

Kabata, Inc.

# TEST REPORT

**SCOPE OF WORK**

FCC TESTING– MODEL: KBT-D60-001

**REPORT NUMBER**

240821032SZN-001

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**Kabata, Inc.**

## Application for Certification

**FCC ID: 2BKO9-D60DB****Smart dumbbells****Kabata, Inc.****Model: KBT-D60-001**

2.4GHz Transmitter

Report No.: 240821032SZN-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 [10-1-23]

Prepared and Checked by:

*Mandy Chen*  
Engineer

Approved by:

---

*Johnny Wang*  
Project Engineer  
Date: September 23, 2024

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**MEASUREMENT/TECHNICAL REPORT**

This report concerns (check one):      Original Grant       Class II Change

Equipment Type: DXX - Part 15 Low Power Communication Device Transmitter

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?      Yes       No

If yes, defer until:

date

Company Name agrees to notify the Commission by:

date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37?      Yes       No

If no, assumed Part 15, Subpart C for intentional radiator – the new 47 CFR [10-1-23 Edition] provision.

Report prepared by:

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**1.0 Summary of Test Result**

Applicant: Kabata, Inc.

Applicant Address: 12121 Wilshire Blvd, Suite 810, Los Angeles, CA 90025

Manufacturer: Kabata, Inc.

Manufacturer Address: 12121 Wilshire Blvd, Suite 810, Los Angeles, CA 90025

MODEL: KBT-D60-001

FCC ID: 2BKO9-D60DB

Test Specification	Reference	Results
Transmitter Radiated Emission Band edge	15.249 &15.209 &15.205	Pass
Conducted Emission	15.207	Pass
20dB Bandwidth	15.215(c)	Pass

Notes: The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

## 2.0 General Description

### 2.1 Product Description

The equipment under test (EUT) is a Smart dumbbells with Bluetooth 5.4 BLE function operating in 2402-2480MHz. The EUT can be powered by DC 3.7V. For more detail information pls. refer to the user manual.

Antenna Type: Integral antenna

Modulation Type: GFSK

Antenna Gain: 0.34dBi (This information is provided by applicant, and the applicant is responsible for the authenticity of the provided information.)

Bluetooth Version: 5.4 BLE (Single Mode)

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 controller unit for the Smart dumbbells which has Bluetooth function, Other digital functions were reported in the verification report: 240821032SZN-002.

### 2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Radiated emission measurement was performed in Semi-anechoic chamber and conducted emission measurement was performed in shield room. 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. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

### 2.4 Test Facility

The Semi-Anechoic chamber and shield room used to collect the radiated data and conducted data are **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, P.R. China. This test facility and site measurement data have been fully placed on file with the FCC (Registration 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 during the test, only the worst data was reported in this report.

For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the bottom 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**

Test Software: nRF Connect for Desktop V5.0.2

#### **3.3 Special Accessories**

No special accessories used.

#### **3.4 Equipment Modification**

Any modifications installed previous to testing by Kabata, Inc. 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.
Base	Kabata, Inc.	KBT-D60-001
AC Adapter	MASS POWER	S030-1D150200VU-V

#### **4.0 Emission Results**

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.

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

Where FS = Field Strength in  $\text{dB}\mu\text{V}/\text{m}$

RA = Receiver Amplitude (including preamplifier) in  $\text{dB}\mu\text{V}$

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB/m

AG = Amplifier Gain in dB

PD = Pulse Desensitization in dB

AV = Average Factor in -dB

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  $\text{dB}\mu\text{V}$  is obtained. The antenna factor of 7.4 dB/m 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  $\text{dB}\mu\text{V}/\text{m}$ . This value in  $\text{dB}\mu\text{V}/\text{m}$  was converted to its corresponding level in  $\mu\text{V}/\text{m}$ .

RA = 62.0  $\text{dB}\mu\text{V}$

AF = 7.4 dB/m

CF = 1.6 dB

AG = 29.0 dB

PD = 0 dB

AV = -10 dB

$$FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 \text{ dB}\mu\text{V}/\text{m}$$

Level in  $\mu\text{V}/\text{m}$  = Common Antilogarithm  $[(42 \text{ dB}\mu\text{V}/\text{m})/20]$  = 125.9  $\mu\text{V}/\text{m}$

**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**

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  
247.959000 MHz

Judgement: Passed by 16.4 dB

***TEST PERSONNEL:***

*Sign on file*

Mandy Chen, Engineer  
*Typed/Printed Name*

September 18, 2024  
*Date*

Applicant: Kabata, Inc.

Date of Test: September 18, 2024

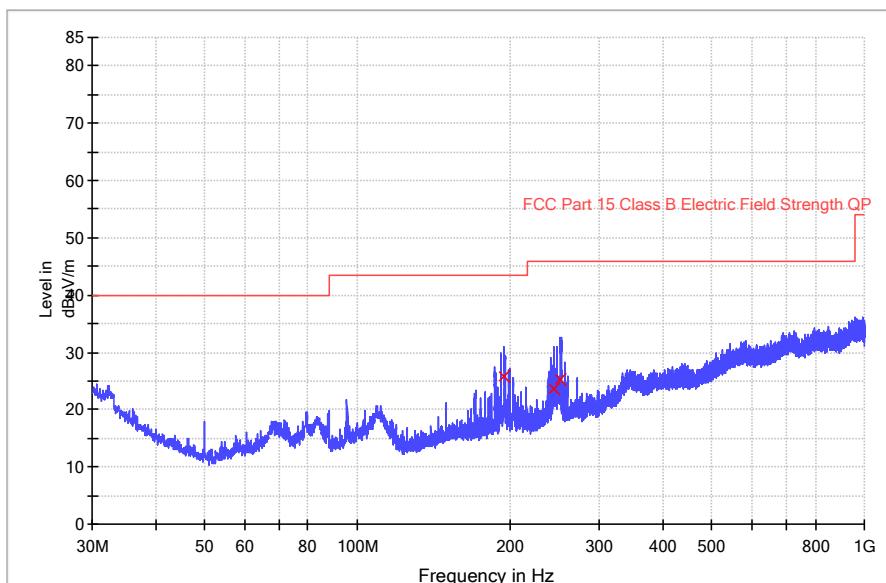
Worst Case Operating Mode:

Model: KBT-D60-001

Transmitting(2402MHz)

ANT Polarity: Horizontal

FCC Part 15



Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
195.191000	25.8	1000.0	120.000	100.0	H	17.0	17.7	43.5
244.143667	23.6	1000.0	120.000	100.0	H	19.0	22.4	46.0
251.321667	25.3	1000.0	120.000	100.0	H	19.5	20.7	46.0

## Remark:

1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Quasi Peak (dB $\mu$ V/m) = Corr. (dB/m) + Read Level (dB $\mu$ V)
3. Margin (dB) = Limit Line (dB $\mu$ V/m) – Level (dB $\mu$ V/m)

Applicant: Kabata, Inc.

Date of Test: September 18, 2024

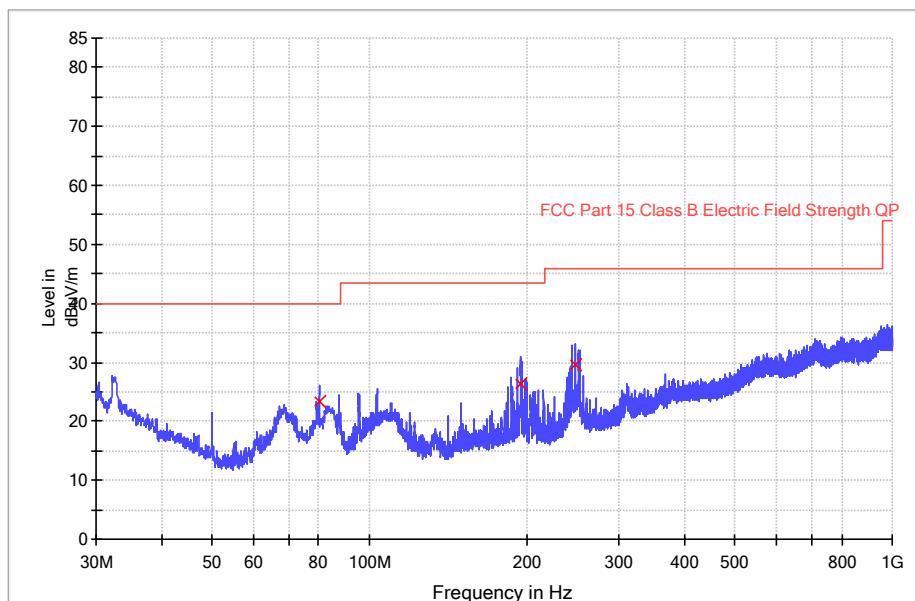
Worst Case Operating Mode:

Model: KBT-D60-001

Transmitting(2402MHz)

ANT Polarity: Vertical

FCC Part 15



Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
80.084333	23.4	1000.0	120.000	100.0	V	13.5	16.6	40.0
195.158667	26.3	1000.0	120.000	100.0	V	17.0	17.2	43.5
247.959000	29.6	1000.0	120.000	100.0	V	19.3	16.4	46.0

Remark:

1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Quasi Peak (dB $\mu$ V/m) = Corr. (dB/m) + Read Level (dB $\mu$ V)
3. Margin (dB) = Limit Line (dB $\mu$ V/m) – Level (dB $\mu$ V/m)

**4.1.4 Transmitter Spurious Emissions (Radiated)**

Worst Case Radiated Emission  
at  
9608.000 MHz

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

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.

Judgement: Passed by 10.5 dB

***TEST PERSONNEL:***

*Sign on file*

Mandy Chen, Engineer  
*Typed/Printed Name*

September 18, 2024  
*Date*

Applicant: Kabata, Inc.

Date of Test: September 18, 2024

Worst Case Operating Mode:

Model: KBT-D60-001

Transmitting(2402MHz)

Table 1

**Radiated Emissions**

(2402MHz)

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dB $\mu$ V/m)	Peak Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Horizontal	2402.000	106.7	36.7	28.1	98.1	114.0	-15.9
Horizontal	4804.000	42.1	36.7	35.5	40.9	74.0	-33.1
Horizontal	7206.000	48.2	36.1	36.5	48.6	74.0	-25.4
Horizontal	9608.000	53.0	36.2	37.0	53.8	74.0	-20.2

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Horizontal	2402.000	88.9	36.7	28.1	80.3	94.0	-13.7
Horizontal	4804.000	34.6	36.7	35.5	33.4	54.0	-20.6
Horizontal	7206.000	38.8	36.1	36.5	39.2	54.0	-14.8
Horizontal	9608.000	42.7	36.2	37.0	43.5	54.0	-10.5

Notes:

1. Peak detector is used for the emission measurement (RBW=1MHz / VBW=3MHz for Peak value, and RBW=1MHz / VBW=10Hz for Average value; RBW=3MHz is used for fundamental emission measurement).
2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter 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 harmonic 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 is used for the emission over 1000MHz.

Applicant: Kabata, Inc.

Date of Test: September 18, 2024

Worst Case Operating Mode:

Model: KBT-D60-001

Transmitting(2440MHz)

Table 2

**Radiated Emissions**

(2440MHz)

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dB $\mu$ V/m)	Peak Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Horizontal	2440.000	105.8	36.7	28.1	97.2	114.0	-16.8
Horizontal	4880.000	42.7	36.7	35.5	41.5	74.0	-32.5
Horizontal	7320.000	46.5	36.1	37.2	47.6	74.0	-26.4
Horizontal	9760.000	50.4	36.2	37.0	51.2	74.0	-22.8

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Horizontal	2440.000	90.5	36.7	28.1	81.9	94.0	-12.1
Horizontal	4880.000	35.4	36.7	35.5	34.2	54.0	-19.8
Horizontal	7320.000	38.5	36.1	37.2	39.6	54.0	-14.4
Horizontal	9760.000	42.3	36.2	37.0	43.1	54.0	-10.9

Notes:

1. Peak detector is used for the emission measurement (RBW=1MHz / VBW=3MHz for Peak value, and RBW=1MHz / VBW=10Hz for Average value; RBW=3MHz is used for fundamental emission measurement).
2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter 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 harmonic 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 is used for the emission over 1000MHz.

Applicant: Kabata, Inc.

Date of Test: September 18, 2024

Worst Case Operating Mode:

Model: KBT-D60-001

Transmitting(2480MHz)

Table 3

**Radiated Emissions**

(2480MHz)

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dB $\mu$ V/m)	Peak Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Horizontal	2480.000	107.3	36.7	28.1	98.7	114.0	-15.3
Horizontal	4960.000	42.8	36.7	35.5	41.6	74.0	-32.4
Horizontal	7440.000	46.4	36.1	37.2	47.5	74.0	-26.5
Horizontal	9920.000	48.7	36.3	38.9	51.3	74.0	-22.7

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Horizontal	2480.000	90.3	36.7	28.1	81.7	94.0	-12.3
Horizontal	4960.000	34.6	36.7	35.5	33.4	54.0	-20.6
Horizontal	7440.000	39.0	36.1	37.2	40.1	54.0	-13.9
Horizontal	9920.000	40.5	36.3	38.9	43.1	54.0	-10.9

Notes:

1. Peak detector is used for the emission measurement (RBW=1MHz / VBW=3MHz for Peak value, and RBW=1MHz / VBW=10Hz for Average value; RBW=3MHz is used for fundamental emission measurement).
2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter 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 harmonic 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 is used for the emission over 1000MHz.

#### 4.2 Conducted Emission Configuration Photograph

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: conducted photos.pdf.

##### 4.2.1 Conducted Emission

Worst Case Conducted Configuration  
at  
0.151817MHz

Judgement: Passed by 16.1dB margin

***TEST PERSONNEL:***

*Sign on file*

Mandy Chen, Engineer  
*Typed/Printed Name*

18 September 2024

*Date*

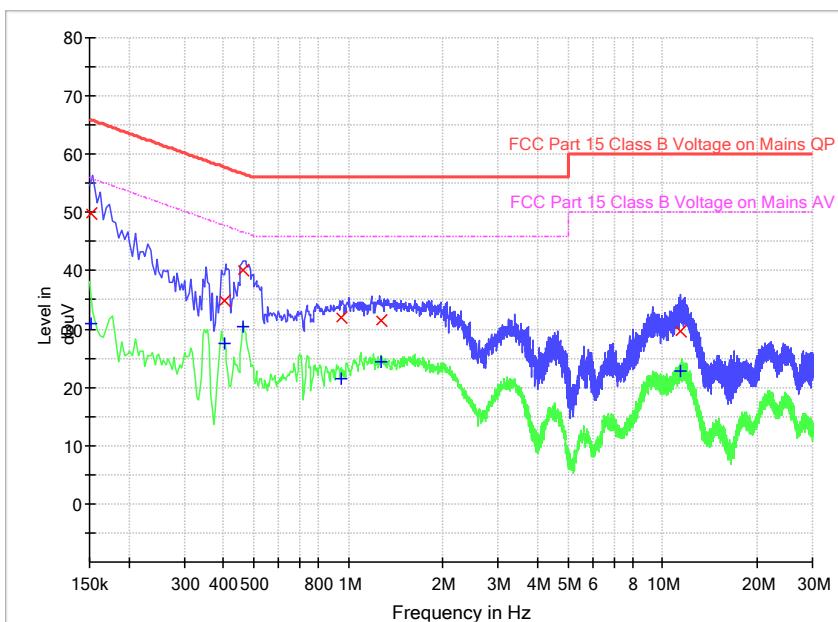
Applicant: Kabata, Inc.

Date of Test: 18 September 2024

Model: KBT-D60-001

Worst Case Operating Mode: Transmitting(2402MHz)

Phase: Live

**Graphic / Data Table****Conducted Emissions  
Pursuant to FCC 15.207: Emissions Requirement****Limit and Margin QP**

Frequency (MHz)	Quasi Peak (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.151817	49.8	9.000	L1	9.6	16.1	65.9
0.402000	34.9	9.000	L1	9.6	22.9	57.8
0.462000	40.2	9.000	L1	9.6	16.5	56.7
0.946000	31.9	9.000	L1	9.6	24.1	56.0
1.266000	31.5	9.000	L1	9.6	24.5	56.0
11.466000	29.6	9.000	L1	10.1	30.4	60.0

**Limit and Margin AV**

Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.151817	31.1	9.000	L1	9.6	24.8	55.9
0.402000	27.7	9.000	L1	9.6	20.1	47.8
0.462000	30.3	9.000	L1	9.6	16.4	46.7
0.946000	21.5	9.000	L1	9.6	24.5	46.0
1.266000	24.3	9.000	L1	9.6	21.7	46.0
11.466000	22.8	9.000	L1	10.1	27.2	50.0

Applicant: Kabata, Inc.

Date of Test: 18 September 2024

Model: KBT-D60-001

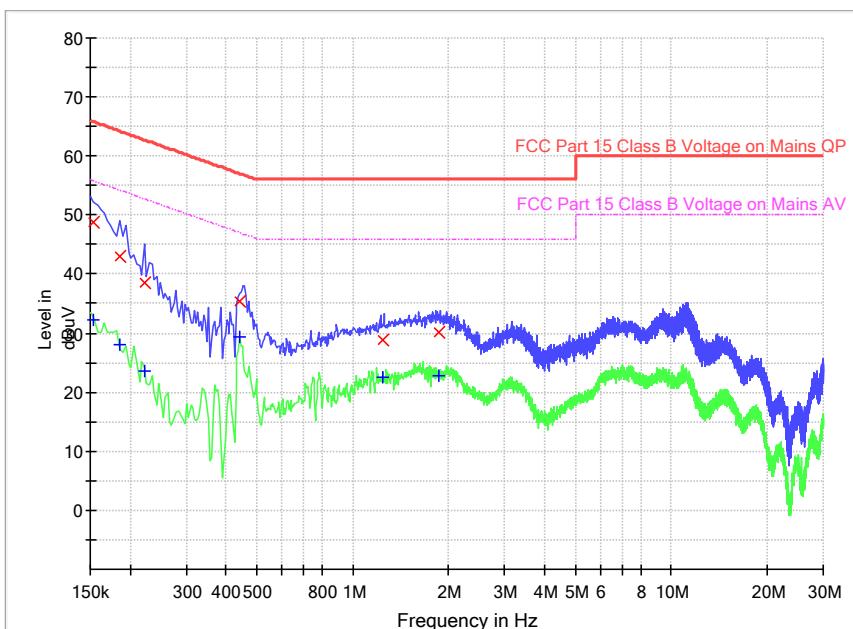
Worst Case Operating Mode: Transmitting(2402MHz)

Phase: Neutral

## Graphic / Data Table

### Conducted Emissions Pursuant to FCC 15.207: Emissions Requirement

Conducted Emission Test FCC Part 15



#### Limit and Margin QP

Frequency (MHz)	Quasi Peak (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.154000	48.9	9.000	N	9.6	16.9	65.8
0.186000	43.0	9.000	N	9.6	21.2	64.2
0.222000	38.7	9.000	N	9.6	24.0	62.7
0.442000	35.3	9.000	N	9.6	21.7	57.0
1.250000	28.9	9.000	N	9.6	27.1	56.0
1.858000	30.0	9.000	N	9.7	26.0	56.0

#### Limit and Margin AV

Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.154000	32.4	9.000	N	9.6	23.4	55.8
0.186000	28.0	9.000	N	9.6	26.2	54.2
0.222000	23.6	9.000	N	9.6	29.1	52.7
0.442000	29.3	9.000	N	9.6	17.7	47.0
1.250000	22.4	9.000	N	9.6	23.6	46.0
1.858000	22.9	9.000	N	9.7	23.1	46.0

## 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 Technical Specifications

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 Miscellaneous Information**

This miscellaneous information includes details of the measured bandedge, 20dB Bandwidth, the test procedure and calculation of factor such as pulse desensitization.

### **9.1 Bandedge Plot**

The test plots are attached as below. From the plot, the field strength of any emissions outside of the specified frequency band are attenuated to the general radiated emission limits in section 15.209. It fulfils the requirement of 15.249(d).

#### **Peak Measurement**

Restricted-band band-edge tests shall be performed as radiated measurements, i.e (Band-edge Plot).

##### **(i) Lowest frequency channel (2402MHz):**

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

$$\begin{aligned} &= 98.1 \text{ dB}\mu\text{v}/\text{m} - 44.35 \text{ dB} \\ &= 53.75 \text{ dB}\mu\text{v}/\text{m} \end{aligned}$$

Average Resultant field strength = Fundamental emissions (average value) – delta from the bandedge plot

$$\begin{aligned} &= 80.3 \text{ dB}\mu\text{v}/\text{m} - 44.35 \text{ dB} \\ &= 35.95 \text{ dB}\mu\text{v}/\text{m} \end{aligned}$$

##### **(ii) Highest frequency channel (2480MHz):**

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

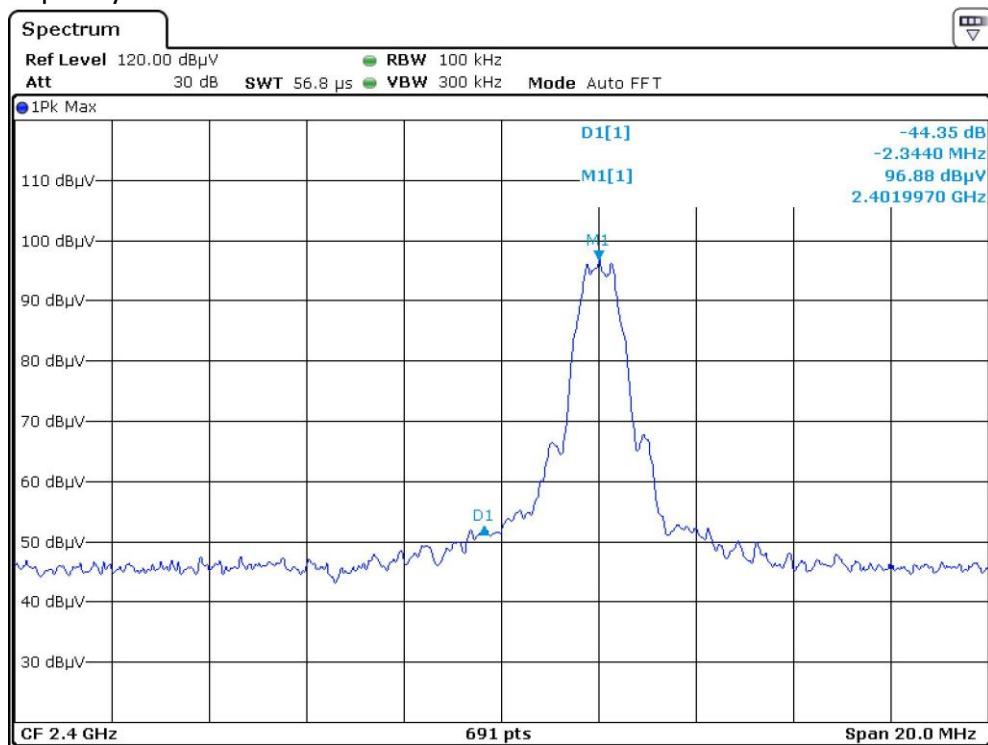
$$\begin{aligned} &= 98.7 \text{ dB}\mu\text{v}/\text{m} - 47.80 \text{ dB} \\ &= 50.90 \text{ dB}\mu\text{v}/\text{m} \end{aligned}$$

Average Resultant field strength = Fundamental emissions (average value) – delta from the bandedge plot

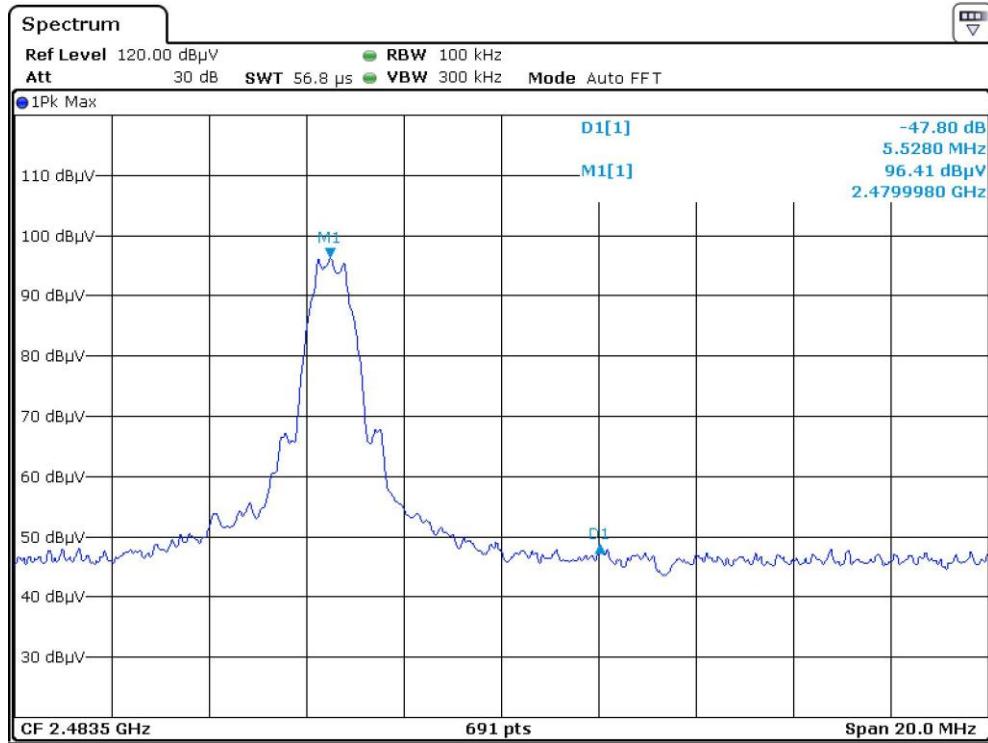
$$\begin{aligned} &= 81.7 \text{ dB}\mu\text{v}/\text{m} - 47.80 \text{ dB} \\ &= 33.90 \text{ dB}\mu\text{v}/\text{m} \end{aligned}$$

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

## Lowest frequency Channel

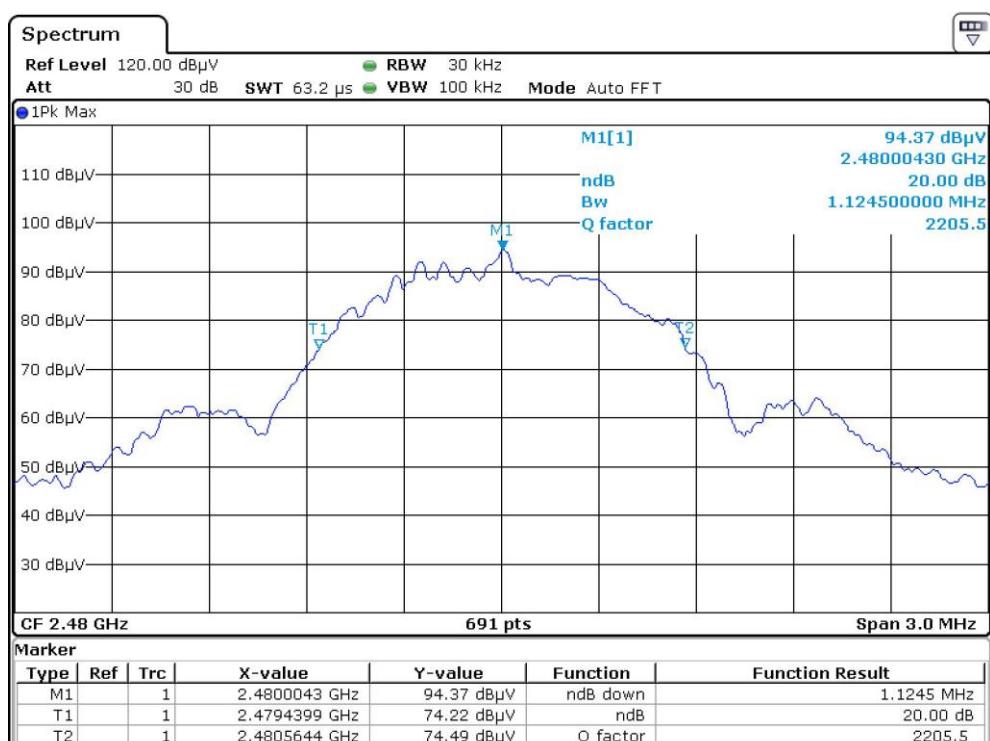
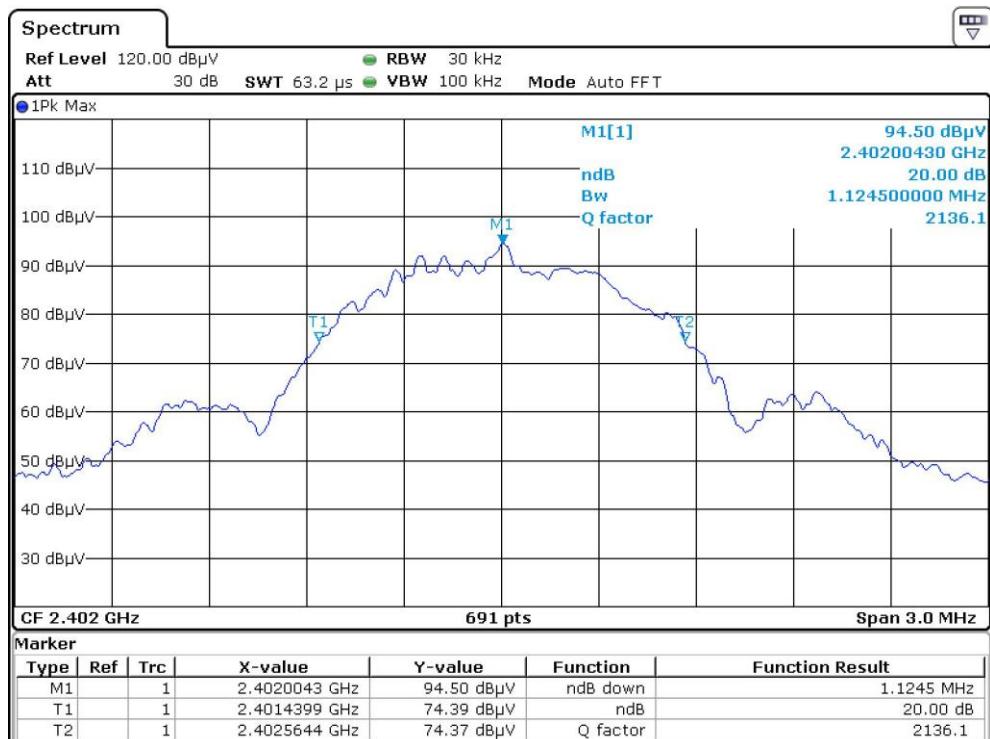


## Highest frequency Channel



## 9.2 20dB Bandwidth

Pursuant to FCC part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered. The test plots are reported as below.



### 9.3 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device since the transmitter transmits the RF signal continuously.

### 9.4 Transmitter Duty Cycle Calculation, FCC Rule 15.35(b, c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The Transmitter ON time was determined from the resultant time-amplitude display:

	See attached spectrum analyzer chart (s) for Transmitter timing
	See Transmitter timing diagram provided by manufacturer
x	Not applicable, duty cycle was not used.

## 9.5 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 and approximately 0.8 meter up to 1GHz and 1.5 meter above 1GHz 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 adjusted 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 9.4.

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.

Detector function for conducted emissions is in QP & AV mode and IFBW setting is 9 kHz from the frequency band 150 kHz to 30MHz.

## 9.5 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.

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.

**10.0 Test Equipment List**

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-13	BiConiLog Antenna	ETS	3142E	00217919	13-Jul-2023	13-Jul-2025
SZ185-03	EMI Receiver	R&S	ESR7	101975	23-Apr-2024	23-Apr-2025
SZ061-09	Horn Antenna	ETS	3115	00092347	14-Oct-2022	14-Oct-2025
SZ061-07	Pyramidal Horn Antenna	ETS	3160-09	00083067	31-Aug-2022	31-Aug-2025
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	05-May-2024	05-May-2027
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	22-Apr-2024	22-Apr-2025
SZ056-06	Signal Analyzer	R&S	FSV 40	101101	13-Dec-2023	13-Dec-2024
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	22-Apr-2024	22-Apr-2025
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	12-Dec-2021	12-Dec-2024
SZ062-23	RF Cable	RADIALL	SF104PE	--	26-Sep-2023	26-Sep-2024
SZ062-35	RF Cable	RADIALL	A50-3.5M3.5M-8M	--	26-Sep-2023	26-Sep-2024
SZ062-30	RF Cable	RADIALL	A50-3.5M3.5M-4.5M	--	26-Sep-2023	26-Sep-2024
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	23-Apr-2024	23-Apr-2025
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	09-Jul-2024	09-Jul-2025
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	18-Oct-2023	19-Oct-2024
SZ187-02	Two-Line V-Network	R&S	ENV216	100072	23-Apr-2024	23-Apr-2025
SZ062-16	RF Cable	HUBER+SUHNE R	CBL2-BN-1m	110127-2231000	10-Jul-2024	10-Jul-2025
SZ188-03	Shielding Room	ETS	RFD-100	4100	20-Dec-2022	20-Dec-2025

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