



ISRAEL TESTING LABORATORIES
Global Certifications You Can Trust



DATE: 22 July 2012

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

FCC Radio Test Report

for

3M Resident Monitoring Ltd.

Equipment under test:

Nurse Tracking Tag

NTT-830-2

Written by: _____

A Ruta , Documentation

Approved by: For/ _____

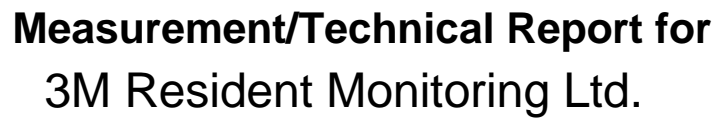
A. Sharabi, Test Engineer

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.



Nurse Tracking Tag

NTT-830-2

FCC ID:QUX-NTT-830-2

IC: 4306B-NTT8302

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:

prepared by:

Shai Avigdori
3M Resident Monitoring Ltd.
2 Habarzel St.
Tel-Aviv, 61131
Israel

Tel: +972-3-767-1700

Fax: +972-3-767-1701

e-mail: adudkevitz@mmm.com



TABLE OF CONTENTS

1.	GENERAL INFORMATION -----	4
1.1	Administrative Information	4
1.2	List of Accreditations	5
1.3	Product Description	6
1.4	Test Methodology	6
1.5	Test Facility	6
1.6	Measurement Uncertainty	6
2.	SYSTEM TEST CONFIGURATION-----	7
2.1	Justification	7
2.2	Special Accessories	7
2.3	Equipment Modifications	7
2.4	Configuration of Tested System	7
3.	RADIATED MEASUREMENT TEST SET-UP PHOTO -----	8
4.	AVERAGE FACTOR CALCULATION-----	10
4.1	Test Equipment Used	12
5.	PERIODIC OPERATION-----	13
5.1	Specification	13
5.2	Requirements	13
5.3	Test Results.....	13
5.4	Test Equipment Used.....	17
6.	FIELD STRENGTH OF FUNDAMENTAL -----	18
6.1	Test Specification	18
6.2	Test Procedure	18
6.3	Test Results.....	18
6.4	Test Instrumentation Used, Field Strength of Fundamental.....	22
7.	RADIATED EMISSION, 9 KHZ – 30 MHZ-----	23
7.1	Test Specification	23
7.2	Test Procedure	23
7.3	Test Results.....	23
7.4	Test Equipment Used, Radiated Measurements.....	24
7.5	Field Strength Calculation	24
8.	SPURIOUS RADIATED EMISSION-----	25
8.1	Test Specification	25
8.2	Test Procedure	25
8.3	Test Results.....	26
8.4	Test Equipment Used, Radiated Measurements.....	28
9.	BANDWIDTH -----	29
9.1	Test procedure	29
9.2	Test Results.....	30
10.	APPENDIX A - CORRECTION FACTORS-----	31
10.1	Correction factors for CABLE	31
10.2	Correction factors for CABLE	32
10.3	Correction factors for CABLE	33
10.4	Correction factors for LOG PERIODIC ANTENNA	34
10.5	Correction factors for LOG PERIODIC ANTENNA	35
10.6	Correction factors for BICONICAL ANTENNA	36
10.7	Correction factors for ACTIVE LOOP ANTENNA	37
11.	COMPARISON REQUIREMENTS FCC WITH INDUSTRY CANADA -----	38



1. General Information

1.1 Administrative Information

Manufacturer: 3M Resident Monitoring Ltd.

Manufacturer's Address: P.O.B. 13236
2 Habarzel St.,
Tel-Aviv, 61132
Israel
Tel: +972-3-767-1700
Fax: +972-3-767-1701

Manufacturer's Representative: Shai Avigdor
Arad Dudkevitz

Equipment Under Test (E.U.T): Nurse Tracking Tag

Equipment Model No.: **NTT-830-2**

Equipment Serial No.: Not Designated

Date of Receipt of E.U.T: 23.01.2012

Start of Test: 23.01.2012

End of Test: 25.01.2012

Test Laboratory Location: I.T.L (Product Testing) Ltd.
Kfar Bin Nun,
ISRAEL 99780

Test Specifications: FCC Part 15 Sub-part 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 Nurse Tracking Tag is a small transmitter that shall be designed to be allocated to nurse to the area monitored by the AMS system.

The device comprises a printed circuit board (PCB) that includes a RF transceiver module with an integral antenna, microcontroller that controls its operation and RFID tag for identification.

The NTT-830-2 has one RF channel (433MHz) over which it communicates with its monitoring system. The RFID tag is read from Pull cord 840

The unit is powered by an internal 3V Lithium battery.

The NTT – 830-2 shall be stored in a specific location when not in use (e.g. a cupboard or drawer). When a nurse arrives at work, she should activate a NTT. The NTT allocate nurses in order to track their location during the work. When the nurse goes to room equipment with pull cord 840 she should put NTT over PC-840. The PC-840 will read RFID tag and transmit “Nurse Presence” identification with NTT ID to AMS system. When the nurse leaves room she should put again NTT over PC-840 for “Nurse Left” identification. . At the end of the work, the nurse shall deactivate NTT.

1.4 Test Methodology

Both conducted and radiated testing were 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 (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site 30-1000 MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 4.96 dB

2. System Test Configuration

2.1 *Justification*

Testing was performed in normal installation ., which represents typical operating condition

2.2 *Special Accessories*

No special accessories were needed.

2.3 *Equipment Modifications*

Initially the product transmitted 10dB lower then the measurements below.

C20 was replaced from 1.2pF to 180nH

C21 Was replaced from 180nH to 1.2pF

2.4 *Configuration of Tested System*

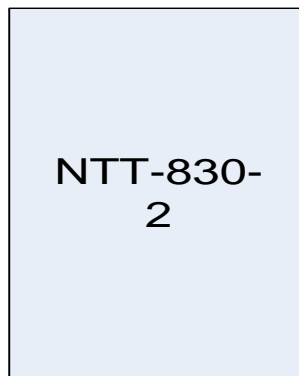


Figure 1. Configuration of Tested System

3. Radiated Measurement Test Set-up Photo



Figure 2. Radiated Emission Test 9KHz-30MHz

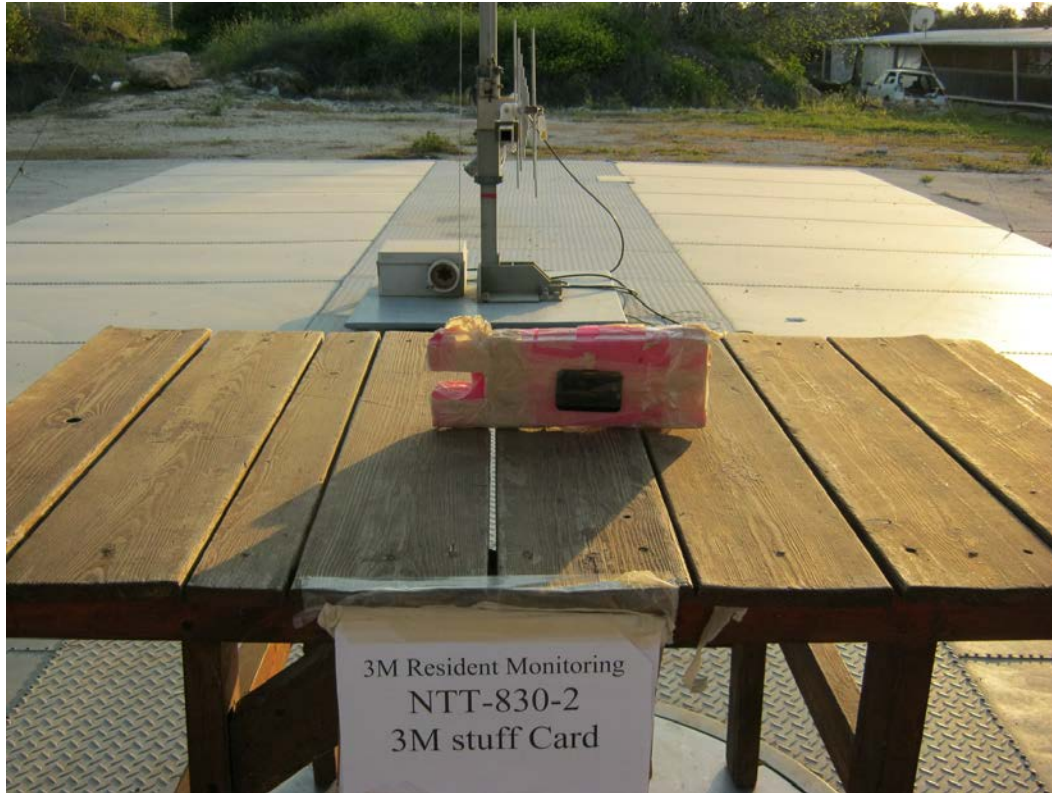


Figure 3. Radiated Emission Test 30MHz=4500MHz

4. Average Factor Calculation

1. Burst duration = 6.62msec
2. Time between bursts >100ms

$$\text{Average Factor} = 20 \log \left[\frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{burst duration}}{100\text{msec}} \times \text{Num of burst within 100msec} \right]$$

Note: Pulse duration and pulse period were considered worst case always ON since unit transmits randomly.

$$\text{Average Factor} = 20 \log \left[1 \times \frac{6.62}{100} \times 1 \right] = -23.6\text{dB}$$

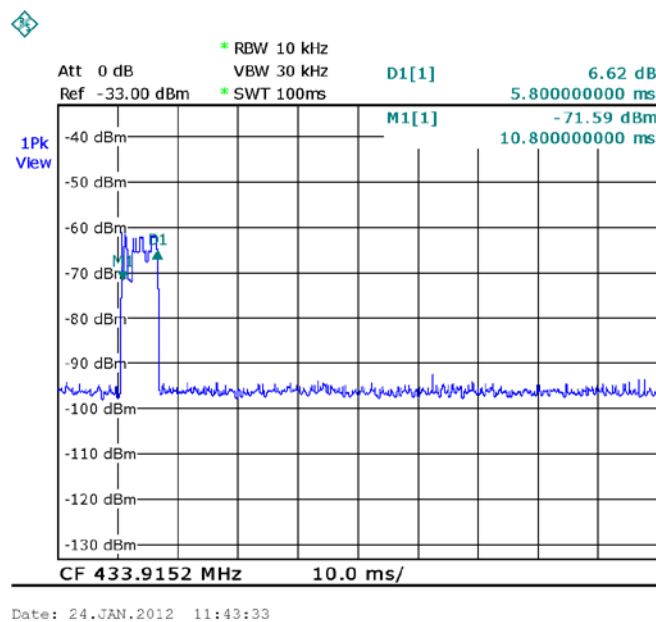


Figure 4. Burst Duration = 6.62msec

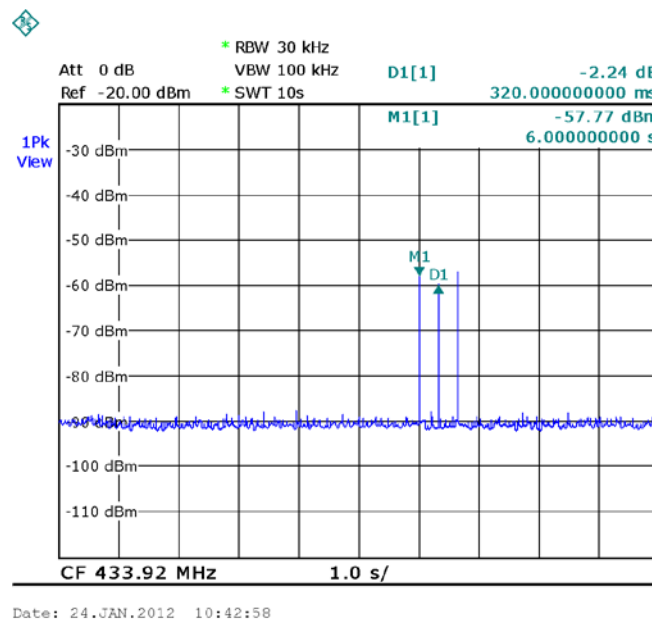


Figure 5. Time Between Bursts > 100 ms (320msec)



4.1 Test Equipment Used

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 21, 2011	1 Year
EMI Receiver	Rohde & Schwarz	ESCI7	100724	October 30, 2011	1 Year
Antenna Bioconical	ETS	3109	3244	August 1, 2011	1 Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 29, 2011	1 Year
Antenna-Log Periodic	A.H.System	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



5. Periodic Operation

5.1 Specification

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

5.2 Requirements

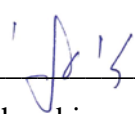
Requirement	Rationale	Verdict
Continuous transmissions are not permitted.	N/A	Complies
A manually operated transmitter shall be deactivated within not more than 5 seconds after releasing the switch.	See plots in Figure 6 and Figure 9.	Complies
An automatically operated transmitter shall cease operation within 5 seconds after activation.	See plots in Figure 7 and Figure 8	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 plots in Figure 9	Complies

5.3 Test Results

JUDGEMENT: Passed

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

TEST PERSONNEL:

Tester Signature: For/ 

Date: 18.4.2012

Typed/Printed Name: A. Sharabi

Periodic Operation

E.U.T Description Nurse Tracking Tag
Type NTT-830-2
Serial Number: Not Designated

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

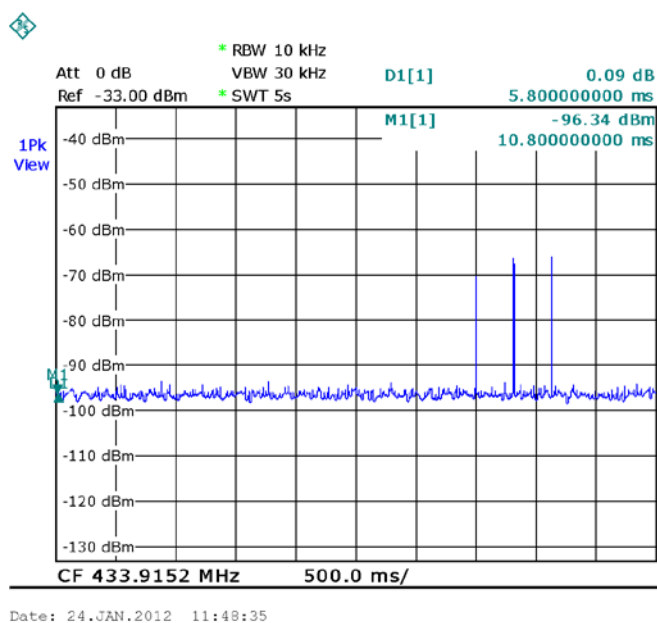


Figure 6. ON /OFF Manual Initializing Transmission

Periodic Operation

E.U.T Description Nurse Tracking Tag
Type NTT-830-2
Serial Number: Not Designated

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

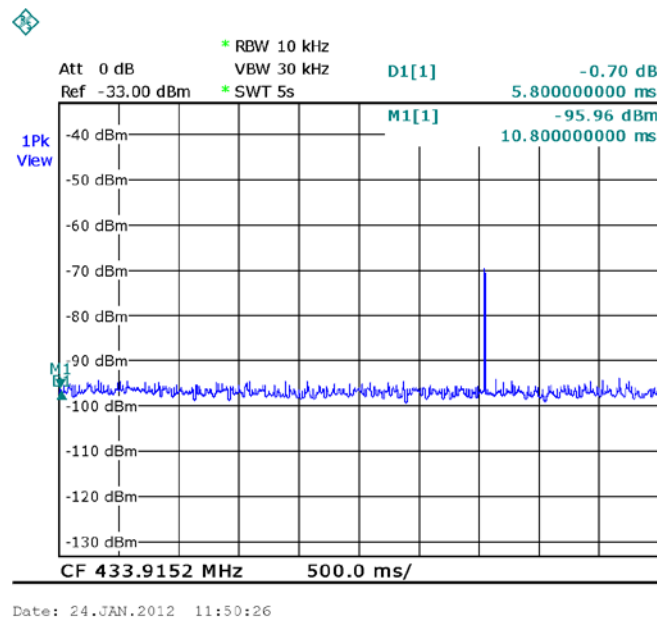


Figure 7. Automatic Transmission With Movement Detector Within 5sec

Periodic Operation

E.U.T Description Nurse Tracking Tag
Type NTT-830-2
Serial Number: Not Designated

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

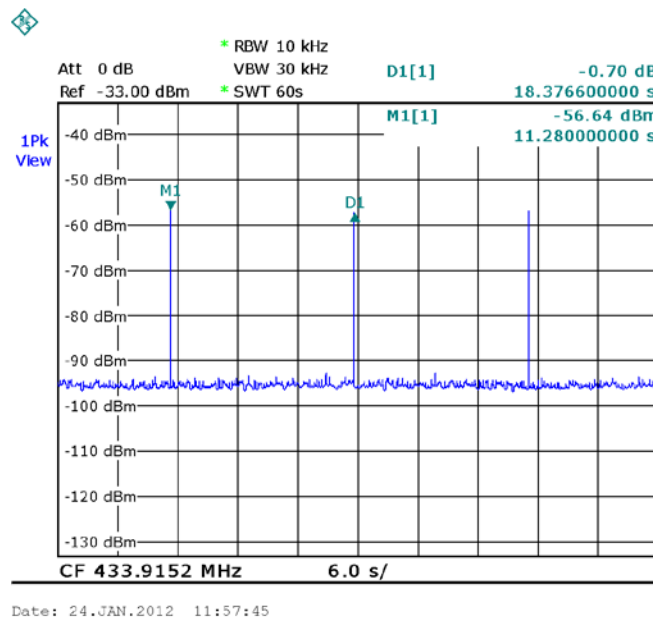


Figure 8. Automatic Transmission

Periodic Operation

E.U.T Description Nurse Tracking Tag
Type NTT-830-2
Serial Number: Not Designated

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

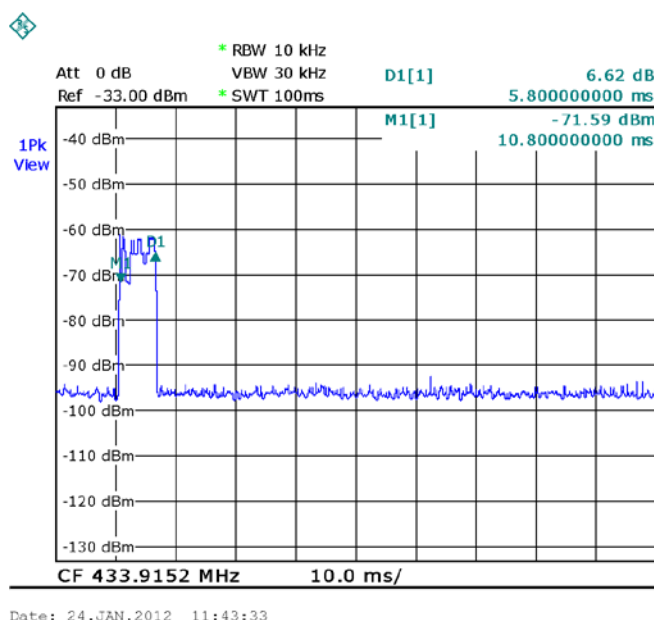


Figure 9. Transmission Burst Length Manual/Automatic/Signal Integrity

Same Signal burst width for manual transmission, automatic transmission and system integrity

In System integrity mode: Within first hour 4 signals (once every 15 minutes) =
 $> 4 \times 6.62\text{ms} = 26.48\text{ms} < 2\text{s}$

In system integrity mode: After first hour 1 signal per hour = 6.62ms < 2s

In automatic & manually transmission mode each transmission signal is less than 5s.

5.4 Test Equipment Used

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 23, 2011	1 Year
RF Section	HP	85420E	3705A00248	November 23, 2011	1 Year
EMI Receiver	Rohde & Schwarz	ESCI7	100724	October 30, 2011	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 (418 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(dBμV/m) + E.U.T. Duty Cycle Factor, in 100msec time window (dB)

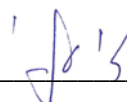
6.3 Test Results

JUDGEMENT: Passed by 3.83 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 10 to Figure 12.

TEST PERSONNEL:

Tester Signature : For/  Date: 18.04.2012

Typed/Printed Name: A. Sharabi



Field Strength of Fundamental

E.U.T Description Nurse Tracking Tag
Type NTT-830-2
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	AVG Result	AVG Specification	Margin
(MHz)	V/H	(dBμV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
433.92	H	100.6	-23.6	77.0	80.83	-3.83
433.92	V	97.2	-23.6	73.6	80.83	-7.83

Figure 10. 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." (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)+D.C.F. (dB)



Field Strength of Fundamental

E.U.T Description Nurse Tracking Tag
Type **NTT-830-2**
Serial Number: Not Designated

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

Antenna Polarization: Horizontal

Test Distance: 3 meters

Detector: Peak

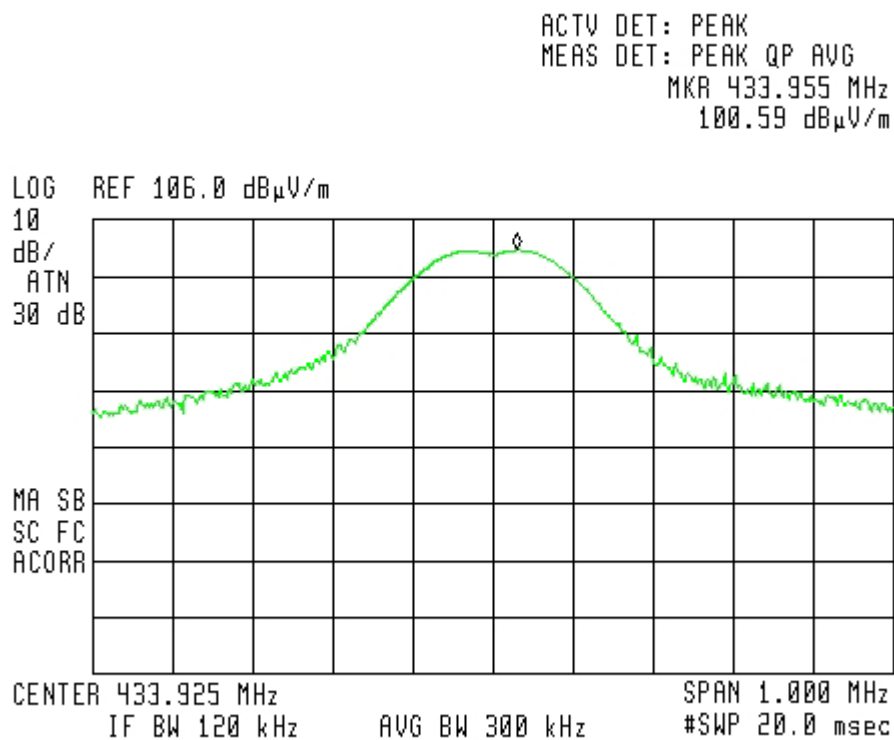


Figure 11. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL.



Field Strength of Fundamental

E.U.T Description Nurse Tracking Tag
Type NTT-830-2
Serial Number: Not Designated

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

Antenna Polarization: Vertical

Test Distance: 3 meters

Detector: Peak

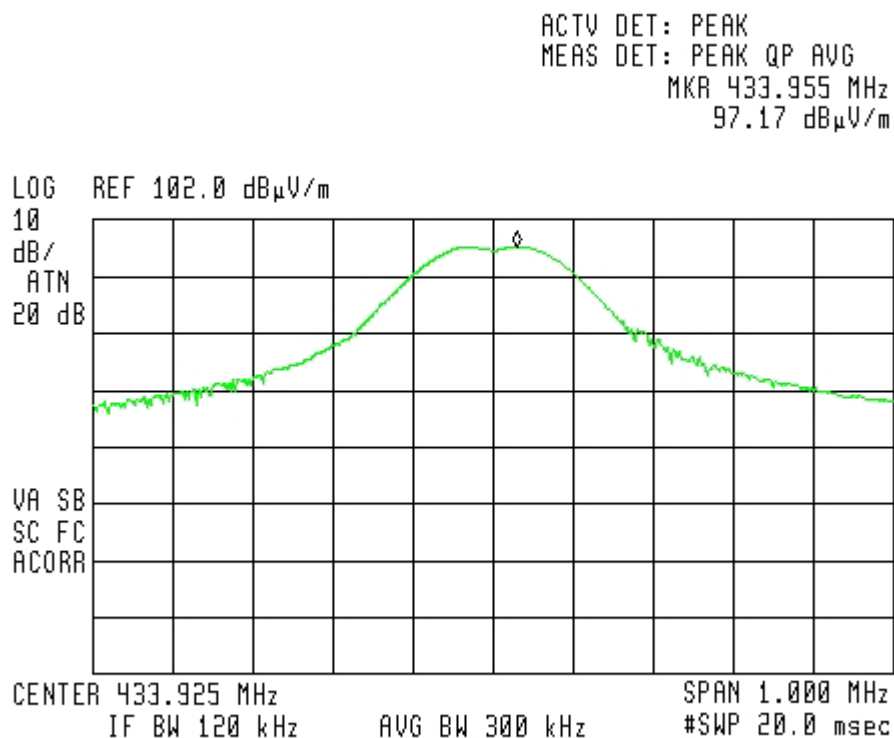


Figure 12. Field Strength of Fundamental. Antenna Polarization: VERTICAL.



6.4 Test Instrumentation Used, Field Strength of Fundamental

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 23, 2011	1 Year
RF Section	HP	85420E	3705A00248	November 23, 2011	1 Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 29, 2011	1 Year
Antenna Mast	ARA	AAM-4A	1001	1001	N/A
Turntable	ARA	ART-1001/4	1001	1001	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	1001	N/A
Printer	HP	LaserJet 2200	JPKGC19982	JPKGC19982	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 3.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 3.1.

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 MHz. This frequency was measured using a peak detector.

7.3 Test Results

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: For/  Date: 18.04.2012

Typed/Printed Name: A. Sharabi



7.4 Test Equipment Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 23, 2011	1 Year
RF Section	HP	85420E	3705A00248	November 23, 2011	1 Year
Active Loop Antenna	EMCO	6502	9506-2950	October 19, 2011	1 Year
Antenna Mast	ARA	AAM-4A	1001	1001	N/A
Turntable	ARA	ART-1001/4	1001	1001	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	1001	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 μ V/m]

RA: Receiver Amplitude [dB μ V]

AF: Receiving Antenna Correction Factor [dB/m]

CF: Cable Attenuation Factor [dB]

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

No external pre-amplifiers are used.

8. Spurious Radiated Emission

8.1 Test Specification

30 - 4500 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 3. 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 – 4.5 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 Results

JUDGEMENT: Passed by 16.1 dB

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

TEST PERSONNEL:

Tester Signature: For/ Date: 18.04.2012
Typed/Printed Name: A. Sharabi



Radiated Emission

E.U.T Description Nurse Tracking Tag
Type NTT-830-2
Serial Number: Not Designated

Specification: FCC Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 30 MHz to 4500 MHz
Antenna: 3 meters distance Detector: Peak

Frequency (MHz)	Antenna Polarity (H/V)	Peak Reading (dB μ V/m)	Average Factor (dB μ V/m)	Average Result (dB μ V/m)	Average Specification (dB μ V/m)	Margin (dB)
867.8	H	52.99	-23.6	29.4	60.8	-31.4
867.8	V	39.77	-23.6	16.2	60.8	-44.6
1301.7	H	61.53	-23.6	37.9	54.0	-16.1
1301.7	V	60.89	-23.6	37.3	54.0	-16.7

Figure 13. Radiated Emission.

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.



8.4 Test Equipment Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 23, 2011	1 Year
RF Section	HP	85420E	3705A00248	November 23, 2011	1 Year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS- 0411N313	013	November 5, 2011	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 21, 2011	1 Year
Antenna Bioconical	ETS	3109	002-3244	August 1, 2011	1 Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 29, 2011	1 Year
Antenna-Log Periodic	A.H.System	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

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. This measurement also represents the 99% occupied bandwidth requirement of Industry Canada.

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.

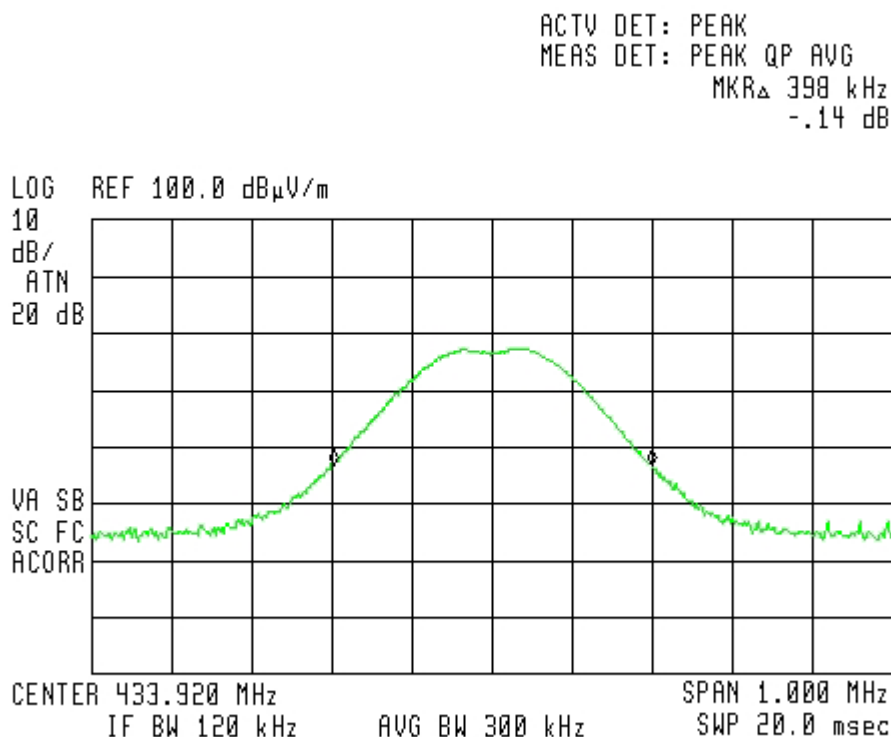


Figure 14



9.2 Test Results

E.U.T Description: Nurse Tracking Tag

Model: **NTT-830-2**

Serial Number: Not Designated

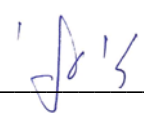
Specification: F.C.C. Part 15, Subpart C: (15.231(c))

Bandwidth Reading (kHz)	Specification (kHz)	Margin (kHz)
398	1082	-684

Figure 15 Bandwidth

JUDGEMENT: Passed by 684 kHz

TEST PERSONNEL:

Tester Signature: For  Date: 18.04.2012

Typed/Printed Name: A. Sharabi

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

Note:

The calculated necessary bandwidth per Industry Canada TRC-43 is:
 $B_n = 2DK + B$; $B = R / (\log_2 S)$, for Frequency Shift Keying digital data Tx
Max. Tx bit rate (R): 31.25 Kbit/ Sec
No. of signaling states (S): 2
Peak deviation (D): 31.7 kHz
 $K=1$
 $B(n) = 95.7 \text{ kHz}$



10. 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.*



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".*



10.4 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".*



**10.5 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".



10.6 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



11. Comparison requirements FCC with Industry Canada

FCC Specification	According FCC Standard	IC Standard
Periodic Operation	FCC Part 15.231 (a)(1-5)	RSS- 210 Issue 8 Section 2.5 Annex 1, A1.1.1
Field Strength at Fundamental	FCC Part 15.231 (b)	RSS- 210 Issue 8 Annex 1 A1.1.2, Section 2.5
Spurious Emissions	FCC Part 15.231 (b)	RSS GEN Issue 3 7.2.2(Table3)
Bandwidth	FCC Part 15.231 (c)	RSS- 210 Issue 8 Section 2.5 Annex 1 A1.1.3