

Suzhou Yoshino Power Technology Co.
Ltd.

TEST REPORT

SCOPE OF WORK

FCC TESTING–B2000 SST

REPORT NUMBER

230419002SZN-001

ISSUE DATE

11 MAY 2023

[REVISED DATE]

[-----]

PAGES

23

DOCUMENT CONTROL NUMBER

FCC ID 209_b

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Suzhou Yoshino Power Technology Co. Ltd.Application
For
Certification**FCC ID: 2BAU4-B2000SST****Portable Power Station****Model: B2000 SST****Transmitter**

Report No.: 230419002SZN-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:**Approved by:****Rode Liu
Project Engineer**

**Ryan RQ Chen
Project Engineer
Date: 11 May 2023**

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Intertek Testing Services Shenzhen Ltd. Longhua Branch

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MEASUREMENT/TECHNICAL REPORT

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

Equipment Type: DCD - Part 15 Low Power Transmitter Below 1705 kHz

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 [10-01-21] Edition] provision.

Report prepared by:

Rode Liu
Intertek Testing Services Shenzhen Ltd.
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1.0 Summary of Test Results

Applicant: Suzhou Yoshino Power Technology Co. Ltd.
Applicant Address: No.3 Shengxi Road, Kunshan Development Zone, Kunshan City, Jiangsu 215335, P.R.China

Manufacturer: Suzhou Yoshino Power Technology Co. Ltd.
Manufacturer Address: No.3 Shengxi Road, Kunshan Development Zone, Kunshan City, Jiangsu 215335, P.R.China

Model: B2000 SST

FCC ID: 2BAU4-B2000SST

TEST ITEM	REFERENCE	RESULTS
Power Line Conducted Emissions	15.207	PASS
Transmitter Radiated Emissions	15.209	Pass
Antenna Requirement	15.203	Pass (See Notes)

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 Portable Power Station operating at 120-130 kHz.

The EUT is powered by:

- a) Input: AC Input: 100-120VAC, 50/60Hz
- b) Car Input: 12VDC/10A
- c) Solar Input: 12-60VDC/10A

Output Port:

- a) 4 Outlets AC Output: (In parallel) 120VAC, 50/60Hz;
- b) 2 DC Output Port: 12.6VDC/10A, 126W, Each Port; Output Power total is 126W;
- c) 2 USB-A Output Port: 5VDC/2.4A, 12W Each Port;
- d) 1 USB-C PD Output: 5-15VDC/3A, 20VDC/5A, 100W Max;
- e) 1 USB-C Output: 5VDC/3A, 9VDC/2.22A, 12VDC/1.66A, 20W Max;

Wireless Charging: 5VDC/1A, 9VDC/1.1A, 12VDC/1.25A, 15W Max

For more detailed features description, please refer to the user's manual.

Antenna Type: Integral Antenna(embedded coil antenna)

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 the Portable Power Station portion which has Wireless Charging function.

1. The related report for FCC SDOC is subjected to report number: 230410024SZN-001;
2. The Wireless Module Contains FCC ID: 2AC7Z-ESPC3MINI1 for WiFi and BT function.

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. 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 Input: AC Input: 100-120VAC, 50/60Hz or Car Input: 12VDC/10A; or Solar Input: 12-60VDC/10A during the test. The test system was pre-scanning tested based on the consideration of following EUT operation mode. and 127kHz was the worst case frequency. Only the worst-case data was shown in this report.

Pertest mode	Description
Mode 1	Standby mode
Mode 2	Bypass + Mobile phone is charging at 1% battery power + USB Output + DC Output
Mode 3	Inverter + Mobile phone is charging at 1% battery power + USB Output + DC Output
Mode 3	Bypass + Mobile phone is charging at 50% battery power + USB Output + DC Output
Mode 4	Bypass + Mobile phone is charging at 99% battery power + USB Output + DC Output

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 emission at and above 30 MHz, 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 report in Section 4.0.

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

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the styrene turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

3.2 EUT Exercising Software

N/A

3.3 Special Accessories

There is no special accessories necessary for compliance of this product.

3.4 Equipment Modification

Any modifications installed previous to testing by Suzhou Yoshino Power 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 of the test conclusion, the Measurement Uncertainty of test has been considered.

Measurement Uncertainty	Uncertainty
Channel Bandwidth	±3.46%
Radiated emission (Up to 1GHz)	±4.8dB
AC Conducted emission	±3.2 dB
Temperature	±1°C
Humidity	±5%

3.6 Support Equipment List and Description

This product was tested in the following configuration:

Description	Manufacturer	Detail
Mobile Phone (Provided by Intertek)	Samsung	S7
Lamp (Provided by Intertek)	/	E27
Lamp holder with AC cable (Provided by Intertek)	/	AC Cable length: 0.8meter, unshielded
Laptop (Provided by Intertek)	DELL	P137G
Cement Resistance (Provided by Intertek)	/	2ohm*2, 1.67ohm, 4ohm, 7.2ohm, 1.26ohm*2, 2.52ohm
DC5521 to DC5521 Cable (Provided by Intertek)	/	0.8meter, unshielded
USB-C to C Cable (Provided by Intertek)	/	1.0meter, unshielded
USB-C Cable (Provided by Intertek)	/	0.6meter, unshielded
USB-A Cable (Provided by Intertek)	/	0.7meter, unshielded
USB-A Cable (Provided by Intertek)	/	0.7meter, unshielded
AC Cable (Provided by Applicant)	/	1.8meter, unshielded
Cigarette Car Charging Cable (Provided by Applicant)	/	3.0meter, unshielded

Solar Charging Cable (Provided by Applicant)	/	1.5meter, unshielded
DC5521 to Cigarette Car Female Output Cable	/	0.5meter, unshielded

4.0 Measurement Results

4.1 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 dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ 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:

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

Example

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

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

$$AF = 7.4 \text{ dB/m}$$

$$CF = 1.6\text{dB}$$

$$AG = 29.0\text{dB}$$

$$PD = 0\text{dB}$$

$$AV = -10\text{dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32\text{dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32\text{dB}\mu\text{V/m})/20] = 39.8\mu\text{V/m}$$

4.2 Radiated Emission Configuration Photograph

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

4.3 Radiated Spurious Emission

Worst Case Radiated Spurious Emission
at
31.46MHz

Judgement: Passed by 3.3dB margin

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

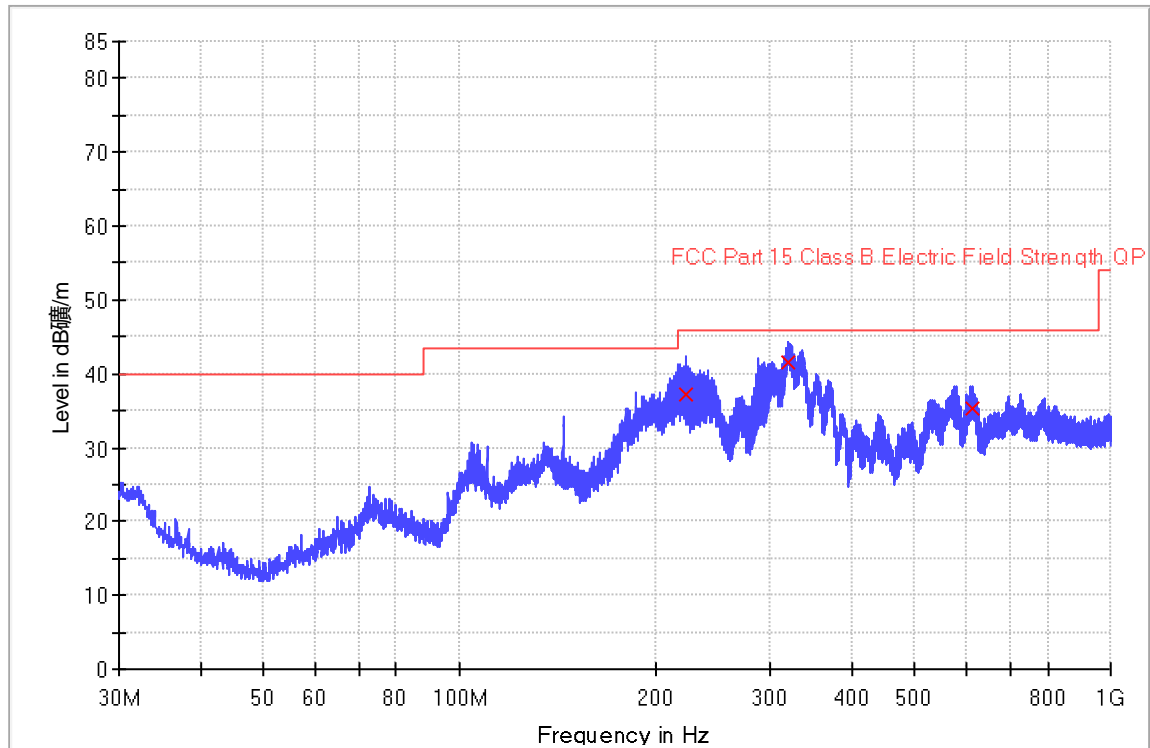
Applicant: Suzhou Yoshino Power Technology Co. Ltd.
Date of Test: 28 April 2023
Worst Case Operating Mode: Mode 2

Model: B2000 SST

Radiated Emissions (30MHz – 1000MHz)

ANT Polarity: Horizontal

FCC Part 15



Frequency (MHz)	Quasi Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
223.094667	37.3	1000.0	120.000	H	19.9	8.7	46.0
320.127000	41.5	1000.0	120.000	H	21.5	4.5	46.0
611.482667	35.2	1000.0	120.000	H	29.3	10.8	46.0

Remark:

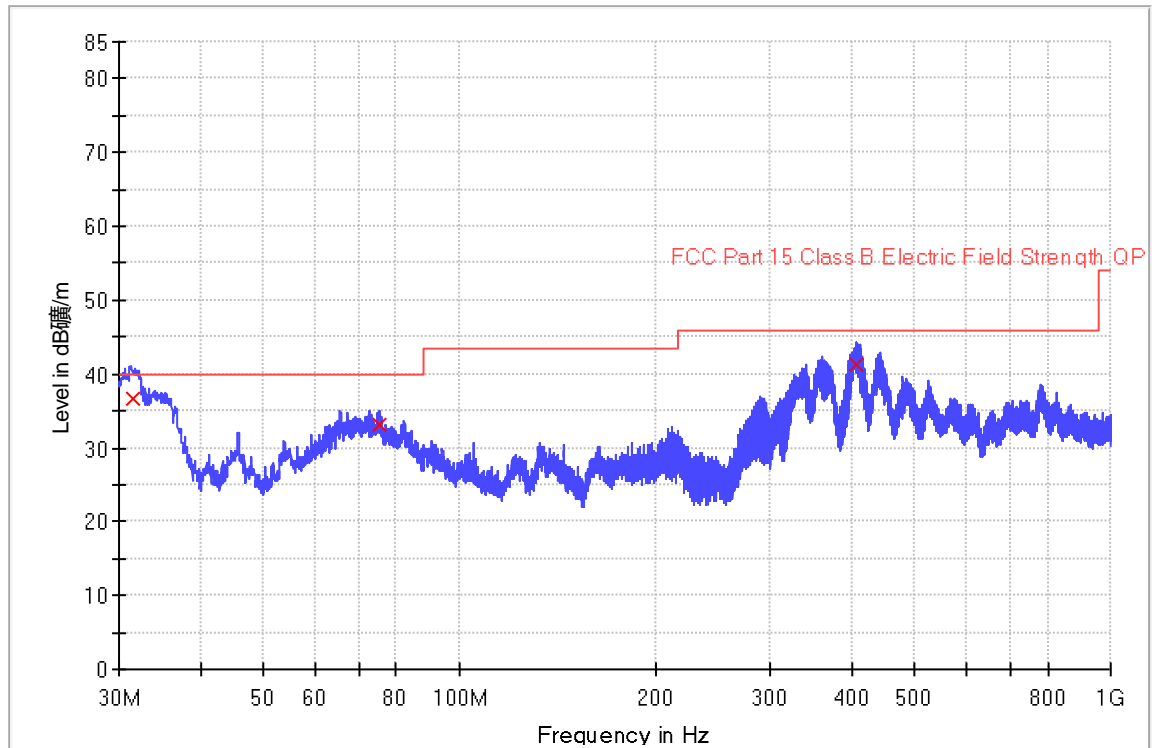
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBµV/m) = Corr. (dB/m) + Read Level (dBµV)
3. Margin (dB) = Limit Line (dBµV/m) – Level (dBµV/m)

Applicant: Suzhou Yoshino Power Technology Co. Ltd.
Date of Test: 28 April 2023
Worst Case Operating Mode: Mode 2

Model: B2000 SST

ANT Polarity: Vertical

FCC Part 15



Frequency (MHz)	Quasi Peak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
31.464573	36.7	1000.0	120.000	V	21.5	3.3	40.0
75.493000	33.2	1000.0	120.000	V	13.6	6.8	40.0
407.815000	41.4	1000.0	120.000	V	25.6	4.6	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)

Applicant: Suzhou Yoshino Power Technology Co. Ltd.

Date of Test: 24 April 2023

Model: B2000 SST

Worst Case Operating Mode: Mode 2

Fundamental & Spurious Emission Below 30MHz

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Distance Factor (-dB)	Calculated at 300m (dB μ V/m)	Limit at 300m (dB μ V/m)	Margin (dB)
Vertical	0.1278	70.0	0.0	15.1	85.1	80	5.1	25.5	-20.4

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Distance Factor (-dB)	Calculated at 30m (dB μ V/m)	Limit at 30m (dB μ V/m)	Margin (dB)
Vertical	0.6376	41.0	0.0	14.4	55.4	40	15.4	31.5	-16.1
Vertical	0.8933	36.6	0.0	13.7	50.3	40	10.3	28.6	-18.3

- Notes:
1. The specified limits of frequency band 9~90 KHz, 110~490 KHz are in average and measurements are made with peak detectors. Quasi-Peak detector is used for other frequency band.
 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. Loop antenna is used for the emission under 30MHz.
 5. Horizontal and Vertical polarization were tested and Only the worst Case data is shown.

4.4 Conducted Emission Configuration Photograph

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

4.5 Conducted Emission

Worst Case Conducted Configuration
at
4.25MHz

Judgement: Passed by 1.2dB margin

Sign on file

Rode Liu, Project Engineer
Typed/Printed Name

April 28, 2023
Date

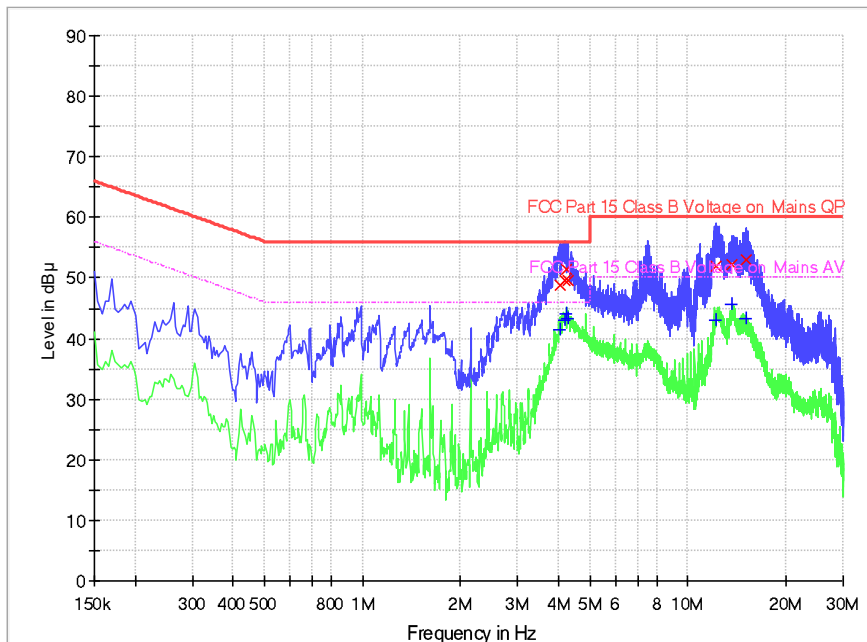
Applicant: Suzhou Yoshino Power Technology Co. Ltd.
Date of Test: April 28, 2023
Worst Case Operating Mode
Test Voltage: 120V/60Hz

Model: B2000 SST
Mode 2
Phase: Live

Graphic / Data Table

Conducted Emissions Pursuant to FCC 15.207: Emissions Requirement

Conducted Emission Test FCC Part 15



Limit and Margin QP

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
4.038000	48.8	9.000	L1	9.8	7.2	56.0
4.170000	49.7	9.000	L1	9.8	6.3	56.0
4.226000	51.4	9.000	L1	9.8	4.6	56.0
4.302000	49.7	9.000	L1	9.8	6.3	56.0
12.198000	51.9	9.000	L1	10.1	8.1	60.0
13.706000	52.3	9.000	L1	10.1	7.8	60.0
15.066000	53.1	9.000	L1	10.2	6.9	60.0

Limit and Margin AV

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
4.038000	41.5	9.000	L1	9.8	4.5	46.0
4.170000	43.0	9.000	L1	9.8	3.0	46.0
4.226000	44.1	9.000	L1	9.8	1.9	46.0
4.302000	43.3	9.000	L1	9.8	2.7	46.0
12.198000	43.0	9.000	L1	10.1	7.0	50.0
13.706000	45.7	9.000	L1	10.1	4.3	50.0
15.066000	43.3	9.000	L1	10.2	6.7	50.0

Applicant: Suzhou Yoshino Power Technology Co. Ltd.

Date of Test: 28 April 2023

Model: B2000 SST

Worst Case Operating Mode

Mode 2

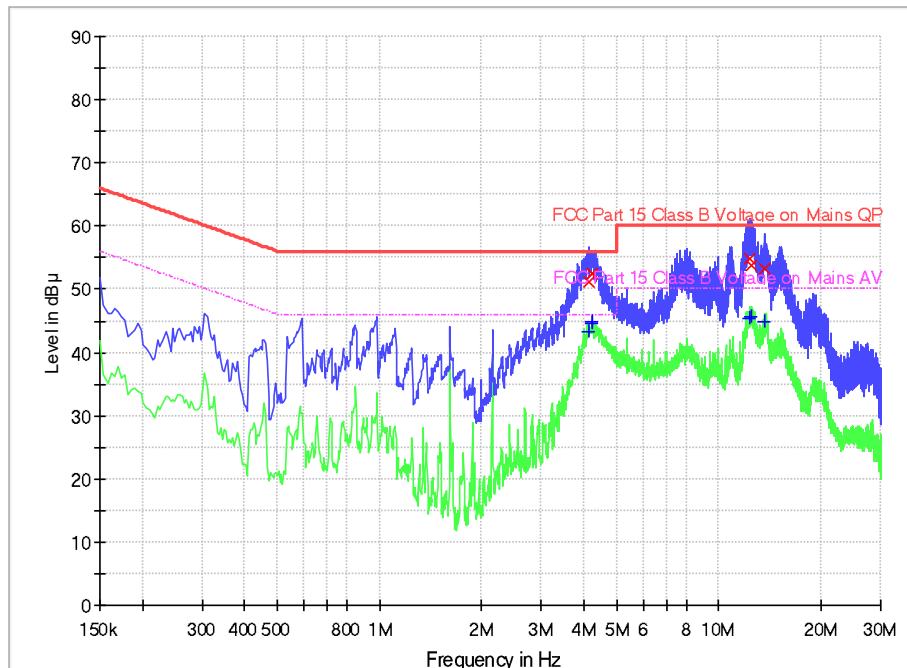
Test Voltage: 120V/60Hz

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)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
4.138000	51.2	9.000	N	9.7	4.8	56.0
4.214000	52.4	9.000	N	9.7	3.6	56.0
4.250000	52.6	9.000	N	9.8	3.4	56.0
12.322000	54.8	9.000	N	10.1	5.2	60.0
12.430000	53.9	9.000	N	10.1	6.1	60.0
13.682000	53.2	9.000	N	10.1	6.8	60.0

Limit and Margin AV

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
4.138000	43.2	9.000	N	9.7	2.8	46.0
4.214000	44.7	9.000	N	9.7	1.3	46.0
4.250000	44.8	9.000	N	9.8	1.2	46.0
12.322000	45.3	9.000	N	10.1	4.7	50.0
12.430000	45.6	9.000	N	10.1	4.4	50.0
13.682000	44.8	9.000	N	10.1	5.2	50.0

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.

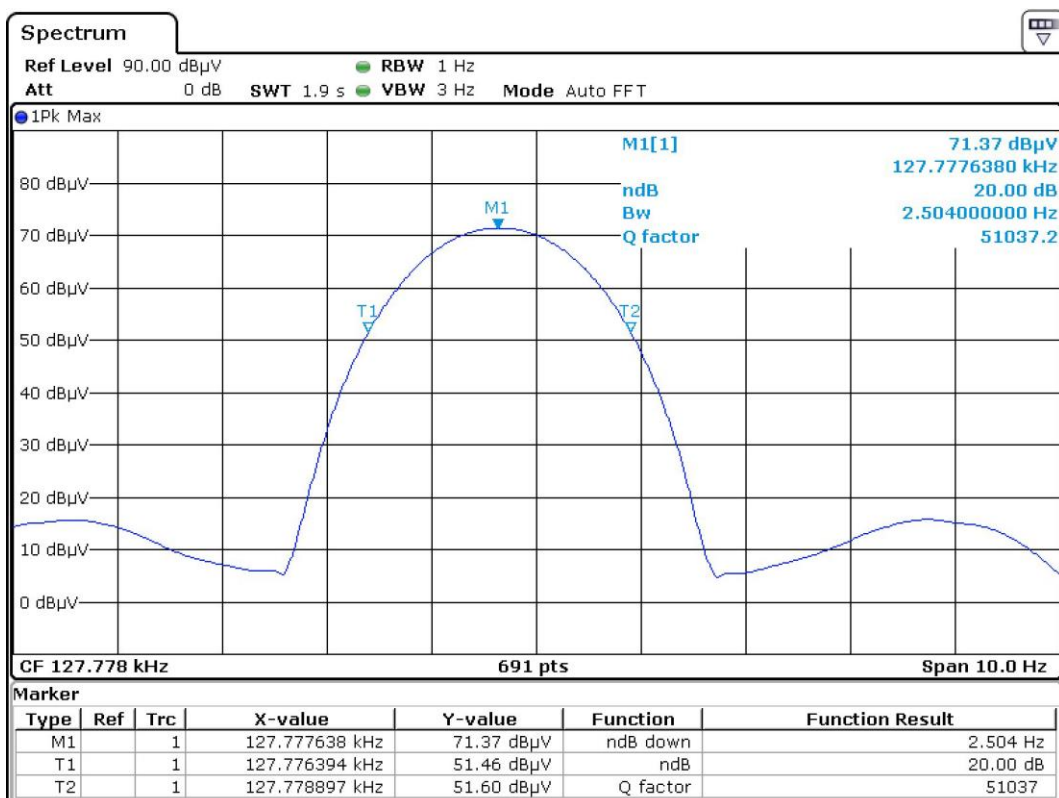
This manual will be provided to the end-user with each unit sold/leased in the United States.

9.0 Miscellaneous Information

This miscellaneous information includes 20dB bandwidth and emission measuring procedure.

9.1 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.



9.2 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 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.

Average detector is used for 9–90 KHz, 110–490 KHz and Quasi-Peak detector is used for other frequency band. 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.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz up to the 1GHz. For line-conducted emissions, the range scanned is 150kHz to 30MHz.

9.2 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. A discussion of whether pulse desensitivity is applicable to this unit is included in this report.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted bands, 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	2021-08-04	2024-08-04
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	2021-05-18	2023-05-18
SZ061-08	Horn Antenna	ETS	3115	00092346	2021-09-05	2024-09-05
SZ056-03	Spectrum Analyzer	R&S	FSP30	101148	2022-05-16	2023-05-16
SZ185-03	EMI Receiver	R & S	ESCI	100547	2022-12-26	2023-12-26
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	2021-12-12	2024-12-12
SZ062-02	RF Cable	RADIALL	RG 213U	--	2022-11-26	2023-05-26
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	2022-11-26	2023-05-26
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	2022-11-26	2023-05-26
SZ185-02	EMI Receiver	R & S	ESCI	--	2022-07-08	2023-07-08
SZ187-01	LISN	R & S	ENV216	--	2022-10-24	2023-10-24
SZ187-02	LISN	R & S	ENV216	--	2022-05-09	2023-05-09
SZ188-03	Shielding Room	ETS	RFD-100	--	2022-12-20	2025-12-20

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