



RF TEST REPORT

Report No: FCS202411212W01

Issued for

Applicant::	Mid Ocean Brands B.V.
Address:	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.
Product Name:	Wireless charger
Brand Name:	N/A
Model Name:	MO2431
Series Model:	N/A
Test Standard:	ETSI EN 303 417 V1.1.1 (2017-09)

**TEST REPORT CERTIFICATION**

Applicant's Name..... : Mid Ocean Brands B.V.
Address..... : 7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan,
Kowloon, Hong Kong.
Manufacturer's Name..... : Mid Ocean Brands B.V.
Address..... : 7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan,
Kowloon, Hong Kong.

Product Description

Product Name..... : Wireless charger
Brand Name : N/A
Model Name..... : MO2431
Series Model..... : N/A

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

This device described above has been tested by FCS, and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU RED Directive requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test..... :

Date (s) of performance of tests..... : November 13, 2024 ~November 18, 2024

Date of Issue..... : November 18, 2024

Test Result..... : **Pass**

Tested by

:

Karl. Huang

(Karl Huang)

Reviewed by

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Duke Qian

(Duke Qian)

Approved by

:

Jack Wang

(Jack Wang)





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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	November 18, 2024	FCS202411212W01	N/A	Initial Issue

1. GENERAL INFORMATION

Product Name:	Wireless charger
Brand Name:	N/A
Model Name:	MO2431
Series Name:	N/A
Model Discrepancy:	N/A
Power Rating:	Wireless OutPut Power: 15W Max Input: DC 9V 2A, 5V 2A Output: DC 5V 1A, 7.5V 1A, 9V 1.1A, 9V 1.67A
Frequency Range:	105kHz~205kHz
Modulation Technique:	Load modulation
Antenna gain:	0 dBi
Hardware version number:	V1.0
Software version number:	V1.0
Temperature Range:	10°C ~ 35°C

Channel List

Operational Mode	Channel	Frequency(KHz)
Mode 1	01	145.75
Mode 2	02	120.35
Mode 2	03	122.85
Mode 3/4	04	122.30
Mode 3/4	05	130.65

2. SETUP OF EQUIPMENT UNDER TEST

2.1 SETUP CONFIGURATION OF THE EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

Remark:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

2.2 TEST FACTORY

Company Name:	Dongguan Funas Testing Technology Co., Ltd.
Address:	Room 105, 1/F.. Baohao Technology Building 1, No.15, Gongye West Road.Songshan Lake Hi-Tech Industrial Area, Dongguan, Guangdong, China
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
FCC Test Firm Registration Number: 514908 CNAS Number: L15566 Designation number: CN0127 A2LA accreditation number: 5545.01 ISED Number: 25801	

2.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.68\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.988\text{dB}$
3	All emissions, radiated below 1GHz	$\pm 2.26\text{dB}$
4	All emissions, radiated 1GHz-18GHz	$\pm 2\text{dB}$
5	All emissions, radiated >18G	$\pm 2.88\text{dB}$



2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2024.08.28	2025.08.27
Signal Analyzer	R&S	FSV40-N	FCS-E012	2024.08.28	2025.08.27
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2024.08.28	2025.08.27
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2024.08.28	2025.08.27
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2024.08.28	2025.08.27
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2024.08.28	2025.08.27
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2024.08.28	2025.08.27
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2024.08.28	2025.08.27
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2024.08.28	2025.08.27
Temperature & Humidity	HTC-1	victor	FCS-E005	2024.08.28	2025.08.27

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2024.08.28	2025.08.27
LISN	R&S	ENV216	FCS-E007	2024.08.28	2025.08.27
LISN	ETS	3810/2NM	FCS-E009	2024.08.28	2025.08.27
Temperature & Humidity	HTC-1	victor	FCS-E008	2024.08.28	2025.08.27

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
Spectrum Analyzer	Keysight	N9020A	FCS-E015	2024.08.28	2025.08.27
Spectrum Analyzer	Agilent	E4447A	MY50180039	2024.08.28	2025.08.27
Spectrum Analyzer	R&S	FSV-40	101499	2024.08.28	2025.08.27

NOTE: Equipments listed above have been calibrated and are in the period of validation.



2.5 TEST SUMMARY

Test Item	Test Mode	Applicable(Y/N)	Result
Permitted range of operating frequencies	declare	Y	PASS
Operating frequency ranges	Mode 1/2/3/4	Y	PASS
Transmitter H-field requirements	Mode 1/2/3/4	Y	PASS
Transmitter spurious emissions	Mode 1/2/3/4	Y	PASS
Transmitter out of band (OOB) emissions	Mode 1/2/3/4	Y	PASS
WPT system unwanted conducted emissions	Mode 1/2/3/4	Y	PASS
Receiver blocking	Mode 1/2/3	Y	PASS
RF Exposure	Mode 1/2/3/4	Y	PASS

Remark:

N/A: Not Applicable

RF: In this whole report RF means Radio Frequency.

The manufacture declare the test mode is mode 1, mode 2, mode 3, mode 4.

Mode 3 and Mode 4 are tested together.

For Transmitter spurious emissions test items:"Operating" means mode 2, 3 and 4; "standby" means mode 1.

Operational Mode	Set-up	Function of base station	Function of mobile device
Mode 1: base station in stand-by, idle mode	Single device	Transmitter	Not applicable
Mode 2: Communication before charging, adjustment charging mode / position	In combination	TX and RX	TX and RX
Mode 3: Communication	WPT system alignment	TX and RX	TX and RX
Mode 4: energy transmission	WPT system alignment	TX and RX	TX and RX

3. TEST METHODOLOGY

3.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT has been tested according to ETSI EN 303 417 V1.1.1 (2017-09)

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
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3.2 TEST MODES

The EUT has been tested under normal operating condition. Control the EUT for staying in continuous transmitting for testing.

The field strength of spurious radiation emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The following data show only with the worst case setup. The worst case of Y axis without cradle was reported.

3.3 TEST CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 20-75 %
- Atmospheric pressure: 86-106 kPa

1). Mains voltage

The extreme test voltage for equipment to be connected to an AC mains source shall be the nominal mains voltage $\pm$ 10 %.

2). Lead-acid battery power sources used on vehicles

When radio equipment is intended for operation from the usual type of alternator fed lead-acid battery power source used on vehicles, then extreme test voltage shall be 1,3 and 0,9 times the nominal voltage of the battery (6 V, 12 V, etc.).

3). Power sources using other types of batteries

The Low extreme test voltages for equipment with power sources using the following types of battery shall be:

- for the Leclanché or lithium type battery: 0,85 times the nominal voltage of the battery;
- for the mercury or nickel-cadmium type of battery: 0,9 times the nominal voltage of the battery.

In both cases, the High extreme test voltage shall be 1,15 times the nominal voltage of the battery.

4). Other power sources

For equipment using other power sources, or capable of being operated from a variety of power sources (primary or secondary), the extreme test voltages shall be those stated by the manufacturer and shall be recorded.

The follow condition is applicable

Test Conditions	Normal	LTLV	LTHV	HTHV	HTLV
Temperature (°C)	22	10	10	35	35
Voltage (VDC)	5	4.5	5.5	5.5	4.5

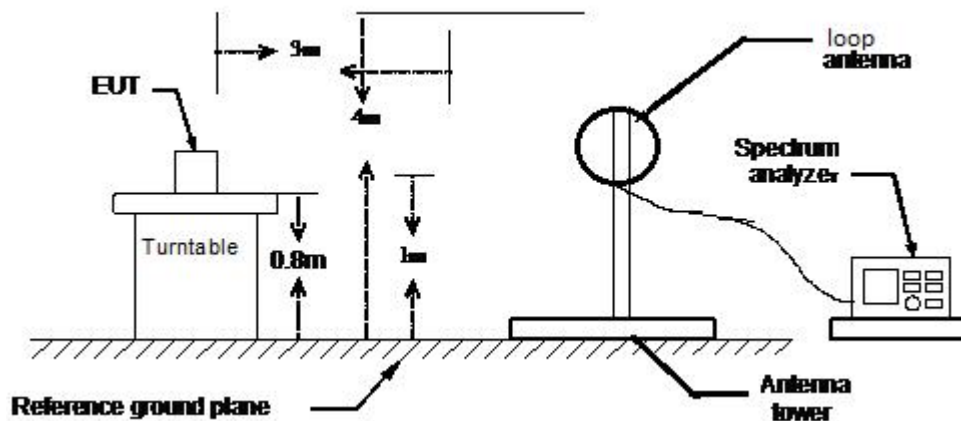
4. PERMITTED RANGE OF OPERATING FREQUENCIES

4.1 LIMIT

The permitted range of operating frequencies used by the EUT shall be declared by the manufacturer. The permitted range of operating frequencies for intentional emissions shall be entirely within the frequency bands in below table.

Table 1			
	WPT frequency range	Frequency Bands	Applications
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	6 765 kHz to 6 795 kHz	WPT systems

4.2 TEST CONFIGURATION





4.3 TEST RESULTS

Mode 1

Test Conditions		Frequency Range			
		fL (KHz)	fH (KHz)	fL Limit (KHz)	fH Limit (KHz)
Normal		143.7524	147.7533	100	300
Extreme	LTLV	143.7518	147.7528	100	300
	LTHV	143.7515	147.7525	100	300
	HTLT	143.7506	147.7521	100	300
	HTHV	143.7517	147.7515	100	300

Mode 2

Test Conditions		Frequency Range			
		fL Low Channel (KHz)	fH High Channel (KHz)	fL Limit (KHz)	fH Limit (KHz)
Normal		118.3513	124.8542	100	300
Extreme	LTLV	118.3510	124.8525	100	300
	LTHV	118.3512	124.8531	100	300
	HTLT	118.3499	124.8527	100	300
	HTHV	118.3512	124.8540	100	300

Mode 3/4

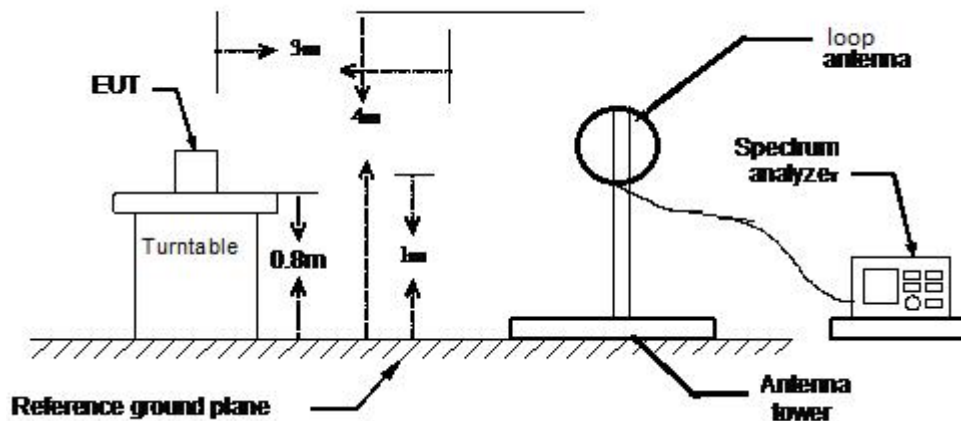
Test Conditions		Frequency Range			
		fL Low Channel (KHz)	fH High Channel (KHz)	fL Limit (KHz)	fH Limit (KHz)
Normal		120.3293	132.6564	100	300
Extreme	LTLV	120.3287	132.6546	100	300
	LTHV	120.3285	132.6550	100	300
	HTLT	120.3275	132.6554	100	300
	HTHV	120.3293	132.6546	100	300

5. OPERATING FREQUENCY RANGES

5.1 LIMIT

The operating frequency ranges for intentional emissions shall be entirely within the frequency bands in table 1

5.2 TEST CONFIGURATION



5.3 TEST PROCEDURE

1. Please refer to ETSI EN 303 417 (V.1.1.1) Sub-clause 5 for the test conditions.
2. Please refer to ETSI EN 303 417 (V.1.1.1) Sub-clause 6.2 for the measurement method.



5.4 TEST RESULTS

Mode 1

Test Conditions		Frequency Range			
		fL (KHz)	fH (KHz)	fL Limit (KHz)	fH Limit (KHz)
Normal		143.7524	147.7533	100	300
Extreme	LTLV	143.7518	147.7528	100	300
	LTHV	143.7515	147.7525	100	300
	HTLT	143.7506	147.7521	100	300
	HTHV	143.7517	147.7515	100	300

Mode 2

Test Conditions		Frequency Range			
		fL Low Channel (KHz)	fH High Channel (KHz)	fL Limit (KHz)	fH Limit (KHz)
Normal		118.3513	124.8542	100	300
Extreme	LTLV	118.3510	124.8525	100	300
	LTHV	118.3512	124.8531	100	300
	HTLT	118.3499	124.8527	100	300
	HTHV	118.3512	124.8540	100	300

Mode 3/4

Test Conditions		Frequency Range			
		fL Low Channel (KHz)	fH High Channel (KHz)	fL Limit (KHz)	fH Limit (KHz)
Normal		120.3293	132.6564	100	300
Extreme	LTLV	120.3287	132.6546	100	300
	LTHV	120.3285	132.6550	100	300
	HTLT	120.3275	132.6554	100	300
	HTHV	120.3293	132.6546	100	300

6. H-FIELD REQUIREMENTS

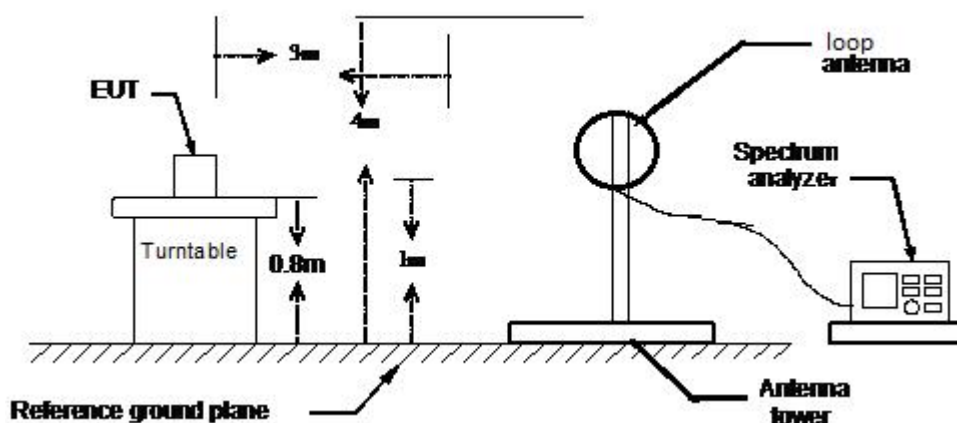
6.1 LIMIT

Table 3: H-field limits

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

NOTE 1: Limit is 42 dB μ A/m for the following spot frequencies: 60 kHz $\pm$ 250 Hz and 129,1 kHz $\pm$ 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.

6.2 TEST CONFIGURATION



6.3 TEST PROCEDURE

1. Please refer to ETSI EN 303 417 (V.1.1.1) Sub-clause 5 for the test conditions.
2. Please refer to ETSI EN 303 417 (V.1.1.1) Sub-clause 6.2 for the measurement method.



6.4 TEST RESULTS

Mode 1

Frequency (KHz)	Reading (dBμA)	Corrected Factor (dB)	Corrected Amplitude E-field (dBμV/m)	Corrected Amplitude H-field_3m (dBμA/m)	Corrected Amplitude H-field_10m (dBμA/m)	Limit_10m (dBμA/m)	Margin (dB)	Result
145.75	62.163	5.25	118.913	67.413	36.213	37.7	-1.487	Pass

Mode 2

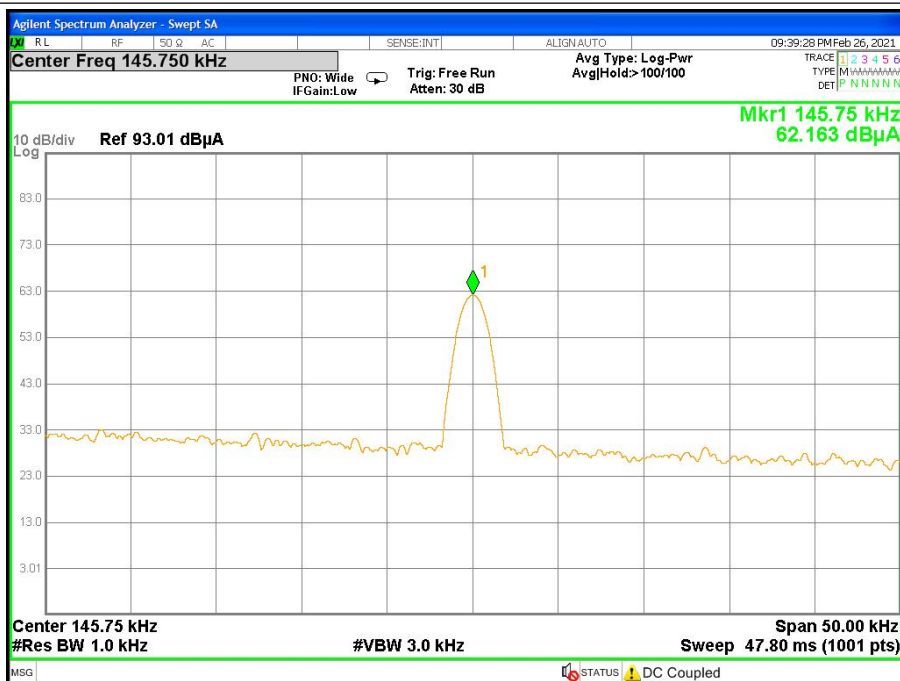
Frequency (KHz)	Reading (dBμA)	Corrected Factor (dB)	Corrected Amplitude E-field (dBμV/m)	Corrected Amplitude H-field_3m (dBμA/m)	Corrected Amplitude H-field_10m (dBμA/m)	Limit_10m (dBμA/m)	Margin (dB)	Result
120.35	43.179	5.25	99.929	48.429	17.229	66.049	-48.82	Pass
122.85	42.059	5.25	98.809	47.309	16.109	66.138	-50.029	Pass

Mode 3/4

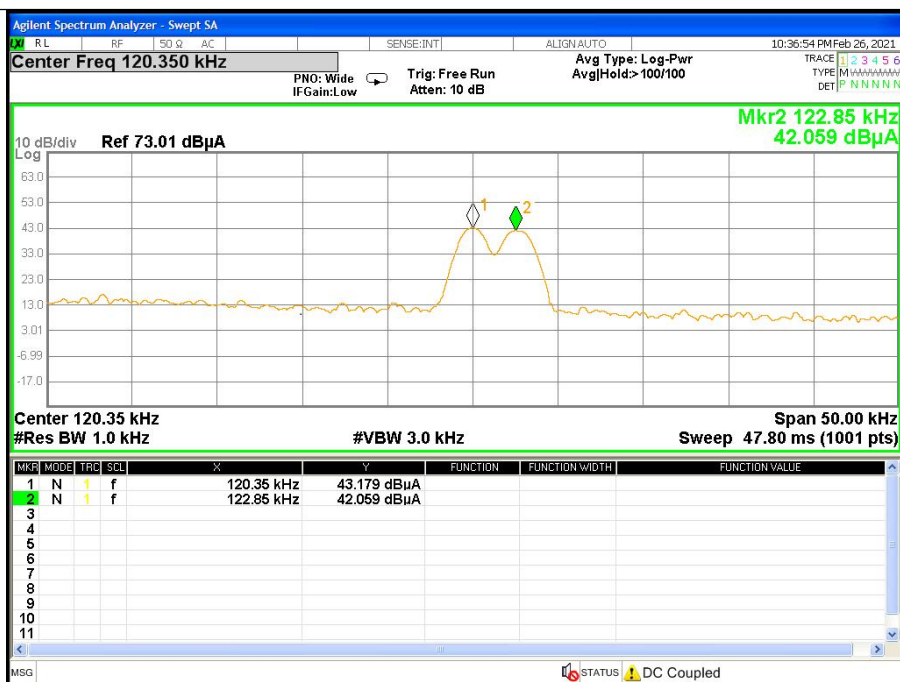
Frequency (KHz)	Reading (dBμA)	Corrected Factor (dB)	Corrected Amplitude E-field (dBμV/m)	Corrected Amplitude H-field_3m (dBμA/m)	Corrected Amplitude H-field_10m (dBμA/m)	Limit_10m (dBμA/m)	Margin (dB)	Result
122.30	26.212	5.25	82.962	31.462	0.262	66.119	-65.857	Pass
130.65	29.508	5.25	86.258	34.758	3.558	66.406	-62.848	Pass



Mode 1

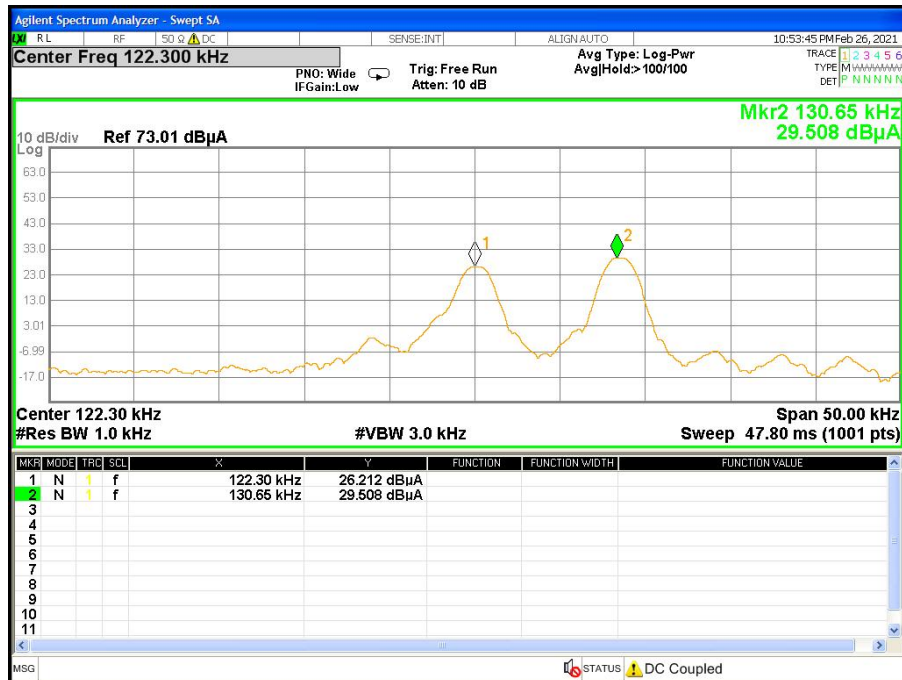


Mode 2





Mode 3/4



7. TRANSMITTER SPURIOUS EMISSIONS

7.1 LIMIT

Limit below 30MHz

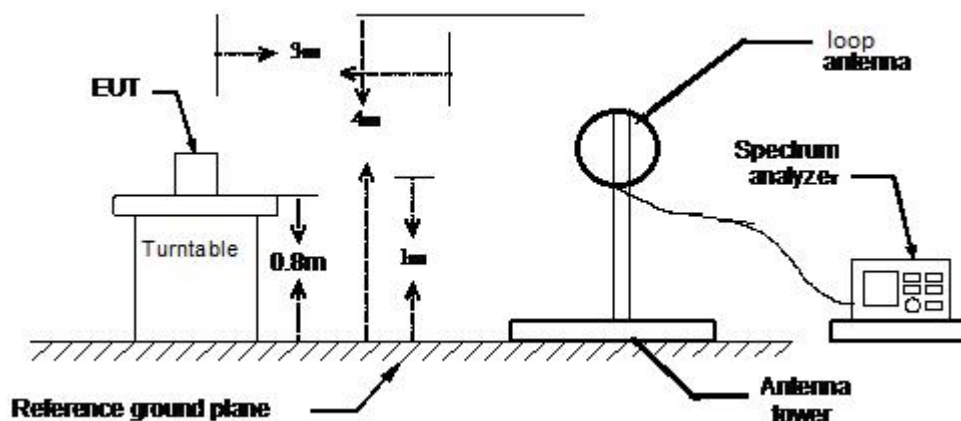
State	Frequency $9 \text{ kHz} \leq f < 10 \text{ MHz}$	Frequency $10 \text{ MHz} \leq f < 30 \text{ MHz}$
Operating	27 dB μ A/m at 9 kHz descending 10 dB/oct	-3,5 dB μ A/m
Standby	5,5 dB μ A/m at 9 kHz descending 10 dB/oct	-25 dB μ A/m

Limit above 30MHz

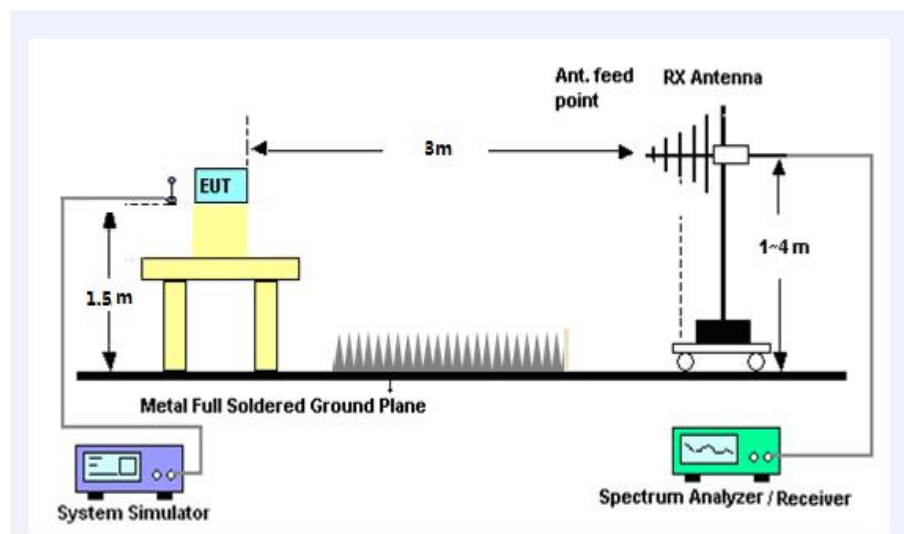
State	47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies between 30 MHz to 1000 MHz
Operating	4nW(-54dBm)	250nW(-36dBm)
Standby	2nW(-57dBm)	2nW(-57dBm)

7.2 TEST CONFIGURATION

Below 30MHz



30MHz-1GHz



7.3 TEST PROCEDURE

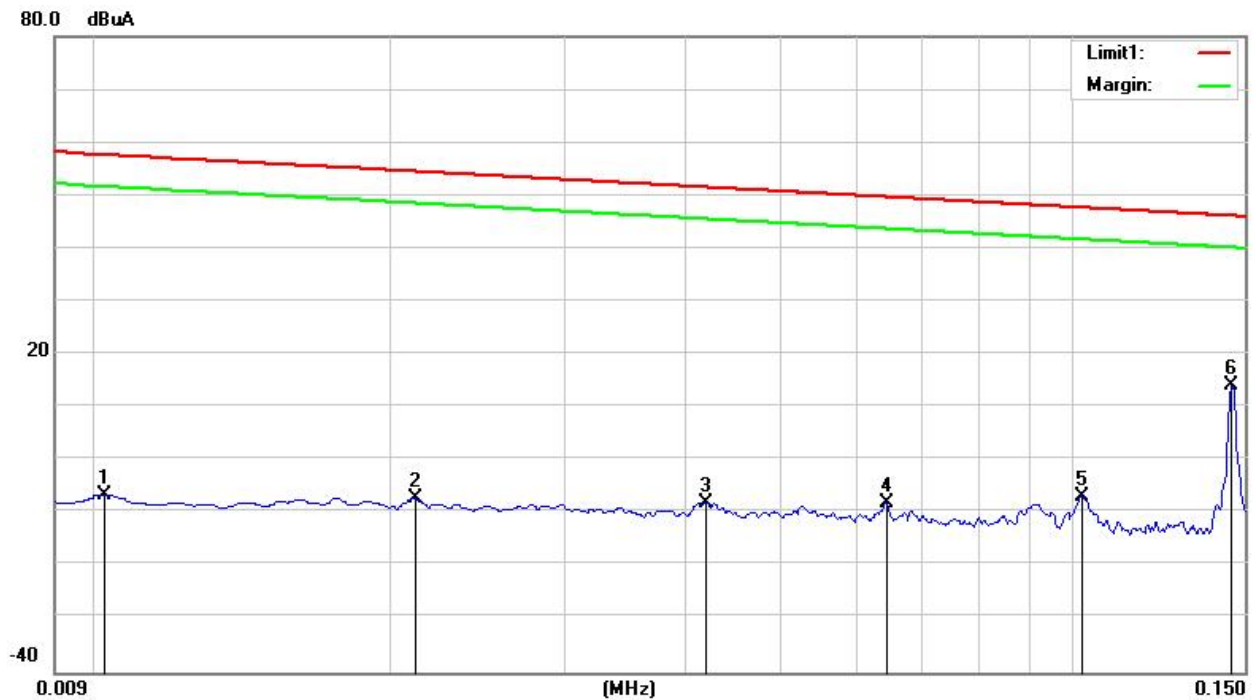
1. Please refer to ETSI EN 303 417 (V.1.1.1) Sub-clause 5 for the test conditions.
2. Please refer to ETSI EN 303 417 (V.1.1.1) Sub-clause 6.2 for the measurement method.

7.4 TEST RESULT

Note: The test report only show the worst case.

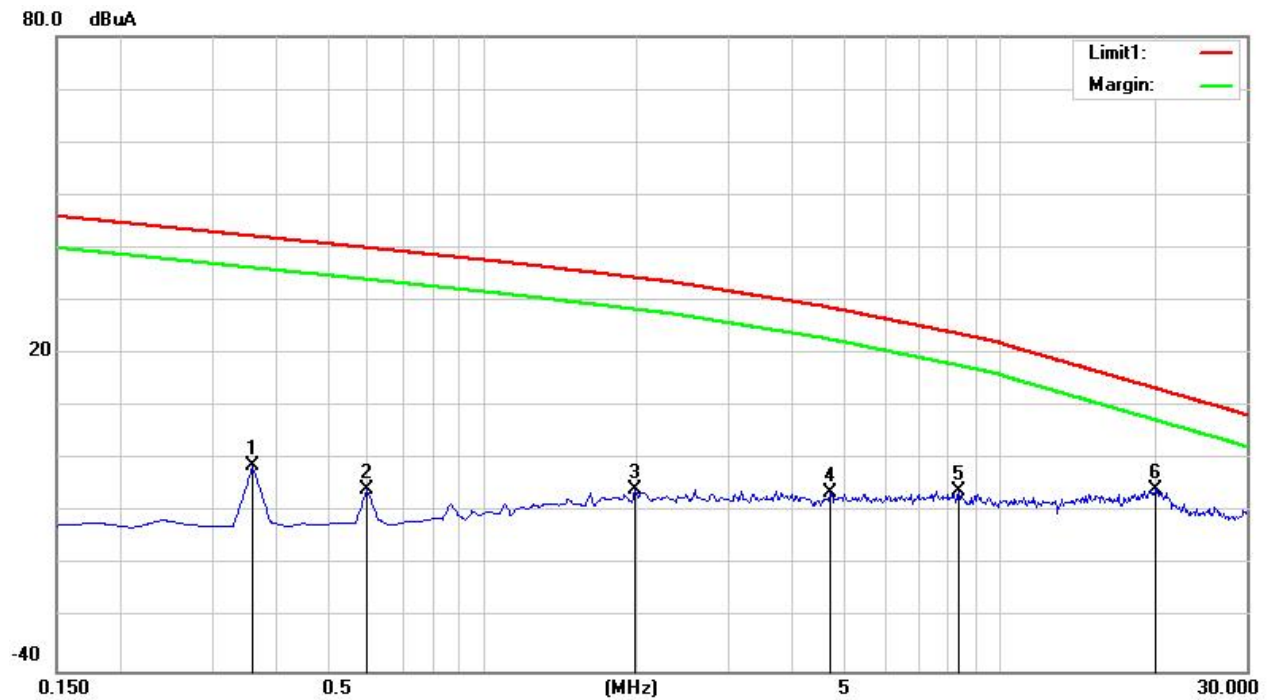
Operating mode

Mode 2
9KHz – 150KHz



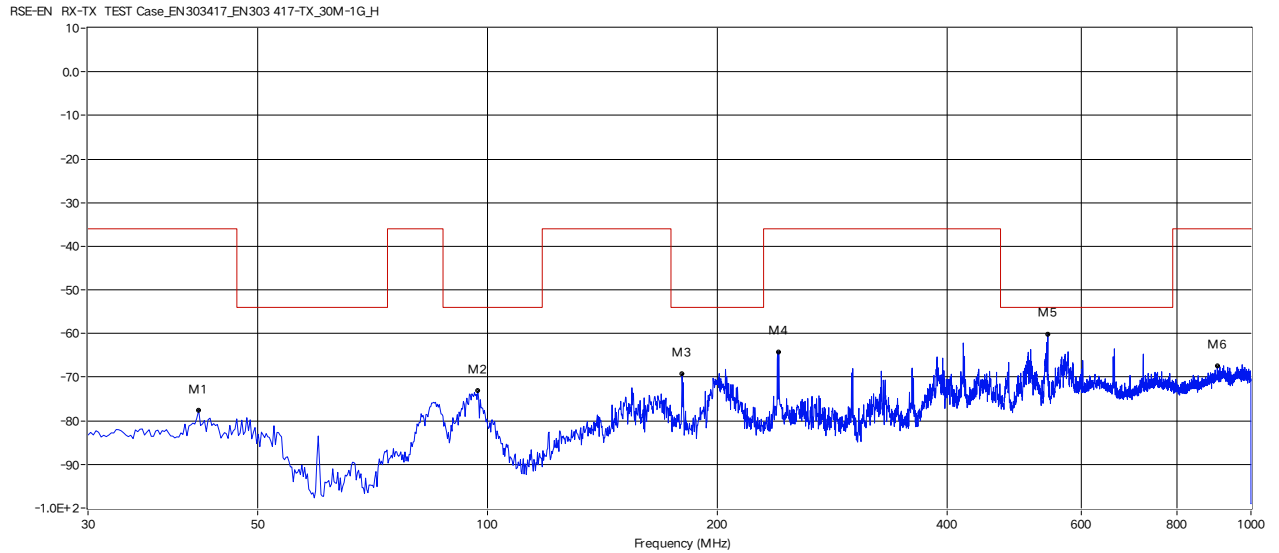
No.	Frequency (KHz)	Reading (dBuA)	Correct Factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Remark
1	0.0101	-25.92	19.38	-6.54	57.70	-64.24	peak
2	0.0211	-27.33	20.08	-7.25	54.51	-61.76	peak
3	0.0418	-27.57	19.66	-7.91	51.55	-59.46	peak
4	0.0643	-27.03	19.10	-7.93	49.69	-57.62	peak
5	0.1022	-24.45	17.60	-6.85	47.68	-54.53	peak
6	0.1453	-3.22	17.51	14.29	46.16	-31.87	peak

150KHz – 30MHz



No.	Frequency (MHz)	Reading (dBuA)	Correct Factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Remark
1	0.3590	-21.42	20.14	-1.28	42.25	-43.53	peak
2	0.5978	-25.79	20.24	-5.55	40.03	-45.58	peak
3	1.9708	-26.04	20.39	-5.65	34.39	-40.04	peak
4	4.7171	-26.84	20.47	-6.37	28.70	-35.07	peak
5	8.3290	-26.29	20.30	-5.99	23.78	-29.77	peak
6	20.0003	-28.26	22.50	-5.76	13.48	-19.24	peak

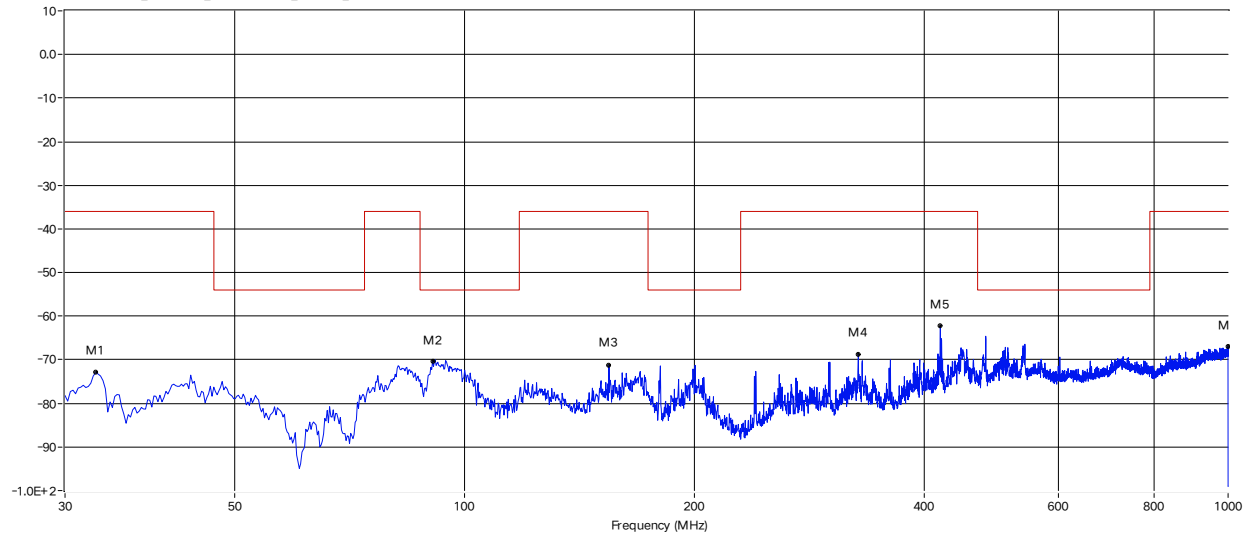
30MHz -1GHz Horizontal



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
41.883	-77.62	-5.65	-36.0	-41.62	84.60	Horizontal	Vertical	Pass
97.173	-73.17	-13.98	-54.0	-19.17	64.50	Horizontal	Vertical	Pass
179.865	-69.27	-10.62	-54.0	-15.27	165.70	Horizontal	Vertical	Pass
240.732	-64.16	-1.98	-36.0	-28.16	302.90	Horizontal	Vertical	Pass
541.918	-60.23	2.92	-54.0	-6.23	256.40	Horizontal	Vertical	Pass
903.485	-67.47	8.96	-36.0	-31.47	111.30	Horizontal	Vertical	Pass

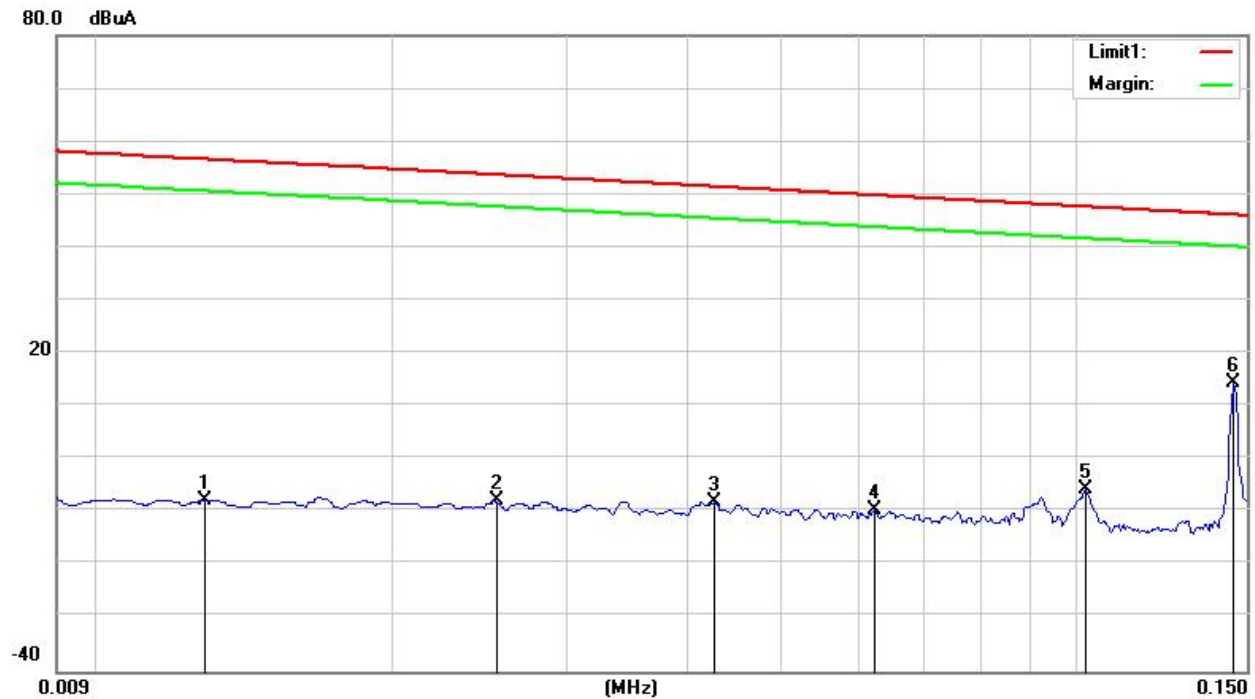
Vertical

RSE-EN RX-TX TEST Case_EN303417_EN303 417-TX_30M-1G_V



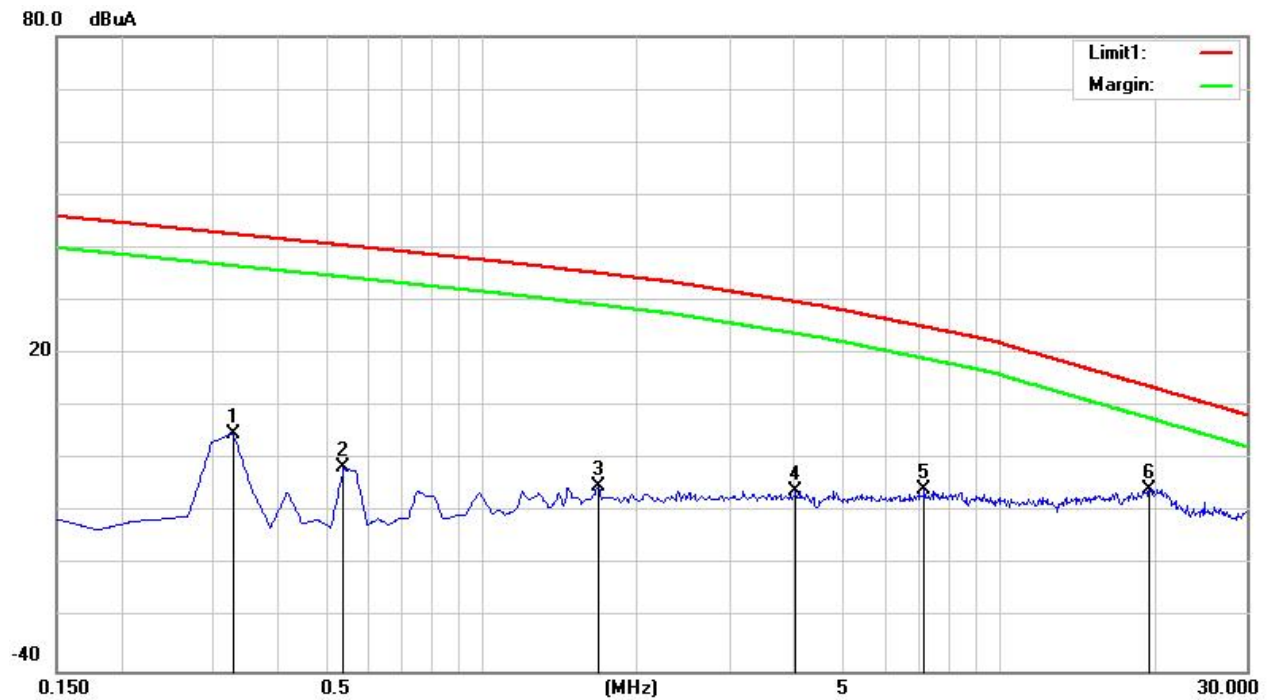
Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
32.910	-72.93	-8.00	-36.0	-36.93	346.20	Vertical	Vertical	Pass
90.868	-70.27	-9.49	-54.0	-16.27	192.20	Vertical	Vertical	Pass
154.645	-71.16	-3.52	-36.0	-35.16	322.80	Vertical	Vertical	Pass
328.033	-68.66	-2.33	-36.0	-32.66	178.80	Vertical	Vertical	Pass
419.940	-62.12	1.26	-36.0	-26.12	45.20	Vertical	Vertical	Pass
999.030	-66.99	10.64	-36.0	-30.99	255.50	Vertical	Vertical	Pass

Mode 3/4
9KHz – 150KHz



No.	Frequency (KHz)	Reading (dBuA)	Correct Factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Remark
1	0.0128	-27.25	19.58	-7.67	56.68	-64.35	peak
2	0.0253	-27.87	19.99	-7.88	53.73	-61.61	peak
3	0.0427	-27.79	19.65	-8.14	51.46	-59.60	peak
4	0.0623	-28.75	19.16	-9.59	49.83	-59.42	peak
5	0.1024	-23.37	17.60	-5.77	47.68	-53.45	peak
6	0.1453	-3.12	17.51	14.39	46.16	-31.77	peak

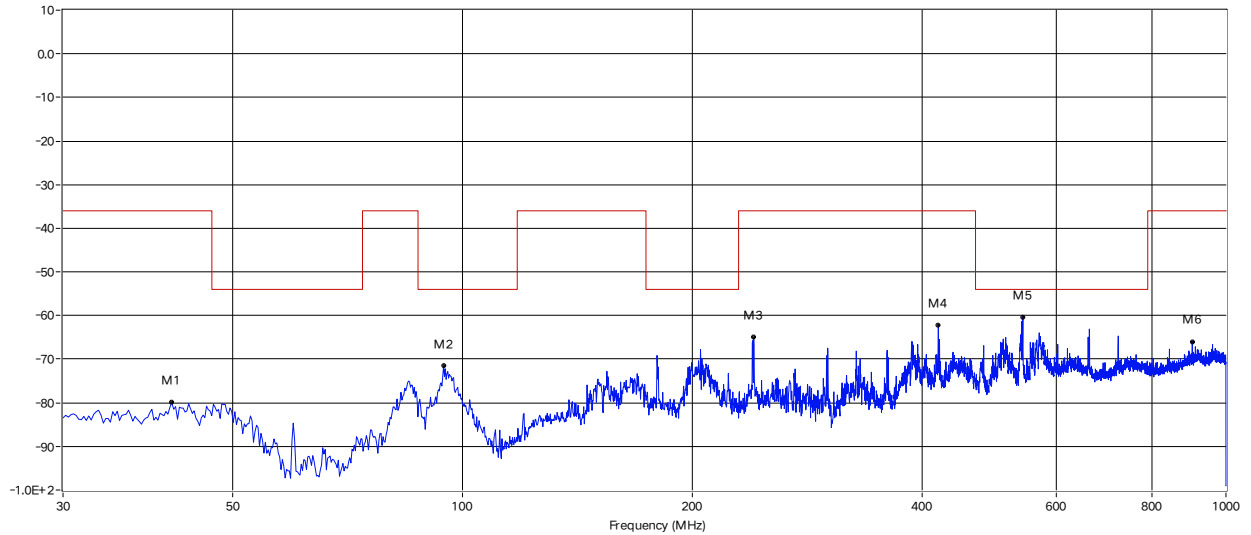
150KHz – 30MHz



No.	Frequency (MHz)	Reading (dBuA)	Correct Factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Remark
1	0.3291	-15.16	20.13	4.97	42.62	-37.65	peak
2	0.5381	-21.78	20.22	-1.56	40.49	-42.05	peak
3	1.6724	-25.24	20.33	-4.91	35.22	-40.13	peak
4	4.0305	-26.28	20.40	-5.88	29.81	-35.69	peak
5	7.1647	-26.11	20.37	-5.74	25.08	-30.82	peak
6	19.4928	-27.93	22.38	-5.55	13.80	-19.35	peak

30MHz -1GHz Horizontal

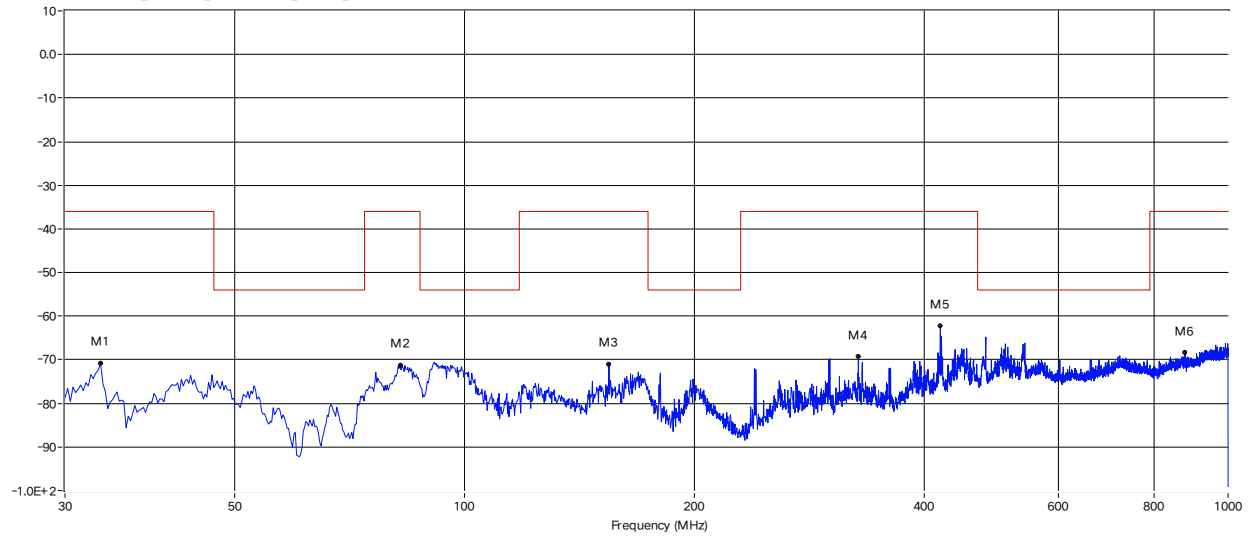
RSE-EN RX-TX TEST Case_EN303417_EN303 417-TX_30M-1G_H



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
41.640	-79.90	-5.47	-36.0	-43.90	36.20	Horizontal	Vertical	Pass
94.505	-71.51	-14.26	-54.0	-17.51	56.30	Horizontal	Vertical	Pass
240.732	-64.98	-1.98	-36.0	-28.98	106.90	Horizontal	Vertical	Pass
419.940	-62.15	2.23	-36.0	-26.15	319.40	Horizontal	Vertical	Pass
541.918	-60.34	2.92	-54.0	-6.34	137.40	Horizontal	Vertical	Pass
903.485	-65.94	8.96	-36.0	-29.94	110.60	Horizontal	Vertical	Pass

Vertical

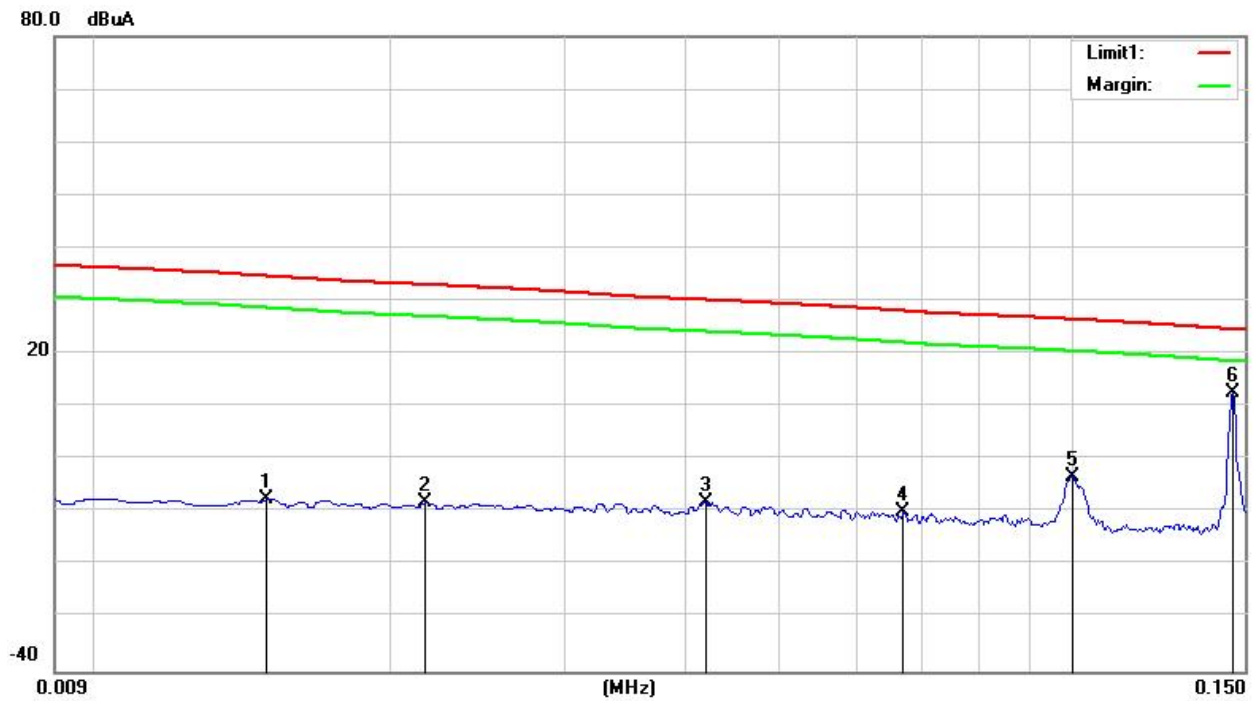
RSE-EN RX-TX TEST Case_EN303417_EN303 417-TX_30M-1G_V



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
33.395	-70.84	-8.31	-36.0	-34.84	357.40	Vertical	Vertical	Pass
82.380	-71.23	-13.74	-36.0	-35.23	360.00	Vertical	Vertical	Pass
154.645	-71.05	-3.52	-36.0	-35.05	321.20	Vertical	Vertical	Pass
328.033	-69.25	-2.33	-36.0	-33.25	317.80	Vertical	Vertical	Pass
419.940	-62.31	1.26	-36.0	-26.31	51.40	Vertical	Vertical	Pass
878.265	-68.33	8.24	-36.0	-32.33	277.30	Vertical	Vertical	Pass

Standby mode

Mode 1
9KHz – 150KHz



No.	Frequency (KHz)	Reading (dBuA)	Correct Factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Remark
1	0.0150	-27.28	19.74	-7.54	34.70	-42.24	peak
2	0.0216	-28.26	20.07	-8.19	33.10	-41.29	peak
3	0.0418	-27.67	19.66	-8.01	30.22	-38.23	peak
4	0.0670	-28.96	19.02	-9.94	28.12	-38.06	peak
5	0.1000	-20.85	17.60	-3.25	26.53	-29.78	peak
6	0.1460	-4.88	17.51	12.63	24.66	-12.03	peak

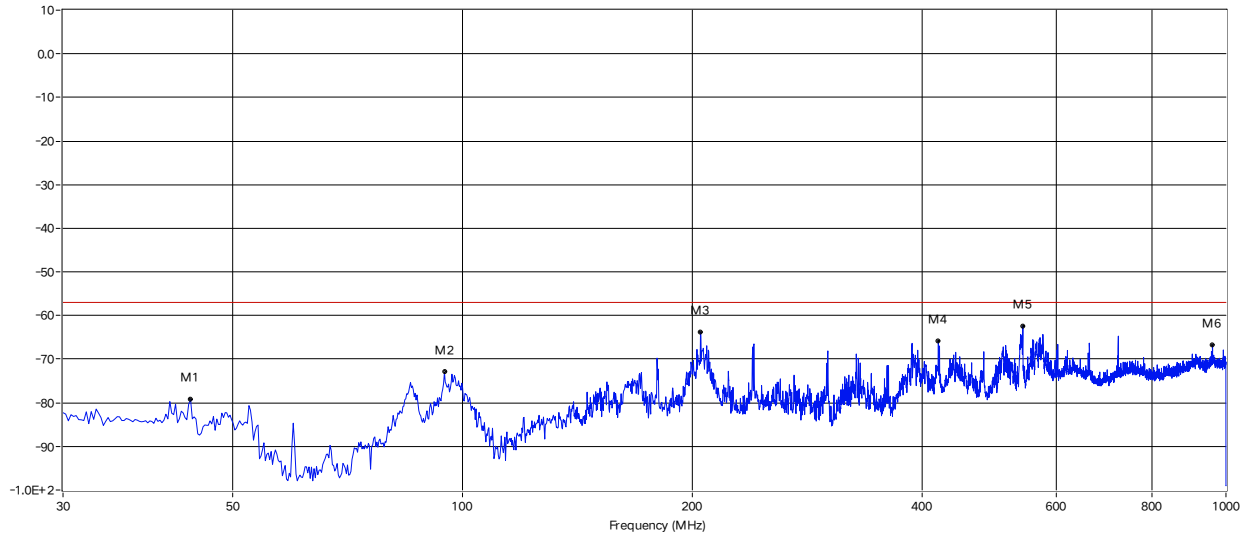
150KHz – 30MHz



No.	Frequency (MHz)	Reading (dBuA)	Correct Factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Remark
1	0.4187	-25.03	20.17	-4.86	20.34	-25.20	peak
2	1.2843	-27.21	20.26	-6.95	15.20	-22.15	peak
3	1.7917	-26.28	20.36	-5.92	13.66	-19.58	peak
4	4.0901	-26.07	20.41	-5.66	8.46	-14.12	peak
5	8.0304	-26.97	20.32	-6.65	2.94	-9.59	peak
6	13.5228	-28.23	20.98	-7.25	-1.88	-5.37	peak

30MHz -1GHz Horizontal

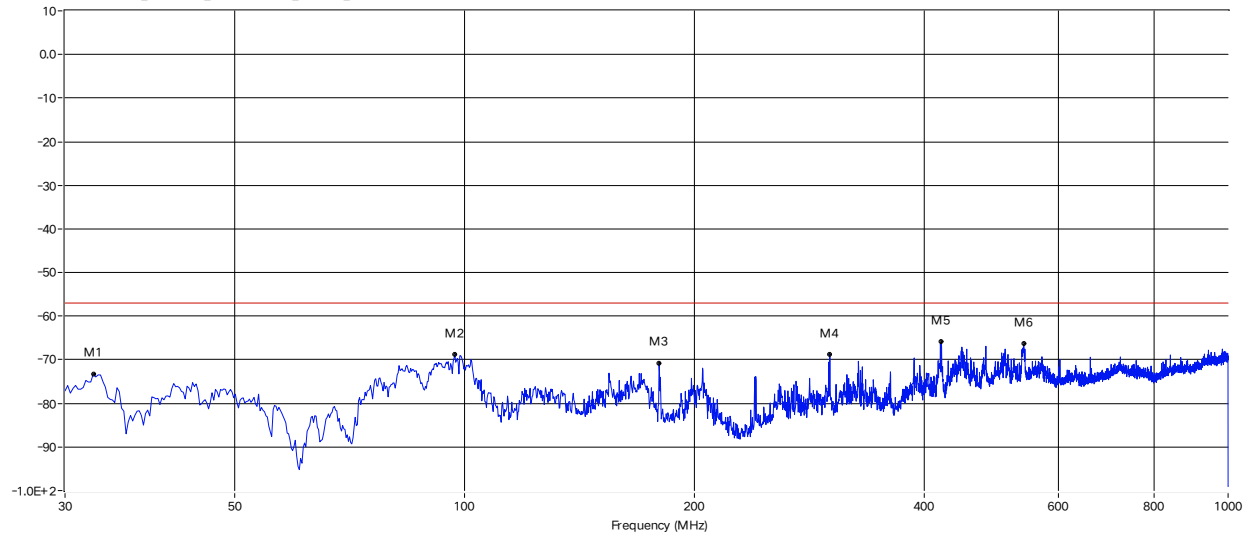
RSE-EN RX-TX TEST Case_EN303417_EN303 417-RX_30M-1G_H



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
44.065	-79.28	-7.28	-57.0	-22.28	89.90	Horizontal	Vertical	Pass
94.747	-72.95	-14.23	-57.0	-15.95	86.60	Horizontal	Vertical	Pass
205.085	-63.80	-11.09	-57.0	-6.80	26.30	Horizontal	Vertical	Pass
419.940	-65.75	2.23	-57.0	-8.75	143.50	Horizontal	Vertical	Pass
541.918	-62.37	2.92	-57.0	-5.37	163.90	Horizontal	Vertical	Pass
960.472	-66.73	9.63	-57.0	-9.73	319.80	Horizontal	Vertical	Pass

Vertical

RSE-EN RX-TX TEST Case_EN303417_EN303 417-RX_30M-1G_V



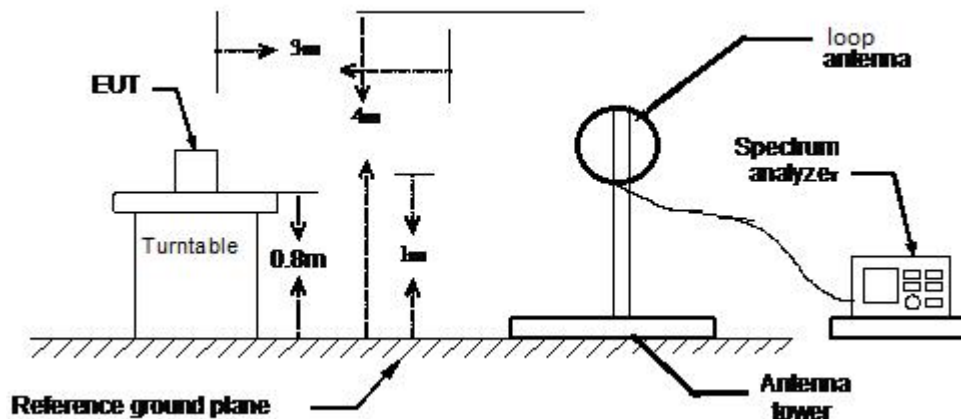
Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
32.667	-73.25	-7.84	-57.0	-16.25	30.90	Vertical	Vertical	Pass
97.173	-68.81	-6.34	-57.0	-11.81	4.40	Vertical	Vertical	Pass
179.865	-70.83	-8.31	-57.0	-13.83	356.40	Vertical	Vertical	Pass
300.873	-68.77	-3.44	-57.0	-11.77	288.80	Vertical	Vertical	Pass
421.395	-65.82	1.25	-57.0	-8.82	34.20	Vertical	Vertical	Pass
539.977	-66.37	5.95	-57.0	-9.37	349.00	Vertical	Vertical	Pass

8. TRANSMITTER OUT OF BAND (OOB) EMISSIONS

8.1 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.

8.2 TEST CONFIGURATION



8.3 TEST PROCEDURE

1. Please refer to ETSI EN 303 417 (V.1.1.1) Sub-clause 5 for the test conditions.
2. Please refer to ETSI EN 303 417 (V.1.1.1) Sub-clause 6.2 for the measurement method.

8.4 TEST RESULT

Mode 1

Out of Band emission	F_{SL}	F_L	F_H	F_{SH}
Operation Frequency (KHz)	133.75	143.75	147.750	157.750
Reading (dB μ A)	30.615	39.215	39.324	29.826
limit (dB μ A/m)	68.127	68.900	26.700	69.325
Result	Pass	Pass	Pass	Pass

Mode 2

Out of Band emission	F _{SL}	F _L	F _H	F _{SH}
Operation Frequency (KHz)	108.35	118.35	124.850	134.850
Reading (dBμA)	10.115	29.136	29.215	9.315
limit (dBμA/m)	96.419	97.338	26.700	97.749
Result	Pass	Pass	Pass	Pass

Mode 3/4

Out of Band emission	F _{SL}	F _L	F _H	F _{SH}
Operation Frequency (KHz)	110.30	120.30	132.650	142.650
Reading (dBμA)	-14.997	11.864	17.256	-13.282
limit (dBμA/m)	96.742	97.606	26.700	98.022
Result	Pass	Pass	Pass	Pass

9. WPT SYSTEM UNWANTED CONDUCTED EMISSIONS

9.1 LIMIT

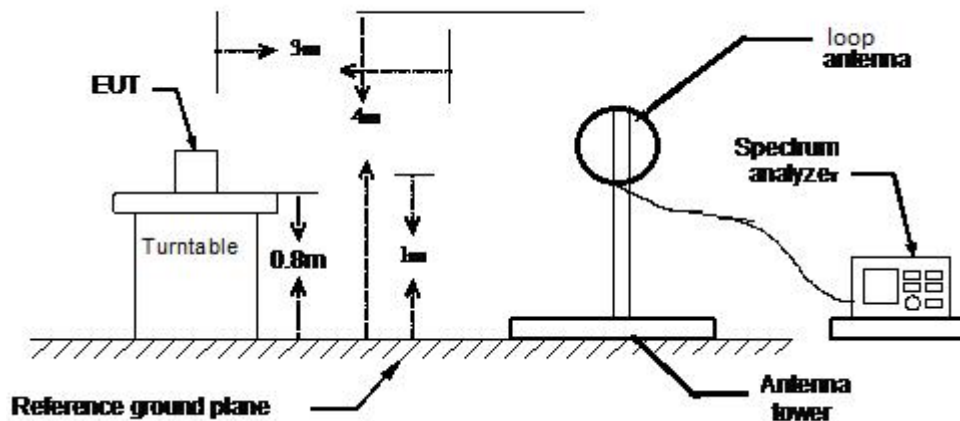
The common mode current (ICM) between 1 MHz and 30 MHz shall not exceed the following limit:

$$I_{CM} = 47 - 8 \times \log(f) \text{ dB}\mu\text{A}$$

NOTE: f is the frequency in MHz.

9.2 TEST CONFIGURATION

Below 30MHz



9.3 TEST PROCEDURE

1. Please refer to ETSI EN 303 417 (V.1.1.1) Sub-clause 5 for the test conditions.
2. Please refer to ETSI EN 303 417 (V.1.1.1) Sub-clause 6.2 for the measurement method.

9.4 TEST RESULT

Note: Not applicable.

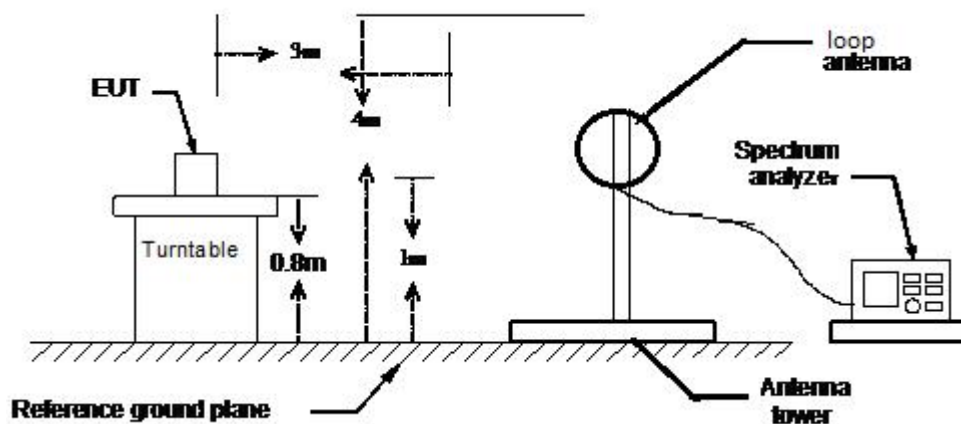
10. RECEIVER BLOCKING

10.1 LIMIT

Table 6: Receiver blocking limits

	In-band signal	OOB signal	Remote-band signal
Frequency	Centre frequency (f_c) of the WPT system (see clause 4.3.3)	$f = f_c \pm F$ (see note)	$f = f_c \pm 10 \times F$ (see note)
Signal level field strength at the EUT	72 dB μ A/m	72 dB μ A/m	82 dB μ A/m
NOTE: F = OFR see clause 4.3.3.			

10.2 TEST CONFIGURATION



10.3 TEST PROCEDURE

1. Please refer to ETSI EN 303 417 (V.1.1.1) Sub-clause 5 for the test conditions.
2. Please refer to ETSI EN 303 417 (V.1.1.1) Sub-clause 6.3 for the measurement method.

10.4 TEST RESULT

Note: Only show the worst case in the report.

Mode 1

operation frequency (KHz)	In-band signal(dB μ A/m)	OOB signal (dB μ A/m)	Remote-band signal(dB μ A/m)
174.9	72	/	/
171.5	/	72	/
178.3	/	72	/
140.9	/	/	82
208.9	/	/	82
Limit	Input the interference signal can work normally		
result	PASS	PASS	PASS

Note: F=OFR=4KHz



Mode 2

operation frequency (KHz)	In-band signal(dBμA/m)	OOB signal (dBμA/m)	Remote-band signal(dBμA/m)
174.9	72	/	/
171.5	/	72	/
178.3	/	72	/
140.9	/	/	82
208.9	/	/	82
Limit	Input the interference signal can work normally		
result	PASS	PASS	PASS

Note: F=OFR=4KHz

Mode 3

operation frequency (KHz)	In-band signal(dBμA/m)	OOB signal (dBμA/m)	Remote-band signal(dBμA/m)
174.9	72	/	/
171.5	/	72	/
178.3	/	72	/
140.9	/	/	82
208.9	/	/	82
Limit	Input the interference signal can work normally		
result	PASS	PASS	PASS

Note: F=OFR=4KHz

※※※※※ END OF THE REPORT※※※※※



EN IEC 62311:2020 TEST Report

Report No: FCS202411212H01

Issued for

Applicant:	Mid Ocean Brands B.V.
Address:	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.
Product Name:	Wireless charger
Brand Name:	N/A
Model Name:	MO2431
Series Model:	N/A
Test Standard:	EN IEC 62311:2020

**TEST RESULT CERTIFICATION**

Applicant's Name.....: Mid Ocean Brands B.V.

Address.....: 7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan,
Kowloon, Hong Kong.

Manufacture's Name.....: Mid Ocean Brands B.V.

Address.....: 7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan,
Kowloon, Hong Kong.

Product Description

Product Name.....: Wireless charger

Brand Name: N/A

Model Name.....: MO2431

Series Model.....: N/A

Test Standards.....: EN IEC 62311:2020

This device described above has been tested by FCS, the test results show that the equipment under test (EUT) is in compliance with the CE requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of FCS, this document may be altered or revised by FCS, personal only, and shall be noted in the revision of the document..

Date of Test.....:

Date (s) of performance of tests.: November 13, 2024 ~November 18, 2024

Date of Issue.....: November 18, 2024

Test Result.....: Pass

Tested by

:

Karl. Huang

(Karl Huang)

Reviewed by

:

Duke Qian

(Duke Qian)

Approved by

:

Jack Wang

(Jack Wang)





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3. HEALTH REQUIREMENTS	6
3.1 TEST STANDARDS	6
3.2 LIMIT	6
3.3 TEST PROCEDURE	6
3.4 TEST SETUP	7
3.5 TEST RESULT	7



1. Testing laboratory

Company Name:	Dongguan Funas Testing Technology Co., Ltd.
Address:	Room 105, 1/F.. Baohao Technology Building 1, No.15, Gongye West Road.Songshan Lake Hi-Tech Industrial Area, Dongguan, Guangdong, China
Telephone:	+86-0769-27280901
Fax:	+86-0769-27280901
Laboratory Accreditations	
FCC Test Firm Registration Number: 514908 CNAS Number: L15566 Designation number: CN0127 A2LA accreditation number: 5545.01 ISED Number: 25801	
http://www.fcs-lab.com	



2. GENERAL INFORMATION

Equipment	Wireless charger	
Brand Name	N/A	
Model Name	MO2431	
Serial Model	N/A	
Model Difference	N/A	
Product Description	The EUT is Wireless charger	
	Operation Frequency:	105-205kHz
	Modulation Type:	☒ MSK
	Antenna Designation:	Inductive Loop Antenna
	Antenna Gain(Peak)	1.0dBi
	More details of EUT technical specification, please refer to the User's Manual.	
Power Supply	Wireless OutPut Power:15W Max Input:DC 9V 2A, 5V 2A Output:DC 5V 1A, 7.5V 1A,9V1.1A, 9V 1.67A	
Battery	N/A	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

GENERAL DESCRIPTION OF EUT

3. HEALTH REQUIREMENTS

3.1 TEST STANDARDS

According to EN 62311, the criteria listed in the below table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified table 2 of Council Recommendation 1999/519/EC

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

According to EN IEC 62311:2020, the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified 1999/519/EC.

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field(μ T)	Equivalent plane wave power density $S_{eq}(W/m^2)$
0-1 Hz	-	$3,2 \times 10^4$	4×10^4	-
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	-
8-25 Hz	10 000	$4\,000/f$	$5\,000/f$	-
0,025-0,8 kHz	$250/f$	$4/f$	$5/f$	-
0,8-3 kHz	$250/f$	5	6,25	-
3-150 kHz	87	5	6,25	-
0,15-1 MHz	87	$0,73/f$	$0,92/f$	-
1-10 MHz	$87/f^{1/2}$	$0,73/f$	$0,92/f$	-
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375 f^{3/2}$	$0,0037 f^{1/2}$	$0,0046 f^{1/2}$	$f/200$
2-300 GHz	61	0,16	0,20	10

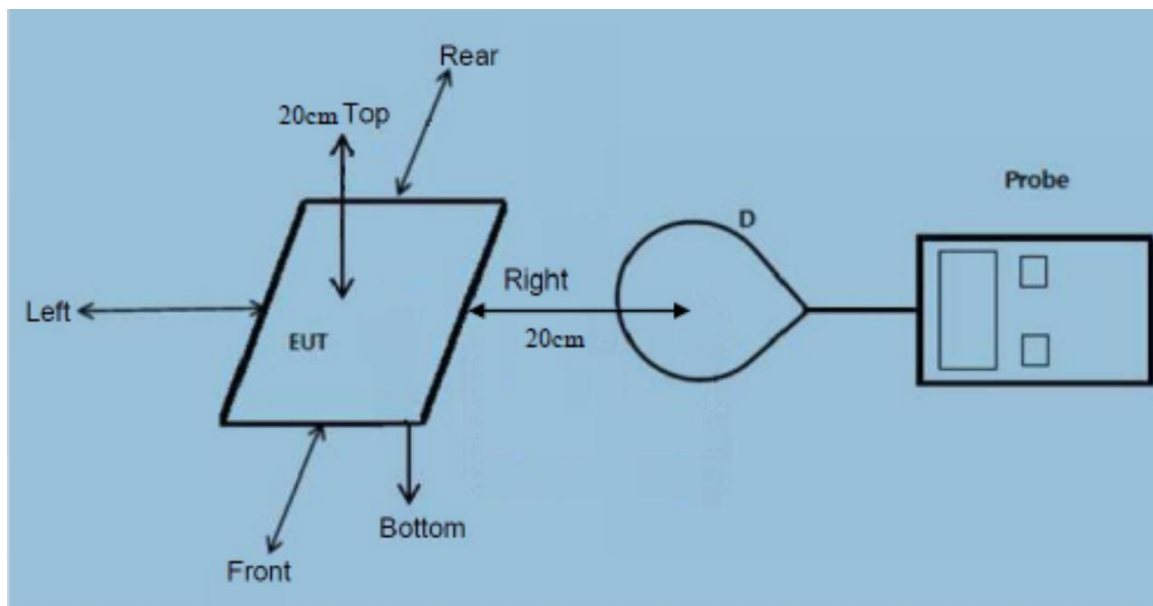
Notes:

1. f as indicated in the frequency range column.
2. For frequencies between 100 kHz and 10 GHz, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10 GHz, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any $68/f^{1.05}$ -minute period (f in GHz).
4. No E-field value is provided for frequencies < 1 Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 25 kV/m. Spark discharges causing stress or annoyance should be avoided.

3.3 TEST PROCEDURE

For devices designed for typical desktop applications, such a wireless charging pads, RF exposure evaluation should be conducted assuming a user separation distance of 20 cm(Top) and 20cm(Center). E and H field strength measurements or numerical modeling may be used to demonstrate compliance. Measurements should be made from all sides and the top of the primary/client pair, with the 20 cm(Top) and 20cm(Center) measured from the center of the probe(s) to the edge of the device.

3.4 TEST SETUP



3.5 TEST RESULT

Maximum Permissible Exposure				
Charging	Separation	Probe from EUT Side	E-field (V/m)	H-field (A/m)
< 1% Battery	20cm	Front	0.458	0.112
< 1% Battery	20cm	Rear	0.434	0.107
< 1% Battery	20cm	Left	0.431	0.121
< 1% Battery	20cm	Right	0.447	0.13
< 1% Battery	20cm	Top	0.469	0.133
Limit			87	4.17
Result			PASS	

Maximum Permissible Exposure				
Charging	Separation	Probe from EUT Side	E-field (V/m)	H-field (A/m)
50% Battery	20cm	Front	0.456	0.124
50% Battery	20cm	Rear	0.427	0.113
50% Battery	20cm	Left	0.426	0.12
50% Battery	20cm	Right	0.449	0.12
50% Battery	20cm	Top	0.474	0.135
Limit			87	4.17
Result			PASS	



Maximum Permissible Exposure				
Charging	Separation	Probe from EUT Side	E-field (V/m)	H-field (A/m)
> 99% Battery	20cm	Front	0.445	0.116
> 99% Battery	20cm	Rear	0.422	0.105
> 99% Battery	20cm	Left	0.417	0.117
> 99% Battery	20cm	Right	0.444	0.125
> 99% Battery	20cm	Top	0.467	0.139
Limit			87	4.17
Result			PASS	

Note: The test frequency is 145.75kHz, Limit: E-field=87 V/m; H-field=5 A/m