EMI Test Report

Tested in accordance with
Federal Communications Commission (FCC)
Personal Communications Services
CFR 47, Part 15 Subpart C
and
Industry Canada, RSS-210

Research In Motion Limited

REPORT NO.: RIM-0111-0409-01

PRODUCT MODEL NO: RAS10WW
TYPE NAME: BlackBerry Wireless Handheld
FCC ID: L6ARAS10WW
IC: 2503A-RAS10WW

Date: _____29 September 2004_____

Declaration

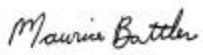
Statement of Performance:

The BlackBerry Wireless Handheld, model RAS10WW and accessories when configured and operated per RIM's operation instructions, 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 equipment used was suitable for the tests performed and within the manufacturers published specifications and operating parameters.
The test methods were consistent with the methods described in the relevant standards.

Tested by



Maurice Battler
Compliance Specialist

Date: 29 September 2004

Reviewed by:

Paul Lock
Senior Compliance Specialist

Date: 29 September 2004

Tested and Reviewed by:

Masud S. Attayi, P.Eng.
Senior Compliance Engineer

Date: 29 September 2004

Approved by:

Paul G. Cardinal, Ph.D.
Manager, Compliance and Certification

Date: 30 September 2004

Table of Contents

A) Scope

This report details the results of compliance tests which were performed in accordance to the requirements of:

- FCC CFR 15 Subpart C, Dec. 8, 2003
- Industry Canada, RSS-210, Issue 5, Nov./2001, Low Power Licence-Exempt Radiocommunication Devices

B) Product Identification

The equipment under test (EUT) was tested at the Research In Motion (RIM) EMI test facility, located at:

305 Phillip Street
Waterloo, Ontario
Canada, N2L 3W8
Phone: 519 888 7465
Fax: 519 888 6906
Web Site: www.rim.com

The testing began on August 31, 2004 and completed on September 17, 2004. The sample equipment under test (EUT) included:

1a) BlackBerry Wireless Handheld, model number RAS10WW, ASY-07434-001 Rev. 002, serial number 1004231791, FCC ID L6ARAS10WW, IC: 2503A-RAS10WW.

1b) BlackBerry Wireless Handheld, model number RAS10WW, ASY-07434-001 Rev. 002, serial number 1004230997, FCC ID L6ARAS10WW, IC: 2503A-RAS10WW.

2a) Travel Charger, model number PSM05R-050CH, part number ASY-03746-003 with an output voltage of 5.0 volts dc, 1.5 amps and attached USB data cable with a lead length of 0.71 metres.

2b) External Battery Charger model number BCM6710A, part number ASY-06630-001 with a dc output of 4.2 volts, 0.75 amps for charging the battery in the charger and 5.1 volts, 0.75 amps for charging of the Handheld battery.

2c) North American Travel Charger, model number PSM04A-050RIM, part number ASY-07040-001 with an output voltage of 5.0 volts dc, 0.85 amps and attached USB data cable with a lead length of 0.73 metres.

2d) Travel Charger, model number PSM05R-050Q, part number ASY-04078-001 with an output of 5.0 volts dc, 0.5 amps.

2e) Rapid Battery Travel Charger, model number PSM08R-050RIM, part number ASY-07041-001 with an output voltage of 5.0 volts dc, 1.6 amps and attached USB data cable with a lead length of 0.85 metres.

3) USB data cable, model number HDW-06610-001, 1.45 metres long.

4) Headset, model number HDW-03458-001. The lead length was 1.25 metres long.

The BlackBerry Wireless Handheld has 802.11b functionality operating in the frequency range of 2412 to 2462 MHz.

C) Support Equipment Used for the Testing of the EUT

1) DC Power Supply, H/P, model 6632B, serial number US37472178

D) Test Voltage

The ac input voltage was 120 volts, 60 Hz where applicable. This configuration was per RIM's specifications.

E) Test Results Chart

SPECIFICATION	Test Type	MEETS REQUIREMENTS	Performed By
FCC CFR 47 Part 15.207 IC RSS-210	AC Conducted Emissions	Yes	Masud Attayi
FCC CFR 47 Part 15.209	Radiated Emissions	Yes	Masud Attayi
FCC CFR 47 Part 15.247(a) IC RSS-210	Spectrum Bandwidth	Yes	Maurice Battler
FCC CFR 47 Part 15.247(b) IC RSS-210	Max. Peak Output Power	Yes	Maurice Battler
FCC CFR 47 Part 15.247(c) IC RSS-210	Band Edge Compliance Spurious RF Conducted Emissions	Yes	Maurice Battler
FCC CFR 47 Part 15.247(d) IC RSS-210	Power Spectral Density	Yes	Maurice Battler

F) **Modifications to EUT**

No modifications were required to the EUT.

G) **Summary of Results**

1) AC CONDUCTED EMISSIONS

The conducted emissions were measured while 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.

1. The Handheld in battery charging mode with 802.11b transmitting was connected to the Travel Charger, part number ASY-03746-003. The ac input to the Travel Charger was 120 volts, 60 Hz.
2. The Handheld in battery charging mode with 802.11b transmitting was connected via the detachable USB cable to the External Battery Charger, part number ASY-06630-001. The ac input to the External Battery Charger was 120 volts, 60 Hz.
3. The Handheld in battery charging mode with 802.11b transmitting was connected to the North American Travel Charger, part number ASY-07040-001. The ac input to the North American Travel Charger was 120 volts, 60 Hz.
4. The Handheld in battery charging mode with 802.11b transmitting was connected via the detachable USB cable to the Travel Charger, part number ASY-04078-001. The ac input to the Travel Charger was 120 volts, 60 Hz.
5. The Handheld in battery charging mode with 802.11b transmitting was connected to the Rapid Battery Travel Charger, part number ASY-07041-001. The ac input to the Rapid Battery Travel Charger was 120 volts, 60 Hz.

The sample EUT's conducted emissions were compared with respect to the FCC CFR 47 Part 15, Subpart B (CISPR 22) and IC ICES-003, Class B limit. The sample EUT had a worse case test margin of 4.58 dB at 0.162 MHz with the North American Travel Charger test configuration.

Measurement Uncertainty ±2.0 dB

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

2) RADIATED EMISSIONS

The radiated emissions from the EUT were measured as per FCC Part 15.247 and IC RSS-210. The EUT was placed on a nonconductive wooden table, 100 cm high that was positioned on a remotely rotatable 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. At this point 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 25.0 GHz. Both the horizontal and vertical polarisations of the emissions were measured.
The measurements were done in a semi-anechoic chamber. The semi-anechoic chamber FCC registration number is **778487** and the Industry Canada file number is **IC4240**.
The EUT was configured and operated to produce the maximum radiated emissions while still keeping within RIM's specifications.
The Handheld was measured in standalone configuration with 802.11b transmitting at low channel (1), middle channel (6) and high channel (11).
The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15, Subpart C, 15.247 and RSS-210.
The 802.11b harmonics were investigated up to the 10th harmonic. Emissions were in the noise floor (NF).

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 ±4.0 dB
To view the test data see APPENDIX 2.

3) 802.11b RF CONDUCTED EMISSIONS

a) 6 dB Bandwidth
The EUT passed the 6 dB bandwidth requirement as per 47 CFR 15.247(a) and RSS-210. Low channel (1), middle channel (6) and high channel (11) were measured.
See APPENDIX 3 for the test data.

b) Maximum Peak Conducted Output Power
The EUT passed the maximum peak conducted output power as per 47 CFR 15.247(b) and RSS-210. Low channel (1), middle channel (6) and high channel (11) were measured.
See APPENDIX 3 for the test data.

c) Band-Edge Compliance of RF Conducted Emissions
The EUT passed the band-edge compliance of RF conducted emissions as per 47 CFR 15.247(c) and RSS-210. Channels 1 and 11 were measured.
See APPENDIX 3 for the test data.

d) Power Spectral Density Measurement
The EUT passed the power spectral density measurement as per 15.247(d) and RSS-210. Low channel (1), middle channel (6) and high channel (11) were measured.
See APPENDIX 3 for the test data.

e) Spurious RF Conducted Emissions
The EUT passed the spurious RF conducted emissions as per 47 CFR 15.247(c) and RSS-210. The frequency range measured was 30 MHz to 26 GHz. Low channel (1), middle channel (6) and high channel (11) were measured.
See APPENDIX 3 for the test data.

H) **Compliance Test Equipment Used**

UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
EMI Receiver	Agilent	85462A	3942A00517	05-08-30	Conducted/Radiated Emissions
RF Filter Section	Agilent	85460A	3704A00481	05-08-30	Conducted/Radiated Emissions
L.I.S.N.	Emco	3816/2	1120	05-08-18	Conducted Emissions
Impulse Limiter	Rohde & Schwarz	ESHS-Z2	836248/052	04-11-03	Conducted Emissions
Preamplifier	Sonoma	310N/11909A	185831	04-11-06	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	04-11-06	Radiated Emissions
EMC Analyzer	Agilent	E7405A	US40240226	05-07-29	Radiated Emissions
EMI Receiver	Agilent	85462A	3942A00517	05-08-30	Radiated Emissions
RF Filter Section	Agilent	85460A	3704A00481	05-08-30	Radiated Emissions
Hybrid Log Antenna	TDK	HLP-3003C	017301	04-12-16	Radiated Emissions
Horn Antenna	TDK	HRN-0118	30201	05-01-08	Radiated Emissions
Horn Antenna	TDK	HRN-0118	30101	05-07-21	Radiated Emissions
Horn Antenna	Emco	3116	2538	04-09-22	Radiated Emissions
Preamplifier	TDK	18-26	3002	04-11-27	Radiated Emissions
Spectrum Analyzer	HP	8563E	3745A08112	05-07-20	RF Conducted Emissions
DC Power Supply	HP	6632B	US37472178	05-08-01	RF Conducted Emissions
Environment Monitor	Control Company	1870	230355190	06-01-11	Radiated Emissions
Environment Monitor	Control Company	1870	230355189	06-01-11	RF Conducted Emissions

APPENDIX 1

AC CONDUCTED EMISSIONS TEST DATA/PLOTS

AC Conducted Emissions Test Results

September 23, 2004

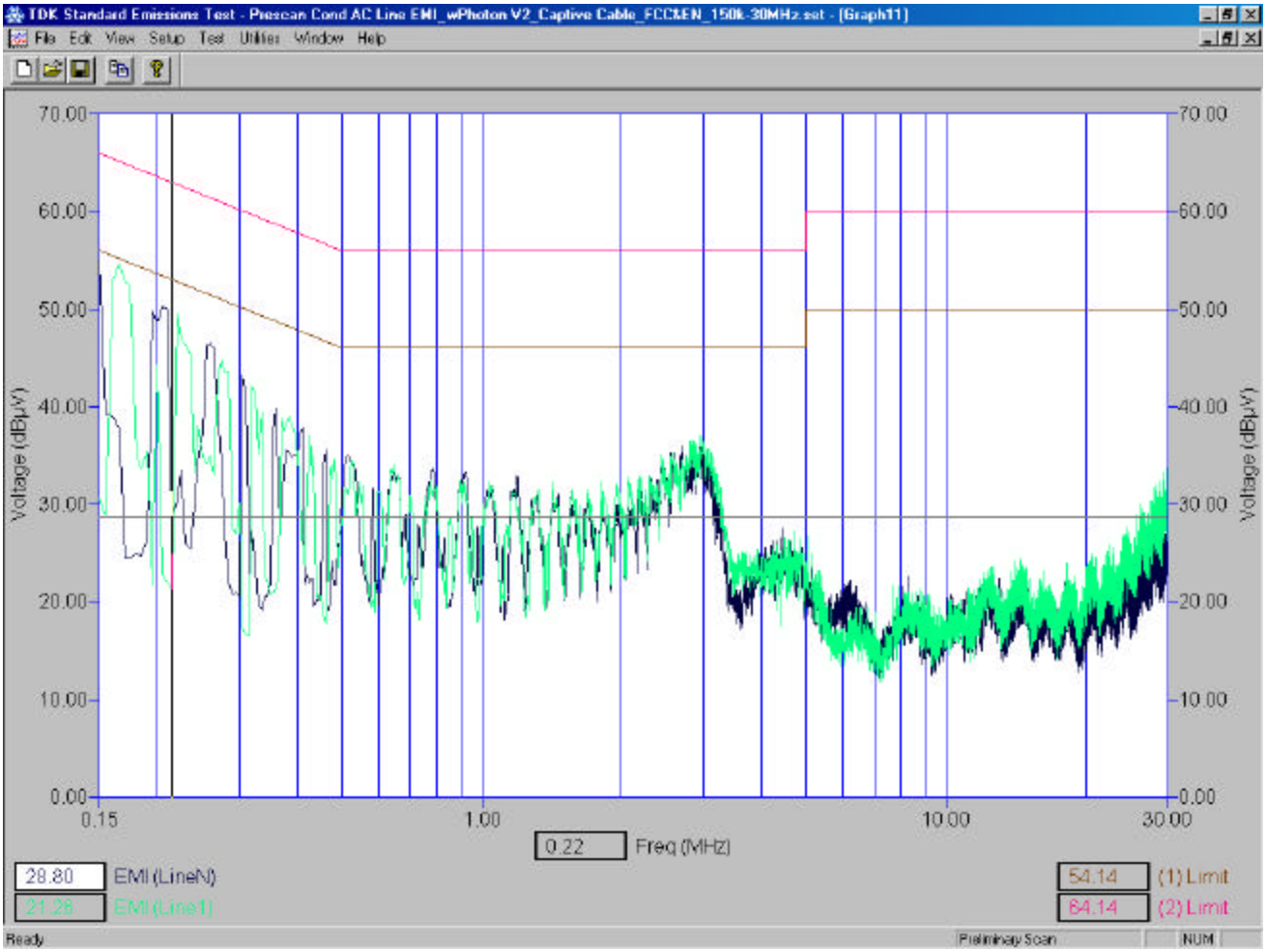
FCC CFR 47 Part 15, Subpart C (CISPR 22), IC ICES-003, Class B

Operating Mode: The Handheld in battery charging mode with 802.11b transmitting was connected to the Travel Charger, part number ASY-03746-003. The ac input to the Travel Charger was 120 volts, 60 Hz.

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factors for Impulse Limiter, LISN, Cable (dB)	QP Level (reading + Corr.Factor) (dB)	(QP) Limit (dBµV)	(AVG) Limit (dBµV)	Margin (QP) Limits (dB)	Margin (AVG) Limits (dB)
0.150	N	39.66	9.82	49.48	66.00	56.00	-16.52	-6.52
0.151	L1	40.51	9.82	50.33	65.21	55.21	-14.87	-4.87
0.194	N	34.37	9.83	44.20	63.41	53.41	-19.20	-9.20
0.221	L1	32.30	9.83	42.13	62.82	52.82	-20.68	-10.68
0.262	N	30.34	9.84	40.18	61.43	51.43	-21.25	-11.25
0.274	L1	28.29	9.85	38.14	60.97	50.97	-22.83	-12.83
0.291	N	26.07	9.85	35.92	60.11	50.11	-24.19	-14.19
0.311	L1	25.18	9.85	35.03	59.71	49.71	-24.68	-14.68
2.845	L1	21.74	9.89	31.63	56.00	46.00	-24.37	-14.37
2.864	N	21.10	9.89	30.99	56.00	46.00	-25.01	-15.01
2.958	N	19.61	9.84	29.45	56.00	46.00	-26.55	-16.55
2.964	L1	21.50	9.84	31.34	56.00	46.00	-24.66	-14.66

All other emission levels had a test margin of greater than 25 dB.
See graph 1 for the measurement plot.

AC Conducted Emissions Test Graph 1



The Handheld in battery charging mode with 802.11b transmitting was connected to the Travel Charger, part number ASY-03746-003. The ac input to the Travel Charger was 120 volts, 60 Hz.

AC Conducted Emissions Test Results cont'd

September 23, 2004

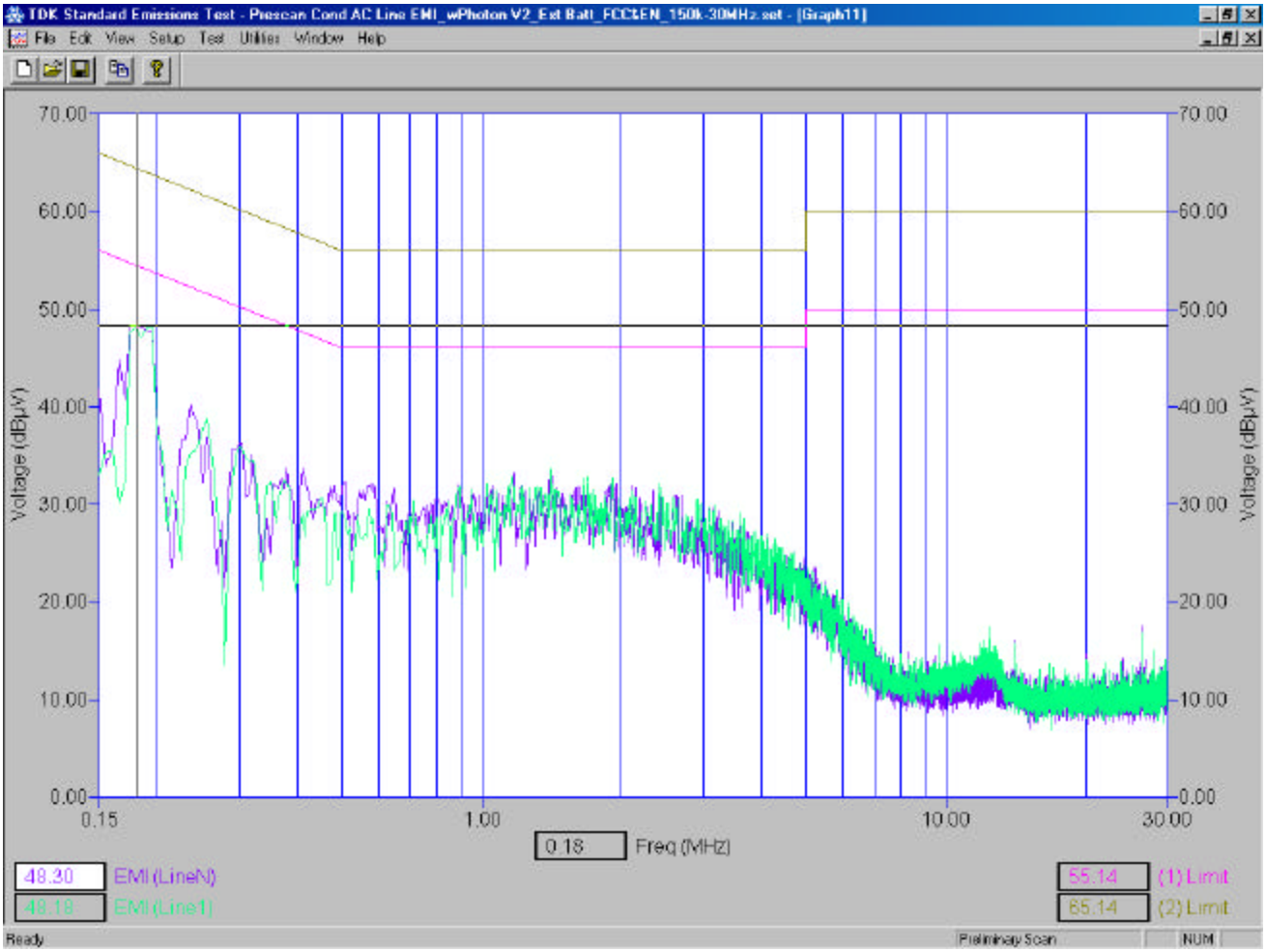
FCC CFR 47 Part 15, Subpart C (CISPR 22), IC ICES-003, Class B

Operating Mode: The Handheld in battery charging mode with 802.11b transmitting was connected via the detachable USB cable model number HDW-06610-001 to the External Battery Charger model number BCM6710A, ASY-06630-001. The ac input to the External Battery Charger was 120 volts, 60 Hz.

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factors for Impulse Limiter, LISN, Cable (dB)	QP Level (reading + Corr.Factor) (dB)	(QP) Limit (dBµV)	(AVG) Limit (dBµV)	Margin (QP) Limits (dB)	Margin (AVG) Limits (dB)
0.174	N	34.09	9.83	43.92	64.72	54.72	-20.80	-10.80
0.186	L1	35.64	9.83	45.47	64.04	54.04	-18.57	-8.57
0.240	N	28.27	9.84	38.11	62.27	52.27	-24.16	-14.16
0.579	N	20.22	9.85	30.07	56.00	46.00	-25.93	-15.93
1.148	L1	20.82	9.90	30.72	56.00	46.00	-25.28	-15.28
1.169	N	15.30	9.90	25.20	56.00	46.00	-30.80	-20.80
1.411	L1	20.47	9.89	30.36	56.00	46.00	-25.64	-15.64
1.429	N	17.46	9.89	27.35	56.00	46.00	-28.65	-18.65
1.668	L1	19.91	9.89	29.80	56.00	46.00	-26.20	-16.20
1.693	L1	17.94	9.88	27.82	56.00	46.00	-28.18	-18.18
1.917	L1	19.12	9.88	29.00	56.00	46.00	-27.00	-17.00
1.948	N	16.31	9.88	26.19	56.00	46.00	-29.81	-19.81

All other emission levels had a test margin of greater than 25 dB.
See graph 2 for the measurement plot.

AC Conducted Emissions Test Graph 2



The Handheld in battery charging mode with 802.11b transmitting was connected via the detachable USB cable model number HDW-06610-001 to the External Battery Charger. The ac input to the External Battery Charger was 120 volts, 60 Hz.

AC Conducted Emissions Test Results cont'd

September 23, 2004

FCC CFR 47 Part 15, Subpart C (CISPR 22), IC ICES-003, Class B

Operating Mode: The Handheld in battery charging mode with 802.11b transmitting was connected to the North American Travel Charger model number PSM04A-050RIM, ASY-07040-001. The ac input to the North American Travel Charger was 120 volts, 60 Hz.

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factors for Impulse Limiter, LISN, Cable (dB)	Level (QP) (reading + Corr.Factor) (dB)	Limit (QP) (dBµV)	Margin (QP) Limits (dB)
0.162	N	50.52	9.82	60.34	65.46	-5.12
0.162	L1	51.06	9.82	60.88	65.46	-4.58
0.190	N	36.12	9.83	45.95	64.04	-18.09
0.211	L1	37.90	9.83	47.73	62.82	-15.08
0.245	N	37.58	9.84	47.42	61.59	-14.17
1.909	N	25.95	9.88	35.83	56.00	-20.17
2.047	N	25.62	9.88	35.50	56.00	-20.50
2.048	L1	24.91	9.88	34.79	56.00	-21.21
2.159	N	26.86	9.89	36.75	56.00	-19.25
2.162	L1	25.99	9.89	35.88	56.00	-20.12
2.665	L1	25.30	9.91	35.21	56.00	-20.79
2.718	L1	25.13	9.91	35.04	56.00	-20.96

Measurements were done with the quasi-peak detector.
See graph 3 for the measurement plot.

AC Conducted Emissions Test Results cont'd

September 23, 2004

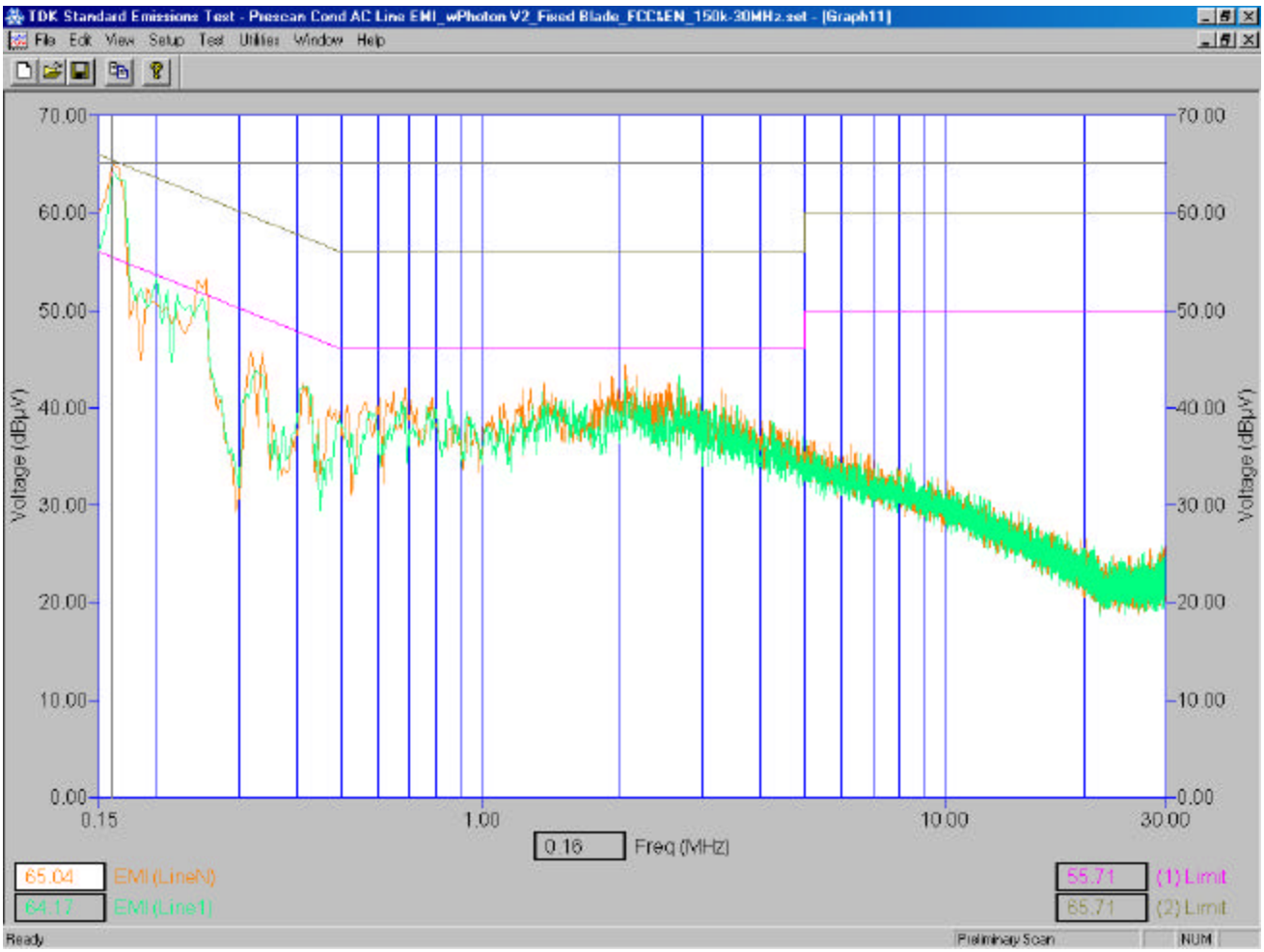
FCC CFR 47 Part 15, Subpart C (CISPR 22), IC ICES-003, Class B

Operating Mode: The Handheld in battery charging mode with 802.11b transmitting was connected to the North American Travel Charger model number PSM04A-050RIM, ASY-07040-001. The ac input to the North American Travel Charger was 120 volts, 60 Hz.

Frequency (MHz)	Line	Reading (AVE.) (dBµV)	Correction Factors for Impulse Limiter, LISN, Cable (dB)	Level (AVE.) (reading + Corr.Factor) (dB)	Limit (AVE.) (dBµV)	Margin (AVE.) Limits (dB)
0.173	N	25.49	9.82	35.31	55.46	-20.15
0.179	N	24.80	9.83	34.63	54.49	-19.86
0.191	N	22.36	9.83	32.19	53.21	-21.01
0.205	N	16.80	9.83	26.63	53.61	-26.98
0.283	L1	14.09	9.85	23.94	50.67	-26.73
0.331	N	19.63	9.84	29.47	49.20	-19.73
0.418	L1	13.18	9.83	23.01	47.45	-24.44
0.425	N	13.73	9.83	23.56	47.45	-23.89
0.527	L1	20.95	9.84	30.79	46.00	-15.21
0.771	L1	21.72	9.86	31.58	46.00	-14.42
1.035	L1	19.83	9.90	29.73	46.00	-16.27
1.083	L1	20.40	9.90	30.30	46.00	-15.70

Measurements were done with the average detector.
See graph 3 for the measurement plot.

AC Conducted Emissions Test Graph 3



The Handheld in battery charging mode with 802.11b transmitting was connected to the North American Travel Charger model number PSM04A-050RIM, ASY-07040-001. The ac input to the North American Travel Charger was 120 volts, 60 Hz.

AC Conducted Emissions Test Results cont'd

September 23, 2004

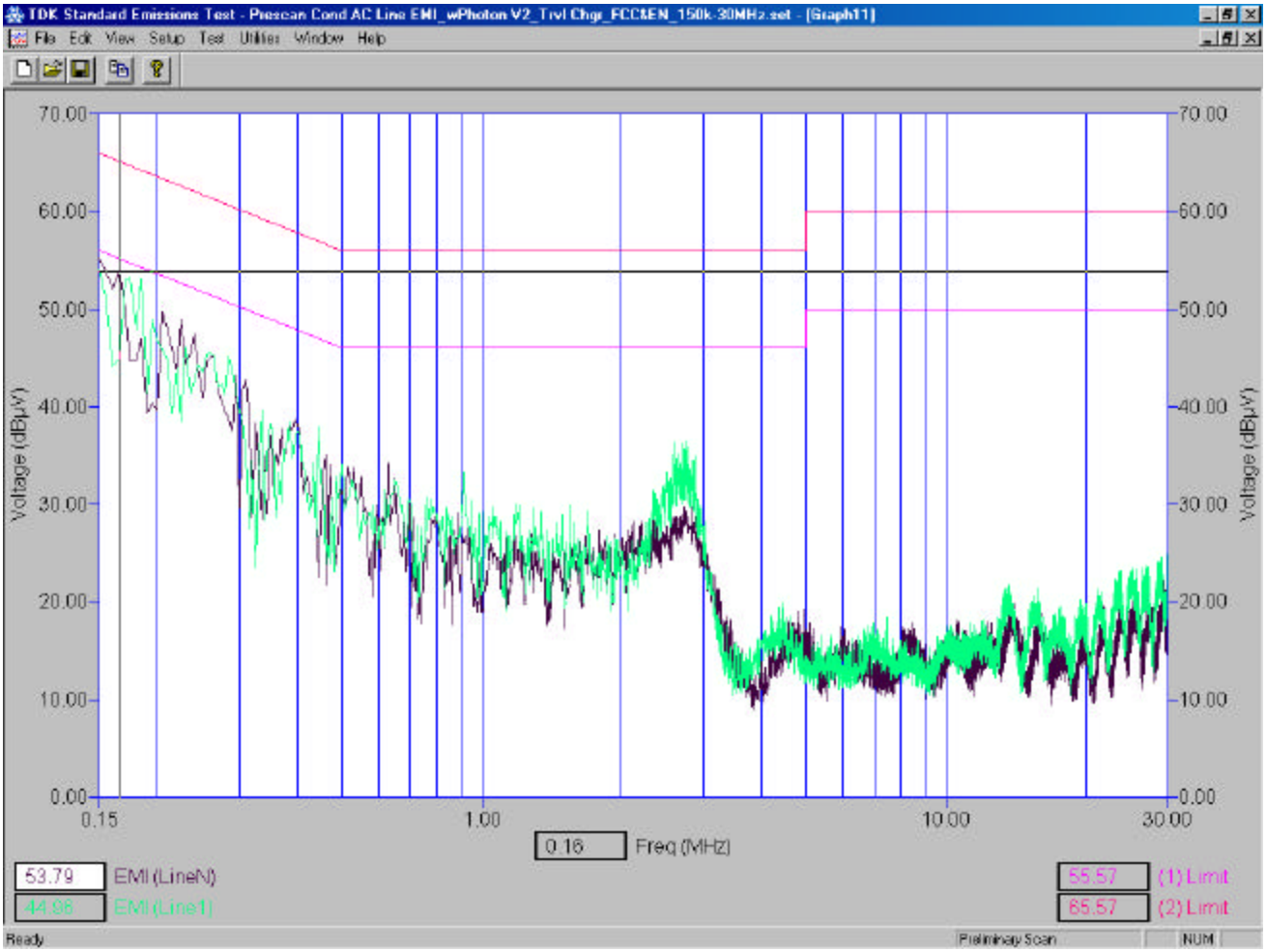
FCC CFR 47 Part 15, Subpart C (CISPR 22), IC ICES-003, Class B

Operating Mode: The Handheld in battery charging mode with 802.11b transmitting was connected to the Travel Charger, model number PSM05R-050Q, part number ASY-04078-001 via the USB data cable, model number HDW-06610-001. The ac input to the Travel Charger was 120 volts, 60 Hz.

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factors for Impulse Limiter, LISN, Cable (dB)	QP Level (reading + Corr.Factor) (dB)	(QP) Limit (dBµV)	(AVG) Limit (dBµV)	Margin (QP) Limits (dB)	Margin (AVG) Limits (dB)
0.153	N	40.44	9.82	50.26	66.00	56.00	-15.74	-5.74
0.154	L1	39.54	9.82	49.36	66.00	56.00	-16.64	-6.64
0.157	L1	38.91	9.83	48.74	64.72	54.72	-15.98	-5.98
0.172	L1	36.34	9.83	46.17	64.26	54.26	-18.09	-8.09
0.185	L1	33.89	9.83	43.72	63.82	53.82	-20.10	-10.10
0.193	N	33.40	9.83	43.23	63.41	53.41	-20.17	-10.17
0.210	N	31.99	9.84	41.83	62.63	52.63	-20.81	-10.81
0.235	L1	30.11	9.84	39.95	62.45	52.45	-22.50	-12.50
0.257	L1	31.23	9.84	41.07	61.43	51.43	-20.36	-10.36
0.271	N	28.06	9.84	37.90	61.27	51.27	-23.37	-13.37
0.295	N	22.25	9.85	32.10	60.38	50.38	-28.28	-18.28
0.310	N	23.92	9.85	33.77	59.97	49.97	-26.20	-16.20

All other emission levels had a test margin of greater than 25 dB.
See graph 4 for the measurement plot.

AC Conducted Emissions Test Graph 4



The Handheld in battery charging mode with 802.11b transmitting was connected to the Travel Charger, model number PSM05R-050Q, part number ASY-04078-001 via the USB data cable, model number HDW-06610-001. The ac input to the Travel Charger was 120 volts, 60 Hz.

AC Conducted Emissions Test Results cont'd

September 23, 2004

FCC CFR 47 Part 15, Subpart C (CISPR 22), IC ICES-003, Class B

Operating Mode: The Handheld in battery charging mode with 802.11b transmitting was connected to the Rapid Battery Travel Charger, model number PSM08R-050RIM, part number ASY-07041-001. The ac input to the Rapid Battery Travel Charger was 120 volts, 60 Hz.

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factors for Impulse Limiter, LISN, Cable (dB)	Level (QP) (reading + Corr.Factor) (dB)	Limit (QP) (dBµV)	Margin (QP) Limits (dB)
0.156	N	48.42	9.82	58.24	65.46	-7.22
0.174	N	41.22	9.83	51.05	64.49	-13.44
0.199	N	46.54	9.83	56.37	63.61	-6.83
0.282	L1	40.29	9.85	50.14	63.21	-10.53
0.337	N	36.77	9.84	46.61	60.67	-12.59
0.408	N	35.35	9.83	45.18	59.20	-12.27
0.425	L1	34.84	9.83	44.67	57.45	-12.78
0.528	L1	34.59	9.84	44.43	57.45	-11.57
0.770	L1	32.12	9.86	41.98	56.00	-14.02
1.042	L1	30.61	9.90	40.51	56.00	-15.49
1.073	L1	32.70	9.90	42.60	56.00	-13.40

Measurements were done with the quasi-peak detector.
See graph 5 for the measurement plot.

AC Conducted Emissions Test Results cont'd

September 23, 2004

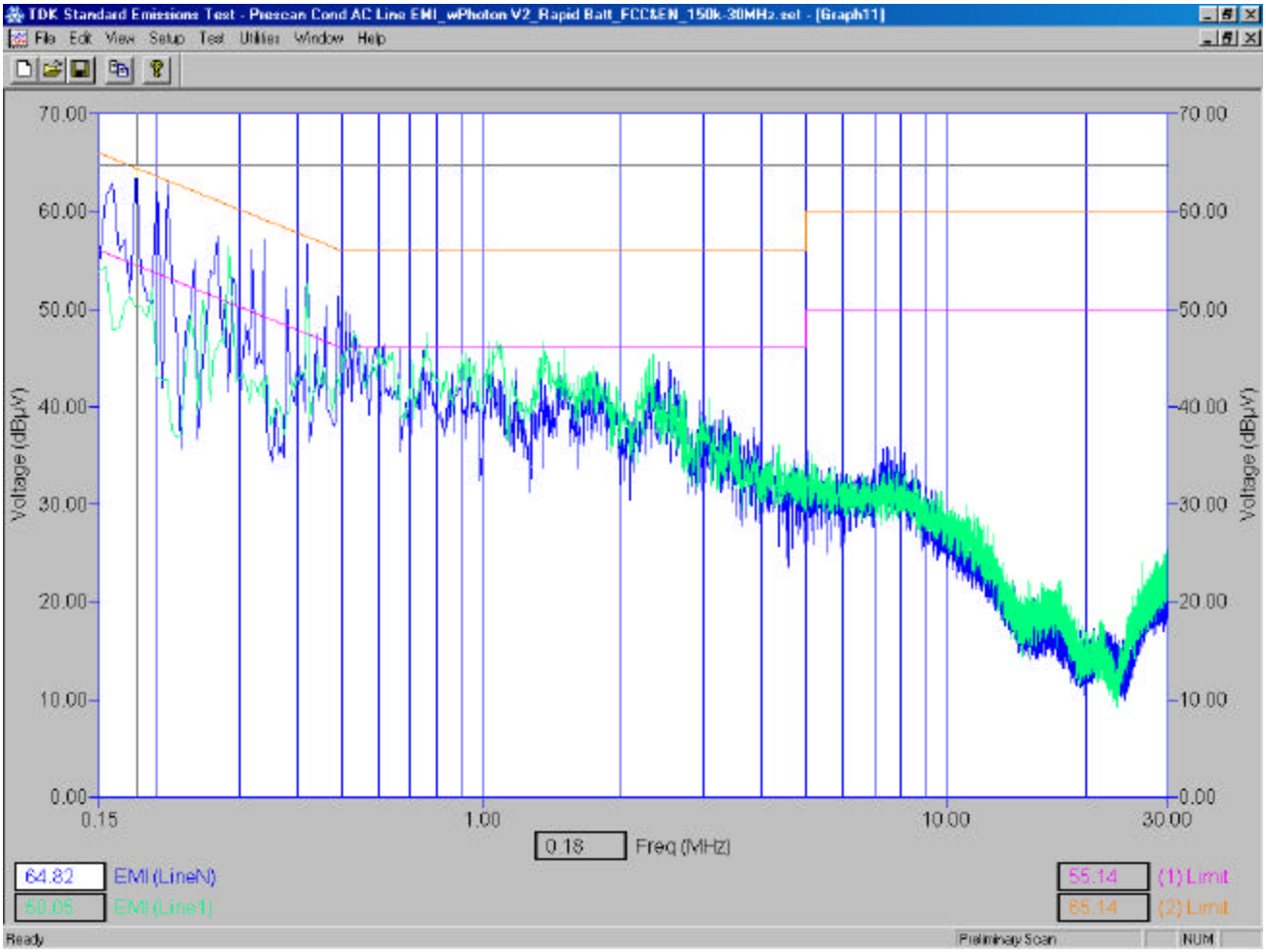
FCC CFR 47 Part 15, Subpart C (CISPR 22), IC ICES-003, Class B

Operating Mode: The Handheld in battery charging mode with 802.11b transmitting was connected to the Rapid Battery Travel Charger, model number PSM08R-050RIM, part number ASY-07041-001. The ac input to the Rapid Battery Travel Charger was 120 volts, 60 Hz.

Frequency (MHz)	Line	Reading (AVE.) (dBµV)	Correction Factors for Impulse Limiter, LISN, Cable (dB)	Level (AVE.) (reading + Corr.Factor) (dB)	Limit (AVE.) (dBµV)	Margin (AVE.) Limits (dB)
0.173	N	25.49	9.82	35.31	55.46	-20.15
0.179	N	24.80	9.83	34.63	54.49	-19.86
0.191	N	22.36	9.83	32.19	53.21	-21.01
0.205	N	16.80	9.83	26.63	53.61	-26.98
0.283	L1	14.09	9.85	23.94	50.67	-26.73
0.331	N	19.63	9.84	29.47	49.20	-19.73
0.418	L1	13.18	9.83	23.01	47.45	-24.44
0.425	N	13.73	9.83	23.56	47.45	-23.89
0.527	L1	20.95	9.84	30.79	46.00	-15.21
0.771	L1	21.72	9.86	31.58	46.00	-14.42
1.035	L1	19.83	9.90	29.73	46.00	-16.27
1.083	L1	20.40	9.90	30.30	46.00	-15.70

Measurements were done with the average detector.
See graph 5 for the measurement plot.

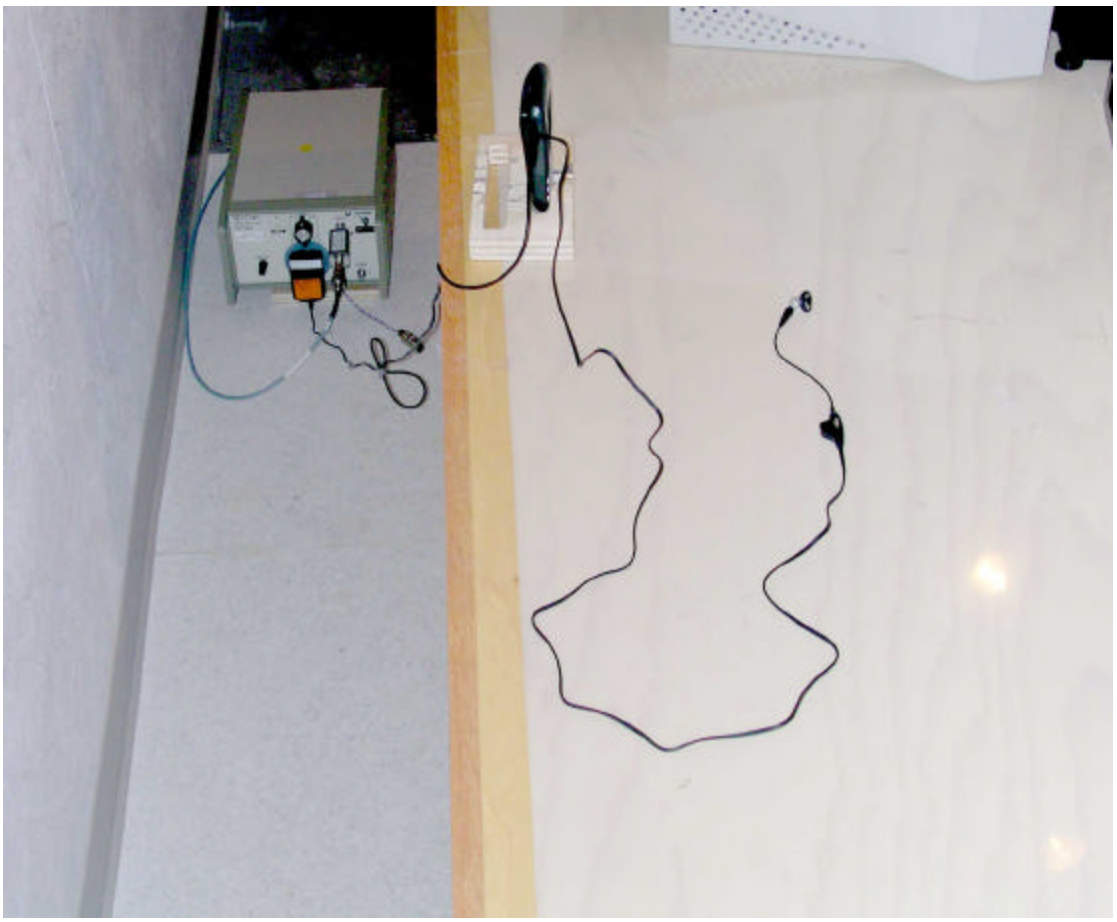
AC Conducted Emissions Test Graph 5



The Handheld in battery charging mode with 802.11b transmitting was connected to the Rapid Battery Travel Charger, model number PSM08R-050RIM, part number ASY-07041-001. The ac input to the Rapid Battery Travel Charger was 120 volts, 60 Hz.

AC Conducted Emission Test-Setup Photo

FCC CFR 47 Part 15, Subpart B, Class B



APPENDIX 2

RADIATED EMISSIONS TEST DATA

Report No. RIM-0111-0409-01 Test Date: August 31 to September 17, 2004

Radiated Emissions Test Results

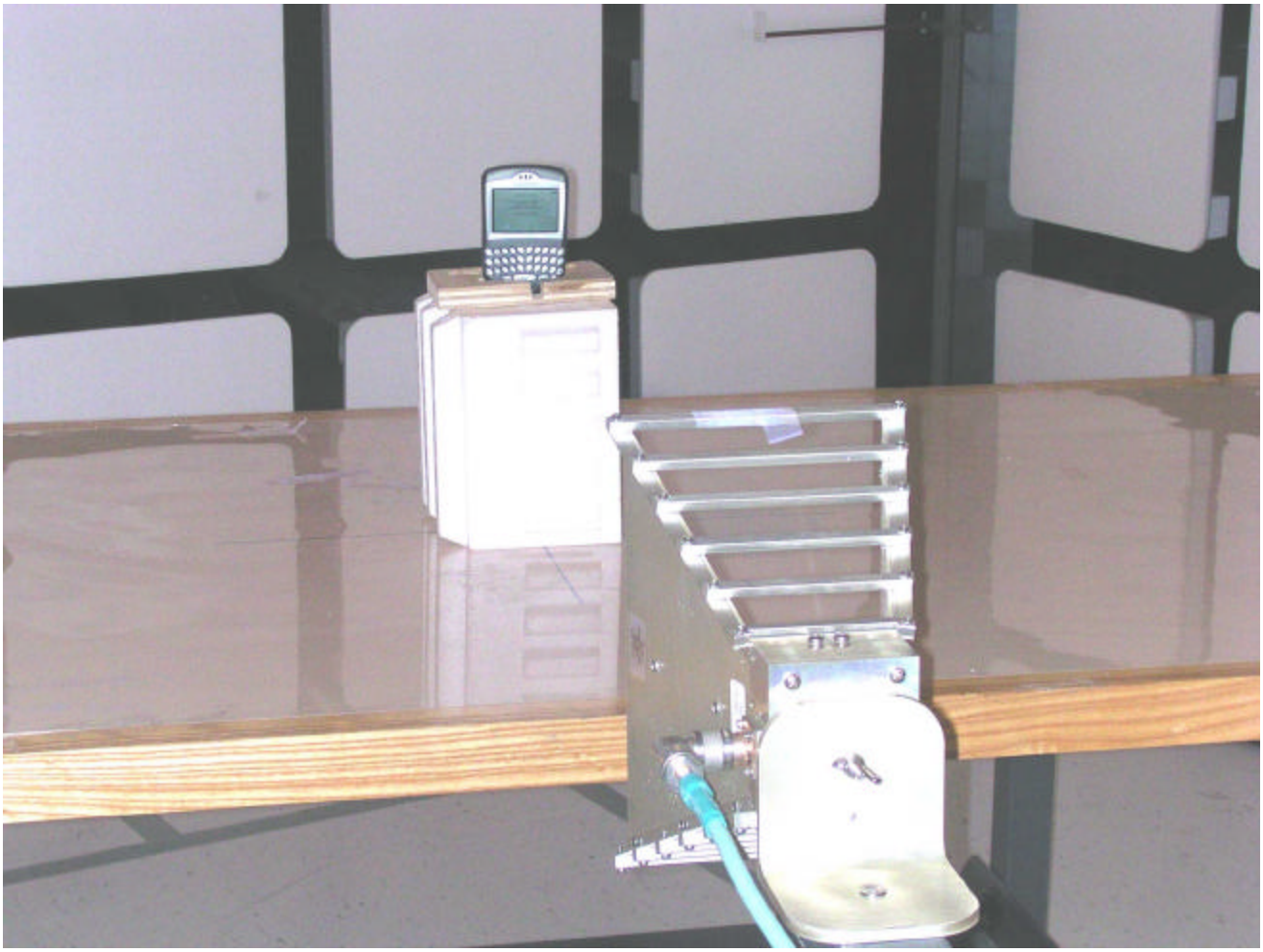
Test Distance was 1.0 metre. 802.11b September 20, 2004

The measurements were performed at maximum output power.

Type	Channel	Frequency	Antenna		Reading	Corrected Reading	Average Limit (at 1 metre)	Peak Limit (at 1 metre)	Diff. To Limit
		(MHz)	Type	Pol	(dBuV)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)
Handheld Standalone,Vertical position **Low Channel** (1) 2412.00 MHz									
2nd	1	4824.00	Horn	V	NF	NF	63.5	83.5	
2nd	1	4824.00	Horn	H	NF	NF			
The harmonics were investigated up to the 10th harmonic. The NF was below the average limit. No emissions could be found. **Middle Channel** (6) 2437.00 MHz									
2nd	6	4874.00	Horn	V	NF	NF	63.5	83.5	
2nd	6	4874.00	Horn	H	NF	NF			
The harmonics were investigated up to the 10th harmonic. The NF was below the average limit. No emissions could be found. **High Channel** (11) 2462.00 MHz									
2nd	11	4874.00	Horn	V	NF	NF	63.5	83.5	
2nd	11	4874.00	Horn	H	NF	NF			
The harmonics were investigated up to the 10th harmonic. The NF was below the average limit. No emissions could be found.									

Due to the noise floor at three metres, the emissions were repeated at a test distance of one metre. The emissions passed the 63.5 dBuV/m average one metre limit.

Radiated Emissions Test Photo



APPENDIX 3

802.11b RF CONDUCTED EMISSIONS TEST DATA/PLOTS

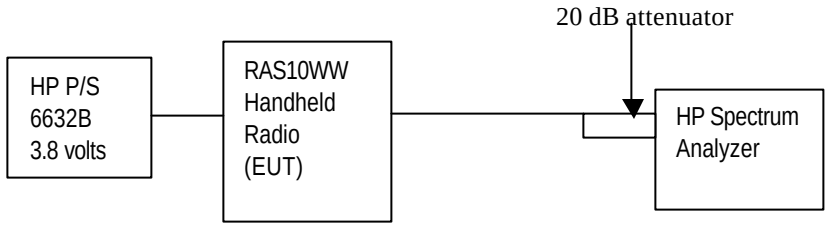
802.11b RF Conducted Emission Test Results

Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer	HP	8563E	374A08112	30 Hz – 26.5 GHz
Attenuator	Mini Circuit	MCL BW-S20W2	-	DC – 18 GHz
DC Power Supply	HP	6632B	US37472178	-

802.11b power output was at maximum for all the recorded measurements shown below.

Test Setup Diagram



6 dB Bandwidth

The EUT passed the 6 dB bandwidth requirement as per 47 CFR 15.247(a) and RSS-210. Low channel (1), middle channel (6) and high channel (11) were measured. The bandwidth of the transmit frequency was measured by the spectrum analyzer which was set to 100 kHz RBW and VBW with a span of 20 MHz.

802.11 Channel	Limit (MHz)	Measured Value (MHz)
1	= 0.50	10.37
6	= 0.50	11.43
11	= 0.50	11.07

See figures 1 to 3 for the plots of the 6 dB bandwidth measurements.

The environmental test conditions were: Temperature 24° C
Pressure 977 mb
Relative Humidity 33 %

RF Conducted Emission Test Results cont'd

Figure 1: 6 dB bandwidth, channel 0

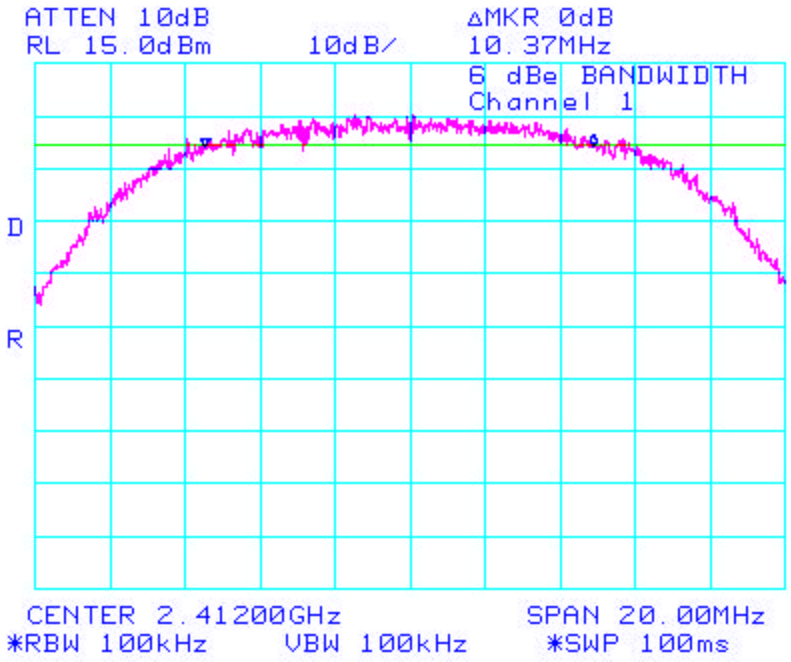
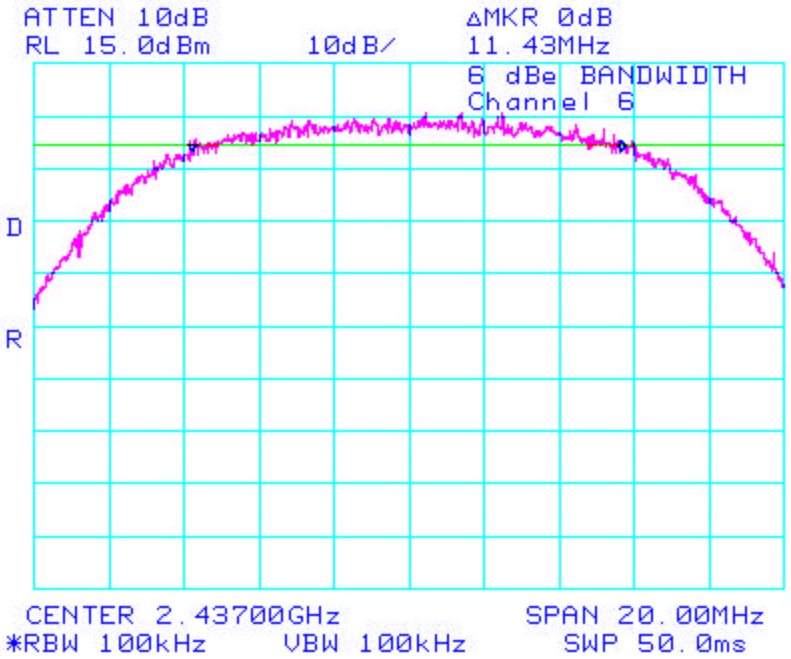
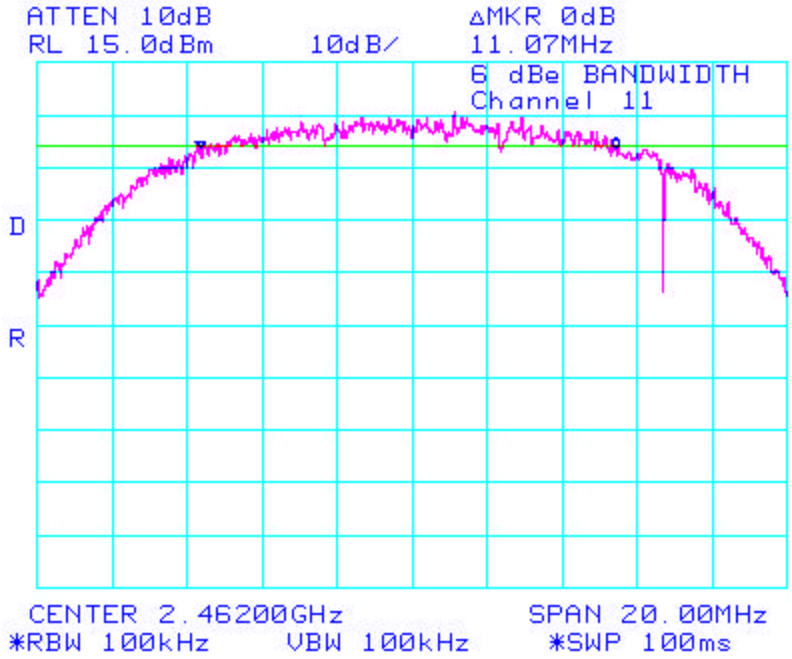


Figure 2: 6 dB bandwidth, channel 6



RF Conducted Emission Test Results cont'd

Figure 3: 6 dB bandwidth, channel 11



Maximum Peak Conducted Output Power

The EUT passed the maximum peak conducted output power requirement as per 47 CFR 15.247(b) and RSS-210. Low channel (1), middle channel (6) and high channel (11) were measured. A reference offset of 20.4 dB was applied to the spectrum analyzer reference level for the coaxial cable loss in the test circuit and the 20 dB attenuator.

802.11b Channel	Measured Value (dBm)	Limit (dBm)
1	15.50	30
6	15.00	30
11	15.33	30

The environmental test conditions were: Temperature 24° C
Pressure 977 mb
Relative Humidity 33 %

See figures 4 to 6 for the plots of the maximum peak conducted output power.

RF Conducted Emission Test Results cont'd

Figure 4: Maximum Peak Conducted Output Power

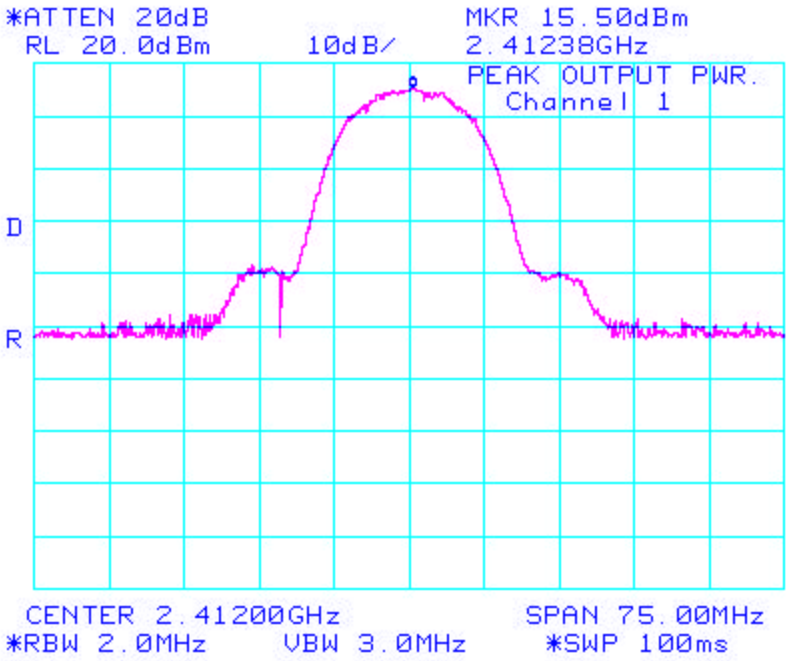
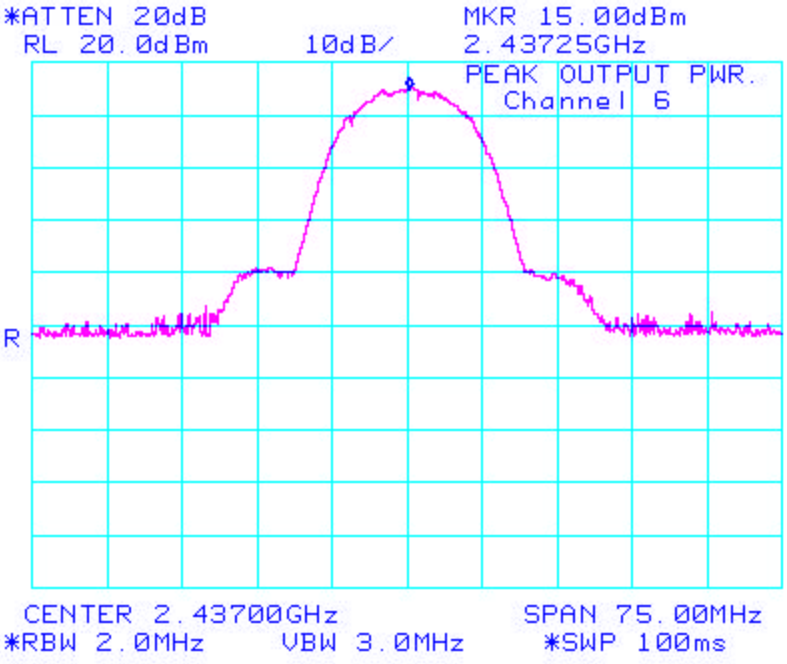
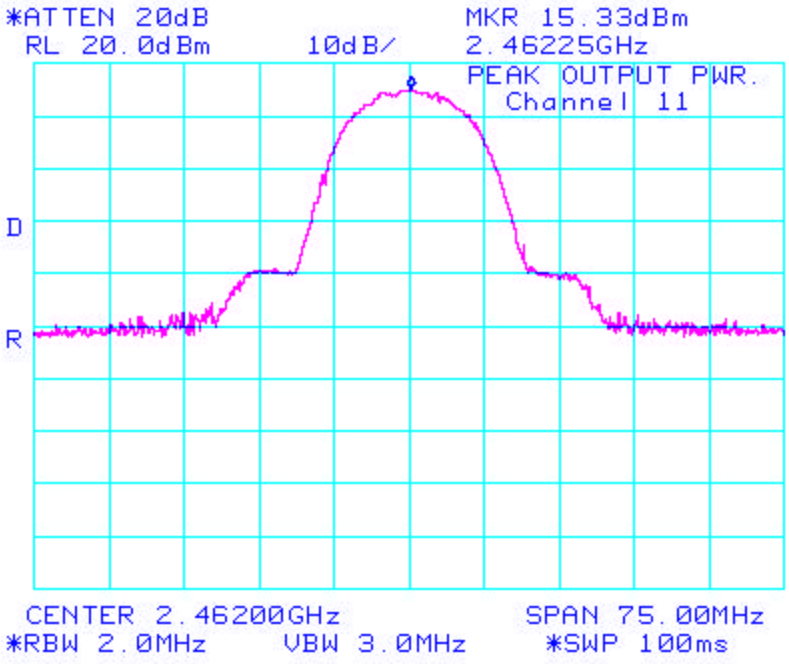


Figure 5: Maximum Peak Conducted Output Power



RF Conducted Emission Test Results cont'd

Figure 6: Maximum Peak Conducted Output Power



Band Edge Compliance

The EUT passed the band edge compliance requirement as per 47 CFR 15.247(c) and RSS-210. Low channel (1`) and high channel (11) were measured.

802.11b Channel	Measured Value (dBc)	Limit (dBc)	Margin (dB)
1	-59.67	= -20	39.67
11	-56.67	= -20	36.67

The environmental test conditions were: Temperature 24º C
Pressure 977 mb
Relative Humidity 33 %

See figures 7 to 8 for the plots of the band edge compliance measurements.

RF Conducted Emission Test Results cont'd

Figure 7: Band Edge Channel 1

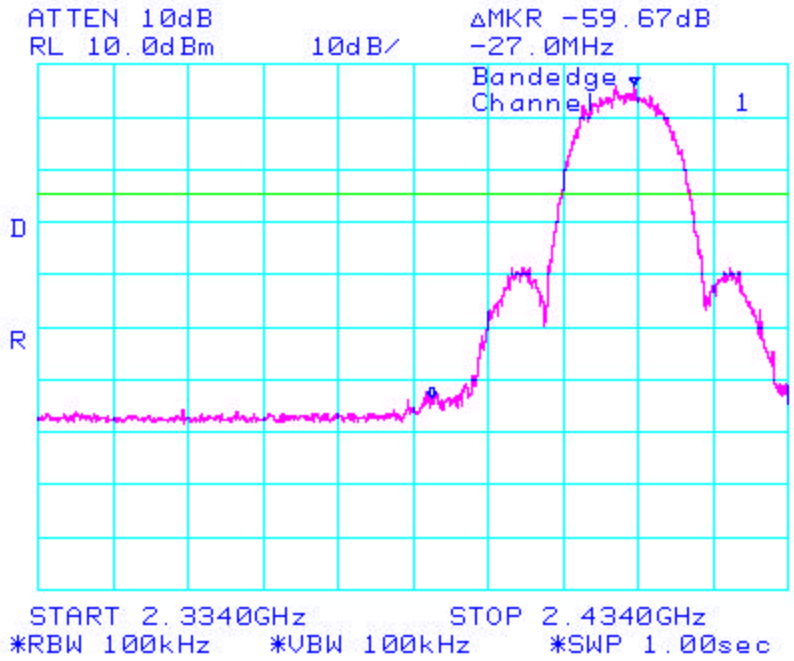
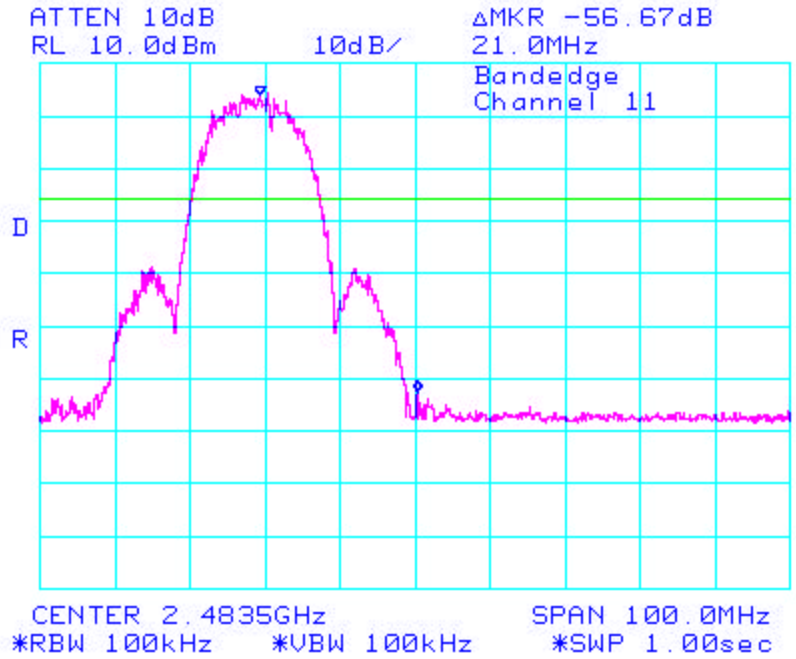


Figure 8: Band Edge Channel 11



RF Conducted Emission Test Results cont'd

Power Spectral Density Measurement

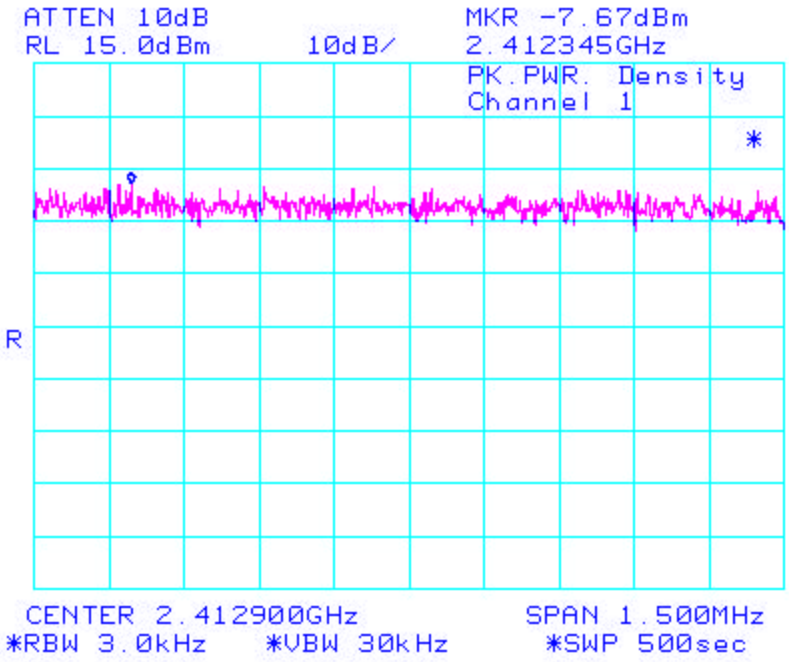
The EUT passed the power spectral density measurement as per 47 CFR 15.247(d) and RSS-210. Low channel (1), middle channel (6) and high channel (11) were measured.

802.11b Channel	Frequency (MHz)	Power Density (dBm)	Limit (dBm)
1	2412	-7.67	= 8
6	2437	-8.17	= 8
11	2462	-8.00	= 8

The environmental test conditions were: Temperature 24º C
Pressure 977 mb
Relative Humidity 33 %

See figures 9 to 11 for the plots of the power density measurements.

Figure 9: Power Spectral Density, Channel 1



RF Conducted Emission Test Results cont'd

Figure 10: Power Spectral Density, Channel 6

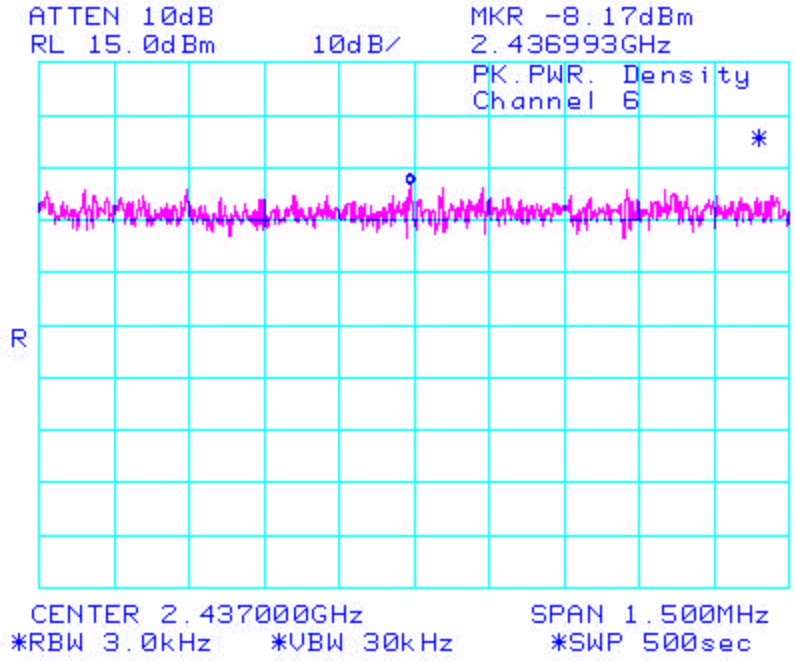
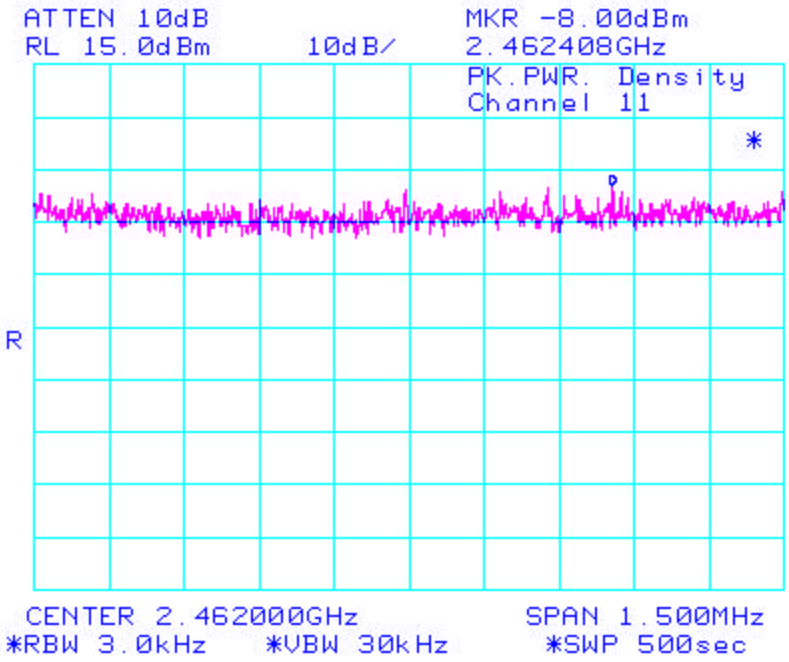


Figure 11: Power Spectral Density, Channel 11



RF Conducted Emission Test Results cont'd

Spurious RF Conducted Emissions

The EUT passed the spurious RF conducted emissions requirement as per 47 CFR 15.247(c) and RSS-210. Low channel (1), middle channel (6) and high channel (11) were measured.

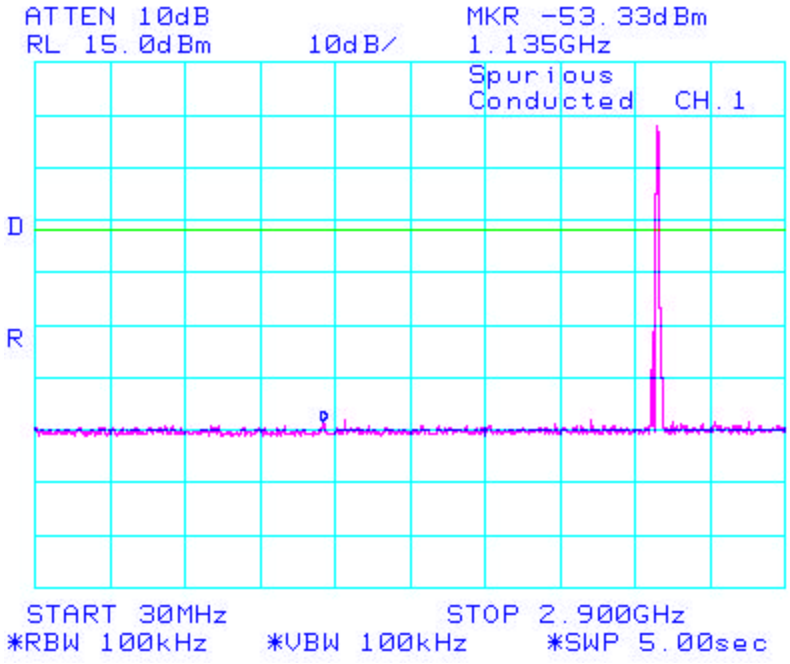
A reference offset of 20.4 dB was applied to the spectrum analyzer reference level for the attenuator and coaxial cable loss in the test circuit.

802.11b Channel	Max. Measured Value from dBc	Limit (dBc)
1	-34.23	= -20
6	-35.23	= -20
11	-33.90	= -20

The environmental test conditions were: Temperature 24º C
Pressure 977 mb
Relative Humidity 33 %

See figures 12 to 17 for the plots of the Spurious RF Conducted Emissions.

Figure 12: Spurious RF Conducted Emissions, Channel 1



RF Conducted Emission Test Results cont'd

Figure 13: Spurious RF Conducted Emissions, Channel 1

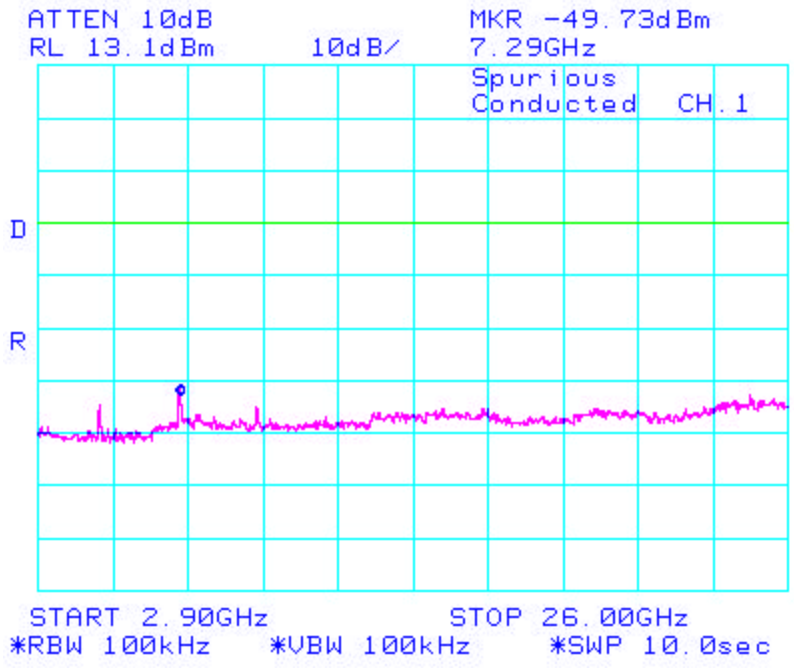
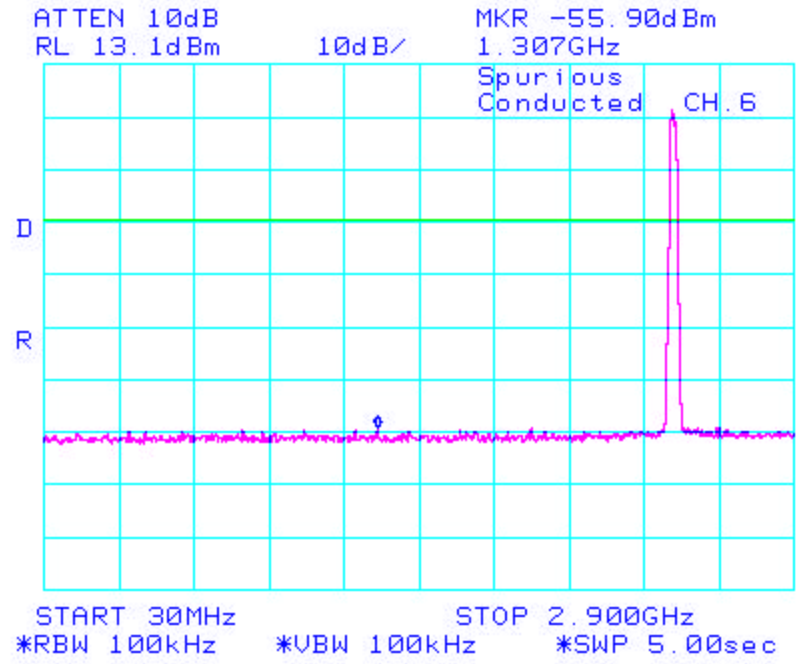


Figure 14: Spurious RF Conducted Emissions, Channel 6



RF Conducted Emission Test Results cont'd

Figure 15: Spurious RF Conducted Emissions, Channel 6

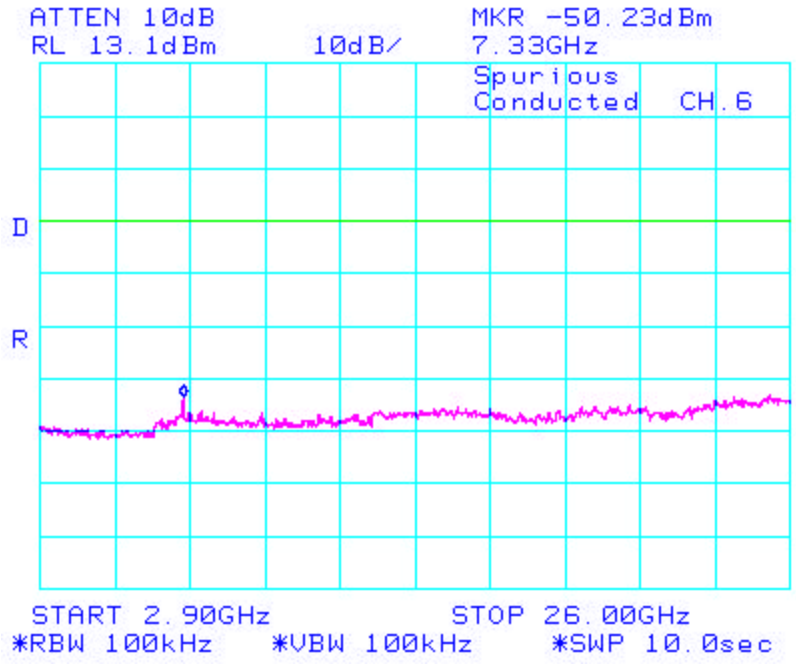
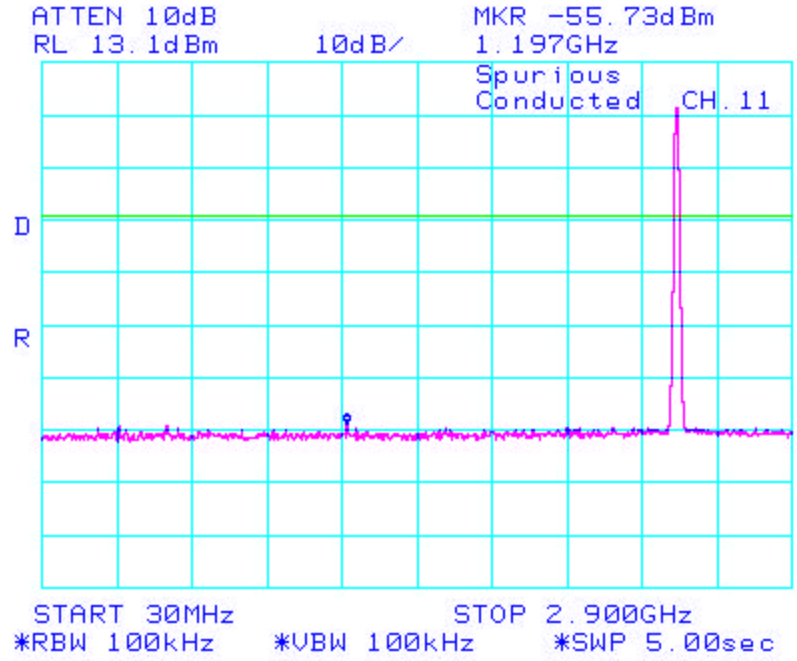
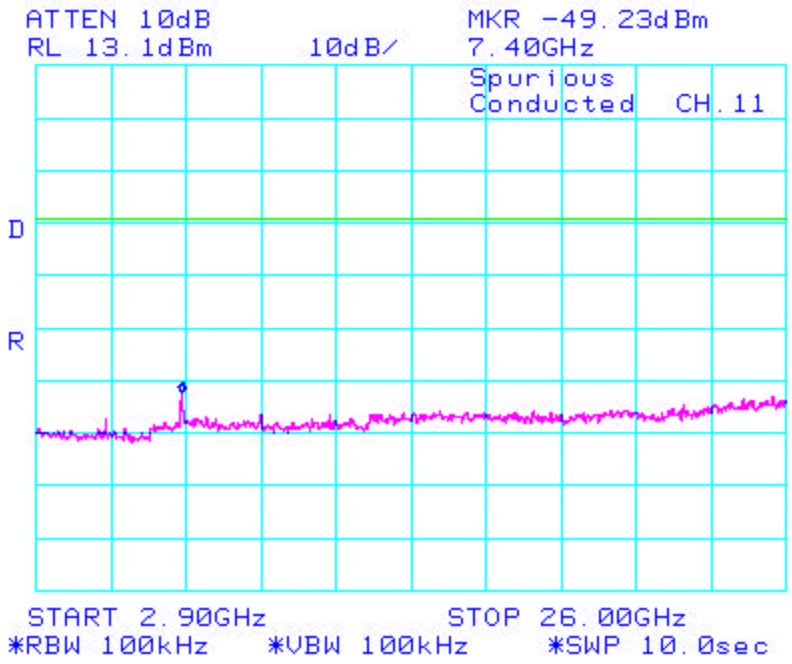


Figure 16: - Spurious RF Conducted Emissions, Channel 11



RF Conducted Emission Test Results cont'd

Figure 17: Spurious RF Conducted Emissions, Channel 11



RF Conducted Emission Test-Setup Photo