



DATE: 14 August 2013

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

FCC Radio Test Report

for

AeroScout Ltd.

Equipment under test:

Hugs Wi-Fi Tag Charger

CGS-HGS-1000

Written by:

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Approved by:

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Approved by:

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This report relates only to items tested.



Measurement/Technical Report for AeroScout Ltd.

Hugs Wi-Fi Tag Charger

CGS-HGS-1000

FCC ID: Q3HCGSHGS1000

IC: 5115A-CGSHGS1000

This report concerns:

Original Grant: X

Class I change:

Class II change:

Equipment Type:

Part 15 Low Power Transmitter
Below 1705 kHz

Limits used:

47CFR15 Section 15.209

47CFR15 Section 15.207

Application for Certification
prepared by:

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

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1. General Information

1.1 Administrative Information

Manufacturer:	AeroScout Ltd.
Manufacturer's Address:	3 Pekeris St. Einstein Entrance 4th Floor Rehovot 76702 Israel Tel: +972-8-9369393 Fax: +972-8-9365977
Manufacturer's Representative:	Dadi Matza
Equipment Under Test (E.U.T):	Hugs Wi-Fi Tag Charger
Equipment Model No.:	CGS-HGS-1000
Equipment Serial No.:	Not Designated
Date of Receipt of E.U.T:	02.07.13
Start of Test:	02.07.13
End of Test:	05.07.13
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Part 15 Subpart C RSS-210, Issue 8, 2010



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 primary purpose of the Hugs Wi-Fi Tag Charger is to charge the Hugs tag batteries. A flashing low battery LED on the back of the Hugs tag indicates that the Hugs tag needs to be recharged. Unit incorporates a 125KHz on board transmitter and a modular approval FCC ID Q3HTAG1200.

- Supports charging of 24 tags simultaneously.

1.4 Test Methodology

Both conducted and 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 06, 2009).

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

1.6 Measurement Uncertainty

Radiated Emission

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

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

± 4.96 dB

Conducted Emission

Conducted Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)

0.15 – 30 MHz:

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

± 3.44 dB

2. System Test Configuration

2.1 Justification

Unit was tested at worst case installation position as desktop device, transmitting continuously, after screening both possible installation orientations: desktop and wall mounted.

2.1 Special Accessories

No special accessories were needed to achieve compliance.

2.2 Equipment Modifications

No equipment modifications were required to achieve compliance.

2.3 Configuration of Tested System

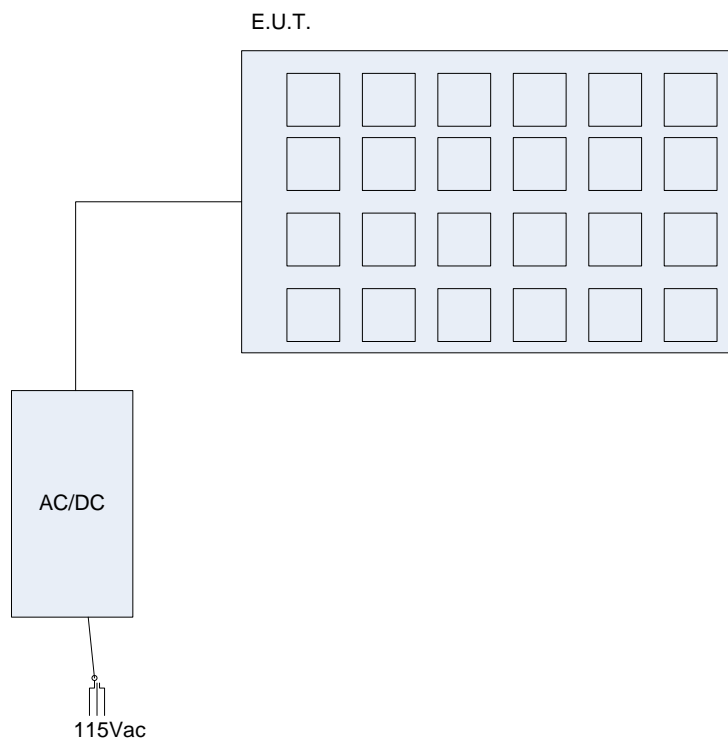


Figure 1. Configuration of Tested System

3. Test Set-up Photos



Figure 2. Conducted Emission



Figure 3. Radiated Emission Test 9 kHz – 30 MHz



Figure 4. Radiated Emission Test 30 -1000 MHz

4. Conducted Emission From AC Ports

4.1 Test Specification

F.C.C., Part 15, Subpart C, 15.207

4.2 Test Procedure

The E.U.T operation mode and test setup are as described in Section 4.1. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room (see Section 3), with the E.U.T placed on a 0.4 meter high wooden table. In the case of a floor-standing E.U.T., it was placed on the horizontal ground plane.

The E.U.T was powered from 115 V AC / 60 Hz via 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.'s 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 effect of varying the position of the cables was investigated to find the configuration that produces maximum emission. The configuration tested is shown in the photograph, *Figure 2*.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are pre-loaded to the receiver 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, using peak detection.

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



4.3 Test Results

The E.U.T met the requirements of the FCC Part 15, Subpart C, 15.207 specifications.

The margin between the emission levels and the specification limit is, in the worst case, 15.36dB for the phase line at 0.19MHz and 14.47dB at 0.19MHz for the neutral line.

The details of the highest emissions are given in *Figure 5* to *Figure 8*.

TEST PERSONNEL:

Tester Signature: _____

Date: 01.09.13

Typed/Printed Name: A. Sharabi



Conducted Emission

E.U.T Description Hugs Wi-Fi Tag Charger
Type CGS-HGS-1000
Serial Number: Not Designated

Specification: FCC Part 15, Subpart C, Class B
Lead: Phase
Detectors: Quasi-peak, Average

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	CE22BQP		
Trace2:	CE22BAP		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
2 Average	190 kHz	38.67	-15.36
1 Quasi Peak	198 kHz	45.20	-18.49
1 Quasi Peak	214 kHz	38.51	-24.53
2 Average	254 kHz	28.94	-22.67
1 Quasi Peak	310 kHz	32.63	-27.33
2 Average	386 kHz	17.37	-30.77
1 Quasi Peak	562 kHz	35.22	-20.77
2 Average	574 kHz	21.42	-24.57
1 Quasi Peak	1.054 MHz	25.92	-30.07
2 Average	1.054 MHz	14.97	-31.02
2 Average	10.282 MHz	21.46	-28.53
1 Quasi Peak	10.342 MHz	30.49	-29.50
2 Average	14.338 MHz	30.81	-19.18
1 Quasi Peak	14.506 MHz	39.11	-20.88
1 Quasi Peak	15.902 MHz	40.27	-19.72
2 Average	16.058 MHz	32.25	-17.74
1 Quasi Peak	21.114 MHz	37.75	-22.25
2 Average	21.542 MHz	32.64	-17.35

Date: 29.JUL.2013 08:01:08

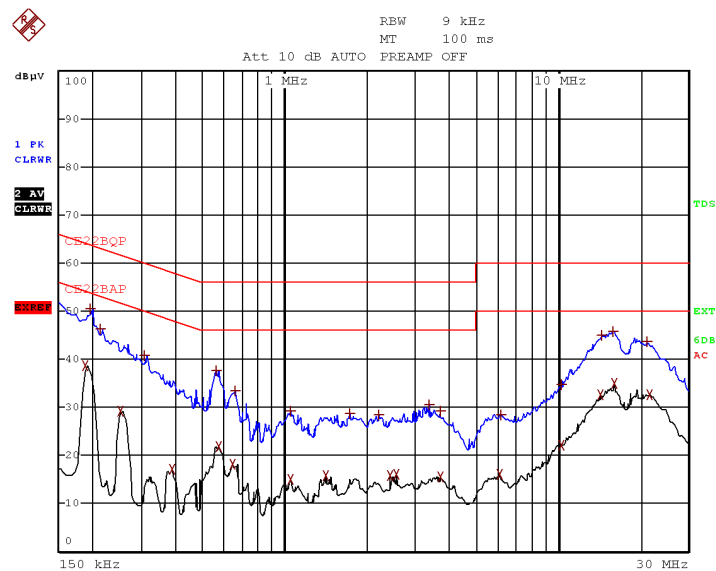
Figure 5. Detectors: Quasi-peak, Average

Note: DELTA LIMIT 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.

Conducted Emission

E.U.T Description Hugs Wi-Fi Tag Charger
Type CGS-HGS-1000
Serial Number: Not Designated

Specification: FCC Part 15, Subpart C, Class B
Lead: Phase
Detectors: Quasi-peak, Average



Date: 29.JUL.2013 07:59:07

Figure 6 Detectors: Quasi-peak, Average



Conducted Emission

E.U.T Description Hugs Wi-Fi Tag Charger
Type CGS-HGS-1000
Serial Number: Not Designated

Specification: FCC Part 15, Subpart C, Class B
Lead: Neutral
Detectors: Quasi-peak, Average

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	CE22BQP		
Trace2:	CE22BAP		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
2 Average	190 kHz	39.56	-14.47
1 Quasi Peak	194 kHz	46.45	-17.41
2 Average	250 kHz	31.92	-19.83
1 Quasi Peak	266 kHz	40.12	-21.12
1 Quasi Peak	310 kHz	33.93	-26.03
2 Average	430 kHz	19.41	-27.84
1 Quasi Peak	570 kHz	38.50	-17.49
2 Average	578 kHz	25.75	-20.24
1 Quasi Peak	666 kHz	30.08	-25.91
2 Average	674 kHz	18.32	-27.67
2 Average	4.586 MHz	13.17	-32.82
1 Quasi Peak	4.63 MHz	24.11	-31.88
2 Average	13.846 MHz	30.86	-19.14
1 Quasi Peak	14.426 MHz	38.09	-21.90
2 Average	14.874 MHz	31.94	-18.05
1 Quasi Peak	17.93 MHz	38.78	-21.21
1 Quasi Peak	21.538 MHz	37.07	-22.92
2 Average	21.542 MHz	30.84	-19.15

Date: 29.JUL.2013 08:06:43

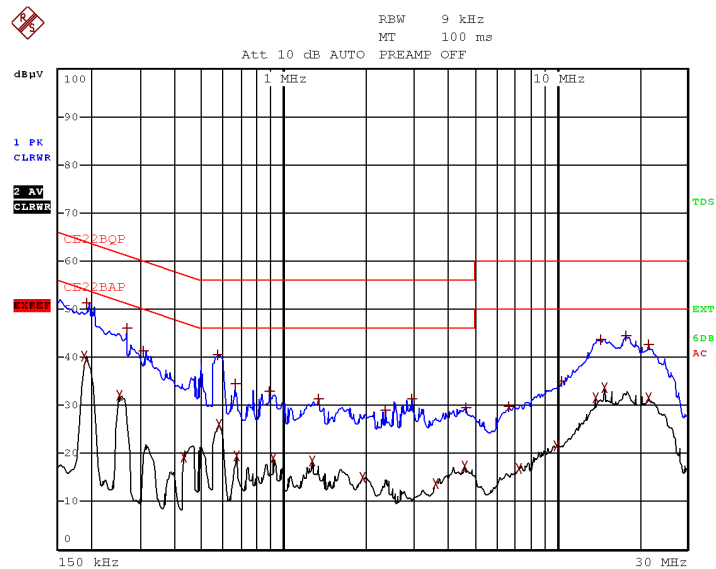
Figure 7. Detectors: Quasi-peak, Average

Note: DELTA LIMIT 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.

Conducted Emission

E.U.T Description Hugs Wi-Fi Tag Charger
Type CGS-HGS-1000
Serial Number: Not Designated

Specification: FCC Part 15, Subpart C, Class B
Lead: Neutral
Detectors: Quasi-peak, Average



Date: 29.JUL.2013 08:04:57

Figure 8 Detectors: Quasi-peak, Average



4.1 Test Equipment Used, Conducted Emission

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
LISN	EMCO	3810/2BR	1297	December 16, 2012	1 year
Transient Limiter	HP	11947A	3107A03041	February 25, 2013	1 year
EMI Receiver	Rohde & Schwarz	ESCI7	100724	December 27, 2012	1 year



5. Bandwidth

5.1 Test Specification

RSS-Gen, Issue 3, Section 4.6, December 2010

5.2 Conclusions

Due to extremely low signal levels which could not be measured, the E.U.T. was not tested.

The manufacturer's declared bandwidth is 4 kHz and therefore the E.U.T. met the requirements. See customer's declaration on the following page.

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: 

Date: 01.09 13

Typed/Printed Name: A. Sharabi



ISRAEL TESTING LABORATORIES
Global Certifications You Can Trust



Date: 21/10/13

Declaration

Subject: BW of 125KHz transmitter

Model: CGS-HGS-1000

IC: 5115A-CGSHGS1000

The Bandwidth of 125KHz transmitter in CGS-HGS-1000 (Hugs Wi-Fi Tag Charger) is 4KHz.

Sincerely,

Signature:
Reuven Amsalem
VP HW R&D

6. Field Strength of Fundamental

6.1 Test Specification

F.C.C., Part 15, Subpart C, 15.209

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 (125 kHz) and Peak Detection.

The distance between the E.U.T. and test antenna was 3 meters.

The turntable and antenna were adjusted for maximum level reading on the EMI receiver. The loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter.

6.3 Test Results

JUDGEMENT: Passed

Reading (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
59.75	105.6	-45.85

The EUT met the FCC Part 15, Subpart C, Section 15.209 specification requirements.

The details of the highest emissions are given in Figure 9.

TEST PERSONNEL:

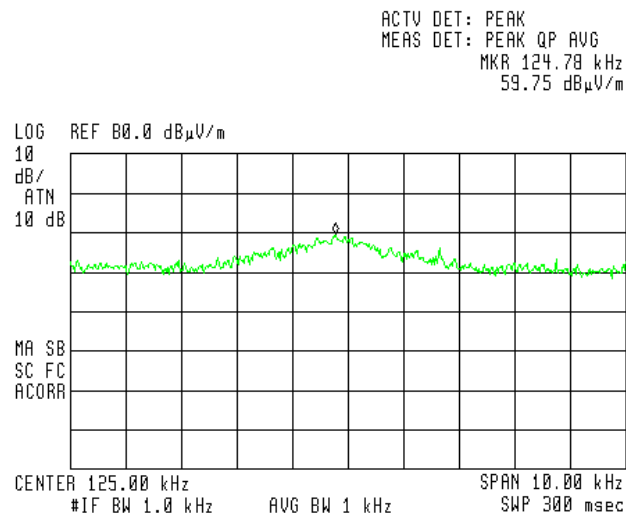
Tester Signature: 

Date: 01.09.13

Typed/Printed Name: A. Sharabi

Field Strength of Fundamental

E.U.T Description Hugs Wi-Fi Tag Charger
Type CGS-HGS-1000
Serial Number: Not Designated



**Figure 9. Field Strength of Fundamental.
Detector: Peak**



6.4 Test Equipment Used, Field Strength of Fundamental

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	February 26, 2013	1 year
RF Section	HP	85420E	3705A00248	February 26, 2013	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 21, 2012	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	JPKGC19982	N/A	N/A

Figure 10. Test Equipment Used



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 1.

The frequency range 9 kHz-30 MHz was scanned.

The emissions were measured using a computerized EMI receiver complying with 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 10 meters.

The E.U.T. was operated at the frequency of 125 kHz. This frequency was measured using a peak detector.

7.3 Test Results

JUDGEMENT: Passed

The EUT was tested and it met the requirements of the FCC Part 15, Subpart C, Section 209 specification.

Frequency (KHz)	Peak (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
250	37.5	99.65	-62.15
375.0	42.2	96.12	-53.92

All emissions were at least 20dB below the limit.

TEST PERSONNEL:

Tester Signature: 

Date: 01.09.13

Typed/Printed Name: A. Sharabi

7.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	February 26, 2013	1 year
RF Section	HP	85420E	3705A00248	February 26, 2013	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 21, 2012	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

Figure 11. Test Equipment Used

7.5 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]

Example: FS = 30.7 dB μ V (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dB μ V

No external pre-amplifiers are used.



8. Spurious Radiated Emission

8.1 Test Specification

30 - 1000 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 4*.

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 with CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

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 Results

JUDGEMENT: Passed

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification. No signals were detected in the frequency range of 30 -1000 MHz. The readings in *Figure 12* are background noise measurement.

TEST PERSONNEL:

Tester Signature: 

Date: 01.09.13

Typed/Printed Name: A. Sharabi

Frequency (kHz)	Peak (dBuV/m)	Limit (dBuV/m)	Margin (dB)
50	44.5	113.6	-69.1
450	28.5	94.5	-66.0
800	25.9	69.5	-43.6
2000	14.6	69.5	-54.9
5000	5.3	69.5	-64.2
15000	12.9	69.5	-56.6

Figure 12. Spurious Radiated Emission Test Results

8.4 Test Equipment Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	February 26, 2013	1 year
RF Section	HP	85420E	3705A00248	February 26, 2013	1 year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	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	JPKGC19982	N/A	N/A

Figure 13. Test Equipment Used

9. APPENDIX A - CORRECTION FACTORS

9.1 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".



9.2 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.

9.3 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".



9.4 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".



9.5 Correction factors for ACTIVE LOOP ANTENNA

Model 6502

S/N 9506-2950

FREQUENCY	Magnetic Antenna Factor	Electric Antenna Factor
(MHz)	(dB)	(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



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

FCC Specification	FCC Standard	IC Standard
Conducted Emission	47CFR15.207	RSS Gen, Issue 3 Section 7.2.4
Spurious Emission	47CFR15.209	RSS-210, Issue 8 Section 2.5