SYBER SENSE IOT COMPANY LIMITED

TEST REPORT

SCOPE OF WORK
FCC TESTING–EZ-BBELL V1

REPORT NUMBER
230306038SZN-001

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SYBER SENSE IOT COMPANY LIMITED

Application
For
Certification

FCC ID: 2AVDC-XDC03B2433

EZ-BBell

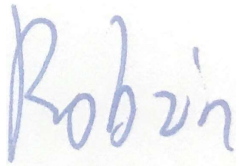
Model: EZ-BBell V1

2.4GHz Wi-Fi Transceiver

Report No.: 230306038SZN-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 [10-1-21]

Prepared and Checked by:



Robin Zhou
Senior Project Engineer

Approved by:

Ryan Chen
Project Engineer
Date: March 28, 2023

MEASUREMENT/TECHNICAL REPORT

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

Equipment Type: DTS - Part 15 Digital Transmission Systems (Wi-Fi transmitter portion)

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 [10-01-21] Edition] provision.

Report prepared by:

Robin Zhou
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1.0 Summary of Test results

Applicant: SYBER SENSE IOT COMPANY LIMITED
Applicant Address: FLAT/RM 10 BLK A 16/F HI TECH INDUSTRIAL CENTRE 5-21 PAK TIN PAR STREET TSUEN WAN, Hong Kong, China
Manufacturer: SYBER SENSE IOT COMPANY LIMITED
Manufacturer Address: FLAT/RM 10 BLK A 16/F HI TECH INDUSTRIAL CENTRE 5-21 PAK TIN PAR STREET TSUEN WAN, Hong Kong, China

EZ-BBell

Model: EZ-BBell V1

FCC ID: 2AVDC-XDC03B2433

TEST ITEM	REFERENCE	RESULTS
Max. Output power	15.247(b)(3)	Pass
6 dB Bandwidth	15.247(a)(2)	Pass
Max. Power Density	15.247(e)	Pass
Out of Band Antenna Conducted Emission	15.247(d)	Pass
Radiated Emission in Restricted Bands	15.247(d), 15.209, FCC 15.205	Pass
AC Conducted Emission	15.207	Pass
Antenna Requirement	15.203	Pass (See Notes)

Notes: The EUT uses an Integral Antenna (LDS) 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 EZ-BBell with2.4G Wi-Fi function operating in 2412-2462MHz for 802.11b/g/n-HT20/n-HT40, 11 channels with 5MHz channel spacing. The EUT is powered by 5V⎓2A (Internal Li-ion battery:3.7V==,6400mAh,23.68Wh). For more detail information pls. refer to the user manual.

Type of Modulation: BPSK, QPSK, 16QAM, 64QAM for OFDM; CCK, DQPSK, DBPSK for DSSS.
Antenna Type: Integral Antenna (LDS)
Antenna Gain: 2.38dBi Max.

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:
DTS- Part 15 Digital Transmission Systems (2.4GHz Wi-Fi transmitter portion).

Remaining portions are subject to the following procedures:
1. Receiver portion of Wi-Fi: exempt from technical requirement of this Part.
2. Other Digital Function: Subject to FCC Part 15B SDOC and refer to report number 230306038SZN-005.
3. 433.95MHz Transmitter function： refer to report number: 230306038SZN-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) and KDB 558074 D01 v05r02. 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.

2.4 Test Facility

The Semi-anechoic chamber and shielded 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 File Number: CN1188.

3.0 System Test Configuration

3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. The EUT was powered by 5V⎓2A (Internal Li-ion battery:3.7V==,6400mAh,23.68Wh) by Adapter from AC 120V, 60Hz during the test.

On 802.11b/g/n-HT20/n-HT40 mode, all data rate were tested and only the worst case data is shown in the report.

For maximizing emissions, the EUT was rotated through 360°, the EUT was placed on the styrene turntable with 0.8m up to 1GHz and 1.5 m above 1GHz. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

The rear of unit shall be flushed with the rear of the table.

Radiated emission measurement were performed 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 to 40 GHz, whichever is lower.

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.

Test software: MT7682 QA 0.3.0.8 (Setting TX Power (Hex): 1B)

3.3 Special Accessories

No special accessories used.

3.4 Measurement Uncertainty

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

Measurement Uncertainty	Uncertainty
Channel Bandwidth	±3.46%
RF Output Power	±0.31dB
Power Spectral Density	±1.19dB
Conducted Unwanted Emission	±0.55dB
Spurious emission (above 18GHz)	±5.3dB
Spurious emission (6GHz to 18GHz)	±5.1dB
Radiated emission (1GHz to 6GHz)	±4.8dB
Radiated emission (Up to 1GHz)	±4.8dB
AC Conducted emission	±3.6 dB
Temperature	±1°C
Humidity	±5%

3.5 Equipment Modification

Any modifications installed previous to testing by SYBER SENSE IOT COMPANY LIMITED 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.

3.6 Support Equipment List and Description

Description	Manufacturer	Model/ Cable length
Laptop (Provided by Intertek)	DELL	Latitude 3480
Adaptor (Provided by Intertek)	Cellularline	AC-250K
Type C USB Cable (Provided by Intertek)	/	Unshielded, 0.35m

Applicant: SYBER SENSE IOT COMPANY LIMITED
Date of Test: March 15, 2023 Model: EZ-BBell V1

4.0 Measurement Results

4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(3):

The antenna power of the EUT was connected to the input of a broadband peak RF power meter. The power meter has a video bandwidth that is greater than DTS bandwidth and utilize a fast-responding diode detector. Power was read directly at the EUT antenna terminals with cable loss added.

For antennas with gains of 6 dBi or less, maximum allowed Transmitter output is 1 watt (+30 dBm). 2.4G band Ant gain: 2.38dBi< 6 dBi, so maximum allowed Transmitter output will reduce to 30.0dBm (1W) for conducted TX power.

Cable loss: 0.5 dB External Attenuation: 0 dB

Cable loss, external attenuation has been included in OFFSET function

Test Result: Please refer the Appendix of 230306038SZN-001 Appendix B.

EUT max. output level = 22.9dBm (802.11g Mode)
EUT max. E.I.R.P = 22.9dBm + 2.38dBi = 25.3dBm =338.8mW

For RF Exposure, the information is saved with filename: RF exposure.pdf.

Applicant: SYBER SENSE IOT COMPANY LIMITED
Date of Test: March 15, 2023 Model: EZ-BBell V1

4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a) (2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz according to FCC KDB 558074 D01 v05r02. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

Limit: The 6 dB Bandwidth is at least 500 kHz.

Test Result: Please refer the Appendix of 230306038SZN-001 Appendix A1.

Applicant: SYBER SENSE IOT COMPANY LIMITED
Date of Test: March 15, 2023 Model: EZ-BBell V1

4.3 Maximum Power Density Reading, FCC Rule 15.247(e):

The Measurement Procedure PKPSD was set according to the FCC KDB 558074 D01 v05r02.

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Limit: The Power Density does not exceed 8dBm/3 kHz.

Test Result: Please refer the Appendix of 230306038SZN-001 Appendix C.

Applicant: SYBER SENSE IOT COMPANY LIMITED
Date of Test: March 15, 2023 Model: EZ-BBell V1

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

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. The Measurement Procedure was set according to the FCC KDB 558074 D01 v05r02.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

Refer to the attached test plots for out of band conducted emissions data with rate of 1Mbps for 802.11b and 6Mbps for 802.11g, MSC0 for 802.11n-HT20 and 802.11n-HT40.

The test plots showed all spurious emission up to the tenth harmonic were measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

Test Result: Please refer the Appendix of 230306038SZN-001 Appendix D and Appendix of 230306038SZN-001 Appendix E.

4.5 Out of Band Radiated Emissions (for emissions in 4.4 above that are less than 20dB below carrier), FCC Rule 15.247(d):

For out of band emissions that are close to or that exceed the 20dB attenuation requirement described in the specification, radiated measurements were performed at a 3m separation distance to determine whether these emissions complied with the general radiated emission requirement.

[×] Not required, since all emissions are more than 20dB below fundamental
[ ] See attached data sheet

Applicant: SYBER SENSE IOT COMPANY LIMITED
Date of Test: March 20, 2023 Model: EZ-BBell V1

4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.205:

Data is included of the worst-case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Applicant: SYBER SENSE IOT COMPANY LIMITED
Date of Test: March 20, 2023 Model: EZ-BBell V1

4.7 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

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
AG = Amplifier Gain in dB
PD = Pulse Desensitization 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

Example
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. The net field strength for comparison to the appropriate emission limit is 42 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB
FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 dBμV/m

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

Applicant: SYBER SENSE IOT COMPANY LIMITED
Date of Test: March 20, 2023 Model: EZ-BBell V1

4.8 Radiated Spurious Emission

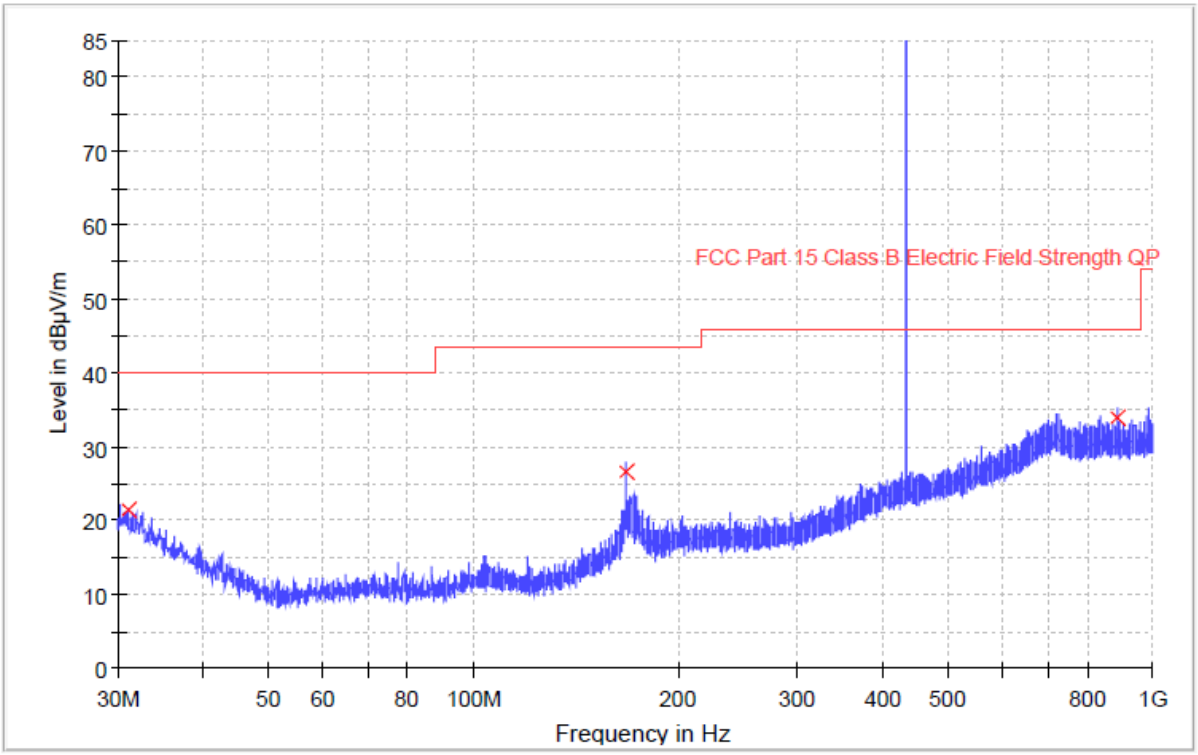
The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit. Simultaneous transmission was considered during the test, only the worst-case data is recorded in this report.

Worst Case Radiated Spurious Emission
at 2390.00MHz
is passed by 4.6dB margin.

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

Applicant: SYBER SENSE IOT COMPANY LIMITED
Date of Test: March 20, 2023 Model: EZ-BBell V1
Worst Case Operating Mode: Simultaneous transmission

ANT Polarity: Horizontal

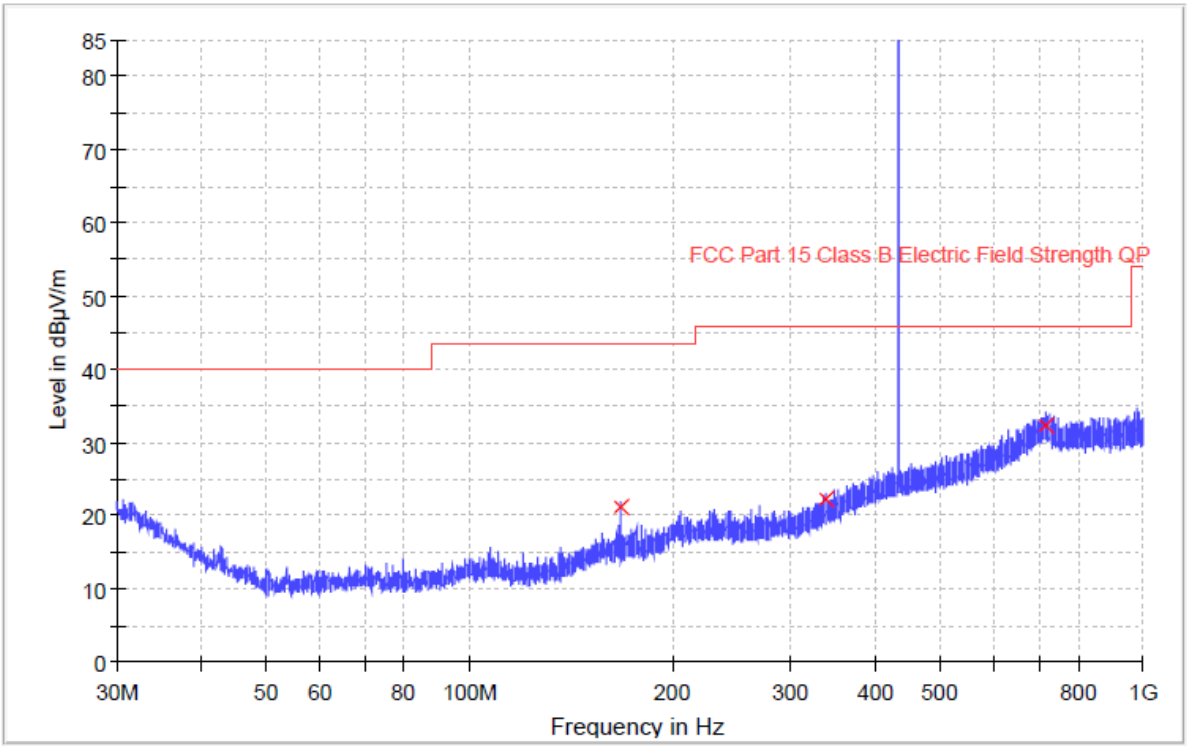


Frequency (MHz)	Quasi Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµVm)
31.080000	21.5	1000.0	120.000	H	21.7	18.5	40.0
167.880000	26.7	1000.0	120.000	H	17.0	16.8	43.5
888.000000	33.9	1000.0	120.000	H	32.2	12.1	46.0

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Quasi Peak (dBµV/m) = Corr. (dB/m) + Read Level (dBµV)
3. Margin (dB) = Limit Line (dBµV/m) – Level (dBµV/m)
4. The frequency point exceeding the limit is the fundamental frequency of 433.95MHz emission.

Applicant: SYBER SENSE IOT COMPANY LIMITED
Date of Test: March 20, 2023 Model: EZ-BBell V1
Worst Case Operating Mode: Simultaneous transmission

ANT Polarity: Vertical



Frequency (MHz)	Quasi Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
168.000000	21.2	1000.0	120.000	V	16.9	22.3	43.5
337.800000	22.4	1000.0	120.000	V	22.4	23.6	46.0
714.360000	32.4	1000.0	120.000	V	32.4	13.6	46.0

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Quasi Peak (dBµV/m) = Corr. (dB/m) + Read Level (dBµV)
3. Margin (dB) = Limit Line (dBµV/m) – Level (dBµV/m)
4. The frequency point exceeding the limit is the fundamental frequency of 433.95MHz emission.

Applicant: SYBER SENSE IOT COMPANY LIMITED
Date of Test: March 20, 2023 Model: EZ-BBell V1

Radiated Emissions (above 1GHz)

Worst Case Operating Mode: Transmitting (802.11 b-Channel 01)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*4824.000	56.7	36.4	33.5	53.8	74.0	-20.2
Vertical	*2390.000	69.8	36.9	29.1	62.0	74.0	-12.0
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*4824.000	50.0	36.4	33.5	47.1	54.0	-6.9
Vertical	*2390.000	56.8	36.9	29.1	49.0	54.0	-5.0

Worst Case Operating Mode: Transmitting (802.11 b-Channel 06)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*4874.000	55.4	36.7	33.4	52.1	74.0	-21.9
Vertical	*7311.000	51.3	36.6	35.8	50.5	74.0	-23.5
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*4874.000	41.6	36.7	33.4	38.3	54.0	-15.7
Vertical	*7311.000	37.2	36.6	35.8	36.4	54.0	-17.6

Worst Case Operating Mode: Transmitting (802.11 b-Channel 11)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*7386.000	53.8	36.5	29.3	46.6	74.0	-27.4
Vertical	*2483.500	65.6	36.8	33.3	62.1	74.0	-11.9
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*7386.000	43.9	36.5	29.3	36.7	54.0	-17.3
Vertical	*2483.500	52.1	36.8	33.3	48.6	54.0	-5.4

Worst Case Operating Mode: Transmitting (802.11 g-Channel 01)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*4824.000	53.1	36.4	33.5	50.2	74.0	-23.8
Vertical	*2390.000	68.8	36.9	29.1	61.0	74.0	-13.0
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*4824.000	44.2	36.4	33.5	41.3	54.0	-12.7
Vertical	*2390.000	57.2	36.9	29.1	49.4	54.0	-4.6

Worst Case Operating Mode: Transmitting (802.11 g-Channel 06)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*4874.000	52.6	36.7	33.4	49.3	74.0	-24.7
Vertical	*7311.000	52.5	36.6	35.8	51.7	74.0	-22.3
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*4874.000	41.8	36.7	33.4	38.5	54.0	-15.5
Vertical	*7311.000	38.0	36.6	35.8	37.2	54.0	-16.8

Worst Case Operating Mode: Transmitting (802.11 g-Channel 11)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*7386.000	55.0	36.5	29.3	47.8	74.0	-26.2
Vertical	*2483.500	63.6	36.8	33.3	60.1	74.0	-13.9
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*7386.000	44.6	36.5	29.3	37.4	54.0	-16.6
Vertical	*2483.500	52.2	36.8	33.3	48.7	54.0	-5.3

Worst Case Operating Mode: Transmitting (802.11 n20-Channel 01)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*4824.000	53.8	36.4	33.5	50.9	74.0	-23.1
Vertical	*2390.000	67.9	36.9	29.1	60.1	74.0	-13.9
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*4824.000	48.3	36.4	33.5	45.4	54.0	-8.6
Vertical	*2390.000	56.5	36.9	29.1	48.7	54.0	-5.3

Worst Case Operating Mode: Transmitting (802.11 n20-Channel 06)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*4874.000	54.8	36.7	33.4	51.5	74.0	-22.5
Vertical	*7311.000	51.7	36.6	35.8	50.9	74.0	-23.1
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*4874.000	42.5	36.7	33.4	39.2	54.0	-14.8
Vertical	*7311.000	37.6	36.6	35.8	36.8	54.0	-17.2

Worst Case Operating Mode: Transmitting (802.11 n20-Channel 11)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*7386.000	55.5	36.5	29.3	48.3	74.0	-25.7
Vertical	*2483.500	64.9	36.8	33.3	61.4	74.0	-12.6
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Vertical	*7386.000	45.1	36.5	29.3	37.9	54.0	-16.1
Vertical	*2483.500	52.3	36.8	33.3	48.8	54.0	-5.2

Worst Case Operating Mode: Transmitting (802.11n40-Channel 03)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4844.000	48.1	36.8	33.5	44.8	74.0	-29.2
Horizontal	*2390.000	68.3	36.4	29.1	61.0	74.0	-13.0
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4844.000	37.0	36.8	33.5	33.7	54.0	-20.3
Horizontal	*2390.000	56.2	36.4	29.1	48.9	54.0	-5.1

Worst Case Operating Mode: Transmitting (802.11n40-Channel 06)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	48.6	36.7	33.4	45.3	74.0	-28.7
Horizontal	*7311.000	50.0	36.6	35.8	49.2	74.0	-24.8
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	37.1	36.7	33.4	33.8	54.0	-20.2
Horizontal	*7311.000	37.3	36.6	35.8	36.5	54.0	-17.5

Worst Case Operating Mode: Transmitting (802.11n40-Channel 09)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*7356.000	56.9	36.5	29.3	49.7	74.0	-24.3
Horizontal	*2483.500	64.4	36.8	33.3	60.9	74.0	-13.1
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*7356.000	51.1	36.5	29.3	43.9	54.0	-10.1
Horizontal	*2483.500	52.5	36.8	33.3	49.0	54.0	-5.0

NOTES:

1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz/VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated 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 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: SYBER SENSE IOT COMPANY LIMITED
Date of Test: March 15, 2023
Model: EZ-BBell V1

4.9 Conducted Emission

Simultaneous transmission was considered during the test, only the worst-case data is recorded in this report.

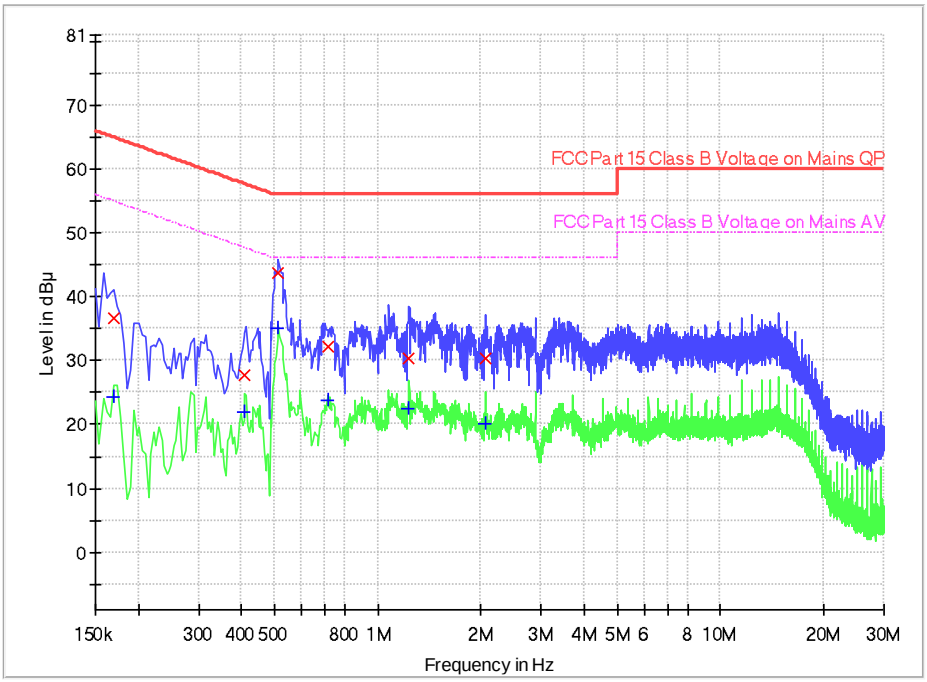
Worst Case Conducted Emission
at 0.514000MHz
is passed by 10.9dB margin.

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

Applicant: SYBER SENSE IOT COMPANY LIMITED
Date of Test: March 15, 2023
Model: EZ-BBell V1
Worst Case Operating Mode: Simultaneous transmission
Phase: Live

Graphic / Data Table

Conducted Emissions
Pursuant to FCC 15.207: Emissions Requirement



Limit and Margin QP

Frequency (MHz)	Quasi Peak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.170000	36.8	9.000	L	9.6	28.2	65.0
0.410000	27.9	9.000	L	9.6	29.7	57.6
0.514000	43.7	9.000	L	9.6	12.3	56.0
0.714000	32.3	9.000	L	9.6	23.7	56.0
1.234000	30.5	9.000	L	9.7	25.5	56.0
2.058000	30.3	9.000	L	9.7	25.7	56.0

Limit and Margin AV

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV
0.170000	24.4	9.000	L	9.6	30.6	55.0
0.410000	21.9	9.000	L	9.6	25.7	47.6
0.514000	35.1	9.000	L	9.6	10.9	46.0
0.714000	23.9	9.000	L	9.6	22.1	46.0
1.234000	22.5	9.000	L	9.7	23.5	46.0
2.058000	20.0	9.000	L	9.7	26.0	46.0

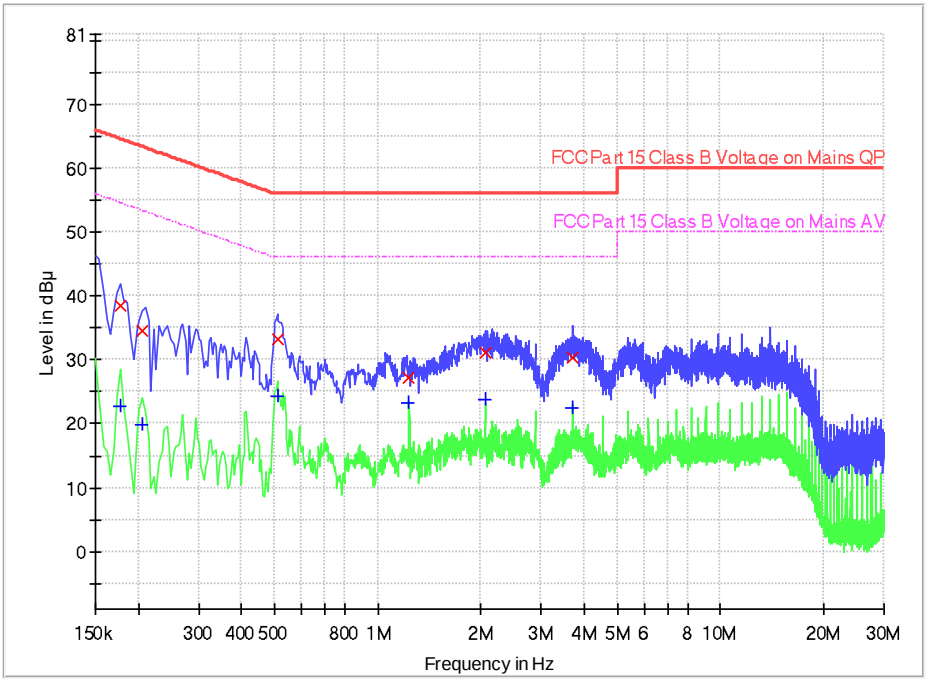
Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Limit (dBµV) – Level (dBµV)

Applicant: SYBER SENSE IOT COMPANY LIMITED
Date of Test:March 15, 2023
Model: EZ-BBell V1
Worst Case Operating Mode: Simultaneous transmission
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 (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.178000	38.5	9.000	N	9.6	26.1	64.6
0.206000	34.5	9.000	N	9.6	28.9	63.4
0.510000	33.2	9.000	N	9.6	22.8	56.0
1.234000	27.2	9.000	N	9.6	28.8	56.0
2.058000	31.2	9.000	N	9.7	24.8	56.0
3.702000	30.5	9.000	N	9.7	25.5	56.0

Limit and Margin AV

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.178000	22.8	9.000	N	9.6	31.8	54.6
0.206000	19.7	9.000	N	9.6	33.7	53.4
0.510000	24.3	9.000	N	9.6	21.7	46.0
1.234000	23.2	9.000	N	9.6	22.8	46.0
2.058000	23.7	9.000	N	9.7	22.3	46.0
3.702000	22.6	9.000	N	9.7	23.4	46.0

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Limit (dBµV) – Level (dBµV)

Applicant: SYBER SENSE IOT COMPANY LIMITED
Model: EZ-BBell V1

4.10 Radiated Emissions from Digital Section of Transceiver, FCC Ref: 15.109

[ ] Not required - No digital part

[ ] Test results are attached

[x] Included in the separated report.

Applicant: SYBER SENSE IOT COMPANY LIMITED
Model: EZ-BBell V1

4.11 Transmitter Duty Cycle Calculation and Measurements, 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.

5.0 Equipment Photographs

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

6.0 Product Labeling

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

7.0 Technical Specifications

For electronic filing, the block diagram and circuit diagram 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 Confidentiality Request

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.

10.0 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF.*

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

11.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ182-02	RF Power Meter	Anritsu	ML2496A	1302005	2022-05-16	2023-05-16
SZ182-02-01	Power Sensor	Anritsu	MA2411B	1207429	2022-05-16	2023-05-16
SZ061-12	Biconilog Antenna	ETS	3142E	00166158	2021-08-04	2024-08-04
SZ185-03	EMI Receiver	R & S	ESR7	1001975	2022-12-26	2023-12-26
SZ061-08	Horn Antenna	ETS	3115	00092346	2021-09-05	2024-09-05
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	2021-05-18	2023-05-18
SZ056-03	Spectrum Analyzer	R&S	FSP30	101148	2022-05-16	2023-05-16
SZ056-06	Signal Analyzer	R&S	FSV 40	101101	2022-12-19	2023-12-19
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	2022-05-16	2023-05-16
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	2021-12-12	2024-12-12
SZ062-02	RF Cable	RADIALL	RG 213U	--	2022-11-20	2023-05-20
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	2022-11-20	2023-05-20
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	2022-11-20	2023-05-20
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	2022-05-17	2023-05-17
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	2022-05-09	2023-05-09
SZ185-02	EMI Receiver	R & S	ESCI	100692	2022-07-08	2023-07-08
SZ188-03	Shielding Room	ETS	RFD-100	4100	2022-12-20	2025-12-20

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