intertek
Total Quality. Assured.

Shantou City Chenghai District Aiwen Toys Factory

TEST REPORT

SCOPE OF WORK
FCC TESTING– MODEL:1015441

REPORTNUMBER
GZHH00448993-001

ISSUE DATE
JUN 23, 2022

PAGES
24

DOCUMENT CONTROL NUMBER
FCC ID 249_C
© 2017 INTERTEK

Shantou City Chenghai District Aiwen Toys Factory

Application for Certification

FCC ID: 2AZYUAW2022A4GT

Toy RC Off Road Bulldog Buggy

Model: 1015441
Additional Model No.: 101XXXX(Where xxxx Can Be 0000-9999 Which Represent Different Customers)

Brand Name: Sharper Image

2.4GHz Transceiver

Report No.: GZHH00448993-001

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 [10-1-20]

Prepared and Checked by:	Approved by:
Sign on file	Peter Kang
Terry Tang *Assistant Supervisor*	*Peter Kang* *Technical Supervisor* *Date: Jun 23, 2022*

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

Intertek Testing Service Shenzhen Ltd. Longhua Branch
101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community GuanHu Subdistrict, LongHua District, Shenzhen, People's Republic of China
Tel: (86 755) 8601 6288 Fax: (86 755) 8601 6751

MEASUREMENT/TECHNICAL REPORT

This report concerns (check one:) Original Grant X 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 __X__

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 __X__

If no, assumed Part 15, Subpart C for intentional radiator – the new 47 CFR [10-1-20Edition] provision.

Report prepared by:

Terry Tang
Intertek Testing Services Shenzhen Ltd. Longhua Branch
101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community GuanHu Subdistrict, LongHua District, Shenzhen, People's Republic of China
Tel / Fax: 86-755-86016288/86-755-86016751

Table of Contents

1.0 Summary of Test Result 4

2.0 General Description 5

2.1Product Description 5
2.2Related Submittal(s) Grants 5
2.3Test Methodology 5
2.4Test Facility 5

3.0 System Test Configuration 6

3.1 Justification 6
3.2EUT Exercising Software 6
3.3Special Accessories 6
3.4Equipment Modification 6
3.5 Measurement Uncertainty 6
3.6 Support Equipment List and Description 6

4.0Emission Results 7

4.1 Radiated Test Results 7
4.1.1 Field Strength Calculation 7
4.1.2 Radiated Emission Configuration Photograph 8
4.1.3Radiated Emissions 8
4.1.4 Transmitter Spurious Emissions 11

5.0 Equipment Photographs 15

6.0Product Labelling 15

7.0Technical Specifications 15

8.0Instruction Manual 15

9.0Miscellaneous Information 16

9.1 Bandedge Plot 16
9.220dB Bandwidth 18
9.3Discussion of Pulse Desensitization 19
9.4Calculation of Average Factor 19
9.5 Emissions Test Procedures 22

10.0 Test Equipment List 24

1.0 Summary of Test Result

Applicant: Shantou City Chenghai District Aiwen Toys Factory
Applicant Address: Xiushui Road bounded on Fengxin road,the 3rd floor of Mingji multiple-use building, Fengxiang Street Shantou China

Manufacturer: Shantou City Chenghai District Aiwen Toys Factory
Manufacturer Address: Xiushui Road bounded on Fengxin road,the 3rd floor of Mingji multiple-use building, Fengxiang Street Shantou China

MODEL:1015441

FCC ID: 2AZYUAW2022A4GT

Test Specification	Reference	Results
Transmitter Radiated Emission Bandedge	15.249 &15.209 &15.205	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 Toy RC Off Road Bulldog Buggy operating at 2.4G Band. The EUT can be powered by DC 3.0V (2 x 1.5V AAA batteries).For more detail information pls. refer to the user manual.

The Model: 101XXXX(Where xxxx Can Be 0000-9999 Which Represent Different Customers) is the same as the Model: 1015441 in hardware and electrical aspect. The difference in appearance and model number serves as marketing strategy.

Antenna Type: Integral antenna
Modulation Type: GFSK
Antenna Gain: 0dBi

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 Toy RC Off Road Bulldog Buggy, and the corresponding car unit which associated with this EUT is subjected to FCC certification with FCC ID: 2AZYUAW2022A4GR.

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. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The Semi-anechoic chamber used to collect the radiated data is **Intertek Testing Services Shenzhen Ltd. Longhua Branch**and located at101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community GuanHu Subdistrict, LongHua District, Shenzhen, People’s Republic of 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 3.0V (2 x 1.5V AAA batteries)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 Section4.

The EUT was operated standalone and placed in the central of 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

There was no special software to exercise the device.

3.3 Special Accessories

No special accessories used.

3.4 Equipment Modification

Any modifications installed previous to testing by Shantou City Chenghai District Aiwen Toys Factory 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.
//	//	//

4.0Emission 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 dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
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 dBµV 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 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 62.0 dBµV
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 dBµV/m

Level in µV/m = Common Antilogarithm [(42 dBµV/m)/20] = 125.9 µV/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
879.720000 MHz

Judgement: Passed by 14.3 dB

TEST PERSONNEL:

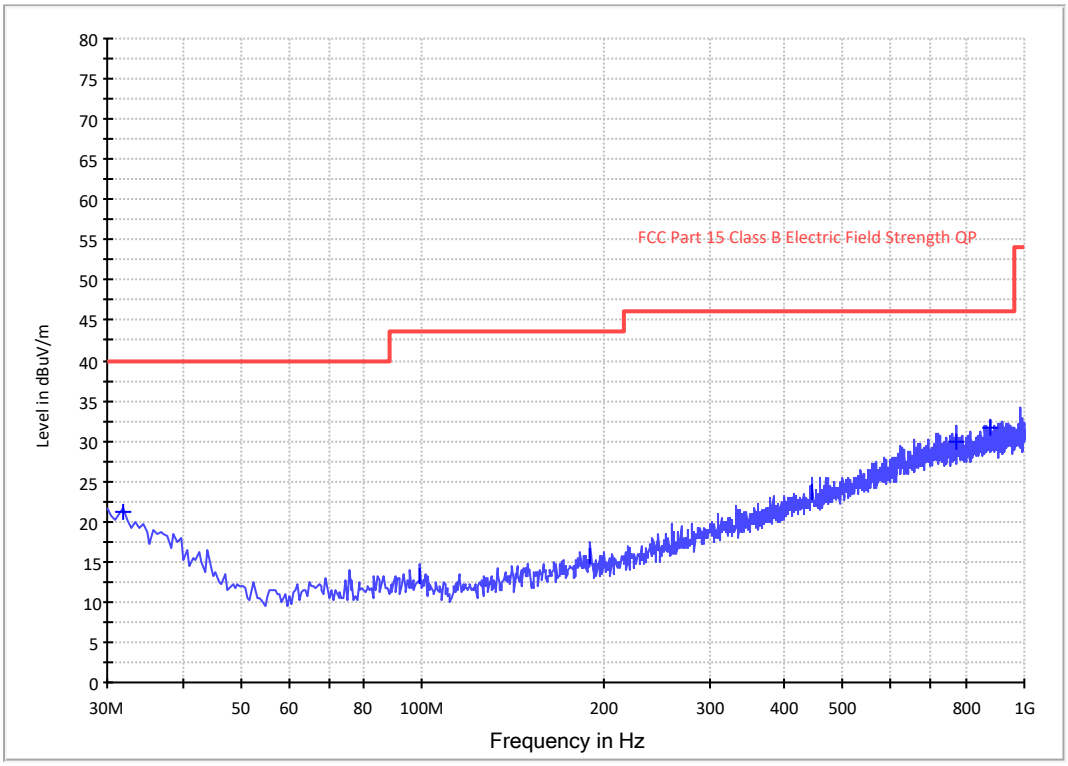
Sign on file

Terry Tang, Assistant Supervisor
Typed/Printed Name

Jun 8, 2022 *Date*

Applicant: Shantou City Chenghai District Aiwen Toys Factory
Date of Test: Jun 8, 2022 Model:1015441
Worst Case Operating Mode: Transmitting(2410.000MHz)

ANT Polarity: Horizontal

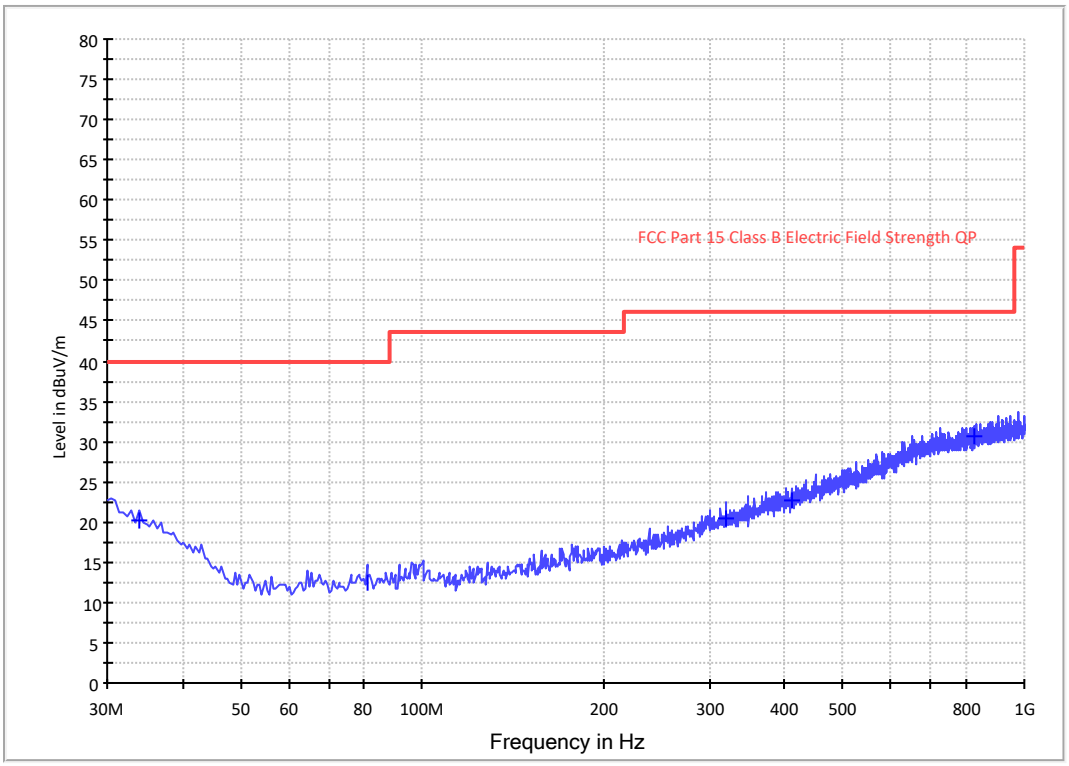


Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
31.940000	21.2	1000.0	120.000	H	17.1	18.8	40.0
769.625000	29.8	1000.0	120.000	H	25.8	16.2	46.0
879.720000	31.7	1000.0	120.000	H	26.8	14.3	46.0

Remark:
1. Corr.(dB/m) = 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)

Applicant: Shantou City Chenghai District Aiwen Toys Factory
Date of Test: Jun 8, 2022 Model:1015441
Worst Case Operating Mode: Transmitting(2410.000MHz)

ANT Polarity: Vertical



Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
33.880000	20.1	1000.0	120.000	V	16.1	19.9	40.0
321.214000	20.9	1000.0	120.000	V	18.4	25.1	46.0
410.240000	22.8	1000.0	120.000	V	19.1	23.2	46.0
827.825000	30.7	1000.0	120.000	V	26.2	15.3	46.0

Remark:
1. Corr.(dB/m) = 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)

Worst Case Radiated Emission
at
2398.213 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 9.4 dB

TEST PERSONNEL:

Sign on file

Terry Tang, Assistant Supervisor
Typed/Printed Name

Jun 8, 2022 *Date*

Applicant: Shantou City Chenghai District Aiwen Toys Factory
Date of Test: Jun 8, 2022 Model:1015441
Worst Case Operating Mode: Transmitting

Table 1

Radiated Emissions
(2410 MHz)

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	2410.000	107.6	36.7	28.1	99.0	114.0	-15.0
Horizontal	4820.000	52.0	36.7	35.5	50.8	74.0	-23.2
Horizontal	7230.000	59.1	36.8	35.6	57.9	74.0	-16.1

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (-dB)	Netat 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	2410.000	107.6	36.7	28.1	20.1	78.9	94.0	-15.1
Horizontal	4820.000	52.0	36.7	35.5	20.1	30.7	54.0	-23.3
Horizontal	7230.000	59.1	36.8	35.6	20.1	37.8	54.0	-16.2

Notes:
1. Peak Detector Data unless otherwise stated.
2. All measurements were made at 3 meters. 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: Shantou City Chenghai District Aiwen Toys Factory
Date of Test: Jun 8, 2022 Model:1015441
Worst Case Operating Mode: Transmitting

Table 2

Radiated Emissions
(2442 MHz)

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	2442.000	107.8	36.7	28.1	99.2	114.0	-14.8
Horizontal	4884.000	52.5	36.7	35.5	51.3	74.0	-22.7
Horizontal	7326.000	59.7	36.8	35.6	58.5	74.0	-15.5

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (-dB)	Netat 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	2442.000	107.8	36.7	28.1	20.1	79.1	94.0	-14.9
Horizontal	4884.000	52.5	36.7	35.5	20.1	31.2	54.0	-22.8
Horizontal	7326.000	59.7	36.8	35.6	20.1	38.4	54.0	-15.6

Notes:
1. Peak Detector Data unless otherwise stated.
2. All measurements were made at 3 meters. 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: Shantou City Chenghai District Aiwen Toys Factory
Date of Test: Jun 8, 2022 Model:1015441
Worst Case Operating Mode: Transmitting

Table 3

Radiated Emissions
(2473 MHz)

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	2473.000	106.6	36.7	28.1	98.0	114.0	-16.0
Horizontal	4946.000	52.6	36.7	35.5	51.4	74.0	-22.6
Horizontal	7419.000	61.6	36.8	35.6	60.4	74.0	-13.6

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (-dB)	Netat 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	2473.000	106.6	36.7	28.1	20.1	77.9	94.0	-16.1
Horizontal	4946.000	52.6	36.7	35.5	20.1	31.3	54.0	-22.7
Horizontal	7419.000	61.6	36.8	35.6	20.1	40.3	54.0	-13.7

Notes:
1. Peak Detector Data unless otherwise stated.
2. All measurements were made at 3 meters. 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.

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.

9.0Miscellaneous Information

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

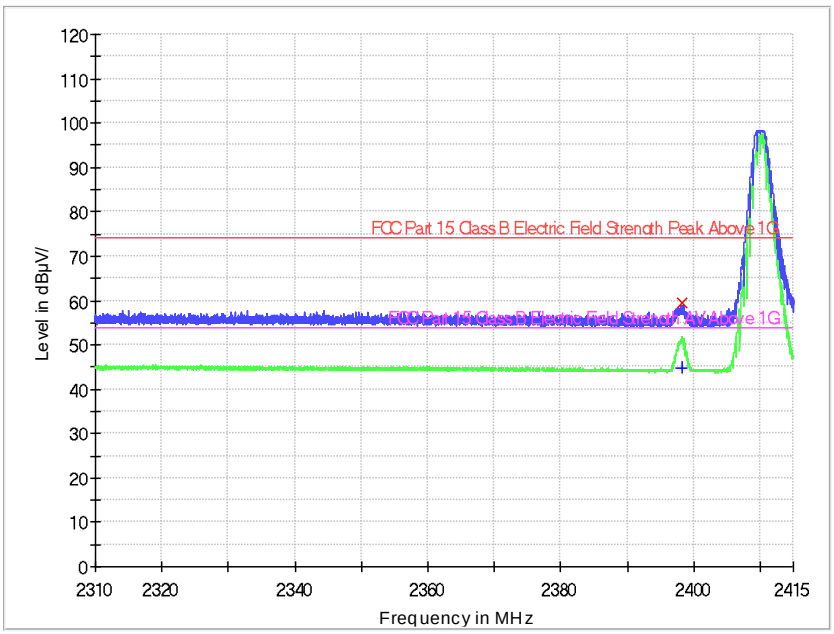
9.1Bandedge Plot

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) Lower channel 2410.000MHz:

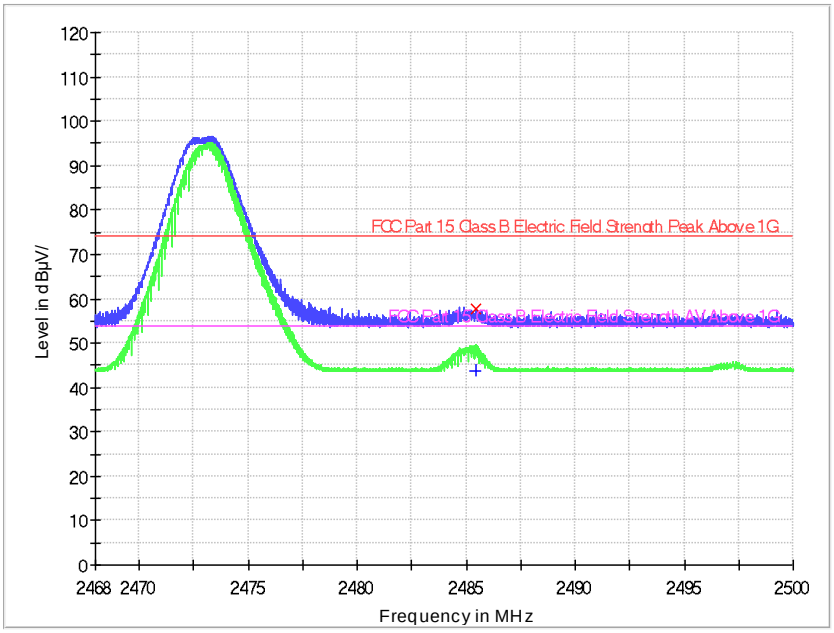


Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	2398.213	68.2	36.7	28.1	59.6	74.0	-14.4

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m	Margin (dB)
Horizontal	2398.213	53.2	36.7	28.1	44.6	54.0	-9.4

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

(ii) Upper channel 2473.000MHz:



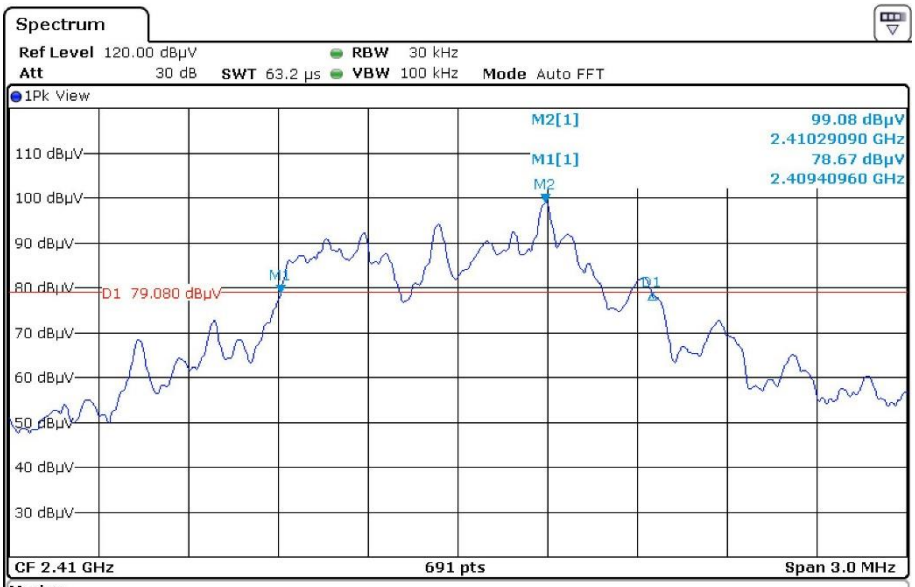
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	2485.424	65.4	36.8	29.1	57.7	74.0	-16.3

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m	Margin (dB)
Horizontal	2485.424	51.6	36.8	29.1	43.9	54.0	-10.1

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

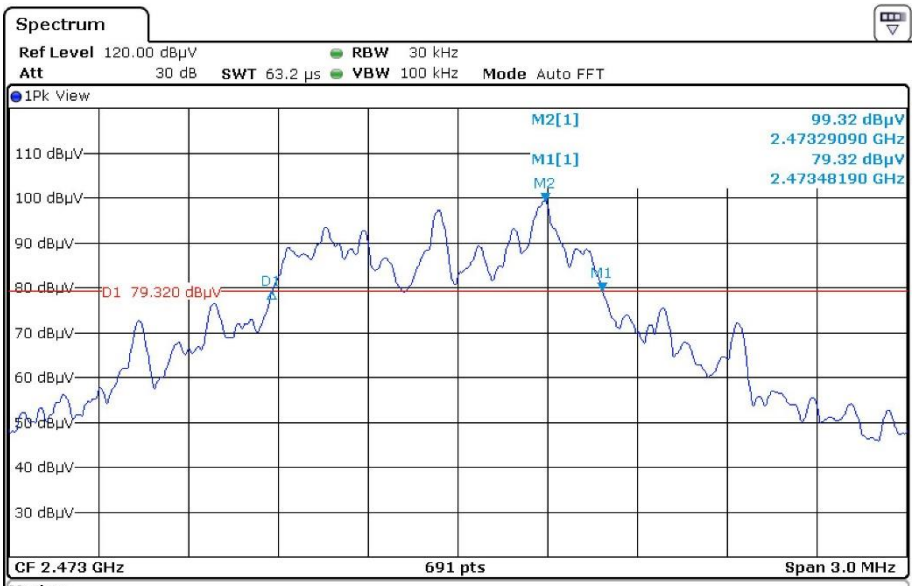
9.2 20dB Bandwidth

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.



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4094096 GHz	78.67 dBµV		
D1	M1	1	1.2373 MHz	0.22 dB		
M2		1	2.4102909 GHz	99.08 dBµV		



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4734819 GHz	79.32 dBµV		
D1	M1	1	-1.1027 MHz	-0.11 dB		
M2		1	2.4732909 GHz	99.32 dBµV		

9.3 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device.The effective period (T_{eff}) is approximately 0.4783ms for a digital "1" bit, as shown in the plots of Section9.4 With a resolution bandwidth (3 dB) of 100 kHz, the pulse desensitivity factor was 0 dB

9.4 Calculation of Average Factor

Averaging factor in dB = 20 log (duty cycle)

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

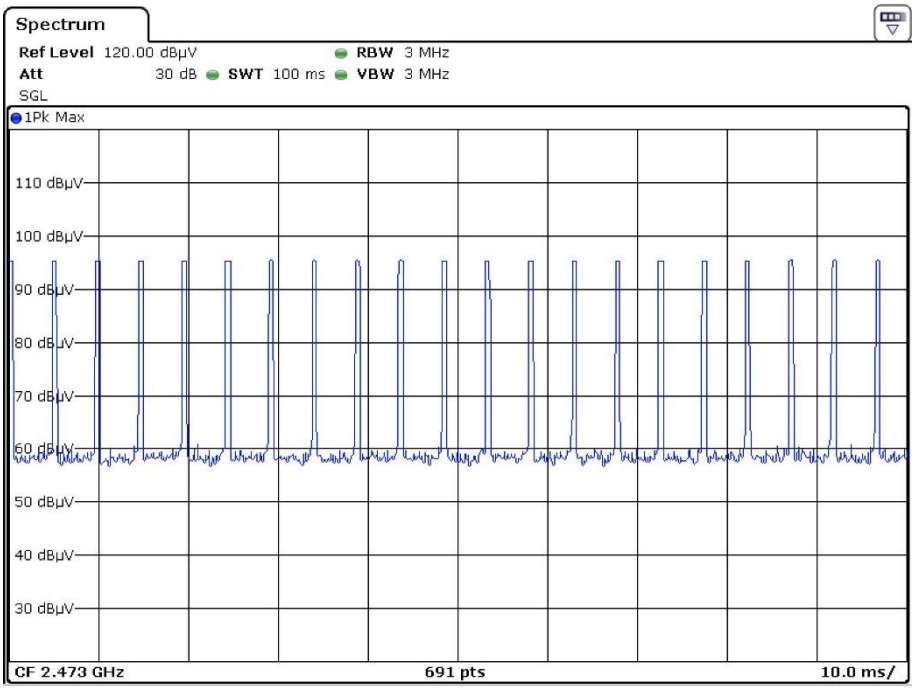
The time period over which the duty cycle is measured is 100 milliseconds, or the repetition cycle, whichever is a shorter time frame. The worst case (highest percentage on) duty cycle is used for the calculation. The duty cycle is measured by placing the spectrum analyzer in zero scan (receiver mode) and linear mode at maximum bandwidth (3 MHz at 3 dB down) and viewing the resulting time domain signal output from the analyzer on a Tektronix oscilloscope. The oscilloscope is used because of its superior time base and triggering facilities.

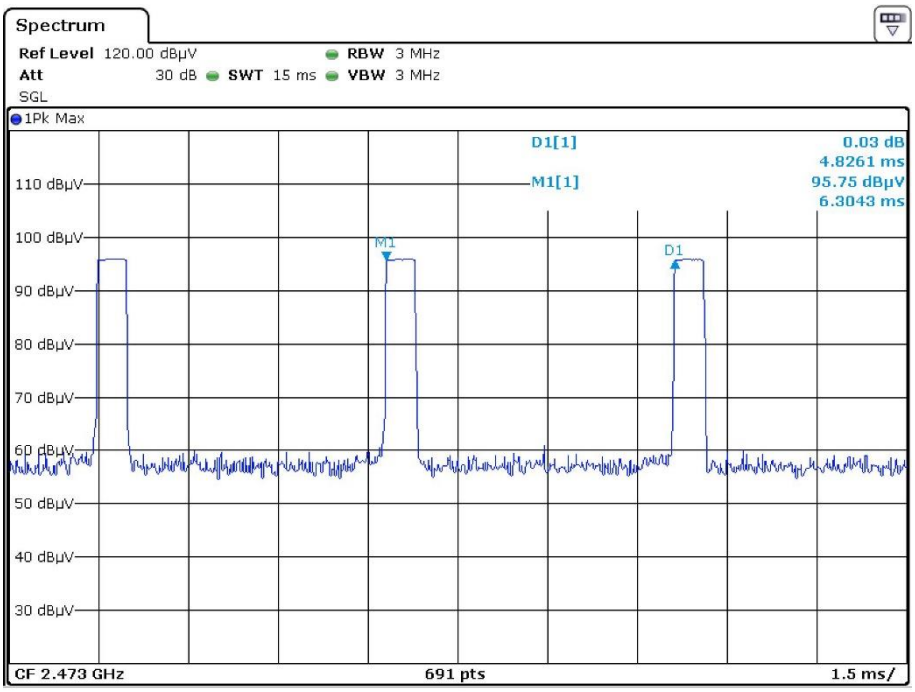
The duty cycle is simply the on-time divided by the period:

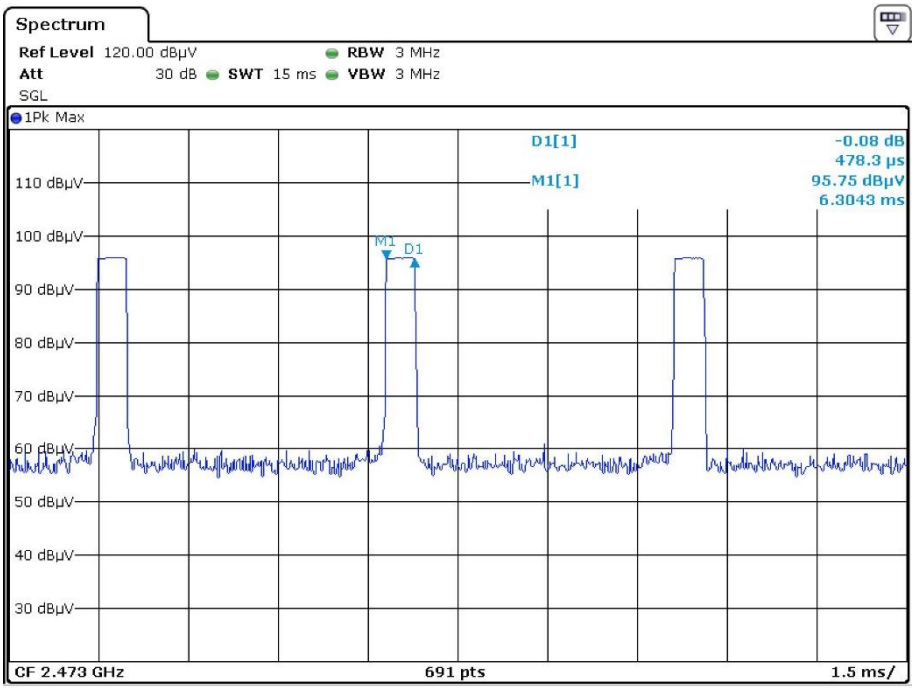
The duration of one cycle = 4.8261ms
Effective period of the cycle = 0.4783ms
DC =0.4783ms / 4.8261ms =0.0991 or 9.91%

Therefore, the averaging factor is found by 20 $\log_{10}$(0.0991) =-20.1dB

The test plots are attached as below.


Spectrum
Ref Level 120.00 dBµV
RBW 3 MHz
Att 30 dB
SWT 100 ms
VBW 3 MHz
SGL
1Pk Max
110 dBµV
100 dBµV
90 dBµV
80 dBµV
70 dBµV
60 dBµV
50 dBµV
40 dBµV
30 dBµV
CF 2.473 GHz
691 pts
10.0 ms/


Spectrum
Ref Level 120.00 dBµV
RBW 3 MHz
Att 30 dB
SWT 15 ms
VBW 3 MHz
SGL
1Pk Max
D1[1]
0.03 dB
4.8261 ms
M1[1]
95.75 dBµV
6.3043 ms
M1
D1
110 dBµV
100 dBµV
90 dBµV
80 dBµV
70 dBµV
60 dBµV
50 dBµV
40 dBµV
30 dBµV
CF 2.473 GHz
691 pts
1.5 ms/


Spectrum
Ref Level 120.00 dBµV
RBW 3 MHz
Att 30 dB
SWT 15 ms
VBW 3 MHz
SGL
1Pk Max
D1[1]
-0.08 dB
478.3 µs
M1[1]
95.75 dBµV
6.3043 ms
110 dBµV
100 dBµV
90 dBµV
80 dBµV
70 dBµV
60 dBµV
50 dBµV
40 dBµV
30 dBµV
M1
D1
CF 2.473 GHz
691 pts
1.5 ms/

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 Section9.4.

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.

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. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Section9.2). Above 1000 MHz, a resolution bandwidth of 1 MHz is used, RBW 3 MHz 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
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	4-Aug-2021	4-Aug-2024
SZ185-04	EMI Receiver	R&S	ESR7	102466	16-Nov-2021	16-Nov-2022
SZ061-09	Horn Antenna	ETS	3115	00092346	17-Oct-2020	17-Oct-2022
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	18-May-2021	18-May-2023
SZ061-15	Double-RidgedWaveguide Horn Antenna	ETS	3116C-PA	00224718	1-Nov-2020	1-Nov-2022
SZ056-06	Spectrum Analyzer	R&S	FSV40	101101	20-Dec-2021	20-Dec-2022
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	16-May-2022	16-May-2023
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	12-Dec-2021	12-Dec-2024
SZ062-02	RF Cable	RADIALL	RG 213U	--	15-Aug-2021	15-Aug-2022
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	15-Aug-2021	15-Aug-2022
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	15-Aug-2021	15-Aug-2022
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	15-Aug-2021	15-Aug-2022

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