

Electromagnetic Compatibility Test Report

Test Report No: MOT 250110 Issued on: January 25, 2010

Product Name EWP3100 Semi Rugged VoWLAN Phone

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

Tests Performed for Motorola Inc. One Motorola Plaza, Holtsville, N.Y 11742, USA

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Test Report details:

Test commencement date:	10.01.2010
Test completion date:	13.01.2010
Customer's representative:	Eli Basri
Issued on:	25.01.2010

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



Table of Contents

1.	GEN	ERAL DESCRIPTION	5
2.	МЕТ	HOD OF MEASUREMENTS	6
	2.1.	Radiated Emission measurements:	6
	2.2.	Power Line Emission measurements:	
	2.3.	Configurations for measurements:	7
3.	TES	FACILITY & UNCERTAINTY OF MEASUREMENT	8
	3.1.	Accreditation/ Registration reference:	8
	3.2.	Test Facility description	8
	3.3.	Uncertainty of Measurement:	9
4.	UNI	NTENTIONAL RADIATIONS: REPORT OF MEASUREMENTS AND EXAMINATIONS	10
	4.1.	Radiated Emission, Receive Mode	10
	4.2.	Power Line Emissions measurements	
5.	APP	ENDIX	25



1. General Description

Description of the EUT system/test Item:

Product name: EWP3100 Semi Rugged VoWLAN Phone

Model: EWP3100

FCC ID: AZ489FT7038 **IC:** 109U-89FT7038

Description:

The EUT is a Smartphone which provides mobile voice and data communications over wireless network to users inside an enterprise.

The Smartphone includes: Smartphone with voice recognition for hands-free dialing, Walkie-talkie call button for dispatch and PTT calls (including private talk groups), two way SMS and Instant Text Messaging, Email, Contacts, Calendar, Tasks etc, including viewing mail attachments and many other built-in tools. Also includes access to enterprise applications, standard mobile internet browser, and the ability to pair with Bluetooth headsets and other Bluetooth devices such as personal computers.

Voice is transmitted/received through WLAN in digital fashion only, using Voice-over-IP protocols. The phone has no other wide area (WAN) voice transceivers, hence the term "Single mode".

The Single Mode VoWLAN solution is intended to leverage unlicensed WiFi spectrum, WLAN infrastructure, and existing telephony infrastructure to provide wireless services, including voice, within an enterprise campus.

It is capable of operating in the unlicensed 2.4 GHz band using 802.11b/g protocols or in applicable 5 GHz bands using the 802.11a protocol.

The EUT also contains a Bluetooth technology for short range interfaces and 3.2Mp 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 system cables to the worst-case position. 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.

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.

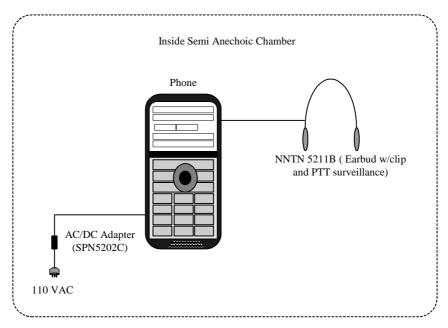
Compliance with the provisions was based on the measurements of the radio frequency voltage between each line and the ground at the power terminal.

The EUT was operated in receive mode and then with both DSS and DTS transmitters operating alternately and the worst case results were presented.



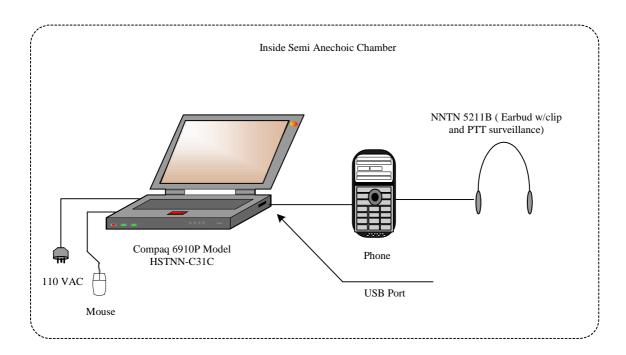
2.3. Configurations for measurements:

Charger configuration



Note: Refer to Appendix B for SPN 5202C FCC Declaration of conformity

PC Configuration





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:

		Uncertainty			
Test Name	Test Method & Range	Combined std. Uc(y) [dB]	Expanded U [dB]		
	30MHz+230MHz, Horiz. polar.	1.8	3.6		
	30MHz÷230MHz, Ver. polar.	2.0	3.9		
Radiated Emission	230MHz+1000MHz, Horiz. polar.	1.5	3.0		
	230MHz÷1000MHz, Vert. polar.	1.5	3.0		
Conducted Emission	9 kHz÷150 kHz	1.4	2.8		
	150 kHz÷30MHz	1.1	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					
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	– Pass				
Mode of operation:	Receive					
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity:Atmospheric Pressure:48%1011.4 hPa				
Test Result:	See below	See Plot 4.1.1 – Plot 4.1.20				

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
32.744750	Biconical	V	100	238	30.6	40	-9.4	Pass
2403.955000	Horn	V	100	46	39.2	54	-14.8	Pass

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

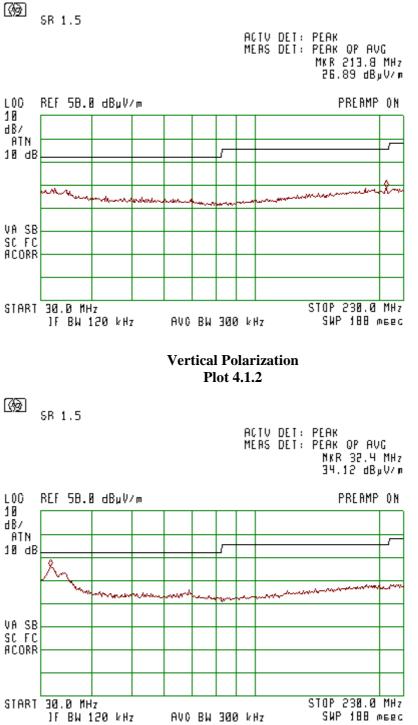
Measured with PC configuration (attached to USB port):

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
280.125000	Log-periodic	Н	100	108	37.7	46	-8.3	Pass
666.077925	Log-periodic	V	100	124	34.9	46	-11.1	Pass
845.632000	Log-periodic	Н	100	119	37.5	46	-8.5	Pass
1665.270000	Horn	V	100	301	29.3	54	-24.7	Pass
2491.650000	Horn	V	100	252	33.2	54	-20.8	Pass

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



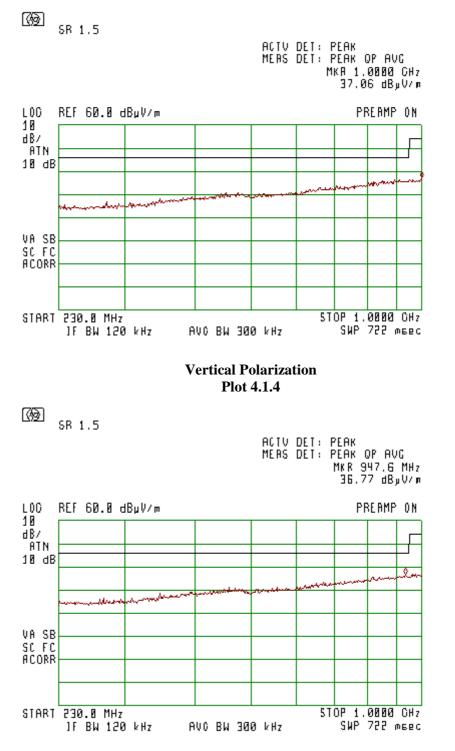
Measured with charger configuration: **Receive mode Horizontal Polarization** Plot 4.1.1



STOP 230.0 MHz SWP 188 meec

AVC BW 300 kHz





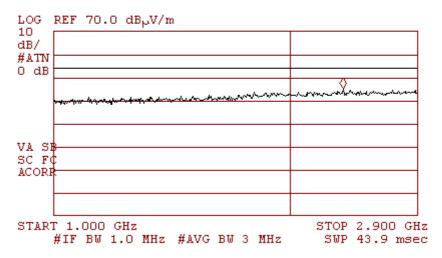


17 SR 1.5 ACTV DET: PEAK MEAS DET: PEAK QP AVG MKR 2.870 GHz $45.19 \text{ dB}_{\mu}\text{V/m}$ LOG REF 70.0 dB_µV/m 10 dB/ #ATN 0 dB nn A Share a shar VA SE SC FC ACORR START 1.000 GHz STOP 2.900 GHz #IF BW 1.0 MHz #AVG BW 3 MHz SWP 43.9 msec

Vertical Polarization Plot 4.1.6

17 SR 1.5

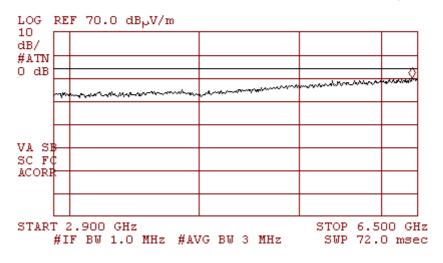
ACTV DET: PEAK MEAS DET: PEAK QP AVG MKR 2.408 GHz 45.19 dB_pV/m





/₽ SR 1.5

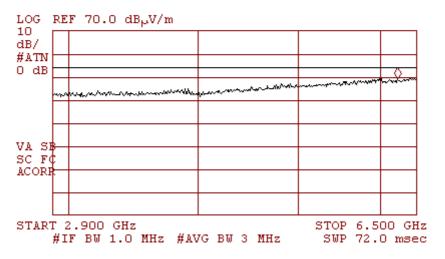
ACTV DET: PEAK MEAS DET: PEAK QP AVG MKR 6.435 GHz 49.74 dB_pV/m



Vertical Polarization Plot 4.1.8

17 SR 1.5

ACTV DET: PEAK MEAS DET: PEAK QP AVG MKR 6.273 GHz 49.27 dB_pV/m

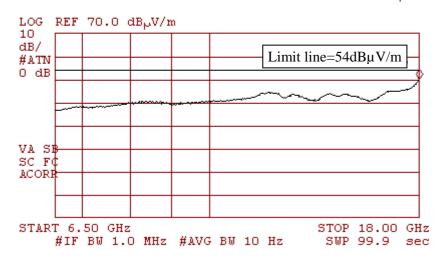


Motorola Inc.



/⊅ SR 1.5

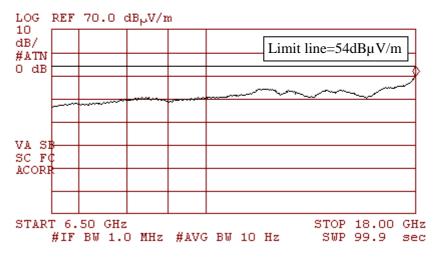
ACTV DET: PEAK MEAS DET: PEAK QP AVG MKR 18.00 GHz 49.80 dB_pV/m



Vertical Polarization Plot 4.1.10

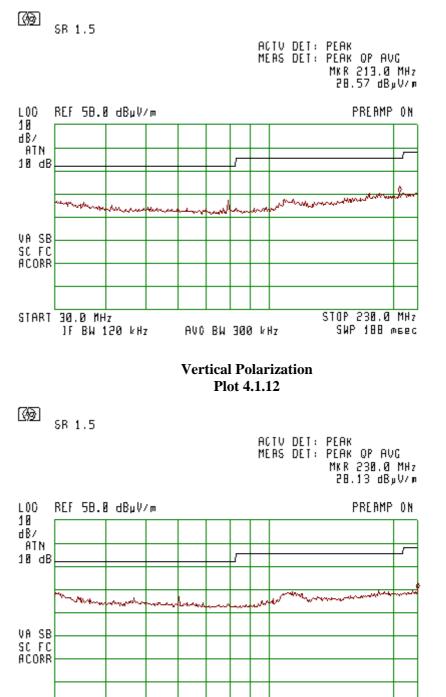
17 SR 1.5

ACTV DET: PEAK MEAS DET: PEAK QP AVG MKR 18.00 GHz 49.61 dB_pV/m





Measured with PC configuration: Receive mode Horizontal Polarization Plot 4.1.11

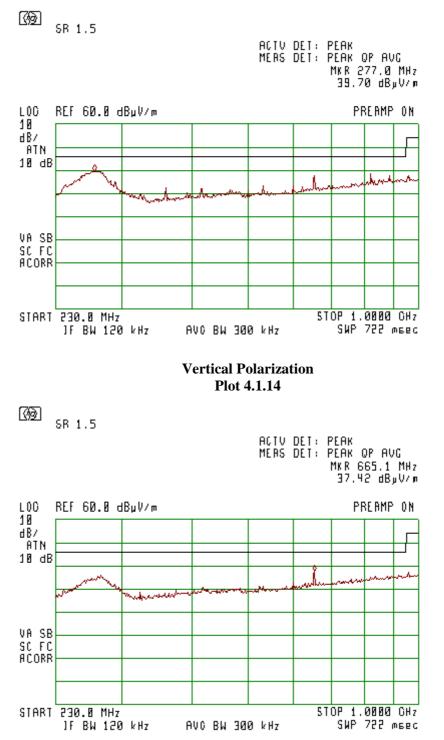


START 30.0 MHz JF BW 120 kHz

AVC BW 300 kHz

STOP 230.0 MHz SWP 188 meec





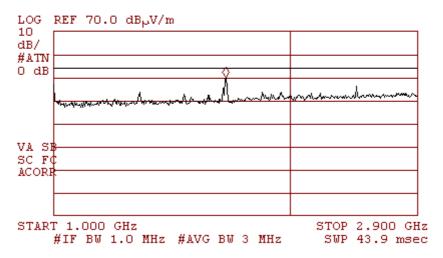


17 SR 1.5 ACTV DET: PEAK MEAS DET: PEAK QP AVG MKR 1.663 GHz 46.45 dB_pV/m LOG REF 70.0 dB_µV/m 10 dB/ #ATN 0 dB and the state of . 10 au while a state of the second VA SE SC FC START 1.000 GHz STOP 2.900 GHz #IF BW 1.0 MHz #AVG BW 3 MHz SWP 43.9 msec

Vertical Polarization Plot 4.1.16

17 SR 1.5

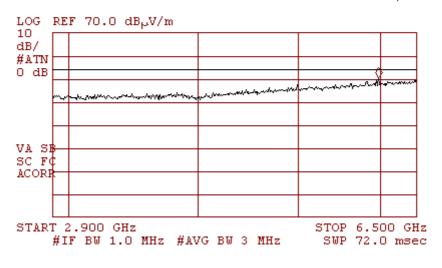
ACTV DET: PEAK MEAS DET: PEAK QP AVG MKR 1.663 GHz 49.91 dB_PV/m





/₽ SR 1.5

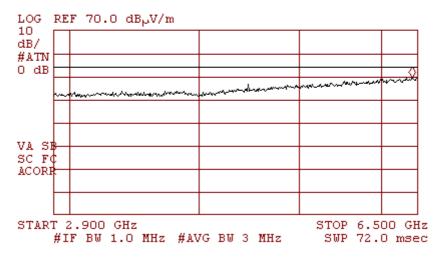
ACTV DET: PEAK MEAS DET: PEAK QP AVG MKR 6.045 GHz 50.25 dB_pV/m



Vertical Polarization Plot 4.1.18

17 SR 1.5

ACTV DET: PEAK MEAS DET: PEAK QP AVG MKR 6.435 GHz 49.37 dB_pV/m



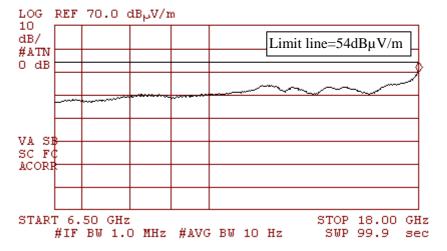


17 SR 1.5 ACTV DET: PEAK MEAS DET: PEAK QP AVG MKR 18.00 GHz 49.39 dB_PV/m LOG REF 70.0 $dB_{\mu}V/m$ 10 dB/ Limit line= $54 dB\mu V/m$ #ATN 0 dB VA SE SC FC START 6.50 GHz STOP 18.00 GHz #IF BW 1.0 MHz #AVG BW 10 Hz SWP 99.9 sec

Vertical Polarization Plot 4.1.20

17 SR 1.5

ACTV DET: PEAK MEAS DET: PEAK QP AVG MKR 18.00 GHz 49.41 dB_pV/m





4.2. Power Line Emissions measurements

Reference document:	47 CFR §15.107/207					
Test Requirements:	The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in §15.107. The emissions from an intentional radiator shall not exceed the field strength levels specified in §15.207. 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					
Operating conditions:	Under normal test conditions					
Method of testing:	Conducted Emissions		Pass			
S.A. Settings:	f <30MHz: RBW: 9kHz, VBW:30kHz					
Radio device:	Idle					
Environment conditions:	Ambient Temperature: 21°c	Relative Humidity:Atmospheric Pressure:54%1011.4 hPa				
Test Result:	See below	below See Plot 4.2.1 - Plot 4.2.4				

Test Results:

Worst case results of unintentional emissions and emissions while transmitters operating alternately, measured at the charger 110VAC port.

"Phase" Lead

Frequency	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail	
[MHz]	QP	AVR	QP	AVR	QP	AVR	1 usb, 1 un	
0.15	40.3	30.5	66.00	56.00	-25.70	-25.50	Pass	
0.220448	35.3	26.6	62.80	52.80	-27.50	-26.20	Pass	
0.284895	36.3	24.4	60.67	50.67	-24.37	-26.27	Pass	
0.366658	39.9	30.5	58.58	48.58	-18.68	-18.08	Pass	
0.584853	37.6	25.9	56.00	46.00	-18.40	-20.10	Pass	
1.168865	39.2	23.2	56.00	46.00	-16.80	-22.80	Pass	

"Neutral" Lead

Frequency	Measure [dB	ed Result [µV]		β Limits μV]		rgin B]	Pass/Fail
[MHz]	QP	AVR	QP	AVR	QP	AVR	
0.15	40.6	31.2	66.00	56.00	-25.40	-24.80	Pass
0.376575	39.3	29.2	58.35	48.35	-19.05	-19.15	Pass
0.45948	36.1	21.2	56.70	46.70	-20.60	-25.50	Pass
0.600415	35	24	56.00	46.00	-21.00	-22.00	Pass
1.58375	35.5	20.4	56.00	46.00	-20.50	-25.60	Pass
2.119013	31.4	15.3	56.00	46.00	-24.60	-30.70	Pass



Measured at the PC 110VAC port

"Phase" Lead

Frequency	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
[MHz]	QP	AVR	QP	AVR	QP	AVR	
0.17289	44.6	30.8	64.82	54.82	-20.22	-24.02	Pass
0.24235	38.1	26.3	62.02	52.02	-23.92	-25.72	Pass
0.329115	41	36.2	59.47	49.47	-18.47	-13.27	Pass
0.66912	36.2	30.6	56.00	46.00	-19.80	-15.40	Pass
9.168983	36	29.9	60.00	50.00	-24.00	-20.10	Pass
15.425173	37.8	31.8	60.00	50.00	-22.20	-18.20	Pass

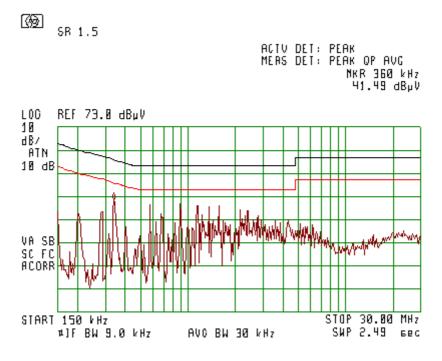
"Neutral" Lead

Frequency [MHz]	Measured Result [dBμV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.20593	46.4	29.6	63.37	53.37	-16.97	-23.77	Pass
0.274975	46.3	28.1	60.97	50.97	-14.67	-22.87	Pass
0.331725	46.3	37.6	59.41	49.41	-13.11	-11.81	Pass
0.486295	41	26.6	56.23	46.23	-15.23	-19.63	Pass
0.66001	37.7	29.3	56.00	46.00	-18.30	-16.70	Pass
0.755735	38.6	25.5	56.00	46.00	-17.40	-20.50	Pass



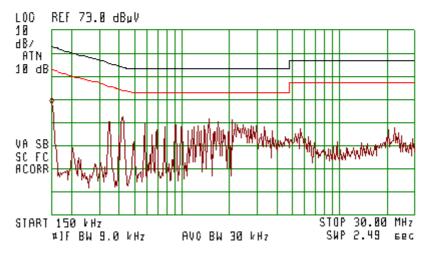
Measured at the charger 110VAC port

Phase Lead Plot 4.2.1



Neutral Lead Plot 4.2.2

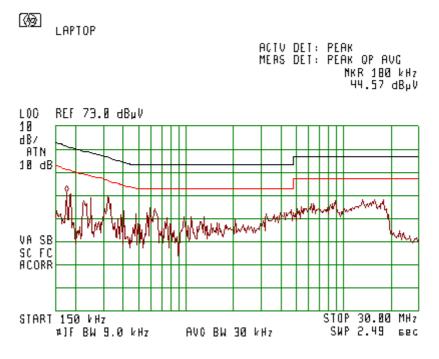
ACTV DET: PEAK Meas det: Peak op avg NKR 150 kHz 40.84 dbµv





Measured at the PC 110VAC port

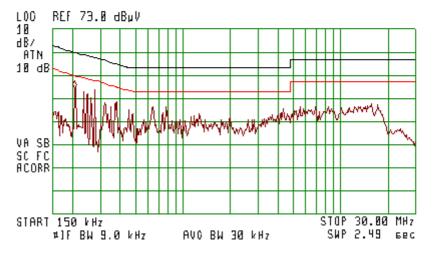
Phase Lead Plot 4.2.3



Neutral Lead Plot 4.2.4

LAPTOP

ACTV DET: PEAK Meas det: Peak op avg NKR 220 kHz 47.72 dBµV





5. Appendix

Appendix A: List of Measuring Equipment used:

Equipment	Manufacturer/ Model	Serial Number	Due date	
CISPR16 EMI Receiver	HP8546A	3710A00392	30-06-10	
Spectrum Analyzer 9kHz ÷ 22 GHz	HP 8593EM	3536A00131	30-06-10	
Spectrum Analyzer 100 Hz ÷ 26.5 GHz	Agilent E7405A	US41160436	30-06-10	
LNA Amplifier 1 GHz ÷ 18 GHz	AMP - 5D-010180-30-10P-GW	618653	30-06-10	
Power meter	Agilent N1911A	MY45100784	23-02-10	
Dual Ridged Guide Ant.1-18 GHz	EMCO 3115	9602-4677	30-06-10	
Antenna 18 GHz ÷ 26.5 GHz	Alpha Industry 861A/599	505	30-06-10	
Turn table	HD100	100/693	-	
Antenna Mast	HD 100	100/693	-	
Biconical 20 –200 MHz	Schwarzbeck VHBB9124	9124/0255	16-05-10	
Log-Periodic 200 – 1000 MHz	Schwarzbeck VUSLP9111	VUSLP9111184	16-05-10	
Pre-Amplifier	MiTeq, AMF-5F-18002650-30- 10P	945372	30-06-10	
LISN	Fischer 50/250-25-2	-	30-06-10	
Transient Limiter	HP11947A	-	30-06-10	
Notch Filter	Micro-Tronics BRM50702-05	0001	30-06-10	



Appendix B: FCC Declaration of Conformity

SPN5202C

	RIWO ELECTRICAL(SHENZHE Hengchang Industrial Zone, XiXiar Bao An District, ShenZhen, 518102 Fek:+88 755 27695269 Fax: +8	g. China & 755 27479461	SDC070914U-FMP5202
	FCC Declaratio	a of Conformity	
l lu Be	O ELECTRICAL (SHENZH ngcheng Industrial Zone, XiXia 5 An District, ShenZhen, 51810 r our sole responsibility that th	ng, LCHINA.	F©
CN Inj	/DC Adapter type ; FMP520 otorola Kit No. SPN5202C) out: 100-240Vac ~50-60112/0.1 tput: 5.0Vdc / 850mA		
	formity with the requirements or rding to the following standars		atibility Directive and the
FCC 47	CFR PART 15,8UBPART,C	LASS B :2006	
		Stuart Mit Engineerir Date: 14 th	ig Manager
		SHIP	

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Support Equipment Notebook Compaq 6910p model HSTNN-C31C

Support Equipment, 2nd device





Appendix C: Accreditation Certificate





End of the Test Report