

Dongguan Yinwo Electronic Technology Co., Ltd

SCOPE OF WORK FCC Testing – FDJAMBAR

REPORT NUMBER 210428003SZN-001

ISSUE DATE

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17 May 2021

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Intertek Report No.: 210428003SZN-001

Dongguan Yinwo Electronic Technology Co., Ltd

Application For Certification

FCC ID: 2AZJ2805

WIRELESS SPEAKER

Model: FDJAMBAR

Brand name: iHip

2.4GHz Transceiver

Report No.: 210428003SZN-001

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-19]

Prepared and Checked by:

Approved by:

Draven Li Project Engineer Peter Kang Senior Technical Supervisor Date: 17 May 2021

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Intertek Testing Service Shenzhen Ltd. Longhua Branch

101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, Shenzhen. Tel: (86 755) 8601 6288 Fax: (86 755) 8601 6751 Total Quality. Assured. TEST REPORT

Intertek Report No.: 210428003SZN-001

MEASUREMENT/TECHNICAL REPORT

| This report concerns (check one: |) Original Grant <u>X</u> | Class | II Change |
|---|---|--|--------------------------|
| Equipment Type: <u>DSS - Part 15 Sp</u> | pread Spectrum Transmitte | <u>er</u> | |
| Deferred grant requested per 47 | CFR 0.457(d)(1)(ii)? | Yes | No <u>X</u> |
| | lf ves, def | er until: | |
| | | | date |
| Company Name agrees to notify | the Commission by: | date | |
| of the intended date of announc | ement of the product so th | at the grant can be i | ssued on that date. |
| Transition Rules Request per 15.3 | 37? | Yes | No <u>X</u> |
| If no, assumed Part 15, Subpart (| C for intentional radiator – | the new 47 CFR [10- | 1-19 Edition] provision. |
| Report prepared by: | | | |
| Inte 101 Cor | iven Li ertek Testing Services Shen 1, 201, Building B, No. 308 ^v nmunity, GuanHu Subdistr : (86 755) 8601 0682 Fax: (| Wuhe Avenue, Zhan ict, LongHua District | gkengjing |

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1.0 Summary of Test Results

| Applicant: | Dongguan Yinwo Electronic Technology Co., Ltd |
|---------------|---|
| Address: | Building 1, No. 18 Jiaoping Road, Tangxia Town,Dongguan, Guangdong, China |
| Manufacturer: | Dongguan Yinwo Electronic Technology Co., Ltd |
| Address: | Building 1, No. 18 Jiaoping Road, Tangxia Town,Dongguan, Guangdong, China |

Model: FDJAMBAR

FCC ID: 2AZJ2805

| TEST | REFERENCE | RESULTS |
|--|--|---------|
| Max. Output power / Max. e.i.r.p. | FCC 15.247(b)(1) | Pass |
| 20dB Bandwidth | FCC 15.247(a)(1) | Pass |
| Channel Separation | FCC 15.247(a)(1) | Pass |
| Channel Number | FCC 15.247(a)(1) (iii) | Pass |
| Dwell Time | FCC 15.247(a)(1)(iii) | Pass |
| Out of Band Antenna Conducted Emission | FCC 15.247(d) | Pass |
| Radiated Emission in Restricted Bands | FCC 15.247(d), FCC 15.209, FCC 15.205 | Pass |
| Band Edge | FCC 15.247(d), FCC 15.209, FCC 15.205 | Pass |
| AC Conducted Emission | FCC 15.209 | N/A |

Notes:

- 1. The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.
- 2. The Bluetooth module does not work while charging.

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2.0 General Description

2.1 Product Description

The equipment under test (EUT) is a WIRELESS SPEAKER with Bluetooth FHSS technology operating in 2402-2480MHz. The Bluetooth transmitter function will be disabled while charging. The EUT is powered by DC 3.7V rechargeable battery. For more detail information pls. refer to the user manual.

Bluetooth Version: 5.0 EDR Antenna Type: Integral antenna Antenna Gain: -0.58 dBi max Modulation Type: GFSK, $\pi/4$ -DQPSK

The product has two colors and they are identical in hardware and electrical aspect.

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

2.2 Related Submittal(s) Grants

This is an application for certification of transceiver for the WIRELESS SPEAKER which has Bluetooth function. Other digital functions were reported in the verification report: 210428003SZN-002.

2.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Radiated emission measurement was performed in semi-anechoic chamber. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "Justification Section" of this Application.

2.4 Test Facility

The Semi-anechoic chamber used to collect the radiated data is **Intertek Testing Services Shenzhen Ltd. Longhua Branch** and located at 101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, Shenzhen. This test facility and site measurement data have been fully placed on file with File Number: CN1188.



3.0 System Test Configuration

3.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.10 (2013).

The EUT was powered by DC 3.7V rechargeable battery during the test.

All packets DH1, DH3 & DH5 mode in modulation type GFSK and π /4-DQPSK were tested and only the worst data was reported in this report.

For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the centre of the loop antenna was placed 1 meter above the ground, and the antenna polarization was changed. For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Section 4.

The EUT and transmitting antenna was centered on the turntable.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was placed on a turn table, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

3.2 EUT Exercising Software

The EUT exercise program (provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The worst case configuration is used in all specified testing.

The parameters of test software setting:

During the test, Channel and power controlling software provided by the applicant was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the application and is going to be fixed on the firmware of the end product.

3.3 Special Accessories

No special accessory attached.

3.4 Equipment Modification

Any modifications installed previous to testing by Dongguan Yinwo Electronic Technology Co., Ltd will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Longhua Branch.



3.5 Measurement Uncertainty

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

3.6 Support Equipment List and Description

| Description | Manufacturer | Model No. | | |
|---|-----------------------------|-------------------------|--|--|
| TF Card | Kingston | N/A | | |
| Mobile phone | SAMSUNG | S7 | | |
| USB Charging &3.5mm auxiliary 2 in 1 cable | N/A (Provided by Client) | Unshielded, Length 50cm | | |
| USB disk | SanDisk | SDCZ36-002G-P36 | | |

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4.0 <u>Test Results</u>

Data is included worst-case configuration (the configuration which resulted in the highest emission levels).

- 4.1 Radiated Test Results A sample calculation, configuration photographs and data tables of the emissions are included.
- 4.1.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

 $\begin{array}{ll} FS = RA + AF + CF - AG + PD + AV \\ Where & FS = Field Strength in dB\mu V/m \\ RA = Receiver Amplitude (including preamplifier) in dB\mu V \\ CF = Cable Attenuation Factor in dB \\ AF = Antenna Factor in dB \\ AG = Amplifier Gain in dB \\ PD = Pulse Desensitization in dB \\ AV = Average Factor in -dB \end{array}$

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD + AV

Assume a receiver reading of 62.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 62.0 dBµV AF = 7.4 dB CF = 1.6 dB AG = 29.0 dB PD = 0 dB AV = -10 dB

FS = $62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 \text{ dB}\mu\text{V/m}$ Level in $\mu\text{V/m} = \text{Common Antilogarithm} [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 <math>\mu\text{V/m}$



4.1.2 Radiated Emission Configuration Photograph

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: radiated photos. pdf.

4.1.3 Radiated Emissions- FCC section 15.209

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Worst Case Radiated Emission

at 311.073667 MHz

Judgement: Passed by 5.6 dB

TEST PERSONNEL:

Sign on file

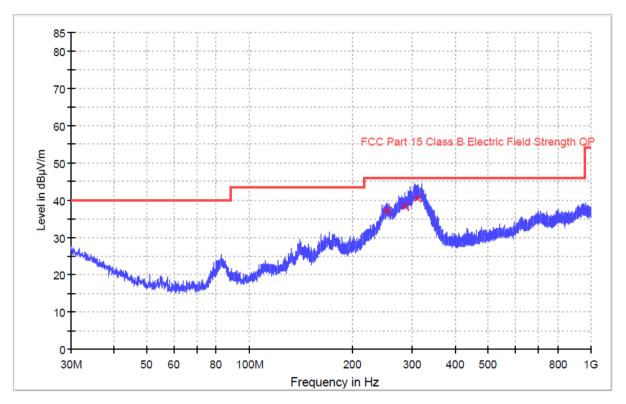
<u>Draven Li, Project Engineer</u> Typed/Printed Name

<u>11 May 2021</u> Date



Applicant: Dongguan Yinwo Electronic Technology Co., Ltd Date of Test: 11 May 2021 Model: FDJAMBAR Worst-case operating Mode: BT link Modulation type: GFSK

ANT Polarity: Horizontal



FCC Part 15

| Frequency | QuasiPeak | Meas. | Bandwidth | Height | Polarization | Corr. | Margin | Limit - |
|------------|-----------|--------|-----------|--------|--------------|-------|--------|----------|
| (MHz) | (dBuV/m) | Time | (kHz) | (cm) | | (dB) | - QPK | QPK |
| | | (ms) | | | | | (dB) | (dBuV/m) |
| 252.809000 | 37.1 | 1000.0 | 120.000 | 100.0 | Н | 14.2 | 8.9 | 46.0 |
| 285.465667 | 38.4 | 1000.0 | 120.000 | 100.0 | н | 15.0 | 7.6 | 46.0 |
| 311.073667 | 40.4 | 1000.0 | 120.000 | 100.0 | Н | 15.7 | 5.6 | 46.0 |

Remark:

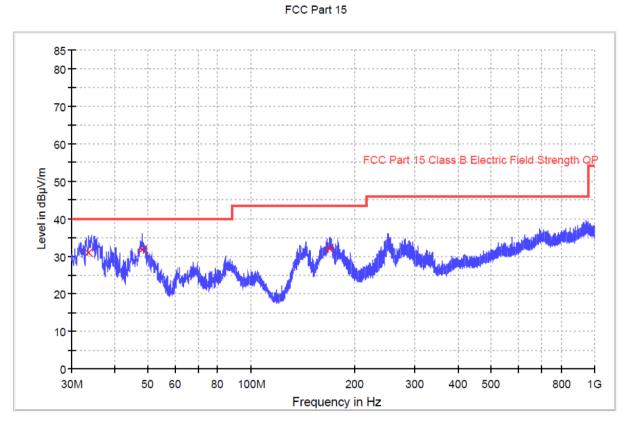
- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. QuasiPeak (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)
- 3. Margin (dB) = Limit Line(dBµV/m) Level (dBµV/m)



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Applicant: Dongguan Yinwo Electronic Technology Co., Ltd Date of Test: 11 May 2021 Model: FDJAMBAR Worst-case operating Mode: BT link Modulation type: GFSK

ANT Polarity: Vertical



| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|--------------------|-----------------------|-----------------------|--------------------|----------------|--------------|---------------|-------------------------|----------------------------|
| 33.680000 | 31.1 | 1000.0 | 120.000 | 100.0 | V | 16.1 | 8.9 | 40.0 |
| 48.320000 | 31.7 | 1000.0 | 120.000 | 100.0 | V | 9.6 | 8.3 | 40.0 |
| 169.520000 | 32.1 | 1000.0 | 120.000 | 100.0 | V | 10.8 | 11.4 | 43.5 |

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)

3. Margin (dB) = Limit Line(dBµV/m) – Level (dBµV/m)



4.1.4 Transmitter Spurious Emissions (Radiated) - FCC section 15.209

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Worst Case Radiated Emission

at 2398.017 MHz

Judgement: Passed by 18.95 dB

TEST PERSONNEL:

Sign on file

<u>Draven Li, Project Engineer</u> Typed/Printed Name

<u>11 May 2021</u> Date



Applicant: Dongguan Yinwo Electronic Technology Co., Ltd Date of Test: 11 May 2021 Model: FDJAMBAR Worst-case operating Mode: Transmit (2402MHz) Modulation type: GFSK

Table 1

Radiated Emissions

| | | | (2 | 402MHz) | | | |
|--------------|--------------------|-------------------|-----------------------------|---------------------------|--------------------------|---------------------------------|----------------|
| Polarization | Frequency (MHz) | Reading (dBµV) | Pre- Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Peak Limit at 3m (dBµV/m) | Margin (dB) |
| Horizontal | **2402.000 | 105.0 | 36.7 | 28.1 | 96.4 | | |
| Horizontal | *4804.000 | 46.9 | 36.7 | 35.5 | 45.7 | 74.0 | -28.3 |

| Polarization | Frequency (MHz) | Reading (dBµV) | Pre- Amp Gain (dB) | Antenna Factor (dB) | Average Factor (-dB) | Net at 3m (dBµV/m) | Average Limit at 3m (dBµV/m) | Margin (dB) |
|--------------|--------------------|-------------------|-----------------------------|---------------------------|----------------------------|--------------------------|---------------------------------------|----------------|
| Horizontal | **2402.000 | 105.0 | 36.7 | 28.1 | 22.5 | 73.9 | | |
| Horizontal | *4804.000 | 46.9 | 36.7 | 35.5 | 22.5 | 23.2 | 54.0 | -30.8 |

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.
- ** Fundamental emission was measured for determining band-edge compliance of using delta measurement technique.



Applicant: Dongguan Yinwo Electronic Technology Co., Ltd Date of Test: 11 May 2021 Model: FDJAMBAR Worst-case operating Mode: Transmit (2441MHz) Modulation type: GFSK

Table 2

Radiated Emissions

| | | | (24 | 441MHz) | | | |
|--------------|--------------------|-------------------|-----------------------------|---------------------------|--------------------------|---------------------------------|----------------|
| Polarization | Frequency (MHz) | Reading (dBµV) | Pre- Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Peak Limit at 3m (dBµV/m) | Margin (dB) |
| Horizontal | *4882.000 | 48.1 | 36.7 | 35.5 | 46.9 | 74.0 | -27.1 |
| Horizontal | *7323.000 | 47.5 | 36.1 | 37.2 | 48.6 | 74.0 | -25.4 |

| Polarization | Frequency (MHz) | Reading (dBµV) | Pre- Amp Gain (dB) | Antenna Factor (dB) | Average Factor (-dB) | Net at 3m (dBµV/m) | Average Limit at 3m (dBµV/m) | Margin (dB) |
|--------------|--------------------|-------------------|-----------------------------|---------------------------|----------------------------|--------------------------|---------------------------------------|----------------|
| Horizontal | *4882.000 | 48.1 | 36.7 | 35.5 | 22.5 | 24.4 | 54.0 | -29.6 |
| Horizontal | *7323.000 | 47.5 | 36.1 | 37.2 | 22.5 | 26.1 | 54.0 | -27.9 |

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.



Applicant: Dongguan Yinwo Electronic Technology Co., Ltd Date of Test: 11 May 2021 Model: FDJAMBAR Worst-case operating Mode: Transmit (2480MHz) Modulation type: GFSK

Table 3

Radiated Emissions

| (2480MHz) | | | | | | | | | | |
|--------------|--------------------|-------------------|-----------------------------|---------------------------|--------------------------|---------------------------------|----------------|--|--|--|
| Polarization | Frequency (MHz) | Reading (dBµV) | Pre- Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Peak Limit at 3m (dBµV/m) | Margin (dB) | | | |
| Horizontal | **2480.000 | 105.7 | 36.7 | 28.1 | 97.1 | | | | | |
| Horizontal | *4960.000 | 51.2 | 36.7 | 35.5 | 50.0 | 74.0 | -24.0 | | | |
| Horizontal | *7440.000 | 47.8 | 36.1 | 37.2 | 48.9 | 74.0 | -25.1 | | | |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre- Amp Gain (dB) | Antenna Factor (dB) | Average Factor (-dB) | Net at 3m (dBµV/m) | Average Limit at 3m (dBµV/m) | Margin (dB) |
|--------------|--------------------|-------------------|-----------------------------|---------------------------|----------------------------|--------------------------|---------------------------------------|----------------|
| Horizontal | **2480.000 | 105.7 | 36.7 | 28.1 | 22.5 | 74.6 | | |
| Horizontal | *4960.000 | 51.2 | 36.7 | 35.5 | 22.5 | 27.5 | 54.0 | -26.5 |
| Horizontal. | *7440.000 | 47.8 | 36.1 | 37.2 | 22.5 | 26.4 | 54.0 | -27.6 |

NOTES: 1. Peak detector is used for the emission measurement.

- 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.
- ** Fundamental emission was measured for determining band-edge compliance of using delta measurement technique.



4.2 Peak Power

Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(1). The antenna port of the EUT was connected to the input of a spectrum analyzer. The analyzer was set for RBW > 20dB bandwidth and power was read directly in dBm.

For antenna with gains of 6dBi or less, and frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, the systems operate with an output power no greater than 125 mW.

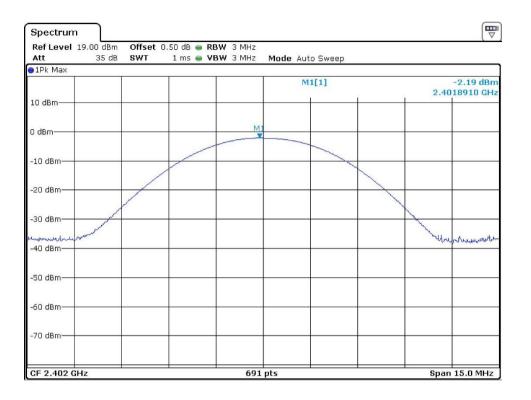
| | Antenna Gain = -0.58dBi | | | | | | | | |
|-----------------|-------------------------|---|----------------------|--|--|--|--|--|--|
| Modulation Type | Frequency (MHz) | Output Power (Peak Reading) (dBm) | Output Power (mW) | | | | | | |
| | 2402 | -2.19 | 0.60 | | | | | | |
| GFSK | 2441 | -1.98 | 0.63 | | | | | | |
| | 2480 | -2.06 | 0.62 | | | | | | |

Cable loss: 0.5 dB External Attenuation: 0 dB

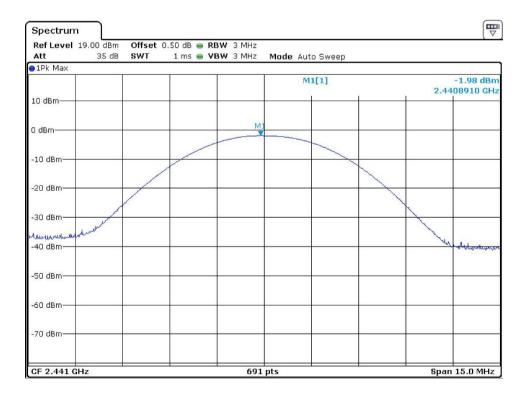


Modulation Type: GFSK

CH00



CH39



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| Spectrum | r) | | | | | | | | |
|----------------|---------|-----|------------|----------|-------------|----------|---|------|------------------------|
| Ref Level | | | 50 dB 👄 RB | | 1.50% DZ 30 | < 17097 | | | `,` |
| Att | 35 dB | SWT | 1 ms 😑 VE | SW 3 MHz | Mode Aut | o Sweep | | | |
| ⊖1Pk Max | | | | | | | | | |
| | | | | | м | 1[1] | | | -2.06 dBm 98700 GHz |
| 10 dBm | | | | | | | | | |
| 0 dBm | | | | MI | | | | | |
| U UDIII | | | | | 1 | . | | | |
| -10 dBm | | | | | | | | | |
| -20 dBm | | | | | | | | | |
| | / | | | | | | 1 | | |
| -30 dBm | | | | | | | | 1 | |
| whenterwhenter | a ample | | | | | | | have | |
| -40 dBm | | | | | - | | | | "tethroleuncours |
| -50 dBm | | | | | | | | | |
| -60 dBm | | | | | | | | | |
| | | | | | | | | | |
| -70 dBm | | | | | | | | | |
| | | | | | | | | | |
| CF 2.48 GH | | | | 691 | pts | | | Span | 15.0 MHz |



4.3 20dB Bandwidth

Maximum 20dB RF Bandwidth, FCC Rule 15.247(a) (1):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was chosen so that the display was a result of the hopping channel modulation. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. Use the spectrum 20dB down delta function to measure the bandwidth.

| Frequency (MHz) | 20 dB Bandwidth (MHz) |
|-----------------|-----------------------|
| 2402 | 1.372 |
| 2441 | 1.368 |
| 2480 | 1.368 |

Modulation Type: $\pi/4$ -DQPSK

CH00

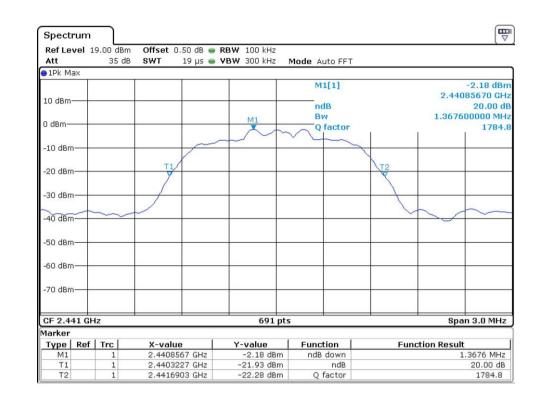
Spectrum Ref Level 19.00 dBm Offset 0.50 dB 🖷 RBW 100 kHz 19 µs 👄 VBW 300 kHz Mode Auto FFT Att 35 dB SWT ●1Pk Max M1[1] 2.39 dBm 2.40185240 GHz 10 dBm ndB 20.00 dF 1.371900000 MHz Bw 0 dBm Q factor 1750.7 -10 dBm -20 dBm -30 dBm--40 dBm--50 dBm -60 dBm--70 dBm-CF 2.402 GHz 691 pts Span 3.0 MHz Marker TypeRefTrcM11 **Function Result** X-value Y-value Function 2.4018524 GHz -2.39 dBm 1.3719 MHz ndB down 2.4013184 GHz Τ1 -22.60 dBm ndB 20.00 dB Q factor Τ2 2.4026903 GHz 1750.7 1 -22.44 dBm

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Intertek Report No.: 210428003SZN-001



CH78

| Spectrum | | | | | | |
|------------|--------------------|--------------------------------|----------------------------|---------------|---------|-----------------------------|
| Ref Level | 19.00 dBm 35 dB | | RBW 100 kHz VBW 300 kHz | Mode Auto FFT | | |
| ●1Pk Max | 55 GL | 5 5 41 15 µ5 | 101 300 KHZ | MOUE AUTOFFT | | |
| | | | | M1[1] | | -2.24 dBm 2.47985670 GHz |
| 10 dBm | | | | ndB | | 20.00 dE |
| 0 dBm | | | M1 | Bw | | 1.367600000 MHz |
| o dbiii | | | | Q factor | -1 | 1813.3 |
| -10 dBm | | | | | 1 | |
| -20 dBm | | | _ | | T2 V | |
| -30 dBm | | | | | | |
| -40 dBm | ~~~ | | | | | ~~~~ |
| -50 dBm | | | | | | |
| | | | | | | |
| -60 dBm | | | | | | |
| -70 dBm | | | | | | |
| CF 2.48 GH | z | | 691 p | ts | | Span 3.0 MHz |
| Marker | | | | 10 | | |
| | Trc | X-value | Y-value | Function | Func | tion Result |
| M1 | 1 | 2.4798567 GHz | -2.24 dBm | | | 1.3676 MHz |
| T1 T2 | 1 | 2.4793227 GHz 2.4806903 GHz | -22.05 dBm -22.33 dBm | | | 20.00 dB 1813.3 |
| 16 | | 2,4000900 GHz | 22.00 UDII | | | 1013.3 |



4.4 Channel Number (Number of Hopping Frequencies)

Minimum Number of Hopping Frequencies, FCC Rule 15.247(a) (1) (iii):

The RF passband of the EUT was divided into 3 approximately equal bands. With the analyzer set to MAX HOLD readings were taken for 2-3 minutes. The channel peaks so recorded were added together, and the total number compared to the minimum number of channels required in the regulation.

| Number of hopping channels = | 79 |
|------------------------------|----|
| | |

Note: In AFH mode, this device operates using 20 channels and it's satisfied the requirement of limit of minimum of 15 hopping channels.

Modulation Type: GFSK

CH00-CH78

| Spectrum | L L | | | | | | | |
|---------------------|--------------------|---------------|-------------------------|-----|----------|--------------|---|--|
| Ref Level Att | 20.00 dBm 35 dB | Offset SWT | D.50 dB 👄 R 1 ms 👄 V | | Mode Aut | o Sweep | | |
| 1Pk Max | | | | | | | | |
| 10 dBm | | | | | | 2[1] 1[1] | 2.4 | -2.37 dBm 80060 GHz -2.52 dBm 01990 GHz |
| ₫ <mark>\</mark> Bm | | | | | | | | M2 |
| 10 dBm- | | vvvvv | | | ~~~~~ | v | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ |
| -20 dBm | | | | | | | | |
| -30 dBm | | | | | | | | |
| -40 dBm | | | | | | | | lu |
| -50 dBm | | | | | | | | |
| -60 dBm | | | | | | | | |
| -70 dBm | | | | | | | | |
| Start 2.4 G | Hz | | | 691 | pts | | Stop 2. | 4835 GHz |

Total Quality. Assured. TEST REPORT

CH00-CH24

| Spectrum | | | | | | | | | |
|------------------|--------------------|---------------|--------------------------|----------------------|----------|---------|------|----------------|---|
| Ref Level Att | 20.00 dBm 35 dB | Offset SWT | 0.50 dB 👄 RI 1 ms 👄 V | BW 1 MHz BW 3 MHz | Mode Aut | o Sweep | | | |
| ●1Pk Max | | | | | <u></u> | | | | |
| | | | | | M | 2[1] | | | -2.45 dBm 60590 GHz |
| 10 dBm | | | | | M | 1[1] | | | -2.57 dBm |
| TO UBIII | | | | | | | | | 19940 GHz |
| 0 dBm M1 | | | | | | | | | M2 |
| | ~~~ | ~~~ | $\rightarrow \sim$ | ~~~~ | ~~~~ | \sim | ~~~~ | $\sim\sim\sim$ | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ |
| -10 dBm- | | | | | | | | | |
| | | | | | | | | | |
| -20 dBm- | | | | | | | | | |
| -20 ubiii | | | | | | | | | |
| 30 dBm- | | | | | | | | | |
| 730 dBm | | | | | | | | | |
| 10 -10 | | | | | | | | | |
| -40 dBm | | | | | | | | | |
| 50 Jp. | | | | | | | | | |
| -50 dBm | ~ | | | | | | | | |
| -60 dBm | | | | | | | | | |
| -oo uBIII | | | | | | | | | |
| -70 dBm | | | | | | | | | |
| -/0 ubiii | | | | | | | | | |
| | | | | | | | | | |
| Start 2.4 G | Hz | | | 691 | pts | | | Stop 2. | 4265 GHz |

CH25-CH52

| Spectrum | | | |
|-----------------------------|------|--|--|
| Ref Level 20.00 d Att 35 | | (BW 1 MHz (BW 3 MHz Mode Auto Swee) | p |
| 10 dBm | | M1[1] M2[1] | -2.34 dBm 2.4269250 GHz -2.32 dBm 2.4539930 GHz |
| M ¹ dBm | ~~~~ | | M2 |
| -10 dBm | | | |
| -20 dBm | | | |
| -30 dBm | | | |
| -40 dBm | | | |
| -50 dBm | | | |
| -60 dBm | | | |
| -70 dBm | | | |
| Start 2.4265 GHz | | 691 pts | Stop 2.4545 GHz |

Total Quality. Assured. TEST REPORT

CH53-CH78

| Spectrum | | | | | | | | | |
|--------------------|--------------------|-----------------|--------------------------|-----------|-----------|--------------|------|---------|--|
| Ref Level : Att | 20.00 dBm 35 dB | Offset 0 SWT | .50 dB 👄 RE 1 ms 👄 VE | | Mode Auto | Swoon | | | |
| 1Pk Max | 33 UD | 341 | 1 1115 👹 🖣 | JWY JIMHZ | Moue Aut | n 2meeh | | | |
| 10 dBm | | | | | | 2[1] L[1] | | 2.47 | -2.39 dBm 99960 GHz -2.39 dBm 51090 GHz |
| didBm- | ~~~ | ~~~ | ~~~~ | ~~~~ | ~~~~ | ~~~ | ~~~~ | M2 | |
| -10 dBm | | | | | | | | | } |
| -20 dBm | | | | | | | | | $\left\{ - \right\}$ |
| -30 dBm | | | | | | | | | |
| -40 dBm | | | | | | | | | home |
| -50 dBm | | | | | | | | | |
| -60 dBm | | | | | | | | | |
| -70 dBm | | | | | | | | | |
| Start 2.454 | 5 GHz | | | 691 | pts | | | Stop 2. | 4835 GHz |



4.5 Channel Separation (Carrier Frequency Separation)

Minimum Hopping Channel Carrier Frequency Separation, FCC Ref: 15.247(a)(1):

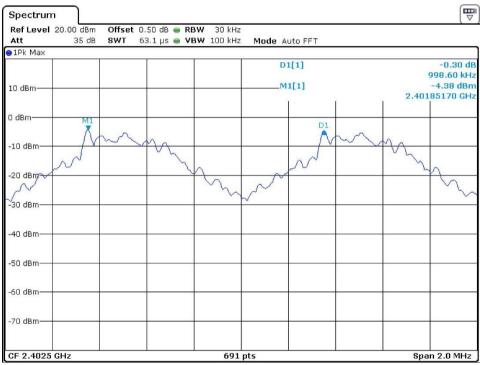
Using the DELTA MARKER function of the analyzer, the frequency separation between two adjacent channels was measured and compared against the limit:

Not less than 2/3 of 20dB bandwidth of hopping channel: 1.372 x 2/3 = 0.915MHz

| Minimum Channel Separation | 0.9986 MHz |
|----------------------------|------------|
|----------------------------|------------|

Modulation Type: $\pi/4$ -DQPSK

Low Channel

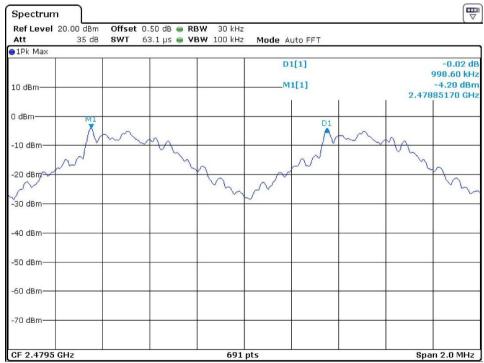




Middle Channel



High Channel





4.6 Dwell Time (Time of Occupancy)

Average Channel Occupancy Time, FCC Ref: 15.247(a) (1)(iii):

The spectrum analyzer center frequency was set to one of the known hopping channels with a longer sweep time to show two successive hops on a channel; the SPAN was set to ZERO SPAN, and the TRIGGER was set to VIDEO. RBW shall be \leq channel spacing and where possible RBW should be set >>1/T, where T is the expected dwell time per channel. The time duration of the transmissions so captured was measured with the MARKER DELTA function.

Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Different modes of operation were performed and only the worst case data was reported.

Worst Test Result:

Normal hopping mode

| Modulation Type | Packet | Unit | Max Dwell Time | Limit (ms) | Result |
|--------------------|--------|------|--------------------|---------------|--------|
| | 2DH1 | ms | 0.380*300 = 114.00 | 400 | Pass |
| $\pi/4$ -DQPSK | 2DH3 | ms | 1.637*85 = 139.15 | 400 | Pass |
| | 2DH5 | ms | 2.890*60 = 173.40 | 400 | Pass |

AFH mode:

| Modulation Type | Packet | Unit | Max Dwell Time | Limit (ms) | Result |
|--------------------|--------|------|------------------|---------------|--------|
| | 2DH1 | ms | 0.380*79 = 30.02 | 400 | Pass |
| π /4-DQPSK | 2DH3 | ms | 1.637*33 = 54.02 | 400 | Pass |
| | 2DH5 | ms | 2.890*22 = 63.58 | 400 | Pass |

Intertek Total Quality. Assured. TEST REPORT

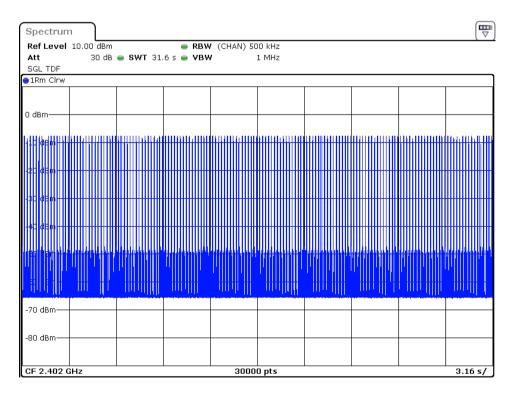
Intertek Report No.: 210428003SZN-001

Modulation Type: $\pi/4$ -DQPSK

Packet: 2DH1

| Spectrum | | |
|--------------------------------|--|---|
| Ref Level 10.00 dBm 🛛 👄 RBW | (CHAN) 500 kHz | |
| Att 30 dB 👄 SWT 779.8 µs 👄 VBW | 1 MHz | |
| SGL TRG:VID TDF | | |
| ●1Rm Clrw | | |
| | M1[1] | -17.67 dBm |
| 0 dBm | D2[1] | -1.87 μs -0.83 dB |
| U aBm | white white have a second white whit | -0.83 μB 379.80 μs |
| | | |
| -10 dBm TRG -8.900 dBm | | |
| ML | | |
| -20 dBm | | |
| | T T | |
| -30 dBm | | |
| | | |
| -40 dBm | | |
| -40 UBIII | | |
| | | |
| -50 dBm | | |
| | | |
| -60 dBm | | the second of the |
| ሐኬ ይላ ሲላክ ሊስካ ሊስካሆ | | Ն ՀԱՌՈՐՄՈՒ ՄՈՒ ԱՆՆՆԱՄՆՆ ԹԱՆՆՆԵՄ |
| -₩φ dβm \ •₩1/// | | <u>f to finite a defaile fille de la satificada de la satificada de la satificada de la satificada de la satifica</u> |
| 1 0 0 ° 1 ° | | 4 9 ° ° ° ° ° 1 |
| -80 dBm | | • |
| | | |
| | | |
| CF 2.402 GHz | 501 pts | 77.98 μs/ |

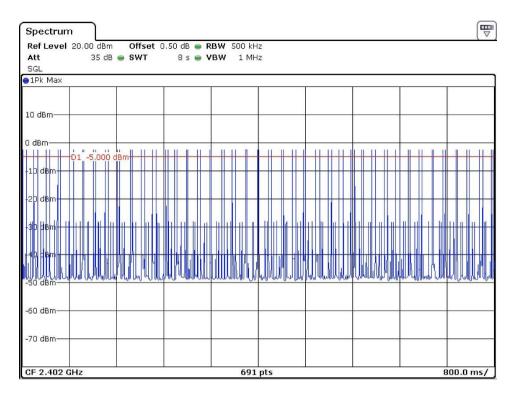
Number of hops (Normal hopping mode)





Number of hops (AFH mode)

Intertek Report No.: 210428003SZN-001

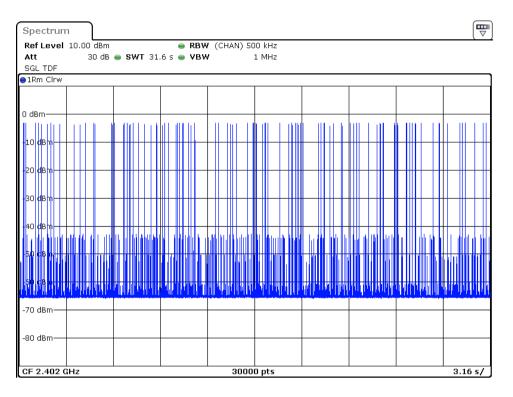


Packet: 2DH3

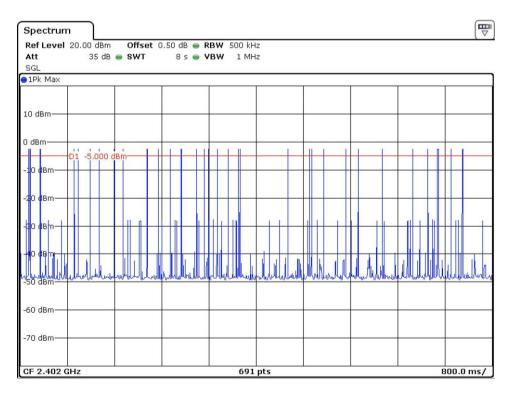
| Spectrum | | |
|---|-----------------------------|------------------------------------|
| Ref Level 10.00 dBm RBV Att 30 dB SWT 3.3 ms VBV SGL TRG: VID TDF VID VID | ₩ (CHAN) 500 kHz ₩ 1 MHz | X |
| ●1Rm Clrw | M1[1] | -4.10 dBm |
| 0 dBm | D2[1] | -1.31 µs -3.53 dB 1.63667 ms |
| -10 dBm TRG -8.900vdBm | | |
| -20 dBm | | |
| -30 dBm | | |
| -40 dBm | | |
| -50 dBm | | |
| -60 dBm | | a a la di stati di i ta si A |
| Program W Mingral | Mpw | MANANANA |
| -80 dBm | | |
| CF 2.402 GHz | 501 pts | 327.99 µs/ |



Number of hops (Normal hopping mode)

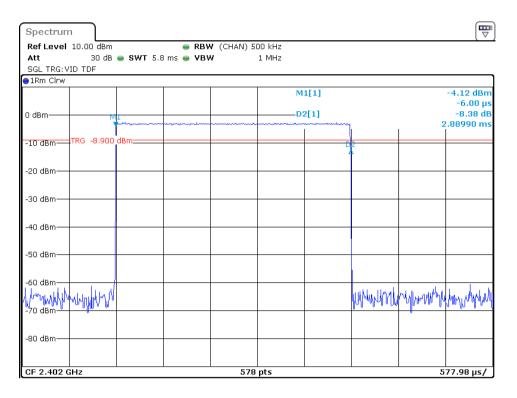


Number of hops (AFH mode)

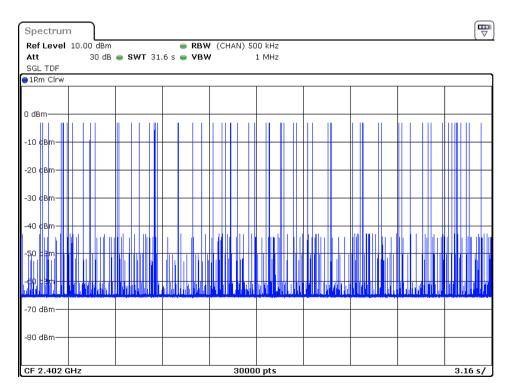


Intertek Total Quality. Assured. TEST REPORT

Packet: 2DH5



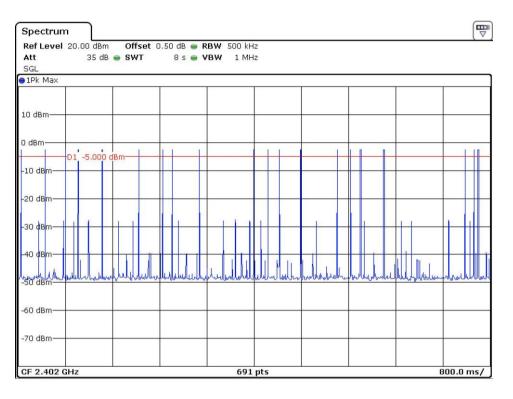
Number of hops (Normal hopping mode)



Intertek Total Quality. Assured. TEST REPORT

Intertek Report No.: 210428003SZN-001

Number of hops (AFH mode)



Total Quality. Assured. TEST REPORT

Intertek Report No.: 210428003SZN-001

4.7 Band Edge

Out of Band Conducted Emissions, FCC Rule 15.247(d):

In any 100 KHz bandwidth outside the EUT passband, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, or else shall meet the general limits for radiated emissions at frequencies outside the passband, whichever results in lower attenuation.

Furthermore, delta measurement technique for measuring bandage emissions was shown as below:

(i) Lower channel 2402MHz:

Peak Resultant field strength = Fundamental emissions (peak value) – delta from the bandedge

Average Resultant field strength = Fundamental emissions (Average value) – delta from the bandedge plot = 73.9dBµV/m-38.95dB = 34.95dBµV/m

(ii) Upper channel 2480MHz:

Peak Resultant field strength = Fundamental emissions (peak value) – delta from the bandedge plot =97.1dBμV/m-49.38dB = 47.72dBμV/m

Average Resultant field strength = Fundamental emissions (Average value) – delta from the bandedge plot = 74.6dBµV/m-49.38dB = 25.22dBµV/m

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed $74dB\mu\nu/m$ (Peak Limit) and $54dB\mu\nu/m$ (Average Limit).

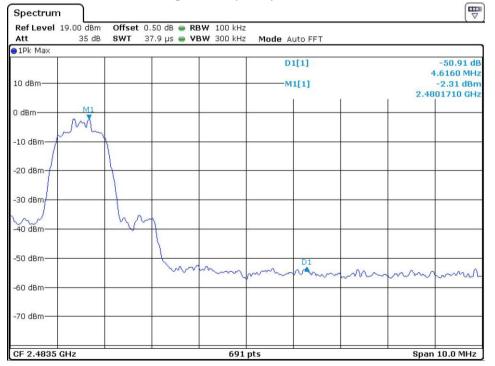
Intertek Total Quality. Assured. TEST REPORT

Intertek Report No.: 210428003SZN-001

Modulation Type: $\pi/4$ -DQPSK Hopping function off

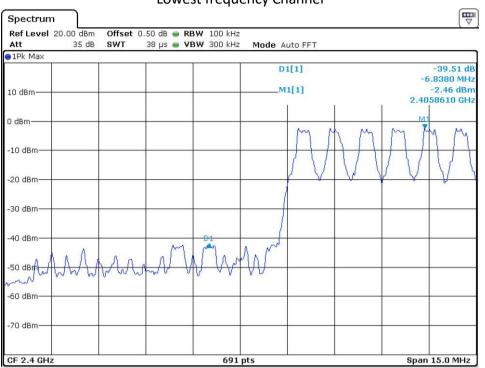
Lowest frequency Channel Spectrum Ref Level 19.00 dBm Offset 0.50 dB 👄 RBW 100 kHz 37.9 µs 👄 VBW 300 kHz 35 dB SWT Att Mode Auto FFT 1Pk Max D1[1] -38.95 dB -3.8350 MHz 10 dBm M1[1] -2.40 dBm 2.4018520 GHz 0 dBm 50 -10 dBm -20 dBm -30 dBm -40 dBm nA/ -50 dBm -60 dBm -70 dBm-Span 10.0 MHz 691 pts CF 2.4 GHz

Highest frequency Channel



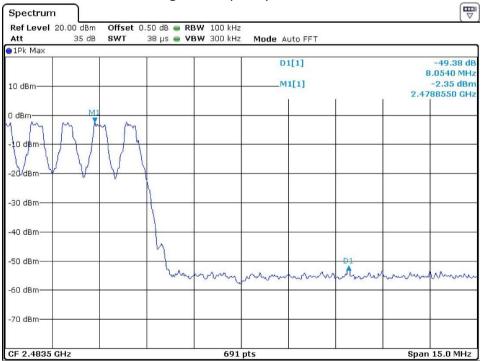


Hopping function on



Lowest frequency Channel

Highest frequency Channel





4.8 Transmitter Spurious Emissions (Conducted)

Out of Band Conducted Spurious Emissions, FCC Rule 15.247(d):

All spurious emission and up to the tenth harmonic was measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.



Intertek Report No.: 210428003SZN-001

Modulation Type: GFSK

CH00

| Spectrum |) | | | | | | | |
|------------------------|-------------------------------|-------------|--|----------|--------------|----------|----------|--|
| Ref Level 19.00 Att |) dBm Offset (35 dB 👄 SWT | 0.50 dB 👄 R | BW 100 kH BW 300 kH | | Auto FFT | | | |
| 1Pk Max | 35 UB 🥌 SWI | 10 ms 🖷 V | BW 300 KH | 2 Mode / | AUTO FFI | | | |
| 10 dBm | | | | | 1[1] 1[1] | | | -47.01 dB 40320 GHz -2.58 dBm 40050 GHz |
| 0 dBm | | | | | | | | M1 T |
| -10 dBm | | | | | | | | |
| -20 dBm | | | | | | | | |
| -30 dBm | | | | | | | | |
| -40 dBm | | | | | | | | |
| -50 dBm- | muner | D | | ununha | warnaulto | homethin | munhalit | Munulion |
| -60 dBm | | | and a started and a start of the start of th | 0.04 | | | | |
| -70 dBm | | | | | | | | |
| Start 1.0 MHz | | | 691 | pts | | | Sto | p 2.5 GHz |

| B SWT | 227 ms 🖷 ۷ | SW 300 KHZ | | uto Sweep | | | |
|-------|--------------------|------------|-----------|--------------|----------|----------|---|
| | | | D | | | | |
| | | | | 1(1) 1(1) | | | -41.28 dE 4.2050 GH; -5.95 dBn 2.4150 GH; |
| | | | | | | | |
| | | | | | | | |
| | | | | | c | | |
| | nothing dependence | www.mum | runhuntur | uh Amanuluru | wannahan | week-the | hadnerthat |
| | | | | | | | |
| | D1 | | | | | | I Compare a compare Compare a compare a comp |



Intertek Report No.: 210428003SZN-001

| Spectrum | | | | | | | | | [|
|---------------------|-----------|--------------------|-----------|--------------------|-------------|-----------------|----------------|--------------------|---------------|
| Ref Level 1 | | | | RBW 100 kHz | | | | | |
| Att | 35 dB | SWT | 25 ms 🧉 🕻 | /BW 300 kHz | Mode Au | uto Sweep | | | |
| ●1Pk Max | | | 1 | 1 | D1 | [1] | | | -50.70 |
| | | | | | | | | -1 | .51530 G |
| 10 dBm | | | _ | | M: | 1[1] | | | -2.30 dB |
| | | | | | 1 | | i i | 2 | .44030 G |
| 0 dBm | | | - | | | | | | M |
| | | | | | | | | | |
| -10 dBm | | | | - | | | | | |
| | | | | | | | | | |
| -20 dBm | | | _ | | | | | | |
| | | | | | | | | | |
| -30 dBm | | | | | | | | | |
| | | | | | | | | | |
| -40 dBm | | | | | | | | | |
| 10 ubili | | | | | | | | | |
| -50 dBm | | | | | | | | | |
| And the contraction | 1 | Lene L subble | D1 | munique | | No. | Madyanderships | hubberry | de l'anti- |
| wethereduction | -L-MARANA | anne - Ale a. a. a | | - Light | hilderennes | And the here we | ar a sussement | 10.00-0.00 00-0.1k | an Another of |
| -60 dBm | | | | | | | | | |
| | | | | | | | | | |
| -70 dBm | | | | | | | | | |
| | | | | | | | | | |
| Start 1.0 MH | 17 | | | 691 | pts | | | Str | p 2.5 GH |
| Cotare 110 Mil | | | | 0,71 | Pr3 | | | 0.0 | |

| Spectrum | | | | |
|----------------------------------|---|------------------|----------------|-------------------------------------|
| Ref Level 19.00 dBm Att 35 dB | Offset 0.50 dB 👄 R SWT 227 ms 👄 V | | Auto Sweep | |
| 1Pk Max | 3W1 227 115 - V | BW 300 KHZ MOULE | Auto Sweep | |
| 10 dBm | | | D1[1] M1[1] | -40.44 dB 164.0 MHz -6.23 dBm |
| | | | 1 T | 2.4480 GHz |
| 0 dBm | | | | |
| -20 dBm | | | | |
| -30 dBm | | | | |
| -40 dBm | | | | |
| -60 dBm | an and a second | mounterment | with monthly | Mututherman |
| -70 dBm | | | | |
| Start 2.3 GHz | | 691 pts | | Stop 25.0 GHz |



Intertek Report No.: 210428003SZN-001

| Spectrum | | | | | | | | |
|--------------------------|------------------------|--------------------|--------------------------|------------------|-----------|---|---------------|-------|
| Ref Level 19.00 Att 3 | dBm Offsel ISdB SWT | 0.50 dB 👄 R | BW 100 kHz BW 300 kHz | | uto Sweep | | | |
| IPk Max | IS UB OWI | 23 1115 🖷 🖣 | DW 300 KH2 | MODE A | uto sweep | | | |
| | | | | D | 1[1] | | | -50 |
| | | | | | | | | 415 |
| 10 dBm | 22 | | | M | 1[1] | | | -2.6 |
| | | | | | | | | |
| 0 dBm | | | | | | | | |
| 10 40- | | | | | | | | |
| -10 dBm | | | | | | | | |
| -20 dBm | | | | | | | | |
| -20 0811 | | | | | | | | |
| -30 dBm | | | | | | | | |
| SO GOIL | | | | | | | | |
| -40 dBm | 0 | | | | | | | |
| | | | | | | | | |
| -50 dBm | | _ | | | | | | |
| Mul wordell to a server | welynamethic | valuederenderstrum | umunumum | week render with | Mummuha | - | horaldwarment | Muhun |
| -60 dBm | | | | | | | | |
| | | | | | | | | |
| -70 dBm | | | - | | | | | |
| | | | | | | | | |
| Start 1.0 MHz | | | 691 | | | | | p 2. |

| Spectrun | 19.00 dBm | Offect (|).50 dB 👄 RE | W 100 PHz | 2 | | | | (V |
|-------------|------------|-----------|--------------|-----------|----------------|------------------|---------|-------------|-------------------------|
| Att | 35 dB | | 227 ms 🖷 VE | | | uto Sweep | | | |
| 1Pk Max | | | | | | | | | |
| | | | | | D | 1[1] | | | -41.48 dB |
| 10 dBm | | | | | M | 1[1] | | | 2.4640 GHz -2.35 dBm |
| to abiii | | | | | 141 | 1[1] | | | 2.4810 GHz |
| Li | | | | | |] | | | |
| dBm | | | | | | | | | |
| | | | | | | | | | |
| -10 dBm— | | | | | | | | | |
| | | | | | | | | | |
| -20 dBm— | | | | | | | | | 2 |
| | | | | | | | | | |
| -30 dBm | | | | | | | | | |
| | | | | | | | | | |
| -40 dBm— | D1 | | - | | | | | | |
| | 1 | | | | | | | | |
| 50 dBm | where have | <u>ц</u> | | | d and | | | | |
| Junarithe | Mannah | wholehout | upaturburger | manuthan | har mark would | man have been by | Munader | uprover and | muldududud |
| -60 dBm | | | | dlan | | | | | |
| | | | | | | | | | |
| -70 dBm | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Start 2.3 C | Hz | | | 691 | pts | | | Stop | 25.0 GHz |



5.0 Equipment Photographs

For electronic filing, the photographs of the tested EUT are saved with filename: external photos.pdf & internal photos.pdf.

6.0 **Product Labelling**

For electronic filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

7.0 <u>Technical Specifications</u>

For electronic filing, the block diagram and schematics of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

8.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.



9.0 <u>Miscellaneous Information</u>

This miscellaneous information includes details of the measured bandedge, the test procedure and calculation of factor such as pulse desensitization.

9.1 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. The effective period (T_{eff}) is approximately 625µs for Bluetooth. With a resolution bandwidth (3dB) of 1MHz, so the pulse desensitivity factor is 0dB.

9.2 Calculation of Average Factor

Based on the Bluetooth Specification Version 5.0 (EDR mode) and worst case AFH mode, transmitter ON time is independent of packet type (DH1, DH3 and DH5) and packet length, the AFH mode Duty cycle connection factor as below:

Channel hop rate = 800 hops/second (AFH Mode)

Adjusted channel hop rate for DH5 mode = 133.33 hops/second

Time per channel hop = 1/133.33 hops/second = 7.5 ms

Time to cycle through all channels = 7.5 x 20 channels = 150 ms

Number of times transmitter hits on one channel = 100 ms / 150 ms = 1 time(s)

Worst case dwell time = 7.5 ms

Duty cycle connection factor = 20log10 (7.5ms / 100ms) = -22.5 dB



9.3 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitters operating under Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.10: 2013.

The transmitting equipment under test (EUT) is placed on a styrene turntable which is four feet in diameter, up to 1GHz 0.8m and above 1GHz 1.5m in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjust through all three orthogonal axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in section 9.2.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower. For line conducted emissions, the range scanned is 150 kHz to 30 MHz with RBW 9KHz used.



9.3 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements are made as described in ANSI C63.10: 2013.

The IF bandwidth used for measurement of radiated signal strength was 10 kHz for emission below 30 MHz and 120 kHz for emission from 30 MHz to 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. Above 1000 MHz, a resolution bandwidth of 1 MHz is used (RBW 3MHz used for fundamental emission).

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, but those measurements taken at a closer distance are so marked.

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TEST REPORT

Intertek Report No.: 210428003SZN-001

10 Test Equipment List

| Equipment No. | Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Due Date |
|------------------|------------------------|------------------|------------------|--------------------|-------------|-------------|
| SZ061-03 | BiConiLog Antenna | ETS | 3142C | 00078828 | 24-May-2019 | 24-May-2022 |
| SZ185-01 | EMI Receiver | R&S | ESCI | 100547 | 22-Dec-2020 | 22-Dec-2021 |
| SZ061-08 | Horn Antenna | ETS | 3115 | 00092346 | 07-Sep-2019 | 07-Sep-2021 |
| SZ061-06 | Active Loop Antenna | Electro-Metrics | EM-6876 | 217 | 24-May-2019 | 24-May-2021 |
| SZ056-03 | Spectrum Analyzer | R&S | FSP 30 | 101148 | 27-May-2020 | 27-May-2021 |
| SZ056-06 | Signal Analyzer | R&S | FSV 40 | 101101 | 22-Dec-2020 | 22-Dec-2021 |
| SZ181-04 | Preamplifier | Agilent | 8449B | 3008A02474 | 27-May-2020 | 27-May-2021 |
| SZ188-01 | Anechoic Chamber | ETS | RFD-F/A- 100 | 4102 | 15-Dec-2018 | 15-Dec-2021 |
| SZ062-02 | RF Cable | RADIALL | RG 213U | | 01-Dec-2020 | 01-Jun-2021 |
| SZ062-05 | RF Cable | RADIALL | 0.04- 26.5GHz | | 01-Dec-2020 | 01-Jun-2021 |
| SZ062-12 | RF Cable | RADIALL | 0.04- 26.5GHz | | 01-Dec-2020 | 01-Jun-2021 |
| SZ067-04 | Notch Filter | Micro-Tronics | BRM50702 -02 | | 27-May-2020 | 27-May-2021 |
| SZ185-02 | EMI Test Receiver | R&S | ESCI | 100692 | 27-Oct-2020 | 27-Oct-2021 |
| SZ187-01 | Two-Line V- Network | R&S | ENV216 | 100072 | 27-Oct-2020 | 27-Oct-2021 |
| SZ187-02 | Two-Line V- Network | R&S | ENV216 | 100072 | 27-May-2020 | 27-May-2021 |
| SZ062-16 | RF Cable | HUBER+SUHNE R | CBL2-BN- 1m | 110127- 2231000 | 13-Nov-2020 | 13-Nov-2021 |
| SZ188-03 | Shielding Room | ETS | RFD-100 | 4100 | 07-Jan-2020 | 07-Jan-2023 |