

**DATE: 07 December 2010**

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

**FCC Radio Test Report**

**for**

**HomeFree Systems Ltd.**

**(An Attenti Subsidiary)**

**Equipment under test:**

**Asset Tracking Tag**

**ATT-830**

Written by:



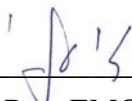
D. Shidlow, Documentation

Approved by:



A. Sharabi, Test Engineer

Approved by:



I. Raz, EMC Laboratory Manager

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This report relates only to items tested.



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## 1. General Information

### 1.1 Administrative Information

Manufacturer:	HomeFree Systems Ltd.
Manufacturer's Address:	2 Habarzel St. Tel-Aviv 61131 Israel Tel: +972-3-647-8871 Fax: +972-3-647-8872
Manufacturer's Representative:	Shai Avigdory
Equipment Under Test (E.U.T):	Asset Tracking Tag
Equipment Model No.:	ATT-830
Equipment Serial No.:	Not Designated
Date of Receipt of E.U.T:	29.11.10
Start of Test:	29.11.10
End of Test:	01.12.10
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 Asset Tracking Tag is a small transmitter that shall be designed for installation on material assets such as computers and printers located within an area monitored by the TRaCE3 system.

Once installed and activated, the ATT shall transmit periodic supervision signals in order to indicate that the transmitter is functional.

Any attempt to move the item upon which the ATT is installed on shall generate a "Motion" transmissions event and shall be used to track the movement path of the protected item.

Additionally, any attempt to remove the ATT from the protected item shall generate a tamper alarm transmission event.

The ATT shall be disposable items with a non replaceable battery that shall be discarded after use.

The E.U.T. operates at 318 MHz.

### **1.4 Test Methodology**

Radiated testing was performed according to the procedures in 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

The Open Site complies with the  $\pm 4$  dB Normalized Site Attenuation requirements of ANSI C63.4-2003. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

## 2. System Test Configuration

### 2.1 *Justification*

Radiated emission screening was performed in 3 orthogonal orientations. The worst case orientation was the horizontal/prone position.

### 2.2 *Special Accessories*

No special accessories were needed.

### 2.3 *Equipment Modifications*

No modifications were needed in order to achieve compliance

### 2.4 *Configuration of Tested System*



**Figure 1. Configuration of Tested System**

### 3. Radiated Measurement Test Set-up Photos



Figure 2. Radiated Emission Test 9 kHz – 30 MHz



Figure 3. Radiated Emission Test 30 MHz- 3.5 GHz



## 4. Average Factor Calculation

1. Burst duration = 6.8msec
2. Time between bursts = 321.7 msec , >100ms
3. Average Factor =  $20 \log \left[ \frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{burst duration}}{100\text{msec}} \times \text{Num of burst within 100msec} \right]$

Note Pulse duration and pulse period was considered worst case always ON cines unit transmits randomly.

$$\text{Average Factor} = 20 \log \left[ 1 \times \frac{6.8}{100} \times 1 \right] = -23.34\text{dB}$$

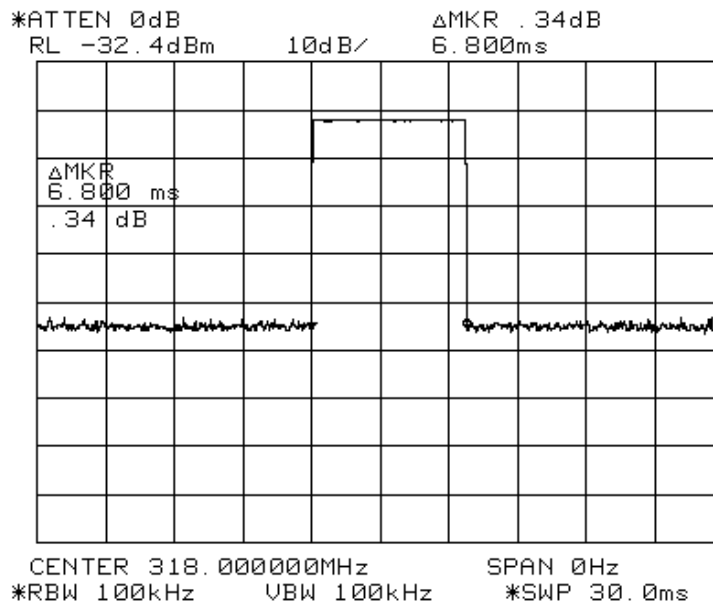


Figure 4. Burst Duration = 6.8 msec

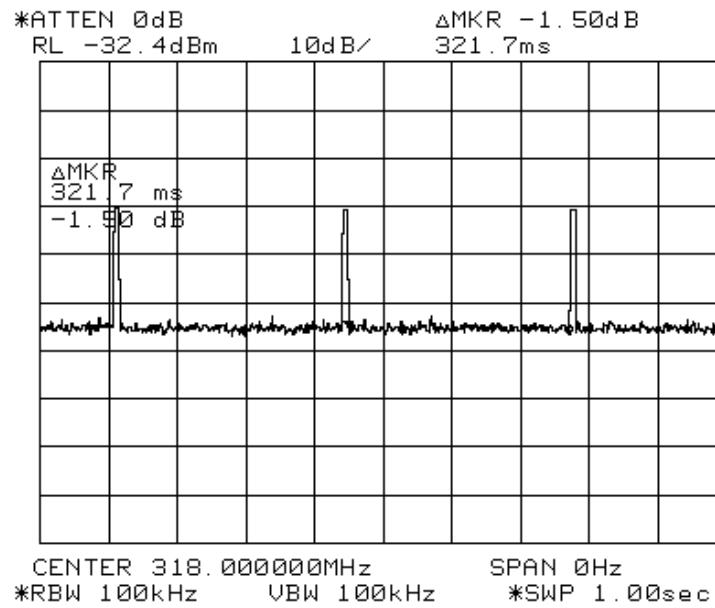


Figure 5. Time between bursts(worst case) = 321.7msec , >100ms

#### 4.1 *Test Instrumentation 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	November 25, 2010	1 Year
RF Section	HP	85420E	3705A00248	November 25, 2010	1 Year
Antenna Bioconical	ARA	BCD 235/B	1041	August 1, 2010	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 24, 2010	1 year
Antenna-Log Periodic	A.H.System	SAS-200/511	253	January 29, 2009	2 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A

## 5. Periodic Operation

### 5.1 Specification

F.C.C., Part 15, Subpart C, Section 15.231(a)

### 5.2 Requirements

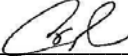
Requirement	Rationale	Verdict
Continuous transmissions are not permitted.	N/A	Complies
A manually operated transmitter shall be deactivated within not more than 5 seconds after releasing the switch.	See Figure 8 to Figure 9.	Complies
An automatically operated transmitter shall cease operation within 5 seconds after activation.	See Figure 6 to Figure 7.	Complies
Periodic transmissions at regular predetermined intervals are not permitted.	N/A	Complies
Polling or supervised transmissions to determine system integrity of transmitter used in security or safety applications shall not exceed more than 2 seconds per hour.	See Figure 10.	Complies

### 5.3 Results

JUDGEMENT: Passed

The EUT met the FCC Part 15, Subpart C, Section 15.231(a) specification requirements.

TEST PERSONNEL:

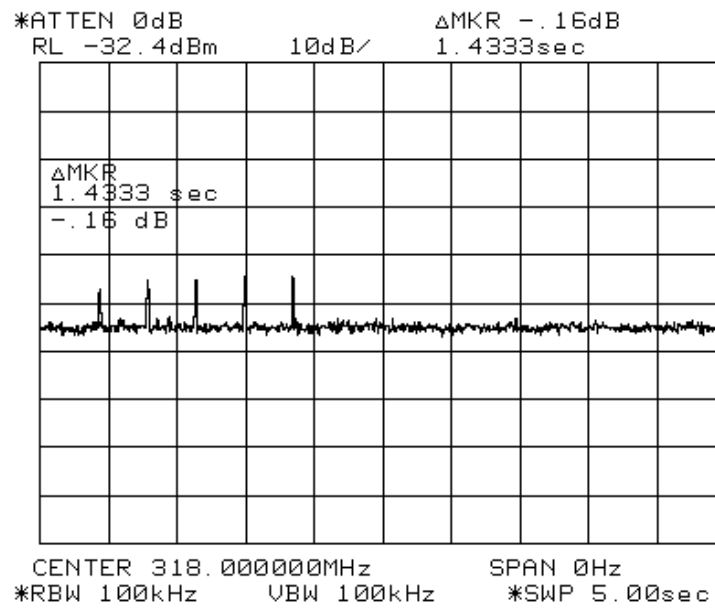
Tester Signature:  Date: 07.12.10

Typed/Printed Name: A. Sharabi

## Periodic Operation

E.U.T Description    Asset Tracking Tag  
Type                    ATT-830  
Serial Number:        Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(a)

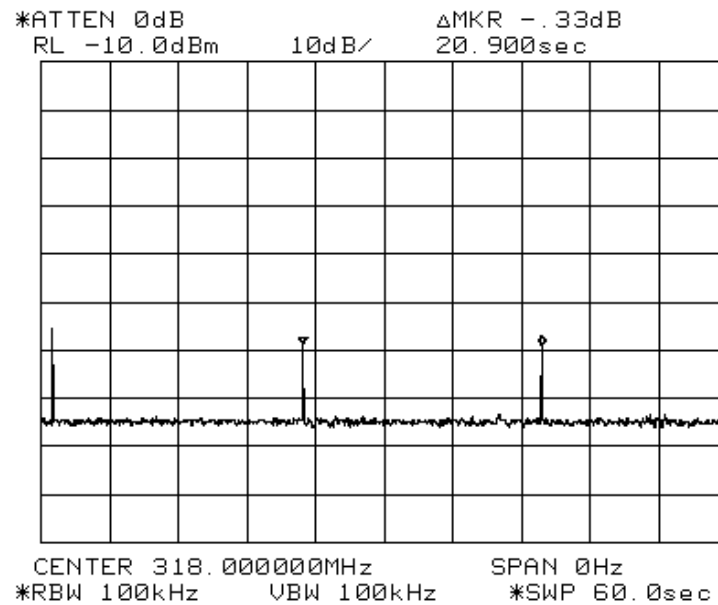


**Figure 6. Automatic operated transmitter Alarm signal ON (Initial burst)**

## Periodic Operation

E.U.T Description    Asset Tracking Tag  
Type                    ATT-830  
Serial Number:        Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(a)

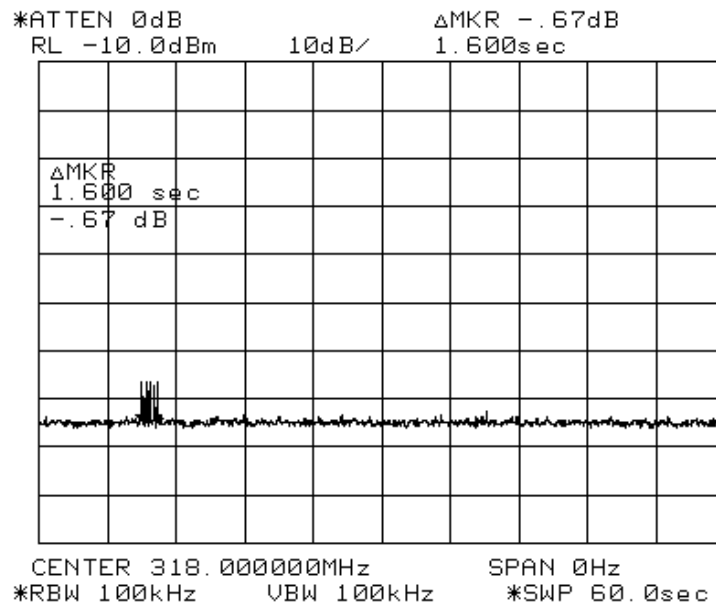


**Figure 7. Automatic operated transmitter Alarm signal ON-  
Continues alarm signal (6.25msec burs every min 19-21sec) until manually shut off**

## Periodic Operation

E.U.T Description    Asset Tracking Tag  
Type                    ATT-830  
Serial Number:        Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(a)

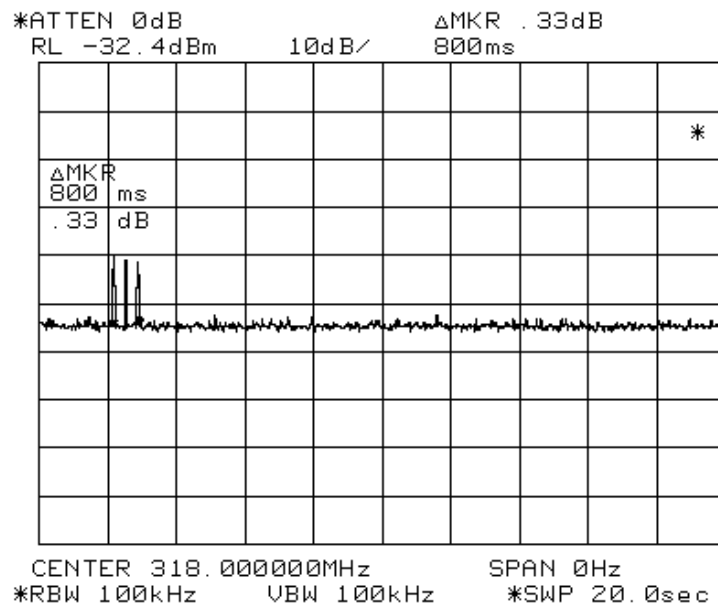


**Figure 8. Manually operated transmitter Alarm signal OFF**

## Periodic Operation

E.U.T Description    Asset Tracking Tag  
Type                    ATT-830  
Serial Number:        Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(a)



**Figure 9. Manually operated transmitter Activity button ON**



## Periodic Operation

E.U.T Description    Asset Tracking Tag  
Type                    ATT-830  
Serial Number:        Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(a)

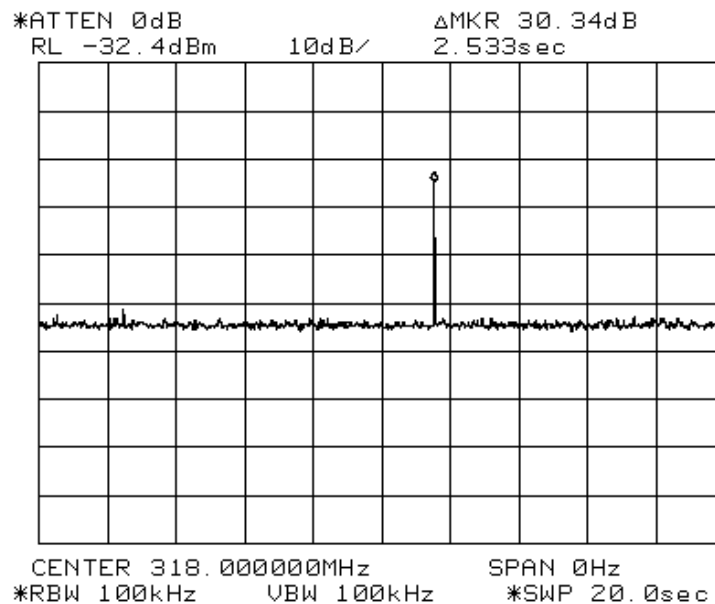


Figure 10. Supervision signal (6.8msec every 1hour)

#### **5.4 Test Instrumentation 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	November 25, 2010	1 Year
RF Section	HP	85420E	3705A00248	November 25, 2010	1 year

## 6. Field Strength of Fundamental

### 6.1 Test Specification

F.C.C., Part 15, Subpart C, Section 15.231(b)

### 6.2 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 (318 MHz) 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.

The average result is:

Peak Level(dB $\mu$ V/m) + E.U.T. Duty Cycle Factor, in 100msec time window (dB)

### 6.3 Measured Data

JUDGEMENT: Passed by 15.6 dB

The EUT met the FCC Part 15, Subpart C, Section 15.231(b) specification requirements.

The details of the highest emissions are given in Figure 11 to Figure 13.

TEST PERSONNEL:

Tester Signature: \_\_\_\_\_ Date: 07.12.10

Typed/Printed Name: A. Sharabi

## Field Strength of Fundamental

E.U.T Description    Asset Tracking Tag  
Type                      ATT-830  
Serial Number:        Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(b)

Antenna Polarization: Horizontal/Vertical

Test Distance: 3 meters

Detector: Peak

Freq.	Pol.	Peak Reading	Average Factor	Average Result	Average Specification	Margin
(MHz)	H/V	(dBμ V/m)	(dB)	(dBμ V/m)	(dBμ V/m)	(dB)
317.96	H	83.66	23.43	60.23	75.8	-15.57
317.96	V	72.25	23.43	48.82	75.8	-26.98

**Figure 11. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL/VERTICAL. Detector: Peak**

### Notes:

1. 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.
2. "Peak Reading." (dBμ V/m) included the "Correction Factors".
3. "Correction Factors" (dB) = Test Antenna Correction Factor(dB) + Cable Loss.
4. "Average Result" (dBμ V/m)=Peak Reading (dBμ V/m) + Average Factor (dB)

## Field Strength of Fundamental


E.U.T Description    Asset Tracking Tag  
Type                    ATT-830  
Serial Number:        Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(b)

Antenna Polarization: Horizontal

Test Distance: 3 meters

Detector: Peak

 10:28:18 NOV 29, 2010

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 317.965 MHz  
83.66 dB $\mu$ V/m

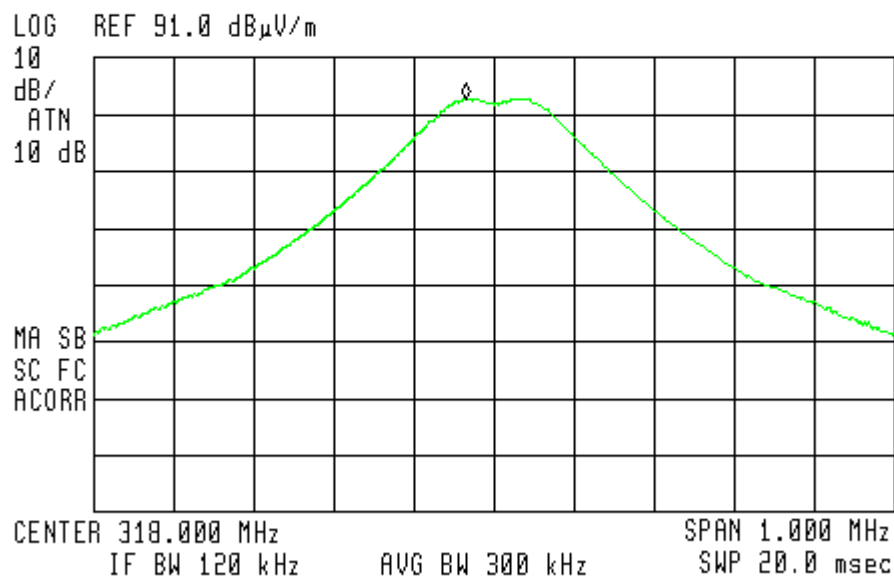


Figure 12. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL.

## Field Strength of Fundamental


E.U.T Description    Asset Tracking Tag  
Type                    ATT-830  
Serial Number:        Not Designated

Specification: F.C.C., Part 15, Subpart C, 15.231(b)

Antenna Polarization: Vertical

Test Distance: 3 meters

Detector: Peak

 10:33:55 NOV 29, 2010

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKA 317.968 MHz  
72.25 dB $\mu$ V/m

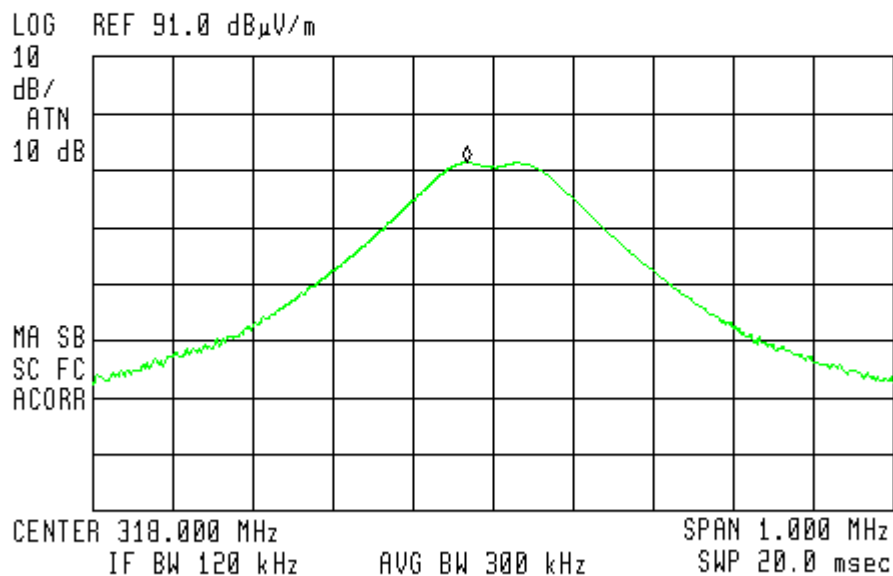


Figure 13. Field Strength of Fundamental. Antenna Polarization: VERTICAL.

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

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 25, 2010	1 year
RF Section	HP	85420E	3705A00248	November 25, 2010	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 24, 2010	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

## 7. 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 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 operated at the frequency of 318 MHz. This frequency was measured using a peak detector.

### 7.3 Measured Data

JUDGEMENT: Passed

The EUT was tested and it met the requirements of the FCC Part 15, Subpart C, specification.

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

TEST PERSONNEL:

Tester Signature: 

Date: 07.12.10

Typed/Printed Name: A. Sharabi



#### 7.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 25, 2010	1 year
RF Section	HP	85420E	3705A00248	November 25, 2010	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 19, 2010	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

#### 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 [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. Spurious Radiated Emission, 30 – 3500 MHz**

### **8.1 Test Specification**

30 - 3500 MHz, 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 configuration tested is shown in Figure 1. The signals from the list of the highest emissions were verified and the list was 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.

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 2.9 – 3.5 GHz, a spectrum analyzer including a low noise amplifier was used. The test distance was 3 meters. 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 emissions were measured at a distance of 3 meters.

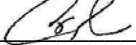
### 8.3 Test Data

JUDGEMENT: Passed by 32.6 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 was 32.63 dB in the worst case at the frequency of 954.00 MHz, vertical polarization.

TEST PERSONNEL:

Tester Signature: 

Date: 07.12.10

Typed/Printed Name: A. Sharabi

## Radiated Emission

E.U.T Description    Asset Tracking Tag  
Type                    ATT-830  
Serial Number:        Not Designated

Specification: FCC Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical      Frequency range: 30 MHz to 3500 MHz  
Antenna: 3 meters distance                      Detector: Peak

Frequency (MHz)	Peak Reading (dBμV/m)	Average Factor (dB)	Average Result (dBμV/m)	Antenna Polarity (H/V)	Average Specification (dBμV/m)	Margin (dB)
636.00	36.2	23.43	12.8	H	55.8	-43.00
636.00	33.4	23.43	9.97	V	55.8	-45.83
954.00	39.4	23.43	15.97	H	55.8	-39.83
954.00	46.6	23.43	23.17	V	55.8	-32.63

**Figure 14. Radiated Emission. Antenna Polarization: VERTICAL.  
Detector: Peak**

Notes:

1. 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.
2. "Peak Reading." (dBμV/m) included the "Correction Factors".
3. "Correction Factors" (dB) = Test Antenna Correction Factor(dB) + Cable Loss.
4. "Average Result" (dBμV/m) = Peak Reading (dBμV/m) + Average Factor (dB)

#### 8.4 Test Instrumentation Used, Radiated Measurements


Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 25, 2010	1 year
RF Section	HP	85420E	3705A00248	November 25, 2010	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS- 0411N313	013	January 13, 2010	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	March 14, 2010	1 Year
Antenna Bioconical	ARA	BCD 235/B	1041	August 1, 2010	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 24, 2010	1 year
Antenna-Log Periodic	A.H.System	SAS-200/511	253	January 29, 2009	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	JPKG19982	N/A	N/A

## 9. Bandwidth

### 9.1 Test procedure

The transmitter unit operated with normal modulation. The spectrum analyzer was set to 120 kHz resolution BW and center frequency of the transmitter fundamental. The spectrum bandwidth of the transmitter unit was measured and recorded. The BW was measured at 20 dBc points.

The EUT was set up as shown in Figure 1, and its proper operation was checked. The transmitter occupied bandwidth was measured with the EMI receiver as frequency delta between reference points on the modulation envelope.

 10:29:26 NOV 29, 2010

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR $\Delta$  418 kHz  
-45 dB

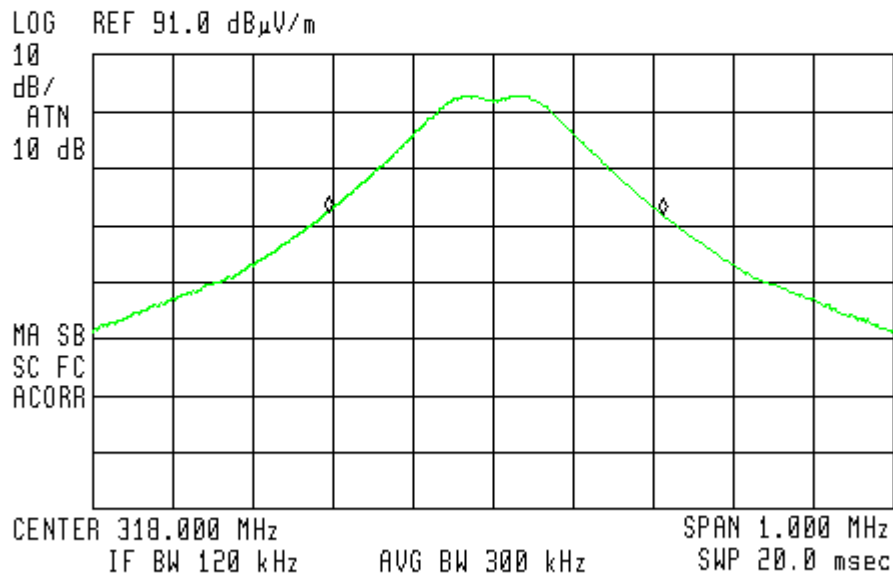


Figure 15

## 9.2 Results table

E.U.T Description: Asset Tracking Tag

Model: ATT-830

Serial Number: Not Designated

Specification: F.C.C. Part 15, Subpart C: (15.231(c))

Bandwidth Reading (kHz)	Specification (1) (kHz)	Margin (kHz)
413	795	-382

**Figure 16 Bandwidth**

JUDGEMENT: Passed by 382 kHz

TEST PERSONNEL:

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

Date: 07.12.10

Typed/Printed Name: A. Sharabi

(1) 0.25% of the E.U.T. fundamental frequency, Section 15.231(c).

### 9.3 Test Equipment Used.

Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 25, 2010	1 year
RF Section	HP	85420E	3705A00248	November 25, 2010	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 24, 2010	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**



## 10. 11. APPENDIX A - CORRECTION FACTORS

### 10.1 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".

**10.2 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.*

### 10.3 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.

#### 10.4 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".

## 10.5 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".

**10.6 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".

## 10.7 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