



DATE: 10 January 2012

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

FCC Radio Test Report

for

Visonic Ltd.

Equipment under test:

PowerCode Magnetic Contact Transmitter

MCT-332 (315 MHz)

MCT-330 (315 MHz)*

* See customer's declaration on page 6.

Written by:

D. Shidlowsky, Documentation

Approved by:

A. Moses, Test Engineer

Approved by:

I. Raz, EMC Laboratory Manager

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This report relates only to items tested.



Measurement/Technical Report for Visonic Ltd.

PowerCode Magnetic Contact Transmitter

MCT-332 (315 MHz)

MCT-330 (315 MHz)*

* See customer's declaration on page 6.

FCC ID: WP3MC332

IC: 1467C-MC332

This report concerns:	Original Grant:	x
	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:

Ishaihou Raz
ITL (Product Testing) Ltd.
Kfar Bin Nun
D.N. Shimshon 99780
Israel
e-mail Sraz@itl.co.il

Applicant for this device:
(different from "prepared by")

Arik Elshtein
Visonic Ltd.
24 Habarzel St.
Tel-Aviv 69710
Israel
Tel: +972-3-645-6789
Fax: +972-3-645-6788
e-mail: aelshtein@visonic.com



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1. General Information

1.1 Administrative Information

Manufacturer:	Visonic Ltd.
Manufacturer's Address:	24 Habarzel St. Tel-Aviv 69710 Israel Tel: +972-3-645-6789 Fax: +972-3-645-6788
Manufacturer's Representative:	Arick Elshtein
Equipment Under Test (E.U.T):	PowerCode Magnetic Contact Transmitter
Equipment Model No.:	MCT-332 (315 MHz), MCT-330 (315 MHz)*
Equipment Serial No.:	Not Designated
Date of Receipt of E.U.T:	27.11.11
Start of Test:	27.11.11
End of Test:	28.11.11
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Part 15 Sub-part C, Section 15.231

* See customer's declaration on following page.



Declaration

Date: 05 July 2011

I hereby declare that the MCT-332 is a full configuration model.
Another model, MCT-330 differs from the MCT-332 only by an extracted reed switch.
The MCT-332 contains two reed switches and the MCT-330 contains only one reed switch.
Please relate to them all (from an EMC point of view) as the same product.

Thank you,

Arick Elshtein
International Certification Manager
Visonic Ltd.

Head Office



24 Habarzel Street, Tel Aviv, 69710, Israel
Postal Address: P.O.B 22020, Tel Aviv, 61220



Tel: 972 3 6456789
Fax: 972 3 6456788



www.visonic.com



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), IC File No.: 46405-4025; Site No. IC 4025B-1.
6. TUV Product Services, England, ASLLAS No. 97201.

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

The MCT-330/MCT-332 is a fully supervised, PowerCode magnetic contact transmitter, for use with PowerCode products. The transmitter includes a built-in reed switch (that opens upon removal of a magnet placed near it).

MCT-332 is similar to MCT-330 but has 2 internal reed switches and 2 external magnets, for use with a door/window with 2 movable parts. One of the MCT-332 reed switches / magnets can be disabled – for use with door/window that has 1 movable part.

The magnet switch has a unique 24-bit PowerCode ID, selected in the factory, from over 16 million possible code combinations.

Since messages transmitted by the MCT-330/MCT-332 might collide with transmissions from other PowerCode transmitters, a "smart" anti-collision transmission sequence is used.

The MCT-330/MCT-332 tamper switch is activated when the cover is removed or when the detector is removed from the wall.

A periodic supervision message is transmitted automatically. The target receiver is thus informed, at regular intervals, of the unit's active participation in the system.

An LED lights whenever alarm or tamper events are reported. The LED light can be disabled if desired. The LED does not light while a supervision message is being transmitted.

Operating power is obtained from an on-board 3 V Lithium battery. When the battery voltage is low, a "low battery" message is sent to the receiver.

The E.U.T operates at 315 MHz.

1.4 Test Methodology

Radiated testing was 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 September 3, 2009).

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

1.6 Measurement Uncertainty

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site 30-1000 MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 4.96 dB

2. System Test Configuration

2.1 *Justification*

Testing was performed in normal installation position.

2.2 *Special Accessories*

No special accessories were needed.

2.3 *Equipment Modifications*

No modifications were needed in order to achieve compliance

2.4 *Configuration of Tested System*

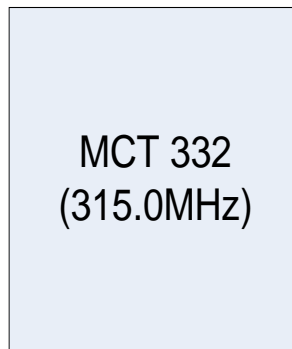


Figure 1. Configuration of Tested System

3. Radiated Measurement Test Set-up Photos



Figure 2. Radiated Emission Test

4. Average Factor Calculation

1. Burst duration = 295msec
2. Time between bursts = 860msec
3. Pulse duration = 800usec.
4. pulse period = 1200usec
5. Average Factor = $20 \log \left[\frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{burst duration}}{100\text{msec}} \times \text{Num of burst within 100msec} \right]$

Duty cycle when '0' bit was sent, was the worst case.

$$\text{Average Factor} = 20 \log \left[\frac{800}{1200} \times \frac{100}{100} \right] = -3.52\text{dB}$$

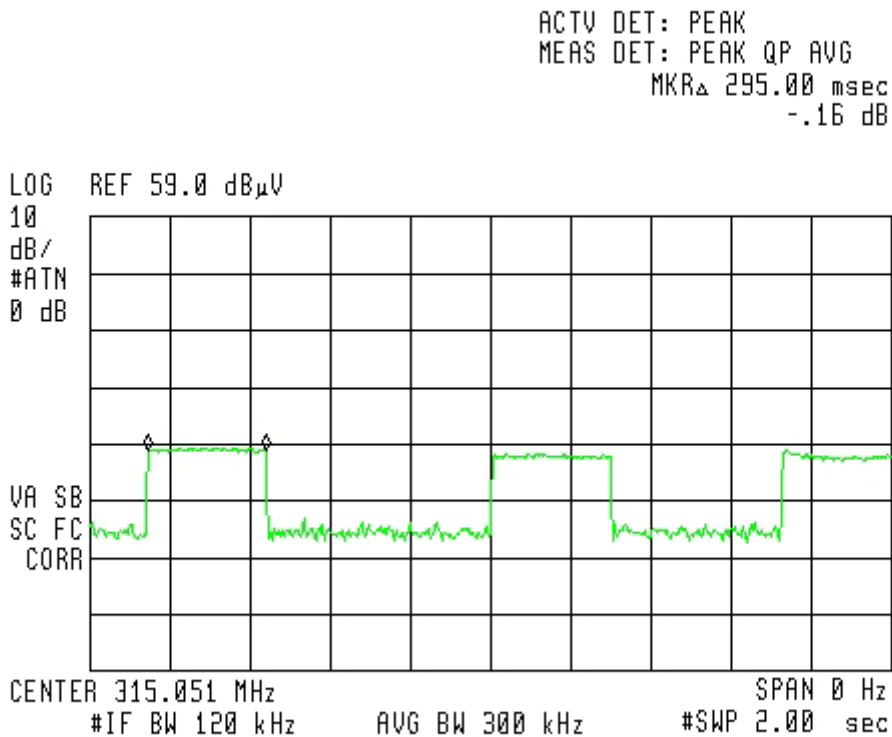


Figure 3. Burst Duration = 295 msec



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR Δ 860.00 msec
-1.72 dB

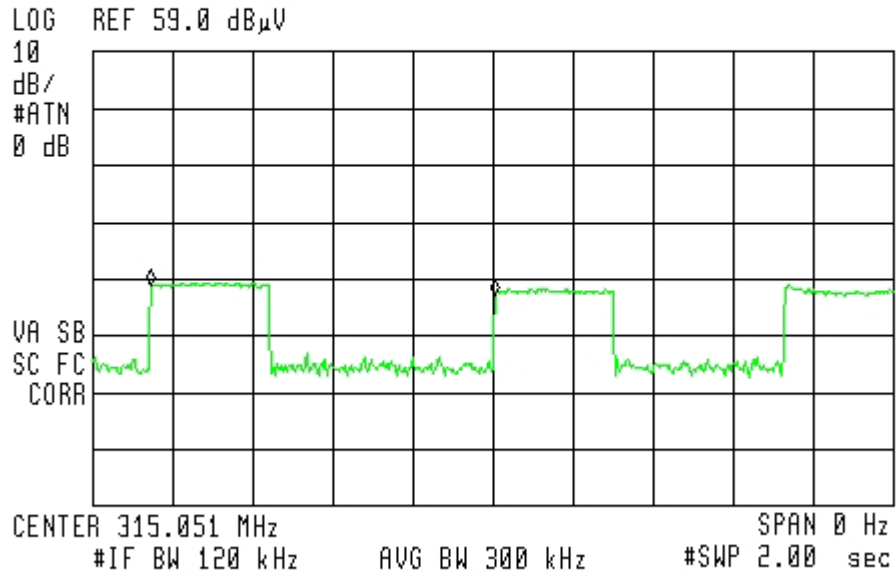
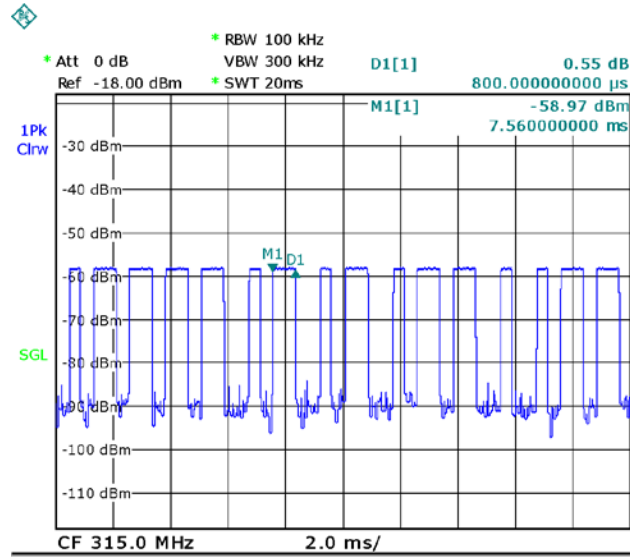
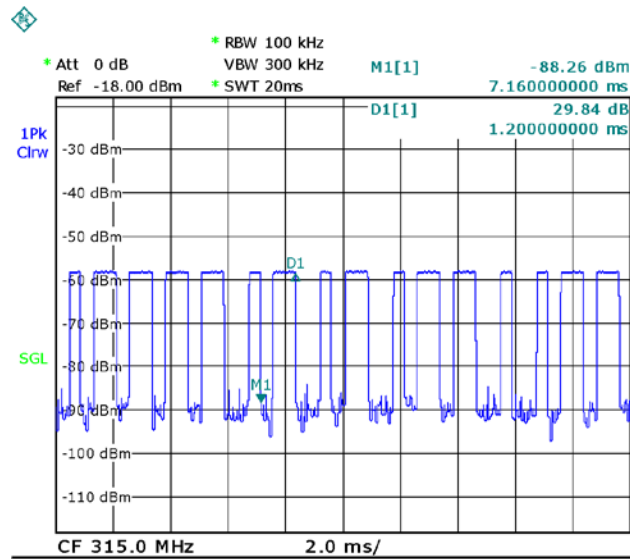


Figure 4. Number of Transmissions Within 100msec

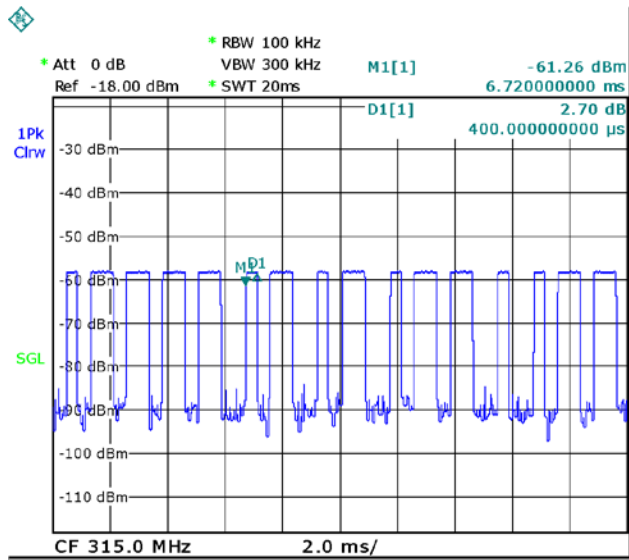


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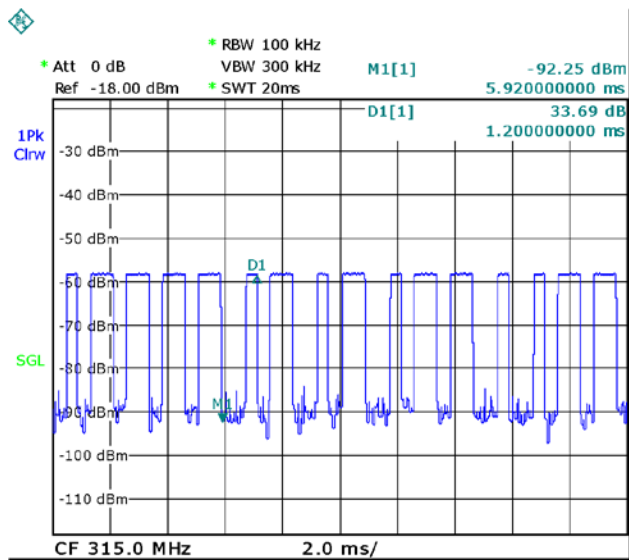


Date: 27.NOV.2011 14:04:20

Figure 5. Duty Cycle When '0' bit was Sent



Date: 27.NOV.2011 14:01:47



Date: 27.NOV.2011 14:02:48

Figure 6. Duty Cycle When '1' bit was Sent



1.1 Test Instrumentation Used

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 21, 2011	1 Year
EMI Receiver	Rohde & Schwarz	ESCI7	100724	October 30, 2011	1 Year
Antenna Bioconical	ETS	3109	3244	August 1, 2011	1 Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 29, 2011	1 Year
Antenna-Log Periodic	A.H.System	SAS-200/511	253	January 27, 2011	2 Years
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



5. Periodic Operation

5.1 Specification

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

5.2 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 Figure 7 to Figure 8.	Complies
Periodic transmissions at regular predetermined intervals are not permitted.	N/A	Complies
<p>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.</p> <p>The E.U.T. supervised transmissions are every 13 minutes. Therefore the supervised transmission time per hour is $5 \times 295 \text{ msec} = 1475 \text{ msec} = 1.475 \text{ sec} < 2 \text{ sec}$.</p>	See Figure 9 to Figure 10.	Complies

5.3 Results

JUDGEMENT: Passed

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

TEST PERSONNEL:

Tester Signature: 

Date: 11.01.12

Typed/Printed Name: A. Moses

Periodic Operation

E.U.T Description PowerCode Magnetic Contact
 Transmitter
Type MCT-332 (315 MHz)
Serial Number: Not Designated

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

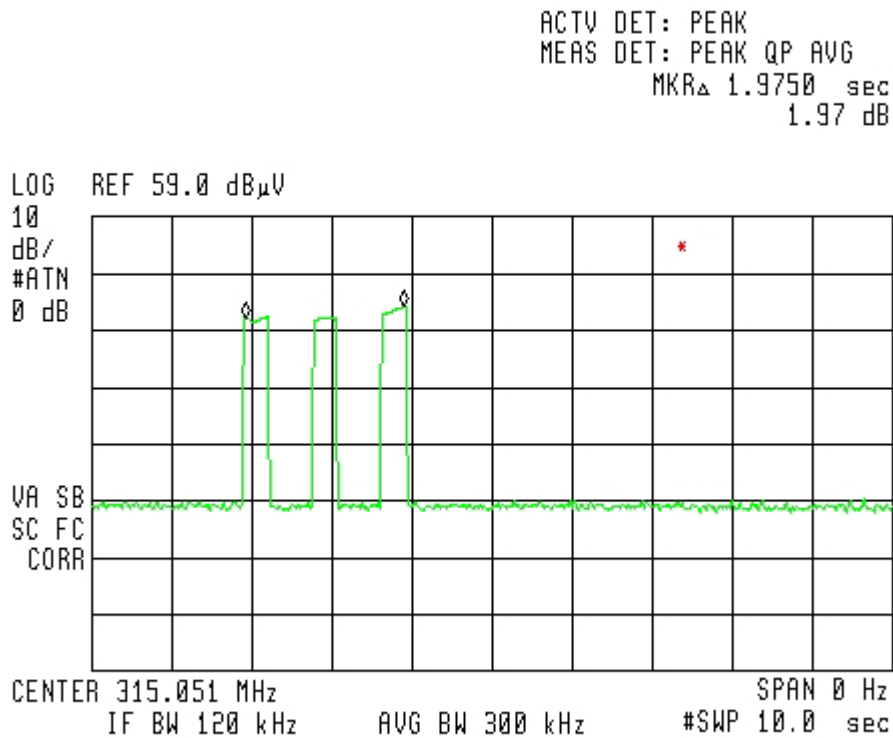
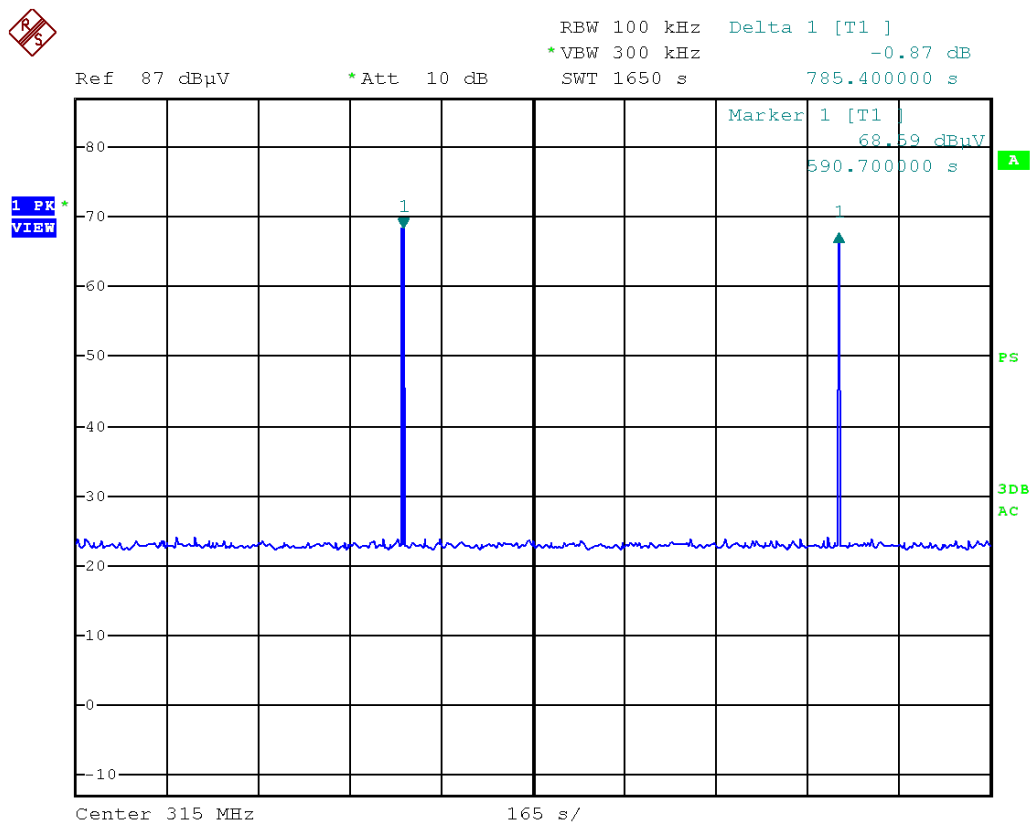


Figure 8 Configuration When Tamper is Open is ON, Within 5sec

Periodic Operation

E.U.T Description PowerCode Magnetic Contact
 Transmitter
Type MCT-332 (315 MHz)
Serial Number: Not Designated

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



Date: 25.DEC.2011 12:49:24

Figure 10 Supervision Signal Once Every 13 minutes
[(3600/X)msec=<2sec



5.1 Test Instrumentation Used

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 23, 2011	1 Year
RF Section	HP	85420E	3705A00248	November 23, 2011	1 Year
EMI Receiver	Rohde & Schwarz	ESCI7	100724	October 30, 2011	1 Year



6. Field Strength of Fundamental

6.1 Test Specification

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

6.2 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 (315 MHz) 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)

6.3 Measured Data

JUDGEMENT: Passed by 4.74 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 11 to Figure 13.

TEST PERSONNEL:

Tester Signature: 

Date: 11.01.12

Typed/Printed Name: A. Moses



Field Strength of Fundamental

E.U.T Description PowerCode Magnetic Contact
 Transmitter
Type MCT-332 (315 MHz)
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. (MHz)	Pol. V/H	Peak Reading (dBμV/m)	Average Factor (dB)	AVG Result (dBμV/m)	AVG Specification (dBμV/m)	Margin (dB)
315.03	V	74.4	-3.52	70.88	75.62	-4.74
315.03	H	66.1	-3.52	62.58	75.62	-13.04

Figure 11. 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 Reading." (dBμV/m) included the "Correction Factors".
3. "Correction Factors" (dB) = Test Antenna Correction Factor(dB) + Cable Loss.
4. "Average Result" (dBμV/m)=Peak Reading (dBμV/m)+ Average Factor (dB)

Field Strength of Fundamental

E.U.T Description PowerCode Magnetic Contact
 Transmitter
Type MCT-332 (315 MHz)
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

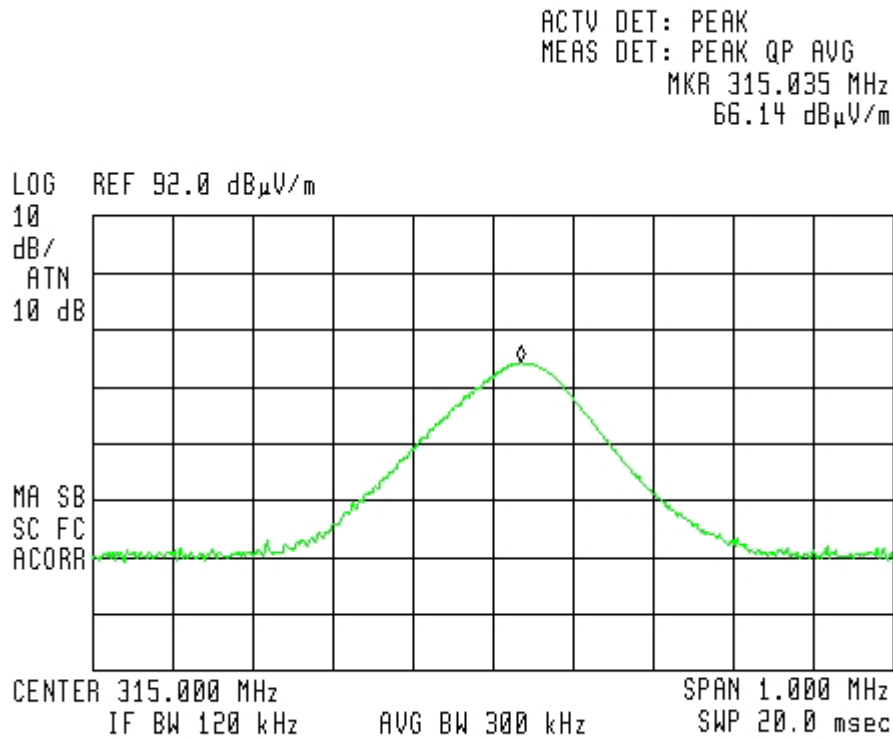


Figure 12. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL.

Detectors: Peak, Quasi-peak, Average

Field Strength of Fundamental

E.U.T Description PowerCode Magnetic Contact
 Transmitter
Type MCT-332 (315 MHz)
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



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 315.035 MHz
74.41 dB μ V/m

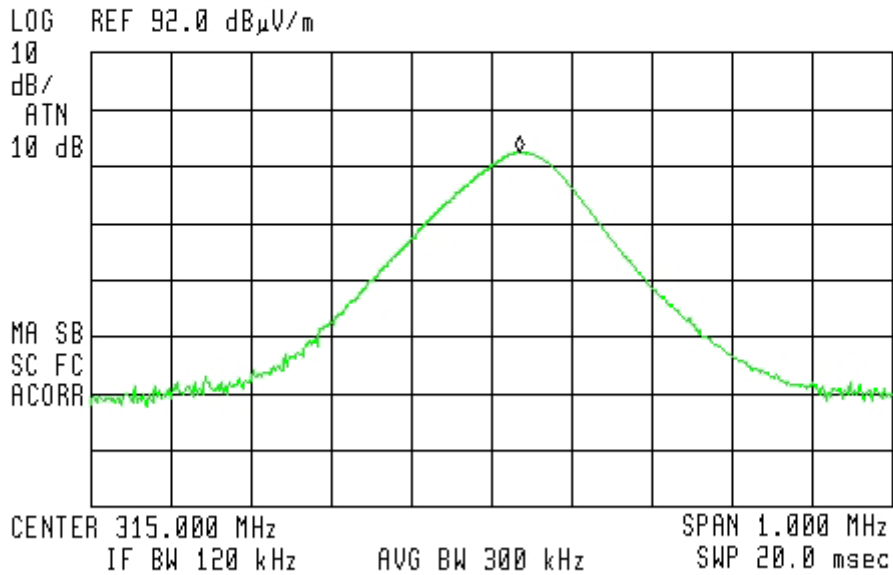


Figure 13. Field Strength of Fundamental. Antenna Polarization: VERTICAL.

Detectors: Peak, Quasi-peak, Average



6.4 Test Instrumentation Used, Field Strength of Fundamental

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 23, 2011	1 Year
RF Section	HP	85420E	3705A00248	November 23, 2011	1 Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 29, 2011	1 Year
Antenna Mast	ARA	AAM-4A	1001	1001	N/A
Turntable	ARA	ART-1001/4	1001	1001	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	1001	N/A
Printer	HP	LaserJet 2200	JPKG19982	JPKG19982	N/A



7. Radiated Emission, 9 kHz – 30 MHz

7.1 Test Specification

9 kHz-30 MHz, FCC, Part 15, Subpart C, Section 209

7.2 Test Procedure

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

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 3.1.

The frequency range 9 kHz-30 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.

The E.U.T. was operated at the frequency of 315MHz. This frequency was measured using a peak detector.

7.3 Measured Data

JUDGEMENT: Passed

The EUT was tested and it met the requirements of the FCC Part 15, Subpart C, specification.

No signals were detected in frequency range of 9 kHz-30 MHz

TEST PERSONNEL:

Tester Signature: 

Date: 11.01.12

Typed/Printed Name: A. Moses



1.2 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 23, 2011	1 Year
RF Section	HP	85420E	3705A00248	November 23, 2011	1 Year
Active Loop Antenna	EMCO	6502	9506-2950	October 19, 2011	1 Year
Antenna Mast	ARA	AAM-4A	1001	1001	N/A
Turntable	ARA	ART-1001/4	1001	1001	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	1001	N/A

7.4 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$FS = RA + AF + CF$$

FS: Field Strength [dB μ v/m]
RA: Receiver Amplitude [dB μ v]
AF: Receiving Antenna Correction Factor [dB/m]
CF: Cable Attenuation Factor [dB]

No external pre-amplifiers are used.

8. Spurious Radiated Emission

8.1 Test Specification

30 - 3500 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 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 2.9 –3.5 GHz, a spectrum analyzer including a low noise amplifier was used. The test distance was 3 meters. 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 4.5dB

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 was 4.5dB in the worst case at the frequency of 2205.22 MHz, vertical polarization.

TEST PERSONNEL:

Tester Signature: 

Date: 11.01.12

Typed/Printed Name: A. Moses



Radiated Emission

E.U.T Description PowerCode Magnetic Contact Transmitter
Type MCT-332 (315 MHz)
Serial Number: Not Designated

Specification: FCC Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 30 MHz to 3500 MHz
Antenna: 3 meters distance Detectors: Peak, Quasi-peak

Frequency (MHz)	Peak Amp (dBμV/m)	Avg Factor	Avg Amp (dBμV/m)	Antenna Polarity (H/V)	Specificatio n (dBμV/m)	Margin (dB)
630.08	40.83	-3.52	37.31	V	55.62	-18.31
630.08	37.98	-3.52	34.46	H	55.62	-20.74
945.11	50.30	-3.52	46.78	V	55.62	-8.84
945.11	43.00	-3.52	39.8	H	55.62	-16.14
1260.11	46.00	-3.52	42.48	H	55.62	-13.14
1260.11	50.91	-3.52	47.39	V	55.62	-8.23
1575.11	44.60	-3.52	41.08	H	55.62	-14.54
1575.11	48.80	-3.52	45.28	V	55.62	-10.34
2205.22	54.64	-3.52	51.12	V	55.62	-4.5
2205.22	53.25	-3.52	49.73	H	55.62	-5.89
2520.25	53.30	-3.52	49.78	V	55.62	-5.84
2520.25	51.70	-3.52	48.18	H	55.62	-7.44

**Figure 14. Radiated Emission. Antenna Polarization: VERTICAL.
Detectors: Peak,Avg**

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 Reading." (dBμV/m) included the "Correction Factors".
3. "Correction Factors" (dB) = Test Antenna Correction Factor(dB) + Cable Loss.
4. "Average Result" (dBμV/m)=Peak Reading (dBμV/m)+ Average Factor (dB)



8.4 Test Instrumentation Used, Radiated Measurements

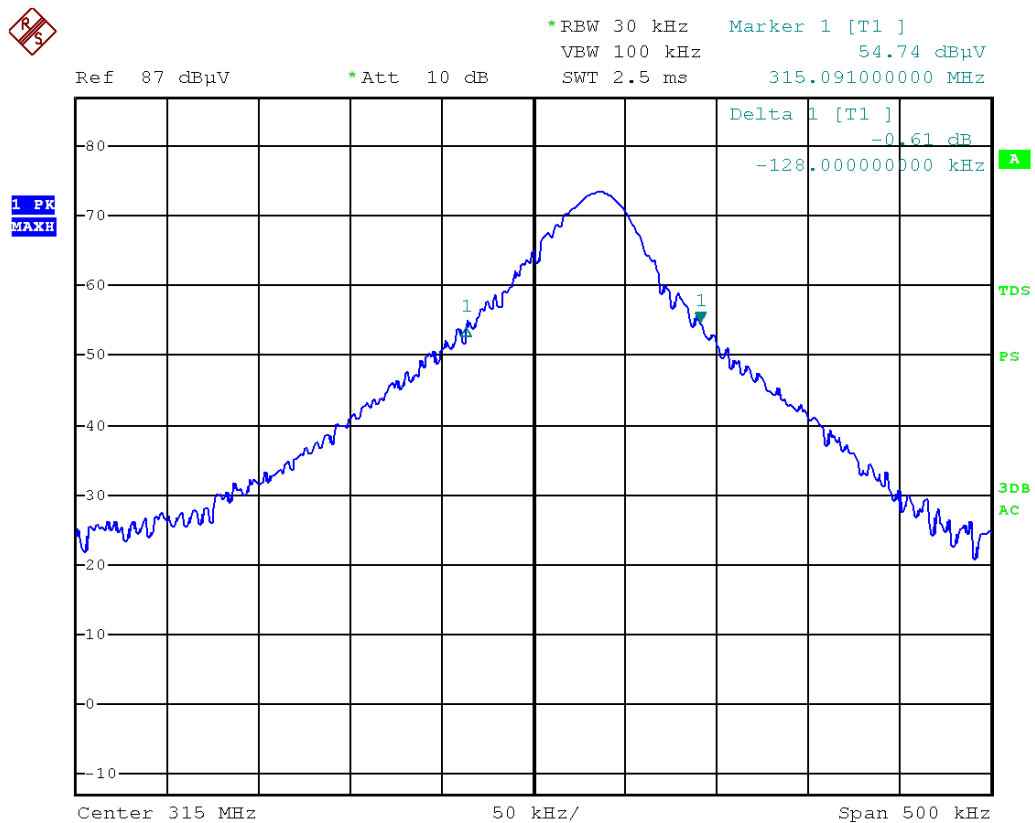
Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 23, 2011	1 Year
RF Section	HP	85420E	3705A00248	November 23, 2011	1 Year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS- 0411N313	013	November 5, 2011	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 21, 2011	1 Year
Antenna Bioconical	ETS	3109	002-3244	August 1, 2011	1 Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 29, 2011	1 Year
Antenna-Log Periodic	A.H.System	SAS-200/511	253	January 27, 2011	2 Years
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 20Bc 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.



Date: 1.DEC.2011 09:12:57

Figure 15 Bandwidth



9.2 Results table

E.U.T Description: PowerCode Magnetic Contact Transmitter
Model: MCT-332 (315 MHz)
Serial Number: Not Designated
Specification: F.C.C. Part 15, Subpart C: (15.231(c))

Bandwidth Reading (kHz)	Specification (kHz)	Margin (kHz)
128	787.5	-659.5

Figure 16 Bandwidth

JUDGEMENT: Passed by 659.5kHz

TEST PERSONNEL:

Tester Signature: 

Date: 11.01.12

Typed/Printed Name: A. Moses

(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	Rohde & Schwarz	ESCI7	100724	October 30, 2011	1 Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 29, 2011	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 17 Test Equipment Used

10. 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 EMI receiver
to test antenna
at 3 meter range.

FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

- 1. The cable type is RG-8.*
- 2. The overall length of the cable is 10 meters.*

10.3 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.



10.4 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".



10.5 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".*



10.6 Correction factors for BICONICAL ANTENNA

**Type 3109,
at 3 meter range**

FREQUENCY (MHz)	AFE (dB/m)
30.0	13.3
40.0	12.7
50.0	11.0
60.0	9.2
70.0	10.0
80.0	7.2
90.0	7.9
100.0	9.4
120.0	11.9
140.0	13.1
160.0	12.3
180.0	12.4
200.0	14.8
250.0	15.3
300.0	17.9

NOTE:

1. Antenna serial number is 002-3244.



10.7 Correction factors for Double-Ridged Waveguide Horn

**Model: 3115, S/N 29845
at 3 meter range.**

FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)	FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)
1.0	24.8	5.4	10.0	38.8	11.4
1.5	26.1	7.6	10.5	38.9	11.8
2.0	28.6	7.7	11.0	39.0	12.1
2.5	29.8	8.4	11.5	39.6	11.8
3.0	31.4	8.4	12.0	39.8	12.0
3.5	32.4	8.7	12.5	39.6	12.5
4.0	33.7	8.6	13.0	40.0	12.5
4.5	33.4	9.9	13.5	39.8	13.0
5.0	34.5	9.7	14.0	40.2	13.0
5.5	35.1	9.9	14.5	40.6	12.9
6.0	35.4	10.4	15.0	41.3	12.4
6.5	35.6	10.8	15.5	39.5	14.6
7.0	36.2	10.9	16.0	38.8	15.5
7.5	37.3	10.4	16.5	40.0	14.6
8.0	37.7	10.6	17.0	41.4	13.4
8.5	38.3	10.5	17.5	44.8	10.3
9.0	38.5	10.8	18.0	47.2	8.1
9.5	38.7	11.1			



10.8 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. Comparison requirements FCC with Industry Canada

FCC Specification	According FCC Standard	IC Standard
Periodic Operation	FCC Part 15.231 (a)(1-5)	RSS- 210 Issue 8 Section 2.5 Annex 1, A1.1.1
Field Strength at Fundamental	FCC Part 15.231 (b)	RSS- 210 Issue 8 Annex 1 A1.1.2, Section 2.5
Spurious Emissions	FCC Part 15.231 (b)	RSS GEN Issue 3 7.2.2(Table3)
Bandwidth	FCC Part 15.231 (c)	RSS- 210 Issue 8 Section 2.5 Annex 1 A1.1.3