

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-2068-1007-74

PRODUCT MODEL NO.: RCL22CW
TYPE NAME: BlackBerry® smartphone
FCC ID: L6ARCL20CW
IC: 2503A-RCL20CW

DATE: July 21, 2010

	EMI Test Report for the BlackBerry® smartphone Model RCL22CW	
Test Report No. RTS-1689-1007-74	Dates of Test July 15 to July 19, 2010	FCC ID: L6ARCL20CW IC: 2503A-RCL20CW

Statement of Performance:

The BlackBerry® smartphone, model RCL22CW, part number CER-32267-001 Rev. 2 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:



Adam Rusinek
Regulatory Compliance Associate
Date: July 21, 2010

Reviewed by:



Michael Cino
Regulatory Compliance Associate
Date: July 22, 2010

Reviewed and Approved by:



Masud S. Attayi, P.Eng.
Manager, Regulatory Compliance
Date: July 22, 2010

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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, October 01, 2009 Class B Digital Devices, Unintentional Radiators
- IC ICES-003 Issue 4, February 2004, Class B Digital Devices, Unintentional Radiators

B. Associated Documents

1. 8530-9330_HW_Difference_Document

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
Waterloo, Ontario
Canada, N2L 3W8
Phone: 519 888 7465
Fax: 519 888 6906

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

The testing was performed from July 15 to July 19, 2010.

The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN	Software
1	RCL22CW	CER-32267-001 Rev 2	322FE8F8	V5.0.0.782 (Platform 4.2.0.352) Bundle 1320
2	RCL22CW	CER-32267-001 Rev 2	322FE88E	V5.0.0.782 (Platform 4.2.0.352) Bundle 1320

AC Conducted Testing was performed on sample 2.

Radiated Emissions Testing was performed on sample 1.

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Only the characteristics that have been affected by the changes from model RCL21CW to model RCL22CW were retested.

For more information see 8530_9330_HW_Difference_Document

BlackBerry® smartphone Accessories Tested

- 1) Folding Blade Charger, part number HDW-17955-001 with an output voltage of 5.0 volts dc, 700 mA and attached USB cable with a lead length of 1.80 metres.
- 2) 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.
- 3) Fixed Blade Charger, part number HDW-24481-001 (Model Number: RIM-C-0004ADUUS-001), with an output voltage of 5.0 volts dc.
- 4) Alternate Fixed Blade Charger, part number HDW-24481-001 (Model Number: PSM04A-050QRIM), with an output voltage of 5.0 volts dc.
- 5) Stereo Headset, part number HDW-14322-003 with a lead length of 1.3 metres.
- 6) Premium Stereo Headset, part number HDW-15766-005, 1.3 metres long.
- 7) USB Data Cable, part number HDW-28109-003, 1.30 metres long.
- 8) USB Data Cable, part number HDW-06610-005, 1.50 metres long.
- 9) Bluetooth Headset, part number HDW-23439-001.
- 10) Alternate Stereo Headset, part number HDW-24529-001, with a lead length of 1.1 metres.

D. Support Equipment Used for the Testing of the EUT

None. See section *F. Compliance Test Equipment Used*.

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

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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:

Test Configuration	Operating Mode(s)	Charger + Accessories
1	CDMA CELL, Idle, Audio Playback	Folding Blade Charger + BT Headset
2	CDMA PCS, Idle, Video Playback	Fixed Blade Charger + 1.5m USB Cable + Premium Stereo Headset
3	BT TX, Audio Playback	Alternate Fixed Blade Charger + 1.3m USB Cable + Stereo Headset
5	802.11b Tx	Captive Cable Charger + Alternate Stereo Headset

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 worse case emission level of 47.68 dBμV, margin of 8.32 dB below the QP limit at 2.216 MHz using the quasi-peak detector, in test configuration 1.

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. 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:

Test Configuration	Operating Mode(s)	Charger + Accessories
1	CDMA CELL, Idle, Audio Playback	Folding Blade Charger + BT Headset
2	CDMA PCS, Idle, Video Playback	Fixed Blade Charger + 1.5m USB Cable + Premium Stereo Headset
3	CDMA CELL, Idle, Audio Playback	Alternate Fixed Blade Charger + 1.3m USB Cable + Stereo Headset
5	CDMA PCS, Idle	Captive Cable Charger + Alternate Stereo Headset

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 level of 30.37 dBµV/m, or 9.63 dB margin below the limit, at 33.55 MHz in Test Configuration 2.

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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.

F. Compliance Test Equipment Used

<u>UNIT</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SERIAL NUMBER</u>	<u>CAL DUE DATE (YY MM DD)</u>	<u>USE</u>
Preamplifier	Sonoma	310N/11909A	185831	10-11-14	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	10-11-06	Radiated Emissions
EMC Analyzer	Rohde & Schwarz	ESIB 40	3942A00517	10-11-30	Radiated Emissions
Digital Multimeter	Hewlett Packard	34401A	US36042324	10-10-08	Conducted/Radiated Emissions
Environment Monitor	Control Company	1870	230355190	11-01-08	Radiated Emissions
Environment Monitor	Control Company	1870	80117164	11-01-08	Conducted/Radiated Emissions
L.I.S.N.	Rohde & Schwarz	ENV216	100060	10-12-11	Conducted Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	017401	10-09-11	Radiated Emissions
Horn Antenna	EMC Automation	HRN-0118	030101	10-07-22	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	837493/073	10-11-30	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	112394	10-11-30	Radiated/Conducted Emissions
EMI Test Receiver	Rohde & Schwarz	ESU 40	100162	10-11-29	Radiated/Conducted Emissions
Bluetooth Tester	Rohde & Schwarz	CBT	100368	10-11-26	Radiated Emissions
Bluetooth Tester	Rohde & Schwarz	CBT	100370	10-11-30	Radiated/Conducted Emissions

APPENDIX 1 - AC CONDUCTED EMISSIONS TEST DATA

	EMI Test Report for the BlackBerry® smartphone Model RCL22CW APPENDIX 1	
Test Report No. RTS-1689-1007-74	Dates of Test July 15 to July 19, 2010	FCC ID: L6ARCL20CW IC: 2503A-RCL20CW

AC Conducted Emissions Test Results

The following tests were performed by Steven Wang

Test Configuration 1

Date of the test: July 15, 2010

The environmental conditions were: Temperature: 23 °C
 Pressure: 1020 mb
 Humidity: 34 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dBµV)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.159	L1	35.86	11.14	47.00	65.52	55.52	-18.52
0.182	N	31.06	11.01	42.07	64.42	54.42	-22.34
0.204	L1	32.20	10.83	43.02	63.45	53.45	-20.42
0.204	N	31.23	10.85	42.08	63.45	53.45	-21.37
0.222	N	32.23	10.73	42.96	62.74	52.74	-19.79
0.263	L1	26.86	10.42	37.28	61.35	51.35	-24.07
0.308	L1	29.78	10.15	39.93	60.04	50.04	-20.11
0.443	L1	32.48	9.95	42.43	57.01	47.01	-14.59
1.118	L1	32.90	9.80	42.70	56.00	46.00	-13.30
1.212	N	31.89	9.80	41.69	56.00	46.00	-14.31
2.049	N	35.72	9.83	45.55	56.00	46.00	-10.45
2.081	L1	37.34	9.83	47.17	56.00	46.00	-8.83
2.112	N	36.97	9.83	46.81	56.00	46.00	-9.20
2.175	N	36.28	9.84	46.11	56.00	46.00	-9.89
2.216	L1	37.85	9.83	47.68	56.00	46.00	-8.32
3.255	L1	31.61	9.88	41.50	56.00	46.00	-14.50
3.404	N	28.69	9.89	38.58	56.00	46.00	-17.42
3.624	L1	31.40	9.89	41.29	56.00	46.00	-14.71

All other emission levels had test margins 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

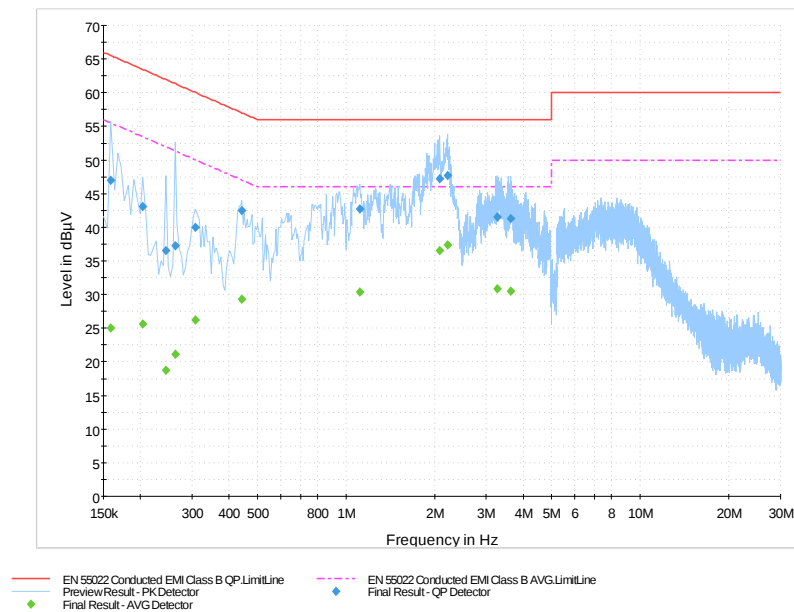
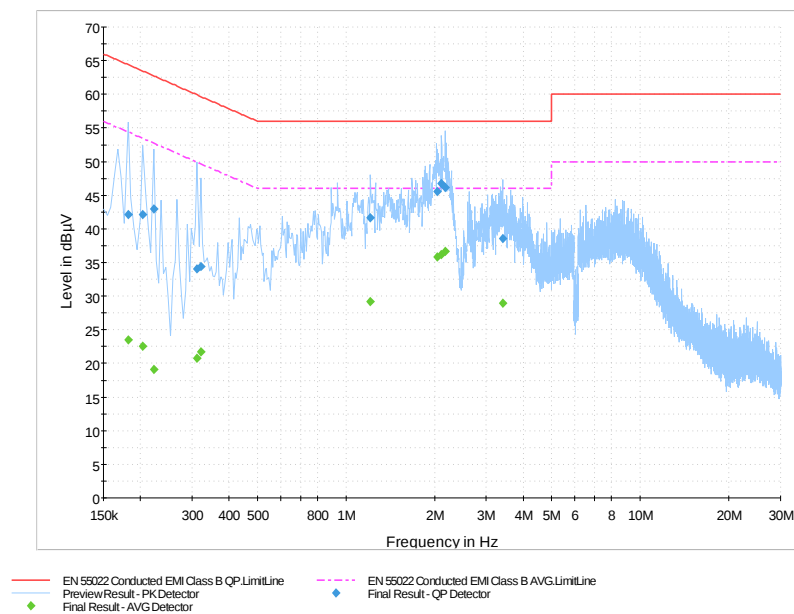


Figure 1-2: N Lines



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AC Conducted Emissions Test Results Cont'd

Test Configuration 2

Date of the test: July 15, 2010

The environmental conditions were: Temperature: 23 °C
 Pressure: 1020 mb
 Humidity: 34 %

Frequency (MHz)	Line	Reading (QP) (dBμV)	Correction Factor (dB)	Corrected Reading (QP) (dBμV)	Limit (QP) (dBμV)	Limit (AV) (dBμV)	Margin (QP) Limits (dB)
0.159	L1	39.34	11.14	50.48	65.52	55.52	-15.04
0.164	N	33.73	11.14	44.87	65.28	55.28	-20.42
0.186	L1	30.96	10.95	41.91	64.21	54.21	-22.30
0.321	L1	31.97	10.13	42.10	59.68	49.68	-17.58
0.398	L1	29.59	10.01	39.60	57.91	47.91	-18.30
0.398	N	25.38	10.03	35.41	57.91	47.91	-22.50
0.848	L1	23.74	9.81	33.56	56.00	46.00	-22.44
2.513	N	26.44	9.85	36.29	56.00	46.00	-19.71
3.660	L1	28.72	9.89	38.62	56.00	46.00	-17.39
3.710	N	25.59	9.90	35.49	56.00	46.00	-20.51
3.768	N	26.01	9.90	35.91	56.00	46.00	-20.09
4.263	N	24.21	9.91	34.11	56.00	46.00	-21.89
7.643	N	27.54	9.98	37.53	60.00	50.00	-22.48

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

Measurements were done with the quasi-peak detector.

See figure 1-3 and figure 1-4 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 2

Figure 1-3: L1 lines

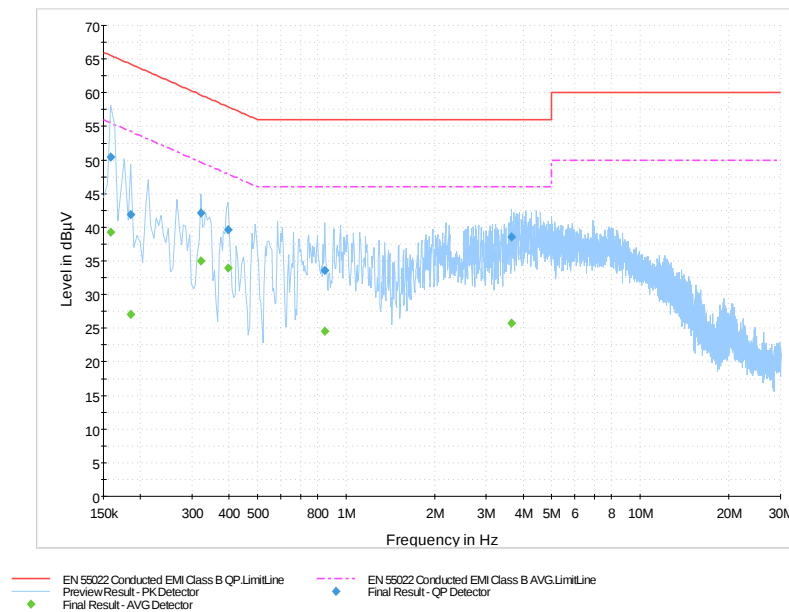
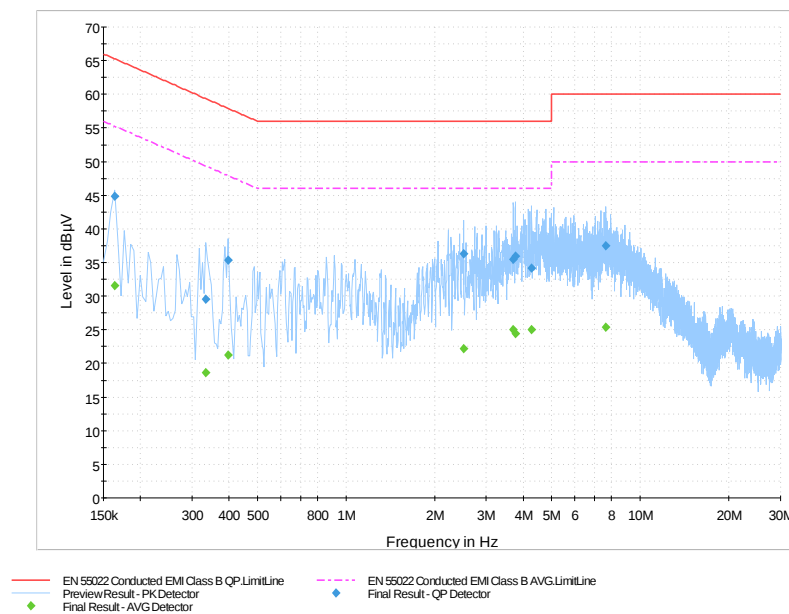


Figure 1-4: N Lines



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AC Conducted Emissions Test Graphs

Test Configuration 3

Figure 1-5: L1 lines

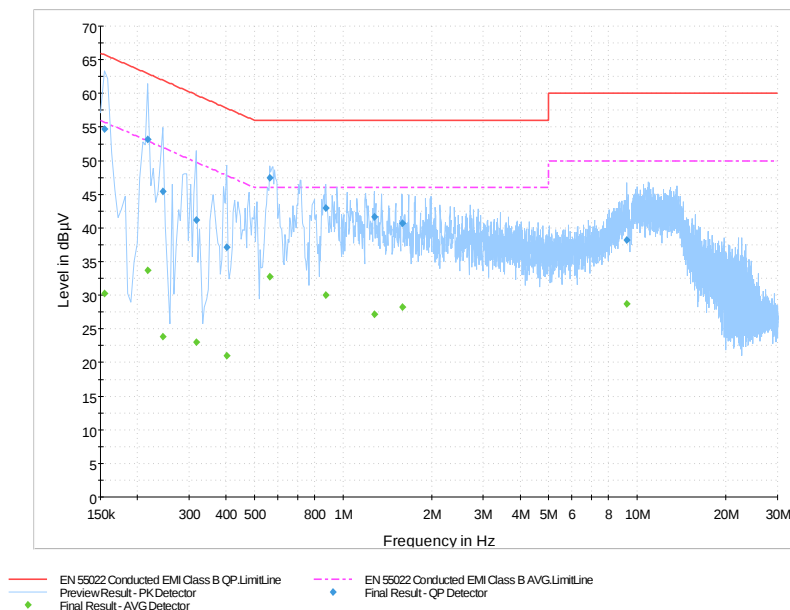
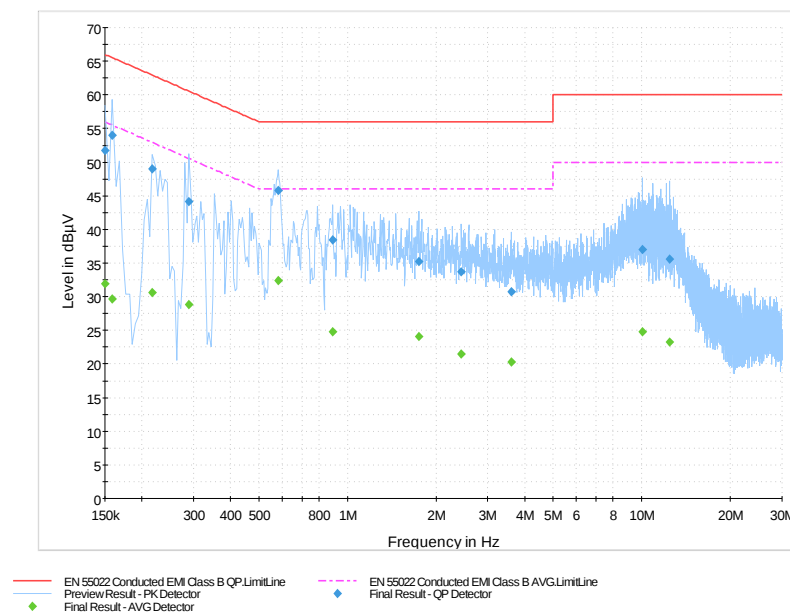


Figure 1-6: N Lines



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AC Conducted Emissions Test Results Cont'd

Test Configuration 4

Date of the test: July 15, 2010

The environmental conditions were: Temperature: 23 °C
 Pressure: 1020 mb
 Humidity: 34 %

Frequency	Line	Reading (QP)	Correction Factor	Corrected Reading (QP)	Limit (QP)	Limit (AV)	Margin (QP) Limits
(MHz)		(dBµV)	(dB)	(dBµV)	(dBµV)	(dBµV)	(dB)
0.407	N	26.24	10.01	36.25	57.72	47.72	-21.47
0.416	L1	27.24	9.99	37.23	57.54	47.54	-20.31
0.447	L1	26.78	9.94	36.72	56.93	46.93	-20.21
0.461	N	22.79	9.94	32.73	56.68	46.68	-23.96
2.346	L1	23.00	9.84	32.84	56.00	46.00	-23.16

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

Measurements were done with the quasi-peak 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.

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AC Conducted Emissions Test Graphs

Test Configuration 4

Figure 1-7: L1 lines

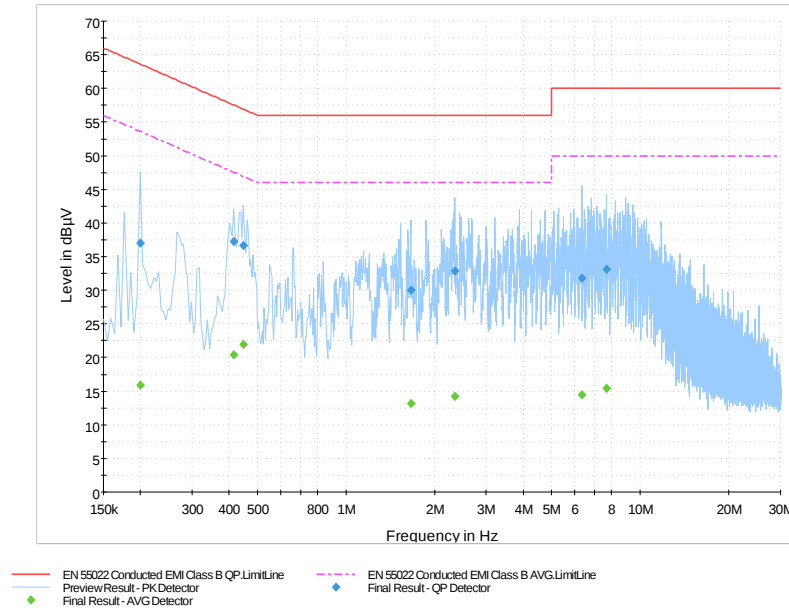
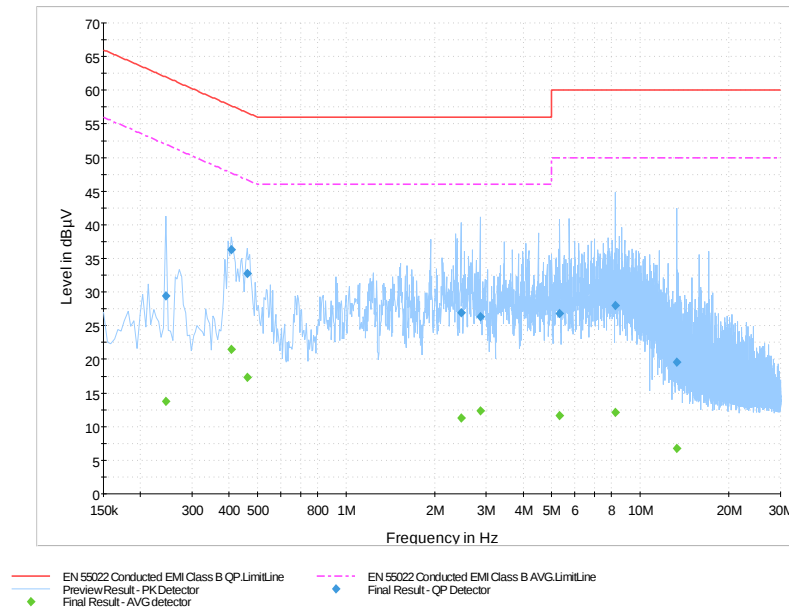


Figure 1-8: N Lines



APPENDIX 2 - RADIATED EMISSIONS TEST DATA

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Radiated Emissions Test Results

The following test were performed by Fahd Faisal

Test Configuration 1

Date of the test: July 19, 2010

The environmental conditions were: Temperature: 24 °C
 Pressure: 1001 mb
 Humidity: 30 %

Frequency (MHz)	Antenna		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)
	Pol. (V/H)	Height (metres)							
36.750	V	2.55	248.00	Q.P.	35.69	-20.47	15.22	40.00	-24.78
424.650	H	2.12	262.00	Q.P.	40.67	-10.56	30.11	46.00	-15.89
All other emission levels had test margins greater than 25 dB.									

Test Configuration 2

The environmental conditions were: Temperature: 24 °C
Pressure: 1001 mb
Humidity: 30 %

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

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Radiated Emissions Test Results Cont'd

Test Configuration 3

Date of the test: July 19, 2010

The environmental conditions were: Temperature: 24 °C
Pressure: 1001 mb
Humidity: 30 %

Frequency (MHz)	Antenna		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)
	Pol. (V/H)	Height (metres)							
30.550	V	1.50	281.00	Q.P.	39.72	-18.65	21.07	40.00	-18.93
38.600	H	3.57	296.00	Q.P.	36.58	-20.89	15.69	40.00	-24.31
38.900	V	1.53	287.00	Q.P.	49.01	-20.98	28.03	40.00	-11.97
48.400	V	1.52	288.00	Q.P.	47.54	-22.65	24.89	40.00	-15.11
49.750	V	1.65	309.00	Q.P.	43.75	-22.84	20.91	40.00	-19.09
201.600	V	1.58	51.00	Q.P.	39.32	-15.64	23.68	43.50	-19.82
All other emission levels had test margins greater than 25 dB.									

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Radiated Emissions Test Results Cont'd

Test Configuration 4

Date of the test: July 19, 2010

The environmental conditions were: Temperature: 24 °C
 Pressure: 1001 mb
 Humidity: 30 %

Frequency (MHz)	Antenna		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)
	Pol. (V/H)	Height (metres)							
38.000	V	1.58	353.00	Q.P.	44.11	-20.72	23.39	40.00	-16.61
52.550	V	1.77	83.00	Q.P.	42.11	-22.92	19.19	40.00	-20.81
324.550	H	2.35	354.00	Q.P.	37.27	-12.90	24.37	46.00	-21.63
466.000	H	1.11	354.00	Q.P.	35.51	-9.48	26.03	46.00	-19.97
All other emission levels had test margins greater than 25 dB.									