

DATE: 09 November 2008

I.T.L. (PRODUCT TESTING) LTD.

FCC Radio Test Report

for

Risco Ltd.

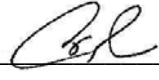
Equipment under test:

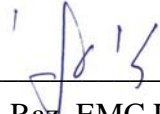
RISCO 2-Way RF Module With:

- 1. Agility Panel, M/N RW132x4t0zza**
- 2. I/O Module, M/N RW132I04000H**
- 3. Wireless Two Way PIR Detector, M/N RWX95043300A**
- 4. Wireless Two Way Pet Detector, M/N RWX95P43300A**

RWRT433R000A

Written by: 
D. Shidlow, Documentation

Approved by: 
A. Sharabi, Test Engineer

Approved by: 
I. Raz, EMC Laboratory Manager

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This report relates only to items tested.

Measurement/Technical Report for Risco Ltd.

RISCO 2-Way RF Module With:

1. Agility Panel, M/N RW132x4t0zzA
2. I/O Module, M/N RW132I04000H
3. Wireless Two Way PIR Detector, M/N RWX95043300A
4. Wireless Two Way Pet Detector, M/N RWX95P43300A

RWRT433R000A

FCC ID: JE4AGILITY

IC: 6564A-AGILITY

This report concerns: Original Grant: X Limited Modular Approval
Class I change:
Class II change:

Equipment type: Part 15 Security/Remote Control Transceiver

47CFR15 Section 15231 (a-d)

Measurement procedure used is ANSI C63.4-2003.

Application for Certification
prepared by:
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1. General Information

1.1 Administrative Information

Manufacturer:	Risco Ltd.
Manufacturer's Address:	14 Hachoma St. Rishon Le T'zion 75655 Israel Tel: +972-3-963-7742 Fax: +972-3-961-6584
Manufacturer's Representative:	Efi Goren
Equipment Under Test (E.U.T):	RISCO 2-Way RF Module With: 1. Agility Panel, M/N RW132x4t0zzA 2. I/O Module, M/N RW132I04000H 3. Wireless Two Way PIR Detector, M/N RWX95043300A 4. Wireless Two Way Pet Detector, M/N RWX95P43300A
Equipment Model No.:	RWRT433R000A
Equipment Serial No.:	Not Designated
Date of Receipt of E.U.T:	01.09.08
Start of Test:	01.09.08
End of Test:	01.10.08
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Part 15 Sub-part C

1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), File No. IC 4025.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 **Product Description**

This report concerns Limited Modular approval testing for the Risco 2-Way RF Module in 3 hosts manufactured by Risco Ltd.

The module is a transceiver which consist of a small PCB with an integral helical antenna, which operates in the frequency of 433.92MHz

Modulation is On-Off Keying using Manchester code with max bit rate of 2400Bps.

This module is installed only in RISCO 2-way wireless units, and its behavior is determined by the host unit, as tested by ITL.

The E.U.T. was placed in the following hosts:

Host: Two-Way Wireless PIR/Pet Detectors

The EUT is a wireless 433.92MHz 2-Way Detector based on PIR technology.

Being bi-directional enables the detectors to receive an acknowledgment from the panel for every transmission.

The unit includes a main PCB and RF module and it's powered by two 3V CR123A lithium batteries.

The difference between the two detectors:

- Lens, PIR uses 15X15m while Pet version uses 12X12m lens.
- Pet immunity is up to a 36kg.

Host: Agility Control Panel

The EUT is a wireless 433.92MHz alarm panel that monitors a variety of products. The panel presents status information visually and verbally.

The panel is monitoring the accessories and the detectors using 2-way communication, so for every message the panel receives it sends acknowledgment message.

The unit includes a main PCB, plug in RF module, and 3 optional plug in modules: GSM module, modem card and IP card, which add communication capabilities to the alarm system. The panel was tested with all 3 units to simulate worst case conditions.

The GSM module include an FCC and IC modular approval:
FCC ID: QIPTC63, IC: 267W-TC63

The EUT is powered by 120VAC/AC power supply and uses 6V 3.3Ah Sealed Lead Acid Battery as backup power source.

Host: Two-Way I/O Expander

The EUT is a wireless 433.92MHz 2-Way I/O module which enables wired devices to be connected to the Agility system.

The unit includes a main PCB and plug-in RF module which contains an integral helical antenna and it's powered by a 120VAC to 9VAC power supply and uses 3x 1.2V AA NiMH 2300mAh batteries.

The EUT supports 4 input zones and 4 outputs. Each output can be operated in a response to a wide variety of system events.

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing August 22, 2006).

I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Conducted Emission

The uncertainty for this test is ± 2 dB.

Radiated Emission

The Open Site complies with the ± 4 dB Normalized Site Attenuation requirements of ANSI C63.4-2003. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

2. System Test Configuration

2.1 Justification

To select the worst case host to be tested for Limited Modular Approval certification, an exploratory radiated emission test, in the frequency range of 9 kHz-4500 MHz, was performed inside the shielded room.

The hosts, with the radio module in constant transmission, were placed on a 0.8 meter high wooden table, 1m meter from the tests antennas, which were 1 m high.

The results of the exploratory radiated emission tests are shown in the table below.

Enclosures	
Model	Result (dBμV/m)
Two-Way Wireless PIR/Pet Detectors	31.8
Agility Control Panel	41.9
Two-Way I/O Expander	38.0

Based on the above exploratory radiated emission test, the Agility Control Panel was selected as the “worst case” host.

2.2 EUT Exercise Software

Manufacturing software was used for all the tests.

2.3 Special Accessories

No special accessories were needed.

2.4 **Equipment Modifications**

No modifications were needed in order to achieve compliance

2.5 **Configuration of Tested System**

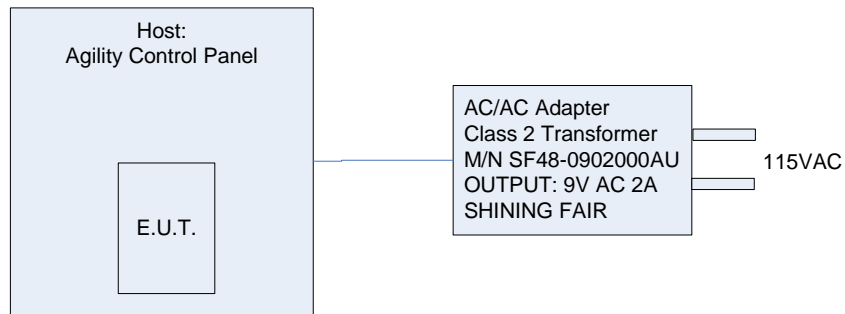


Figure 1. Configuration of Tested System

3. Test Set-up Photos



Figure 2. Radiated Emission Screening Test, Host: Two Way Wireless PIR Detector

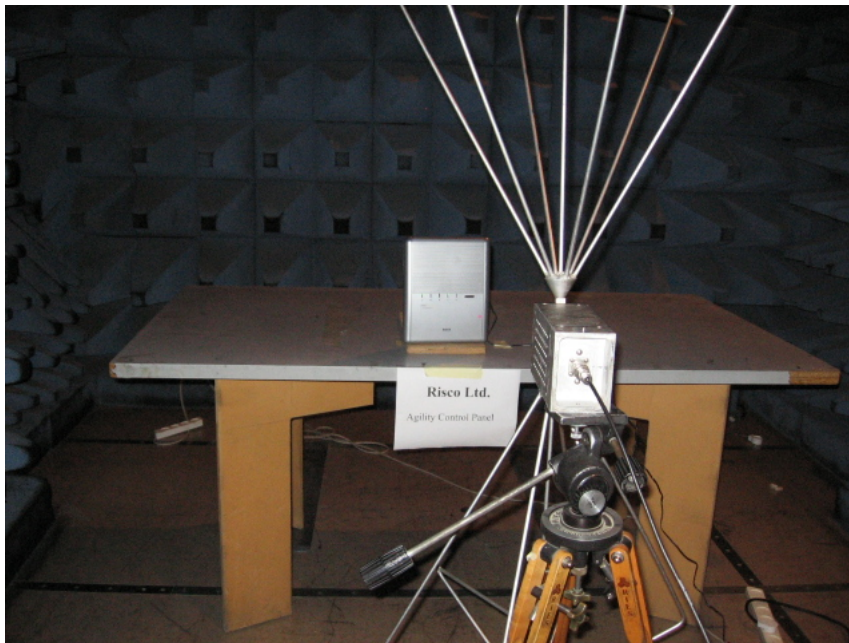


Figure 3. Radiated Emission Screening Test, Host: Agility Control Panel

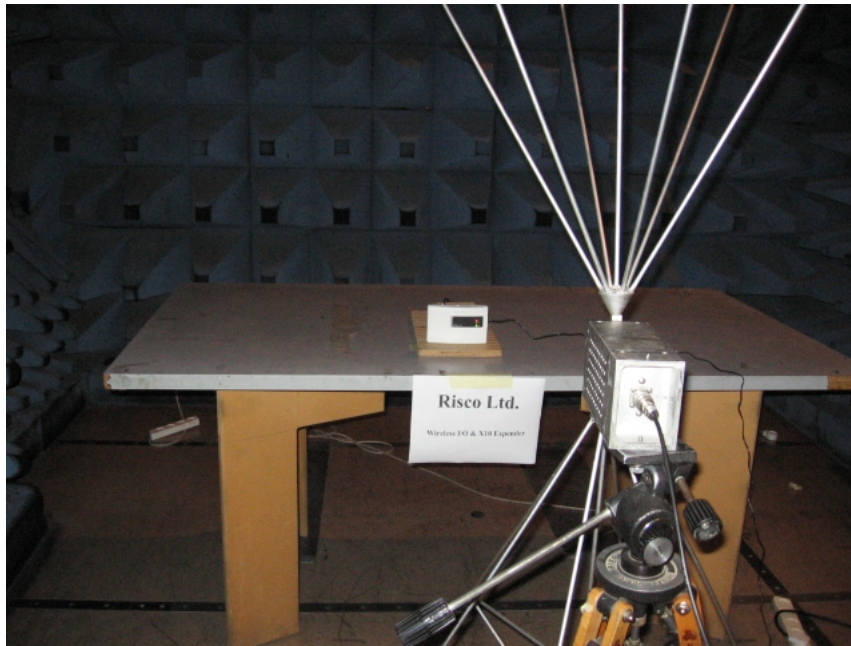


Figure 4. Radiated Emission Screening Test, Host: Two Way I/O Expander



Figure 5. Conducted Emission Test



Figure 6. Radiated Emission Test

4. Conducted Emission Data

4.1 Test Specification

F.C.C., Part 15, Subpart C

4.2 Test Procedure

The E.U.T operation mode and test set-up are as described in Section 3.1. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room, with the E.U.T placed on a 0.8 meter high wooden table, 0.4 meter from the room's vertical wall.

The E.U.T was powered from 115 V AC / 60 Hz via a 50 Ohm / 50 μ Hn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are loaded to the receiver via a 3.5" floppy disk and are displayed on the receiver's spectrum display.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, and using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.

4.3 Measured Data

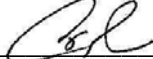
JUDGEMENT: Passed by 28.6 dB

The margin between the emission levels and the specification limit is, in the worst case, 28.6 dB for the phase line at 26.67 MHz and 31.4 dB at 26.67 MHz for the neutral line.

The EUT met the F.C.C. Part 15, Subpart C specification requirements.

The details of the highest emissions are given in *Figure 7* to *Figure 10*.

TEST PERSONNEL:

Tester Signature:  Date: 09.11.08

Typed/Printed Name: A. Sharabi

Conducted Emission

E.U.T Description Radio Device Module With:
 1. Agility Panel, M/N RW132x4t0zzA

Type RWRT433R000A

Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C

Lead: Phase

Detectors: Peak, Quasi-peak, Average

Signal Number	Frequency (MHz)	Peak (dBuV)	QP (dBuV)	QP Delta L 1 (dB)	Avg (dBuV)	Av Delta L 2 (dB)	Corr (dB)
1	0.251614	7.4	-0.9	-62.7	-8.3	-60.1	0.0
2	1.198693	9.0	6.6	-49.4	4.3	-41.7	0.0
3	5.334552	13.0	11.6	-48.4	9.1	-40.9	0.0
4	21.334027	11.7	9.6	-50.4	6.9	-43.1	0.0
5	24.999766	23.2	21.4	-38.6	16.5	-33.5	0.0
6	26.668382	25.1	24.0	-36.0	21.4	-28.6	0.0


Figure 7. Detectors: Peak, Quasi-peak, AVERAGE .

Note: QP Delta/Av Delta refer to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Conducted Emission

E.U.T Description Radio Device Module With:
 1. Agility Panel, M/N RW132x4t0zzA
 Type RWRT433R000A
 Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C
 Lead: Phase
 Detectors: Peak, Quasi-peak, Average

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ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 26.63 MHz
 19.20 dBμV

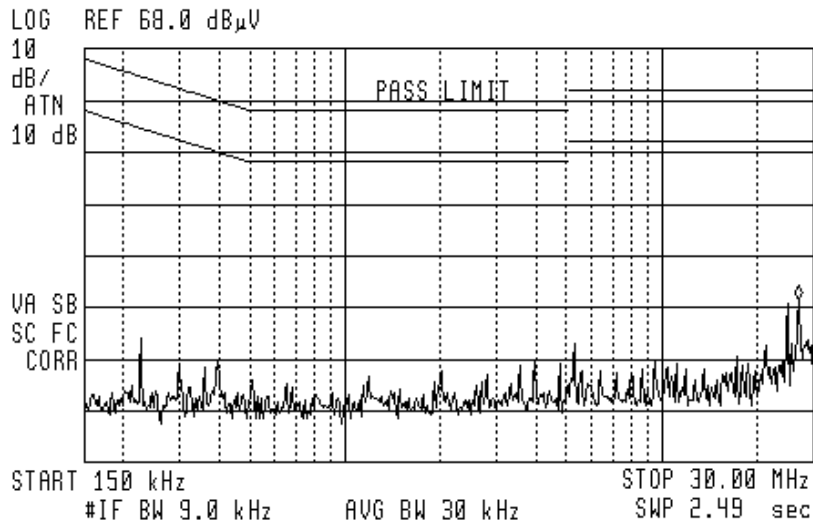


Figure 8. Detectors: Peak, Quasi-peak, Average

Conducted Emission

E.U.T Description Radio Device Module With:
1. Agility Panel, M/N RW132x4t0zzA

Type RWRT433R000A

Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C

Lead: Neutral

Detectors: Peak, Quasi-peak, Average

Signal Number	Frequency (MHz)	Peak (dBuV)	QP (dBuV)	QP Delta L 1 (dB)	Avg (dBuV)	Av Delta L 2 (dB)	Corr (dB)
1	0.197908	8.3	0.0	-63.7	-8.4	-62.1	0.0
2	1.997882	10.2	6.5	-49.5	2.7	-43.3	0.0
3	5.333072	12.2	10.1	-49.9	7.4	-42.6	0.0
4	16.001948	12.0	9.7	-50.3	5.7	-44.3	0.0
5	25.000389	21.8	20.1	-39.8	15.4	-34.6	0.0
6	26.670059	22.4	21.2	-38.8	18.6	-31.4	0.0


Figure 9. Detectors: Peak, Quasi-peak, AVERAGE

Note: QP Delta/Av Delta refer to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Conducted Emission

E.U.T Description Radio Device Module With:
 1. Agility Panel, M/N RW132x4t0zzA
 Type RWRT433R000A
 Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C
 Lead: Neutral
 Detectors: Peak, Quasi-peak, Average

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ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 26.63 MHz
 16.84 dBµV

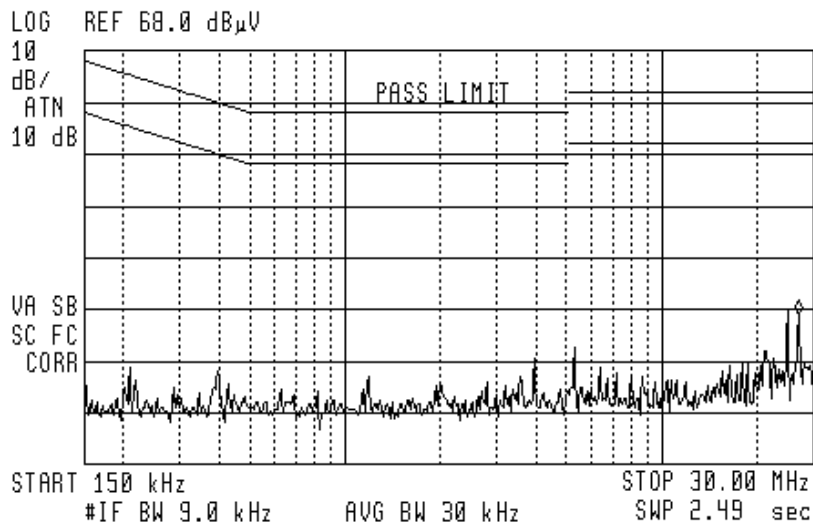


Figure 10 Conducted Emission: NEUTRAL
Detectors: Peak, Quasi-peak, Average

4.4 Test Instrumentation Used, Conducted Measurement

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
LISN	Fischer	FCC-LISN-2A	127	March 8, 2008	1 Year
LISN	Fischer	FCC-LISN-2A	128	March 8, 2008	1 Year
EMI Receiver	HP	85422E	3906A00276	November 12, 2007	1 Year
RF Filter Section	HP	85420E	3705A00248	November 12, 2007	1 Year
Printer	HP	LaserJet 2200	JPKG19982	N/A	N/A

5. Average Factor Calculation

1. Transmission pulse duration = 225 usec
2. Transmission pulse period = 450 usec
3. Burst duration = 112.5 msec, >100ms
4. Average Factor = $20 \log \left[\frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{burst duration}}{100\text{msec}} \times \text{Num of burst within 100msec} \right]$

$$\text{Average Factor} = 20 \log \left[\frac{0.225}{0.450} \times \frac{100}{100} \times 1 \right] = -6.02\text{dB}$$

13:52:32 SEP 07, 2008

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 225.00 μsec
 -11.25 dB

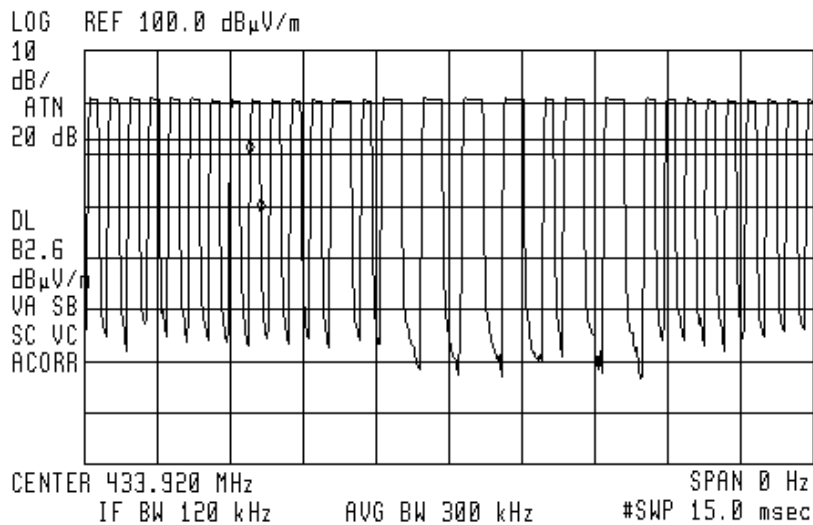


Figure 11. Transmission pulse duration = 225usec

13:53:10 SEP 07, 2008

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 450.00 μsec
 10.46 dB

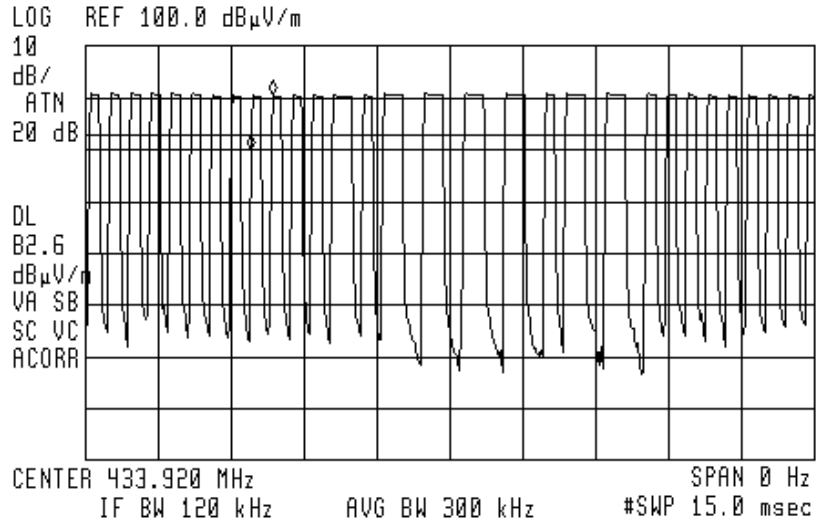


Figure 12. Transmission pulse period = 413usec

14:02:17 SEP 07, 2008

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR Δ 112.50 msec
 .00 dB

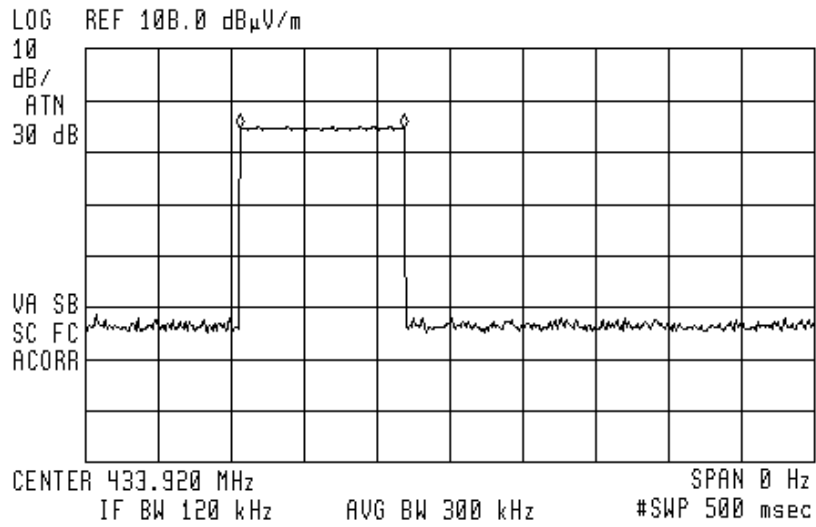


Figure 13. Burst duration = 112.5 msec , >100 msec

5.1 Test Instrumentation Used

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 5, 2008	1 Year
Antenna Bioconical	ARA	BCD 235/B	1041	March 23, 2008	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 22, 2007	1 year
Antenna-Log Periodic	A.H.System	SAS-200/511	253	February 4, 2007	2 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A

6. Periodic Operation

6.1 Specification

F.C.C., Part 15, Subpart C, Section 15.231(a)

6.2 Requirements

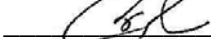
Requirement	Rationale	Verdict
Continuous transmissions are not permitted.	N/A	Complies
A manually operated transmitter shall be deactivated within not more than 5 seconds after releasing the switch.	N/A	Complies
An automatically operated transmitter shall cease operation within 5 seconds after activation.	See plots in Figure 14 to Figure 16	Complies
Periodic transmissions at regular predetermined intervals are not permitted.	N/A	Complies
Polling or supervised transmissions to determine system integrity of transmitter used in security or safety applications shall not exceed more than 2 seconds per hour.	See plots in Figure 17	Complies

6.3 Results

JUDGEMENT: Passed

The EUT met the FCC Part 15, Subpart C, Section 15.231(a) specification requirements.

TEST PERSONNEL:

Tester Signature: 

Date: 09.11.08

Typed/Printed Name: A. Sharabi

Periodic Operation

E.U.T Description Radio Device Module With:
 1. Agility Panel, M/N RW132x4t0zzaA
 Type RWRT433R000A
 Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(a)

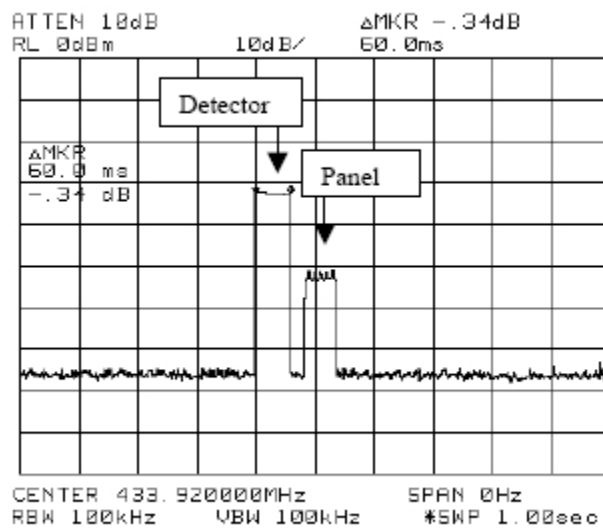


Figure 14. An automatically operated transmission of the RF module (60msec) inside the Detector and automatically operated response from the Panel

Periodic Operation

E.U.T Description Radio Device Module With:
 1. Agility Panel, M/N RW132x4t0zzaA

Type RWRT433R000A

Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(a)

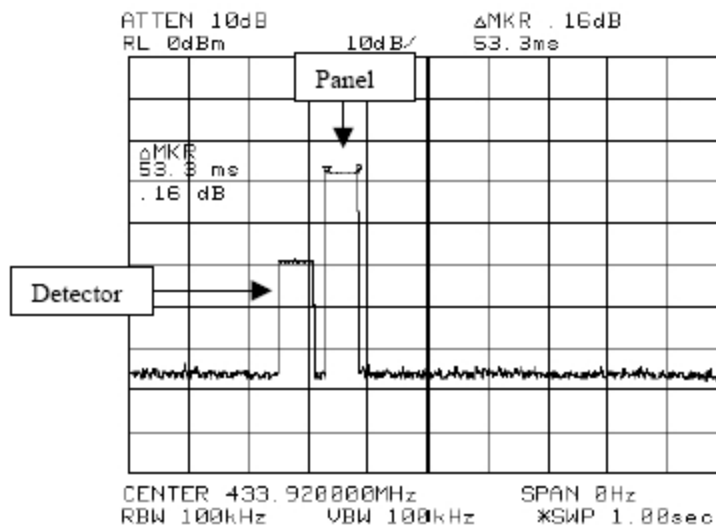


Figure 15. An automatically operated transmission of the RF module inside the Detector and automatically operated response from the Panel (53.3msec)

Periodic Operation

E.U.T Description Radio Device Module With:
 1. Agility Panel, M/N RW132x4t0zzA

Type RWRT433R000A

Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(a)

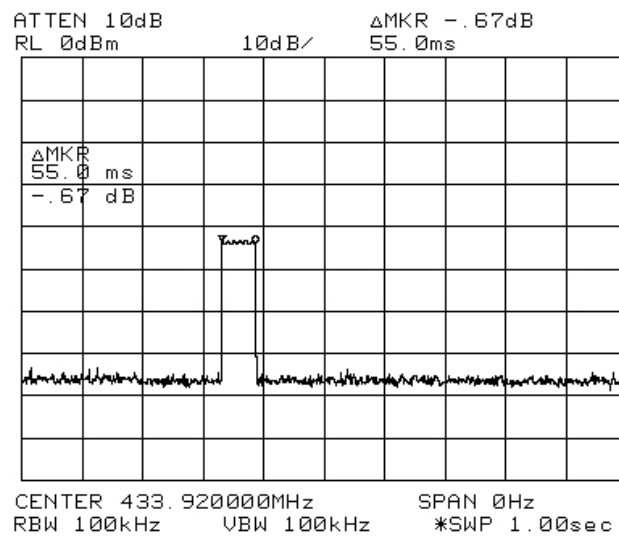


Figure 16. Power failure – No AC Power \ Low battery (55msec)

Periodic Operation

E.U.T Description Radio Device Module With:
 1. Agility Panel, M/N RW132x4t0zzaA
 Type RWRT433R000A
 Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(a)

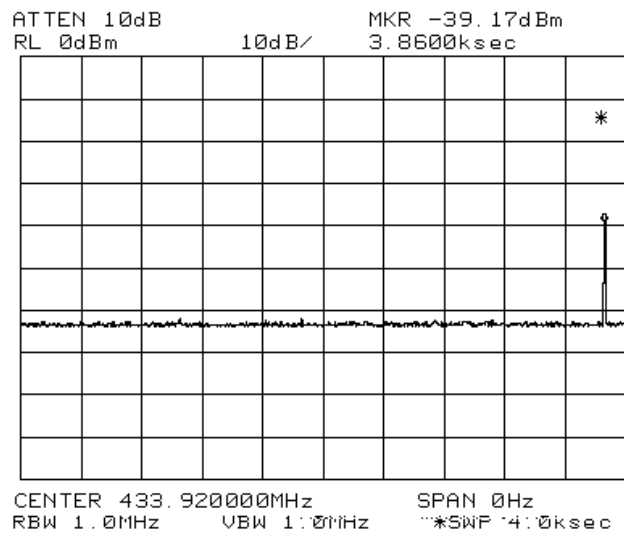


Figure 17. Supervised transmissions to determine system integrity in 4000sec of the RF module (Max 8 times X 60msec = 0.48sec <2sec)

7. Field Strength of Fundamental

7.1 Test Specification

F.C.C., Part 15, Subpart C, Section 15.231(b)

7.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

The E.U.T. was placed on a non-conductive table, 0.8 meters above the O.A.T.S. ground plane.

The EMI receiver was set to the E.U.T. Fundamental Frequency (433.92MHz) and Peak Detection.

The turntable and antenna mast were adjusted for maximum level reading on the EMI receiver.

The measurement was performed for vertical and horizontal polarizations of the test antenna.

The average result is:

Peak Level(dB μ V/m) + E.U.T. Duty Cycle Factor, in 100msec time window (dB)

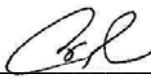
7.3 Measured Data

JUDGEMENT: Passed by 3.4 dB

The EUT met the FCC Part 15, Subpart C, Section 15.231(b) specification requirements.

The details of the highest emissions are given in Figure 18 to Figure 20.

TEST PERSONNEL:

Tester Signature: 

Date: 09.11.08

Typed/Printed Name: A. Sharabi

Field Strength of Fundamental

E.U.T Description Radio Device Module With:
 1. Agility Panel, M/N RW132x4t0zzA

Type RWRT433R000A

Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(b)

Antenna Polarization: Horizontal/Vertical

Test Distance: 3 meters

Detector: Peak

Freq.	Pol.	Peak Amp	Average Factor	AVG Result	AVG Specification	Margin
(MHz)	V/H	(dBμ V/m)	(dB)	(dBμ V/m)	(dBμ V/m)	(dB)
433.92	H	82.7	-6.02	76.7	80.8	-4.1
433.92	V	83.4	-6.02	77.4	80.8	-3.4

Figure 18. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL/VERTICAL. Detector: Peak

Notes:

1. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.
2. "Peak Amp." (dBμ V/m) included the "Correction Factors".
3. "Correction Factors" (dB) = Test Antenna Correction Factor(dB) + Cable Loss.
4. "Average Factor = $20 \log [(burst\ duration/100msec)*Num\ of\ burst\ within\ 100msec]$ = $20 \log [(2/100)*1]$ = -34.0
5. "Average Result" (dBμ V/m) = Peak Amp. (dBμ V/m) + D.C.F. (dB)

Field Strength of Fundamental


E.U.T Description Radio Device Module With:
 1. Agility Panel, M/N RW132x4t0zzA
 Type RWRT433R000A
 Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(b)

Antenna Polarization: Horizontal

Test Distance: 3 meters

Detectors: Peak, Quasi-peak, Average

 13:13:29 SEP 07, 2008

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 433.900 MHz
 82.72 dB μ V/m

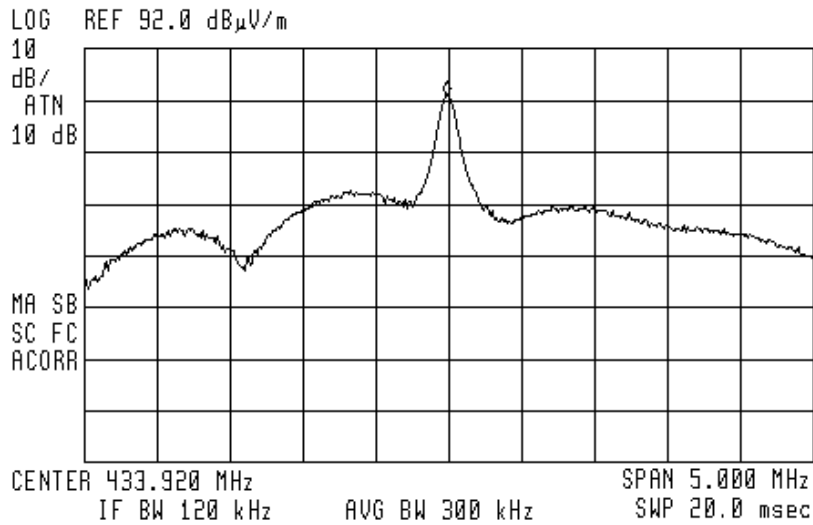


Figure 19. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL. Detectors: Peak, Quasi-peak, Average

Field Strength of Fundamental

E.U.T Description Radio Device Module With:
 1. Agility Panel, M/N RW132x4t0zzaA
 Type RWRT433R000A
 Serial Number: Not Designated

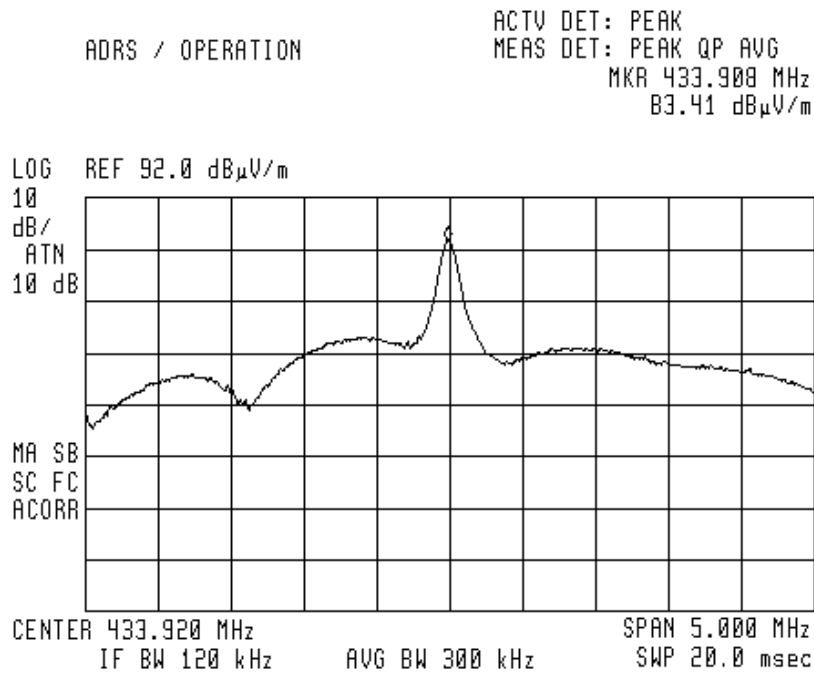
Specification: F.C.C., Part 15, Subpart C, 15.231(b)

Antenna Polarization: Vertical

Test Distance: 3 meters

Detectors: Peak, Quasi-peak, Average

13:10:27 SEP 07, 2008



**Figure 20. Field Strength of Fundamental. Antenna Polarization: VERTICAL.
 Detectors: Peak, Quasi-peak, Average**

7.4 Test Instrumentation Used, Field Strength of Fundamental

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 12, 2007	1 year
RF Section	HP	85420E	3705A00248	November 12, 2007	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 22, 2007	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKG19982	N/A	N/A

8. Radiated Emission, 9 kHz – 4500 MHz

8.1 Test Specification

9 kHz - 4500 MHz, F.C.C., Part 15, Subpart C

8.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3. See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 1. The signals from the list of the highest emissions were verified and the list was updated accordingly.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

The frequency range 9 kHz-4500 MHz was scanned.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 9 kHz-30MHz, the loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter at a distance of 3 meters.

In the frequency range 2.9-4.5 GHz, a spectrum analyzer including a low noise amplifier was used. During peak measurements, the I.F. bandwidth was 1 MHz, and video bandwidth 3 MHz. During average measurements, the I.F. bandwidth was 1 MHz and video bandwidth was 100 Hz.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization. Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.)

The emissions were measured at a distance of 3 meters.

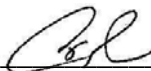
8.3 Test Data

JUDGEMENT: Passed by 16.5 dB

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.
The margin between the emission level and the specification limit is 16.5 dB in the worst case at the frequency of 1301.76 MHz, vertical polarization.

The details of the highest emissions are given in Figure 21 to Figure 22.

TEST PERSONNEL:

Tester Signature: 

Date: 09.11.08

Typed/Printed Name: A. Sharabi

Radiated Emission

E.U.T Description Radio Device Module With:
 1. Agility Panel, M/N RW132x4t0zzA

Type RWRT433R000A

Serial Number: Not Designated

Specification: FCC Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 9 kHz to 4500 MHz
 Antenna: 3 meters distance Detectors: Peak

Frequency (MHz)	Peak Reading (dBμV/m)	Antenna Polarity (H/V)	Peak Specification (dBμV/m)	Margin (dB)
867.83	45.6	H	80.8	-35.2
867.83	43.0	V	80.8	-37.8
1301.76	42.6	H	74.0	-31.4
1301.76	43.7	V	74.0	-30.3

Figure 21. Radiated Emission. Antenna Polarization: HORIZONTAL/VERTICAL. Detectors: Peak

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description Radio Device Module With:
 1. Agility Panel, M/N RW132x4t0zzA

Type RWRT433R000A

Serial Number: Not Designated

Specification: FCC Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 9 kHz to 4500 MHz
 Antenna: 3 meters distance Detectors: Average

Frequency (MHz)	Average Reading (dBμV/m)	Antenna Polarity (H/V)	Average Specification (dBμV/m)	Margin (dB)
867.83	39.6	H	60.8	-21.2
867.83	37.0	V	60.8	-23.8
1301.76	36.6	H	54.0	-17.4
1301.76	37.5	V	54.0	-16.5

**Figure 22. Radiated Emission. Antenna Polarization: VERTICAL.
 Detectors: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

8.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 12, 2007	1 year
RF Section	HP	85420E	3705A00248	November 12, 2007	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS- 0411N313	013	November 2, 2007	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	March 5, 2008	1 Year
Active Loop Antenna	EMCO	6502	9506-2950	October 15, 2008	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	March 23, 2008	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 22, 2007	1 year
Antenna-Log Periodic	A.H.System	SAS-200/511	253	February 4, 2007	2 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKG19982	N/A	N/A

9. Bandwidth

9.1 Test procedure

The transmitter unit operated with normal modulation. The spectrum analyzer was set to 30 kHz resolution BW and center frequency of the transmitter fundamental. The spectrum bandwidth of the transmitter unit was measured and recorded. The BW was measured at 20 dBc points.

The EUT was set up as shown in Figure 1, and its proper operation was checked. The transmitter occupied bandwidth was measured with the EMI receiver as frequency delta between reference points on the modulation envelope.

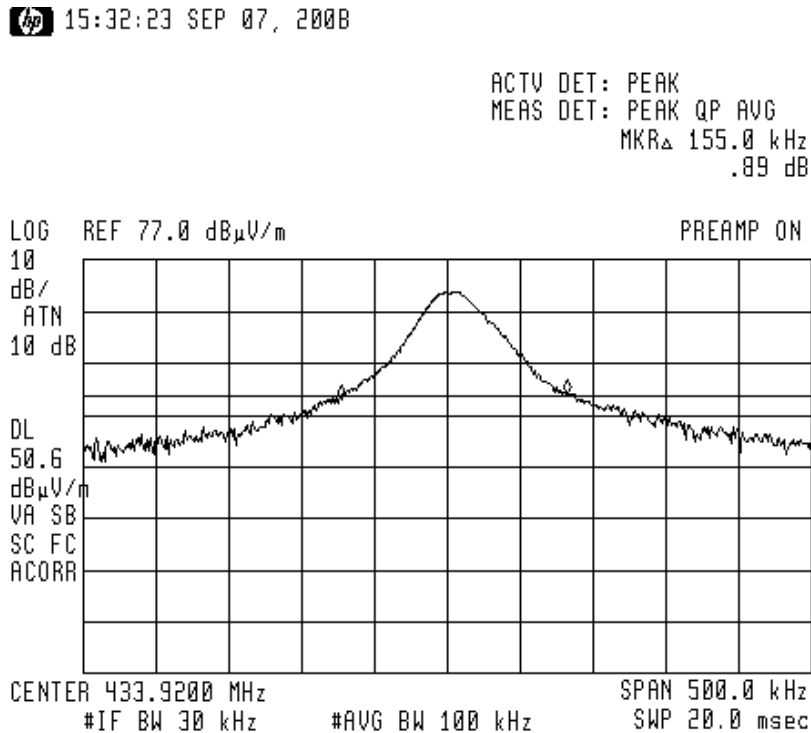


Figure 23 Bandwidth

9.2 Results table

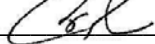
E.U.T Description: Radio Device Module With:
 1. Agility Panel, M/N RW132x4t0zzA
 Model: RWRT433R000A
 Serial Number: Not Designated
 Specification: F.C.C. Part 15, Subpart C: (15.231(c))

Bandwidth Reading (kHz)	Specification (1) (kHz)	Margin (kHz)
155.0	1084.8	-929.8

Figure 24 Bandwidth

JUDGEMENT: Passed by 929.8 kHz

TEST PERSONNEL:

Tester Signature: 

Date: 09.11.08

Typed/Printed Name: A. Sharabi

(1) 0.25% of the E.U.T. fundamental frequency, Section 15.231(c).

9.3 Test Equipment Used.

Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 12, 2007	1 year
RF Section	HP	85420E	3705A00248	November 12, 2007	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 22, 2007	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKG19982	N/A	N/A

Figure 25 Test Equipment Used

10. 11. APPENDIX A - CORRECTION FACTORS

10.1 Correction factors for CABLE from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)	FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3	1200.0	7.3
20.0	0.6	1400.0	7.8
30.0	0.8	1600.0	8.4
40.0	0.9	1800.0	9.1
50.0	1.1	2000.0	9.9
60.0	1.2	2300.0	11.2
70.0	1.3	2600.0	12.2
80.0	1.4	2900.0	13.0
90.0	1.6		
100.0	1.7		
150.0	2.0		
200.0	2.3		
250.0	2.7		
300.0	3.1		
350.0	3.4		
400.0	3.7		
450.0	4.0		
500.0	4.3		
600.0	4.7		
700.0	5.3		
800.0	5.9		
900.0	6.3		
1000.0	6.7		

NOTES:

1. The cable type is RG-214.
2. The overall length of the cable is 27 meters.
3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".

10.2 Correction factors for CABLE
from spectrum analyzer
to test antenna above 2.9 GHz

FREQUENCY (GHz)	CORRECTION FACTOR (dB)	FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.9	14.0	9.1
2.0	2.7	15.0	9.5
3.0	3.5	16.0	9.9
4.0	4.2	17.0	10.2
5.0	4.9	18.0	10.4
6.0	5.5	19.0	10.7
7.0	6.0	20.0	10.9
8.0	6.5	21.0	11.2
9.0	7.0	22.0	11.6
10.0	7.5	23.0	11.9
11.0	7.9	24.0	12.3
12.0	8.3	25.0	12.6
13.0	8.7	26.0	13.0

NOTES:

1. The cable type is *SUCOFLEX 104 E* manufactured by *SUHNER*.
2. The cable is used for measurements above 2.9 GHz.
3. The overall length of the cable is 10 meters.

12.6 Correction factors for LOG PERIODIC ANTENNA

**Type LPD 2010/A
at 3 and 10 meter ranges.**

Distance of 3 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.1
250.0	10.2
300.0	12.5
400.0	15.4
500.0	16.1
600.0	19.2
700.0	19.4
800.0	19.9
900.0	21.2
1000.0	23.5

Distance of 10 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.0
250.0	10.1
300.0	11.8
400.0	15.3
500.0	15.6
600.0	18.7
700.0	19.1
800.0	20.2
900.0	21.1
1000.0	23.2

NOTES:

1. Antenna serial number is 1038.
2. The above lists are located in file number 38M30.ANT for a 3 meter range,
and file number 38M100.ANT for a 10 meter range.
3. The files mentioned above are located on the disk marked "Radiated Emission
Test EMI Receiver".

10.3 Correction factors for

LOG PERIODIC ANTENNA

**Type SAS-200/511
at 3 meter range.**

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
1.0	24.9
1.5	27.8
2.0	29.9
2.5	31.2
3.0	32.8
3.5	33.6
4.0	34.3
4.5	35.2
5.0	36.2
5.5	36.7
6.0	37.2
6.5	38.1

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
7.0	38.6
7.5	39.2
8.0	39.9
8.5	40.4
9.0	40.8
9.5	41.1
10.0	41.7
10.5	42.4
11.0	42.5
11.5	43.1
12.0	43.4
12.5	44.4
13.0	44.6

NOTES:

1. Antenna serial number is 253.
2. The above lists are located in file number SAS3M0.ANT for a 3 meter range.
3. The files mentioned above are located on the disk marked "Antenna Factors".

**10.4 Correction factors for BICONICAL ANTENNA
Type BCD-235/B,
at 3 meter range**

FREQUENCY (MHz)	AFE (dB/m)
20.0	19.4
30.0	14.8
40.0	11.9
50.0	10.2
60.0	9.1
70.0	8.5
80.0	8.9
90.0	9.6
100.0	10.3
110.0	11.0
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13.0
180.0	13.5
190.0	14.0
200.0	14.8
210.0	15.3
220.0	15.8
230.0	16.2
240.0	16.6
250.0	17.6
260.0	18.2
270.0	18.4
280.0	18.7
290.0	19.2
300.0	19.9
310	20.7
320	21.9
330	23.4
340	25.1
350	27.0

NOTES:

1. Antenna serial number is 1041.
2. The above list is located in file 19BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

10.5 Correction factors for ACTIVE LOOP ANTENNA
Model 6502
S/N 9506-2950

FREQUENCY (MHz)	Magnetic Antenna Factor (dB)	Electric Antenna Factor (dB)
.009	-35.1	16.4
.010	-35.7	15.8
.020	-38.5	13.0
.050	-39.6	11.9
.075	-39.8	11.8
.100	-40.0	11.6
.150	-40.0	11.5
.250	-40.0	11.6
.500	-40.0	11.5
.750	-40.1	11.5
1.000	-39.9	11.7
2.000	-39.5	12.0
3.000	-39.4	12.1
4.000	-39.7	11.9
5.000	-39.7	11.8
10.000	40.2	11.3
15.000	-40.7	10.8
20.000	-40.5	11.0
25.000	-41.3	10.2
30.000	42.3	9.2

11. APPENDIX B – Comparison of Industry Canada Requirements With FCC Requirements

FCC Specification	FCC Standard	IC Standard
Spurious Emissions Transmission Mode	47CFR15.231(b)	RSS-210 Section 2.6 Annex 1 A1.1.2
Maximum Transmitting Power	47CFR15.231(b)	RSS-210 Section 2.6 Annex 1 A1.1.2
Periodic Operation Requirement	47CFR15.231(a)(1-5)	RSS-210 Section 2.6 Annex 1 A1.1.1
Occupied Bandwidth	47CFR15.231(c)	RSS-210 Section 2.6 Annex 1 A1.1.3