FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/CDMA + BLUETOOTH + DTS/UNII a/b/g/n RADIO MODULE

MODEL NUMBER: QM8626
FCC ID: J9CQM8626

REPORT NUMBER: 15U19820-E1, Revision A

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
-	05/16/15	Initial Issue	CHOON OOI
A	08/15/15	Revised Antenna Gain and Setup Photo	CHOON OOI

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	QUALCOMM TECHNOLOGIES, INC.
EUT DESCRIPTION:	GSM/WCDMA/CDMA + BLUETOOTH + DTS/UNII a/b/g/n RADIO MODULE
SERIAL NUMBER:	N10KRK88G
DATE TESTED:	MARCH 9 – APRIL 26, 2015

APPLICABLE STANDARDS	
STANDARD	**STANDARD**
FCC PART 22H AND 24E	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.

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2. TEST METHODOLOGY

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

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(IC: 2324B-1)	☐ Chamber D(IC: 2324B-4)
☐ Chamber B(IC: 2324B-2)	☐ Chamber E(IC: 2324B-5)
☒ Chamber C(IC: 2324B-3)	☐ Chamber F(IC: 2324B-6)
	☐ Chamber G(IC: 2324B-7)
	☐ Chamber H(IC: 2324B-8)

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:

EIRP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna) + Substitution Antenna Factor (dBi)

ERP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna)

(Path loss = Signal generator output – PSA reading with substitution antenna)

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 20000 MHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/CDMA + BLUETOOTH + DTS/UNII a/b/g/n radio module.

5.2. MAXIMUM OUTPUT POWER

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

FCC Part 22/24						
Band	Frequency Range(MHz)	Modulation mW	Conducted		Radiated	
			AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
GSM850	824~849	GPRS	33.40	2187.76	30.61	1150.8
	824~849	EGPRS	27.24	529.66	25.29	338.06
GSM1900	1850~1910	GPRS	32.48	1770.11	32.56	1803.02
	1850~1910	EGPRS	25.98	396.28	29.15	822.24
Band 5	824~849	Rel99	24.13	258.82	21.84	152.76
	824~849	HSDPA	23.10	204.17	20.76	119.12
	824~849	HSUPA	23.22	209.89		
Band 2	1850~1910	Rel99	23.65	231.74	25.29	338.06
	1850~1910	HSDPA	22.61	182.39	24.15	260.02
	1850~1910	HSUPA	22.90	194.98		
BC0	824~849	1xRTT	23.75	237.14	21.88	154.17
	824~849	EVDO REL. 0	23.90	245.47	21.87	153.82
	824~849	EVDO REV. A	23.87	243.78		
BC1	1850~1910	1xRTT	23.84	242.10	25.49	354.00
	1850~1910	EVDO REL. 0	24.00	251.19	25.58	361.41
	1850~1910	EVDO REV. A	24.00	251.19		

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency (MHz)	Peak Gain (dBi)
Band 5, 824~849MHz	-1.3
Band 2, 1850~1910MHz	-0.2

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	HP	N/A	CND8153DGD	N/A

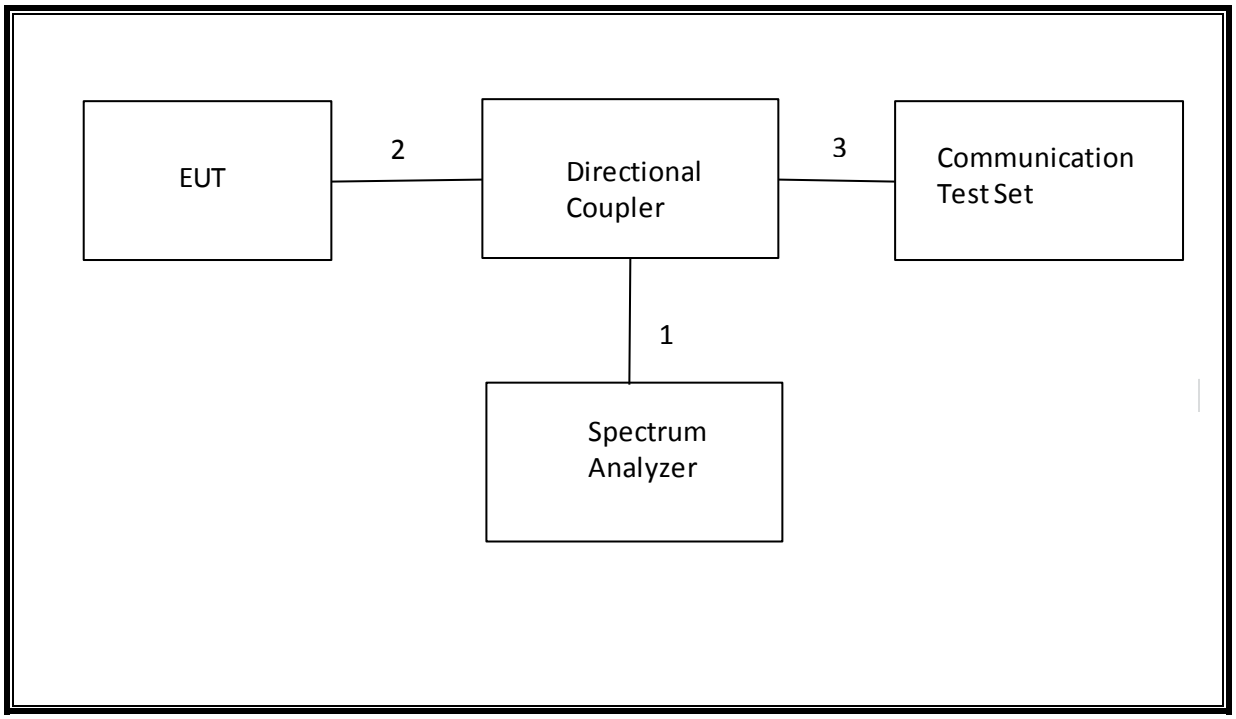
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB	1	USB	Unshielded	1.0m	N/A

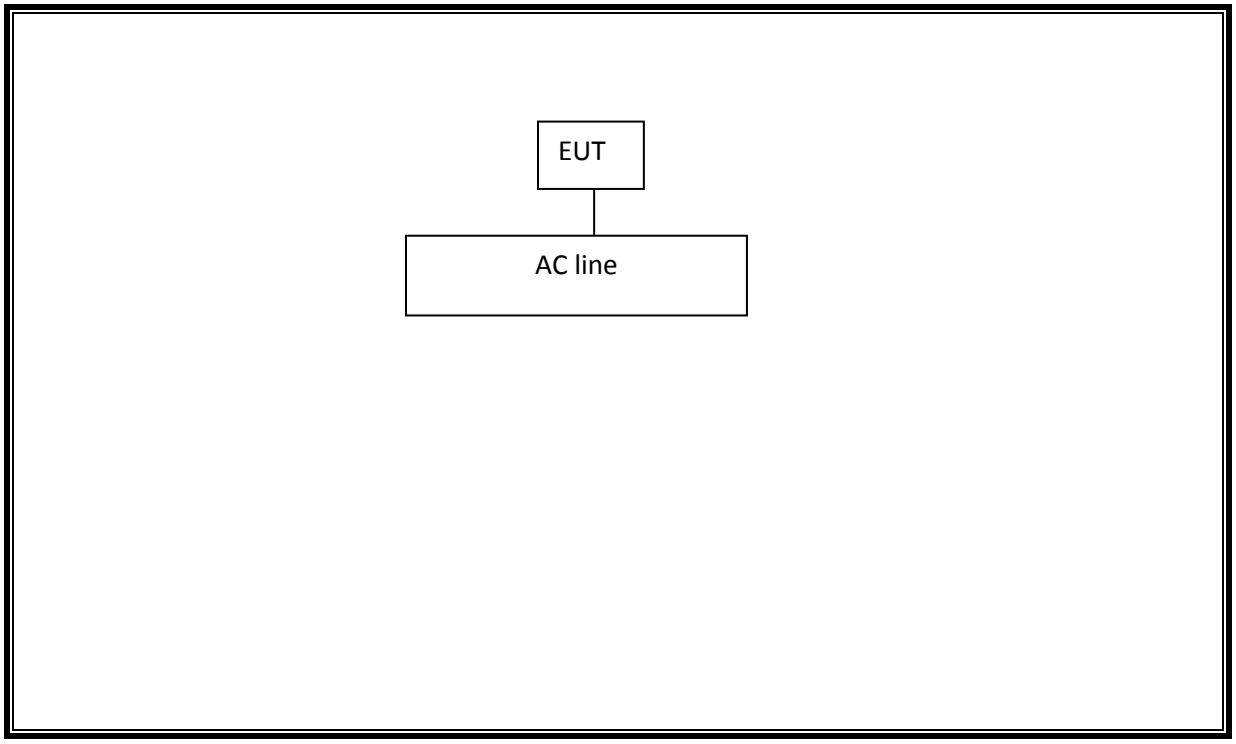
TEST SETUP

The EUT is continuously communicated to the call box during the tests.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01179	02/26/16
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	08/14/15
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/25/15
Antenna, Horn, 18 GHz	EMCO	3115	C00784	10/25/15
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02688	CNR
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/16
Communications Test Set	R&S	CMW500	T159	07/02/15
DC power supply, 8 V @ 3 A or 15 V	Agilent / HP	E3610A	None	CNR
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	07/06/15
Antenna, Tuned Dipole 400~1000	ETS	3121C DB4	C00993	02/14/16
Directional Coupler	RF-Lambda	RFDC5M06G15	None	CNR
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	12/17/15
Multimeter	Fluke	26111	74320701	4/15/2016

7. Summary Table

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Note
2.1049	N/A	Occupied Band width (99%)	N/A	Conducted	Pass	4.2228 MHz
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-15.349dBm
2.1046	N/A	Conducted output power	N/A		Pass	33.40dBm
22.355 24.235	RSS-132(4.3) RSS-133(6.3)	Frequency Stability	2.5PPM		Pass	.001ppm
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38.45 dBm	Radiated	Pass	28.78dBm
24.232(c)	RSS-133(6.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	32.56dBm
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1)	Radiated Spurious Emission	-13dBm		Pass	-37.3dBm

8. RF POWER OUTPUT VERIFICATION

8.1. GSM/GPRS/EDGE

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

> 30 dBm for GPRS1800/1900

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

Frequency Offset > + 0 Hz

Mode > BCCH and TCH

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

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

Channel Type > Off

P0> 4 dB

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

TCH > choose desired test channel

Hopping > Off

Main Timeslot > 3 (Default)

Network Coding Scheme > CS4 (GPRS) and MCS5 ~ MCS9 (EGPRS)

Bit Stream > 2E9-1PSR Bit Pattern

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

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

8.1.1. GSM OUTPUT POWER RESULT

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)
GSM (Voice)	CS1	1	128	824.2	33.3
			190	836.6	33.4
			251	848.8	33.0
GPRS (GMSK)	CS1	1	128	824.2	33.3
			190	836.6	33.4
			251	848.8	33.0
		2	128	824.2	33.3
			190	836.6	33.3
			251	848.8	32.9
EGPRS (8PSK)	MCS5	1	128	824.2	27.2
			190	836.6	27.1
			251	848.8	26.7
		2	128	824.2	27.2
			190	836.6	27.0
			251	848.8	26.5

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)
GSM (Voice)	CS1	1	512	1850.2	32.1
			661	1880.0	32.5
			810	1909.8	32.5
GPRS (GMSK)	CS1	1	512	1850.2	32.1
			661	1880.0	32.5
			810	1909.8	32.5
		2	512	1850.2	32.1
			661	1880.0	32.5
			810	1909.8	32.4
EGPRS (8PSK)	MCS5	1	512	1850.2	25.8
			661	1880.0	25.7
			810	1909.8	26.0
		2	512	1850.2	25.7
			661	1880.0	25.6
			810	1909.8	26.0

8.2. UMTS REL 99

TEST PROCEDURE

The following summary of these settings are illustrated below:

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

8.2.1. UMTS REL 99 OUTPUT POWER RESULT

Release 99

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Rel 99 (RMC, 12.2 kbps)	4132	826.4	0	24.1
		4183	836.6	0	24.1
		4233	846.6	0	23.2

Release 99

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	0	23.6
		9400	1880.0	0	23.7
		9538	1907.6	0	23.6

8.3. UMTS HSDPA

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these 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			

8.3.1. UMTS HSDPA OUTPUT POWER RESULT

HSDPA

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	0	23.1
		4183	836.6	0	23.1
		4233	846.6	0	22.2
	Subtest 2	4132	826.4	0	22.9
		4183	836.6	0	22.8
		4233	846.6	0	22.1
	Subtest 3	4132	826.4	0.5	22.2
		4183	836.6	0.5	22.2
		4233	846.6	0.5	21.5
	Subtest 4	4132	826.4	0.5	22.3
		4183	836.6	0.5	22.1
		4233	846.6	0.5	21.5

HSDPA

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	22.6
		9400	1880.0	0	22.6
		9538	1907.6	0	22.5
	Subtest 2	9262	1852.4	0	22.5
		9400	1880.0	0	22.2
		9538	1907.6	0	22.2
	Subtest 3	9262	1852.4	0.5	21.8
		9400	1880.0	0.5	22.0
		9538	1907.6	0.5	22.3
	Subtest 4	9262	1852.4	0.5	22.4
		9400	1880.0	0.5	22.0
		9538	1907.6	0.5	22.2

8.4. UMTS HSUPA

TEST PROCEDURE

The following summary of these settings are illustrated below: (ETSI TS 134.121-1 Table C.11.1)

	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				
	P-CPICH (dB)	-10				
	P-CCPCH (dB)	-12				
	SCH (dB)	-12				
	PICH(dB)	-15				
	DPCH (dB)	-9				
	HS-SCCH_1 (dB)	-8				
	HS-PDSCH (dB)	-3				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	Bc	11/15	6/15	15/15	2/15	15/15
	Bd	15/15	15/15	9/15	15/15	15/15
	Bec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	Bhs	22/15	12/15	30/15	4/15	30/15
	βed (note1)	1309/225	94/75	47/15 47/15	56/75	134/15
	MPR	0	2	1	2	0
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	21
	Reference E-TFCIs	5	5	2	5	5
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	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	

Note1: βed cannot be set directly, it is set by Absolute Grant Value.

8.4.1. UMTS HSUPA OUTPUT POWER RESULT

HSUPA

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	0	23.1
		4183	836.6	0	23.1
		4233	846.6	0	22.4
	Subtest 2	4132	826.4	2	21.6
		4183	836.6	2	21.8
		4233	846.6	2	20.9
	Subtest 3	4132	826.4	1	22.0
		4183	836.6	1	21.7
		4233	846.6	1	21.0
	Subtest 4	4132	826.4	2	22.1
		4183	836.6	2	22.1
		4233	846.6	2	21.4
	Subtest 5	4132	826.4	0	23.2
		4183	836.6	0	23.2
		4233	846.6	0	22.5

HSUPA

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	22.9
		9400	1880.0	0	22.7
		9538	1907.6	0	22.1
	Subtest 2	9262	1852.4	2	21.1
		9400	1880.0	2	20.2
		9538	1907.6	2	20.9
	Subtest 3	9262	1852.4	1	22.6
		9400	1880.0	1	22.4
		9538	1907.6	1	21.9
	Subtest 4	9262	1852.4	2	22.4
		9400	1880.0	2	22.5
		9538	1907.6	2	21.7
	Subtest 5	9262	1852.4	0	22.9
		9400	1880.0	0	22.9
		9538	1907.6	0	22.2

8.5. CDMA2000

8.5.1. 1xRTT

TEST PROCEDURE

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

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

- Call Setup > Shift & Preset
- Cell Info > Cell Parameters > System ID (SID) > 7
  > Network ID (NID) > 1
- Protocol Rev > 6 (IS-2000-0)
- Radio Config (RC) > Please see following table or details
- FCH Service Option (SO) Setup > Please see following table or details
- Traffic Data Rate > Full
- TDSO SCH Info > F-SCH Parameters > F-SCH Data Rate > 153.6 kbps
  > R-SCH Parameters > R-SCH Data Rate > 153.6 kbps
- Rvs Power Ctrl > Active bits
  - Rvs Power Ctrl > All Up bits (Maximum TxPout)

8.5.2. CDMA2000 OUTPUT POWER RESULT

1xRTT

Band	Mode	Ch	Freq. (MHz)	Avg Pwr (dBm)
BC1	RC1, SO55 (Loopback)	25	1851.25	23.8
		600	1880.00	23.8
		1175	1908.75	23.8
	RC3, SO55 (Loopback)	25	1851.25	23.8
		600	1880.00	23.8
		1175	1908.75	23.8
	RC3, SO32 (+F-SCH)	25	1851.25	23.8
		600	1880.00	23.8
		1175	1908.75	23.7

1xRTT

Band	Mode	Ch	Freq. (MHz)	Avg Pwr (dBm)
BC0	RC1, SO55 (Loopback)	1013	824.70	23.8
		384	836.52	23.8
		777	848.31	23.7
	RC3, SO55 (Loopback)	1013	824.70	23.7
		384	836.52	23.7
		777	848.31	23.7
	RC3, SO32 (+F-SCH)	1013	824.70	23.8
		384	836.52	23.7
		777	848.31	23.7

8.5.3. 1xEV-DO Release 0

TEST PROCEDURE

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

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

EVDO Release 0 - RTAP

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

EVDO Release 0 - FTAP

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

8.5.4. 1XEVDO REL 0 OUTPUT POWER RESULT

1xEv-Do Rel. 0

Band	FTAP Rate	Channel	f (MHz)	Avg Pwr (dBm)
BC1	307.2 kbps (2 slot, QPSK)	25	1851.25	24.0
		600	1880.00	24.0
		1175	1908.75	24.0

1xEv-Do Rel. 0

Band	FTAP Rate	Channel	f (MHz)	Avg Pwr (dBm)
BC0	307.2 kbps (2 slot, QPSK)	1013	824.70	23.9
		384	836.52	23.9
		777	848.31	23.9

8.5.5. 1xEV-DO Rev. A

TEST PROCEDURE

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

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

EVDO Release A – RETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > RETAP
- R-Data Pkt Size > 4096
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2

> PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)

- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

EVDO Release A - FETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > FETAP
- F-Traffic Format > 4 (1024, 2,128) Canonical (307.2k, QPSK)
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2

> PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)

- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

8.5.6. 1xEVDO REV A OUTPUT RESULT

1xEv-Do Rev. A

Band	FETAP Traffic Format	Channel	f (MHz)	Avg Pwr (dBm)
BC1	307.2k, QPSK/ ACK channel is transmitted at all the slots	25	1851.25	24.0
		600	1880.00	24.0
		1175	1908.75	24.0

1xEv-Do Rev. A

Band	FETAP Traffic Format	Channel	f (MHz)	Avg Pwr (dBm)
BC0	307.2k, QPSK/ ACK channel is transmitted at all the slots	1013	824.70	23.9
		384	836.52	23.9
		777	848.31	23.9

9. PEAK TO AVERAGE RATIO

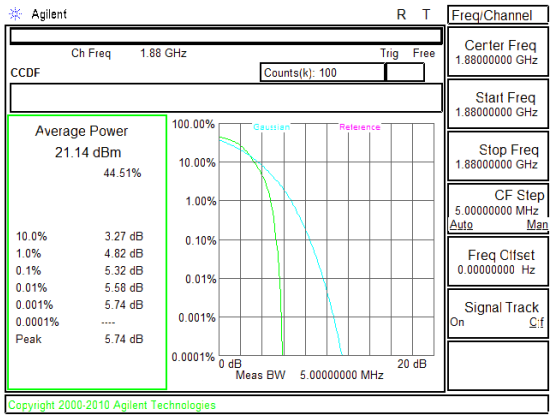
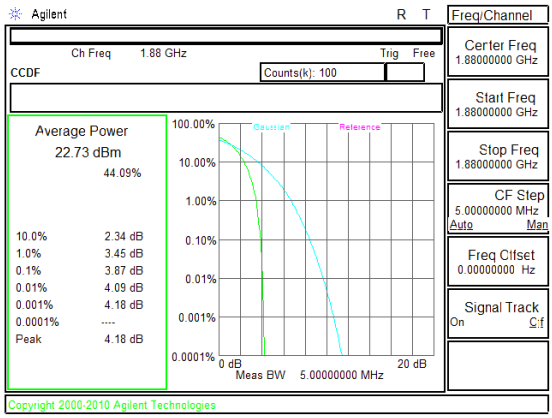
Test Procedure

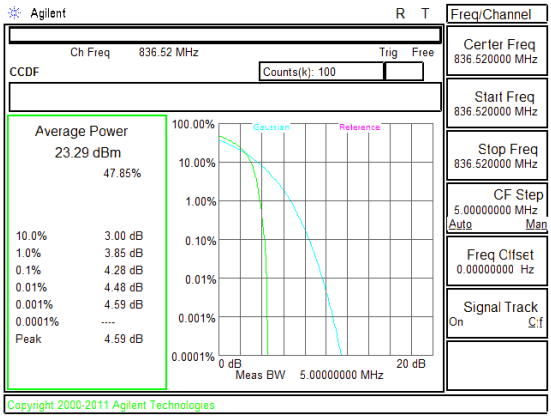
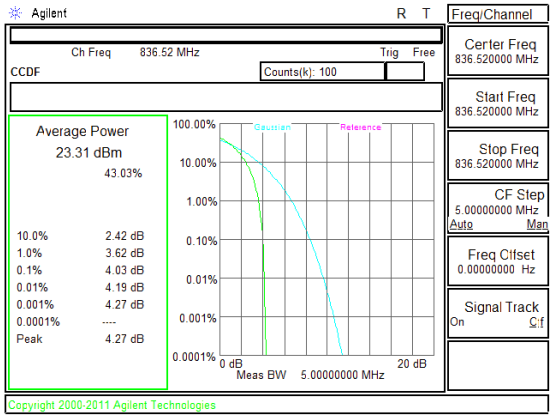
Per KDB 971168 D01 Power Meas License Digital Systems v02r02

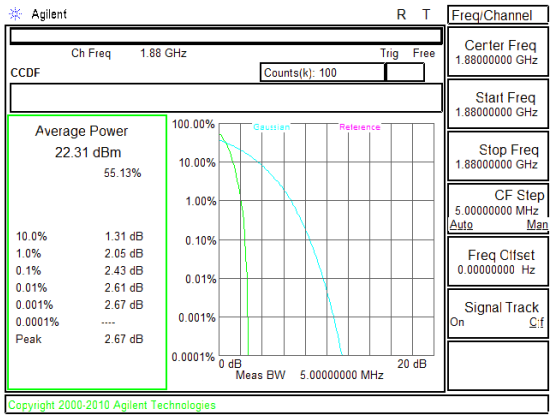
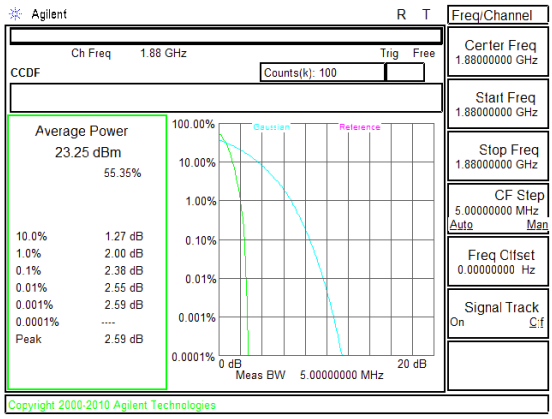
Test Spec

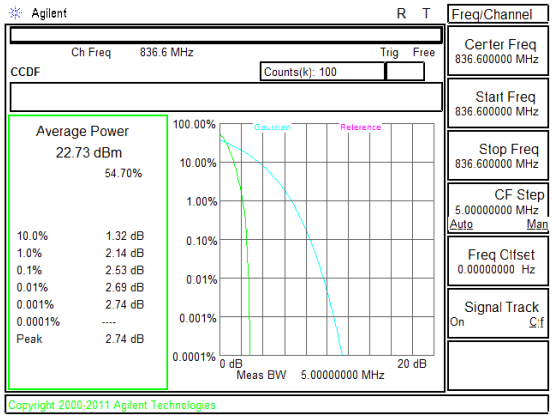
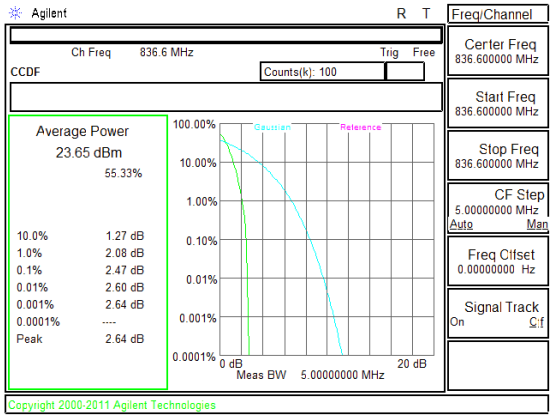
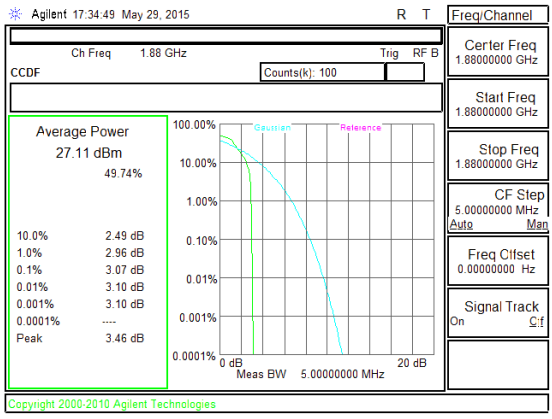
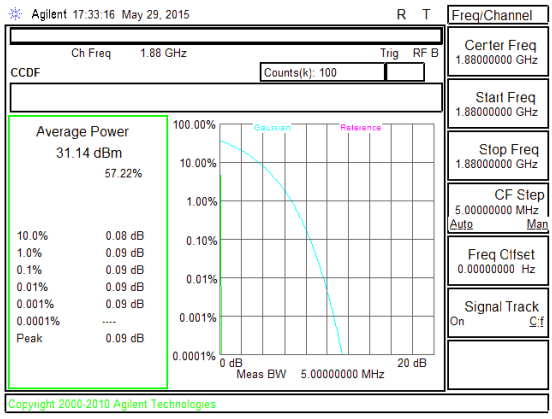
In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

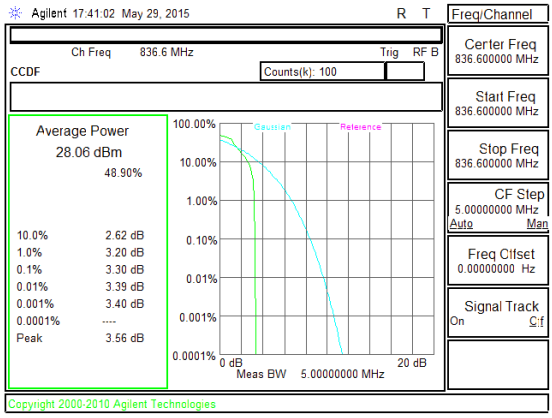
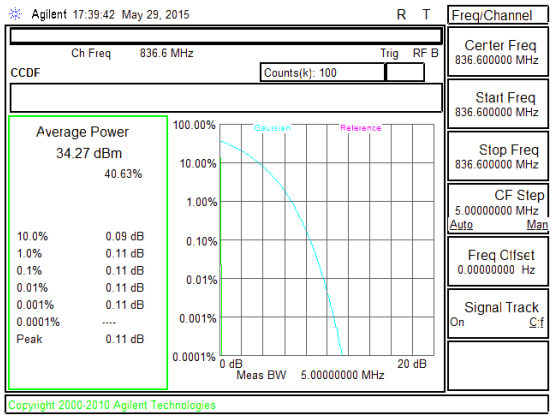
9.1. CONDUCTED PEAK TO AVERAGE RESULT

Band BC1	 Band BC1 EVDO Rel. 0 Mid channel	 Band BC1 1xRTT Mid channel

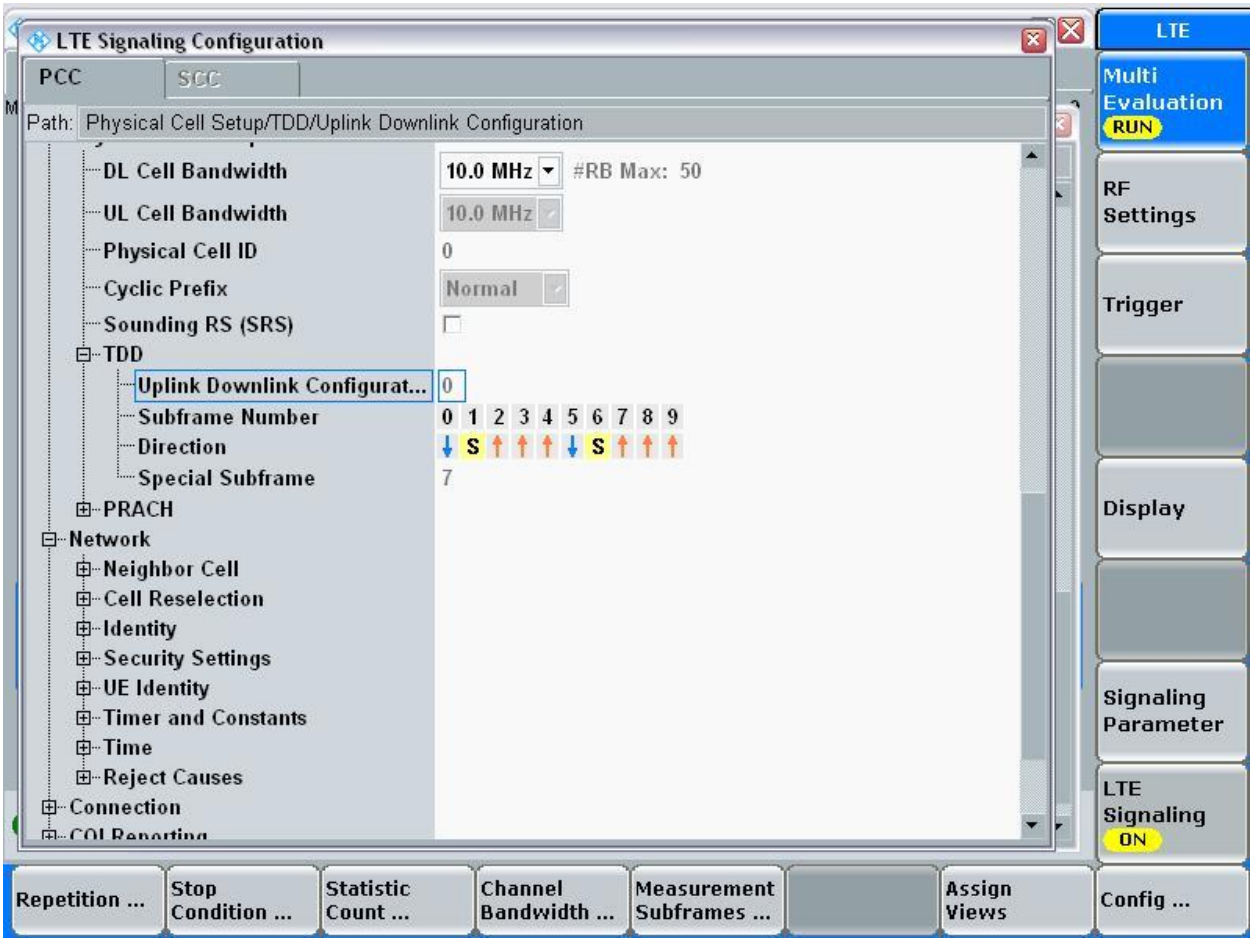
Band BC0	 Band BC0 EVDO Rel. 0 Mid channel	 Band BC0 1xRTT Mid channel

WCDMA Band 2	 WCDMA B2 HSDPA	 WCDMA B2 REL99

WCDMA Band 5	 WCDMA B5 HSDPA	 WCDMA B5 REL99
GSM 1900	 GSM1900 EGPRS	 GSM1900 GPRS

GSM 850	 GSM850 EGPRS	 GSM850 GPRS

Sub frame setting:



So average reading need apply 4.44dB duty cycle factor (20log (6/10)).

10. LIMITS AND CONDUCTED RESULTS

10.1. OCCUPIED BANDWIDTH

RULE PART(S)

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

LIMITS

For reporting purposes only

TEST PROCEDURE

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

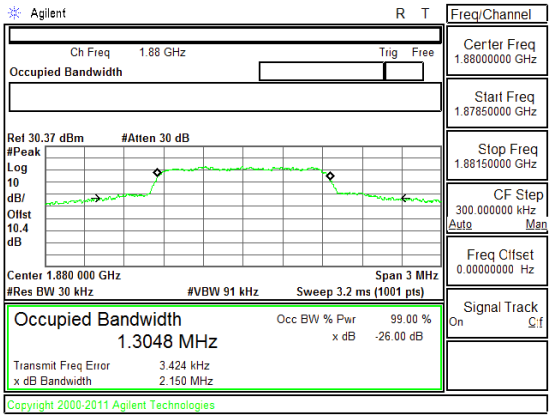
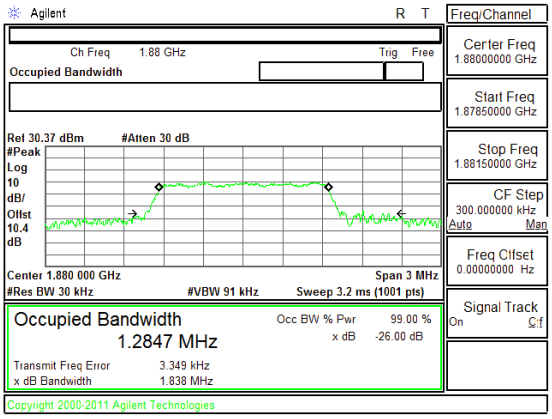
(KDB 971168 D01 Power Meas License Digital Systems v02r02)

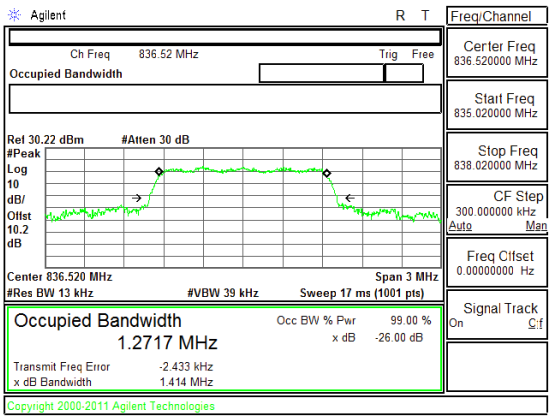
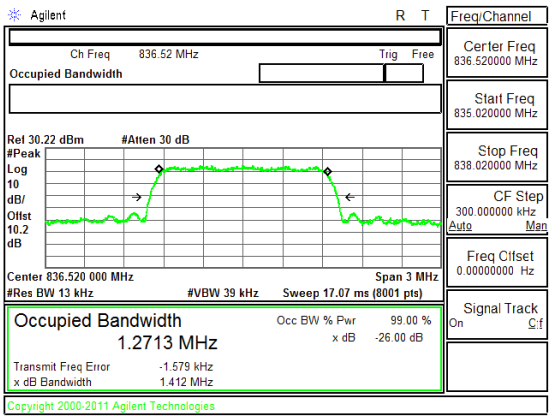
10.1.1. OCCUPIED BANDWIDTH RESULTS

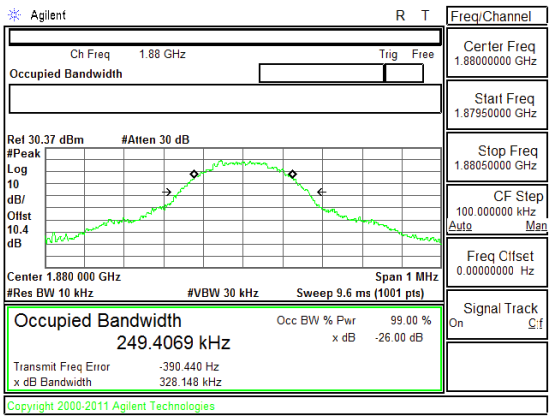
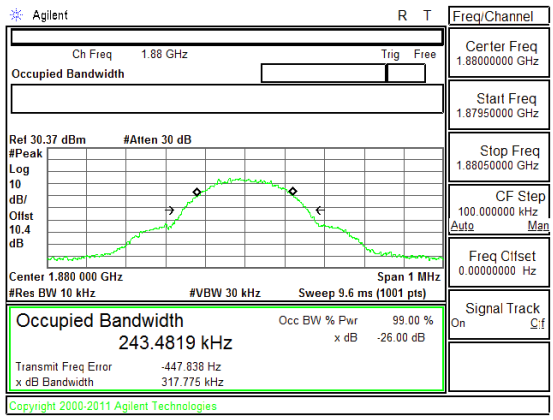
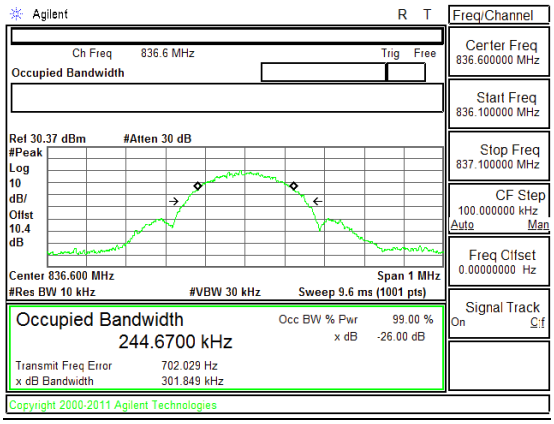
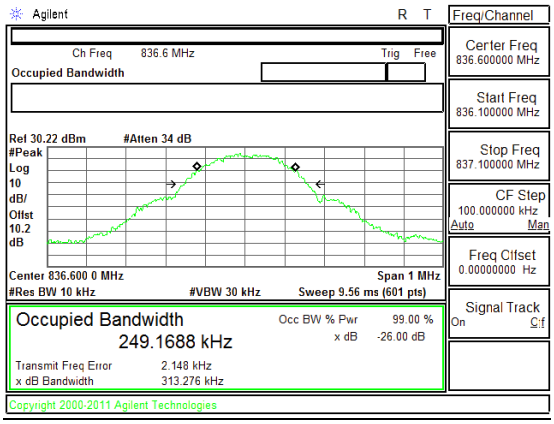
Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
GSM850	GPRS	128	824.2	244.3744	316.779
		190	836.6	249.1688	313.276
		251	848.8	243.4325	319.830
	EGPRS	128	824.2	248.4751	318.067
		190	836.6	244.6700	301.849
		251	848.8	243.7810	322.084
GSM1900	GPRS	512	1850.2	246.5633	318.325
		661	1880	243.4819	317.775
		810	1909.8	243.9795	314.159
	EGPRS	512	1850.2	254.0323	336.705
		661	1880	249.4069	328.148
		810	1909.8	242.2663	313.390
Band 5	Rel99	4132	826.4	4180.9	4728
		4183	836.6	4172	4724
		4233	846.6	4159.2	4718
	HSDPA	4132	826.4	4197.8	4748
		4183	836.6	4173	4725
		4233	846.6	4169.2	10455
Band 2	Rel99	9262	1852.4	4211.9	6105
		9400	1880	4222.8	6228
		9538	1907.6	4167.6	4696
	HSDPA	9262	1852.4	4189.2	5084
		9400	1880	4178.9	4740
		9538	1907.6	4150.3	4691

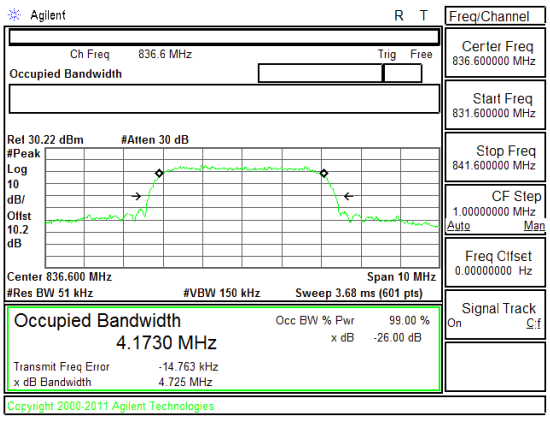
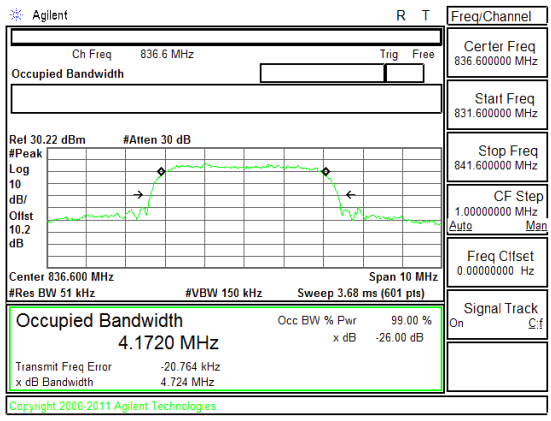
BC0	1xRTT	1013	824.7	1267	1402
		384	836.52	1271.3	1412
		777	848.31	1276.8	1419
	EVDO REL. 0	1013	824.7	1268	1407
		384	836.52	1271.7	1414
		777	848.31	1269.8	1418
BC1	1xRTT	25	1851.25	1274.1	1432
		600	1880	1284.7	1838
		1175	1908.75	1276.9	1425
	EVDO REL. 0	25	1851.25	1296.6	1977
		600	1880	1304.8	2150
		1175	1908.75	1270.7	1432

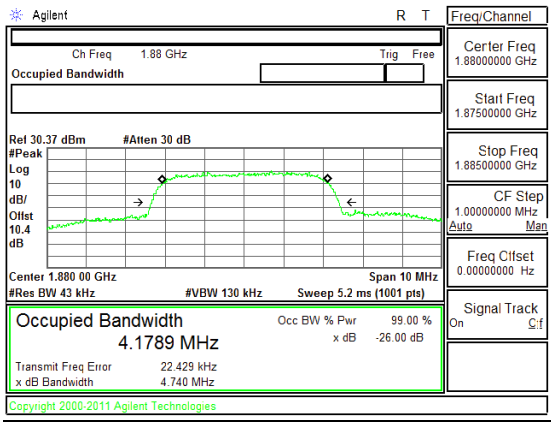
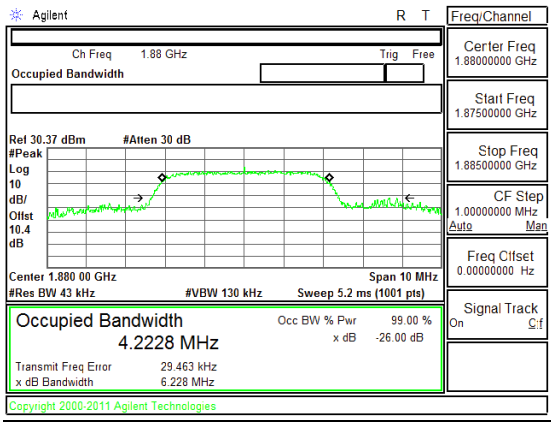
10.1.1. OCCUPIED BANDWIDTH PLOTS

Band BC1 EVDO REL. 0	 Band BC1 EVDO Rel. 0 OBW Mid channel	 Band BC1 1xRTT OBW Mid channel

Band BC0 EVDO REL. 0	 Band BC0 EVDO Rel. 0 OBW Mid channel	 Band BC0 1xRTT OBW Mid channel

Band GSM1900 EGPRS	 Band GSM1900 EGPRS OBW Mid channel	 Band GSM1900 GPRS OBW Mid channel
Band GSM850 EGPRS	 **Band GSM850 EGPRS OBW Mid channel**	 **Band GSM850 GPRS OBW Mid channel**

Band WCDMA Band 5	 WCDMA HSDPA OBW Mid channel	 WCDMA REL99 OBW Mid channel

Band **WCDMA BAND2**	 **WCDMA HSDPA OBW Mid channel**	 **WCDMA REL99 Mid channel**

10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238

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

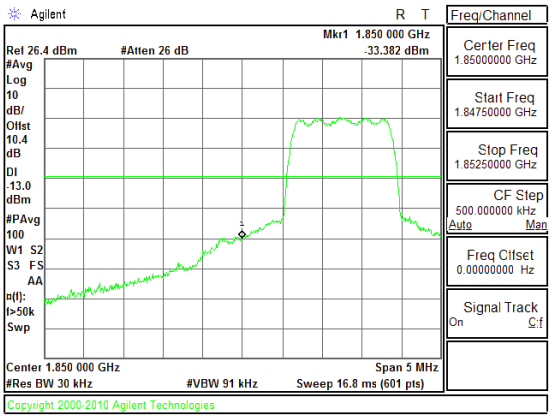
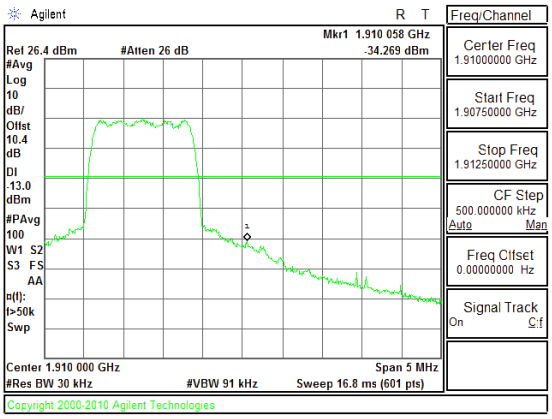
Per KDB 971168 D01 Power Meas License Digital Systems v02r02
The transmitter output was connected to an Agilent 8960 or a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

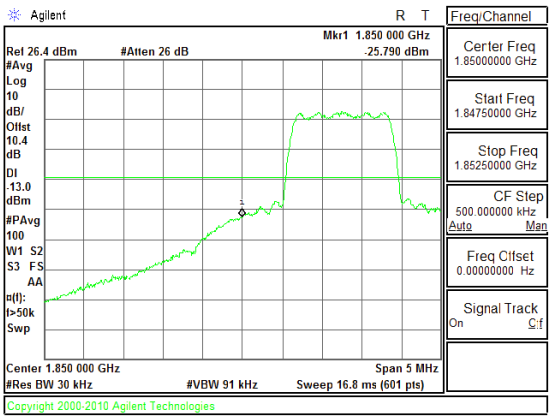
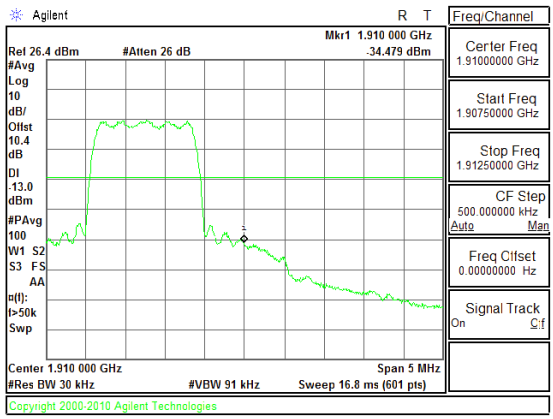
MODES TESTED

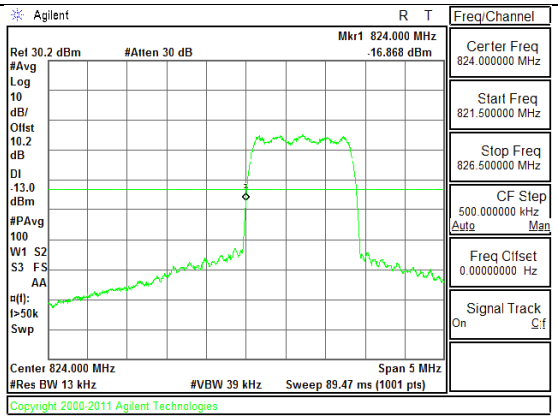
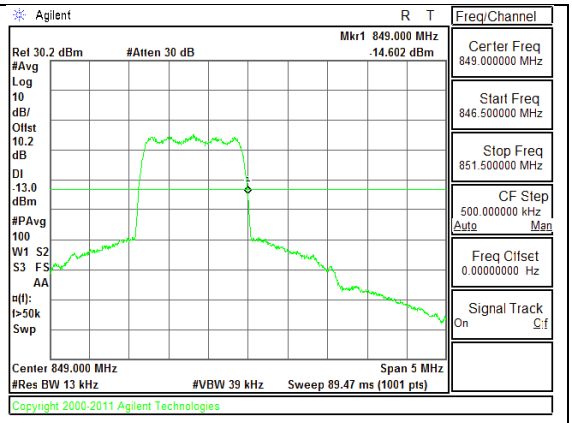
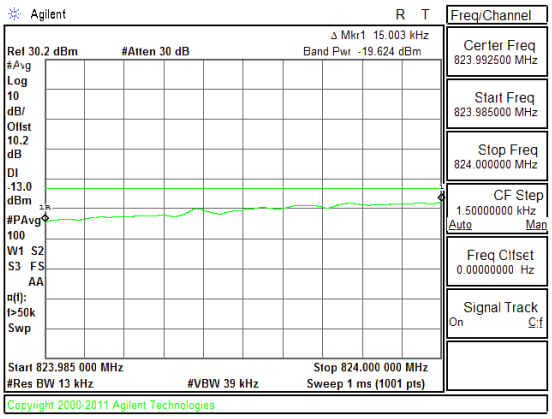
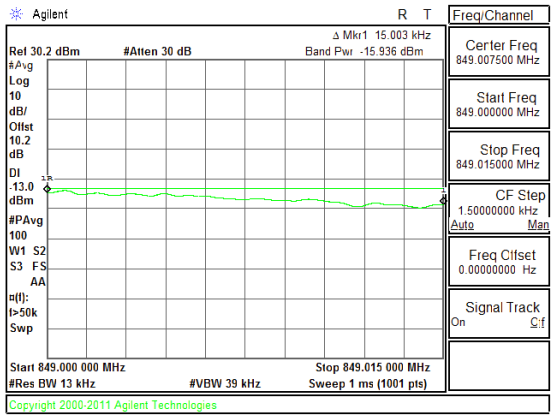
RESULTS

Note: GSM reading need add 9dB DCCF factor due to duty cycle is 12.5% during test.

10.2.1. BAND EDGE PLOTS

Band BC1 EVDO REL. 0	 Band BC1 EVDO Rel. 0 CBE Low channel	 Band BC1 EVDO Rel. 0 CBE High channel

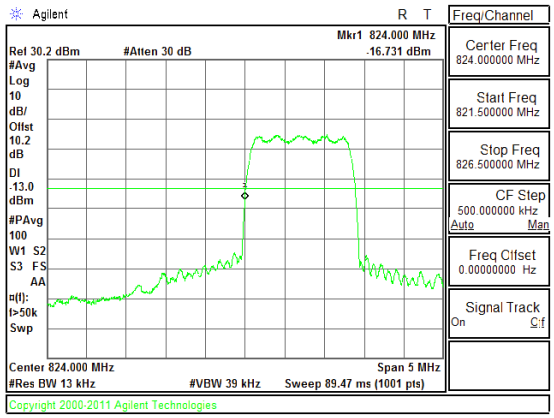
Band BC1 1xRTT	 Band BC1 1xRTT CBE Low channel	 Band BC1 1xRTT CBE High channel

Band		
BC0	 Band BC0 EVDO Rel. 0 CBE Low channel	 Band BC0 EVDO Rel. 0 CBE High channel
EVDO REL. 0		

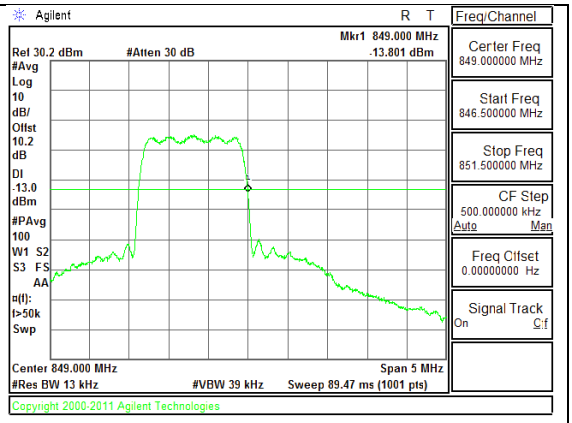
Band

BC0

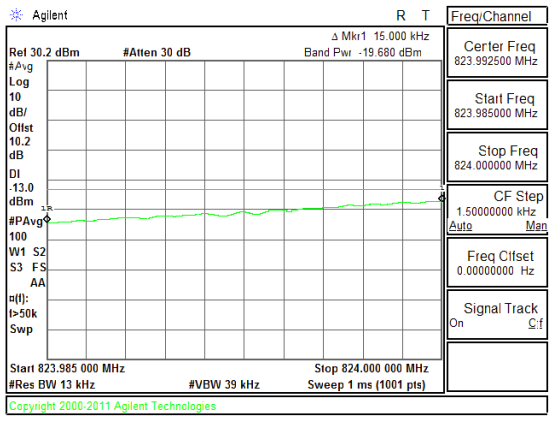
1xRTT

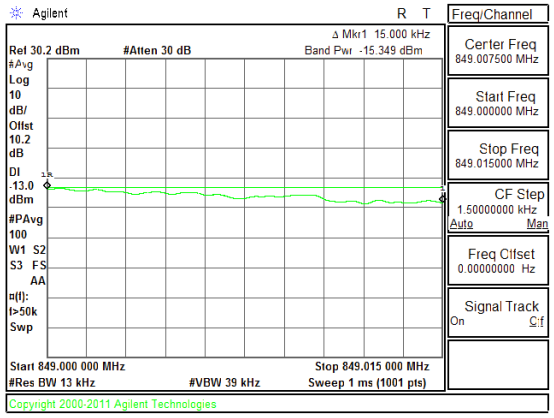


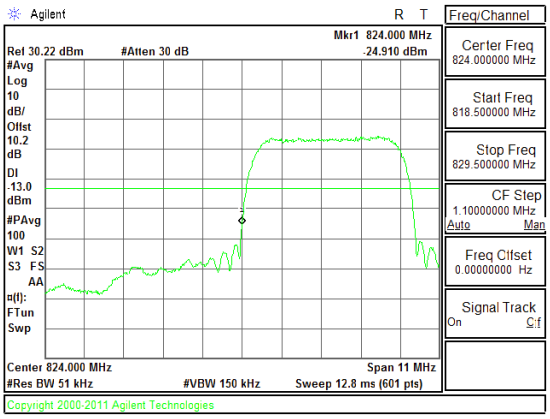
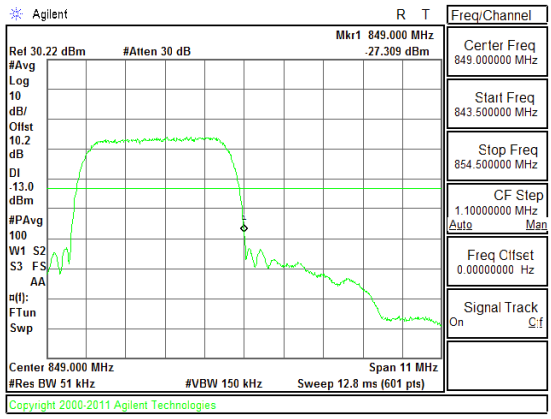
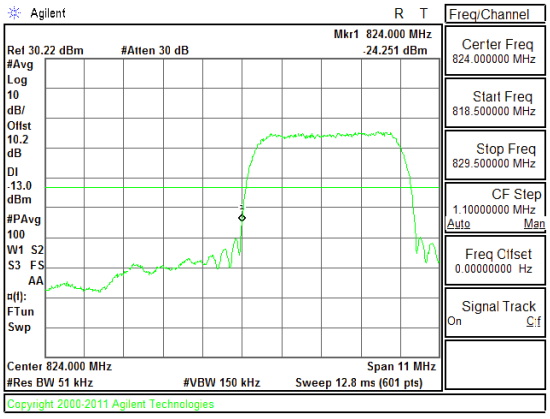
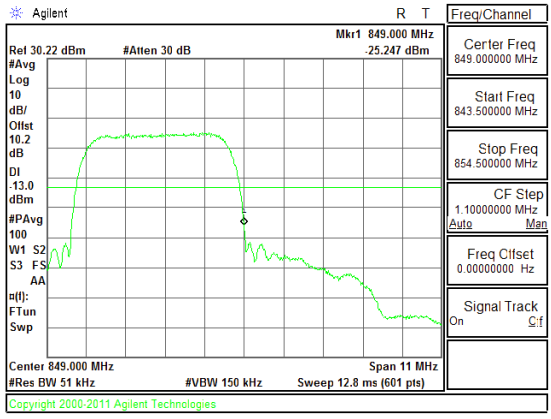
Band BC0 1xRTT CBE Low channel

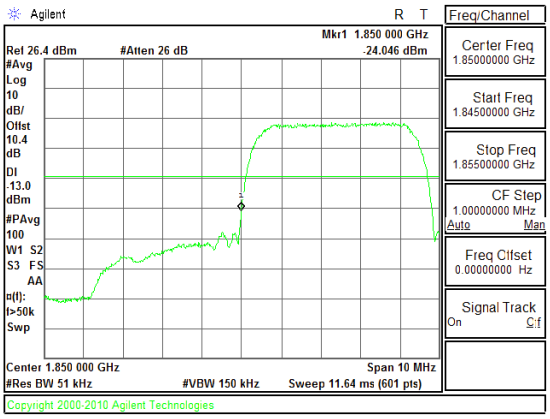
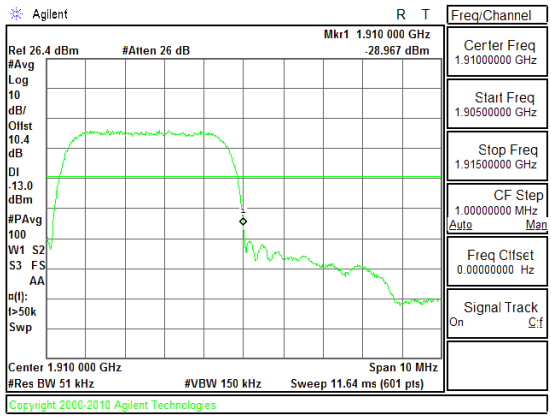
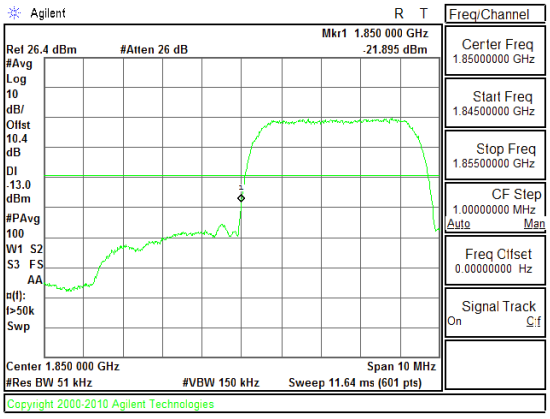
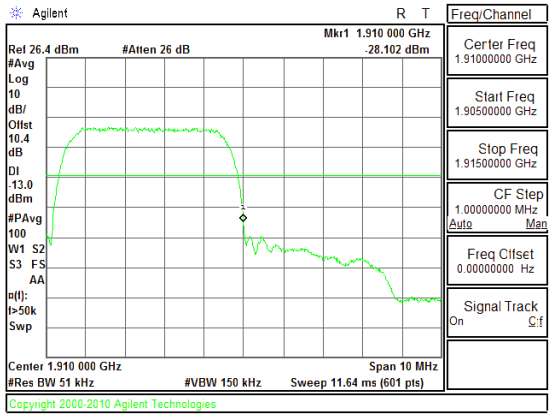


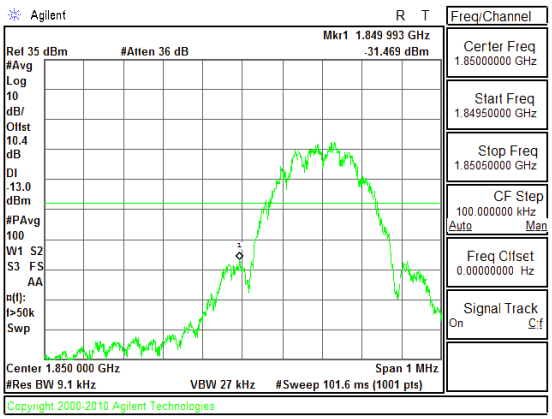
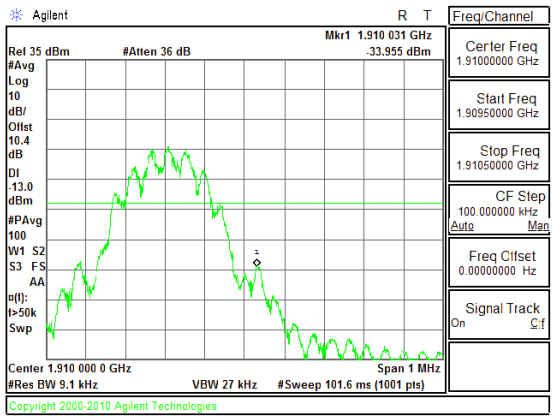
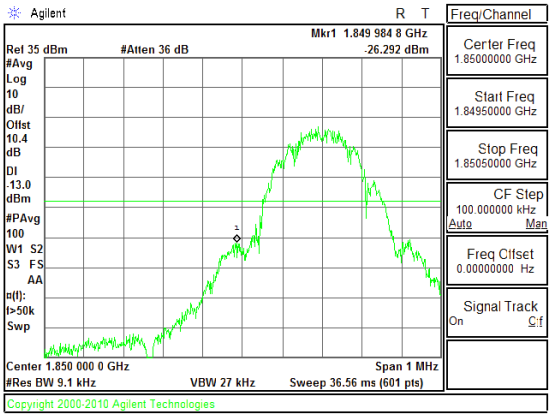
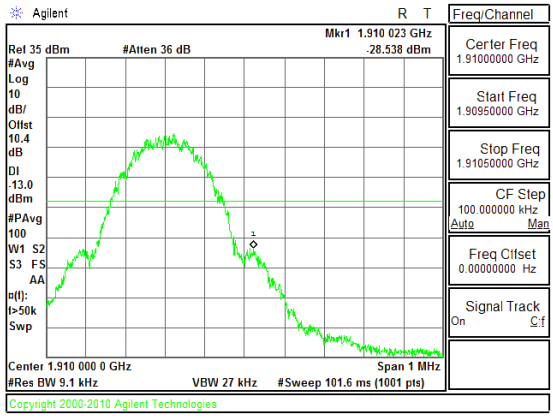
Band BC0 1xRTT CBE High channel

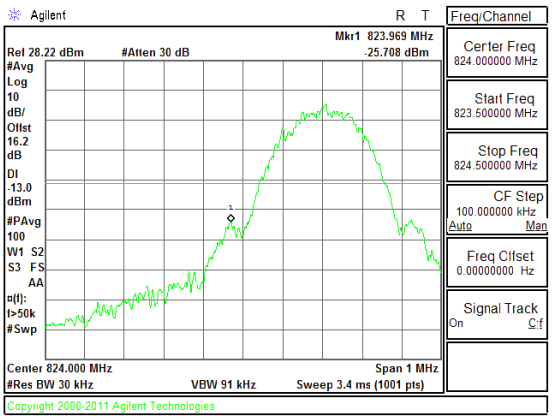
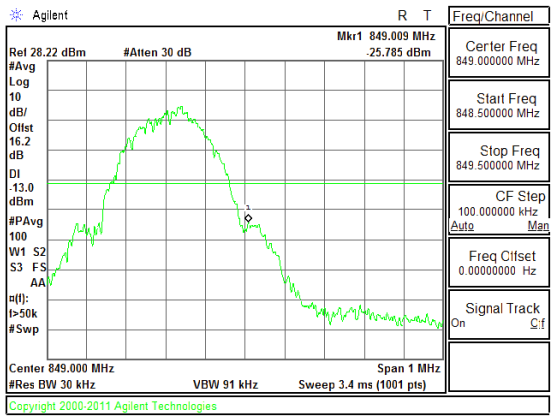
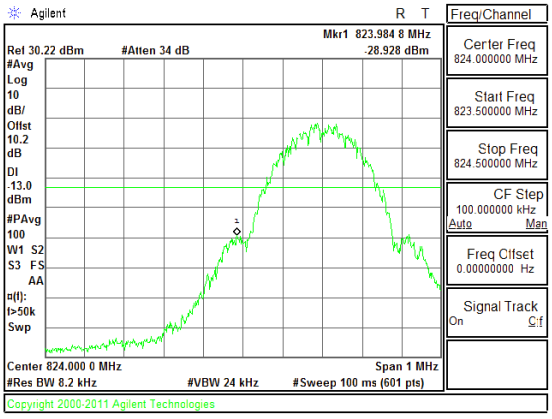
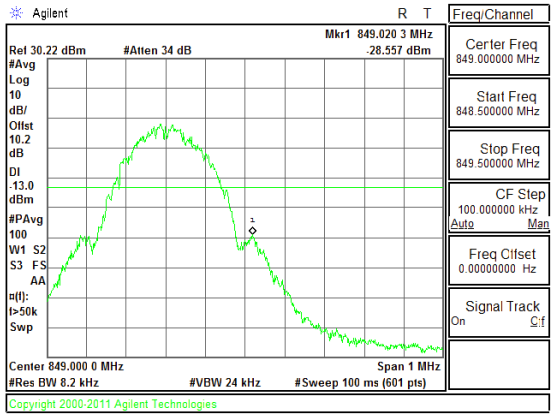




WCDMA BAND5 HSDPA	 LOW CHANNEL	 HIGH CHANNEL
WCDMA BAND5 REL99	 LOW CHANNEL	 HIGH CHANNEL

WCDMA BAND2 HSDPA	 LOW CHANNEL	 HIGH CHANNEL
WCDMA BAND2 REL99	 LOW CHANNEL	 HIGH CHANNEL

Band GSM1900 EGPRS	 Band GSM1900 EGPRS CBE Low channel	 Band GSM1900 EGPRS CBE High channel
Band GSM1900 GPRS	 Band GSM1900 GPRS CBE Low channel	 Band GSM1900 GPRS CBE High channel

Band GSM850 EGPRS	 Band GSM850 EGPRS CBE Low channel	 Band GSM850 EGPRS CBE High channel
Band GSM850 GPRS	 Band GSM850 GPRS CBE Low channel	 Band GSM850 GPRS CBE High channel

10.2.2. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §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.

Part 27: (m)(4) (4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

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.

SOP

For each out of band emissions measurement:

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

MODES TESTED

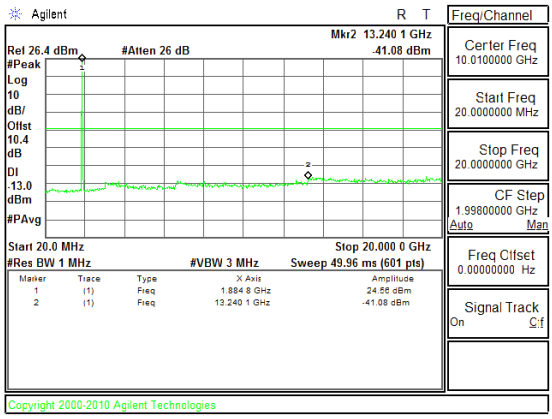
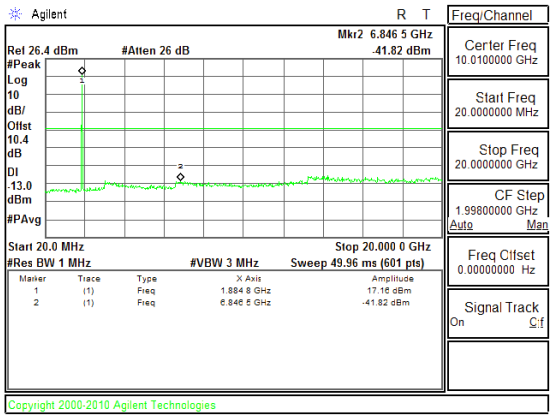
RESULTS

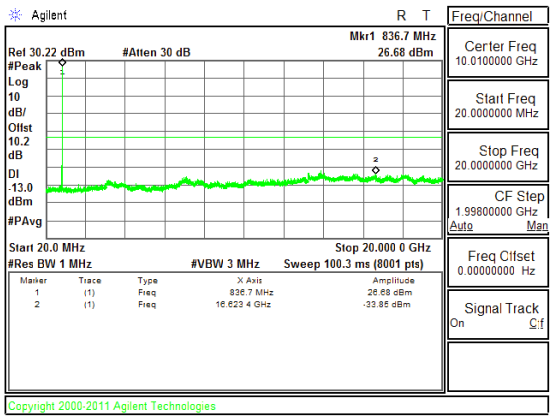
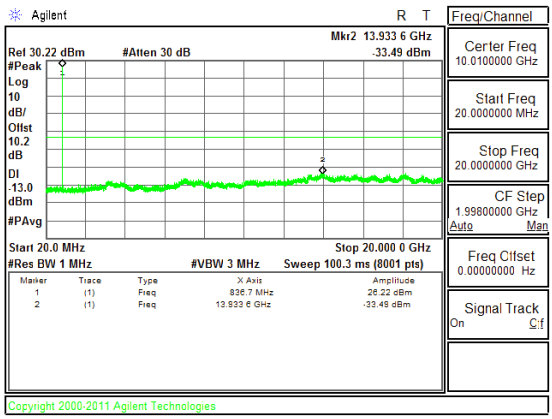
10.2.3. OUT OF BAND EMISSIONS RESULT

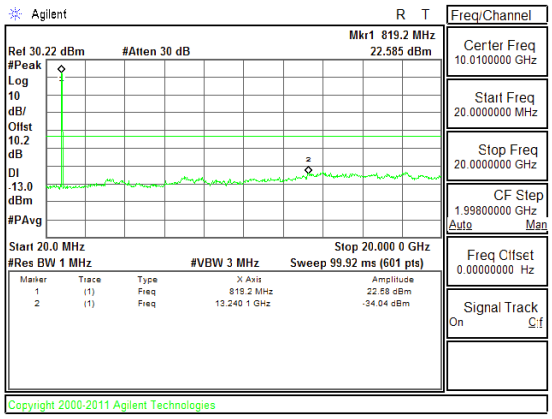
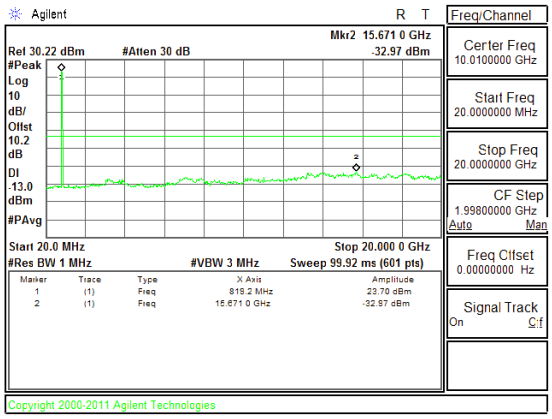
Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM850	GPRS	824.2	-33.53	-13	-20.53
		836.6	-34.09	-13	-21.09
		848.8	-32.65	-13	-19.65
	EGPRS	824.2	-27.18	-13	-14.18
		836.6	-27.58	-13	-14.58
		848.8	-28.23	-13	-15.23
GSM1900	GPRS	1850.2	-40.86	-13	-27.86
		1880	-40.47	-13	-27.47
		1909.8	-40.66	-13	-27.66
	EGPRS	1850.2	-30.15	-13	-17.15
		1880	-31.66	-13	-18.66
		1909.8	-29.81	-13	-16.81
Band 5	Rel99	826.4	-33.72	-13	-20.72
		836.6	-32.97	-13	-19.97
		846.6	-33.56	-13	-20.56
	HSDPA	826.4	-33.87	-13	-20.87
		836.6	-34.04	-13	-21.04
		846.6	-33.81	-13	-20.81
Band 2	Rel99	1852.4	-39.82	-13	-26.82
		1880	-39.98	-13	-26.98
		1907.6	-40.31	-13	-27.31
	HSDPA	1852.4	-38.99	-13	-25.99
		1880	-40.03	-13	-27.03
		1907.6	-39.27	-13	-26.27

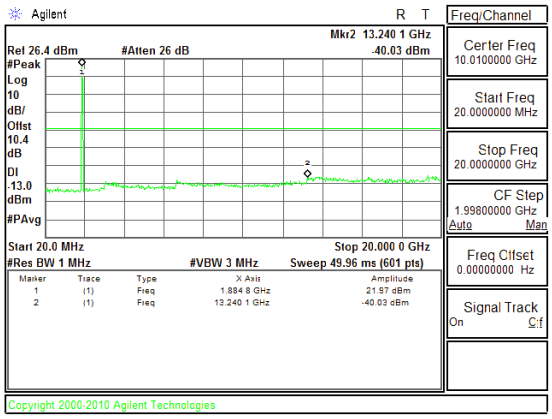
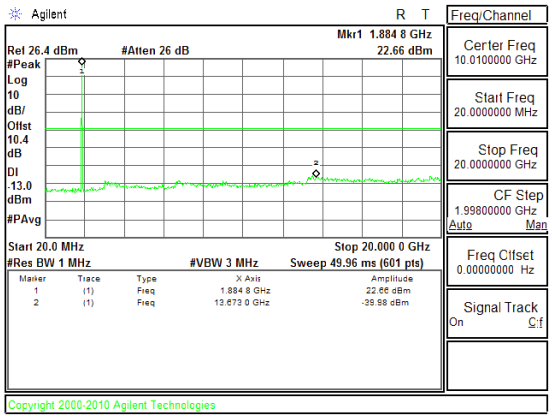
BC0	1xRTT	824.7	-33.19	-13	-20.19
		836.52	-33.49	-13	-20.49
		848.31	-33.15	-13	-20.15
	EVDO	824.7	-33.23	-13	-20.23
		836.52	-33.85	-13	-20.85
		848.31	-35.83	-13	-22.83
BC1	1xRTT	1851.25	-40.19	-13	-27.19
		1880	-41.82	-13	-28.82
		1908.75	-40.7	-13	-27.7
	EVDO	1851.25	-40.35	-13	-27.35
		1880	-41.08	-13	-28.08
		1908.75	-36.68	-13	-23.68

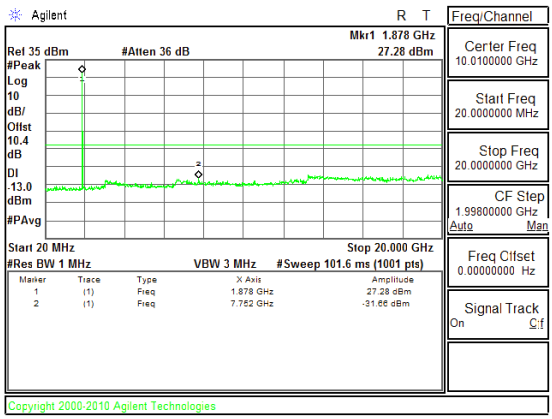
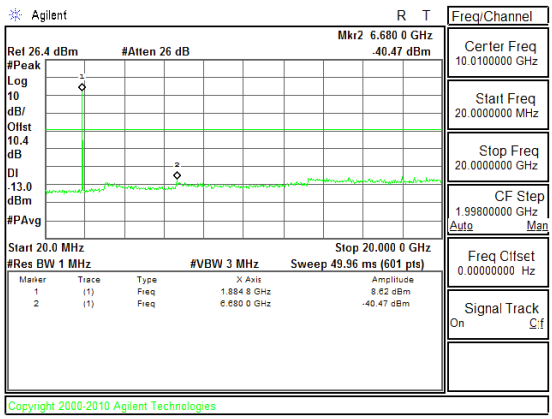
10.2.4. OUT OF BAND EMISSIONS PLOTS

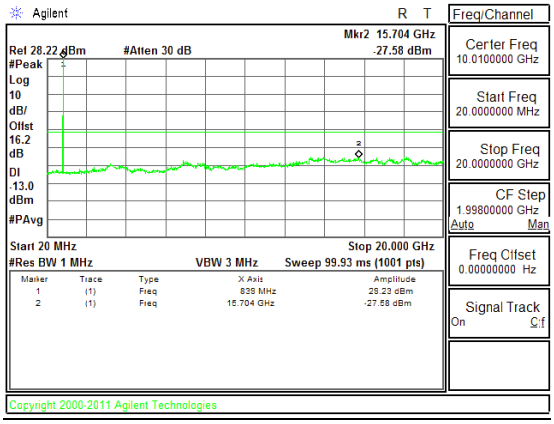
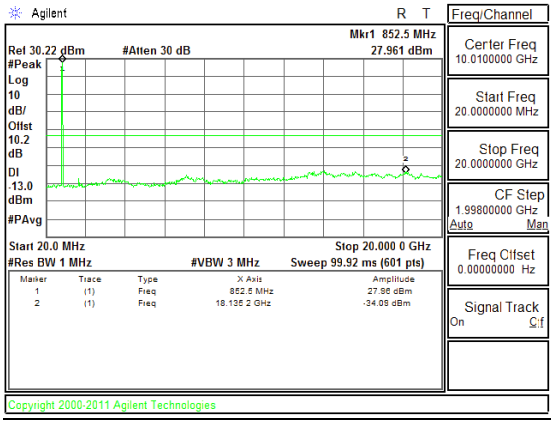
Band BC1 EVDO REL. 0	 Band BC1 EVDO Rel. 0 CSE Mid channel	 Band BC1 1xRTT CSE Mid channel

Band BC0 EVDO REL. 0	 Band BC0 EVDO Rel. 0 CSE Mid channel	 Band BC0 1xRTT CSE Mid channel

WCDMA BAND5	 HSDPA MID CHANNEL	 REL99 MID CHANNEL

WCDMA BAND2	 HSDPA MID CHANNEL	 REL99 MID CHANNEL

Band GSM1900 EGPRS	 Band GSM1900 EGPRS CSE Mid channel	 Band GSM1900 GPRS CSE Mid channel

Band **GSM850** **EGPRS**	 **Band GSM850 EGPRS CSE Mid channel**	 **Band GSM850 GPRS CSE Mid channel**

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

MODES TESTED

RESULTS

See the following pages.

10.3.1. FREQUENCY STABILITY RESULTS

WCDMA BAND 2 – MID CHANNEL (1880.0 MHz)

Reference Frequency: Cellular Mid Channel 1879.999988MHz @ 20°C Limit: to stay +- 2.5 ppm = 4700.000 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
(Vac)	**Temperature (°C)**	**(MHz)**	**Delta (ppm)**	**Limit (ppm)**
230.00	50	1879.999988	0.000	2.5
230.00	40	1879.999988	0.000	2.5
230.00	30	1879.999988	0.000	2.5
230.00	***20***	***1879.999988***	***0***	2.5
230.00	10	1879.999988	0.000	2.5
230.00	0	1879.999987	0.000	2.5
230.00	-10	1879.999988	0.000	2.5
230.00	-20	1879.999988	0.000	2.5
230.00	-30	1879.999989	0.000	2.5

Reference Frequency: Cellular Mid Channel 1879.999988MHz @ 20°C Limit: to stay +- 2.5 ppm = 4700.000 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
(Vac)	**Temperature (°C)**	**(MHz)**	**Delta (ppm)**	**Limit (ppm)**
230.00	***20***	***1879.999988***	***0***	***2.5***
207.00	20	1879.999988	*0.000*	2.5
240.00	20	1879.999989	*-0.001*	2.5

WCDMA BAND 5 – MID CHANNEL (836.5 MHz)

Reference Frequency: Cellular Mid Channel 836.599997MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
(Vac)	**Temperature (°C)**	**(MHz)**	**Delta (ppm)**	**Limit (ppm)**
230.00	50	836.599997	-0.001	2.5
230.00	40	836.599996	0.001	2.5
230.00	30	836.599997	0.000	2.5
230.00	***20***	***836.599997***	***0***	2.5
230.00	10	836.600003	-0.007	2.5
230.00	0	836.600002	-0.006	2.5
230.00	-10	836.599997	0.000	2.5
230.00	-20	836.599997	0.000	2.5
230.00	-30	836.600003	-0.008	2.5

Reference Frequency: Cellular Mid Channel 836.599997MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
(Vac)	**Temperature (°C)**	**(MHz)**	**Delta (ppm)**	**Limit (ppm)**
230.00	***20***	***836.599997***	***0***	***2.5***
207.00	20	836.599997	*-0.001*	2.5
240.00	20	836.599996	*0.001*	2.5

11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232

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.

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

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17; PSA setting reference to 971168 D01 v02r02

For peak power measurement with a PSA:

a) Set the RBW ≥ OBW; b) Set VBW ≥ 3 × RBW; c) Set span ≥ 2 x RBW; d) Sweep time = auto couple; e) Detector = peak; f) Ensure that the number of measurement points ≥ span/RBW; g) Trace mode = max hold;

For average power measurement with a PSA:

a) Set span to at least 1.5 times the OBW; b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz; c) Set VBW ≥ 3 x RBW; d) Set number of points in sweep ≥ 2 × span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle ≥ 98; h) Use trigger to capture bursts If burst duty cycle < 98; i) Trace average at least 100 traces in power averaging (*i.e.*, RMS) mode. j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function.

11.1.1. ERP/EIRP Results

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
BC1	1xRTT	25	1851.25	25.49	354.00
		600	1880	24.89	308.32
		1175	1908.75	24.55	285.10
	EVDO REL. 0	25	1851.25	25.51	355.63
		600	1880	24.92	310.46
		1175	1908.75	25.58	361.41

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
BC0	1xRTT	1013	824.7	21.70	147.91
		384	836.52	21.74	149.28
		777	848.31	21.88	154.17
	EVDO REL. 0	1013	824.7	21.69	147.57
		384	836.52	21.73	148.94
		777	848.31	21.87	153.82

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 2	Rel99	9262	1852.4	25.29	338.06
		9400	1880	25.29	338.06
		9538	1907.6	25.24	334.20
	HSDPA	9262	1852.4	24.12	258.23
		9400	1880	24.01	251.77
		9538	1907.6	24.15	260.02

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 5	Rel99	4132	826.4	21.51	141.58
		4183	836.6	21.84	152.76
		4233	846.6	21.84	152.76
	HSDPA	4132	826.4	20.04	100.93
		4183	836.6	20.41	109.90
		4233	846.6	20.76	119.12

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM1900	GPRS	512	1850.2	32.56	1803.02
		661	1880	31.89	1545.25
		810	1909.8	32.22	1667.25
	EGPRS	512	1850.2	29.08	809.10
		661	1880	28.83	763.84
		810	1909.8	29.15	822.24

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM850	GPRS	128	824.2	29.58	907.82
		190	836.6	29.51	893.31
		251	848.8	30.61	1150.8
	EGPRS	128	824.2	24.55	285.10
		190	836.6	24.63	290.40
		251	848.8	25.29	338.06

11.1.2. ERP/EIRP PLOTS

Band

GSM1900

EGPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber A

Company: Qualcomm
Project #: 15U19820
Date: 3/9/2015
Test Engineer: R. Alegre
Configuration: EUT only
Mode: EGPRS 1900

Test Equipment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.20	14.23	V	0.9	8.0	21.39	33.0	-11.6	
1850.20	21.92	H	0.9	8.0	29.08	33.0	-3.9	
Mid Ch								
1880.00	14.03	V	0.9	8.0	21.19	33.0	-11.8	
1880.00	21.67	H	0.9	8.0	28.83	33.0	-4.2	
High Ch								
1909.80	14.12	V	0.9	8.0	21.28	33.0	-11.7	
1909.80	21.99	H	0.9	8.0	29.15	33.0	-3.9	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

Band

GSM1900

GPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber A

Company: Qualcomm
Project #: 15U19820
Date: 3/9/2015
Test Engineer: R. Alegre
Configuration: EUT only
Mode: GPRS 1900

Test Equipment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.20	18.16	V	0.9	8.0	25.32	33.0	-7.7	
1850.20	25.40	H	0.9	8.0	32.56	33.0	-0.4	
Mid Ch								
1880.00	18.09	V	0.9	8.0	25.25	33.0	-7.8	
1880.00	24.73	H	0.9	8.0	31.89	33.0	-1.1	
High Ch								
1909.80	18.10	V	0.9	8.0	25.26	33.0	-7.7	
1909.80	25.06	H	0.9	8.0	32.22	33.0	-0.8	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

Band

GSM850

EGPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber A

Company: Qualcomm
Project #: 15U19820
Date: 3/9/2015
Test Engineer: R. Alegre
Configuration: EUT only
Mode: EGPRS850

Test Equipment:
Receiving: Hybrid T130, and Chamber A N-type Cable
Substitution: Dipole T273, 8ft SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	20.15	V	0.9	0.0	19.25	38.5	-19.2	
824.20	25.45	H	0.9	0.0	24.55	38.5	-13.9	
Mid Ch								
836.60	19.77	V	0.9	0.0	18.87	38.5	-19.6	
836.60	25.53	H	0.9	0.0	24.63	38.5	-13.8	
High Ch								
848.80	20.50	V	0.9	0.0	19.60	38.5	-18.8	
848.80	26.19	H	0.9	0.0	25.29	38.5	-13.2	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

Band

GSM850

GPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber A

Company: Qualcomm
Project #: 15U19820
Date: 3/9/2015
Test Engineer: R. Alegre
Configuration: EUT only
Mode: GPRS850

Test Equipment:
Receiving: Hybrid T130, and Chamber A N-type Cable
Substitution: Dipole T273, 8ft SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	24.52	V	0.9	0.0	23.62	38.5	-14.8	
824.20	30.48	H	0.9	0.0	29.58	38.5	-8.9	
Mid Ch								
836.60	23.94	V	0.9	0.0	23.04	38.5	-15.4	
836.60	30.41	H	0.9	0.0	29.51	38.5	-8.9	
High Ch								
848.80	24.82	V	0.9	0.0	23.92	38.5	-14.5	
848.80	31.51	H	0.9	0.0	30.61	38.5	-7.8	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

WCDMA BAND5

HSDPA

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Qualcomm
Project #: 15U19820
Date: 03/05/15
Test Engineer: D. Sblendorio
Configuration: EUT only
Mode: WCDMA Band 5 HSDPA

Test Equipment:
Receiving: Sunol T185, and 3m Chamber C N-type Cable
Substitution: Dipole T273, 4ft SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	14.40	V	0.9	0.0	13.50	38.5	-24.9	
826.40	20.94	H	0.9	0.0	20.04	38.5	-18.4	
Mid Ch								
836.60	14.77	V	0.9	0.0	13.87	38.5	-24.6	
836.60	21.31	H	0.9	0.0	20.41	38.5	-18.0	
High Ch								
846.60	13.16	V	0.9	0.0	12.26	38.5	-26.2	
846.60	21.66	H	0.9	0.0	20.76	38.5	-17.7	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

WCDMA BAND5 REL99

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Qualcomm
Project #: 15U19820
Date: 03/05/15
Test Engineer: D. Sblendorio
Configuration: EUT only
Mode: REL99 B5 FUND

Test Equipment:
Receiving: Sunol T185, and 3m Chamber A N-type Cable
Substitution: Dipole T273, 4ft SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	13.70	V	0.9	0.0	12.80	38.5	-25.6	
826.40	22.41	H	0.9	0.0	21.51	38.5	-16.9	
Mid Ch								
836.60	13.97	V	0.9	0.0	13.07	38.5	-25.4	
836.60	22.74	H	0.9	0.0	21.84	38.5	-16.6	
High Ch								
846.60	12.66	V	0.9	0.0	11.76	38.5	-26.7	
846.60	22.74	H	0.9	0.0	21.84	38.5	-16.6	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

WCDMA BAND2

HSDPA

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber A

Company: Qualcomm
Project #: 15U19820
Date: 03/09/15
Test Engineer: R.Alegre
Configuration: EUT only
Mode: HSDPA B2

Test Equipment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	10.37	V	0.9	8.0	17.48	33.0	-15.5	
1852.40	17.01	H	0.9	8.0	24.12	33.0	-8.9	
Mid Ch								
1880.00	10.35	V	0.9	8.0	17.46	33.0	-15.5	
1880.00	16.90	H	0.9	8.0	24.01	33.0	-9.0	
High Ch								
1907.60	10.35	V	0.9	8.0	17.46	33.0	-15.5	
1907.60	17.04	H	0.9	8.0	24.15	33.0	-8.8	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

WCDMA BAND2

REL 99

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber A

Company: Qualcomm
Project #: 15U19820
Date: 03/09/15
Test Engineer: R.Alegre
Configuration: EUT only
Mode: Rel99 B2

Test Equipment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	11.44	V	0.9	8.0	18.55	33.0	-14.5	
1852.40	18.18	H	0.9	8.0	25.29	33.0	-7.7	
Mid Ch								
1880.00	11.33	V	0.9	8.0	18.44	33.0	-14.6	
1880.00	18.18	H	0.9	8.0	25.29	33.0	-7.7	
High Ch								
1907.60	11.40	V	0.9	8.0	18.51	33.0	-14.5	
1907.60	18.13	H	0.9	8.0	25.24	33.0	-7.8	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

BC0

EVD0
R0

High Frequency Substitution Measurement
UL Verification Services Chamber C

Company: Qualcomm
Project #: 15U19820
Date: 4/26/2015
Test Engineer: R.A
Configuration: EUT Only
Mode: CDMA EVDO BC0

Test Equipment:
Receiving: T185, and Chamber C Cable
Substitution: Dipole T273, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	13.04	V	0.9	0.0	12.14	38.5	-26.3	
824.70	22.59	H	0.9	0.0	21.69	38.5	-16.8	
Mid Ch								
836.52	12.88	V	0.9	0.0	11.98	38.5	-26.5	
836.52	22.63	H	0.9	0.0	21.73	38.5	-16.7	
High Ch								
848.31	13.56	V	0.9	0.0	12.66	38.5	-25.8	
848.31	22.77	H	0.9	0.0	21.87	38.5	-16.6	

Rev. 3.17.11

BC0

RTT

High Frequency Substitution Measurement
UL Verification Services Chamber C

Company: Qualcomm
Project #: 15U19820
Date: 4/26/2015
Test Engineer: R.A
Configuration: EUT Only
Mode: CDMA RTT BC0

Test Equipment:
Receiving: T185, and Chamber C Cable
Substitution: Dipole T273, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	13.10	V	0.9	0.0	12.20	38.5	-26.2	
824.70	22.60	H	0.9	0.0	21.70	38.5	-16.7	
Mid Ch								
836.52	12.84	V	0.9	0.0	11.94	38.5	-26.5	
836.52	22.64	H	0.9	0.0	21.74	38.5	-16.7	
High Ch								
848.31	13.69	V	0.9	0.0	12.79	38.5	-25.7	
848.31	22.78	H	0.9	0.0	21.88	38.5	-16.6	

Rev. 3.17.11

BC1

EVD0
R0

High Frequency Fundamental Measurement
UL Verification Services, Inc.

Company: Qualcomm
Project #: 15U19820
Date: 4/3/2015
Test Engineer: R. Alegre
Configuration: EUT Only
Mode: CDMA EVDO BC1

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.8513	12.2	V	0.90	8.01	19.35	33.0	-13.7	
1.8513	18.4	H	0.90	8.01	25.51	33.0	-7.5	
Mid Ch								
1.8800	11.0	V	0.90	8.01	18.12	33.0	-14.9	
1.8800	17.8	H	0.90	8.01	24.92	33.0	-8.1	
High Ch								
1.9088	12.6	V	0.90	8.01	19.69	33.0	-13.3	
1.9088	18.5	H	0.90	8.01	25.58	33.0	-7.4	

Rev. 3.17.11

BC1

RTT

High Frequency Fundamental Measurement
UL Verification Services, Inc.

Company:	Qualcomm
Project #:	15U19820
Date:	4/3/2015
Test Engineer:	R. Alegre
Configuration:	EUT Only
Mode:	CDMA RTT BC1

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.8513	12.3	V	0.90	8.01	19.37	33.0	-13.6	
1.8513	18.4	H	0.90	8.01	25.49	33.0	-7.5	
Mid Ch								
1.8800	11.0	V	0.90	8.01	18.07	33.0	-14.9	
1.8800	17.8	H	0.90	8.01	24.89	33.0	-8.1	
High Ch								
1.9088	12.2	V	0.90	8.01	19.31	33.0	-13.7	
1.9088	17.4	H	0.90	8.01	24.55	33.0	-8.5	

Rev. 3.17.11

11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238

LIMIT

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

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.

11.2.1. SPURIOUS RADIATION PLOTS

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Qualcomm
Project #: 15U19820
Date: 04/26/15
Test Engineer: R.A
Configuration: EUT only
Mode: GSM 1900 EGPRS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1850.2MHz									
GSM1900 EGPRS	3.700	-16.9	V	3.0	35.4	1.0	-51.3	-13.0	-38.3	
	5.551	-11.4	V	3.0	34.7	1.0	-45.2	-13.0	-32.2	
	7.401	-13.8	V	3.0	34.9	1.0	-47.7	-13.0	-34.7	
	3.700	-18.5	H	3.0	35.4	1.0	-52.9	-13.0	-39.9	
	5.551	-5.4	H	3.0	34.7	1.0	-39.1	-13.0	-26.1	
	7.401	-13.2	H	3.0	34.9	1.0	-47.1	-13.0	-34.1	
	Mid Ch, 1880MHz									
	3.760	-17.4	V	3.0	35.3	1.0	-51.8	-13.0	-38.8	
	5.640	-14.3	V	3.0	34.7	1.0	-48.0	-13.0	-35.0	
	7.520	-14.2	V	3.0	34.9	1.0	-48.1	-13.0	-35.1	
	3.760	-18.5	H	3.0	35.3	1.0	-52.9	-13.0	-39.9	
	5.640	-11.0	H	3.0	34.7	1.0	-44.7	-13.0	-31.7	
	7.520	-12.6	H	3.0	34.9	1.0	-46.5	-13.0	-33.5	
	High Ch, 1909.8MHz									
	3.820	-17.3	V	3.0	35.3	1.0	-51.6	-13.0	-38.6	
	5.729	-15.1	V	3.0	34.7	1.0	-48.8	-13.0	-35.8	
	7.639	-13.1	V	3.0	35.0	1.0	-47.1	-13.0	-34.1	
	3.820	-17.3	H	3.0	35.3	1.0	-51.6	-13.0	-38.6	
	5.729	-11.8	H	3.0	34.7	1.0	-45.5	-13.0	-32.5	
	7.639	-12.1	H	3.0	35.0	1.0	-46.0	-13.0	-33.0	

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

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Qualcomm
Project #: 15U19820
Date: 04/26/15
Test Engineer: R.A
Configuration: EUT only
Mode: GSM 1900 GPRS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band

GSM1900

GPRS

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3.700	-15.6	V	3.0	35.4	1.0	-50.0	-13.0	-37.0	
5.551	-10.1	V	3.0	34.7	1.0	-43.8	-13.0	-30.8	
7.401	-13.5	V	3.0	34.9	1.0	-47.4	-13.0	-34.4	
3.700	-16.9	H	3.0	35.4	1.0	-51.3	-13.0	-38.3	
5.551	-3.6	H	3.0	34.7	1.0	-37.3	-13.0	-24.3	
7.401	-12.1	H	3.0	34.9	1.0	-46.0	-13.0	-33.0	
Mid Ch, 1880MHz									
3.760	-16.3	V	3.0	35.3	1.0	-50.6	-13.0	-37.6	
5.640	-12.7	V	3.0	34.7	1.0	-46.5	-13.0	-33.5	
7.520	-14.2	V	3.0	34.9	1.0	-48.1	-13.0	-35.1	
3.760	-16.6	H	3.0	35.3	1.0	-51.0	-13.0	-38.0	
5.640	-9.5	H	3.0	34.7	1.0	-43.2	-13.0	-30.2	
7.520	-13.1	H	3.0	34.9	1.0	-47.1	-13.0	-34.1	
High Ch, 1909.8MHz									
3.820	-16.1	V	3.0	35.3	1.0	-50.4	-13.0	-37.4	
5.729	-14.0	V	3.0	34.7	1.0	-47.7	-13.0	-34.7	
7.639	-12.3	V	3.0	35.0	1.0	-46.2	-13.0	-33.2	
3.820	-15.5	H	3.0	35.3	1.0	-49.7	-13.0	-36.7	
5.729	-10.2	H	3.0	34.7	1.0	-43.9	-13.0	-30.9	
7.639	-11.1	H	3.0	35.0	1.0	-45.1	-13.0	-32.1	

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

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Qualcomm
Project #: 15U19820
Date: 04/26/15
Test Engineer: R.A
Configuration: EUT only
Mode: EGPRS850 Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band

GSM850

EGPRS

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1.648	-18.7	V	3.0	37.4	1.0	-55.1	-13.0	-42.1	
2.473	-22.7	V	3.0	36.4	1.0	-58.1	-13.0	-45.1	
3.297	-21.6	V	3.0	35.8	1.0	-56.4	-13.0	-43.4	
1.648	-14.3	H	3.0	37.4	1.0	-50.7	-13.0	-37.7	
2.473	-25.8	H	3.0	36.4	1.0	-61.2	-13.0	-48.2	
3.297	-22.0	H	3.0	35.8	1.0	-56.8	-13.0	-43.8	
Mid Ch, 836.6MHz									
1.673	-21.0	V	3.0	37.3	1.0	-57.3	-13.0	-44.3	
2.510	-23.8	V	3.0	36.4	1.0	-59.2	-13.0	-46.2	
3.346	-22.1	V	3.0	35.8	1.0	-56.8	-13.0	-43.8	
1.673	-24.5	H	3.0	37.3	1.0	-60.9	-13.0	-47.9	
2.510	-25.5	H	3.0	36.4	1.0	-60.8	-13.0	-47.8	
3.346	-22.3	H	3.0	35.8	1.0	-57.0	-13.0	-44.0	
High Ch, 848.8MHz									
1.698	-21.4	V	3.0	37.3	1.0	-57.7	-13.0	-44.7	
2.546	-23.6	V	3.0	36.3	1.0	-59.0	-13.0	-46.0	
3.395	-22.5	V	3.0	35.7	1.0	-57.2	-13.0	-44.2	
1.698	-14.4	H	3.0	37.3	1.0	-50.7	-13.0	-37.7	
2.546	-25.0	H	3.0	36.3	1.0	-60.3	-13.0	-47.3	
3.395	-21.9	H	3.0	35.7	1.0	-56.6	-13.0	-43.6	

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

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company:	Qualcomm
Project #:	15U19820
Date:	04/26/15
Test Engineer:	R.A
Configuration:	EUT only
Mode:	GPRS 850

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band

GSM850

GPRS

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1.648	-18.0	V	3.0	37.4	1.0	-54.4	-13.0	-41.4	
2.473	-22.2	V	3.0	36.4	1.0	-57.5	-13.0	-44.5	
3.297	-21.3	V	3.0	35.8	1.0	-56.1	-13.0	-43.1	
1.648	-13.5	H	3.0	37.4	1.0	-49.9	-13.0	-36.9	
2.473	-25.1	H	3.0	36.4	1.0	-60.5	-13.0	-47.5	
3.297	-20.9	H	3.0	35.8	1.0	-55.7	-13.0	-42.7	
Mid Ch, 836.6MHz									
1.673	-19.5	V	3.0	37.3	1.0	-55.8	-13.0	-42.8	
2.510	-23.3	V	3.0	36.4	1.0	-58.6	-13.0	-45.6	
3.346	-21.6	V	3.0	35.8	1.0	-56.3	-13.0	-43.3	
1.673	-23.5	H	3.0	37.3	1.0	-59.9	-13.0	-46.9	
2.510	-24.3	H	3.0	36.4	1.0	-59.7	-13.0	-46.7	
3.346	-21.5	H	3.0	35.8	1.0	-56.2	-13.0	-43.2	
High Ch, 848.8MHz									
1.698	-21.1	V	3.0	37.3	1.0	-57.4	-13.0	-44.4	
2.546	-22.3	V	3.0	36.3	1.0	-57.7	-13.0	-44.7	
3.395	-21.6	V	3.0	35.7	1.0	-56.3	-13.0	-43.3	
1.698	-13.4	H	3.0	37.3	1.0	-49.7	-13.0	-36.7	
2.546	-23.9	H	3.0	36.3	1.0	-59.3	-13.0	-46.3	
3.395	-21.5	H	3.0	35.7	1.0	-56.2	-13.0	-43.2	

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

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Qualcomm
Project #: 15U19820
Date: 04/26/15
Test Engineer: R.A
Configuration: EUT only
Mode: HSDPA_B5

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

WCDM A5

HSDPA

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1.653	-18.9	V	3.0	37.4	1.0	-55.3	-13.0	-42.3	
2.479	-22.9	V	3.0	36.4	1.0	-58.3	-13.0	-45.3	
3.306	-20.2	V	3.0	35.8	1.0	-55.0	-13.0	-42.0	
1.653	-14.1	H	3.0	37.4	1.0	-50.5	-13.0	-37.5	
2.479	-24.0	H	3.0	36.4	1.0	-59.4	-13.0	-46.4	
3.306	-20.8	H	3.0	35.8	1.0	-55.5	-13.0	-42.5	
Mid Ch, 836.6MHz									
1.673	-20.4	V	3.0	37.3	1.0	-56.8	-13.0	-43.8	
2.510	-22.5	V	3.0	36.4	1.0	-57.9	-13.0	-44.9	
3.346	-19.8	V	3.0	35.8	1.0	-54.6	-13.0	-41.6	
1.673	-14.7	H	3.0	37.3	1.0	-51.1	-13.0	-38.1	
2.510	-23.9	H	3.0	36.4	1.0	-59.3	-13.0	-46.3	
3.346	-20.4	H	3.0	35.8	1.0	-55.1	-13.0	-42.1	
High Ch, 846.6MHz									
1.693	-22.1	V	3.0	37.3	1.0	-58.4	-13.0	-45.4	
2.540	-22.6	V	3.0	36.3	1.0	-57.9	-13.0	-44.9	
3.386	-20.7	V	3.0	35.7	1.0	-55.4	-13.0	-42.4	
1.693	-14.6	H	3.0	37.3	1.0	-50.9	-13.0	-37.9	
2.540	-24.1	H	3.0	36.3	1.0	-59.4	-13.0	-46.4	
3.386	-20.0	H	3.0	35.7	1.0	-54.7	-13.0	-41.7	

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

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Qualcomm
Project #: 15U19820
Date: 04/26/15
Test Engineer: R.A
Configuration: EUT only
Mode: REL99_B5

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

WCDM A5

REL99

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1.653	-18.8	V	3.0	37.4	1.0	-55.1	-13.0	-42.1	
2.479	-23.1	V	3.0	36.4	1.0	-58.4	-13.0	-45.4	
3.306	-20.1	V	3.0	35.8	1.0	-54.9	-13.0	-41.9	
1.653	-14.1	H	3.0	37.4	1.0	-50.5	-13.0	-37.5	
2.479	-23.9	H	3.0	36.4	1.0	-59.3	-13.0	-46.3	
3.306	-20.7	H	3.0	35.8	1.0	-55.5	-13.0	-42.5	
Mid Ch, 836.6MHz									
1.673	-20.4	V	3.0	37.3	1.0	-56.7	-13.0	-43.7	
2.510	-22.5	V	3.0	36.4	1.0	-57.8	-13.0	-44.8	
3.346	-19.7	V	3.0	35.8	1.0	-54.5	-13.0	-41.5	
1.673	-14.3	H	3.0	37.3	1.0	-50.7	-13.0	-37.7	
2.510	-23.5	H	3.0	36.4	1.0	-58.8	-13.0	-45.8	
3.346	-20.3	H	3.0	35.8	1.0	-55.1	-13.0	-42.1	
High Ch, 846.6MHz									
1.693	-21.7	V	3.0	37.3	1.0	-58.0	-13.0	-45.0	
2.540	-22.4	V	3.0	36.3	1.0	-57.7	-13.0	-44.7	
3.386	-20.6	V	3.0	35.7	1.0	-55.3	-13.0	-42.3	
1.693	-14.9	H	3.0	37.3	1.0	-51.2	-13.0	-38.2	
2.540	-23.9	H	3.0	36.3	1.0	-59.2	-13.0	-46.2	
3.386	-19.9	H	3.0	35.7	1.0	-54.6	-13.0	-41.6	

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

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Qualcomm
Project #: 15U19820
Date: 3/9/2015
Test Engineer: R. Alegre
Configuration: X-pos EUT only
Mode: HSDPA_B2

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T34 8449B	Filter 1	Part 24

WCDM A2

HSDPA

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.705	-15.7	V	3.0	35.4	1.0	-50.1	-13.0	-37.1	
5.557	-16.2	V	3.0	34.7	1.0	-49.9	-13.0	-36.9	
7.410	-13.4	V	3.0	34.9	1.0	-47.4	-13.0	-34.4	
3.705	-18.7	H	3.0	35.4	1.0	-53.1	-13.0	-40.1	
5.557	-16.0	H	3.0	34.7	1.0	-49.8	-13.0	-36.8	
7.410	-13.6	H	3.0	34.9	1.0	-47.6	-13.0	-34.6	
Mid Ch, 1880MHz									
3.760	-16.8	V	3.0	35.3	1.0	-51.1	-13.0	-38.1	
5.640	-15.1	V	3.0	34.7	1.0	-48.9	-13.0	-35.9	
7.520	-14.6	V	3.0	34.9	1.0	-48.5	-13.0	-35.5	
3.760	-17.4	H	3.0	35.3	1.0	-51.7	-13.0	-38.7	
5.640	-14.9	H	3.0	34.7	1.0	-48.6	-13.0	-35.6	
7.520	-12.4	H	3.0	34.9	1.0	-46.3	-13.0	-33.3	
High Ch, 1907.6MHz									
3.815	-15.2	V	3.0	35.3	1.0	-49.5	-13.0	-36.5	
5.723	-15.9	V	3.0	34.7	1.0	-49.6	-13.0	-36.6	
7.630	-13.4	V	3.0	34.9	1.0	-47.4	-13.0	-34.4	
3.815	-16.8	H	3.0	35.3	1.0	-51.1	-13.0	-38.1	
5.723	-15.6	H	3.0	34.7	1.0	-49.3	-13.0	-36.3	
7.630	-12.3	H	3.0	34.9	1.0	-46.2	-13.0	-33.2	

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

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Qualcomm
Project #: 15U19820
Date: 3/9/2015
Test Engineer: R. Alegre
Configuration: X-pos EUT only
Mode: REL99_B2

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T34 8449B	Filter 1	Part 24

WCDMA2

REL99

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.705	-15.3	V	3.0	35.4	1.0	-49.7	-13.0	-36.7	
5.557	-15.8	V	3.0	34.7	1.0	-49.6	-13.0	-36.6	
7.410	-14.0	V	3.0	34.9	1.0	-47.9	-13.0	-34.9	
3.705	-18.3	H	3.0	35.4	1.0	-52.7	-13.0	-39.7	
5.557	-15.5	H	3.0	34.7	1.0	-49.2	-13.0	-36.2	
7.410	-13.1	H	3.0	34.9	1.0	-47.0	-13.0	-34.0	
Mid Ch, 1880MHz									
3.760	-16.5	V	3.0	35.3	1.0	-50.8	-13.0	-37.8	
5.640	-15.3	V	3.0	34.7	1.0	-49.0	-13.0	-36.0	
7.520	-14.0	V	3.0	34.9	1.0	-47.9	-13.0	-34.9	
3.760	-17.0	H	3.0	35.3	1.0	-51.3	-13.0	-38.3	
5.640	-14.6	H	3.0	34.7	1.0	-48.3	-13.0	-35.3	
7.520	-13.1	H	3.0	34.9	1.0	-47.0	-13.0	-34.0	
High Ch, 1907.6MHz									
3.815	-15.1	V	3.0	35.3	1.0	-49.4	-13.0	-36.4	
5.723	-15.4	V	3.0	34.7	1.0	-49.1	-13.0	-36.1	
7.630	-13.0	V	3.0	34.9	1.0	-47.0	-13.0	-34.0	
3.815	-16.5	H	3.0	35.3	1.0	-50.8	-13.0	-37.8	
5.723	-15.0	H	3.0	34.7	1.0	-48.8	-13.0	-35.8	
7.630	-11.7	H	3.0	34.9	1.0	-45.7	-13.0	-32.7	

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

BC1

EVDO

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Qualcomm
Project #: 15U19820
Date: 04/14/15
Test Engineer: R. Alegre
Configuration: X-Pos EUT only
Mode: CDMA EVDO BC1

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T343 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1851.25MHz									
3.703	-16.3	H	3.0	35.4	1.0	-50.7	-13.0	-37.7	
5.554	-13.5	H	3.0	34.7	1.0	-47.2	-13.0	-34.2	
7.405	-12.6	H	3.0	34.9	1.0	-46.6	-13.0	-33.6	
3.703	-20.4	V	3.0	35.4	1.0	-54.8	-13.0	-41.8	
5.554	-16.1	V	3.0	34.7	1.0	-49.8	-13.0	-36.8	
7.405	-13.7	V	3.0	34.9	1.0	-47.6	-13.0	-34.6	
Mid Ch, 1880.0MHz									
3.760	-20.2	H	3.0	35.3	1.0	-54.5	-13.0	-41.5	
5.640	-15.5	H	3.0	34.7	1.0	-49.2	-13.0	-36.2	
7.520	-12.8	H	3.0	34.9	1.0	-46.8	-13.0	-33.8	
3.760	-19.1	V	3.0	35.3	1.0	-53.5	-13.0	-40.5	
5.640	-15.8	V	3.0	34.7	1.0	-49.6	-13.0	-36.6	
7.520	-13.6	V	3.0	34.9	1.0	-47.5	-13.0	-34.5	
High Ch, 1908.75 MHz									
3.818	-17.9	H	3.0	35.3	1.0	-52.1	-13.0	-39.1	
5.726	-15.0	H	3.0	34.7	1.0	-48.7	-13.0	-35.7	
7.635	-10.9	H	3.0	34.9	1.0	-44.9	-13.0	-31.9	
3.818	-19.2	V	3.0	35.3	1.0	-53.5	-13.0	-40.5	
5.726	-15.7	V	3.0	34.7	1.0	-49.5	-13.0	-36.5	
7.635	-13.0	V	3.0	34.9	1.0	-47.0	-13.0	-34.0	

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

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Qualcomm
Project #: 15U19820
Date: 04/14/15
Test Engineer: R. Alegre
Configuration: X-Pos EUT only
Mode: RTT BC1

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T34 8449B	Filter 1	Part 24

BC1

RTT

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1851.25 MHz									
3.703	-16.3	H	3.0	35.4	1.0	-50.7	-13.0	-37.7	
5.554	-13.6	H	3.0	34.7	1.0	-47.3	-13.0	-34.3	
7.405	-12.3	H	3.0	34.9	1.0	-46.2	-13.0	-33.2	
3.703	-20.3	V	3.0	35.4	1.0	-54.7	-13.0	-41.7	
5.554	-16.2	V	3.0	34.7	1.0	-49.9	-13.0	-36.9	
7.405	-13.6	V	3.0	34.9	1.0	-47.5	-13.0	-34.5	
Mid Ch, 1880 MHz									
3.760	-20.4	H	3.0	35.3	1.0	-54.7	-13.0	-41.7	
5.640	-16.0	H	3.0	34.7	1.0	-49.8	-13.0	-36.8	
7.520	-12.6	H	3.0	34.9	1.0	-46.5	-13.0	-33.5	
3.760	-20.1	V	3.0	35.3	1.0	-54.4	-13.0	-41.4	
5.640	-15.9	V	3.0	34.7	1.0	-49.6	-13.0	-36.6	
7.520	-13.6	V	3.0	34.9	1.0	-47.5	-13.0	-34.5	
High Ch, 1908.75 MHz									
3.818	-17.1	H	3.0	35.3	1.0	-51.3	-13.0	-38.3	
5.726	-14.9	H	3.0	34.7	1.0	-48.6	-13.0	-35.6	
7.635	-11.0	H	3.0	34.9	1.0	-44.9	-13.0	-31.9	
3.818	-20.0	V	3.0	35.3	1.0	-54.3	-13.0	-41.3	
5.726	-14.9	V	3.0	34.7	1.0	-48.6	-13.0	-35.6	
7.635	-13.2	V	3.0	34.9	1.0	-47.1	-13.0	-34.1	

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

BC0

EVDO

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Qualcomm
Project #: 15U19820
Date: 04/15/15
Test Engineer: R.A
Configuration: EUT
Mode: CDMA EVDO BC0

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T343 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.7MHz									
1.650	-13.8	H	3.0	37.4	1.0	-50.2	-13.0	-37.2	
2.474	-22.3	H	3.0	36.4	1.0	-57.7	-13.0	-44.7	
3.298	-21.0	H	3.0	35.8	1.0	-55.8	-13.0	-42.8	
1.650	-10.0	V	3.0	37.4	1.0	-46.4	-13.0	-33.4	
2.474	-21.9	V	3.0	36.4	1.0	-57.2	-13.0	-44.2	
3.298	-21.7	V	3.0	35.8	1.0	-56.5	-13.0	-43.5	
Mid Ch, 836.52MHz									
1.673	-14.4	H	3.0	37.3	1.0	-50.8	-13.0	-37.8	
2.509	-23.0	H	3.0	36.4	1.0	-58.4	-13.0	-45.4	
3.346	-21.6	H	3.0	35.8	1.0	-56.4	-13.0	-43.4	
1.673	-9.2	V	3.0	37.3	1.0	-45.5	-13.0	-32.5	
2.509	-18.9	V	3.0	36.4	1.0	-54.3	-13.0	-41.3	
3.346	-20.0	V	3.0	35.8	1.0	-54.7	-13.0	-41.7	
High Ch, 848.31 MHz									
1.697	-15.6	H	3.0	37.3	1.0	-51.9	-13.0	-38.9	
2.545	-14.9	H	3.0	36.3	1.0	-50.3	-13.0	-37.3	
3.393	-20.7	H	3.0	35.7	1.0	-55.4	-13.0	-42.4	
1.697	-19.5	V	3.0	37.3	1.0	-55.8	-13.0	-42.8	
2.545	-16.8	V	3.0	36.3	1.0	-52.2	-13.0	-39.2	
3.393	-21.1	V	3.0	35.7	1.0	-55.8	-13.0	-42.8	

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

BC0

RTT

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Qualcomm
Project #: 15U19820
Date: 04/15/15
Test Engineer: R.A
Configuration: EUT
Mode: RTT BC0

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.7MHz									
1.649	-13.7	H	3.0	37.4	1.0	-50.0	-13.0	-37.0	
2.474	-22.6	H	3.0	36.4	1.0	-58.0	-13.0	-45.0	
3.299	-21.1	H	3.0	35.8	1.0	-55.9	-13.0	-42.9	
1.649	-10.2	V	3.0	37.4	1.0	-46.6	-13.0	-33.6	
2.474	-21.6	V	3.0	36.4	1.0	-57.0	-13.0	-44.0	
3.299	-20.1	V	3.0	35.8	1.0	-54.9	-13.0	-41.9	
Mid Ch, 836.52MHz									
1.673	-14.5	H	3.0	37.3	1.0	-50.9	-13.0	-37.9	
2.510	-23.3	H	3.0	36.4	1.0	-58.6	-13.0	-45.6	
3.346	-21.0	H	3.0	35.8	1.0	-55.8	-13.0	-42.8	
1.673	-9.0	V	3.0	37.3	1.0	-45.3	-13.0	-32.3	
2.510	-19.7	V	3.0	36.4	1.0	-55.0	-13.0	-42.0	
3.346	-19.9	V	3.0	35.8	1.0	-54.6	-13.0	-41.6	
High Ch, 848.31MHz									
1.697	-15.1	H	3.0	37.3	1.0	-51.4	-13.0	-38.4	
2.545	-15.3	H	3.0	36.3	1.0	-50.6	-13.0	-37.6	
3.393	-20.5	H	3.0	35.7	1.0	-55.2	-13.0	-42.2	
1.697	-19.8	V	3.0	37.3	1.0	-56.1	-13.0	-43.1	
2.545	-16.6	V	3.0	36.3	1.0	-52.0	-13.0	-39.0	
3.393	-20.8	V	3.0	35.7	1.0	-55.5	-13.0	-42.5	

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