FCC Test Report

for

433MHz FSK module

Trade Name	:	**Uniform**
Model No.	:	**PCT 433MHz TX/RX Module**
FCC ID	:	**TFJFSK7108**
Report Number	:	**RF-U010-1401-161**
Date of Receipt	:	**January 21, 2014**
Date of Report	:	**April 11, 2014**

Prepared for

Uniform Industrial Corp.

47436 Fremont Blvd., Fremont, CA 94538-6512, USA

Prepared by

Central Research Technology Co.
EMC Test Laboratory

No.11, Lane41, Fushuen St., Jungshan Chiu, Taipei, Taiwan, 104, R.O.C.

NVLAP LAB CODE 200575-0

This report shall not be reproduced, except in full, without the written approval of Central Research Technology Co.. It may be duplicated completely in its entirely for legal use with the permission of the applicant. It should not be used to claim product endorsement by NVLAP, NIST or any U.S. government agency. The test result in the report applies only to the sample tested.

Verification of Compliance

Equipment under Test	**:** 433MHz FSK module
Model No.	**:** PCT 433MHz TX/RX Module
FCC ID	**:** TFJFSK7108
Manufacturer	**:** Uniform Industrial Corp.
Applicant	**:** Uniform Industrial Corp.
Address	**:** 47436 Fremont Blvd., Fremont, CA 94538-6512, USA
Date of Testing	**:** April 9, 2014 (Conducted Emission test) January 22~23, 2014 (Other tests)
Applicable Standards	**:** 47 CFR part 15, Subpart C
Deviation	**:** N/A
Condition of Test Sample	**:** Mass Production

We, **Central Research Technology Co**., hereby certify that one sample of the designated product was tested in our facility during the period mentioned above. The test records, data evaluation and Equipment Under Test (EUT) configurations shown in the present report are true and accurate representation of the measurements of the sample's RF characteristics under the conditions herein specified.

The test results show that the EUT as described in the present report is in compliance with the requirements set forth in the standards mentioned above and apply to the tested sample identified in the present report only. The test report shall not be reproduced, except in its entirety, without the written approval of Central Research Technology Co.

PREPARED BY : Cathy Chen, **DATE :** April 17, 2014
(Cathy Chen/ Technical Manager)

APPROVED BY : J. Y. Shih, **DATE :** Apr. 17. 2014
(Tsun-Yu Shih/General Manager)

Contents

1 General Description

1.1 General Description of EUT

Equipment underTest : 433MHz FSK module

Model No. : PCT 433MHz TX/RX Module

Power in : DC 3V

Test Voltage : DC 3 (Battery*1)

Manufacturer : Uniform Industrial Corp.

Channel Numbers : 1

Frequency Range : 433.44 MHz

Function Modulation : FSK

Function Description :

The EUT is used to transmit control command only. Please refer to the user's manual for the details.

1.2 Test Methodology

For this E.U.T., the radiated emissions measurement performed according to the procedures illustrated in ANSI C63.4:2003 and other required were illustrated in separate sections of this test report for detail.

Since the EUT is considered a potable unit, it was pre-tested on the positioned in each of 3 axes. Therefor only the test data of the worse case- x axis was used for Radiated test.

1.3 Applied standards

(1) Radiated Emission Requirement

The field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundament (uV/m)	Field Strength of Spurious Emission (uV/m)
40.66 - 40.70	1,000	100
70 – 130	500	50
130 – 174	500 to 1500**	50 to 150**
174 – 260	1500	150
260 – 470	1500 to 5000**	150 to 500**
Above 470	5000	500

** linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, μV/m at 3 meters = 22.72727(F) - 2454.545; for the band 260-470 MHz, μV/m at 3 meters = 16.6667(F) - 2833.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

(2) Bandwidth

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. 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.

(3) Dwell Time

Automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

(4) Restricted Band

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (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)
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(5) Conduction Emission Requirement

For intentional device, according to §15.207(a) line conduction emission limit is as below table.

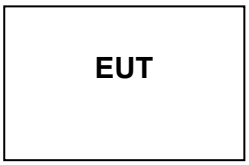
Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

* Decreases with the logarithm of the frequency.

1.4 The Support Units

No.	Unit	Model No./ Serial No.	Teade Name	PowerCode	Supported by lab.
NA	*	*	*	*	*

1.5 Layout of Setup



Connecting Cables :

No.	Cable	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
NA	*	*	*	*	*	*	*

Justification:

For both conducted and radiated emission below 1GHz, the system was configured for typical fashion as a customer could normal use it.

For radiated emission, measurement of radiated emission from digital circuit is performed with normal transmitting.

1.6 Test Capability

Test Facility

The test facility used for evaluating the conformance of the EUT with each standard in the present report meets what required in CISPR16-1-4, CISPR16-2-3 and ANSI C63.4:2003.

Test Room	Type of Test Room	Descriptions
TR1	10m semi-anechoic chamber (23m×14m×9m)	Complying with the NSA requirements in documents CISPR 22 and ANSI C63.4:2003. For the radiated emission measurement.
TR11	3m semi-anechoic chamber (9m × 6m × 6m)	
TR300	3m fully-anechoic chamber (8m × 5m × 5m)	
TR13	Test site	For the RF conducted emission measurement.
TR5	Shielding Room (8m×5m×4m)	For the conducted emission measurement.

Test Laboratory Competence Information

Central Research Technology Co. has been accredited/filed/authorized by the agencies listed in the following table.

Certificate	Nation	Agency	Code	Mark
Accreditation Certificate	USA	NVLAP	200575-0	ISO/IEC 17025
	R.O.C. (Taiwan)	TAF	0905	ISO/IEC 17025
	R.O.C. (Taiwan)	BSMI	SL2-IN-E-0033, SL2-IS-E-0033, SL2-R1/R2-E-0033, SL2-A1-E-0033 SL2-L1-E-0033	ISO/IEC 17025
Site Filing Document	USA	FCC	474046, TW1053	Test facility list & NSA Data
	Canada	IC	4699A-1,-3	Test facility list & NSA Data
	Japan	VCCI	R-1527,C-1609,T-1441, G-10, C-4400, G-614, T-1334	Test facility list & NSA Data
Authorization Certificate	Germany	TUV	10021687	ISO/IEC 17025
	Norway	Nemko	ELA212	ISO/IEC 17025

The copy of each certificate can be downloaded from our web site: www.crc-lab.com

1.7 Measurement Uncertainty

The assessed measurement uncertainty with a suitable coverage factor K to ensure 95% confidence level for the normal distribution are shown as below, the values are less than U_{cispr} in table 1 of CISPR 16-4-2.

Test Item	Measurement Uncertainty
Radiated Emission: (30MHz~200MHz)	Horizontal: 3.3dB；Vertical: 4.1dB
Radiated Emission: (200MHz~1GHz)	Horizontal: 3.8dB；Vertical: 5.1dB
Radiated Emission: (1GHz~18GHz)	Horizontal: 3.4dB；Vertical: 3.6dB

2 Conducted Emission Measurement

Test Data: Pass

2.1 Limits for Emission Measurement

For intentional device, according to §15.207(a) line conduction emission limit is as below table.

Frequency of Emission (MHz)	Conducted 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.

Note:
For a device with a permanent antenna operating at or below 30 MHz, the FCC will accept measurements done with a suitable dummy load, in lieu of the permanent antenna under the following conditions: (1) perform the AC line conducted tests with the permanent antenna to determine compliance with the Section 15.207 limits outside the transmitter's fundamental emission band; (2) retest with a dummy load in lieu of the permanent antenna to determine compliance with the Section 15.207 limits within the transmitter's fundamental emission band.

2.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Test Receiver	R&S	ESCS 30/ 836858/021	Jan. 15, 2014	Jan. 15, 2015
LISN	R&S	ESH2-Z5/ 880669/039	March 15, 2014	March 15, 2015
2nd LISN	R&S	ENV4200/ 833209/010	March 29, 2014	March 29, 2015
50Ω terminator	N/A	N/A/ 001	Aug. 19, 2013	Aug. 19, 2014
RF Switch	N/A	RSU28/ 338965/002	Aug. 19, 2013	Aug. 19, 2014
RF Cable	N/A	N/A/ C0052 ~ 56	Aug. 19, 2013	Aug. 19, 2014
Dummy Load	N/A	50Ω 1/4W Resistance	NCR	NCR
Test Software	Audix	e3/ Ver. 5.2004-2-19k	NCR	NCR
TR5 shielded room	ETS LINDGREN	TR5/ 15353-F	NCR	NCR

Note:
1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

Instrument Setting

IF BW	Measurement Time	Detector	Trace	Comment
9kHz	1 second	Quasi-Peak / Average	Maxhold	

Climatic Condition

Ambient Temperature：25°C; Relative Humidity : 67%

2.3 Test Procedures

a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.

b. If the EUT is tabletop equipment, it was placed on a non-conducted table with a height of 0.8 meters above the reference ground plane and 0.4 meters from the conducting wall of the shielded room. Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 12 millimeters above the reference ground plane.

c. Connect the EUT's power source to the appropriate power mains through the LISN.

d. All the other peripherals are connected to the 2nd LISN, if any.

e. The LISN was placed 0.8 meters from the EUT and at least 0.8 meters from other units and other metal planes.

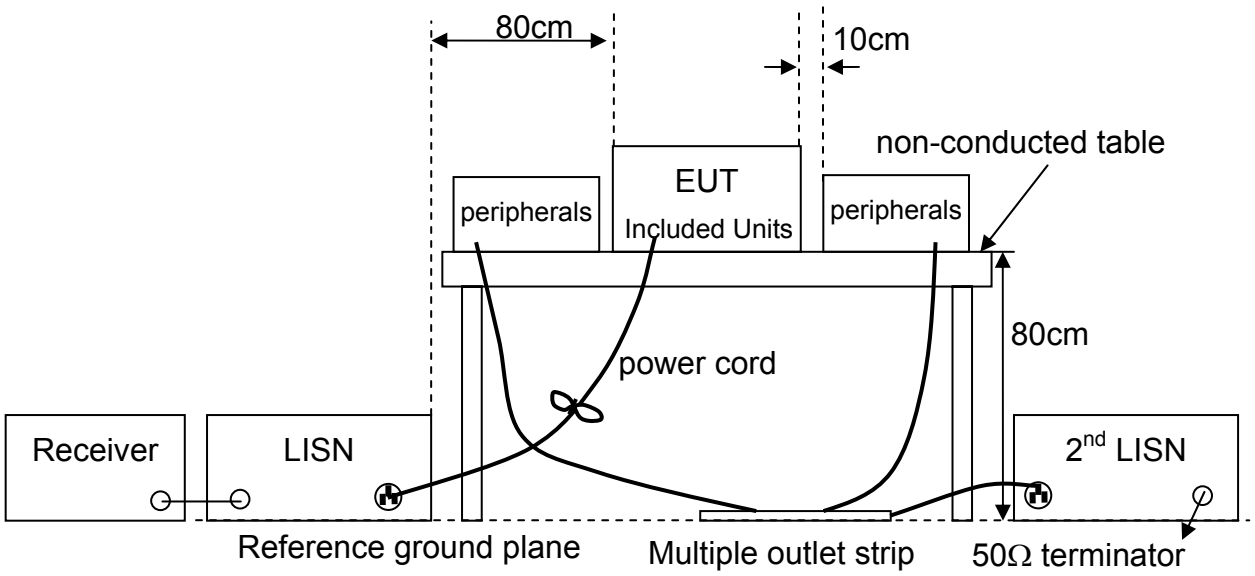
f. Measure the conducted emissions on each power line (Neutral Line and Line 1 – Hot side) of the EUT's power source by using the test receiver connected to the coupling RF output port of LISN.

g. Rapidly scan the signal from 150kHz to 30MHz by using the receiver through the Maximum-Peak detector to determine those frequencies associated with higher emission levels for each measured line.

h. Then measure the maximum level of conducted disturbance for each frequency found from step g. by using the receiver through the Quasi-Peak and Average detectors per CISPR 16-1.

i. Record the level for each frequency and compare with the required limit.

2.4 Test Configurations

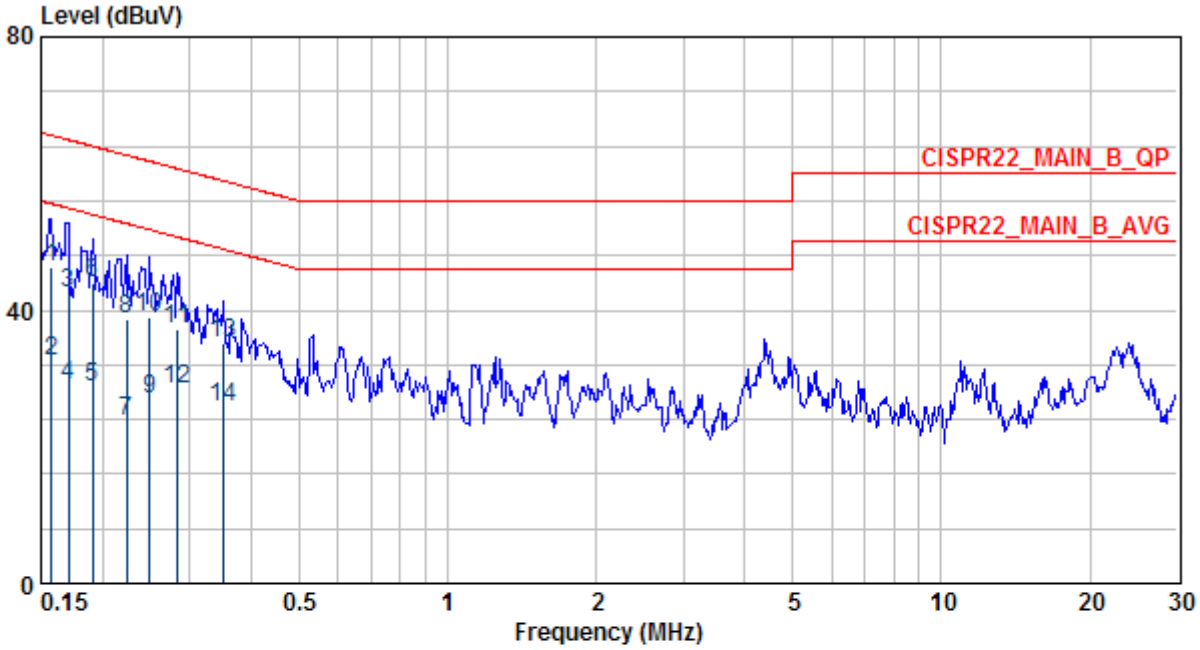


2.5 Test Data

Test Mode : **Continuous Transmitting**

Tester : Der-Jan Ken **Frequency Range** : 150kHz~30MHz

Phase : Line

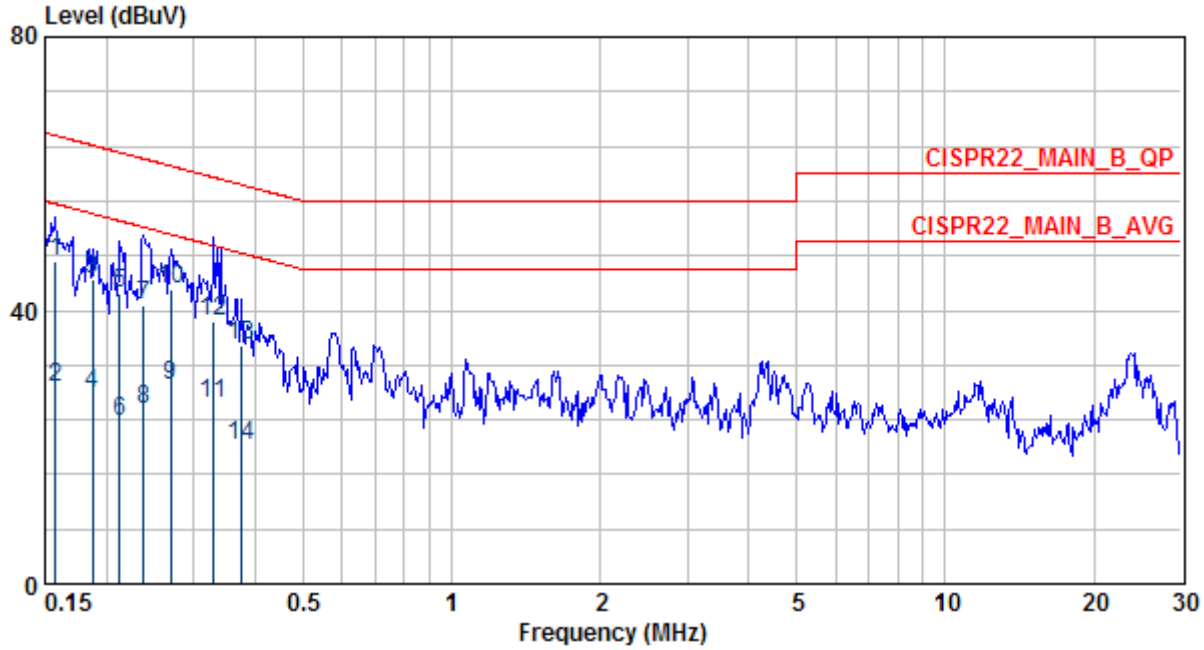


	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	cm		
1	0.157	46.39	0.28	46.11	65.60	-19.21	---	LINE	QP
2	0.157	32.62	0.28	32.34	55.60	-22.98	---	LINE	AVERAGE
3	0.170	42.61	0.28	42.33	64.94	-22.33	---	LINE	QP
4	0.170	28.96	0.28	28.68	54.94	-25.98	---	LINE	AVERAGE
5	0.190	28.68	0.29	28.39	54.02	-25.34	---	LINE	AVERAGE
6	0.190	43.96	0.29	43.67	64.02	-20.06	---	LINE	QP
7	0.223	23.81	0.29	23.52	52.70	-28.89	---	LINE	AVERAGE
8	0.223	38.56	0.29	38.27	62.70	-24.14	---	LINE	QP
9	0.249	26.93	0.29	26.64	51.78	-24.84	---	LINE	AVERAGE
10	0.249	38.91	0.29	38.62	61.78	-22.86	---	LINE	QP
11	0.283	37.21	0.30	36.91	60.72	-23.51	---	LINE	QP
12	0.283	28.37	0.30	28.07	50.72	-22.35	---	LINE	AVERAGE
13	0.352	35.10	0.31	34.79	58.91	-23.82	---	LINE	QP
14	0.352	25.85	0.31	25.54	48.91	-23.07	---	LINE	AVERAGE

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Q.P. is abbreviation of quasi-peak.

Test Mode	**:**	**Continuous Transmitting**			
Tester	**:**	Der-Jan Ken	**Frequency Range**	**:**	150kHz~30MHz
Phase	**:**	Neutral			



	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	cm		
1	0.157	47.09	0.31	46.78	65.60	-18.51	---	NEUTRAL	QP
2	0.157	28.59	0.31	28.28	55.60	-27.01	---	NEUTRAL	AVERAGE
3	0.187	44.62	0.32	44.30	64.15	-19.53	---	NEUTRAL	QP
4	0.187	27.71	0.32	27.39	54.15	-26.44	---	NEUTRAL	AVERAGE
5	0.213	42.50	0.32	42.18	63.10	-20.59	---	NEUTRAL	QP
6	0.213	23.65	0.32	23.33	53.10	-29.44	---	NEUTRAL	AVERAGE
7	0.238	40.84	0.32	40.52	62.17	-21.33	---	NEUTRAL	QP
8	0.238	25.52	0.32	25.20	52.17	-26.65	---	NEUTRAL	AVERAGE
9	0.270	29.02	0.32	28.70	51.12	-22.09	---	NEUTRAL	AVERAGE
10 @	0.270	42.98	0.32	42.66	61.12	-18.13	---	NEUTRAL	QP
11	0.330	26.36	0.33	26.03	49.44	-23.09	---	NEUTRAL	AVERAGE
12	0.330	38.38	0.33	38.05	59.44	-21.07	---	NEUTRAL	QP
13	0.375	34.83	0.33	34.50	58.39	-23.56	---	NEUTRAL	QP
14	0.375	20.25	0.33	19.92	48.39	-28.14	---	NEUTRAL	AVERAGE

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Q.P. is abbreviation of quasi-peak.

3 Radiated Emission

Test Result: Pass

3.1 Applied standard

According to 15.231(e), In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundament (uV/m)	Field Strength of Spurious Emission (uV/m)
40.66 - 40.70	1,000	100
70 – 130	500	50
130 – 174	500 to 1500**	50 to 150**
174 – 260	1500	150
260 – 470	1500 to 5000**	150 to 500**
Above 470	5000	500

** linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, μV/m at 3 meters = 22.72727(F) - 2454.545; for the band 260-470 MHz, μV/m at 3 meters = 16.6667(F) - 2833.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in Section 15.209, whichever limit permits a higher field strength.

3.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESCI/ 100019	June 7, 2013	June 7, 2014
Spectrum Analyzer	Agilent	E4407B/ MY45106795	May 29, 2013	May 29, 2014
Broadband Antenna	EMCO	3142C/ 52088	May 27, 2013	May 27, 2014
Horn Antenna	EMCO	3117/ 82847	Nov. 20, 2013	Nov. 20, 2014
Pre-Amplifier	Mini-circuit	ZKL-2/ 004	Aug. 3, 2013	Feb. 3, 2014
Pre-Amplifier	MITEQ	AFS6-02001800-35-10P-6/949196	Nov. 20, 2013	Nov. 20, 2014
RF Cable	N/A	N/A/ C0080	Aug. 3, 2013	Feb. 3, 2014
Test Software	Audix	e3/ ARD-SPR-000282	NCR	NCR
Semi - anechoic Chamber	ETS. LINDGREN	TR11/ 906-A	May 11, 2013	May 11, 2014

Note:
1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.
3. The calibration date of the semi-anechoic chamber listed above is the date of NSA measurement.

Instrument Setting

RBW	VBW	Detector	Trace	Comment
100KHz	N/A	Peak/Average	Maxhold	Field Strength of Fundament
120kHz	N/A	Quasi-Peak	Maxhold	Below 1GHz
1MHz	1MHz/10Hz	Peak	Maxhold	Above 1GHz Peak/Average

Climatic Condition

Ambient Temperature：18°C; Relative Humidity : 45%

3.3 Measurement Procedure

a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.

b. A software provided by client enabled the EUT to transmit and receive data.

c. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the reference ground plane in the semi-anechoic chamber. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 12 millimeters above the reference ground plane in the semi-anechoic chamber.

d. The EUT was set 3m away from the interference receiving antenna.

e. Rapidly sweep the signal in the test frequency range by using the spectrum through the Maximum-peak detector.

f. Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 to 4 meters above the reference ground plane continuously to determine at least six frequencies associated with higher emission levels and record them.

g. Then measure each frequency found from step f. by using the spectrum with rotating the EUT and positioning the receiving antenna height to determine the maximum level.

h. For measurement of frequency above 1000MHz, the beamwidth of receiving horn antenna should keep covering EUT when the receiving horn antenna height varied.

i. For measurement of frequency above 1000MHz, set the spectrum detector to be Peak or Average to find out the maximum level occurred, if any.

j. Record frequency, azimuth angle of the turntable, height, and polarization of the receiving antenna and compare the maximum level with the required limit.

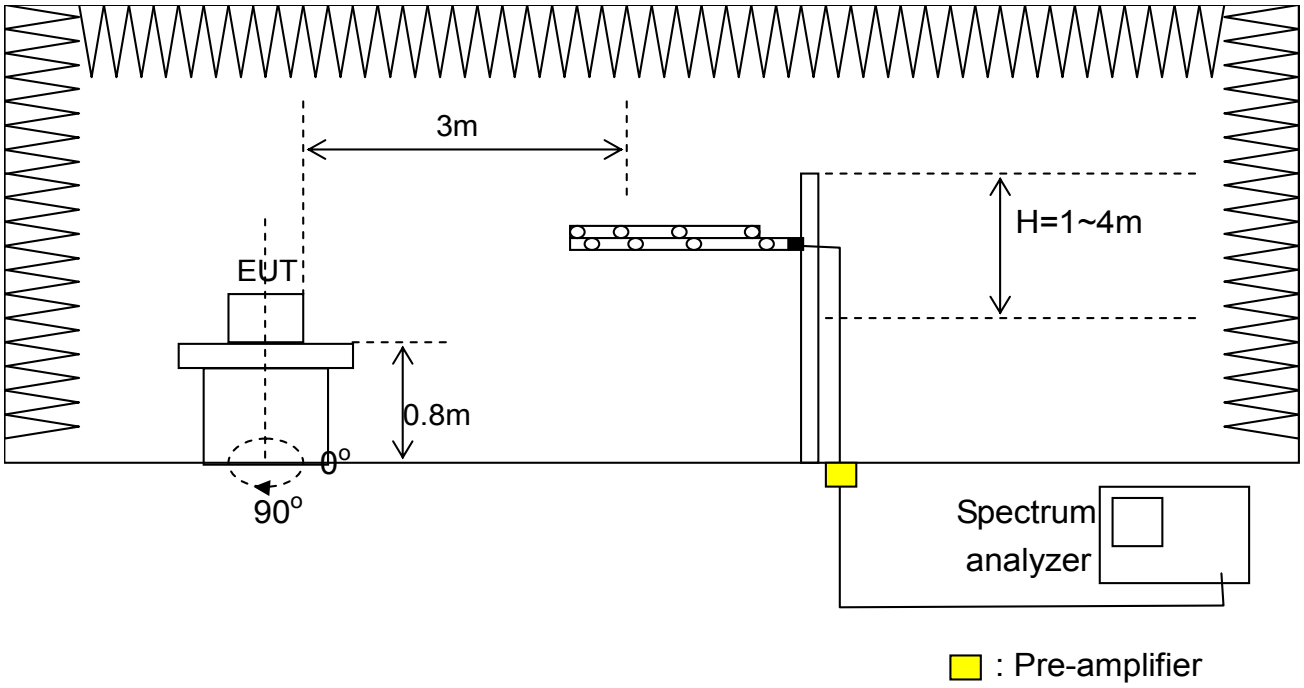
k. Change the receiving antenna to another polarization to measure radiated emission by following step e. to j. again.

l. If the peak emission level below 1000MHz measured from step f. is 4dB lower than the limit specified, then the emission values presented will be the peak value only. Otherwise, accurate Q.P. value will be measured and presented.

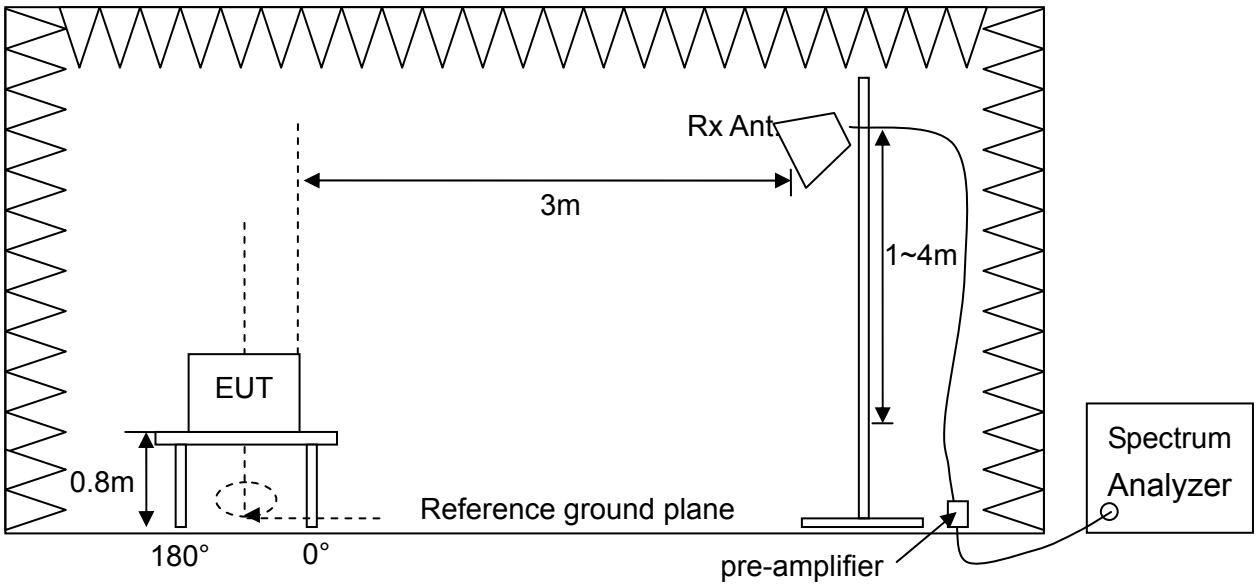
m. If the peak emission level above 1000MHz measured from step f. is 20dB lower than the limit specified, then the emission values presented will be the peak value only. Otherwise, accurate A.V. value will be measured and presented.

3.4 Test configuration

Below 1GHz



Above 1GHz



3.5 Test Data

Field Strength of Fundament

Test Mode : Continuous Transmitting

Tester : Liu

Frequency (MHz)	Polarization	Reading Data (dBuV)		Correction Factor (dB/m)	Field Strength (dBμV/m)		Limit (dBμV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
433.44	H	93.48	N/A	-8.22	85.26	65.26	92.85	72.85	7.59	7.59
433.44	V	88.91	N/A	-8.22	80.69	60.69	92.85	72.85	12.16	12.16

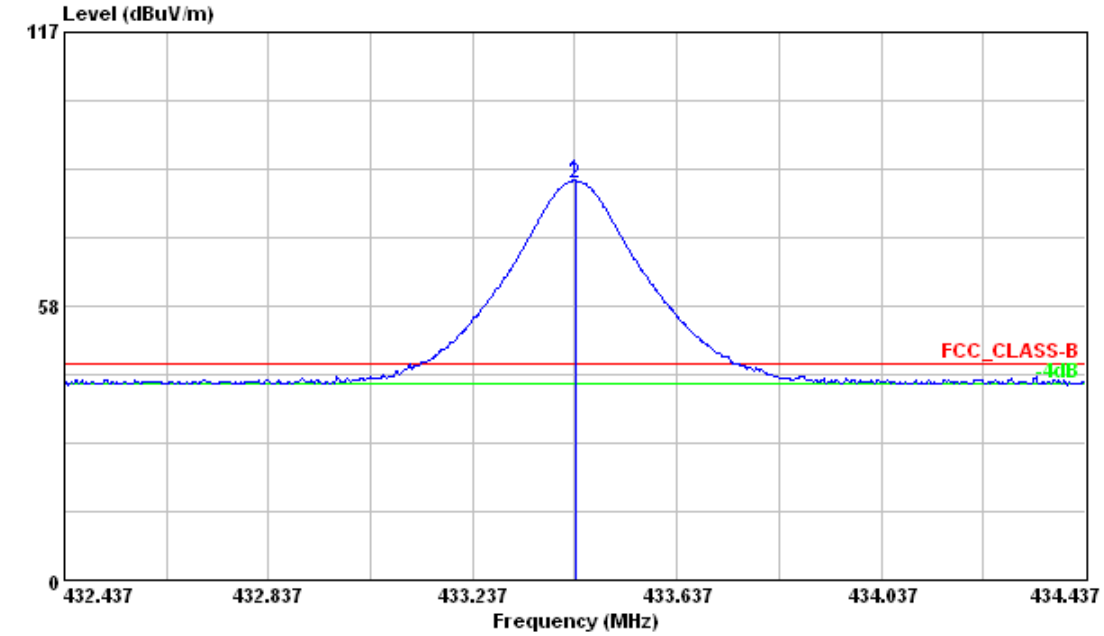
Note：

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Field Strength (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Field Strength
4. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle)
   Where the duty factor is calculated from following formula:

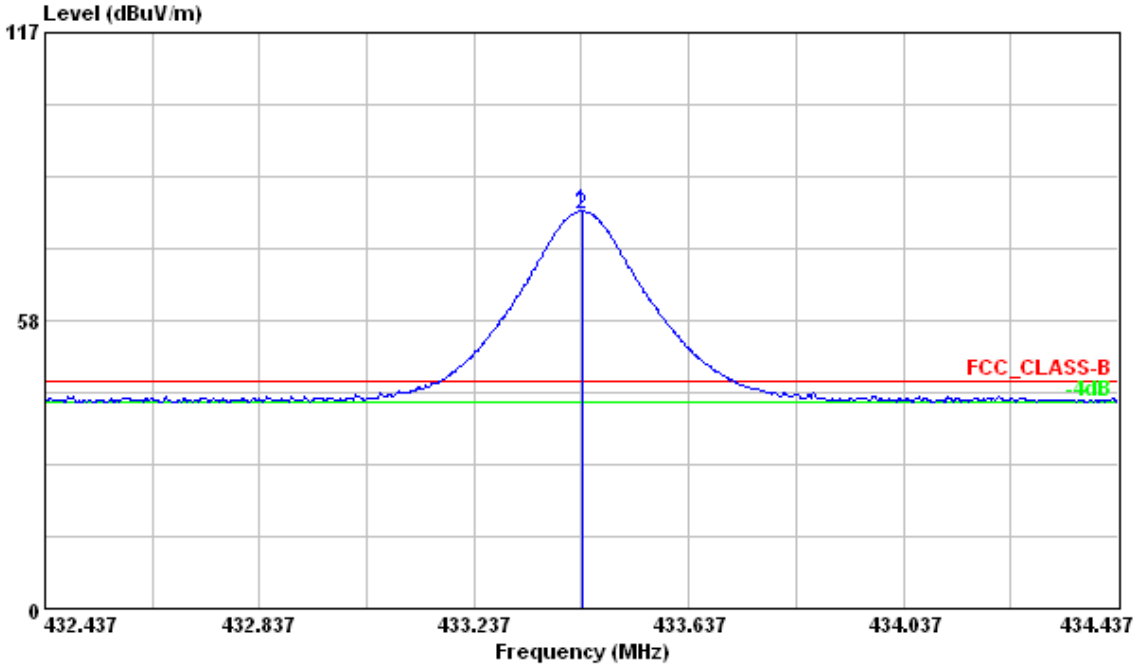
   20log(Duty cycle) = 20log $\frac{6}{100}$ < -20dB

   The total time is longer than 100ms, so the total time uses 100ms to express.
   please see page 26 for plotted duty cycle.

H Polarization, PK



V Polarization, PK

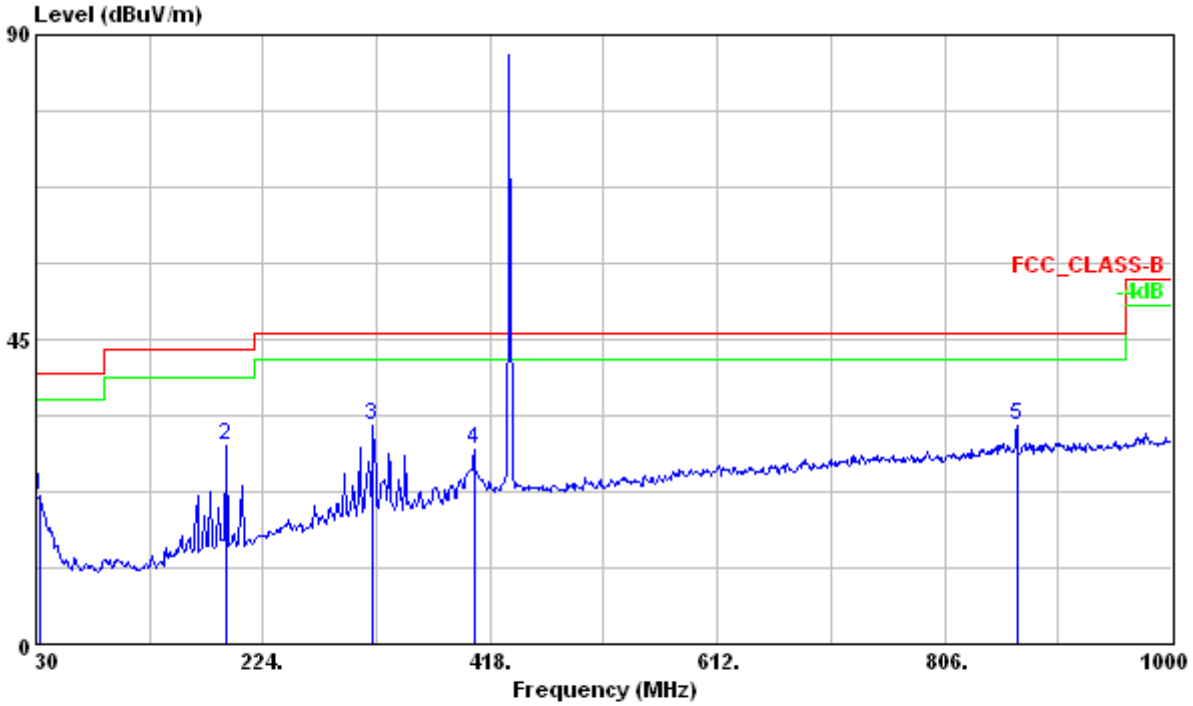


Radiated Emission Measurement below 1000MHz

Test Mode : **Continuous Transmitting**

Tester : Liu **Frequency Range** : 30MHz~1GHz

Polarization : **Horizontal**



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	32.680	21.84	32.08	-10.24	40.00	-18.16	---	---	HORIZONTAL	Peak
2	192.140	29.43	45.38	-15.95	43.50	-14.07	---	---	HORIZONTAL	Peak
3 @	318.237	32.24	43.58	-11.34	46.00	-13.76	100	115	HORIZONTAL	QP
4	403.860	28.84	37.73	-8.89	46.00	-17.16	---	---	HORIZONTAL	Peak
5	868.080	32.15	33.63	-1.48	46.00	-13.85	---	---	HORIZONTAL	Peak

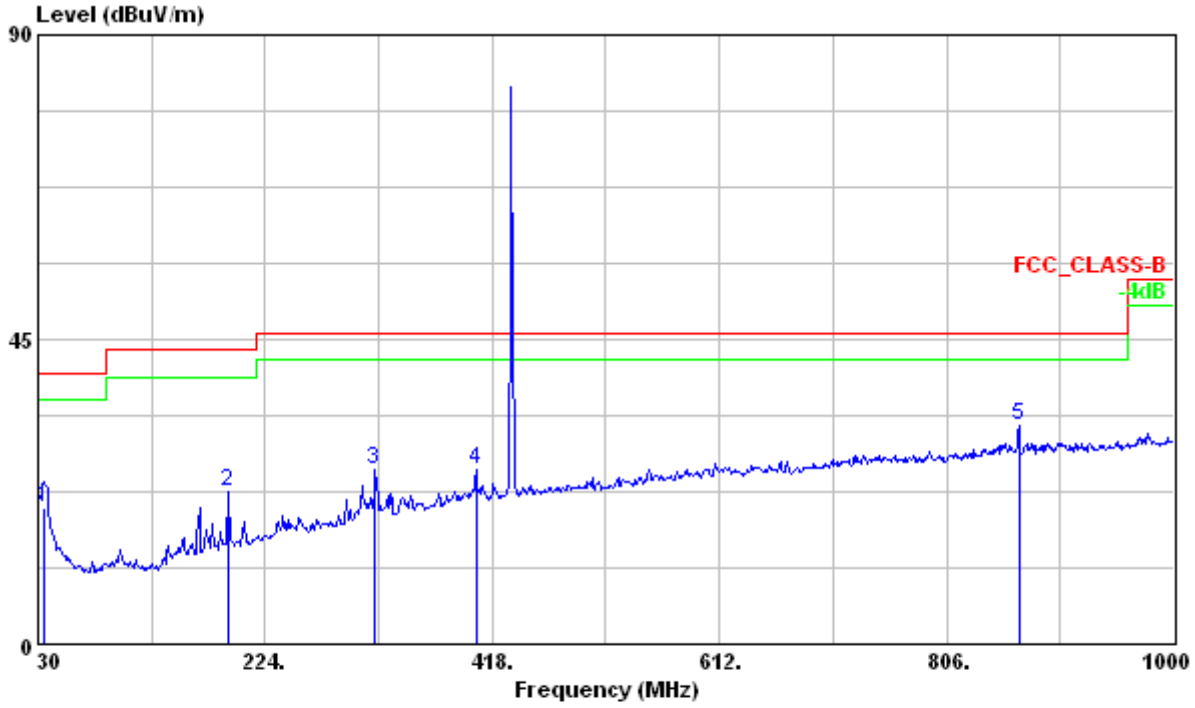
Note：

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor

Test Mode : **Continuous Transmitting**

Tester : Liu **Frequency Range** : 30MHz~1GHz

Polarization : **Vertical**



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	34.690	20.10	31.53	-11.43	40.00	-19.90	100	290	VERTICAL	QP
2	192.140	22.46	38.41	-15.95	43.50	-21.04	---	---	VERTICAL	Peak
3	318.100	25.71	37.05	-11.34	46.00	-20.29	---	---	VERTICAL	Peak
4	403.860	25.63	34.52	-8.89	46.00	-20.37	---	---	VERTICAL	Peak
5	868.080	32.15	33.63	-1.48	46.00	-13.85	---	---	HORIZONTAL	Peak

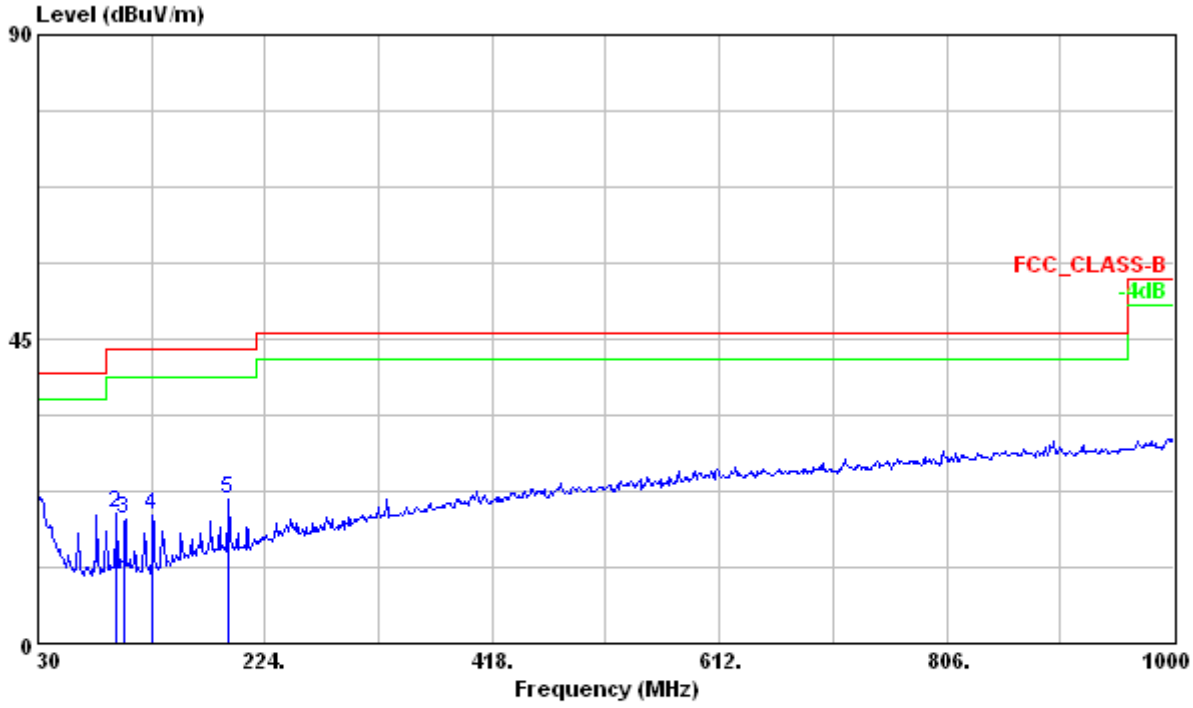
Note：

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor

Test Mode : Continuous Receiving

Tester : Liu **Frequency Range** : 30MHz~1GHz

Polarization : Horizontal



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	30.540	19.18	28.15	-8.97	40.00	-20.82	120	158	HORIZONTAL	QP
2	96.150	19.17	38.08	-18.91	43.50	-24.33	---	---	HORIZONTAL	Peak
3	104.250	18.41	37.26	-18.85	43.50	-25.09	---	---	HORIZONTAL	Peak
4	128.010	18.87	38.17	-19.30	43.50	-24.63	---	---	HORIZONTAL	Peak
5	192.810	21.24	37.16	-15.92	43.50	-22.26	---	---	HORIZONTAL	Peak

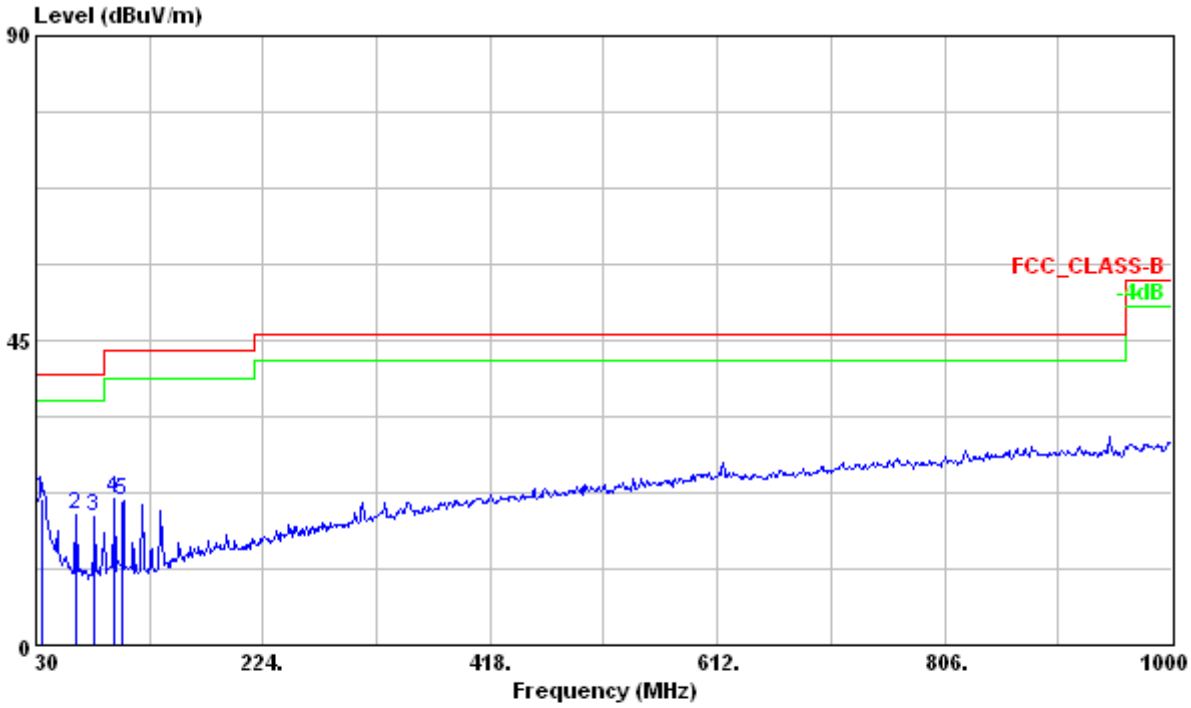
Note：

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor

Test Mode : **Continuous Receiving**

Tester : Liu **Frequency Range** : 30MHz~1GHz

Polarization : **Vertical**



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1 @	34.590	21.58	32.95	-11.37	40.00	-18.42	100	192	VERTICAL	QP
2	64.290	19.31	39.02	-19.71	40.00	-20.69	---	---	VERTICAL	Peak
3	79.950	18.86	38.92	-20.06	40.00	-21.14	---	---	VERTICAL	Peak
4	96.150	21.51	40.42	-18.91	43.50	-21.99	---	---	VERTICAL	Peak
5	104.250	21.18	40.03	-18.85	43.50	-22.32	---	---	VERTICAL	Peak

Note：

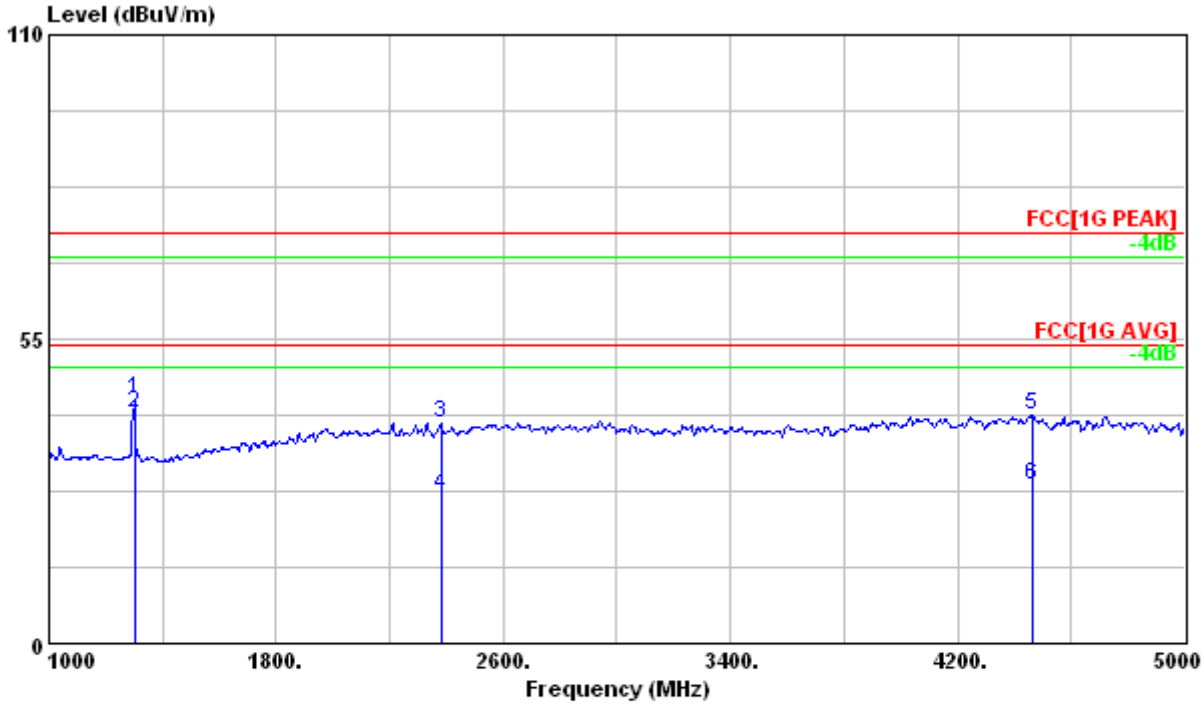
1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor

Radiated Emission Measurement above 1000MHz

Test Mode : **Continuous Transmitting**

Tester : Liu **Frequency Range** : 1GHz~5GHz

Polarization : **Horizontal**



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	1300.429	44.11	85.67	-41.56	74.00	-29.89	106	71	HORIZONTAL	Peak
2 @	1300.429	41.67	83.23	-41.56	54.00	-12.33	106	71	HORIZONTAL	Average
3	2380.000	39.84	76.03	-36.19	74.00	-34.16	100	242	HORIZONTAL	Peak
4	2380.000	26.76	62.95	-36.19	54.00	-27.24	100	242	HORIZONTAL	Average
5	4464.000	41.11	74.10	-32.99	74.00	-32.89	100	329	HORIZONTAL	Peak
6	4464.000	28.56	61.55	-32.99	54.00	-25.44	100	329	HORIZONTAL	Average

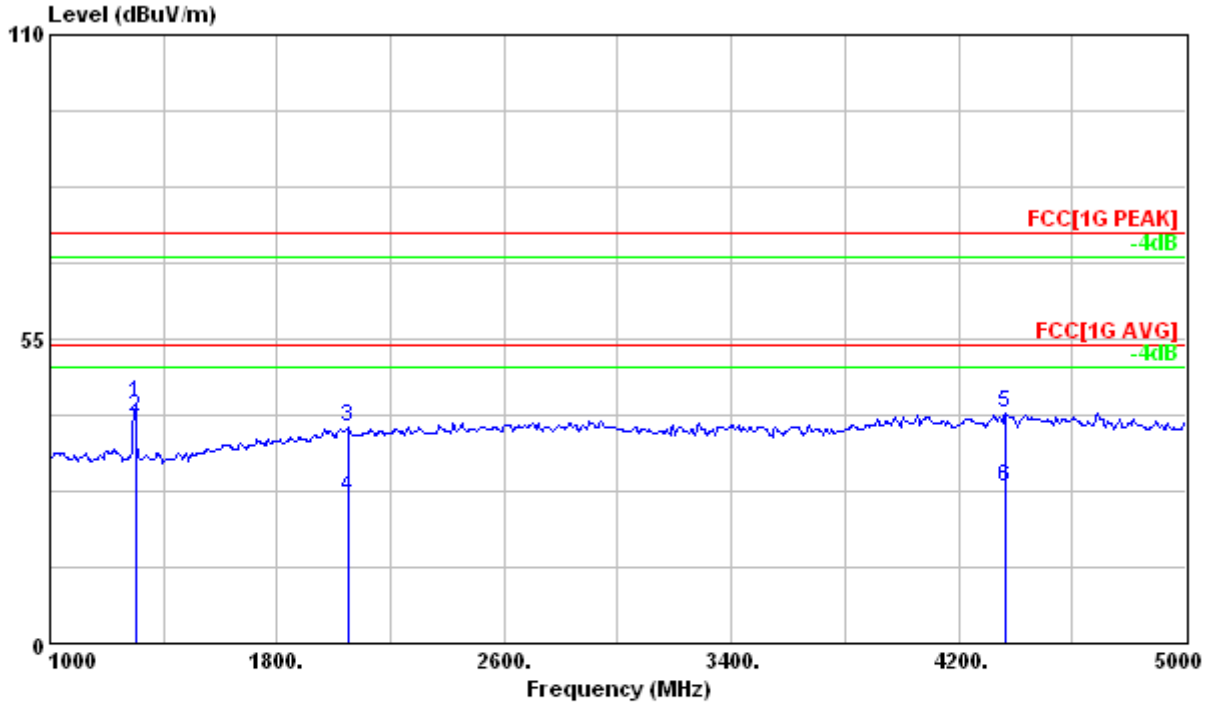
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.

Test Mode : Continuous Transmitting

Tester : Liu **Frequency Range : 1GHz~5GHz**

Polarization : Vertical



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	1300.490	43.35	84.91	-41.56	74.00	-30.65	112	163	VERTICAL	Peak
2 @	1300.490	40.85	82.41	-41.56	54.00	-13.15	112	163	VERTICAL	Average
3	2048.000	39.06	76.01	-36.95	74.00	-34.94	100	221	VERTICAL	Peak
4	2048.000	26.23	63.18	-36.95	54.00	-27.77	100	221	VERTICAL	Average
5	4364.000	41.68	74.74	-33.06	74.00	-32.32	100	291	VERTICAL	Peak
6	4364.000	28.11	61.17	-33.06	54.00	-25.89	100	291	VERTICAL	Average

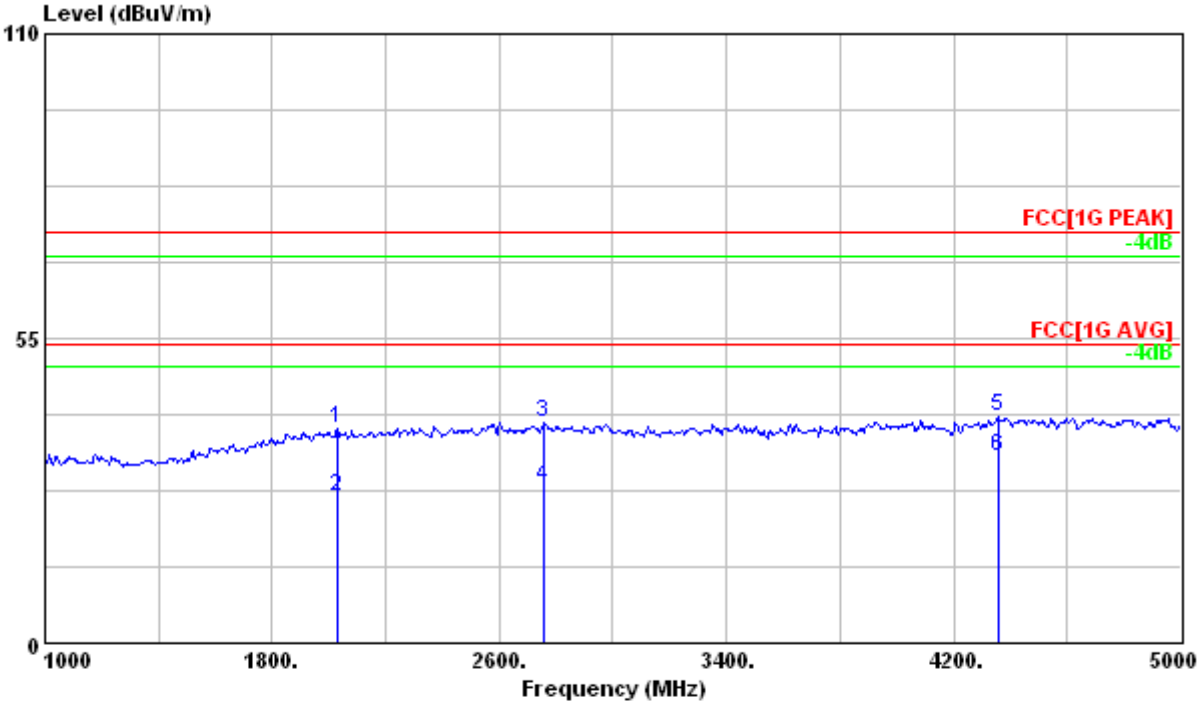
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.

Test Mode : **Continuous Receiving**

Tester : Liu **Frequency Range** : 1GHz~5GHz

Polarization : **Horizontal**



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2028.000	38.77	75.77	-37.00	74.00	-35.23	101	54	HORIZONTAL	Peak
2	2028.000	26.48	63.48	-37.00	54.00	-27.52	101	54	HORIZONTAL	Average
3	2760.000	39.63	75.20	-35.57	74.00	-34.37	100	136	HORIZONTAL	Peak
4	2760.000	28.28	63.85	-35.57	54.00	-25.72	100	136	HORIZONTAL	Average
5	4356.000	40.74	73.84	-33.10	74.00	-33.26	102	185	HORIZONTAL	Peak
6 @	4356.000	33.63	66.73	-33.10	54.00	-20.37	102	185	HORIZONTAL	Average

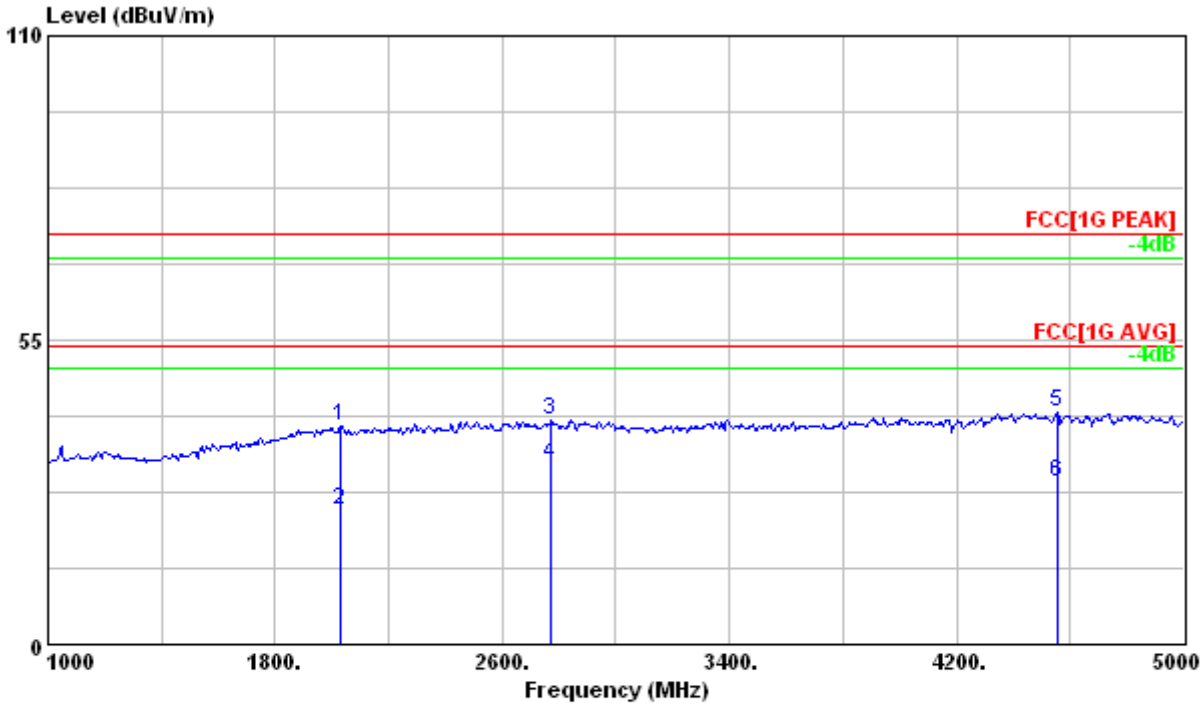
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.

Test Mode : Continuous Receiving

Tester : Liu **Frequency Range : 1GHz~5GHz**

Polarization : Vertical



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2028.000	39.52	76.52	-37.00	74.00	-34.48	101	235	VERTICAL	Peak
2	2028.000	24.32	61.32	-37.00	54.00	-29.68	101	235	VERTICAL	Average
3	2772.000	40.54	76.12	-35.58	74.00	-33.46	103	221	VERTICAL	Peak
4 @	2772.000	32.74	68.32	-35.58	54.00	-21.26	103	221	VERTICAL	Average
5	4556.000	41.83	75.00	-33.17	74.00	-32.17	101	322	VERTICAL	Peak
6	4556.000	29.42	62.59	-33.17	54.00	-24.58	101	322	VERTICAL	Average

Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.

4 Bandwidth

Test Result: Pass

4.1 Applied standard

According to 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. 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.

4.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Data	Calibration Due Data
Spectrum Analyzer	Agilent	E4405B/ MY45106706	April 9, 2013	April 9, 2014
Test Site	N.A.	TR13	NCR	NCR

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR:No Calibration Required.

Instrument Setting

RBW	VBW	Span	Detector	Comment
30kHz	100kHz	Peak	Maxhold	

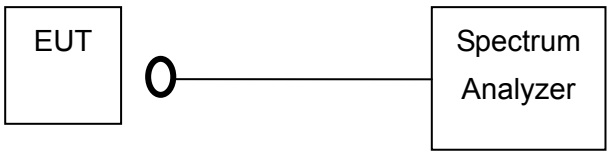
Climatic Condition

Ambient Temperature：20°C; Relative Humidity : 54%

4.3 Measurement Procedure

a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
b. The Transmitter output of EUT was tested by the spectrum analyzer.
c. Measure the bandwidth and compare with the required limit.

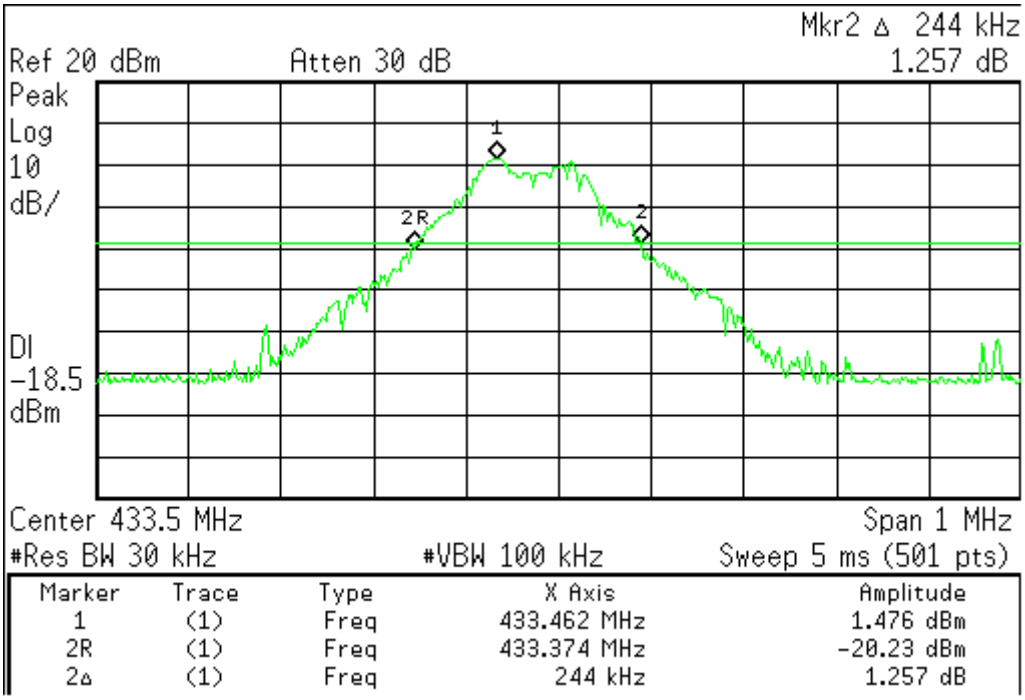
4.4 Test configuration



4.5 Test Data

Test Mode : Continuous Transmitting

Tester : Jun



Measured 20dB bandwidth is 244kHz < 433.44 MHzX0.25% = 1083.6kHz.

5 Dwell Time

Test Result: Pass

5.1 Applied standard

According to 15.231(e), each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

.

5.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Data	Calibration Due Data
Spectrum Analyzer	Agilent	E4405B/ MY45106706	April 9, 2013	April 9, 2014
Test Site	N.A.	TR13	NCR	NCR

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR:No Calibration Required.

Instrument Setting

RBW	VBW	Detector	Trace	Comment
100KHz	300kHz	Peak	Maxhold	

Climatic Condition

Ambient Temperature：20°C; Relative Humidity : 54%

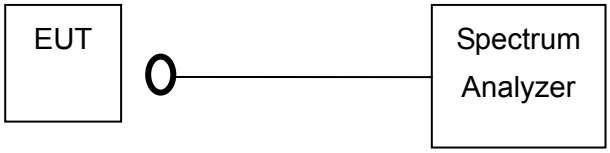
5.3 Measurement Procedure

a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.

b. The Transmitter output of EUT was tested by the spectrum analyzer through an attenuator.

c. Measure the dwell time and compare with the required limit.

5.4 Test configuration



5.5 Test Data

Test Mode : Continuous Transmitting

Tester : Jun