

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

RIM Testing Services (RTS)

A division of Research In Motion Limited

REPORT NO.: RTS-1364-0812-14

PRODUCT MODEL NO.: RCE21CW
TYPE NAME: BlackBerry® smartphone
FCC ID: L6ARCE20CW
IC: 2503A-RCE20CW

DATE: 04 January, 2009

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Statement of Performance:

The BlackBerry® smartphone, model RCE21CW, part number CER-21463-001 Rev. 1, and accessories when configured and operated per RIM's operation instructions, perform 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.

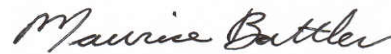
The test methods were consistent with the methods described in the relevant standards.

Documented by:



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Date: 16 December, 2008

Reviewed by:



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Date: 16 December, 2008

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Date: 06 January, 2009

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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, July 10, 2008, Class B Digital Devices, Unintentional Radiators
- IC ICES-003 Issue 4, February, 2004, Class B Digital Devices, Unintentional Radiators

B. Associated Document

No Associated Documents.

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 location:

RIM Testing Services (RTS) EMI test facilities
440 Phillip Street
Waterloo, Ontario,
Canada , N2L 5R9
Phone: 519 888 7465
Fax: 519 888 6906

The testing was performed on December 01 - 12, 2008.

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The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN
1	RCE21CW	CER-21463-001 Rev 1	3048F4CD
2	RCE21CW	CER-21463-001 Rev 1	304C20F4

BlackBerry® smartphone Accessories Tested

- 1) Folding Blade Charger, part number HDW-19129-001 with an output voltage of 5.0 volts dc, 700 mA with an attached USB cable with a length of 1.80 metres.
- 2) Alternative Folding Blade Charger part number HDW-19955-001 with an output voltage of 5.0 volts dc, 700 mA and attached USB cable with a lead length of 1.80 metres.
- 3) Captive Cable Charger part number HDW-17957-003 with an output voltage of 5.0 volts dc, 700 mA and attached USB cable with a lead length of 1.80 metres.
- 4) Premium Single Button Stereo Headset, 3.5 mm, part number HDW-15766-005, 1.3 metres long.
- 5) Premium Multi-Button Stereo Headset, 3.5 mm, part number ASY-15765-001, 1.3 metres long.
- 6) Premium Mono Headset, 3.5 mm, part number HDW-17906-003, 1.3 meters long.
- 7) Stereo Headset, 3.5 mm, part number HDW-14322-003, 1.3 metres long.
- 8) Alternative Stereo Headset, 3.5 mm, part number HDW-14322-003, 1.3 metres long.
- 9) Mono Headset, 3.5 mm, HDW-12420-003, 1.3 metres long.
- 10) BlackBerry® Charging Pod, part number HDW-14389-001.
- 11) USB Data Cable, part number HDW-06610-009, 1.00 metres long
- 12) BlackBerry® Remote Stereo Gateway, part number ASY-16007-001.

D. Support Equipment Used for the Testing of the EUT

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

E. Modifications to EUT

No modifications were required on the EUT.

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F. 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) CONDUCTED AC LINE 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, PIN 3048F4CD was in battery charging mode. The input voltage was 120 V, 60 Hz.

The following test configurations were measured:

1. The BlackBerry® smartphone in Cellular idle mode mode with the 3.5 mm Premium Stereo Headset connected was sitting in the Charging Pod which was connected to the Captive Cable Charger.
2. The BlackBerry® smartphone in Cellular idle mode mode with the 3.5 mm Mono Headset connected was sitting in the Charging Pod which was connected to the Captive Cable Charger.
3. The BlackBerry® smartphone, in PCS idle mode with the 3.5 mm Premium Multi-Button Stereo Headset connected was sitting in the Charging Pod which was connected to the Folding Blade Charger.

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 case test margin of 10.32 dB below the QP limit at 0.204 MHz using the quasi-peak detector, test configuration 3.

Measurement Uncertainty ±3.0 dB

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

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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 (SAC). The FCC registration number is **959115** and the IC file number is **2503C-1**. The EUT was measured on the low, middle and high channels.

The EUT was configured and operated to produce the maximum radiated emissions while still keeping within RIM's specifications.

The BlackBerry® smartphone PIN 304C20F4 was in battery charging mode for all configurations. The ac input voltage was 120V, 60Hz.

The following test configurations were measured:

1. The BlackBerry® smartphone, in Cellular idle mode with the 3.5 mm Premium Stereo Headset attached was connected to the laptop through the USB cable.
2. The BlackBerry® smartphone, in Cellular idle mode with the 3.5 mm Stereo Headset attached was sitting in the Charging Pod which was connected to the Captive Cable Charger.
3. The BlackBerry® smartphone, in PCS idle mode with the 3.5 mm Mono Headset attached was sitting in the Charging Pod which was connected to the Captive Cable Charger.
4. The BlackBerry® smartphone, in Bluetooth Tx mode with the 3.5 mm Stereo Headset attached was sitting in the Charging Pod which was connected to the Alternative Folding Blade Charger.

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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 case emission test margin of 13.42 dB at 44.499 MHz using test configuration 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

To view the test data see APPENDIX 2.

G. Compliance Test Equipment Used

<u>UNIT</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SERIAL NUMBER</u>	<u>CAL DUE DATE</u> (YY MM DD)	<u>USE</u>
Bluetooth Tester	Rohde & Schwarz	CBT	100370	09-12-08	Radiated Emissions
Digital Multimeter	Hewlett Packard	34401A	US36042324	09-01-01	Conducted/Radiated Emissions
EMC Analyzer	Aglient	E7405A	US40240226	09-01-01	Radiated Emissions
EMI Test Receiver	Rohde & Schwarz	ESIB 40	100255	09-12-02	Conducted/Radiated Emissions
Environment Monitor	Control Company	1870	80117164	10-01-08	Conducted/Radiated Emissions
Horn Antenna	Emco	3116	2538	10-09-15	Radiated Emissions
Hybrid Log Antenna	TDK	HLP-3003C	017201	09-10-24	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA4-SP	001	09-06-03	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA-SP	001	09-02-29	Radiated Emissions
L.I.S.N.	Rohde & Schwarz	ENV216	100060	10-04-21	Conducted Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	112394	09-12-07	Conducted/ Radiated Emissions

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APPENDIX 1 - AC LINE CONDUCTED EMISSIONS TEST DATA

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AC Conducted Emissions Test Results

The measurements were performed by Heng Lin and Savtej Sandhu.

Test Configuration 1

The environmental test conditions were:

Temperature	27°C
Pressure	1014 mb
Relative Humidity	28%

FCC CFR 47 Part 15, Subpart B and IC ICES-003, Class B

Date of test: December 01, 2008

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.159	N	35.37	9.96	45.33	65.52	55.52	-20.19
0.173	L1	34.75	9.88	44.63	64.84	54.84	-20.21
0.213	L1	29.49	9.89	39.38	63.09	53.09	-23.71
0.218	N	29.66	9.80	39.46	62.91	52.91	-23.45
0.222	L1	28.15	9.89	38.04	62.74	52.74	-24.70
0.276	N	26.19	9.81	36.00	60.94	50.94	-24.94
0.299	N	25.56	9.82	35.38	60.28	50.28	-24.90
0.429	N	34.03	9.87	43.90	57.27	47.27	-13.37
0.461	L1	30.99	9.71	40.70	56.68	46.68	-15.98
0.551	L1	29.64	9.66	39.30	56.00	46.00	-16.70
0.947	L1	29.58	9.53	39.11	56.00	46.00	-16.89
1.212	L1	22.97	9.51	32.48	56.00	46.00	-23.52
1.307	N	28.92	9.62	38.54	56.00	46.00	-17.46
1.635	L1	29.35	9.50	38.85	56.00	46.00	-17.15
2.009	N	31.65	9.61	41.26	56.00	46.00	-14.74
2.657	N	33.33	9.61	42.94	56.00	46.00	-13.06
2.774	L1	31.40	9.58	40.98	56.00	46.00	-15.02
2.823	N	33.29	9.61	42.90	56.00	46.00	-13.10
4.808	N	30.10	9.60	39.70	56.00	46.00	-16.30

All other emission levels had a test margin of greater than 25 dB.

Measurements were done with the quasi-peak detector.

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

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AC Conducted Emissions Test Graphs

Test Configuration 1

Figure 1-1: L1 lines

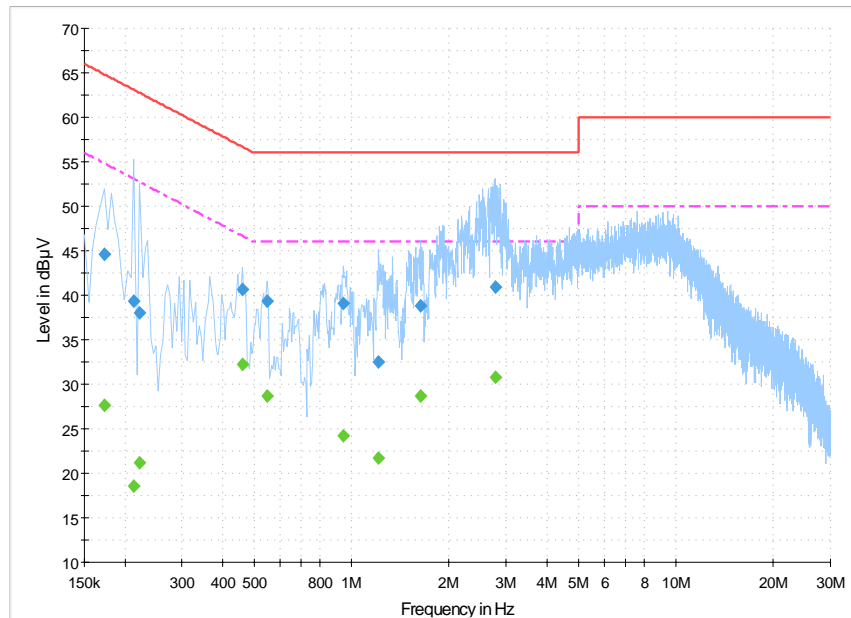
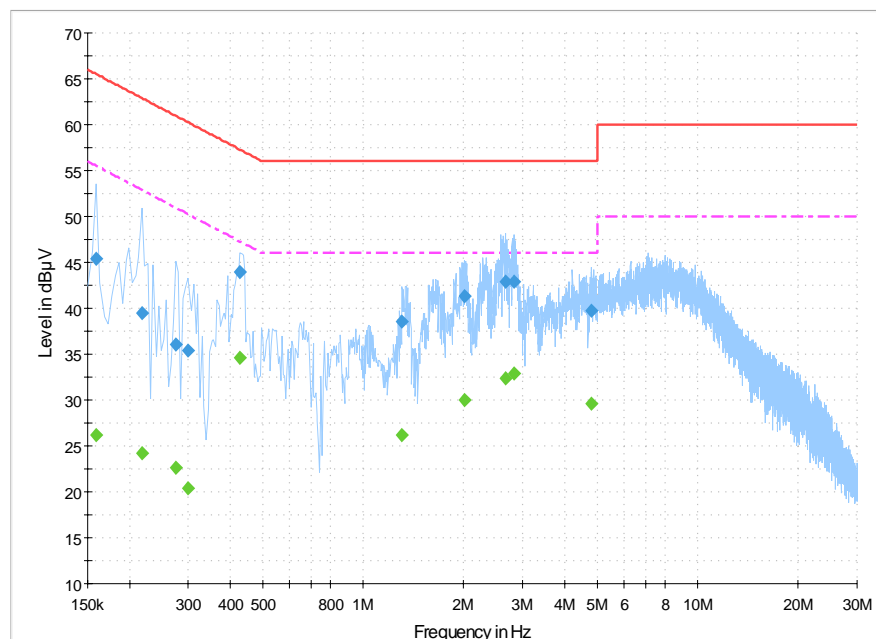


Figure 1-2: N Lines



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AC Conducted Emissions Test Graphs

Test Configuration 2

Figure 1-3: L1 lines

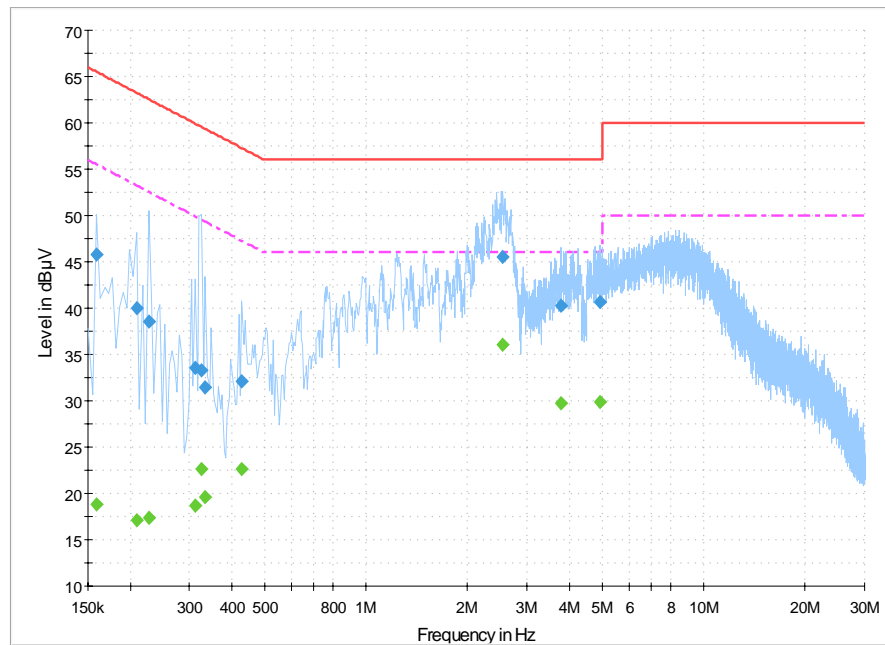
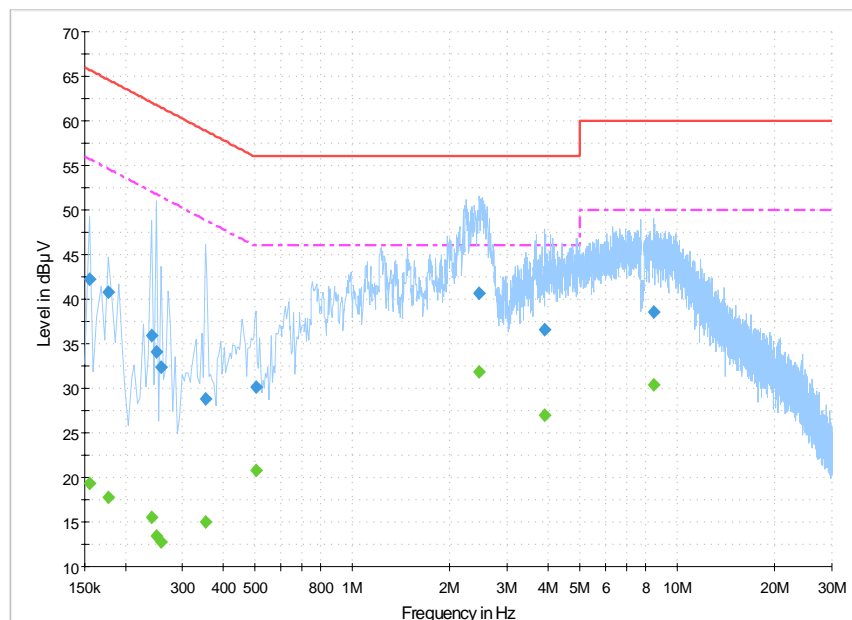


Figure 1-4: N Lines



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AC Conducted Emissions Test Graphs

Test Configuration 3

Figure 1-5: L1 lines

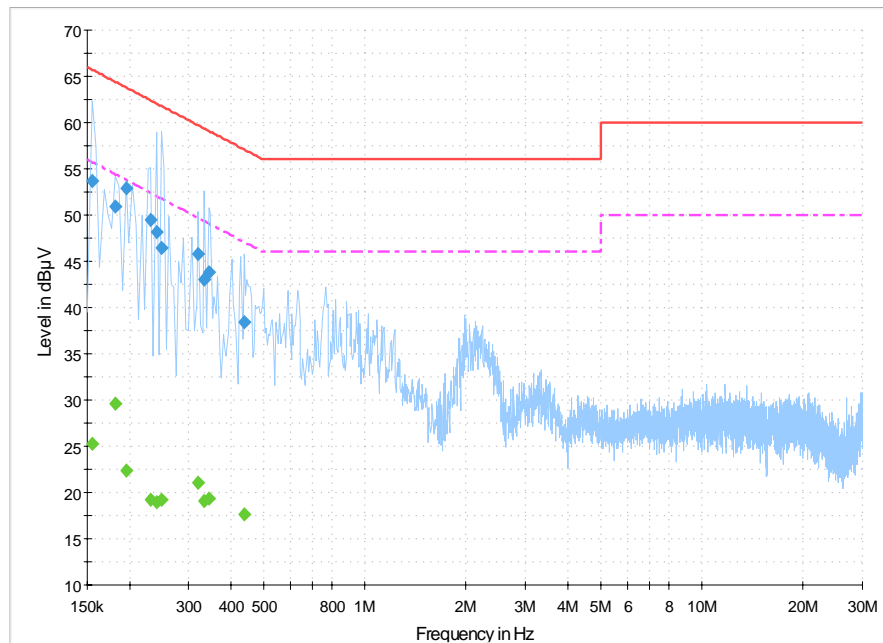
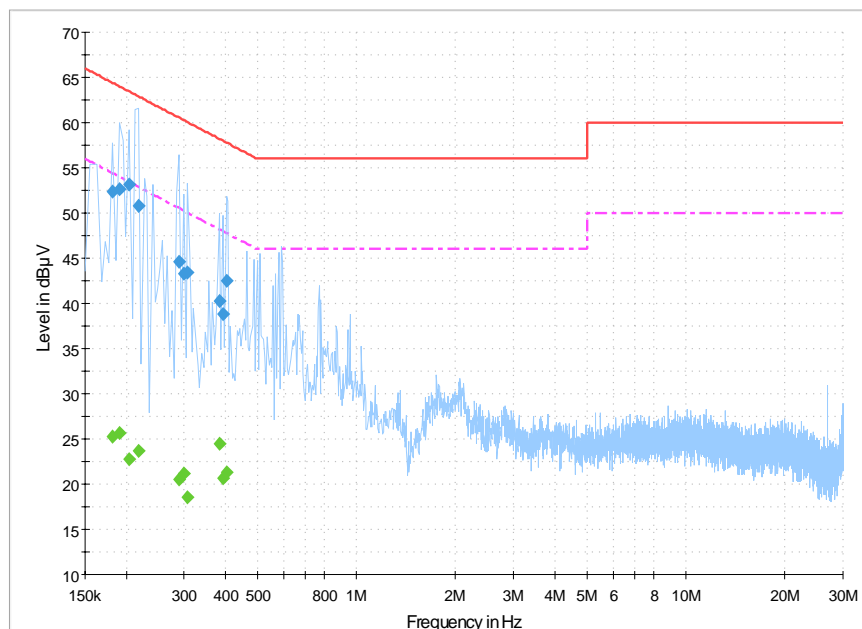


Figure 1-6: N Lines



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APPENDIX 2 - RADIATED EMISSIONS TEST DATA

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Radiated Emissions Test Results

The measurements were performed by Heng Lin and Savtej Sandhu.

Test Configuration 1

The environmental test conditions were:

Temperature	27°C
Pressure	1014 mb
Relative Humidity	38%

FCC CFR 47 Part 15, Subpart B and IC ICES-003, Class B

Date of test: December 11, 2008

Test Distance was 3.0 metres.

Frequency (MHz)	Antenna		Test Angle (Deg.)	Detector (Q.P. or Ave)	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)
	Pol. (V/H)	Height (metres)							
49.766	V	1.00	184	Q.P.	46.25	-23.19	23.06	40.00	-16.94
232.996	V	3.27	348	Q.P.	48.48	-18.74	29.74	46.00	-16.26
243.397	V	3.00	9	Q.P.	45.67	-18.44	27.23	46.00	-18.77
383.988	H	1.00	357	Q.P.	44.53	-13.26	31.27	46.00	-14.73
527.984	V	2.54	75	Q.P.	32.13	-9.52	22.61	46.00	-23.39
3349.369	H	2.01	339	Q.P.	18.16	13.05	31.21	54.00	-22.79

All other emission levels had a test margin greater than 25 dB.

