



DATE: 14 September 2016

**I.T.L. (PRODUCT TESTING) LTD.
FCC Radio Test Report**

For

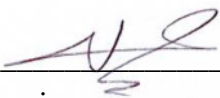
Risco Ltd.

Equipment under test:

915 MHz RF Module

RWTRSS10915A-40

Tested by:



N. Levi

Approved by:



D. Shidlovsky

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This report relates only to items tested.



Measurement/Technical Report for Risco Ltd.

Equipment under test:

915 MHz RF Module

RWTRSS10915A-40

FCC ID: JE4STAMP915

This report concerns:	Original Grant: X
	Class I change:
	Class II change:
Equipment type:	DXT – Part 15 Low Power Transceiver, Rx Verified.
Limits used:	47CFR15 Section 15.249

Measurement procedure used is ANSI C63.10-2013.

Application for Certification
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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: +972-3-963-7777 Fax: +972-3-961-6584
Manufacturer's Representative:	Motti Barad
Equipment Under Test (E.U.T):	915 MHz RF Module
Equipment Model No.:	RWTRSS10915A-40
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	July 03, 2016
Start of Test:	July 03, 2016
End of Test:	July 11, 2016
Test Laboratory Location:	I.T.L (Product Testing) Ltd. 1 Batsheva St., Lod ISRAEL 7120101
Test Specifications:	FCC Part 15, Subpart C, Section 15.249



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 Number IL1005.
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-3006, R-2729, T-1877, G-245.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025A-1, 4025A-2.

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 RWTRSS10915A-40 is “Stamp” that transmit in 915Mhz .

The Transceiver Si4432 is by Silicon Laboratories’ highly integrated, single chip wireless ISM. It includes a complete line of transmitters, receivers, and transceivers allowing the RF system designer to choose the optimal wireless part for their application.

The Si4432 offers advanced radio features including continuous frequency coverage from 240–930 MHz. The Si4432’s high level of integration offers reduced BOM cost while simplifying the overall system design. Additional system features such as an automatic wake-up timer, low battery detector, 64 byte TX/RX FIFOs, automatic packet handling, and preamble detection reduce overall current consumption and allow the use of lower-cost system MCUs. An integrated temperature sensor, general purpose ADC, poweron- reset (POR), and GPIOs further reduce overall system cost and size.

The Si4432’s digital receive architecture features a high-performance ADC and DSP based modem which performs demodulation, filtering, and packet handling for increased flexibility and performance. This digital architecture simplifies system design while allowing for the use of lower-end MCUs. The direct digital transmit modulation and automatic PA power ramping ensure precise transmit modulation and reduced spectral spreading ensuring compliance with FCC and ETSI regulations.

Model Name	RWTRSS10915A-40
Mode of Operation	Transmitter
Modulations	915MHz OOK
Assigned Frequency Range	915MHz
Operation Frequency	915MHz
Transmit Power	8dBm
Antenna Gain	+3dBi

1.4 Test Methodology

Radiated testing were performed according to the procedures in ANSI C63.10-2013. Radiated testing was performed at an antenna to EUT distance of 3 meters.



1.5 Test Facility

Radiated 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 IL1005.

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

1.7 Ambient conditions

Temperature (32°C- 22.7 °C)/humidity (35.6%-41.1%)

2. System Test Configuration

2.1 *Justification*

Testing was performed with the module transmitting modulated signal at 915.0 MHz while assembled on an evaluation board with a DC board. The DC board was connected to an AC/DC adapter.

2.2 *EUT Exercise Software*

No special exercise software was needed to achieve compliance.

2.3 *Special Accessories*

No special exercise software was needed to achieve compliance

2.4 *Equipment Modifications*

No equipment modifications were needed to achieve compliance.

2.5 *Configuration of Tested System*

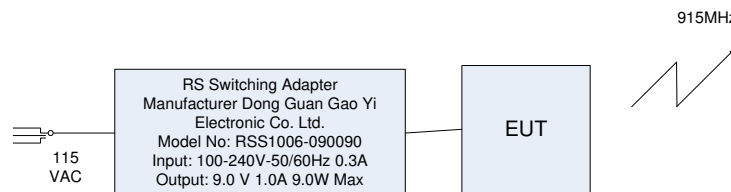


Figure 1. Configuration of Tested System

3. Radiated Measurement Test Set-Up Photos

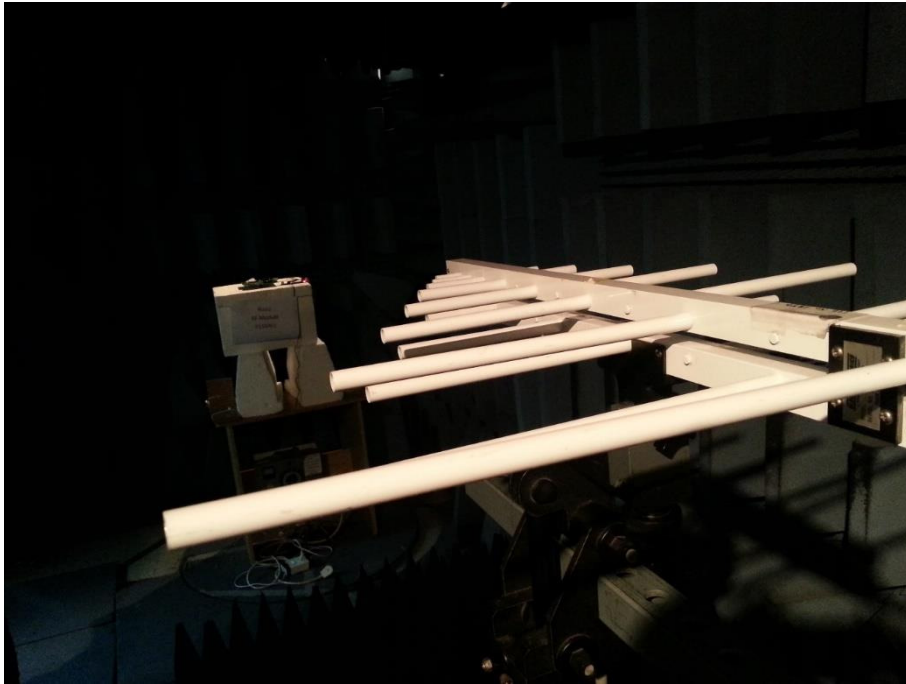


Figure 2. Field Strength of Fundamental Test



Figure 3. Radiated Emission Test



Figure 4. Radiated Emission Test



Figure 5. Radiated Emission Test



Figure 6. Radiated Emission Test

4. Field Strength of Fundamental

4.1 Test Specification

F.C.C., Part 15, Subpart C, Section 15.249(a)

4.2 Test Procedure

The E.U.T operation mode and test set-up are as described in Section 2 of this report.

The E.U.T was tested in the chamber, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The configuration tested is shown in *Figure 2*.

The E.U.T was evaluated in the operation frequency of 915.0MHz.

The readings were maximized by adjusting the turntable azimuth between 0-360°, and the antenna polarization

4.3 Test Limits

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of fundamental (dBuV/m)
902.0-928.0 MHz	50.0	94.0
2400-2483.5 MHz	50.0	94.0
5725.0-5875.0 MHz	50.0	94.0
24.0-24.25 GHz	250.0	108.0

*Field strength limits are specified at a distance of 3 meters

** for frequencies above 1000 MHz, the field strength limits of this section are based on average limits.

However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

4.4 Test Results

JUDGEMENT: Passed by 1.9dB

The EUT met the FCC Part 15, Subpart C, Section 15.249(a) specification requirements.

The details of the highest emissions are given in *Figure 7* to *Figure 9*.



Field Strength of Fundamental

E.U.T Description 915 MHz RF Module
Model Number RWTRSS10915A-40
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C 15.249(a)

Antenna Polarization: Horizontal/Vertical

Test Distance: 3 meters

Detector: Peak, Q.peak

Freq.	Axis	Pol.	Peak Reading	Q.peak Reading	Correction Factor*	Total reading	Limit	Margin
(MHz)		(V/H)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
915.0	X	H	67.5	67.1	25.0	92.1	94.0	-1.9
915.0		V	58.2	58.0	25.0	83.0	94.0	-11.0
915.0	Y	H	63.8	63.5	25.0	88.5	94.0	-5.5
915.0		V	66.6	66.3	25.0	91.3	94.0	-2.7
915.0	Z	H	65.3	65.2	25.0	90.2	94.0	-3.8
915.0		V	59.7	59.5	25.0	84.5	94.0	-9.5

Figure 7. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL/VERTICAL. Detector: 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.

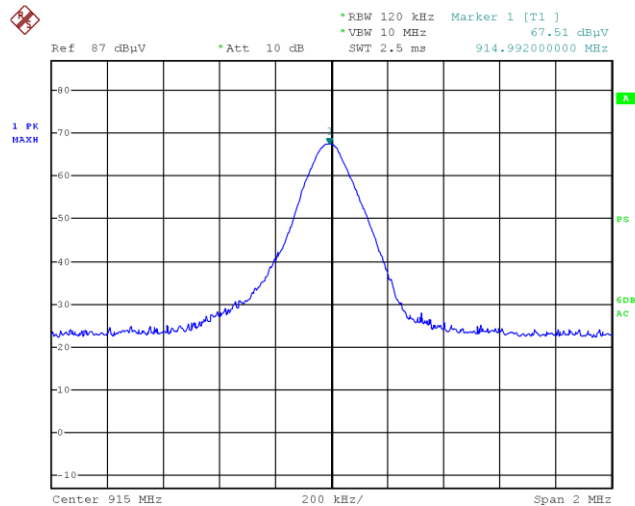
* "Correction Factors" = Antenna Correction Factor + Cable Loss.

Field Strength of Fundamental

E.U.T Description 915 MHz RF Module
 Model Number RWTRSS10915A-40
 Serial Number: Not designated

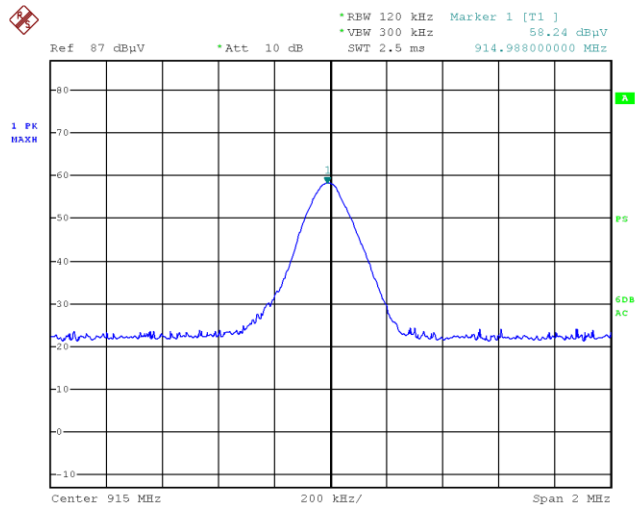
Specification: F.C.C., Part 15, Subpart C 15.249(a)

Antenna Polarization: Horizontal/Vertical Operation Frequency: 915.0MHz
 Test Distance: 3 meters Detector: Peak



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Figure 8. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL



Date: 30.JUN.2016 10:32:02

Figure 9. Field Strength of Fundamental. Antenna Polarization: VERTICAL



4.5 Test Instrumentation Used; Field Strength of Fundamental

Instrument	Manufacturer	Model	Serial Number	Last Calibration Date	Next Calibration Date
EMI Receiver	R&S	ESCI7	100724	February 29, 2016	March 1, 2017
Log Periodic Antenna	EMCO	3146	9107-3158	March 24, 2016	March 24, 2017
Semi Anechoic Chamber	ETS	S81	SL 11643	N/A	N/A

Figure 10 Test Equipment Used

5. Field Strength of Harmonics

5.1 Test Specification

FCC, Part 15, Subpart C, Section 249(a)

5.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 2 of this report.

The E.U.T was placed in the chamber and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The configuration tested is shown in *Figure 1*.

The frequency range 1000.0MHz-10,000MHz was scanned. RBW was set to 1000 kHz. The readings were maximized by adjusting the turntable azimuth between 0-360°, and the antenna polarization.

The evaluation distance was 3 meters.

5.3 Test Limits

Fundamental frequency (MHz)	Field strength of harmonics (microvolts/meter)	Field strength of harmonics (dBuV/m)
902.0-928.0 MHz	500.0	54.0
2400-2483.5 MHz	500.0	54.0
5725.0-5875.0 MHz	500.0	54.0
24.0-24.25 GHz	2500.0	68.0

* for frequencies above 1000 MHz, the field strength limits of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

5.4 Test Results

JUDGEMENT: Passed

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

For additional information see *Figure 11* and *Figure 12*.



Field Strength of Harmonics

E.U.T Description 915 MHz RF Module
Type RWTRSS10915A-40
Serial Number: Not designated

Specification: FCC Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency Range: 30 MHz to 10.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: 915.0MHz

Freq. (MHz)	Polarity (H/V)	Avg (dB μ V/m)			Limit (dB μ V/m)	Margin (dB)
		X	Y	Z		
1829.9	H	35.1	35.3	35.4	54.0	-18.6
1829.9	V	36.2	36.5	36.0	54.0	-17.5
2745.3	H	37.4	37.6	37.7	54.0	-16.3
2744.9	V	36.8	37.0	37.3	54.0	-16.7
5490.0	H	39.2	39.7	39.5	54.0	-14.3
5489.5	V	40.3	40.8	40.9	54.0	-13.1

Figure 11. Field Strength of Harmonics. Antenna Polarization: AVG -HORIZONTAL / VERTICAL.



Field Strength of Harmonics

E.U.T Description 915 MHz RF Module
Type RWTRSS10915A-40
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency Range: 30 MHz to 10.0 GHz
Test Distance: 3 meters Detector: Peak
Operation Frequency: 915.0MHz

Freq. (MHz)	Polarity (H/V)	Peak (dB μ V/m)			Limit (dB μ V/m)	Margin (dB)
		X	Y	Z		
1829.9	H	41.3	41.4	41.0	74.0	-32.6
1829.9	V	42.2	42.5	42.7	74.0	-31.3
2745.3	H	43.7	44.2	44.7	74.0	-29.3
2744.9	V	44.1	44.5	44.8	74.0	-29.2
5490.0	H	50.1	50.3	49.7	74.0	-23.7
5489.5	V	50.2	49.6	50.3	74.0	-23.7

Figure 12. Field Strength of Harmonics. Antenna Polarization: Peak -HORIZONTAL / VERTICAL.

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



5.5 Test Instrumentation Used; Field Strength of Harmonics

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Last Calibration Date
EMI Receiver	R&S	ESCI7	100724	February 29, 2016	March 1, 2017
Spectrum Analyzer	HP	8592L	3826A01204	March 13, 2016	March 13, 2017
Active Loop Antenna	EMCO	6502	9506-2950	November 5, 2015	November 30, 2016
Biconical Antenna	EMCO	3110B	9912-3337	March 24, 2016	March 24, 2018
Log Periodic Antenna	EMCO	3146	9505-4081	April 23, 2016	April 23, 2017
1G-18GHz Horn Antenna	ETS	3115	29845	May 19, 2015	May 19, 2018
Antenna Mast	ETS	2070-2	9608-1497	N/A	N/A
Turntable	ETS	2087	-	N/A	N/A
Mast & Table Controller	ETS/EMCO	2090	9908-1456	N/A	N/A

Figure 13 Test Equipment Used



5.6 **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.



6. Radiated Emission

6.1 Test Specification

Part 15, Subpart C, Section 15.249(d)

6.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 2 of this report.

For measurements between 0.009MHz -30.0MHz:

The E.U.T was tested inside the shielded room and placed on a non-metallic table, 1.5 meters above the ground. The frequency range 0.009MHz-30.0MHz was scanned. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.

For 30.0MHz-1000.0MHz range:

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 0.009 MHz-1000 MHz was scanned.

RBW was set to 100 kHz.

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

For 1000.0MHz-10,000.0MHz range:

The E.U.T was placed in the chamber and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The configuration tested is shown in *Figure 1*.

The frequency range 1000.0MHz-10,000MHz was scanned. RBW was set to 1000 kHz. The readings were maximized by adjusting the turntable azimuth between 0-360°, and the antenna polarization.

For all final evaluations the distance was 3 meters.

6.3 Test Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

6.4 Test Results

JUDGEMENT: Passed

The margin between the emission level and the specification limit was 4.5 dB in the worst case at the frequency of 64.8 MHz, vertical polarization.

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 15.249 specification.



Radiated Emission

E.U.T Description 915 MHz RF Module
Type RWTRSS10915A-40
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 30 MHz to 10.0 GHz
Test Distance: 3 meters Detector: Peak
Operation Frequency: 915.0MHz

Freq. (MHz)	Polarity (H/V)	Peak (dBμV/m)	Q.Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)
64.8	H	26.6	20.3	40.0	-13.4
64.8	V	35.5	25.7	40.0	-4.5
125.7	H	29.1	22.7	43.5	-14.4
125.7	V	32.2	25.3	43.5	-11.3
159.6	H	33.3	26.9	43.5	-10.2
159.6	V	32.2	25.2	43.5	-11.3

**Figure 14. 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



6.5 Test Instrumentation Used; Radiated Emissions

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Date
EMI Receiver	R&S	ESCI7	100724	February 29, 2016	March 1, 2017
Spectrum Analyzer	HP	8592L	3826A01204	March 13, 2016	March 13, 2017
Active Loop Antenna	EMCO	6502	9506-2950	November 5, 2015	November 30, 2016
Biconical Antenna	EMCO	3110B	9912-3337	March 24, 2016	March 24, 2018
Log Periodic Antenna	EMCO	3146	9505-4081	April 23, 2016	April 23, 2017
1G-18GHz Horn Antenna	ETS	3115	29845	May 19, 2015	May 19, 2018
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 15 Test Equipment Used



6.6 **Field Strength Calculation**

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

$$[\text{dB}\mu\text{v}/\text{m}] \text{ FS} = \text{RA} + \text{AF} + \text{CF}$$

- 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]



7. Antenna Info/Gain

+3.0dBi



P/N: ANT868-2S-CHETH

Rev-D

Specification

Frequency: 868.65 MHz Gain: Max +3dbi



8. R.F Exposure/Safety

Typical use of the E.U.T. is as a module in alarm system units.

The typical placement of the E.U.T. is in alarm detectors, control panels, keypads.

The typical distance between the E.U.T. and the user is greater than 20 cm.

Calculation of Maximum Permissible Exposure (MPE) Based on Section 1.1310 Requirements

(a) FCC limits at 915 MHz is: $(f/1500)\frac{mW}{cm^2} = 915/1500 = .61\frac{mW}{cm^2}$

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 92.1dBuV/m (Peak) = -3.1dBm = 0.49mW
(testing performed conducted, power calculation contains antenna gain)

G_T - Antenna Gain, +3.0dBi

R- Distance from Transmitter using 20cm

(c) The peak power density is:

$$S_p = \frac{0.49}{4\pi(20)^2} = 9.75 \times 10^{-5} \frac{mW}{cm^2}$$

(d) This is below the FCC limit.

9. APPENDIX A - CORRECTION FACTORS

9.1 Correction factors for **CABLE**

from EMI receiver
to test antenna
at 3 meter range.

Frequency (MHz)	Cable Loss (dB)
0.010	0.4
0.015	0.2
0.020	0.2
0.030	0.3
0.050	0.3
0.075	0.3
0.100	0.2
0.150	0.2
0.200	0.3
0.500	0.4
1.00	0.4
1.50	0.5
2.00	0.5
5.00	0.6
10.00	0.8
15.00	0.9
20.00	0.8

Frequency (MHz)	Cable Loss (dB)
50.00	1.2
100.00	0.7
150.00	2.1
200.00	2.3
300.00	2.9
500.00	3.8
750.00	4.8
1000.00	5.4
1500.00	6.7
2000.00	9.0
2500.00	9.4
3000.00	9.9
3500.00	10.2
4000.00	11.2
4500.00	12.1
5000.00	13.1
5500.00	13.5
6000.00	14.5

NOTES:

1. The cable type is SPUMA400 RF-11N(X2) and 39m long
2. The cable is manufactured by Huber + Suhner



9.2 Correction factors for CABLE
from EMI receiver
to test antenna
at 3 meter range (chamber).

Frequency (GHz)	Cable Loss (dB)	Frequency (MHz)	Cable Loss (dB)
1.0	-1.5	11.0	-6.1
2.0	-2.1	12.0	-6.1
3.0	-2.7	13.0	-6.2
4.0	-3.1	14.0	-6.7
5.0	-3.5	15.0	-7.4
6.0	-4.1	16.0	-7.5
7.0	-4.6	17.0	-7.9
8.0	-4.9	18.0	-8.1
9.0	-5.7	19.0	-8.8
10.0	-5.7	20.0	-9.1

NOTES:

- 1. The cable type is 0623 WBC-400 and 39m long*
- 2. The cable is manufactured by COMMSCOPE*



9.3 Correction factors for CABLE

from EMI receiver
to test antenna
at 3 meter range additional
cable(chamber).

Frequency (GHz)	Cable Loss (dB)
1.0	-0.3
2.0	-0.5
3.0	-0.7
4.0	-0.7
5.0	-0.7
6.0	-1.0
7.0	-0.3
8.0	-0.4
9.0	-0.7

Frequency (MHz)	Cable Loss (dB)
10.0	-0.1
11.0	-2.0
12.0	-0.4
13.0	-2.9
14.0	-3.3
15.0	-1.6
16.0	-2.6
17.0	-1.4
18.0	-1.4

NOTES:

1. The cable type is 705A009301 EIM and 1m long
2. The cable is manufactured by Huber Zhuner



9.4 Correction factors for LOG PERIODIC ANTENNA

Model: 3146

**Antenna serial number: 9505-4081
3 meter range**

Frequency [MHz]	AF [dB/m]
200.0	11.47
250.0	12.06
300.0	14.77
400.0	15.77
500.0	18.01
600.0	18.84
700.0	20.93
800.0	21.27
900.0	22.44
1000.0	24.10



9.5 Correction factors for Biconical Antenna

Model: EMCO 3110B

serial number: 9912-3337

3 meter range

Frequency [MHz]	AF [dB/m]
30.0	14.18
35.0	13.95
40.0	12.84
45.0	11.23
50.0	11.10
60.0	10.39
70.0	9.34
80.0	9.02
90.0	9.31
100.0	8.95
120.0	11.53
140.0	12.20
160.0	12.56
180.0	13.49
200.0	15.27



9.6 Correction factors for Horn ANTENNA

Model: 3115

Antenna serial number: 29845

10 meter range

FREQUENCY (MHz)	AFE (dB/m)	FREQUENCY (MHz)	AFE (dB/m)
1000	22.4	10000	36.1
2000	25.2	11000	37.0
3000	31.1	12000	41.3
4000	30.2	13000	38.1
5000	34.2	14000	41.7
6000	31.6	15000	39.0
7000	34.7	16000	38.8
8000	34.8	17000	43.2
9000	36.2	18000	43.7



9.7 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