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DATE: 11 March 2015

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

FCC Radio Test Report

for

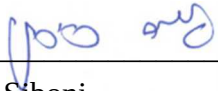
Cardo Peripheral Systems

Equipment under test:

Rider Communication System

**SRC-System PRO
2401 MHz Transmitter**

Tested by:


I. Siboni

Approved by:


D. Shidlow

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This report relates only to items tested.



Measurement/Technical Report for Cardo Peripheral Systems

Rider Communication System

SRC-System PRO

FCC ID: Q95ER20

IC: 4668A-ER20

27 January 2015

This report concerns: Original Grant: X
Class I Change:
Class II Change:

Equipment type: Digital Transmission System

Limits used: 47CFR15 Section 15.247

Measurement procedure used is KDB 558074 D01 v03r02 and ANSI C63.4-2009.

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TABLE OF CONTENTS

1.	GENERAL INFORMATION -----	5
1.1	Administrative Information	5
1.2	List of Accreditations	6
1.3	Product Description	7
1.4	Test Methodology	7
1.5	Test Facility	7
1.6	Measurement Uncertainty	7
2.	SYSTEM TEST CONFIGURATION-----	8
2.1	Justification	8
2.2	EUT Exercise Software	8
2.3	Special Accessories	8
2.4	Equipment Modifications	8
2.5	Configuration of Tested System	9
3.	CONDUCTED & RADIATED MEASUREMENT TEST SET-UP PHOTOS -----	10
4.	CONDUCTED EMISSION FROM AC PORTS -----	12
4.1	Test Specification	12
4.2	Test Procedure	12
4.3	Test Results.....	13
4.4	Test Equipment Used; Conducted Emission.....	18
5.	6 DB MINIMUM BANDWIDTH -----	19
5.1	Test Specification	19
5.2	Test Procedure	19
5.3	Test Results.....	20
5.4	Test Equipment Used; 6dB Bandwidth	21
6.	26 DB MINIMUM BANDWIDTH-----	22
6.1	Test Specification	22
6.2	Test Procedure	22
6.3	Test Results.....	23
6.4	Test Equipment Used; 26 dB Minimum Bandwidth.....	24
7.	MAXIMUM TRANSMITTED PEAK POWER OUTPUT -----	25
7.1	Test Specification	25
7.2	Test Procedure	25
7.3	Test Results.....	26
7.4	Test Equipment Used; Maximum Transmitted Peak Power Output.....	27
8.	BAND EDGE SPECTRUM -----	28
8.1	Test Specification	28
8.2	Test Procedure	28
8.3	Test Results.....	28
8.4	Test Equipment Used; Band Edge Spectrum	30
9.	RADIATED EMISSION, 9 KHZ – 30 MHZ -----	31
9.1	Test Specification	31
9.2	Test Procedure	31
9.3	Test Results.....	31
9.4	Test Instrumentation Used, Radiated Measurements.....	32
9.5	Field Strength Calculation	33
10.	SPURIOUS RADIATED EMISSION, 30 – 25000 MHZ -----	34
10.1	Radiated Emission 30-25000 MHz.....	34
10.2	Test Results.....	35
10.3	Test Instrumentation Used, Radiated Measurements Above 30 MHz	38
11.	TRANSMITTED POWER DENSITY -----	39
11.1	Test Specification	39
11.2	Test Procedure	39
11.3	Test Results.....	39



11.4	Test Equipment Used; Transmitted Power Density	41
12.	ANTENNA GAIN/INFORMATION-----	42
13.	R.F EXPOSURE/SAFETY-----	43
14.	APPENDIX A - CORRECTION FACTORS -----	44
14.1	Correction factors for CABLE	44
14.2	Correction factors for CABLE	45
14.3	Correction factors for CABLE	46
14.4	Correction factors for CABLE	47
12.6	Correction factors for Double-Ridged Waveguide Horn.....	48
14.5	Correction factors for Horn Antenna	49
14.6	Correction factors for ACTIVE LOOP ANTENNA	50
15.	COMPARISON INDUSTRY CANADA REQUIREMENTS WITH FCC -----	51



1. General Information

1.1 Administrative Information

Manufacturer:	Cardo Peripheral Systems
Manufacturer's Address:	13 Hamifal St., Or Yehuda, 60221 Israel Tel: +972-3-735-3111 Fax: +972-3562-3360
Manufacturer's Representative:	Avi Moato
Equipment Under Test (E.U.T):	Rider Communication System
Equipment Model No.:	SRC-System PRO
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	01.01.15
Start of Test:	01.01.15
End of Test:	20.01.15
Test Laboratory Location:	I.T.L (Product Testing) Ltd. 1 Batsheva St., Lod ISRAEL 7120101
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.), FCC Designation No. US1004.
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 4025A-1.

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 SRC System Pro is a class 1 Bluetooth headset and Bluetooth intercom for motorbikes, designed specifically for Schuberth helmets. This system provides communication and entertainment features.

1.4 Test Methodology

Radiated testing was performed according to the procedures in KDB 558074 D01 v03r02, ANSI C63.4: 2009 and RSS-Gen Issue 4. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

Emissions tests were performed at I.T.L.'s testing facility in Lod, Israel. I.T.L.'s EMC Laboratory is accredited by A2LA, certificate No. 1152.01 and its FCC Designation Number is US1004.

1.6 Measurement Uncertainty

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

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):

± 4.98 dB

Note: See ITL Procedure No. PM 198.

2. System Test Configuration

2.1 *Justification*

Radiated emission screening was performed in 3 orthogonal orientations to determine the worst case.

The fundamental results are shown in the below table:

Frequency (GHz)	X axis (dBuV/m)	Y axis (dBuV/m)	Z axis (dBuV/m)
2.401	72.9	74.0	62.6

According to above results the worst case was the y axis.

The unit was transmitting continuously at the frequency of 2401 MHz (the only operational channel) with one modulation mode: MSK.

2.2 *EUT Exercise Software*

No special exercise software was used.

2.3 *Special Accessories*

No special accessories were needed to achieve compliance.

2.4 *Equipment Modifications*

No modifications were necessary in order to achieve compliance.

2.5 Configuration of Tested System

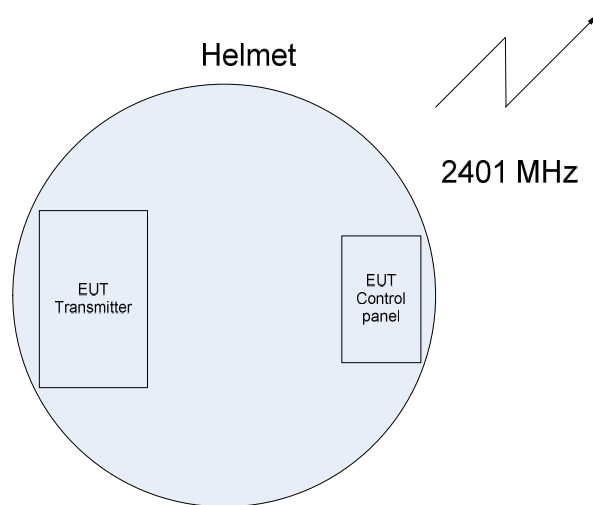


Figure 1. Configuration of Tested System

3. Conducted & Radiated Measurement Test Set-up Photos



Figure 2. Conducted Emission Test



Figure 3. Radiated Emission Test



Figure 4. Radiated Emission Test



Figure 5. Radiated Emission Test

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 2. 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 0.8 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 0.80 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. Conducted Emission Test*.

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.



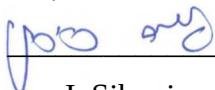
4.3 **Test Results**

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, 23.49 dB for the phase line at 0.330 MHz and 24.95 dB at 0.338 MHz for the neutral line.

The details of the highest emissions are given in *Figure 6* to *Figure 9*.

TEST PERSONNEL:

Tester Signature:  _____

Date: 16.02.15

Typed/Printed Name: I. Siboni

Conducted Emission

E.U.T Description Rider Communication System
Type SRC-System PRO
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	154 kHz	20.06	-35.71
1	Quasi Peak	238 kHz	33.55	-28.60
1	Quasi Peak	330 kHz	35.96	-23.49
2	Average	342 kHz	21.41	-27.73
2	Average	486 kHz	14.04	-32.19
1	Quasi Peak	534 kHz	29.14	-26.85
1	Quasi Peak	874 kHz	22.83	-33.16
2	Average	982 kHz	14.88	-31.11
2	Average	1.278 MHz	13.65	-32.34
1	Quasi Peak	2.022 MHz	24.27	-31.72
2	Average	2.594 MHz	13.22	-32.77
1	Quasi Peak	2.602 MHz	23.48	-32.51
1	Quasi Peak	3.614 MHz	20.86	-35.13
2	Average	3.762 MHz	11.88	-34.11
1	Quasi Peak	6.33 MHz	20.21	-39.78
2	Average	6.654 MHz	10.20	-39.79
2	Average	15.838 MHz	9.95	-40.04
1	Quasi Peak	17.358 MHz	19.53	-40.46
2	Average	26.822 MHz	23.17	-26.82
1	Quasi Peak	27.09 MHz	34.24	-25.75

Date: 20.JAN.2015 11:32:22

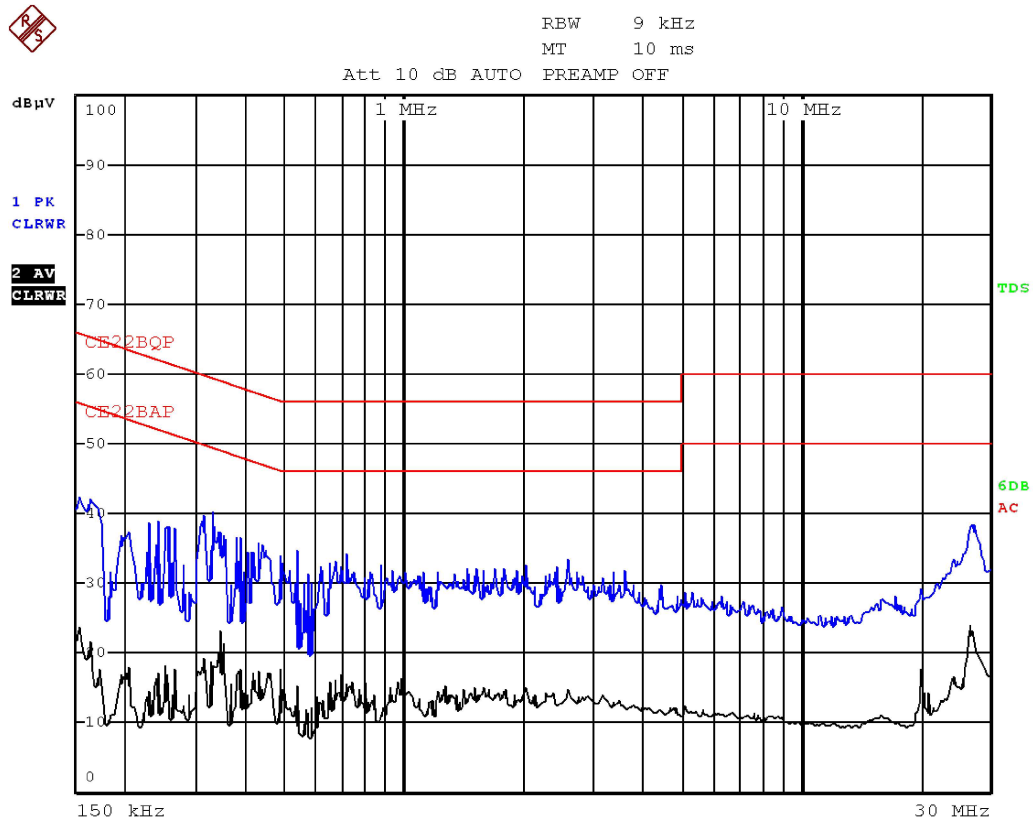
Figure 6. Detectors: Quasi-peak, Average

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 Rider Communication System
Type SRC-System PRO
Serial Number: Not designated

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



Date: 20.JAN.2015 11:28:03

Figure 7 Detectors: Quasi-peak, Average



Conducted Emission

E.U.T Description Rider Communication System
Type SRC-System PRO
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	162 kHz	19.10	-36.25
1	Quasi Peak	246 kHz	33.34	-28.55
1	Quasi Peak	338 kHz	34.30	-24.95
2	Average	338 kHz	20.18	-29.06
1	Quasi Peak	434 kHz	29.50	-27.66
2	Average	666 kHz	13.80	-32.19
2	Average	966 kHz	15.87	-30.12
1	Quasi Peak	998 kHz	26.97	-29.02
2	Average	1.302 MHz	13.91	-32.08
1	Quasi Peak	1.658 MHz	26.46	-29.53
1	Quasi Peak	2.85 MHz	25.89	-30.10
2	Average	2.934 MHz	14.03	-31.96
2	Average	3.718 MHz	13.49	-32.50
1	Quasi Peak	3.77 MHz	25.13	-30.86
2	Average	6.298 MHz	10.31	-39.68
1	Quasi Peak	10.122 MHz	20.04	-39.95
1	Quasi Peak	17.27 MHz	23.33	-36.66
2	Average	17.49 MHz	11.68	-38.31
2	Average	26.706 MHz	22.67	-27.33
1	Quasi Peak	27.242 MHz	33.88	-26.11

Date: 20.JAN.2015 11:23:22

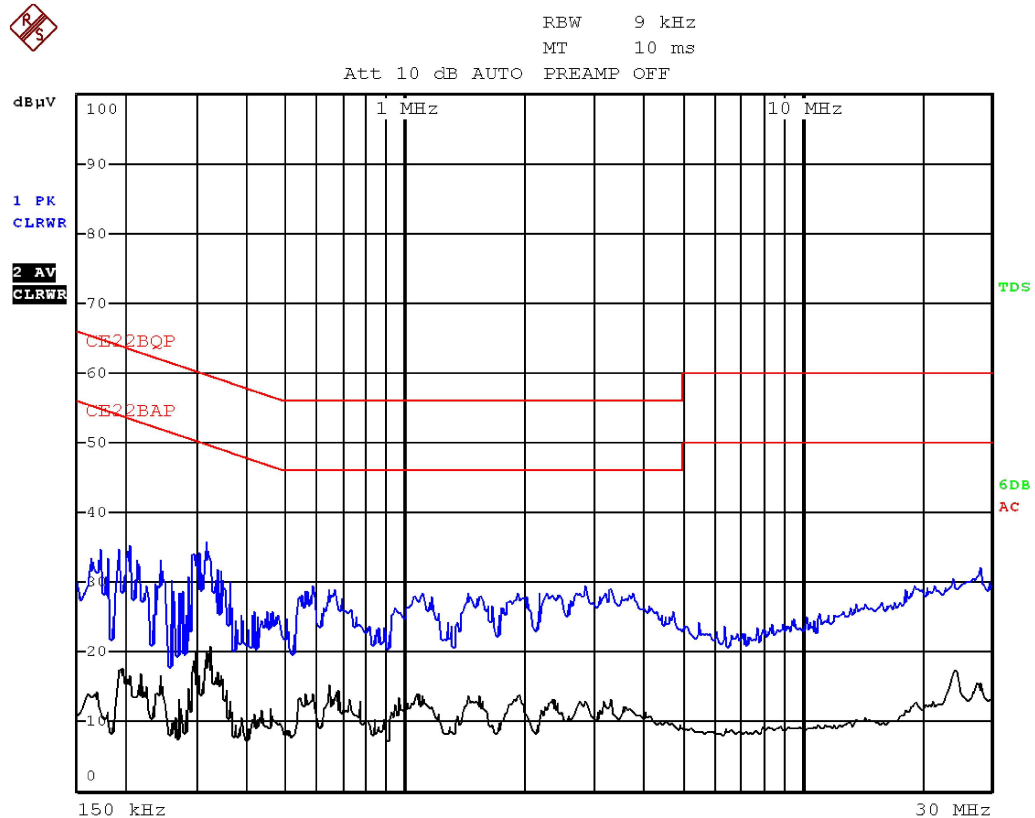
Figure 8. Detectors: Quasi-peak, Average

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 Rider Communication System
Type SRC-System PRO
Serial Number: Not designated

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



Date: 20.JAN.2015 10:56:43

Figure 9 Detectors: Quasi-peak, Average



4.4 ***Test Equipment Used; Conducted Emission***

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
LISN	Fischer	FCC-LISN-25A	127	June 30, 2014	1 year
Transient Limiter	HP	11947A	3107A03041	May 13, 2014	1 year
EMI Receiver	Rohde & Schwarz	ESCI7	100724	January 4, 2015	1 year

5. 6 dB Minimum Bandwidth

5.1 Test Specification

F.C.C. Part 15, Subpart C: (15.247-a2)

5.2 Test Procedure

The E.U.T. was set to the applicable test frequency. The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (30 dB) and an appropriate coaxial cable (cable loss = 0.5 dB). The spectrum analyzer was set to 100 kHz resolution BW. The spectrum bandwidth of the E.U.T. at the point of 6 dB below maximum peak power was measured and recorded.

The E.U.T. was tested at 2401 MHz.

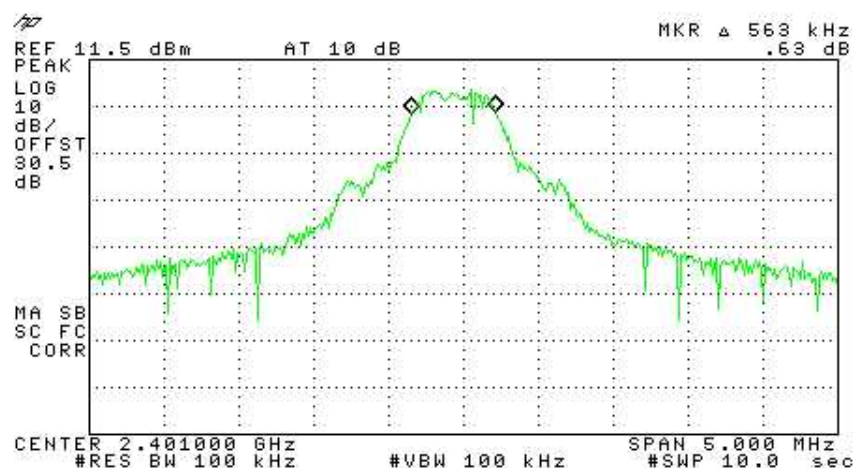


Figure 10 — 2401MHz Channel

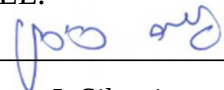
5.3 Test Results

Operation Frequency (MHz)	Modulation	Reading (MHz)	Specification (MHz)
2401.00	MSK	0.563	>0.5

Figure 11 6 dB Minimum Bandwidth

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: 

Date: 16.02.15

Typed/Printed Name: I. Siboni



5.4 ***Test Equipment Used; 6dB Bandwidth***

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 year
30 db Attenuator	Weinschel Engineering	49-30-34	PD426	January 14, 2015	1 year

Figure 12 Test Equipment Used

6. 26 dB Minimum Bandwidth

6.1 Test Specification

F.C.C. Part 15, Subpart C: (15.247-a2)

6.2 Test Procedure

The E.U.T. was set to the applicable test frequency. The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (30 dB) and an appropriate coaxial cable (cable loss = 0.5 dB). The spectrum analyzer was set to 100 kHz resolution BW. The spectrum bandwidth of the E.U.T. at the point of 26 dB below maximum peak power was measured and recorded.

The E.U.T. was tested at 2401 MHz.

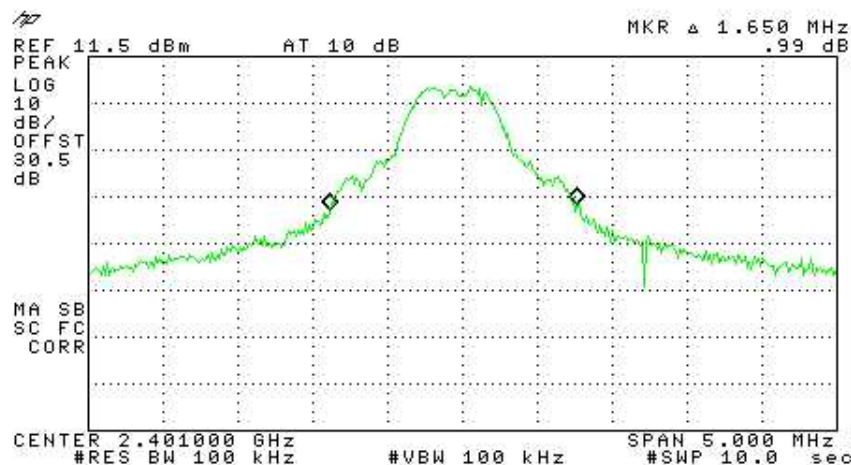


Figure 13 — 2401MHz Channel

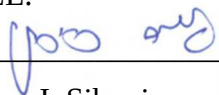
6.3 Test Results

Operation Frequency (MHz)	Modulation	Reading (MHz)
2401.00	MSK	1.65

Figure 14 26 dB Minimum Bandwidth

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: 

Date: 16.02.15

Typed/Printed Name: I. Siboni



6.4 ***Test Equipment Used; 26 dB Minimum Bandwidth***

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 year
30 db Attenuator	Weinschel Engineering	49-30-34	PD426	January 14, 2015	1 year

Figure 15 Test Equipment Used

7. Maximum Transmitted Peak Power Output

7.1 *Test Specification*

F.C.C. Part 15, Subpart C Section 15.247(b)

7.2 *Test Procedure*

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator (30 dB) and an appropriate coaxial cable (cable loss = 0.5 dB). The Spectrum Analyzer was set to 1.0 MHz resolution BW. Peak power level was measured at selected operation frequencies.

The E.U.T. was tested at 2401 MHz.

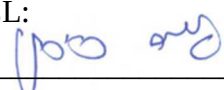
7.3 Test Results

Operation Frequency (MHz)	Modulation	Power (dBm)	Specification (dBm)	Margin (dB)
2401.00	MSK	5.25	30	-24.75

Figure 16 Maximum Peak Power Output

JUDGEMENT: Passed by 24.75 dB

TEST PERSONNEL:

Tester Signature: 

Date: 16.02.15

Typed/Printed Name: I. Siboni

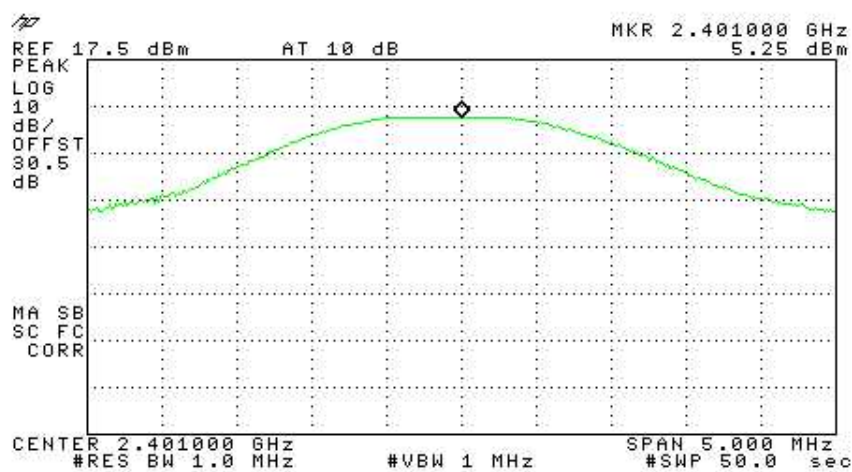


Figure 17 , 2401MHz Channel

7.4 ***Test Equipment Used; Maximum Transmitted Peak Power Output***

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 year
30 db Attenuator	Weinschel Engineering	49-30-34	PD426	January 14, 2015	1 year

Figure 18 Test Equipment Used

8. Band Edge Spectrum

[In Accordance with section 15.247(c)]

8.1 Test Specification

F.C.C. Part 15, Subpart C (15.247)

8.2 Test Procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (30 dB) and an appropriate coaxial cable (cable loss = 0.5 dB). The spectrum analyzer was set to 100 kHz resolution BW. Maximum power level below 2400 MHz and above 2483.5 MHz was measured relative to power level at 2400 MHz, and 2483 MHz correspondingly.

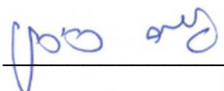
8.3 Test Results

Operation Frequency (MHz)	Modulation	Band Edge Frequency (MHz)	Spectrum Level (dBm)	Specification (dBm)	Margin (dB)
2401.0	MSK	2400.0	-24.4	-15.3	-9.1
2401.0	MSK	2483.5	-43.6	-15.3	-28.3

Figure 19 Band Edge Spectrum

JUDGEMENT: Passed by 9.1 dB

TEST PERSONNEL:

Tester Signature: 
Typed/Printed Name: I. Siboni

Date: 16.02.15

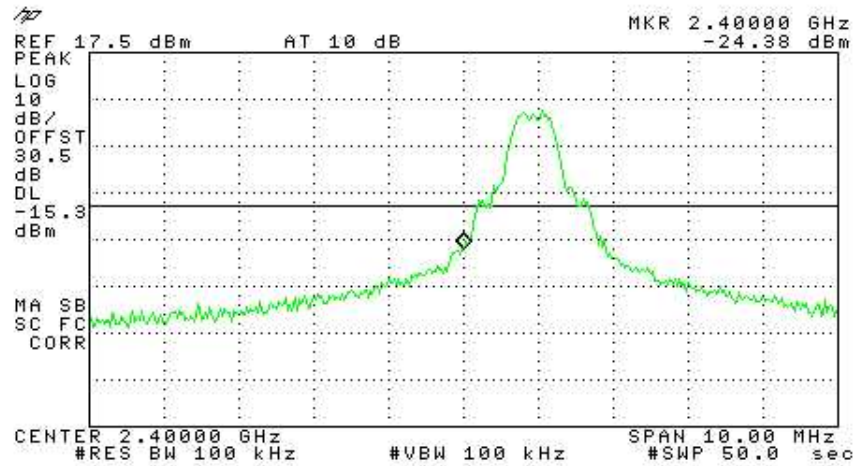


Figure 20 —Lower Band Edge, MSK

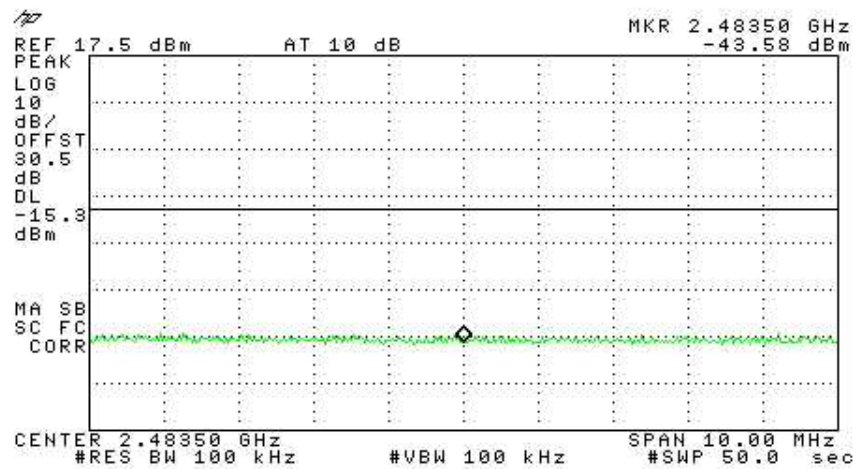


Figure 21 —Upper Band Edge, MSK

8.4 *Test Equipment Used; Band Edge Spectrum*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 year
30 db Attenuator	Weinschel Engineering	49-30-34	PD426	January 14, 2015	1 year

Figure 22 Test Equipment Used

9. Radiated Emission, 9 kHz – 30 MHz

9.1 Test Specification

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

9.2 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 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 3 meters.

The E.U.T. was operated at 2.401GHz using a peak detector.

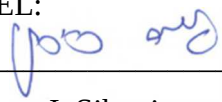
9.3 Test Results

JUDGEMENT: Passed

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 209 specification.

All the emissions detected were greater than 20 dB below the limit.

TEST PERSONNEL:

Tester Signature: 

Date: 16.02.15

Typed/Printed Name: I. Siboni

9.4 *Test Instrumentation Used, Radiated Measurements*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	R&S	ESBI7	100120	January 1, 2015	1 year
Active Loop Antenna	EMCO	6502	9506-2950	November 4, 2014	1 year
Antenna Mast	ETS	2070-2	9608-1497	N/A	N/A
Turntable	ETS	2087	-	N/A	N/A
Mast & Table Controller	ETS/EMCO	2090	9608-1456	N/A	N/A

Figure 23 Test Equipment Used

9.5 **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: $FS = 30.7 \text{ dB}\mu\text{V (RA)} + 14.0 \text{ dB (AF)} + 0.9 \text{ dB (CF)} = 45.6 \text{ dB}\mu\text{V}$

No external pre-amplifiers are used.

10. Spurious Radiated Emission, 30 – 25000 MHz

10.1 Radiated Emission 30-25000 MHz

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, 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 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 30-1000 MHz, the readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

In the frequency range 1-6.0 GHz, a computerized EMI receiver complying with CISPR 16 requirements was used.

In the frequency range 6.0-25.0 GHz, a spectrum analyzer including a low noise amplifier was used. During average measurements, the IF bandwidth was 1 MHz and the video bandwidth was 100Hz. During peak measurements, the IF bandwidth was 1 MHz and the video bandwidth was 3 MHz.

The test distance was 3 meters.

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 E.U.T. was operated at 2.401GHz using a peak detector.



10.2 Test Results

JUDGEMENT: Passed by 2.9 dB

For the operation frequency of 2401 MHz, the margin between the emission level and the specification limit is in the worst case 2.9 dB at the frequency of 2390.0 MHz, horizontal polarization.

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

The details of the highest emissions are given in *Figure 24* to *Figure 25*.

TEST PERSONNEL:

Tester Signature:  _____

Date: 16.02.15

Typed/Printed Name: I. Siboni

Radiated Emission Above 1 GHz

E.U.T Description Rider Communication System
Type SRC-System PRO
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Peak
Operation Frequency: 2401 MHz

Freq.	Polarity	Peak Amp	Peak. Specification	Peak. Margin
(MHz)	(H/V)	(dB μ V/m)	(dB μ V/m)	(dB)
2390.0	H	65.2	74.0	-8.8
2390.0	V	64.1	74.0	-9.9
4802.0	H	61.7	74.0	-12.3
4802.0	V	61.6	74.0	-12.4

**Figure 24. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL.
Detector: Peak**

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.

“Peak Amp” includes correction factor.

* “Correction Factor” = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Above 1 GHz

E.U.T Description Rider Communication System
Type SRC-System PRO
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: 2401 MHz

Freq.	Polarity	Average Amp	Average Specification	Peak. Margin
(MHz)	(H/V)	(dB μ V/m)	(dB μ V/m)	(dB)
2390.0	H	51.1	54.0	-2.9
2390.0	V	49.8	54.0	-4.2
4802.0	H	47.4	54.0	-6.6
4802.0	V	47.4	54.0	-6.6

**Figure 25. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL.
Detector: Average**

Notes:

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.

“Average Amp” includes correction factor.

* Correction Factor = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

10.3 *Test Instrumentation Used, Radiated Measurements Above 30 MHz*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	R&S	ESBI7	100120	January 1, 2015	1 year
Spectrum Analyzer	R&S	FSL6	100194	January 1, 2015	1 year
Biconilog Antenna	EMCO	3142B	1250	May 22, 2014	2 years
Horn Antenna	ETS	3115	6142	March 14, 2012	3 years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 22, 2014	1 year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 29, 2014	1 year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	1 year
Antenna Mast	ETS	2070-2	9608-1497	N/A	N/A
Turntable	ETS	2087	-	N/A	N/A
Mast & Table Controller	ETS/EMCO	2090	9608-1456	N/A	N/A

Figure 26 Test Equipment Used

11. Transmitted Power Density

[In accordance with section 15.247(d)]

11.1 Test Specification

F.C.C. Part 15, Subpart C (15.247(d))

11.2 Test Procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (30dB) and an appropriate coaxial cable (cable loss = 0.5 dB). The spectrum analyzer was set to 3 kHz resolution BW. and sweep time of 1 second for each 3 kHz “window”. The spectrum peaks were located at each of the 3 operating frequencies.

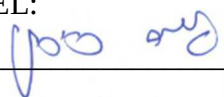
11.3 Test Results

Operation Frequency (MHz)	Modulation	Reading Spectrum Analyzer (dBm)	Specification (dBm)	Margin (dB)
2401.0	MSK	-7.4	8.0	-0.6

Figure 27 Test Results

JUDGEMENT: Passed by 0.6 dB

TEST PERSONNEL:

Tester Signature: 

Date: 16.02.15

Typed/Printed Name: I. Siboni

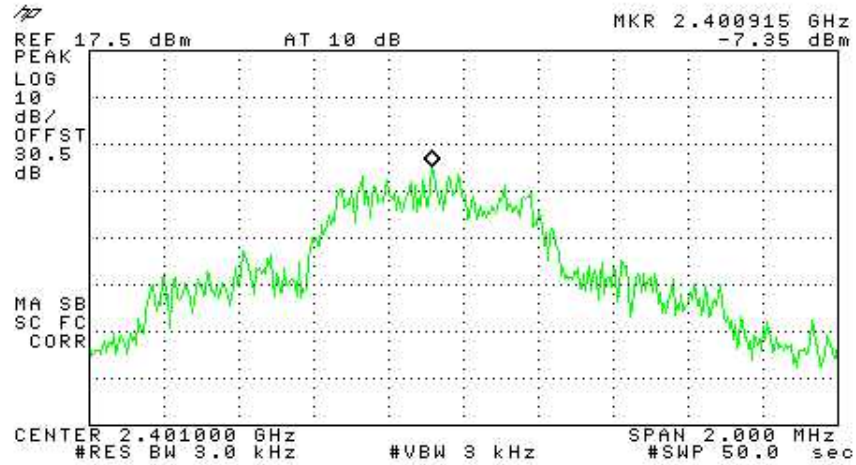


Figure 28 — 2401 MHz Channel, MSK, Vertical



11.4 ***Test Equipment Used; Transmitted Power Density***

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 year
30 db Attenuator	Weinschel Engineering	49-30-34	PD426	January 14, 2015	1 year

Figure 29 Test Equipment Used

12. Antenna Gain/Information

The antenna gain is 0.5 dBi, integral.

RainSun

AN2051 Multilayer Chip Antenna

◆ Features

- Light weight and low profile 5.05mm(L)X2.0mm(W)X1.07mm(H)
- Omni-directional in azimuth
- Lead (Pb) Free

◆ Applications

- 2.4GHz wireless communications
- 2.4GHz Modules
- Bluetooth System
- 802.11b/g Wireless LAN System

Specifications

Center frequency	2.45GHz
Peak gain	0.5dBi
Operation temperature	-40 ~ +85 °C
Storage temperature	-40 ~ +85 °C
VSWR	2.0 (max)
Input Impedance	50 Ohm
Power handling	2W (max)
Bandwidth	110MHz
Azimuth beamwidth	Omni-directional
Polarization	Linear

13. R.F Exposure/Safety

Typical use of the E.U.T. is as a Rider Communication System.

The typical placement of the E.U.T. is in the inside cushion of a motorcycle helmet. The typical distance between the E.U.T. and the user in the worst case application, is 2 cm.

Calculation of Maximum Permissible Exposure (MPE)

Based on Section 1.1310 Requirements

(a) FCC limits at 2401 MHz is:

$$1 \frac{mW}{cm^2}$$

Using table 1 of Section 1.1310 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

(b) The power density produced by the E.U.T. is

$$S = \frac{P_t G_t}{4\pi R^2}$$

P_t- Transmitted Power 5.25 dBm (Peak) = 3.35 mW

G_T- Antenna Gain, 0.5 dBi = 1.12 numeric

R- Distance from Transmitter using 2cm worst case

(c) The peak power density is:

$$S = \frac{(3.35 \times 1.2)}{4\pi (2)^2} = 0.0799 \frac{mW}{cm^2}$$

(d) This is below the FCC limit.

14. APPENDIX A - CORRECTION FACTORS

14.1 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".

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

FREQUENCY	CORRECTION
(GHz)	FACTOR
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.

14.3 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.

14.4 Correction factors for CABLE
from EMI receiver
to test antenna
at 10 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)	FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3	1200.0	9.8
20.0	0.8	1400.0	10.0
30.0	0.9	1600.0	11.3
40.0	1.2	1800.0	12.2
50.0	1.4	2000.0	13.1
60.0	1.6	2300.0	14.5
70.0	1.8	2600.0	15.9
80.0	1.9	2900.0	16.4
90.0	2.0		
100.0	2.1		
150.0	2.6		
200.0	3.2		
250.0	3.8		
300.0	4.2		
350.0	4.6		
400.0	5.1		
450.0	5.3		
500.0	5.6		
600.0	6.3		
700.0	7.0		
800.0	7.6		
900.0	8.0		
1000.0	8.7		

NOTES:

1. The cable type is RG-214.
2. The overall length of the cable is 34 meters.
3. The above data is located in file 34M10MO.CBL on the disk marked "Radiated Emissions Tests EMI Receiver".

12.6 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			

14.5 Correction factors for

Horn Antenna
Model: SWH-28
at 1 meter range.

FREQUENCY (GHz)	AFE (dB /m)	Gain (dB1)
18.0	40.3	16.1
19.0	40.3	16.3
20.0	40.3	16.1
21.0	40.3	16.3
22.0	40.4	16.8
23.0	40.5	16.4
24.0	40.5	16.6
25.0	40.5	16.7
26.0	40.6	16.4



14.6 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

15. Comparison Industry Canada Requirements With FCC

Cardo Peripheral Systems M/N: SRC-System PRO

IC: 4668A-ER20 FCC ID: Q95ER20

Test	FCC	IC
❑ Radiated Emission	15.209	RSS 210 Issue 8 Clause 2.5
❑ Max power / Peak power	15.247(b)(3)	RSS 210 Issue 8 A8.4(4)
❑ 6dB BW	15.247(a)2	RSS 210 Issue 8 A8.2a
❑ Power density	15.247(e)	RSS 210 Issue 8 A8.2b
❑ Spurious radiated emission in the restricted band	15.205(c)	RSS 210 Issue 8 2.5 RSS Gen 7.2.2 (Table 1)
❑ Band edge spectrum	15.247(d)	RSS 210 Issue 8 A8.5
❑ RF Exposure Limits	1.1310	RSS 102 4.4