FCC 47 CFR PART 15 SUBPART C

Product Type	:	PIR wireless remote control light switch
Applicant	:	Dongguan BaoshanElectronic Ltd.
Address	:	Baoshan industry zone, ZMT town, Dongguan city, GD province, China
Trade Name	:	AML
Model Number	:	1238A
Test Specification	:	FCC 47 CFR PART 15 SUBPART C: Oct., 2011 ANSI C63.4-2009
Application Purpose	:	Original
Receive Date	:	February 19, 2013
Test Period	:	March 20, 2013~ March 28, 2013
Issue Date	:	April 07, 2013

Issue by

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade City,
Taoyuan County 334, Taiwan R.O.C.
Tel：+886-3-2710188 / Fax：+886-3-2710190

Taiwan Accreditation Foundation accreditation number: 1330

Revision History

Rev.	Issue Date	Revisions	Revised By
00	April 07, 2013	Initial Issue	

Verification of Compliance

Issued Date: 04/07/2013

Product Type	:	PIR wireless remote control light switch
Applicant	:	Dongguan BaoshanElectronic Ltd.
Address	:	Baoshan industry zone, ZMT town, Dongguan city, GD province, China
Trade Name	:	AML
Model Number	:	1238A
FCC ID	:	YA8-1238
EUT Rated Voltage	:	DC 4.5V
Test Voltage	:	DC 4.5V
Applicable Standard	:	FCC 47 CFR PART 15 SUBPART C: Oct., 2011 ANSI C63.4-2009
Test Result	:	Complied
Application Purpose	:	Original
Performing Lab.	:	A Test Lab Techno Corp. No. 140-1, Changan Street, Bade City, Taoyuan County 334, Taiwan R.O.C. Tel：+886-3-2710188 / Fax：+886-3-2710190 Taiwan Accreditation Foundation accreditation number: 1330 http://www.atl-lab.com.tw/e-index.htm

The above equipment was tested by A Test Lab Techno Corp. 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: 2009 and the energy emitted by the sample tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.231 .

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

Approved By	:		Reviewed By	:
(Manager)		(Murphy Wang)	(Testing Engineer)	(Fly Lu)

TABLE OF CONTENTS

1 General Information 5
1.1. Summary of Test Result 5
1.2. Measurement Uncertainty 5
2 EUT Description 6
3 Test Methodology 7
3.1. Mode of Operation 7
3.2. EUT Exercise Software 7
3.3. Configuration of Test System Details 7
3.4. Test Site Environment 7
4 Conducted Emission Measurement 8
4.1. Limit 8
4.2. Test Instruments 8
4.3. Test Setup 8
4.4. Test Procedure 9
4.5. Test Result 9
5 Radiated Emissions Measurement 10
5.1. Limit 10
5.2. Test Instruments 11
5.3. Setup 12
5.4. Test Procedure 13
5.5. Test Result 15
6 Bandwidth Measurement 19
6.1. Limit 19
6.2. Test Setup 19
6.3. Test Instruments 19
6.4. Test Procedure 20
6.5. Test Result 20
6.6. Test Graphs 21

1 General Information

1.1. Summary of Test Result

Reference 47 CFR Part 15.207&15.231	Test	Results	Section
15.207	AC Power Conducted Emission	N/A	4.5
15.231(a)	Transmitter deactivation time	PASS	5.5
15.231(b)	Transmitter field strength of emissions	PASS	5.5
15.231(c)	Bandwidth of the emission	PASS	6.5
CFR 47 Part 15.231(2011) / ANSI C63.4: 2009			

The test results of this report relate only to the tested sample(s) identified in this report. Manufacturer or whom it may concern should recognize the pass or fail of the test result.

1.2. Measurement Uncertainty

Radiated Emission

The measurement uncertainty of is evaluated as ± 3.072dB.

2 EUT Description

Applicant	Dongguan BaoshanElectronic Ltd.
Applicant Address	Baoshan industry zone, ZMT town, Dongguan city, GD province, China
Manufacturer	Dongguan BaoshanElectronic Ltd.
Manufacturer Address	Baoshan industry zone, ZMT town, Dongguan city, GD province, China
Product	PIR wireless remote control light switch
Trade Name	AML
Model Number	1238A
FCC ID	YA8-1238
Frequency Range	315 MHz
Modulation Type	OO K / ASK
Number of Channels	1 Channel
Antenna Type	Helical antenna
Antenna Gain	0 dBi

3 Test Methodology

3.1. Mode of Operation

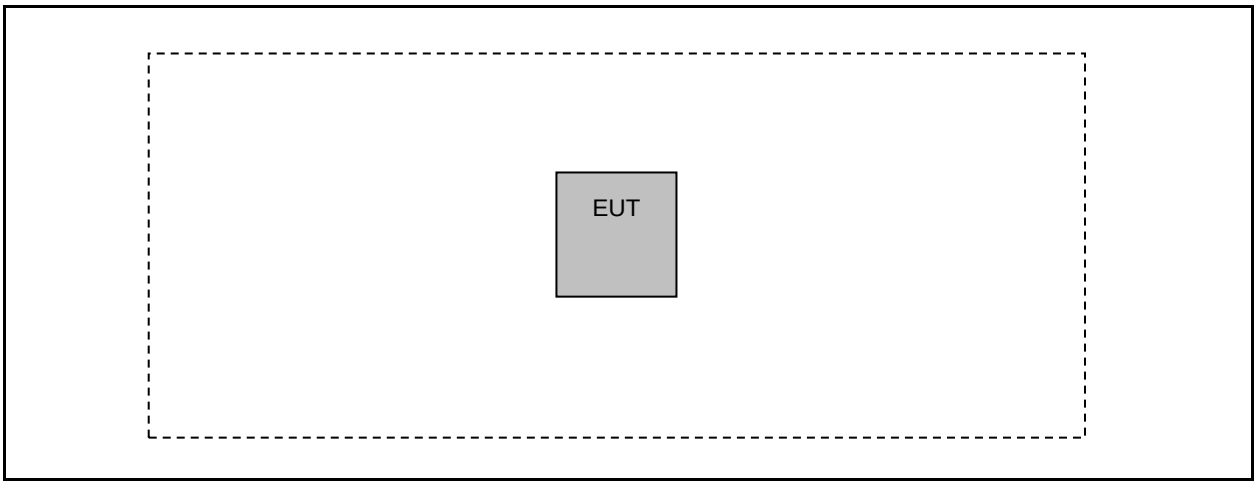
Test Mode
Mode 1: Transmitter Mode With new battery

Then, the above highest fundamental level mode of the configuration of the EUT and antenna was chosen for all final test items.

3.2. EUT Exercise Software

1	Setup the EUT as shown on 3.3.
2	Turn on the power of all equipment.
3	The EUT will start to operate function.

3.3. Configuration of Test System Details



3.4. Test Site Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	26
Humidity (%RH)	25-75	60
Barometric pressure (mbar)	860-1060	950

4 Conducted Emission Measurement

4.1. Limit

Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

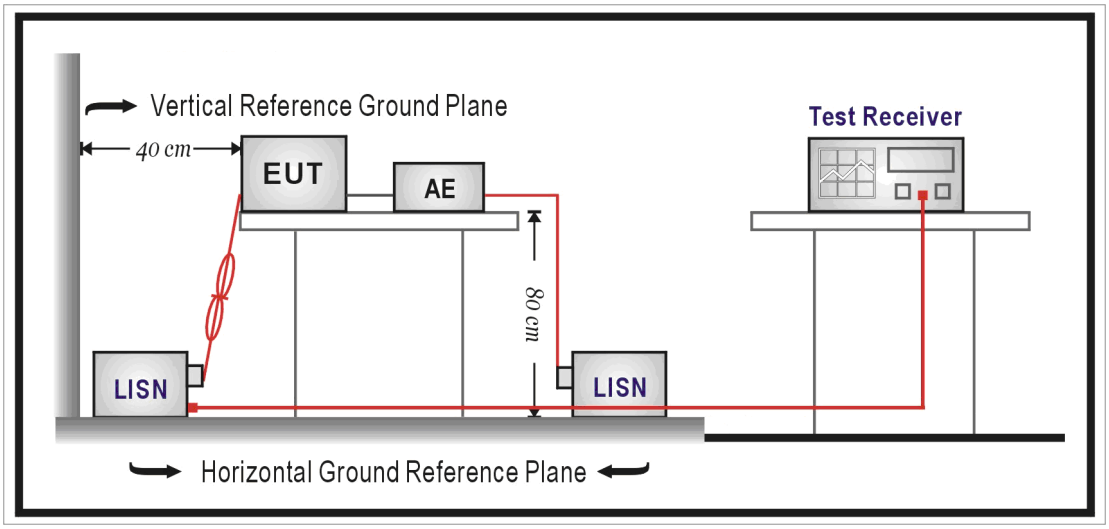
4.2. Test Instruments

Describe	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Test Receiver	R&S	ESCI	100367	06/18/2012	(1)
LISN	R&S	ENV216	101040	03/07/2013	(1)
LISN	R&S	ENV216	101041	03/07/2013	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.

Note: N.C.R. = No Calibration Request.

4.3. Test Setup



4.4. Test Procedure

The power line conducted emission measurements were performed in a shielded enclosure. The EUT was assembled on a wooden table which is 80 centimeters high, was placed 40 centimeters from the back wall and at least 1 meter from the sidewall.

Power was fed to the EUT from the public utility power grid through a line filter and EMCO Model 3162/2 SH Line Impedance Stabilization Networks (LISN). The LISN housing, measuring instrumentation case, ground plane, etc., were electrically bonded together at the same RF potential. The Spectrum analyzer was connected to the AC line through an isolation transformer. The 50-ohm output of the LISN was connected to the spectrum analyzer directly. Conducted emission levels were in the CISPR quasi-peak detection mode. The analyzer's 6 dB bandwidth was set to 9 KHz. No post-detector video filter was used.

The spectrum was scanned from 150 KHz to 30 MHz. The physical arrangement of the test system and associated cabling was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude and frequency. All spurious emission frequencies were observed. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in paragraph 4.1.

4.5. Test Result

Not applicant, the EUT’s power source is use DC Battery.

5 Radiated Emissions Measurement

5.1. Limit

According to FCC Part 15.231(b) and RSS-210 A1.1.2 requirement:

In addition to the provisions of §RSS-210 section 2.7 Table1, the field strength of emissions from intentional radiator operated under this section shall not exceed the following:

Fundamental and harmonics emission limits

Frequency range (MHz)	Peak Field Strength of Fundamental		Average Field Strength of Fundamental (dBμV/m@3m)
	(μV/m@3m)	(dBμV/m@3m)	
315.00	60416.772	95.62	75.62

General Radiated emission Limit

Frequency range (MHz)	Field Strength of Fundamental (uV/m at 3m)	Field Strength of Harmonics (uV/m at 3m)
40.66 to 40.70	2250 (67.04 dBuV)	225 (47.04 dBuV)
70 to 130	1250 (61.94 dBuV)	125 (41.94 dBuV)
130 to 174	1250 (61.94 dBuV) to 3750 (71.48 dBuV)	125 (41.94 dBuV) to 375 (51.48 dBuV)
174 to 260	3750 (71.48 dBuV)	375 (51.48 dBuV)
260 to 470	3750 (71.48 dBuV) to 12500 (81.84 dBuV)	375 (51.48 dBuV) to 1250 (61.94 dBuV)
470 and above	12500 (81.84 dBuV)	1250 (61.94 dBuV)

Remark: 1. The table above tighter limit applies at the band edges.

2. The measurement distance in meters, which that between form closest point of EUT to instrument antenna.

5.2. Test Instruments

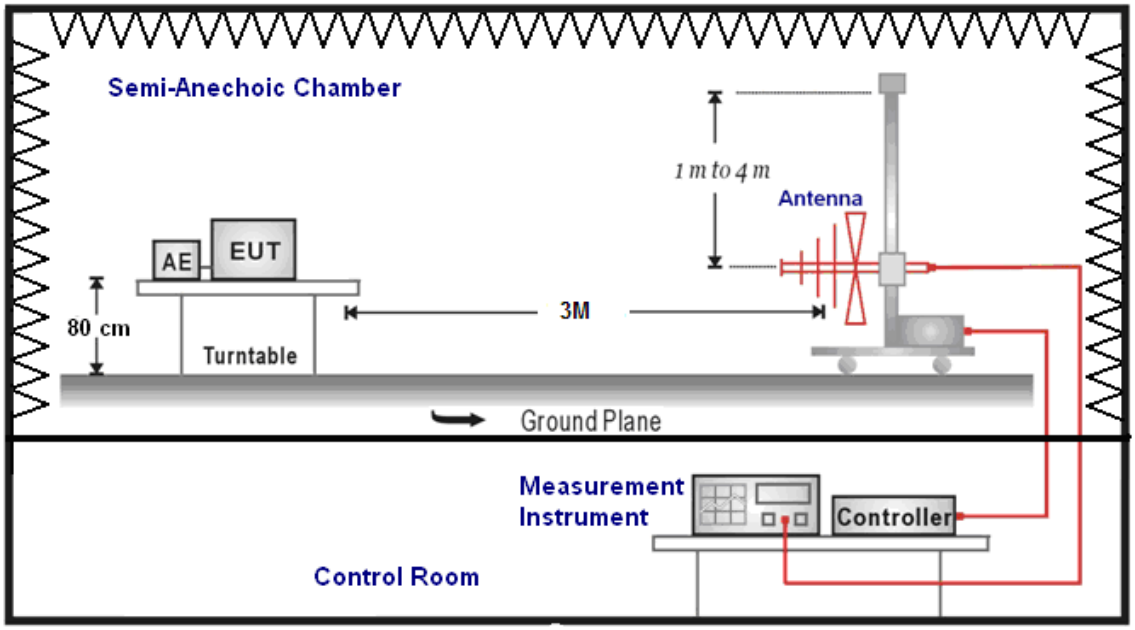
3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/16/2012	(2)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/16/2013	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/22/2013	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/22/2013	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	07/29/2012	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/15/2012	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	06/21/2012	(1)
Test Site	ATL	TE01	888001	12/20/2012	(1)

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.

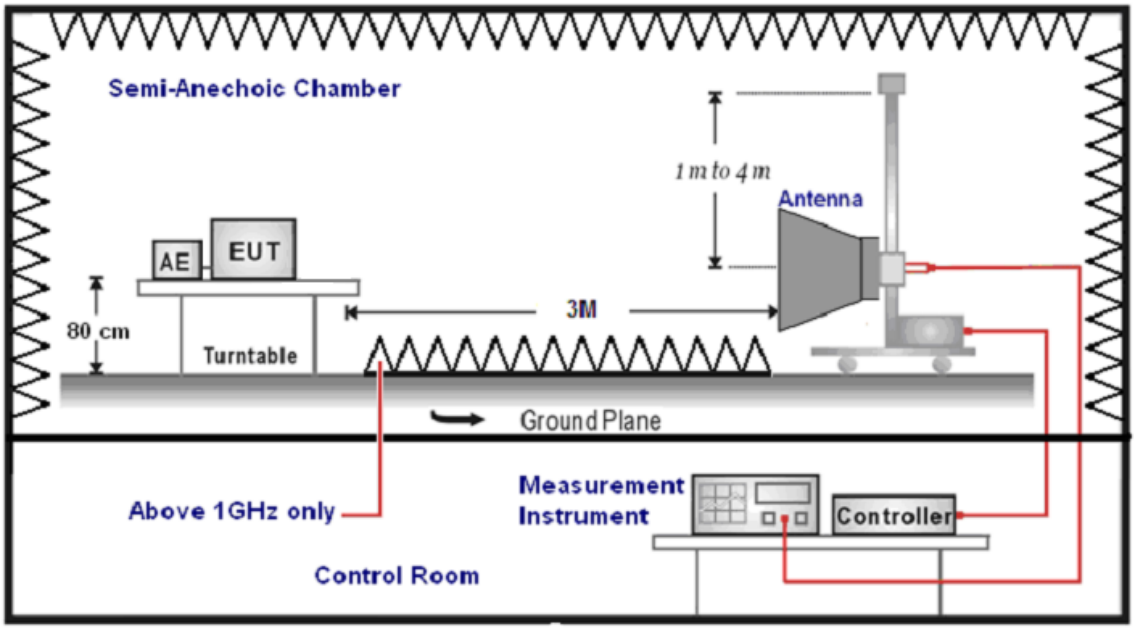
Note: N.C.R. = No Calibration Request.

5.3. Setup

Below 1GHz



Above 1GHz



5.4. Test Procedure

Final radiation measurements were made on a three-meter, Semi Anechoic Chamber. The EUT system was placed on a nonconductive turntable which is 0.8 meters height, top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 30 MHz to 26.5 GHz is investigated.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

A nonconductive material surrounded the EUT to supporting the EUT for standing on tree orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

SCHWARZBECK MESS-ELEKTRONIK Biconilog Antenna (mode VULB9163) at 3 Meter and the SCHWARZBECK Double Ridged Guide Antenna (model BBHA9120D&9170) was used in frequencies 1 – 26.5 GHz at a distance of 1 meter. All test results were extrapolated to equivalent signal at 3 meters utilizing an inverse linear distance extrapolation Factor (20dB/decade).

For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post – detector video filters were used in the test.

The spectrum analyzer's 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.

The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBuV) into field intensity in micro volts pre meter (uV/m).

The actual field intensity in decibels referenced to 1 microvolt in to field intensity in micro colts per meter (dBuV/m).

The actual field is intensity in referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

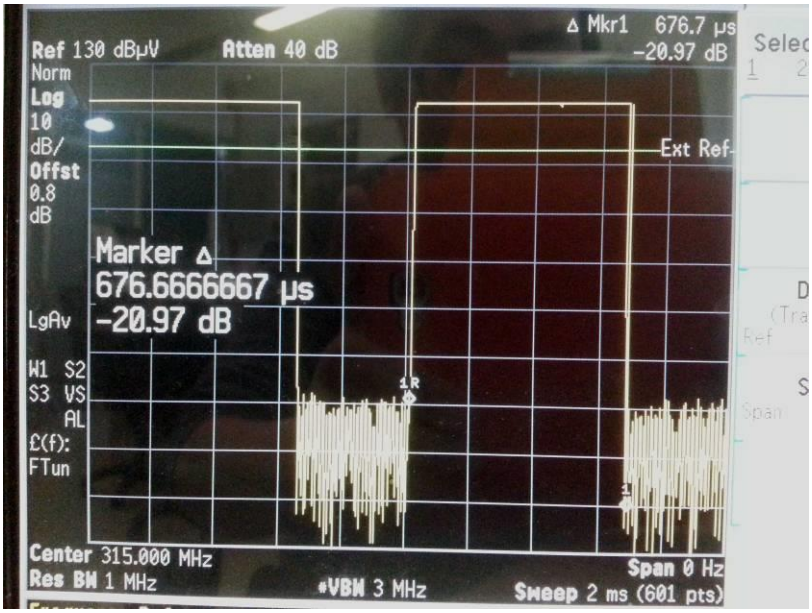
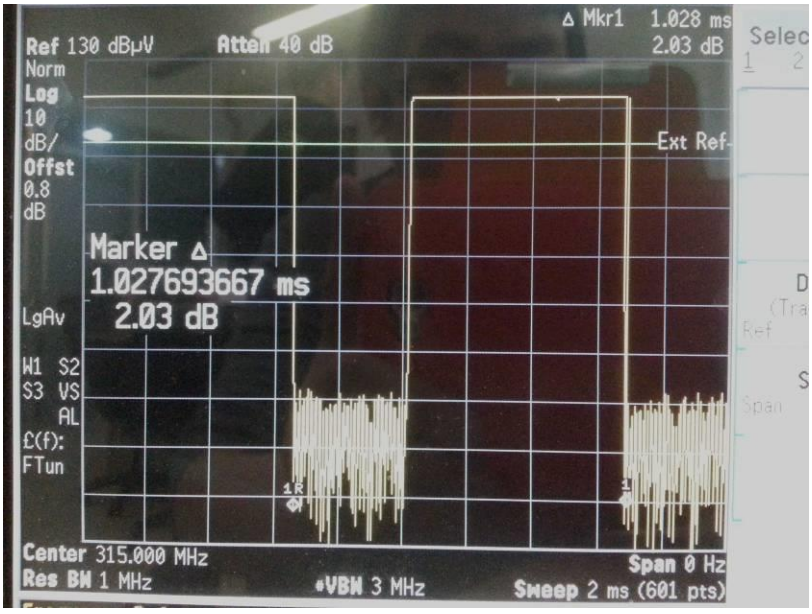
(1) Amplitude (dBuV/m) = FI (dBuV) +AF (dBuV) +CL (dBuV)-Gain (dB)
FI= Reading of the field intensity.
AF= Antenna factor.
CL= Cable loss.
P.S Amplitude is auto calculate in spectrum analyzer.

(2) Actual Amplitude (dBuV/m) = Amplitude (dBuV)-Dis(dB)
The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:
(a) For fundamental frequency : Transmitter Output < +30dBm
(b) For spurious frequency : Spurious emission limits = fundamental emission limit /10

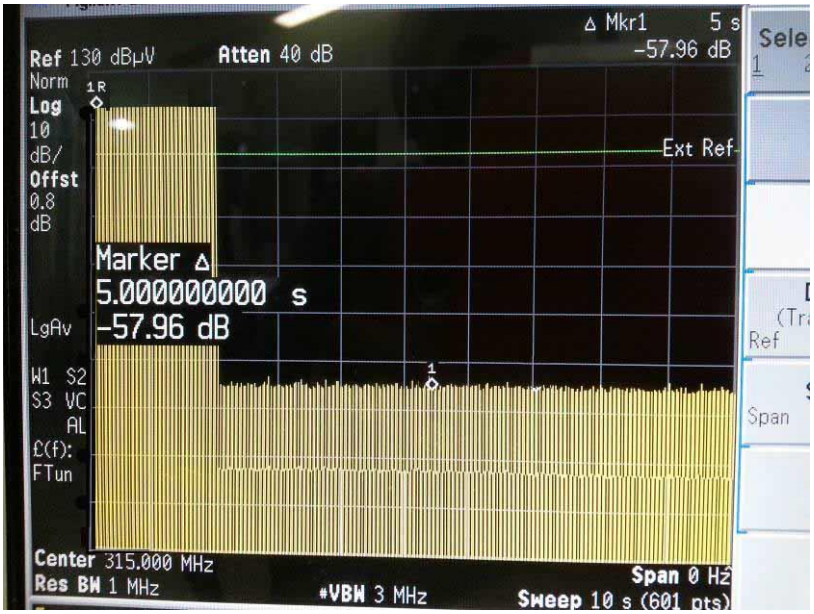
Data of measurement within this frequency range without mark in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5.5. Test Result

Duty Cycle Test Diagrams

Length of a complete pulse(T_{on})

Length of a complete period(T_P)


The EUT was complied with the requirement of FCC 15.231 (a) (2), which cease transmission within 5 seconds after activation



Calculation of Average Factor

The output field strengths of specification in accordance with the FCC & RSS-210 rules specify measurements with an average detector. During the test, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

Please see the diagrams below.

Duty Cycle＝Ton/Tp=0.68ms/1.03ms=0.66

Duty Cycle Factor =20log (Duty Cycle)=20log(0. 66)=-3.61

Note: Average Amplitude =Peak Amplitude + Duty Cycle Factor

Fundamental Frequency:

Standard:	FCC Part 15.231	Test Distance:	3m
Test item:	Fundamental Frequency	Power:	DC 4.5V
Model Number:	1238A	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 1	Date:	03/20/2013
		Test By:	Fly Lu

Frequency (MHz)	Ant. Polar.	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
315.00	H	111.69	-34.80	76.89	95.6	-18.71	Peak
315.00	H	/	/	73.28	75.6	-2.32	AVG
315.00	V	104.29	-35.20	69.09	95.6	-26.51	Peak
315.00	V	/	/	65.48	75.6	-10.12	AVG

Note: Average Amplitude =Peak Amplitude + Duty Cycle Factor

Spurious Radiated Emissions:

Standard:	FCC Part 15.231	Test Distance:	3m
Test item:	Spurious Radiated Emissions	Power:	DC 4.5V
Model Number:	1238A	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 1	Date:	03/20/2013
Test frequency range:	30 to 4000MHz	Test By:	Fly Lu

Frequency (MHz)	Ant. Polar.	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
630.00	H	82.69	-28.80	53.89	75.60	-21.71	Peak
630.00	H	/	/	50.28	55.60	-5.32	AVG
945.00	H	70.26	-25.40	44.86	75.60	-30.74	Peak
945.00	H	/	/	41.25	55.60	-14.35	AVG
1260.00	H	59.16	-22.10	37.06	75.60	-38.54	Peak
1260.00	H	/	/	33.45	55.60	-22.15	AVG
1575.00	H	59.83	-19.00	40.83	74.00	-33.17	Peak
1575.00	H	/	/	37.22	54.00	-16.78	AVG
1890.00	H	56.65	-17.90	38.75	75.60	-36.85	Peak
1890.00	H	/	/	35.14	55.60	-20.46	AVG
2205.00	H	55.19	-15.30	39.89	74.00	-34.11	Peak
2205.00	H	/	/	36.28	54.00	-17.72	AVG
630.00	V	82.26	-29.60	52.66	75.60	-22.94	Peak
630.00	V	/	/	49.05	55.60	-6.55	AVG
945.00	V	72.49	-26.40	46.09	75.60	-29.51	Peak
945.00	V	/	/	42.48	55.60	-13.12	AVG
1260.00	V	59.43	-23.90	35.53	75.60	-40.07	Peak
1260.00	V	/	/	31.92	55.60	-23.68	AVG
1575.00	V	58.26	-20.10	38.16	74.00	-35.84	Peak
1575.00	V	/	/	34.55	54.00	-19.45	AVG
1890.00	V	51.16	-17.70	33.46	75.60	-42.14	Peak
1890.00	V	/	/	29.85	55.60	-25.75	AVG
2205.00	V	56.24	-15.90	40.34	74.00	-33.66	Peak
2205.00	V	/	/	36.73	54.00	-17.27	AVG

Note: Average Amplitude =Peak Amplitude + Duty Cycle Factor

6 Bandwidth Measurement

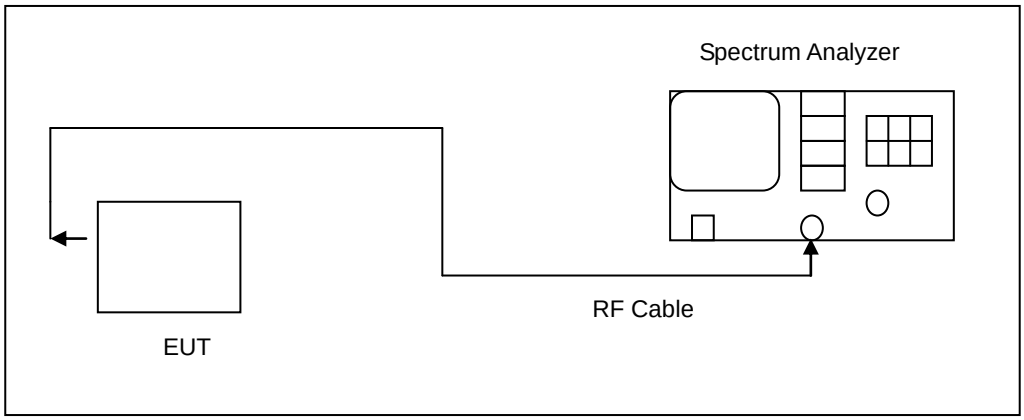
6.1. Limit

According to 15.231(c) requirement:

Bandwidth is determined at the points 20 dB down from the modulated carrier.

B.W Limit = 0.25% * f (MHz) = 0.25% * 315 MHz = 787.50 kHz

6.2. Test Setup



6.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/21/2012	(2)
Test Site	ATL	TE05	TE05	N.C.R.	-----

dRemark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.

Note: N.C.R. = No Calibration Request.

6.4. Test Procedure

20dB Bandwidth

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage. The RF function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = wide enough to cover the whole wave sharp
2. RBW ⩾1% of the 20dB bandwidth
3. VBW ⩾RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

The trace was allowed to stabilize. The EUT was transmitting at its maximum data rate. The marker-to-peak function was used to set the marker to the peak of the emission. The marker-delta function was used to measure 20dB down one side of the emission. The marker-delta function and marker was moved to the other side of the emission until it was even with the reference marker. The marker-delta reading at this point was the 20dB bandwidth of the emission.

6.5. Test Result

Model Number	1238A		
Mode	Mode 1		
Date of Test	03/22/2013	Test Site	TE02
Frequency (MHz)	20 dB Bandwidth (KHz)	Limited (KHz)	
315.00	525.00	787.50	

6.6. Test Graphs

20 dB Bandwidth