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-2605-1105-04A

PRODUCT MODEL NO.: RDH71CW, RDP71UW
TYPE NAME: BlackBerry® smartphone
FCC ID: L6ARDH70CW, L6ARDP70UW
IC: 2503A-RDH70CW, 2503A-RDP70UW

DATE: June 27, 2011

Statement of Performance:

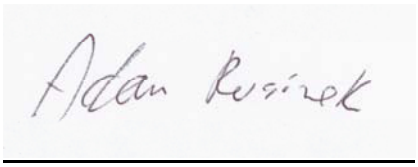
The BlackBerry® smartphone, model RDH71CW, part number CER-30956-001 Rev. 2 and accessories when configured and operated per RIM's operation instructions, and performs within the requirements of the test standards.

The BlackBerry® smartphone, model RDP71UW, part number CER-39231-001 Rev. 1, and its accessories perform within the requirements of the test standards when configured and operated under RIM's operation instructions.

Declaration:

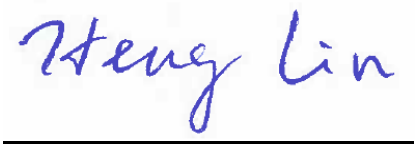
We hereby certify that:
The test data reported herein is an accurate record of the performance of the sample(s) tested.
The test results are valid for the tested unit (s) only.
The test equipment used was suitable for the tests performed and within manufacturer's published specifications and operating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

Documented by:



Adam Rusinek
Regulatory Compliance Associate
Date: June 27, 2011

Reviewed by:



Heng Lin
Regulatory Compliance Specialist
Date: June 28, 2011

Reviewed and Approved by:

Masud S. Attayi, P.Eng.
Manager, Regulatory Compliance
Date: June 29, 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

1. MultiSourceDeclaration_RDH71CW_b157
2. MultiSourceDeclaration_RDH71CW_b260
3. MultiSourceDeclaration_RDH71CW_b421
4. RDH71CW_HW_Declaration_CER-30956-001_Rev 2
5. BlackBerrySystemSimilarity_RDH71CW_RDP71UW

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 March 18 to April 18, 2011.

The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN	Software
1	RDH71CW	CER-30956-001 Rev 2	32DF5EB6	V6.1.0.46 Bundle 421
2	RDH71CW	CER-30956-001 Rev 1	329CDE6F	V6.1.0.16 Bundle 157

AC conducted testing was performed on sample 1.
Radiated Emissions testing was performed on sample 2.

To view the differences between bundle 157 and 421, see document number MultiSourceDeclaration_RDH71CW_b260 and MultiSourceDeclaration_RDH71CW_b421.

To view the differences between CER-30956-001 Rev. 1 and CER-30956-001 Rev. 2, see document HW_Declaration_CER-30956-001 Rev 2.

Only the characteristic that may have been affected by changes from Rev 1 to Rev2 have been re-tested.

BlackBerry® smartphone Accessories Tested

1) Fix Blade Charger (Phihong), part number HDW-24481-001 (model number PSM04A-050QRIM-R), with an output voltage of 5.0 volts dc.
2) Alt. Fixed Blade Charger (Flextronics), part number HDW-24481-001 (model number RIM-C-4ADUUS-001 with an output voltage of 5.0 volts dc.
3) 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.
4) Premium Stereo Headset, part number HDW-15766-005, 1.3 metres long.
5) Stereo Headset, part number HDW-14322-003 with a lead length of 1.3 metres.
6) Alt. 1 Stereo Headset, part number HDW-24529-001, with a lead length of 1.1 metres
7) Alt. 2 Stereo Headset part number HDW-24529-001,with a lead length of 1.1 metres
8) Bluetooth Headset part number HDW-25937-001
9) USB Data Cable, part number HDW-06610-005, 1.5 metres long.
10) USB Data Cable, part number HDW-06610-013, 0.3 metre long.
11) USB Data Cable, part number HDW-29108-003, 1.2 metre long.
12) Sync Pod, part number HDW-38308-001

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 RDH71CW:

Test Configuration	Operating Mode(s)	Charger + Accessories
1	GSM 850 Idle, Audio Playback	Alt. Fixed Blade Charger Premium Stereo Headset 1.5USB cable Sync Pod
2	GSM1900 Idle, Video Playback	Fixed Blade Charger Stereo Headset 1.0m USB Cable
3	CDMA Cellular Idle	Fixed Blade Charger Bluetooth Headset 1.2m USB Cable
4	CDMA PCS Idle	Captive Cable Charger Premium 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 test margin of 8.47 dB below the QP limit at 0.150 MHz using the quasi-peak detector, Test Configuration 1.

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 RDH71CW:

Test Configuration	Operating Mode(s)	Charger + Accessories
1	GSM 850 Idle	Captive Cable Charger Stereo Headset
2	CDMA PCS Idle	Fixed Blade Charger + Charging Pod + 1.5m USB Cable
3	CDMA CELL Idle	Fixed Blade Charger + Charging Pod + 1.0m USB Cable
4	PCS 1900 Idle	Alternate Fixed Blade Charger 1.2m USB Cable Stereo Headset
5	Bluetooth, Tx	Laptop 0.3m USB Cable Stereo Headset
6	802.11b Tx	Fixed Blade Charger 0.3m USB 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 worse case emission test margin of 10.29 dB at 864.050MHz using Test Configuration 5.

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	11-09-13	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	11-10-13	Radiated Emission
T/RH Meter	OMEGA	iTHX-SD	0380567	11-10-13	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	837493/073	11-09-23	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	112394	11-11-29	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 RDH71CW.

The following tests were performed by Savtej Sandhu.

Test Configuration 1

Date of the test: April 18, 2011
The environmental conditions were: Temperature: 24.9 °C
Humidity: 33.7 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.150	L1	46.32	11.20	57.53	66.00	56.00	**-8.47**
0.155	N	45.55	11.20	56.75	65.80	55.80	-9.05
0.173	L1	45.14	11.05	56.19	64.80	54.80	-8.61
0.182	L1	44.14	10.99	55.13	64.40	54.40	-9.28
0.186	N	42.47	10.98	53.45	64.20	54.20	-10.75
0.195	L1	43.43	10.89	54.32	63.80	53.80	-9.48
0.195	N	42.18	10.92	53.10	63.80	53.80	-10.70
0.204	L1	42.59	10.83	53.42	63.40	53.40	-9.98
0.227	N	39.72	10.69	50.42	62.60	52.60	-12.19
0.240	L1	39.73	10.58	50.31	62.10	52.10	-11.79
0.240	N	38.71	10.60	49.31	62.10	52.10	-12.79
0.249	N	38.72	10.54	49.25	61.80	51.80	-12.55
0.281	L1	38.95	10.29	49.24	60.80	50.80	-11.56
0.281	N	37.67	10.31	47.98	60.80	50.80	-12.82

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.

AC Conducted Emissions Test Results

Test Configuration 1 cont'd

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.335	L1	34.30	10.11	44.41	59.30	49.30	-14.89
0.335	N	34.41	10.12	44.53	59.30	49.30	-14.77
0.371	N	31.05	10.07	41.12	58.50	48.50	-17.38
0.380	N	30.70	10.05	40.75	58.30	48.30	-17.55
0.425	L1	29.99	9.97	39.96	57.40	47.40	-17.44
0.434	L1	28.82	9.96	38.78	57.20	47.20	-18.42
0.470	N	27.20	9.93	37.13	56.50	46.50	-19.37
0.965	L1	29.72	9.81	39.52	56.00	46.00	-16.48
2.072	N	26.75	9.83	36.58	56.00	46.00	-19.42
2.099	L1	24.90	9.83	34.73	56.00	46.00	-21.27
2.324	L1	24.61	9.84	34.45	56.00	46.00	-21.55
3.120	N	26.62	9.88	36.51	56.00	46.00	-19.50
4.137	L1	21.76	9.90	31.66	56.00	46.00	-24.34
4.439	N	24.30	9.91	34.21	56.00	46.00	-21.79
6.459	L1	29.79	9.93	39.72	60.00	50.00	-20.28

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.

AC Conducted Emissions Test Graphs

Test Configuration 1

Figure 1-1: L1 lines

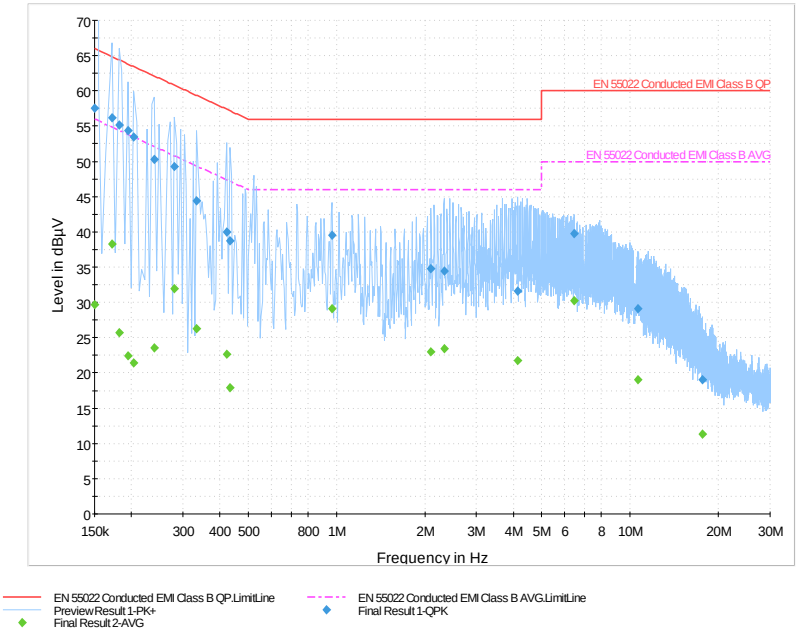
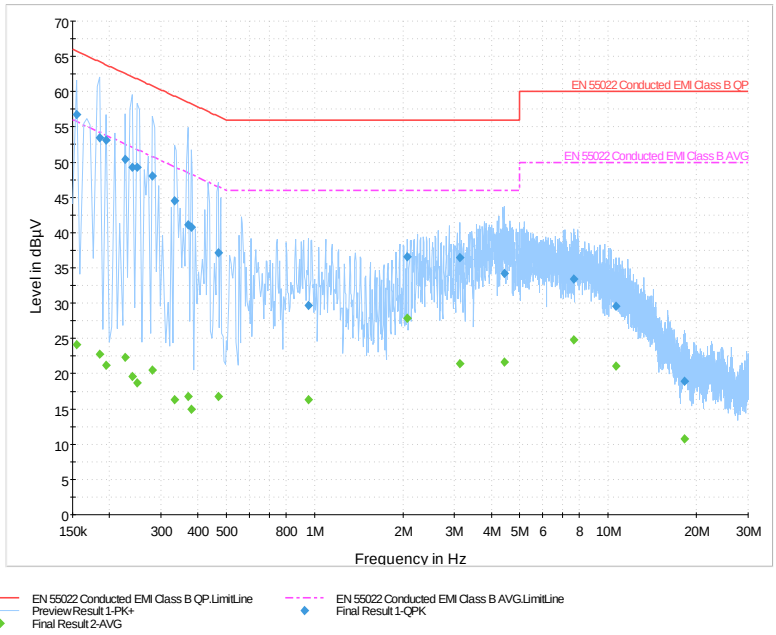


Figure 1-2: N Lines



AC Conducted Emissions Test Results cont'd

The following tests were performed by Savtej Sandhu.

Test Configuration 2

Date of the test: April 18, 2011
The environmental conditions were: Temperature: 24.4 °C
Humidity: 36.4%

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	42.47	11.17	53.64	65.50	55.50	-11.86
0.164	L1	42.31	11.11	53.42	65.30	55.30	-11.88
0.173	L1	42.32	11.05	53.37	64.80	54.80	-11.43
0.182	N	40.56	11.01	51.58	64.40	54.40	-12.82
0.195	N	39.79	10.92	50.71	63.80	53.80	-13.09
0.209	N	38.64	10.82	49.46	63.30	53.30	-13.84
0.222	L1	40.79	10.70	51.50	62.70	52.70	-11.20
0.227	N	38.86	10.69	49.56	62.60	52.60	-13.04
0.236	N	37.19	10.63	47.83	62.30	52.30	-14.48
0.249	L1	36.39	10.51	46.90	61.80	51.80	-14.90
0.249	N	36.37	10.54	46.91	61.80	51.80	-14.89
0.258	L1	35.45	10.45	45.91	61.50	51.50	-15.60
0.258	N	35.51	10.47	45.98	61.50	51.50	-15.52
0.272	L1	38.01	10.36	48.36	61.10	51.10	-12.74
0.281	N	34.12	10.31	44.43	60.80	50.80	-16.37
0.290	N	33.37	10.25	43.62	60.50	50.50	-16.88
0.348	L1	30.46	10.09	40.55	59.00	49.00	-18.45
0.357	L1	29.86	10.08	39.93	58.80	48.80	-18.87

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.

AC Conducted Emissions Test Results cont'd

Test Configuration 2 cont'd

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.456	L1	25.66	9.93	35.59	56.80	46.80	-21.21
0.533	L1	32.00	9.89	41.89	56.00	46.00	-14.11
0.542	N	33.44	9.89	43.34	56.00	46.00	-12.66
0.906	N	26.78	9.81	36.60	56.00	46.00	-19.40
1.050	L1	27.82	9.80	37.62	56.00	46.00	-18.38
1.275	L1	23.07	9.80	32.87	56.00	46.00	-23.13
2.175	L1	21.79	9.83	31.62	56.00	46.00	-24.38
3.881	L1	21.78	9.90	31.68	56.00	46.00	-24.32
10.149	L1	29.56	9.97	39.53	60.00	50.00	-20.48
10.676	N	25.36	9.98	35.34	60.00	50.00	-24.66
11.679	L1	30.48	10.01	40.49	60.00	50.00	-19.51

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.

AC Conducted Emissions Test Graphs

Test Configuration 2

Figure 1-3: L1 lines

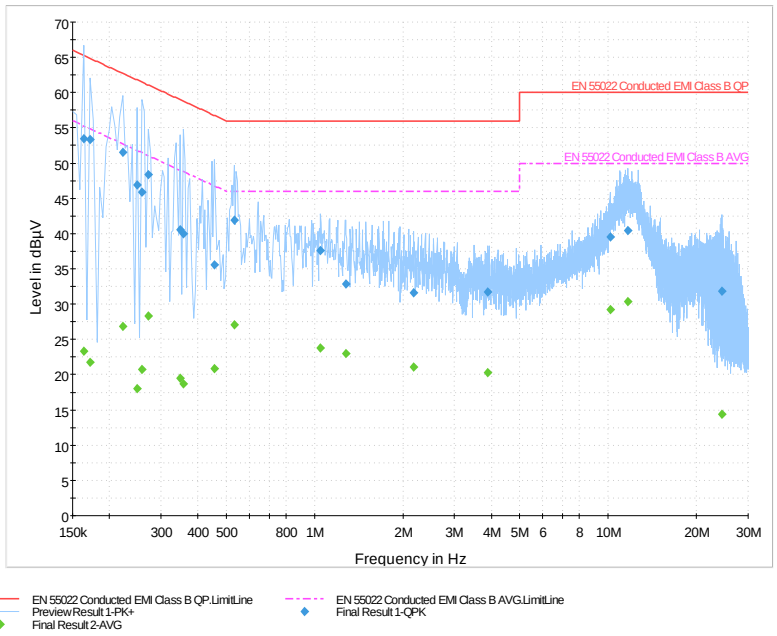
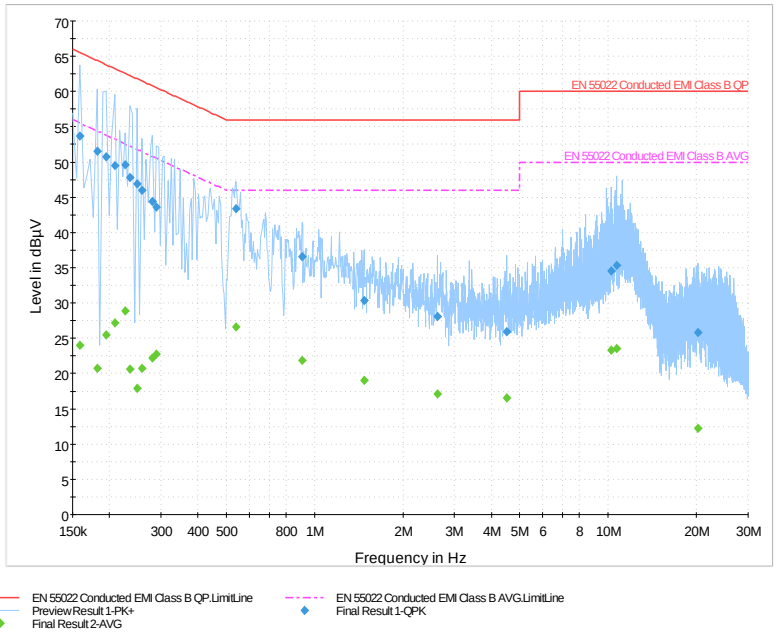


Figure 1-4: N Lines



AC Conducted Emissions Test Results cont'd

The following tests were performed by Adam Rusinek.

Test Configuration 3

Date of the test: March 18, 2011
The environmental conditions were: Temperature: 25.0 °C
Humidity: 33.7%

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.150	L1	44.11	11.20	55.31	66.00	56.00	-10.69
0.150	N	37.80	11.23	49.04	66.00	56.00	-16.96
0.200	L1	37.23	10.86	48.09	63.60	53.60	-15.51
0.209	L1	36.35	10.80	47.15	63.30	53.30	-16.15
0.222	L1	32.30	10.70	43.00	62.70	52.70	-19.70
0.407	L1	35.40	10.00	45.40	57.70	47.70	-12.30
0.407	N	28.75	10.01	38.76	57.70	47.70	-18.94
0.506	L1	34.90	9.91	44.81	56.00	46.00	-11.19
0.605	N	27.43	9.86	37.29	56.00	46.00	-18.71
0.672	L1	34.65	9.84	44.49	56.00	46.00	-11.51
0.722	N	28.02	9.83	37.85	56.00	46.00	-18.15
0.735	L1	31.17	9.83	41.00	56.00	46.00	-15.01
0.785	L1	33.88	9.82	43.70	56.00	46.00	-12.30
0.861	N	27.13	9.82	36.95	56.00	46.00	-19.05
0.906	N	27.52	9.81	37.33	56.00	46.00	-18.67
1.023	N	27.15	9.81	36.96	56.00	46.00	-19.04
1.365	N	26.26	9.81	36.07	56.00	46.00	-19.93

All other emission levels had a test margin of greater than 25 dB.
Measurements were done with the quasi-peak detector.
See figure 1-5 and figure 1-6 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

AC Conducted Emissions Test Results cont'd

Test Configuration 3 cont'd

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
1.415	N	26.97	9.81	36.78	56.00	46.00	-19.23
1.487	N	25.55	9.81	35.36	56.00	46.00	-20.64
1.514	L1	32.53	9.80	42.34	56.00	46.00	-13.66
1.707	N	24.57	9.82	34.39	56.00	46.00	-21.61
2.148	N	24.25	9.83	34.09	56.00	46.00	-21.91
2.162	L1	28.64	9.83	38.47	56.00	46.00	-17.53
3.750	L1	27.75	9.89	37.65	56.00	46.00	-18.35
3.899	N	22.55	9.90	32.45	56.00	46.00	-23.55
10.379	L1	26.46	9.97	36.43	60.00	50.00	-23.57
11.400	L1	27.67	9.99	37.67	60.00	50.00	-22.33

All other emission levels had a test margin of greater than 25 dB.
Measurements were done with the quasi-peak detector.
See figure 1-5 and figure 1-6 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 1-5: L1 lines

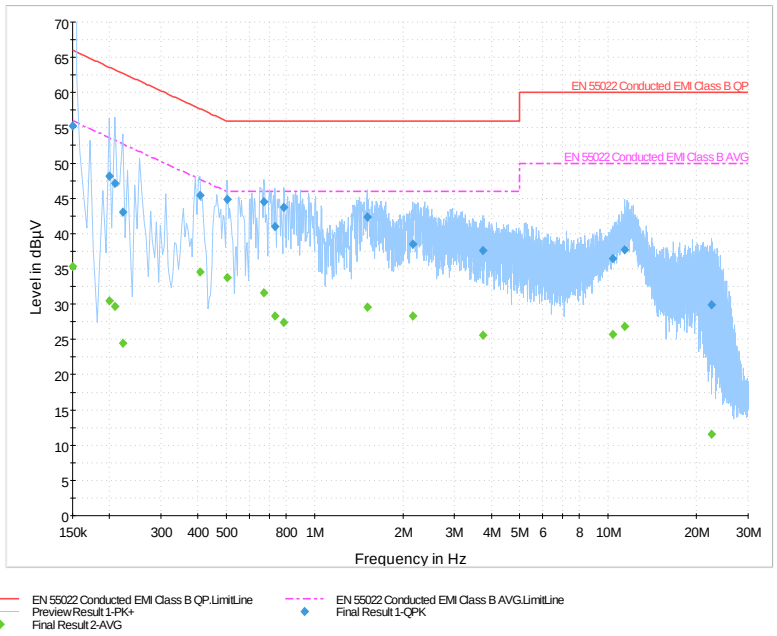
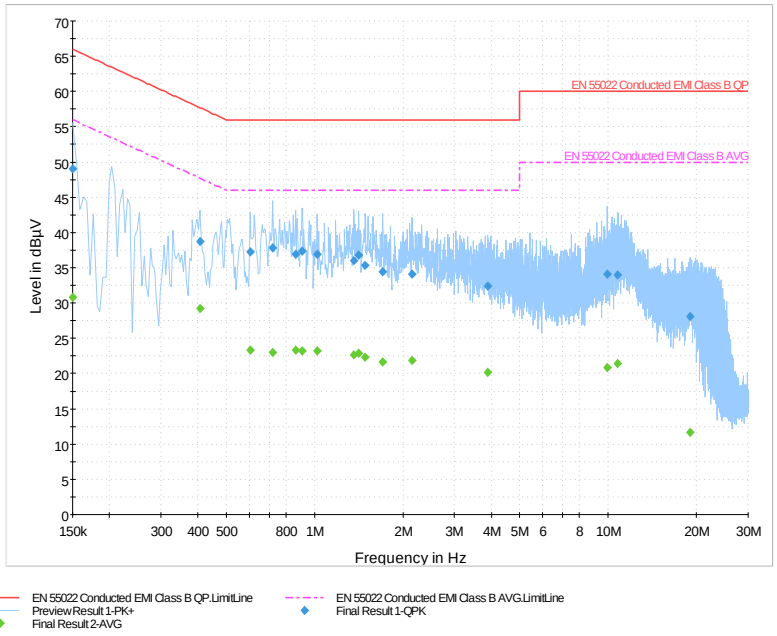


Figure 1-6: N Lines



AC Conducted Emissions Test Results cont'd

Test Configuration 4

Date of the test: April 18, 2011
The environmental conditions were: Temperature: 24.0 °C
Humidity: 34.2 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.150	L1	46.05	11.20	57.25	66.00	56.00	-8.75
0.150	N	45.42	11.23	56.65	66.00	56.00	-9.35
0.164	N	44.37	11.14	55.51	65.30	55.30	-9.79
0.168	L1	43.88	11.08	54.96	65.10	55.10	-10.14
0.177	N	43.08	11.05	54.12	64.60	54.60	-10.48
0.191	L1	42.57	10.92	53.50	64.00	54.00	-10.51
0.200	L1	42.22	10.86	53.08	63.60	53.60	-10.52
0.200	N	41.27	10.89	52.15	63.60	53.60	-11.45
0.209	N	40.79	10.82	51.61	63.30	53.30	-11.69
0.213	L1	42.42	10.77	53.19	63.10	53.10	-9.92
0.222	L1	40.28	10.70	50.98	62.70	52.70	-11.72
0.245	N	38.62	10.57	49.19	61.90	51.90	-12.71
0.254	L1	38.63	10.48	49.12	61.60	51.60	-12.48
0.254	N	38.08	10.50	48.58	61.60	51.60	-13.02
0.267	N	36.95	10.41	47.36	61.20	51.20	-13.84
0.308	N	33.75	10.17	43.92	60.00	50.00	-16.08

All other emission levels had a test margin of 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 Results cont'd

Test Configuration 4 cont'd

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.339	N	31.86	10.12	41.98	59.20	49.20	-17.22
0.344	L1	33.78	10.10	43.88	59.10	49.10	-15.22
0.353	L1	33.24	10.08	43.32	58.90	48.90	-15.58
0.438	N	26.30	9.96	36.26	57.10	47.10	-20.84
0.452	L1	27.55	9.94	37.49	56.80	46.80	-19.31
0.942	N	26.17	9.81	35.98	56.00	46.00	-20.02
0.996	L1	32.59	9.80	42.39	56.00	46.00	-13.61
2.045	L1	31.89	9.83	41.72	56.00	46.00	-14.28
2.103	N	26.10	9.83	35.94	56.00	46.00	-20.07
2.378	L1	31.67	9.84	41.52	56.00	46.00	-14.49
3.597	N	28.72	9.90	38.61	56.00	46.00	-17.39
4.110	N	28.87	9.91	38.78	56.00	46.00	-17.23
4.146	L1	30.30	9.90	40.20	56.00	46.00	-15.80

All other emission levels had a test margin of 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 1-7: L1 lines

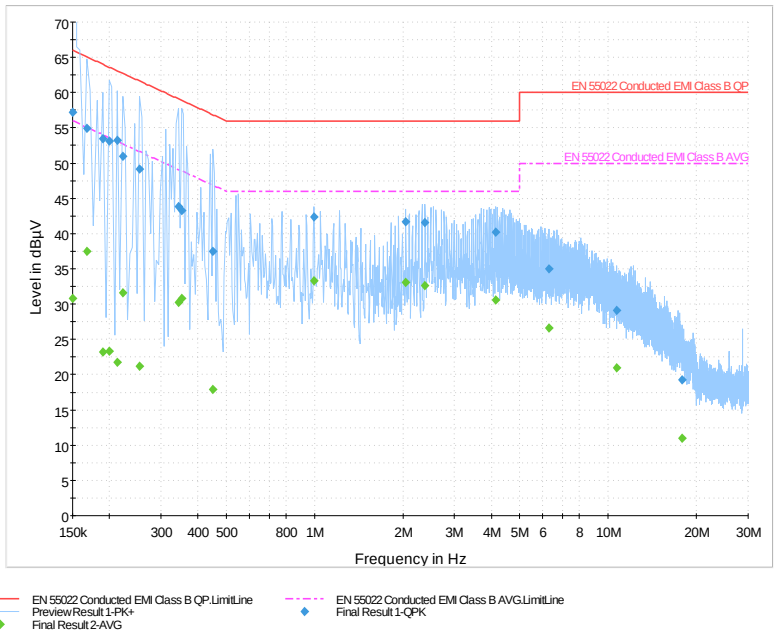
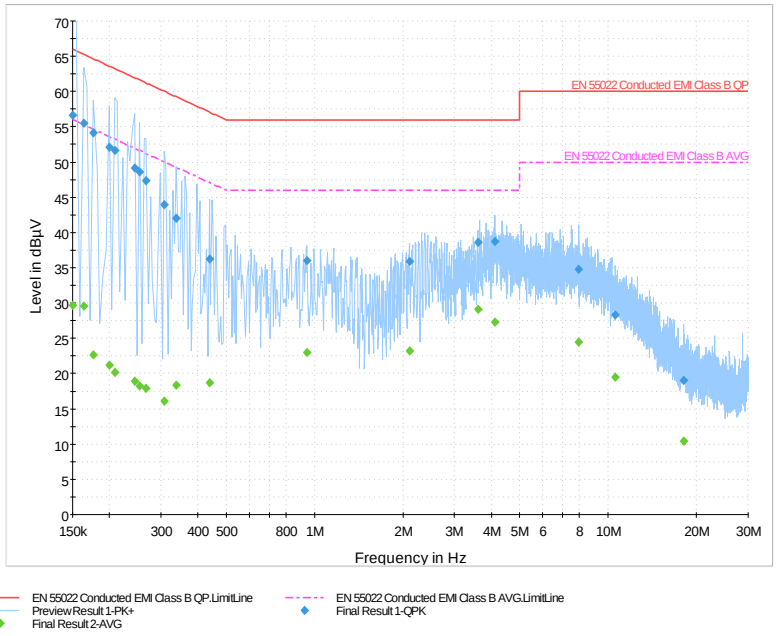


Figure 1-8: N Lines



AC Conducted Emissions Test Results cont'd

Test Configuration 5

Date of the test: April 18, 2011
The environmental conditions were: Temperature: 24.5 °C
Humidity: 38.3 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.150	L1	46.10	11.20	57.30	66.00	56.00	-8.70
0.150	N	43.65	11.23	54.89	66.00	56.00	-11.12
0.159	L1	42.63	11.14	53.77	65.50	55.50	-11.73
0.159	N	40.83	11.17	52.00	65.50	55.50	-13.50
0.177	N	40.35	11.05	51.39	64.60	54.60	-13.21
0.182	L1	40.64	10.99	51.63	64.40	54.40	-12.78
0.195	L1	39.43	10.89	50.32	63.80	53.80	-13.48
0.195	N	38.64	10.92	49.56	63.80	53.80	-14.24
0.204	L1	41.36	10.83	52.19	63.40	53.40	-11.21
0.227	L1	39.66	10.67	50.33	62.60	52.60	-12.27
0.227	N	38.53	10.69	49.23	62.60	52.60	-13.38
0.236	L1	35.75	10.61	46.36	62.30	52.30	-15.94
0.236	N	34.36	10.63	45.00	62.30	52.30	-17.31
0.245	L1	36.23	10.55	46.78	61.90	51.90	-15.12
0.249	N	33.99	10.54	44.53	61.80	51.80	-17.27
0.276	N	33.25	10.34	43.60	60.90	50.90	-17.30
0.290	N	31.19	10.25	41.44	60.50	50.50	-19.07
0.335	L1	31.39	10.11	41.50	59.30	49.30	-17.80
0.344	L1	29.69	10.10	39.78	59.10	49.10	-19.32
0.533	L1	32.47	9.89	42.36	56.00	46.00	-13.64
0.533	N	34.45	9.90	44.35	56.00	46.00	-11.65
0.884	N	27.39	9.82	37.21	56.00	46.00	-18.79
0.902	L1	29.01	9.81	38.82	56.00	46.00	-17.18

All other emission levels had a test margin of 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 Results cont'd

Test Configuration 5 cont'd

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
1.361	L1	23.81	9.80	33.62	56.00	46.00	-22.38
1.604	N	22.36	9.82	32.17	56.00	46.00	-23.83
2.193	L1	21.44	9.83	31.27	56.00	46.00	-24.73
10.185	L1	26.87	9.97	36.84	60.00	50.00	-23.16
10.496	L1	27.18	9.97	37.15	60.00	50.00	-22.85

All other emission levels had a test margin of greater than 25 dB.
Measurements were done with the Quasi-Peak and Average detector.
See figure 1-9 and figure 1-10 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

AC Conducted Emissions Test Graphs

Test Configuration 5

Figure 1-9: L1 lines

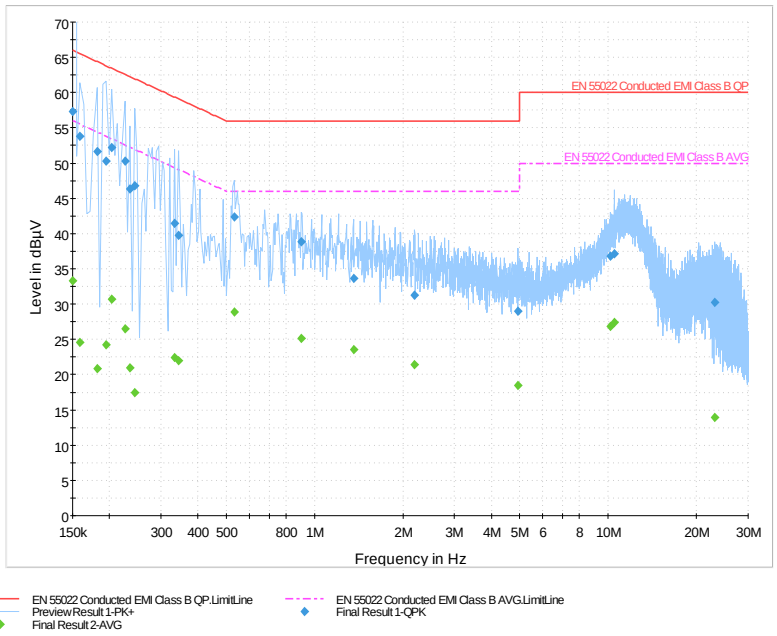
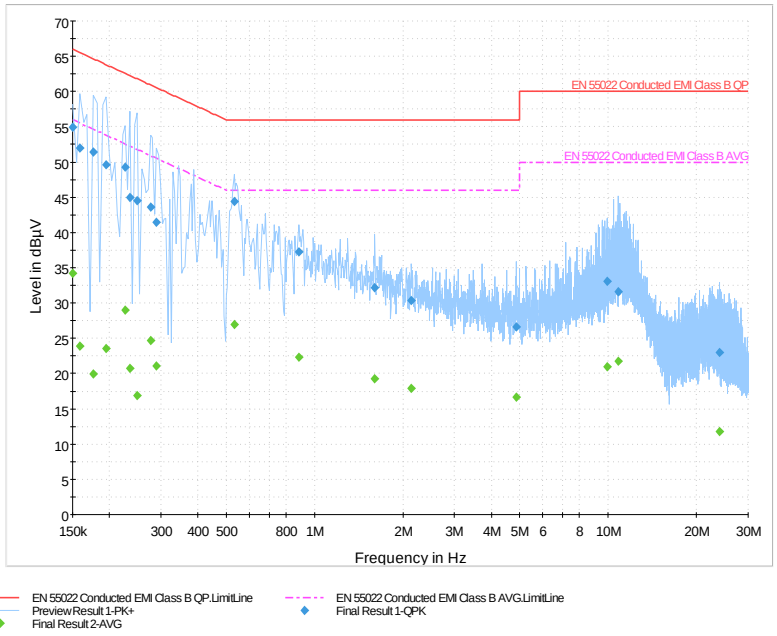


Figure 1-10: N Lines



AC Conducted Emissions Test Results cont'd

Test Configuration 6

Date of the test: April 18, 2011
The environmental conditions were: Temperature: 24.8 °C
Humidity: 34.3 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.150	L1	38.38	11.20	49.58	66.00	56.00	-16.42
0.204	N	35.39	10.85	46.24	63.40	53.40	-17.16
0.402	L1	35.42	10.01	45.43	57.80	47.80	-12.37
0.407	N	29.09	10.01	39.10	57.70	47.70	-18.60
0.465	L1	32.69	9.93	42.62	56.60	46.60	-13.98
0.501	L1	34.65	9.91	44.55	56.00	46.00	-11.45
0.650	L1	34.22	9.85	44.06	56.00	46.00	-11.94
0.672	L1	35.09	9.84	44.93	56.00	46.00	-11.07
0.672	N	30.75	9.85	40.60	56.00	46.00	-15.40
0.717	N	27.43	9.84	37.27	56.00	46.00	-18.73
0.731	L1	33.77	9.83	43.60	56.00	46.00	-12.41
0.785	L1	34.02	9.82	43.84	56.00	46.00	-12.16
0.789	N	24.75	9.82	34.57	56.00	46.00	-21.43
0.816	N	25.77	9.82	35.59	56.00	46.00	-20.41
0.843	L1	33.62	9.81	43.44	56.00	46.00	-12.56
0.852	N	27.91	9.82	37.73	56.00	46.00	-18.27
0.915	N	27.28	9.81	37.10	56.00	46.00	-18.91

All other emission levels had a test margin of greater than 25 dB.
Measurements were done with the quasi-peak and the average detector.
See figure 1-11 and figure 1-12 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

AC Conducted Emissions Test Results cont'd

Test Configuration 6 cont'd

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.974	N	26.43	9.81	36.24	56.00	46.00	-19.76
1.460	L1	32.67	9.80	42.48	56.00	46.00	-13.52
1.509	L1	32.56	9.80	42.36	56.00	46.00	-13.64
1.554	N	24.85	9.81	34.66	56.00	46.00	-21.34
1.590	N	24.40	9.81	34.21	56.00	46.00	-21.79
2.171	L1	29.05	9.83	38.88	56.00	46.00	-17.12
2.981	N	22.31	9.88	32.19	56.00	46.00	-23.81
3.683	L1	27.15	9.89	37.05	56.00	46.00	-18.95
3.890	N	21.14	9.90	31.05	56.00	46.00	-24.95
10.397	L1	26.56	9.97	36.53	60.00	50.00	-23.47
11.040	L1	27.30	9.98	37.28	60.00	50.00	-22.72

All other emission levels had a test margin of greater than 25 dB.
Measurements were done with the Quasi-Peak and Average detector.
See figure 1-11 and figure 1-12 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

AC Conducted Emissions Test Graphs

Test Configuration 5

Figure 1-11: L1 lines

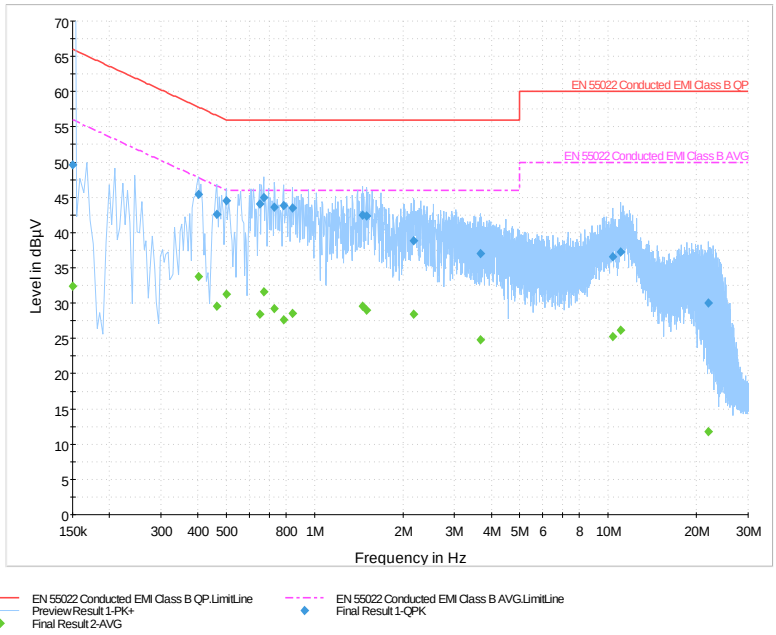
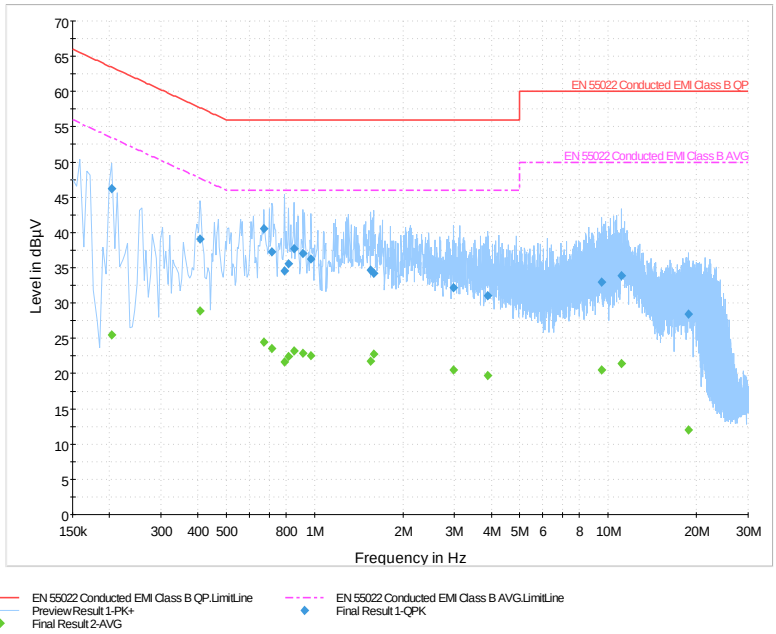


Figure 1-12: N Lines



APPENDIX 2 - RADIATED EMISSIONS TEST DATA (RDH71CW)

Radiated Emissions Test Results

The following test configurations were measured for model RDH71CW.

The following tests were performed by Kevin Rose

Test Configuration 1

Date of the test: March 21, 2011
The environmental conditions were: Temperature: 23.4 °C
Humidity: 25.8 %

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)
41.150	V	3.74	41.00	Q.P.	32.85	-15.85	17.00	40.00	-23.00

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

Radiated Emissions Test Results cont'd

Test Configuration 2

Date of the test: March 21, 2011
The environmental conditions were: Temperature: 23.4 °C
Humidity: 17.1 %

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)
45.700	V	1.41	12.00	Q.P.	39.00	-16.74	22.26	40.00	-17.74
57.450	V	1.76	279.00	Q.P.	39.18	-17.37	21.81	40.00	-18.19
90.450	V	1.43	270.00	Q.P.	34.63	-14.06	20.57	43.50	-22.93

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

Radiated Emissions Test Results cont'd

Test Configuration 3

Date of the test: March 21, 2011
The environmental conditions were: Temperature: 23.4 °C
Humidity: 17.1 %

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

Test Configuration 4

Date of the test: March 18, 2011
The environmental conditions were: Temperature: 23.4 °C
Humidity: 25.8 %

Frequency	Antenna		Test Angle	Detector	Measured Level	Correction Factor for preamp/antenna / cables/ filter	Field Strength Level (reading+corr)	Limit @ 3.0 m	Test Margin
	Pol.	Height		(Q.P. or Peak)	(dBµV)	(dB/m)			
(MHz)	(V/H)	(metres)	(Deg.)				(dBµV/m)	(dBµV/m)	(dB)
41.050	V	1.71	330.00	Q.P.	45.03	-15.82	29.21	40.00	-10.79
42.600	H	3.98	171.00	Q.P.	32.82	-16.20	16.62	40.00	-23.38
58.750	V	1.51	313.00	Q.P.	39.44	-17.30	22.14	40.00	-17.86
74.750	V	1.77	350.00	Q.P.	38.56	-15.75	22.81	40.00	-17.19
77.350	H	1.91	12.00	Q.P.	39.47	-15.40	24.07	40.00	-15.93
87.700	V	1.53	184.00	Q.P.	33.98	-14.44	19.54	40.00	-20.46
146.500	V	1.43	25.00	Q.P.	30.98	-12.47	18.51	43.50	-24.99

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

Radiated Emissions Test Results cont'd

Test Configuration 5

Date of the test: March 21, 2011
The environmental conditions were: Temperature: 23.4 °C
Humidity: 17.1 %

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)
33.100	V	1.67	8.00	Q.P.	32.40	-13.84	18.56	40.00	-21.44
74.050	V	3.35	192.00	Q.P.	31.18	-15.90	15.28	40.00	-24.72
122.250	V	3.05	175.00	Q.P.	36.48	-12.22	24.26	43.50	-19.24
122.900	H	3.04	248.00	Q.P.	43.40	-12.20	31.20	43.50	-12.30
130.850	H	1.73	54.00	Q.P.	38.50	-12.62	25.88	43.50	-17.62
143.750	H	2.27	77.00	Q.P.	45.40	-12.58	32.82	43.50	-10.68
144.000	H	2.26	73.00	Q.P.	45.45	-12.60	32.85	43.50	-10.65
216.050	V	3.12	39.00	Q.P.	38.97	-9.23	29.74	46.00	-16.26
240.000	H	1.34	250.00	Q.P.	43.76	-10.09	33.67	46.00	-12.33
240.100	V	1.54	31.00	Q.P.	39.13	-10.09	29.04	46.00	-16.96
307.450	V	1.63	10.00	Q.P.	32.12	-6.78	25.34	46.00	-20.66
332.200	H	1.01	140.00	Q.P.	29.00	-5.05	23.95	46.00	-22.05
368.500	V	2.06	351.00	Q.P.	30.22	-5.68	24.54	46.00	-21.46
442.600	V	1.52	7.00	Q.P.	29.92	-2.88	27.04	46.00	-18.96
864.050	H	2.28	53.00	Q.P.	29.30	6.41	35.71	46.00	**-10.29**

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

Radiated Emissions Test Results cont'd

Test Configuration 6

Date of the test: March 21, 2011
The environmental conditions were: Temperature: 23.4 °C
Humidity: 15.6 %

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