

RF Exposure Report

Report No.: SA210128C01

FCC ID: PZWCHM80W

Test Model: CH-M80W

Received Date: Jan. 28, 2021

Test Date: Mar. 24, 2021

Issued Date: Mar. 25, 2021

Applicant: DENSO WAVE INCORPORATED

Address: 1 Yoshiike Kusagi Agui-cho, Chita-gun Aichi 470-2297, Japan

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, TAIWAN

**FCC Registration /
Designation Number:** 788550 / TW0003



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 General Information	5
2.1 General Description of EUT	5
2.2 Description of Test Modes	5
3 RF Exposure	6
3.1 Description of Support Units	6
4.1.1 Configuration of System under Test	6
4.2 Test Setup	7
4.3 Test Instruments	7
4.4 Limits for Maximum Permissible Exposure (MPE).....	8
4.5 Test Point Description	8
5. Calculation Result of Maximum Conducted Power	9
6. Photographs of the Test Configuration	13

Release Control Record

Issue No.	Description	Date Issued
SA210128C01	Original release	Mar. 25, 2021

1 Certificate of Conformity

Product: Charger

Brand: DENSO

Test Model: CH-M80W

Sample Status: Engineering sample

Applicant: DENSO WAVE INCORPORATED

Test Date: Mar. 24, 2021

Standards: FCC Part 1 (Section 1.1307(b), Section 1.1310)
FCC Part 2 (Section 2.1091)

References Test IEEE C95.3 -2002

Guidance: KDB 680106 D01 RF Exposure Wireless Charging Apps v03r01

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Mar. 25, 2021
Polly Chen / Specialist

Approved by :  , **Date:** Mar. 25, 2021
Bruce Chen / Senior Project Engineer

2 General Information

2.1 General Description of EUT

Product	Charger
Brand	DENSO
Test Model	CH-M80W
Sample Status	Engineering sample
Power Supply Rating	12.0Vdc (from adapter)
Modulation Type	FSK/ASK
Operating Frequency	144kHz
Antenna Type	Coil antenna (The Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible)
Field Strength	-2.5dBuV/m
Max output power for charger coil	9W
Max surface coupling area	27.04cm
Accessory Device	NA
Data Cable Supplied	NA

Note:

- The EUT uses following adapter and battery.

Adapter (Option)	
Brand	Sunny
Model	SYS1548-5012-T3
Input Power	100-240Vac, 1.5A MAX, 50-60Hz
Output Power	+12.0Vdc, 4.16A
Power cable	DC: 1.16m cable with one core AC: 1.71m non-shielded cable without core

Battery (Support unit)	
Brand	DENSO
Model	BT1S-W
Rating	3.85Vdc, 2900mAh, 11.16Wh

2.2 Description of Test Modes

1 channel is provided to this EUT

Channel	Freq. (kHz)
1	144

3 RF Exposure

3.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

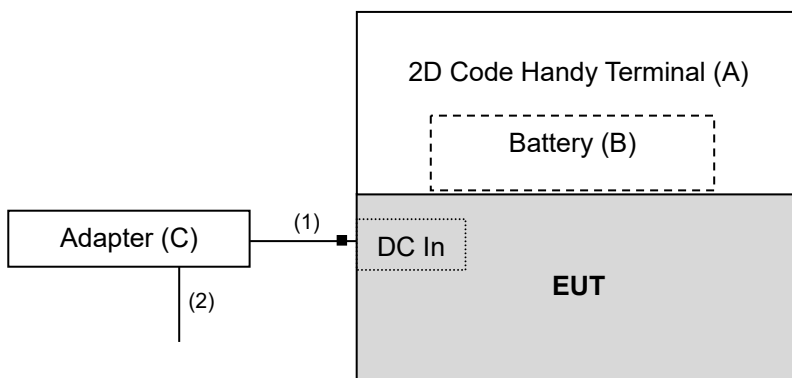
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	2D Code Handy Terminal	DENSO	BHT-M80-QWG	NA	PZWBHTM80QWG	Provided by manufacturer
B.	Battery	DENSO	BT1S-W	NA	NA	Provided by manufacturer
C.	Adapter	Sunny	SYS1548-5012-T3	NA	NA	Option

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Power cable	1	1.16	-	1	Option
2.	Power cable	1	1.71	N	0	Option

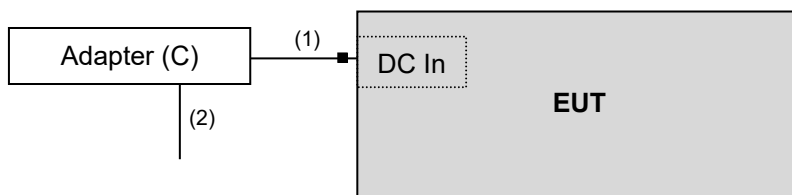
Note: The core(s) is(are) originally attached to the cable(s).

3.1.1 Configuration of System under Test

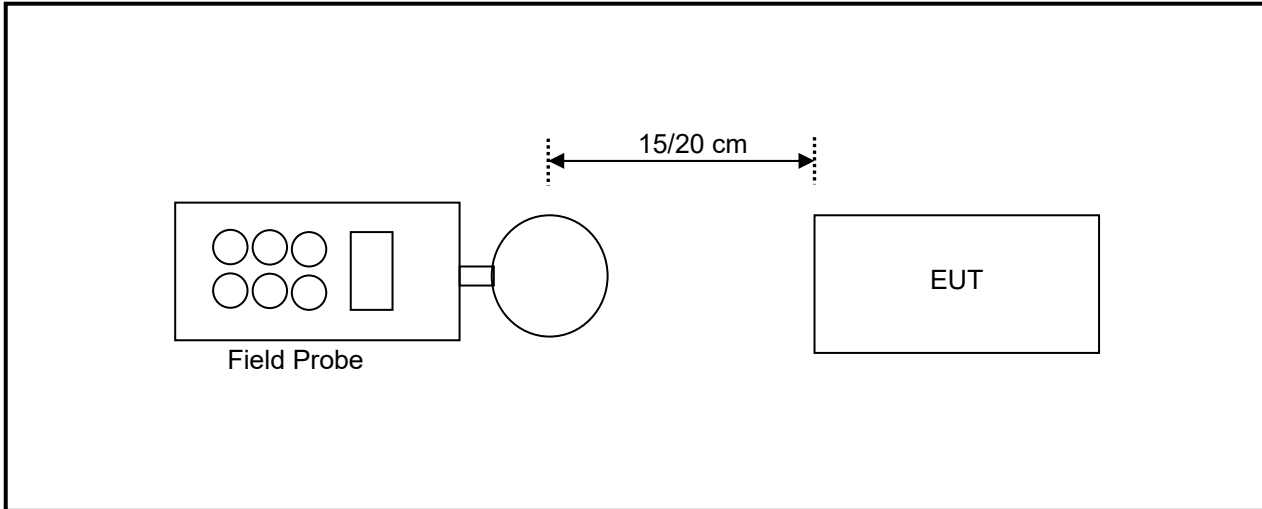
Charging Mode:



Standby Mode:



3.2 Test Setup



Note: Measurements were made from all sides and the top of the primary/client pair, with the 15/20cm measured from the center of the probe(s) to the edge of the device.

3.3 Test Instruments

Description	Brand	Model No.	Frequency Range	Calibrated Date	Calibrated Until
Electric Field Meter	EMC Master	SMP2 dual	-	Nov. 03, 2020	Nov. 02, 2021
Field Probe	EMC Master	WP400	-	Nov. 03, 2020	Nov. 02, 2021

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa RF Chamber

3.4 Limits for Maximum Permissible Exposure (MPE)

§ 1.1310 The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency(RF) radiation as specified in § 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of § 2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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 Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(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
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

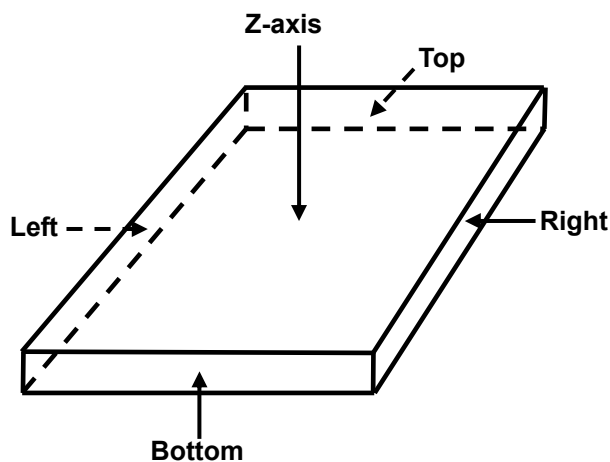
NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

680106 D01 RF Exposure Wireless Charging Apps v03r01

The aggregate H-fields strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.

3.5 Test Point Description



4. Calculation Result of Maximum Conducted Power

For 144kHz (Charging Mode)

Charging Mode with Terminal, battery 10% Charge

E-Field (15cm)								E-Field (20cm)
Frequency (kHz)	EUT Side	Left	Right	Top	Bottom	Z-axis (Above)	Z-axis (Below)	Z-axis (Above)
144	Max E-field (V/m)	1.5540	1.5390	1.5180	1.4690	1.5840	1.4740	1.3090
144	Limit (V/m)	614	614	614	614	614	614	614
144	Margin (V/m)	-612.4460	-612.4610	-612.4820	-612.5310	-612.4160	-612.5260	-612.6910
144	50 % Limit (V/m)	307	307	307	307	307	307	307
144	50 % Margin (V/m)	-305.4460	-305.4610	-305.4820	-305.5310	-305.4160	-305.5260	-305.6910

H-Field (15cm)								H-Field (20cm)
Frequency (kHz)	EUT Side	Left	Right	Top	Bottom	Z-axis (Above)	Z-axis (Below)	Z-axis (Above)
144	Max H-field (uT)	0.4280	0.4320	0.4220	0.4730	0.5030	0.4750	0.3610
144	Max H-field (A/m)	0.3424	0.3456	0.3376	0.3784	0.4024	0.3800	0.2888
144	Limit (A/m)	1.63	1.63	1.63	1.63	1.63	1.63	1.63
144	Margin (A/m)	-1.2876	-1.2844	-1.2924	-1.2516	-1.2276	-1.2500	-1.3412
144	50 % Limit (A/m)	0.815	0.815	0.815	0.815	0.815	0.815	0.815
144	50 % Margin (A/m)	-0.4726	-0.4694	-0.4774	-0.4366	-0.4126	-0.4350	-0.5262

Measurements were made from all sides and the top of the primary/client pair, with the 15/20cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

Charging Mode with Terminal, battery 50% Charge

E-Field (15cm)								E-Field (20cm)
Frequency (kHz)	EUT Side	Left	Right	Top	Bottom	Z-axis (Above)	Z-axis (Below)	Z-axis (Above)
144	Max E-field (V/m)	1.4630	1.4470	1.4260	1.3770	1.4980	1.3860	1.2180
144	Limit (V/m)	614	614	614	614	614	614	614
144	Margin (V/m)	-612.5370	-612.5530	-612.5740	-612.6230	-612.5020	-612.6140	-612.7820
144	50 % Limit (V/m)	307	307	307	307	307	307.0000	307
144	50 % Margin (V/m)	-305.5370	-305.5530	-305.5740	-305.6230	-305.5020	-305.6140	-305.7820

H-Field (15cm)								H-Field (20cm)
Frequency (kHz)	EUT Side	Left	Right	Top	Bottom	Z-axis (Above)	Z-axis (Below)	Z-axis (Above)
144	Max H-field (uT)	0.3970	0.4010	0.3940	0.4420	0.4760	0.3840	0.3340
144	Max H-field (A/m)	0.3176	0.3208	0.3152	0.3536	0.3808	0.3072	0.2672
144	Limit (A/m)	1.63	1.63	1.63	1.63	1.63	1.63	1.63
144	Margin (A/m)	-1.3124	-1.3092	-1.3148	-1.2764	-1.2492	-1.3228	-1.3628
144	50 % Limit (A/m)	0.815	0.815	0.815	0.815	0.815	0.815	0.815
144	50 % Margin (A/m)	-0.4974	-0.4942	-0.4998	-0.4614	-0.4342	-0.5078	-0.5478

Measurements were made from all sides and the top of the primary/client pair, with the 15/20cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

Charging Mode with Terminal, battery Max Charge

E-Field (15cm)								E-Field (20cm)
Frequency (kHz)	EUT Side	Left	Right	Top	Bottom	Z-axis (Above)	Z-axis (Below)	Z-axis (Above)
144	Max E-field (V/m)	1.3680	1.3570	1.3390	1.2870	1.4060	1.2970	1.1260
144	Limit (V/m)	614	614	614	614	614	614	614
144	Margin (V/m)	-612.6320	-612.6430	-612.6610	-612.7130	-612.5940	-612.7030	-612.8740
144	50 % Limit (V/m)	307	307	307	307	307	307	307
144	50 % Margin (V/m)	-305.6320	-305.6430	-305.6610	-305.7130	-305.5940	-305.7030	-305.8740

H-Field (15cm)								H-Field (20cm)
Frequency (kHz)	EUT Side	Left	Right	Top	Bottom	Z-axis (Above)	Z-axis (Below)	Z-axis (Above)
144	Max H-field (uT)	0.3660	0.3710	0.3650	0.4150	0.4460	0.3570	0.3080
144	Max H-field (A/m)	0.2928	0.2968	0.2920	0.3320	0.3568	0.2856	0.2464
144	Limit (A/m)	1.63	1.63	1.63	1.63	1.63	1.63	1.63
144	Margin (A/m)	-1.3372	-1.3332	-1.3380	-1.2980	-1.2732	-1.3444	-1.3836
144	50 % Limit (A/m)	0.815	0.815	0.815	0.815	0.815	0.815	0.815
144	50 % Margin (A/m)	-0.5222	-0.5182	-0.5230	-0.4830	-0.4582	-0.5294	-0.5686

Measurements were made from all sides and the top of the primary/client pair, with the 15/20cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

For 144kHz (Standby Mode)
Standby Mode

E-Field (15cm)								E-Field (20cm)
Frequency (kHz)	EUT Side	Left	Right	Top	Bottom	Z-axis (Above)	Z-axis (Below)	Z-axis (Above)
144	Max E-field (V/m)	0.4760	0.4830	0.4960	0.4630	0.5360	0.5130	0.3920
144	Limit (V/m)	614	614	614	614	614	614	614
144	Margin (V/m)	-613.5240	-613.5170	-613.5040	-613.5370	-613.4640	-613.4870	-613.6080
144	50 % Limit (V/m)	307	307	307	307	307	307	307
144	50 % Margin (V/m)	-306.5240	-306.5170	-306.5040	-306.5370	-306.4640	-306.4870	-306.6080

H-Field (15cm)								H-Field (20cm)
Frequency (kHz)	EUT Side	Left	Right	Top	Bottom	Z-axis (Above)	Z-axis (Below)	Z-axis (Above)
144	Max H-field (uT)	0.0458	0.0455	0.0467	0.0458	0.0473	0.0454	0.0327
144	Max H-field (A/m)	0.0366	0.0364	0.0374	0.0366	0.0378	0.0363	0.0262
144	Limit (A/m)	1.63	1.63	1.63	1.63	1.63	1.63	1.63
144	Margin (A/m)	-1.5934	-1.5936	-1.5926	-1.5934	-1.5922	-1.5937	-1.6038
144	50 % Limit (A/m)	0.815	0.815	0.815	0.815	0.815	0.815	0.815
144	50 % Margin (A/m)	-0.7784	-0.7786	-0.7776	-0.7784	-0.7772	-0.7787	-0.7888

Measurements were made from all sides and the top of the primary/client pair, with the 15/20cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

5. Photographs of the Test Configuration

Please refer to the attached file (Test Setup Photo).

--- END ---