





**DATE: 5 July 2012**

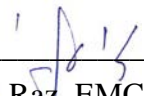
**I.T.L. (PRODUCT TESTING) LTD.**  
**FCC Radio Test Report**  
**for**  
**The Stanley Works Israel Ltd.**

**Equipment under test:**

**Stanley Guard Object Tracking  
Device**

Written by:   
I. Smilansky, 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**  
**The Stanley Works Israel Ltd.**  
**Stanley Guard Object Tracking Device**

**FCC ID: GDOICS311000**

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

Equipment type:                      Digital Transmission System

Limits used:  
47CFR15 Section 15.209; 15.247

Measurement procedure used is KDB 558074 D01 18 January 2012 and  
ANSI C63.4-2003.

Application for Certification  
prepared by:  
Ishaishou Raz  
ITL (Product Testing) Ltd.  
Kfar Bin Nun  
D.N. Shimshon 99780  
Israel

e-mail Sraz@itl.co.il

Applicant for this device:  
(different from "prepared by")  
Irit Teerosh  
The Stanley Works Israel Ltd.  
19 Ha'melacha St.  
New Industrial Zone  
Rosh Ha Ayin 48091  
Israel  
Tel: + 972 - 3 - 902-0200  
Fax: + 972 - 3 - 902-0222  
e-mail: Irit.Teerosh@sbdinc.com



## TABLE OF CONTENTS

<b>1.</b>	<b>GENERAL INFORMATION -----</b>	<b>5</b>
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
<b>2.</b>	<b>SYSTEM TEST CONFIGURATION-----</b>	<b>8</b>
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 .....	8
<b>4.</b>	<b>6DB MINIMUM BANDWIDTH -----</b>	<b>10</b>
4.1	Test Specification .....	10
4.2	Test procedure .....	10
4.3	Test Results.....	11
4.4	6dB Minimum Bandwidth Test Equipment Used. ....	12
<b>5.</b>	<b>RADIATED POWER OUTPUT -----</b>	<b>13</b>
5.1	Test Specification .....	13
5.2	Test procedure .....	13
5.3	Test Results.....	15
5.4	Radiated Power Output Test Equipment Used. ....	16
<b>6.</b>	<b>RADIATED EMISSION, 9 KHZ – 30 MHZ-----</b>	<b>17</b>
6.1	Test Specification .....	17
6.2	Test Procedure .....	17
6.3	Measured Data .....	17
6.4	Radiated Emission Test Instrumentation Used. ....	18
6.5	Field Strength Calculation .....	18
<b>7.</b>	<b>SPURIOUS RADIATED EMISSION 30 – 25000 MHZ-----</b>	<b>19</b>
7.1	Test Specification .....	19
7.2	Test Procedure .....	19
7.3	Test Results.....	20
7.4	Radiated Emission Test Instrumentation Used. ....	23
7.5	Field Strength Calculation 30 – 1000 MHz .....	24
<b>8.</b>	<b>RADIATED POWER SPECTRAL DENSITY-----</b>	<b>25</b>
8.1	Test procedure .....	25
8.2	Test Results.....	26
8.3	Transmitted Power Density Test Equipment Used.....	27
<b>9.</b>	<b>ANTENNA GAIN/INFORMATION -----</b>	<b>28</b>
<b>10.</b>	<b>R.F EXPOSURE/SAFETY -----</b>	<b>29</b>



<b>11.</b>	<b>APPENDIX A - CORRECTION FACTORS-----</b>	<b>30</b>
11.1	Correction factors for CABLE .....	30
11.2	Correction factors for CABLE .....	31
11.3	Correction factors for CABLE .....	32
11.4	Correction factors for LOG PERIODIC ANTENNA .....	33
11.5	Correction factors for LOG PERIODIC ANTENNA .....	34
11.6	Correction factors for BICONICAL ANTENNA .....	35
11.7	Correction factors for Double-Ridged Waveguide Horn .....	36
11.8	Correction factors for Horn Antenna .....	37
11.9	Correction factors for ACTIVE LOOP ANTENNA .....	38



## 1. General Information

### 1.1 Administrative Information

Manufacturer:	The Stanley Works Israel Ltd.
Manufacturer's Address:	19 Ha'Melacha St. New Industrial Zone, Rosh Ha'Ayin, 48091 Israel Tel: +972-3-902-0200 Fax: +972-3-902-0222
Manufacturer's Representative:	Irit Teerosh
Equipment Under Test (E.U.T):	Stanley Guard Object Tracking Device
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	20.02.2012
Start of Test:	20.02.2012
End of Test:	23.02.2012
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Part 15 Subpart C



## **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***

An inventory control system for reducing tool loss in jobsites during working hours.

The systems contains the main unit which interacts with other system components and provides the logic that validates the functionality.

The tool tag units interact with main unit and LF 125KHz passive RFID tags to identify tool tags (2.4GHz active tags) to identify objects.

### **1.4     *Test Methodology***

Radiated testing was performed according to the procedures in KDB 558074 D01 18 January 2012 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 September 3, 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

## 2. System Test Configuration

### 2.1 *Justification*

Radiated emission screening was performed in 3 orthogonal orientations since device can be installed in different orientations.

### 2.2 *EUT Exercise Software*

Original software was used.

### 2.3 *Special Accessories*

No special accessories were required.

### 2.4 *Equipment Modifications*

No modifications were needed in order to achieve compliance

### 2.5 *Configuration of Tested System*



Figure 1. Configuration of Tested System



### 3. Test Set-up Photo



**Figure 2 - Radiated Emission Test**

## 4. 6dB Minimum Bandwidth

### 4.1 Test Specification

F.C.C. Part 15, Subpart C: 15.247(a)(2)

### 4.2 Test procedure

The E.U.T was placed on a non-metallic table, 0.8 meters above the ground plane, on a remote-controlled turntable in the OATS. The test distance was 3 meters. The transmitter unit operated with normal modulation. The EMI receiver was set to 100 kHz resolution BW. The spectrum bandwidth of the transmitter unit was measured and recorded. The test was performed to measure the transmitter occupied bandwidth. The EUT was set up as shown in Figure 2, and its proper operation was checked. The transmitter occupied bandwidth was measured with the EMI receiver as frequency delta between reference points on modulation envelope. The E.U.T. was tested in operating channel at frequency 2407 MHz.

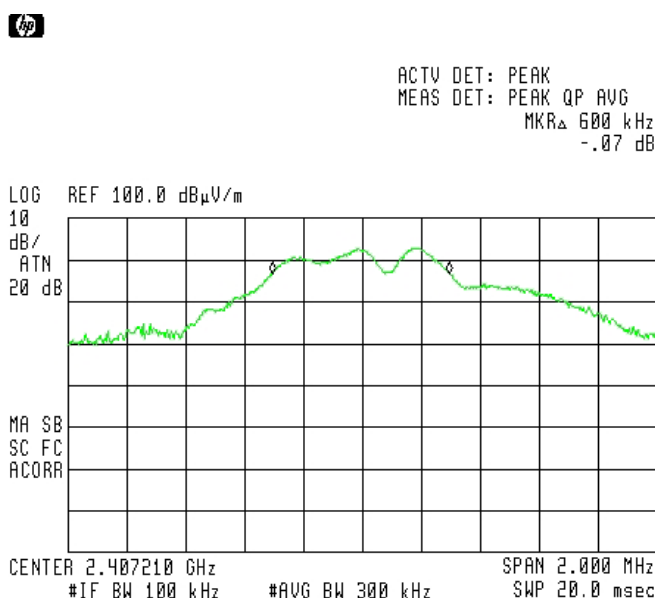


Figure 3. 2407 MHz




#### 4.3 Test Results

Operation Frequency (MHz)	Bandwidth Reading (MHz)	Specification (MHz)
2407	0.6	>0.5

**Figure 4 Test Results**

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: 

Date: 30.07.12

Typed/Printed Name: A. Sharabi



#### **4.4 6dB Minimum Bandwidth Test Equipment Used.**

<b>Instrument</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration</b>	<b>Period</b>
EMI Receiver	HP	85422E	3906A00276	December 12 , 2011	1 year
RF Section	HP	85420E	3705A00248	December 12, 2011	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	January 27 , 2011	2 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 5 Test Equipment Used**



## 5. Radiated Power Output

### 5.1 Test Specification

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

### 5.2 Test procedure

The E.U.T was placed on a non-metallic table, 0.8 meters above the ground plane, on a remote-controlled turntable in the OATS. The test distance was 3 meters.

The transmitter unit operated with normal modulation. The EMI receiver was set to 1 MHz resolution BW. The EUT was set up as shown in Figure 2, and its proper operation was checked.

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

The E.U.T. was tested in operating channel at frequency 2407 MHz.

Radiated output power levels were measured at selected operation frequencies and the results were converted to power level according to the formula as shown below:

$$P = \frac{(E_{V/m} \times d)^2}{(30 \times G)} [\text{W}]$$

The E.U.T. was tested at 2407 MHz with QPSK modulation.



ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 2.407398 GHz  
96.44 dB $\mu$ V/m

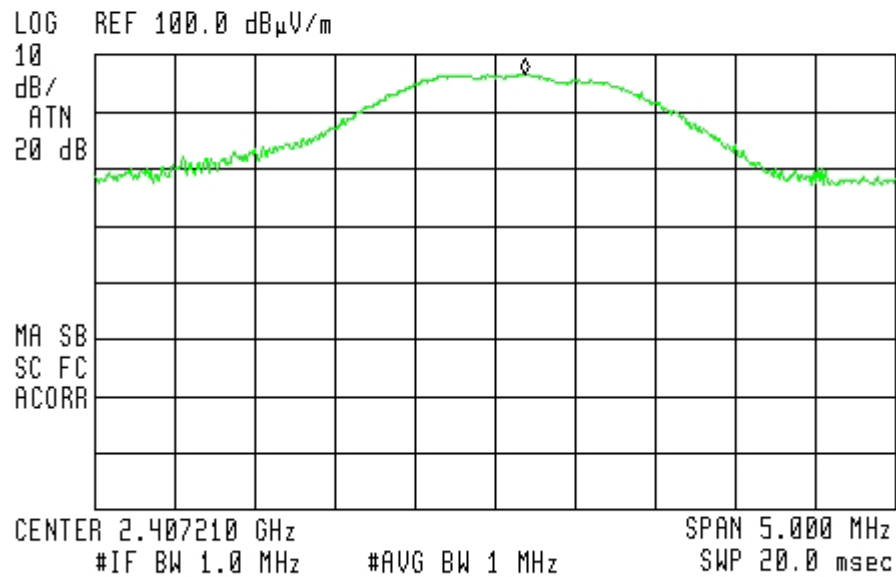


Figure 6 2407 MHz



### 5.3 Test Results

Frequency	E	E	Antenna Gain	Antenna Distance	Calculated Results	Limit	Margin
(MHz)	(dBμV/m)	(V/m)	(dBi)	(m)	(mW)	(mW)	(mW)
2407	96.44	0.07	0	3	1.47	1000	-998.53

Figure 7 - Radiated Power Output Test Results Table

JUDGEMENT: Passed by 998.53 mW

TEST PERSONNEL:

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

Date: 30.07.12

Typed/Printed Name: A. Sharabi



#### **5.4 Radiated Power Output Test Equipment Used.**

<b>Instrument</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration</b>	<b>Period</b>
Receiver	HP	85422E	3906A00276	December 12 , 2011	1 year
RF Section	HP	85420E	3705A00248	December 12 , 2011	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A
Antenna-Log Periodic	A.H.System	SAS-200/511	253	January 27 , 2011	2 years

**Figure 8 Test Equipment Used**





## 6. Radiated Emission, 9 kHz – 30 MHz

### 6.1 Test Specification

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

### 6.2 Test Procedure

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

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

In the frequency range 9 kHz-30MHz, the loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter at a distance of 3 meters.

The E.U.T. was tested in operating channel at frequency 2407 MHz.

### 6.3 Measured Data

JUDGEMENT: Passed

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

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

TEST PERSONNEL:

Tester Signature: 

Date: 30.07.12

Typed/Printed Name: A. Sharabi



#### 6.4 Radiated Emission Test Instrumentation Used.

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	December 12, 2011	1 year
RF Section	HP	85420E	3705A00248	December 12, 2011	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 19 , 2011	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 9 - Test Equipment 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:

$$FS = RA + AF + CF$$

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 are used.



## **7. Spurious Radiated Emission 30 – 25000 MHz**

### **7.1 Test Specification**

30 MHz-25000 MHz, F.C.C., Part 15, Subpart C

### **7.2 Test Procedure**

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

See Section 2.1 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 frequency range 30 MHz-25000 MHz was scanned, and the list of the highest emissions was verified and 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.

In the frequency range 30 MHz -2.9 GHz, a computerized EMI receiver complying to 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 2.9-25.0 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 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.

The E.U.T. was tested in operating channel at frequency 2407 MHz.




### 7.3 Test Results

JUDGEMENT: Passed by 9.6 dB

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

The margin between the emission level and the specification limit is 9.6 in the worst case at the frequency of 7222.2 MHz, horizontal and vertical polarizations.

TEST PERSONNEL:

Tester Signature: 

Date: 30.07.12

Typed/Printed Name: A. Sharabi



## Radiated Emission Above 1 GHz

E.U.T Description Stanley Guard Object Tracking Device

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 (MHz)	Freq. (MHz)	Polarity (H/V)	Peak Reading (dB $\mu$ V/m)	Peak. Specification (dB $\mu$ V/m)	Peak. Margin (dB)
2407.4	2390.00	H	54.3	74.0	-19.7
2407.4	2390.00	V	53.7	74.0	-20.3
2407.4	4814.8	H	51.7	74.0	-22.3
2407.4	4814.8	V	51.7	74.0	-22.3
2407.4	7222.2	H	58.2	74.0	-15.8
2407.4	7222.2	V	58.2	74.0	-15.8

**Figure 10. 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 Reading” includes correction factor.

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



## Radiated Emission Above 1 GHz

E.U.T Description Stanley Guard Object Tracking Device  
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical  
Test Distance: 3 meters

Frequency range: 1.0 GHz to 25.0 GHz  
Detector: Average

Operation Frequency (MHz)	Freq. (MHz)	Polarity (H/V)	Average Reading (dB $\mu$ V/m)	Average Specification (dB $\mu$ V/m)	Average Margin (dB)
2407.4	2390.00	H	40.4	54.0	-13.6
2407.4	2390.00	V	40.6	54.0	-13.4
2407.4	4814.8	H	37.1	54.0	-16.9
2407.4	4814.8	V	37.4	54.0	-16.6
2407.4	7222.2	H	44.4	54.0	-9.6
2407.4	7222.2	V	44.4	54.0	-9.6

**Figure 11. 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



#### 7.4 Radiated Emission Test Instrumentation Used.

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	December 12, 2011	1 Year
RF Filter Section	HP	85420E	3705A00248	December 12, 2011	1 Year
Antenna Biconical	ARA	BCD 235/B	1041	November 12, 2011	1 Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 29 , 2011	1 Year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	January 27 , 2011	2 Years
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 14 , 2010	2 Years
Horn Antenna	ARA	SWH-28	1007	January 26 , 2011	2 Years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	November 5, 2011	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	January 4, 2012	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 21, 2011*	1 Year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKG19982	N/A	N/A

Figure 12 - Test Equipment Used

\* Calibration valid until February 29, 2012.



### **7.5 Field Strength Calculation 30 – 1000 MHz**

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]

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 are used.



## 8. Radiated Power Spectral Density

[In accordance with section 15.247(d)]

### 8.1 Test procedure

The E.U.T was placed on a non-metallic table, 0.8 meters above the ground plane, on a remote-controlled turntable in the OATS. The test distance was 3 meters.

The transmitter unit operated with normal modulation. The EMI receiver was set to 1 MHz resolution BW. The EUT was set up as shown in Figure 3, and its proper operation was checked.

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

The E.U.T. was tested in operating channel at frequency 2407 MHz.

Then the EMI receiver was set to 3 kHz resolution BW, span of 300.0 kHz, and sweep time of 100 seconds. The spectrum peaks were located at each of the 3 operating frequencies.

Radiated peak output power levels were converted to power level according to the formula as shown below:

$$P = \frac{(E_{V/m} \times d)^2}{(30 \times G)} [W]$$

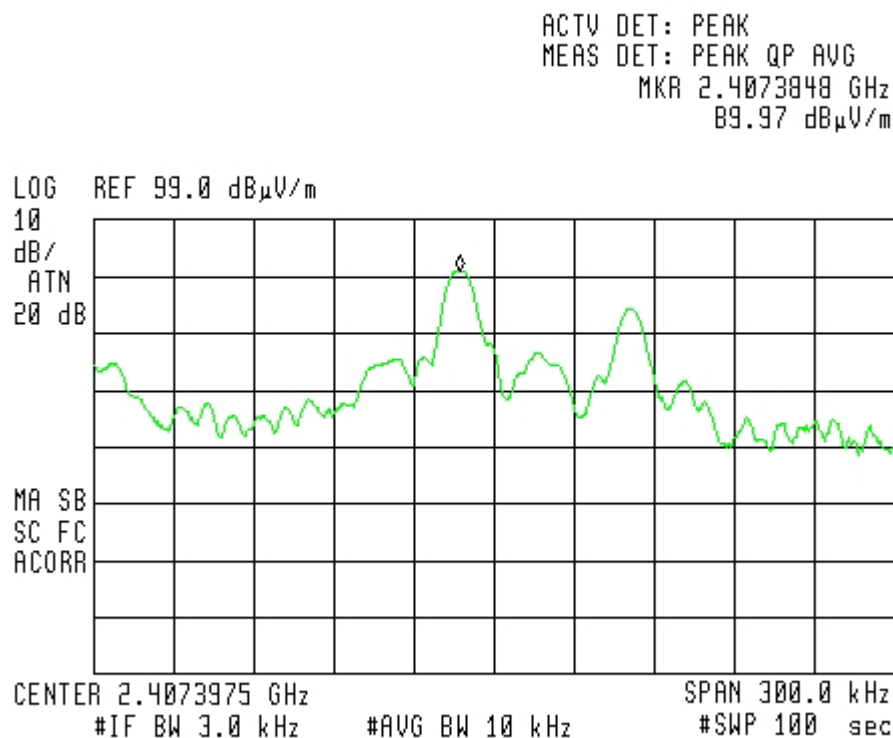


Figure 13 — 2407 MHz



## 8.2 Test Results

Frequency	E	Spectral Density Result	Antenna Gain	Antenna Distance	Calculated Results	Spec.	Margin
(MHz)	(dB $\mu$ V/m)	(V/m)	(dBi)	(m)	(mW)	(mW)	(mW)
2407.38	89.97	0.03	0	3	0.27	8	-7.3

Figure 14 Test Results

JUDGEMENT: Passed by 7.3 mW

TEST PERSONNEL:

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

Date: 30.07.12

Typed/Printed Name: A. Sharabi



### 8.3 Transmitted Power Density Test Equipment Used.

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	December 12, 2011	1 year
RF Section	HP	85420E	3705A00248	December 12, 2011	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	January 27 , 2011	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

**Figure 15 Test Equipment Used**



## 9. Antenna Gain/Information

The antenna gain is 0 dBi.



## 10. R.F Exposure/Safety

Typical use of the E.U.T. is to monitor tools on job sites. The typical placement of the E.U.T. is on a tool. The typical distance between the E.U.T. and the user is 2cm.

### Calculation of Maximum Permissible Exposure (MPE)

Based on Section 1.1307(b)(1) Requirements

(a) FCC limits at 2407 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

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

$P_t G_t$  – Calculated Transmitted Power (Power including Antenna Gain (0 dBi)) = 1.47 mw Peak (Calculated)

R- Distance from Transmitter using 2 cm worst case

(c) The peak power density is :

$$S_p = \frac{1.47}{4\pi(2)^2} = 0.029 \frac{mW}{cm^2}$$

(d) This is below the FCC limit.



## 11. APPENDIX A - CORRECTION FACTORS

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

FREQUENCY	CORRECTION FACTOR	FREQUENCY	CORRECTION FACTOR
(MHz)	(dB)	(MHz)	(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".



**11.2 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.*



**11.3 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.*





#### 11.4 Correction factors for LOG PERIODIC ANTENNA

**Type LPD 2010/A  
at 3 and 10 meter ranges.**

##### **Distance of 3 meters**

<b>FREQUENCY</b> (MHz)	<b>AFE</b> (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**

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



**11.5 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".



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

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



**11.7 Correction factors for Double-Ridged Waveguide Horn**

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

FREQUENCY	ANTENNA	ANTENN	FREQUENCY	ANTENNA	ANTENNA
(GHz)	FACTOR	A Gain	(GHz)	FACTOR	Gain
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			



**11.8 Correction factors for**

**Horn Antenna**

**Model: SWH-28  
at 1 meter range.**

<b>FREQUENCY</b> (GHz)	<b>AFE</b> (dB /m)	<b>Gain</b> (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



**11.9 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