

FCC Test Report

Product Name	WIRELESS POWER CHARGER UNIT
Model No.	NMOK-401W
FCC ID.	2AV76-NMOK-401W

Applicant	NIDEC MOBILITY KOREA CORPORATION
Address	790-12, Bogaewonsam-ro, Bogae-myeon, Anseong-si, Gyeonggi-do, Republic of Korea

Date of Receipt	Jun. 11, 2021
Issued Date	Aug. 11, 2021
Report No.	2160470R-E3032110102
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report

Issued Date: Aug. 11, 2021

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Applicant	NIDEC MOBILITY KOREA CORPORATION
Address	790-12, Bogaewonsam-ro, Bogae-myeon, Anseong-si, Gyeonggi-do, Republic of Korea
Manufacturer	NIDEC MOBILITY KOREA CORPORATION
Model No.	NMOK-401W
FCC ID.	2AV76-NMOK-401W
EUT Rated Voltage	DC 12V Power by Battery
EUT Test Voltage	DC 12V Power by Battery
Trade Name	NIDEC MOBILITY KOREA
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By

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Jinn Chen

(Supervisor / Jinn Chen)

Tested By

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Ivan Chuang

(Senior Engineer / Ivan Chuang)

Approved By

:

Alan Chen

(Senior Engineer / Alan Chen)

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Revision History

Report No.	Version	Description	Issued Date
2160470R-E3032110102	V1.0	Initial issue of report.	Aug. 11, 2021

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	WIRELESS POWER CHARGER UNIT
Trade Name	NIDEC MOBILITY KOREA
Model No.	NMOK-401W
FCC ID.	2AV76-NMOK-401W
Frequency Range	120kHz-125kHz
Type of Modulation	FSK
Type of antenna	Coil Antenna

Note:

1. The EUT is a WIRELESS POWER CHARGER UNIT with a built-in 120kHz-125kHz transceiver.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.209.
3. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit
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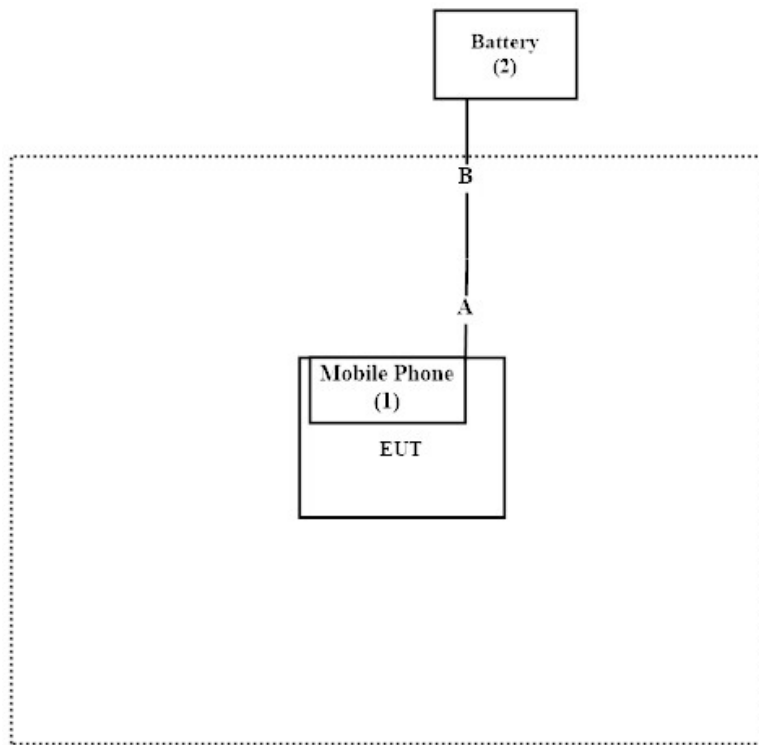
1.2. Test System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Mobile Phone	SONY	H8296	43027566	N/A
2 Battery	YUASA	55B24L-CMF II	N/A	N/A

Signal Cable Type	Signal cable Description
A Power Cable	Non-shielded, 0.6m
B Power Cable	Non-shielded, 2m

1.3. Configuration of Test System



1.4. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.3.
- (2) Provide power to the EUT.
- (3) Start the continuous transmitter.
- (4) Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Radiated Emission	Temperature (°C)	10~40 °C	24 °C
	Humidity (%RH)	10~90 %	62 %

USA : FCC Registration Number: TW0033

Canada : IC Registration Number: 26930

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No. 26, Huaya 1st Rd., Guishan Dist.,
Taoyuan City 333411, Taiwan, R.O.C.

Phone number : +886-3-275-7255

Fax number : +866-3-327-5505

Email address : info.tw@dekra.com

Website : <http://www.dekra.com.tw>

1.6. List of Test Equipment

For Conduction measurements /SH1

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
	EMI Test Receiver	R&S	ESR7	101601	2021.01.04	2022.01.03
	Two-Line V-Network	R&S	ENV216	101306	2021.04.08	2022.04.07
	Two-Line V-Network	R&S	ENV216	101307	2020.05.04	2022.05.03
	Coaxial Cable	DEKRA	RG400_BNC	RF001	2021.05.24	2022.05.23

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Testing System V2.0

For Radiated measurements /966-3

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	Loop Antenna	AMETEK	HLA6121	56736	2021.04.14	2022.04.13
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-678	2020.09.04	2021.09.03
	Horn Antenna	ETS-Lindgren	3117	00201259	2020.10.23	2021.10.22
	Horn Antenna	Com-Power	AH-840	101087	2020.06.08	2021.06.07
X	Pre-Amplifier	EMCI	EMC001330	980302	2021.07.08	2022.07.07
	Pre-Amplifier	EMCI	EMC051835SE	980313	2020.11.25	2021.11.24
	Pre-Amplifier	EMCI	EMC05820SE	980362	2021.06.20	2022.06.19
	Pre-Amplifier	EMCI	EMC184045SE	980314	2021.06.10	2022.06.09
	Filter	MICRO TRONICS	BRM50702	G251	2020.09.17	2021.09.16
	Filter	MICRO TRONICS	BRM50716	G188	2020.09.17	2021.09.16
X	EMI Test Receiver	R&S	ESR	102793	2020.12.17	2021.12.16
X	Spectrum Analyzer	R&S	FSV3044	101113	2021.02.03	2022.02.02

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Testing System V2.0

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

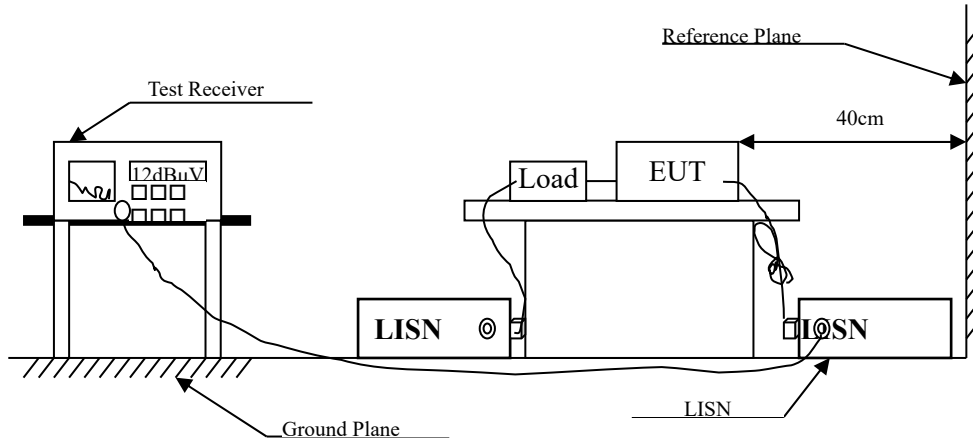
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty	
Conducted Emission	±3.42 dB	
Radiated Emission	Under 1GHz ±4.06 dB	Above 1GHz ±3.73 dB

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dB μ V) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56 ^(§§)	56-46 ^(§§)
0.50-5.0	56	46
5.0 - 30	60	50

2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

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 C63.4: 2014 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

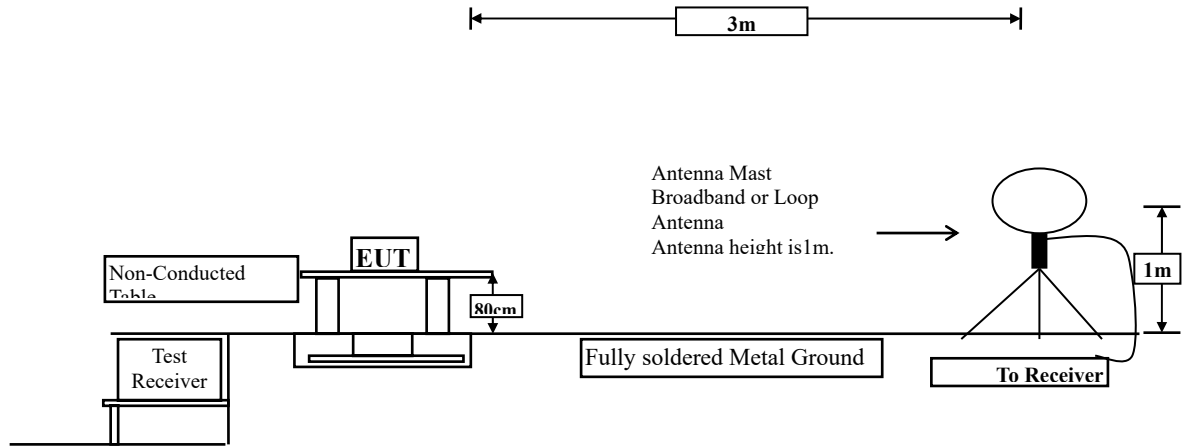
2.4. Test Result of Conducted Emission

Owing to the DC operation of EUT, this test item is not performed.

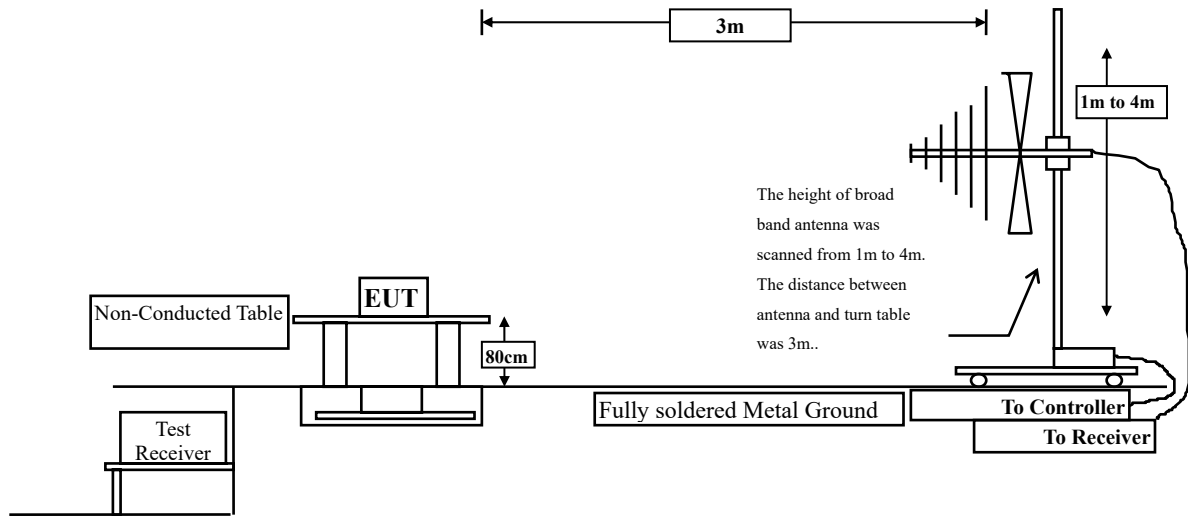
3. Radiated Emission

3.1. Test Setup

Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



3.2. Limits

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

- Remarks :
1. RF Voltage (dB μ V) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.209 requirements.

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz. Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

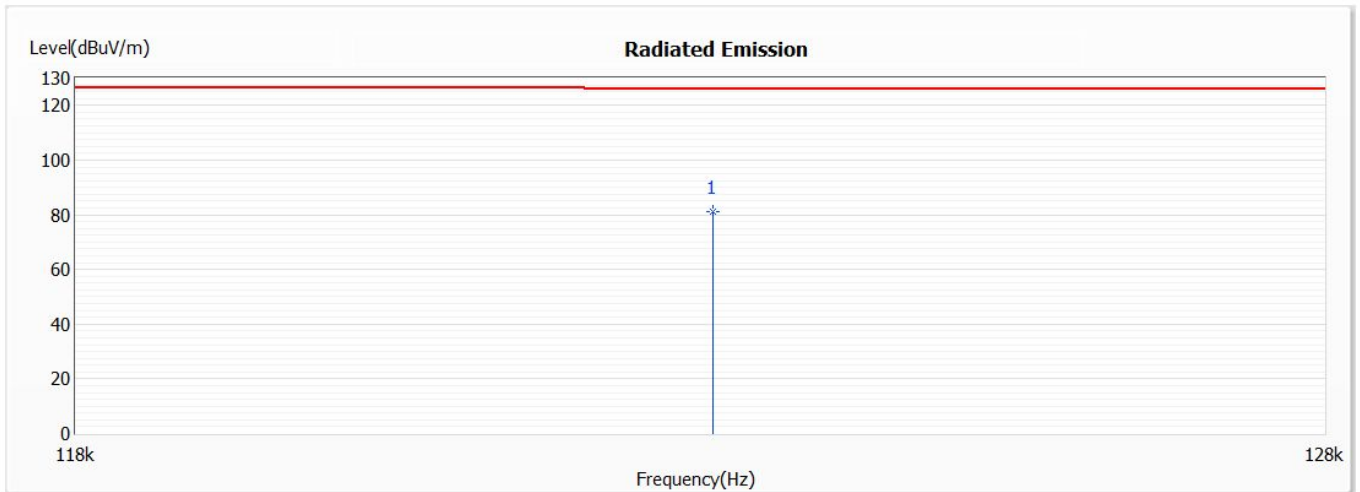
The worst radiated emission is measured on the Final Measurement.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

3.4. Test Result of Radiated Emission

Product : WIRELESS POWER CHARGER UNIT
 Test Item : Radiated Emission
 Test date : 2021/06/16
 Test Mode : Mode 1: Transmit

Horizontal



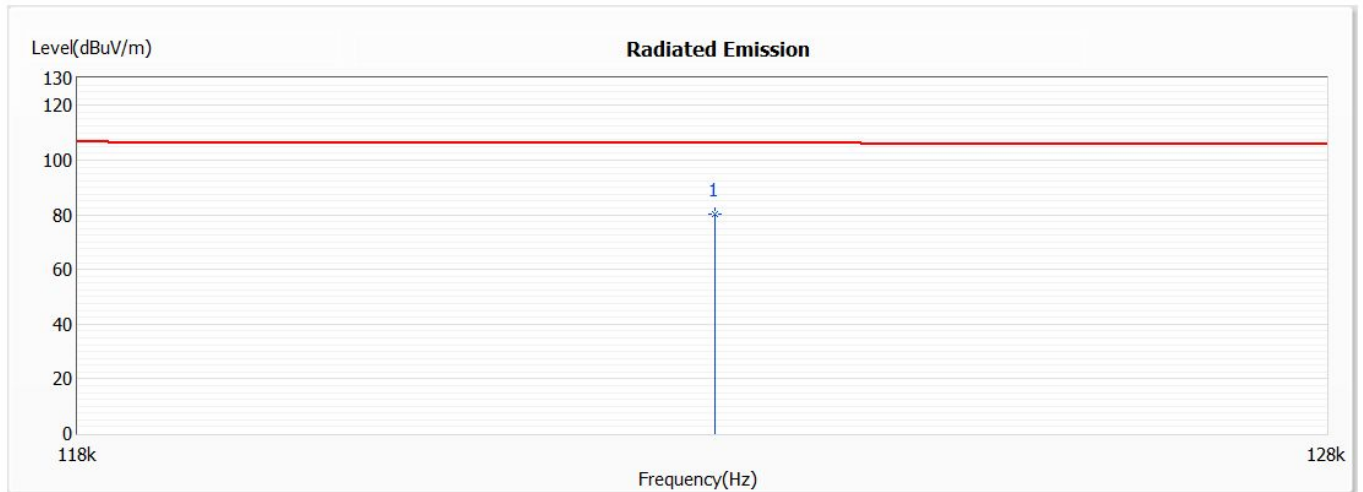
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.123	81.00	125.81	-44.81	60.87	20.13	PK

Note:

1. The reading levels are peak values.
2. Measurement Level = Reading Level + Correct Factor.

Product : WIRELESS POWER CHARGER UNIT
 Test Item : Radiated Emission
 Test date : 2021/06/16
 Test Mode : Mode 1: Transmit

Horizontal



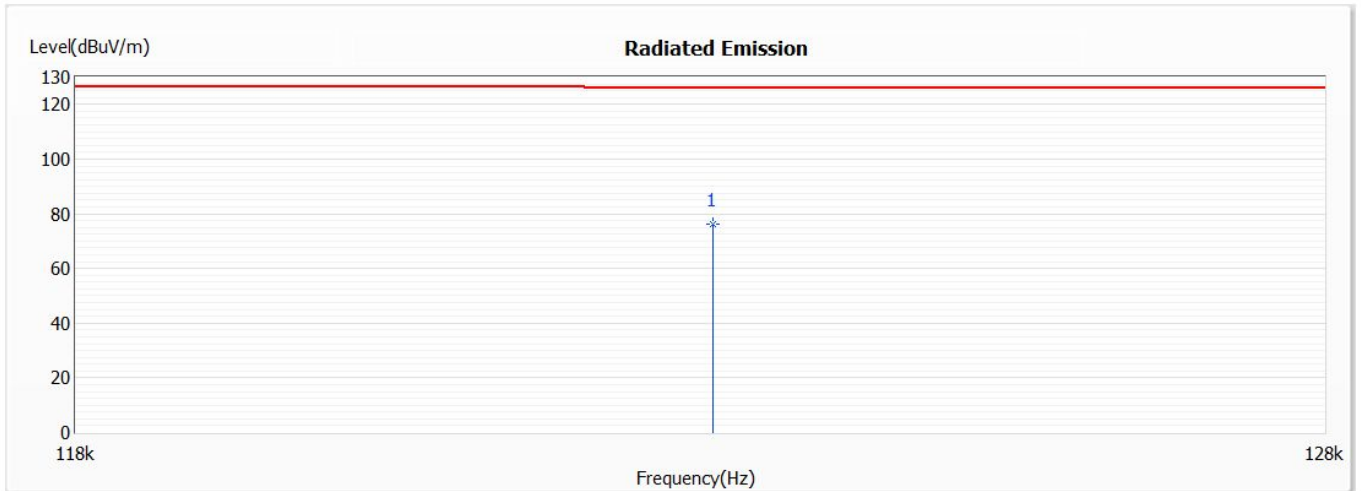
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.123	80.30	105.81	-25.51	60.17	20.13	AV

Note:

1. The reading levels are Average values.
2. Measurement Level = Reading Level + Correct Factor.

Product : WIRELESS POWER CHARGER UNIT
 Test Item : Radiated Emission
 Test date : 2021/06/16
 Test Mode : Mode 1: Transmit

Vertical



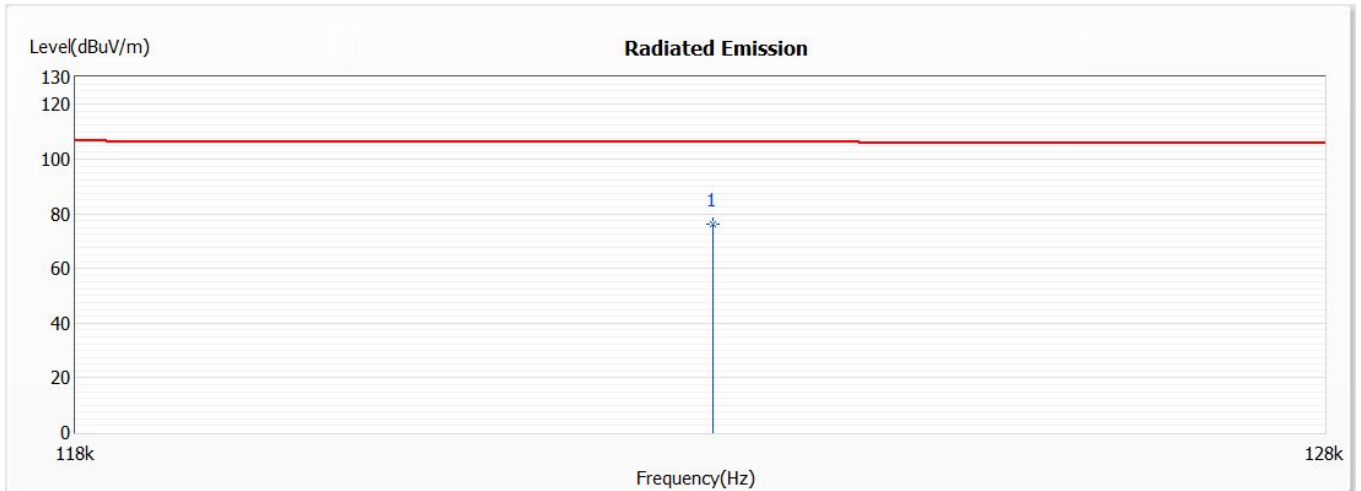
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.123	76.30	125.81	-49.51	56.17	20.13	PK

Note:

1. The reading levels are Average values.
2. Measurement Level = Reading Level + Correct Factor.

Product : WIRELESS POWER CHARGER UNIT
 Test Item : Radiated Emission
 Test date : 2021/06/16
 Test Mode : Mode 1: Transmit

Vertical



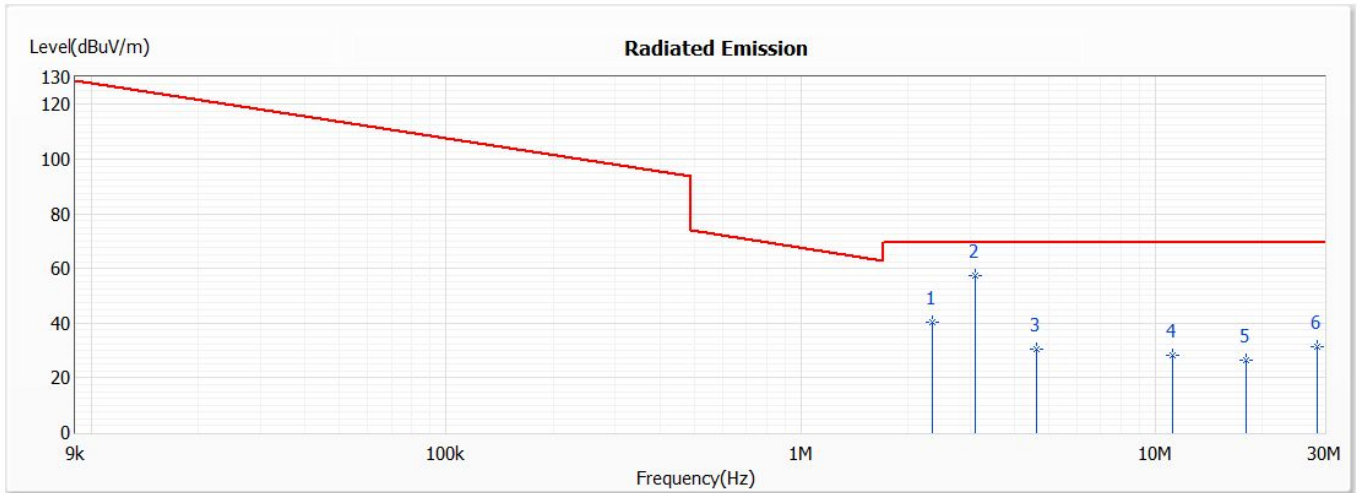
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.123	76.00	105.81	-29.81	55.87	20.13	AV

Note:

1. The reading levels are Average values.
2. Measurement Level = Reading Level + Correct Factor.

Product : WIRELESS POWER CHARGER UNIT
 Test Item : Radiated Emission
 Test date : 2021/06/16
 Test Mode : Mode 1: Transmit

9kHz~30MHz_Horizontal



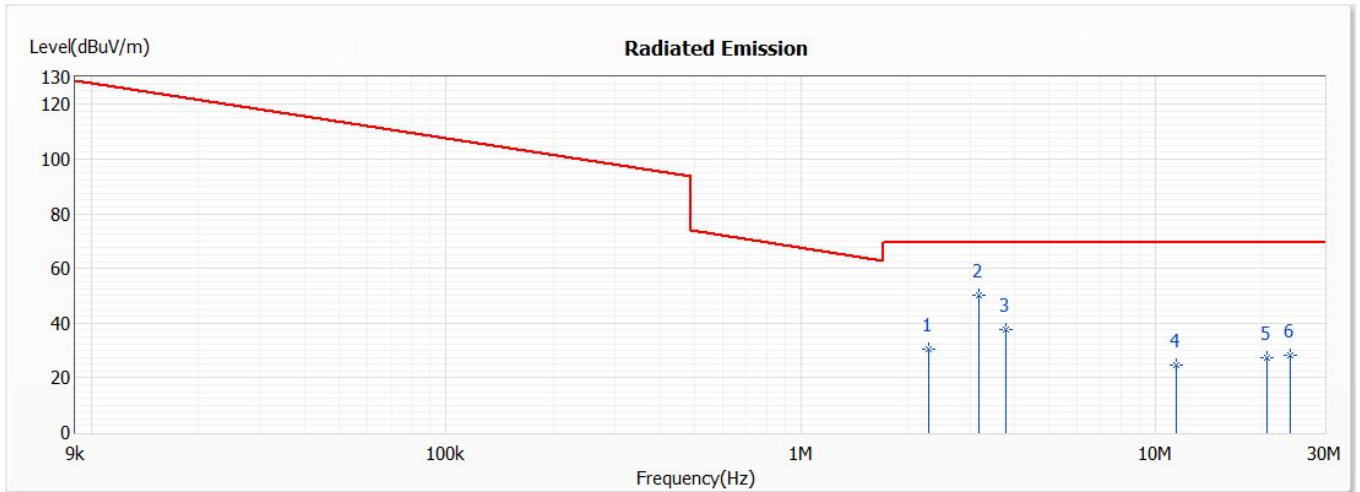
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2.348	40.35	69.54	-29.19	20.25	20.10	QP
* 2	3.098	57.19	69.54	-12.35	37.08	20.11	QP
3	4.628	30.43	69.54	-39.11	10.32	20.11	QP
4	11.166	28.08	69.54	-41.46	8.01	20.07	QP
5	18.064	26.31	69.54	-43.23	6.44	19.87	QP
6	28.650	31.49	69.54	-38.05	11.48	20.01	QP

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “ * ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WIRELESS POWER CHARGER UNIT
 Test Item : Radiated Emission
 Test date : 2021/06/16
 Test Mode : Mode 1: Transmit

9kHz~30MHz_Vertical



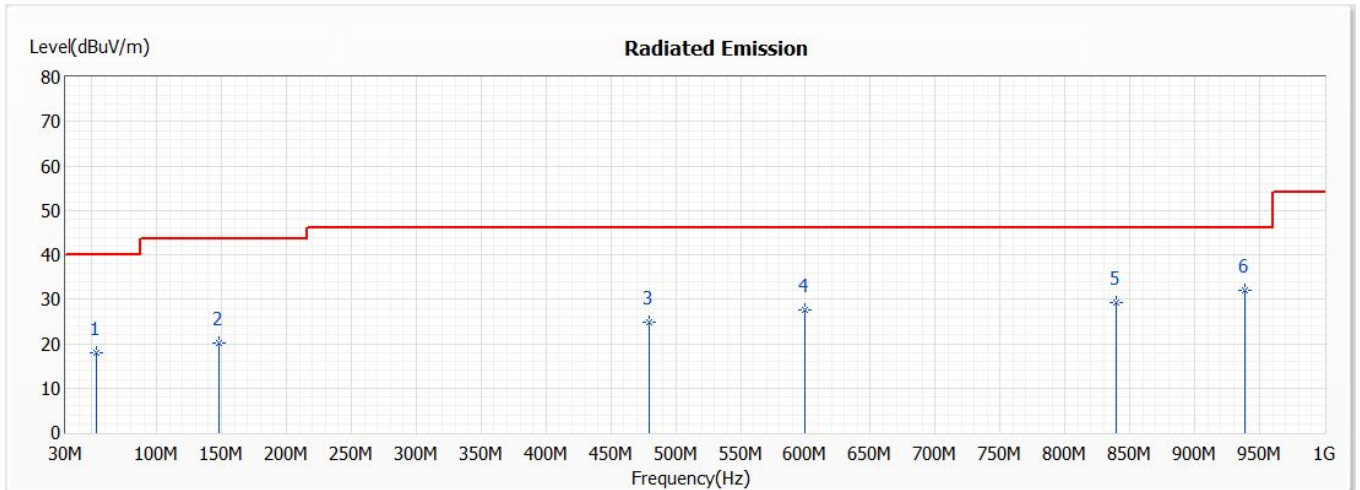
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2.288	30.55	69.54	-38.99	10.45	20.10	QP
* 2	3.188	50.28	69.54	-19.26	30.16	20.12	QP
3	3.788	37.52	69.54	-32.02	17.38	20.14	QP
4	11.466	24.64	69.54	-44.90	4.57	20.07	QP
5	20.583	27.49	69.54	-42.05	7.76	19.73	QP
6	23.972	28.10	69.54	-41.44	8.33	19.77	QP

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “*” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WIRELESS POWER CHARGER UNIT
 Test Item : General Radiated Emission
 Test date : 2021/06/16
 Test Mode : Mode 1: Transmit

30MHz~1GHz_Horizontal



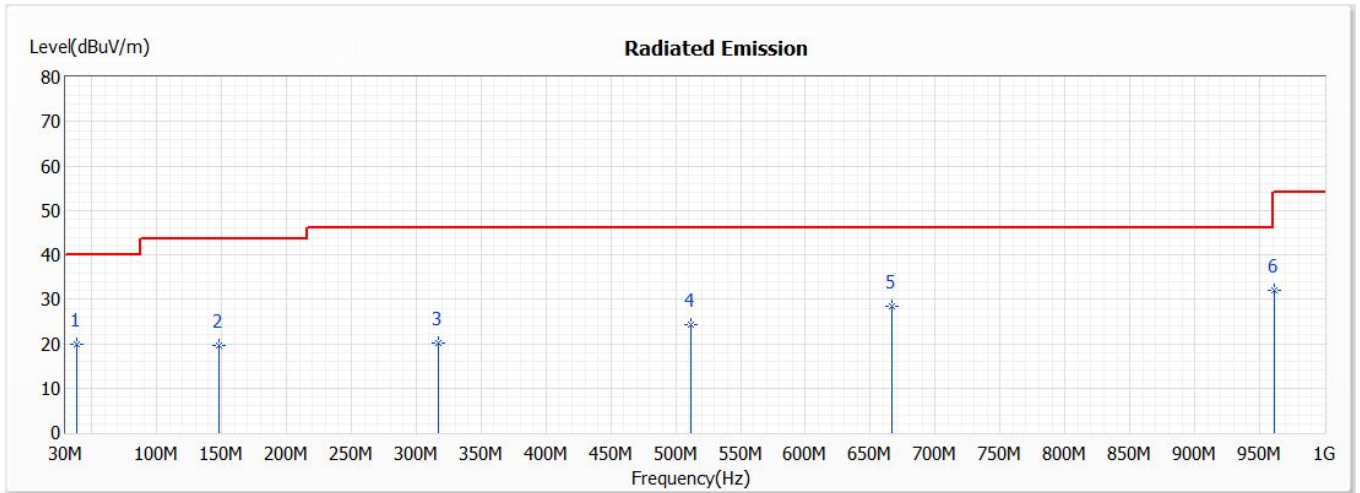
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	53.280	17.94	40.00	-22.06	28.54	-10.60	QP
2	148.340	20.20	43.50	-23.30	30.58	-10.38	QP
3	479.110	24.85	46.00	-21.15	30.37	-5.52	QP
4	599.390	27.60	46.00	-18.40	30.46	-2.86	QP
5	838.980	29.32	46.00	-16.68	29.03	0.29	QP
* 6	938.890	31.99	46.00	-14.01	30.25	1.74	QP

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “*” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WIRELESS POWER CHARGER UNIT
 Test Item : General Radiated Emission
 Test date : 2021/06/16
 Test Mode : Mode 1: Transmit

30MHz~1GHz_Vertical



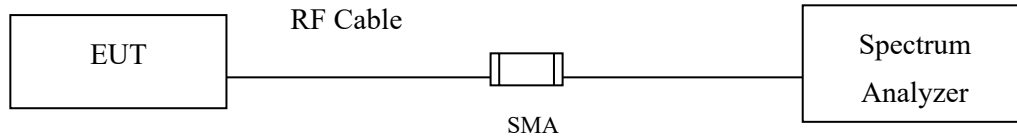
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	38.730	19.94	40.00	-20.06	31.03	-11.09	QP
2	148.340	19.63	43.50	-23.87	30.01	-10.38	QP
3	317.120	20.10	46.00	-25.90	29.40	-9.30	QP
4	512.090	24.33	46.00	-21.67	29.22	-4.89	QP
* 5	666.320	28.46	46.00	-17.54	30.70	-2.24	QP
6	961.200	31.90	54.00	-22.10	29.89	2.01	QP

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “ * ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

4. Occupied Bandwidth

4.1. Test Setup

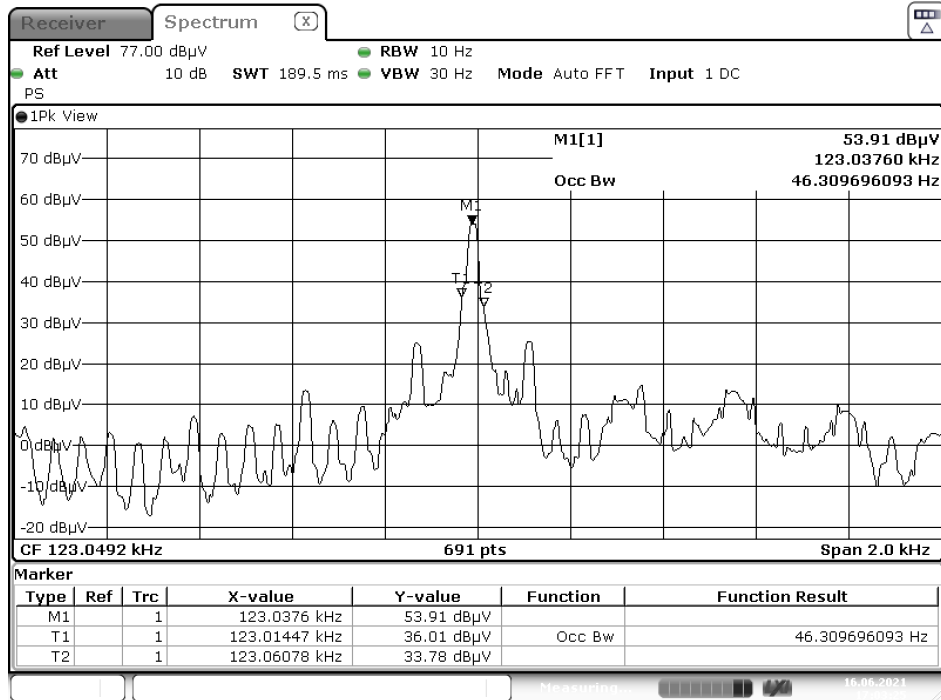


4.2. Test Procedure

The EUT was setup according to ANSI C63.4, 2014; tested according to IEEE C63.10 Section 6.9.2 for compliance to FCC 47CFR 15.215(c) requirements.

4.3. Test Result of Occupied Bandwidth

Product : WIRELESS POWER CHARGER UNIT
 Test Item : Occupied Bandwidth
 Test date : 2021/07/16
 Test Mode : Mode 1: Transmit



Date: 16.JUN.2021 17:03:25

5. EMI Reduction Method During Compliance Testing

No modification was made during testing.