

# FCC TEST REPORT FCC ID: 2AP2N-SUPER

On Behalf of

## Shenzhen Esorun Technology Co., LTD

Wireless Charger

Model No.: Super P, Super Z

Prepared for : Shenzhen Esorun Technology Co., LTD

Address Room 226, Building A, B, C, Zone B, Yuanfen Industrial Zone, Taoyuan

Community, Dalang Street, Longhua District, Shenzhen

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.

Address Building i, No.2, Lixin Road, Fuyong Street, Bao'an District,

518103, Shenzhen, Guangdong, China

Report Number : A2212151-C01-R05 Date of Receipt : December 20, 2022

Date of Test : December 20, 2022-January 3, 2023

Date of Report : January 4, 2023

Version Number : v0

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### TEST REPORT DECLARATION

Applicant : Shenzhen Esorun Technology Co., LTD

Address Room 226, Building A, B, C, Zone B, Yuanfen Industrial Zone, Taoyuan

Community, Dalang Street, Longhua District, Shenzhen

Manufacturer : Shenzhen Esorun Technology Co., LTD

Address Room 226, Building A, B, C, Zone B, Yuanfen Industrial Zone, Taoyuan

Community, Dalang Street, Longhua District, Shenzhen

EUT Description : Wireless Charger

(A) Model No. : Super P, Super Z

(B) Trademark : ESORUN

#### Measurement Standard Used:

#### FCC CFR Title 47 Part 15 Subpart C Section 15.209

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC CFR Title 47 Part 15 Subpart C Section 15.209 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....:

Lucas Pang
Project Engineer

Jack Xu
Project Manager

Date of issue...... January 4, 2023

## **Revision History**

Revision	Issue Date	Revisions	Revised By
V0	January 4, 2023	Initial released Issue	Lucas Pang

## 1. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Spurious Emission	§15.209(a)(f)	PASS
Occupied Bandwidth	§15.215 (c)	PASS

#### Note:

- 1. PASS: Test item meets the requirement.
- 2. Fail: Test item does not meet the requirement.
- 3. N/A: Test case does not apply to the test object.
- 4. The test result judgment is decided by the limit of test standard.
- 5. Decision rules for the conclusion of this test report: decision by actual test data without considering measurement uncertainty.

2.

**General Information** 

2.1. Description of Device (EUT)

**EUT Name** Wireless Charger Super P, Super Z Model No.

DIFF. There is no difference between the models except the appearance color.

So all the test were performed on the model Super P.

Trademark **ESORUN** 

Power supply Input: 5V-2A, 9V-2.22A

Wireless Output: 5W, 7.5W, 10W, 15W

Radio Technology Wireless power transmission systems

Operation frequency 115-205KHz

Modulation MSK

Antenna Type Coil Antenna, Maximum Gain is 0dBi(This value is supplied by applicant).

Connector cable loss 0.5dB (This value is supplied by applicant).

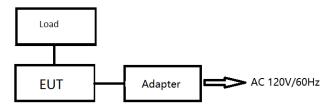
Software version V1.0 Hardware version V1.1

Accessories	:	/
Manufacturer	:	/
Model	:	/
Input	:	/
Output	:	/

## 2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDoC
1	Adapter	BlitzForce	BZ-PC001	N/A	N/A
2	Load	N/A	N/A	N/A	N/A
3	Adapter	Huoniu	HNFCQC3024UU	N/A	N/A

## 2.4. Block Diagram of connection between EUT and simulators



## 2.5. Description of Test Modes

Channel	Frequency (KHz)
1	128

## 2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	<b>24</b> ℃
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

## 2.7. Test Facility

Shenzhen Alpha Product Testing Co., Ltd Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission

Registration Number: 293961

July 15, 2019 Certificated by IC Registration Number: CN0085

## 2.8. Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	1.63dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber	3.74dB(Polarize: V)
(30MHz to 1GHz)	3.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber	3.77dB(Polarize: V)
(1GHz to 25GHz)	3.80dB(Polarize: H)
Uncertainty for radio frequency	5.06×10 <sup>-8</sup> GHz
Uncertainty for conducted RF Power	0.40dB
Uncertainty for temperature	0.2℃
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

## 2.9. Test Equipment List

Equipment	Manufacture	Model No.	Firmware version	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	/	N/A	2022.05.17	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2022.08.22	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2022.08.22	1Year
Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-10 2082-Wa	2022.08.22	1Year
Receiver	R&S	ESCI	4.42 SP1	101165	2022.08.22	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	/	VULB 9168#627	2021.08.30	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2021.08.30	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00059	2021.08.30	2Year
RF Cable	Resenberger	Cable 1	/	RE1	2022.08.22	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2022.08.22	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2022.08.22	1Year
Pre-amplifier	HP	HP8347A	/	2834A00455	2022.08.22	1Year
Pre-amplifier	Agilent	8449B	/	3008A02664	2022.08.22	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2022.08.22	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2022.08.23	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	/	00946	2021.08.30	2 Year
Preamplifier	SKET	LNPA_1840 -50	/	SK2018101801	2022.08.22	1 Year
Power Meter	Agilent	E9300A	/	MY41496628	2022.08.22	1 Year
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2022.08.22	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000 -40-880	/	100631	2022.08.22	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2022.08.22	1 Year
Adjustable attenuator	MWRFtest	N/A	/	N/A	N/A	N/A
10dB Attenuator	Mini-Circuits	DC-6G	/	N/A	N/A	N/A

Software Information						
Test Item	Software Name	Version				
RE EZ-EMC		farad	Alpha-3A1			
CE	EZ-EMC	farad	Alpha-3A1			
RF-CE	MTS 8310	MWRFtest	2.0.0.0			

## 3. Test Results and Measurement Data

## 3.1. Conducted Emission

## 3.1.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.2	07		
Test Method:	ANSI C63.10:2013			
Frequency Range:	150 kHz to 30 MHz			
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto			
Limits:	Frequency range (MHz)         Limit (dBuV)           Quasi-peak         Avera           0.15-0.5         66 to 56*         56 to 4           0.5-5         56         46           5-30         60         50			
	Refere	nce Plane		
Test Setup:	Adapter  E.U.T Adapter  Filter AC p  EMI Receiver  Remark: E.U.T: Equipment Under Test LISN Line Impedence Stabilization Network Test table height=0.8m		er   — AC power	
Test Mode:	Transmitting Mode			
Test Procedure:	<ol> <li>The E.U.T is connected to an adapter through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>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).</li> <li>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: 2013 on conducted measurement.</li> </ol>			
Test Result:	PASS			

#### 3.1.2. Test data

#### Please refer to following diagram for individual

Test Mode : Full Load

Test Results : PASS

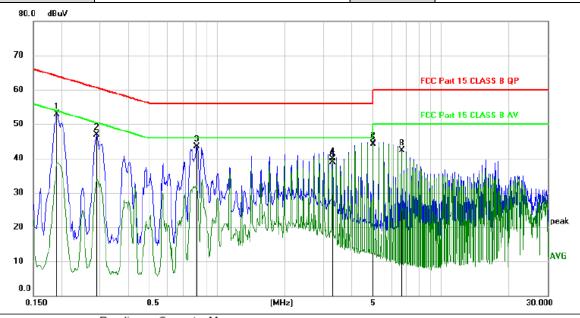
Note: The test results are listed in next pages.

All test modes has been tested, this report only reflected the worst mode.

If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.

If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.

<b>EUT Description</b>	Wireless Charger	Model No.	Super P
Temperature	<b>24</b> ℃	Humidity	56%
Test Voltage	AC 120V/60Hz		
Pol	Line	_	

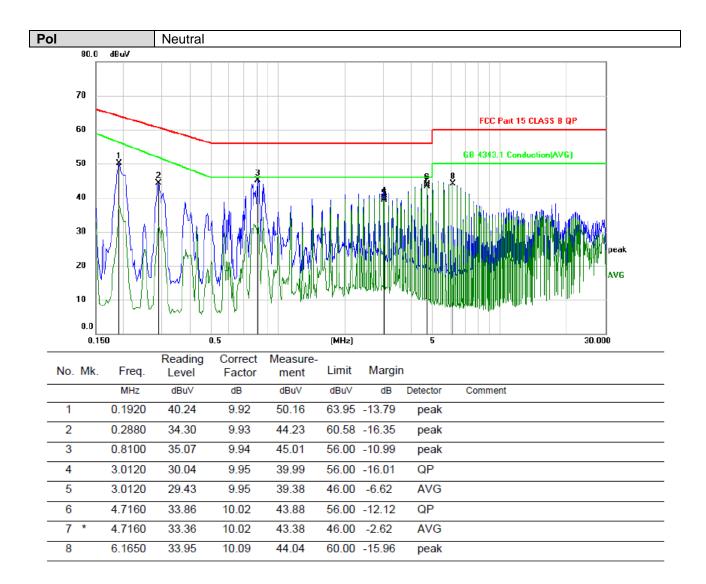


No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margir	1	
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1920	42.92	9.92	52.84	63.95	-11.11	peak	
2	0.2880	36.96	9.93	46.89	60.58	-13.69	peak	
3	0.8100	33.47	9.94	43.41	56.00	-12.59	peak	
4	3.2790	29.86	9.95	39.81	56.00	-16.19	QP	
5	3.2790	29.01	9.95	38.96	46.00	-7.04	AVG	
6	4.9890	33.99	10.04	44.03	56.00	-11.97	QP	
7 *	4.9890	34.27	10.04	44.31	46.00	-1.69	AVG	
8	6.6990	32.11	10.11	42.22	60.00	-17.78	peak	

Reference Only

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

<sup>\*:</sup>Maximum data x:Over limit !:over margin



Reference Only

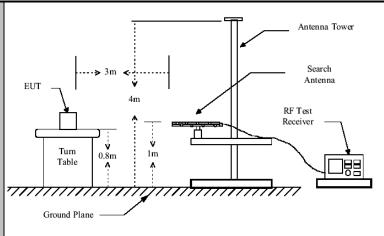
Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable
\*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

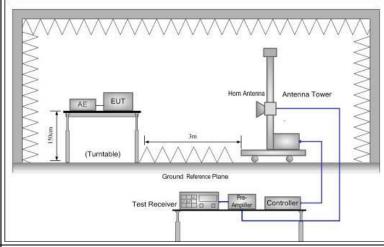
<sup>\*:</sup>Maximum data x:Over limit !:over margin

## 3.2.1. Test Specification

Test Requirement:	FCC Part15 C	Section	on 15.	209						
Test Method:	ANSI C63.10: 2	2013								
Frequency Range:	9 kHz to 25 GHz									
Measurement Distance:	3 m									
Antenna Polarization:	Horizontal & Vertical									
Operation mode:	Refer to item 4.1									
	Frequency 9kHz- 150kHz	Detector Quasi-pea k		a 200Hz	VBW 1kHz	Q	Remark uasi-peak Value			
Receiver Setup:	150kHz- 30MHz	Qua	asi-pe k	a 9kHz	30kHz	Q	uasi-peak Value			
·	30MHz-1GH z		asi-pe k	Z	300KH z		uasi-peak Value			
	Above 1GHz		Peak	1MHz	3MHz 10Hz		eak Value			
	Frequer	ı	Peak	1MHz Field Stre (microvolts	ength	Me [	Average Value  Measurement  Distance  (meters)			
	0.009-0.4			2400/F(I			300			
	0.490-1.705			24000/F(	KHz)	30				
	1.705-30			30 100		30				
	30-88 88-216			150			3			
Limit:	216-960			200			3			
	Above 960			500		3				
	Frequency		Field Strength (microvolts/mete r)		Measure nt Distan (meter	ce	Detector			
	Above 1GH	z		500	3		Average			
	For redicted and	nies:-	no br	5000	3		Peak			
	For radiated en	Distance		IOW 30MHZ		Γ	Computer			
Test setup:	Pre -Amplifier  Pre -Amplifier  Receiver									
	30MHz to 1GH	7	Gr	ound Plane			,			
	CONTILL TO TOTAL	_								



#### Above 1GHz



1. For the radiated emission test below 1GHz:

The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high PASS filter are used for the test in order to get better signal level.

For the radiated emission test above 1GHz:

Place the measurement antenna on a turntable with 1.5 meter above ground, which is away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

- Corrected Reading: Antenna Factor + Cable Loss + Read Level -Preamp Factor = Level
- 3. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported.

#### **Test Procedure:**

	<ul> <li>Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.</li> <li>4. Use the following spectrum analyzer settings: <ol> <li>Span shall wide enough to fully capture the emission being measured;</li> <li>Set RBW=100 kHz for f &lt; 1 GHz; VBW ≥RBW; Sweep = auto; Detector function = peak; Trace = max hold;</li> <li>Set RBW = 1 MHz, VBW= 3MHz for f 1 GHz for peak measurement.</li> </ol> </li> <li>For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</li> </ul>
Test mode:	Refer to section 4.1 for details
Test results:	PASS

### 3.2.2. Test Data

### Please refer to following diagram for individual

Frequency Range : 9KHz~30MHz

Test Mode : TX: 128kHz

Test Results : PASS

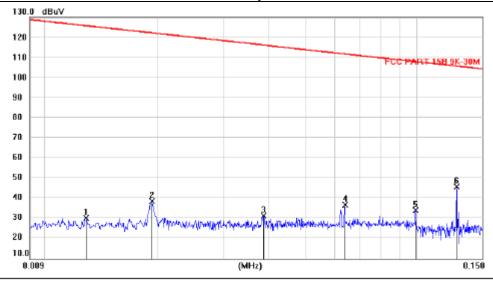
Note: 1. The test results are listed in next pages.

2. This mode is worst case mode, so this report only reflected the worst mode.

3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.

## For signal coil:

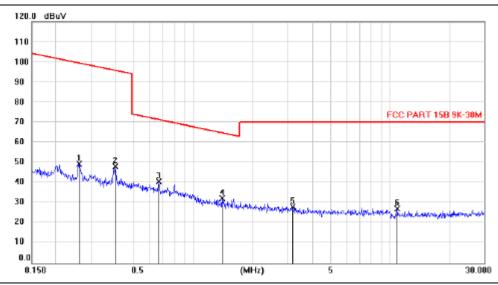
## Polarity: X axis



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		Antenna Height		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	cm	degree	Comment
1	0.0128	8.89	21.43	30.32	125.6	-95.33	peak			
2	0.0192	17.41	21.27	38.68	122.1	-83.44	peak			
3	0.0386	10.89	20.52	31.41	116.0	-84.65	peak			
4	0.0638	16.86	20.11	36.97	111.7	-74.73	peak			
5	0.0990	14.41	19.81	34.22	107.8	-73.66	peak			
6 *	0.1280	25.83	19.88	45.71	105.6	-59.94	peak			

Note:1. \*:Maximum data; x:Over limit; !:over margin.

<sup>2.</sup>Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		Antenna Height		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	cm	degree	Comment
1		0.2621	29.46	20.04	49.50	99.42	-49.92	peak			
2		0.3998	28.31	19.84	48.15	95.76	-47.61	peak			
3	*	0.6654	20.77	19.80	40.57	71.30	-30.73	peak			
4		1.3897	12.14	20.10	32.24	64.80	-32.56	peak			
5		3.1871	7.55	20.60	28.15	70.00	-41.85	peak			
6		10.7900	6.23	20.81	27.04	70.00	-42.96	peak			

Note:1. \*:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Frequency Range : 30MHz~1000MHz

Test Mode : TX: 128kHz

Test Results : PASS

Note: 1. The test results are listed in next pages.

2. All test modes has been tested, this report only reflected the worst mode.

3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.

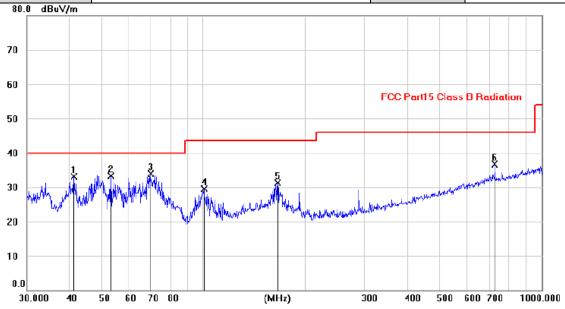
Frequency Range	:	Above 1GHz			
EUT	:	/	Test Date	:	/
M/N	:	/	Temperature	:	/
Test Engineer	:	/	Humidity	:	/
Test Mode	:	/			
Test Results	:	N/A			

Note:

1. The highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. So the frequency rang above 1GHz radiation test not applicable.

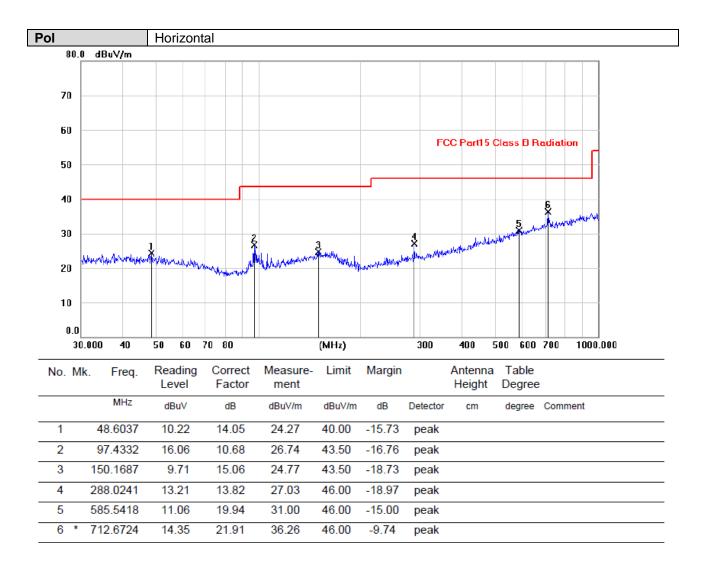
#### 30MHz-1GHz

<b>EUT Description</b>	Wireless Charger	Model No.	Super P
Temperature	24℃	Humidity	56%
Test Voltage	AC 120V/60Hz		
Pol	Vertical		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		41.3151	18.70	14.34	33.04	40.00	-6.96	peak			
2		53.1375	19.67	13.72	33.39	40.00	-6.61	peak			
3	*	69.6248	22.53	11.42	33.95	40.00	-6.05	peak			
4		100.2754	18.53	10.88	29.41	43.50	-14.09	peak			
5		165.9904	16.83	14.46	31.29	43.50	-12.21	peak			
6		727.6552	14.67	22.11	36.78	46.00	-9.22	peak			

Note:1. \*:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Note:1. \*: Maximum data; x: Over limit; !: over margin.

<sup>2.</sup>Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

## 3.3. Test Specification

Test Requirement:	FCC Part15 C Section 15.215(c)
Test Method:	ANSI C63.10: 2013
Limit:	N/A
Test Procedure:	<ol> <li>According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.</li> <li>Set to the maximum power setting and enable the EUT transmit continuously.</li> <li>Use the following spectrum analyzer settings for 20dB Bandwidth measurement.         Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW≥1% of the 20 dB bandwidth; VBW≥RBW; Sweep = auto; Detector function = peak; Trace = max hold.     </li> <li>Measure and record the results in the test report.</li> </ol>
Test setup:	Spectrum Analyzer EUT
Test Mode:	Refer to section 4.1 for details
Test results:	PASS

#### 3.3.1. Test data

#### For Watch:

Frequency(kHz)	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
128	0.260		Pass

Test plots as follows:



## 4. Photos of test setup

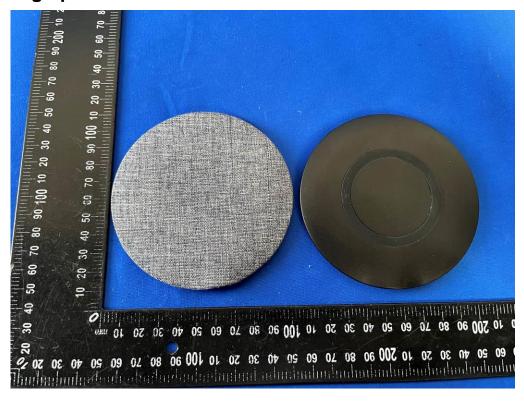
Radiated Emission



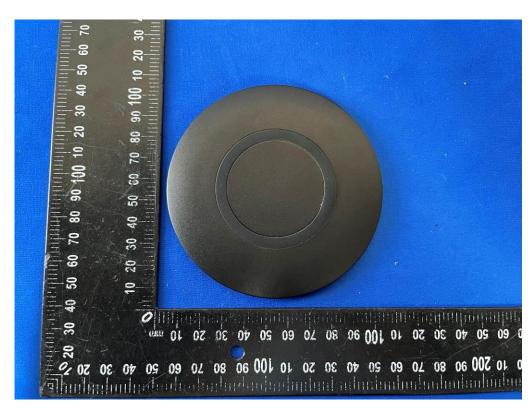




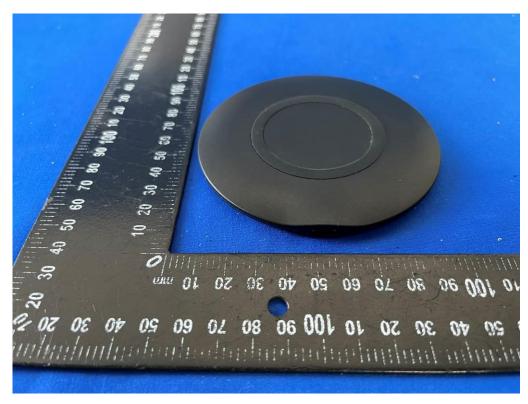
## 5. Photographs of EUT



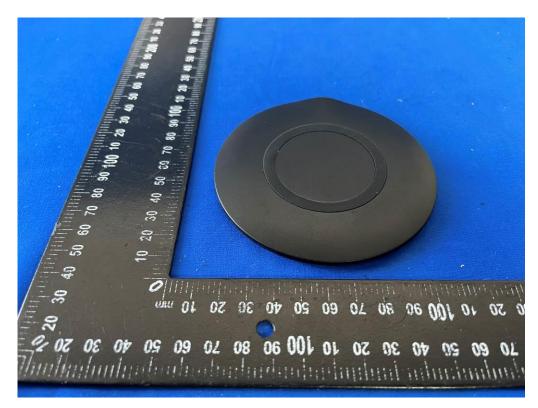


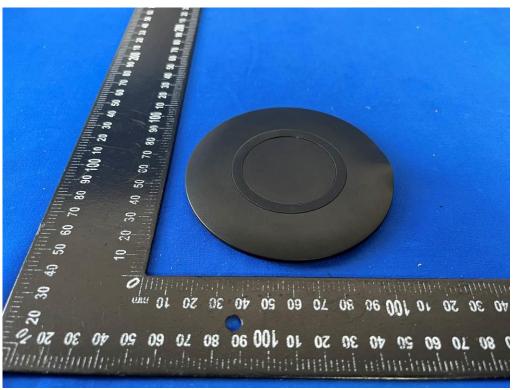


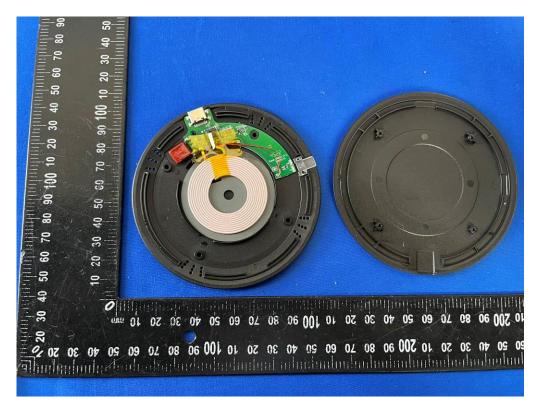


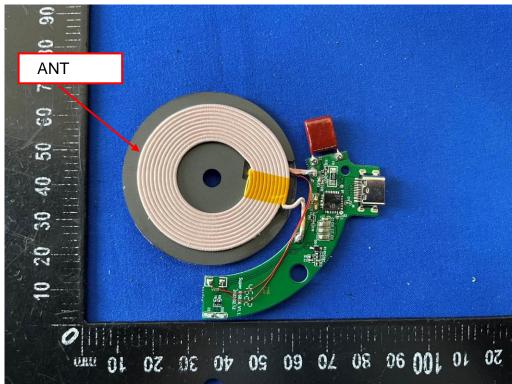


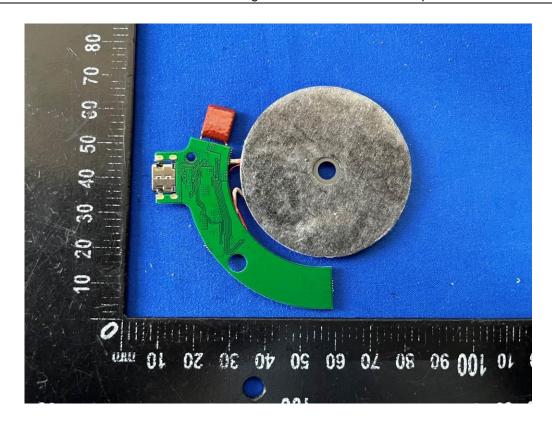












-----END OF REPORT-----