NVLAP TESTING
NVLAP LAB CODE 600341-0

BACL Bay Area Compliance Labs Corp.

# TEST REPORT

| | |
|---|---|
| **Applicant:** | **QUANZHOU DAYTECH ELECTRONICS CO., LTD.** |
| **Address:** | **Hengdali Business Center, North Quanan Road, Jinjiang City,Quanzhou,Fujian,China** |
| **Product Name:** | **Call Button** |
| **FCC ID:** | **2AWYQ-E-05W** |
| **IC:** | **27222-E05W** |
| **HVIN:** | **E-05W** |
| **Standard(s):** | **47 CFR Part 15, Subpart C(15.231)<br>RSS-210 Issue 10, December 2019,<br>Amendment (April 2020)<br>RSS-Gen, Issue 5, February 2021 Amendment 2<br>ANSI C63.10-2013** |
| **Report Number:** | **2402U43773E-RF-00** |
| **Report Date:** | **2024/9/24** |

The above device has been tested and found compliant with the requirement of the relative standards by Bay Area Compliance Laboratories Corp. (Dongguan).

| | |
|---|---|
| **Reviewed By:** Gavin Xu | **Approved By:** Ivan Cao |
| Title: RF Supervisor | Title: EMC Manager |

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# CONTENTS

# DOCUMENT REVISION HISTORY

| Revision Number | Report Number | Description of Revision | Date of Revision |
|---|---|---|---|
| 1.0 | 2402U43773E-RF-00 | Original Report | 2024/9/24 |

# 1. GENERAL INFORMATION

## 1.1 Product Description for Equipment under Test (EUT)

| | |
|---|---|
| **EUT Name:** | Call Button |
| **EUT Model:** | E-05W |
| **Multiple Models:** | E-05W-O, E-05W-GY, E-05W-WH |
| **Operation Frequency:** | 433.97 MHz |
| **Modulation Type:** | ASK |
| **Rated Input Voltage:** | DC 3V from battery |
| **Serial Number:** | 2NG9-1 |
| **EUT Received Date:** | 2024/6/24 |
| **EUT Received Status:** | Good |
| Note:<br>The multiple models are electrically identical with the test model. Please refer to the declaration letter for more detail, which was provided by manufacturer. | |

## 1.2 Accessory Information

| Accessory Description | Manufacturer | Model | Parameters |
|---|---|---|---|
| / | / | / | / |

## 1.3 Antenna Information Detail▲

| Antenna Manufacturer | Antenna Type | Antenna Connector | Frequency Range | Antenna Gain |
|---|---|---|---|---|
| QUANZHOU DAYTECH ELECTRONICS CO., LTD. | PCB | Integrated | 433.97 MHz | Unknown |
| **The design of compliance with §15.203:** | | | | |
| ☒ Unit uses a permanently attached antenna. | | | | |
| ☐ Unit uses a unique coupling to the intentional radiator. | | | | |
| ☐ Unit was professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit. | | | | |

## 1.4 Equipment Modifications

No modifications are made to the EUT during all test items.

# 2. SUMMARY OF TEST RESULTS

| Standard(s) Section | Test Items | Result |
|---|---|---|
| §15.207 (a)<br>RSS-Gen Clause 8.8 | Conducted Emissions | Not Applicable |
| §15.205, §15.209, §15.231 (b)<br>RSS-Gen Clause 8.10<br>RSS-210 Annex A A.1.2 | Radiated Emissions | Compliant |
| §15.231 (c)<br>RSS-Gen Clause 6.7<br>RSS-210 Annex A A.1.3 | 20dB Bandwidth&99% Occupied Bandwidth | Compliant |
| §15.231 (a)<br>RSS-210 Annex A A.1.1 | Deactivation Testing | Compliant |
| §15.203<br>RSS-Gen Clause 6.8 | Antenna Requirement | Compliant |
| Not Applicable, the device was powered by battery when operating. | | |

# 3. DESCRIPTION OF TEST CONFIGURATION

## 3.1 EUT Operation Condition

The system was configured for testing in Engineering Mode, which was provided by the manufacturer.

## 3.2 EUT Exercise Software

Engineering Mode was provided by manufacturer▲. The maximum power was configured default setting.

## 3.3 Support Equipment List and Details

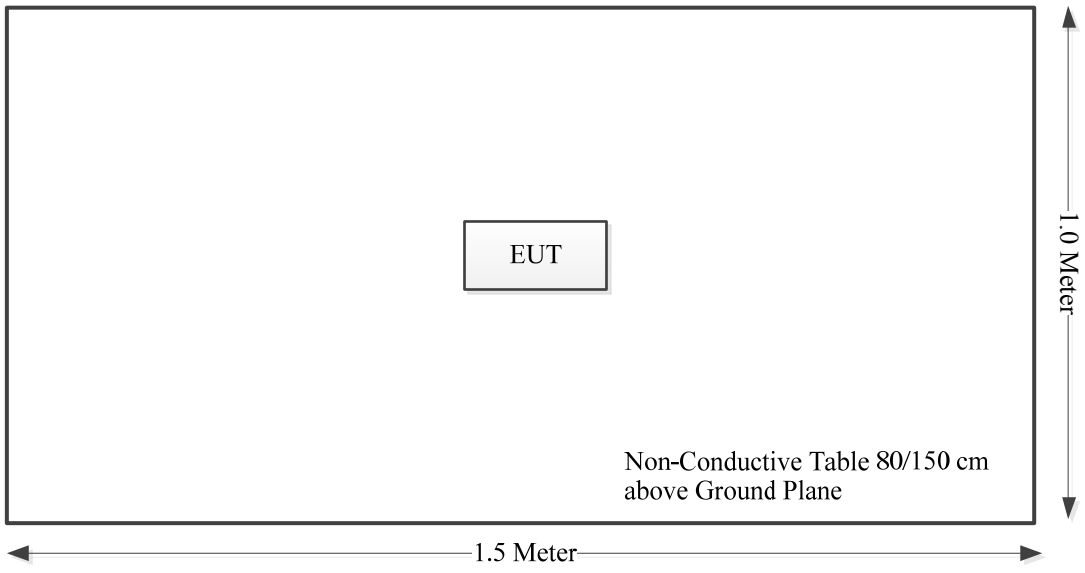
| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| / | / | / | / |

## 3.4 Support Cable List and Details

| Cable Description | Shielding Type | Ferrite Core | Length (m) | From Port | To |
|---|---|---|---|---|---|
| / | / | / | / | / | / |

## 3.5 Block Diagram of Test Setup

Radiated Emissions:



## 3.6 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 829273, the FCC Designation No. : CN5044.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

## 3.7 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

| Parameter | Measurement Uncertainty |
|---|---|
| Occupied Channel Bandwidth | ±5 % |
| Unwanted Emissions, radiated | 9kHz~30MHz: 3.3dB, 30MHz~200MHz: 4.55 dB, 200MHz~1GHz: 5.92 dB, 1GHz~6GHz: 4.98 dB, 6GHz~18GHz: 5.89 dB, 18GHz~26.5GHz:5.47 dB, 26.5GHz~40GHz:5.63 dB |
| Unwanted Emissions, conducted | ±2.47 dB |
| Temperature | ±1℃ |
| Humidity | ±5% |
| DC and low frequency voltages | ±0.4% |
| Duty Cycle | 1% |
| AC Power Lines Conducted Emission | 3.11 dB (150 kHz to 30 MHz) |

# 4. REQUIREMENTS AND TEST RESULT

## 4.1 AC Line Conducted Emissions

### 4.1.1 Applicable Standard

FCC§15.207(a).

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| | Conducted limit (dBμV) | |
|---|---|---|
| Frequency of emission (MHz) | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 μV within the frequency band 535-1705 kHz, as measured using a 50 μH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221,§15.223, or §15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

RSS-Gen Clause 8.8

Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the limits in table 4, as measured using a 50 μH / 50 Ω line impedance stabilization network. This requirement applies for the radio frequency voltage measured between each power line and the ground terminal of each AC power-line mains cable of the EUT.
For an EUT that connects to the AC power lines indirectly, through another device, the requirement for compliance with the limits in table 4 shall apply at the terminals of the AC power-line mains cable of a representative support device, while it provides power to the EUT. The lower

limit applies at the boundary between the frequency ranges. The device used to power the EUT shall be representative of typical applications.

**Table 4 – AC power-line conducted emissions limits**

| Frequency (MHz) | Conducted limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 - 0.5 | 66 to 56[1] | 56 to 46[1] |
| 0.5 – 5 | 56 | 46 |
| 5 – 30 | 60 | 50 |

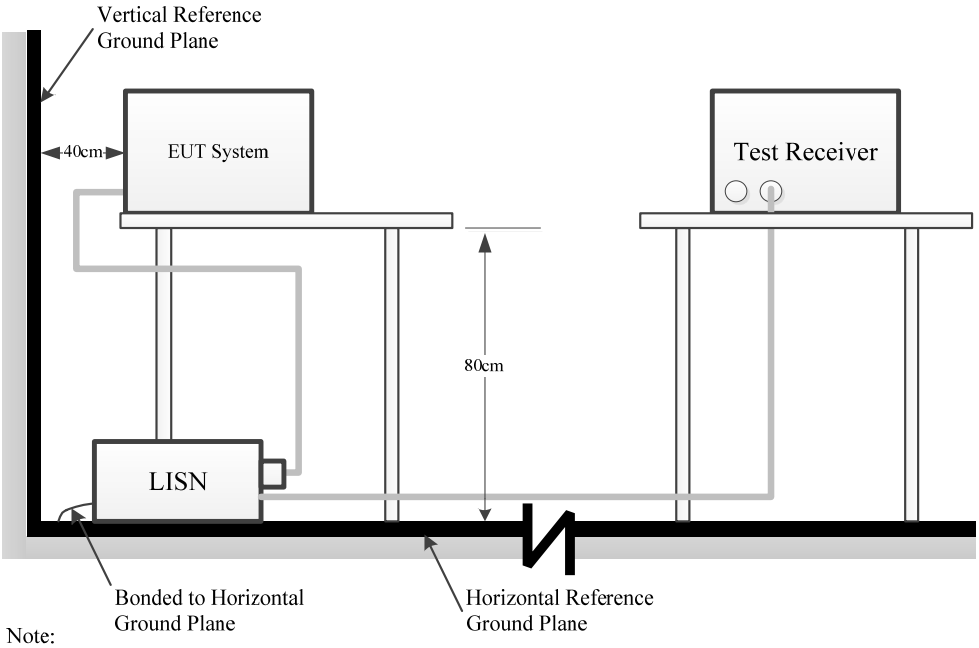
**Note 1:** The level decreases linearly with the logarithm of the frequency.

For an EUT with a permanent or detachable antenna operating between 150 kHz and 30 MHz, the AC power-line conducted emissions must be measured using the following configurations:

(a) Perform the AC power-line conducted emissions test with the antenna connected to determine compliance with the limits of table 4 outside the transmitter's fundamental emission band.

(b) Retest with a dummy load instead of the antenna to determine compliance with the limits of table 4 within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network that simulates the antenna in the fundamental frequency band.

### 4.1.2 EUT Setup




Note:
1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at least 80 cm from other units and oter metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207, RSS-Gen limits.

The spacing between the peripherals was 10 cm.

The adapter or EUT was connected to the main LISN with a 120 V/60 Hz AC power source.

### 4.1.3 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

| Frequency Range | IF B/W |
|---|---|
| 150 kHz – 30 MHz | 9 kHz |

### 4.1.4 Test Procedure

During the conducted emission test, the EUT was connected to the outlet of the first LISN.

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase ("hot") line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

### 4.1.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = attenuation caused by cable loss + voltage division factor of AMN

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

### 4.1.6 Test Result

Not Applicable, the device was powered by battery when operating.

## 4.2 Radiation Spurious Emissions

### 4.2.1 Applicable Standard

FCC §15.231 (b);

In addition to the provisions of § 15.205, 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] 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.

(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

(2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in § 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of § 15.205 shall be demonstrated using the measurement instrumentation specified in that section.

(3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in § 15.209, whichever limit permits a higher field strength.

RSS-210, Annex A, A.1.2

Following are the requirements for field strength of emissions:

(a) The field strength of emissions from momentarily operated intentional radiators shall not exceed the limits in table A1, based on the average value of the measured emissions. The requirements of the “Pulsed operation” section of RSS-Gen apply for averaging pulsed emissions and limiting peak emissions.
Alternatively, compliance with the limits in table A1 may be demonstrated using an International Special Committee on Radio Interference (CISPR) quasi-peak detector.

(b) Unwanted emissions shall be 10 times below the fundamental emissions field strength limits in table A1 or comply with the limits specified in RSS-Gen, whichever is less stringent.

**Table A1 — Permissible field strength limits for momentarily operated devices**

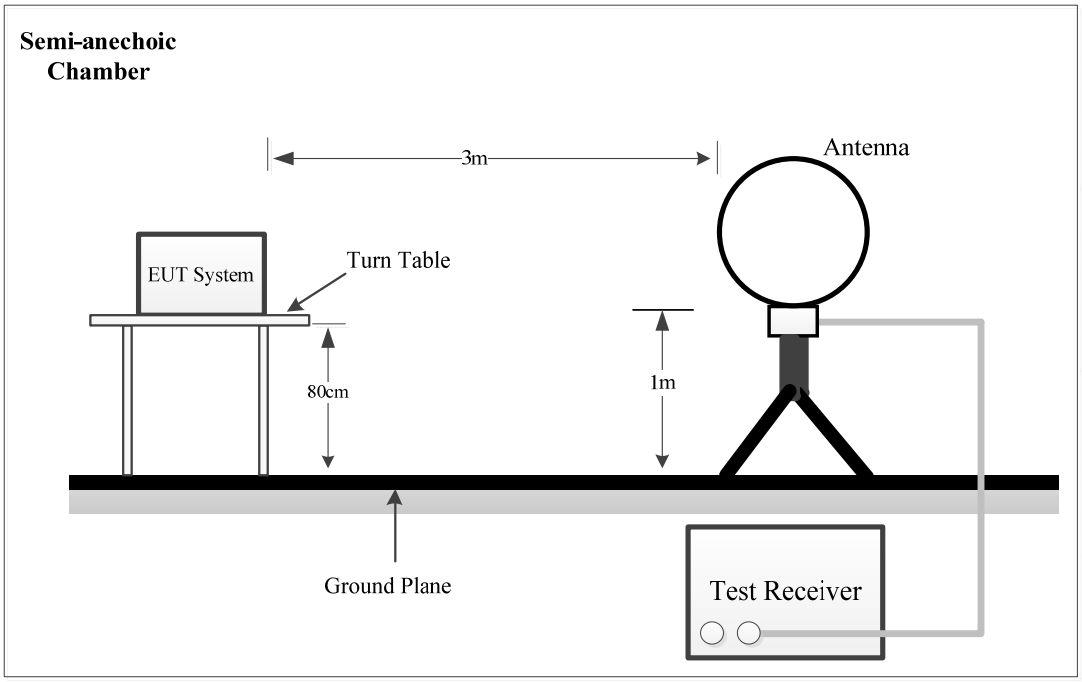
| Fundamental frequency (MHz), excluding restricted frequency bands specified in RSS-Gen | Field strength of the fundamental emissions (µV/m at 3 m) |
|---|---|
| 70-130 | 1,250 |
| 130-174 | 1,250 to 3,750* |
| 174-260** | 3,750 |
| 260-470** | 3,750 to 12,500* |
| Above 470 | 12,500 |

* Linear interpolation with frequency, f, in MHz:
- For 130-174 MHz: Field Strength (µV/m) = (56.82 x f)-6136
- For 260-470 MHz: Field Strength (µV/m) = (41.67 x f)-7083

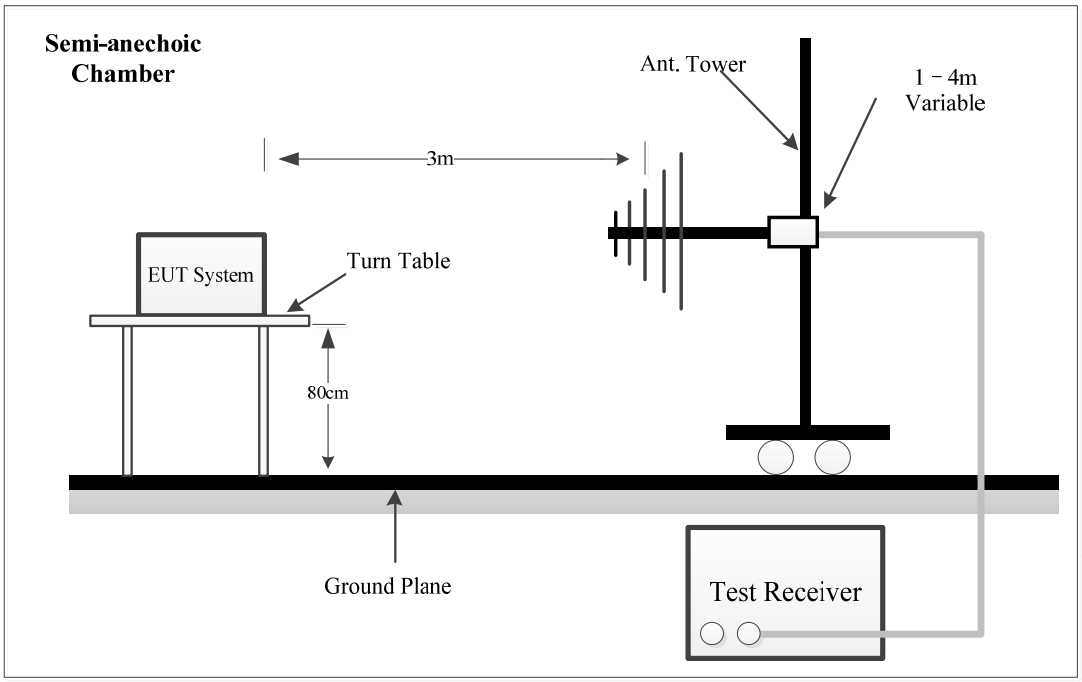
** Frequency bands 225-328.6 MHz and 335.4-399.9 MHz are designated for the exclusive use of the Government of Canada. Manufacturers should be aware of possible harmful interference and degradation of their licence-exempt radio equipment in these frequency bands.

### 4.2.2 EUT Setup

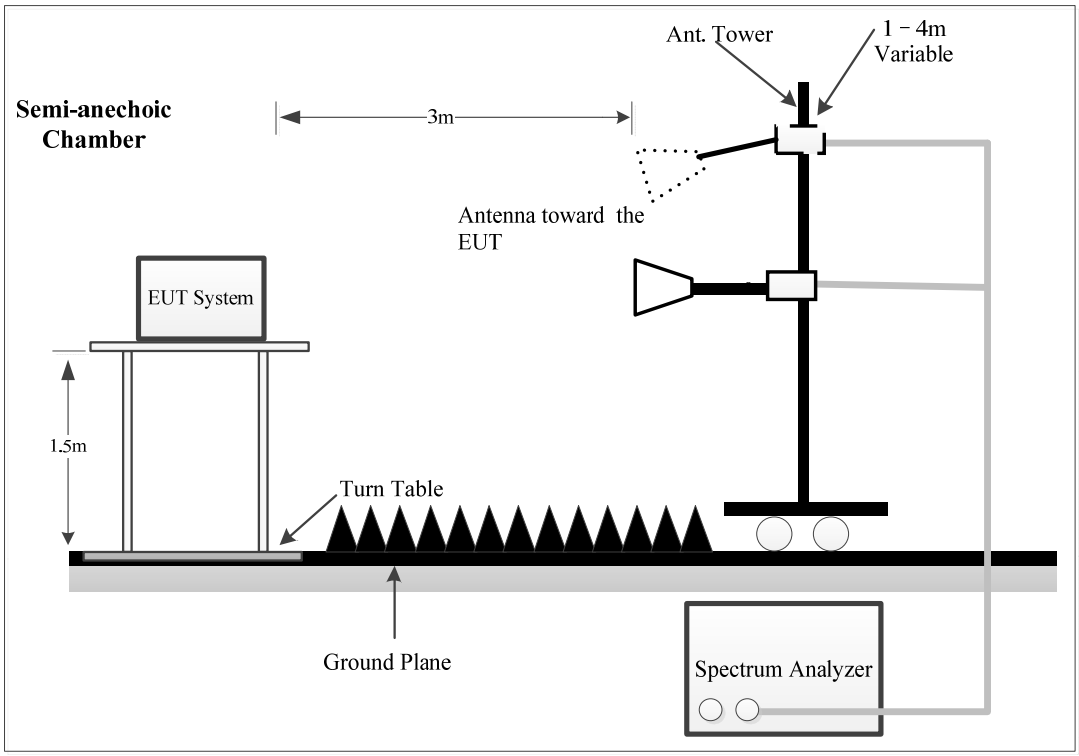
**9kHz - 30MHz:**



**30MHz - 1GHz:**




**Above 1GHz:**




The radiated emissions were performed in the 3 meters distance, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.205, 15.209, FCC 15.231 and RSS-Gen limits.

For 9kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

### 4.2.3 EMI Test Receiver & Spectrum Analyzer Setup

During the radiated emission test, the test receiver was set with the following configurations other than pulsed emissions for average test:

9kHz-1000MHz:

| Frequency Range | Measurement | RBW | Video B/W | IF B/W |
|---|---|---|---|---|
| 9 kHz – 150 kHz | QP/AV | 200 Hz | 1 kHz | 200 Hz |
| 150 kHz – 30 MHz | QP/AV | 9 kHz | 30 kHz | 9 kHz |
| 30 MHz – 1000 MHz | PK | 100 kHz | 300 kHz | / |
| | QP | / | / | 120 kHz |

Above 1GHz:

| Measurement | RBW | Video B/W |
|---|---|---|
| PK | 1MHz | 3 MHz |

If the maximized peak measured value is under the QP/Average limit, then it is unnecessary to perform an QP/Average measurement.

### 4.2.4 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

According to §15.231, Intentional radiators operating under the provisions of this Section shall demonstrate compliance with the limits on the field strength of emissions, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector

For pulsed emissions, according to C63.10 clause 7.5, Procedure for determining the average value of pulsed emissions

Unless otherwise specified, when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 s (100 ms). In cases where the pulse train exceeds 0.1 s, the measured field strength shall be determined during a 0.1 s interval.64 The following procedure is an example of how the average value may be determined. The average field strength may be found by measuring the peak pulse amplitude (in log equivalent units) and determining the duty cycle correction factor (in dB) associated with the pulse modulation as shown in Equation

$$\delta(\mathrm{dB}) = 20\log(\Delta)$$

where

$\delta$ is the duty cycle correction factor (dB)
$\Delta$ is the duty cycle (dimensionless)

### 4.2.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = Antenna Factor + Cable Loss- Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

### 4.2.6 Test Result

| | | | |
|---|---|---|---|
| Serial Number: | 2NG9-1 | Test Date: | Below 1GHz : 2024/7/6~2024/9/23<br>Above 1GHz: 2024/8/6 |
| Test Site: | Chamber10m, Chamber B | Test Mode: | Transmitting |
| Tester: | Zoo Zou, Leo Xiao | Test Result: | Pass |

**Environmental Conditions:**

| | | | | | |
|---|---|---|---|---|---|
| Temperature: (℃) | 26.6~29.3 | Relative Humidity: (%) | 35~65 | ATM Pressure: (kPa) | 99.5~100.8 |

**Test Equipment List and Details:**

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| 9 kHz~1GHz | | | | | |
| Sunol Sciences | Hybrid Antenna | JB3 | A060611-1 | 2023/9/6 | 2026/9/5 |
| Narda | Coaxial Attenuator | 779-6dB | 04269 | 2023/9/6 | 2026/9/5 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-1000-01 | 2024/8/1 | 2025/7/31 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0400-04 | 2024/8/1 | 2025/7/31 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0530-01 | 2024/8/1 | 2025/7/31 |
| Sonoma | Amplifier | 310N | 185914 | 2024/8/1 | 2025/7/31 |
| R&S | EMI Test Receiver | ESCI | 101121 | 2023/10/18 | 2024/10/17 |
| Farad | Test Software | EZ-EMC | V1.1.4.2 | N/A | N/A |
| Above 1GHz | | | | | |
| ETS-Lindgren | Horn Antenna | 3115 | 000 527 35 | 2023/9/7 | 2026/9/6 |
| R&S | Spectrum Analyzer | FSV40 | 101944 | 2023/10/18 | 2024/10/17 |
| Xinhang Macrowave | Coaxial Cable | XH750A-N/J-SMA/J-10M | 20231117004 #0001 | 2023/11/17 | 2024/11/16 |
| Audix | Test Software | E3 | 191218 (V9) | N/A | N/A |
| AH | Preamplifier | PAM-0118P | 469 | 2023/8/19 | 2024/8/18 |

** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

**Test Data:**

Please refer to the below table and plots.

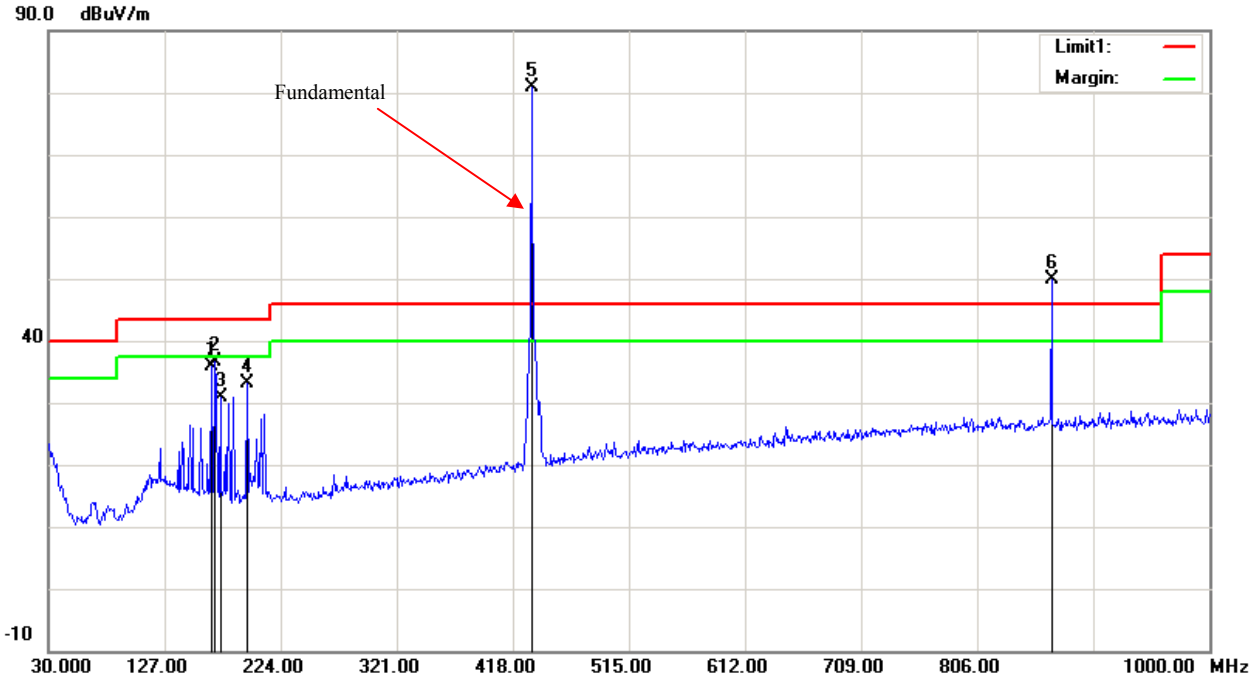
After pre-scan in the X, Y and Z axes of orientation, the worst case is below:

**1) 9kHz~30MHz**

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

**2) 30MHz-1GHz**

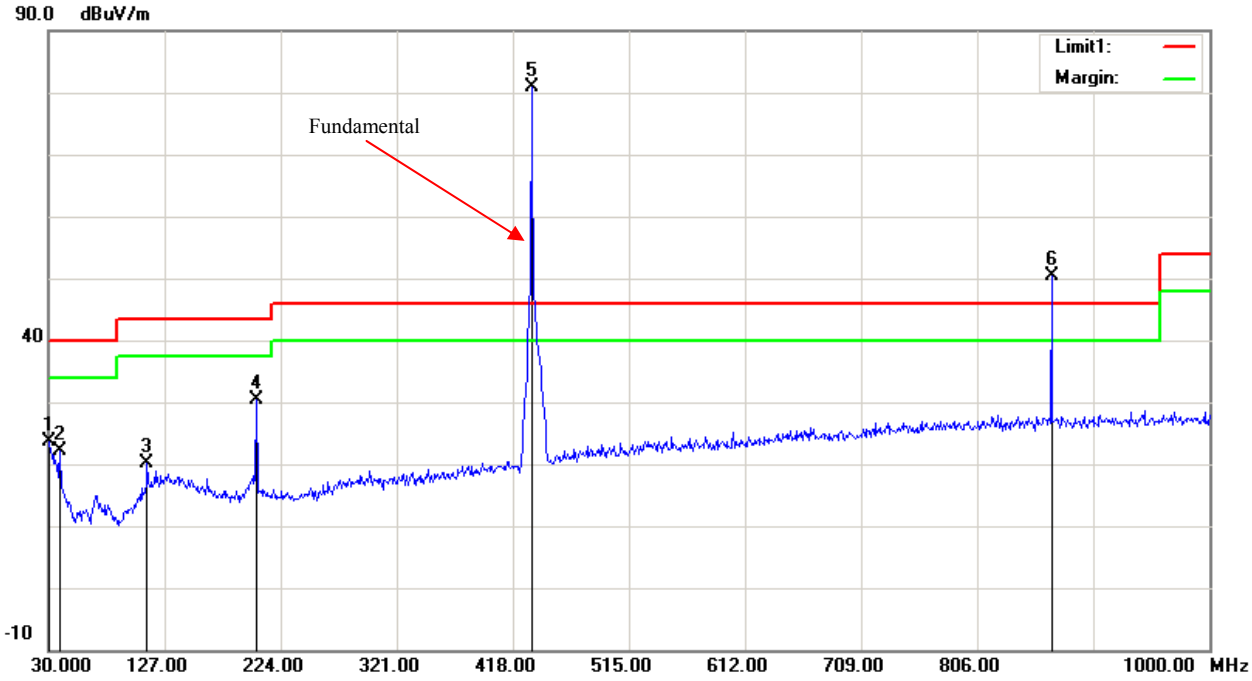
| | |
|---|---|
| Project No: | 2402U43773E-RF |
| Test Engineer: | Zoo Zou |
| Test Date: | 2024-7-6 |
| Polarization: | Horizontal |
| Test Mode: | Transmitting |
| Power Source: | DC 3V |




| No. | Frequency (MHz) | Reading (dBµV) | Detector | Corrected (dB/m) | Result (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 1 | 166.77 | 47.35 | peak | -11.58 | 35.77 | 43.50 | 7.73 |
| 2 | 168.71 | 48.25 | peak | -11.70 | 36.55 | 43.50 | 6.95 |
| 3 | 173.56 | 42.95 | peak | -11.98 | 30.97 | 43.50 | 12.53 |
| 4 | 195.87 | 44.85 | peak | -11.78 | 33.07 | 43.50 | 10.43 |
| 5* | 433.97 | 86.86 | peak | -6.04 | 80.82 | 100.83 | 20.01 |
| 6** | 867.94 | 48.80 | peak | 1.07 | 49.87 | 80.83 | 30.96 |

Note:
*Fundamental
**Harmonic

| | |
|---|---|
| Project No: | 2402U43773E-RF |
| Test Engineer: | Zoo Zou |
| Test Date: | 2024-7-6 |
| Polarization: | Vertical |
| Test Mode: | Transmitting |
| Power Source: | DC 3V |

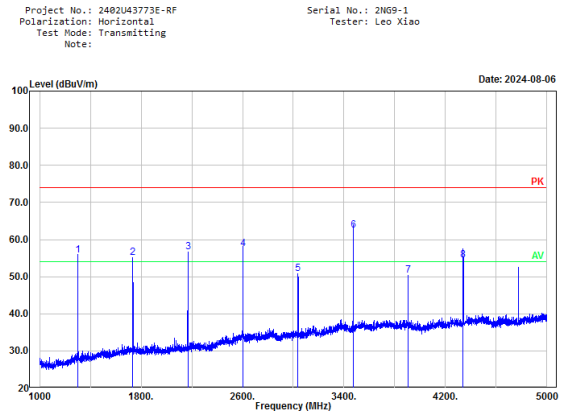
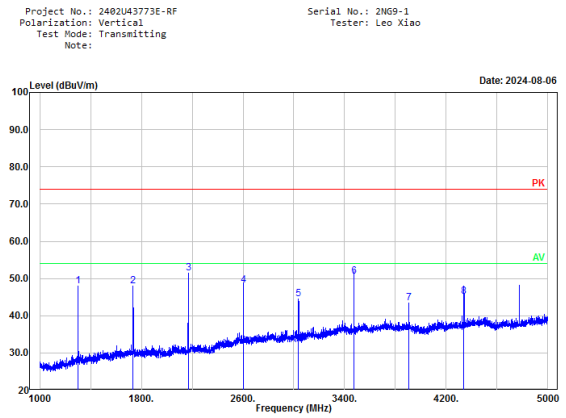



| No. | Frequency (MHz) | Reading (dBµV) | Detector | Corrected (dB/m) | Result (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 1 | 30.00 | 27.47 | peak | -3.80 | 23.67 | 40.00 | 16.33 |
| 2 | 39.70 | 32.79 | peak | -10.73 | 22.06 | 40.00 | 17.94 |
| 3 | 112.45 | 31.18 | peak | -11.02 | 20.16 | 43.50 | 23.34 |
| 4 | 203.63 | 42.34 | peak | -11.91 | 30.43 | 43.50 | 13.07 |
| 5* | 433.97 | 86.96 | peak | -6.04 | 80.92 | 100.83 | 19.91 |
| 6** | 867.94 | 49.34 | peak | 1.07 | 50.41 | 80.83 | 30.42 |

Note:
*Fundamental
**Harmonic
.

**3) 1GHz-5GHz:**
**Peak:**

| Frequency | Reading | Polar | Factor | Corrected Amplitude | Limit | Margin |
|---|---|---|---|---|---|---|
| MHz | dBµV | H/V | dB/m | dBµV/m | dBµV/m | dB |
| 1301.91 | 73.40 | H | -17.52 | 55.88 | 74.00 | 18.12 |
| 1301.91 | 65.53 | V | -17.52 | 48.01 | 74.00 | 25.99 |
| 1735.88 | 71.83 | H | -16.68 | 55.15 | 80.83 | 25.68 |
| 1735.88 | 64.74 | V | -16.68 | 48.06 | 80.83 | 32.77 |
| 2169.85 | 72.21 | H | -15.59 | 56.62 | 80.83 | 24.21 |
| 2169.85 | 66.97 | V | -15.59 | 51.38 | 80.83 | 29.45 |
| 2603.82 | 71.29 | H | -13.72 | 57.57 | 80.83 | 23.26 |
| 2603.82 | 61.99 | V | -13.72 | 48.27 | 80.83 | 32.56 |
| 3037.79 | 63.54 | H | -12.68 | 50.86 | 80.83 | 29.97 |
| 3037.79 | 57.27 | V | -12.68 | 44.59 | 80.83 | 36.24 |
| 3471.76 | 74.60 | H | -12.04 | 62.56 | 80.83 | 18.27 |
| 3471.76 | 62.52 | V | -12.04 | 50.48 | 80.83 | 30.35 |
| 3905.73 | 61.32 | H | -11.02 | 50.30 | 74.00 | 23.70 |
| 3905.73 | 54.42 | V | -11.02 | 43.40 | 74.00 | 30.60 |
| 4339.70 | 64.93 | H | -10.45 | 54.48 | 74.00 | 19.52 |
| 4339.70 | 55.50 | V | -10.45 | 45.05 | 74.00 | 28.95 |

| Horizontal | Vertical |
|---|---|
|  |  |





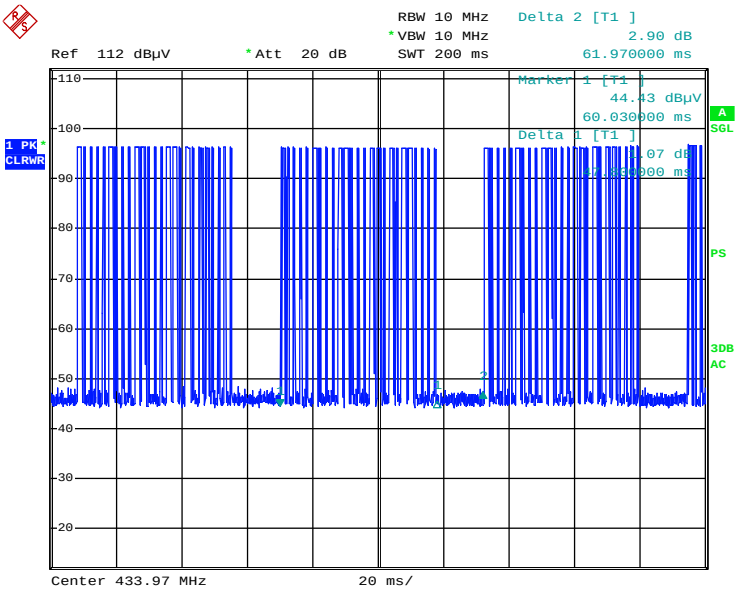
Note:
Corrected Amplitude = Reading + Factor
Margin = Limit- Corrected Amplitude

Average

| Frequency (MHz) | Peak Measurement @3m (dBµV/m) | Polar (H/V) | Duty Cycle Correction Factor (dB) | Average Amp. (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|
| 433.97 | 80.82 | H | -8.98 | 71.84 | 80.83 | 8.99 |
| 433.97 | 80.92 | V | -8.98 | 71.94 | 80.83 | 8.89 |
| 867.94 | 49.87 | H | -8.98 | 40.89 | 60.83 | 19.94 |
| 867.94 | 50.41 | V | -8.98 | 41.43 | 60.83 | 19.4 |
| 1301.91 | 55.88 | H | -8.98 | 46.9 | 54.00 | 7.1 |
| 1301.91 | 48.01 | V | -8.98 | 39.03 | 54.00 | 14.97 |
| 1735.88 | 55.15 | H | -8.98 | 46.17 | 60.83 | 14.66 |
| 1735.88 | 48.06 | V | -8.98 | 39.08 | 60.83 | 21.75 |
| 2169.85 | 56.62 | H | -8.98 | 47.64 | 60.83 | 13.19 |
| 2169.85 | 51.38 | V | -8.98 | 42.4 | 60.83 | 18.43 |
| 2603.82 | 57.57 | H | -8.98 | 48.59 | 60.83 | 12.24 |
| 2603.82 | 48.27 | V | -8.98 | 39.29 | 60.83 | 21.54 |
| 3037.79 | 50.86 | H | -8.98 | 41.88 | 60.83 | 18.95 |
| 3037.79 | 44.59 | V | -8.98 | 35.61 | 60.83 | 25.22 |
| 3471.76 | 62.56 | H | -8.98 | 53.58 | 60.83 | 7.25 |
| 3471.76 | 50.48 | V | -8.98 | 41.5 | 60.83 | 19.33 |
| 3905.73 | 50.30 | H | -8.98 | 41.32 | 54.00 | 12.68 |
| 3905.73 | 43.40 | V | -8.98 | 34.42 | 54.00 | 19.58 |
| 4339.70 | 54.48 | H | -8.98 | 45.5 | 54.00 | 8.5 |
| 4339.70 | 45.05 | V | -8.98 | 36.07 | 54.00 | 17.93 |

Note:
Average Amp. = Peak Measurement@3m(dBµV/m)+ Duty Cycle Correction Factor
Margin = Limit- Average Amp.
Duty Cycle Correction Factor
=20*log(Ton/Ton+Toff)
=20*log((1.56*9+0.5*16)/61.97)
=-8.98

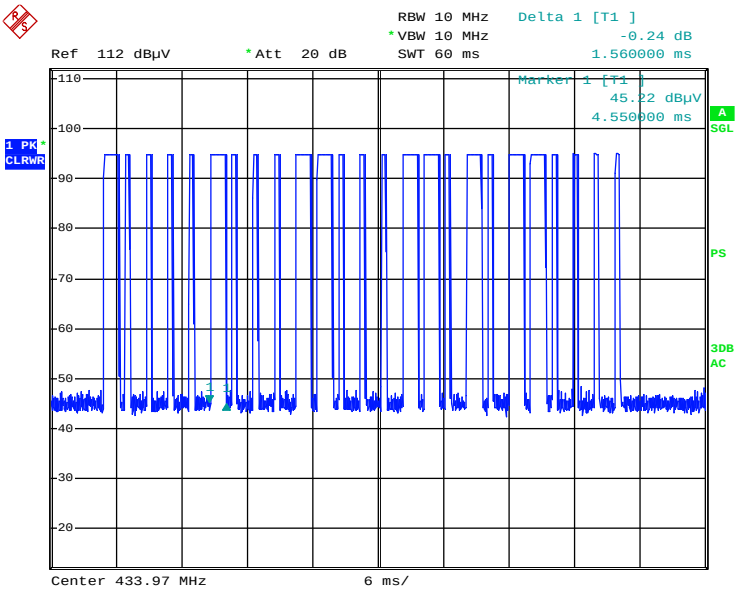
*Ton+Toff=61.97ms*




ProjectNo.:2402U43773E-RF Tester:Zoo Zou

Date: 23.SEP.2024 16:17:01

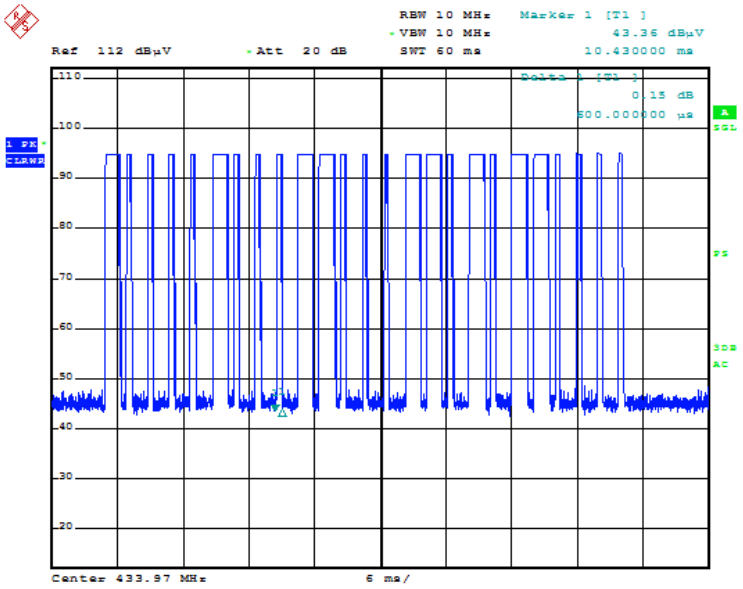
*Ton1=1.56ms, 9 pulse*




ProjectNo.:2402U43773E-RF Tester:Zoo Zou

Date: 23.SEP.2024 16:13:45

*Ton2=0.5ms, 16pulse*




ProjectNo.:2402U43773E-RF Tester:Zoo Zou

Date: 23.SEP.2024 16:15:12

## 4.3 20 dB Emission Bandwidth&99% Occupied Bandwidth:

### 4.3.1 Applicable Standard

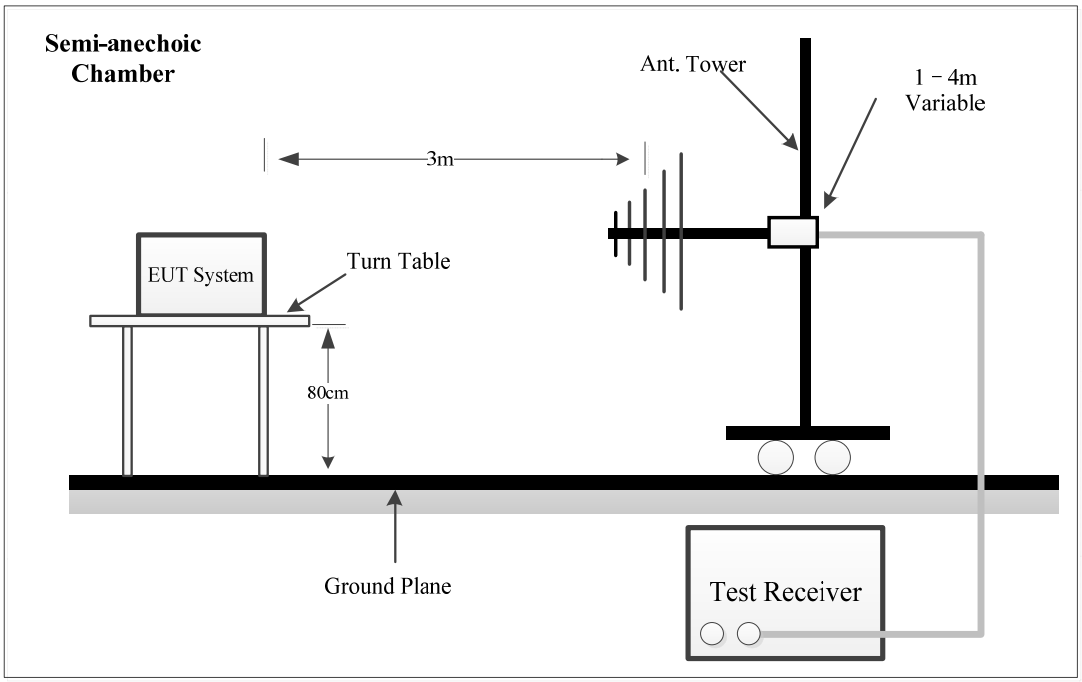
FCC §15.231(c)

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. Bandwidth is determined at the points 20 dB down from the modulated carrier.

RSS-210, Annex A, A.1.3

The occupied bandwidth of momentarily operated devices shall be less than or equal to 0.25% of the centre frequency for devices operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the occupied bandwidth shall be less than or equal to 0.5% of the centre frequency.

### 4.3.2 EUT Setup




### 4.3.3 Test Procedure

According to ANSI C63.10-2013 Section 6.9.2

**20dB Bandwidth:**
a) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, unless otherwise specified by the applicable requirement.
b) Set the video bandwidth (VBW) ≥ 3×RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

**99% Occupied Bandwidth:**
a) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, unless otherwise specified by the applicable requirement.
b) Set the video bandwidth (VBW) ≥ 3×RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) use the 99% Occupied bandwidth function to test the bandwidth.

### 4.3.4 Test Result

| | | | |
|---|---|---|---|
| Serial Number: | 2NG9-1 | Test Date: | 2024/8/9 |
| Test Site: | Chamber10m | Test Mode: | Transmitting |
| Tester: | Zoo Zou | Test Result: | Pass |

| **Environmental Conditions:** | | | | | |
|---|---|---|---|---|---|
| Temperature: (℃) | 29.3 | Relative Humidity: (%) | 52 | ATM Pressure: (kPa) | 100.8 |

**Test Equipment List and Details:**

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Sunol Sciences | Hybrid Antenna | JB3 | A060611-1 | 2023/9/6 | 2026/9/5 |
| Narda | Coaxial Attenuator | 779-6dB | 04269 | 2023/9/6 | 2026/9/5 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-1000-01 | 2024/8/1 | 2025/7/31 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0400-04 | 2024/8/1 | 2025/7/31 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0530-01 | 2024/8/1 | 2025/7/31 |
| Sonoma | Amplifier | 310N | 185914 | 2024/8/1 | 2025/7/31 |
| R&S | EMI Test Receiver | ESCI | 101121 | 2023/10/18 | 2024/10/17 |

**** Statement of Traceability:*** *Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

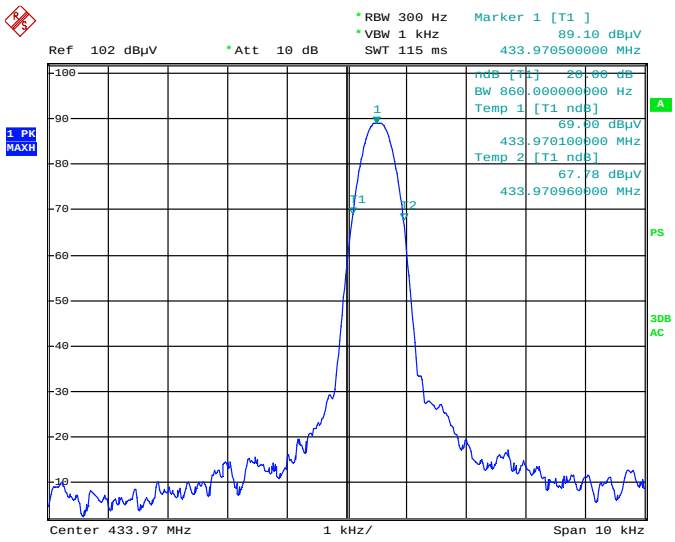
**Test Data:**

| Channel Frequency (MHz) | 20 dB Bandwidth (kHz) | Limit (kHz) | Result |
|---|---|---|---|
| 433.97 | 0.86 | 1084.93 | Pass |

| Channel Frequency (MHz) | 99% Occupied Bandwidth (kHz) | Limit (kHz) | Result |
|---|---|---|---|
| 433.97 | 0.76 | 1084.93 | Pass |

*Note: Limit = 0.25% * Channel Frequency*

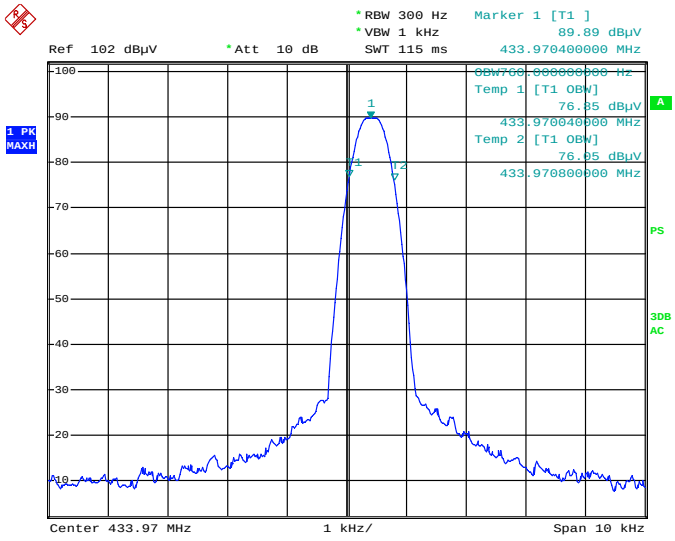
## 20dB Emission Bandwidth




ProjectNo.:2402U43773E-RF Tester:Zoo Zou

Date: 9.AUG.2024 16:43:49

## 99% Occupied Bandwidth




ProjectNo.:2402U43773E-RF Tester:Zoo Zou

Date: 9.AUG.2024 16:40:23

## 4.4 DEACTIVATION TESTING

### 4.4.1 Applicable Standard

FCC §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. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation:

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

(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

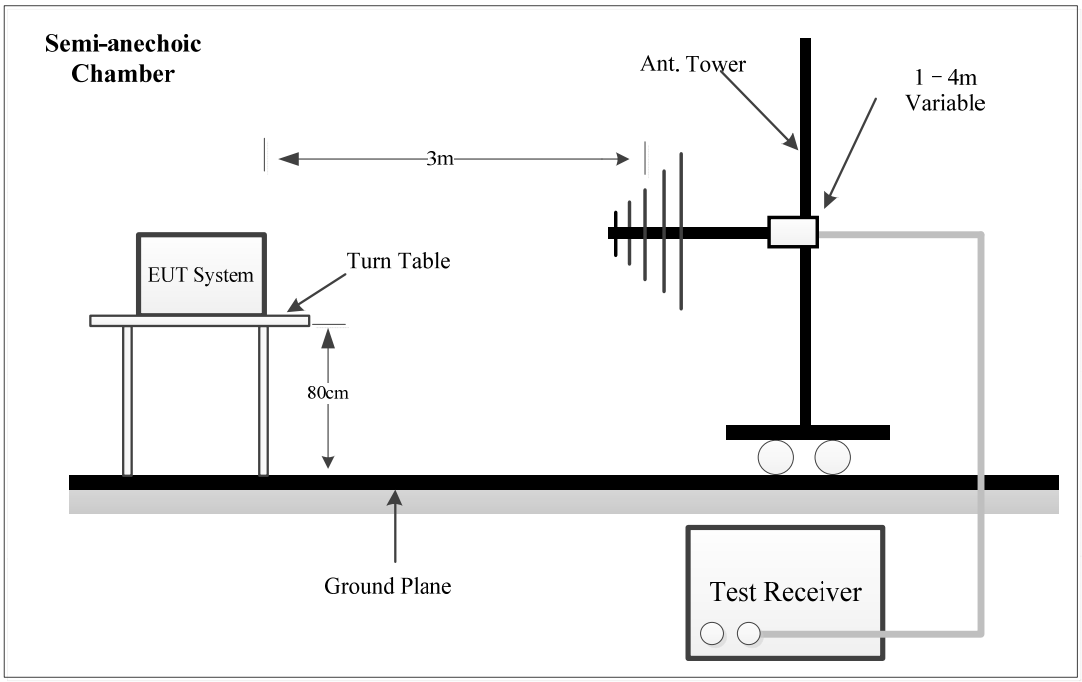
(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition

(5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

RSS-210, Annex A, A.1.1(a)

A manually operated transmitter shall be equipped with a push-to-operate switch and be under manual control at all times during transmission. When released, the transmitter shall cease transmission within no more than 5 seconds of being released.

### 4.4.2 EUT Setup




### 4.4.3 Test Procedure

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:
1) Set the center frequency of the instrument to the center frequency of the transmission.
2) Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.
3) Set VBW ≥ RBW. Set detector = peak or average.

### 4.4.4 Test Result

| | | | |
|---|---|---|---|
| Serial Number: | 2NG9-1 | Test Date: | 2024/8/8 |
| Test Site: | Chamber10m | Test Mode: | Transmitting |
| Tester: | Zoo Zou | Test Result: | Pass |

| **Environmental Conditions:** | | | | | |
|---|---|---|---|---|---|
| Temperature: (℃) | 29.3 | Relative Humidity: (%) | 52 | ATM Pressure: (kPa) | 100.8 |

**Test Equipment List and Details:**

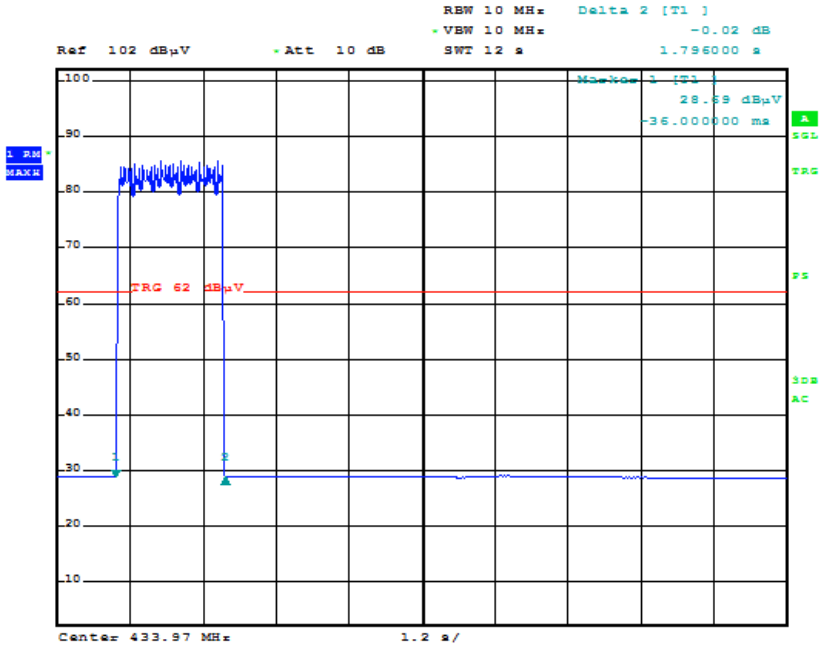
| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Sunol Sciences | Hybrid Antenna | JB3 | A060611-1 | 2023/9/6 | 2026/9/5 |
| Narda | Coaxial Attenuator | 779-6dB | 04269 | 2023/9/6 | 2026/9/5 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-1000-01 | 2024/8/1 | 2025/7/31 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0400-04 | 2024/8/1 | 2025/7/31 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0530-01 | 2024/8/1 | 2025/7/31 |
| Sonoma | Amplifier | 310N | 185914 | 2024/8/1 | 2025/7/31 |
| R&S | EMI Test Receiver | ESCI | 101121 | 2023/10/18 | 2024/10/17 |

**** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

**Test Data:**

| Deactivate Time (s) | Limit (s) | Result |
|---|---|---|
| 1.796 | <5 | Pass |

Transmission duration Time




ProjectNo.:2402U43773E-RF Tester:Zoo Zou

Date: 8.AUG.2024 15:38:08

## 4.5 Antenna Requirement

### 4.5.1 Applicable Standard

FCC §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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

RSS-Gen Clause 6.8

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).
When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.
The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.
For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:
This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

### 4.5.2 Judgment

**Compliant.** Please refer to the Antenna Information detail in Section 1.3.

# EXHIBIT A - EUT PHOTOGRAPHS

Please refer to the attachment 2402U43773E-RF-EXP EUT external photographs and 2402U43773E-RF-INP EUT internal photographs.

# EXHIBIT B - TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2402U43773E-RF-00-TSP test setup photographs.

# EXHIBIT C - RF EXPOSURE EVALUATION

## 1-mW Test Exemption:

### Applicable Standard

§1.1307(b)(3)(i) For single RF sources (*i.e.*, any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

### Measurement Result

| Frequency (MHz) | Maximum EIRP | | 1-mW Test Exemption |
|---|---|---|---|
| | dBm | mW | |
| 433.97 | -14.28 | 0.04 | Compliant |

Note:
1. This device maximum E-Field level is 80.92 dBμV/m at 3m, so the EIRP power is -14.28 dBm.
2. EIRP(dBm)=Field Strength of Fundamental(dBuV/m)-95.2

**Result: Compliant.** RF Exposure is exemption**.**

## Exemption Limits For Routine Evaluation-SAR Evaluation

## Applicable Standard

RSS-102, Issue 5, Clause 2.5.1:

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5.

**Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance[4,5]**

| Frequency (MHz) | Exemption Limits (mW) | | | | |
|---|---|---|---|---|---|
| | At separation distance of ≤5 mm | At separation distance of 10 mm | At separation distance of 15 mm | At separation distance of 20 mm | At separation distance of 25 mm |
| ≤300 | 71 mW | 101 mW | 132 mW | 162 mW | 193 mW |
| 450 | 52 mW | 70 mW | 88 mW | 106 mW | 123 mW |
| 835 | 17 mW | 30 mW | 42 mW | 55 mW | 67 mW |
| 1900 | 7 mW | 10 mW | 18 mW | 34 mW | 60 mW |
| 2450 | 4 mW | 7 mW | 15 mW | 30 mW | 52 mW |
| 3500 | 2 mW | 6 mW | 16 mW | 32 mW | 55 mW |
| 5800 | 1 mW | 6 mW | 15 mW | 27 mW | 41 mW |

| Frequency (MHz) | Exemption Limits (mW) | | | | |
|---|---|---|---|---|---|
| | At separation distance of 30 mm | At separation distance of 35 mm | At separation distance of 40 mm | At separation distance of 45 mm | At separation distance of ≥50 mm |
| ≤300 | 223 mW | 254 mW | 284 mW | 315 mW | 345 mW |
| 450 | 141 mW | 159 mW | 177 mW | 195 mW | 213 mW |
| 835 | 80 mW | 92 mW | 105 mW | 117 mW | 130 mW |
| 1900 | 99 mW | 153 mW | 225 mW | 316 mW | 431 mW |
| 2450 | 83 mW | 123 mW | 173 mW | 235 mW | 309 mW |
| 3500 | 86 mW | 124 mW | 170 mW | 225 mW | 290 mW |
| 5800 | 56 mW | 71 mW | 85 mW | 97 mW | 106 mW |

## Measurement Result:

This device maximum E-Field level is 80.92 dBμV/m at 3m,
so the EIRP power is -14.28 dBm(0.04mW).
EIRP(dBm)=Field Strength of Fundamental(dBuV/m)-95.2

The exemption power(P) limits for routine evaluation in 433.97MHz is:
(433.97-450)/(300-450)=( P -52)/(71-52)
=>P=54 mW@433.97 MHz
> 0.04mW

**So the stand-alone SAR evaluation can be exempted.**

******** END OF REPORT*******