Electromagnetic Compatibility
Test Report

Test Report No: MOT 151111
Issued on: June 10, 2012 Rev.4

Product Name
EWP2200 Semi Rugged VoWLAN Phone

Tested According to
FCC 47 CFR, Part 15, Subpart B, Class B Computing Device Peripheral
Industry Canada ICES-003:04; C108.8-M1983, Issue 4
VCCI Technical Requirements, V-3/2001.04

Tests Performed for
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ELECTRICAL TESTING
CERT #1633.01

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Test Report details:

Test commencement date: 13.11.2011

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Customer's representative: Eli Basri

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Revision details:

Version	Date	Details/Reasons	Page no
Rev. 1	15.11.2011	-	-
Rev. 2	08.05.2012	Comment 2: A note "Class B Computing Device Peripheral" was added	1
		Comment 6: Test procedure of Radiated Emission measurements was corrected	7
		Comment 7: Test procedure of Radiated Emissions Measurements was corrected	7
		Comment 12: In the charger configuration test results table, test results sentence was changed	10
		Comment 2:A note "Class B Computing Device Peripheral" was added	10
		Comment 2:A note "Class B Computing Device Peripheral" was added	20
Rev. 3	30.05.2012	Comment 1: Peripheral equipment, FCC ID added. See Appendix B A note is added in Sec.4.1	24/10
Rev.4	10.06.2012	Comment 1:Retesting was performed with a second peripheral device(additional monitor)	
	10.06.12	Comment 3: the list of measuring equipment used was revised according to the last calibration data	24

Assessment information:

This report contains an assessment of the EUT against Electromagnetic Compatibility based upon tests carried out on the samples submitted. The results contained in this report relate only to the items tested. Manufactured products will not necessarily give identical results due to production and measurement tolerances. QualiTech, EMC Lab does not assume responsibility for any conclusion and generalization drawn from the test results with regards to other specimens or samples of type of the equipment represented by test item.

The EUT was set up and exercised using the configuration, modes of operation and arrangements defined in this report only.

Modifications:

Modifications made to the EUT

None

Modifications made to the Test Standard

None

Summary of Compliance Status

Unintentional Radiations

Test Spec. Clause	Test Case	Remarks
47 CFR §15.407(b)(6) & §15.109/209, ICES-003 RSS-GEN section 7.2.3.2	Radiated Emission- (Receive mode)	Comply
47 CFR §15.407(b)(6) & §15.107/207, ICES-003 RSS-GEN section 7.2.3.2	Power line Emission measurements	Comply

Note: Emissions tested in compliance with C63.4 Sections 11.1.1.2 and 11.2

Table of Contents

1. General Description

Description of the EUT system/test Item:

Product name: EWP2200 Semi Rugged VoWLAN Phone

Model: EWP2200

FCC ID: AZ489FT7052

IC ID: 109U-89FT7052

Description:

The EUT is a Smartphone which provides mobile voice and data communications over wireless network to users inside an enterprise.
It is capable of operating in the unlicensed 2.4 GHz band using 802.11b/g/n protocols or in applicable 5 GHz bands using the 802.11a/n protocol.
The EUT also contains a Bluetooth technology for short range interfaces and EWP2200 has an additional 3.2 Mp auto-focus camera.

2. Method of Measurements

2.1. Radiated Emission measurements:

Measurements were performed at a 3-meter measurement distance in the semi-anechoic chamber in order to evaluate the radiated electromagnetic interference characteristics of the EUT. The EUT was placed on a non-metallic table/support, 0.8m above the turntable, was configured, arranged and operated in a manner consistent with typical application and load conditions. The test program of exercising the equipment ensured that various parts of the EUT were exercised to permit detection of all EUT disturbances.
An appropriate antenna depending upon the frequency range, per ANSI C63.4-2003 clause 4.1.5 was used. While the turntable was being rotated, the height of the antenna was varied from 1 to 4m for the frequency range of 30MHz to 1GHz. The highest radiated emission was detected by manipulating the EUT through three axis(x,y,z) and system cables, worst-case results are reported by max hold function. This process was repeated for both antenna polarizations. The spectrum up to 10GHz was investigated for emissions, using a band-reject filter where appropriate.
The amplitudes of worst-case emission were measured with the detector modes and resolution bandwidths over various frequency ranges according to the requirements of ANSI C63.4-2003 clause 4.2.in addition worst-case results of the various modulation modes (where applicable) were reported.

2.2. Power Line Emission measurements:

The EUT was placed on a non-conductive table/support 80 cm above the reference ground plane. The EUT was configured in accordance with ANSI C63.4-2003 using a 50μH/50 ohm LISN.

Compliance with the provisions was based on the measurements of the radio frequency voltage between each line and the ground at the power terminal.

3. Test Facility & Uncertainty of Measurement

3.1. Accreditation/ Registration reference:

- *A2LA Certificate Number: 1633.01*

3.2. Test Facility description

The tests were performed at the EMC Laboratory, QualiTech Division, ECI Telecom Group

Address: 30, Hasivim St., Petah Tikva, Israel.
Tel: 972-3-926-8443

3m Anechoic Chamber:

The 3m-screened chamber is used in two configurations: the semi-anechoic configuration for Radiated Emission measurements and the full-anechoic configuration for Radiated Immunity tests.

Semi Anechoic Configuration:

Measurement distance	3m
Chamber dimensions	9.5m x 6.5m x 5.2m
Antenna height	1 - 4m
Shielding Effectiveness	Magnetic field ≥80dB at 15 kHz ≥90dB at 100 kHz Electric field >120dB from 1MHz to 1GHz >110dB from 1GHz to 10GHz
Absorbing material	Ferrite tiles on the walls and ceiling Frankonia hybrid absorbing material in selected positions on the walls
Normalized Site Attenuation measured at 5 positions	±3.49dB, 30MHz to 1GHz
Transmission Loss measured at 5 positions, at 1.5m height	±3dB, 1GHz to 18GHz

Full-Anechoic Configuration:

Measurement distance	3m
Chamber dimensions	7m x 4m x 3m
Antenna height	1.55m at Horizontal & Vertical polarizations
Shielding Effectiveness	Magnetic field ≥80dB at 15 kHz ≥90dB at 100 kHz Electric field >120dB from 1MHz to 1GHz >110dB from 1GHz to 10GHz
Absorbing material	Ferrite tiles on the walls and ceiling Frankonia hybrid absorbing material in selected positions on the walls and floor
Field Uniformity to EN61000-4-3	±3dB 80MHz to 18GHz

3.3. Uncertainty of Measurement:

Test Name	Test Method & Range	Uncertainty	
		Combined std. Uc(y) [dB]	**Expanded U** [dB]
Radiated Emission	30MHz÷230MHz, Horiz. polar. 30MHz÷230MHz, Ver. polar. 230MHz÷1000MHz, Horiz. polar. 230MHz÷1000MHz, Vert. polar.	1.8 2.0 1.5 1.5	3.6 3.9 3.0 3.0
Conducted Emission	9 kHz÷150 kHz 150 kHz÷30MHz	1.4 1.1	2.8 2.2

4. Unintentional Radiations: Report of Measurements and Examinations

4.1. Radiated Emission, Receive Mode

Reference document:	**47 CFR §15.109/209**		
Test Requirements:	Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Sec.15.209. Emission Level shall not exceed the limits of §15.109.		
Test setup:	See sec 2.1	**Pass**	
Method of testing:	Radiated		
Operating conditions:	Under normal test conditions		
S.A. Settings:	f <1GHz: RBW: 120kHz,VBW: 300kHz f >1GHz: RBW: 1MHz, VBW: 3MHz		
Mode of operation:	Receive		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.1.1 – Plot 4.1.16	

Test results:

Measured with charger configuration:

Frequency [MHz]	Ant. Type	Ant. Pol.	Ant. Pos. [cm]	Turn-table Azimuth [°]	Radiated Emission dB(µV/m)	Class B Limit at 3m dB(µV/m)	Margin [dB]	Pass/ Fail
No emissions were found								Pass

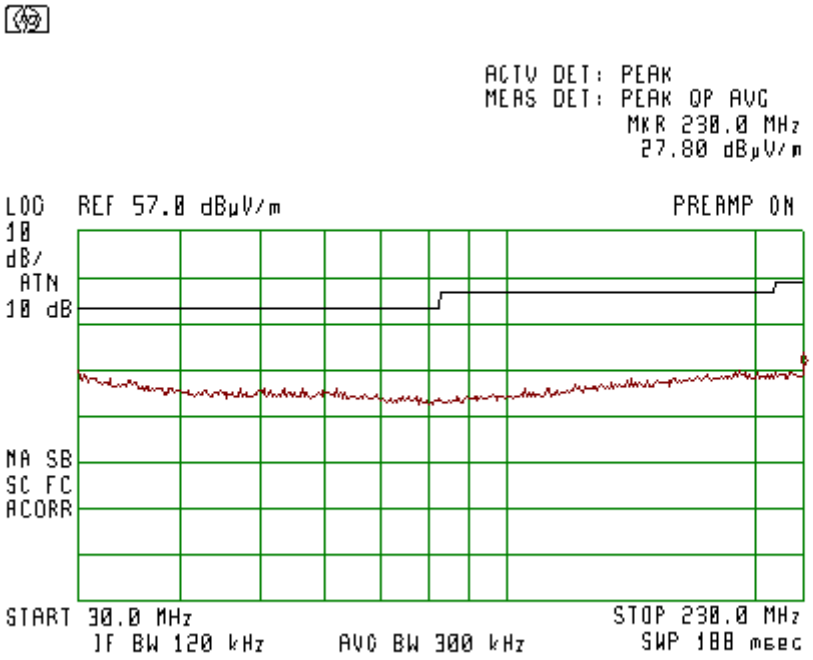
Note: Radiated Emission [dBµV/m] = measured [dBµV] + Correction-factor [dB(1/m)]
Correction Factor = Antenna factor + Cable Loss

Measured with PC configuration- Class B Computing Device Peripheral

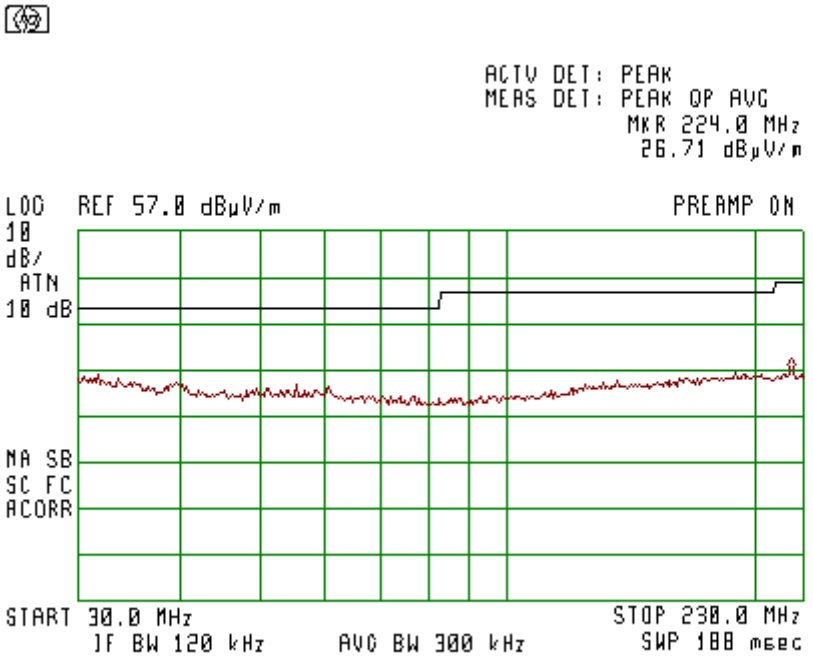
Frequency [MHz]	Ant. Type	Ant. Pol.	Ant. Pos. [cm]	Turn-table Azimuth [°]	Radiated Emission dB(µV/m)	Class B Limit at 3m dB(µV/m)	Margin [dB]	Pass/ Fail
73.55	Biconical	V	102	3	37.8	40	-2.2	Pass
166.08	Biconical	H	114	339	24.7	43.5	-18.8	Pass
232.30	Log-periodic	V	220	169	24.3	46	-21.7	Pass
359.97	Log-periodic	V	104	147	27.0	46	-19	Pass
527.99	Log-periodic	H	101	91	28.7	46	-17.3	Pass
542.94	Log-periodic	H	102	357	32.6	46	-13.4	Pass

Note: Radiated Emission [dBµV/m] = measured [dBµV] + Correction-factor [dB(1/m)]
Correction Factor = Antenna factor + Cable Loss

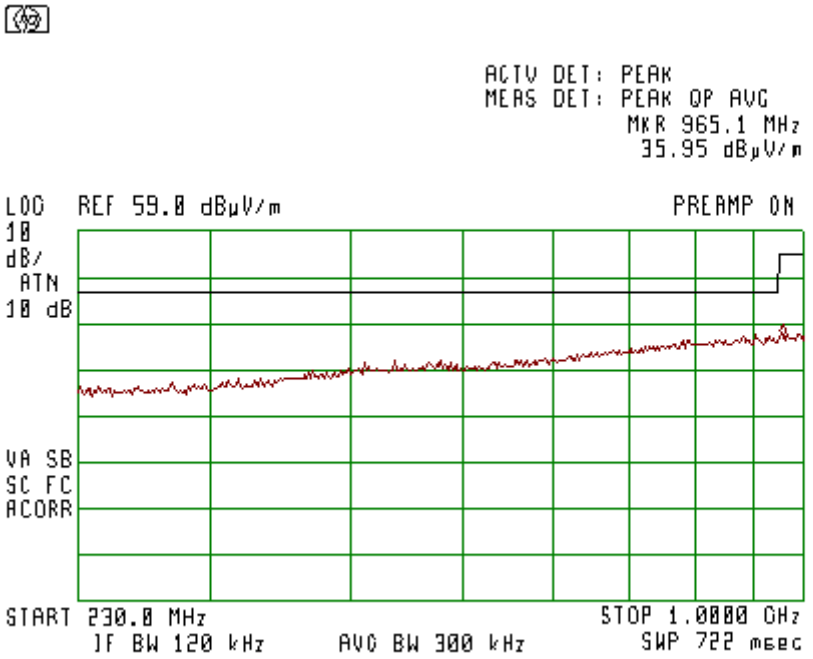
Measured with charger configuration:
Horizontal Polarization
Plot 4.1.1



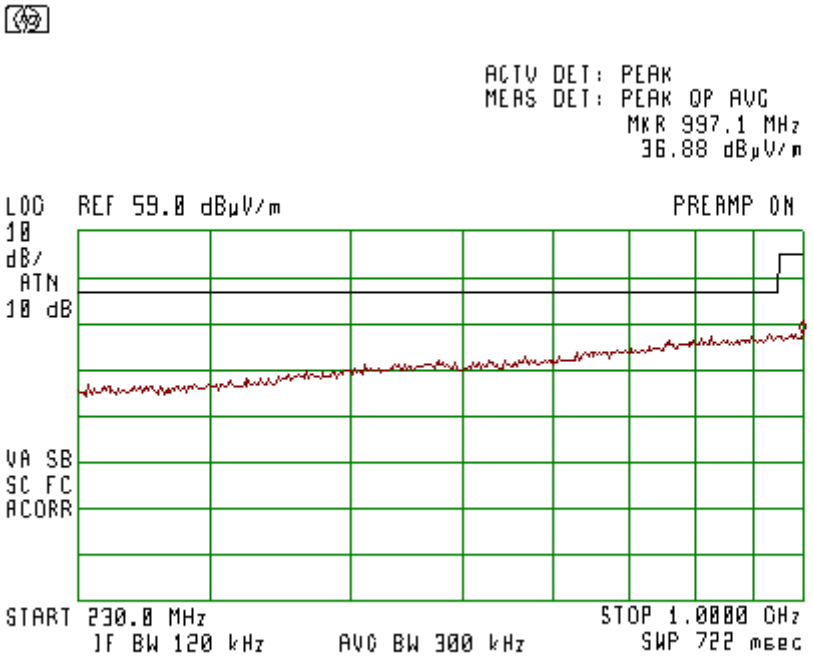
Vertical Polarization
Plot 4.1.2



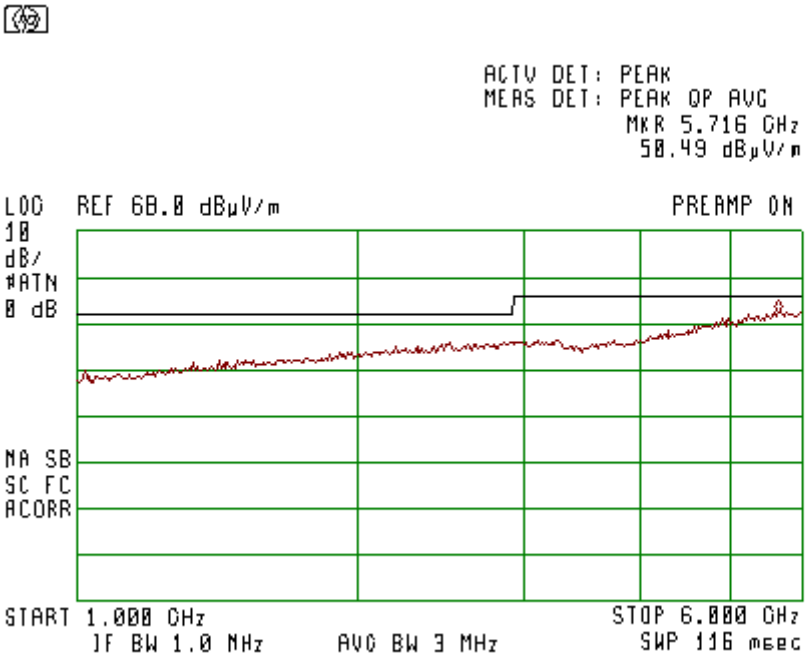
Horizontal Polarization
Plot 4.1.3



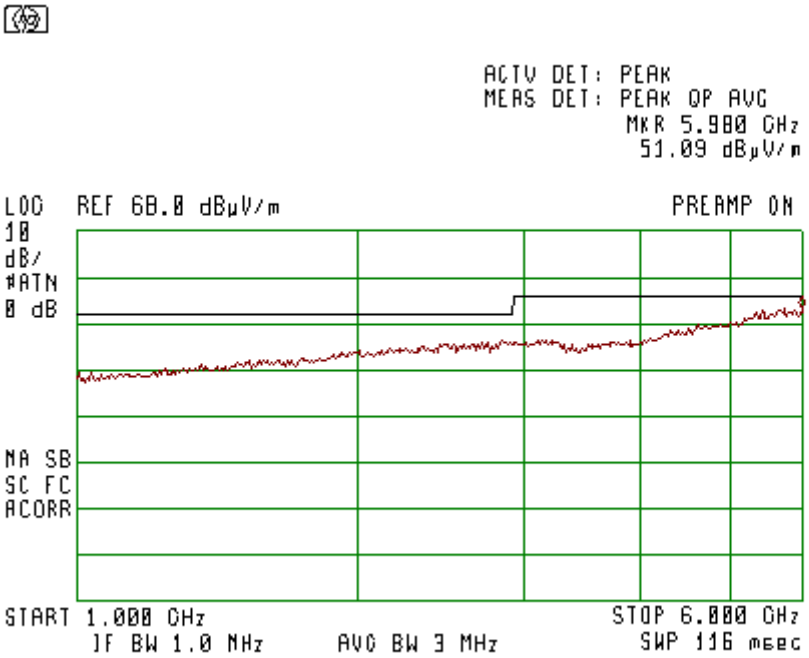
Vertical Polarization
Plot 4.1.4



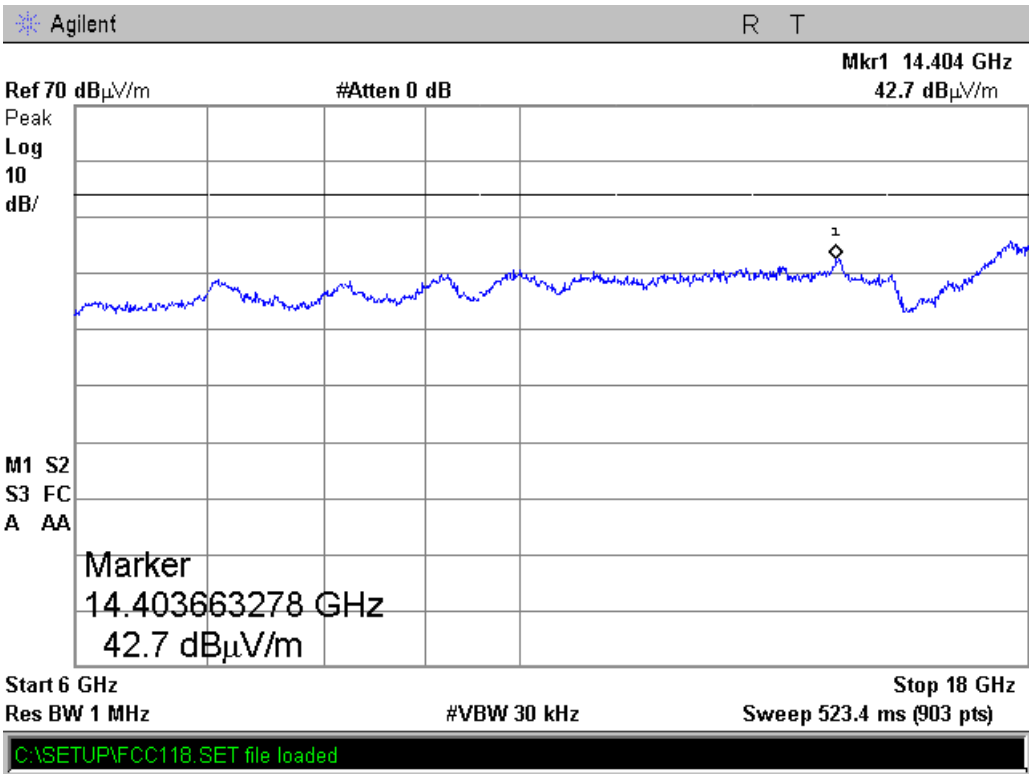
Horizontal Polarization
Plot 4.1.5



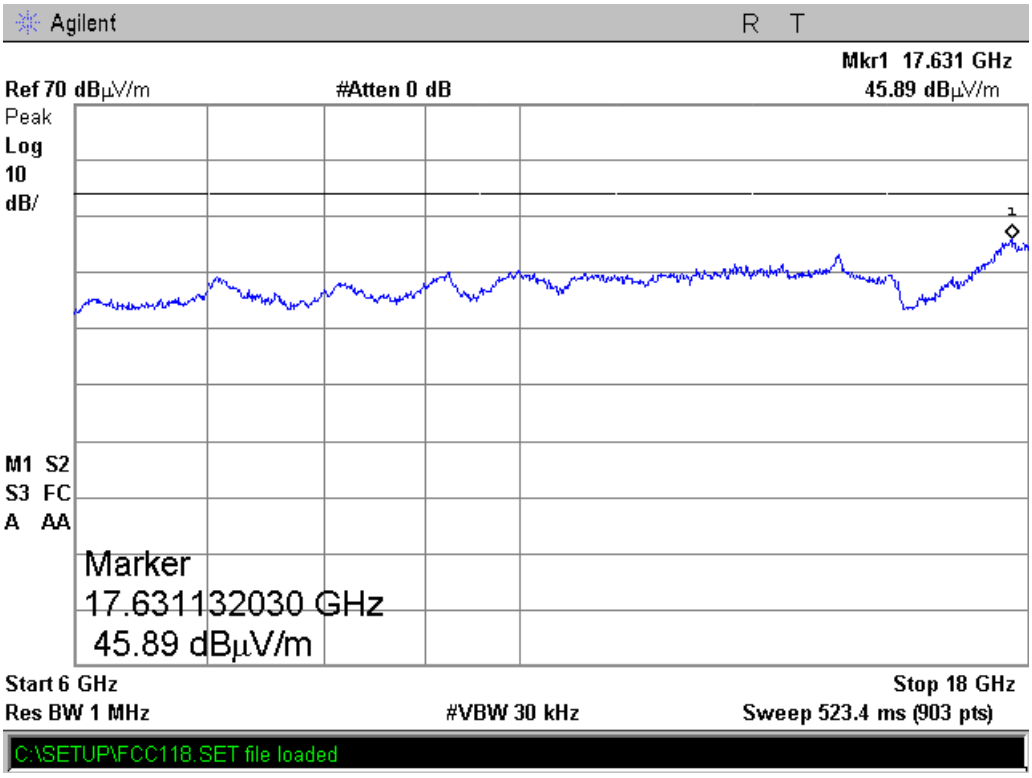
Vertical Polarization
Plot 4.1.6



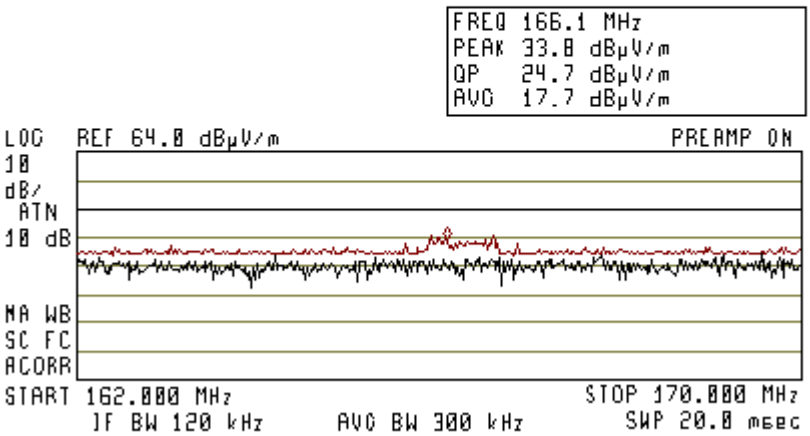
Horizontal Polarization
Plot 4.1.7



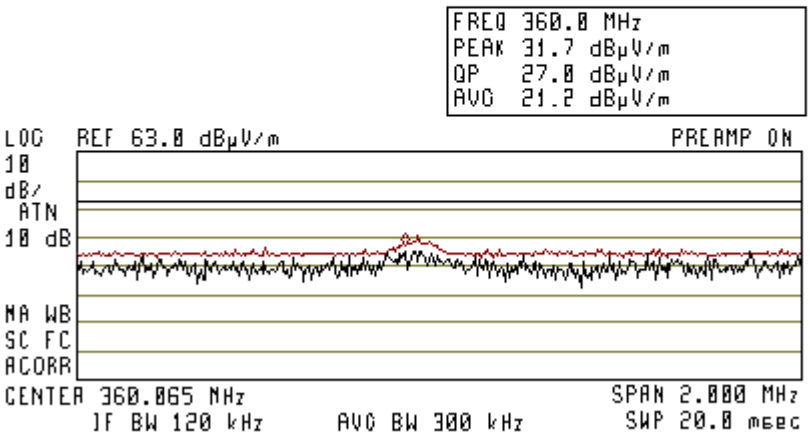
Vertical Polarization
Plot 4.1.8



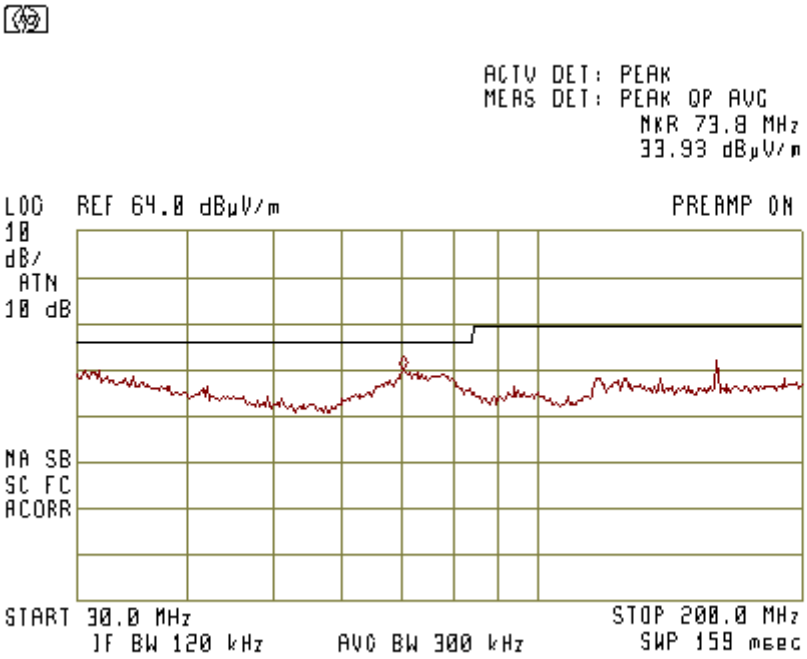
Signal	Freq (MHz)	PK Amp	QP Amp	AV Amp	QP▵L1
1	73.550650	41.9	37.8	30.3	-2.3
2	166.888888	33.8	24.7	17.7	-18.8



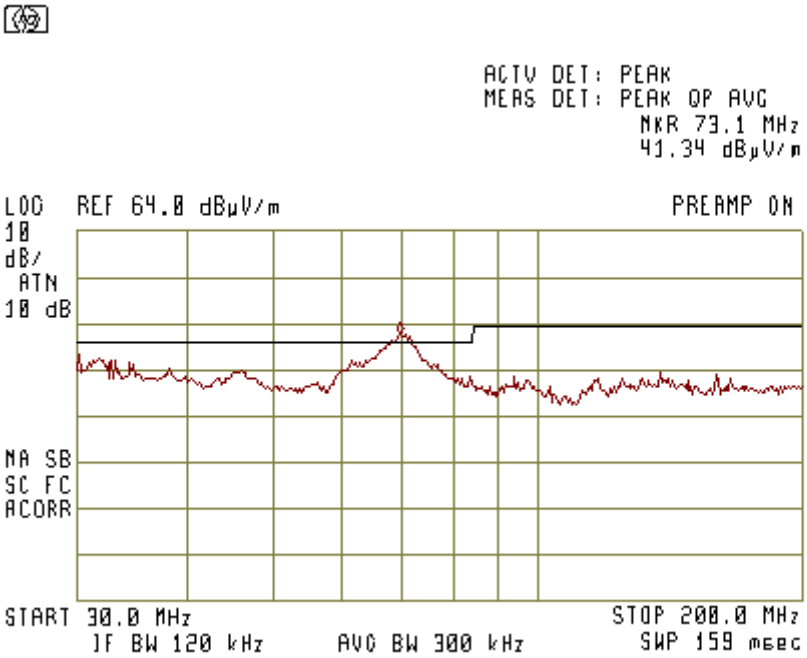
Signal	Freq (MHz)	PK Amp	QP Amp	AV Amp	QP▵L1
1	232.303100	35.1	24.3	16.9	-21.8
2	527.990725	33.1	28.7	23.4	-17.3
3	542.946950	35.7	32.6	30.3	-13.4
4	359.970700	31.7	27.0	21.2	-19.0



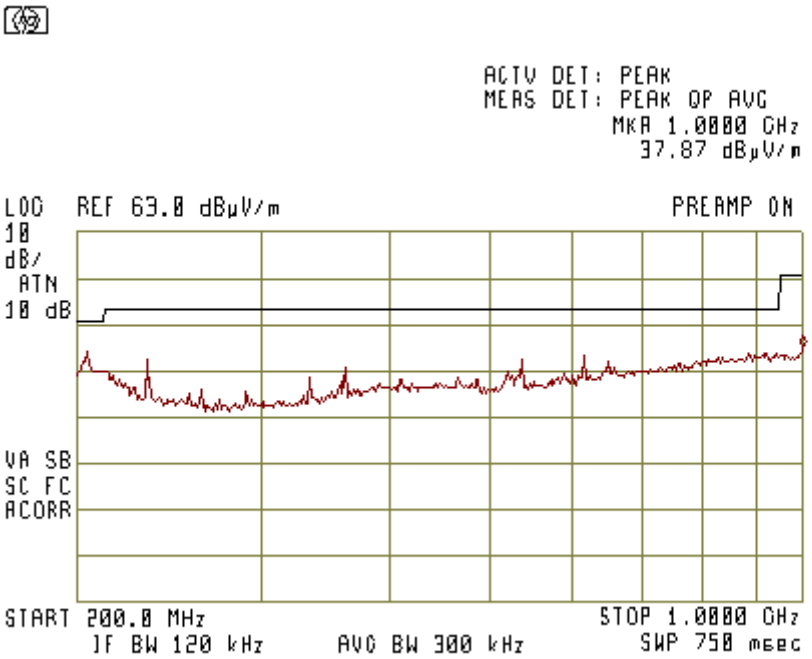
Measured with PC configuration
Receive mode
Horizontal Polarization
Plot 4.1.9



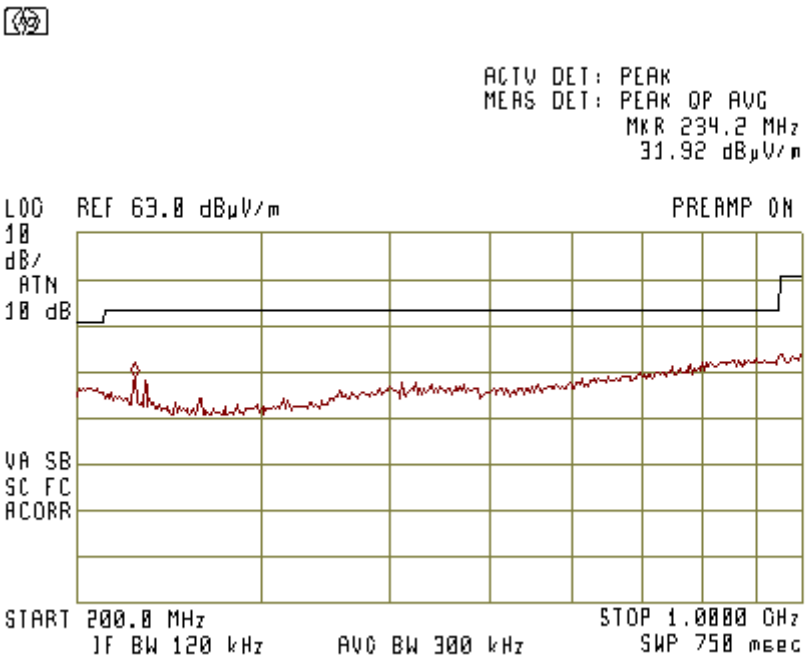
Vertical Polarization
Plot 4.1.10



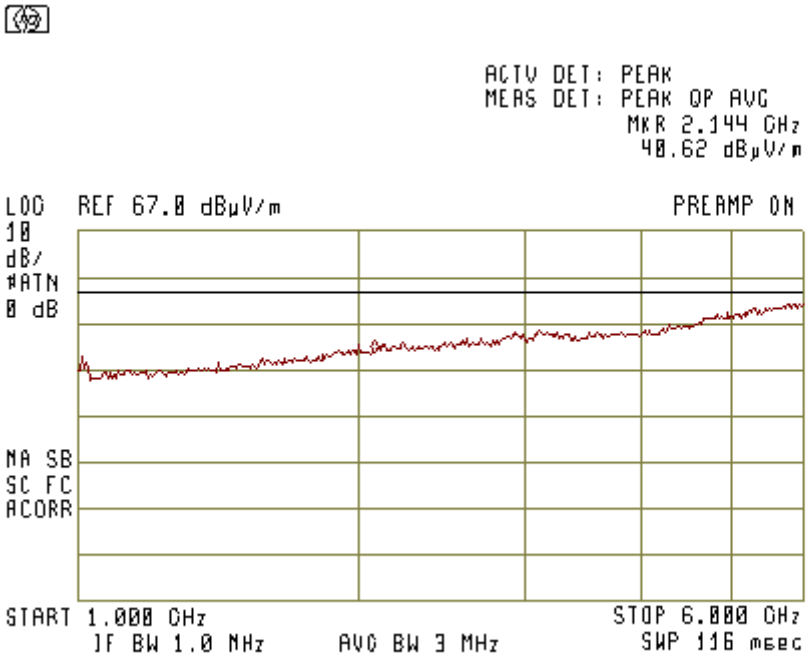
Horizontal Polarization
Plot 4.1.11



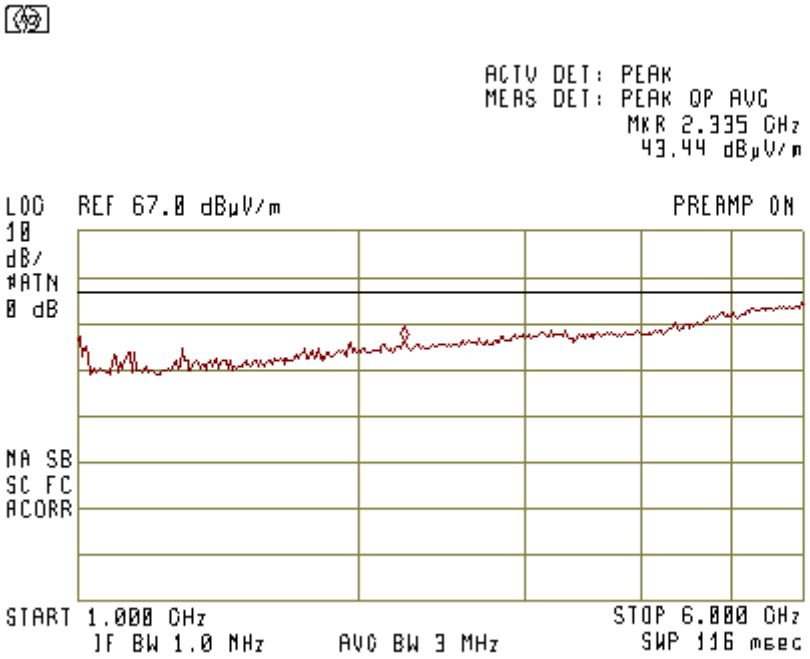
Vertical Polarization
Plot 4.1.12



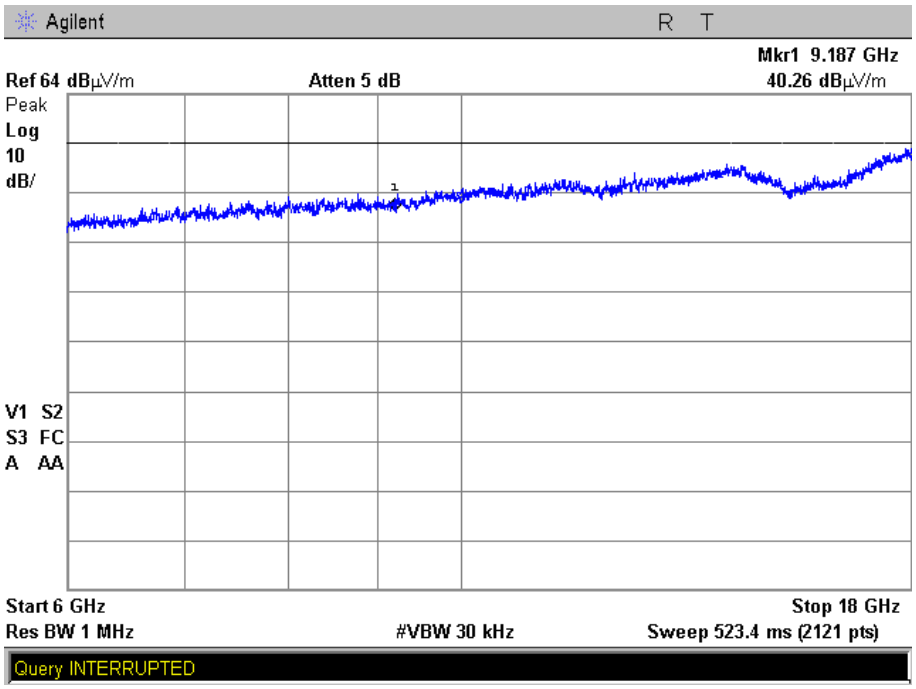
Horizontal Polarization
Plot 4.1.13



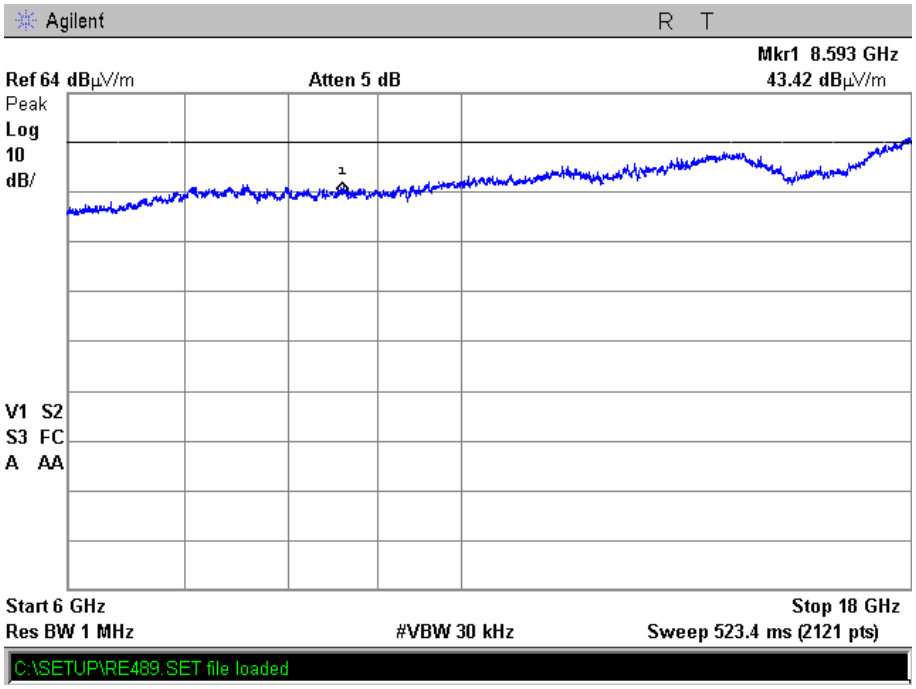
Vertical Polarization
Plot 4.1.14



Horizontal Polarization
Plot 4.1.15



Vertical Polarization
Plot 4.1.16



4.2. Power Line Emissions measurements

Reference document:	**47 CFR §15.107/207**		
Test Requirements:	Any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Sec.15.207.		
Test setup:	See Sec. 2.2	**Pass**	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted Emissions		
S.A. Settings:	f <30MHz: RBW: 9kHz, VBW:30kHz		
Radio device:	Idle		
Environment conditions:	Ambient Temperature: 21°c	Relative Humidity: 54%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.2.1 - Plot 4.2.4	

Test Results:

Measured at the charger 110VAC port.

"Phase" Lead

Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.767768	38	23.6	56.00	46.00	-18.00	-22.40	Pass
0.508303	38.9	24	56.00	46.00	-17.10	-22.00	Pass
0.320533	39.4	29.4	59.69	49.69	-20.29	-20.29	Pass
1.602735	37	18.8	56.00	46.00	-19.00	-27.20	Pass
1.783115	36.6	22.9	56.00	46.00	-19.40	-23.10	Pass
2.051	34.4	22.4	56.00	46.00	-21.60	-23.60	Pass

"Neutral" Lead

Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.593063	36.3	26.2	56.00	46.00	-19.70	-19.80	Pass
0.191489	36.5	25.8	63.97	53.97	-27.47	-28.17	Pass
0.329369	37.9	30.5	59.47	49.47	-21.57	-18.97	Pass
0.790036	35.8	25.2	56.00	46.00	-20.20	-20.80	Pass
2.43638	33.6	19.2	56.00	46.00	-22.40	-26.80	Pass
1.587	32	15.8	56.00	46.00	-24.00	-30.20	Pass

Measured at the PC 110VAC port, Class B Computing Device Peripheral

"Phase" Lead

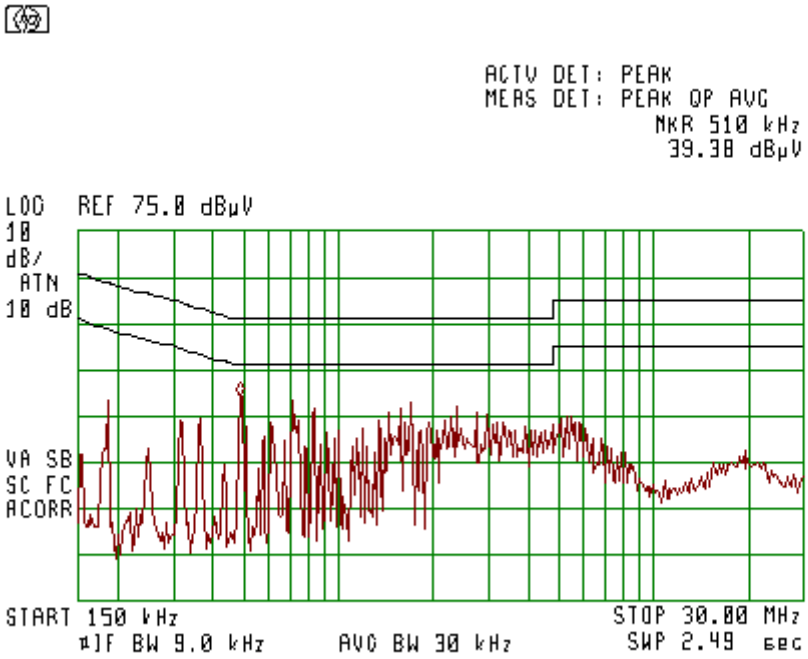
Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.15	39.4	19	66.00	56.00	-26.60	-37.00	Pass
0.164974	60.9	39.7	65.21	55.21	-4.31	-15.51	Pass
0.19671	51.6	29.1	63.75	53.75	-12.15	-24.65	Pass
0.220327	50.2	28.6	62.81	52.81	-12.61	-24.21	Pass
0.41442	36.9	7.3	57.56	47.56	-20.66	-40.26	Pass
21.96	33.3	27.3	60.00	50.00	-26.70	-22.70	Pass

"Neutral" Lead

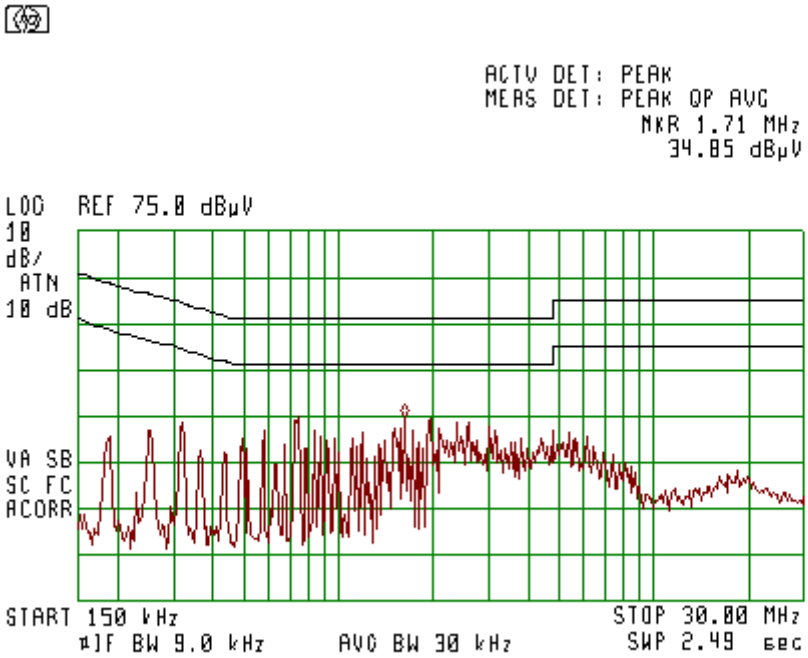
Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.160989	53.7	48.1	65.41	55.41	-11.71	-7.31	Pass
0.150000	36.7	17.5	66.00	56.00	-29.30	-38.50	Pass
0.230453	54.7	27	62.43	52.43	-7.73	-25.43	Pass
0.382123	43.7	10.3	58.23	48.23	-14.53	-37.93	Pass
0.56082	31	10.8	56.00	46.00	-25.00	-35.20	Pass
3.028	28.6	22.4	56.00	46.00	-27.40	-23.60	Pass

Measured at the charger 110VAC port

Phase Lead
Plot 4.2.1

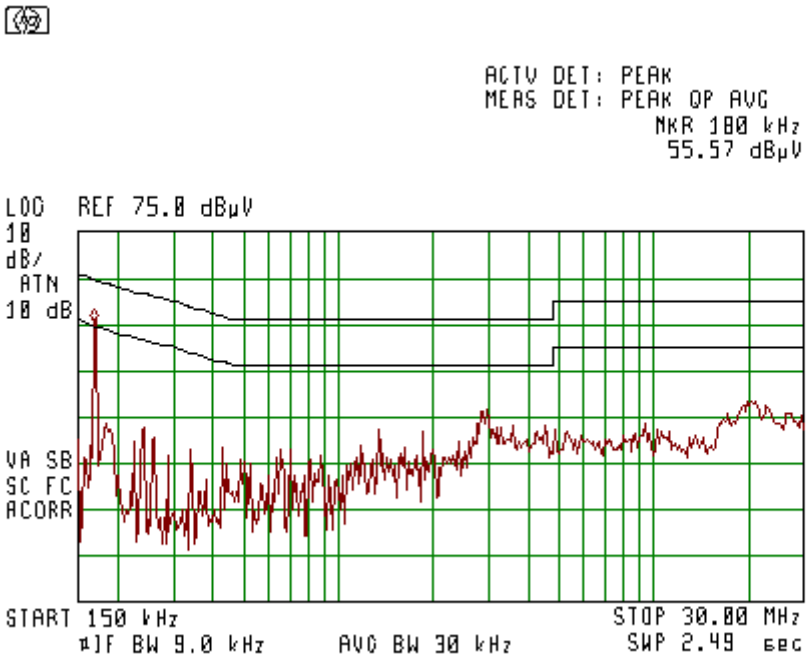


Neutral Lead
Plot 4.2.2

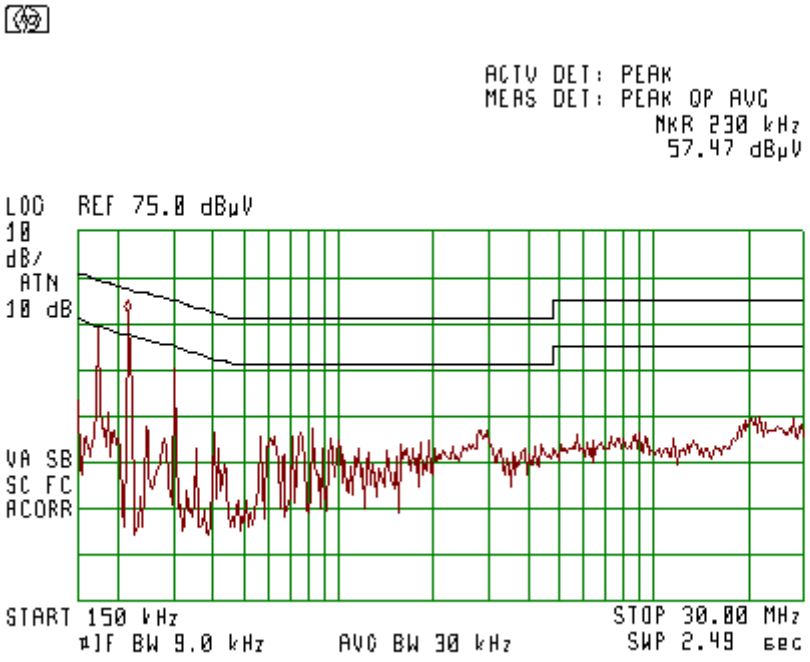


Measured at the PC 110VAC port

Phase Lead
Plot 4.2.3



Neutral Lead
Plot 4.2.4



5. Appendix

Appendix A: List of Measuring Equipment used:

Equipment	Manufacturer/ Model	Serial Number	Due date
CISPR16 EMI Receiver	HP8546A	3710A00392	17-11-12
Spectrum Analyzer 100 Hz ÷ 26.5 GHz	Agilent E7405A	US41160436	24-11-12
LNA Amplifier 1 GHz ÷ 18 GHz	AMP – 5D-010180-30-10P-GW	618653	07-03-13
Dual Ridged Guide Ant.1-18 GHz	A.R.A DRG 118/A	17188	23-01-13
Turn table	HD100	100/693	-
Antenna Mast	HD 100	100/693	-
Biconical 20 –200 MHz	Seibersdorf, PBA 320	301	20-01-15
Log-Periodic 200 – 1000 MHz	Schwarzbeck VUSLP9111	VUSLP9111184	20-01-15
LISN	Fischer 50/250-25-2	-	05-03-13
Transient Limiter	HP11947A	-	05-03-13

Appendix B: Peripheral equipment

Laptop

Mouse

Additional Monitor VGA port

Appendix C: Accreditation Certificate

ilac-MRA

The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Laboratory

A2LA has accredited

QUALITECH (ECI TELECOM)

Petach-Tikva, ISRAEL

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 22nd day of March 2011.

President & CEO
For the Accreditation Council
Certificate Number 1633.01
Valid to September 30, 2012

A2LA

For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

End of the Test Report