



## *FCC COMPLIANCE TEST REPORT*

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

### **The product**

<b>Equipment Under Test</b>	: Remote Control
<b>Model Number</b>	: TEB-100-R
<b>Product Series</b>	: N/A
<b>Report Number</b>	: HA210505-RA
<b>Issue Date</b>	: 07-July-2021
<b>Test Result</b>	: Compliance

is produced by

**Star Seeds Co., Ltd**

**No.5, Lu-Kung South 2 Road, Chang-Pin Industrial Park Lu-Kang, Changhua, Taiwan, R.O.C.**



**HongAn TECHNOLOGY CO., LTD.**  
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**BSMI Registration No. :** SL2-IN-E-0023, SL2-A1-E-0023,  
SL2-IS-E-0023, SL2-R1-E-0023,  
SL2-R2-E-0023, SL2-L1-E-0023

**FCC Designation No. :** TW1071, TW1163

**TAF Accreditation No. :** 1163

**IC assigned Code :** 11226A-2

**VCCI Registration No. :** R-12156, C-12329, T-10219, G-10696

**ISED CAB identifier:** TW1163

### **Caution :**

This report sets forth our findings solely with respect to the test sample. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment. Please note that the measurement uncertainty are provided for informational purpose only and are not used in determining the Pass/Fail results. This test report shall not be reproduced without written approval of HongAn TECHNOLOGY EMC Laboratory. The relevant information of the content of this test report is provided by the customer. For the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error, which will affect the validity of the results of this test report, the laboratory will not be liable Related responsibilities.

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## Release control Record

Report Version	Description	Issued Date
V00	Original release.	07-Jul-2021



## Test Result Certification

<b>Applicant</b>	: Star Seeds Co., Ltd
<b>Address of Applicant</b>	: No.5, Lu-Kung South 2 Road, Chang-Pin Industrial Park Lu-Kang, Changhua, Taiwan, R.O.C.
<b>Manufacturer</b>	: Star Seeds Co., Ltd
<b>Address of Manufacturer</b>	: No.5, Lu-Kung South 2 Road, Chang-Pin Industrial Park Lu-Kang, Changhua, Taiwan, R.O.C.
<b>Trade Name</b>	: N/A
<b>Equipment Under Test</b>	: Remote Control
<b>Model Number</b>	: TEB-100-R
<b>Product Series</b>	: N/A
<b>FCC ID</b>	: 2A2GCTEB-100-R
<b>Filing Type</b>	: Certification
<b>Sample Received Date</b>	: 24-Jun-2021
<b>Test Standard</b>	:

☒ 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.
4. Test Location: HongAn Technology Co., Ltd., No.15-1 Cweishuh Keng, Cweipin Village, Linkou Dist., New Taipei City, Taiwan, R.O.C. FCC Designation No.: TW1071, TW1163.

**Tested by:****Tom Tang/ ENG. Dept. Staff****Date:**

2021-06-28

**Approved by:****Eason Hsieh/ Authorized Report Reviewer****Date:**

2021-07-07



## 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

<b>Equipment Under Test</b>	:	Remote Control
<b>Model Number of EUT</b>	:	TEB-100-R
<b>Product Series</b>	:	N/A
<b>Power Supply</b>	:	2 x AA dry batteries
<b>Frequency Range</b>	:	433.32MHz~434.52MHz
<b>Number of Channels</b>	:	3
<b>Channel List</b>	:	CH1: 433.32MHz; CH2: 433.92MHz; CH3: 434.52MHz
<b>Channel Spacing</b>	:	0.6MHz
<b>Antenna Specification</b>	:	PCB Antenna, 1.13 dBi Gain
<b>Modulation Technique</b>	:	FSK
<b>Specification</b>	:	<b>Dimensions</b> : 125 mm (L) X 65 mm (W) X 30 mm (H) <b>Weight</b> : 78g <b>Function</b> : The EUT is a Remote Control. 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

HA2

Instrument Name	Manufacture Mode	Model Number	Serial Number	Last Cal. Date	Next Cal. Date
Spectrum Analyzer	R&S	FSV 40	101296	08-Apr-2021	07-Apr-2022
ESCI 7 EMI Test Receiver	R&S	ESCI 7	100931	07-Aug-2020	06-Aug-2021
Pre-Amplifier	Schaffner	CPA9231A	0405	17-Dec-2020	16-Dec-2021
Pre-Amplifier	EMCI	EMC051845SE	980692	03-Dec-2020	02-Dec-2021
Pre-Amplifier	EMCI	EMC184045SE	980699	05-May-2021	04-May-2022
Bilog Antenna	TESEQ	CBL6111D	47016	24-Jul-2020	24-Jul-2021
Horn Antenna	EMCO	3115	9912-5992	18-May-2021	17-May-2022
Horn Antenna	Com-Power	AH-840	101042	21-May-2021	20-May-2022
Cable	HongAn	8D-FB	HA2-10MSite	21-Aug-2020	20-Aug-2021
Cable	EMCI	EMC104-SM-N M-1000	191104	03-Dec-2020	02-Dec-2021
Cable	EMCI	EMC104-SM-N M-8000	191103	03-Dec-2020	02-Dec-2021
Cable	EMCI	EMC102-KM-K M-1000	200301	28-Apr-2021	27-Apr-2022
Cable	EMCI	EMC102-KM-K M-8000	200213	28-Apr-2021	27-Apr-2022
Software	Audix	e3 (Ver:6.101006a)	N/A	N/A	N/A

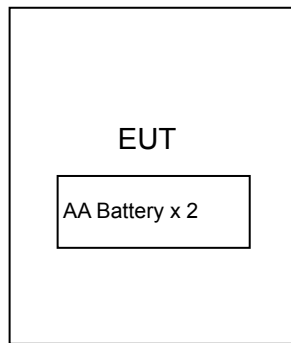
※ The test equipments used are calibrated and can be traced to National ITRI and International Standards.



## 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: TEB-100-R

## 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 433.92 MHz.
- 3. Mode 3: 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. Therefore, the Final Assessment was performed for the worst case.
- 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 AA type of Dry Batteries were used during whole testing.

## 1.6 Final Test Mode

- 1. Radiated Emission (30~1000MHz): Mode 1
- 2. Field Strength (Fundamental): Mode 1 and 3
- 3. Field Strength (Harmonics): Mode 1 and 3
- 4. Conducted Emission: N/A. The EUT is designed to use Battery.



## **1.7 Condition of Power Supply**

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 C63.10-2013 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 set according to the requirements in Section 6.2 of ANSI C63.10 (2013).

### **Radiated Emissions**

The EUT is set according to the requirements in Section 6.3 of ANSI C63.10 (2013).

## **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
<sup>1</sup> 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	( <sup>2</sup> )
13.36-13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

<sup>2</sup> 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.

## 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.**

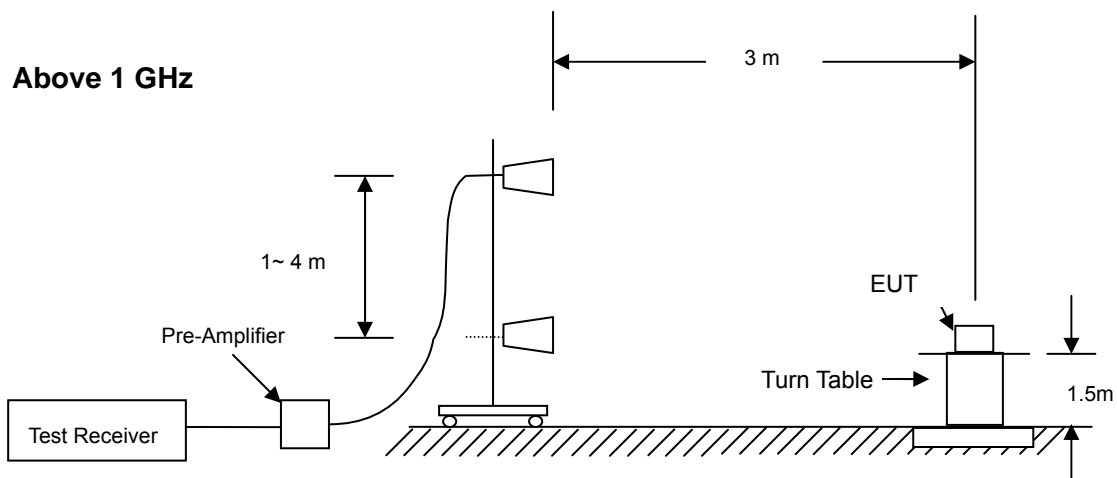
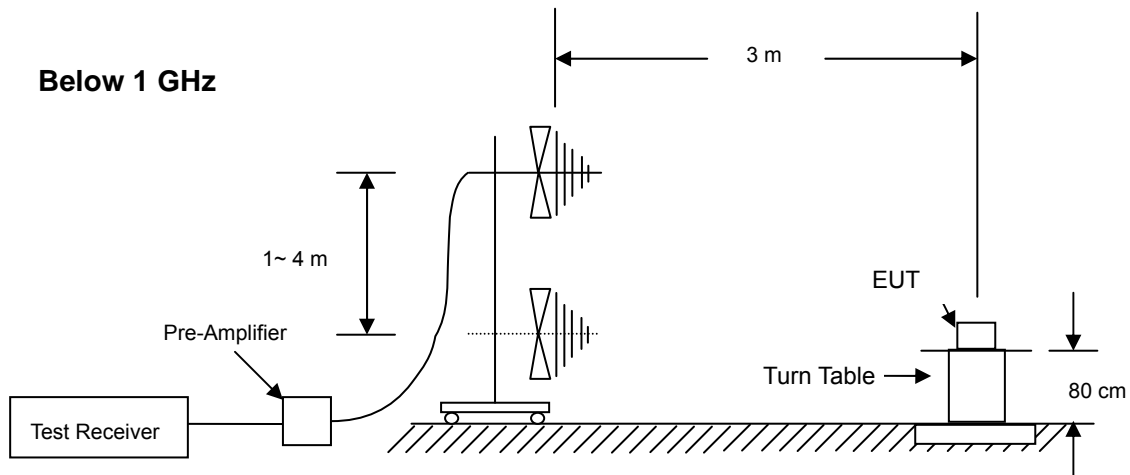


### 3 Radiated Emission Test

#### 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 1.5 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. Maximum 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	<sup>1</sup> 1,250 to 3,750	<sup>1</sup> 125 to 375
174-260	3,750	375
260-470	<sup>1</sup> 3,750 to 12,500	<sup>1</sup> 375 to 1,250
Above 470	12,500	1,250

Remark: 1. Linear interpolations.

The transmitting frequency of the EUT is 433.92MHz. 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	80.80	1,097	60.80
434.52	11.022	80.84	1,102	60.84

Note:

- Field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.
- 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.
- 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.

Frequency (MHz)	Field strength (microvolts/ meter)	Measurement distance (meters)
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.

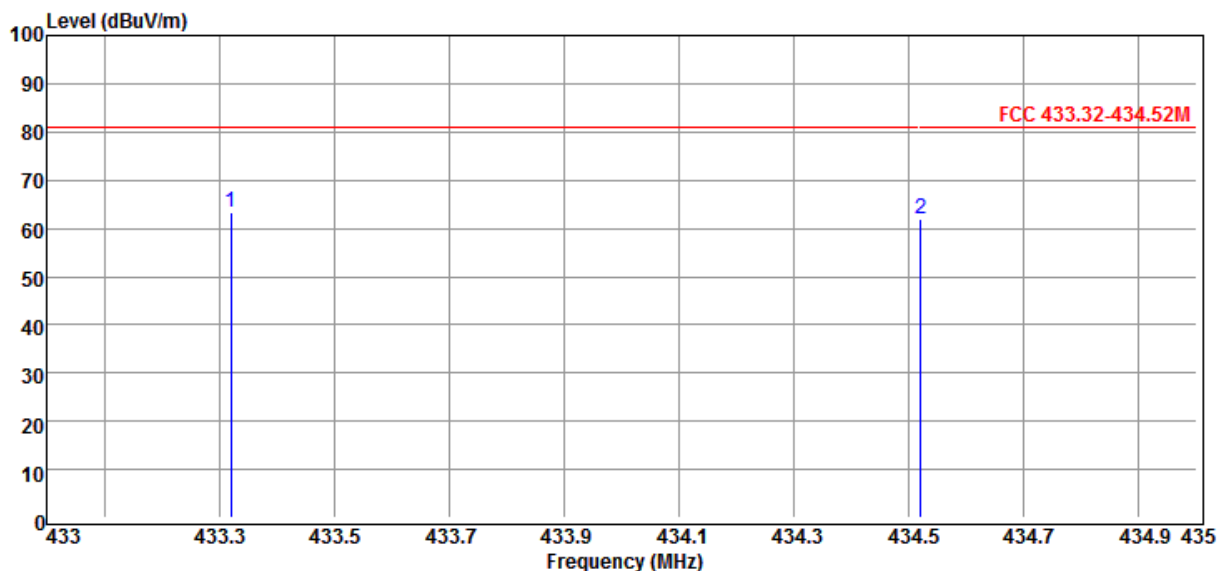
### 3.5 Test Result

#### Compliance

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

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

Temperature	: 29.7°C	Humidity	: 71%
Test Date	: 28-Jun-2021	Tested by	: Tom Tang
Polarization	: Horizontal	Channel	: Low (433.32 MHz);
Test Mode	: Mode 1, 3		High (434.52MHz)



No.	Freq MHz	Reading dBuV	C.F dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Antenna Pol.	Remark
1	433.32	68.90	-5.51	63.39	80.80	-17.41	HORIZONTAL	Peak
2	434.52	67.44	-5.53	61.91	80.84	-18.93	HORIZONTAL	Peak

Note 1. C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain.

Note 2. Margin = Result - Limit ; Result = Reading + C.F.

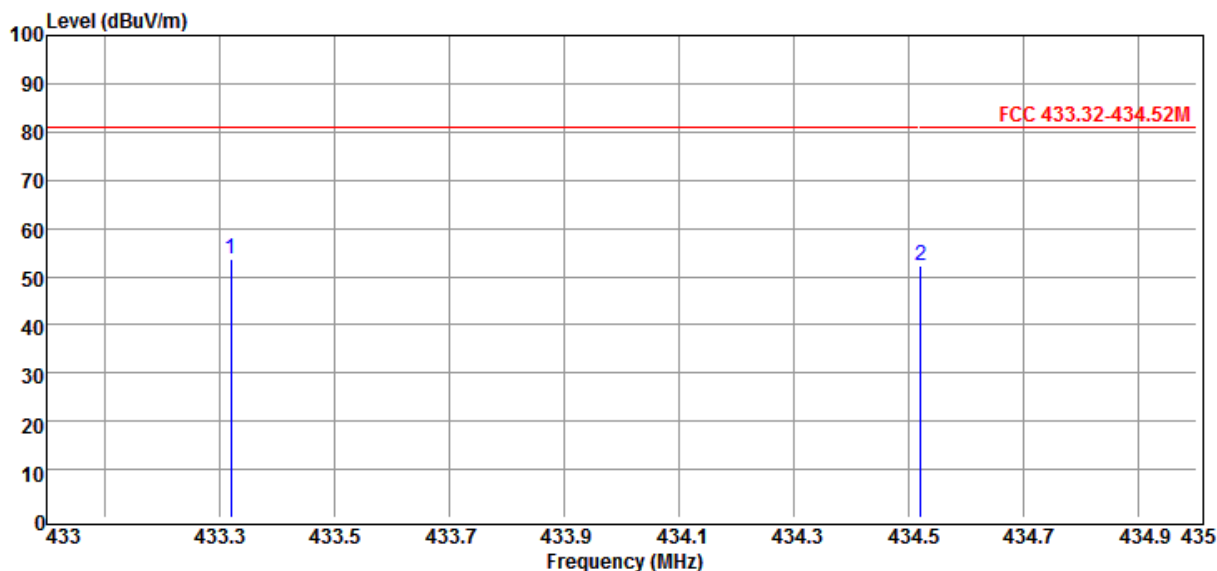
Remark :

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	: 29.7°C	Humidity	: 71%
Test Date	: 28-Jun-2021	Tested by	: Tom Tang
Polarization	: Vertical	Channel	: Low (433.32 MHz);
Test Mode	: Mode 1, 3		High (434.52MHz)



No.	Freq MHz	Reading dBuV	C.F dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Antenna Pol.	Remark
1	433.32	59.15	-5.51	53.64	80.80	-27.16	VERTICAL	Peak
2	434.52	57.74	-5.53	52.21	80.84	-28.63	VERTICAL	Peak

Note 1. C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain.

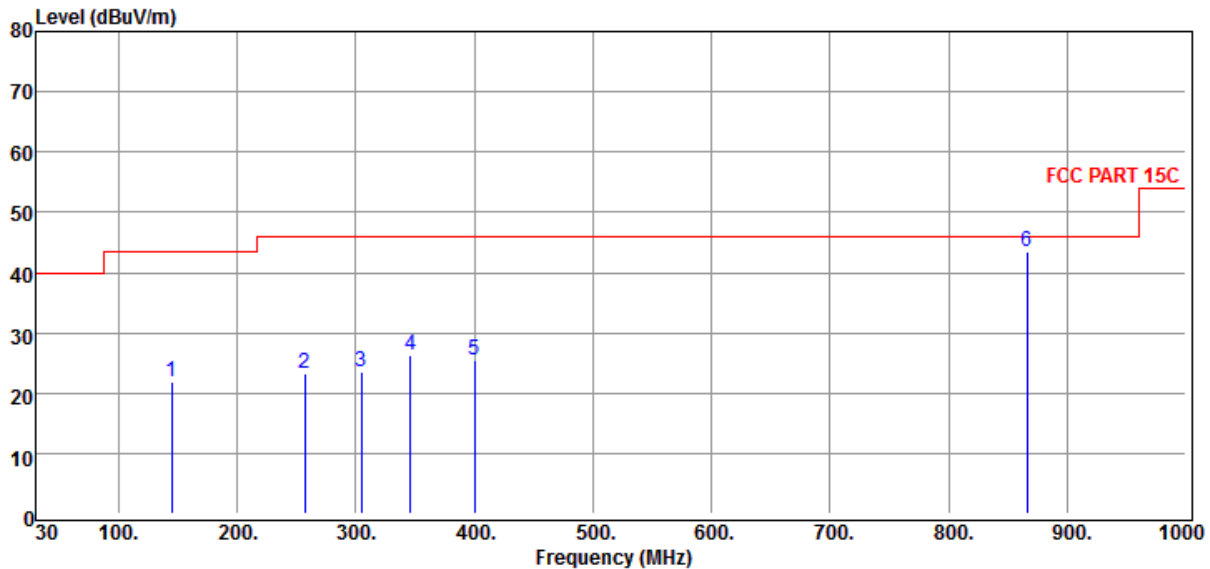
Note 2. Margin = Result - Limit ; Result = Reading + C.F.

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 (Below 1 GHz)

Temperature	: 29.7°C	Humidity	: 71%
Test Date	: 28-Jun-2021	Tested by	: Tom Tang
Polarization	: Horizontal	Channel	: Low (433.32 MHz)
Test Mode	: Mode 1		



No.	Freq MHz	Reading dBμV	C.F dB/m	Result dBμV/m	Limit dBμV/m	Margin dB	Antenna Pol.	Remark
1	144.46	33.30	-11.54	21.76	43.50	-21.74	HORIZONTAL	Peak
2	256.98	32.66	-9.34	23.32	46.00	-22.68	HORIZONTAL	Peak
3	304.51	32.64	-9.06	23.58	46.00	-22.42	HORIZONTAL	Peak
4	346.22	33.94	-7.55	26.39	46.00	-19.61	HORIZONTAL	Peak
5	400.54	31.61	-6.14	25.47	46.00	-20.53	HORIZONTAL	Peak
6	866.64	40.52	3.00	43.52	46.00	-2.48	HORIZONTAL	Peak

Note 1. C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain.

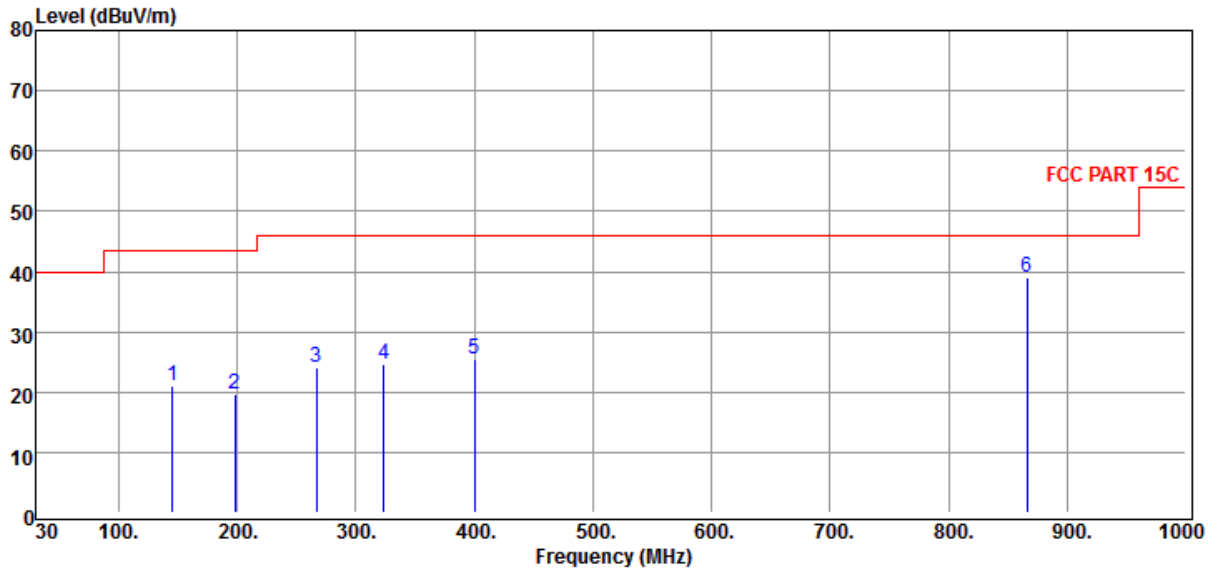
Note 2. Margin = Result - Limit ; Result = Reading + C.F.

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	: 29.7°C	Humidity	: 71%
Test Date	: 28-Jun-2021	Tested by	: Tom Tang
Polarization	: Vertical	Channel	: Low (433.32 MHz)
Test Mode	: Mode 1		



No.	Freq MHz	Reading dBμV	C.F dB/m	Result dBμV/m	Limit dBμV/m	Margin dB	Antenna Pol.	Remark
1	145.43	32.73	-11.58	21.15	43.50	-22.35	VERTICAL	Peak
2	197.81	32.81	-13.03	19.78	43.50	-23.72	VERTICAL	Peak
3	266.68	32.93	-8.95	23.98	46.00	-22.02	VERTICAL	Peak
4	323.91	33.09	-8.53	24.56	46.00	-21.44	VERTICAL	Peak
5	400.54	31.62	-6.14	25.48	46.00	-20.52	VERTICAL	Peak
6	866.64	36.02	3.00	39.02	46.00	-6.98	VERTICAL	Peak

Note 1. C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain.

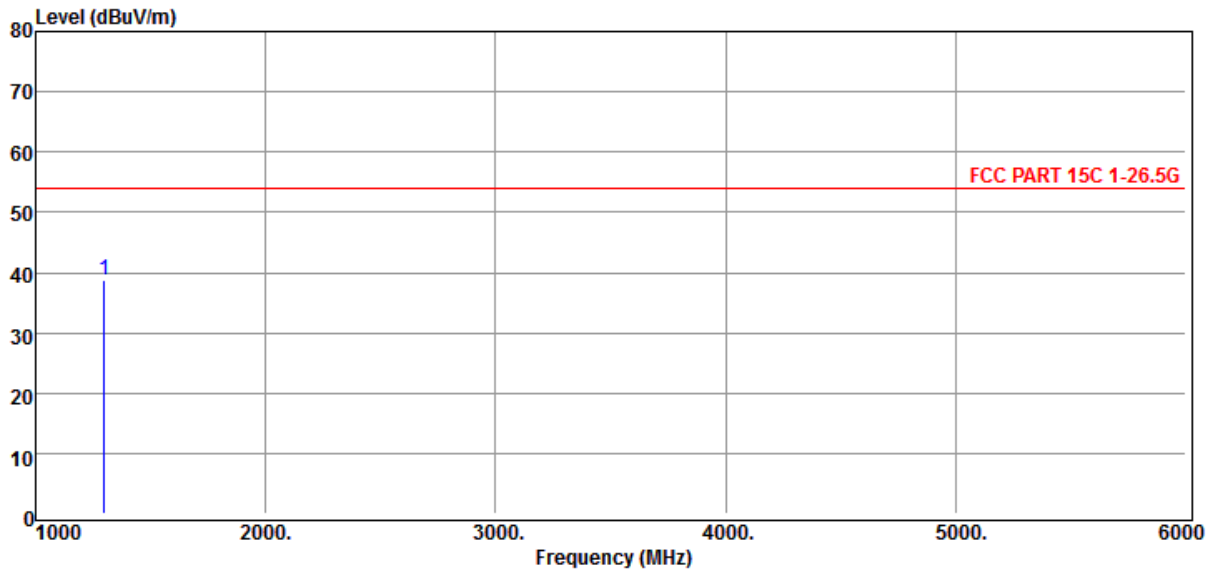
Note 2. Margin = Result - Limit ; Result = Reading + C.F.

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	: 29.7°C	Humidity	: 71%
Test Date	: 28-Jun-2021	Tested by	: Tom Tang
Polarization	: Horizontal	Channel	: Low (433.32 MHz)
Test Mode	: Mode 1		



No.	Freq MHz	Reading dBμV	C.F dB/m	Result dBμV/m	Limit dBμV/m	Margin dB	Antenna Pol.	Remark
1	1299.96	59.21	-20.49	38.72	54.00	-15.28	HORIZONTAL	Peak

Note 1. C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain.

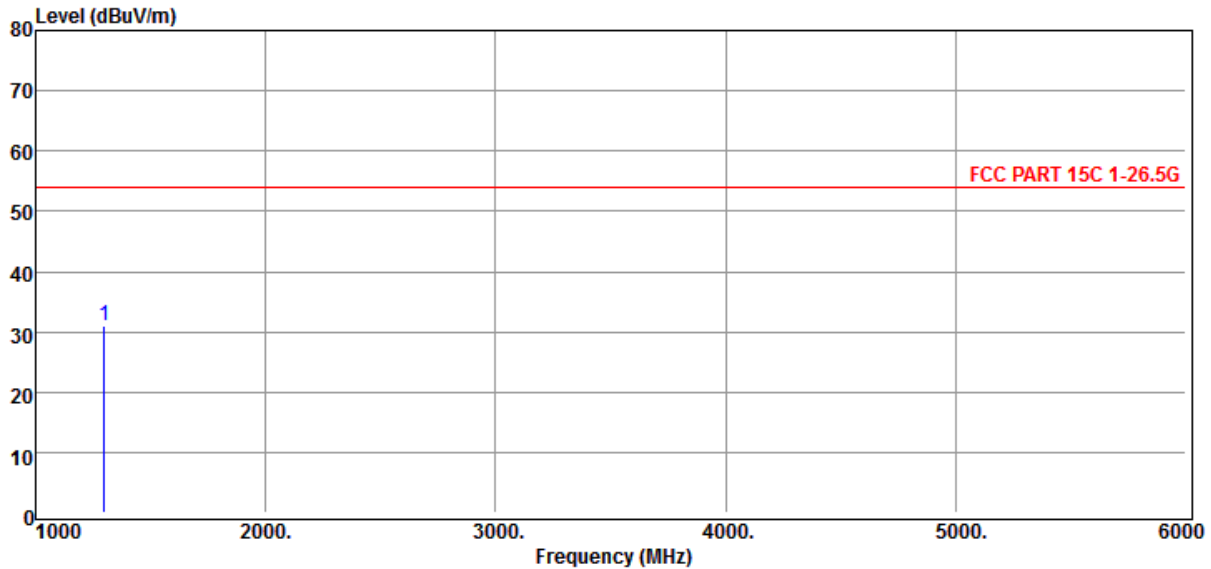
Note 2. Margin = Result - Limit ; Result = Reading + C.F.

Remark :

1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> 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 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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

Temperature	: 29.7°C	Humidity	: 71%
Test Date	: 28-Jun-2021	Tested by	: Tom Tang
Polarization	: Vertical	Channel	: Low (433.32 MHz)
Test Mode	: Mode 1		



No.	Freq MHz	Reading dBμV	C.F dB/m	Result dBμV/m	Limit dBμV/m	Margin dB	Antenna Pol.	Remark
1	1299.96	51.39	-20.49	30.90	54.00	-23.10	VERTICAL	Peak

Note 1. C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain.

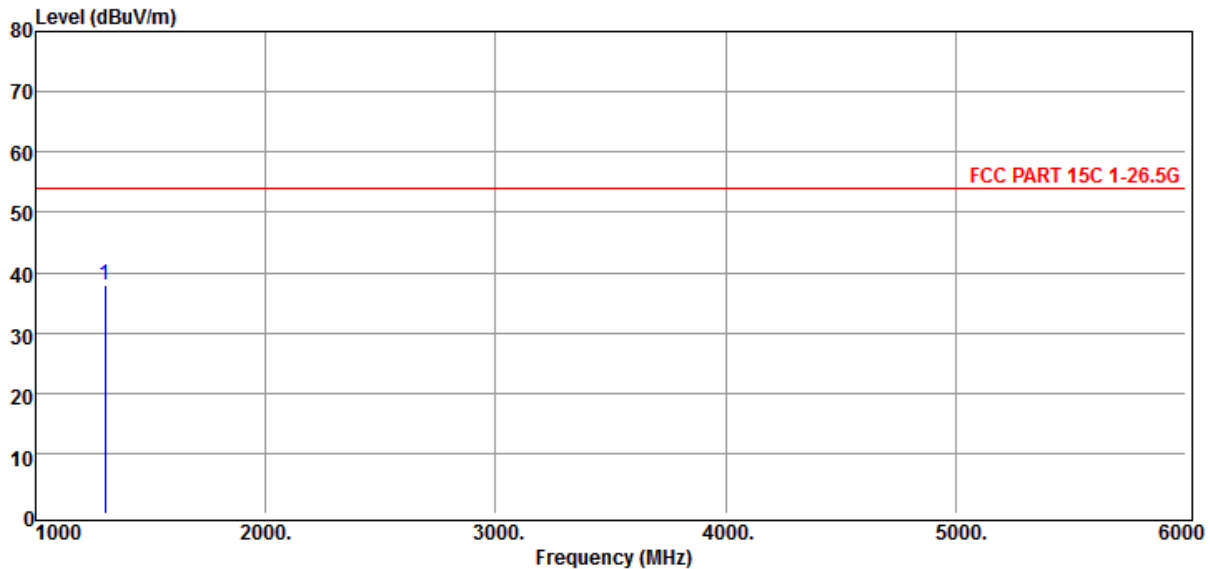
Note 2. Margin = Result - Limit ; Result = Reading + C.F.

Remark :

- Measuring frequencies from 1 GHz to the 10<sup>th</sup> 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 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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

Temperature	: 29.7°C	Humidity	: 71%
Test Date	: 28-Jun-2021	Tested by	: Tom Tang
Polarization	: Horizontal	Channel	: High (434.52 MHz)
Test Mode	: Mode 3		



No.	Freq MHz	Reading dBμV	C.F dB/m	Result dBμV/m	Limit dBμV/m	Margin dB	Antenna Pol.	Remark
1	1303.56	58.43	-20.47	37.96	54.00	-16.04	HORIZONTAL	Peak

Note 1. C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain.

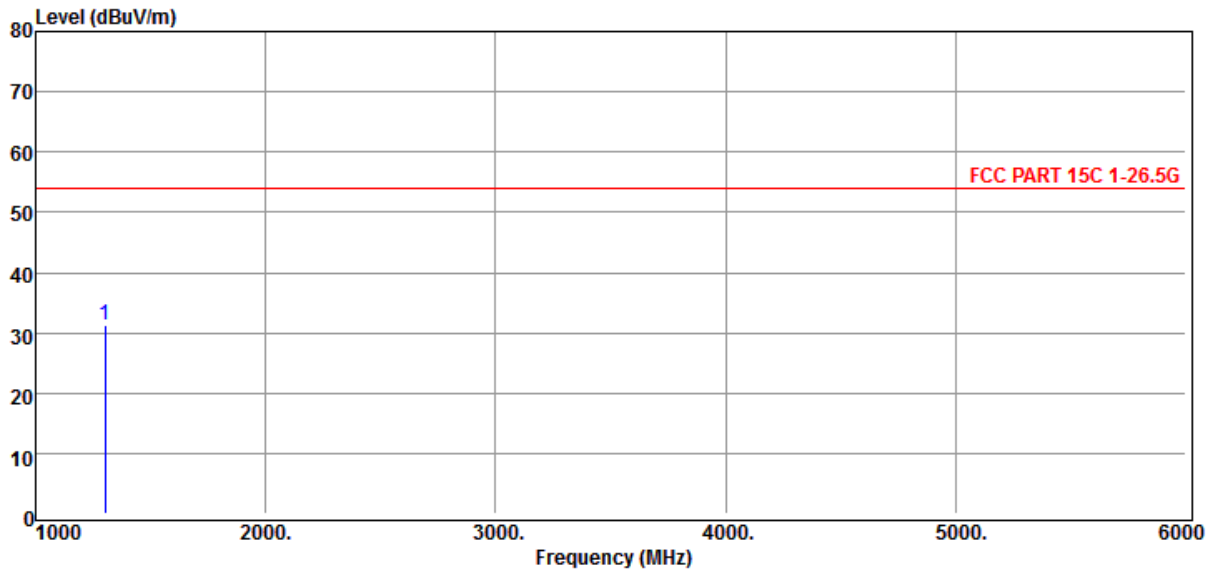
Note 2. Margin = Result - Limit ; Result = Reading + C.F.

Remark :

1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> 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 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

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

Temperature	: 29.7°C	Humidity	: 71%
Test Date	: 28-Jun-2021	Tested by	: Tom Tang
Polarization	: Vertical	Channel	: High (434.52 MHz)
Test Mode	: Mode 3		



No.	Freq MHz	Reading dBμV	C.F dB/m	Result dBμV/m	Limit dBμV/m	Margin dB	Antenna Pol.	Remark
1	1303.56	51.80	-20.47	31.33	54.00	-22.67	VERTICAL	Peak

Note 1. C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain.

Note 2. Margin = Result - Limit ; Result = Reading + C.F.

Remark :

- Measuring frequencies from 1 GHz to the 10<sup>th</sup> 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 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

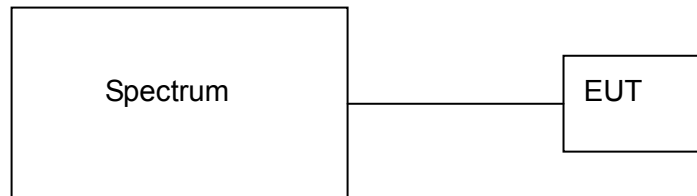


## 4 Conditions for intentional radiators to comply with periodic operation

### 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.





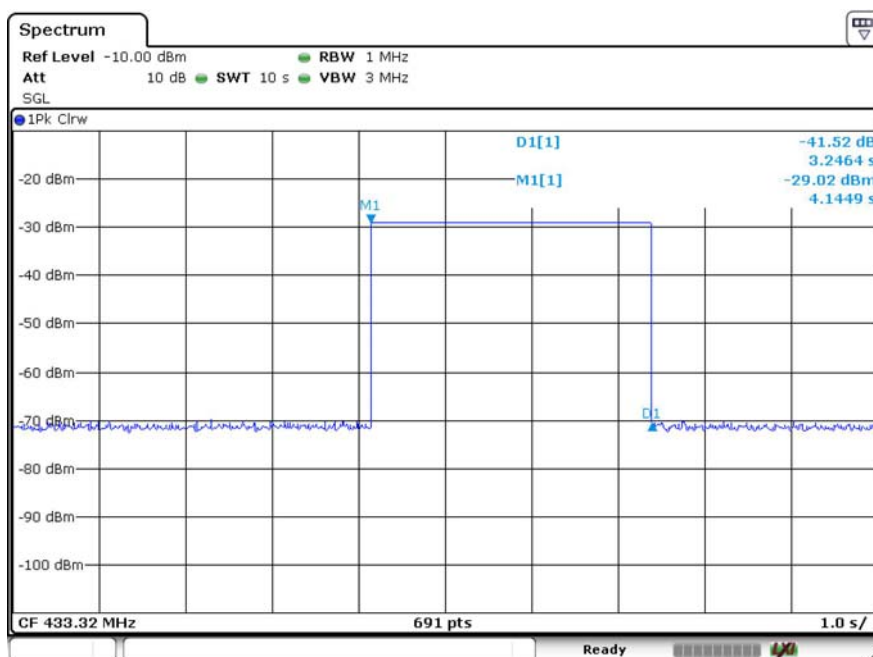
- (4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.
- (5) Transmission of set-up information for security systems may exceed 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).

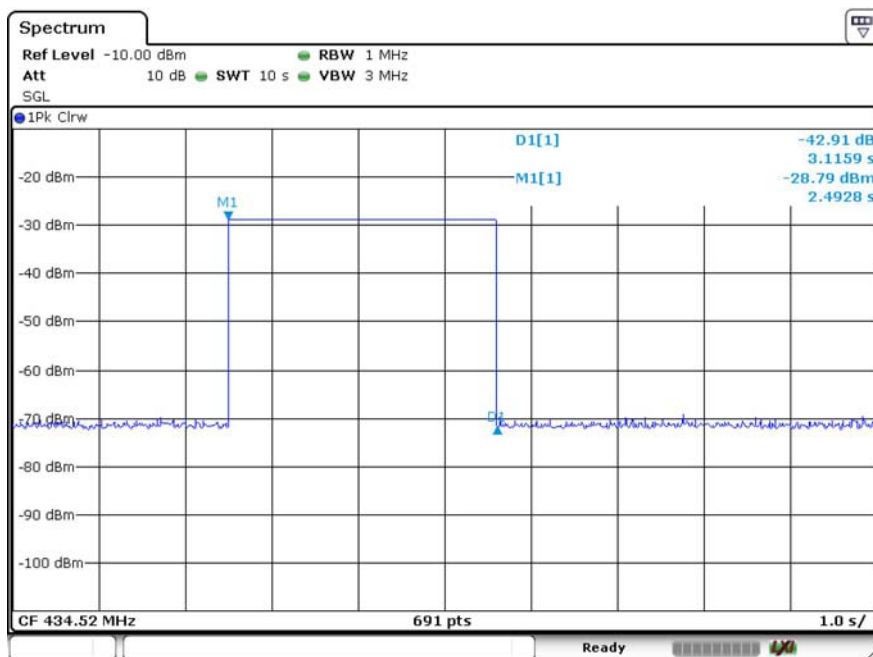
Temperature	: 29.7°C	Humidity	: 71%
Test Date	: 28-Jun-2021	Tested by	: Tom Tang
Test Mode	: Mode 1	Channel	: Low (433.32 MHz)



Duration of being released (sec)	Limit of duration (sec)	Result
3.2464	5	Pass

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

Temperature	: 29.7°C	Humidity	: 71%
Test Date	: 28-Jun-2021	Tested by	: Tom Tang
Test Mode	: Mode 3	Channel	: High (434.52 MHz)



Duration of being released (sec)	Limit of duration (sec)	Result
3.1159	5	Pass

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

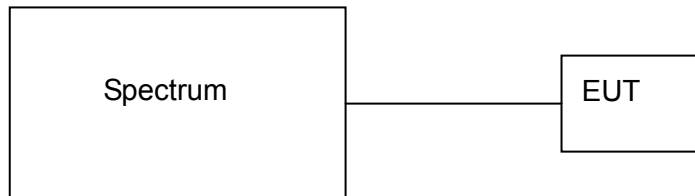


## 5 Emission Bandwidth

### 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 100 kHz RBW and 100 kHz VBW. Measured the -20 dB bandwidth and plotted the graph.
3. Manually adjust to Channel low (433.32 MHz) and Channel high (434.52MHz).

### 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.

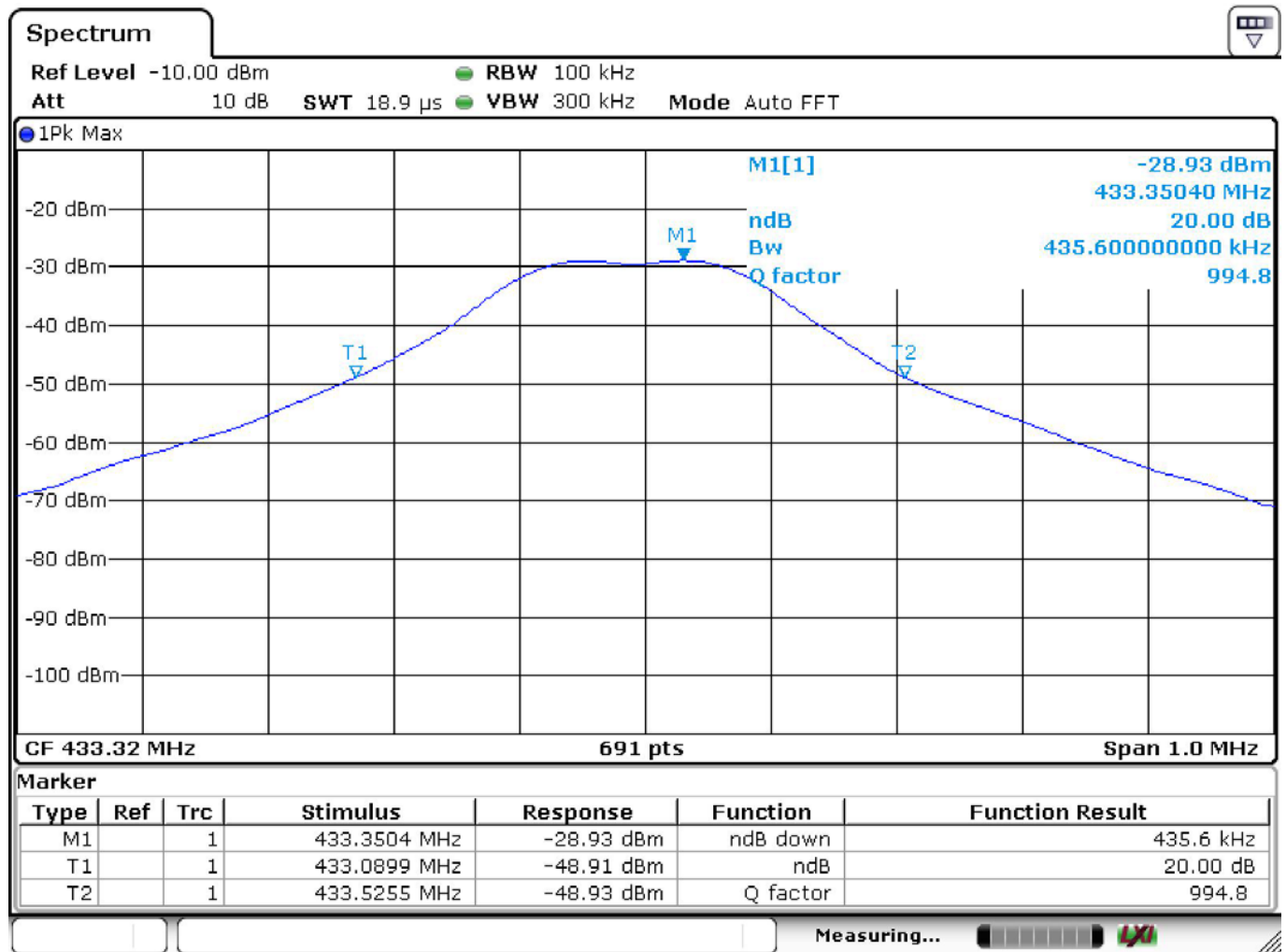
### 5.4 Test Result

#### Compliance.

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



Temperature	: 29.7°C	Humidity	: 71%
Test Date	: 28-Jun-2021	Tested by	: Tom Tang
Test Mode	: N/A	Channel	: Low (433.32 MHz)

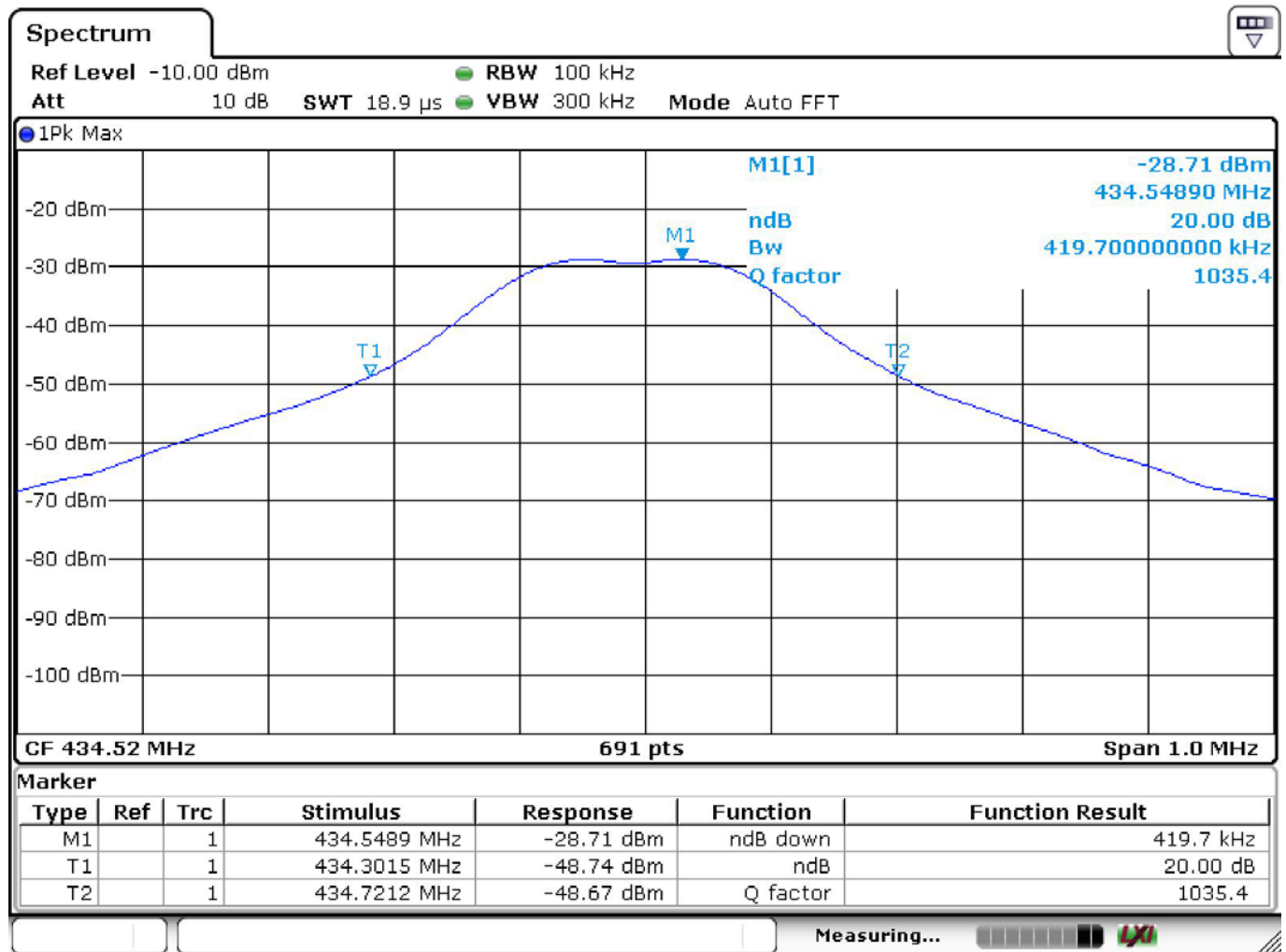


-20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Result
435.6	1083.3	Pass

Limit = 0.25% of 433.32MHz is 1083.3kHz



Temperature	: 29.7°C	Humidity	: 71%
Test Date	: 28-Jun-2021	Tested by	: Tom Tang
Test Mode	: N/A	Channel	: High (434.52 MHz)



-20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Result
419.7	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 unique 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 PCB antenna with 1.13 dBi gain.