

# FCC REPORT

**Applicant:** Shenzhen Macross Industrial Co., Ltd.

**Address of Applicant:** 6rd floor,#7 Building,Jianghao Technology Park #430 Jihua Rd.Bantian St.Longgang District, Shenzhen, Guangdong, China

**Manufacturer/Factory:** Shenzhen Macross Industrial Co., Ltd.

**Address of Manufacturer/Factory:** 6rd floor,#7 Building,Jianghao Technology Park #430 Jihua Rd.Bantian St.Longgang District, Shenzhen, Guangdong, China

**Equipment Under Test (EUT)**

Product Name: Wireless Solar Driveway Alarm

Model No.: Receiver:HS-002A  
Transmitter:HS-002B

Trade Mark: HOSMART, EMACROS

**FCC ID:** 2AJEM-HS002

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.231

**Date of sample receipt:** June 06, 2019

**Date of Test:** June 10-27, 2019

**Date of report issued:** June 28, 2019

**Test Result :** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

**Robinson Lo**  
**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

Version No.	Date	Description
01	June 28, 2019	Original

Prepared By:

*Bill. yuan*

Date:

June 28, 2019

Project Engineer

Check By:

*Robinson*

Date:

June 28, 2019

Reviewer

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## 4 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203	Pass
Conduction Emission	15.207	Pass
Field strength of the Fundamental Signal	15.231 (b)	Pass
Spurious Emissions	15.231 (b)/15.209	Pass
20dB Bandwidth	15.231 (c)	Pass
Dwell Time	15.231 (a)(2)	Pass

*Pass: The EUT complies with the essential requirements in the standard.*

### 4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.64dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.64dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 3.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.44dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

## 5 General Information

### 5.1 General Description of EUT

Product Name:	Wireless Solar Driveway Alarm
Model No.:	Receiver:HS-002A Transmitter:HS-002B
Serial No.:	041434
Hardware Version:	HS-002 Ver. A
Software Version:	HS-002 Ver.01
Test sample(s) ID:	GTS201906000065-1
Sample(s) Status:	Engineer sample
Operation Frequency:	433.93MHz
Channel Number	1 channel
Modulation technology:	FSK
Antenna Type:	Integral antenna
Antenna gain:	0dBi(declare by applicant)
Power supply:	AC/DC Adapter : Model: JHD-AP006U-050100BB-2 Input: AC 100-240V, 50/60Hz, 0.2A Output: DC 5V, 1000mA Or RX: DC 6V(4*1.5V, SIZE“AA”) TX: Battery DV 3.7V, 8.14Wh, 2200mAh

Note: The test report is for Transmitter:HS-002B

## 5.2 Test mode

Transmitting mode	Keep the EUT in transmitting mode.
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### Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which only the worst case was shown in this test report and defined as follows:

433.93MHz	Axis	X	Y	Z
	Field Strength(dBuV/m)	83.50	85.29	84.16

## 5.3 Description of Support Units

None.

## 5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2.

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

## 5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.  
 No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone,  
 Xixiang Road, Baoan District, Shenzhen, Guangdong, China  
 Tel: 0755-27798480  
 Fax: 0755-27798960

## 5.6 Other Information Requested by the Customer

None.

## 6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 20 2018	Oct. 19 2019
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 20 2018	Oct. 19 2019
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 20 2018	Oct. 19 2019
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 26 2019	June. 25 2020

<b>Conducted Emission</b>						
<b>Item</b>	<b>Test Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Inventory No.</b>	<b>Cal.Date (mm-dd-yy)</b>	<b>Cal.Due date (mm-dd-yy)</b>
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 26 2019	June. 25 2020
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 26 2019	June. 25 2020
5	Coaxial Cable	GTS	N/A	GTS227	June. 26 2019	June. 25 2020
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 26 2019	June. 25 2020
8	Absorbing clamp	Elektronik- Feinmechanik	MDS21	GTS229	June. 26 2019	June. 25 2020
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 26 2019	June. 25 2020

<b>General used equipment:</b>						
<b>Item</b>	<b>Test Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Inventory No.</b>	<b>Cal.Date (mm-dd-yy)</b>	<b>Cal.Due date (mm-dd-yy)</b>
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020



## 7 Test results and Measurement Data

### 7.1 Antenna Requirement

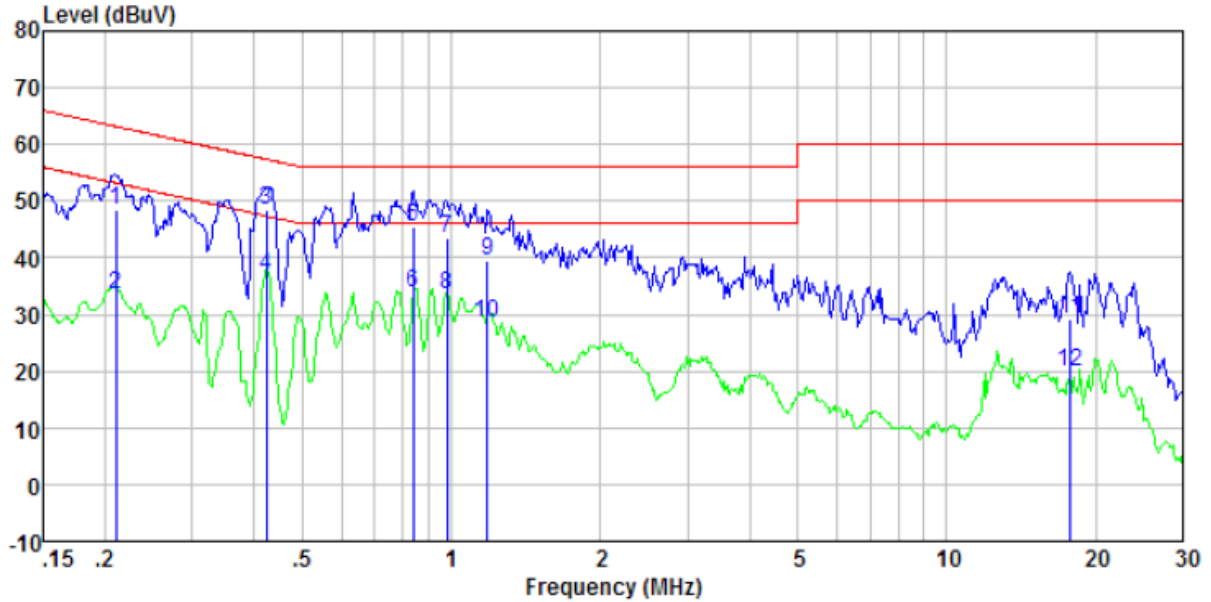
<b>Standard requirement:</b>	FCC Part15 C Section 15.203
<b>15.203 requirement:</b> An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
<b>EUT Antenna:</b>	
<i>The antenna is Integral antenna, the best case gain of the antenna is 0dBi, reference to the appendix II for details</i>	

## 7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto					
Limit:	Frequency range (MHz)		Limit (dBuV)			
			Quasi-peak		Average	
	0.15-0.5		66 to 56*		56 to 46*	
	0.5-5		56		46	
	5-30		60		50	
* Decreases with the logarithm of the frequency.						
Test setup:	<p><i>Remark</i>                  E.U.T: Equipment Under Test                  LISN: Line Impedance Stabilization Network                  Test table height=0.8m</p>					
Test procedure:	<ol style="list-style-type: none"> <li>1. The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</li> </ol>					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

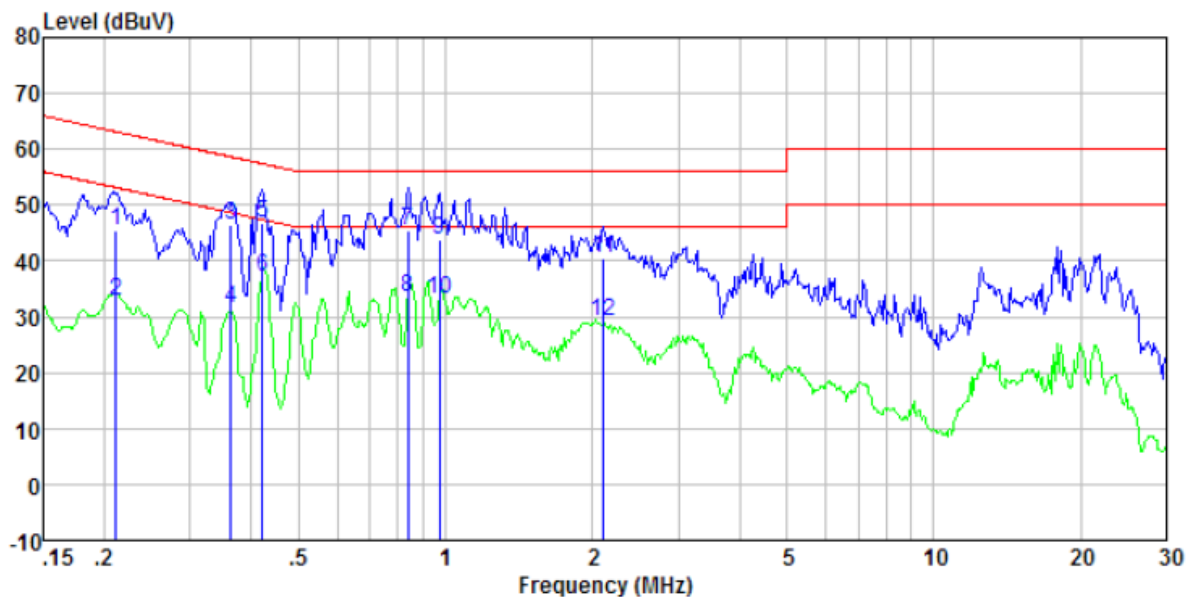
**Measurement data**

Line:



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.21	48.09	0.40	0.11	48.60	63.18	-14.58	QP
0.21	33.08	0.40	0.11	33.59	53.18	-19.59	Average
0.42	48.12	0.34	0.11	48.57	57.37	-8.80	QP
0.42	36.41	0.34	0.11	36.86	47.37	-10.51	Average
0.84	45.13	0.23	0.14	45.50	56.00	-10.50	QP
0.84	33.31	0.23	0.14	33.68	46.00	-12.32	Average
0.98	43.14	0.20	0.15	43.49	56.00	-12.51	QP
0.98	33.18	0.20	0.15	33.53	46.00	-12.47	Average
1.18	38.99	0.20	0.16	39.35	56.00	-16.65	QP
1.18	28.09	0.20	0.16	28.45	46.00	-17.55	Average
17.75	28.64	0.26	0.22	29.12	60.00	-30.88	QP
17.75	19.55	0.26	0.22	20.03	50.00	-29.97	Average

**Neutral:**

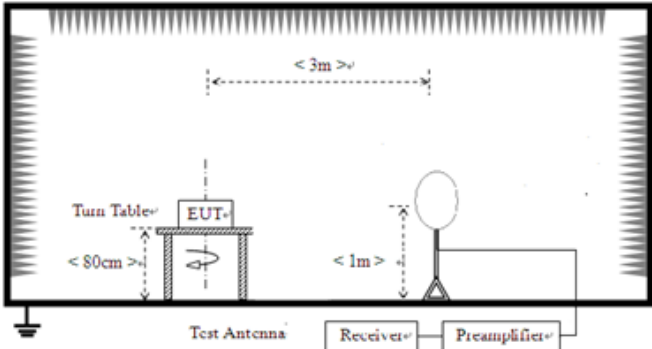


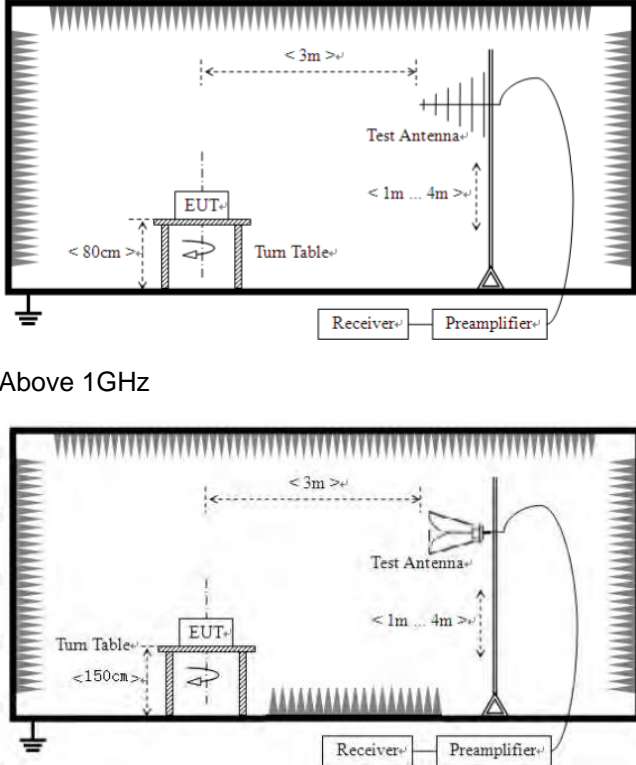
Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.21	44.87	0.40	0.11	45.38	63.14	-17.76	QP
0.21	32.39	0.40	0.11	32.90	53.14	-20.24	Average
0.36	45.96	0.37	0.10	46.43	58.65	-12.22	QP
0.36	30.96	0.37	0.10	31.43	48.65	-17.22	Average
0.42	46.49	0.34	0.11	46.94	57.42	-10.48	QP
0.42	36.69	0.34	0.11	37.14	47.42	-10.28	Average
0.84	45.01	0.23	0.14	45.38	56.00	-10.62	QP
0.84	33.28	0.23	0.14	33.65	46.00	-12.35	Average
0.97	43.54	0.21	0.15	43.90	56.00	-12.10	QP
0.97	32.76	0.21	0.15	33.12	46.00	-12.88	Average
2.11	39.93	0.20	0.18	40.31	56.00	-15.69	QP
2.11	28.77	0.20	0.18	29.15	46.00	-16.85	Average

*Notes:*

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss
4. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

### 7.3 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.231 (b)& Section 15.209					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	9kHz to 5000MHz					
Test site:	Measurement Distance: 3m					
Receiver setup:	Frequency	Detector	RBW	VBW	Value	
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak	
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak	
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak	
	Above 1GHz	Peak	1MHz	3MHz	Peak	
Peak		1MHz	10Hz	Average		
Limit: (Field strength of the fundamental signal)	Frequency	Limit (dBuV/m @3m)		Remark		
	433.93MHz	100.83		Peak Value		
		80.83		Average Value		
Limit: (Spurious Emissions)	Fundamental Frequency (MHz)	Field Strength of fundamental (microvolts/meter)		Field Strength of Unwanted Emissions (microvolts/meter)		
	40.66-40.70	1,000		100		
	70-130	500		50		
	130-174	500 to 1,500**		50 to 1,50**		
	174-260	1,500		1,50		
	260-470	1,500 to 5,000**		1,50 to 5,00**		
	Above 470	5,000		5,00		
	Frequency (MHz)	Class B(dBuV/m @3m)				
		Above 1000	Peak		Average	
			74		54	
Or The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level whichever limit permits a higher field strength.						
Test setup:	<p>Below 30MHz</p>  <p>Below 1GHz</p>					

	 <p>Above 1GHz</p>
<p>Test Procedure:</p>	<ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table (0.8 meters for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li> </ol>
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>
<p>Test mode:</p>	<p>Refer to section 5.2 for details</p>
<p>Test voltage:</p>	<p>AC 120V, 60Hz</p>
<p>Test results:</p>	<p>Pass</p>

**Measurement data:**

**7.3.1 Field Strength of The Fundamental Signal**

**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
433.93	89.14	17.53	3.02	29.43	80.26	100.83	-20.57	Horizontal
433.93	94.17	17.53	3.02	29.43	85.29	100.83	-15.54	Vertical

**Average value:**

Frequency (MHz)	Peak Value (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
433.93	80.26	-8.67	71.59	80.83	-9.24	Horizontal
433.93	85.29	-8.67	76.62	80.83	-4.21	Vertical

*Remarks:*

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor*
2. *Average value = Peak value + Duty cycle factor*

## 7.3.2 Spurious Emissions

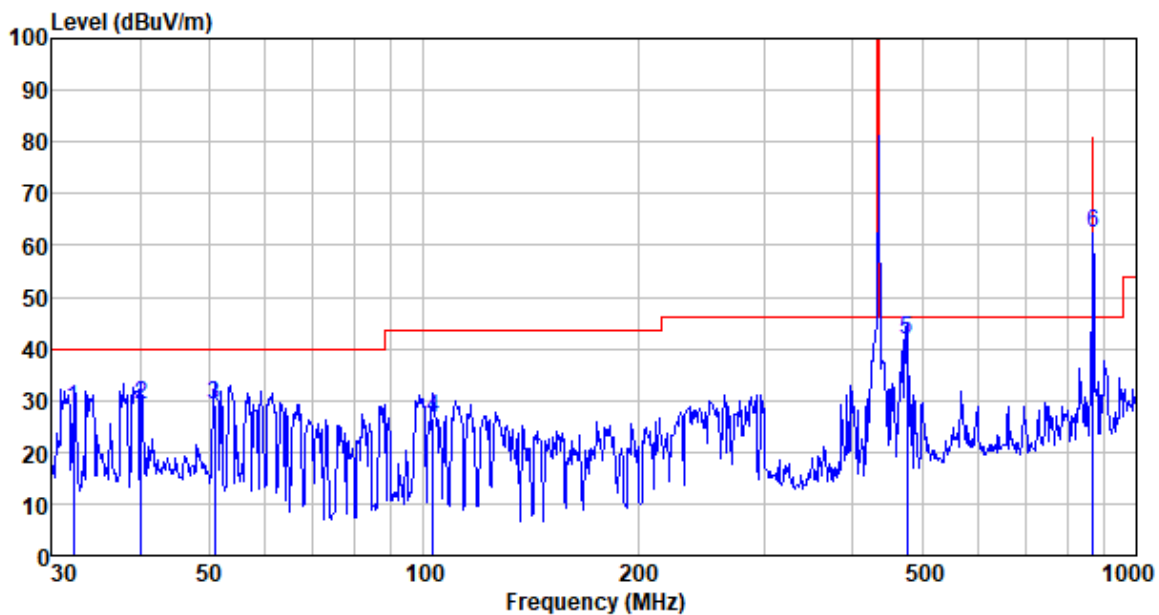
### Measurement data:

9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

### Below 1GHz:

<b>Mode:</b>	<b>Transmitting mode</b>	<b>Test by:</b>	<b>Bill</b>
<b>Temp./Hum.(%H):</b>	<b>26°C/56%RH</b>	<b>Polarization:</b>	<b>Horizontal</b>



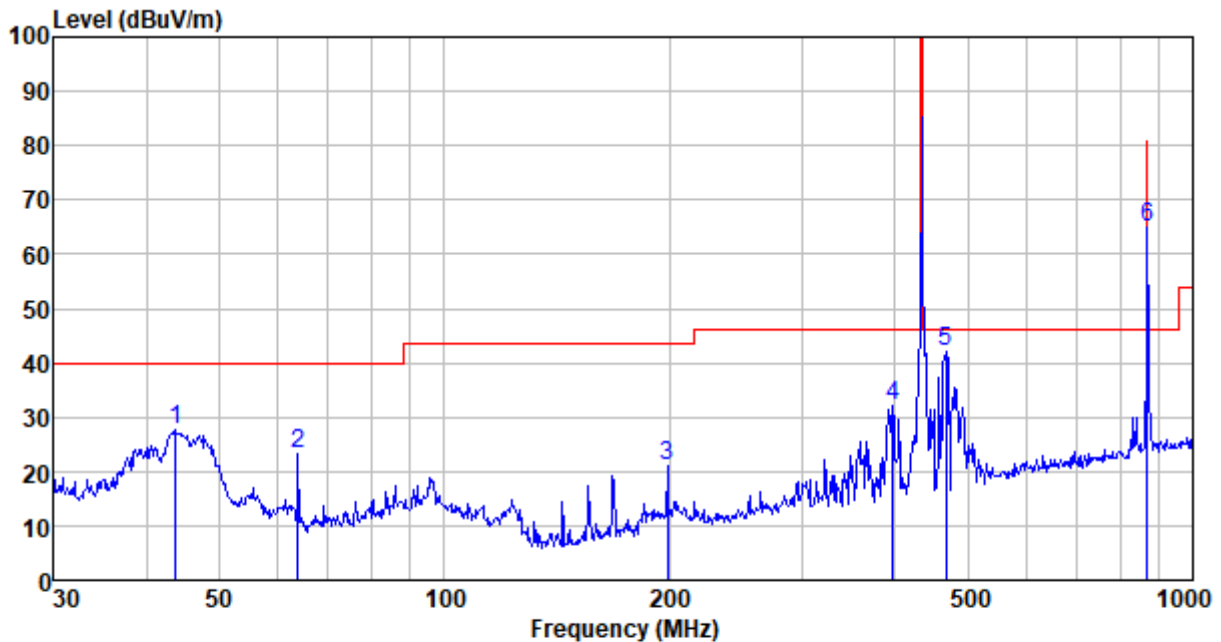
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
32.293	51.74	11.25	0.58	35.17	28.40	40.00	-11.60	QP
40.135	52.06	12.20	0.66	35.67	29.25	40.00	-10.75	QP
50.942	52.52	12.20	0.78	36.19	29.31	40.00	-10.69	QP
103.080	50.09	11.83	1.22	36.75	26.39	43.50	-17.11	QP
477.169	59.02	16.89	3.21	37.51	41.61	46.00	-4.39	QP
867.860	73.16	22.02	4.73	37.61	62.30	80.83	-18.53	Peak

### Average value:

Frequency (MHz)	Peak Level (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
867.860	62.30	-8.67	53.63	60.83	-7.20	Horizontal



<b>Mode:</b>	<b>Transmitting mode</b>	<b>Test by:</b>	<b>Bill</b>
<b>Temp./Hum.(%H):</b>	<b>26°C/56%RH</b>	<b>Polarization:</b>	<b>Vertical</b>



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
43.812	50.63	12.24	0.71	35.87	27.71	40.00	-12.29	QP
63.759	48.76	9.80	0.89	36.37	23.08	40.00	-16.92	QP
198.588	46.28	10.31	1.83	37.32	21.10	43.50	-22.40	QP
397.633	51.41	15.27	2.84	37.52	32.00	46.00	-14.00	QP
467.235	59.73	16.69	3.17	37.51	42.08	46.00	-3.92	QP
867.860	75.67	22.02	4.73	37.61	64.81	80.83	-16.02	Peak

Average value:

Frequency (MHz)	Peak Level (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
867.860	64.81	-8.67	56.14	60.83	-4.69	Vertical

**Above 1G:**

**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1735.72	61.49	25.05	4.82	34.00	57.36	74.00	-16.64	Vertical
2169.65	55.81	27.74	5.15	34.27	54.43	74.00	-19.57	Vertical
2603.58	54.08	27.82	5.58	33.78	53.70	74.00	-20.30	Vertical
1735.72	60.21	25.05	4.82	34.00	56.08	74.00	-17.92	Horizontal
2169.65	55.51	27.74	5.15	34.27	54.13	74.00	-19.87	Horizontal
2603.58	53.69	27.82	5.58	33.78	53.31	74.00	-20.69	Horizontal

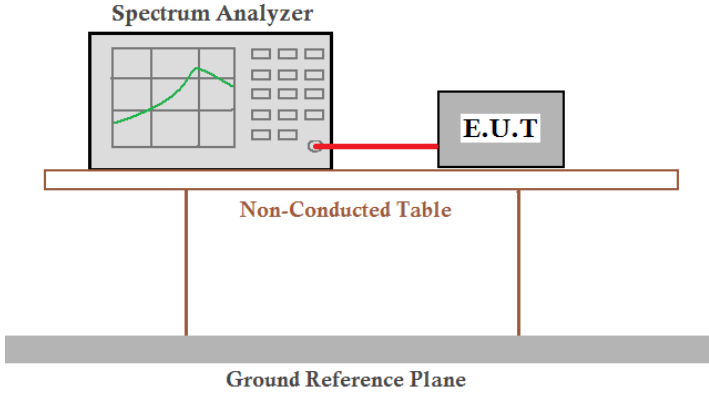
**Average value:**

Frequency (MHz)	Level (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1735.72	57.36	-8.67	48.69	54.00	-5.31	Vertical
2169.65	54.43	-8.67	45.76	54.00	-8.24	Vertical
2603.58	53.70	-8.67	45.03	54.00	-8.97	Vertical
1735.72	56.08	-8.67	47.41	54.00	-6.59	Horizontal
2169.65	54.13	-8.67	45.46	54.00	-8.54	Horizontal
2603.58	53.31	-8.67	44.64	54.00	-9.36	Horizontal

*Remarks:*

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *Average value = Peak value + Duty cycle factor*

## 7.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.231 (c)
Test Method:	ANSI C63.10:2013
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

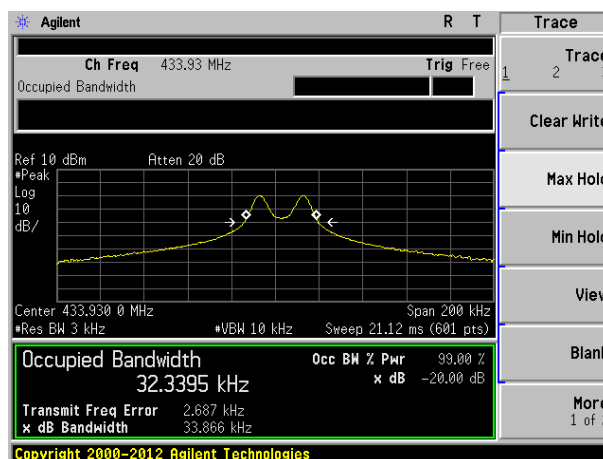
### Measurement Data

Test Frequency (MHz)	20dB bandwidth (MHz)	Limit (MHz)	Result
433.93	0.0339	1.085	Pass

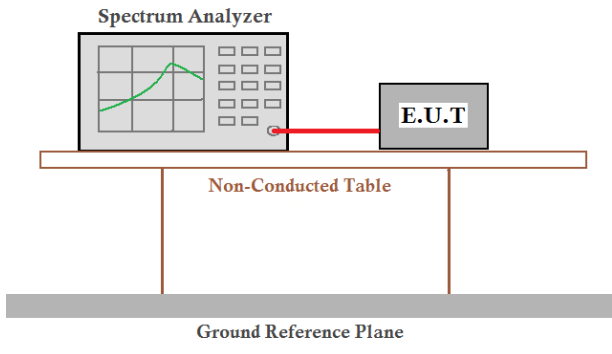
Note: Limit= Fundamental frequency×0.25%

$$433.93 \times 0.25\% = 1.085 \text{ MHz}$$

Test plot as follows:



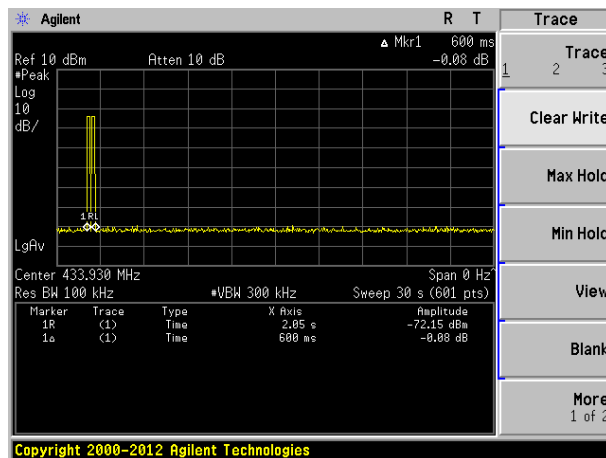
## 7.5 Dwell Time

Test Requirement:	FCC Part15 C Section 15.231 (a)(2)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100KHz, VBW=300KHz, span=0Hz, detector: Peak
Limit:	Not more than 5 seconds
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

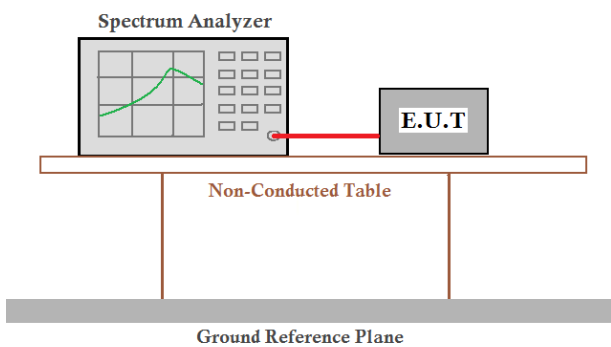
### Measurement data:

Frequency (MHz)	Duration of each TX (second)	Limit (second)	Result
433.93	0.6	<5.0	Pass

Test plot as follows:



## 7.6 Duty Cycle

Test Requirement:	FCC Part15 C Section 15.231
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100KHz, VBW=300KHz, span=0Hz, detector: Peak
Limit:	No dedicated limit specified in the Rules.
Test Procedure:	<ol style="list-style-type: none"> <li>1. Place the EUT on the table and set it in transmitting mode.</li> <li>2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.</li> <li>3. Set centre frequency of spectrum analyzer=operating frequency.</li> <li>4. Set the spectrum analyzer as RBW=100kHz, VBW=100kHz, Span=0Hz, Adjust Sweep=100ms to obtain the "worst-case" pulse on time</li> <li>5. Repeat above procedures until all frequency measured was complete.</li> </ol>
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

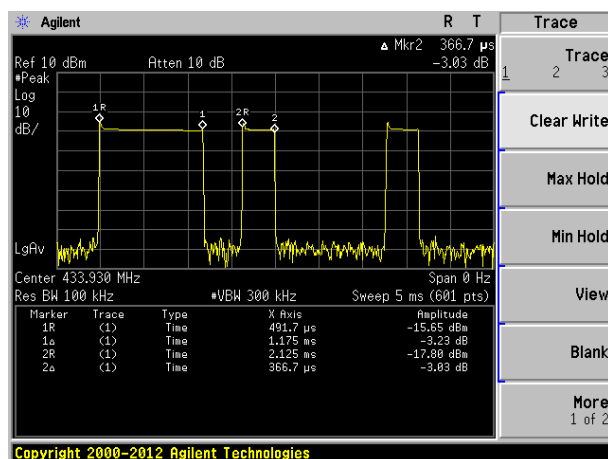
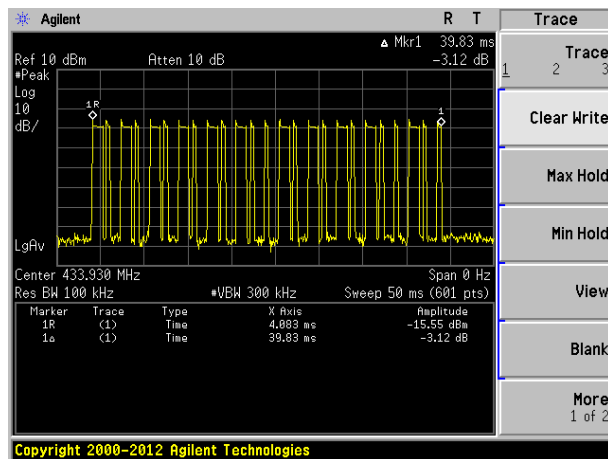
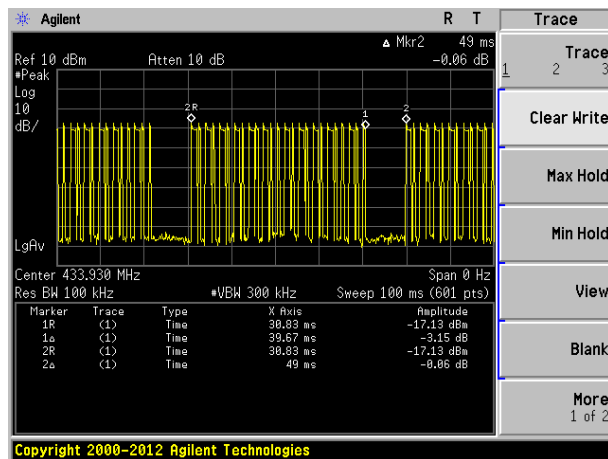
### Measurement data:

Calculate Formula: Duty cycle factor =  $20 \log(\text{Duty cycle})$   
Duty cycle = on time / 0.1 seconds or period, whichever is less

Test data:

T on time  $1.175 \times 11 + 0.3667 \times 14 = 18.0588(\text{ms})$   
T period = 49(ms)  
Duty cycle =  $18.0588 / 49 = 36.85\%$   
Duty cycle factor =  $20 \log(0.3685) = -8.67$

Test plot as follows:



## 8 Test Setup Photo

Reference to the **appendix I** for details.

## 9 EUT Constructional Details

Reference to the **appendix II** for details.

----- End -----