

**DATE: 05 October 2010**

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

# **FCC Radio Test Report**

**for**

**HomeFree Systems Ltd.**

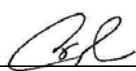
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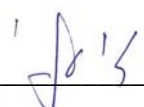
**Equipment under test:**

**Pull Cord**

**PC-830**

Written by:   
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Approved by:   
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Approved by:   
I. Raz, EMC Laboratory Manager

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This report relates only to items tested.



# Measurement/Technical Report for HomeFree Systems Ltd.

## Pull Cord

# PC-830

**FCC ID: QUX-PC-830-2**

This report concerns:	Original Grant:	x
	Class I change:	
	Class II change:	

Equipment type: Part 15 Security/Remote Control Transceiver

47CFR15 Section 15231 (a-d)

Measurement procedure used is ANSI C63.4-2003.

Application for Certification:  
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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):	Pull Cord
Equipment Model No.:	PC-830
Equipment Serial No.:	293FC59053
Date of Receipt of E.U.T:	04.08.10
Start of Test:	04.08.10
End of Test:	08.08.10
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), File No. IC 4025.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

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 Pull Cord(Emergency Call Unit & Activity Button) is a small, wall-mounted device that is positioned in close proximity to the resident, near the bed and/or bath and can be used to notify care center Staff members whenever the resident activates an emergency distress alarm. The built in Activity Check-in button allows either independent resident to notify the monitoring station that they are up and about during the day or can be used to indicate Staff presence. The Pull Cord is not for use outside the monitored area. Includes 433.92 MHz and 318 MHz version.

### **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*

The worst case EUT was tested in typical vertical orientation.

### 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*

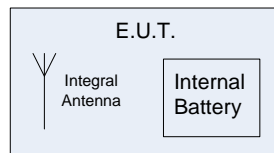


Figure 1. Configuration of Tested System

### 3. Test Set-up Photos



Figure 2. Radiated Emission Test 9 kHz – 30 MHz



Figure 3. Radiated Emission Test 30 – 4340 MHz

## 4. Average Factor Calculation

1. Burst duration = 6.35 msec
2. Time between bursts = 371.25msec , >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.

$$\text{Average Factor} = 20 \log \left[ 1 \times \frac{6.35}{100} \times 1 \right] = -23.94\text{dB}$$

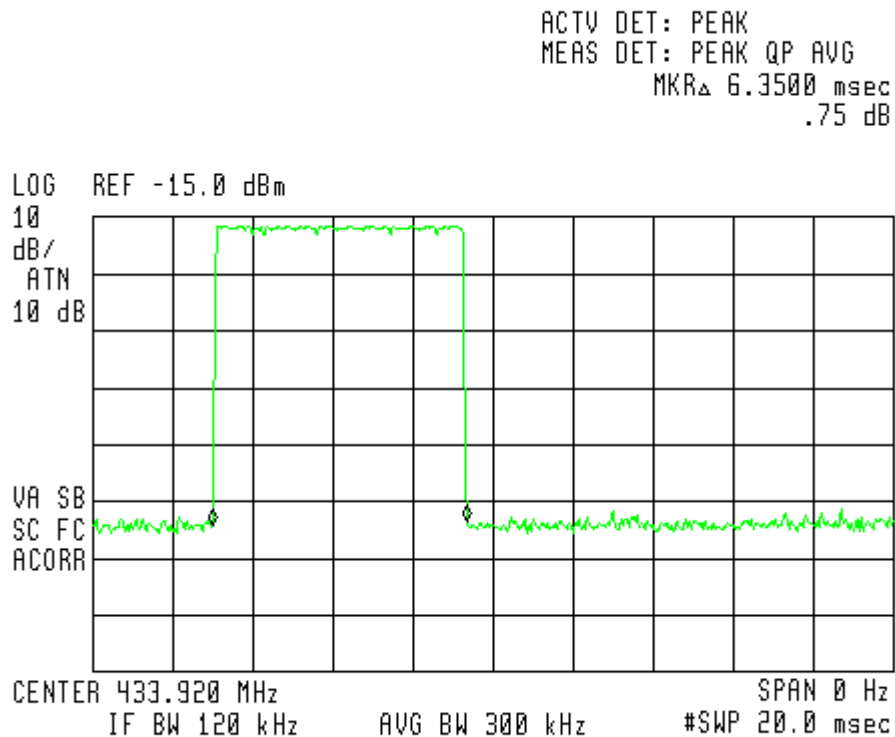
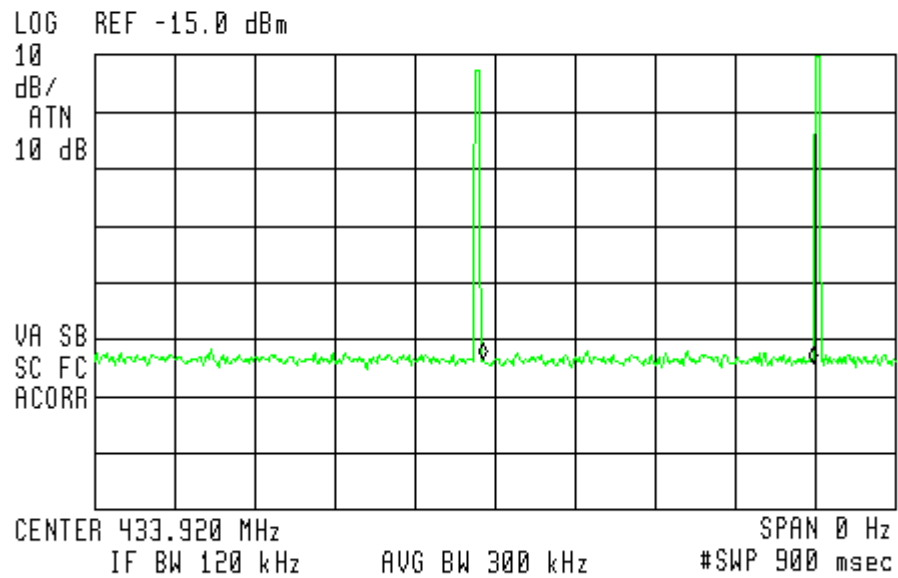


Figure 4. Burst Duration = 6.35msec



ACTV DET: PEAK  
 MEAS DET: PEAK QP AVG  
 MKR $\Delta$  371.25 msec  
 -.71 dB



**Figure 5. Time Between Bursts (Worst Case) = 371.25msec , >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 10, 2009	1 Year
RF Section	HP	85420E	3705A00248	November 10, 2009	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

## 5. Periodic Operation

### 5.1 Specification

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

### 5.2 Requirements

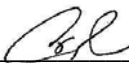
Requirement	Rationale	Verdict
Continuous transmissions are not permitted.	N/A	Complies
A manually operated transmitter shall be deactivated within not more than 5 seconds after releasing the switch.	See Figure 6 to Figure 9.	Complies
An automatically operated transmitter shall cease operation within 5 seconds after activation.	N/A	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: 12.09.10

Typed/Printed Name: A. Sharabi

## Periodic Operation

E.U.T Description    Pull Cord  
Type                    PC-830  
Serial Number:        293FC59053

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

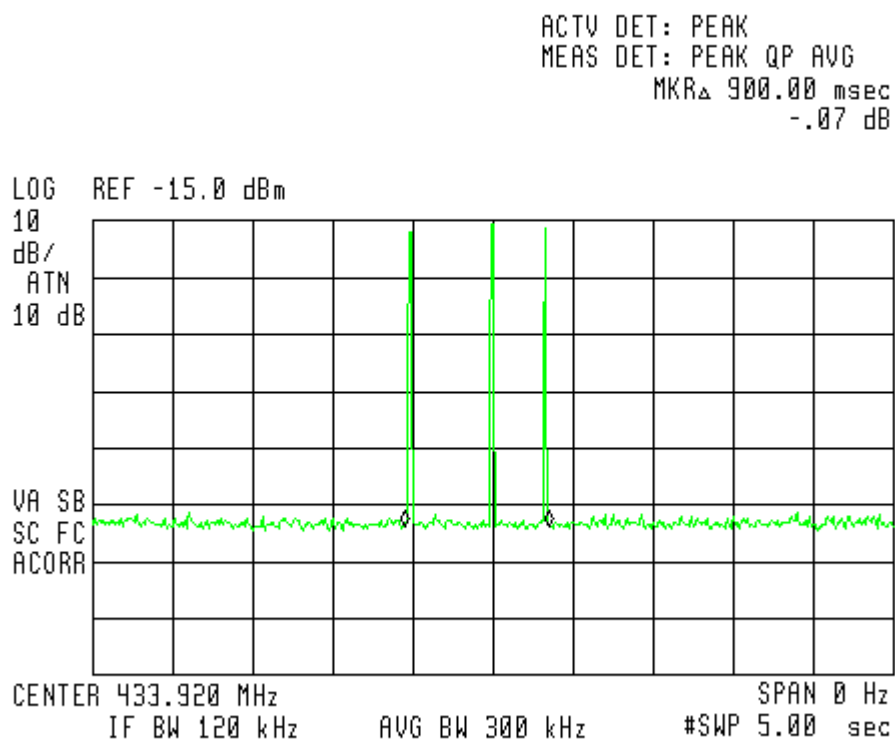
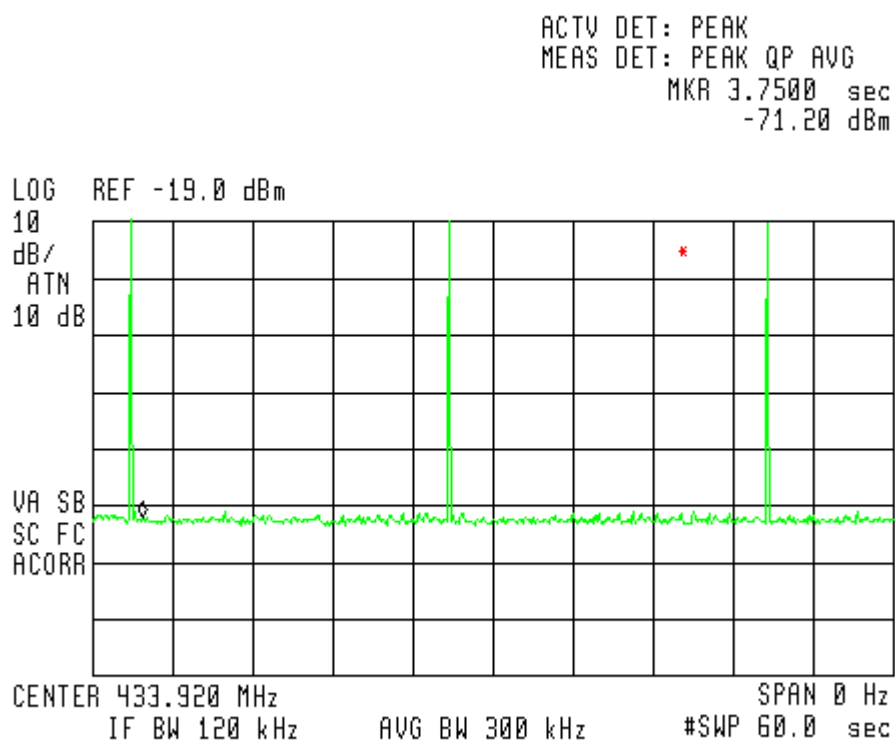


Figure 6. Manually Operated Transmitter Alarm Signal ON (Initial Burst)

## Periodic Operation

E.U.T Description Pull Cord  
Type PC-830  
Serial Number: 293FC59053

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

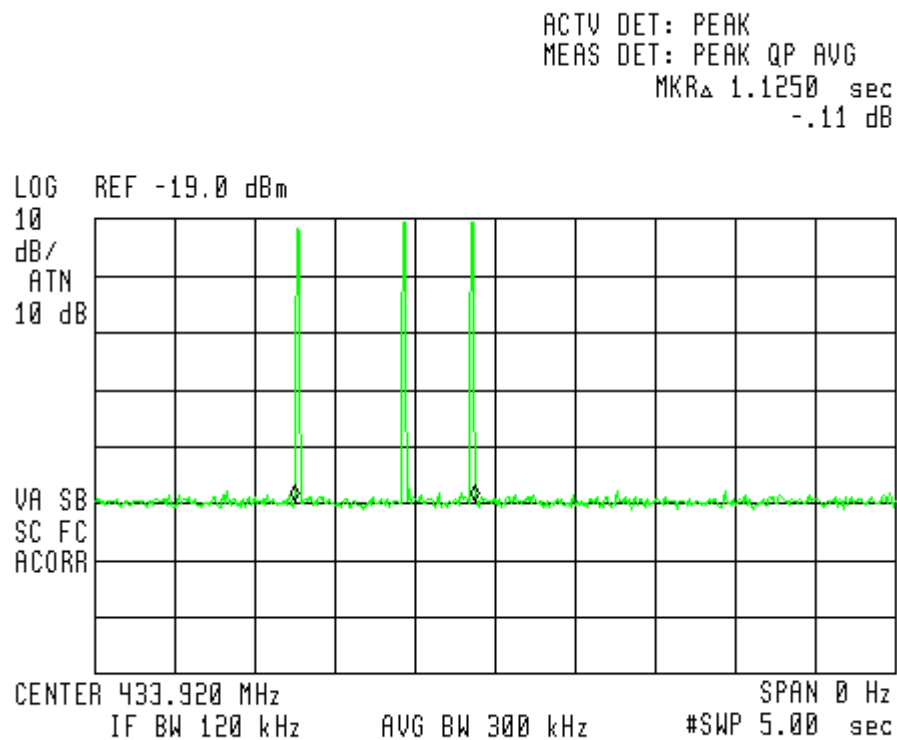


**Figure 7. Manually Operated Transmitter Alarm Signal ON-  
Continuous Alarm Signal (6.25msec burs every min 18sec) Until Manually Shut Off**

## Periodic Operation

E.U.T Description    Pull Cord  
Type                    PC-830  
Serial Number:        293FC59053

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

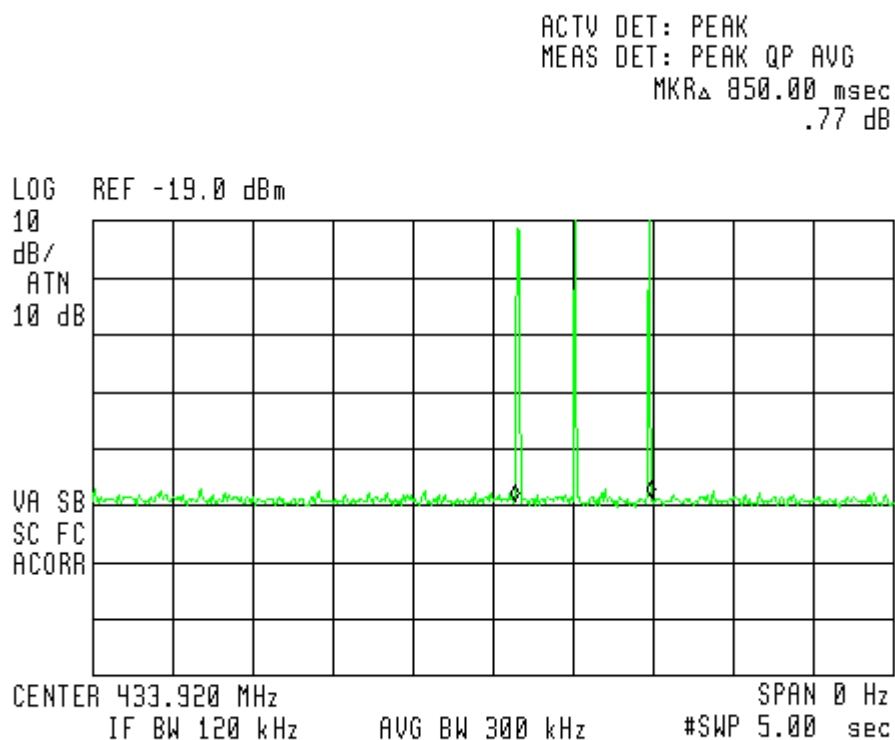


**Figure 8. Manually Operated Transmitter Alarm Signal OFF**

## Periodic Operation

E.U.T Description    Pull Cord  
Type                    PC-830  
Serial Number:        293FC59053

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

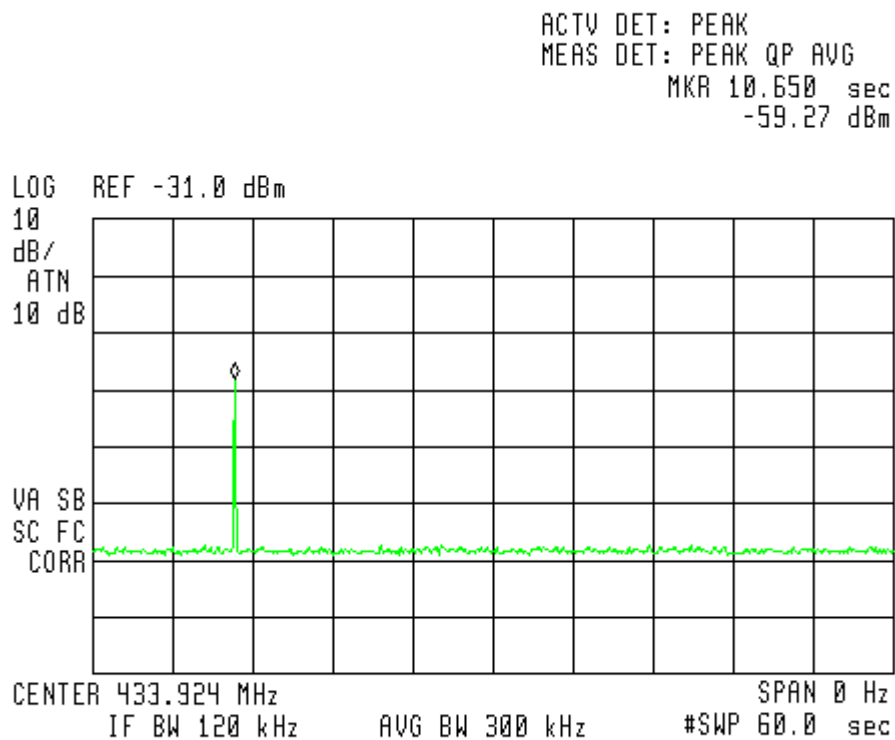


**Figure 9. Manually Operated Transmitter Activity Button ON**

## Periodic Operation

E.U.T Description    Pull Cord  
Type                    PC-830  
Serial Number:        293FC59053

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



**Figure 10. Supervision Signal**  
**(6.35msec 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 10, 2009	1 Year
RF Section	HP	85420E	3705A00248	November 10, 2009	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 (433.91 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 9.04 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: 05.10.10

Typed/Printed Name: A. Sharabi

## Field Strength of Fundamental

E.U.T Description    Pull Cord  
Type                      PC-830  
Serial Number:        293FC59053

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)	V/H	(dBμ V/m)	(dB)	(dBμ V/m)	(dBμ V/m)	(dB)
433.91	H	80.54	-23.94	56.6	80.83	-24.23
433.91	V	95.73	-23.94	71.79	80.83	-9.04

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

### 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 Pull Cord  
Type PC-830  
Serial Number: 293FC59053

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

Antenna Polarization: Horizontal

Test Distance: 3 meters

Detector: Peak



ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 433.880 MHz  
80.54 dB $\mu$ V/m

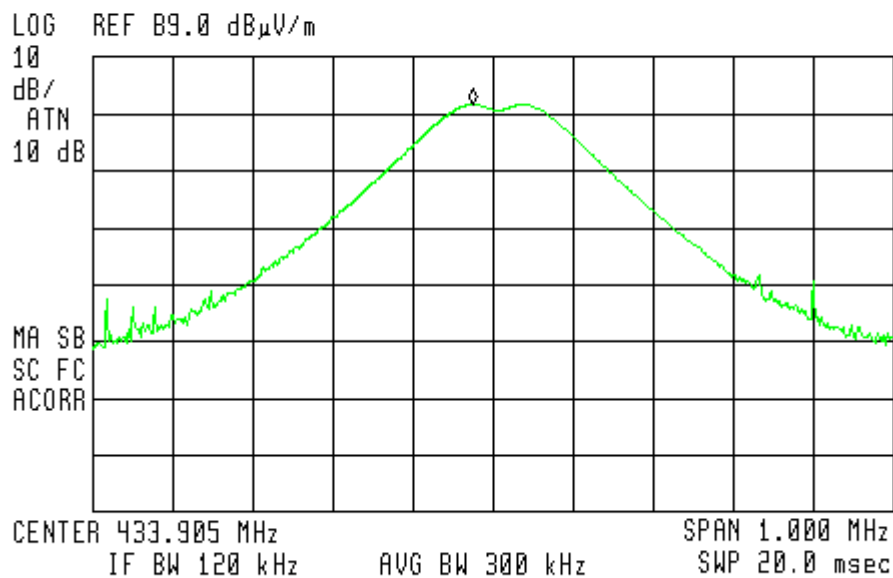


Figure 12. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL.

## Field Strength of Fundamental

E.U.T Description Pull Cord  
Type PC-830  
Serial Number: 293FC59053

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

Antenna Polarization: Vertical

Test Distance: 3 meters

Detector: Peak

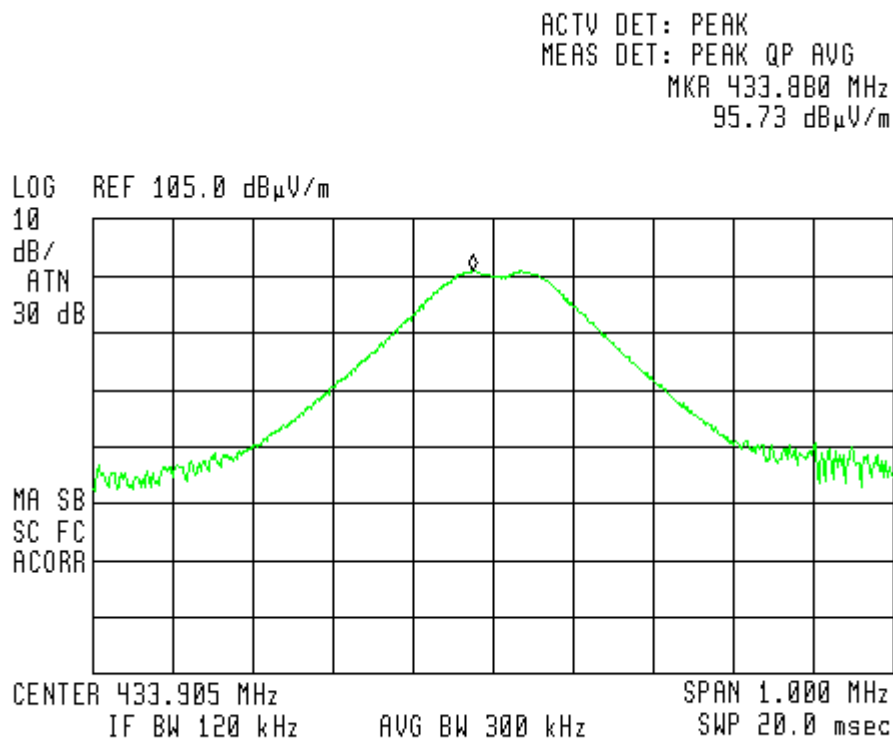


Figure 13. Field Strength of Fundamental. Antenna Polarization: VERTICAL.

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

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 10, 2009	1 year
RF Section	HP	85420E	3705A00248	November 10, 2009	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 433.91 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: 12.09.10

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 10, 2009	1 Year
RF Section	HP	85420E	3705A00248	November 10, 2009	1 Year
Active Loop Antenna	EMCO	6502	9506-2950	October 19, 2009	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]

No external pre-amplifiers are used.

## 8. Spurious Radiated Emission 30 – 4340 MHz

### 8.1 Test Specification

30 - 4340 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 – 4.340 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.

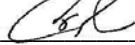
### 8.3 Test Data

JUDGEMENT: Passed by 5.6 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 5.6 dB in the worst case at the frequency of 1301.75 MHz, horizontal polarization.

TEST PERSONNEL:

Tester Signature: 

Date: 05.10.10

Typed/Printed Name: A. Sharabi

## Radiated Emission

E.U.T Description    Pull Cord  
Type                      PC-830  
Serial Number:        293FC59053

Specification: FCC Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical      Frequency range: 30 MHz to 4340 MHz  
Antenna: 3 meters distance                      Detectors: Peak

Frequency (MHz)	Peak Reading (dBμV/m)	Average Factor	Average Result (dBμV/m)	Antenna Polarity (H/V)	Specification (dBμV/m)	Margin (dB)
1301.75	71.97	-23.94	48.03	V	54.00	-5.97
1301.75	72.34	-23.94	48.4	H	54.00	-5.6
2169.90	73.34	-23.94	49.4	V	60.83	-11.43
2169.90	74.48	-23.94	50.54	H	60.83	-10.29

**Figure 14. Radiated Emission. Antenna Polarization: Horizontal/Vertical**

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 10, 2009	1 year
RF Section	HP	85420E	3705A00248	November 10, 2009	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 20Bc 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.

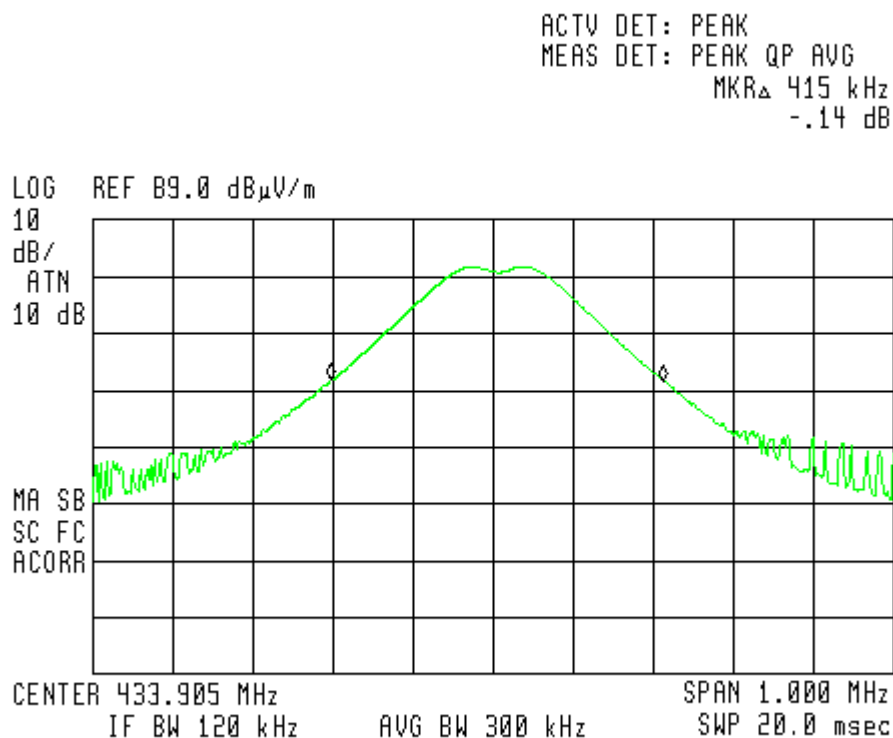


Figure 15

## 9.2 Results table

E.U.T Description: Pull Cord

Model: PC-830

Serial Number: 293FC59053

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

Bandwidth Reading	Specification (kHz)	Margin (kHz)
415	1084.76	-669.76

**Figure 16 Bandwidth**

JUDGEMENT: Passed by 669.76 kHz

TEST PERSONNEL:

Tester Signature: 

Date: 12.09.10

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 10, 2009	1 year
RF Section	HP	85420E	3705A00248	November 10, 2009	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	JPKG19982	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 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 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".

### 10.3 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".

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

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

## 10.5 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