FCC Test Report

Report No: FCS202102010W01

Issued for

Applicant:	DONGGUAN YUJIE ELECTRONICS TECHNOLOGY CO.,LID
Address:	Area B, 7th FL, A Building, Changyou Industrial Zone, Yuanshanzai Rd, Xin'an District, Chang'an Town, Dongguan City, China
Product Name:	RV LOCK
Brand Name:	N/A
Model Name:	YJ-C02-L
Series Model:	YJ-C02-B ,YJ-C02-G ,YJ-C02-R ,YJ-C02-GR
FCC ID:	2AY54-YJC02L
Issued By: Flux Compliance Service Laboratory Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan Tel: 769-27280901 Fax:769-27280901 http://www.FCS-lab.com	

TEST RESULT CERTIFICATION

Applicant's Name..... :	DONGGUAN YUJIE ELECTRONICS TECHNOLOGY CO.,LID
Address..... :	Area B, 7th FL, A Building, Changyou Industrial Zone, Yuanshanzai Rd, Xin'an District, Chang'an Town, Dongguan City, China
Manufacture's Name..... :	DONGGUAN YUJIE ELECTRONICS TECHNOLOGY CO.,LID
Address..... :	Area B, 7th FL, A Building, Changyou Industrial Zone, Yuanshanzai Rd, Xin'an District, Chang'an Town, Dongguan City, China

Product Description

Product Name..... :	RV LOCK
Brand Name .....:	N/A
Model Name..... :	YJ-C02-L
Series Model.....:	YJ-C02-B ,YJ-C02-G ,YJ-C02-R ,YJ-C02-GR
Test Standards..... :	FCC Rules and Regulations Part 15 Subpart C, Section 231
Test Procedure..... :	ANSI C63.10:2013

This device described above has been tested FCS, 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.
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Date of Test..... :

Date (s) of performance of tests. :	24 Feb. 2021 ~ 10 Mar. 2021
Date of Issue.....:	10 Mar. 2021
Test Result.....:	Pass

Tested by : Scott Shen

(Scott Shen)

Reviewed by : Duke Qian

(Duke Qian)

Approved by : Kait Chen

(Kait Chen)

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Revision History

Rev.	Issue Date	Effect Page	Contents
00	10 Mar. 2021	All	Initial Issue

1. SUMMARY OF TEST RESULTS

FCC Part 15.231,Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	--
15.209, 15.231(b)	Radiated Emission	PASS	--
15.231(a) (1)	Transmitter time	PASS	--
15.231(c)	20dB Bandwidth	PASS	
15.231	Duty cycle	PASS	--
15.203	Antenna Requirement	PASS	--

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2) All tests are according to ANSI C63.10-2013

1.1 TEST FACTORY

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
FCC Test Firm Registration Number: 514908 Designation number: CN0127 A2LA accreditation number：5545.01	

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ±U**, where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately **95** %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.71dB
2	Unwanted Emissions, conducted	±2.98 dB
3	Conducted Emission (9KHz-150KHz)	±4.13 dB
4	Conducted Emission (150KHz-30MHz)	±4.74 dB
5	All emissions,radiated(<1G) 30MHz-1000MHz	±3.2 dB
6	All emissions,radiated (1GHz -18GHz)	±3.66 dB
7	All emissions,radiated (18GHz -40GHz)	±4.31 dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	RV LOCK
Trade Name	N/A
Model Name	YJ-C02-L
Series Model	YJ-C02-B ,YJ-C02-G ,YJ-C02-R ,YJ-C02-GR
Model Difference	The above product with same circuit, PCB layout, electrical parts, materials and wiring structures, Appearance shape, the materials of decorative accessories is same, only different color.
Frequency	433.92MHZ
Modulation	ASK
Antenna type	PCB antenna
Power Supply	DC 3V
Hardware version number	V1.0
Software version number	V1.0
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

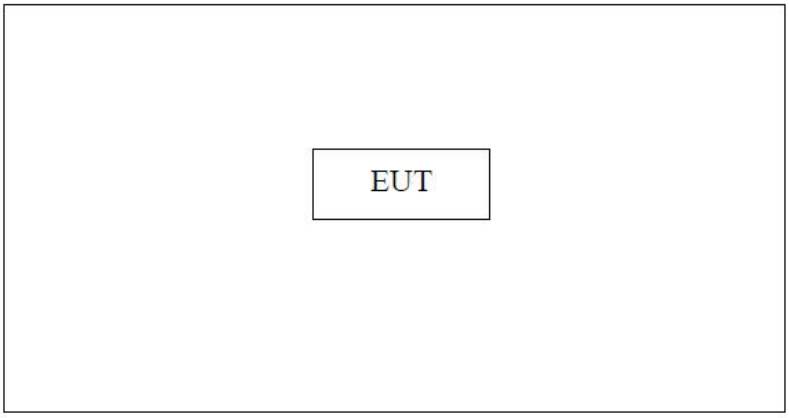
1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	GDJE	PCB Antenna	N/A	1.0dBi	Antenna

2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Configuration and peripherals



Test environment conditions
During the measurement the environmental conditions were within the listed ranges:
Temperature range: 21-25℃
Humidity range: 40-75%
Pressure range: 86-106kPa

2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2020. 06.26	2021. 06.25
Signal Analyzer	R&S	FSV40-N	FCS-E012	2020.06.05	2021.06.04
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2020.08.09	2021.08.10
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2020.08.26	2021.08.25
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2020.08.26	2021.08.25
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2020.06.26	2021.06.25
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2020.06.26	2021.06.25
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2020.06.03	2021.06.02
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2020.08.08	2021.08.07
Temperature & Humidity	HTC-1	victor	FCS-E005	2020.08.26	2021.08.25

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2020.06.03	2021.06.02
LISN	R&S	ENV216	FCS-E007	2020.08.08	2021.08.07
LISN	ETS	3810/2NM	FCS-E009	2020.06.03	2021.06.02
Temperature & Humidity	HTC-1	victor	FCS-E008	2020.08.08	2021.08.07

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
Spectrum Analyzer	Keysight	N9020A	FCS-E015	2020.06.03	2021.06.02
Spectrum Analyzer	Agilent	E4447A	MY50180039	2020.08.08	2021.08.07
Spectrum Analyzer	R&S	FSV-40	101499	2020.08.26	2021.08.25

3. RADIATED EMISSION MEASUREMENT

3.1 LIMIT

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009mhz - 1000mhz)

Frequencies (MHz)	Field Strength (micorvolts/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

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

LIMITS OF FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
433.92	100.83	80.83

Note: (1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz.Radiated emissions limits in these three bands are based on measurements employing an average detector

(2) At frequencies below 30MHz, measurement may be performed at a distance closer then that specified, and the limit at closer measurement distance can be extrapolated by below formula:
Limit3m(dBuV/m)= Limit300m(dBuV/m) + 40Log(300m/3m) = Limit300m(dBuV/m) + 80
Limit3m(dBuV/m)= Limit30m(dBuV/m) + 40Log(30m/3m) = Limit30m(dBuV/m) + 40

(3) Limit for this EUT
All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions include fundamental emission shall not exceed FCC 15.231 section (b) limit of comply with FCC 15.209 limit which permit higher emission level.

[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, 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.]

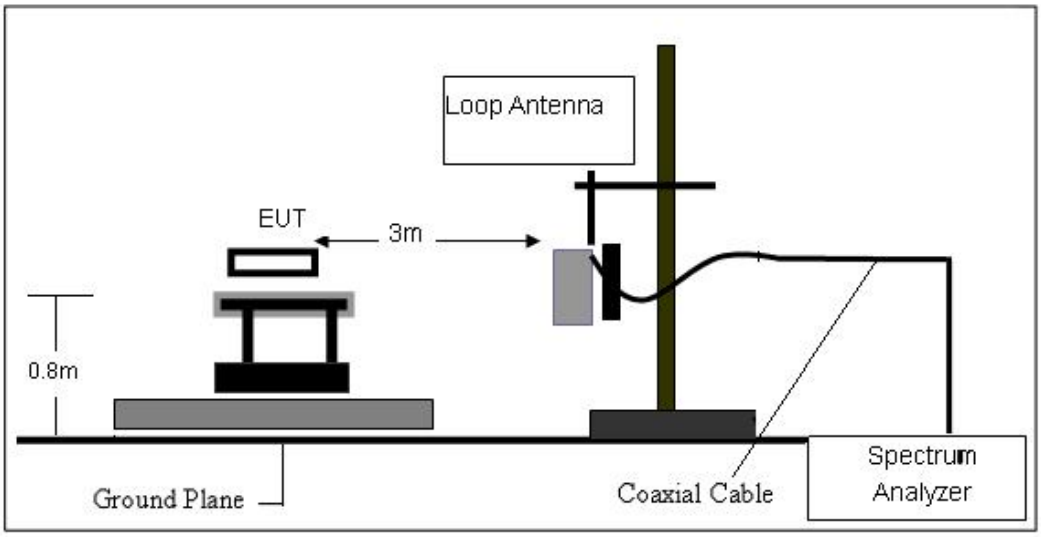
3.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz,and above 1GHz.
b. The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then QuasiPeak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

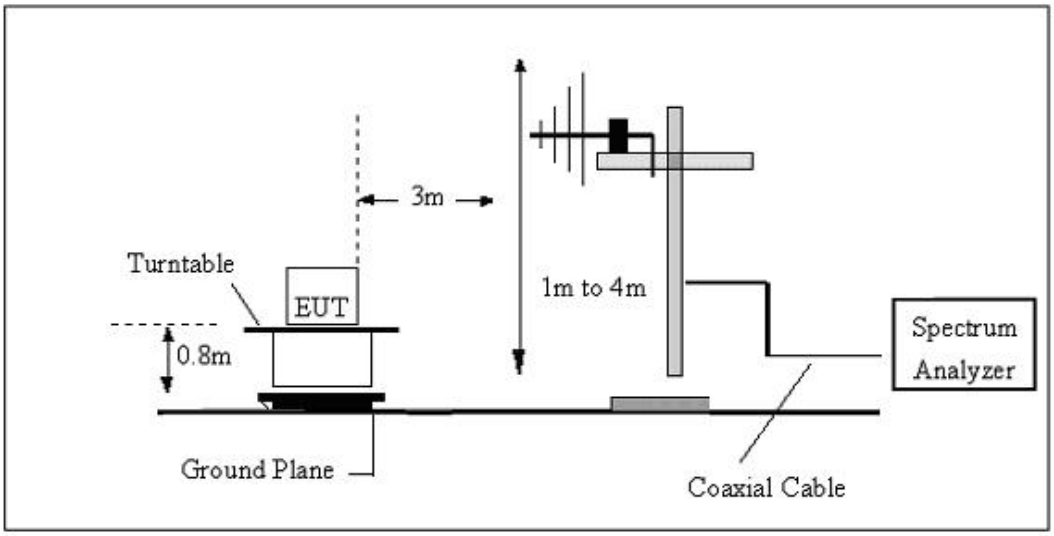
Note:
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.3 TEST SETUP

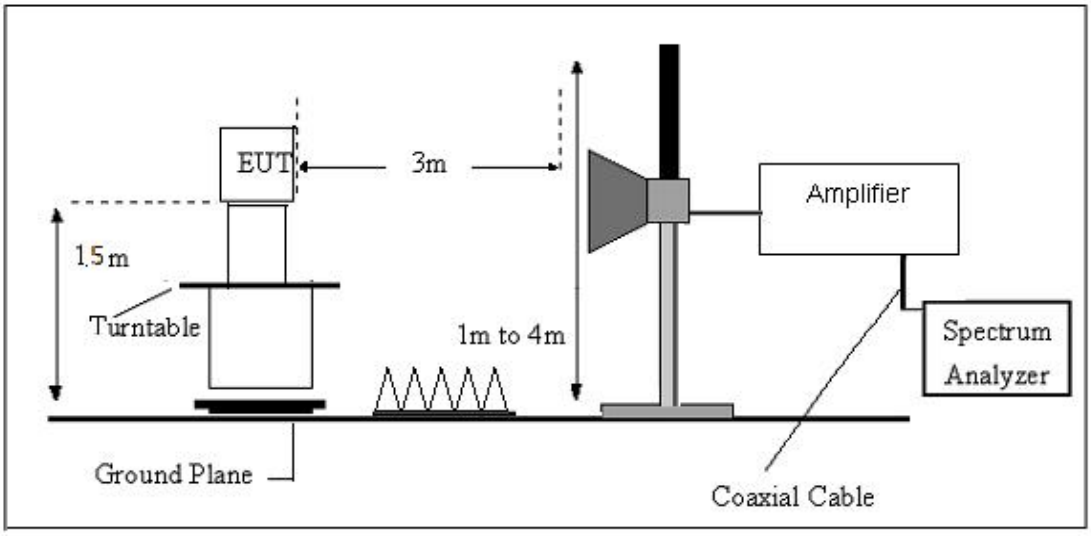
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



3.4 TEST RESULTS

Temperature:	25℃	Relative Humidity:	60%
Test Mode:	ASK	Test Voltage:	DC 3V

For spurious emission

(9KHz-30MHz)

Freq.	Reading	Limit	Margin	State	Test Result
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F	
--	--	--	--	--	PASS
--	--	--	--	--	PASS

Note:
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits (dBuv) + distance extrapolation factor.

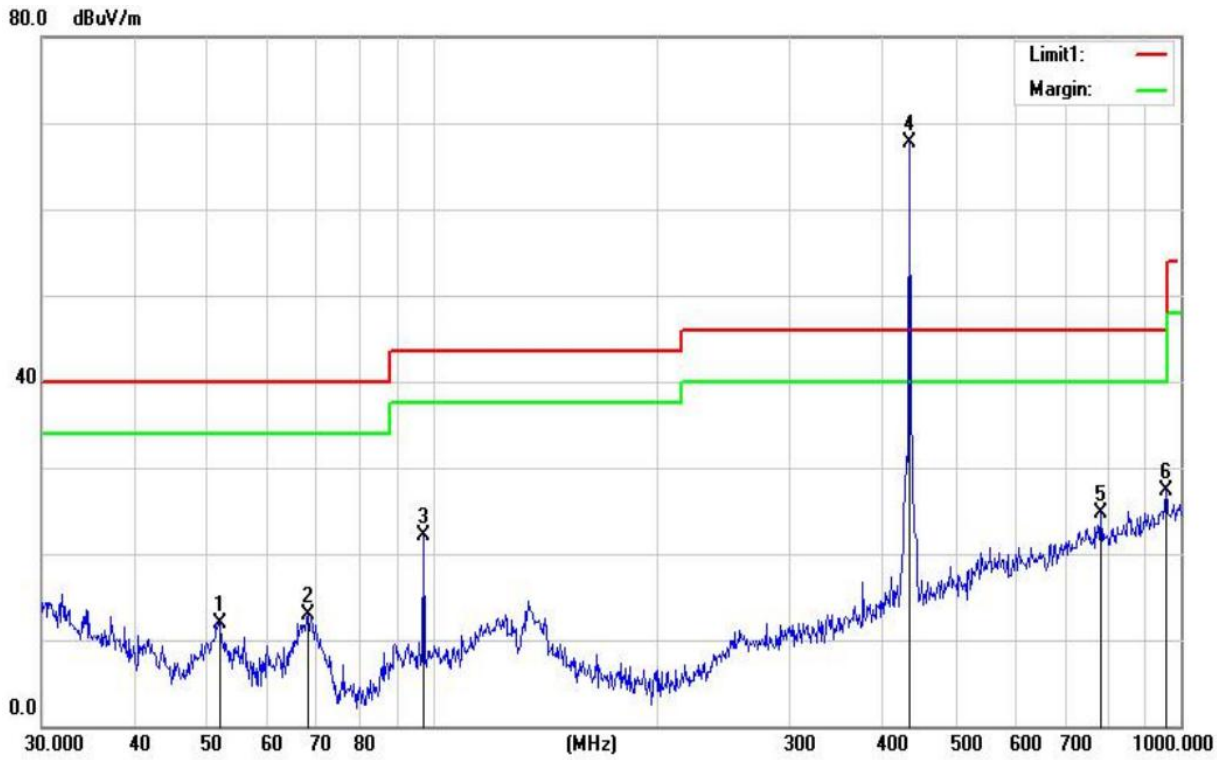
(30MHZ-1000MHZ)

Temperature:	23.7℃	Relative Humidity:	61%
Test Voltage:	DC 3V	Phase:	Horizontal
Test Mode:	ASK		

No.	Frequency (MHz)	Reading (dBuV)	Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	54.8430	33.88	-22.00	11.88	40.00	-28.12	QP
2	68.1514	37.13	-24.15	12.98	40.00	-27.02	QP
3	97.1148	41.50	-19.48	22.02	43.50	-21.48	QP
4	433.9200	78.66	-10.90	67.76	100.83	-33.07	Peak
5	867.8400	27.90	-3.15	24.75	80.83	-56.08	Peak
6	955.4381	27.49	-0.26	27.23	46.00	-18.77	QP

Frequency (MHz)	Reading (dBuV)	Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
433.92	67.76	-14.41	53.35	80.83	-27.48	AV
867.84	24.75	-14.41	10.34	60.83	-50.49	AV

Remark:
1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor)–Limit

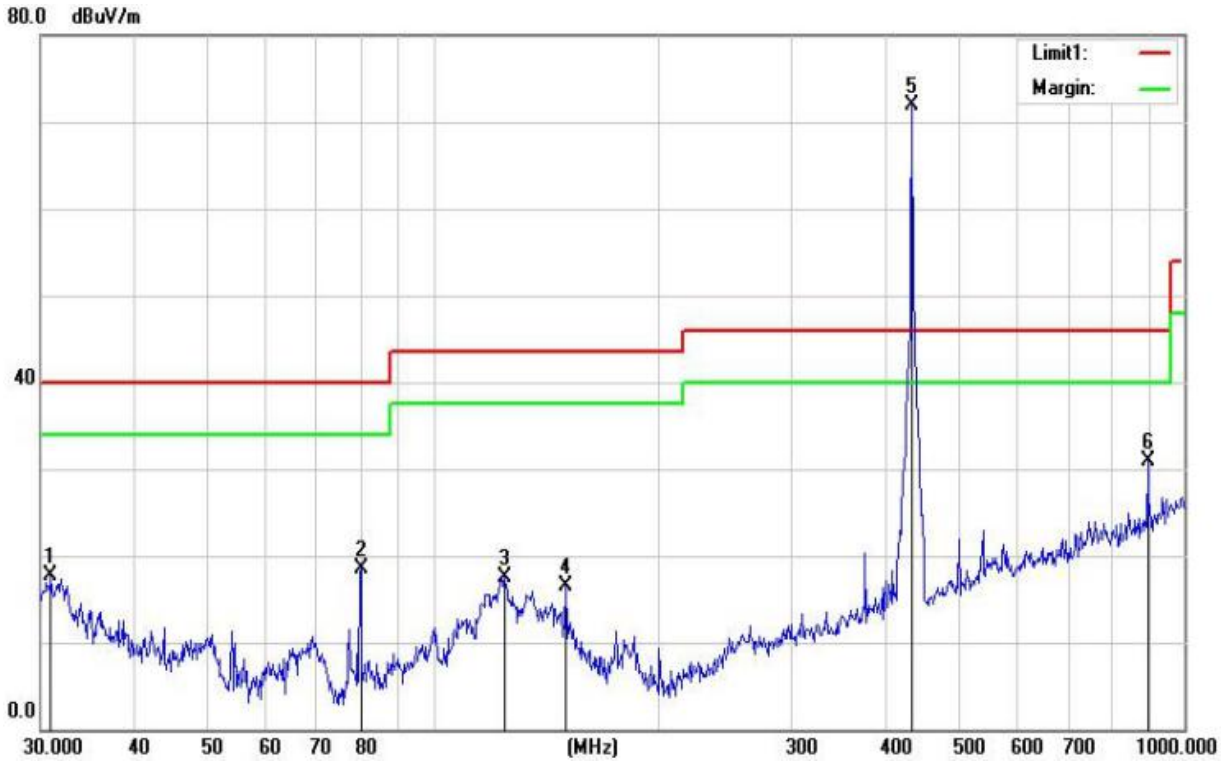


Temperature:	22.7℃	Relative Humidity:	61%
Test Voltage:	DC 3V	Phase:	Vertical
Test Mode:	ASK		

No.	Frequency (MHz)	Reading (dBuV)	Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.9618	29.38	-11.68	17.70	40.00	-22.30	QP
2	80.0806	41.23	-22.67	18.56	40.00	-21.44	QP
3	124.5690	35.22	-17.63	17.59	43.50	-25.91	QP
4	150.0107	34.43	-17.97	16.46	43.50	-27.04	QP
5	433.9200	82.86	-10.90	71.96	100.83	-28.87	Peak
6	867.8400	33.26	-2.34	30.92	80.83	-49.91	Peak

Frequency (MHz)	Reading (dBuV)	Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
433.92	71.96	-14.41	57.55	80.83	-23.28	AV
867.84	30.92	-14.41	16.51	60.83	-44.32	AV

Remark:
1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor)–Limit



(ABOVE ~ 1GHZ)

Frequency	Reading	Detector	Amplifier	Loss	Antenna Factor	Corrected Factor	Corrected Amplitude	FCC Part 15.231/15.209/205		RX Antenna
								Limit	Margin	Polar
(MHz)	(dBμV/m)	(PK/QP/AV)	(dB)	(dB)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(H/V)
1301.76	64.34	PK	45.10	4.00	25.10	-16.00	48.34	74	-25.66	H
1301.76	64.25	PK	45.10	4.00	25.10	-16.00	48.25	74	-25.75	V
1670.25	62.32	PK	44.10	5.30	25.00	-13.80	48.52	74	-25.48	H
1670.25	62.28	PK	44.10	5.30	25.00	-13.80	48.48	74	-25.52	V
2695.36	60.19	PK	43.80	5.43	25.90	-12.47	47.72	74	-26.28	H
2695.36	60.21	PK	43.80	5.43	25.90	-12.47	47.74	74	-26.26	V
4536.25	56.16	PK	46.40	7.03	28.60	-10.77	45.39	74	-28.61	H
4536.25	56.31	PK	46.40	7.03	28.60	-10.77	45.54	74	-28.46	V

4. TRANSMITTER TIME

4.1 LIMIT

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released

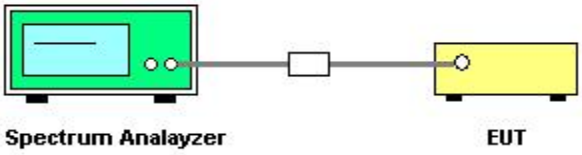
4.2 TEST PROCEDURE

a. The EUT′ s RF signal was coupled to spectrum analyzer by antenna connected to spectrum analyzer.

b. Set the spectrum to zero span mode, and centered of EUT frequency.

c. Measure the stop transmitting time after release EUT button

4.3 TEST SETUP



5.4 TEST RESULTS

Frequency(MHz)	Limit	Result
433.92	≤5s	Pass

Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 510.000 ms
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
02:54:39 PM Oct 19, 2017
ΔMkr1 510.0 ms
-0.42 dB
10 dB/div Ref 0.00 dBm
Log
1Δ2
Center 433.920000 MHz
Span 0 Hz
Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 10.00 s (1001 pts)
1 Δ2 t (Δ) 510.0 ms (Δ) -0.42 dB
2 F t 1.430 s -72.42 dBm
Marker
Select Marker 1
Normal
Delta
Fixed
Off
Properties
More 1 of 2

Agilent Spectrum Analyzer - Swept SA
Marker 3 Δ 18.8100 s
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold: 8/100
09:43:07 AM Dec 08, 2017
ΔMkr3 18.81 s
-0.005 dB
10 dB/div Ref 0.00 dBm
Log
1Δ2
3Δ4
Center 433.920000 MHz
Span 0 Hz
Res BW 100 kHz
#VBW 100 kHz
Sweep 30.00 s (1001 pts)
1 Δ2 t (Δ) 500.0 ms (Δ) 0.630 dB
2 F t 4.830 s -82.369 dBm
3 Δ4 t (Δ) 18.81 s (Δ) -0.005 dB
4 F t 4.830 s -82.369 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2

5. 20 DB BANDWIDTH TEST

5.1 LIMIT

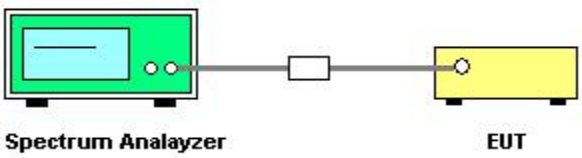
The bandwidth of the emission shall be no wider than 0.25% of the center frequency of devices operation above 70MHz and below 900MHz.

5.2 TEST PROCEDURE

a. Connect EUT′ s antenna output to spectrum analyzer by RF cable.

b. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 300Hz RBW and 1kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB

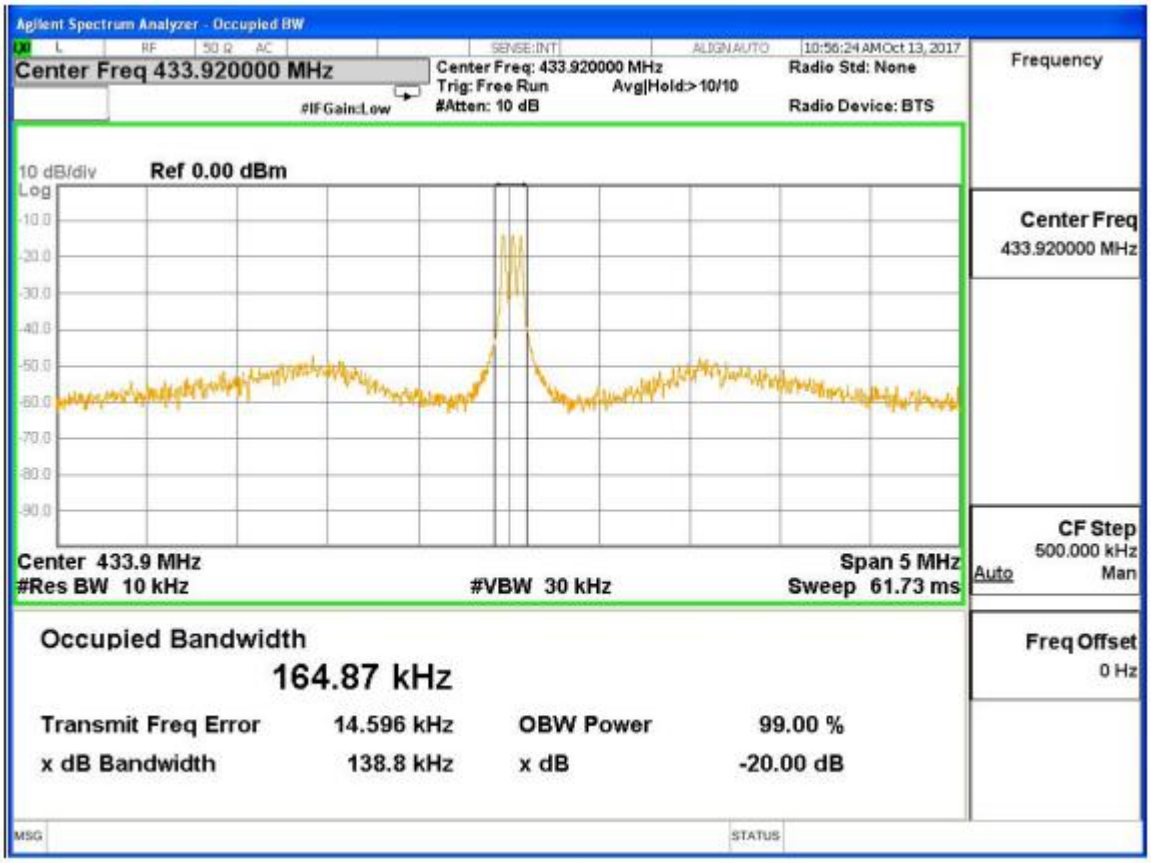
5.3 TEST SETUP



5.4 TEST RESULTS

Temperature:	25℃	Relative Humidity:	50%
Test Mode:	ASK	Test Voltage:	DC 3V

Frequency	20dB Bandwidth (KHz)	Result
433.92 MHz	138.8	PASS



6. DUTY CYCLE

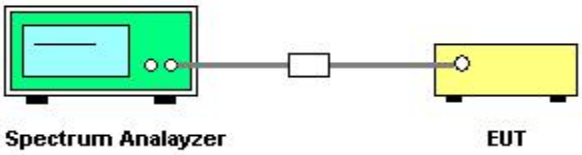
6.1 LIMIT

None: for reporting purposes only.

6.2 TEST PROCEDURE

a. Set the Centre frequency of the spectrum analyzer to the transmitting frequency;
Set the span=0MHz, RBW=1MHz, VBW=1MHz, Sweep time=300ms;
Trace mode = Single hold

6.3 TEST SETUP

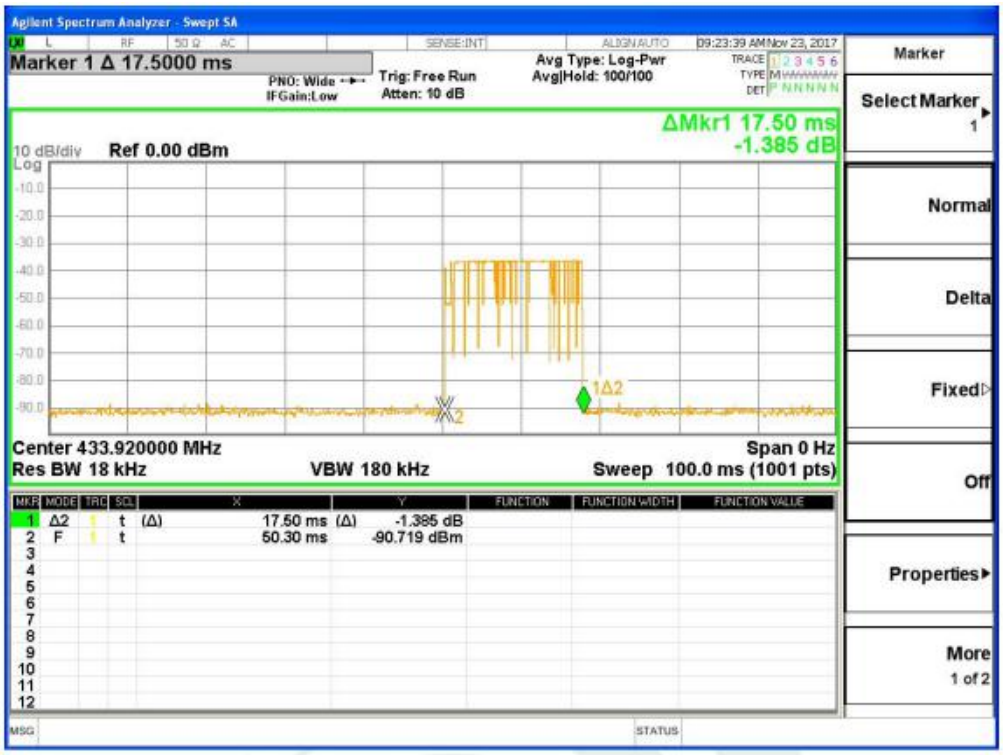


6.4 TEST RESULTS

FCC Part15.231(e)	
Total On interval in a complete pulse train(ms)	17.50
Length of a complete pulse train(ms)	92
Duty Cycle(%)	19.02%
Duty Cycle Correction Factor(dB)	-14.41

Refer to the duty cycle plot (as below),This device meets the FCC requirement. Length of a complete pulse train
Remark:FCC part15.35(c) required that a complete pulse train is more than 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

Original test data


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 17.5000 ms
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
09:23:39 AM Nov 23, 2017
ΔMkr1 17.50 ms
-1.385 dB
10 dB/div
Ref 0.00 dBm
Log
Center 433.920000 MHz
Res BW 18 kHz
VBW 180 kHz
Span 0 Hz
Sweep 100.0 ms (1001 pts)
1 Δ2 t (Δ) 17.50 ms (Δ) -1.385 dB
2 F t 50.30 ms -90.719 dBm
Marker
Select Marker 1
Normal
Delta
Fixed
Off
Properties
More 1 of 2

7 ANTENNA REQUIREMENT

7.1 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.

7.2 EUT ANTENNA

The antennas used for this product are PCB antenna and other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 1.0dBi.

※※※※※END OF THE REPORT※※※※※