

FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E
INDUSTRY CANADA RSS-132 ISSUE 3
INDUSTRY CANADA RSS-133 ISSUE 6

CERTIFICATION TEST REPORT

FOR

**Fitness Watch with integrated Radios 1) WCDMA (850/1800/2100/R99+HSDPA) 2) BT
(v3.0+EDR+LE) 3) GPS**

MODEL NUMBER: M061

FCC ID: EP9-TMXM061

IC: 3348A-TMXM061

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Prepared for

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Revision History

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-	08/04/14	Initial Issue	

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Timex Group USA, INC.
EUT DESCRIPTION: Fitness Watch with integrated Radios 1) WCDMA
(850/1800/2100/R99+HSDPA) 2) BT (v3.0+EDR+LE) 3) GPS
MODEL: M061
SERIAL NUMBER: P2A/D2-918, P2A/D2-919, P2A/D2-921, P2A/D2-922
DATE TESTED: August 1-2, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H and 24E	PASS
INDUSTRY CANADA RSS-132,133	PASS
INDUSTRY CANADA RSS-GEN ISSUE 3	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 Part 22, and FCC CFR 47 Part 24

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☐ Chamber A	☐ Chamber D
☒ Chamber B	☐ Chamber E
☐ Chamber C	☐ Chamber F

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\text{EIRP} = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss(between the SG and substitution antenna)} + \text{Substitution Antenna Factor (dBi)}$$

$$\text{ERP} = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss(between the SG and substitution antenna)}$$

$$(\text{Path loss} = \text{Signal generator output} - \text{PSA reading with substitution antenna})$$

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB
Radiated Disturbance, 1GHz to 40GHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Fitness Watch with integrated Radios 1) WCDMA (850/1800/2100/R99+HSDPA)
2) BT (v3.0+EDR+LE) 3) GPS)

5.2. MAXIMUM OUTPUT POWER

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

FCC Part 22/2 4/27						
Band	Frequency Range(MHz)	Modulation Peak	Conducted		Radiated	
			Peak	mW	Peak	mW
Band 5	824~849	REL99	23.50	223.87	22.84	192.31
	824~849	HSDPA	23.60	229.09	23.41	219.28
Band 2	1850~1910	REL99	23.70	234.42	22.86	193.20
	1850~1910	HSDPA	23.70	234.42	21.10	128.82

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna for the [List the bands supported] with a maximum peak gain as follow:

Frequency (MHz)	Peak Gain (dBi)
Band 5, 824~849MHz	-3.0
Band 2, 1850~1910MHz	-1.5

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	FLOTV	PSAI050R-050Q	2LMA299MZ09370	N/A

I/O CABLES (CONDUCTED SETUP)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Shielded	None	NA
2	Antenna Port	1	EUT	Shielded	0.1m	NA
3	RF In/Out	1	Communication Test Set	Shielded	1m	NA

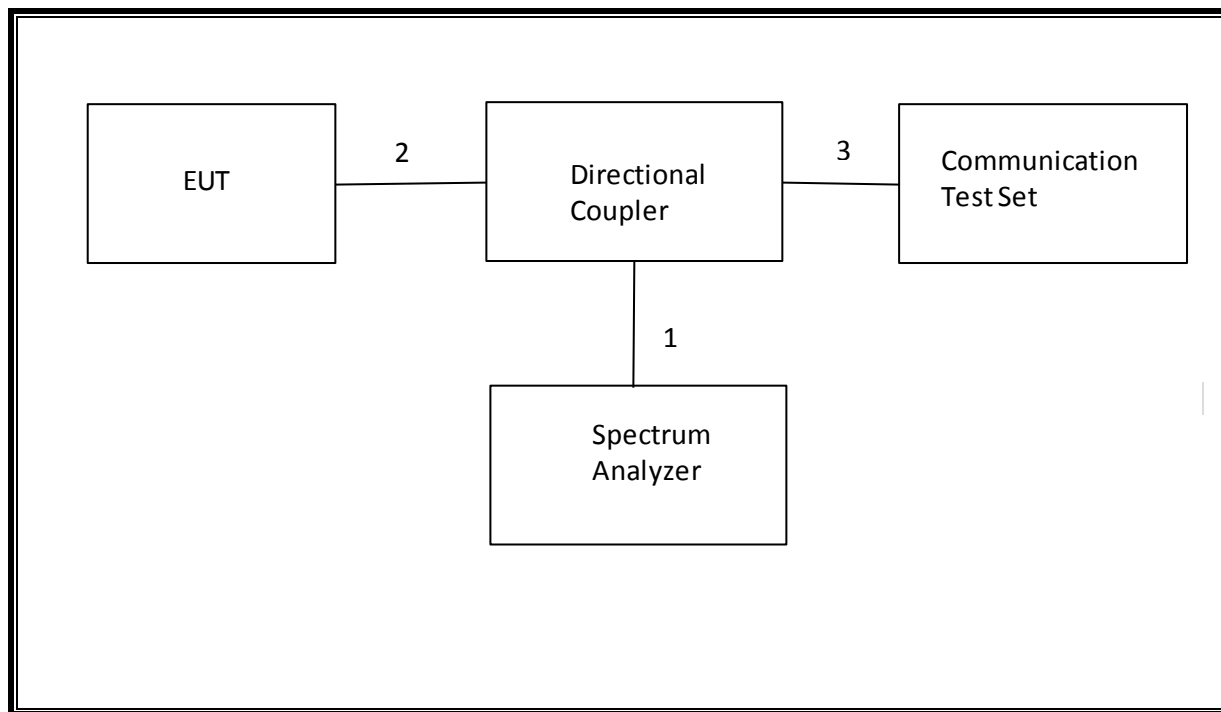
I/O CABLES (RADIATED SETUP)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	USB	1	AC Adapter	Un-shielded	1.2m	No
2	Jack	1	Headset	Shielded	1m	No
3	RF In/out	1	Communication Test Set	Un-shielded	2m	Yes

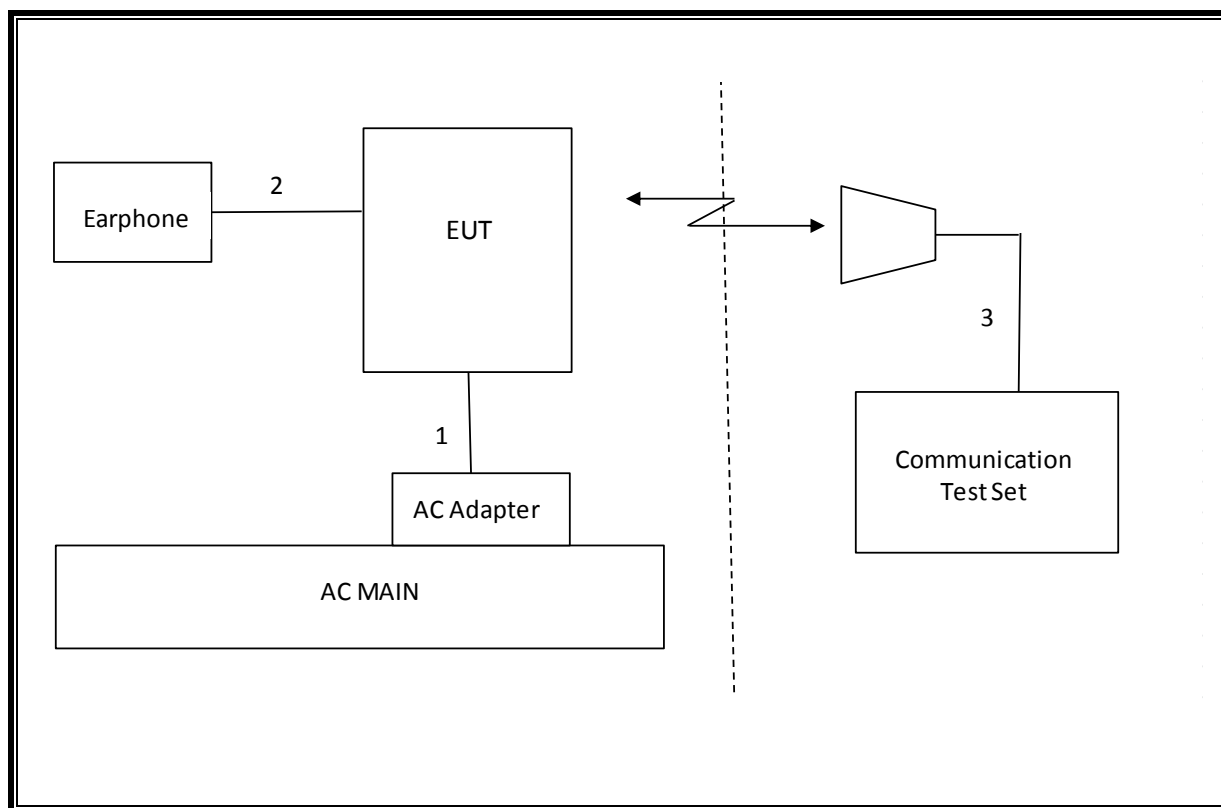
TEST SETUP

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

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. TEST AND MEASUREMENT EQUIPMENT

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

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

7. Summary Table

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Note
2.1049	N/A	Occupied Band width (99%)	N/A	Conducted	Pass	4.18 MHz
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1) RSS-139(6.5.1)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-19.35 dBm
2.1046	N/A	Conducted output power	N/A		Pass	23.7 dBm
22.355 24.235	RSS-132(4.3) RSS-133(6.3) RSS-139(6.3) RSS-199(4.3)	Frequency Stability	2.5PPM		Pass	-0.013 PPM
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	23.4 dBm
24.232(c)	RSS-133(6.4) RSS-199(4.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	22.9 dBm
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1) RSS-139(6.5.1)	Radiated Spurious Emission	-13dBm		Pass	-34.8 dBm
N/A	RSS-132(4.6) RSS-133(6.6) RSS-139(6.6)	Receiver Spurious Emission	5nW above 1GHz 2nW below 1GHz		Pass	

8. WCDMA OUTPUT POWER

8.1. UMTS REL 99

TEST PROCEDURE

The following summary of these settings are illustrated below:

	Mode	Rel99
	Subtest	-
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	HSDPA FRC	Not Applicable
	HSUPA Test	Not Applicable
	Power Control Algorithm	Algorithm2
	β_c	Not Applicable
	β_d	Not Applicable
	β_{ec}	Not Applicable
	β_c/β_d	8/15
	β_{hs}	Not Applicable
	β_{ed}	Not Applicable

8.1.1. UMTS REL 99 OUTPUT POWER RESULT

Band	Mode	Ch.	f(MHz)	Conducted Power (dBm)
				Avg (dBm)
Band 5	REL99	4132	826.4	23.5
		4183	836.6	23.5
		4233	846.6	23.4
Band 2	REL99	9262	1852.4	23.4
		9400	1880	23.7
		9538	1907.6	23.4

8.2. UMTS HSDPA

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

	Mode	Rel5 HSDPA			
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	$A_{hs} = \beta_{hs}/\beta_c$	30/15			

8.2.1. UMTS HSDPA OUTPUT POWER RESULT

Band	Mode	Subset	Ch.	f(MHz)	Conducted Power (dBm)
					Avg (dBm)
Band 5	HSDPA	1	4132	826.4	23.6
			4183	836.6	23.5
			4233	846.6	23.5
		2	4132	826.4	23.6
			4183	836.6	23.6
			4233	846.6	23.5
		3	4132	826.4	22.6
			4183	836.6	22.6
			4233	846.6	22.5
		4	4132	826.4	21.6
			4183	836.6	21.6
			4233	846.6	21.6
Band 2	HSDPA	1	9262	1852.4	23.4
			9400	1880	23.7
			9538	1907.6	23.0
		2	9262	1852.4	23.3
			9400	1880	23.7
			9538	1907.6	23.1
		3	9262	1852.4	22.3
			9400	1880	22.6
			9538	1907.6	22.4
		4	9262	1852.4	21.5
			9400	1880	21.5
			9538	1907.6	21.5

9. PEAK TO AVERAGE RATIO

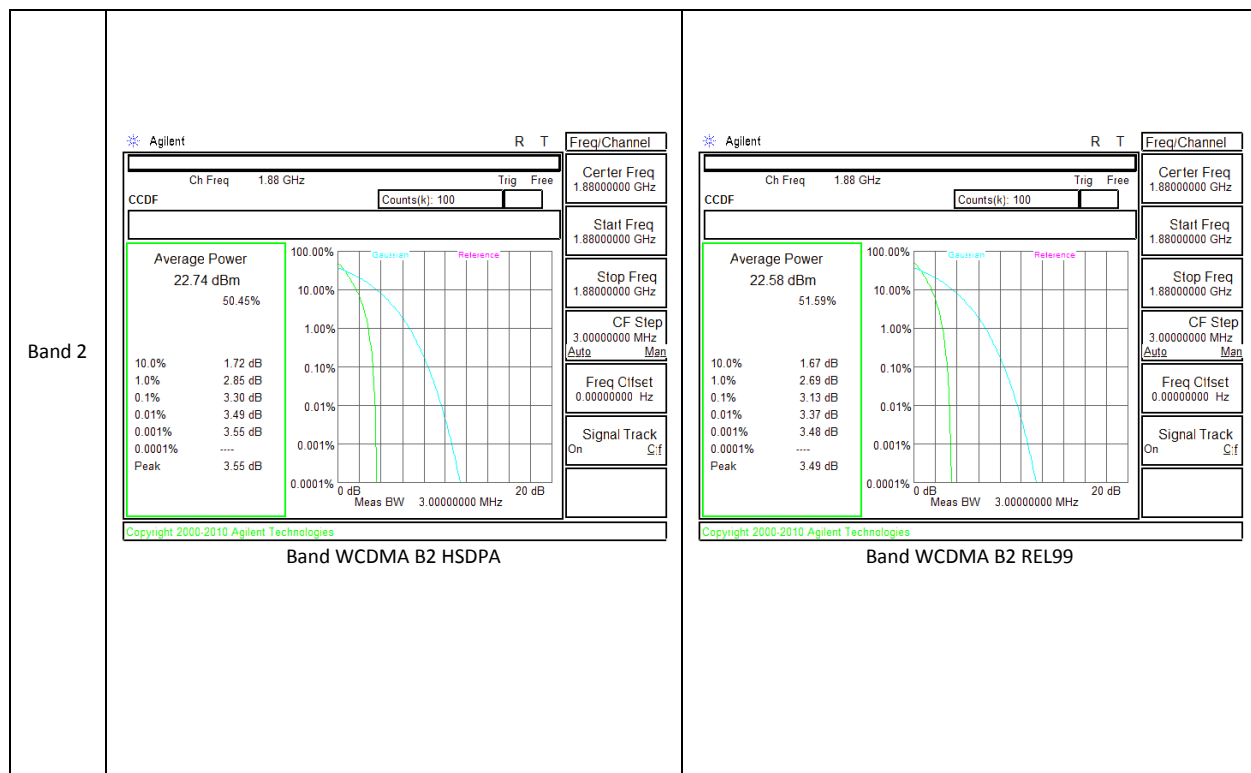
Test Procedure

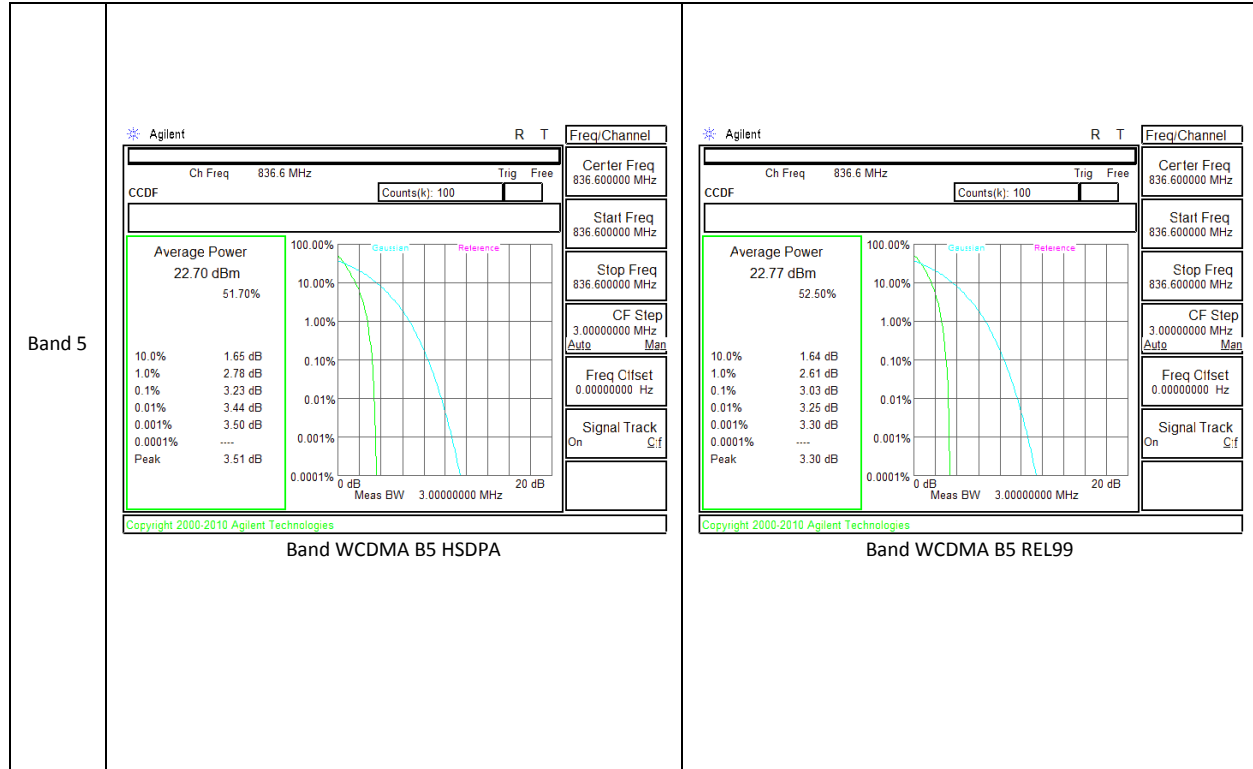
Per KDB 971168 D01 Power Meas License Digital Systems v02r01

Test Spec

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

9.1. CONDUCTED PEAK TO AVERAGE RESULT





10. LIMITS AND CONDUCTED RESULTS

10.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

IC: RSS-132, 4.5; RSS-133, 6.5

LIMITS

For reporting purposes only

TEST PROCEDURE

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

(KDB 971168 D01 Power Meas License Digital Systems v02r01 - 06/07/2013)

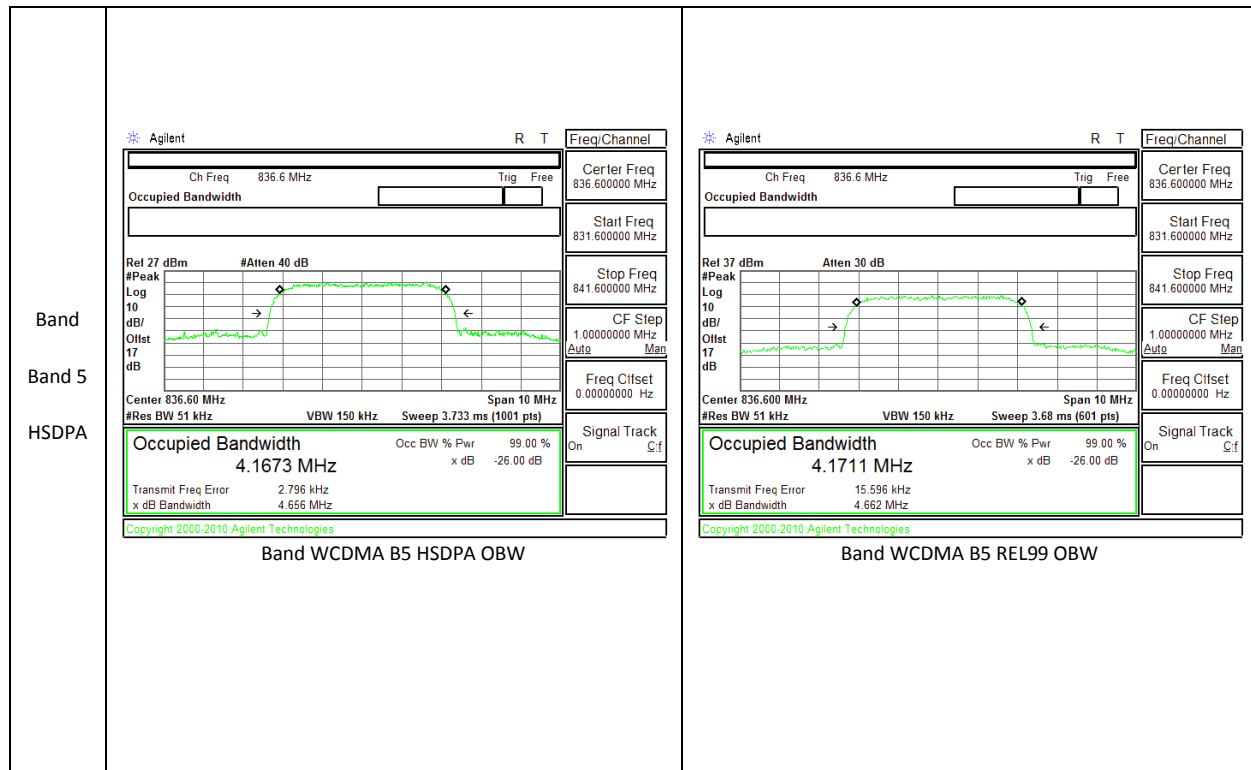
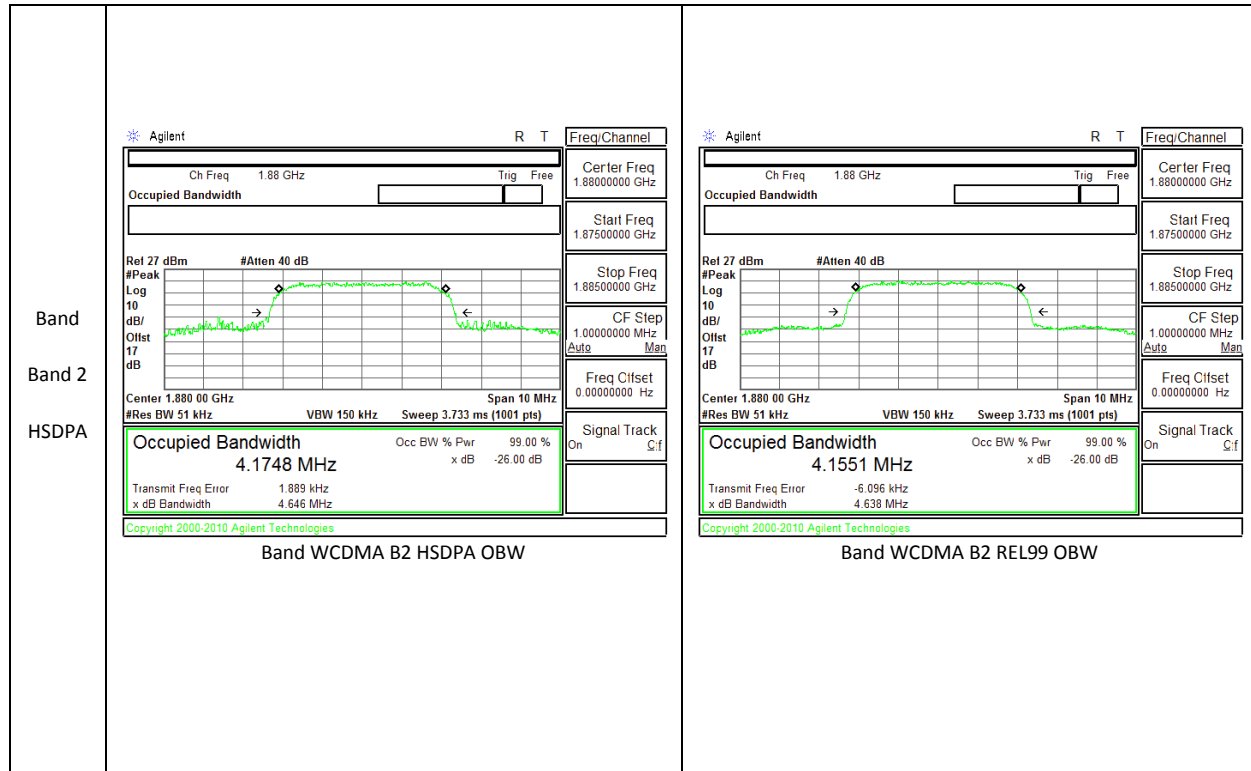
MODES TESTED

WCDMA Band 2 and Band 5

10.1.1. OCCUPIED BANDWIDTH RESULTS

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Band 5	REL99	4132	826.4	4.155	4.654
		4183	836.6	4.141	4.662
		4233	846.6	4.164	4.649
	HSDPA	4132	826.4	4.163	4.643
		4183	836.6	4.167	4.656
		4233	846.6	4.166	4.655
Band 2	REL99	9262	1852.4	4.145	4.652
		9400	1880	4.155	4.638
		9538	1907.6	4.123	4.676
	HSDPA	9262	1852.4	4.145	4.652
		9400	1880	4.155	4.638
		9538	1907.6	4.183	4.676

10.1.1. OCCUPIED BANDWIDTH PLOTS



10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238

LIMITS

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

Part 27: (m)(4) For mobile station, the attenuation factor shall be not less than $43+10\log(P)$ dB at the channel edge and $(55+10\log(P))$ dB at 5.5MHz from the channel edges.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

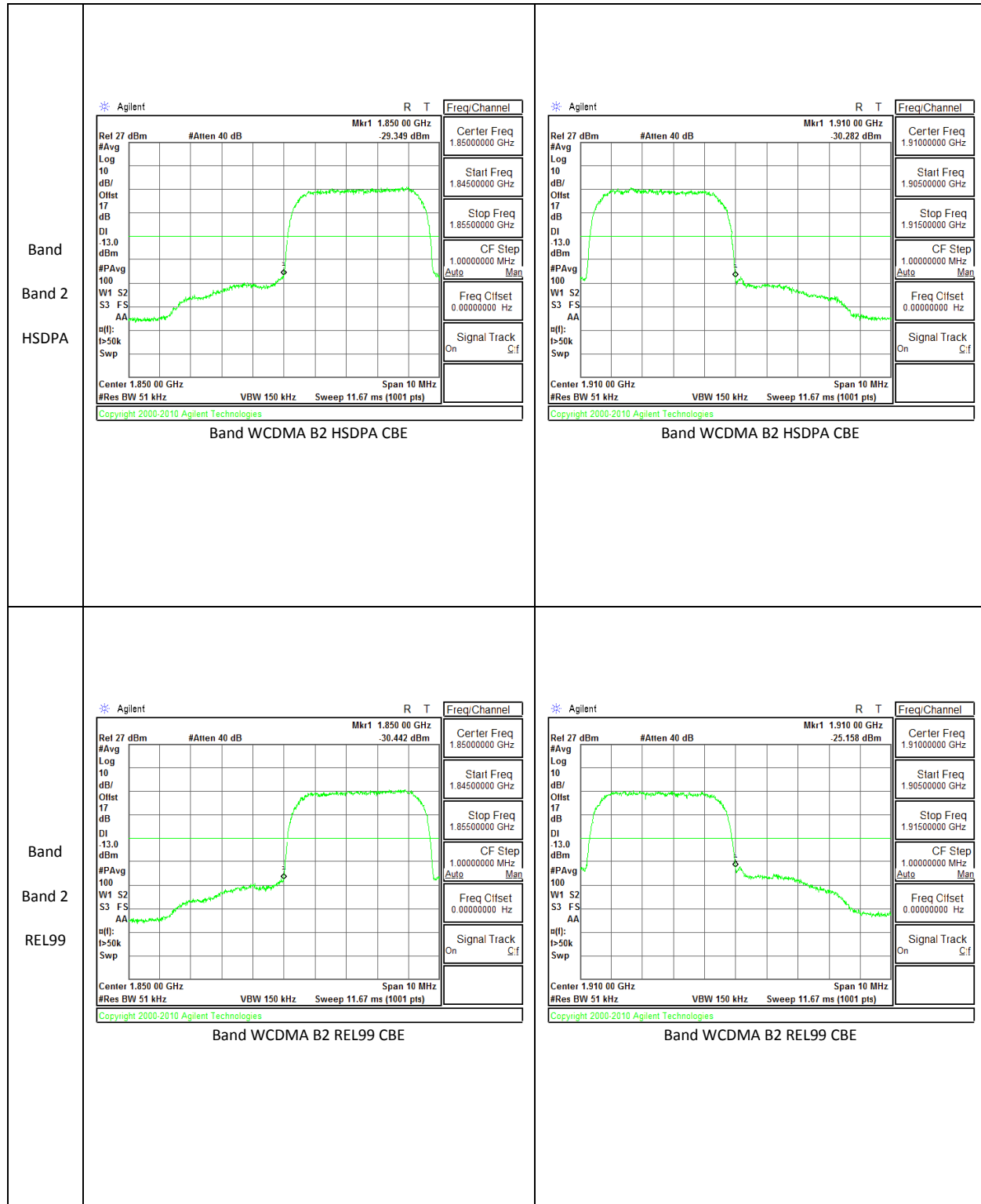
The transmitter output was connected to an Agilent 8960 or a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

MODES TESTED

WCDMA Band 2 and Band 5

RESULTS

10.2.1. BAND EDGE PLOTS



The figure consists of four spectral plots arranged in a 2x2 grid, each showing the frequency response of a WCDMA B5 HSDPA signal. The plots are labeled as follows:

- Top Left: Band WCDMA B5 HSDPA CBE**
 - Center Freq: 824.00 MHz
 - Start Freq: 819.000000 MHz
 - Stop Freq: 829.000000 MHz
 - Span: 10 MHz
 - Attenuation: 40 dB
- Top Right: Band WCDMA B5 HSDPA CBE**
 - Center Freq: 849.00 MHz
 - Start Freq: 844.000000 MHz
 - Stop Freq: 854.000000 MHz
 - Span: 10 MHz
 - Attenuation: 40 dB
- Bottom Left: Band WCDMA B5 REL99 CBE**
 - Center Freq: 824.00 MHz
 - Start Freq: 819.000000 MHz
 - Stop Freq: 829.000000 MHz
 - Span: 10 MHz
 - Attenuation: 30 dB
- Bottom Right: Band WCDMA B5 REL99 CBE**
 - Center Freq: 849.00 MHz
 - Start Freq: 844.000000 MHz
 - Stop Freq: 854.000000 MHz
 - Span: 10 MHz
 - Attenuation: 30 dB

Each plot shows a green trace representing the signal power spectral density. The y-axis is labeled 'dBm' and the x-axis is labeled 'MHz'. The plots include various parameters such as 'Rel 27 dBm', '#Aveg', 'Log', '10', 'dB/Offst', '17', 'dB', 'DI', '-13.0', 'dBm', '#PAveg', '100', 'W1 S2', 'S3 FS', 'AA', 'n(f):', 't>50k', and 'Swp'. The plots are generated using Agilent software, as indicated by the 'Agilent' logo and 'Copyright 2000-2010 Agilent Technologies' text.

10.3. OUT OF BAND EMISSIONS

RULE PART(S)

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

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

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.

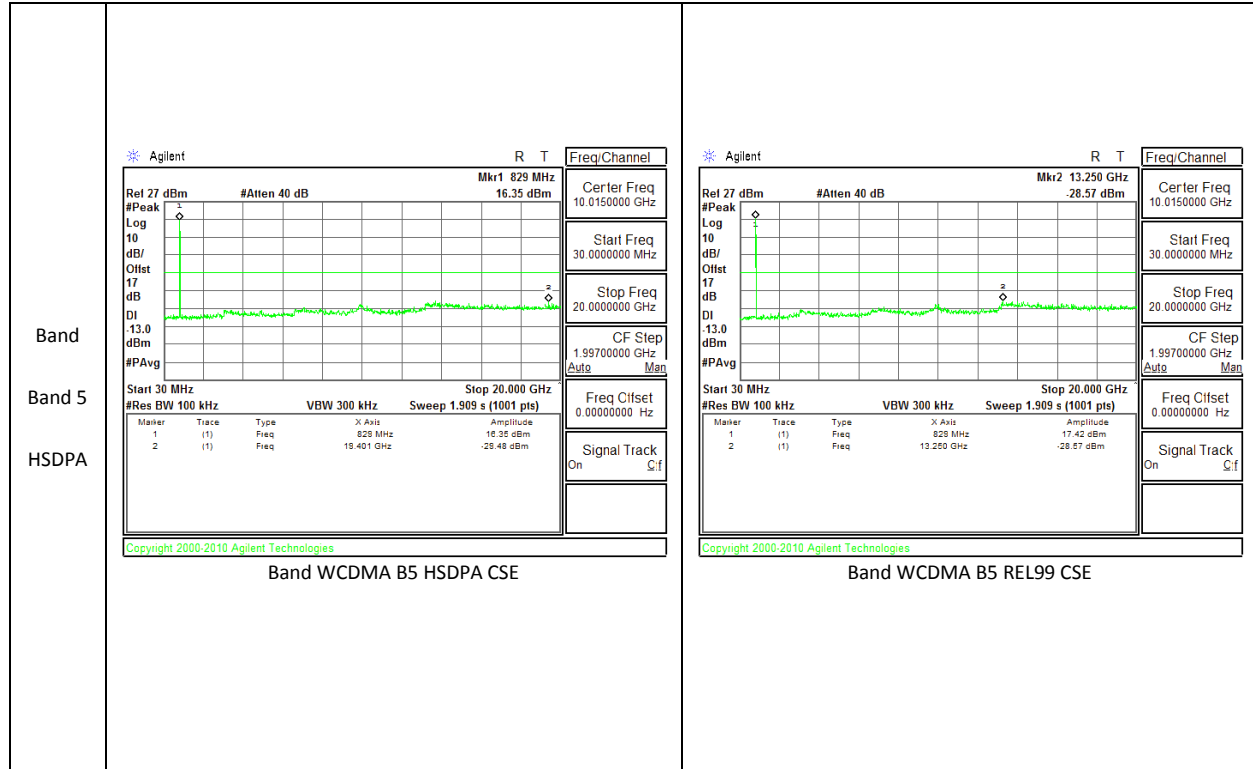
MODES TESTED

WCDMA Band 2 and Band 5

RESULTS

10.3.1. OUT OF BAND EMISSIONS RESULT

Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
Band 5	REL99	826.4	-29.47	-13	-16.47
		836.6	-28.57	-13	-15.57
		846.6	-29.77	-13	-16.77
	HSDPA	826.4	-29.47	-13	-16.47
		836.6	-29.48	-13	-16.48
		846.6	-29.86	-13	-16.86
Band 5	REL99	1852.4	-19.35	-13	-6.35
		1880	-20.55	-13	-7.55
		1907.6	-19.88	-13	-6.88
	HSDPA	1852.4	-19.79	-13	-6.79
		1880	-21.82	-13	-8.82
		1907.6	-19.46	-13	-6.46



10.4. 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

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

MODES TESTED

WCDMA Band 2 and Band 5

RESULTS

See the following pages.

10.4.1. FREQUENCY STABILITY RESULTS

Reference Frequency: Cell Mid Channel 836.6 MHz @ 20°C				
Limit: +/- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.70	50	836.599967	-0.006	2.5
3.70	40	836.599971	-0.011	2.5
3.70	30	836.599965	-0.004	2.5
3.70	20	836.599962	0	2.5
3.70	10	836.599973	-0.013	2.5
3.70	0	836.599971	-0.011	2.5
3.70	-10	836.599972	-0.012	2.5
3.70	-20	836.599965	-0.004	2.5
3.70	-30	836.599971	-0.011	2.5

Reference Frequency: Mid Channel 836.6 MHz @ 20°C				
Limit: +/- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
			Delta (ppm)	Limit (ppm)
3.70	20	836.599962	0.00000	2.5
4.20	20	836.599965	-0.00330	2.5
3.30	20	836.599971	-0.01088	2.5

Reference Frequency: PC S Mid Channel 1880MHz @ 20°C				
Limit: to stay +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.70	50	1879.999935	0.008	2.5
3.70	40	1879.99995	0.000	2.5
3.70	30	1879.999942	0.004	2.5
3.70	20	1879.999950	0	2.5
3.70	10	1879.999941	0.005	2.5
3.70	0	1879.999942	0.004	2.5
3.70	-10	1879.999936	0.008	2.5
3.70	-20	1879.999936	0.008	2.5
3.70	-30	1879.999957	-0.004	2.5

Reference Frequency: PCS Mid Channel 1880 MHz @ 20°C				
Limit: to stay +/- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.70	20	1879.999950	0	2.5
4.20	20	1879.999942	0.004	2.5
3.30	20	1879.999952	-0.001	2.5

11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232

LIMITS

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

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

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

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17; PSA setting reference to 971168 D01 v02r01

For peak power measurement with a PSA:

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

For average power measurement with a PSA:

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

MODES TESTED

WCDMA Band 2 and Band 5

TEST RESULTS

11.1.1. ERP/EIRP Results

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 2	REL99	9262	1852.4	22.75	188.36
		9400	1880	22.31	170.33
		9538	1907.6	22.84	192.31
	HSDPA	9262	1852.4	22.24	167.49
		9400	1880	22.75	188.36
		9538	1907.6	23.41	219.28

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 5	REL99	4132	826.4	22.86	193.20
		4183	836.6	21.24	133.05
		4233	846.6	22.58	181.13
	HSDPA	4132	826.4	20.85	121.62
		4183	836.6	19.89	97.50
		4233	846.6	21.10	128.82

11.1.2. ERP/EIRP DATA

Band Band 2 HSDPA	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C Company: QualComm Project #: 14U17447 Date: 08/01/14 Test Engineer: K. Kedida Configuration: Y POS Mode: HSDPA Band 2 Test Equipment: Receiving: Horn T119, and Chamber C SMA Cables Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBi)</th> <th>EIRP (dBm)</th> <th>Limit (dBm)</th> <th>Margin (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>1852.40</td> <td>12.06</td> <td>V</td> <td>0.9</td> <td>7.9</td> <td>19.06</td> <td>33.0</td> <td>-13.9</td> <td></td> </tr> <tr> <td>1852.40</td> <td>15.24</td> <td>H</td> <td>0.9</td> <td>7.9</td> <td>22.24</td> <td>33.0</td> <td>-10.8</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1880.00</td> <td>10.79</td> <td>V</td> <td>0.9</td> <td>7.9</td> <td>17.79</td> <td>33.0</td> <td>-15.2</td> <td></td> </tr> <tr> <td>1880.00</td> <td>15.75</td> <td>H</td> <td>0.9</td> <td>7.9</td> <td>22.75</td> <td>33.0</td> <td>-10.3</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1907.60</td> <td>11.47</td> <td>V</td> <td>0.9</td> <td>7.9</td> <td>18.47</td> <td>33.0</td> <td>-14.5</td> <td></td> </tr> <tr> <td>1907.60</td> <td>16.41</td> <td>H</td> <td>0.9</td> <td>7.9</td> <td>23.41</td> <td>33.0</td> <td>-9.6</td> <td></td> </tr> </tbody> </table> Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch									1852.40	12.06	V	0.9	7.9	19.06	33.0	-13.9		1852.40	15.24	H	0.9	7.9	22.24	33.0	-10.8		Mid Ch									1880.00	10.79	V	0.9	7.9	17.79	33.0	-15.2		1880.00	15.75	H	0.9	7.9	22.75	33.0	-10.3		High Ch									1907.60	11.47	V	0.9	7.9	18.47	33.0	-14.5		1907.60	16.41	H	0.9	7.9	23.41	33.0	-9.6	
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																			
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	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C								
	Company: QualComm Project #: 14U17447 Date: 08/01/14 Test Engineer: K. Kedida Configuration: Y POS Mode: REL 99 Band 2								
	Test Equipment: Receiving: Horn T119, and Chamber C SMA Cables Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse								
Band									
Band 2									
REL99									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	1852.40	12.56	V	0.9	7.9	19.56	33.0	-13.4	
	1852.40	15.75	H	0.9	7.9	22.75	33.0	-10.3	
	Mid Ch								
	1880.00	12.39	V	0.9	7.9	19.39	33.0	-13.6	
	1880.00	15.31	H	0.9	7.9	22.31	33.0	-10.7	
	High Ch								
	1907.60	11.41	V	0.9	7.9	18.41	33.0	-14.6	
	1907.60	15.84	H	0.9	7.9	22.84	33.0	-10.2	
	Rev. 3.17.11								
	Note: For Band 4 EIRP limit is 30dBm								

	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C																																																																																																	
	Company: QualComm Project #: 14U17447 Date: 08/01/14 Test Engineer: T. Oeur, K. Huynh Configuration: Y w/ Charger Mode: HSDPA Band 5																																																																																																	
	Test Equipment: Receiving: Sunol T185, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) Warehouse.																																																																																																	
Band Band 5 HSDPA	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBd)</th> <th>ERP (dBm)</th> <th>Limit (dBm)</th> <th>Margin (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>Low</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>826.40</td> <td>19.00</td> <td>V</td> <td>0.5</td> <td>0.0</td> <td>18.50</td> <td>38.5</td> <td>-19.9</td> <td></td> </tr> <tr> <td>826.40</td> <td>21.35</td> <td>H</td> <td>0.5</td> <td>0.0</td> <td>20.85</td> <td>38.5</td> <td>-17.6</td> <td></td> </tr> <tr> <td>Mid</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>836.60</td> <td>17.98</td> <td>V</td> <td>0.5</td> <td>0.0</td> <td>17.48</td> <td>38.5</td> <td>-21.0</td> <td></td> </tr> <tr> <td>836.60</td> <td>20.39</td> <td>H</td> <td>0.5</td> <td>0.0</td> <td>19.89</td> <td>38.5</td> <td>-18.6</td> <td></td> </tr> <tr> <td>High</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>846.60</td> <td>15.99</td> <td>V</td> <td>0.5</td> <td>0.0</td> <td>15.49</td> <td>38.5</td> <td>-23.0</td> <td></td> </tr> <tr> <td>846.60</td> <td>21.60</td> <td>H</td> <td>0.5</td> <td>0.0</td> <td>21.10</td> <td>38.5</td> <td>-17.3</td> <td></td> </tr> </tbody> </table>								f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low									826.40	19.00	V	0.5	0.0	18.50	38.5	-19.9		826.40	21.35	H	0.5	0.0	20.85	38.5	-17.6		Mid									836.60	17.98	V	0.5	0.0	17.48	38.5	-21.0		836.60	20.39	H	0.5	0.0	19.89	38.5	-18.6		High									846.60	15.99	V	0.5	0.0	15.49	38.5	-23.0		846.60	21.60	H	0.5	0.0	21.10	38.5	-17.3	
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																										
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826.40	19.00	V	0.5	0.0	18.50	38.5	-19.9																																																																																											
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	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C								
	Company: QualComm Project #: 14U17447 Date: 08/02/14 Test Engineer: R. Alegre Configuration: EUT w/ AC Charger Mode: REL99 Band 5								
	Test Equipment: Receiving: Sunol T185, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) Warehouse.								
Band									
Band 5									
REL99									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low								
	826.40	19.74	V	0.5	0.0	19.24	38.5	-19.2	
	826.40	23.36	H	0.5	0.0	22.86	38.5	-15.6	
	Mid								
	836.60	19.16	V	0.5	0.0	18.66	38.5	-19.8	
	836.60	21.74	H	0.5	0.0	21.24	38.5	-17.2	
	High								
	846.60	18.01	V	0.5	0.0	17.51	38.5	-20.9	
	846.60	23.08	H	0.5	0.0	22.58	38.5	-15.9	
	Rev. 3.17.11								
	Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								

11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238

LIMIT

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

TEST PROCEDURE

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

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

MODES TESTED

WCDMA Band 2 and Band 5

RESULTS

11.2.1. SPURIOUS RADIATION DATA

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement										
Company: Project #: Date: Test Engineer: Configuration: Mode:		Qualcomm 14U17447 08/02/14 R. Alegre Y-Pos EUT w/ AC Charger HSDPA_B2								
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber		T34 8449B		Filter 1						
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch, 1852.4MHz										
Band	3.705	-16.4	V	3.0	35.4	1.0	-50.8	-13.0	-37.8	
	5.557	-15.4	V	3.0	34.7	1.0	-49.1	-13.0	-36.1	
Band 2	7.410	-9.1	V	3.0	34.9	1.0	-43.0	-13.0	-30.0	
	3.705	-13.0	H	3.0	35.4	1.0	-47.4	-13.0	-34.4	
HSDPA	5.557	-14.5	H	3.0	34.7	1.0	-48.2	-13.0	-35.2	
	7.410	-8.0	H	3.0	34.9	1.0	-41.9	-13.0	-28.9	
Mid Ch, 1880MHz										
	3.760	-16.9	V	3.0	35.3	1.0	-51.2	-13.0	-38.2	
	5.640	-10.1	V	3.0	34.7	1.0	-43.8	-13.0	-30.8	
	7.520	-7.7	V	3.0	34.9	1.0	-41.6	-13.0	-28.6	
	3.760	-16.3	H	3.0	35.3	1.0	-50.7	-13.0	-37.7	
	5.640	-13.4	H	3.0	34.7	1.0	-47.1	-13.0	-34.1	
	7.520	-10.5	H	3.0	34.9	1.0	-44.5	-13.0	-31.5	
High Ch, 1907.6MHz										
	3.815	-14.4	V	3.0	35.3	1.0	-48.7	-13.0	-35.7	
	5.723	-5.1	V	3.0	34.7	1.0	-38.8	-13.0	-25.8	
	7.630	-3.2	V	3.0	34.9	1.0	-37.2	-13.0	-24.2	
	3.815	-13.2	H	3.0	35.3	1.0	-47.5	-13.0	-34.5	
	5.723	-1.6	H	3.0	34.7	1.0	-35.4	-13.0	-22.4	
	7.630	-0.8	H	3.0	34.9	1.0	-34.8	-13.0	-21.8	
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement										
Company: Project #: Date: Test Engineer: Configuration: Mode:		Qualcomm 14U17447 08/02/14 R. Alegre Y-Pos EUT w/ AC Charger REL99_B2								
Chamber 3m Chamber		Pre-amplifier T34 8449B		Filter Filter 1		Limit 				
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Band	Low Ch, 1852.4MHz									
	3.705	-16.5	V	3.0	35.4	1.0	-50.9	-13.0	-37.9	
Band 2	5.557	-15.2	V	3.0	34.7	1.0	-48.9	-13.0	-35.9	
	7.410	-8.8	V	3.0	34.9	1.0	-42.7	-13.0	-29.7	
REL99	3.705	-13.7	H	3.0	35.4	1.0	-48.1	-13.0	-35.1	
	5.557	-15.0	H	3.0	34.7	1.0	-48.7	-13.0	-35.7	
	7.410	-8.4	H	3.0	34.9	1.0	-42.3	-13.0	-29.3	
	Mid Ch, 1880MHz									
	3.760	-16.2	V	3.0	35.3	1.0	-50.5	-13.0	-37.5	
	5.640	-9.9	V	3.0	34.7	1.0	-43.7	-13.0	-30.7	
	7.520	-7.8	V	3.0	34.9	1.0	-41.8	-13.0	-28.8	
	3.760	-15.7	H	3.0	35.3	1.0	-50.1	-13.0	-37.1	
	5.640	-14.0	H	3.0	34.7	1.0	-47.7	-13.0	-34.7	
	7.520	-10.6	H	3.0	34.9	1.0	-44.5	-13.0	-31.5	
	High Ch, 1907.6MHz									
	3.815	-14.6	V	3.0	35.3	1.0	-48.9	-13.0	-35.9	
	5.723	-6.1	V	3.0	34.7	1.0	-39.9	-13.0	-26.9	
	7.630	-4.2	V	3.0	34.9	1.0	-38.2	-13.0	-25.2	
	3.815	-14.2	H	3.0	35.3	1.0	-48.4	-13.0	-35.4	
	5.723	-1.4	H	3.0	34.7	1.0	-35.1	-13.0	-22.1	
	7.630	-1.7	H	3.0	34.9	1.0	-35.7	-13.0	-22.7	
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement										
Company:	Qualcomm									
Project #:	14U17447									
Date:	08/02/14									
Test Engineer:	R. Alegre									
Configuration:	Y-Pos EUT w/ AC Charger									
Mode:	HSDPA_B5									
Chamber 3m Chamber Pre-amplifer T34 8449B Filter Filter 1 Limit Part 22										
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Band	Low Ch, 826.4MHz									
	1.653	-20.4	V	3.0	37.4	1.0	-56.8	-13.0	-43.8	
Band 5	2.479	-15.3	V	3.0	36.4	1.0	-50.6	-13.0	-37.6	
	3.306	-16.7	V	3.0	35.8	1.0	-51.5	-13.0	-38.5	
HSDPA	1.653	-21.8	H	3.0	37.4	1.0	-58.2	-13.0	-45.2	
	2.479	-17.2	H	3.0	36.4	1.0	-52.6	-13.0	-39.6	
	3.306	-13.8	H	3.0	35.8	1.0	-48.6	-13.0	-35.6	
	Mid Ch, 836.6MHz									
	1.673	-22.7	V	3.0	37.3	1.0	-59.1	-13.0	-46.1	
	2.510	-17.9	V	3.0	36.4	1.0	-53.2	-13.0	-40.2	
	3.346	-16.4	V	3.0	35.8	1.0	-51.2	-13.0	-38.2	
	1.673	-18.7	H	3.0	37.3	1.0	-55.0	-13.0	-42.0	
	2.510	-18.3	H	3.0	36.4	1.0	-53.7	-13.0	-40.7	
	3.346	-15.6	H	3.0	35.8	1.0	-50.4	-13.0	-37.4	
	High Ch, 846.6MHz									
	1.693	-22.2	V	3.0	37.3	1.0	-58.5	-13.0	-45.5	
	2.540	-15.0	V	3.0	36.3	1.0	-50.3	-13.0	-37.3	
	3.386	-18.1	V	3.0	35.7	1.0	-52.8	-13.0	-39.8	
	1.693	-18.2	H	3.0	37.3	1.0	-54.5	-13.0	-41.5	
	2.540	-16.5	H	3.0	36.3	1.0	-51.9	-13.0	-38.9	
	3.386	-13.4	H	3.0	35.7	1.0	-48.1	-13.0	-35.1	
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement										
Company:		Qualcomm								
Project #:		14U17447								
Date:		08/02/14								
Test Engineer:		R. Alegre								
Configuration:		Y-Pos EUT w/ AC Charger								
Mode:		REL99_B5								
Chamber 3m Chamber Pre-amplifer T34 8449B Filter Filter 1 Limit Part 22										
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Band	Low Ch, 826.4MHz									
	1.653	-21.0	V	3.0	37.4	1.0	-57.4	-13.0	-44.4	
Band 5	2.479	-15.0	V	3.0	36.4	1.0	-50.4	-13.0	-37.4	
	3.306	-17.5	V	3.0	35.8	1.0	-52.3	-13.0	-39.3	
REL99	1.653	-22.2	H	3.0	37.4	1.0	-58.6	-13.0	-45.6	
	2.479	-17.6	H	3.0	36.4	1.0	-53.0	-13.0	-40.0	
	3.306	-13.7	H	3.0	35.8	1.0	-48.5	-13.0	-35.5	
	Mid Ch, 836.6MHz									
	1.673	-22.6	V	3.0	37.3	1.0	-59.0	-13.0	-46.0	
	2.510	-17.8	V	3.0	36.4	1.0	-53.2	-13.0	-40.2	
	3.346	-15.7	V	3.0	35.8	1.0	-50.5	-13.0	-37.5	
	1.673	-19.3	H	3.0	37.3	1.0	-55.6	-13.0	-42.6	
	2.510	-18.2	H	3.0	36.4	1.0	-53.5	-13.0	-40.5	
	3.346	-16.4	H	3.0	35.8	1.0	-51.1	-13.0	-38.1	
	High Ch, 846.6MHz									
	1.693	-22.5	V	3.0	37.3	1.0	-58.8	-13.0	-45.8	
	2.540	-15.4	V	3.0	36.3	1.0	-50.7	-13.0	-37.7	
	3.386	-17.4	V	3.0	35.7	1.0	-52.1	-13.0	-39.1	
	1.693	-16.6	H	3.0	37.3	1.0	-52.9	-13.0	-39.9	
	2.540	-17.2	H	3.0	36.3	1.0	-52.5	-13.0	-39.5	
	3.386	-13.8	H	3.0	35.7	1.0	-48.5	-13.0	-35.5	
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										