FCC RADIO TEST REPORT

Applicant	:	Shenzhen JueXiao Technology co.,Ltd
Address	:	4th Floor, No.72, Ailian Zhangbei Road, Longcheng Street, Longgang District, Shenzhen（518172 ）
Equipment	:	DOG TRAINING COLLAR
Model No.	:	JPXG001
Trade Name	:	N/A
FCC ID	:	2APKN-JPXG001

I HEREBY CERTIFY THAT :

The sample was received on Apr. 10, 2018 and the testing was carried out on May 03, 2018 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Mark Liao

Assistant Manager

Laboratory Accreditation:

☒ Cerpass Technology Corporation Test Laboratory

TAF LAB Code:	**1439**

☐ Cerpass Technology(SuZhou) Co., Ltd.

NVLAP LAB Code:	**200814-0**
CNAS LAB Code:	**L5515**

Contents

History of this test report

■ ORIGINAL

☐ Additional attachment as following record:

Attachment No.	Issue Date	Description
DEFL1804006	May 03, 2018	Original

1. Summary of Test Procedure and Test Results

1.1 Applicable Standards

ANSI C63.10-2013

FCC Rules and Regulations Part 15 Subpart C §15.231

FCC Rule	. Description of Test	Result
15.203	. Antenna Requirement	Pass
15.207	. AC Power Line Conducted Emission	N/A
15.209 15.231	. Spurious Emission(Radiated)	Pass
15.231	. 20dB Occupied Bandwidth Measurement	Pass

Note: (1)"N/A" denotes test is not applicable in this test report.

2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Modulation Type	ASK
Frequency Range	433.92MHz
Channel Number	1
Antenna Type/ gain	spring antenna with 2.5dBi
Power Source	3.7V DC

2.2 Test Mode and Test Software

a. During testing, the interface cables and equipment positions were varied according to technical standards.
b. The complete test system included EUT for the test.
c. XYZ 3 axes of the EUT have been tested, only the worst axis was reported.
d. Lithium battery was used for all the testing on this report.

2.3 Description of Test System

The EUT was tested alone. No support devices are needed for testing.

2.4 General Information of Test

☒	Test Site	**Cerpass Technology Corporation Test Laboratory** Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582
	FCC	TW1079, TW1061, TW1439
	IC	4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-3428, R-4218 for Radiated emission test G-812, G-813 for radiated disturbance above 1GHz
Frequency Range Investigated:		Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 25000MHz
Test Distance:		The test distance of radiated emission from antenna to EUT is 3 M.

3. Test Equipment and Ancillaries Used for Tests

Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI3	100821	2017/09/08	2018/09/07
LISN	Schwarzbeck	NSLK 8127	8127-568	2018/02/26	2019/02/25
Pulse Limiter	R&S	ESH3-Z2	101934	2018/02/22	2019/02/21
Bilog Antenna	Schwarzbeck	VULB9168	275	2017/08/31	2018/08/30
Active Loop Antenna	EMCO	6507	40855	2017/05/15	2018/05/14
Horn Antenna	EMCO	3115	31601	2017/09/11	2018/09/10
Horn Anrenna	EMCO	3116	31970	2018/03/23	2019/03/22
Preamplifier	EM	EM330	60658	2017/09/08	2018/09/07
Preamplifier	EMC INSTRUMENTS	EMC051845SE	980333	2017/09/20	2018/09/19
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2017/11/10	2018/11/09
MXG MW Analog Signal Generator	KEYSIGHT	N5183A	MY50142931	2018/03/23	2019/03/22
Spectrum Analyzer	R&S	FSP40	100219	2017/07/01	2018/06/30
BLUETOOTH TESTER	R&S	CBT	101133	2018/04/02	2019/04/01
Attenuator	KEYSIGHT	8491B	MY39250705	2017/09/04	2018/09/03
Rotary Attenuator	Agilent	8495B	MY42146680	2018/03/29	2019/03/28
Temp & Humi chamber	T-MACHINE	TMJ-9712	T-12-040111	2017/09/04	2018/09/03
Series Power Meter	Anritsu	ML2495A	1224005	2018/03/23	2019/03/22
Power Sensor	Anritsu	MA2411B	1207295	2018/03/23	2019/03/22
Software	Farad	Ez-EMC	ver.ct3a1	N/A	N/A
Software	AUDIX	E3	V8.2014-8-6	N/A	N/A
Software	Keysight	N7607B Signal Studio	V3.0.0.0	N/A	N/A
Software	Keysight	Inservice MonitorUtility	N/A	N/A	N/A

4. Antenna Requirements

4.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 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.

4.2 Antenna Construction and Directional Gain

No.	Antenna Type	Antenna Gain
	spring antenna	2.5dBi

5. Test of Radiated Emission

5.1 Test Limit

According to 15.231(e) the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Frequency (MHz)	Field Strength of Fundamental	Field Strength of Spurious
	μV/ m	μV/ m
40.66 ~ 40.70	2250	225
70 ~130	1250	125
130 ~ 174	1250 ~ 3750	125 ~ 375
174 ~ 260	3750	375
260 ~ 470	3750~ 12500	375~ 1250
Above 470	12500	1250

NOTE:

1. Where F is the frequency in MHz, the formula for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 56.81818(F) - 6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(F) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.
2. The above field strength limits are specified at a distance of 3meters. The tighter limits apply at the band edges.

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequency (MHz)	Distance	Limit (μV/ m)
0.09 ~ 0.490	300m	2400/F(kHz)
0.490 ~ 1.705	30m	24000/ F(kHz)
1.705 ~ 30	30m	30
30 ~ 88	3m	100
88 ~ 216	3m	150
216 ~ 960	3m	200
Above 960	3m	500

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

5.2 Test Procedures

a. The EUT was placed on a rotatable table top 0.8 meter above ground.
b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
i. “Cone of radiation” has been considered to be 3dB beamwidth of the measurement antenna.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The Average value = Peak value + 20log(Duty cycle)
4. Duty Factor = 20log(total duty / period of pulse train)

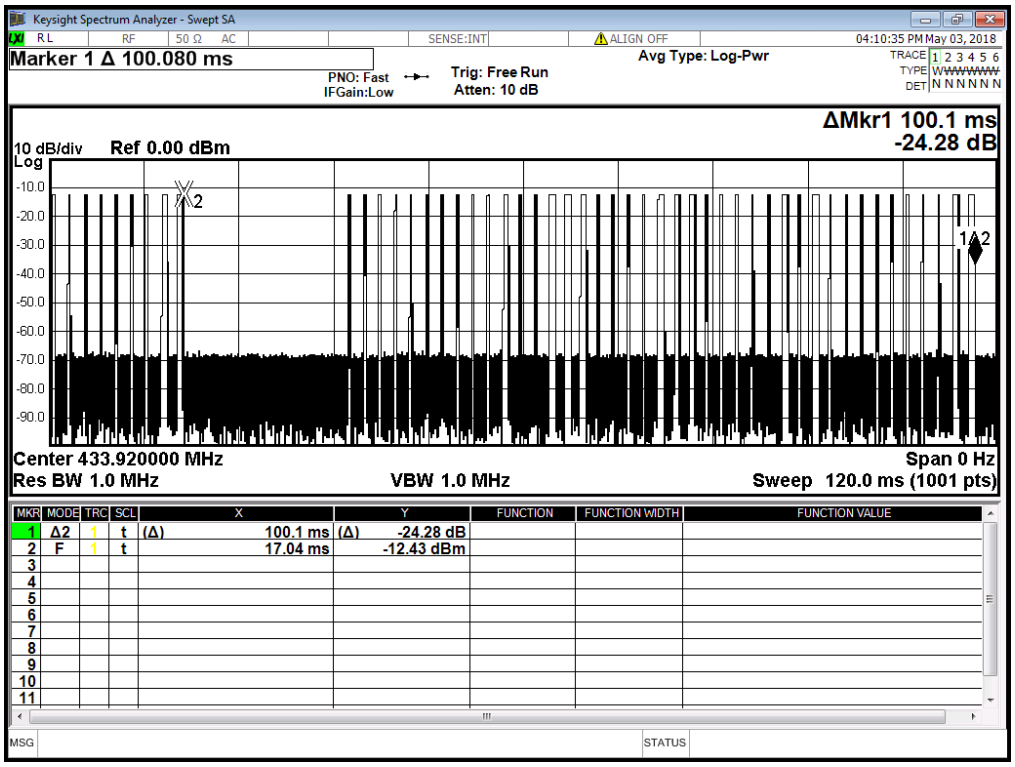
NATA& PLOT:

Data Transmissions		Number of pulses
Long pulse Duration	0.76 msec	10
Short pulse Duration	0.27 msec	30
Total Transmissions Duration	0.76∗10+0.27*30=15.7 msec	
Off Time	100.1 msec	
Dutycycle Correction factor	20log(15.7/100.1)=-16.09dB	

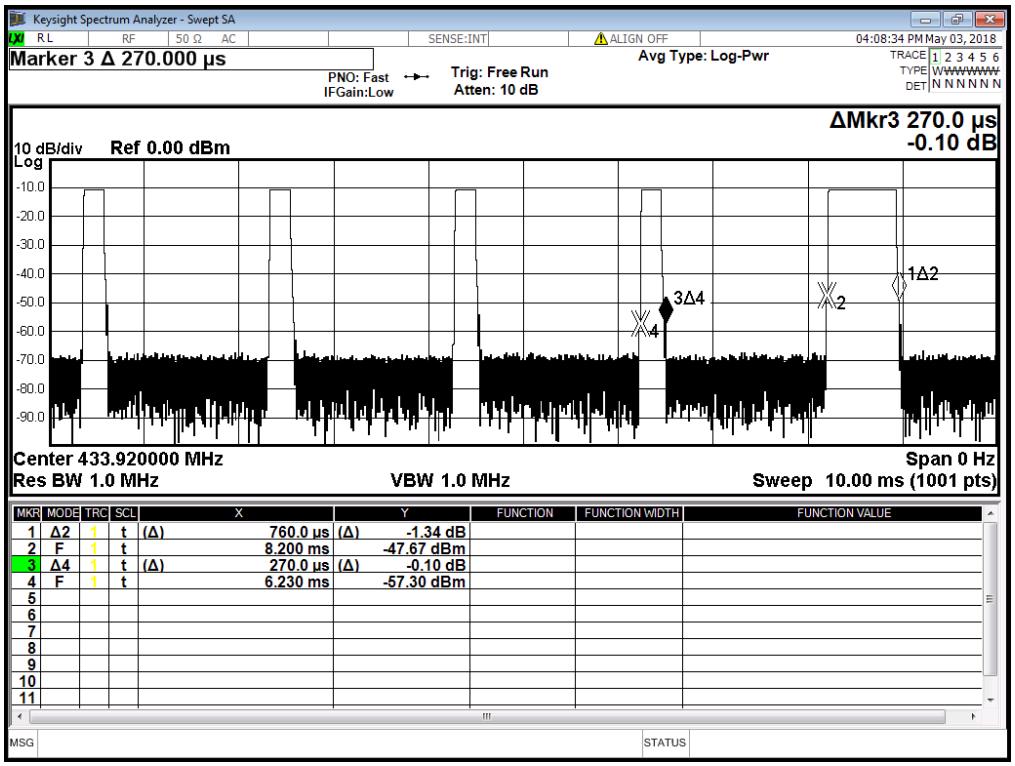
Test Date: May 03, 2018 Temperature: 26°C

Atmospheric pressure: 1008 hPa Humidity: 50%

Number of pulses

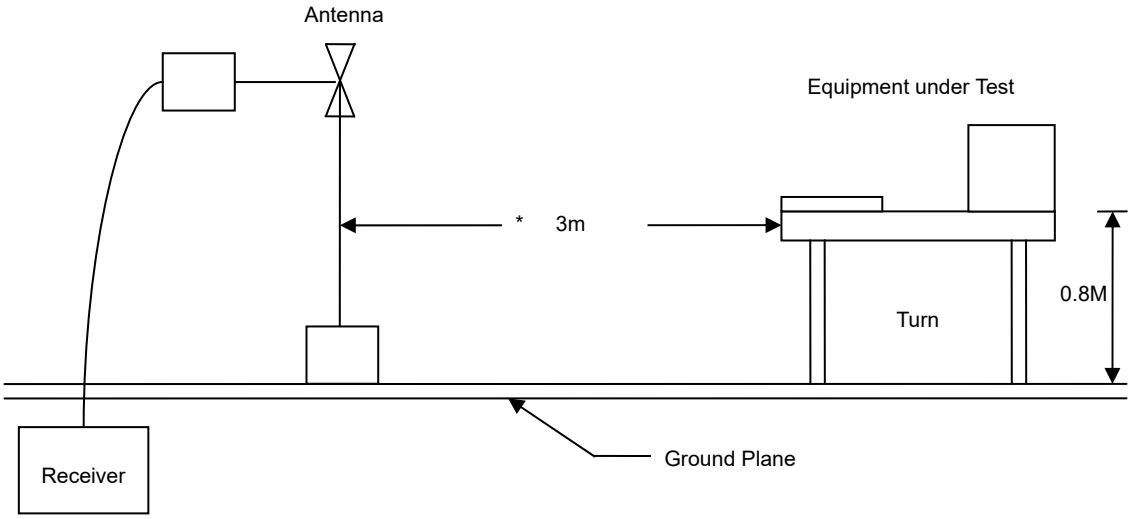


Pulse Duration

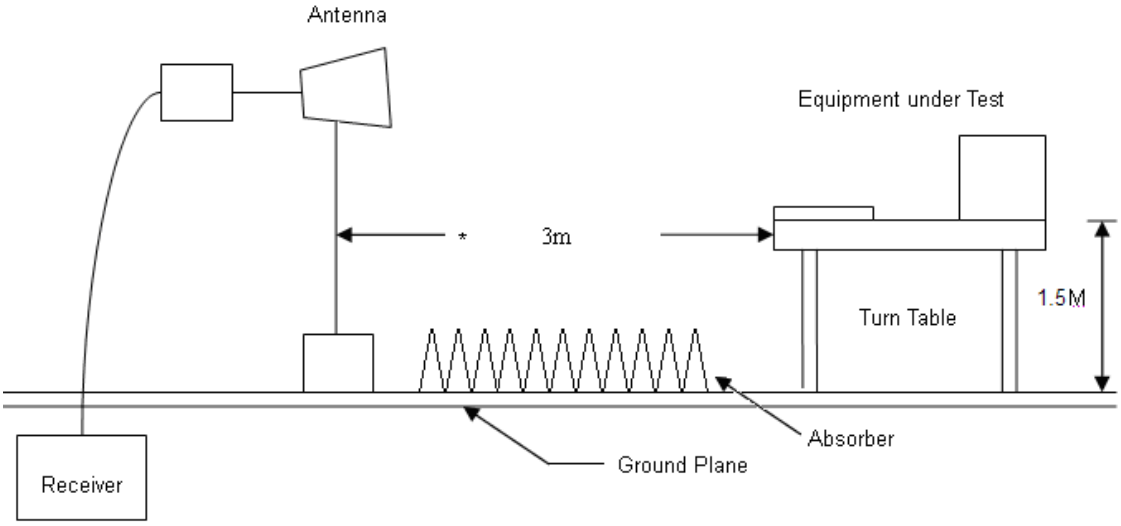


5.3 Typical Test Setup

Below 1GHz test setup



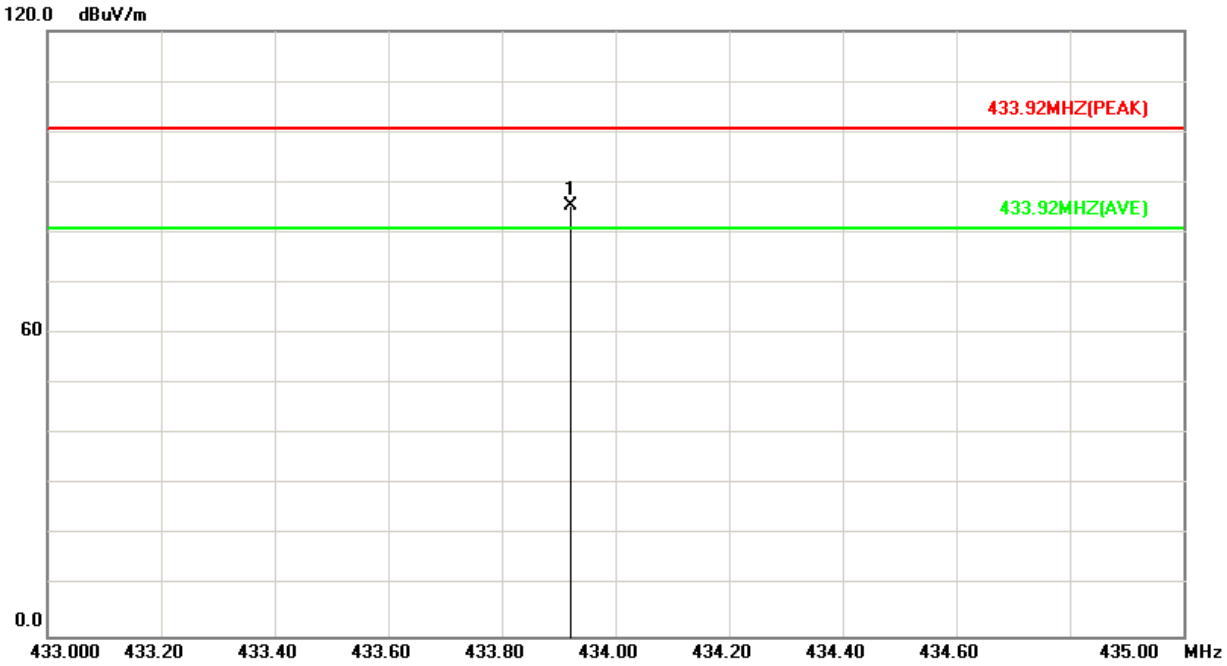
Above 1GHz Test Setup



5.4 Test Result and Data

5.4.1 Test Result of Fundamental Emission

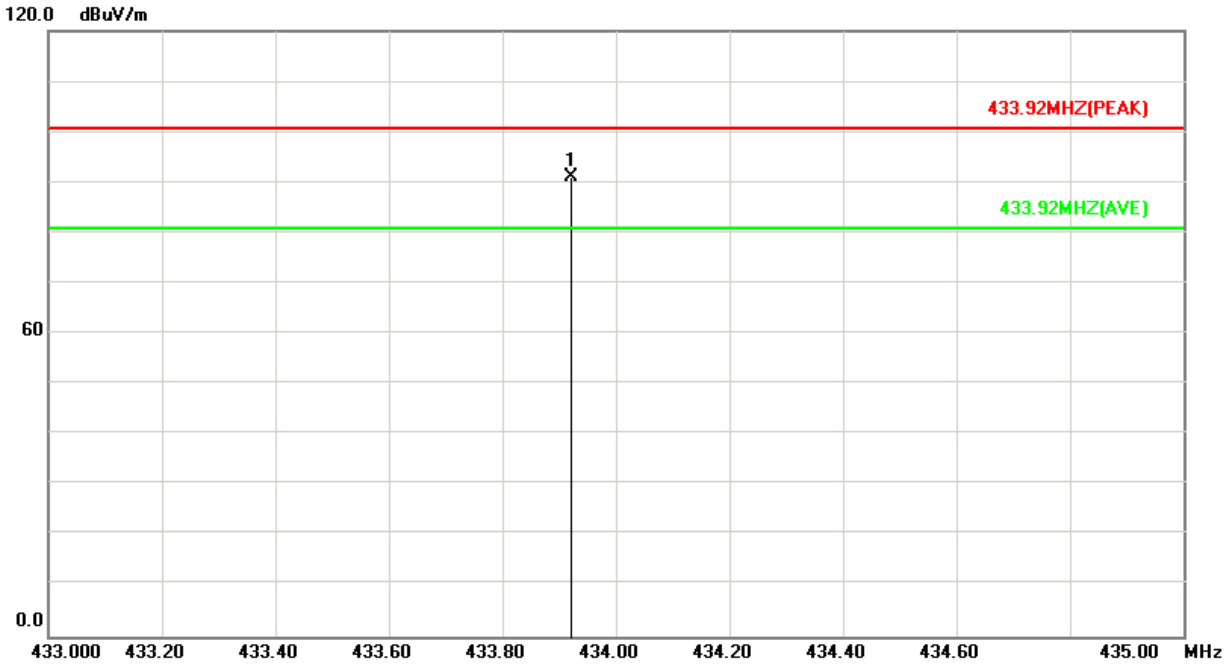
Power	:	DC 3.7V	Pol/Phase	:	VERTICAL
Test Mode	:	Transmit	Temperature	:	26 °C
Test Date	:	Apr. 18, 2018	Humidity	:	50 %
Memo	:		Atmospheric Pressure	:	1009 hpa



Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
433.9200	-4.45	89.94	85.49	100.80	-15.31	peak

Note: Level = Reading + Factor
Margin = Level – Limit
AV=Peak value+ Duty cycle factor= 85.49+ (-16.09) = 69.40 dBuV/m < Limit 80.80dBuV/m

Power	:	DC 3.7V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Transmit	Temperature	:	26 °C
Test Date	:	Apr. 18, 2018	Humidity	:	50 %
Memo	:		Atmospheric Pressure	:	1009 hpa



Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
433.9200	-4.45	95.46	91.01	100.80	-9.79	peak

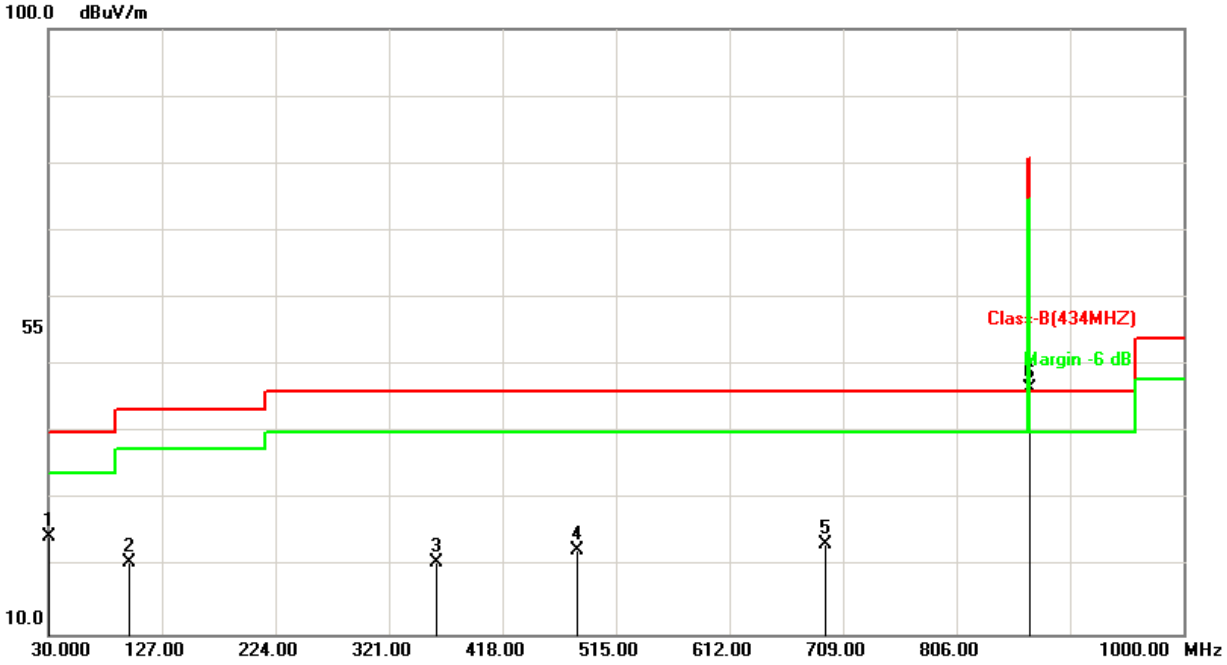
Note: Level = Reading + Factor
Margin = Level – Limit
AV=Peak value+ Duty cycle factor= 91.01+ (-16.09) = 74.92 dBuV/m < Limit 80.80dBuV/m

5.4.2 Test Result and Data (9KHz ~ 30MHz)

The 9kHz-30MHz spurious emission is under limit 20dB more.

5.4.3 Test Result of Unwanted Spurious emission(Below 1GHz)

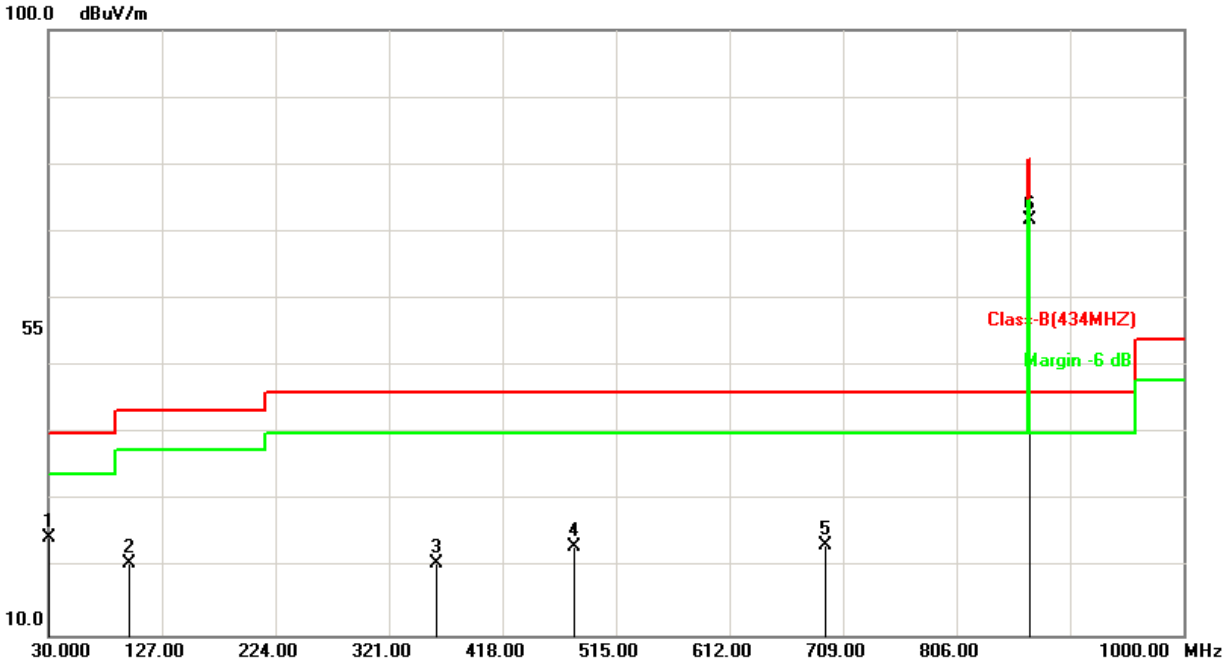
Power	:	DC 3.7V	Pol/Phase	:	VERTICAL
Test Mode	:	Transmit	Temperature	:	26 °C
Test Date	:	Apr. 18, 2018	Humidity	:	50 %
Memo	:		Atmospheric Pressure	:	1009 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	30.0000	-3.01	27.48	24.47	40.00	-15.53	peak	100	0
2	98.8700	-9.77	30.52	20.75	43.50	-22.75	peak	100	0
3	361.7400	-4.46	25.21	20.75	46.00	-25.25	peak	100	0
4	482.0199	-1.22	23.77	22.55	46.00	-23.45	peak	100	0
5	694.4500	-1.20	24.68	23.48	46.00	-22.52	peak	100	0
6	868.0800	2.27	44.26	46.53	80.80	-34.27	peak	100	0

Note: Level = Reading + Factor
Margin = Level – Limit

Power	:	DC 3.7V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Transmit	Temperature	:	26 °C
Test Date	:	Apr. 18, 2018	Humidity	:	50 %
Memo	:		Atmospheric Pressure	:	1009 hpa

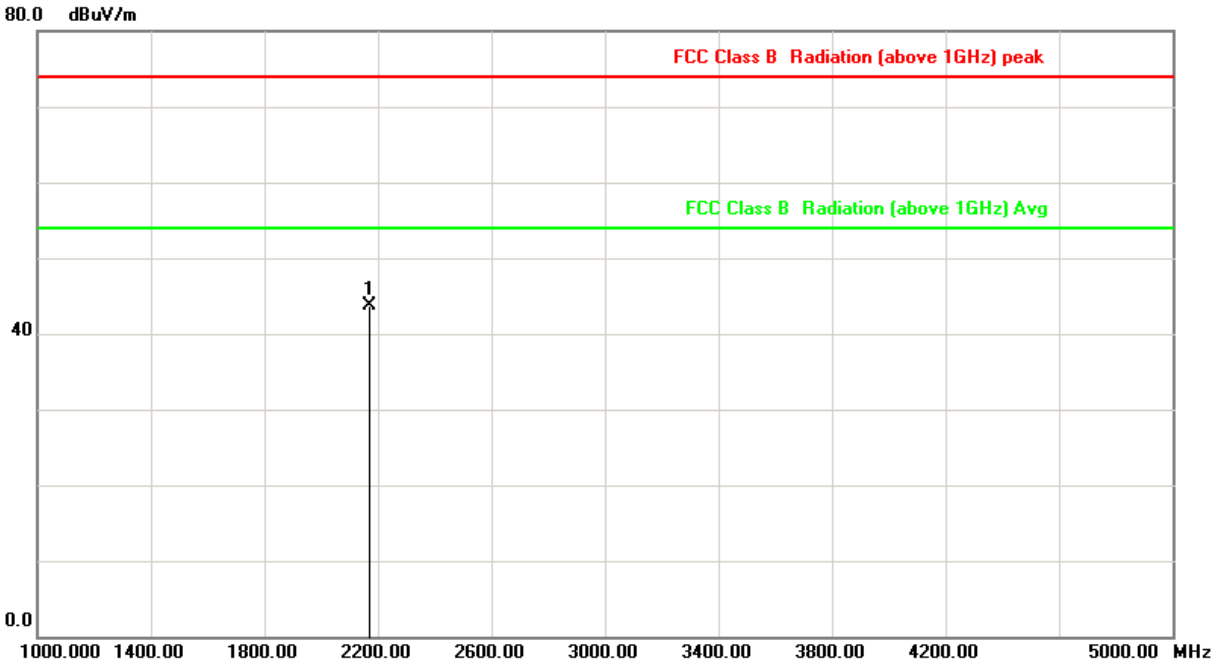


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	30.0000	-3.01	27.61	24.60	40.00	-15.40	30.0000	100	360
2	98.8700	-9.77	30.52	20.75	43.50	-22.75	98.8700	100	360
3	361.7400	-4.46	25.21	20.75	46.00	-25.25	361.7400	100	360
4	479.1100	-1.14	24.40	23.26	46.00	-22.74	479.1100	100	360
5	694.4500	-1.20	24.68	23.48	46.00	-22.52	694.4500	100	360
6	868.0800	2.27	69.45	71.72	80.80	-9.08	868.0800	100	360

Note: Level = Reading + Factor
Margin = Level – Limit

5.4.4 Test Result of Unwanted Spurious emission (Above 1GHz)

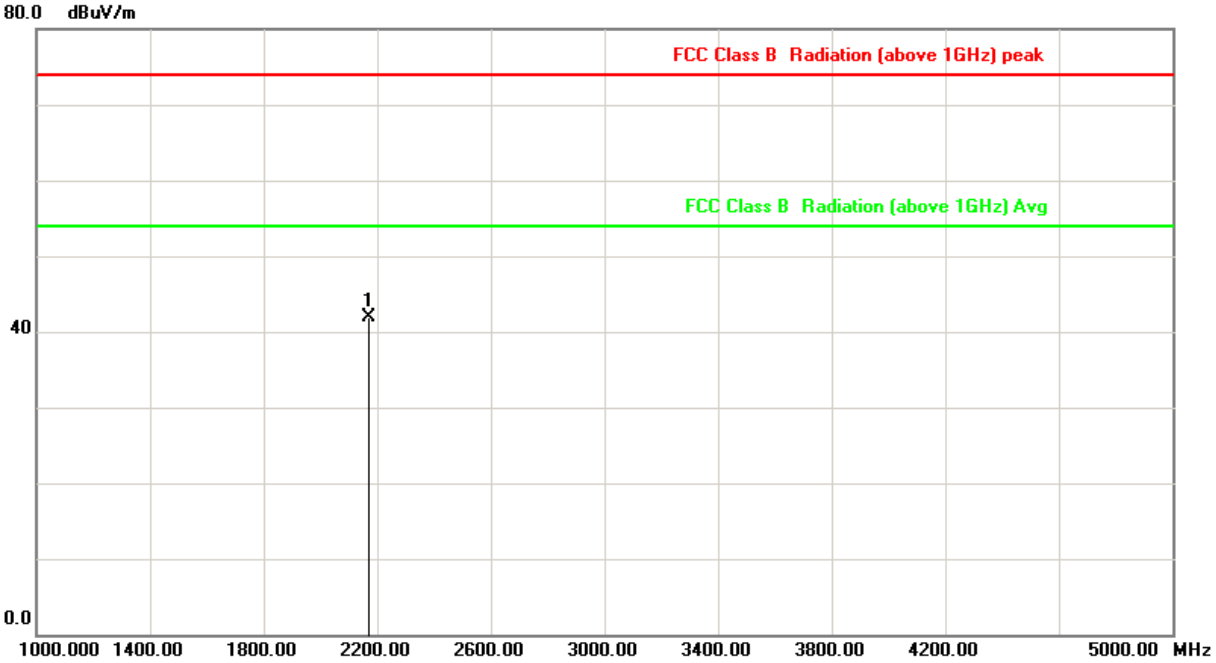
Power	:	DC 3.7V	Pol/Phase	:	VERTICAL
Test Mode	:	Transmit	Temperature	:	26 °C
Test Date	:	Apr. 18, 2018	Humidity	:	50 %
Memo	:		Atmospheric Pressure	:	1009 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	2170.000	-4.00	47.64	43.64	74.00	-30.36	peak

Note: Level = Reading + Factor
Margin = Level – Limit

Power	:	DC 3.7V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Transmit	Temperature	:	26 °C
Test Date	:	Apr. 18, 2018	Humidity	:	50 %
Memo	:		Atmospheric Pressure	:	1009 hpa

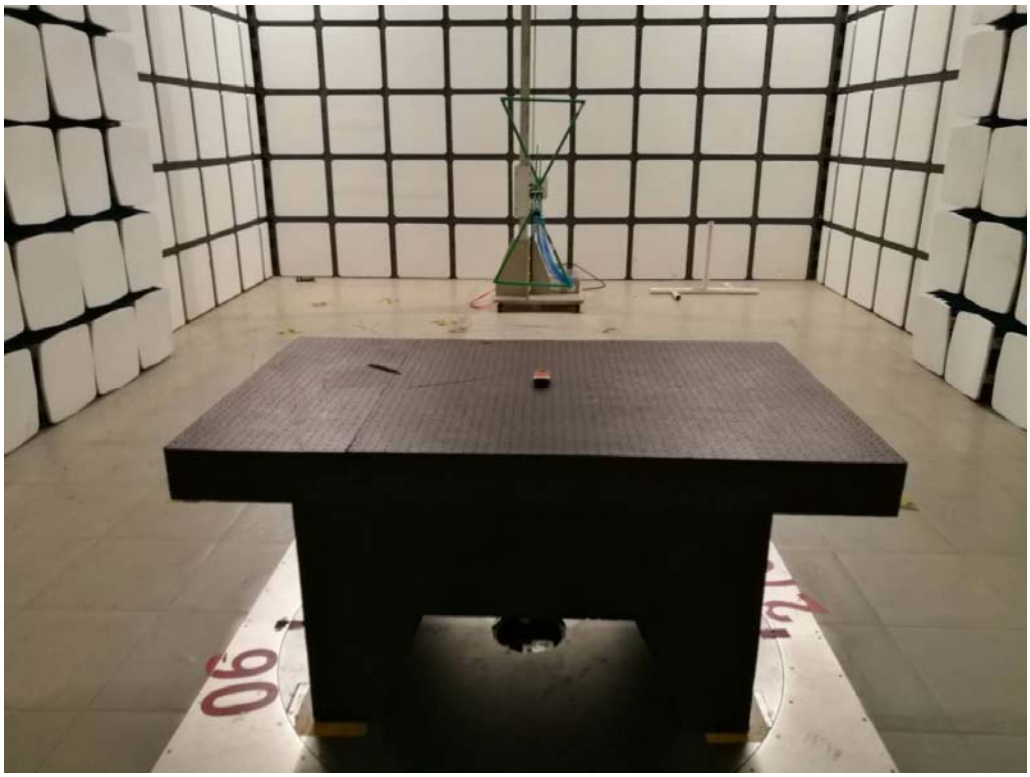


1	2170.000	-4.00	45.86	41.86	74.00	-32.14	peak

Note: Level = Reading + Factor
Margin = Level – Limit

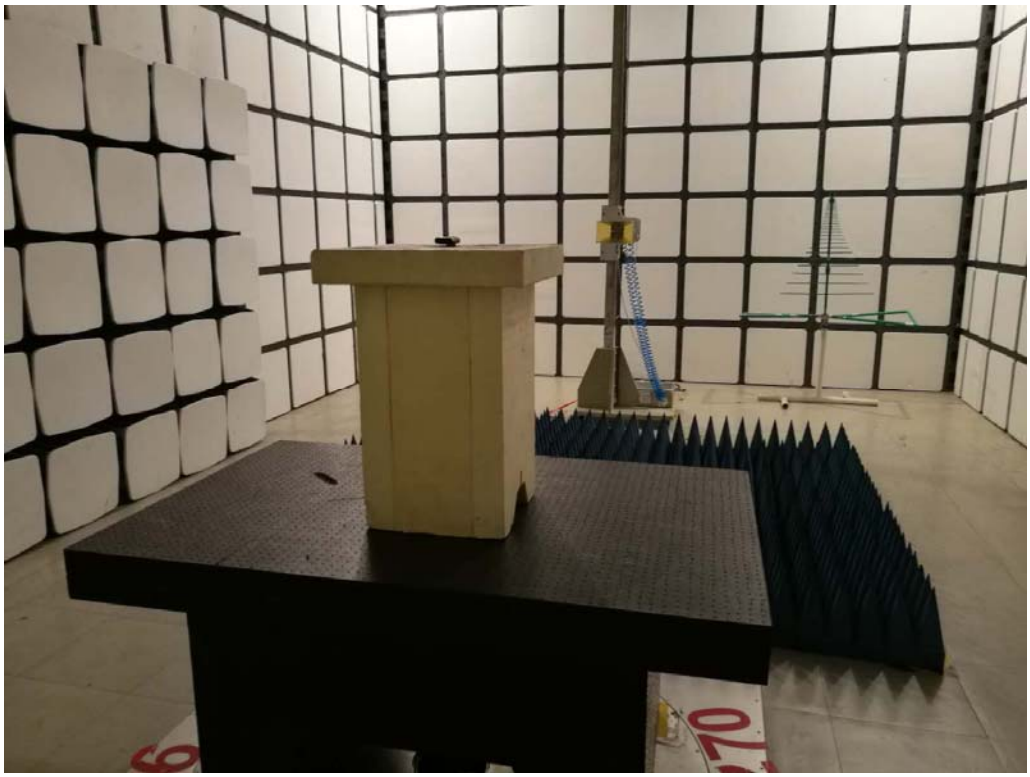
5.5 Test Photographs

Below 1GHz



Above1GHz

Rear View

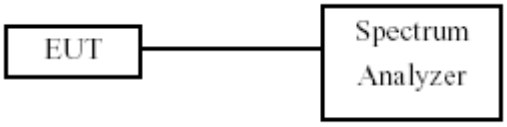


6. 20dB Occupied Bandwidth Measurement

6.1 Test Procedure

a. The EUT placed on the turning table.
b. The signal was coupled to the spectrum analyzer through an antenna.
c. Set the resolution bandwidth to 100kHz and video bandwidth to 100kHz then select Peak function to scan the channel frequency.
d. The 20dB bandwidth was measured and recorded.

6.2 Test Setup Layout



6.3 Limits of Band Edges Measurement

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

Frequency (MHz)	Limit of 20dB Bandwidth (MHz)
433.92	1.08

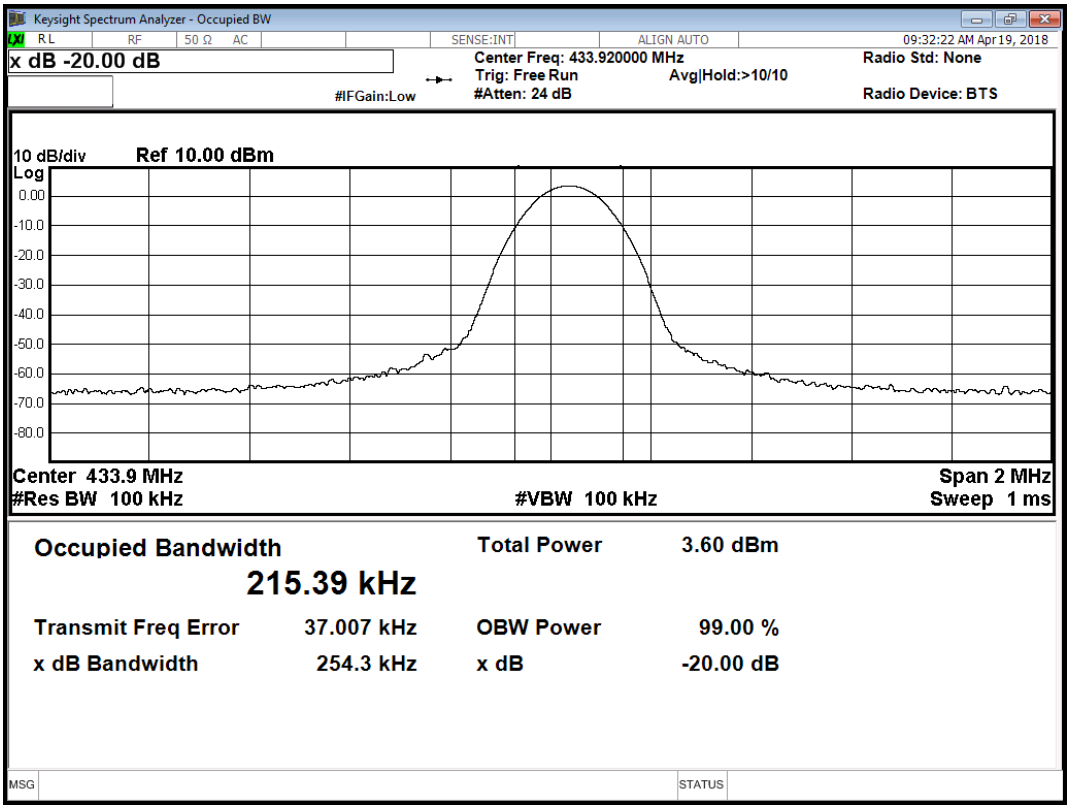
6.4 Test Result and Data

Test Date: Apr. 19, 2018 Temperature: 26°C

Atmospheric pressure: 1008 hPa Humidity: 50%

Frequency (MHz)	20 dB bandwidth (MHz)	PASS / FAIL
433.92	0.254	PASS

Frequency: 433.92MHz, CH1

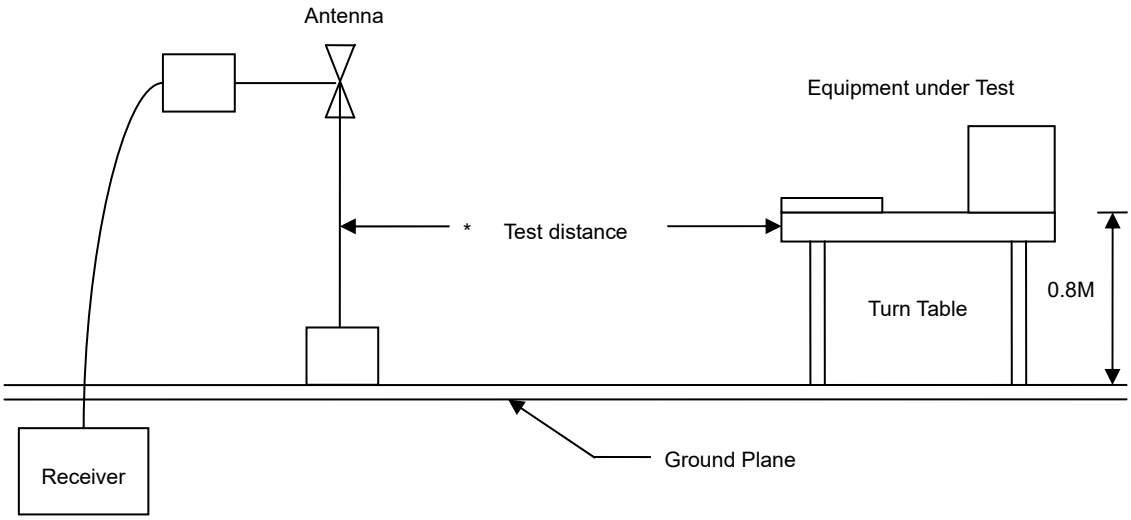


7. Transmission Time Control

7.1 Test Procedure

1. Set up the EUT in the state of Transmitter.
2. Set up the Spectrum, judge whether to accord with the regulation demand or not.

7.2 Test Setup Layout



7.3 Test Limit

Please refer section15.231

According to §15.231(a)(1), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
According to §15.231(a)(2), A transmitter sctivated automatically shall cease transmission within 5 seconds after activation.
According to §15.231(e), In addition, devices operated under the provisions of this paragraph shall be provided with a means for 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.

7.4 Test Result and Data

Test Date: Apr. 21, 2018 Temperature: 26°C

Atmospheric pressure: 1008 hPa Humidity: 50%

Frequency (MHz)	Operation time(Sec.)	Limit	PASS / FAIL
433.92	4.344	<5 sec	PASS

Frequency: 433.92MHz