

# FCC CFR47 PART 22H AND 24E **CERTIFICATION TEST REPORT**

## FOR

QUAD-BAND RADIO WITH WLAN AND BT RADIO

Model: A1530

FCC ID: BCG-E2643A

REPORT NUMBER: 13U15037-1

ISSUE DATE: JULY 22, 2013

Prepared for

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

Prepared by

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### **Revision History**

	Issue		
Rev.	Date	Revisions	Revised By
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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:	Model: A1530
SERIAL NUMBER:	C39KD01GFJ0Y
DATE TESTED:	APRIL 22-JUNE 12, 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.

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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-C, FCC CFR 47 Part 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 <u>http://www.ccsemc.com</u>.

# 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 A1530 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	Modulation	Conducted(Peak)		ERP/EIR	P(Peak)		
(MHz)	Wouldton	dBm	mW	dBm	mW		
824.2 - 848.8	GPRS	33.60	2290.9	28.20	660.7		
824.2 - 848.8	EGPRS	31.70	1479.1	27.40	549.5		
1850.2-1909.8	GPRS	30.70	1174.9	32.00	1584.9		
1850.2-1909.8	EGPRS	30.50	1122.0	30.90	1230.3		

Part 22								
Frequency range	Modulation	Conducted	(Average)	ERP/EIRP (Average)				
(MHz)	Wouldton	dBm	mW	dBm	mW			
826.4-846.6	WCDMA, REL 99	24.50	281.8	23.15	206.5			
826.4-846.6	WCDMA, HSDPA	23.67	232.8	22.50	177.8			

Part 24								
Frequency range	Modulation	Conducted(Peak) ERP/EIRP (		P (Peak)				
(MHz)	MODUIATION	dBm	mW	dBm	mW			
1852.4 - 1907.6	WCDMA, REL 99	26.80	478.6	29.34	859.0			
1852.4 - 1907.6	WCDMA, HSDPA	26.41	437.5	28.84	765.6			

Part 22 /24							
Frequency range	Modulation	Conducted(Peak)		ERP/EIR	P(Peak)		
(MHz)	Wouldton	dBm	mW	dBm	mW		
824.2 - 848.8	GPRS	33.70	2344.2	26.80	478.6		
824.2 - 848.8	EGPRS	32.38	1729.8	26.00	398.1		
1850.2-1909.8	GPRS	30.70	1174.9	25.47	352.4		
1850.2-1909.8	EGPRS	30.48	1116.9	24.57	286.4		

### UAT / PORT B

Part 22							
Frequency range	Modulation	Conducted(Average) ERP/EIRP (Average		(Average)			
(MHz)	Wouldtion	dBm	mW	dBm	mW		
826.4-846.6	WCDMA, REL 99	24.20	263.0	20.30	107.2		
826.4-846.6	WCDMA, HSDPA	23.50	223.9	19.70	93.3		

Part 24							
Frequency range	Modulation	Conducte	d(Peak)	ERP/EIR	ERP/EIRP (Peak)		
(MHz)	Modulation	dBm	mW	dBm	mW		
1852.4 - 1907.6	WCDMA, REL 99	26.50	446.7	21.99	158.1		
1852.4 - 1907.6	WCDMA, HSDPA	25.70	371.5	20.79	119.9		

## 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 A1530	Gain (dBi) UAT A1530
<b>Cell,</b> 824 - 849	-1.60	-4.5
<b>PCS,</b> 1850 - 1910	1.70	-2.8

## 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

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## 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 worstcase scenario for all measurements.

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.

Worst-case modes below:

- 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

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## 5.1. 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	Port	# of	Connector Type	Cable Type	Cable Length	Remarks		
No		identical			(m)			
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)

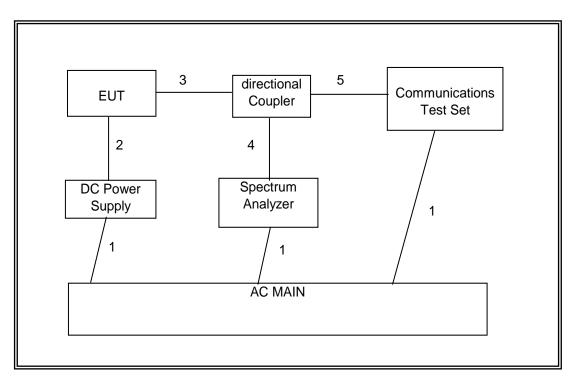
	I/O CABLE LIST							
Cable No.	Port	# of Identica Ports	Connector Type	Cable Type	Cable Length	Remarks		
1	Jack	1	Earphone	Un-shielded	0.5m	NA		
2	RF In/Out	1	Antenna	Un-shielded	5m	NA		

#### TEST SETUP

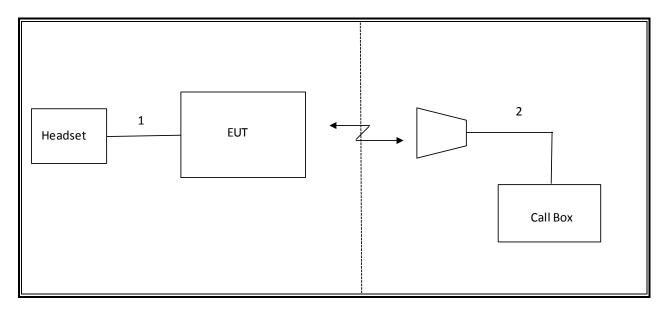
The EUT is a stand-alone device. The Communication test set exercised the EUT.

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### SETUP DIAGRAM FOR RF CONDUCTED TESTS



#### SETUP DIAGRAM FOR RF RADIATED TESTS



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# 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					

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# 7. RF POWER OUTPUT VERIFICATION

## 7.1. GSM

### TEST PROCEDURE

### **GPRS/EGPRS**

Menu select > GSM Mobile Station > GSM 850/900/1800/1900 Function: Press Connection control to choose the different menus Press RESET > choose all to reset all settings Press Signal Off to turn off the signal and change settings Connection Network Support > GSM+GPRS or GSM+EGPRS Main Service > Packet Data Service selection > Test Mode A – Auto Slot Config. off Press Slot Config bottom on the right twice to select and change the number of MS Signal 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] Off Channel Type > P0> 4 dB Unchanged (if already set under MS Signal) Slot Config > TCH > choose desired test channel Hopping >Off Main Timeslot > 3 (Default) Coding Scheme > CS4 (GPRS) and MCS9 (EGPRS) Network Bit Stream > 2E9-1PSR Bit Pattern AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input Press Signal On to turn on the signal and change settings Connection

### **RESULTS**

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### LAT PORT

			1 time slots		2 time	slots
Mode	Ch.	f (MHz)	Peak	Average	Peak	Average
	128	824.2	33.60	33.50	32.43	32.20
GPRS	190	836.6	33.60	33.45	32.38	32.20
	251	848.8	33.60	33.50	32.40	32.20
	128	824.2	31.70	29.00	31.70	28.60
EGPRS	190	836.6	31.50	29.00	31.40	28.88
	251	848.8	31.50	28.90	31.50	28.85

			1 time slots		2 time	slots
Mode	Ch.	f (MHz)	Peak	Average	Peak	Average
	512	1850.2	30.80	30.50	28.30	28.00
GPRS	661	1880.0	30.70	30.45	28.20	27.95
	810	1909.8	30.70	30.45	28.20	27.98
	512	1850.2	30.50	28.00	30.10	27.70
EGPRS	661	1880.0	30.40	27.90	30.20	27.70
	810	1909.8	30.50	28.00	30.30	27.80

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			1 time slots		2 time	slots
Mode	Ch.	f (MHz)	Peak	Average	Peak	Average
	128	824.2	33.70	33.20	32.40	32.19
GPRS	190	836.6	33.65	33.20	32.40	32.20
	251	848.8	33.50	33.17	32.35	31.90
	128	824.2	31.60	28.70	31.50	28.70
EGPRS	190	836.6	31.40	28.67	31.30	28.70
	251	848.8	31.40	28.63	31.30	28.70

### UAT PORT

			1 time	e slots	2 time	slots
Mode	Ch.	f (MHz)	Peak	Average	Peak	Average
	512	1850.2	30.70	30.47	29.10	28.75
GPRS	661	1880.0	30.70	30.50	29.00	28.70
	810	1909.8	30.70	30.50	29.10	28.75
	512	1850.2	30.30	27.40	30.21	27.33
EGPRS	661	1880.0	30.30	27.39	30.41	27.30
	810	1909.8	30.48	27.40	30.48	27.37

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### 7.2. UMTS REL99

### TEST PROCEDURE

The following summary of these settings are illustrated below:

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

#### LAT PORT

#### UMTS REL99

	UL Ch	DL Ch	Ch Band	Conducted output power (dBm)	
		Frequency	Peak	Average	
Band 5	4132	4357	826.4	27.98	24.44
UMTS 850	4180	4405	836.0	28.09	24.49
	4230	4455	846.6	27.98	<mark>24.50</mark>

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	
20110	02 011		Peak		Average
Band 2	9262	9662	1852.4	<mark>26.80</mark>	<mark>23.00</mark>
UMTS 1900	9400	9800	1880.0	26.58	22.90
	9538	9938	1907.6	26.60	22.95

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#### UAT PORT

#### UMTS REL 99

				Conducted output power (dBm)		
Band	UL Ch	DL Ch	Frequency	Peak	Average	
Band 5	4132	4357	826.4	27.75	24.20	
UMTS 850	4180	4405	836.0	27.85	<mark>24.20</mark>	
	4230	4455	846.6	<mark>27.97</mark>	24.10	

_				Conducted output	it power (dBm)
Band	UL Ch	DL Ch	Frequency	Peak	Average
Band 2	9262	9662	1852.4	26.45	22.47
UMTS 1900	9400	9800	1880.0	26.40	22.45
	9538	9938	1907.6	<mark>26.50</mark>	<mark>22.50</mark>

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

#### <u>RESULT</u>

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#### LAT PORT HSDPA

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	Conducted output power (dBm)
					Peak	Average
		4132	4357	826.4	27.61	23.42
	1	4180	4405	836.0	27.06	23.60
		4230	4455	846.0	27.45	23.33
		4132	4357	826.4	<mark>28.50</mark>	23.56
	2	4180	4405	836.0	28.25	<mark>23.67</mark>
UMTS850		4230	4455	846.0	28.00	23.23
(Band V)		4132	4357	826.4	27.79	23.05
	3	4180	4405	836.0	27.87	23.12
		4230	4455	846.0	27.86	23.10
	4	4132	4357	826.4	28.11	23.00
		4180	4405	836.0	27.95	23.04
		4230	4455	846.0	27.88	22.94
		9262	9662	1852.4	26.27	22.00
	1	9400	9800	1880.0	26.38	<mark>22.20</mark>
		9538	9938	1907.6	<mark>26.41</mark>	22.10
		9262	9662	1852.4	26.23	21.96
	2	9400	9800	1880.0	26.41	22.10
UMTS1900		9538	9938	1907.6	26.30	22.14
(Band II)		9262	9662	1852.4	26.34	21.90
	3	9400	9800	1880.0	26.30	22.00
		9538	9938	1907.6	26.29	22.00
		9262	9662	1852.4	26.07	22.00
	4	9400	9800	1880.0	26.18	22.10
		9538	9938	1907.6	26.33	22.10

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#### UAT PORT HSDPA

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)	Conducted output power (dBm)
					Peak	Average
		4132	4357	826.4	27.50	23.40
	1	4180	4405	836.0	27.47	<mark>23.50</mark>
		4230	4455	846.0	27.20	23.33
		4132	4357	826.4	27.30	23.40
	2	4180	4405	836.0	27.43	23.50
UMTS850		4230	4455	846.0	27.31	23.34
(Band V)		4132	4357	826.4	27.38	23.44
	3	4180	4405	836.0	27.56	23.42
		4230	4455	846.0	27.34	23.25
		4132	4357	826.4	<mark>27.69</mark>	23.40
	4	4180	4405	836.0	27.59	23.47
		4230	4455	846.0	27.29	23.33
		9262	9662	1852.4	25.29	21.32
	1	9400	9800	1880.0	25.36	<mark>21.60</mark>
		9538	9938	1907.6	25.54	21.40
		9262	9662	1852.4	25.12	21.30
	2	9400	9800	1880.0	25.50	21.60
UMTS1900		9538	9938	1907.6	25.55	21.30
(Band II)		9262	9662	1852.4	25.12	21.40
	3	9400	9800	1880.0	25.35	21.50
		9538	9938	1907.6	2 <b>5.70</b>	21.40
		9262	9662	1852.4	25.11	21.36
	4	9400	9800	1880.0	25.35	21.50
		9538	9938	1907.6	25.38	21.32

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## 7.4. UMTS DUAL CARRIER HSDPA

#### LAT PORT

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted ou	tput power (dBm)
Danu	Sublesi		DLOI	Frequency	Peak	Average
		4132	4357	826.4	26.76	23.50
	1	4180	4405	836.0	26.63	23.25
		4230	4455	846.0	26.72	23.40
		4132	4357	826.4	<mark>27.00</mark>	23.50
	2	4180	4405	836.0	26.87	23.27
UMTS850		4230	4455	846.0	26.85	23.38
(Band V)		4132	4357	826.4	26.83	23.00
	3	4180	4405	836.0	26.67	22.75
		4230	4455	846.0	26.77	22.85
	4	4132	4357	826.4	26.55	23.10
		4180	4405	836.0	26.63	22.77
		4230	4455	846.0	26.94	22.90
		9262	9662	1852.4	25.71	22.00
	1	9400	9800	1880.0	25.69	22.00
		9538	9938	1907.6	25.86	22.00
		9262	9662	1852.4	25.73	22.00
	2	9400	9800	1880.0	25.95	22.00
UMTS1900		9538	9938	1907.6	25.78	<mark>22.10</mark>
(Band II)		9262	9662	1852.4	25.59	21.40
	3	9400	9800	1880.0	25.62	21.60
		9538	9938	1907.6	25.70	21.50
		9262	9662	1852.4	<mark>26.51</mark>	21.40
	4	9400	9800	1880.0	25.51	21.60
		9538	9938	1907.6	25.74	21.50

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### UAT PORT

<u>HSDPA</u>

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted out	tput power (dBm)
Danu	Sublest	UL Ch	DLCN	Frequency	Peak	Average
		4132	4357	826.4	26.62	<mark>23.40</mark>
	1*	4180	4405	836.0	26.78	23.20
		4230	4455	846.0	26.78	23.30
		4132	4357	826.4	26.89	23.48
	2	4180	4405	836.0	26.71	23.20
UMTS850		4230	4455	846.0	<mark>26.90</mark>	23.30
(Band V)		4132	4357	826.4	26.43	22.97
	3	4180	4405	836.0	26.39	22.70
		4230	4455	846.0	26.59	22.80
	4	4132	4357	826.4	26.51	22.97
		4180	4405	836.0	26.34	22.70
		4230	4455	846.0	26.47	22.80
		9262	9662	1852.4	25.40	21.32
	1*	9400	9800	1880.0	25.35	<mark>21.58</mark>
		9538	9938	1907.6	<mark>25.65</mark>	21.42
		9262	9662	1852.4	25.32	21.32
	2	9400	9800	1880.0	25.50	21.55
UMTS1900		9538	9938	1907.6	25.45	21.34
(Band II)		9262	9662	1852.4	25.22	21.42
	3	9400	9800	1880.0	25.38	21.50
		9538	9938	1907.6	25.60	21.42
		9262	9662	1852.4	25.43	21.40
	4	9400	9800	1880.0	25.35	21.50
		9538	9938	1907.6	25.40	21.35

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## 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			
	Loopback Mode	Test Mode 1							
	Rel99 RMC	12.2kbps RMC							
	HSDPA FRC	H-Set1							
	HSUPA Test	HSUPA Loopb	ack						
	Power Control Algorithm	Algorithm2							
WCDMA General	βc	11/15	6/15	15/15	2/15	15/15			
Settings	βd	15/15	15/15	9/15	15/15	0			
Settings	βес	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			
				47/15					
	βed	1309/225	94/75	47/15	56/75	47/15			
	DACK	8		-					
	DNAK	8							
	DCQI	8							
HSDPA A	Ack-Nack repetition factor	3							
Specific	CQI Feedback (Table 5.2B.4)	4ms	4ms						
Settings	CQI Repetition Factor (Table								
	5.2B.4)	2							
	Ahs = $\beta$ hs/ $\beta$ c	30/15							
	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			
HSUPA Specific Settings		E-TFCI 11 E-TFCI PO 4 E-TFCI 67			E-TFCI 11 E-TFCI PO 4 E-TFCI 67				
		E-TFCI PO 18			E-TFCI PO 18				
	Reference E TFCIs	E-TFCI 71			E-TFCI 71				
		E-TFCI PO 23		E-TFCI 11	E-TFCI PO 23				
		E-TFCI 75		E-TFCI PO 4	E-TFCI 75				
		E-TFCI PO 26		E-TFCI 92	E-TFCI PO 26				
		E-TFCI 81		E-TFCI PO	E-TFCI 81				
		E-TFCI PO 27		18	E-TFCI PO 27				

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### LAT PORT

David	Culture				Conducted output	ut power (dBm)
Band	Subtest	UL Ch	DL Ch	Frequency	Peak	Average
		4132	4357	826.4	27.94	23.22
	1*	4180	4405	836.0	27.69	22.98
		4230	4455	846.0	<mark>28.10</mark>	23.32
		4132	4357	826.4	27.38	22.35
	2	4180	4405	836.0	27.86	22.54
		4230	4455	846.0	27.53	22.21
		4132	4357	826.4	27.65	22.32
UMTS850	3	4180	4405	836.0	27.46	22.12
(Band V)		4230	4455	846.0	28.01	22.50
		4132	4357	826.4	27.94	22.90
	4	4180	4405	836.0	27.67	22.87
		4230	4455	846.0	27.25	22.46
		4132	4357	826.4	28.10	23.13
	5	4180	4405	836.0	27.30	22.78
		4230	4455	846.0	27.88	22.90
		9262	9662	1852.4	26.55	22.20
	1*	9400	9800	1880.0	26.60	22.04
		9538	9938	1907.6	26.27	21.92
		9262	9662	1852.4	26.25	21.00
	2	9400	9800	1880.0	26.45	21.20
		9538	9938	1907.6	26.45	21.45
		9262	9662	1852.4	25.85	20.54
UMTS1900	3	9400	9800	1880.0	25.99	20.84
(Band II)		9538	9938	1907.6	26.35	21.01
		9262	9662	1852.4	26.22	21.80
	4	9400	9800	1880.0	26.27	22.00
		9538	9938	1907.6	26.14	22.00
		9262	9662	1852.4	26.16	22.10
	5	9400	9800	1880.0	26.15	22.01
		9538	9938	1907.6	26.25	22.08

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### UAT PORT

Dand	Cubtoot	UL Ch	DL Ch	Fraguenay	Conducted output	ut power (dBm)
Band	Subtest	OL Ch	DL Ch	Frequency	Peak	Average
		4132	4357	826.4	28.00	23.00
	1*	4180	4405	836.0	27.41	22.80
		4230	4455	846.0	27.85	23.00
		4132	4357	826.4	27.43	22.01
	2	4180	4405	836.0	27.67	22.01
		4230	4455	846.0	27.27	22.00
		4132	4357	826.4	27.75	22.40
UMTS850	3	4180	4405	836.0	27.15	21.73
(Band V)		4230	4455	846.0	27.88	22.00
		4132	4357	826.4	27.51	22.40
	4	4180	4405	836.0	27.55	22.50
		4230	4455	846.0	27.88	22.30
		4132	4357	826.4	27.69	23.00
	5	4180	4405	836.0	27.72	22.70
		4230	4455	846.0	28.05	22.90
		9262	9662	1852.4	25.13	21.00
	1*	9400	9800	1880.0	25.44	<mark>21.60</mark>
		9538	9938	1907.6	25.17	21.30
		9262	9662	1852.4	25.21	20.41
	2	9400	9800	1880.0	25.15	20.20
		9538	9938	1907.6	25.24	20.10
UMTS1900		9262	9662	1852.4	25.21	20.71
	3	9400	9800	1880.0	25.24	20.30
(Band II)		9538	9938	1907.6	25.60	20.50
		9262	9662	1852.4	25.08	20.41
	4	9400	9800	1880.0	25.85	21.20
		9538	9938	1907.6	25.62	21.30
		9262	9662	1852.4	25.38	21.60
	5	9400	9800	1880.0	25.57	21.50
		9538	9938	1907.6	25.43	21.10

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## 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)
		128	824.20	246.2500	321.000
	GPRS	190	836.60	253.7100	308.000
Cellular		251	848.80	246.7500	301.300
Cellular		128	824.20	252.6030	302.509
	EGPRS	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)
		4357	826.4	4.2118	4.629
	UMTS, REL 99	4405	836.0	4.2279	4.570
Cellular	1122 00	4455	846.0	4.2057	4.607
Cellular		4357	826.4	4.1935	4.568
	UMTS, HSDPA	4405	836.0	4.1837	4.596
	1100171	4455	846.0	4.1799	4.570

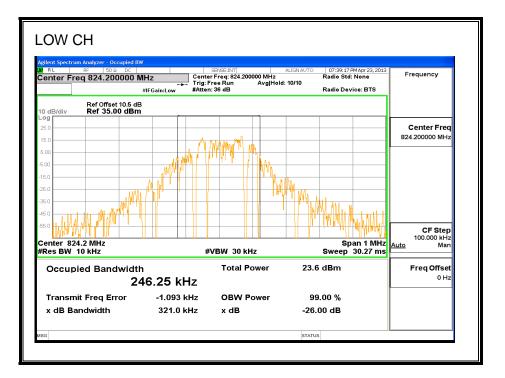
Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
PCS	GPRS	512	1850.2	242.0300	285.600
		661	1880.0	241.1300	318.000
		810	1909.8	247.2300	279.400
	EGPRS	512	1850.2	251.9306	301.317
		661	1880.0	251.8630	305.247
		810	1909.8	252.6045	306.481

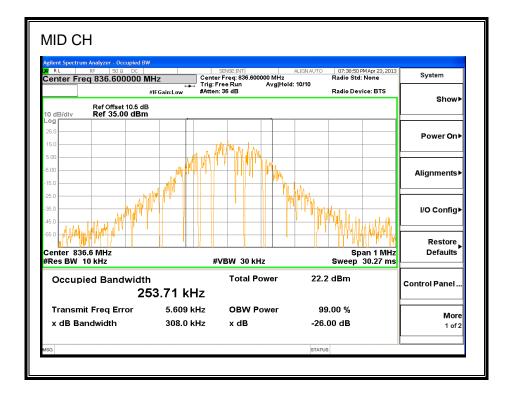
Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
PCS	UMTS, REL 99	9662	1852.4	4.2174	4.569
		9800	1880.0	4.2111	4.609
		9938	1907.6	4.2060	4.657
	UMTS, HSDPA	9662	1852.4	4.1455	4.621
		9800	1880.0	4.1365	4.628
		9938	1907.6	4.1682	4.528

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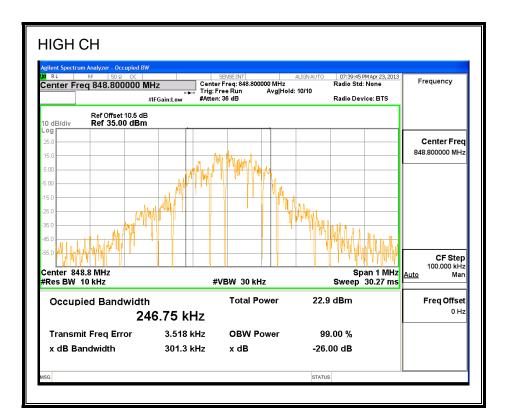
#### GPRS850

#### (Cellular Band)





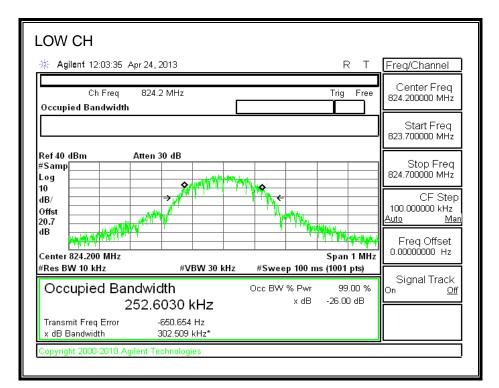
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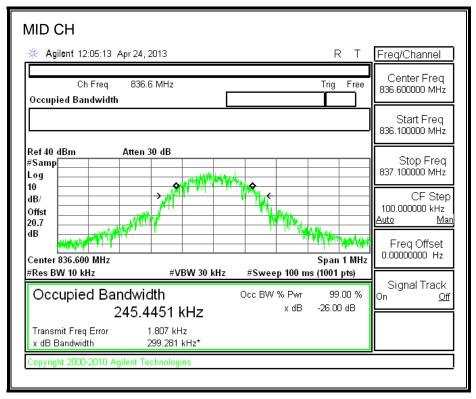


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#### EGPRS850

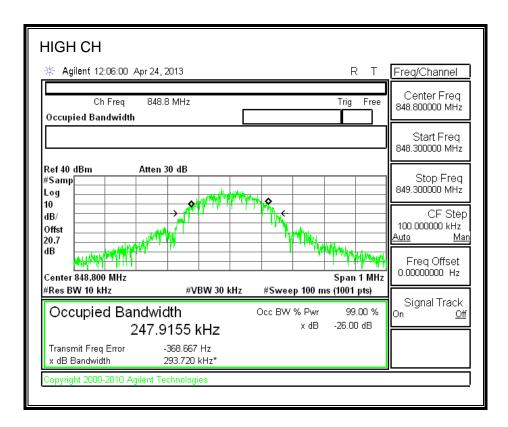
#### **Cellular Band**





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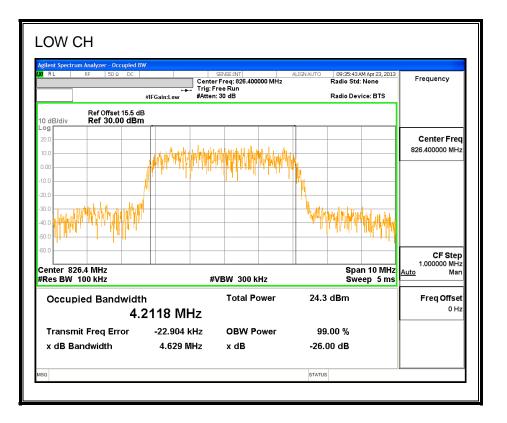
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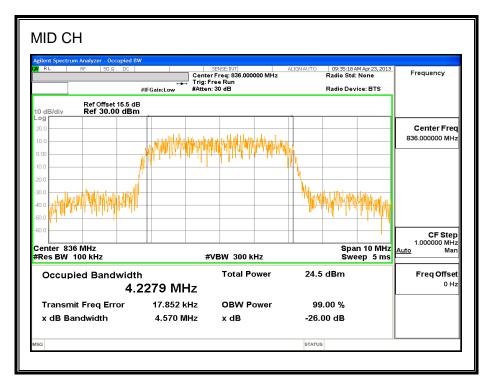


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#### WCDMA850

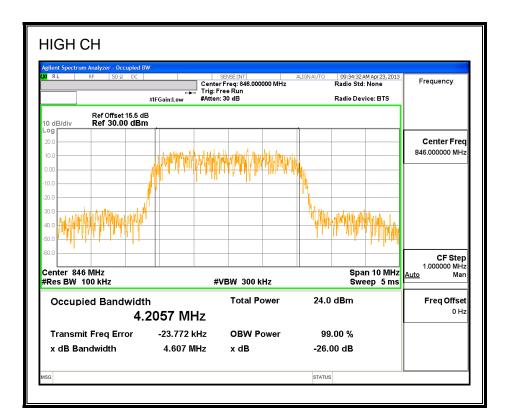
#### Rel 99 (Cellular Band)





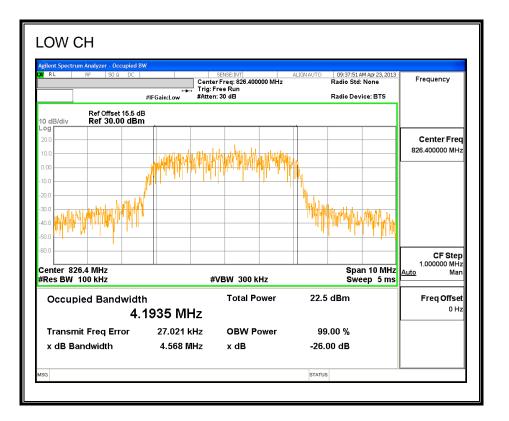
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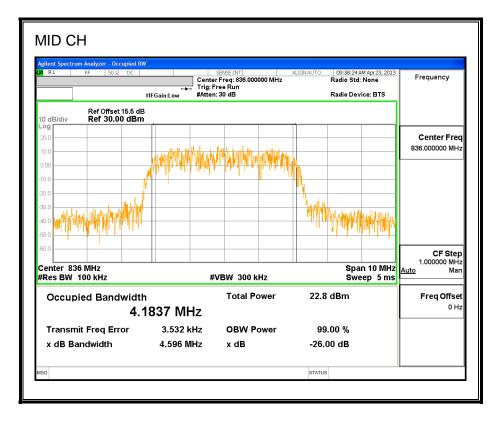
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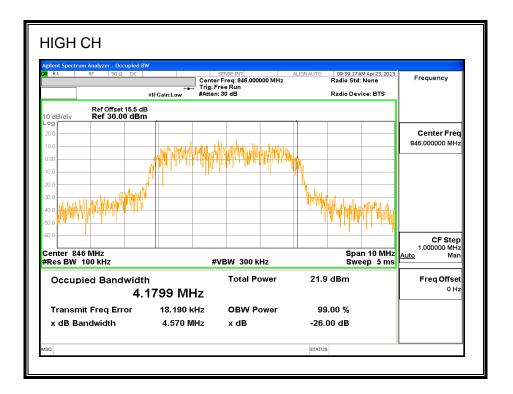
#### HSDPA (Cellular Band)





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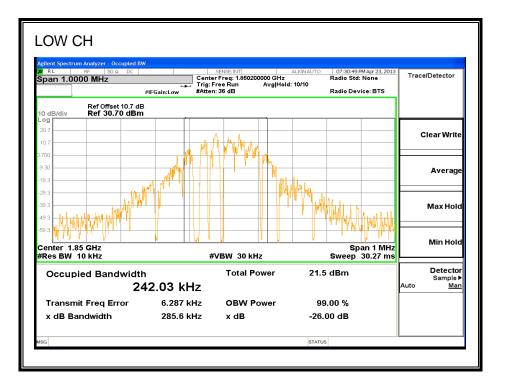
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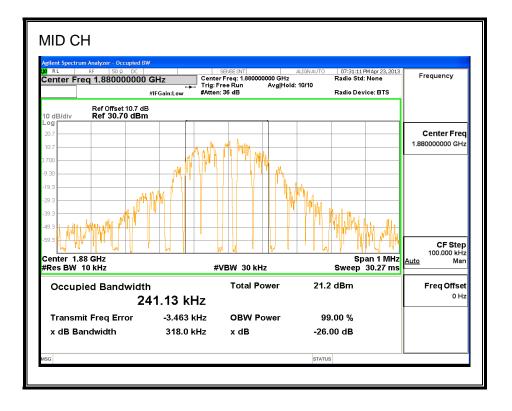


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#### **GPRS 1900**

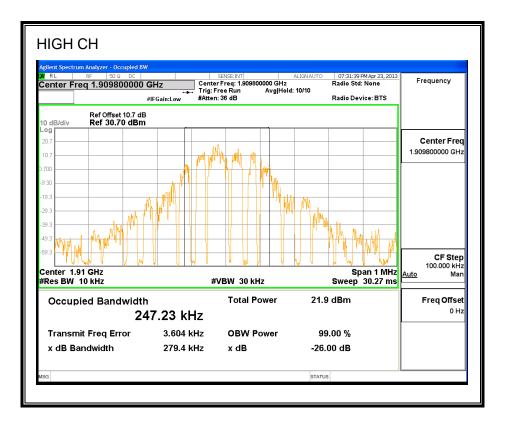
#### PCS 1900 Band



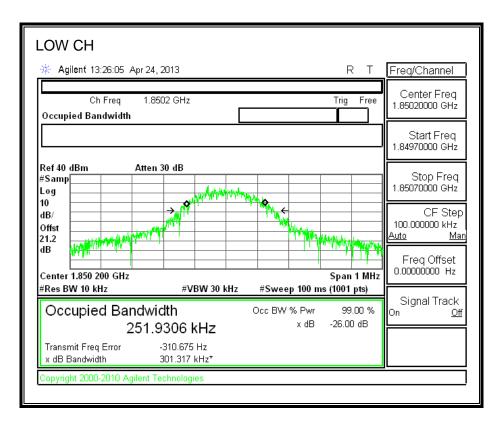


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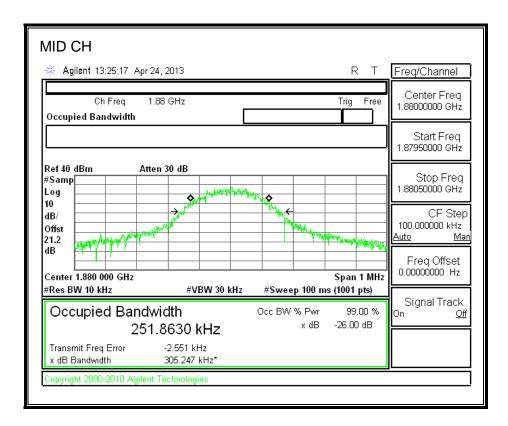
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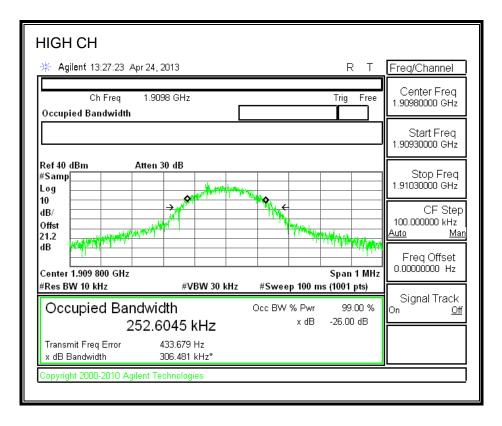


#### **EGPRS 1900**



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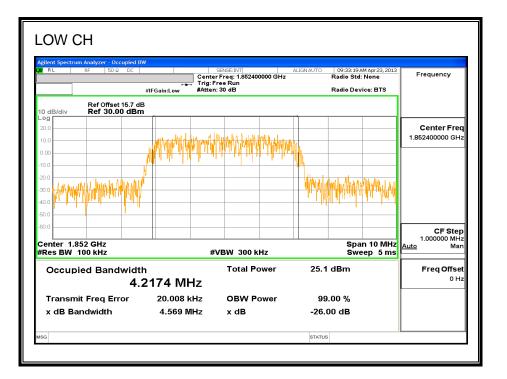


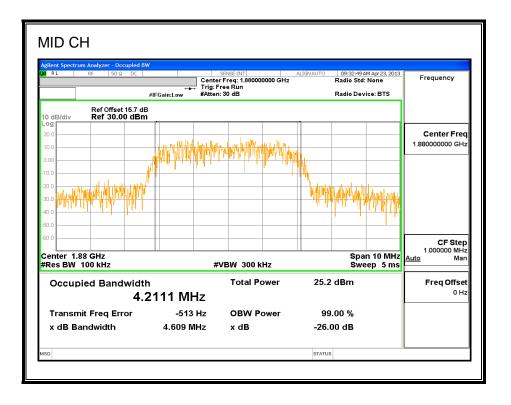


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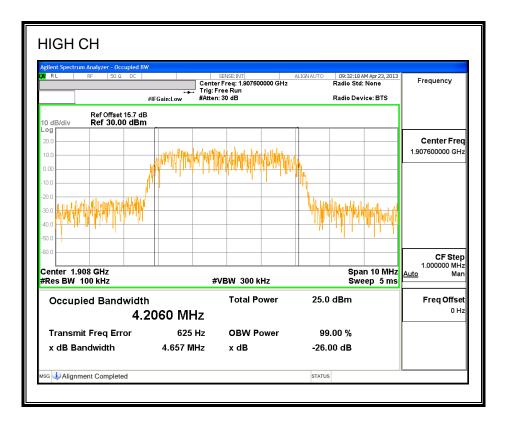
# WCDMA1900

# REL 99 Mode



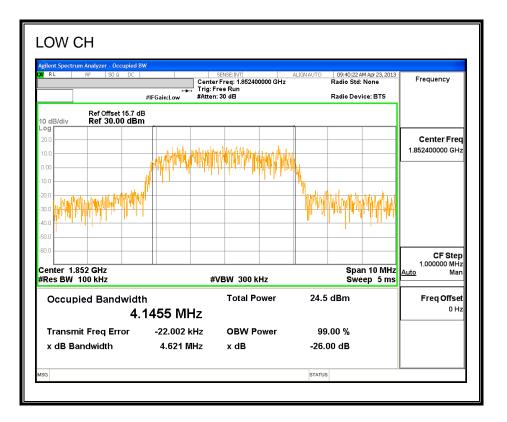


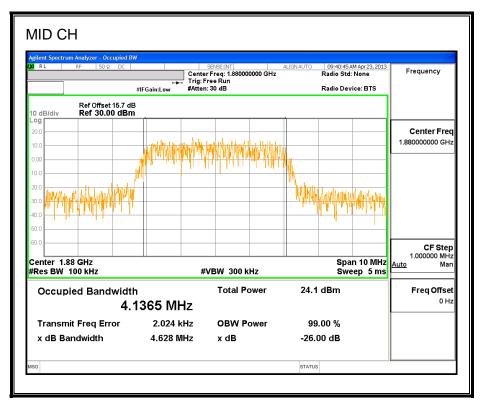
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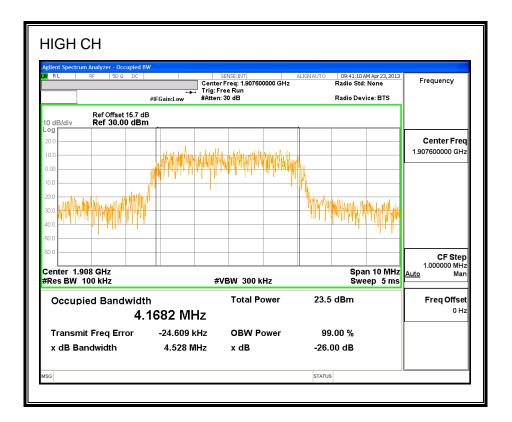
#### HSDPA Mode (PCS Band)





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# 8.2. BAND EDGE

# RULE PART(S)

FCC: §22.359, §24.238

# <u>LIMITS</u>

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

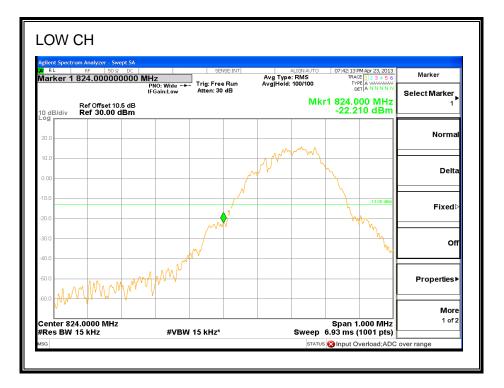
# **RESULTS**

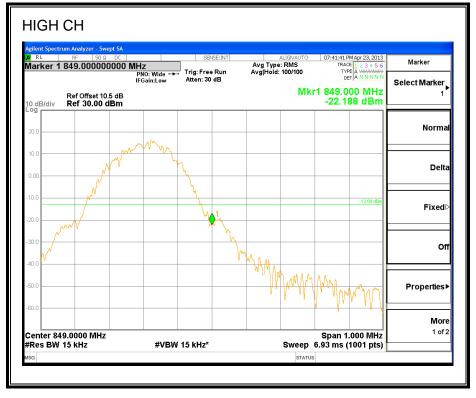
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# 8.2.1. GPRS850

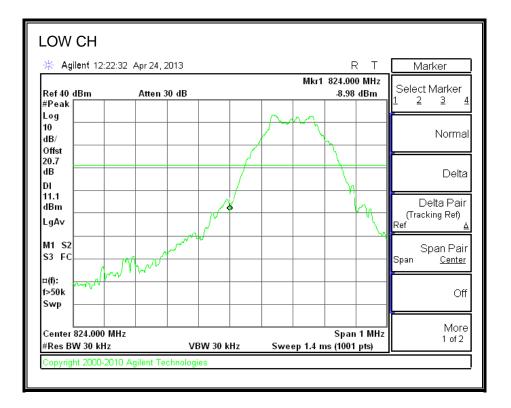
#### CELL BAND



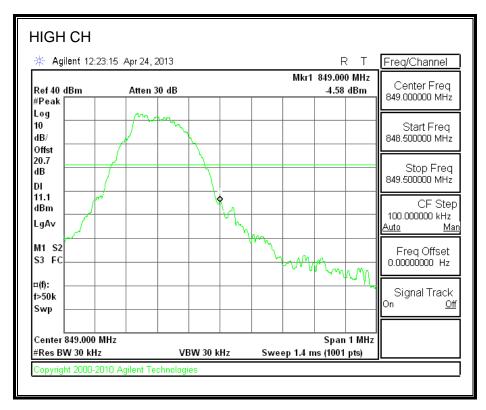


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# 8.2.2. EGPRS850

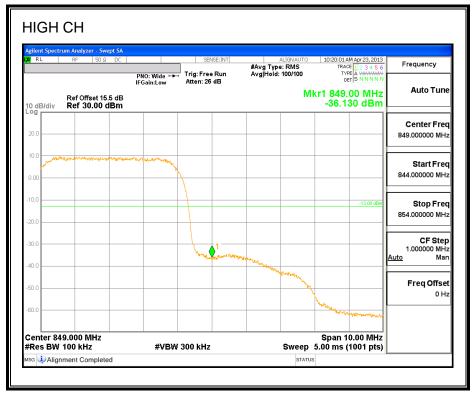


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# 8.2.3. UMTS850

#### **REL99**

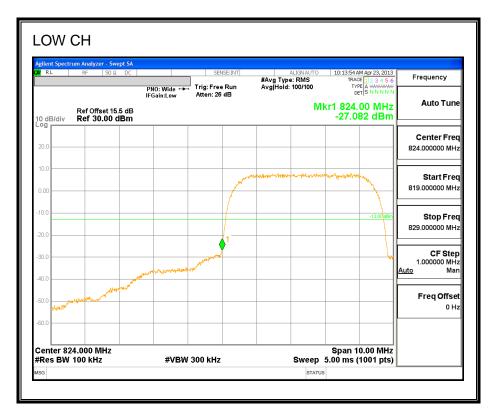
LOW CH ilent Spectrum Analyzer - Swept SA 10:20:37 AM Apr 23, 2013 TRACE 1 2 3 4 5 6 TYPE A WAWAWA DET S N N N N N Frequency #Avg Type: RMS Avg|Hold: 100/100 PNO: Wide +++ Trig: Free Run IFGain:Low Atten: 26 dB Mkr1 824.00 MHz -25.611 dBm Auto Tune Ref Offset 15.5 dB Ref 30.00 dBm 10 dB/div **Center Freq** 824.000000 MHz Start Freq 819.000000 MH Stop Freq 829.000000 MH CF Step 1.000000 MHz Mar Auto Freq Offset 0 Hz Center 824.000 MHz Span 10.00 MHz Sweep 5.00 ms (1001 pts) #VBW 300 kHz #Res BW 100 kHz STATUS

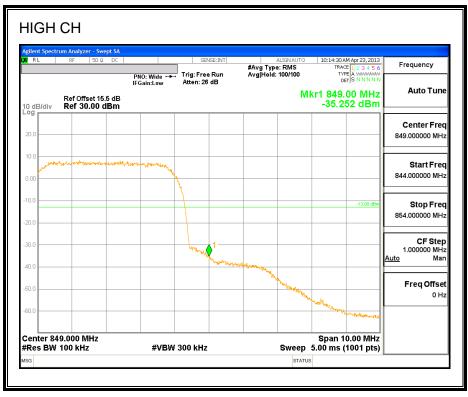


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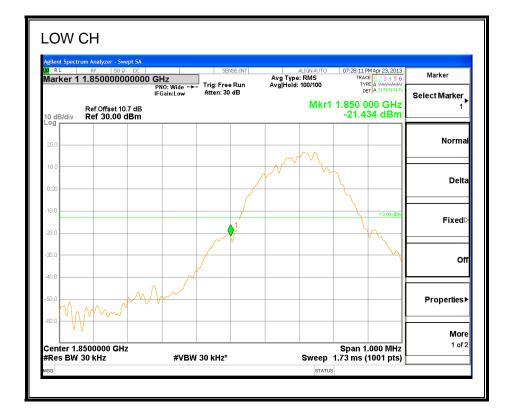
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# <u>HSDPA</u>





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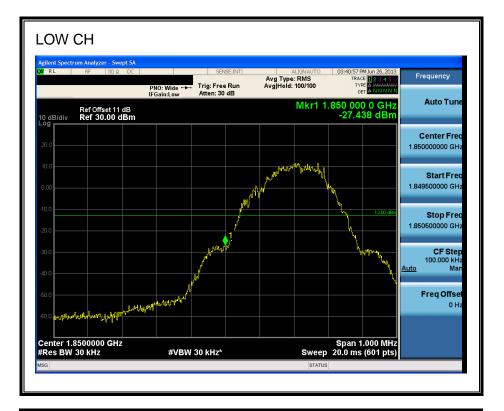
# 8.2.4. GPRS1900



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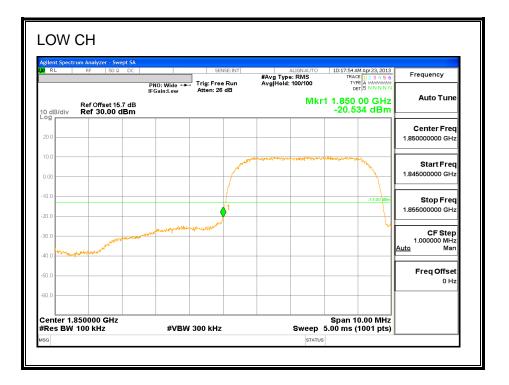


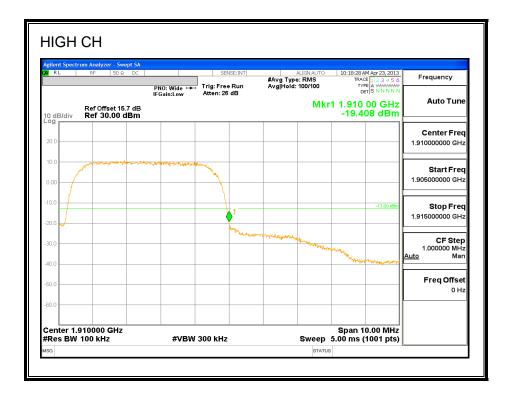


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# 8.2.6. UMTS1900

#### **REL99**

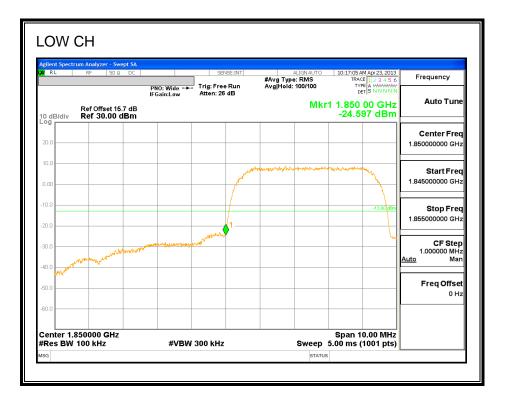


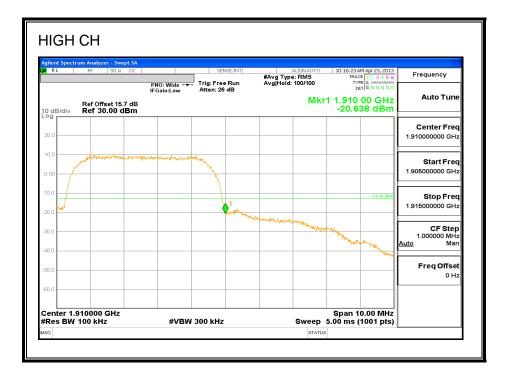


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# <u>HSDPA</u>





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# 8.3. OUT OF BAND EMISSIONS

# RULE PART(S)

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

# <u>LIMITS</u>

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.

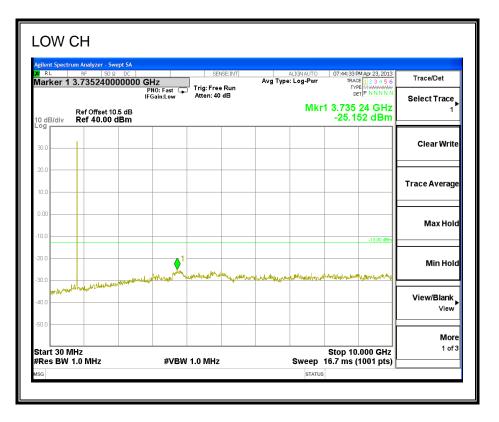
#### MODES TESTED

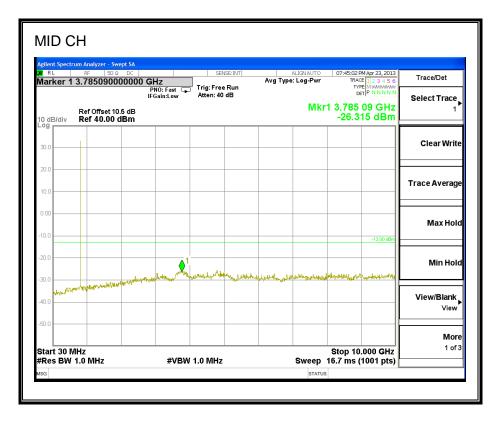
- GPRS and EGPRS
- UMTS, REL 99 and HSDPA

# **RESULTS**

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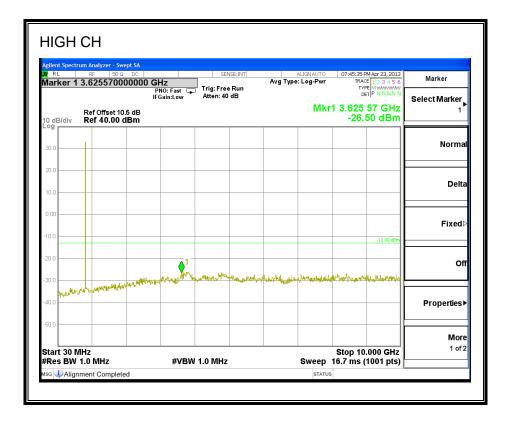
#### **GPRS850**





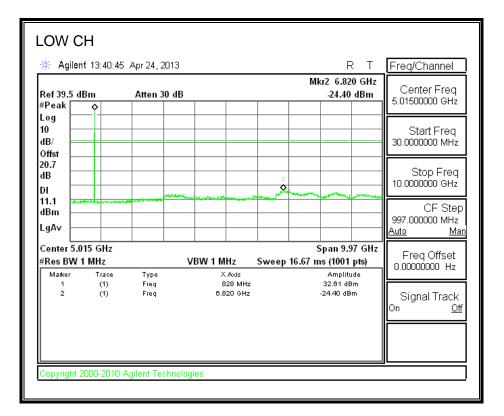
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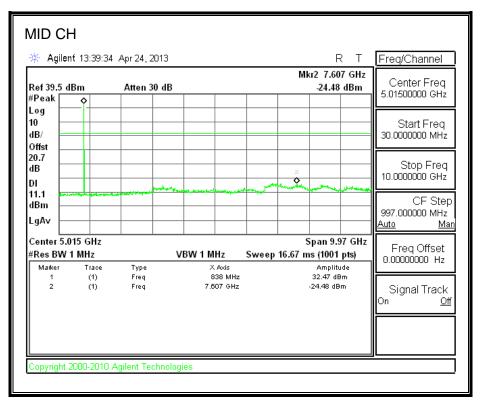
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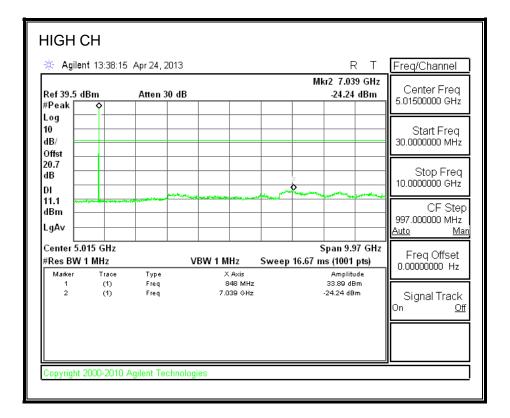
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#### EGPRS850





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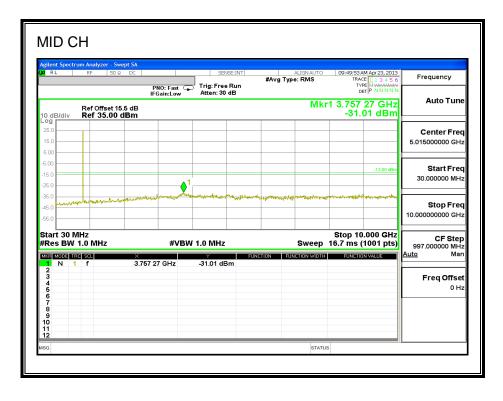


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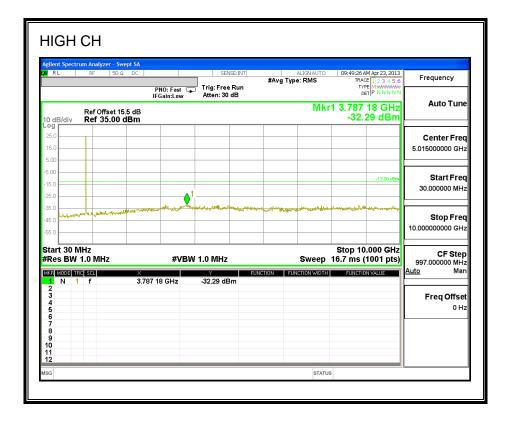
# <u>UMTS850</u>

# <u>REL 99</u>





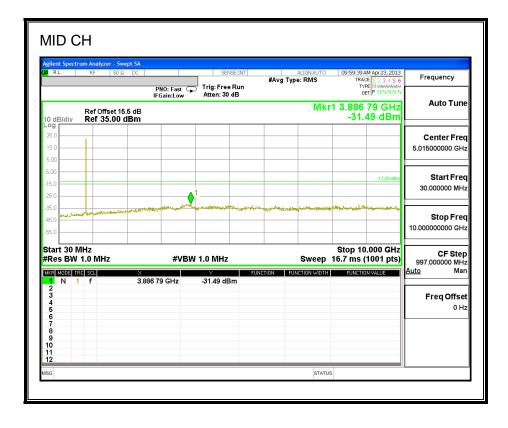
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# <u>HSDPA</u>

Frequency	06 AM Apr 23, 2013		ALIGN AUTO	#Avg Typ	SE:INT	SEN		DC	F 50 Ω	R	RL
	TYPE MWAMAAAAA DET P N N N N N	T	. RIVIS	#Avg iyp		Trig: Free Atten: 30	NO: Fast 🕞	PI			
Auto Tune	7 30 GHz 1.40 dBm		Mkr					5 dB	of Offset 16 of 35.00		dB/
Center Free											9 5.0
5.015000000 GH											5.0
											- 00. .00 -
Start Free 30.000000 MH	-13.00 dBm										5.0
			وروادهم ورياس								5.0 -
Stop Free		and the second	an an air an an air an an air an an air an	- Carlotter and the Carlotter and the		нациральна.		an and the series of the series	personal track	ennerle	5.0
10.000000000 GH											5.0 -
997.000000 MH	10.000 GHz s (1001 pts)		Sweep			1.0 MHz	#VBW			30 MHz BW 1.0	
<u>Auto</u> Mar	CTION VALUE	FUNCT	CTION WIDTH	TION FUN		¥ -31.40 dE	) GHz	× 3.717 3		DE TRC SC 1 f	
Freq Offse											2
0 H											4 5 6
											7 B
											9
											1 2
		3	STATUS								G

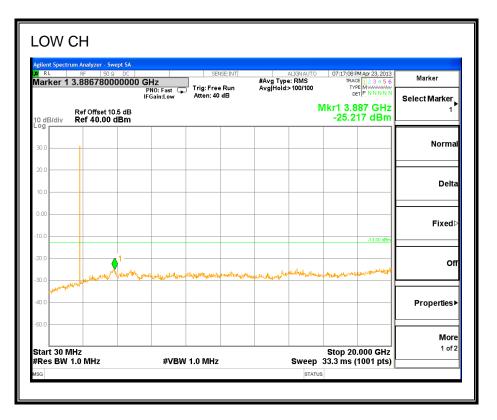


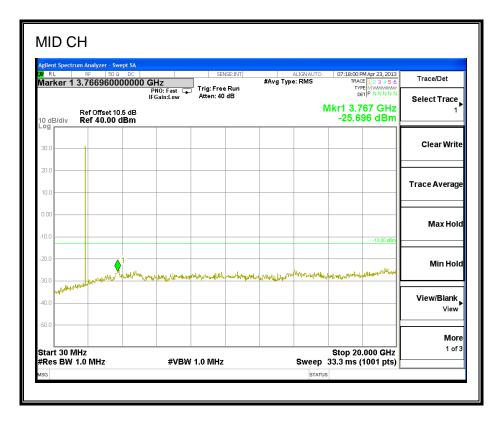
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RL	RF	er - Swept SA 50 Ω DC		SEN	VSE:INT		ALIGN AUTO	10:00:52/	AM Apr 23, 2013	
	14	Joo a De				#Avg Typ		TRAC	CE 1 2 3 4 5 6 PE MWAAAAAA	Frequency
			PNO: Fast 🕞 IFGain:Low	Atten: 30				D	ET P NNNNN	
I0 dB/div		set 15.5 dB 5.00 dBm					Mkr		27 GHz 23 dBm	Auto Tune
25.0										Center Free
15.0						+				5.015000000 GH
5.00										
15.0									-13.00 dBm	Start Fred
25.0	_		<sup>1</sup>		ļ				I	30.000000 MH
35.0		lenfortententententententententententententent	may completion when	work we we wanted	War ward	monther	Rent were and the st	and the stand of the	hendelsenne	
43.0	"Internation of	(index at 1							—— <b>I</b> I	Stop Free 10.000000000 GH
-55.0							-			10.0000000 GH
Start 30 I									0.000 GHz	CF Step
	1.0 MHz	_	#VBW	V 1.0 MHz			•		(1001 pts)	997.000000 MH Auto Mar
MKR MODE T		× 3.72	27 27 GHz	-30.23 dB		CTION FUN	NCTION WIDTH	FUNCTIO	DN VALUE	Auto
2 3										Freq Offse
4 5										0 H
6 7										1
8 9										
10										

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#### **GPRS1900**



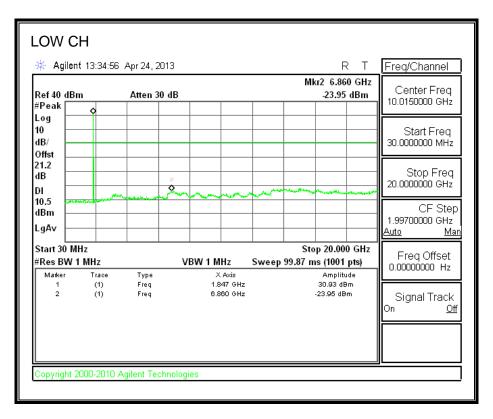


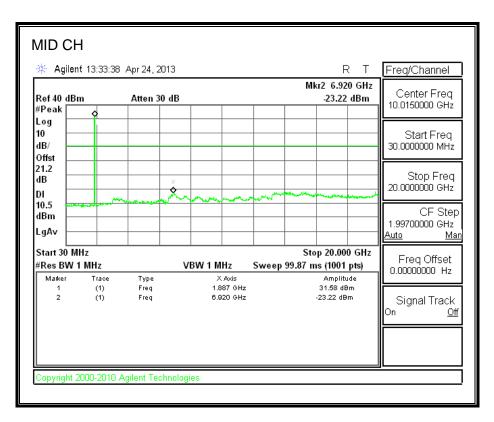
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#### EGPRS1900





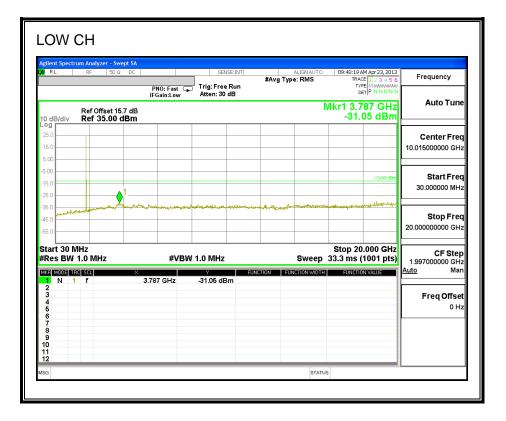
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0150000 GHz Start Freq
Start From
0000000 MHz
Stop Freq .0000000 GHz
CF Step 19700000 GHz <u>0 Ma</u>
Freq Offset D0000000 Hz
Signal Track
(

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# <u>UMTS1900</u>

# <u>REL 99</u>



Agnent Speci <mark>XI</mark> R L	trum Analyzer - Sweg RF 50 Ω	DC DC	SENSE:INT	ALIGN AUTO	09:47:28 AM Apr 23, 2013	Frequency	
		PNO: Fast C	Trig: Free Run Atten: 30 dB	#Avg Type: RMS	TYPE MWWWWWW DET P N N N N N		
10 dB/div	Ref Offset 15.7 Ref 35.00 d			ľ	//////////////////////////////////////	Auto Tun	
	Kei 33.00 u						
15.0						Center Fre 10.015000000 GH	
5.00						10.015000000 GH	
-5.00							
-15.0					-13.00 dBm	Start Free	
-25.0						30.000000 MH	
-35.0	-pumerous and and	and when all all all all and a second and a	and the second states and the second	and the second marker of	who repaired and have		
-45.0						Stop Free	
-55.0						20.00000000 GH	
Start 30	MHz				Stop 20.000 GHz	CF Ster	
#Res BW	( 1.0 MHz						
MKR MODE		× 3,767 GHz		INCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Mai	
2	1 f	3.767 GHZ	-30.34 dBm				
3 4						Freq Offse	
5 6						он	
7							
9 10							
11							
12							

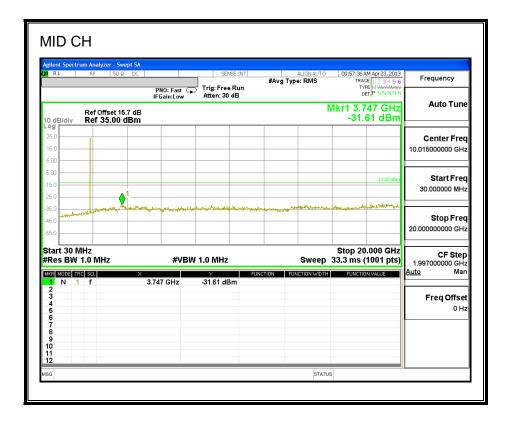
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ilent Spec RL	trum Analyzer - Swep RF 50 Ω	t SA	SENSE:INT	ALIGN AUTO	09:47:55 AM Apr 23, 2013	
				#Avg Type: RMS	TRACE 1 2 3 4 5 6	Frequency
		PNO: Fast ⊂ IFGain:Low	Atten: 30 dB		DET P N N N N	Auto Tun
0 dB/div	Ref Offset 15.7 Ref 35.00 dE			Ν	/kr1 3.707 GHz -31.12 dBm	Auto Tun
og 25.0						Center Fre
15.0						10.015000000 GH
5.00						
5.00					-13.00 dBm	Start Free
25.0	1					30.000000 MH
		and the second	ويهيا الحمر والمالية والمرود والمسالح والمعادر	m the manufacture in the second se	her was to one again the way	
15.0	white the state and the state					Stop Fre
6.0						20.00000000 GH
tart 30	MHz				Stop 20.000 GHz	05.04-
Res BW	/ 1.0 MHz	#VBI	N 1.0 MHz	Sweep	33.3 ms (1001 pts)	CF Ste 1.997000000 GH
KR MODE	TRE SEL	× 3.707 GHz	Y FU -31.12 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
2		5.707 GHZ	51.12 dBii			
4						Freq Offse 0 H
5						
7						
9						
1						

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# <u>HSDPA</u>

	AM Apr 23, 2013 CE 1 2 3 4 5 6 PE M WAAAAAAA	TRA	ALIGN AUTO e: RMS	#Avg Typ	SE:INT		NO: Fast	ΟΩ DC	RF	RL
Auto Tune	er∣ <sup>p</sup> NNNNN 787 GHz 81 dBm	/kr1 3.7	N		dB	Atten: 30	Gain:Low	15.7 dB	Ref Offs Ref 35	dB/div
Center Free 10.015000000 GH:										
Start Free 30.000000 MH:	-13.00 dBm							▲ <sup>1</sup>		
Stop Fred 20.000000000 GH	nades.Totashiyon	ulahis qubiere	anna a tha anna anna anna anna anna anna	normente and the	Prove Altra and Provention	*******	an a	Antonia	-have a second	.0 .0 .0
CF Step 1.997000000 GH: Auto Mar	0.000 GHz (1001 pts)	33.3 ms (	Sweep	TION FU	- TIM	1.0 MHz	#VBW	×	1.0 MHz	art 30 es BV
Freq Offse		Tokene				-29.81 dB	7 GHz			N
			STATUS							



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	trum Analyzer - Swe								
RL	RF 50 Ω	DC		SENSE:INT	#Avg Typ	ALIGNAUTO	09:57:57 AM	Apr 23, 2013	Frequency
		PNO: F IFGain:		ig: Free Run ten: 30 dB			TYPE		
0 dB/div	Ref Offset 15 Ref 35.00 (					N	/lkr1 3.78 -30.6	7 GHz 0 dBm _	Auto Tur
.og 25.0									Center Fre
15.0									10.015000000 GH
5.00								-13.00 dBm	Start Fre
15.0		1							30.000000 MH
25.0		Jummer das m.		he have the based	-	durant with a sa		Allachan	
45.0 Mart	works worangeting the	10.10	de obrido a conte		and draw and highly and				Stop Fre
55.0								l	20.00000000 GH
tart 30 Res BV	MHz V 1.0 MHz		#VBW 1.0	MHz		Sweep	Stop 20.0 33.3 ms (10		CF Ste
ikr mode	TAC SCL	×		Y	FUNCTION FU			· · ·	1.997000000 GF . <u>uto</u> Ma
2	1 f	3.787 GH	Iz -30	0.60 dBm					
3									Freq Offs 0 H
5 6									UF
7 8									
9 10									
11									

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# 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 20°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50°C is reached.

# Frequency Stability vs Voltage:

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

# MODES TESTED

- GPRS 850MHz, 1900MHz
- WCDMA ; HSDPA

# <u>RESULTS</u>

See the following pages.

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#### CELL, GPRS MODULATION - MID CHANNEL

Refe		ellular Mid Channe stay +- 2.5 ppm  =	el 836.600008MHz @ 2091.500	20°C Hz			
Power Supply	Environment	Frequency Deviation Measureed with Time Elaps					
(Vdc)	Temperature (°C)	(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			

Refer	Reference Frequency: Cellular Mid Channel 836.600008MHz @ 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	836.600008	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

	ence Frequency: P ne authorized block		1880.000014 MHz @ 4700.000	20⁰C Hz			
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse					
(Vdc)	Temperature (*C)	(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 @ 20°C Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz								
Power Supply	Environment	Environment Frequency Deviation Measureed with Time Elapse							
(Vdc)	Temperature (*C)	(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					

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# **CELL, EGPRS MODULATION – MID CHANNEL**

Refer	ence Frequency: Ce	ellular Mid Channe	el 836.599974MHz @ :	20°C			
	Limit: to s	stay +- 2.5 ppm =	2091.500	Hz			
Power Supply	Environment	Frequency Dev	viation Measureed wi	th 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	r 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	
4.20 3.40	20 20	836.600025 836.600016	-0.019 -0.008	2.5 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 Devi	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	

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Refere	Reference Frequency: Cellular Mid Channel 835.599994 MHz @ 20°C				
	Limit: to s	tay +- 2.5 ppm =	2089.000	Hz	
Power Supply	Environment	Frequency Devi	iation Measureed w	ith Time Elapse	
(Vdc)	Temperature (°C)	(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	

#### 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	ower Supply Environment Frequency Deviation Measureed with Time Elapse				
(Vdc)	Temperature (°C)	(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	Environment	vironment Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (°C)	(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	Environment Frequency Deviation Measureed with Time Elapse				
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)	
3.80	20	1880.000007	0	2.5	
4.20	20	1880.000005	0.0011	2.5	
4.20 3.40	20 20	1880.000005 1880.000003	0.0011 0.0021	2.5 2.5	

# 9. RADIATED TEST RESULTS

# 9.1. RADIATED POWER (ERP & EIRP)

# RULE PART(S)

FCC: §2.1046, §22.913, §24.232

# <u>LIMITS</u>

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-toaverage ratio of the power shall not exceed 13 dB.

# TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17

KDB 971168 v02r01 RF power output using broadband peak and average power meter method.

# MODES TESTED

- GPRS and EGPRS
- UMTS, REL 99 and HSDPA

### **RESULTS**

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# REPORT NO: 13U15037-1 EUT: QUAD-BAND RADIO WITH WLAN AND BT RADIO

# <u>LAT / PORT A</u>

			ERP	(Peak)
Mode	Channel	f (MHz)	dBm	mW
	128	824.20	27.30	537.03
GPRS	190	836.60	28.00	630.96
	251	848.80	28.20	660.69
	128	824.20	26.60	457.09
EGPRS	190	836.60	27.40	549.54
	251	848.80	27.10	512.86

			EIRP	(Peak)
Mode	Channel	f (MHz)	dBm	mW
	512	1850.20	32.00	1584.89
GPRS	661	1880.00	31.48	1406.05
	810	1909.80	31.34	1361.44
	512	1850.20	30.90	1230.27
EGPRS	661	1880.00	30.28	1066.60
	810	1909.80	30.74	1185.77

			ERP (/	Average)
Mode	Channel	f (MHz)	dBm	mW
	4357	826.40	22.80	190.55
UMTS,REL 99	4405	836.00	23.00	199.53
	4455	846.00	23.15	206.54
	4357	826.40	22.40	173.78
UMTS, HSDPA	4405	836.00	22.30	169.82
	4455	846.00	22.50	177.83

			EIRP	(Peak)
Mode	Channel	f (MHz)	dBm	mW
	9662	1852.40	29.00	794.33
UMTS, REL 99	9800	1880.00	29.08	809.10
	9938	1907.60	29.34	859.01
	9662	1852.40	28.70	741.31
UMTS, HSDPA	9800	1880.00	28.48	704.69
	9938	1907.60	28.84	765.60

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# REPORT NO: 13U15037-1 EUT: QUAD-BAND RADIO WITH WLAN AND BT RADIO

# UAT / PORT B

			ERP	(Peak)
Mode	Channel	f (MHz)	dBm	mW
	128	824.20	25.90	389.05
GPRS	190	836.60	26.60	457.09
	251	848.80	26.80	478.63
	128	824.20	26.00	398.11
EGPRS	190	836.60	25.20	331.13
	251	848.80	25.10	323.59

			EIRP	(Peak)
Mode	Channel	f (MHz)	dBm	mW
	512	1850.20	25.47	352.37
GPRS	661	1880.00	24.84	304.79
	810	1909.80	25.28	337.29
	512	1850.20	24.04	253.51
EGPRS	661	1880.00	24.25	266.07
	810	1909.80	24.57	286.42

			ERP (/	Average)
Mode	Channel	f (MHz)	dBm	mW
	4357	826.40	19.80	95.50
UMTS,REL 99	4405	836.00	20.10	102.33
	4455	846.00	20.30	107.15
	4357	826.40	19.10	81.28
UMTS, HSDPA	4405	836.00	19.60	91.20
	4455	846.00	19.70	93.33

			EIRP	(Peak)
Mode	Channel	f (MHz)	dBm	mW
	9662	1852.40	21.99	158.12
UMTS, REL 99	9800	1880.00	21.68	147.23
	9938	1907.60	21.97	157.40
	9662	1852.40	20.79	119.95
UMTS, HSDPA	9800	1880.00	20.47	111.43
	9938	1907.60	20.69	117.22

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#### LAT / PORT A

#### GPRS850

ompany:		Apple						
roject #:		13U15037						
ate:		06/11/13						
est Engi		Roy Zheng						
onfigura		EUT only						
ode:		GRPS 850MH	z CELL					
_	: Sunol T407,			etup this one for e (SN # 20894700	_	-		
eceiving ubstituti f	: Sunol T407, on: Dipole S/N SG reading	l: 00022117, Ant. Pol.	4ft SMA Cable	e (SN # 20894700 Antenna Gain	03) Wareh ERP	iouse. Limit	Margin	Notes
eceiving ubstituti f MHz	: Sunol T407, on: Dipole S/N	l: 00022117,	4ft SMA Cabl	e (SN # 20894700	03) Wareh	iouse.	Margin (dB)	Notes
eceiving ubstituti f <u>MHz</u> Low Ch	: Sunol T407, on: Dipole S/N SG reading (dBm)	l: 00022117, Ant. Pol.	4ft SMA Cable	e (SN # 20894700 Antenna Gain	03) Wareh ERP (dBm)	iouse. Limit	(dB)	Notes
eceiving ubstituti f MHz	: Sunol T407, on: Dipole S/N SG reading	l: 00022117, Ant. Pol. (H/V)	4ft SMA Cabl Cable Loss (dB)	e (SN # 20894700 Antenna Gain (dBd)	03) Wareh ERP	iouse. Limit (dBm)	-	Notes
eceiving ubstituti f MHz Low Ch 824.20 824.20	: Sunol T407, on: Dipole S/N SG reading (dBm) 27.90	I: 00022117, Ant. Pol. (H/V) V	4ft SMA Cable Cable Loss (dB) 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0	03) Wareh ERP (dBm) 27.30	Limit (dBm)	(dB) -11.1	Notes
eceiving ubstituti f <u>MHz</u> Low Ch 824.20 824.20 Mid Ch	: Sunol T407, on: Dipole S/N SG reading (dBm) 27.90 8.10	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0	03) Wareh ERP (dBm) 27.30 7.50	Limit (dBm) 38.5 38.5	(dB) -11.1 -30.9	Notes
eceiving ubstituti f MHz Low Ch 824.20 824.20	: Sunol T407, on: Dipole S/N SG reading (dBm) 27.90	I: 00022117, Ant. Pol. (H/V) V	4ft SMA Cable Cable Loss (dB) 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0	03) Wareh ERP (dBm) 27.30	Limit (dBm)	(dB) -11.1	Notes
eceiving ubstituti f MHz Low Ch 824.20 824.20 Mid Ch 836.60 836.60	: Sunol T407, on: Dipole S/N SG reading (dBm) 27.90 8.10 28.60	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0 0.0	03) Wareh ERP (dBm) 27.30 7.50 28.00	Limit (dBm) 38.5 38.5 38.5	(dB) -11.1 -30.9 -10.4	Notes
eceiving ubstituti f <u>MHz</u> Low Ch 824.20 824.20 Mid Ch 836.60	: Sunol T407, on: Dipole S/N SG reading (dBm) 27.90 8.10 28.60	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0 0.0	03) Wareh ERP (dBm) 27.30 7.50 28.00	Limit (dBm) 38.5 38.5 38.5	(dB) -11.1 -30.9 -10.4	Notes

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Apple

13U15037

06/11/13

EUT only

Roy Zheng

EGRPS 850MHz CELL

### EGPRS850

#### High Frequency Substitution Measurement Compliance Certification Services Chamber D

Company: Project #: Date: Test Engineer: Configuration: Mode:

#### Test Equipment:

Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.

f	-			Antenna Gain		Limit	Margin	Notes
MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
Low Ch								
824.20	27.20	V	0.6	0.0	26.60	38.5	-11.8	
824.20	8.40	Н	0.6	0.0	7.80	38.5	-30.6	
Mid Ch								
836.60	28.00	V	0.6	0.0	27.40	38.5	-11.0	
836.60	9.10	Н	0.6	0.0	8.50	38.5	-29.9	
High Ch								
848.80	27.70	V	0.6	0.0	27.10	38.5	-11.3	
848.80	8.64	H	0.6	0.0	8.04	38.5	-30.4	
ev. 3.17.11	L			l		i	L	

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#### GPRS1900

Company:		Apple						
Project #:		13U15037						
Date:		06/11/13						
Test Engi		Roy Zheng						
Configura		EUT Only						
Mode:		GPRS 1900MH;	7					
cociting	: T344, and Ch		( oubles					
				244639001) Warehou				
f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
				·		Limit (dBm)	Delta (dB)	Notes
f GHz Low Ch	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	(dBm)	(dB)	Notes
f GHz Low Ch 1.850	SG reading (dBm) 24.6	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi) 7.94	EIRP (dBm) 31.04	(dBm) 33.0	(dB) -2.0	Notes
f GHz Low Ch	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	(dBm)	(dB)	Notes
f GHz Low Ch 1.850 1.850	SG reading (dBm) 24.6	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi) 7.94	EIRP (dBm) 31.04	(dBm) 33.0	(dB) -2.0	Notes
f GHz Low Ch 1.850	SG reading (dBm) 24.6	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi) 7.94	EIRP (dBm) 31.04	(dBm) 33.0	(dB) -2.0	Notes
f GHz Low Ch 1.850 1.850 Mid Ch	SG reading (dBm) 24.6 24.7	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50	Antenna Gain (dBi) 7.94 8.80	EIRP (dBm) 31.04 32.00	(dBm) 33.0 33.0	(dB) -2.0 -1.0	Notes
f GHz Low Ch 1.850 1.850 Mid Ch 1.880 1.880	SG reading (dBm) 24.6 24.7 23.9	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 31.04 32.00 30.35	(dBm) 33.0 33.0 33.0 33.0	(dB) -2.0 -1.0 -2.7	Notes
f GHz Low Ch 1.850 1.850 Mid Ch 1.880 1.880 High Ch	SG reading (dBm) 24.6 24.7 23.9 24.3	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi)   7.94   8.80   7.95   8.68	EIRP (dBm) 31.04 32.00 30.35 31.48	(dBm) 33.0 33.0 33.0 33.0 33.0	(dB) -2.0 -1.0 -2.7 -1.5	Notes
f GHz Low Ch 1.850 1.850 Mid Ch 1.880 1.880	SG reading (dBm) 24.6 24.7 23.9	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 31.04 32.00 30.35	(dBm) 33.0 33.0 33.0 33.0	(dB) -2.0 -1.0 -2.7	Notes

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#### EGPRS1900

Company		Apple						
roject #:		13U15037						
Date:		06/11/13						
rest Engi		Roy Zheng						
Configura		EUT Only						
Johngura Node:		EGPRS 1900MI	u					
est Equi	pment:							
	g: T344, and Ch	amber D SM/	A Cables					
			itt SMA Cable (2	44639001) Warehou	se			
		ubstitution, 4	ITT SIMA Cable (2	244639001) Warehou	se			
f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
f GHz						Limit (dBm)	Delta (dB)	Notes
	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP			Notes
GHz	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP			Notes
GHz Low Ch	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	(dBm)	(dB)	Notes
GHz Low Ch 1.850 1.850	SG reading (dBm) 21.8	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi) 7.94	EIRP (dBm) 28.24	(dBm) 33.0	(dB) -4.8	Notes
GHz Low Ch 1.850 1.850 Mid Ch	SG reading (dBm) 21.8 23.6	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50	Antenna Gain (dBi) 7.94 8.80	EIRP (dBm) 28.24 30.90	(dBm) 33.0 33.0	(dB) 4.8 -2.1	Notes
GHz Low Ch 1.850 1.850 Mid Ch 1.880	SG reading (dBm) 21.8 23.6 21.3	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 28.24 30.90 27.75	(dBm) 33.0 33.0 33.0	(dB) 4.8 -2.1 -5.3	Notes
GHz Low Ch 1.850 1.850 Mid Ch	SG reading (dBm) 21.8 23.6	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50	Antenna Gain (dBi) 7.94 8.80	EIRP (dBm) 28.24 30.90	(dBm) 33.0 33.0	(dB) 4.8 -2.1	Notes
GHz Low Ch 1.850 1.850 Mid Ch 1.880 1.880	SG reading (dBm) 21.8 23.6 21.3	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 28.24 30.90 27.75	(dBm) 33.0 33.0 33.0	(dB) 4.8 -2.1 -5.3	Notes
GHz Low Ch 1.850 1.850 Mid Ch 1.880	SG reading (dBm) 21.8 23.6 21.3	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 28.24 30.90 27.75	(dBm) 33.0 33.0 33.0	(dB) 4.8 -2.1 -5.3	Notes
GHz Low Ch 1.850 1.850 Mid Ch 1.880 1.880 High Ch	SG reading (dBm) 21.8 23.6 21.3 23.1	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi)   7.94   8.80   7.95   8.68	EIRP (dBm) 28.24 30.90 27.75 30.28	(dBm) 33.0 33.0 33.0 33.0 33.0	(dB) -4.8 -2.1 -5.3 -2.7	Notes

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# <u>UMTS850</u>

# <u>REL 99</u>

ompany:		Apple						
roject #:		13U15037						
ate:		06/11/13						
est Engi		Roy Zheng						
onfigura lode:		EUT only REL 99, CELL						
est Equi	oment:							
eceiving	: Sunol T407,	and Chambe	er D Cable (Se	etup this one for	• testing E	EUT)		
-				etup this one for (SN # 20894700	-			
-	on: Dipole S/N	l: 00022117,	4ft SMA Cable	•	3) Wareh	ouse.	Margin	Notes
ubstitutio		l: 00022117,	4ft SMA Cable	(SN # 20894700	-		Margin (dB)	Notes
ubstitutio f	on: Dipole S/N SG reading	l: 00022117, Ant. Pol.	4ft SMA Cable Cable Loss	(SN # 20894700 Antenna Gain	03) Wareh	ouse. Limit	-	Notes
ubstitutio f MHz	on: Dipole S/N SG reading (dBm) 23.40	l: 00022117, Ant. Pol. (H/V) V	4ft SMA Cable Cable Loss	(SN # 20894700 Antenna Gain	03) Wareh	Limit (dBm)	-	Notes
f MHz Low Ch	on: Dipole S/N SG reading (dBm)	l: 00022117, Ant. Pol. (H/V)	4ft SMA Cable Cable Loss (dB)	e (SN # 20894700 Antenna Gain (dBd)	)3) Wareh ERP (dBm)	Limit (dBm)	(dB)	Notes
f MHz Low Ch 826.40	on: Dipole S/N SG reading (dBm) 23.40	l: 00022117, Ant. Pol. (H/V) V	4ft SMA Cable Cable Loss (dB)	(SN # 20894700 Antenna Gain (dBd)	03) Wareh ERP (dBm) 22.80	Limit (dBm)	(dB) -15.6	Notes
f MHz Low Ch 826.40 826.40	on: Dipole S/N SG reading (dBm) 23.40	l: 00022117, Ant. Pol. (H/V) V	4ft SMA Cable Cable Loss (dB)	(SN # 20894700 Antenna Gain (dBd)	03) Wareh ERP (dBm) 22.80	Limit (dBm)	(dB) -15.6	Notes
f MHz Low Ch 826.40 826.40 Mid Ch	SG reading (dBm) 23.40 5.20	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	(SN # 20894700 Antenna Gain (dBd) 0.0 0.0	03) Wareh ERP (dBm) 22.80 4.60	Limit (dBm) 38.5 38.5	(dB) -15.6 -33.8	Notes
dbstitution f MHz Low Ch 826.40 826.40 826.40 Mid Ch 836.00 836.00	SG reading (dBm) 23.40 5.20 23.60	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	(SN # 20894700 Antenna Gain (dBd) 0.0 0.0 0.0	03) Wareh ERP (dBm) 22.80 4.60 23.00	Couse. Limit (dBm) 38.5 38.5 38.5	(dB) -15.6 -33.8 -15.4	Notes
dbstitutio f MHz Low Ch 826.40 826.40 Mid Ch 836.00	SG reading (dBm) 23.40 5.20 23.60	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	(SN # 20894700 Antenna Gain (dBd) 0.0 0.0 0.0	03) Wareh ERP (dBm) 22.80 4.60 23.00	Couse. Limit (dBm) 38.5 38.5 38.5	(dB) -15.6 -33.8 -15.4	Notes

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## <u>HSDPA</u>

	High Frequency Substitution Measurement Compliance Certification Services Chamber D
Company:	Apple
Project #:	13U15037
Date:	06/11/13
Test Engineer:	Roy Zheng
Configuration:	EUT only
Mode:	HSDPA, CELL
Test Equipment:	
	407, and Chamber D Cable (Setup this one for testing EUT)

Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.

f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin	Notes
MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
Low Ch								
826.40	23.00	V	0.6	0.0	22.40	38.5	-16.0	
826.40	4.10	Н	0.6	0.0	3.50	38.5	-34.9	
Mid Ch								
836.00	22.90	V	0.6	0.0	22.30	38.5	-16.1	
836.00	4.00	Н	0.6	0.0	3.40	38.5	-35.0	
High Ch								
846.00	23.10	V	0.6	0.0	22.50	38.5	-15.9	
846.00	4.24	Н	0.6	0.0	3.64	38.5	-34.8	
ev. 3.17.11							ll.	

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#### <u>UMTS1900</u>

#### <u>REL 99</u>

			-	ental Measuremen Services Chamber				
ompany:		Apple						
roject #:		13U15037						
ate:		06/11/13						
est Engi	neer:	Roy Zheng						
onfigura	tion:	EUT Only						
ode:		Rel 99, PCS						
ubstituti	: T344, and Ch on: Horn T60 S	ubstitution, 4	4ft SMA Cable (2	244639001) Warehou		1::4	Dalla	Natas
eceiving ubstituti f GHz	: T344, and Ch			244639001) Warehou Antenna Gain (dBi)	se EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
eceiving ubstituti f GHz Low Ch	: T344, and Ch on: Horn T60 S SG reading (dBm)	Ant. Pol. (H/V)	fft SMA Cable (2 Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	(dBm)	(dB)	Notes
eceiving ubstituti f GHz	: T344, and Ch on: Horn T60 S SG reading	Ant. Pol.	ft SMA Cable (2 Cable Loss	Antenna Gain	EIRP			Notes
eceiving ubstituti f GHz Low Ch 1.852 1.852	: T344, and Ch on: Horn T60 S SG reading (dBm) 20.7	Ant. Pol. (H/V)	fft SMA Cable (2 Cable Loss (dB) 1.50	Antenna Gain (dBi) 7.94	EIRP (dBm) 27.14	(dBm) 33.0	(dB) -5.9	Notes
eceiving ubstituti f GHz Low Ch 1.852 1.852 Mid Ch	: T344, and Ch on: Horn T60 S SG reading (dBm) 20.7 21.7	Ant. Pol. (H/V) V H	fft SMA Cable (2 Cable Loss (dB) 1.50 1.50	Antenna Gain (dBi) 7.94 8.80	EIRP (dBm) 27.14 29.00	(dBm) 33.0 33.0	(dB) -5.9 -4.0	Notes
eceiving ubstituti f GHz Low Ch 1.852 1.852 Mid Ch 1.880	: T344, and Ch on: Horn T60 S SG reading (dBm) 20.7 21.7 19.8	Ant. Pol. (H/V) V H	4ft SMA Cable (2 Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 27.14 29.00 26.25	(dBm) 33.0 33.0 33.0 33.0	(dB) -5.9 -4.0 -6.8	Notes
eceiving ubstituti f GHz Low Ch 1.852 1.852 Mid Ch	: T344, and Ch on: Horn T60 S SG reading (dBm) 20.7 21.7	Ant. Pol. (H/V) V H	fft SMA Cable (2 Cable Loss (dB) 1.50 1.50	Antenna Gain (dBi) 7.94 8.80	EIRP (dBm) 27.14 29.00	(dBm) 33.0 33.0	(dB) -5.9 -4.0	Notes
eceiving ubstituti f GHz Low Ch 1.852 1.852 Mid Ch 1.880	: T344, and Ch on: Horn T60 S SG reading (dBm) 20.7 21.7 19.8 21.9	Ant. Pol. (H/V) V H V H	4ft SMA Cable (2 Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 27.14 29.00 26.25	(dBm) 33.0 33.0 33.0 33.0	(dB) -5.9 -4.0 -6.8	Notes
eceiving ubstituti f GHz Low Ch 1.852 1.852 Mid Ch 1.880 1.880	: T344, and Ch on: Horn T60 S SG reading (dBm) 20.7 21.7 19.8	Ant. Pol. (H/V) V H	4ft SMA Cable (2 Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 27.14 29.00 26.25	(dBm) 33.0 33.0 33.0 33.0	(dB) -5.9 -4.0 -6.8	Notes

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#### <u>HSDPA</u>

Company	:	Apple						
Project #:		13U15037						
Date:		06/11/13						
lest Engi		Roy Zheng						
Configura		EUT Only						
Node:		HSDPA, PCS						
	g: T344, and Ch ion: Horn T60 S			244639001) Warehou	se			
f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
GHz Low Ch	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	Notes
GHz Low Ch 1.852	(dBm) 21.3	(H/V) V	(dB) 1.50	(dBi) 7.94	(dBm) 27.74	(dBm) 33.0	(dB) -5.3	Notes
GHz Low Ch	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	Notes
GHz Low Ch 1.852	(dBm) 21.3	(H/V) V	(dB) 1.50	(dBi) 7.94	(dBm) 27.74	(dBm) 33.0	(dB) -5.3	Notes
GHz Low Ch 1.852 1.852	(dBm) 21.3	(H/V) V H	(dB) 1.50 1.50 1.50	(dBi) 7.94 8.80 7.95	(dBm) 27.74 28.70 26.85	(dBm) 33.0	(dB) -5.3 -4.3 -6.2	Notes
GHz Low Ch 1.852 1.852 Mid Ch	(dBm) 21.3 21.4	(H/V) V H	(dB) 1.50 1.50	(dBi) 7.94 8.80	(dBm) 27.74 28.70	(dBm) 33.0 33.0	(dB) -5.3 -4.3	Notes
GHz Low Ch 1.852 1.852 Mid Ch 1.880 1.880	(dBm) 21.3 21.4 20.4	(H/V) V H	(dB) 1.50 1.50 1.50	(dBi) 7.94 8.80 7.95	(dBm) 27.74 28.70 26.85	(dBm) 33.0 33.0 33.0 33.0	(dB) -5.3 -4.3 -6.2	Notes
GHz Low Ch 1.852 1.852 Mid Ch 1.880	(dBm) 21.3 21.4 20.4	(H/V) V H	(dB) 1.50 1.50 1.50	(dBi) 7.94 8.80 7.95	(dBm) 27.74 28.70 26.85	(dBm) 33.0 33.0 33.0 33.0	(dB) -5.3 -4.3 -6.2	Notes
GHz Low Ch 1.852 1.852 Mid Ch 1.880 1.880	(dBm) 21.3 21.4 20.4	(H/V) V H	(dB) 1.50 1.50 1.50	(dBi) 7.94 8.80 7.95	(dBm) 27.74 28.70 26.85	(dBm) 33.0 33.0 33.0 33.0	(dB) -5.3 -4.3 -6.2	Not

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## UAT / PORT B

#### <u>GPRS850</u>

				titution Measur on Services Cha				
ompany:		Apple						
roject #:		13U15037						
ate:		06/11/13						
est Engi	neer:	Roy Zheng						
onfigura	tion:	EUT only						
lode:		GRPS 850MH	z CELL					
ubstituti	: Sunol T407, on: Dipole S/N	I: 00022117,	4ft SMA Cable	etup this one for e (SN # 20894700	03) Wareh	iouse.	Margin	Notes
eceiving	: Sunol T407,	I: 00022117,	4ft SMA Cable	•	03) Wareh		Margin (dB)	Notes
eceiving ubstituti f <u>MHz</u> Low Ch	: Sunol T407, on: Dipole S/N SG reading (dBm)	I: 00022117, Ant. Pol. (H/V)	4ft SMA Cable Cable Loss (dB)	e (SN # 20894700 Antenna Gain (dBd)	03) Wareh ERP (dBm)	Limit (dBm)	(dB)	Notes
eceiving ubstituti f MHz Low Ch 824.20	: Sunol T407, on: Dipole S/N SG reading (dBm) 26.50	l: 00022117, Ant. Pol. (H/V) V	4ft SMA Cable Cable Loss (dB) 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0	03) Wareh ERP (dBm) 25.90	Limit (dBm)	(dB) -12.5	Notes
eceiving ubstituti f <u>MHz</u> Low Ch	: Sunol T407, on: Dipole S/N SG reading (dBm)	I: 00022117, Ant. Pol. (H/V)	4ft SMA Cable Cable Loss (dB)	e (SN # 20894700 Antenna Gain (dBd)	03) Wareh ERP (dBm)	Limit (dBm)	(dB)	Notes
eceiving ubstituti f MHz Low Ch 824.20	: Sunol T407, on: Dipole S/N SG reading (dBm) 26.50	l: 00022117, Ant. Pol. (H/V) V	4ft SMA Cable Cable Loss (dB) 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0	03) Wareh ERP (dBm) 25.90	Limit (dBm)	(dB) -12.5	Notes
eceiving ubstitution f MHz Low Ch 824.20 824.20	: Sunol T407, on: Dipole S/N SG reading (dBm) 26.50	l: 00022117, Ant. Pol. (H/V) V	4ft SMA Cable Cable Loss (dB) 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0	03) Wareh ERP (dBm) 25.90	Limit (dBm)	(dB) -12.5	Notes
eceiving ubstituti f <u>MHz</u> Low Ch 824.20 824.20 Mid Ch	: Sunol T407, on: Dipole S/N SG reading (dBm) 26.50 6.70	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0	03) Wareh ERP (dBm) 25.90 6.10	Limit (dBm) 38.5 38.5	(dB) -12.5 -32.3	Notes
eceiving ubstituti f MHz Low Ch 824.20 824.20 Mid Ch 836.60 836.60	: Sunol T407, on: Dipole S/N SG reading (dBm) 26.50 6.70 27.20	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0 0.0	03) Wareh ERP (dBm) 25.90 6.10 26.60	Limit (dBm) 38.5 38.5 38.5	(dB) -12.5 -32.3 -11.8	Notes
eceiving ubstituti f <u>MHz</u> Low Ch 824.20 824.20 Mid Ch 836.60	: Sunol T407, on: Dipole S/N SG reading (dBm) 26.50 6.70 27.20	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0 0.0	03) Wareh ERP (dBm) 25.90 6.10 26.60	Limit (dBm) 38.5 38.5 38.5	(dB) -12.5 -32.3 -11.8	Notes

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Apple

13U15037

06/11/13

EUT only

Roy Zheng

EGRPS 850MHz CELL

### EGPRS850

#### High Frequency Substitution Measurement Compliance Certification Services Chamber D

Company: Project #: Date: Test Engineer: Configuration: Mode:

#### Test Equipment:

Receiving: Sunol T407, and Chamber D Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 208947003) Warehouse.

			Antenna Gain		Limit	Margin	Notes
(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
26.60	V	0.6	0.0	26.00	38.5	-12.4	
9.20	Н	0.6	0.0	8.60	38.5	-29.8	
25.80	V	0.6	0.0	25.20	38.5	-13.2	
8.10	Н	0.6	0.0	7.50	38.5	-30.9	
25.70	V	0.6	0.0	25.10	38.5	-13.3	
7.79	Н	0.6	0.0	7.19	38.5	-31.3	
		.i.					
	26.60 9.20 25.80 8.10 25.70	26.60 V 9.20 H 25.80 V 8.10 H 25.70 V	26.60 V 0.6   9.20 H 0.6   25.80 V 0.6   8.10 H 0.6   25.70 V 0.6	26.60 V 0.6 0.0   9.20 H 0.6 0.0   25.80 V 0.6 0.0   25.80 H 0.6 0.0   25.70 V 0.6 0.0	26.60 V 0.6 0.0 26.00   9.20 H 0.6 0.0 8.60   25.80 V 0.6 0.0 25.20   8.10 H 0.6 0.0 7.50   25.70 V 0.6 0.0 25.10	26.60 V 0.6 0.0 26.00 38.5   9.20 H 0.6 0.0 8.60 38.5   25.80 V 0.6 0.0 25.20 38.5   8.10 H 0.6 0.0 7.50 38.5   25.70 V 0.6 0.0 25.10 38.5	Z6.60 V 0.6 0.0 26.00 38.5 -12.4   9.20 H 0.6 0.0 8.60 38.5 -29.8   25.80 V 0.6 0.0 25.20 38.5 -13.2   8.10 H 0.6 0.0 7.50 38.5 -30.9   25.70 V 0.6 0.0 25.10 38.5 -13.3

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#### GPRS1900

Company:		Apple						
Project #:		13U15037						
)ate:		06/11/13						
lest Engi		Roy Zheng						
Configura		EUT Only						
/lode:		GPRS 1900MH	Z					
est Equi		D CI	College					
	g: T344, and Ch							
ubstituti								
	on. Horn 100 a	Substitution, 4	ift SMA Cable (2	244639001) Warehou	se			
f			Cable Loss			Limit	Delta	Notes
f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit (dBm)	Delta (dB)	Notes
f GHz						Limit (dBm)	Delta (dB)	Notes
f GHz Low Ch	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	(dBm)	(dB)	Notes
f GHz	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP			Notes
f GHz Low Ch 1.850 1.850	SG reading (dBm) 16.4	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi) 7.94	EIRP (dBm) 22.81	(dBm) 33.0	(dB) -10.2	Notes
f GHz Low Ch 1.850 1.850 Mid Ch	SG reading (dBm) 16.4 18.2	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50	Antenna Gain (dBi) 7.94 8.80	EIRP (dBm) 22.81 25.47	(dBm) 33.0 33.0	(dB) -10.2 -7.5	Notes
f GHz Low Ch 1.850 1.850 Mid Ch 1.880	SG reading (dBm) 16.4 18.2 16.4	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 22.81 25.47 22.87	(dBm) 33.0 33.0 33.0 33.0	(dB) -10.2 -7.5 -10.1	Notes
f GHz Low Ch 1.850 1.850 Mid Ch	SG reading (dBm) 16.4 18.2	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50	Antenna Gain (dBi) 7.94 8.80	EIRP (dBm) 22.81 25.47	(dBm) 33.0 33.0	(dB) -10.2 -7.5	Notes
f GHz Low Ch 1.850 1.850 Mid Ch 1.880 1.880	SG reading (dBm) 16.4 18.2 16.4	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 22.81 25.47 22.87	(dBm) 33.0 33.0 33.0 33.0	(dB) -10.2 -7.5 -10.1	Notes
f GHz Low Ch 1.850 1.850 Mid Ch 1.880 1.880 High Ch	SG reading (dBm) 16.4 18.2 16.4 17.7	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi)   7.94   8.80   7.95   8.68	EIRP (dBm) 22.81 25.47 22.87 24.84	(dBm) 33.0 33.0 33.0 33.0	(dB) -10.2 -7.5 -10.1 -8.2	Notes
f GHz Low Ch 1.850 1.850 Mid Ch 1.880 1.880	SG reading (dBm) 16.4 18.2 16.4	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 22.81 25.47 22.87	(dBm) 33.0 33.0 33.0 33.0	(dB) -10.2 -7.5 -10.1	Notes

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#### EGPRS1900

Company:		Apple						
Project #:		13U15037						
Date:		06/11/13						
Test Engi		Roy Zheng						
Configura		EUT Only						
Node:		EGPRS 1900MI	u. <b>-</b>					
			-					
lest Equi	pment:							
		amber D SMA	A Cables					
eceivinc								
				44639001) Warehou	se			
				244639001) Warehou	se			
				244639001) Warehou Antenna Gain	se EIRP	Limit	Delta	Notes
ubstituti	on: Horn T60 S	ubstitution, 4	Ift SMA Cable (2			Limit (dBm)	Delta (dB)	Notes
ubstituti f	on: Horn T60 S	ubstitution, 4 Ant. Pol.	Ift SMA Cable (2 Cable Loss	Antenna Gain	EIRP			Notes
Substituti f GHz Low Ch 1.850	on: Horn T60 S SG reading (dBm) 17.6	Ant. Pol. (H/V)	ft SMA Cable (2 Cable Loss (dB) 1.50	Antenna Gain (dBi) 7.94	EIRP (dBm) 24.04	(dBm) 33.0	(dB) -9.0	Notes
Substituti f GHz Low Ch	on: Horn T60 S SG reading (dBm)	ubstitution, 4 Ant. Pol. (H/V)	ft SMA Cable (2 Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	(dBm)	(dB)	Notes
Substituti f GHz Low Ch 1.850 1.850	on: Horn T60 S SG reading (dBm) 17.6	Ant. Pol. (H/V)	ft SMA Cable (2 Cable Loss (dB) 1.50	Antenna Gain (dBi) 7.94	EIRP (dBm) 24.04	(dBm) 33.0	(dB) -9.0	Notes
Substituti f GHz Low Ch 1.850 1.850 Mid Ch	on: Horn T60 S SG reading (dBm) 17.6 16.4	Ant. Pol. (H/V) V H	Ht SMA Cable (2 Cable Loss (dB) 1.50 1.50	Antenna Gain (dBi) 7.94 8.80	EIRP (dBm) 24.04 23.70	(dBm) 33.0 33.0	(dB) -9.0 -9.3	Notes
Substituti f GHz Low Ch 1.850 1.850 Mid Ch 1.880	on: Horn T60 S SG reading (dBm) 17.6 16.4 17.8	Ant. Pol. (H/V) V H	Ift SMA Cable (2 Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 24.04 23.70 24.25	(dBm) 33.0 33.0 33.0 33.0	(dB) -9.0 -9.3 -8.8	Notes
Substituti f GHz Low Ch 1.850 1.850 Mid Ch	on: Horn T60 S SG reading (dBm) 17.6 16.4	Ant. Pol. (H/V) V H	Ht SMA Cable (2 Cable Loss (dB) 1.50 1.50	Antenna Gain (dBi) 7.94 8.80	EIRP (dBm) 24.04 23.70	(dBm) 33.0 33.0	(dB) -9.0 -9.3	Notes
Substituti f GHz Low Ch 1.850 1.850 Mid Ch 1.880 1.880 High Ch	on: Horn T60 S SG reading (dBm) 17.6 16.4 17.8 16.5	Ant. Pol. (H/V) V H V H	Ift SMA Cable (2 Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi)   7.94   8.80   7.95   8.68	EIRP (dBm) 24.04 23.70 24.25 23.68	(dBm) 33.0 33.0 33.0 33.0 33.0	(dB) -9.0 -9.3 -8.8 -9.3	Notes
Substituti   f   GHz   Low Ch   1.850   1.850   Mid Ch   1.880   1.880	on: Horn T60 S SG reading (dBm) 17.6 16.4 17.8	Ant. Pol. (H/V) V H	Ift SMA Cable (2 Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 24.04 23.70 24.25	(dBm) 33.0 33.0 33.0 33.0	(dB) -9.0 -9.3 -8.8	Notes

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# <u>UMTS850</u>

## <u>REL 99</u>

				titution Measur on Services Cha				
ompany:		Apple						
oject #:		13U15037						
ite:		06/11/13						
st Engiı		Mona Hua						
onfigura	tion:	EUT only						
ode:		REL 99, CELL	-					
Ibstitutio	: Sunol T407, on: Dipole S/N	l: 00022117,	4ft SMA Cable	etup this one for e (SN # 20894700 Antenna Gain	)3) Wareh	iouse.	Margin	Notes
eceiving	: Sunol T407,	l: 00022117,	4ft SMA Cable	•	3) Wareh		Margin (dB)	Notes
f MHz ow Ch	: Sunol T407, on: Dipole S/N SG reading (dBm)	l: 00022117, Ant. Pol. (H/V)	4ft SMA Cable Cable Loss (dB)	e (SN # 20894700 Antenna Gain (dBd)	93) Wareh ERP (dBm)	Limit (dBm)	(dB)	Notes
f MHz ow Ch 826.40	: Sunol T407, on: Dipole S/N SG reading (dBm) 20.40	l: 00022117, Ant. Pol. (H/V) V	4ft SMA Cable Cable Loss (dB)	e (SN # 20894700 Antenna Gain (dBd) 0.0	03) Wareh ERP (dBm) 19.80	Limit (dBm)	(dB) -18.6	Notes
f MHz 26.40	: Sunol T407, on: Dipole S/N SG reading (dBm)	l: 00022117, Ant. Pol. (H/V)	4ft SMA Cable Cable Loss (dB)	e (SN # 20894700 Antenna Gain (dBd)	93) Wareh ERP (dBm)	Limit (dBm)	(dB)	Notes
f MHz ow Ch 826.40	: Sunol T407, on: Dipole S/N SG reading (dBm) 20.40	l: 00022117, Ant. Pol. (H/V) V	4ft SMA Cable Cable Loss (dB)	e (SN # 20894700 Antenna Gain (dBd) 0.0	03) Wareh ERP (dBm) 19.80	Limit (dBm)	(dB) -18.6	Notes
f MHz ow Ch 826.40 826.40 Mid Ch 836.00	: Sunol T407, on: Dipole S/N SG reading (dBm) 20.40 5.00 20.70	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0 0.0	03) Wareh ERP (dBm) 19.80 4.40 20.10	Limit (dBm) 38.5 38.5 38.5	(dB) -18.6 -34.0 -18.3	Notes
f MHz ow Ch 826.40 826.40 Mid Ch	: Sunol T407, on: Dipole S/N SG reading (dBm) 20.40 5.00	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0	03) Wareh ERP (dBm) 19.80 4.40	Limit (dBm) 38.5 38.5	(dB) -18.6 -34.0	Notes
f MHz ow Ch 826.40 826.40 Mid Ch 836.00	: Sunol T407, on: Dipole S/N SG reading (dBm) 20.40 5.00 20.70	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0 0.0	03) Wareh ERP (dBm) 19.80 4.40 20.10	Limit (dBm) 38.5 38.5 38.5	(dB) -18.6 -34.0 -18.3	Notes
ceiving bstitutio f MHz ow Ch 26.40 26.40 26.40 10 Ch 36.00 36.00	: Sunol T407, on: Dipole S/N SG reading (dBm) 20.40 5.00 20.70	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0 0.0	03) Wareh ERP (dBm) 19.80 4.40 20.10	Limit (dBm) 38.5 38.5 38.5	(dB) -18.6 -34.0 -18.3	Notes

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## <u>HSDPA</u>

		High Free	uency Subs	stitution Measur	ement			
		Compliand	e Certificatio	on Services Cha	amber D			
ompany:		Apple						
roject #:		13U15037						
ate:		06/11/13						
est Engir	neer:	Mona Hua						
onfigurat	tion:	EUT only						
ode:		HSDPA, CELI	L					
eceiving	on: Dipole S/N	I: 00022117,		etup this one for e (SN # 20894700	-			
eceiving ubstitutio	: Sunol T407, on: Dipole S/N SG reading	: 00022117, Ant. Pol.	4ft SMA Cabl	e (SN # 20894700 Antenna Gain	03) Wareh	iouse.	Margin	Notes
eceiving ubstitutio	: Sunol T407, on: Dipole S/N	I: 00022117,	4ft SMA Cabl	e (SN # 20894700	)3) Wareh	iouse.	Margin (dB)	Notes
eceiving ubstitutio f MHz Low Ch	: Sunol T407, on: Dipole S/N SG reading (dBm)	: 00022117, Ant. Pol. (H/V)	4ft SMA Cabl Cable Loss (dB)	e (SN # 20894700 Antenna Gain (dBd)	03) Wareh ERP (dBm)	louse. Limit (dBm)	(dB)	Notes
eceiving ubstitutio f MHz Low Ch 826.40	: Sunol T407, on: Dipole S/N SG reading (dBm) 19.70	l: 00022117, Ant. Pol. (H/V) V	4ft SMA Cabl Cable Loss (dB) 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0	03) Wareh ERP (dBm) 19.10	Limit (dBm)	(dB) -19.3	Notes
eceiving ubstitutio f MHz Low Ch	: Sunol T407, on: Dipole S/N SG reading (dBm)	: 00022117, Ant. Pol. (H/V)	4ft SMA Cabl Cable Loss (dB)	e (SN # 20894700 Antenna Gain (dBd)	03) Wareh ERP (dBm)	louse. Limit (dBm)	(dB)	Notes
eceiving ubstitutio f MHz Low Ch 826.40 826.40	: Sunol T407, on: Dipole S/N SG reading (dBm) 19.70	l: 00022117, Ant. Pol. (H/V) V	4ft SMA Cabl Cable Loss (dB) 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0	03) Wareh ERP (dBm) 19.10	Limit (dBm)	(dB) -19.3	Notes
eceiving ubstitutio f MHz Low Ch 826.40	: Sunol T407, on: Dipole S/N SG reading (dBm) 19.70	l: 00022117, Ant. Pol. (H/V) V	4ft SMA Cabl Cable Loss (dB) 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0	03) Wareh ERP (dBm) 19.10	Limit (dBm)	(dB) -19.3	Notes
eceiving ubstitutio f MHz Low Ch 826.40 826.40 Mid Ch	: Sunol T407, on: Dipole S/N SG reading (dBm) 19.70 4.70	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cabl Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0	03) Wareh ERP (dBm) 19.10 4.10	Limit (dBm) 38.5 38.5	(dB) -19.3 -34.3	Notes
eceiving ubstitutio f MHz Low Ch 826.40 826.40 Mid Ch 836.00 836.00	: Sunol T407, on: Dipole S/N SG reading (dBm) 19.70 4.70 20.20	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0 0.0	03) Wareh ERP (dBm) 19.10 4.10 19.60	Limit (dBm) 38.5 38.5 38.5	(dB) -19.3 -34.3 -18.8	Notes
eceiving ubstitution f MHz Low Ch 826.40 826.40 Mid Ch 836.00	: Sunol T407, on: Dipole S/N SG reading (dBm) 19.70 4.70 20.20	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0 0.0	03) Wareh ERP (dBm) 19.10 4.10 19.60	Limit (dBm) 38.5 38.5 38.5	(dB) -19.3 -34.3 -18.8	Notes
eceiving ubstitutio f MHz Low Ch 826.40 826.40 Mid Ch 836.00 836.00	: Sunol T407, on: Dipole S/N SG reading (dBm) 19.70 4.70 20.20	I: 00022117, Ant. Pol. (H/V) V H	4ft SMA Cable Cable Loss (dB) 0.6 0.6	e (SN # 20894700 Antenna Gain (dBd) 0.0 0.0 0.0	03) Wareh ERP (dBm) 19.10 4.10 19.60	Limit (dBm) 38.5 38.5 38.5	(dB) -19.3 -34.3 -18.8	Notes

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# <u>UMTS1900</u>

#### <u>REL 99</u>

ompany:		Apple						
roject #:		13U15037						
Date:		06/11/13						
lest Engi	neer:	Mona Hua						
Configura	tion:	EUT Only						
/lode:		Rel 99, PCS						
	j: T344, and Ch on: Horn T60 S							
	·			Antenna Gain		Limit	Delta	Notes
f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit (dBm)	Delta (dB)	Notes
f GHz	·					Limit (dBm)	Delta (dB)	Notes
f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP			Notes
f GHz Low Ch	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	(dBm)	(dB)	Notes
f GHz Low Ch 1.852 1.852	SG reading (dBm) 13.0	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi) 7.94	EIRP (dBm) 19.41	(dBm) 33.0	(dB) -13.6	Notes
f GHz Low Ch 1.852	SG reading (dBm) 13.0	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi) 7.94	EIRP (dBm) 19.41	(dBm) 33.0	(dB) -13.6	Notes
f GHz Low Ch 1.852 1.852 Mid Ch	SG reading (dBm) 13.0 14.7	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50	Antenna Gain (dBi) 7.94 8.80	EIRP (dBm) 19.41 21.99	(dBm) 33.0 33.0	(dB) -13.6 -11.0	Notes
f GHz Low Ch 1.852 1.852 Mid Ch 1.880 1.880	SG reading (dBm) 13.0 14.7 13.1	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 19.41 21.99 19.51	(dBm) 33.0 33.0 33.0 33.0	(dB) -13.6 -11.0 -13.5	Notes
f GHz Low Ch 1.852 1.852 Mid Ch 1.880	SG reading (dBm) 13.0 14.7 13.1	Ant. Pol. (H/V) V H	Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 19.41 21.99 19.51	(dBm) 33.0 33.0 33.0 33.0	(dB) -13.6 -11.0 -13.5	Notes

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#### HSDPA 1900MHz

company:		Apple						
roject #:		13U15037						
)ate:		06/11/13						
rest Engi		Mona Hua						
Configura		EUT Only						
/ode:		HSDPA, PCS						
lest Equi	pment:							
	: T344, and Ch	amber D SM/	A Cables					
ubstituti				44639001) Warehou	se			
				244639001) Warehou				
ubstituti f				244639001) Warehou Antenna Gain	EIRP	Limit	Delta	Notes
	on: Horn T60 S	Substitution, 4	Ift SMA Cable (2			Limit (dBm)	Delta (dB)	Notes
f	on: Horn T60 S	Substitution, 4	Ift SMA Cable (2 Cable Loss	Antenna Gain	EIRP			Notes
f GHz Low Ch 1.852	on: Horn T60 S SG reading (dBm) 12.9	Ant. Pol. (H/V)	fft SMA Cable (2 Cable Loss (dB) 1.50	Antenna Gain (dBi) 7.94	EIRP (dBm) 19.35	(dBm) 33.0	(dB) -13.7	Notes
f GHz Low Ch	on: Horn T60 S SG reading (dBm)	Substitution, 4 Ant. Pol. (H/V)	Ift SMA Cable (2 Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	(dBm)	(dB)	Notes
f GHz Low Ch 1.852 1.852	on: Horn T60 S SG reading (dBm) 12.9	Ant. Pol. (H/V)	fft SMA Cable (2 Cable Loss (dB) 1.50	Antenna Gain (dBi) 7.94	EIRP (dBm) 19.35	(dBm) 33.0	(dB) -13.7	Notes
f GHz Low Ch 1.852 1.852 Mid Ch	on: Horn T60 S SG reading (dBm) 12.9 13.5	Ant. Pol. (H/V) V H	Ift SMA Cable (2 Cable Loss (dB) 1.50 1.50	Antenna Gain (dBi) 7.94 8.80	EIRP (dBm) 19.35 20.79	(dBm) 33.0 33.0	(dB) -13.7 -12.2	Notes
f GHz Low Ch 1.852 1.852 Mid Ch 1.880	on: Horn T60 S SG reading (dBm) 12.9 13.5 11.6	Substitution, 4 Ant. Pol. (H/V) V H	Iff SMA Cable (2 Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 19.35 20.79 18.05	(dBm) 33.0 33.0 33.0 33.0	(dB) -13.7 -12.2 -15.0	Notes
f GHz Low Ch 1.852 1.852 Mid Ch	on: Horn T60 S SG reading (dBm) 12.9 13.5	Ant. Pol. (H/V) V H	Ift SMA Cable (2 Cable Loss (dB) 1.50 1.50	Antenna Gain (dBi) 7.94 8.80	EIRP (dBm) 19.35 20.79	(dBm) 33.0 33.0	(dB) -13.7 -12.2	Notes
f GHz Low Ch 1.852 1.852 Mid Ch 1.880	on: Horn T60 S SG reading (dBm) 12.9 13.5 11.6	Substitution, 4 Ant. Pol. (H/V) V H	Iff SMA Cable (2 Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 19.35 20.79 18.05	(dBm) 33.0 33.0 33.0 33.0	(dB) -13.7 -12.2 -15.0	Notes
f GHz Low Ch 1.852 1.852 Mid Ch 1.880 1.880	on: Horn T60 S SG reading (dBm) 12.9 13.5 11.6	Substitution, 4 Ant. Pol. (H/V) V H	Iff SMA Cable (2 Cable Loss (dB) 1.50 1.50 1.50	Antenna Gain (dBi) 7.94 8.80 7.95	EIRP (dBm) 19.35 20.79 18.05	(dBm) 33.0 33.0 33.0 33.0	(dB) -13.7 -12.2 -15.0	Notes

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# 9.2. PEAK-TO-AVERAGE RATIO

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

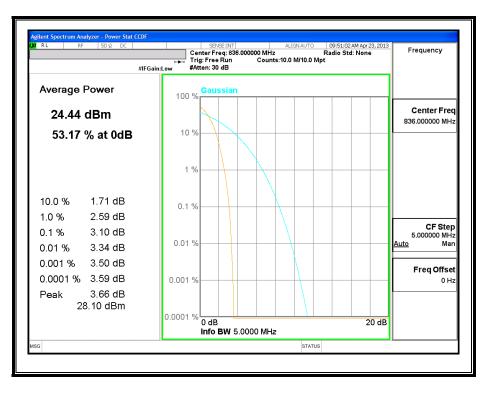
### Peak-To-Average Ratio:

#### Band 5

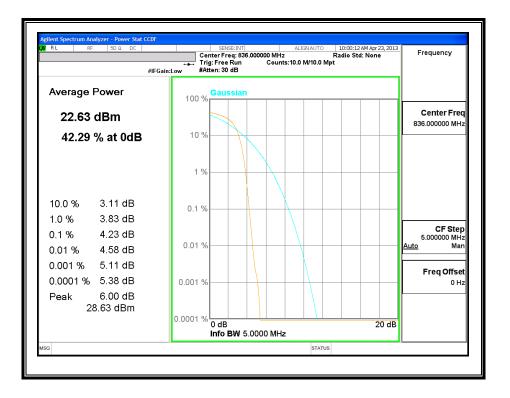
	Channel Band-			Power (dBm)	Peak-to- Average Ratio
Mode	width (KHZ)	Modulation	*Peak	Average	(PAR)
UMTS	5	REL99	28.1	24.44	3.66
	Channel Band-		Couducted	Power (dBm)	Peak-to- Average Ratio
Mode	width (MHZ)	Ch. No.	*Peak	Average	(PAR)
UMTS	5	HSDPA	28.63	22.63	6.00
*Peak Readin	g = Average Readir	ng + Peak-to-Ave	erage Ratio		

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#### UMTS850, REL 99



#### UMTS850, HSDPA



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# 9.3. FIELD STRENGTH OF SPURIOUS RADIATION

# RULE PART(S)

FCC: §2.1053, §22.917, §24.238

# <u>LIMIT</u>

§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.

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# 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**

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## LAT / PORT A

#### <u>GPRS850</u>

			Cor Above 1GH	npliance Ce z High Freq				ement	
Company: Project #: Date: Test Engi Configura Mode:	neer: tion:	Apple 13U15037 06/05/13 Roy Zheng EUT only GPRS CELL							
	Chambe	r	Pre-an	nplifer		Filter			Limit
3m	n Chamber D	• •	T145 84498	3 🚽	Fil	ter 1	-	Part 22	2 🗸
f	SG reading	Ant. Pol.	Distance	Preamp	Filter	ERP	Limit	Delta	Notes
GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
	(dBm) 24.2MHz)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
Low Ch, (82 1.648	24.2MHz) _11.9	V	3.0	32.7	1.0	_43.6	-13.0	-30.6	
Low Ch, (82 1.648 2.473	24.2MHz) -11.9 -23.9	V V	3.0 3.0	32.7 31.4	1.0 1.0	-43.6 -54.3	-13.0 -13.0	-30.6 -41.3	
Low Ch, (82 1.648 2.473 1.648	24.2MHz) -11.9 -23.9 -22.4	V V H	3.0 3.0 3.0	32.7 31.4 32.7	1.0 1.0 1.0	-43.6 -54.3 -54.1	-13.0 -13.0 -13.0	-30.6 -41.3 -41.1	
Low Ch, (82 1.648 2.473 1.648	24.2MHz) -11.9 -23.9	V V	3.0 3.0	32.7 31.4	1.0 1.0	-43.6 -54.3	-13.0 -13.0	-30.6 -41.3	
Low Ch, (8) 1.648 2.473 1.648 2.473	24.2MHz) -11.9 -23.9 -22.4 -27.8	V V H	3.0 3.0 3.0	32.7 31.4 32.7	1.0 1.0 1.0	-43.6 -54.3 -54.1	-13.0 -13.0 -13.0	-30.6 -41.3 -41.1	
Low Ch, (82 1.648	24.2MHz) -11.9 -23.9 -22.4 -27.8	V V H	3.0 3.0 3.0	32.7 31.4 32.7	1.0 1.0 1.0	-43.6 -54.3 -54.1	-13.0 -13.0 -13.0	-30.6 -41.3 -41.1	
Low Ch, (8) 1.648 2.473 1.648 2.473 Mid Ch, (8)	24.2MHz) -11.9 -23.9 -22.4 -27.8 36.6MHz)	V V H H	3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4	1.0 1.0 1.0 1.0	-43.6 -54.3 -54.1 -58.2	-13.0 -13.0 -13.0 -13.0	-30.6 -41.3 -41.1 -45.2	
Low Ch, (8) 1.648 2.473 1.648 2.473 Mid Ch, (8) 1.673 2.510 1.673	24.2MHz) -11.9 -23.9 -22.4 -27.8 36.6MHz) -12.9 -27.2 -19.7	V V H H V V V	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4 32.6 31.5 32.6	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	43.6 -54.3 -54.1 -58.2 -44.5 -57.7 -51.3	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	30.6 41.3 41.1 45.2 31.5 44.7 38.3	
Low Ch, (8) 1.648 2.473 1.648 2.473 Mid Ch, (8) 1.673	24.2MHz) -11.9 -23.9 -22.4 -27.8 36.6MHz) -12.9 -27.2	V V H H V V	3.0 3.0 3.0 3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4 32.6 31.5	1.0 1.0 1.0 1.0 1.0	43.6 -54.3 -54.1 -58.2 -44.5 -57.7	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0	30.6 41.3 41.1 45.2 31.5 44.7	
.ow Ch, (8: 1.648 2.473 1.648 2.473 Mid Ch, (8: 1.673 2.510 1.673 2.510	24.2MHz) -11.9 -23.9 -22.4 -27.8 36.6MHz) -12.9 -12.9 -27.2 -19.7 -26.3	V V H H V V V	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4 32.6 31.5 32.6	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	43.6 -54.3 -54.1 -58.2 -44.5 -57.7 -51.3	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	30.6 41.3 41.1 45.2 31.5 44.7 38.3	
ow Ch, (8) .648 .473 .648 .473 .648 .473 .673 .510 .510 .510 ligh Ch, (8)	24.2MHz) -11.9 -23.9 -22.4 -27.8 36.6MHz) -12.9 -12.9 -27.2 -19.7 -26.3 48.8MHz)	V V H H V V H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	43.6 -54.3 -54.1 -58.2 -44.5 -57.7 -51.3 -56.8	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	30.6 41.3 41.1 45.2 31.5 44.7 38.3 43.8	
ow Ch, (8: .648 .473 .648 .473 .648 .473 .610 .510 .673 .510 .510 .673 .510	24.2MHz) -11.9 -23.9 -22.4 -27.8 36.6MHz) -12.9 -7.2 -19.7 -26.3 48.8MHz) -7.9	V V H H H V V V H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5 32.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	43.6 -54.3 -54.1 -58.2 -44.5 -57.7 -51.3 -56.8 -39.4	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	30.6 41.3 41.1 45.2 31.5 44.7 38.3 43.8 -26.4	
Low Ch, (8) 1.648 2.473 1.648 2.473 Mid Ch, (8) 1.673 2.510 1.673	24.2MHz) -11.9 -23.9 -22.4 -27.8 36.6MHz) -12.9 -12.9 -27.2 -19.7 -26.3 48.8MHz)	V V H H V V H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	43.6 -54.3 -54.1 -58.2 -44.5 -57.7 -51.3 -56.8	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	30.6 41.3 41.1 45.2 31.5 44.7 38.3 43.8	

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## EGPRS850

			Cor Above 1GH	mpliance Co z High Frec				ement	
Company: Project #: Date: Test Engineer: Configuration: Mode:	06/ Roy EU	ple J15037 05/13 y Zheng T only PRS CELL							
Cha	amber		Pre-an	nplifer		Filter		Li	mit
3m Cham	ber D	-	T145 8449	В 🚽	Fil	ter 1	•	Part 22	-
f SG rea	-	nt. Pol.	Distance	Preamp	Filter	ERP (dBm)		Delta	Notes
GHz (dB		(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
ow Ch, (824.2MHz		V	3.0	32.7	1.0	-48.9	-13.0	-35.9	
2.473 -22		v	3.0	31.4	1.0	-52.8	-13.0	-39.8	
1.648 -20	.5	Н	3.0	32.7	1.0	-52.2	-13.0	-39.2	
	.3	Η	3.0	31.4	1.0	-55.7	-13.0	-42.7	
2.473 -25									
							1		
Mid Ch, (836.6MHz		V	3.0	32.6	1.0	-47.0	-13.0	-34.0	
2.473 -25 Mid Ch, (836.6MHz 1.673 -15 2.510 -25	.4	V V	3.0 3.0	32.6 31.5	1.0	_47.0 _55.5	-13.0 -13.0	-34.0 -42.5	
Mid Ch, (836.6MHz 1.673 -15	.4 .0								
Mid_Ch, (836.6MHz 1.673 -15 2.510 -25	.4 .0 .5	V	3.0	31.5	1.0	-55.5	-13.0	-42.5	
Mid Ch, (836.6MHz 1.673 -15 2.510 -25 1.673 -19 2.510 -27	.4 .0 .5 .0	V H	3.0 3.0	31.5 32.6	1.0 1.0	-55.5 -51.1	-13.0 -13.0	-42.5 -38.1	
Mid Ch, (836.6MHz 1.673 -15 2.510 -25 1.673 -19 2.510 -27 High Ch, (848.8MHz	.4 .0 .5 .0	V H H	3.0 3.0 3.0	31.5 32.6 31.5	1.0 1.0 1.0	-55.5 -51.1 -57.5	-13.0 -13.0 -13.0	42.5 -38.1 -44.5	
Mid Ch, (836.6MHz 1.673 -15 2.510 -25 1.673 -19 2.510 -27 11gh Ch, (848.8MHz 1.698 -19	.4 .0 .5 .0 ) .7	V H H	3.0 3.0 3.0 3.0	31.5 32.6 31.5 32.5	1.0 1.0 1.0	-55.5 -51.1 -57.5 -51.2	-13.0 -13.0 -13.0 -13.0	-42.5 -38.1 -44.5 -38.2	
Mid Ch, (836.6MHz 1.673 -15 2.510 -25 1.673 -19 2.510 -27 High Ch, (848.8MHz	.4 .0 .5 .0 ) .7 .0	V H H	3.0 3.0 3.0	31.5 32.6 31.5	1.0 1.0 1.0	-55.5 -51.1 -57.5	-13.0 -13.0 -13.0	42.5 -38.1 -44.5	

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# <u>UMTS850</u>

# <u>REL 99</u>

			Cor Above 1GH	mpliance Ce z High Freq				ement	
Company Project # Date: Test Eng Configura Mode:	ineer: ation:	Apple 13U15037 06/05/13 Mona Hua EUT only REL 99 CELL							
	Chambe	r	Pre-an	nplifer		Filter		Li	mit
3r	n Chamber D	-	T145 8449I	В 🚽	Fil	ter 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
GHz	(dBm)	(H/V)							Notes
GHz Low Ch, (8 1.653	(dBm) 26.4MHz) -20.4	(H/V) V	(m) 3.0	(dB) 32.7	(dB)	(dBm)	(dBm) -13.0	(dB) -39.1	Notes
GHz Low Ch, (8 1.653 2.479	(dBm) 26.4MHz) -20.4 -25.9	(H/V) V V	(m) 3.0 3.0	(dB) 32.7 31.4	(dB) 1.0 1.0	(dBm) -52.1 -56.3	(dBm) -13.0 -13.0	(dB) -39.1 -43.3	Notes
GHz Low Ch, (8 1.653 2.479 1.653	(dBm) 26.4MHz) -20.4 -25.9 -22.7	(H/V) V V H	(m) 3.0 3.0 3.0	(dB) 32.7 31.4 32.7	(dB) 1.0 1.0 1.0	(dBm) -52.1 -56.3 -54.3	(dBm) -13.0 -13.0 -13.0	(dB) -39.1 -43.3 -41.3	Notes
GHz Low Ch, (8 1.653 2.479 1.653	(dBm) 26.4MHz) -20.4 -25.9	(H/V) V V	(m) 3.0 3.0	(dB) 32.7 31.4	(dB) 1.0 1.0	(dBm) -52.1 -56.3	(dBm) -13.0 -13.0	(dB) -39.1 -43.3	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479	(dBm) 26.4MHz) -20.4 -25.9 -22.7 -29.1	(H/V) V V H	(m) 3.0 3.0 3.0	(dB) 32.7 31.4 32.7	(dB) 1.0 1.0 1.0	(dBm) -52.1 -56.3 -54.3	(dBm) -13.0 -13.0 -13.0	(dB) -39.1 -43.3 -41.3	Notes
GHz Low Ch, (8 1.653 2.479 1.653	(dBm) 26.4MHz) -20.4 -25.9 -22.7 -29.1	(H/V) V V H	(m) 3.0 3.0 3.0	(dB) 32.7 31.4 32.7	(dB) 1.0 1.0 1.0	(dBm) -52.1 -56.3 -54.3	(dBm) -13.0 -13.0 -13.0	(dB) -39.1 -43.3 -41.3	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8	(dBm) 26.4MHz) -20.4 -25.9 -22.7 -29.1 36.6MHz)	(H/V) V H H	(m) 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4	(dB) 1.0 1.0 1.0 1.0	(dBm) -52.1 -56.3 -54.3 -59.5	(dBm) -13.0 -13.0 -13.0 -13.0	(dB) 39.1 43.3 41.3 46.5	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673	(dBm) 26.4MHz) -20.4 -25.9 -22.7 -29.1 36.6MHz) -20.5 -26.8 -22.8	(H/V) V H H V V V H	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6	(dB) 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	(dBm) -52.1 -56.3 -54.3 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.4 -52.1 -52.4 -59.5	(dBm) -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	(dB) -39.1 43.3 41.3 46.5 	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510	(dBm) 26.4MHz) -20.4 -25.9 -22.7 -29.1 36.6MHz) -20.5 -26.8	(H/V) V H H V V	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4 32.6 31.5	(dB) 1.0 1.0 1.0 1.0 1.0 1.0	(dBm) -52.1 -56.3 -54.3 -59.5 -52.1 -57.3	(dBm) -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	(dB) -39.1 43.3 41.3 46.5 	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673 2.510	(dBm) 26.4MHz) -20.4 -25.9 -22.7 -29.1 36.6MHz) -20.5 -26.8 -22.8 -22.8 -29.0	(H/V) V H H V V V H	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6	(dB) 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	(dBm) -52.1 -56.3 -54.3 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.5 -59.4 -52.1 -52.4 -59.5	(dBm) -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	(dB) -39.1 43.3 41.3 46.5 	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673 2.510 High Ch, (8	(dBm) 26.4MHz) -20.4 -25.9 -22.7 -29.1 36.6MHz) -20.5 -26.8 -22.8 -29.0 46.6MHz)	(H/V) V H H V V V H H	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5	(dB) 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	(dBm) -52.1 -56.3 -54.3 -59.5 -52.1 -57.3 -57.3 -54.4 -59.5	(dBm) -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	(dB) 39.1 43.3 41.3 46.5 39.1 44.3 41.4 46.5	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673 2.510 High Ch, (8 1.688	(dBm) 26.4MHz) -20.4 -25.9 -22.7 -29.1 36.6MHz) -20.5 -26.8 -22.8 -29.0 346.6MHz) -18.3	(H/V) V H H V V V H	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5 32.6 31.5	(dB) 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	(dBm) -52.1 -56.3 -54.3 -59.5 -52.1 -57.3 -54.4 -59.5 -59.5 -49.8	(dBm) -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	(dB) -39.1 43.3 41.3 46.5 	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673 2.510 High Ch, (8	(dBm) 26.4MHz) -20.4 -25.9 -22.7 -29.1 36.6MHz) -20.5 -26.8 -22.8 -29.0 46.6MHz)	(H/V) V H H V V V H H V	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5	(dB) 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	(dBm) -52.1 -56.3 -54.3 -59.5 -52.1 -57.3 -57.3 -54.4 -59.5	(dBm) -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	(dB) 39.1 43.3 41.3 46.5 39.1 44.3 41.4 46.5 36.8	Notes

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#### <u>HSDPA</u>

			Cor Above 1GH	mpliance Co z High Free				ement	
Company Project #: Date: Test Engi Configura Mode:	neer: ition:	Apple 13U15037 06/05/13 Mona Hua EUT only HSDPA CELL							
	Chambe	r	Pre-an	nplifer		Filter		Li	mit
3n	n Chamber D	-	T145 84498	В 🚽	Filt	ter 1	-	Part 22	•
f	SG reading	Ant. Pol.	Distance	Preamp	Filter	ERP	Limit	Delta	Notes
GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
	· · · ·		(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
Low Ch, (8 1.653	26.4MHz) _21.9	V	3.0	32.7	1.0	-53.6	-13.0	-40.6	
Low Ch, (8 1.653 2.479	26.4MHz) -21.9 -26.4	V V	3.0 3.0	32.7 31.4	1.0 1.0	-53.6 -56.8	-13.0 -13.0	-40.6 -43.8	
Low Ch, (8 1.653 2.479 1.653	26.4MHz) -21.9 -26.4 -23.2	V V H	3.0 3.0 3.0	32.7 31.4 32.7	1.0 1.0 1.0	-53.6 -56.8 -54.8	-13.0 -13.0 -13.0	40.6 43.8 41.8	
Low Ch, (8 1.653 2.479 1.653	26.4MHz) -21.9 -26.4	V V	3.0 3.0	32.7 31.4	1.0 1.0	-53.6 -56.8	-13.0 -13.0	-40.6 -43.8	
Low Ch, (8 1.653 2.479 1.653 2.479	26.4MHz) -21.9 -26.4 -23.2 -28.4	V V H	3.0 3.0 3.0	32.7 31.4 32.7	1.0 1.0 1.0	-53.6 -56.8 -54.8	-13.0 -13.0 -13.0	40.6 43.8 41.8	
Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8	26.4MHz) -21.9 -26.4 -23.2 -28.4 36.6MHz)	V V H	3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4	1.0 1.0 1.0	-53.6 -56.8 -54.8 -58.8	-13.0 -13.0 -13.0 -13.0	40.6 43.8 41.8 45.8	
Low Ch, (8 1.653 2.479 1.653	26.4MHz) -21.9 -26.4 -23.2 -28.4	V V H H	3.0 3.0 3.0	32.7 31.4 32.7	1.0 1.0 1.0 1.0	-53.6 -56.8 -54.8 -58.8 -58.8	-13.0 -13.0 -13.0 -13.0 -13.0	40.6 43.8 41.8	
Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673	26.4MHz) -21.9 -26.4 -23.2 -28.4 36.6MHz) -21.3	V V H H	3.0 3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4 32.6	1.0 1.0 1.0 1.0	-53.6 -56.8 -54.8 -58.8	-13.0 -13.0 -13.0 -13.0	40.6 43.8 41.8 45.8 -39.9	
Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673	26.4MHz) -21.9 -26.4 -23.2 -28.4 36.6MHz) -21.3 -26.5	V V H H V V	3.0 3.0 3.0 3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4 32.6 31.5	1.0 1.0 1.0 1.0 1.0	-53.6 -56.8 -54.8 -58.8 -58.8 -58.8 -58.9 -57.0	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0	40.6 43.8 41.8 45.8 -39.9 44.0	
Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673 2.510	26.4MHz) -21.9 -26.4 -23.2 -28.4 36.6MHz) -21.3 -26.5 -22.5 -28.5	V V H H V V V	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4 32.6 31.5 32.6	1.0 1.0 1.0 1.0 1.0 1.0 1.0	-53.6 -56.8 -54.8 -58.8 -58.8 -52.9 -57.0 -57.0 -54.1	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	40.6 43.8 41.8 45.8 39.9 44.0 41.1	
Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673 2.510 High Ch, (8	26.4MHz) -21.9 -26.4 -23.2 -28.4 36.6MHz) -21.3 -26.5 -22.5 -28.5 46.6MHz)	V V H H H V V H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	-53.6 -56.8 -54.8 -58.8 -52.9 -57.0 -54.1 -59.0	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	40.6 43.8 41.8 45.8 39.9 44.0 41.1 46.0	
Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673 2.510 High Ch, (8 1.688	26.4MHz) -21.9 -26.4 -23.2 -28.4 36.6MHz) -21.3 -26.5 -22.5 -28.5 -28.5 46.6MHz) -19.5	V V H H H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5 32.6	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	-53.6 -56.8 -54.8 -58.8 -52.9 -57.0 -57.0 -54.1 -59.0 -51.0	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	40.6 43.8 41.8 45.8 39.9 44.0 41.1 46.0 38.0	
Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673 2.510 High Ch, (8 1.688 2.532	26.4MHz) -21.9 -26.4 -23.2 -28.4 36.6MHz) -21.3 -26.5 -26.5 -28.5 -28.5 -46.6MHz) -19.5 -26.4	V V H H H H V V V V V V	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	-53.6 -56.8 -54.8 -58.8 -58.8 -57.0 -57.0 -54.1 -59.0 -51.0 -56.9	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	40.6 43.8 41.8 45.8 39.9 44.0 41.1 46.0 38.0 43.9	
Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673 2.510 High Ch, (8 1.688	26.4MHz) -21.9 -26.4 -23.2 -28.4 36.6MHz) -21.3 -26.5 -22.5 -28.5 -28.5 46.6MHz) -19.5	V V H H H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5 32.6	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	-53.6 -56.8 -54.8 -58.8 -52.9 -57.0 -57.0 -54.1 -59.0 -51.0	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	40.6 43.8 41.8 45.8 39.9 44.0 41.1 46.0 38.0	

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#### GPRS1900

				mpliance Ce z High Freq				ement	
Company	:	Apple							
Project #	:	13U15037							
Date:		06/05/13							
Test Eng	ineer:	Mona Hua							
Configura	ation:	EUT only							
Mode:		GPRS PCS							
	Chambe	r	Pre-an	nplifer		Filter		Lir	nit
3r	n Chamber D	-	T145 8449	В 🗸	Fil	ter 1	•	Part 24	•
			·						
f	SG reading		Distance	Preamp	Filter	ERP	Limit	Delta	Notes
GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
	850.2 MHz)								
3.700	-25.3	V	3.0	30.2	1.0	-54.5	-13.0	-41.5	
7.401 3.700	-27.4 -27.5	V H	3.0 3.0	26.5 30.2	1.0 1.0	-52.9 -56.7	-13.0 -13.0	-39.9 -43.7	
7.401	-27.5	H	3.0	26.5	1.0	-50.7	-13.0	-43.7	
1.401	-21.1		5.0	20.3	1.0	-32.0	-13.0	-55.0	
Mid Ch, (1	880 MHz)								
3.760	-26.6	V	3.0	30.1	1.0	-55.8	-13.0	-42.8	
7.520	-28.6	V	3.0	26.3	1.0	-53.9	-13.0	-40.9	
3.760	-27.2	Н	3.0	30.1	1.0	-56.3	-13.0	-43.3	
	-27.5	Н	3.0	26.3	1.0	-52.8	-13.0	-39.8	
7.520									
			3.0	30.1	1.0	-55.2	-13.0	-42.2	
High Ch, (		v		30.1	1.0		-13.0 -13.0	-42.2	
High Ch, (' 3.819	-26.1	V			10	52.2			
High Ch, (* 3.819 7.639	-26.1 -28.2	V	3.0	26.2	1.0	-53.3			
ligh Ch, ( 8.819	-26.1	-			1.0 1.0 1.0	-53.3 -56.3 -51.7	-13.0 -13.0 -13.0	_43.3 _38.7	

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#### EGPRS1900

			Con Above 1GH	npliance Co z High Free				ement	
Company Project # Date: Test Eng Configur:	ineer: ation:	Apple 13U15037 06/05/13 Mona Hua EUT only							
Mode:	Chambe	EGPRS PCS	Pre-am	plifer		Filter		L	imit
3r	n Chamber D	•	T145 8449E	•	Fil	ter 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
	850.2 MHz)	(1.1.4)	()	(42)	(42)	(4811)	(ubiii)	(	
3.700	-26.9	V	3.0	30.2	1.0	-56.1	-13.0	-43.1	
7.401	-27.3	V	3.0	26.5	1.0	-52.8	-13.0	-39.8	
3.700	-27.5	Η	3.0	30.2	1.0	-56.7	-13.0	-43.7	
7.401	-26.8	Н	3.0	26.5	1.0	-52.3	-13.0	-39.3	
Mid Ch, (1	880 MHz)								
3.760	-27.1	V	3.0	30.1	1.0	-56.3	-13.0	43.3	
7.520	-28.3	v	3.0	26.3	1.0	-53.6	-13.0	-40.6	
3.760	-26.8	Ĥ	3.0	30.1	1.0	-55.9	-13.0	-42.9	
7.520	-27.0	H	3.0	26.3	1.0	-52.3	-13.0	-39.3	
High Ch, (* 3.819	1909.8 MHz) -26.6	V	3.0	30.1	1.0	-55.7	-13.0	-42.7	
3.819 7.639	-26.6	V	3.0 3.0	30.1 26.2	1.0	-52.2	-13.0 -13.0	-42.7 -39.2	
1.033		_	······································	,					
3.819									
1.639	-27.7 -27.4	V H H	3.0 3.0 3.0	26.2 30.1 26.2	1.0 1.0 1.0	-52.2 -56.8 -52.6	-13.0 -13.0 -13.0	-39.2 -43.8 -39.6	

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## REPORT NO: 13U15037-1 EUT: QUAD-BAND RADIO WITH WLAN AND BT RADIO

# <u>UMTS1900</u>

#### <u>REL 99</u>

				mpliance Ce z High Freq				ement	
Company	:	Apple							
Project #	:	13U15037							
Date:		06/05/13							
Test Eng	ineer:	Mona Hua							
Configura	ation:	EUT only							
Mode:		REL 99 PCS							
	Chambe	r	Pre-an	nplifer		Filter		Lin	nit
31	n Chamber D		T145 8449	•	Fil	ter 1	•	Part 24	
		· ·			I				
f	SG reading		Distance	Preamp	Filter	ERP	Limit	Delta	Notes
GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
	1852.4 MHz)								
3.705	-27.0	V	3.0	30.2	1.0	-56.2	-13.0	-43.2	
7.410	-28.5	V	3.0	26.5	1.0	-53.9	-13.0	-40.9	
3.705	-26.9	H	3.0	30.2	1.0	-56.1	-13.0	-43.1	
7.410	-27.3	H	3.0	26.5	1.0	-52.8	-13.0	-39.8	
	880 MH-1								
Mid Ch /	·····	V	3.0	30.1	1.0	-55.6	-13.0	-42.6	
		v	· · · · · · · · · · · · · · · · · · ·	26.3	1.0	-53.8	-13.0	-40.8	
3.760	-26.4	V	r 30					-43.2	
Mid Ch, (1 3.760 7.520 3.760	-28.5	V H	3.0 3.0	· · · · · · · · · · · · · · · · · · ·		-56.2	-1.5.0	-4.3.2 :	
3.760 7.520 3.760		V H H	3.0 3.0 3.0	30.1 26.3	1.0 1.0	-56.2 -53.0	-13.0 -13.0	-43.2 -40.0	
3.760 7.520 3.760 7.520	-28.5 -27.1 -27.7	H	3.0	30.1	1.0		·		
3.760 7.520 3.760 7.520 High Ch, ('	-28.5 -27.1 -27.7 1907.6 MHz)	H	3.0 3.0	30.1 26.3	1.0 1.0	-53.0	-13.0	-40.0	
3.760 7.520 3.760 7.520 High Ch, (1 3.815	-28.5 -27.1 -27.7 1907.6 MHz) -25.6	H H V	3.0 3.0 3.0	30.1 26.3 30.1	1.0 1.0 1.0	-53.0 -54.7	-13.0 -13.0	_40.0 _41.7	
3.760 7.520 3.760 7.520 High Ch, (' 3.815 7.630	-28.5 -27.1 -27.7 1907.6 MHz) -25.6 -28.3	H H V V	3.0 3.0 3.0 3.0 3.0	30.1 26.3 30.1 26.2	1.0 1.0 1.0 1.0	-53.0 -54.7 -53.5	-13.0 -13.0 -13.0	_40.0 _41.7 _40.5	
3.760 7.520 3.760 7.520	-28.5 -27.1 -27.7 1907.6 MHz) -25.6	H H V	3.0 3.0 3.0	30.1 26.3 30.1	1.0 1.0 1.0	-53.0 -54.7	-13.0 -13.0	_40.0 _41.7	

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#### <u>HSDPA</u>

			Cor Above 1GH	mpliance Ce z High Freq				ement	
Compan	r:	Apple							
Project #		13U15037							
Date:		06/05/13							
Test End	ineer:	Mona Hua							
Configu		EUT only							
Mode:		HSDPA PCS							
	Chambe	r	Pre-an	nplifer		Filter		Lin	nit
3	m Chamber D	-	T145 8449	В 🚽	Fil	ter 1	•	Part 24	•
f	SG reading	Ant. Pol.	Distance	Preamp	Filter	ERP	Limit	Delta	Notes
GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
Low Ch, (	1852.4 MHz)	. ,		. /	. /		<u>, , ,</u>		
3.705	-26.0	V	3.0	30.2	1.0	-55.2	-13.0	-42.2	
7.410	-28.3	V	3.0	26.5	1.0	-53.7	-13.0	-40.7	
3.705	-26.5	H	3.0	30.2	1.0	-55.7	-13.0	-42.7	
7.410	-27.0	Н	3.0	26.5	1.0	-52.5	-13.0	-39.5	
Mid Ch. (	1880 MHz)								
3.760	-27.0	V	3.0	30.1	1.0	-56.2	-13.0	-43.2	
7.520	-28.6	V	3.0	26.3	1.0	-53.9	-13.0	-40.9	
	-26.5	Η	3.0	30.1	1.0	-55.6	-13.0	-42.6	
3.760	-27.1	Н	3.0	26.3	1.0	-52.4	-13.0	-39.4	
7.520	4007 C MU-1			30.1	1.0	-55.8	-13.0	-42.8	
7.520 High Ch,	1907.6 MHz)	V	30		1.0		-13.0	-42.0	
7.520 High Ch, 3.815	-26.7	V	3.0 3.0		1.0	-531			
7.520 High Ch, 3.815 7.630	-26.7 -27.9	V	3.0	26.2	1.0 1.0	-53.1		-43.1	
7.520	-26.7	-			1.0 1.0 1.0	-53.1 -56.1 -52.7	-13.0 -13.0 -13.0	-43.1 -39.7	

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## UAT / PORT B

#### **GPRS850**

			Co Above 1GH	mpliance Co z High Frec				ement	
Company		Apple							
Project #:		13U15037							
Date:		06/06/13							
Test Engi		Mona Hua							
Configura	tion:	EUT only							
/lode:		GPRS CELL							
	Chambe	r	Pre-ar	nplifer		Filter		L	imit
2	n Chamber D	-	T145 8449	•	Fil	ter 1	<b>_</b>	Part 22	
5			I				_		
f	SG reading	Ant. Pol.	Distance	Preamp	Filter	ERP	Limit	Delta	Notes
GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
_ow Ch, (8	24.2MHz)				-				
1.648	-13.2	V	3.0	32.7	1.0	-44.9	-13.0	-31.9	
2.473	-24.5	V	3.0	31.4	1.0	-54.9	-13.0	-41.9	
1.648	-23.2	H	3.0	32.7	1.0	-54.9	-13.0	-41.9	
2.473	-28.5	H	3.0	31.4	1.0	-58.9	-13.0	_45.9	
Mid Ch, (8	26 CMU~)								
h.	-15.2	V	3.0	32.6	1.0	-46.8	-13.0	-33.8	
	-13.2	V	3.0	32.0 31.5	1.0	-40.0	-13.0	-33.0 -45.1	
	-20.6	V H	3.0	32.6	1.0	-52.2	-13.0	-39.2	
2.510			·	JZ.V			-13.0	-44.9	
2.510 1.673		н	3.0	31.5	1.0	-5/.9			
1.673 2.510 1.673 2.510	-20.0 -27.4	H	3.0	31.5	1.0	-57.9	-13.0		
2.510 1.673 2.510	-27.4	Н	3.0	31.5	1.0	-57.9	-13.0		
2.510 1.673 2.510 High Ch, (8	-27.4	H	3.0 3.0	31.5 32.5	1.0	<u>-57.9</u> _43.7	-13.0	-30.7	
2.510 1.673 2.510 High Ch, (8 1.698	-27.4 48.8MHz)								
2.510 1.673	-27.4 48.8MHz) -12.2	v	3.0	32.5	1.0	-43.7	-13.0	-30.7	

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## EGPRS850

			Co Above 1GH	mpliance Ce Iz High Freq				ement	
Company Project # Date: Test Eng Configura Mode:	ineer:	Apple 13U15037 06/06/13 Mona Hua EUT only EGPRS CELL							
	Chambe	r	Pre-ar	nplifer		Filter		L	imit
3r	n Chamber D	) •	T145 8449	B	Fil	ter 1	•	Part 22	•
f	SG reading	Ant. Pol.	Distance	Preamp	Filter	ERP	Limit	Delta	Notes
GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
	24 2MU~\		1			:	: :	:	
.ow Ch, (8	)24.2IVITZ)								
.648	-18.3	V	3.0	32.7	1.0	-50.0	-13.0	-37.0	
1.648 2.473	-18.3 -23.8	V	3.0	31.4	1.0	-54.2	-13.0	-41.2	
1.648 2.473 1.648	-18.3 -23.8 -21.4	V H	3.0 3.0	31.4 32.7	1.0 1.0	-54.2 -53.1	-13.0 -13.0	-41.2 -40.1	
1.648 2.473 1.648	-18.3 -23.8	V	3.0	31.4	1.0	-54.2	-13.0	-41.2	
1.648 2.473 1.648 2.473	-18.3 -23.8 -21.4 -26.2	V H	3.0 3.0	31.4 32.7	1.0 1.0	-54.2 -53.1	-13.0 -13.0	-41.2 -40.1	
1.648 2.473 1.648 2.473 Mid Ch, (8	-18.3 -23.8 -21.4 -26.2 336.6MHz)	V H H	3.0 3.0 3.0	31.4 32.7 31.4	1.0 1.0 1.0	-54.2 -53.1 -56.6	-13.0 -13.0 -13.0	-41.2 -40.1 -43.6	
1.648 2.473 1.648 2.473 Mid Ch, (8 1.673	-18.3 -23.8 -21.4 -26.2 336.6MHz) -16.4	V H H	3.0 3.0 3.0 3.0	31.4 32.7 31.4 32.6	1.0 1.0 1.0 1.0	-54.2 -53.1 -56.6 -48.0	-13.0 -13.0 -13.0 -13.0	-41.2 -40.1 -43.6 -35.0	
Low Ch, (8 1.648 2.473 1.648 2.473 Mid Ch, (8 1.673 2.510 1.673	-18.3 -23.8 -21.4 -26.2 336.6MHz) -16.4 -25.8	V H H V V	3.0 3.0 3.0 3.0 3.0 3.0	31.4 32.7 31.4 32.6 31.5	1.0 1.0 1.0 1.0 1.0	-54.2 -53.1 -56.6 -48.0 -56.3	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0	41.2 40.1 43.6 -35.0 43.3	
1.648 2.473 1.648 2.473 Mid Ch, (8 1.673	-18.3 -23.8 -21.4 -26.2 336.6MHz) -16.4	V H H	3.0 3.0 3.0 3.0	31.4 32.7 31.4 32.6	1.0 1.0 1.0 1.0	-54.2 -53.1 -56.6 -48.0	-13.0 -13.0 -13.0 -13.0	-41.2 -40.1 -43.6 -35.0	
I.648 2.473 I.648 2.473 Mid Ch, (8 I.673 2.510 I.673	-18.3 -23.8 -21.4 -26.2 	V H H V V	3.0 3.0 3.0 3.0 3.0 3.0 3.0	31.4 32.7 31.4 32.6 31.5 32.6	1.0 1.0 1.0 1.0 1.0 1.0 1.0	-54.2 -53.1 -56.6 -48.0 -56.3 -52.3	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	41.2 40.1 43.6 -35.0 43.3 -39.3	
1.648 2.473 1.648 2.473 Mid Ch, (8 1.673 2.510 1.673 2.510	-18.3 -23.8 -21.4 -26.2 	V H H V V	3.0 3.0 3.0 3.0 3.0 3.0 3.0	31.4 32.7 31.4 32.6 31.5 32.6	1.0 1.0 1.0 1.0 1.0 1.0 1.0	-54.2 -53.1 -56.6 -48.0 -56.3 -52.3	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	41.2 40.1 43.6 -35.0 43.3 -39.3	
1.648 2.473 1.648 2.473 Mid_Ch, (8 1.673 2.510 1.673 2.510 High Ch, (1 1.698	-18.3 -23.8 -21.4 -26.2 -16.4 -25.8 -20.7 -28.2	V H H H V V H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5 32.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	-54.2 -53.1 -56.6 -56.3 -56.3 -52.3 -58.7 -58.7 -51.7	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	41.2 40.1 43.6 .35.0 43.3 .39.3 45.7 .38.7	
1.648 2.473 1.648 2.473 Mid Ch, (f 1.673 2.510 1.673 2.510 High Ch, (f 1.698 2.546	-18.3 -23.8 -21.4 -26.2 -336.6MHz) -16.4 -25.8 -20.7 -28.2 -28.2 -20.2 -28.2	V H H H V V H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	31.4 32.7 31.4 32.6 31.5 32.6 31.5 31.5 32.5 31.4	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	-54.2 -53.1 -56.6 -48.0 -56.3 -52.3 -58.7 -51.7 -58.7	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	41.2 40.1 43.6 .35.0 43.3 .39.3 45.7 .38.7 45.7	
1.648 2.473 1.648 2.473 Mid_Ch, (8 1.673 2.510 1.673 2.510 High Ch, (1 1.698	-18.3 -23.8 -21.4 -26.2 -336.6MHz) -16.4 -25.8 -20.7 -28.2 -28.2 -28.2 -20.2	V H H H V V H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5 32.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	-54.2 -53.1 -56.6 -56.3 -56.3 -52.3 -58.7 -58.7 -51.7	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	41.2 40.1 43.6 .35.0 43.3 .39.3 45.7 .38.7	

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# <u>UMTS850</u>

# <u>REL 99</u>

			Cor Above 1GH	mpliance Co Iz High Fred				ement	
Company Project # Date: Test Eng Configura Mode:	neer: ition:	Apple 13U15037 06/06/13 Mona Hua EUT only REL 99 CELL							
	Chambe	r	Pre-an	nplifer		Filter		Li	mit
3n	3m Chamber D		T145 8449B 🗸		Filter 1 🚽			Part 22	
			<b>D</b> . (	<b>D</b>	<b>F</b> 344	ERP	Lingth	Delta	Notes
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	(dBm)	Limit (dBm)	(dB)	Notes
GHz Low Ch, (8	(dBm)	(H/V)		(dB)		(dBm)	(dBm)	(dB)	Notes
GHz Low Ch, (8 1.653	(dBm) 26.4MHz) -21.5	(H/V) V	(m) 3.0	(dB) 32.7	(dB) 1.0	(dBm)	(dBm) -13.0	(dB) -40.2	Notes
GHz Low Ch, (8 1.653 2.479	(dBm) 26.4MHz) -21.5 -26.2	(H/V) V V	(m) 3.0 3.0	(dB) 32.7 31.4	(dB) 1.0 1.0	(dBm) -53.2 -56.6	(dBm) -13.0 -13.0	(dB) _40.2 _43.6	Notes
GHz Low Ch, (8 1.653 2.479 1.653	(dBm) 26.4MHz) -21.5 -26.2 -23.2	(H/V) V V H	(m) 3.0 3.0 3.0	(dB) 32.7 31.4 32.7	(dB) 1.0 1.0 1.0	(dBm) -53.2 -56.6 -54.8	(dBm) -13.0 -13.0 -13.0	(dB) -40.2 -43.6 -41.8	Notes
GHz Low Ch, (8 1.653 2.479	(dBm) 26.4MHz) -21.5 -26.2	(H/V) V V	(m) 3.0 3.0	(dB) 32.7 31.4	(dB) 1.0 1.0	(dBm) -53.2 -56.6	(dBm) -13.0 -13.0	(dB) _40.2 _43.6	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479	(dBm) 26.4MHz) -21.5 -26.2 -23.2 -29.7	(H/V) V V H	(m) 3.0 3.0 3.0	(dB) 32.7 31.4 32.7	(dB) 1.0 1.0 1.0	(dBm) -53.2 -56.6 -54.8	(dBm) -13.0 -13.0 -13.0	(dB) -40.2 -43.6 -41.8	Notes
GHz Low Ch, (8 1.653 2.479 1.653	(dBm) 26.4MHz) -21.5 -26.2 -23.2 -29.7	(H/V) V V H	(m) 3.0 3.0 3.0	(dB) 32.7 31.4 32.7	(dB) 1.0 1.0 1.0	(dBm) -53.2 -56.6 -54.8	(dBm) -13.0 -13.0 -13.0	(dB) -40.2 -43.6 -41.8	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8	(dBm) 26.4MHz) -21.5 -26.2 -23.2 -29.7 36.6MHz) -21.3 -27.3	(H/V) V H H V V V	(m) 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4	(dB) 1.0 1.0 1.0 1.0	(dBm) -53.2 -56.6 -54.8 -60.1	(dBm) -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	(dB) 40.2 43.6 41.8 47.1 39.9 44.8	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673	(dBm) 26.4MHz) -21.5 -26.2 -23.2 -29.7 36.6MHz) -21.3 -27.3 -27.3 -23.9	(H/V) V H H V V V H	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4 32.6 31.5 32.6	(dB) 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	(dBm) -53.2 -56.6 -54.8 -60.1 -52.9 -57.8 -55.5	(dBm) -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	(dB) 40.2 43.6 41.8 47.1 39.9 44.8 42.5	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510	(dBm) 26.4MHz) -21.5 -26.2 -23.2 -29.7 36.6MHz) -21.3 -27.3	(H/V) V H H V V V	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4 32.6 31.5	(dB) 1.0 1.0 1.0 1.0 1.0 1.0 1.0	(dBm) -53.2 -56.6 -54.8 -60.1 -52.9 -57.8	(dBm) -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	(dB) 40.2 43.6 41.8 47.1 39.9 44.8	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673 2.510	(dBm) 26.4MHz) -21.5 -26.2 -23.2 -29.7 36.6MHz) -21.3 -27.3 -23.9 -29.7	(H/V) V H H V V V H	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4 32.6 31.5 32.6	(dB) 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	(dBm) -53.2 -56.6 -54.8 -60.1 -52.9 -57.8 -55.5	(dBm) -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	(dB) 40.2 43.6 41.8 47.1 39.9 44.8 42.5	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673 2.510 High Ch, (8	(dBm) 26.4MHz) -21.5 -26.2 -23.2 -29.7 36.6MHz) -21.3 -27.3 -23.9 -29.7 46.6MHz)	(H/V) V H H V V V H H	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5	(dB) 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	(dBm) -53.2 -56.6 -54.8 -60.1 -52.9 -57.8 -55.5 -60.2	(dBm) -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	(dB) 40.2 43.6 41.8 47.1 39.9 44.8 42.5 47.2	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673 2.510 High Ch, (8 1.688	(dBm) 26.4MHz) -21.5 -26.2 -23.2 -29.7 -29.7 -21.3 -27.3 -27.3 -23.9 -29.7 -29.7 -29.7 -46.6MHz) -19.8	(H/V) V H H V V V H	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5 32.6 31.5	(dB) 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	(dBm) -53.2 -56.6 -54.8 -60.1 -52.9 -57.8 -55.5 -60.2 -51.3	(dBm) -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	(dB) 40.2 43.6 41.8 47.1 39.9 44.8 42.5 47.2 38.3	Notes
GHz Low Ch, (8 1.653 2.479 1.653 2.479 Mid Ch, (8 1.673 2.510 1.673 2.510 High Ch, (8	(dBm) 26.4MHz) -21.5 -26.2 -23.2 -29.7 36.6MHz) -21.3 -27.3 -23.9 -29.7 46.6MHz)	(H/V) V H H V V V H H V V	(m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	(dB) 32.7 31.4 32.7 31.4 32.6 31.5 32.6 31.5 32.6 31.5	(dB) 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	(dBm) -53.2 -56.6 -54.8 -60.1 -52.9 -57.8 -55.5 -60.2	(dBm) -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	(dB) 40.2 43.6 41.8 47.1 39.9 44.8 42.5 47.2	

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#### <u>HSDPA</u>

			Con Above 1GH	npliance Co z High Fred				ement	
Company Project #: Date: Test Engi Configura Mode:	ineer: ation:	Apple 13U15037 06/06/13 Mona Hua EUT only HSDPA CELL							
	Chambe	r	Pre-am	plifer		Filter		Lir	nit
3n	n Chamber D		T145 8449E	3 🗸	Filter 1		•	Part 22	-
f	SG reading	Ant. Pol.	Distance	Preamp	Filter	ERP	Limit	Delta	Notes
GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
.ow Ch, (8	26.4MHz)								
1.653	-22.7	V	3.0	32.7	1.0	-54.4	-13.0	-41.4	
2.479	-27.1	V	3.0	31.4	1.0	-57.5	-13.0	-44.5	
.653	-23.8	H	3.0	32.7	1.0	-55.4	-13.0	-42.4	
470	-28.7	Н	3.0	31.4	1.0	-59.1	-13.0	-46.1	
.419									
	36.6MHz)			22.0	1.0	-53.2	-13.0	-40.2	
2.479 Mid Ch, (8 1.673	36.6MHz) 21.6	V	3.0	32.6					
Mid Ch, (8 1.673		V V	3.0 3.0	32.6 31.5	1.0	-57.7	-13.0	-44.7	
Mid Ch, (8 1.673 2.510	-21.6					-57.7 -54.0	-13.0 -13.0	-44.7 -41.0	
lid Ch, (8 .673 .510 .673	-21.6 -27.2	V	3.0	31.5	1.0	· · · · · · · · · · · · · · · · · · ·			
Mid Ch, (8 1.673 2.510 1.673 2.510	-21.6 -27.2 -22.4 -28.4	V H	3.0 3.0	31.5 32.6	1.0 1.0	-54.0	-13.0	-41.0	
Mid Ch, (8 1.673 2.510 1.673 2.510 4igh Ch, (8	-21.6 -27.2 -22.4 -28.4 46.6MHz)	V H H	3.0 3.0 3.0	31.5 32.6 31.5	1.0 1.0 1.0	-54.0 -58.9	-13.0 -13.0	_41.0 _45.9	
Aid Ch, (8 .673 .510 .673 .510 Iigh Ch, (8 .688	-21.6 -27.2 -22.4 -28.4 246.6MHz) -20.0	V H H	3.0 3.0 3.0 3.0	31.5 32.6 31.5 32.6	1.0 1.0 1.0 1.0	-54.0 -58.9 -51.5	-13.0 -13.0 -13.0	_41.0 _45.9 _38.5	
Aid Ch, (8 .673 .510 .673 .510 ligh Ch, (8 .688 .532	-21.6 -27.2 -22.4 -28.4 -28.4 -28.4 -20.0 -27.5	V H H V V	3.0 3.0 3.0 3.0 3.0 3.0	31.5 32.6 31.5 32.6 31.5	1.0 1.0 1.0 1.0	-54.0 -58.9 -51.5 -58.0	-13.0 -13.0 -13.0 -13.0 -13.0	41.0 45.9 -38.5 45.0	
Mid Ch, (8	-21.6 -27.2 -22.4 -28.4 246.6MHz) -20.0	V H H	3.0 3.0 3.0 3.0	31.5 32.6 31.5 32.6	1.0 1.0 1.0 1.0	-54.0 -58.9 -51.5	-13.0 -13.0 -13.0	_41.0 _45.9 _38.5	

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#### GPRS1900

				mpliance Ce Iz High Freq				ement	
Company	:	Apple							
Project #:		13U15037							
Date:		06/06/13							
Test Engi	neer:	Mona Hua							
Configura	tion:	EUT only							
Mode:		GPRS PCS							
	Chambe	r l	Pre-ar	nplifer		Filter		Lir	nit
3n	n Chamber D	-	T145 8449B		Filter 1			Part 24	
•			1		J				
f	SG reading	Ant. Pol.	Distance	Preamp	Filter	ERP	Limit	Delta	Notes
GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
Low Ch, (1	850.2 MHz)								
3.700	-25.7	V	3.0	30.2	1.0	-54.9	-13.0	-41.9	
7.401	-28.2	V	3.0	26.5	1.0	-53.7	-13.0	-40.7	
3.700	-28.2	Н	3.0	30.2	1.0	-57.4	-13.0	-44.4	
7.401	-27.5	H	3.0	26.5	1.0	-53.0	-13.0	-40.0	
	990 MU-)								
Mid Ch //	000 MITZ)	V	3.0	30.1	1.0	-56.3	-13.0	-43.3	
Mid Ch, (1 3 760	27 1			يىۋىۋ		-50.5	-13.0	41.3	
3.760	-27.1		30	263	10		-10.0		
3.760 7.520	-29.0	V	3.0 3.0	26.3 30.1	1.0		-13.0	-43.2	
3.760			3.0 3.0 3.0	26.3 30.1 26.3	1.0 1.0 1.0	-54.5 -56.2 -53.1	-13.0 -13.0	_43.2 _40.1	
3.760 7.520 3.760 7.520	-29.0 -27.1 -27.8	V H	3.0	30.1	1.0	-56.2			
3.760 7.520 3.760 7.520 High Ch, (1	-29.0 -27.1 -27.8 909.8 MHz)	V H H	3.0 3.0	30.1 26.3	1.0 1.0	-56.2 -53.1	-13.0	-40.1	
3.760 7.520 3.760 7.520 High Ch, (1 3.819	-29.0 -27.1 -27.8 909.8 MHz) -26.3	V H H	3.0 3.0 3.0	30.1 26.3 30.1	1.0 1.0 1.0	-56.2 -53.1 -55.4	-13.0 -13.0	_40.1 _42.4	
3.760 7.520 3.760 7.520 High Ch, (1 3.819 7.639	-29.0 -27.1 -27.8 909.8 MHz) -26.3 -28.7	V H H V V	3.0 3.0 3.0 3.0 3.0	30.1 26.3 30.1 26.2	1.0 1.0 1.0 1.0	-56.2 -53.1 -55.4 -53.8	-13.0 -13.0 -13.0	40.1 42.4 40.8	
3.760 7.520 3.760 7.520 High Ch, (1 3.819	-29.0 -27.1 -27.8 909.8 MHz) -26.3	V H H	3.0 3.0 3.0	30.1 26.3 30.1	1.0 1.0 1.0	-56.2 -53.1 -55.4	-13.0 -13.0	_40.1 _42.4	

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#### EGPRS1900

			Cor Above 1GH	mpliance C z High Free				ement		
Company: Project #: Date: Test Engi Configura Mode:	neer: tion:	Apple 13U15037 06/06/13 Mona Hua EUT only EGPRS PCS								
	Chambe	r	Pre-an	nplifer		Filter		I	Limit	
3n	3m Chamber D		T145 84498	В 🚽	Filter 1 🚽		•	Part 24	24 -	
f	SG reading	Ant. Pol.	Distance	Preamp	Filter	ERP	Limit	Delta	Notes	
GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)		
L Ch. 14	050 0 000-1									
Low Ch, (1	500.2 MHZ)									
Low Ch, (1 3.700	-27.6	V	3.0	30.2	1.0	-56.8	-13.0	-43.8		
3.700 7.401	-27.6 -28.0	V	3.0	26.5	1.0	-53.5	-13.0	-40.5		
3.700 7.401 3.700	-27.6 -28.0 -28.3	V H	3.0 3.0	26.5 30.2	1.0 1.0	-53.5 -57.5	-13.0 -13.0	-40.5 -44.5		
3.700 7.401 3.700	-27.6 -28.0	V	3.0	26.5	1.0	-53.5	-13.0	-40.5		
3.700 7.401 3.700 7.401	-27.6 -28.0 -28.3 -27.4	V H	3.0 3.0	26.5 30.2	1.0 1.0	-53.5 -57.5	-13.0 -13.0	-40.5 -44.5		
3.700 7.401 3.700 7.401 Mid Ch, (1	-27.6 -28.0 -28.3 -27.4 880 MHz)	V H	3.0 3.0 3.0	26.5 30.2 26.5	1.0 1.0 1.0	-53.5 -57.5 -52.9	-13.0 -13.0 -13.0	40.5 44.5 -39.9		
3.700 7.401 3.700 7.401 Mid Ch, (1 3.760	-27.6 -28.0 -28.3 -27.4	V H H	3.0 3.0	26.5 30.2	1.0 1.0	-53.5 -57.5	-13.0 -13.0	-40.5 -44.5		
3.700 7.401 3.700 7.401	-27.6 -28.0 -28.3 -27.4 880 MHz) -27.8	V H H V	3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1	1.0 1.0 1.0	-53.5 -57.5 -52.9 -57.0	-13.0 -13.0 -13.0 -13.0	40.5 44.5 -39.9 44.0		
3.700 7.401 3.700 7.401 Mid Ch, (1 3.760 7.520	-27.6 -28.0 -28.3 -27.4 880 MHz) -27.8 -28.9	V H H V V	3.0 3.0 3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1 26.3	1.0 1.0 1.0 1.0 1.0	-53.5 -57.5 -52.9 -57.0 -57.0 -54.2	-13.0 -13.0 -13.0 -13.0 -13.0	40.5 44.5 -39.9 44.0 41.2		
3.700 7.401 3.700 7.401 Mid Ch, (1 3.760 7.520 3.760 7.520	-27.6 -28.0 -28.3 -27.4 880 MHz) -27.8 -28.9 -27.3 -27.4	V H H V V	3.0 3.0 3.0 3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1 26.3 30.1	1.0 1.0 1.0 1.0 1.0 1.0 1.0	-53.5 -57.5 -52.9 -57.0 -54.2 -56.4	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0	40.5 44.5 -39.9 44.0 41.2 43.4		
3.700 7.401 3.700 7.401 Mid Ch, (1 3.760 7.520 3.760 7.520 High Ch, (1	-27.6 -28.0 -28.3 -27.4 -27.4 -27.8 -27.8 -27.8 -27.3 -27.3 -27.4 -27.4 -27.4 -27.4	V H H V V H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1 26.3 30.1 26.3	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	-53.5 -57.5 -52.9 -57.0 -54.2 -56.4 -52.7	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	40.5 44.5 -39.9 44.0 -41.2 43.4 -39.7		
3.700 7.401 3.700 7.401 Mid Ch, (1 3.760 7.520 3.760 7.520 High Ch, (1 3.819	-27.6 -28.0 -28.3 -27.4 -27.4 -27.8 -27.8 -27.8 -27.3 -27.4 -27.4 -27.4	V H H V V H H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1 26.3 30.1 26.3 30.1 26.3 30.1	1.0 1.0 1.0 1.0 1.0 1.0 1.0	-53.5 -57.5 -52.9 -57.0 -54.2 -56.4 -52.7 -56.5	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	40.5 44.5 -39.9 44.0 41.2 43.4 -39.7 43.5		
3.700 7.401 3.700 7.401 Mid Ch. (1 3.760 7.520 3.760 7.520 High Ch. (1 3.819 7.639	-27.6 -28.0 -28.3 -27.4 -27.4 -27.8 -28.9 -27.3 -27.4 -27.4 -27.4 -27.4 -27.4 -27.4 -27.4 -27.9	V H H V V H H V V V V V	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1 26.3 30.1 26.3 30.1 26.3 30.1 26.2	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	-53.5 -57.5 -52.9 -57.0 -54.2 -56.4 -52.7 -56.5 -53.0	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	40.5 44.5 -39.9 44.0 41.2 43.4 -39.7 43.5 40.0		
3.700 7.401 3.700 7.401 Mid Ch, (1 3.760 7.520 3.760 7.520 High Ch, (1 3.819	-27.6 -28.0 -28.3 -27.4 -27.4 -27.8 -27.8 -27.8 -27.3 -27.4 -27.4 -27.4	V H H V V H H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1 26.3 30.1 26.3 30.1 26.3 30.1	1.0 1.0 1.0 1.0 1.0 1.0 1.0	-53.5 -57.5 -52.9 -57.0 -54.2 -56.4 -52.7 -56.5	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	40.5 44.5 -39.9 44.0 41.2 43.4 -39.7 43.5		

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## REPORT NO: 13U15037-1 EUT: QUAD-BAND RADIO WITH WLAN AND BT RADIO

# <u>UMTS1900</u>

#### <u>REL 99</u>

				mpliance Ce z High Freq				ement		
Company	r:	Apple								
Project #	:	13U15037								
Date:		06/06/13								
Test Eng	ineer:	Mona Hua								
Configur	ation:	EUT only								
Mode:		REL 99 PCS								
	Chambe	r	Pre-an	nplifer		Filter		Lin	nit	
31	3m Chamber D		T145 8449	в	Filter 1		•	Part 24	4 🗸	
f	SG reading	Ant Pol	Distance	Preamp	Filter	ERP	Limit	Delta	Notes	
GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	Notes	
	1852.4 MHz)	(100)	(111)	(UD)			(ubiii)			
3.705	-27.6	V	3.0	30.2	1.0	-56.8	-13.0	-43.8		
7.410	-29.1	v	3.0	26.5	1.0	-54.5	-13.0	-41.5		
3.705	-27.3	Ĥ	3.0	30.2	1.0	-56.5	-13.0	-43.5		
7.410	-27.7	Н	3.0	26.5	1.0	-53.2	-13.0	-40.2		
	1880 MHz)	V		20.4	4.0		42.0			
	-27.2	V V	3.0 3.0	30.1 26.3	1.0 1.0	-56.4 -54.2	-13.0 -13.0	_43.4 _41.2		
3.760		V	<u>.</u>	20.3 30.1	1.0	-54.2	-13.0 -13.0	-41.2 -43.6		
3.760 7.520		н			1.0		-13.0	-40.4		
3.760 7.520 3.760	-27.5	H H	3.0 3.0	26.3	1.0	-53.4	-13.0			
3.760 7.520 3.760 7.520	-27.5 -28.1				1.0	-33.4	-13.0			
3.760 7.520 3.760 7.520 High Ch, (	-27.5 -28.1 1907.6 MHz)	Н	3.0	26.3						
3.760 7.520 3.760 7.520 High Ch, ( 3.815	-27.5 -28.1 1907.6 MHz) -26.2	H V	3.0 3.0	26.3 30.1	1.0	-55.3	-13.0	42.3		
3.760 7.520 3.760 7.520 High Ch, ( 3.815 7.630	-27.5 -28.1 1907.6 MHz) -26.2 -29.2	H V V	3.0 3.0 3.0	26.3 30.1 26.2	1.0 1.0	-55.3 -54.4	-13.0 -13.0	42.3 -41.4		
3.760 7.520 3.760 7.520 High Ch, (	-27.5 -28.1 1907.6 MHz) -26.2	H V	3.0 3.0	26.3 30.1	1.0	-55.3	-13.0	42.3		

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#### <u>HSDPA</u>

			Cor Above 1GH	mpliance Co z High Frec				ement		
Company	:	Apple								
Project #		13U15037								
Date:		06/06/13								
Test Eng	ineer:	Mona Hua								
Configura		EUT only								
Mode:		HSDPA PCS								
	Chambe	r	Pre-amplifer		Filter			Limit		
3r	3m Chamber D		T145 8449E	В	Fil	ter 1	•	Part 24	•	
f	SG reading	Ant. Pol.	Distance	Preamp	Filter	ERP	Limit	Delta	Notes	
GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)		
Low Ch, (1	852.4 MHz)									
3.705	-26.4	V	3.0	30.2	1.0	-55.6	-13.0	-42.6		
3.705 7.410	-26.4 -28.9	V	3.0	26.5	1.0	-54.3	-13.0	-41.3		
3.705 7.410 3.705	-26.4 -28.9 -27.3	V H	3.0 3.0	26.5 30.2	1.0 1.0	-54.3 -56.5	-13.0 -13.0	-41.3 -43.5		
3.705 7.410 3.705	-26.4 -28.9	V	3.0	26.5	1.0	-54.3	-13.0	-41.3		
3.705 7.410 3.705 7.410	-26.4 -28.9 -27.3 -27.3	V H	3.0 3.0	26.5 30.2	1.0 1.0	-54.3 -56.5	-13.0 -13.0	-41.3 -43.5		
3.705 7.410 3.705 7.410 Mid Ch, (1	-26.4 -28.9 -27.3 -27.3	V H	3.0 3.0	26.5 30.2	1.0 1.0	-54.3 -56.5	-13.0 -13.0	-41.3 -43.5		
3.705 7.410 3.705 7.410 Mid Ch, (1 3.760	-26.4 -28.9 -27.3 -27.3 880 MHz)	V H H	3.0 3.0 3.0	26.5 30.2 26.5	1.0 1.0 1.0	-54.3 -56.5 -52.8	-13.0 -13.0 -13.0	41.3 43.5 -39.8		
3.705 7.410 3.705 7.410 Mid Ch, (1 3.760 7.520 3.760	-26.4 -28.9 -27.3 -27.3 880 MHz) -27.7 -29.0 -27.0	V H H V V H	3.0 3.0 3.0 3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1 26.3 30.1	1.0 1.0 1.0 1.0 1.0 1.0 1.0	-54.3 -56.5 -52.8 -56.9 -56.9 -54.3 -56.1	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	41.3 43.5 -39.8 43.9 41.3 43.1		
3.705 7.410 3.705 7.410 Mid Ch, (1 3.760 7.520 3.760	-26.4 -28.9 -27.3 -27.3 880 MHz) -27.7 -29.0	V H H V V	3.0 3.0 3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1 26.3	1.0 1.0 1.0 1.0 1.0	-54.3 -56.5 -52.8 -56.9 -54.3	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0	41.3 43.5 -39.8 43.9 41.3		
3.705 7.410 3.705 7.410 Mid Ch, (1 3.760 7.520 3.760 7.520	-26.4 -28.9 -27.3 -27.3 -27.3 -27.7 -29.0 -27.0 -27.0 -27.3	V H H V V H	3.0 3.0 3.0 3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1 26.3 30.1	1.0 1.0 1.0 1.0 1.0 1.0 1.0	-54.3 -56.5 -52.8 -56.9 -56.9 -54.3 -56.1	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	41.3 43.5 -39.8 43.9 41.3 43.1		
3.705 7.410 3.705 7.410 Mid Ch, (1 3.760 7.520 3.760 7.520 High Ch, (1	-26.4 -28.9 -27.3 -27.3 -27.3 -27.7 -29.0 -27.0 -27.0 -27.3 -27.3	V H H V V H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1 26.3 30.1 26.3	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	-54.3 -56.5 -52.8 -56.9 -54.3 -56.1 -52.6	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	41.3 43.5 -39.8 43.9 41.3 43.1 -39.6		
3.705 7.410 3.705 7.410 Mid_Ch, (1 3.760 7.520 3.760 7.520 High Ch, ( 3.815	-26.4 -28.9 -27.3 -27.3 -27.3 -27.7 -29.0 -27.0 -27.0 -27.3	V H H H H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1 26.3 30.1	1.0 1.0 1.0 1.0 1.0 1.0 1.0	-54.3 -56.5 -52.8 -56.9 -56.9 -54.3 -56.1	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	41.3 43.5 -39.8 43.9 41.3 43.1		
3.705 7.410 3.705 7.410 Mid Ch, (1 3.760 7.520 3.760 7.520 High Ch, (1 3.815 7.630	-26.4 -28.9 -27.3 -27.3 -27.3 -27.7 -29.0 -27.0 -27.0 -27.3 -27.3 -27.3 -27.3	V H H H V V V H H H	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1 26.3 30.1 26.3 30.1 26.3 30.1	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	-54.3 -56.5 -52.8 -56.9 -56.9 -56.1 -56.1 -52.6	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	41.3 43.5 -39.8 43.9 41.3 43.1 -39.6 43.2		
Low Ch, (1 3.705 7.410 3.705 7.410 Mid Ch, (1 3.760 7.520 3.760 7.520 High Ch, ( 3.815 7.630 3.815 7.630	-26.4 -28.9 -27.3 -27.3 -27.3 -27.7 -29.0 -27.0 -27.0 -27.3 -27.3 -27.3 -27.1 -27.1 -28.0	V H H H V V V H H H V V	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	26.5 30.2 26.5 30.1 26.3 30.1 26.3 30.1 26.3	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	-54.3 -56.5 -52.8 -56.9 -54.3 -56.1 -52.6 -52.6 -56.2 -56.2 -53.2	-13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0 -13.0	41.3 43.5 -39.8 43.9 41.3 43.1 -39.6 43.2 40.2		

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