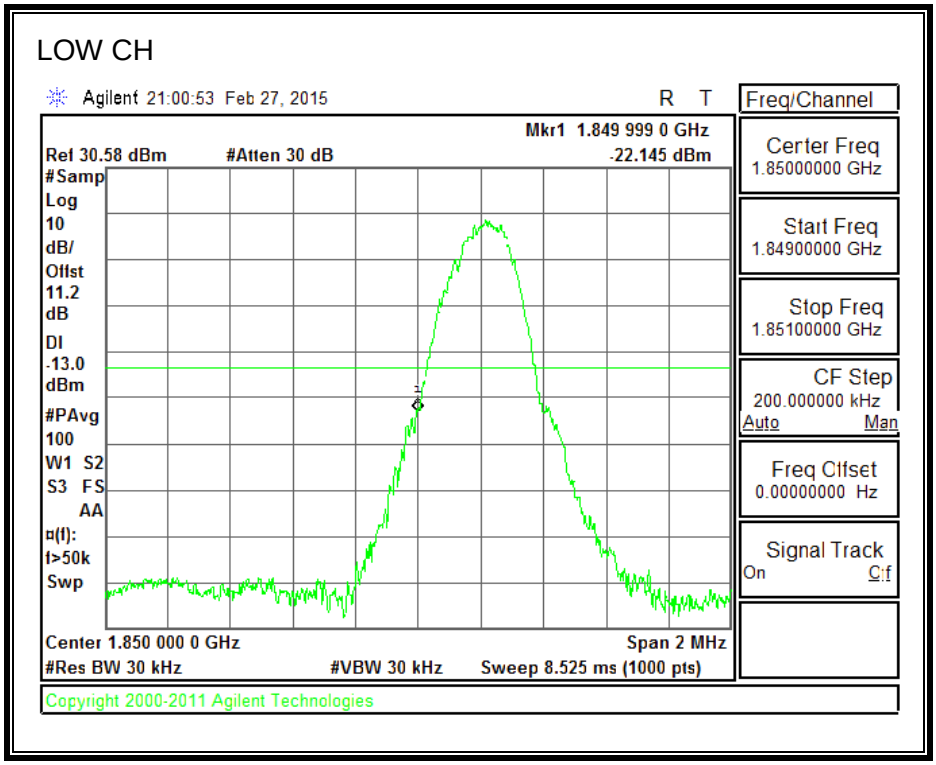


HIGH CH

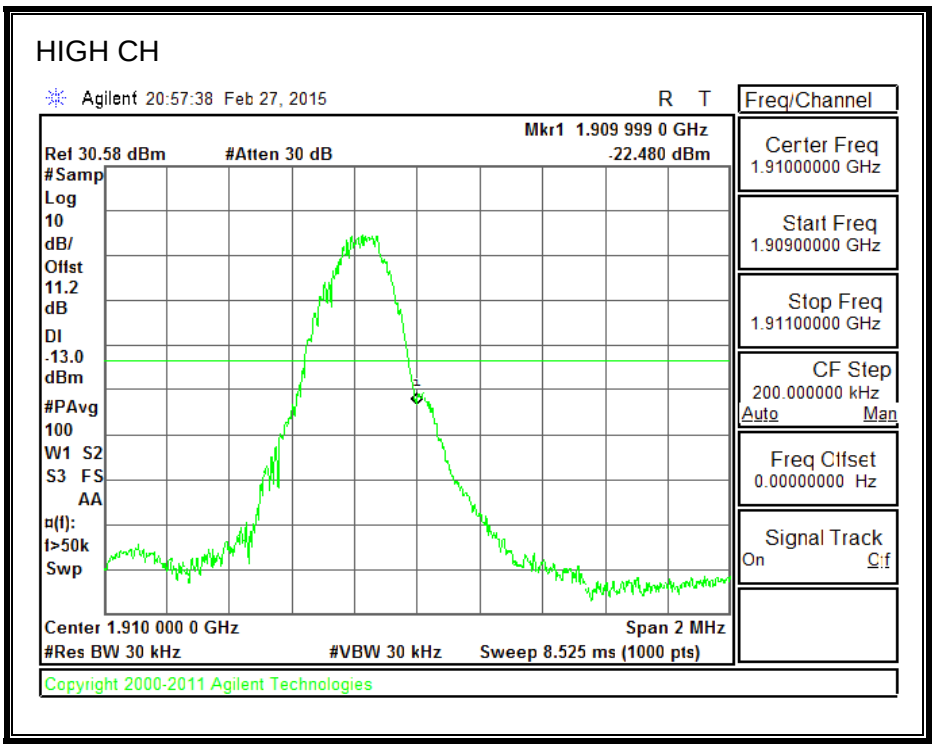


1900MHz BAND

LOW CH



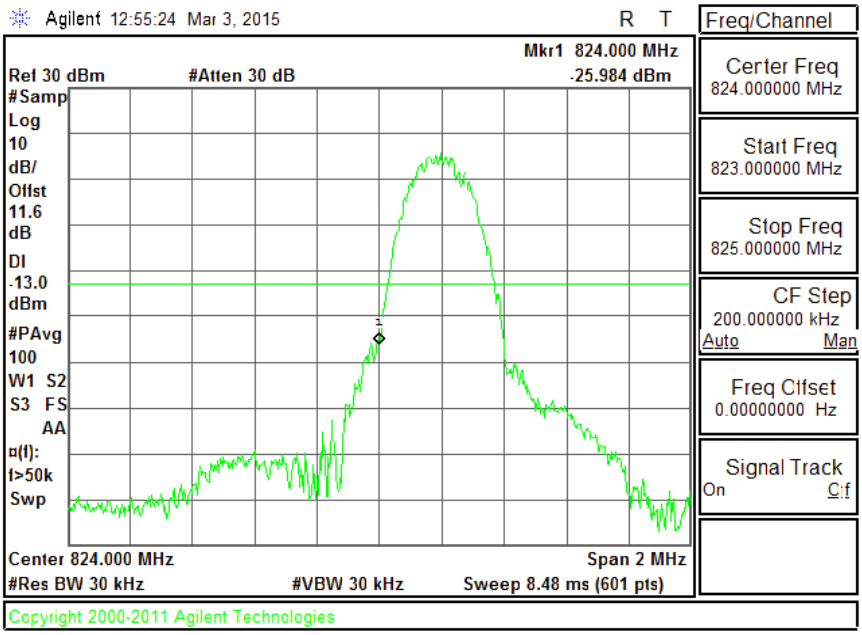
HIGH CH



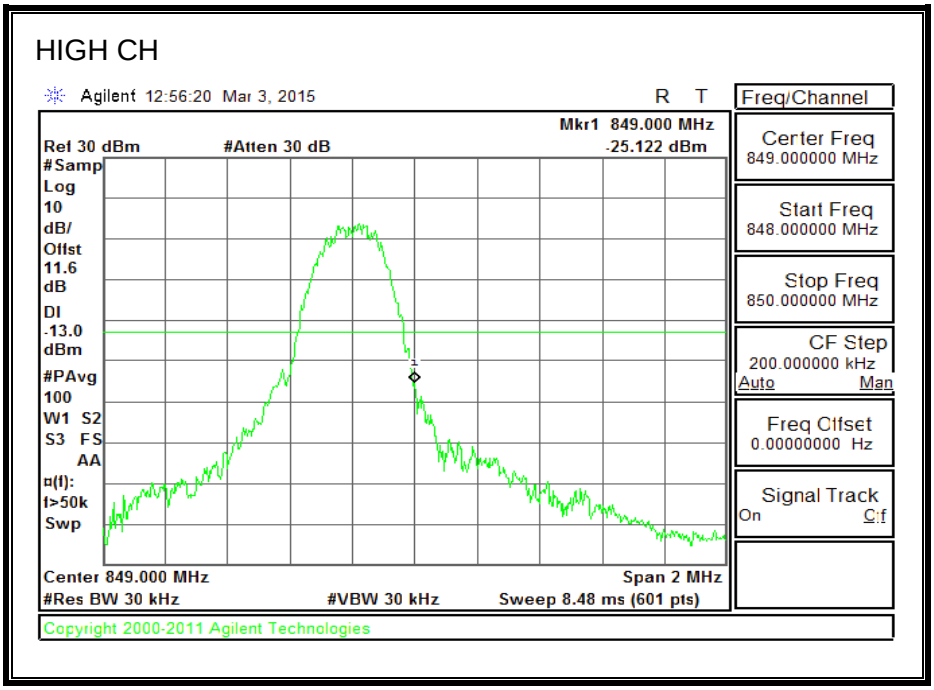
8.2.2. GSM-EGPRS

850MHz BAND

LOW CH

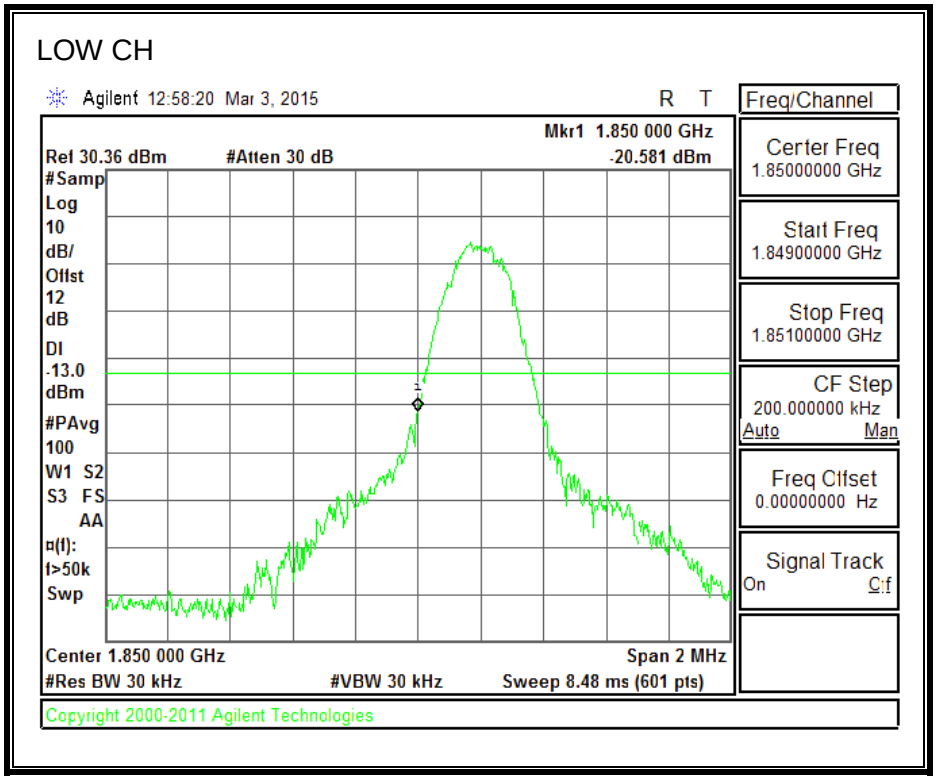


HIGH CH

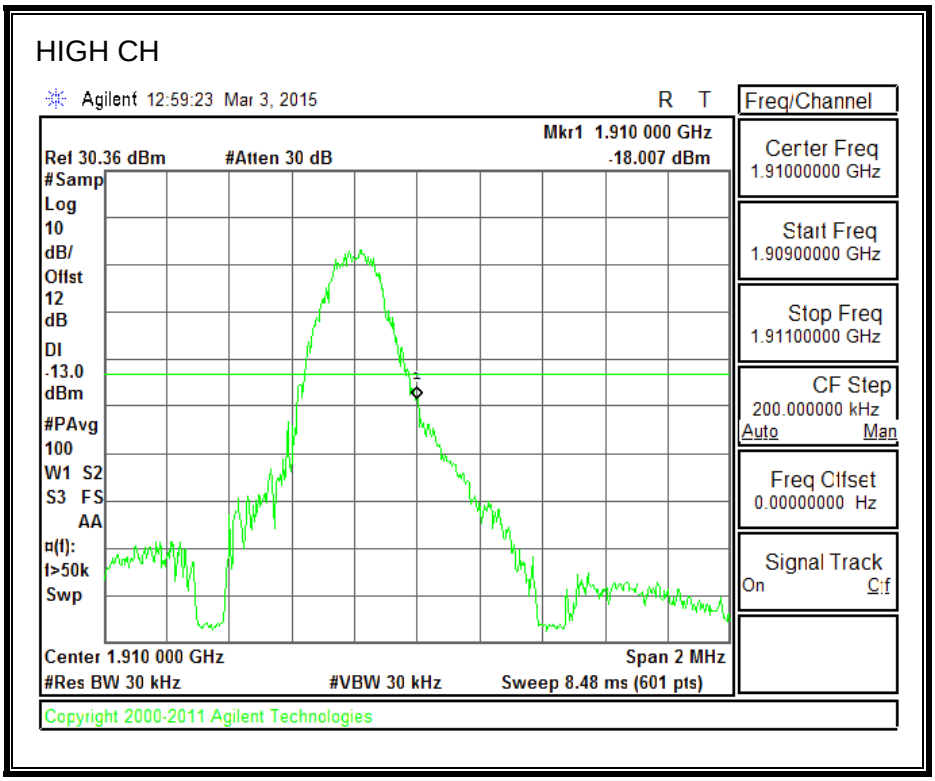


1900MHz BAND

LOW CH

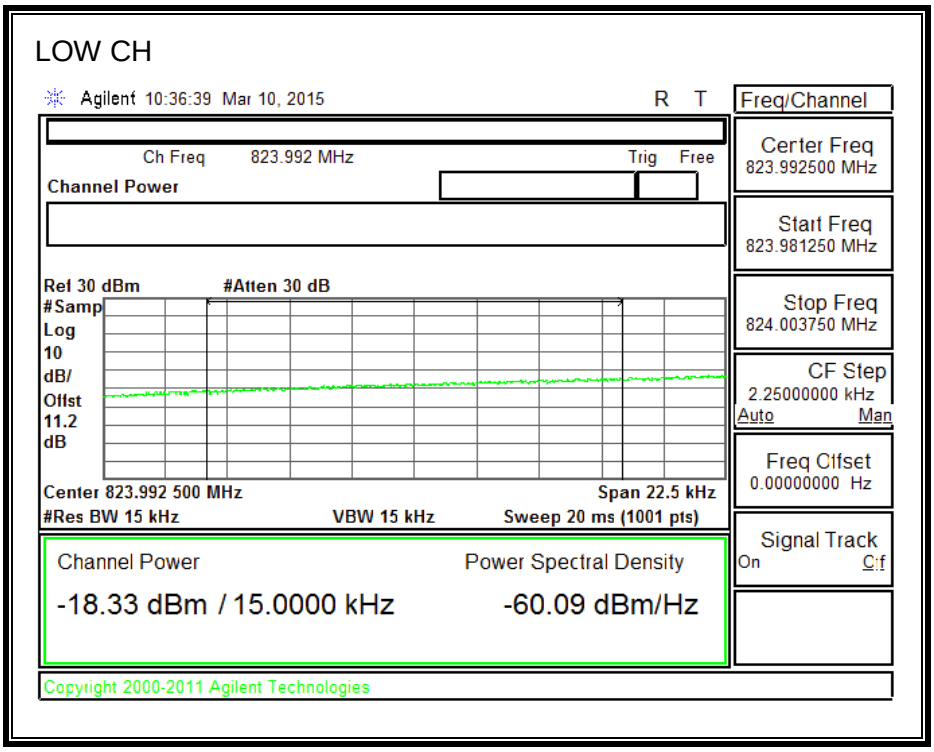


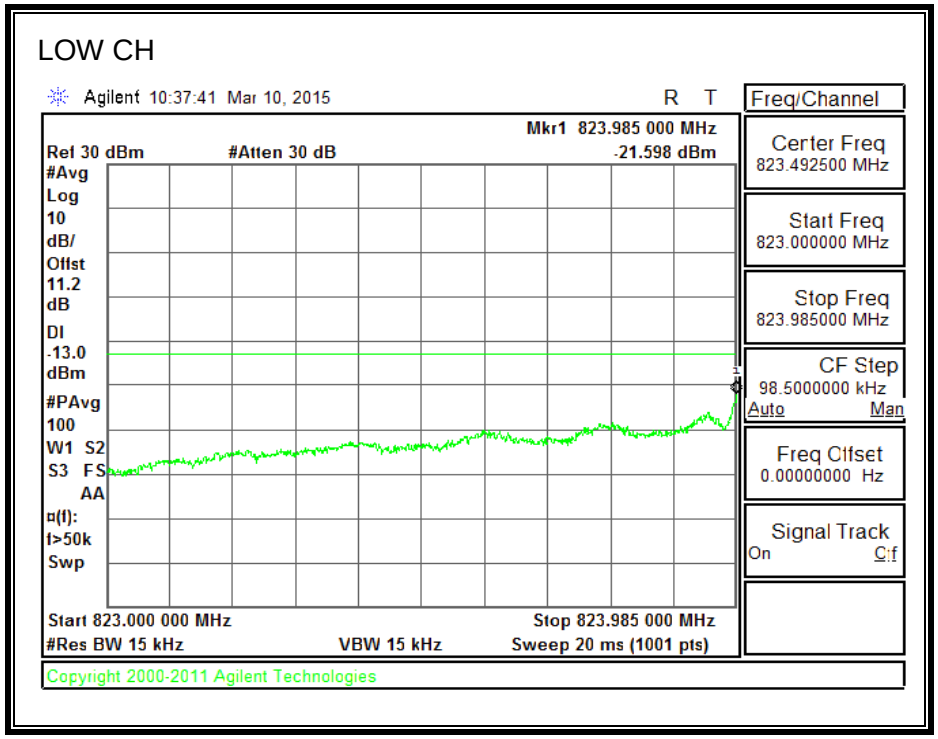
HIGH CH



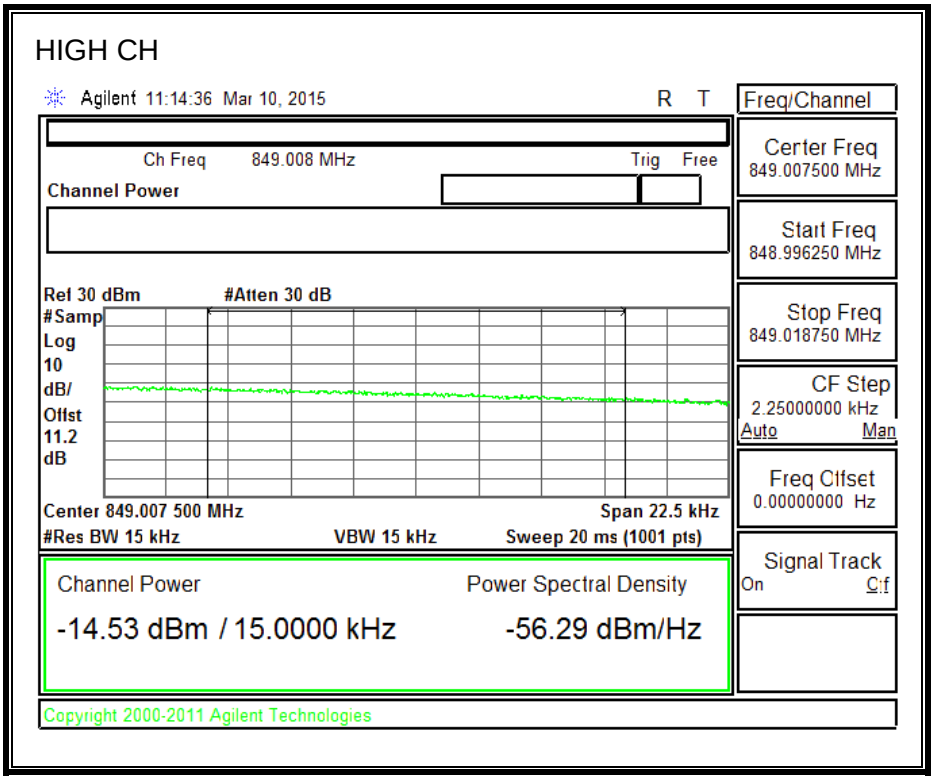
8.2.3. CDMA2000 1xRTT

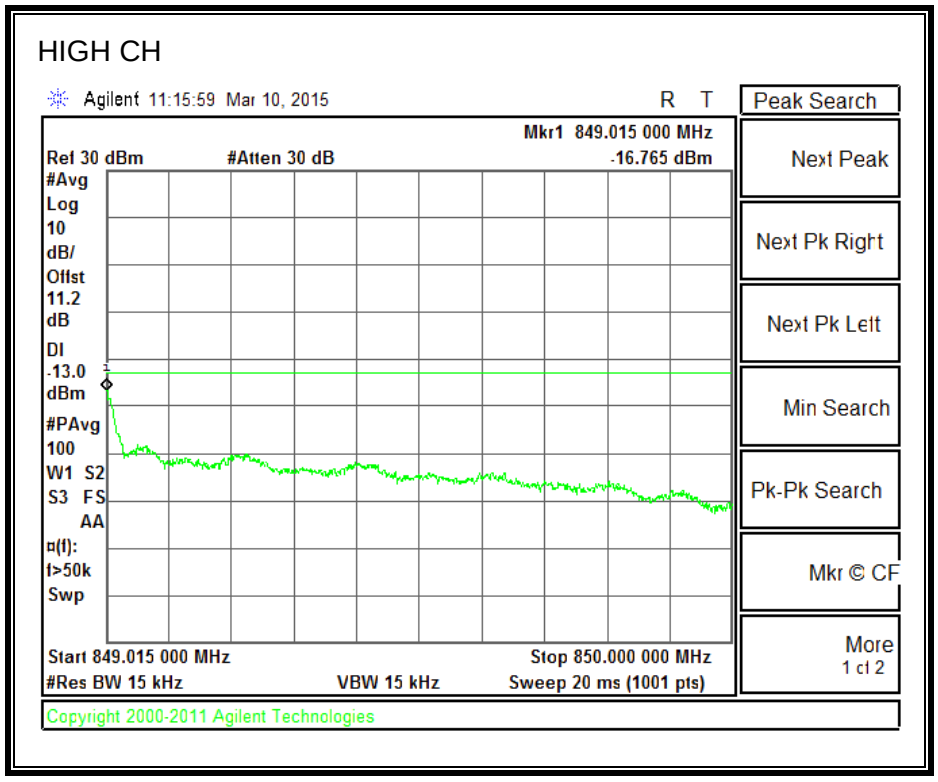
850MHz BAND





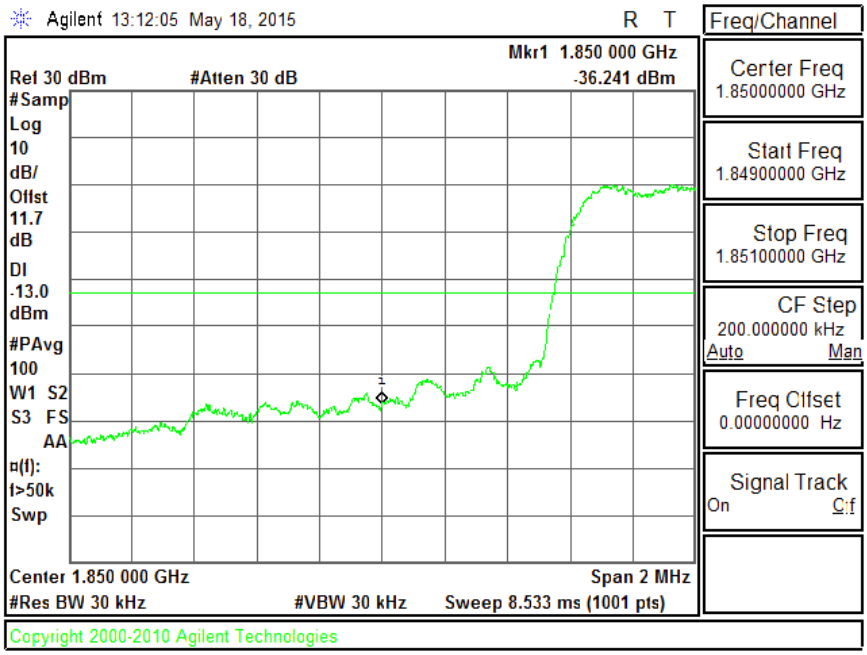
850MHz BAND



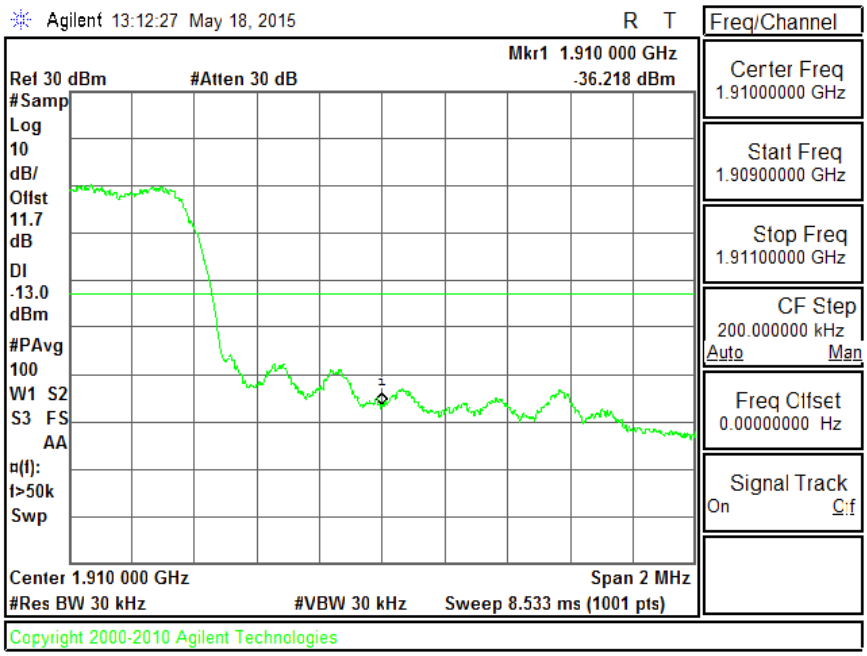


1900MHz BAND

LOW CH

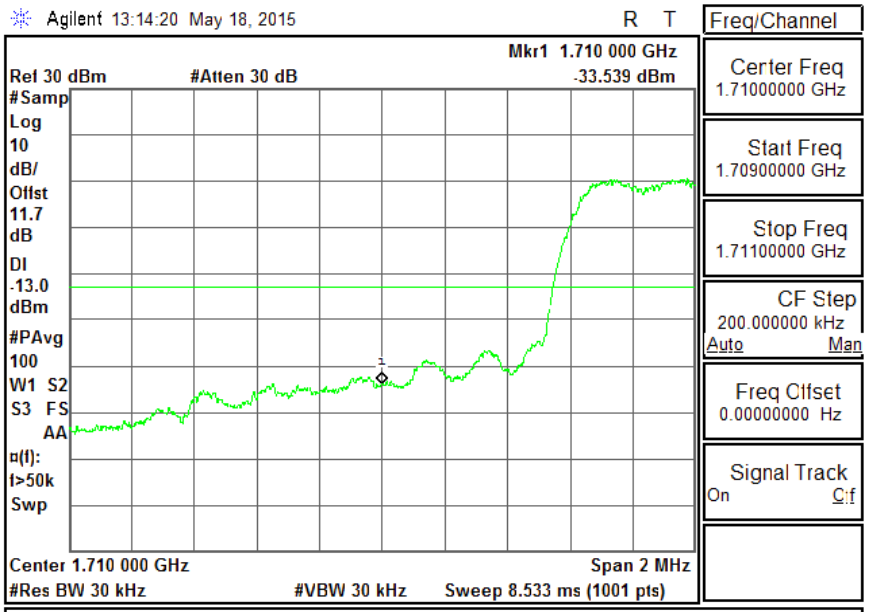


HIGH CH

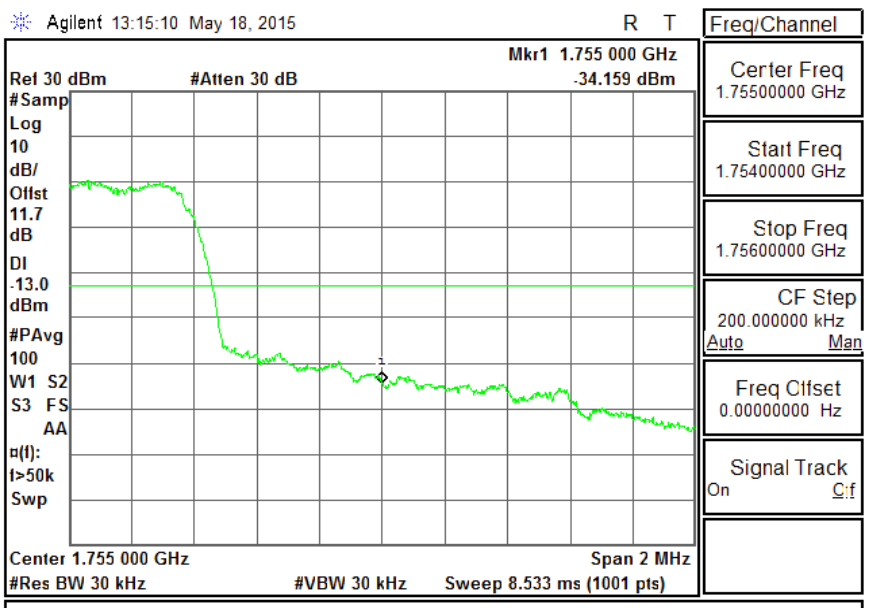


1700MHz BAND

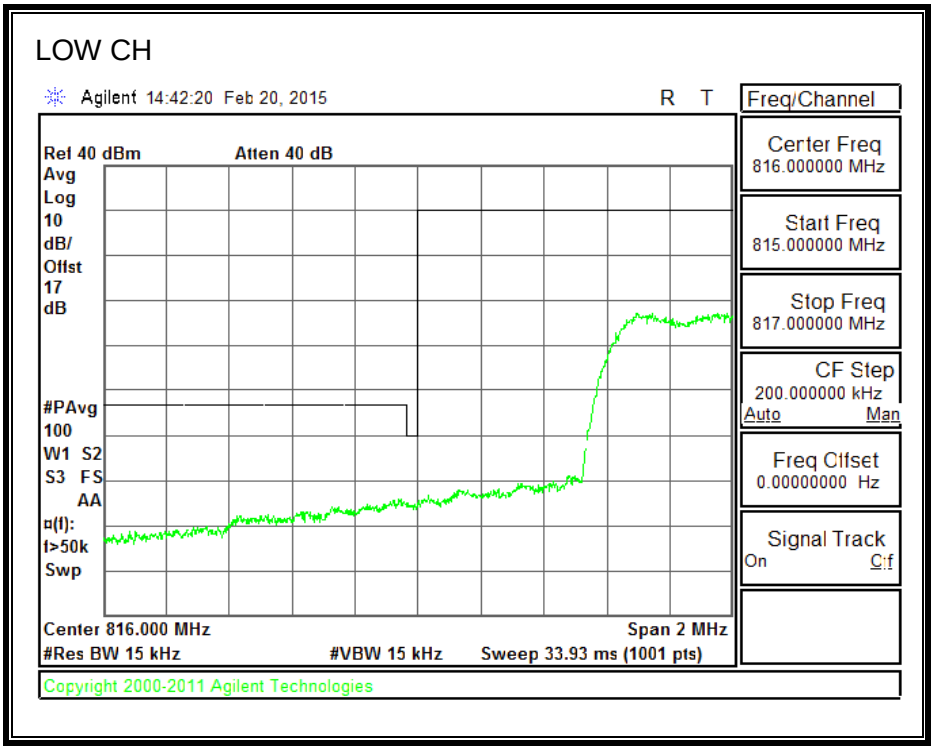
LOW CH



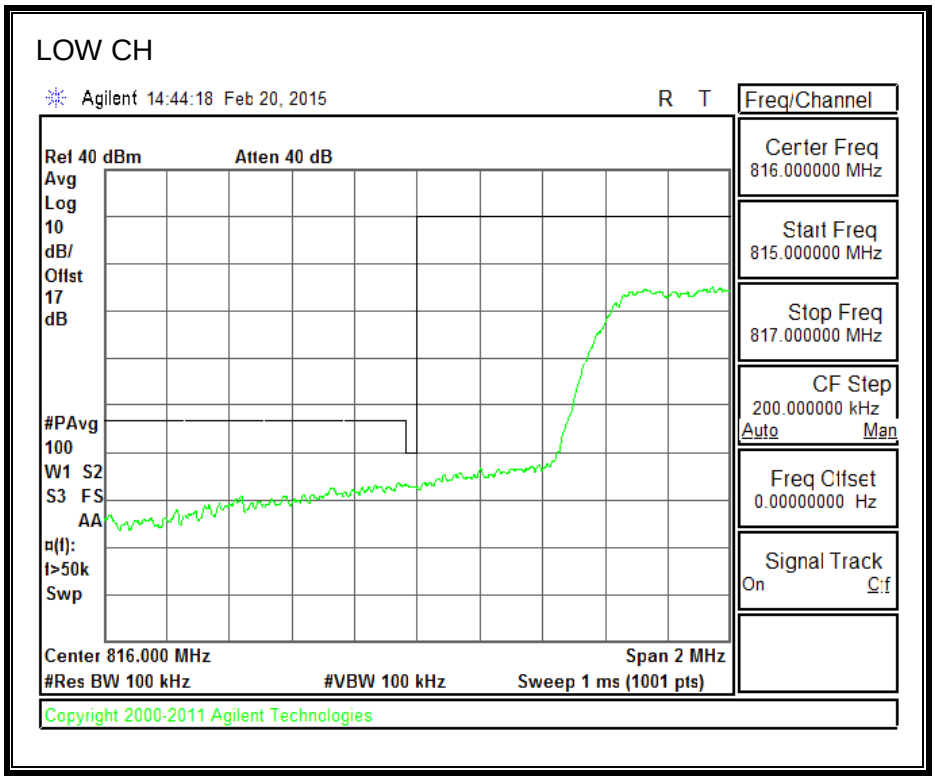
HIGH CH



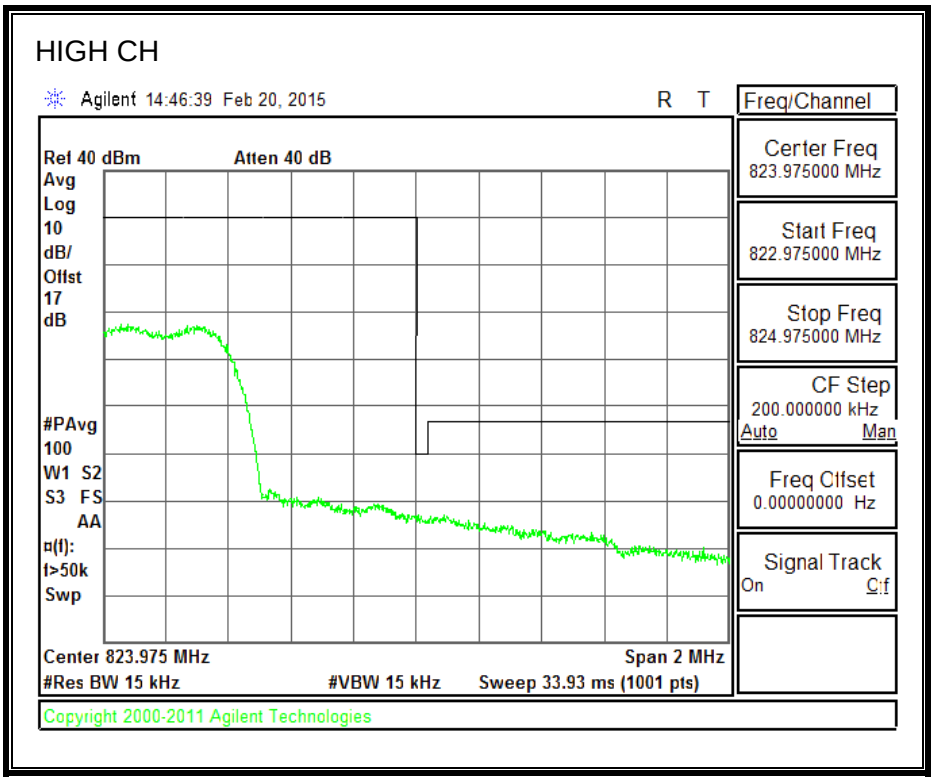
8.2.4. CDMA2000 1xRTT BC10 MASK



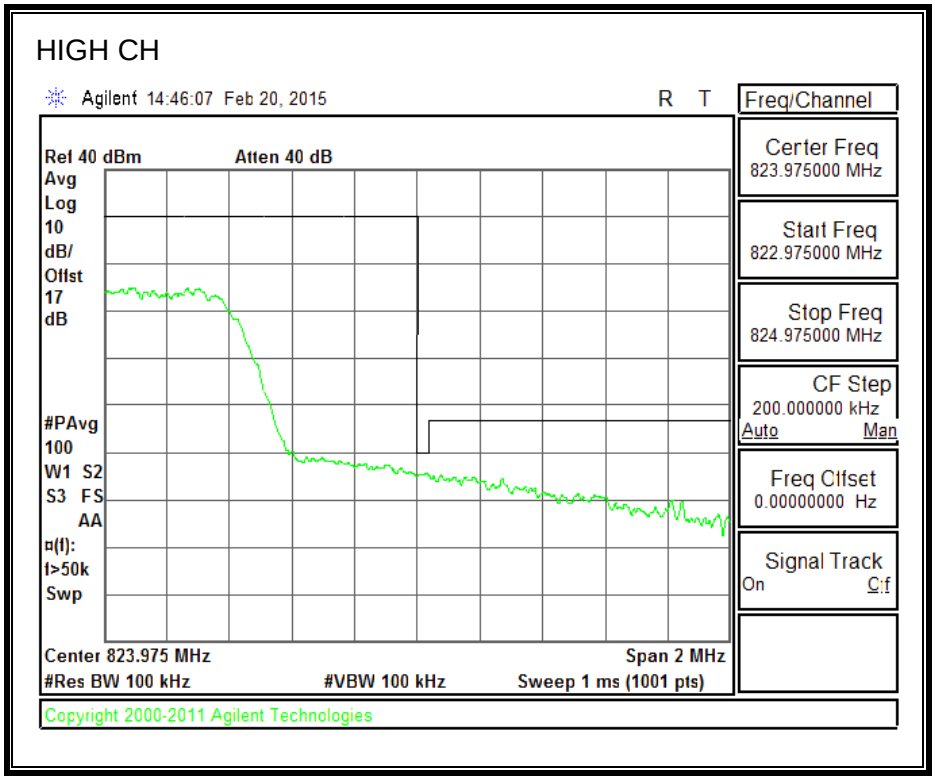
Note: RBW=1% of EBW



Note: RBW of 1% of 37.5KHz of outer channel frequency block



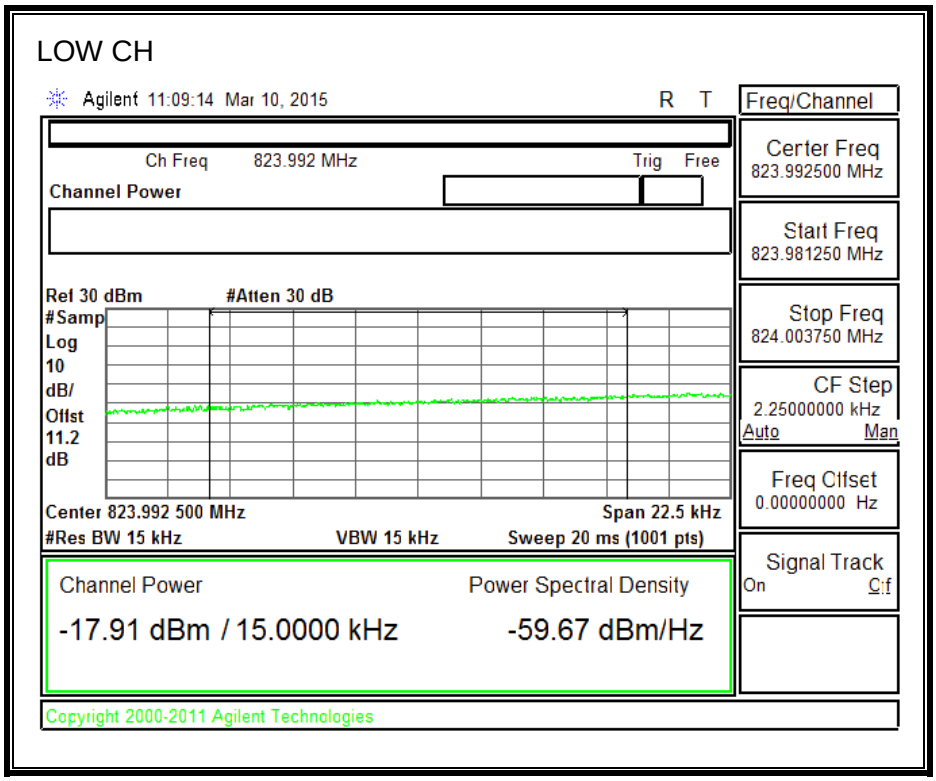
Note: RBW=1% of EBW

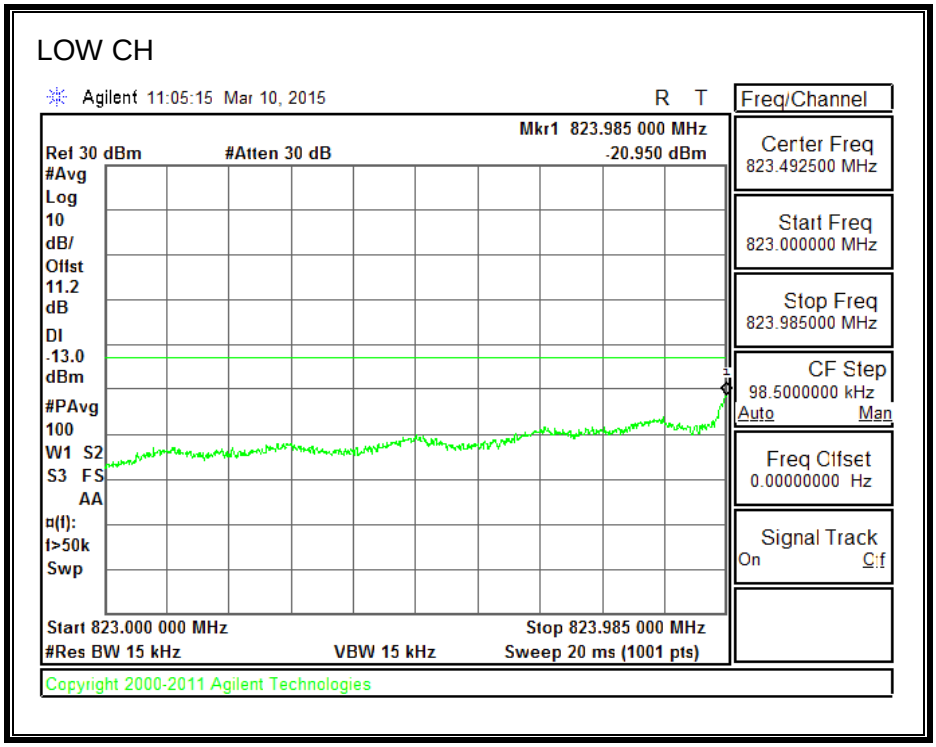


Note: RBW of 1% of 37.5KHz of outer channel frequency block

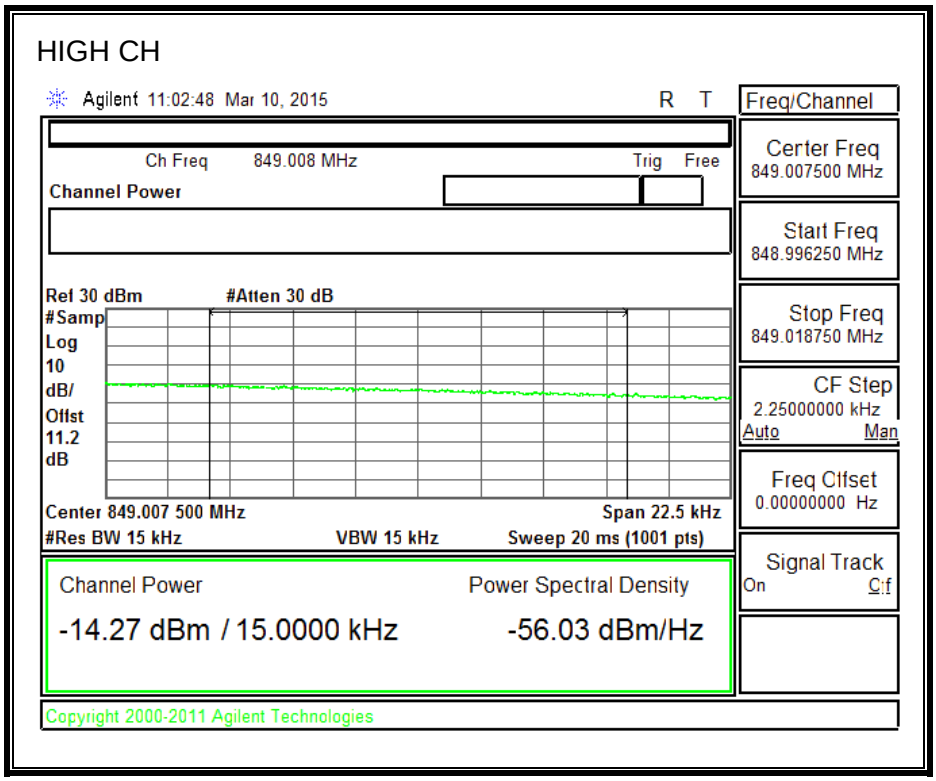
8.2.5. CDMA2000 EVDO REV A

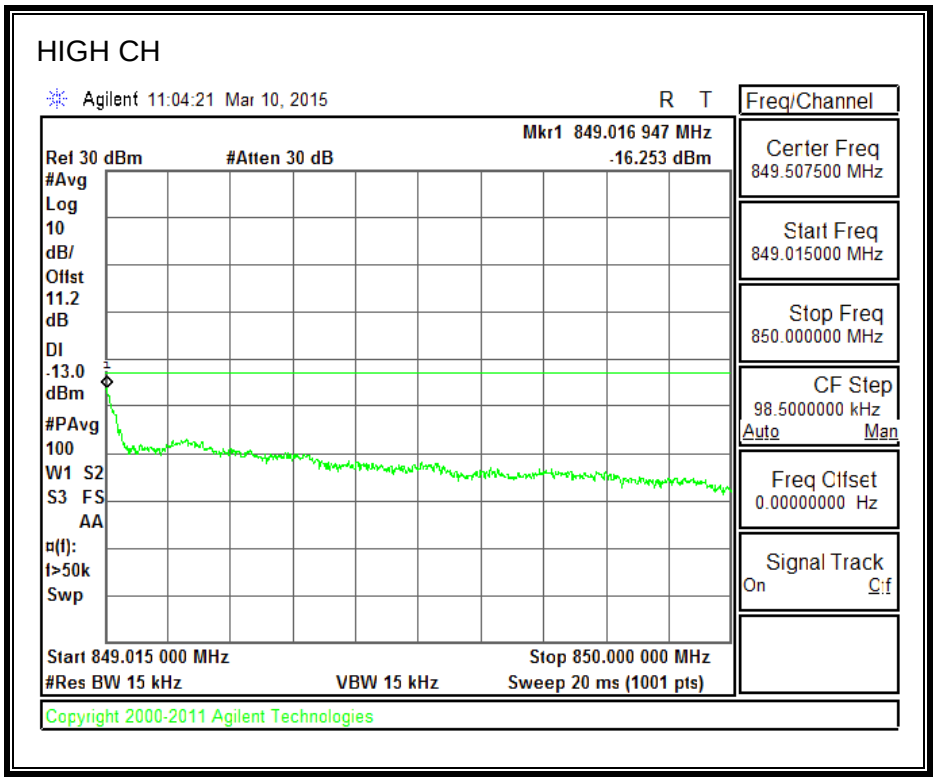
850MHz BAND





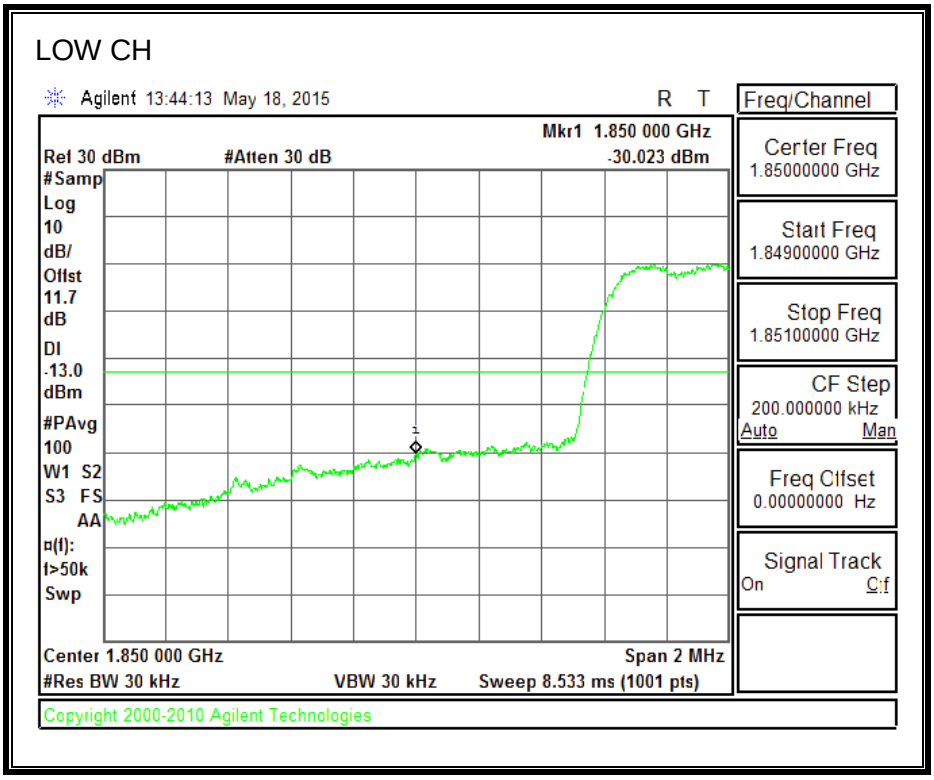
850MHz BAND



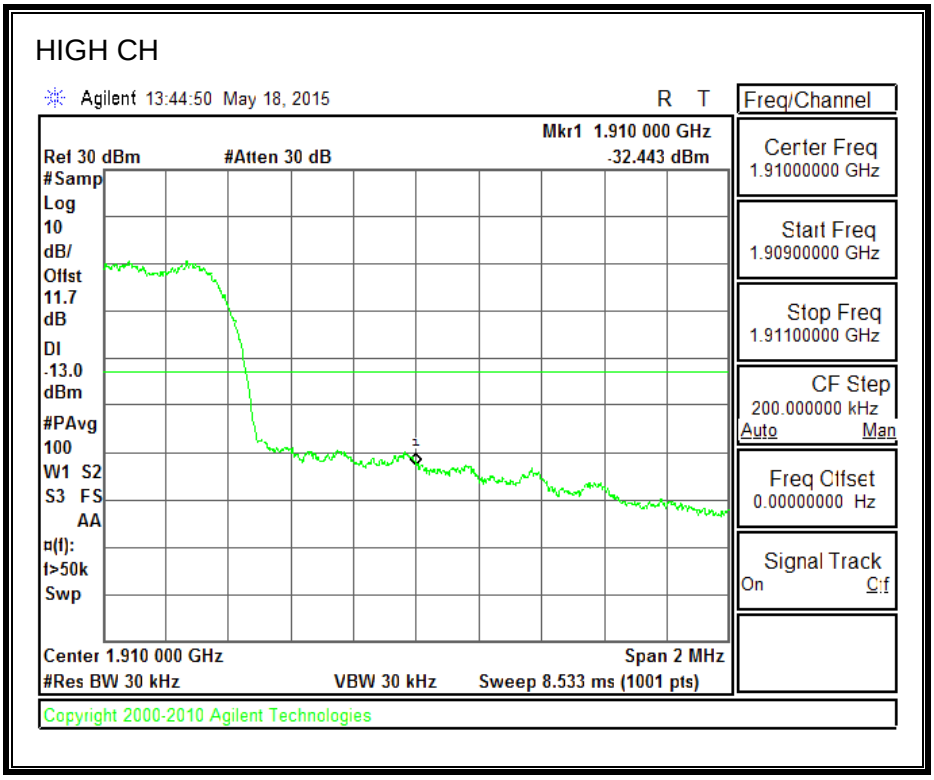


1900MHz BAND

LOW CH

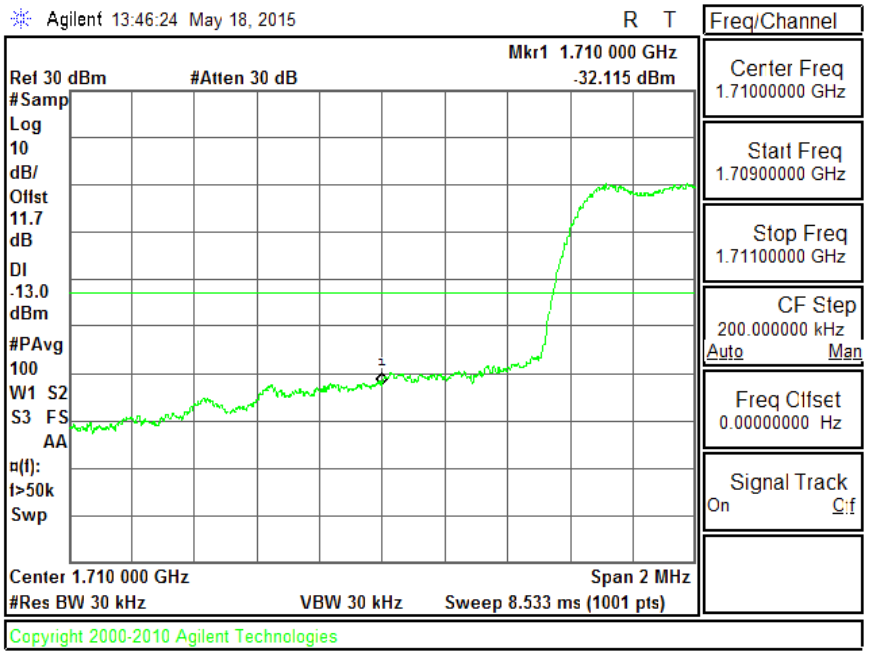


HIGH CH

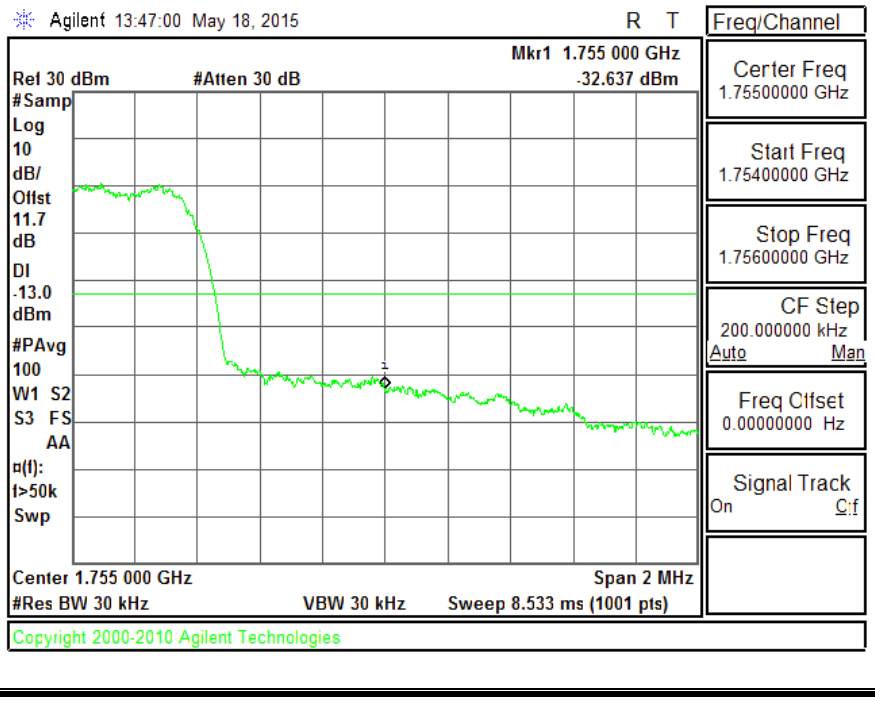


1700MHz BAND

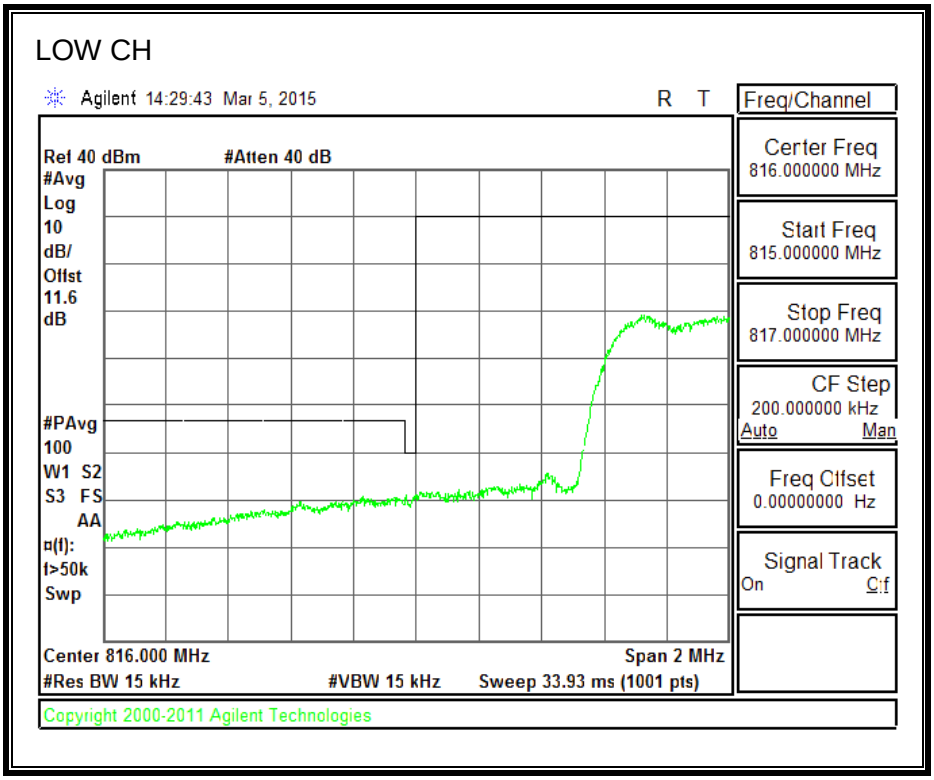
LOW CH



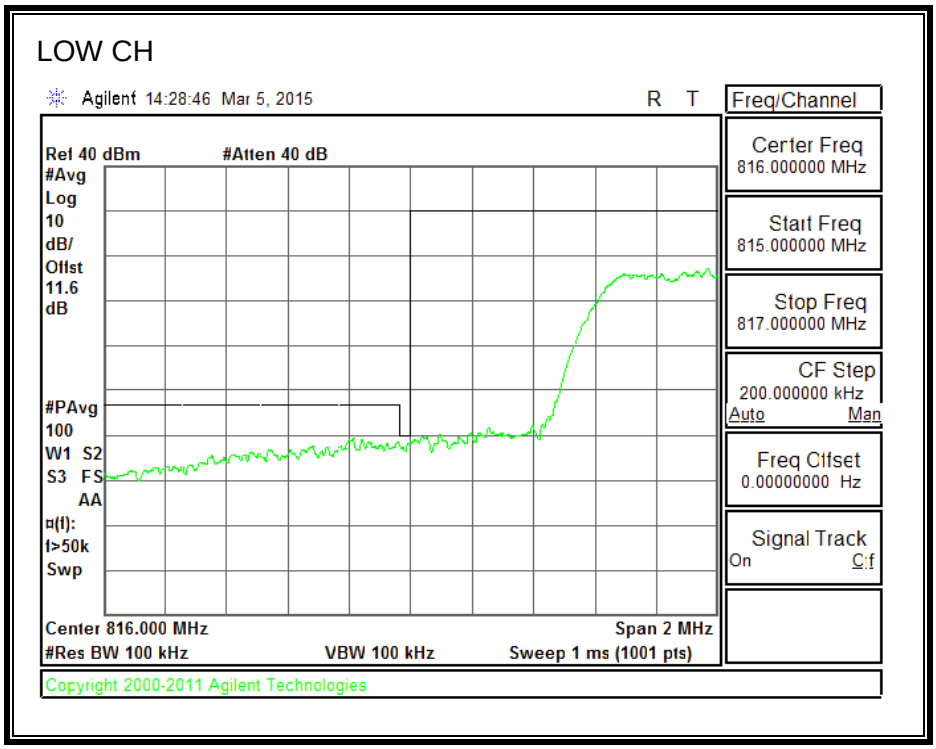
HIGH CH



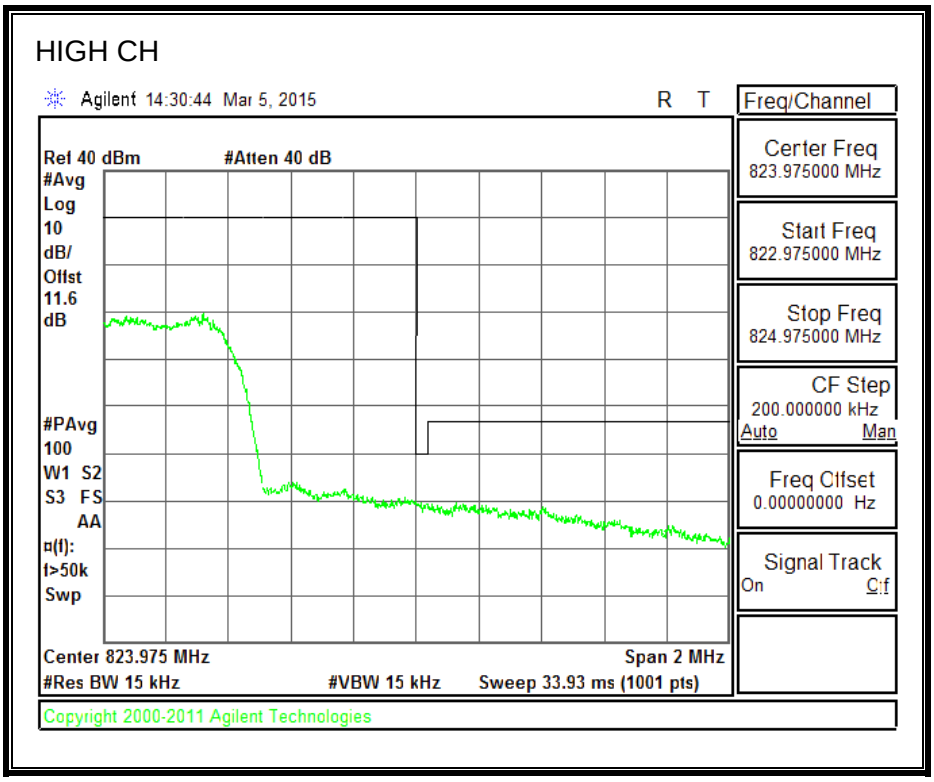
8.2.6. CDMA2000 EVDO REV A BC10 MASK



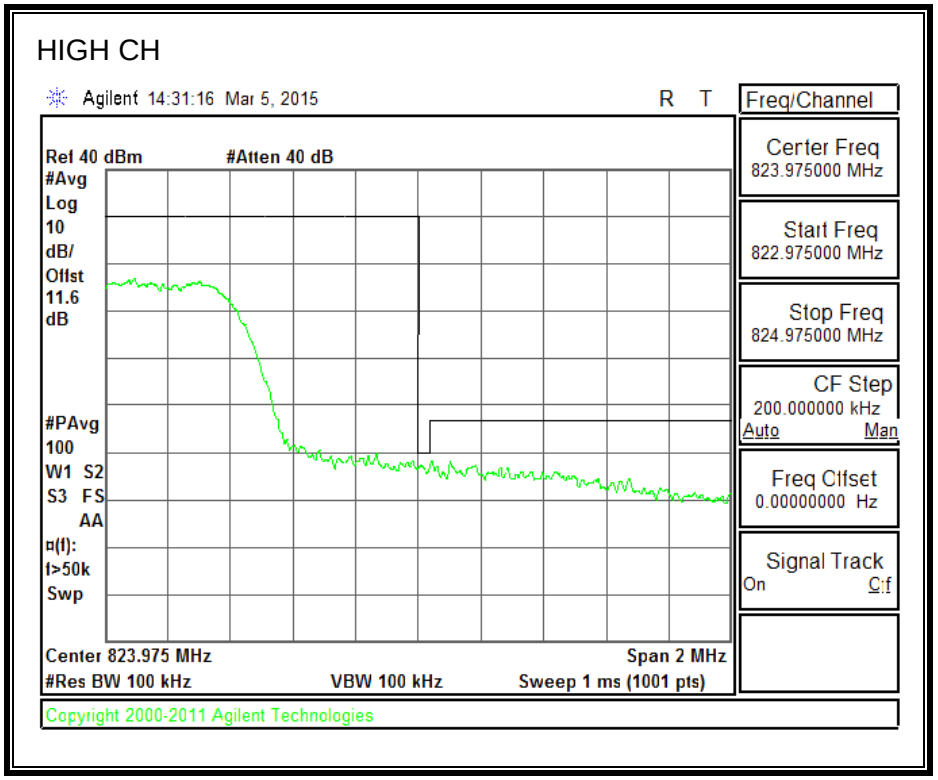
Note: RBW=1% of EBW



Note: RBW of 1% of 37.5KHz of outer channel frequency block



Note: RBW=1% of EBW

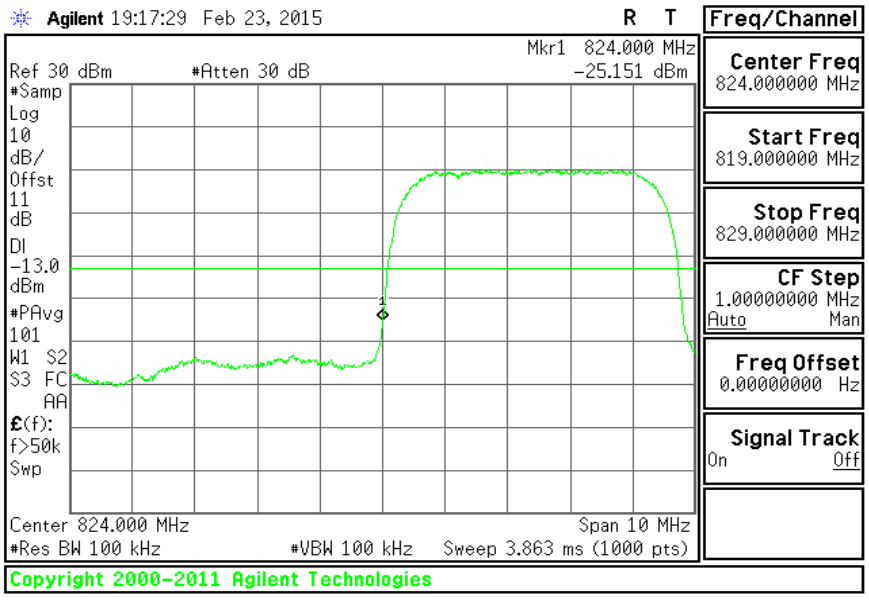


Note: RBW of 1% of 37.5KHz of outer channel frequency block

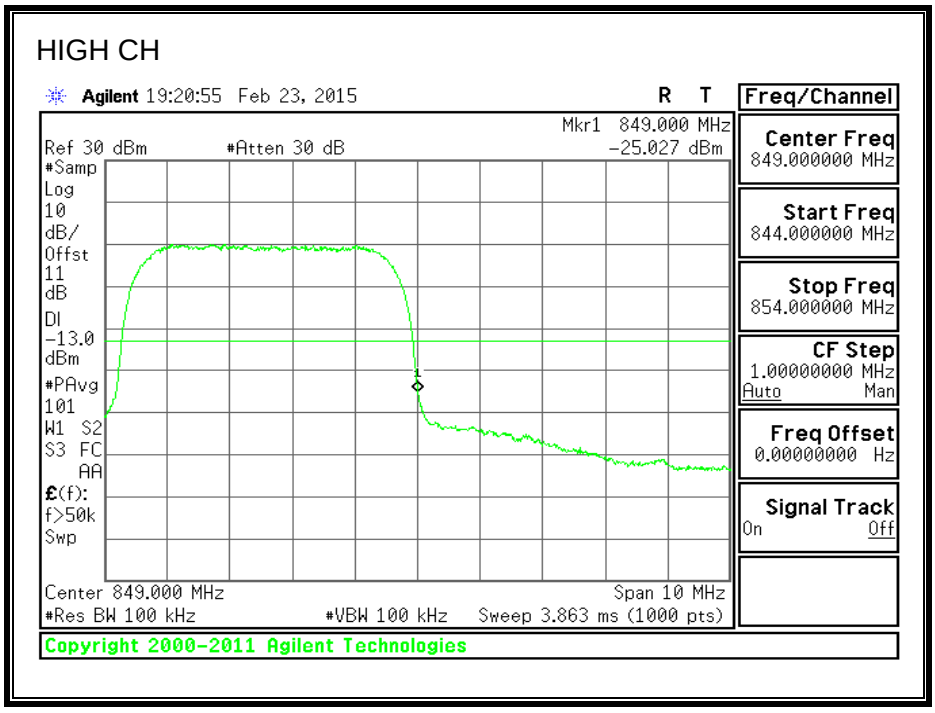
8.2.7. UMTS REL 99

850MHz BAND

LOW CH

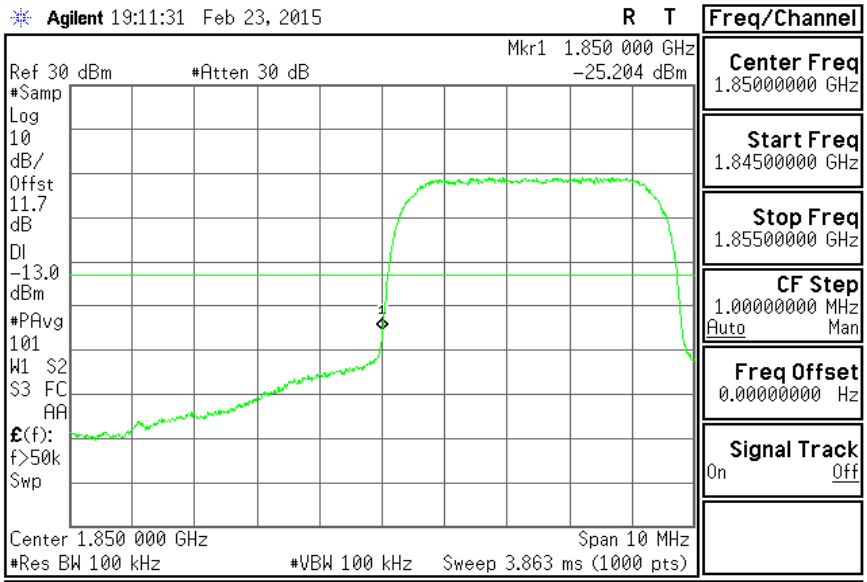


HIGH CH

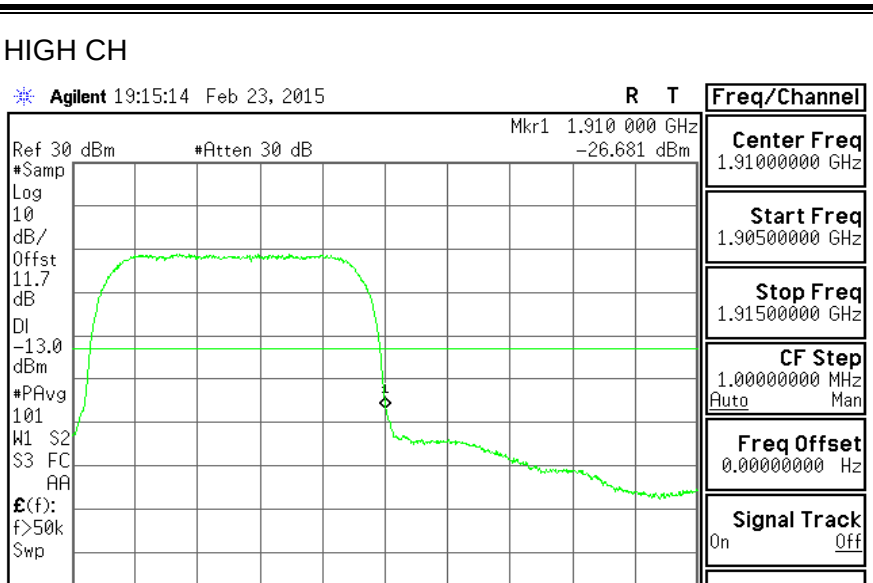


1900MHz BAND

LOW CH

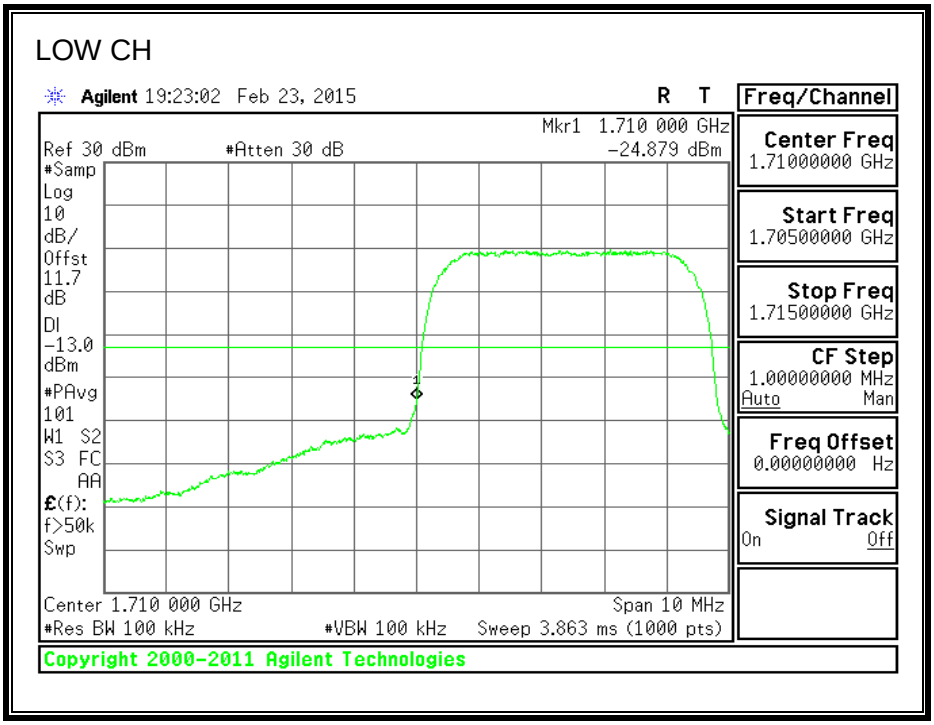


HIGH CH

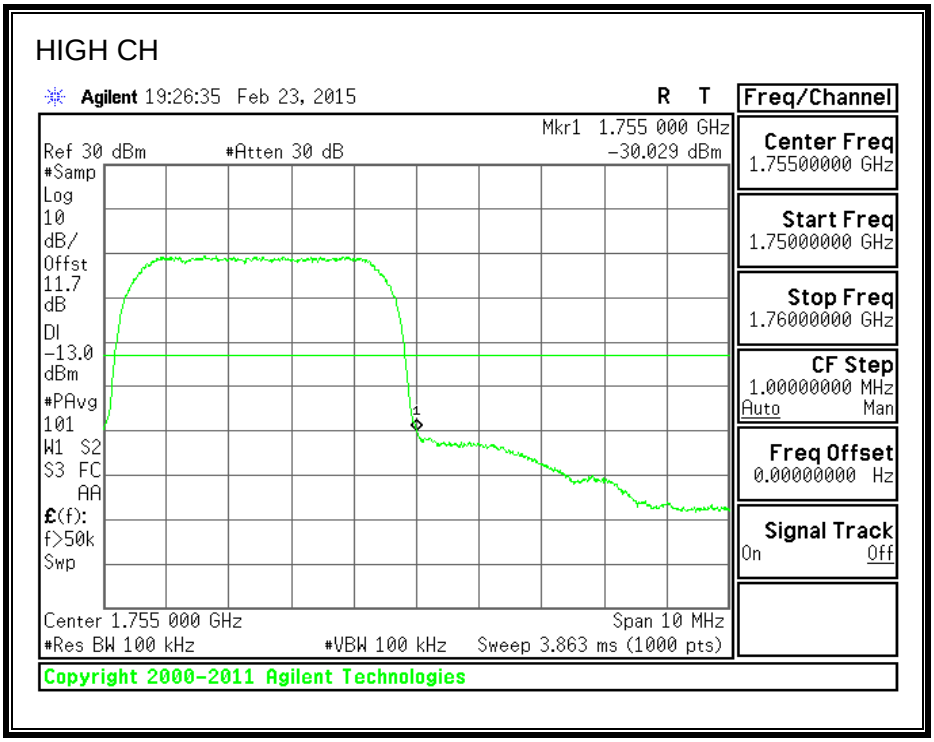


1700MHz BAND

LOW CH



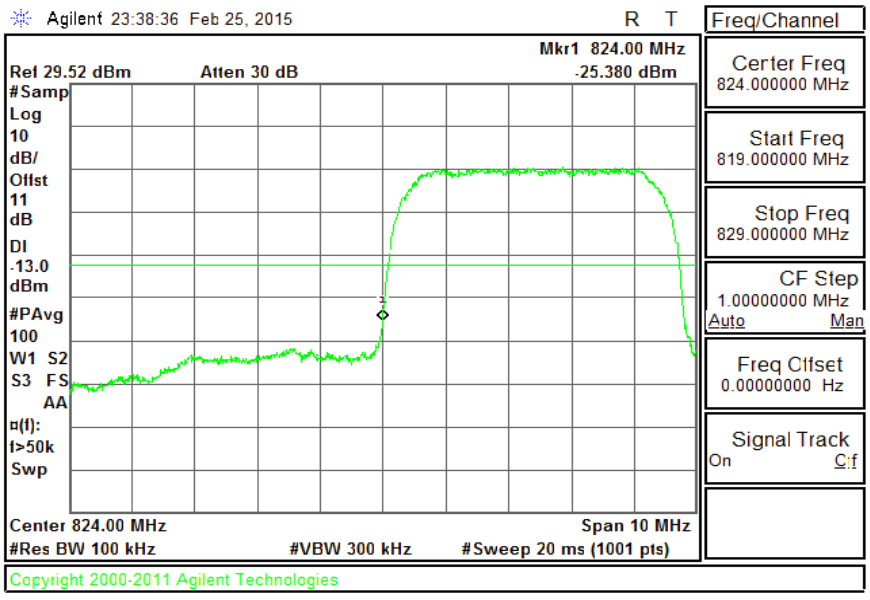
HIGH CH



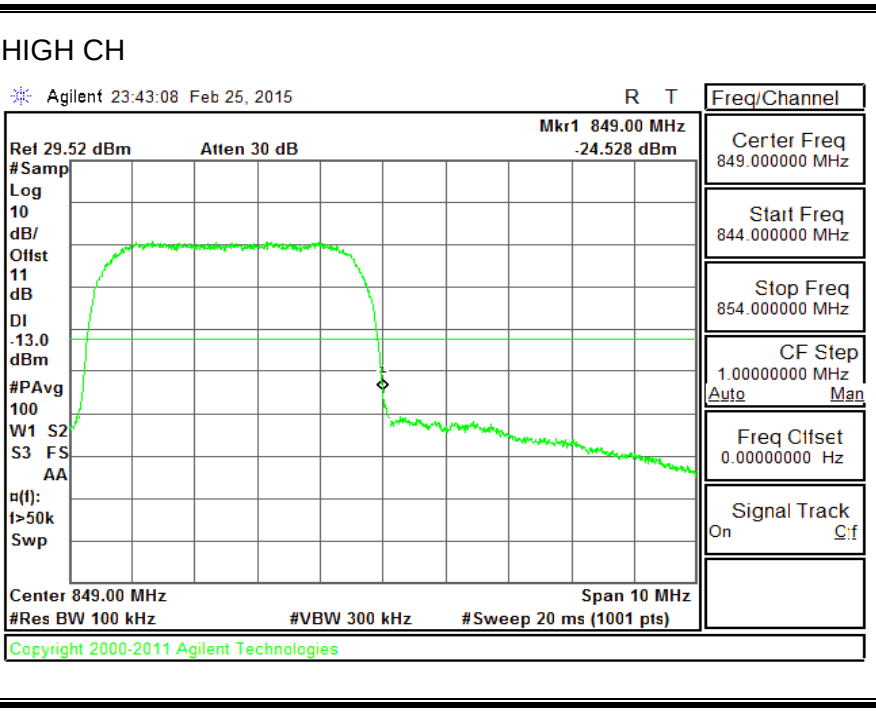
8.2.8. UMTS HSDPA

850MHz BAND

LOW CH

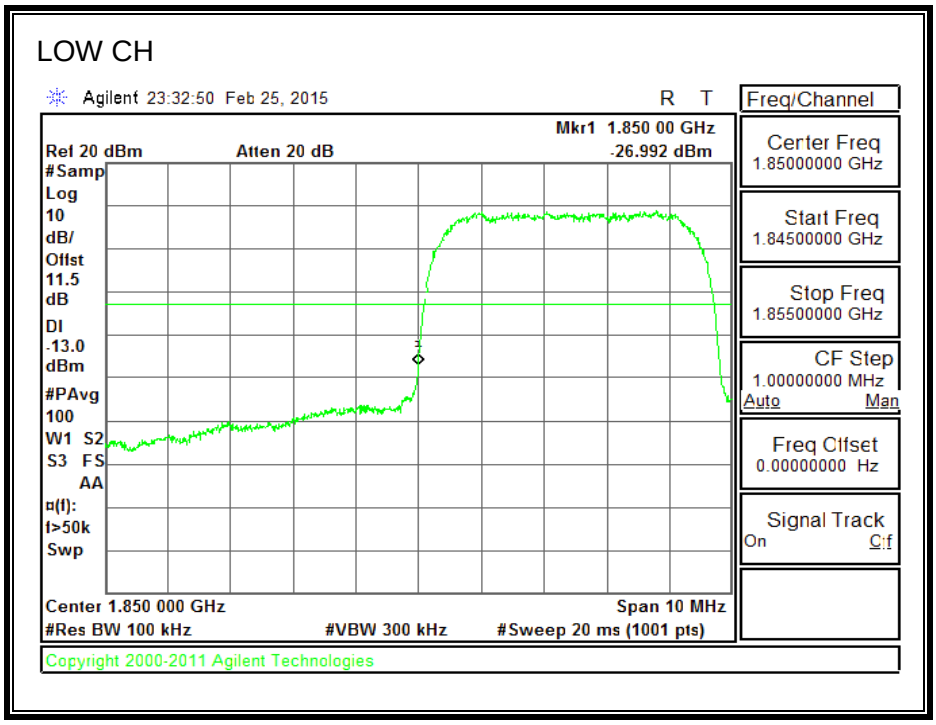


HIGH CH

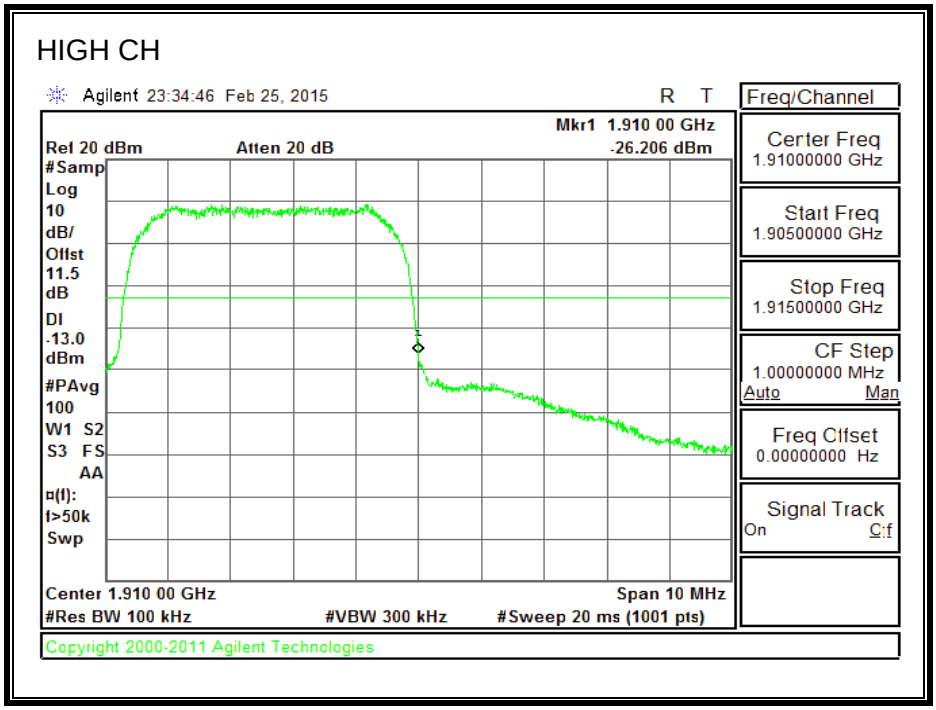


1900MHz BAND

LOW CH

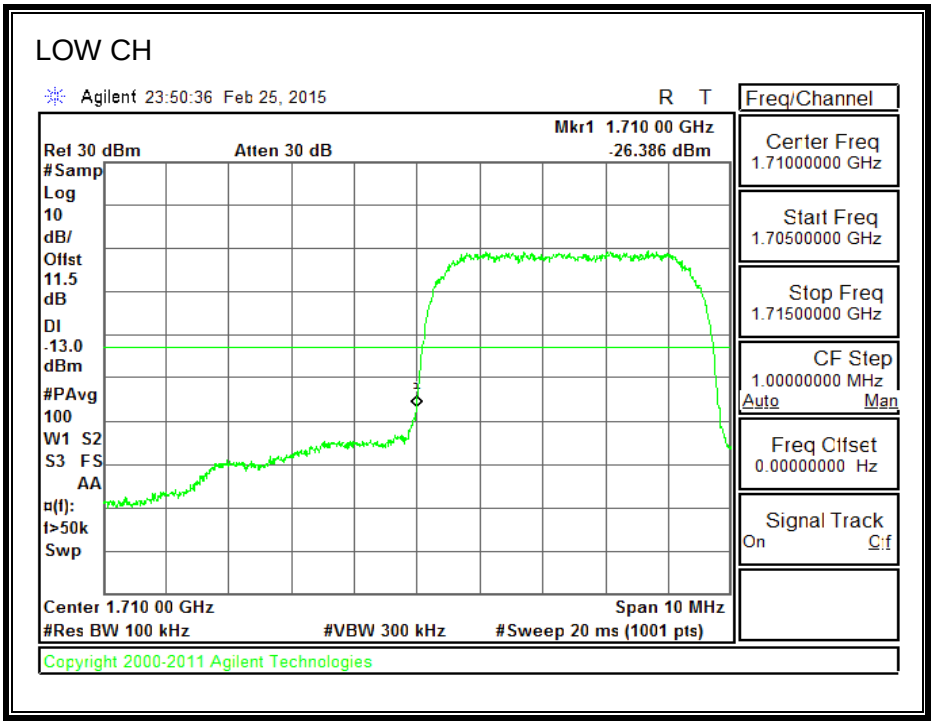


HIGH CH

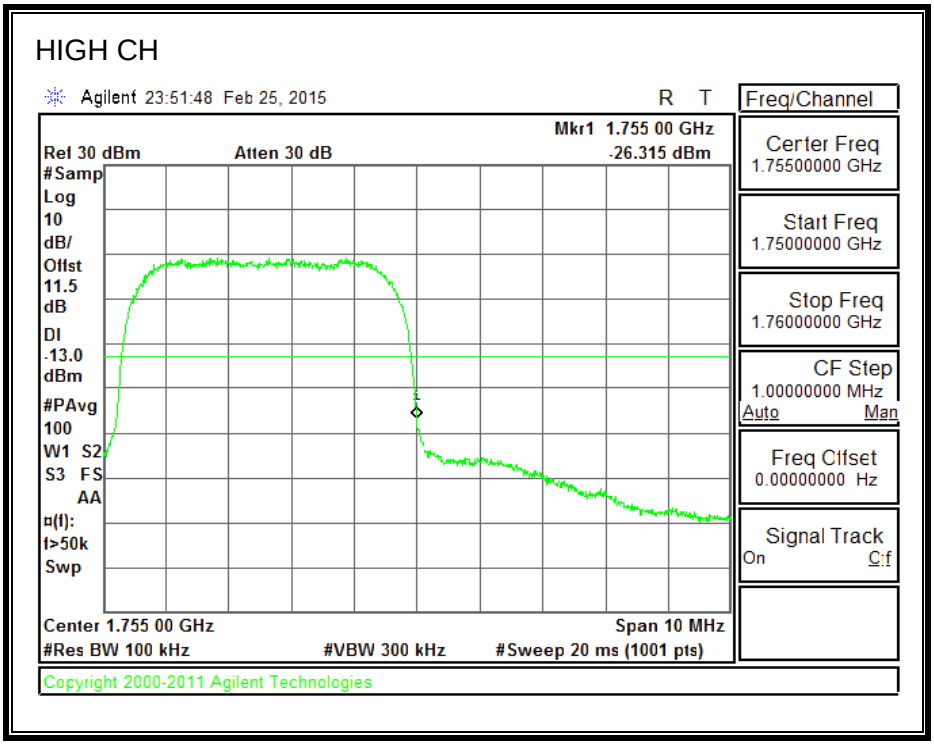


1700MHz BAND

LOW CH



HIGH CH



8.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238 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 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:

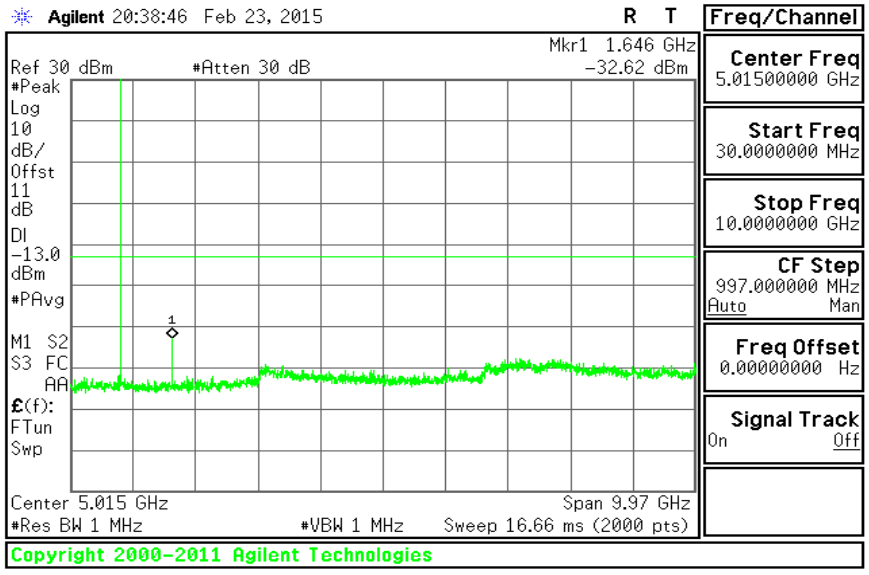
- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

RESULTS

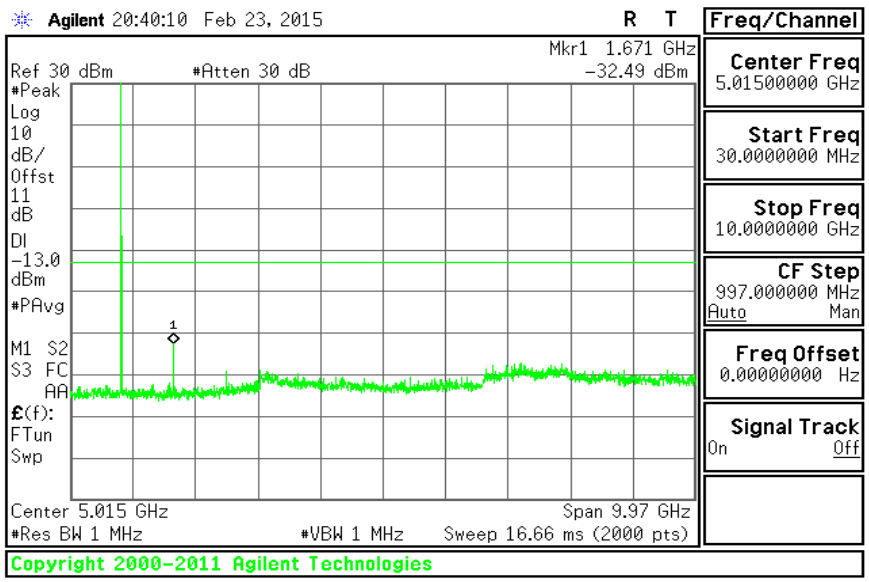
8.3.1. GSM-GPRS

850MHz BAND

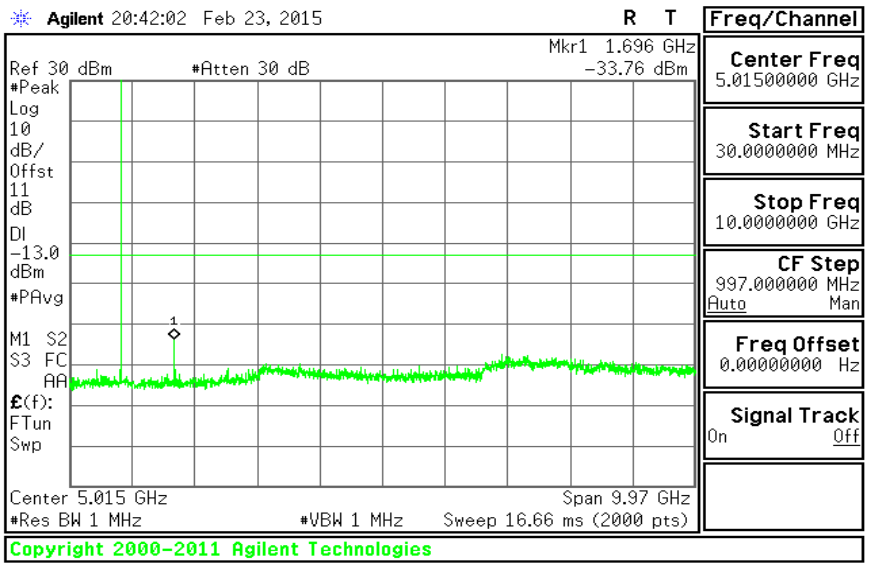
LOW CH



MID CH

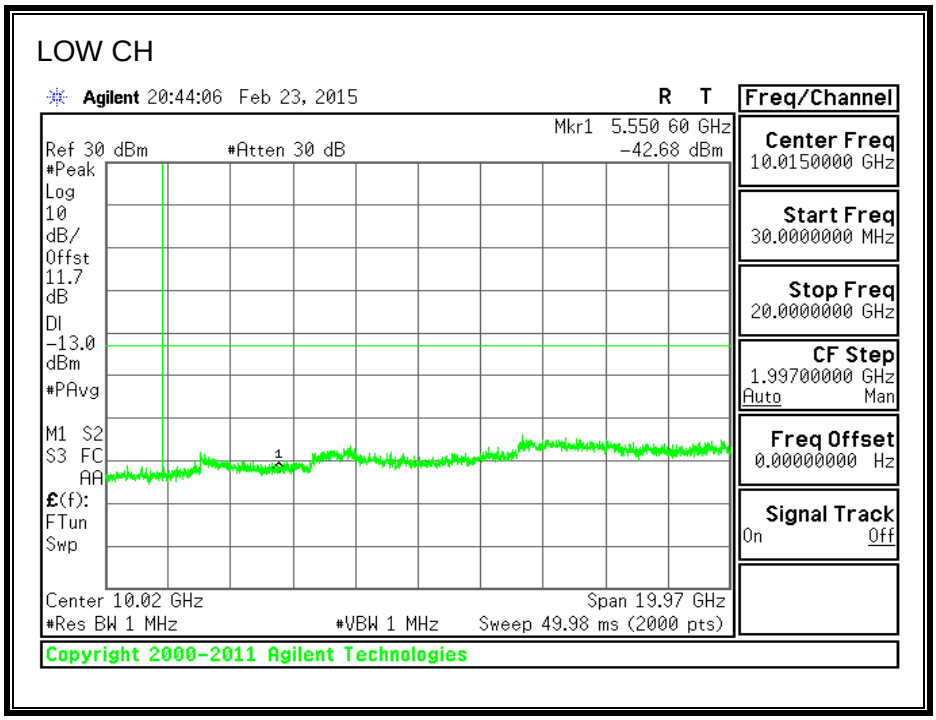


HIGH CH

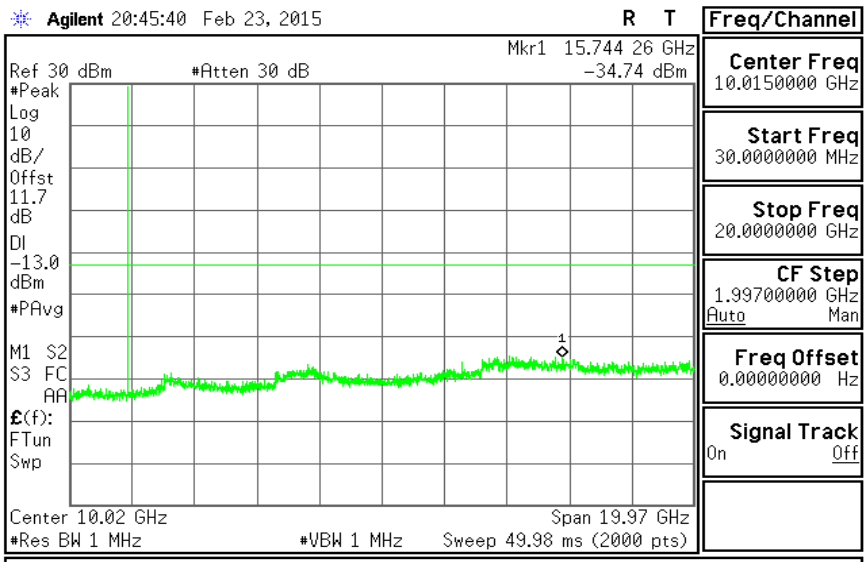


1900MHz BAND

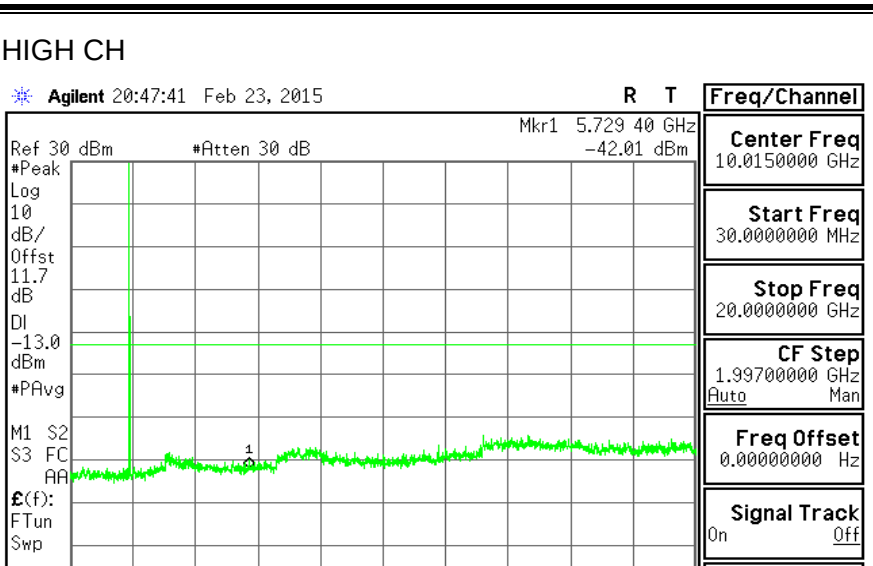
LOW CH



MID CH



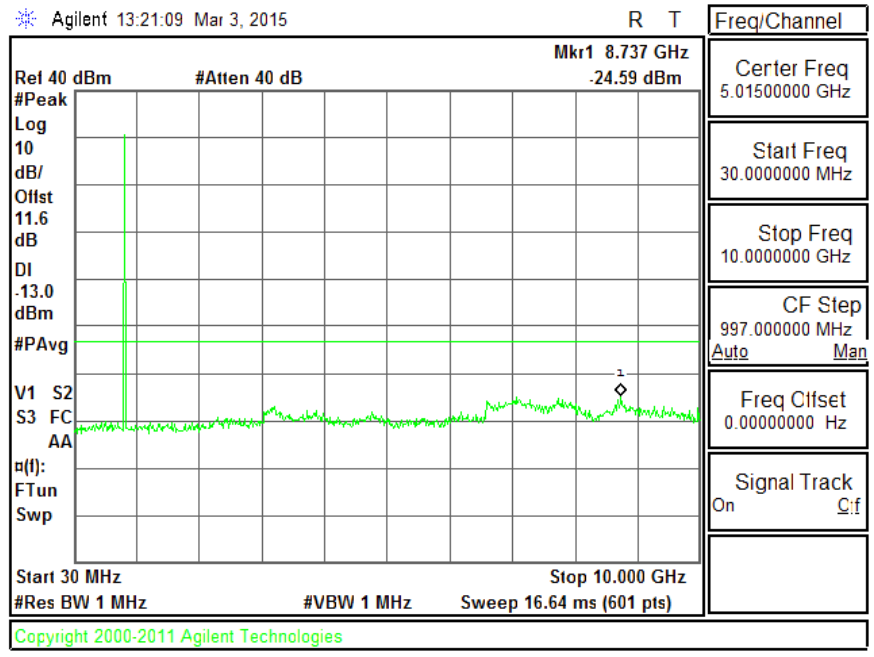
HIGH CH



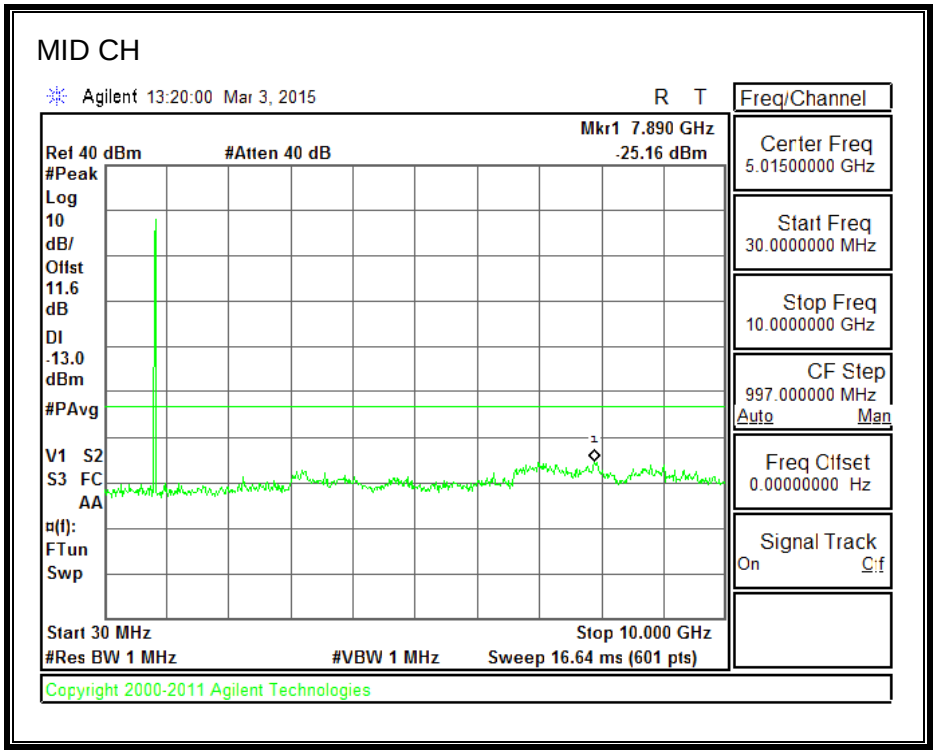
8.3.2. GSM-EGPRS

850MHz BAND

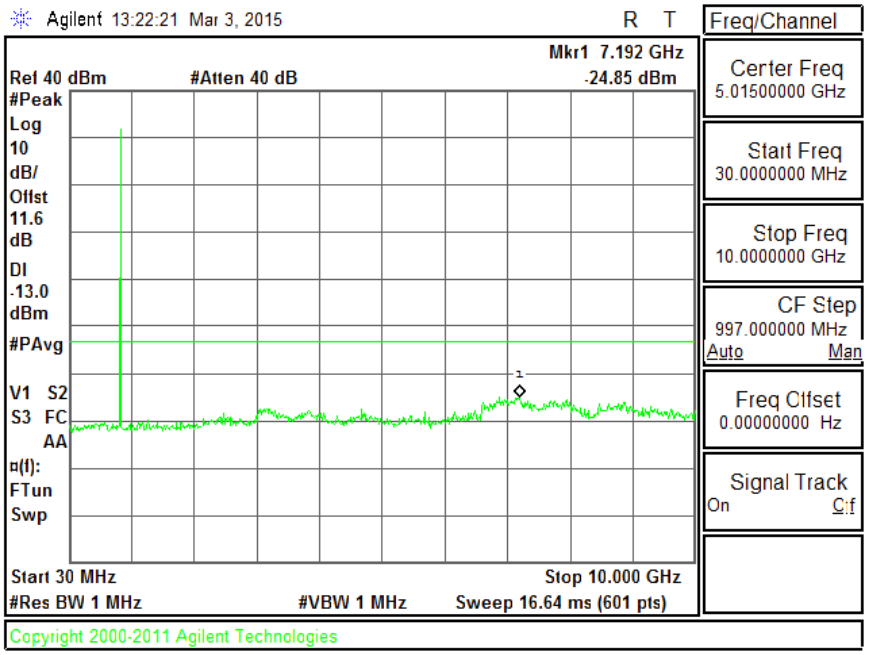
LOW CH



MID CH

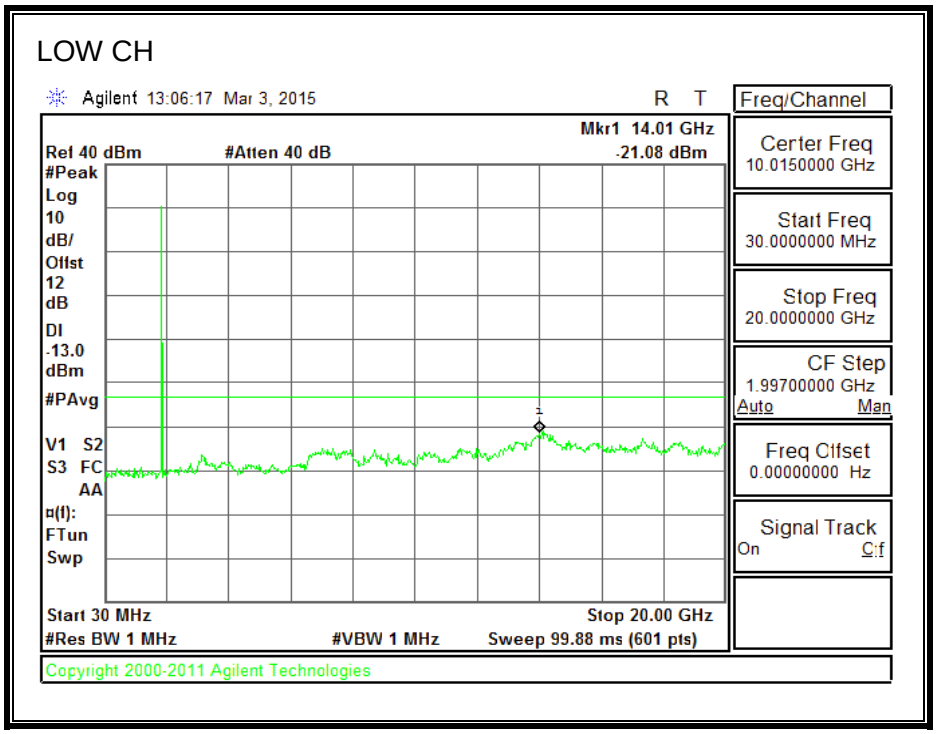


HIGH CH

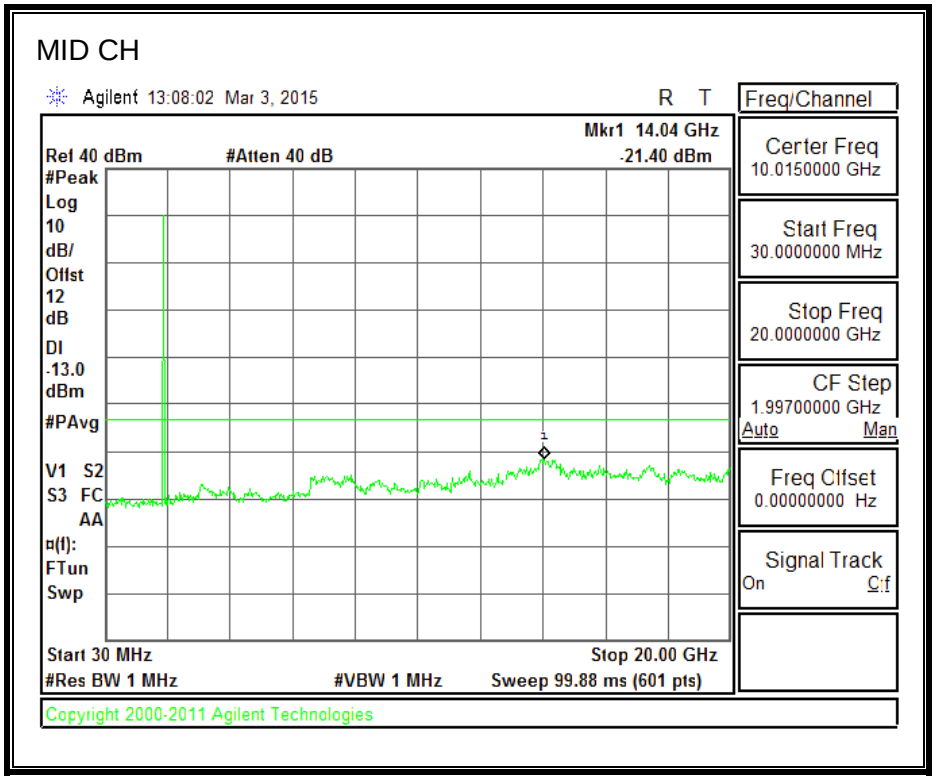


1900MHz BAND

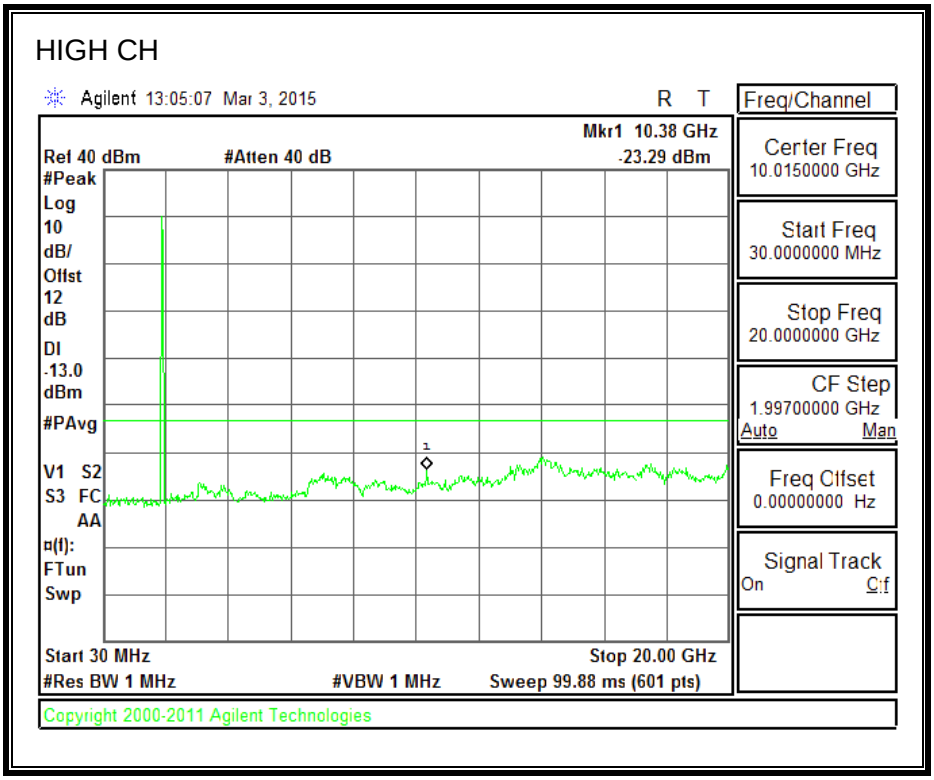
LOW CH



MID CH



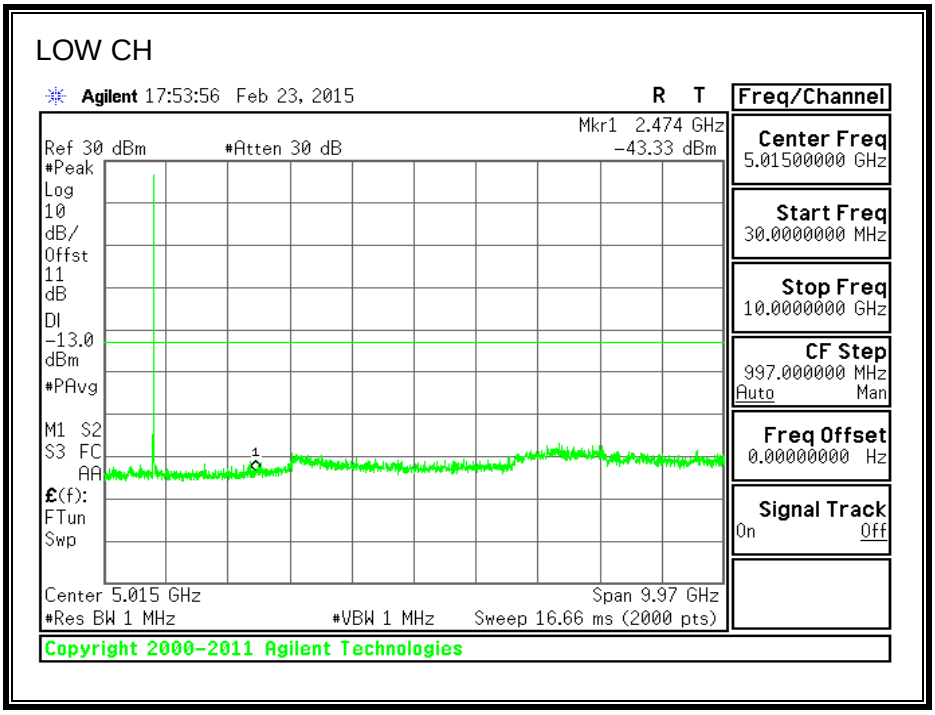
HIGH CH



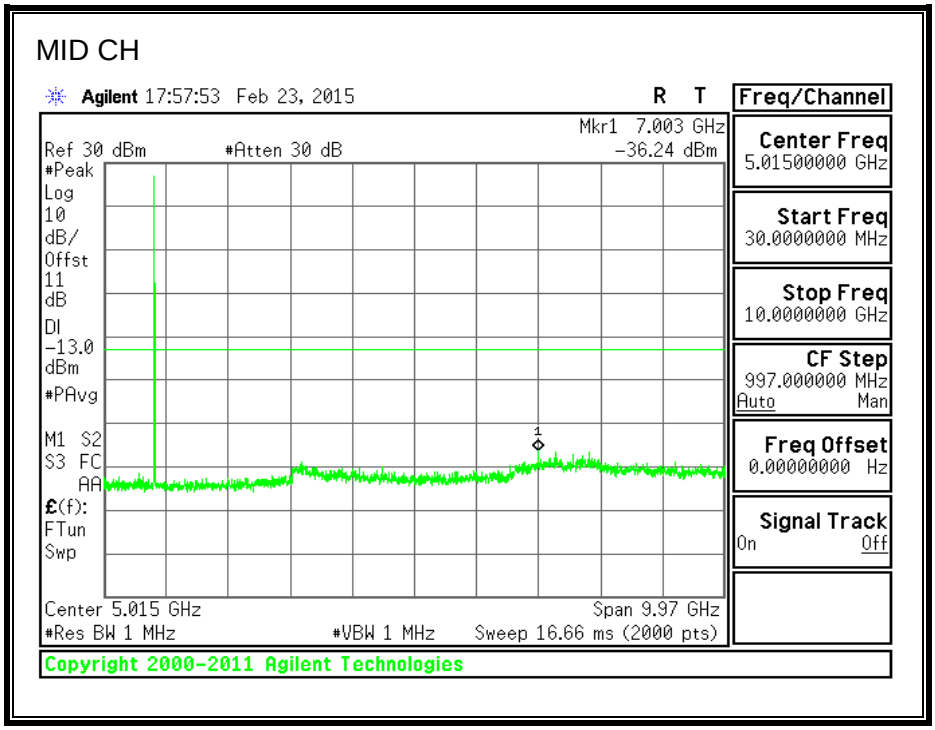
8.3.3. CDMA2000 1xRTT

850MHz BAND

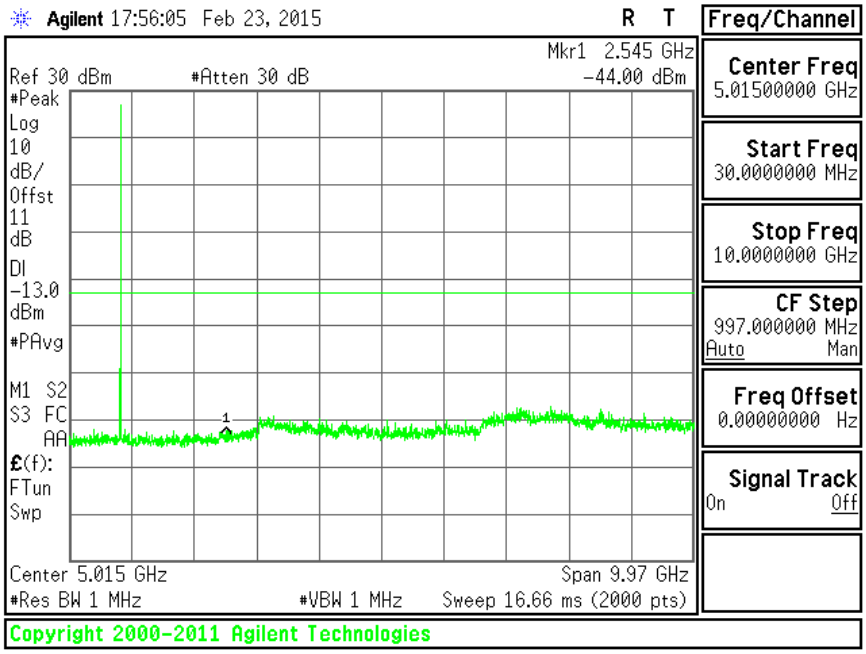
LOW CH



MID CH

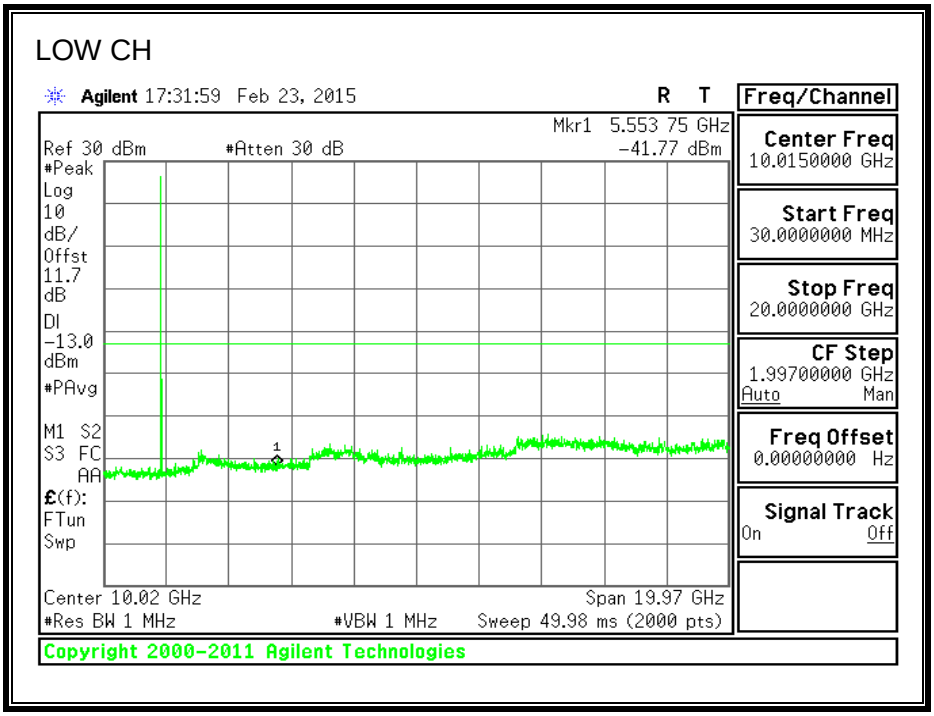


HIGH CH

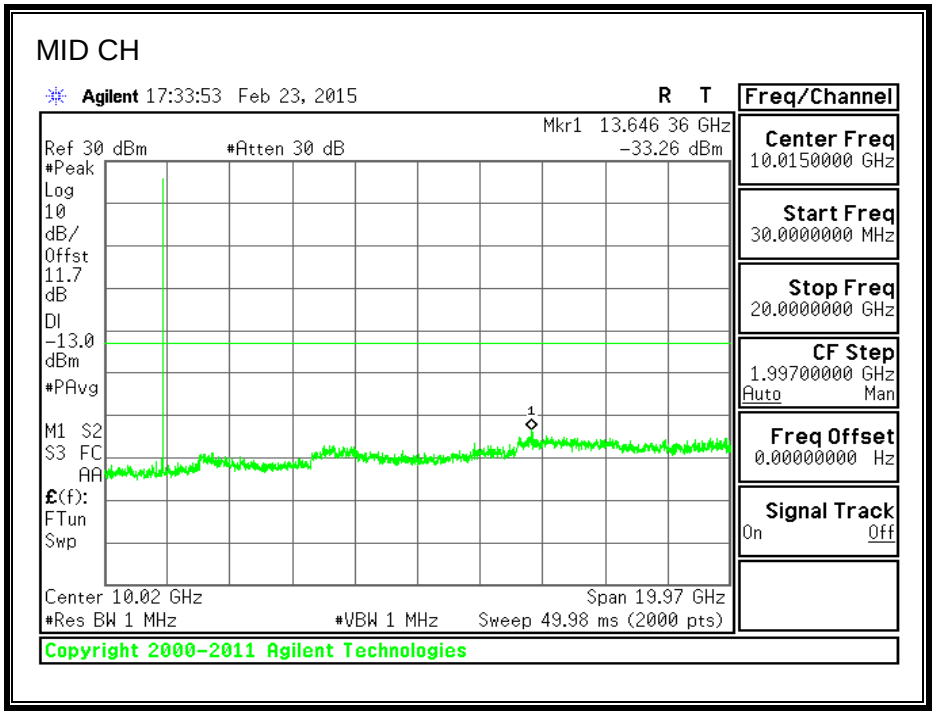


1900MHz BAND

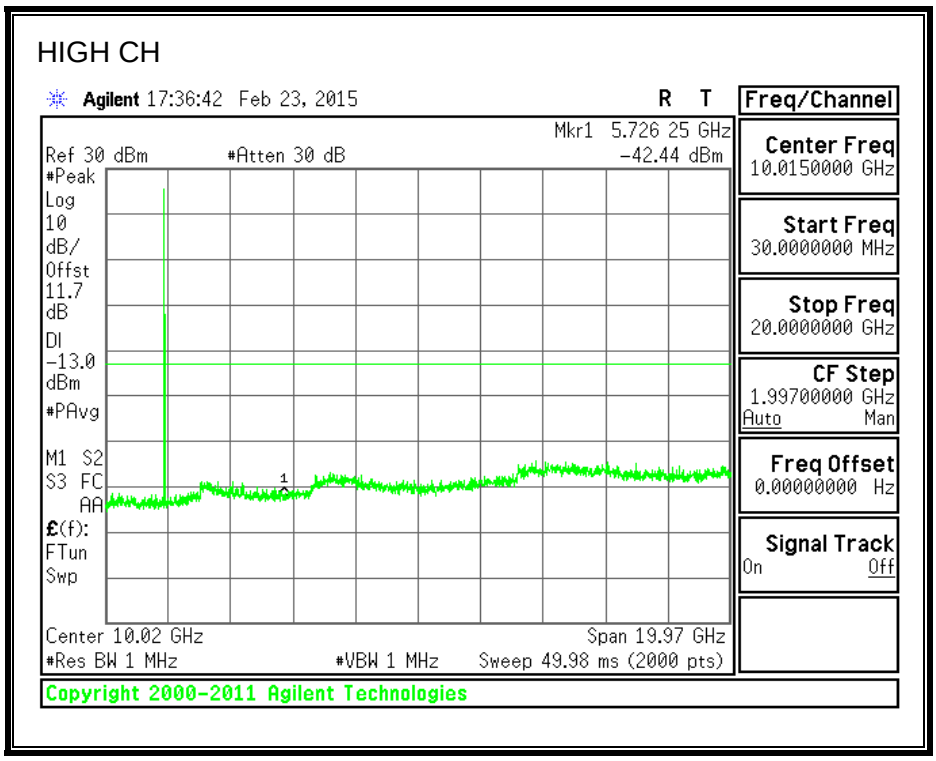
LOW CH



MID CH

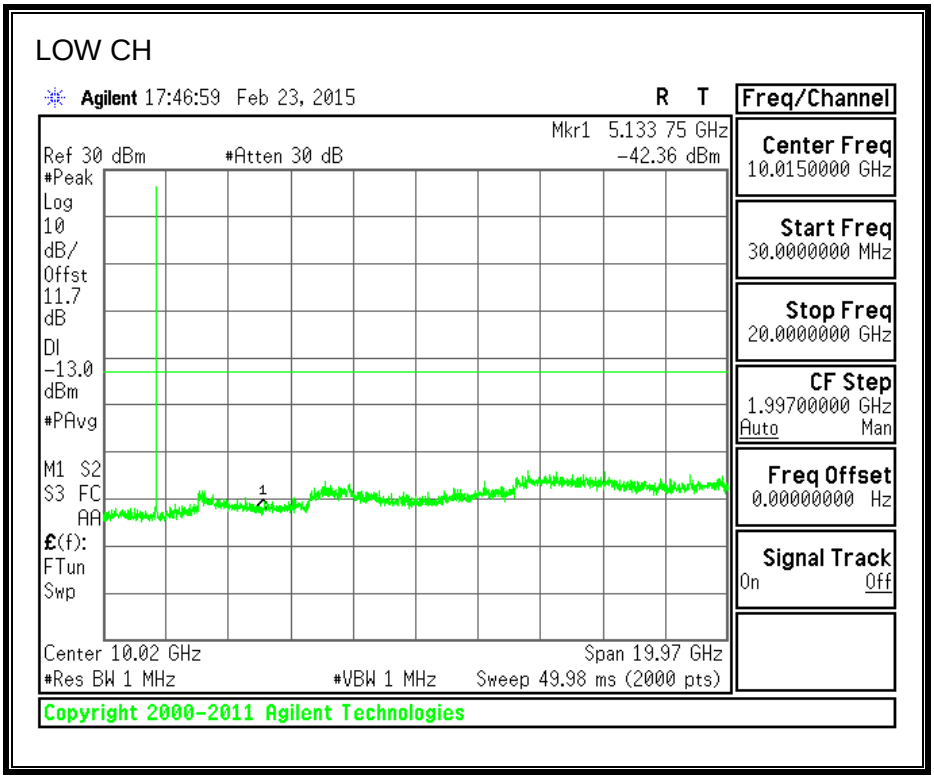


HIGH CH

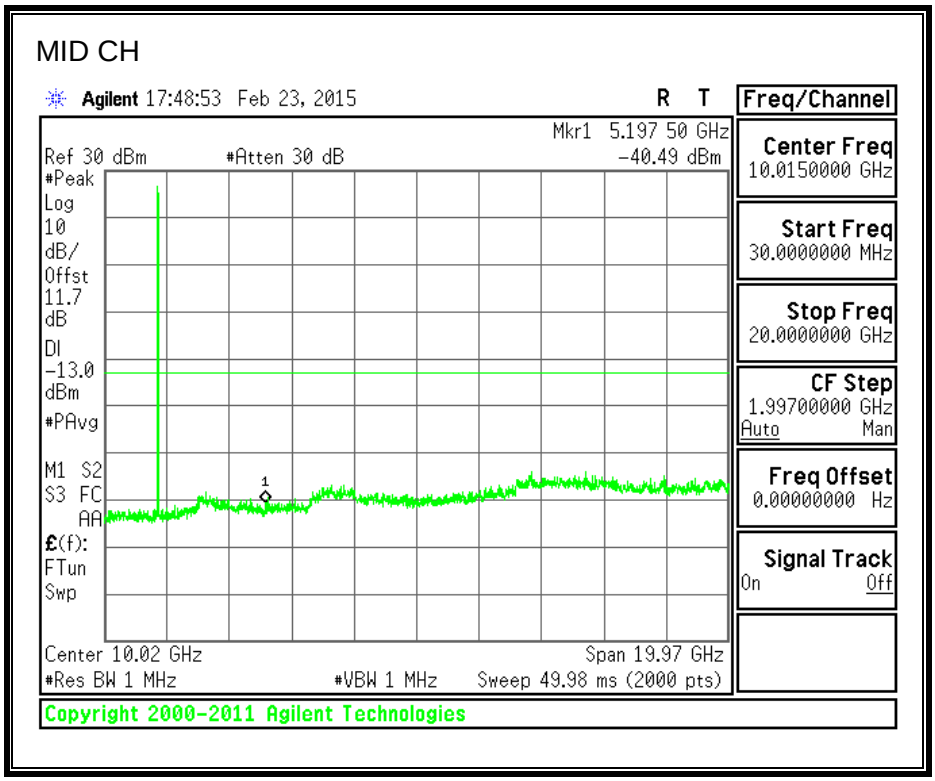


1700MHz BAND

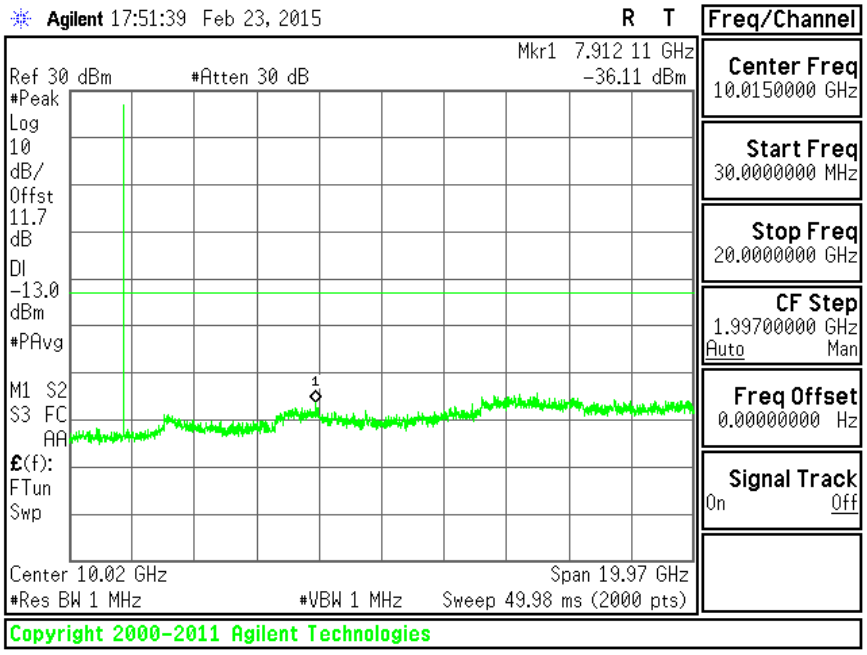
LOW CH



MID CH

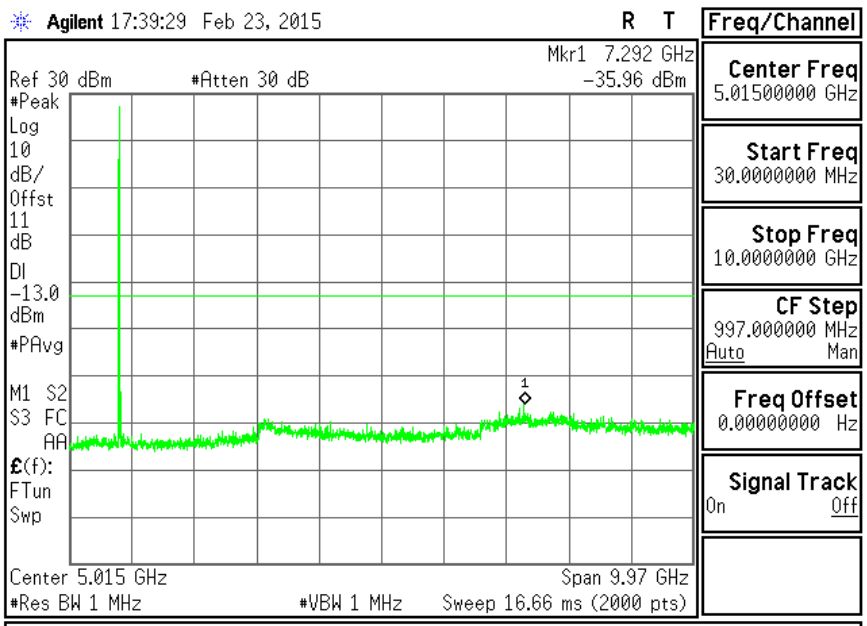


HIGH CH

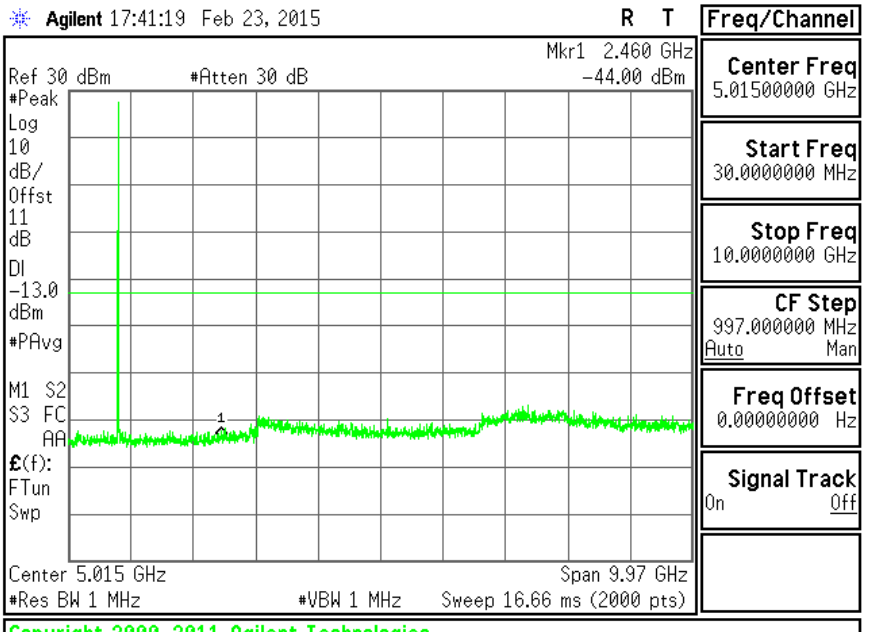


800MHz SECONDARY BAND

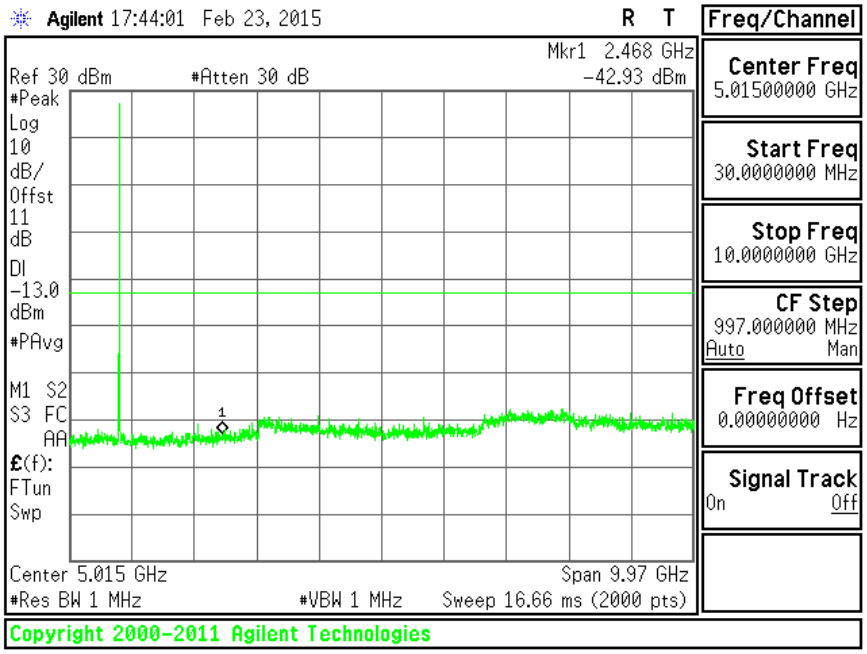
LOW CH



MID CH



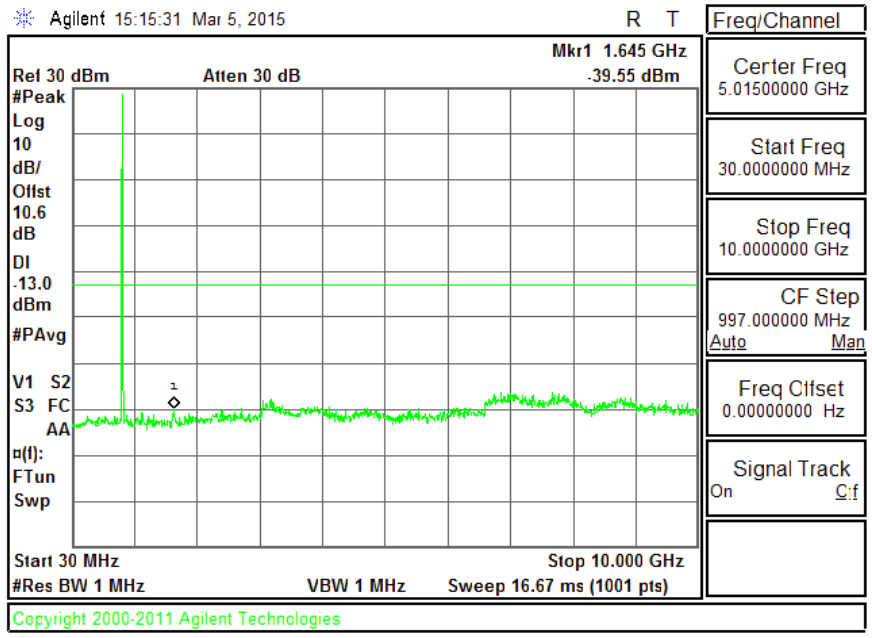
HIGH CH



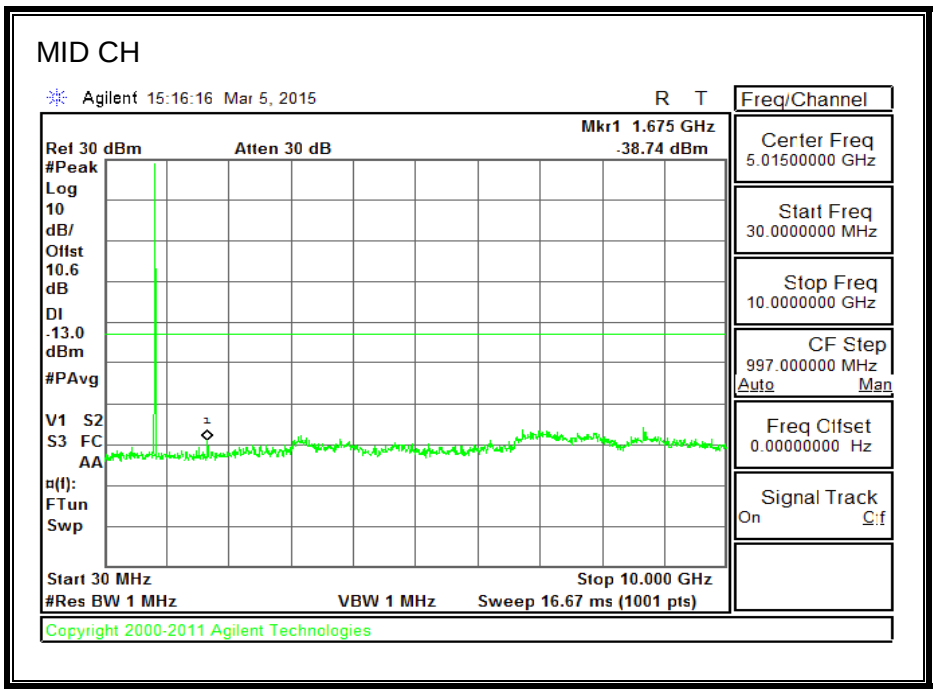
8.3.4. CDMA2000 REV A

850MHz BAND

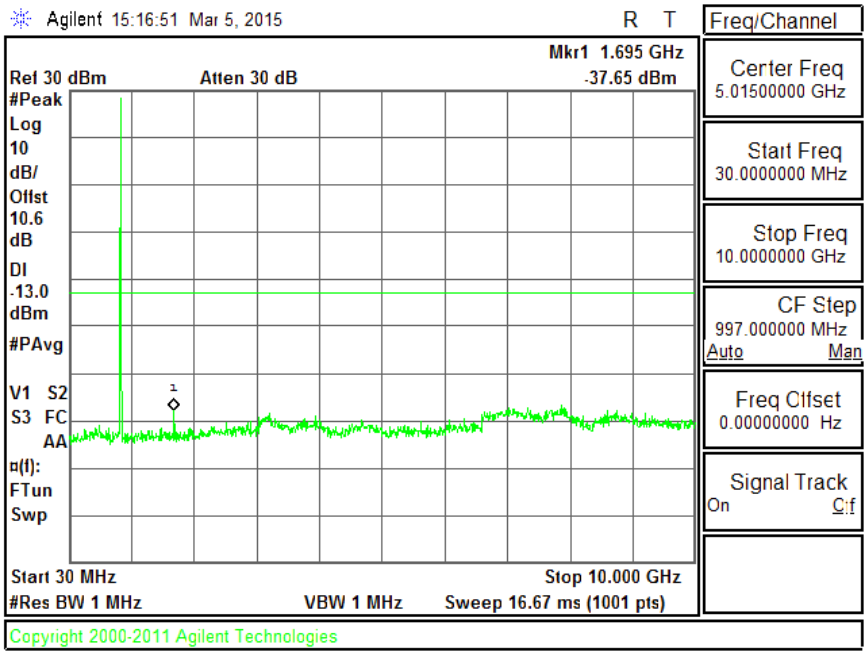
LOW CH



MID CH

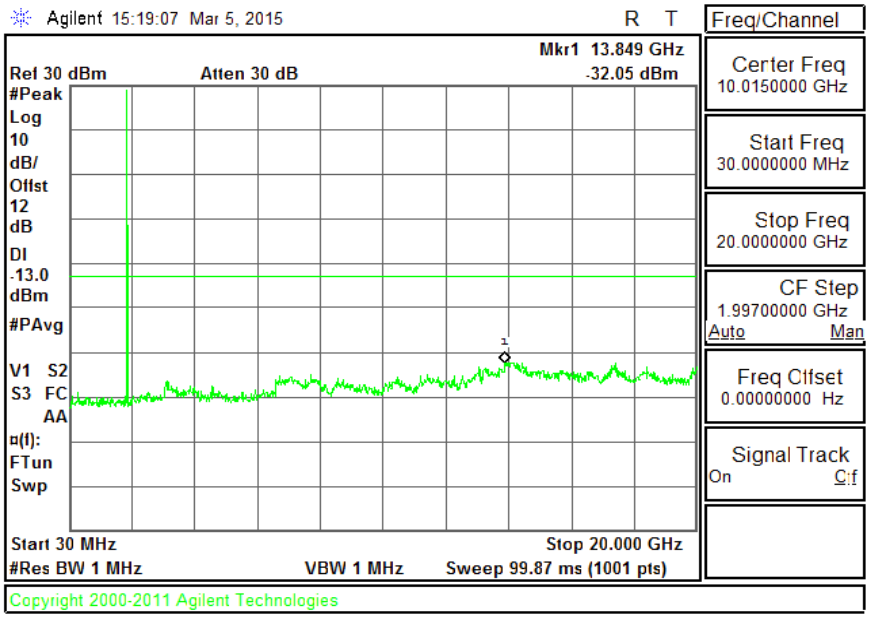


HIGH CH

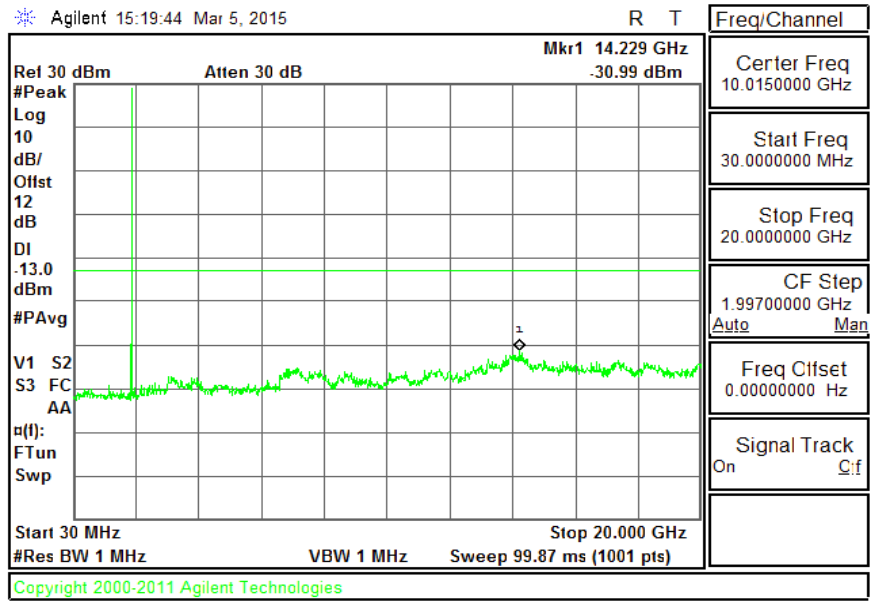


1900MHz BAND

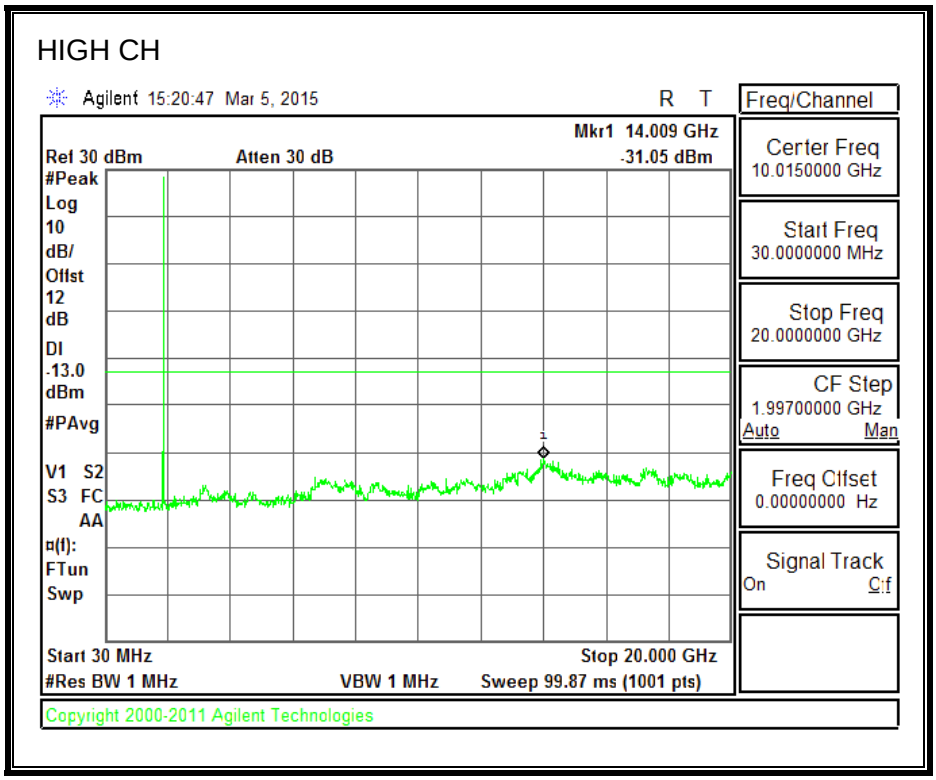
LOW CH



MID CH

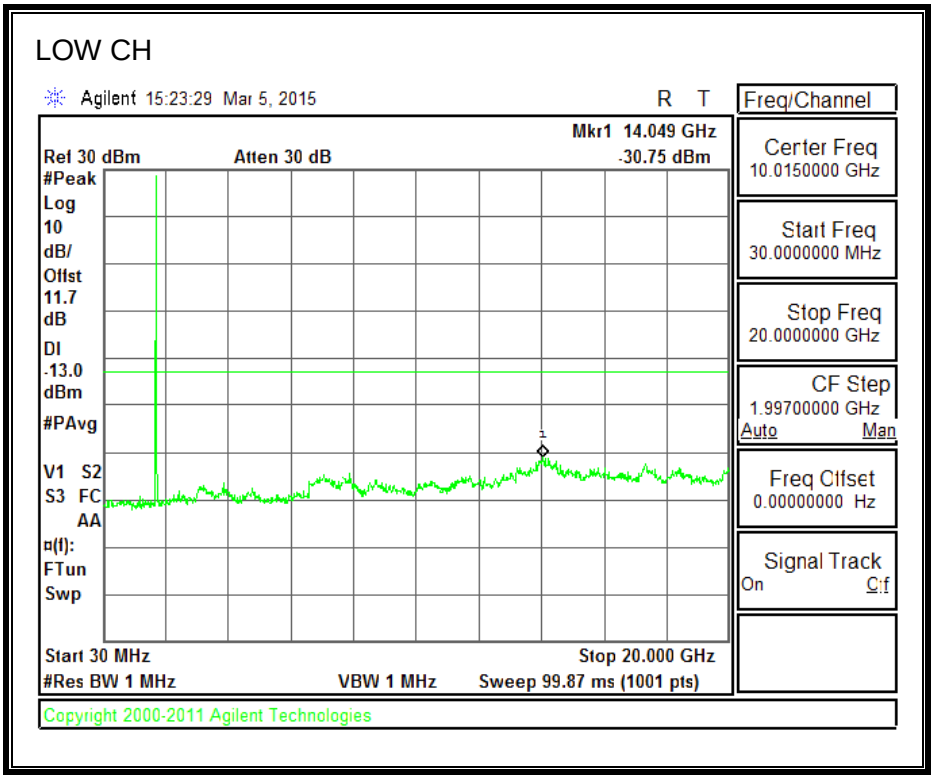


HIGH CH

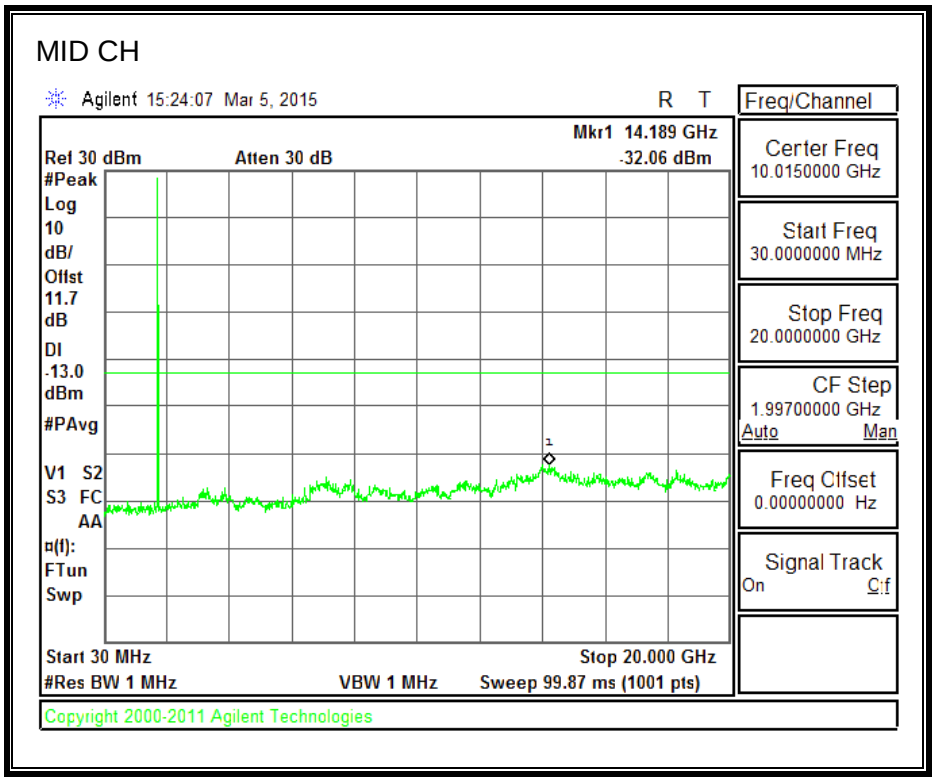


1700MHz BAND

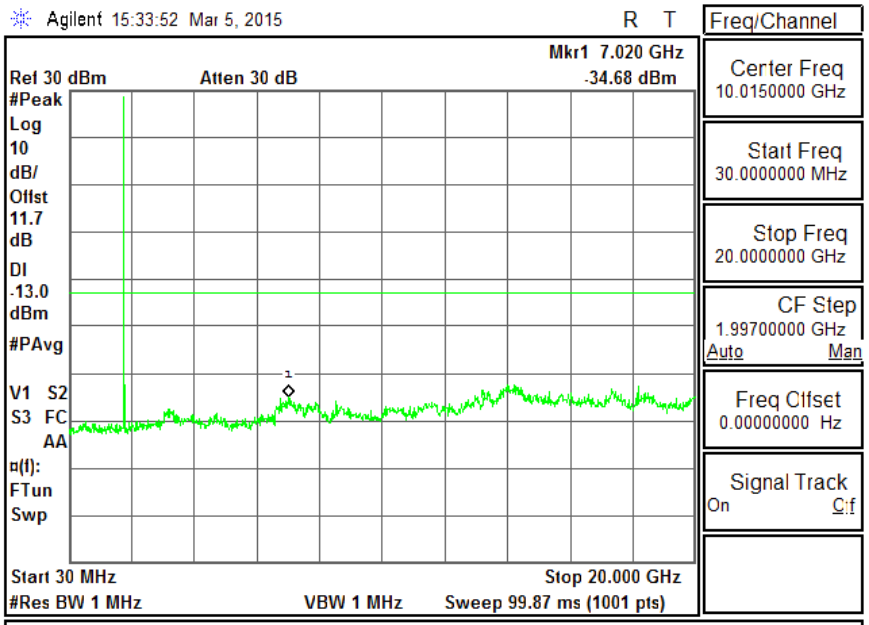
LOW CH



MID CH

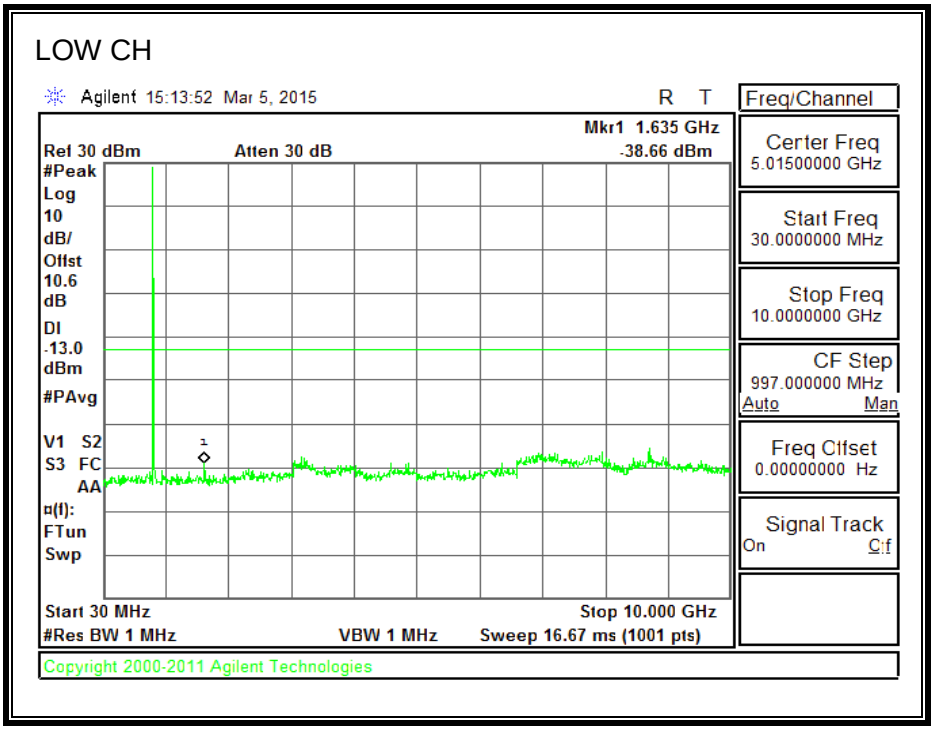


HIGH CH

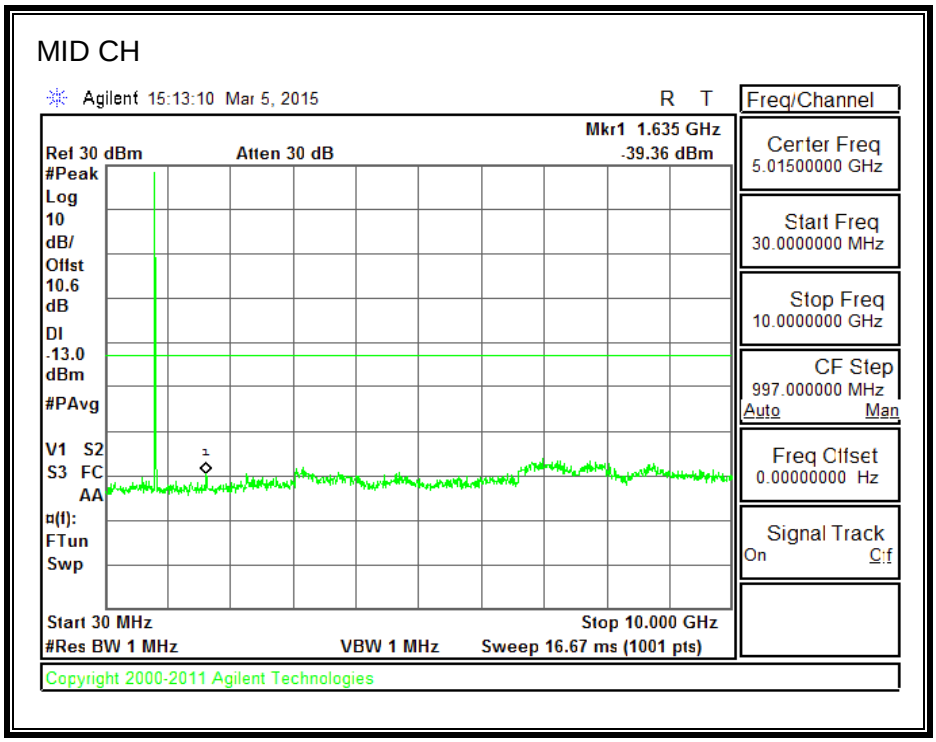


800MHz SECONDARY BAND

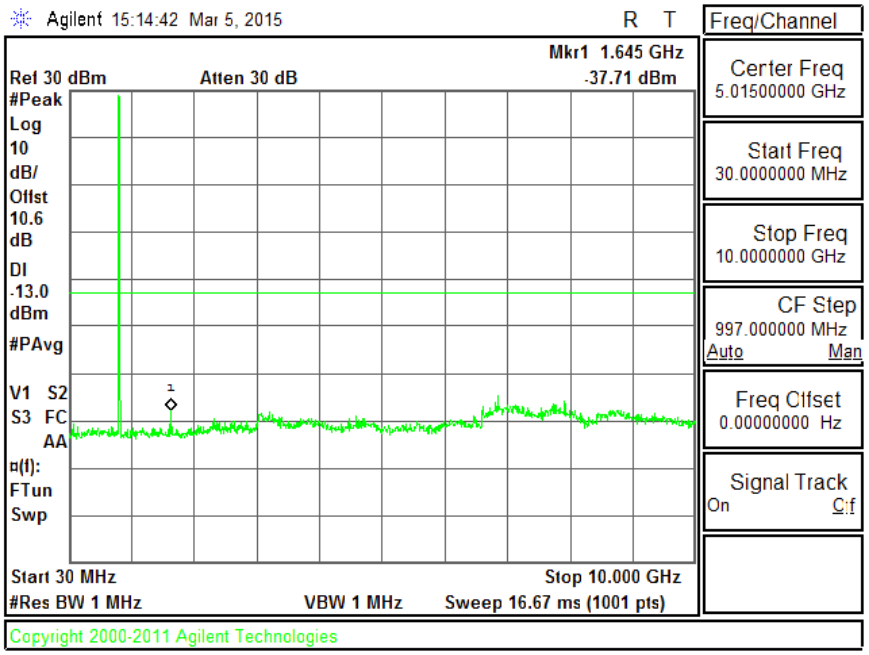
LOW CH



MID CH



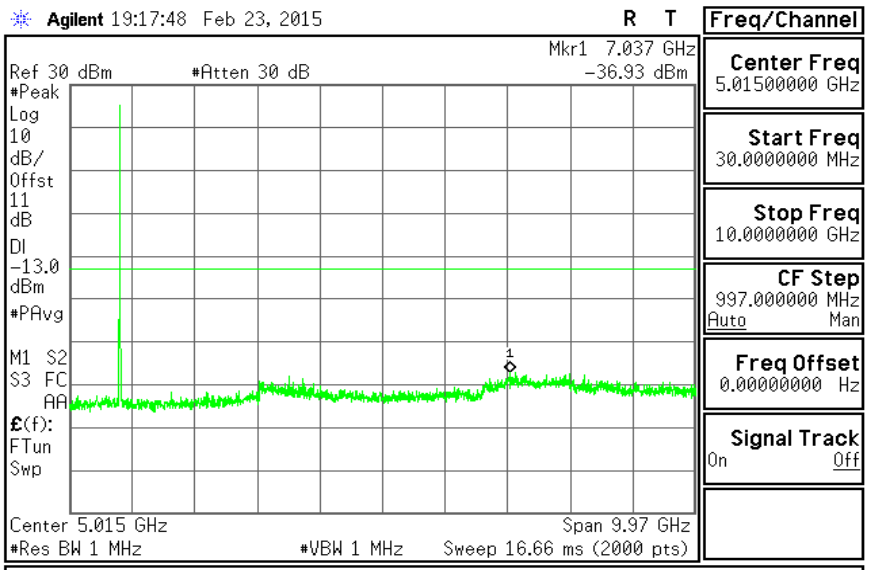
HIGH CH



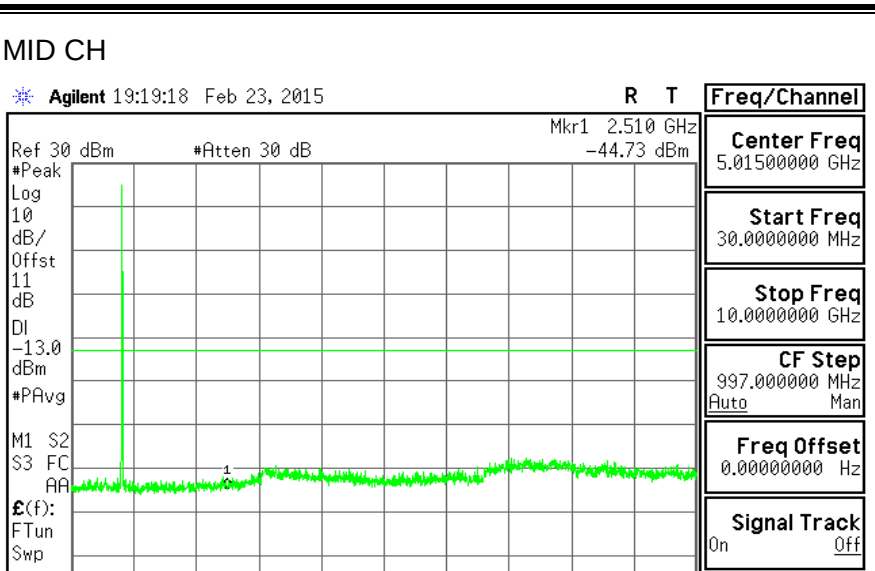
8.3.5. UMTS REL 99

850MHz BAND

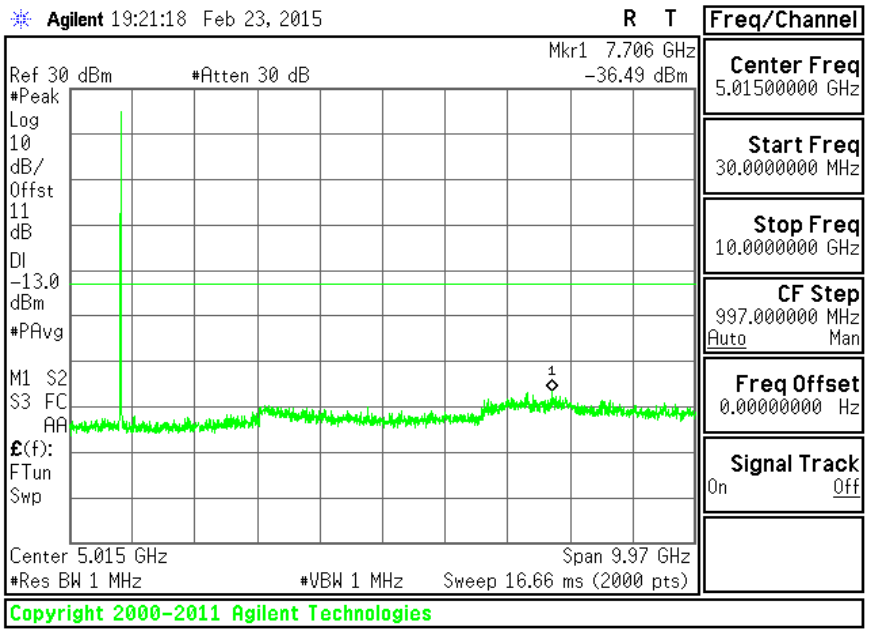
LOW CH



MID CH

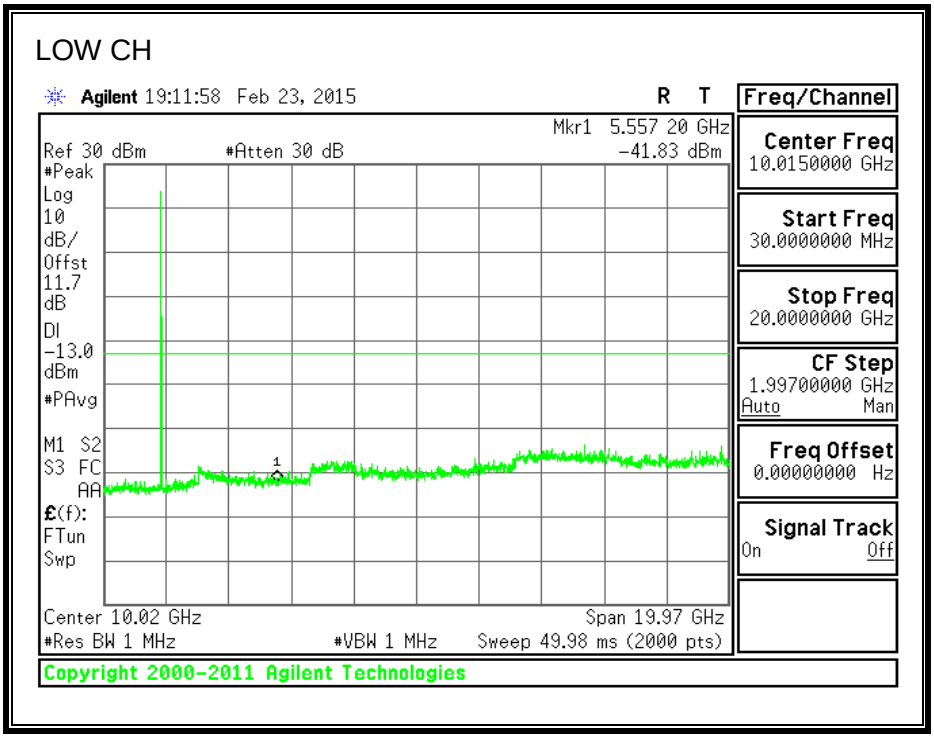


HIGH CH

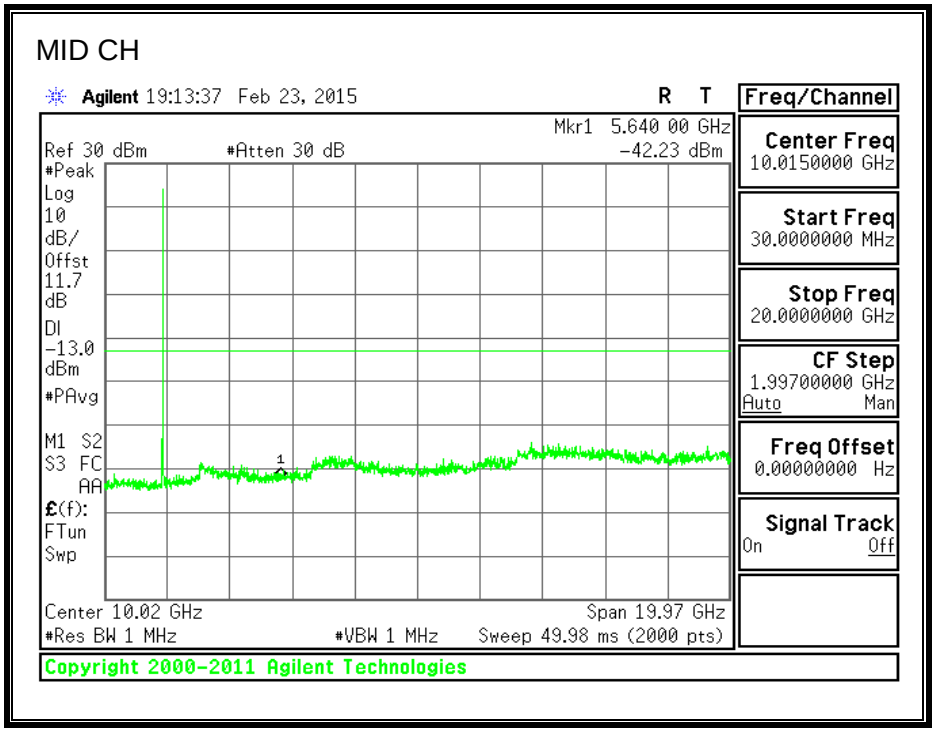


1900MHz BAND

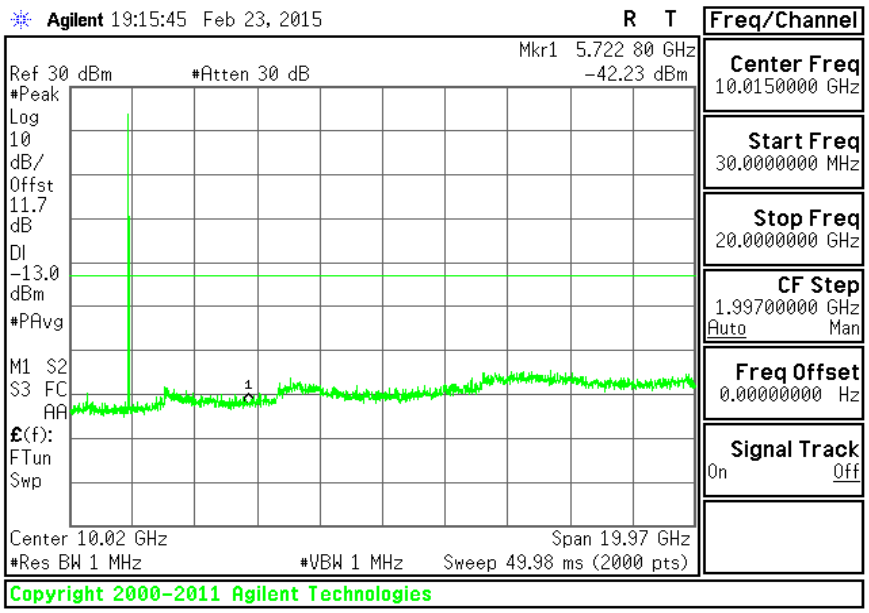
LOW CH



MID CH

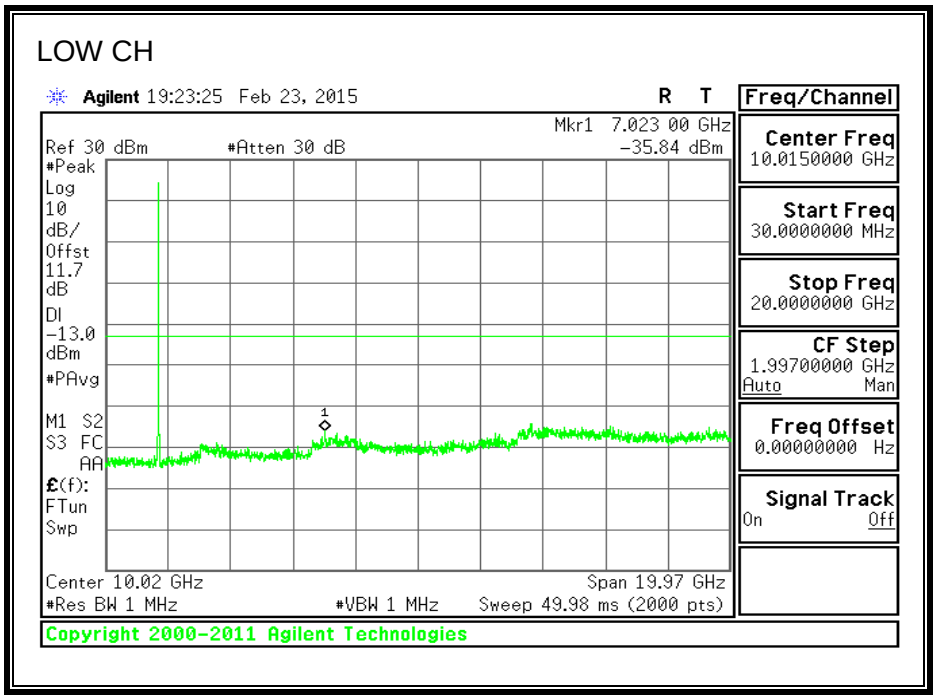


HIGH CH

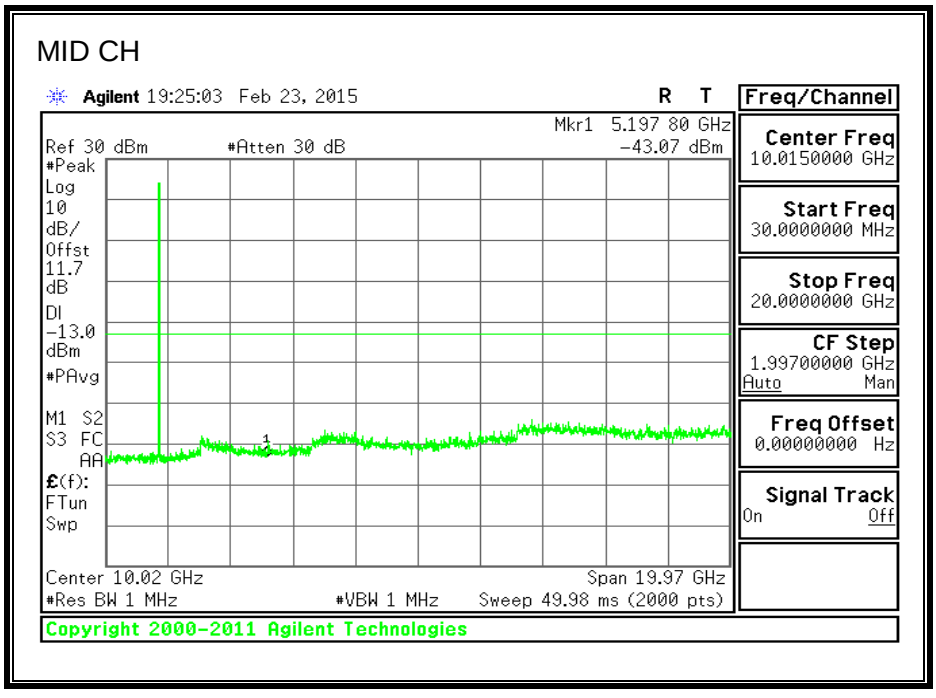


1700MHz BAND

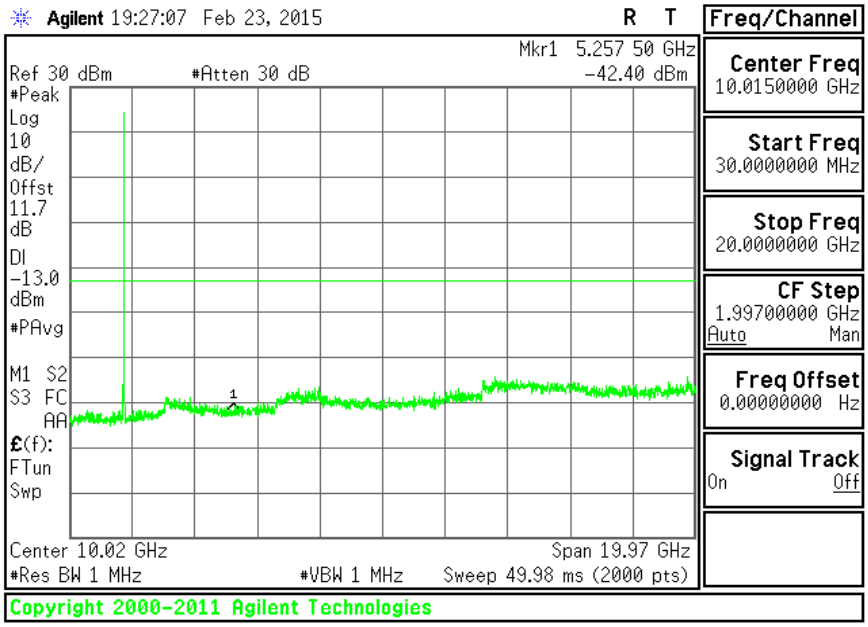
LOW CH



MID CH



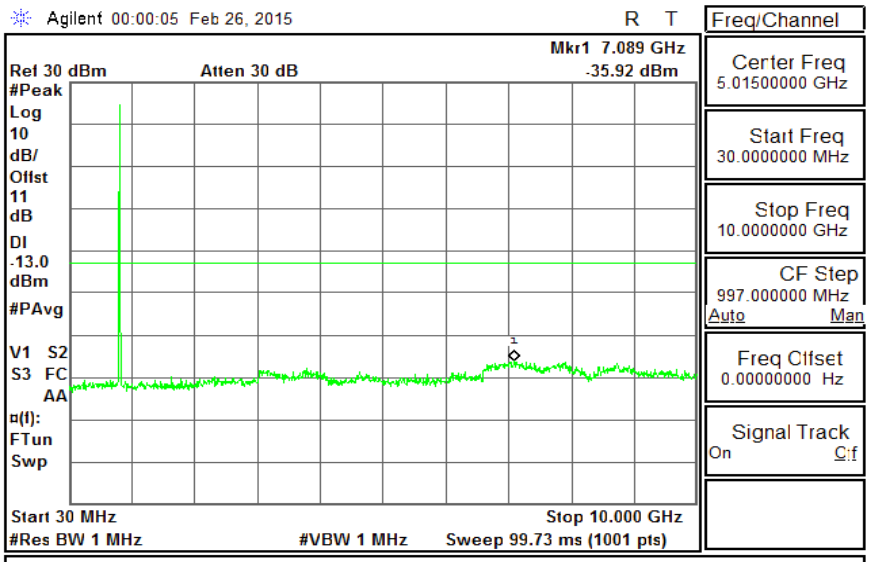
HIGH CH



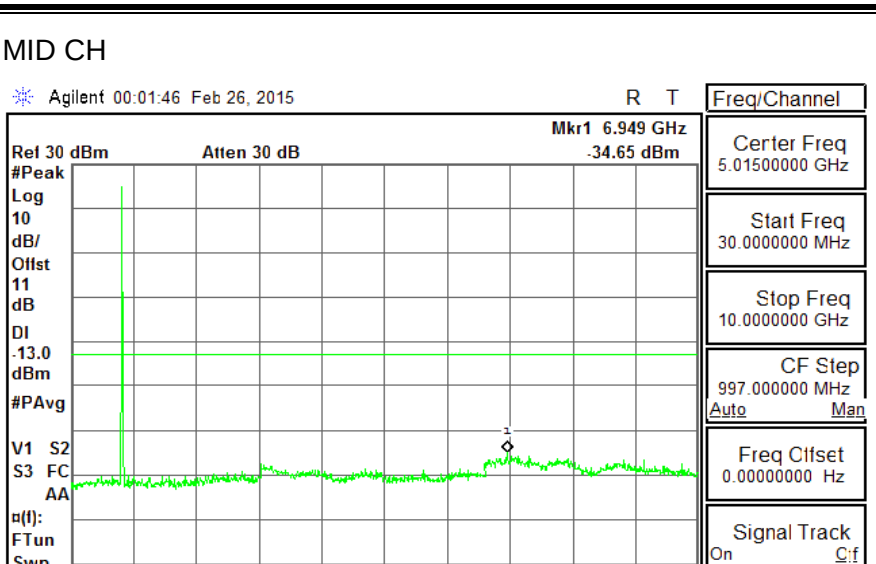
8.3.6. UMTS HSDPA

850MHz BAND

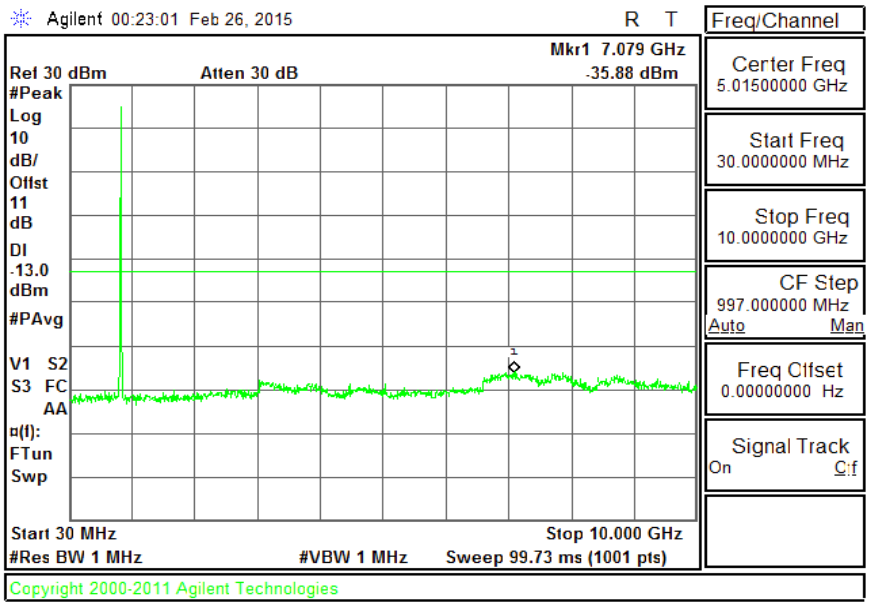
LOW CH



MID CH

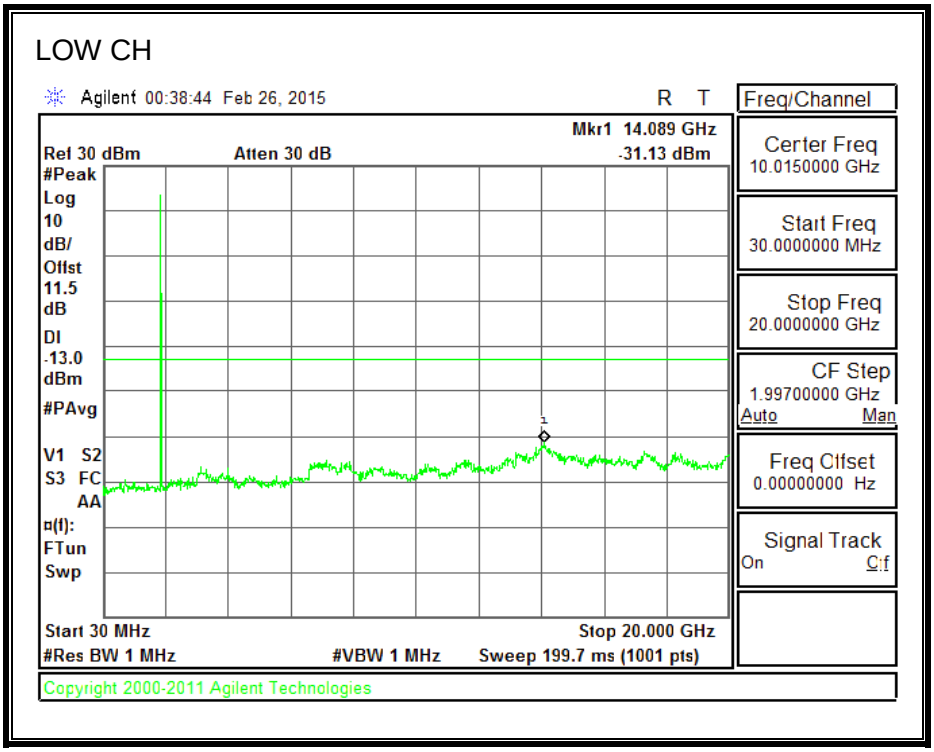


HIGH CH

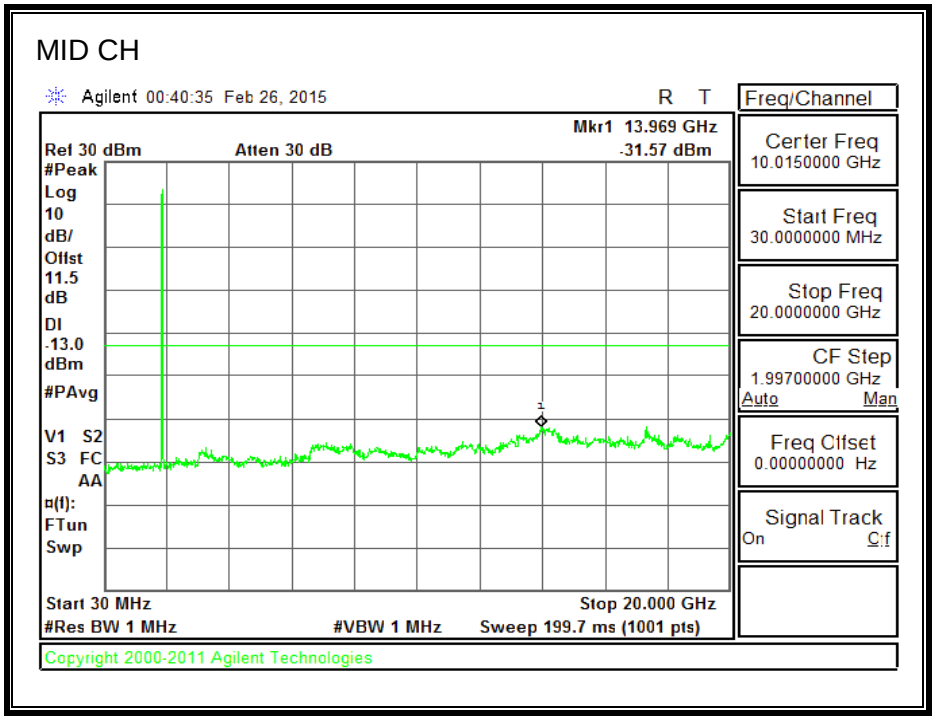


1900MHz BAND

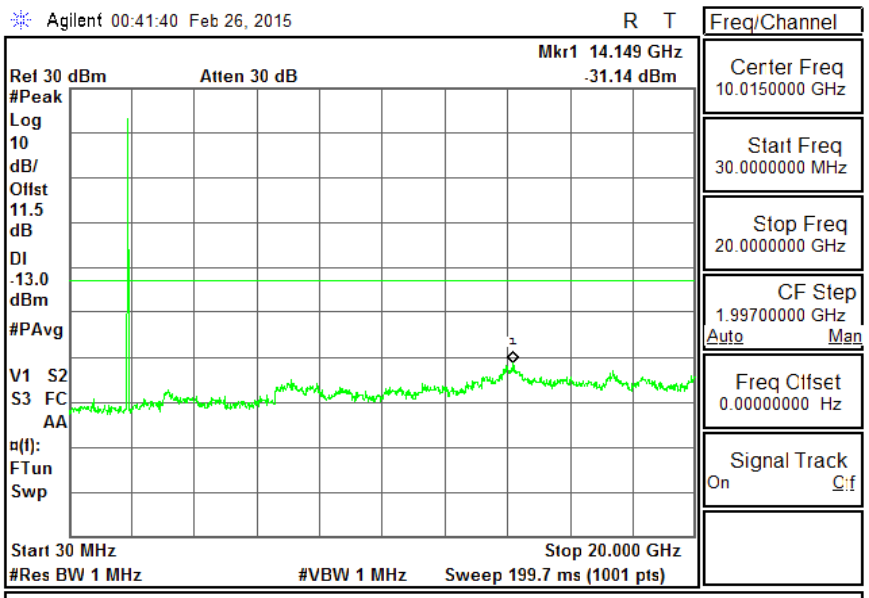
LOW CH



MID CH

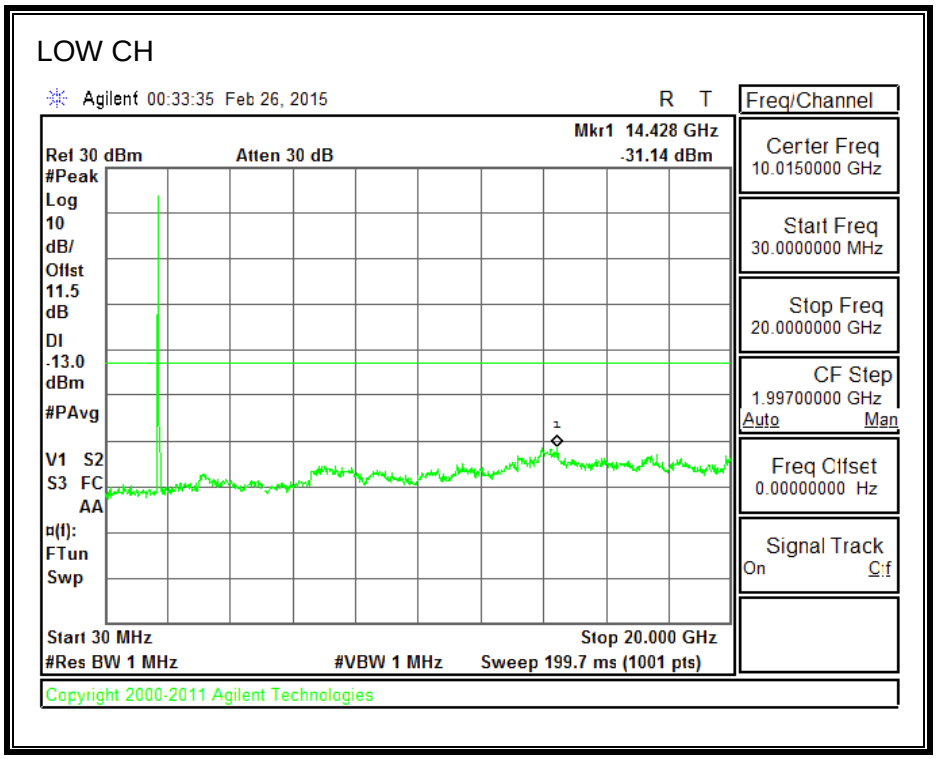


HIGH CH

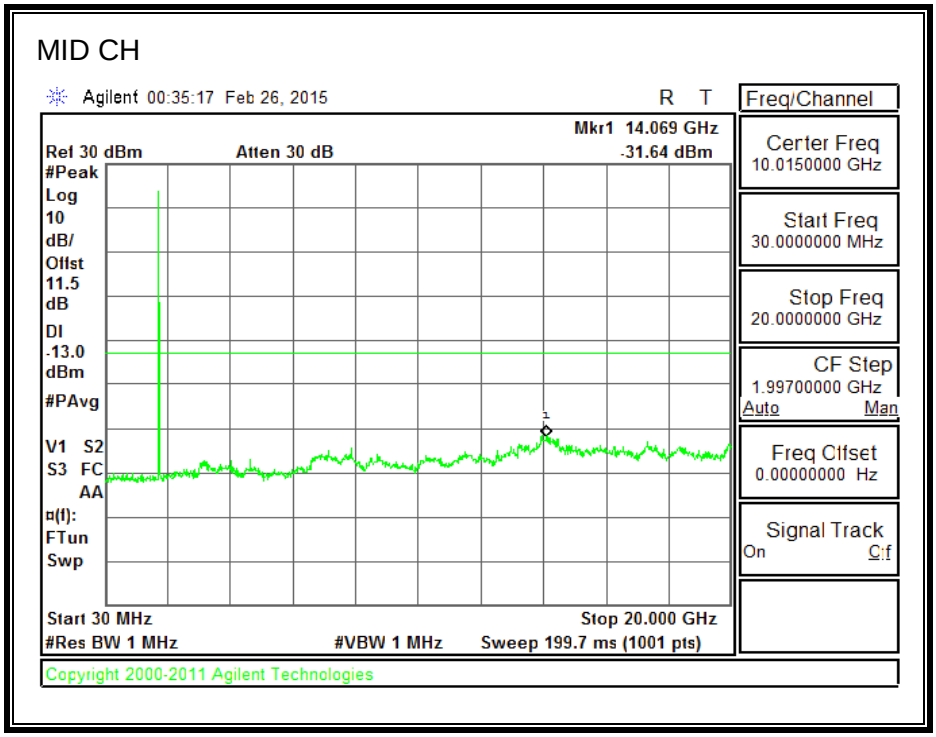


1700MHz BAND

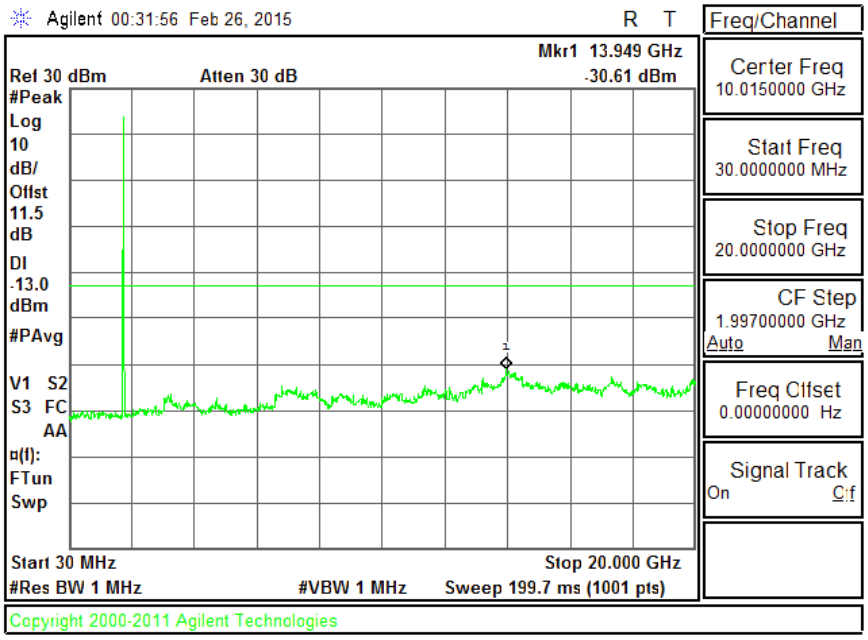
LOW CH



MID CH



HIGH CH



9. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54.and §90.213

LIMITS

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

§24.235 & §27.54 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

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

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

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

RESULTS

See the following pages.

9.1. GSM

GPRS 850

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	824.0007	848.9535		
Extreme (50C)		824.0008	848.9536	28.2	0.03
Extreme (40C)		824.0008	848.9535	23.1	0.03
Extreme (30C)		824.0008	848.9535	21.5	0.03
Extreme (10C)		824.0008	848.9535	20.6	0.02
Extreme (0C)		824.0008	848.9535	18.6	0.02
Extreme (-10C)		824.0008	848.9535	18.8	0.02
Extreme (-20C)		824.0008	848.9535	15.8	0.02
Extreme (-30C)		824.0008	848.9535	15.8	0.02
25C	10%	824.0008	848.9535	16.1	0.02
	-10%	824.0008	848.9535	15.9	0.02
	End Point	824.0008	848.9535	17.2	0.02

EGPRS 850

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	824.0361	848.9709		
Extreme (50C)		824.0362	848.9710	28.6	0.03
Extreme (40C)		824.0362	848.9710	29.9	0.04
Extreme (30C)		824.0362	848.9710	27.9	0.03
Extreme (10C)		824.0362	848.9710	24.0	0.03
Extreme (0C)		824.0362	848.9710	24.6	0.03
Extreme (-10C)		824.0362	848.9710	21.7	0.03
Extreme (-20C)		824.0362	848.9710	18.8	0.02
Extreme (-30C)		824.0362	848.9710	18.7	0.02
25C	10%	824.0362	848.9710	17.9	0.02
	-10%	824.0362	848.9710	17.7	0.02
	End Point	824.0362	848.9710	18.2	0.02

GPRS 1900

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)		1850.0309	1909.9657		
Extreme (50C)		1850.0310	1909.9658	68.0	0.04
Extreme (40C)		1850.0310	1909.9658	63.0	0.03
Extreme (30C)		1850.0310	1909.9658	60.1	0.03
Extreme (10C)	Normal	1850.0310	1909.9658	62.0	0.03
Extreme (0C)		1850.0310	1909.9658	61.2	0.03
Extreme (-10C)		1850.0310	1909.9658	65.9	0.04
Extreme (-20C)		1850.0310	1909.9658	66.7	0.04
Extreme (-30C)		1850.0310	1909.9658	60.7	0.03
25C	10%	1850.0310	1909.9658	61.2	0.03
	-10%	1850.0310	1909.9658	62.9	0.03
	End Point	1850.0310	1909.9658	61.8	0.03

EGPRS 1900

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)		1850.0296	1909.9692		
Extreme (50C)		1850.0296	1909.9693	65.0	0.03
Extreme (40C)		1850.0296	1909.9693	66.3	0.04
Extreme (30C)		1850.0296	1909.9693	64.9	0.03
Extreme (10C)	Normal	1850.0296	1909.9693	64.8	0.03
Extreme (0C)		1850.0296	1909.9693	63.9	0.03
Extreme (-10C)		1850.0296	1909.9693	60.3	0.03
Extreme (-20C)		1850.0296	1909.9693	57.0	0.03
Extreme (-30C)		1850.0296	1909.9693	56.1	0.03
25C	10%	1850.0296	1909.9693	55.9	0.03
	-10%	1850.0296	1909.9693	57.4	0.03
	End Point	1850.0296	1909.9693	58.5	0.03

9.2. CDMA2000

CDMA 1xRTT BC0

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	824.0046	848.9820		
Extreme (50C)		824.0046	848.9820	-1.3	0.00
Extreme (40C)		824.0046	848.9820	1.2	0.00
Extreme (30C)		824.0046	848.9820	1.4	0.00
Extreme (10C)		824.0046	848.9820	-2.7	0.00
Extreme (0C)		824.0046	848.9820	-3.7	0.00
Extreme (-10C)		824.0046	848.9820	-2.1	0.00
Extreme (-20C)		824.0046	848.9820	1.4	0.00
Extreme (-30C)		824.0046	848.9820	2.2	0.00
25C	10%	824.0046	848.9820	0.9	0.00
	-10%	824.0046	848.9820	-1.4	0.00
	End Point	824.0046	848.9820	2.1	0.00

CDMA 1x RTT BC1

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	1850.5622	1909.4383		
Extreme (50C)		1850.5622	1909.4383	5.0	0.00
Extreme (40C)		1850.5622	1909.4383	4.5	0.00
Extreme (30C)		1850.5622	1909.4383	6.5	0.00
Extreme (10C)		1850.5622	1909.4383	8.0	0.00
Extreme (0C)		1850.5622	1909.4383	10.9	0.01
Extreme (-10C)		1850.5622	1909.4383	8.5	0.00
Extreme (-20C)		1850.5622	1909.4383	7.5	0.00
Extreme (-30C)		1850.5622	1909.4383	9.9	0.01
25C	10%	1850.5622	1909.4383	6.9	0.00
	-10%	1850.5622	1909.4383	5.7	0.00
	End Point	1850.5622	1909.4383	6.5	0.00

CDMA 1xRTT BC10

Limit		816.35	823.65	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	816.5616	823.4445		
Extreme (50C)		816.5616	823.4445	1.9	0.00
Extreme (40C)		816.5616	823.4445	-2.3	0.00
Extreme (30C)		816.5616	823.4445	0.7	0.00
Extreme (10C)		816.5616	823.4445	0.2	0.00
Extreme (0C)		816.5616	823.4445	-1.3	0.00
Extreme (-10C)		816.5616	823.4445	-1.1	0.00
Extreme (-20C)		816.5616	823.4445	-2.0	0.00
Extreme (-30C)		816.5616	823.4445	-2.9	0.00
25C	10%	816.5616	823.4445	-2.3	0.00
	-10%	816.5616	823.4445	-2.4	0.00
	End Point	816.5616	823.4445	-2.6	0.00

CDMA 1xRTT BC15

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	1710.5621	1754.4447		
Extreme (50C)		1710.5621	1754.4447	-5.6	0.00
Extreme (40C)		1710.5621	1754.4447	2.5	0.00
Extreme (30C)		1710.5621	1754.4447	5.0	0.00
Extreme (10C)		1710.5622	1754.4447	9.5	0.01
Extreme (0C)		1710.5621	1754.4447	1.9	0.00
Extreme (-10C)		1710.5621	1754.4447	1.2	0.00
Extreme (-20C)		1710.5621	1754.4447	4.7	0.00
Extreme (-30C)		1710.5621	1754.4447	3.9	0.00
25C	10%	1710.5621	1754.4447	-2.3	0.00
	-10%	1710.5621	1754.4447	-4.7	0.00
	End Point	1710.5622	1754.4447	9.5	0.01

9.3. UMTS

UMTS REL99 BAND 5

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	Normal	824.1283	848.8772		
Extreme (50C)		824.1283	848.8772	-2.5	0.00
Extreme (40C)		824.1283	848.8772	-3.6	0.00
Extreme (30C)		824.1283	848.8772	-2.6	0.00
Extreme (10C)		824.1283	848.8772	-2.7	0.00
Extreme (0C)		824.1283	848.8772	-2.7	0.00
Extreme (-10C)		824.1283	848.8772	-2.1	0.00
Extreme (-20C)		824.1283	848.8772	1.2	0.00
Extreme (-30C)		824.1283	848.8772	5.9	0.01
25C	10%	824.1283	848.8772	-2.4	0.00
	-10%	824.1283	848.8772	-1.7	0.00
	End Point	824.1283	848.8772	-2.3	0.00

UMTS REL99 BAND 2

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	Normal	1850.1273	1909.8669		
Extreme (50C)		1850.1273	1909.8669	13.2	0.01
Extreme (40C)		1850.1273	1909.8669	11.7	0.01
Extreme (30C)		1850.1273	1909.8669	10.8	0.01
Extreme (10C)		1850.1273	1909.8669	11.8	0.01
Extreme (0C)		1850.1273	1909.8669	11.5	0.01
Extreme (-10C)		1850.1273	1909.8669	15.8	0.01
Extreme (-20C)		1850.1273	1909.8669	10.1	0.01
Extreme (-30C)		1850.1273	1909.8669	11.2	0.01
25C	10%	1850.1273	1909.8669	10.6	0.01
	-10%	1850.1273	1909.8669	11.3	0.01
	End Point	1850.1273	1909.8669	11.5	0.01

UMTS REL99 BAND 4

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	1710.1309	1754.8765		
Extreme (50C)		1710.1309	1754.8765	11.0	0.01
Extreme (40C)		1710.1309	1754.8765	13.6	0.01
Extreme (30C)		1710.1309	1754.8765	16.9	0.01
Extreme (10C)		1710.1309	1754.8765	15.0	0.01
Extreme (0C)		1710.1309	1754.8765	10.4	0.01
Extreme (-10C)		1710.1309	1754.8765	12.7	0.01
Extreme (-20C)		1710.1309	1754.8765	11.3	0.01
Extreme (-30C)		1710.1309	1754.8765	15.0	0.01
25C	10%	1710.1309	1754.8765	11.9	0.01
	-10%	1710.1309	1754.8765	10.5	0.01
	End Point	1710.1309	1754.8765	12.2	0.01

10. RADIATED TEST RESULTS

10.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50 and §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(d) (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band are limited to 1 watt EIRP. Fixed stations operating in this band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in this band must employ a means for limiting power to the minimum necessary for successful communications

§90.635 Limitations on power and antenna height.

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

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

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

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

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

2 Applicants 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.

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

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

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17

KDB 971168 D01RF Power output using broadband peak and average power meter method

MODES TESTED

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

RESULTS

Part 22 / RSS 132 850MHz Band

Band	Mode	Channel	f (MHz)	ERP (Average)	
				dBm	mW
CELL	GPRS	128	824.2	29.83	961.61
		190	836.6	29.86	968.28
		251	848.8	**30.18**	1042.32
	EGPRS	128	824.2	25.03	318.42
		190	836.6	25.31	339.63
		251	848.8	**25.46**	351.56

Part 24 / RSS 133 1900MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	GPRS	512	1850.2	**30.18**	1042.32
		661	1880.0	28.41	693.43
		810	1909.8	28.36	685.49
	EGPRS	512	1850.2	**29.95**	988.55
		661	1880.0	29.61	914.11
		810	1909.8	28.42	695.02

Part 90 800MHz Band

Band	Mode	Channel	f (MHz)	ERP (Average)	
				dBm	mW
CELL	BC10, 1xRTT	476	817.9	21.27	133.97
		526	819.2	**21.54**	142.56
		684	823.1	21.33	135.83
	BC10, EVDO A	476	817.9	21.33	135.83
		526	819.2	**21.62**	145.21
		684	823.1	21.36	136.77

Part 22 / RSS 132 850MHz Band

Band	Mode	Channel	f (MHz)	ERP (Average)	
				dBm	mW
CELL	BC 0, 1xRTT	1013	824.7	**22.89**	194.54
		384	836.5	22.24	167.49
		777	848.3	21.26	133.66
	BC 0, EVDO Rev A	1013	824.7	**22.98**	198.61
		384	836.5	22.39	173.38
		777	848.3	21.34	136.14

Part 24 / RSS 133 1900MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	BC1, 1xRTT	25	1851.3	25.51	355.63
		600	1880.0	**25.78**	378.44
		1175	1908.8	25.53	357.27
	BC1, EVDO REV A	25	1851.3	25.71	372.39
		600	1880.0	**25.85**	384.59
		1175	1908.8	25.57	360.58

Part 27 / RSS 139 1700MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
AWS	BC15, 1xRTT	25	1711.3	**25.60**	363.08
		450	1732.5	25.32	340.41
		875	1753.8	24.28	267.92
	BC15, EVDO, REV A	25	1711.3	**25.68**	369.83
		450	1732.5	25.36	343.56
		875	1753.8	24.48	280.54

CDMA2000 REV B

Mode	Channel	f (MHz)	ERP (Average)	
			dBm	mW
EVDO Rev B Two Carriers Min.	1013+31	825.3	**19.38**	86.70
	384+425	837.2	19.14	82.04
	736+777	847.6	18.76	75.16
EVDO Rev B Two Carriers Max	1013+156	826.5	**19.33**	85.70
	384+550	838.8	19.14	82.04
	611+777	844.9	19.06	80.54
EVDO Rev B Three Carriers Min.	1013+31+72	825.9	**19.63**	91.83
	384+425+466	837.7	19.24	83.95
	695+736+777	846.7	19.16	82.41

Part 22 / RSS 132 850MHz Band

Band	Mode	Channel	f (MHz)	ERP (Average)	
				dBm	mW
CELL	UMTS,REL 99	4357	826.4	21.81	151.71
		4405	836.0	**22.24**	167.49
		4455	846.0	22.06	160.69
	UMTS, HSDPA	4357	826.4	**20.13**	103.04
		4405	836.0	19.44	87.90
		4455	846.0	20.06	101.39

Part 27 / RSS 139 1700MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	UMTS,REL 99	1537	1712.4	25.68	369.83
		1638	1732.6	**25.93**	391.74
		1738	1752.5	25.18	329.61
	UMTS, HSDPA	1537	1712.4	**24.78**	300.61
		1638	1732.6	24.73	297.17
		1738	1752.5	24.18	261.82

Part 24 / RSS 133 1900MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	UMTS,REL 99	9662	1852.4	25.72	373.25
		9800	1880.0	**25.84**	383.71
		9938	1907.6	25.67	368.98
	UMTS, HSDPA	9662	1852.4	**25.02**	317.69
		9800	1880.0	24.90	309.03
		9938	1907.6	24.73	297.17

10.1.1. GSM

GPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/26/15
Test Engineer: R.Z
Configuration: EUT only
Mode: GSM 850MHz

Test Equipment:
Receiving: Sunol T900, and Chamber H Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes
Low Ch										
824.20	27.3	V	0.6	0.0	26.68	28.83	38.45	40.60	-11.8	
824.20	30.5	H	0.6	0.0	29.83	31.98	38.45	40.60	-8.6	
Mid Ch										
836.60	28.2	V	0.6	0.0	27.63	29.78	38.45	40.60	-10.8	
836.60	30.5	H	0.6	0.0	29.86	32.01	38.45	40.60	-8.6	
High Ch										
848.80	27.9	V	0.6	0.0	27.32	29.47	38.45	40.60	-11.1	
848.80	30.8	H	0.6	0.0	30.18	32.33	38.45	40.60	-8.3	

Rev. 06.18.14

EGPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/26/15
Test Engineer: R.Z
Configuration: EUT only
Mode: EDGE 850MHz

Test Equipment:
Receiving: Sunol T900, and Chamber H Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes
Low Ch										
824.20	23.9	V	0.6	0.0	23.28	25.43	38.45	40.60	-15.2	
824.20	25.7	H	0.6	0.0	25.03	27.18	38.45	40.60	-13.4	
Mid Ch										
836.60	24.1	V	0.6	0.0	23.45	25.60	38.45	40.60	-15.0	
836.60	25.9	H	0.6	0.0	25.31	27.46	38.45	40.60	-13.1	
High Ch										
848.80	23.9	V	0.6	0.0	23.32	25.47	38.45	40.60	-15.1	
848.80	26.1	H	0.6	0.0	25.46	27.61	38.45	40.60	-13.0	

Rev. 06.18.14

GPRS, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/16/15
Test Engineer: R.Z
Configuration: EUT only
Mode: GSM 1900MHz

Test Equipment:
Receiving: Horn T863 and Chamber H SMA Cables
Substitution: Horn T60 Substitution, and 8ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1.851	21.9	V	0.98	9.25	30.18	33.0	-2.8	
1.851	14.9	H	0.98	9.25	23.15	33.0	-9.9	
Mid Ch								
1.880	20.2	V	0.98	9.15	28.41	33.0	-4.6	
1.880	16.1	H	0.98	9.15	24.23	33.0	-8.8	
High Ch								
1.910	20.3	V	0.98	9.05	28.36	33.0	-4.6	
1.910	18.4	H	0.98	9.05	26.43	33.0	-6.6	

Rev. 02.26.15

EGPRS, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/16/15
Test Engineer: R.Z
Configuration: EUT only
Mode: EDGE 1900MHz

Test Equipment:
Receiving: Horn T863 and Chamber H SMA Cables
Substitution: Horn T60 Substitution, and 8ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1.851	21.7	V	0.98	9.25	29.95	33.0	-3.1	
1.851	14.2	H	0.98	9.25	22.47	33.0	-10.5	
Mid Ch								
1.880	21.4	V	0.98	9.15	29.61	33.0	-3.4	
1.880	14.4	H	0.98	9.15	22.53	33.0	-10.5	
High Ch								
1.910	20.4	V	0.98	9.05	28.42	33.0	-4.6	
1.910	14.2	H	0.98	9.05	22.23	33.0	-10.8	

Rev. 02.26.15

10.1.2. CDMA2000

CDMA2000 1xRTT, 800MHz BC10

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/26/15
Test Engineer: R.Z
Configuration: EUT only
Mode: CDMA 1XRTT 800MHz

Test Equipment:
Receiving: Sunol T900, and Chamber H Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Notes
Low Ch								
817.25	19.21	V	0.6	0.0	18.59	50.00	-31.4	
817.25	21.88	H	0.6	0.0	21.27	50.00	-28.7	
Mid Ch								
820.00	19.25	V	0.6	0.0	18.63	50.00	-31.4	
820.00	22.15	H	0.6	0.0	21.54	50.00	-28.5	
High Ch								
822.75	18.82	V	0.6	0.0	18.20	50.00	-31.8	
822.75	21.95	H	0.6	0.0	21.33	50.00	-28.7	

Rev. 02.26.15

EVDO-Rev A, 800MHz BC10

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/26/15
Test Engineer: R.Z
Configuration: EUT only
Mode: CDMA Rev A 850MHz

Test Equipment:
Receiving: Sunol T900, and Chamber H Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes
Low Ch										
824.70	19.3	V	0.6	0.0	18.63	20.78	38.45	40.60	-19.8	
824.70	22.0	H	0.6	0.0	21.33	23.48	38.45	40.60	-17.1	
Mid Ch										
836.52	19.6	V	0.6	0.0	19.00	21.15	38.45	40.60	-19.4	
836.52	22.2	H	0.6	0.0	21.62	23.77	38.45	40.60	-16.8	
High Ch										
848.31	19.8	V	0.6	0.0	19.18	21.33	38.45	40.60	-19.3	
848.31	22.0	H	0.6	0.0	21.36	23.51	38.45	40.60	-17.1	

Rev. 02.26.15

CDMA2000 1xRTT, 850MHz BC0

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/26/15
Test Engineer: R.Z
Configuration: EUT only
Mode: CDMA 1XRTT 850MHz

Test Equipment:
Receiving: Sunol T900, and Chamber H Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes
Low Ch										
824.70	21.4	V	0.6	0.0	20.78	22.93	38.45	40.60	-17.7	
824.70	23.5	H	0.6	0.0	22.89	25.04	38.45	40.60	-15.6	
Mid Ch										
836.52	21.2	V	0.6	0.0	20.55	22.70	38.45	40.60	-17.9	
836.52	22.9	H	0.6	0.0	22.24	24.39	38.45	40.60	-16.2	
High Ch										
848.31	21.0	V	0.6	0.0	20.42	22.57	38.45	40.60	-18.0	
848.31	21.9	H	0.6	0.0	21.26	23.41	38.45	40.60	-17.2	

Rev. 02.26.15

EVDO-Rev A, 850MHz BC0

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/26/15
Test Engineer: R.Z
Configuration: EUT only
Mode: CDMA Rev A 850MHz

Test Equipment:
Receiving: Sunol T900, and Chamber H Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes
Low Ch										
824.70	21.5	V	0.6	0.0	20.88	23.03	38.45	40.60	-17.6	
824.70	23.6	H	0.6	0.0	22.98	25.13	38.45	40.60	-15.5	
Mid Ch										
836.52	21.3	V	0.6	0.0	20.65	22.80	38.45	40.60	-17.8	
836.52	23.0	H	0.6	0.0	22.39	24.54	38.45	40.60	-16.1	
High Ch										
848.31	21.2	V	0.6	0.0	20.53	22.68	38.45	40.60	-17.9	
848.31	22.0	H	0.6	0.0	21.34	23.49	38.45	40.60	-17.1	

Rev. 02.26.15

CDMA2000 1xRTT, 1900MHz BC1

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 14U19187
Date: 03/10/15
Test Engineer: Tony W
Configuration: EUT only
Mode: CDMA 1XRTT 1900MHz

Test Equipment:
Receiving: Horn T863 and Chamber F SMA Cables
Substitution: Horn T60 Substitution, and 6ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1.851	17.2	V	0.90	9.25	25.51	33.0	-7.5	
1.851	14.2	H	0.90	9.25	22.55	33.0	-10.5	
Mid Ch								
1.880	17.5	V	0.90	9.15	25.78	33.0	-7.2	
1.880	14.8	H	0.90	9.15	23.01	33.0	-10.0	
High Ch								
1.909	17.4	V	0.90	9.05	25.53	33.0	-7.5	
1.909	14.8	H	0.90	9.05	22.93	33.0	-10.1	

Rev. 02.26.15

EVDO-Rev A, 1900MHz BC1

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 14U19187
Date: 02/26/15
Test Engineer: R.Z
Configuration: EUT only
Mode: CDMA Rev A 1900MHz

Test Equipment:
Receiving: Horn T863 and Chamber F SMA Cables
Substitution: Horn T60 Substitution, and 6ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1.851	17.4	V	0.90	9.25	25.71	33.0	-7.3	
1.851	14.4	H	0.90	9.25	22.75	33.0	-10.3	
Mid Ch								
1.880	17.6	V	0.90	9.15	25.85	33.0	-7.2	
1.880	14.8	H	0.90	9.15	23.03	33.0	-10.0	
High Ch								
1.909	17.4	V	0.90	9.05	25.57	33.0	-7.4	
1.909	14.8	H	0.90	9.05	22.98	33.0	-10.0	

Rev. 02.26.15

CDMA2000 1xRTT, 1700MHz BC15

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 14U19187
Date: 03/10/15
Test Engineer: Tony W
Configuration: EUT only
Mode: CDMA 1XRTT 1700MHz

Test Equipment:
Receiving: Horn T863 and Chamber F SMA Cables
Substitution: Horn T60 Substitution, and 6ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1.711	18.2	V	0.90	8.35	25.60	30.0	-4.4	
1.711	13.1	H	0.90	8.35	20.58	30.0	-9.4	
Mid Ch								
1.733	17.6	V	0.90	8.61	25.32	30.0	-4.7	
1.733	12.3	H	0.90	8.61	19.99	30.0	-10.0	
High Ch								
1.754	16.3	V	0.90	8.87	24.28	30.0	-5.7	
1.754	11.2	H	0.90	8.87	19.18	30.0	-10.8	

Rev. 02.26.15

EVDO-Rev A, 1700MHz BC15

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 14U19187
Date: 03/10/15
Test Engineer: Tony W
Configuration: EUT only
Mode: CDMA Rev A 1700MHz

Test Equipment:
Receiving: Horn T863 and Chamber F SMA Cables
Substitution: Horn T60 Substitution, and 6ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1.711	18.2	V	0.90	8.35	25.68	30.0	-4.3	
1.711	13.0	H	0.90	8.35	20.48	30.0	-9.5	
Mid Ch								
1.733	17.7	V	0.90	8.61	25.36	30.0	-4.6	
1.733	12.2	H	0.90	8.61	19.89	30.0	-10.1	
High Ch								
1.754	16.5	V	0.90	8.87	24.48	30.0	-5.5	
1.754	11.3	H	0.90	8.87	19.26	30.0	-10.7	

Rev. 02.26.15

CDMA2000, REV B

2 CARRIER MIN

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/26/15
Test Engineer: R.Z
Configuration: EUT only
Mode: CDMA Rev B 2C Min Sep 850MHz

Test Equipment:
Receiving: Sunol T900, and Chamber H Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes
Low Ch										
825.3MHz (824.7 + 825.93MHz)	18.3	V	0.6	0.0	17.68	19.83	38.45	40.60	-20.8	
825.3MHz (824.7 + 825.93MHz)	20.0	H	0.6	0.0	19.38	21.53	38.45	40.60	-19.1	
Mid Ch										
837.2MHz (836.52+837.75MHz)	18.3	V	0.6	0.0	17.65	19.80	38.45	40.60	-20.8	
837.2MHz (836.52+837.75MHz)	19.8	H	0.6	0.0	19.14	21.29	38.45	40.60	-19.3	
High Ch										
847.6MHz (847.08+848.31MHz)	17.8	V	0.6	0.0	17.22	19.37	38.45	40.60	-21.2	
847.6MHz (847.08+848.31MHz)	19.4	H	0.6	0.0	18.76	20.91	38.45	40.60	-19.7	

Rev. 02.26.15

CDMA2000, REV B

2 CARRIER MAX

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/26/15
Test Engineer: R.Z
Configuration: EUT only
Mode: CDMA Rev B 2C Max Sep 850MHz

Test Equipment:
Receiving: Sunol T900, and Chamber H Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes
Low Ch										
825.3MHz (824.7 + 825.93MHz)	17.8	V	0.6	0.0	17.18	19.33	38.45	40.60	-21.3	
825.3MHz (824.7 + 825.93MHz)	20.0	H	0.6	0.0	19.33	21.48	38.45	40.60	-19.1	
Mid Ch										
837.2MHz (836.52+837.75MHz)	18.4	V	0.6	0.0	17.75	19.90	38.45	40.60	-20.7	
837.2MHz (836.52+837.75MHz)	19.8	H	0.6	0.0	19.14	21.29	38.45	40.60	-19.3	
High Ch										
847.6MHz (847.08+848.31MHz)	17.7	V	0.6	0.0	17.12	19.27	38.45	40.60	-21.3	
847.6MHz (847.08+848.31MHz)	19.7	H	0.6	0.0	19.06	21.21	38.45	40.60	-19.4	

Rev. 02.26.15

CDMA2000, REV B

3 CARRIER MIN

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/26/15
Test Engineer: R.Z
Configuration: EUT only
Mode: CDMA Rev B 3C Min Sep 850MHz

Test Equipment:
Receiving: Sunol T900, and Chamber H Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes
Low Ch										
825.3MHz (824.7 + 825.93MHz)	18.4	V	0.6	0.0	17.74	19.89	38.45	40.60	-20.7	
825.3MHz (824.7 + 825.93MHz)	20.3	H	0.6	0.0	19.63	21.78	38.45	40.60	-18.8	
Mid Ch										
837.2MHz (836.52+837.75MHz)	18.6	V	0.6	0.0	17.95	20.10	38.45	40.60	-20.5	
837.2MHz (836.52+837.75MHz)	19.9	H	0.6	0.0	19.24	21.39	38.45	40.60	-19.2	
High Ch										
847.6MHz (847.08+848.31MHz)	18.0	V	0.6	0.0	17.42	19.57	38.45	40.60	-21.0	
847.6MHz (847.08+848.31MHz)	19.8	H	0.6	0.0	19.16	21.31	38.45	40.60	-19.3	

Rev. 02.26.15

10.1.3. UMTS

UMTS REL 99, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/16/15
Test Engineer: R.Z
Configuration: EUT only
Mode: WCDMA Rel 99 850MHz

Test Equipment:
Receiving: Sunol T900, and Chamber H Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes
Low Ch										
826.40	21.4	V	0.6	0.0	20.78	22.93	38.45	40.60	-17.7	
826.40	22.4	H	0.6	0.0	21.81	23.96	38.45	40.60	-16.6	
Mid Ch										
836.00	21.2	V	0.6	0.0	20.55	22.70	38.45	40.60	-17.9	
836.00	22.9	H	0.6	0.0	22.24	24.39	38.45	40.60	-16.2	
High Ch										
846.00	22.3	V	0.6	0.0	21.72	23.87	38.45	40.60	-16.7	
846.00	22.7	H	0.6	0.0	22.06	24.21	38.45	40.60	-16.4	

Rev. 06.18.14

UMTS HSDPA, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 03/10/15
Test Engineer: R.Z
Configuration: EUT only
Mode: WCDMA DC HSDPA 850MHz

Test Equipment:
Receiving: Sunol T900, and Chamber H Cable
Substitution: Dipole S/N: 00022117, 8ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes
Low Ch										
826.40	19.4	V	0.6	0.0	18.78	20.93	38.45	40.60	-19.7	
826.40	20.8	H	0.6	0.0	20.13	22.28	38.45	40.60	-18.3	
Mid Ch										
836.00	19.5	V	0.6	0.0	18.85	21.00	38.45	40.60	-19.6	
836.00	20.1	H	0.6	0.0	19.44	21.59	38.45	40.60	-19.0	
High Ch										
846.00	18.9	V	0.6	0.0	18.32	20.47	38.45	40.60	-20.1	
846.00	20.7	H	0.6	0.0	20.06	22.21	38.45	40.60	-18.4	

Rev. 06.18.14

UMTS REL 99, 1700MHz BAND 4

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/16/15
Test Engineer: R.Z
Configuration: EUT only
Mode: WCDMA Rel 99 1700MHz

Test Equipment:
Receiving: Horn T863 and Chamber H SMA Cables
Substitution: Horn T60 Substitution, and 8ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1.712	18.3	V	0.95	8.36	25.68	30.0	-4.3	
1.712	14.1	H	0.95	8.36	21.54	30.0	-8.5	
Mid Ch								
1.733	18.3	V	0.95	8.61	25.93	30.0	-4.1	
1.733	13.8	H	0.95	8.61	21.51	30.0	-8.5	
High Ch								
1.753	17.3	V	0.95	8.85	25.18	30.0	-4.8	
1.753	12.9	H	0.95	8.85	20.80	30.0	-9.2	

Rev. 02.26.15

UMTS HSDPA, 1700MHz BAND 4

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 02/16/15
Test Engineer: R.Z
Configuration: EUT only
Mode: WCDMA DC HSDPA 1700MHz

Test Equipment:
Receiving: Horn T863 and Chamber H SMA Cables
Substitution: Horn T60 Substitution, and 8ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1.712	17.4	V	0.95	8.36	24.78	30.0	-5.2	
1.712	13.9	H	0.95	8.36	21.34	30.0	-8.7	
Mid Ch								
1.733	17.1	V	0.95	8.61	24.73	30.0	-5.3	
1.733	12.7	H	0.95	8.61	20.41	30.0	-9.6	
High Ch								
1.753	16.3	V	0.95	8.85	24.18	30.0	-5.8	
1.753	12.9	H	0.95	8.85	20.80	30.0	-9.2	

Rev. 02.26.15

UMTS REL 99, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 03/10/15
Test Engineer: R.Z
Configuration: EUT only
Mode: WCDMA Rel 99 1900MHz

Test Equipment:
Receiving: Horn T863 and Chamber H SMA Cables
Substitution: Horn T60 Substitution, and 8ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1.852	17.5	V	0.98	9.24	25.72	33.0	-7.3	
1.852	11.5	H	0.98	9.24	19.76	33.0	-13.2	
Mid Ch								
1.880	17.7	V	0.98	9.15	25.84	33.0	-7.2	
1.880	12.1	H	0.98	9.15	20.23	33.0	-12.8	
High Ch								
1.908	17.6	V	0.98	9.06	25.67	33.0	-7.3	
1.908	12.0	H	0.98	9.06	20.04	33.0	-13.0	

Rev. 02.26.15

UMTS HSDPA, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber H

Company:
Project #: 14U19187
Date: 03/10/15
Test Engineer: R.Z
Configuration: EUT only
Mode: WCDMA DC HSDPA 1900MHz

Test Equipment:
Receiving: Horn T863 and Chamber H SMA Cables
Substitution: Horn T60 Substitution, and 8ft SMA Cable

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1.852	16.8	V	0.98	9.24	25.02	33.0	-8.0	
1.852	10.2	H	0.98	9.24	18.46	33.0	-14.5	
Mid Ch								
1.880	16.7	V	0.98	9.15	24.90	33.0	-8.1	
1.880	11.8	H	0.98	9.15	19.93	33.0	-13.1	
High Ch								
1.908	16.7	V	0.98	9.06	24.73	33.0	-8.3	
1.908	12.7	H	0.98	9.06	20.74	33.0	-12.3	

Rev. 02.26.15

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.

Peak-To-Average Ratio:

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
GSM850	GPRS	33.48	33.23	0.25
	EGPRS	31.04	27.79	3.25
*Peak Reading = Average Reading + Peak-to-Average Ratio				

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
GSM1900	GPRS	30.74	30.39	0.35
	EGPRS	29.89	26.81	3.08
*Peak Reading = Average Reading + Peak-to-Average Ratio				

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
CDMA2000 BC0	1xRTT	29.16	24.42	4.74
	EVDO A	29.9	24.47	5.43
*Peak Reading = Average Reading + Peak-to-Average Ratio				

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
CDMA2000 BC1	1xRTT	28.64	23.95	4.69
	EVDO A	29.46	23.99	5.47
*Peak Reading = Average Reading + Peak-to-Average Ratio				

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
CDMA2000 BC15	1xRTT	29.12	24.43	4.69
	EVDO A	30.08	24.49	5.59
*Peak Reading = Average Reading + Peak-to-Average Ratio				

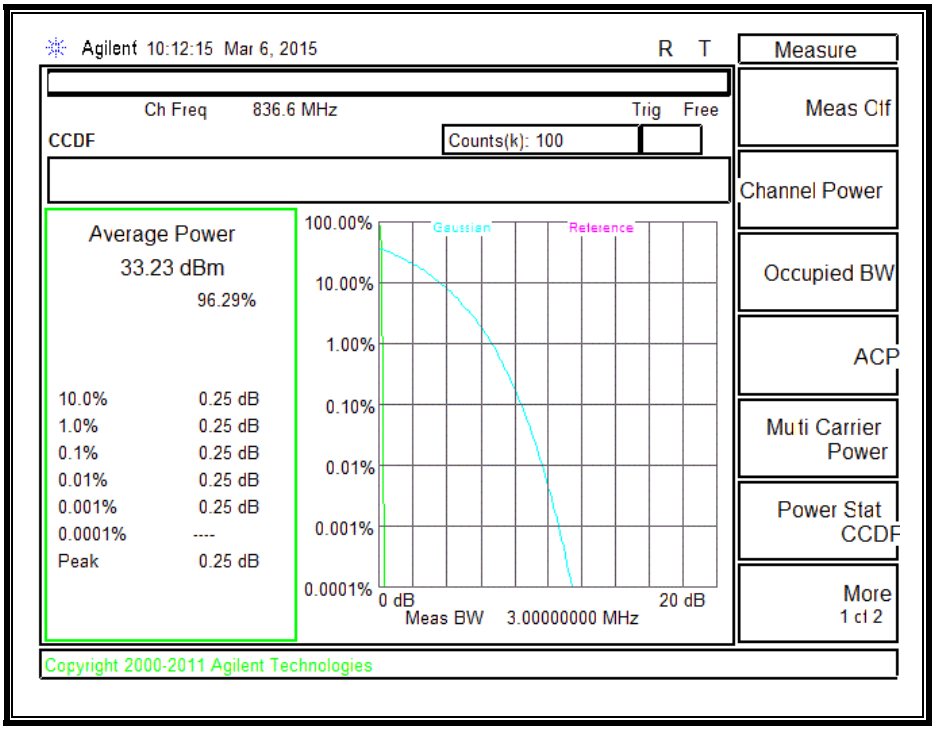
Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
CDMA2000 BC10	1xRTT	28.94	24.95	3.99
	EVDO A	28.98	24.95	4.03
*Peak Reading = Average Reading + Peak-to-Average Ratio				

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
UMTS Band 5	REL99	28.22	24.92	3.3
	HSDPA	28.14	24.15	3.99
*Peak Reading = Average Reading + Peak-to-Average Ratio				

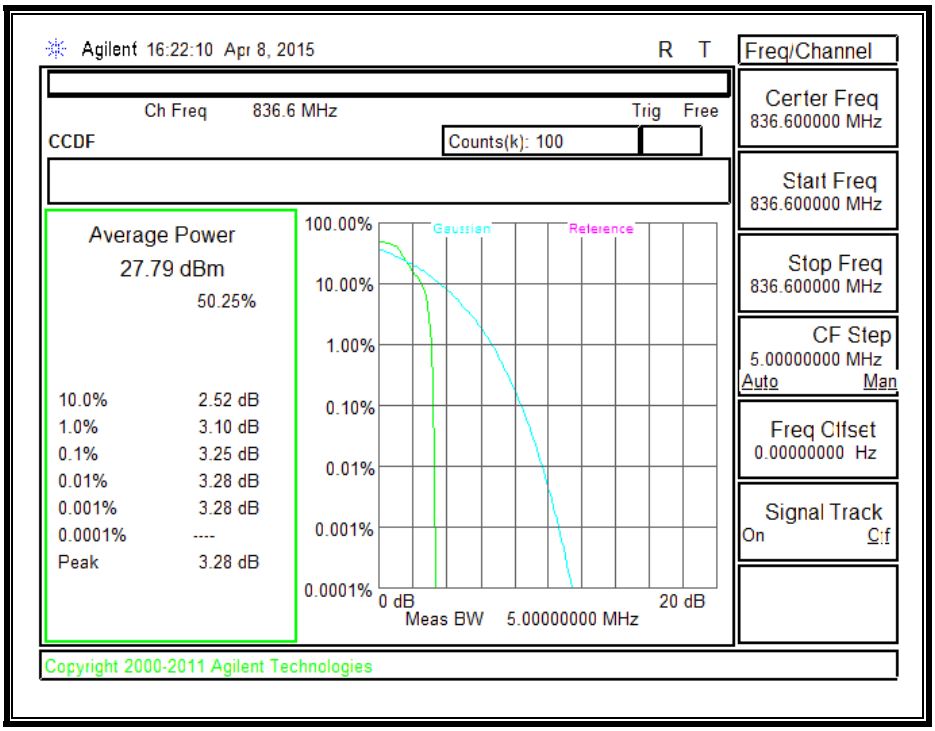
Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
UMTS Band 4	REL99	27.59	24.46	3.13
	HSDPA	27.08	23.21	3.87
*Peak Reading = Average Reading + Peak-to-Average Ratio				

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
		*Peak	Average	
UMTS Band 2	REL99	27.2	23.98	3.22
	HSDPA	26.88	22.98	3.9
*Peak Reading = Average Reading + Peak-to-Average Ratio				

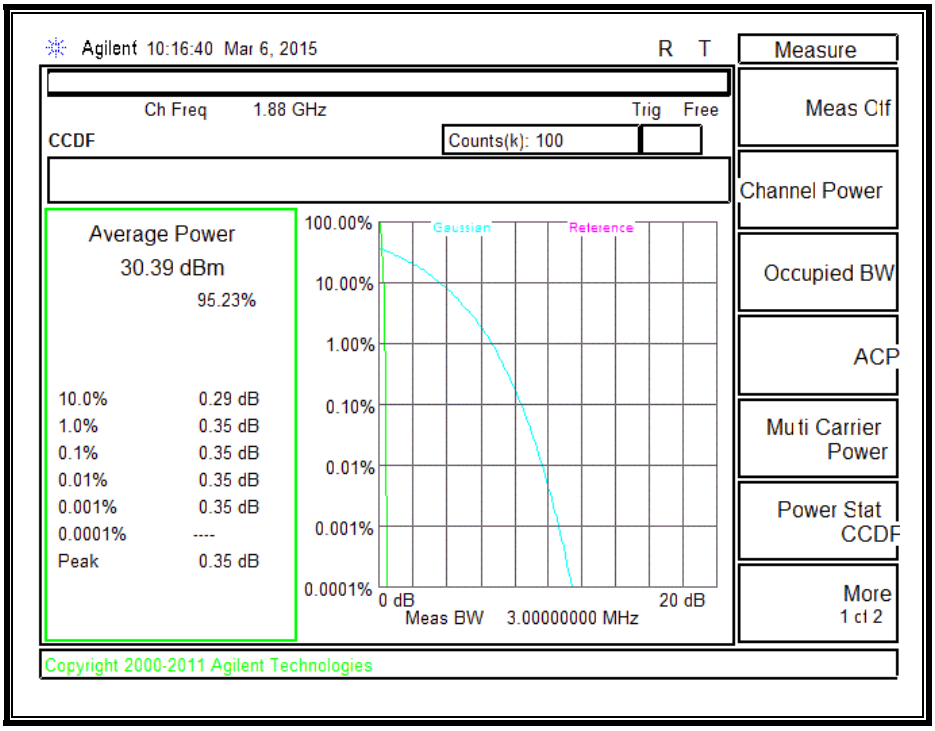
GSM850, GPRS



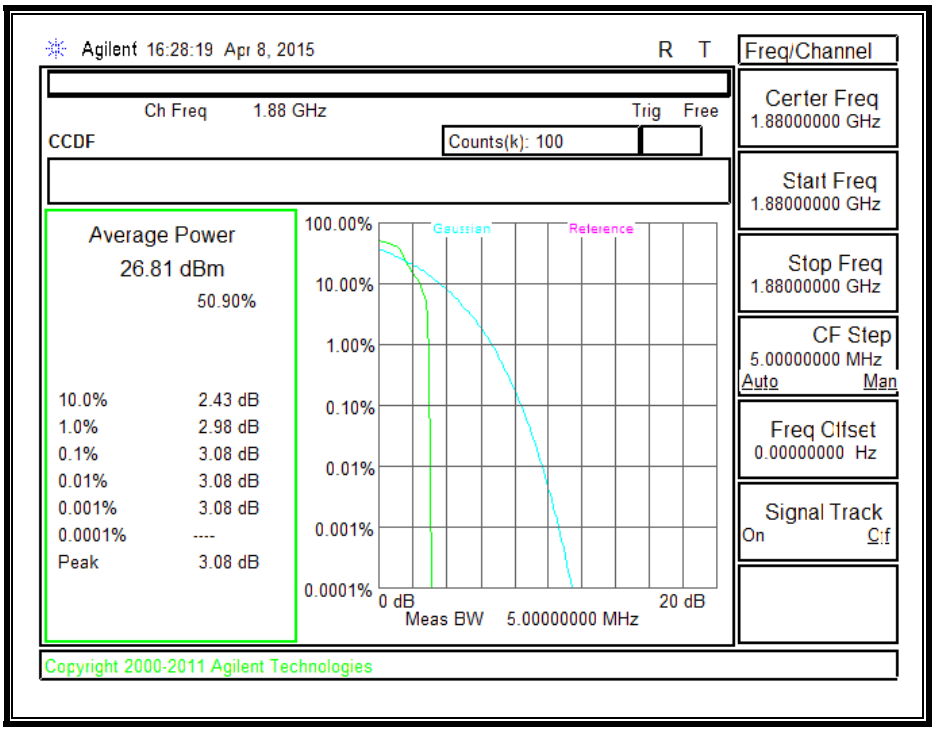
GSM850, EGPRS



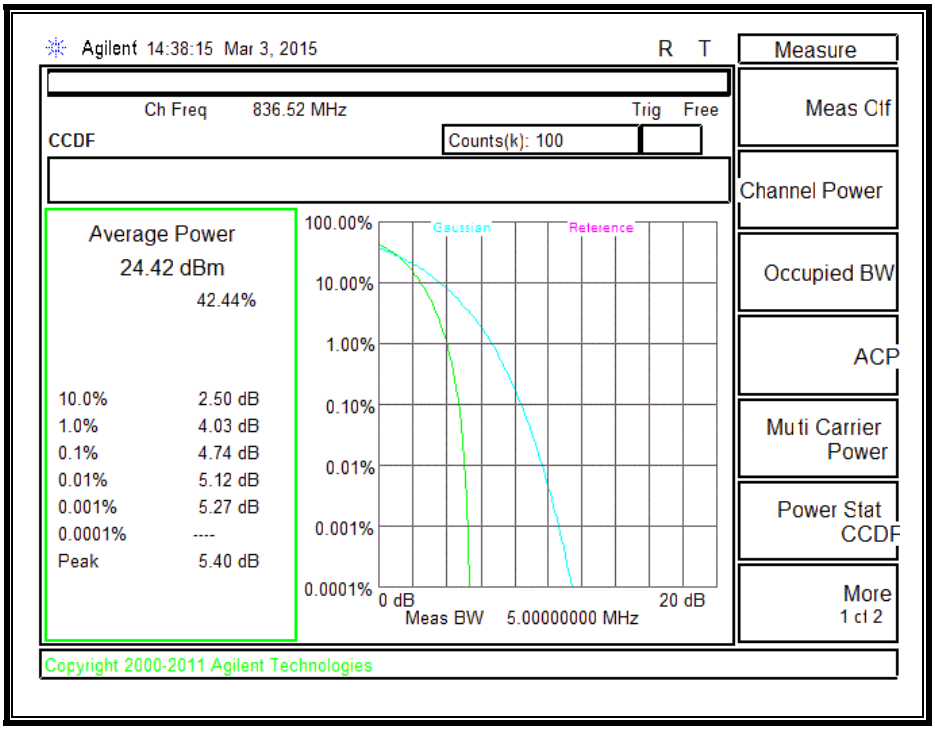
GSM1900, GPRS



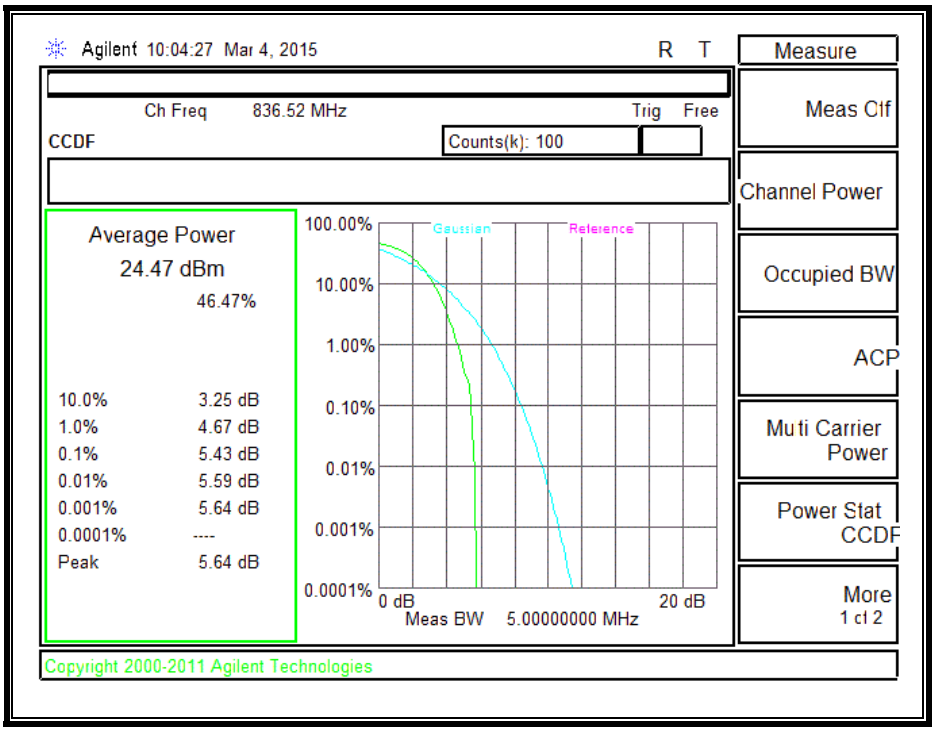
GSM1900, EGPRS



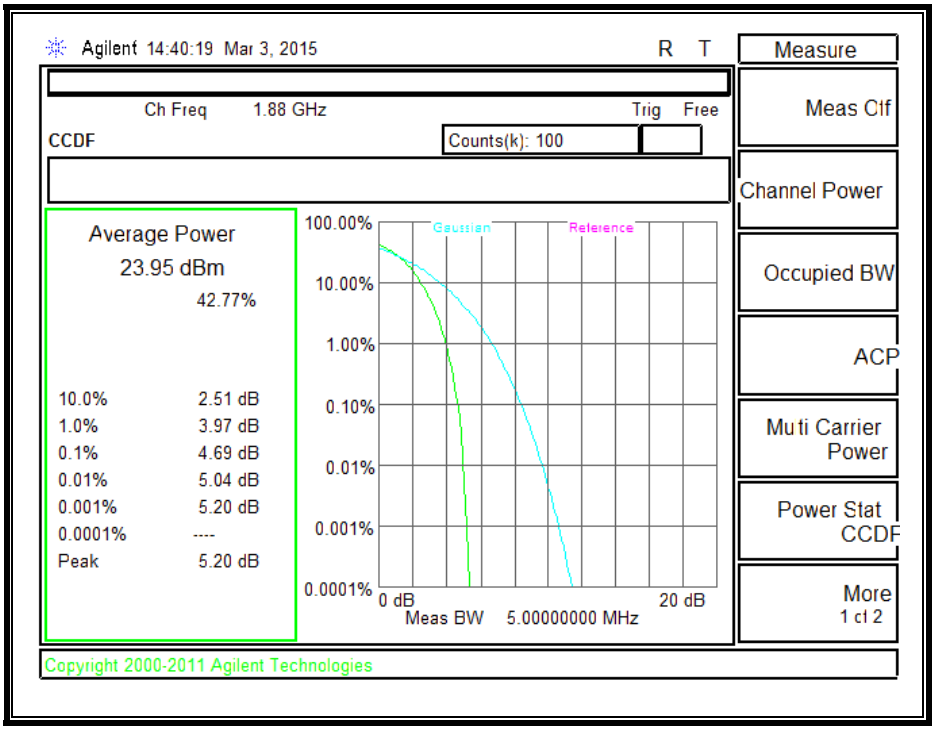
BC 0, 1xRTT



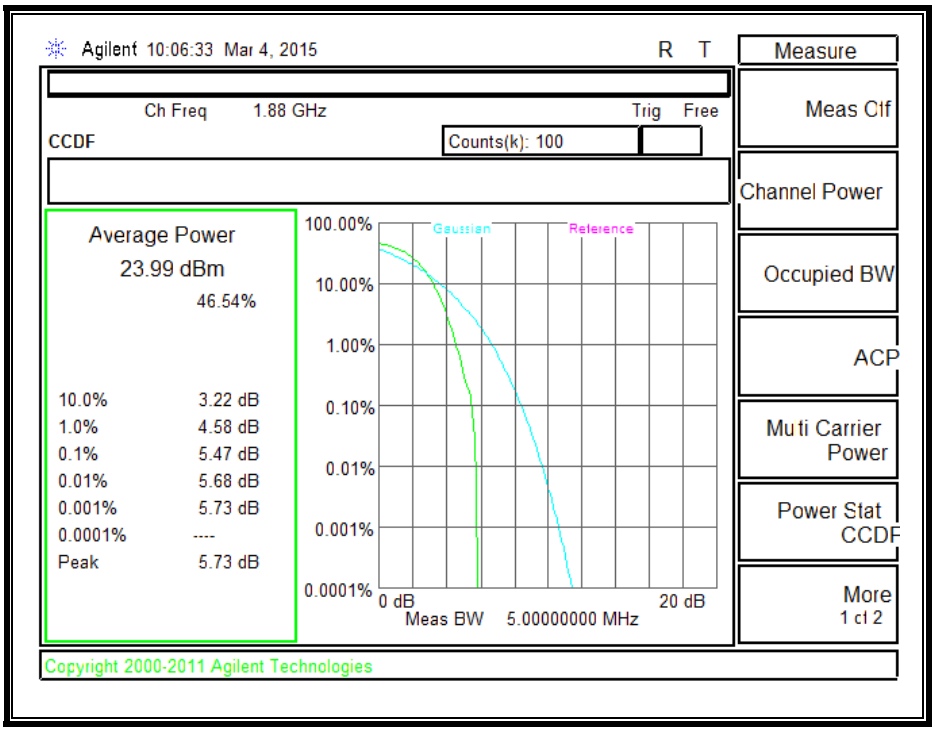
BC 0, EVDO A



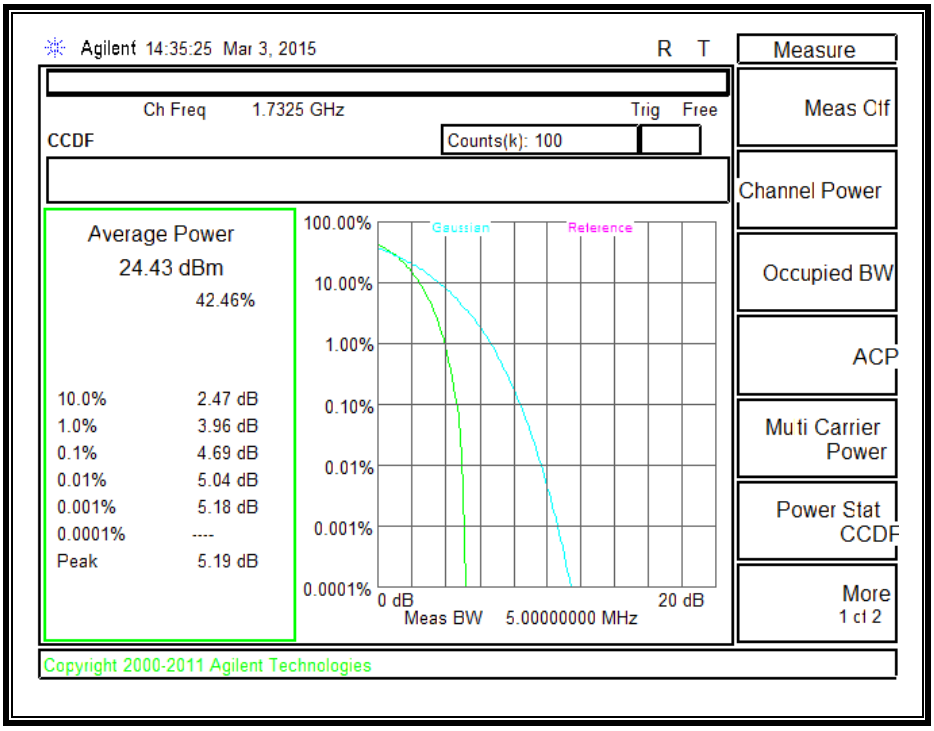
BC 1, 1xRTT



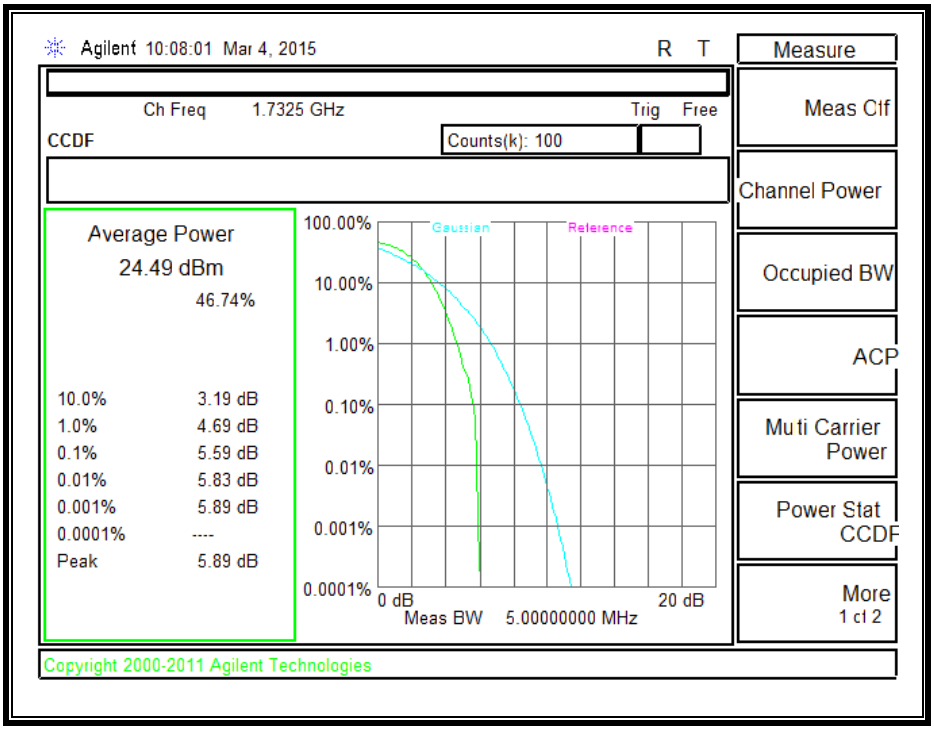
BC 1, EVDO A



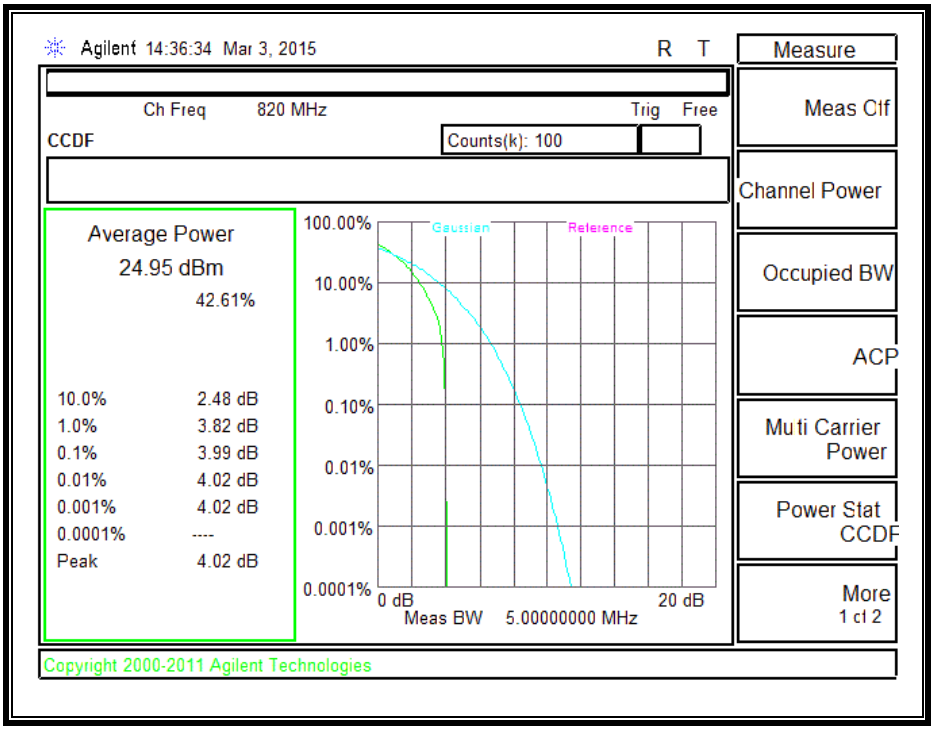
BC15, 1xRTT



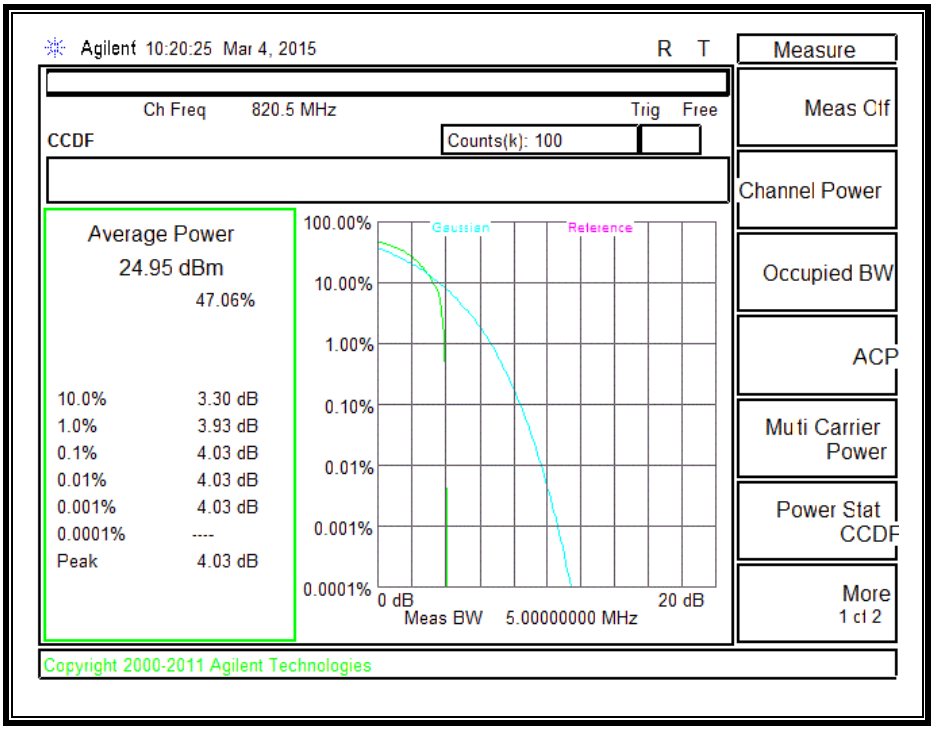
BC15, EVDO A



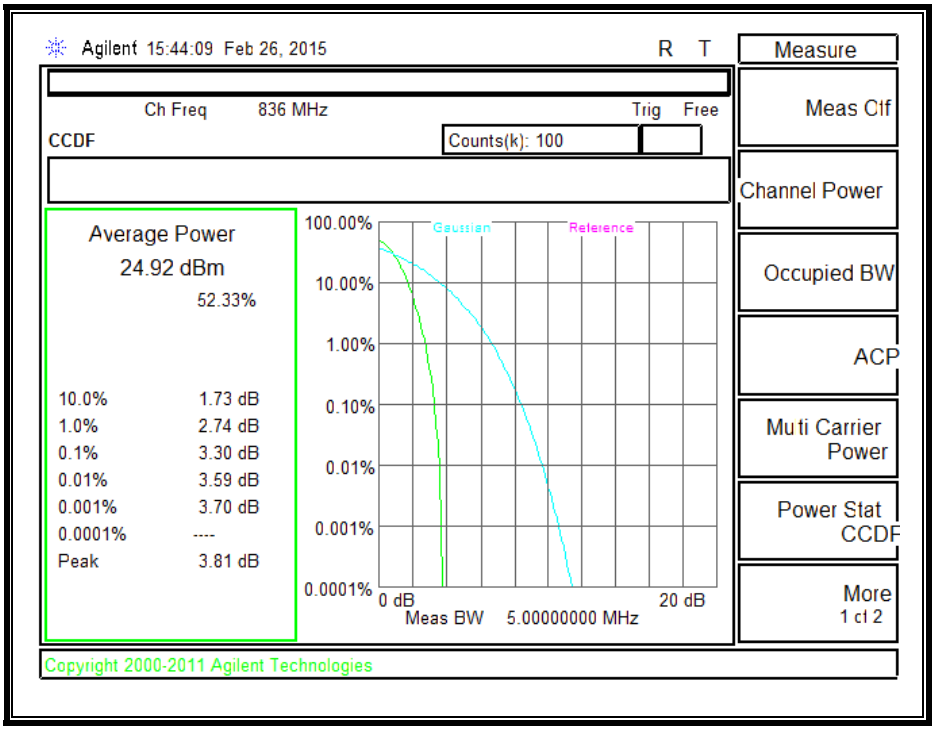
BC10, 1xRTT



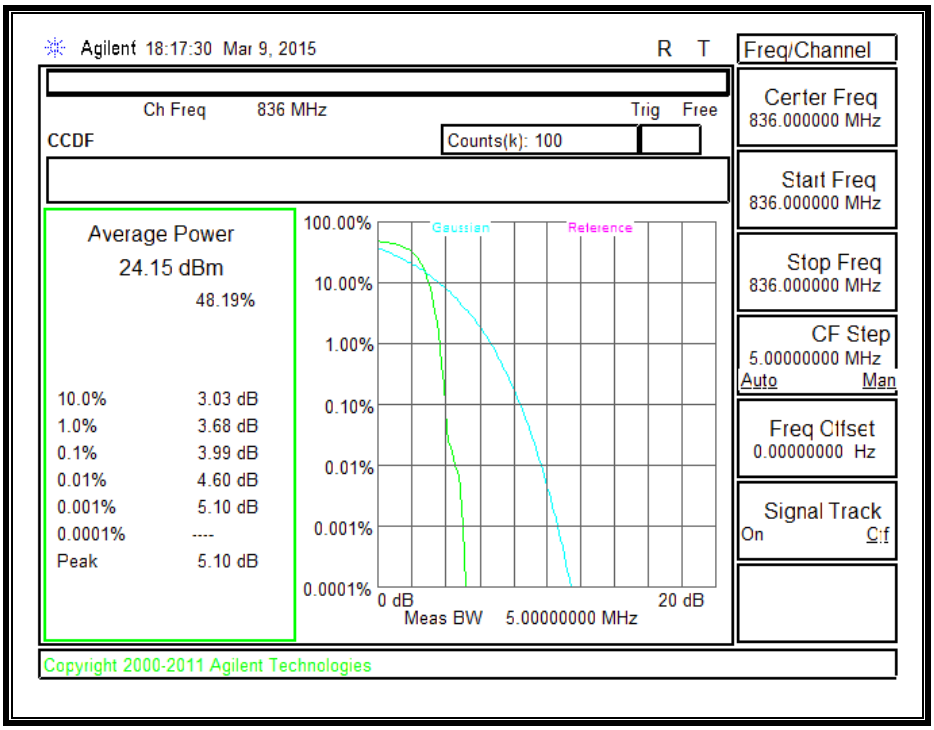
BC10, EVDO A



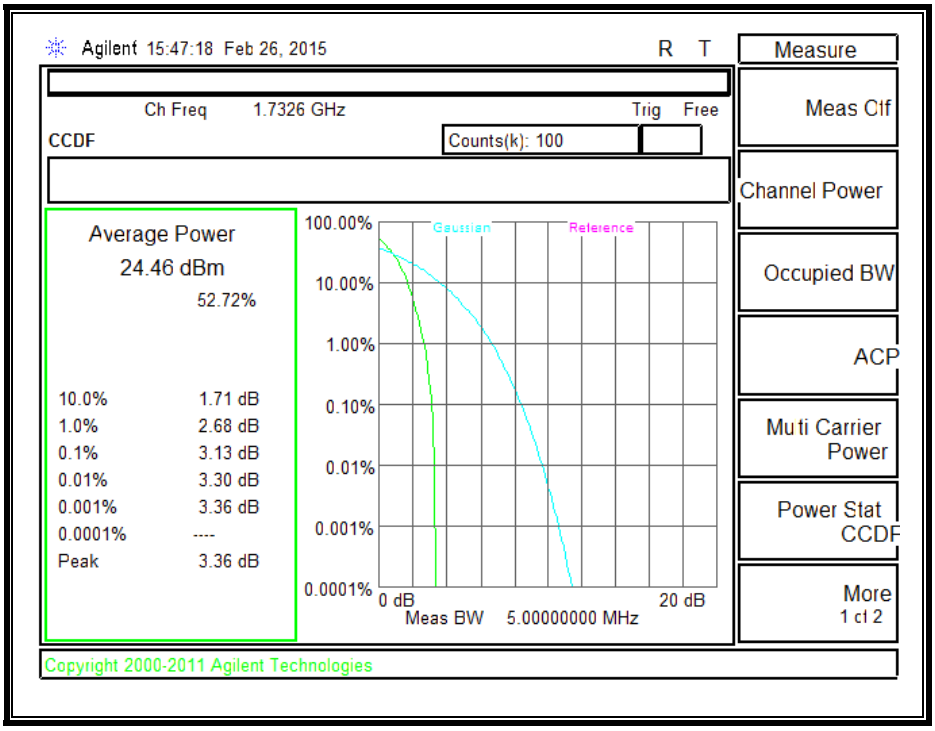
UMTS850, REL 99 BAND 5



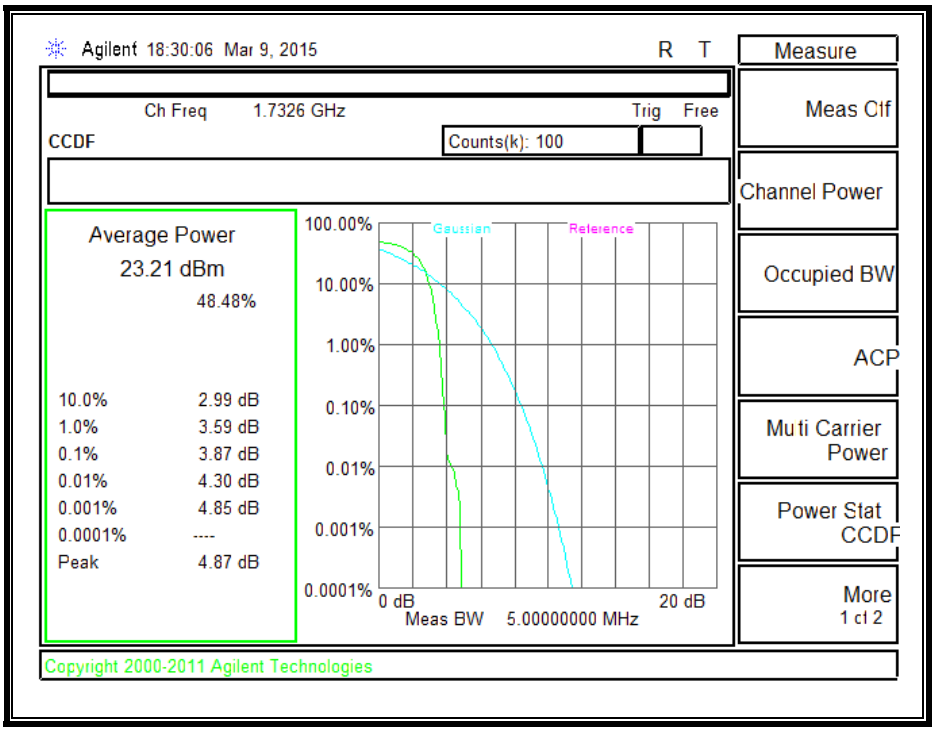
UMTS 850, HSDPA BAND 5



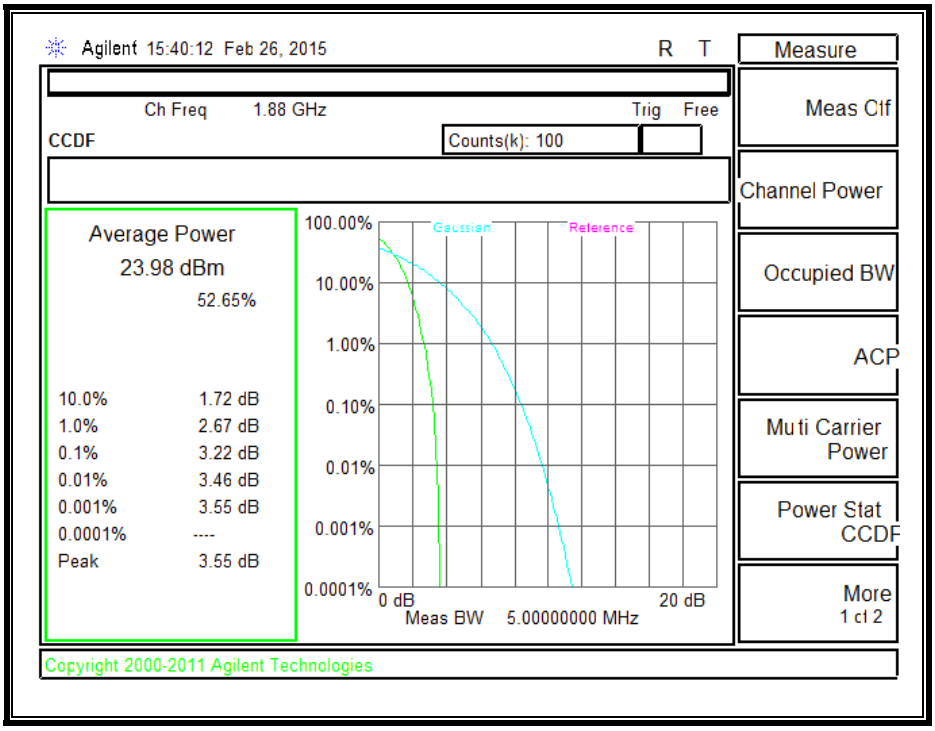
UMTS 1700, REL99 BAND 4



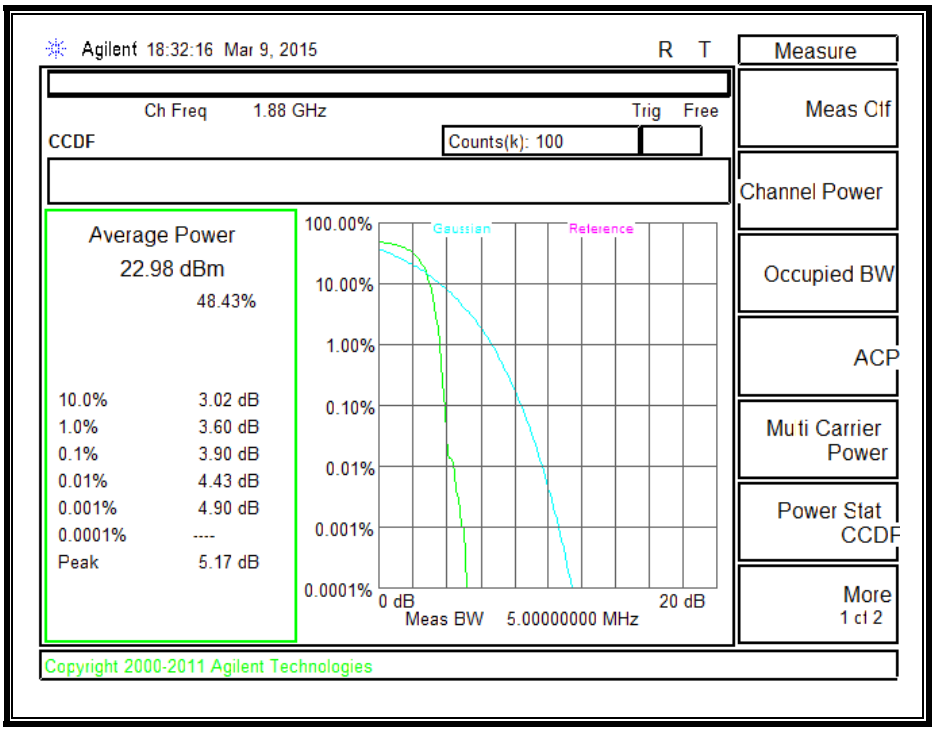
UMTS 1700, HSDPA BAND 4



UMTS 1900, REL99 BAND 2



UMTS 1900, HSDPA BAND 2



10.1. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53 and §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.

§27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB

§90.691 Emission mask requirements for EA-based systems.

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

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

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

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

TEST PROCEDURE

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

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve

measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

MODES TESTED

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

RESULTS

10.1.1. GSM

GPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/16/15
Test Engineer: F. Guarnero
Configuration: EUT Only
Mode: GPRS 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 22

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.2MHz)										
1.648	-54.5	H	3.0	-10.8	33.7	1.0	-43.5	-13.0	-30.5	
2.473	-63.9	H	3.0	-16.5	34.1	1.0	-49.6	-13.0	-36.6	
1.650	-58.2	V	3.0	-12.2	33.7	1.0	-44.9	-13.0	-31.9	
2.473	-63.4	V	3.0	-15.3	34.1	1.0	-48.4	-13.0	-35.4	
Mid Channel (836.6MHz)										
1.673	-52.1	H	3.0	-8.1	33.7	1.0	-40.8	-13.0	-27.8	
2.510	-65.0	H	3.0	-17.5	34.1	1.0	-50.6	-13.0	-37.6	
1.673	-57.1	V	3.0	-11.1	33.7	1.0	-43.8	-13.0	-30.8	
2.510	-66.3	V	3.0	-18.3	34.1	1.0	-51.4	-13.0	-38.4	
High Channel (848.8MHz)										
1.698	-55.7	H	3.0	-11.5	33.7	1.0	-44.2	-13.0	-31.2	
2.548	-64.2	H	3.0	-16.6	34.2	1.0	-49.7	-13.0	-36.7	
1.698	-57.3	V	3.0	-11.2	33.7	1.0	-43.8	-13.0	-30.8	
2.546	-65.4	V	3.0	-17.2	34.2	1.0	-50.3	-13.0	-37.3	

Rev. 09.18.14

EGPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/16/15
Test Engineer: F. Guarnero
Configuration: EUT Only
Mode: EGPRS 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 22

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.2MHz)										
1.649	-56.2	H	3.0	-12.5	33.7	1.0	-45.2	-13.0	-32.2	
2.472	-66.2	H	3.0	-18.8	34.1	1.0	-51.9	-13.0	-38.9	
1.649	-56.2	V	3.0	-10.2	33.7	1.0	-42.9	-13.0	-29.9	
2.472	-67.2	V	3.0	-19.1	34.1	1.0	-52.2	-13.0	-39.2	
Mid Channel (836.6MHz)										
1.674	-55.1	H	3.0	-11.1	33.7	1.0	-43.8	-13.0	-30.8	
2.510	-66.3	H	3.0	-18.8	34.1	1.0	-51.9	-13.0	-38.9	
1.674	-57.4	V	3.0	-11.3	33.7	1.0	-44.0	-13.0	-31.0	
2.510	-67.3	V	3.0	-19.2	34.1	1.0	-52.3	-13.0	-39.3	
High Channel (848.8MHz)										
1.698	-57.5	H	3.0	-13.3	33.7	1.0	-46.0	-13.0	-33.0	
2.546	-68.2	H	3.0	-20.6	34.2	1.0	-53.7	-13.0	-40.7	
1.698	-61.1	V	3.0	-15.0	33.7	1.0	-47.6	-13.0	-34.6	
2.546	-66.4	V	3.0	-18.2	34.2	1.0	-51.3	-13.0	-38.3	

Rev. 09.18.14

GPRS, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/17/15
Test Engineer: T Wang
Configuration: EUT Only
Mode: GPRS 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 24

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.700	-68.5	H	3.0	-17.5	34.4	1.0	-50.9	-13.0	-37.9	
5.551	-69.3	H	3.0	-15.6	34.1	1.0	-48.7	-13.0	-35.7	
3.700	-67.0	V	3.0	-15.9	34.4	1.0	-49.3	-13.0	-36.3	
5.551	-68.6	V	3.0	-14.7	34.1	1.0	-47.8	-13.0	-34.8	
Mid Channel (1880.0)										
3.760	-68.0	H	3.0	-16.8	34.4	1.0	-50.2	-13.0	-37.2	
5.640	-70.7	H	3.0	-16.9	34.1	1.0	-50.0	-13.0	-37.0	
3.760	-66.7	V	3.0	-15.4	34.4	1.0	-48.8	-13.0	-35.8	
5.640	-69.4	V	3.0	-15.4	34.1	1.0	-48.5	-13.0	-35.5	
High Channel (1909.8MHz)										
3.820	-68.6	H	3.0	-17.3	34.4	1.0	-50.7	-13.0	-37.7	
5.729	-69.7	H	3.0	-15.7	34.1	1.0	-48.8	-13.0	-35.8	
3.820	-67.6	V	3.0	-16.2	34.4	1.0	-49.6	-13.0	-36.6	
5.729	-70.0	V	3.0	-15.9	34.1	1.0	-49.0	-13.0	-36.0	

Rev. 09.05.14

EGPRS, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/17/15
Test Engineer: T. Wang
Configuration: EUT Only
Mode: EGPRS 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 24

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.70	-68.9	H	3.0	-17.9	34.4	1.0	-51.3	-13.0	-38.3	
5.55	-69.2	H	3.0	-15.5	34.1	1.0	-48.6	-13.0	-35.6	
3.70	-68.8	V	3.0	-17.7	34.4	1.0	-51.1	-13.0	-38.1	
5.55	-69.3	V	3.0	-15.4	34.1	1.0	-48.5	-13.0	-35.5	
Mid Channel (1880.0)										
3.76	-68.6	H	3.0	-17.4	34.4	1.0	-50.8	-13.0	-37.8	
5.64	-69.5	H	3.0	-15.7	34.1	1.0	-48.8	-13.0	-35.8	
3.76	-67.9	V	3.0	-16.6	34.4	1.0	-50.0	-13.0	-37.0	
5.64	-69.6	V	3.0	-15.6	34.1	1.0	-48.7	-13.0	-35.7	
High Channel (1909.8MHz)										
3.82	-69.7	H	3.0	-18.4	34.4	1.0	-51.8	-13.0	-38.8	
5.73	-70.4	H	3.0	-16.4	34.1	1.0	-49.5	-13.0	-36.5	
3.82	-69.3	V	3.0	-17.9	34.4	1.0	-51.3	-13.0	-38.3	
5.73	-70.1	V	3.0	-16.0	34.1	1.0	-49.1	-13.0	-36.1	

Rev. 09.05.14

10.1.2. CDMA2000

CDMA2000 1xRTT, 850MHz BC0

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/23/15
Test Engineer: T Wang
Configuration: EUT Only
Mode: 1xRTT 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 22

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.7MHz)										
1.649	-66.2	H	3.0	-22.2	34.6	1.0	-55.8	-13.0	-42.8	
2.474	-66.8	H	3.0	-19.5	34.1	1.0	-52.5	-13.0	-39.5	
1.649	-66.0	V	3.0	-21.3	34.6	1.0	-54.8	-13.0	-41.8	
2.474	-66.6	V	3.0	-18.6	34.1	1.0	-51.7	-13.0	-38.7	
Mid Channel (836.52MHz)										
1.673	-66.4	H	3.0	-22.3	34.5	1.0	-55.9	-13.0	-42.9	
2.510	-66.5	H	3.0	-19.0	34.1	1.0	-52.1	-13.0	-39.1	
1.673	-66.2	V	3.0	-21.4	34.5	1.0	-54.9	-13.0	-41.9	
2.510	-66.8	V	3.0	-18.7	34.1	1.0	-51.8	-13.0	-38.8	
High Channel (848.31MHz)										
1.697	-66.7	H	3.0	-22.5	34.5	1.0	-56.1	-13.0	-43.1	
2.545	-66.4	H	3.0	-18.8	34.2	1.0	-51.9	-13.0	-38.9	
1.697	-66.8	V	3.0	-21.9	34.5	1.0	-55.4	-13.0	-42.4	
2.545	-65.7	V	3.0	-17.5	34.2	1.0	-50.6	-13.0	-37.6	

Rev. 09.05.14

EVDO-Rev A, 850MHz BC0

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/23/15
Test Engineer: F. Guarnero
Configuration: EUT Only
Mode: EVDO Rev A 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 22

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.7MHz)										
1.649	-66.4	H	3.0	-22.6	33.7	1.0	-55.3	-13.0	-42.3	
2.474	-67.1	H	3.0	-19.6	34.1	1.0	-52.7	-13.0	-39.7	
1.649	-67.0	V	3.0	-21.0	33.7	1.0	-53.7	-13.0	-40.7	
2.474	-68.0	V	3.0	-19.9	34.1	1.0	-53.0	-13.0	-40.0	
Mid Channel (836.52MHz)										
1.673	-66.4	H	3.0	-22.5	33.7	1.0	-55.2	-13.0	-42.2	
2.510	-67.5	H	3.0	-20.0	34.1	1.0	-53.1	-13.0	-40.1	
1.673	-67.4	V	3.0	-21.3	33.7	1.0	-54.0	-13.0	-41.0	
2.510	-67.5	V	3.0	-19.4	34.1	1.0	-52.5	-13.0	-39.5	
High Channel (848.31MHz)										
1.697	-67.8	H	3.0	-23.6	33.7	1.0	-56.3	-13.0	-43.3	
2.545	-67.3	H	3.0	-19.7	34.2	1.0	-52.9	-13.0	-39.9	
1.697	-67.4	V	3.0	-21.2	33.7	1.0	-53.9	-13.0	-40.9	
2.545	-67.2	V	3.0	-19.0	34.2	1.0	-52.2	-13.0	-39.2	

Rev. 09.05.14

CDMA2000 1xRTT, 1900MHz BC1

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/23/15
Test Engineer: T Wang
Configuration: EUT Only
Mode: 1xRTT 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 24

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1851.25MHz)										
3.703	-65.9	H	3.0	-14.9	34.4	1.0	-48.3	-13.0	-35.3	
5.554	-67.0	H	3.0	-13.3	34.1	1.0	-46.4	-13.0	-33.4	
3.703	-66.6	V	3.0	-15.5	34.4	1.0	-48.9	-13.0	-35.9	
5.554	-66.7	V	3.0	-12.8	34.1	1.0	-45.9	-13.0	-32.9	
Mid Channel (1880MHz)										
3.760	-65.2	H	3.0	-14.0	34.4	1.0	-47.4	-13.0	-34.4	
5.640	-66.6	H	3.0	-12.8	34.1	1.0	-45.9	-13.0	-32.9	
3.760	-65.9	V	3.0	-14.6	34.4	1.0	-48.0	-13.0	-35.0	
5.640	-67.4	V	3.0	-13.4	34.1	1.0	-46.5	-13.0	-33.5	
High Channel (1908.75MHz)										
3.818	-65.9	H	3.0	-14.6	34.4	1.0	-48.0	-13.0	-35.0	
5.726	-67.5	H	3.0	-13.6	34.1	1.0	-46.7	-13.0	-33.7	
3.818	-66.1	V	3.0	-14.7	34.4	1.0	-48.1	-13.0	-35.1	
5.726	-66.8	V	3.0	-12.7	34.1	1.0	-45.8	-13.0	-32.8	

Rev. 09.05.14

EVDO-Rev A, 1900MHz BC1

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/23/15
Test Engineer: F. Guarnero
Configuration: EUT Only
Mode: EVDO RevA 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 24

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1851.25MHz)										
3.703	-68.3	H	3.0	-17.3	34.4	1.0	-50.8	-13.0	-37.8	
5.554	-69.3	H	3.0	-15.6	34.1	1.0	-48.7	-13.0	-35.7	
3.703	-69.3	V	3.0	-18.1	34.4	1.0	-51.6	-13.0	-38.6	
5.554	-68.4	V	3.0	-14.5	34.1	1.0	-47.6	-13.0	-34.6	
Mid Channel (1880MHz)										
3.760	-68.5	H	3.0	-17.3	34.4	1.0	-50.7	-13.0	-37.7	
5.640	-69.4	H	3.0	-15.6	34.1	1.0	-48.7	-13.0	-35.7	
3.760	-67.0	V	3.0	-15.7	34.4	1.0	-49.1	-13.0	-36.1	
5.640	-68.0	V	3.0	-14.0	34.1	1.0	-47.1	-13.0	-34.1	
High Channel (1908.75MHz)										
3.818	-67.8	H	3.0	-16.5	34.4	1.0	-49.9	-13.0	-36.9	
5.726	-68.3	H	3.0	-14.3	34.1	1.0	-47.4	-13.0	-34.4	
3.818	-67.2	V	3.0	-15.8	34.4	1.0	-49.2	-13.0	-36.2	
5.726	-68.1	V	3.0	-14.0	34.1	1.0	-47.1	-13.0	-34.1	

Rev. 09.05.14

CDMA2000 1xRTT, 1700MHz BC15

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/23/15
Test Engineer: T Wang
Configuration: EUT Only
Mode: 1xRTT 1700MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 27

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1711.25MHz)										
3.423	-65.4	H	3.0	-15.1	34.6	1.0	-48.7	-13.0	-35.7	
5.114	-66.3	H	3.0	-13.2	34.2	1.0	-46.4	-13.0	-33.4	
3.423	-61.1	V	3.0	-10.6	34.6	1.0	-44.2	-13.0	-31.2	
5.114	-66.9	V	3.0	-13.5	34.2	1.0	-46.7	-13.0	-33.7	
Mid Channel (1732.5MHz)										
3.465	-67.1	H	3.0	-16.7	34.6	1.0	-50.2	-13.0	-37.2	
5.198	-68.0	H	3.0	-14.8	34.2	1.0	-48.0	-13.0	-35.0	
3.465	-66.8	V	3.0	-16.2	34.6	1.0	-49.7	-13.0	-36.7	
5.198	-66.7	V	3.0	-13.2	34.2	1.0	-46.4	-13.0	-33.4	
High Channel (1753.75MHz)										
3.507	-67.0	H	3.0	-16.5	34.5	1.0	-50.0	-13.0	-37.0	
5.261	-67.7	H	3.0	-14.4	34.2	1.0	-47.6	-13.0	-34.6	
3.507	-67.1	V	3.0	-16.4	34.5	1.0	-49.9	-13.0	-36.9	
5.261	-67.6	V	3.0	-14.0	34.2	1.0	-47.2	-13.0	-34.2	

Rev. 09.05.14

EVDO-Rev A, 1700MHz BC15

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/23/15
Test Engineer: F. Guarnero
Configuration: EUT Only
Mode: EVDO Rev A, 1700MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 27

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1711.25MHz)										
3.423	-63.6	H	3.0	-13.3	34.6	1.0	-46.9	-13.0	-33.9	
5.114	-69.2	H	3.0	-16.1	34.2	1.0	-49.3	-13.0	-36.3	
3.423	-60.0	V	3.0	-9.5	34.6	1.0	-43.1	-13.0	-30.1	
5.114	-68.5	V	3.0	-15.1	34.2	1.0	-48.3	-13.0	-35.3	
Mid Channel (1732.5MHz)										
3.465	-69.3	H	3.0	-18.8	34.6	1.0	-52.4	-13.0	-39.4	
5.198	-69.4	H	3.0	-16.2	34.2	1.0	-49.4	-13.0	-36.4	
3.465	-68.6	V	3.0	-18.0	34.6	1.0	-51.5	-13.0	-38.5	
5.198	-69.6	V	3.0	-16.1	34.2	1.0	-49.3	-13.0	-36.3	
High Channel (1753.75MHz)										
3.507	-69.6	H	3.0	-19.1	34.5	1.0	-52.6	-13.0	-39.6	
5.261	-69.4	H	3.0	-16.1	34.2	1.0	-49.2	-13.0	-36.2	
3.507	-69.1	V	3.0	-18.4	34.5	1.0	-51.9	-13.0	-38.9	
5.261	-69.8	V	3.0	-16.2	34.2	1.0	-49.4	-13.0	-36.4	

Rev. 09.05.14

CDMA2000 1xRTT, 800MHz BC10

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/23/15
Test Engineer: T Wang
Configuration: EUT Only
Mode: 1xRTT 800MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 90

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (817.25MHz)										
1.635	-66.5	H	3.0	-22.9	33.7	1.0	-55.6	-13.0	-42.6	
2.452	-66.9	H	3.0	-19.5	34.1	1.0	-52.6	-13.0	-39.6	
1.635	-66.3	V	3.0	-20.4	33.7	1.0	-53.1	-13.0	-40.1	
2.452	-66.4	V	3.0	-18.3	34.1	1.0	-51.4	-13.0	-38.4	
Mid Channel (820MHz)										
1.640	-65.1	H	3.0	-21.4	33.7	1.0	-54.2	-13.0	-41.2	
2.460	-66.9	H	3.0	-19.5	34.1	1.0	-52.6	-13.0	-39.6	
1.640	-65.6	V	3.0	-19.7	33.7	1.0	-52.4	-13.0	-39.4	
2.460	-66.8	V	3.0	-18.7	34.1	1.0	-51.8	-13.0	-38.8	
High Channel (822.75MHz)										
1.646	-63.4	H	3.0	-19.7	33.7	1.0	-52.4	-13.0	-39.4	
2.468	-66.6	H	3.0	-19.2	34.1	1.0	-52.3	-13.0	-39.3	
1.646	-65.8	V	3.0	-19.8	33.7	1.0	-52.6	-13.0	-39.6	
2.468	-66.6	V	3.0	-18.5	34.1	1.0	-51.6	-13.0	-38.6	

Rev. 09.05.14

EVDO-Rev A, 800MHz BC10

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/23/15
Test Engineer: T Wang
Configuration: EUT Only
Mode: EVDO Rev A, 800MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 90

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (817.25MHz)										
1.635	-64.3	H	3.0	-20.7	33.7	1.0	-53.4	-13.0	-40.4	
2.452	-68.1	H	3.0	-20.7	34.1	1.0	-53.8	-13.0	-40.8	
1.635	-66.3	V	3.0	-20.4	33.7	1.0	-53.1	-13.0	-40.1	
2.452	-67.7	V	3.0	-19.6	34.1	1.0	-52.7	-13.0	-39.7	
Mid Channel (820MHz)										
1.640	-63.1	H	3.0	-19.4	33.7	1.0	-52.2	-13.0	-39.2	
2.460	-67.3	H	3.0	-19.8	34.1	1.0	-53.0	-13.0	-40.0	
1.640	-63.6	V	3.0	-17.7	33.7	1.0	-50.4	-13.0	-37.4	
2.460	-66.5	V	3.0	-18.4	34.1	1.0	-51.5	-13.0	-38.5	
High Channel (822.75MHz)										
1.646	-63.1	H	3.0	-19.4	33.7	1.0	-52.1	-13.0	-39.1	
2.468	-67.4	H	3.0	-20.0	34.1	1.0	-53.1	-13.0	-40.1	
1.646	-64.2	V	3.0	-18.2	33.7	1.0	-50.9	-13.0	-37.9	
2.468	-66.6	V	3.0	-18.5	34.1	1.0	-51.6	-13.0	-38.6	

Rev. 09.05.14

10.1.3. UMTS

UMTS REL 99, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/17/15
Test Engineer: T Wang
Configuration: EUT only
Mode: REL 99, 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 22

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (826.4MHz)										
1.653	-60.5	H	3.0	-15.8	33.7	1.0	-48.5	-13.0	-35.5	
2.479	-64.8	H	3.0	-16.1	34.1	1.0	-49.2	-13.0	-36.2	
1.653	-61.1	V	3.0	-14.2	33.7	1.0	-46.9	-13.0	-33.9	
2.479	-64.7	V	3.0	-15.4	34.1	1.0	-48.5	-13.0	-35.5	
Mid Channel (836MHz)						1.0				
1.672	-62.2	H	3.0	-17.3	33.7	1.0	-50.0	-13.0	-37.0	
2.508	-65.4	H	3.0	-16.8	34.1	1.0	-49.9	-13.0	-36.9	
1.672	-62.1	V	3.0	-15.1	33.7	1.0	-47.8	-13.0	-34.8	
2.508	-65.8	V	3.0	-16.6	34.1	1.0	-49.7	-13.0	-36.7	
High Channel (846.6MHz)										
1.693	-62.6	H	3.0	-17.6	33.7	1.0	-50.2	-13.0	-37.2	
2.540	-64.6	H	3.0	-15.9	34.1	1.0	-49.0	-13.0	-36.0	
1.693	-63.0	V	3.0	-16.0	33.7	1.0	-48.7	-13.0	-35.7	
2.540	-64.9	V	3.0	-15.6	34.1	1.0	-48.7	-13.0	-35.7	

Rev. 09.05.14

UMTS HSDPA, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/23/15
Test Engineer: T Wang
Configuration: EUT only
Mode: HSDPA 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 22

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (826.4MHz)										
1.653	-64.1	H	3.0	-20.3	33.7	1.0	-53.0	-13.0	-40.0	
2.479	-67.1	H	3.0	-19.7	34.1	1.0	-52.8	-13.0	-39.8	
1.653	-64.9	V	3.0	-18.9	33.7	1.0	-51.6	-13.0	-38.6	
2.479	-66.9	V	3.0	-18.8	34.1	1.0	-51.9	-13.0	-38.9	
Mid Channel (836MHz)										
1.672	-63.9	H	3.0	-19.9	33.7	1.0	-52.6	-13.0	-39.6	
2.508	-66.3	H	3.0	-18.8	34.1	1.0	-51.9	-13.0	-38.9	
1.672	-65.1	V	3.0	-19.0	33.7	1.0	-51.7	-13.0	-38.7	
2.508	-67.5	V	3.0	-19.4	34.1	1.0	-52.5	-13.0	-39.5	
High Channel (846MHz)										
1.693	-66.2	H	3.0	-22.0	33.7	1.0	-54.7	-13.0	-41.7	
2.540	-66.7	H	3.0	-19.1	34.1	1.0	-52.2	-13.0	-39.2	
1.693	-67.0	V	3.0	-20.9	33.7	1.0	-53.6	-13.0	-40.6	
2.540	-66.9	V	3.0	-18.7	34.1	1.0	-51.9	-13.0	-38.9	

Rev. 09.05.14

UMTS REL 99, 1700MHz BAND 4

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/17/15
Test Engineer: F. Guarnero
Configuration: EUT only
Mode: REL 99, 1700MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 27

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.42	-70.3	H	3.0	-20.5	34.6	1.0	-54.1	-13.0	-41.1	
5.14	-71.6	H	3.0	-19.3	33.8	1.0	-52.2	-13.0	-39.2	
3.42	-70.3	V	3.0	-20.2	34.6	1.0	-53.8	-13.0	-40.8	
5.14	-72.1	V	3.0	-19.6	33.8	1.0	-52.4	-13.0	-39.4	
Mid Channel (1732.6MHz)										
3.47	-72.0	H	3.0	-22.1	34.6	1.0	-55.7	-13.0	-42.7	
5.20	-71.1	H	3.0	-18.7	33.8	1.0	-51.5	-13.0	-38.5	
3.47	-69.1	V	3.0	-18.9	34.6	1.0	-52.5	-13.0	-39.5	
5.20	-70.8	V	3.0	-18.2	33.8	1.0	-51.0	-13.0	-38.0	
High Channel (1752.6MHz)										
3.50	-67.5	H	3.0	-17.5	34.6	1.0	-51.1	-13.0	-38.1	
5.26	-70.1	H	3.0	-17.7	33.8	1.0	-50.5	-13.0	-37.5	
3.50	-66.4	V	3.0	-16.1	34.6	1.0	-49.7	-13.0	-36.7	
5.26	-68.9	V	3.0	-16.2	33.8	1.0	-49.0	-13.0	-36.0	

Rev. 09.05.14

UMTS HSDPA, 1700MHz BAND 4

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/23/15
Test Engineer: T Wang
Configuration: EUT only
Mode: HSDPA 1700MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 27

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.425	-67.6	H	3.0	-17.7	34.6	1.0	-51.4	-13.0	-38.4	
5.137	-66.7	H	3.0	-14.4	33.8	1.0	-47.2	-13.0	-34.2	
3.425	-67.0	V	3.0	-16.8	34.6	1.0	-50.4	-13.0	-37.4	
5.137	-66.3	V	3.0	-13.8	33.8	1.0	-46.6	-13.0	-33.6	
Mid Channel (1732.6MHz)										
3.465	-67.6	H	3.0	-17.7	34.6	1.0	-51.3	-13.0	-38.3	
5.198	-67.5	H	3.0	-15.1	33.8	1.0	-47.9	-13.0	-34.9	
3.465	-67.7	V	3.0	-17.5	34.6	1.0	-51.1	-13.0	-38.1	
5.198	-67.8	V	3.0	-15.2	33.8	1.0	-48.0	-13.0	-35.0	
High Channel (1752.6MHz)										
3.505	-66.7	H	3.0	-16.7	34.6	1.0	-50.3	-13.0	-37.3	
5.258	-67.0	H	3.0	-14.5	33.8	1.0	-47.3	-13.0	-34.3	
3.505	-64.5	V	3.0	-14.2	34.6	1.0	-47.8	-13.0	-34.8	
5.258	-66.4	V	3.0	-13.7	33.8	1.0	-46.5	-13.0	-33.5	

Rev. 09.05.14

UMTS REL 99, 1900MHz BAND 2

Company:
Project #: 14U19187
Date: 02/17/15
Test Engineer: F. Guarnero
Configuration: EUT only
Mode: REL 99, 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 24

Frequency (GHz)			Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.70	-69.8	H	3.0	-19.5	34.5	1.0	-53.0	-13.0	-40.0	
5.56	-69.1	H	3.0	-16.2	33.6	1.0	-48.9	-13.0	-35.9	
3.70	-68.7	V	3.0	-18.2	34.5	1.0	-51.7	-13.0	-38.7	
5.56	-69.9	V	3.0	-16.8	33.6	1.0	-49.5	-13.0	-36.5	
Mid Channel (1880MHz)										
3.76	-68.9	H	3.0	-18.6	34.5	1.0	-52.0	-13.0	-39.0	
5.64	-70.3	H	3.0	-17.3	33.6	1.0	-49.9	-13.0	-36.9	
3.76	-68.5	V	3.0	-17.9	34.5	1.0	-51.3	-13.0	-38.3	
5.65	-70.4	V	3.0	-17.1	33.6	1.0	-49.8	-13.0	-36.8	
High Channel (1907.6MHz)										
3.86	-69.0	H	3.0	-18.6	34.4	1.0	-52.0	-13.0	-39.0	
5.72	-70.5	H	3.0	-17.3	33.6	1.0	-49.9	-13.0	-36.9	
3.86	-69.0	V	3.0	-18.2	34.4	1.0	-51.6	-13.0	-38.6	
5.74	-70.2	V	3.0	-16.9	33.6	1.0	-49.4	-13.0	-36.4	

Rev. 09.05.14

UMTS HSDPA, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 14U19187
Date: 02/23/15
Test Engineer: T Wang
Configuration: EUT only
Mode: HSDPA 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	Part 24

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	Path Loss @ SG End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.705	-66.4	H	3.0	-16.1	34.5	1.0	-49.6	-13.0	-36.6	
5.557	-67.2	H	3.0	-14.3	33.6	1.0	-47.0	-13.0	-34.0	
3.705	-66.2	V	3.0	-15.6	34.5	1.0	-49.1	-13.0	-36.1	
5.557	-66.6	V	3.0	-13.5	33.6	1.0	-46.2	-13.0	-33.2	
Mid Channel (1880MHz)										
3.760	-66.0	H	3.0	-15.7	34.5	1.0	-49.1	-13.0	-36.1	
5.640	-67.1	H	3.0	-14.1	33.6	1.0	-46.7	-13.0	-33.7	
3.760	-66.3	V	3.0	-15.7	34.5	1.0	-49.1	-13.0	-36.1	
5.640	-67.4	V	3.0	-14.2	33.6	1.0	-46.8	-13.0	-33.8	
High Channel (1907.6MHz)										
3.815	-65.8	H	3.0	-15.4	34.4	1.0	-48.8	-13.0	-35.8	
5.723	-68.0	H	3.0	-14.9	33.6	1.0	-47.4	-13.0	-34.4	
3.815	-65.4	V	3.0	-14.7	34.4	1.0	-48.1	-13.0	-35.1	
5.723	-67.5	V	3.0	-14.2	33.6	1.0	-46.8	-13.0	-33.8	

Rev. 09.05.14