

Prüfbericht-Nr.: <i>Test report no.:</i>	CN208N8X 001	Auftrags-Nr.: <i>Order no.:</i>	168287068	Seite 1 von 23 Page 1 of 23
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2020-11-06	
Auftraggeber: <i>Client:</i>	Luxshare Precision Industry Co., Ltd. Floor 2, Block A, Sanyo New Industrial Area, West Haoyi Community, Shajing Subdistrict Office, Bao'an District, Shenzhen, P. R. China			
Prüfgegenstand: <i>Test item:</i>	Apple Watch USB-Stick Wireless Charger			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	ZEA01B/00 (Trademark: ZENS)			
Auftrags-Inhalt: <i>Order content:</i>	Type Test			
Prüfgrundlage: <i>Test specification:</i>	CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 15: Subpart C Section 15.209 CFR47 FCC Part 15: Subpart C Section 15.215 CFR47 FCC Part 2: Subpart J Section 1.1310			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2020-11-07	Refer to photos document		
Prüfmuster-Nr.: <i>Test sample no.:</i>	A002934917-001			
Prüfzeitraum: <i>Testing period:</i>	2020-11-17 – 2020-12-03			
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	genehmigt von: <i>authorized by:</i>			
Datum: <i>Date:</i> 2020-12-21	Ausstellungsdatum: <i>Issue date:</i> 2020-12-21			
Stellung / Position	Senior Project Engineer	Stellung / Position	Department Manager	
Sonstiges / Other:	FCC ID: 2AYYSZEA01B			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet * Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

V05

Test Summary

5.1.1 ANTENNA REQUIREMENT

RESULT: Pass

5.1.2 20dB BANDWIDTH

RESULT: Pass

5.1.3 RADIATED SPURIOUS EMISSION

RESULT: Pass

5.1.4 CONDUCTED EMISSIONS

RESULT: Pass

6.1.1 ELECTROMAGNETIC FIELDS

RESULT: Pass

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1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

No. 362 Huangguan Road Middle, Longhua District, Shenzhen 518110, China

FCC Registration No.: CN1260

IC Registration No.: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

TÜV Rheinland (Shenzhen) Co., Ltd.

Spurious Emissions Testing				
Description	Manufacturer	Model	Serial No.	Cal. until
EMI Test Receiver	R&S	ESR 7	102021	19.08.2021
Signal Analyzer	R&S	FSV 40	101439	21.08.2021
System Controller Interface	R&S	SCI-100	S10010038	N/A
Filterbank	R&S	Wlan	100759	21.08.2021
OSP	R&S	OSP 120	102040	N/A
Pre-amplifier	R&S	SCU08F1	08320031	20.08.2021
Amplifier	R&S	SCU-18F	180070	20.08.2021
Amplifier	R&S	SCU40A	100475	20.08.2021
Trilog Broadband Antenna (30 MHz - 1 GHz)	Schwarzbeck	VULB9162	193	02.09.2021
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	02.09.2021
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	02.09.2021
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	01.09.2021
Wideband Ridged Horn Antenna (12-18 GHz)	Steatite	QMS-00208	18313	02.09.2021
Test software	R&S	V10.40.10-EMC32	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	07.06.2021
Conducted Emissions				
Description	Manufacturer	Model	Serial No.	Cal. until
EMI Test Receiver	R&S	ESR3	102428	03.09.2021
Artificial Mains Network	R&S	ENV216	102333	19.08.2021
Attenuator	R&S	ESH2Z31	100300	19.08.2021
EMC32 test software	R&S	EMC32(Ver.10.50.0 1)	N/A	N/A

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table

Test	Parameters	Expanded uncertainty (U_{lab})	Expanded uncertainty (U_{cispr})
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 3.70 dB ± 3.30 dB	± 3.8 dB ± 3.4 dB
Radiated Emission (3m SAC)	Level accuracy (30MHz to 1000MHz)	± 4.52 dB	± 6.3 dB
	Level accuracy (above 1000MHz)	± 4.37 dB	N/A

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd. file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at No. 362 Huangguan Road Middle, Longhua District, Shenzhen 518110, China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The device is an Apple Watch USB-Stick Wireless Charger.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	Apple Watch USB-Stick Wireless Charger
Type Designation	ZEAW01B/00
Trademark	ZENS
FCC ID	2AYYSZEAW01B
Input Voltage	USB Operated, 5V, 1.2A max
Test voltage	120Vac, 60Hz
Technical Specification of WPT	
Operating Frequency	326.5KHz
Modulation	FSK
Antenna Type	Coil Antenna
Antenna number	1
Wireless Charger output power	Max. 5W

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, Wireless charging
- B. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- ID Label and Location Info

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5&6. All testing were performed according to the procedures in ANSI C63.10: 2013.

4.3 Special Accessories and Auxiliary Equipment

Table 3: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N	Rating
Adapter	TUVR	AC/DC Adapter1	SE-002	Output: 5Vdc, 1.2A max
Adapter	TUVR	AC/DC Adapter2	KA25-0501200CN	Output: 5Vdc, 1.2A max
Apple Watch	Apple	Apple Watch Series 2	---	---

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

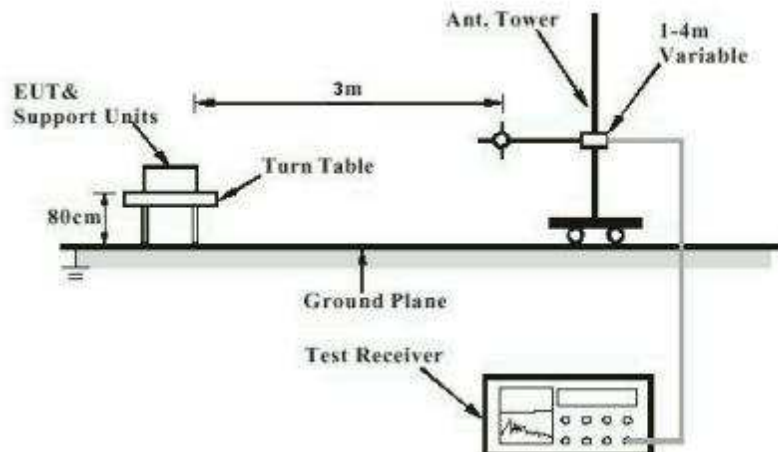
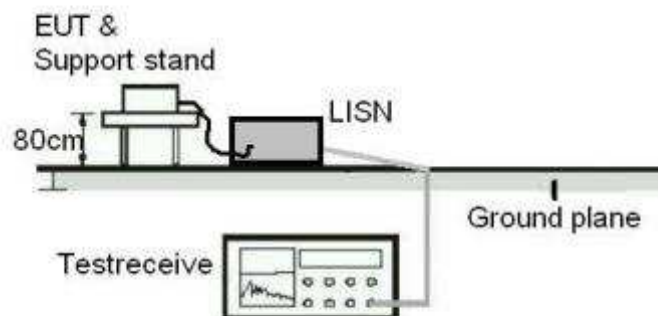


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:

Pass

Test Specification

Test standard : Part 15.203

According to the manufacturer declared, the EUT has an internal antenna, and the antenna is permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 20dB Bandwidth

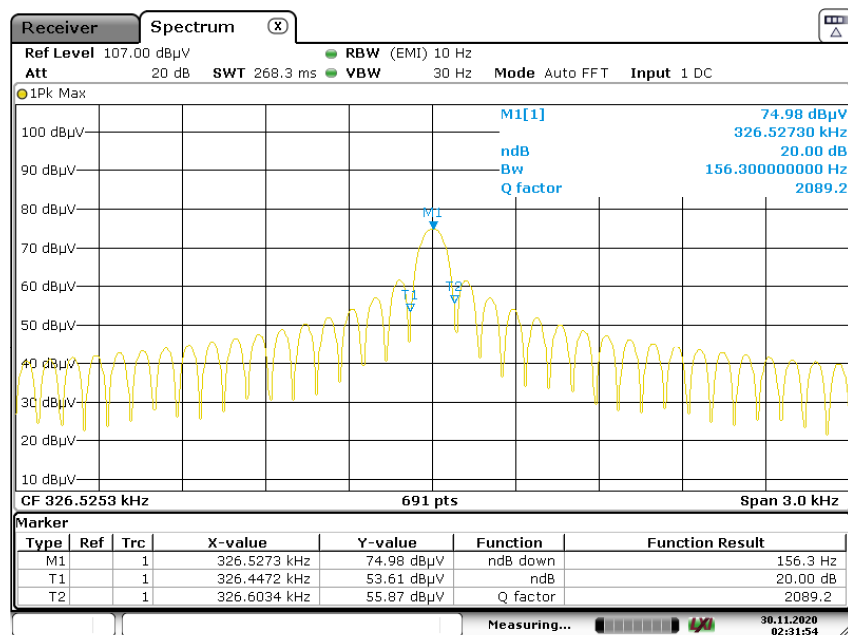
RESULT:
Pass
Test Specification

Test standard : FCC Part 15.215(c)
 Basic standard : ANSI C63.10: 2013
 Kind of test site : Shielded Room

Test Setup

Date of testing : 30.11.2020
 Input voltage : 120Vac, 60Hz
 Operation mode : A
 Ambient temperature : 25 °C
 Relative humidity : 56 %
 Atmospheric pressure : 101 kPa

For details refer to following test result.



Date: 30.NOV.2020 02:31:54

5.1.3 Radiated Spurious Emission

RESULT:**Pass****Test Specification**

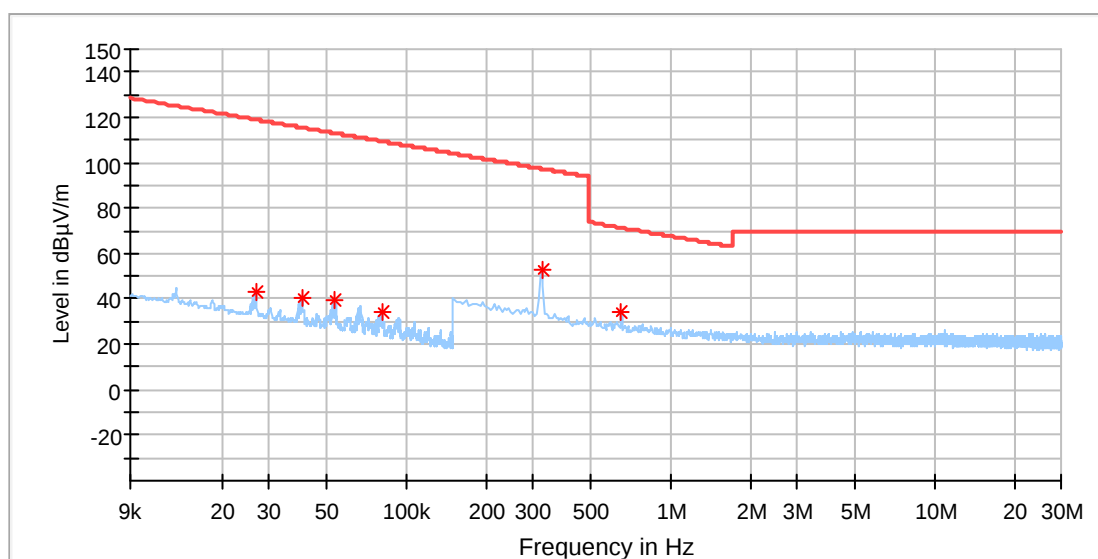
Test standard	: FCC Part 15.209 & 15.205
Basic standard	: ANSI C63.10: 2013
Limits	: Refer to 15.209(a)
Kind of test site	: 3m Semi-anechoic Chamber

Test Setup

Date of testing	: 19.11.2020 ~ 27.11.2020
Input voltage	: 120Vac, 60Hz
Operation mode	: A
Ambient temperature	: 23 °C
Relative humidity	: 49 %
Atmospheric pressure	: 101 kPa

EUT Information

EUT Name:	Magnetic Charging Cable
Model:	ZEAW01B/00
Test Mode:	Wireless charging
Test Voltage::	120Vac, 60Hz
Remark:	Temp 23 Humi:49%
Test Standard:	FCC 15.209
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

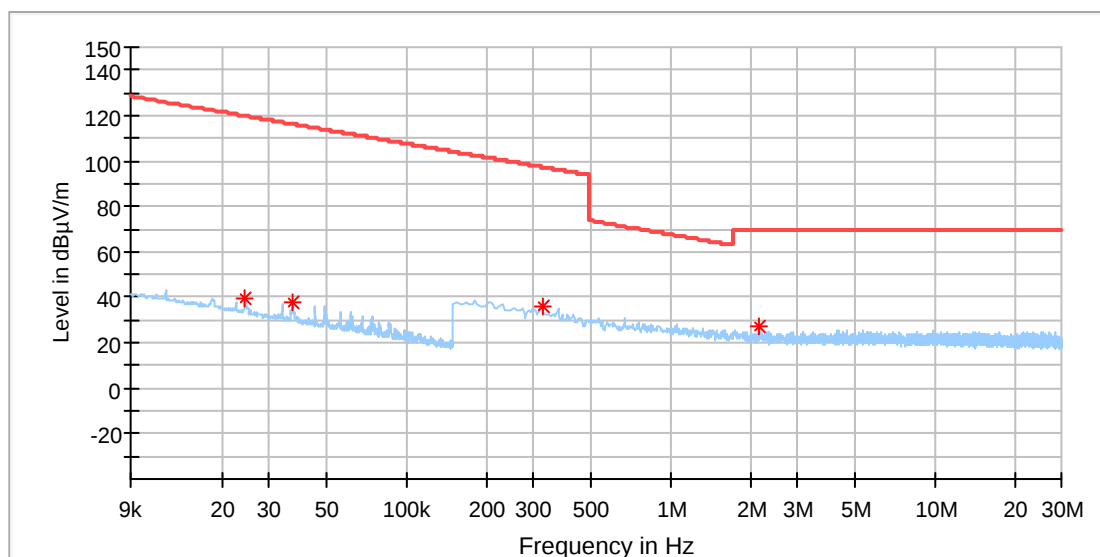


Critical Freqs

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
0.026826	43.01	119.02	76.01	100.0	X	46.0	20.0
0.040221	40.86	115.50	74.65	100.0	X	55.0	20.0
0.053516	39.23	113.02	73.80	100.0	X	64.0	20.0
0.080608	34.46	109.47	75.01	100.0	X	46.0	20.0
0.325588	52.42	97.35	44.93	100.0	X	328.0	20.0
0.650427	34.45	71.35	36.89	100.0	X	52.0	20.0

EUT Information

EUT Name:	Magnetic Charging Cable
Model:	ZEAW01B/00
Test Mode:	Wireless charging
Test Voltage::	120Vac, 60Hz
Remark:	Temp 23 Humi:49%
Test Standard:	FCC 15.209
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

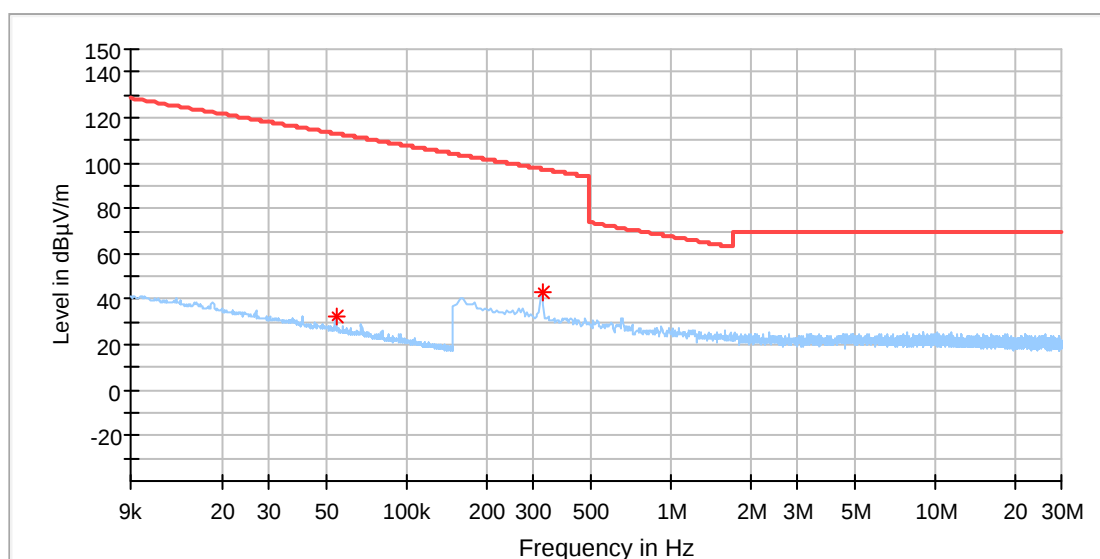


Critical Freqs

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
0.024510	39.43	119.80	80.37	100.0	Y	350.0	20.0
0.036797	38.06	116.28	78.22	100.0	Y	350.0	20.0
0.325588	36.13	97.35	61.22	100.0	Y	28.0	20.0
2.164875	27.24	69.50	42.26	100.0	Y	287.0	20.0

EUT Information

EUT Name:	Magnetic Charging Cable
Model:	ZEAW01B/00
Test Mode:	Wireless charging
Test Voltage::	120Vac, 60Hz
Remark:	Temp 23 Humi:49%
Test Standard:	FCC 15.209
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical Freqs

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
0.053818	32.26	112.98	80.71	100.0	Z	36.0	20.0
0.325588	42.99	97.35	54.36	100.0	Z	327.0	20.0

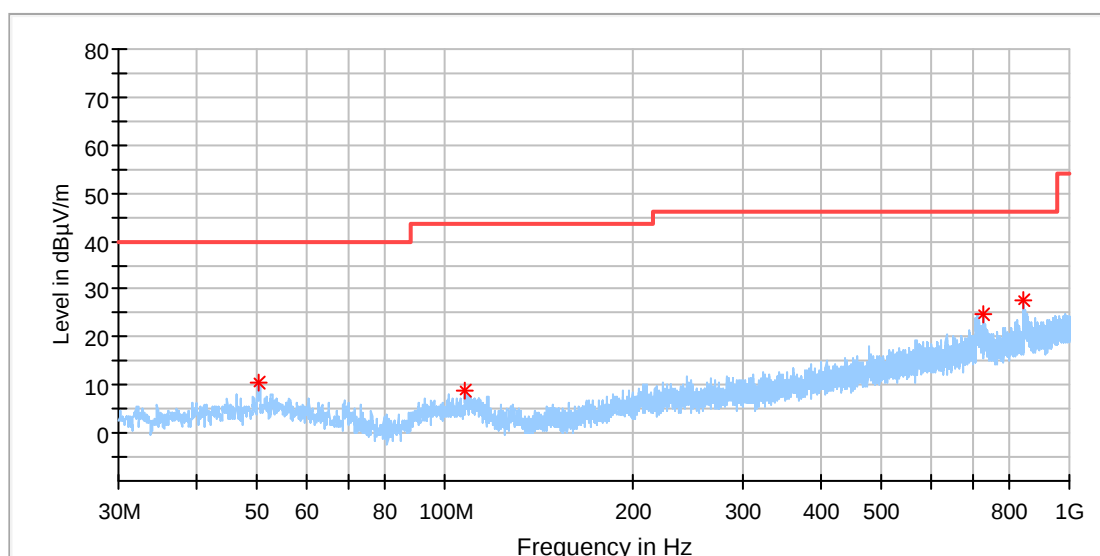
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EUT Information

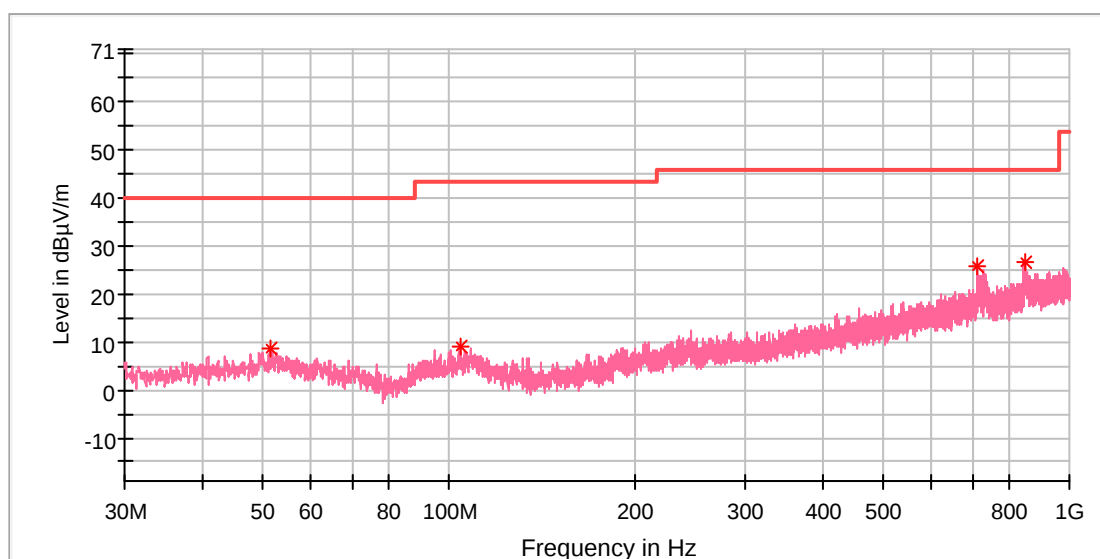
EUT Name:	Magnetic Charging Cable
Model:	ZEAW01B/00
Test Mode:	Wireless charging
Test Voltage::	120Vac, 60Hz
Remark:	Temp 23 Humi:49%
Test Standard:	FCC 15.209
Tested By:	Kei Zhang
Reviewed By:	Terry Yin


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
50.127500	10.47	---	40.00	29.53	100.0	H	122.0	-18.3
107.600000	8.88	---	43.50	34.62	100.0	H	6.0	-18.9
728.691000	24.72	---	46.00	21.28	100.0	H	242.0	-7.5
844.897000	27.58	---	46.00	18.42	100.0	H	91.0	-5.6

EUT Information

EUT Name:	Magnetic Charging Cable
Model:	ZEAW01B/00
Test Mode:	Wireless charging
Test Voltage::	120Vac, 60Hz
Remark:	Temp 23 Humi:49%
Test Standard:	FCC 15.209
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
51.437000	8.65	---	40.00	31.35	100.0	V	306.0	-18.3
104.156500	8.97	---	43.50	34.53	100.0	V	244.0	-18.8
710.261000	25.78	---	46.00	20.22	100.0	V	81.0	-7.8
848.825500	26.60	---	46.00	19.40	100.0	V	39.0	-5.5

5.1.4 Conducted emissions

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.207
Basic standard	: ANSI C63.10: 2013
Frequency range	: 150KHz - 30MHz
Classification	: Class B
Limit	FCC Part 15.207 (a)
Kind of test site	: Shielded Room

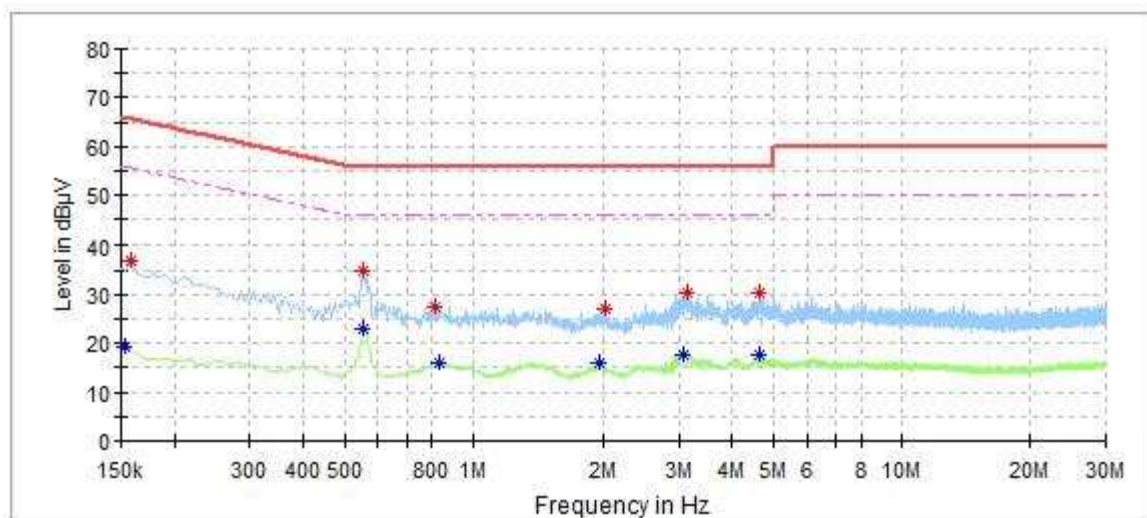
Test Setup

Date of testing	: 15.04.2020
Input voltage	: 120Vac, 60Hz
Operation mode	: A
Ambient temperature	: 23 °C
Relative humidity	: 48 %
Atmospheric pressure	: 101 kPa

Refer to following test plots for details of test result.

EUT Information

EUT Name:	Magnetic Charging Cable
Model:	ZEAW01B/00
Test Mode:	Wireless charging
Test Voltage:	120Vac, 60Hz
Test By:	Shower.Dai
Review By:	Gary Chen
Remark:	SR1

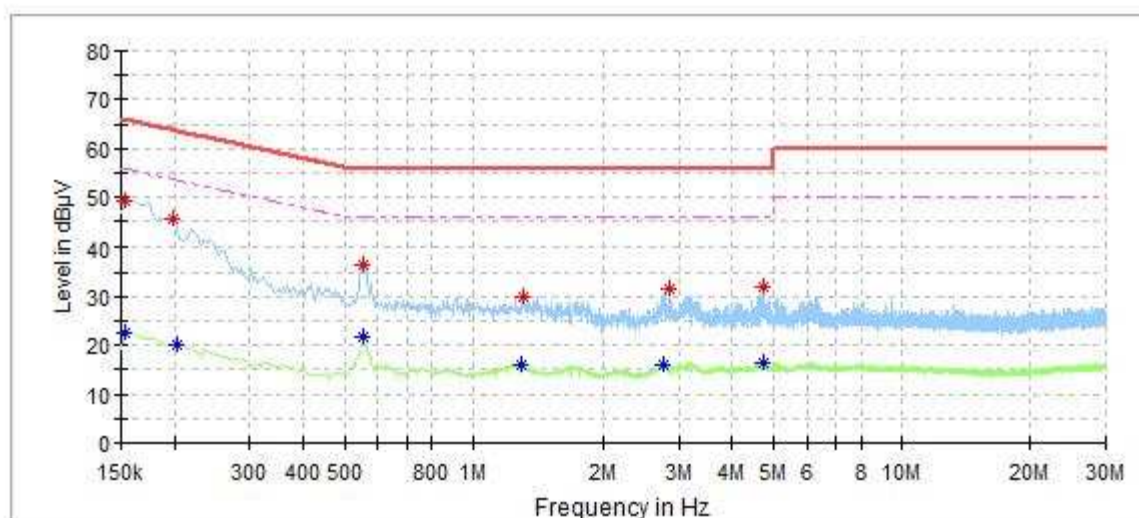


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.154000	---	19.30	55.78	36.48	L1	9.6
0.158000	36.95	---	65.57	28.62	L1	9.6
0.556000	---	22.78	46.00	23.22	L1	9.7
0.556000	34.69	---	56.00	21.31	L1	9.7
0.820000	27.69	---	56.00	28.31	L1	9.7
0.832000	---	16.00	46.00	30.00	L1	9.7
1.960000	---	16.07	46.00	29.93	L1	9.7
2.028000	27.10	---	56.00	28.90	L1	9.7
3.088000	---	17.83	46.00	28.17	L1	9.8
3.144000	30.17	---	56.00	25.83	L1	9.8
4.644000	---	17.44	46.00	28.56	L1	9.9
4.648000	30.32	---	56.00	25.68	L1	9.9

EUT Information

EUT Name:	Magnetic Charging Cable
Model:	ZEAW01B/00
Test Mode:	Wireless charging
Test Voltage:	120Vac, 60Hz
Test By:	Shower.Dai
Review By:	Gary Chen
Remark:	SR1



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.154000	---	22.57	55.78	33.21	N	9.6
0.154000	49.05	---	65.78	16.73	N	9.6
0.198000	45.51	---	63.69	18.19	N	9.6
0.202000	---	20.31	53.53	33.22	N	9.6
0.552000	36.58	---	56.00	19.42	N	9.7
0.556000	---	21.81	46.00	24.19	N	9.7
1.292000	---	15.80	46.00	30.20	N	9.7
1.312000	29.94	---	56.00	26.06	N	9.7
2.772000	---	16.12	46.00	29.88	N	9.8
2.856000	31.67	---	56.00	24.33	N	9.8
4.720000	---	16.56	46.00	29.44	N	9.9
4.732000	31.90	---	56.00	24.10	N	9.9

6 Safety Human Exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:

Pass

Test Specification

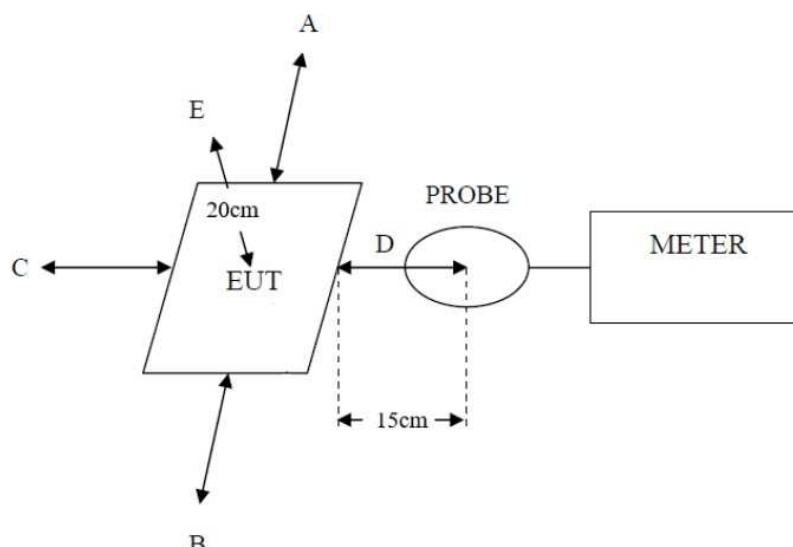
Test standard	:	CFR47 FCC Part 2: Subpart J Section 1.1310 FCC CFR 47 Part 1(1.1310) KDB 680106 D01 v03
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According to the table 1 of FCC Part 2.1310, the reference limit as below:

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	8
3.0-30	1842/f	4.89/f	*900/f ²	8
30-300	61.4	0.163	1.0	8
300-1,500			f/300	8
1,500-100,000			5	8
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

Test Setup:



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Test Result:

Table: H-Field Strength at 15 cm from the edges surrounding the EUT and 20cm from the top surface of the EUT

EUT Test Mode	Measured H-Field Strength Values (A/m)					50% Limit (A/m)	Limit (A/m)	Result
	Test Position Top	Test Position front	Test Position rear	Test Position left	Test Position right			
1% Battery Level	0.2568	0.2032	0.2488	0.2296	0.1816	0.815	1.63	Pass
50% Battery Level	0.2509	0.2021	0.2477	0.2295	0.1815	0.815	1.63	Pass
99% Battery Level	0.2560	0.2023	0.2474	0.2281	0.1805	0.815	1.63	Pass

7 Photographs of the Test Set-Up

Refer to test photo document.

8 List of Tables

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