



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

FOR

CELLULAR PHONE WITH BLUETOOTH AND WLAN RADIOS

MODEL NUMBER: A1784

FCC ID: BCG-E3092A

REPORT NUMBER: 16U23366-E6V2

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Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	07/25/2016	Initial Review	Chin Pang
V2	07/31/2016	Addressed TCB Questions	Tina Chu

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: CELLULAR PHONE WITH BLUETOOTH AND WLAN RADIOS

MODEL: A1784

SERIAL NUMBER: C39RV054HFPQ (CONDUCTED); C39RL002H948 (RADIATED)

DATE TESTED: FEBRUARY 18, 2016 – JULY 15, 2016

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 22H, 24E, AND 27L	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
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Prepared By:



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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-D, 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 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, 9KHz to 0.15 MHz	3.84 dB
Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT, Model A1784 is a mobile phone with multimedia functions (music, application support, and video), cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/LTE-radio, IEEE 802.11a/b/g/n/ac, NFC 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:

5.2.1. LAT

GSM MODES

Part 22 / RSS 132 850MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		ERP (Average)	
		dBm	mW	dBm	mW
824- 849	GPRS	33.50	2238.7	30.5	1111.7
	EGPRS	29.00	794.3	26.2	414.0

Part 24 / RSS 133 1900MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1850 - 1910	GPRS	31.50	1412.5	30.6	1142.9
	EGPRS	28.00	631.0	26.8	480.8

UMTS MODES

Part 22 / RSS 132 850MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		ERP (Average)	
		dBm	mW	dBm	mW
824 – 849	REL 99	25.00	316.2	22.22	166.7
	HSDPA REL 5	24.00	251.2	22.17	164.8

Part 24 / RSS 133 1900MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1850 – 1910	REL 99	25.20	331.1	26.26	422.7
	HSDPA REL 5	24.20	263.0	26.50	446.7

Part 27 /RSS 139 1700MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1710– 1755	REL 99	25.20	331.1	25.05	319.9
	HSDPA REL 5	24.20	263.0	24.76	299.2

5.2.1. UAT

GSM MODES

Part 22 / RSS 132 850MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		ERP (Average)	
		dBm	mW	dBm	mW
824- 849	GPRS	31.00	1258.9	27.2	529.7
	EGPRS	26.50	446.7	22.8	188.8

Part 24 / RSS 133 1900MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1850 - 1910	GPRS	26.20	416.9	24.9	268.5
	EGPRS	24.50	281.8	22.8	190.5

UMTS MODES

Part 22 / RSS 132 850MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		ERP (Average)	
		dBm	mW	dBm	mW
824 – 849	REL 99	23.00	199.5	18.84	76.6
	HSDPA REL 5	22.00	158.5	18.82	76.2

Part 24 / RSS 133 1900MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1850 – 1910	REL 99	21.50	141.3	20.45	110.9
	HSDPA REL 5	20.50	112.2	20.40	109.6

Part 27 /RSS 139 1700MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1710– 1755	REL 99	21.25	133.4	19.77	94.8
	HSDPA REL 5	20.25	105.9	19.75	94.4

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency (MHz)	Port A (LAT) Antenna Gain (dBi)	Port B (UAT) Antenna Gain (dBi)
824 - 849	-2.42	-3.65
1850 - 1910	0.49	-1.43
1710 - 1755	-1.08	-1.10

5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 0.26.02.

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
- UMTS REL 99
- UMTS HSDPA

We only performed the conducted test at LAT port as worst case since it has higher output powers.

The fundamental of the EUT was investigated in three orthogonal orientations X/Y/Z, it was determined that Landscape orientation was worst-case orientation for cell bands; Flatbed 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	APPLE	A1222	N/A
Laptop	Apple	MacBook Pro	730374GJAGW
DC power supply	Sorensen	XT 20-3	1318A00529

I/O CABLES (RF Conducted Test)

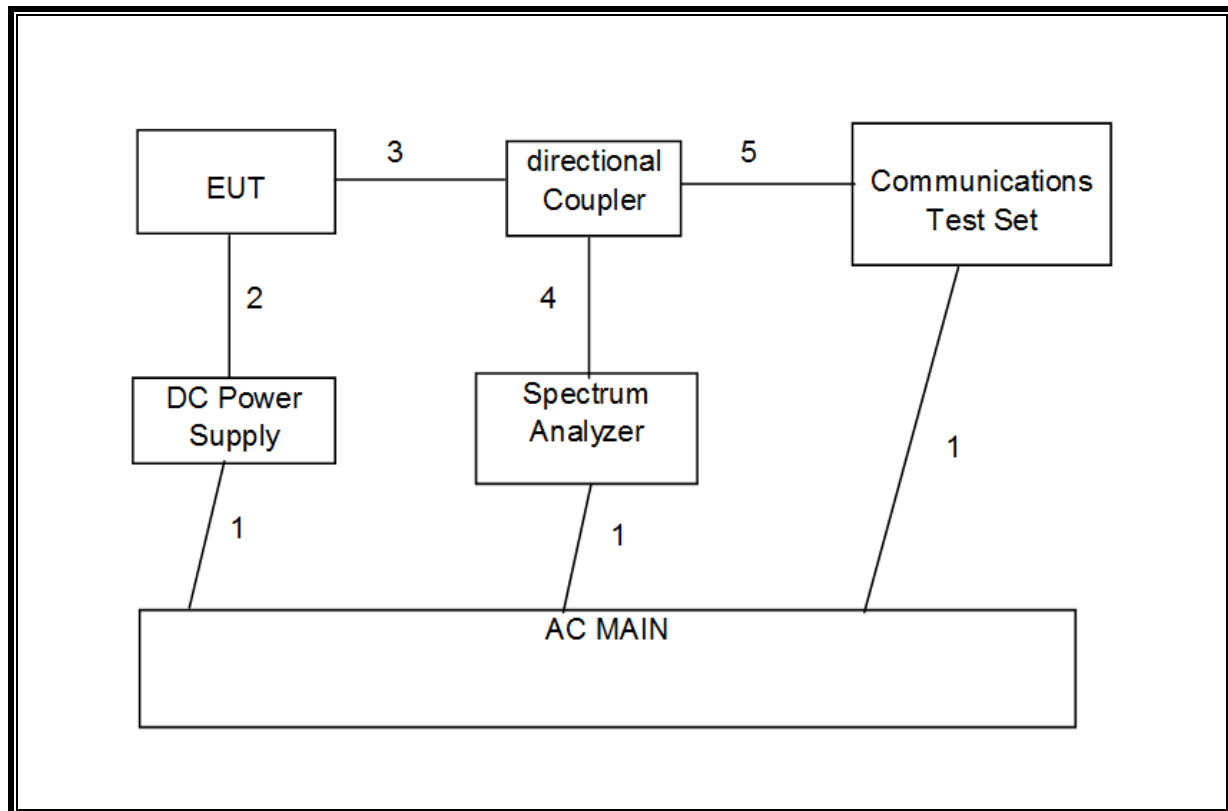
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	US 115V	Un-shielded	2m	N/A
2	DC	1	DC	Un-shielded	1.4m	N/A
3	RF In/Out	1	EUT	Un-shielded	0.4m	N/A
4	RF In/Out	1	Barrel	N/A	N/A	N/A
5	RF In/Out	1	Communication Test Set	Un-shielded	1m	N/A

I/O CABLES (RF Radiated Test)

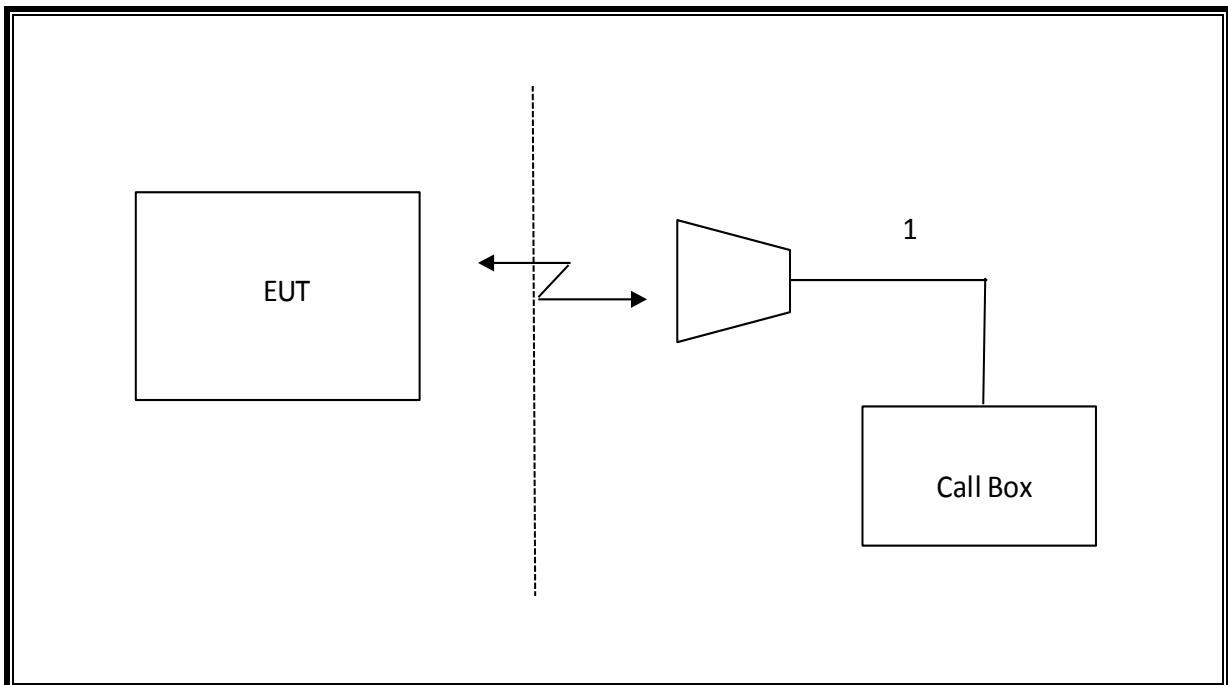
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF In/Out	1	Antenna	Un-shielded	5m	NA

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
Spectrum Analyzer, PSA, 3Hz to 44GHz	Agilent	E4446A	T123	10/21/16
Wideband Communication Test Set, Call Box	Rohde & Schwarz	CMW500	T971	07/22/16
Directional Coupler, 10dB SMA, 0.5GHz to 26.5GHz	Krytar	152610	T922	06/17/17
*Power Meter, P-series single channel	Keysight	N1911A	T1255	06/08/16
*Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight	N1921A	T1226	05/06/16
P - Series Power Meter	Keysight	N1911A	T1245	05/03/17
Wideband Power Sensor 50 MHz - 18 GHz	Keysight	N1921A	T1228	06/20/17
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Agilent	E4440A	T200	09/01/16
Directional Coupler, 10dB SMA, 0.5GHz to 26.5GHz	Krytar	152613	T1538	04/11/17
Wireless Communications Test Set, 8960 Series 10	Agilent	E5515C	T211	11/18/16
Antenna, Horn 1-18GHz	Emco	3115	T59	11/18/16
**Tuned Dipole, 400 - 1000MHz	ETS Lindgren	3121C DB4	T273	05/16/17
**Filter, Highpass 4.0GHz	Micro-Tronics	HPM13351	T1239	06/24/17
Filter, HPF 1.2GHz	Wainwright Instruments	WHKX1.2/15G-6ST	T1182	05/31/17
Chamber, Environmental	Cincinnati Sub Zero	ZPHS-8-3.5-SCT/WC	T754	09/14/16
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	T1466	03/09/17
Directional Coupler, 10dB SMA, 0.5GHz to 26.5GHz	Krytar	152610	T1161	04/12/17
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	T340	11/15/16
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T712	01/12/17
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	T408	10/27/16
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	T1113	11/08/16
Wideband Communication Test Set, Call Box	Rohde & Schwarz	CMW500	T259	10/22/16
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T711	01/12/17
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	T243	09/24/16
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	T341	10/14/16
*Wideband Communication Test Set, Call Box	Rohde & Schwarz	CMW500	T260	07/09/16
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T344	02/22/17
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	T185	03/09/17
Wideband Communication Test Set, Call Box	Rohde & Schwarz	CMW500	T1526	04/15/17
**Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	T491	05/31/17
**Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	T834	06/17/17
*Amplifier, 1 to 26.5GHz, 23.5dB Gain minimum	Keysight	8449B	3008A04710	06/29/16
*Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826	T447	05/18/16
**Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826	T447	06/16/17
Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	T742	01/31/17

NOTE: *testing was completed before the equipment calibration due date.

**Equipment was set to test after May 2016 or June 2016.

7. RF POWER OUTPUT VERIFICATION

7.1. GSM

Using CMW500 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 Params: 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. PORT A GPRS/EGPRS (LAT)

ID:	50820	Date:	6/13/16
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Mode	Ch.	f (MHz)	1 time slot		2 time slots	
			Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)
GPRS	128	824.2	33.63	33.50	32.60	32.47
	190	836.6	33.53	33.45	32.50	32.45
	251	848.8	33.60	33.40	32.55	32.47
EGPRS	128	824.2	32.20	29.00	31.07	27.80
	190	836.6	32.10	28.90	31.05	27.75
	251	848.8	32.05	28.85	31.00	27.80
GPRS	512	1850.2	31.62	31.50	30.60	30.49
	661	1880.0	31.53	31.45	30.60	30.50
	810	1909.8	31.52	31.42	30.52	30.40
EGPRS	512	1850.2	31.20	28.00	30.10	26.90
	661	1880.0	31.10	27.80	30.00	26.80
	810	1909.8	31.06	27.75	29.90	26.70

7.1.2. PORT B GPRS/EGPRS (UAT)

ID:	44366	Date:	6/16/16
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Mode	Ch.	f (MHz)	1 time slot		2 time slots	
			Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)
GPRS	128	824.2	30.90	30.80	29.85	29.78
	190	836.6	31.00	30.90	29.85	29.84
	251	848.8	31.20	31.00	30.10	29.96
EGPRS	128	824.2	29.60	26.50	28.60	25.49
	190	836.6	29.50	26.40	28.50	25.40
	251	848.8	29.50	26.40	28.50	25.40
GPRS	512	1850.2	26.30	26.20	25.29	25.19
	661	1880.0	26.17	26.15	25.25	25.14
	810	1909.8	26.20	26.10	25.19	25.17
EGPRS	512	1850.2	27.70	24.50	26.50	23.40
	661	1880.0	27.60	24.40	26.40	23.30
	810	1909.8	27.50	24.46	26.30	23.35

7.2. 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 $\geq$ RBW $\geq$ 26dB BW, typically 5MHz.
- Set a marker to point the corresponding peak value.

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

RESULTS

7.2.1. PORT A UMTS REL99 (LAT)

ID:	50820	Date:	6/13/16
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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	28.70	24.95
	4183	4408	836.6	28.90	25.00
	4233	4458	846.6	28.75	24.96

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	29.06	25.20
	9400	9800	1880.0	28.90	25.15
	9538	9938	1907.6	28.97	25.12

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	29.00	25.15
	1413	1638	1732.6	29.15	25.20
	1513	1738	1752.6	29.03	25.10

7.2.2. PORT B UMTS REL99 (UAT)

ID:	44366	Date:	6/16/16
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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	27.10	22.90
	4183	4408	836.6	27.20	23.00
	4233	4458	846.6	27.00	22.80

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	25.69	21.49
	9400	9800	1880.0	25.65	21.45
	9538	9938	1907.6	25.70	21.50

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	25.43	21.23
	1413	1638	1732.6	25.32	21.12
	1513	1738	1752.6	25.47	21.25

7.3. 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			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	11/15	15/8	15/4
	β_{hs}	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			
	$A_{hs} = \beta_{hs}/\beta_c$	30/15			

RESULT

7.3.1. PORT A HSDPA REL 5 (LAT)

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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	28.10	23.90
		4183	4408	836.6	28.15	23.95
		4233	4458	846.6	28.20	24.00
	2	4132	4357	826.4	28.10	23.90
		4183	4408	836.6	28.13	23.93
		4233	4458	846.6	28.16	23.96
	3	4132	4357	826.4	27.65	23.45
		4183	4408	836.6	27.60	23.40
		4233	4458	846.6	27.70	23.50
	4	4132	4357	826.4	27.62	23.42
		4183	4408	836.6	27.60	23.40
		4233	4458	846.6	27.55	23.35

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	28.33	24.13
		9400	9800	1880.0	28.35	24.15
		9538	9938	1907.6	28.40	24.20
	2	9262	9662	1852.4	28.28	24.08
		9400	9800	1880.0	28.34	24.14
		9538	9938	1907.6	28.36	24.16
	3	9262	9662	1852.4	27.90	23.70
		9400	9800	1880.0	27.85	23.65
		9538	9938	1907.6	27.80	23.60
	4	9262	9662	1852.4	27.79	23.59
		9400	9800	1880.0	27.82	23.62
		9538	9938	1907.6	27.85	23.65

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	28.37	24.17
		1413	1638	1732.6	28.50	24.20
		1513	1738	1752.6	28.34	24.14
	2	1312	1537	1712.4	28.31	24.11
		1413	1638	1732.6	28.35	24.15
		1513	1738	1752.6	27.90	24.10
	3	1312	1537	1712.4	27.82	23.62
		1413	1638	1732.6	27.80	23.60
		1513	1738	1752.6	27.77	23.57
	4	1312	1537	1712.4	27.85	23.65
		1413	1638	1732.6	27.79	23.59
		1513	1738	1752.6	27.70	23.50

7.3.2. PORT B HSDPA REL 5 (UAT)

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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	26.15	21.95
		4183	4408	836.6	26.20	22.00
		4233	4458	846.6	26.10	21.90
	2	4132	4357	826.4	26.08	21.88
		4183	4408	836.6	26.05	21.85
		4233	4458	846.6	26.10	21.90
	3	4132	4357	826.4	25.65	21.45
		4183	4408	836.6	25.70	21.50
		4233	4458	846.6	25.67	21.47
	4	4132	4357	826.4	25.60	21.40
		4183	4408	836.6	25.63	21.43
		4233	4458	846.6	25.65	21.45

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	24.60	20.40
		9400	9800	1880.0	24.62	20.42
		9538	9938	1907.6	24.70	20.50
	2	9262	9662	1852.4	24.69	20.49
		9400	9800	1880.0	24.60	20.40
		9538	9938	1907.6	24.58	20.38
	3	9262	9662	1852.4	24.16	19.96
		9400	9800	1880.0	23.99	19.79
		9538	9938	1907.6	23.94	19.74
	4	9262	9662	1852.4	23.85	19.65
		9400	9800	1880.0	23.75	19.55
		9538	9938	1907.6	23.80	19.60

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	24.37	20.17
		1413	1638	1732.6	24.33	20.13
		1513	1738	1752.6	24.45	20.25
	2	1312	1537	1712.4	24.35	20.15
		1413	1638	1732.6	24.30	20.10
		1513	1738	1752.6	24.25	20.05
	3	1312	1537	1712.4	23.85	19.65
		1413	1638	1732.6	23.90	19.70
		1513	1738	1752.6	23.95	19.75
	4	1312	1537	1712.4	23.91	19.71
		1413	1638	1732.6	23.87	19.67
		1513	1738	1752.6	23.93	19.73

7.4. 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				
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	15/1
	β_{hs}	22/15	12/15	30/15	4/15	5/15
	β_{ed}	1309/225	94/75	47/15	56/75	47/15
	CM (dB)	1	3	2	3	1
	MPR (dB)	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				
	$A_{hs} = \beta_{hs}/\beta_c$	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	12
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	67
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27	

RESULTS

7.4.1. PORT A HSPA REL 6 (HSDPA & HSUPA) (LAT)

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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	28.15	23.94
		4183	4408	836.6	28.18	23.97
		4233	4458	846.6	28.10	23.95
	2	4132	4357	826.4	26.19	21.95
		4183	4408	836.6	26.14	21.90
		4233	4458	846.6	26.12	21.88
	3	4132	4357	826.4	27.11	22.87
		4183	4408	836.6	27.20	22.96
		4233	4458	846.6	26.14	23.00
	4	4132	4357	826.4	26.19	21.95
		4183	4408	836.6	26.10	21.86
		4233	4458	846.6	26.76	21.90
	5	4132	4357	826.4	28.14	23.90
		4183	4408	836.6	28.08	23.95
		4233	4458	846.6	28.13	23.89

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	28.34	24.10
		9400	9800	1880	28.36	24.12
		9538	9938	1908	28.37	24.20
	2	9262	9662	1852	26.38	22.14
		9400	9800	1880	26.32	22.08
		9538	9938	1908	26.34	22.10
	3	9262	9662	1852	27.44	23.20
		9400	9800	1880	27.34	23.10
		9538	9938	1908	27.31	23.07
	4	9262	9662	1852	26.34	22.10
		9400	9800	1880	26.30	22.06
		9538	9938	1908	26.60	22.20
	5	9262	9662	1852	28.22	24.15
		9400	9800	1880	28.30	24.16
		9538	9938	1908	28.34	24.10

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	28.31	24.07
		1413	1638	1732.6	28.34	24.10
		1513	1738	1752.6	28.35	24.18
	2	1312	1537	1712.4	26.29	22.05
		1413	1638	1732.6	26.34	22.10
		1513	1738	1752.6	26.40	22.16
	3	1312	1537	1712.4	27.39	23.15
		1413	1638	1732.6	27.34	23.10
		1513	1738	1752.6	27.30	23.06
	4	1312	1537	1712.4	26.27	22.03
		1413	1638	1732.6	26.38	22.14
		1513	1738	1752.6	26.44	22.20
	5	1312	1537	1712.4	28.30	24.12
		1413	1638	1732.6	28.32	24.16
		1513	1738	1752.6	28.33	24.09

7.4.2. PORT B HSPA REL 6 (HSDPA & HSUPA) (UAT)

ID:	44366	Date:	6/7/16
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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	26.04	21.80
		4183	4408	836.6	26.14	21.90
		4233	4458	846.6	26.09	21.85
	2	4132	4357	826.4	24.14	19.90
		4183	4408	836.6	24.09	19.85
		4233	4458	846.6	23.94	19.70
	3	4132	4357	826.4	25.04	20.80
		4183	4408	836.6	25.09	20.85
		4233	4458	846.6	25.01	20.77
	4	4132	4357	826.4	24.14	19.90
		4183	4408	836.6	24.03	19.79
		4233	4458	846.6	24.12	19.88
	5	4132	4357	826.4	25.99	21.75
		4183	4408	836.6	26.10	21.85
		4233	4458	846.6	26.09	21.82

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	24.54	20.30
		9400	9800	1880	24.50	20.26
		9538	9938	1908	24.64	20.40
	2	9262	9662	1852	22.74	18.50
		9400	9800	1880	22.64	18.40
		9538	9938	1908	22.60	18.36
	3	9262	9662	1852	23.64	19.40
		9400	9800	1880	23.60	19.36
		9538	9938	1908	23.69	19.45
	4	9262	9662	1852	22.64	18.40
		9400	9800	1880	22.69	18.45
		9538	9938	1908	22.61	18.37
	5	9262	9662	1852	24.49	20.25
		9400	9800	1880	24.44	20.20
		9538	9938	1908	24.49	20.25

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	24.40	20.15
		1413	1638	1732.6	24.34	20.10
		1513	1738	1752.6	24.29	20.05
	2	1312	1537	1712.4	22.39	18.15
		1413	1638	1732.6	22.31	18.07
		1513	1738	1752.6	22.24	18.00
	3	1312	1537	1712.4	23.39	19.15
		1413	1638	1732.6	23.34	19.10
		1513	1738	1752.6	23.26	19.02
	4	1312	1537	1712.4	22.29	18.05
		1413	1638	1732.6	22.27	18.03
		1513	1738	1752.6	22.34	18.10
	5	1312	1537	1712.4	24.19	19.95
		1413	1638	1732.6	24.29	20.05
		1513	1738	1752.6	24.33	20.09

7.5. 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	Processes	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.		

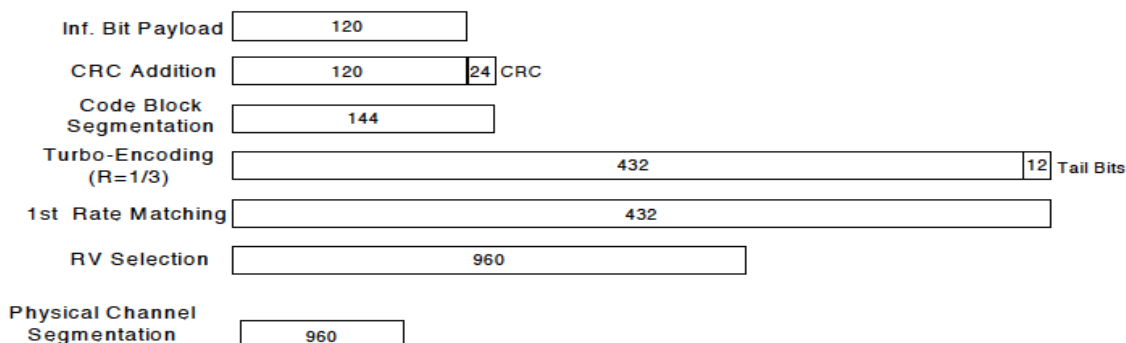


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
HSDPA Specific Settings	MPR	0	0	0.5	0.5
	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	$A_{hs} = \beta_{hs} / \beta_c$	30/15			

RESULT

7.5.1. PORT A DUAL CARRIER HSDPA (LAT)

ID:	50820	Date:	6/13/16
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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	28.2	24.0
		4183	4408	836.6	28.1	23.9
		4233	4458	846.6	28.1	23.9
	2	4132	4357	826.4	28.1	23.9
		4183	4408	836.6	28.1	23.9
		4233	4458	846.6	28.1	23.9
	3	4132	4357	826.4	27.6	23.4
		4183	4408	836.6	27.6	23.4
		4233	4458	846.6	27.7	23.4
	4	4132	4357	826.4	27.6	23.4
		4183	4408	836.6	27.6	23.4
		4233	4458	846.6	27.6	23.3

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	28.3	24.1
		9400	9800	1880.0	28.3	24.2
		9538	9938	1907.6	28.3	24.1
	2	9262	9662	1852.4	28.2	24.1
		9400	9800	1880.0	28.3	24.1
		9538	9938	1907.6	28.3	24.0
	3	9262	9662	1852.4	27.8	23.6
		9400	9800	1880.0	27.8	23.6
		9538	9938	1907.6	27.7	23.5
	4	9262	9662	1852.4	27.8	23.6
		9400	9800	1880.0	27.8	23.5
		9538	9938	1907.6	27.7	23.5

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	28.3	24.1
		1413	1638	1732.6	28.4	24.1
		1513	1738	1752.6	28.2	24.0
	2	1312	1537	1712.4	28.3	24.1
		1413	1638	1732.6	28.3	24.1
		1513	1738	1752.6	28.3	24.1
	3	1312	1537	1712.4	27.8	23.6
		1413	1638	1732.6	27.8	23.6
		1513	1738	1752.6	27.7	23.5
	4	1312	1537	1712.4	27.8	23.6
		1413	1638	1732.6	27.8	23.5
		1513	1738	1752.6	27.7	23.5

7.5.2. PORT B DUAL CARRIER HSDPA (UAT)

ID:	44366	Date:	6/16/16
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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	26.15	21.96
		4183	4408	836.6	26.05	21.81
		4233	4458	846.6	26.00	21.76
	2	4132	4357	826.4	26.10	21.96
		4183	4408	836.6	26.01	21.77
		4233	4458	846.6	25.99	21.75
	3	4132	4357	826.4	25.67	21.43
		4183	4408	836.6	25.66	21.42
		4233	4458	846.6	25.71	21.47
	4	4132	4357	826.4	25.69	21.45
		4183	4408	836.6	25.74	21.50
		4233	4458	846.6	25.70	21.46

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	24.59	20.35
		9400	9800	1880.0	24.64	20.40
		9538	9938	1907.6	24.66	20.42
	2	9262	9662	1852.4	24.54	20.30
		9400	9800	1880.0	24.50	20.40
		9538	9938	1907.6	24.64	20.40
	3	9262	9662	1852.4	24.24	20.00
		9400	9800	1880.0	24.17	19.93
		9538	9938	1907.6	24.19	19.95
	4	9262	9662	1852.4	23.94	19.70
		9400	9800	1880.0	23.99	19.75
		9538	9938	1907.6	23.84	19.60

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	24.39	20.15
		1413	1638	1732.6	24.32	20.08
		1513	1738	1752.6	24.34	20.10
	2	1312	1537	1712.4	24.36	20.12
		1413	1638	1732.6	24.34	20.10
		1513	1738	1752.6	24.31	20.07
	3	1312	1537	1712.4	23.71	19.47
		1413	1638	1732.6	23.79	19.55
		1513	1738	1752.6	23.69	19.45
	4	1312	1537	1712.4	23.72	19.48
		1413	1638	1732.6	23.91	19.67
		1513	1738	1752.6	23.79	19.55

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 AND 24 / RSS 132 AND 133

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
CELL	GPRS	128	824.2	239.5433	300.515
		190	836.6	241.2732	305.221
		251	848.8	240.0728	301.590

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
PCS	GPRS	512	1850.2	243.1799	310.927
		661	1880.0	242.0756	306.391
		810	1909.8	242.9039	313.148

GSM-EGPRS MODE PART 22 AND 24 / RSS 132 AND 133

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
CELL	EGPRS	128	824.2	242.8871	300.238
		190	836.6	258.5472	332.591
		251	848.8	247.8445	316.346

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
PCS	EGPRS	512	1850.2	243.7392	312.596
		661	1880.0	243.6877	309.161
		810	1909.8	241.1778	296.384

UMTS REL99 MODE PART 22, 24, AND 27 / RSS 132, 133 AND 139

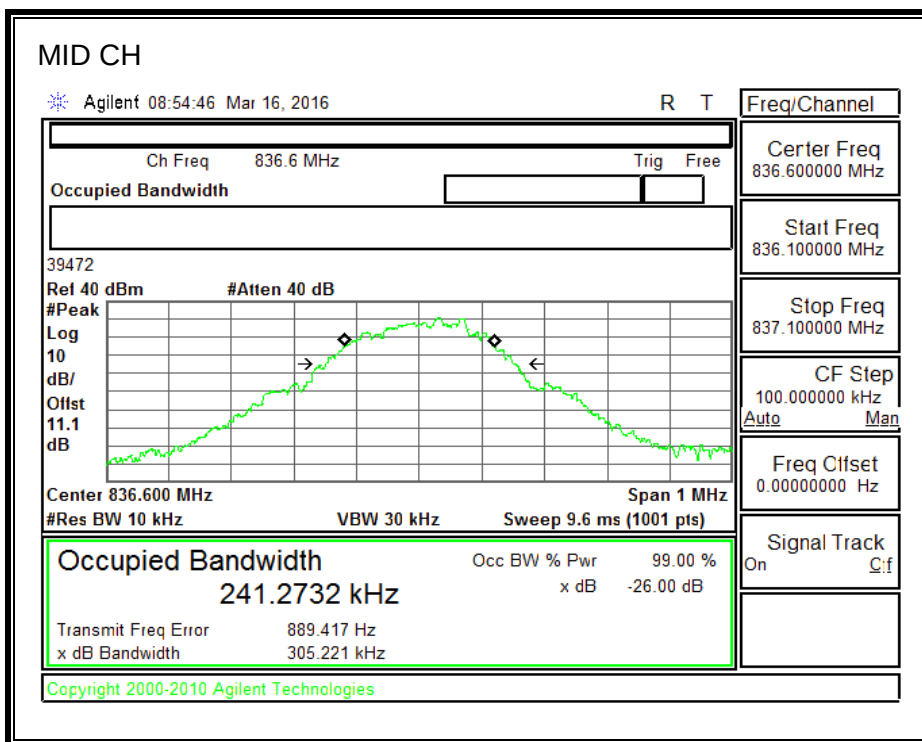
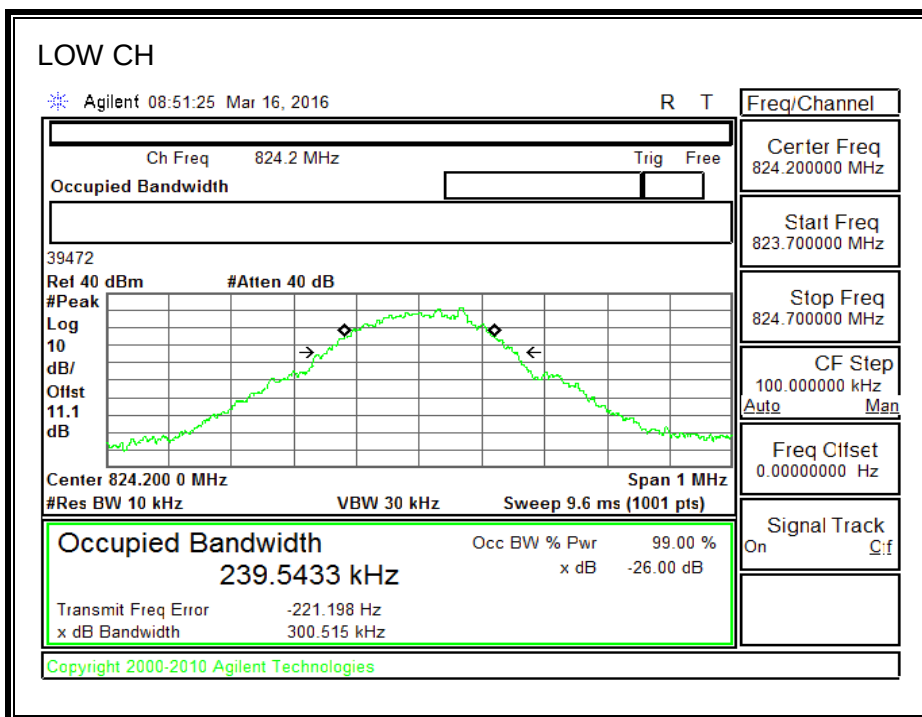
Band	Mode	DL Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
850MHz	UMTS Rel. 99	4357	826.40	4.0826	4.665
		4408	836.60	4.0845	4.621
		4458	846.60	4.0712	4.637
1900MHz		9662	1852.40	4.0737	4.623
		9800	1880.00	4.0835	4.647
		9938	1907.60	4.084	4.6
1700MHz		1537	1712.40	4.058	4.638
		1638	1732.60	4.086	4.644
		1738	1752.60	4.0762	4.656

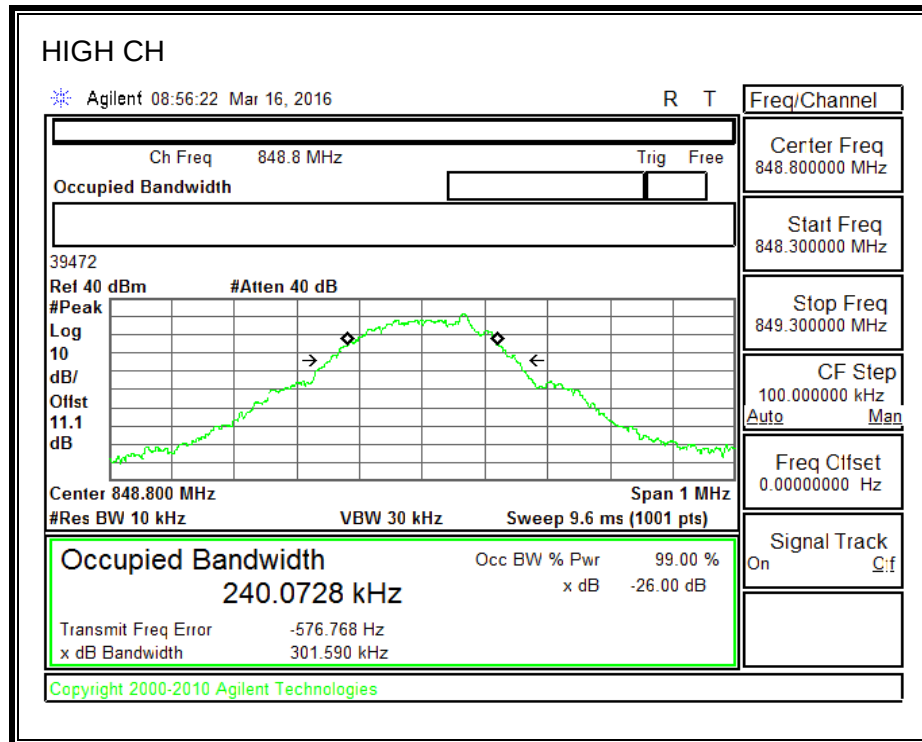
UMTS HSDPA MODE PART 22, 24, AND 27 / RSS 132, 133 AND 139

Band	Mode	DL Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
850MHz	UMTS HSDPA	4357	826.40	4.0683	4.651
		4408	836.60	4.0837	4.656
		4458	846.60	4.0829	4.642
1900MHz		9662	1852.40	4.1089	4.641
		9800	1880.00	4.0625	4.648
		9938	1907.60	4.0558	4.634
1700MHz		1537	1712.40	4.0591	4.654
		1638	1732.60	4.0781	4.616
		1738	1752.60	4.0598	4.612

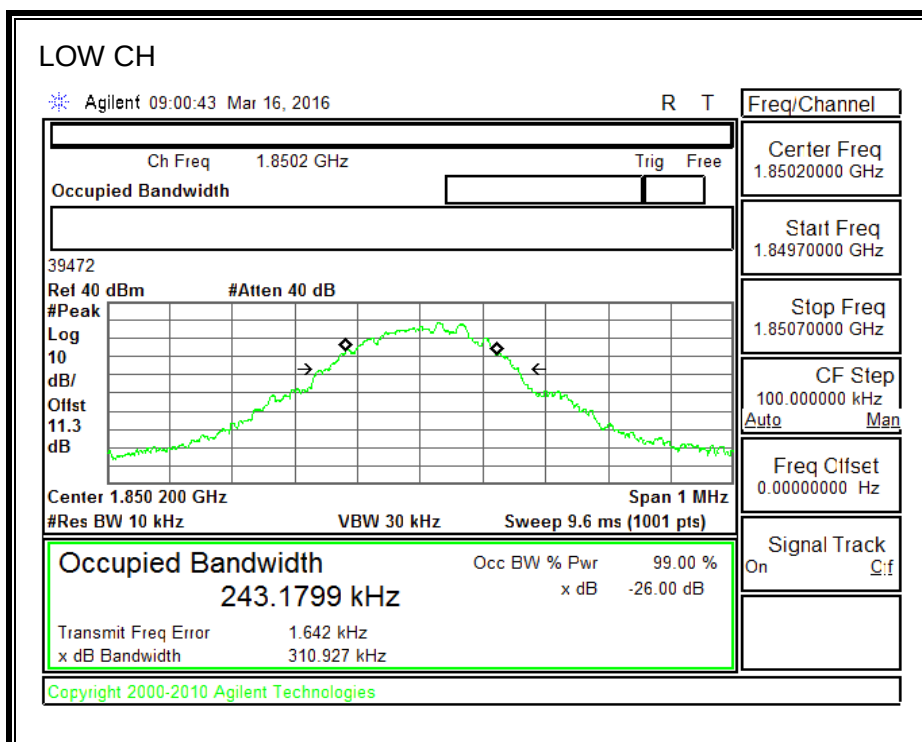
8.1.1. GSM GPRS

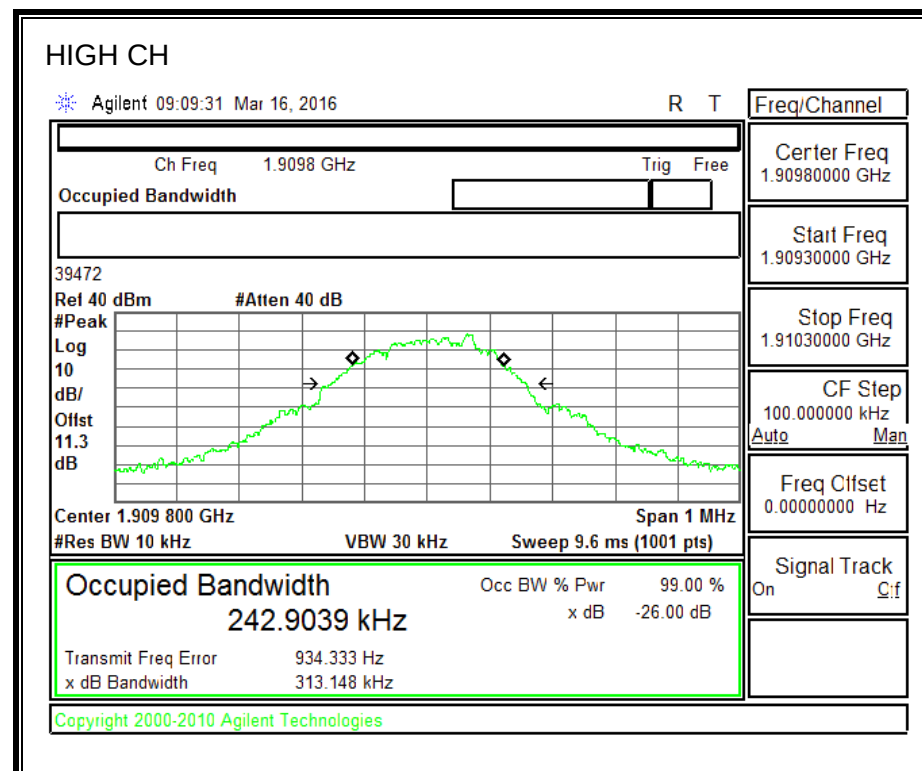
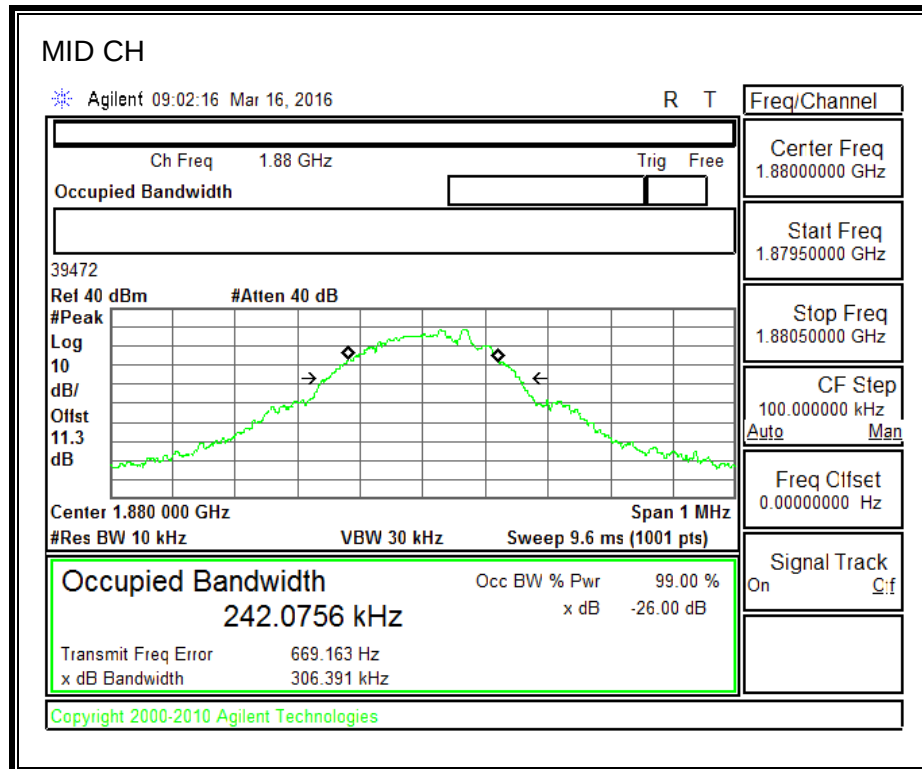
850MHz BAND





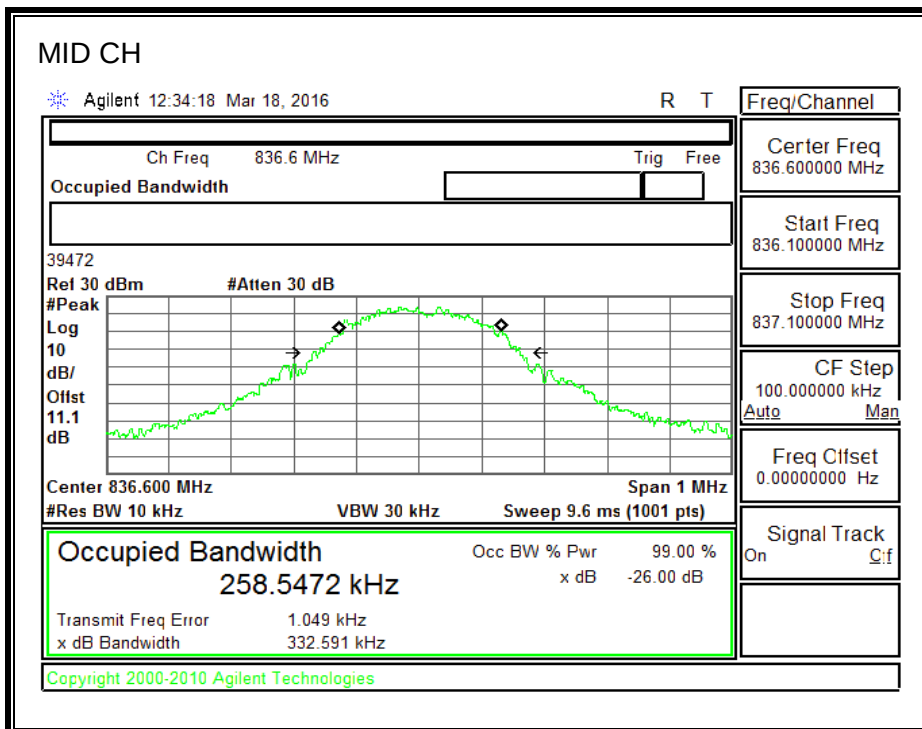
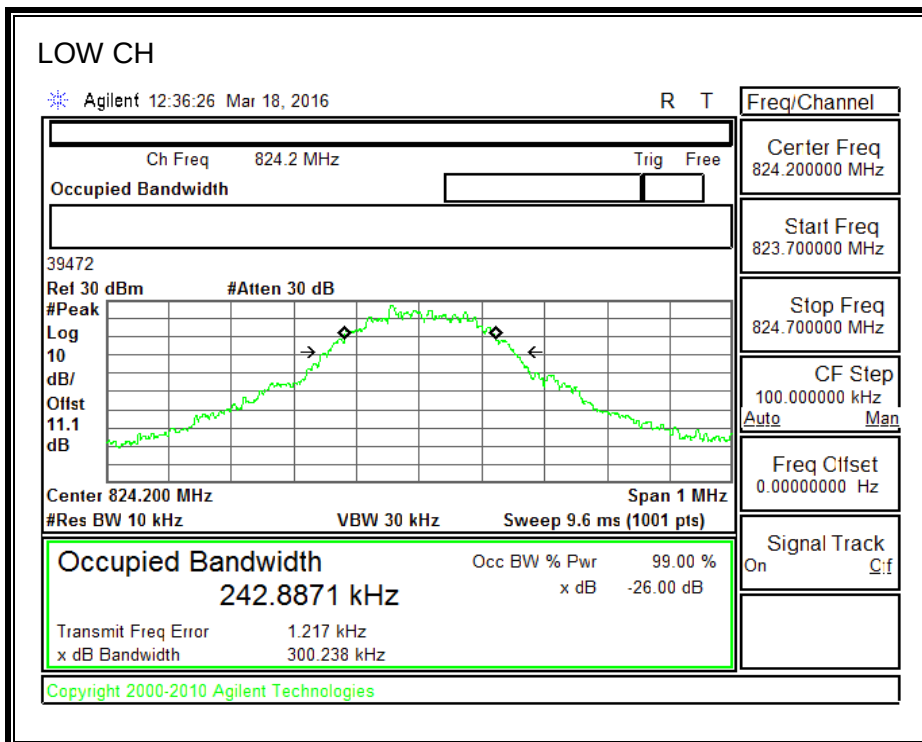
1900MHz BAND

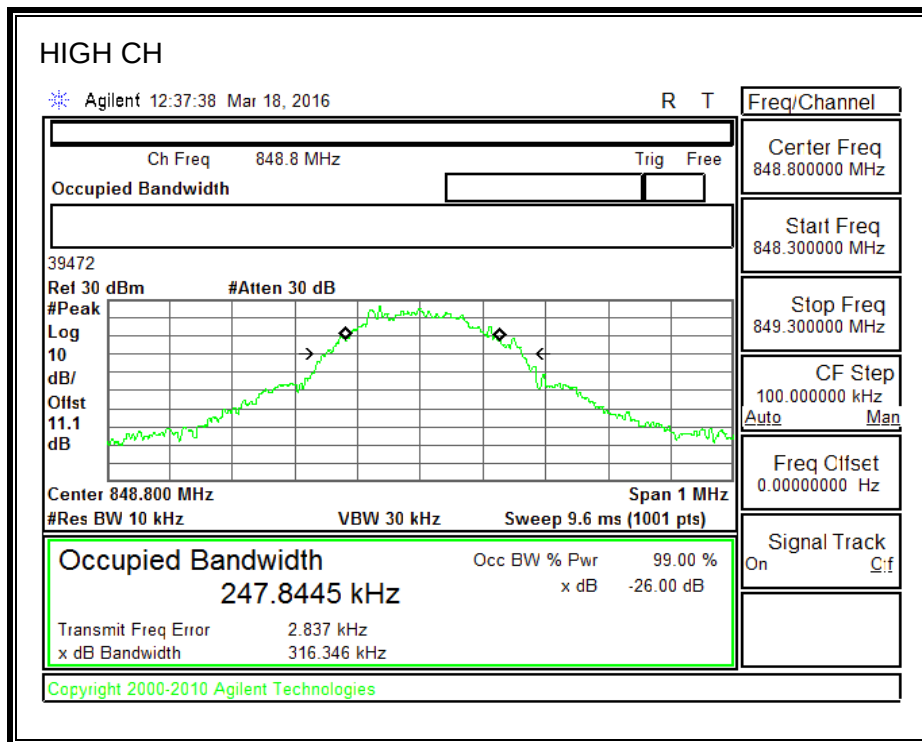




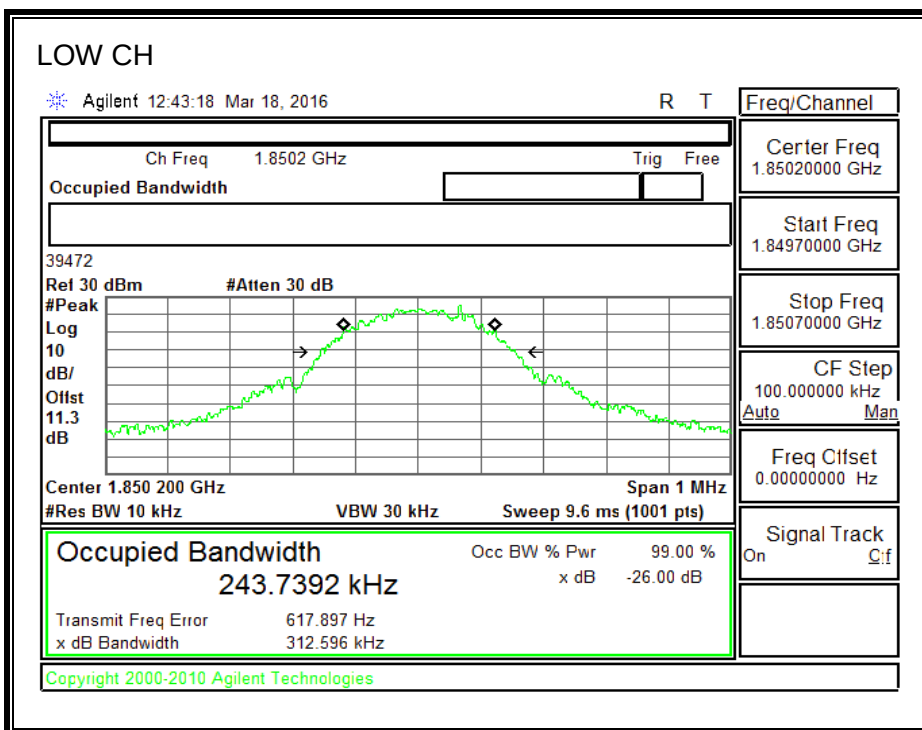
8.1.2. GSM EGPRS

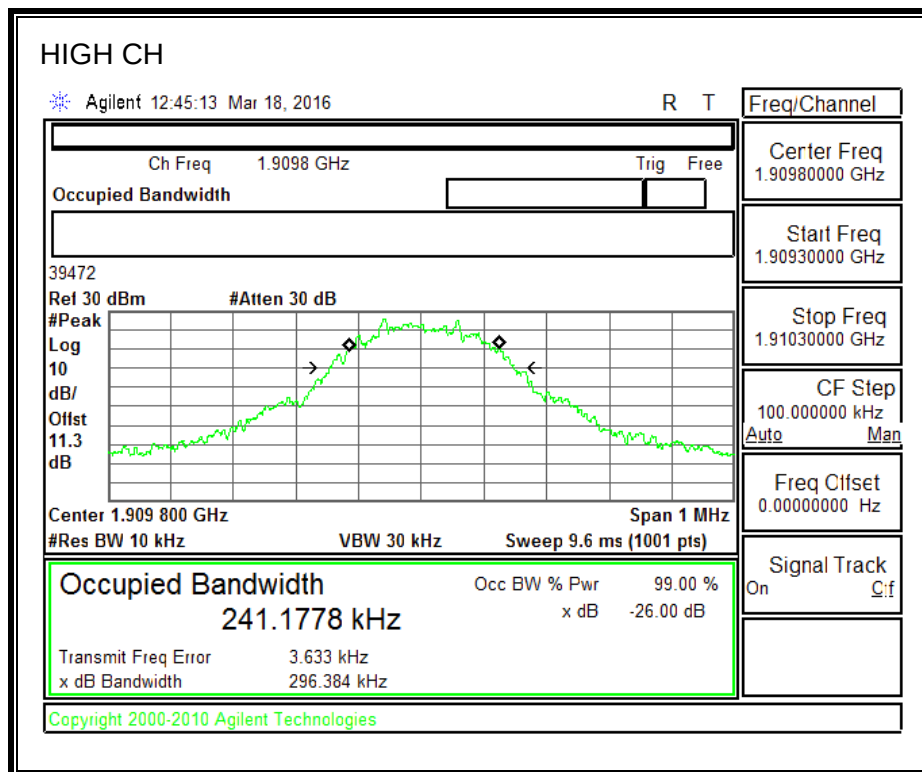
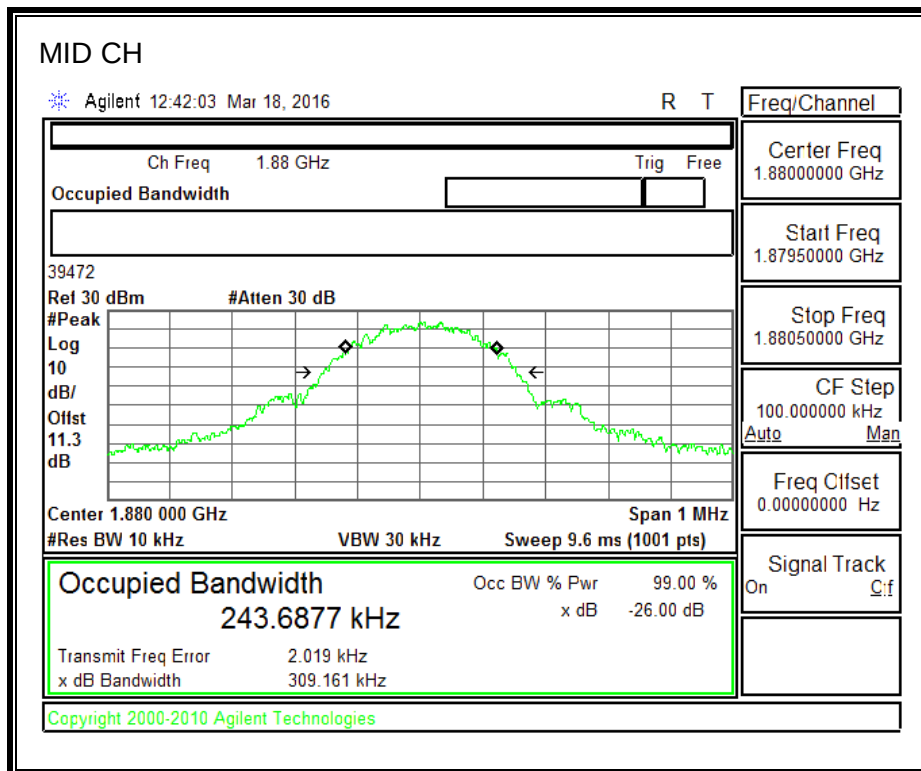
850MHz BAND





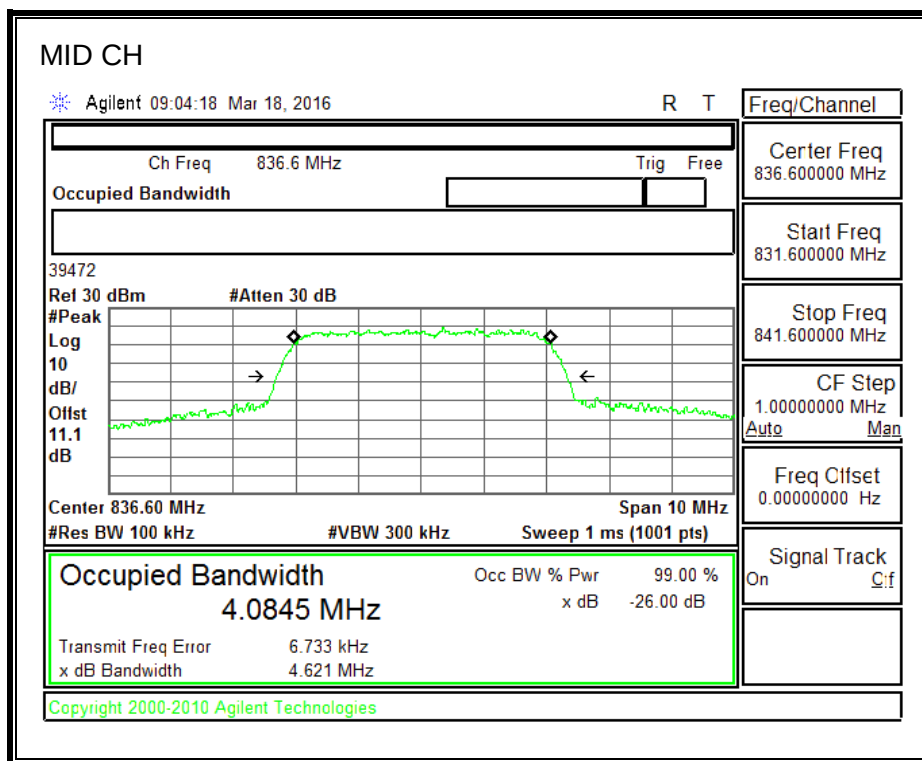
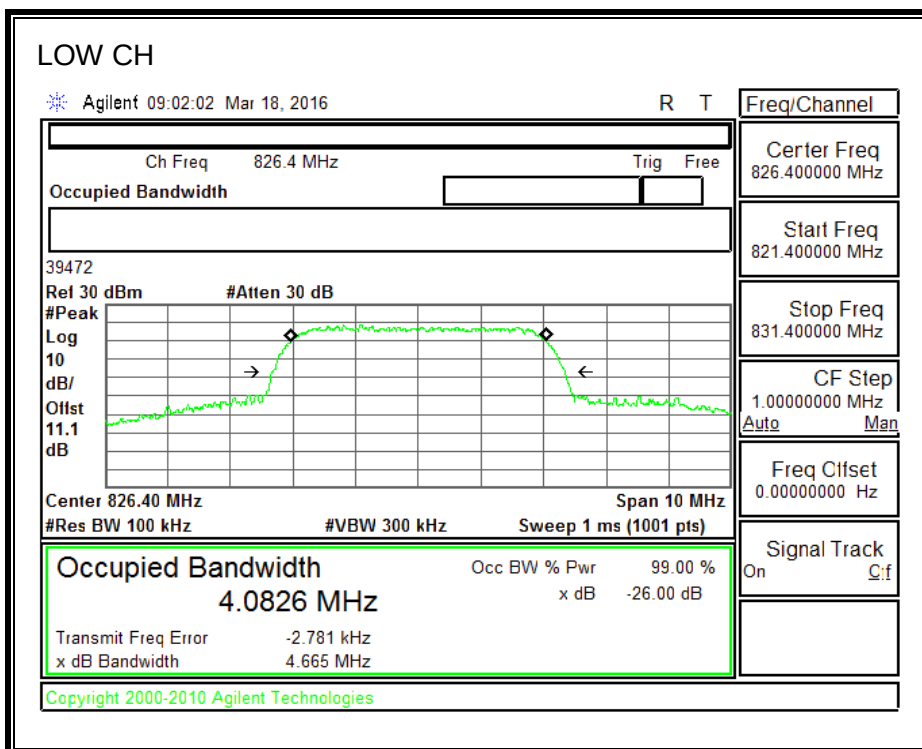
1900MHz BAND

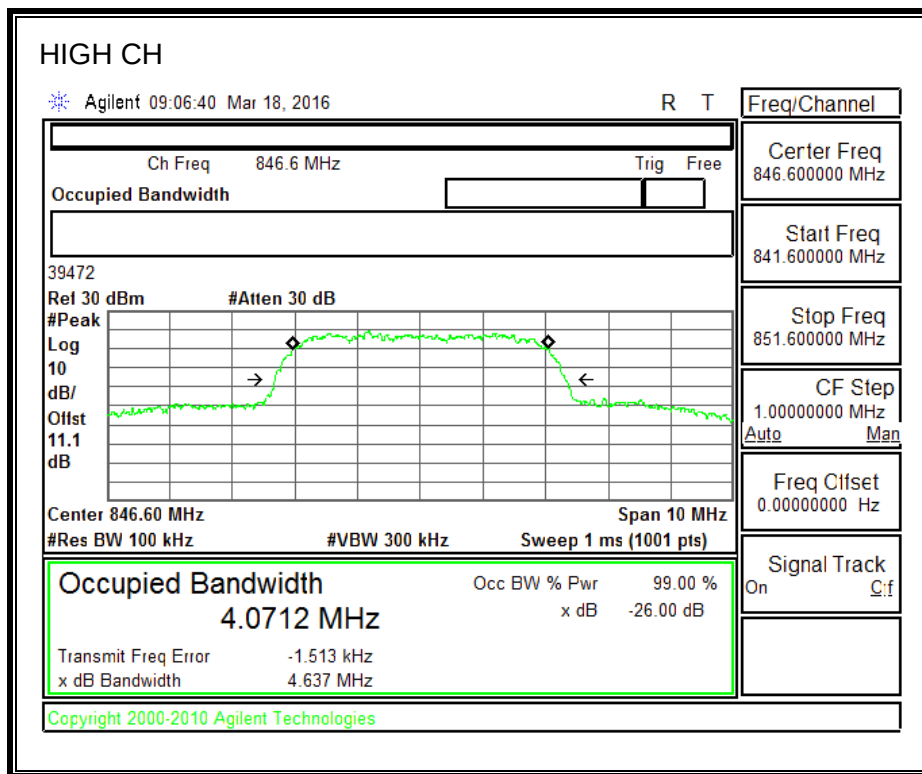




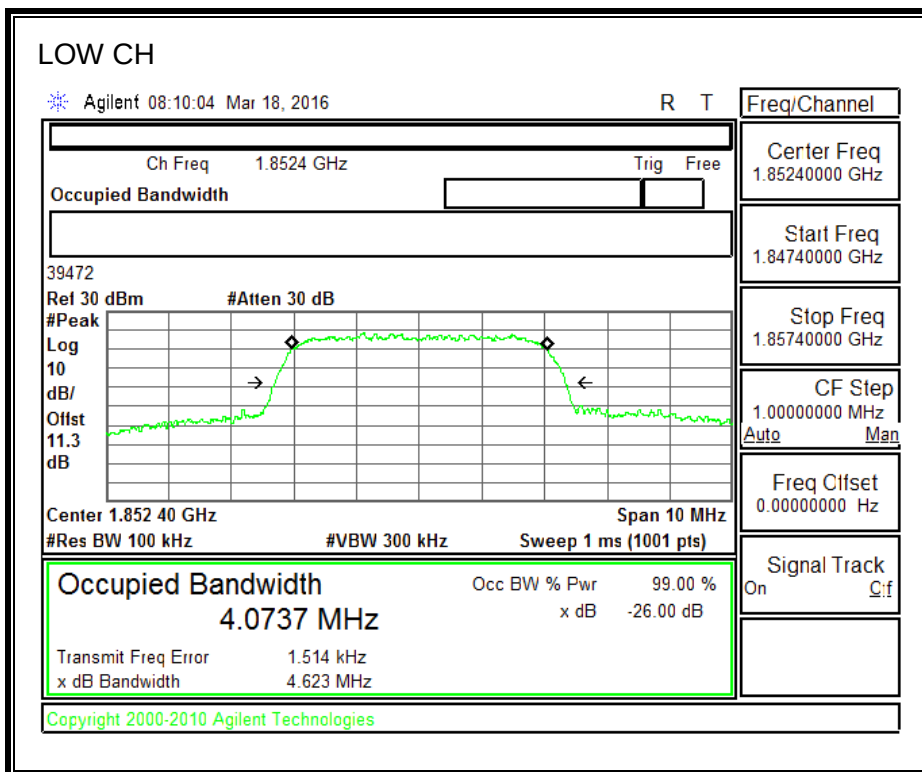
8.1.3. UMTS REL 99

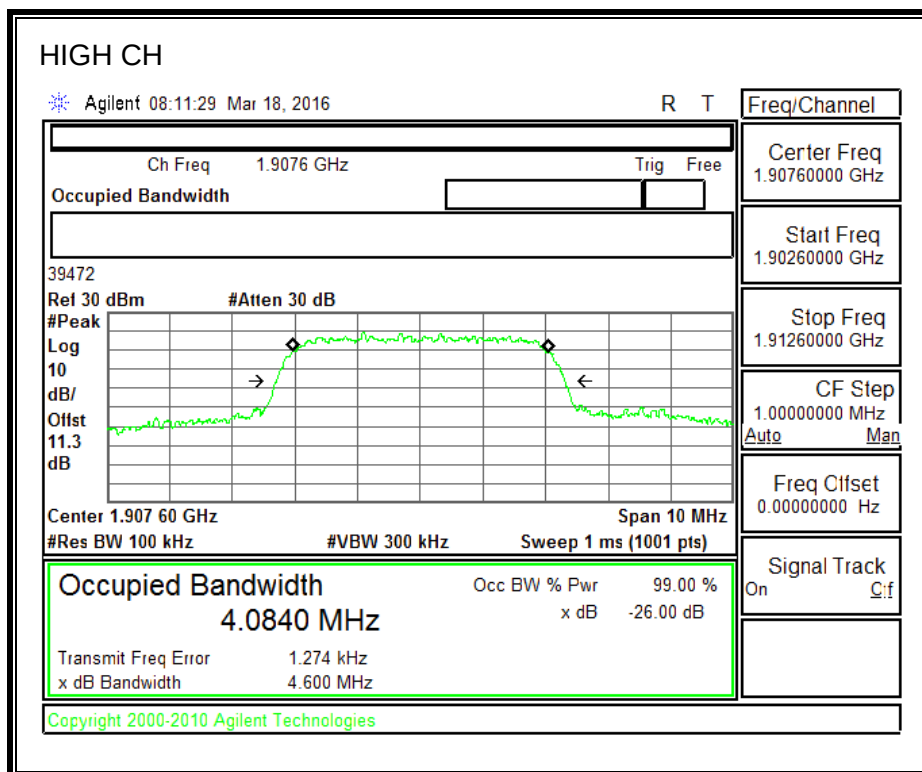
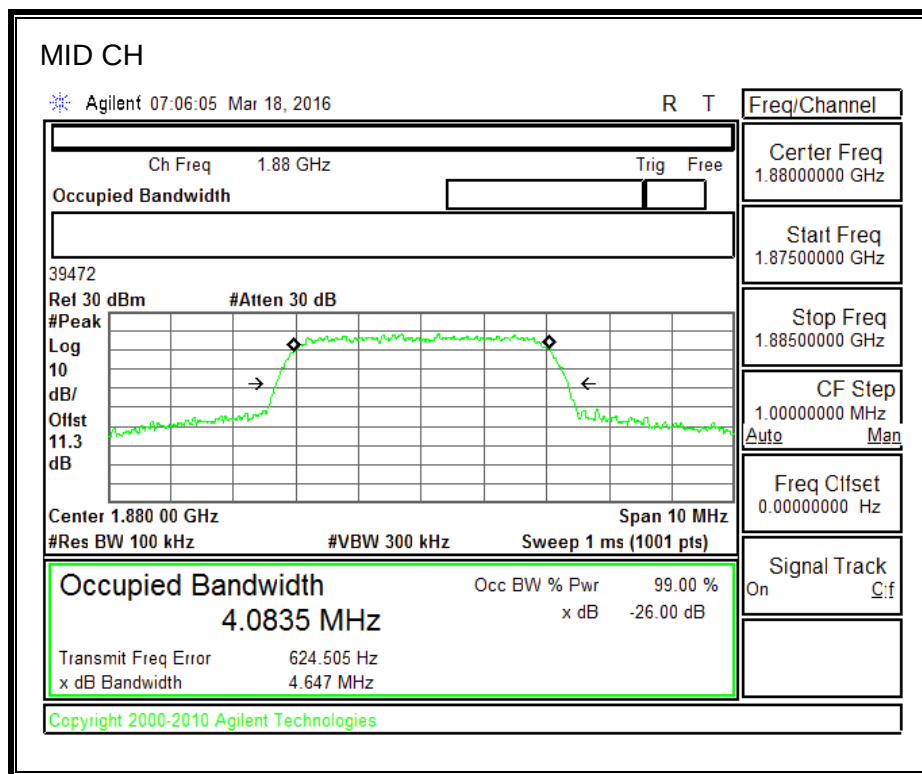
850MHz BAND



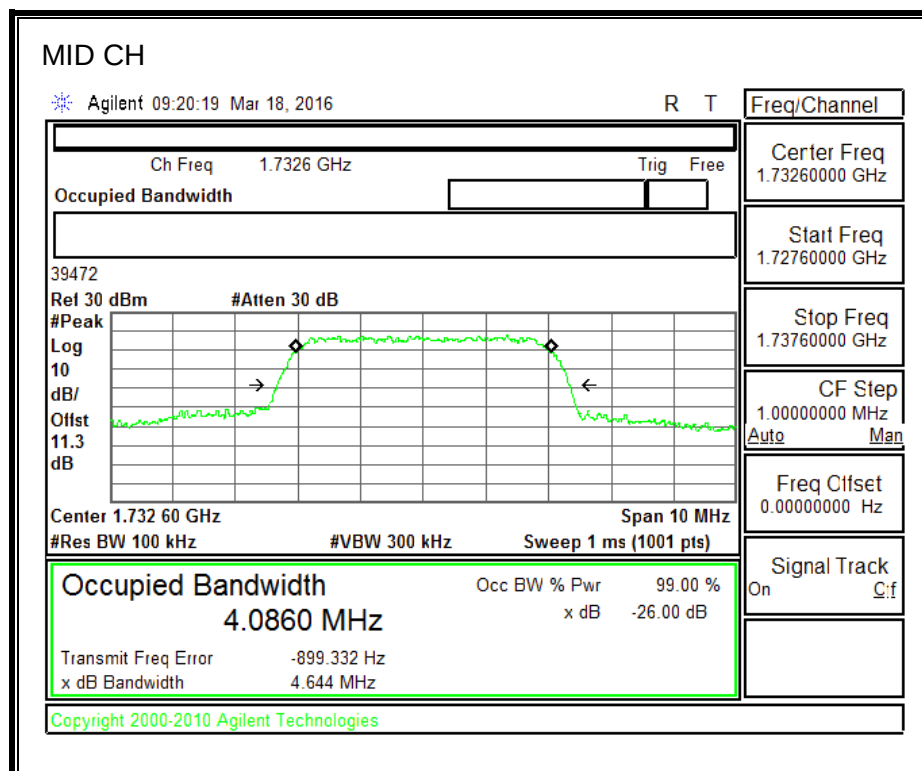
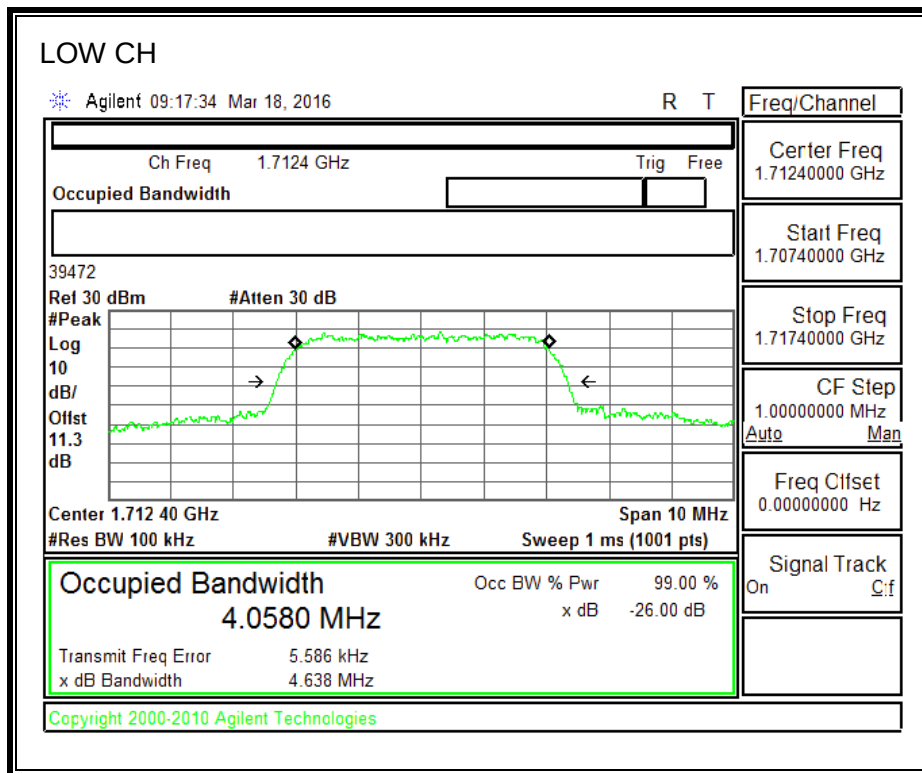


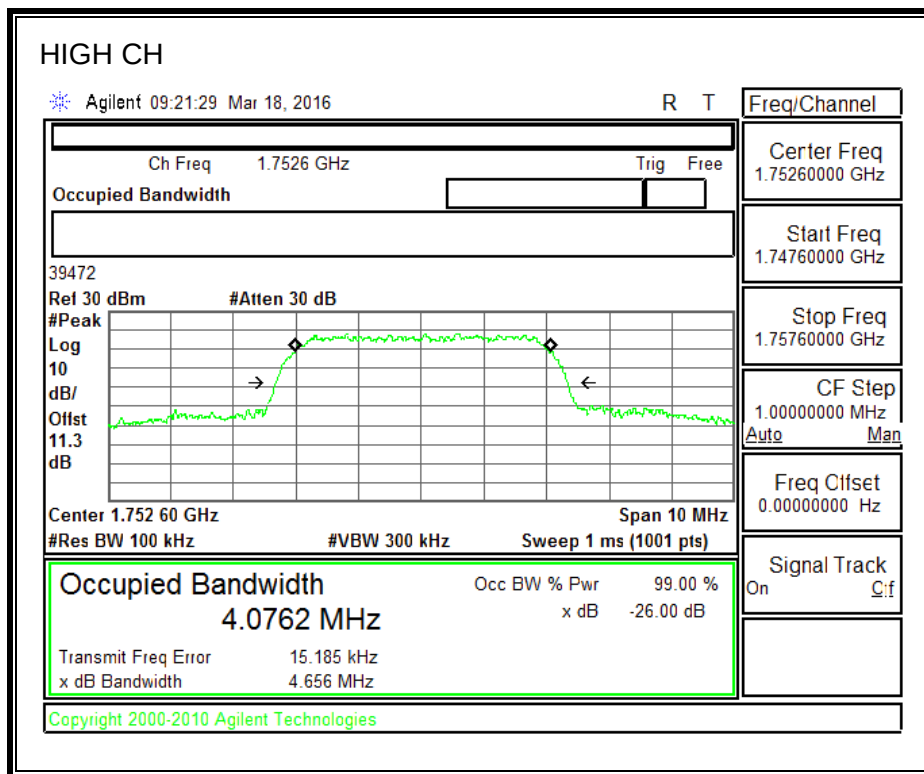
1900MHz BAND





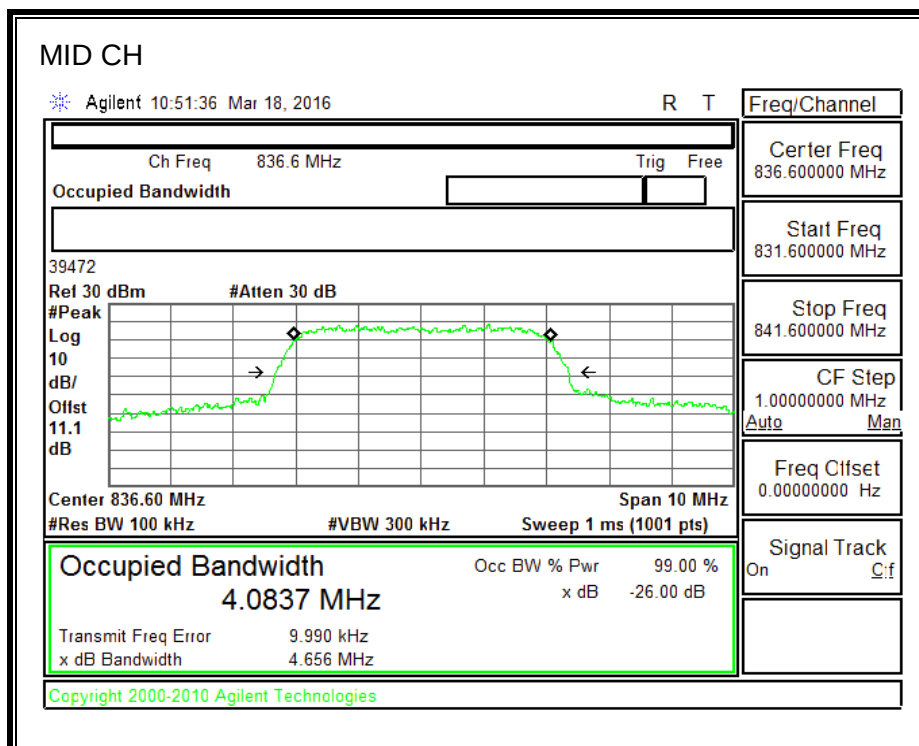
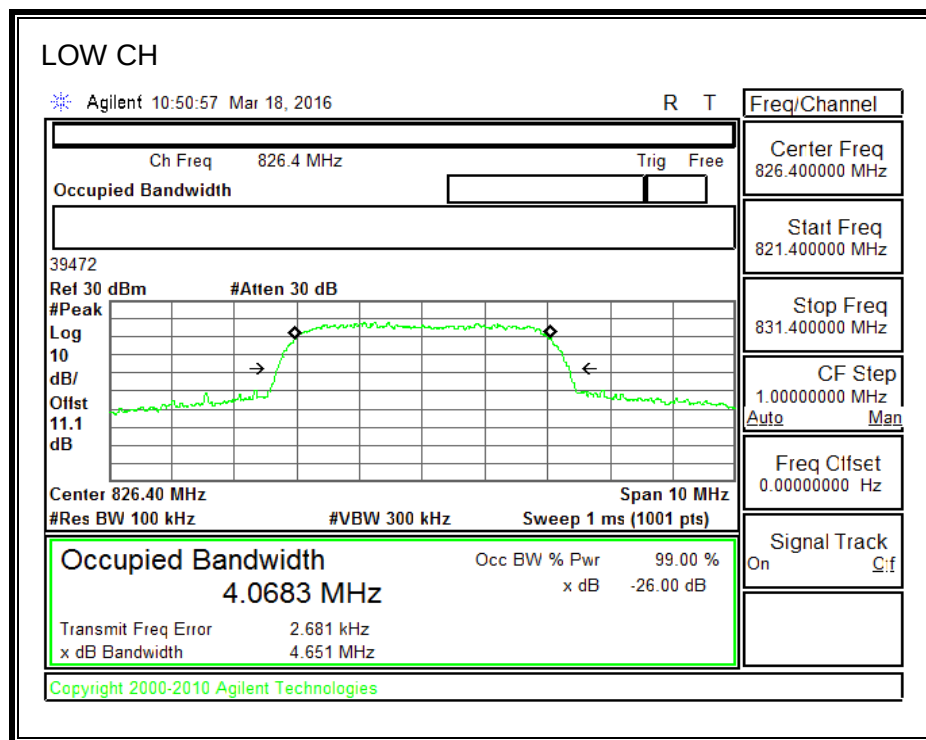
1700MHz BAND

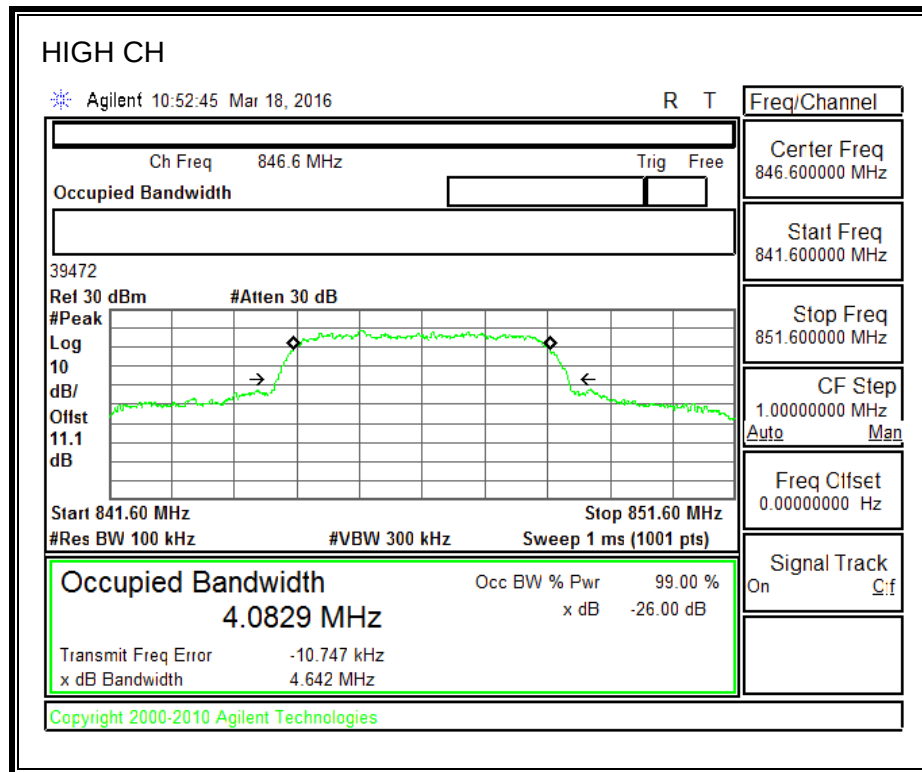




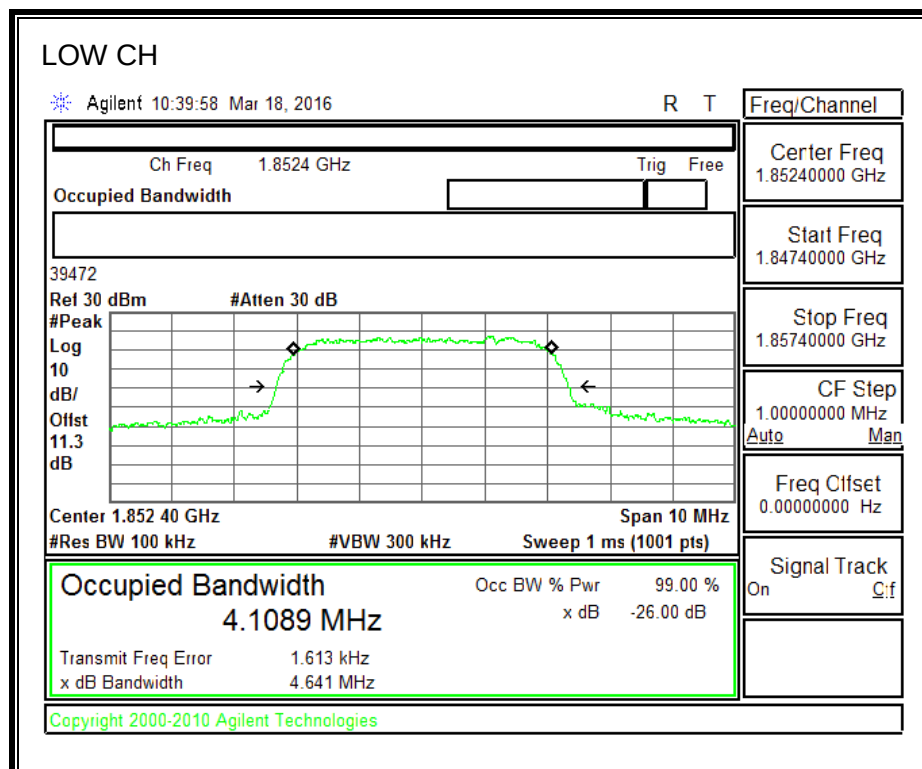
8.1.4. UMTS HSDPA

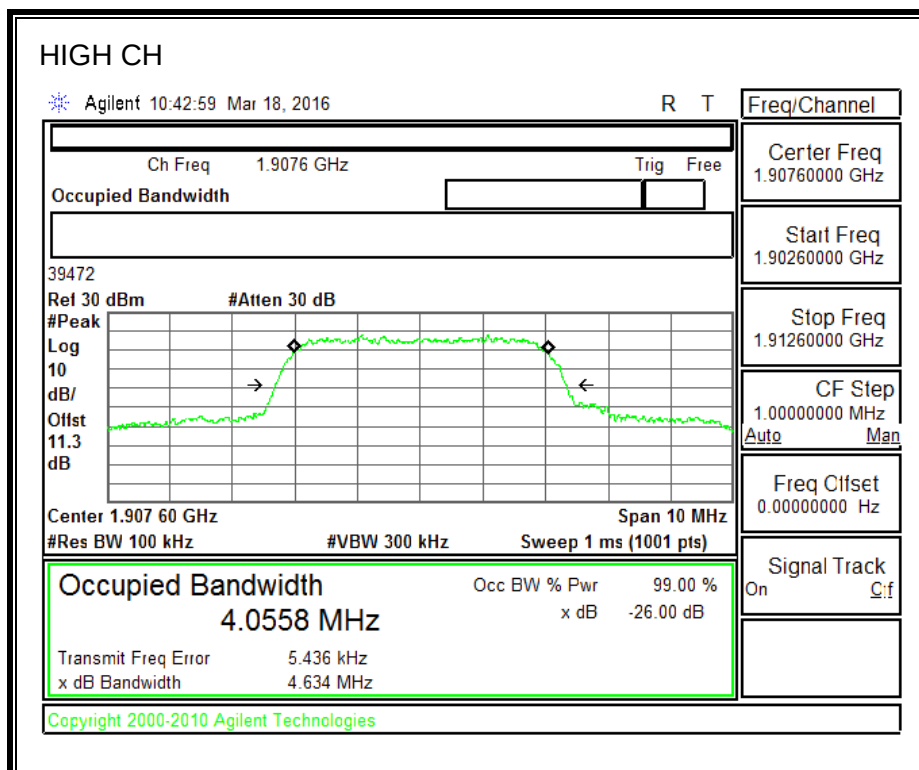
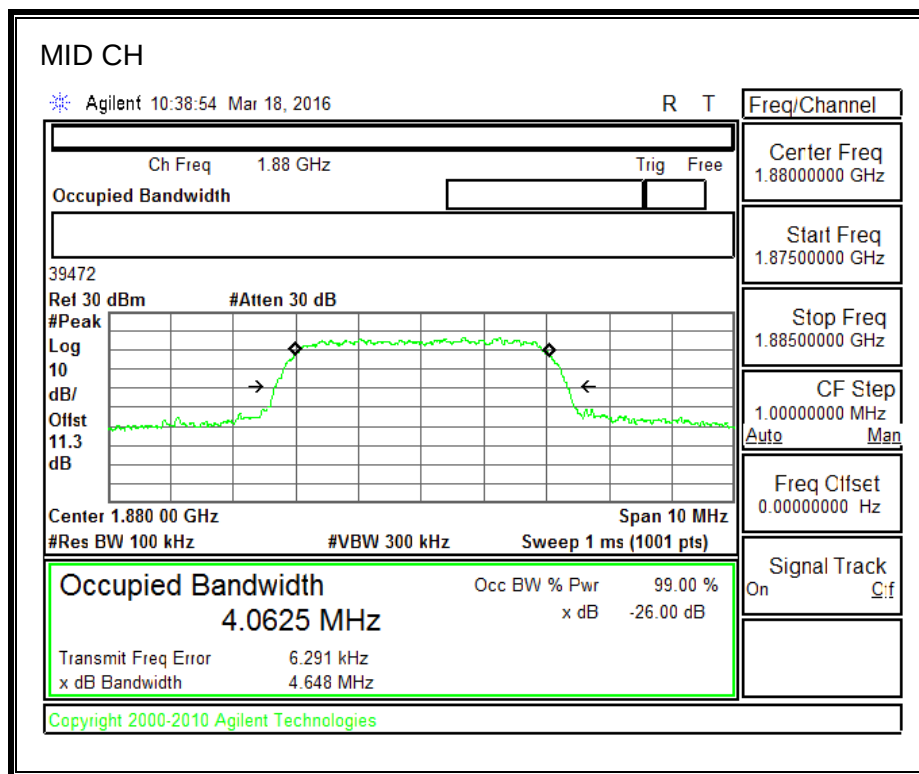
850MHz BAND



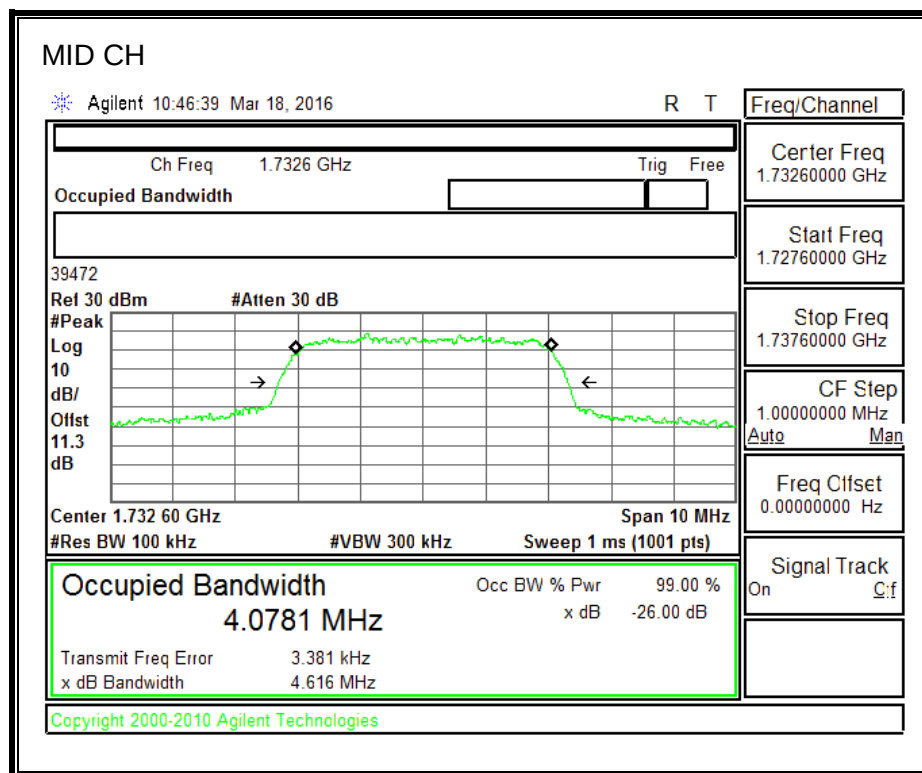
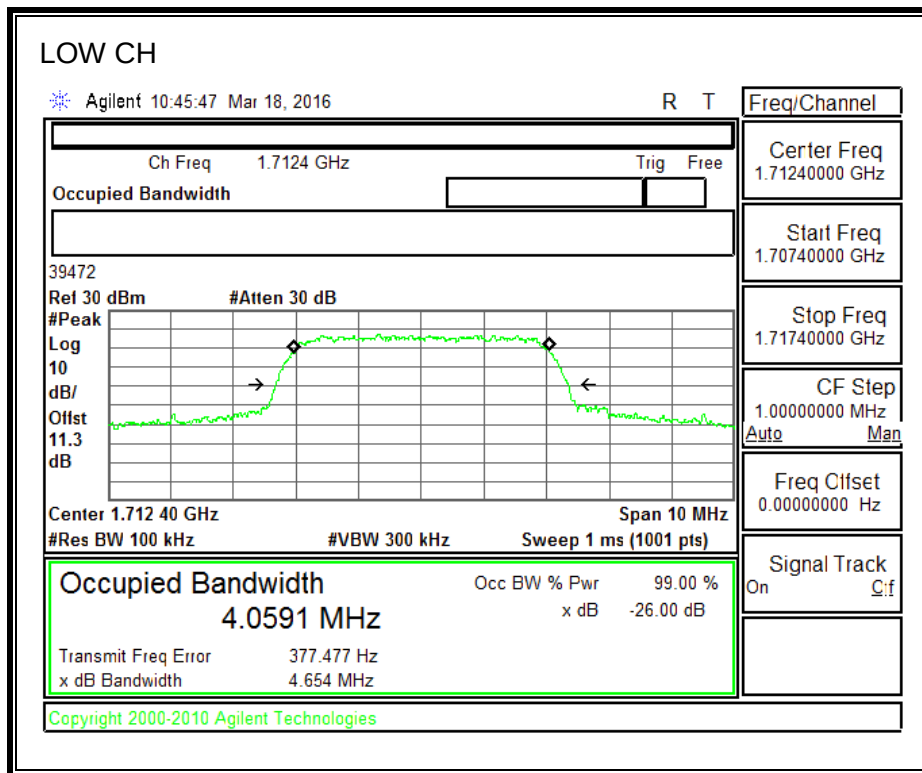


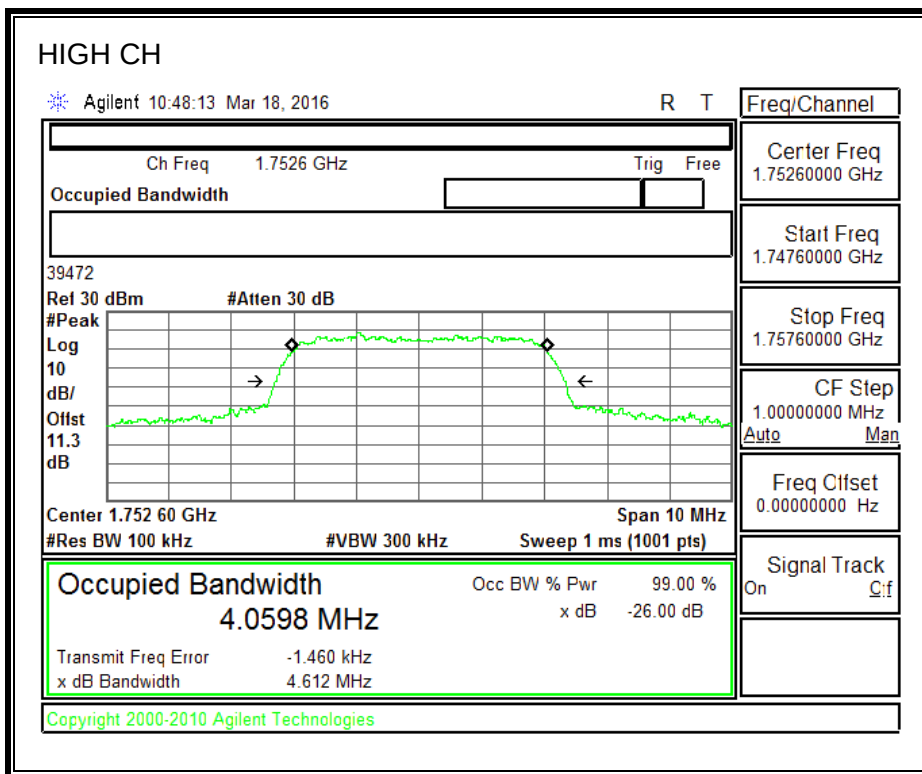
1900MHz BAND





1700MHz BAND





8.2. BAND EDGE

RULE PART(S)

FCC: §22.359, 24.238 and §27.53

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 an 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.

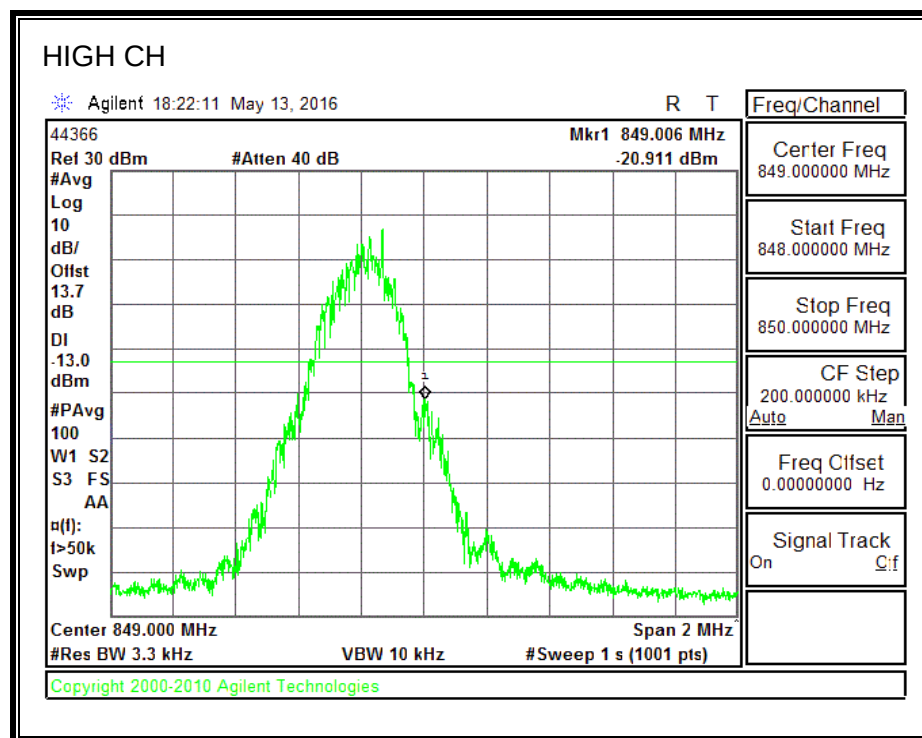
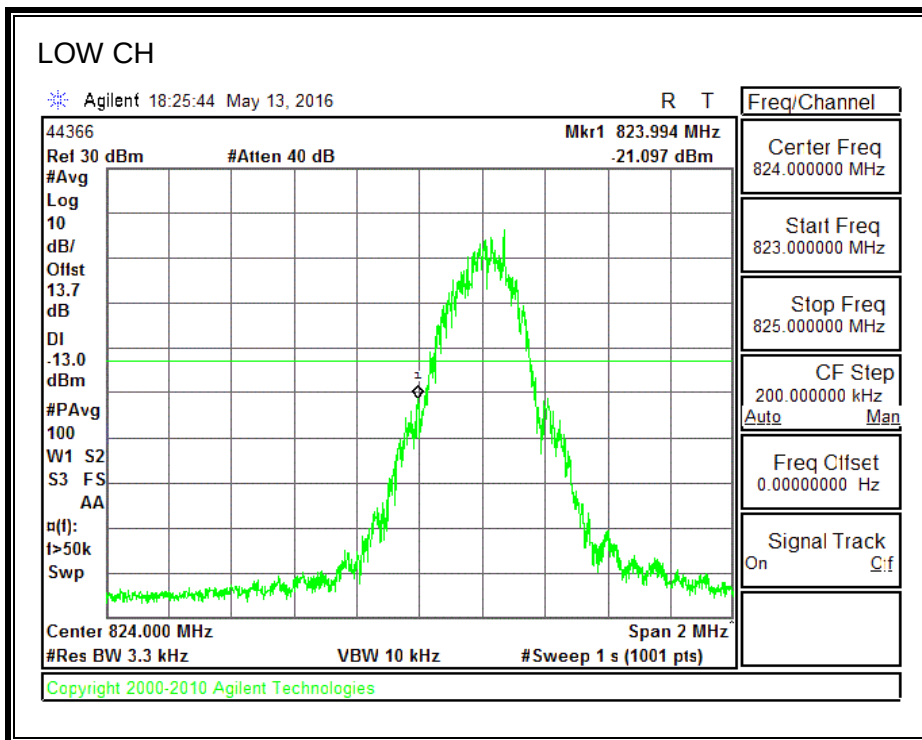
For each band edge measurement:

- 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.

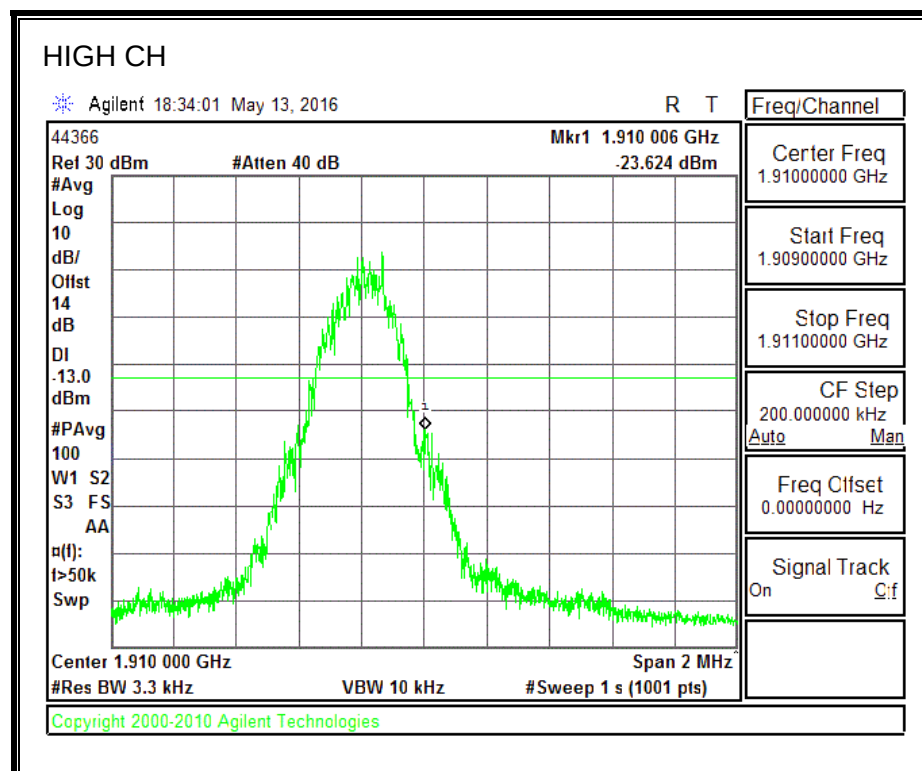
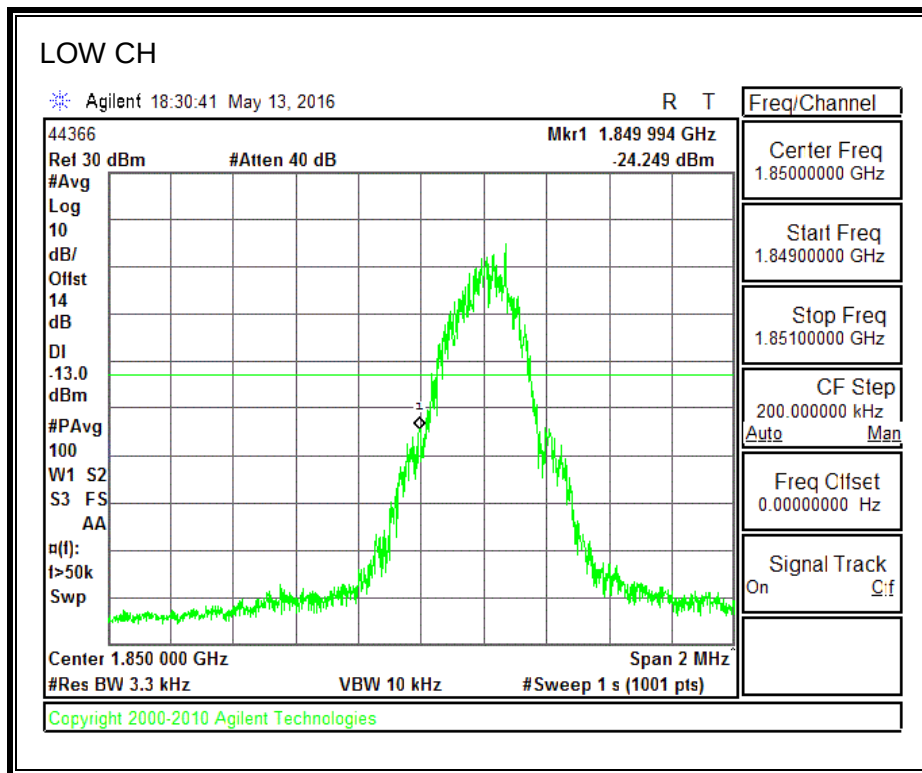
RESULTS

8.2.1. GSM-GPRS

850MHz BAND

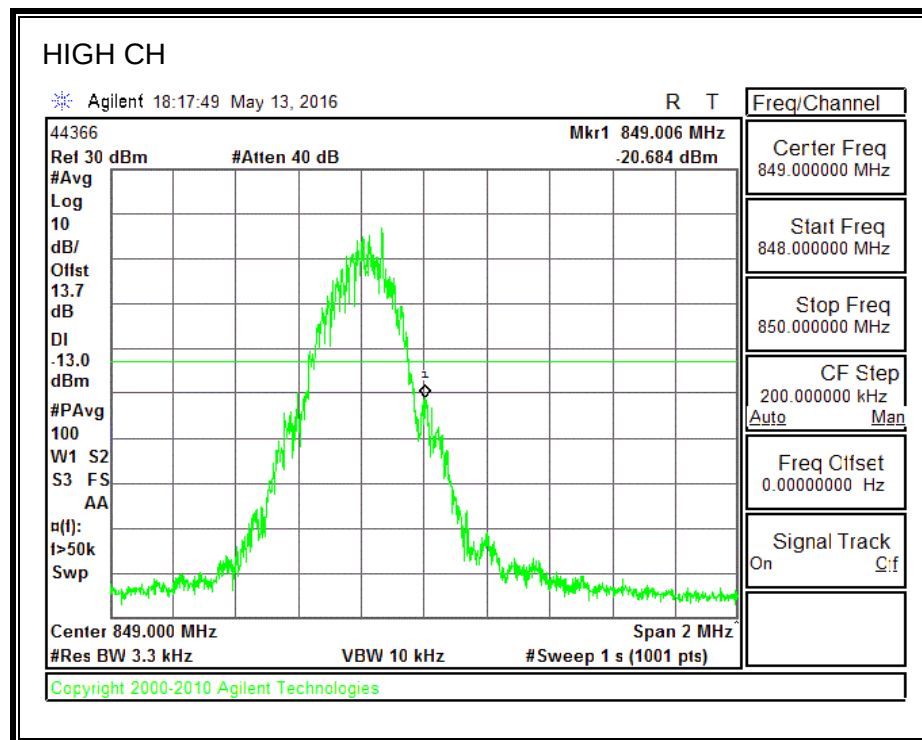
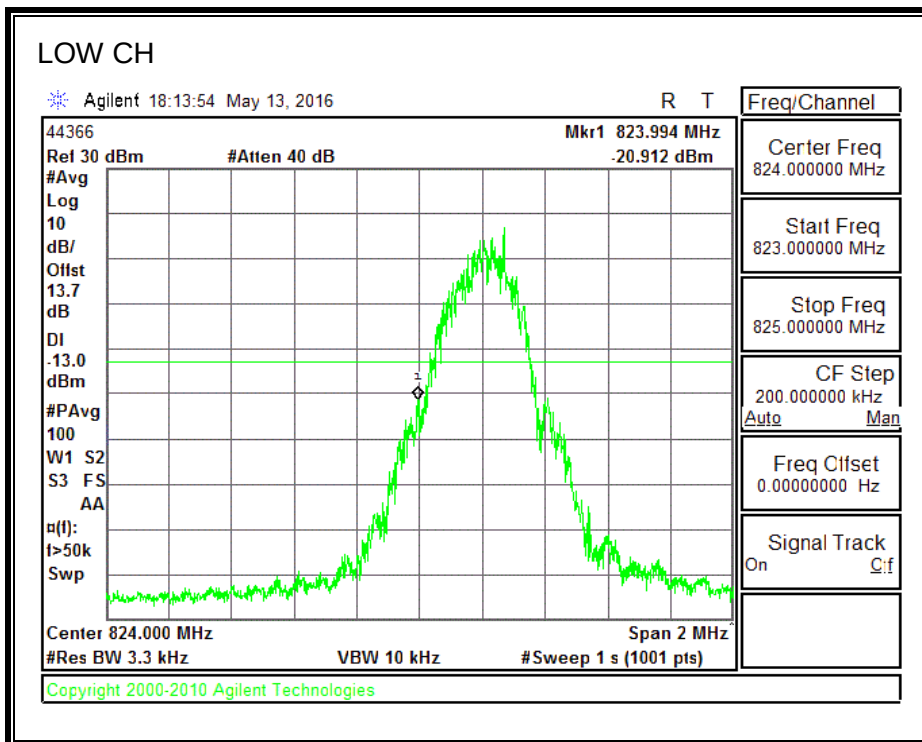


1900MHz BAND

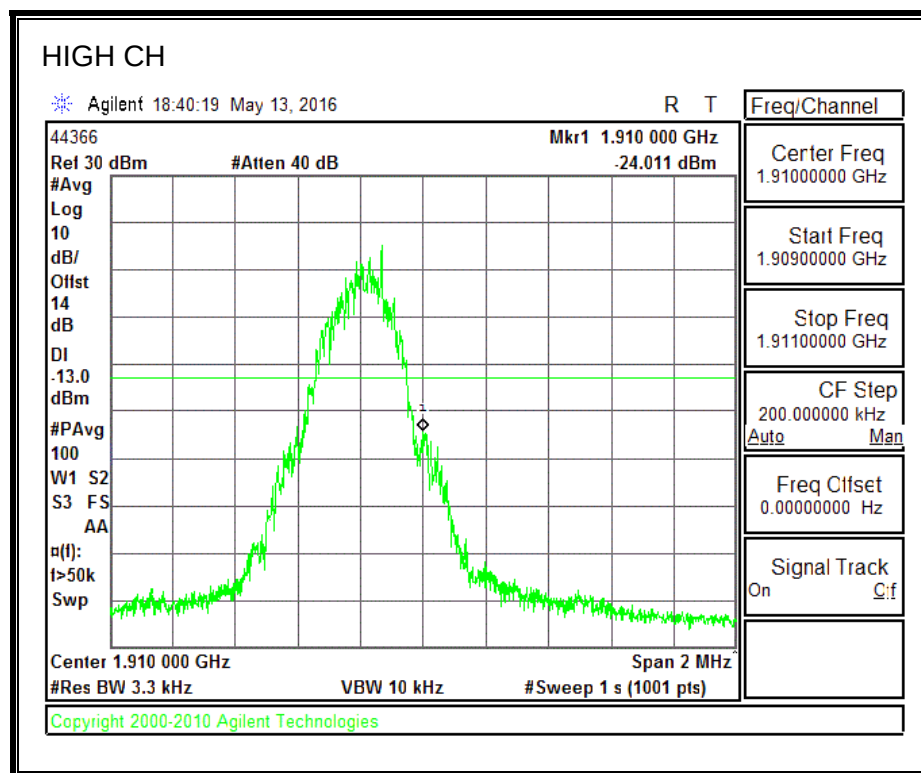
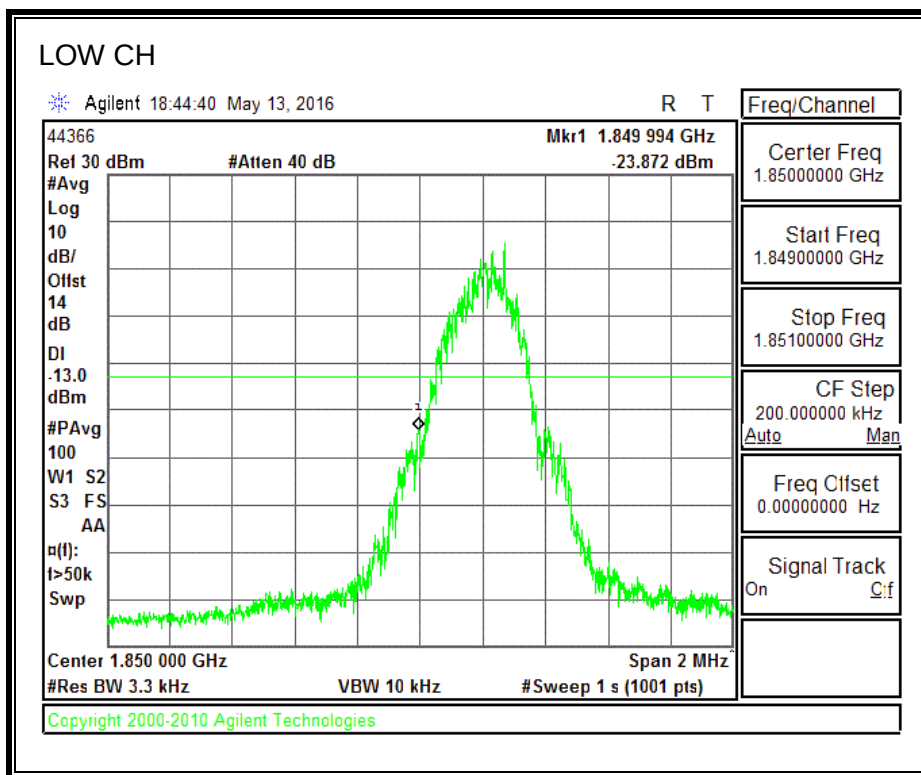


8.2.2. GSM-EGPRS

850MHz BAND

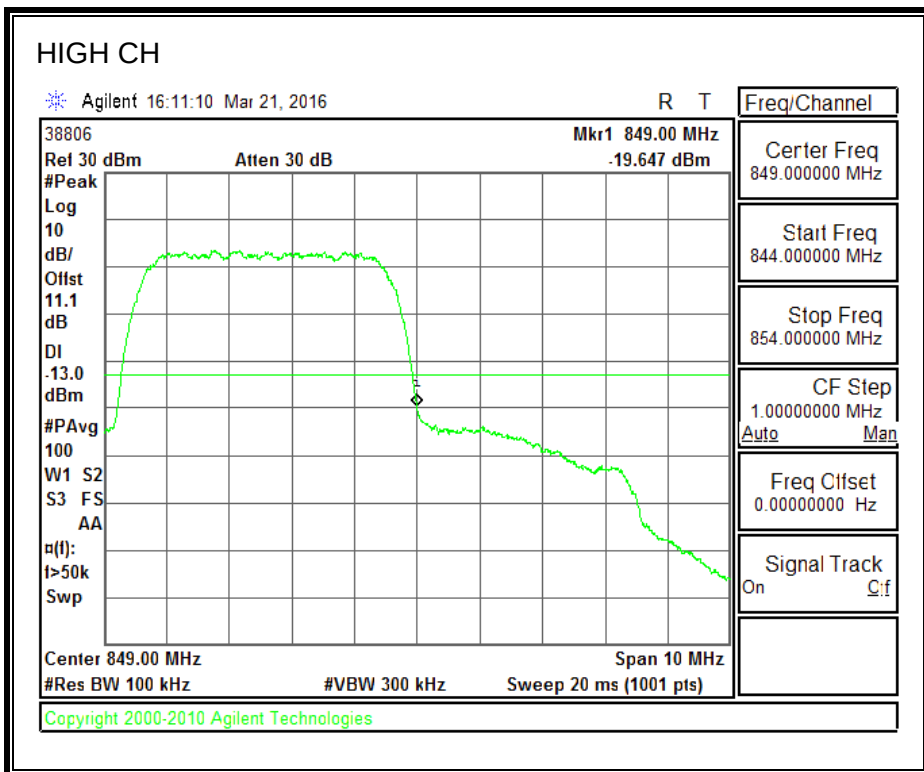
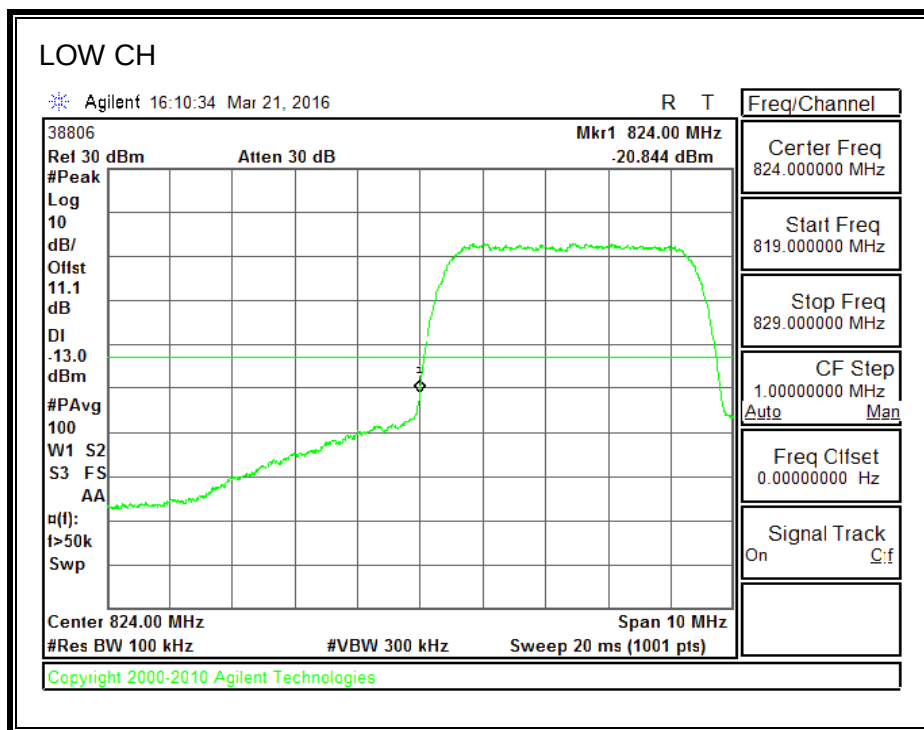


1900MHz BAND

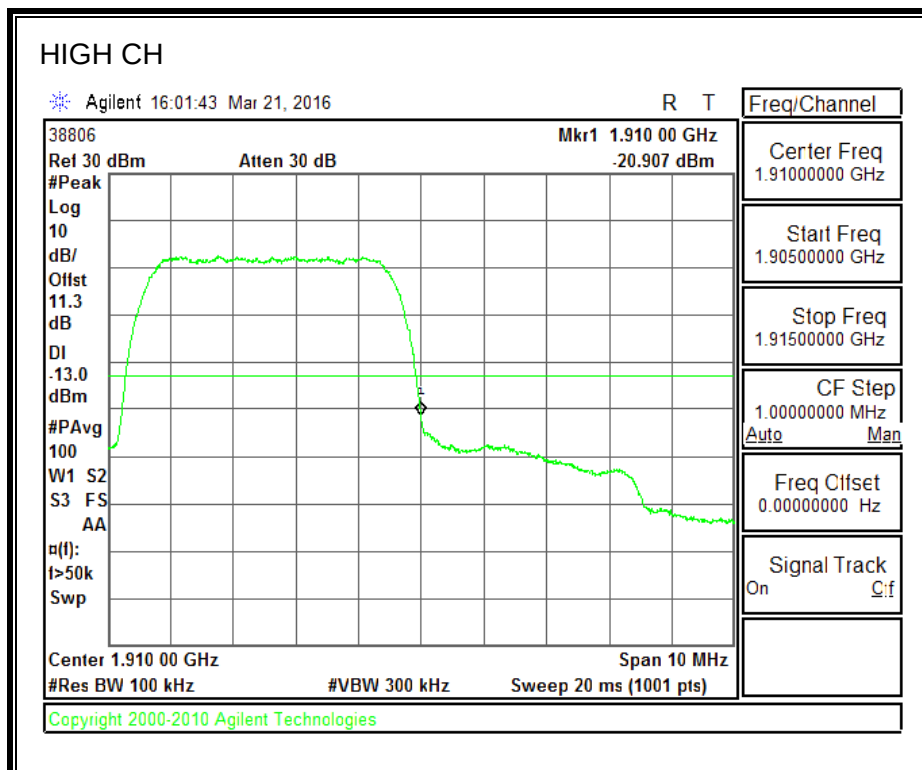
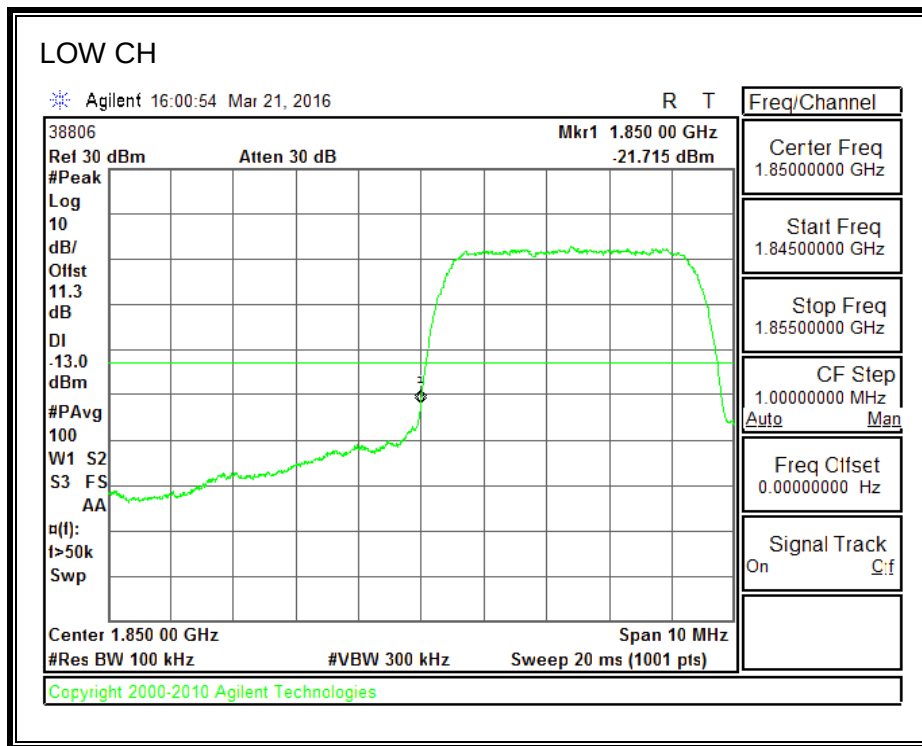


8.2.3. UMTS REL 99

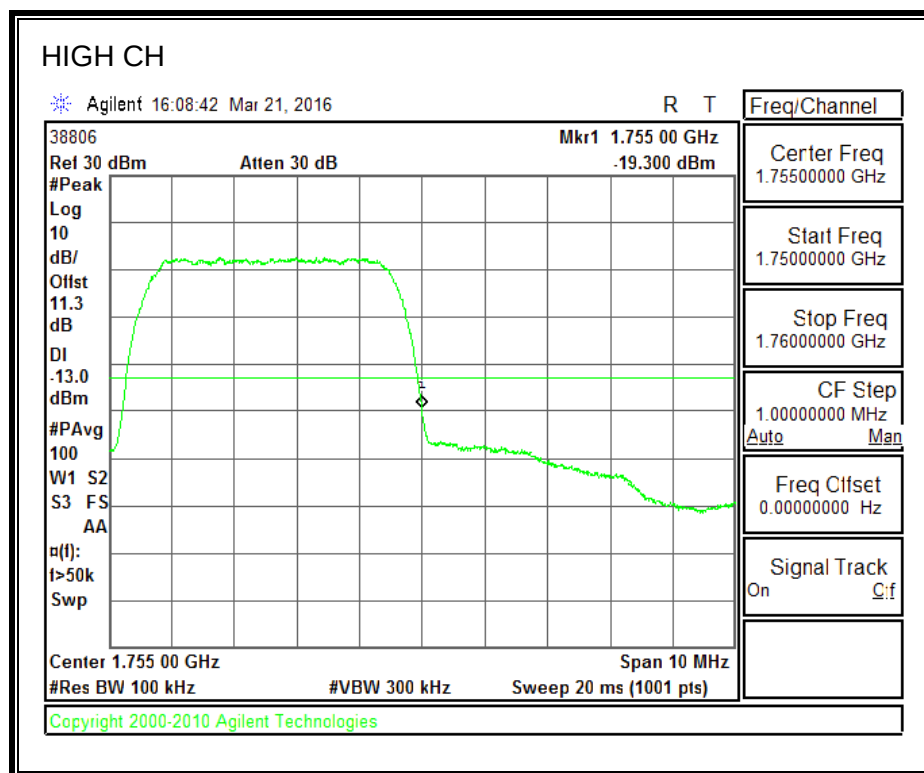
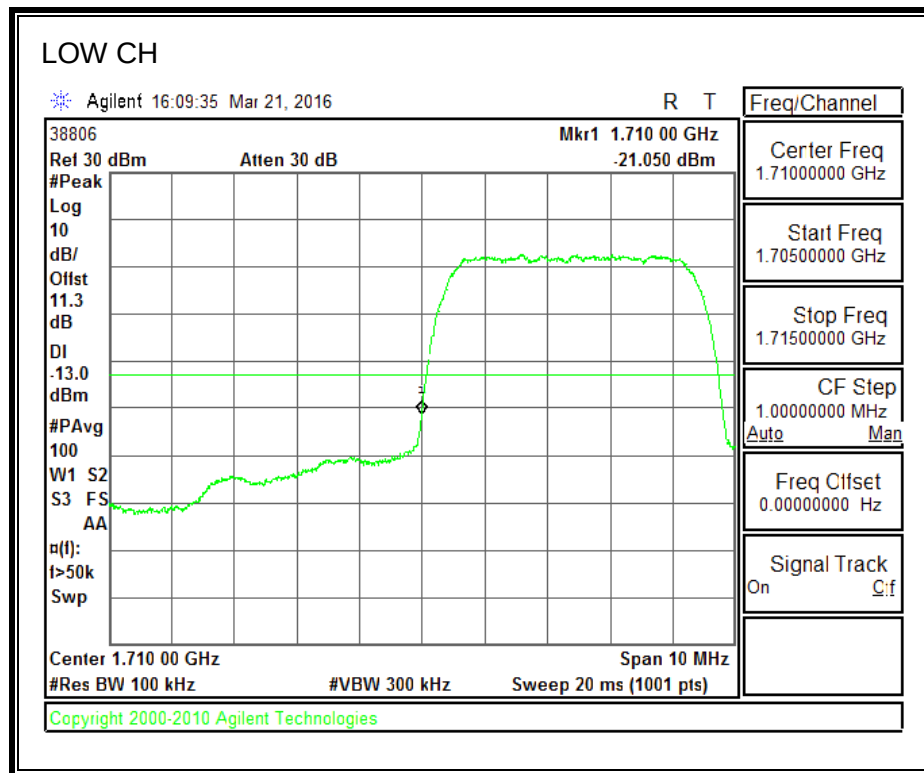
850MHz BAND



1900MHz BAND

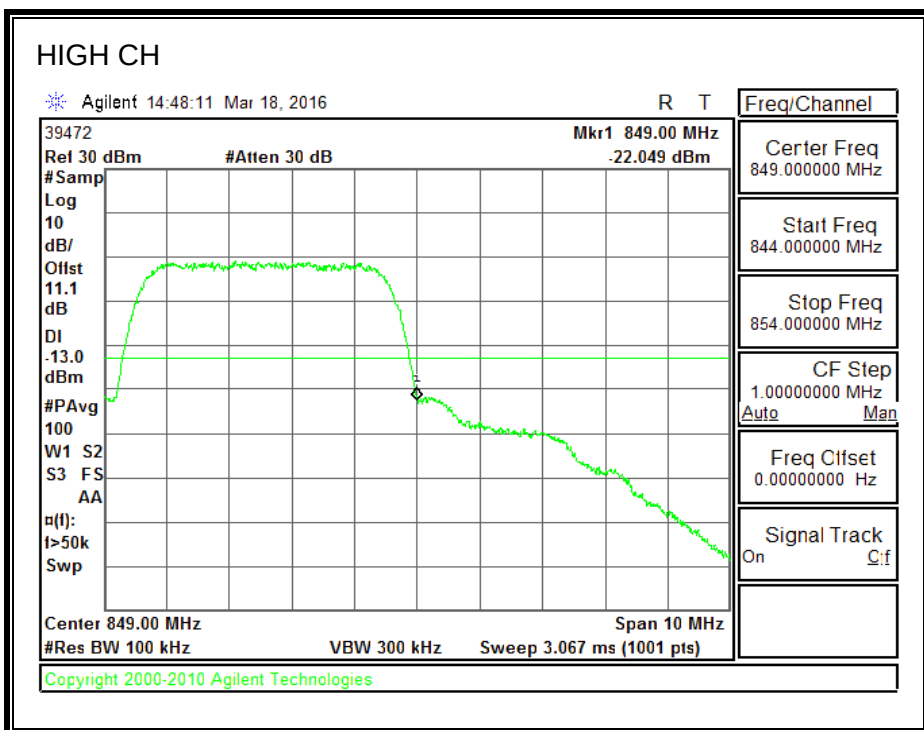
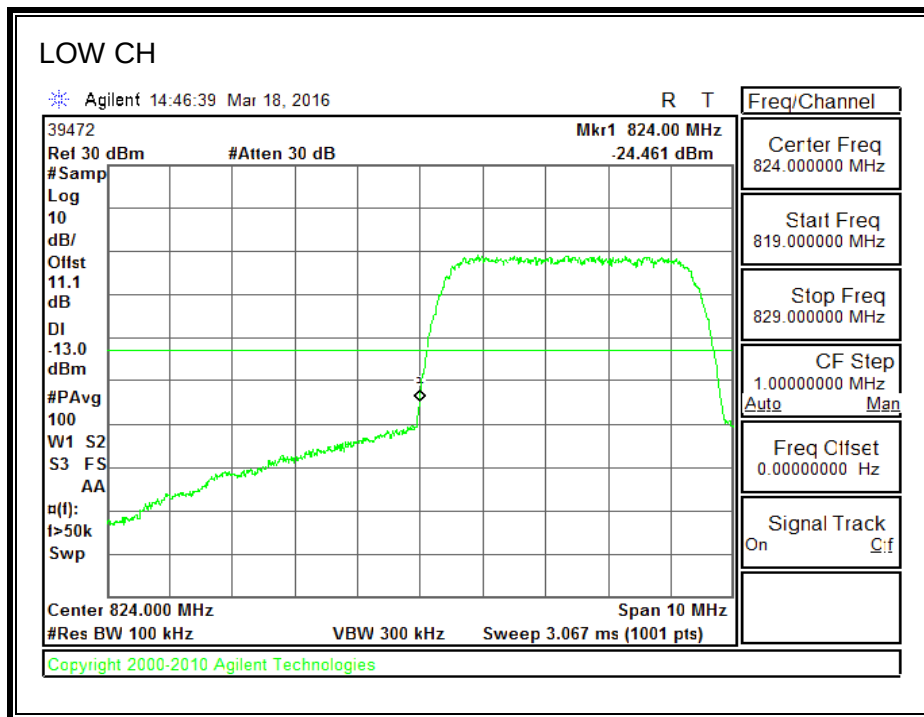


1700MHz BAND

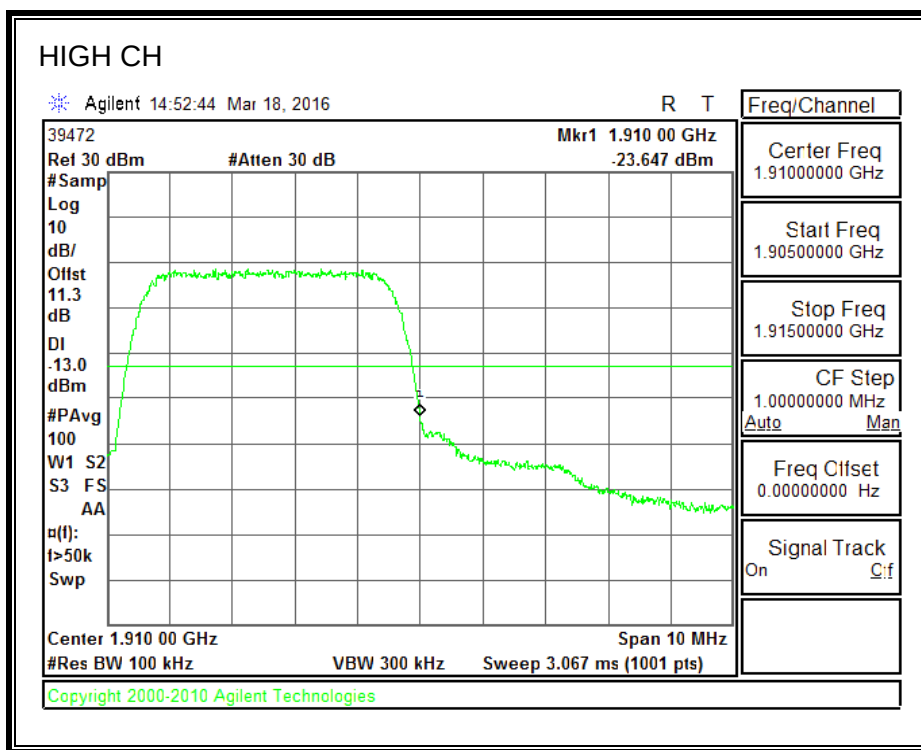
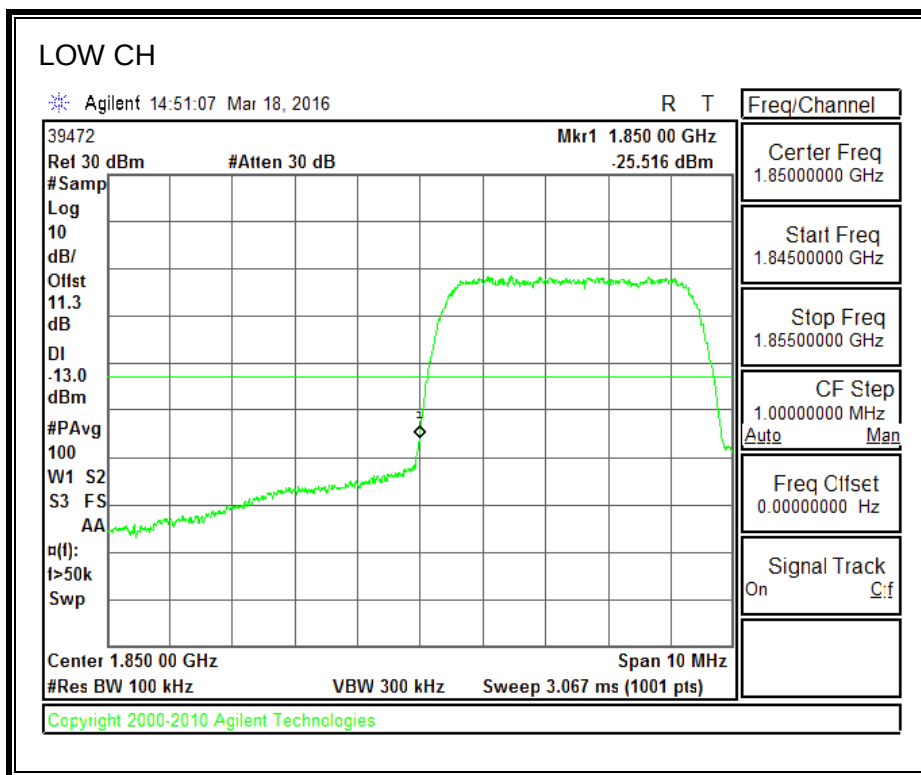


8.2.4. UMTS HSDPA

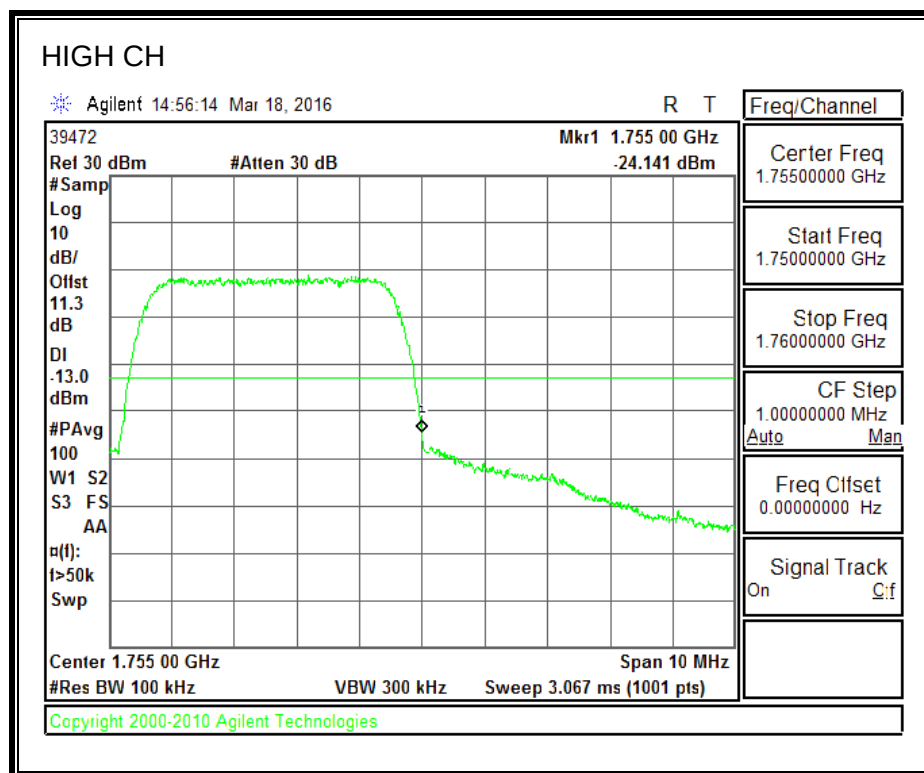
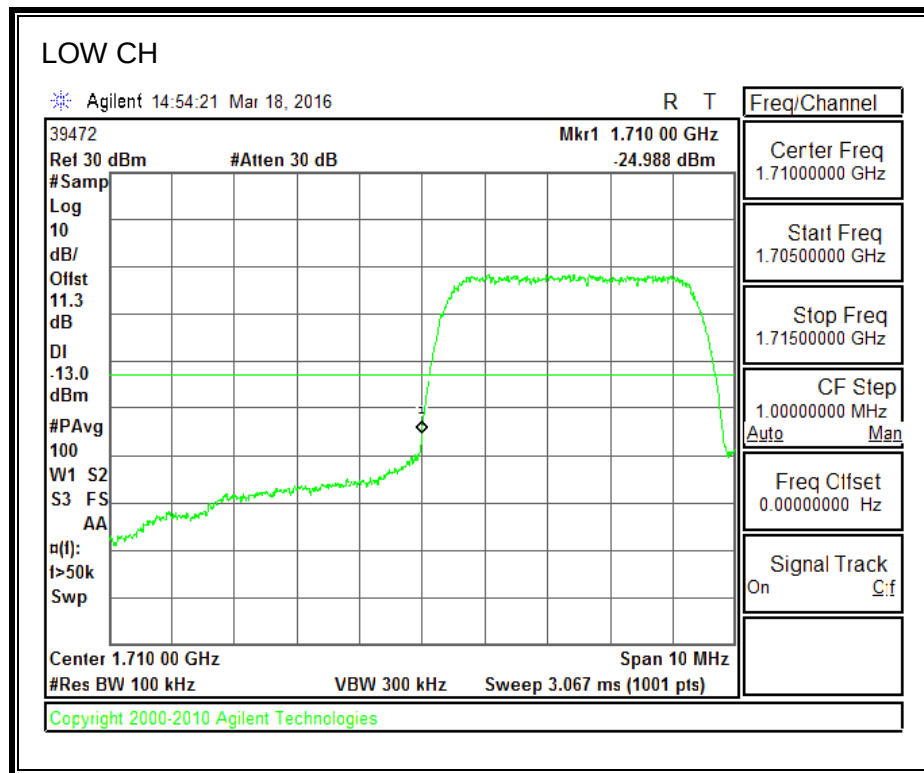
850MHz BAND



1900MHz BAND



1700MHz BAND



8.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917 and §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

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.

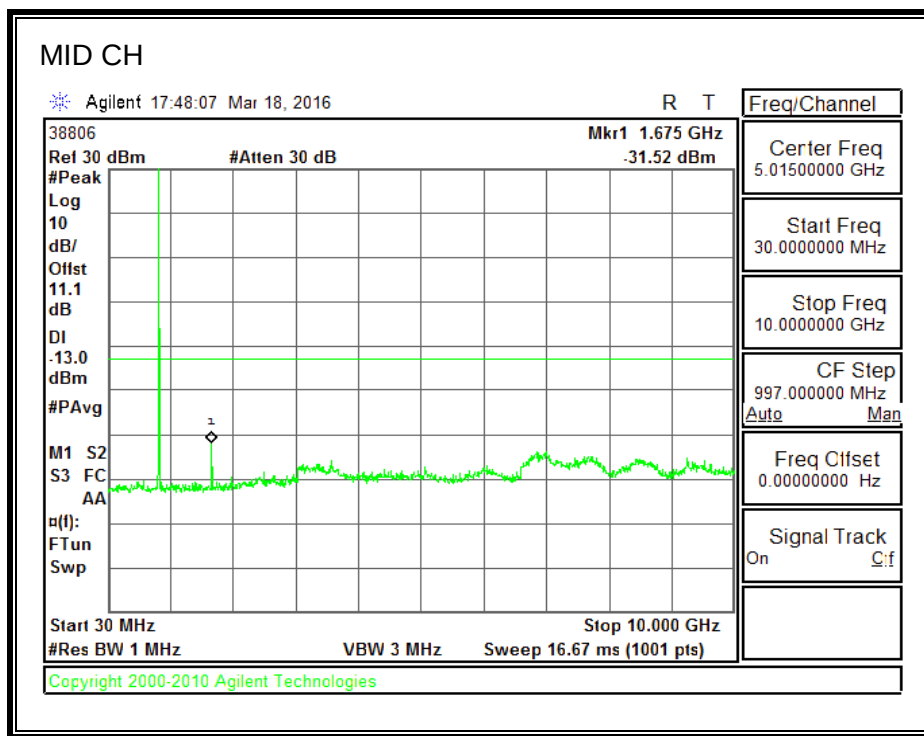
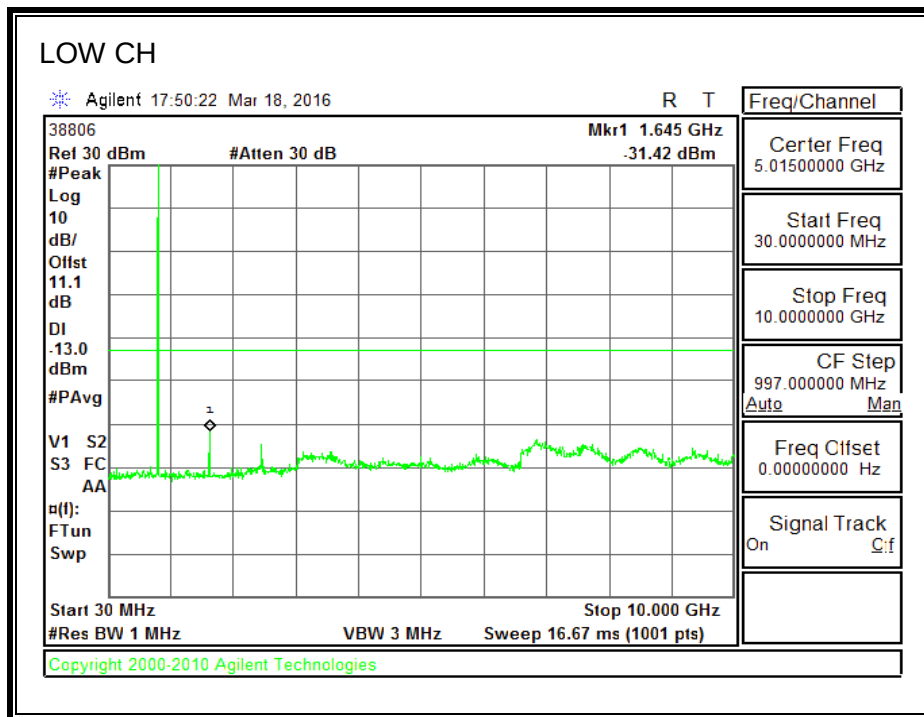
For each out of band emissions measurement:

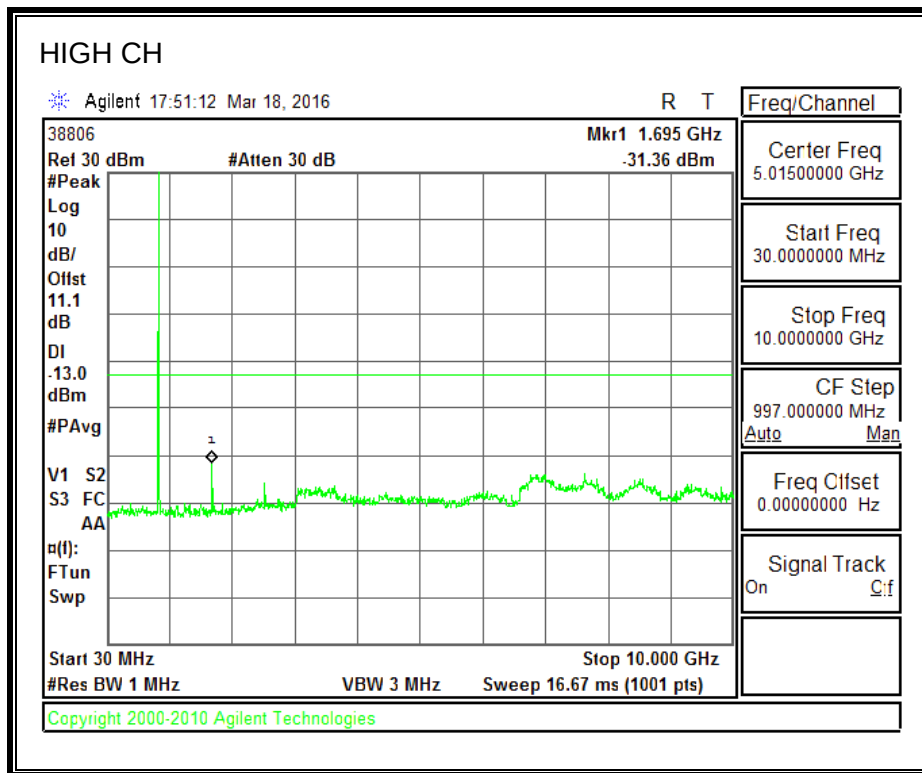
- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

RESULTS

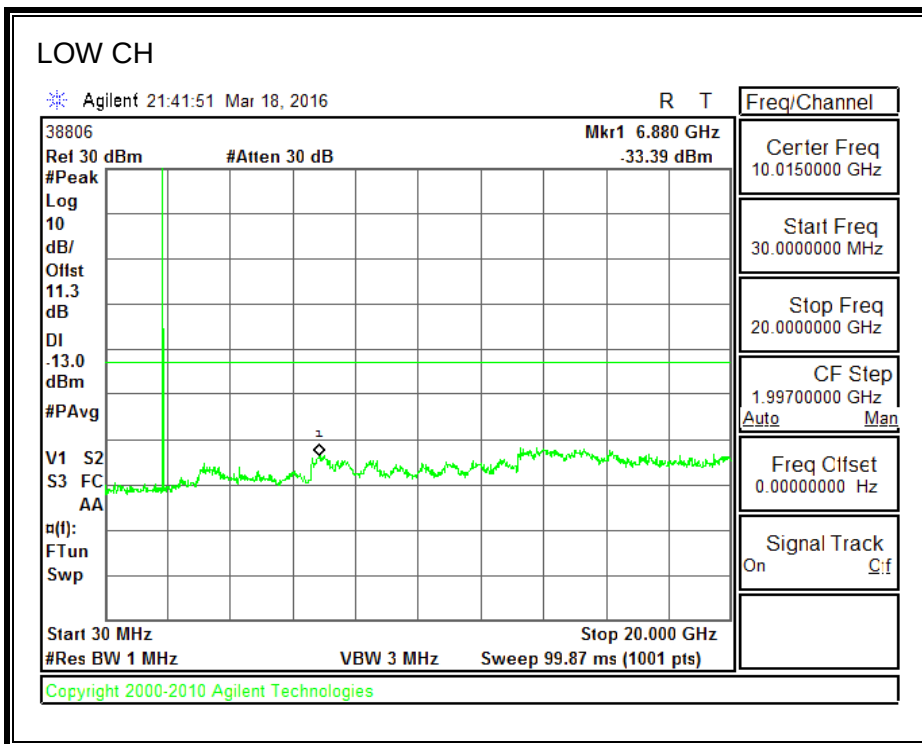
8.3.1. GSM-GPRS

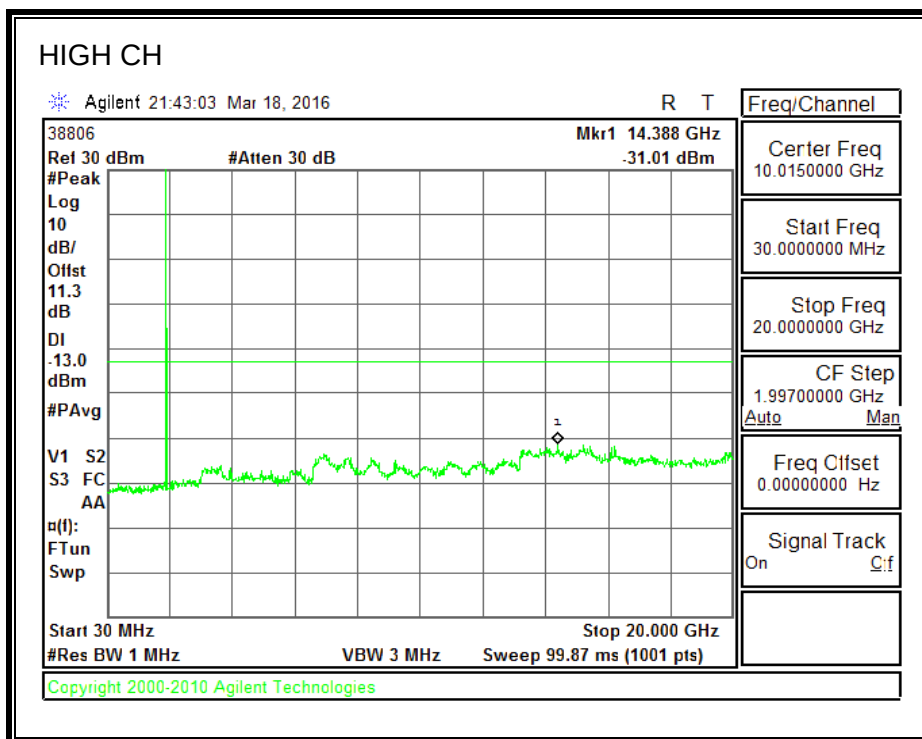
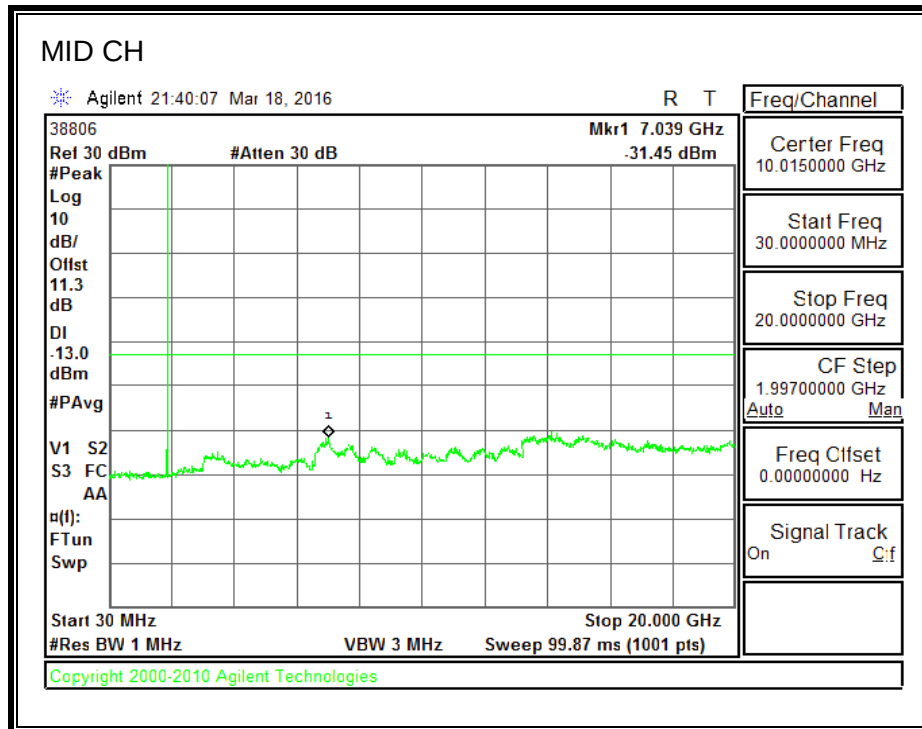
850MHz BAND





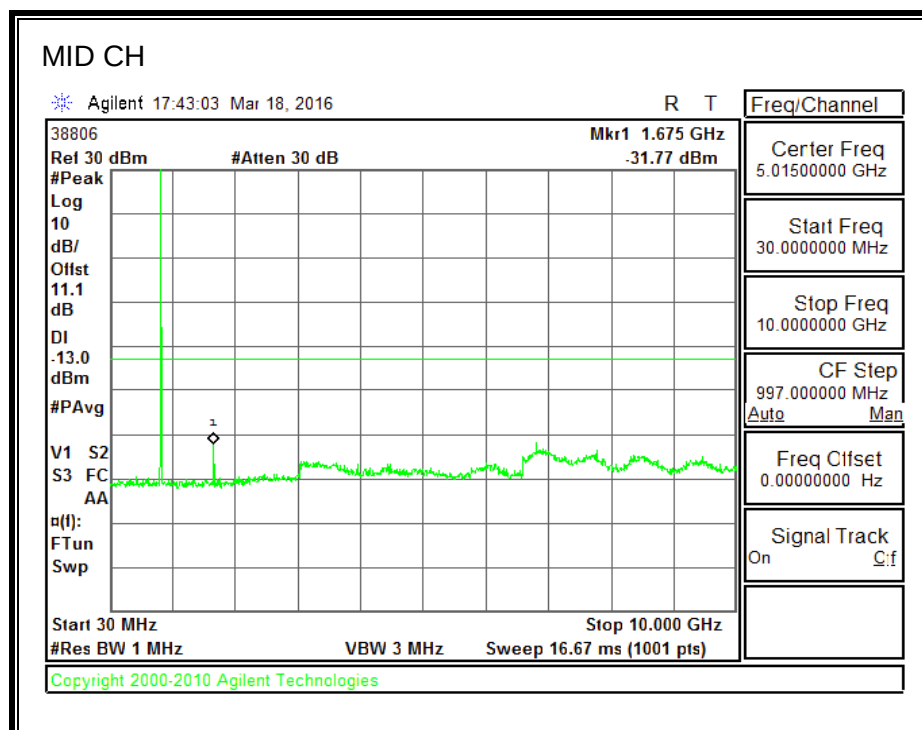
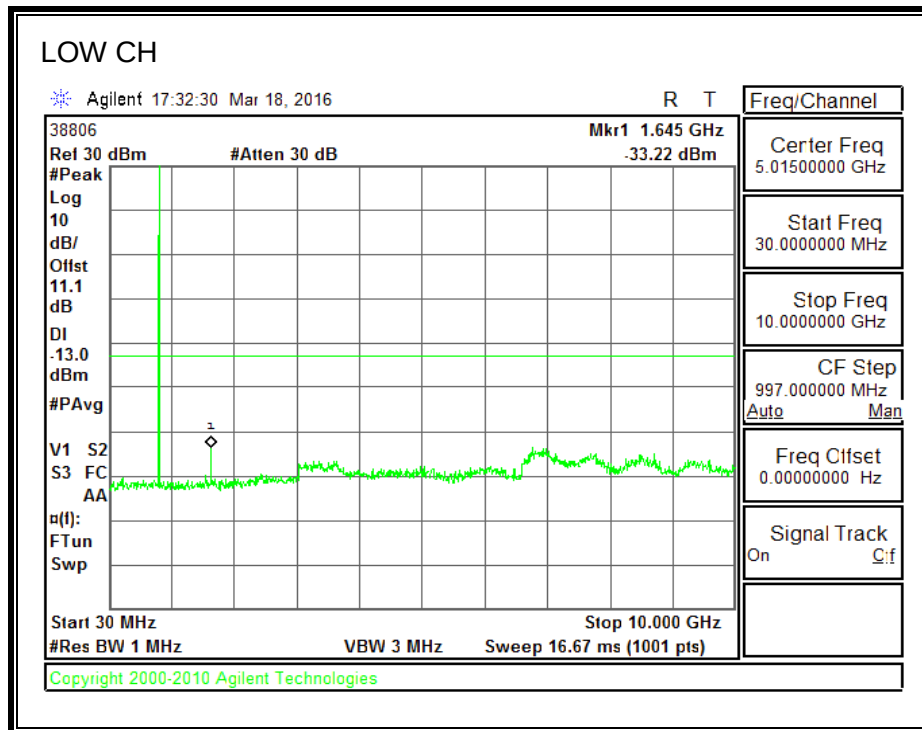
1900MHz BAND

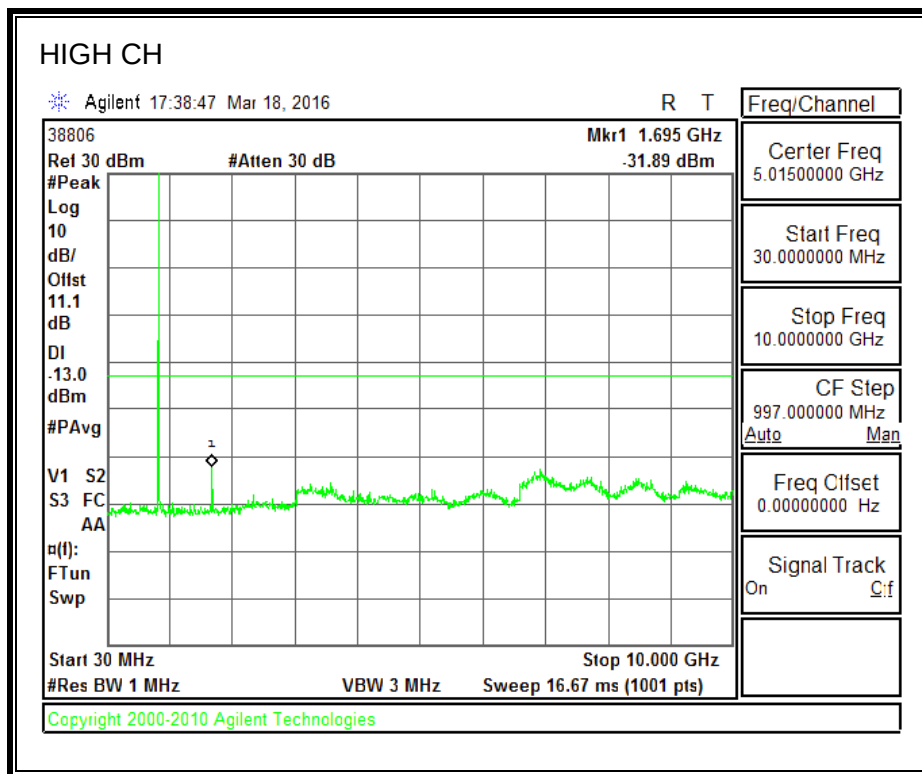




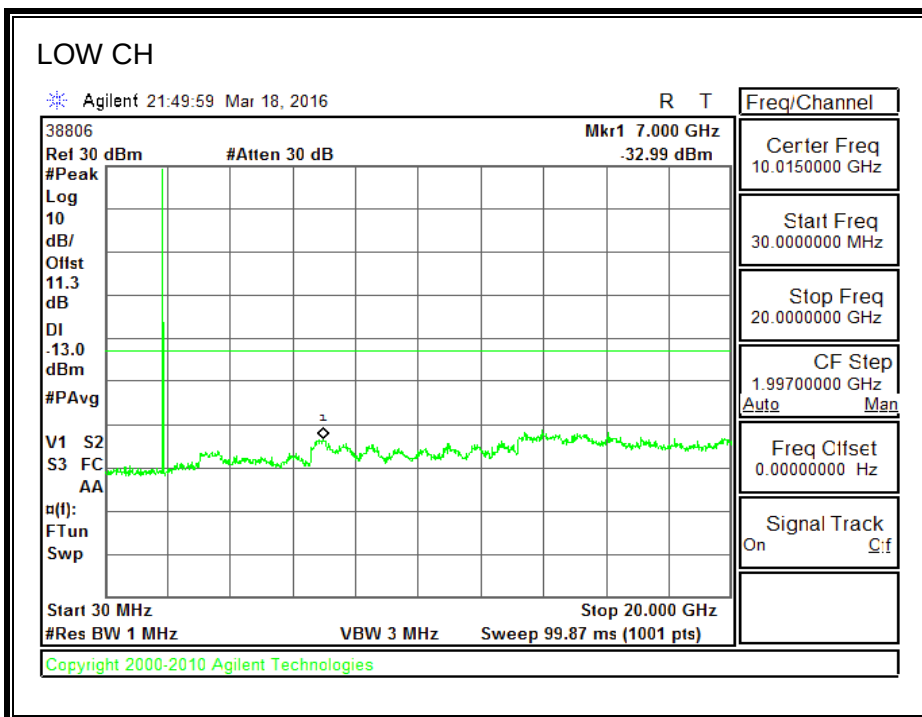
8.3.2. GSM-EGPRS

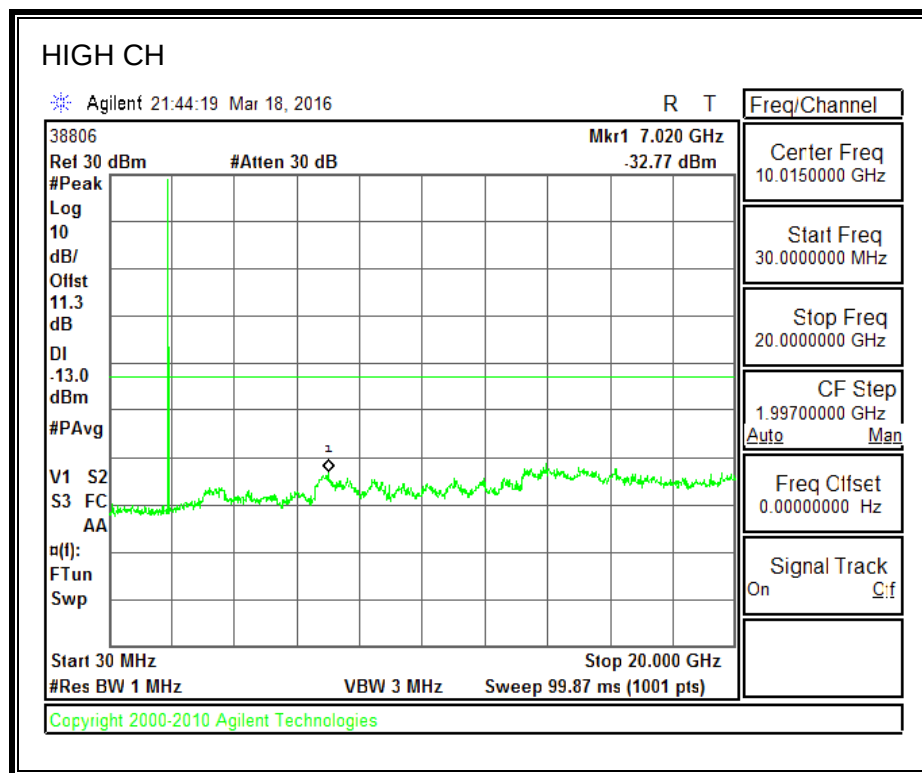
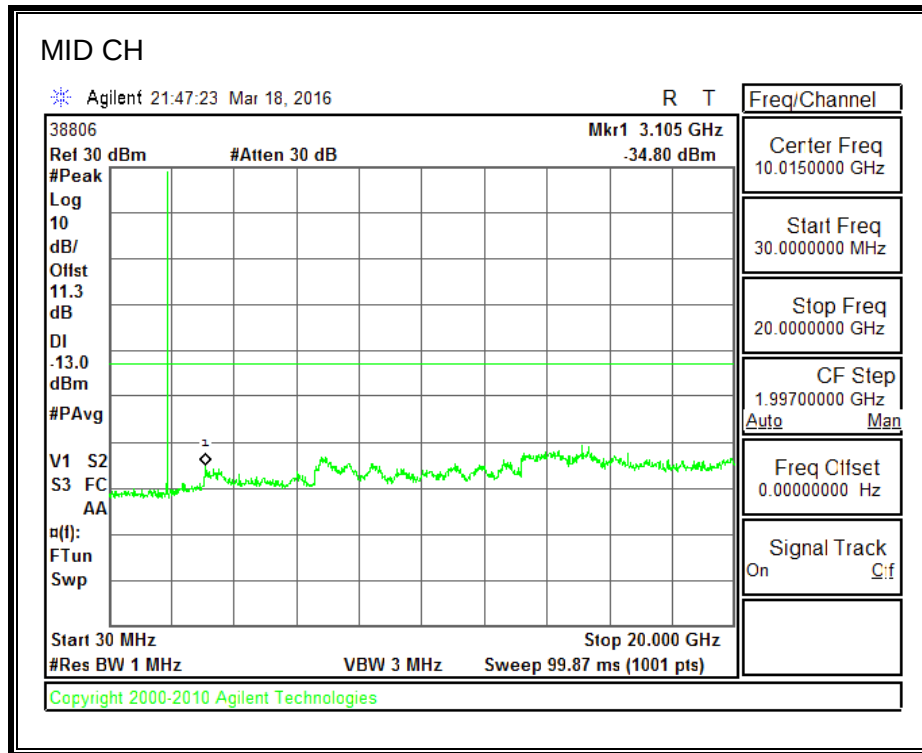
850MHz BAND





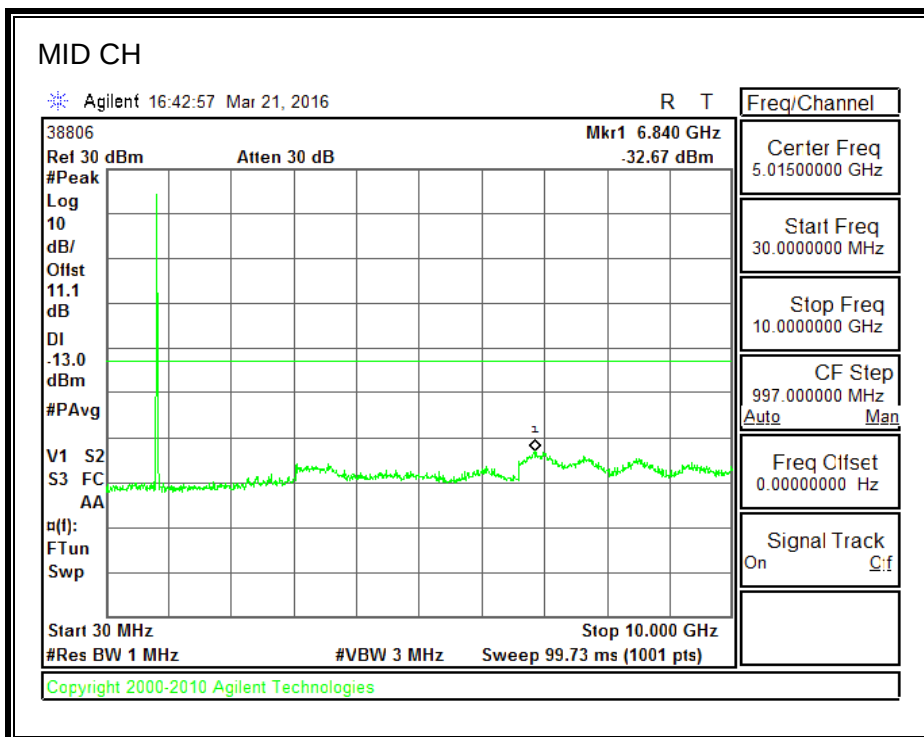
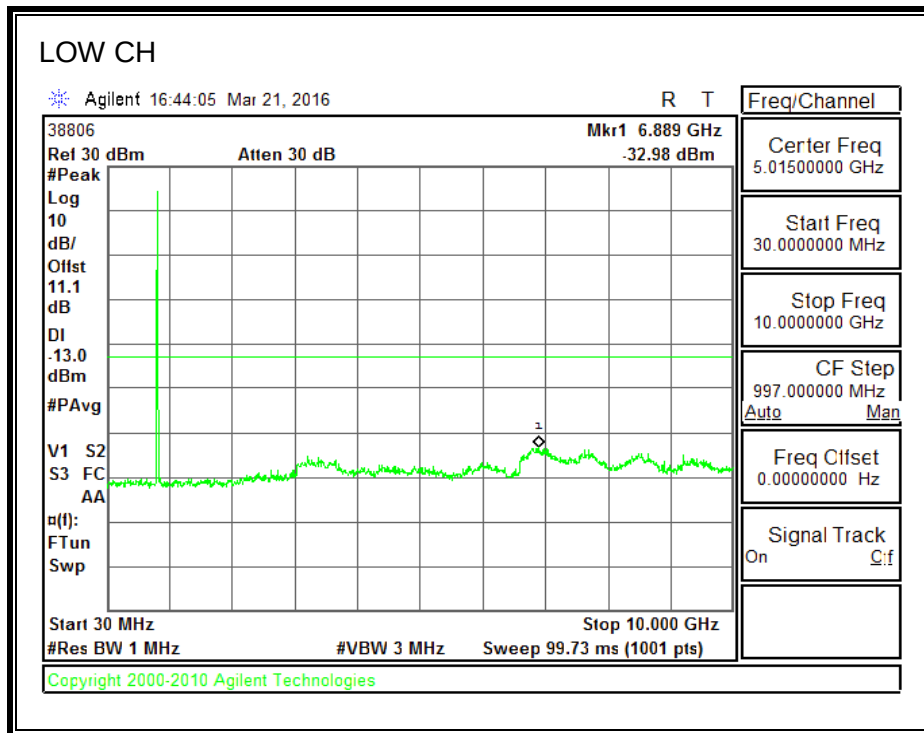
1900MHz BAND

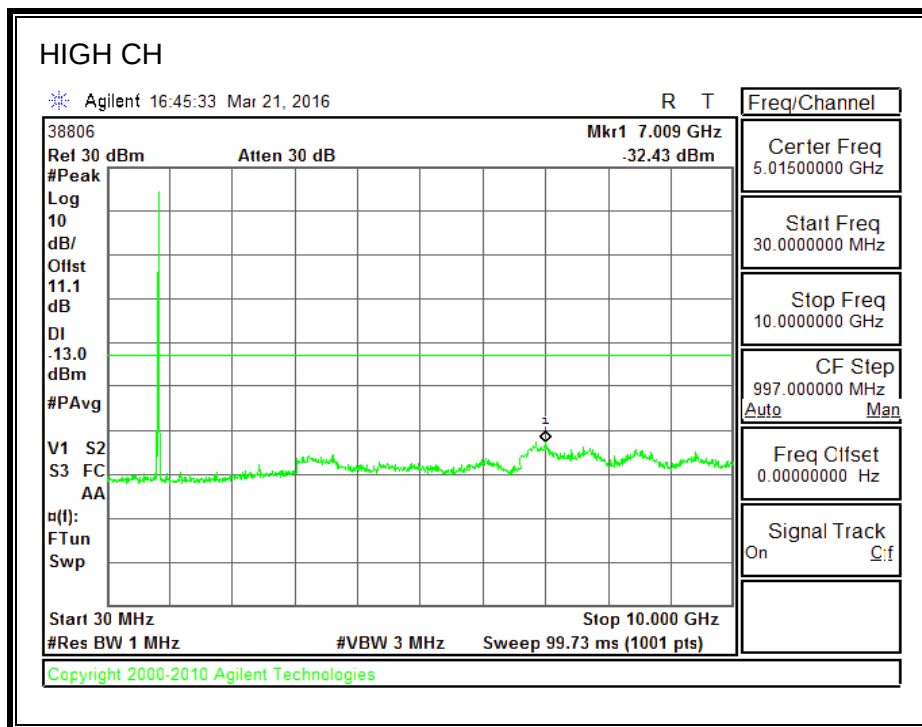




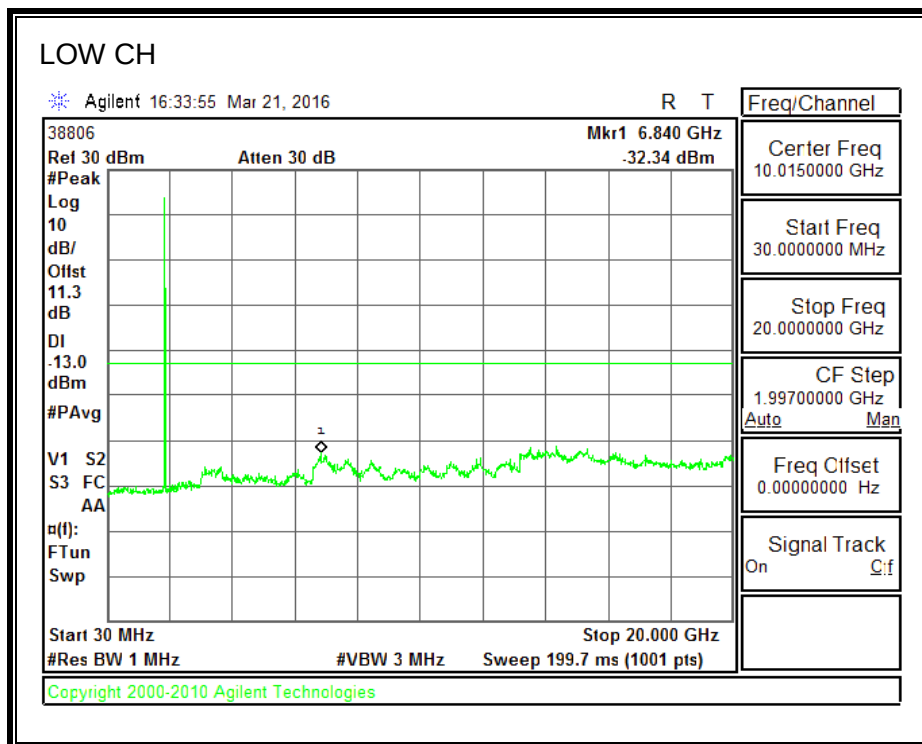
8.3.3. UMTS REL 99

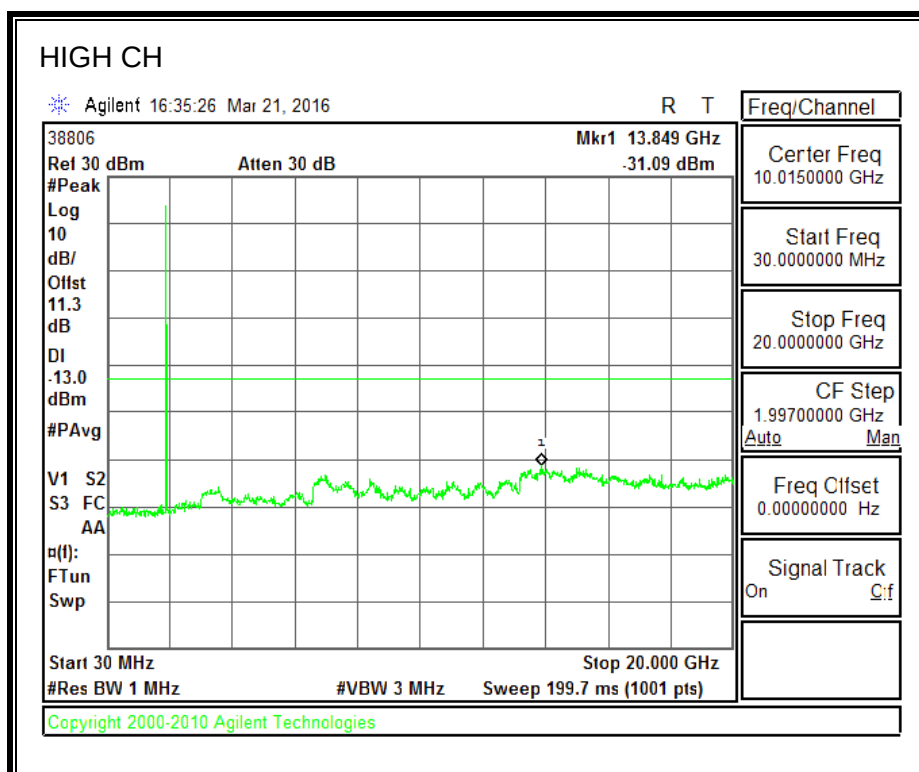
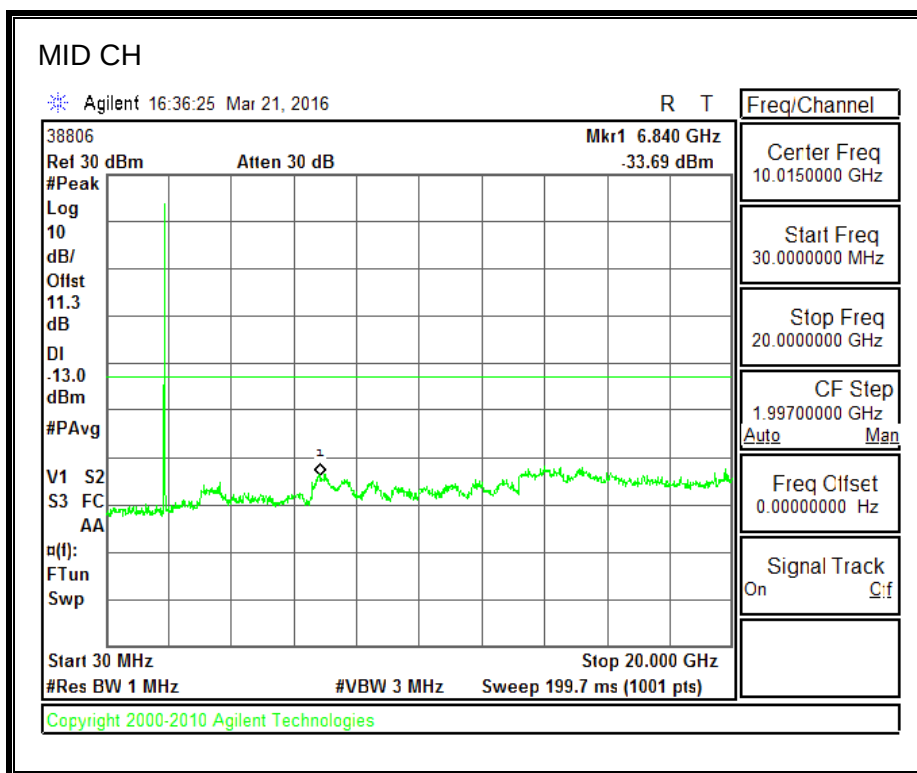
850MHz BAND



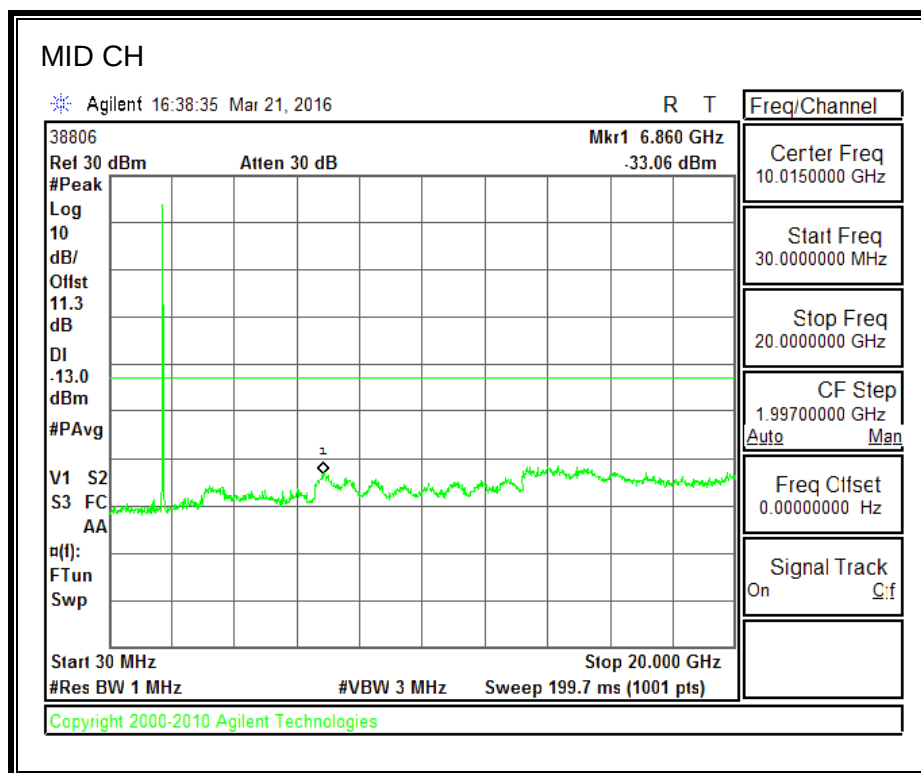
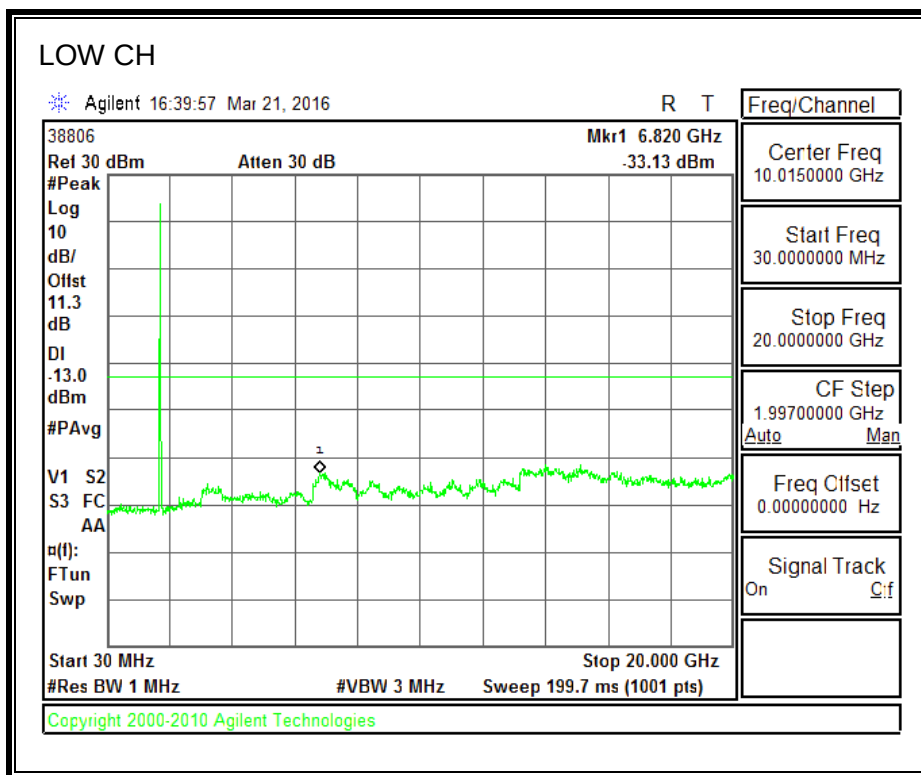


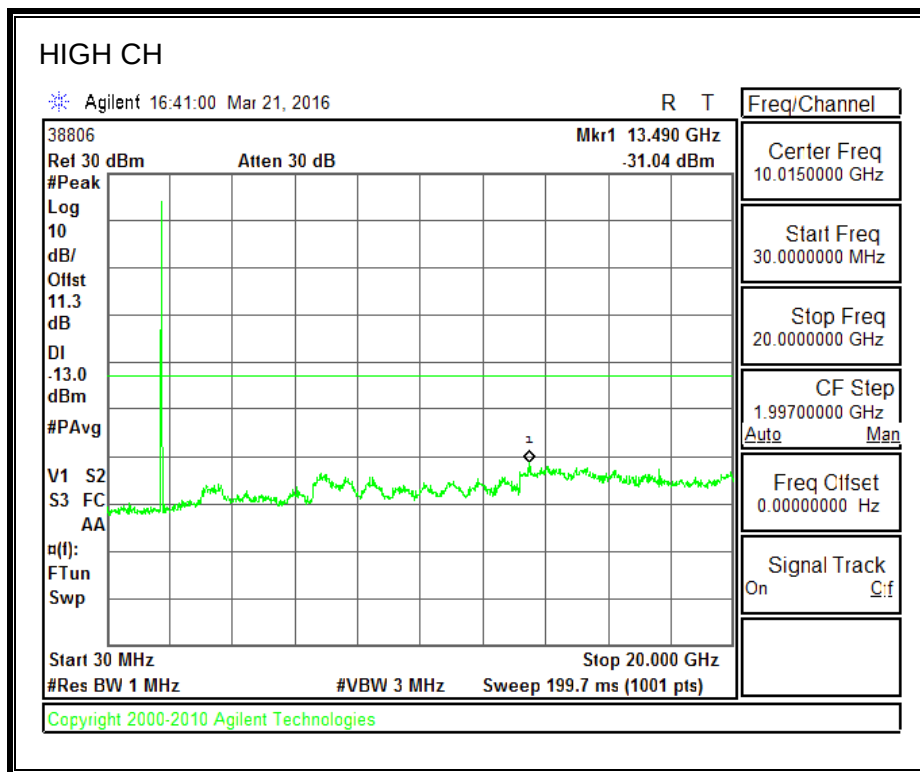
1900MHz BAND





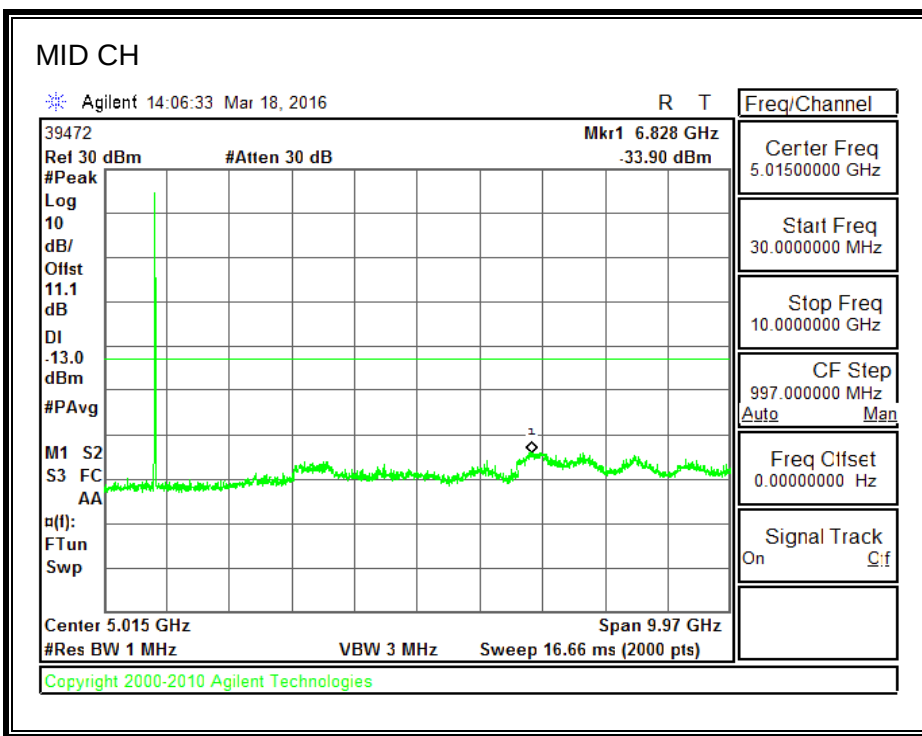
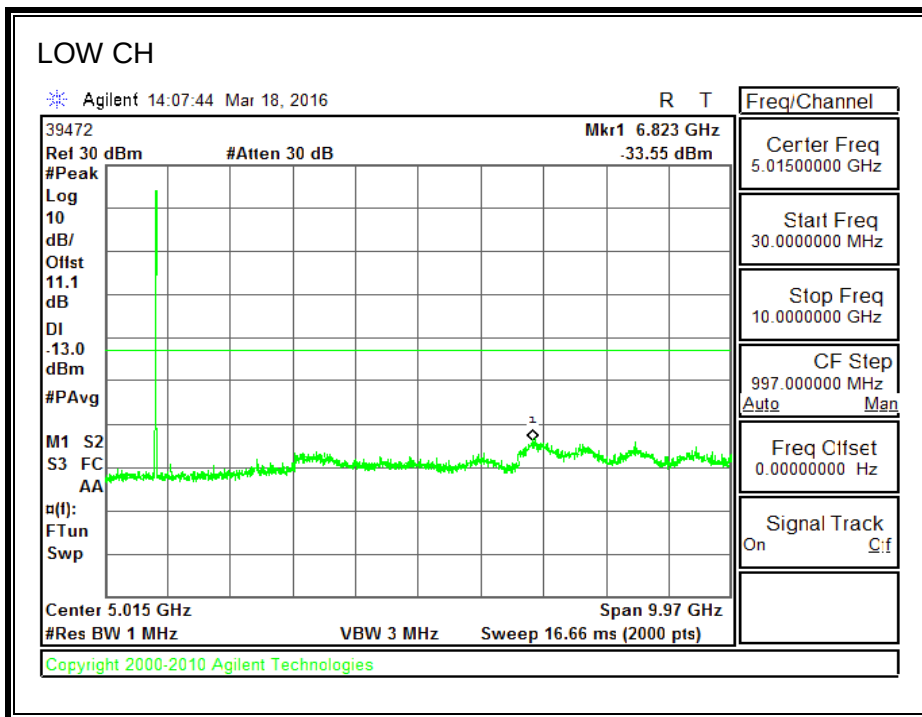
1700MHz BAND

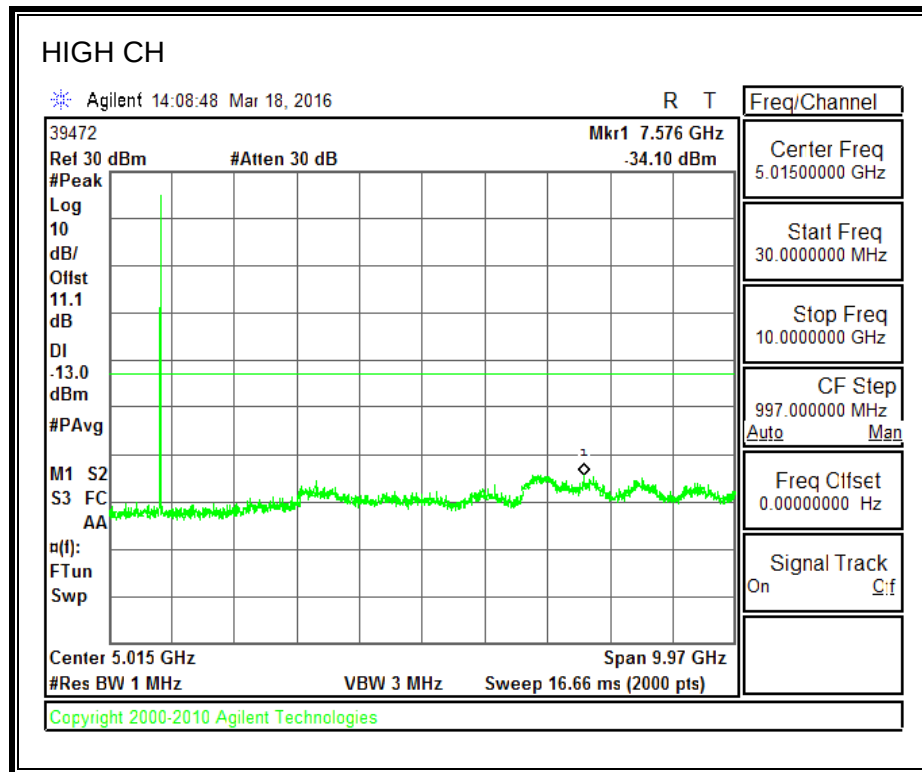




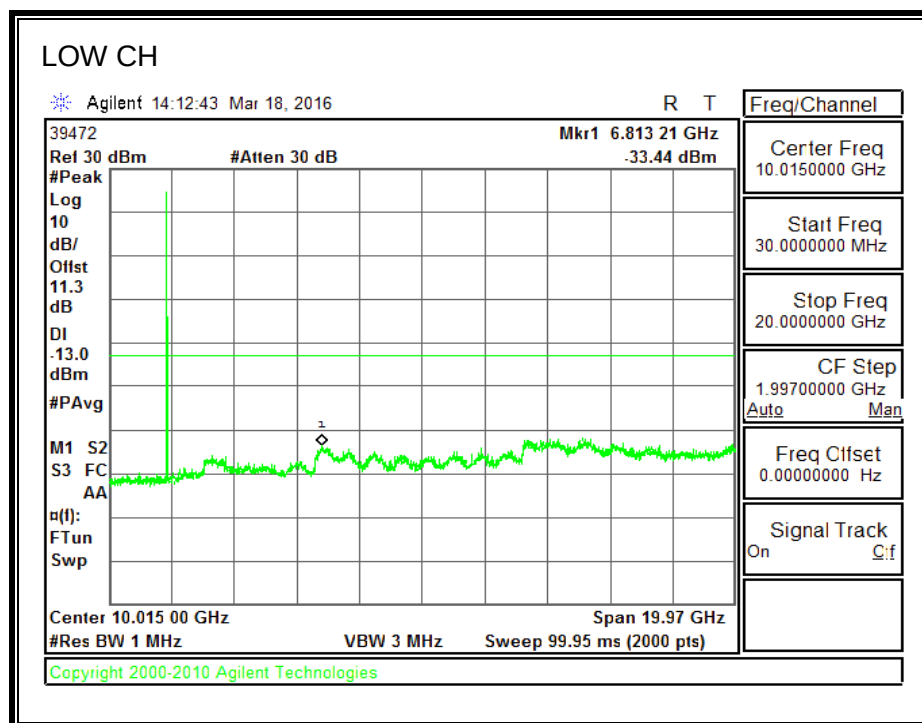
8.3.4. UMTS HSDPA

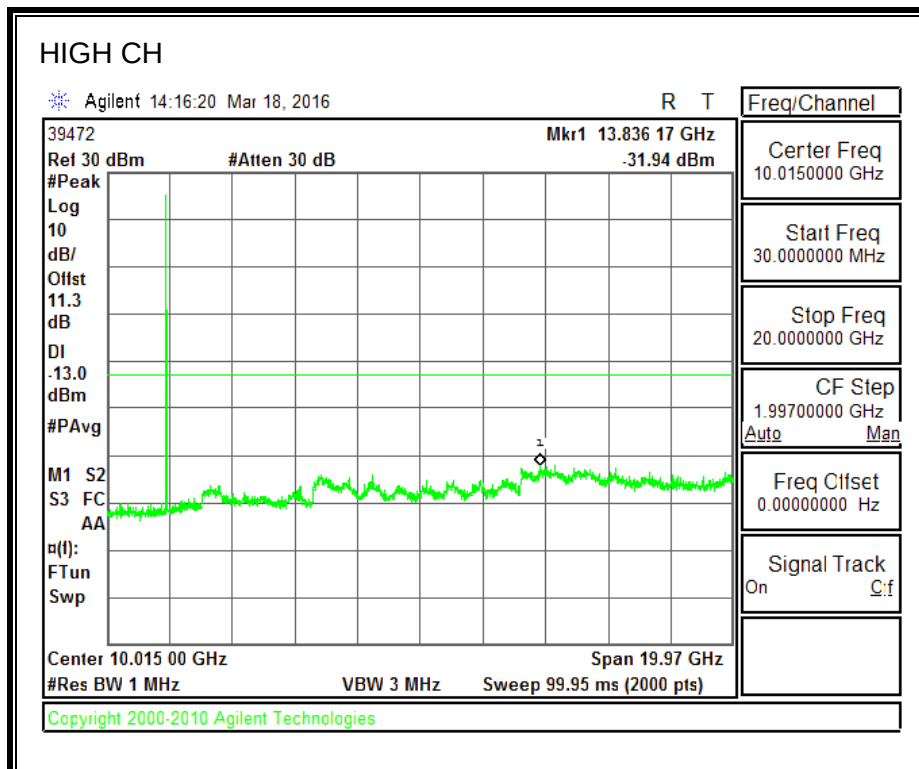
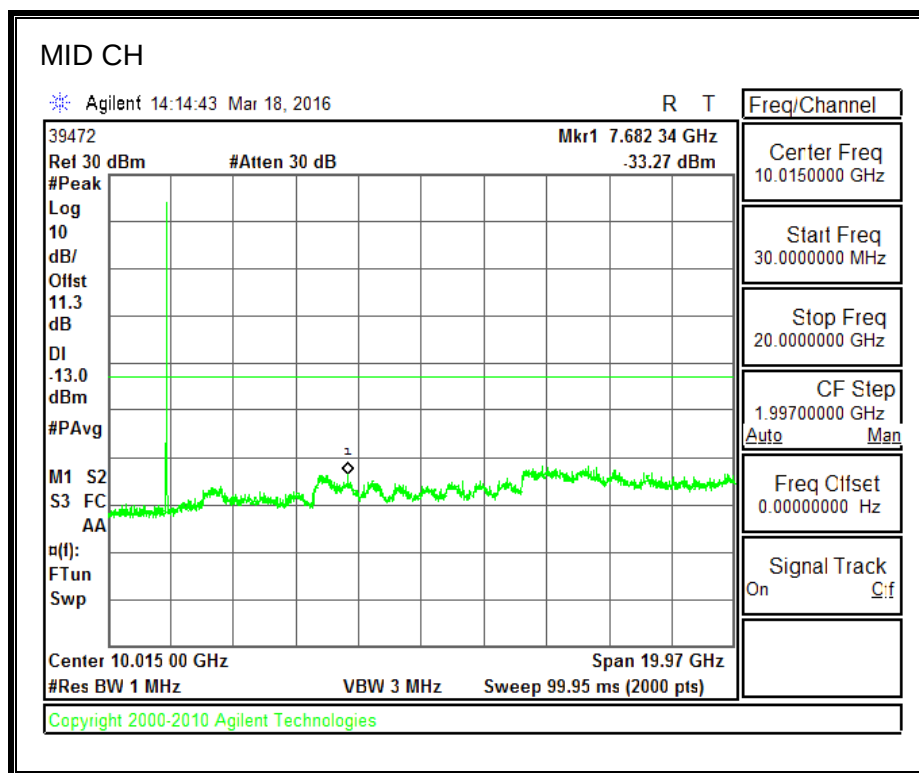
850MHz BAND



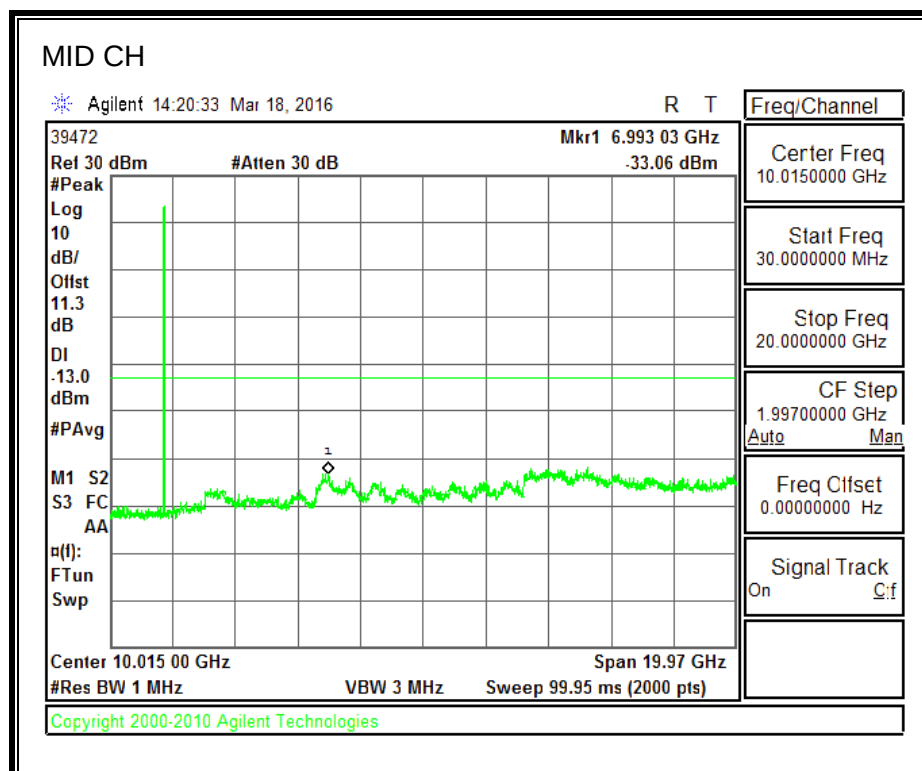
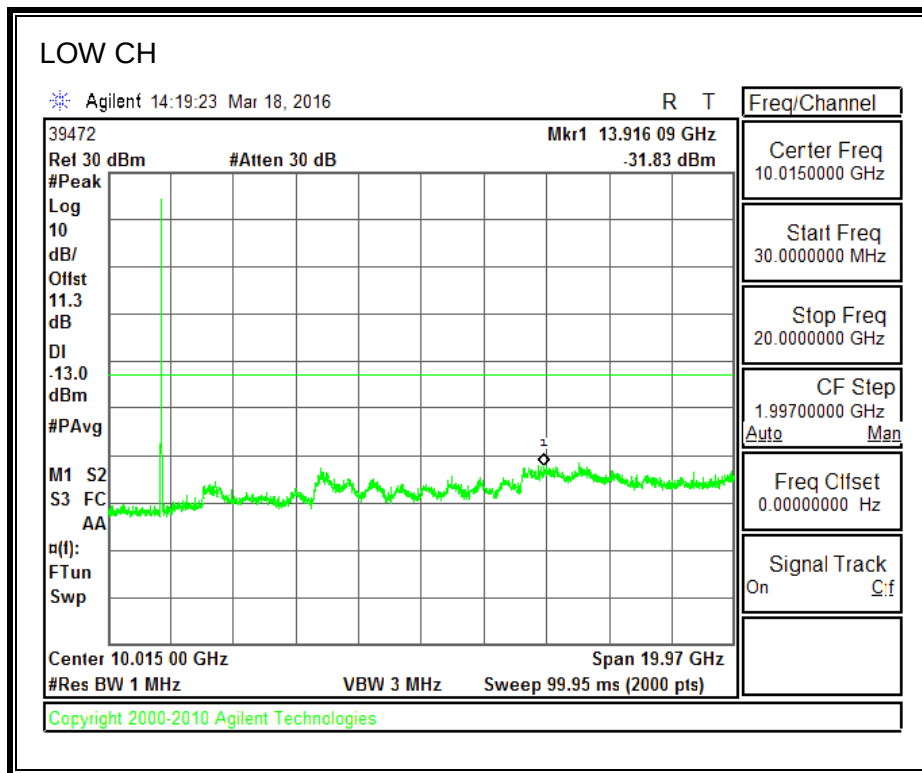


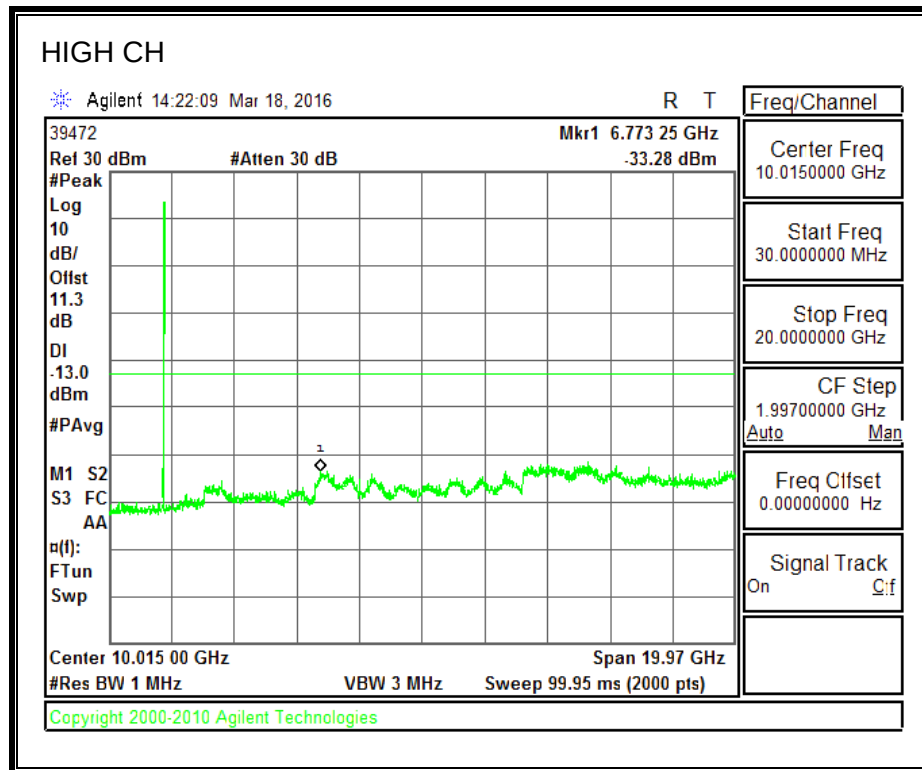
1900MHz BAND





1700MHz BAND





9. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = -30° to $+50^{\circ}\text{C}$
- Voltage = (85% - 115%)

Frequency Stability vs Temperature:

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

Frequency Stability vs Voltage:

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

RESULTS

See the following pages.

9.1. GSM

ID:	44379	Date:	4/29/16
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GPRS 850

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	Normal	824.0245	848.9816		
Extreme (50C)		824.0245	848.9817	25.9	0.03
Extreme (40C)		824.0245	848.9817	21.2	0.03
Extreme (30C)		824.0245	848.9817	17.5	0.02
Extreme (10C)		824.0245	848.9817	20.9	0.03
Extreme (0C)		824.0245	848.9817	20.4	0.02
Extreme (-10C)		824.0245	848.9817	26.7	0.03
Extreme (-20C)		824.0245	848.9817	18.0	0.02
Extreme (-30C)		824.0245	848.9817	22.7	0.03
25C	10%	824.0245	848.9817	18.4	0.02
	-10%	824.0245	848.9817	23.6	0.03
	End Point	824.0245	848.9817	22.1	0.03

EGPRS 850

Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)	Delta (Hz)	Frequency Stability (ppm)
Temperature	Voltage				
Normal (25C)	Normal	824.0397	848.9648		
Extreme (50C)		824.0397	848.9648	23.6	0.03
Extreme (40C)		824.0397	848.9648	20.6	0.02
Extreme (30C)		824.0397	848.9648	19.4	0.02
Extreme (10C)		824.0397	848.9648	25.5	0.03
Extreme (0C)		824.0397	848.9648	24.9	0.03
Extreme (-10C)		824.0397	848.9648	20.4	0.02
Extreme (-20C)		824.0397	848.9648	17.7	0.02
Extreme (-30C)		824.0397	848.9648	22.3	0.03
25C	10%	824.0397	848.9648	18.6	0.02
	-10%	824.0397	848.9648	24.5	0.03
	End Point	824.0397	848.9648	19.3	0.02

GPRS 1900

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	Normal	1850.0285	1909.9710		
Extreme (50C)		1850.0285	1909.9710	21.1	0.01
Extreme (40C)		1850.0285	1909.9710	23.5	0.01
Extreme (30C)		1850.0285	1909.9710	22.7	0.01
Extreme (10C)		1850.0285	1909.9710	18.9	0.01
Extreme (0C)		1850.0285	1909.9710	25.8	0.01
Extreme (-10C)		1850.0284	1909.9709	-20.7	-0.01
Extreme (-20C)		1850.0285	1909.9710	22.3	0.01
Extreme (-30C)		1850.0285	1909.9710	23.5	0.01
25C	10%	1850.0285	1909.9710	24.0	0.01
	-10%	1850.0285	1909.9710	21.7	0.01
	End Point	1850.0285	1909.9710	21.5	0.01

EGPRS 1900

Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)	Delta (Hz)	Frequency Stability (ppm)
Temperature	Voltage				
Normal (25C)	Normal	1850.0393	1909.9566		
Extreme (50C)		1850.0393	1909.9566	19.4	0.01
Extreme (40C)		1850.0393	1909.9566	21.5	0.01
Extreme (30C)		1850.0393	1909.9566	17.8	0.01
Extreme (10C)		1850.0393	1909.9566	18.2	0.01
Extreme (0C)		1850.0394	1909.9566	22.8	0.01
Extreme (-10C)		1850.0393	1909.9566	18.0	0.01
Extreme (-20C)		1850.0393	1909.9566	20.2	0.01
Extreme (-30C)		1850.0393	1909.9566	21.5	0.01
25C	10%	1850.0393	1909.9566	21.5	0.01
	-10%	1850.0393	1909.9566	20.0	0.01
	End Point	1850.0394	1909.9566	23.6	0.01

9.2. UMTS

ID:	44379	Date:	4/28/16
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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	824.1450	844.3282		
Extreme (50C)		824.1451	844.3283	8.4	0.01
Extreme (40C)		824.1451	844.3283	10.8	0.01
Extreme (30C)		824.1451	844.3283	13.0	0.02
Extreme (10C)		824.1451	844.3283	8.6	0.01
Extreme (0C)		824.1451	844.3283	9.0	0.01
Extreme (-10C)		824.1451	844.3283	7.7	0.01
Extreme (-20C)		824.1451	844.3283	6.6	0.01
Extreme (-30C)		824.1451	844.3283	7.1	0.01
25C	10%	824.1451	844.3283	10.6	0.01
	-10%	824.1451	844.3283	9.7	0.01
	End Point	824.1451	844.3283	10.1	0.01

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	1850.1488	1909.8570		
Extreme (50C)		1850.1488	1909.8571	27.6	0.01
Extreme (40C)		1850.1488	1909.8571	25.6	0.01
Extreme (30C)		1850.1488	1909.8571	25.3	0.01
Extreme (10C)		1850.1488	1909.8571	21.7	0.01
Extreme (0C)		1850.1488	1909.8571	28.0	0.01
Extreme (-10C)		1850.1488	1909.8571	28.2	0.02
Extreme (-20C)		1850.1488	1909.8571	23.8	0.01
Extreme (-30C)		1850.1488	1909.8571	22.4	0.01
25C	10%	1850.1488	1909.8571	24.5	0.01
	-10%	1850.1488	1909.8571	21.9	0.01
	End Point	1850.1488	1909.8571	20.4	0.01

UMTS REL99 BAND 4

Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)	Delta (Hz)	Frequency Stability (ppm)
Temperature	Voltage				
Normal (25C)	Normal	1710.1469	1754.8660		
Extreme (50C)		1710.1469	1754.8660	22.6	0.01
Extreme (40C)		1710.1469	1754.8660	20.4	0.01
Extreme (30C)		1710.1469	1754.8660	21.3	0.01
Extreme (10C)		1710.1469	1754.8660	22.7	0.01
Extreme (0C)		1710.1469	1754.8660	23.3	0.01
Extreme (-10C)		1710.1469	1754.8660	21.9	0.01
Extreme (-20C)		1710.1469	1754.8660	19.7	0.01
Extreme (-30C)		1710.1469	1754.8660	18.8	0.01
25C	10%	1710.1469	1754.8660	23.4	0.01
	-10%	1710.1469	1754.8660	22.4	0.01
	End Point	1710.1469	1754.8660	25.9	0.01

10. RADIATED TEST RESULTS

10.1. RADIATED POWER (ERP & EIRP) (LAT)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232 and §27.50

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

(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 603-D Clause 2.2.17

KDB 971168 D01 RF Power output using broadband peak and average power meter method

MODES TESTED

- GPRS/EGPRS
- UMTS, REL 99 and HSDPA

RESULTS

10.1.1. GSM

Part 22 / RSS 132 850MHz Band

Band	Mode	Channel	f (MHz)	ERP (Average)	
				dBm	mW
CELL	GPRS	128	824.2	30.09	1020.94
		190	836.6	30.12	1028.02
		251	848.8	30.46	1111.73
	EGPRS	128	824.2	26.17	414.00
		190	836.6	26.11	408.32
		251	848.8	26.13	410.20

Part 24 / RSS 133 1900MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	GPRS	512	1850.2	29.61	914.11
		661	1880.0	30.17	1039.92
		810	1909.8	30.58	1142.88
	EGPRS	512	1850.2	25.86	385.48
		661	1880.0	26.48	444.63
		810	1909.8	26.82	480.84

10.1.2. UMTS

Part 22 / RSS 132 850MHz Band

Band	Mode	Channel	f (MHz)	ERP (Average)	
				dBm	mW
CELL	UMTS,REL 99	4132	826.4	22.16	164.44
		4183	836.6	22.14	163.68
		4233	846.6	22.22	166.72
	UMTS, HSDPA	4132	826.4	22.17	164.82
		4183	836.6	22.12	162.93
		4233	846.6	22.17	164.82

Part 24 / RSS 133 1900MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	UMTS,REL 99	9662	1852.4	24.52	283.14
		9800	1880.0	26.26	422.67
		9938	1907.6	25.86	385.48
	UMTS, HSDPA	9662	1852.4	25.16	328.10
		9800	1880.0	26.09	406.44
		9938	1907.6	26.50	446.68

Part 27 / RSS 139 1700MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	UMTS,REL 99	1537	1712.4	25.05	319.89
		1638	1732.6	24.69	294.44
		1738	1752.5	24.35	272.27
	UMTS, HSDPA	1537	1712.4	24.49	281.19
		1638	1732.6	24.64	291.07
		1738	1752.5	24.76	299.23

10.1.3. GSM

GPRS, 850MHz BAND 5

High Frequency Substitution Measurement UL Fremont Radiated Chamber F										
Company: Project #: 16U23366 Date: 06/18/16 Test Engineer: 52268 Configuration: EUT Only Mode: GSM 850MHz										
Test Equipment: Receiving: Sunol T344, and Chamber F 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	19.7	V	0.6	0.0	19.10	21.25	38.45	40.60	-19.3	
824.20	30.7	H	0.6	0.0	30.09	32.24	38.45	40.60	-8.4	
Mid Ch										
836.60	20.4	V	0.6	0.0	19.75	21.90	38.45	40.60	-18.7	
836.60	30.7	H	0.6	0.0	30.12	32.27	38.45	40.60	-8.3	
High Ch										
848.80	21.0	V	0.6	0.0	20.41	22.56	38.45	40.60	-18.0	
848.80	31.1	H	0.6	0.0	30.46	32.61	38.45	40.60	-8.0	
Rev. 06.15.16										

EGPRS, 850MHz BAND 5

High Frequency Substitution Measurement UL Fremont Radiated Chamber F										
Company:										
Project #: 16U23366										
Date: 06/14/16										
Test Engineer: 52268										
Configuration: EUT Only										
Mode: EDGE 850MHz										
Test Equipment:										
Receiving: Horn T344, and Chamber F 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	14.2	V	0.6	0.0	13.58	15.73	38.45	40.60	-24.9	
824.20	26.8	H	0.6	0.0	26.17	28.32	38.45	40.60	-12.3	
Mid Ch										
836.60	14.1	V	0.6	0.0	13.44	15.59	38.45	40.60	-25.0	
836.60	26.7	H	0.6	0.0	26.11	28.26	38.45	40.60	-12.3	
High Ch										
848.80	14.0	V	0.6	0.0	13.41	15.56	38.45	40.60	-25.0	
848.80	26.7	H	0.6	0.0	26.13	28.28	38.45	40.60	-12.3	
Rev. 06.18.16										

GPRS, 1900MHz BAND 2

High Frequency Substitution Measurement UL Fremont Radiated Chamber D								
Company:								
Project #: 16U23366								
Date: 06/13/16								
Test Engineer: 30606								
Configuration: EUT Only								
Mode: GSM 1900MHz								
Test Equipment:								
Receiving: Horn T344 and Chamber D SMA Cables								
Substitution: Horn T59 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	21.4	V	0.98	8.05	28.43	33.0	-4.6	
1.851	22.5	H	0.98	8.05	29.61	33.0	-3.4	
Mid Ch								
1.880	21.8	V	0.98	8.03	28.82	33.0	-4.2	
1.880	23.1	H	0.98	8.03	30.17	33.0	-2.8	
High Ch								
1.910	21.5	V	0.98	8.05	28.55	33.0	-4.5	
1.910	23.5	H	0.98	8.05	30.58	33.0	-2.4	
Rev. 06.15.16								

EGPRS, 1900MHz BAND 2

High Frequency Substitution Measurement UL Fremont Radiated Chamber D								
Company:								
Project #:		16U23366						
Date:		06/22/16						
Test Engineer:		50822						
Configuration:		EUT only						
Mode:		EDGE 1900MHz						
Test Equipment:								
Receiving: Horn T344 and Chamber D SMA Cables								
Substitution: Horn T59 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	17.8	V	0.98	8.05	24.87	33.0	-8.1	
1.851	18.8	H	0.98	8.05	25.86	33.0	-7.1	
Mid Ch								
1.880	17.6	V	0.98	8.03	24.69	33.0	-8.3	
1.880	19.4	H	0.98	8.03	26.48	33.0	-6.5	
High Ch								
1.910	18.0	V	0.98	8.05	25.04	33.0	-8.0	
1.910	19.7	H	0.98	8.05	26.82	33.0	-6.2	
Rev. 06.15.16								

10.1.4. UMTS

UMTS REL 99, 850MHz BAND 5

High Frequency Substitution Measurement UL Fremont Radiated Chamber F										
Company: Project #: 16U23366 Date: 06/14/16 Test Engineer: 52268 Configuration: EUT Only Mode: WCDMA Rel 99 850MHz										
Test Equipment: Receiving: Sunol T344, and Chamber F 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	11.0	V	0.6	0.0	10.34	12.49	38.45	40.60	-28.1	
826.40	22.8	H	0.6	0.0	22.16	24.31	38.45	40.60	-16.3	
Mid Ch										
836.60	12.1	V	0.6	0.0	11.48	13.63	38.45	40.60	-27.0	
836.60	22.8	H	0.6	0.0	22.14	24.29	38.45	40.60	-16.3	
High Ch										
846.60	12.8	V	0.6	0.0	12.17	14.32	38.45	40.60	-26.3	
846.60	22.8	H	0.6	0.0	22.22	24.37	38.45	40.60	-16.2	
Rev. 06.15.16										

UMTS HSDPA, 850MHz BAND 5

High Frequency Substitution Measurement UL Fremont Radiated Chamber E										
Company: Project #: 16U23366 Date: 06/14/16 Test Engineer: 52268 Configuration: EUT Only Mode: WCDMA HSDPA 850MHz										
Test Equipment: Receiving: Sunol T407, and Chamber D 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	10.1	V	0.6	0.0	9.50	11.65	38.45	40.60	-29.0	
826.40	22.8	H	0.6	0.0	22.17	24.32	38.45	40.60	-16.3	
Mid Ch										
836.60	11.3	V	0.6	0.0	10.70	12.85	38.45	40.60	-27.8	
836.60	22.7	H	0.6	0.0	22.12	24.27	38.45	40.60	-16.3	
High Ch										
846.60	11.9	V	0.6	0.0	11.33	13.48	38.45	40.60	-27.1	
846.60	22.8	H	0.6	0.0	22.17	24.32	38.45	40.60	-16.3	
Rev. 06.15.16										

UMTS REL 99, 1900MHz BAND 2

High Frequency Substitution Measurement UL Fremont Radiated Chamber D								
Company:								
Project #:		16U23366						
Date:		06/13/16						
Test Engineer:		30606						
Configuration:		EUT Only						
Mode:		WCDMA Rel 99 1900MHz						
Test Equipment:								
Receiving: Horn T344 and Chamber D SMA Cables								
Substitution: Horn T59 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	16.7	V	0.98	8.05	23.80	33.0	-9.2	
1.852	17.5	H	0.98	8.05	24.52	33.0	-8.5	
Mid Ch								
1.880	17.6	V	0.98	8.03	24.63	33.0	-8.4	
1.880	19.2	H	0.98	8.03	26.26	33.0	-6.7	
High Ch								
1.908	17.9	V	0.98	8.04	24.93	33.0	-8.1	
1.908	18.8	H	0.98	8.04	25.86	33.0	-7.1	
Rev. 06.15.16								

UMTS HSDPA, 1900MHz BAND 2

High Frequency Substitution Measurement UL Fremont Radiated Chamber D								
Company:								
Project #:		16U23366						
Date:		06/13/16						
Test Engineer:		30606						
Configuration:		EUT Only						
Mode:		WCDMA DC HSDPA 1900MHz						
Test Equipment:								
Receiving: Horn T344 and Chamber D SMA Cables								
Substitution: Horn T59 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	16.6	V	0.98	8.05	23.64	33.0	-9.4	
1.852	18.1	H	0.98	8.05	25.16	33.0	-7.8	
Mid Ch								
1.880	16.7	V	0.98	8.03	23.76	33.0	-9.2	
1.880	19.0	H	0.98	8.03	26.09	33.0	-6.9	
High Ch								
1.908	16.6	V	0.98	8.04	23.71	33.0	-9.3	
1.908	19.4	H	0.98	8.04	26.50	33.0	-6.5	
Rev. 06.15.16								

UMTS REL 99, 1700MHz BAND 4

High Frequency Substitution Measurement UL Fremont Radiated Chamber D								
Company:								
Project #: 16U23366								
Date: 06/13/16								
Test Engineer: 30606								
Configuration: EUT Only								
Mode: WCDMA Rel 99 1700MHz								
Test Equipment:								
Receiving: Horn T344 and Chamber D SMA Cables								
Substitution: Horn T59 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	16.7	V	0.95	8.27	23.98	30.0	-6.0	
1.712	17.7	H	0.95	8.27	25.05	30.0	-4.9	
Mid Ch								
1.733	16.3	V	0.95	8.23	23.60	30.0	-6.4	
1.733	17.4	H	0.95	8.23	24.69	30.0	-5.3	
High Ch								
1.753	15.3	V	0.95	8.18	22.51	30.0	-7.5	
1.753	17.1	H	0.95	8.18	24.35	30.0	-5.7	
Rev. 06.15.16								

UMTS HSDPA, 1700MHz BAND 4

High Frequency Substitution Measurement UL Fremont Radiated Chamber D								
Company:								
Project #: 16U23366								
Date: 06/13/16								
Test Engineer: 30606								
Configuration: EUT Only								
Mode: WCDMA DC HSDPA 1700MHz								
Test Equipment:								
Receiving: Horn T344 and Chamber D SMA Cables								
Substitution: Horn T59 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								
1.713	15.6	V	0.95	8.27	22.89	30.0	-7.1	
1.713	17.2	H	0.95	8.27	24.49	30.0	-5.5	
Mid Ch								
1.733	15.7	V	0.95	8.23	23.00	30.0	-7.0	
1.733	17.4	H	0.95	8.23	24.64	30.0	-5.4	
High Ch								
1.753	16.0	V	0.95	8.18	23.22	30.0	-6.8	
1.753	17.5	H	0.95	8.18	24.76	30.0	-5.2	
Rev. 06.15.16								

10.2. RADIATED POWER (ERP & EIRP) (UAT)

10.2.1. GSM

Part 22 / RSS 132 850MHz Band

Band	Mode	Channel	f (MHz)	ERP (Average)	
				dBm	mW
CELL	GPRS	128	824.2	27.15	518.80
		190	836.6	27.24	529.66
		251	848.8	27.10	512.86
	EGPRS	128	824.2	22.63	183.23
		190	836.6	22.53	179.06
		251	848.8	22.76	188.80

Part 24 / RSS 133 1900MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	GPRS	512	1850.2	24.66	292.42
		661	1880.0	24.88	307.61
		810	1909.8	24.64	291.07
	EGPRS	512	1850.2	22.84	192.31
		661	1880.0	22.81	190.99
		810	1909.8	22.77	189.23

10.2.2. UMTS

Part 22 / RSS 132 850MHz Band

Band	Mode	Channel	f (MHz)	ERP (Average)	
				dBm	mW
CELL	UMTS,REL 99	4132	826.4	18.80	75.86
		4183	836.6	18.84	76.56
		4233	846.6	18.13	65.01
	UMTS, HSDPA	4132	826.4	18.63	72.95
		4183	836.6	18.82	76.21
		4233	846.6	18.28	67.30

Part 24 / RSS 133 1900MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	UMTS,REL 99	9662	1852.4	20.11	102.57
		9800	1880.0	20.45	110.92
		9938	1907.6	20.01	100.23
	UMTS, HSDPA	9662	1852.4	20.01	100.23
		9800	1880.0	20.40	109.65
		9938	1907.6	20.22	105.20

Part 27 / RSS 139 1700MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	UMTS,REL 99	1537	1712.4	19.42	87.50
		1638	1732.6	19.77	94.84
		1738	1752.5	19.52	89.54
	UMTS, HSDPA	1537	1712.4	19.40	87.10
		1638	1732.6	19.75	94.41
		1738	1752.5	19.51	89.33

10.2.3. GSM

GPRS, 850MHz BAND 5

High Frequency Substitution Measurement UL Fremont Radiated Chamber F										
Company: Project #: 16U23366 Date: 06/14/16 Test Engineer: 52268 Configuration: EUT only Mode: GSM 850MHz										
Test Equipment: Receiving: Horn T344 and Chamber F SMA Cables 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	27.8	V	0.6	0.0	27.15	29.30	38.45	40.60	-11.3	
824.20	23.6	H	0.6	0.0	23.02	25.17	38.45	40.60	-15.4	
Mid Ch										
836.60	27.9	V	0.6	0.0	27.24	29.39	38.45	40.60	-11.2	
836.60	23.9	H	0.6	0.0	23.30	25.45	38.45	40.60	-15.2	
High Ch										
848.80	27.7	V	0.6	0.0	27.10	29.25	38.45	40.60	-11.3	
848.80	23.8	H	0.6	0.0	23.20	25.35	38.45	40.60	-15.2	
Rev. 06.15.16										

EGPRS, 850MHz BAND 5

High Frequency Substitution Measurement UL Fremont Radiated Chamber F										
Company: Project #: 16U23366 Date: 06/14/16 Test Engineer: 52298 Configuration: EUT Only 1167 Mode: EDGE 850MHz										
Test Equipment: Receiving: Horn T344 and Chamber F SMA Cables 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	23.2	V	0.6	0.0	22.63	24.78	38.45	40.60	-15.8	
824.20	18.8	H	0.6	0.0	18.22	20.37	38.45	40.60	-20.2	
Mid Ch										
836.60	23.2	V	0.6	0.0	22.53	24.68	38.45	40.60	-15.9	
836.60	18.7	H	0.6	0.0	18.11	20.26	38.45	40.60	-20.3	
High Ch										
848.80	23.4	V	0.6	0.0	22.76	24.91	38.45	40.60	-15.7	
848.80	19.2	H	0.6	0.0	18.59	20.74	38.45	40.60	-19.9	
Rev. 06.15.16										

GPRS, 1900MHz BAND 2

High Frequency Substitution Measurement UL Fremont Radiated Chamber G								
Company: Project #: 16U23366 Date: 06/22/16 Test Engineer: 50822 Configuration: EUT Only Mode: GSM 1900MHz								
Test Equipment: Receiving: Horn T136 and Chamber G SMA Cables Substitution: Horn T59 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	13.0	V	0.98	8.05	20.08	33.0	-12.9	
1.851	17.6	H	0.98	8.05	24.66	33.0	-8.3	
Mid Ch								
1.880	13.8	V	0.98	8.03	20.84	33.0	-12.2	
1.880	17.8	H	0.98	8.03	24.88	33.0	-8.1	
High Ch								
1.910	13.1	V	0.98	8.05	20.16	33.0	-12.8	
1.910	17.6	H	0.98	8.05	24.64	33.0	-8.4	
Rev. 06.18.14								

EGPRS, 1900MHz BAND 2

High Frequency Substitution Measurement UL Fremont Radiated Chamber G								
Company: Project #: 16U23366 Date: 06/22/16 Test Engineer: 50822 Configuration: EUT Only Mode: EDGE 1900MHz								
Test Equipment: Receiving: Horn T136 and Chamber G SMA Cables Substitution: Horn T59 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	9.5	V	0.98	8.05	16.61	33.0	-16.4	
1.851	15.8	H	0.98	8.05	22.84	33.0	-10.2	
Mid Ch								
1.880	10.7	V	0.98	8.03	17.77	33.0	-15.2	
1.880	15.8	H	0.98	8.03	22.81	33.0	-10.2	
High Ch								
1.910	9.7	V	0.98	8.05	16.75	33.0	-16.3	
1.910	15.7	H	0.98	8.05	22.77	33.0	-10.2	
Rev. 06.18.14								

10.2.4. UMTS

UMTS REL 99, 850MHz BAND 5

High Frequency Substitution Measurement UL Fremont Radiated Chamber F										
Company: Project #: 16U23366 Date: 06/14/16 Test Engineer: 52298 Configuration: EUT Only Mode: WCDMA Rel 99 850MHz										
Test Equipment: Receiving: Horn T344 and Chamber F SMA Cables 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	18.80	20.95	38.45	40.60	-19.7	
826.40	3.8	H	0.6	0.0	3.19	5.34	38.45	40.60	-35.3	
Mid Ch										
836.60	19.5	V	0.6	0.0	18.84	20.99	38.45	40.60	-19.6	
836.60	4.7	H	0.6	0.0	4.08	6.23	38.45	40.60	-34.4	
High Ch										
846.60	18.8	V	0.6	0.0	18.13	20.28	38.45	40.60	-20.3	
846.60	4.8	H	0.6	0.0	4.21	6.36	38.45	40.60	-34.2	
Rev. 06.15.16										

UMTS HSDPA, 850MHz BAND 5

High Frequency Substitution Measurement UL Fremont Radiated Chamber F										
Company: Project #: 16U23366 Date: 06/15/16 Test Engineer: 52268 Configuration: EUT Only Mode: WCDMA HSDPA 850MHz										
Test Equipment: Receiving: Horn T344 and Chamber F SMA Cables 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	19.2	V	0.6	0.0	18.63	20.78	38.45	40.60	-19.8	
826.40	3.2	H	0.6	0.0	2.55	4.70	38.45	40.60	-35.9	
Mid Ch										
836.60	19.4	V	0.6	0.0	18.82	20.97	38.45	40.60	-19.6	
836.60	4.0	H	0.6	0.0	3.43	5.58	38.45	40.60	-35.0	
High Ch										
846.60	18.9	V	0.6	0.0	18.28	20.43	38.45	40.60	-20.2	
846.60	4.0	H	0.6	0.0	3.42	5.57	38.45	40.60	-35.0	
Rev. 06.15.16										

UMTS REL 99, 1900MHz BAND 2

High Frequency Substitution Measurement UL Fremont Radiated Chamber F								
Company:								
Project #:		16U23366						
Date:		06/14/16						
Test Engineer:		52298						
Configuration:		EUT Only						
Mode:		WCDMA Rel 99 1900MHz						
Test Equipment:								
Receiving: Horn T344 and Chamber F SMA Cables								
Substitution: Horn T59 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	9.0	V	0.98	8.05	16.06	33.0	-16.9	
1.852	13.0	H	0.98	8.05	20.11	33.0	-12.9	
Mid Ch								
1.880	9.6	V	0.98	8.03	16.64	33.0	-16.4	
1.880	13.4	H	0.98	8.03	20.45	33.0	-12.5	
High Ch								
1.908	9.0	V	0.98	8.04	16.04	33.0	-17.0	
1.908	13.0	H	0.98	8.04	20.01	33.0	-13.0	
Rev. 06.15.16								

UMTS HSDPA, 1900MHz BAND 2

High Frequency Substitution Measurement UL Fremont Radiated Chamber F								
Company:								
Project #:		16U23366						
Date:		06/15/16						
Test Engineer:		52268						
Configuration:		EUT Only						
Mode:		WCDMA HSDPA 1900MHz						
Test Equipment:								
Receiving: Horn T344 and Chamber F SMA Cables								
Substitution: Horn T59 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	8.2	V	0.98	8.05	15.27	33.0	-17.7	
1.852	12.9	H	0.98	8.05	20.01	33.0	-13.0	
Mid Ch								
1.880	8.9	V	0.98	8.03	15.98	33.0	-17.0	
1.880	13.4	H	0.98	8.03	20.40	33.0	-12.6	
High Ch								
1.908	8.2	V	0.98	8.04	15.28	33.0	-17.7	
1.908	13.2	H	0.98	8.04	20.22	33.0	-12.8	
Rev. 06.15.16								

UMTS REL 99, 1700MHz BAND 4

High Frequency Substitution Measurement UL Fremont Radiated Chamber F								
Company:								
Project #: 16U23366								
Date: 06/15/16								
Test Engineer: 52298								
Configuration: EUT Only								
Mode: WCDMA Rel 99 1700MHz								
Test Equipment:								
Receiving: Horn T344 and Chamber F SMA Cables								
Substitution: Horn T59 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	7.8	V	0.95	8.27	15.13	30.0	-14.9	
1.712	12.1	H	0.95	8.27	19.42	30.0	-10.6	
Mid Ch								
1.733	7.5	V	0.95	8.23	14.76	30.0	-15.2	
1.733	12.5	H	0.95	8.23	19.77	30.0	-10.2	
High Ch								
1.753	7.8	V	0.95	8.18	15.05	30.0	-14.9	
1.753	12.3	H	0.95	8.18	19.52	30.0	-10.5	
Rev. 06.15.16								

UMTS HSDPA, 1700MHz BAND 4

High Frequency Substitution Measurement UL Fremont Radiated Chamber F								
Company:								
Project #: 16U23366								
Date: 06/15/16								
Test Engineer: 52298								
Configuration: EUT Only								
Mode: WCDMA HSDPA 1700MHz								
Test Equipment:								
Receiving: Horn T344 and Chamber F SMA Cables								
Substitution: Horn T59 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								
1.713	7.1	V	0.95	8.27	14.46	30.0	-15.5	
1.713	12.1	H	0.95	8.27	19.40	30.0	-10.6	
Mid Ch								
1.733	6.9	V	0.95	8.23	14.15	30.0	-15.8	
1.733	12.5	H	0.95	8.23	19.75	30.0	-10.2	
High Ch								
1.753	7.1	V	0.95	8.18	14.34	30.0	-15.7	
1.753	12.3	H	0.95	8.18	19.51	30.0	-10.5	
Rev. 06.15.16								

10.3. 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.

RESULT

The results from all CCDF plots are passed with 13dB peak-to-average ratio criteria.

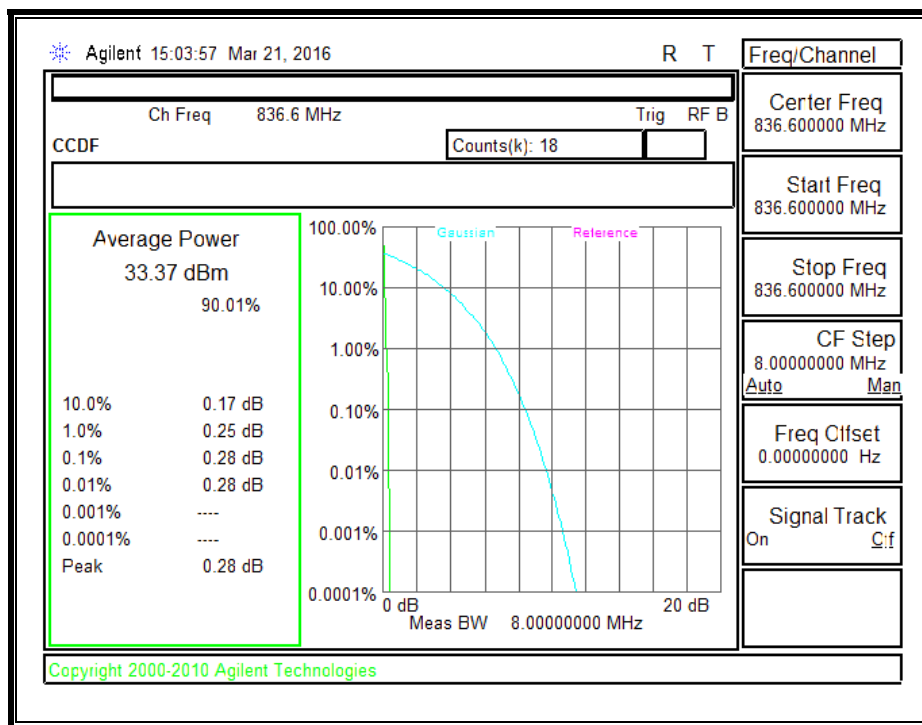
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Mode	Modulation	Conducted Power (dBm)		Peak-to-Average Ratio
		*Peak	Average	
GSM850	GPRS	33.65	33.37	0.28
	EGPRS	29.54	28.94	0.6
GSM1900	GPRS	32.34	31.47	0.87
	EGPRS	28.43	27.93	0.5
*Peak Reading = Average Reading + Peak-to-Average Ratio				

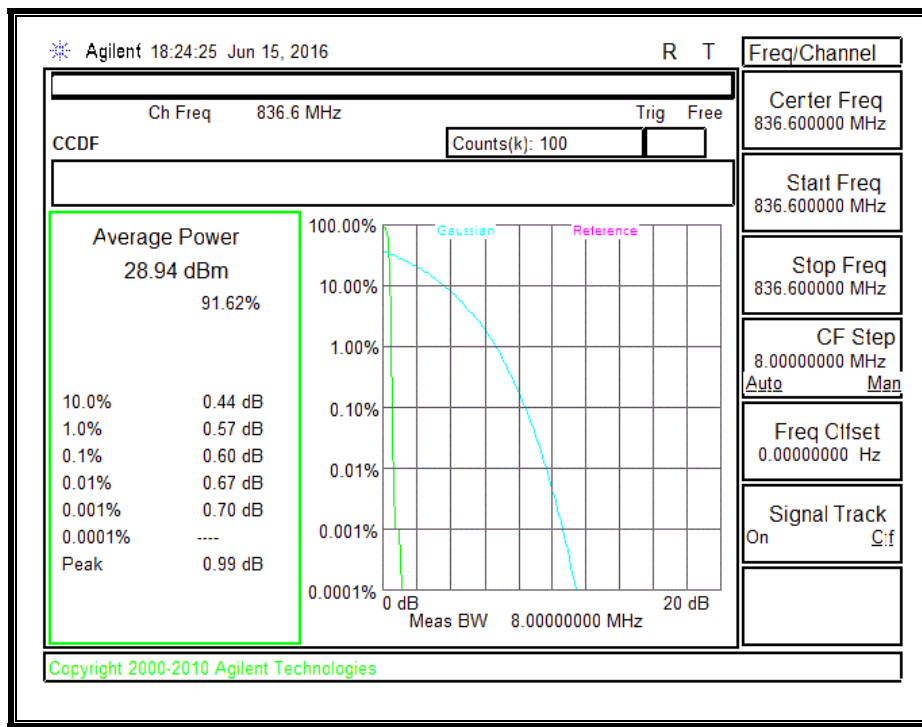
ID:	38806	Date:	3/21/16
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Mode	Modulation	Conducted Power (dBm)		Peak-to-Average Ratio
		*Peak	Average	
UMTS Band 5	REL99	28.21	24.97	3.24
	HSDPA	27.69	24.01	3.68
UMTS Band 2	REL99	28.41	25.19	3.22
	HSDPA	28.41	24.15	4.26
UMTS Band 4	REL99	28.31	25.11	3.2
	HSDPA	28.25	24.18	4.07
*Peak Reading = Average Reading + Peak-to-Average Ratio				

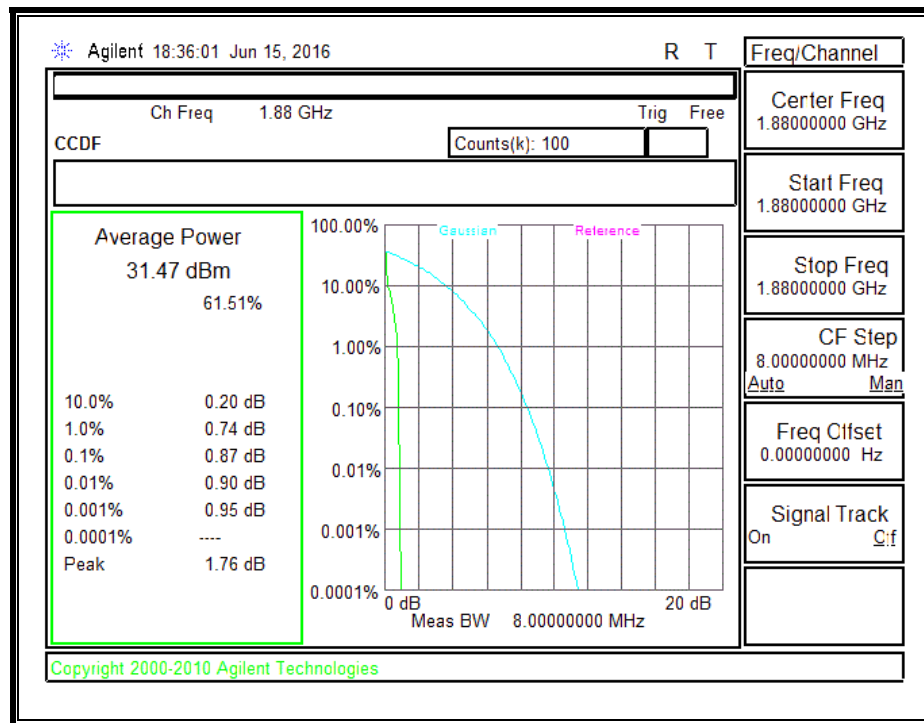
GSM850, GPRS



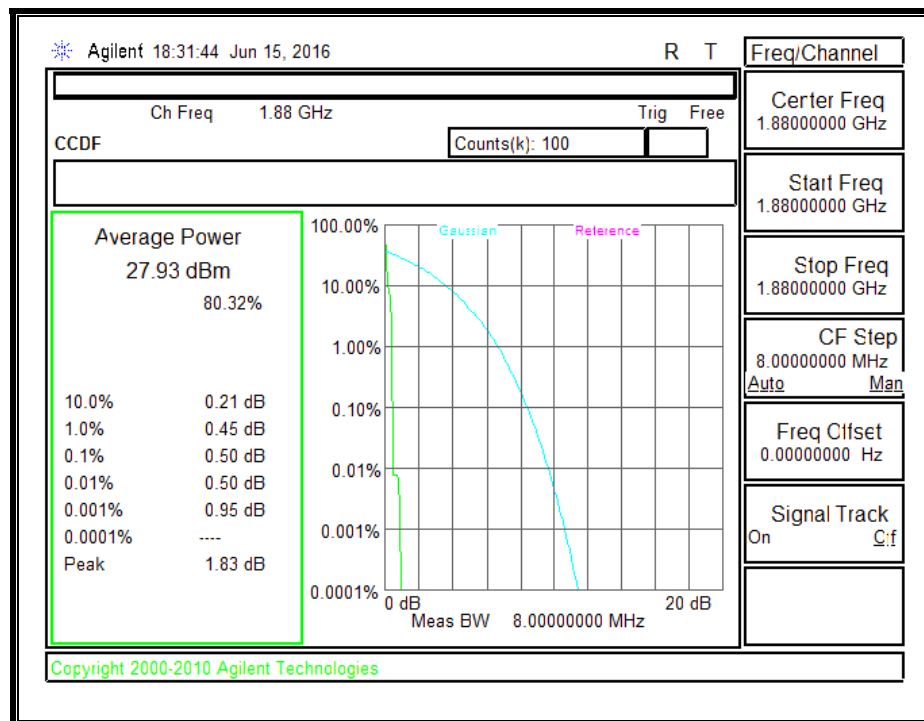
GSM850, EGPRS



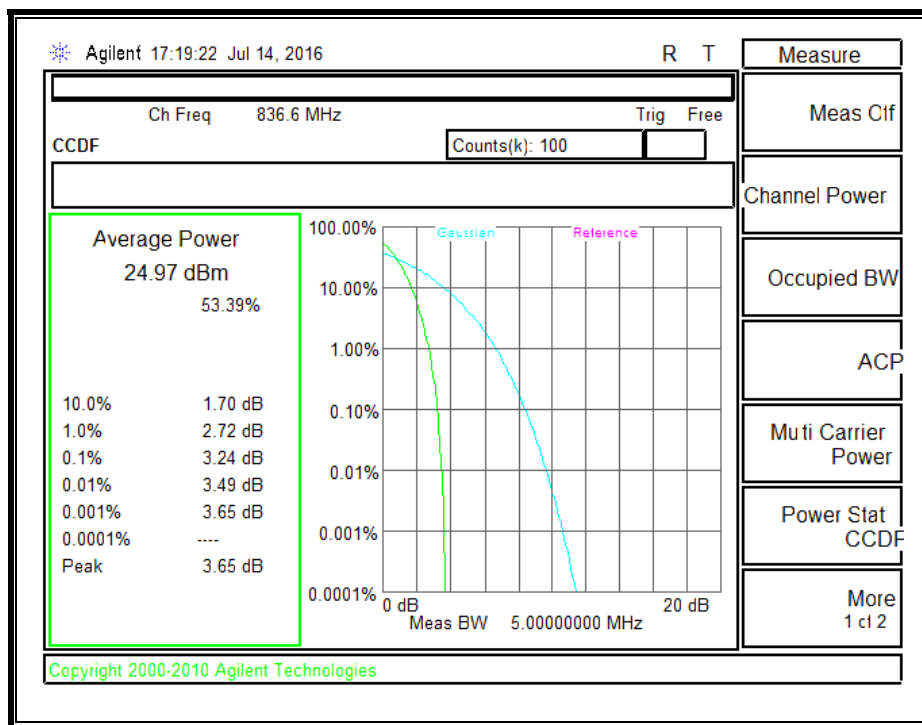
GSM1900, GPRS



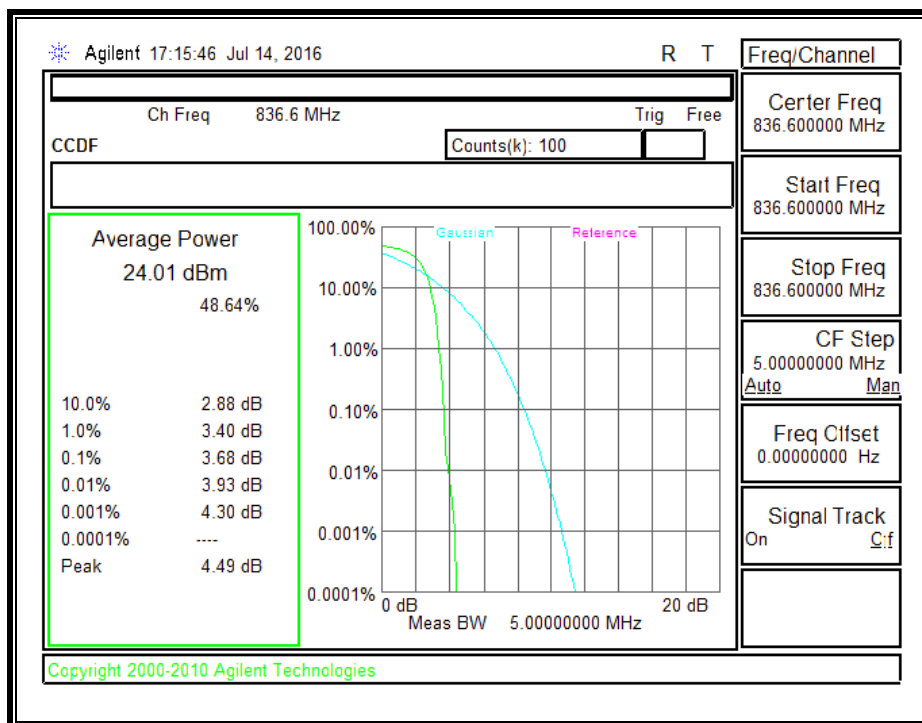
GSM1900, EGPRS



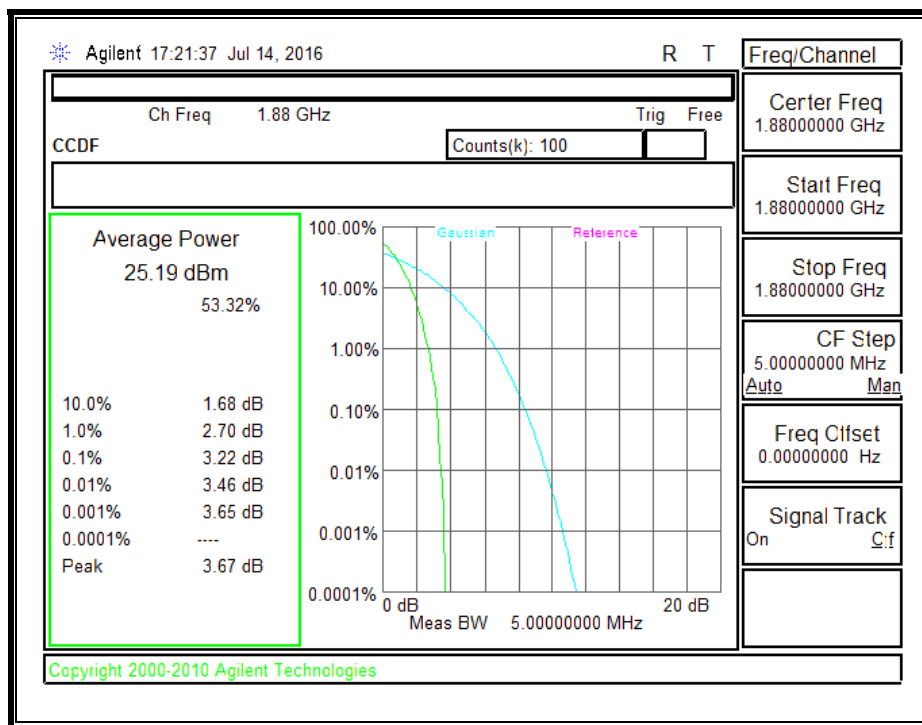
UMTS850, REL 99 BAND 5



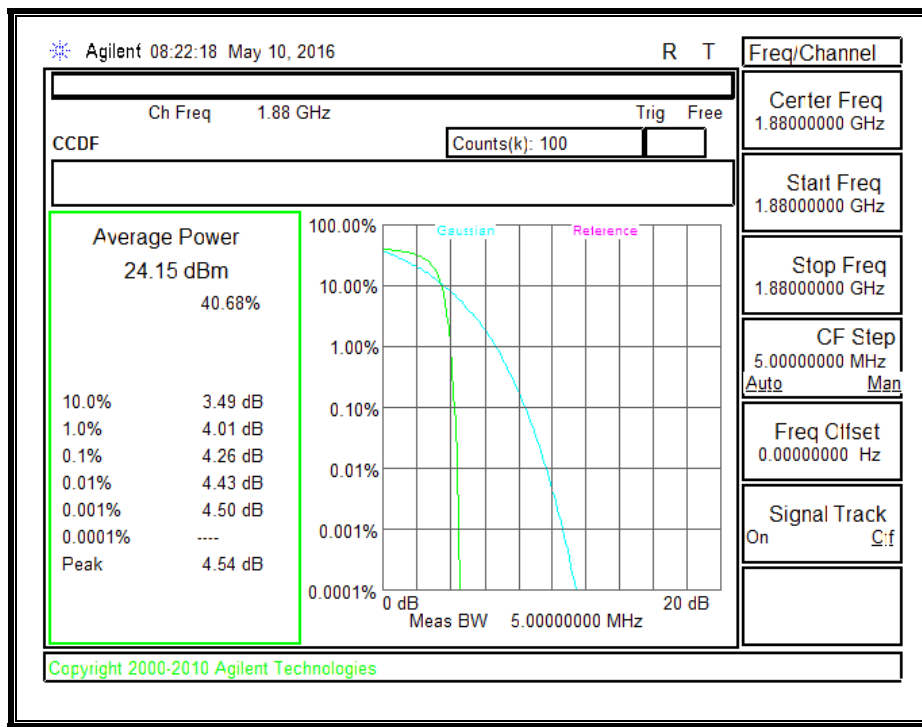
UMTS 850, HSDPA BAND 5



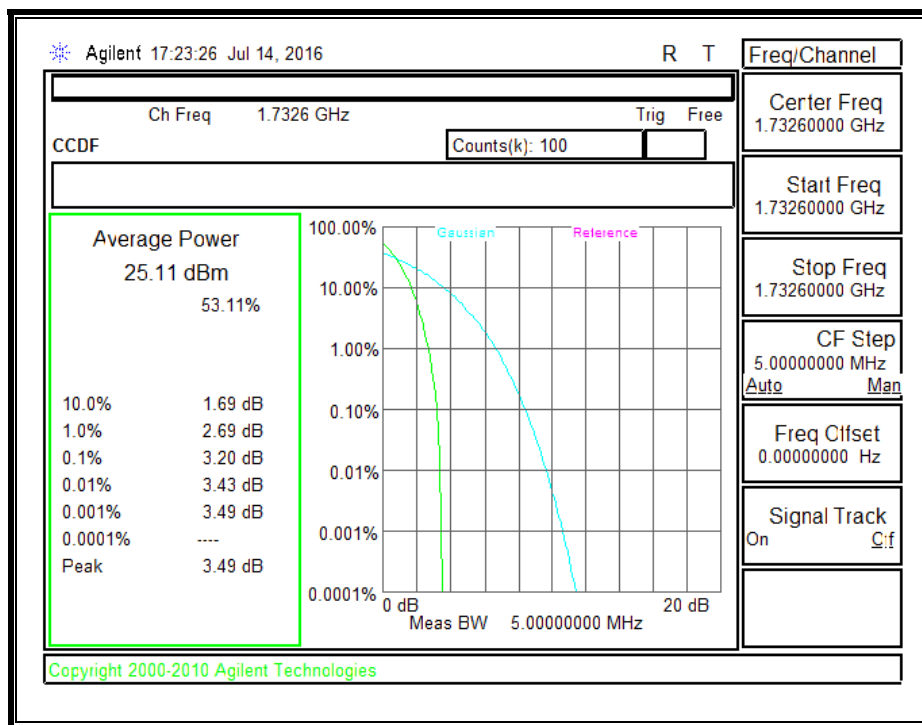
UMTS 1900, REL99 BAND 2



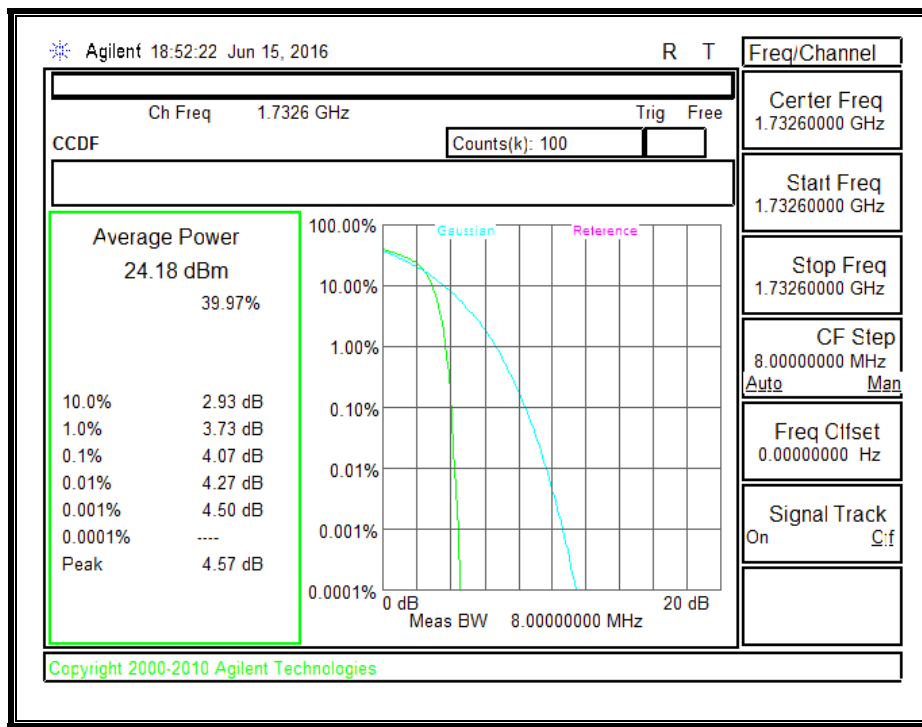
UMTS 1900, HSDPA BAND 2



UMTS 1700, REL99 BAND 4



UMTS 1700, HSDPA BAND 4



10.4. FIELD STRENGTH OF SPURIOUS RADIATION (LAT)

RULE PART(S)

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

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 $43 + 10 \log_{10}(P)$ dB

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

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

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

TEST PROCEDURE

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

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

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

MODES TESTED

- GPRS/EGPRS
- UMTS, REL 99 and HSDPA

RESULTS

10.4.1. GSM

GPRS, 850MHz BAND 5

High Frequency Substitution Measurement UL Fremont Radiated Chamber											
Company: Project #: 16U23366 Date: 05/09/16 Test Engineer: 38602 Configuration: EUT only Mode: GPRS 850MHz											
Test Equipment: Substitution: Horn T59 Substitution, and 8ft SMA Cable											
Chamber			Pre-amplifier			Filter			Limit		
3m Chamber G			3m Chamber G			Filter			EIRP		
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes	
Low Channel (824.2MHz)											
1.65	-60.9	H	3.0	-19.5	37.8	1.0	-56.3	-13.0	-43.3		
2.47	-60.0	H	3.0	-16.9	36.6	1.0	-52.4	-13.0	-39.4		
3.30	-60.4	H	3.0	-14.5	36.5	1.0	-50.0	-13.0	-37.0		
4.12	-60.8	H	3.0	-13.2	36.0	1.0	-48.2	-13.0	-35.2		
1.65	-60.5	V	3.0	-18.7	37.8	1.0	-55.6	-13.0	-42.6		
2.47	-59.8	V	3.0	-15.8	36.6	1.0	-51.4	-13.0	-38.4		
3.30	-60.9	V	3.0	-15.0	36.5	1.0	-50.5	-13.0	-37.5		
4.12	-61.4	V	3.0	-13.2	36.0	1.0	-48.2	-13.0	-35.2		
Mid Channel (836.6MHz)											
1.67	-60.2	H	3.0	-18.8	37.8	1.0	-55.6	-13.0	-42.6		
2.51	-60.1	H	3.0	-16.9	36.4	1.0	-52.3	-13.0	-39.3		
3.35	-60.7	H	3.0	-14.7	36.5	1.0	-50.1	-13.0	-37.1		
4.18	-61.0	H	3.0	-13.3	36.1	1.0	-48.3	-13.0	-35.3		
1.67	-60.7	V	3.0	-18.9	37.8	1.0	-55.8	-13.0	-42.8		
2.51	-59.5	V	3.0	-15.3	36.4	1.0	-50.6	-13.0	-37.6		
3.35	-60.8	V	3.0	-14.7	36.5	1.0	-50.2	-13.0	-37.2		
4.18	-61.3	V	3.0	-13.1	36.1	1.0	-48.1	-13.0	-35.1		
High Channel (848.8MHz)											
1.70	-60.7	H	3.0	-19.2	37.8	1.0	-56.0	-13.0	-43.0		
2.55	-60.8	H	3.0	-17.4	36.4	1.0	-52.8	-13.0	-39.8		
3.40	-60.0	H	3.0	-13.8	36.4	1.0	-49.3	-13.0	-36.3		
4.24	-61.0	H	3.0	-13.2	36.1	1.0	-48.2	-13.0	-35.2		
1.70	-60.9	V	3.0	-19.1	37.8	1.0	-56.0	-13.0	-43.0		
2.55	-60.0	V	3.0	-15.7	36.4	1.0	-51.1	-13.0	-38.1		
3.40	-61.1	V	3.0	-14.9	36.4	1.0	-50.4	-13.0	-37.4		
4.24	-61.2	V	3.0	-12.8	36.1	1.0	-47.9	-13.0	-34.9		
Rev. 03.19.15											

EGPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company: _____
 Project #: 16U23366
 Date: 05/09/16
 Test Engineer: 38602
 Configuration: EUT only
 Mode: EGPRS 850MHz

Test Equipment:
 Substitution: Horn T69 Substitution, and 8ft SMA Cable

Chamber
 3m Chamber G

Pre-amplifier
 3m Chamber G

Filter
 Filter

Limit
 EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.2MHz)										
1.65	-60.8	H	3.0	-19.4	37.8	1.0	-56.2	-13.0	-43.2	
2.47	-60.0	H	3.0	-16.9	36.6	1.0	-52.5	-13.0	-39.5	
3.30	-60.4	H	3.0	-14.5	36.5	1.0	-50.0	-13.0	-37.0	
4.12	-61.0	H	3.0	-13.4	36.0	1.0	-48.4	-13.0	-35.4	
1.65	-60.5	V	3.0	-18.7	37.8	1.0	-55.6	-13.0	-42.6	
2.47	-60.0	V	3.0	-16.0	36.6	1.0	-51.5	-13.0	-38.5	
3.30	-61.0	V	3.0	-15.1	36.5	1.0	-50.6	-13.0	-37.6	
4.12	-61.5	V	3.0	-13.3	36.0	1.0	-48.3	-13.0	-35.3	
Mid Channel (836.6MHz)										
1.67	-60.4	H	3.0	-18.9	37.8	1.0	-55.7	-13.0	-42.7	
2.51	-60.1	H	3.0	-16.9	36.4	1.0	-52.2	-13.0	-39.2	
3.35	-60.7	H	3.0	-14.6	36.5	1.0	-50.1	-13.0	-37.1	
4.18	-61.0	H	3.0	-13.3	36.1	1.0	-48.4	-13.0	-35.4	
1.67	-60.8	V	3.0	-19.0	37.8	1.0	-55.8	-13.0	-42.8	
2.51	-59.4	V	3.0	-15.2	36.4	1.0	-50.6	-13.0	-37.6	
3.35	-60.7	V	3.0	-14.7	36.5	1.0	-50.1	-13.0	-37.1	
4.18	-61.3	V	3.0	-13.0	36.1	1.0	-48.1	-13.0	-35.1	
High Channel (848.8MHz)										
1.70	-60.8	H	3.0	-19.3	37.8	1.0	-56.1	-13.0	-43.1	
2.55	-60.8	H	3.0	-17.5	36.4	1.0	-52.9	-13.0	-39.9	
3.40	-60.1	H	3.0	-14.0	36.4	1.0	-49.4	-13.0	-36.4	
4.24	-61.1	H	3.0	-13.3	36.1	1.0	-48.3	-13.0	-35.3	
1.70	-61.0	V	3.0	-19.2	37.8	1.0	-56.0	-13.0	-43.0	
2.55	-60.0	V	3.0	-15.7	36.4	1.0	-51.1	-13.0	-38.1	
3.40	-61.2	V	3.0	-15.0	36.4	1.0	-50.4	-13.0	-37.4	
4.24	-61.1	V	3.0	-12.8	36.1	1.0	-47.8	-13.0	-34.8	

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GPRS, 1900MHz BAND 2

**High Frequency Substitution Measurement
UL Fremont Radiated Chamber**

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 38602
Configuration: EUT only
Mode: GPRS 1900MHz

Test Equipment:

Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifier	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.70	-62.8	H	3.0	-16.0	36.2	1.0	-51.3	-13.0	-38.3	
5.55	-63.3	H	3.0	-13.0	36.1	1.0	-48.1	-13.0	-35.1	
7.40	-64.0	H	3.0	-10.9	35.2	1.0	-45.1	-13.0	-32.1	
9.25	-64.9	H	3.0	-10.1	33.9	1.0	-43.0	-13.0	-30.0	
3.70	-63.0	V	3.0	-15.9	36.2	1.0	-51.1	-13.0	-38.1	
5.55	-63.3	V	3.0	-13.2	36.1	1.0	-48.3	-13.0	-35.3	
7.40	-64.1	V	3.0	-11.1	35.2	1.0	-45.3	-13.0	-32.3	
9.25	-65.0	V	3.0	-10.3	33.9	1.0	-43.2	-13.0	-30.2	
Mid Channel (1880.0)										
3.76	-62.5	H	3.0	-15.6	36.2	1.0	-50.8	-13.0	-37.8	
5.64	-63.4	H	3.0	-12.9	36.1	1.0	-48.0	-13.0	-35.0	
7.52	-64.3	H	3.0	-11.1	35.1	1.0	-45.2	-13.0	-32.2	
9.40	-64.8	H	3.0	-9.8	33.8	1.0	-42.6	-13.0	-29.6	
3.76	-62.2	V	3.0	-14.9	36.2	1.0	-50.1	-13.0	-37.1	
5.64	-63.2	V	3.0	-12.9	36.1	1.0	-48.0	-13.0	-35.0	
7.52	-64.5	V	3.0	-11.4	35.1	1.0	-45.5	-13.0	-32.5	
9.40	-64.9	V	3.0	-10.1	33.8	1.0	-42.9	-13.0	-29.9	
High Channel (1909.8MHz)										
3.82	-62.4	H	3.0	-15.4	36.1	1.0	-50.5	-13.0	-37.5	
5.73	-63.3	H	3.0	-12.7	36.1	1.0	-47.7	-13.0	-34.7	
7.64	-64.4	H	3.0	-11.1	35.0	1.0	-45.1	-13.0	-32.1	
9.55	-65.2	H	3.0	-10.1	33.7	1.0	-42.8	-13.0	-29.8	
3.82	-62.5	V	3.0	-15.0	36.1	1.0	-50.1	-13.0	-37.1	
5.73	-64.0	V	3.0	-13.6	36.1	1.0	-48.6	-13.0	-35.6	
7.64	-64.2	V	3.0	-11.0	35.0	1.0	-45.0	-13.0	-32.0	
9.55	-65.0	V	3.0	-10.0	33.7	1.0	-42.7	-13.0	-29.7	

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EGPRS, 1900MHz BAND 2

**High Frequency Substitution Measurement
UL Fremont Radiated Chamber**

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 38602
Configuration: EUT only
Mode: EGPRS 1900MHz

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

Chamber	Pre-amplifier	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.70	-62.6	H	3.0	-15.8	36.2	1.0	-51.1	-13.0	-38.1	
5.55	-63.9	H	3.0	-13.6	36.1	1.0	-48.7	-13.0	-35.7	
7.40	-64.0	H	3.0	-10.9	35.2	1.0	-45.1	-13.0	-32.1	
9.25	-65.1	H	3.0	-10.3	33.9	1.0	-43.2	-13.0	-30.2	
3.70	-62.7	V	3.0	-15.6	36.2	1.0	-50.8	-13.0	-37.8	
5.55	-63.5	V	3.0	-13.4	36.1	1.0	-48.5	-13.0	-35.5	
7.40	-64.2	V	3.0	-11.2	35.2	1.0	-45.4	-13.0	-32.4	
9.25	-64.8	V	3.0	-10.1	33.9	1.0	-43.0	-13.0	-30.0	
Mid Channel (1880.0)										
3.76	-62.1	H	3.0	-15.2	36.2	1.0	-50.4	-13.0	-37.4	
5.64	-63.7	H	3.0	-13.2	36.1	1.0	-48.3	-13.0	-35.3	
7.52	-64.5	H	3.0	-11.3	35.1	1.0	-45.4	-13.0	-32.4	
9.40	-64.6	H	3.0	-9.6	33.8	1.0	-42.4	-13.0	-29.4	
3.76	-62.9	V	3.0	-15.6	36.2	1.0	-50.8	-13.0	-37.8	
5.64	-64.1	V	3.0	-13.8	36.1	1.0	-48.9	-13.0	-35.9	
7.52	-64.4	V	3.0	-11.3	35.1	1.0	-45.4	-13.0	-32.4	
9.40	-65.2	V	3.0	-10.4	33.8	1.0	-43.2	-13.0	-30.2	
High Channel (1909.8MHz)										
3.82	-62.5	H	3.0	-15.5	36.1	1.0	-50.6	-13.0	-37.6	
5.73	-63.7	H	3.0	-13.1	36.1	1.0	-48.1	-13.0	-35.1	
7.64	-64.0	H	3.0	-10.7	35.0	1.0	-44.7	-13.0	-31.7	
9.55	-65.1	H	3.0	-10.0	33.7	1.0	-42.7	-13.0	-29.7	
3.82	-62.0	V	3.0	-14.5	36.1	1.0	-49.6	-13.0	-36.6	
5.73	-64.1	V	3.0	-13.7	36.1	1.0	-48.7	-13.0	-35.7	
7.64	-64.1	V	3.0	-10.9	35.0	1.0	-44.9	-13.0	-31.9	
9.55	-65.1	V	3.0	-10.1	33.7	1.0	-42.8	-13.0	-29.8	

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10.4.2. UMTS

UMTS REL 99, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 38602
Configuration: EUT only
Mode: REL 99, 850MHz

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

Chamber
 3m Chamber G

Pre-amplifier
 3m Chamber G

Filter
 Filter

Limit
 EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (826.4MHz)										
1.65	-61.8	H	3.0	-20.4	37.8	1.0	-57.2	-13.0	-44.2	
2.48	-60.7	H	3.0	-17.5	36.5	1.0	-53.0	-13.0	-40.0	
3.31	-60.4	H	3.0	-14.5	36.5	1.0	-50.0	-13.0	-37.0	
1.65	-61.6	V	3.0	-19.8	37.8	1.0	-56.7	-13.0	-43.7	
2.48	-61.1	V	3.0	-17.0	36.5	1.0	-52.5	-13.0	-39.5	
3.31	-60.1	V	3.0	-14.2	36.5	1.0	-49.7	-13.0	-36.7	
Mid Channel (836.6MHz)										
1.67	-61.7	H	3.0	-20.2	37.8	1.0	-57.0	-13.0	-44.0	
2.51	-60.7	H	3.0	-17.5	36.4	1.0	-52.9	-13.0	-39.9	
3.35	-60.6	H	3.0	-14.6	36.5	1.0	-50.1	-13.0	-37.1	
1.67	-62.1	V	3.0	-20.3	37.8	1.0	-57.1	-13.0	-44.1	
2.51	-60.2	V	3.0	-16.0	36.4	1.0	-51.4	-13.0	-38.4	
3.35	-61.2	V	3.0	-15.1	36.5	1.0	-50.6	-13.0	-37.6	
High Channel (846.6MHz)										
1.69	-62.3	H	3.0	-20.8	37.8	1.0	-57.6	-13.0	-44.6	
2.54	-60.9	H	3.0	-17.6	36.4	1.0	-53.0	-13.0	-40.0	
3.39	-60.8	H	3.0	-14.7	36.5	1.0	-50.2	-13.0	-37.2	
1.69	-62.1	V	3.0	-20.3	37.8	1.0	-57.1	-13.0	-44.1	
2.54	-60.3	V	3.0	-16.0	36.4	1.0	-51.4	-13.0	-38.4	
3.39	-61.5	V	3.0	-15.3	36.5	1.0	-50.8	-13.0	-37.8	

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UMTS HSDPA, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 38602
Configuration: EUT only
Mode: HSPA 850MHz

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

Chamber

3m Chamber G

Pre-amplifier

3m Chamber G

Filter

Filter

Limit

EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (826.4MHz)										
1.65	-61.3	H	3.0	-19.9	37.8	1.0	-56.7	-13.0	-43.7	
2.48	-60.6	H	3.0	-17.5	36.5	1.0	-53.0	-13.0	-40.0	
3.31	-60.2	H	3.0	-14.2	36.5	1.0	-49.7	-13.0	-36.7	
1.65	-61.9	V	3.0	-20.1	37.8	1.0	-57.0	-13.0	-44.0	
2.48	-60.8	V	3.0	-16.7	36.5	1.0	-52.2	-13.0	-39.2	
3.31	-60.9	V	3.0	-15.0	36.5	1.0	-50.5	-13.0	-37.5	
Mid Channel (836.6MHz)										
1.67	-61.5	H	3.0	-20.0	37.8	1.0	-56.8	-13.0	-43.8	
2.51	-59.9	H	3.0	-16.7	36.4	1.0	-52.1	-13.0	-39.1	
3.35	-60.8	H	3.0	-14.8	36.5	1.0	-50.3	-13.0	-37.3	
1.67	-61.9	V	3.0	-20.1	37.8	1.0	-56.9	-13.0	-43.9	
2.51	-60.8	V	3.0	-16.6	36.4	1.0	-51.9	-13.0	-38.9	
3.35	-60.5	V	3.0	-14.4	36.5	1.0	-49.9	-13.0	-36.9	
High Channel (846.6MHz)										
1.69	-61.2	H	3.0	-19.6	37.8	1.0	-56.5	-13.0	-43.5	
2.54	-60.4	H	3.0	-17.1	36.4	1.0	-52.4	-13.0	-39.4	
3.39	-60.9	H	3.0	-14.8	36.5	1.0	-50.3	-13.0	-37.3	
1.69	-58.0	V	3.0	-16.2	37.8	1.0	-53.0	-13.0	-40.0	
2.54	-61.0	V	3.0	-16.7	36.4	1.0	-52.1	-13.0	-39.1	
3.39	-60.2	V	3.0	-14.0	36.5	1.0	-49.5	-13.0	-36.5	

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UMTS REL 99, 1900MHz BAND 2

**High Frequency Substitution Measurement
UL Fremont Radiated Chamber**

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 38602
Configuration: EUT only
Mode: REL 99, 1900MHz

Test Equipment:

Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifier	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.71	-57.5	H	3.0	-10.7	36.2	1.0	-45.9	-13.0	-32.9	
5.56	-58.6	H	3.0	-8.3	36.1	1.0	-43.4	-13.0	-30.4	
7.41	-59.8	H	3.0	-6.7	35.2	1.0	-40.9	-13.0	-27.9	
3.71	-57.4	V	3.0	-10.2	36.2	1.0	-45.4	-13.0	-32.4	
5.56	-58.8	V	3.0	-8.7	36.1	1.0	-43.8	-13.0	-30.8	
7.41	-59.0	V	3.0	-5.9	35.2	1.0	-40.1	-13.0	-27.1	
Mid Channel (1880MHz)										
3.76	-56.1	H	3.0	-9.2	36.2	1.0	-44.4	-13.0	-31.4	
5.64	-58.9	H	3.0	-8.4	36.1	1.0	-43.5	-13.0	-30.5	
7.52	-59.5	H	3.0	-6.3	35.1	1.0	-40.5	-13.0	-27.5	
3.76	-57.2	V	3.0	-9.8	36.2	1.0	-45.0	-13.0	-32.0	
5.64	-58.3	V	3.0	-8.1	36.1	1.0	-43.2	-13.0	-30.2	
7.52	-58.6	V	3.0	-5.5	35.1	1.0	-39.6	-13.0	-26.6	
High Channel (1907.6MHz)										
3.82	-56.2	H	3.0	-9.2	36.1	1.0	-44.4	-13.0	-31.4	
5.72	-58.7	H	3.0	-8.1	36.1	1.0	-43.1	-13.0	-30.1	
7.63	-57.9	H	3.0	-4.6	35.1	1.0	-38.7	-13.0	-25.7	
3.82	-56.9	V	3.0	-9.4	36.1	1.0	-44.5	-13.0	-31.5	
5.72	-59.2	V	3.0	-8.7	36.1	1.0	-43.8	-13.0	-30.8	
7.63	-59.0	V	3.0	-5.8	35.1	1.0	-39.9	-13.0	-26.9	

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UMTS HSDPA, 1900MHz BAND 2

**High Frequency Substitution Measurement
UL Fremont Radiated Chamber**

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 38602
Configuration: EUT only
Mode: HSPA 1900MHz

Test Equipment:

Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifier	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.71	-57.3	H	3.0	-10.5	36.2	1.0	-45.7	-13.0	-32.7	
5.56	-58.9	H	3.0	-8.6	36.1	1.0	-43.7	-13.0	-30.7	
7.41	-58.9	H	3.0	-5.8	35.2	1.0	-40.0	-13.0	-27.0	
3.71	-56.9	V	3.0	-9.8	36.2	1.0	-45.0	-13.0	-32.0	
5.56	-58.8	V	3.0	-8.6	36.1	1.0	-43.8	-13.0	-30.8	
7.41	-59.2	V	3.0	-6.2	35.2	1.0	-40.4	-13.0	-27.4	
Mid Channel (1880MHz)										
3.76	-56.2	H	3.0	-9.3	36.2	1.0	-44.5	-13.0	-31.5	
5.64	-58.8	H	3.0	-8.3	36.1	1.0	-43.4	-13.0	-30.4	
7.52	-59.7	H	3.0	-6.5	35.1	1.0	-40.7	-13.0	-27.7	
3.76	-56.7	V	3.0	-9.4	36.2	1.0	-44.6	-13.0	-31.6	
5.64	-57.9	V	3.0	-7.7	36.1	1.0	-42.8	-13.0	-29.8	
7.52	-58.6	V	3.0	-5.5	35.1	1.0	-39.6	-13.0	-26.6	
High Channel (1907.6MHz)										
3.82	-55.5	H	3.0	-8.5	36.1	1.0	-43.6	-13.0	-30.6	
5.72	-58.9	H	3.0	-8.2	36.1	1.0	-43.3	-13.0	-30.3	
7.63	-59.4	H	3.0	-6.1	35.1	1.0	-40.1	-13.0	-27.1	
3.82	-56.7	V	3.0	-9.2	36.1	1.0	-44.3	-13.0	-31.3	
5.72	-58.8	V	3.0	-8.4	36.1	1.0	-43.4	-13.0	-30.4	
7.63	-58.5	V	3.0	-5.3	35.1	1.0	-39.4	-13.0	-26.4	

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UMTS REL 99, 1700MHz BAND 4

**High Frequency Substitution Measurement
UL Fremont Radiated Chamber**

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 38602
Configuration: EUT only
Mode: REL 99, 1700MHz

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

Chamber	Pre-amplifier	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.43	-59.7	H	3.0	-13.5	36.4	1.0	-49.0	-13.0	-36.0	
5.14	-59.3	H	3.0	-9.6	36.3	1.0	-44.9	-13.0	-31.9	
6.85	-59.8	H	3.0	-7.4	35.6	1.0	-41.9	-13.0	-28.9	
3.43	-60.7	V	3.0	-14.4	36.4	1.0	-49.8	-13.0	-36.8	
5.14	-59.1	V	3.0	-9.6	36.3	1.0	-44.9	-13.0	-31.9	
6.85	-58.2	V	3.0	-5.8	35.6	1.0	-40.3	-13.0	-27.3	
Mid Channel (1732.6MHz)										
3.47	-61.0	H	3.0	-14.7	36.4	1.0	-50.1	-13.0	-37.1	
5.20	-58.2	H	3.0	-8.5	36.3	1.0	-43.8	-13.0	-30.8	
6.93	-59.2	H	3.0	-6.6	35.5	1.0	-41.1	-13.0	-28.1	
3.47	-60.3	V	3.0	-13.9	36.4	1.0	-49.3	-13.0	-36.3	
5.20	-57.8	V	3.0	-8.3	36.3	1.0	-43.5	-13.0	-30.5	
6.93	-59.1	V	3.0	-6.5	35.5	1.0	-41.1	-13.0	-28.1	
High Channel (1752.6MHz)										
3.51	-60.1	H	3.0	-13.7	36.4	1.0	-49.1	-13.0	-36.1	
5.26	-58.5	H	3.0	-8.6	36.3	1.0	-43.9	-13.0	-30.9	
7.01	-59.3	H	3.0	-6.6	35.5	1.0	-41.1	-13.0	-28.1	
3.51	-60.6	V	3.0	-14.1	36.4	1.0	-49.5	-13.0	-36.5	
5.26	-59.0	V	3.0	-9.4	36.3	1.0	-44.6	-13.0	-31.6	
7.01	-59.6	V	3.0	-6.9	35.5	1.0	-41.4	-13.0	-28.4	

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UMTS HSDPA, 1700MHz BAND 4

**High Frequency Substitution Measurement
UL Fremont Radiated Chamber**

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 38602
Configuration: EUT only
Mode: HSPA 1700MHz

Test Equipment:

Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifier	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.43	-60.4	H	3.0	-14.2	36.4	1.0	-49.7	-13.0	-36.7	
5.14	-59.7	H	3.0	-10.1	36.3	1.0	-45.3	-13.0	-32.3	
6.85	-58.4	H	3.0	-5.9	35.6	1.0	-40.5	-13.0	-27.5	
3.43	-60.7	V	3.0	-14.4	36.4	1.0	-49.8	-13.0	-36.8	
5.14	-59.7	V	3.0	-10.3	36.3	1.0	-45.6	-13.0	-32.6	
6.85	-58.9	V	3.0	-6.6	35.6	1.0	-41.1	-13.0	-28.1	
Mid Channel (1732.6MHz)										
3.47	-60.9	H	3.0	-14.6	36.4	1.0	-50.0	-13.0	-37.0	
5.20	-58.2	H	3.0	-8.5	36.3	1.0	-43.8	-13.0	-30.8	
6.93	-59.0	H	3.0	-6.4	35.5	1.0	-40.9	-13.0	-27.9	
3.47	-60.6	V	3.0	-14.2	36.4	1.0	-49.6	-13.0	-36.6	
5.20	-57.9	V	3.0	-8.4	36.3	1.0	-43.7	-13.0	-30.7	
6.93	-59.2	V	3.0	-6.7	35.5	1.0	-41.2	-13.0	-28.2	
High Channel (1752.6MHz)										
3.51	-59.6	H	3.0	-13.3	36.4	1.0	-48.6	-13.0	-35.6	
5.26	-59.0	H	3.0	-9.2	36.3	1.0	-44.5	-13.0	-31.5	
7.01	-58.9	H	3.0	-6.2	35.5	1.0	-40.7	-13.0	-27.7	
3.51	-60.2	V	3.0	-13.7	36.4	1.0	-49.1	-13.0	-36.1	
5.26	-58.9	V	3.0	-9.3	36.3	1.0	-44.6	-13.0	-31.6	
7.01	-59.1	V	3.0	-6.5	35.5	1.0	-41.0	-13.0	-28.0	

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10.5. FIELD STRENGTH OF SPURIOUS RADIATION (UAT)

10.5.1. GSM

GPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23366
Date: 06/11/16
Test Engineer: 45200
Configuration: EUT only
Mode: GPRS 850MHz

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

Chamber
 3m Chamber G

Pre-amplifier
 3m Chamber G

Filter
 Filter

Limit
 EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.2MHz)										
1.65	-61.0	H	3.0	-19.5	37.8	1.0	-56.3	-13.0	-43.3	
2.47	-60.1	H	3.0	-17.0	36.6	1.0	-52.6	-13.0	-39.6	
3.30	-60.5	H	3.0	-14.6	36.5	1.0	-50.1	-13.0	-37.1	
4.12	-60.9	H	3.0	-13.3	36.0	1.0	-48.4	-13.0	-35.4	
1.65	-60.5	V	3.0	-18.8	37.8	1.0	-55.6	-13.0	-42.6	
2.47	-60.0	V	3.0	-16.0	36.6	1.0	-51.5	-13.0	-38.5	
3.30	-61.0	V	3.0	-15.1	36.5	1.0	-50.7	-13.0	-37.7	
4.12	-61.4	V	3.0	-13.2	36.0	1.0	-48.3	-13.0	-35.3	
Mid Channel (836.6MHz)										
1.67	-60.4	H	3.0	-18.9	37.8	1.0	-55.7	-13.0	-42.7	
2.51	-60.1	H	3.0	-16.9	36.4	1.0	-52.3	-13.0	-39.3	
3.35	-60.8	H	3.0	-14.8	36.5	1.0	-50.3	-13.0	-37.3	
4.18	-61.0	H	3.0	-13.3	36.1	1.0	-48.3	-13.0	-35.3	
1.67	-60.7	V	3.0	-19.0	37.8	1.0	-55.8	-13.0	-42.8	
2.51	-59.5	V	3.0	-15.3	36.4	1.0	-50.7	-13.0	-37.7	
3.35	-60.8	V	3.0	-14.8	36.5	1.0	-50.2	-13.0	-37.2	
4.18	-61.3	V	3.0	-13.0	36.1	1.0	-48.1	-13.0	-35.1	
High Channel (848.8MHz)										
1.70	-60.8	H	3.0	-19.3	37.8	1.0	-56.1	-13.0	-43.1	
2.55	-60.8	H	3.0	-17.4	36.4	1.0	-52.8	-13.0	-39.8	
3.40	-60.2	H	3.0	-14.0	36.4	1.0	-49.5	-13.0	-36.5	
4.24	-61.1	H	3.0	-13.3	36.1	1.0	-48.3	-13.0	-35.3	
1.70	-61.0	V	3.0	-19.2	37.8	1.0	-56.0	-13.0	-43.0	
2.55	-60.0	V	3.0	-15.7	36.4	1.0	-51.1	-13.0	-38.1	
3.40	-61.2	V	3.0	-15.0	36.4	1.0	-50.5	-13.0	-37.5	
4.24	-61.1	V	3.0	-12.7	36.1	1.0	-47.8	-13.0	-34.8	

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EGPRS, 850MHz BAND 5

**High Frequency Substitution Measurement
UL Fremont Radiated Chamber**

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 38602
Configuration: EUT only
Mode: EGPRS 850MHz

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

Chamber	Pre-amplifier	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.2MHz)										
1.65	-61.0	H	3.0	-19.6	37.8	1.0	-56.4	-13.0	-43.4	
2.47	-60.0	H	3.0	-16.9	36.6	1.0	-52.5	-13.0	-39.5	
3.30	-60.4	H	3.0	-14.5	36.5	1.0	-50.0	-13.0	-37.0	
4.12	-60.9	H	3.0	-13.3	36.0	1.0	-48.4	-13.0	-35.4	
1.65	-60.5	V	3.0	-18.8	37.8	1.0	-55.6	-13.0	-42.6	
2.47	-60.0	V	3.0	-16.0	36.6	1.0	-51.5	-13.0	-38.5	
3.30	-61.0	V	3.0	-15.1	36.5	1.0	-50.6	-13.0	-37.6	
4.12	-61.4	V	3.0	-13.2	36.0	1.0	-48.2	-13.0	-35.2	
Mid Channel (836.6MHz)										
1.67	-60.3	H	3.0	-18.8	37.8	1.0	-55.6	-13.0	-42.6	
2.51	-60.0	H	3.0	-16.8	36.4	1.0	-52.2	-13.0	-39.2	
3.35	-60.7	H	3.0	-14.7	36.5	1.0	-50.2	-13.0	-37.2	
4.18	-61.1	H	3.0	-13.3	36.1	1.0	-48.4	-13.0	-35.4	
1.67	-60.8	V	3.0	-19.0	37.8	1.0	-55.8	-13.0	-42.8	
2.51	-59.4	V	3.0	-15.2	36.4	1.0	-50.5	-13.0	-37.5	
3.35	-60.8	V	3.0	-14.8	36.5	1.0	-50.3	-13.0	-37.3	
4.18	-61.4	V	3.0	-13.1	36.1	1.0	-48.1	-13.0	-35.1	
High Channel (848.8MHz)										
1.70	-60.8	H	3.0	-19.2	37.8	1.0	-56.1	-13.0	-43.1	
2.55	-60.7	H	3.0	-17.3	36.4	1.0	-52.7	-13.0	-39.7	
3.40	-60.2	H	3.0	-14.1	36.4	1.0	-49.5	-13.0	-36.5	
4.24	-61.3	H	3.0	-13.4	36.1	1.0	-48.5	-13.0	-35.5	
1.70	-61.1	V	3.0	-19.3	37.8	1.0	-56.1	-13.0	-43.1	
2.55	-59.9	V	3.0	-15.6	36.4	1.0	-51.0	-13.0	-38.0	
3.40	-61.2	V	3.0	-15.1	36.4	1.0	-50.5	-13.0	-37.5	
4.24	-61.0	V	3.0	-12.6	36.1	1.0	-47.7	-13.0	-34.7	

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GPRS, 1900MHz BAND 2

**High Frequency Substitution Measurement
UL Fremont Radiated Chamber**

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 38602
Configuration: EUT only
Mode: GPRS 1900MHz

Test Equipment:

Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifier	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.70	-62.6	H	3.0	-15.8	36.2	1.0	-51.1	-13.0	-38.1	
5.55	-63.7	H	3.0	-13.4	36.1	1.0	-48.5	-13.0	-35.5	
7.40	-64.0	H	3.0	-10.9	35.2	1.0	-45.1	-13.0	-32.1	
9.25	-64.6	H	3.0	-9.8	33.9	1.0	-42.7	-13.0	-29.7	
3.70	-62.5	V	3.0	-15.4	36.2	1.0	-50.6	-13.0	-37.6	
5.55	-63.2	V	3.0	-13.1	36.1	1.0	-48.2	-13.0	-35.2	
7.40	-63.6	V	3.0	-10.6	35.2	1.0	-44.8	-13.0	-31.8	
9.25	-64.5	V	3.0	-9.8	33.9	1.0	-42.7	-13.0	-29.7	
Mid Channel (1880.0)										
3.76	-62.6	H	3.0	-15.7	36.2	1.0	-50.9	-13.0	-37.9	
5.64	-63.6	H	3.0	-13.1	36.1	1.0	-48.2	-13.0	-35.2	
7.52	-63.3	H	3.0	-10.1	35.1	1.0	-44.2	-13.0	-31.2	
9.40	-65.0	H	3.0	-10.0	33.8	1.0	-42.8	-13.0	-29.8	
3.76	-62.8	V	3.0	-15.5	36.2	1.0	-50.7	-13.0	-37.7	
5.64	-63.4	V	3.0	-13.1	36.1	1.0	-48.2	-13.0	-35.2	
7.52	-64.0	V	3.0	-10.9	35.1	1.0	-45.0	-13.0	-32.0	
9.40	-64.3	V	3.0	-9.5	33.8	1.0	-42.3	-13.0	-29.3	
High Channel (1909.8MHz)										
3.82	-62.2	H	3.0	-15.2	36.1	1.0	-50.3	-13.0	-37.3	
5.73	-63.8	H	3.0	-13.2	36.1	1.0	-48.2	-13.0	-35.2	
7.64	-64.5	H	3.0	-11.2	35.0	1.0	-45.2	-13.0	-32.2	
9.55	-64.7	H	3.0	-9.6	33.7	1.0	-42.3	-13.0	-29.3	
3.82	-62.3	V	3.0	-14.8	36.1	1.0	-49.9	-13.0	-36.9	
5.73	-63.6	V	3.0	-13.2	36.1	1.0	-48.2	-13.0	-35.2	
7.64	-63.7	V	3.0	-10.5	35.0	1.0	-44.5	-13.0	-31.5	
9.55	-64.4	V	3.0	-9.4	33.7	1.0	-42.1	-13.0	-29.1	

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EGPRS, 1900MHz BAND 2

**High Frequency Substitution Measurement
UL Fremont Radiated Chamber**

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 38602
Configuration: EUT only
Mode: EGPRS 1900MHz

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

Chamber	Pre-amplifier	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.70	-63.0	H	3.0	-16.2	36.2	1.0	-51.5	-13.0	-38.5	
5.55	-62.5	H	3.0	-12.2	36.1	1.0	-47.3	-13.0	-34.3	
7.40	-63.8	H	3.0	-10.7	35.2	1.0	-44.9	-13.0	-31.9	
9.25	-64.8	H	3.0	-10.0	33.9	1.0	-42.9	-13.0	-29.9	
3.70	-62.7	V	3.0	-15.6	36.2	1.0	-50.8	-13.0	-37.8	
5.55	-63.6	V	3.0	-13.5	36.1	1.0	-48.6	-13.0	-35.6	
7.40	-63.8	V	3.0	-10.8	35.2	1.0	-45.0	-13.0	-32.0	
9.25	-64.7	V	3.0	-10.0	33.9	1.0	-42.9	-13.0	-29.9	
Mid Channel (1880.0)										
3.76	-61.9	H	3.0	-15.0	36.2	1.0	-50.2	-13.0	-37.2	
5.64	-63.4	H	3.0	-12.9	36.1	1.0	-48.0	-13.0	-35.0	
7.52	-64.0	H	3.0	-10.8	35.1	1.0	-44.9	-13.0	-31.9	
9.40	-65.0	H	3.0	-10.0	33.8	1.0	-42.8	-13.0	-29.8	
3.76	-62.8	V	3.0	-15.5	36.2	1.0	-50.7	-13.0	-37.7	
5.64	-64.0	V	3.0	-13.7	36.1	1.0	-48.8	-13.0	-35.8	
7.52	-65.0	V	3.0	-11.9	35.1	1.0	-46.0	-13.0	-33.0	
9.40	-65.3	V	3.0	-10.5	33.8	1.0	-43.3	-13.0	-30.3	
High Channel (1909.8MHz)										
3.82	-62.5	H	3.0	-15.5	36.1	1.0	-50.6	-13.0	-37.6	
5.73	-64.1	H	3.0	-13.5	36.1	1.0	-48.5	-13.0	-35.5	
7.64	-63.9	H	3.0	-10.6	35.0	1.0	-44.6	-13.0	-31.6	
9.55	-65.0	H	3.0	-9.9	33.7	1.0	-42.6	-13.0	-29.6	
3.82	-62.2	V	3.0	-14.7	36.1	1.0	-49.8	-13.0	-36.8	
5.73	-62.8	V	3.0	-12.4	36.1	1.0	-47.4	-13.0	-34.4	
7.64	-64.0	V	3.0	-10.8	35.0	1.0	-44.8	-13.0	-31.8	
9.55	-64.9	V	3.0	-9.9	33.7	1.0	-42.6	-13.0	-29.6	

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10.5.2. UMTS

UMTS REL 99, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 39005
Configuration: EUT only
Mode: REL 99, 850MHz

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

Chamber

3m Chamber G

Pre-amplifier

3m Chamber G

Filter

Filter

Limit

EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (826.4MHz)										
1.65	-62.8	H	3.0	-21.4	37.8	1.0	-58.2	-13.0	-45.2	
2.48	-63.2	H	3.0	-20.1	36.5	1.0	-55.6	-13.0	-42.6	
3.31	-63.6	H	3.0	-17.7	36.5	1.0	-53.2	-13.0	-40.2	
1.65	-62.9	V	3.0	-21.1	37.8	1.0	-57.9	-13.0	-44.9	
2.48	-63.5	V	3.0	-19.4	36.5	1.0	-54.9	-13.0	-41.9	
3.31	-63.7	V	3.0	-17.8	36.5	1.0	-53.3	-13.0	-40.3	
Mid Channel (836.6MHz)										
1.67	-62.7	H	3.0	-21.2	37.8	1.0	-58.1	-13.0	-45.1	
2.51	-63.2	H	3.0	-20.0	36.4	1.0	-55.3	-13.0	-42.3	
3.35	-63.6	H	3.0	-17.5	36.5	1.0	-53.0	-13.0	-40.0	
1.67	-63.2	V	3.0	-21.4	37.8	1.0	-58.3	-13.0	-45.3	
2.51	-63.6	V	3.0	-19.3	36.4	1.0	-54.7	-13.0	-41.7	
3.35	-64.1	V	3.0	-18.0	36.5	1.0	-53.5	-13.0	-40.5	
High Channel (846.6MHz)										
1.69	-63.1	H	3.0	-21.6	37.8	1.0	-58.4	-13.0	-45.4	
2.54	-63.3	H	3.0	-20.0	36.4	1.0	-55.4	-13.0	-42.4	
3.39	-64.0	H	3.0	-17.9	36.5	1.0	-53.3	-13.0	-40.3	
1.69	-62.6	V	3.0	-20.8	37.8	1.0	-57.7	-13.0	-44.7	
2.54	-63.4	V	3.0	-19.1	36.4	1.0	-54.5	-13.0	-41.5	
3.39	-63.9	V	3.0	-17.7	36.5	1.0	-53.2	-13.0	-40.2	

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UMTS HSDPA, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company: _____
 Project #: 16U23366
 Date: 05/09/16
 Test Engineer: 39005
 Configuration: EUT only
 Mode: HSPA 850MHz

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

Chamber
 3m Chamber G

Pre-amplifier
 3m Chamber G

Filter
 Filter

Limit
 EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (826.4MHz)										
1.65	-62.9	H	3.0	-21.4	37.8	1.0	-58.2	-13.0	-45.2	
2.48	-63.3	H	3.0	-20.2	36.5	1.0	-55.7	-13.0	-42.7	
3.31	-63.4	H	3.0	-17.4	36.5	1.0	-52.9	-13.0	-39.9	
1.65	-63.1	V	3.0	-21.4	37.8	1.0	-58.2	-13.0	-45.2	
2.48	-63.5	V	3.0	-19.4	36.5	1.0	-54.9	-13.0	-41.9	
3.31	-63.5	V	3.0	-17.6	36.5	1.0	-53.1	-13.0	-40.1	
Mid Channel (836.6MHz)										
1.67	-62.7	H	3.0	-21.2	37.8	1.0	-58.0	-13.0	-45.0	
2.51	-63.3	H	3.0	-20.1	36.4	1.0	-55.5	-13.0	-42.5	
3.35	-63.5	H	3.0	-17.5	36.5	1.0	-53.0	-13.0	-40.0	
1.67	-63.1	V	3.0	-21.3	37.8	1.0	-58.2	-13.0	-45.2	
2.51	-63.6	V	3.0	-19.4	36.4	1.0	-54.7	-13.0	-41.7	
3.35	-64.5	V	3.0	-18.4	36.5	1.0	-53.9	-13.0	-40.9	
High Channel (846.6MHz)										
1.69	-63.0	H	3.0	-21.5	37.8	1.0	-58.3	-13.0	-45.3	
2.54	-63.3	H	3.0	-20.0	36.4	1.0	-55.4	-13.0	-42.4	
3.39	-63.8	H	3.0	-17.7	36.5	1.0	-53.2	-13.0	-40.2	
1.69	-63.0	V	3.0	-21.2	37.8	1.0	-58.1	-13.0	-45.1	
2.54	-63.5	V	3.0	-19.2	36.4	1.0	-54.6	-13.0	-41.6	
3.39	-63.9	V	3.0	-17.8	36.5	1.0	-53.2	-13.0	-40.2	

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UMTS REL 99, 1900MHz BAND 2

**High Frequency Substitution Measurement
 UL Fremont Radiated Chamber**

Company:
 Project #: 16U23366
 Date: 05/09/16
 Test Engineer: 39005
 Configuration: EUT only
 Mode: REL 99, 1900MHz

Test Equipment:

Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifier	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.70	-63.5	H	3.0	-16.7	36.2	1.0	-51.9	-13.0	-38.9	
5.56	-63.8	H	3.0	-13.4	36.1	1.0	-48.6	-13.0	-35.6	
7.41	-64.3	H	3.0	-11.2	35.2	1.0	-45.4	-13.0	-32.4	
3.70	-63.9	V	3.0	-16.8	36.2	1.0	-52.0	-13.0	-39.0	
5.56	-64.3	V	3.0	-14.2	36.1	1.0	-49.3	-13.0	-36.3	
7.41	-64.8	V	3.0	-11.7	35.2	1.0	-45.9	-13.0	-32.9	
Mid Channel (1880MHz)										
3.76	-63.5	H	3.0	-16.6	36.2	1.0	-51.8	-13.0	-38.8	
5.64	-64.4	H	3.0	-13.9	36.1	1.0	-49.0	-13.0	-36.0	
7.52	-65.0	H	3.0	-11.9	35.1	1.0	-46.0	-13.0	-33.0	
3.76	-64.1	V	3.0	-16.8	36.2	1.0	-51.9	-13.0	-38.9	
5.64	-63.6	V	3.0	-13.3	36.1	1.0	-48.4	-13.0	-35.4	
7.52	-65.2	V	3.0	-12.1	35.1	1.0	-46.2	-13.0	-33.2	
High Channel (1907.6MHz)										
3.82	-63.2	H	3.0	-16.2	36.1	1.0	-51.3	-13.0	-38.3	
5.72	-64.2	H	3.0	-13.6	36.1	1.0	-48.6	-13.0	-35.6	
7.63	-65.0	H	3.0	-11.7	35.0	1.0	-45.7	-13.0	-32.7	
3.82	-63.3	V	3.0	-15.8	36.1	1.0	-50.9	-13.0	-37.9	
5.72	-64.3	V	3.0	-13.8	36.1	1.0	-48.9	-13.0	-35.9	
7.63	-64.7	V	3.0	-11.4	35.0	1.0	-45.5	-13.0	-32.5	

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UMTS HSDPA, 1900MHz BAND 2

**High Frequency Substitution Measurement
UL Fremont Radiated Chamber**

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 39005
Configuration: EUT only
Mode: HSPA 1900MHz

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

Chamber	Pre-amplifier	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.70	-64.2	H	3.0	-17.5	36.2	1.0	-52.7	-13.0	-39.7	
5.56	-63.9	H	3.0	-13.6	36.1	1.0	-48.7	-13.0	-35.7	
7.41	-64.7	H	3.0	-11.6	35.2	1.0	-45.8	-13.0	-32.8	
3.70	-64.0	V	3.0	-16.9	36.2	1.0	-52.1	-13.0	-39.1	
5.56	-64.1	V	3.0	-14.0	36.1	1.0	-49.1	-13.0	-36.1	
7.41	-64.9	V	3.0	-11.8	35.2	1.0	-46.1	-13.0	-33.1	
Mid Channel (1880MHz)										
3.76	-64.0	H	3.0	-17.1	36.2	1.0	-52.3	-13.0	-39.3	
5.64	-64.2	H	3.0	-13.7	36.1	1.0	-48.8	-13.0	-35.8	
7.52	-65.7	H	3.0	-12.5	35.1	1.0	-46.6	-13.0	-33.6	
3.76	-63.7	V	3.0	-16.4	36.2	1.0	-51.5	-13.0	-38.5	
5.64	-64.6	V	3.0	-14.3	36.1	1.0	-49.4	-13.0	-36.4	
7.52	-65.6	V	3.0	-12.5	35.1	1.0	-46.6	-13.0	-33.6	
High Channel (1907.6MHz)										
3.82	-63.8	H	3.0	-16.8	36.1	1.0	-52.0	-13.0	-39.0	
5.72	-64.2	H	3.0	-13.6	36.1	1.0	-48.7	-13.0	-35.7	
7.63	-64.8	H	3.0	-11.5	35.0	1.0	-45.5	-13.0	-32.5	
3.82	-63.7	V	3.0	-16.2	36.1	1.0	-51.4	-13.0	-38.4	
5.72	-64.5	V	3.0	-14.1	36.1	1.0	-49.2	-13.0	-36.2	
7.63	-64.9	V	3.0	-11.7	35.0	1.0	-45.7	-13.0	-32.7	

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UMTS REL 99, 1700MHz BAND 4

**High Frequency Substitution Measurement
UL Fremont Radiated Chamber**

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 39005
Configuration: EUT only
Mode: REL 99, 1700MHz

Test Equipment:

Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifier	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.43	-64.6	H	3.0	-18.4	36.4	1.0	-53.9	-13.0	-40.9	
5.14	-63.7	H	3.0	-14.1	36.3	1.0	-49.3	-13.0	-36.3	
6.85	-64.9	H	3.0	-12.5	35.6	1.0	-47.0	-13.0	-34.0	
3.43	-63.8	V	3.0	-17.5	36.4	1.0	-52.9	-13.0	-39.9	
5.14	-63.8	V	3.0	-14.3	36.3	1.0	-49.6	-13.0	-36.6	
6.85	-65.0	V	3.0	-12.7	35.6	1.0	-47.2	-13.0	-34.2	
Mid Channel (1732.6MHz)										
3.47	-64.2	H	3.0	-17.9	36.4	1.0	-53.3	-13.0	-40.3	
5.20	-63.7	H	3.0	-13.9	36.3	1.0	-49.2	-13.0	-36.2	
6.93	-64.9	H	3.0	-12.3	35.5	1.0	-46.9	-13.0	-33.9	
3.47	-64.4	V	3.0	-18.0	36.4	1.0	-53.4	-13.0	-40.4	
5.20	-63.7	V	3.0	-14.2	36.3	1.0	-49.4	-13.0	-36.4	
6.93	-64.6	V	3.0	-12.1	35.5	1.0	-46.7	-13.0	-33.7	
High Channel (1752.6MHz)										
3.51	-63.4	H	3.0	-17.1	36.4	1.0	-52.4	-13.0	-39.4	
5.26	-64.2	H	3.0	-14.3	36.3	1.0	-49.6	-13.0	-36.6	
7.01	-65.0	H	3.0	-12.3	35.5	1.0	-46.8	-13.0	-33.8	
3.51	-63.9	V	3.0	-17.4	36.4	1.0	-52.7	-13.0	-39.7	
5.26	-64.1	V	3.0	-14.5	36.3	1.0	-49.8	-13.0	-36.8	
7.01	-64.8	V	3.0	-12.2	35.5	1.0	-46.7	-13.0	-33.7	

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UMTS HSDPA, 1700MHz BAND 4

**High Frequency Substitution Measurement
UL Fremont Radiated Chamber**

Company:
Project #: 16U23366
Date: 05/09/16
Test Engineer: 39005
Configuration: EUT only
Mode: HSPA 1700MHz

Test Equipment:

Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifier	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.43	-64.9	H	3.0	-18.7	36.4	1.0	-54.1	-13.0	-41.1	
5.14	-64.1	H	3.0	-14.5	36.3	1.0	-49.7	-13.0	-36.7	
6.85	-65.1	H	3.0	-12.7	35.6	1.0	-47.2	-13.0	-34.2	
3.43	-64.1	V	3.0	-17.8	36.4	1.0	-53.2	-13.0	-40.2	
5.14	-64.1	V	3.0	-14.7	36.3	1.0	-50.0	-13.0	-37.0	
6.85	-64.8	V	3.0	-12.4	35.6	1.0	-47.0	-13.0	-34.0	
Mid Channel (1732.6MHz)										
3.47	-64.1	H	3.0	-17.8	36.4	1.0	-53.2	-13.0	-40.2	
5.20	-63.2	H	3.0	-13.5	36.3	1.0	-48.7	-13.0	-35.7	
6.93	-65.0	H	3.0	-12.4	35.5	1.0	-46.9	-13.0	-33.9	
3.47	-64.4	V	3.0	-18.0	36.4	1.0	-53.3	-13.0	-40.3	
5.20	-63.3	V	3.0	-13.8	36.3	1.0	-49.1	-13.0	-36.1	
6.93	-64.7	V	3.0	-12.2	35.5	1.0	-46.7	-13.0	-33.7	
High Channel (1752.6MHz)										
3.51	-64.0	H	3.0	-17.7	36.4	1.0	-53.1	-13.0	-40.1	
5.26	-63.3	H	3.0	-13.5	36.3	1.0	-48.7	-13.0	-35.7	
7.01	-65.3	H	3.0	-12.6	35.5	1.0	-47.1	-13.0	-34.1	
3.51	-64.1	V	3.0	-17.6	36.4	1.0	-52.9	-13.0	-39.9	
5.26	-64.1	V	3.0	-14.5	36.3	1.0	-49.8	-13.0	-36.8	
7.01	-64.7	V	3.0	-12.1	35.5	1.0	-46.6	-13.0	-33.6	

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