EMI Test Report

Tested in accordance with
Federal Communications Commission (FCC)
Personal Communications Services
CFR 47, Parts 15, Subpart B
&
Industry Canada (IC), ICES-003

A division of Research In Motion Limited

REPORT NO.: RTS-5955-1110-13

PRODUCT MODEL NO.: REQ71UW
TYPE NAME: BlackBerry® smartphone
FCC ID: L6AREQ70UW
IC: 2503A-REQ70UW

DATE: October 31, 2011

Statement of Performance:

The BlackBerry® smartphone, model REQ71UW, part number CER-41254-001 Rev. 1 and accessories when configured and operated per RIM's operation instructions, and performs within the requirements of the test standards.

Declaration:

We hereby certify that:
The test data reported herein is an accurate record of the performance of the sample(s) tested.
The test results are valid for the tested unit (s) only.
The test equipment used was suitable for the tests performed and within manufacturer's published specifications and operating parameters.
The test methods were consistent with the methods described in the relevant standards.

Documented by:

Shuo Wang
Regulatory Compliance Specialist
Date: October 26, 2011

Reviewed by:

Heng Lin
Regulatory Compliance Specialist
Date: October 28, 2011

Reviewed and Approved by:

Masud S. Attayi, P.Eng.
Manager, Regulatory Compliance
Date: November 1, 2011

Table of Contents

A. Scope

This report details the results of compliance tests that were performed in accordance with the requirements of:

- FCC CFR 47 Part 15, Subpart B, October, 2010 Class B Digital Devices, Unintentional Radiators
- IC ICES-003 Issue 4, February 2004, Class B Digital Devices, Unintentional Radiators

B. Associated Documents

- RoW_NA_Similiarity HW_Declaration

C. Product Identification

Manufactured by Research In Motion Limited whose headquarters is located at:
295 Phillip Street
Waterloo, Ontario
Canada, N2L 3W8
Phone: 519 888 7465
Fax: 519 888 6906

The equipment under test (EUT) was tested at the following locations:

RIM Testing Services EMI test facilities

305 Phillip Street	440 Phillip Street
Waterloo, Ontario	Waterloo, Ontario
Canada, N2L 3W8	Canada, N2L 5R9
Phone: 519 888 7465	Phone: 519 888 7465
Fax: 519 888 6906	Fax: 519 888 6906

The testing was performed from September 27 to September 30, 2011.

The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN	Software
1	REQ71UW	CER-41254-001 Rev 1	28406592	V7.0.0.392 Bundle 1802 Platform: 5.0.0.570

AC conducted testing was performed on sample 1.
Radiated Emissions testing was performed on sample 1.

BlackBerry® smartphone Accessories Tested

1) Fixed Blade Charger Rev.1, part number HDW-24481-001 (model number RIM-C-4ADUUS-001 with an output voltage of 5.0 volts dc.
2) Alt. Fixed Blade Charger Rev.2, part number HDW-24481-001 (model number RIM-C-4ADUUS-001 with an output voltage of 5.0 volts dc.
3) Alt.1 Fixed Blade Charger, part number HDW-24481-001 (model number PSM04A-050QRIM-R), with an output voltage of 5.0 volts dc.
4) Folding Blade Charger, part number HDW-34724-003 with an output voltage of 5.0 volts dc and current of 1.8 Amps.
5) Captive Cable Charger, part number HDW-17957-003 with an output voltage of 5.0 volts dc, 750 mA and attached USB cable with a lead length of 1.80 metres.
6) Premium Stereo Headset, part number HDW-15766-005, 1.3 metres long.
7) Stereo Headset, part number HDW-24529-001, with a lead length of 1.1 metres.
8) Alt. Stereo Headset, part number HDW-24529-001, with a lead length of 1.1metres.
9) USB Data Cable, part number HDW-28109-001, 0.3 metre long.
10) USB Data Cable, part number HDW-28109-003, 1.2 metre long.
11) USB Y-Cable, part number HDW-19137-002, lead lengths of 26 cm and 11 cm.
12) External Battery Charger, part number HDW-24478-001.
13) BlackBerry Charging Pod, part number HDW-43200-001.

D. Support Equipment Used for the Testing of the EUT

1) IBM Thinkpad Lenovo T60p laptop, type 8742-C2U, product ID 8742C2U

E. Summary of Results

SPECIFICATION		TEST TYPE	Meets Requirement	Test Data APPENDIX
FCC CFR 47	IC			
Part 15, Subpart B	ICES-003	Conducted AC Line Emission	Yes	1
Part 15, Subpart B	ICES-003	Radiated Unintentional Spurious Emissions	Yes	2

a) AC CONDUCTED EMISSIONS

The conducted emissions were measured using the test procedure outlined in CISPR Recommendation 22 through a 50 Ohm Line Impedance Stabilization Network (LISN), which was inserted in the power line to the equipment to provide the specified impedance for measurements. The EUT was placed on a nonconductive wooden table, 80 cm high that was positioned 40 cm from a vertical ground plane. The RF output of the network was connected to an EMI receiver system with characteristics that duplicate those of the receiver specified in CISPR Publication 16. BlackBerry® smartphone was in battery charging mode. The input voltage was 120 V, 60 Hz.

The following test configurations were measured for model REQ71UW:

Test Configuration	Operating Mode(s)	Charger + Accessories
1	GSM 850 Idle, Audio Playback	Fixed Blade Charger Stereo Headset 1.2m USB Cable Charging Pod
2	GSM1900 Idle, Video Playback	Alt. Fixed Blade Charger Premium Stereo Headset 1.2m USB Cable
3	UMTS Band 2 Idle, Audio Playback	Folding Blade Charger Premium Stereo Headset Charging Pod
4	UMTS Band 5 idle, Video Playback	Captive Cable Charger Premium Stereo Headset External Battery Charger USB Y-Cable

The sample EUT's conducted emissions were compared with respect to the FCC CFR 47 Part 15, Subpart B, and IC ICES-003, Class B limit. The sample EUT had a worst test case margin of 1.59 dB below the AVG limit at 0.190 MHz using the average peak detector in Test Configuration 4.

Measurement Uncertainty ±3.0 dB

To view the test data/plots, see APPENDIX 1.

b) RADIATED EMISSIONS

The radiated emissions from the EUT were measured using the methods outlined in CISPR Recommendation 22. The EUT was placed on a nonconductive Styrofoam table, 80 cm high that was positioned on a remote controlled turntable. The test distance used between the EUT and the receiving antenna was three metres. The turntable was rotated to determine the azimuth of the peak emissions. Then the emissions were maximized by elevating the antenna in the range of 1 to 4 metres. The maximum emission level was recorded. The frequency range measured was from 30 MHz to 5.0 GHz. Both the horizontal and vertical polarizations of the emissions were measured.

The measurements were done in a semi-anechoic chamber. The FCC registration number is **778487** and the Industry Canada(IC) file number is **2503B-1**. The EUT was configured and operated to produce the maximum radiated emissions while still keeping within RIM's specifications.

The BlackBerry® smartphone was in battery charging mode for all configurations. The ac input voltage was 120V, 60Hz.

The following test configurations were measured for model REQ71UW:

Test Configuration	Operating Mode(s)	Charger + Accessories
1	GSM 850 Idle, Audio Playback	Fixed Blade Charger Stereo Headset 1.2m USB Cable Charging Pod
2	PCS 1900 Idle, Video Playback	Alt. Fixed Blade Charger Premium Stereo Headset 0.3m USB Cable
3	Bluetooth Tx, Audio Playback	Alt. 1 Fixed Blade Charger Premium Stereo Headset 1.2m USB Cable Charging Pod
4	802.11b Tx, Video Playback	Captive Cable Charger Alt. Stereo Headset
5	UMTS Band 2 Idle, Audio Playback	Folding Blade Charger Premium Stereo Headset 1.2m USB Cable Charging Pod IBM Thinkpad Lenovo T60p laptop
6	UMTS Band 5 Idle, Audio Playback	Captive Cable Charger Premium Stereo Headset External Battery Charger USB Y-Cable

The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15, Subpart B, and IC ICES-003, Class B limit.

The system met the requirements with a worst test case emission margin of 3.94 dB below the QP limit at 41.80 MHz using quasi-peak detector in Test Configuration 6.

To view the test data see APPENDIX 2.

Sample Calculation:

Field Strength (dBµV/m) is calculated as follows:
FS = Measured Level (dBµV) + A.F. (dB/m) + Cable Loss (dB) - Preamp (dB) + Filter Loss (dB)

Measurement Uncertainty ±4.6 dB

F. Compliance Test Equipment Used

UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
Preamplifier	Sonoma	310N/11909A	185831	11-11-14	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	12-10-07	Radiated Emissions
EMC Analyzer	Rohde & Schwarz	ESIB 40	3942A00517	11-11-28	Radiated Emissions
Digital Multimeter	Hewlett Packard	34401A	US36042324	11-10-28	Conducted/Radiated Emissions
T/RH Meter	OMEGA	iTHX-SD	0380561	12-10-20	Radiated Emission
T/RH Meter	OMEGA	iTHX-SD	0380567	12-10-20	Radiated Emission
L.I.S.N.	Rohde & Schwarz	ENV216	100060	11-12-10	Conducted Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	017401	12-01-14	Radiated Emissions
Horn Antenna	EMC Automation	HRN-0118	030101	12-07-20	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	112394	11-11-28	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	112395	11-11-28	Radiated/Conducted Emissions
EMI Test Receiver	Rohde & Schwarz	ESU 40	100162	11-10-30	Radiated/Conducted Emissions
Bluetooth Tester	Rohde & Schwarz	CBT	100368	11-11-27	Radiated Emissions
Bluetooth Tester	Rohde & Schwarz	CBT	100370	11-11-29	Radiated/Conducted Emissions

APPENDIX 1 - AC CONDUCTED EMISSIONS TEST DATA

AC Conducted Emissions Test Results

The following test configurations were measured for model REQ71UW.

The following tests were performed by Savtej Sandhu.

Test Configuration 1

Date of the test: September 30, 2011
The environmental conditions were: Temperature: 26.0 °C
Humidity: 34.1 %

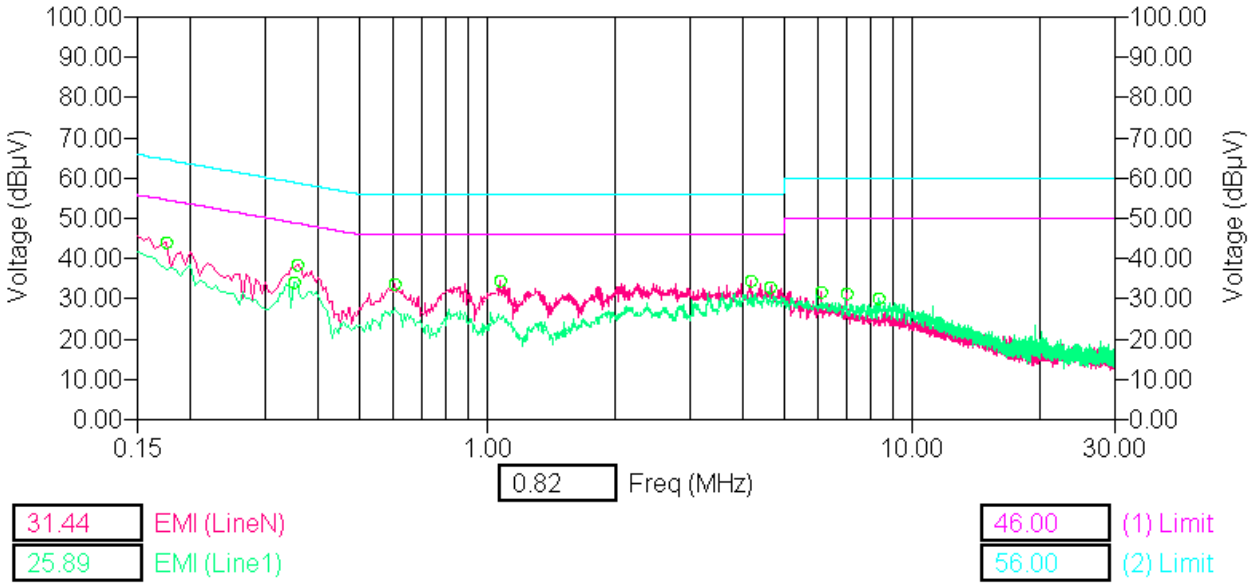
All emission levels had test margins of greater than 25 dB.
Measurements were done with the quasi-peak detector.

See figure 1-1 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

AC Conducted Emissions Test Graphs

Test Configuration 1

Figure 1-1: L1 and N lines Conducted Emissions



AC Conducted Emissions Test Results cont'd

Test Configuration 2

Date of the test: September 30, 2011
The environmental conditions were: Temperature: 26.0 °C
Humidity: 34.1 %

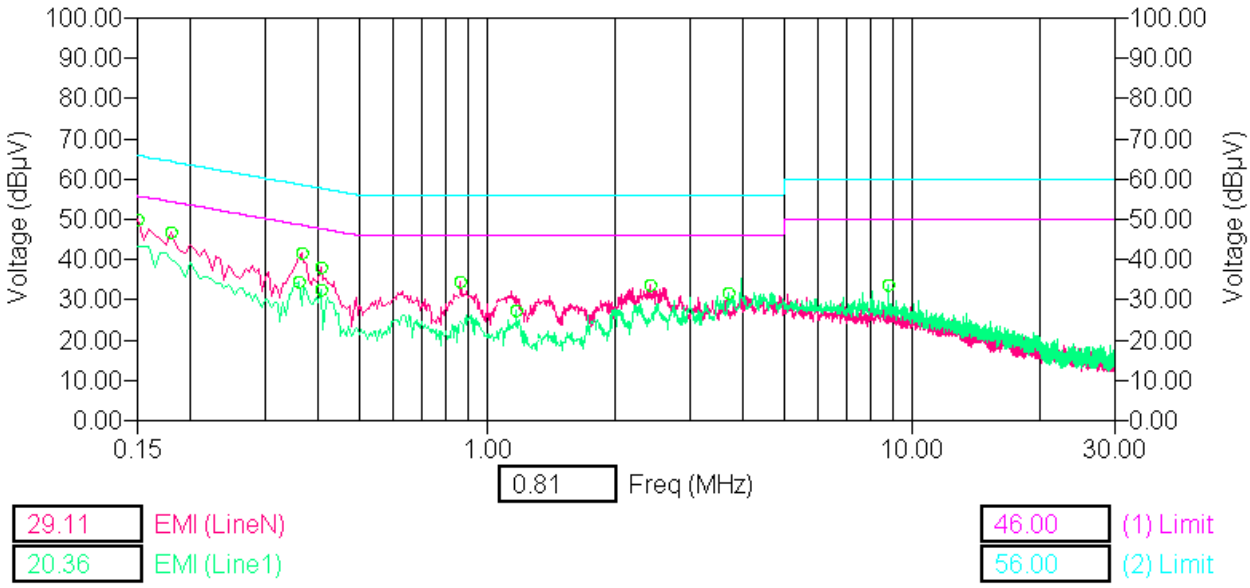
All emission levels had test margins of greater than 25 dB.
Measurements were done with the quasi-peak detector.

See figure 1-2 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

AC Conducted Emissions Test Graphs

Test Configuration 2

Figure 1-2: L1 and N lines Conducted Emissions



AC Conducted Emissions Test Results cont'd

Test Configuration 3

Date of the test: September 30, 2011
The environmental conditions were: Temperature: 26.0 °C
Humidity: 34.1 %

Freq (MHz)	Line	Cable (dB)	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	AVG Limit (dBµV)	(2) Limit (dBµV)	(AVG) Margin (dB)	(QP) Margin (dB)
0.18	L1	9.91	36.92	44.71	54.49	64.49	-17.57	-19.78
0.19	L1	9.91	36.35	43.84	54.26	64.26	-17.9	-20.42
0.19	N	9.91	34.35	43.45	54.04	64.04	-19.69	-20.59
0.2	N	9.91	36.23	44.33	53.41	63.41	-17.18	-19.07
0.46	N	9.95	33.32	45.44	46.6	56.6	-13.29	-11.16
0.47	L1	9.94	37.66	48.73	46.43	56.43	-8.76	-7.7
0.54	L1	9.95	31.85	40.56	46	56	-14.15	-15.44
0.64	N	9.96	32.85	43.82	46	56	-13.15	-12.18
0.77	L1	9.97	31.36	37.7	46	56	-14.64	-18.3
0.96	N	9.96	35.31	41.62	46	56	-10.69	-14.38
1.01	L1	9.87	34.46	41.4	46	56	-11.54	-14.6
1.04	L1	9.88	33.48	41.5	46	56	-12.52	-14.5
1.1	N	9.89	39.11	45.97	46	56	-6.89	-10.03
1.17	L1	9.9	28.95	38.88	46	56	-17.05	-17.12
1.27	N	9.92	33.19	41.53	46	56	-12.81	-14.47
1.83	L1	9.98	34.93	41.56	46	56	-11.07	-14.44
2.02	N	10	33.07	39.12	46	56	-12.93	-16.88
2.09	L1	10.01	34.47	40.13	46	56	-11.53	-15.87
2.19	N	10.01	33.31	39.41	46	56	-12.69	-16.59

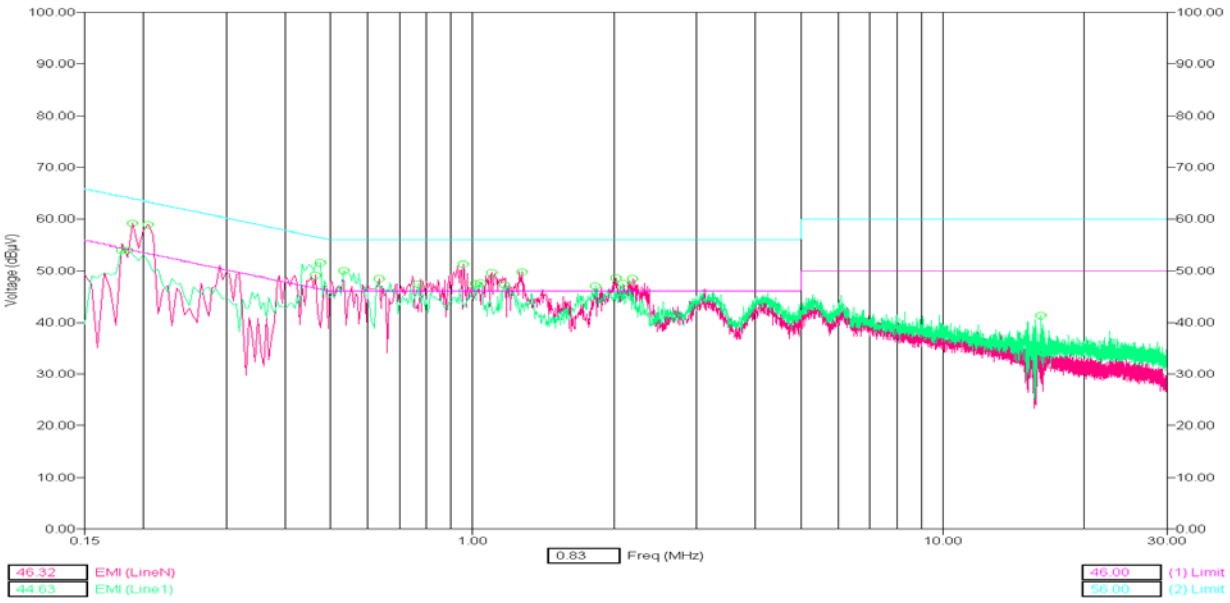
All other emission levels had test margins of greater than 25 dB.
Measurements were done with the quasi-peak detector.

See figure 1-3 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

AC Conducted Emissions Test Graphs

Test Configuration 3

Figure 1-3: L1 and N lines Conducted Emissions



AC Conducted Emissions Test Results cont'd

Test Configuration 4

Date of the test: September 30, 2011
The environmental conditions were: Temperature: 26.0 °C
Humidity: 34.1 %

Freq (MHz)	Line	Cable (dB)	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	AVG Limit (dBµV)	QP Limit (dBµV)	(AVG) Margin (dB)	(QP) Margin (dB)
0.17	N	9.9	29.55	54.98	54.96	64.96	-25.41	-9.98
0.19	L1	9.91	41.45	62.67	54.26	64.26	-12.81	**-1.59**
0.23	L1	9.92	24.66	50.77	52.27	62.27	-27.61	-11.5
0.25	N	9.92	37.83	56.66	51.92	61.92	-14.09	-5.26
0.49	N	9.94	25.64	40.38	46.17	56.17	-20.53	-15.79
0.5	L1	9.94	27.93	41.53	46.08	56.08	-18.16	-14.55
0.51	N	9.94	24.46	38.59	46	56	-21.54	-17.41
0.55	L1	9.95	33.2	46.7	46	56	-12.8	-9.3
0.55	N	9.95	23.07	36.6	46	56	-22.93	-19.4
0.73	L1	9.97	32.85	45.26	46	56	-13.15	-10.74
5.54	L1	10.14	24.36	35.71	50	60	-25.64	-24.29
11.91	N	10.29	22.6	32.42	50	60	-27.4	-27.58
11.91	L1	10.29	26.92	36.23	50	60	-23.08	-23.77

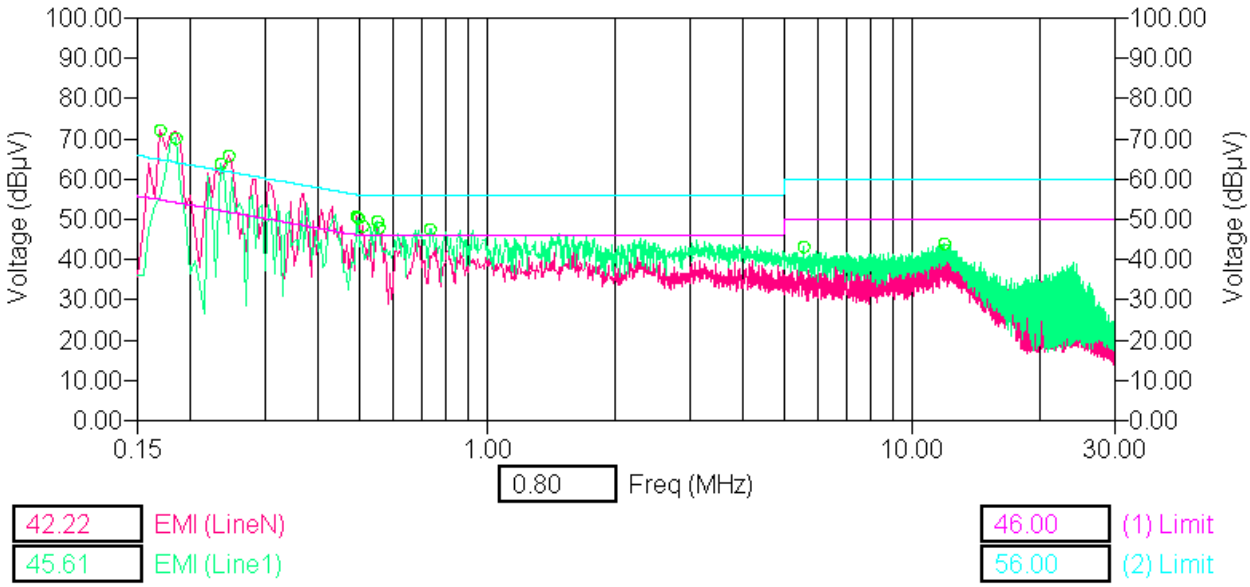
All other emission levels had test margins greater than 25 dB.
Measurements were done with the quasi-peak and the average detector.

See figure 1-7 and figure 1-8 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

AC Conducted Emissions Test Graphs

Test Configuration 4

Figure 1-4: L1 and N lines Conducted Emissions



APPENDIX 2 - RADIATED EMISSIONS TEST DATA (REQ71UW)

Radiated Emissions Test Results

The following test configurations were measured for model REQ71UW.

The following tests were performed by Ven Olis.

Test Configuration 1

Date of the test: September 27, 2011
The environmental conditions were: Temperature: 26.0 °C
Humidity: 36.9 %

Frequency (MHz)	Antenna Pol. (V/H)	Antenna Height (metres)	Test Angle (Deg.)	Detector (Q.P. or Peak)	Measured Level (dBµV)	Correction Factor for preamp/antenna / cables/ filter (dB/m)	Field Strength Level (reading +corr) (dBµV/m)	Limit @ 3.0 m (dBµV/m)	Test Margin (dB)
46.250	V	1.42	171.00	Q.P.	38.50	-16.85	21.65	40.00	-18.35

All other emission levels had test margins greater than 25 dB.

Radiated Emissions Test Results cont'd

Test Configuration 2

Date of the test: September 27, 2011
The environmental conditions were: Temperature: 26.0 °C
Humidity: 36.9 %

Frequency (MHz)	Antenna Pol. (V/H)	Antenna Height (metres)	Test Angle (Deg.)	Detector (Q.P. or Peak)	Measured Level (dBµV)	Correction Factor for preamp/antenna / cables/ filter (dB/m)	Field Strength Level (reading +corr) (dBµV/m)	Limit @ 3.0 m (dBµV/m)	Test Margin (dB)
43.500	V	1.40	275.00	Q.P.	49.28	-16.27	33.01	40.00	-6.99
64.550	V	1.40	110.00	Q.P.	38.90	-16.81	22.09	40.00	-17.91

All other emission levels had test margins greater than 25 dB.

Radiated Emissions Test Results cont'd

Test Configuration 3

Date of the test: August 17, 2011
The environmental conditions were: Temperature: 25.2 °C
Humidity: 38.2 %

Frequency (MHz)	Antenna Pol. (V/H)	Antenna Height (metres)	Test Angle (Deg.)	Detector (Q.P. or Peak)	Measured Level (dBµV)	Correction Factor for preamp/antenna / cables/ filter (dB/m)	Field Strength Level (reading+corr) (dBµV/m)	Limit @ 3.0 m (dBµV/m)	Test Margin (dB)
46.250	V	1.40	137.00	Q.P.	46.24	-16.78	29.46	40.00	-10.54
75.050	V	1.84	353.00	Q.P.	36.77	-15.69	21.08	40.00	-18.92
87.250	H	2.44	190.00	Q.P.	33.03	-14.54	18.49	40.00	-21.51
832.200	V	3.04	287.00	Q.P.	23.33	4.51	27.84	46.00	-18.16

All other emission levels had test margins greater than 25 dB.

Radiated Emissions Test Results cont'd

Test Configuration 4

Date of the test: September 27, 2011
The environmental conditions were: Temperature: 26.0 °C
Humidity: 36.9 %

Frequency (MHz)	Antenna Pol. (V/H)	Antenna Height (metres)	Test Angle (Deg.)	Detector (Q.P. or Peak)	Measured Level (dBµV)	Correction Factor for preamp/antenna / cables/ filter (dB/m)	Field Strength Level (reading+corr) (dBµV/m)	Limit @ 3.0 m (dBµV/m)	Test Margin (dB)
41.800	V	1.45	321.00	Q.P.	33.44	-16.03	17.41	40.00	-22.59
49.450	V	1.40	291.00	Q.P.	42.88	-17.15	25.73	40.00	-14.27
64.500	V	1.40	144.00	Q.P.	35.56	-16.83	18.73	40.00	-21.27

All other emission levels had test margins greater than 25 dB.

Radiated Emissions Test Results cont'd

Test Configuration 5

Date of the test: September 27, 2011
The environmental conditions were: Temperature: 26.0 °C
Humidity: 36.9 %

Frequency (MHz)	Antenna Pol. (V/H)	Antenna Height (metres)	Test Angle (Deg.)	Detector (Q.P. or Peak)	Measured Level (dBµV)	Correction Factor for preamp/antenna / cables/ filter (dB/m)	Field Strength Level (reading+corr) (dBµV/m)	Limit @ 3.0 m (dBµV/m)	Test Margin (dB)
43.200	V	1.40	176.00	Q.P.	50.17	-16.21	33.96	40.00	-6.04
71.600	V	1.40	266.00	Q.P.	35.62	-16.02	19.60	40.00	-20.40
92.500	H	3.05	252.00	Q.P.	39.13	-13.86	25.27	43.50	-18.23
199.250	H	3.49	169.00	Q.P.	28.35	-8.91	19.44	43.50	-24.06
240.000	H	1.44	93.00	Q.P.	42.42	-10.09	32.33	46.00	-13.67
244.350	V	1.76	354.00	Q.P.	35.78	-9.92	25.86	46.00	-20.14
442.850	V	1.48	33.00	Q.P.	33.35	-2.86	30.49	46.00	-15.51
720.050	V	2.58	354.00	Q.P.	26.71	2.93	29.64	46.00	-16.36
864.000	V	1.40	181.00	Q.P.	28.24	6.41	34.65	46.00	-11.35
923.650	H	2.58	336.00	Q.P.	23.23	6.68	29.91	46.00	-16.09

All other emission levels had test margins greater than 25 dB.

Radiated Emissions Test Results cont'd

Test Configuration 6

Date of the test: September 27, 2011
The environmental conditions were: Temperature: 25.4 °C
Humidity: 37.9 %

Frequency (MHz)	Antenna Pol. (V/H)	Antenna Height (metres)	Test Angle (Deg.)	Detector (Q.P. or Peak)	Measured Level (dBµV)	Correction Factor for preamp/antenna / cables/ filter (dB/m)	Field Strength Level (reading+corr) (dBµV/m)	Limit @ 3.0 m (dBµV/m)	Test Margin (dB)
41.800	V	1.40	163.00	Q.P.	51.97	-15.91	36.06	40.00	**-3.94**
42.100	H	3.44	354.00	Q.P.	35.63	-15.99	19.64	40.00	-20.36

All other emission levels had test margins greater than 25 dB.