

FCC RADIO TEST REPORT

FCC ID:2ARZLDS-PB1

Product: Panic Button

Trade Name: D-Stars

Model Name: DS-PB1

Serial Model: DS-PB2

Report No.: UNIA2018120502FR-01

Prepared for

Ningbo Double Stars Trading Co., Ltd

No. 22 Yunhai Road, Ninghai County, Ningbo, China

Prepared by

Shenzhen United Testing Technology Co., Ltd.

2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang
Community, Xixiang Str, Bao'an District, Shenzhen, China

TEST RESULT CERTIFICATION

Applicant's name.....: Ningbo Double Stars Trading Co., Ltd

Address.....: No. 22 Yunhai Road, Ninghai County, Ningbo, China

Manufacturer's Name.....: Ningbo Double Stars Trading Co., Ltd

Address.....: No. 22 Yunhai Road, Ninghai County, Ningbo, China

Product description

Product name.....: Panic Button

Trade Mark.....: D-Stars

Model and/or type reference ..: DS-PB1, DS-PB2

Standards.....: FCC Part 15 Subpart C 15.231

ANSI C63.10: 2013

This device described above has been tested by Shenzhen United 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.

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Date of Test.....: Dec. 06, 2018

Date (s) of performance of tests.....: Dec. 06, 2018 -- Jan. 21, 2019

Date of Issue.....: Dec. 27, 2018

Test Result.....: Pass

Prepared by:

Kahn Yang

Kahn yang/Editor

Reviewer:

Sherwin Qia

Sherwin Qia /Supervisor

Approved & Authorized Signer:

Jiuzhe

Jiuzhe/Manager

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1 TEST SUMMARY

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 |

TEST FACILITY

Test Firm : Shenzhen United Testing Technology Co., Ltd.

Address : 2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19. The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L6494

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of testing Laboratories.

Designation Number: CN1227

Test Firm Registration Number: 674885

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files.

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 | 3.0V |
| Other | Relative Humidity | 55 % |
| | Air Pressure | 101 kPa |

2.2 GENERAL DESCRIPTION OF EUT

| | |
|--------------------|--|
| Equipment | Panic Button |
| Trade Mark | D-Stars |
| Model Name | DS-PB1 |
| Serial No. | DS-PB2 |
| Model Difference | All models have the same functionality, software and electronics, only the color, front frame shape and model names may differ. Test sample model:DS-PB1 |
| FCC ID | 2ARZLDS-PB1 |
| Antenna Type | Rod antenna |
| Antenna Gain | 1.0dbi |
| Frequency Range | 434.603MHz |
| Number of Channels | 1 |
| Modulation Type | ASK |
| Battery | N/A |
| Power Source | DC 3V from battery |
| Adapter Model | N/A |

2.3 CARRIER FREQUENCY OF CHANNELS

| Channel | Frequency (MHz) |
|---------|-----------------|
| 1 | 434.603 |

2.4 OPERATION OF EUT DURING TESTING

Operating Mode

The mode is used: Transmitting mode

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 | Horn Antenna | Sunol | DRH-118 | A101415 | 2019.09.29 |
| 2 | BicoNILog Antenna | Sunol | JB1 Antenna | A090215 | 2019.09.29 |
| 3 | PREAMP | HP | 8449B | 3008A00160 | 2019.09.09 |
| 4 | PREAMP | HP | 8447D | 2944A07999 | 2019.09.09 |
| 5 | EMI TEST RECEIVER | Rohde&Schwarz | ESR3 | 101891 | 2019.09.09 |
| 6 | VECTOR Signal Generator | Rohde&Schwarz | SMU200A | 101521 | 2019.09.28 |
| 7 | Signal Generator | Agilent | E4421B | MY4335105 | 2019.09.28 |
| 8 | MXA Signal Analyzer | Agilent | N9020A | MY50510140 | 2019.09.28 |
| 9 | MXA Signal Analyzer | Agilent | N9020A | MY51110104 | 2019.09.09 |
| 10 | ANT Tower&Turn table Controller | Champro | EM 1000 | 60764 | 2019.09.28 |
| 11 | Anechoic Chamber | Taihe Maorui | 9m*6m*6m | 966A0001 | 2019.09.09 |
| 12 | Shielding Room | Taihe Maorui | 6.4m*4m*3m | 643A0001 | 2019.09.09 |
| 13 | RF Power sensor | DARE | RPR3006W | 15I00041SNO88 | 2019.03.14 |
| 14 | RF Power sensor | DARE | RPR3006W | 15I00041SNO89 | 2019.03.14 |
| 15 | RF power divider | Anritsu | K241B | 992289 | 2019.09.28 |
| 16 | Wideband radio communication tester | Rohde&Schwarz | CMW500 | 154987 | 2019.09.28 |
| 17 | Biconical antenna | Schwarzbeck | VHA 9103 | 91032360 | 2019.09.08 |
| 18 | Biconical antenna | Schwarzbeck | VHA 9103 | 91032361 | 2019.09.08 |
| 19 | Broadband Hybrid Antennas | Schwarzbeck | VULB9163 | VULB9163#958 | 2019.09.08 |
| 20 | Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-1680 | 2019.01.12 |
| 21 | Active Receive Loop Antenna | Schwarzbeck | FMZB 1919B | 00023 | 2019.11.02 |
| 22 | Horn Antenna | Schwarzbeck | BBHA 9170 | BBHA9170651 | 2019.03.14 |
| 23 | Microwave Broadband Preamplifier | Schwarzbeck | BBV 9721 | 100472 | 2019.10.24 |
| 24 | Active Loop Antenna | Com-Power | AL-130R | 10160009 | 2019.05.10 |
| 25 | Power Meter | KEYSIGHT | N1911A | MY50520168 | 2019.05.10 |

3 TEST CONDITIONS AND RESULTS

3.1 CONDUCTED EMISSIONS TEST

Limit

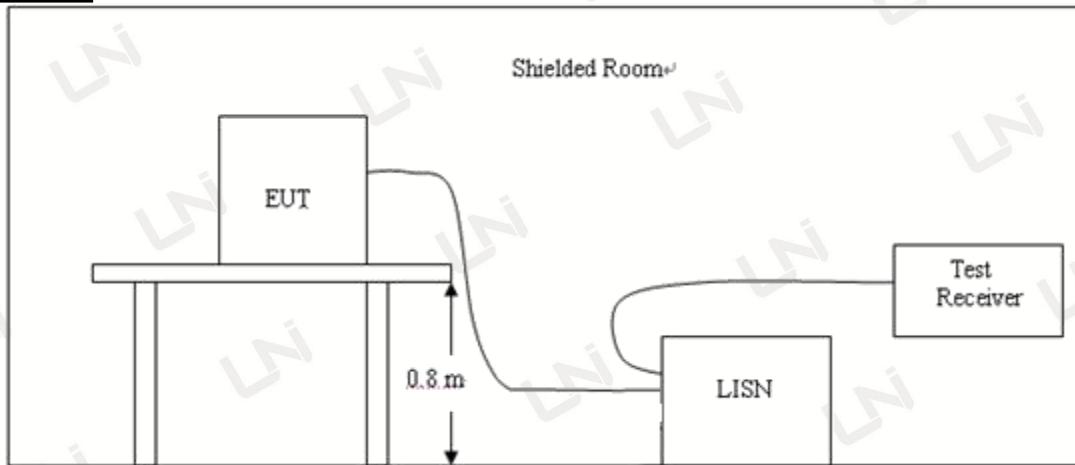
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

| Frequency range (MHz) | Limit (dB _{UV}) | |
|-----------------------|---------------------------|-----------|
| | 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 (dB μ V/m) | Radiated (μ V/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:

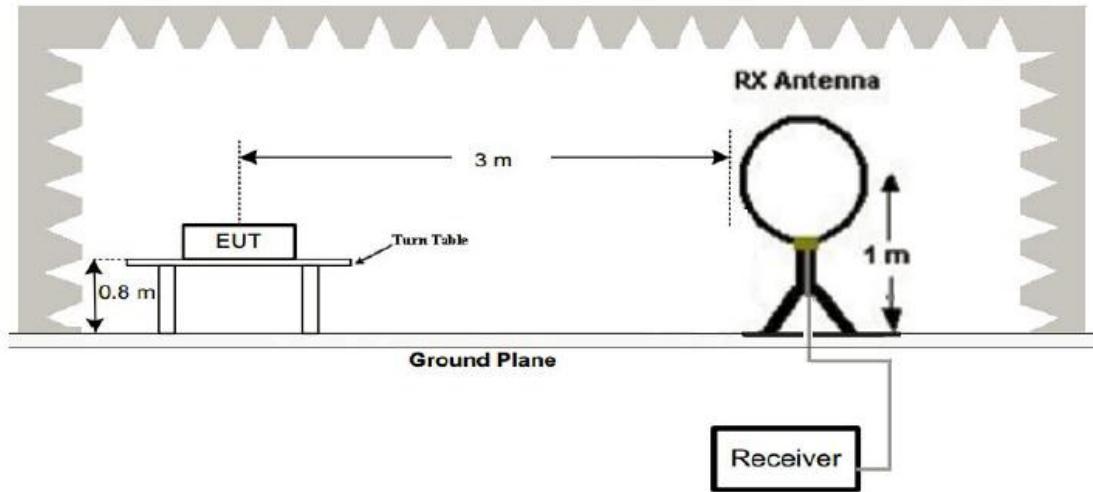
| Fundamental frequency (MHz) | Field strength of fundamental (microvolts/meter) | Field strength of spurious emissions (microvolts/meter) |
|-----------------------------|--|---|
| 40.66–40.70 | 2,250 | 225 |
| 70–130 | 1,250 | 125 |
| 130–174 | 1,1250 to 3,750 | 1 125 to 375 |
| 174–260 | 3,750 | 375 |
| 260–470 | 13,750 to 12,500 | 1 375 to 1,250 |
| Above 470 | 12,500 | 1,250 |

¹ Linear interpolations.

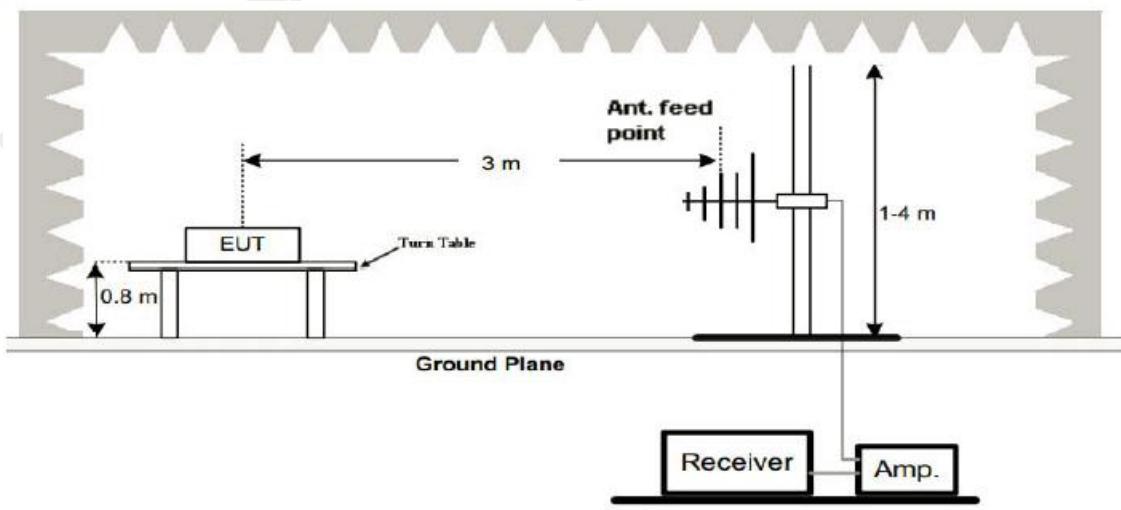
[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 260-470 MHz, μ V/m at 3 meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

Test Setup

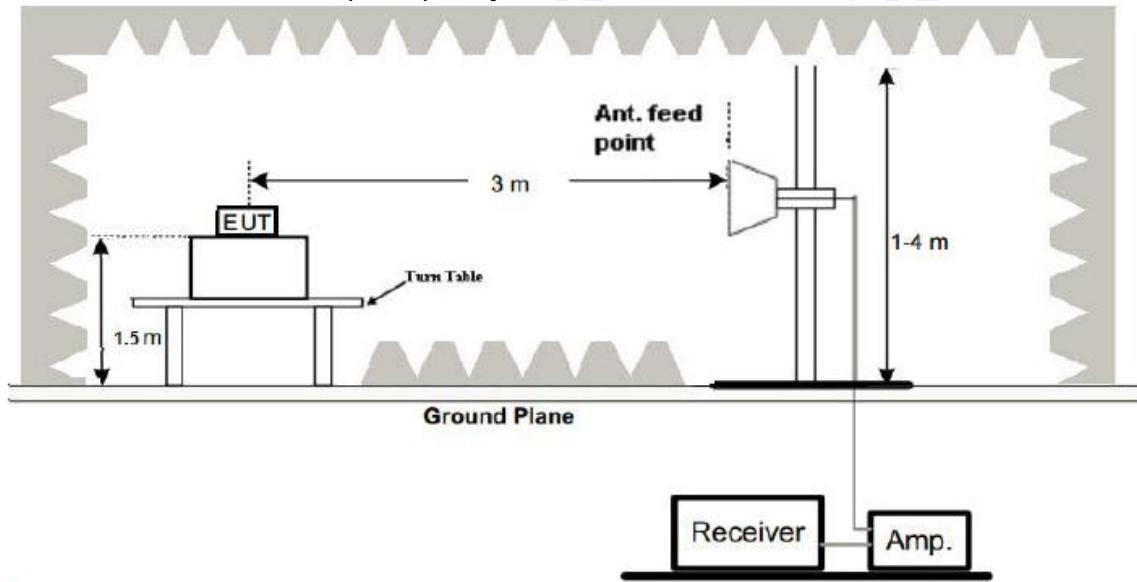
1. Radiated Emission Test-Up Frequency Below 30MHz



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

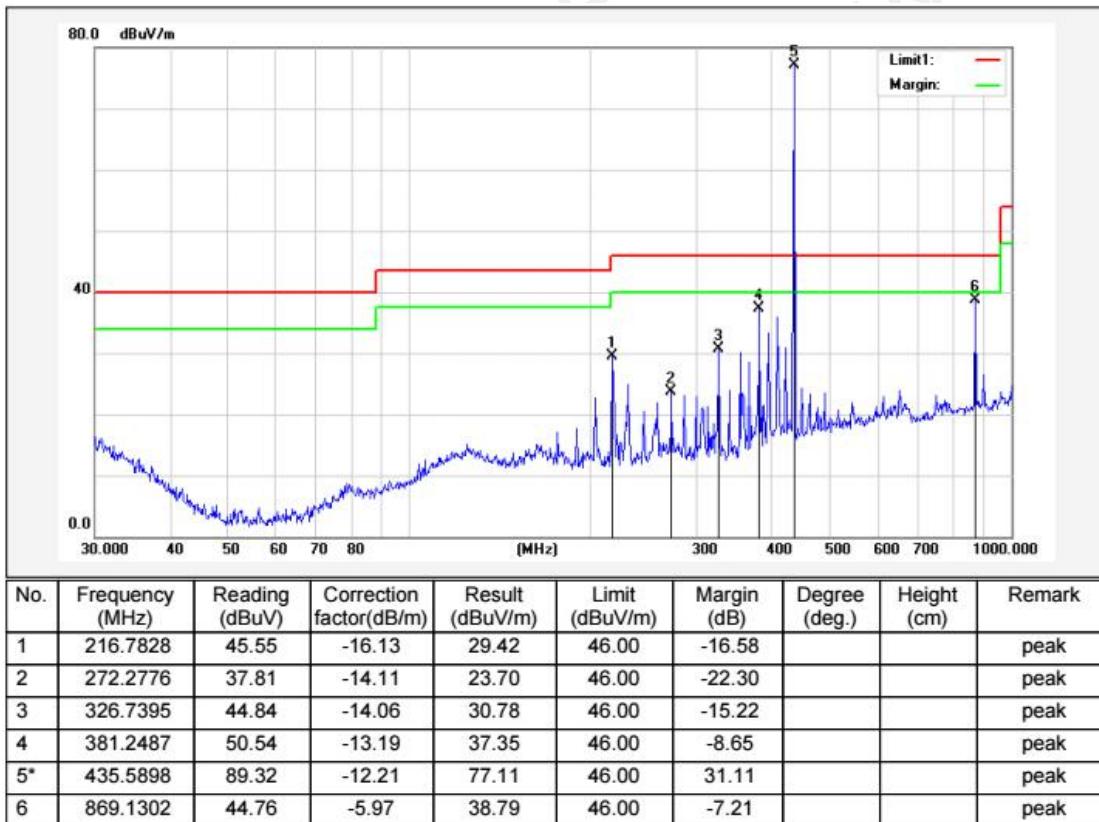
---PASS---

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.

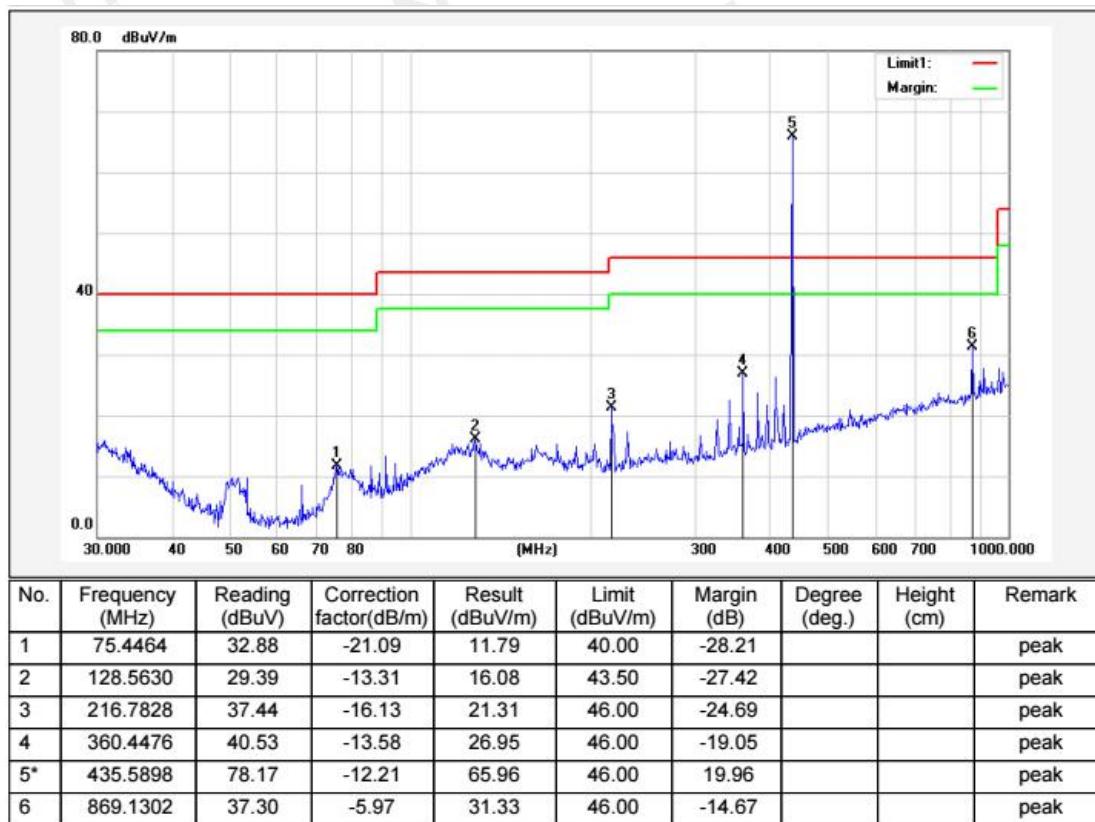
Below 1GHz Test Results:

| | | | |
|---------------|-------------------|--------------------|------------|
| Temperature: | 24°C | Relative Humidity: | 49% |
| Test Date: | Jan. 13, 2019 | Pressure: | 1010hPa |
| Test Voltage: | DC 3V | Polarization: | Horizontal |
| Test Mode: | Continuous launch | | |



Remark: Absolute Level= Reading Level+ Factor, Margin= Absolute Level – Limit
 Factor=Ant. Factor + Cable Loss – Pre-amplifier

| | | | |
|---------------|-------------------|--------------------|----------|
| Temperature: | 24°C | Relative Humidity: | 49% |
| Test Date: | Jan. 13, 2019 | Pressure: | 1010hPa |
| Test Voltage: | DC 3V | Polarization: | Vertical |
| Test Mode: | Continuous launch | | |



Remark: Absolute Level= Reading Level+ Factor, Margin= Absolute Level – Limit
 Factor=Ant. Factor + Cable Loss – Pre-amplifier

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

The fundamental frequency is 434.603MHz, so the fundamental and spurious emissions radiated limit base on the the operating frequency 434.603MHz.

Above 1 GHz Test Results:

Horizontal:

| Frequency (MHz) | Reading Result (dB μ V) | Factor (dB) | Emission Level (dB μ V/m) | Limits (dB μ V/m) | Margin (dB) | Detector Type |
|--------------------|-----------------------------------|----------------|----------------------------------|--------------------------|----------------|------------------|
| 1303.8 | 61.63 | -5.34 | 56.29 | 74 | -17.71 | PK |
| 1303.8 | 52.04 | -5.34 | 46.70 | 54 | -7.30 | AV |
| 1738.4 | 59.86 | -5.02 | 54.84 | 74 | -19.16 | PK |
| 1738.4 | 51.68 | -5.02 | 46.66 | 54 | -7.34 | AV |
| 2173 | 58.39 | -4.76 | 53.63 | 74 | -20.37 | PK |
| 2173 | 47.65 | -4.76 | 42.89 | 54 | -11.11 | AV |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

| Frequency (MHz) | Reading Result (dB μ V) | Factor (dB) | Emission Level (dB μ V/m) | Limits (dB μ V/m) | Margin (dB) | Detector Type |
|--------------------|-----------------------------------|----------------|----------------------------------|--------------------------|----------------|------------------|
| 1303.8 | 62.85 | -5.34 | 57.51 | 74 | -16.19 | PK |
| 1303.8 | 51.63 | -5.34 | 46.29 | 54 | -7.71 | AV |
| 1738.4 | 60.56 | -5.02 | 55.54 | 74 | -18.46 | PK |
| 1738.4 | 50.56 | -5.02 | 45.54 | 54 | -8.46 | AV |
| 2173 | 59.07 | -4.76 | 54.31 | 74 | -19.69 | PK |
| 2173 | 47.89 | -4.76 | 43.13 | 54 | -10.87 | AV |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

The fundamental frequency is 434.603MHz, so the fundamental and spurious emissions radiated limit base on the the operating frequency 434.603MHz.

For average Emission

| Frequency (MHz) | PK Level(dB μ V/m) | PK Limit line(dB μ V/m) | Over Limits(dB) | Polarization |
|-----------------|------------------------|-----------------------------|-----------------|--------------|
| 434.603 | 72.65 | 100.85 | -8.20 | Horizontal |
| 434.603 | 70.23 | 100.85 | -10.62 | Vertical |

Notes: Peak emission Level = $20\log [41.6667(F) - 7083.3333]$

| Frequency (MHz) | AV Level(dB μ V/m) | AV Limit line(dB μ V/m) | Over Limits(dB) | Polarization |
|-----------------|------------------------|-----------------------------|-----------------|--------------|
| 434.603 | 68.62 | 80.85 | -12.23 | Horizontal |
| 434.603 | 65.36 | 80.85 | -15.49 | Vertical |

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

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.

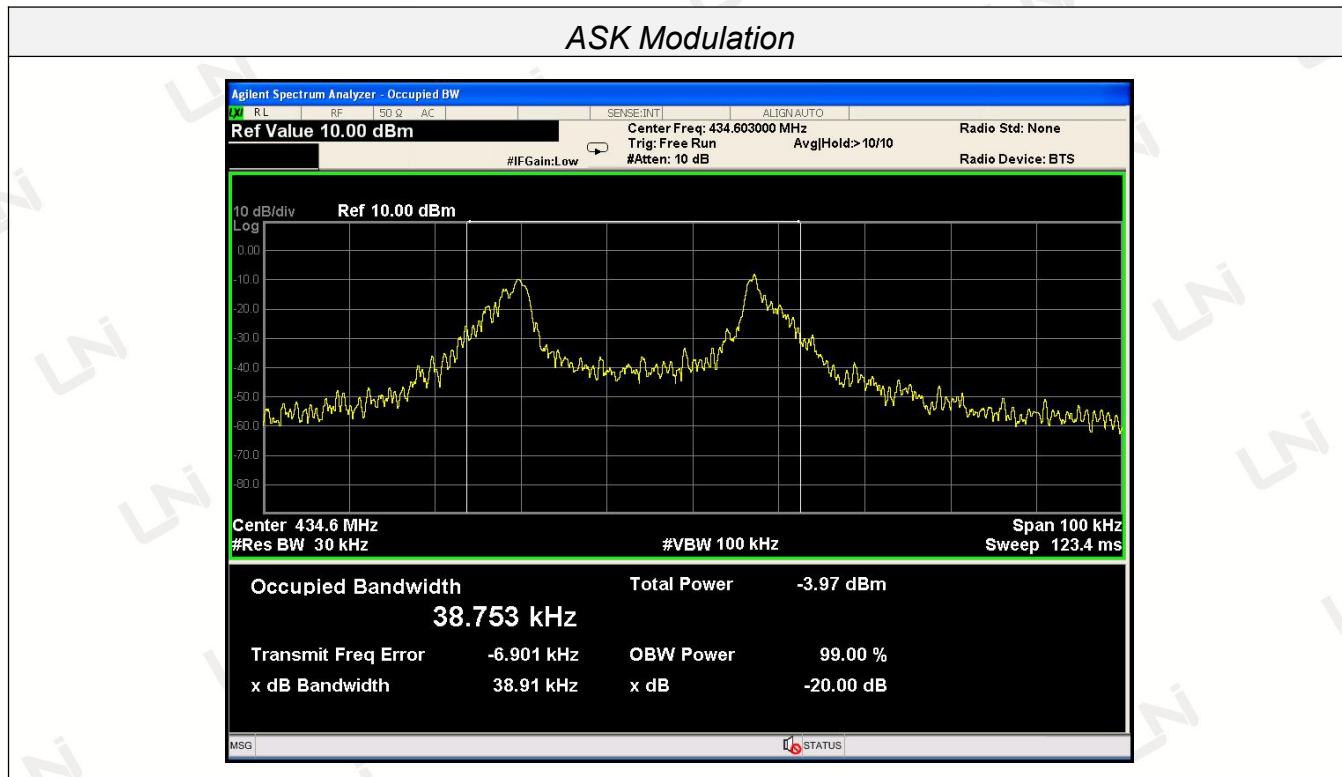
Test Configuration



Test Result

---PASS---

| Modulation | Channel Frequency (MHz) | 99% OBW (KHz) | 20dB bandwidth (KHz) | Limit (KHz) | Result |
|------------|-------------------------|---------------|----------------------|----------------------|--------|
| ASK | 434.603 | 38.753 | 38.91 | 0.25%*434.603=1086.5 | Pass |



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

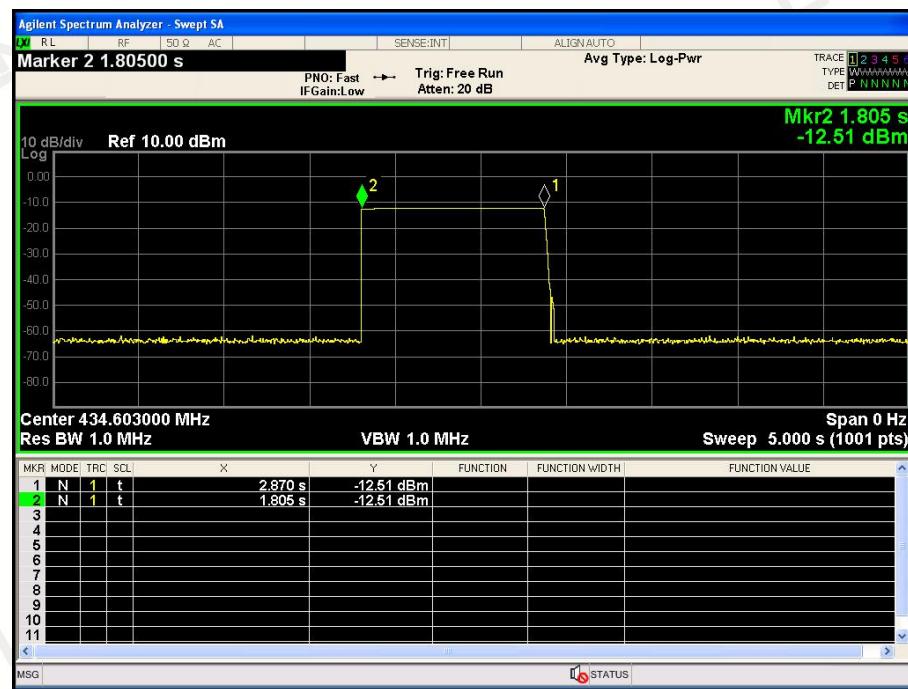
1. The EUT was placed on a wooded table which is 0.8m height and close to receiver antenna of spectrum analyzer.
2. The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was set to 1 MHz to encompass all significant spectral components during the test. The spectrum analyzer 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 |
|--------------------|---------------------------------|----------|--------|
| 434.603 | 1.065 | 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 = 100ms

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

Duty Cycle = 100%

Therefore, the averaging factor is found by $20\log 1 = 0\text{dB}$

Test plot as follows:



3.6 ANTENNA REQUIREMENT

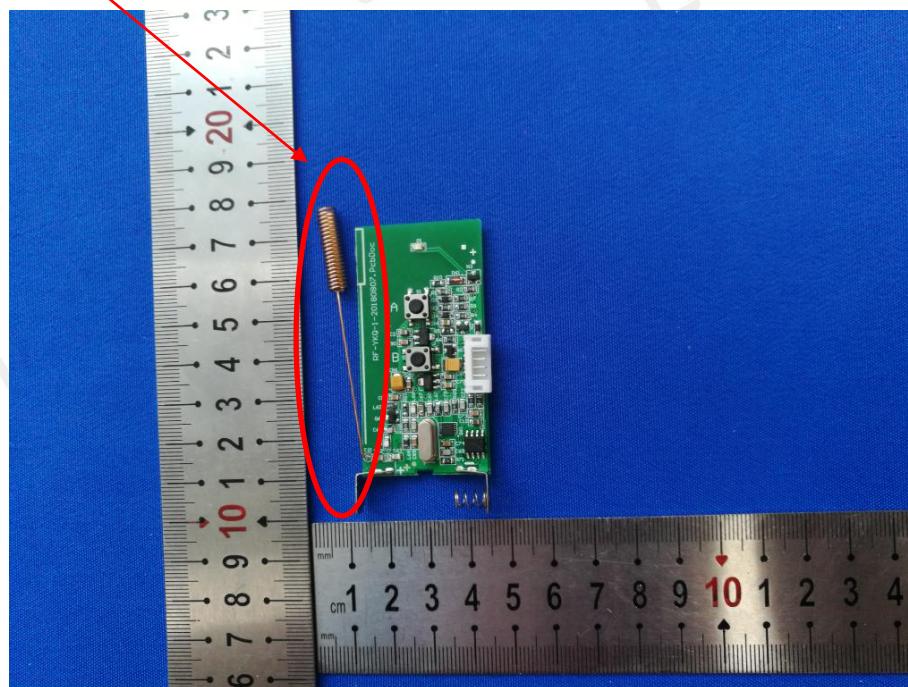
Standard Applicable:

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 1.0dbi

ANTENNA



4 PHOTOGRAPH OF TEST

Radiated Emission

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