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DATE: 28 June 2012

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

FCC Radio Test Report

for

Precyse Technologies Inc.

Equipment under test:

Badge Tag 915MHz

E3-HuTag-AGPS

Written by: _____
I. Smilansky, Documentation

Approved by: _____
I. Siboni, Test Engineer

Approved by: _____
I. Raz, EMC Laboratory Manager

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Measurement/Technical Report for

Precyse Technologies Inc.

Badge Tag 915MHz

E3-HuTag-AGPS

FCC ID: WONSA91004000

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 18 January 2012 and ANSI C63.4-2003.

Application for Certification
prepared by:
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ITL (Product Testing) Ltd.
Kfar Bin Nun
D.N. Shimshon 99780
Israel
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Applicant for this device:
(different from "prepared by")
Lior Bilia
Precyse Technologies Ltd.
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1. General Information

1.1 Administrative Information

Manufacturer:	Precyse Technologies Inc.
Manufacturer's Address:	94 Em Hamoshavot St. Petach Tikva 49527 Israel Tel: +972-3-922-7093 Fax: +972-3-922-7515
Manufacturer's Representative:	Lior Bilia
Equipment Under Test (E.U.T):	Badge Tag 915MHz
Equipment Model No.:	E3-HuTag-AGPS
Equipment Part No.:	SA91/004000
Date of Receipt of E.U.T:	30.05.2012
Start of Test:	30.05.2012
End of Test:	30.05.2012
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

The SA Tag is used to track assets in real time. It is based on an RF transceiver and a microcontroller.
It uses the iLocate proprietary protocol which provides a 2 way, half duplex communication with the base station.
The unit is powered by 1 AA lithium thionyl chloride (Li-SOCl2) battery and is hermetically sealed with no connectors available to the end user.

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. The worst case orientation was the vertical position.

The unit tested was configured with all hardware options present (Motion sensor M1 and keypad connectors J2 and J3).

2.2 EUT Exercise Software

Since the unit, under its normal operation, does not transmit data periodically, for emissions measurements, the SAT was programmed with a special test software to transmit packets continuously at maximum output power. Following files were used: BadgeTag915_Continuous_TX, Badgetag915_RXmode, Badgetag915_8.2.1.1.24 (Normal operation mode). Normal duty cycle, assuming worst case, one event per second is 0.5% (5msec transmit time per 1 second).

2.3 Special Accessories

No special accessories were required.

2.4 Equipment Modifications

No modifications were needed.

2.5 Configuration of Tested System

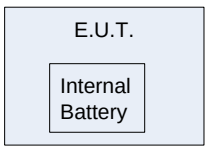

Figure 1. Configuration of Tested System

3. Test Setup Photograph

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 3, 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 at the operation frequencies of 905.0, 911.4, and 917.0 MHz.

4.3 Test Results

Operation Frequency (MHz)	Bandwidth Reading (MHz)	Specification (MHz)
905.0	0.595	>0.5
911.4	0.575	>0.5
917.0	0.580	>0.5

Figure 3 6dB Minimum Bandwidth Test Results Table

.

JUDGEMENT: Passed

Additional information of the results is given in *Figure 4* to *Figure 6*.

TEST PERSONNEL:

Tester Signature: _____ Date: 28.06.12

Typed/Printed Name: I. Siboni

6dB Minimum Bandwidth

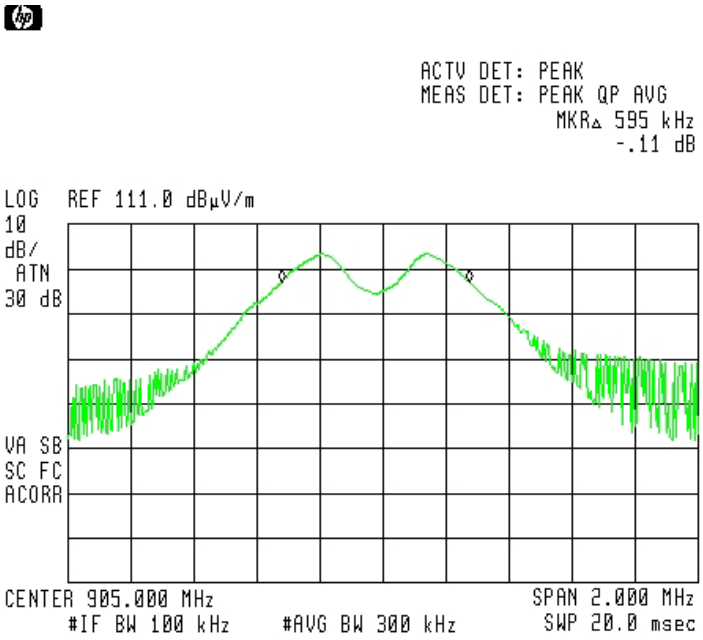

Figure 4. — 905.0 MHz

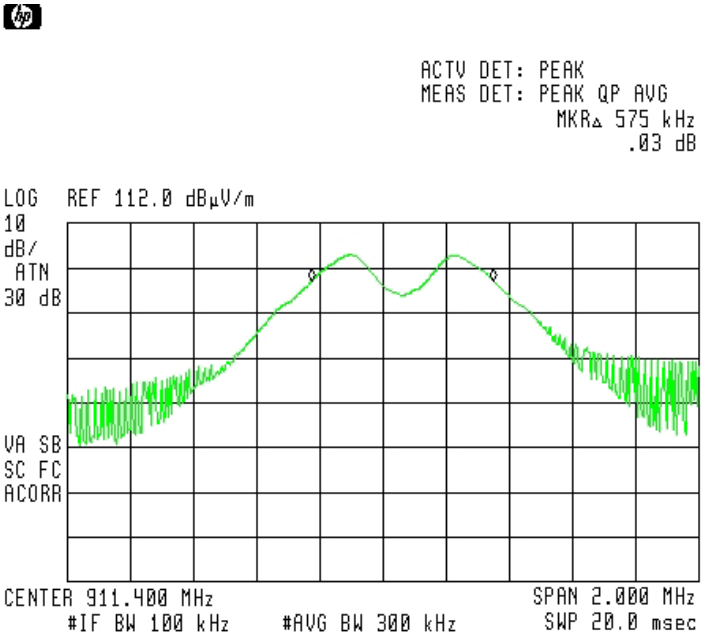

Figure 5. — 911.4 MHz

6dB Minimum Bandwidth

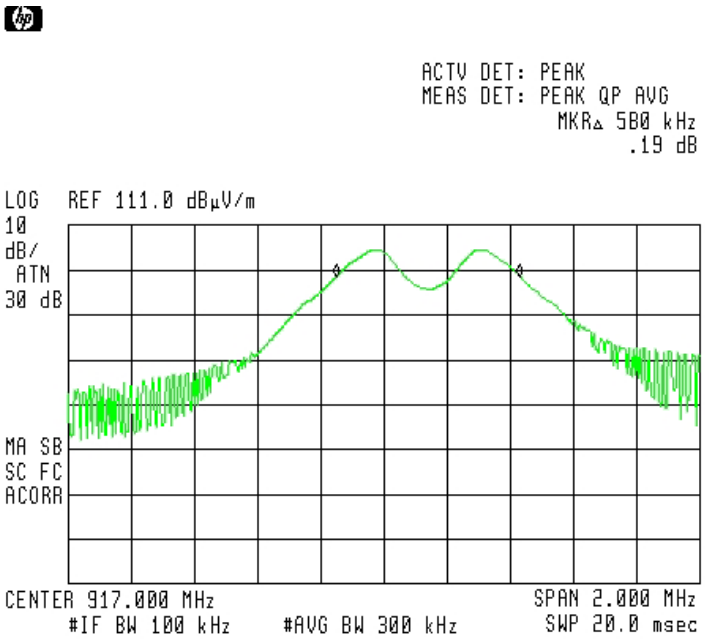

Figure 6. — 917.0 MHz

6dB Minimum Bandwidth

4.4 6dB Minimum Bandwidth 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	ARA	LPD-2010/A	1038	March 29, 2012	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 7 Test Equipment Used

5. Radiated Maximum 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 at the three operating frequencies of 905.0, 911.4 and 917.0 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:

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

Radiated Maximum Power Output

5.3 Test Results

Frequency	E	E	Antenna Gain	Antenna Distance	Calculated Results	Limit
(MHz)	(dbµV/m	(V/m)	(dBi)	(m)	(mW)	(mW)
905.00	109.46	0.30	0	3	27.00	1000
911.40	109.83	0.31	0	3	28.83	1000
917.00	110.01	0.32	0	3	30.72	1000

Figure 8 Radiated Maximum Power Output Test Results Table

JUDGEMENT: Passed

Additional information of the results is given in *Figure 9* to *Figure 11*.

TEST PERSONNEL:

Tester Signature: _____ Date: 28.06.12

Typed/Printed Name: I. Siboni

Radiated Maximum Power Output

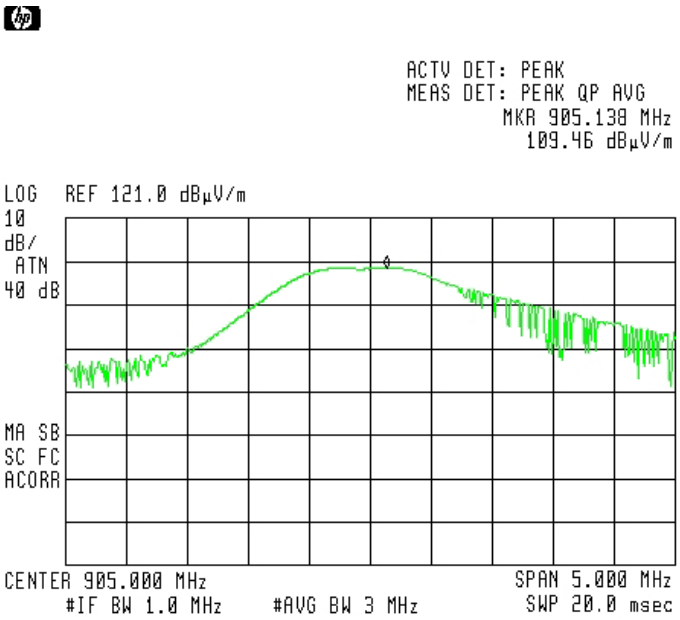

Figure 9 — 905.0 MHz

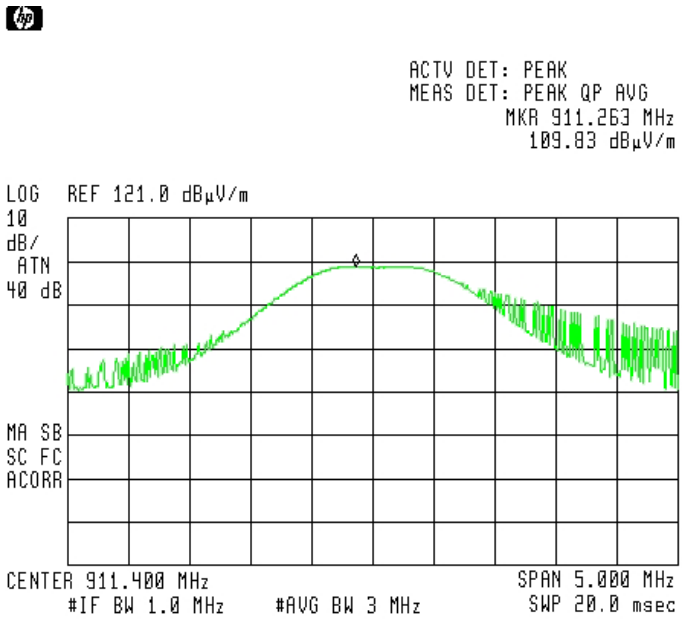

Figure 10 — 911.4 MHz

Radiated Maximum Power Output

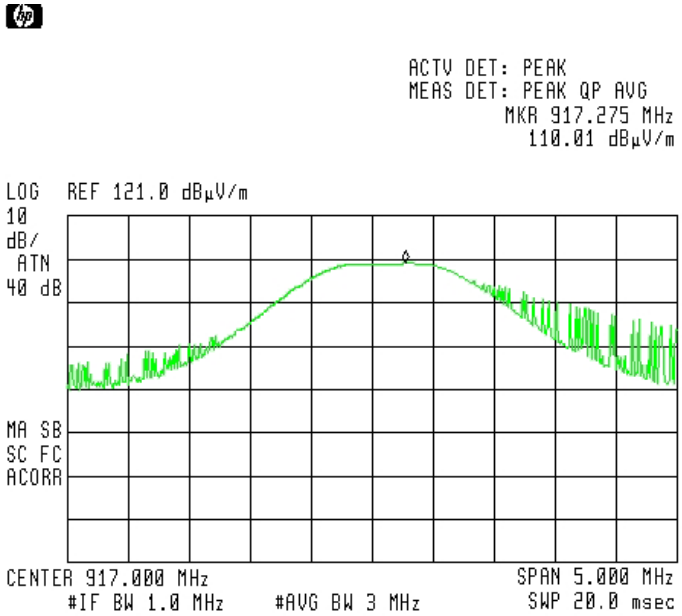

Figure 11 — 917.0 MHz

Radiated Maximum Power Output

5.4 Radiated Maximum Power Output Test Equipment Used.

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
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	ARA	LPD-2010/A	1038	March 29, 2012	1 year

Figure 12 Test Equipment Used

6. Band Edge

6.1 Test Specification

FCC Part 15, Subpart C, Section 15.247(d)

6.2 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 EMI receiver was adjusted to the transmission channel at the maximum radiated level. The display line was set to 20 dBc and the EMI receiver was set to the band edge frequencies.
Maximum power level below 902.0 MHz and above 928.0 MHz was measured relative to power level at 905.0 MHz, and 917.0 MHz correspondingly.

The E.U.T. was tested at the operating frequencies of 905.0 and 917.0 MHz.

6.3 Test Results

Operation Frequency (MHz)	Band Edge Frequency (MHz)	Spectrum Level (dBuV/m)	Specification (dBuV/m)	Margin (dB)
905.00	902.00	79.0	84.9	-5.9
917.00	928.00	70.2	86.2	-16.0

Figure 13 Band Edge Test Results Table

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JUDGEMENT: Passed by 5.9dB

Additional information of the results is given in *Figure 14* to *Figure 15*.

TEST PERSONNEL:

Tester Signature: _____ Date: 28.06.12

Typed/Printed Name: I. Siboni

Band Edge

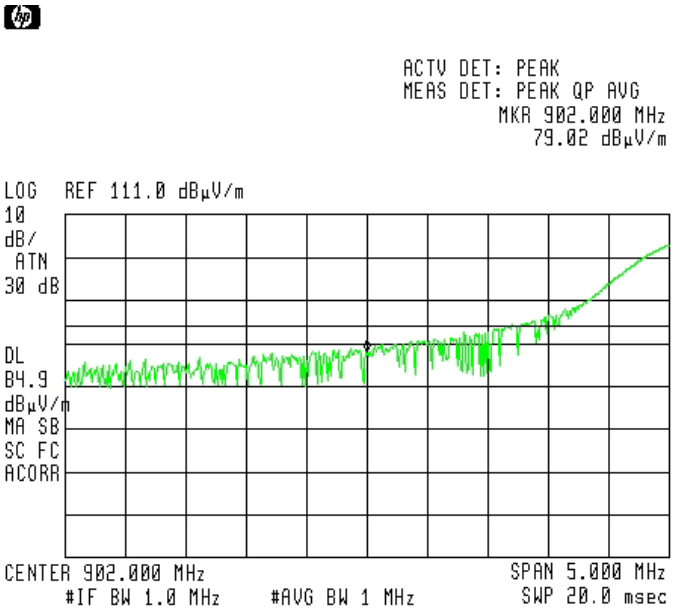

Figure 14 — 905.0 MHz

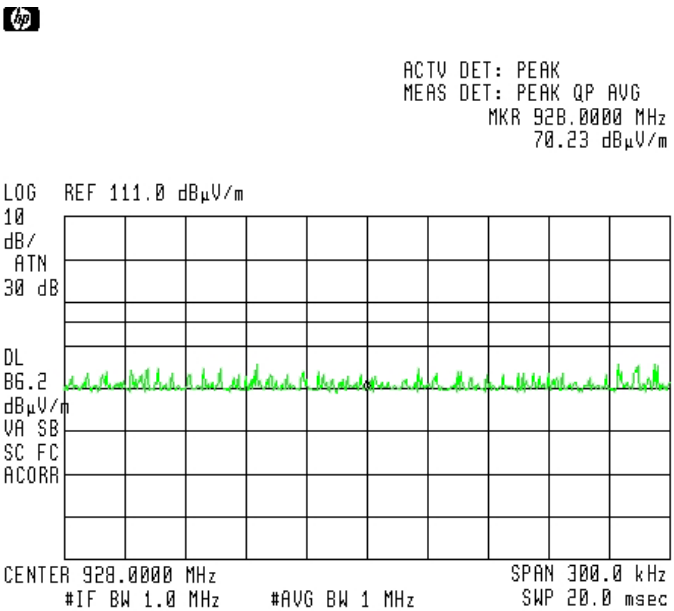

Figure 15 — 917.0 MHz

Band Edge

6.4 Band Edge Test Equipment Used.

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
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	ARA	LPD-2010/A	1038	March 29, 2012	1 year

Figure 16 Test Equipment Used

7. Spurious Radiated Emission, 9 kHz – 30 MHz

7.1 Test Specification

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

7.2 Test Procedure

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

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 at the three operating frequencies of 905.0, 911.4, and 917.0 MHz.

7.3 Test Results

JUDGEMENT: Passed

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

The results for all three operating frequencies were the same.

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

TEST PERSONNEL:

Tester Signature: _____ Date: 28.06.12

Typed/Printed Name: I. Siboni

Spurious Radiated Emission, 9 kHz – 30 MHz

7.4 Spurious Radiated Emission, 9 kHz – 30 MHz 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
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 17 Test Equipment Used

7.5 Field Strength Calculation

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

$$FS = RA + AF + CF$$

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

Example: FS = 30.7 dBμV (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dBμV
No external pre-amplifiers are used.

8. Spurious Radiated Emission 30 MHz – 10 GHz

8.1 Test Specification

30 MHz-10 GHz, F.C.C., Part 15, Subpart C

8.2 Test Procedure

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

See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground.

The frequency range 30 MHz-10 GHz 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 2.9-10.0 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.)

8.3 Test Results

JUDGEMENT: Passed by 5.5 dB.

For the operation frequencies of 905.00, 911.40, and 917.00 MHz, no signals were detected in the frequency range of 30 – 1000 MHz.

For the operation frequency 905.00MHz, the margin between the emission level and the specification limit is 5.5 in the worst case at the frequency of 1811.43 MHz, horizontal polarization.

For the operation frequency 911.40 MHz, the margin between the emission level and the specification limit is 6.7 in the worst case at the frequency of 1823.00 MHz, vertical polarization.

For the operation frequency 917.00 MHz, the margin between the emission level and the specification limit is 8.8 in the worst case at the frequency of 1833.90 MHz, vertical polarization.

Additional information of the results is given in *Figure 18* to *Figure 19*.

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

TEST PERSONNEL:

Tester Signature: _____ Date: 28.06.12

Typed/Printed Name: I. Siboni

Spurious Radiated Emission 30 MHz – 10 GHz

E.U.T Description	Badge Tag 915MHz
Model Number	E3-HuTag-AGPS
Part Number:	SA91/004000

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)	Polarity (H/V)	Peak Reading (dBµV/m)	Specification (dB µV/m)	Margin (dB)
905.00	1811.43	H	67.6	74.0	-6.4
905.00	1811.43	V	68.5	74.0	-5.5
911.40	1823.00	H	61.7	74.0	-12.3
911.40	1823.00	V	62.4	74.0	-11.6
917.00	1833.90	H	58.9	74.0	-15.1
917.00	1833.90	V	62.9	74.0	-11.1

Figure 18. 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

Spurious Radiated Emission 30 MHz – 10 GHz

E.U.T Description	Badge Tag 915MHz
Model Number	E3-HuTag-AGPS
Part Number:	SA91/004000

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 (MHz)	Freq. (MHz)	Polarity (H/V)	Average Reading (dBµV/m)	Specification (dB µV/m)	Margin (dB)
905.00	1811.43	H	44.7	54.0	-9.3
905.00	1811.43	V	48.4	54.0	-5.6
911.40	1823.00	H	47.0	54.0	-7.0
911.40	1823.00	V	47.3	54.0	-6.7
917.00	1833.90	H	44.1	54.0	-9.9
917.00	1833.90	V	45.2	54.0	-8.8

Figure 19. 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 Reading" includes correction factor.

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

8.4 Spurious Radiated Emission 30 MHz – 10 GHz, Test Equipment 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, 2012	1 Year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	January 27, 2011	2 Years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	November 5, 2011	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	March 5, 2012	1 Year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 20 Test Equipment Used

Spurious Radiated Emission 30 MHz – 10 GHz

8.5 Field Strength Calculation 30 MHz – 1 GHz

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

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

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

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

No external pre-amplifiers are used.

9. Radiated Power Spectral Density

9.1 Test Specification

FCC Part 15, Subpart C, Section 15.247(d)

9.2 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 at the three operating frequencies of 905.0, 911.4, and 917.0 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:

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

Radiated Power Spectral Density

9.3 Test Results

Frequency	E	Spectral Density Result	Antenna Gain	Antenna Distance	Calculated Results	Spec.	Margin
(MHz)	(dbµV/m)	(V/m)	(dBi)	(m)	(mW)	(mW)	(mW)
905.00	98.42	0.08	0	3	1.92	6.3	-4.48
911.40	98.54	0.08	0	3	1.92	6.3	-4.48
917.00	99.59	0.10	0	3	3.00	6.3	-3.30

Figure 21 Radiated Power Spectral Density Test Results

JUDGEMENT: Passed by 3.3 mW

Additional information of the results is given in *Figure 22* to *Figure 24*.

TEST PERSONNEL:

Tester Signature: _____ Date: 28.06.12

Typed/Printed Name: I. Siboni

Radiated Power Spectral Density

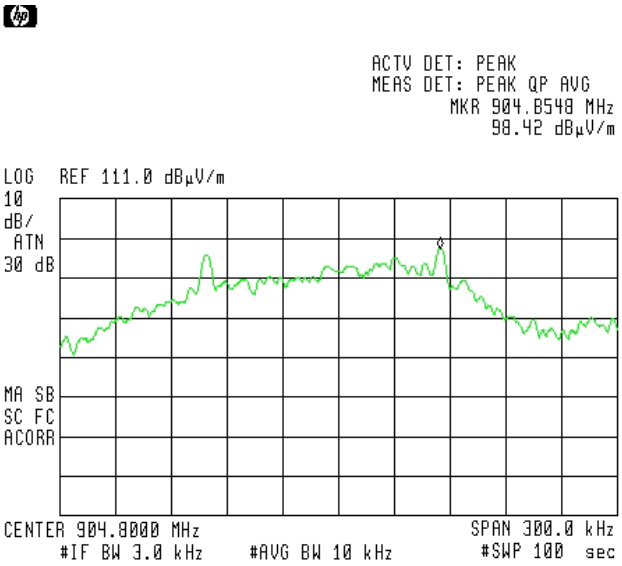

Figure 22 — 905.0 MHz

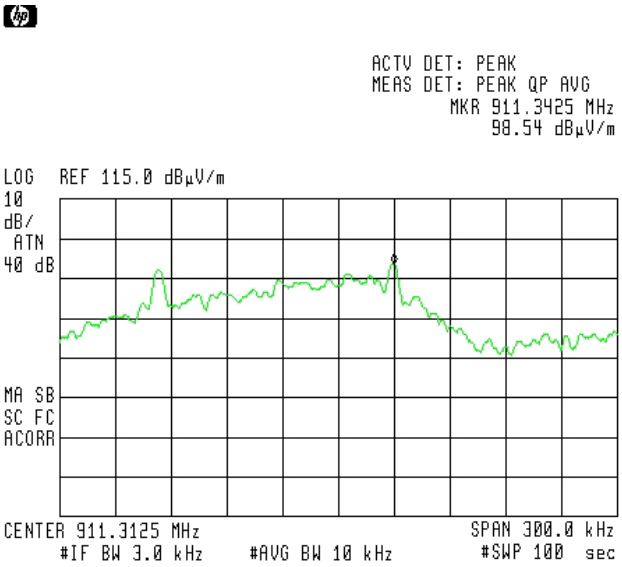

Figure 23 — 911.4 MHz

Radiated Power Spectral Density

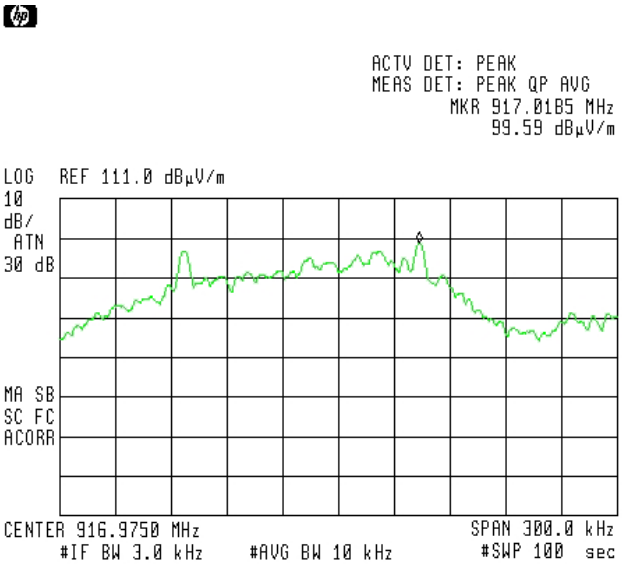

Figure 24 — 917.0 MHz

Radiated Power Spectral Density

9.4 Radiated Power Spectral 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	ARA	LPD-2010/A	1038	March 29, 2012	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 25 Test Equipment Used

10. Antenna Gain/Information

The antenna gain is 0dBi.

11. R.F Exposure/Safety

Typical use of the E.U.T. is defining a location zone. The typical placement of the E.U.T. is wall mounted. The typical distance between the E.U.T. and the user is 1 m.

Calculation of Maximum Permissible Exposure (MPE)
Based on Section 1.1307(b)(1) Requirements

(a) FCC limits at 905.0 MHz is: $\frac{f}{1500} = 0.603 \frac{mW}{cm^2}$

FCC limits at 911.4 MHz is: $\frac{f}{1500} = 0.608 \frac{mW}{cm^2}$

FCC limits at 917.0 MHz is: $\frac{f}{1500} = 0.611 \frac{mW}{cm^2}$

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

G_T- Antenna Gain

R- Distance from Transmitter

(c) Transmitter peak power using source based time averaging of 0.5 % maximum, 5 msec “ON” time, “OFF” + “ON” time 1sec:

Frequency MHz	Pt mW	Pt Source Based Time Averaging mW
905.0	27.00	0.135
911.4	28.83	0.144
917.0	30.72	0.153

(d) The peak power density (time averaging) is :

Frequency (MHz)	Pt (mW)	Antenna type	G_T (dBi)	R (cm)	S_{AV} (mW/cm^2)	Spec (mW/cm^2)
905.0	0.135	Internal	0	100	10.7×10^{-5}	0.603
911.4	0.144	Internal	0	100	11.4×10^{-5}	0.608
917.0	0.153	Internal	0	100	12.1×10^{-5}	0.611

(e) The above are below the FCC limits.

12. APPENDIX B - CORRECTION FACTORS

12.1 Correction factors for CABLE

**from EMI receiver
to test antenna
at 3 meter range.**

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3
20.0	0.6
30.0	0.8
40.0	0.9
50.0	1.1
60.0	1.2
70.0	1.3
80.0	1.4
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

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	7.3
1400.0	7.8
1600.0	8.4
1800.0	9.1
2000.0	9.9
2300.0	11.2
2600.0	12.2
2900.0	13.0

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".

12.2 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

1. The cable type is RG-8.

2. The overall length of the cable is 10 meters.

12.3 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.

12.6 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 38M3O.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".*

12.4 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".*

12.5 Correction factors for BICONICAL ANTENNA

Type BCD-235/B,
at 3 meter range

FREQUENCY (MHz)	AFE (dB/m)
20.0	19.4
30.0	14.8
40.0	11.9
50.0	10.2
60.0	9.1
70.0	8.5
80.0	8.9
90.0	9.6
100.0	10.3
110.0	11.0
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13.0
180.0	13.5
190.0	14.0
200.0	14.8
210.0	15.3
220.0	15.8
230.0	16.2
240.0	16.6
250.0	17.6
260.0	18.2
270.0	18.4
280.0	18.7
290.0	19.2
300.0	19.9
310	20.7
320	21.9
330	23.4
340	25.1
350	27.0

NOTES:

1. Antenna serial number is 1041.

2. The above list is located in file 19BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

12.6 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