



FCC RADIO TEST REPORT

FCC ID: 2AJP6HB-805B

Product: Wireless Panic Button

Trade Name: HTZSAFE

Model Name: HB-805B

Serial Model: HB-806B,HB-807B,HB-808B

Report No.: PTC19043001601E-FC01

Prepared for

Ningbo Hengbo Telecommunication Co.,Ltd.
No.1 JinQiao 8th Road,TaoYuan Sub-district, Ninghai County, Ningbo City,
Zhejiang Province., China

Prepared by

Dongguan Precise Testing&Certification Corp., Ltd.
Building D, Baoding Technology Park, Guangming Road 2,
Guangming Community, Dongcheng District, Dongguan, Guangdong, China



TEST RESULT CERTIFICATION

Applicant's name : Ningbo Hengbo Telecommunication Co.,Ltd.

Address : No.1 JinQiao 8th Road,TaoYuan Sub-district, Ninghai County,
Ningbo City, Zhejiang Province., China

Manufacture's Name : Ningbo Hengbo Telecommunication Co.,Ltd.

Address : No.1 JinQiao 8th Road,TaoYuan Sub-district, Ninghai County,
Ningbo City, Zhejiang Province., China

Product description

Product name..... : Wireless Panic Button

Trade Mark : HTZSAFE

Model and/or type reference : HB-805B

Serial Model..... : HB-806B,HB-807B,HB-808B

Standards..... : FCC Part 15 Subpart C 15.231
ANSI C63.10: 2013

This device described above has been tested by Dongguan Precise Testing&Certification Corp., 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.

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Date of Test..... : May. 17, 2019

Date (s) of performance of tests..... : May. 17~22, 2019

Date of Issue..... : May. 22, 2019

Test Result..... : Pass

Prepared by:

Leo Yang / Engineer

Reviewer:

Chris Du / Manager



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1 TEST SUMMARY

1 TEST PROCEDURES AND RESULTS

FCC and IC Requirements		
FCC Part 15.207	Conducted Emission	N/A
FCC Part 15.231(a)(2)	Automatically Deactivate	PASS
FCC Part 15.231(b)	Electric Field Strength of Fundamental Emission	PASS
FCC Part 15.205 & 15.209 & 15.231(b)	Electric Field Strength of Spurious Emission	PASS
FCC Part 15.231(c)	-20dB bandwidth	PASS

2 TEST FACILITY

Test Firm : Dongguan Precise Testing&Certification Corp., Ltd.

Address : Building D, Baoding Technology Park, Guangming Road 2, Guangming Community, Dongcheng District, Dongguan, Guangdong, China

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A-1

3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.23dB, k=2

Radiated emission expanded uncertainty(9kHz-30MHz) = 3.08dB, k=2

Radiated emission expanded uncertainty(30MHz-1000MHz) = 4.42dB, k=2

Radiated emission expanded uncertainty(Above 1GHz) = 4.06dB, k=2



2 GENERAL INFORMATION

2.1 ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

Temperature	Normal Temperature:	26°C
Voltage	Normal Voltage	12.0V
Other	Relative Humidity	55 %
	Air Pressure	101 kPa

2.2 GENERAL DESCRIPTION OF EUT

Equipment	Wireless Panic Button
Trade Mark	HTZSAFE
Model Name	HB-805B
Serial Model	HB-806B,HB-807B,HB-808B
Model Difference	All the models are the same circuit and RF module, except the model names and appearance color.
FCC ID	2AJP6HB-805B
Antenna Type	Internal Antenna
Antenna Gain	0dBi
Frequency Range	434.6MHz
Number of Channels	1
Modulation Type	FSK
Battery	DC12V

2.3 CARRIER FREQUENCY OF CHANNELS

Channel	Frequency (MHz)
1	434.6



2.4 OPERATION OF EUT DURING TESTING

Operating Mode

The mode is used: Transmitting mode

Transmission operation mode

When you press any Button, the EUT can achieve a transmission.

2.5 DESCRIPTION OF TEST SETUP

Operation of EUT during Conducted testing: N/A

Note : This device is pure battery powered and does not require charging

Operation of EUT during Radiation and Above1GHz Radiation testing:





2.6 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
CONDUCTED EMISSIONS TEST					
1	AMN	Schwarzbeck	NNLK8121	8121370	2019.09.09
2	AMN	ETS	3810/2	00020199	2019.09.09
3	EMI TEST RECEIVER	Rohde&Schwarz	ESCI	101210	2019.09.09
4	AAN	TESEQ	T8-Cat6	38888	2019.09.09
RADIATED EMISSION TEST					
1	EMI Test Receiver	Rohde&Schwarz	ESCI	101417	2019.09.19
2	Loop Antenna	Schwarzbeck	FMZB 1519	012	2019.09.19
3	Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	2019.09.19
4	Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	2019.09.19
5	Cable	Schwarzbeck	PLF-100	549489	2019.09.19
6	Spectrum Analyzer	Agilent	E4407B	MY45109572	2019.09.19
7	Horn Antenna	SCHWARZBECK	9120D	9120D-1246	2019.09.19
8	Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	2019.09.19
9	Cable	H+S	CBL-26	N/A	2019.09.19
10	ANT Tower&Turn table Controller	Champro	EM 1000	60764	2019.09.19
11	Anechoic Chamber	Taihe Maorui	9m*6m*6m	966A0001	2019.09.19
12	Active Loop Antenna	Com-Power	AL-130R	10160009	2020.03.14
13	Power Meter	KEYSIGHT	N1911A	MY50520168	2020.03.14
Test software					
1	E3	Audix	6.101223a	N/A	N/A



TEST CONDITIONS AND RESULTS

3.1 CONDUCTED EMISSIONS TEST

Limit

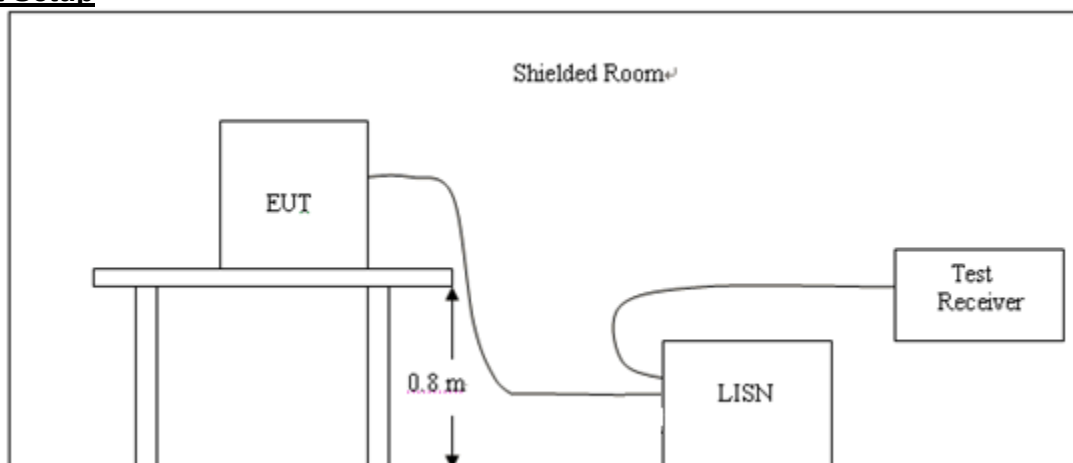
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

Test Setup



Test Procedure

- 1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. A wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
- 2, Support equipment, if needed, was placed as per ANSI C63.10.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

Test Result

This device is pure battery powered and does not require charging.

3.2 RADIATED EMISSION TEST

Radiation Limit

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
30-88	3	40	100
88-216	3	43.5	150
216-960	3	46	200
Above 960	3	54	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

In addition to the provisions of 15.231(b) and RSS 210-A1.1.2, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

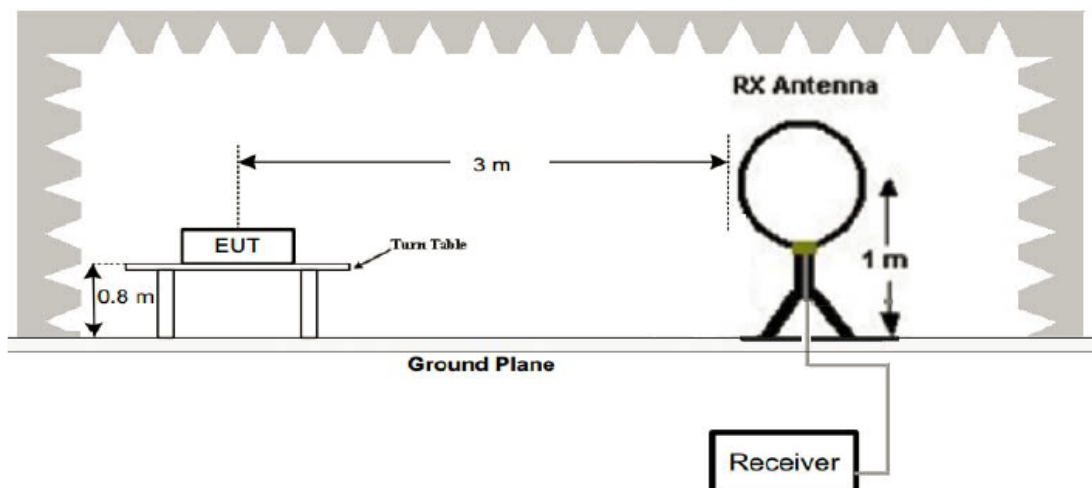
Funda-mental fre-quency (MHz)	Field strength of funda-mental (microvolts/ meter)	Field strength of spurious emissions (microvolts/meter)
40.66–40.70.	2,250	225
70–130	1,250	125
130–174	¹ 1,250 to 3,750	¹ 125 to 375
174–260	3,750	375
260–470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

¹ Linear interpolations.

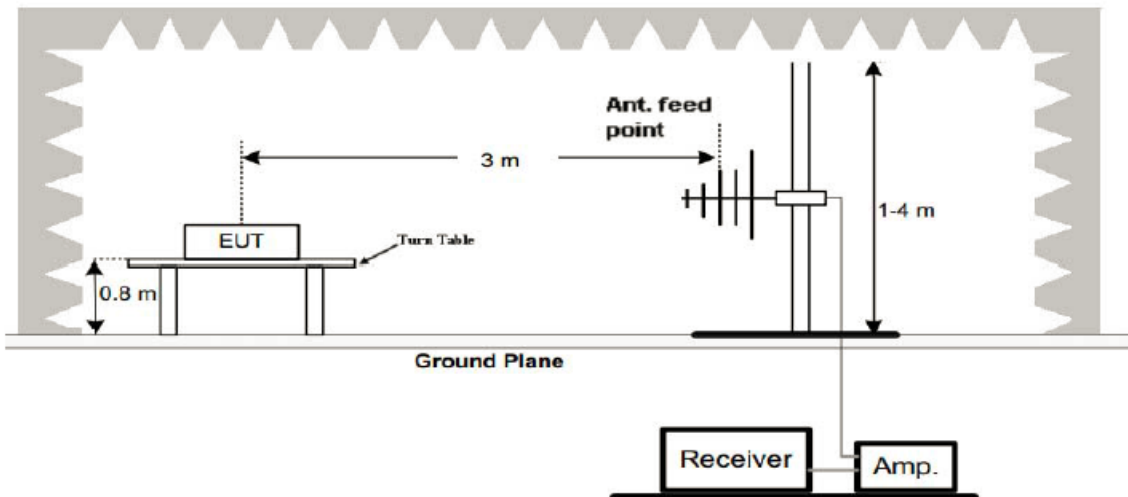
[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 260-470 MHz, µV/m at 3 meters = 41.6667(F) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

Test Setup

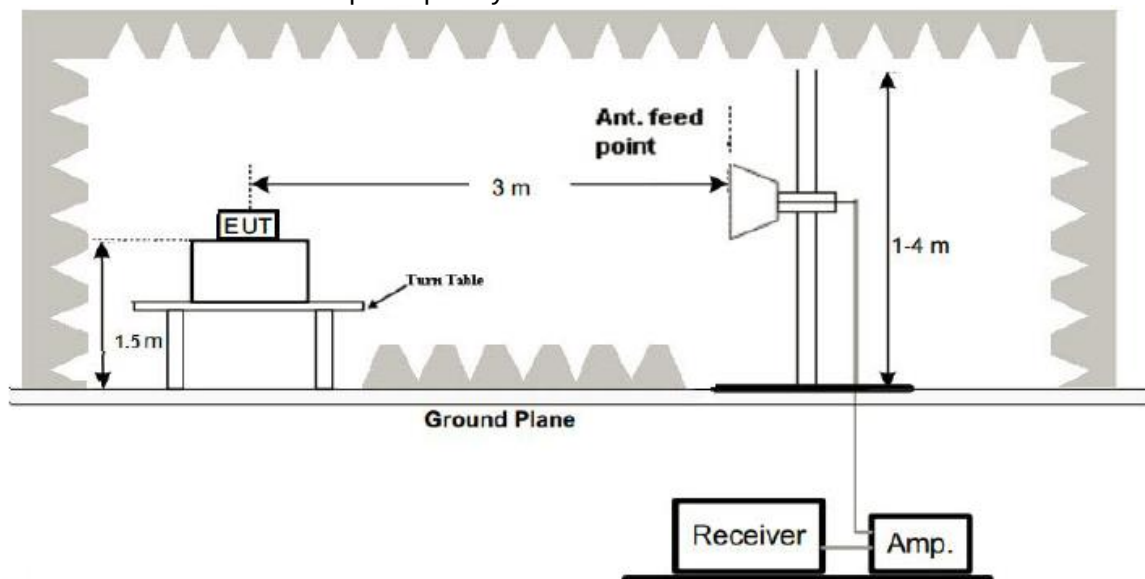
1. Radiated Emission Test-Up Frequency Below 30MHz



2. Radiated Emission Test-Up Frequency 30MHz~1GHz



3. Radiated Emission Test-Up Frequency Above 1GHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane. And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m 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. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9kHz to 25GHz per FCC PART 15.33(a).

Note:

For battery operated equipment, the equipment tests shall be performed using a new battery.

Test Result

---PASS---



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Remark:

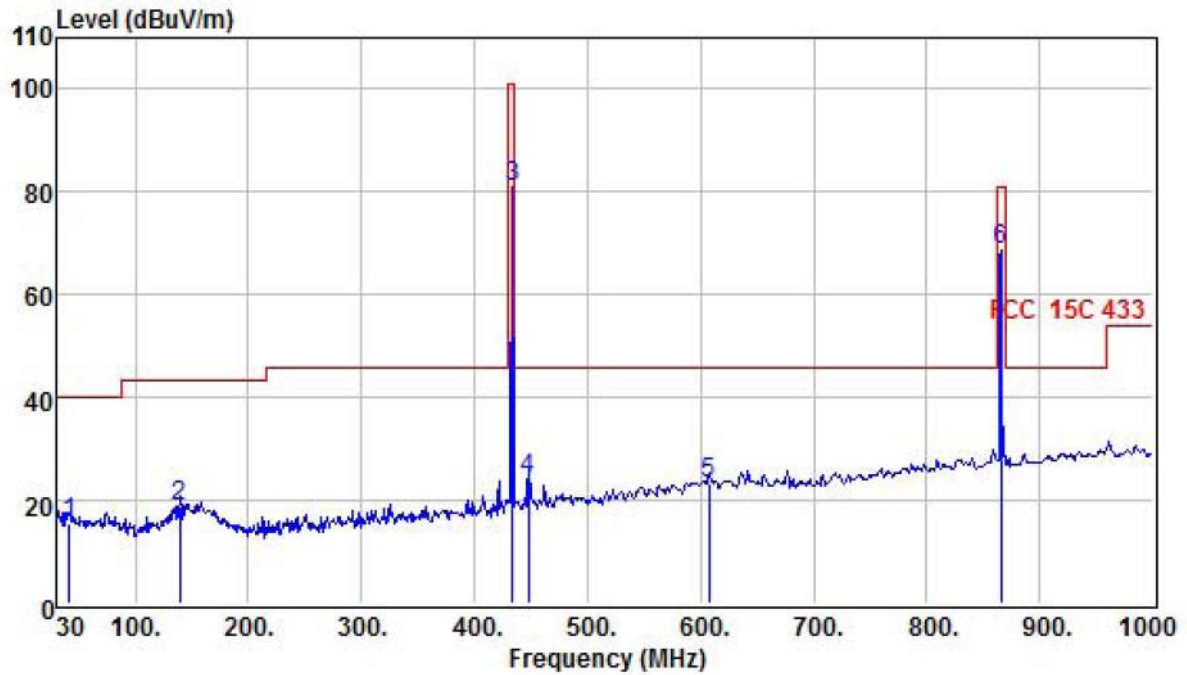
1. All the test modes completed for test. The worst case of Radiated Emission is Middle channel, the test data of this mode was reported.
2. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Z axis" position was the worst, and test data recorded in this report.
3. Radiated emission test from 9KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9KHz to 30MHz and not recorded in this report.



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Below 1GHz Test Results:

Temperature:	24°C	Relative Humidity:	49%
Test Date:	May. 20, 2019	Pressure:	1010hPa
Test Voltage:	DC 12V	Polarization:	Horizontal
Test Mode:	TX Mode		



	Freq	ReadAntenna	Cable		Limit	Over	
	MHz	Level	Factor	Loss	Level	Line	Limit Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB
1	41.57	1.86	13.41	0.13	15.40	40.00	-24.60 QP
2	139.36	3.29	15.13	0.23	18.65	43.50	-24.85 QP
3	434.60	65.13	15.03	1.00	81.16	100.85	-19.64 Peak
4	447.98	7.79	15.32	1.04	24.15	46.00	-21.85 QP
5	607.79	4.74	17.53	1.14	23.41	46.00	-22.59 QP
6	869.20	45.31	21.76	1.55	68.62	80.85	-12.18 Peak

For average:

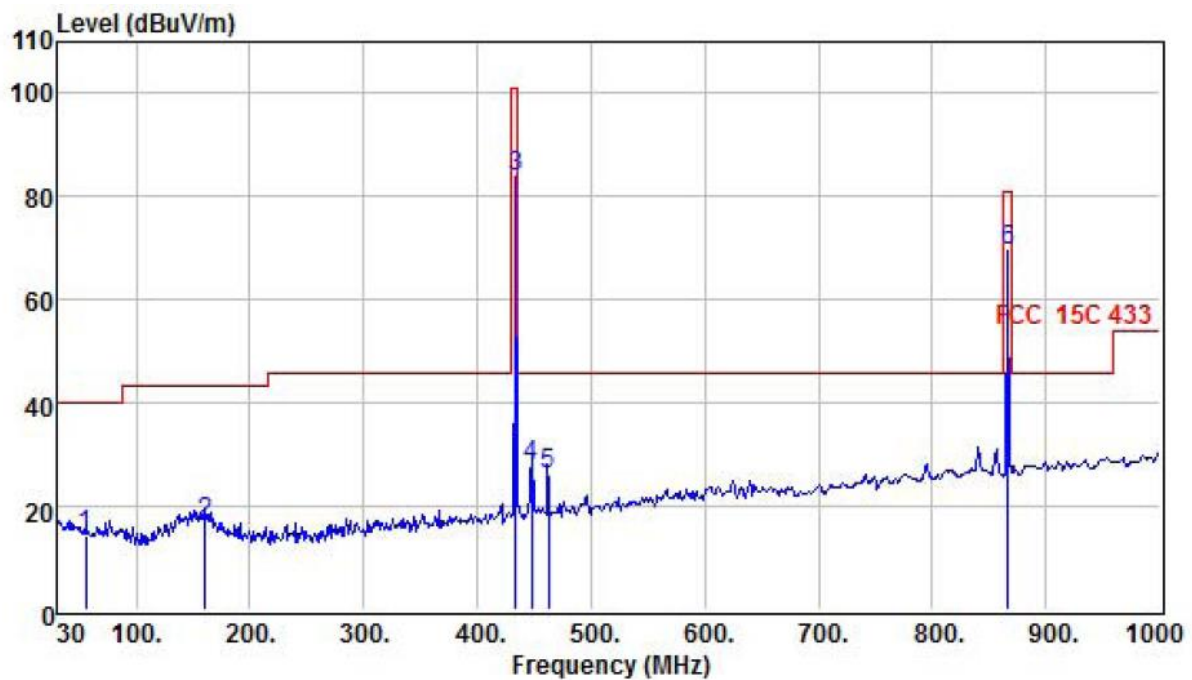
Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit	Margin dB
434.60	81.16	-17.20	63.96	80.85	-16.89
869.20	68.62	-17.20	51.42	60.85	-9.43

- Notes: 1. Average emission Level = Peak Level + Duty cycle factor
 2. Duty cycle level please see clause 3.5.
 3. We pretest all two keys, only worst case is presented in the report.



Report No.: PTC19043001601E-FC01

Temperature:	24°C	Relative Humidity:	49%
Test Date:	May. 20, 2019	Pressure:	1010hPa
Test Voltage:	DC 12V	Polarization:	Vertical
Test Mode:	TX Mode		



	Read	Antenna	Cable		Limit	Over	
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	55.22	1.97	12.41	0.13	14.51	40.00	-25.49 QP
2	160.91	0.94	15.52	0.23	16.69	43.50	-26.81 QP
3	434.60	67.99	15.03	1.00	84.02	100.85	-16.78 Peak
4	447.98	11.42	15.32	1.04	27.78	46.00	-18.22 QP
5	462.35	9.65	15.60	1.09	26.34	46.00	-19.66 QP
6	869.20	45.97	22.08	1.55	69.60	80.85	-11.20 Peak

For average:

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit	Margin dB
434.60	84.02	-17.20	66.82	80.85	-14.03
869.20	69.60	-17.20	52.40	60.85	-8.45

- Notes: 1. Average emission Level = Peak Level + Duty cycle factor
 2. Duty cycle level please see clause 3.5.
 3. We pretest all two keys, only worst case is presented in the report.



Test Data for 1GHz~5GHz

Test Frequency	Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit		Margin dB		Polarization
					PK	AV	PK	AV	
434.6MHz	1303.80	50.63	-17.20	33.43	74.00	54.00	-23.37	-20.57	Vertical
	1738.40	45.78	-17.20	28.58	74.00	54.00	-28.22	-25.42	Vertical
	2173.00	43.24	-17.20	26.04	74.00	54.00	-30.76	-27.96	Vertical
	2607.60	40.00	-17.20	22.80	74.00	54.00	-34.00	-31.20	Vertical
	3042.20	38.90	-17.20	21.70	74.00	54.00	-35.10	-32.30	Vertical
	1303.80	38.66	-17.20	21.46	74.00	54.00	-35.34	-32.54	Vertical
	1738.40	50.70	-17.20	33.50	74.00	54.00	-23.30	-20.50	Horizontal
	2173.00	46.91	-17.20	29.71	74.00	54.00	-27.09	-24.29	Horizontal
	2607.60	43.51	-17.20	26.31	74.00	54.00	-30.49	-27.69	Horizontal
	3042.20	41.02	-17.20	23.82	74.00	54.00	-32.98	-30.18	Horizontal
	3476.80	38.73	-17.20	21.53	74.00	54.00	-35.27	-32.47	Horizontal
	1303.80	39.11	-17.20	21.91	74.00	54.00	-34.89	-32.09	Horizontal

Notes: 1.Average emission Level = Peak Level + Duty cycle factor

2.Duty cycle level please see clause 5.

3. Pulse Desensitization Correction Factor

Pulse Width (PW) = 45.75ms

$2/PW = 2/45.75ms = 0.04kHz$

RBW (100 kHz) > 2/PW (0.028kHz)

Therefore PDCF is not needed

4.Other harmonics emissions are lower than 20dB below the allowable limit.



3.3 -20db OCCUPIED BANDWIDTH

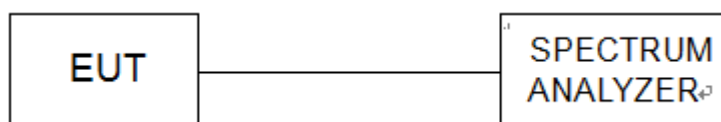
Limit

According to 47 CFR 15.231(c) The bandwidth of the emission shall be no wider than 0.25% of the centre frequency for devices operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20dB down from the modulated carrier.

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 KHz RBW and 100 KHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

Test Configuration



Test Result

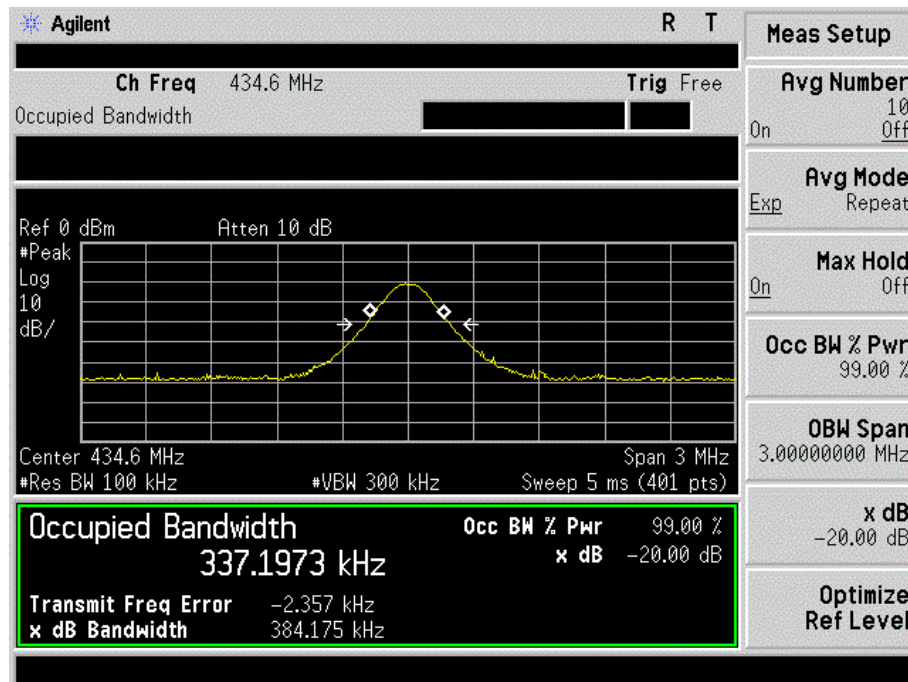
---PASS---

Modulation	Channel Frequency (MHz)	99% OBW (KHz)	20dB bandwidth (KHz)	Limit (KHz)	Result
FSK	434.60	337.20	384.18	$0.25\% \times 434.60 = 1086.5$	Pass

FSK Modulation



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3.4 Deactivation Time

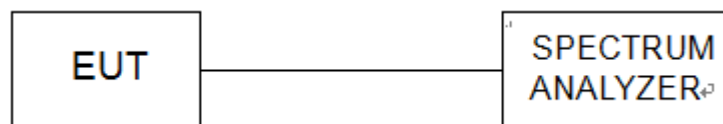
LIMIT

According to FCC §15.231(a)(2), A transmitter activated automatically shall cease transmission within 5 seconds after activation.

TEST PROCEDURE

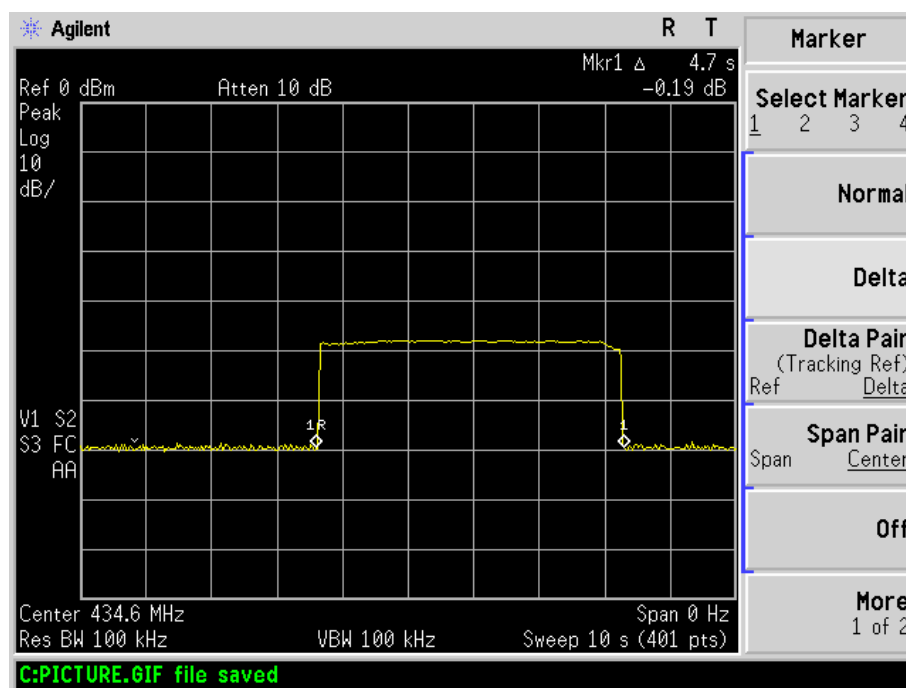
1. The EUT was placed on a wooded table which is 0.8m height and close to receiver antenna of spectrum analyzer.
2. The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was set to 1 MHz to encompass all significant spectral components during the test. The spectrum analyzer was operated in linear scale and zero span mode after tuning to the transmitter carrier frequency.

Test Configuration



TEST RESULTS

Frequency (MHz)	One transmission time (S)	Limit(S)	Result
434.60	4.7	5	Pass





3.5 CALCULATION OF AVERAGE FACTOR

The output field strengths of specification in accordance with the FCC rules specify measurements with an average detector. During the test, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

The duty cycle is measured in 100 ms or the repetition cycle period, whichever is a shorter time frame. The duty cycle is measured by placing the spectrum analyzer to set zero span at 100kHz resolution bandwidth.

Averaging factor in dB = $20\log(\text{duty cycle})$

The duration of one cycle = 45.75ms

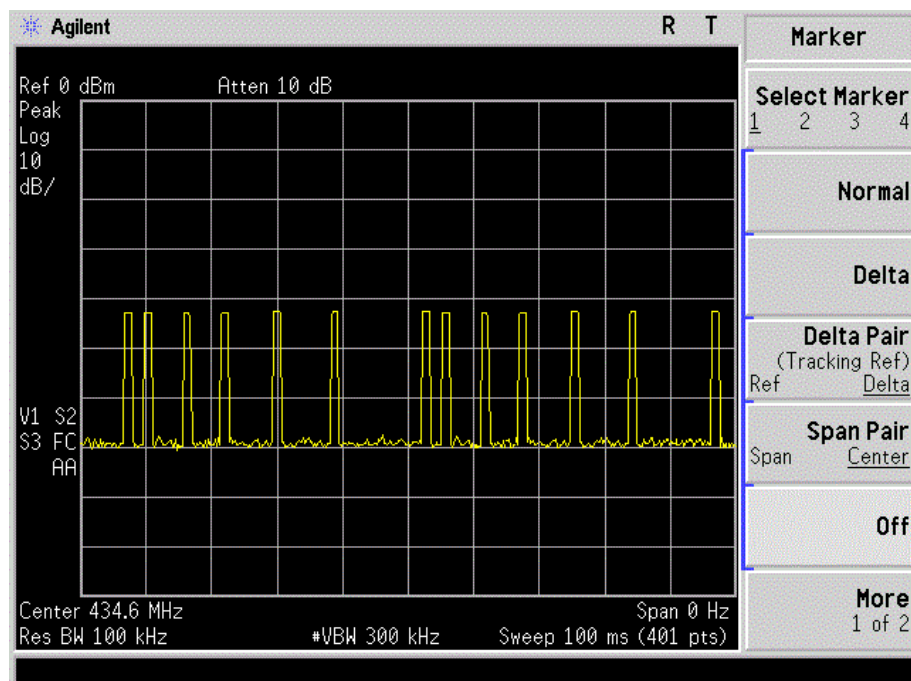
The duty cycle is simply the on-time divided the duration of one cycle

Duty Cycle = $1.05 \times 6 / 45.75\text{ms} = 0.138$

Therefore, the averaging factor is found by $20\log 0.138 = -17.20\text{dB}$

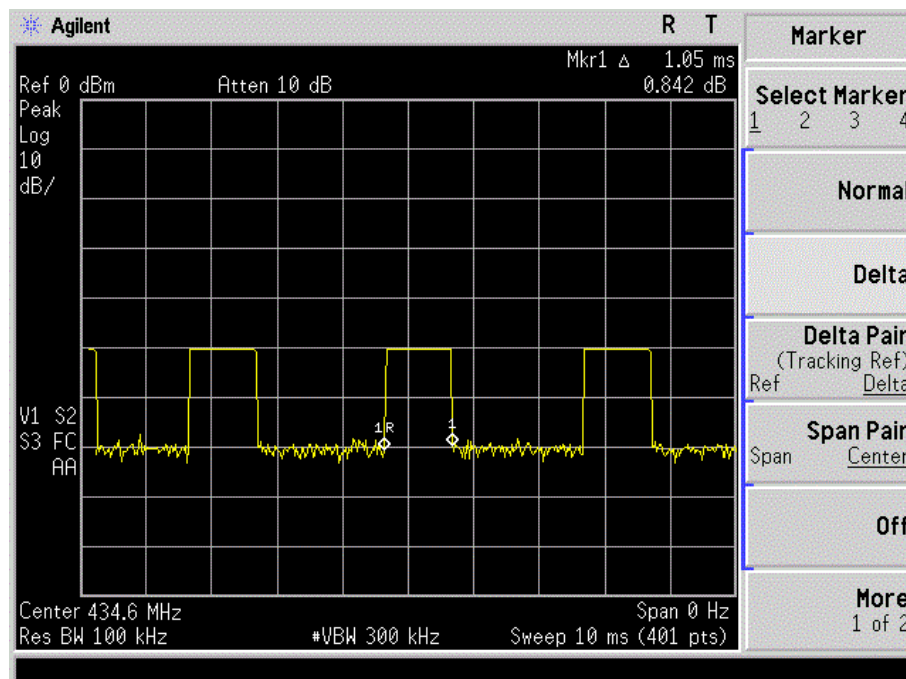
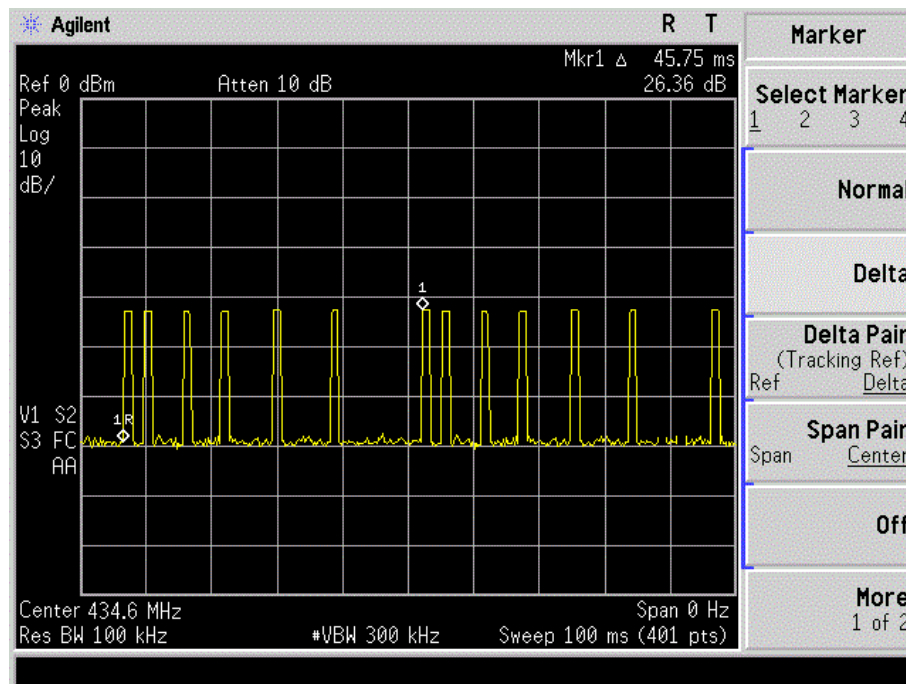
Test plot as follows:

T period





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3.6 ANTENNA REQUIREMENT

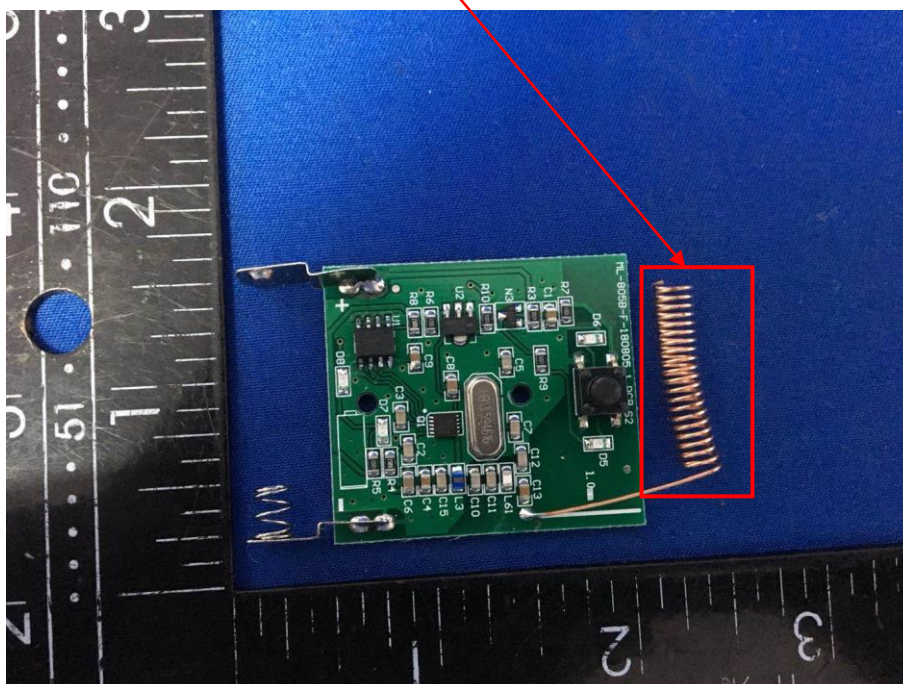
Standard Applicable:

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.

Antenna Connected Construction

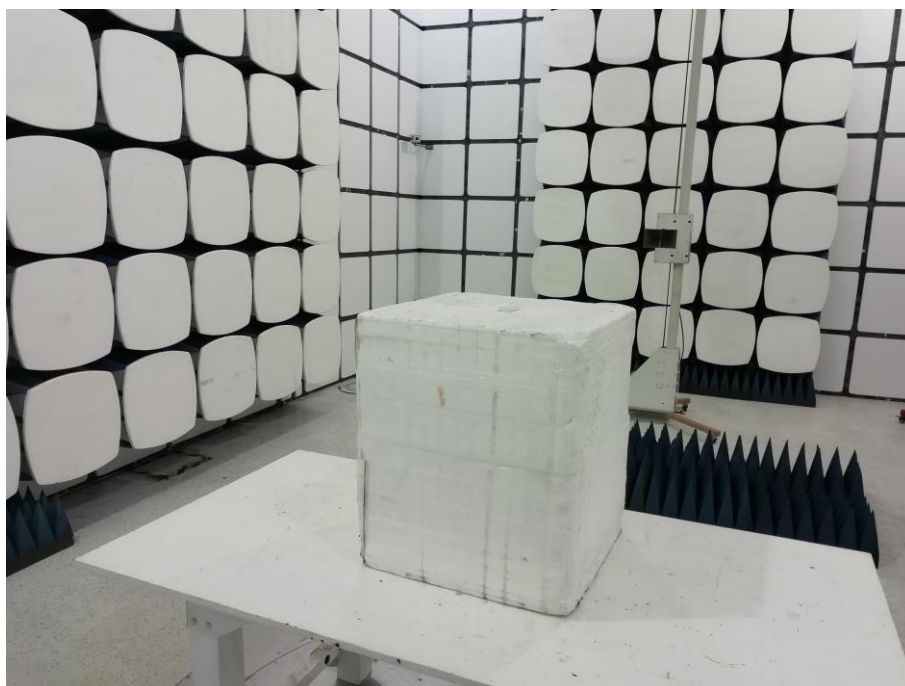
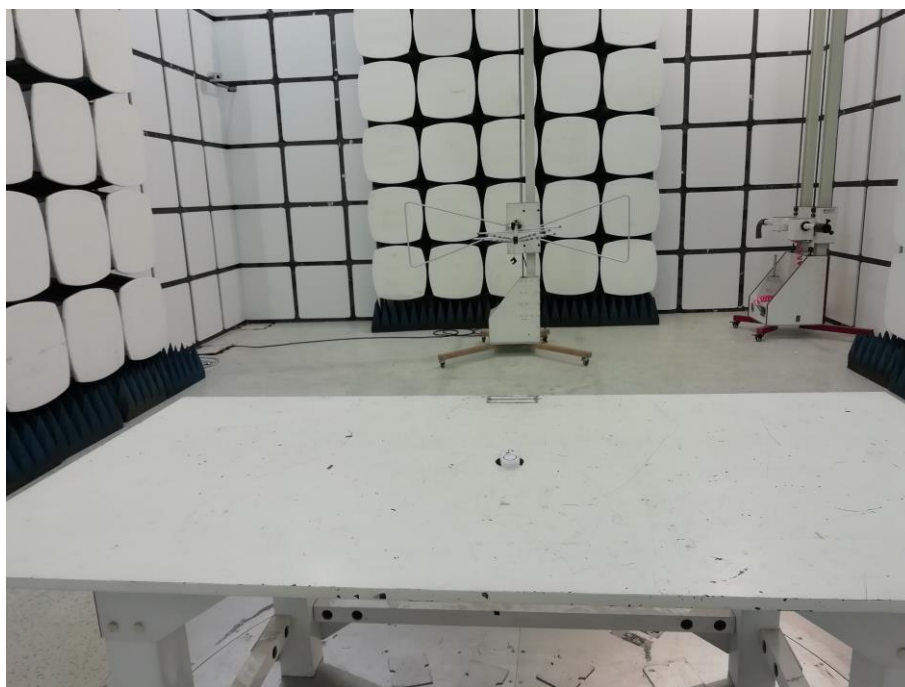
The antenna used in this product is an Integral Antenna, the directional gains of antenna used for transmitting is 0dBi

ANTENNA



3 PHOTOGRAPH OF TEST

Radiated Emission



***** End of Report *****