

FCC Test Report

Part 15 subpart C

Client Information:

Applicant : AUDIO LINK.CO., LTD
Applicant add.: #101-1207. CHUNUI TECHNO PARK. 198-36 BUCHEON ROAD.
WONMI-GU. BUCHEON CITY.GYEONGGI-DO. KOREA

EUT Information:

EUT Name : RF REMOTE
Model No. : GO RIDER CONTROLLER
Brand Name : MEDALLION
FCC ID : 2AFN315RM01

Prepared By:

Shenzhen ECT Testing Technology Co., Ltd.
Add. : Room 1106, Era Innovation Center, Xixiang gushu second road,
Baoan district, Shenzhen city, China
Date of Receipt: Jul. 06, 2015 Date of Test: Jul. 06~ 20, 2015
Date of Issue: Jul. 20, 2015 Test Result: **Pass**

Test procedure used: ANSI C63.4-2009

This device described above has been tested by Shenzhen ECT Testing Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

*This test report must not be used by the client to claim product endorsement by any agency of the U.S. government.



Reviewed by: Nancy Xu
Nancy Xu

Approved by: Kelly Jiang
Kelly Jiang

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2 Test Summary

2.1 Compliance with FCC Part 15 subpart C

Test	Test Requirement	Standard Paragraph	Result
Antenna Requirement	FCC Part 15 C:2013	Section 15.203	PASS
Radiated Emission	FCC Part 15 C:2013	section 15.231(b)	PASS
Occupied Bandwidth	FCC Part 15 C:2013	section 15.231(c)	PASS
Dwell Time	FCC Part 15 C:2013	section 15.231(a)	PASS

2.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, The following measurements uncertainty Levels have estimated based on ANSI C63.4:2009, the maximum value of the uncertainty as below

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	Radiated Emission Test	$\pm 3.57\text{dB}$

3 General Information

3.1 General Description of EUT

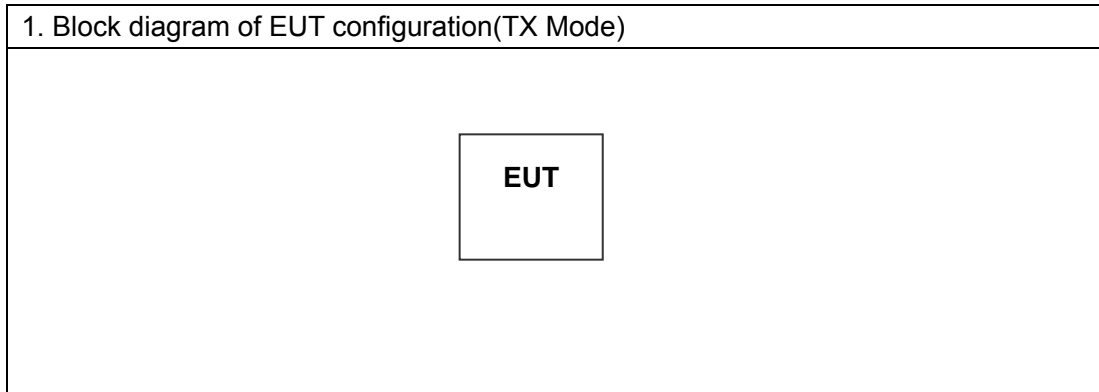
Manufacturer:	Audio Development Organization
Manufacturer add:	Puxinhu,Pulong Industry Complex Tangxia Town,Dongguan City, Guangdong Province,China
EUT Name:	RF REMOTE
Model No:	GO RIDER CONTROLLER
Serial No:	N/A
Brand Name:	MEDALLION
Operation frequency:	433.92MHz
Channel Number:	1
Modulation Technology:	ASK
AntennaType:	Integral
Antenna Gain:	0 dBi
Power Supply Range:	DC 3.0 V (CR2016 battery)
Power Supply:	DC 3.0 V (CR2016 battery)
Power Cord:	N/A

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 Description of Test conditions

(1) EUT was tested in normal configuration (Please See following Block diagram)



(2) E.U.T. test conditions:

15.31(e): For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

(3) Test frequencies:

According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and. If required reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

(4) Frequency range of radiated measurements:

According to the 15.33, The test range will be up to the tenth harmonic of the highest fundamental frequency .

3.3 EUT Peripheral List

No.	Equipment	Manufacturer	Model No.	Serial No.	Power cord	signal cable
1	N/A	N/A	N/A	N/A	N/A	N/A

3.4 Test Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	signal cable
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

4 Equipments List for All Test Items

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	ADVANTEST	R3182	150900201	2014.10.16	2015.10.15
2	EMI Measuring Receiver	Schaffner	SCR3501	235	2014.10.16	2015.10.15
3	Low Noise Pre Amplifier	Tsj	MLA-10K01-B01-27	1205323	2014.09.08	2015.09.07
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2015.04.08	2016.04.07
5	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2015.07.05	2016.07.04
6	Broadband Horn Antenna	SCHWARZBECK	BBHA9120A	451	2015.07.05	2016.07.04
7	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2014.09.08	2015.09.07
8	EMI Test Receiver	R&S	ESCI	100124	2014.12.29	2015.12.28
9	LISN	Kyoritsu	KNW-242	8-837-4	2015.04.08	2016.04.07
10	LISN	Kyoritsu	KNW-407	8-1789-3	2015.04.08	2016.04.07
11	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2015.04.08	2016.04.07
12	Loop Antenna	ARA	PLA-1030/B	1029	2015.04.08	2016.04.07
13	Power Meter	R&S	NRVS	101336	2015.04.08	2016.04.07
14	EMI Test Receiver	Rohde & Schwarz	ESIB26	100394	2015.04.08	2016.04.07

5 Test Result

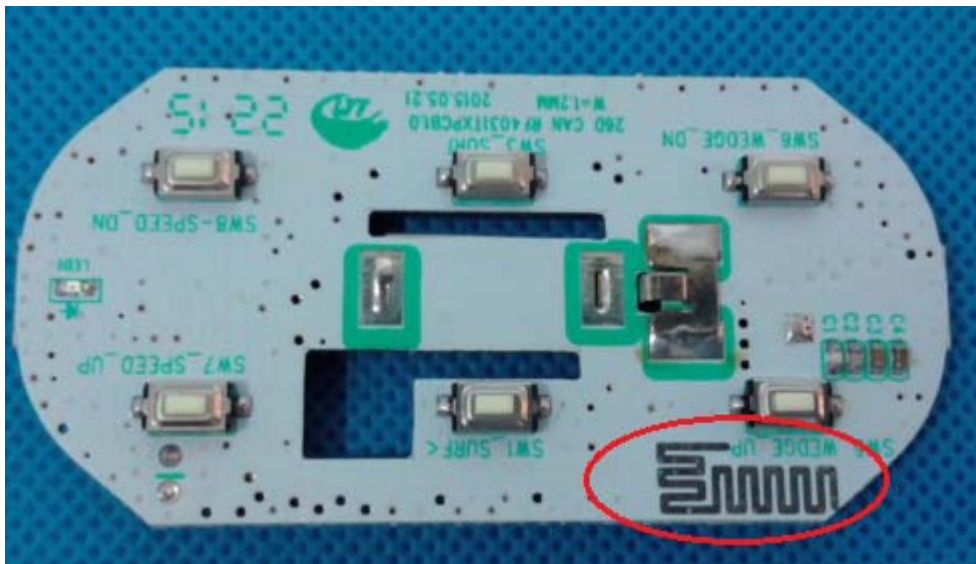
5.1 Antenna Requirement

5.1.1 Standard requirement

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

5.1.2 EUT Antenna

The antenna is an integral Antenna on the main PCB and no consideration of replacement. The maximum gain of the antenna is 0 dBi.



Test result: The unit does meet the FCC requirements.

5.2 Radiated Emissions Measurement

Test Requirement:	FCC Part15 C section 15.231(b)
Measurement Distance:	3 m (Semi-Anechoic Chamber)
Test Status:	Test in transmitting mode.
Requirements:	the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency MHz	Field Strength of Fundamental (dB μ V/m @ 3 m)	Field Strength of Harmonics and Spurious Emissions (dB μ V/m @ 3 m)
40.66 to 40.70	67.04	47.04
70 to 130	61.94	41.94
130 to 174	61.94 to 71.48	41.94 to 51.48
174 to 260	71.48	51.48
260 to 470	71.48 to 81.94	51.48 to 61.94
Above 470	81.94	61.94
Detector:	Peak for pre-scan QP for 30MHz to1000 MHz:120 kHz resolution bandwidth Peak for Above 1 GHz: 1 MHz resolution bandwidth	

** 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, μ V/m at 3 meters = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, μ V/m at 3 meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

The fundamental frequency of the EUT is 433.92 MHz

The limit for average or QP field strength dBuV/m for the fundamental emission= 80.8 dB μ V/m

No fundamental is allowed in the restricted bands.

The limit for average field strength dBuV/m for the spurious emission=60.8 dBuV/m.Spurious in the restricted bands must be less than 60.8 dBuV/m or 15.209, whichever limit permits a higher field strength.

Test Procedure:

1) 9 kHz to 30 MHz emissions:

For testing performed with the loop antenna. The center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

2) 30 MHz to 1 GHz emissions:

For testing performed with the bi-log type antenna. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

3) 1 GHz to 40 GHz emissions:

Test site with RF absorbing material covering the ground plane that met the site validation criterion called out in CISPR 16-1-4:2007 was used to perform radiated emission test above 1 GHz.

For testing performed with the horn antenna. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

Detector For PK value:

: RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

For AV value:

For other unwanted emissions:

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW = 10Hz

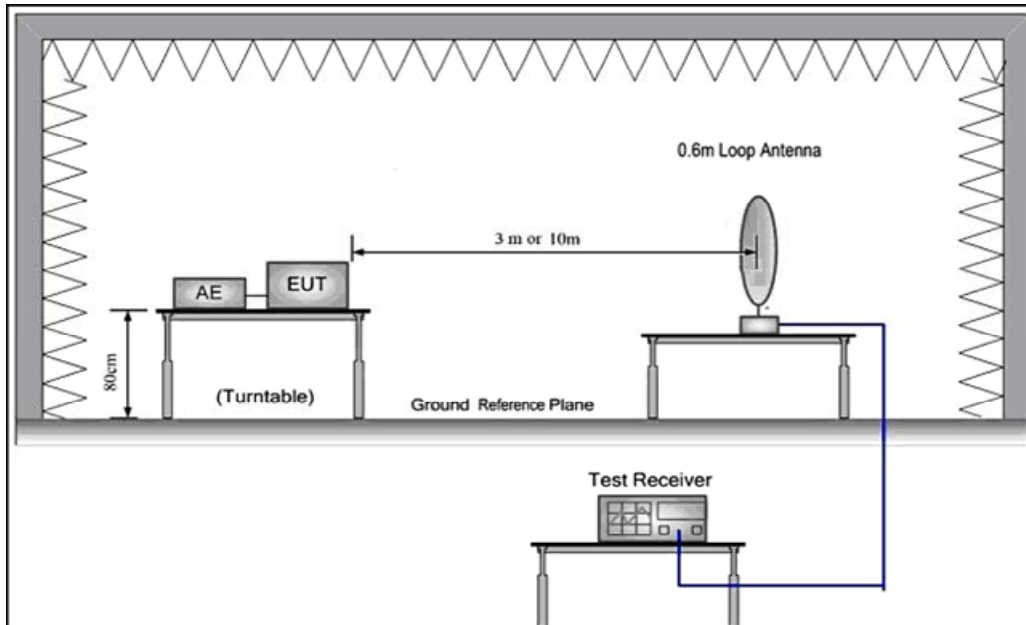
Sweep = auto

Detector function = peak

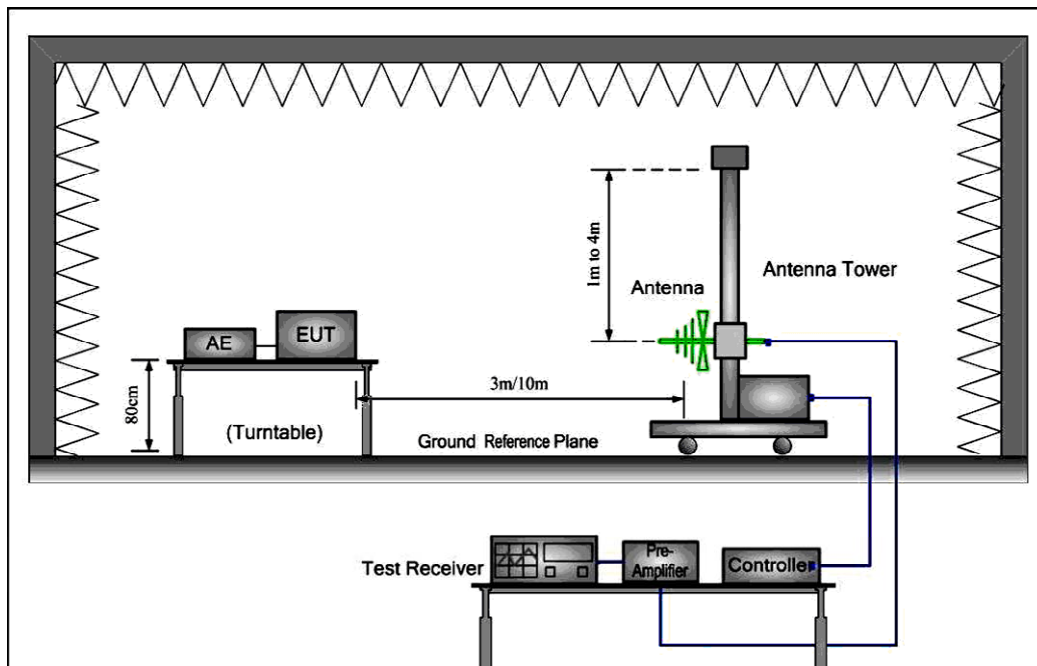
Trace = max hold

Test Configuration:

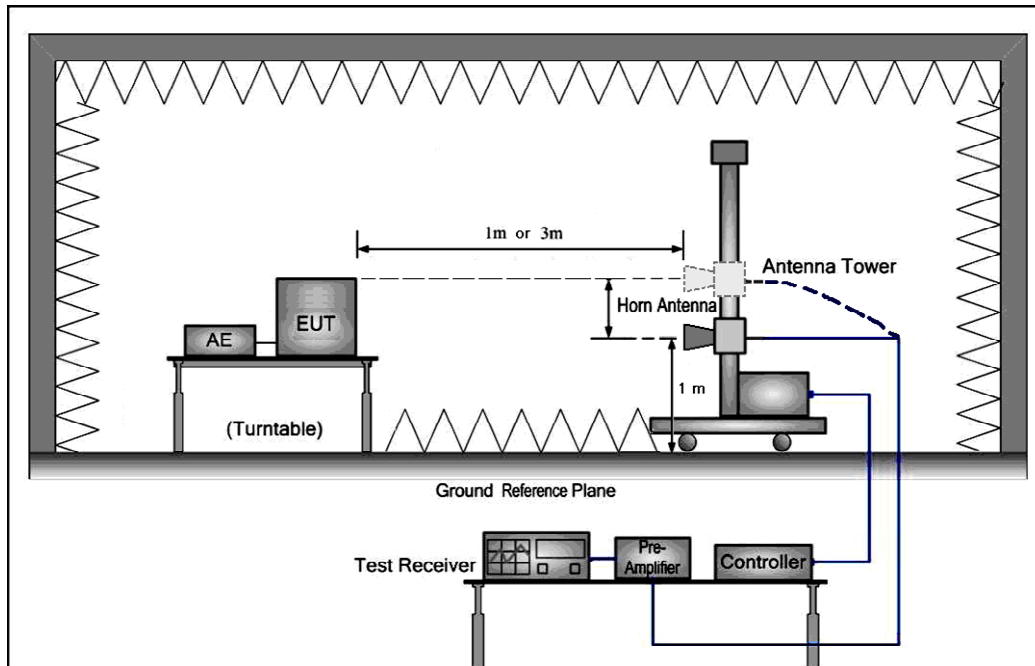
- 1) 9 kHz to 30 MHz emissions:



- 2) 30 MHz to 1 GHz emissions:



3) 1 GHz to 40 GHz emissions:



1) Fundamental emission:

Antenna polarization: Horizontal:

Frequency (MHz)	Read Level (dBUV)	Factor (dB)	Level (dBUV/m)	Limit Line (dBUV/m)	Over Limit (dB)	Remark
433.92	83.18	-6.57	76.61	100.8	-24.19	Peak
433.92	80.64	-6.57	74.07	80.8	-6.73	Average

Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBUV)	Factor (dB)	Level (dBUV/m)	Limit Line (dBUV/m)	Over Limit (dB)	Remark
433.92	87.16	-6.57	80.59	100.8	-20.21	Peak
433.92	84.31	-6.57	77.74	80.8	-3.06	Average

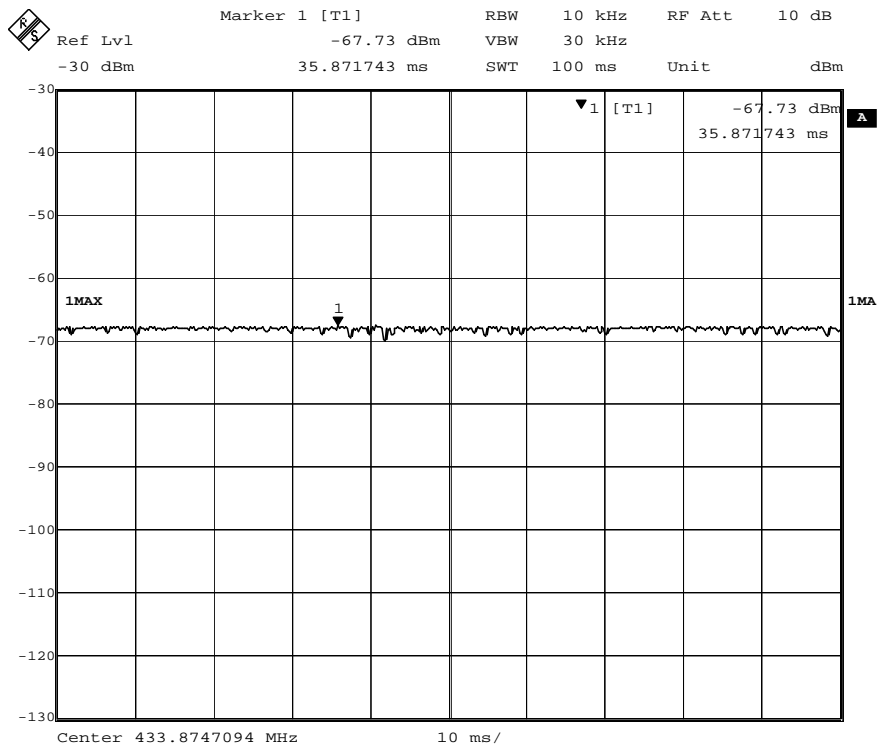
Antenna polarization: Vertical

Y: rotate EUT by 90° vertically.

X: rotate EUT by 90° clockwise.

Z: EUT as Radiated Emission test setup photograph in section 6 of this report.

Remark: Radiated Emission test setup photograph in section 6 of this report is the worst case and reported.



Duty cycle=100%

2) other emissions:

The receive was scanned from the lowest frequency generated within the EUT to 5 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. The worst case emissions were reported.

An initial pre-scan was performed in the 3 m chamber using the spectrum analyzer in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bilog antenna with 2 orthogonal polarities.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Peramplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor –Peramplifier Factor.

The following test results were performed on the EUT.

Test the EUT in transmitting mode.:

9 kHz~30 MHz Field Strength of Unwanted Emissions.Quasi-Peak Measurement

The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

30 MHz~5 GHz Field Strength of Unwanted Emissions.Quasi-Peak Measurement

Horizontal.

Frequency (MHz)	Read Level (dBUV)	Factor (dB)	Level (dBUV/m)	Limit Line (dBUV/m)	Over Limit (dB)	Remark
100.5806	32.13	-13.75	18.38	43.50	-25.12	QP
290.0172	30.27	-9.64	20.63	46.00	-25.37	QP
408.946	37.21	-6.61	30.60	46.00	-15.40	QP
463.9696	38.08	-6.50	31.58	46.00	-14.42	QP
629.4772	37.92	-2.12	35.80	46.00	-10.20	QP
801.7862	32.81	3.09	35.90	46.00	-10.10	QP
1301.332	41.12	-10.33	30.79	74.00	-43.21	peak
1301.332	29.25	-10.33	18.92	54.00	-35.08	AVG
1771.048	39.51	-9.43	30.08	74.00	-43.92	peak
1771.048	26.42	-9.43	16.99	54.00	-37.01	AVG
2312.995	39.45	-6.41	33.04	74.00	-40.96	peak
2312.995	26.35	-6.41	19.94	54.00	-34.06	AVG
3009.976	42.18	-1.65	40.53	74.00	-33.47	peak
3009.976	29.78	-1.65	28.13	54.00	-25.87	AVG
3902.968	40.92	3.12	44.04	74.00	-29.96	peak
3902.968	26.85	3.12	29.97	54.00	-24.03	AVG
4553.192	41.78	4.97	46.75	74.00	-27.25	peak
4553.192	27.38	4.97	32.35	54.00	-21.65	AVG

Vertical.

Frequency (MHz)	Read Level (dBUV)	Factor (dB)	Level (dBUV/m)	Limit Line (dBUV/m)	Over Limit (dB)	Remark
182.5592	31.72	-10.47	21.25	43.50	-22.25	QP
277.0935	31.27	-10.43	20.84	46.00	-25.16	QP
413.2706	36.08	-6.68	29.40	46.00	-16.60	QP
460.7271	39.98	-6.78	33.20	46.00	-12.80	QP
633.9071	39.49	-2.09	37.40	46.00	-8.60	QP
787.8513	38.89	-0.29	38.60	46.00	-7.40	QP
1336.7820	39.28	-10.30	28.98	74.00	-45.02	peak
1336.7820	26.52	-10.30	16.22	54.00	-37.78	AVG
1933.5690	38.59	-9.37	29.22	74.00	-44.78	peak
1933.5690	25.88	-9.37	16.51	54.00	-37.49	AVG
2622.0770	40.90	-4.06	36.84	74.00	-37.16	peak
2622.0770	28.31	-4.06	24.25	54.00	-29.75	AVG
3455.2600	40.62	-0.69	39.93	74.00	-34.07	peak
3455.2600	27.56	-0.69	26.87	54.00	-27.13	AVG
4052.6220	40.79	3.92	44.71	74.00	-29.29	peak
4052.6220	26.05	3.92	29.97	54.00	-24.03	AVG
4770.3240	41.89	5.06	46.95	74.00	-27.05	peak
4770.3240	27.63	5.06	32.69	54.00	-21.31	AVG

Remark:

According to 15.35 (b) When average radiated emission measurements are specified in the regulations, including emission measurements below 1000 MHz, there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules, e.g., see Section 15.255.

This test item was transferred to Asia Institute Technology (Dongguan) Limited which was confirmed to have enough capacity to perform this subcontract work. The FCC Registration No. of Asia Institute Technology (Dongguan) Limited is 248337.

Test result: The unit does meet the FCC requirements.

5.3 BANDWIDTH TEST

Test Requirement: FCC Part 15 C section 15.231 (c)

Test Status: Test in transmitting mode at lowest and highest channel.

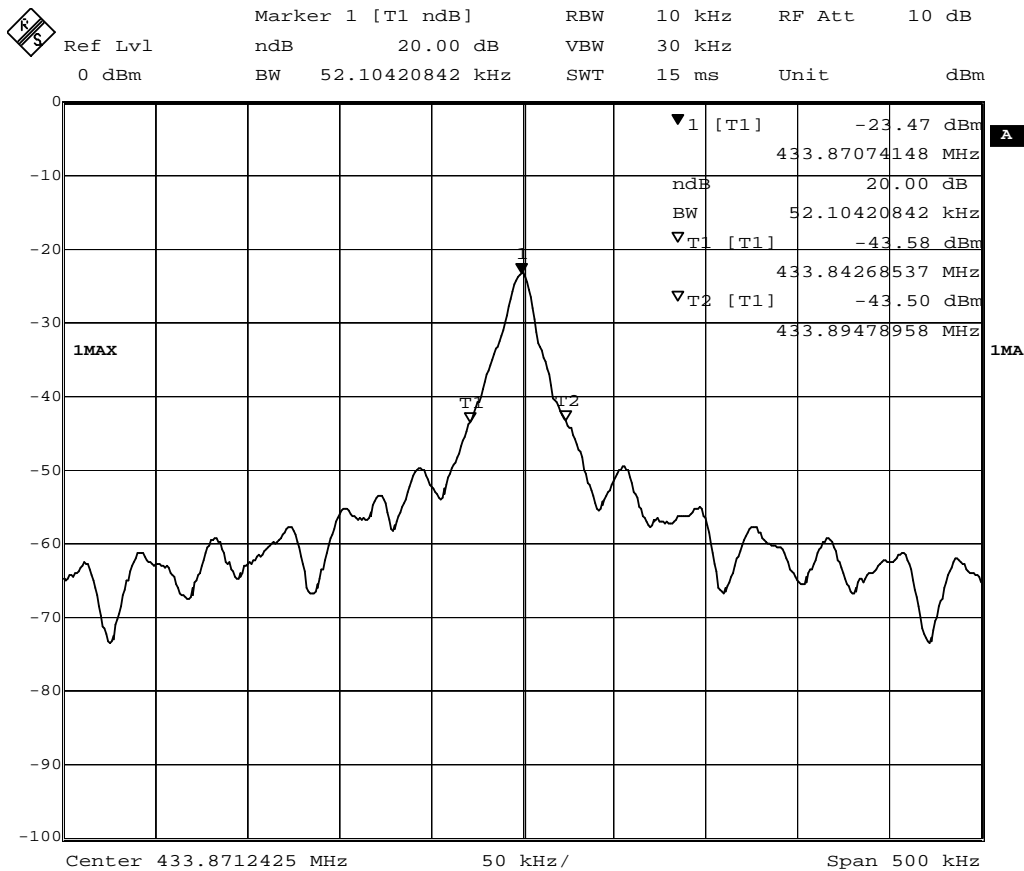
Requirements: 15.231 (c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Method of measurement: The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector. Record the 20 dB bandwidth of the carrier.

Test result:

Test Channel	bandwidth	Limit
433.92MHz	52.10 kHz	1.08 MHz

Test plot:



5.4 Dwell time

Test Requirement: FCC Part 15 C section 15.231(a)

Test Method: FCC Part 15 C section 15.231(a)

Test Status: Test in transmitting mode.

Requirements:

1. Regulation 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. Radio control of toys is not permitted. Continuous transmissions, such as voice or video, and data transmissions are not permitted. The prohibition against data transmissions does not preclude the use of recognition codes. Those codes are used to identify the sensor that is activated or to identify the particular component as being part of the system.

Result:

The EUT is a remote switch without audio or video transmitted.

The EUT meets the requirements of this section.

2. Regulation 15.231 (a1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Result:

Carrier Frequency	Shutdown Time	Limit
433.92MHz	0.408	≤5s

Result polt as follows:

