

Shenzhen Huaxia Testing Technology Co., Ltd

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Test Report

Report No.: CQASZ20210400533E-01

Applicant: HONGKONG VIMAI TECHNOLOGY CO., LIMITED

Address of Applicant: FLAT/RM H29,1/F PHASE 2 KWAI SHING IND BLDG NO.42-46,TAI LIN PAI

ROAD KWAI CHUNG, HONG KONG

Equipment Under Test (EUT):

Product: Magsafe

Model No.: Q2000-Charging **Test Model No.:** Q2000-Charging

Brand Name: N/A

FCC ID: 2AVLI-Q2000

Standards: 47 CFR Part 15, Subpart C

Date of Receipt: 2021-04-30

Date of Test: 2021-04-30 to 2021-05-06

Date of Issue: 2021-05-06 **Test Result:** PASS*

*In the configuration tested, the EUT complied with the standards specified above

lewis 2hou

Tested By: ____ (Lewis Zhou)

Reviewed By:

(Timo Lei)

(Sheek Luo)



The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.





1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20210400533E-01	Rev.01	Initial report	2021-05-06





2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203	ANSI C63.10 2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2013	PASS
20dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.215	ANSI C63.10 2013	PASS
Radiated Emission , Radiated Spurious Emissions	47 CFR Part 15, Subpart C Section 15.209	ANSI C63.10 2013	PASS



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4 General Information

4.1 Client Information

Applicant:	HONGKONG VIMAI TECHNOLOGY CO.,LIMITED
Address of Applicant:	FLAT/RM H29,1/F PHASE 2 KWAI SHING IND BLDG NO.42-46,TAI LIN PAI
	ROAD KWAI CHUNG,HONG KONG
Manufacturer:	SHEN ZHEN VIMAI TECHNOLOGY CO.,LTD
Address of Manufacturer:	Floor 3,building B,no.5 huating road,tongsheng community,dalang street,
	longhua district,shenzhen
Factory:	HONGKONG VIMAI TECHNOLOGY CO.,LIMITED
Address of Factory:	FLAT/RM H29,1/F PHASE 2 KWAI SHING IND BLDG NO.42-46,TAI LIN PAI
·	ROAD KWAI CHUNG,HONG KONG

4.2 General Description of EUT

Product Name:	Magsafe		
Model No.:	Q2000-Charging		
Test Model No.:	Q2000-Charging		
Brand Name: N/A			
Hardware Version:	Q2000-Charging-V1.0-20201029		
Software Version: Q2000-Charging-V1.0-20201023			
EUT Power Supply:	9V 2.5A		

4.3 Product Specification subjective to this standard

Equipment Category:	Non-ISM frequency
Operation Frequency range:	110kHz~205kHz
Modulation Type:	Induction
Antenna Type:	Induction coil
Antenna Gain:	0dBi
Power:	Output: 15W(Max)

Note:

1. In section 15.31(m), regards to the operating frequency range less 1 MHz.



4.4 Test Environment

Operating Environment						
Radiated Emissions:						
Temperature:	25.5 °C					
Humidity:	53 % RH					
Atmospheric Pressure:	1009 mbar					
Conducted Emissions:						
Temperature:	25.8 °C					
Humidity:	58 % RH					
Atmospheric Pressure:	1009 mbar					
Radio conducted item to	est (RF Conducted test room):					
Temperature:	27.1 °C					
Humidity:	56 % RH					
Atmospheric Pressure:	1009 mbar					
Test Mode:						
Mode a:	Wireless output Mode at 5W					
Mode b:	Wireless output Mode at 7.5W					
Mode c:	Wireless output Mode at 10W					
Mode d:	Wireless output Mode at 15W					
Note: The mode a was t	Note: The mode a was the worst case and only the data of the worst case record in this report.					

4.5 Description of Support Units

The EUT has been tested with associated equipment below.

1) Support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
Adapter	HUAWEI	LPL-C010050200Z	DOC	CQA
2) Cable				
Cable No.	Description	Manufacturer	Cable Type/Length	Supplied by
1	/	1		/





4.6 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd.** guality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CQA laboratory is reported:

No.	Item	Uncertainty	Notes
1	Radiated Emission (Below 1GHz)	5.12dB	(1)
2	Radiated Emission (Above 1GHz)	4.60dB	(1)
3	Occupied Bandwidth	1.1%	(1)
4	Temperature test	0.8℃	(1)
5	Humidity test	2.0%	(1)

⁽¹⁾This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.7 Test Location

Shenzhen Huaxia Testing Technology Co., Ltd,

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

4.8 Test Facility

A2LA (Certificate No. 4742.01)

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

• FCC Registration No.: 522263

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

4.9 Deviation from Standards

None.

4.10 Other Information Requested by the Customer

None.





4.11 Equipment List

	_		Instrument	Calibration	Calibration
Test Equipment	Manufacturer	Model No.	No.	Date	Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2020/10/25	2021/10/24
Spectrum analyzer	R&S	FSU26	CQA-038	2020/10/25	2021/10/24
Preamplifier	MITEQ	AMF-6D-02001800-29- 20P	CQA-036	2020/10/25	2021/10/24
Loop antenna	Schwarzbeck	FMZB1516	CQA-060	2020/10/21	2021/10/20
Bilog Antenna	R&S	HL562	CQA-011	2020/9/26	2021/9/25
Horn Antenna	R&S	HF906	CQA-012	2020/9/26	2021/9/25
Horn Antenna	Schwarzbeck	BBHA 9170	CQA-088	2020/9/25	2021/9/24
Coaxial Cable (Above 1GHz)	CQA	N/A	C007	2020/9/26	2021/9/25
Coaxial Cable (Below 1GHz)	CQA	N/A	C013	2020/9/26	2021/9/25
Antenna Connector	CQA	RFC-01	CQA-080	2020/9/26	2021/9/25
RF cable(9KHz~40GHz)	CQA	RF-01	CQA-079	2020/9/26	2021/9/25
Power divider	Power divider MIDWEST		CQA-067	2020/9/26	2021/9/25
EMI Test Receiver	MI Test Receiver R&S		CQA-005	2020/10/25	2021/10/24
LISN	R&S	ENV216	CQA-003	2020/10/23	2021/10/22
Coaxial cable	CQA	N/A	CQA-C009	2020/9/26	2021/9/25
DC power	KEYSIGHT	E3631A	CQA-028	2020/9/26	2021/9/25





5 Test results and Measurement Data

5.1 Antenna Requirement

Standard requirement: 47 CFR Part 15C Section 15.203

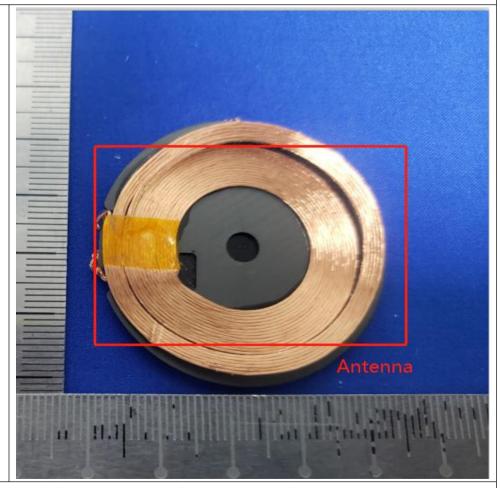
15.203 requirement:

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.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:



The antenna is Induction coil. The best case gain of the antenna is 0dBi.





5.2 Conducted Emissions

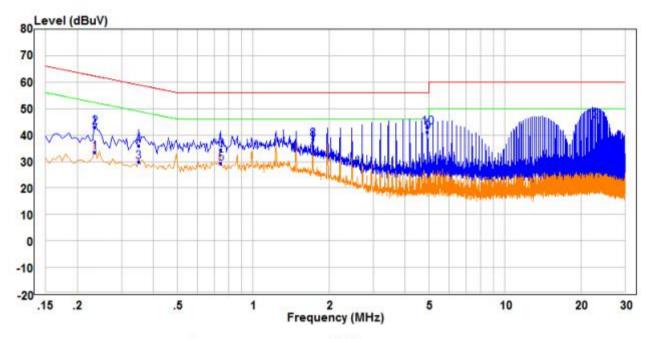
Test Requirement:	47 CFR Part 15C Section 15.2	207			
Test Method:	ANSI C63.10: 2013				
Test Frequency Range:	150kHz to 30MHz				
Limit:	_ Limit (dBuV)				
	Frequency range (MHz)	Quasi-peak	Average		
	0.15-0.5	66 to 56*	56 to 46*		
	0.5-5	56	46		
	5-30	60	50		
Test Procedure:	 * Decreases with the logarithm of the frequency. 1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane. 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to 				
Test Setup:	Shielding Room EUT AC Mains LISN1	AE LISN2 AC Mai	Test Receiver		
Test Results:	Pass				
	·				

Measurement Data

The worst case:

Mode d:

Live line:



	Freq	Read Level	Factor	Level	Limit	Over	Remark	Pol/Phase
-	MHz	dBuV	——dB	dBuV	dBuV	dB		
	0.235	24.16	9.49	33.65	52.27	-18.62	Average	Line
	0.235	33.39	9.49	42.88	62.27	-19.39	QP	Line
	0.350	20.36	9.50	29.86	48.96	-19.10	Average	Line
	0.350	26.54	9.50	36.04	58.96	-22.92	QP	Line
	0.745	19.55	9.82	29.37	46.00	-16.63	Average	Line
	0.745	24.52	9.82	34.34	56.00	-21.66	QP	Line
	1.730	26.19	9.53	35.72	46.00	-10.28	Average	Line
	1.730	28.70	9.53	38.23	56.00	-17.77	QP	Line
PP	4.935	31.48	9.74	41.22	46.00	-4.78	Average	Line
QP	4.935	33.25	9.74	42.99	56.00	-13.01	QP	Line
	22.205	16.48	10.07	26.55	50.00	-23.45	Average	Line
	22.205	35.28	10.07	45.35	60.00	-14.65	QP	Line
		MHz 0.235 0.235 0.350 0.350 0.745 0.745 1.730 1.730 PP 4.935 QP 4.935 22.205	MHZ dBuV 0.235 24.16 0.235 33.39 0.350 20.36 0.350 26.54 0.745 19.55 0.745 24.52 1.730 26.19 1.730 28.70 PP 4.935 31.48 QP 4.935 33.25 22.205 16.48	Freq Level Factor MHz dBuV dB 0.235 24.16 9.49 0.235 33.39 9.49 0.350 20.36 9.50 0.350 26.54 9.50 0.745 19.55 9.82 0.745 24.52 9.82 1.730 26.19 9.53 1.730 28.70 9.53 PP 4.935 31.48 9.74 QP 4.935 33.25 9.74 22.205 16.48 10.07	MHz dBuV dB dBuV 0.235 24.16 9.49 33.65 0.235 33.39 9.49 42.88 0.350 20.36 9.50 29.86 0.350 26.54 9.50 36.04 0.745 19.55 9.82 29.37 0.745 24.52 9.82 34.34 1.730 26.19 9.53 35.72 1.730 28.70 9.53 38.23 PP 4.935 31.48 9.74 41.22 QP 4.935 33.25 9.74 42.99 22.205 16.48 10.07 26.55	Freq Level Factor Level Line MHz dBuV dB dBuV dBuV 0.235 24.16 9.49 33.65 52.27 0.235 33.39 9.49 42.88 62.27 0.350 20.36 9.50 29.86 48.96 0.350 26.54 9.50 36.04 58.96 0.745 19.55 9.82 29.37 46.00 0.745 24.52 9.82 34.34 56.00 1.730 26.19 9.53 35.72 46.00 1.730 28.70 9.53 38.23 56.00 PP 4.935 31.48 9.74 41.22 46.00 QP 4.935 33.25 9.74 42.99 56.00 22.205 16.48 10.07 26.55 50.00	MHz dBuV dB dBuV dBuV dB 0.235 24.16 9.49 33.65 52.27 -18.62 0.235 33.39 9.49 42.88 62.27 -19.39 0.350 20.36 9.50 29.86 48.96 -19.10 0.350 26.54 9.50 36.04 58.96 -22.92 0.745 19.55 9.82 29.37 46.00 -16.63 0.745 24.52 9.82 34.34 56.00 -21.66 1.730 26.19 9.53 35.72 46.00 -10.28 1.730 28.70 9.53 38.23 56.00 -17.77 PP 4.935 31.48 9.74 41.22 46.00 -4.78 QP 4.935 33.25 9.74 42.99 56.00 -13.01 22.205 16.48 10.07 26.55 50.00 -23.45	MHz dBuV dB dBuV dBuV dB dBuV dBuV dB dBuV dBuV

Remark:

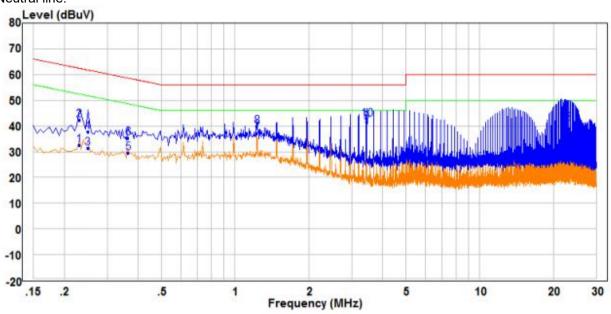
- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
- 3. If the Peak value under Average limit, the Average value is not recorded in the report.



The worst case:

Mode d:

Neutral line:



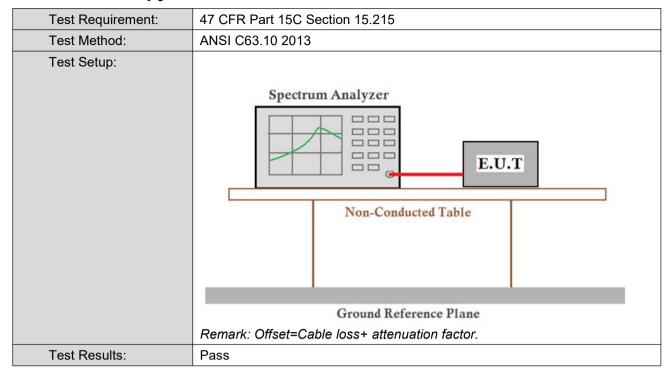
	<u> 886</u>	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
		MHZ	dBuV	dB	dBuV	dBuV	dB		
1		0.230	23.20	9.48	32.68	52.45	-19.77	Average	Neutral
2		0.230	32.72	9.48	42.20	62.45	-20.25	QP	Neutral
3		0.250	21.84	9.48	31.32	51.76	-20.44	Average	Neutral
4		0.250	28.22	9.48	37.70	61.76	-24.06	QP	Neutral
5		0.365	20.05	9.52	29.57	48.61	-19.04	Average	Neutral
6		0.365	25.96	9.52	35.48	58.61	-23.13	QP	Neutral
7		1.230	27.33	9.72	37.05	46.00	-8.95	Average	Neutral
8		1.230	30.09	9.72	39.81	56.00	-16.19	QP	Neutral
9	PP	3.450	31.73	9.76	41.49	46.00	-4.51	Average	Neutral
10	QP	3.450	33.00	9.76	42.76	56.00	-13.24	QP	Neutral
11		22.175	16.97	10.06	27.03	50.00	-22.97	Average	Neutral
12		22.175	31.04	10.06	41.10	60.00	-18.90	QP	Neutral

Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
- 3. If the Peak value under Average limit, the Average value is not recorded in the report.



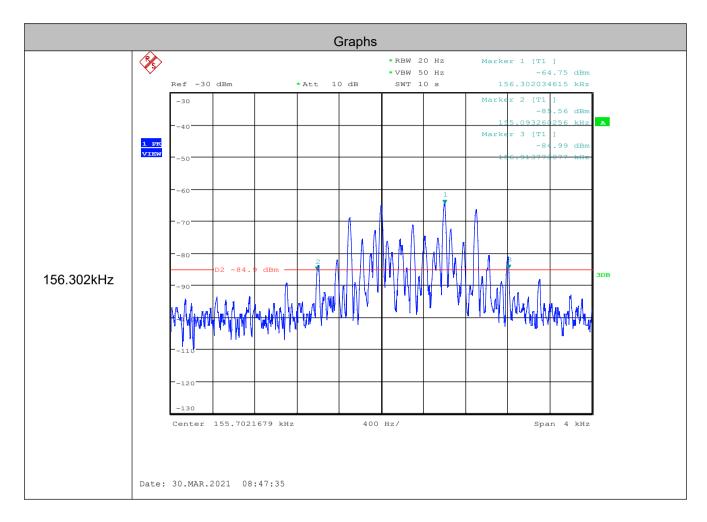
5.3 20dB Occupy Bandwidth



Measurement Data

Mode a						
Test Frequency (kHz)	Result					
156.302	1820.5	Pass				

Test plot as follows:





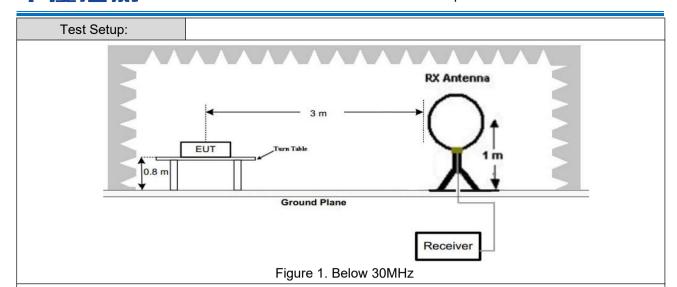
5.4 Radiated Spurious Emission & Restricted bands

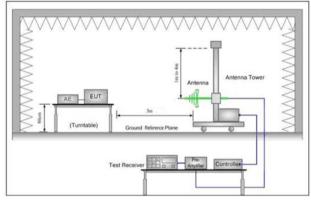
5.4.1 Spurious Emissions								
Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205							
Test Method:	ANSI C63.10 2013							
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)							
Receiver Setup:	Frequency	Detector	ector RBW		VBW	Remark		
	0.009MHz-0.090MH	z	Peak	10kHz	z 30kHz		Peak	
	0.009MHz-0.090MH	z	Average	10kHz	z 30kHz		Average	
	0.090MHz-0.110MH	Z	Quasi-peak	10kHz	z 30kHz		Quasi-peak	
	0.110MHz-0.490MH	Z	Peak	10kHz	Z	30kHz	Peak	
	0.110MHz-0.490MH	z	Average	10kHz	<u>z</u>	30kHz	Average	
	0.490MHz -30MHz		Quasi-peak	10kHz	<u>z</u>	30kHz	Quasi-peak	
	30MHz-1GHz		Quasi-peak	100 kH	Iz 3	300kHz	Quasi-peak	
	Above 1GHz		Peak	1MHz	<u>-</u>	3MHz	Peak	
			Peak	1MHz	<u>-</u>	10Hz	Average	
Limit:	Frequency		eld strength crovolt/meter)	Limit (dBuV/m)	R	emark	Measuremen distance (m)	
	0.009MHz-0.490MHz 2		400/F(kHz)	-	-		300	
	0.490MHz-1.705MHz		1000/F(kHz)	-	-		30	
	1.705MHz-30MHz 30MHz-88MHz		30	-	-		30	
			100	40.0	Quasi-peak		3	
	88MHz-216MHz		150	43.5	Quasi-peak		3	
	216MHz-960MHz		200	46.0	Quasi-peak		3	
	960MHz-1GHz		500	54.0	Quasi-peak		3	
	Above 1GHz		500	54.0	A۱	verage	3	
	Note: 15.35(b), frequency emissions is limit applicable to the epeak emission level race	20c quip	IB above the oment under t	maximum est. This p	perm	nitted ave	erage emission	



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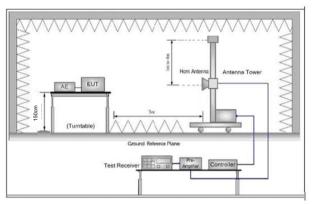


Figure 2. 30MHz to 1GHz

Figure 3. Above 1 GHz

Test Procedure:

- a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
 - 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

Note: For the radiated emission test above 1GHz:

Place the measurement antenna 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.

- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the



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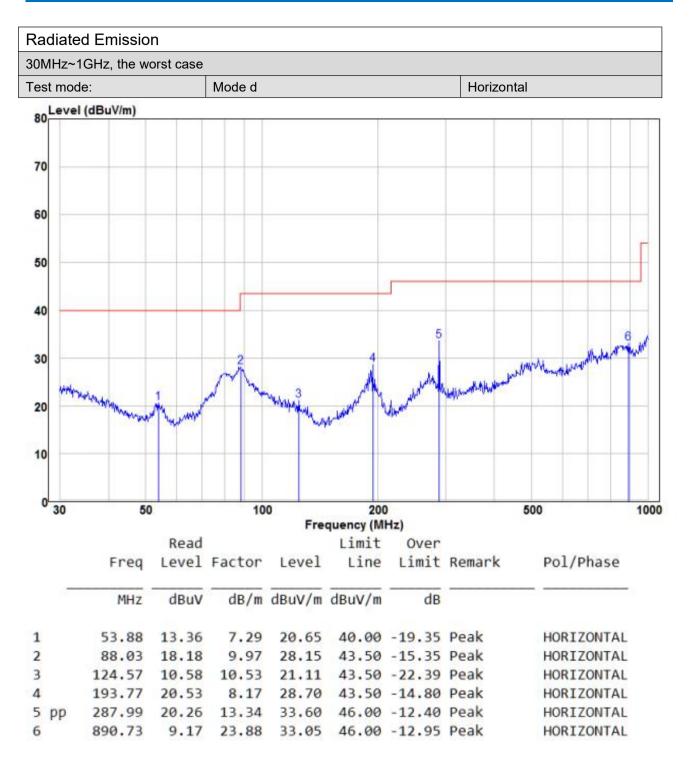
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	measurement.
	d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
	e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
	f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
	g. Repeat above procedures until all frequencies measured was complete.
Test Results:	Pass

Radiated Emission below 9k~30MHz					
the worst case					
Test mode:	Mode d				

Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) Peak	Limit dB(uV/m) Average	Margin dB	Pass/Fail
0.156302	Face	44.18	19.59	63.77	104.50	40.73	Pass
0.156302	Side	40.55	19.59	69.36	104.50	44.36	Pass

Note: No other emissions found between lowest internal used/generated frequencies to 30MHz. The peak level of the emission is less than the average limit, so the average level shall be less than the limit without test.



Remark:

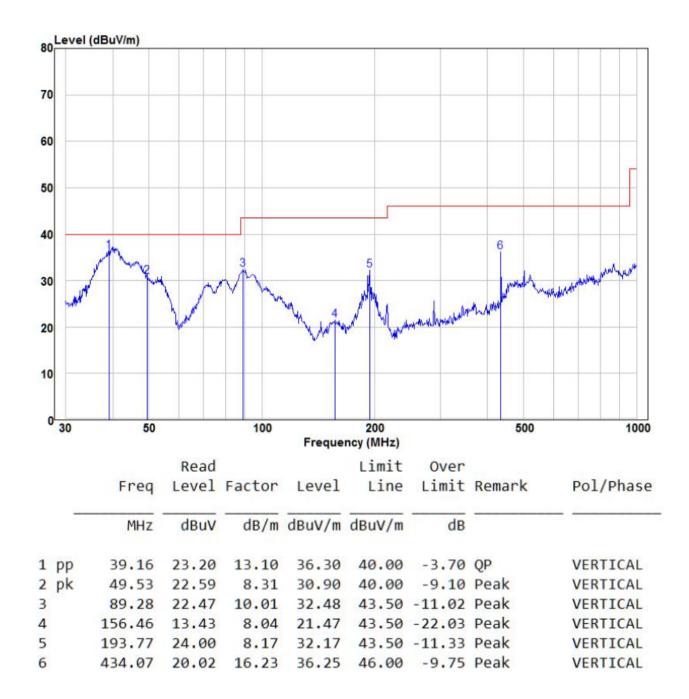
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor





30MHz~1GHz, the worst case					
Test mode:	Mode d	Vertical			



Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor

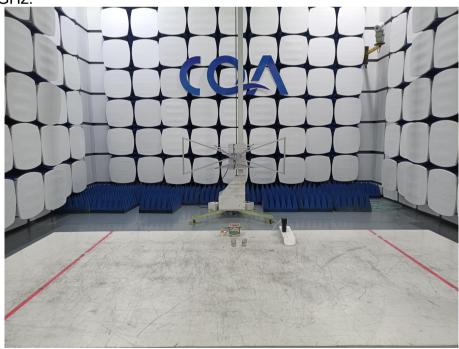
6 Photographs - EUT Test Setup

6.1 Radiated Emission

9kHz~30MHz:



30MHz~1GHz:





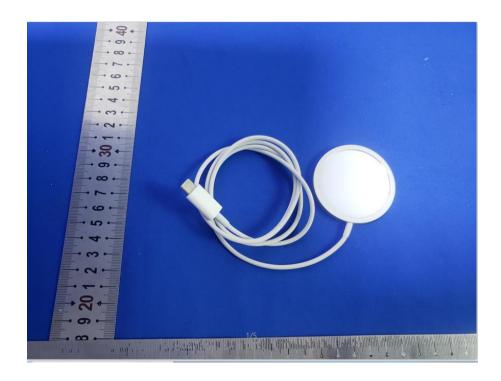


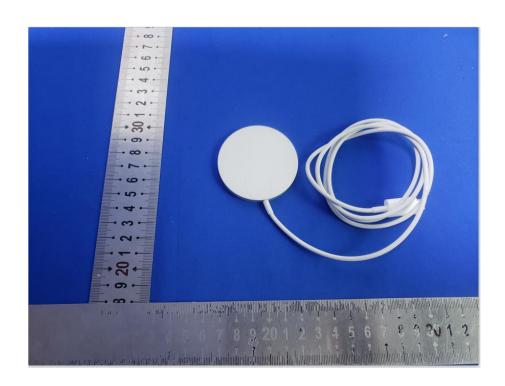
6.2 Conducted Emission



7 Photographs - EUT Constructional Details

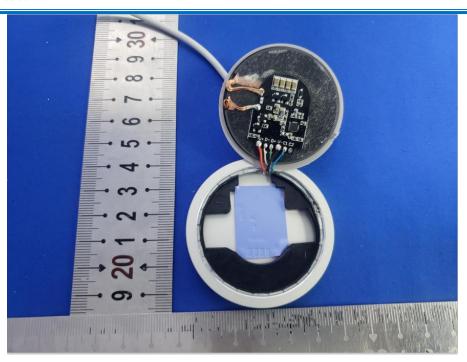
Test Model No.: Q2000-Charging

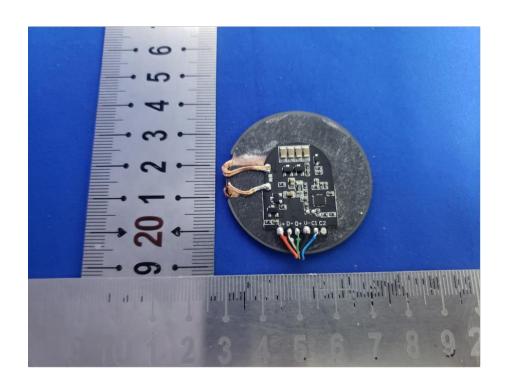








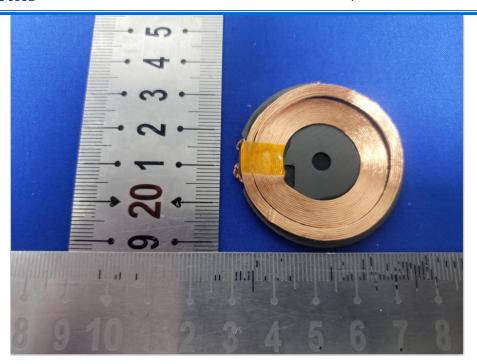






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Report No.: CQASZ20210400533E-01



*** End of Report ***