FCC RF Test Report
(WPT)

Report No.:	JYTSZ-R12-2400112
Applicant:	FuelBox INC DBA The Empower Project
Address of Applicant:	1311 Anacapa St, Santa Barbara, CA 93101, USA
Equipment Under Test (EUT)	
Product Name:	Empower Dock
Model No.:	EDC100123, EDS100123
Trade Mark:	The Empowerr Project
FCC ID:	2BEWO-EDC100123
Applicable Standards:	FCC CFR Title 47 Part 15C (§15.209)
Date of Sample Receipt:	16 Jan., 2024
Date of Test:	17 Jan., to 01 Feb., 2024
Date of Report Issue:	01 Feb., 2024
Test Result:	PASS

Tested by:	Lisan Li ***Project Engineer***	***Date:***	*01 Feb., 2024*
Reviewed by:	Peter Chang ***Senior Engineer***	***Date:***	*01 Feb., 2024*
Approved by:	James Wei ***Manager***	***Date:***	*01 Feb., 2024*

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

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1 Version

Version No.	Date	Description
00	*01 Feb., 2024*	*Original*

2 Contents

Page

Cover Page **1**
1 Version **2**
2 Contents **3**
3 General Information **4**
3.1 Client Information 4
3.2 General Description of E.U.T. 4
3.3 Test Mode and Environment 5
3.4 Description of Test Auxiliary Equipment 5
3.5 Measurement Uncertainty 5
3.6 Additions to, Deviations, or Exclusions From the Method 5
3.7 Laboratory Facility 5
3.8 Laboratory Location 6
3.9 Test Instruments List 6
4 Measurement Setup and Procedure **7**
4.1 Test Setup 7
4.2 Test Procedure 9
5 Test Results **10**
5.1 Summary 10
5.1.1 Clause and Data Summary 10
5.1.2 Test Limit 10
5.2 Antenna Requirement 11
5.3 AC Power Line Conducted Emission 12
5.4 20dB Bandwidth 14
5.5 Field Strength of Spurious Emissions 15

3 General Information

3.1 Client Information

Applicant:	FuelBox INC DBA The Empower Project
Address:	1311 Anacapa St, Santa Barbara, CA 93101, USA
Manufacturer/Factory:	Shenzhen Wayto Technology Co., Ltd
Address:	3rd Floor, Building B, Jinkaijin Industrial Zone, Shilongzai, Shiyan, Bao'an, Shenzhen, GD, CN (518108)

3.2 General Description of E.U.T.

Product Name:	Empower Dock
Model No.:	EDC100123, EDS100123
Operation Frequency:	110 kHz - 205 kHz
Modulation Type:	ASK
Antenna Type:	Coil Antenna
Test Sample Condition:	The test samples were provided in good working order with no visible defects.
Power Supply:	Input: 5V, 3A / 9V, 2.22A / 12V, 1.67A Wireless Output: 5W, 7.5W, 10W, 15W
Remark:	EDC100123, EDS100123 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only different color.

3.3 Test Mode and Environment

Test Mode:	
Transmitting mode:	Keep the EUT in transmitting mode with modulation
Remark: *Pre-scan input: 5V, 3A / 9V, 2.22A / 12V, 1.67A, output: 5W, 7.5W, 10W, 15W of the Power supply, found input: 12V, 1.67A and output: 15W was worse case mode. So the report only reflects the worse mode.*	
Operating Environment:	
Temperature:	15℃ ~ 35℃
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar
Voltage:	Nominal: 5 Vdc, Extreme: Low 4.5 Vdc, High 5.5 Vdc
Test Engineer:	Logan Li (Conducted measurement) Robin Gu (Radiated measurement)

3.4 Description of Test Auxiliary Equipment

Manufacturer	Description	Model	S/N	FCC ID/DoC
Skytek	Wireless charging match load	N/A	N/A	N/A
Shenzhen Baijunda Electronics Co., LTD	Adapter	235C-020A-1A1C	N/A	DoC

3.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Conducted Emission for LISN (9kHz ~ 150kHz)	3.57 dB
Conducted Emission for LISN (150kHz ~ 30MHz)	3.14 dB
Radiated Emission (9kHz ~ 30MHz) (3m SAC)	3.3 dB
Radiated Emission (30MHz ~ 200MHz) (10m SAC)	4.3 dB
Radiated Emission (200MHz ~ 1000MHz) (10m SAC)	4.3 dB
Note: *All the measurement uncertainty value were shown with a coverage k=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.*	

3.6 Additions to, Deviations, or Exclusions From the Method

No

3.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

3.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: http://jyt.lets.com

3.9 Test Instruments List

Radiated Emission(3m SAC):

Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	ETS	9m*6m*6m	WXJ001-1	04-14-2021	04-13-2024
Loop Antenna	Schwarzbeck	FMZB 1519 B	WXJ002-4	02-09-2023	02-08-2024
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	02-09-2023	02-08-2024
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXJ001-2	12-27-2023	12-26-2024
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	12-27-2023	12-26-2024
Coaxial Cable (9kHz ~ 30MHz)	JYT	JYT3M-1G-BB-5M	WXG001-6	01-18-2023	01-17-2024
				01-17-2024	01-16-2025
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	01-18-2023	01-17-2024
				01-17-2024	01-16-2025
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Test Software	Tonscend	TS+	Version: 3.0.0.1		
EMI Test Software	AUDIX	E3	Version: 6.110919b		

Radiated Emission(10m SAC):

Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
10m SAC	ETS	RFSD-100-F/A	WXJ090	04-28-2021	04-27-2024
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-1	12-28-2023	12-27-2024
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-2	12-28-2023	12-27-2024
EMI Test Receiver	R&S	ESR 3	WXJ090-3	12-27-2023	12-26-2024
EMI Test Receiver	R&S	ESR 3	WXJ090-4	12-27-2023	12-26-2024
Low Pre-amplifier	Bost	LNA 0920N	WXJ090-6	12-27-2023	12-26-2024
Low Pre-amplifier	Bost	LNA 0920N	WXJ090-7	12-27-2023	12-26-2024
Cable	Bost	JYT10M-1G-NN-10M	WXG002-7	01-18-2023	01-17-2024
				01-17-2024	01-16-2025
Cable	Bost	JYT10M-1G-NN-10M	WXG002-8	01-18-2023	01-17-2024
				01-17-2024	01-16-2025
Test Software	R&S	EMC32	Version: 10.50.40		

Conducted Emission:

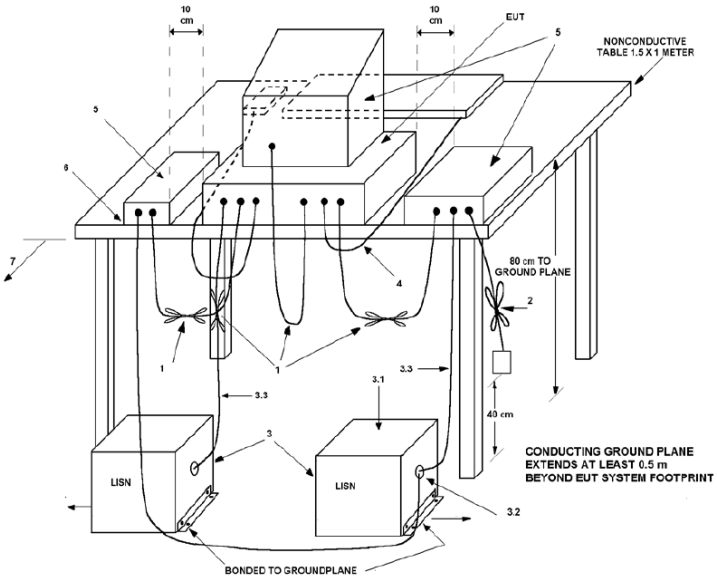
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESR3	WXJ003-2	07-05-2023	07-04-2024
LISN	Schwarzbeck	NSLK 8127	QCJ001-13	12-27-2023	12-26-2024
LISN	Rohde & Schwarz	ESH3-Z5	WXJ005-1	12-27-2023	12-26-2024
LISN Coaxial Cable (9kHz ~ 30MHz)	JYTSZ	JYTCE-1G-NN-2M	WXG003-1	01-18-2023	01-17-2024
				01-17-2024	01-16-2025
RF Switch	TOP PRECISION	RSU0301	WXG003	N/A	
Test Software	AUDIX	E3	Version: 6.110919b		

Conducted Method:					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
Spectrum Analyzer	Keysight	N9020B	WXJ081-1	06-13-2023	06-12-2024

4 Measurement Setup and Procedure

4.1 Test Setup

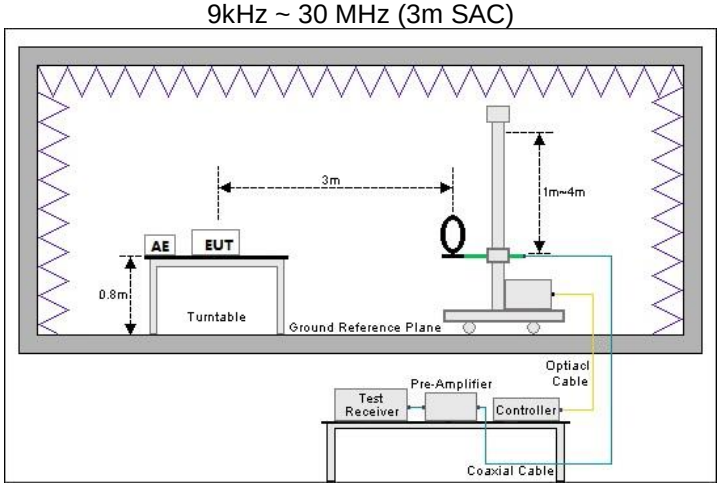
1) Conducted emission measurement:



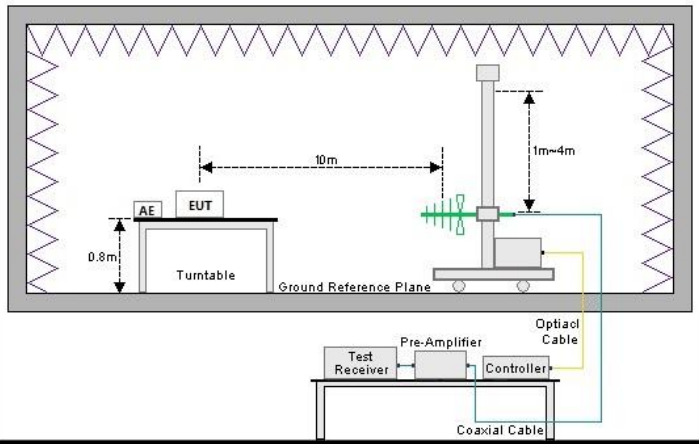
Note: The detailed descriptions please refer to Figure 8 of ANSI C63.4:2014.

2) Radiated emission measurement:

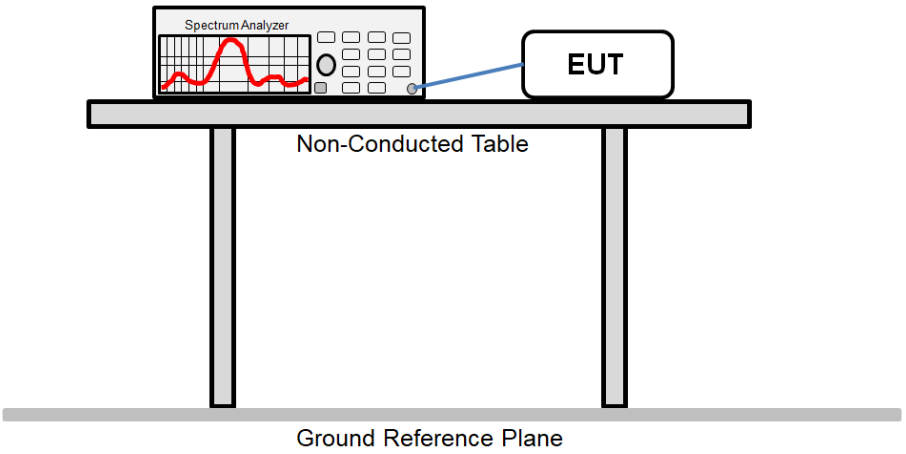
9kHz ~ 30 MHz (3m SAC)



30 MHz ~ 1GHz (10m SAC)


10m
1m~4m
AE
EUT
0.8m
Turntable
Ground Reference Plane
Optiacl
Cable
Pre-Amplifier
Test
Receiver
Controller
Coaxial Cable

Conducted test method:



4.2 Test Procedure

Test method	Test step
Conducted emission	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Radiated emission	1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m or 10 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m or 10 m. 2. EUT works in each mode of operation that needs to be tested， and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
Conducted test method	1. The antenna port of EUT was connected to the RF port of the spectrum analyzer through an RF cable. 2. The EUT is keeping in continuous transmission mode and tested in all modulation modes. 3. The test data is saved by the screenshot function of the spectrum analyzer.

5 Test Results

5.1 Summary

5.1.1 Clause and Data Summary

Test items	Standard clause	Test data	Result
Antenna Requirement	15.203	See Section 5.2	Pass
AC Power Line Conducted Emission	15.207	See Section 5.3	Pass
20dB Bandwidth	15.215(c)	See Section 5.4	Pass
Field Strength of Fundamental	15.209	See Section 5.5	Pass
Field Strength of Spurious Emissions	15.209	See Section 5.6	Pass

Remark:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *N/A: Not Applicable.*

Test Method:	*ANSI C63.4-2014* *ANSI C63.10-2013*

5.1.2 Test Limit

<table>
<tr><th>Test items</th><th>Limit</th></tr>
<tr><td>AC Power Line Conducted Emission</td><td>
<table>
<tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Limit (dBμV)</th></tr>
<tr><th>Quasi-Peak</th><th>Average</th></tr>
<tr><td>0.15 – 0.5</td><td>66 to 56 Note 1</td><td>56 to 46 Note 1</td></tr>
<tr><td>0.5 – 5</td><td>56</td><td>46</td></tr>
<tr><td>5 – 30</td><td>60</td><td>50</td></tr>
<tr><td colspan="3">Note 1: The limit level in dBμV decreases linearly with the logarithm of frequency.
Note 2: The more stringent limit applies at transition frequencies.</td></tr>
</table>
</td></tr>
<tr><td>20dB Bandwidth</td><td>N/A</td></tr>
<tr><td>Field Strength of Fundamental

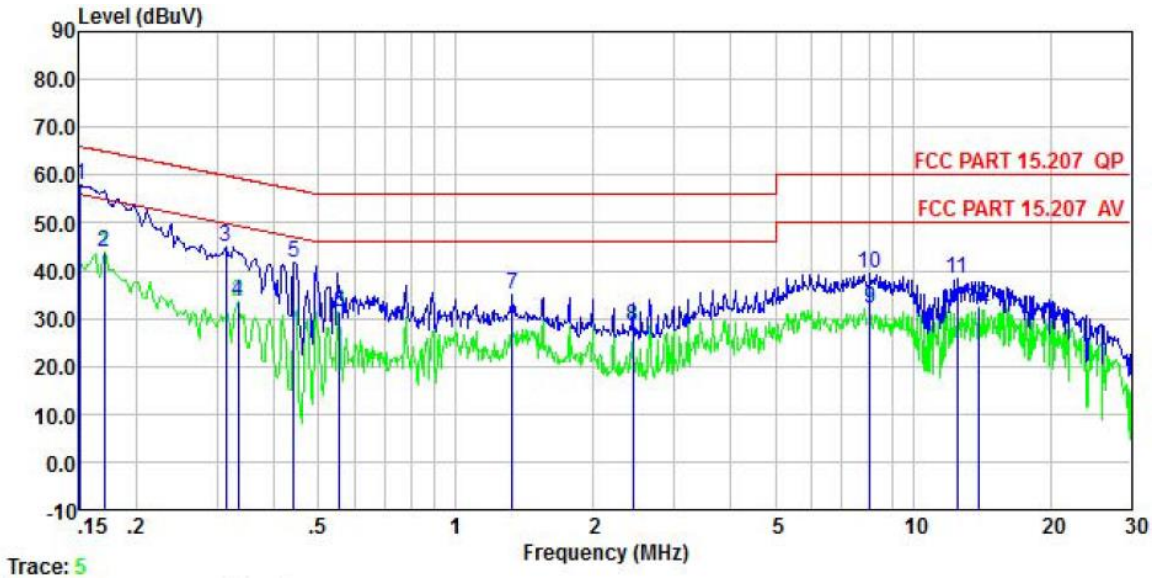
Field Strength of Spurious Emissions</td><td>
<table>
<tr><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr>
<tr><td>0.009 – 0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490 – 1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705 – 30.0</td><td>30</td><td>30</td></tr>
<tr><td>30 – 88</td><td>100**</td><td>3</td></tr>
<tr><td>88 – 216</td><td>150**</td><td>3</td></tr>
<tr><td>216 – 960</td><td>200**</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
<tr><td colspan="3">** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</td></tr>
</table>
</td></tr>
</table>

5.2 Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
E.U.T Antenna:	The EUT make use of a coil antenna.

5.3 AC Power Line Conducted Emission

Product name:	Empower Dock	**Product model:**	EDC100123
Test by:	Asher	**Test mode:**	Charing mode
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Line
Test voltage:	AC 120 V/60 Hz		

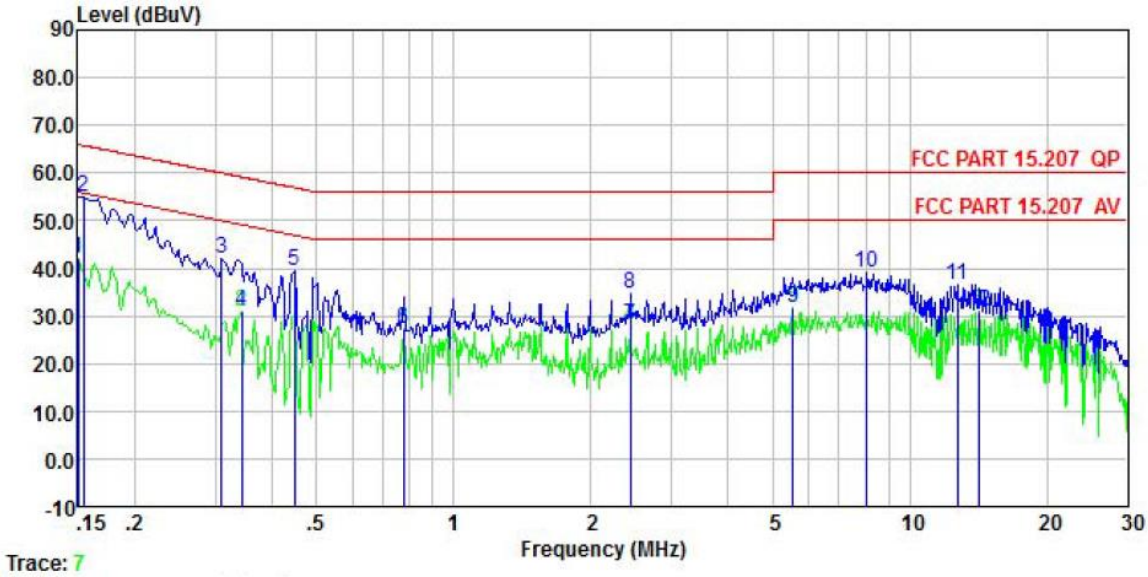


	Freq	Read Level	LISN Factor	Aux2 Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.151	47.15	0.20	10.50	0.01	57.86	65.96	-8.10	QP
2	0.170	33.20	0.20	10.50	0.01	43.91	54.94	-11.03	Average
3	0.313	34.22	0.20	10.50	0.03	44.95	59.88	-14.93	QP
4	0.334	22.93	0.20	10.50	0.02	33.65	49.35	-15.70	Average
5	0.442	30.96	0.20	10.50	0.03	41.69	57.02	-15.33	QP
6	0.555	20.64	0.20	10.50	0.02	31.36	46.00	-14.64	Average
7	1.331	24.34	0.20	10.50	0.12	35.16	56.00	-20.84	QP
8	2.435	17.55	0.20	10.50	0.14	28.39	46.00	-17.61	Average
9	8.062	21.14	0.20	10.50	0.10	31.94	50.00	-18.06	Average
10	8.062	28.70	0.20	10.50	0.10	39.50	60.00	-20.50	QP
11	12.516	27.64	0.20	10.50	0.11	38.45	60.00	-21.55	QP
12	13.915	21.49	0.20	10.50	0.12	32.31	50.00	-17.69	Average

Remark:

1. Level = Read level + LISN Factor + Cable Loss.

Product name:	Empower Dock	**Product model:**	EDC100123
Test by:	Asher	**Test mode:**	Charing mode
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Neutral
Test voltage:	AC 120 V/60 Hz		



	Freq	Read Level	LISN Factor	Aux2 Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.150	31.37	0.20	10.50	0.01	42.08	56.00	-13.92	Average
2	0.154	44.23	0.20	10.50	0.01	54.94	65.78	-10.84	QP
3	0.310	31.37	0.20	10.50	0.03	42.10	59.97	-17.87	QP
4	0.343	20.21	0.20	10.50	0.02	30.93	49.13	-18.20	Average
5	0.447	28.78	0.20	10.50	0.03	39.51	56.93	-17.42	QP
6	0.775	16.54	0.20	10.50	0.03	27.27	46.00	-18.73	Average
7	2.435	17.21	0.30	10.50	0.14	28.15	46.00	-17.85	Average
8	2.435	23.54	0.30	10.50	0.14	34.48	56.00	-21.52	QP
9	5.535	20.82	0.30	10.50	0.09	31.71	50.00	-18.29	Average
10	8.062	27.99	0.34	10.50	0.10	38.93	60.00	-21.07	QP
11	12.716	25.57	0.40	10.50	0.11	36.58	60.00	-23.42	QP
12	14.138	20.01	0.40	10.50	0.12	31.03	50.00	-18.97	Average

Remark:

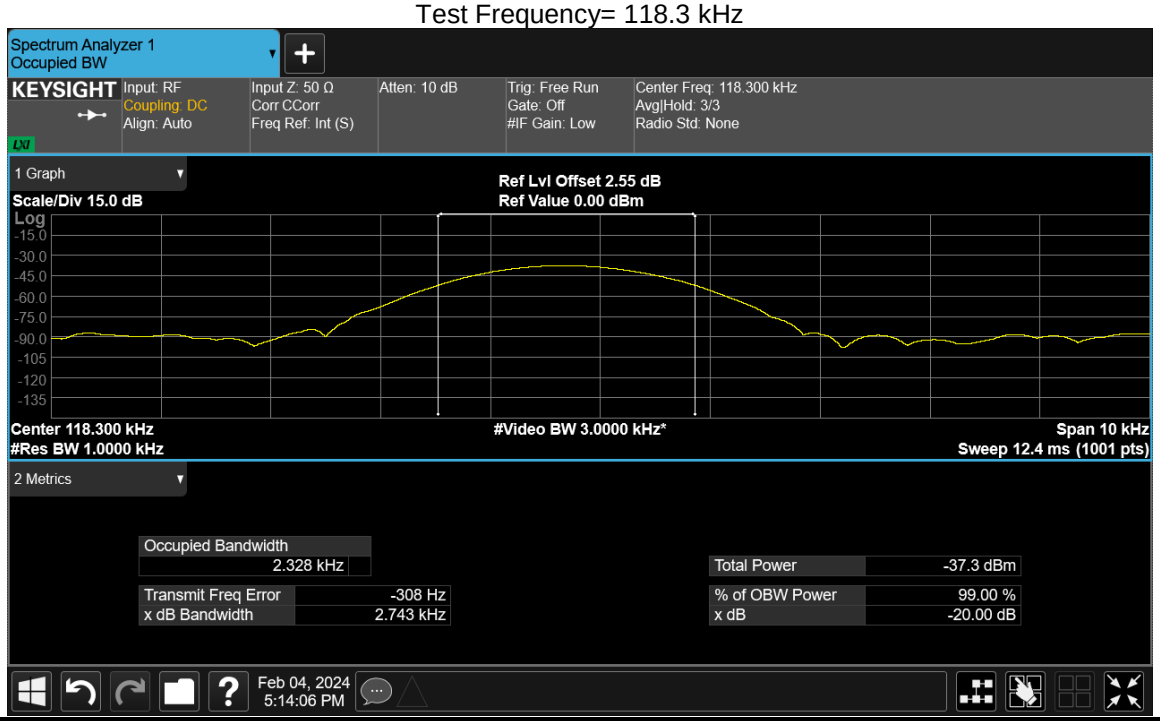
1. Level = Read level + LISN Factor + Cable Loss.

5.4 20dB Bandwidth

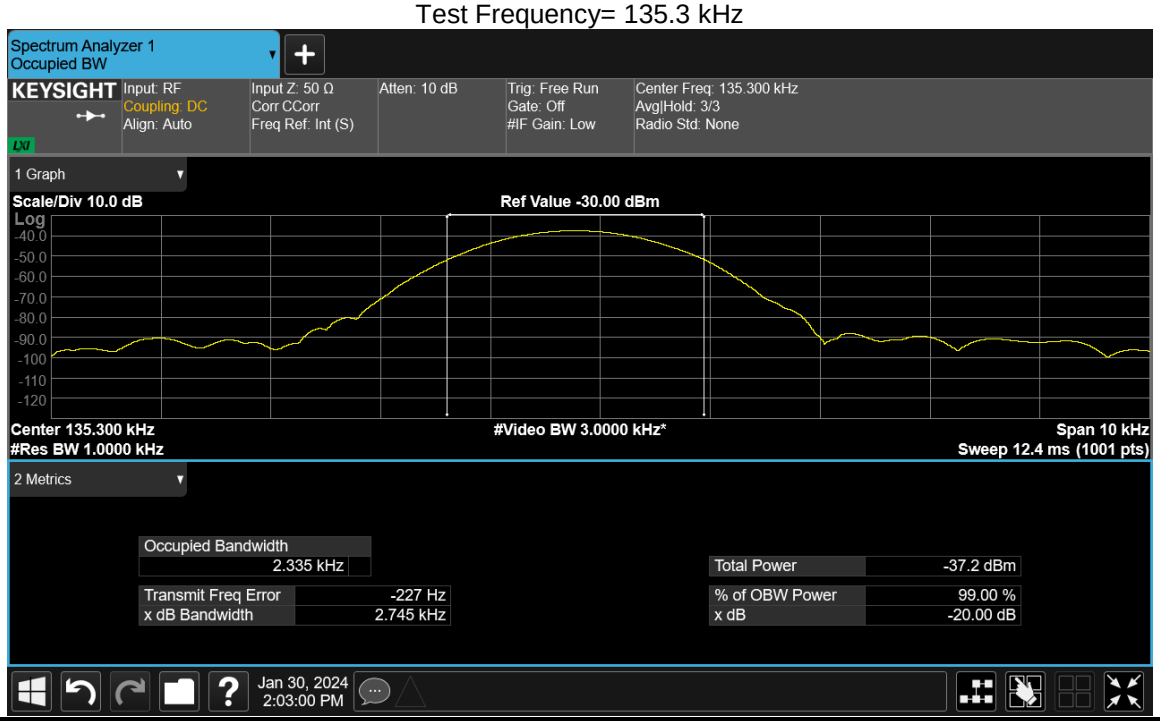
20dB bandwidth (kHz)	Limits
2.743	N/A
2.745	N/A
Remark: For report purpose only.	

Test plot as follows:

Test Frequency= 118.3 kHz

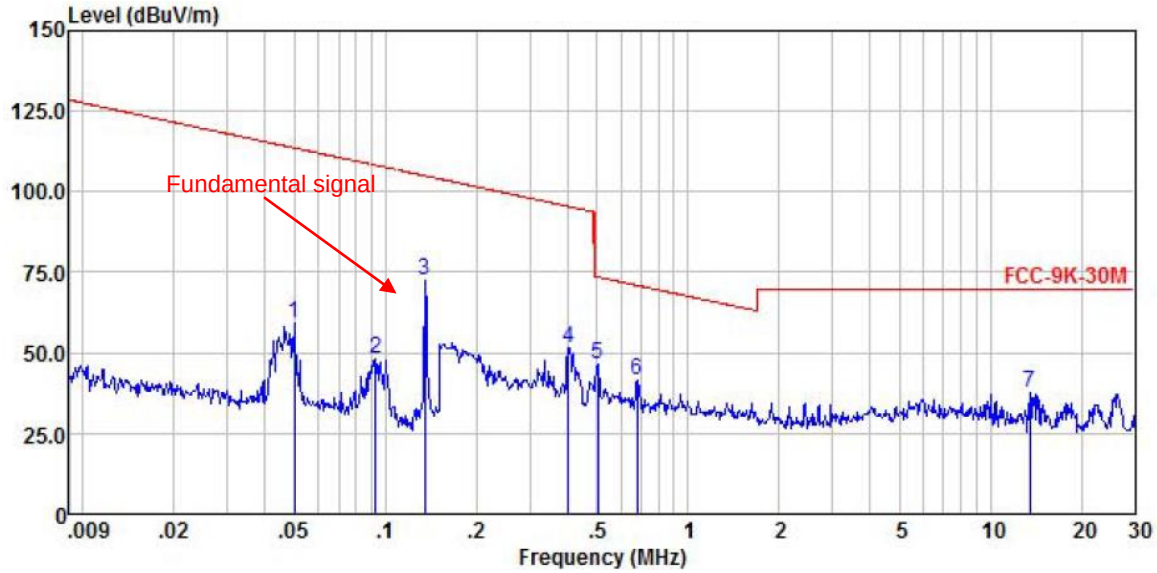


Test Frequency= 135.3 kHz



5.5 Field Strength of Spurious Emissions

Product Name:	Empower Dock	**Product Model:**	EDC100123
Test By:	Robin	**Test mode:**	Charing mode
Test Frequency:	9 kHz – 30 MHz	**Polarization:**	Coxial
Test Voltage:	AC 120V/60Hz		

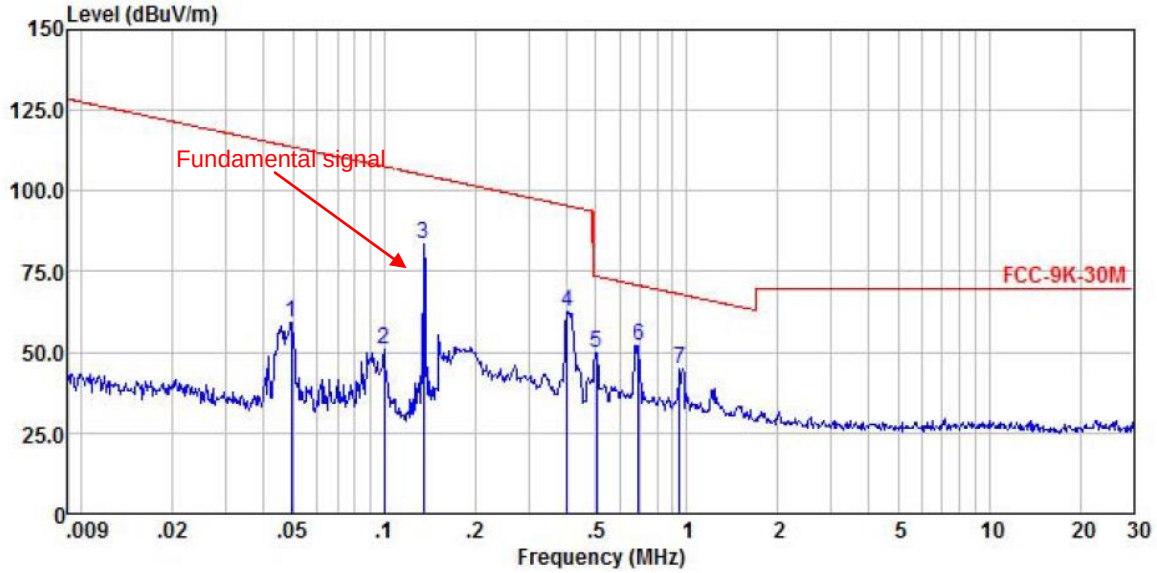


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	0.050	38.46	20.60	0.02	0.00	59.08	113.63	-54.55	
2	0.093	27.65	20.64	0.02	0.00	48.31	108.22	-59.91	
3	0.135	52.61	19.98	0.03	0.00	72.62	105.01	-32.39	
4	0.404	30.52	20.69	0.06	0.00	51.27	95.48	-44.21	
5	0.503	25.44	20.80	0.07	0.00	46.31	73.57	-27.26	
6	0.679	20.58	20.67	0.10	0.00	41.35	70.97	-29.62	
7	13.548	17.55	19.59	0.41	0.00	37.55	69.50	-31.95	

Remark:

1. Level = Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

Product Name:	Empower Dock	Product Model:	EDC100123
Test By:	Robin	Test mode:	Charing mode
Test Frequency:	9 kHz – 30 MHz	Polarization:	Coplanar
Test Voltage:	AC 120V/60Hz		

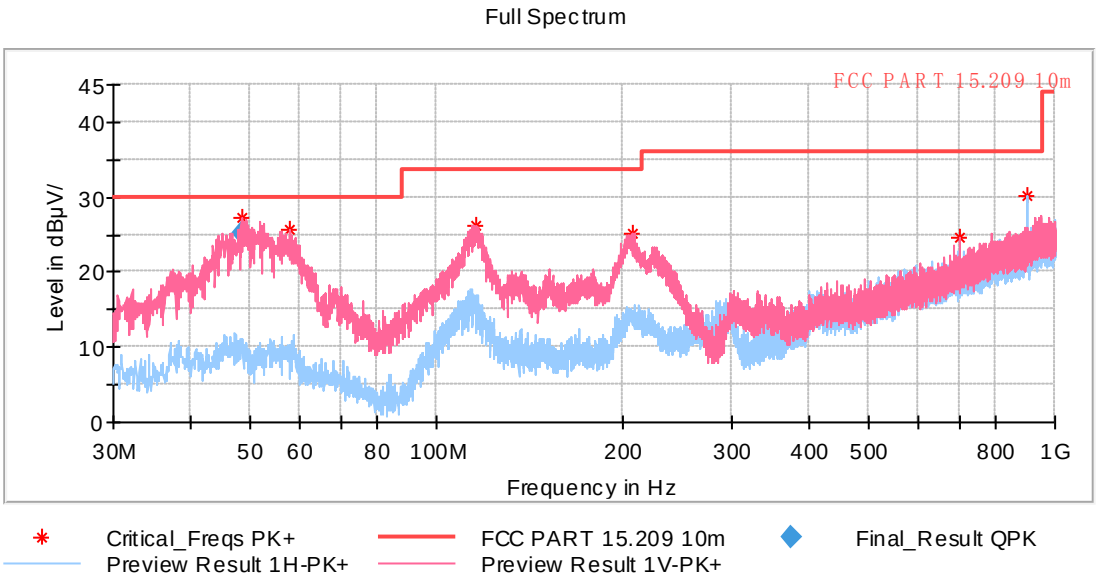


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	0.049	38.85	20.59	0.02	0.00	59.46	113.70	-54.24	Peak
2	0.100	30.66	20.49	0.02	0.00	51.17	107.60	-56.43	Peak
3	0.135	63.81	19.98	0.03	0.00	83.82	105.01	-21.19	Peak
4	0.404	41.73	20.69	0.06	0.00	62.48	95.48	-33.00	Peak
5	0.503	28.98	20.80	0.07	0.00	49.85	73.57	-23.72	Peak
6	0.696	31.37	20.66	0.10	0.00	52.13	70.76	-18.63	Peak
7	0.947	24.38	20.52	0.11	0.00	45.01	68.09	-23.08	Peak

Remark:

1. Level = Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

Product Name:	Empower Dock	**Product Model:**	EDC100123
Test By:	Asher	**Test mode:**	Charing mode
Test Frequency:	30 MHz – 1000 MHz	**Polarization:**	Vertical & Horizontal
Test Voltage:	AC 120V/60Hz		



Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.333000	27.22	30.00	2.78	100.0	V	167.0	-16.4
58.081500	25.63	30.00	4.37	100.0	V	282.0	-16.8
116.233000	26.22	33.50	7.28	100.0	V	126.0	-17.9
206.782500	25.17	33.50	8.33	100.0	V	179.0	-18.2
704.004500	24.69	36.00	11.31	100.0	V	52.0	-4.0
901.933000	30.11	36.00	5.89	100.0	H	282.0	-1.4

Final_Result

Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.373000	25.18	30.00	4.82	108.0	V	181.0	-16.4

Remark:

1. Level = Reading+ Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

------End of report------