



**DATE: 26 March 2014**

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


**For**

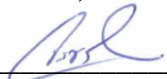
**Panoramic Power Ltd.**

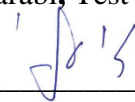
**Equipment under test:**

**High Current Wireless Sensor**

**PAN-14-US**

Written by:   
R. Pinchuck, Documentation

Approved by:   
A. Sharabi, Test Engineer

Approved by:   
I. Raz, EMC Laboratory Manager

This report must not be reproduced, except in full, without the written  
permission of I.T.L. (Product Testing) Ltd.

This report relates only to items tested.



## Measurement/Technical Report for Panoramic Power Ltd.

Equipment under test:

### High Current Wireless Sensor PAN-14-US

FCC ID: Z9M-PAN-1-4

This report concerns:

Original Grant: x

Class I change:

Class II change:

Equipment Type:

Digital Transmission System

Limits used:

47CFR15 Section 15.249

Measurement procedure used is KDB 558074 D01 09 April 2013 and  
ANSI C63.4-2003.

Application for Certification

prepared by:

R Pinchuck

ITL (Product Testing) Ltd.

Kfar Bin Nun

D.N. Shimshon 99780

Israel

Tel: +972-8-918-6117

Fax: +972-8-915-3101

Email: rpinchuck@itl.co.il

Applicant for this device:

(different from "prepared by")

Adi Shamir

Panoramic Power Ltd.

20 Atir Yeda St.

Kfar Saba, 44643

Israel

Tel: 972-9-766-7600

Fax: 972-9-766-7610

Email: adi@panpwr.com



## TABLE OF CONTENTS

<b>1.</b>	<b>GENERAL INFORMATION</b>	<b>4</b>
1.1	Administrative Information	4
1.2	List of Accreditations	5
1.3	Product Description	6
1.4	Test Methodology	6
1.5	Test Facility	6
1.6	Measurement Uncertainty	6
<b>2.</b>	<b>SYSTEM TEST CONFIGURATION</b>	<b>7</b>
2.1	Justification	7
2.2	Special Accessories	7
2.3	Equipment Modifications	7
2.4	Configuration of Tested System	7
<b>3.</b>	<b>RADIATED MEASUREMENTS TEST SETUP PHOTOS</b>	<b>8</b>
<b>4.</b>	<b>FIELD STRENGTH OF FUNDAMENTAL</b>	<b>10</b>
4.1	Test Specification	10
4.2	Test Procedure	10
4.3	Test Results	10
4.4	Test Instrumentation Used, Field Strength of Fundamental	14
<b>5.</b>	<b>SPURIOUS RADIATED EMISSION 9 KHZ - 30 MHZ</b>	<b>15</b>
5.1	Test Specification	15
5.2	Test Procedure	15
5.3	Test results	15
5.4	Test Instrumentation Used, Radiated Measurements 9 kHz – 30 MHz	16
5.5	Field Strength Calculation	16
<b>6.</b>	<b>SPURIOUS RADIATED EMISSION 30 MHZ- 10 GHZ</b>	<b>17</b>
6.1	Test Specification	17
6.2	Test Procedure	17
6.3	Test Results	17
6.4	Test Instrumentation Used, Radiated Measurements 30 MHz – 10 GHz	20
6.5	Field Strength Calculation	20
<b>7.</b>	<b>BAND EDGE ATTENUATION</b>	<b>21</b>
7.1	Test Specification	21
7.2	Test Procedure	21
7.3	Test Results	21
7.4	Test Instrumentation Used, Band Edge Attenuation	25
<b>8.</b>	<b>AVERAGE FACTOR CALCULATION</b>	<b>26</b>
8.1	Test Equipment Used, Average Factor Calculation	28
<b>9.</b>	<b>APPENDIX A - CORRECTION FACTORS</b>	<b>29</b>
9.1	Correction factors for CABLE	29
9.2	Correction factors for CABLE	30
9.3	Correction factors for CABLE	31
9.4	Correction factors for LOG PERIODIC ANTENNA	32
9.5	Correction factors for LOG PERIODIC ANTENNA	33
9.6	Correction factors for BICONICAL ANTENNA	34
9.7	Correction factors for ACTIVE LOOP ANTENNA	35



## 1. General Information

### 1.1 Administrative Information

Manufacturer:	Panoramic Power Ltd.
Manufacturer's Address:	20 Atir Yeda St., Kfar Saba 44643, Israel Tel: +972-9-766-7600 Fax: +972-9-766-7610
Manufacturer's Representative:	Yael Alali
Equipment Under Test (E.U.T):	High Current Wireless Sensor
Equipment Model No.:	PAN-14-US
Equipment Serial No.:	Not Designated
Date of Receipt of E.U.T:	24.03.14
Start of Test:	24.03.14
End of Test:	25.03.14
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
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.), 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.

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 Panoramic Power sensor series is made up of non-invasive, self powered, miniature wireless current sensors. The PAN-14 high current sensor attaches to any size standard 0-5 A current transformer, allowing measurements at any current range or wire gauge. Hundreds of sensors can be installed in a few hours with no disturbance of daily operations. Powered by magnetic fields, the sensors become part of the building infrastructure, never requiring maintenance, service or battery replacement.

### **1.4 Test Methodology**

Radiated testing was performed according to the procedures in KDB 558074 D01 09 April 2013 and 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 November 21, 2012). 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):

$\pm 4.96$  dB

## 2. System Test Configuration

### 2.1 *Justification*

The E.U.T. was tested in normal operation mode set to transmit in 915MHz within the 902 – 928 MHz frequency band.

Since unit can be installed in different orientations, unit was scanned in 3 different orientations to determine worst-case radiation.

### 2.2 *Special Accessories*

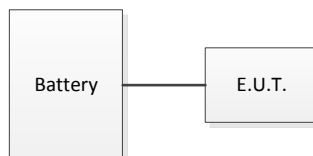
No special accessories were needed to achieve compliance.

### 2.3 *Equipment Modifications*

No special modifications were needed to achieve compliance.

### 2.4 *Configuration of Tested System*

The configuration of the tested system is described below.



**Figure 1. Configuration of Tested System**

### 3. Radiated Measurements Test Setup Photos



**Figure 2. Radiated Emission Test**



**Figure 3. Radiated Emission Test**





**Figure 4. Radiated Emission Test**



**Figure 5. 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 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 (915 MHz) Peak and Quasi-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.


### 4.3 Test Results

JUDGEMENT: Passed by 2.61 dB

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

See additional details in *Figure 6* to *Figure 8*.

TEST PERSONNEL:

Tester Signature: 

Date: 30.03.14

Typed/Printed Name: A. Sharabi



## Field Strength of Fundamental

E.U.T Description High Current Wireless Sensor  
Model Number PAN-14-US  
Serial Number: Not Designated

Specification: FCC, Part 15, Subpart C 15.249(a)

Antenna Polarization: Horizontal/Vertical

Test Distance: 3 meters

Detectors: Peak, Quasi-peak

Freq. (MHz)	Pol. V/H	Peak Reading (dB $\mu$ V/m)	Peak Specification (dB $\mu$ V/m)	QP Reading (dB $\mu$ V/m)	QP Specification (dB $\mu$ V/m)	Margin (dB)
915.0	H	91.37	113.0	91.37	93.98	-2.61
915.0	V	83.94	113.0	83.94	93.98	-10.04

**Figure 6. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL/VERTICAL.  
Detectors: Peak, Quasi-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.

“Peak Reading” includes “Correction Factors.

“Correction Factors” = Antenna Correction Factor + Cable Loss.

“Quasi-peak Reading” includes “Correction Factors.

“Correction Factors” = Antenna Correction Factor + Cable Loss.



## Field Strength of Fundamental

E.U.T Description High Current Wireless Sensor  
Model Number PAN-14-US  
Serial Number: Not Designated

Specification: FCC, Part 15, Subpart C 15.249(a)

Antenna Polarization: Horizontal/Vertical

Test Distance: 3 meters

Detector: Peak, Quasi-peak

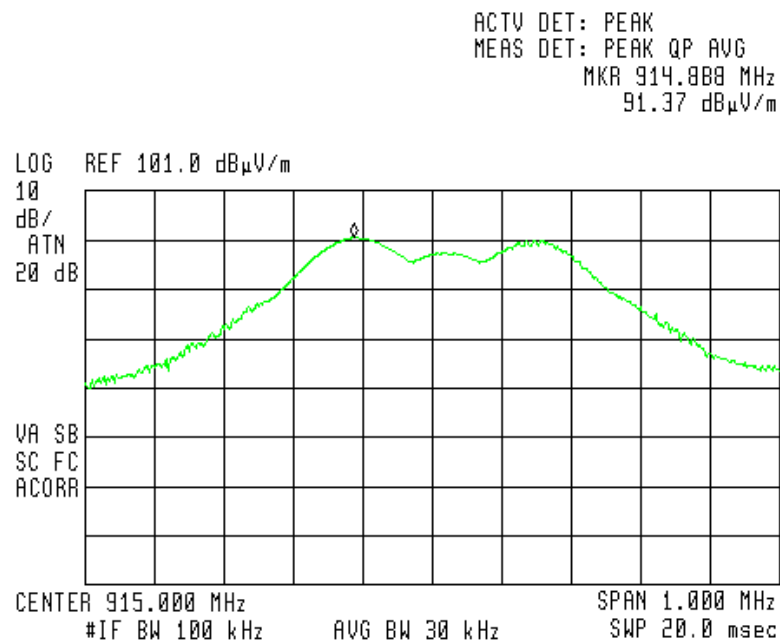


Figure 7. 915.00 MHz Antenna Polarization Horizontal



ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 914.890 MHz  
83.94 dB $\mu$ V/m

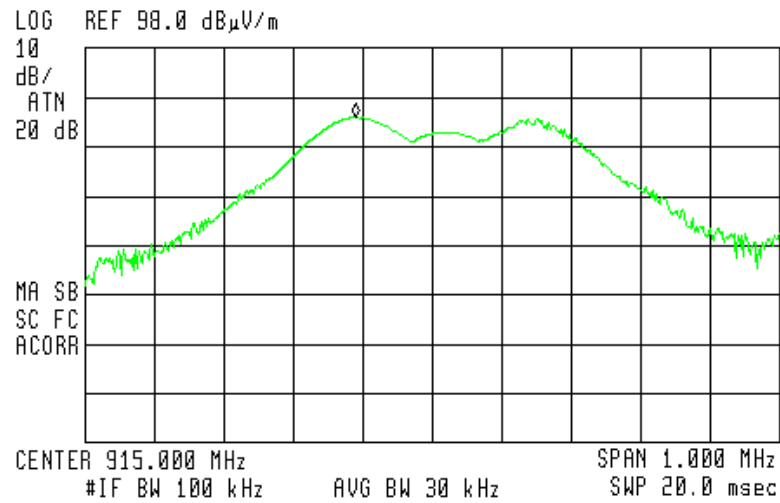


Figure 8. 915.00 MHz Antenna Polarization Vertical



#### **4.4 Test Instrumentation Used, Field Strength of Fundamental**

<b>Instrument</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration</b>	<b>Period</b>
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 year
RF Section	HP	85420E	3705A00248	January 15, 2014	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

**Figure 9 - Test Instrumentation Used**



## 5. Spurious Radiated Emission 9 kHz - 30 MHz

### 5.1 Test Specification

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

### 5.2 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-1000 MHz was scanned and the list of the highest emissions was verified and updated accordingly.

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-30 MHz, the loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter.

The E.U.T. was operated in continuous transmission to enable better detection of signals.


### 5.3 Test results

JUDGEMENT: Passed

No signals were detected in the frequency range of 9 kHz – 30 MHz.

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

TEST PERSONNEL:

Tester Signature: 

Date: 30.03.14

Typed/Printed Name: A. Sharabi



#### 5.4 Test Instrumentation Used, Radiated Measurements 9 kHz – 30 MHz

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 year
RF Section	HP	85420E	3705A00248	January 15, 2014	1 year
Active Loop Antenna	EMCO	6502	9506-2950	November 4, 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	JPKG19982	N/A	N/A

Figure 10 - Test Instrumentation Used

#### 5.5 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 $\mu$ V/m]  
RA: Receiver Amplitude [dB $\mu$ V]  
AF: Receiving Antenna Correction Factor [dB/m]  
CF: Cable Attenuation Factor [dB]

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

No external pre-amplifiers were used.





## 6. Spurious Radiated Emission 30 MHz- 10 GHz

### 6.1 Test Specification

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

### 6.2 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, 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 emission levels were compared to the requirement of Section 15.249.

In the frequency range 30 MHz - 2.9 GHz, a computerized EMI receiver complying with CISPR 16 requirements was used. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 2.9 - 10 GHz, a spectrum analyzer including a low noise amplifier was used. During peak measurements, the I.F. bandwidth was 1 MHz, and video bandwidth 3 MHz. During average measurements, the I.F. bandwidth was 1 MHz and video bandwidth was 100 Hz.

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

Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.).

The test distance was 3 meters.

### 6.3 Test Results

JUDGEMENT: Passed by 18.1 dB

The margin between the emission level and the specification limit is 18.1dB in the worst case at the frequency of 2744MHz, vertical polarization.

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

TEST PERSONNEL:

Tester Signature: 

Date: 30.03.14

Typed/Printed Name: A. Sharabi



## Spurious Radiated Emission 30 MHz- 10 GHz

E.U.T Description High Current Wireless Sensor  
Type PAN-14-US  
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 (MHz)	Freq. (MHz)	Pol. V/H	Peak Reading (dB $\mu$ V/m)	Peak Specification (dB $\mu$ V/m)	Margin (dB)
915.00	1830.00	H	53.9	74.0	-20.1
915.00	1830.00	V	53.7	74.0	-20.3
915.00	2744.0	H	55.2	74.0	-18.8
915.00	2744.0	V	55.9	74.0	-18.1

**Figure 11. Spurious Radiated Emission**

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 Reading” includes correction factor.

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



## Spurious Radiated Emission 30 MHz- 10 GHz

E.U.T Description High Current Wireless Sensor  
Type PAN-14-US  
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 (MHz)	Freq. (MHz)	Pol. V/H	Average Reading (dB $\mu$ V/m)	Average Specification (dB $\mu$ V/m)	Margin (dB)
915.00	1830.00	H	12.9	54.0	-41.1
915.00	1830.00	V	12.7	54.0	-41.3
915.00	2744.0	H	14.2	54.0	-39.8
915.00	2744.0	V	14.9	54.0	-39.1

**Figure 12. Spurious Radiated Emission**

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 Reading” includes correction factor.

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

#### 6.4 Test Instrumentation Used, Radiated Measurements 30 MHz – 10 GHz

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2013	1 Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	1 Year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	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	JPKGK19982	N/A	N/A

Figure 13 - Test Instrumentation Used

#### 6.5 Field Strength Calculation

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

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

FS: Field Strength [dB $\mu$ V/m]  
 RA: Receiver Amplitude [dB $\mu$ V]  
 AF: Receiving Antenna Correction Factor [dB/m]  
 CF: Cable Attenuation Factor [dB]



## 7. Band Edge Attenuation

### 7.1 Test Specification

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

### 7.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3. The E.U.T. was placed on a non-conductive table, 0.8 meters above the O.A.T.S. ground plane.

The EMI receiver was set to the E.U.T. Fundamental Frequency 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.

### 7.3 Test Results

JUDGEMENT: Passed by 0.5 dB

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

TEST PERSONNEL:

Tester Signature:  \_\_\_\_\_

Date: 30.03.14

Typed/Printed Name: A. Sharabi



## Band Edge Attenuation

E.U.T Description    High Current Wireless Sensor  
Model Number        PAN-14-US  
Serial Number:       Not Designated

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

<b>Freq.</b> (MHz)	<b>Reading</b> (dBc)	<b>Specification</b> (dBc)	<b>Margin</b> (dB)
902.0	-51.2	-50	-1.2
928.0	-50.5	-50	-0.5

**Figure 14. Band Edge Attenuation**

## Band Edge Attenuation

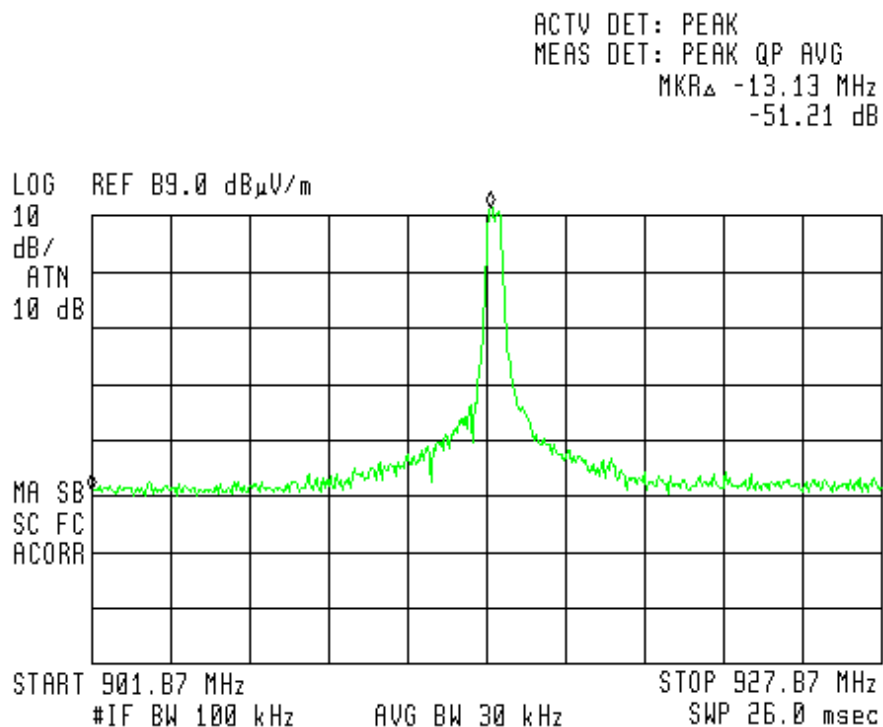


Figure 15. Band Edge Attenuation

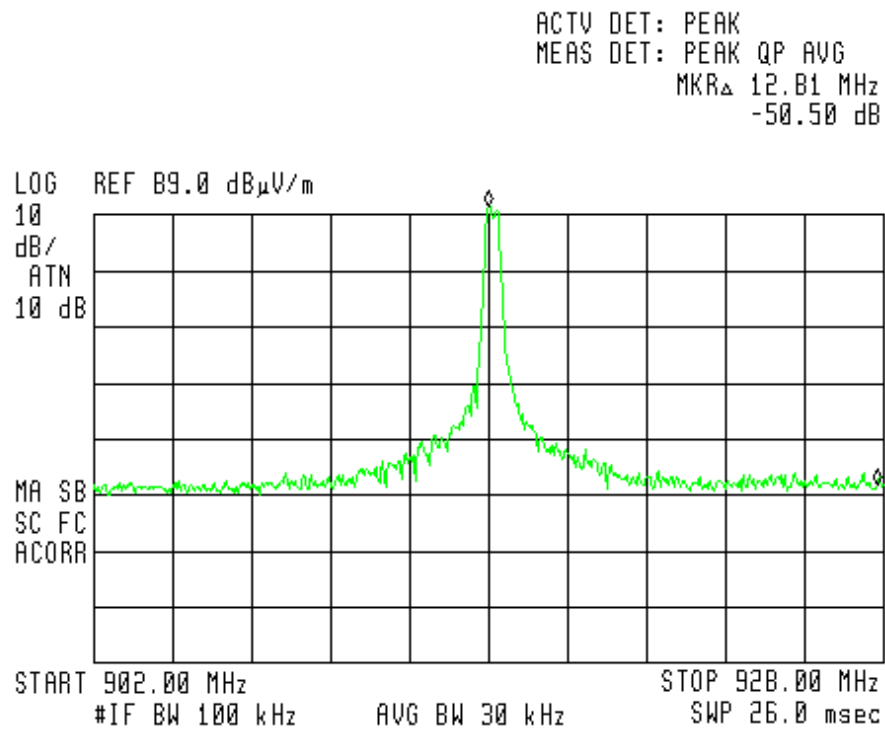


Figure 16. Band Edge Attenuation





#### **7.4 Test Instrumentation Used, Band Edge Attenuation**

<b>Instrument</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial No.</b>	<b>Last Calibration Date</b>	<b>Period</b>
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	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 17 -Test Instrumentation Used**

## 8. Average Factor Calculation

1. Burst duration = 0.825msec
2. Time between bursts >100msec
3. Average Factor =  $20 \log \left[ \frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{burst duration}}{100\text{msec}} \times \text{Num of burst within 100msec} \right]$

$$\text{Average Factor} = 20 \log \left[ \frac{0.825}{100} \right] = -41.0\text{dB}$$

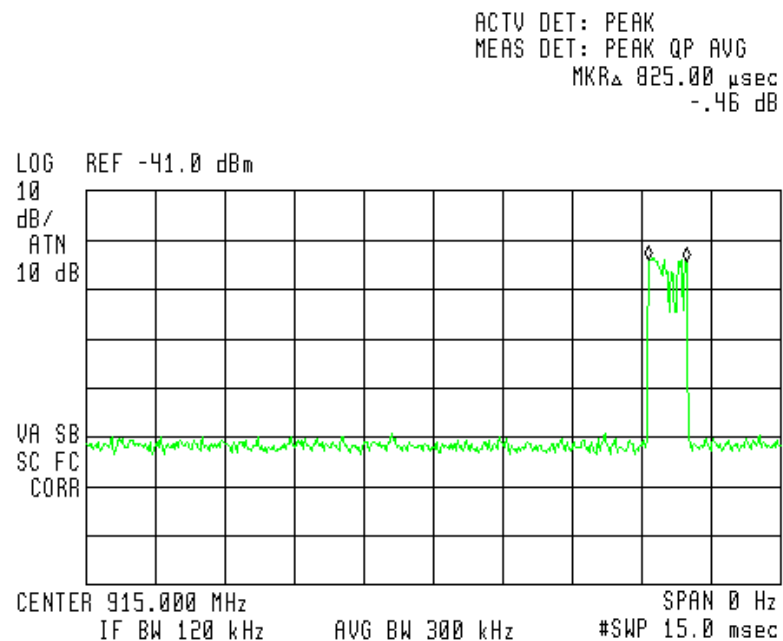


Figure 18 Avg. Factor - Pulse Duration = 0.825msec



ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR $\Delta$  -5.1000 sec  
27.25 dB

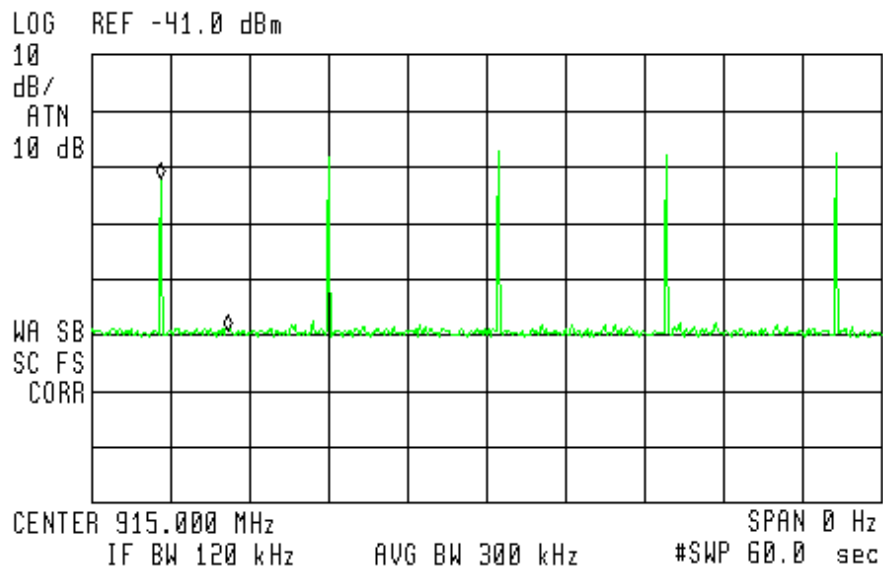


Figure 19 Avg. Factor - Time between transmissions >100msec



### 8.1 Test Equipment Used, Average Factor Calculation

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A0027 6	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A0024 8	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2013	1 Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	1 Year
Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	Narda	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A0120 4	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A0027 5	March 2, 2014	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	JPKG199 82	N/A	N/A

**Figure 20 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	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.*

**9.3 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.



#### 9.4 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".





**9.5 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".



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

<b>FREQUENCY</b>	<b>AFE</b>
<b>(MHz)</b>	<b>(dB/m)</b>
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".



**9.7 Correction factors for ACTIVE LOOP ANTENNA**

**Model 6502  
S/N 9506-2950**

<b>FREQUENCY</b>	<b>Magnetic Antenna Factor</b>	<b>Electric Antenna Factor</b>
<b>(MHz)</b>	<b>(dB)</b>	<b>(dB)</b>
.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