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ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT

OF

Reader

Model No.:VMSR

FCC ID: HD5VMSR

Trademark: Honeywell

Report No.:ES150312095E

Issue Date: April 16, 2015

Prepared for

Honeywell International Inc
9680 Old Bailes Rd. Fort Mill,SC 29707,USA

Prepared by

SHENZHEN EMTEK CO., LTD.

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VERIFICATION OF COMPLIANCE

Applicant:	Honeywell International Inc 9680 Old Bailes Rd. Fort Mill,SC 29707,USA
Manufacturer:	Rosslare Electronics (Shenzhen) Ltd Block 2, No. A-1 Baiwangxin Indurstrial Park, XiLi Town, Shenzhen, China
Product Description:	Reader
Model Number:	VMSR
Trademark:	Honeywell

We hereby certify that:

The above equipment was tested by SHENZHEN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2014) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.209(2014).

The test results of this report relate only to the tested sample identified in this report.

Date of Test : March 12, 2015 to April 11, 2015

Prepared by : Ivy Huang/Editor

Reviewer : Hong Yang/Supervisor

Approved & Authorized Signer : Sam Lv/Manager

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	ES150312095E

Table of Contents

1 General Information

1.1 Product Description

Characteristics	Description
Product Name	Reader
Model number	VMSR
Power Supply	DC 5-16V
Modulation	ASK
Operating Frequency Range	125KHz
Number of Channels	1 channel
Antenna Type	Internal antenna

Note: for a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

1.2 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radio Frequency	±1x10^-5
Maximum Peak Output Power Test	±1.0dB
Conducted Emissions Test	±2.0dB
Radiated Emission Test	±2.0dB
Power Density	±2.0dB
Occupied Bandwidth Test	±1.0dB
Band Edge Test	±3dB
All emission, radiated	±3dB
Antenna Port Emission	±3dB
Temperature	±0.5℃
Humidity	±3%

Measurement Uncertainty for a level of Confidence of 95%

1.3 Test Facility

Site Description

EMC Lab. : Accredited by CNAS, 2013.10.29
The certificate is valid until 2016.10.28
The Laboratory has been assessed and proved to be
in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2005)
The Certificate Registration Number is L2291.

Accredited by TUV Rheinland Shenzhen 2010.5.25
The Laboratory has been assessed according to the requirements
ISO/IEC 17025.

Accredited by FCC, April 17, 2013
The Certificate Registration Number is 709623

Accredited by Industry Canada, November 15, 2010
The Certificate Registration Number is 46405-4480.

Name of Firm : SHENZHEN EMTEK CO., LTD.

Site Location : Bldg 69, Majialong Industry Zone,
Nanshan District, Shenzhen, Guangdong, China

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2014 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-2014.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

Table 2-1 Equipment Used in Tested System

Item	Equipment	Brand	Model No.	FCC ID	Series No.	Note
1	Reader	Honeywell	VMSR	HD5VMSR	N/A	***EUT***

Note:

(1) Unless otherwise denoted as EUT in『Remark』column, device(s) used in tested system is a support equipment.

(2) Three orthogonal panels X, Y, Z of EUT are tested. And the test results of the worst test panel(Y) were recorded.

2 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207	AC Power Conducted Emission	N/A
§15.209	Radiated Emission	Complied
§15.209	20dB Bandwidth	Complied
§15.203	Antenna Application	Complied

Remark: The EUT is supplied by battery, there is no need for AC Power Conducted Emission test to be performed on this product.

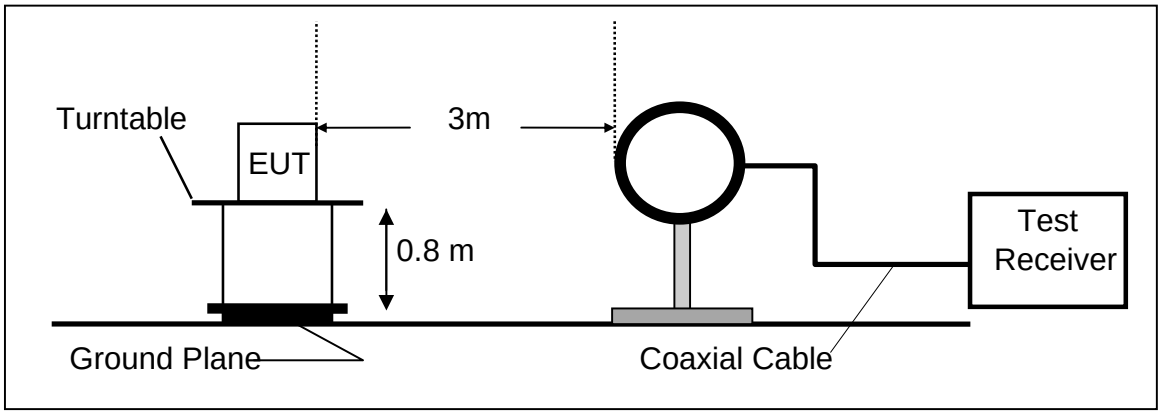
3 Radiated Emission Test

3.1 Measurement Procedure

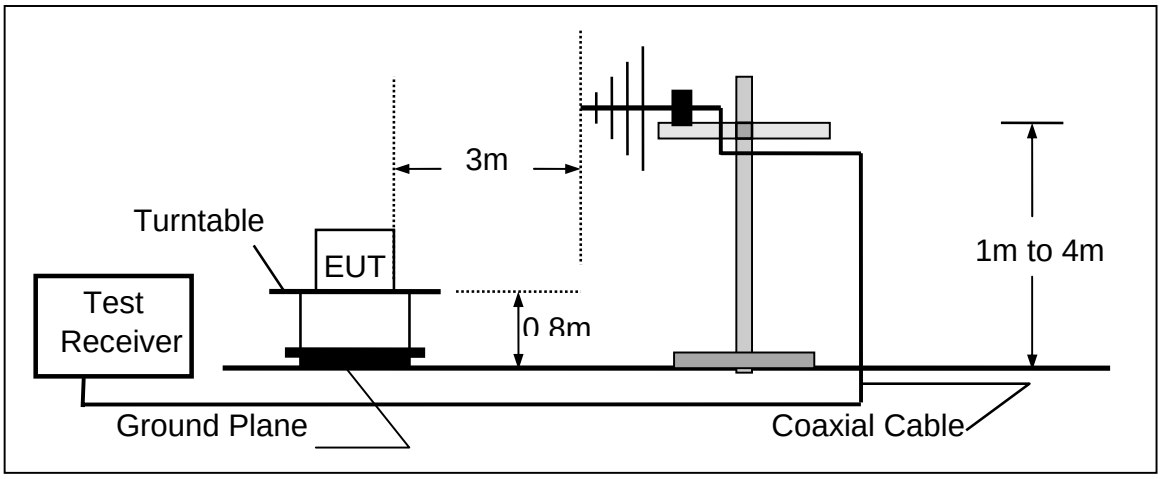
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

3.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



3.3 Measurement Equipment Used

Equipment	Serial No.	Manufacturer	Model No.	Cal. Date	Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/16/2014	05/15/2015
Pre-Amplifier	HP	8447D	2944A07999	05/16/2014	05/15/2015
Bilog Antenna	Schwarzbeck	VULB9163	142	05/16/2014	05/15/2015
Loop Antenna	Schwarzbeck	FMZB 1519	012	05/16/2014	05/15/2015
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/16/2014	05/15/2015
Horn Antenna	Schwarzbeck	BBHA9120D	D143	05/16/2014	05/15/2015
Cable	Schwarzbeck	AK9513	ACRX1	05/19/2014	05/18/2015
Cable	Rosenberger	N/A	FP2RX2	05/19/2014	05/18/2015
Cable	Schwarzbeck	AK9513	CRPX1	05/19/2014	05/18/2015
Cable	Schwarzbeck	AK9513	CRRX2	05/19/2014	05/18/2015
Pre-Amplifier	A.H.	PAM-0126	1415261	05/19/2014	05/18/2015

3.4 Radiated Emission Limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

FCC Part 15.209				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation Frequency tion at 3m Measurement Dist	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
0.009 – 0.490	2400 / F(KHz)	300m	10000 * 2400/F(KHz)	20log 2400/F(KHz) + 80
0.490 – 1.705	24000 / F(KHz)	30m	100 * 24000/F(KHz)	20log 24000/F(KHz) + 40
1.705 – 30.00	30	30m	100* 30	20log 30 + 40
30.0 – 88.0	100	3m	100	20log 100
88.0 – 216.0	150	3m	150	20log 150
216.0 – 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500

15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

Remark : 1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

3.5 Measurement Result

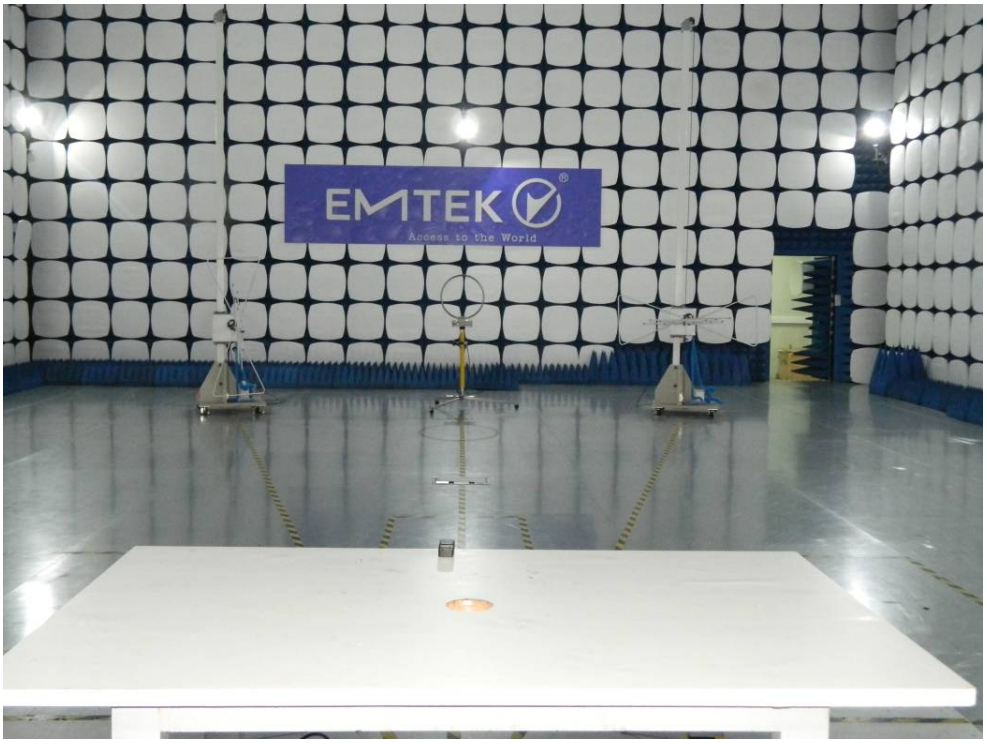
Fundamental

Frequency (MHz)	Ant.Pol (H/V)	Reading@3m (dBuV/m)		Limit@3m (dBuV/m)		Margin (dB)	
		Peak	Average	Peak	Average	Peak	Average
0.125	V	66.42	64.10	125.7	105.7	-59.28	-41.60

Other Emissions:

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)	Note
44.1300	V	16.34	40.00	-23.66	QP
127.4000	V	17.87	43.50	-25.63	QP
269.3300	V	19.30	46.00	-26.70	QP
329.1300	V	21.27	46.00	-24.73	QP
364.5300	V	22.18	46.00	-23.82	QP
517.2100	V	23.67	46.00	-22.33	QP
42.4600	H	17.44	40.00	-22.56	QP
60.3700	H	16.35	40.00	-23.65	QP
103.4600	H	15.67	43.50	-27.83	QP
277.4200	H	18.24	46.00	-27.76	QP
405.3100	H	21.58	46.00	-24.42	QP
619.4600	H	25.57	46.00	-20.43	QP

3.6 Radiated Measurement Photos:

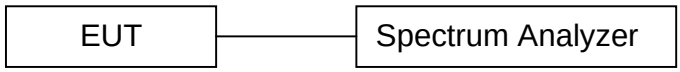


4 20dB Bandwidth test

4.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

4.2 Test SET-UP (Block Diagram of Configuration)



4.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	10Hz-30GHz	03/15/2015	03/14/2016
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	03/15/2015	03/14/2016
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	10Hz-30GHz	03/15/2015	03/14/2016

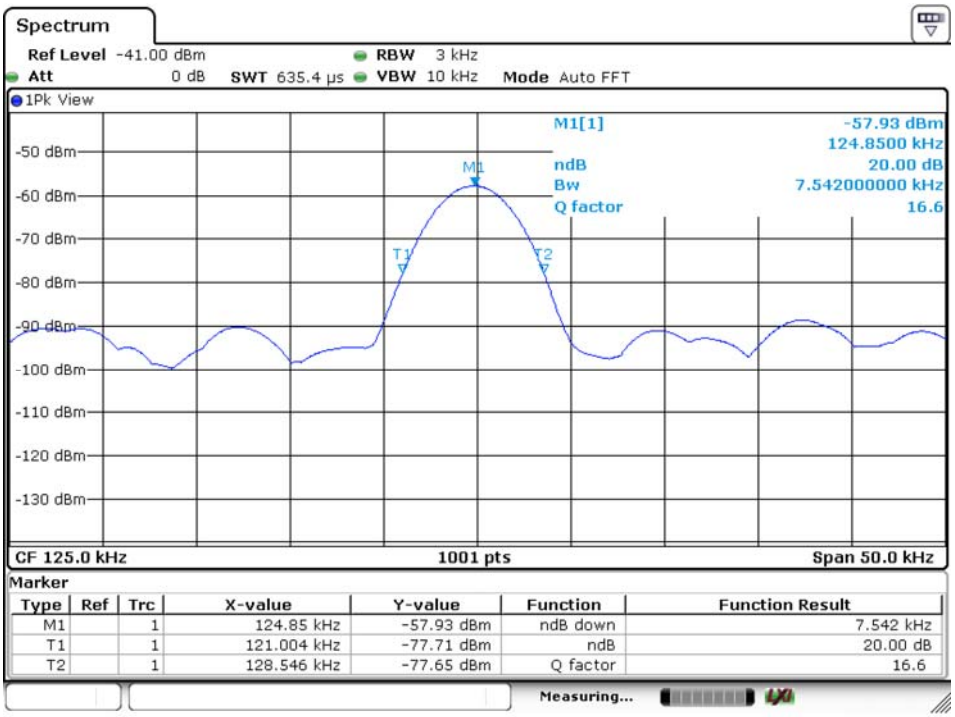
Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.
The cable loss is 0.4dBm, and impedance is 50 Ω for the antenna connector.

4.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	June 28, 2015
Test By:	Andy	Temperature :	24℃
Test Result:	PASS	Humidity :	53 %
Modulation:	GFSK		

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	0.125	785


Spectrum
Ref Level -41.00 dBm
RBW 3 kHz
Att 0 dB
SWT 635.4 µs
VBW 10 kHz
Mode Auto FFT
1Pk View
M1[1]
-57.93 dBm
124.8500 kHz
ndB
20.00 dB
Bw
7.542000000 kHz
Q factor
16.6
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
-100 dBm
-110 dBm
-120 dBm
-130 dBm
M1
T1
T2
CF 125.0 kHz
1001 pts
Span 50.0 kHz
Marker
Type | Ref | Trc | X-value | Y-value | Function | Function Result
M1 | | 1 | 124.85 kHz | -57.93 dBm | ndB down | 7.542 kHz
T1 | | 1 | 121.004 kHz | -77.71 dBm | ndB | 20.00 dB
T2 | | 1 | 128.546 kHz | -77.65 dBm | Q factor | 16.6
Measuring...

5 ANTENNA REQUIREMENT

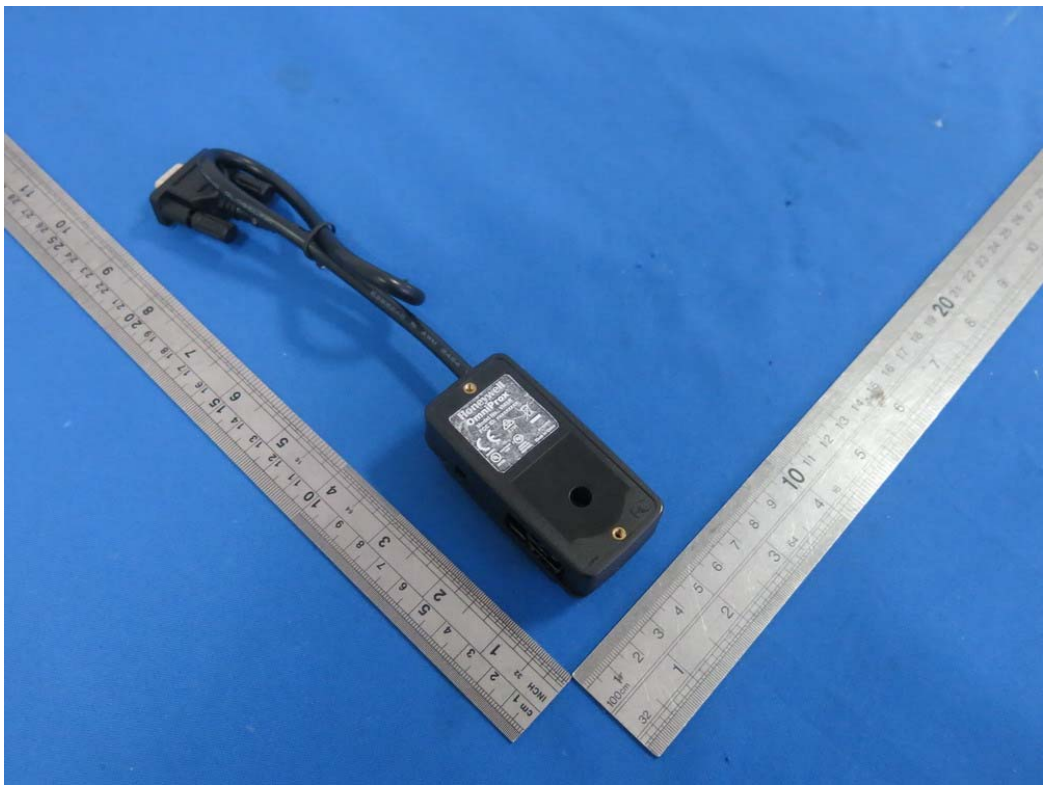
The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247.

FCC part 15C section 15.247 requirements:
Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

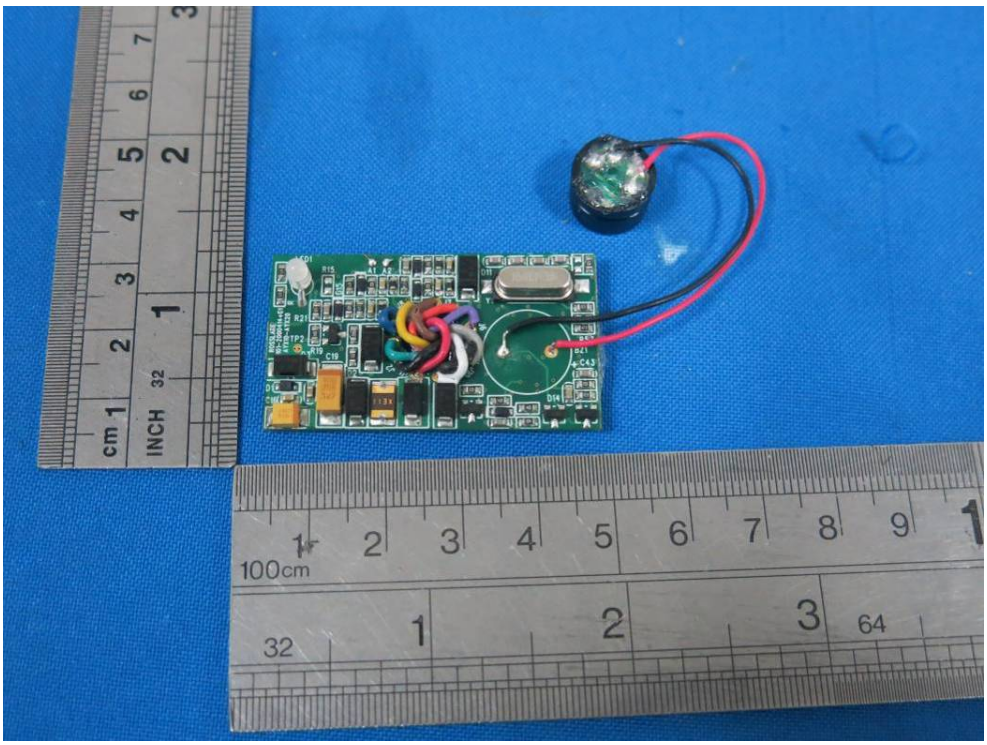
5.1 Result

The antenna is permanently attached on PCB, no consideration of replacement. Please refer to internal Photos for details.

APPENDIX I
(Photos of EUT)




Honeywell International Inc
www.honeywellaidc.com
Patents: www.hsmpats.com
Model: VMSR
FCC ID: HD5VMSR
IC: 1693B-VMSR
AY-K10DC
SECURITY
EQUIPMENT
1808
LISTED
LISTED
GENERAL
SIGNALING
EQUIPMENT
Made in China
E296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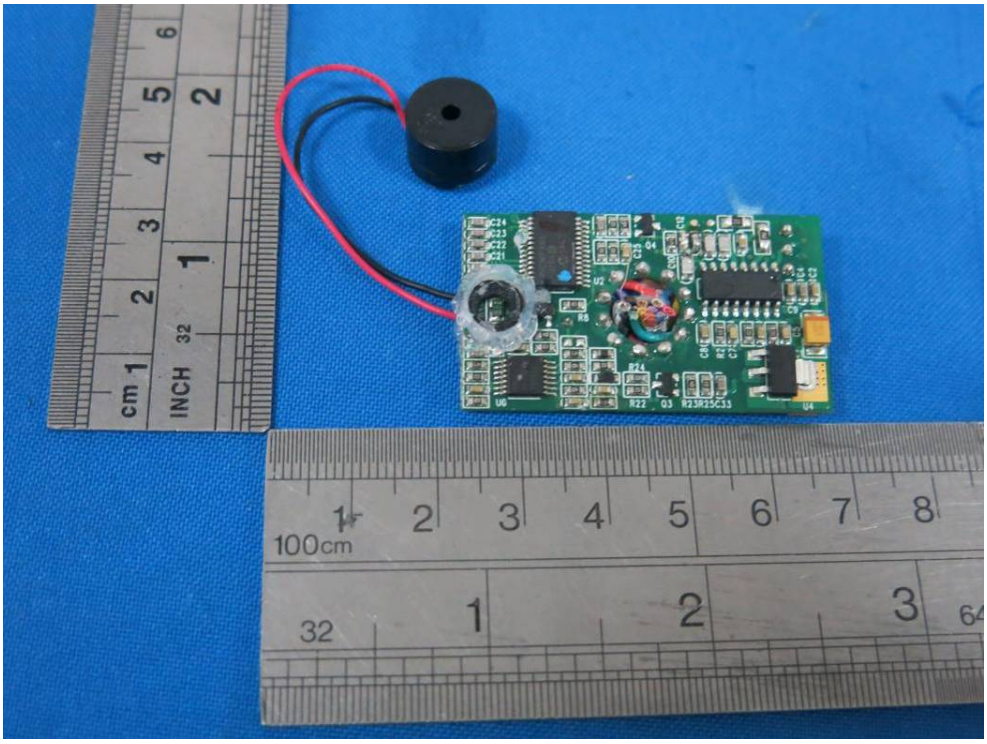
INCH
100cm
32
64


cm 1
INCH
100cm
32
64