

## FCC 47 CFR PART 15 SUBPART C

Product Type : NX-ECO  
Applicant : KYE SYSTEMS CORP.  
Address : No.492, Sec.5, Chung Hsin Rd., San Chung Dist., New Taipei City,  
24160, Taiwan, R.O.C.  
Trade Name : Genius  
Model Number : GM-120011/T  
Test Specification : FCC 47 CFR PART 15 SUBPART C: Oct., 2011  
ANSI C63.4-2009  
Application Purpose : Original  
Receive Date : Oct. 05, 2012  
Test Period : Oct. 10 ~ Oct. 15, 2012  
Issue Date : Oct. 19, 2012

### 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

**Note:** This report shall not be reproduced except in full, without the written approval of A Test Lab Techno Corp. This document may be altered or revised by A Test Lab Techno Corp. personnel only, and shall be noted in the revision section of the document. The client should not use it to claim product endorsement by TAF, or any government agencies. The test results in the report only apply to the tested sample.

**Revision History**

Rev.	Issue Date	Revisions	Revised By
00	Oct. 19, 2012	Initial Issue	

## Verification of Compliance

Issued Date: 10/19/2012

Product Type : NX-ECO  
Applicant : KYE SYSTEMS CORP.  
Address : No.492, Sec.5, Chung Hsin Rd., San Chung Dist., New Taipei City, 24160, Taiwan, R.O.C.  
Trade Name : Genius  
Model Number : GM-120011/T  
FCC ID : FSUGMZK7  
EUT Rated Voltage : DC 2.7V, 6mA  
Test Voltage : DC 2.7V  
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, 15.247 .

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

Approved By



(Manager)

(Murphy Wang)

Reviewed By



(Testing Engineer)

(Fly Lu)

## TABLE OF CONTENTS

<b>1</b>	<b>General Information .....</b>	<b>5</b>
1.1.	Summary of Test Result .....	5
1.2.	Measurement Uncertainty .....	5
<b>2</b>	<b>EUT Description .....</b>	<b>6</b>
<b>3</b>	<b>Test Methodology .....</b>	<b>7</b>
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 .....	8
<b>4</b>	<b>Conducted Emission Measurement .....</b>	<b>9</b>
4.1.	Limit.....	9
4.2.	Test Instruments.....	9
4.3.	Test Setup .....	9
4.4.	Test Procedure .....	10
4.5.	Test Result .....	11
<b>5</b>	<b>Radiated Interference Measurement .....</b>	<b>13</b>
5.1.	Limit.....	13
5.2.	Test Instruments.....	14
5.3.	Setup.....	15
5.4.	Test Procedure .....	16
5.5.	Test Result .....	18
<b>6</b>	<b>Band Edges Measurement .....</b>	<b>27</b>
6.1.	Limit.....	27
6.2.	Test Setup .....	27
6.3.	Test Instruments.....	27
6.4.	Test Procedure .....	28
6.5.	Test Result .....	29
<b>7</b>	<b>20dB Bandwidth and 99 % Occupied Bandwidth Measurement .....</b>	<b>33</b>
7.1.	Limit.....	33
7.2.	Test Setup .....	33
7.3.	Test Instruments.....	33
7.4.	Test Procedure .....	33
7.5.	Test Result .....	34
7.6.	Test Graphs.....	35
<b>8</b>	<b>Antenna Measurement.....</b>	<b>36</b>
8.1.	Limit.....	36
8.2.	Antenna Connector Construction .....	36

## 1 General Information

### 1.1. Summary of Test Result

Standard		Item	Result	Remark
15.249	RSS-GEN			
15.207	7.2.2	AC Power Conducted Emission	PASS	-----
-	6	Receiver Radiated Emissions	N/A	This device only has TX function.
Standard		Item	Result	Remark
15.249	RSS-210			
15.249(a)	A2.9 (a)	Transmitter Radiated Emissions	PASS	-----
15.249(d)	A2.9 (b)	Band Edge Measurement	PASS	-----
15.249(e)	-	20dB RF Bandwidth	PASS	-----
-	-	Occupied Bandwidth Measurement	N/A	-----
15.203	-	Antenna Requirement	PASS	-----

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

#### Conducted Emission

The measurement uncertainty is evaluated as  $\pm 2.24$  dB.

#### Radiated Emission

The measurement uncertainty of 30 MHz - 1GHz is evaluated as  $\pm 3.072$ dB.

## 2 EUT Description

Product	NX-ECO
Trade Name	Genius
Model Number	GM-120011/T
Applicant	KYE SYSTEMS CORP. No.492, Sec.5, Chung Hsin Rd., San Chung Dist., New Taipei City, 24160, Taiwan, R.O.C.
Manufacturer	KYE SYSTEMS CORP. No.492, Sec.5, Chung Hsin Rd., San Chung Dist., New Taipei City, 24160, Taiwan, R.O.C.
FCC ID	FSUGMZK7
Frequency Range	2402 ~ 2480 MHz
Modulation Type	GFSK
Number of Channel	79 CH
Antenna Type	Chip Antenna
Antenna Gain	-3.0 dBi
Field Strength	91.73 dBuV/m

### 3 Test Methodology

#### 3.1. Mode of Operation

Decision of Test ATL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

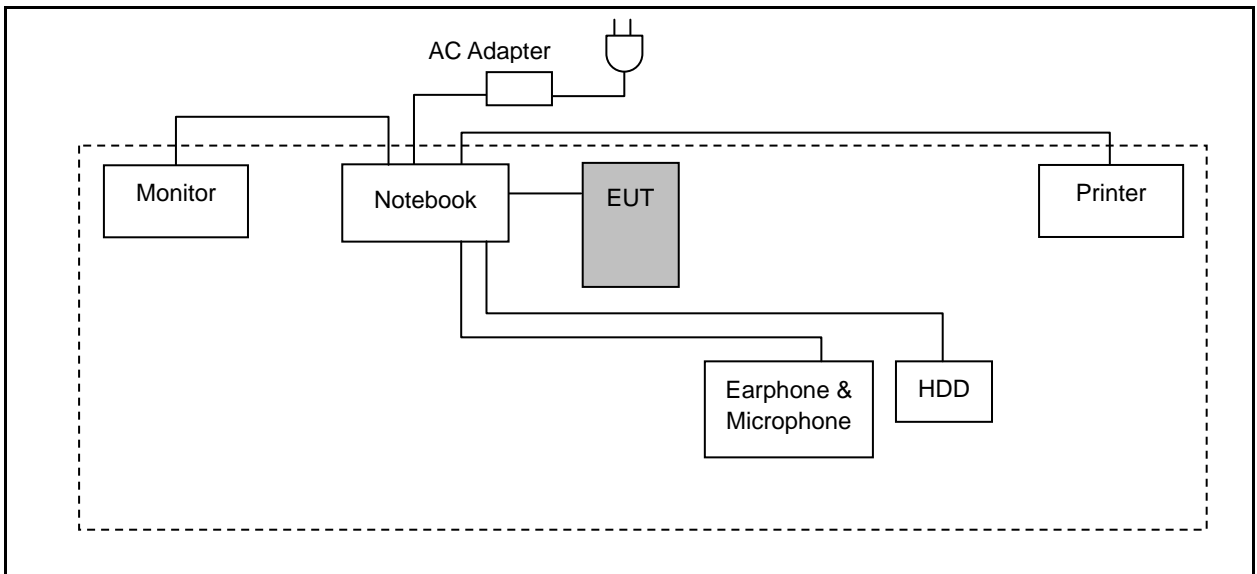
Test Mode
Mode 1: Normal Operation Mode
Mode 2: Transmission Mode

#### 3.2. EUT Exercise Software

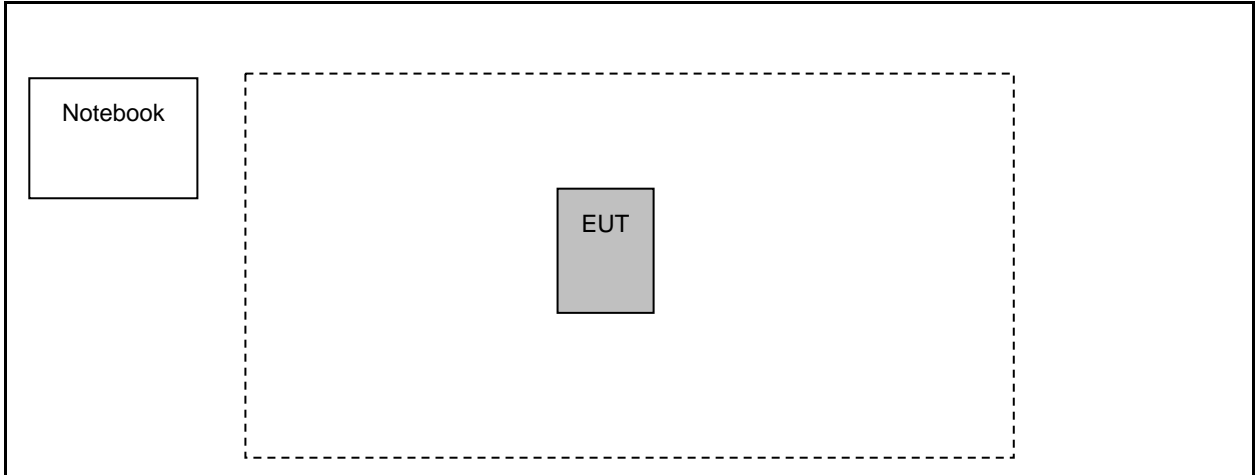
1	Setup the EUT as shown on 3.3.
2	Turn on the power of EUT.

#### 3.3. Configuration of Test System Details

Conducted Emission



Radiated Emission



**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

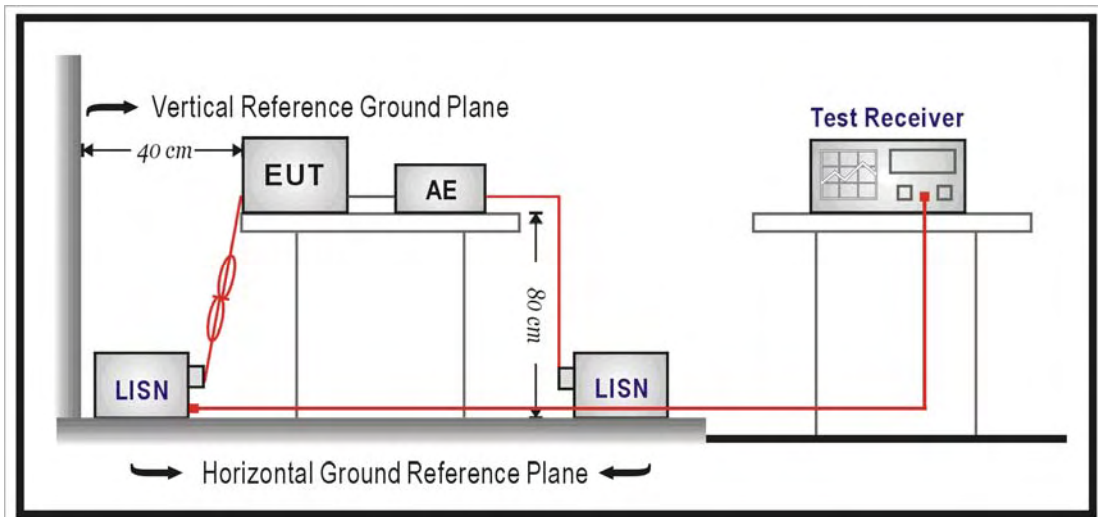
### 4.2. Test Instruments

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

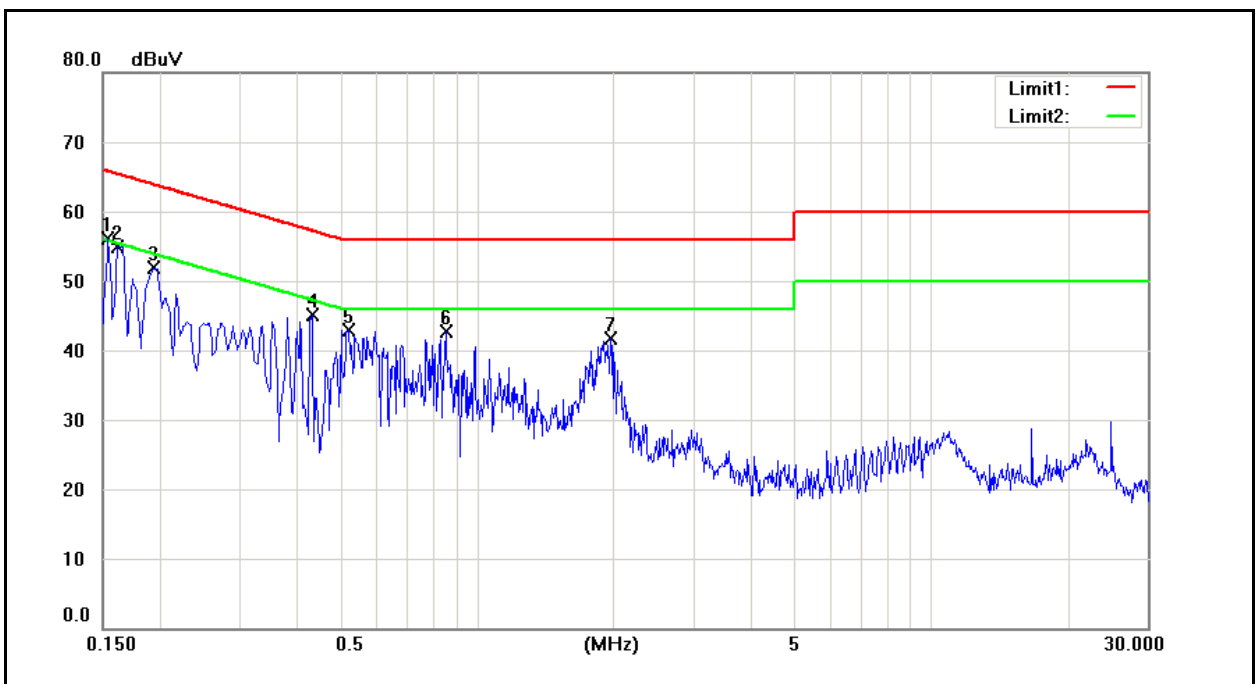
The power line conducted emission measurements were performed in a shielded enclosure. The EUT was assembled on a wooden table which is 80 centimeters high, was placed 40 centimeters from the back wall and at least 1 meter from the sidewall.

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.

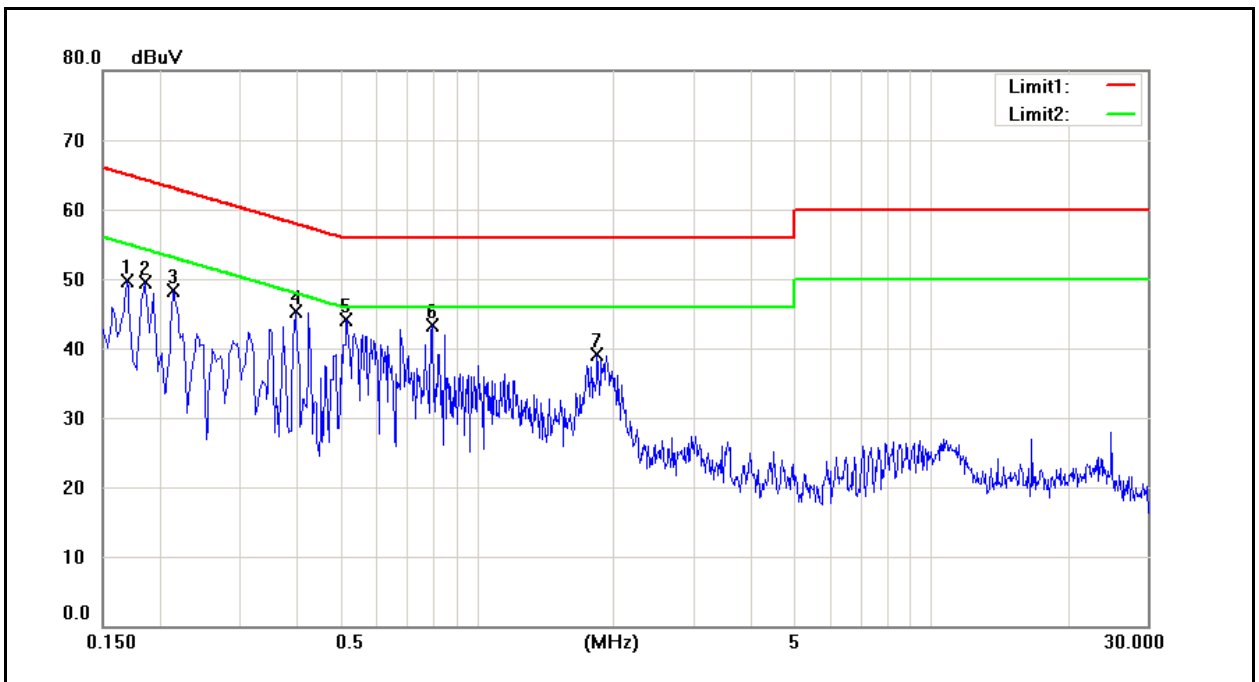
#### 4.5. Test Result

Standard:	FCC Part 15C	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Test Mode:	1	Date:	10/15/2012
		Test By:	Fly Lu
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1540	44.03	30.86	9.72	53.75	40.58	65.78	55.78	-12.03	-15.20	Pass
2	0.1620	42.77	30.46	9.72	52.49	40.18	65.36	55.36	-12.87	-15.18	Pass
3	0.1940	39.81	26.36	9.72	49.53	36.08	63.86	53.86	-14.33	-17.78	Pass
4	0.4340	31.63	13.32	9.72	41.35	23.04	57.18	47.18	-15.83	-24.14	Pass
5	0.5220	29.95	14.84	9.72	39.67	24.56	56.00	46.00	-16.33	-21.44	Pass
6	0.8540	28.08	16.16	9.72	37.80	25.88	56.00	46.00	-18.20	-20.12	Pass
7	1.9740	28.13	17.41	9.80	37.93	27.21	56.00	46.00	-18.07	-18.79	Pass

Standard:	FCC Part 15C	Line:	N
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Test Mode:	1	Date:	10/15/2012
		Test By:	Fly Lu
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1700	37.99	26.11	9.65	47.64	35.76	64.96	54.96	-17.32	-19.20	Pass
2	0.1860	36.37	26.35	9.64	46.01	35.99	64.21	54.21	-18.20	-18.22	Pass
3	0.2140	35.22	25.93	9.64	44.86	35.57	63.05	53.05	-18.19	-17.48	Pass
4	0.3980	33.24	16.27	9.64	42.88	25.91	57.90	47.90	-15.02	-21.99	Pass
5	0.5180	32.33	17.30	9.64	41.97	26.94	56.00	46.00	-14.03	-19.06	Pass
6	0.7980	29.27	14.22	9.67	38.94	23.89	56.00	46.00	-17.06	-22.11	Pass
7	1.8420	26.37	16.46	9.71	36.08	26.17	56.00	46.00	-19.92	-19.83	Pass

## 5 Radiated Interference Measurement

### 5.1. Limit

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ at meter)	Measurement Distance (meter)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 - 88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

- Note: (1) The tighter limit applies at the band edges.  
 (2) Emission level (dBuV/m)=20log Emission level ( $\mu\text{V/m}$ ).

#### Limits of Radiated Emission Measurement (FCC 15.209)

Frequency (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	Peak	AVG	Peak	AVG
0.009 – 0.490	80	60	74	54

- Notes: (1) The limit for radiated test was performed according to FCC PART 15C.  
 (2) The tighter limit applies at the band edges.  
 (3) Emission level (dBuV/m)=20log Emission level ( $\mu\text{V/m}$ ).

#### Limits of Radiated Emission Measurement (FCC Part 15.249)

Frequency Range (MHz)	Limit
2400-2483.5	Field strength of fundamental 50000 $\mu\text{V/m}$ (94 dB $\mu\text{V/m}$ ) @ 3 m
Above 2483.5	Field strength of harmonics 500 $\mu\text{V/m}$ (54 dB $\mu\text{V/m}$ ) @ 3 m

## 5.2. Test Instruments

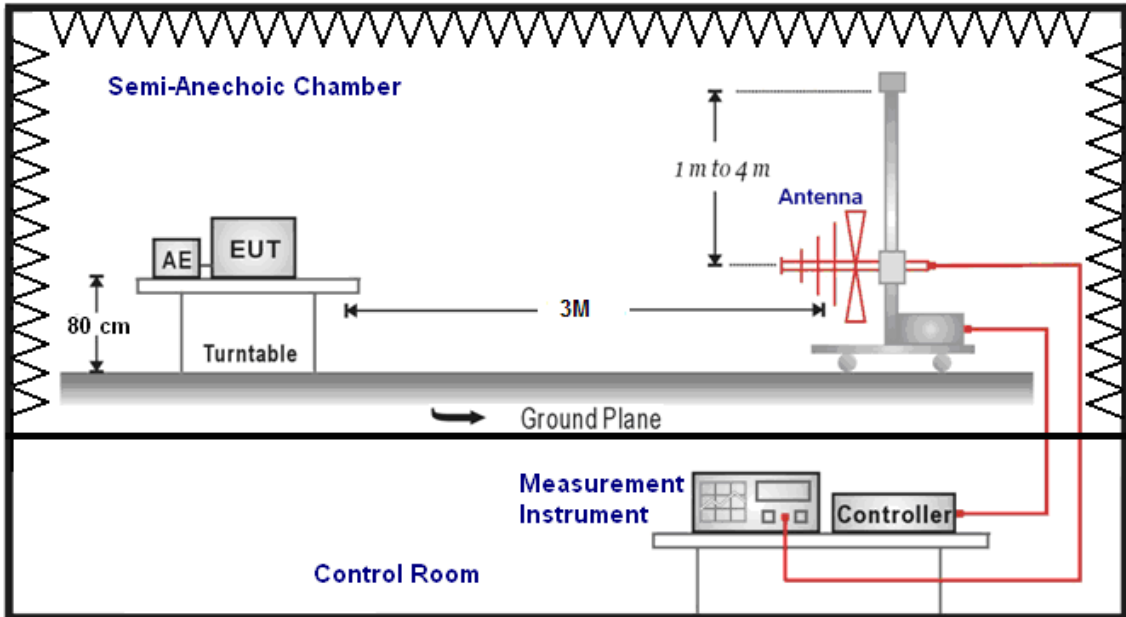
3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/16/2012	(2)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/16/2012	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/22/2012	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/22/2012	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	06/15/2012	(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	12/20/2011	(1)

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

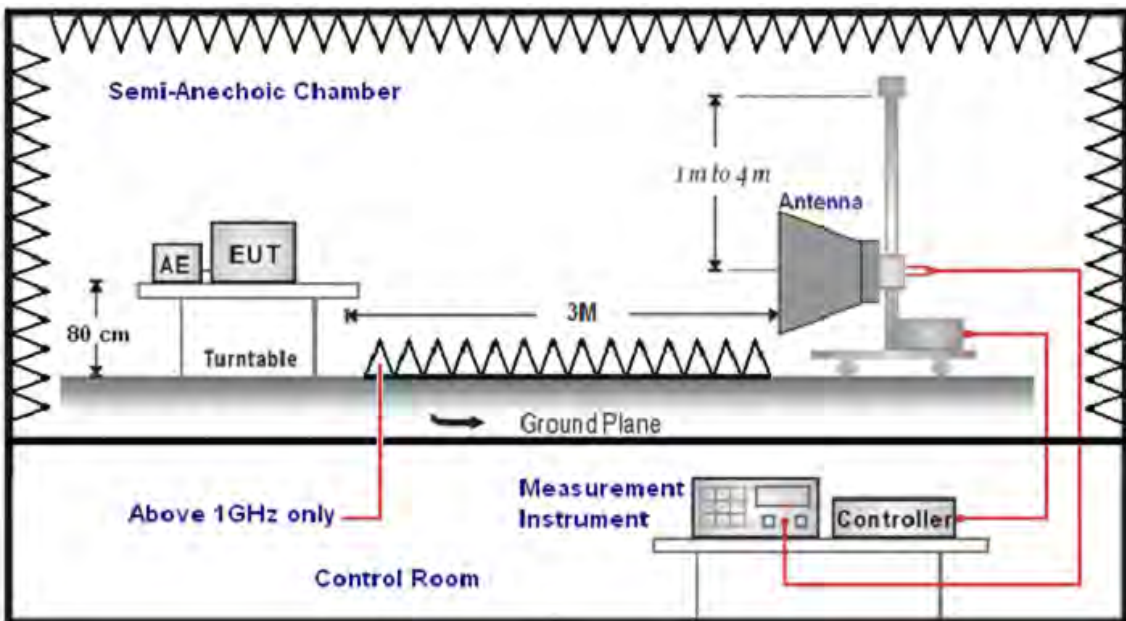
Note: N.C.R. = No Calibration Request.

### 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 three 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 volts per meter (dBuV/m).



The actual field 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)  $\text{Amplitude (dBuV/m)} = \text{FI (dBuV)} + \text{AF (dBuV)} + \text{CL (dBuV)} - \text{Gain (dB)}$

FI= Reading of the field intensity.

AF= Antenna factor.

CL= Cable loss.

P.S Amplitude is auto calculate in spectrum analyzer.

(2)  $\text{Actual Amplitude (dBuV/m)} = \text{Amplitude (dBuV)} - \text{Dis(dB)}$

The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:

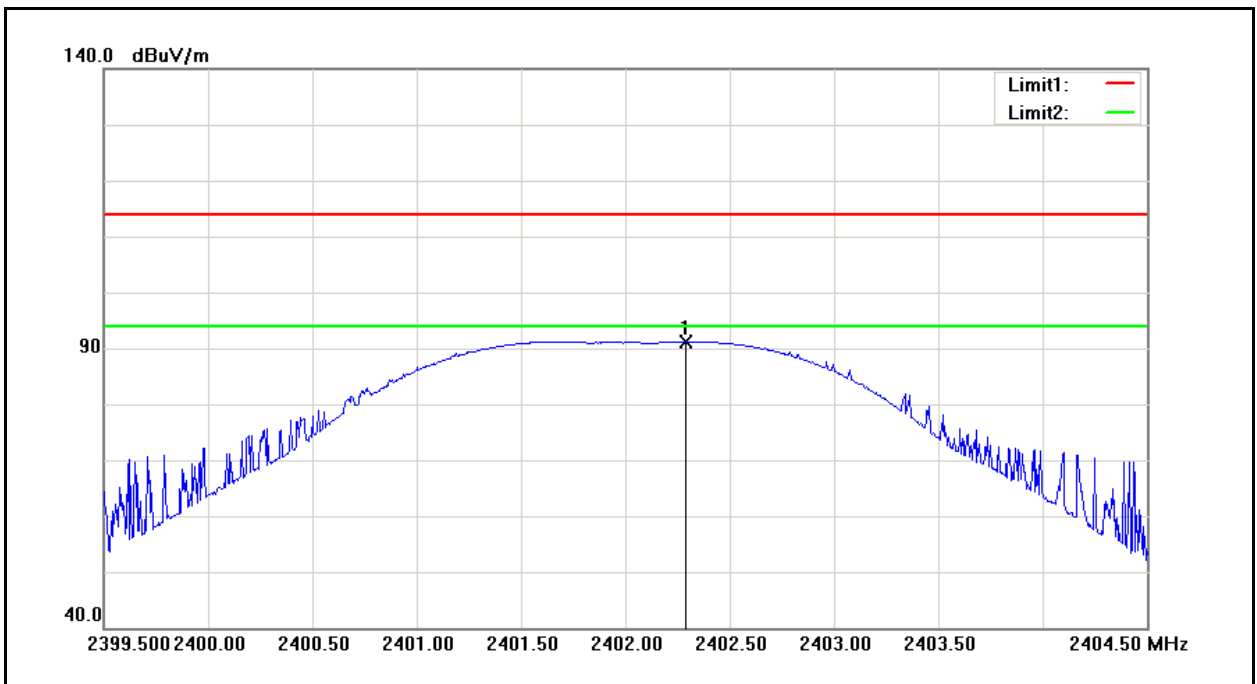
(a) For fundamental frequency : Transmitter Output < +30dBm

(b) For spurious frequency : Spurious emission limits = fundamental emission limit /10

### 5.5. Test Result

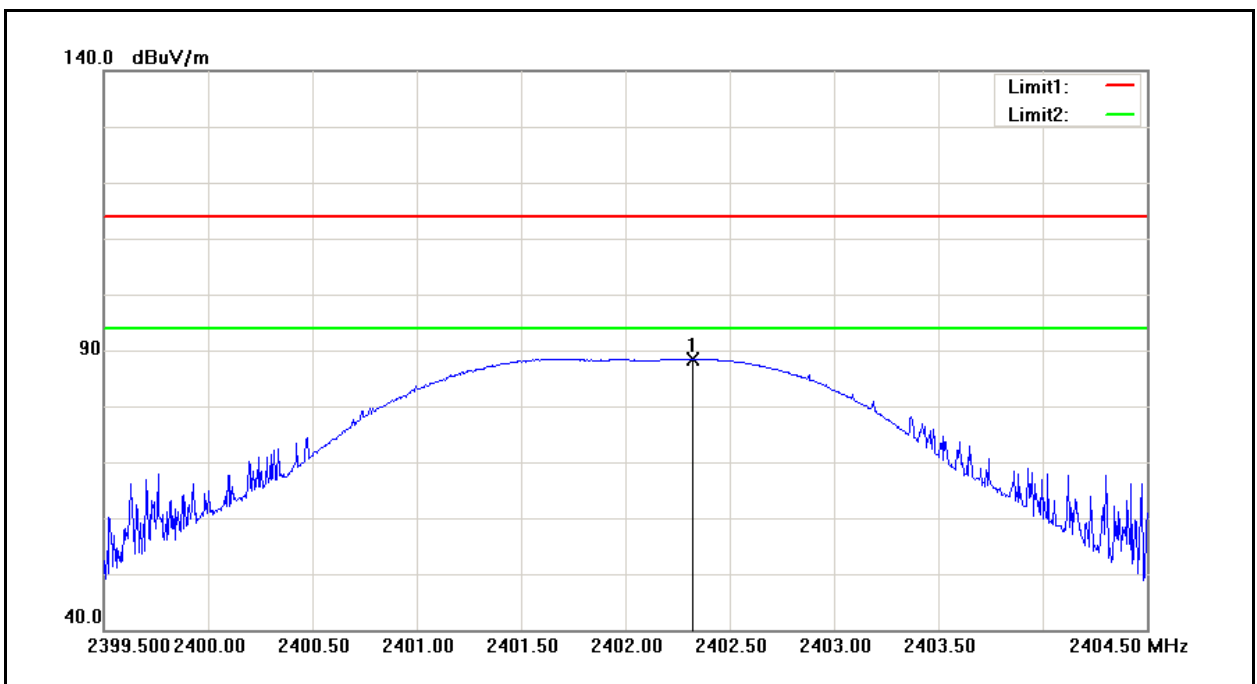
Fundamental Test Result:

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 2.7V
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Test Mode:	2	Date:	10/12/2012
Frequency:	2402 MHz	Test By:	Fly Lu
Ant.Polar.:	Horizontal		



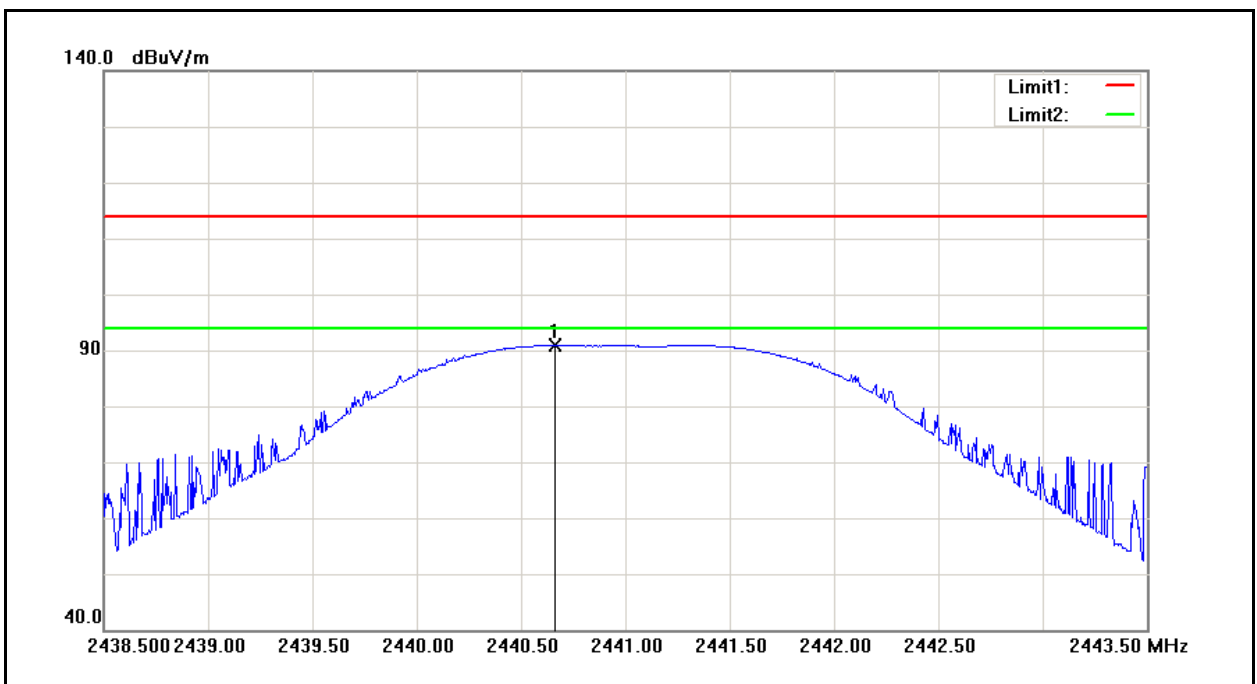
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2402.290	91.28	-0.10	91.18	114.00	-22.82	Peak

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 2.7V
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Test Mode:	2	Date:	10/12/2012
Frequency:	2402 MHz	Test By:	Fly Lu
Ant.Polar.:	Vertical		



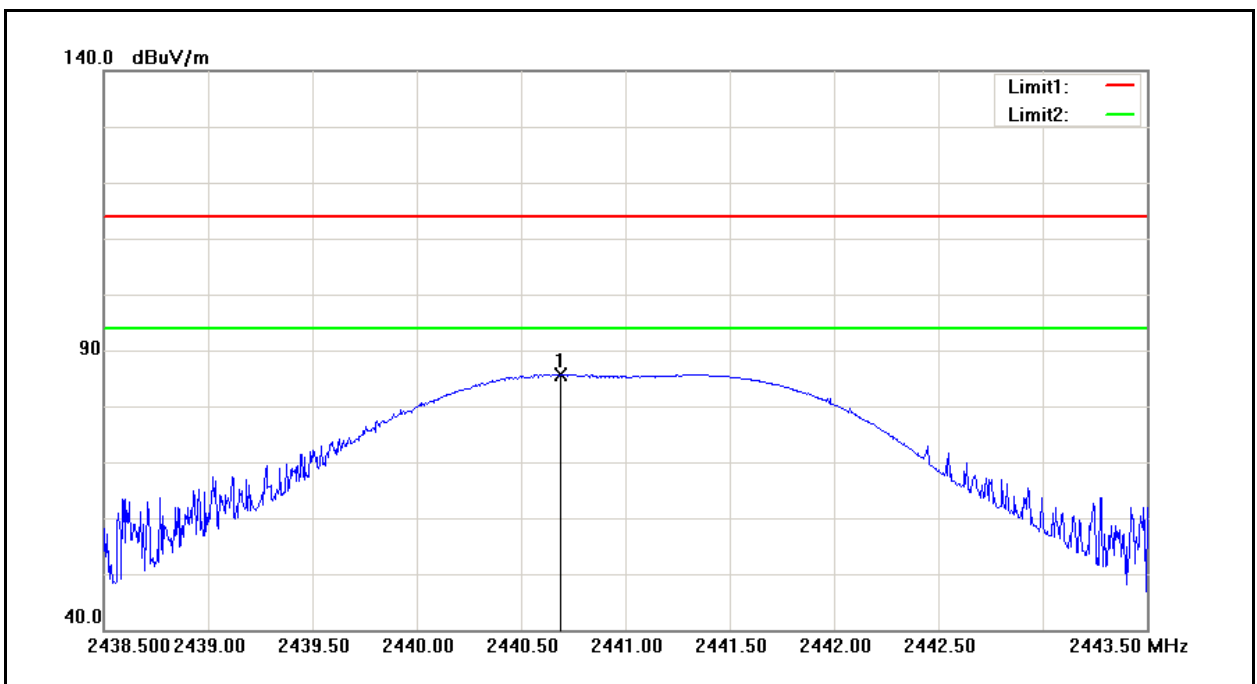
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2402.320	88.55	-0.10	88.45	114.00	-25.55	Peak

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 2.7V
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Test Mode:	2	Date:	10/12/2012
Frequency:	2441 MHz	Test By:	Fly Lu
Ant.Polar.:	Horizontal		



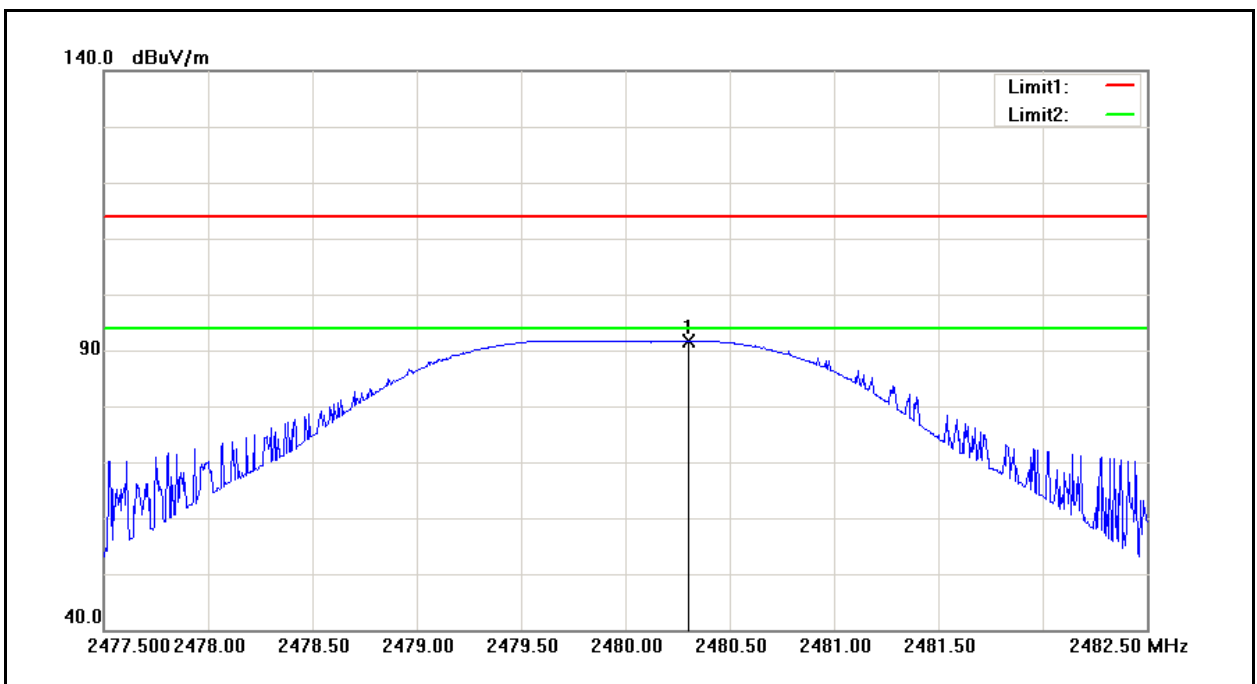
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2440.665	90.79	0.07	90.86	114.00	-23.14	Peak

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 2.7V
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Test Mode:	2	Date:	10/12/2012
Frequency:	2441 MHz	Test By:	Fly Lu
Ant.Polar.:	Vertical		



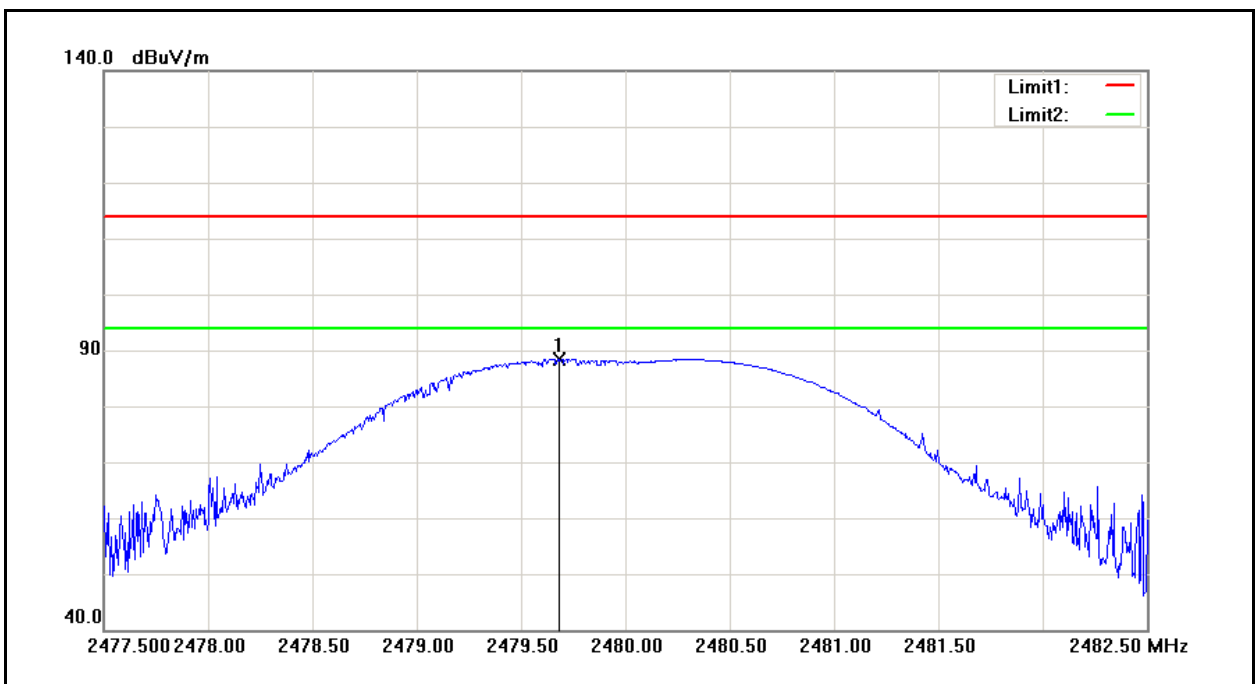
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2440.690	85.60	0.07	85.67	114.00	-28.33	Peak

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 2.7V
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Test Mode:	2	Date:	10/12/2012
Frequency:	2480 MHz	Test By:	Fly Lu
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.305	91.48	0.25	91.73	114.00	-22.27	Peak

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 2.7V
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Test Mode:	2	Date:	10/12/2012
Frequency:	2480 MHz	Test By:	Fly Lu
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2479.680	88.17	0.25	88.42	114.00	-25.58	Peak

## Below 1GHz

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 2.7V
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1	Date:	10/12/2012
		Test By:	Fly Lu

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pola H / V
100.0000	27.41	-13.85	13.56	43.50	-29.94	QP	H
255.5000	25.80	-11.96	13.84	46.00	-32.16	QP	H
416.0000	26.89	-8.41	18.48	46.00	-27.52	QP	H
546.5000	27.68	-6.58	21.10	46.00	-24.90	QP	H
692.0000	26.40	-3.76	22.64	46.00	-23.36	QP	H
855.5000	26.15	-0.69	25.46	46.00	-20.54	QP	H
120.0000	32.97	-16.06	16.91	43.50	-26.59	QP	V
254.0000	25.74	-11.96	13.78	46.00	-32.22	QP	V
402.5000	26.63	-8.57	18.06	46.00	-27.94	QP	V
599.5000	26.59	-5.05	21.54	46.00	-24.46	QP	V
749.0000	27.10	-2.49	24.61	46.00	-21.39	QP	V
896.0000	26.14	0.28	26.42	46.00	-19.58	QP	V

Note: No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).



## Above 1GHz

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 2.7V
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2	Date:	10/12/2012
Frequency:	2402 MHz	Test By:	Fly Lu

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remar	Ant. Polar. H / V
2918.000	38.03	1.81	39.84	74.00	-34.16	peak	H
4598.000	35.20	7.18	42.38	74.00	-31.62	peak	H
6250.000	31.93	11.97	43.90	74.00	-30.10	peak	H
2981.000	38.69	2.04	40.73	74.00	-33.27	peak	V
4619.000	36.47	7.25	43.72	74.00	-30.28	peak	V
6397.000	33.79	12.63	46.42	74.00	-27.58	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 2.7V
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2	Date:	10/12/2012
Frequency:	2441 MHz	Test By:	Fly Lu

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remar	Ant. Polar. H / V
2883.000	36.95	1.69	38.64	74.00	-35.36	peak	H
4598.000	35.06	7.18	42.24	74.00	-31.76	peak	H
6271.000	32.53	12.07	44.60	74.00	-29.40	peak	H
3065.000	38.13	2.28	40.41	74.00	-33.59	peak	V
4619.000	35.73	7.25	42.98	74.00	-31.02	peak	V
6117.000	32.53	11.38	43.91	74.00	-30.09	peak	V

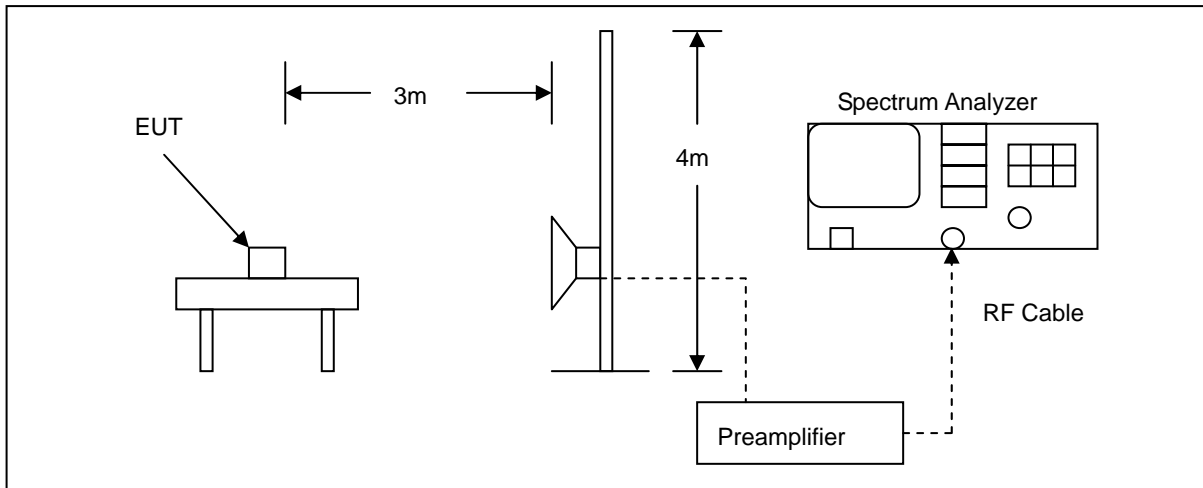
Standard:	FCC Part 15C	Test Distance:	3m				
Test item:	Radiated Emission	Power:	DC 2.7V				
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH				
Mode:	2	Date:	10/12/2012				
Frequency:	2480 MHz	Test By:	Fly Lu				
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remar	Ant. Polar. H / V
2883.000	35.74	1.69	37.43	74.00	-36.57	peak	H
4577.000	37.48	7.10	44.58	74.00	-29.42	peak	H
6355.000	32.09	12.45	44.54	74.00	-29.46	peak	H
2862.000	37.67	1.61	39.28	74.00	-34.72	peak	V
4619.000	35.62	7.25	42.87	74.00	-31.13	peak	V
6271.000	33.76	12.07	45.83	74.00	-28.17	peak	V

## 6 Band Edges Measurement

### 6.1. Limit

In any 100 kHz bandwidth outside the frequency band, the radio frequency power is at least 50dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

### 6.2. Test Setup



### 6.3. 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	01/16/2012	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/22/2012	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/22/2012	(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	12/20/2011	(1)

Remark: (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**

The emissions on the harmonics frequencies, the limits, and the margin of compliance are presented. These tests were made when the transmitter was in full radiated power. The additional test was performed to show compliance with the requirement at the band-edge frequency 2483.5 MHz and up to 2500 MHz and at 2390.0 MHz.

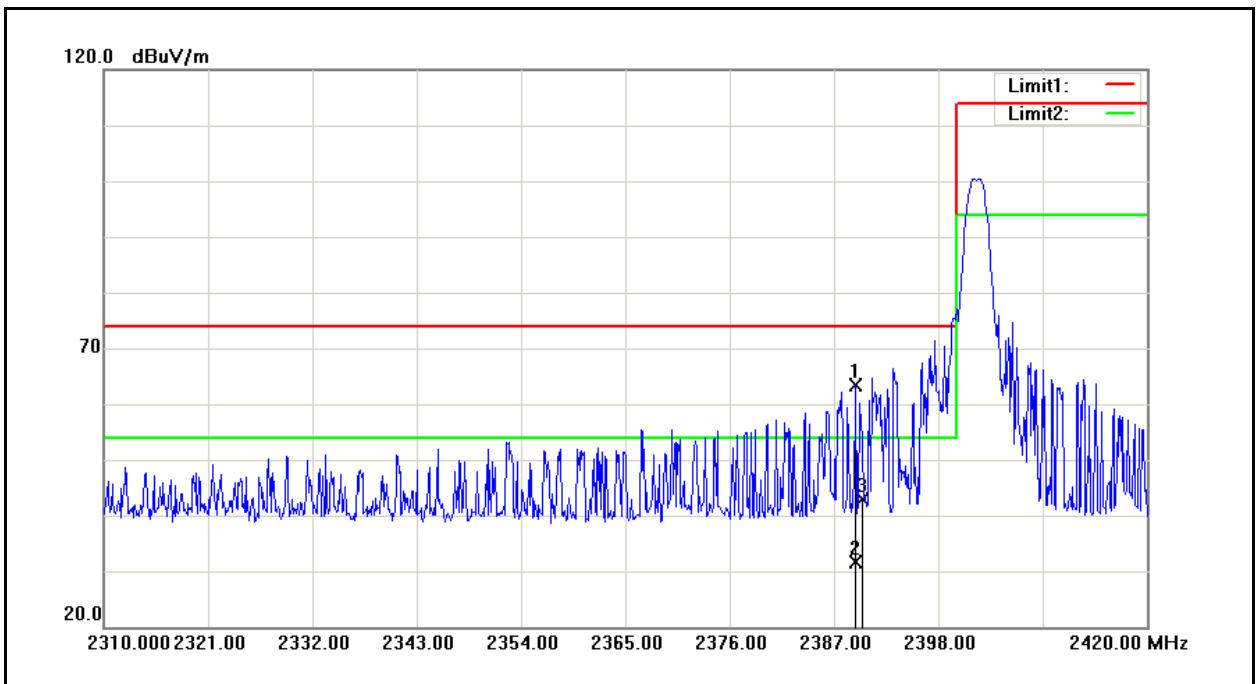
The transmitter was configured with the worst case antenna and setup to transmit at the highest channel. Then the field strength was measured at 2483.5 MHz.

The transmitter was then configured with the worst case antenna and setup to transmit at the lowest channel. Then the field strength was measured at 2390.0 MHz. These tests were performed at 4 different bit rates.

For measurements 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.

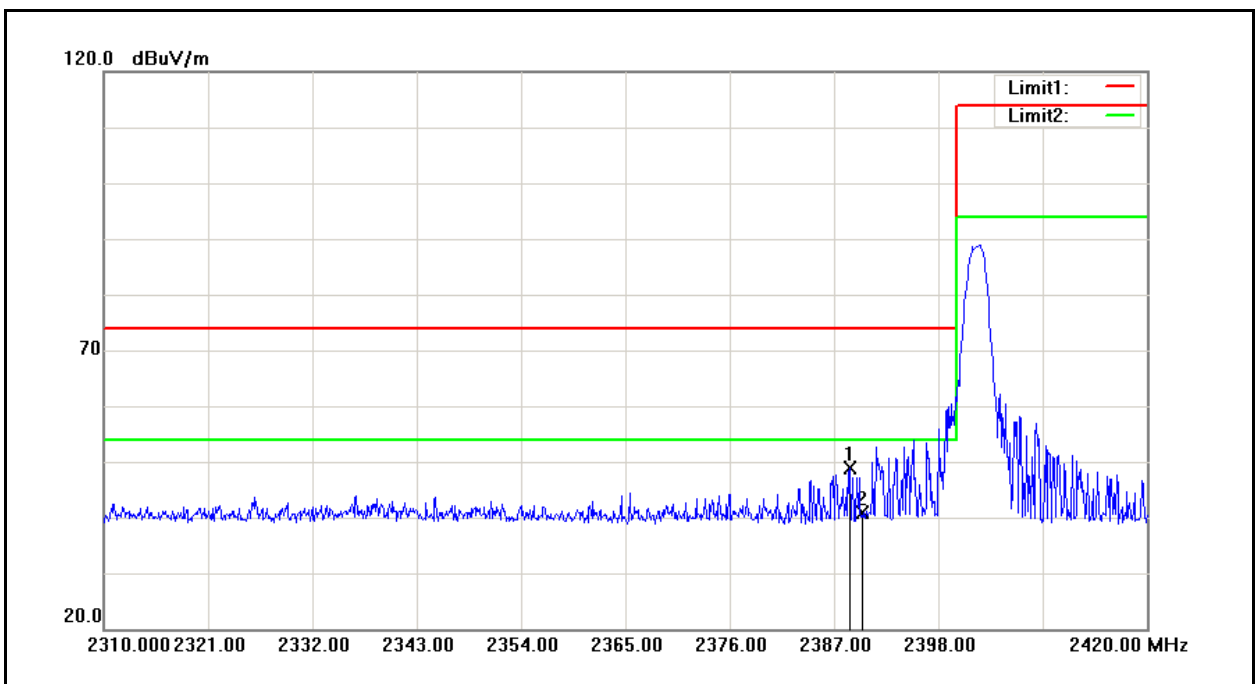
### 6.5. Test Result

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 2.7V
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Test Mode:	2	Date:	10/12/2012
Frequency:	2402 MHz	Test By:	Fly Lu
Ant.Polar.:	Horizontal		



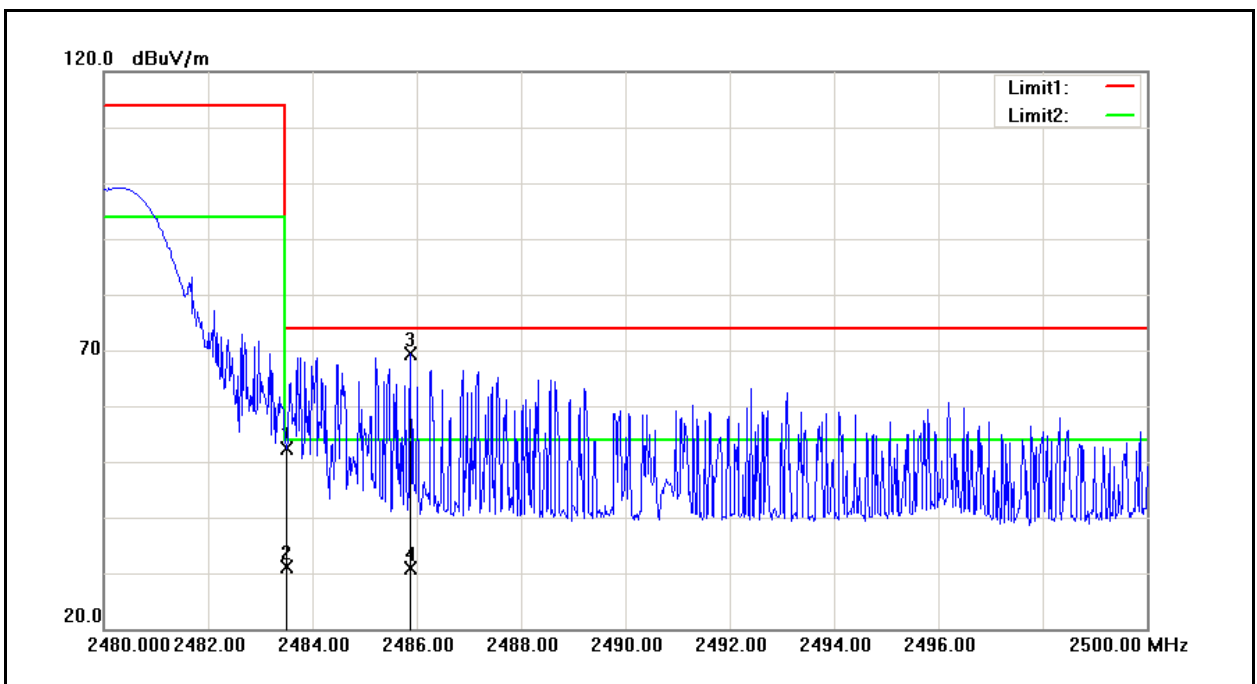
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2389.310	63.56	-0.16	63.40	74.00	-10.60	peak
2	2389.310	31.71	-0.16	31.55	54.00	-22.45	AVG
3	2390.000	42.95	-0.16	42.79	74.00	-31.21	peak

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 2.7V
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Test Mode:	2	Date:	10/12/2012
Frequency:	2402 MHz	Test By:	Fly Lu
Ant.Polar.:	Vertical		



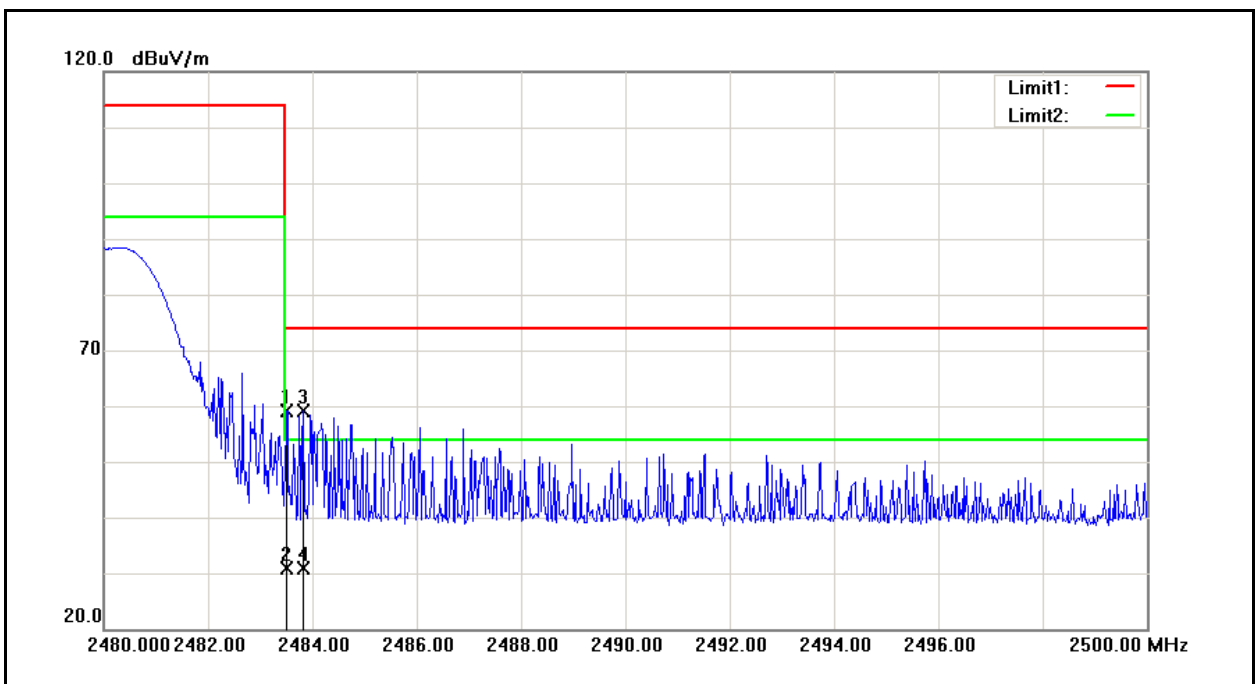
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2388.650	48.92	-0.16	48.76	74.00	-25.24	peak
2	2390.000	40.93	-0.16	40.77	74.00	-33.23	peak

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 2.7V
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Test Mode:	2	Date:	10/12/2012
Frequency:	2480 MHz	Test By:	Fly Lu
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	52.06	0.25	52.31	74.00	-21.69	peak
2	2483.500	30.98	0.25	31.23	54.00	-22.77	AVG
3	2485.880	69.07	0.27	69.34	74.00	-4.66	peak
4	2485.880	30.61	0.27	30.88	54.00	-23.12	AVG

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 2.7V
Model Number:	GM-120011/T	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Test Mode:	2	Date:	10/12/2012
Frequency:	2480 MHz	Test By:	Fly Lu
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	58.77	0.25	59.02	74.00	-14.98	peak
2	2483.500	30.71	0.25	30.96	54.00	-23.04	AVG
3	2483.820	58.80	0.25	59.05	74.00	-14.95	peak
4	2483.820	30.54	0.25	30.79	54.00	-23.21	AVG

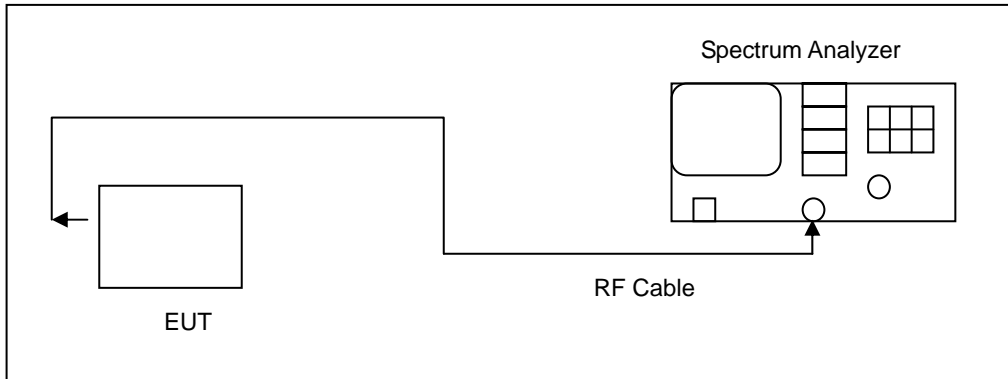


## 7 20dB Bandwidth and 99 % Occupied Bandwidth Measurement

### 7.1. Limit

N/A

### 7.2. Test Setup



### 7.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/21/2011	(2)
Test Site	ATL	TE05	TE05	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.

### 7.4. Test Procedure

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%.

The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded

**7.5. Test Result**

Model Number	GM-120011/T		
Test Item	20dB RF Bandwidth and 99 % Occupied Bandwidth		
Test Mode	Mode 2: Transmission Mode		
Date of Test	10/15/2012	Test Site	TE05
Frequency (MHz)	20dB RF Bandwidth (kHz)	99 % Occupied Bandwidth (kHz)	Limit (MHz)
2402	735.806	1.0981	-----
2441	744.562	1.0903	-----
2480	702.569	1.1767	-----

7.6. Test Graphs

20dB RF Bandwidth & 99 % Occupied Bandwidth	
Mode 2: Transmission Mode	
2402	<p><b>Agilent</b> R T Freq/Channel</p> <p>Ch Freq 2.402 GHz Trig Free</p> <p>Center Freq 2.40200000 GHz</p> <p>Start Freq 2.40100000 GHz</p> <p>Stop Freq 2.40300000 GHz</p> <p>CF Step 200.000000 kHz</p> <p>Freq Offset 0.00000000 Hz</p> <p>Signal Track On Off</p> <p>Ref -10 dBm #Atten 0 dB</p> <p>#Peak Log 10 dB/</p> <p>Center 2.402 000 GHz Span 2 MHz</p> <p>#Res BW 10 kHz #VBW 30 kHz Sweep 19.12 ms (601 pts)</p> <p><b>Occupied Bandwidth</b> Occ BW % Pwr 99.00 %</p> <p>1.0981 MHz x dB -20.00 dB</p> <p>Transmit Freq Error -6.547 kHz</p> <p>x dB Bandwidth 735.806 kHz</p> <p>Copyright 2000-2005 Agilent Technologies</p>
2441	<p><b>Agilent</b> T Freq/Channel</p> <p>Ch Freq 2.441 GHz Trig Free</p> <p>Center Freq 2.44100000 GHz</p> <p>Start Freq 2.44000000 GHz</p> <p>Stop Freq 2.44200000 GHz</p> <p>CF Step 200.000000 kHz</p> <p>Freq Offset 0.00000000 Hz</p> <p>Signal Track On Off</p> <p>Ref -10 dBm #Atten 0 dB</p> <p>#Peak Log 10 dB/</p> <p>Center 2.441 000 GHz Span 2 MHz</p> <p>#Res BW 10 kHz #VBW 30 kHz Sweep 19.12 ms (601 pts)</p> <p><b>Occupied Bandwidth</b> Occ BW % Pwr 99.00 %</p> <p>1.0903 MHz x dB -20.00 dB</p> <p>Transmit Freq Error 1.188 kHz</p> <p>x dB Bandwidth 744.562 kHz</p> <p>Copyright 2000-2005 Agilent Technologies</p>
2480	<p><b>Agilent</b> T Meas Setup</p> <p>Ch Freq 2.48 GHz Trig Free</p> <p>Center Freq 2.48000000 GHz</p> <p>Start Freq 2.47900000 GHz</p> <p>Stop Freq 2.48100000 GHz</p> <p>CF Step 200.000000 kHz</p> <p>Freq Offset 0.00000000 Hz</p> <p>Signal Track On Off</p> <p>Ref -10 dBm #Atten 0 dB</p> <p>#Peak Log 10 dB/</p> <p>Center 2.480 000 GHz Span 2 MHz</p> <p>#Res BW 10 kHz #VBW 30 kHz Sweep 19.12 ms (601 pts)</p> <p><b>Occupied Bandwidth</b> Occ BW % Pwr 99.00 %</p> <p>1.1767 MHz x dB -20.00 dB</p> <p>Transmit Freq Error -10.372 kHz</p> <p>x dB Bandwidth 702.569 kHz</p> <p>Copyright 2000-2005 Agilent Technologies</p>

## **8 Antenna Measurement**

### **8.1. Limit**

For intentional device, according to 15.203, 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.

And According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **8.2. Antenna Connector Construction**

The antenna used in this product is Chip antenna. And the maximum Gain of this antenna is only -3.0 dBi.