

**DATE: 24 September 2009**

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

**FCC Radio Test Report**

for

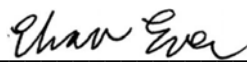
**Visonic Ltd.**

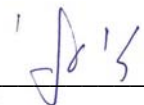
**Equipment under test:**

**Magnetic Wireless Detector**

**MCT 320**

Written by:   
D. Shidlow, Documentation

Approved by:   
E. Ever, Test Engineer

Approved by:   
I. Raz, EMC Laboratory Manager

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This report relates only to items tested.



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# 1. General Information

## 1.1 Administrative Information

Manufacturer:	Visonic Ltd.
Manufacturer's Address:	Habarzel 24 Tel Aviv Israel 69710 Tel: +936-03-645-6789 Fax: +936-03-645-6788
Manufacturer's Representative:	Arik Elshtein
Equipment Under Test (E.U.T):	Magnetic Wireless Detector
Equipment Model No.:	MCT 320
Equipment Serial No.:	Not Designated
Date of Receipt of E.U.T:	20.08.09
Start of Test:	20.08.09
End of Test:	06.09.09
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.
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 MCT-320 is a fully supervised, PowerCode magnetic contact transmitter, for use with PowerCode products. The transmitter includes a built-in reed switch (that opens upon removal of a magnet placed near it).

The magnet switch has a unique 24-bit PowerCode ID, selected in the factory from over 16 million possible code combinations.

Since messages transmitted by the MCT-320 might collide with transmissions from other PowerCode transmitters, a "smart" anti-collision transmission sequence is used.

The MCT-320 tamper switch is activated when the cover is removed or when the detector is removed from the wall.

A periodic supervision message is transmitted automatically. The target receiver is thus informed, at regular intervals, of the unit's active participation in the system.

An LED lights whenever alarm or tamper events are reported. The LED light can be disabled if desired. The LED does not light while a supervision message is being transmitted.

Operating power is obtained from an on-board 3 V Lithium battery. When the battery voltage is low, a "low battery" message is sent to the receiver.

### **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 August 22, 2006).

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 MCT-320 is a fully supervised, PowerCode magnetic contact transmitter, for use with PowerCode products. The transmitter includes a built-in reed switch (that opens upon removal of a magnet placed near it). The magnet switch has a unique 24-bit PowerCode ID, selected in the factory from over 16 million possible code combinations.

Since messages transmitted by the MCT-320 might collide with transmissions from other PowerCode transmitters, a "smart" anti-collision transmission sequence is used. The MCT-320 tamper switch is activated when the cover is removed or when the detector is removed from the wall. A periodic supervision message is transmitted automatically. The target receiver is thus informed, at regular intervals, of the unit's active participation in the system.

An LED lights whenever alarm or tamper events are reported. The LED light can be disabled if desired. The LED does not light while a supervision message is being transmitted. Operating power is obtained from an on-board 3 V Lithium battery. When the battery voltage is low, a "low battery" message is sent to the receiver.

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

### 2.2 *EUT Exercise Software*

Manufacturing software was used for the tests.

### 2.3 *Special Accessories*

No special accessories were needed.

### 2.4 *Equipment Modifications*

No modifications were needed in order to achieve compliance

## 2.5 Configuration of Tested System

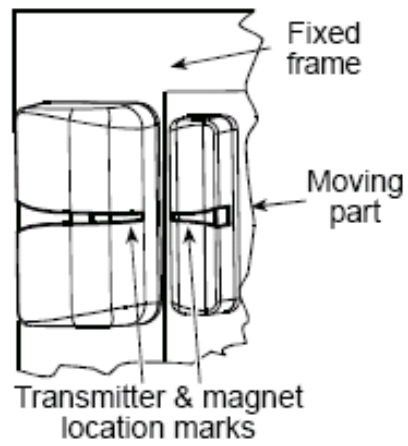


Figure 1. Configuration of Tested System



### 3. Test Set-up Photo



Figure 2. Radiated Emission Test

## 4. Average Factor Calculation

1. Maximum Transmission pulse duration = 750 usec
2. Transmission pulse period = 1.2375 msec
3. Burst duration = 46.5 msec
4. Average Factor =  $20 \log \left[ \frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{burst duration}}{100\text{msec}} \times \text{Num of burst within 100msec} \right]$

$$\text{Average Factor} = 20 \log \left[ \frac{0.750}{1.2375} \times \frac{46.5}{100} \times 2 \right] = -4.98\text{dB}$$

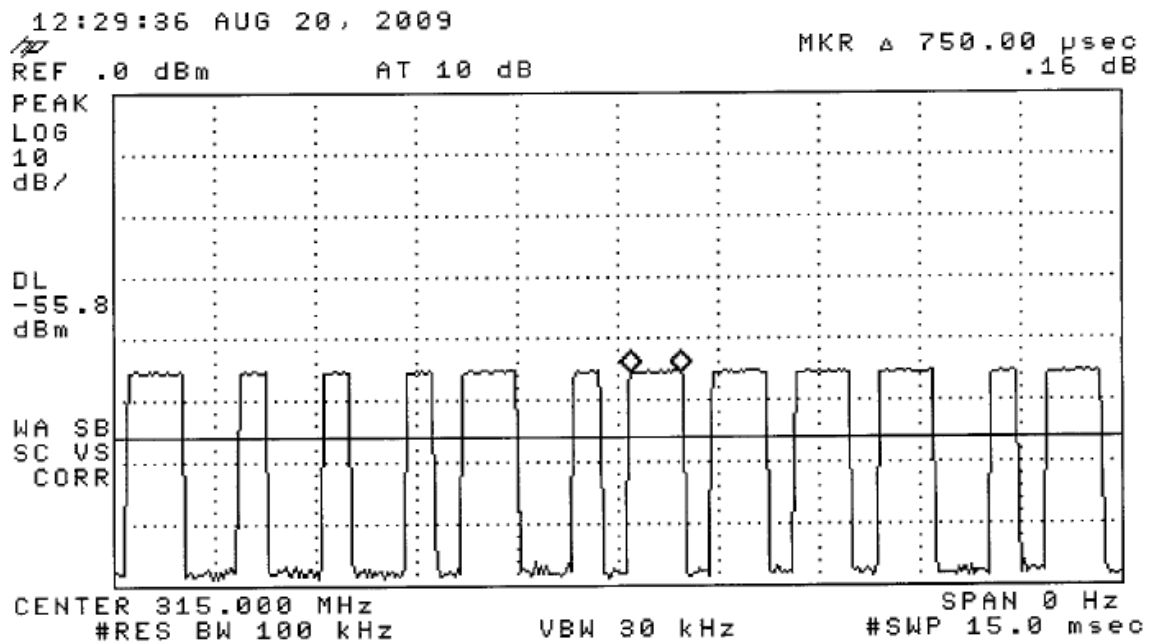


Figure 3. Transmission pulse duration = 750usec

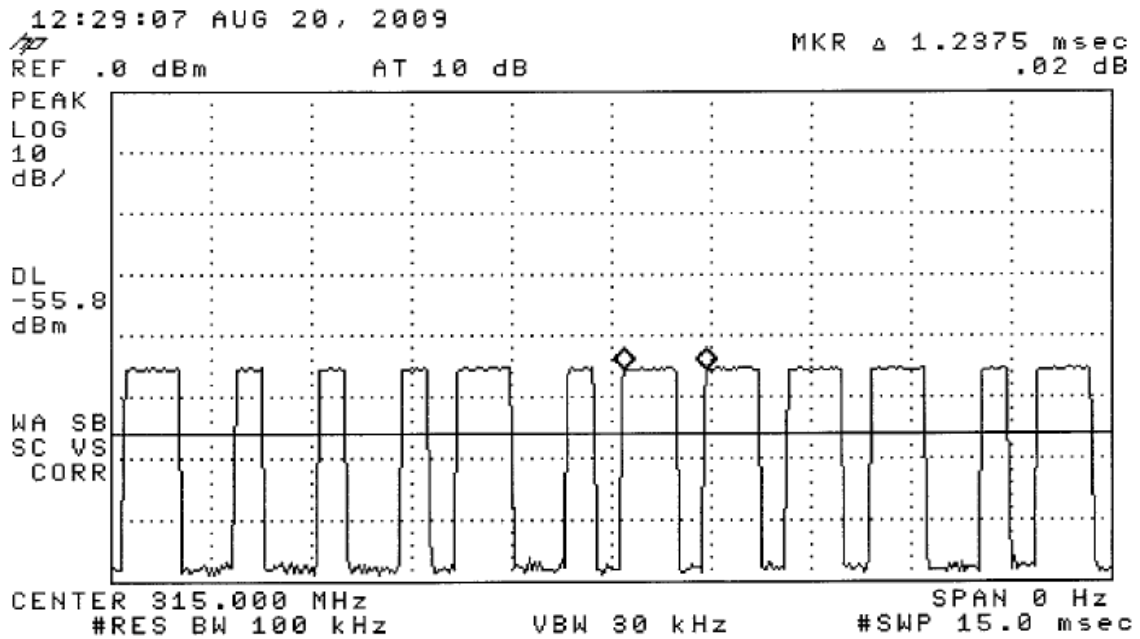


Figure 4. Transmission pulse period = 1.2375msec

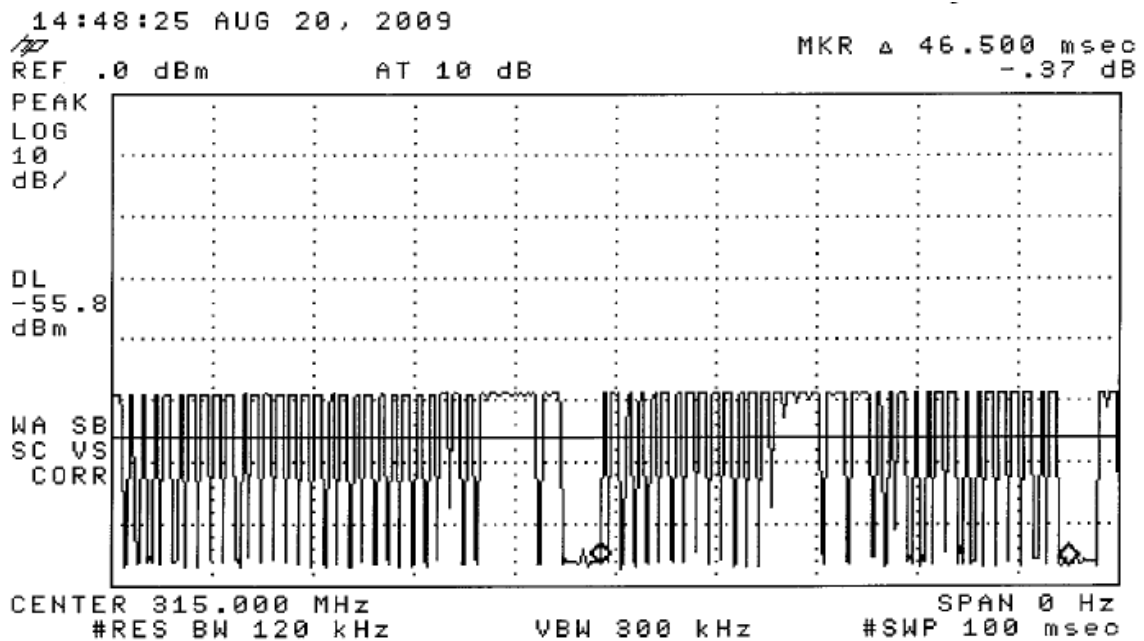


Figure 5. Burst duration = 46.5msec

#### **4.1 Test Instrumentation Used**

<b>Instrument</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration</b>	<b>Period</b>
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 Year

## 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.	See plots in Figure 6 to Figure 8	Complies
A manually operated transmitter shall be deactivated within not more than 5 seconds after releasing the switch.	See plots in Figure 6	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 plots in Figure 7	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: *E. Ever* Date: 24.09.09

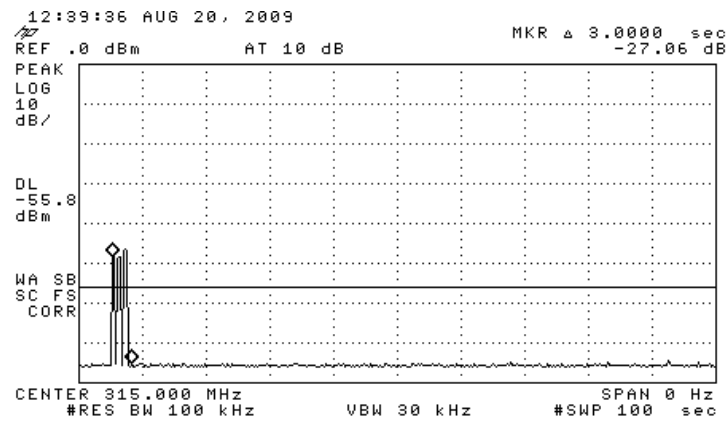
Typed/Printed Name: E. Ever



## Periodic Operation

E.U.T Description   Magnetic Wireless Detector  
 Type                   MCT 320  
 Serial Number:       Not Designated

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



**Figure 8. Entire transmission within 100 sec. (3.0 sec. total)**

#### **5.4 Test Instrumentation Used**

<b>Instrument</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration</b>	<b>Period</b>
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 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 (315 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 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 9* to *Figure 11*.

TEST PERSONNEL:

Tester Signature: Chav Ever Date: 24.09.09

Typed/Printed Name: E. Ever

## Field Strength of Fundamental

E.U.T Description    Magnetic Wireless Detector  
 Type                    MCT 320  
 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	(dB $\mu$ V/m)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
315.00	H	75.0	-4.98	70.0	75.6	-5.6
315.00	V	64.3	-4.98	53.9	75.6	-21.7

**Figure 9. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL/VERTICAL. Detector: Peak**

Notes:

1. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.
2. "Peak Amp." (dB $\mu$ V/m) included the "Correction Factors".
3. "Correction Factors" (dB) = Test Antenna Correction Factor(dB) + Cable Loss.

$$4. \text{ Average Factor} = 20 \log \left[ \frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{burst duration}}{100\text{msec}} \times \text{Num of burst within 100msec} \right]$$

$$\text{Average Factor} = 20 \log \left[ \frac{0.750}{1.2375} \times \frac{46.5}{100} \times 2 \right] = -4.98\text{dB}$$

5. "Average Result" (dB $\mu$ V/m)=Peak Amp. (dB $\mu$ V/m)+D.C.F. (dB)

## Field Strength of Fundamental

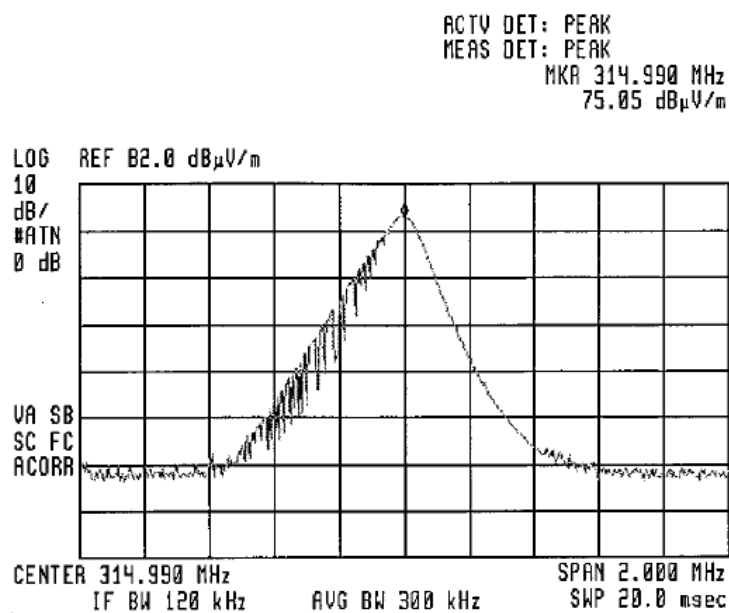
E.U.T Description    Magnetic Wireless Detector  
 Type                    MCT 320  
 Serial Number:        Not Designated

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

Antenna Polarization: Horizontal

Test Distance: 3 meters

Detectors: Peak, Quasi-peak, Average



**Figure 10. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL.  
 Detectors: Peak, Quasi-peak, Average**

## Field Strength of Fundamental

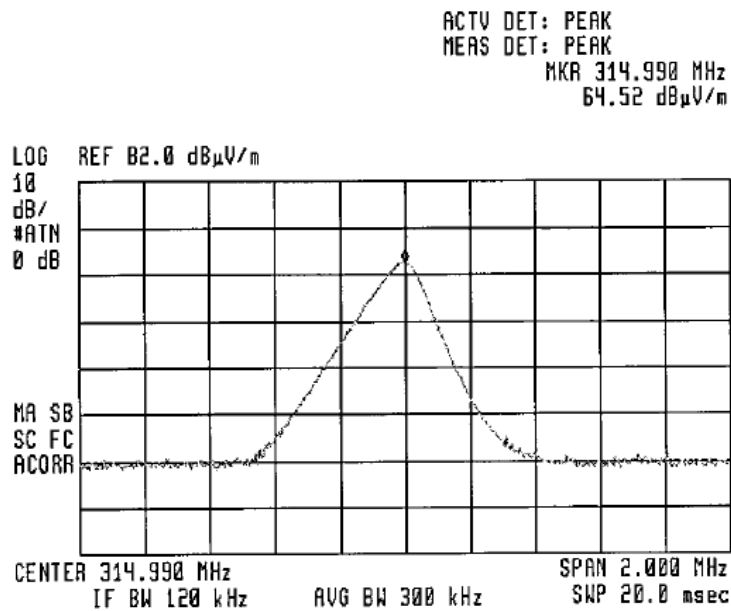
E.U.T Description   Magnetic Wireless Detector  
 Type                    MCT 320  
 Serial Number:        Not Designated

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

Antenna Polarization: Vertical

Test Distance: 3 meters

Detectors: Peak, Quasi-peak, Average



**Figure 11. Field Strength of Fundamental. Antenna Polarization: VERTICAL.  
 Detectors: Peak, Quasi-peak, Average**

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

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	8546A	3650A00365	20 November 2008	1 year
Receiver RF Filter Section	HP	85460A	3650A00365	20 November 2008	1 year
Biconilog Antenna	EMCO	3142B	1250	21 August 2008	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

## 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 10 meters.

The E.U.T. was operated at the frequency of kHz. 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.

The signals in the band 9 kHz – 30 MHz were at least 20 dB below the specification limit.

TEST PERSONNEL:

Tester Signature: E. Ever

Date: 24.09.09

Typed/Printed Name: E. Ever

#### 7.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	8546A	3650A00365	20 November 2008	1 year
Receiver RF Filter Section	HP	85460A	3650A00365	20 November 2008	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 15, 2008	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

#### 7.5 Field Strength Calculation

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

$$FS = RA + AF + CF$$

- FS: Field Strength [dB $\mu$ v/m]  
 RA: Receiver Amplitude [dB $\mu$ v]  
 AF: Receiving Antenna Correction Factor [dB/m]  
 CF: Cable Attenuation Factor [dB]

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

No external pre-amplifiers are used.

## 8. Spurious Radiated Emission

### 8.1 Test Specification

30 - 3200 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 – 3.2 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 6.5 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 6.5 dB in the worst case at the frequency of 944.96 MHz, horizontal polarization.

TEST PERSONNEL:

Tester Signature: *E. Ever* Date: 24.09.09

Typed/Printed Name: E. Ever

## Radiated Emission

E.U.T Description   Magnetic Wireless Detector  
 Type                    MCT 320  
 Serial Number:        Not Designated

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 (MHz)	Antenna Polarity (H/V)	Peak Amp (dB $\mu$ V/m)	Specification (dB $\mu$ V/m)	Margin (dB)
629.99	H	39.3	46.0	-6.7
944.96	H	39.5	46.0	-6.5
629.99	V	39.4	46.0	-6.6
944.96	V	39.2	46.0	-6.8

**Figure 12. Radiated Emission. Antenna Polarization: HORIZONTAL/VERTICAL.  
 Detectors: Peak, Quasi-peak**

*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.*

## Radiated Emission

E.U.T Description   Magnetic Wireless Detector  
 Type                    MCT 320  
 Serial Number:        Not Designated

Specification: FCC Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical      Frequency range: 1.0 GHz to 3.2 GHz  
 Antenna: 3 meters distance                      Detectors: Peak

Freq.	Pol.	Peak Reading	Average Factor	AVG Result	AVG Specification	Margin
(MHz)	V/H	(dB $\mu$ V/m)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
1259.96	H	48.8	-4.98	43.8	54.0	-10.2
1259.96	V	48.7	-4.98	43.7	54.0	-10.3

**Figure 13. Radiated Emission. Antenna Polarization: HORIZONTAL/VERTICAL.  
 Detectors: Peak**

Notes:

1. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.
2. "Peak Amp." (dB $\mu$ V/m) included the "Correction Factors".
3. "Correction Factors" (dB) = Test Antenna Correction Factor(dB) + Cable Loss.

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

$$\text{Average Factor} = 20 \log \left[ \frac{0.750}{1.2375} \times \frac{46.5}{100} \times 2 \right] = -4.98\text{dB}$$

4. "Average Result" (dB $\mu$ V/m)=Peak Amp. (dB $\mu$ V/m)+D.C.F. (dB)

#### 8.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial No.	Calibration	Period
RF Amplifier	HP	8447F	3113A0638 6	02 December 2008	1 Year
EMI Receiver	HP	8546A	3650A0036 5	20 November 2008	1 Year
Receiver RF Filter Section	HP	85460A	3650A0036 5	20 November 2008	1 Year
EMC Analyzer	HP	HP8593	3536A0012 0	14 November 2008	1 Year
Biconilog Antenna	EMCO	3142B	1250	21 August 2008	1 Year
Horn Antenna	ETS	3115	6142	16 March 2008	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

## 9. Bandwidth

### 9.1 Test procedure

The transmitter unit operated with normal modulation. The spectrum analyzer was set to 30 kHz resolution BW and center frequency of the transmitter fundamental. The spectrum bandwidth of the transmitter unit was measured and recorded. The BW was measured at 20 dBc points.

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

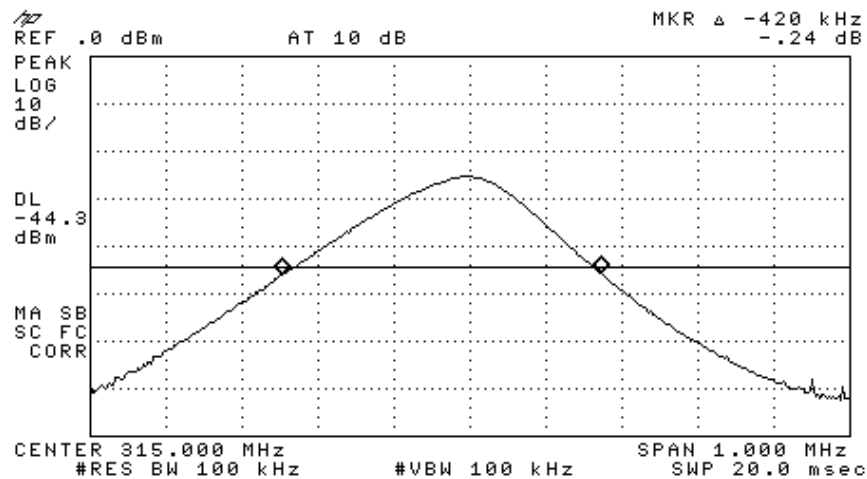


Figure 14

## 9.2 Results table

E.U.T Description: Magnetic Wireless Detector  
 Model: MCT 320  
 Serial Number: Not Designated  
 Specification: F.C.C. Part 15, Subpart C: (15.231(c))

Bandwidth Reading (kHz)	Specification (1) (kHz)	Margin (kHz)
420	787	-367

**Figure 15 Bandwidth**

JUDGEMENT: Passed by 367 kHz

TEST PERSONNEL:

Tester Signature: *E. Ever* Date: 24.09.09

Typed/Printed Name: E. Ever

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

### 9.3 Test Equipment Used.

Bandwidth

<b>Instrument</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration</b>	<b>Period</b>
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 year

**Figure 16 Test Equipment Used**

## 10. APPENDIX A - CORRECTION FACTORS

### 10.1 Correction factors for CABLE

from EMI receiver  
to test antenna  
at 3 AND 10 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)	FREQUENCY (MHz)	CORRECTION FACTOR (dB)
30	1.96	700	11.25
35	2.08	800	12.53
40	2.26	900	13.86
45	2.43	1000	14.86
50	2.59	1200	15.7
55	2.65	1400	17.05
60	2.86	1600	18.2
65	2.96	1800	19.4
70	3.04	2000	21.3
75	3.27		
80	3.41		
85	3.54		
90	3.68		
95	3.77		
100	3.93		
110	4.19		
120	4.41		
130	4.6		
140	4.83		
150	5.06		
160	5.35		
170	5.57		
180	5.7		
190	5.84		
200	6.02		
250	6.86		
300	7.59		
350	8.09		
400	8.7		
450	9.15		
500	9.53		
550	9.82		
600	10.24		
650	10.74		

*NOTES:*

1. The cable type is RG-214/U





## 10.2 Correction factors for Amplifier 8447F 30M-1.3G GAIN

<b>FREQUENCY (MHz)</b>	<b>GAIN (dB)</b>
<b>20</b>	<b>27.16</b>
<b>30</b>	<b>27.18</b>
<b>50</b>	<b>27.15</b>
<b>100</b>	<b>27.01</b>
<b>200</b>	<b>26.48</b>
<b>500</b>	<b>27.54</b>
<b>1000</b>	<b>26.96</b>
<b>1100</b>	<b>26.69</b>
<b>1200</b>	<b>26.28</b>
<b>1300</b>	<b>25.85</b>

### 10.3 Correction factors for Bilog ANTENNA

Model: 3142

Antenna serial number: 1250

3 meter range

<b>FREQUENCY</b>	<b>AFE</b>	<b>FREQUENCY</b>	<b>AFE</b>
(MHz)	(dB/m)	(MHz)	(dB/m)
30	18.4	1100	25
40	13.7	1200	24.9
50	9.9	1300	26
60	8.1	1400	26.1
70	7.4	1500	27.1
80	7.2	1600	27.2
90	7.5	1700	28.3
100	8.5	1800	28.1
120	7.8	1900	28.5
140	8.5	2000	28.9
160	10.8		
180	10.4		
200	10.5		
250	12.7		
300	14.3		
400	17		
500	18.6		
600	19.6		
700	21.1		
800	21.4		
900	23.5		
1000	24.3		

#### 10.4 Correction factors for ACTIVE LOOP ANTENNA

**Model 6502**

**S/N 9506-2950**

<b>FREQUENCY</b> (MHz)	<b>Magnetic Antenna Factor</b> (dB)	<b>Electric Antenna Factor</b> (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