FCC CFR47 PART 22H AND 24E
CERTIFICATION TEST REPORT

FOR

QUAD-BAND RADIO WITH WLAN AND BT RADIO

MODEL NUMBER: A1529

FCC ID: BCG-E2694A

REPORT NUMBER: 13U15037-10

ISSUE DATE: JULY 22, 2013

Prepared for

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

Prepared by

UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
---	07/22/13	Initial Issue	T. Chan

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1. ATTESTATION OF TEST RESULTS

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

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

MODEL: A1529

SERIAL NUMBER: C39KD01GFJ0Y

DATE TESTED: APRIL 22 – JULY 13, 2013

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 22H AND 24E	Pass

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Verification Services Inc. By:

Thu Chan
WiSE Operations Manager
UL Verification Services Inc.

Tested By:

Tony Wang
WiSE Lab Technician
UL Verification Services Inc.

2. TEST METHODOLOGY

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

3. FACILITIES AND ACCREDITATION

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

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT, Model A1529 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, Bluetooth and GPS radio. The rechargeable battery is not user accessible.

5.2. MAXIMUM OUTPUT POWER

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

LAT (PORT A)

Part 22 /24					
Frequency range (MHz)	Modulation	Conducted(Peak)		ERP/EIRP(Peak)	
		dBm	mW	dBm	mW
824.2 - 848.8	GPRS	33.70	2344.2	32.35	1717.9
824.2 - 848.8	EGPRS	32.00	1584.9	30.60	1148.2
1850.2-1909.8	GPRS	31.70	1479.1	31.95	1566.8
1850.2-1909.8	EGPRS	31.00	1258.9	30.40	1096.5

Part 22					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP/EIRP (Average)	
		dBm	mW	dBm	mW
826.4-846.6	WCDMA, REL 99	24.50	281.8	21.46	140.0
826.4-846.6	WCDMA, HSDPA	23.20	208.9	19.80	95.5

Part 24					
Frequency range (MHz)	Modulation	Conducted(Peak)		ERP/EIRP (Peak)	
		dBm	mW	dBm	mW
1852.4 - 1907.6	WCDMA, REL 99	26.60	457.1	24.73	297.2
1852.4 - 1907.6	WCDMA, HSDPA	26.30	426.6	23.28	212.8

UAT (PORT B)

Part 22 /24					
Frequency range (MHz)	Modulation	Conducted(Peak)		ERP/EIRP(Peak)	
		dBm	mW	dBm	mW
824.2 - 848.8	GPRS	33.39	2182.7	17.90	61.7
824.2 - 848.8	EGPRS	31.50	1412.5	17.60	57.5
1850.2-1909.8	GPRS	31.20	1318.3	25.91	389.9
1850.2-1909.8	EGPRS	30.40	1096.5	25.40	346.7

Part 22					
Frequency range (MHz)	Modulation	Conducted(Average)		ERP/EIRP (Average)	
		dBm	mW	dBm	mW
826.4-846.6	WCDMA, REL 99	24.20	263.0	12.80	19.1
826.4-846.6	WCDMA, HSDPA	23.20	208.9	11.20	13.2

Part 24					
Frequency range (MHz)	Modulation	Conducted(Peak)		ERP/EIRP (Peak)	
		dBm	mW	dBm	mW
1852.4 - 1907.6	WCDMA, REL 99	26.41	437.5	22.48	177.0
1852.4 - 1907.6	WCDMA, HSDPA	27.21	526.0	23.58	228.0

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

Frequency (MHz)	Gain (dBi) LAT A1529	Gain (dBi) UAT A1529
Cell, 824 - 849	-1.07	-8.54
PCS, 1850 - 1910	-0.26	-3.11

5.4. SOFTWARE AND FIRMWARE

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

The EUT is linked with CMW500 Test Set.

5.5. WORST-CASE CONFIGURATION AND MODE

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

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

Worst-case modes below:

For the device, all tests were performed as below,
_Port A: Both conducted and radiated emissions measurement with all bands.
_Port B: All conducted emissions measurement and only ERP/EIRP radiated emissions on all bands.

- For Cellular band: GPRS and EGPRS is Z position
- For PCS band: GPRS and EGPRS is X position
- For Cellular band: UMTS, REL 99 and HSDPA is Z position
- For PCS band: UMTS, REL 99 and HSDPA is X position

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

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

I/O CABLES (RF CONDUCTED TEST)

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

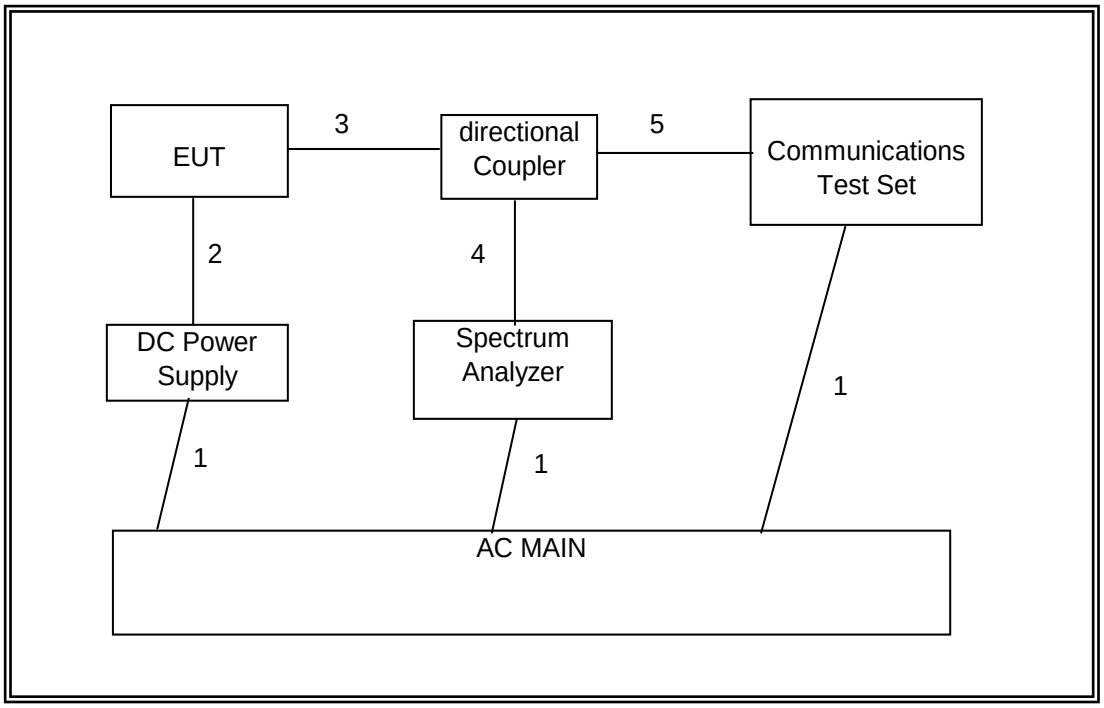
I/O CABLES (RF RADIATED TEST)

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

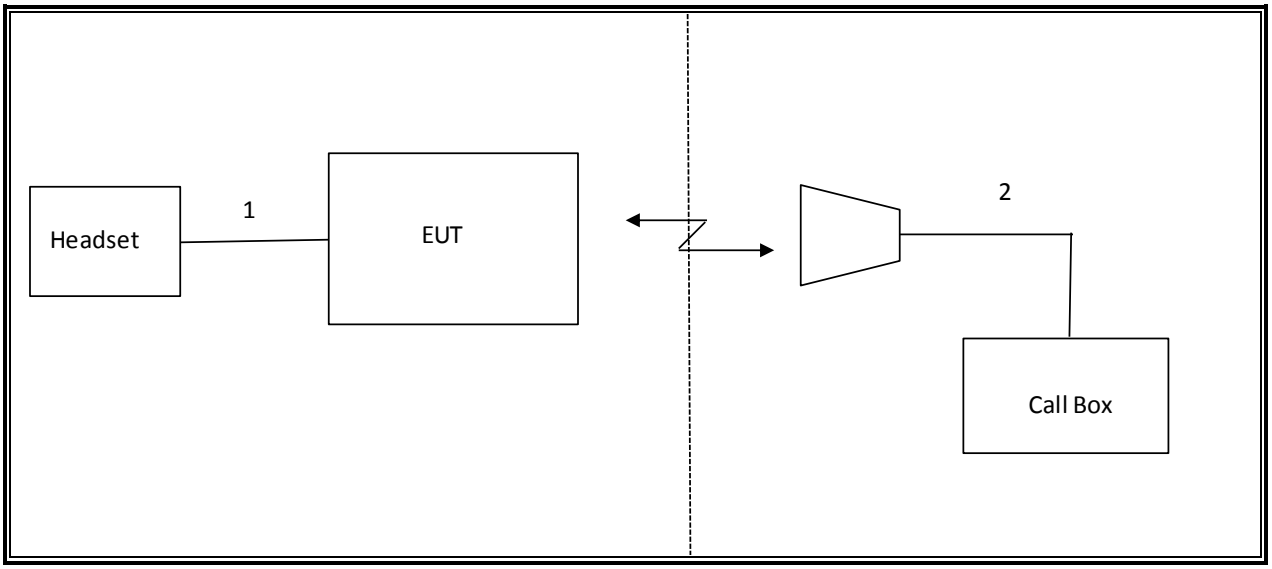
TEST SETUP

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

SETUP DIAGRAM FOR RF CONDUCTED TESTS



SETUP DIAGRAM FOR RF RADIATED TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Spectrum Analyzer, 44GHz	Agilent	N9030A	F00129	02/21/14
Directional Coupler	Krytar	1817	N02656	CNR
Communication Test Set	R & S	CMW500	F00014	02/21/14
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/14
Vector signal generator, 6 GHz	Agilent / HP	E4438C	F00037	07/06/14
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02686	CNR
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02688	CNR
Bilog, 30-1GHz	Sunol Science	A0222813-1	C01011	03/07/14
Peak Power Meter	Boonton	4541	C01189	06/20/14
Peak Power Sensor	Boonton	57006	C01202	05/29/14
Horn Antenna	ETS Lindgren	3117	F00131	02/19/14
PreAmp 1-18GHz	Agilent/HP	8449B	C01063	03/18/14
PreAmp 30-1000MHz	Sonama	310	981661	11/06/13

7. RF POWER OUTPUT VERIFICATION

7.1. GSM

TEST PROCEDURE

GPRS/EGPRS

Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900

Press Connection control to choose the different menus

Press RESET > choose all to reset all settings

Connection Press Signal Off to turn off the signal and change settings

Network Support > GSM+GPRS or GSM+EGPRS

Main Service > Packet Data

Service selection > Test Mode A – Auto Slot Config. off

MS Signal Press Slot Config bottom on the right twice to select and change the number of time slots and power setting

> Slot configuration > Uplink/Gamma

> 33 dBm for GPRS 850/900

> 27 dBm for EGPRS 850/900

> 30 dBm for GPRS1800/1900

> 26 dBm for EGPRS1800/1900

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

Frequency Offset > + 0 Hz

Mode > BCCH and TCH

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

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

Channel Type > Off

P0> 4 dB

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

TCH > choose desired test channel

Hopping > Off

Main Timeslot > 3 (Default)

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

Bit Stream > 2E9-1PSR Bit Pattern

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

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

RESULTS

LAT PORT

Mode	Ch.	f (MHz)	1 time slots		2 time slots	
			Peak	Average	Peak	Average
GPRS	128	824.2	33.68	33.50	32.67	32.50
	190	836.6	33.70	33.50	32.70	32.50
	251	848.8	33.65	33.45	32.60	32.45
EGPRS	128	824.2	31.90	28.90	31.80	29.00
	190	836.6	32.00	29.00	31.80	29.00
	251	848.8	31.80	28.92	31.70	28.90

Mode	Ch.	f (MHz)	1 time slots		2 time slots	
			Peak	Average	Peak	Average
GPRS	512	1850.2	31.60	31.45	29.70	29.40
	661	1880.0	31.70	31.50	29.80	29.50
	810	1909.8	31.65	31.40	29.75	29.45
EGPRS	512	1850.2	30.90	27.80	30.10	27.70
	661	1880.0	31.00	27.90	30.20	27.70
	810	1909.8	31.00	27.85	30.30	27.80

UAT PORT

Mode	Ch.	f (MHz)	1 time slots		2 time slots	
			Peak	Average	Peak	Average
GPRS	128	824.2	33.32	33.17	32.87	32.20
	190	836.6	33.39	33.20	32.85	32.15
	251	848.8	33.25	33.20	32.54	32.10
EGPRS	128	824.2	31.40	28.60	31.50	28.60
	190	836.6	31.40	28.60	31.50	28.60
	251	848.8	31.50	28.70	31.52	28.65

Mode	Ch.	f (MHz)	1 time slots		2 time slots	
			Peak	Average	Peak	Average
GPRS	512	1850.2	31.10	30.86	29.85	29.55
	661	1880.0	31.20	30.90	29.90	29.60
	810	1909.8	31.20	30.80	30.00	29.70
EGPRS	512	1850.2	30.40	27.40	30.30	27.40
	661	1880.0	30.30	27.30	30.25	27.35
	810	1909.8	30.40	27.35	30.32	27.39

7.2. UMTS REL99

TEST PROCEDURE

The following summary of these settings are illustrated below:

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

LAT PORT

UMTS REL99

	UL Ch	DL Ch	Band Frequency	Conducted output power (dBm)	
				Peak	Average
Band 5 UMTS 850	4132	4357	826.4	27.00	24.39
	4180	4405	836.0	27.16	24.40
	4230	4455	846.6	27.73	**24.50**

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
				Peak	Average
Band 2 UMTS 1900	9262	9662	1852.4	26.36	22.92
	9400	9800	1880.0	**26.60**	23.00
	9538	9938	1907.6	26.42	22.98

UAT PORT

UMTS REL 99

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
				Peak	Average
Band 5 UMTS 850	4132	4357	826.4	27.51	24.10
	4180	4405	836.0	27.45	24.08
	4230	4455	846.6	27.53	**24.20**

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
				Peak	Average
Band 2 UMTS 1900	9262	9662	1852.4	27.15	23.70
	9400	9800	1880.0	**27.21**	23.80
	9538	9938	1907.6	27.10	23.60

7.3. UMTS Rel 5 HSDPA

TEST PROCEDURE

The following summary of these settings are illustrated below:

	Mode	Rel5 HSDPA	Rel5 HSDPA	Rel5 HSDPA	Rel5 HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	HSUPA Test	Not Applicable			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βec	-	-	-	-
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	βed	Not Applicable			
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs = βhs/βc	30/15			

RESULT

LAT PORT HSDPA

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	Conducted output power (dBm)
					Peak	Average
UMTS850 (Band V)	1	4132	4357	826.4	27.08	23.17
		4180	4405	836.0	27.06	23.13
		4230	4455	846.0	27.24	**23.20**
	2*	4132	4357	826.4	27.08	23.10
		4180	4405	836.0	27.01	23.15
		4230	4455	846.0	27.05	23.19
	3	4132	4357	826.4	27.08	22.89
		4180	4405	836.0	27.01	22.90
		4230	4455	846.0	26.93	22.99
	4	4132	4357	826.4	26.71	22.73
		4180	4405	836.0	26.90	22.97
		4230	4455	846.0	26.77	22.74
UMTS1900 (Band II)	1	9262	9662	1852.4	26.19	21.75
		9400	9800	1880.0	26.12	21.82
		9538	9938	1907.6	25.90	21.59
	2*	9262	9662	1852.4	**26.30**	21.60
		9400	9800	1880.0	26.21	21.96
		9538	9938	1907.6	25.72	21.51
	3	9262	9662	1852.4	26.29	21.56
		9400	9800	1880.0	26.10	21.74
		9538	9938	1907.6	25.62	21.50
	4	9262	9662	1852.4	26.27	21.63
		9400	9800	1880.0	26.07	21.78
		9538	9938	1907.6	25.96	21.52

UAT PORT HSDPA

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	Conducted output power (dBm)
					Peak	Average
UMTS850 (Band V)	1	4132	4357	826.4	27.12	23.12
		4180	4405	836.0	27.00	22.98
		4230	4455	846.0	27.03	23.06
	2*	4132	4357	826.4	27.20	23.07
		4180	4405	836.0	27.17	23.06
		4230	4455	846.0	27.22	**23.20**
	3	4132	4357	826.4	27.20	22.83
		4180	4405	836.0	26.91	22.69
		4230	4455	846.0	27.13	23.18
	4	4132	4357	826.4	26.89	22.68
		4180	4405	836.0	26.70	22.77
		4230	4455	846.0	26.71	22.76
UMTS1900 (Band II)	1	9262	9662	1852.4	26.67	22.58
		9400	9800	1880.0	26.60	22.65
		9538	9938	1907.6	26.60	22.52
	2*	9262	9662	1852.4	26.63	22.56
		9400	9800	1880.0	**26.74**	22.84
		9538	9938	1907.6	26.61	22.61
	3	9262	9662	1852.4	26.51	22.50
		9400	9800	1880.0	26.57	22.59
		9538	9938	1907.6	26.53	22.39
	4	9262	9662	1852.4	26.50	22.52
		9400	9800	1880.0	26.63	22.61
		9538	9938	1907.6	26.56	22.58

7.4. UMTS DUAL CARRIER HSDPA

LAT PORT

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS850 (Band V)	1*	4132	4357	826.4	27.25	**23.40**
		4180	4405	836.0	27.22	23.39
		4230	4455	846.0	27.13	23.30
	2	4132	4357	826.4	27.26	23.38
		4180	4405	836.0	27.18	23.34
		4230	4455	846.0	27.15	23.38
	3	4132	4357	826.4	27.04	23.36
		4180	4405	836.0	26.81	22.90
		4230	4455	846.0	26.96	22.94
	4	4132	4357	826.4	27.20	23.36
		4180	4405	836.0	26.80	22.91
		4230	4455	846.0	26.71	22.96
UMTS1900 (Band II)	1	9262	9662	1852.4	25.57	21.78
		9400	9800	1880.0	25.60	21.80
		9538	9938	1907.6	25.60	21.67
	2*	9262	9662	1852.4	25.61	21.76
		9400	9800	1880.0	25.69	21.79
		9538	9938	1907.6	**25.70**	21.83
	3	9262	9662	1852.4	25.63	21.43
		9400	9800	1880.0	25.58	21.50
		9538	9938	1907.6	25.54	21.61
	4	9262	9662	1852.4	25.47	21.39
		9400	9800	1880.0	25.49	21.54
		9538	9938	1907.6	25.64	21.59

UAT PORT

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS850 (Band V)	1	4132	4357	826.4	26.92	23.10
		4180	4405	836.0	26.90	23.08
		4230	4455	846.0	26.93	23.07
	2*	4132	4357	826.4	27.10	**23.13**
		4180	4405	836.0	27.07	23.10
		4230	4455	846.0	27.02	23.11
	3	4132	4357	826.4	26.74	23.00
		4180	4405	836.0	26.61	22.80
		4230	4455	846.0	26.73	22.84
	4	4132	4357	826.4	26.69	22.99
		4180	4405	836.0	26.60	22.73
		4230	4455	846.0	26.71	22.76
UMTS1900 (Band II)	1	9262	9662	1852.4	26.47	22.63
		9400	9800	1880.0	26.30	22.60
		9538	9938	1907.6	26.40	22.72
	2*	9262	9662	1852.4	26.03	22.78
		9400	9800	1880.0	**26.64**	22.74
		9538	9938	1907.6	26.41	22.69
	3	9262	9662	1852.4	26.01	22.47
		9400	9800	1880.0	26.37	22.40
		9538	9938	1907.6	26.20	22.32
	4	9262	9662	1852.4	26.10	22.50
		9400	9800	1880.0	26.53	22.46
		9538	9938	1907.6	26.36	22.24

7.5. UMTS Rel 6 HSPA (HSDPA & HSUPA)

TEST PROCEDURE

The following summary of these settings are illustrated below:

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

LAT PORT

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS850 (Band V)	1*	4132	4357	826.4	27.34	23.20
		4180	4405	836.0	27.29	23.04
		4230	4455	846.0	27.43	23.30
	2	4132	4357	826.4	27.40	22.31
		4180	4405	836.0	27.36	22.50
		4230	4455	846.0	27.24	22.17
	3	4132	4357	826.4	27.41	22.32
		4180	4405	836.0	27.35	22.09
		4230	4455	846.0	27.40	22.55
	4	4132	4357	826.4	27.35	22.86
		4180	4405	836.0	27.37	22.89
		4230	4455	846.0	27.20	22.56
	5	4132	4357	826.4	27.41	23.23
		4180	4405	836.0	27.32	22.81
		4230	4455	846.0	27.38	22.89
UMTS1900 (Band II)	1*	9262	9662	1852.4	26.55	21.88
		9400	9800	1880.0	26.54	21.84
		9538	9938	1907.6	26.39	21.72
	2	9262	9662	1852.4	26.20	21.03
		9400	9800	1880.0	26.37	21.27
		9538	9938	1907.6	26.41	21.55
	3	9262	9662	1852.4	25.75	20.46
		9400	9800	1880.0	25.87	20.81
		9538	9938	1907.6	26.31	21.00
	4	9262	9662	1852.4	26.14	21.74
		9400	9800	1880.0	26.19	21.76
		9538	9938	1907.6	26.16	21.80
	5	9262	9662	1852.4	26.27	21.79
		9400	9800	1880.0	26.25	21.81
		9538	9938	1907.6	26.31	21.80

UAT PORT

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
					Peak	Average
UMTS850 (Band V)	1*	4132	4357	826.4	27.53	**23.09**
		4180	4405	836.0	27.38	22.83
		4230	4455	846.0	27.45	23.02
	2	4132	4357	826.4	27.40	22.67
		4180	4405	836.0	27.37	22.45
		4230	4455	846.0	27.24	22.74
	3	4132	4357	826.4	27.43	22.62
		4180	4405	836.0	27.10	22.34
		4230	4455	846.0	27.46	22.55
	4	4132	4357	826.4	27.40	22.46
		4180	4405	836.0	27.33	22.53
		4230	4455	846.0	27.37	22.43
	5	4132	4357	826.4	27.36	23.02
		4180	4405	836.0	27.42	22.89
		4230	4455	846.0	27.50	22.94
UMTS1900 (Band II)	1*	9262	9662	1852.4	26.43	22.37
		9400	9800	1880.0	26.64	22.70
		9538	9938	1907.6	26.43	22.62
	2	9262	9662	1852.4	26.49	21.99
		9400	9800	1880.0	26.51	21.87
		9538	9938	1907.6	26.48	21.60
	3	9262	9662	1852.4	26.50	22.34
		9400	9800	1880.0	26.44	22.39
		9538	9938	1907.6	26.60	22.47
	4	9262	9662	1852.4	26.48	22.35
		9400	9800	1880.0	26.62	22.23
		9538	9938	1907.6	26.61	22.56
	5	9262	9662	1852.4	26.54	22.62
		9400	9800	1880.0	26.52	22.59
		9538	9938	1907.6	26.43	22.47

8. CONDUCTED TEST RESULTS

8.1. OCCUPIED BANDWIDTH

RULE PART(S)

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

LIMITS

For reporting purposes only

TEST PROCEDURE

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

MODES TESTED

- GPRS and EGPRS
- UMTS, REL 99 and HSDPA

RESULTS

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
Cellular	GPRS	128	824.20	246.2500	321.000
		190	836.60	253.7100	308.000
		251	848.80	246.7500	301.300
	EGPRS	128	824.20	252.6030	302.509
		190	836.60	245.4451	299.281
		251	848.80	247.9155	293.720

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Cellular	UMTS, REL 99	4357	826.4	4.2118	4.629
		4405	836.0	4.2279	4.570
		4455	846.0	4.2057	4.607
	UMTS, HSDPA	4357	826.4	4.1935	4.568
		4405	836.0	4.1837	4.596
		4455	846.0	4.1799	4.570

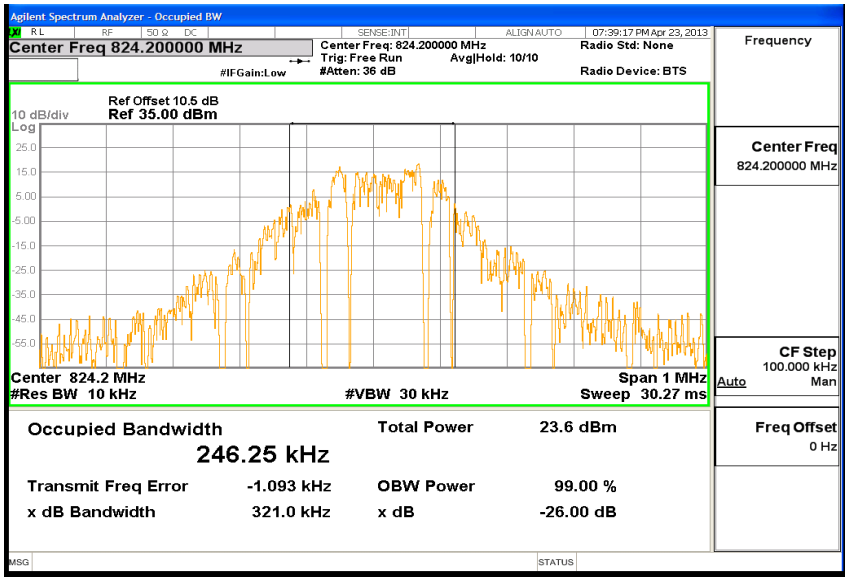
Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
PCS	GPRS	512	1850.2	242.0300	285.600
		661	1880.0	241.1300	318.000
		810	1909.8	247.2300	279.400
	EGPRS	512	1850.2	251.9306	301.317
		661	1880.0	251.8630	305.247
		810	1909.8	252.6045	306.481

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
PCS	UMTS, REL 99	9662	1852.4	4.2174	4.569
		9800	1880.0	4.2111	4.609
		9938	1907.6	4.2060	4.657
	UMTS, HSDPA	9662	1852.4	4.1455	4.621
		9800	1880.0	4.1365	4.628
		9938	1907.6	4.1682	4.528

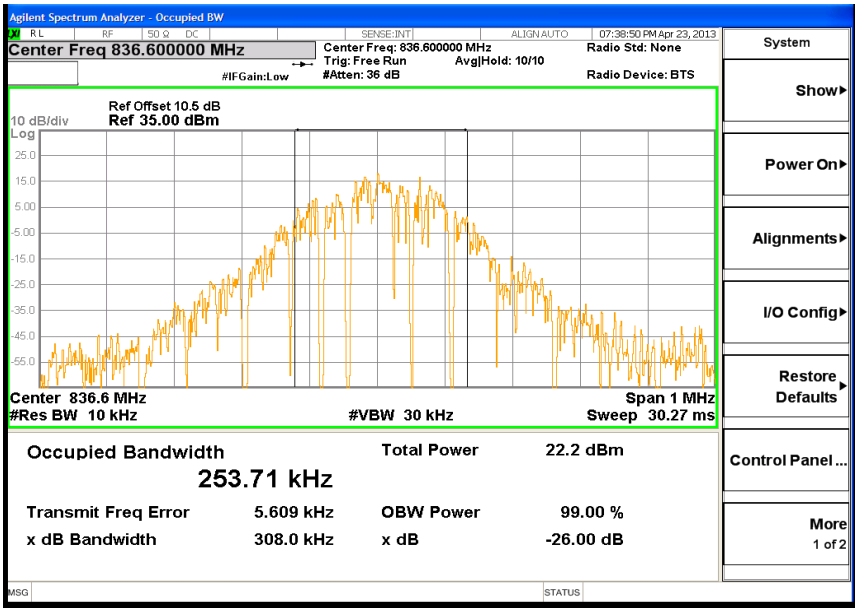
GPRS850

(Cellular Band)

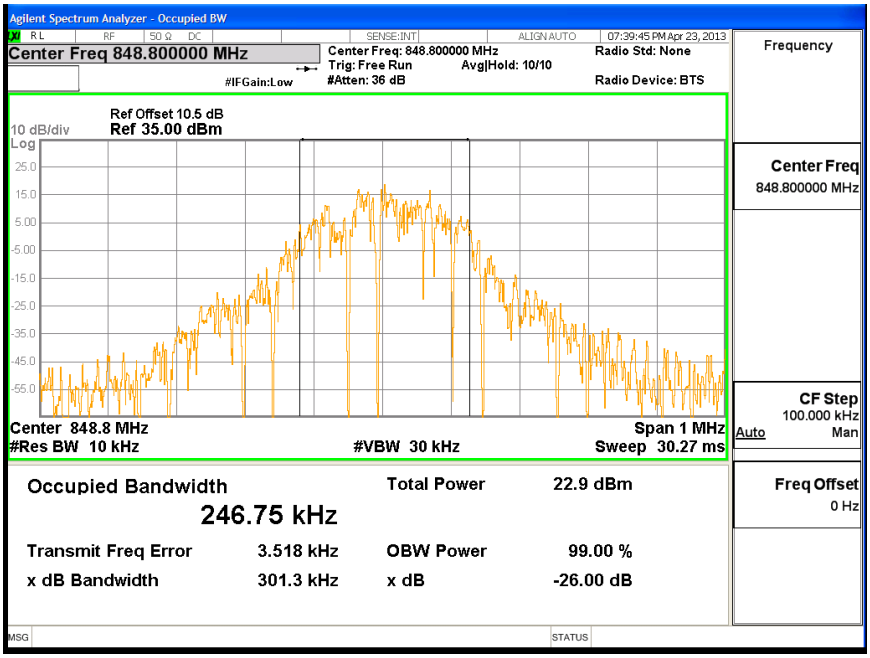
LOW CH



MID CH

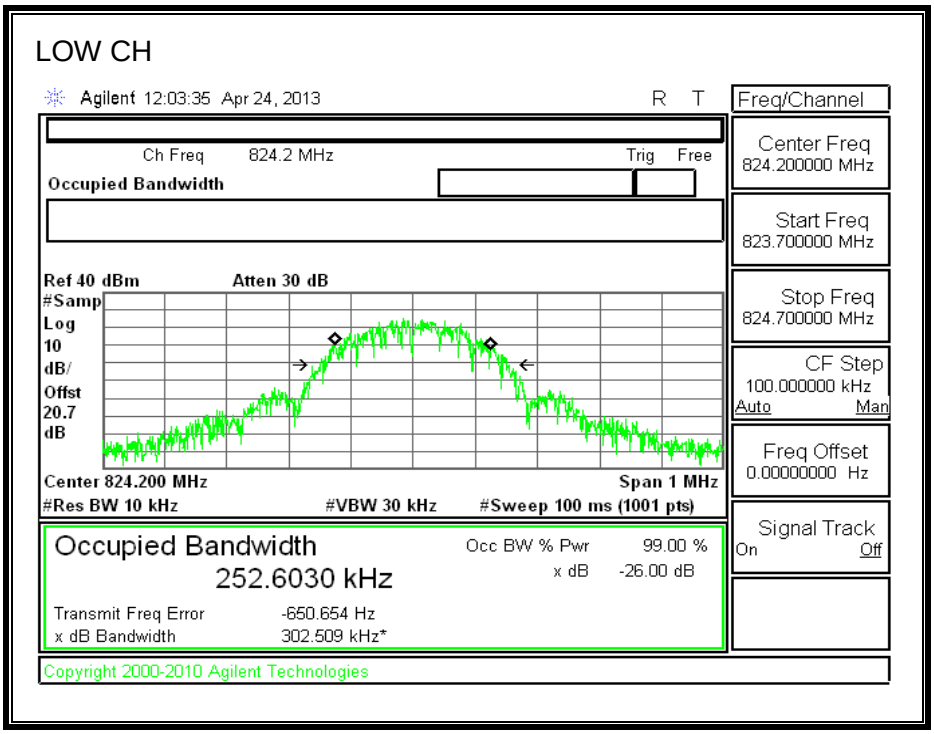


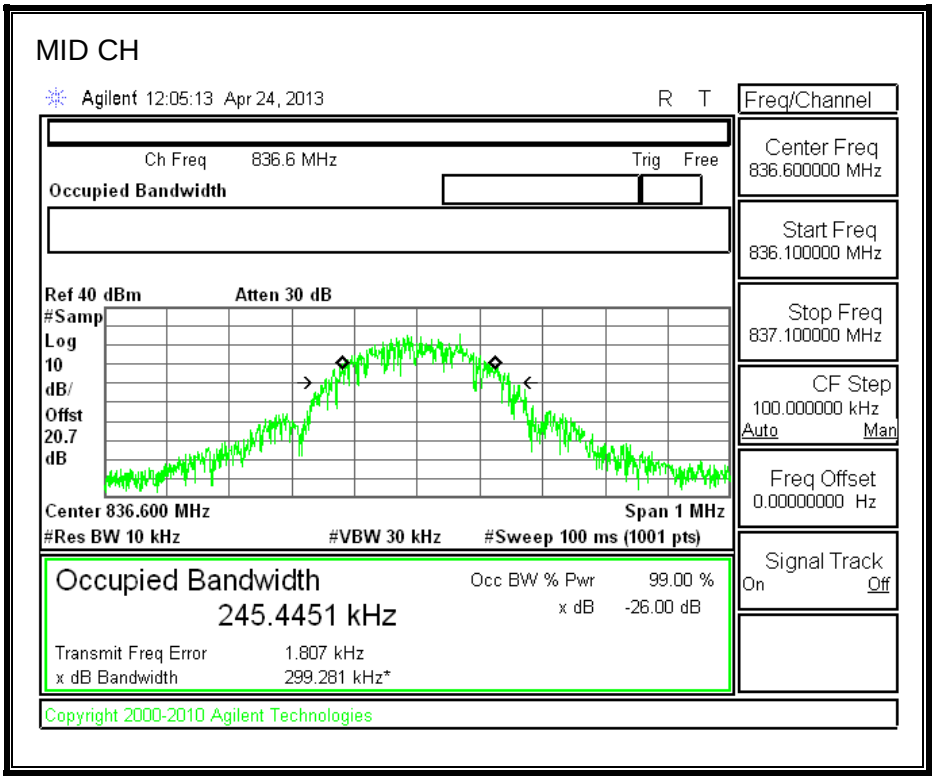
HIGH CH



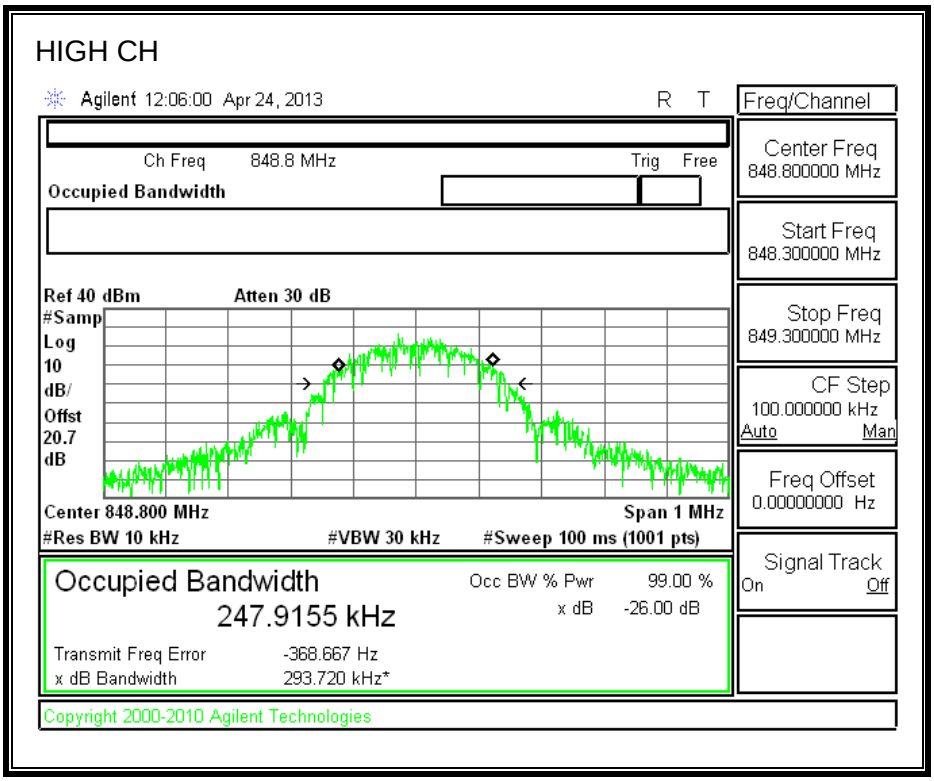
EGPRS850

Cellular Band





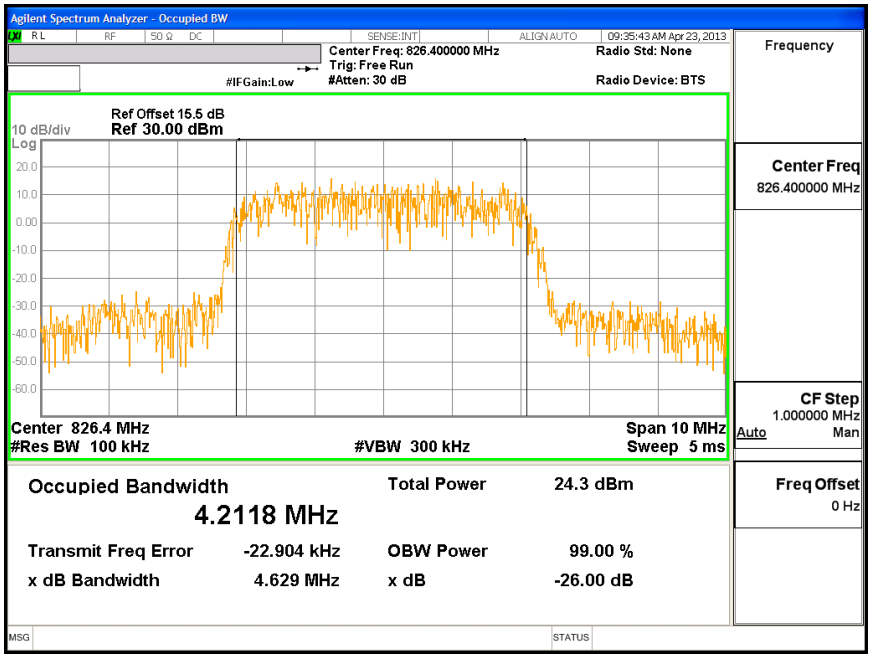
HIGH CH



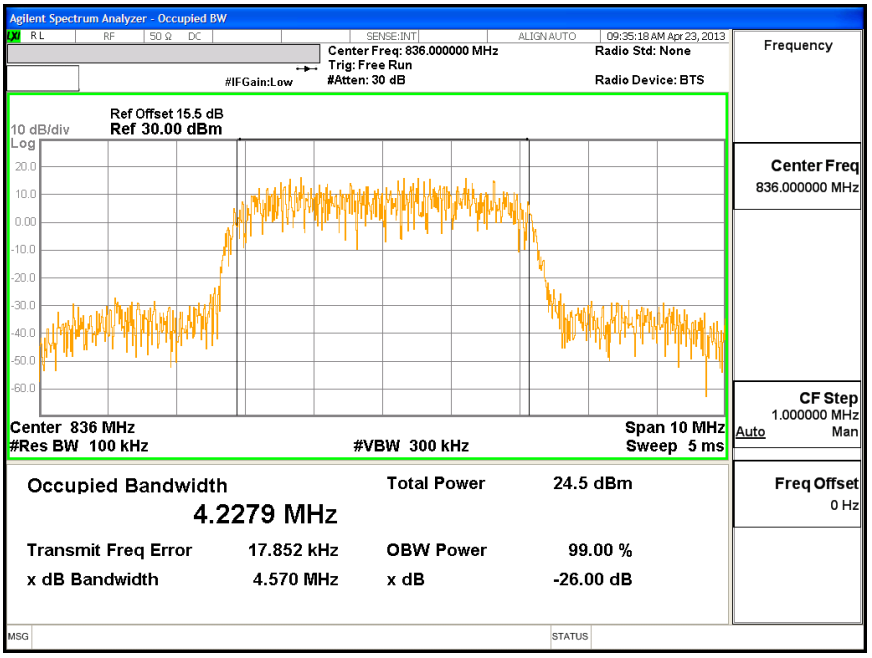
WCDMA850

Rel 99 (Cellular Band)

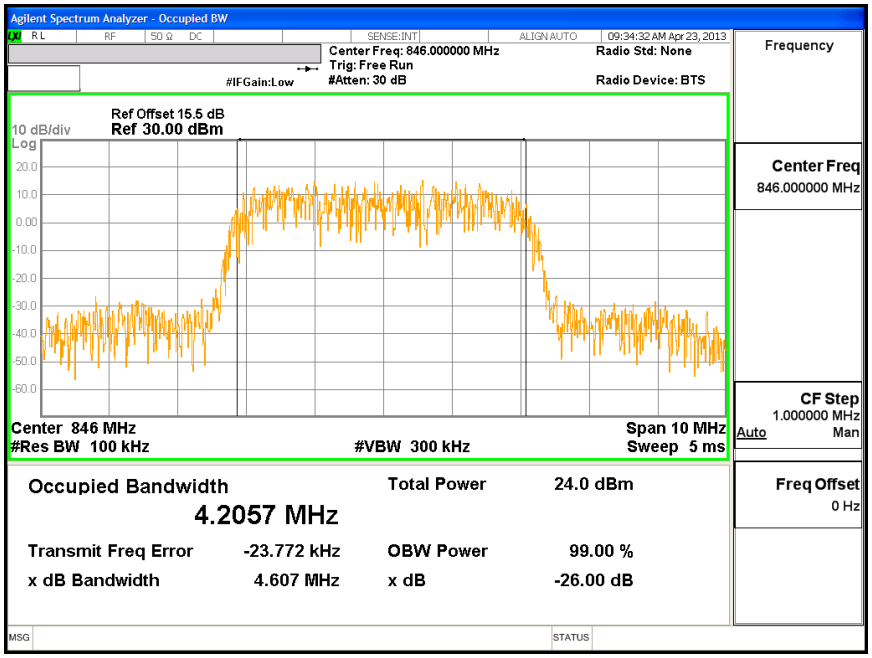
LOW CH



MID CH

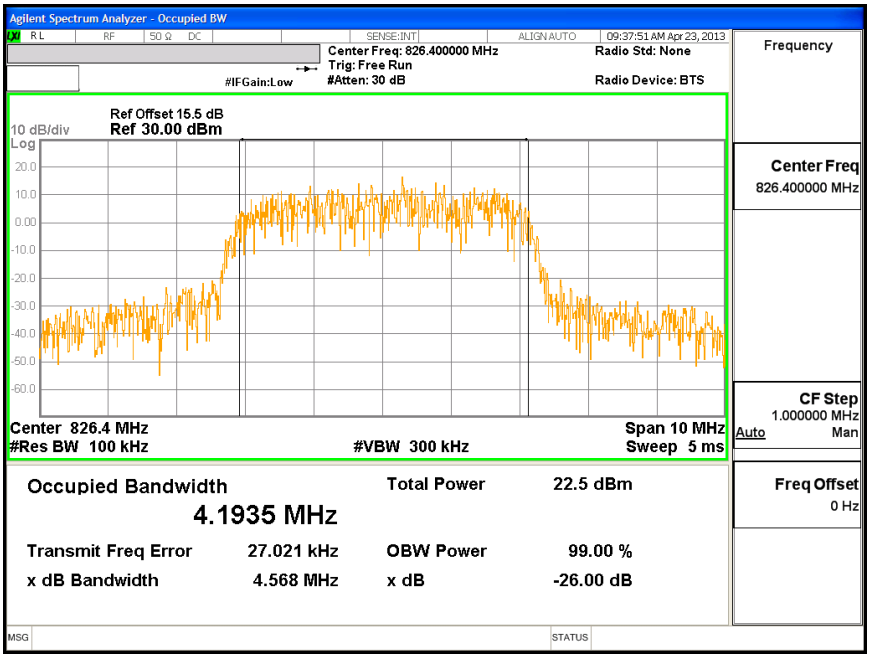


HIGH CH

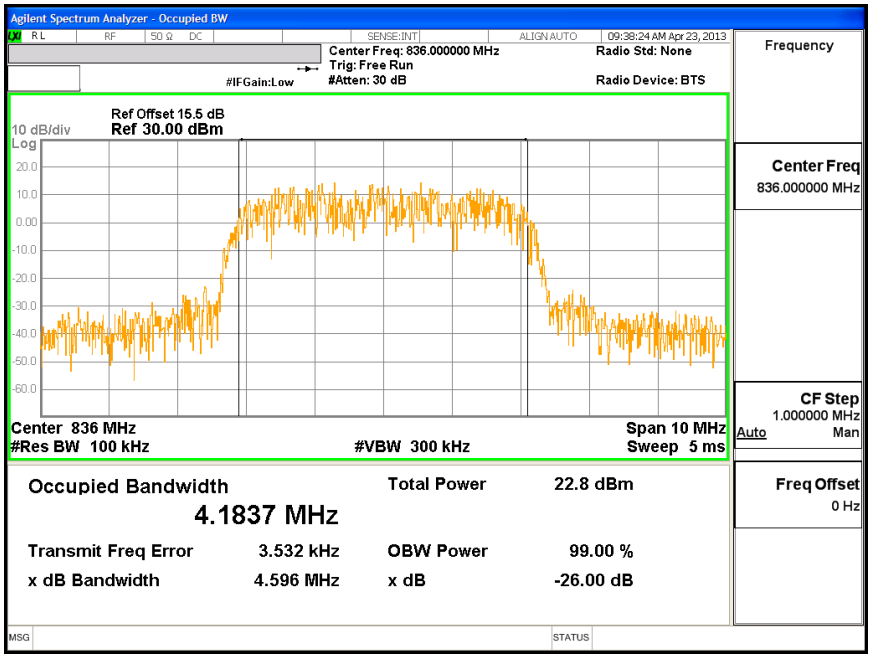


HSDPA (Cellular Band)

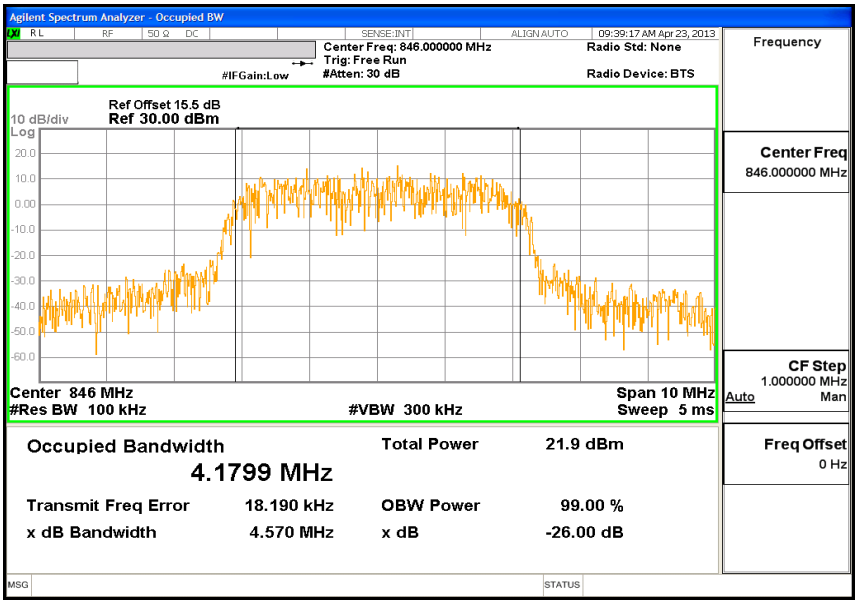
LOW CH



MID CH



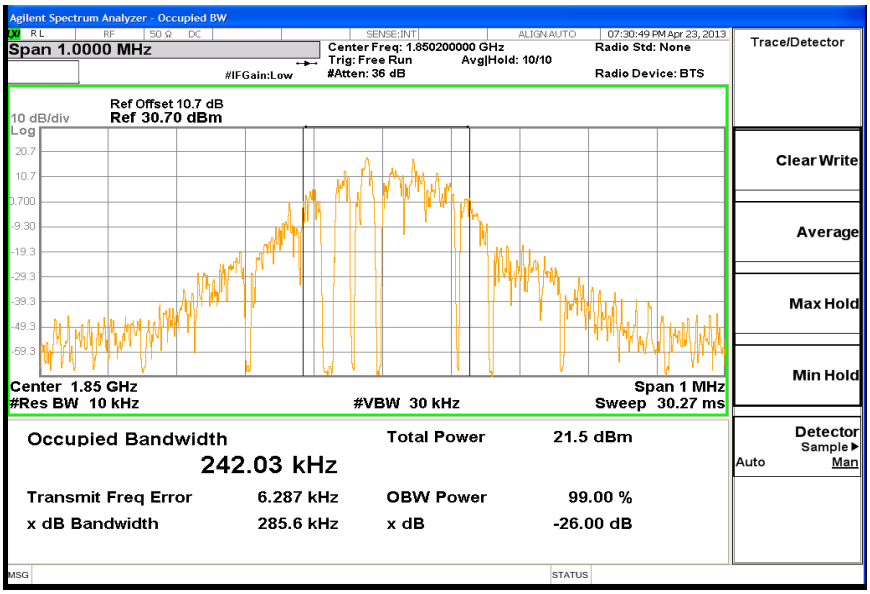
HIGH CH



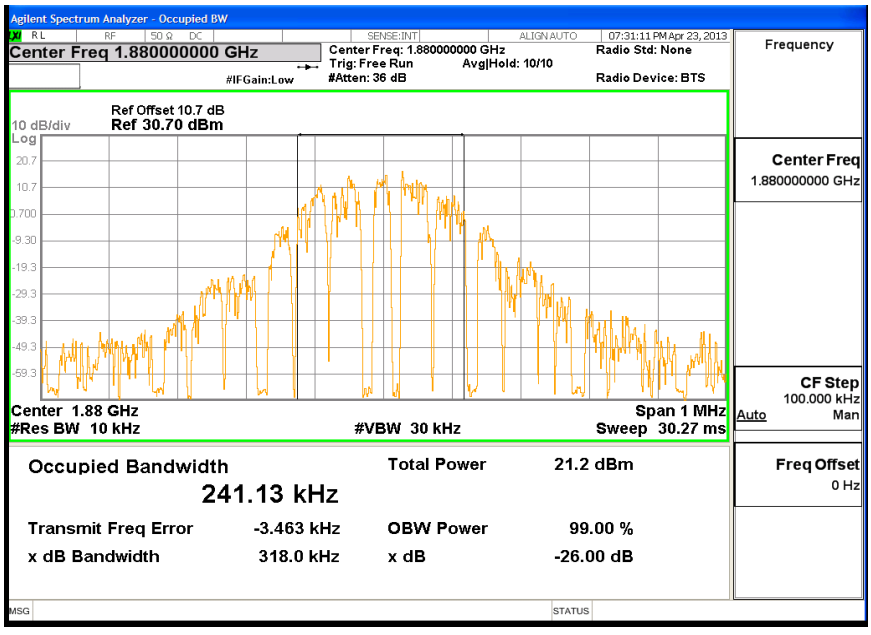
GPRS 1900

PCS 1900 Band

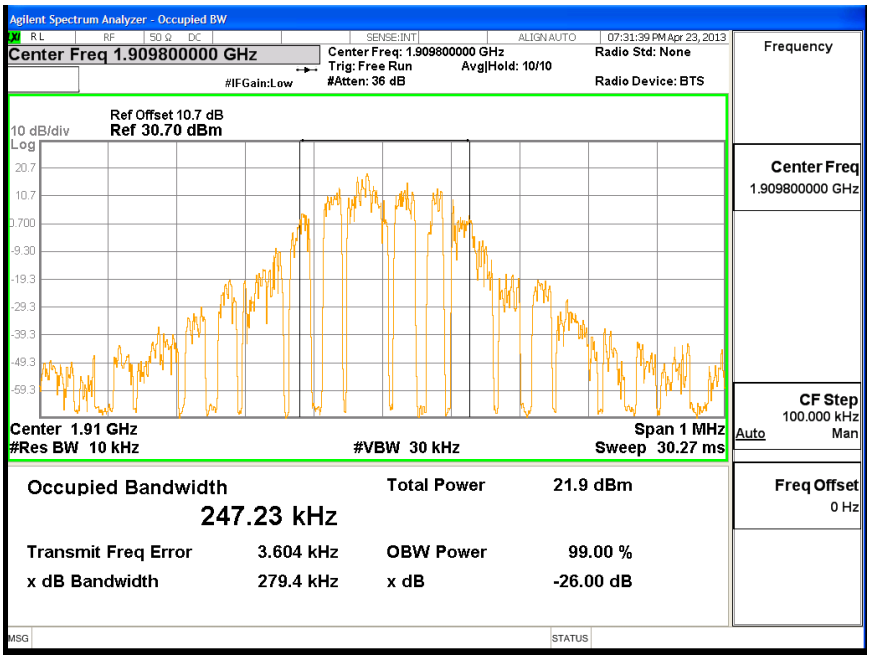
LOW CH



MID CH

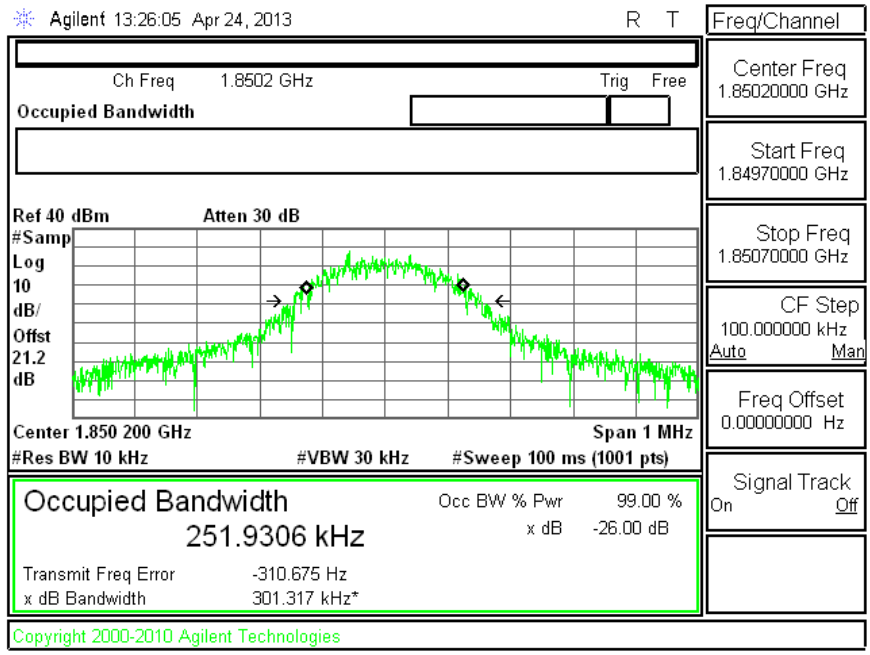


HIGH CH

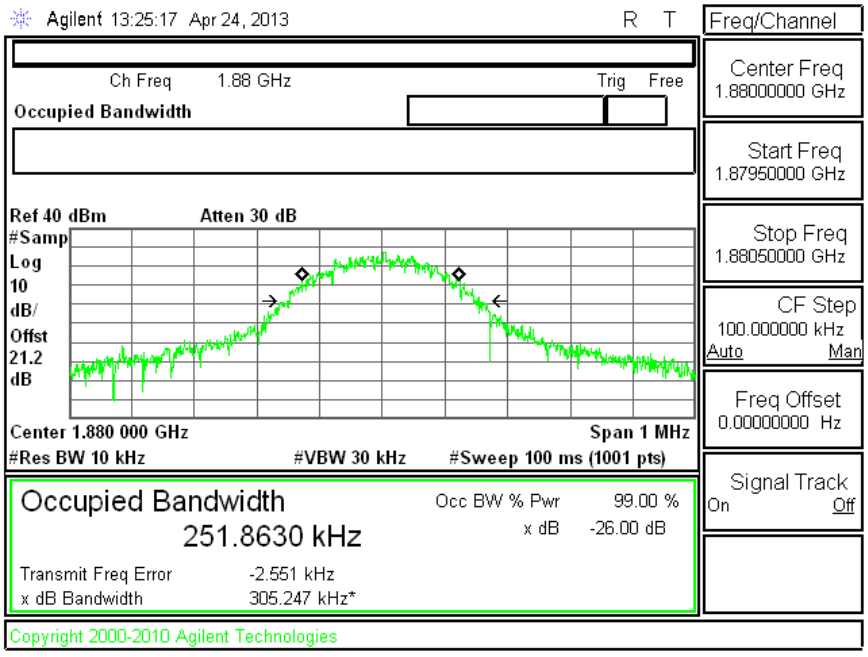


EGPRS 1900

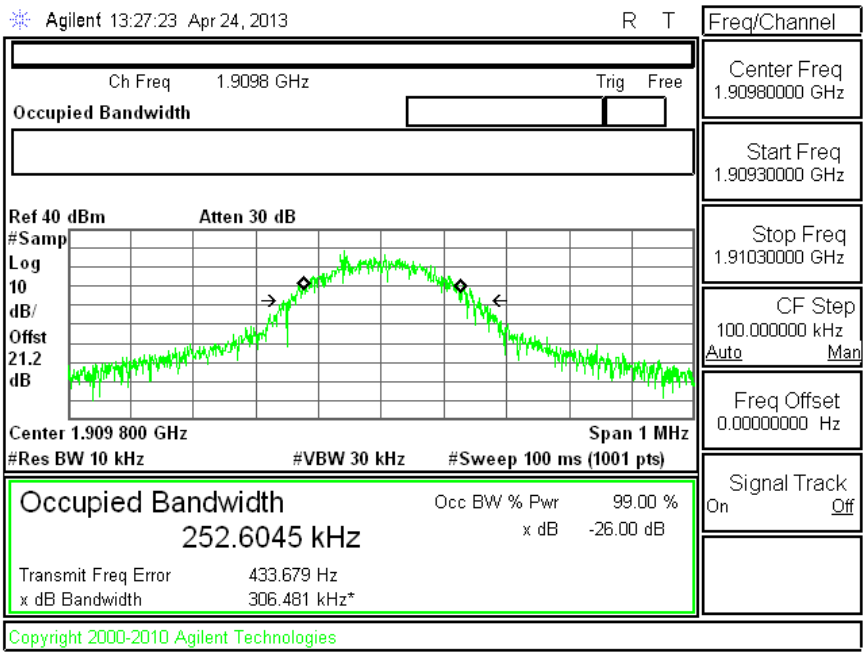
LOW CH



MID CH



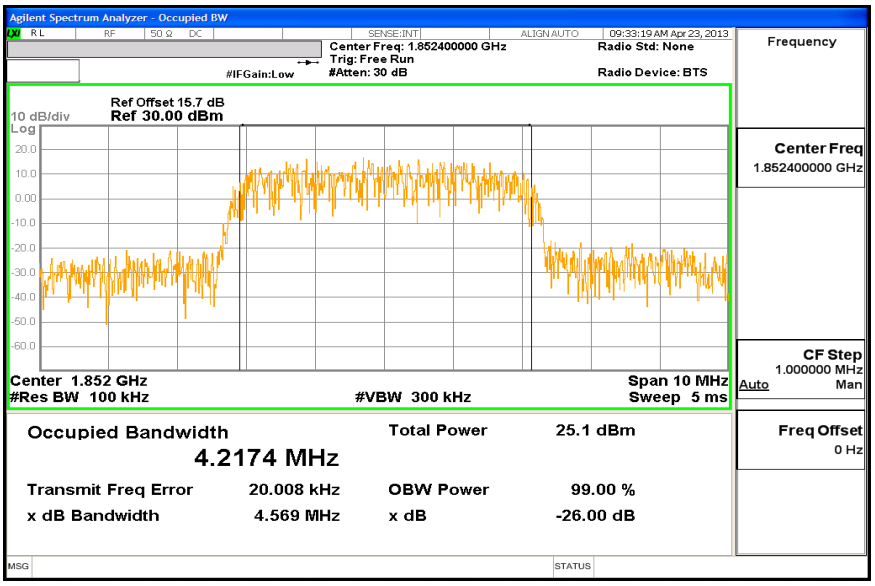
HIGH CH



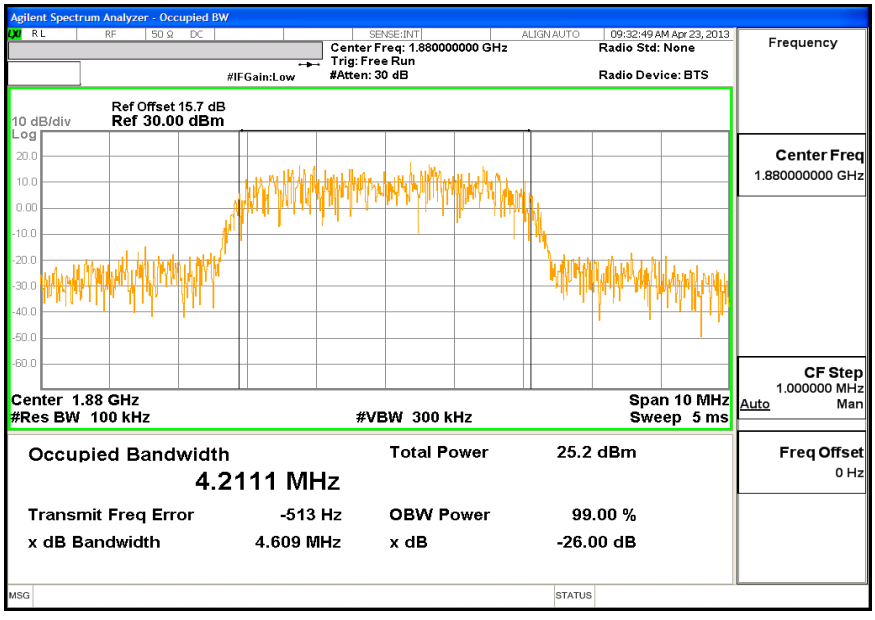
WCDMA1900

REL 99 Mode

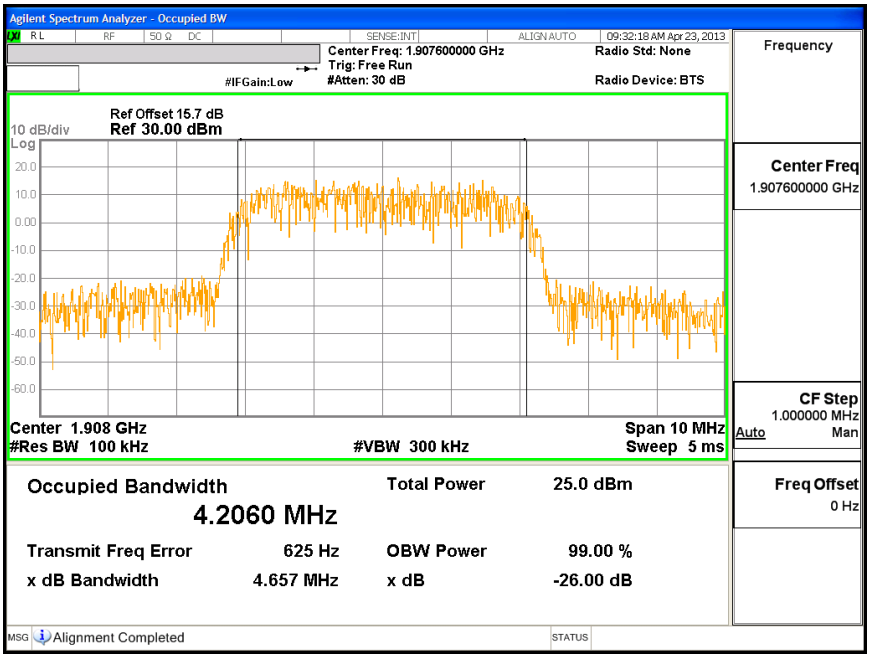
LOW CH



MID CH

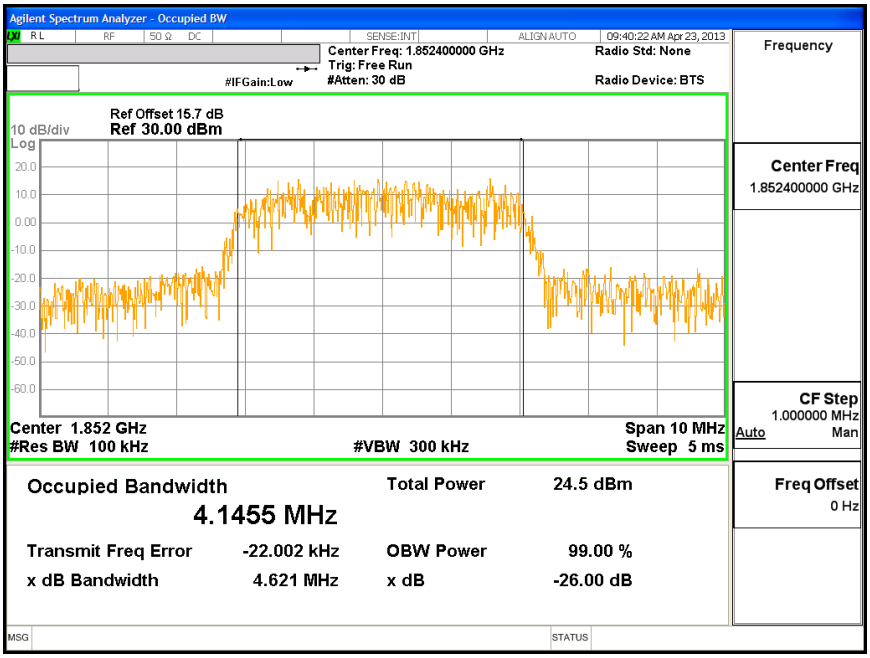


HIGH CH

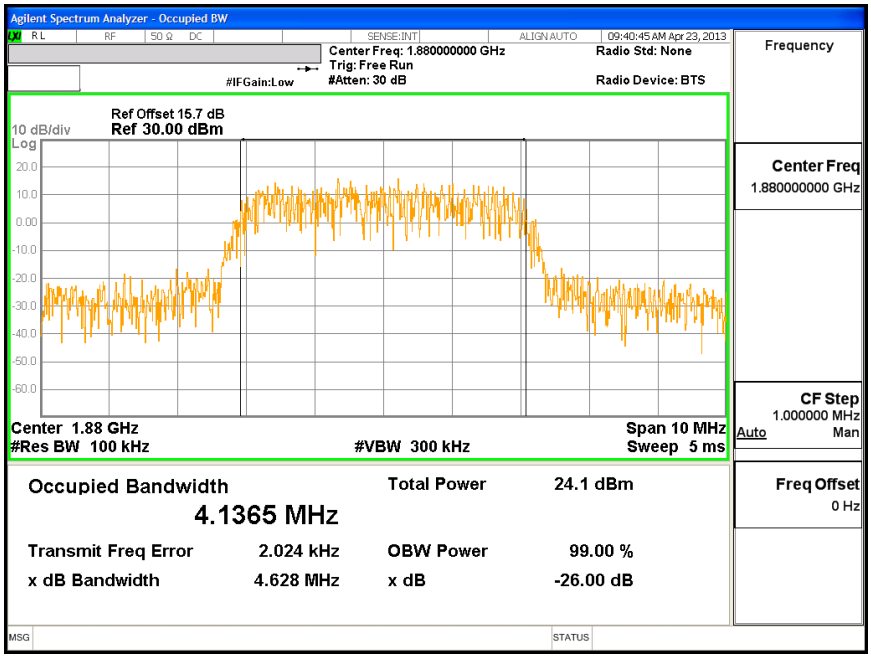


HSDPA Mode (PCS Band)

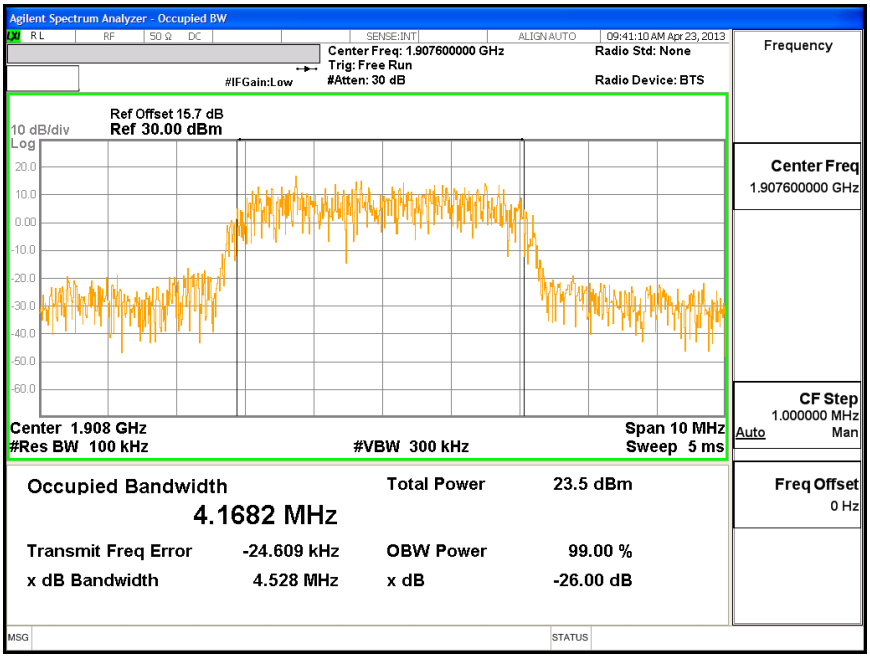
LOW CH



MID CH



HIGH CH



8.2. BAND EDGE

RULE PART(S)

FCC: §22.359, 24.238

LIMITS

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

TEST PROCEDURE

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

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

MODES TESTED

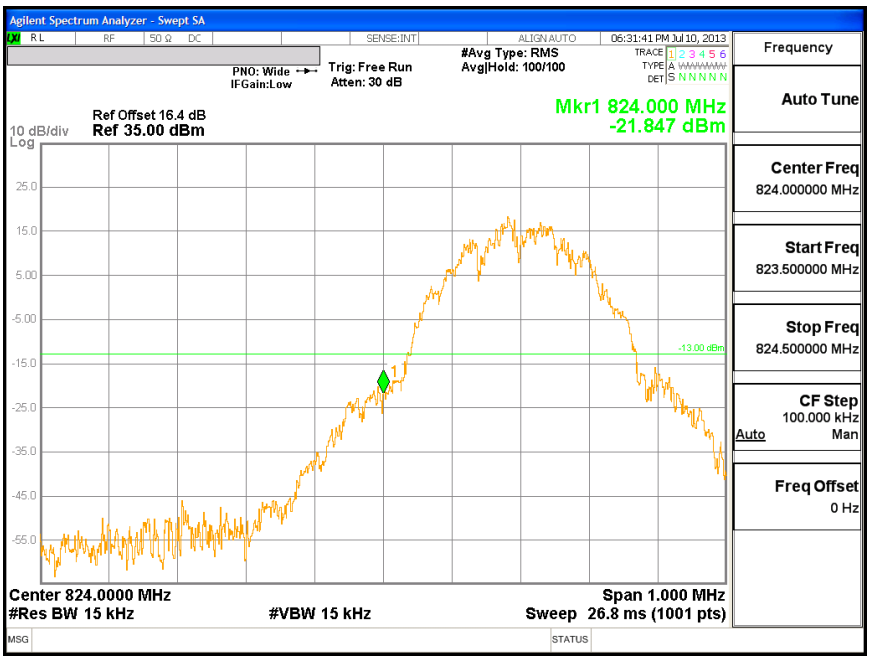
- GPRS and EGPRS
- UMTS, REL 99 and HSDPA

RESULTS

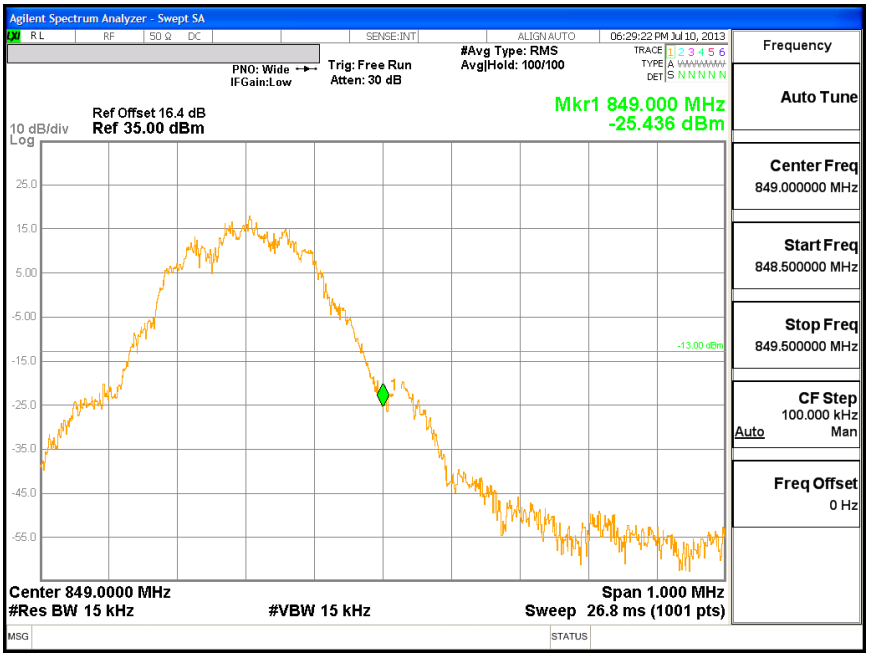
8.2.1. GPRS850

LAT (PORT A) / PRIMARY, CELL BAND

LOW CH

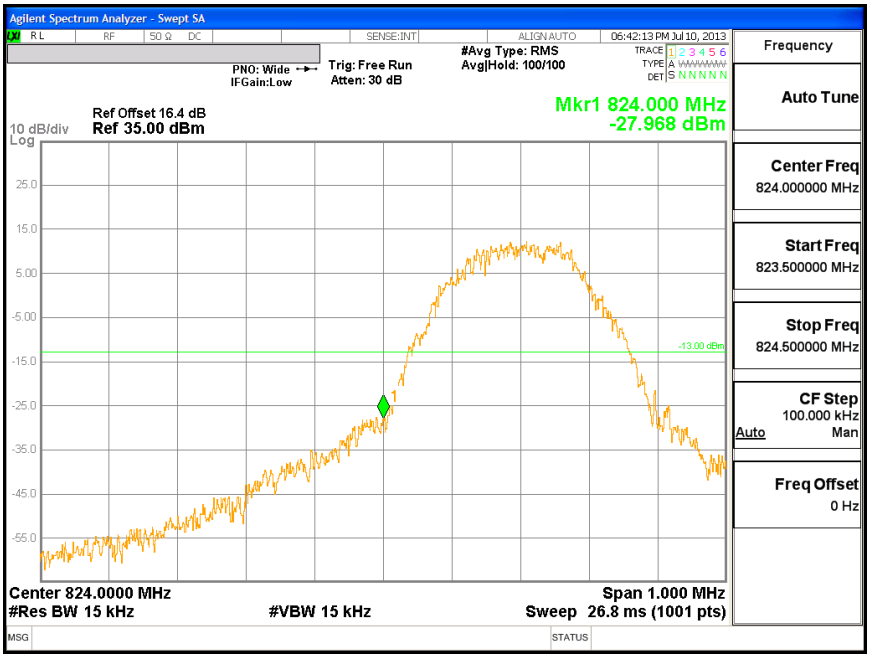


HIGH CH

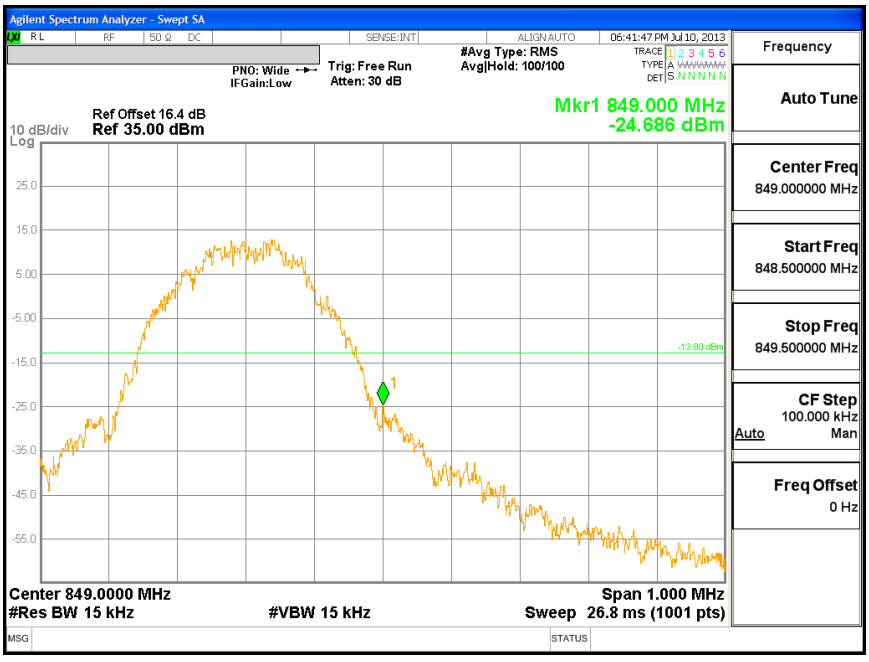


8.2.2. EGPRS850

LOW CH



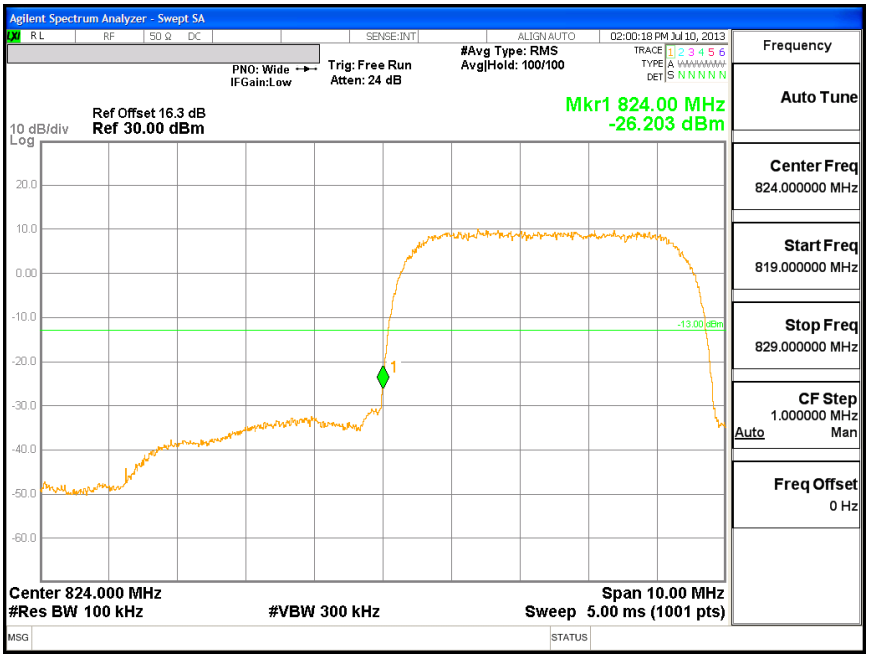
HIGH CH



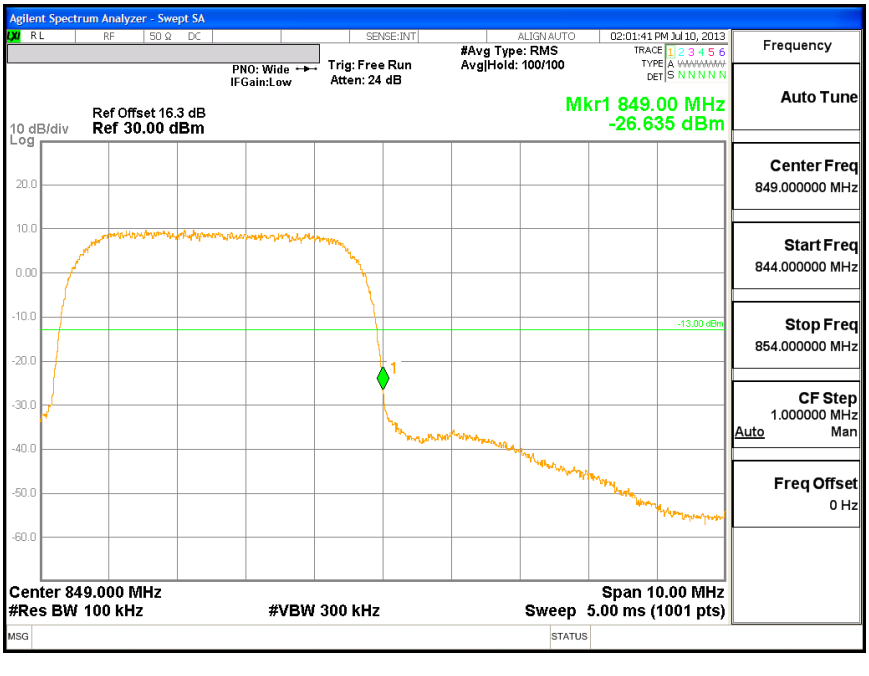
8.2.3. UMTS850

REL99

LOW CH

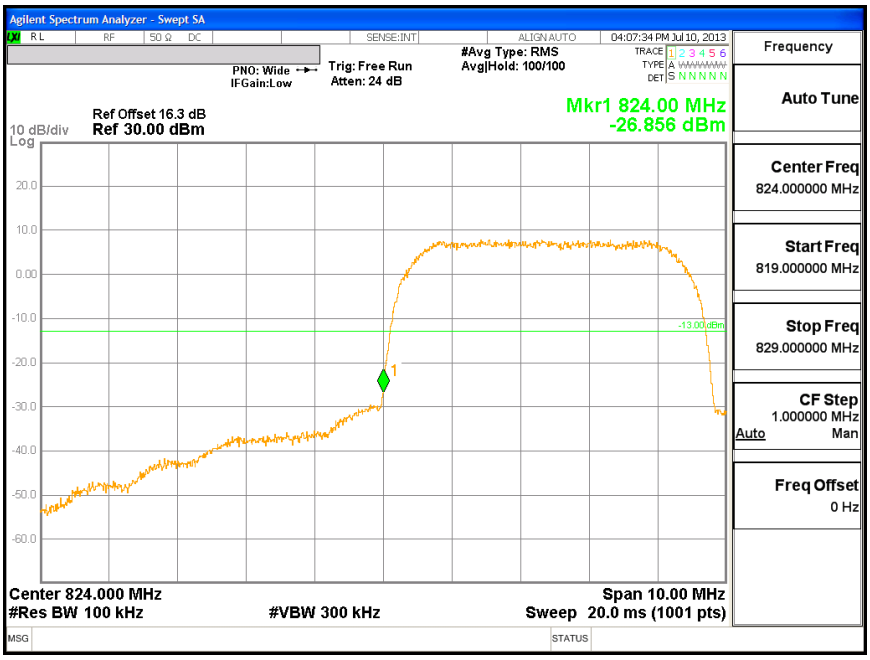


HIGH CH

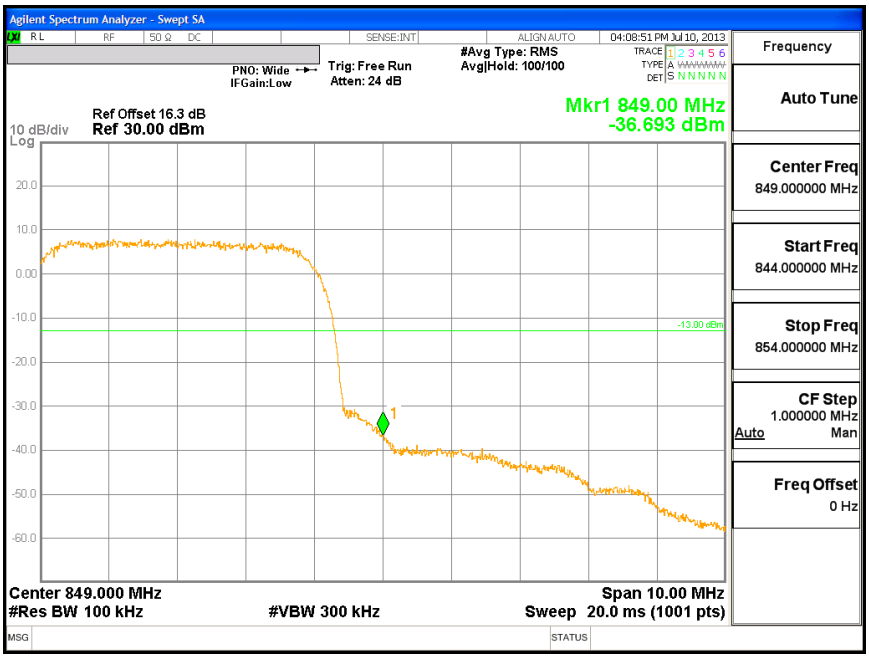


HSDPA

LOW CH

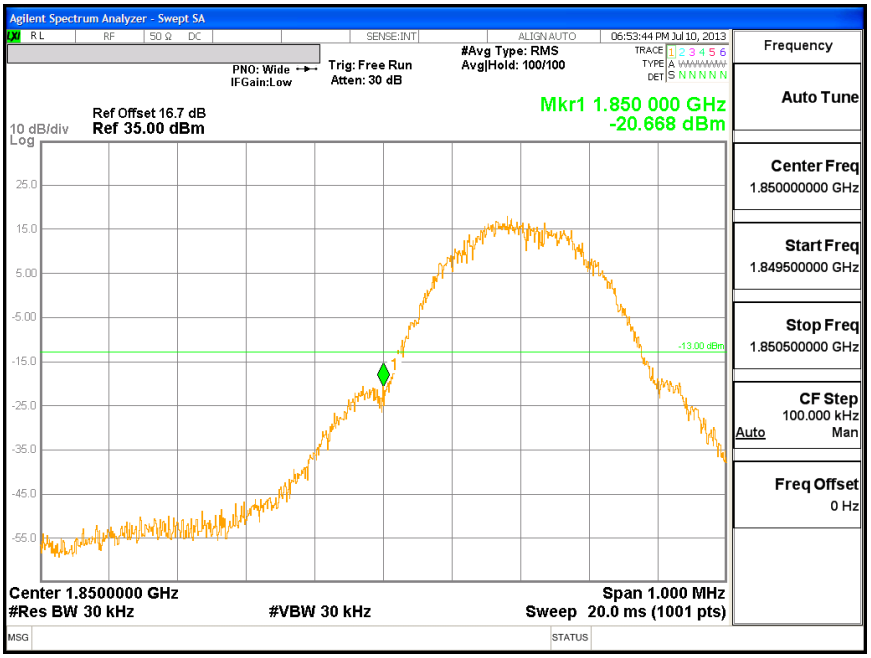


HIGH CH

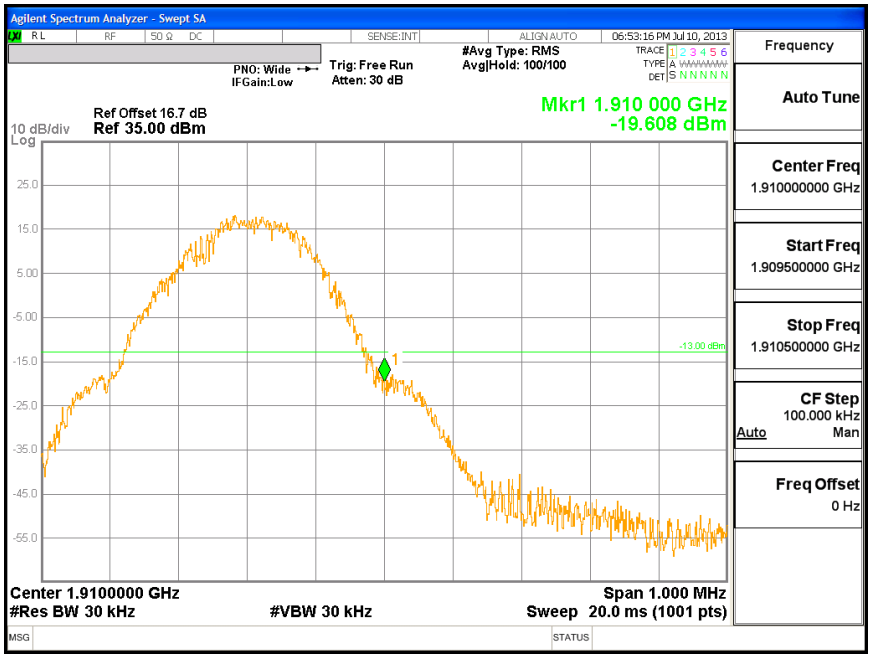


8.2.4. GPRS1900

LOW CH

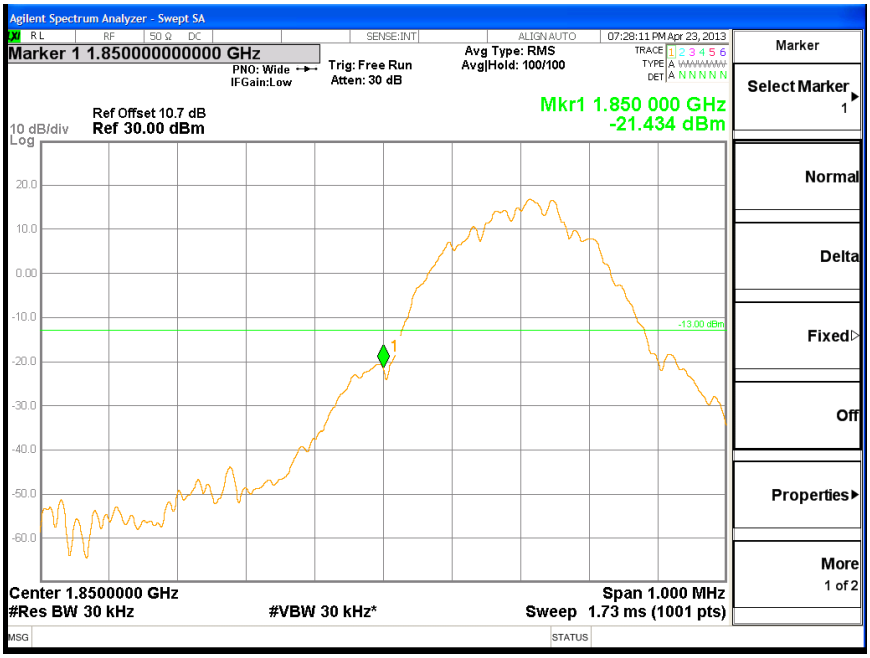


HIGH CH

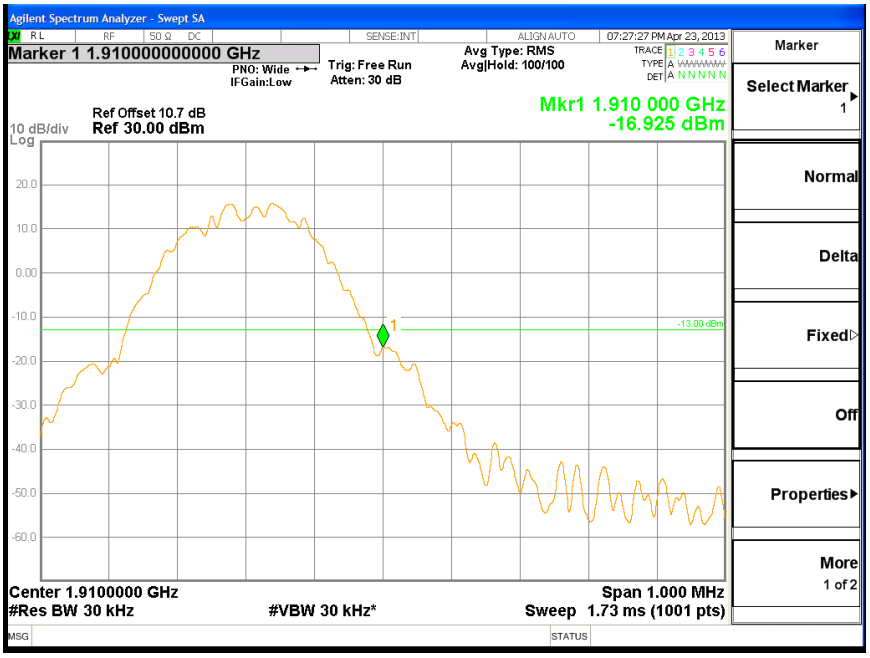


8.2.5. EGPRS1900

LOW CH



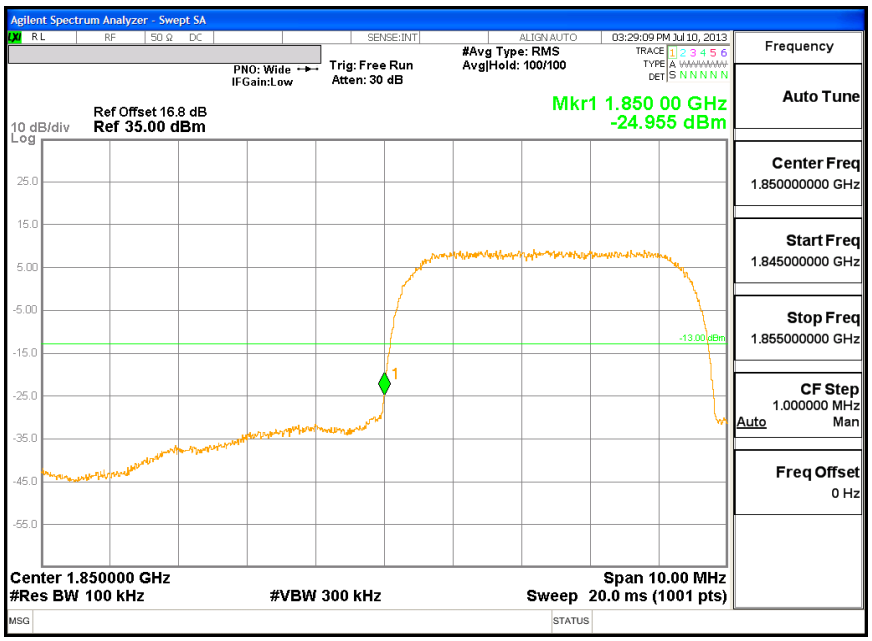
HIGH CH



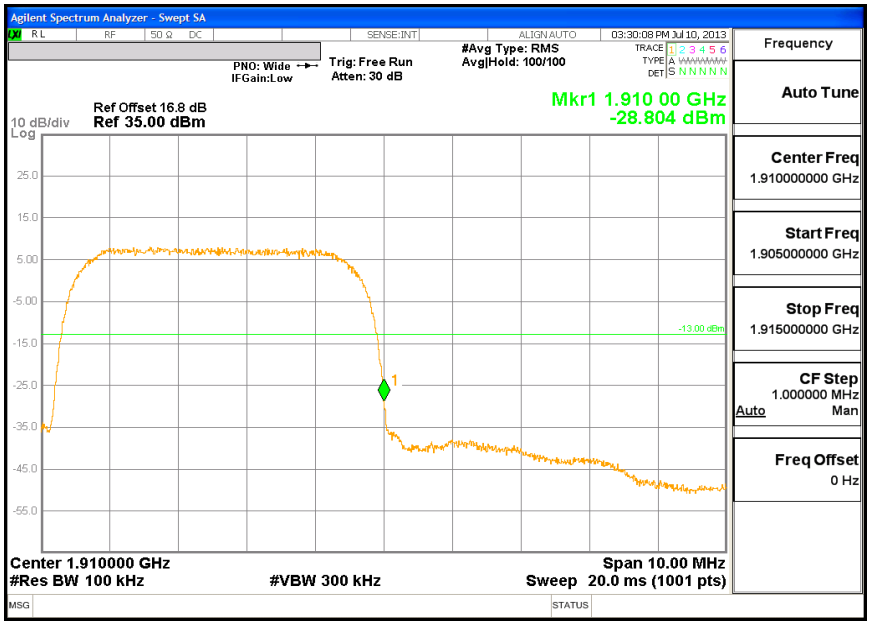
8.2.6. UMTS1900

REL99

LOW CH

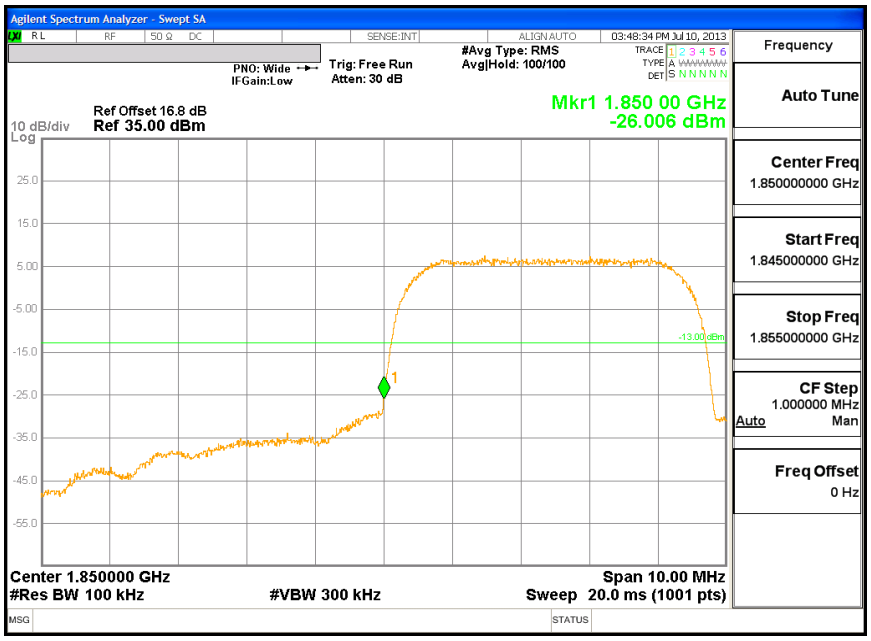


HIGH CH

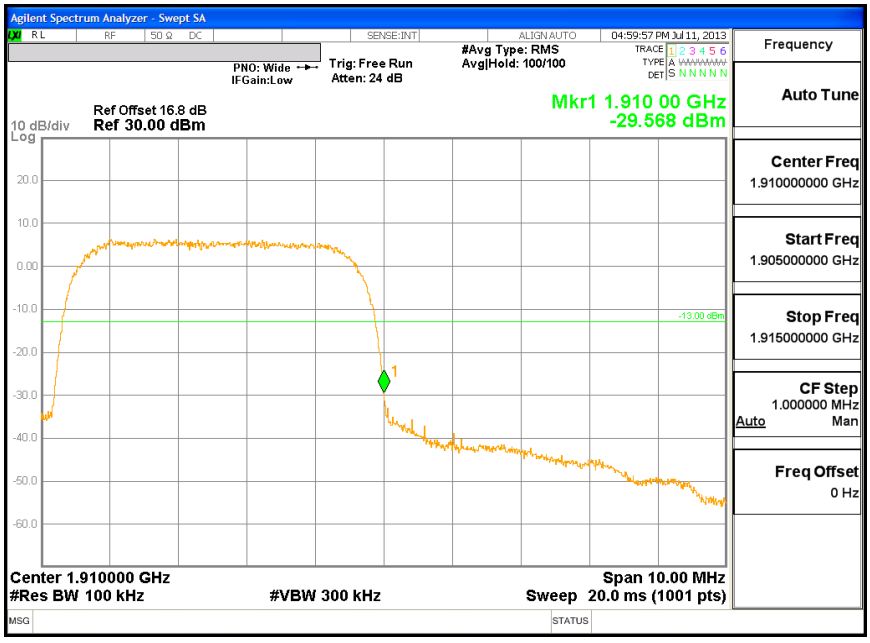


HSDPA

LOW CH



HIGH CH



8.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §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.

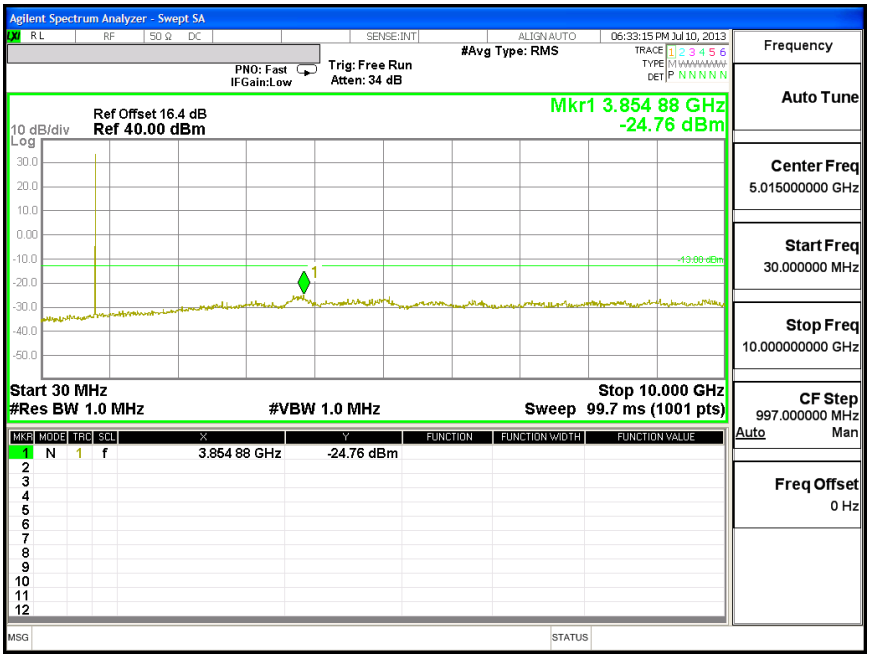
MODES TESTED

- GPRS and EGPRS
- UMTS, REL 99 and HSDPA

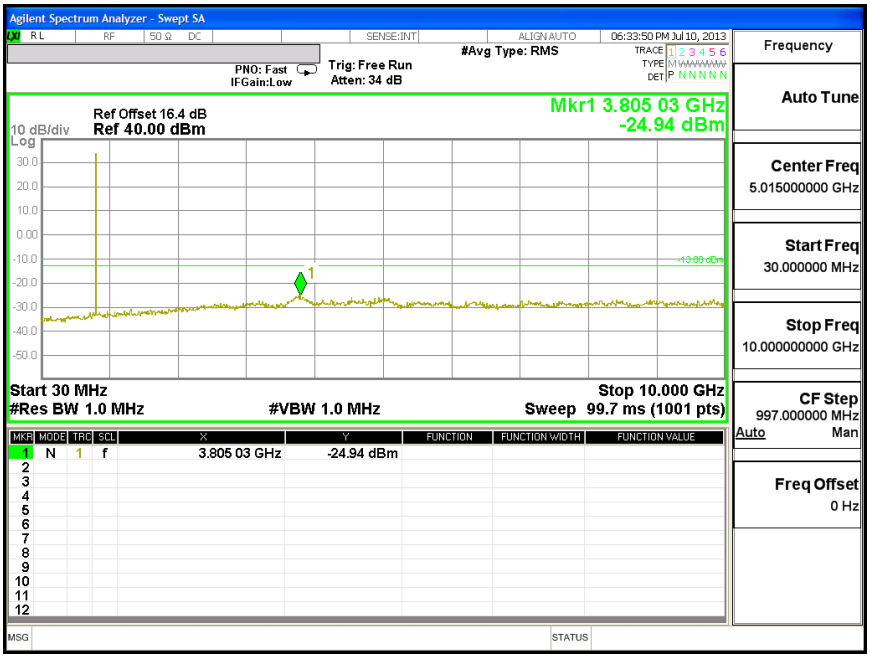
RESULTS

GPRS850

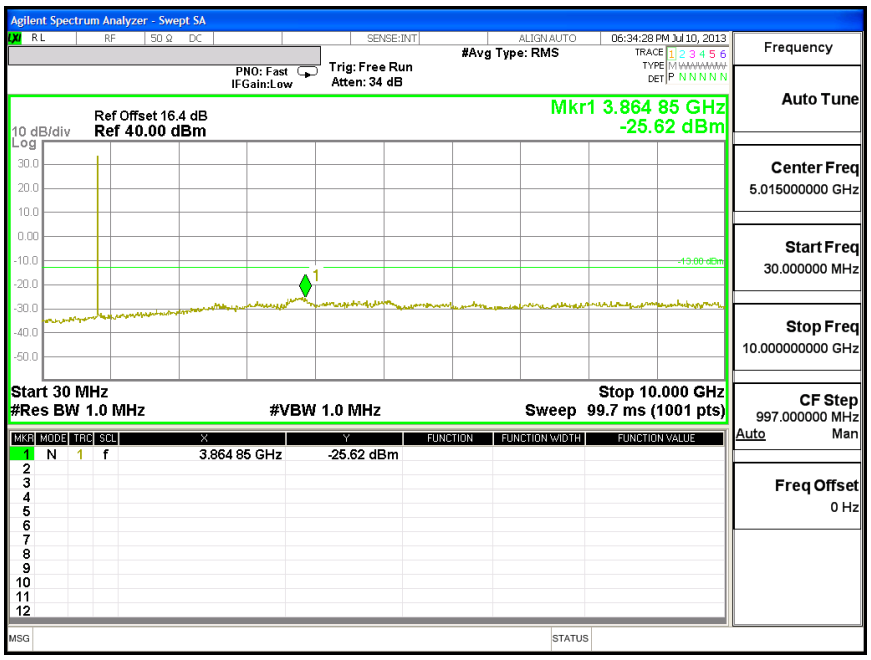
LOW CH



MID CH

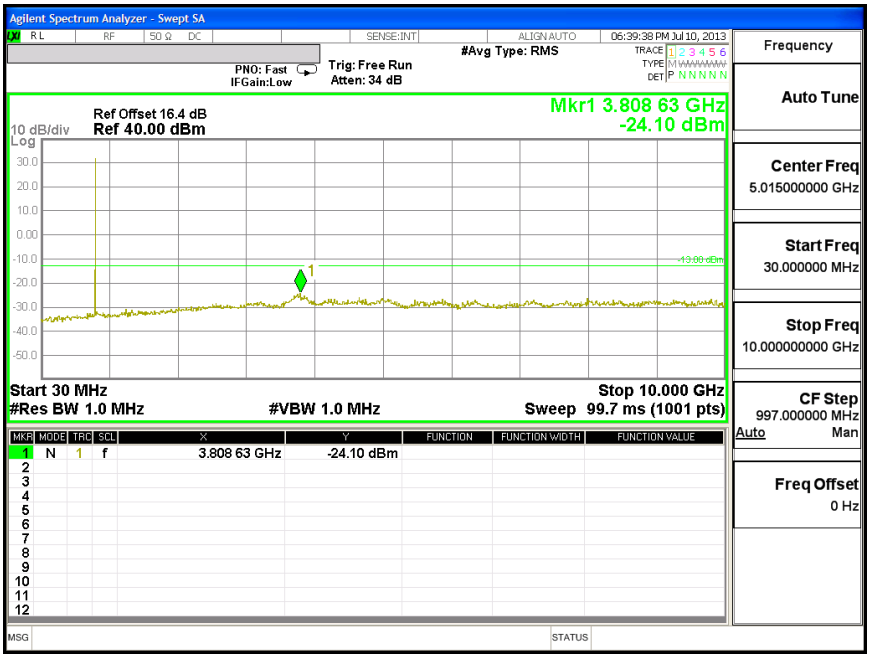


HIGH CH

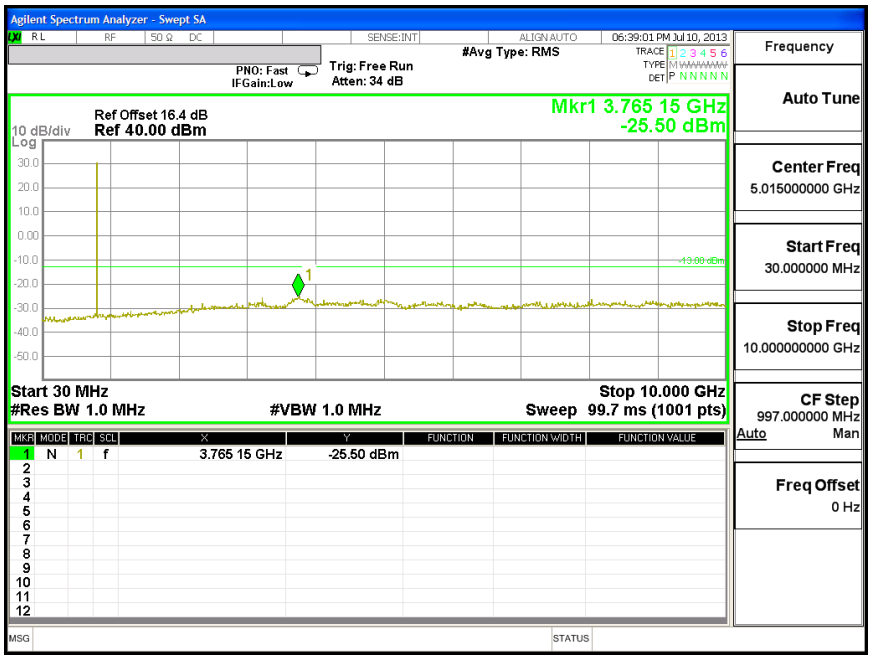


EGPRS850

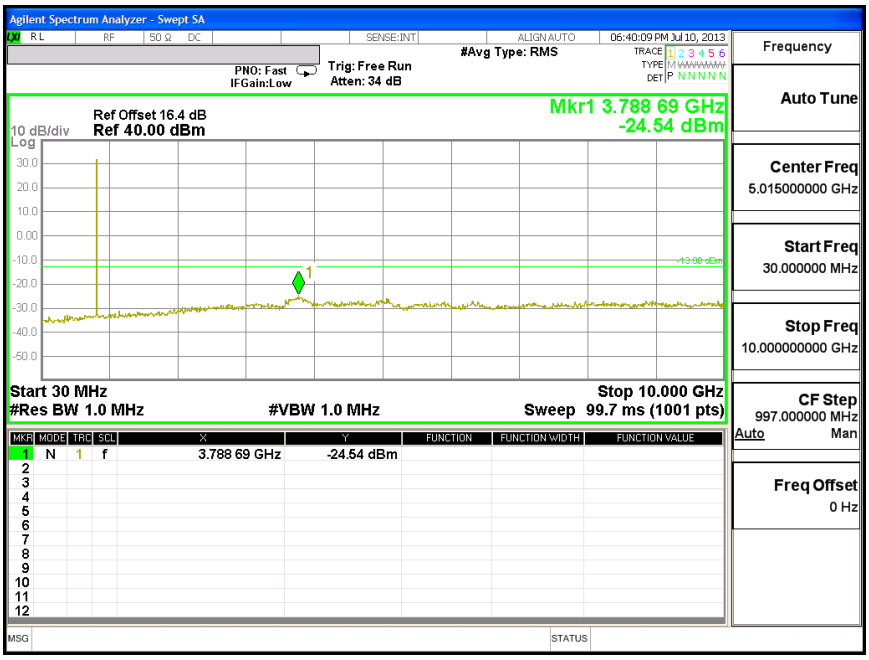
LOW CH



MID CH



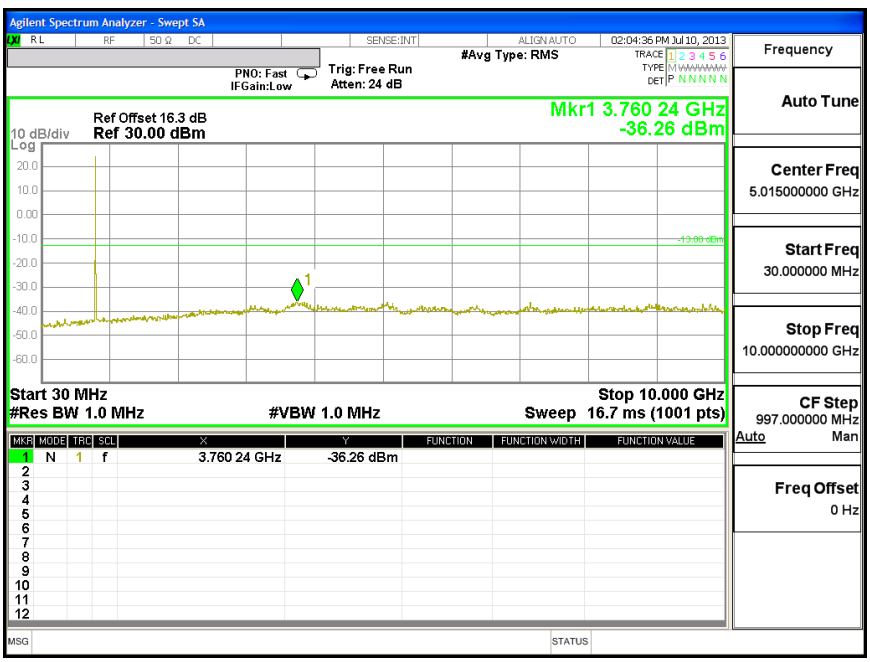
HIGH CH



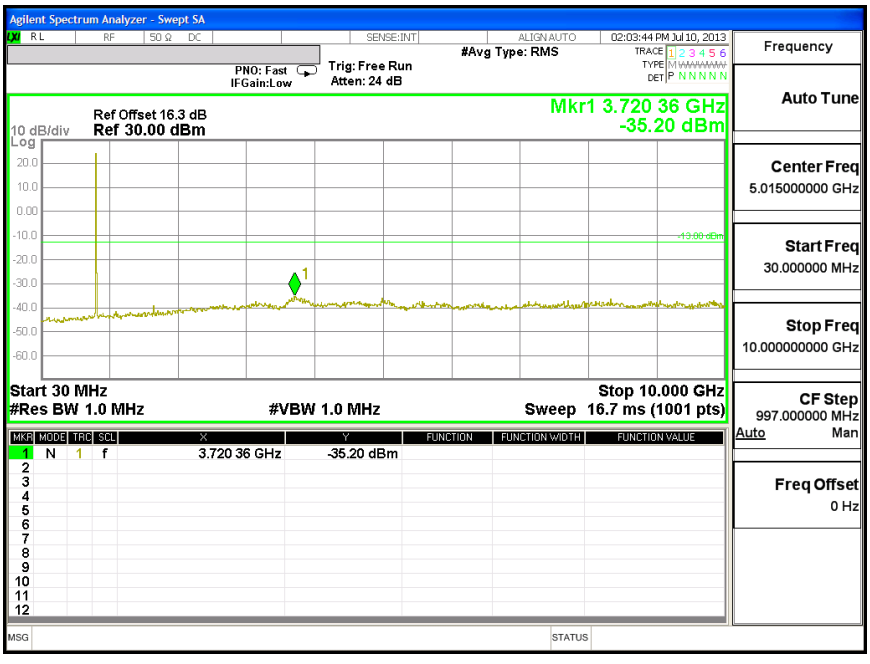
UMTS850

REL 99

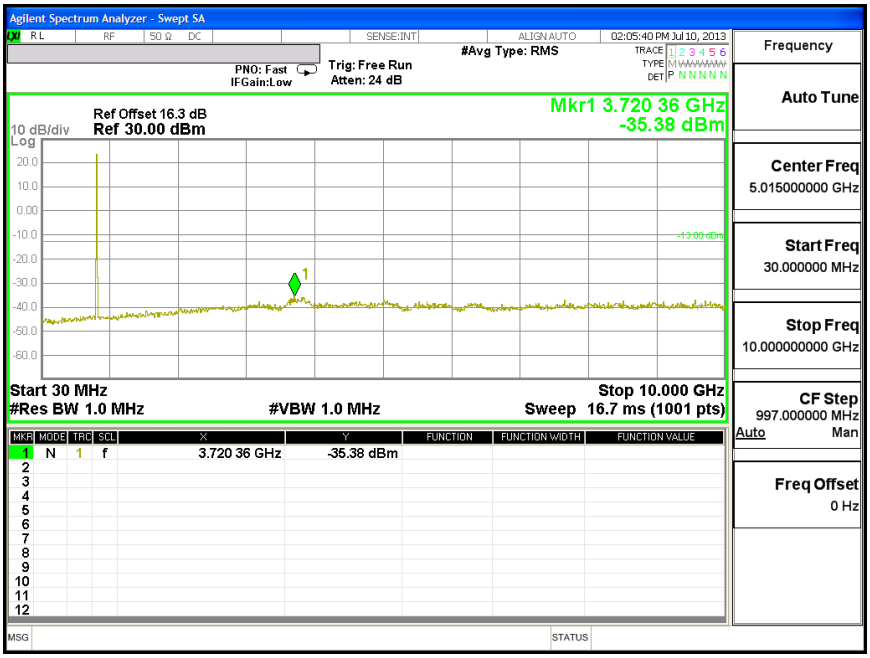
LOW CH



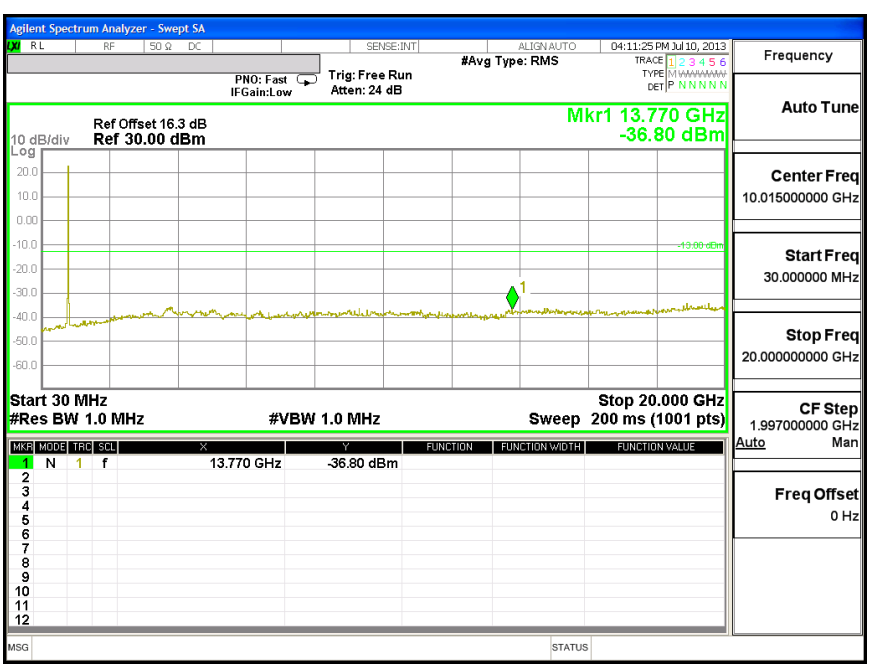
MID CH



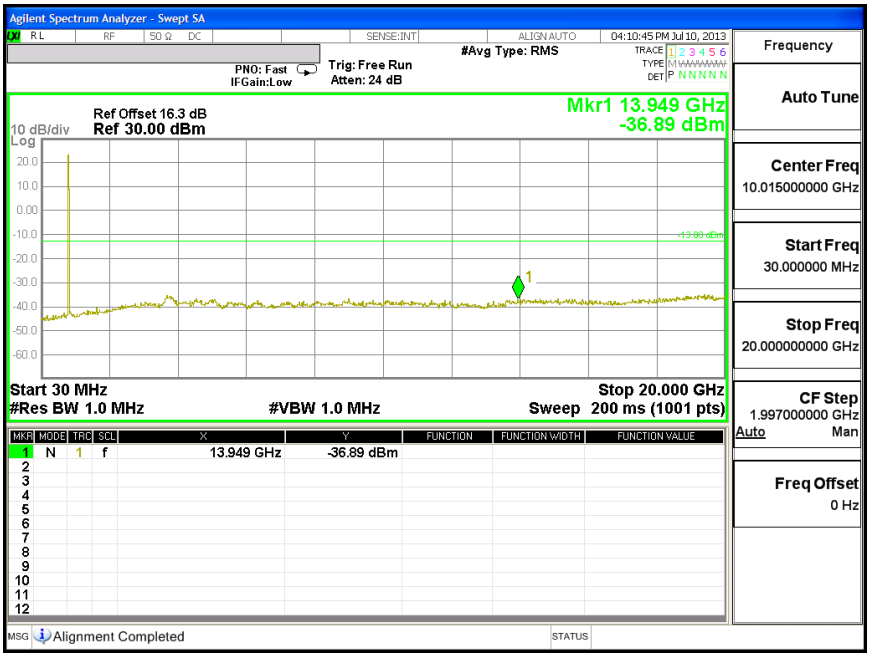
HIGH CH



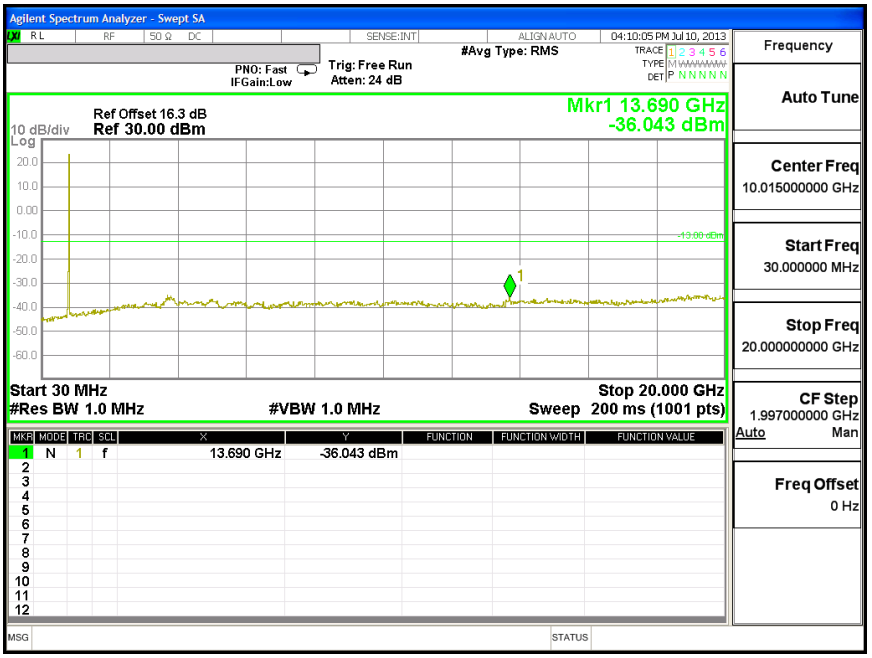
HSDPA



MID CH

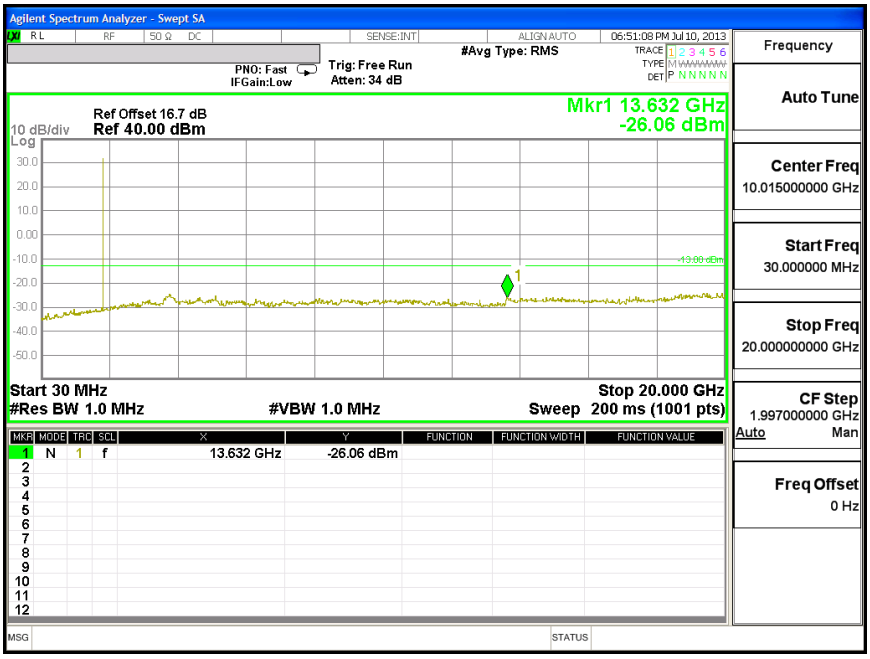


HIGH CH

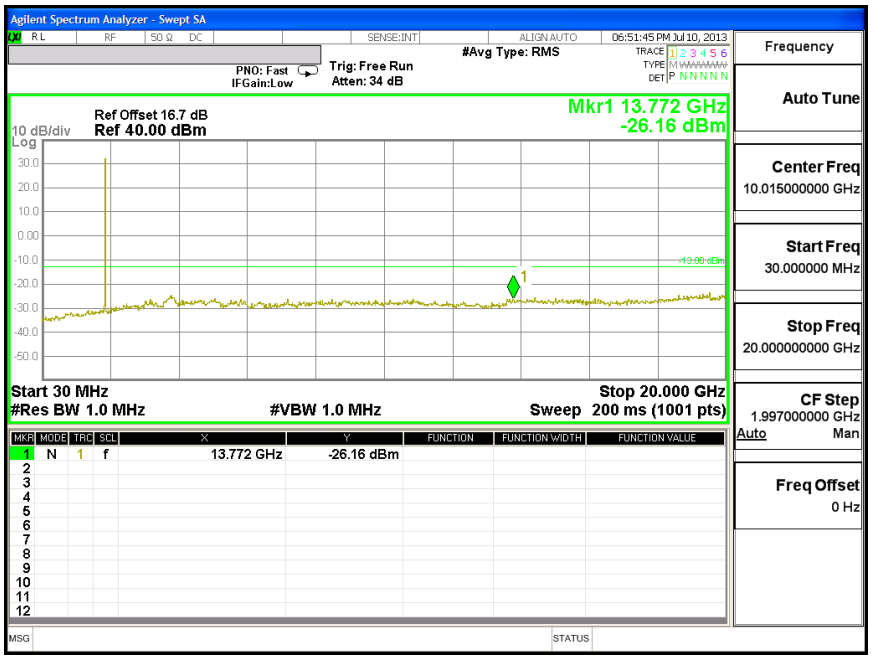


GPRS1900

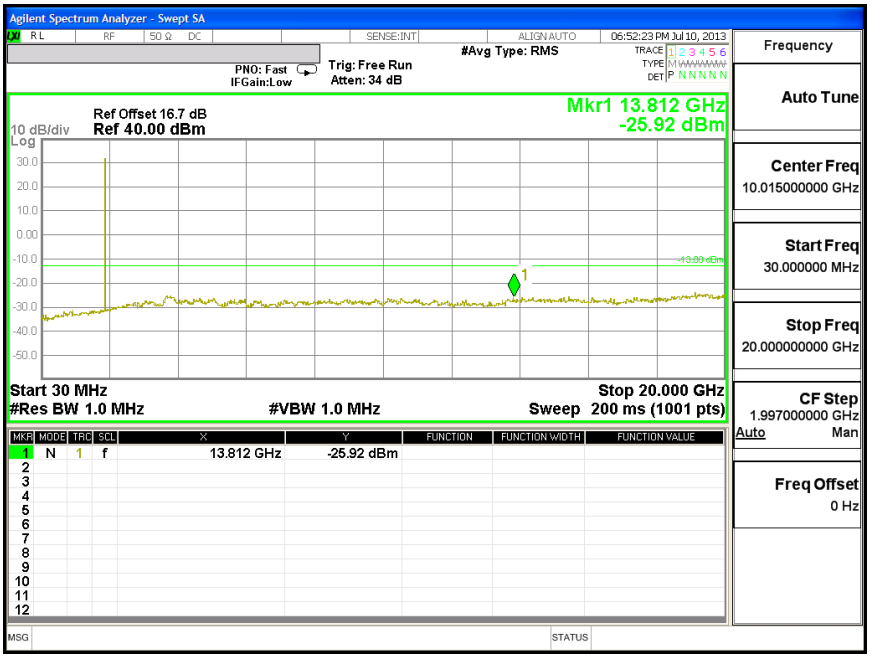
LOW CH



MID CH

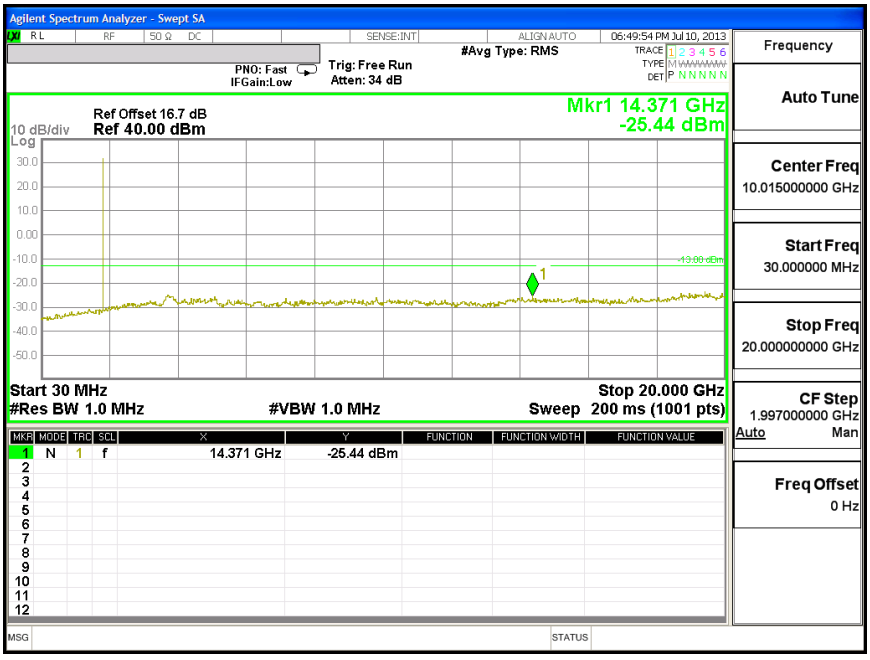


HIGH CH

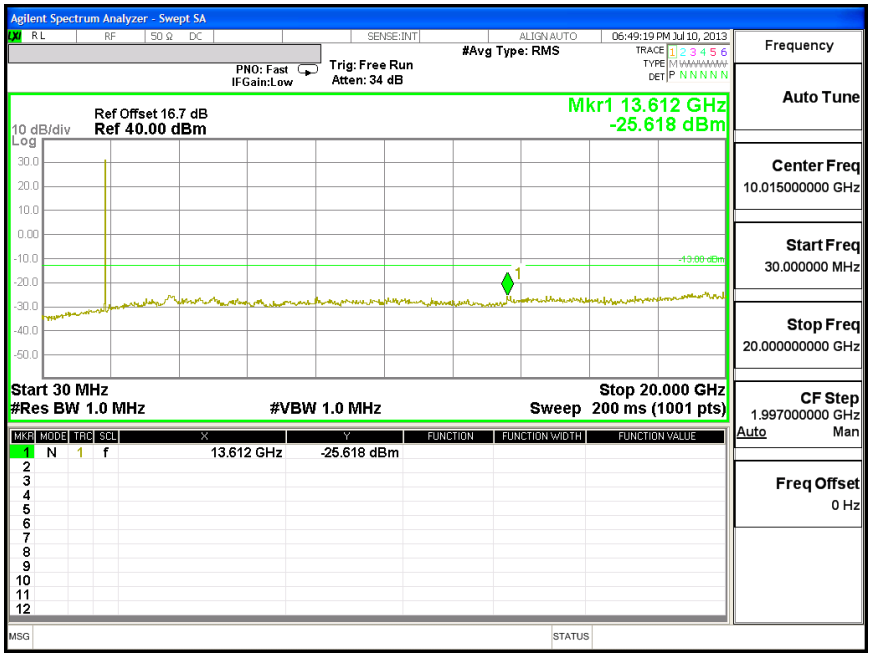


EGPRS1900

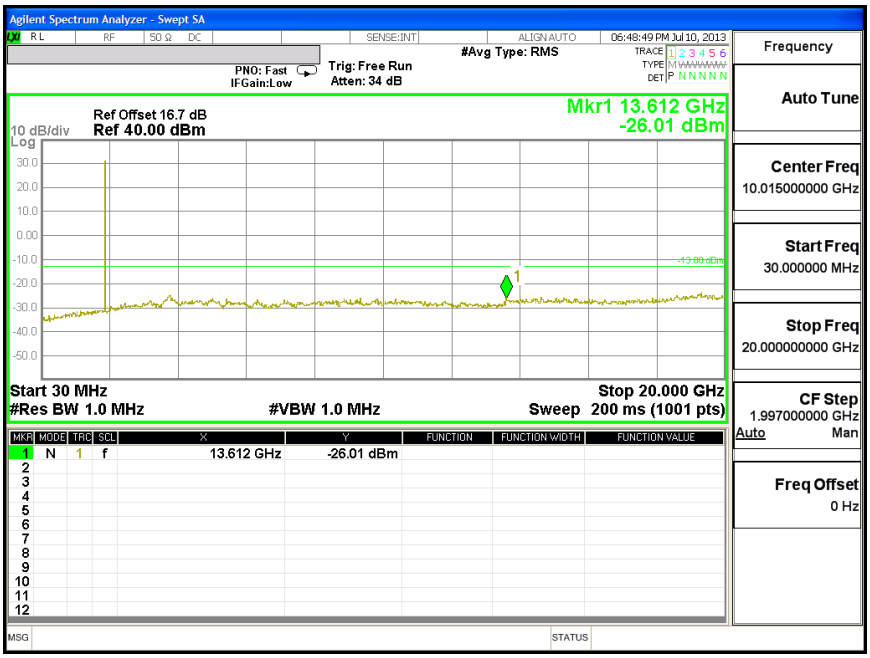
LOW CH



MID CH



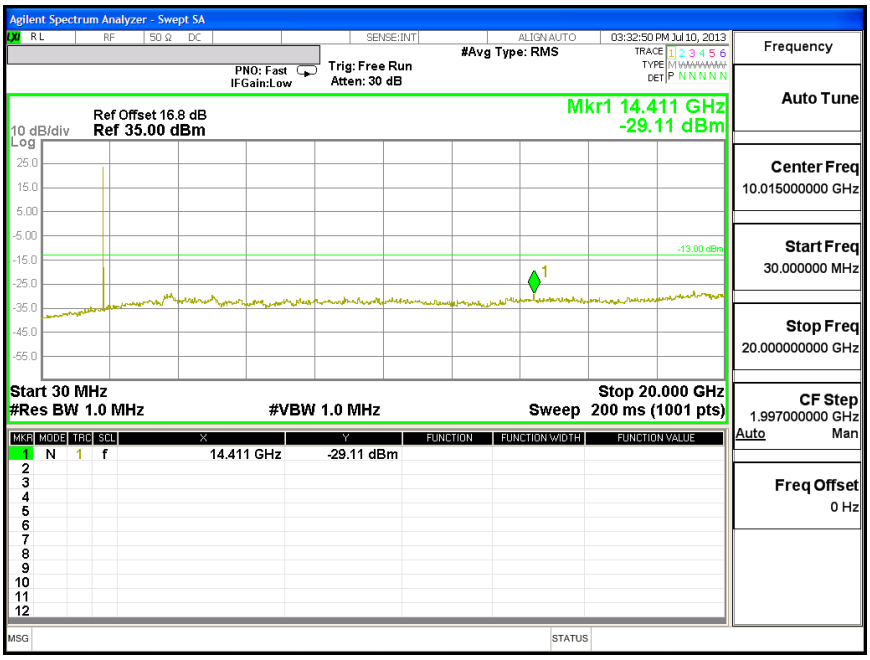
HIGH CH



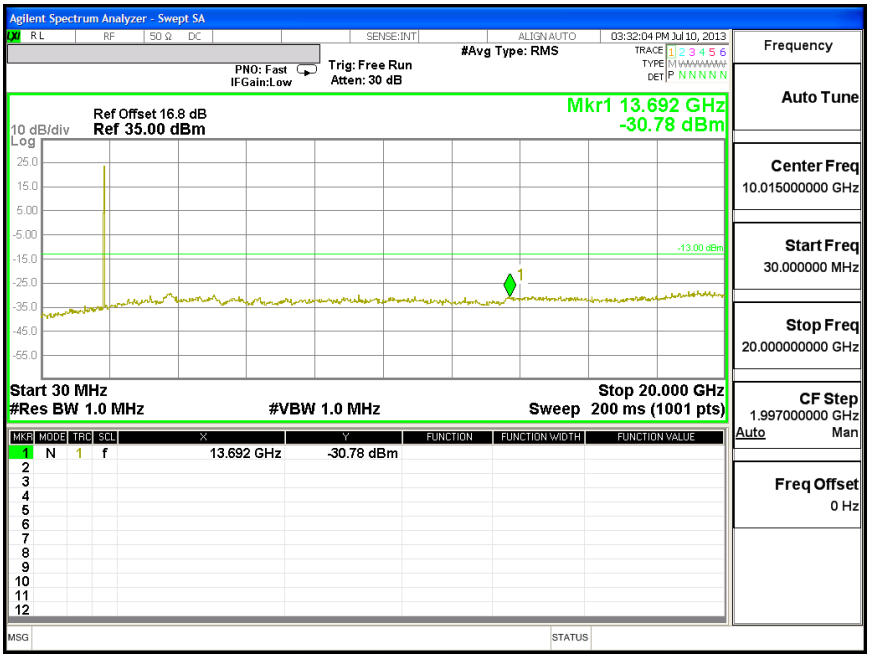
UMTS1900

REL 99

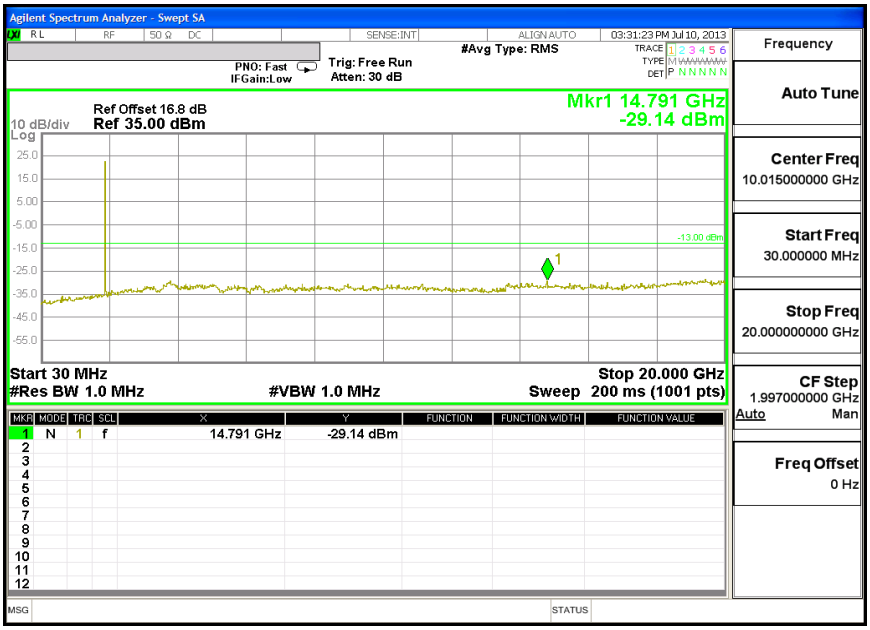
LOW CH



MID CH

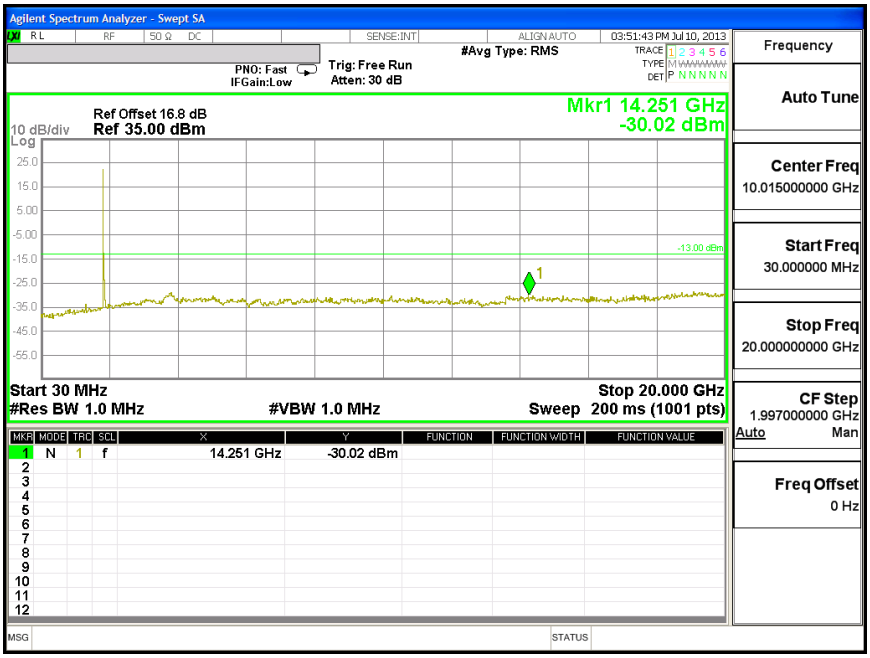


HIGH CH

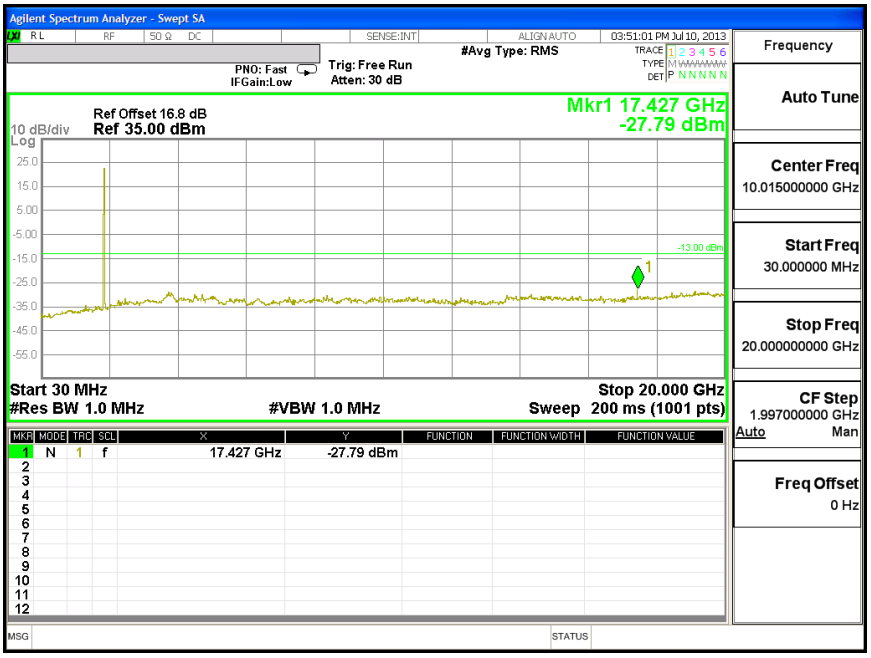


HSDPA

LOW CH



MID CH



HIGH CH

8.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235

LIMITS

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

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

TEST PROCEDURE

Use Agilent 8960 and 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).

MODES TESTED

- GPRS 850MHz, 1900MHz
- WCDMA ; HSDPA

RESULTS

See the following pages.

CELL, GPRS MODULATION – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.600008MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.600016	-0.010	2.5
3.80	40	836.600000	0.010	2.5
3.80	30	836.600001	0.008	2.5
3.80	***20***	***836.600008***	***0***	2.5
3.80	10	836.600020	-0.014	2.5
3.80	0	836.600018	-0.012	2.5
3.80	-10	836.600020	-0.014	2.5
3.80	-20	836.600017	-0.011	2.5
3.80	-30	836.600014	-0.007	2.5

Reference Frequency: Cellular Mid Channel 836.600008MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***836.600008***	***0***	***2.5***
4.20	20	836.600016	*-0.010*	2.5
3.40	20	836.600029	*-0.025*	2.5
End Volt(3.2)	20	836.600015	*-0.008*	2.5

PCS, EGPRS MODULATION – MID CHANNEL

Reference Frequency: PCS Mid Channel 1880.000014 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.999997	0.009	2.5
3.80	40	1879.999994	0.011	2.5
3.80	30	1879.999999	0.008	2.5
3.80	***20***	***1880.000014***	***0***	***2.5***
3.80	10	1880.000035	-0.011	2.5
3.80	0	1880.000047	-0.018	2.5
3.80	-10	1880.000052	-0.020	2.5
3.80	-20	1880.000056	-0.022	2.5
3.80	-30	1880.000003	0.006	2.5

Reference Frequency: PCS Mid Channel 1880.000014 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1880.000014***	***0.00000***	***2.5***
4.20	20	1880.000037	*-0.01223*	2.5
3.40	20	1879.999998	*0.00851*	2.5
End Volt(3.2)	20	1879.999992	*0.01170*	2.5

CELL, EGPRS MODULATION – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.599974MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.600016	-0.008	2.5
3.80	40	836.599998	0.013	2.5
3.80	30	836.600001	0.010	2.5
3.80	***20***	***836.600009***	***0***	2.5
3.80	10	836.600020	-0.013	2.5
3.80	0	836.600026	-0.020	2.5
3.80	-10	836.600027	-0.022	2.5
3.80	-20	836.600027	-0.022	2.5
3.80	-30	836.600013	-0.005	2.5

Reference Frequency: Cellular Mid Channel 836.600009MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.500 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***836.600009***	***0***	***2.5***
4.20	20	836.600025	*-0.019*	2.5
3.40	20	836.600016	*-0.008*	2.5
End Volt(3.2)	20	836.600015	*-0.007*	2.5

PCS, EGPRS MODULATION – MID CHANNEL

Reference Frequency: PCS Mid Channel 1880.000026 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (*C)	(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000003	0.012	2.5
3.80	40	1880.000050	-0.013	2.5
3.80	30	1880.000011	0.008	2.5
3.80	***20***	***1880.000026***	***0***	***2.5***
3.80	10	1880.000055	-0.015	2.5
3.80	0	1880.000067	-0.022	2.5
3.80	-10	1880.000053	-0.014	2.5
3.80	-20	1880.000043	-0.009	2.5
3.80	-30	1880.000012	0.007	2.5

Reference Frequency: PCS Mid Channel 1880.000026 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (*C)	(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1880.000026***	***0.00000***	***2.5***
4.20	20	1880.000047	*-0.01117*	2.5
3.40	20	1880.000045	*-0.01011*	2.5
End Volt(3.2)	20	1879.999997	*0.01543*	2.5

CELL WCDMA – MID CHANNEL

Reference Frequency: Cellular Mid Channel 835.599994 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2089.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	835.599993	0.001	2.5
3.80	40	835.599992	0.002	2.5
3.80	30	835.599991	0.004	2.5
3.80	***20***	***835.599994***	***0***	2.5
3.80	10	835.599990	0.005	2.5
3.80	0	835.599990	0.005	2.5
3.80	-10	835.599991	0.004	2.5
3.80	-20	835.599990	0.005	2.5
3.80	-30	835.599990	0.005	2.5

Reference Frequency: Cellular Mid Channel 835.599994 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2089.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***835.599994***	***0***	***2.5***
4.20	20	835.599991	*0.004*	2.5
3.40	20	835.599992	*0.002*	2.5
End Volt(3.2)	20	835.599991	*0.004*	2.5

PCS, WCDMA – MID CHANNEL

Reference Frequency: PCS Mid Channel 1880.000007MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.999995	0.0064	2.5
3.80	40	1879.999998	0.0048	2.5
3.80	30	1879.999996	0.0059	2.5
3.80	***20***	***1880.000007***	***0***	***2.5***
3.80	10	1880.000001	0.0032	2.5
3.80	0	1880.000003	0.0021	2.5
3.80	-10	1880.000005	0.0011	2.5
3.80	-20	1880.000004	0.0016	2.5
3.80	-30	1880.000003	0.0021	2.5

Reference Frequency: PCS Mid Channel 1880.000007MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1880.000007***	***0***	***2.5***
4.20	20	1880.000005	0.0011	2.5
3.40	20	1880.000003	0.0021	2.5
End Volt(3.2)	20	1880.000002	0.0027	2.5

9. RADIATED TEST RESULTS

9.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232

LIMITS

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232(c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

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

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17
KDB 971168 D01 Power Meas License Digital Systems v02r01, “Measurement Guidance for Certification of Licensed Digital Transmitters”

MODES TESTED

- GPRS and EGPRS
- UMTS, REL 99 and HSDPA

RESULTS

LAT / PORT A

Mode	Channel	f (MHz)	ERP	
			dBm	mW
GPRS	128	824.20	31.20	1318.26
	190	836.60	31.48	1406.05
	251	848.80	**32.35**	1717.91
EGPRS	128	824.20	30.40	1096.48
	190	836.60	**30.60**	1148.15
	251	848.80	30.20	1047.13

Mode	Channel	f (MHz)	ERP	
			dBm	mW
UMTS,REL 99	4357	826.40	**21.46**	139.96
	4405	836.00	21.20	131.83
	4455	846.00	20.10	102.33
UMTS, HSDPA	4357	826.40	**19.80**	95.50
	4405	836.00	19.60	91.20
	4455	846.00	19.10	81.28

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
GPRS	512	1850.20	31.30	1348.96
	661	1880.00	31.53	1422.33
	810	1909.80	**31.95**	1566.75
EGPRS	512	1850.20	**30.40**	1096.48
	661	1880.00	30.30	1071.52
	810	1909.80	30.26	1061.70

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
UMTS, REL 99	9662	1852.40	24.06	254.68
	9800	1880.00	**24.73**	297.17
	9938	1907.60	23.24	210.86
UMTS, HSDPA	9662	1852.40	22.70	186.21
	9800	1880.00	**23.28**	212.81
	9938	1907.60	21.54	142.56

UAT / PORT B

Mode	Channel	f (MHz)	ERP	
			dBm	mW
GPRS	128	824.20	**17.90**	61.66
	190	836.60	17.00	50.12
	251	848.80	16.50	44.67
EGPRS	128	824.20	**17.60**	57.54
	190	836.60	16.70	46.77
	251	848.80	16.10	40.74

Mode	Channel	f (MHz)	ERP	
			dBm	mW
UMTS,REL 99	4357	826.40	**12.80**	19.05
	4405	836.00	11.20	13.18
	4455	846.00	9.90	9.77
UMTS, HSDPA	4357	826.40	**11.20**	13.18
	4405	836.00	9.80	9.55
	4455	846.00	8.70	7.41

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
GPRS	512	1850.20	**25.91**	389.94
	661	1880.00	25.68	369.83
	810	1909.80	25.75	375.84
EGPRS	512	1850.20	**25.40**	346.74
	661	1880.00	25.18	329.61
	810	1909.80	25.14	326.59

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
UMTS, REL 99	9662	1852.40	22.20	165.96
	9800	1880.00	**22.48**	177.01
	9938	1907.60	22.14	163.68
UMTS, HSDPA	9662	1852.40	23.40	218.78
	9800	1880.00	**23.58**	228.03
	9938	1907.60	22.54	179.47

LAT GPRS850

High Frequency Substitution Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/20/13
Test Engineer: Mona Hua
Configuration: EUT Only
Mode: GRPS 850MHz CELL

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	31.80	V	0.6	0.0	31.20	38.5	-7.2	
824.20	12.53	H	0.6	0.0	11.93	38.5	-26.5	
Mid Ch								
836.60	32.08	V	0.6	0.0	31.48	38.5	-7.0	
836.60	12.84	H	0.6	0.0	12.24	38.5	-26.2	
High Ch								
848.80	32.95	V	0.6	0.0	32.35	38.5	-6.1	
848.80	12.87	H	0.6	0.0	12.27	38.5	-26.2	

Rev. 3.17.11

LAT EGPRS850

High Frequency Substitution Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/20/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: EGRPS 850MHz CELL

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	31.00	V	0.6	0.0	30.40	38.5	-8.0	
824.20	12.10	H	0.6	0.0	11.50	38.5	-26.9	
Mid Ch								
836.60	31.20	V	0.6	0.0	30.60	38.5	-7.8	
836.60	12.81	H	0.6	0.0	12.21	38.5	-26.2	
High Ch								
848.80	30.80	V	0.6	0.0	30.20	38.5	-8.2	
848.80	12.34	H	0.6	0.0	11.74	38.5	-26.7	

Rev. 3.17.11

LAT UMTS850

REL 99

High Frequency Substitution Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/24/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: REL 99, CELL, Average

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	22.06	V	0.6	0.0	21.46	38.5	-17.0	
826.40	2.20	H	0.6	0.0	1.60	38.5	-36.8	
Mid Ch								
836.00	21.80	V	0.6	0.0	21.20	38.5	-17.2	
836.00	2.73	H	0.6	0.0	2.13	38.5	-36.3	
High Ch								
846.60	20.70	V	0.6	0.0	20.10	38.5	-18.3	
846.60	2.24	H	0.6	0.0	1.64	38.5	-36.8	

Rev. 3.17.11

HSDPA

High Frequency Substitution Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/24/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: HSDPA, CELL, Average

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	20.40	V	0.6	0.0	19.80	38.5	-18.6	
826.40	0.90	H	0.6	0.0	0.30	38.5	-38.1	
Mid Ch								
836.00	20.20	V	0.6	0.0	19.60	38.5	-18.8	
836.00	1.00	H	0.6	0.0	0.40	38.5	-38.0	
High Ch								
846.60	19.70	V	0.6	0.0	19.10	38.5	-19.3	
846.60	0.90	H	0.6	0.0	0.30	38.5	-38.1	

Rev. 3.17.11

LAT GPRS1900

High Frequency Fundamental Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/20/13
Test Engineer: Mona Hua
Configuration: EUT Only
Mode: GPRS 1900MHz

Test Equipment:
Receiving: T344, and Chamber D SMA Cables
Substitution: Horn T60 Substitution, 8ft SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.850	21.6	V	1.50	7.94	28.01	33.0	-5.0	
1.850	24.0	H	1.50	8.80	31.30	33.0	-1.7	
Mid Ch								
1.880	21.6	V	1.50	7.95	28.05	33.0	-5.0	
1.880	24.4	H	1.50	8.68	31.53	33.0	-1.5	
High Ch								
1.910	22.5	V	1.50	7.97	28.95	33.0	-4.1	
1.910	24.9	H	1.50	8.57	31.95	33.0	-1.1	

Rev. 3.17.11

LAT EGPRS1900

High Frequency Fundamental Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/20/13
Test Engineer: Mona Hua
Configuration: EUT Only
Mode: EGPRS 1900MHz

Test Equipment:
Receiving: T344, and Chamber D SMA Cables
Substitution: Horn T60 Substitution, 4ft SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.850	20.4	V	1.50	7.94	26.82	33.0	-6.2	
1.850	23.1	H	1.50	8.80	30.40	33.0	-2.6	
Mid Ch								
1.880	20.8	V	1.50	7.95	27.28	33.0	-5.7	
1.880	23.1	H	1.50	8.68	30.30	33.0	-2.7	
High Ch								
1.910	20.8	V	1.50	7.97	27.28	33.0	-5.7	
1.910	23.2	H	1.50	8.57	30.26	33.0	-2.7	

Rev. 3.17.11

LAT UMTS1900

REL 99

High Frequency Fundamental Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/24/13
Test Engineer: Mona Hua
Configuration: EUT Only
Mode: Rel 99, PCS, Average

Test Equipment:
Receiving: T344, and Chamber D SMA Cables
Substitution: Horn T60 Substitution, 8ft SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.852	13.9	V	1.50	7.94	20.34	33.0	-12.7	
1.852	16.8	H	1.50	8.80	24.06	33.0	-8.9	
Mid Ch								
1.880	14.6	V	1.50	7.95	21.07	33.0	-11.9	
1.880	17.6	H	1.50	8.68	24.73	33.0	-8.3	
High Ch								
1.908	12.8	V	1.50	7.97	19.27	33.0	-13.7	
1.908	16.2	H	1.50	8.57	23.24	33.0	-9.8	

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HSDPA

High Frequency Fundamental Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/24/13
Test Engineer: Mona Hua
Configuration: EUT Only
Mode: HSDPA, PCS, Average

Test Equipment:
Receiving: T344, and Chamber D SMA Cables
Substitution: Horn T60 Substitution, 8ft SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.852	12.8	V	1.50	7.94	19.24	33.0	-13.8	
1.852	15.4	H	1.50	8.80	22.70	33.0	-10.3	
Mid Ch								
1.880	13.3	V	1.50	7.95	19.75	33.0	-13.3	
1.880	16.1	H	1.50	8.68	23.28	33.0	-9.7	
High Ch								
1.908	11.3	V	1.50	7.97	17.77	33.0	-15.2	
1.908	14.5	H	1.50	8.57	21.54	33.0	-11.5	

Rev. 3.17.11

UAT

GPRS850

High Frequency Substitution Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/25/13
Test Engineer: Mona Hua
Configuration: EUT Only
Mode: GRPS 850MHz CELL

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	18.50	V	0.6	0.0	17.90	38.5	-20.5	
824.20	1.40	H	0.6	0.0	0.80	38.5	-37.6	
Mid Ch								
836.60	17.60	V	0.6	0.0	17.00	38.5	-21.4	
836.60	1.80	H	0.6	0.0	1.20	38.5	-37.2	
High Ch								
848.80	17.10	V	0.6	0.0	16.50	38.5	-21.9	
848.80	1.04	H	0.6	0.0	0.44	38.5	-38.0	

Rev. 3.17.11

UAT EGPRS850

High Frequency Substitution Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/25/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: EGRPS 850MHz CELL

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	18.20	V	0.6	0.0	17.60	38.5	-20.8	
824.20	1.10	H	0.6	0.0	0.50	38.5	-37.9	
Mid Ch								
836.60	17.30	V	0.6	0.0	16.70	38.5	-21.7	
836.60	1.30	H	0.6	0.0	0.70	38.5	-37.7	
High Ch								
848.80	16.70	V	0.6	0.0	16.10	38.5	-22.3	
848.80	0.64	H	0.6	0.0	0.04	38.5	-38.4	

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UAT UMTS850

REL 99

High Frequency Substitution Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/25/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: REL 99, CELL, Average

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	13.40	V	0.6	0.0	12.80	38.5	-25.6	
826.40	-5.00	H	0.6	0.0	-5.60	38.5	-44.0	
Mid Ch								
836.00	11.80	V	0.6	0.0	11.20	38.5	-27.2	
836.00	-5.70	H	0.6	0.0	-6.30	38.5	-44.7	
High Ch								
846.60	10.50	V	0.6	0.0	9.90	38.5	-28.5	
846.60	-6.26	H	0.6	0.0	-6.86	38.5	-45.3	

Rev. 3.17.11

HSDPA

High Frequency Substitution Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/25/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: HSDPA, CELL, Average

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	11.80	V	0.6	0.0	11.20	38.5	-27.2	
826.40	-5.84	H	0.6	0.0	-6.44	38.5	-44.9	
Mid Ch								
836.00	10.40	V	0.6	0.0	9.80	38.5	-28.6	
836.00	-5.80	H	0.6	0.0	-6.40	38.5	-44.8	
High Ch								
846.60	9.30	V	0.6	0.0	8.70	38.5	-29.7	
846.60	-6.06	H	0.6	0.0	-6.66	38.5	-45.1	

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UAT GPRS1900

High Frequency Fundamental Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/25/13
Test Engineer: Mona Hua
Configuration: EUT Only
Mode: GPRS 1900MHz

Test Equipment:
Receiving: T344, and Chamber D SMA Cables
Substitution: Horn T60 Substitution, 4ft SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.850	16.3	V	1.50	7.94	22.74	33.0	-10.3	
1.850	18.6	H	1.50	8.80	25.91	33.0	-7.1	
Mid Ch								
1.880	15.4	V	1.50	7.95	21.85	33.0	-11.2	
1.880	18.5	H	1.50	8.68	25.68	33.0	-7.3	
High Ch								
1.910	16.8	V	1.50	7.97	23.27	33.0	-9.7	
1.910	18.7	H	1.50	8.57	25.75	33.0	-7.3	

Rev. 3.17.11

UAT EGPRS1900

High Frequency Fundamental Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/25/13
Test Engineer: Mona Hua
Configuration: EUT Only
Mode: EGPRS 1900MHz

Test Equipment:
Receiving: T344, and Chamber D SMA Cables
Substitution: Horn T60 Substitution, 4ft SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.850	15.6	V	1.50	7.94	22.04	33.0	-11.0	
1.850	18.1	H	1.50	8.80	25.40	33.0	-7.6	
Mid Ch								
1.880	14.9	V	1.50	7.95	21.35	33.0	-11.7	
1.880	18.0	H	1.50	8.68	25.18	33.0	-7.8	
High Ch								
1.910	16.3	V	1.50	7.97	22.77	33.0	-10.2	
1.910	18.1	H	1.50	8.57	25.14	33.0	-7.9	

Rev. 3.17.11

UAT UMTS1900

REL 99

High Frequency Fundamental Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/25/13
Test Engineer: Mona Hua
Configuration: EUT Only
Mode: Rel 99, PCS, Average

Test Equipment:
Receiving: T344, and Chamber D SMA Cables
Substitution: Horn T60 Substitution, 8ft SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.852	8.2	V	1.50	7.94	14.64	33.0	-18.4	
1.852	10.2	H	1.50	8.80	17.50	33.0	-15.5	
Mid Ch								
1.880	8.9	V	1.50	7.95	15.35	33.0	-17.7	
1.880	10.9	H	1.50	8.68	18.08	33.0	-14.9	
High Ch								
1.908	9.1	V	1.50	7.97	15.57	33.0	-17.4	
1.908	10.7	H	1.50	8.57	17.74	33.0	-15.3	

Rev. 3.17.11

HSDPA

High Frequency Fundamental Measurement
Compliance Certification Services Chamber D

Company: Apple
Project #: 13U15037
Date: 06/25/13
Test Engineer: Mona Hua
Configuration: EUT Only
Mode: HSDPA, PCS, Average

Test Equipment:
Receiving: T344, and Chamber D SMA Cables
Substitution: Horn T60 Substitution, 8ft SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.852	6.7	V	1.50	7.94	13.14	33.0	-19.9	
1.852	9.5	H	1.50	8.80	16.80	33.0	-16.2	
Mid Ch								
1.880	7.3	V	1.50	7.95	13.75	33.0	-19.3	
1.880	9.8	H	1.50	8.68	16.98	33.0	-16.0	
High Ch								
1.908	7.2	V	1.50	7.97	13.67	33.0	-19.3	
1.908	8.9	H	1.50	8.57	15.94	33.0	-17.1	

Rev. 3.17.11

9.2. PEAK-TO-AVERAGE RATIO

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

Peak-To-Average Ratio:

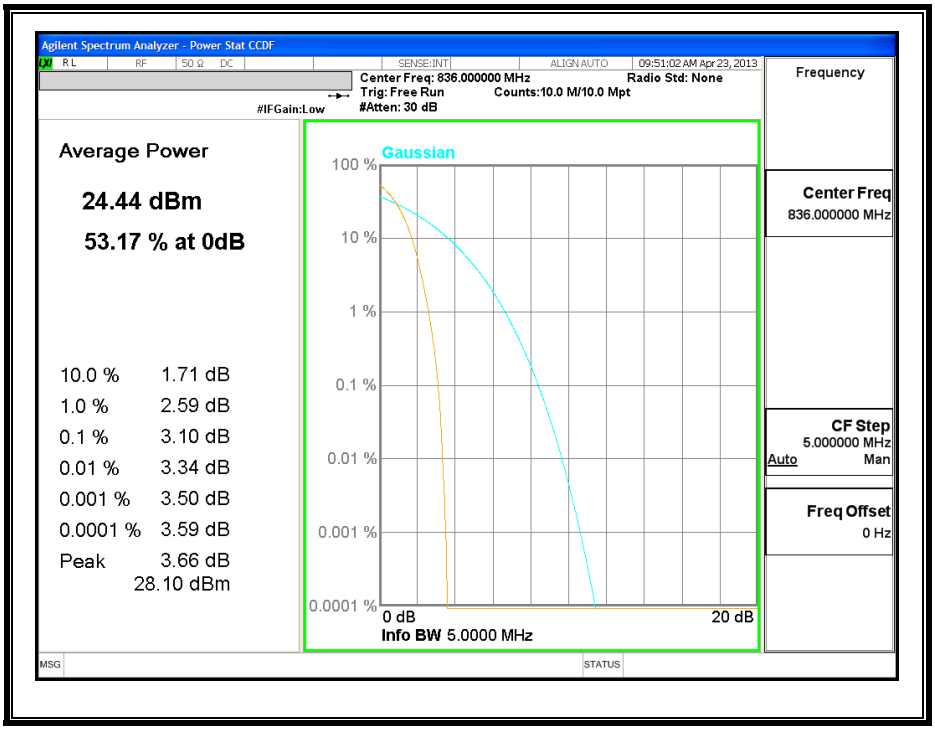
Band 5

Mode	Channel Band-width (KHZ)	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
			*Peak	Average	
UMTS	5	REL99	28.1	24.44	3.66

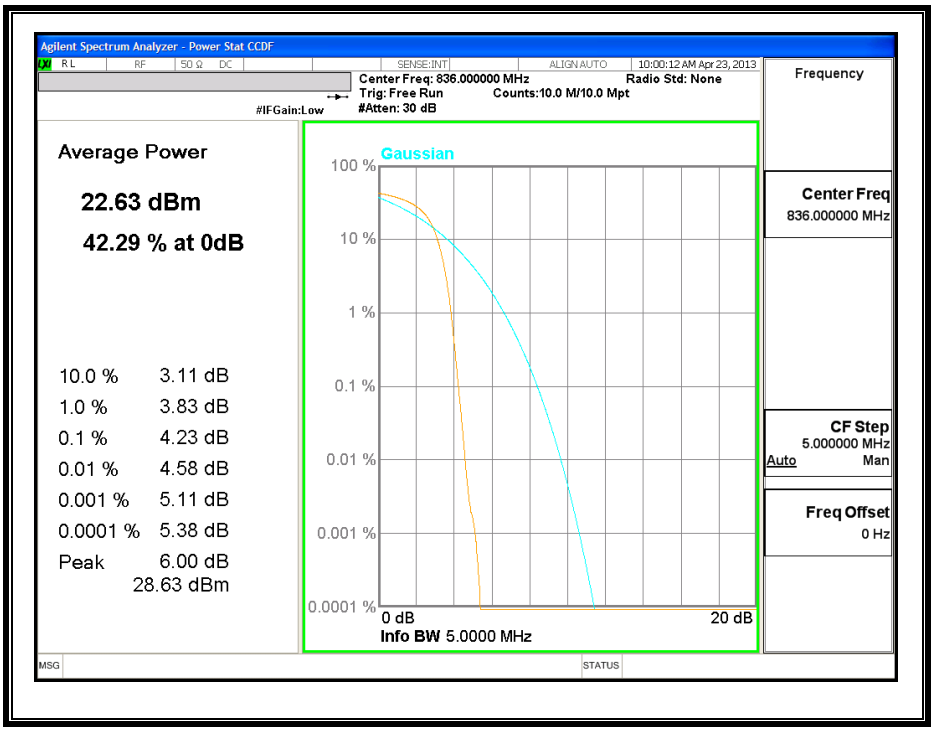
Mode	Channel Band-width (MHZ)	Ch. No.	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
			*Peak	Average	
UMTS	5	HSDPA	28.63	22.63	6.00

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

UMTS850, REL 99



UMTS850, HSDPA



9.3. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238

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.

(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:

LAT and UAT PORTS

- GPRS and EGPRS
- UMTS, REL 99 and HSDPA

RESULTS

LAT GPRS850

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	13U15037
Date:	07/02/13
Test Engineer:	Mona Hua
Configuration:	EUT only
Mode:	GPRS CELL

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-24.8	V	3.0	32.7	1.0	-56.5	-13.0	-43.5	
2.473	-21.3	V	3.0	31.4	1.0	-51.7	-13.0	-38.7	
1.648	-29.6	H	3.0	32.7	1.0	-61.3	-13.0	-48.3	
2.473	-24.3	H	3.0	31.4	1.0	-54.7	-13.0	-41.7	
Mid Ch, (836.6MHz)									
1.673	-25.9	V	3.0	32.6	1.0	-57.5	-13.0	-44.5	
2.510	-19.3	V	3.0	31.5	1.0	-49.8	-13.0	-36.8	
1.673	-29.8	H	3.0	32.6	1.0	-61.4	-13.0	-48.4	
2.510	-21.8	H	3.0	31.5	1.0	-52.3	-13.0	-39.3	
High Ch, (848.8MHz)									
1.698	-27.3	V	3.0	32.5	1.0	-58.8	-13.0	-45.8	
2.546	-17.2	V	3.0	31.4	1.0	-47.7	-13.0	-34.7	
1.698	-30.9	H	3.0	32.5	1.0	-62.4	-13.0	-49.4	
2.546	-20.8	H	3.0	31.4	1.0	-51.2	-13.0	-38.2	

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

LAT EGPRS850

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 13U15037
Date: 07/02/13
Test Engineer: Mona Hua
Configuration: EUT only
Mode: EGPRS CELL

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-28.6	V	3.0	32.7	1.0	-60.3	-13.0	-47.3	
2.473	-26.9	V	3.0	31.4	1.0	-57.3	-13.0	-44.3	
1.648	-30.6	H	3.0	32.7	1.0	-62.3	-13.0	-49.3	
2.473	-28.4	H	3.0	31.4	1.0	-58.8	-13.0	-45.8	
Mid Ch, (836.6MHz)									
1.673	-28.3	V	3.0	32.6	1.0	-59.9	-13.0	-46.9	
2.510	-25.8	V	3.0	31.5	1.0	-56.3	-13.0	-43.3	
1.673	-30.3	H	3.0	32.6	1.0	-61.9	-13.0	-48.9	
2.510	-28.9	H	3.0	31.5	1.0	-59.4	-13.0	-46.4	
High Ch, (848.8MHz)									
1.698	-28.8	V	3.0	32.5	1.0	-60.3	-13.0	-47.3	
2.546	-25.1	V	3.0	31.4	1.0	-55.6	-13.0	-42.6	
1.698	-30.7	H	3.0	32.5	1.0	-62.2	-13.0	-49.2	
2.546	-29.3	H	3.0	31.4	1.0	-59.7	-13.0	-46.7	

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

LAT UMTS850

REL 99

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	13U15037
Date:	07/02/13
Test Engineer:	Mona Hua
Configuration:	EUT only
Mode:	REL 99 CELL

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.4MHz)									
1.653	-27.7	V	3.0	32.7	1.0	-59.4	-13.0	-46.4	
2.479	-26.9	V	3.0	31.4	1.0	-57.3	-13.0	-44.3	
1.653	-29.8	H	3.0	32.7	1.0	-61.4	-13.0	-48.4	
2.479	-28.4	H	3.0	31.4	1.0	-58.8	-13.0	-45.8	
Mid Ch, (836.6MHz)									
1.673	-27.0	V	3.0	32.6	1.0	-58.6	-13.0	-45.6	
2.510	-26.5	V	3.0	31.5	1.0	-57.0	-13.0	-44.0	
1.673	-30.1	H	3.0	32.6	1.0	-61.7	-13.0	-48.7	
2.510	-28.9	H	3.0	31.5	1.0	-59.4	-13.0	-46.4	
High Ch, (846.6MHz)									
1.688	-27.7	V	3.0	32.6	1.0	-59.2	-13.0	-46.2	
2.532	-27.2	V	3.0	31.5	1.0	-57.7	-13.0	-44.7	
1.688	-30.1	H	3.0	32.6	1.0	-61.7	-13.0	-48.7	
2.532	-28.8	H	3.0	31.5	1.0	-59.3	-13.0	-46.3	

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

HSDPA

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	13U15037
Date:	07/02/13
Test Engineer:	Mona Hua
Configuration:	EUT only
Mode:	HSDPA CELL

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.4MHz)									
1.653	-28.2	V	3.0	32.7	1.0	-59.9	-13.0	-46.9	
2.479	-27.0	V	3.0	31.4	1.0	-57.4	-13.0	-44.4	
1.653	-30.9	H	3.0	32.7	1.0	-62.5	-13.0	-49.5	
2.479	-29.1	H	3.0	31.4	1.0	-59.5	-13.0	-46.5	
Mid Ch, (836.6MHz)									
1.673	-27.7	V	3.0	32.6	1.0	-59.3	-13.0	-46.3	
2.510	-26.7	V	3.0	31.5	1.0	-57.2	-13.0	-44.2	
1.673	-30.1	H	3.0	32.6	1.0	-61.7	-13.0	-48.7	
2.510	-28.9	H	3.0	31.5	1.0	-59.4	-13.0	-46.4	
High Ch, (846.6MHz)									
1.688	-28.3	V	3.0	32.6	1.0	-59.8	-13.0	-46.8	
2.532	-27.0	V	3.0	31.5	1.0	-57.5	-13.0	-44.5	
1.688	-30.3	H	3.0	32.6	1.0	-61.9	-13.0	-48.9	
2.532	-29.3	H	3.0	31.5	1.0	-59.8	-13.0	-46.8	

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

LAT GPRS1900

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	13U15037
Date:	07/05/13
Test Engineer:	R.Zheng
Configuration:	EUT only
Mode:	GPRS PCS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.2 MHz)									
3.700	-26.7	V	3.0	30.2	1.0	-55.9	-13.0	-42.9	
7.401	-28.9	V	3.0	26.5	1.0	-54.4	-13.0	-41.4	
3.700	-27.3	H	3.0	30.2	1.0	-56.5	-13.0	-43.5	
7.401	-28.1	H	3.0	26.5	1.0	-53.6	-13.0	-40.6	
Mid Ch, (1880 MHz)									
3.760	-26.9	V	3.0	30.1	1.0	-56.1	-13.0	-43.1	
7.520	-28.9	V	3.0	26.3	1.0	-54.2	-13.0	-41.2	
3.760	-27.4	H	3.0	30.1	1.0	-56.5	-13.0	-43.5	
7.520	-28.4	H	3.0	26.3	1.0	-53.7	-13.0	-40.7	
High Ch, (1909.8 MHz)									
3.819	-26.6	V	3.0	30.1	1.0	-55.7	-13.0	-42.7	
7.639	-28.8	V	3.0	26.2	1.0	-53.9	-13.0	-40.9	
3.819	-27.3	H	3.0	30.1	1.0	-56.4	-13.0	-43.4	
7.639	-27.6	H	3.0	26.2	1.0	-52.8	-13.0	-39.8	

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

LAT EGPRS1900

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple Inc.
Project #: 13U15037
Date: 07/05/13
Test Engineer: R.Zheng
Configuration: EUT only
Mode: EGPRS PCS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.2 MHz)									
3.700	-26.8	V	3.0	30.2	1.0	-56.0	-13.0	-43.0	
7.401	-29.0	V	3.0	26.5	1.0	-54.5	-13.0	-41.5	
3.700	-27.3	H	3.0	30.2	1.0	-56.5	-13.0	-43.5	
7.401	-28.2	H	3.0	26.5	1.0	-53.7	-13.0	-40.7	
Mid Ch, (1880 MHz)									
3.760	-27.0	V	3.0	30.1	1.0	-56.2	-13.0	-43.2	
7.520	-29.1	V	3.0	26.3	1.0	-54.4	-13.0	-41.4	
3.760	-27.6	H	3.0	30.1	1.0	-56.7	-13.0	-43.7	
7.520	-27.9	H	3.0	26.3	1.0	-53.2	-13.0	-40.2	
High Ch, (1909.8 MHz)									
3.819	-27.4	V	3.0	30.1	1.0	-56.5	-13.0	-43.5	
7.639	-28.5	V	3.0	26.2	1.0	-53.6	-13.0	-40.6	
3.819	-27.1	H	3.0	30.1	1.0	-56.2	-13.0	-43.2	
7.639	-27.1	H	3.0	26.2	1.0	-52.3	-13.0	-39.3	

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

LAT UMTS1900

REL 99

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15037
Date:	07/05/13
Test Engineer:	R. Zheng
Configuration:	EUT only
Mode:	Rel99 PCS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1852.4 MHz)									
3.705	-26.5	V	3.0	30.2	1.0	-55.7	-13.0	-42.7	
7.410	-29.5	V	3.0	26.5	1.0	-54.9	-13.0	-41.9	
3.705	-27.1	H	3.0	30.2	1.0	-56.3	-13.0	-43.3	
7.410	-28.3	H	3.0	26.5	1.0	-53.8	-13.0	-40.8	
Mid Ch, (1880 MHz)									
3.760	-26.9	V	3.0	30.1	1.0	-56.1	-13.0	-43.1	
7.520	-29.6	V	3.0	26.3	1.0	-54.9	-13.0	-41.9	
3.760	-26.7	H	3.0	30.1	1.0	-55.8	-13.0	-42.8	
7.520	-28.1	H	3.0	26.3	1.0	-53.4	-13.0	-40.4	
High Ch, (1907.6 MHz)									
3.815	-26.4	V	3.0	30.1	1.0	-55.5	-13.0	-42.5	
7.630	-29.2	V	3.0	26.2	1.0	-54.4	-13.0	-41.4	
3.815	-26.9	H	3.0	30.1	1.0	-56.0	-13.0	-43.0	
7.630	-28.3	H	3.0	26.2	1.0	-53.5	-13.0	-40.5	

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

HSDPA

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple Inc.
Project #: 13U15037
Date: 07/05/13
Test Engineer: R. Zheng
Configuration: EUT only
Mode: HSDPA PCS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1852.4 MHz)									
3.705	-25.7	V	3.0	30.2	1.0	-54.9	-13.0	-41.9	
7.410	-29.2	V	3.0	26.5	1.0	-54.6	-13.0	-41.6	
3.705	-24.5	H	3.0	30.2	1.0	-53.7	-13.0	-40.7	
7.410	-28.5	H	3.0	26.5	1.0	-54.0	-13.0	-41.0	
Mid Ch, (1880 MHz)									
3.760	-26.5	V	3.0	30.1	1.0	-55.7	-13.0	-42.7	
7.520	-29.2	V	3.0	26.3	1.0	-54.5	-13.0	-41.5	
3.760	-26.4	H	3.0	30.1	1.0	-55.5	-13.0	-42.5	
7.520	-28.1	H	3.0	26.3	1.0	-53.4	-13.0	-40.4	
High Ch, (1907.6 MHz)									
3.815	-26.7	V	3.0	30.1	1.0	-55.8	-13.0	-42.8	
7.630	-29.3	V	3.0	26.2	1.0	-54.5	-13.0	-41.5	
3.815	-27.2	H	3.0	30.1	1.0	-56.3	-13.0	-43.3	
7.630	-28.2	H	3.0	26.2	1.0	-53.4	-13.0	-40.4	

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

UAT GPRS850

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	13U15037
Date:	07/02/13
Test Engineer:	Mona Hua
Configuration:	EUT only
Mode:	GPRS CELL

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-27.7	V	3.0	32.7	1.0	-59.4	-13.0	-46.4	
2.473	-27.1	V	3.0	31.4	1.0	-57.5	-13.0	-44.5	
1.648	-28.6	H	3.0	32.7	1.0	-60.3	-13.0	-47.3	
2.473	-28.8	H	3.0	31.4	1.0	-59.2	-13.0	-46.2	
Mid Ch, (836.6MHz)									
1.673	-23.9	V	3.0	32.6	1.0	-55.5	-13.0	-42.5	
2.510	-26.4	V	3.0	31.5	1.0	-56.9	-13.0	-43.9	
1.673	-26.3	H	3.0	32.6	1.0	-57.9	-13.0	-44.9	
2.510	-28.4	H	3.0	31.5	1.0	-58.9	-13.0	-45.9	
High Ch, (848.8MHz)									
1.698	-24.1	V	3.0	32.5	1.0	-55.6	-13.0	-42.6	
2.546	-27.0	V	3.0	31.4	1.0	-57.5	-13.0	-44.5	
1.698	-24.7	H	3.0	32.5	1.0	-56.2	-13.0	-43.2	
2.546	-28.7	H	3.0	31.4	1.0	-59.1	-13.0	-46.1	

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

UAT EGPRS850

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	13U15037
Date:	07/02/13
Test Engineer:	Mona Hua
Configuration:	EUT only
Mode:	EGPRS CELL

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-28.0	V	3.0	32.7	1.0	-59.7	-13.0	-46.7	
2.473	-27.6	V	3.0	31.4	1.0	-58.0	-13.0	-45.0	
1.648	-29.3	H	3.0	32.7	1.0	-61.0	-13.0	-48.0	
2.473	-29.3	H	3.0	31.4	1.0	-59.7	-13.0	-46.7	
Mid Ch, (836.6MHz)									
1.673	-24.7	V	3.0	32.6	1.0	-56.3	-13.0	-43.3	
2.510	-27.0	V	3.0	31.5	1.0	-57.5	-13.0	-44.5	
1.673	-27.4	H	3.0	32.6	1.0	-59.0	-13.0	-46.0	
2.510	-29.0	H	3.0	31.5	1.0	-59.5	-13.0	-46.5	
High Ch, (848.8MHz)									
1.698	-25.3	V	3.0	32.5	1.0	-56.8	-13.0	-43.8	
2.546	-27.9	V	3.0	31.4	1.0	-58.4	-13.0	-45.4	
1.698	-26.0	H	3.0	32.5	1.0	-57.5	-13.0	-44.5	
2.546	-29.3	H	3.0	31.4	1.0	-59.7	-13.0	-46.7	

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

UAT UMTS850

REL 99

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	13U15037
Date:	07/02/13
Test Engineer:	Mona Hua
Configuration:	EUT only
Mode:	REL 99 CELL

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.4MHz)									
1.653	-28.1	V	3.0	32.7	1.0	-59.7	-13.0	-46.7	
2.479	-26.7	V	3.0	31.4	1.0	-57.1	-13.0	-44.1	
1.653	-30.2	H	3.0	32.7	1.0	-61.8	-13.0	-48.8	
2.479	-28.5	H	3.0	31.4	1.0	-58.9	-13.0	-45.9	
Mid Ch, (836.6MHz)									
1.673	-27.7	V	3.0	32.6	1.0	-59.3	-13.0	-46.3	
2.510	-26.9	V	3.0	31.5	1.0	-57.4	-13.0	-44.4	
1.673	-30.2	H	3.0	32.6	1.0	-61.8	-13.0	-48.8	
2.510	-28.8	H	3.0	31.5	1.0	-59.3	-13.0	-46.3	
High Ch, (846.6MHz)									
1.688	-26.9	V	3.0	32.6	1.0	-58.4	-13.0	-45.4	
2.532	-27.4	V	3.0	31.5	1.0	-57.9	-13.0	-44.9	
1.688	-30.9	H	3.0	32.6	1.0	-62.5	-13.0	-49.5	
2.532	-28.6	H	3.0	31.5	1.0	-59.1	-13.0	-46.1	

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

HSDPA

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	13U15037
Date:	07/02/13
Test Engineer:	Mona Hua
Configuration:	EUT only
Mode:	HSDPA CELL

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.4MHz)									
1.653	-28.7	V	3.0	32.7	1.0	-60.4	-13.0	-47.4	
2.479	-27.1	V	3.0	31.4	1.0	-57.5	-13.0	-44.5	
1.653	-31.2	H	3.0	32.7	1.0	-62.8	-13.0	-49.8	
2.479	-29.7	H	3.0	31.4	1.0	-60.1	-13.0	-47.1	
Mid Ch, (836.6MHz)									
1.673	-27.9	V	3.0	32.6	1.0	-59.5	-13.0	-46.5	
2.510	-26.8	V	3.0	31.5	1.0	-57.3	-13.0	-44.3	
1.673	-30.4	H	3.0	32.6	1.0	-62.0	-13.0	-49.0	
2.510	-29.4	H	3.0	31.5	1.0	-59.9	-13.0	-46.9	
High Ch, (846.6MHz)									
1.688	-28.5	V	3.0	32.6	1.0	-60.0	-13.0	-47.0	
2.532	-27.2	V	3.0	31.5	1.0	-57.7	-13.0	-44.7	
1.688	-30.9	H	3.0	32.6	1.0	-62.5	-13.0	-49.5	
2.532	-29.6	H	3.0	31.5	1.0	-60.1	-13.0	-47.1	

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

UAT GPRS1900

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15037
Date:	07/05/13
Test Engineer:	R.Zheng
Configuration:	EUT only
Mode:	GPRS PCS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.2 MHz)									
3.700	-27.5	V	3.0	30.2	1.0	-56.7	-13.0	-43.7	
7.401	-29.1	V	3.0	26.5	1.0	-54.6	-13.0	-41.6	
3.700	-26.8	H	3.0	30.2	1.0	-56.0	-13.0	-43.0	
7.401	-28.2	H	3.0	26.5	1.0	-53.7	-13.0	-40.7	
Mid Ch, (1880 MHz)									
3.760	-26.6	V	3.0	30.1	1.0	-55.8	-13.0	-42.8	
7.520	-29.0	V	3.0	26.3	1.0	-54.3	-13.0	-41.3	
3.760	-27.6	H	3.0	30.1	1.0	-56.7	-13.0	-43.7	
7.520	-27.9	H	3.0	26.3	1.0	-53.2	-13.0	-40.2	
High Ch, (1909.8 MHz)									
3.819	-26.9	V	3.0	30.1	1.0	-56.0	-13.0	-43.0	
7.639	-28.4	V	3.0	26.2	1.0	-53.5	-13.0	-40.5	
3.819	-27.6	H	3.0	30.1	1.0	-56.7	-13.0	-43.7	
7.639	-27.9	H	3.0	26.2	1.0	-53.1	-13.0	-40.1	

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

UAT EGPRS1900

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	13U15037
Date:	07/05/13
Test Engineer:	R.Zheng
Configuration:	EUT only
Mode:	EGPRS PCS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.2 MHz)									
3.700	-27.6	V	3.0	30.2	1.0	-56.8	-13.0	-43.8	
7.401	-29.2	V	3.0	26.5	1.0	-54.7	-13.0	-41.7	
3.700	-27.7	H	3.0	30.2	1.0	-56.9	-13.0	-43.9	
7.401	-27.8	H	3.0	26.5	1.0	-53.3	-13.0	-40.3	
Mid Ch, (1880 MHz)									
3.760	-26.9	V	3.0	30.1	1.0	-56.1	-13.0	-43.1	
7.520	-29.0	V	3.0	26.3	1.0	-54.3	-13.0	-41.3	
3.760	-27.6	H	3.0	30.1	1.0	-56.7	-13.0	-43.7	
7.520	-28.2	H	3.0	26.3	1.0	-53.5	-13.0	-40.5	
High Ch, (1909.8 MHz)									
3.819	-26.7	V	3.0	30.1	1.0	-55.8	-13.0	-42.8	
7.639	-28.6	V	3.0	26.2	1.0	-53.8	-13.0	-40.8	
3.819	-27.9	H	3.0	30.1	1.0	-57.0	-13.0	-44.0	
7.639	-28.2	H	3.0	26.2	1.0	-53.4	-13.0	-40.4	

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

UAT UMTS1900

REL 99

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15037
Date:	07/05/13
Test Engineer:	R. Zheng
Configuration:	EUT only
Mode:	REL 99 PCS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1852.4 MHz)									
3.705	-26.4	V	3.0	30.2	1.0	-55.6	-13.0	-42.6	
7.410	-28.6	V	3.0	26.5	1.0	-54.0	-13.0	-41.0	
3.705	-27.3	H	3.0	30.2	1.0	-56.5	-13.0	-43.5	
7.410	-28.3	H	3.0	26.5	1.0	-53.8	-13.0	-40.8	
Mid Ch, (1880 MHz)									
3.760	-27.5	V	3.0	30.1	1.0	-56.7	-13.0	-43.7	
7.520	-29.4	V	3.0	26.3	1.0	-54.7	-13.0	-41.7	
3.760	-27.5	H	3.0	30.1	1.0	-56.6	-13.0	-43.6	
7.520	-28.4	H	3.0	26.3	1.0	-53.7	-13.0	-40.7	
High Ch, (1907.6 MHz)									
3.815	-27.4	V	3.0	30.1	1.0	-56.5	-13.0	-43.5	
7.630	-29.1	V	3.0	26.2	1.0	-54.3	-13.0	-41.3	
3.815	-27.7	H	3.0	30.1	1.0	-56.8	-13.0	-43.8	
7.630	-28.3	H	3.0	26.2	1.0	-53.5	-13.0	-40.5	

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

HSDPA

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple Inc.
Project #:	13U15037
Date:	07/05/13
Test Engineer:	R. Zheng
Configuration:	EUT only
Mode:	HSDPA PCS

Chamber	Pre-amplifer	Filter	Limit
3m Chamber D	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1852.4 MHz)									
3.705	-27.6	V	3.0	30.2	1.0	-56.8	-13.0	-43.8	
7.410	-29.7	V	3.0	26.5	1.0	-55.1	-13.0	-42.1	
3.705	-27.8	H	3.0	30.2	1.0	-57.0	-13.0	-44.0	
7.410	-28.2	H	3.0	26.5	1.0	-53.7	-13.0	-40.7	
Mid Ch, (1880 MHz)									
3.760	-27.3	V	3.0	30.1	1.0	-56.5	-13.0	-43.5	
7.520	-29.1	V	3.0	26.3	1.0	-54.4	-13.0	-41.4	
3.760	-27.8	H	3.0	30.1	1.0	-56.9	-13.0	-43.9	
7.520	-28.3	H	3.0	26.3	1.0	-53.6	-13.0	-40.6	
High Ch, (1907.6 MHz)									
3.815	-27.1	V	3.0	30.1	1.0	-56.2	-13.0	-43.2	
7.630	-29.1	V	3.0	26.2	1.0	-54.3	-13.0	-41.3	
3.815	-27.2	H	3.0	30.1	1.0	-56.3	-13.0	-43.3	
7.630	-27.6	H	3.0	26.2	1.0	-52.8	-13.0	-39.8	

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