RADIO TEST REPORT

For

Mid Ocean Brands B.V.

Wireless charger

Test Model: MO6399

Additional Model No.: Please Refer to Page 6

Prepared for	:	Mid Ocean Brands B.V.
Address	:	7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
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Date of receipt of test sample	:	November 10, 2021
Number of tested samples	:	2
Serial number	:	Prototype
Date of Test	:	November 10, 2021 ~ November 16, 2021
Date of Report	:	November 17, 2021

RADIO TEST REPORT

ETSI EN 303 417 V1.1.1 (2017-09)

Wireless power transmission systems, using technologies other than radio frequency beam in the 19 - 21 kHz, 59 - 61 kHz, 79 - 90 kHz, 100 - 300 kHz, 6 765 - 6 795 kHz ranges; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

Report Reference No.	:	**LCS211108127AEB**
Date Of Issue.....	:	November 17, 2021
Testing Laboratory Name.....	:	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address.....	:	Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao' an District, Shenzhen, Guangdong, China
Testing Location/Procedure.....	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name.....	:	**Mid Ocean Brands B.V.**
Address.....	:	7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Test Specification		
Standard.....	:	ETSI EN 303 417 V1.1.1 (2017-09)
Test Report Form No.	:	LCSEMC-1.0
TRF Originator.....	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF.....	:	Dated 2011-03

Test Item Description.....	:	**Wireless charger**
Trade Mark.....	:	N/A
Test Model.....	:	MO6399
Ratings.....	:	Input: 5V⎓2A, 9V⎓2A Output: 5V⎓1A, 7.5V⎓1A, 9V⎓1.1A Wireless Output power: 10W
Result	:	**Positive**

Compiled by:	Supervised by:	Approved by:
Kevin Huang	Jin Wang	
Kevin Huang/ Administrator	Jin Wang/ Technique principal	Gavin Liang/ Manager

RADIO -- TEST REPORT

Test Report No. : LCS211108127AEB	November 17, 2021 Date of issue

Test Model.....	:	MO6399
EUT.....	:	Wireless charger
Applicant.....	:	**Mid Ocean Brands B.V.**
Address.....	:	7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Telephone.....	:	/
Fax.....	:	/
Manufacturer.....	:	**114628**
Address.....	:	/
Telephone.....	:	/
Fax.....	:	/
Factory	:	**114628**
Address.....	:	/
Telephone.....	:	/
Fax.....	:	/

Test Result	Positive

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revisions	Revised By
000	November 17, 2021	Initial Issue	Gavin Liang

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1. Product Description for Equipment Under Test (EUT)

EUT	: Wireless charger
Test Model	: MO6399
Additional Model	: MO6392, MO6453
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Power Supply	: Input: 5V⎓2A, 9V⎓2A Output: 5V⎓1A, 7.5V⎓1A, 9V⎓1.1A Wireless Output power: 10W
Hardware Version	: WD_Q5_10W V2.1
Software Version	: QX:4IDA
Wireless Charging	:
Operating Frequency	: 110.0~205.0KHz
Modulation Type	: ASK
Antenna Type	: Coil Antenna

1.2. Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate
HONOR	Mobile phone	V30Pro	---	CE
OPPO	Adapter	OP52KAUH	--	CE

Note: Phone equipment is provided by the laboratory.

1.3. External I/O

I/O Port Description	Quantity	Cable
Micro USB Port	1	N/A

1.4. Objective

The following report of is prepared on behalf of the **Mid Ocean Brands B.V.** in accordance with ETSI EN 303 417 V1.1.1 (2017-09): Wireless power transmission systems, using technologies other than radio frequency beam in the 19 - 21 kHz, 59 - 61 kHz, 79 - 90 kHz, 100 - 300 kHz, 6 765 - 6 795 kHz ranges; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU.

The objective is to determine compliance with ETSI EN 303 417 V1.1.1 (2017-09).

1.5. Test Methodology

All measurements contained in this report were conducted with ETSI EN 303 417 V1.1.1 (2017-09).

1.6. Measurement Uncertainty (95% confidence levels, k=2)

Test Item		Uncertainty
Radio Frequency	:	0.9×10^{-4}
Total RF Power, Conducted	:	1.0 dB
RF Power Density, Conducted	:	1.8 dB
Spurious Emissions, Conducted	:	1.8 dB
All Emissions, Radiated	:	3.1 dB
Temperature	:	0.5°C
Humidity	:	1 %
DC And Low Frequency Voltages	:	1 %

1.7. Description of Test Facility

NVLAP Accreditation Code is 600167-0.
FCC Designation Number is CN5024.
CAB identifier is CN0071.
CNAS Registration Number is L4595.

1.8. Description Of Test Mode

The EUT has been tested under typical operating condition. No software used to control the EUT for staying in transmitting mode for testing.

***Note: The EUT has been tested under normal condition in this report , and only recorded the worst test data in the report.

2. SYSTEM TEST CONFIGURATION

2.1. Justification

The system was configured for testing in engineering mode.

2.2. EUT Exercise Software

N/A.

2.3. Special Accessories

N/A.

2.4. Block Diagram/Schematics

Please refer to the related document.

2.5. Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

2.6. Configuration of Test Setup

Please refer to the test setup photo.

3. SUMMARY OF TEST RESULTS

Reference Clause No.	Description Of Test Item	Result
§4.3.2	Permitted range of operating frequencies	Compliant
§4.3.3	Operating frequency range(s) (OFR)	Compliant
§4.3.4	H-field requirements	Compliant
§4.3.5	Transmitter spurious emissions	Compliant
§4.3.6	Transmitter out of band (OOB) emissions	Compliant
§4.3.7	WPT system unwanted conducted emissions	N/A
§4.4.2	Receiver blocking	Compliant

Note: N/A means not applicable

4. PERMITTED RANGE OF OPERATING FREQUENCIES

4.1. Definition

The permitted range of operating frequencies denotes the frequency ranges set out in Table 1. It likewise denotes the respective frequency range for accommodation of the fundamental WPT frequency of the EUT within its operating frequency range (OFR).

Table 1: WPT systems within the permitted frequency bands below 30MHz

	WPT frequency range	Frequency Bands	WPT systems
Transmit and Receive	1	19 kHz to 21 kHz	WPT systems
Transmit and Receive	2	59 kHz to 61 kHz	WPT systems
Transmit and Receive	3	79 kHz to 90 kHz	WPT systems
Transmit and Receive	4	100 kHz to 119 kHz	WPT systems
Transmit and Receive		119 kHz to 140 kHz	WPT systems
Transmit and Receive		140 kHz to 148,5 kHz	WPT systems
Transmit and Receive		148.5 kHz to 300 kHz	WPT systems
Transmit and Receive	5	6765kHz to 6795 kHz	WPT systems

4.2. Limit

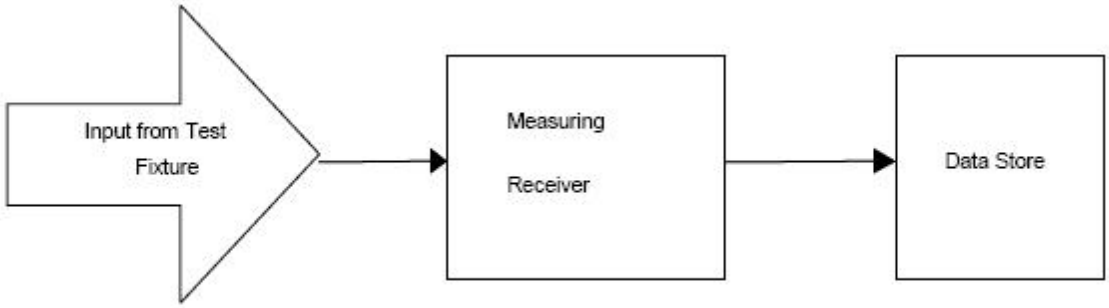
The permitted range of operating frequency range(s) for intentional emissions shall be within 19 - 21 kHz, 59 - 61 kHz, 79 - 90 kHz, 100 - 300 kHz, 6 765 - 6 795 kHz.

Table 2: Overview of operational modes within a WPT system

Operational Mode	Set-up	Function of base station	Function of mobile device	Test scenario	Conformance Requirements
Mode 1: base station in stand-by, idle mode	Single device	Transmitter	Not applicable	Single radiation test (TX) with the base station/charging pad. The test set-up as described in clause 6.1.2 shall be used.	• Operating frequency range (clause 4.3.3) • H-Field emission (clause 4.3.4) • TX spurious (clauses 4.3.5, 4.3.6 and 4.3.7) • Performance criteria test (RX test) (clause 4.4)
Mode 2: Communication before charging, adjustment charging mode / position	In combination	TX and RX	TX and RX	Specific test setup, declared by the manufacturer. Manufacturer shall declare the maximal distance between base station and mobile device the WPT system is able to communicate (distance D). The test setup- up shall be performed with the largest communication distance. The test set-up as described in clause 6.1.3 shall be used.	• Operating frequency range (clause 4.3.3) • H-Field emission (clause 4.3.4) • TX spurious (clauses 4.3.5, 4.3.6 and 4.3.7) • Performance criteria test (RX test) (clause 4.4) • Wanted performance criteria test (RX test) (clause 4.4)
Mode 3: Communication	WPT system alignment	TX and RX	TX and RX	Worst case alignment	• Operating frequency range (clause 4.3.3) • H-Field emission (clause 4.3.4) • TX spurious (clauses 4.3.5, 4.3.6 and 4.3.7) • Performance criteria test (RX test) (clause 4.4) • Wanted performance criteria test (RX test) (clause 4.4)
Mode 4: energy transmission	WPT system alignment	TX and RX	TX and RX	Both tests can be performed within one set-up, worst-case alignment. The test set-up as described in clause 6.1.4 shall be used.	

4.3. Test Procedure

Please refer to ETSI EN 303 417 V1.1.1 (2017-09) clause 6 for the measurement method.



4.4. Test Result

The manufacturer declared that the WPT system is designed to operate in the frequency ranges 110KHz~205KHz. The justification/test shall be performed for Operating frequency ranges(OFR).

5. OPERATING FREQUENCY RANGE(S) (OFR)

5.1. Definition

The operating frequency range is the frequency range over which the WPT system is intentionally transmitting (all operational modes, see clause 4.2.3, Table 2).

The operating frequency range(s) of the WPT system are determined by the lowest (fL) and highest frequency (fH) as occupied by the power envelope.

The WPT system could have more than one operating frequency range.

For a single frequency systems the OFR is equal to the occupied bandwidth (OBW) of the WPT system.

For multi-frequency systems the OFR is described in figures 2 and 3.

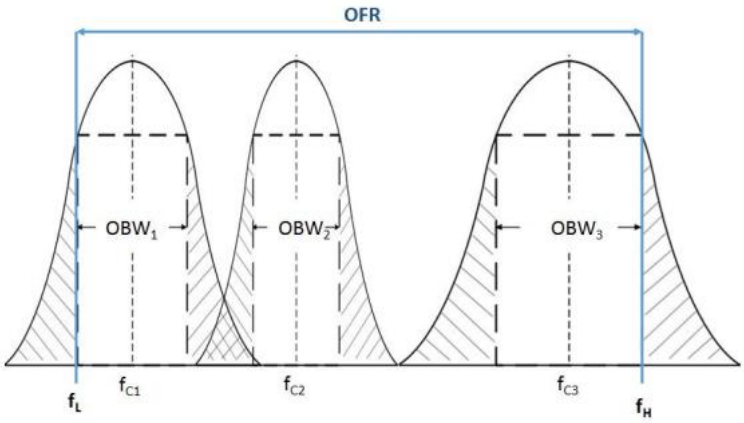


Figure 2: OFR of a multi - frequency WPT system within one frequency range of Table 2 and within one WPT system cycle time

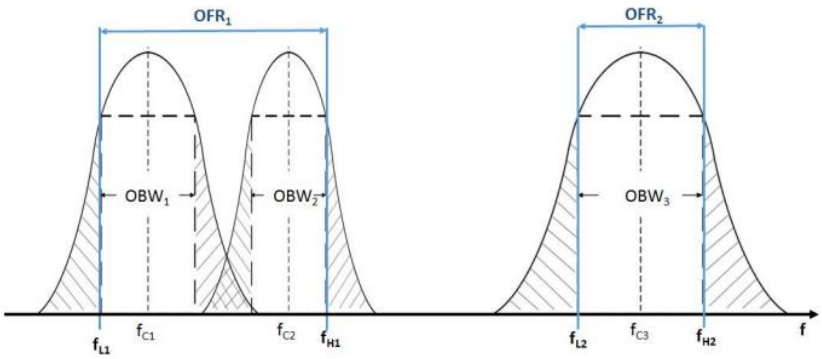


Figure 3: OFR of a multi - frequency WPT system within two frequency ranges of Table 2 and within one WPT system cycle time

5.2. Limit

The operating frequency range for emissions shall be within one of the following limits: 19 - 21 kHz, 59 - 61 kHz, 79 - 90 kHz, 100 - 300 kHz, 6 765 - 6 795 kHz.

5.3. Test Procedure

Please refer to ETSI EN 303 417 V1.1.1 (2017-09) clause 6 for the measurement method.

5.4. Test Result

Pass

Test Voltage: DC 9V (All voltages are tested and only recorded the worst cast which voltage is DC 9V)

Test Mode: Mode 3 (Worst Case)

Test Result				
Test Environmental Conditions	Test Voltage (Vdc)	Lower Frequency (KHz)	Upper Frequency (KHz)	Limit
22.3℃, 54.1%	9	110.41	206.48	100KHz<f<300KHz

6. H-FIELD REQUIREMENTS

6.1. Definition

The radiated H-field is defined in the direction of maximum field strength under specified conditions of measurement.

6.2. Limit

The H-field limits are provided in Table 3.

They have been specified for control of any radiated emissions within the OFR originating from the WPT system (power transmission and accompanying data communication).

The H-field limits in Table 3 are EU wide harmonised according to EC Decision 2013/752/EU [i.2]. Further information is available in ERC/REC 70-03 [i.1].

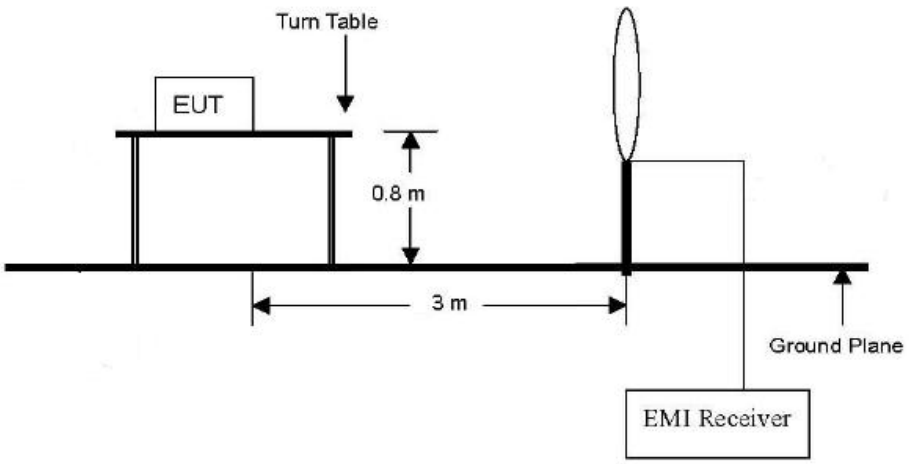
Table 3 H-field limits at 10 m

Frequency range [MHz]	H-field strength limit [dBµA/m at 10 m]	Comments
0,019 ≤ f < 0,021	72	
0,059 ≤ f < 0,061	69,1 descending 10 dB/dec above 0,059 MHz	See note 1
0,079 ≤ f < 0,090	67,8 descending 10 dB/dec above 0,079 MHz	See note 2
0,100 ≤ f < 0,119	42	
0,119 ≤ f < 0,135	66 descending 10 dB/dec above 0,119 MHz	See note 1
0,135 ≤ f < 0,140	42	
0,140 ≤ f < 0,1485	37,7	
0,1485 ≤ f < 0,30	-5	
6,765 ≤ f < 6,795	42	

NOTE 1: Limit is 42 dBµA/m for the following spot frequencies: 60 kHz ± 250 Hz and 129,1 kHz ± 500 Hz.

NOTE 2: At the time of preparation of the present document the feasibility of increased limits for high power wireless power transmission systems to charge vehicles [i.4] was prepared. New specific requirements for such systems (e.g. higher H-field emission limits in the 79 - 90 kHz band) will be reflected within a future revision of the present document.

6.3. Test Setup



6.4. Test Procedure

Please refer to ETSI EN 303 417 V1.1.1 (2017-09) clause 6.1&6.2 for the measurement method.

6.5. Test Result

Pass

Test Voltage: DC 9V (All voltages are tested and only recorded the worst cast which voltage is DC 9V)

Normal Condition

Test Mode: Mode 1 (Worst Case: TX 165.0KHz)

Frequency (KHz)	Antenna Polarity	Measure Level At 3m (dBuA/m)	Calculated Factor (dB, $-C_3$)	Result At 10m (dBuA/m)	Limit At 10m (dBuA/m)
110.00	--	-2.93	-31.4	-34.33	42
113.00	--	-8.05	-31.4	-39.45	42
117.00	--	4.59	-31.4	-26.81	42
121.00	--	6.45	-31.4	-24.95	42
125.00	--	4.54	-31.4	-26.86	66 descending 3 dB/oct above 0,119 MHz
130.00	--	6.16	-31.4	-25.24	66 descending 3 dB/oct above 0,119 MHz
133.00	--	7.21	-31.4	-24.19	66 descending 3 dB/oct above 0,119 MHz
134.50	--	4.78	-31.4	-26.62	66 descending 3 dB/oct above 0,119 MHz
139.00	--	4.65	-31.4	-26.75	42
144.00	--	3.42	-31.4	-27.98	37.7
147.50	--	3.66	-31.4	-27.74	37.7
150.00	--	8.10	-31.4	-23.30	-5
165.00	--	5.45	-31.4	-25.95	-5
205.00	--	7.79	-31.4	-23.61	-5

***Note:

$H_{10m}=H_{3m}-C_3$

The correct factor C_3 is equal to or approximately equal to 31.4dB

All test modes have been tested and only record the worst result.

Extreme Condition: Lower Temperature -20℃

Test Mode: Mode 1 (Worst Case: TX 165.0KHz)

Frequency (KHz)	Measure Level by Probe at 10cm (dBuA/m)	Calculated Factor (dB)	Result At 10m (dBuA/m)	Limit At 10m (dBuA/m)
110.00	34.56	-60.94	-26.38	42
113.00	34.05	-60.94	-26.89	42
117.00	27.27	-60.94	-33.67	42
121.00	28.42	-60.94	-32.52	42
125.00	28.35	-60.94	-32.59	66 descending 3 dB/oct above 0,119 MHz
130.00	27.91	-60.94	-33.03	66 descending 3 dB/oct above 0,119 MHz
133.00	28.25	-60.94	-32.69	66 descending 3 dB/oct above 0,119 MHz
134.50	34.49	-60.94	-26.45	66 descending 3 dB/oct above 0,119 MHz
139.00	31.58	-60.94	-29.36	42
144.00	28.07	-60.94	-32.87	37.7
147.50	31.04	-60.94	-29.90	37.7
150.00	30.02	-60.94	-30.92	-5
165.00	27.11	-60.94	-33.83	-5
205.00	23.80	-60.94	-37.14	-5

***Note:

The correct factor is -60.94dB which is calculated by the reference level measured by probe in normal condition.

All test modes have been tested and only record the worst result.

Extreme Condition: Lower Temperature +45℃

Test Mode: Mode 1 (Worst Case: TX 165.0KHz)

Frequency (KHz)	Measure Level by Probe at 10cm (dBuA/m)	Calculated Factor (dB)	Result At 10m (dBuA/m)	Limit At 10m (dBuA/m)
110.00	33.03	-60.94	-27.91	42
113.00	32.56	-60.94	-28.38	42
117.00	30.34	-60.94	-30.60	42
121.00	29.87	-60.94	-31.07	42
125.00	25.67	-60.94	-35.27	66 descending 3 dB/oct above 0,119 MHz
130.00	26.70	-60.94	-34.24	66 descending 3 dB/oct above 0,119 MHz
133.00	28.79	-60.94	-32.15	66 descending 3 dB/oct above 0,119 MHz
134.50	33.77	-60.94	-27.17	66 descending 3 dB/oct above 0,119 MHz
139.00	32.23	-60.94	-28.71	42
144.00	28.94	-60.94	-32.00	37.7
147.50	28.55	-60.94	-32.39	37.7
150.00	32.35	-60.94	-28.59	-5
165.00	28.73	-60.94	-32.21	-5
205.00	25.30	-60.94	-35.64	-5

***Note:

The correct factor is -60.94dB which is calculated by the reference level measured by probe in normal condition.

All test modes have been tested and only record the worst result.

7. TRANSMITTER SPURIOUS EMISSIONS

7.1. Definition

The transmitter spurious emissions for a single frequency system are to be considered in frequency ranges defined in Figure 4 (f < fSL and f > fSH).

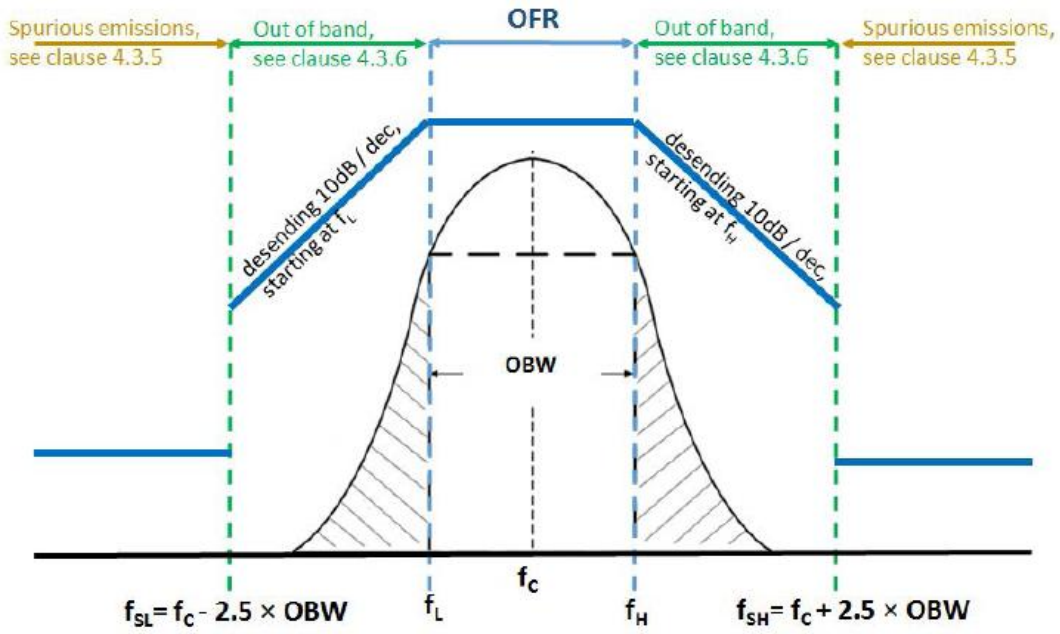


Figure 4

7.2. Limit

The radiated field strength of spurious emissions below 30 MHz shall not exceed the generated H-field given in Table 4.

Table 4

State (see note)	Frequency 9 kHz ⩽ f < 10 MHz	Frequency 10 MHz ⩽ f < 30 MHz
Operating	27 dBμA/m at 9 kHz descending 10 dB/dec	-3,5 dBμA/m
Standby	5,5 dBμA/m at 9 kHz descending 10 dB/dec	-25 dBμA/m
NOTE: "Operating" means mode 2, 3 and 4 according to Table 2; "standby" means mode 1 according to Table 2.		

The power of any radiated spurious emission between 30 MHz and 1 GHz shall not exceed the values given in Table 5.

Table 5

State (see note)	47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 790 MHz	Other frequencies between 30 MHz to 1 000 MHz
Operating	4 nW	250 nW
Standby	2 nW	2 nW
NOTE: "Operating" means mode 2, 3 and 4 according to Table 2; "standby" means mode 1 according to Table 2.		

7.3. Test Setup

Please refer to ETSI EN 303 417 V1.1.1 (2017-09) clause 6.

7.4. Test Procedure

Please refer to ETSI EN 303 417 V1.1.1 (2017-09) clause 6.1&6.2 for the measurement method.

7.5. Test Result

The Worst Test Result for Mode 1 (TX 165.0KHz; 9KHz~30MHz)			
Frequency (MHz)	**Measure Level (dBuA/m)**	**Limit (dBuA/m)**	**Margin (dB)**
0.20	7.52	27 dBµA/m at 9 kHz descending 3 dB/oct (9KHz – 10MHz)	-6.06
0.82	0.85		-6.62
14.75	-16.77	-3,5 dBµA/m (10MHz – 30MHz)	-13.27
21.29	-14.83		-11.33
Test Result for Mode 1 (Standby; 9KHz~30MHz)			
Frequency (MHz)	**Measure Level (dBuA/m)**	**Limit (dBuA/m)**	**Margin (dB)**
0.23	-15.32	5.5 dBµA/m at 9 kHz descending 3 dB/oct (9KHz – 10MHz)	-6.79
0.42	-17.54		-6.41
11.13	-36.75	-25 dBµA/m (10MHz – 30MHz)	-11.75
22.77	-40.12		-15.12

Remark:
Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured. Measured in frequency range from 9k~10th harmonic or 1GHz(which is greater).

Test Voltage: DC 9V (All voltages are tested and only recorded the worst cast which voltage is DC 9V)

The Worst Test Result for Mode 1 (TX 165.0KHz; Above 30MHz)					
Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Pol./Phase	Remark
170.11	-47.18	-36.00	-11.18	Horizontal	Peak
299.41	-48.25	-36.00	-12.25	Horizontal	Peak
736.51	-64.29	-54.00	-10.29	Horizontal	Peak
114.55	-68.24	-54.00	-14.24	Vertical	Peak
362.45	-52.44	-36.00	-16.44	Vertical	Peak
651.15	-68.82	-54.00	-14.82	Vertical	Peak

Note: We have test all modes and only record the worst result.

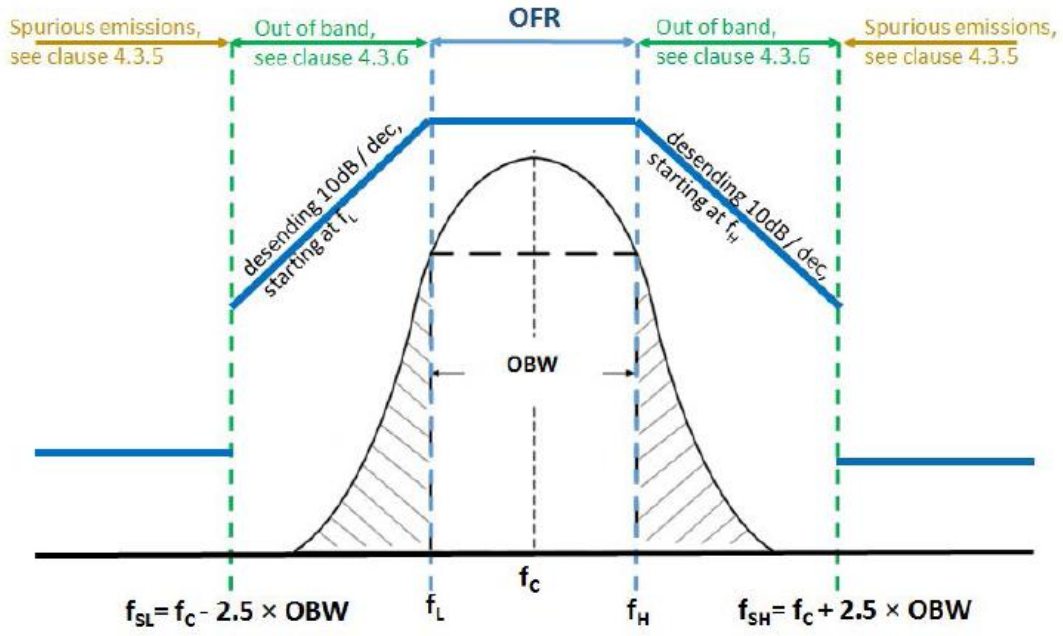
8. TRANSMITTER OUT OF BAND (OOB) EMISSIONS

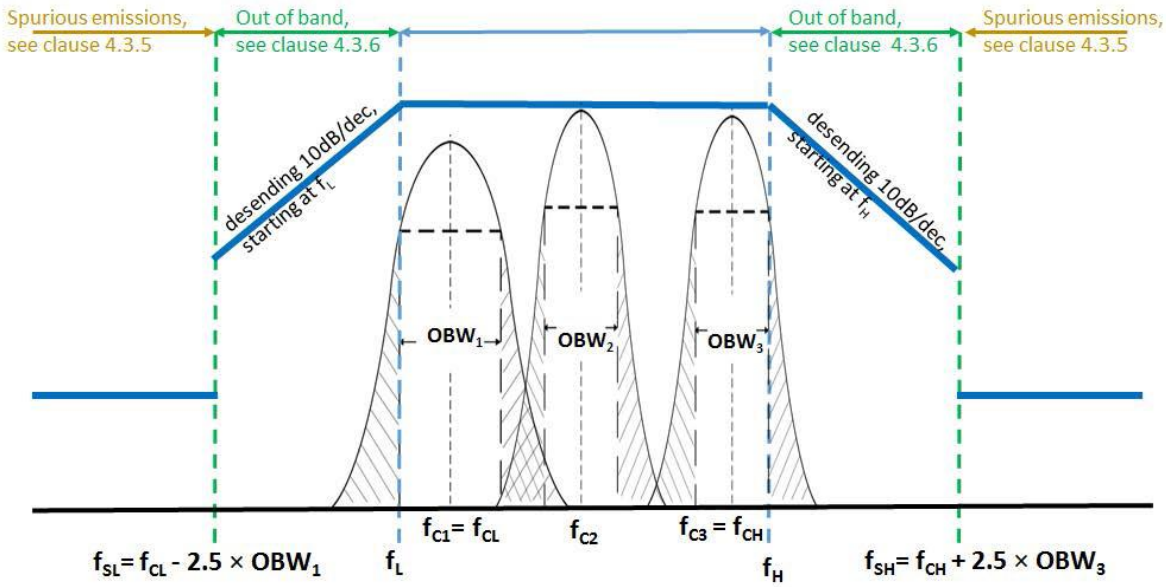
8.1. Definition

The WPT system out of band emissions are to be considered in frequency ranges defined in Figure 4 and Figure 5 (between fSL and fL and between fH and fSH).

8.2. Limit

The OOB limits are visualized in figures 4 and 5; they are descending from the intentional limits from Table 3 at fH/fL with 10 dB/decade.





8.3. Test Procedure

Please refer to ETSI EN 303 417 V1.1.1 (2017-09) clause 6.1&6.2 for the measurement method.

8.4. Test Result

PASS

Test Voltage: DC 9V (All voltages are tested and only recorded the worst cast which voltage is DC 9V)

Test Mode: Mode 1

fC (KHz)	fL (KHz)	fH (KHz)	OBW (KHz)
110KHz(fCL)	109.963	109.987	0.024
205KHz(fCH)	203.961	204.036	0.075

Frequency (KHz)	Max measured Values At 3m (dBuA/m)	Calculated Factor (dB, -C3)	Max measured Values At 10m (dBuA/m)	Limit (dBuA/m)
109.8300KHz ~ 110.0000KHz	-6.83	-31.4	-38.23	42.0
205KHz ~ 205.1900KHz	-6.93	-31.4	-38.33	-5.0

***Note:

$H_{10m}=H_{3m}-C_3$

The correct factor C_3 is equal to or approximately equal to 31.4dB

All test modes have been tested and only record the worst result.

9. WPT SYSTEM UNWANTED CONDUCTED EMISSIONS

9.1. Applicability

This applies to all WPT systems where the cable to the primary coil exceeds a length of 3 m and where the cable is not installed in the ground or any metallic structures.

9.2. Definition

WPT system unwanted conducted emissions are based on the emissions of the unwanted common mode current on the cable between the off board power supply and the primary coil seen as a monopole radiator driven against the power supply.

9.3. Limit

The common mode current (ICM) between 1 MHz and 30 MHz shall not exceed the following limit:

$$ICM = 47 - 8 \times \log(f)\ dB\mu A$$

NOTE: f is the frequency in MHz.

9.4. Test Procedure

Please refer to ETSI EN 303 417 V1.1.1 (2017-09) clause 6.2.4 for the measurement method.

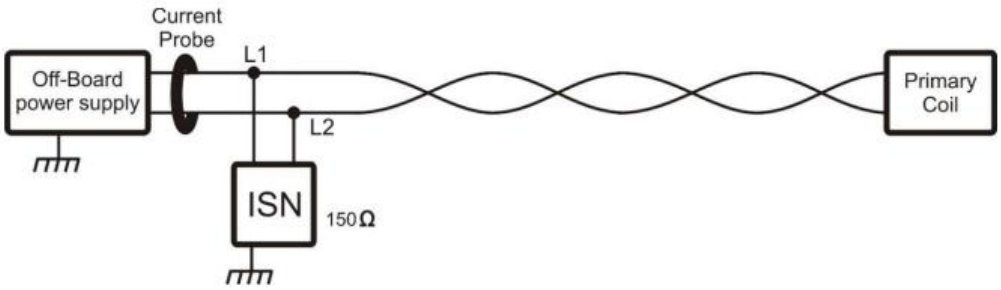


Figure 9: Measurement setup for unwanted conducted emissions

9.5. Test Result

NOT Applicable.

Note: The EUT cable to the primary coil is less than a length of 3 m.

10. RECEIVER BLOCKING

10.1. Definition

Blocking is a measure of the capability of the receiver to receive a wanted signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the receiver spurious responses.

The test shall be performed in the relevant operational modes (see clause 4.2.3).

The wanted performance criteria from clause 4.2.2 shall be used as criterion for the receiver blocking tests.

10.2. Limit

Table 6: Receiver blocking limits

	In-band signal	OOB signal	Remote-band signal
Frequency	Centre frequency (fc) of the WPT system (see clause 4.3.3)	f = fc ± F (see note)	f = fc ± 10 × F (see note)
Signal level field strength at the EUT	72 dBµA/m	72 dBµA/m	82 dBµA/m
NOTE: F = OFR see clause 4.3.3.			

10.3. Test Setup

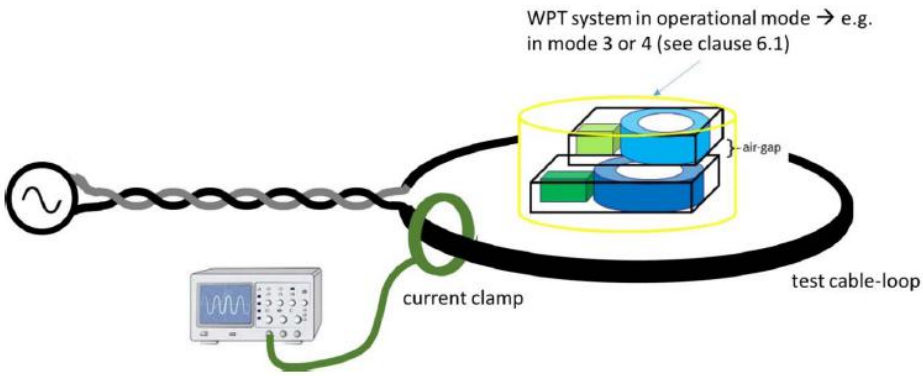


Figure 11: Schematic test set-up for the RX-blocking test

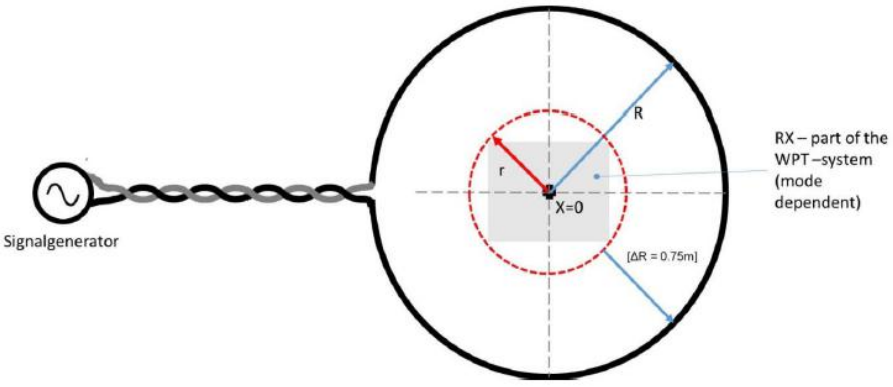


Figure 12: Schematic test set-up for the RX-blocking test

10.4. Test Procedure

a) The fulfilment of the WPT system performance criterion in all possible operational modes (see clause 4.2.3) shall be tested in presence of the inference signals according to Table 6.

b) The manufacturer shall declare in which device orientation(s) (worst case) the test shall be performed.

c) The WPT system shall initially operate without interference according to its specified sensitivity (detecting an specific object in the maximum depth as declared by the manufacturer (see clause 4.2.2 on wanted performance criteria)).

d) The test setup is visualized in the following Figures 11 and 12.

e) The tool shall be operated as intended (e.g. some tools might require to be moved across the object, some tool can be used stationary).

f) The test shall be carried out inside a test chamber according to clauses C.1.1 and C.1.2 in ETSI EN 300 330 [1].

g) A test loop with a radius r shall be used to create the magnetic field; the test loop shall lie on a non-metallic ground and the minimum distance to metallic objects (e.g. ground plane) shall be 0,75 m.

h) The EUT shall be placed to the centre of the test-loop (e.g. see Figures 11 and 12).

i) The test loop shall be sufficiently large so that the test loop itself does not influence the WPT system; The radius R of the test-loop shall be in minimum ΔR = 0,75 m larger than the maximum dimension r of the EUT.

j) (See Figure 12): R >= r + ΔR.

k) The maximum H-Field can be calculated from the loop current I (into the test-loop) with the following formula:

l) The required output current to achieve the required magnetic field from Table 12 at the WPT system shall be generated with a signal generator (unmodulated signal) at the test frequencies from Table 6.

m) For each test frequency the "reaction" of the device shall be recorded and checked against the performance criterion from clause 4.2.2.

n)

10.5. Test Result

PASS.

EUT Operational Mode	Interference			Conclusion
	Unwanted Input Signal Type	Test Frequency (KHz)	Unwanted Input Signal Level (dBμA/m)	
Mode 3 (worst case)	In-band signal	fc=165.0KHz	72	PASS
	OOB signal	fc - OFR	72	PASS
		fc + OFR	72	PASS
	Remote-band signal	fc - 10*OFR	82	PASS
		fc + 10*OFR	82	PASS
Note: F = OFR				

11. LIST OF MEASURING EQUIPMENT

Item	Manufacturer	Description	Model	Serial Number	Cal. Date	Due Date
1	EMI Test Software	Farad	EZ	/	N/A	N/A
2	3m Full Anechoic Chamber	MRDIANZI	FAC-3M	MR009	2021-09-25	2022-09-24
3	Positioning Controller	MF	MF7082	MF78020803	2021-06-21	2022-06-20
4	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2021-07-25	2024-07-24
5	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2021-07-25	2024-07-24
6	EMI Test Receiver	R&S	ESR 7	101181	2021-06-21	2022-06-20

12. TEST SETUP PHOTOGRAPHS

Please refer to separated files Appendix D for Photographs of Test Setup_RF.

13. PHOTOGRAPHS OF THE EUT

Please refer to separated files Appendix C for Photographs of The EUT.

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

HEALTH TEST REPORT

For

Mid Ocean Brands B.V.

Wireless charger

Test Model: MO6399

Additional Model No.: Please Refer to Page 5

Prepared for	:	Mid Ocean Brands B.V.
Address	:	7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
Tel	:	(+86)755-82591330
Fax	:	(+86)755-82591332
Web	:	www.LCS-cert.com
Mail	:	webmaster@LCS-cert.com

Date of receipt of test sample	:	November 10, 2021
Number of tested samples	:	2
Serial number	:	Prototype
Date of Test	:	November 10, 2021 ~ November 16, 2021
Date of Report	:	November 17, 2021

HEALTHTEST REPORT
EN IEC 62311: 2020
Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)

Report Reference No.....	:	**LCS211108127AEC**
Date of Issue.....	:	November 17, 2021
Testing Laboratory Name.....	:	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address.....	:	Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
Testing Location/Procedure.....	:	Full application of Harmonised standards ■ Partial application of Harmonised standards□ Other standard testing method□
Applicant's Name.....	:	**Mid Ocean Brands B.V.**
Address.....	:	7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Test Specification		
Standard.....	:	EN IEC 62311: 2020
Test Report Form No.....	:	LCSEMC-1.0
TRF Originator.....	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF.....	:	Dated 2011-03

Test Item Description.....	:	**Wireless charger**
Trade Mark.....	:	N/A
Test Model.....	:	MO6399
Ratings	:	Input: 5V⎓2A, 9V⎓2A Output: 5V⎓1A, 7.5V⎓1A, 9V⎓1.1A Wireless Output power: 10W
**Result…….....	:	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Kevin Huang	Jin Wang	
Kevin Huang/ Administrator	Jin Wang/ Technique principal	Gavin Liang/ Manager

HEALTH--TEST REPORT

Test Report No. : LCS211108127AEC	November 17, 2021 Date of issue

Test Model.....	: MO6399
EUT.....	: Wireless charger
Applicant.....	**: Mid Ocean Brands B.V.**
Address.....	: 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: 114628**
Address.....	: /
Telephone.....	: /
Fax.....	: /
Factory.....	**: 114628**
Address.....	: /
Telephone.....	: /
Fax.....	: /

Test Result	Positive

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Report Version	Issue Date	Revisions	Revised By
000	November 17, 2021	Initial Issue	Gavin Liang

1. GENERAL INFORMATION

1.1. Product Description for Equipment Under Test (EUT)

EUT	: Wireless charger
Test Model	: MO6399
Additional Model	: MO6392, MO6453
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Power Supply	: Input: 5V⎓2A, 9V⎓2A Output: 5V⎓1A, 7.5V⎓1A, 9V⎓1.1A Wireless Output power: 10W
Hardware Version	: WD_Q5_10W V2.1
Software Version	: QX:4IDA
Wireless Charging	:
Operating Frequency	: 110.0~205.0KHz
Modulation Type	: ASK
Antenna Type	: Coil Antenna

1.2. Objective

According to its specifications, the EUT must comply with the requirements of the following standards:
EN IEC 62311: 2020 –Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)

1.3. Test Methodology

All measurements contained in this report were conducted with EN IEC 62311: 2020,
EN 50665 is being considered.

1.4. Description of Test Facility

NVLAP Accreditation Code is 600167-0.
FCC Designation Number is CN5024.
CAB identifier is CN0071.
CNAS Registration Number is L4595.

1.5. Support Equipment List

Manufacturer	Description	Model	Serial Number	Certificate
HONOR	Mobile phone	V30Pro	---	CE
OPPO	Adapter	OP52KAUH	--	CE

Note: Phone equipment is provided by the laboratory.

1.6. External I/O

I/O Port Description	Quantity	Cable
Micro USB Port	1	N/A

1.7. Equipment

Radiated emissions are measured with one or more of the following types of linearly polarizedantennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrumanalyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.Conducted emissions are measured with Line Impedance Stabilization Networks and EMI TestReceivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for makingmeasurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference MeasuringApparatus and Measurement Methods.”

1.8. Measurement Uncertainty(95% confidence levels, k=2)

Test Item		Uncertainty
Radio Frequency	:	0.9×10^{-4}
Total RF Power, Conducted	:	1.0 dB
RF Power Density, Conducted	:	1.8 dB
Spurious Emissions, Conducted	:	1.8 dB
All Emissions, Radiated	:	3.1 dB
Temperature	:	0.5°C
Humidity	:	1 %
DC And Low Frequency Voltages	:	1 %

2.HUMAN EXPOSURE TO THE ELECTROMAGNETIC FIELDS

2.1 Basic Restrictions Reference levels

Council Recommendation 1999/519/EC Annex III

Basic restrictions for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	Magnetic flux density (mT)	Current density (Ma/m2) (rms)	Whole body average SAR (W/kg)	Localised SAR (head and trunk) (W/kg)	Localised SAR (limbs) (W/kg)	Power density (W/m2)
0Hz	40	-	-	-	-	-
>0-1Hz	-	8	-	-	-	-
1-4Hz	-	8/f	-	-	-	-
4-1000Hz	-	2	-	-	-	-
1000Hz-100kHz	-	f/500	-	-	-	-
100kHz-10MHz	-	f/500	0.08	2	4	-
10MHz-10GHz	-	-	0.08	2	4	-
10-300GHz	-	-	-	-	-	10

Note:

1. f is the frequency in Hz.
2. The basic restriction on the current density is intended to protect against acute exposure effects on central nervous system tissues in the head and trunk of the body and includes a safety factor. The basic restrictions for ELF fields are based on established adverse effects on the central nervous system. Such acute effects are essentially instantaneous and there is no scientific justification to modify the basic restrictions for exposure of short duration. However, since the basic restriction refers to adverse effects on the central nervous system, this basic restriction may permit higher current densities in body tissues other than the central nervous system under the same exposure conditions.
3. Because of electrical inhomogeneity of the body, current densities should be averaged over a cross section of 1cm2 perpendicular to the current direction.
4. For frequencies up to 100 kHz, peak current density values can be obtained by multiplying the rms value by √2(=1.414). For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp)
5. For frequencies up to 100kHz and for pulsed magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate basic restriction.
6. All SAR values are to be averaged over any six-minute period.
7. Localised SAR averaging mass is any 10g of contiguous tissue; the maximum SAR so obtained should be the value used for the estimation of exposure. These 10g of tissue are intended to be a mass of contiguous tissue with nearly homogeneous electrical properties. In specifying a contiguous mass of tissue, it is recognised that this concept can be used in computational dosimetry but may present difficulties for direct physical measurements. A simple geometry such as cubic tissue mass can be used provided that the calculated dosimetric quantities have conservation values relative to the exposure guidelines.

8. For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp). Additionally, for pulsed exposures, in the frequency range 0,3 to 10GHz and for localised exposure of the head, in order to limit and avoid auditory effects caused by thermoelastic expansion, an additional basic restriction is recommended. This is that SA should not exceed 2mJ kg-1 averaged over 10g of tissue.

2.2 Reference Levels

Council Recommendation 1999/519/EC Annex III
Reference levels for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density Seq (W/m2)
0-1Hz	-	$3,2\times10^4$	4×10^4	-
1-8Hz	1000	$3,2\times10^4/f^2$	$4\times10^4/f^2$	-
8-25Hz	1000	4000/f	5000/f	-
0.025Hz-0,8kHz	250/f	4/f	5/f6,25	-
0,8-3kHz	250/f	5	6,25	-
3-150kHz	87	5	6,25	-
0,15-1MHz	87	0.73/f	0,92/f	-
1-10MHz	$87/f^{1/2}$	0.73/f	0,92/f	-
10-400MHz	28	0.073	0,092	2
400-2000MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046f^{1/2}$	f/200
2-300GHz	61	0,16	0,20	10

Note:
1. As indicated in the frequency range column.
2. For frequencies between 100kHz and 10GHz, Seq, E2, H2 and B2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10GHz, Seq, E2, H2 and B2 are to be averaged over any 68/.1.05-minute period (.in GHz).
4. No E-field value is provided for frequencies <1Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 20kV/m. Spark discharges causing stress or annoyance should be avoided.

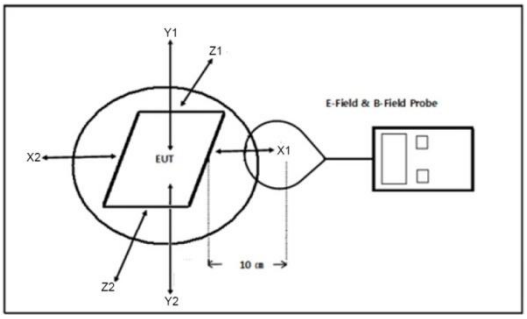
3. RF EXPOSURE EVALUATION

3.1.Test Equipment

The following test equipments are used during the power line conducted measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
1	Exposure Level Tester	Narda	ELT-400	N-0713	2021-06-21	2022-06-20
2	B-Field Probe	Narda	ELT-400	M-1154	2021-06-21	2022-06-20

3.2.Block Diagram of Test Setup



*Note:
Position A: Back Side of the EUT
Position B: Left Side of the EUT
Position C: Front Side of the EUT
Position D: Right Side of the EUT
Position E: Top Side of the EUT
Position F: Bottom Side of the EUT

3.3. Test Results

H-field Strength Test Result:

Test condition: Wireless Charging mode

Frequency Range(KHz)	Probe Position Hx1 (A/m)	Probe Position Hx2 (A/m)	Probe Position Hy (A/m)	Probe Position Hz1 (A/m)	Probe Position Hz2 (A/m)	ResultH (A/m)	Limit (A/m)
165.0	0.12	0.11	0.11	0.10	0.08	0.191	4.242

$$H = \sqrt{H_X^2 + H_Y^2 + H_Z^2} = \sqrt{0.12^2 + 0.11^2 + 0.10^2}\ A/m = 0.191 A/m$$

Limit=0.73/0.165A/m=4.242A/m

Note: All test modes have been tested and only record the worst result.

----------THE END OFREPORT----------