



DATE: 16 April 2015

I.T.L. (PRODUCT TESTING) LTD.
FCC Radio Test Report
for
AeroScout Ltd.

Equipment under test:

Fall Monitor

M310, M210*

*See customer's declaration on page 6

Approved by: 

M. Zohar, Test Engineer

Approved by: 

For: D. Shidlovsky, Documentation

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This report relates only to items tested.



Measurement/Technical Report for AeroScout Ltd.

Fall Monitor

M310

FCC ID: Q3HFM

IC: 5115A-FM

16 April 2015

This report concerns:

Original Grant:

Class I Change:

Class II Change:

Equipment type:

Spread Spectrum/Digital Device
912-920 MHz

Limits used:

47CFR15 Section 15.247

Measurement procedure used is KDB 558074 D01 v03r02 and ANSI C63.4-2009.

Application for Certification
prepared by:

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1. General Information

1.1 Administrative Information

Manufacturer: AeroScout Ltd.

Manufacturer's Address: 3 Pekeris St.
Einstein Entrance
4th Floor
Rechovot 76702
Tel: +972-8-9369393
Fax: +972-8-9365977

Manufacturer's Representative: Leonid Genusin

Equipment Under Test (E.U.T): Fall Monitor

Equipment Model No.: M310, M210*

Equipment Serial No.: Not designated

Date of Receipt of E.U.T: 11.08.14

Start of Test: 11.08.14

End of Test: 02.12.14

Test Laboratory Location: I.T.L (Product Testing) Ltd.
Kfar Bin Nun,
ISRAEL 99780
and
I.T.L (Product Testing) Ltd.
1 Batsheva St.,
Lod
ISRAEL 7120101

Test Specifications: FCC Part 15, Subpart C
RSS-210, Issue 8, 2010

*See customer's Declaration on following page.



Date: December 16, 2014

DECLARATION

I hereby declare that the AeroScout Fall Monitor Model M310 is identical to Model M210 except that Model M210 does not contain the 2.4 GHz transmitter which Model M310 has.

Signature:
Reuven Amsalem

VP HW R&D
Aeroscout LTD.



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 and FCC Designation Number US1004
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 and Site No. IC 4025A-1

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 new Stanley Healthcare M series of Fall Management solutions includes four monitors with a consistent industrial design resulting and incorporating the MobileView platform. The adoption of a unified software platform and business intelligent in combination with bidirectional Wi-Fi connectivity results in a Fall Management solution that provides accurate, timely and relevant intelligence while improving patient safety and outcomes. The option for of a cordless pad monitoring system provides a solution which reduces the risk of patient and staff tripping due to pad cords.

Using a dedicated pressure pad the Stanley Healthcare M310 monitors are designed to sound an alarm when a patient attempts to get out of a wheelchair, chair, bed or commode. The monitors are mounted on either a chair or bed using a universal mounting bracket or on a wall using a wall mounting device. The monitors' module is connected to pressure pad that senses when the patient exits a bed or chair.

Monitor M310 includes a Wi-Fi transceiver through which it's monitored by MobileView. Any weight pressure removal event from the pad attached to it is transmitted to the MobileView server, processed and indicated in the MobileView UI as a patient movement or an alarm.

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in KDB 558074 D01 v03r02, ANSI C63.4: 2009 and RSS, Gen Issue 4. 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 November 21, 2012). Testing was also performed at ITL's testing facility in Lod, Israel (FCC Designation Number is US1004.)

I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Conducted Emission

Conducted Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)
0.15 – 30 MHz:

Expanded Uncertainty (95% Confidence, K=2):
± 3.44 dB

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):
± 5.2 dB

Note: See ITL Procedure No. PM 198.



2. System Test Configuration

2.1 Justification

Testing was performed in installation position.

The EUT incorporates the following transmitters:

1. A 2.4 GHz single modular approved transmitter, TAG1200 under FCC ID: Q3HTAG1200 and IC: 5115A-TAG1200.
2. A 916 MHz transmitter tested under this report.

The 916 MHz transmitter incorporates 2 diversity printed antennas (top and side).

Evaluation was done on both antennas separately.

Intermodulation testing of the TAG1200 and 916 MHz transmitter was performed and RF exposure was calculated.

A C2PC of the TAG1200 FCC Grant and IC Certification is being requested in order to:

- 1) allow simultaneous transmission of the TAG1200 and 916 MHz transmitter;
- 2) add limited modular approval of the TAG1200 in the new host, the Fall Monitor; and
- 3) change the allowable separation distance between the antenna and all persons from 20cm to 1cm.

2.2 EUT Exercise Software

No special exercise software was used.

2.3 Special Accessories

No special accessories were needed to achieve compliance.

2.4 Equipment Modifications

No modifications were necessary in order to achieve compliance.

2.5 Configuration of Tested System

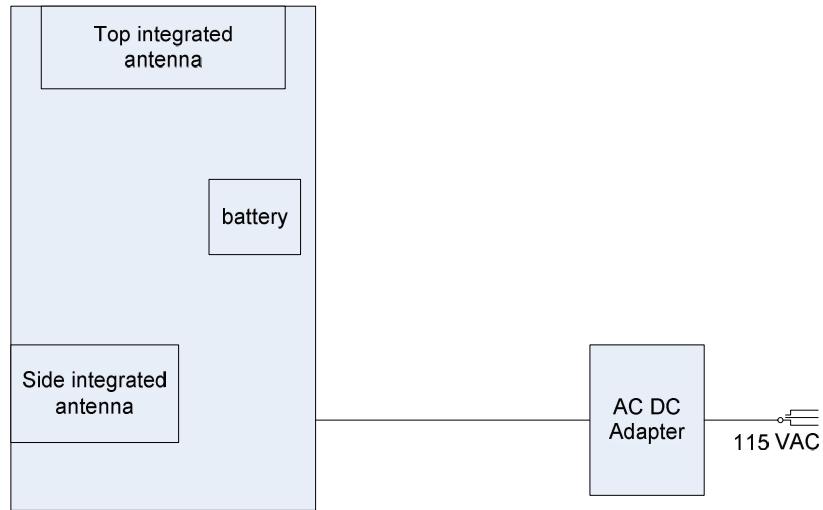


Figure 1. Configuration of Tested System

3. Conducted & Radiated Measurement Test Set-Up Photos



Figure 2. Conducted Emission Test

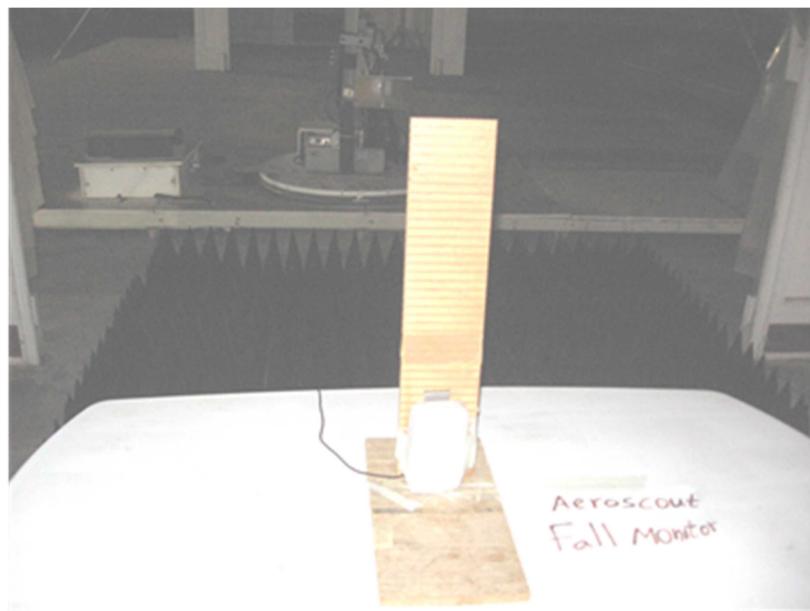


Figure 3. Radiated Emission Test



Figure 4. Radiated Emission Test



Figure 5. Radiated Emission Test

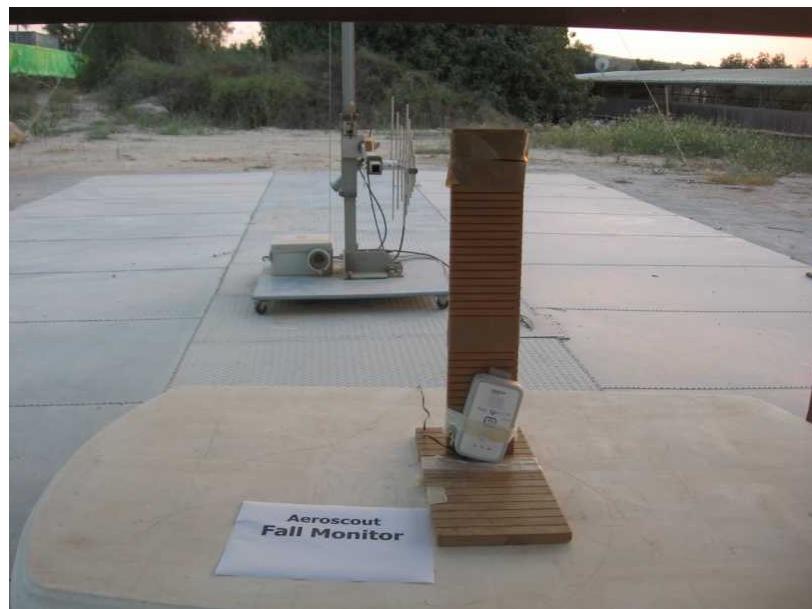


Figure 6. Radiated Emission Test

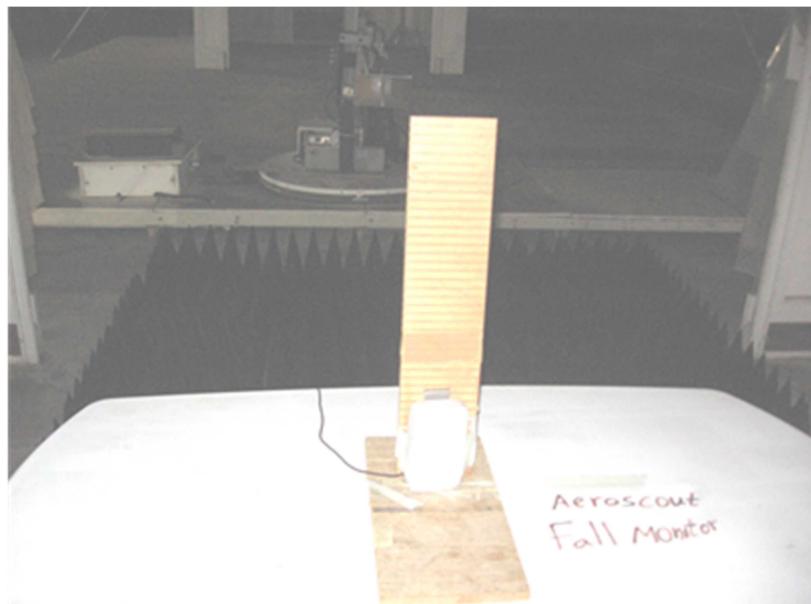


Figure 6. Intermodulation Radiated Test



4. Conducted Emission From AC Ports

4.1 Test Specification

F.C.C., Part 15, Subpart C, 15.207

4.2 Test Procedure

The E.U.T operation mode and test setup are as described in Section 4.1. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room (see Section 3), with the E.U.T placed on a 0.4 meter high wooden table. In the case of a floor-standing E.U.T., it was placed on the horizontal ground plane.

The E.U.T was powered from 115 V AC / 60 Hz via 50 Ohm / 50 μ Hn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T.'s AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission. The configuration tested is shown in the photograph, Figure 2.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are pre-loaded to the receiver and are displayed on the receiver's spectrum display.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.



4.3 Test Results

The E.U.T met the requirements of the FCC Part 15, Subpart C, 15.207 specifications.

The margin between the emission levels and the specification limit is, in the worst case, 15.11 dB for the phase line at 0.482 MHz and 16.98 dB at 0.486 MHz for the neutral line.

The details of the highest emissions are given in *Figure 7* to *Figure 10*.

TEST PERSONNEL:

Tester Signature: 

Date: 13.01.15

Typed/Printed Name: M. Zohar

Conducted Emission

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC Part 15, Subpart C, Class B
Lead: Phase
Detectors: Quasi-peak, Average

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CE22BQP			
Trace2:	CE22BAP			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dB μ V	DELTA LIMIT dB	
1 Quasi Peak	150 kHz	36.61	-29.38	
2 Average	254 kHz	21.68	-29.94	
2 Average	418 kHz	23.11	-24.37	
1 Quasi Peak	430 kHz	29.74	-27.50	
1 Quasi Peak	482 kHz	37.06	-18.44	
2 Average	482 kHz	31.19	-15.11	
2 Average	826 kHz	18.23	-27.76	
1 Quasi Peak	838 kHz	25.41	-30.58	
2 Average	1.534 MHz	19.78	-26.21	
1 Quasi Peak	1.638 MHz	25.66	-30.33	
2 Average	2.742 MHz	19.41	-26.58	
1 Quasi Peak	2.99 MHz	22.81	-33.18	
2 Average	3.766 MHz	16.83	-29.16	
1 Quasi Peak	5.878 MHz	24.23	-31.77	
2 Average	8.306 MHz	23.95	-26.05	
1 Quasi Peak	8.438 MHz	27.99	-32.00	
1 Quasi Peak	17.578 MHz	25.71	-34.29	
2 Average	17.626 MHz	21.38	-28.61	
2 Average	19.018 MHz	24.43	-25.56	
1 Quasi Peak	19.434 MHz	29.12	-30.87	

Date: 31.AUG.2014 13:12:16

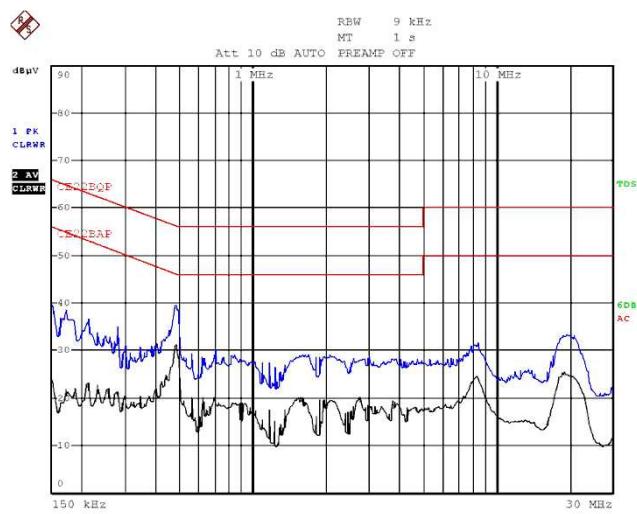
Figure 7. Detectors: Quasi-peak, Average

Note: *DELTA LIMIT 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.*

Conducted Emission

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC Part 15, Subpart C, Class B
Lead: Phase
Detectors: Quasi-peak, Average



Date: 31.AUG.2014 13:11:06

Figure 8 Detectors: Quasi-peak, Average

Conducted Emission

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC Part 15, Subpart C, Class **B**
Lead: Neutral
Detectors: Quasi-peak, Average

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CE22BQP			
Trace2:	CE22BAP			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dB μ V	DELTA LIMIT dB	
1 Quasi Peak	158 kHz	36.35	-29.21	
2 Average	250 kHz	20.04	-31.70	
2 Average	418 kHz	23.27	-24.21	
1 Quasi Peak	422 kHz	29.34	-28.06	
1 Quasi Peak	478 kHz	35.73	-20.64	
2 Average	486 kHz	29.25	-16.98	
1 Quasi Peak	846 kHz	25.70	-30.29	
2 Average	954 kHz	20.18	-25.81	
1 Quasi Peak	1.258 MHz	22.17	-33.82	
2 Average	1.322 MHz	17.29	-28.70	
2 Average	2.126 MHz	17.28	-28.71	
1 Quasi Peak	2.426 MHz	19.77	-36.22	
2 Average	3.97 MHz	13.22	-32.77	
1 Quasi Peak	3.974 MHz	19.80	-37.19	
2 Average	8.422 MHz	26.08	-23.91	
1 Quasi Peak	8.53 MHz	29.95	-30.04	
2 Average	17.586 MHz	21.49	-28.50	
1 Quasi Peak	17.602 MHz	26.19	-33.80	
2 Average	18.862 MHz	23.89	-26.10	
1 Quasi Peak	18.886 MHz	28.49	-31.51	

Date: 31.AUG.2014 13:18:14

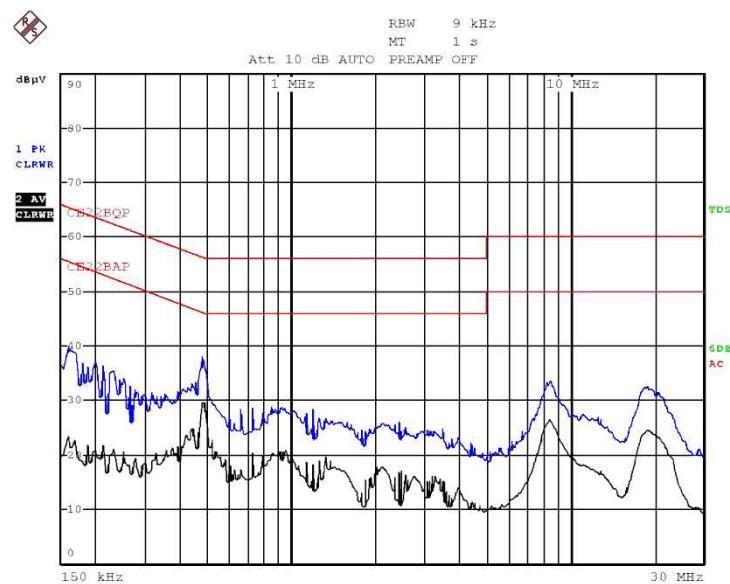
Figure 9. Detectors: Quasi-peak, Average

Note: *DELTA LIMIT 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.*

Conducted Emission

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC Part 15, Subpart C, Class **B**
Lead: Neutral
Detectors: Quasi-peak, Average



Date: 31.AUG.2014 13:17:19

Figure 10 Detectors: Quasi-peak, Average



4.1 Test Equipment Used, Conducted Emission

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
LISN	Fischer	FCC-LISN-2A	127	January 1, 2014	1 year
Transient Limiter	HP	11947A	3107A03041	May 13, 2014	1 year
EMI Receiver	Rohde & Schwarz	ESCI7	100724	December 17, 2013	1 year

Figure 11 Test Equipment Used

5. 6 dB Minimum Bandwidth

5.1 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.

The E.U.T was tested at 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 spectrum bandwidth of the E.U.T. at the point of 6 dB below maximum peak power was measured and recorded.

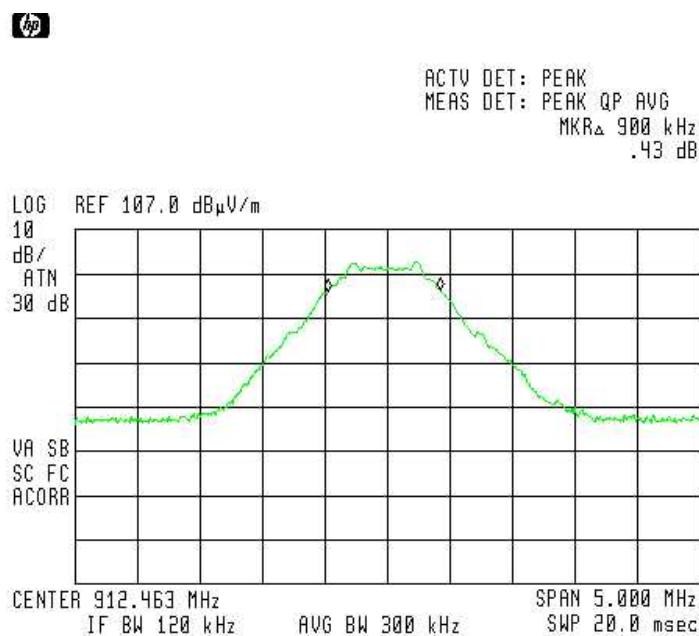


Figure 12 — Low Channel



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR_Δ 838 kHz
-.05 dB

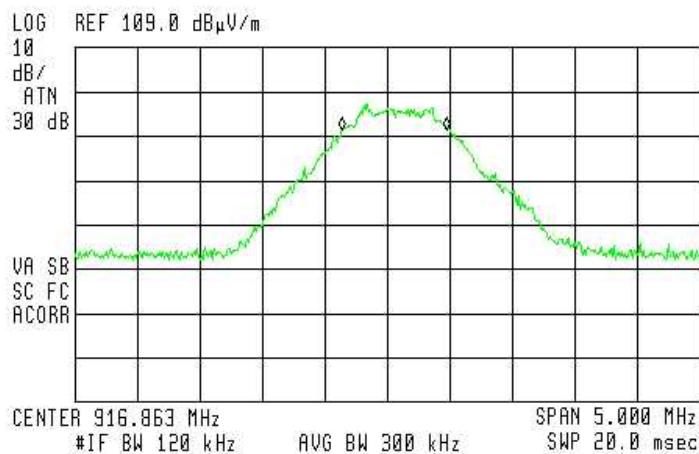


Figure 13 — Mid Channel



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR_Δ -875 kHz
.10 dB

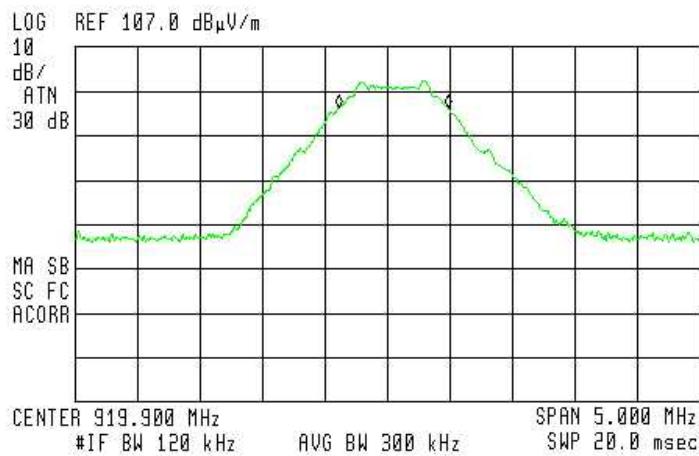


Figure 14 — High Channel



5.2 Results Table

E.U.T Description: Fall Monitor

Model No.: M310

Serial Number: Not designated

Specification: F.C.C. Part 15, Subpart C: (15.247-a2)

Operation Frequency (MHz)	Reading (KHz)	Specification (KHz)
912.4	900	>500
916.9	838	>500
919.9	875	>500

Figure 15 6 dB Minimum Bandwidth

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: 

Date: 13.01.15

Typed/Printed Name: M. Zohar



5.3 Test Equipment Used; 6 dB Minimum Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	2 Years
Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	Narda	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	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 16 Test Equipment Used

6. 26 dB Minimum Bandwidth

6.1 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.

The E.U.T was tested at 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 spectrum bandwidth of the E.U.T. at the point of 26 dB below maximum peak power was measured and recorded.

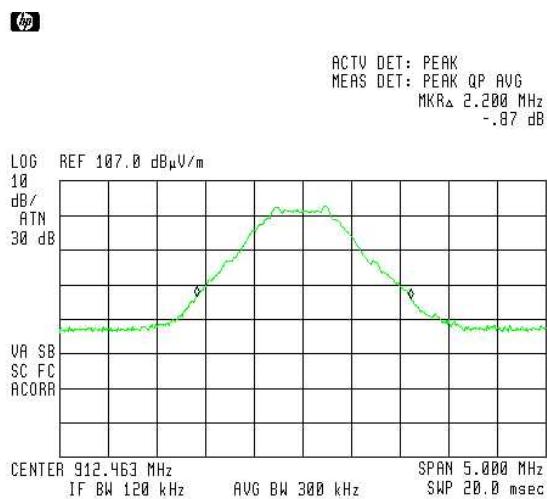


Figure 17 — Low Channel

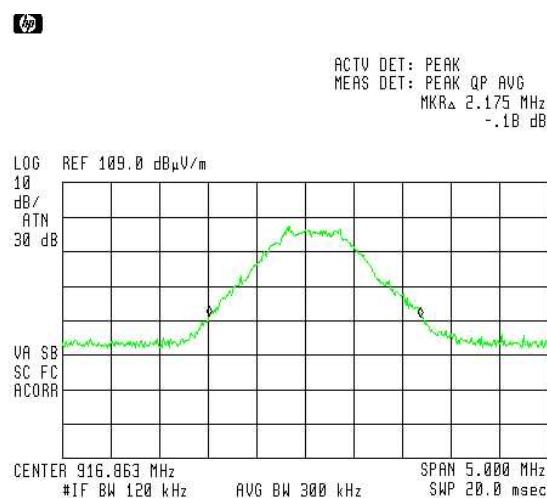


Figure 18 — Mid Channel

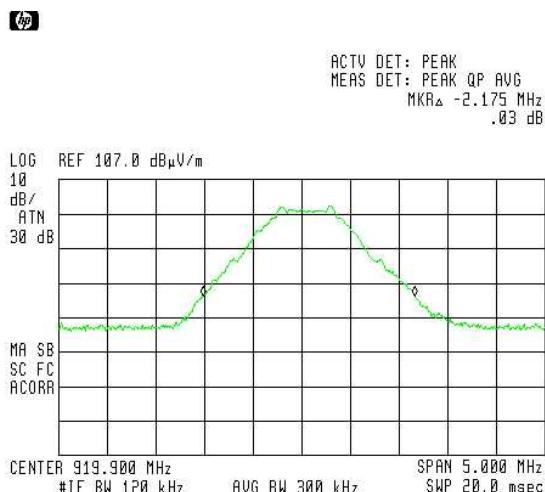


Figure 19 — High Channel



6.2 Results table

E.U.T Description: Fall Monitor

Model No.: M310

Serial Number: Not designated

Specification: F.C.C. Part 15, Subpart C: (15.247-a2)

Operation Frequency (MHz)	Reading (MHz)	Specification (MHz)
912.4	2.2	N/A
916.9	2.1	N/A
919.9	2.1	N/A

Figure 20 26 dB Minimum Bandwidth

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature:  Date: 13.01.15

Typed/Printed Name: M. Zohar



6.3 Test Equipment Used; 26 dB Minimum Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	2 Years
Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	Narda	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	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 21 Test Equipment Used

7. Maximum Transmitted Peak Power Output

7.1 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.

The E.U.T was tested at 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 E.U.T. was tested at low, mid and high channels with the following modulations: BPSK (6Mbps).

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:

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

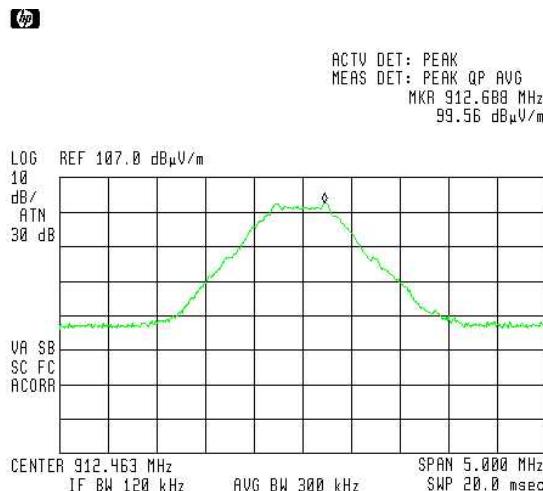


Figure 22 , Low Channel, Side Antenna, Vertical

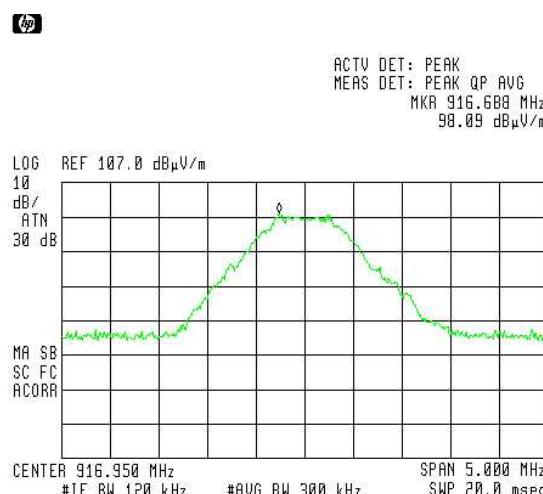


Figure 23, Mid Channel, Side Antenna, Vertical

hp

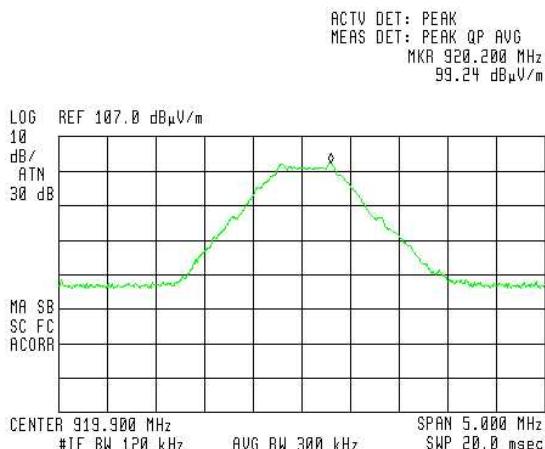


Figure 24 , High Channel, Side Antenna, Vertical

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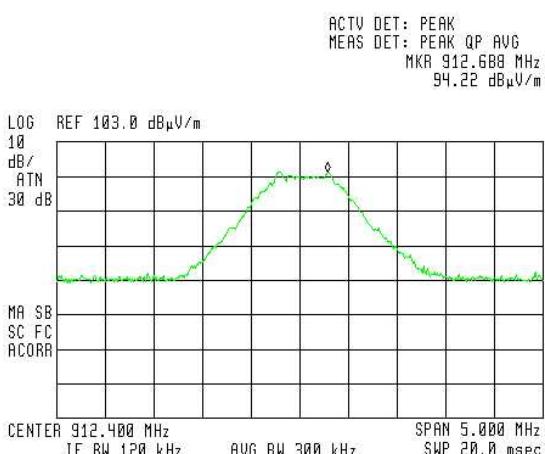


Figure 25 , Low Channel, Top Antenna, Horizontal

hp

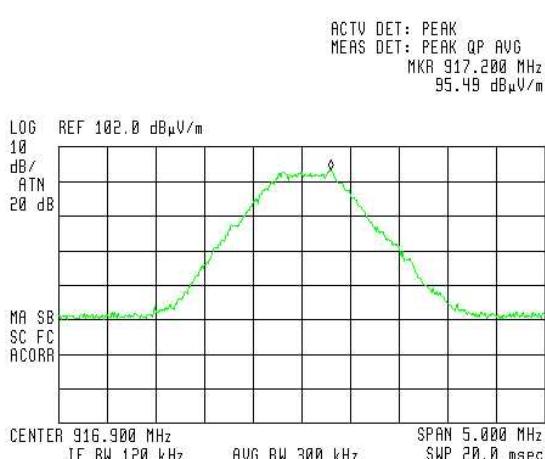


Figure 26, Mid Channel, Top Antenna, Horizontal

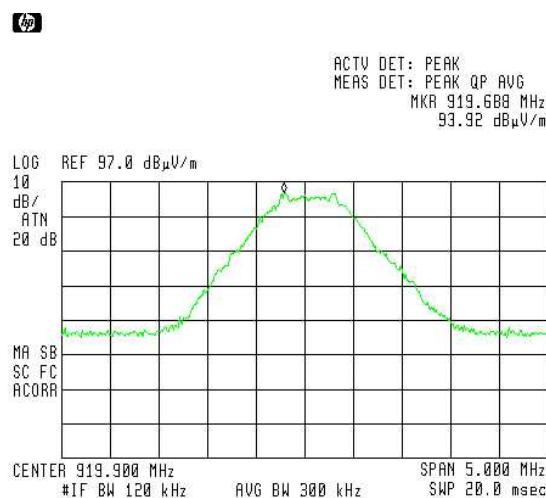


Figure 27 , High Channel, Top Antenna, Horizontal

7.2 Results table

E.U.T. Description: Fall Monitor

Model No.: M310

Serial Number: Not designated

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

Antenna Mode	Frequency (MHz)	Polarization H/V	Radiated Power (dBuV/m)	Power (dBm)	Power (W)	Specification (W)	Margin (W)
TOP	912.4	H	94.2	-1.0	0.00079	1.0	-0.99921
	916.9	H	95.5	0.3	0.00107	1.0	-0.99893
	919.9	H	93.9	-1.3	0.00074	1.0	-0.99926
SIDE	912.4	V	99.6	4.4	0.00275	1.0	-0.99725
	916.9	V	98.1	2.9	0.00195	1.0	-0.99805
	919.9	V	99.2	4.0	0.00251	1.0	-0.99749

Figure 28 Maximum Peak Power Output VERTICAL/HORIZONTAL

JUDGEMENT: Passed by 0.99725 W

TEST PERSONNEL:

Tester Signature: 

Date: 13.01.15

Typed/Printed Name: M. Zohar



7.3 Test Equipment Used; Peak Power Output

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	2 Years
Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	Narda	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	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 29 Test Equipment Used

8. Band Edge Spectrum

[In Accordance with section 15.247(c)]

8.1 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.

The E.U.T was tested at 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 E.U.T. was tested at low, mid and high channels with the following modulations:

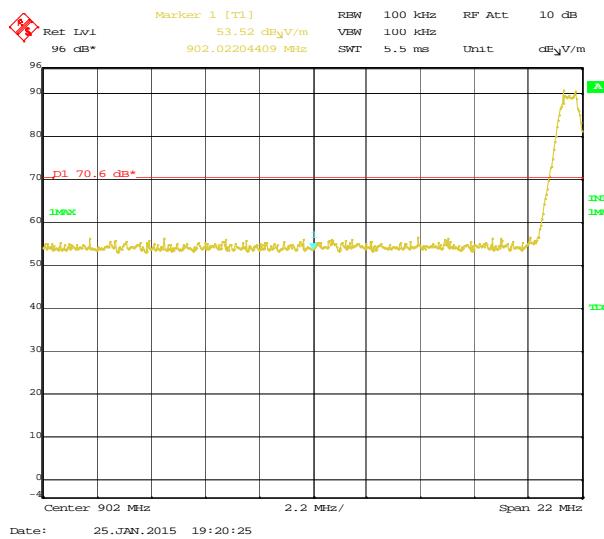


Figure 30 —Lower Band Edge, Side Antenna, Vertical

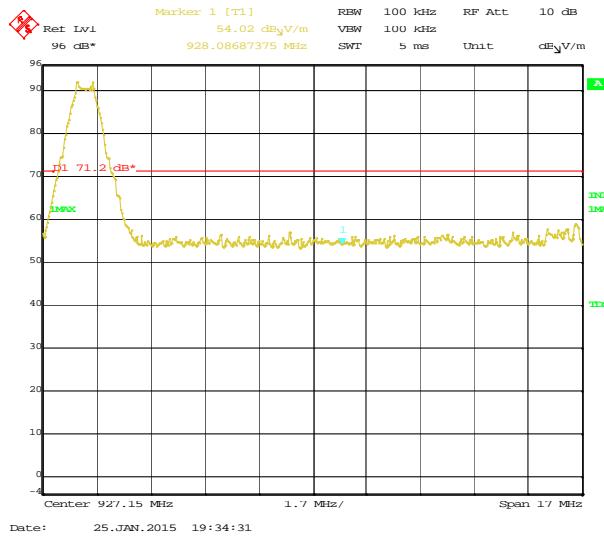


Figure 31 —Upper Band Edge, Side Antenna, Vertical

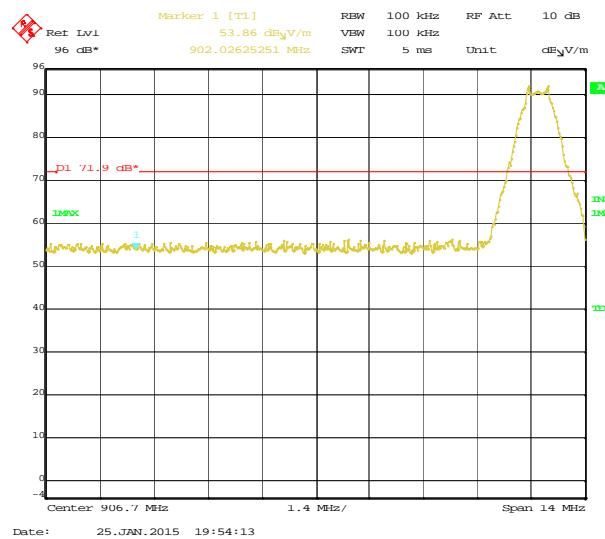


Figure 32 —Lower Band Edge, Top Antenna, Horizontal

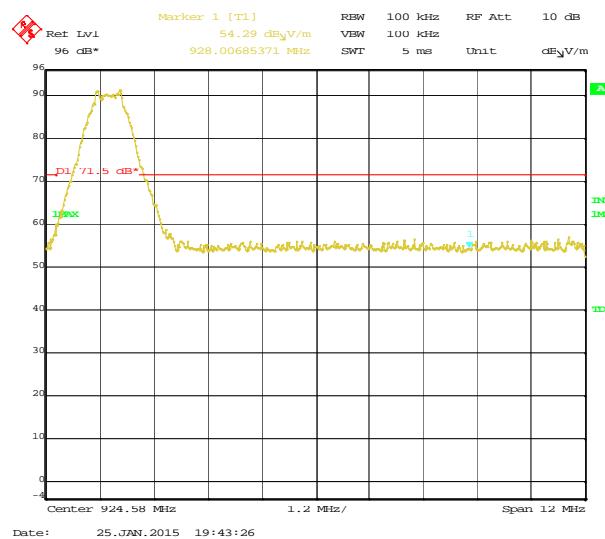


Figure 33 —Upper Band Edge, Top Antenna, Horizontal

8.2 Results table

E.U.T. Description: Fall Monitor

Model No.: M310

Serial Number: Not designated

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

ANTANNA MODE	Operation Frequency (MHz)	Band Edge Frequency (MHz)	Spectrum Level (dBuV/m)	Specification (dBuV/m)	Margin (dB)
TOP	912.4	902	53.9	71.9	-18.0
	919.4	928	54.3	71.5	-17.2
SIDE	912.4	902	53.5	70.6	-17.1
	919.4	928	54.0	71.2	-17.2

Figure 34 Band Edge Spectrum

JUDGEMENT: Passed by 17.1 dB

TEST PERSONNEL:

Tester Signature: 

Date: 13.01.15

Typed/Printed Name: M. Zohar



8.3

Test Equipment Used; Band Edge Spectrum

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	R&S	ESBI7	100120	January 1, 2015	1 year
Biconilog Antenna	EMCO	3142B	1250	May 22, 2014	2 years
Antenna Mast	ETS	2070-2	9608-1497	N/A	N/A
Turntable	ETS	2087	-	N/A	N/A
Mast & Table Controller	ETS/EMCO	2090	9608-1456	N/A	N/A

Figure 35 Test Equipment Used



9. Radiated Emission, 9 kHz – 30 MHz

9.1 Test Specification

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

9.2 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 with 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 low, mid and high channels using a peak detector.

9.3 Measured Data

JUDGEMENT: Passed by more than 20dB.

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

TEST PERSONNEL:

Tester Signature: 

Date: 13.01.15

Typed/Printed Name: M. Zohar



9.4 Test Instrumentation Used; Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 year
RF Section	HP	85420E	3705A00248	January 15, 2014	1 year
Active Loop Antenna	EMCO	6502	9506-2950	November 4, 2013	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 36 Test Equipment Used



9.5 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: $FS = 30.7 \text{ dB}\mu\text{V (RA)} + 14.0 \text{ dB (AF)} + 0.9 \text{ dB (CF)} = 45.6 \text{ dB}\mu\text{V}$

No external pre-amplifiers are used.

10. Spurious Radiated Emission, 30 –10000 MHz

10.1 Radiated Emission 30-10000 MHz

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, 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 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-1.0 GHz, testing was performed at the Bin Nun Site using a computerized EMI receiver complying with CISPR 16 requirements.

In the frequency range 1.0-10.0 GHz, a spectrum analyzer including a low noise amplifier was used at the Lod site. 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.)

The E.U.T. was operated at the low, mid and high channels using a peak detector.



10.2 Test Data

JUDGEMENT: Passed by 18.6dB

For the operation frequency of 912 MHz, the margin between the emission level and the specification limit is in the worst case 21.2 dB at the frequency of 2737 MHz, vertical polarization.

For the operation frequency of 916 MHz, the margin between the emission level and the specification limit is in the worst case 18.6dB at the frequency of 2750 MHz, vertical polarization.

For the operation frequency of 919 MHz, the margin between the emission level and the specification limit is 19.2dB in the worst case at the frequency of 2757 MHz, horizontal polarization.

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

The details of the highest emissions are given in *Figure 37* to *Figure 42*.

TEST PERSONNEL:

Tester Signature: 

Date: 13.01.15

Typed/Printed Name: M. Zohar



Radiated Emission Above 1 GHz

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 10.0 GHz

Test Distance: 3 meters Detector: Peak

Operation Frequency: Side Antenna, 912 MHz

Freq. (MHz)	Polarity (H/V)	Peak Amp (dB μ V/m)	Peak. Specification (dB μ V/m)	Peak. Margin (dB)
902.0	V	43.5	74.0	-30.5
902.0	H	38.6	74.0	-35.4
2737.0	V	52.8	74.0	-21.2
2737.0	H	51.3	74.0	-22.7

**Figure 37. 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 Amp” includes correction factor.

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



Radiated Emission Above 1 GHz

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 10.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: Side Antenna, 912 MHz

Freq. (MHz)	Polarity (H/V)	Average Amp (dB μ V/m)	Average Specification (dB μ V/m)	Margin (dB)
2737.0	V	23.7	54.0	-30.3
2737.0	H	22.2	54.0	-31.8

**Figure 38. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL.
Detector: Average**

Notes:

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

“Average Amp” includes correction factor.

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



Radiated Emission Above 1 GHz

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 10.0 GHz

Test Distance: 3 meters Detector: Peak

Operation Frequency: Side Antenna, 916 MHz

Freq. (MHz)	Polarity (H/V)	Peak Amp (dB μ V/m)	Peak. Specification (dB μ V/m)	Margin (dB)
2750.0	V	55.4	74.0	-18.6
2750.0	H	53.8	74.0	-20.2

**Figure 39. 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 Amp” includes correction factor.

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



Radiated Emission Above 1 GHz

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 10.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: Side Antenna, 916 MHz

Freq.	Polarity	Average Amp	Average Specification	Margin
(MHz)	(H/V)	(dB μ V/m)	(dB μ V/m)	(dB)
2750.0	V	26.3	54.0	-27.7
2750.0	H	24.7	54.0	-29.3

**Figure 40. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL.
Detector: Average**

Notes:

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

“Average Amp” includes correction factor.

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



Radiated Emission Above 1 GHz

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 10.0 GHz

Test Distance: 3 meters Detector: Peak

Operation Frequency: Side Antenna, 919 MHz

Freq. (MHz)	Polarity (H/V)	Peak Amp (dB μ V/m)	Peak. Specification (dB μ V/m)	Margin (dB)
928.0	V	42.9	74.0	-31.1
928.0	H	40.2	74.0	-33.8
2757.0	V	51.9	74.0	-22.1
2757.0	H	52.6	74.0	-21.4

**Figure 41. 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 Amp” includes correction factor.

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

**“Correction Factor” = Antenna Factor + Cable Loss



Radiated Emission Above 1 GHz

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 10.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: Side Antenna, 919 MHz

Freq. (MHz)	Polarity (H/V)	Average Amp (dB μ V/m)	Average Specification (dB μ V/m)	Margin (dB)
2757.0	V	22.8	54.0	-31.2
2757.0	H	23.5	54.0	-30.5

**Figure 42. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL.
Detector: Average**

Notes:

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

“Average Amp” includes correction factor.

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

**“Correction Factor” = Antenna Factor + Cable Loss



Radiated Emission Above 1 GHz

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 10.0 GHz

Test Distance: 3 meters Detector: Peak

Operation Frequency: Top Antenna, 912 MHz

Freq. (MHz)	Polarity (H/V)	Peak Amp (dB μ V/m)	Peak. Specification (dB μ V/m)	Margin (dB)
902.0	V	44.0	74.0	-30.0
902.0	H	43.2	74.0	-30.8
2737.0	V	52.6	74.0	-21.4
2737.0	H	51.9	74.0	-22.1

**Figure 43. 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 Amp” includes correction factor.

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



Radiated Emission Above 1 GHz

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 10.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: Top Antenna, 912 MHz

Freq.	Polarity	Average Amp	Average Specification	Margin
(MHz)	(H/V)	(dB μ V/m)	(dB μ V/m)	(dB)
2737.0	V	23.5	54.0	-30.5
2737.0	H	22.8	54.0	-31.2

**Figure 44. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL.
Detector: Average**

Notes:

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

“Average Amp” includes correction factor.

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



Radiated Emission Above 1 GHz

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 10.0 GHz

Test Distance: 3 meters Detector: Peak

Operation Frequency: Top Antenna, 916 MHz

Freq. (MHz)	Polarity (H/V)	Peak Amp (dB μ V/m)	Peak. Specification (dB μ V/m)	Margin (dB)
2750.0	V	54.7	74.0	-19.3
2750.0	H	54.3	74.0	-19.7

**Figure 45. 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 Amp” includes correction factor.

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



Radiated Emission Above 1 GHz

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 10.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: Top Antenna, 916 MHz

Freq. (MHz)	Polarity (H/V)	Average Amp (dB μ V/m)	Average Specification (dB μ V/m)	Margin (dB)
2750.0	V	25.6	54.0	-28.4
2750.0	H	25.2	54.0	-28.8

**Figure 46. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL.
Detector: Average**

Notes:

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

“Average Amp” includes correction factor.

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



Radiated Emission Above 1 GHz

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 10.0 GHz

Test Distance: 3 meters Detector: Peak

Operation Frequency: Top Antenna, 919 MHz

Freq. (MHz)	Polarity (H/V)	Peak Amp (dB μ V/m)	Peak. Specification (dB μ V/m)	Margin (dB)
928.0	V	43.8	74.0	-30.2
928.0	H	40.9	74.0	-33.1
2757.0	V	53.2	74.0	-20.8
2757.0	H	54.8	74.0	-19.2

**Figure 47. 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 Amp” includes correction factor.

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

**“Correction Factor” = Antenna Factor + Cable Loss



Radiated Emission Above 1 GHz

E.U.T Description Fall Monitor
Type M310
Serial Number: Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 10.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: Top Antenna, 919 MHz

Freq. (MHz)	Polarity (H/V)	Average Amp (dB μ V/m)	Average Specification (dB μ V/m)	Margin (dB)
2757.0	V	24.1	54.0	-29.9
2757.0	H	25.7	54.0	-28.3

**Figure 48. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL.
Detector: Average**

Notes:

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

“Average Amp” includes correction factor.

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

**“Correction Factor” = Antenna Factor + Cable Loss



10.3 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	R&S	ESBI7	100120	January 1, 2015	1 year
Spectrum Analyzer	R&S	FSL6	100194	January 1, 2015	1 year
Active Loop Antenna	EMCO	6502	9506-2950	November 4, 2014	1 year
Biconilog Antenna	EMCO	3142B	1250	May 22, 2014	2 years
Horn Antenna	ETS	3115	6142	March 14, 2012	3 years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 years
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 22, 2014	1 year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 29, 2014	1 year
Antenna Mast	ETS	2070-2	9608-1497	N/A	N/A
Turntable	ETS	2087	-	N/A	N/A
Mast & Table Controller	ETS/EMCO	2090	9608-1456	N/A	N/A
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	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

Figure 49 Test Equipment Used

11. Transmitted Power Density

[In accordance with section 15.247(d)]

11.1 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.

The E.U.T was tested at 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 spectrum analyzer was set to 3 kHz resolution BW and sweep time of 1 second for each 3 kHz “window”. The spectrum peaks were located at each of the 3 operating frequencies.

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

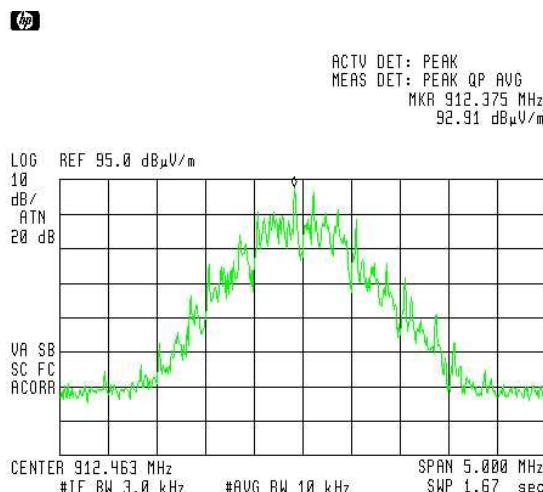


Figure 50 — Low Channel, Side Antenna, Vertical

hp

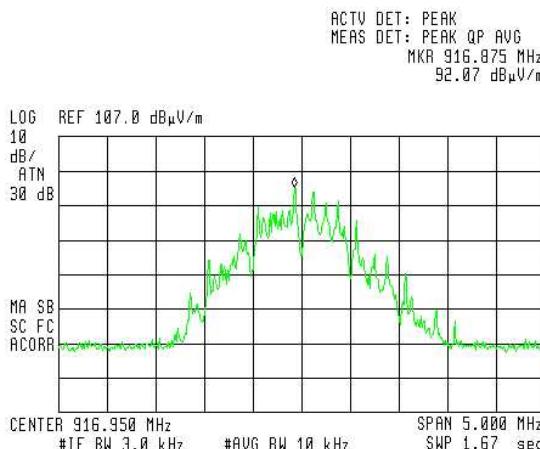


Figure 51 — Mid Channel, Side Antenna, Vertical

hp

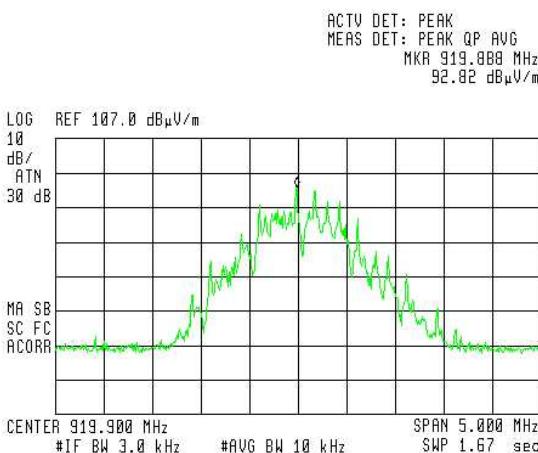


Figure 52 — High channel, Side Antenna, Vertical

hp

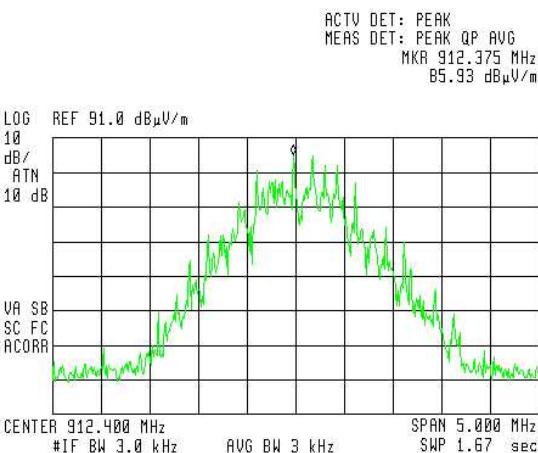


Figure 53 — Low Channel, Top Antenna, Horizontal

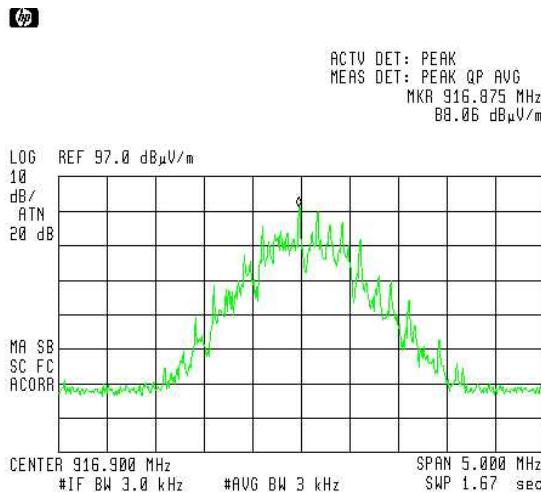


Figure 54 — Mid Channel, Top Antenna, Horizontal

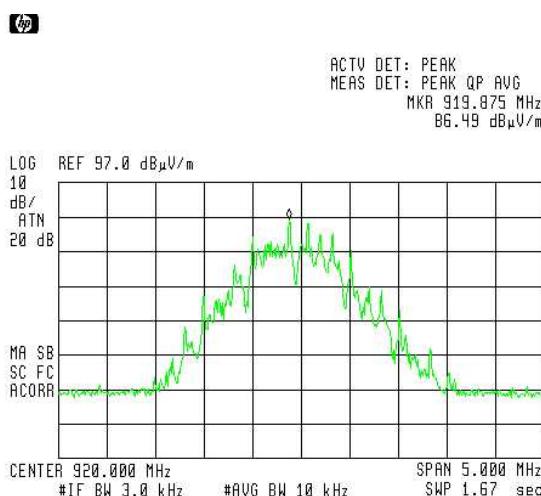


Figure 55 — High Channel, Top Antenna, Horizontal



11.2 Results table

E.U.T. Description: Fall Monitor

Model No.: M310

Serial Number: Not designated

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

Antenna mode	Operation Frequency (MHz)	Reading Spectrum Analyzer (dB μ V/m)	Reading Spectrum Analyzer (dBm)	Specification (dBm)	Margin (dB)
Top	912.4	85.9	-9.3	8.0	-17.3
	916.9	88.1	-7.1	8.0	-15.1
	919.9	86.5	-8.7	8.0	-16.7
Side	912.4	92.9	-2.3	8.0	-10.3
	916.9	92.1	-3.1	8.0	-11.1
	919.9	92.8	-2.4	8.0	-10.4

Figure 56 Test Results

JUDGEMENT: Passed by 10.3 dB

TEST PERSONNEL:

Tester Signature: 

Date: 13.01.15

Typed/Printed Name: M. Zohar



11.3 Test Equipment Used; Transmitted Power Density

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	2 Years
Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	Narda	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	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 57 Test Equipment Used

12. Intermodulation Radiated

12.1 Test procedure

The power of any emission outside of the authorized operating frequency ranges (916 MHz; 2405-2483.5 MHz) must be attenuated below the radiated limit.

(a) The E.U.T. operation mode and test set-up are as described in Section 2.1.

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 E.U.T. was operated in transmission mode at CW signal.

(b) The frequency range 30 MHz-7 GHz was scanned and the list of the highest emissions was verified and updated accordingly.

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

The emissions were measured at a distance of 3 meters.

In the frequency range 7-10.0 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 10 Hz. During peak measurements, the IF bandwidth was 1 MHz and the video bandwidth was 3 MHz.

The EUT was transmitting at the frequencies: 916 and 2442 MHz.

12.2 Test Results

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature:  Date: 04.01.15

Typed/Printed Name: I. Siboni



Specification: FCC Part 15, Subpart C

Antenna Polarization: Horizontal, Vertical **Frequency range: 30 MHz to 1000 MHz**
Antenna: 3 meters distance **Detectors: Peak, Quasi-peak**

Frequency	Antenna Polarization		Azimuth	Antenna Height	Peak Amp	QP Amp	Limit	Margin
(MHz)	Hor.	Ver.	(Degrees)	(cm)	(dB μ V/m)	(dB μ V/m)	(dB μ V/m)	(dB)
304.35	X		258.4	147.6	39.2	33.9	46.5	-12.6
		X	75.1	149.6	39.0	33.9	46.5	-12.6
611.10	X		123.1	137.1	36.2	31.1	46.5	-15.4
		X	214.9	135.7	35.7	31.1	46.5	-15.4

Figure 58 Intermodulation Radiated Results –Peak/Quasi Peak

Specification: FCC Part 15, Subpart C

Antenna Polarization: Horizontal, Vertical **Frequency range: 1 GHz to 10 GHz**
Antenna: 3 meters distance **Detectors: Peak**

Frequency	Antenna Polarization		Azimuth	Antenna Height	Peak Amp	Peak Limit	Peak Margin
(MHz)	Hor.	Ver.	(Degrees)	(cm)	(dB μ V/m)	(dB μ V/m)	(dB)
3357.45	X		123.1	158.0	55.3	74.0	-18.7
		X	333.9	134.4	65.9	74.0	-8.1
3968.45	X		0.0	191.0	58.6	74.0	-15.4
		X	85.2	106.0	68.4	74.0	-5.6
4272.9	X		105.1	147.1	60.1	74.0	-13.9
		X	168.4	194.4	59.6	74.0	-14.4
5835.45	X		66.9	108.9	65.7	74.0	-8.3
		X	139.5	160.0	66.1	74.0	-7.9

Figure 59 Intermodulation Radiated Results – Peak



Specification: FCC Part 15, Subpart C

Antenna Polarization: Horizontal, Vertical **Frequency range: 1 GHz to 10 GHz**
Antenna: 3 meters distance **Detectors: Average**

Frequency (MHz)	Antenna Polarization		Azimuth (Degrees)	Antenna Height (cm)	Avg Amp (dB μ V/m)	Avg Limit (dB μ V/m)	Avg Margin (dB)
	Hor.	Ver.					
3357.45	X		123.1	158.0	41.9	54.0	-12.1
		X	333.9	134.4	41.8	54.0	-12.2
3968.45	X		0.0	191.0	45.1	54.0	-8.9
		X	85.2	106.0	45.1	54.0	-8.9
4272.9	X		105.1	147.1	45.5	54.0	-8.5
		X	168.4	194.4	45.7	54.0	-8.3
5835.45	X		66.9	108.9	52.0	54.0	-2.0
		X	139.5	160.0	51.9	54.0	-2.1

Figure 60 Intermodulation Radiated Results – Average



12.3 Test Instrumentation Used; Radiated Measurements Intermodulation

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	R&S	ESBI7	100120	January 1, 2015	1 year
Spectrum Analyzer	R&S	FSL6	100194	January 1, 2015	1 year
Active Loop Antenna	EMCO	6502	9506-2950	November 4, 2014	1 year
Biconilog Antenna	EMCO	3142B	1250	May 22, 2014	2 years
Horn Antenna	ETS	3115	6142	March 14, 2012	3 years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 years
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 22, 2014	1 year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 29, 2014	1 year
Antenna Mast	ETS	2070-2	9608-1497	N/A	N/A
Turntable	ETS	2087	-	N/A	N/A
Mast & Table Controller	ETS/EMCO	2090	9608-1456	N/A	N/A

Figure 61 Test Equipment Used



13. Antenna Gain/Information

Integral - Top antenna gain is -5 dBi.

Integral - Side antenna gain is -2.6 dBi.

14. Average Factor Calculation

1. Burst duration = 3.25msec
2. Time between bursts >100msec
3. Pulse duration = N/A
4. pulse period = N/A

$$5. \text{ Average Factor} = 20 \log \left[\frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{burst duration}}{100\text{msec}} \times \text{Num of burst within 100msec} \right]$$

$$\text{AverageFactor} = 20 \log \left[\frac{3.25}{100} \right] = -29.1 \text{dB}$$

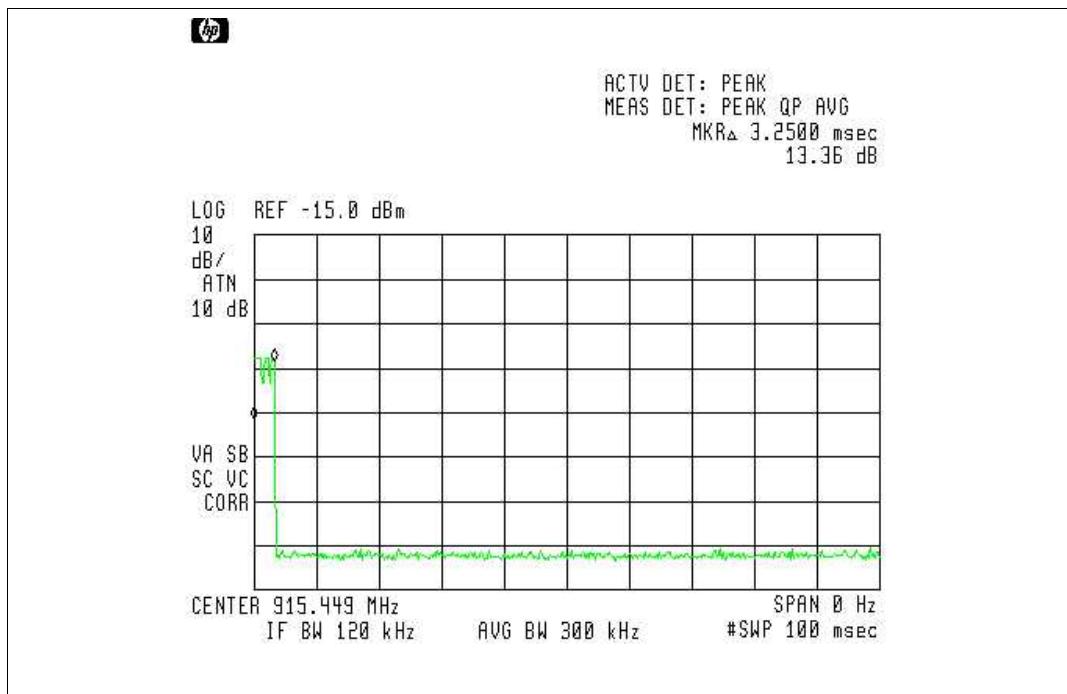


Figure 62. Burst Duration



14.1 Test Equipment Used, Average Factor Calculation

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	1 Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	1 Year
Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	Narda	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	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 63 Test Equipment Used

15. R.F Exposure/Safety

Typical use of the E.U.T. is as a monitor that sends off an alarm when a patient attempts to get out of a wheelchair, bed or commode.

The typical placement of the E.U.T. is on either a chair or a bed.

The typical distance between the E.U.T. and the user in the worst case application, is 1 cm.

Calculation of Maximum Permissible Exposure (MPE)

Based on Section 1.1307(b)(1) Requirements

(a) FCC limits at 916.00 MHz is:

$$\frac{f}{1500} = 0.610 \frac{mW}{cm^2}$$

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

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

(c) **Top antenna**

P_t- Transmitted Power 95.5 dBuV/m (Peak) = 1.07 mW

G_t- Antenna Gain, -5dBi = 0.32 numeric – tests were performed radiated and take gain into account

R- Distance from Transmitter using 1 cm worst case

Duty Cycle = 0.1% - based on customer's Duty Cycle Declaration

S_{AVG} - Equivalent averaged transmitted power is 1.07 x 0.001 = 0.00107 mW

(d) The average power density is:

$$S = \frac{(0.00107)}{4\pi (1)^2} = 0.000085 \frac{mW}{cm^2}$$

(e) **Side antenna:**

P_t- Transmitted Power 99.6 dBuV/m (Peak) = 2.75 mW

G_T- Antenna Gain, -2.6dBi = 0.55 numeric – tests were performed radiated and take gain into account

R- Distance from Transmitter using 1cm worst case

Duty Cycle = 0.1% - based on customer's Duty Cycle Declaration

S_{AVG} - Equivalent averaged transmitted power is 2.75 x 0.001 = 0.00275 mW

(f) The average power density is:

$$S = \frac{(0.00275)}{4f(1)^2} = 0.00022 \frac{mW}{cm^2}$$

(g) **Combined intermodulated RF**

916 MHz Highest Average Transmited Power (using side antenna):

P_t- Transmitted Power 99.6 dBuV/m (Peak) = 2.75 mW

Duty Cycle = 0.1% - based on customer's Duty Cycle Declaration

S_{AVG} - Equivalent averaged transmitted power is 2.75 x 0.001 = 0.00275 mW

2.4 GHz Average Transmited Power

P_t- Transmitted Power 22.48 dBm (Peak) = 177.01 mW

Duty Cycle = 0.1% - based on customer's Duty Cycle Declaration

G_T - Antenna Gain, -2.0 dBi = 0.63

S_{AVG} - Equivalent averaged transmitted power is 177.01 x 0.001 = 0.17701 mW

R- Distance from Transmitter using 1 cm worst case

$$S = \frac{(0.17701 \times 0.63) + 0.00275}{4f(1)^2} = 0.009 \frac{mW}{cm^2}$$

(h) This is below the FCC limit.

16. APPENDIX A - CORRECTION FACTORS

16.1 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".



**16.2 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.

16.3 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.



16.4 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".



**16.5 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".



16.6 Correction factors for Double-Ridged Waveguide Horn
Model: 3115, S/N 29845
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)	FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)
1.0	24.8	5.4	10.0	38.8	11.4
1.5	26.1	7.6	10.5	38.9	11.8
2.0	28.6	7.7	11.0	39.0	12.1
2.5	29.8	8.4	11.5	39.6	11.8
3.0	31.4	8.4	12.0	39.8	12.0
3.5	32.4	8.7	12.5	39.6	12.5
4.0	33.7	8.6	13.0	40.0	12.5
4.5	33.4	9.9	13.5	39.8	13.0
5.0	34.5	9.7	14.0	40.2	13.0
5.5	35.1	9.9	14.5	40.6	12.9
6.0	35.4	10.4	15.0	41.3	12.4
6.5	35.6	10.8	15.5	39.5	14.6
7.0	36.2	10.9	16.0	38.8	15.5
7.5	37.3	10.4	16.5	40.0	14.6
8.0	37.7	10.6	17.0	41.4	13.4
8.5	38.3	10.5	17.5	44.8	10.3
9.0	38.5	10.8	18.0	47.2	8.1
9.5	38.7	11.1			



**16.7 Correction factors for ACTIVE LOOP ANTENNA
Model 6502
S/N 9506-2950**

FREQUENCY (MHz)	Magnetic Antenna Factor (dB)	Electric Antenna Factor (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



17. Comparison Industry Canada Requirements With FCC

AeroScout Fall Monitor
M/N: M310
IC: 5115A-FM FCC ID: Q3HFM

Test	FCC	IC	
<input type="checkbox"/> Radiated Emission	15.209	RSS 210 Issue 8 Clause 2.5	
<input type="checkbox"/> Max power / Peak power	15.247(b)(3)	RSS 210 Issue 8 A8.4(4)	
<input type="checkbox"/> 6dB BW	15.247(a)2	RSS 210 Issue 8 A8.2a	
<input type="checkbox"/> Power density	15.247(e)	RSS 210 Issue 8 A8.2b	
<input type="checkbox"/> Spurious radiated emission in the restricted band	15.205(c)	RSS 210 Issue 8 2.5 RSS Gen 7.2.2 (Table 1)	
<input type="checkbox"/> Band edge spectrum	15.247(d)	RSS 210 Issue 8 A8.5	
<input type="checkbox"/> RF Exposure Limits	1.1307(b)(1)	RSS 102 4.4	