



Electromagnetic Compatibility Test Report

Test Report No: MOT 061107

Issued on: November 06, 2007

Product Name

VoWLAN

Tested According to

FCC 47 CFR, Part 15, Subparts B

IC RSS-210

Tests Performed for

Motorola Israel Ltd.

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Regis. No: 102724 1633.01

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Test personnel



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QA and Lab. Manager
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1633.01

Test Report details:

Test commencement date: 04.11.2007
Test completion date: 06.11.2007
Customer's Representative: Teddy Neeman
Issued on: 06.11.2007

Assessment information:

This report contained 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

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1. General Description

Description of the EUT system/test Item:

Product name: VoWLAN

Model: F2977A

FCC ID: AZ489FT7031

IC: 109U-89FT7031

Description:

Single Mode VoWLAN 802.11a/b/g phone

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.

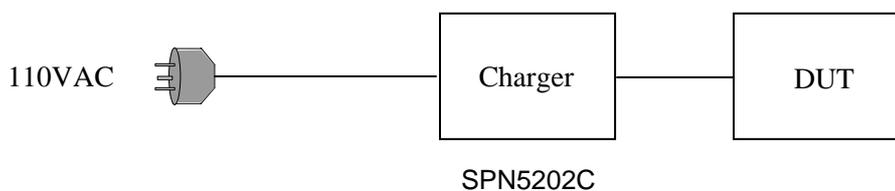
2.2. Power Line Emission measurements:

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 50 μ H/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.

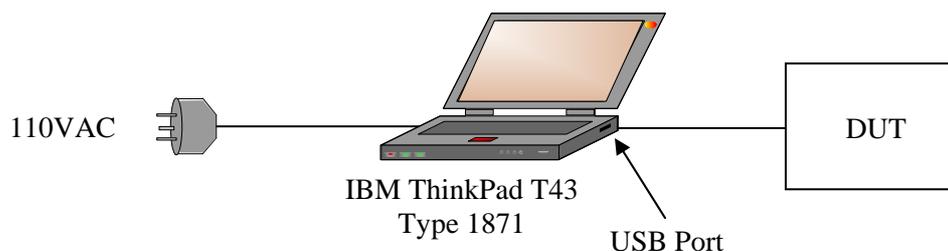
2.3. Configurations for measurements:

Charger configuration:



Note: Refer to Appendix B for SPN5202C FCC Declaration of Conformity

PC configuration (attached to USB port):



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 ≥ 80 dB at 15 kHz ≥ 90 dB at 100 kHz Electric field > 120 dB from 1MHz to 1GHz > 110 dB 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	± 3.49 dB, 30MHz to 1GHz
Transmission Loss measured at 5 positions, at 1.5m height	± 3 dB, 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 ≥ 80 dB at 15 kHz ≥ 90 dB at 100 kHz Electric field > 120 dB from 1MHz to 1GHz > 110 dB 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	± 3 dB 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.	1.8	3.6
	30MHz÷230MHz, Ver. polar.	2.0	3.9
	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	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 4.1.12	

Test results:

Measured with charger configuration:

All emissions are at least 10 dB below the Class B limits.

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

Correction Factor = Antenna factor + Cable Loss

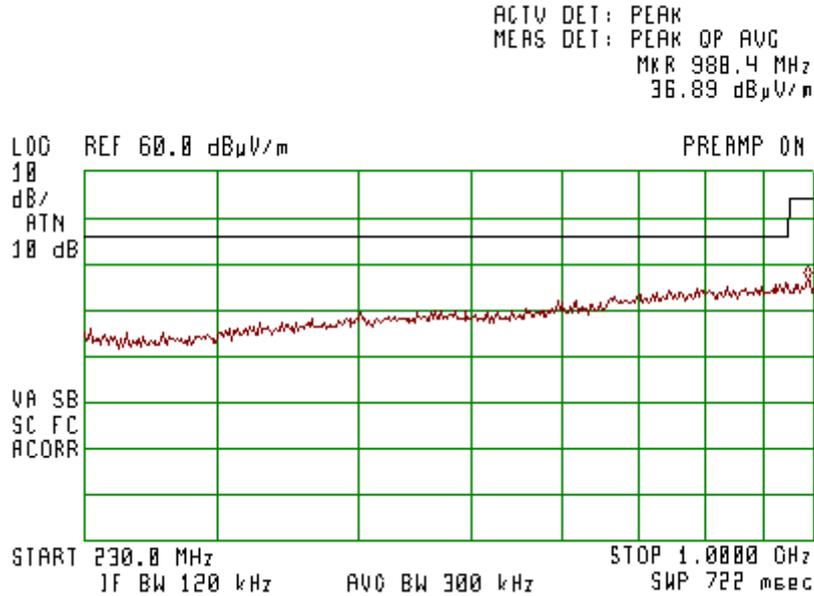
Measured with PC configuration (attached to USB port):

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
97.268510	Biconical	H	189	360	25.4	43.5	-18.1	Pass
173.979592	Biconical	H	195	7	26.3	43.5	-17.2	Pass
226.957500	Biconical	H	167	278	30.1	46	-15.9	Pass
400.021300	Log-periodic	H	105	360	44.1	46	-1.9	Pass
421.848199	Log-periodic	H	115	5	34.3	46	-11.7	Pass
486.731950	Log-periodic	V	112	135	38.8	46	-7.2	Pass

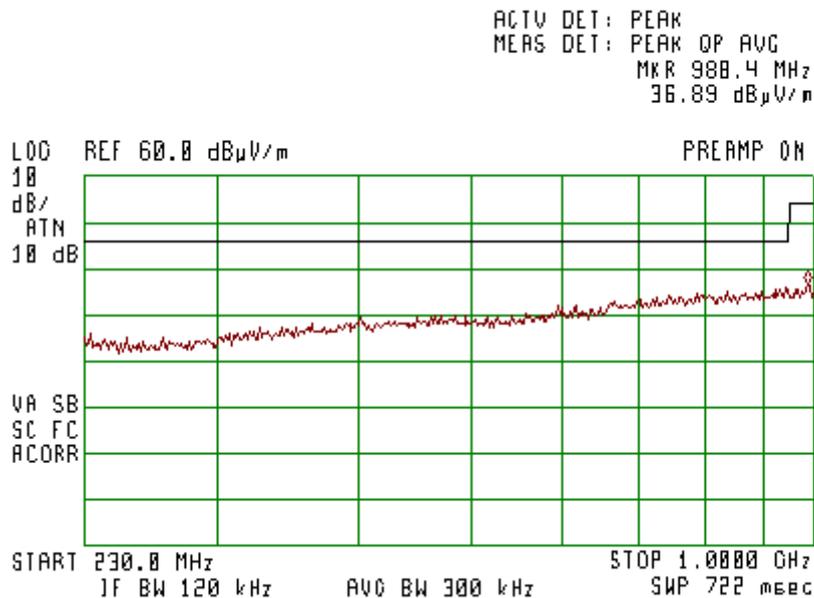
Note: Radiated Emission [dBμV/m] = measured [dBμV] + Correction-factor [dB(1/m)]

Correction Factor = Antenna factor + Cable Loss

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



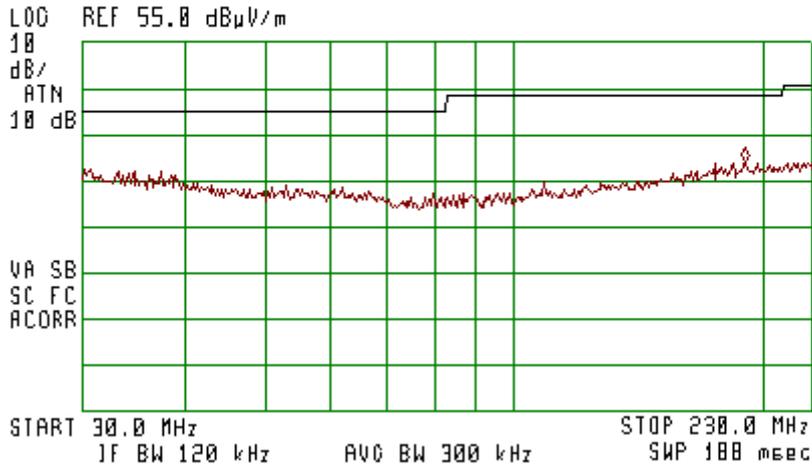
**Vertical Polarization
Plot 4.1.2**



Horizontal Polarization
Plot 4.1.3



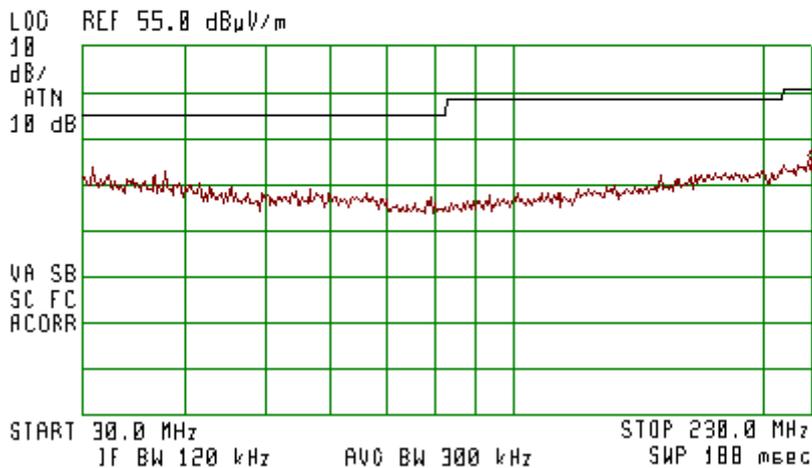
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 198.5 MHz
29.12 dB μ V/m



Vertical Polarization
Plot 4.1.4



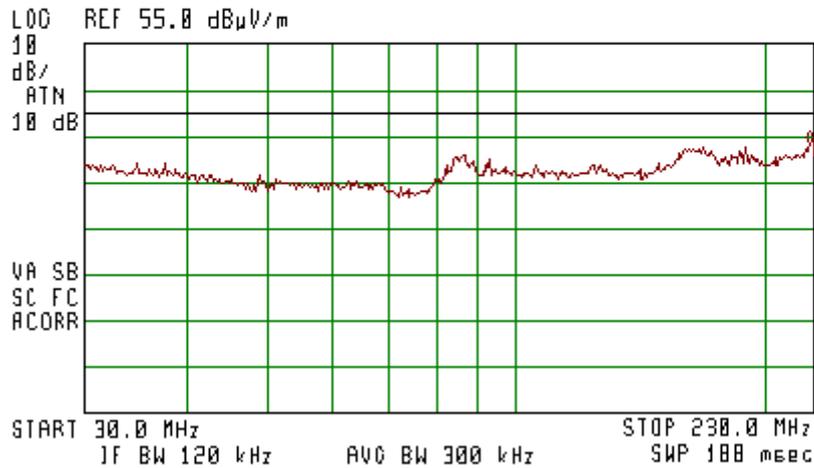
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 229.1 MHz
30.06 dB μ V/m



**Measured with PC configuration:
Receive mode
Horizontal Polarization
Plot 4.1.5**



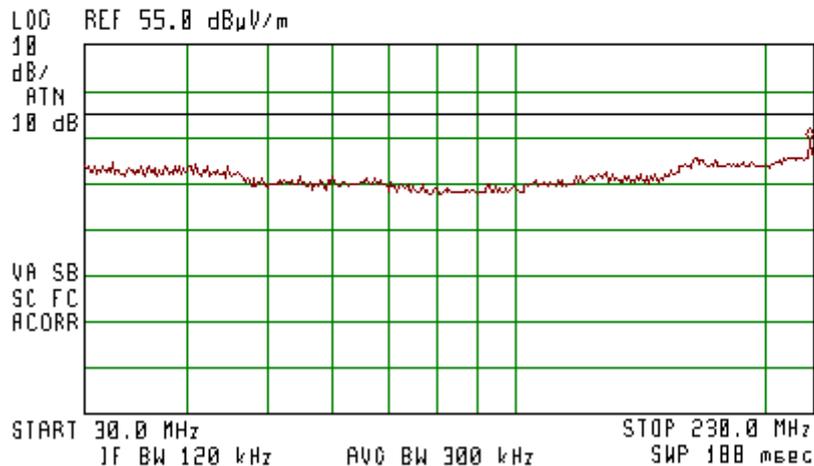
ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 227.4 MHz
33.59 dB μ V/m



**Vertical Polarization
Plot 4.1.6**



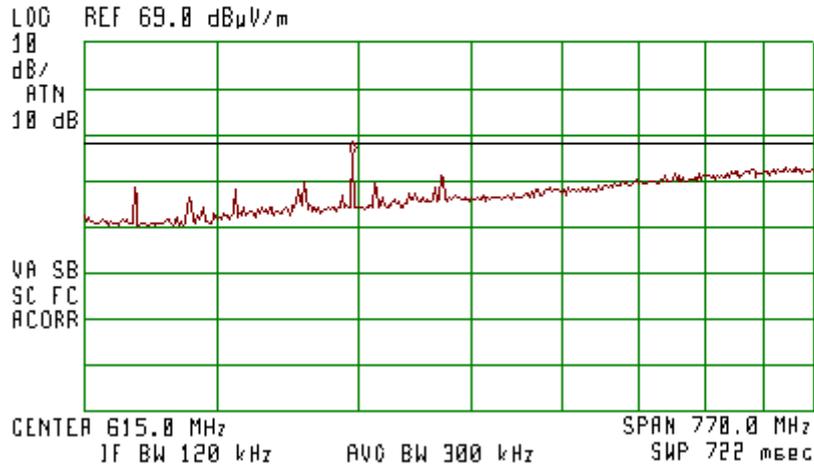
ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 227.4 MHz
34.18 dB μ V/m



Horizontal Polarization
Plot 4.1.7



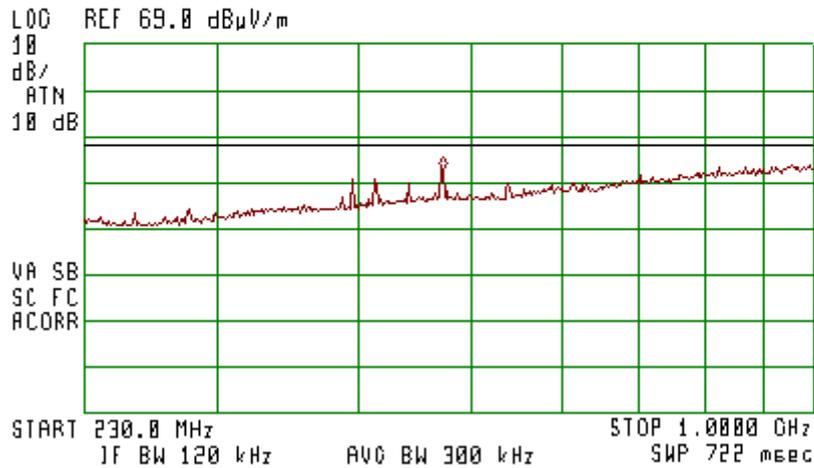
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 398.8 MHz
44.83 dB μ V/m



Vertical Polarization
Plot 4.1.8



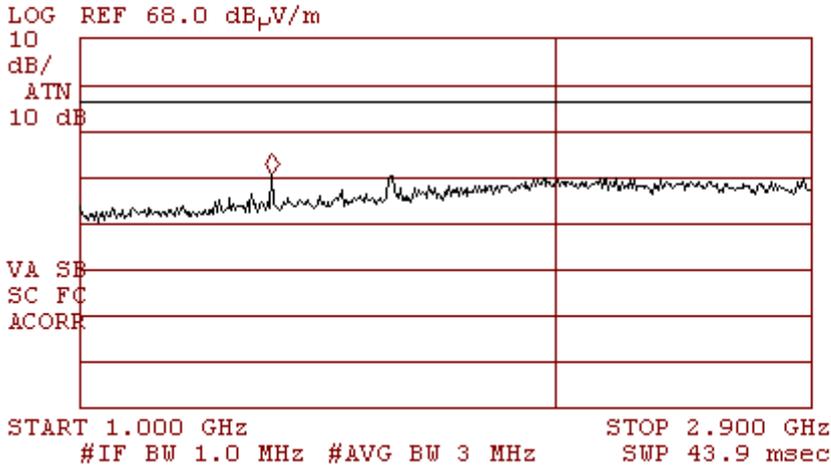
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 486.9 MHz
42.04 dB μ V/m



Horizontal Polarization
Plot 4.1.9

1/2

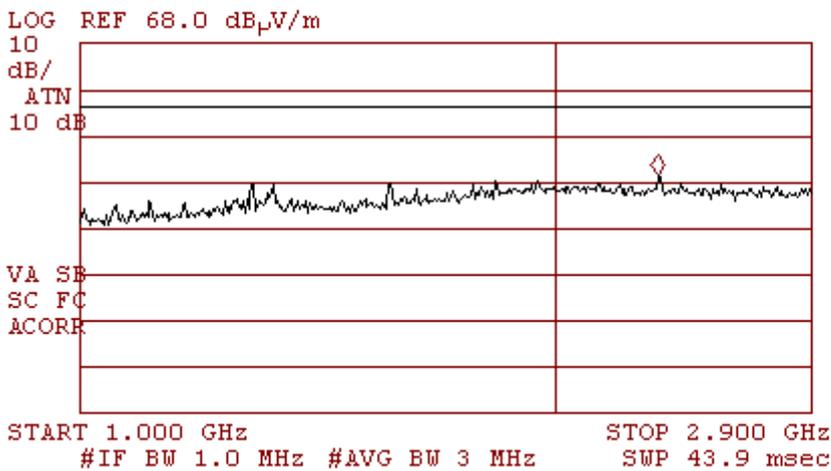
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.368 GHz
38.46 dB μ V/m



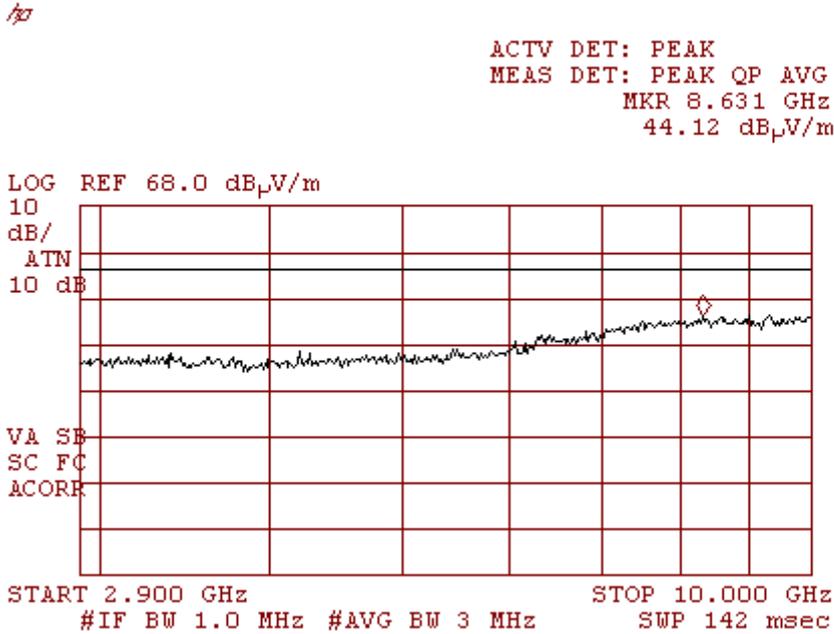
Vertical Polarization
Plot 4.1.10

1/2

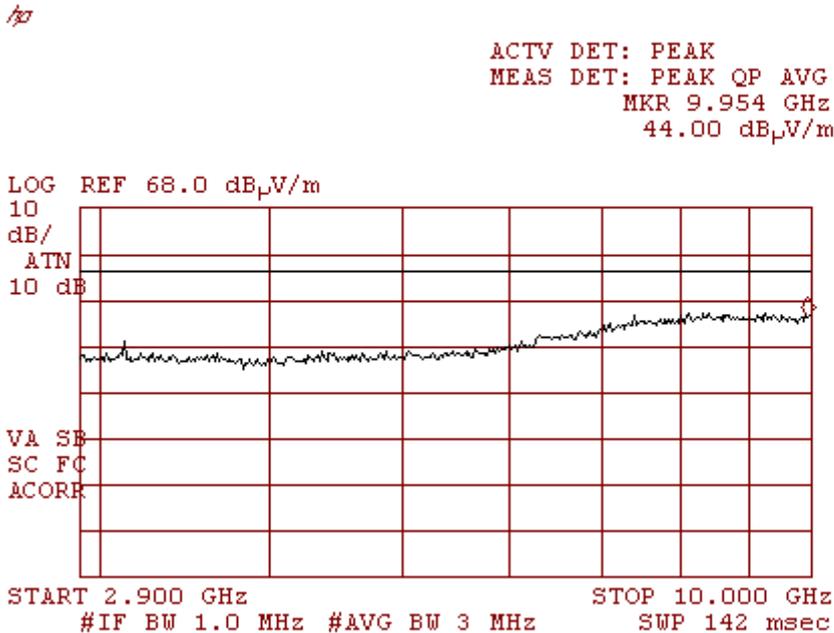
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.396 GHz
39.23 dB μ V/m



Horizontal Polarization
Plot 4.1.11



Vertical Polarization
Plot 4.1.12



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	
0.278923	32	15.2	60.9	50.9	-28.9	-35.7	Pass
0.613292	31.7	15.9	56	46	-24.3	-30.1	Pass
0.723431	29.4	15.9	56	46	-26.6	-30.1	Pass
1.26273	29.4	17.1	56	46	-26.6	-28.9	Pass
1.737101	27.9	17.1	56	46	-28.1	-28.9	Pass
5.313335	23.3	13.9	60	50	-36.7	-36.1	Pass

“Neutral” Lead

Frequency [MHz]	Measured Result [dBμV]		Class B Limits [dBμV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.278923	23.8	8.2	60.9	50.9	-37.1	-42.7	Pass
0.613292	34.1	22.5	56	46	-21.9	-23.5	Pass
0.723431	30.5	20.2	56	46	-25.5	-25.8	Pass
1.26273	30.2	18.5	56	46	-25.8	-27.5	Pass
1.737101	26.8	14.4	56	46	-29.2	-31.6	Pass
5.313335	25.5	13.9	60	50	-34.5	-36.1	Pass

Measured at the PC 110VAC port

“Phase” Lead

Frequency [MHz]	Measured Result [dBμV]		Class B Limits [dBμV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.154575	55	23.7	65.75	55.75	-10.75	-32.05	Pass
0.481094	27.9	13.2	56.32	46.32	-28.42	-33.12	Pass
3.026568	28.1	21.6	56.00	46.00	-27.90	-24.40	Pass
9.448107	29.3	23.1	60.00	50.00	-30.70	-26.90	Pass
21.093965	37.7	31.8	60.00	50.00	-22.30	-18.20	Pass
27.484612	29.5	22.6	60.00	50.00	-30.50	-27.40	Pass

“Neutral” Lead

Frequency [MHz]	Measured Result [dBμV]		Class B Limits [dBμV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.154575	55.1	24.6	65.75	55.75	-10.65	-31.15	Pass
0.481094	29.8	12.9	56.32	46.32	-26.52	-33.42	Pass
3.026568	26.8	20.3	56.00	46.00	-29.20	-25.70	Pass
9.448107	26.4	18.7	60.00	50.00	-33.60	-31.30	Pass
21.093965	34.8	28.9	60.00	50.00	-25.20	-21.10	Pass
27.484612	27.7	20.4	60.00	50.00	-32.30	-29.60	Pass

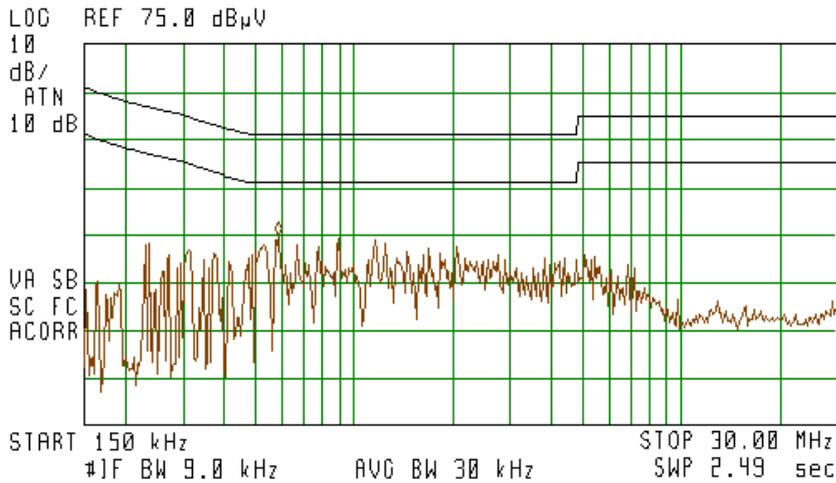
Measured at the charger 110VAC port

**Phase Lead
Plot 4.2.1**



EN55022 CONDUCTED EMISSION CLASS B

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 600 kHz
34.86 dB μ V

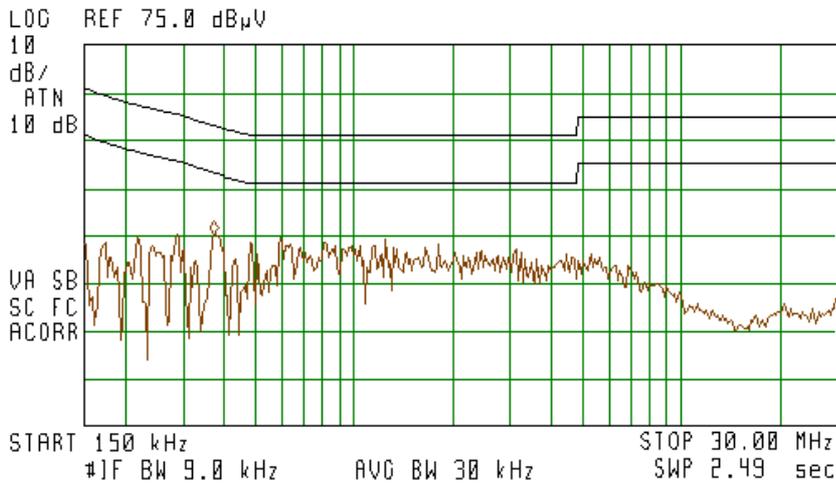


**Neutral Lead
Plot 4.2.2**



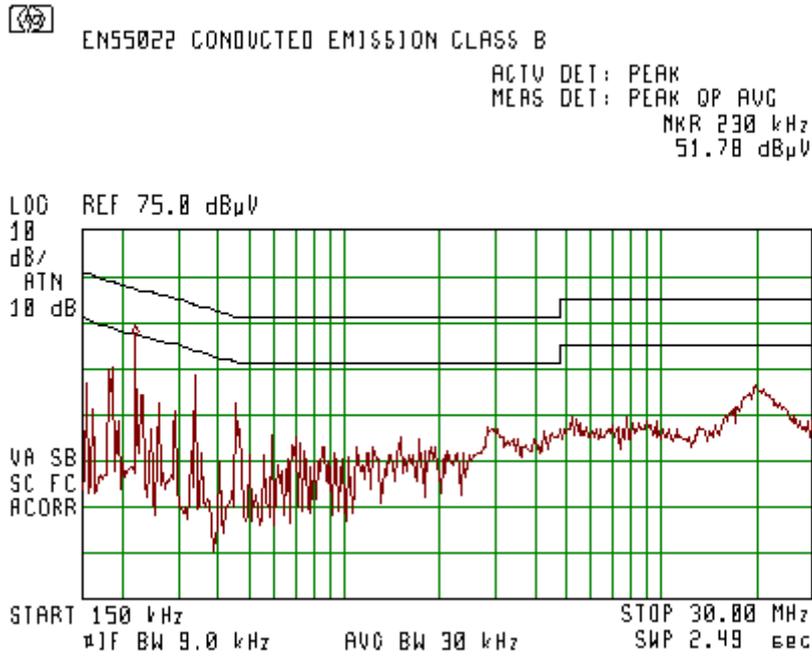
EN55022 CONDUCTED EMISSION CLASS B

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 400 kHz
35.12 dB μ V

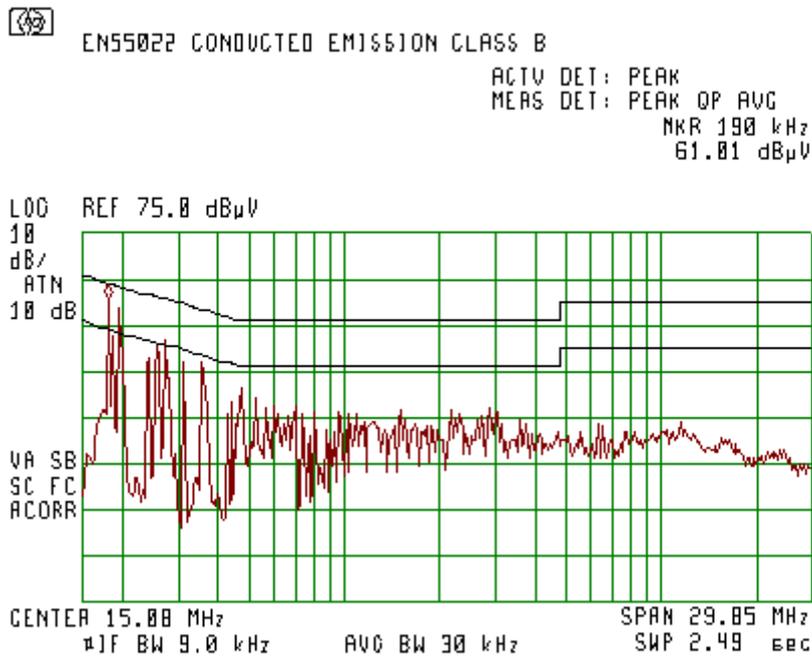


Measured at the PC 110VAC port

**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	30-06-08
Spectrum Analyzer 9kHz ÷ 22 GHz	HP 8593EM	3536A00131	30-06-08
Spectrum Analyzer 100 Hz ÷ 26.5 GHz	Agilent E7405A	US41160436	30-06-08
LNA Amplifier 1 GHz ÷ 18 GHz	AMP – 5D-010180-30-10P-GW	618653	30-06-08
Power meter	Agilent N1911A	MY45100784	23-02-08
Dual Ridged Guide Ant.1-18 GHz	EMCO 3115	9602-4677	30-06-08
Antenna 18 GHz ÷ 26.5 GHz	Alpha Industry 861A/599	505	30-06-08
Turn table	HD100	100/693	-
Antenna Mast	HD 100	100/693	-
Biconical 20 –200 MHz	Schwarzbeck VHBB9124	9124/0255	16-05-08
Log-Periodic 200 – 1000 MHz	Schwarzbeck VUSLP9111	VUSLP9111184	16-05-08
Pre-Amplifier	MiTeq, AMF-5F-18002650-30-10P	945372	30-06-08
LISN	Fischer 50/250-25-2	-	30-06-08
Transient Limiter	HP11947A	-	30-06-08
Notch Filter	Micro-Tronics BRM50702-05	0001	30-06-08

Appendix B: FCC Declaration of Conformity

Support Equipment SPN5202C



FRIWO ELECTRICAL(SHENZHEN) COMPANY LTD.
Hangcheng Industrial Zone, XiXiang,
Bao An District, ShenZhen, 518102, China
Tel: +86 755 27695268 Fax: +86 755 27479461

Our Ref: SDC070914U-FMP5202C

FCC Declaration of Conformity

We, **FRIWO ELECTRICAL (SHENZHEN) COMPANY LTD.**,
Hangcheng Industrial Zone, XiXiang,
Bao An District, ShenZhen, 518102, CHINA.



Declare under our sole responsibility that the designated product

AC/DC Adapter type : FMP5202C
(Motorola Kit No. SPN5202C)
Input: 100-240Vac ~50-60Hz/0.12A
Output: 5.0Vdc / 850mA

1) Is in conformity with the requirements of Electromagnetic Compatibility Directive and the tested according to the following standard:

FCC 47 CFR PART 15, SUBPART, CLASS B : 2006

Stuart Mitchell
Engineering Manager
Date: 14 th Sep, 2007

Support Equipment IBM ThinkPad T43Type 1871



Appendix C: Accreditation Certificate



End of the Test Report