



FCC COMPLIANCE TEST REPORT

Technical Statement of Conformity
in accordance with 47 CFR Part 15 Subpart C

The product

Equipment Under Test	: <i>Remote Controller</i>
Model Number	: <i>N2-FM</i>
Product Series	: <i>N/A</i>
Report Number	: <i>HA150158-RA</i>
Issue Date	: <i>19-MAR-2015</i>
Test Result	: <i>Compliance</i>

is produced by

Ruoey Lung Enterprise Corp.

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SL2-IS-E-0023, SL2-R1-E-0023,
SL2-R2-E-0023, SL2-L1-E-0023

FCC Designation No.: TW1071

TAF Accreditation No.: 1163

VCCI Registration No.: R-2156, C-2329, T-219

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Test Result Certification

Applicant : Ruoei Lung Enterprise Corp.

Address of Applicant : No.17, Lu-Kung South 2 Road, Chang-Pin Industrial Park, Lu-Kang, Changhua, Taiwan

Manufacturer : Ruoei Lung Enterprise Corp.

Address of Manufacturer : No.17, Lu-Kung South 2 Road, Chang-Pin Industrial Park, Lu-Kang, Changhua, Taiwan

Trade Name : 

Equipment Under Test : Remote Controller

Model Number : N2-FM

Product Series : N/A

FCC ID : TRUN2-FM

Filing Type : Certification

Sample Received Date : 12-MAR-2015

Test Standard :

☒ FCC Part 15 Subpart C §15.231

Deviations from standard test methods & any other specifications : NONE

Remark:

1. This report details the results of the test carried out on one sample.
2. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.203, 15.207, 15.209, 15.231.
3. This report applies to the above sample only and shall not be reproduced in part without written approval of HongAn Technology Co., Ltd.

**Documented by:****Kay Wang/ ADM. Dept Staff****2015-04-28****Tested by:****Eason Hsieh/ ENG. Dept. Staff****2015-04-28****Approved by:****Date: 2015-04-28**



Peter Chin / Section Manager



Summary of Test Result

	Test Item	Applicable Standard	Test Result
1	Antenna Requirement	FCC part 15 subpart C §203	Compliance
2	Conducted limits	FCC part 15 subpart C §207	N/A
3	Radiated emission limits	FCC part 15 subpart C §209	Compliance
4	Conditions of Intentional radiators to comply with periodic operation	FCC part 15 subpart C §231(a)(1)	Compliance
		FCC part 15 subpart C §231(a)(2)	N/A
		FCC part 15 subpart C §231(a)(3)	N/A
		FCC part 15 subpart C §231(a)(4)	N/A
		FCC part 15 subpart C §231(a)(5)	N/A
5	Field Strength	FCC part 15 subpart C §231(b)	Compliance
6	Emission Bandwidth	FCC part 15 subpart C §231(c)	Compliance
7	Requirements for devices operating within 40.66~40.70MHz band	FCC part 15 subpart C §231(d)	N/A
8	Conditions for intentional radiators to comply with periodic operation	FCC part 15 subpart C §231(e)	N/A

1 General Description

1.1 Description of EUT

Equipment Under Test	:	Remote Controller
Model Number of EUT	:	N2-FM
Product Series	:	N/A
Power Supply	:	DC 3V, 10mA AA Battery x 2
Frequency Range	:	433.32MHz, 433.92MHz, 434.52MHz
Number of Channels	:	3
Channel Spacing	:	0.6 MHz
Antenna Specification	:	Spring Antenna, 0 dBi Gain
Modulation Technique	:	FSK
Specification	:	Dimensions : 175 mm (L) X 65 mm (W) X 25 mm (H) Weight : 90g Function : The EUT is a remote controller. Its transmitting frequencies are 433.32MHz, 433.92MHz and 434.52MHz. ※For more detail specification, please refer to the User Manual.



1.2 Test Instruments

1.2.1. Instruments Used for Measurement

HA1

Instrument Name	Manufacture Mode	Model Number	Serial Number	Last Cal. Date	Next Cal. Date
RF Amplifier	AR	15S1G3	306578	11-AUG-2014	11-AUG-2015
EMI Receiver	R&S	ESCI	100615	03-MAR-2015	03-MAR-2016
Spectrum Analyzer	R&S	FSL6	100323	11-JUN-2014	11-JUN-2015
Spectrum Analyzer	Advantest	R3172	101202158	24-JUN-2014	24-JUN-2015
Preamplifier	WIRELESS	FPA-6592G	060009	09-JUL-2014	09-JUL-2015
Preamplifier	HD	HD17187	004	04-AUG-2014	04-AUG-2015
Bilog Antenna	TESEQ	CBL6111D	25769	03-MAR-2015	03-MAR-2016
Bilog Antenna	Schaffner	CBL6112B	2860	12-AUG-2014	12-AUG-2015
Double-Ridged Waveguide Horn	EMCO	3115	9912-5992	04-MAY-2014	04-MAY-2015
Temp. & Humidity Chamber	Giant Force	GTH-150-20-SP-AR	MMA0907-012	22-JUL-2014	22-JUL-2015

※ The test equipments used are calibrated and can be traced to National ITRI and International Standards.



1.3 Auxiliary Equipments

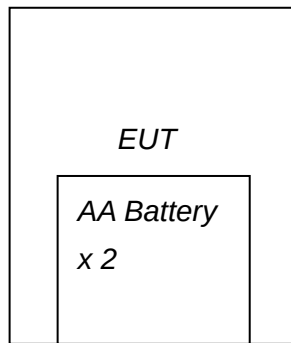
1.3.1. *Provided by HongAn Technology Co., Ltd. for Emission Test.*

N/A

1.3.2. *Provided by the Manufacturer*

N/A

1.4 EUT SETUP



Note: Main Test Sample: N2-FM

1.5 Identifying the Final Test Mode

1. *Mode 1: EUT in X axes. Transmitting Channel set at 433.32 MHz.*
2. *Mode 2: EUT in X axes. Transmitting Channel set at 434.52 MHz.*

Note:

1. *During radiated emission pre-test, rotation of the EUT through three orthogonal axes has been evaluated.*
2. *After pre-test, we identified that the TX X Position was most likely to cause maximum disturbance and most likely to be susceptible to disturbance. Therefore, the Final Assessment was performed for the worst case. All pre-test data show at appendix.*
3. *Channel Low (433.32 MHz) and High (434.52 MHz) were chosen for full testing.*
4. *According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.207, 15.209 and 15.231 under the FCC Rules Part 15 Subpart C.*
5. *New or a fresh dry batteries were used during whole testing.*

1.6 Final Test Mode

1. *Radiated Emission (30~1000MHz): Mode 2*
2. *Field Strength (Fundamental & Harmonics): Mode 1, 2*
3. *Conducted Emission: N/A. The EUT is designed to use Batteries.*



1.7 Condition of Power Supply

DC 3 V (AA battery x 2)

1.8 EUT Configuration

- 1. Setup the EUT as shown in Sec.1.4 Block Diagram.*
- 2. Turn on the power of all equipments.*
- 3. Activate the selected Final Test Mode.*

1.9 Test Methodology

The tests documented in this report were performed in accordance with ANSI C63.4 (2003) and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.203, 15.205, 15.207, 15.209 and 15.231.

1.10 General Test Procedures

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.3 of ANSI C63.4 (2003) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. The EUT was designed to be mounted on back of vehicle seat, according to the requirements in Section 13.4 of ANSI C 63.4 (2003), only one axe of the EUT has to be measured.

1.11 Modification

N/A

**1.12 FCC Part 15.205 restricted bands of operations**

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37635-8.38675	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

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

1.13 Qualification of Test Facility

BSMI Certificate No. : SL2-IS-E-0023, SL2-IN-E-0023, SL2-R1-E-0023, SL2-R2-E-0023, SL2-A1-E-0023, SL2-L1-E-0023.

FCC Designation No. : TW1071

TAF Accreditation No. : 1163

VCCI Certificate No. : R-2156, C-2329, T-219



2 Power line Conducted Emission Measurement

2.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

2.2 Test Arrangement and Procedure

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

2.3 Limit (§ 15.207)

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency (MHz)	Limits (dBuV)	
	Q.P. (Quasi-Peak)	A.V. (Average)
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5.0	56	46
5.0 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

2.4 Test Result

N/A.

The EUT applied two AA Batteries; therefore, no conducted emission measurement is required.

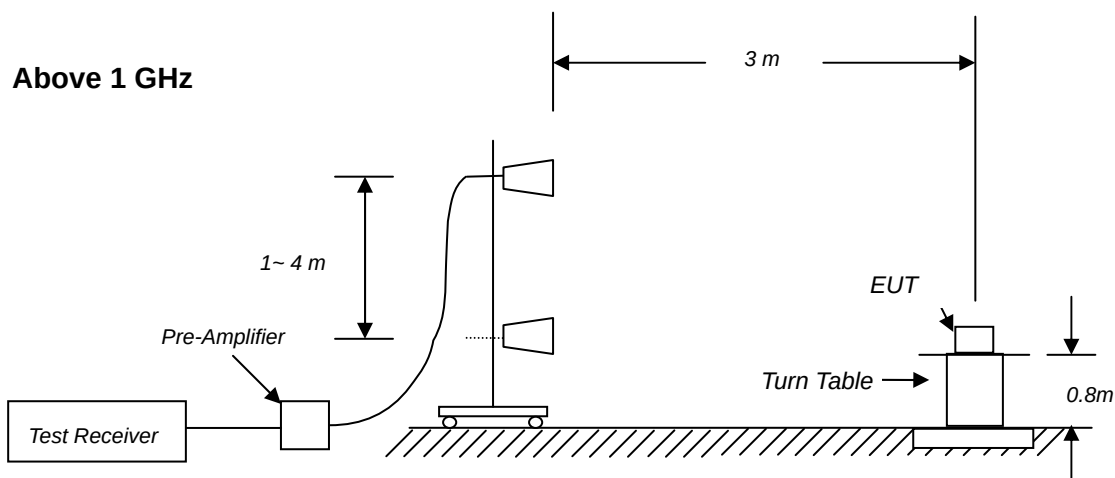
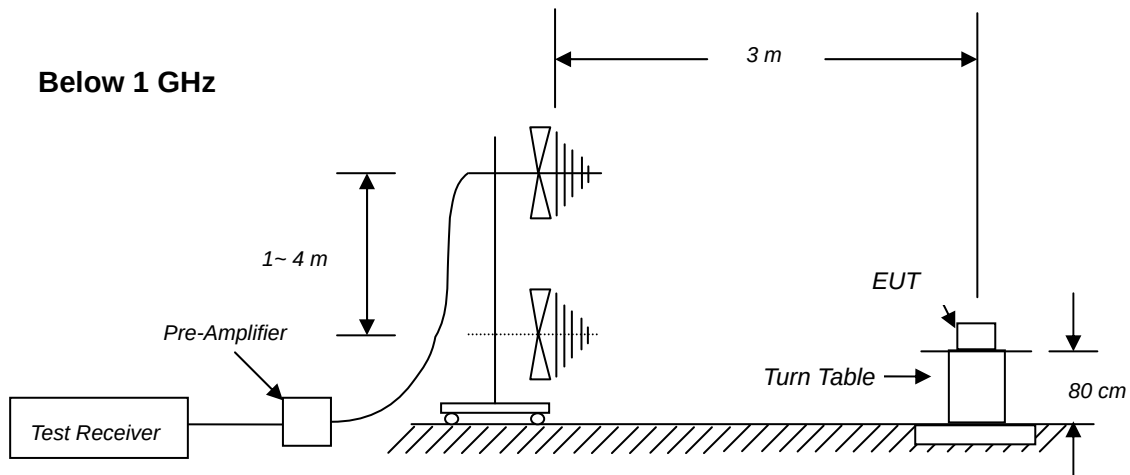


3 Radiated Emission Test

3.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

3.2 Test Arrangement and Procedure



1. The EUT is placed on a turntable, which is 0.8m (below 1GHz) or 0.8 m (above 1GHz) above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
4. Maxium procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
(a) Below 1 GHz: RBW =100 kHz/ VBW = 300 kHz/ Sweep = AUTO.



(b) Above 1 GHz: Peak: RBW = VBW = 1MHz/ Sweep = AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.

3.3 Limit of Field Strength of Fundamental (§ 15.231(b))

The field strength of emissions from intentional radiators operated under these frequency bands shall not exceed with the following:

Fundamental Frequency (MHz)	Field strength of fundamental (microvolts/ meter)	Field strength of spurious emission (microvolts/ meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	¹ 1,250 to 3,750	¹ 125 to 375
174-260	3,750	375
260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

Remark: 1. Linear interpolations.

The transmitting frequency of the EUT is from 433.32MHz to 434.52MHz. According to Linear interpolations, the limits for fundamental and spurious are in the following table:

Transmitting Frequency (MHz)	Field strength of fundamental		Field strength of spurious emission	
	(microvolts/ meter)	dBuV/m	(microvolts/ meter)	dBuV/m
433.32	10,972	80.81	1,097	60.81
434.52	11.022	80.84	1,102	60.84

Note:

1. Field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.
2. Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in § 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of § 15.205 shall be demonstrated using the measurement instrumentation specified in that section.
3. The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. 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 § 15.209, whichever limit permits a higher field strength.

3.4 Limit of Spurious Emission (§ 15.209)

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 to the general radiated emission limits in § 15.209, whichever is lesser attenuation.

<i>Frequency (MHz)</i>	<i>Field strength (microvolts/ meter)</i>	<i>Measurement distance (meters)</i>
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

*** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g.§§ 15.231 and 15.241.*

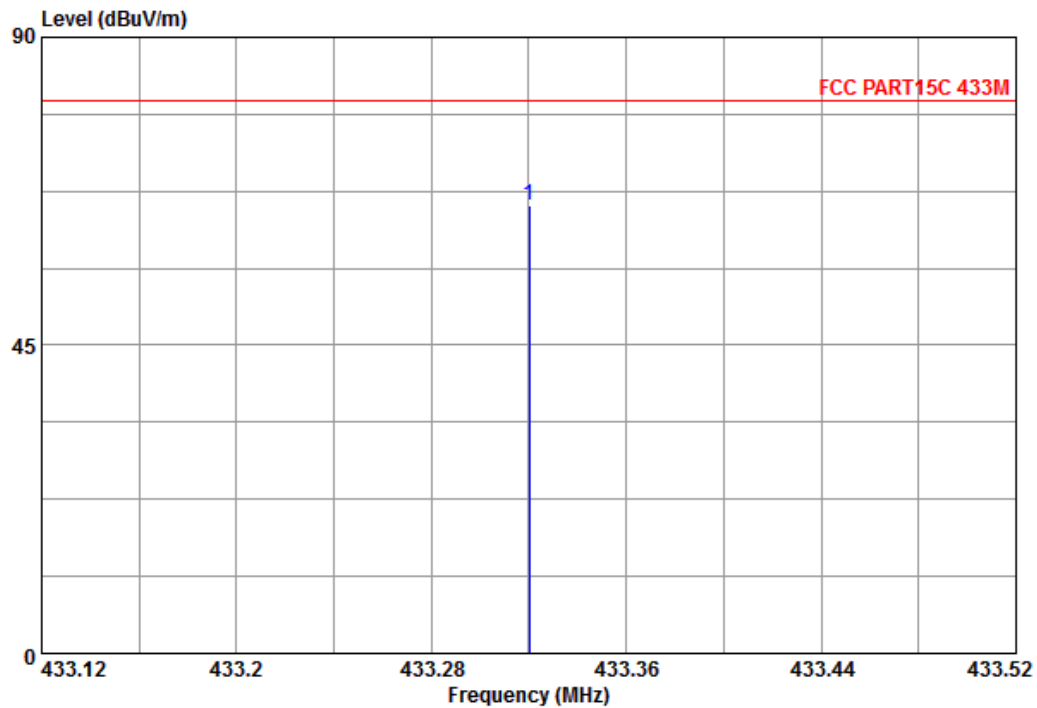
3.5 Test Result

Compliance

The final test data are shown on the following page(s).

Radiated Emission Test Data (Field Strength of Fundamental)

Temperature	: 25.8℃	Humidity	: 58%
Test Date	: 18-MAR-2015	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH LOW (433.32 MHz)
Test Mode	: Mode 1		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @ 433.320	80.67	-15.29	65.38	80.79	-15.41	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

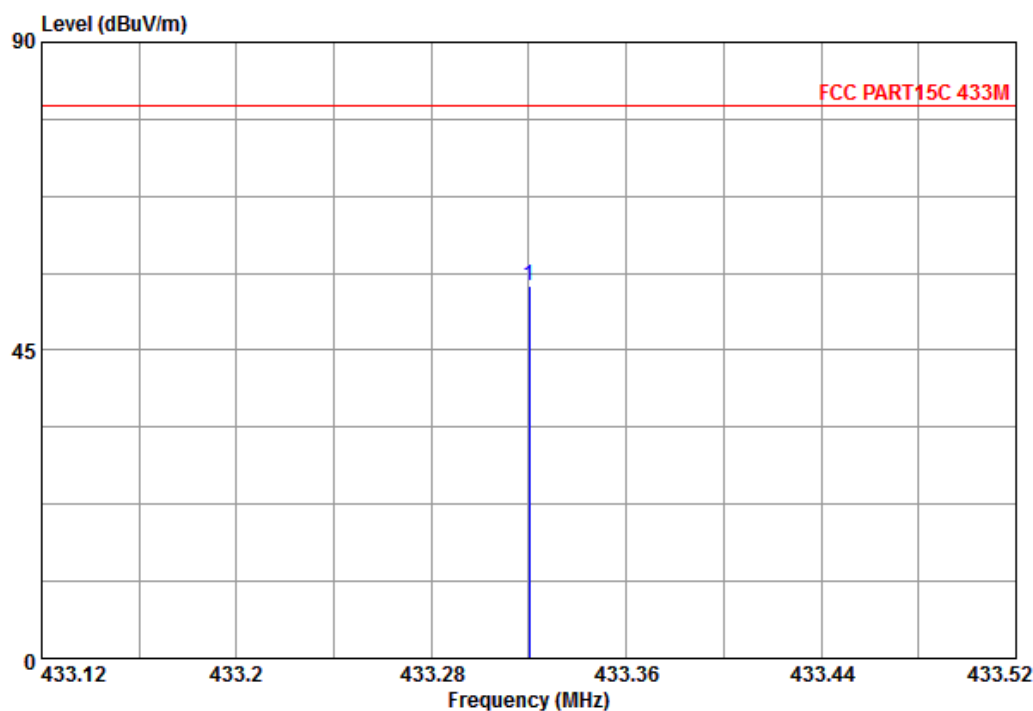
@ : Maximum Data x : Over Limit

Remark :

1. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
2. Spectrum setting: Peak Setting, RBW = 100kHz, VBW = 300kHz

Radiated Emission Test Data (Field Strength of Fundamental)

Temperature	: 25.8℃	Humidity	: 58%
Test Date	: 18-MAR-2015	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH LOW (433.32 MHz)
Test Mode	: Mode 1		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @ 433.320	69.76	-15.29	54.47	80.79	-26.32	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
 Result = Reading + C.F ; Margin = Result - Limit

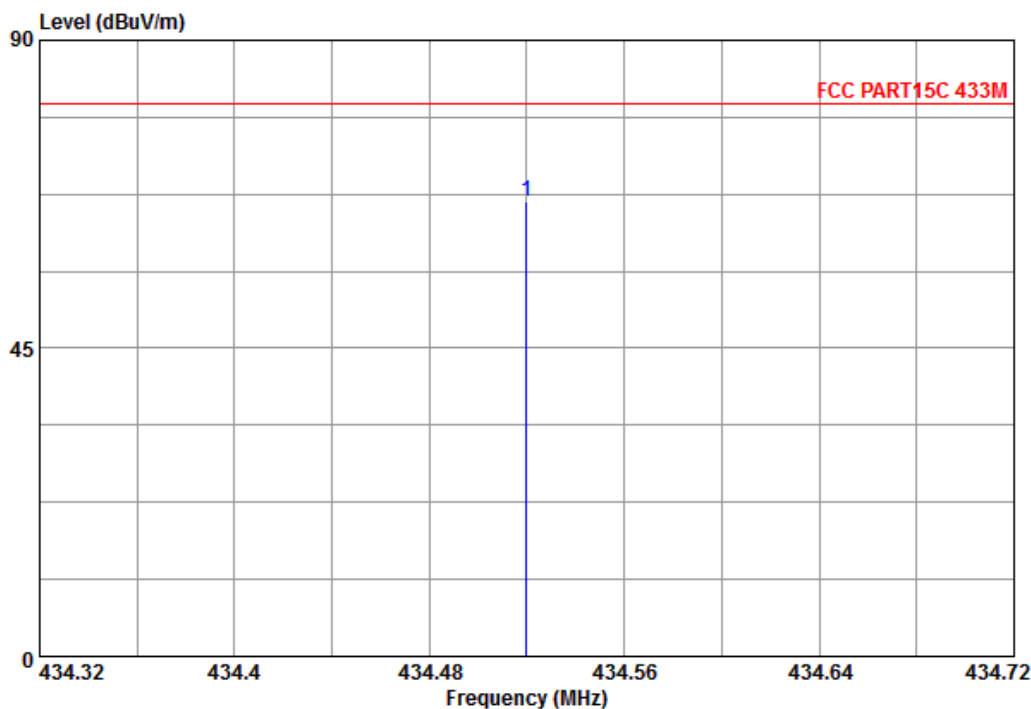
@ : Maximum Data x : Over Limit

Remark :

- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting: Peak Setting. RBW = 100kHz, VBW = 300kHz

Radiated Emission Test Data (Field Strength of Fundamental)

Temperature	: 25.8℃	Humidity	: 58%
Test Date	: 18-MAR-2015	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH High (434.52 MHz)
Test Mode	: Mode 2		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @ 434.520	81.57	-15.15	66.42	80.79	-14.37	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
 Result = Reading + C.F ; Margin = Result - Limit

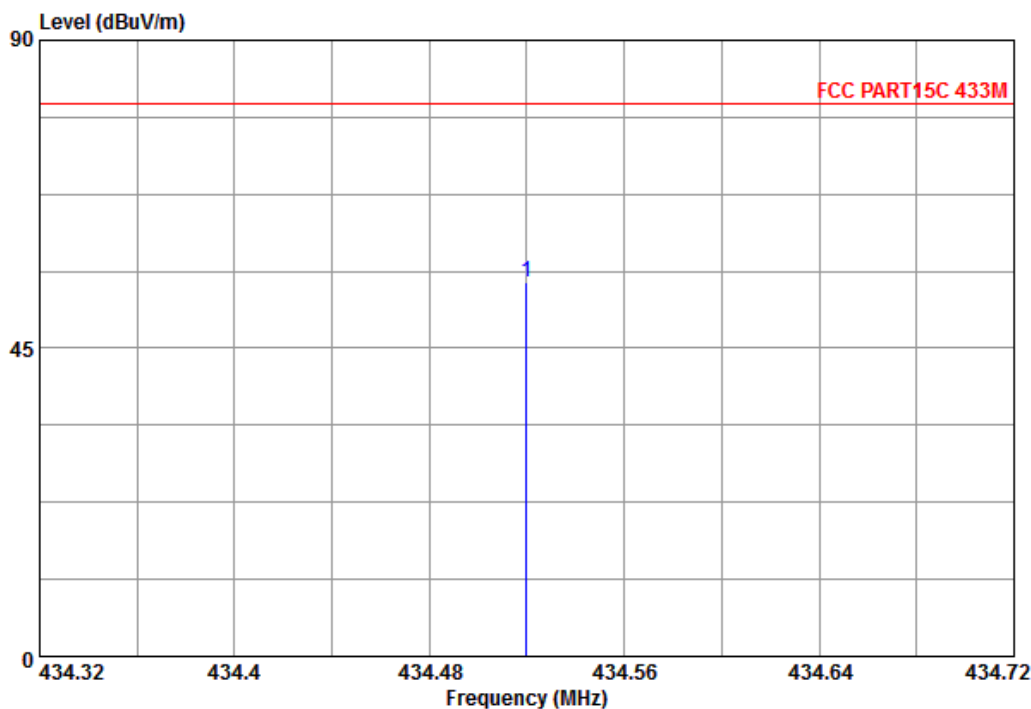
@ : Maximum Data x : Over Limit

Remark :

- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting: Peak Setting, RBW = 100kHz, VBW = 300kHz

**Radiated Emission Test Data (Field Strength of Fundamental)**

Temperature	: 25.8℃	Humidity	: 58%
Test Date	: 18-MAR-2015	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH High (434.52 MHz)
Test Mode	: Mode 2		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @ 434.520	69.92	-15.15	54.77	80.79	-26.02	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

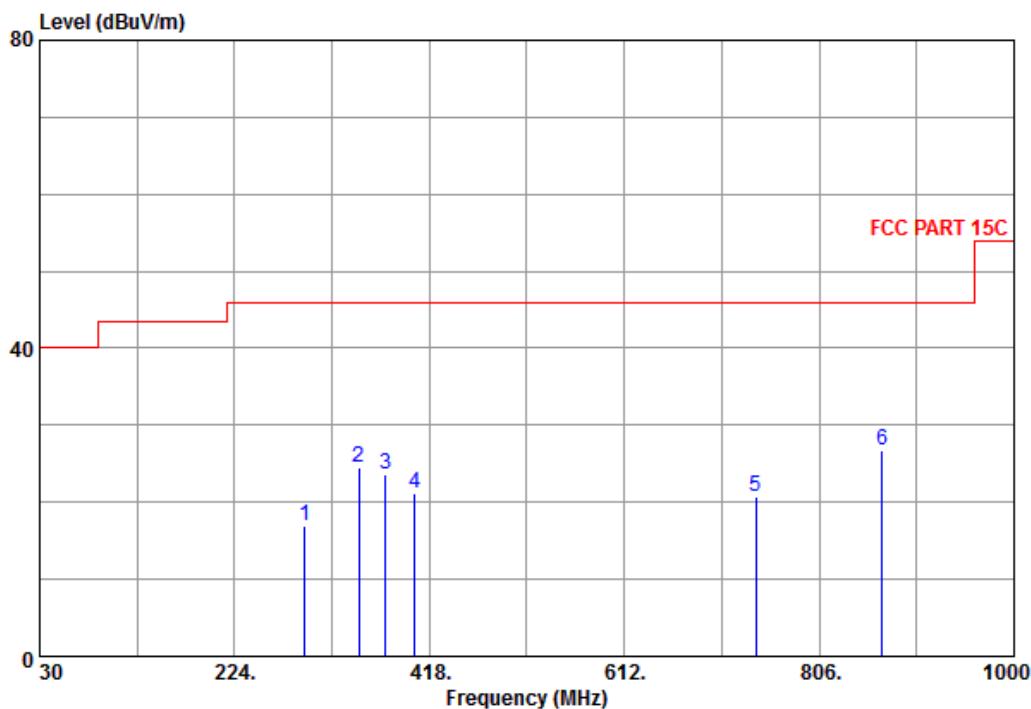
@ : Maximum Data x : Over Limit

Remark :

- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting: Peak Setting, RBW = 100kHz, VBW = 300kHz

Radiated Emission Test Data (Below 1 GHz)

Temperature	: 25.8℃	Humidity	: 58%
Test Date	: 18-MAR-2015	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH High (434.52 MHz)
Test Mode	: Mode 2		



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	293.840	34.49	-17.64	16.85	46.00	-29.15	---	---	
2	348.160	39.48	-14.86	24.62	46.00	-21.38	---	---	
3	374.350	37.86	-14.27	23.59	46.00	-22.41	---	---	
4	403.450	35.54	-14.28	21.26	46.00	-24.74	---	---	
5	742.950	27.17	-6.46	20.71	46.00	-25.29	---	---	
6 @	869.040	31.05	-4.37	26.68	46.00	-19.32	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
 Result = Reading + C.F ; Margin = Result - Limit

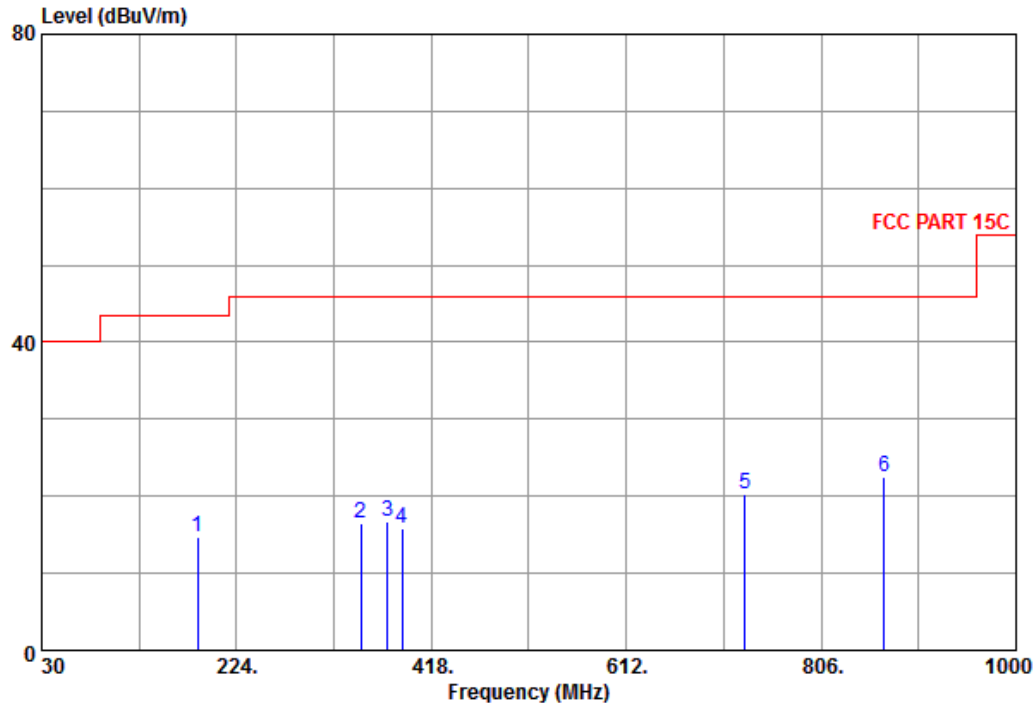
@ : Maximum Data x : Over Limit

Remark :

1. Measuring frequencies from 30 MHz to 1 GHz.
2. Measurements above show only up to 6 maximum emissions noted.
3. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Q.P. detector mode.
4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
5. The IF bandwidth of SPA between 30 MHz to 1 GHz was 100 kHz.

**Radiated Emission Test Data (Below 1 GHz)**

Temperature	: 25.8℃	Humidity	: 58%
Test Date	: 18-MAR-2015	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH High (434.52 MHz)
Test Mode	: Mode 2		



	Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1	185.200	32.13	-17.37	14.76	43.50	-28.74	---	---	
2	348.160	31.33	-14.86	16.47	46.00	-29.53	---	---	
3	374.350	30.89	-14.27	16.62	46.00	-29.38	---	---	
4	388.900	29.82	-13.91	15.91	46.00	-30.09	---	---	
5	730.340	26.80	-6.56	20.24	46.00	-25.76	---	---	
6 @	869.040	26.95	-4.37	22.58	46.00	-23.42	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
 Result = Reading + C.F ; Margin = Result - Limit

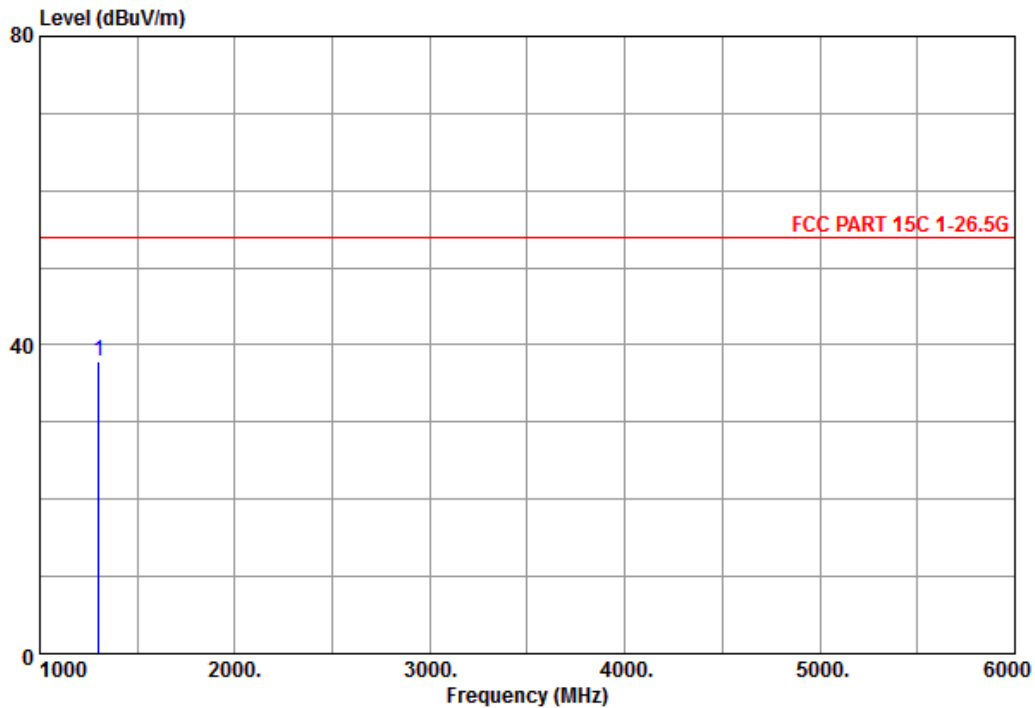
@ : Maximum Data x : Over Limit

Remark :

1. Measuring frequencies from 30 MHz to 1 GHz.
2. Measurements above show only up to 6 maximum emissions noted.
3. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Q.P. detector mode.
4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
5. The IF bandwidth of SPA between 30 MHz to 1 GHz was 100 kHz.

**Radiated Emission Test Data (Above and Field Strength to 10th Harmonic)**

Temperature	: 25.8℃	Humidity	: 58%
Test Date	: 28-APR-2015	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH High (433.32 MHz)
Test Mode	: Mode 1		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @1299.960	49.80	-11.93	37.87	54.00	-16.13	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

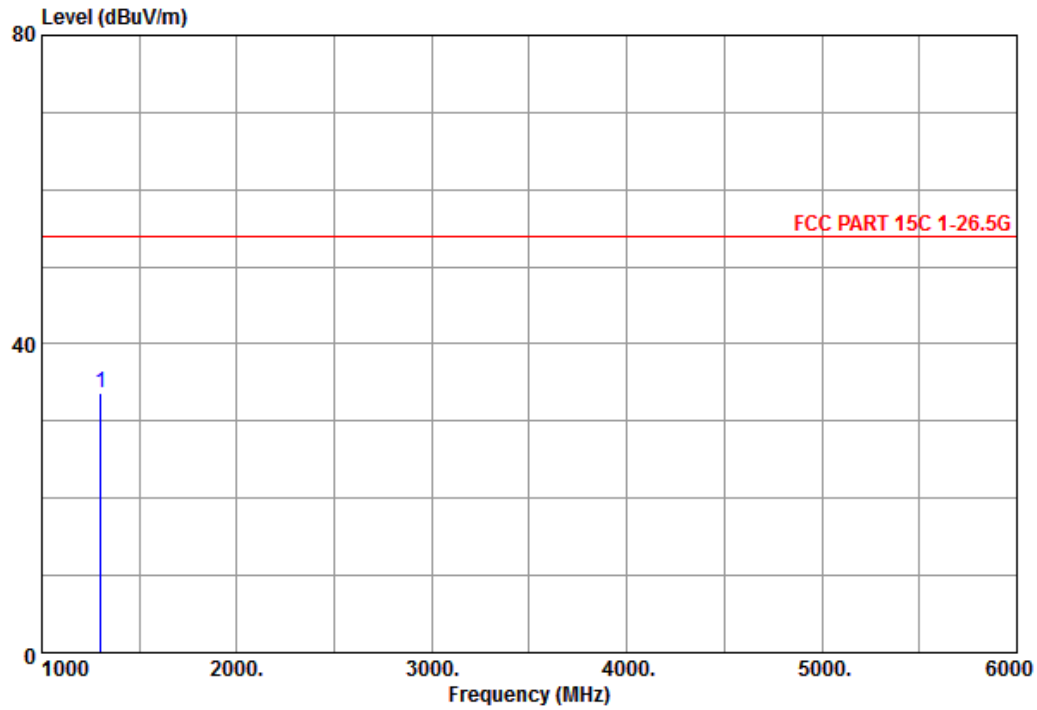
@ :Maximum Data x :Over Limit

Remark :

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
 - Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Radiated Emission Test Data (Above and Field Strength to 10th Harmonic)**

Temperature	: 25.8℃	Humidity	: 58%
Test Date	: 28-APR-2015	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH High (433.32 MHz)
Test Mode	: Mode 1		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @1299.960	45.67	-11.93	33.74	54.00	-20.26	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

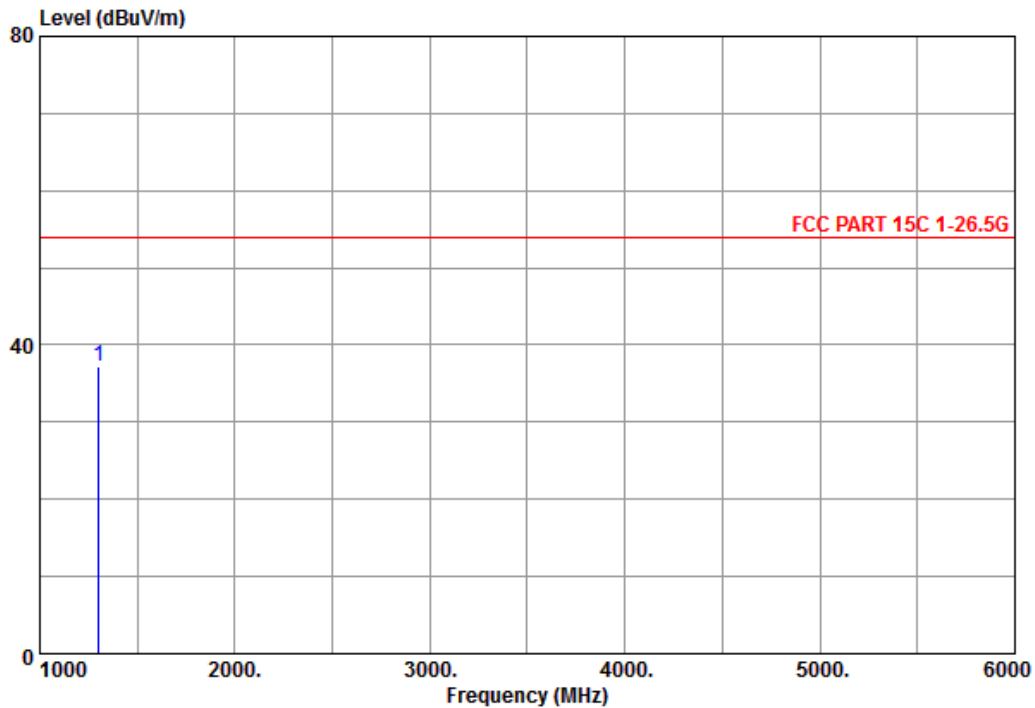
@ :Maximum Data x :Over Limit

Remark :

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
 - (a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Radiated Emission Test Data (Above and Field Strength to 10th Harmonic)**

Temperature	: 25.8℃	Humidity	: 58%
Test Date	: 28-APR-2015	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH High (434.52 MHz)
Test Mode	: Mode 2		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @1303.560	49.19	-11.93	37.26	54.00	-16.74	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

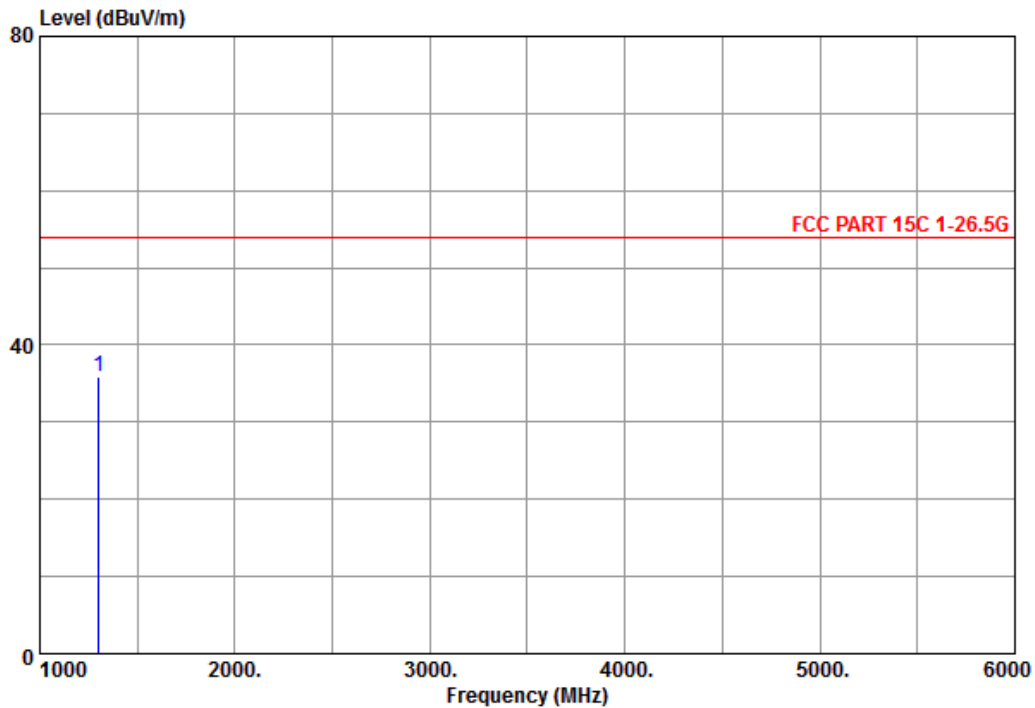
@ :Maximum Data x :Over Limit

Remark :

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
(a) Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Radiated Emission Test Data (Above and Field Strength to 10th Harmonic)**

Temperature	: 25.8℃	Humidity	: 58%
Test Date	: 28-APR-2015	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH High (434.52 MHz)
Test Mode	: Mode 2		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 @1303.560	47.73	-11.93	35.80	54.00	-18.20	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain
Result = Reading + C.F ; Margin = Result - Limit

@ :Maximum Data x :Over Limit

Remark :

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
- Spectrum setting:
 - Peak Setting 1GHz to 10th harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

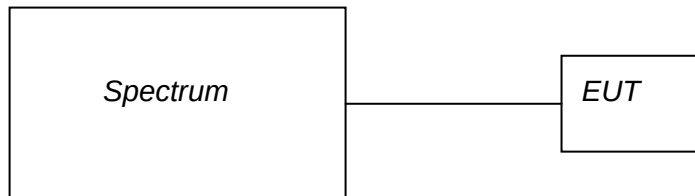


4 Conditions for intentional radiators to comply with periodic operation

4.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

4.2 Test Arrangement and Procedure



1. The transmitter output was connected to the spectrum analyzer (through an attenuator, if it's necessary).
2. The transmitting duration time was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW. Swept time set at 10 seconds.
3. The EUT is a manually operated transmitter which employs a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
4. Push down the manual switch. Then, release the manual switch to see if the transmitter deactivate within not more than 5 seconds.

4.3 Limit (§ 15.231(a))

The provisions of this section are restricted to periodic operation within the band 40.66-40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation:

- (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- (3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.



- (4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.*
- (5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.*

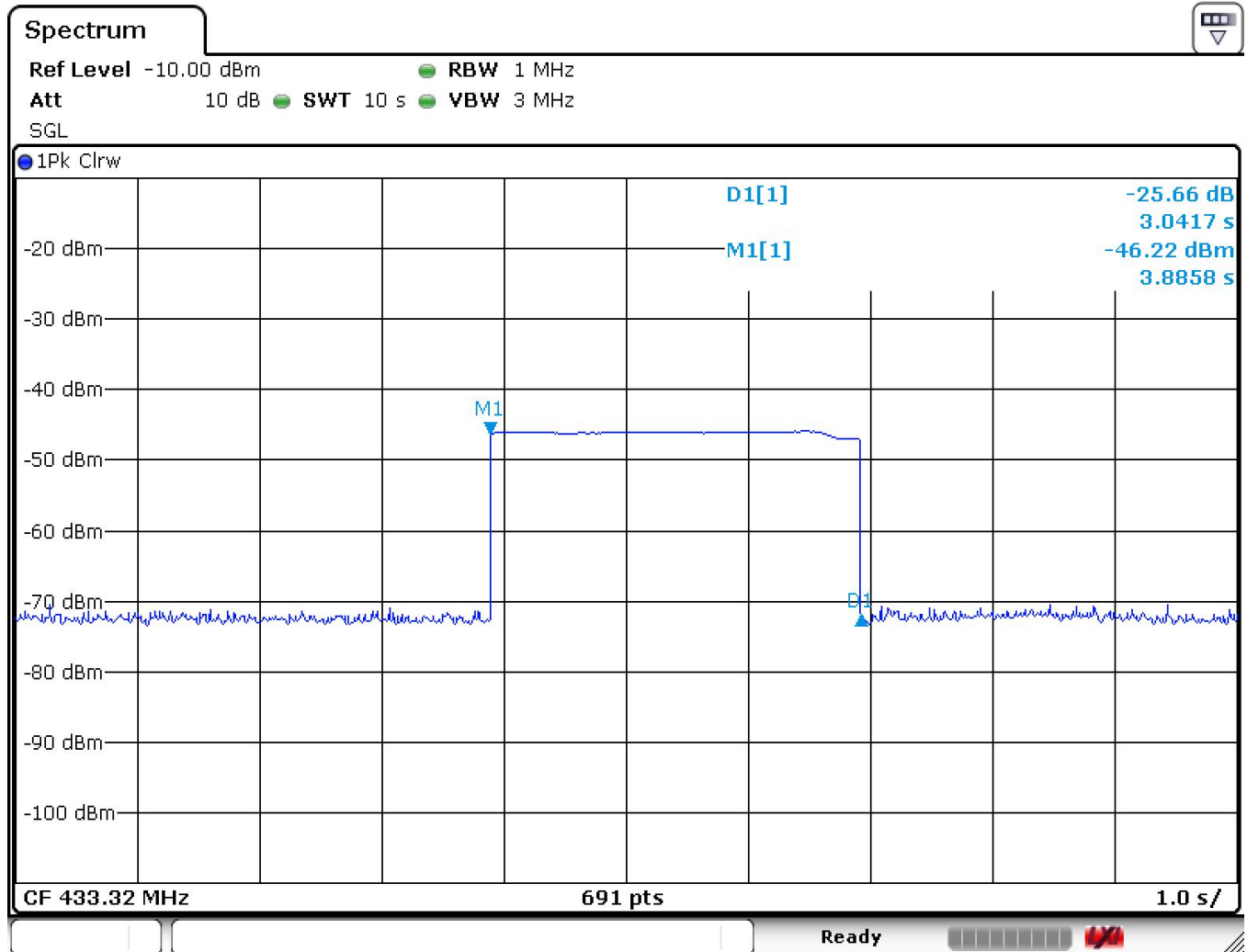
4.4 Test Result

Compliance

The final test data are shown on the following page(s).



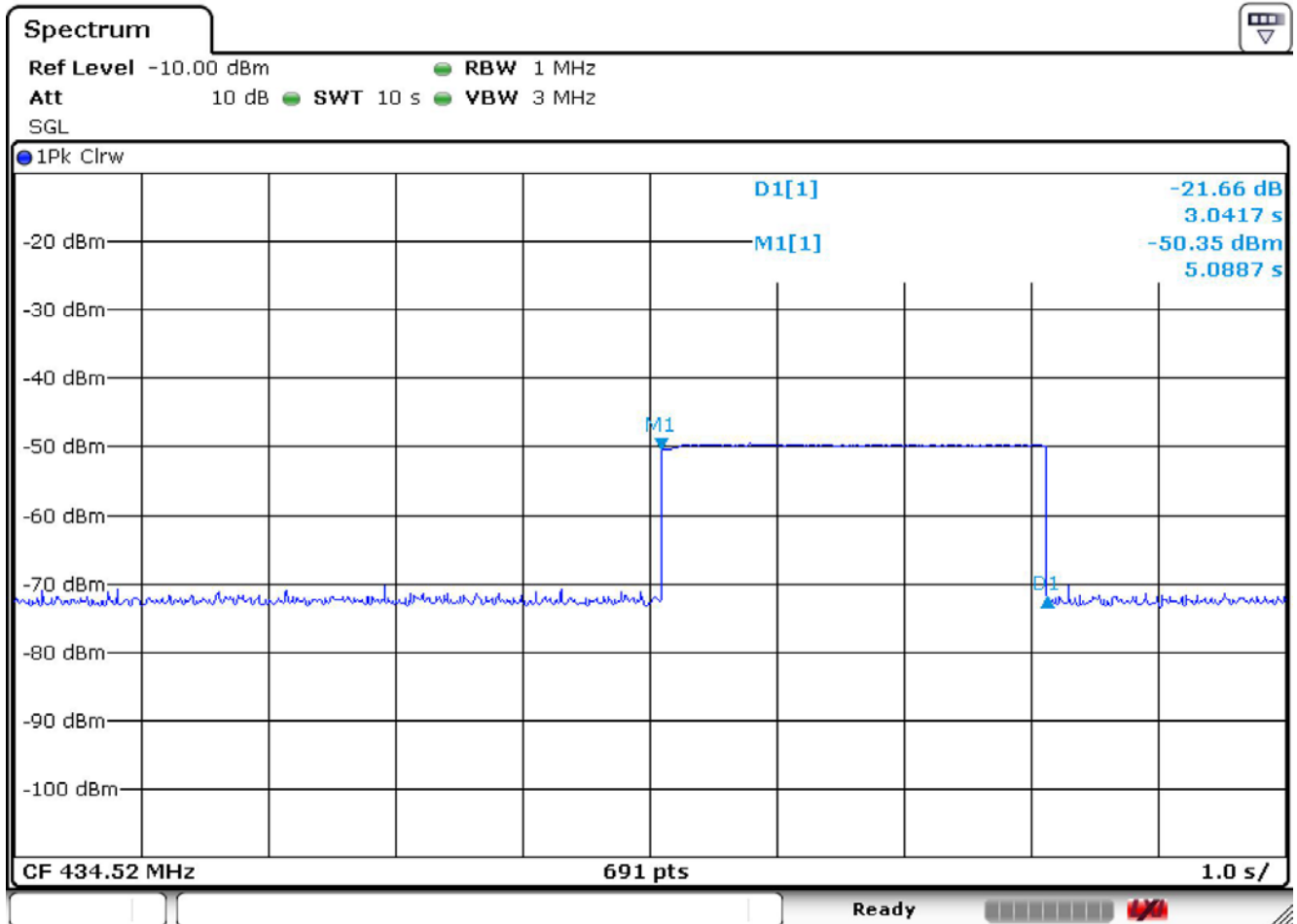
Temperature	: 25.8 °C	Humidity	: 58%
Test Date	: 18-MAR-2015	Tested by	: Eason Hsieh
Test Mode	: Manual mode (Automatically deactivated)	Channel	: CH LOW (433.32 MHz)



Duration of being released (sec)	Limit of duration (sec)	Result
3.0417	5	Pass



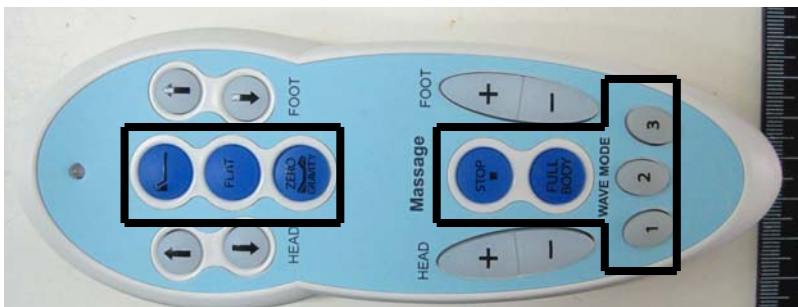
Temperature	: 25.8 °C	Humidity	: 58%
Test Date	: 18-MAR-2015	Tested by	: Eason Hsieh
Test Mode	: Manual mode (Automatically deactivated)	Channel	: CH High (434.52 MHz)



Duration of being released (sec)	Limit of duration (sec)	Result
3.0417	5	Pass

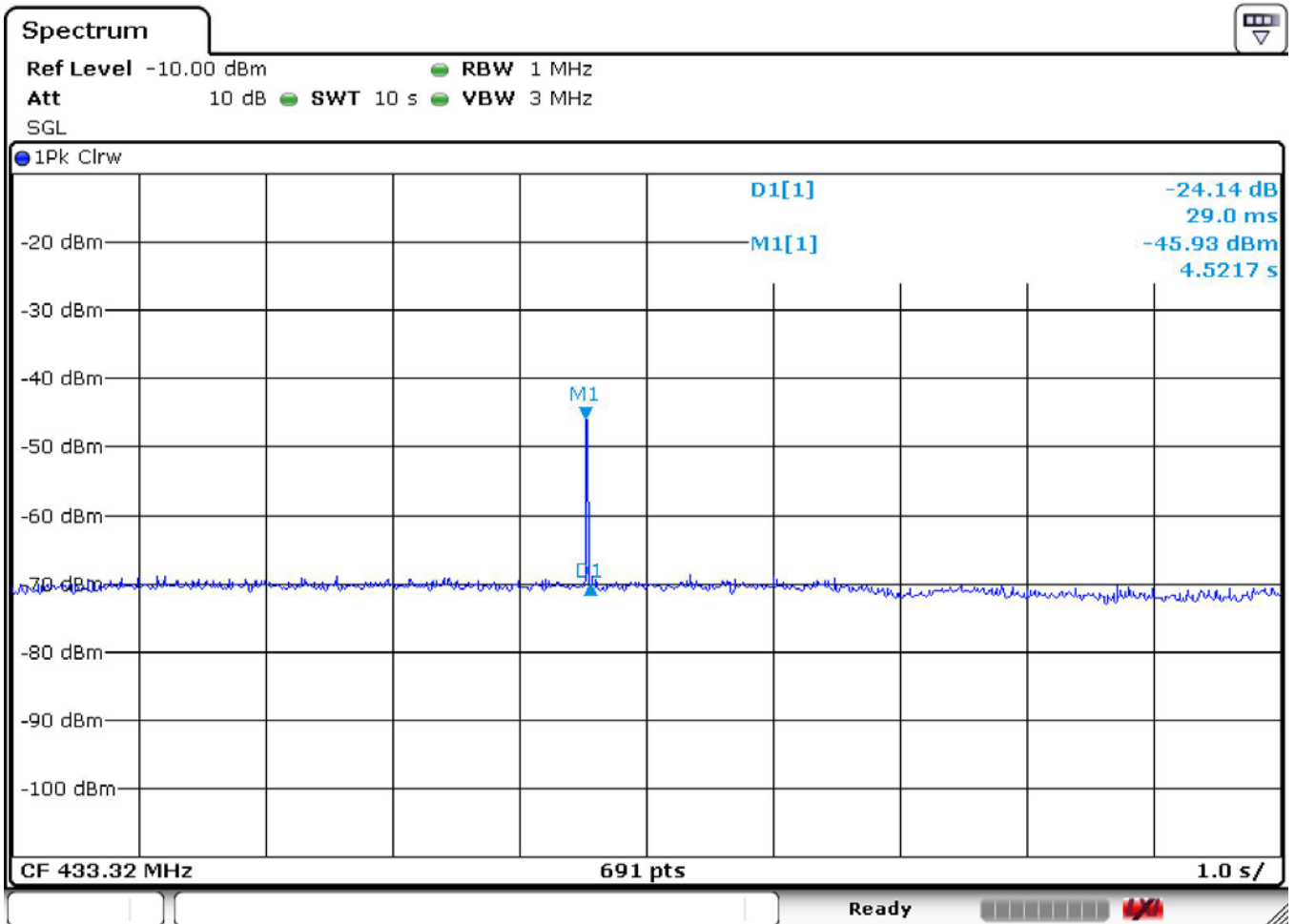
Note: 1. M1 represent the time when we push down the button. D1 represent the time when EUT stops transmitting.

2. The buttons marked by black frame are manually operated transmitters that will automatically deactivate the transmitter within not more than 5 seconds of being activated.





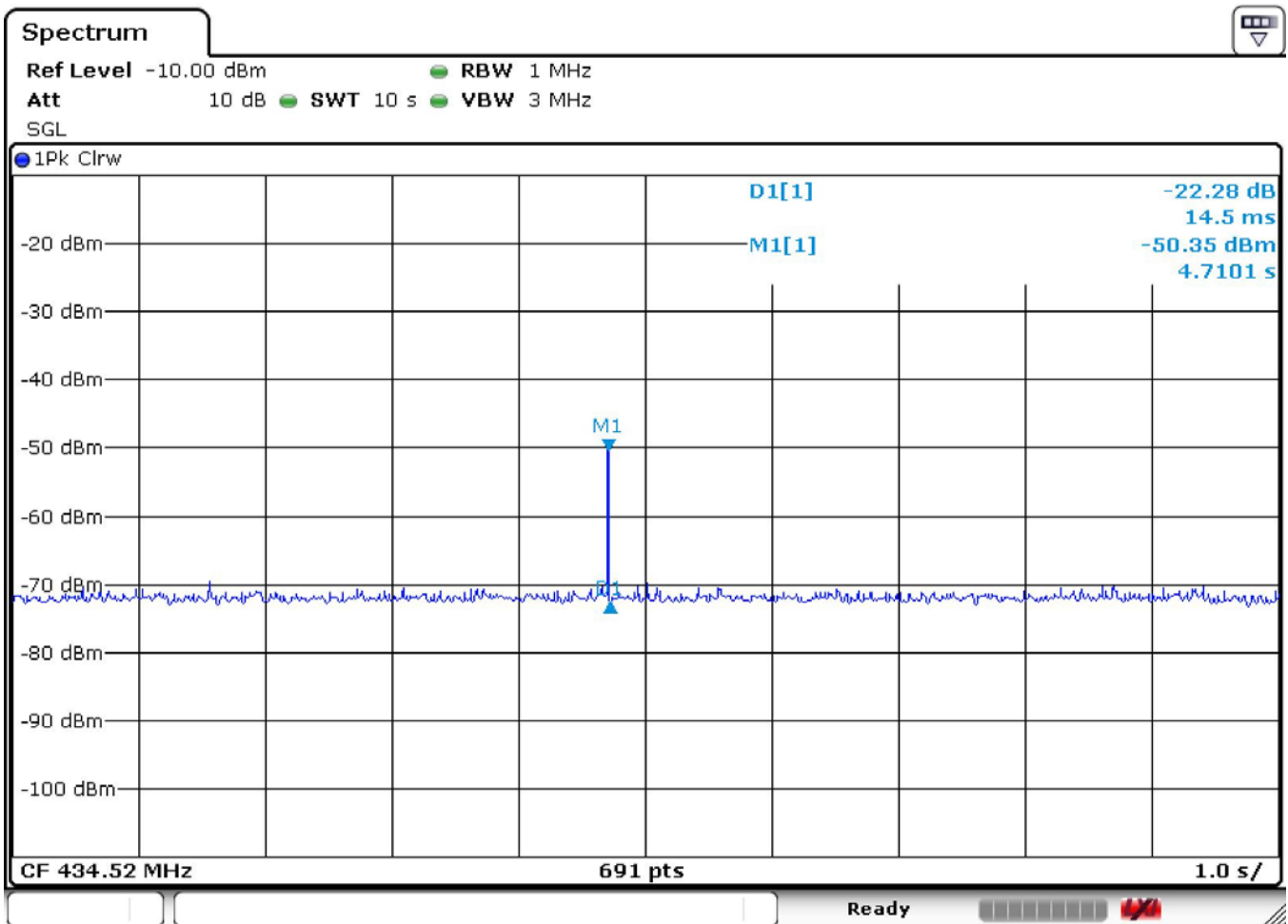
Temperature	: 25.8 °C	Humidity	: 58%
Test Date	: 18-MAR-2015	Tested by	: Eason Hsieh
Test Mode	: Manual mode (Manually deactivated)	Channel	: CH LOW (433.32 MHz)



Duration of being released (sec)	Limit of duration (sec)	Result
0.029	5	Pass



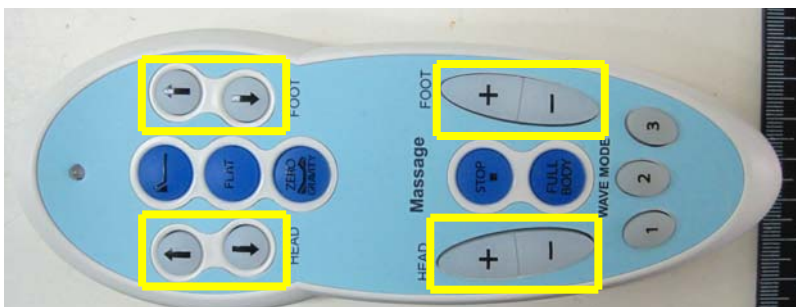
Temperature	: 25.8 °C	Humidity	: 58%
Test Date	: 18-MAR-2015	Tested by	: Eason Hsieh
Test Mode	: Manual mode (Manually deactivated)	Channel	: CH High (434.52 MHz)



Duration of being released (sec)	Limit of duration (sec)	Result
0.0145	5	Pass

Note:

1. M1 represent the time when we release the button. D1 represent the time when EUT stops transmitting.
2. The buttons marked by yellow frame are manually operated transmitters that will automatically deactivate the transmitter within not more than 5 seconds of being released.



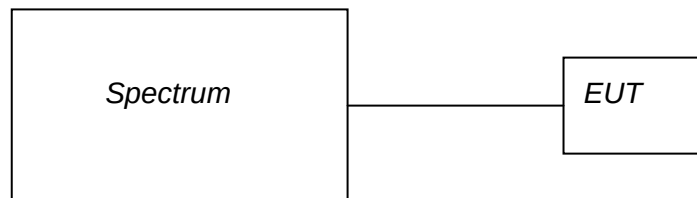


5 Emission Bandwidth

5.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

5.2 Test Arrangement and Procedure



- 1. The transmitter output was connected to the spectrum analyzer (through an attenuator, if it's necessary).*
- 2. The transmitting duration time was measured by spectrum analyzer with 10 kHz RBW and 30 kHz VBW. Measured the -20 dB bandwidth and plotted the graph.*
- 3. Manually adjust to Channel Low (433.32 MHz), and Channel High (434.52 MHz) respectively*

5.3 Limit (§ 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.

5.4 Test Result

Compliance.

The final test data are shown on the following page(s).



Temperature : 25.8°C

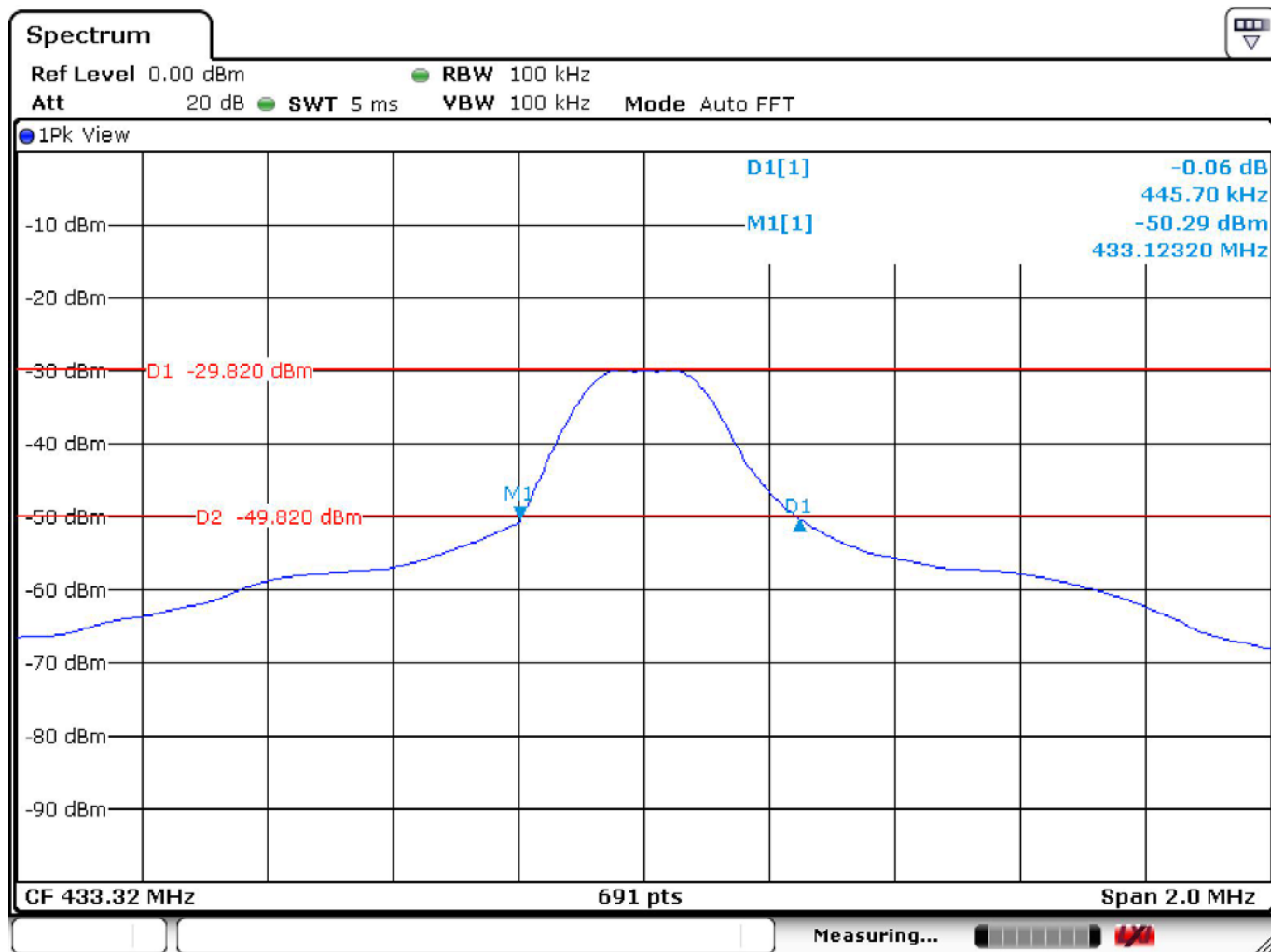
Humidity : 58%

Test Date : 18-MAR-2015

Tested by : Eason Hsieh

Test Mode : N/A

Channel : CH LOW (433.32 MHz)

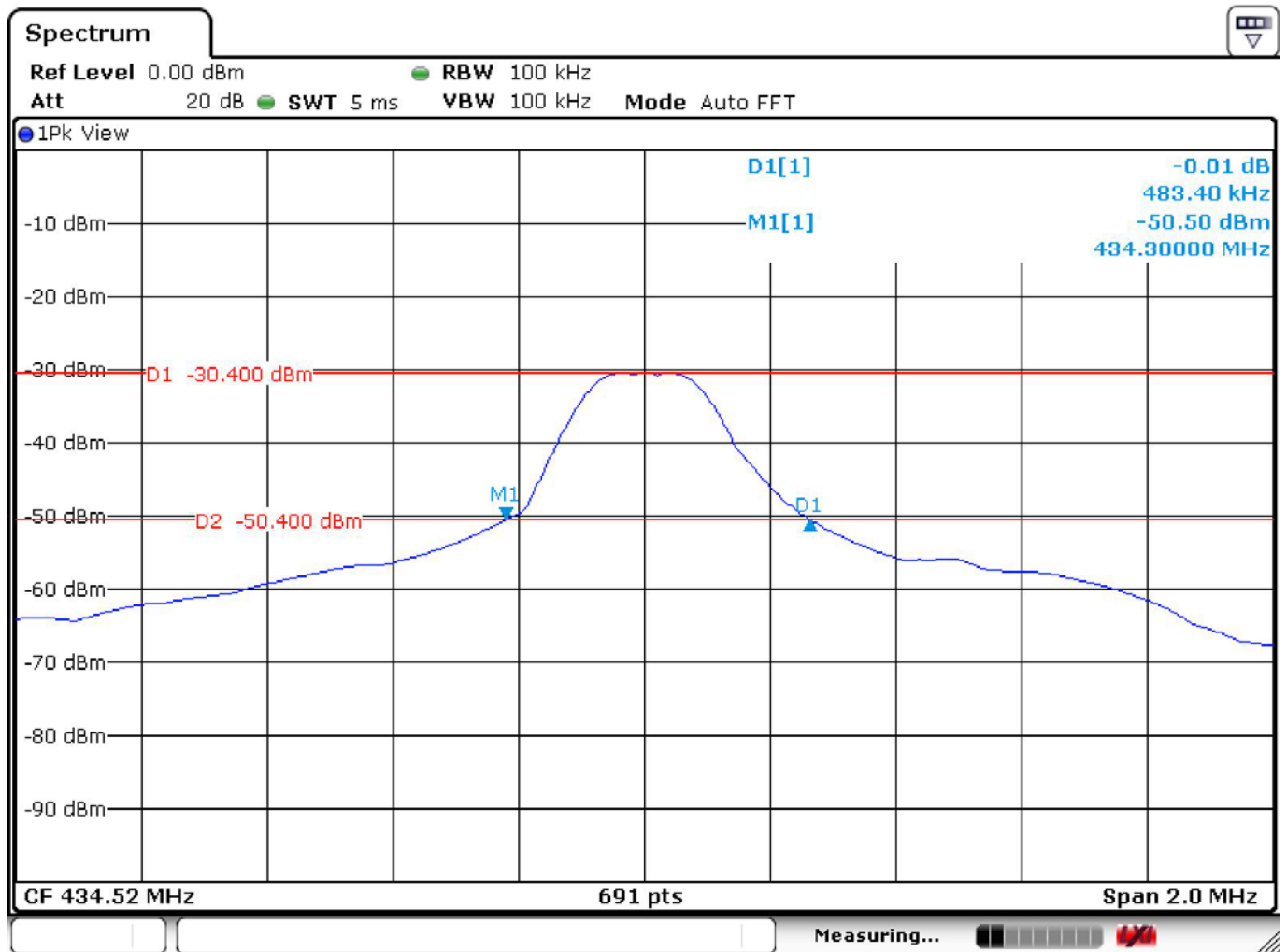


-20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Result
445.70	1083.3	Pass

Limit = 0.25% of 433.32MHz is 1083.3kHz



Temperature	: 25.8 °C	Humidity	: 58%
Test Date	: 18-MAR-2015	Tested by	: Eason Hsieh
Test Mode	: N/A	Channel	: CH HIGH (434.52 MHz)



-20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Result
483.4	1086.3	Pass

Limit = 0.25% of 434.52MHz is 1086.3kHz



6 Antenna requirement

6.1 Limit (§ 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. The use of a permanently attached antenna or of an antenna that uses a uniue coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

6.2 Test Result

Compliance.

The EUT applies a spring antenna with 0 dBi gain.