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

FOR

CELLULAR PHONE WITH BLUETOOTH AND WLAN RADIOS

MODEL NUMBER: A1778

FCC ID: BCG-E3091A

REPORT NUMBER: 16U23328-E6V4

ISSUE DATE: JULY 28, 2016

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	07/07/2016	Initial Review	Chin Pang
V2	07/15/2016	Address TCB's Questions	Chin Pang
V3	07/17/2016	Updated test equipment list	Tina Chu
V4	07/28/2016	Updated Section 7.3	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: A1778

SERIAL NUMBER: C7CRQ00NHCWJ (CONDUCTED);
C7CRQ009HCWH (RADIATED)

DATE TESTED: APRIL 29, 2016 – JUNE 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.

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FRANCISCO GUARNERO
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UL VERIFICATION SERVICES INC.

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 A1778 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	33.5	2238.7	31.5	1396.4
	EGPRS	29.0	794.3	27.1	516.4

Part 24 / RSS 133 1900MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1850 - 1910	GPRS	31.5	1412.5	31.3	1336.6
	EGPRS	28.0	631.0	28.3	674.5

UMTS MODES

Part 22 / RSS 132 850MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		ERP (Average)	
		dBm	mW	dBm	mW
824 – 849	REL 99	25.0	316.2	25.9	384.6
	HSDPA REL 5	24.0	251.2	25.0	314.1

Part 24 / RSS 133 1900MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1850 – 1910	REL 99	25.2	331.1	25.7	367.3
	HSDPA REL 5	24.2	263.0	24.4	277.3

Part 27 /RSS 139 1700MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1710– 1755	REL 99	25.2	331.1	25.5	357.3
	HSDPA REL 5	24.2	263.0	25.0	313.3

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	31.0	1258.9	27.4	548.3
	EGPRS	26.5	446.7	22.2	164.1

Part 24 / RSS 133 1900MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1850 - 1910	GPRS	26.2	416.9	25.5	351.6
	EGPRS	24.5	281.8	23.4	217.8

UMTS MODES

Part 22 / RSS 132 850MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		ERP (Average)	
		dBm	mW	dBm	mW
824 – 849	REL 99	23.0	199.5	17.9	62.2
	HSDPA REL 5	22.0	158.5	17.1	51.5

Part 24 / RSS 133 1900MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1850 – 1910	REL 99	21.5	141.3	20.0	99.8
	HSDPA REL 5	20.5	112.2	19.2	83.0

Part 27 /RSS 139 1700MHz Band

Frequency range (MHz)	Modulation	Conducted (Average)		EIRP (Average)	
		dBm	mW	dBm	mW
1710– 1755	REL 99	21.0	125.9	21.9	153.8
	HSDPA REL 5	20.0	100.0	21.4	137.1

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency (MHz)	Port A (LAT) Antenna Gain (dBi)	Port B (UAT) Antenna Gain (dBi)
824 - 849	-2.17	-2.33
1710 - 1755	-1.59	-0.09
1850 - 1910	0.09	0.54

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 Flatbed orientation was worst-case orientation for cell bands; Landscape orientation was worst-case orientation for pcs bands without AC/DC adapter and headset.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List			
Description	**Manufacturer**	**Model**	**Serial Number**
AC/DC adapter	APPLE	A1222	N/A
Laptop	Apple	MacBook Pro	730374GJAGW
DC power supply	Sorensen	XT 20-3	1318A00529

I/O CABLES (RF Conducted Test)

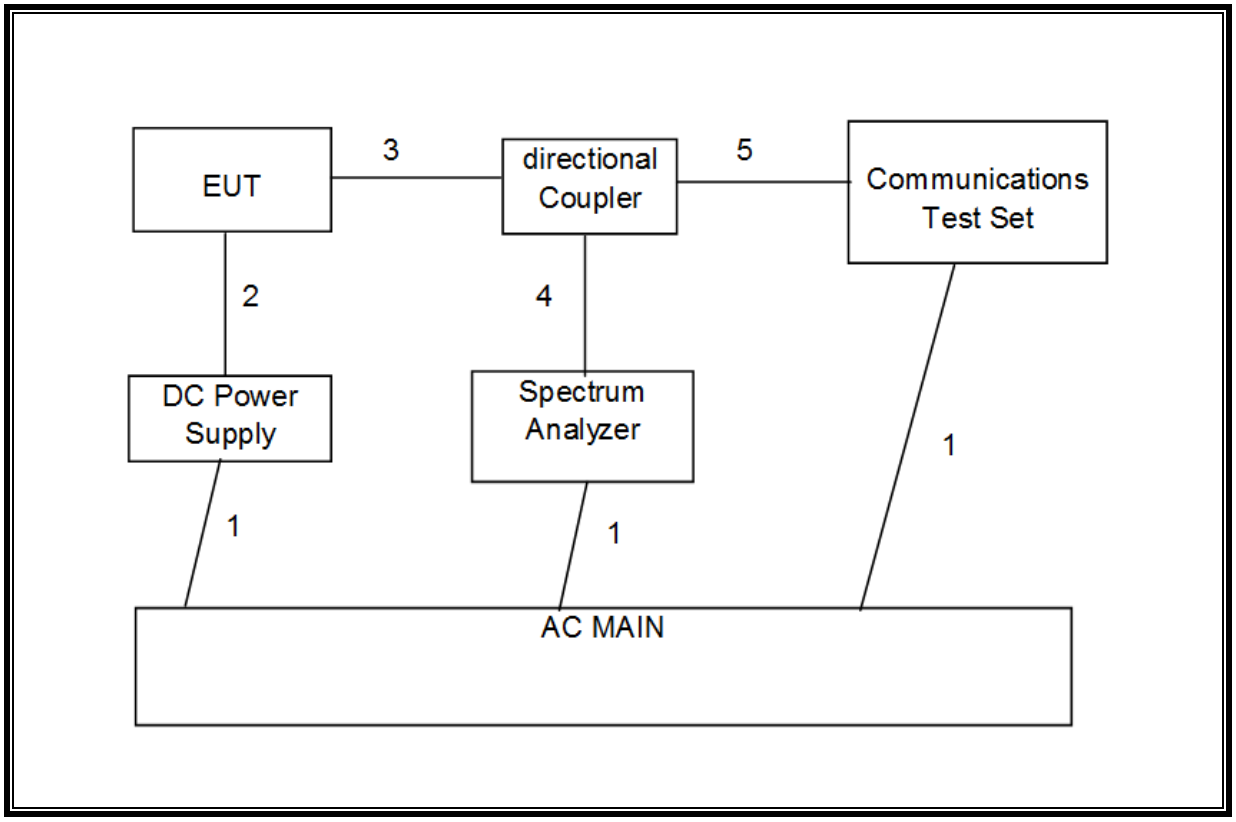
I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	US 115V	Un-shielded	2m	N/A
2	DC	1	DC	Un-shielded	1.4m	N/A
3	RF In/Out	1	EUT	Un-shielded	0.4m	N/A
4	RF In/Out	1	Barrel	N/A	N/A	N/A
5	RF In/Out	1	Communication Test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

I/O CABLES (RF Radiated Test)

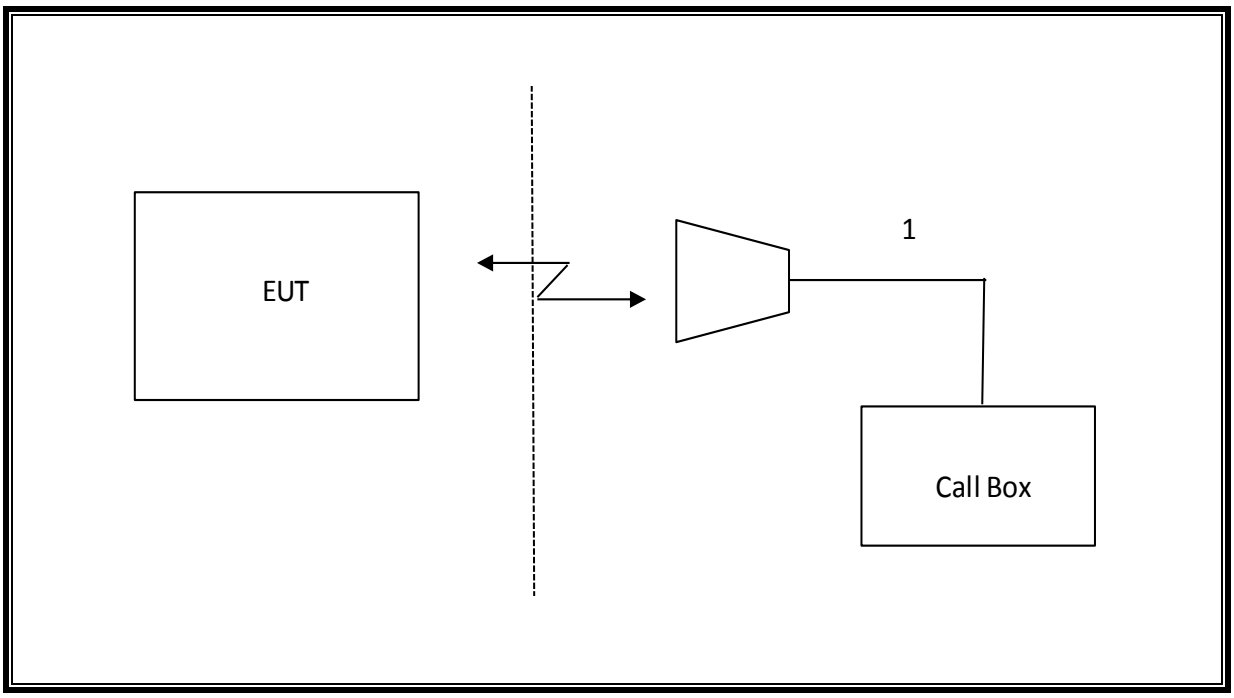
I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	RF In/Out	1	Antenna	Un-shielded	5m	NA

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	06/10/16
P - Series Power Meter	Keysight	N1911A	T1245	05/03/17
*Wideband Power Sensor 50 MHz - 18 GHz	Keysight	N1921A	T1228	06/06/16
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Agilent	E4440A	T200	09/01/16
Wideband Communication Test Set, Call Box	Rohde & Schwarz	CMW500	T954	05/03/17
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	06/24/16
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	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
*Amplifier, 1 to 26.5GHz, 23.5dB Gain minimum	Keysight	8449B	3008A04710	06/29/16
*Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826	209338	05/18/16
Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	T742	01/31/17

*Testing is completed before equipment expiration date.

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

conducted power)

Control:	Active Cell ➔	GSM/GPRS

7.1.1. PORT A GPRS/EGPRS (LAT)

ID:	44366	Date:	5/19/16

Mode	Ch.	f (MHz)	1 time slot		2 time slots	
			Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)
GPRS	128	824.2	33.4	33.2	32.4	32.3
	190	836.6	**33.6**	**33.5**	32.5	32.3
	251	848.8	33.5	33.3	32.7	32.5
EGPRS	128	824.2	31.5	28.6	30.3	27.8
	190	836.6	**31.8**	**29.0**	30.5	28.0
	251	848.8	31.7	28.8	30.5	27.9
GPRS	512	1850.2	31.5	31.3	30.6	30.4
	661	1880.0	**31.6**	**31.5**	30.5	30.3
	810	1909.8	31.5	31.3	30.6	30.5
EGPRS	512	1850.2	31.0	27.8	29.4	26.9
	661	1880.0	**31.1**	**28.0**	29.3	27.0
	810	1909.8	30.8	27.7	29.2	26.8

7.1.2. PORT B GPRS/EGPRS (UAT)

ID:	44366	Date:	5/19/16

Mode	Ch.	f (MHz)	1 time slot		2 time slots	
			Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)
GPRS	128	824.2	30.8	30.7	29.9	29.7
	190	836.6	**31.2**	**31.0**	30.2	30.0
	251	848.8	30.9	30.7	29.8	29.7
EGPRS	128	824.2	**29.4**	**26.5**	28.3	25.5
	190	836.6	29.2	26.2	28.2	25.1
	251	848.8	29.3	26.3	28.3	25.2
GPRS	512	1850.2	26.3	26.1	25.2	25.0
	661	1880.0	**26.4**	**26.2**	25.4	25.2
	810	1909.8	26.2	26.0	25.1	24.9
EGPRS	512	1850.2	27.3	24.3	26.1	23.2
	661	1880.0	**27.5**	**24.5**	26.3	23.5
	810	1909.8	27.4	24.3	26.1	23.2

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 ≥ RBW.≥ 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
	βc	Not Applicable
	βd	Not Applicable
	βec	Not Applicable
	βc/βd	8/15
	βhs	Not Applicable
	βed	Not Applicable

RESULTS

7.2.1. PORT A UMTS REL99 (LAT)

ID:	38806	Date:	6/24/16

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	28.5	24.9
	4183	4408	836.6	**28.7**	**25.0**
	4233	4458	846.6	28.5	24.8

Part 24 / RSS 133 1900MHz Band

Band	UL Channel	DL Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)
UMTS Rel. 99 1900MHz	9262	9662	1852.4	28.8	25.1
	9400	9800	1880.0	**29.0**	**25.2**
	9538	9938	1907.6	28.8	25.1

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	28.8	25.1
	1413	1638	1732.6	**28.9**	**25.2**
	1513	1738	1752.6	28.7	25.0

7.2.2. PORT B UMTS REL99 (UAT)

ID:	44366	Date:	5/19/16

Part 22 / RSS 132 850MHz Band

Band	UL Channel	DL Channel	Frequency (MHz)	25.83	Average Power (dBm)
UMTS Rel. 99 850MHz	4132	4357	826.4	26.68	22.85
	4183	4408	836.6	26.65	22.80
	4233	4458	846.6	**26.80**	**23.00**

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	25.20	21.30
	9400	9800	1880.0	25.24	21.35
	9538	9938	1907.6	**25.30**	**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	24.90	20.80
	1413	1638	1732.6	24.90	20.80
	1513	1738	1752.6	**25.00**	**21.00**

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			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	11/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs =βhs/βc	30/15			

RESULT

7.3.1. PORT A HSDPA REL 5 (LAT)

ID:	44366	Date:	6/24/16

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	28.0	23.8
		4183	4408	836.6	**28.2**	**24.0**
		4233	4458	846.6	28.0	24.0
	2	4132	4357	826.4	28.0	24.0
		4183	4408	836.6	28.0	24.0
		4233	4458	846.6	27.9	23.9
	3	4132	4357	826.4	27.4	23.4
		4183	4408	836.6	27.4	23.4
		4233	4458	846.6	27.5	23.5
	4	4132	4357	826.4	27.3	23.3
		4183	4408	836.6	27.4	23.4
		4233	4458	846.6	27.4	23.4

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	**28.4**	**24.2**
		9400	9800	1880.0	28.1	24.1
		9538	9938	1907.6	28.1	24.2
	2	9262	9662	1852.4	28.2	24.1
		9400	9800	1880.0	28.2	24.2
		9538	9938	1907.6	28.1	24.1
	3	9262	9662	1852.4	27.5	23.5
		9400	9800	1880.0	27.4	23.4
		9538	9938	1907.6	27.5	23.5
	4	9262	9662	1852.4	27.6	23.6
		9400	9800	1880.0	27.5	23.5
		9538	9938	1907.6	27.5	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**	**24.2**
		1413	1638	1732.6	28.0	24.0
		1513	1738	1752.6	28.0	24.1
	2	1312	1537	1712.4	28.1	24.0
		1413	1638	1732.6	28.1	24.1
		1513	1738	1752.6	28.0	24.0
	3	1312	1537	1712.4	27.4	23.4
		1413	1638	1732.6	27.3	23.3
		1513	1738	1752.6	27.4	23.4
	4	1312	1537	1712.4	27.5	23.5
		1413	1638	1732.6	27.4	23.4
		1513	1738	1752.6	27.4	23.4

7.3.2. PORT B HSDPA REL 5 (UAT)

ID:	44366	Date:	6/24/16

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	**26.4**	**22.0**
		4183	4408	836.6	26.2	21.9
		4233	4458	846.6	26.3	21.9
	2	4132	4357	826.4	26.0	21.8
		4183	4408	836.6	26.0	21.8
		4233	4458	846.6	26.1	21.9
	3	4132	4357	826.4	25.5	21.3
		4183	4408	836.6	25.6	21.4
		4233	4458	846.6	25.6	21.4
	4	4132	4357	826.4	25.6	21.4
		4183	4408	836.6	25.6	21.4
		4233	4458	846.6	25.5	21.3

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	**24.8**	**20.5**
		9400	9800	1880.0	24.7	20.4
		9538	9938	1907.6	24.7	20.3
	2	9262	9662	1852.4	24.3	20.5
		9400	9800	1880.0	24.5	20.5
		9538	9938	1907.6	24.2	20.4
	3	9262	9662	1852.4	24.4	20.0
		9400	9800	1880.0	24.5	19.9
		9538	9938	1907.6	24.4	19.8
	4	9262	9662	1852.4	24.5	19.9
		9400	9800	1880.0	24.4	19.8
		9538	9938	1907.6	24.3	19.9

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	24.0	19.9
		1413	1638	1732.6	**24.4**	**20.0**
		1513	1738	1752.6	24.2	19.9
	2	1312	1537	1712.4	24.1	20.0
		1413	1638	1732.6	24.2	19.9
		1513	1738	1752.6	24.3	19.9
	3	1312	1537	1712.4	24.2	19.5
		1413	1638	1732.6	24.0	19.4
		1513	1738	1752.6	24.0	19.5
	4	1312	1537	1712.4	24.2	19.5
		1413	1638	1732.6	24.1	19.5
		1513	1738	1752.6	24.0	19.5

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				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	15/1
	βhs	22/15	12/15	30/15	4/15	5/15
	βed	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				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	12
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	67
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27	

RESULTS

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

ID:	44366	Date:	6/24/16

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	28.0	23.9
		4183	4408	836.6	28.0	23.9
		4233	4458	846.6	**28.1**	**24.0**
	2	4132	4357	826.4	26.5	21.9
		4183	4408	836.6	26.6	22.0
		4233	4458	846.6	26.5	21.9
	3	4132	4357	826.4	27.6	23.0
		4183	4408	836.6	27.7	23.1
		4233	4458	846.6	27.5	22.9
	4	4132	4357	826.4	26.6	22.0
		4183	4408	836.6	26.4	21.8
		4233	4458	846.6	26.5	21.9
	5	4132	4357	826.4	27.9	23.9
		4183	4408	836.6	27.9	23.8
		4233	4458	846.6	28.0	23.8

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	28.2	24.1
		9400	9800	1880	**28.2**	**24.2**
		9538	9938	1908	28.0	24.1
	2	9262	9662	1852	26.7	22.1
		9400	9800	1880	26.7	22.1
		9538	9938	1908	26.8	22.2
	3	9262	9662	1852	27.6	23.0
		9400	9800	1880	27.8	23.2
		9538	9938	1908	27.8	23.2
	4	9262	9662	1852	26.6	22.0
		9400	9800	1880	26.6	22.0
		9538	9938	1908	26.8	22.2
	5	9262	9662	1852	28.2	24.1
		9400	9800	1880	28.2	24.0
		9538	9938	1908	28.2	24.1

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	28.5	23.9
		1413	1638	1732.6	28.5	24.0
		1513	1738	1752.6	**28.5**	**24.0**
	2	1312	1537	1712.4	26.9	22.3
		1413	1638	1732.6	26.8	22.2
		1513	1738	1752.6	26.9	22.3
	3	1312	1537	1712.4	27.8	23.2
		1413	1638	1732.6	27.7	23.1
		1513	1738	1752.6	27.8	23.2
	4	1312	1537	1712.4	27.0	22.2
		1413	1638	1732.6	26.9	22.3
		1513	1738	1752.6	27.0	22.1
	5	1312	1537	1712.4	28.5	23.9
		1413	1638	1732.6	28.5	24.0
		1513	1738	1752.6	28.5	24.0

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

ID:	44366	Date:	5/19/16

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	26.2	22.0
		4183	4408	836.6	26.2	22.0
		4233	4458	846.6	**26.3**	**22.0**
	2	4132	4357	826.4	24.2	20.0
		4183	4408	836.6	24.2	20.0
		4233	4458	846.6	24.1	19.9
	3	4132	4357	826.4	25.2	21.0
		4183	4408	836.6	25.1	20.9
		4233	4458	846.6	25.0	20.8
	4	4132	4357	826.4	24.2	20.0
		4183	4408	836.6	24.0	19.7
		4233	4458	846.6	24.1	19.9
	5	4132	4357	826.4	26.1	21.9
		4183	4408	836.6	26.1	21.9
		4233	4458	846.6	26.1	21.9

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	24.7	20.5
		9400	9800	1880	24.7	20.5
		9538	9938	1908	**24.7**	**20.5**
	2	9262	9662	1852	22.7	18.5
		9400	9800	1880	22.6	18.4
		9538	9938	1908	22.7	18.5
	3	9262	9662	1852	23.7	19.5
		9400	9800	1880	23.6	19.4
		9538	9938	1908	23.6	19.4
	4	9262	9662	1852	22.7	18.5
		9400	9800	1880	22.6	18.4
		9538	9938	1908	22.6	18.4
	5	9262	9662	1852	24.6	20.4
		9400	9800	1880	24.7	20.5
		9538	9938	1908	24.5	20.3

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	24.0	19.8
		1413	1638	1732.6	**24.2**	**20.0**
		1513	1738	1752.6	24.0	19.8
	2	1312	1537	1712.4	22.7	17.9
		1413	1638	1732.6	22.9	18.0
		1513	1738	1752.6	22.7	18.0
	3	1312	1537	1712.4	23.1	18.9
		1413	1638	1732.6	23.2	19.0
		1513	1738	1752.6	23.1	18.9
	4	1312	1537	1712.4	22.5	17.9
		1413	1638	1732.6	22.7	18.0
		1513	1738	1752.6	22.8	18.0
	5	1312	1537	1712.4	24.1	19.9
		1413	1638	1732.6	23.9	19.7
		1513	1738	1752.6	24.1	19.9

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

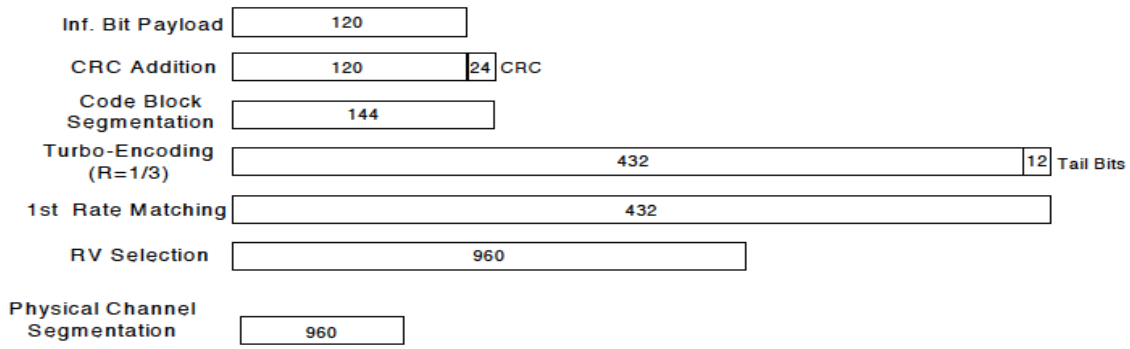


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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

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

RESULT

7.5.1. PORT A DUAL CARRIER HSDPA (LAT)

ID:	50820	Date:	6/24/16

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	28.0	23.9
		4183	4408	836.6	**28.1**	**24.0**
		4233	4458	846.6	28.0	23.7
	2	4132	4357	826.4	27.9	23.8
		4183	4408	836.6	28.0	24.0
		4233	4458	846.6	27.8	23.7
	3	4132	4357	826.4	27.8	23.5
		4183	4408	836.6	27.7	23.2
		4233	4458	846.6	27.7	23.4
	4	4132	4357	826.4	27.8	23.1
		4183	4408	836.6	28.0	23.5
		4233	4458	846.6	28.0	23.4

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	28.0	24.1
		9400	9800	1880.0	28.0	24.1
		9538	9938	1907.6	**28.3**	**24.2**
	2	9262	9662	1852.4	28.2	24.1
		9400	9800	1880.0	28.1	23.9
		9538	9938	1907.6	27.9	23.9
	3	9262	9662	1852.4	28.2	23.6
		9400	9800	1880.0	27.9	23.5
		9538	9938	1907.6	27.8	23.5
	4	9262	9662	1852.4	27.8	23.6
		9400	9800	1880.0	27.9	23.6
		9538	9938	1907.6	27.8	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	28.2	24.1
		1413	1638	1732.6	28.1	24.1
		1513	1738	1752.6	**28.4**	**24.2**
	2	1312	1537	1712.4	28.3	24.0
		1413	1638	1732.6	28.3	24.1
		1513	1738	1752.6	28.1	24.1
	3	1312	1537	1712.4	28.2	23.5
		1413	1638	1732.6	27.9	23.6
		1513	1738	1752.6	27.9	23.6
	4	1312	1537	1712.4	27.8	23.5
		1413	1638	1732.6	27.8	23.4
		1513	1738	1752.6	27.9	23.6

7.5.2. PORT B DUAL CARRIER HSDPA (UAT)

ID:	50820	Date:	6/13/16

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	26.2	**22.0**
		4183	4408	836.6	26.2	21.8
		4233	4458	846.6	**26.3**	21.9
	2	4132	4357	826.4	26.1	21.9
		4183	4408	836.6	26.0	21.8
		4233	4458	846.6	26.2	21.8
	3	4132	4357	826.4	26.0	21.5
		4183	4408	836.6	26.0	21.5
		4233	4458	846.6	25.9	21.5
	4	4132	4357	826.4	25.9	21.3
		4183	4408	836.6	26.2	21.4
		4233	4458	846.6	25.8	21.3

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	**24.7**	**20.4**
		9400	9800	1880.0	24.4	20.4
		9538	9938	1907.6	24.6	20.3
	2	9262	9662	1852.4	24.5	20.4
		9400	9800	1880.0	24.2	20.2
		9538	9938	1907.6	24.4	20.4
	3	9262	9662	1852.4	24.2	19.9
		9400	9800	1880.0	24.0	19.9
		9538	9938	1907.6	24.1	19.8
	4	9262	9662	1852.4	24.4	19.8
		9400	9800	1880.0	24.1	19.8
		9538	9938	1907.6	24.2	19.9

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	**24.6**	**20.0**
		1413	1638	1732.6	24.5	19.9
		1513	1738	1752.6	24.6	20.0
	2	1312	1537	1712.4	24.0	19.8
		1413	1638	1732.6	23.9	19.9
		1513	1738	1752.6	24.3	20.0
	3	1312	1537	1712.4	24.4	19.5
		1413	1638	1732.6	24.2	19.5
		1513	1738	1752.6	24.3	19.4
	4	1312	1537	1712.4	24.4	19.4
		1413	1638	1732.6	24.2	19.4
		1513	1738	1752.6	24.5	19.5

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	244.0726	308.507
		190	836.6	245.2918	301.028
		251	848.8	247.3739	299.166

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
PCS	GPRS	512	1850.2	247.6797	312.946
		661	1880.0	243.8529	301.463
		810	1909.8	244.8887	299.131

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	243.8064	304.277
		190	836.6	243.8709	299.503
		251	848.8	244.8012	300.216

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
PCS	EGPRS	512	1850.2	243.2905	303.345
		661	1880.0	244.9239	301.893
		810	1909.8	248.5285	299.042

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	4.0723	4.639
		4408	836.60	4.0723	4.635
		4458	846.60	**4.0933**	**4.673**
1900MHz		9662	1852.40	4.0735	4.644
		9800	1880.00	4.0548	4.652
		9938	1907.60	**4.0888**	**4.686**
1700MHz		1537	1712.40	4.0878	**4.678**
		1638	1732.60	4.0688	4.649
		1738	1752.60	**4.0955**	4.671

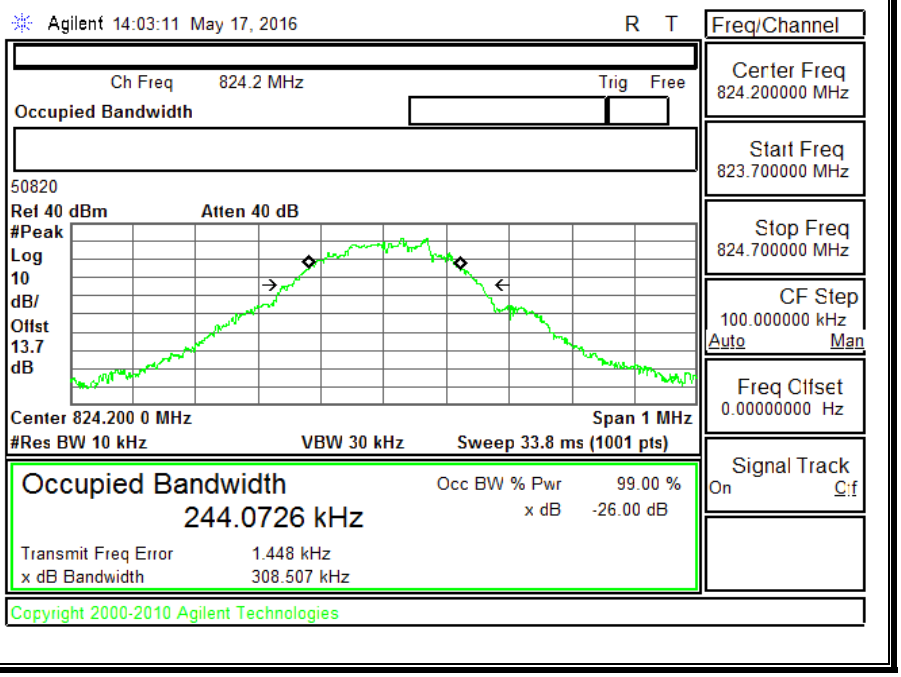
UMTS HSDPA MODE PART 22, 24, AND 27 / RSS 132, 133 AND 139

Band	Mode	DL Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
850MHz	UMTS HSDPA	4357	826.40	**4.0982**	4.579
		4408	836.60	4.0829	**4.603**
		4458	846.60	4.0881	4.541
1900MHz		9662	1852.40	**4.1045**	**4.668**
		9800	1880.00	4.0694	4.52
		9938	1907.60	4.0590	4.619
1700MHz		1537	1712.40	4.0741	4.529
		1638	1732.60	4.0995	**4.534**
		1738	1752.60	**4.1483**	4.526

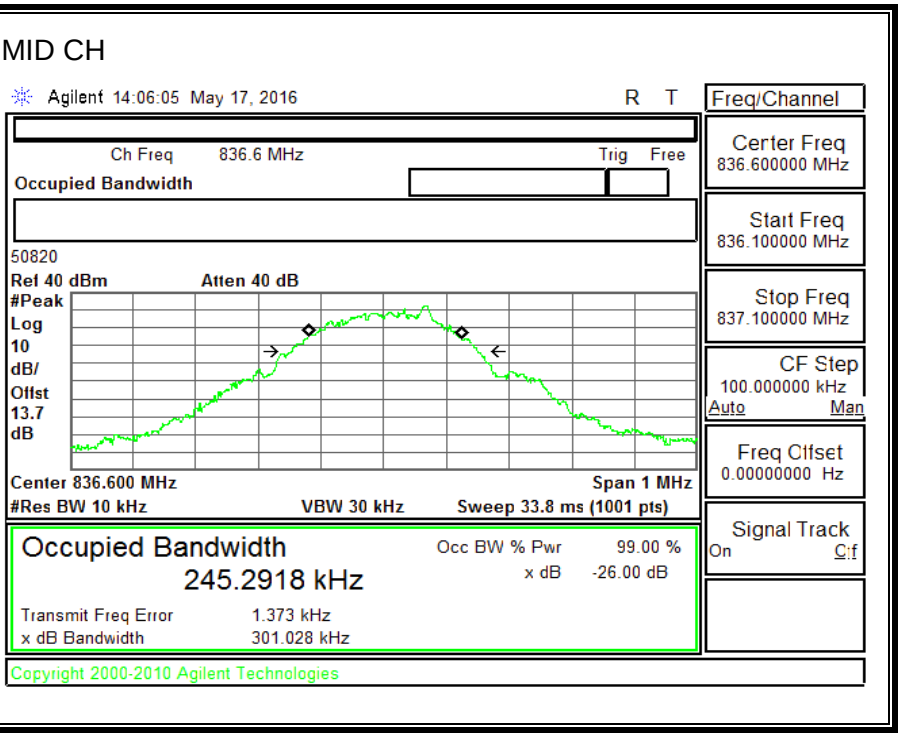
8.1.1. GSM GPRS

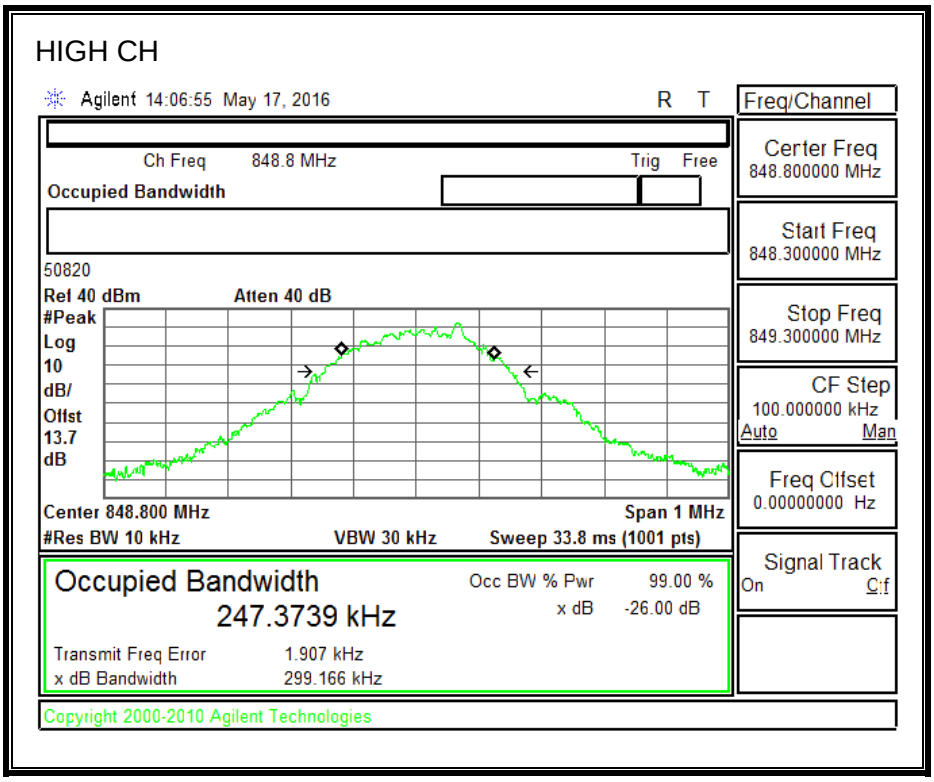
850MHz BAND

LOW CH

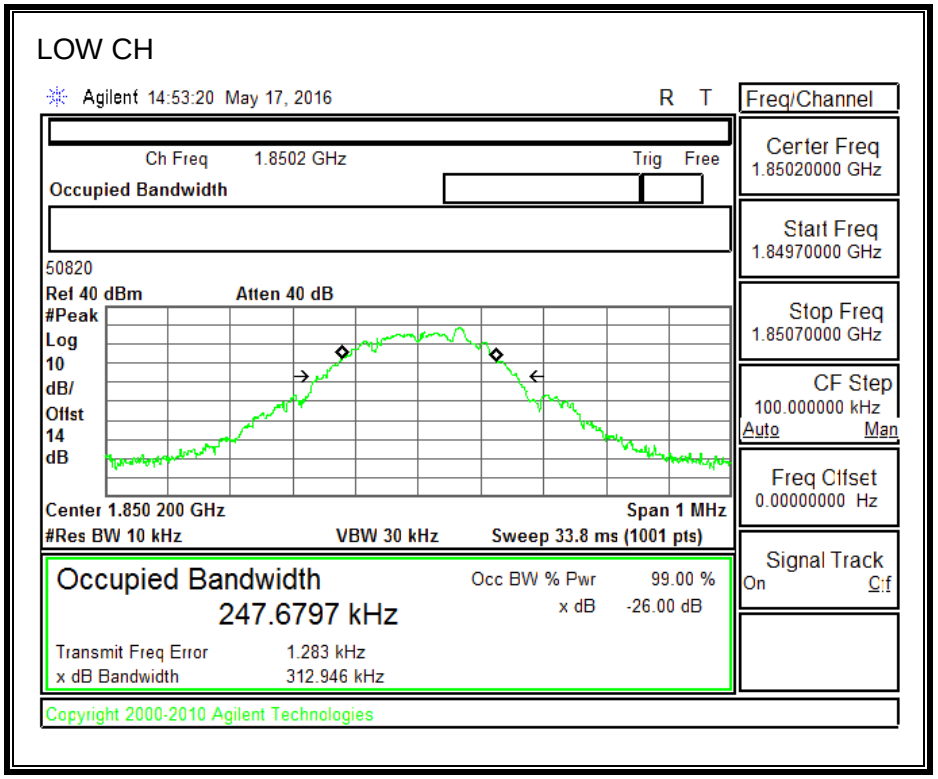


MID CH

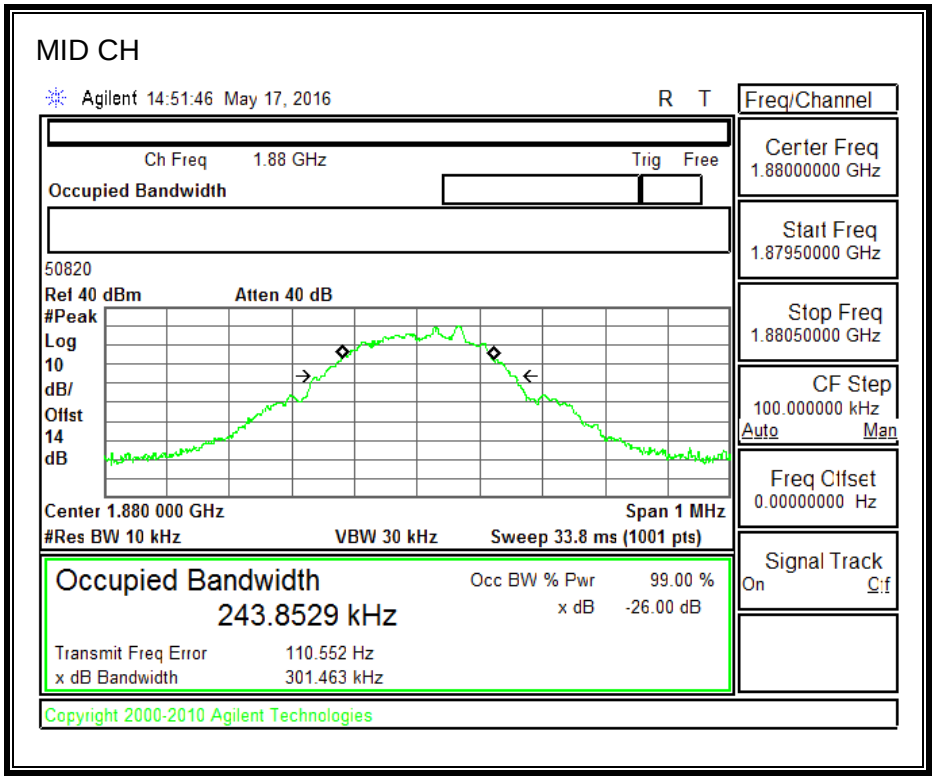




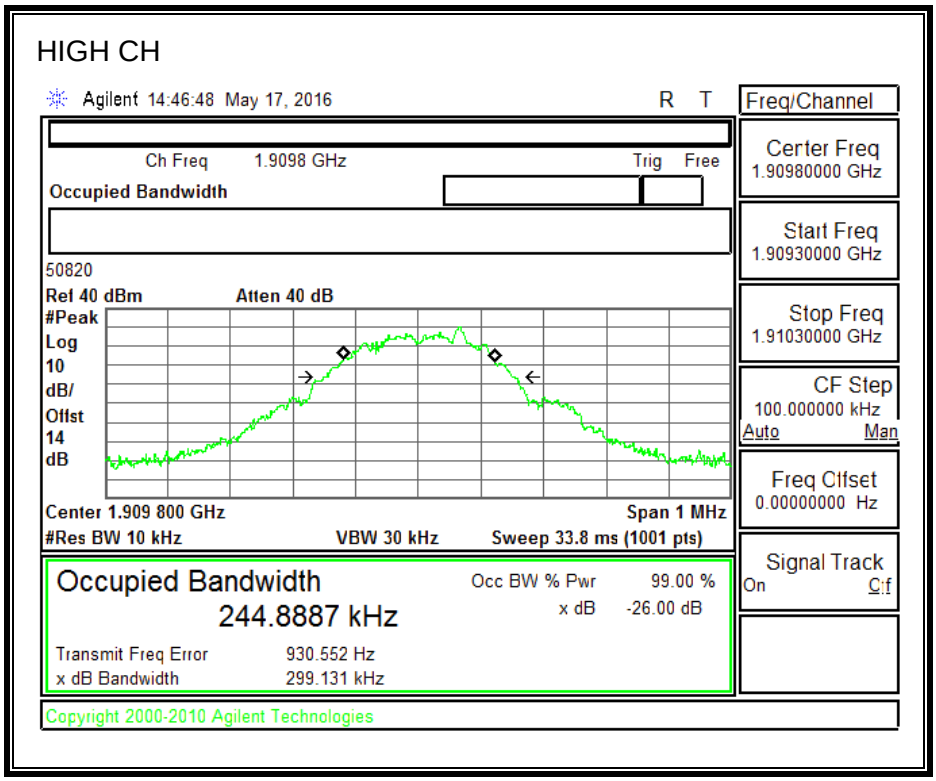
1900MHz BAND



MID CH



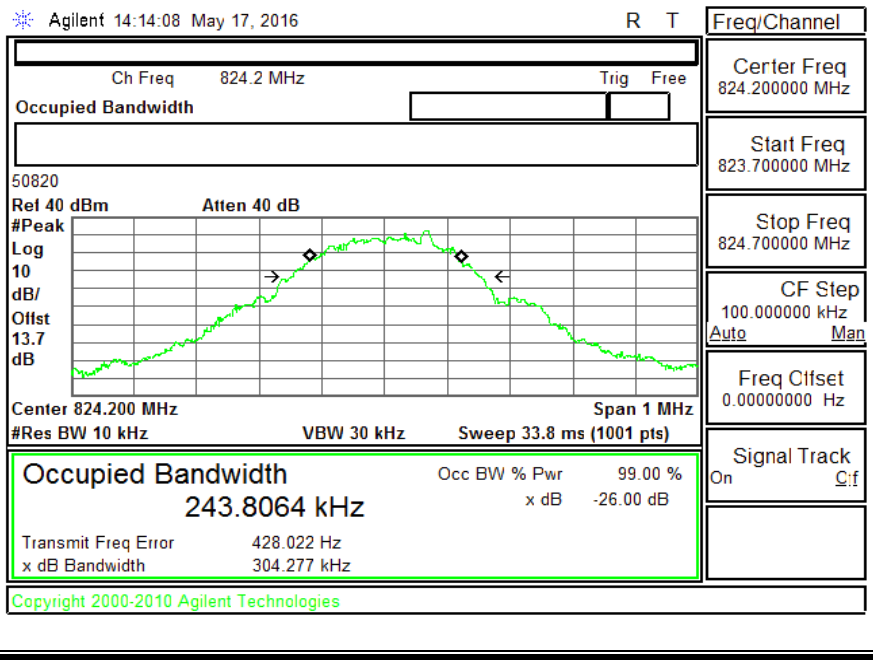
HIGH CH



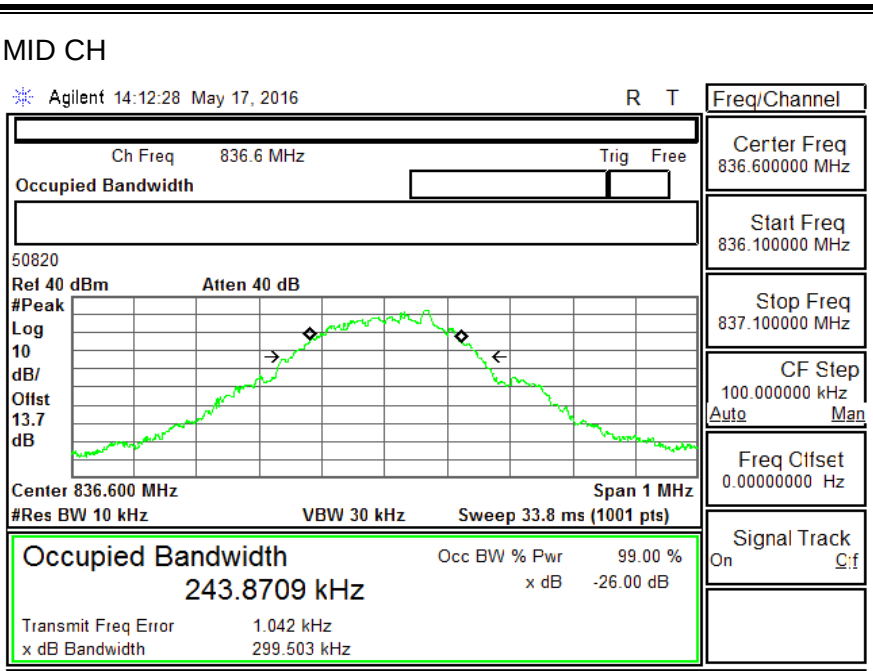
8.1.2. GSM EGPRS

850MHz BAND

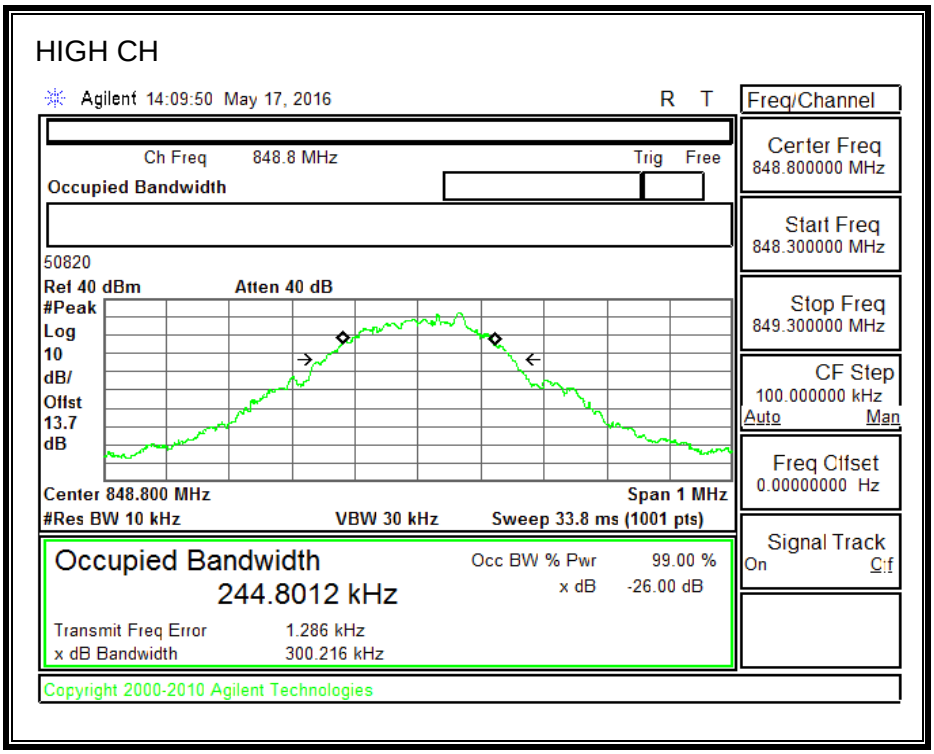
LOW CH



MID CH

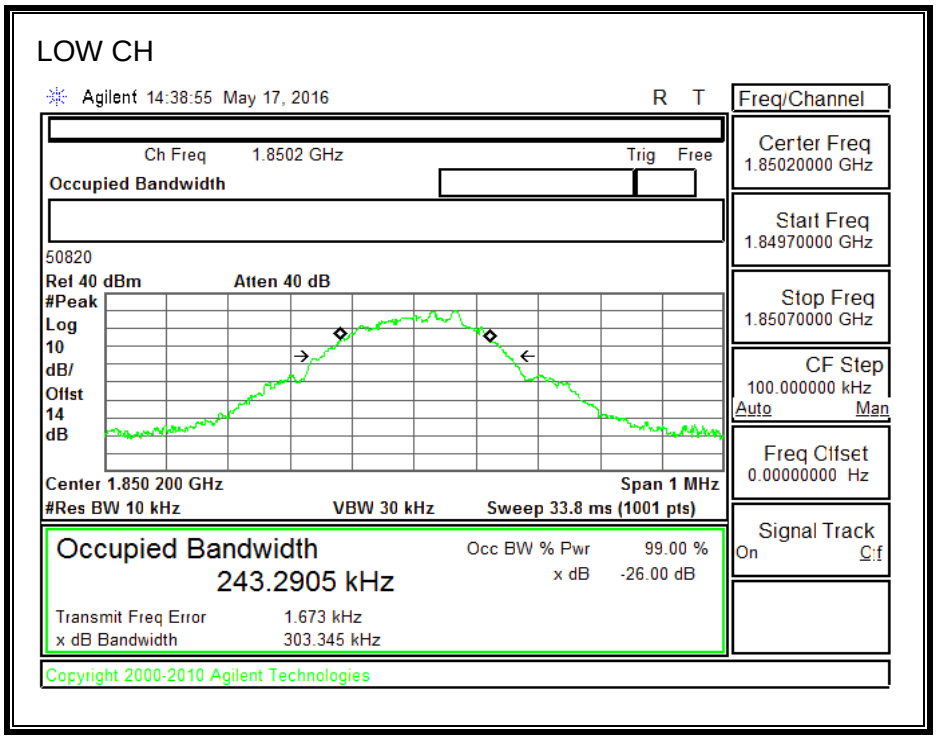


HIGH CH

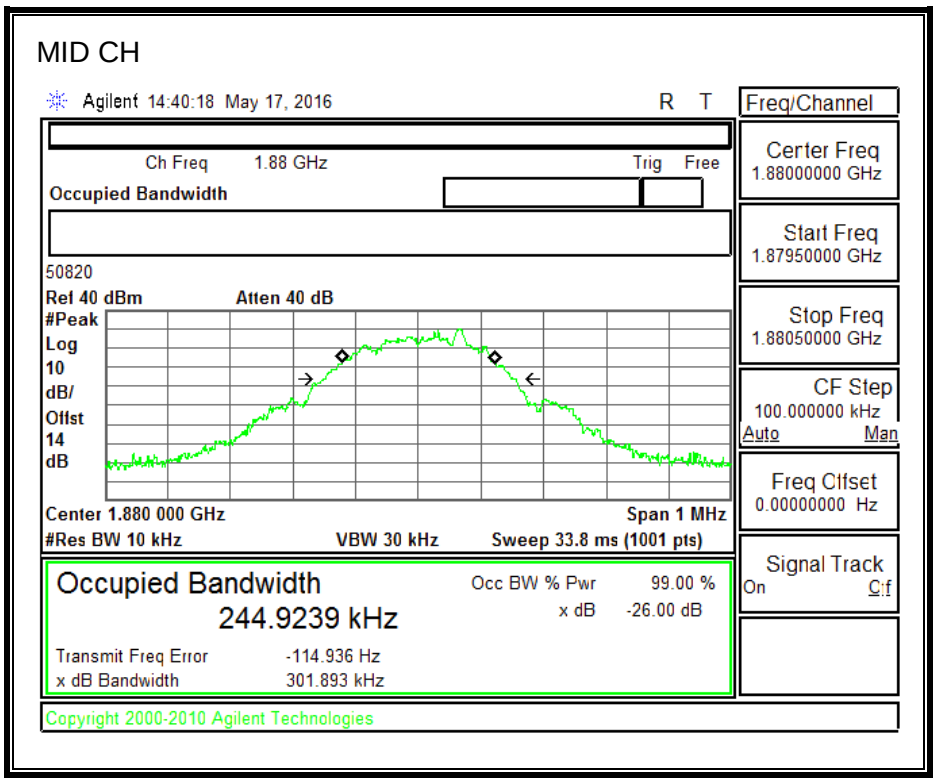


1900MHz BAND

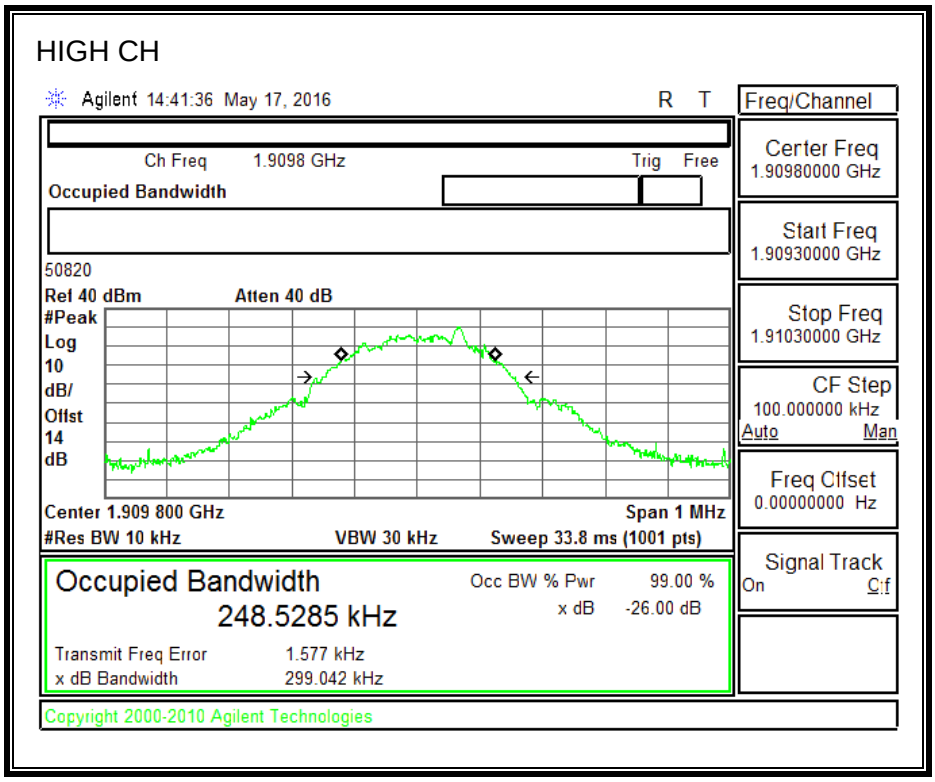
LOW CH



MID CH



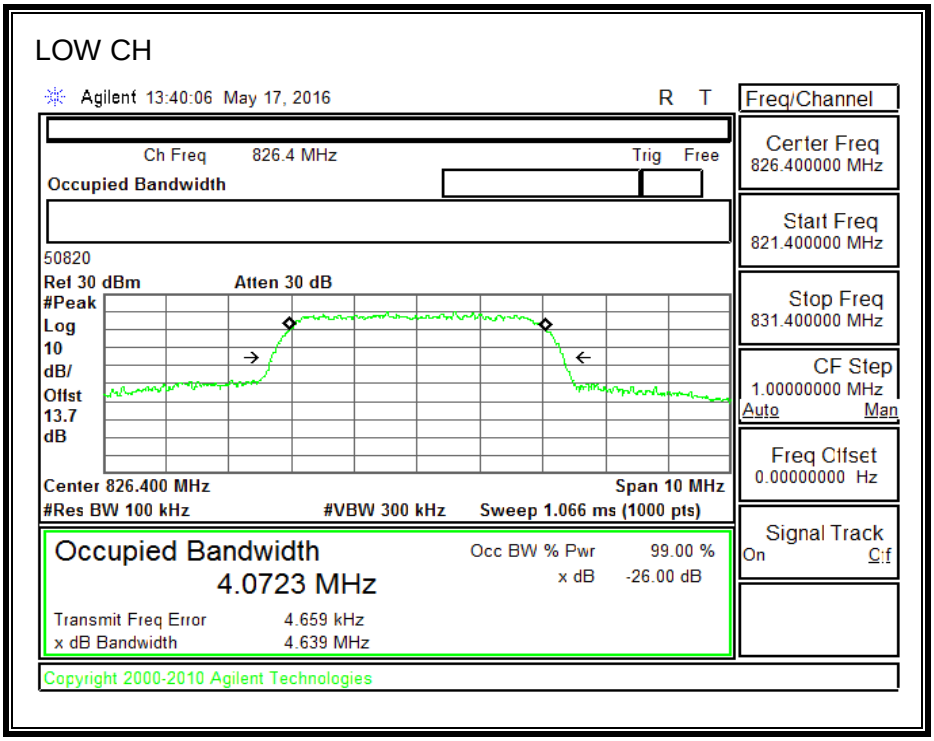
HIGH CH



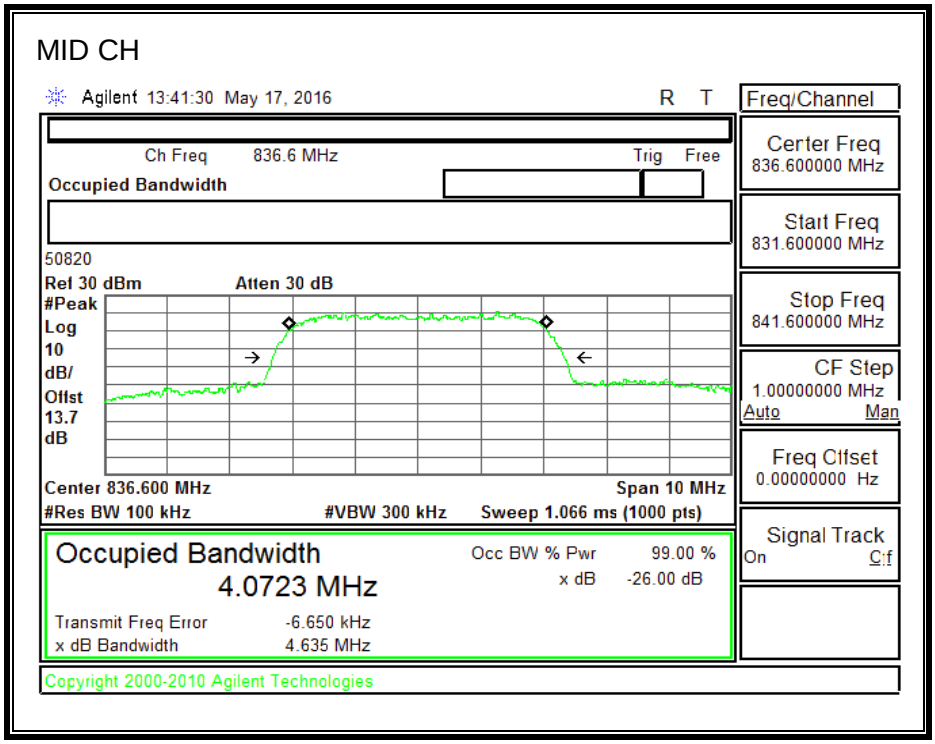
8.1.3. UMTS REL 99

850MHz BAND

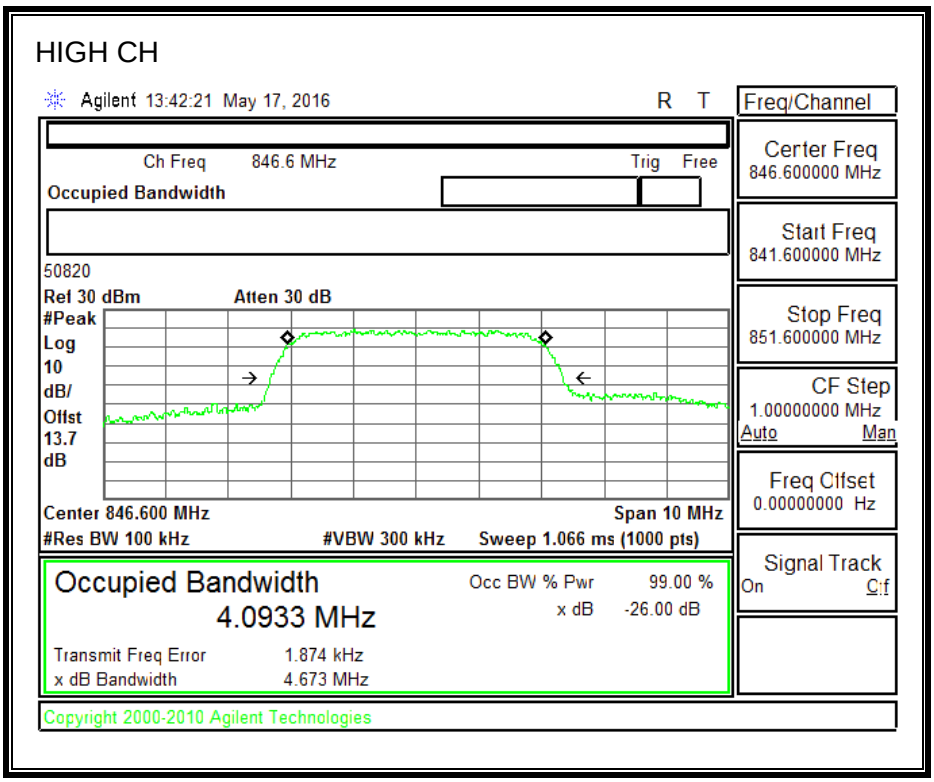
LOW CH



MID CH

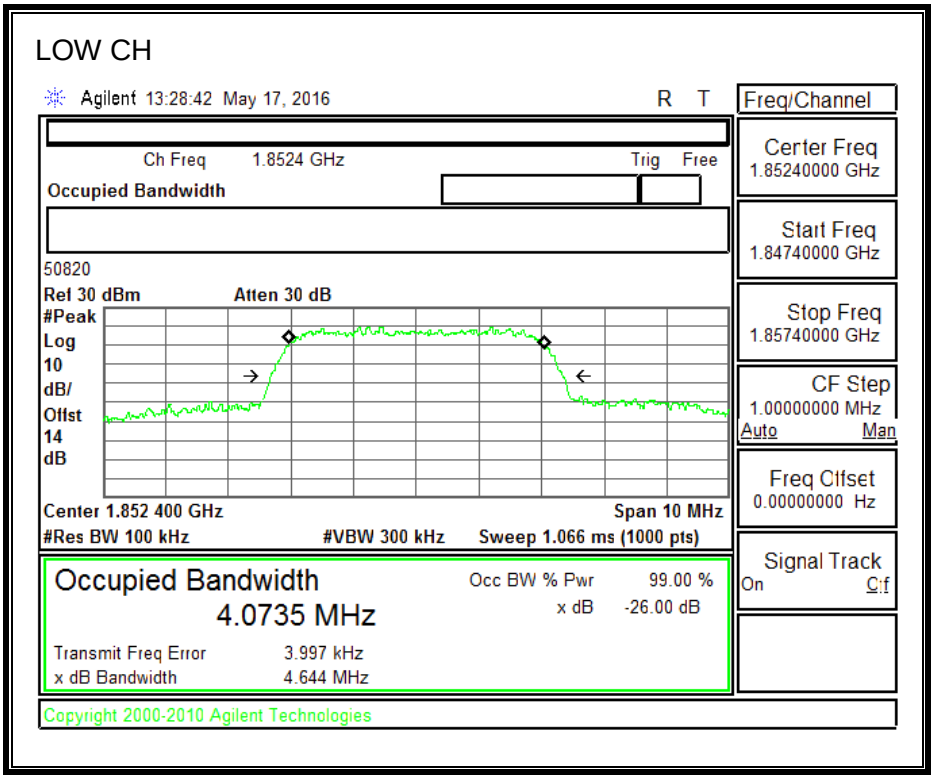


HIGH CH

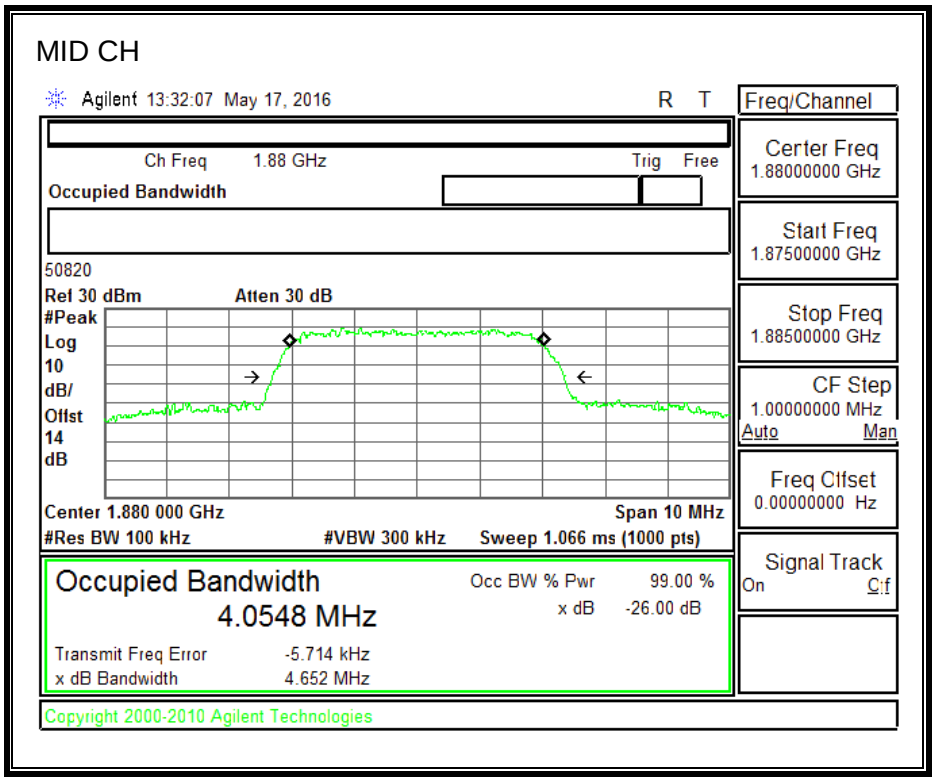


1900MHz BAND

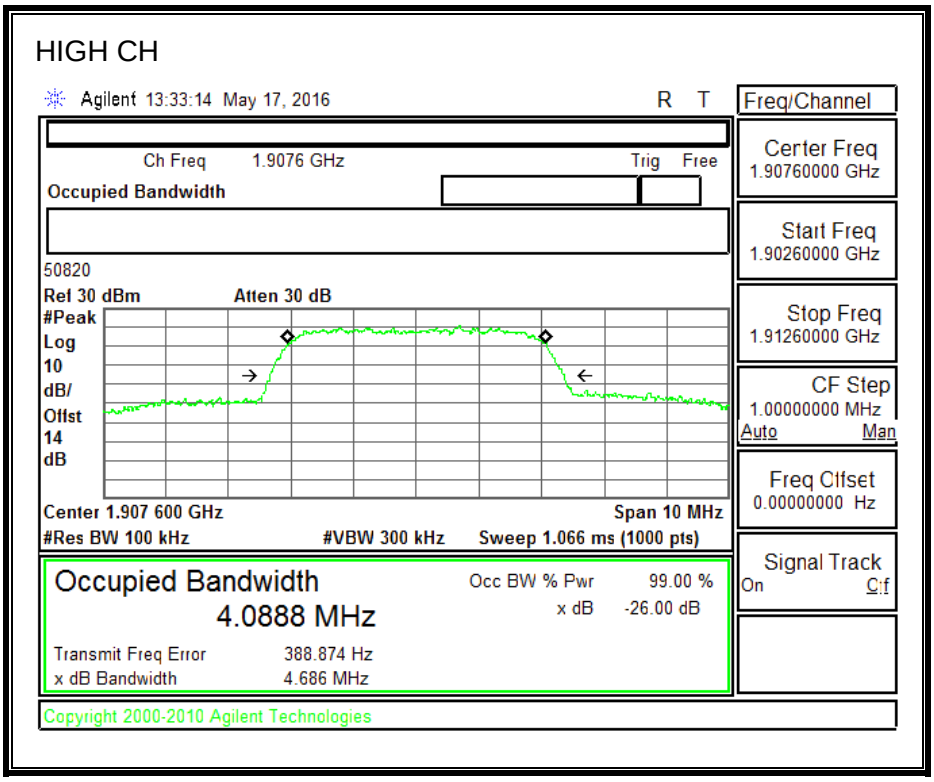
LOW CH



MID CH

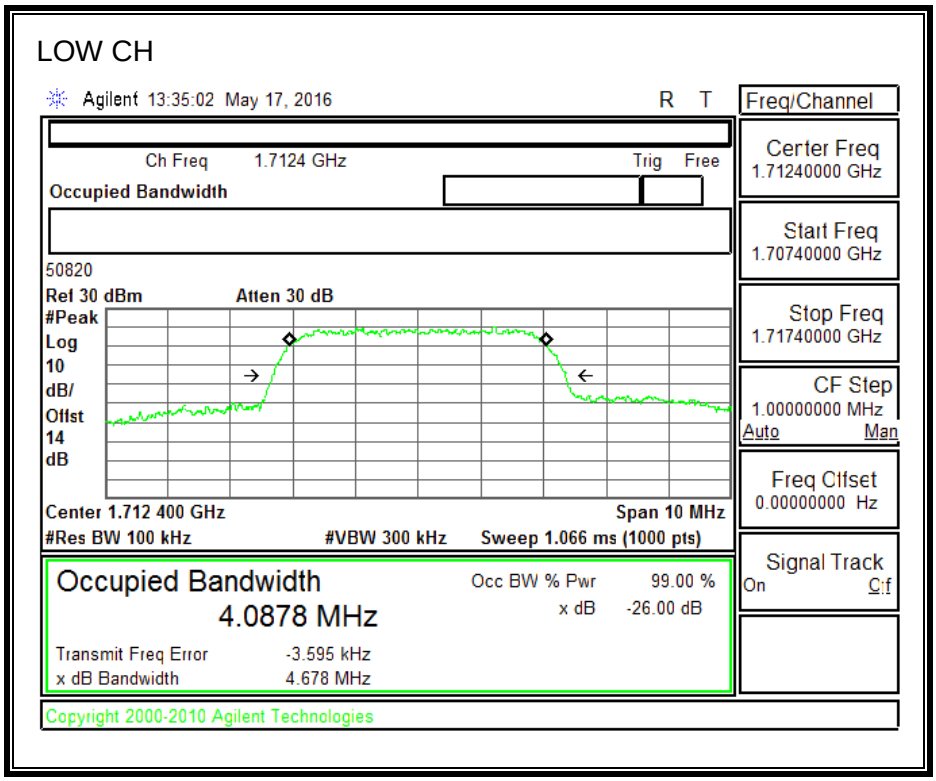


HIGH CH

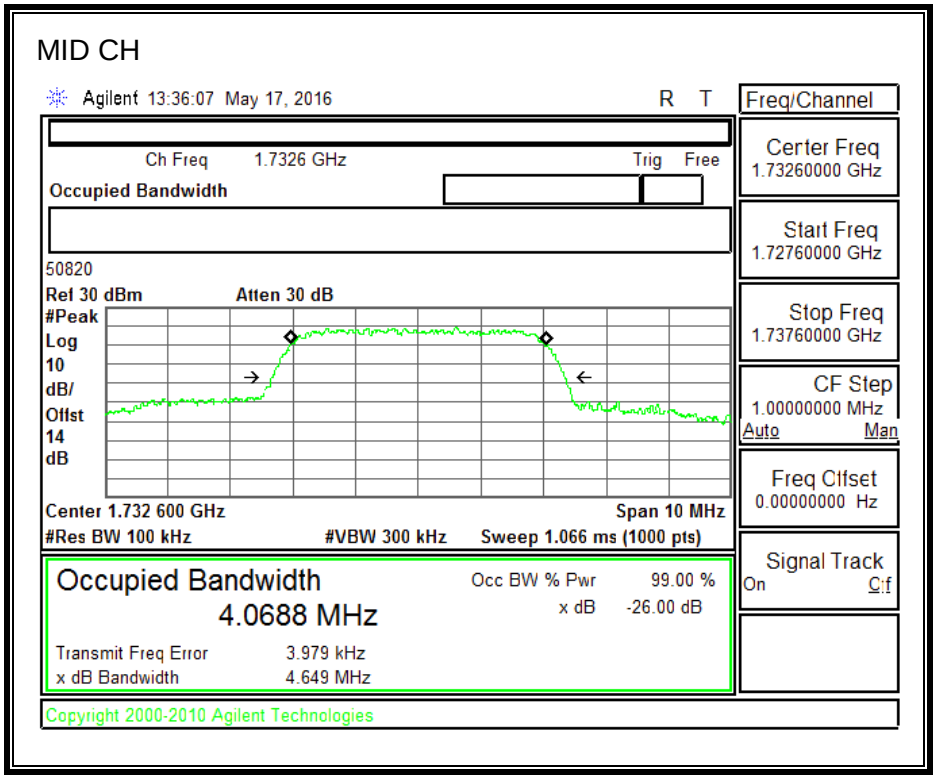


1700MHz BAND

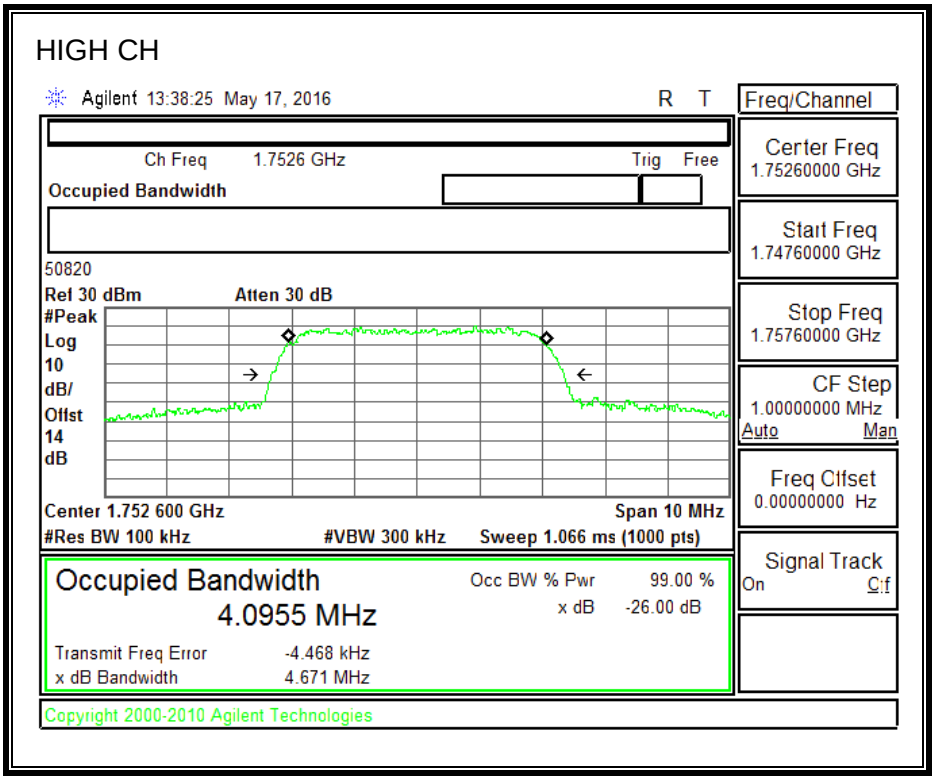
LOW CH



MID CH



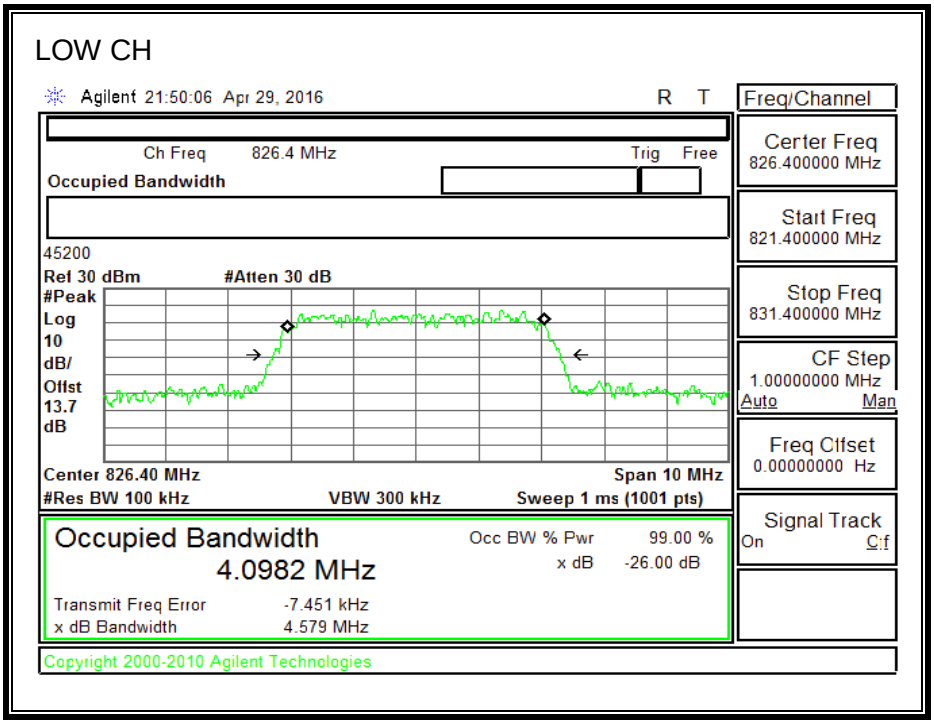
HIGH CH



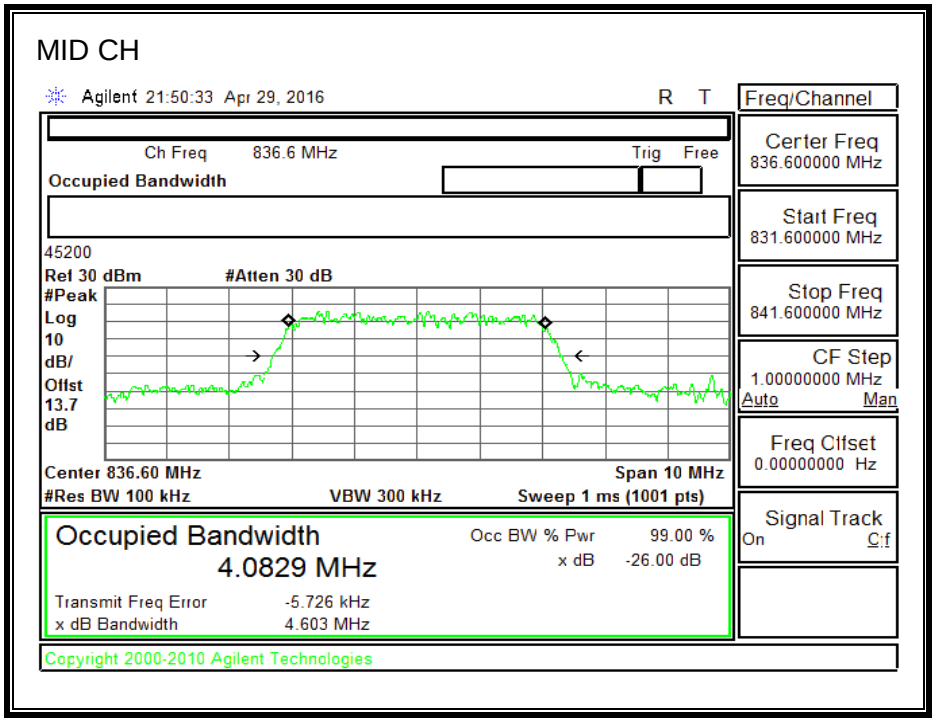
8.1.4. UMTS HSDPA

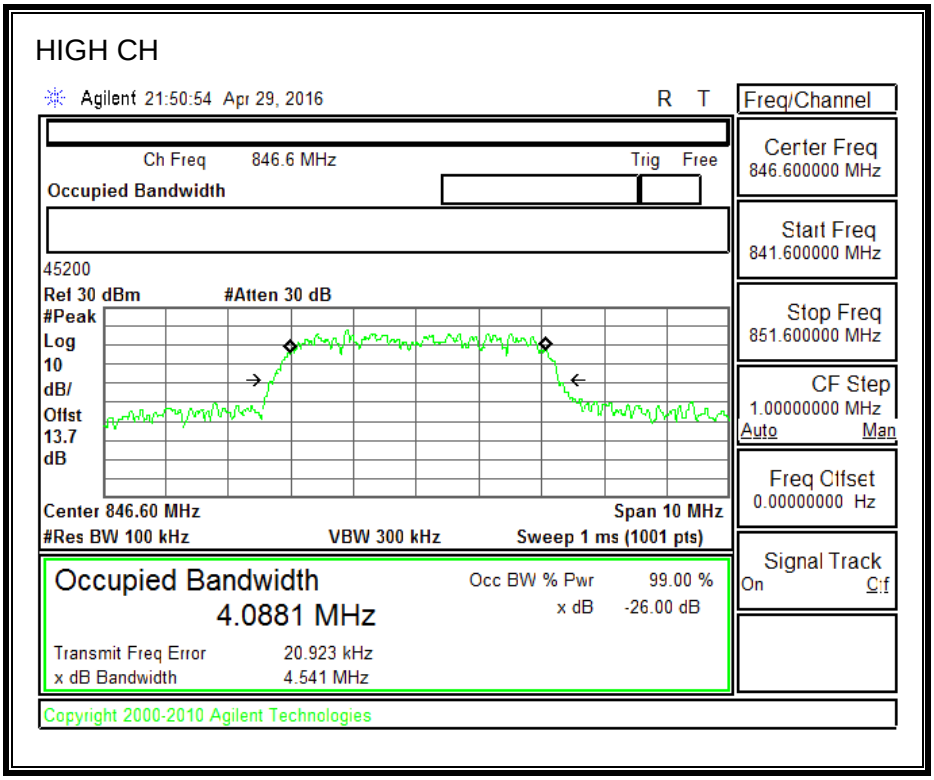
850MHz BAND

LOW CH



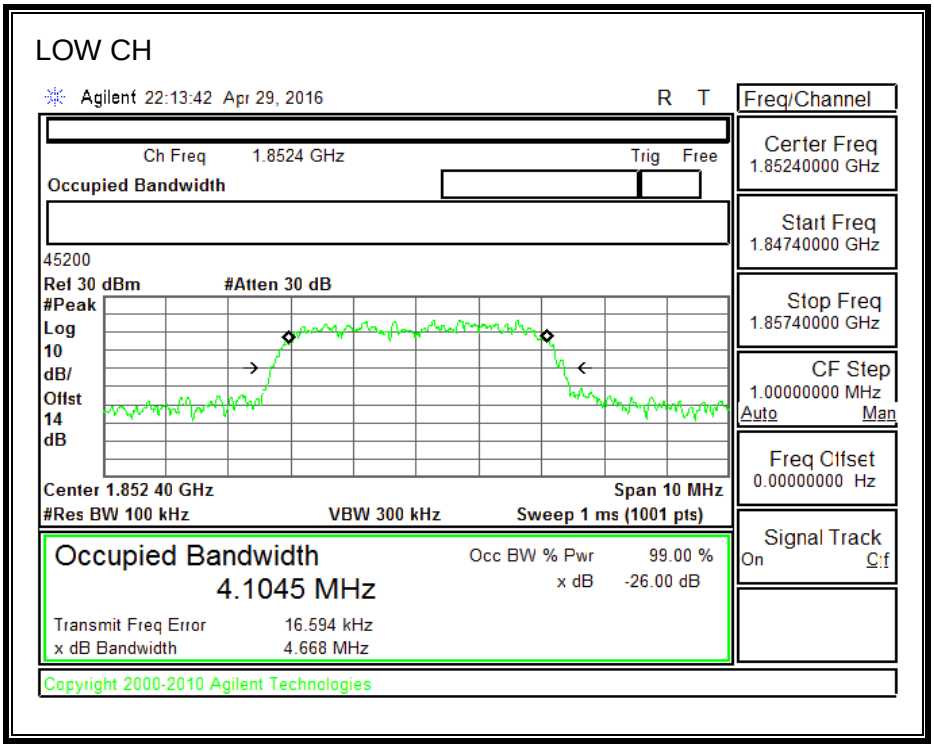
MID CH



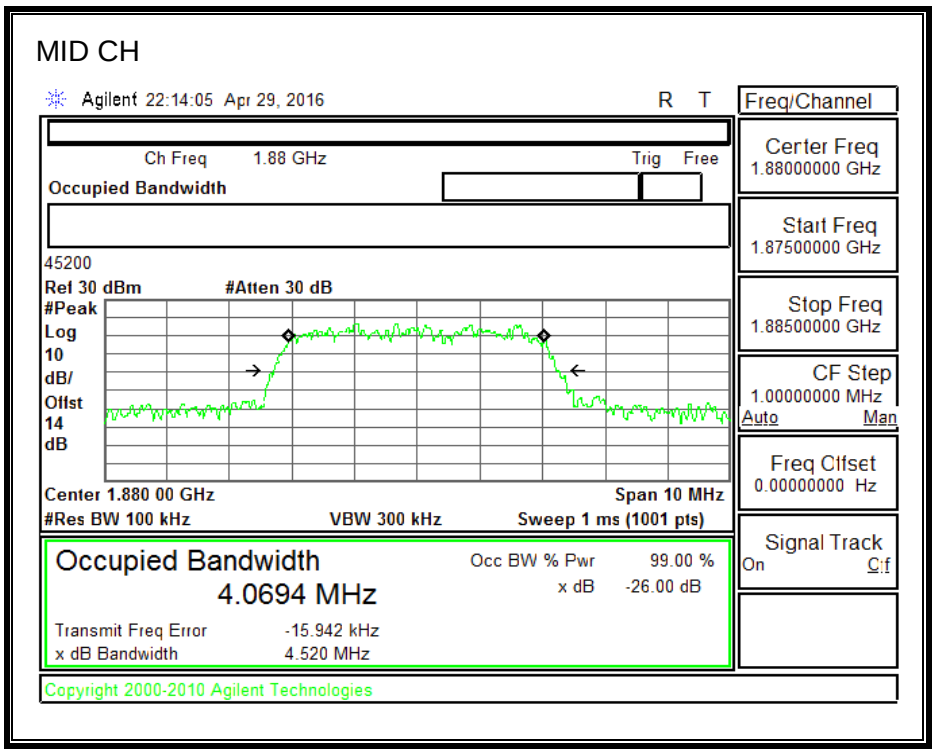


1900MHz BAND

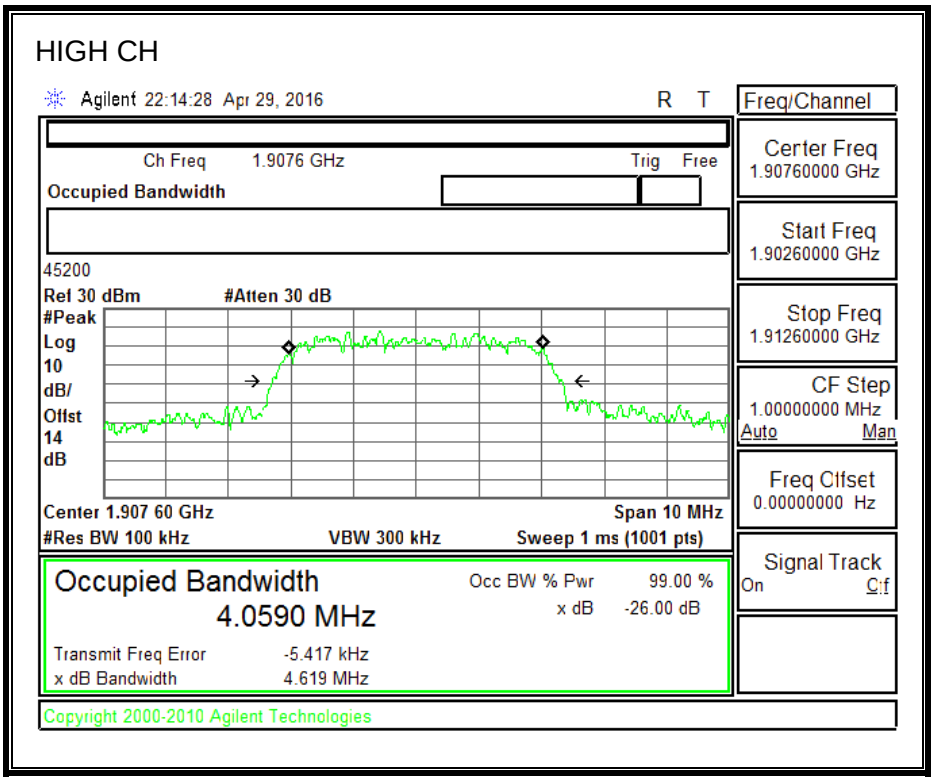
LOW CH



MID CH

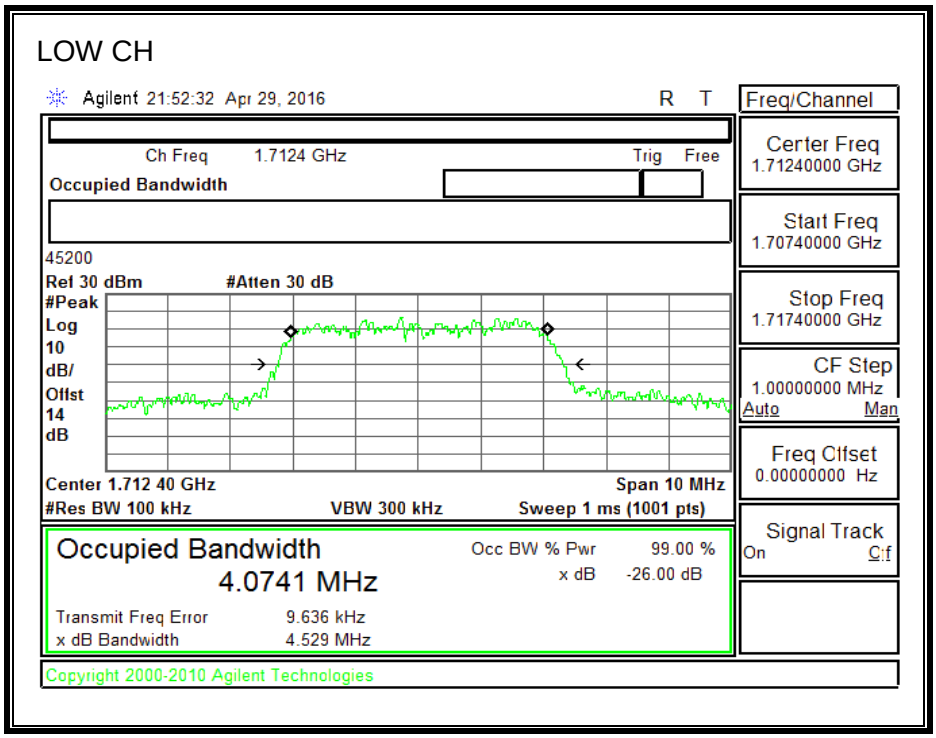


HIGH CH

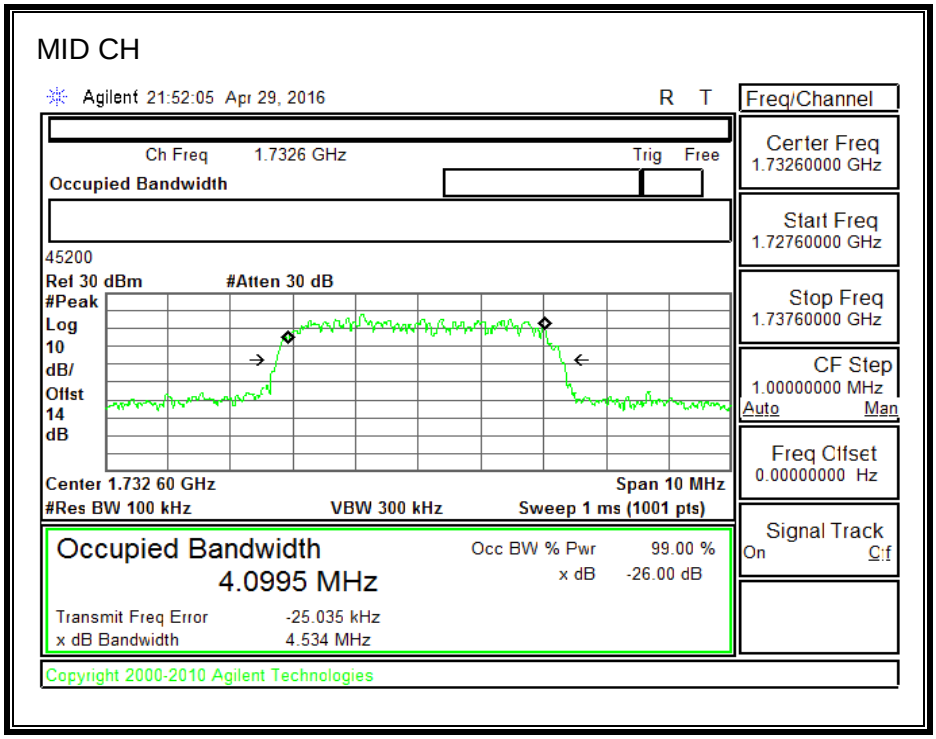


1700MHz BAND

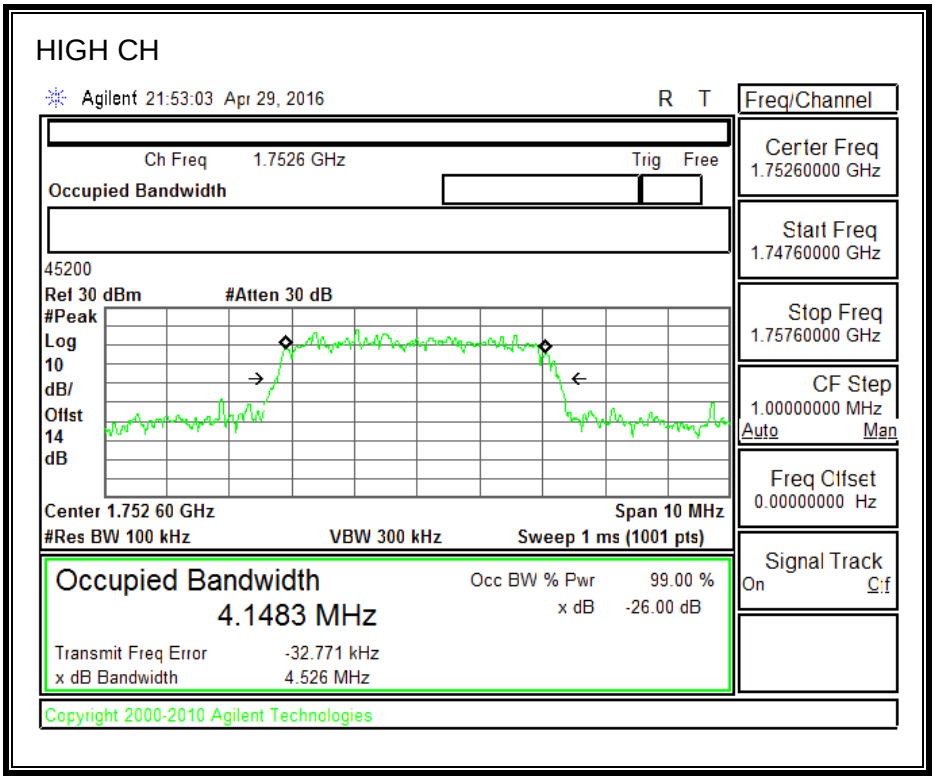
LOW CH



MID CH



HIGH CH



8.2. BAND EDGE

RULE PART(S)

FCC: §22.359, 24.238 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:

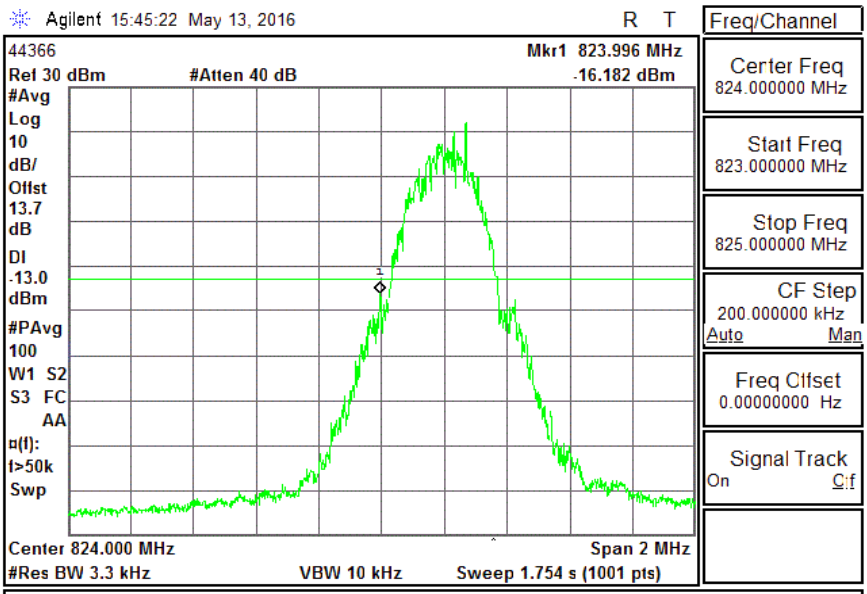
- Set the spectrum analyzer span to include the block edge frequency (824, 849, 1850, 1910MHz)
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

RESULTS

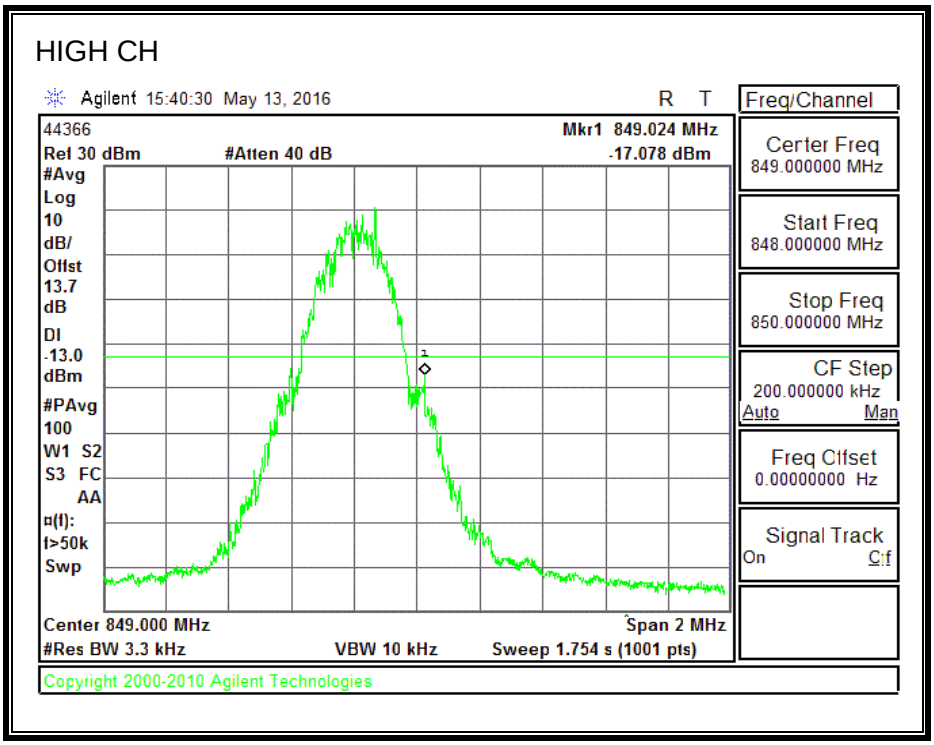
8.2.1. GSM-GPRS

850MHz BAND

LOW CH

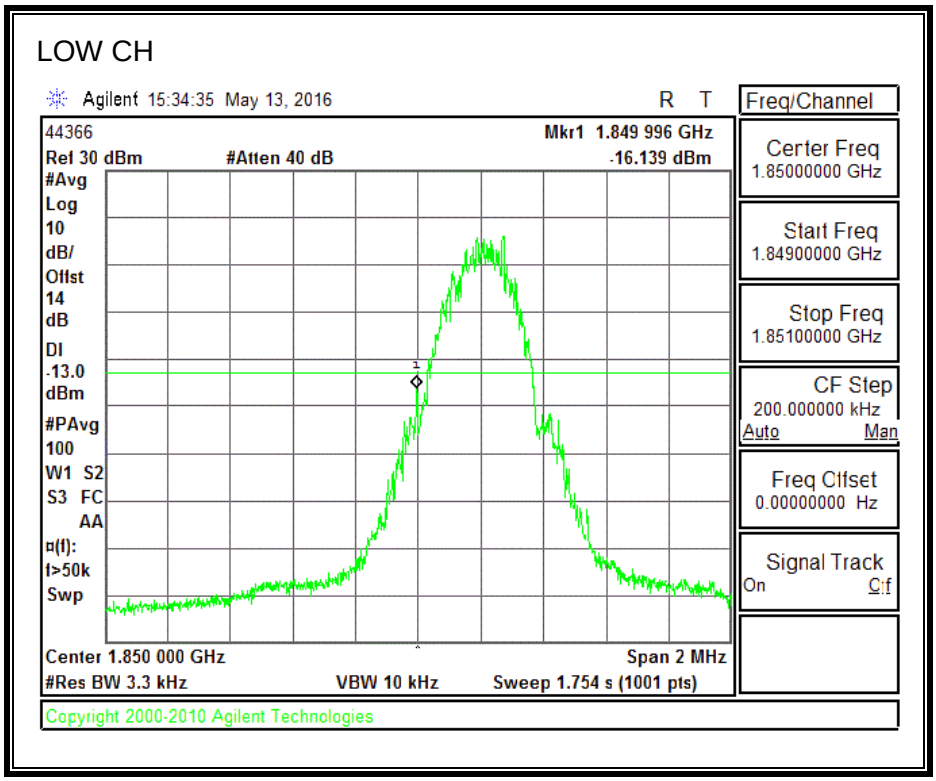


HIGH CH

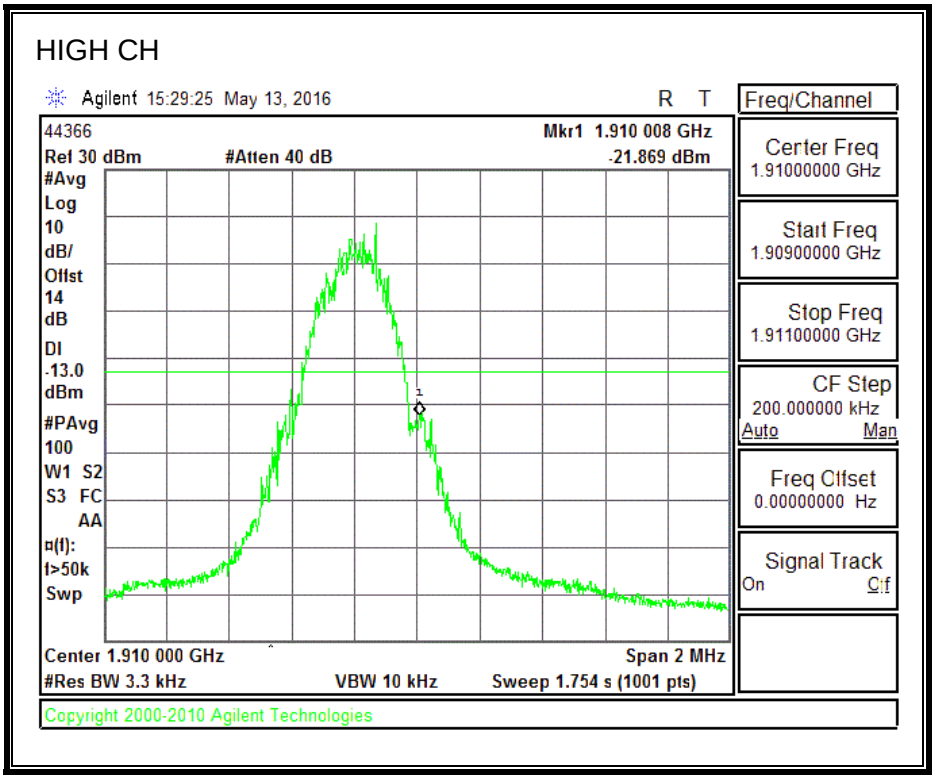


1900MHz BAND

LOW CH



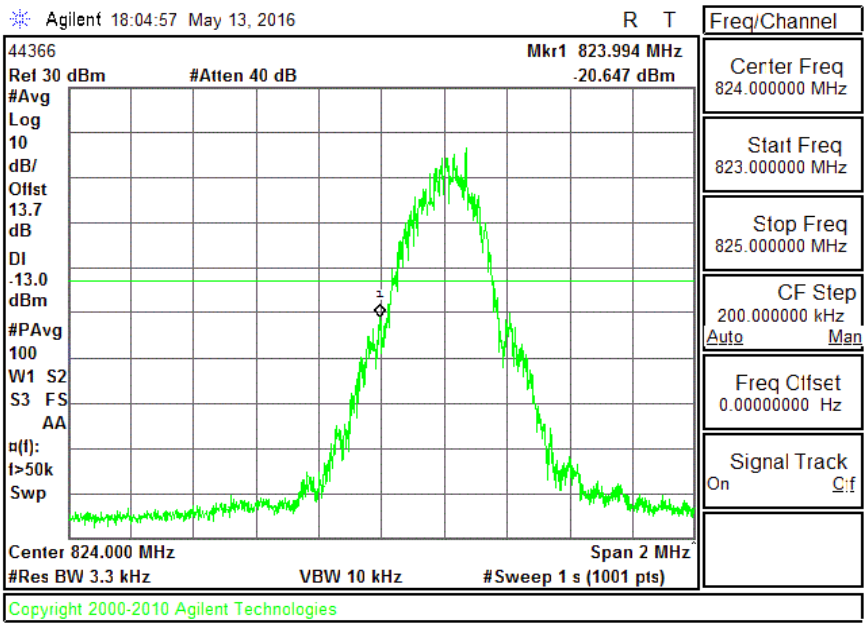
HIGH CH



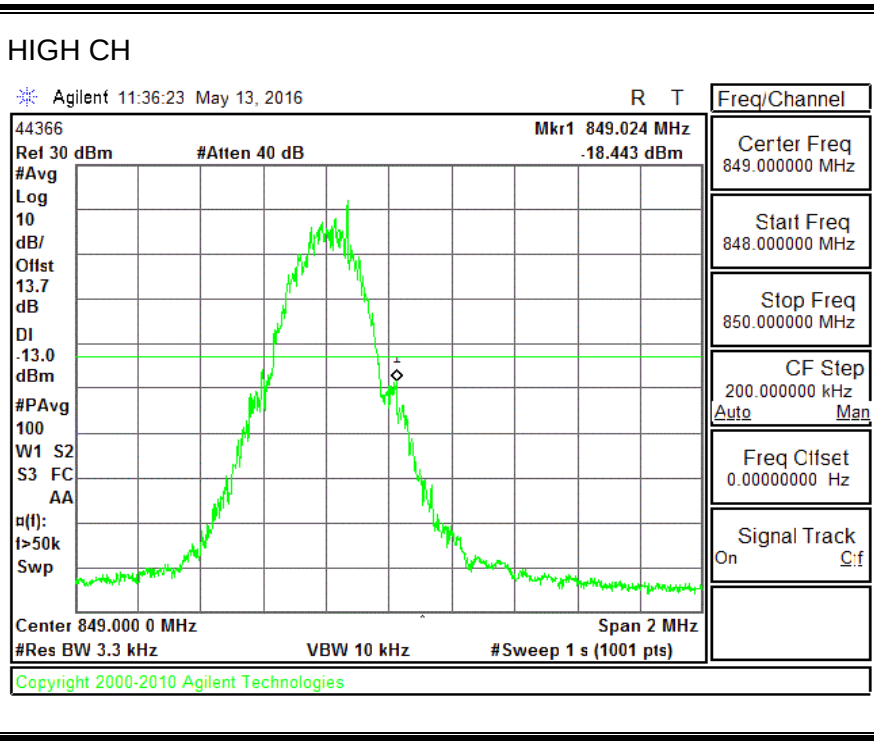
8.2.2. GSM-EGPRS

850MHz BAND

LOW CH

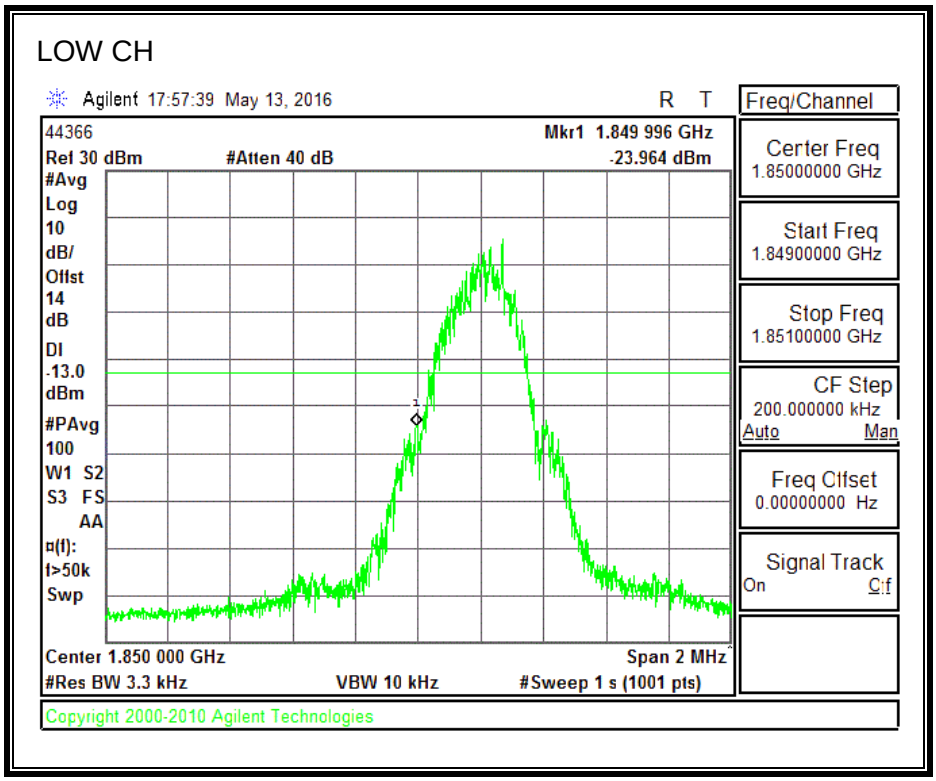


HIGH CH

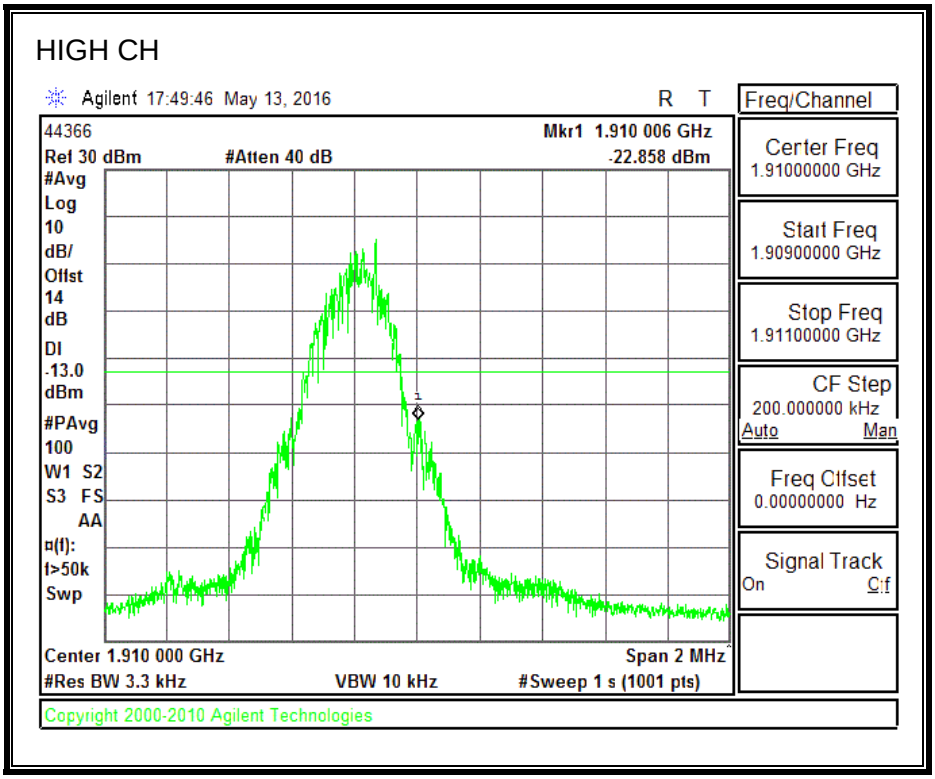


1900MHz BAND

LOW CH



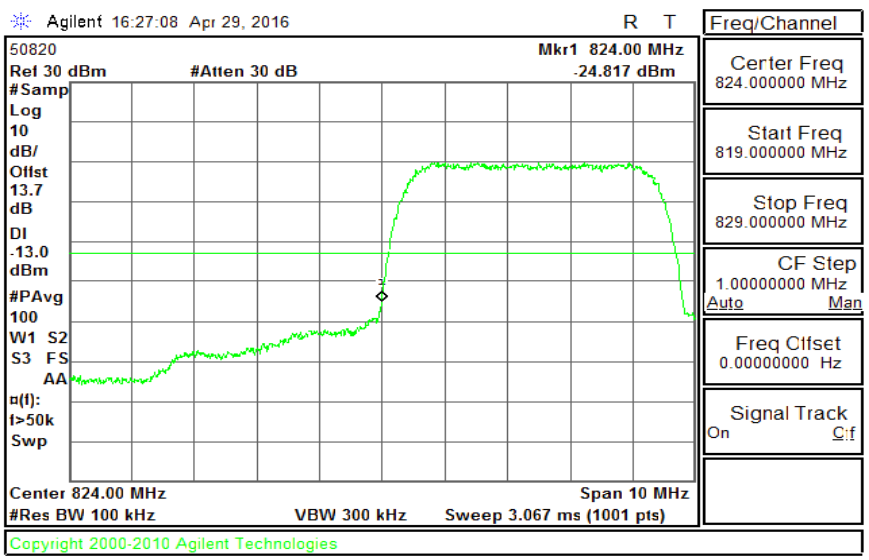
HIGH CH



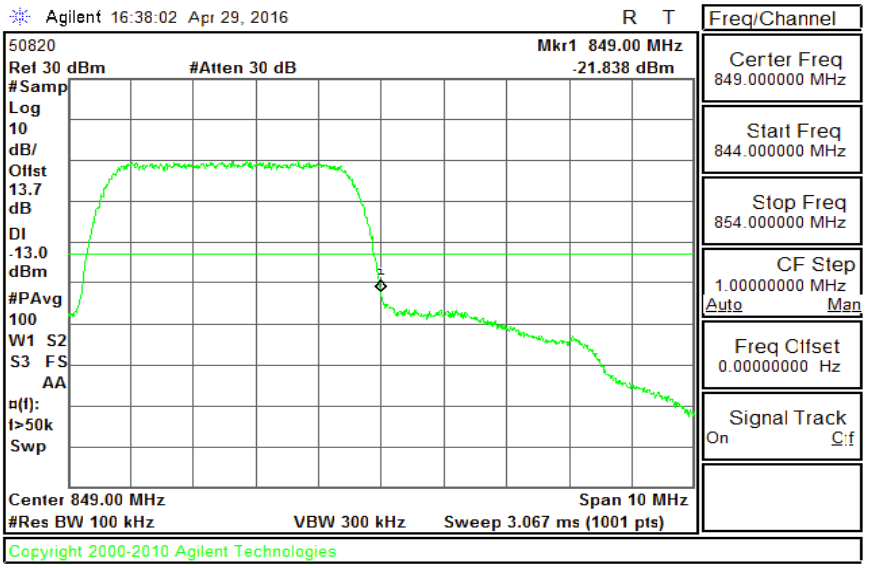
8.2.3. UMTS REL 99

850MHz BAND

LOW CH

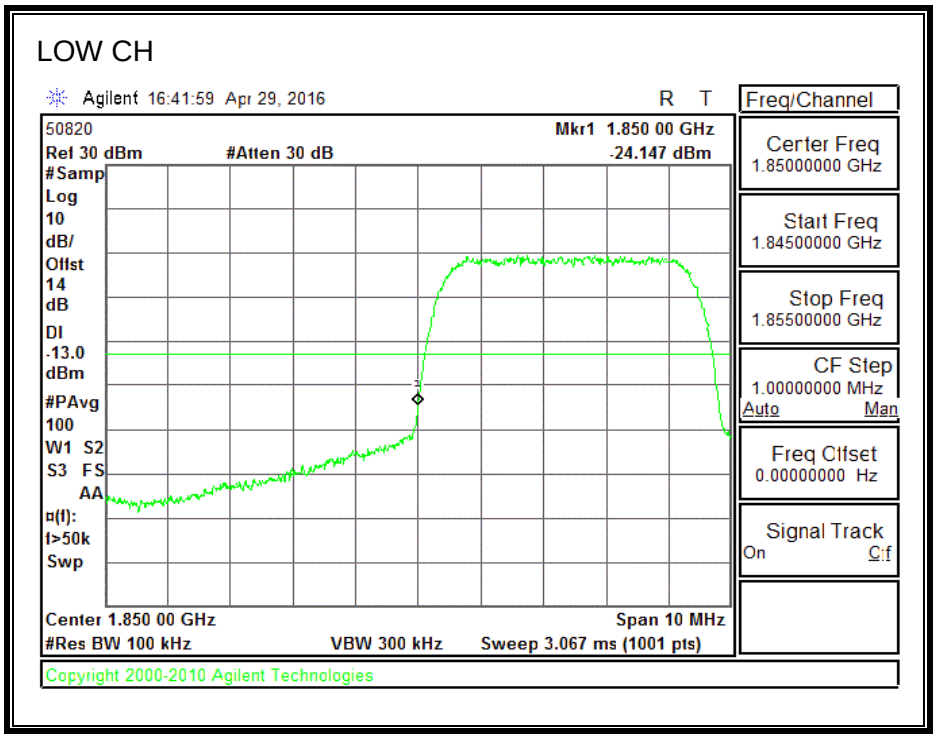


HIGH CH

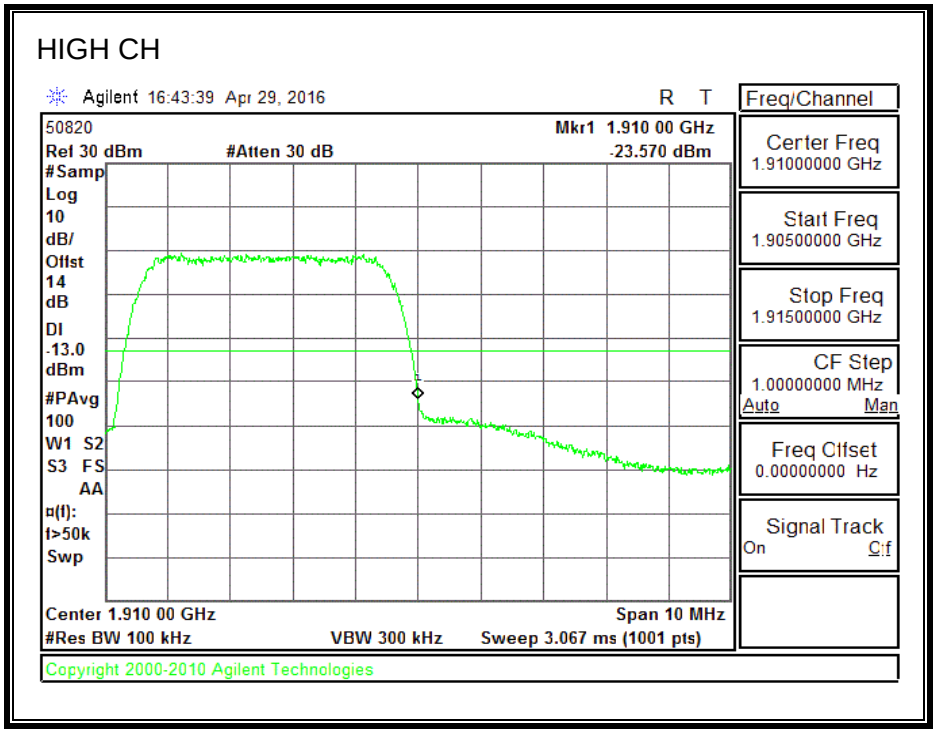


1900MHz BAND

LOW CH

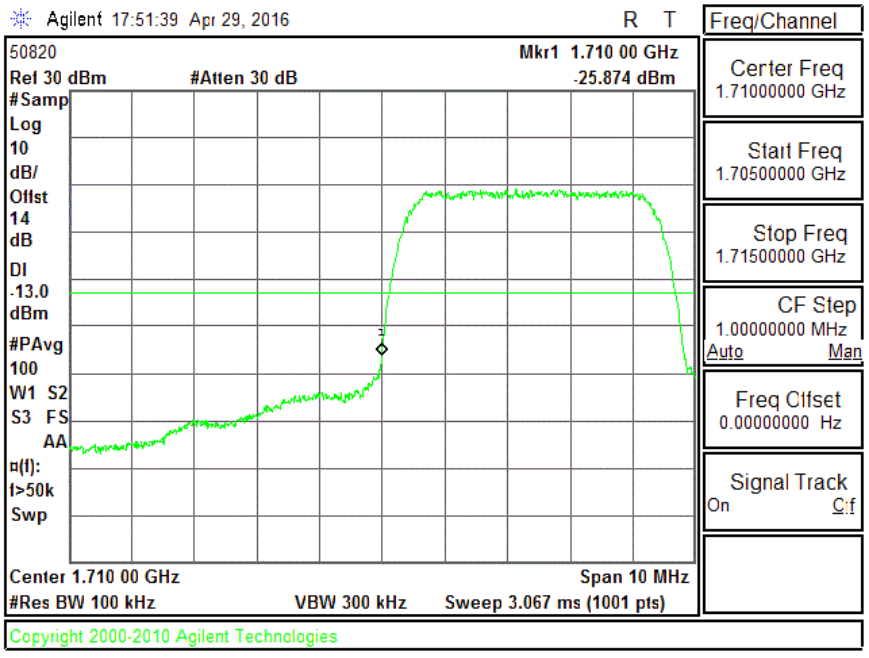


HIGH CH

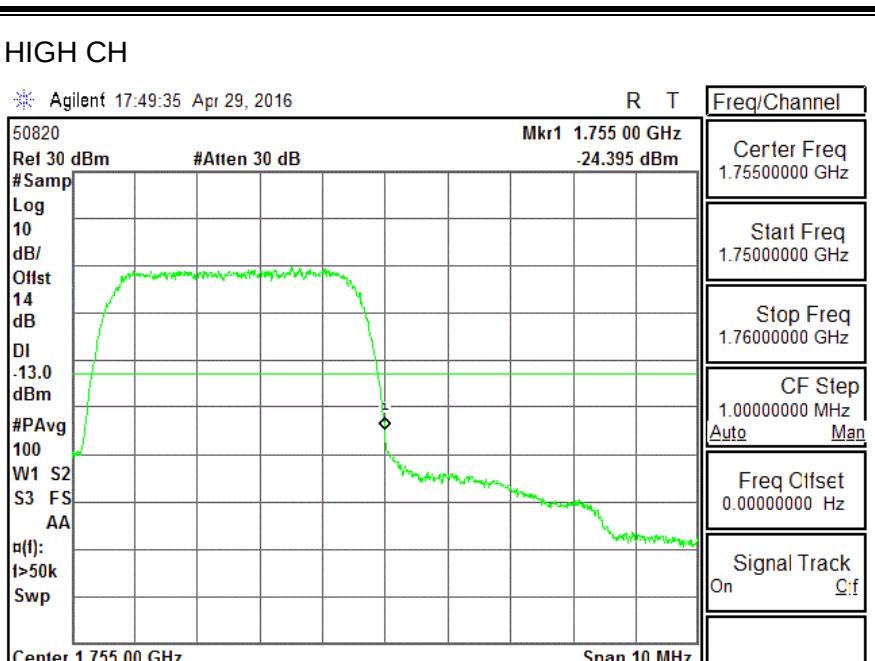


1700MHz BAND

LOW CH



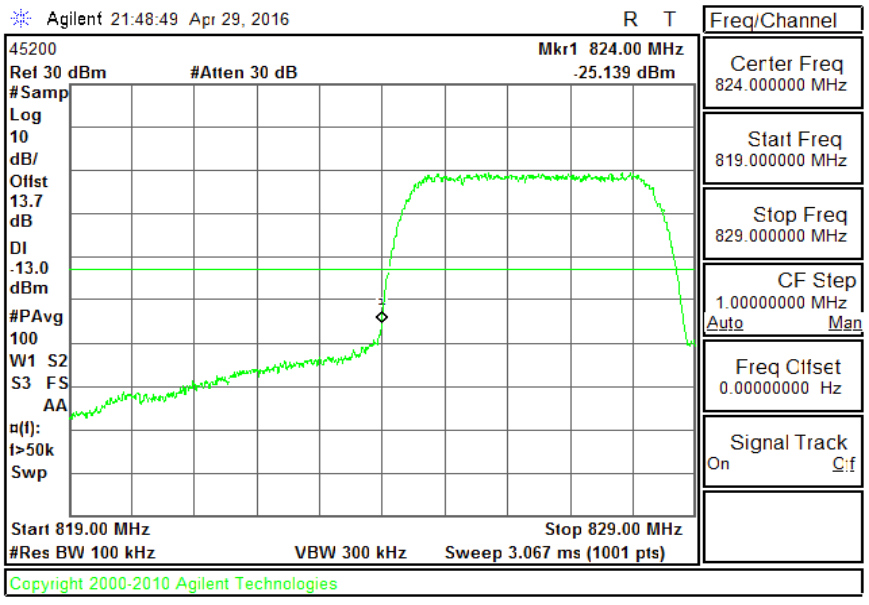
HIGH CH



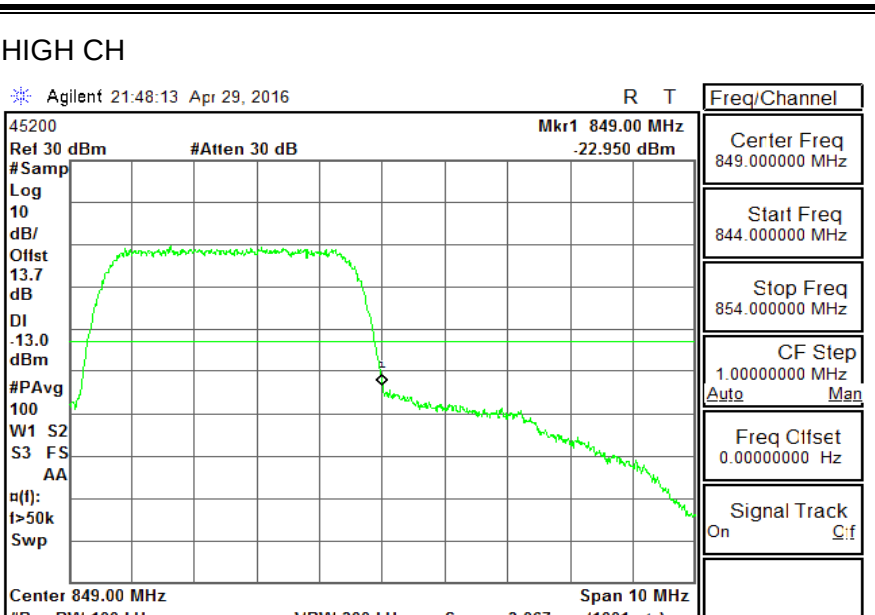
8.2.4. UMTS HSDPA

850MHz BAND

LOW CH

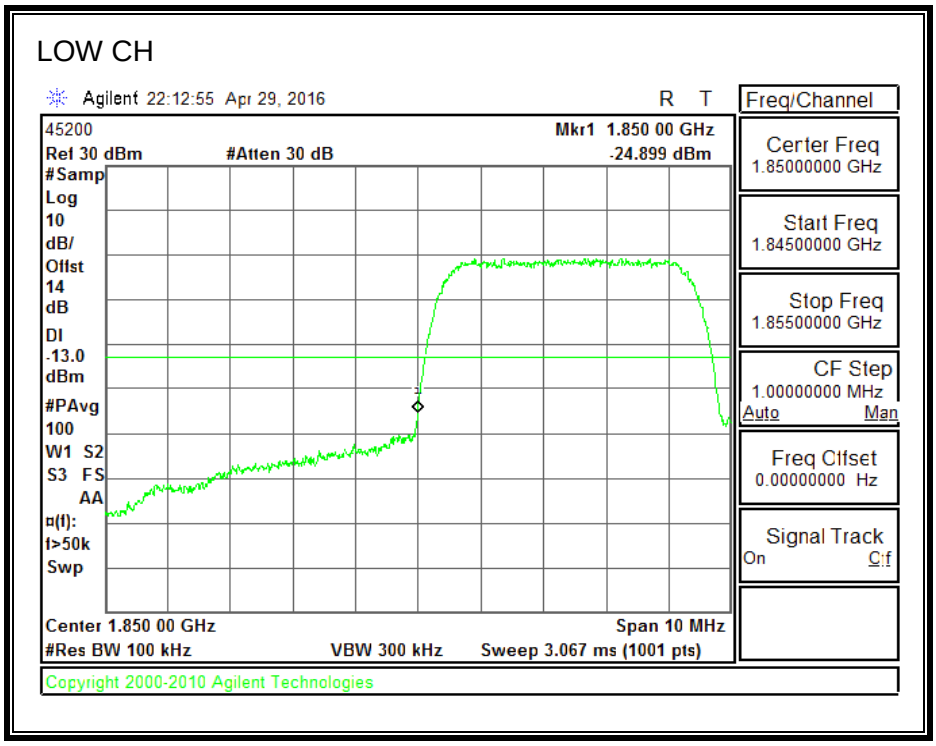


HIGH CH

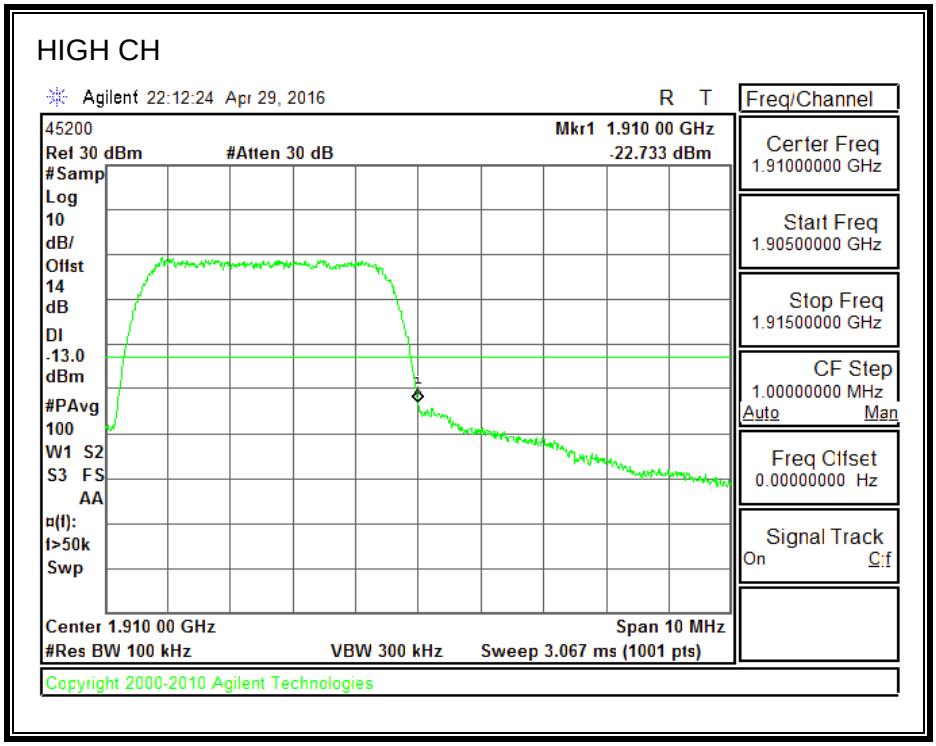


1900MHz BAND

LOW CH

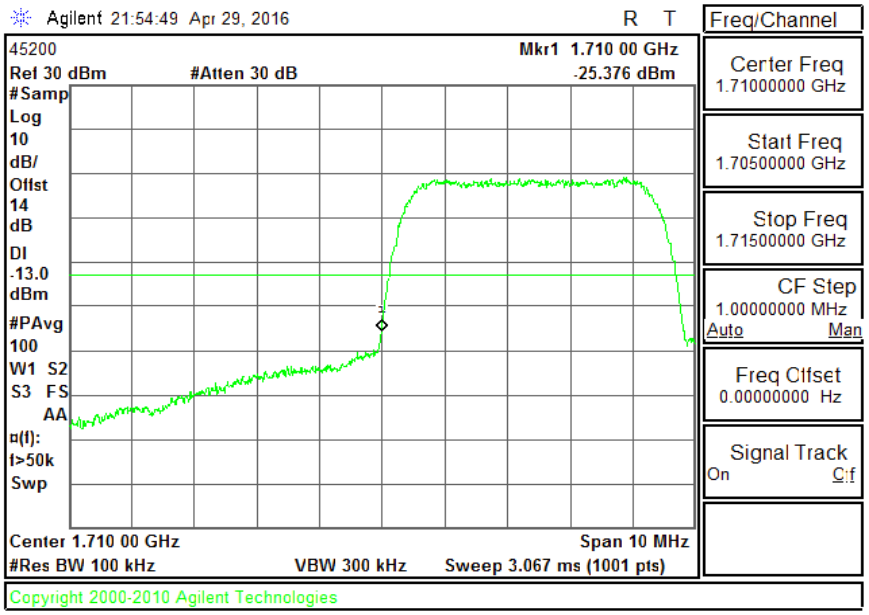


HIGH CH

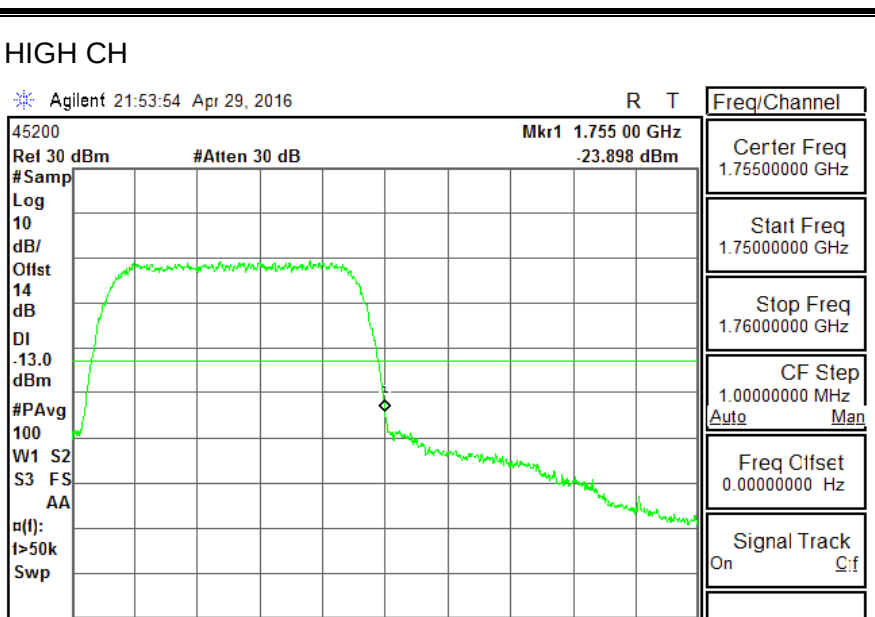


1700MHz BAND

LOW CH



HIGH CH



8.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917 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:

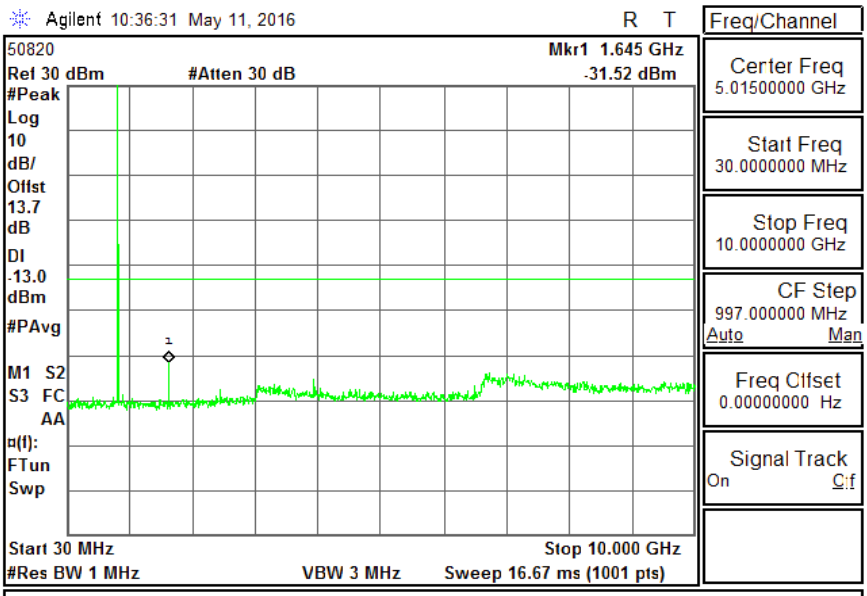
- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

RESULTS

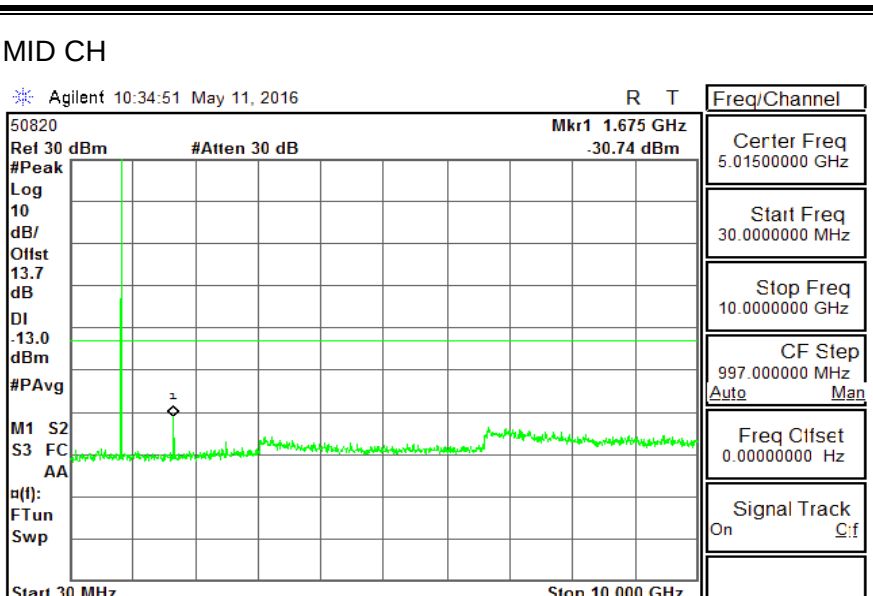
8.3.1. GSM-GPRS

850MHz BAND

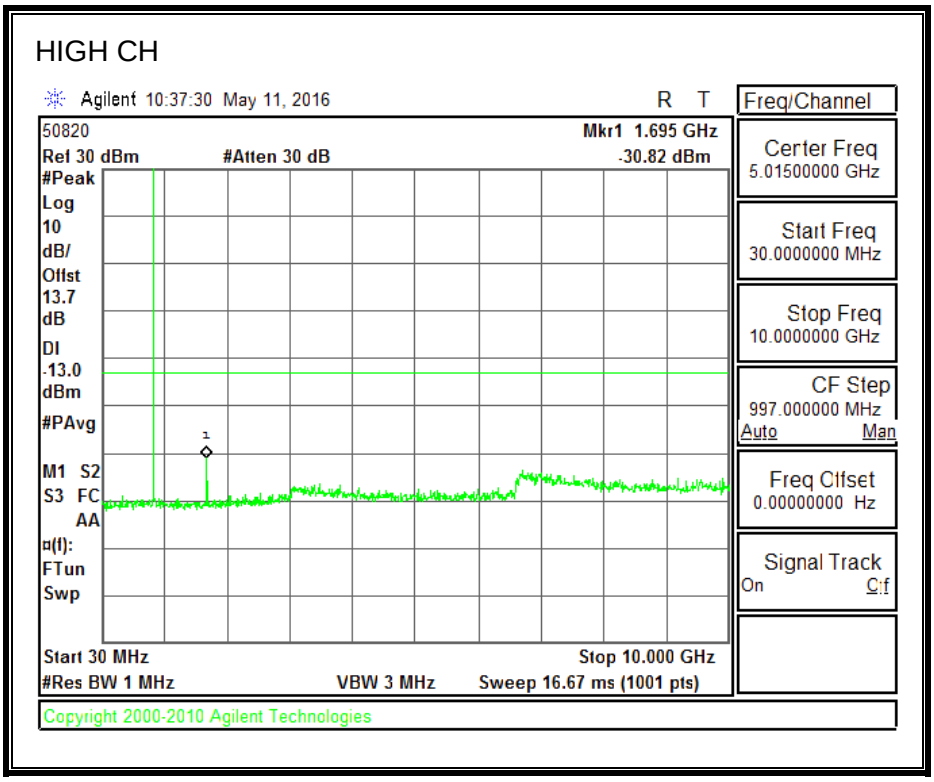
LOW CH



MID CH

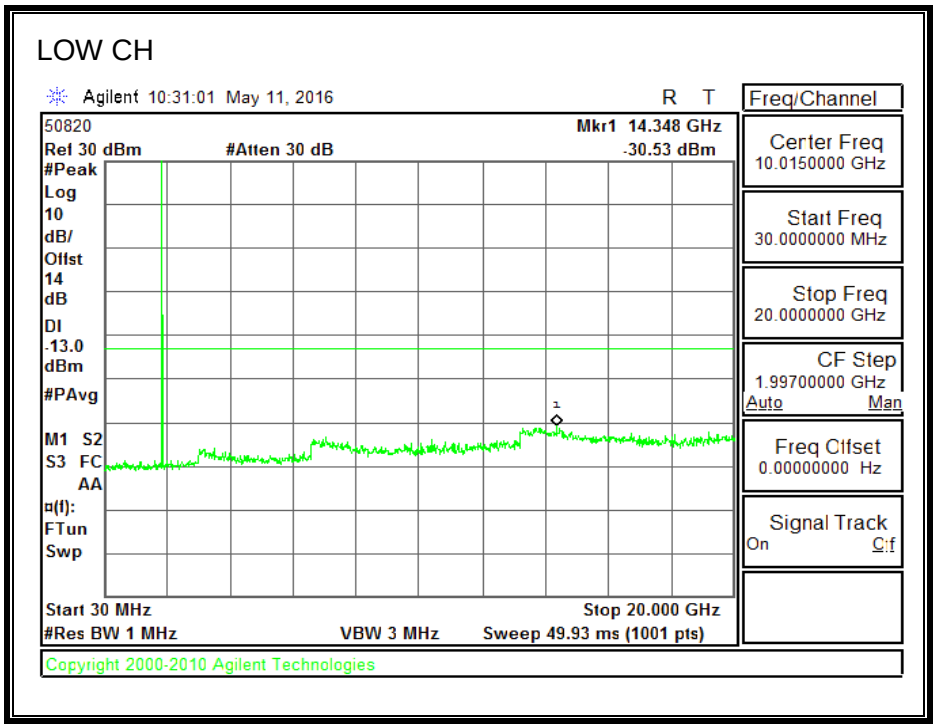


HIGH CH



1900MHz BAND

LOW CH



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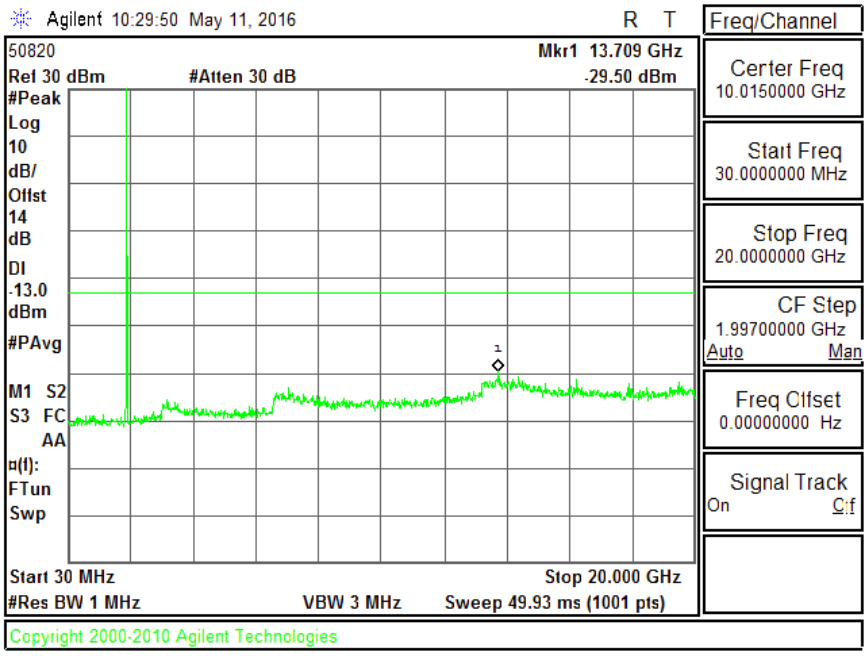
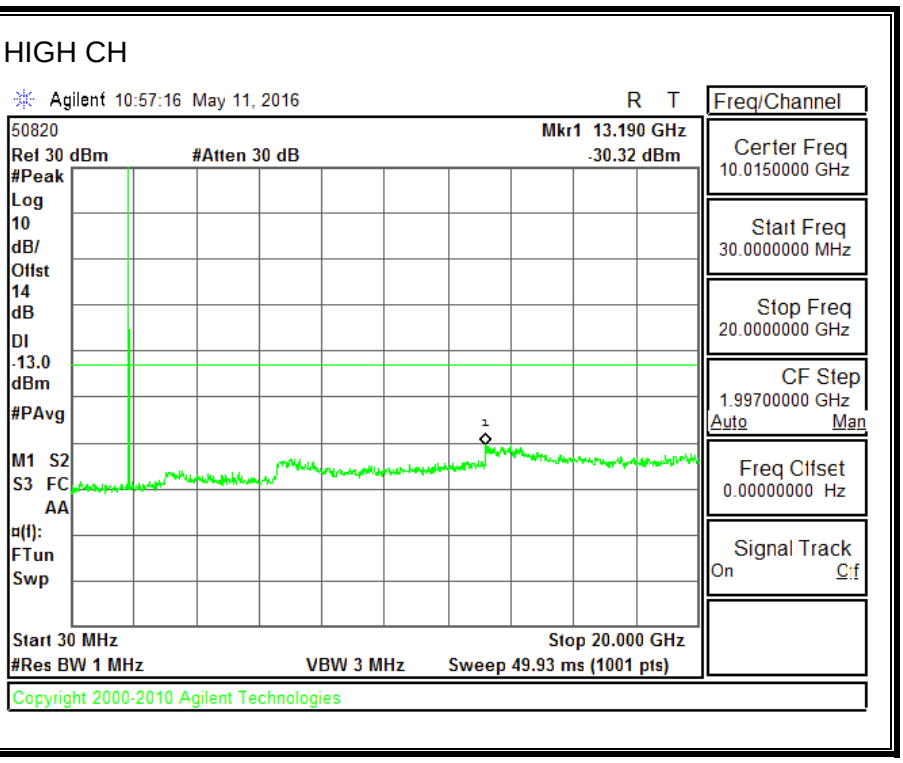


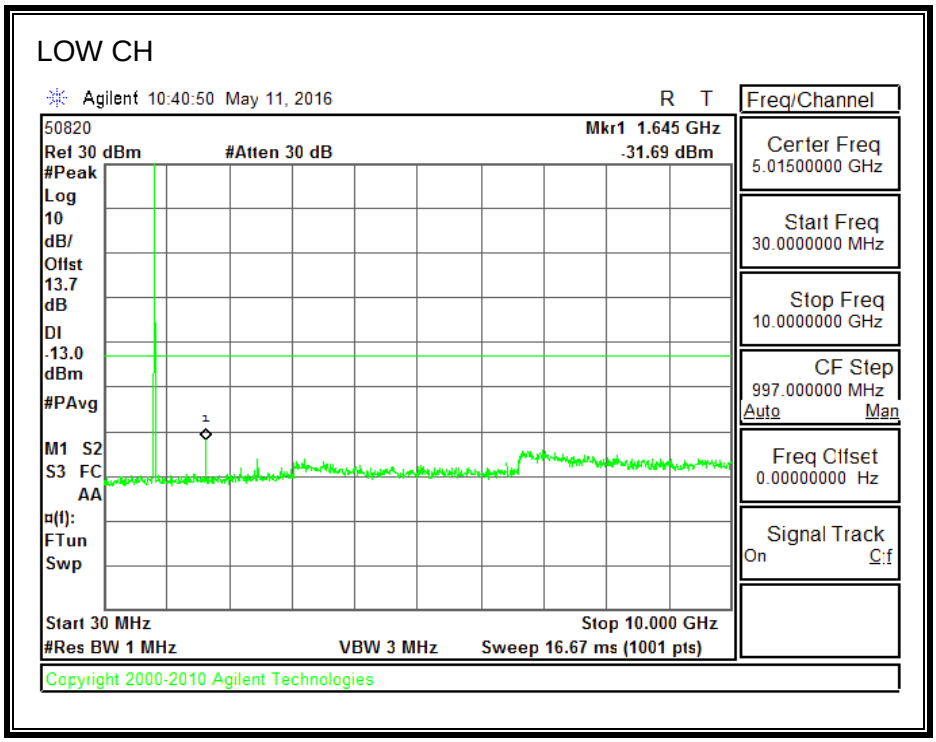
HIGH CH



GSM-EGPRS

850MHz BAND

LOW CH



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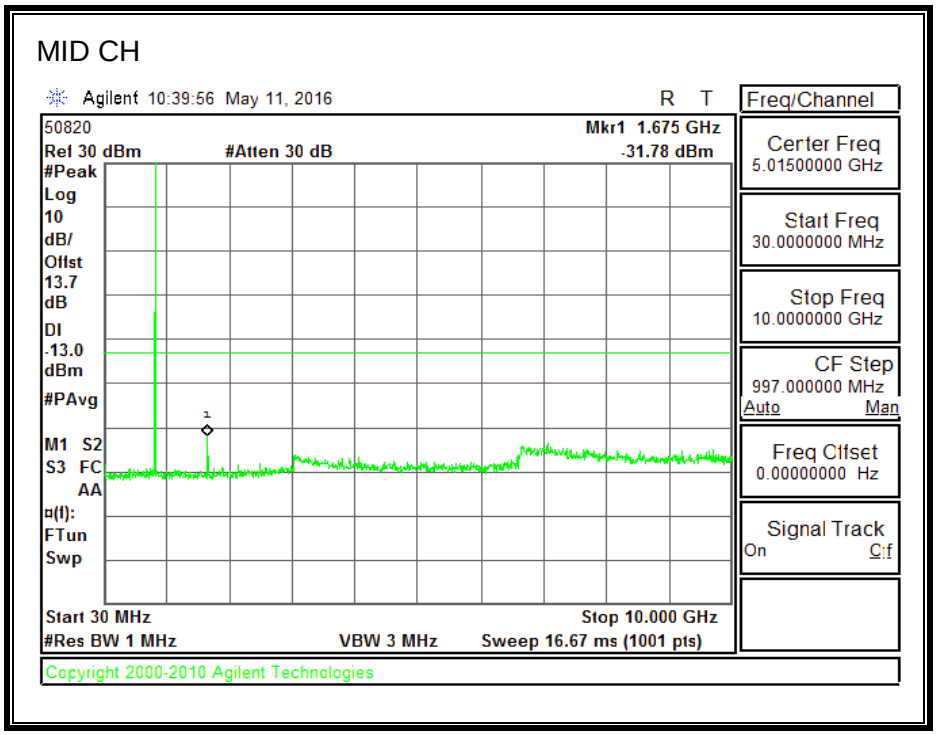

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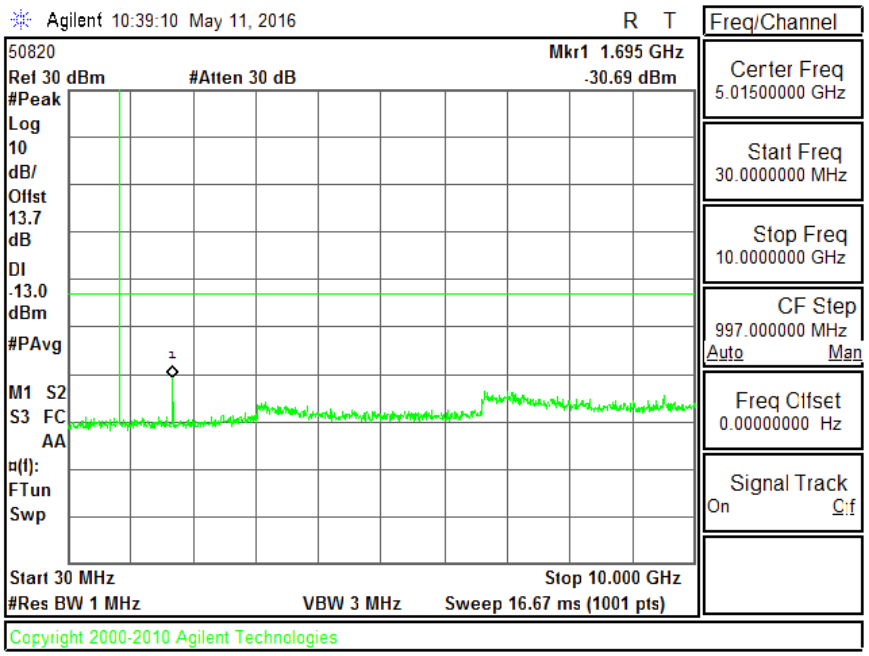
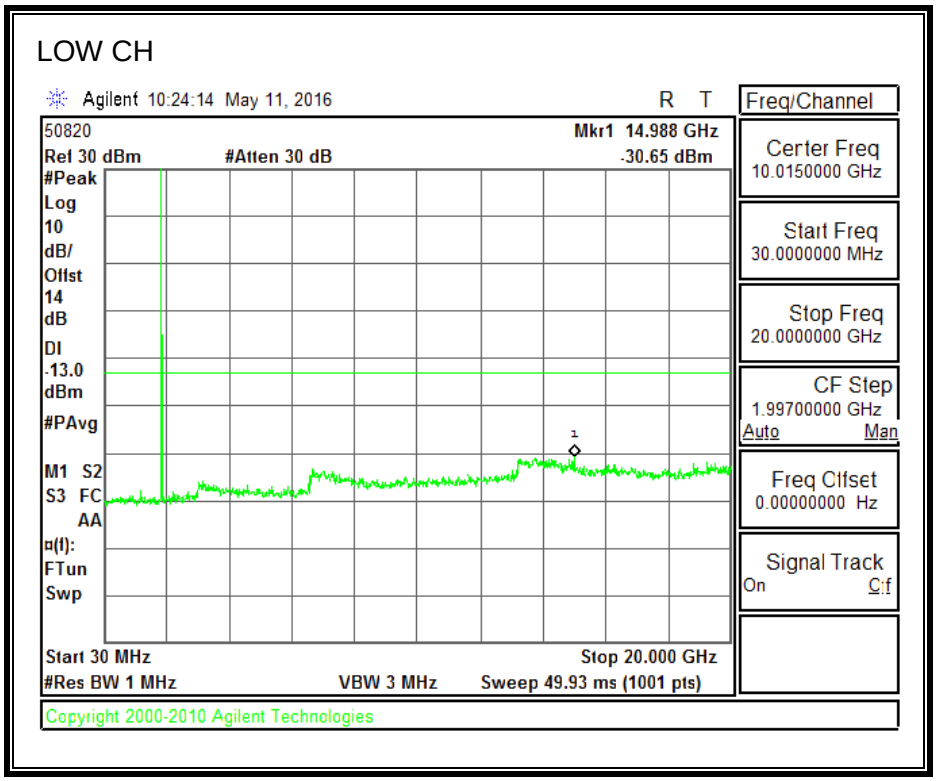


1900MHz BAND

LOW CH



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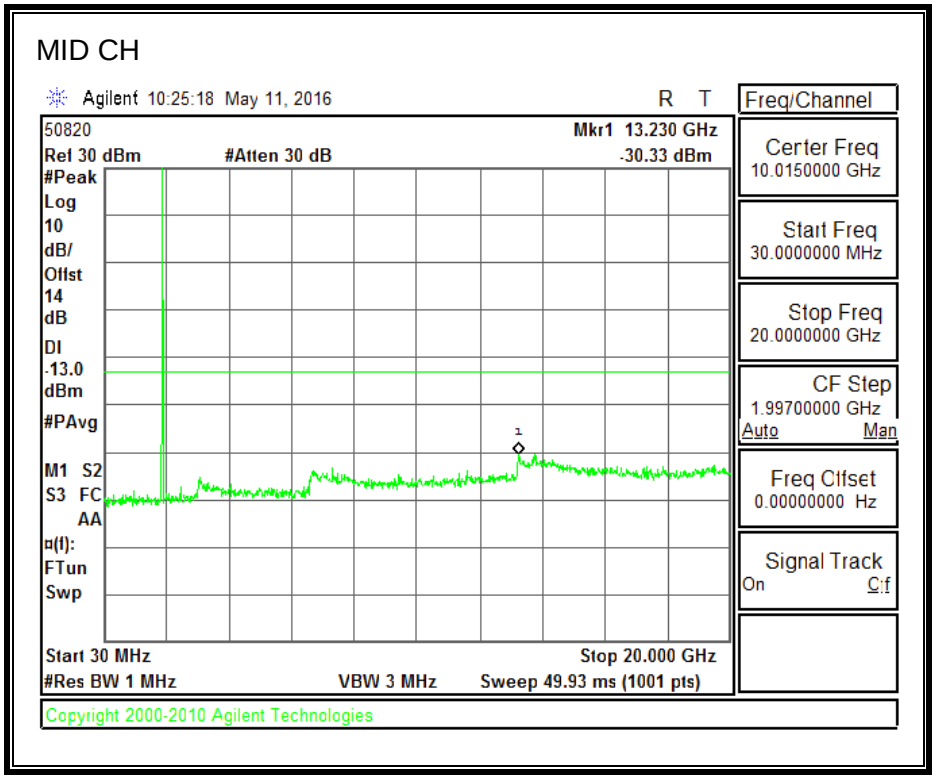

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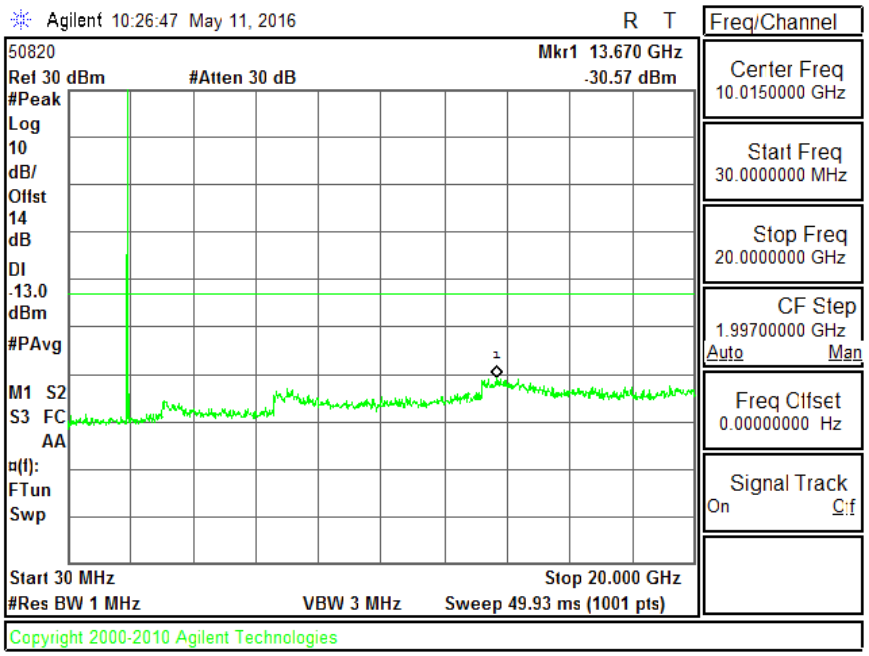
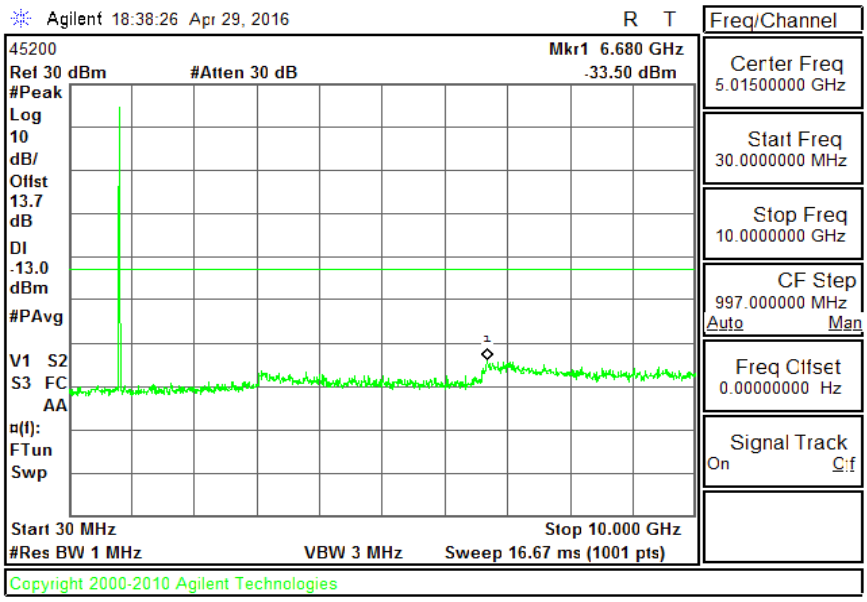


8.3.2. UMTS REL 99

850MHz BAND

LOW CH



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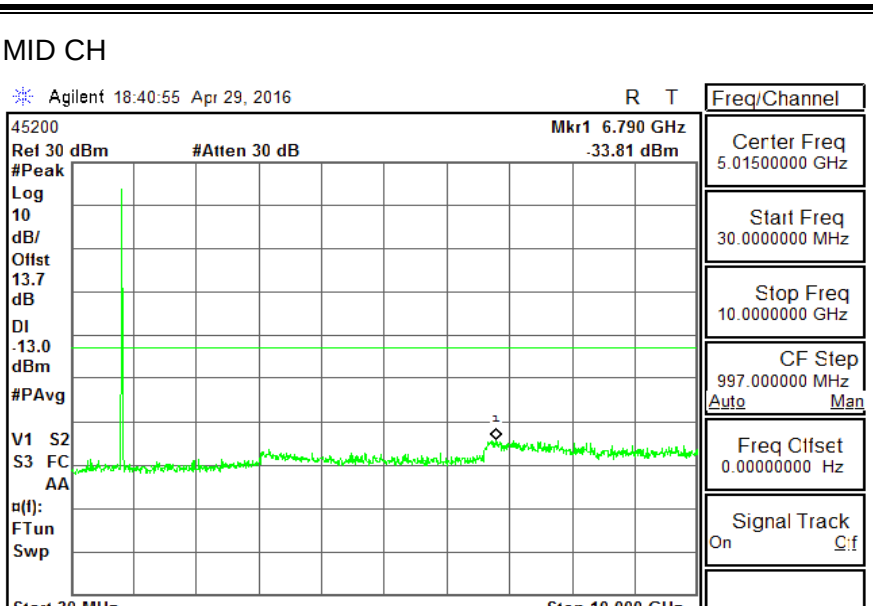

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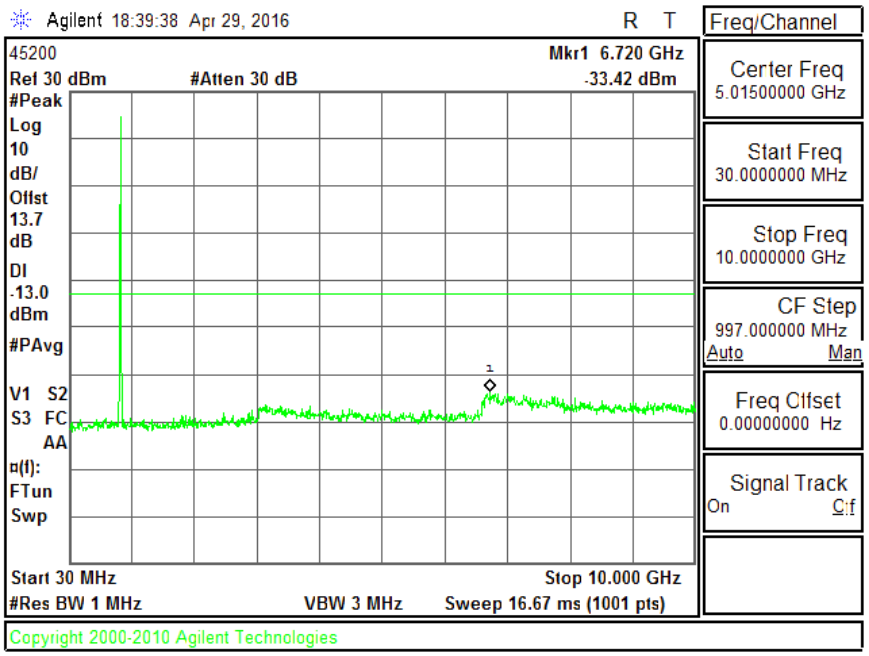
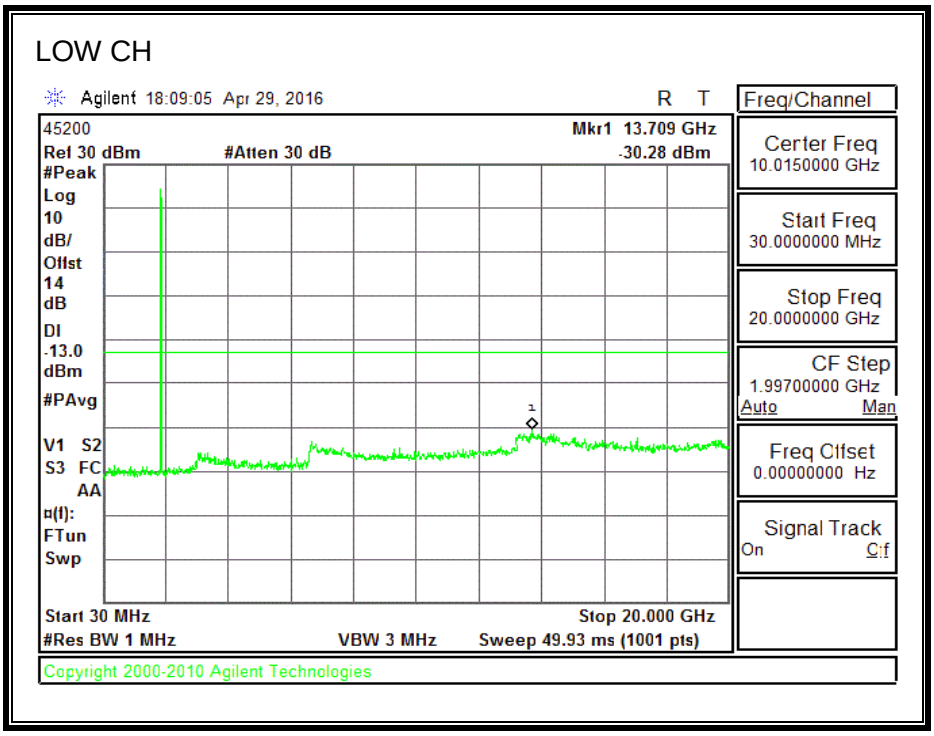


1900MHz BAND

LOW CH



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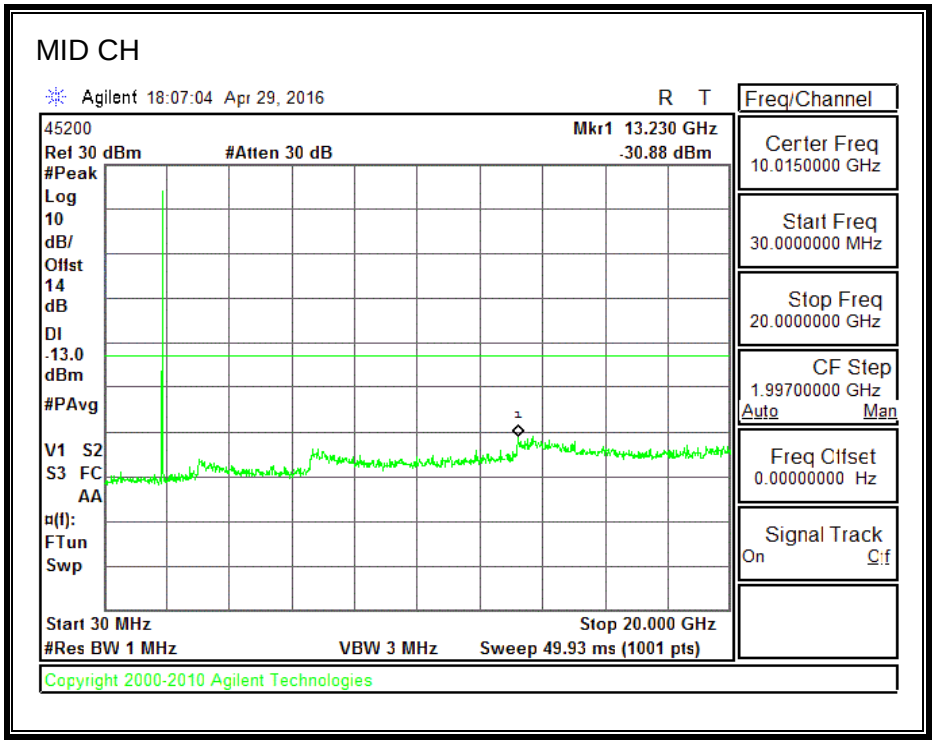
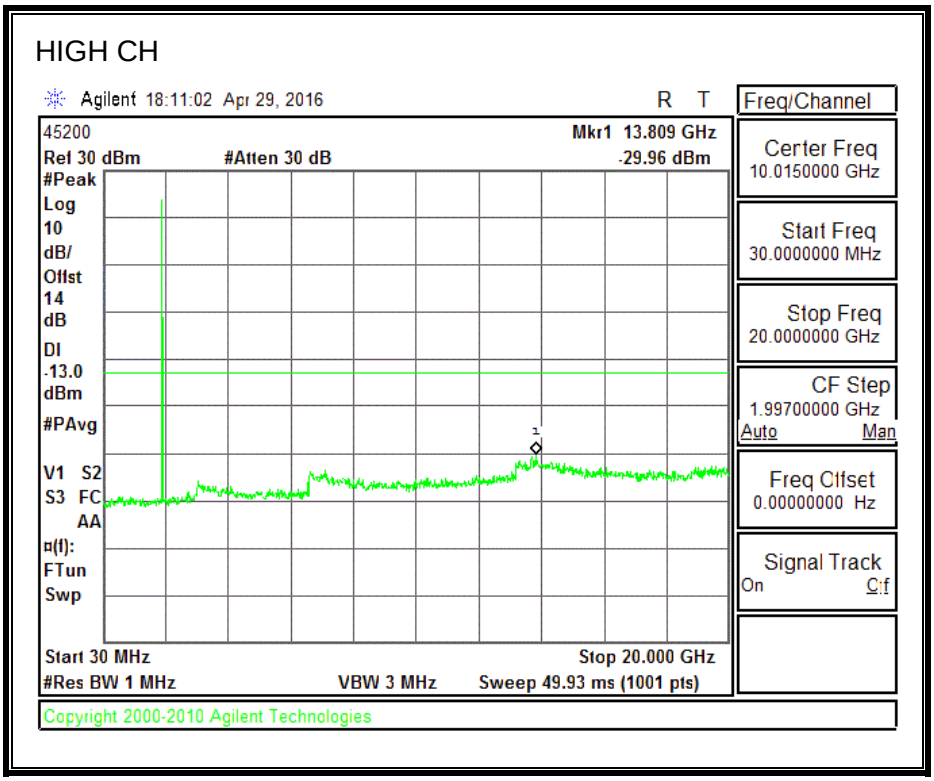
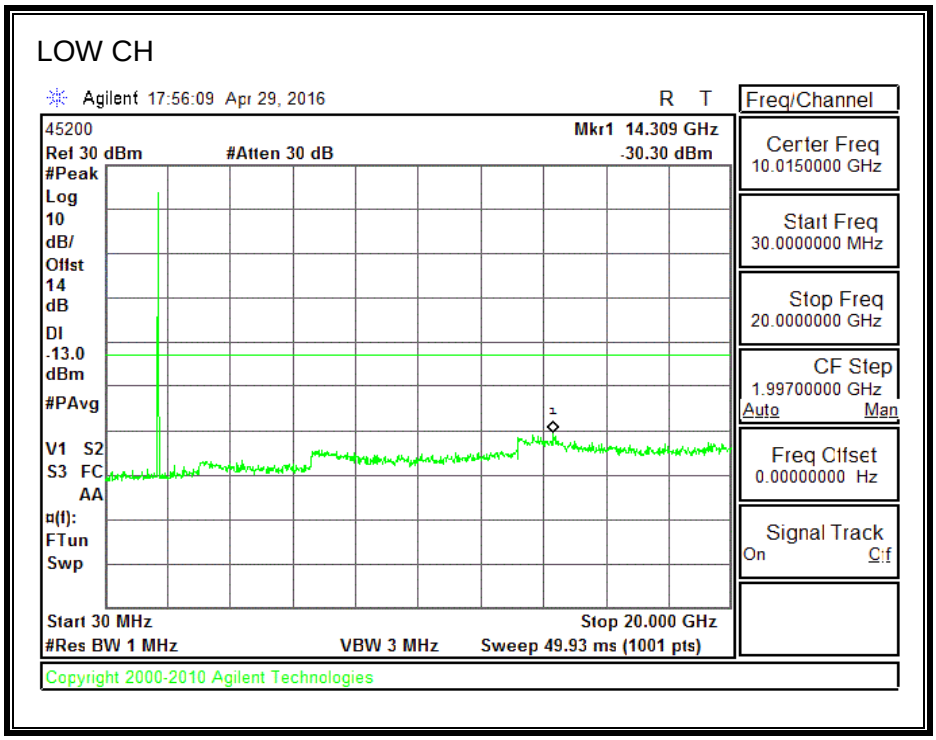


HIGH CH

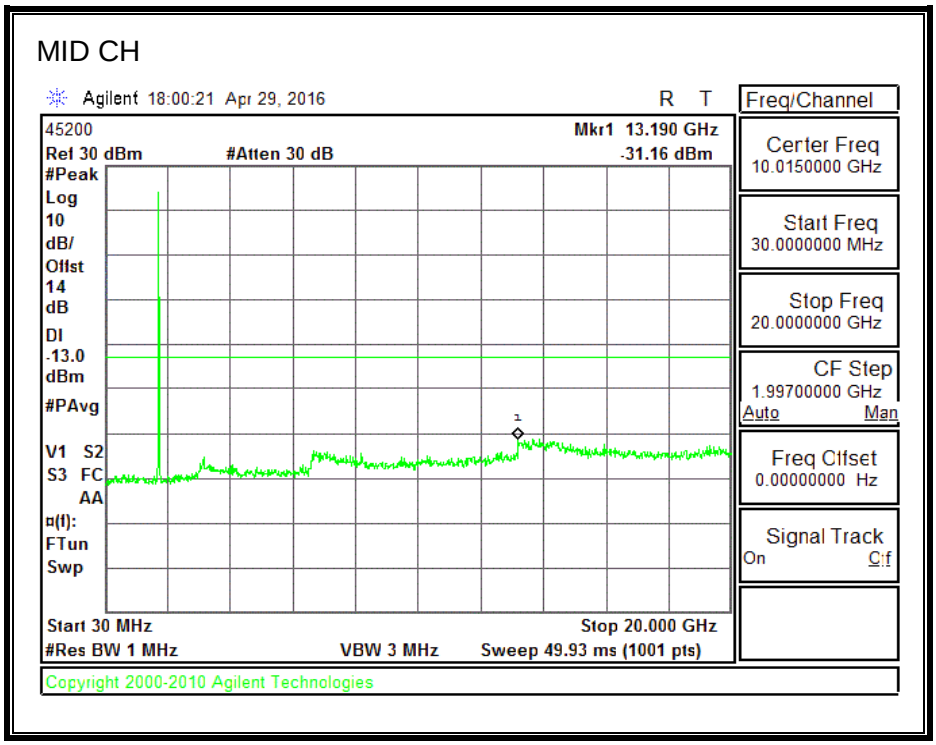


1700MHz BAND

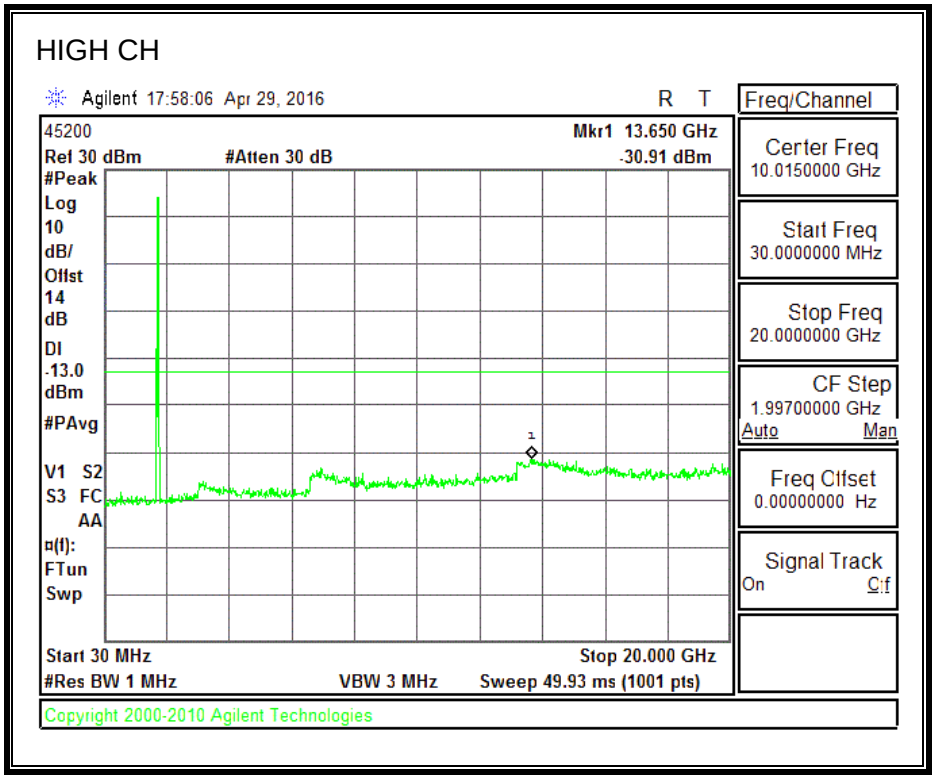
LOW CH



MID CH



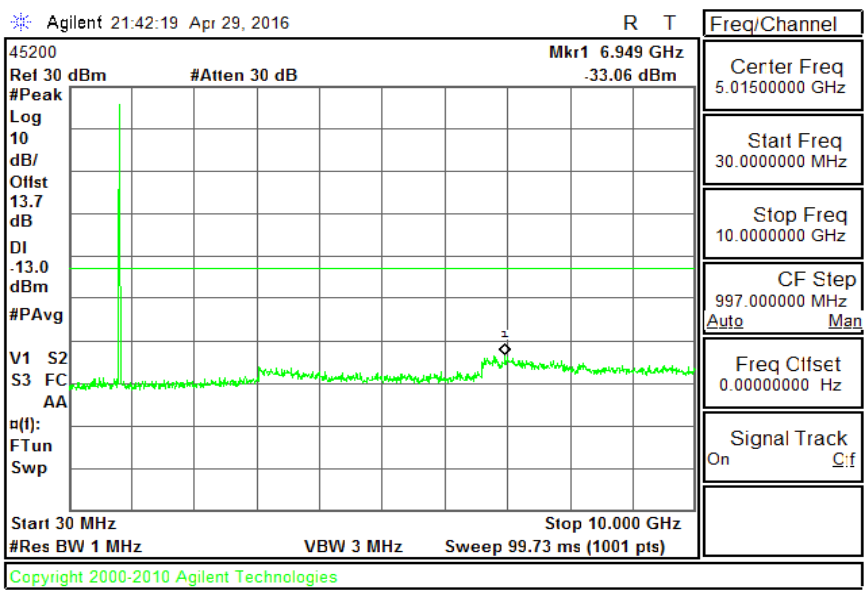
HIGH CH



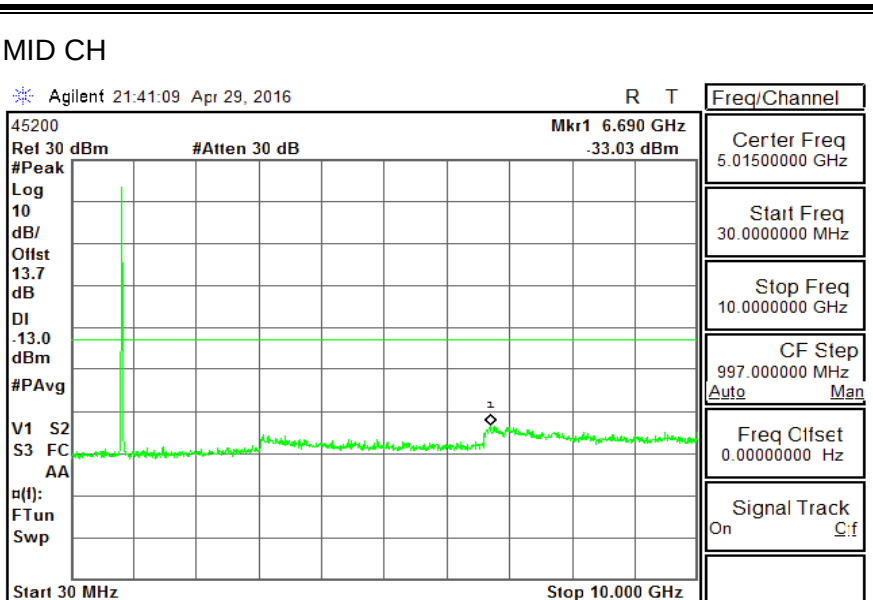
8.3.3. UMTS HSDPA

850MHz BAND

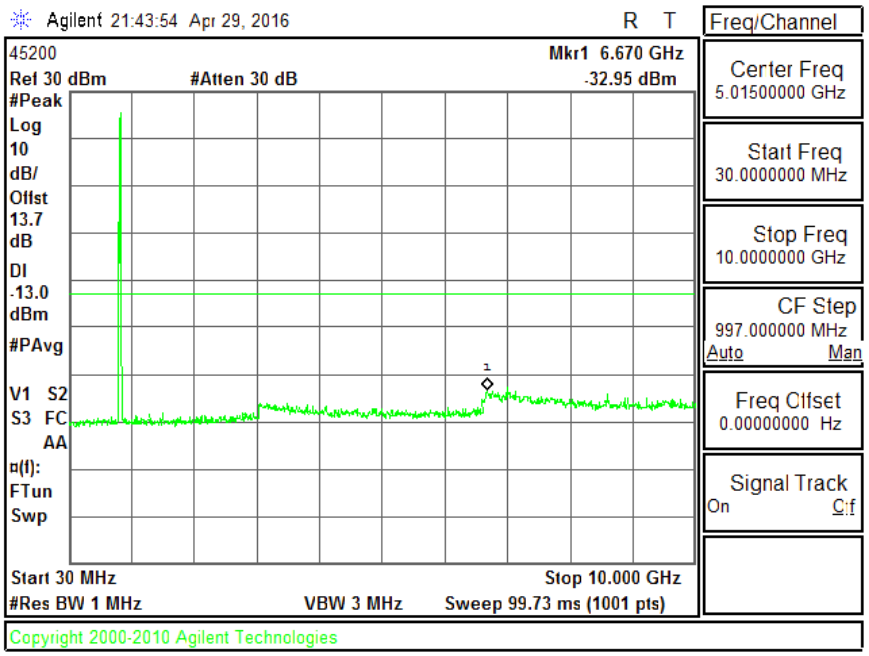
LOW CH



MID CH

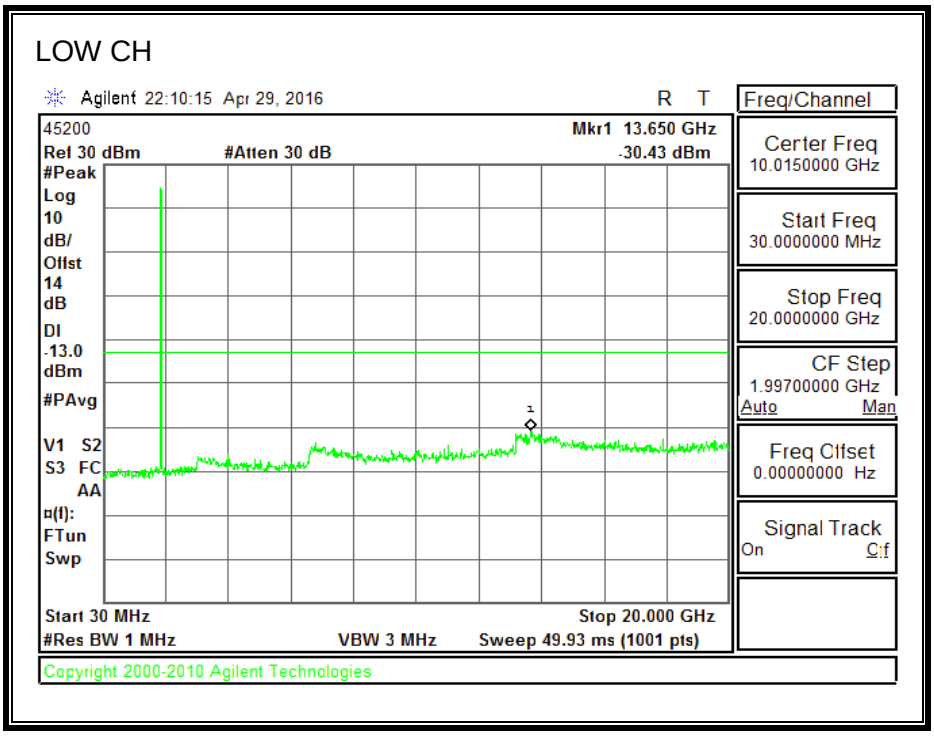


HIGH CH

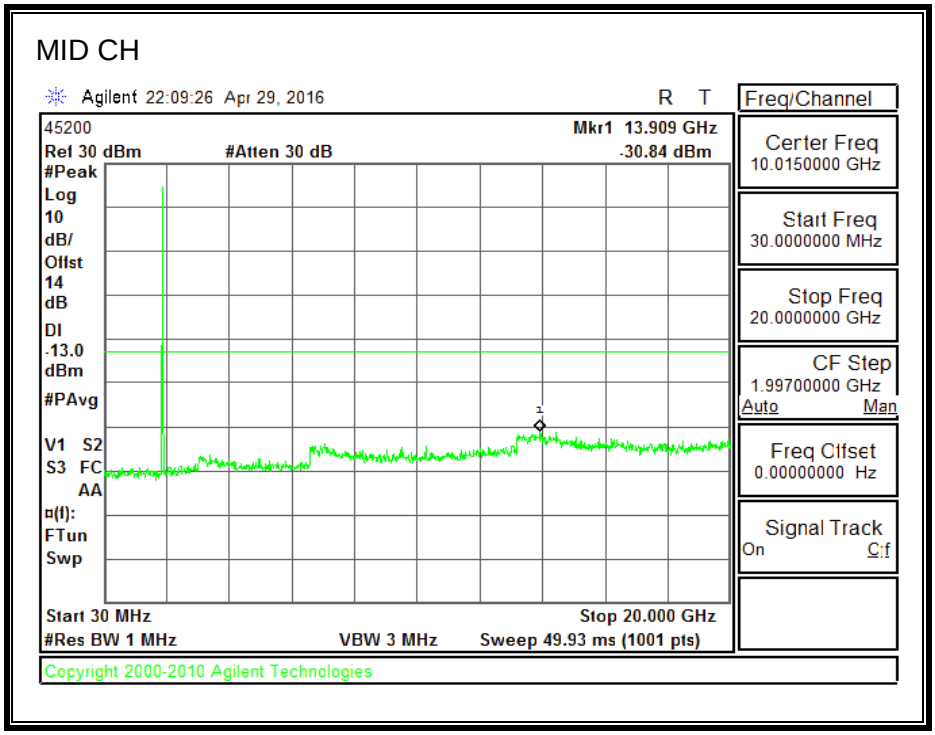


1900MHz BAND

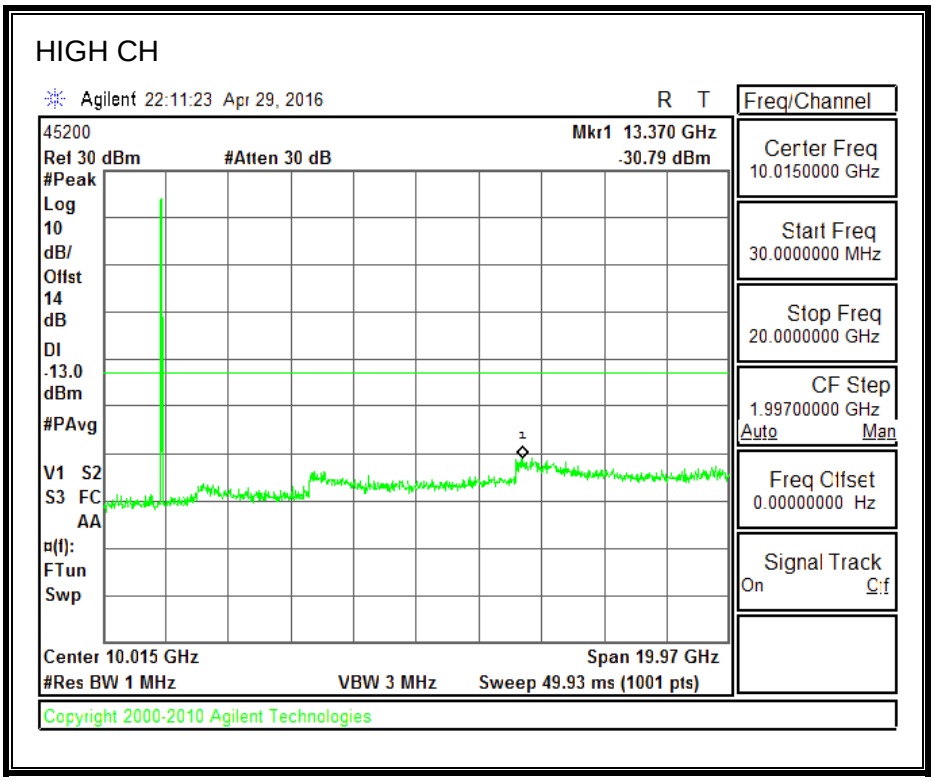
LOW CH



MID CH

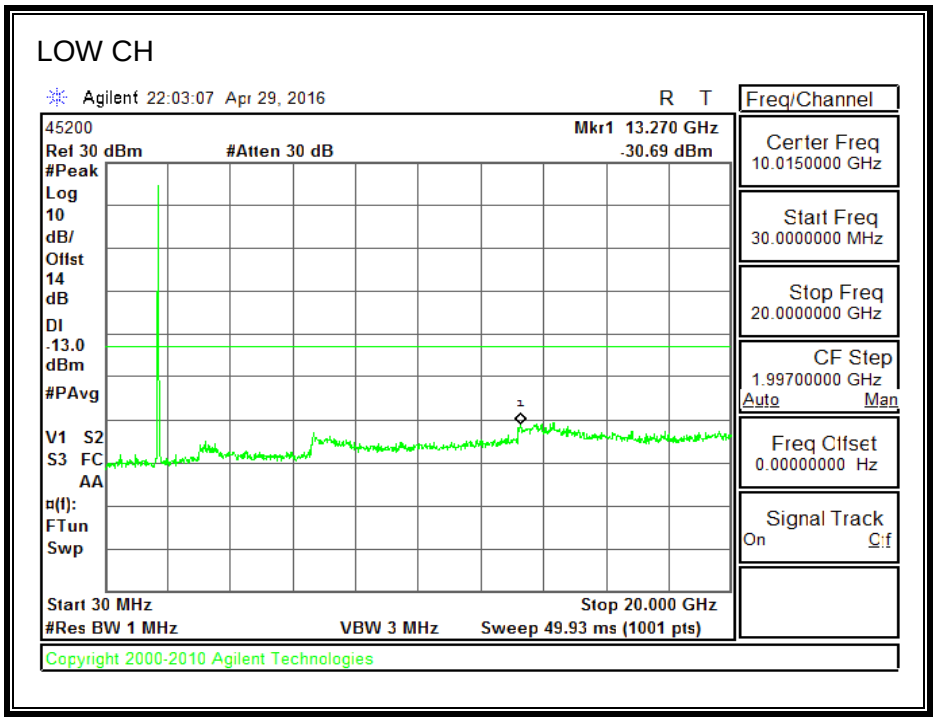


HIGH CH



1700MHz BAND

LOW CH



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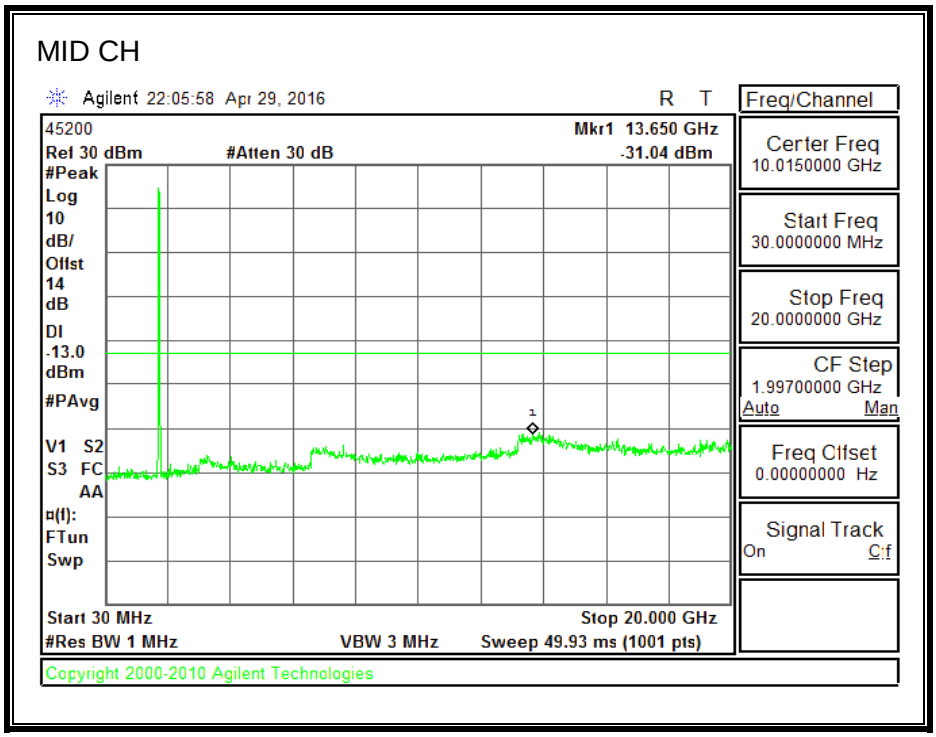

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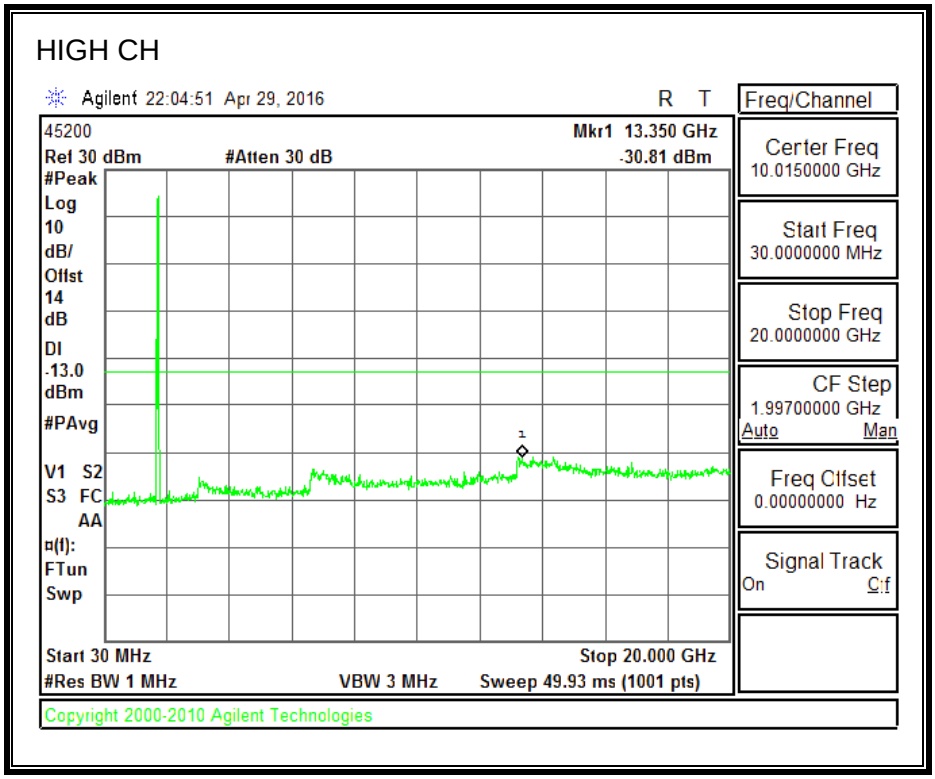

9. FREQUENCY STABILITY

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°C
- Voltage = (85% - 115%)

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

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

RESULTS

See the following pages.

9.1. GSM

ID:	50820	Date:	5/13/16

GPRS 850

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	824.0128	848.9866		
Extreme (50C)		824.0128	848.9866	5.7	0.01
Extreme (40C)		824.0128	848.9866	8.6	0.01
Extreme (30C)		824.0128	848.9866	6.1	0.01
Extreme (10C)		824.0128	848.9866	8.2	0.01
Extreme (0C)		824.0128	848.9866	7.6	0.01
Extreme (-10C)		824.0128	848.9866	6.1	0.01
Extreme (-20C)		824.0128	848.9866	5.7	0.01
Extreme (-30C)		824.0128	848.9866	6.3	0.01
25C	10%	824.0128	848.9866	6.4	0.01
	-10%	824.0128	848.9866	5.2	0.01
	End Point	824.0128	848.9866	4.2	0.01

EGPRS 850

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	824.0060	848.9902		
Extreme (50C)		824.0060	848.9902	6.2	0.01
Extreme (40C)		824.0060	848.9902	7.2	0.01
Extreme (30C)		824.0060	848.9902	6.9	0.01
Extreme (10C)		824.0060	848.9902	7.6	0.01
Extreme (0C)		824.0060	848.9902	8.0	0.01
Extreme (-10C)		824.0060	848.9902	7.7	0.01
Extreme (-20C)		824.0060	848.9902	6.4	0.01
Extreme (-30C)		824.0060	848.9902	5.8	0.01
25C	10%	824.0060	848.9902	7.3	0.01
	-10%	824.0060	848.9902	6.2	0.01
	End Point	824.0060	848.9902	5.2	0.01

GPRS 1900

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	1850.0141	1909.9727		
Extreme (50C)		1850.0141	1909.9727	8.2	0.00
Extreme (40C)		1850.0141	1909.9727	7.1	0.00
Extreme (30C)		1850.0141	1909.9727	8.0	0.00
Extreme (10C)		1850.0141	1909.9727	6.2	0.00
Extreme (0C)		1850.0141	1909.9727	7.9	0.00
Extreme (-10C)		1850.0141	1909.9727	7.5	0.00
Extreme (-20C)		1850.0141	1909.9727	7.3	0.00
Extreme (-30C)		1850.0141	1909.9727	7.5	0.00
25C	10%	1850.0141	1909.9727	7.2	0.00
	-10%	1850.0141	1909.9727	6.6	0.00
	End Point	1850.0141	1909.9727	5.6	0.00

EGPRS 1900

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	1850.0169	1909.9687		
Extreme (50C)		1850.0169	1909.9687	7.4	0.00
Extreme (40C)		1850.0169	1909.9687	7.3	0.00
Extreme (30C)		1850.0169	1909.9687	7.2	0.00
Extreme (10C)		1850.0169	1909.9687	7.2	0.00
Extreme (0C)		1850.0169	1909.9687	7.1	0.00
Extreme (-10C)		1850.0169	1909.9687	6.9	0.00
Extreme (-20C)		1850.0169	1909.9687	6.2	0.00
Extreme (-30C)		1850.0169	1909.9687	8.1	0.00
25C	10%	1850.0169	1909.9687	7.8	0.00
	-10%	1850.0169	1909.9687	7.3	0.00
	End Point	1850.0169	1909.9687	6.2	0.00

9.2. UMTS

ID:	45200	Date:	4/29/16

UMTS REL99 BAND 5

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	824.1822	848.8205		
Extreme (50C)		824.1822	848.8205	2.8	0.00
Extreme (40C)		824.1822	848.8205	4.7	0.01
Extreme (30C)		824.1822	848.8205	4.6	0.01
Extreme (10C)		824.1822	848.8205	-3.5	0.00
Extreme (0C)		824.1822	848.8205	-4.3	-0.01
Extreme (-10C)		824.1822	848.8205	-2.9	0.00
Extreme (-20C)		824.1822	848.8205	-2.6	0.00
Extreme (-30C)		824.1822	848.8205	-2.2	0.00
25C	10%	824.1822	848.8205	-5.0	-0.01
	-10%	824.1822	848.8205	-4.0	0.00
	End Point	824.1822	848.8205	-6.0	-0.01

UMTS REL99 BAND 2

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	1850.2002	1909.7976		
Extreme (50C)		1850.2002	1909.7976	22.7	0.01
Extreme (40C)		1850.2002	1909.7976	19.2	0.01
Extreme (30C)		1850.2002	1909.7976	18.7	0.01
Extreme (10C)		1850.2002	1909.7976	20.6	0.01
Extreme (0C)		1850.2002	1909.7976	19.6	0.01
Extreme (-10C)		1850.2002	1909.7976	16.1	0.01
Extreme (-20C)		1850.2002	1909.7976	13.3	0.01
Extreme (-30C)		1850.2002	1909.7976	10.5	0.01
25C	10%	1850.2002	1909.7976	21.7	0.01
	-10%	1850.2002	1909.7976	21.7	0.01
	End Point	1850.2002	1909.7976	22.0	0.01

UMTS REL99 BAND 4

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	Normal	1710.1976	1754.8286		
Extreme (50C)		1710.1976	1754.8286	10.0	0.01
Extreme (40C)		1710.1976	1754.8286	9.9	0.01
Extreme (30C)		1710.1976	1754.8286	12.4	0.01
Extreme (10C)		1710.1976	1754.8286	12.4	0.01
Extreme (0C)		1710.1976	1754.8286	10.5	0.01
Extreme (-10C)		1710.1976	1754.8286	11.2	0.01
Extreme (-20C)		1710.1976	1754.8286	10.2	0.01
Extreme (-30C)		1710.1976	1754.8286	10.9	0.01
25C	10%	1710.1976	1754.8286	8.5	0.00
	-10%	1710.1976	1754.8286	10.9	0.01
	End Point	1710.1976	1754.8286	11.6	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

10.2. LAT, Port A RADIATED POWER (ERP & EIRP)

10.2.1. GSM

Part 22 / RSS 132 850MHz Band

Band	Mode	Channel	f (MHz)	ERP (Average)	
				dBm	mW
CELL	GPRS	128	824.2	31.08	1282.33
		190	836.6	31.10	1288.25
		251	848.8	**31.45**	1396.37
	EGPRS	128	824.2	**27.13**	516.42
		190	836.6	27.04	505.82
		251	848.8	26.80	478.63

Part 24 / RSS 133 1900MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	GPRS	512	1850.2	**31.26**	1336.60
		661	1880.0	30.54	1132.40
		810	1909.8	30.37	1088.93
	EGPRS	512	1850.2	**28.29**	674.53
		661	1880.0	28.13	650.13
		810	1909.8	28.21	662.22

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	**25.85**	384.59
		4183	836.6	25.76	376.70
		4233	846.6	25.24	334.20
	UMTS, HSDPA	4132	826.4	**24.97**	314.05
		4183	836.6	24.81	302.69
		4233	846.6	24.43	277.33

Part 24 / RSS 133 1900MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	UMTS,REL 99	9662	1852.4	**25.65**	367.28
		9800	1880.0	25.61	363.92
		9938	1907.6	25.47	352.37
	UMTS, HSDPA	9662	1852.4	**24.43**	277.33
		9800	1880.0	24.39	274.79
		9938	1907.6	24.32	270.40

Part 27 / RSS 139 1700MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	UMTS,REL 99	1537	1712.4	25.39	345.94
		1638	1732.6	**25.53**	357.27
		1738	1752.5	25.47	352.37
	UMTS, HSDPA	1537	1712.4	**24.96**	313.33
		1638	1732.6	24.48	280.54
		1738	1752.5	24.60	288.40

10.2.3. GSM

GPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/06/16
Test Engineer: 52298
Configuration: EUT only
Mode: GSM 850MHz

Test Equipment:
Receiving: Sunol T185, 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	22.6	V	0.6	0.0	21.95	24.10	38.45	40.60	-16.5	
824.20	31.7	H	0.6	0.0	31.08	33.23	38.45	40.60	-7.4	
Mid Ch										
836.60	22.1	V	0.6	0.0	21.50	23.65	38.45	40.60	-17.0	
836.60	31.7	H	0.6	0.0	31.10	33.25	38.45	40.60	-7.4	
High Ch										
848.80	22.7	V	0.6	0.0	22.07	24.22	38.45	40.60	-16.4	
848.80	32.1	H	0.6	0.0	31.45	33.60	38.45	40.60	-7.0	

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EGPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/06/16
Test Engineer: 52298
Configuration: EUT only
Mode: EDGE 850MHz

Test Equipment:
Receiving: Sunol T185, 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	19.3	V	0.6	0.0	18.71	20.86	38.45	40.60	-19.7	
824.20	27.8	H	0.6	0.0	27.13	29.28	38.45	40.60	-11.3	
Mid Ch										
836.60	18.9	V	0.6	0.0	18.31	20.46	38.45	40.60	-20.1	
836.60	27.7	H	0.6	0.0	27.04	29.19	38.45	40.60	-11.4	
High Ch										
848.80	18.4	V	0.6	0.0	17.73	19.88	38.45	40.60	-20.7	
848.80	27.4	H	0.6	0.0	26.80	28.95	38.45	40.60	-11.7	

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GPRS, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/06/16
Test Engineer: 52298
Configuration: EUT only
Mode: GSM 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								
1.851	23.2	V	0.98	8.05	30.23	33.0	-2.8	
1.851	24.2	H	0.98	8.05	31.26	33.0	-1.7	
Mid Ch								
1.880	23.5	V	0.98	8.03	30.50	33.0	-2.5	
1.880	23.5	H	0.98	8.03	30.54	33.0	-2.5	
High Ch								
1.910	23.2	V	0.98	8.05	30.27	33.0	-2.7	
1.910	23.3	H	0.98	8.05	30.37	33.0	-2.6	

Rev. 06.07.16

EGPRS, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/15/16
Test Engineer: 52298
Configuration: EUT only
Mode: EDGE 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								
1.851	17.9	V	0.98	8.05	25.00	33.0	-8.0	
1.851	21.2	H	0.98	8.05	28.29	33.0	-4.7	
Mid Ch								
1.880	17.9	V	0.98	8.03	24.93	33.0	-8.1	
1.880	21.1	H	0.98	8.03	28.13	33.0	-4.9	
High Ch								
1.910	17.5	V	0.98	8.05	24.59	33.0	-8.4	
1.910	21.1	H	0.98	8.05	28.21	33.0	-4.8	

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10.2.4. UMTS

UMTS REL 99, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/07/16
Test Engineer: 52268
Configuration: EUT Only
Mode: WCDMA Rel 99 850MHz

Test Equipment:
Receiving: Sunol T185, 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	14.7	V	0.6	0.0	14.05	16.20	38.45	40.60	-24.4	
826.40	26.5	H	0.6	0.0	25.85	28.00	38.45	40.60	-12.6	
Mid Ch										
836.60	15.0	V	0.6	0.0	14.36	16.51	38.45	40.60	-24.1	
836.60	26.4	H	0.6	0.0	25.76	27.91	38.45	40.60	-12.7	
High Ch										
846.60	15.5	V	0.6	0.0	14.88	17.03	38.45	40.60	-23.6	
846.60	25.9	H	0.6	0.0	25.24	27.39	38.45	40.60	-13.2	

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UMTS HSDPA, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/07/16
Test Engineer: 52268
Configuration: EUT Only
Mode: WCDMA HSDPA 850MHz

Test Equipment:
Receiving: Sunol T185, 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	13.3	V	0.6	0.0	12.72	14.87	38.45	40.60	-25.7	
826.40	25.6	H	0.6	0.0	24.97	27.12	38.45	40.60	-13.5	
Mid Ch										
836.60	13.6	V	0.6	0.0	13.00	15.15	38.45	40.60	-25.5	
836.60	25.4	H	0.6	0.0	24.81	26.96	38.45	40.60	-13.6	
High Ch										
846.60	14.3	V	0.6	0.0	13.72	15.87	38.45	40.60	-24.7	
846.60	25.0	H	0.6	0.0	24.43	26.58	38.45	40.60	-14.0	

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UMTS REL 99, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/07/16
Test Engineer: 52268
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	18.6	V	0.98	8.05	25.65	33.0	-7.3	
1.852	16.6	H	0.98	8.05	23.62	33.0	-9.4	
Mid Ch								
1.880	18.6	V	0.98	8.03	25.61	33.0	-7.4	
1.880	16.5	H	0.98	8.03	23.51	33.0	-9.5	
High Ch								
1.908	18.4	V	0.98	8.04	25.47	33.0	-7.5	
1.908	16.4	H	0.98	8.04	23.42	33.0	-9.6	

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UMTS HSDPA, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/07/16
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	17.4	V	0.98	8.05	24.43	33.0	-8.6	
1.852	15.6	H	0.98	8.05	22.62	33.0	-10.4	
Mid Ch								
1.880	17.3	V	0.98	8.03	24.39	33.0	-8.6	
1.880	15.3	H	0.98	8.03	22.40	33.0	-10.6	
High Ch								
1.908	17.3	V	0.98	8.04	24.32	33.0	-8.7	
1.908	15.5	H	0.98	8.04	22.51	33.0	-10.5	

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UMTS REL 99, 1700MHz BAND 4

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/07/16
Test Engineer: 52268
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	14.5	V	0.95	8.27	21.78	30.0	-8.2	
1.712	18.1	H	0.95	8.27	25.39	30.0	-4.6	
Mid Ch								
1.733	15.0	V	0.95	8.23	22.23	30.0	-7.8	
1.733	18.3	H	0.95	8.23	25.53	30.0	-4.5	
High Ch								
1.753	15.1	V	0.95	8.18	22.34	30.0	-7.7	
1.753	18.2	H	0.95	8.18	25.47	30.0	-4.5	

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UMTS HSDPA, 1700MHz BAND 4

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/07/16
Test Engineer: 52268
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								
1.712	13.5	V	0.95	8.27	20.79	30.0	-9.2	
1.712	17.6	H	0.95	8.27	24.96	30.0	-5.0	
Mid Ch								
1.733	13.7	V	0.95	8.23	20.99	30.0	-9.0	
1.733	17.2	H	0.95	8.23	24.48	30.0	-5.5	
High Ch								
1.753	13.7	V	0.95	8.18	20.90	30.0	-9.1	
1.753	17.4	H	0.95	8.18	24.60	30.0	-5.4	

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10.3. UAT, Port B RADIATED POWER (ERP & EIRP)

10.3.1. GSM

Part 22 / RSS 132 850MHz Band

Band	Mode	Channel	f (MHz)	ERP (Average)	
				dBm	mW
CELL	GPRS	128	824.2	27.24	529.66
		190	836.6	**27.39**	548.28
		251	848.8	27.23	528.45
	EGPRS	128	824.2	21.72	148.59
		190	836.6	**22.15**	164.06
		251	848.8	21.81	151.71

Part 24 / RSS 133 1900MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	GPRS	512	1850.2	**25.46**	351.56
		661	1880.0	25.36	343.56
		810	1909.8	25.27	336.51
	EGPRS	512	1850.2	22.77	189.23
		661	1880.0	23.02	200.45
		810	1909.8	**23.38**	217.77

10.3.2. UMTS

Part 22 / RSS 132 850MHz Band

Band	Mode	Channel	f (MHz)	ERP (Average)	
				dBm	mW
CELL	UMTS,REL 99	4132	826.4	**17.94**	62.23
		4183	836.6	17.77	59.84
		4233	846.6	17.34	54.20
	UMTS, HSDPA	4132	826.4	**17.12**	51.52
		4183	836.6	17.01	50.23
		4233	846.6	16.54	45.08

Part 24 / RSS 133 1900MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	UMTS,REL 99	9662	1852.4	19.27	84.53
		9800	1880.0	19.61	91.41
		9938	1907.6	**19.99**	99.77
	UMTS, HSDPA	9662	1852.4	18.43	69.66
		9800	1880.0	18.80	75.86
		9938	1907.6	**19.19**	82.99

Part 27 / RSS 139 1700MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Average)	
				dBm	mW
PCS	UMTS,REL 99	1537	1712.4	21.16	130.62
		1638	1732.6	**21.87**	153.82
		1738	1752.5	21.76	149.97
	UMTS, HSDPA	1537	1712.4	20.26	106.17
		1638	1732.6	**21.37**	137.09
		1738	1752.5	21.14	130.02

10.3.3. GSM

GPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/09/16
Test Engineer: 52268
Configuration: EUT Only
Mode: GSM 850MHz

Test Equipment:
Receiving: Sunol T185, 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	19.3	V	0.6	0.0	18.71	20.86	38.45	40.60	-19.7	
824.20	27.9	H	0.6	0.0	27.24	29.39	38.45	40.60	-11.2	
Mid Ch										
836.60	18.9	V	0.6	0.0	18.26	20.41	38.45	40.60	-20.2	
836.60	28.0	H	0.6	0.0	27.39	29.54	38.45	40.60	-11.1	
High Ch										
848.80	19.0	V	0.6	0.0	18.40	20.55	38.45	40.60	-20.0	
848.80	27.8	H	0.6	0.0	27.23	29.38	38.45	40.60	-11.2	

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EGPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/09/16
Test Engineer: 52268
Configuration: EUT Only
Mode: EDGE 850MHz

Test Equipment:
Receiving: Sunol T185, 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	13.60	15.75	38.45	40.60	-24.8	
824.20	22.3	H	0.6	0.0	21.72	23.87	38.45	40.60	-16.7	
Mid Ch										
836.60	13.5	V	0.6	0.0	12.90	15.05	38.45	40.60	-25.6	
836.60	22.8	H	0.6	0.0	22.15	24.30	38.45	40.60	-16.3	
High Ch										
848.80	13.9	V	0.6	0.0	13.24	15.39	38.45	40.60	-25.2	
848.80	22.4	H	0.6	0.0	21.81	23.96	38.45	40.60	-16.6	

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GPRS, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/08/16
Test Engineer: 52298
Configuration: EUT Only
Mode: GSM 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								
1.851	14.5	V	0.98	8.05	21.59	33.0	-11.4	
1.851	18.4	H	0.98	8.05	25.46	33.0	-7.5	
Mid Ch								
1.880	16.2	V	0.98	8.03	23.26	33.0	-9.7	
1.880	18.3	H	0.98	8.03	25.36	33.0	-7.6	
High Ch								
1.910	10.4	V	0.98	8.05	17.45	33.0	-15.5	
1.910	18.2	H	0.98	8.05	25.27	33.0	-7.7	

Rev. 06.07.16

EGPRS, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/08/16
Test Engineer: 52298
Configuration: EUT Only
Mode: EDGE 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								
1.851	12.7	V	0.98	8.05	19.77	33.0	-13.2	
1.851	15.7	H	0.98	8.05	22.77	33.0	-10.2	
Mid Ch								
1.880	14.4	V	0.98	8.03	21.43	33.0	-11.6	
1.880	16.0	H	0.98	8.03	23.02	33.0	-10.0	
High Ch								
1.910	8.6	V	0.98	8.05	15.69	33.0	-17.3	
1.910	16.3	H	0.98	8.05	23.38	33.0	-9.6	

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10.3.4. UMTS

UMTS REL 99, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/08/16
Test Engineer: 52298
Configuration: EUT Only
Mode: WCDMA Rel 99 850MHz

Test Equipment:
Receiving: Sunol T185, 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	10.9	V	0.6	0.0	10.33	12.48	38.45	40.60	-28.1	
826.40	18.6	H	0.6	0.0	17.94	20.09	38.45	40.60	-20.5	
Mid Ch										
836.60	11.4	V	0.6	0.0	10.82	12.97	38.45	40.60	-27.6	
836.60	18.4	H	0.6	0.0	17.77	19.92	38.45	40.60	-20.7	
High Ch										
846.60	12.3	V	0.6	0.0	11.71	13.86	38.45	40.60	-26.7	
846.60	18.0	H	0.6	0.0	17.34	19.49	38.45	40.60	-21.1	

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UMTS HSDPA, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/07/16
Test Engineer: 52268
Configuration: EUT Only
Mode: WCDMA HSDPA 850MHz

Test Equipment:
Receiving: Sunol T185, 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	10.1	V	0.6	0.0	9.53	11.68	38.45	40.60	-28.9	
826.40	17.7	H	0.6	0.0	17.12	19.27	38.45	40.60	-21.3	
Mid Ch										
836.60	10.7	V	0.6	0.0	10.09	12.24	38.45	40.60	-28.4	
836.60	17.6	H	0.6	0.0	17.01	19.16	38.45	40.60	-21.4	
High Ch										
846.60	11.6	V	0.6	0.0	10.94	13.09	38.45	40.60	-27.5	
846.60	17.2	H	0.6	0.0	16.54	18.69	38.45	40.60	-21.9	

Rev. 05.31.16

UMTS REL 99, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 6 7 2016
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	11.4	V	0.98	8.05	18.51	33.0	-14.5	
1.852	12.2	H	0.98	8.05	19.27	33.0	-13.7	
Mid Ch								
1.880	11.5	V	0.98	8.03	18.54	33.0	-14.5	
1.880	12.6	H	0.98	8.03	19.61	33.0	-13.4	
High Ch								
1.908	11.6	V	0.98	8.04	18.62	33.0	-14.4	
1.908	12.9	H	0.98	8.04	19.99	33.0	-13.0	

Rev. 05.31.16

UMTS HSDPA, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/07/16
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	10.7	V	0.98	8.05	17.73	33.0	-15.3	
1.852	11.4	H	0.98	8.05	18.43	33.0	-14.6	
Mid Ch								
1.880	10.5	V	0.98	8.03	17.51	33.0	-15.5	
1.880	11.7	H	0.98	8.03	18.80	33.0	-14.2	
High Ch								
1.908	10.7	V	0.98	8.04	17.72	33.0	-15.3	
1.908	12.1	H	0.98	8.04	19.19	33.0	-13.8	

Rev. 05.31.16

UMTS REL 99, 1700MHz BAND 4

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 6/7/16
Test Engineer: 52298.0
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	9.6	V	0.95	8.27	16.92	30.0	-13.1	
1.712	13.8	H	0.95	8.27	21.16	30.0	-8.8	
Mid Ch								
1.733	11.8	V	0.95	8.23	19.07	30.0	-10.9	
1.733	14.6	H	0.95	8.23	21.87	30.0	-8.1	
High Ch								
1.753	12.3	V	0.95	8.18	19.49	30.0	-10.5	
1.753	14.5	H	0.95	8.18	21.76	30.0	-8.2	

Rev. 05.31.16

UMTS HSDPA, 1700MHz BAND 4

High Frequency Substitution Measurement
UL Fremont Radiated Chamber F

Company:
Project #: 16U23328
Date: 06/07/16
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								
1.712	9.1	V	0.95	8.27	16.42	30.0	-13.6	
1.712	12.9	H	0.95	8.27	20.26	30.0	-9.7	
Mid Ch								
1.733	11.1	V	0.95	8.23	18.34	30.0	-11.7	
1.733	14.1	H	0.95	8.23	21.37	30.0	-8.6	
High Ch								
1.753	11.4	V	0.95	8.18	18.63	30.0	-11.4	
1.753	13.9	H	0.95	8.18	21.14	30.0	-8.9	

Rev. 05.31.16

10.4. 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.

ID:	44366	Date:	5/27/16

Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio
		*Peak	Average	
GSM850	GPRS	34.1	33.41	0.69
	EGPRS	32.62	28.98	3.64
GSM1900	GPRS	31.99	31.5	0.49
	EGPRS	31.39	27.89	3.50

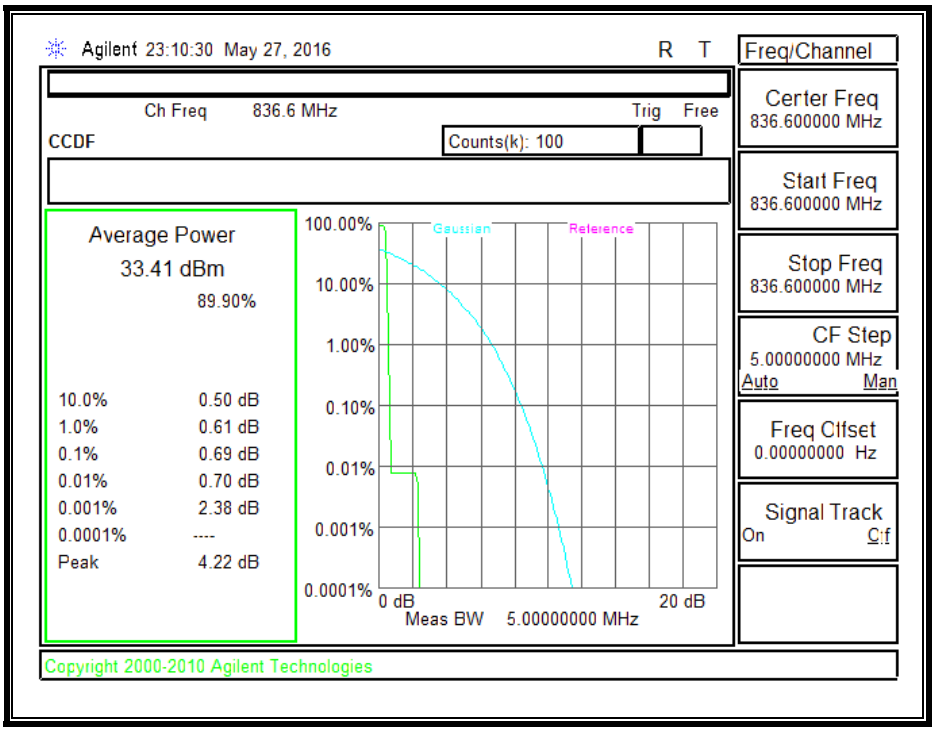
*Peak Reading = Average Reading + Peak-to-Average Ratio

ID:	44388	Date:	6/8/16

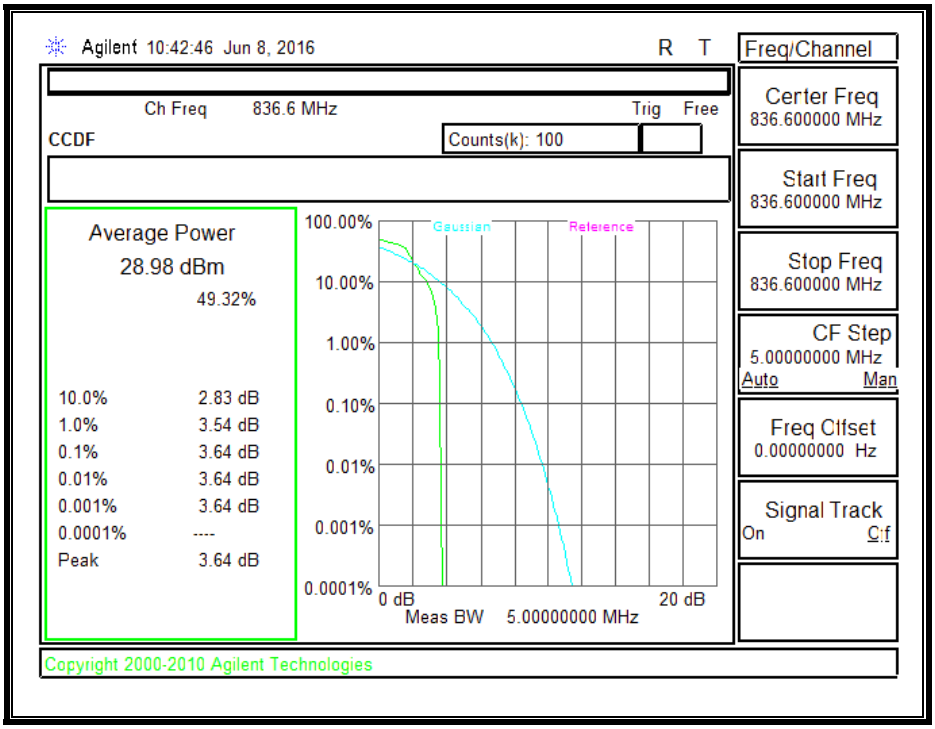
Mode	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio
		*Peak	Average	
UMTS Band 5	REL99	28.18	25.03	3.15
	HSDPA	27.47	23.82	3.65
UMTS Band 2	REL99	28.39	25.29	3.10
	HSDPA	27.93	24.30	3.63
UMTS Band 4	REL99	28.36	25.29	3.07
	HSDPA	27.69	24.30	3.39

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

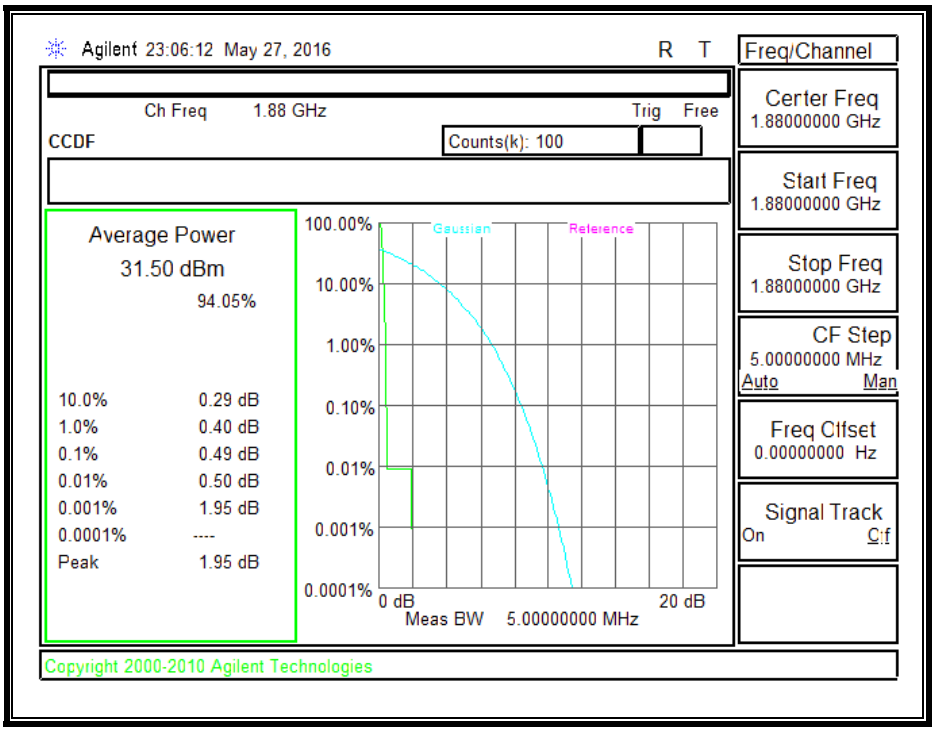
GSM850, GPRS



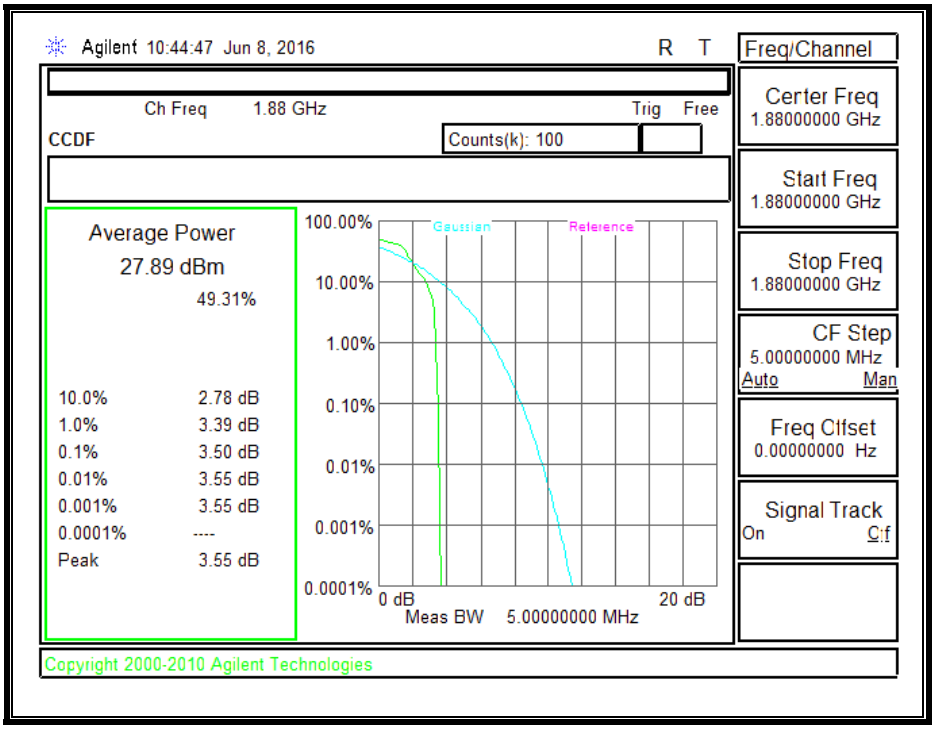
GSM850, EGPRS



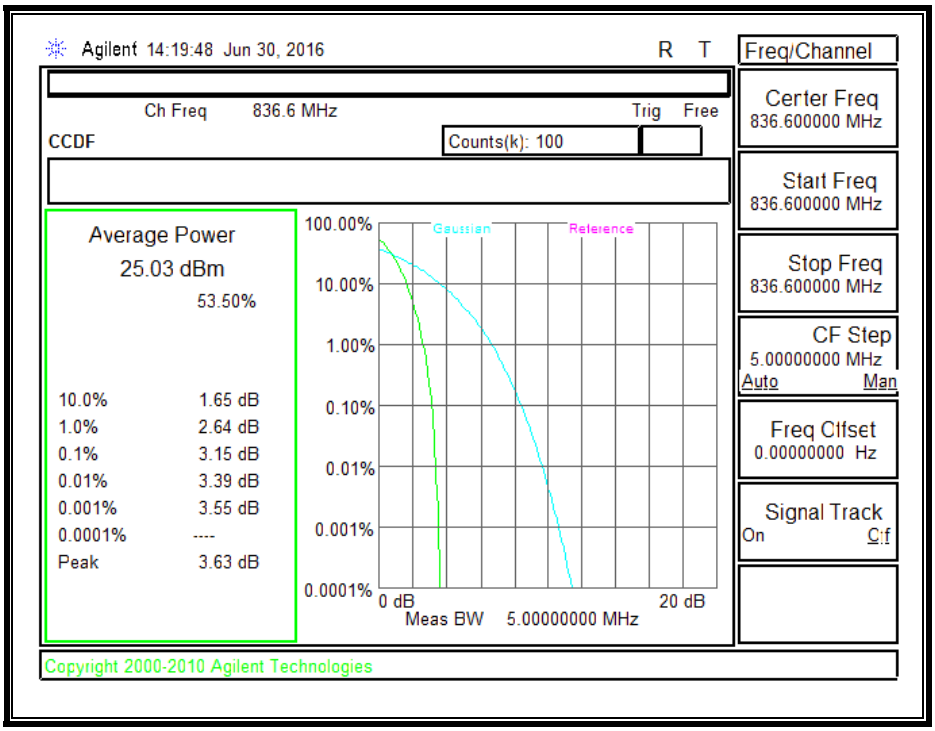
GSM1900, GPRS



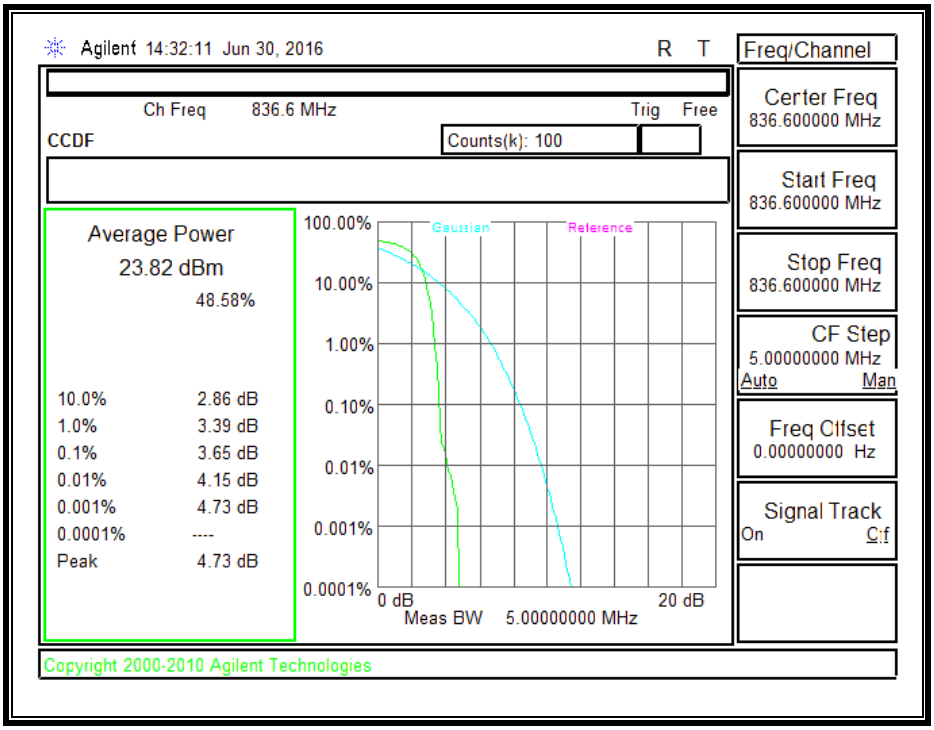
GSM1900, EGPRS



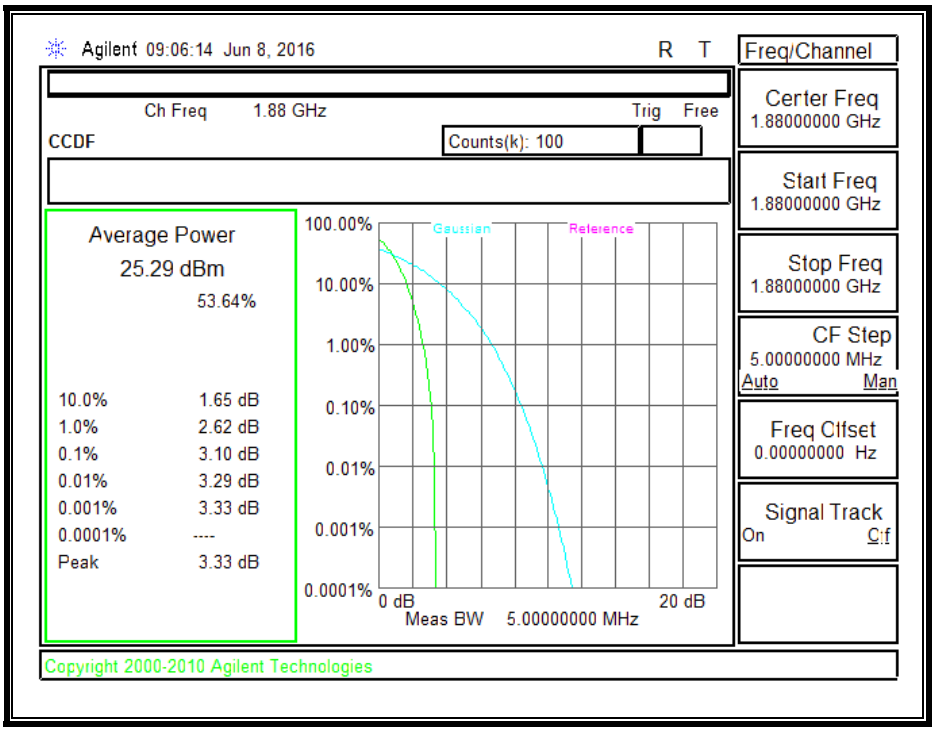
UMTS850, REL 99 BAND 5



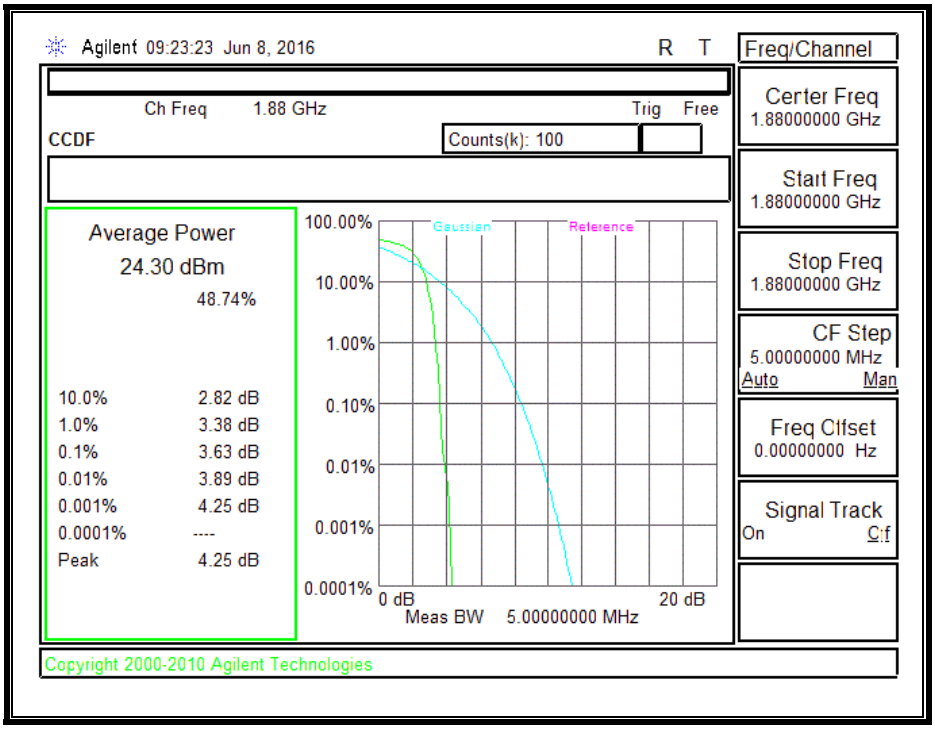
UMTS 850, HSDPA BAND 5



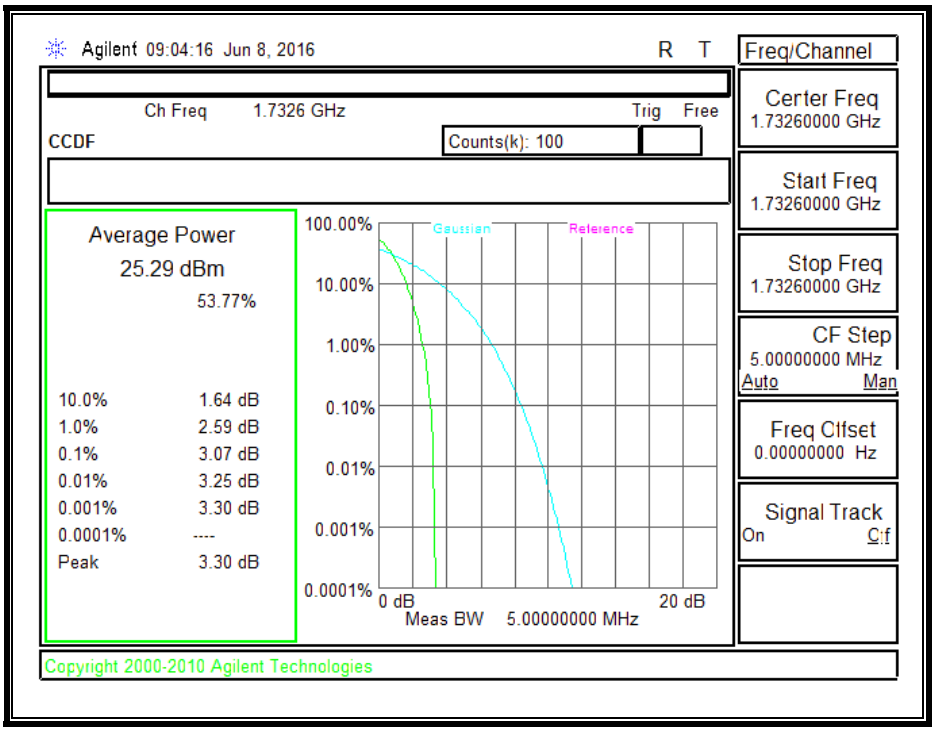
UMTS 1900, REL99 BAND 2



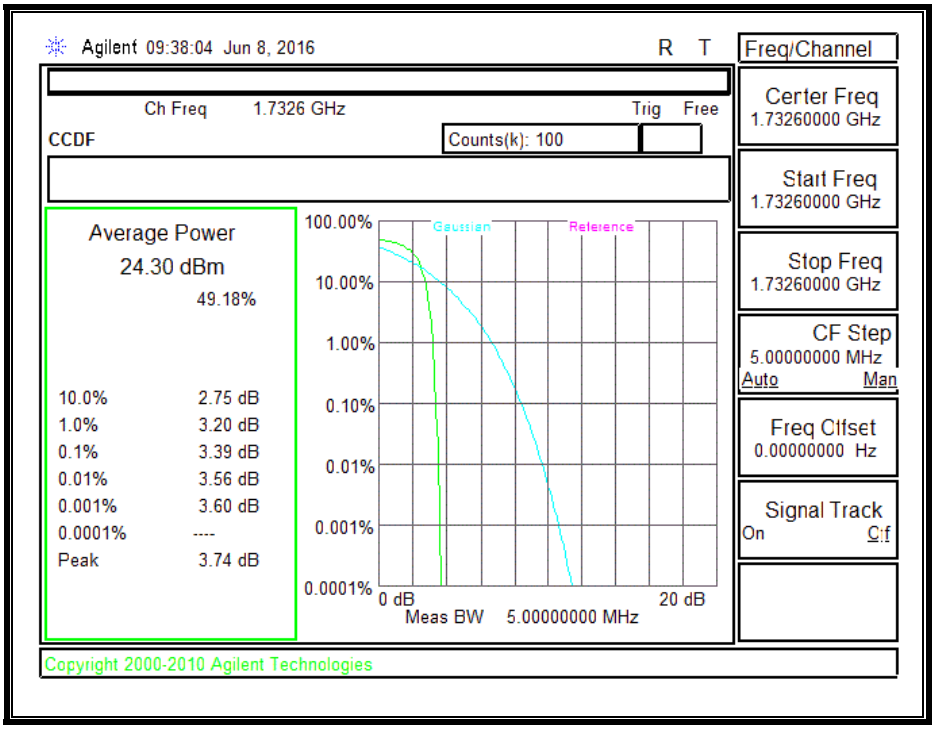
UMTS 1900, HSDPA BAND 2



UMTS 1700, REL99 BAND 4



UMTS 1700, HSDPA BAND 4



10.5. FIELD STRENGTH OF SPURIOUS RADIATION

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 log10(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 Log10 (f/6.1) decibels or 50 + 10 Log10 (P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

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

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

TEST PROCEDURE

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

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

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

MODES TESTED

- GPRS/EGPRS
- UMTS, REL 99 and HSDPA

RESULTS

10.6. LAT, Port A

10.6.1. GSM

GPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/09/16
Test Engineer: 43575
Configuration: EUT only
Mode: GPRS 850MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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	-64.5	H	3.0	-23.4	33.7	1.0	-56.1	-13.0	-43.1	
2.47	-65.5	H	3.0	-21.4	34.1	1.0	-54.6	-13.0	-41.6	
3.28	-65.0	H	3.0	-16.9	34.7	1.0	-50.5	-13.0	-37.5	
1.65	-64.4	V	3.0	-21.0	33.7	1.0	-53.7	-13.0	-40.7	
2.47	-65.2	V	3.0	-20.5	34.1	1.0	-53.6	-13.0	-40.6	
3.30	-65.2	V	3.0	-16.7	34.7	1.0	-50.3	-13.0	-37.3	
Mid Channel (836.6MHz)										
1.67	-65.2	H	3.0	-23.9	33.7	1.0	-56.6	-13.0	-43.6	
2.52	-64.8	H	3.0	-20.5	34.1	1.0	-53.6	-13.0	-40.6	
3.33	-65.9	H	3.0	-17.5	34.6	1.0	-51.1	-13.0	-38.1	
1.70	-65.4	V	3.0	-22.0	33.7	1.0	-54.7	-13.0	-41.7	
2.49	-65.5	V	3.0	-20.8	34.1	1.0	-53.9	-13.0	-40.9	
3.32	-65.8	V	3.0	-17.2	34.6	1.0	-50.8	-13.0	-37.8	
High Channel (848.8MHz)										
1.72	-64.5	H	3.0	-22.9	33.7	1.0	-55.6	-13.0	-42.6	
2.54	-65.0	H	3.0	-20.6	34.1	1.0	-53.8	-13.0	-40.8	
3.38	-65.4	H	3.0	-16.8	34.6	1.0	-50.4	-13.0	-37.4	
1.67	-65.2	V	3.0	-21.8	33.7	1.0	-54.5	-13.0	-41.5	
2.53	-65.4	V	3.0	-20.5	34.1	1.0	-53.6	-13.0	-40.6	
3.41	-65.4	V	3.0	-16.6	34.6	1.0	-50.2	-13.0	-37.2	

Rev. 03.19.15

EGPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/09/16
Test Engineer: 43575
Configuration: EUT only
Mode: EGPRS 850MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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)										
1.64	-65.8	H	3.0	-24.7	33.7	1.0	-57.4	-13.0	-44.4	
2.47	-65.0	H	3.0	-20.9	34.1	1.0	-54.0	-13.0	-41.0	
3.28	-66.3	H	3.0	-18.2	34.7	1.0	-51.8	-13.0	-38.8	
1.65	-64.4	V	3.0	-21.0	33.7	1.0	-53.7	-13.0	-40.7	
2.48	-65.3	V	3.0	-20.6	34.1	1.0	-53.7	-13.0	-40.7	
3.28	-65.9	V	3.0	-17.5	34.7	1.0	-51.1	-13.0	-38.1	
Mid Channel (836.6MHz)										
1.67	-64.3	H	3.0	-22.9	33.7	1.0	-55.6	-13.0	-42.6	
2.51	-65.3	H	3.0	-21.1	34.1	1.0	-54.2	-13.0	-41.2	
3.33	-65.7	H	3.0	-17.3	34.6	1.0	-51.0	-13.0	-38.0	
1.67	-65.1	V	3.0	-21.7	33.7	1.0	-54.4	-13.0	-41.4	
2.49	-65.1	V	3.0	-20.3	34.1	1.0	-53.4	-13.0	-40.4	
3.34	-65.4	V	3.0	-16.8	34.6	1.0	-50.4	-13.0	-37.4	
High Channel (848.8MHz)										
1.70	-64.5	H	3.0	-23.0	33.7	1.0	-55.6	-13.0	-42.6	
2.55	-63.9	H	3.0	-19.5	34.2	1.0	-52.6	-13.0	-39.6	
3.37	-64.5	H	3.0	-16.0	34.6	1.0	-49.6	-13.0	-36.6	
1.70	-64.7	V	3.0	-21.3	33.7	1.0	-54.0	-13.0	-41.0	
2.56	-65.1	V	3.0	-20.0	34.2	1.0	-53.2	-13.0	-40.2	
3.42	-65.9	V	3.0	-17.0	34.6	1.0	-50.6	-13.0	-37.6	

Rev. 03.19.15

GPRS, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/09/16
Test Engineer: 43575
Configuration: EUT only
Mode: GPRS 1900MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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)										
3.71	-64.1	H	3.0	-14.3	34.4	1.0	-47.8	-13.0	-34.8	
5.55	-65.6	H	3.0	-12.1	34.1	1.0	-45.3	-13.0	-32.3	
7.42	-67.1	H	3.0	-10.7	33.6	1.0	-43.3	-13.0	-30.3	
3.71	-63.9	V	3.0	-14.0	34.4	1.0	-47.5	-13.0	-34.5	
5.55	-65.2	V	3.0	-11.6	34.1	1.0	-44.7	-13.0	-31.7	
7.41	-67.2	V	3.0	-11.0	33.6	1.0	-43.6	-13.0	-30.6	
Mid Channel (1880.0)										
3.74	-63.7	H	3.0	-13.8	34.4	1.0	-47.2	-13.0	-34.2	
5.65	-66.1	H	3.0	-12.5	34.1	1.0	-45.6	-13.0	-32.6	
5.65	-66.1	H	3.0	-12.5	34.1	1.0	-45.6	-13.0	-32.6	
3.76	-63.5	V	3.0	-13.5	34.4	1.0	-46.9	-13.0	-33.9	
5.65	-66.2	V	3.0	-12.5	34.1	1.0	-45.6	-13.0	-32.6	
7.53	-67.6	V	3.0	-11.3	33.5	1.0	-43.8	-13.0	-30.8	
High Channel (1909.8MHz)										
3.80	-63.5	H	3.0	-13.4	34.4	1.0	-46.8	-13.0	-33.8	
5.74	-66.2	H	3.0	-12.4	34.1	1.0	-45.5	-13.0	-32.5	
7.63	-67.0	H	3.0	-10.4	33.4	1.0	-42.8	-13.0	-29.8	
3.80	-62.4	V	3.0	-12.2	34.4	1.0	-45.6	-13.0	-32.6	
5.75	-66.8	V	3.0	-12.9	34.1	1.0	-46.0	-13.0	-33.0	
7.65	-66.2	V	3.0	-9.7	33.4	1.0	-42.2	-13.0	-29.2	

Rev. 03.19.15

EGPRS, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/09/16
Test Engineer: 43575
Configuration: EUT only
Mode: EGPRS 1900MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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)										
3.69	-64.0	H	3.0	-14.3	34.4	1.0	-47.7	-13.0	-34.7	
5.56	-65.7	H	3.0	-12.3	34.1	1.0	-45.4	-13.0	-32.4	
7.41	-67.4	H	3.0	-11.1	33.6	1.0	-43.7	-13.0	-30.7	
3.68	-64.3	V	3.0	-14.5	34.5	1.0	-48.0	-13.0	-35.0	
5.56	-65.5	V	3.0	-11.8	34.1	1.0	-44.9	-13.0	-31.9	
7.39	-67.7	V	3.0	-11.6	33.6	1.0	-44.2	-13.0	-31.2	
Mid Channel (1880.0)										
3.74	-63.5	H	3.0	-13.6	34.4	1.0	-47.0	-13.0	-34.0	
5.64	-66.3	H	3.0	-12.7	34.1	1.0	-45.9	-13.0	-32.9	
7.52	-67.7	H	3.0	-11.2	33.5	1.0	-43.8	-13.0	-30.8	
3.76	-63.0	V	3.0	-12.9	34.4	1.0	-46.3	-13.0	-33.3	
5.65	-65.7	V	3.0	-12.0	34.1	1.0	-45.1	-13.0	-32.1	
7.50	-67.2	V	3.0	-11.0	33.5	1.0	-43.5	-13.0	-30.5	
High Channel (1909.8MHz)										
3.81	-62.8	H	3.0	-12.7	34.4	1.0	-46.1	-13.0	-33.1	
5.72	-66.5	H	3.0	-12.8	34.1	1.0	-45.9	-13.0	-32.9	
7.66	-66.8	H	3.0	-10.1	33.4	1.0	-42.6	-13.0	-29.6	
3.82	-62.8	V	3.0	-12.5	34.4	1.0	-45.9	-13.0	-32.9	
5.71	-66.1	V	3.0	-12.3	34.1	1.0	-45.4	-13.0	-32.4	
7.66	-67.0	V	3.0	-10.5	33.4	1.0	-43.0	-13.0	-30.0	

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10.6.2. UMTS

UMTS REL 99, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/09/16
Test Engineer: 43575
Configuration: EUT only
Mode: REL 99, 850MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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	-58.4	H	3.0	-17.3	33.7	1.0	-50.0	-13.0	-37.0	
2.47	-59.0	H	3.0	-14.9	34.1	1.0	-48.0	-13.0	-35.0	
3.29	-58.1	H	3.0	-9.9	34.7	1.0	-43.6	-13.0	-30.6	
1.63	-58.5	V	3.0	-15.1	33.7	1.0	-47.9	-13.0	-34.9	
2.47	-58.8	V	3.0	-14.1	34.1	1.0	-47.2	-13.0	-34.2	
3.30	-57.7	V	3.0	-9.2	34.7	1.0	-42.9	-13.0	-29.9	
Mid Channel (836.6MHz)										
1.67	-58.7	H	3.0	-17.4	33.7	1.0	-50.1	-13.0	-37.1	
2.52	-58.3	H	3.0	-14.0	34.1	1.0	-47.1	-13.0	-34.1	
3.34	-58.0	H	3.0	-9.6	34.6	1.0	-43.3	-13.0	-30.3	
1.67	-58.5	V	3.0	-15.1	33.7	1.0	-47.8	-13.0	-34.8	
2.53	-57.8	V	3.0	-12.9	34.1	1.0	-46.0	-13.0	-33.0	
3.36	-58.7	V	3.0	-10.0	34.6	1.0	-43.6	-13.0	-30.6	
High Channel (846.6MHz)										
1.70	-57.9	H	3.0	-16.4	33.7	1.0	-49.1	-13.0	-36.1	
2.56	-58.3	H	3.0	-13.8	34.2	1.0	-47.0	-13.0	-34.0	
3.37	-58.9	H	3.0	-10.4	34.6	1.0	-44.0	-13.0	-31.0	
1.70	-58.4	V	3.0	-15.0	33.7	1.0	-47.6	-13.0	-34.6	
2.52	-58.4	V	3.0	-13.5	34.1	1.0	-46.6	-13.0	-33.6	
3.38	-59.1	V	3.0	-10.3	34.6	1.0	-43.9	-13.0	-30.9	

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UMTS HSDPA, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/09/16
Test Engineer: 43575
Configuration: EUT only
Mode: HSPA 850MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	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 (826.4MHz)										
1.63	-58.5	H	3.0	-17.5	33.7	1.0	-50.2	-13.0	-37.2	
2.46	-58.5	H	3.0	-14.4	34.1	1.0	-47.5	-13.0	-34.5	
3.30	-58.7	H	3.0	-10.4	34.7	1.0	-44.1	-13.0	-31.1	
1.64	-58.9	V	3.0	-15.5	33.7	1.0	-48.3	-13.0	-35.3	
2.46	-57.8	V	3.0	-13.1	34.1	1.0	-46.2	-13.0	-33.2	
3.30	-58.7	V	3.0	-10.2	34.7	1.0	-43.9	-13.0	-30.9	
Mid Channel (836.6MHz)										
1.69	-58.3	H	3.0	-16.9	33.7	1.0	-49.5	-13.0	-36.5	
2.49	-58.6	H	3.0	-14.5	34.1	1.0	-47.6	-13.0	-34.6	
3.35	-58.9	H	3.0	-10.5	34.6	1.0	-44.1	-13.0	-31.1	
1.66	-58.9	V	3.0	-15.5	33.7	1.0	-48.2	-13.0	-35.2	
2.53	-58.0	V	3.0	-13.1	34.1	1.0	-46.2	-13.0	-33.2	
3.36	-58.8	V	3.0	-10.1	34.6	1.0	-43.8	-13.0	-30.8	
High Channel (846.6MHz)										
1.68	-58.1	H	3.0	-16.7	33.7	1.0	-49.4	-13.0	-36.4	
2.55	-58.6	H	3.0	-14.2	34.2	1.0	-47.3	-13.0	-34.3	
3.38	-58.0	H	3.0	-9.4	34.6	1.0	-43.0	-13.0	-30.0	
1.68	-58.3	V	3.0	-14.9	33.7	1.0	-47.6	-13.0	-34.6	
2.56	-58.6	V	3.0	-13.5	34.2	1.0	-46.7	-13.0	-33.7	
3.37	-58.9	V	3.0	-10.1	34.6	1.0	-43.8	-13.0	-30.8	

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UMTS REL 99, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/09/16
Test Engineer: 43575
Configuration: EUT only
Mode: REL 99, 1900MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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	-54.6	H	3.0	-4.9	34.4	1.0	-38.3	-13.0	-25.3	
5.56	-56.4	H	3.0	-3.0	34.1	1.0	-36.1	-13.0	-23.1	
7.40	-58.2	H	3.0	-1.8	33.6	1.0	-34.5	-13.0	-21.5	
3.70	-55.0	V	3.0	-5.1	34.4	1.0	-38.6	-13.0	-25.6	
5.58	-56.3	V	3.0	-2.6	34.1	1.0	-35.7	-13.0	-22.7	
7.39	-58.6	V	3.0	-2.5	33.6	1.0	-35.1	-13.0	-22.1	
Mid Channel (1880MHz)										
3.77	-54.6	H	3.0	-4.6	34.4	1.0	-38.0	-13.0	-25.0	
5.64	-56.5	H	3.0	-2.9	34.1	1.0	-36.0	-13.0	-23.0	
7.52	-57.2	H	3.0	-0.7	33.5	1.0	-33.2	-13.0	-20.2	
3.76	-54.7	V	3.0	-4.6	34.4	1.0	-38.0	-13.0	-25.0	
5.65	-57.2	V	3.0	-3.4	34.1	1.0	-36.5	-13.0	-23.5	
7.53	-58.7	V	3.0	-2.4	33.5	1.0	-34.9	-13.0	-21.9	
High Channel (1907.6MHz)										
3.83	-54.6	H	3.0	-4.3	34.4	1.0	-37.7	-13.0	-24.7	
5.72	-57.0	H	3.0	-3.3	34.1	1.0	-36.4	-13.0	-23.4	
7.65	-57.7	H	3.0	-1.1	33.4	1.0	-33.5	-13.0	-20.5	
3.81	-54.0	V	3.0	-3.8	34.4	1.0	-37.2	-13.0	-24.2	
5.73	-57.6	V	3.0	-3.7	34.1	1.0	-36.8	-13.0	-23.8	
7.65	-57.5	V	3.0	-1.0	33.4	1.0	-33.4	-13.0	-20.4	

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UMTS HSDPA, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/09/16
Test Engineer: 43575
Configuration: EUT only
Mode: HSPA 1900MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	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)										
3.72	-53.3	H	3.0	-3.5	34.4	1.0	-36.9	-13.0	-23.9	
5.54	-56.1	H	3.0	-2.7	34.1	1.0	-35.8	-13.0	-22.8	
7.40	-57.4	H	3.0	-1.1	33.6	1.0	-33.7	-13.0	-20.7	
3.69	-54.8	V	3.0	-5.0	34.4	1.0	-38.4	-13.0	-25.4	
5.56	-54.9	V	3.0	-1.3	34.1	1.0	-34.4	-13.0	-21.4	
7.41	-57.8	V	3.0	-1.7	33.6	1.0	-34.3	-13.0	-21.3	
Mid Channel (1880MHz)										
3.77	-54.1	H	3.0	-4.0	34.4	1.0	-37.4	-13.0	-24.4	
5.64	-56.0	H	3.0	-2.5	34.1	1.0	-35.6	-13.0	-22.6	
7.54	-57.0	H	3.0	-0.5	33.5	1.0	-33.0	-13.0	-20.0	
3.74	-55.3	V	3.0	-5.3	34.4	1.0	-38.7	-13.0	-25.7	
5.62	-57.4	V	3.0	-3.7	34.1	1.0	-36.8	-13.0	-23.8	
7.52	-59.2	V	3.0	-2.9	33.5	1.0	-35.4	-13.0	-22.4	
High Channel (1907.6MHz)										
3.81	-53.8	H	3.0	-3.7	34.4	1.0	-37.0	-13.0	-24.0	
5.71	-56.8	H	3.0	-3.1	34.1	1.0	-36.2	-13.0	-23.2	
7.64	-57.4	H	3.0	-0.8	33.4	1.0	-33.2	-13.0	-20.2	
3.83	-53.6	V	3.0	-3.3	34.4	1.0	-36.7	-13.0	-23.7	
5.73	-57.2	V	3.0	-3.3	34.1	1.0	-36.4	-13.0	-23.4	
7.63	-57.1	V	3.0	-0.6	33.4	1.0	-33.1	-13.0	-20.1	

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UMTS REL 99, 1700MHz BAND 4

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/09/16
Test Engineer: 43575
Configuration: EUT only
Mode: REL 99, 1700MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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)										
3.41	-58.9	H	3.0	-10.2	34.6	1.0	-43.8	-13.0	-30.8	
5.12	-58.4	H	3.0	-5.6	34.2	1.0	-38.8	-13.0	-25.8	
5.12	-58.4	H	3.0	-5.6	34.2	1.0	-38.8	-13.0	-25.8	
3.44	-58.8	V	3.0	-9.8	34.6	1.0	-43.4	-13.0	-30.4	
5.14	-58.8	V	3.0	-5.7	34.2	1.0	-38.9	-13.0	-25.9	
6.85	-58.9	V	3.0	-3.5	33.9	1.0	-36.4	-13.0	-23.4	
Mid Channel (1732.6MHz)										
3.45	-59.2	H	3.0	-10.4	34.6	1.0	-44.0	-13.0	-31.0	
5.21	-59.5	H	3.0	-6.7	34.2	1.0	-39.8	-13.0	-26.8	
6.93	-59.8	H	3.0	-4.2	33.9	1.0	-37.1	-13.0	-24.1	
3.48	-58.3	V	3.0	-9.1	34.6	1.0	-42.7	-13.0	-29.7	
5.19	-58.3	V	3.0	-5.2	34.2	1.0	-38.3	-13.0	-25.3	
6.95	-59.4	V	3.0	-3.9	33.9	1.0	-36.8	-13.0	-23.8	
High Channel (1752.6MHz)										
3.53	-59.0	H	3.0	-9.9	34.5	1.0	-43.4	-13.0	-30.4	
5.27	-58.7	H	3.0	-5.8	34.2	1.0	-38.9	-13.0	-25.9	
7.03	-59.5	H	3.0	-3.7	33.9	1.0	-36.6	-13.0	-23.6	
3.52	-59.1	V	3.0	-9.9	34.5	1.0	-43.4	-13.0	-30.4	
5.24	-59.7	V	3.0	-6.4	34.2	1.0	-39.6	-13.0	-26.6	
7.00	-59.9	V	3.0	-4.3	33.9	1.0	-37.2	-13.0	-24.2	

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UMTS HSDPA, 1700MHz BAND 4

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/09/16
Test Engineer: 43575
Configuration: EUT only
Mode: HSPA 1700MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	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)										
3.44	-56.4	H	3.0	-7.7	34.6	1.0	-41.2	-13.0	-28.2	
5.15	-55.4	H	3.0	-2.6	34.2	1.0	-35.8	-13.0	-22.8	
6.85	-57.8	H	3.0	-2.3	33.9	1.0	-35.2	-13.0	-22.2	
3.41	-56.6	V	3.0	-7.7	34.6	1.0	-41.3	-13.0	-28.3	
5.12	-55.4	V	3.0	-2.4	34.2	1.0	-35.6	-13.0	-22.6	
6.84	-57.4	V	3.0	-2.0	33.9	1.0	-35.0	-13.0	-22.0	
Mid Channel (1732.6MHz)										
3.44	-57.1	H	3.0	-8.3	34.6	1.0	-41.8	-13.0	-28.8	
5.18	-55.5	H	3.0	-2.7	34.2	1.0	-35.9	-13.0	-22.9	
6.93	-57.5	H	3.0	-1.8	33.9	1.0	-34.7	-13.0	-21.7	
3.46	-55.8	V	3.0	-6.8	34.6	1.0	-40.3	-13.0	-27.3	
5.20	-56.5	V	3.0	-3.4	34.2	1.0	-36.5	-13.0	-23.5	
6.96	-57.0	V	3.0	-1.5	33.9	1.0	-34.4	-13.0	-21.4	
High Channel (1752.6MHz)										
3.49	-57.4	H	3.0	-8.5	34.6	1.0	-42.0	-13.0	-29.0	
5.28	-56.2	H	3.0	-3.2	34.2	1.0	-36.4	-13.0	-23.4	
7.00	-55.8	H	3.0	-0.1	33.9	1.0	-33.0	-13.0	-20.0	
3.52	-57.0	V	3.0	-7.8	34.5	1.0	-41.3	-13.0	-28.3	
5.27	-56.7	V	3.0	-3.4	34.2	1.0	-36.6	-13.0	-23.6	
7.02	-57.4	V	3.0	-1.8	33.9	1.0	-34.7	-13.0	-21.7	

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10.7. UAT, Port B

10.7.1. GSM

GPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/10/16
Test Engineer: 43575
Configuration: EUT only
Mode: GPRS 850MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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	-65.3	H	3.0	-24.2	33.7	1.0	-56.9	-13.0	-43.9	
2.48	-65.8	H	3.0	-21.7	34.1	1.0	-54.8	-13.0	-41.8	
3.27	-65.6	H	3.0	-17.5	34.7	1.0	-51.2	-13.0	-38.2	
1.65	-63.5	V	3.0	-20.1	33.7	1.0	-52.8	-13.0	-39.8	
2.46	-66.8	V	3.0	-22.1	34.1	1.0	-55.2	-13.0	-42.2	
3.26	-65.2	V	3.0	-16.9	34.7	1.0	-50.6	-13.0	-37.6	
Mid Channel (836.6MHz)										
1.67	-66.2	H	3.0	-24.9	33.7	1.0	-57.6	-13.0	-44.6	
2.50	-66.5	H	3.0	-22.3	34.1	1.0	-55.4	-13.0	-42.4	
3.37	-66.0	H	3.0	-17.5	34.6	1.0	-51.1	-13.0	-38.1	
1.67	-63.8	V	3.0	-20.4	33.7	1.0	-53.1	-13.0	-40.1	
2.54	-64.9	V	3.0	-19.9	34.1	1.0	-53.1	-13.0	-40.1	
3.34	-66.8	V	3.0	-18.2	34.6	1.0	-51.8	-13.0	-38.8	
High Channel (848.8MHz)										
1.69	-65.9	H	3.0	-24.5	33.7	1.0	-57.2	-13.0	-44.2	
2.55	-63.6	H	3.0	-19.1	34.2	1.0	-52.3	-13.0	-39.3	
3.42	-65.9	H	3.0	-17.2	34.6	1.0	-50.8	-13.0	-37.8	
1.70	-64.8	V	3.0	-21.4	33.7	1.0	-54.1	-13.0	-41.1	
2.53	-65.2	V	3.0	-20.3	34.1	1.0	-53.4	-13.0	-40.4	
3.86	-67.3	V	3.0	-16.8	34.4	1.0	-50.2	-13.0	-37.2	

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EGPRS, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/10/16
Test Engineer: 43575
Configuration: EUT only
Mode: EGPRS 850MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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	-65.8	H	3.0	-24.6	33.7	1.0	-57.3	-13.0	-44.3	
2.46	-67.8	H	3.0	-23.7	34.1	1.0	-56.8	-13.0	-43.8	
3.25	-67.7	H	3.0	-19.6	34.7	1.0	-53.3	-13.0	-40.3	
1.65	-64.5	V	3.0	-21.1	33.7	1.0	-53.8	-13.0	-40.8	
2.43	-67.5	V	3.0	-22.8	34.2	1.0	-56.0	-13.0	-43.0	
3.28	-67.6	V	3.0	-19.2	34.7	1.0	-52.9	-13.0	-39.9	
Mid Channel (836.6MHz)										
1.67	-65.6	H	3.0	-24.3	33.7	1.0	-57.0	-13.0	-44.0	
2.47	-67.3	H	3.0	-23.2	34.1	1.0	-56.3	-13.0	-43.3	
3.30	-67.6	H	3.0	-19.4	34.7	1.0	-53.0	-13.0	-40.0	
1.72	-67.0	V	3.0	-23.5	33.7	1.0	-56.2	-13.0	-43.2	
2.46	-66.6	V	3.0	-21.9	34.1	1.0	-55.0	-13.0	-42.0	
3.35	-67.3	V	3.0	-18.6	34.6	1.0	-52.2	-13.0	-39.2	
High Channel (848.8MHz)										
1.70	-67.3	H	3.0	-25.9	33.7	1.0	-58.5	-13.0	-45.5	
2.55	-64.9	H	3.0	-20.5	34.2	1.0	-53.7	-13.0	-40.7	
3.37	-67.4	H	3.0	-18.9	34.6	1.0	-52.5	-13.0	-39.5	
1.67	-67.2	V	3.0	-23.8	33.7	1.0	-56.5	-13.0	-43.5	
2.58	-67.6	V	3.0	-22.4	34.2	1.0	-55.6	-13.0	-42.6	
3.38	-67.8	V	3.0	-19.0	34.6	1.0	-52.6	-13.0	-39.6	

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GPRS, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/10/16
Test Engineer: 43575
Configuration: EUT only
Mode: GPRS 1900MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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)										
3.69	-64.8	H	3.0	-15.1	34.4	1.0	-48.5	-13.0	-35.5	
5.57	-66.8	H	3.0	-13.4	34.1	1.0	-46.5	-13.0	-33.5	
7.36	-68.1	H	3.0	-11.8	33.6	1.0	-44.5	-13.0	-31.5	
3.75	-64.2	V	3.0	-14.2	34.4	1.0	-47.6	-13.0	-34.6	
5.58	-66.0	V	3.0	-12.4	34.1	1.0	-45.5	-13.0	-32.5	
7.44	-66.9	V	3.0	-10.7	33.6	1.0	-43.3	-13.0	-30.3	
Mid Channel (1880.0)										
3.77	-64.2	H	3.0	-14.1	34.4	1.0	-47.5	-13.0	-34.5	
5.63	-66.1	H	3.0	-12.5	34.1	1.0	-45.6	-13.0	-32.6	
7.55	-68.0	H	3.0	-11.5	33.5	1.0	-44.0	-13.0	-31.0	
3.71	-64.7	V	3.0	-14.8	34.4	1.0	-48.2	-13.0	-35.2	
5.66	-66.9	V	3.0	-13.2	34.1	1.0	-46.3	-13.0	-33.3	
7.47	-68.5	V	3.0	-12.2	33.6	1.0	-44.8	-13.0	-31.8	
High Channel (1909.8MHz)										
3.80	-64.2	H	3.0	-14.1	34.4	1.0	-47.4	-13.0	-34.4	
5.77	-67.3	H	3.0	-13.5	34.1	1.0	-46.6	-13.0	-33.6	
7.66	-67.4	H	3.0	-10.7	33.4	1.0	-43.1	-13.0	-30.1	
3.79	-64.6	V	3.0	-14.4	34.4	1.0	-47.8	-13.0	-34.8	
5.78	-67.2	V	3.0	-13.2	34.1	1.0	-46.3	-13.0	-33.3	
7.61	-67.5	V	3.0	-11.1	33.4	1.0	-43.6	-13.0	-30.6	

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EGPRS, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/10/16
Test Engineer: 43575
Configuration: EUT only
Mode: EGPRS 1900MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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)										
3.75	-65.0	H	3.0	-15.0	34.4	1.0	-48.4	-13.0	-35.4	
5.56	-67.1	H	3.0	-13.6	34.1	1.0	-46.7	-13.0	-33.7	
7.38	-68.5	H	3.0	-12.2	33.6	1.0	-44.8	-13.0	-31.8	
3.74	-64.6	V	3.0	-14.6	34.4	1.0	-48.0	-13.0	-35.0	
5.56	-66.3	V	3.0	-12.6	34.1	1.0	-45.7	-13.0	-32.7	
7.41	-68.8	V	3.0	-12.6	33.6	1.0	-45.2	-13.0	-32.2	
Mid Channel (1880.0)										
3.80	-64.5	H	3.0	-14.4	34.4	1.0	-47.8	-13.0	-34.8	
5.64	-65.9	H	3.0	-12.3	34.1	1.0	-45.4	-13.0	-32.4	
7.53	-67.9	H	3.0	-11.4	33.5	1.0	-44.0	-13.0	-31.0	
3.74	-64.9	V	3.0	-14.9	34.4	1.0	-48.3	-13.0	-35.3	
5.59	-66.6	V	3.0	-12.9	34.1	1.0	-46.0	-13.0	-33.0	
7.53	-67.8	V	3.0	-11.4	33.5	1.0	-44.0	-13.0	-31.0	
High Channel (1909.8MHz)										
3.82	-64.6	H	3.0	-14.4	34.4	1.0	-47.8	-13.0	-34.8	
5.76	-67.7	H	3.0	-14.0	34.1	1.0	-47.1	-13.0	-34.1	
7.62	-67.7	H	3.0	-11.1	33.4	1.0	-43.5	-13.0	-30.5	
3.85	-64.6	V	3.0	-14.2	34.4	1.0	-47.5	-13.0	-34.5	
5.72	-67.3	V	3.0	-13.4	34.1	1.0	-46.5	-13.0	-33.5	
7.60	-67.8	V	3.0	-11.4	33.5	1.0	-43.8	-13.0	-30.8	

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10.7.2. UMTS

UMTS REL 99, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/09/16
Test Engineer: 43575
Configuration: EUT only
Mode: REL 99, 850MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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	-59.6	H	3.0	-18.4	33.7	1.0	-51.1	-13.0	-38.1	
2.45	-59.0	H	3.0	-15.0	34.1	1.0	-48.1	-13.0	-35.1	
3.26	-59.0	H	3.0	-10.9	34.7	1.0	-44.6	-13.0	-31.6	
1.66	-59.8	V	3.0	-16.4	33.7	1.0	-49.1	-13.0	-36.1	
2.45	-59.4	V	3.0	-14.6	34.1	1.0	-47.8	-13.0	-34.8	
3.28	-59.7	V	3.0	-11.2	34.7	1.0	-44.9	-13.0	-31.9	
Mid Channel (836.6MHz)										
1.71	-59.6	H	3.0	-18.0	33.7	1.0	-50.7	-13.0	-37.7	
2.47	-59.9	H	3.0	-15.8	34.1	1.0	-48.9	-13.0	-35.9	
3.30	-59.7	H	3.0	-11.4	34.7	1.0	-45.1	-13.0	-32.1	
1.66	-58.1	V	3.0	-14.7	33.7	1.0	-47.4	-13.0	-34.4	
2.55	-59.2	V	3.0	-14.2	34.2	1.0	-47.4	-13.0	-34.4	
3.31	-59.1	V	3.0	-10.6	34.7	1.0	-44.2	-13.0	-31.2	
High Channel (846.6MHz)										
1.72	-59.3	H	3.0	-17.6	33.7	1.0	-50.3	-13.0	-37.3	
2.57	-59.8	H	3.0	-15.2	34.2	1.0	-48.4	-13.0	-35.4	
3.43	-59.9	H	3.0	-11.2	34.6	1.0	-44.7	-13.0	-31.7	
1.69	-59.5	V	3.0	-16.0	33.7	1.0	-48.7	-13.0	-35.7	
2.57	-59.3	V	3.0	-14.1	34.2	1.0	-47.3	-13.0	-34.3	
3.39	-59.6	V	3.0	-10.8	34.6	1.0	-44.4	-13.0	-31.4	

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UMTS HSDPA, 850MHz BAND 5

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/10/16
Test Engineer: 43575
Configuration: EUT only
Mode: HSPA 850MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	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 (826.4MHz)										
1.67	-59.8	H	3.0	-18.5	33.7	1.0	-51.2	-13.0	-38.2	
2.52	-59.6	H	3.0	-15.3	34.1	1.0	-48.4	-13.0	-35.4	
3.26	-58.8	H	3.0	-10.7	34.7	1.0	-44.3	-13.0	-31.3	
1.70	-59.7	V	3.0	-16.3	33.7	1.0	-49.0	-13.0	-36.0	
2.44	-59.7	V	3.0	-15.0	34.2	1.0	-48.2	-13.0	-35.2	
3.28	-59.1	V	3.0	-10.7	34.7	1.0	-44.3	-13.0	-31.3	
Mid Channel (836.6MHz)										
1.72	-59.5	H	3.0	-17.8	33.7	1.0	-50.5	-13.0	-37.5	
2.55	-59.2	H	3.0	-14.8	34.2	1.0	-48.0	-13.0	-35.0	
3.38	-58.9	H	3.0	-10.3	34.6	1.0	-43.9	-13.0	-30.9	
1.72	-58.8	V	3.0	-15.4	33.7	1.0	-48.0	-13.0	-35.0	
2.55	-59.5	V	3.0	-14.5	34.2	1.0	-47.6	-13.0	-34.6	
3.31	-58.8	V	3.0	-10.3	34.7	1.0	-43.9	-13.0	-30.9	
High Channel (846.6MHz)										
1.71	-59.0	H	3.0	-17.4	33.7	1.0	-50.1	-13.0	-37.1	
2.56	-59.0	H	3.0	-14.5	34.2	1.0	-47.7	-13.0	-34.7	
3.41	-59.3	H	3.0	-10.6	34.6	1.0	-44.2	-13.0	-31.2	
1.73	-59.0	V	3.0	-15.6	33.7	1.0	-48.2	-13.0	-35.2	
2.55	-58.4	V	3.0	-13.4	34.2	1.0	-46.5	-13.0	-33.5	
3.41	-58.4	V	3.0	-9.5	34.6	1.0	-43.1	-13.0	-30.1	

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UMTS REL 99, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/10/16
Test Engineer: 43575
Configuration: EUT only
Mode: REL 99, 1900MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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)										
3.75	-57.3	H	3.0	-7.3	34.4	1.0	-40.8	-13.0	-27.8	
5.52	-59.3	H	3.0	-5.9	34.1	1.0	-39.0	-13.0	-26.0	
7.41	-61.3	H	3.0	-5.0	33.6	1.0	-37.6	-13.0	-24.6	
3.75	-56.9	V	3.0	-6.8	34.4	1.0	-40.2	-13.0	-27.2	
5.57	-58.5	V	3.0	-4.9	34.1	1.0	-38.0	-13.0	-25.0	
7.38	-60.6	V	3.0	-4.5	33.6	1.0	-37.1	-13.0	-24.1	
Mid Channel (1880MHz)										
3.75	-56.4	H	3.0	-6.5	34.4	1.0	-39.9	-13.0	-26.9	
5.59	-59.3	H	3.0	-5.8	34.1	1.0	-38.9	-13.0	-25.9	
7.49	-60.3	H	3.0	-3.9	33.5	1.0	-36.5	-13.0	-23.5	
3.75	-57.0	V	3.0	-7.0	34.4	1.0	-40.4	-13.0	-27.4	
5.60	-59.0	V	3.0	-5.3	34.1	1.0	-38.4	-13.0	-25.4	
7.53	-60.7	V	3.0	-4.4	33.5	1.0	-36.9	-13.0	-23.9	
High Channel (1907.6MHz)										
3.85	-57.1	H	3.0	-6.8	34.4	1.0	-40.1	-13.0	-27.1	
5.77	-58.9	H	3.0	-5.1	34.1	1.0	-38.2	-13.0	-25.2	
7.62	-60.6	H	3.0	-4.0	33.4	1.0	-36.5	-13.0	-23.5	
3.81	-57.0	V	3.0	-6.7	34.4	1.0	-40.1	-13.0	-27.1	
5.68	-59.2	V	3.0	-5.4	34.1	1.0	-38.5	-13.0	-25.5	
7.62	-60.3	V	3.0	-3.9	33.4	1.0	-36.3	-13.0	-23.3	

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UMTS HSDPA, 1900MHz BAND 2

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/10/16
Test Engineer: 43575
Configuration: EUT only
Mode: HSPA 1900MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	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)										
3.69	-56.6	H	3.0	-6.9	34.4	1.0	-40.3	-13.0	-27.3	
5.59	-58.6	H	3.0	-5.1	34.1	1.0	-38.3	-13.0	-25.3	
7.43	-61.0	H	3.0	-4.6	33.6	1.0	-37.2	-13.0	-24.2	
3.74	-57.2	V	3.0	-7.2	34.4	1.0	-40.6	-13.0	-27.6	
5.59	-58.7	V	3.0	-5.0	34.1	1.0	-38.1	-13.0	-25.1	
7.39	-60.5	V	3.0	-4.4	33.6	1.0	-37.0	-13.0	-24.0	
Mid Channel (1880MHz)										
3.79	-56.7	H	3.0	-6.6	34.4	1.0	-40.0	-13.0	-27.0	
5.96	-58.4	H	3.0	-4.3	34.1	1.0	-37.4	-13.0	-24.4	
7.57	-60.9	H	3.0	-4.4	33.5	1.0	-36.9	-13.0	-23.9	
3.76	-56.6	V	3.0	-6.5	34.4	1.0	-39.9	-13.0	-26.9	
5.62	-59.5	V	3.0	-5.8	34.1	1.0	-38.9	-13.0	-25.9	
7.55	-60.7	V	3.0	-4.4	33.5	1.0	-36.9	-13.0	-23.9	
High Channel (1907.6MHz)										
3.77	-56.7	H	3.0	-6.7	34.4	1.0	-40.1	-13.0	-27.1	
5.76	-59.3	H	3.0	-5.5	34.1	1.0	-38.6	-13.0	-25.6	
7.68	-59.5	H	3.0	-2.8	33.4	1.0	-35.2	-13.0	-22.2	
3.86	-56.6	V	3.0	-6.2	34.4	1.0	-39.5	-13.0	-26.5	
5.76	-59.2	V	3.0	-5.3	34.1	1.0	-38.3	-13.0	-25.3	
7.65	-59.8	V	3.0	-3.3	33.4	1.0	-35.8	-13.0	-22.8	

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UMTS REL 99, 1700MHz BAND 4

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/10/16
Test Engineer: 43575
Configuration: EUT only
Mode: REL 99, 1700MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	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)										
3.41	-60.1	H	3.0	-11.4	34.6	1.0	-45.0	-13.0	-32.0	
5.09	-60.8	H	3.0	-8.2	34.2	1.0	-41.4	-13.0	-28.4	
6.83	-61.9	H	3.0	-6.4	33.9	1.0	-39.3	-13.0	-26.3	
3.38	-60.9	V	3.0	-12.1	34.6	1.0	-45.7	-13.0	-32.7	
5.09	-61.5	V	3.0	-8.6	34.2	1.0	-41.8	-13.0	-28.8	
6.84	-61.5	V	3.0	-6.1	33.9	1.0	-39.1	-13.0	-26.1	
Mid Channel (1732.6MHz)										
3.44	-60.6	H	3.0	-11.9	34.6	1.0	-45.5	-13.0	-32.5	
5.21	-61.6	H	3.0	-8.7	34.2	1.0	-41.9	-13.0	-28.9	
6.91	-63.0	H	3.0	-7.4	33.9	1.0	-40.3	-13.0	-27.3	
3.43	-61.1	V	3.0	-12.1	34.6	1.0	-45.7	-13.0	-32.7	
5.16	-60.9	V	3.0	-7.8	34.2	1.0	-41.0	-13.0	-28.0	
6.92	-61.7	V	3.0	-6.2	33.9	1.0	-39.2	-13.0	-26.2	
High Channel (1752.6MHz)										
3.50	-60.8	H	3.0	-11.7	34.5	1.0	-45.3	-13.0	-32.3	
5.21	-61.7	H	3.0	-8.8	34.2	1.0	-42.0	-13.0	-29.0	
7.00	-62.2	H	3.0	-6.4	33.9	1.0	-39.3	-13.0	-26.3	
3.55	-60.6	V	3.0	-11.3	34.5	1.0	-44.8	-13.0	-31.8	
5.22	-61.6	V	3.0	-8.4	34.2	1.0	-41.6	-13.0	-28.6	
7.04	-62.0	V	3.0	-6.4	33.9	1.0	-39.3	-13.0	-26.3	

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UMTS HSDPA, 1700MHz BAND 4

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23328
Date: 05/10/16
Test Engineer: 43575
Configuration: EUT only
Mode: HSPA 1700MHz

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

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	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)										
3.46	-58.8	H	3.0	-10.0	34.6	1.0	-43.5	-13.0	-30.5	
5.09	-59.1	H	3.0	-6.4	34.2	1.0	-39.6	-13.0	-26.6	
6.90	-59.7	H	3.0	-4.1	33.9	1.0	-37.0	-13.0	-24.0	
3.41	-58.7	V	3.0	-9.9	34.6	1.0	-43.5	-13.0	-30.5	
5.17	-58.9	V	3.0	-5.8	34.2	1.0	-39.0	-13.0	-26.0	
6.81	-59.4	V	3.0	-4.0	33.9	1.0	-37.0	-13.0	-24.0	
Mid Channel (1732.6MHz)										
3.43	-59.4	H	3.0	-10.7	34.6	1.0	-44.3	-13.0	-31.3	
5.17	-59.7	H	3.0	-6.9	34.2	1.0	-40.1	-13.0	-27.1	
6.91	-59.9	H	3.0	-4.2	33.9	1.0	-37.1	-13.0	-24.1	
3.45	-58.6	V	3.0	-9.7	34.6	1.0	-43.2	-13.0	-30.2	
5.15	-59.4	V	3.0	-6.4	34.2	1.0	-39.5	-13.0	-26.5	
6.91	-59.3	V	3.0	-3.8	33.9	1.0	-36.7	-13.0	-23.7	
High Channel (1752.6MHz)										
3.46	-58.8	H	3.0	-9.9	34.6	1.0	-43.5	-13.0	-30.5	
5.21	-59.5	H	3.0	-6.6	34.2	1.0	-39.8	-13.0	-26.8	
7.02	-60.1	H	3.0	-4.3	33.9	1.0	-37.2	-13.0	-24.2	
3.46	-59.4	V	3.0	-10.4	34.6	1.0	-44.0	-13.0	-31.0	
5.22	-59.0	V	3.0	-5.8	34.2	1.0	-39.0	-13.0	-26.0	
7.00	-59.6	V	3.0	-4.1	33.9	1.0	-37.0	-13.0	-24.0	

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