



Test report No:
NIE: 62807RAN.001

Test report

RF EXPOSURE REPORT ACCORDING TO

IEEE Std C95.3-2002
ISED RSS-102 Issue 5:2015
ISED RSS-102-SPR-002 Issue 1:2016

(*) Identification of item tested	Wireless Charger Module (WCM)
(*) Trademark	Harman
(*) Model and /or type reference	VW WLC
(*) Other identification of the product	HW version: 02.00 SW Version: 00.10.05 FCC ID : 2AHPN-WLC
(*) Features	No additional features except smartphone charging and Foreign Object detection
(*) Manufacturer	Company name: Harman da Amazonia Indústria Eletronica e Participações Ltda Postal address: Av. Cupiuba, nr. 401, Galpão B, Distrito Industrial Manaus - AM, Brazil, 69075-060
Test method requested, standard	IEEE Std C95.3-2002: "IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz–300 GHz". FCC 47 CFR Part 2.1091 Radiofrequency radiation exposure evaluation: mobile devices. ISED RSS-102 Issue 5 (2015-03) – Radio Frequency Exposure Compliance of Radiocommunication Apparatus RSS-102-SPR-002 Issue 1 (2016-09). – Supplementary Procedure for Assessing Compliance with RSS-102 Nerve Stimulation Exposure Limits (3kHz a 10MHz)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Miguel Lacave Antennas Lab Manager
Date of issue	2020-10-19
Report template No	FAN39_01 (*) "Data provided by the client"

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Competences and guarantees

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In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification at the time of performance of the test.

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Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification S.A.U. internal document FAN40.

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested", "Other identification of the product", "Features" and "Manufacturer").
2. Installation distance.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: the client

Sample M/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
62807F/003	WPT	5U0 980 611	VWZGZ1W1470106	2020-06-16
62807F/004	Load Box	--	--	2020-06-16
62807F/008	Harness RS232	--	--	2020-06-16
61466/014	Mobile Phone Samsung Note 10	N970F	IMEI: 357452/1	2020-07-26

1. Sample M/01 has undergone the test(s) specified in subclause "Test method requested".

Test sample description

The test sample consists of a Wireless Charger is a device that enables charging the battery of a smartphone or any other device that is Qi compliant using magnetic induction up to the power of 10W.

Identification of the client

Company name: Harman Connected Services Pvt Ltd.

Postal address: Plot No. 3 & 3A, Eoiz Industrial Area, Sadaramangala, Bengaluru, Karnataka 560066

Contact person: Pradeep Somashekar

Telephone / e-mail: +91 6366533036 / Pradeep.somashekar@harman.com

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2020-09-09
Date (finish)	2020-09-14

Document history

Report number	Date	Description
62807RAN.001	2020-10-19	First release

Environmental conditions

Date	Max. Temp. °C	Min. Temp. °C	Max. Hum. %	Min. Hum. %	Limit
From 2020-09-09 to 2020-09-14	30.0	22.1	57.4	32.1	10-40 °C 0-90%

Remarks and comments

- The tests have been performed by the technical personnel: Francisco J. Sánchez.
- The instrumentation utilized to perform the tests covered in this test report is listed in the following table:

	Last Cal. date	Cal. due date
1. Narda EHP-200A E and H Field Analyzer	2019/11	2021/11
2. WaveControl WP400-3 E and H Field Analyzer	2020/08	2022/08
3. Low Dielectric Tripod Manfrotto H-491009-01	-	-
4. Temperature and humidity logger HW GROUP HWg-STE	2020/04	2021/04

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

FCC 47 CFR § 2.1091 & ISED RSS-102 Issue 5 & ISED RSS-102-SPR-002 Issue 1	VERDICT			
	N/A	P	F	NM
Qi Wireless Charge		P		

Appendix A: FCC RF Exposure

General description of the device under evaluation

The device under test consists of a Wireless Charger is a device that enables charging the battery of a smartphone or any other device that is Qi compliant using magnetic induction up to the power of 10W.

According to the manufacturer, during its normal use, the separation distance between the device and the body of nearby users will be greater than 17 cm once installed.

RF Exposure evaluation for the Qi wireless technology has been conducted through field measurements (see Qi WPT Evaluation section below).

Evaluation Results

Following results correspond to maximum measured field values:

Technology	Frequency (MHz)	Max. E-field (V/m)	Max. H-field (A/m)	Max Power Density (mW/cm ²)	E-field Limit (V/m)	H-field Limit (A/m)	Power Density Limit (mW/cm ²)	Verdict
Qi WPT	0.125	0.33	0.18	-	614.00	1.63	-	PASS

Table 1: Results

Qi WPT Evaluation

E-Field and H-Field measurements have been made from all sides of the device using a separation distance from 4.5 cm (as close as possible due to the measurement field probe dimensions) to 15 cm, measured from the center of the probe to each edge and 20 cm to the Top side of the device, following the procedures described on TCB Workshop, “RF Exposure Procedures Slides, November 2019” and KDB 680106 D01. This measurements results have been approved by FCC through inquiry nº 739426. Emissions between 100 kHz to 300 kHz should be assessed versus the limits at 300 kHz in Table 1 of Section 1.1310: 614 V/m and 1.63 A/m.

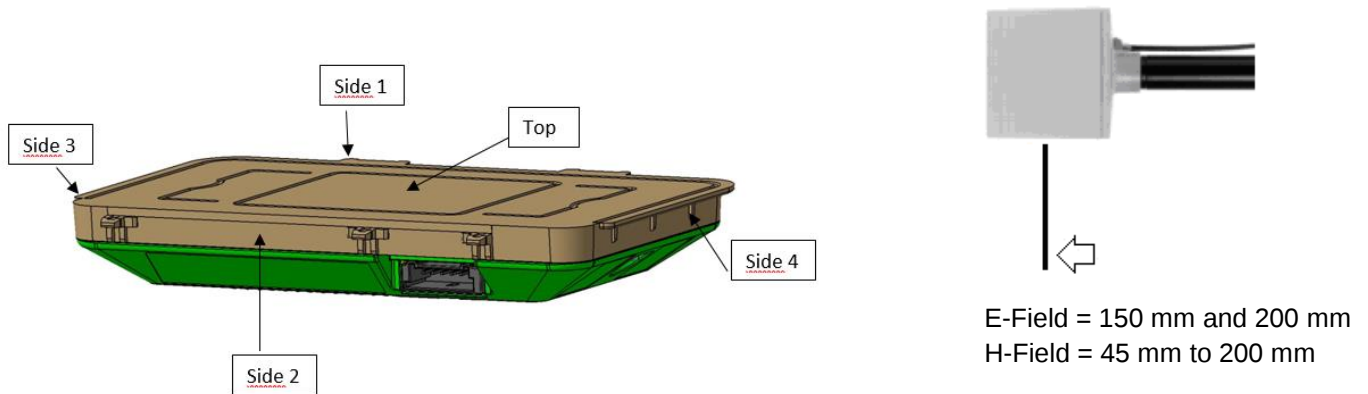


Figure 1: WPT measurement setup

Two testing setups have been measured in order to assess compliance for the device:

- Setup 1 – Charging setup with a Smartphone

For the normal charging setup, H-Field measurements have been performed for all device sides from 4.5 cm to 10 cm and 15 cm distance, except for the back and Top sides, at different battery charge levels. Measurements for Top side have been performed from 4.5 cm to 10 cm and 20 cm distance.

E-Field measurement at 15 cm distance has been performed for all device sides, except for the back and Top sides, at different battery charger levels. Measurements for Top side have been performed at 20 cm distance.

- Setup 2 – Charger:

Measurements have been performed at 15 cm distance over the charger without any device charging for all device edges except for back and Top sides of the charger. Measurement for Top side has been performed at 20 cm.

- Setup 1 Measurements

Test results for [Android 1% battery]

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	4.5	0.1270	0.142	1.630	8.7	Pass
Side 1	4.5	0.1265	0.180	1.630	11.0	Pass
Side 2	4.5	0.1265	0.075	1.630	4.6	Pass
Side 3	4.5	0.1263	0.062	1.630	3.8	Pass
Side 4	4.5	0.1265	0.181	1.630	11.1	Pass

Table 2: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	6	0.1265	0.089	1.630	5.5	Pass
Side 1	6	0.1263	0.140	1.630	8.6	Pass
Side 2	6	0.1263	0.040	1.630	2.4	Pass
Side 3	6	0.1263	0.032	1.630	2.0	Pass
Side 4	6	0.1265	0.110	1.630	6.8	Pass

Table 3: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	8	0.1265	0.034	1.630	2.1	Pass
Side 1	8	0.1263	0.081	1.630	5.0	Pass
Side 2	8	0.1263	0.022	1.630	1.3	Pass
Side 3	8	0.1263	0.022	1.630	1.3	Pass
Side 4	8	0.1265	0.062	1.630	3.8	Pass

Table 4: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	10	0.1263	0.024	1.630	1.5	Pass
Side 1	10	0.1265	0.038	1.630	2.3	Pass
Side 2	10	0.1265	0.017	1.630	1.0	Pass
Side 3	10	0.1263	0.017	1.630	1.1	Pass
Side 4	10	0.1263	0.040	1.630	2.5	Pass

Table 5: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	20	0.1265	0.033	1.630	2.0	Pass
Side 1	15	0.1333	0.010	1.630	0.6	Pass
Side 2	15	0.1255	0.009	1.630	0.6	Pass
Side 3	15	0.1240	0.010	1.630	0.6	Pass
Side 4	15	0.1108	0.010	1.630	0.6	Pass

Table 6: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	E-Field (V/m)	Limit (V/m)	% Limit	Verdict
Top	20	0.1263	0.33	614.00	0.05	Pass
Side 1	15	0.1295	0.07	614.00	0.01	Pass
Side 2	15	0.1250	0.07	614.00	0.01	Pass
Side 3	15	0.1190	0.07	614.00	0.01	Pass
Side 4	15	0.1223	0.07	614.00	0.01	Pass

Table 7: E-field measurement values

Test results for [Android 50% battery]

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	4.5	0.1263	0.071	1.630	4.3	Pass
Side 1	4.5	0.1260	0.085	1.630	5.2	Pass
Side 2	4.5	0.1263	0.117	1.630	7.2	Pass
Side 3	4.5	0.1263	0.050	1.630	3.1	Pass
Side 4	4.5	0.1265	0.235	1.630	14.4	Pass

Table 8: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	6	0.1263	0.053	1.630	3.3	Pass
Side 1	6	0.1263	0.029	1.630	1.8	Pass
Side 2	6	0.1265	0.058	1.630	3.6	Pass
Side 3	6	0.1265	0.034	1.630	2.1	Pass
Side 4	6	0.1263	0.118	1.630	7.2	Pass

Table 9: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	8	0.1270	0.022	1.630	1.4	Pass
Side 1	8	0.1265	0.017	1.630	1.0	Pass
Side 2	8	0.1265	0.037	1.630	2.2	Pass
Side 3	8	0.1265	0.024	1.630	1.5	Pass
Side 4	8	0.1265	0.068	1.630	4.2	Pass

Table 10: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	10	0.1265	0.016	1.630	1.0	Pass
Side 1	10	0.1263	0.012	1.630	0.7	Pass
Side 2	10	0.1263	0.025	1.630	1.5	Pass
Side 3	10	0.1265	0.020	1.630	1.2	Pass
Side 4	10	0.1265	0.041	1.630	2.5	Pass

Table 11: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	20	0.1348	0.010	1.630	0.6	Pass
Side 1	15	0.1333	0.010	1.630	0.6	Pass
Side 2	15	0.1263	0.015	1.630	0.9	Pass
Side 3	15	0.1265	0.014	1.630	0.8	Pass
Side 4	15	0.1265	0.024	1.630	1.5	Pass

Table 12: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	E-Field (V/m)	Limit (V/m)	% Limit	Verdict
Top	20	0.1263	0.21	614.00	0.03	Pass
Side 1	15	0.1263	0.22	614.00	0.04	Pass
Side 2	15	0.1265	0.20	614.00	0.03	Pass
Side 3	15	0.1265	0.19	614.00	0.03	Pass
Side 4	15	0.1263	0.22	614.00	0.04	Pass

Table 13: E-field measurement values

Test results for [Android 99% battery]

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	4.5	0.1265	0.058	1.630	3.5	Pass
Side 1	4.5	0.1263	0.169	1.630	10.4	Pass
Side 2	4.5	0.1265	0.046	1.630	2.8	Pass
Side 3	4.5	0.1263	0.098	1.630	6.0	Pass
Side 4	4.5	0.1263	0.300	1.630	18.4	Pass

Table 14: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	6	0.1270	0.032	1.630	2.0	Pass
Side 1	6	0.1263	0.076	1.630	4.7	Pass
Side 2	6	0.1263	0.023	1.630	1.4	Pass
Side 3	6	0.1265	0.046	1.630	2.8	Pass
Side 4	6	0.1270	0.162	1.630	10.0	Pass

Table 15: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	8	0.1265	0.018	1.630	1.1	Pass
Side 1	8	0.1263	0.049	1.630	3.0	Pass
Side 2	8	0.1263	0.019	1.630	1.1	Pass
Side 3	8	0.1260	0.031	1.630	1.9	Pass
Side 4	8	0.1263	0.079	1.630	4.8	Pass

Table 16: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	10	0.127	0.013	1.630	0.8	Pass
Side 1	10	0.1260	0.026	1.630	1.6	Pass
Side 2	10	0.1265	0.011	1.630	0.7	Pass
Side 3	10	0.1265	0.019	1.630	1.2	Pass
Side 4	10	0.1260	0.048	1.630	2.9	Pass

Table 17: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	20	0.1265	0.010	1.630	0.6	Pass
Side 1	15	0.1268	0.010	1.630	0.6	Pass
Side 2	15	0.1203	0.009	1.630	0.6	Pass
Side 3	15	0.1260	0.010	1.630	0.6	Pass
Side 4	15	0.1263	0.020	1.630	1.2	Pass

Table 18: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	E-Field (V/m)	Limit (V/m)	% Limit	Verdict
Top	20	0.1265	0.24	614.00	0.04	Pass
Side 1	15	0.1263	0.19	614.00	0.03	Pass
Side 2	15	0.1263	0.26	614.00	0.04	Pass
Side 3	15	0.1263	0.22	614.00	0.04	Pass
Side 4	15	0.1263	0.20	614.00	0.03	Pass

Table 19: E-field measurement values

- Setup 2 Measurements

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	20	0.1268	0.052	1.630	3.2	Pass
Side 1	15	0.1270	0.040	1.630	2.4	Pass
Side 2	15	0.1270	0.037	1.630	2.3	Pass
Side 3	15	0.1273	0.025	1.630	1.5	Pass
Side 4	15	0.1265	0.016	1.630	1.0	Pass

Table 20: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	E-Field (V/m)	Limit (V/m)	% Limit	Verdict
Top	20	0.1270	0.14	614.00	0.02	Pass
Side 1	15	0.1273	0.11	614.00	0.02	Pass
Side 2	15	0.1273	0.17	614.00	0.03	Pass
Side 3	15	0.1275	0.15	614.00	0.02	Pass
Side 4	15	0.1268	0.12	614.00	0.02	Pass

Table 21: E-field measurement values

All H-Field and E-Field values are in compliance to values shown into §1.1310, paragraph (e), "Table 1: limits for Maximum Permissible Exposure (MPE).

Appendix B: ISED RF Exposure

General description of the device under evaluation

The device under test consists of a Wireless Charger is a device that enables charging the battery of a smartphone or any other device that is Qi compliant using magnetic induction up to the power of 10W.

According to the manufacturer, during its normal use, the separation distance between the device and the body of nearby users will be greater than 17 cm once installed.

RF Exposure evaluation for the Qi wireless technology has been conducted through field measurements (see Qi WPT Evaluation section below).

Evaluation Results

Following results correspond to maximum measured field values:

Technology	Frequency (MHz)	Max. E-field (V/m rms)	Max. H-field (A/m rms)	Max Power Density (W/m ²)	E-field Limit (V/m rms)	H-field Limit (A/m rms)	Power Density Limit (W/m ²)	Verdict
Qi WPT	0.125	-	0.305	-	-	5.780	-	PASS
Qi WPT - NS	0.125	0.38	0.038	-	83.0	90.0	-	PASS

Table 22: ISED Results

Qi WPT Evaluation

Measurements at 10 cm test distance were performed using the equipment listed in the “Used Instrumentation” paragraph of this document to compare the measured H-Field values with the limits shown on table 4 of RSS-102 Issue 5, Paragraph “4.Exposure Limits”, Industry of Canada.

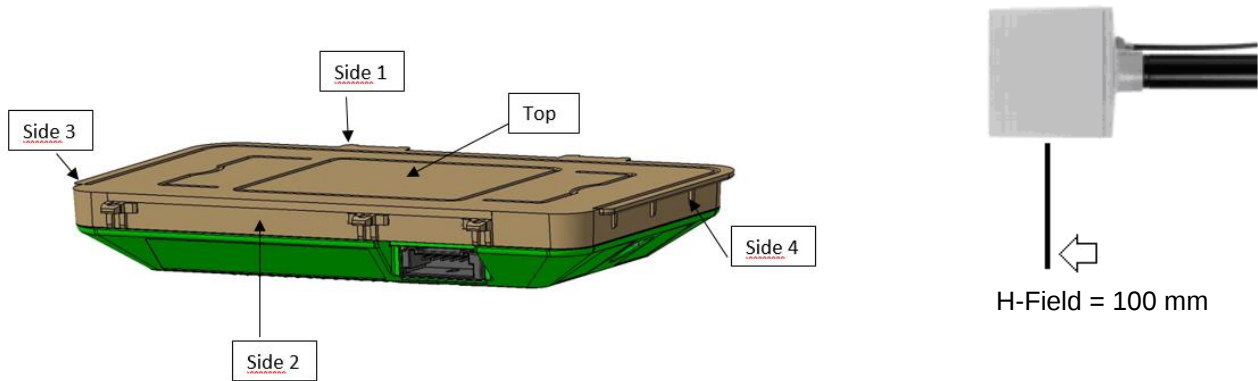


Figure 2: WPT Measurement setup

Two testing setups have been measured in order to assess compliance for the device:

- Setup 1 – Charging setup with a Smartphone

For the normal charging setup, measurements at 10 cm distance have been performed for all device sides except for the back side, at different battery charge levels.

- Setup 2 – Charger:

Measurements at 10 cm distance over the charger without any device charging were performed for all device sides except for the back side of the charger.

- Setup 1 Measurements

Test results for [Android 1% battery]

Test side	Distance (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	10	0.1265	0.076	5.771	1.3	Pass
Side 1	10	0.1268	0.035	5.757	0.6	Pass
Side 2	10	0.1265	0.090	5.771	1.6	Pass
Side 3	10	0.1263	0.090	5.780	1.6	Pass
Side 4	10	0.1263	0.237	5.780	4.1	Pass

Table 23: H-field measurement values

Test results for [Android 50% battery]

Test side	Distance (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	10	0.1263	0.074	5.780	1.3	Pass
Side 1	10	0.1263	0.054	5.780	0.9	Pass
Side 2	10	0.1263	0.188	5.780	3.2	Pass
Side 3	10	0.1263	0.133	5.780	2.3	Pass
Side 4	10	0.1263	0.305	5.780	5.3	Pass

Table 24: H-field measurement values

Test results for [Android 99% battery]

Test side	Distance (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	10	0.1263	0.015	5.780	0.3	Pass
Side 1	10	0.1265	0.040	5.771	0.7	Pass
Side 2	10	0.1263	0.015	5.780	0.3	Pass
Side 3	10	0.1263	0.087	5.780	1.5	Pass
Side 4	10	0.1265	0.042	5.771	0.7	Pass

Table 25: H-field measurement values

- Setup 2 Measurements

Test side	Distance (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	10	0.1265	0.013	5.771	0.2	Pass
Side 1	10	0.1270	0.012	5.748	0.2	Pass
Side 2	10	0.1278	0.023	5.712	0.4	Pass
Side 3	10	0.1275	0.009	5.725	0.2	Pass
Side 4	10	0.1218	0.009	5.993	0.2	Pass

Table 26: H-field measurement values

All H-Field values are in compliance to values shown into "Table 4: RF Field Strength Limits for Devices Used by the General Public" for the frequency range used by the device.

Qi WPT Evaluation - ISED Nerve Stimulation

According to RSS-102 Issue 5, Nerve Stimulation exposure limits shall be evaluated for transmission into the frequency range from 0.003 to 10 MHz. Supplementary Procedure SPR-002, Issue 1, for Radio Standards Specification RSS-102 sets out the general test methods to be followed when carrying out an assessment to the nerve stimulation exposure requirements of RSS-102 Issue 5.

Measurements have been performed at a compliance distance of 10 cm from the probe edge to the device edge, placing the device in the edge of the table, using the equipment listed in the “Used Instrumentation” paragraph of this document, and following the measurement method shown in paragraph 6.6.1.1 of “Supplementary Procedure for Assessing Compliance with RSS-102 Nerve Stimulation Exposure Limits SPR-002”:

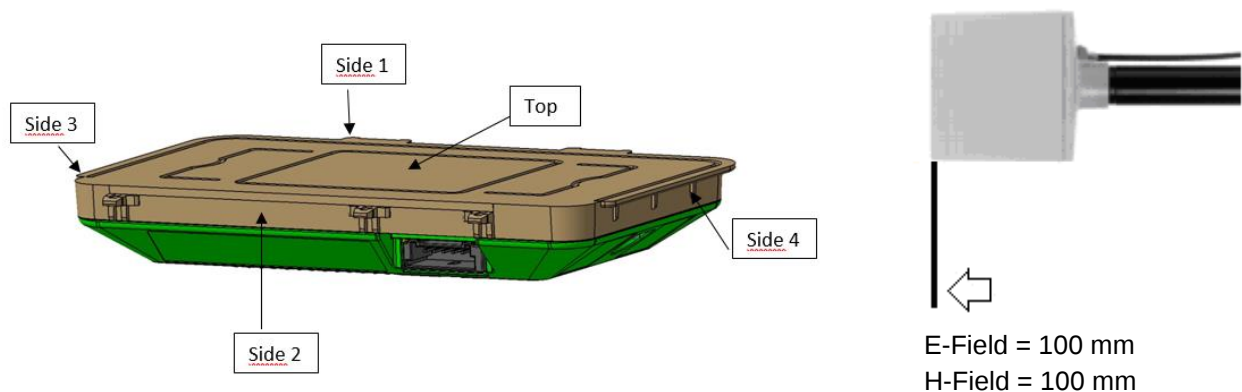


Figure 3: Nerve Stimulation measurement setup

- 3 kHz to 10 MHz H-Field and E-Field frequency scan:

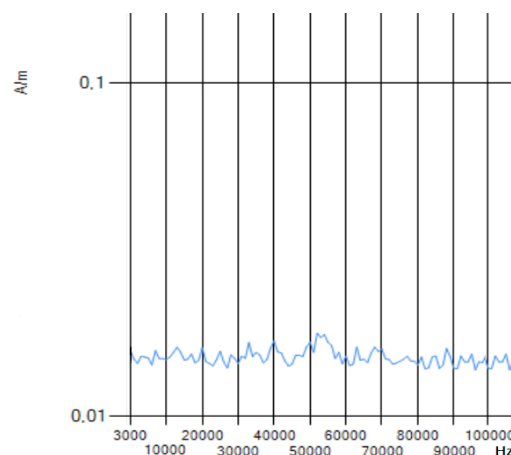


Figure 4: H-Field scan from 3 to 100kHz

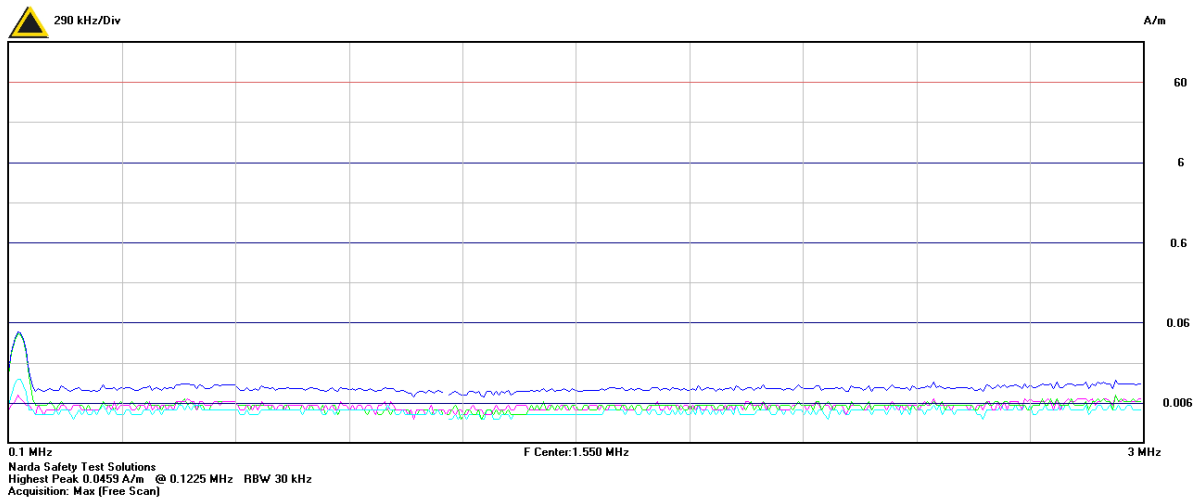


Figure 5: H-Field scan from 100kHz to 3MHz

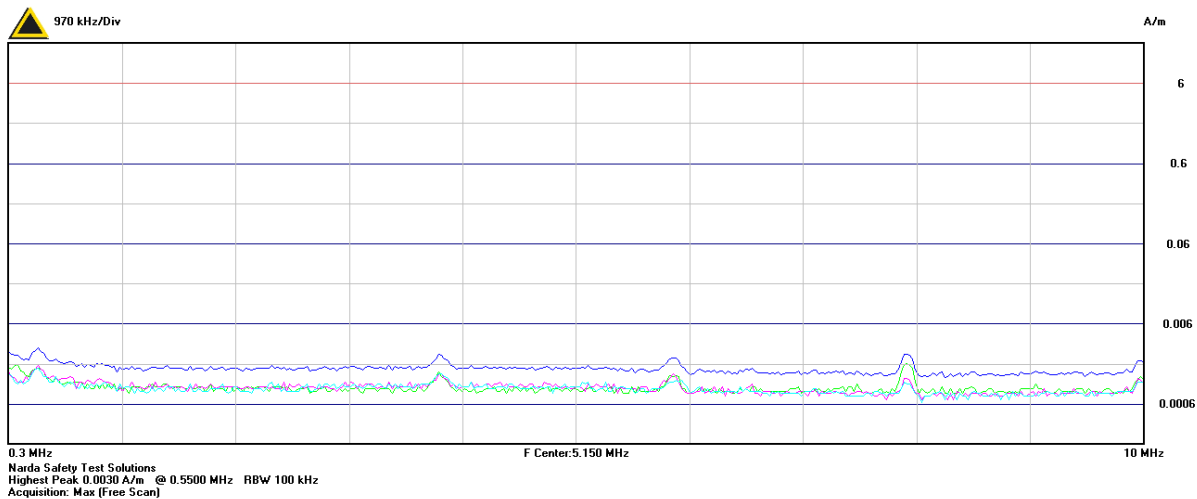


Figure 6: H-Field from 300kHz to 10MHz

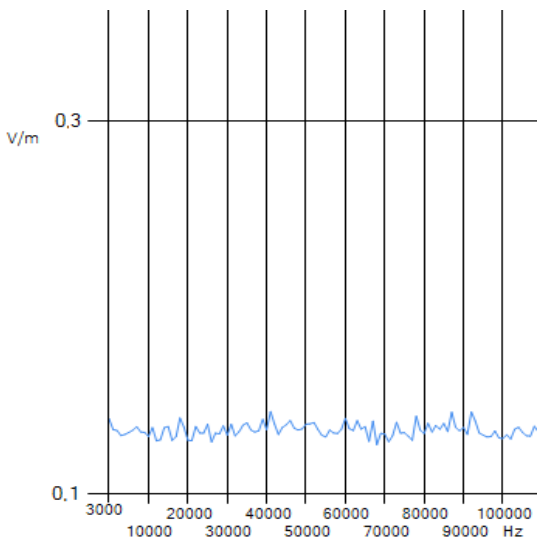


Figure 7: E-Field scan from 3 to 100kHz

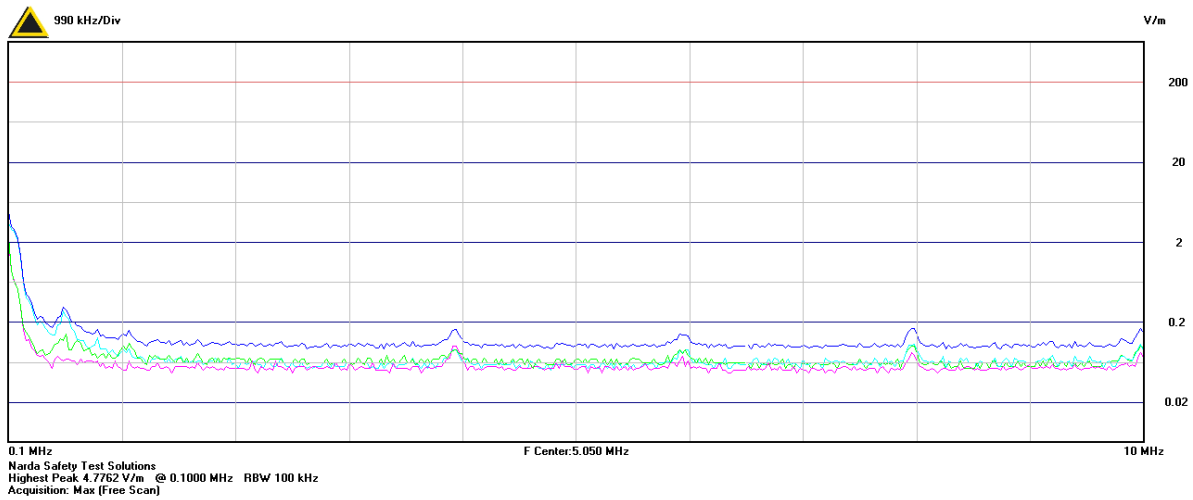


Figure 8: E-Field scan from 100kHz to 10MHz

Two testing setups have been measured in order to assess compliance for the device:

- Setup 1 – Charging setup with a Smartphone

For the normal charging setup, measurements at 10 cm distance have been performed for all device sides except for the back side, at 50% battery level as worst case.

- Setup 2 – Charger:

Measurements at 10 cm distance over the charger without any device charging were performed for all device sides except for the back side of the charger.

- Setup 1 Measurements

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	10	0.1263	0.013	90	0.0	Pass
Side 1	10	0.1273	0.024	90	0.0	Pass
Side 2	10	0.1263	0.011	90	0.0	Pass
Side 3	10	0.1273	0.038	90	0.0	Pass
Side 4	10	0.1273	0.022	90	0.0	Pass

Table 27: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	E-Field (V/m)	Limit (V/m)	% Limit	Verdict
Top	10	0.1270	0.38	83	0.5	Pass
Side 1	10	0.1263	0.27	83	0.3	Pass
Side 2	10	0.1270	0.28	83	0.3	Pass
Side 3	10	0.1273	0.34	83	0.4	Pass
Side 4	10	0.1263	0.27	83	0.3	Pass

Table 28: E-field measurement values

- Setup 2 Measurements

Test side	Distance to DUT (cm)	Frequency (MHz)	H-Field (A/m)	Limit (A/m)	% Limit	Verdict
Top	10	0.1325	0.018	90	0.0	Pass
Side 1	10	0.1263	0.024	90	0.0	Pass
Side 2	10	0.1278	0.011	90	0.0	Pass
Side 3	10	0.1205	0.010	90	0.0	Pass
Side 4	10	0.1210	0.010	90	0.0	Pass

Table 29: H-field measurement values

Test side	Distance to DUT (cm)	Frequency (MHz)	E-Field (V/m)	Limit (V/m)	% Limit	Verdict
Top	10	0.1338	0.09	83	0.1	Pass
Side 1	10	0.1240	0.08	83	0.1	Pass
Side 2	10	0.1260	0.09	83	0.1	Pass
Side 3	10	0.1278	0.08	83	0.1	Pass
Side 4	10	0.1273	0.46	83	0.6	Pass

Table 30: E-field measurement values

All H-Field and E-Field values are in compliance to values shown into "Table 4: RF Field Strength Limits for Devices Used by the General Public" for the frequency range used by the device.

Appendix C: RF Exposure Information

FCC RF Exposure evaluation for mobile devices

When a device qualifies for the categorical exclusion provision of § 2.1091(c), the minimum test separation distance may be estimated, when applicable, by simple calculations according to plane-wave equivalent conditions, to ensure the transmitter and its antenna(s) can operate in manners that meet or exceed the estimated distance. The source-based time-averaged maximum radiated power, according to the maximum antenna gain, must be applied to calculate the field strength and power density required to establish the minimum test separation distance. When the estimated test separation distance becomes overly conservative and does not support compliance, MPE measurement or computational modeling may be used to determine the required minimum separation distance.

According to §1.1310 Radiofrequency radiation exposure limits, paragraph (e), the limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields are:

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 Exposure				
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
300–1,500			f/300	6
1,500–100,000			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
300–1,500			f/1500	30
1,500–100,000			1.0	30

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

FCC MPE Evaluation

In order to perform the assessment, the following equations have been used for the calculations; these equations are accurate in the far-field of an antenna and will over-predict power density in the near field, where they could be used for making a "worst case" or conservative prediction:

$$\text{Power density: } S[\text{mW} / \text{cm}^2] = \frac{P_{E.I.R.P.}[\text{mW}]}{4\pi R[\text{cm}]^2}$$

Where:

S = power density

$P_{E.I.R.P.}$ = Equivalent isotropically radiated power

R = distance to the center of radiation of the antenna (evaluation distance)

ISED RF Exposure evaluation for mobile devices

According to RSS-102 Issue 5, Paragraph "4. Exposure Limits", Industry of Canada has adopted the RF field strength limits established in Health Canada's RF exposure guideline, Safety code 6:

**Table 4: RF Field Strength Limits for Devices Used by the General Public
(Uncontrolled Environment)**

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ⁻¹¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ <i>f</i>	-	6**
1.1-10	87/ <i>f</i> ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ <i>f</i> ^{0.25}	0.1540/ <i>f</i> ^{0.25}	8.944/ <i>f</i> ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> ^{0.3417}	0.008335 <i>f</i> ^{0.3417}	0.02619 <i>f</i> ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻³ <i>f</i>	616000/ <i>f</i> ^{1.2}
Note: <i>f</i> is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

ISED MPE Evaluation

In order to perform the MPE assessment, the following equations have been used for the calculations; these equations are accurate in the far-field of an antenna and will over-predict power density in the near field, where they could be used for making a "worst-case" or conservative prediction:

$$\text{Power density: } S[W / m^2] = \frac{P_{E.I.R.P.}[W]}{4\pi R[m]^2}$$

Where:

S = power density

*P*_{E.I.R.P.} = Equivalent isotropically radiated power

R = distance to the center of radiation of the antenna (evaluation distance)

Appendix D: Photographs

Equipment view



FCC H-Field and E-Field measurement setup 1 views

Top – 4.5 cm



Side 1 – 4.5 cm



Side 2 – 4.5 cm



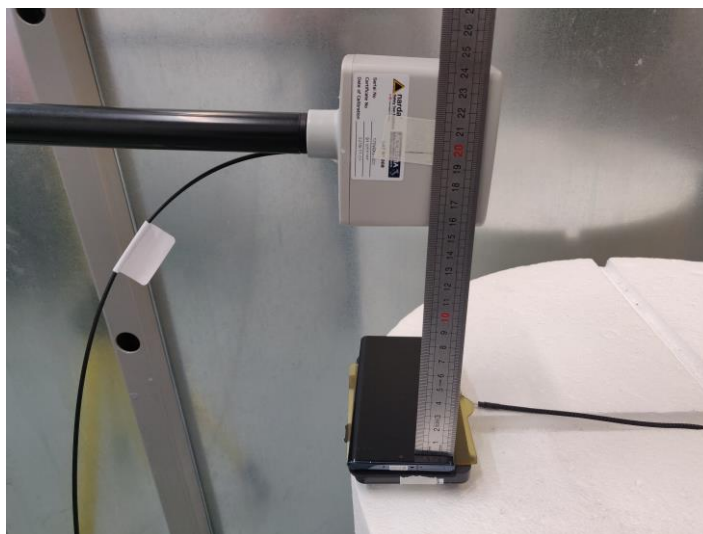
Side 3 – 4.5 cm



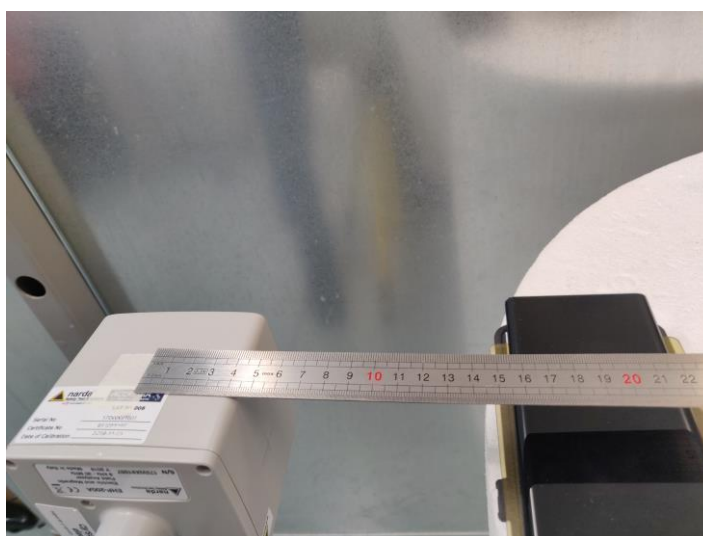
Side 4 – 4.5 cm



Top – 20 cm



Side 1 – 15 cm



Side 2 – 15 cm



Side 3 – 15 cm

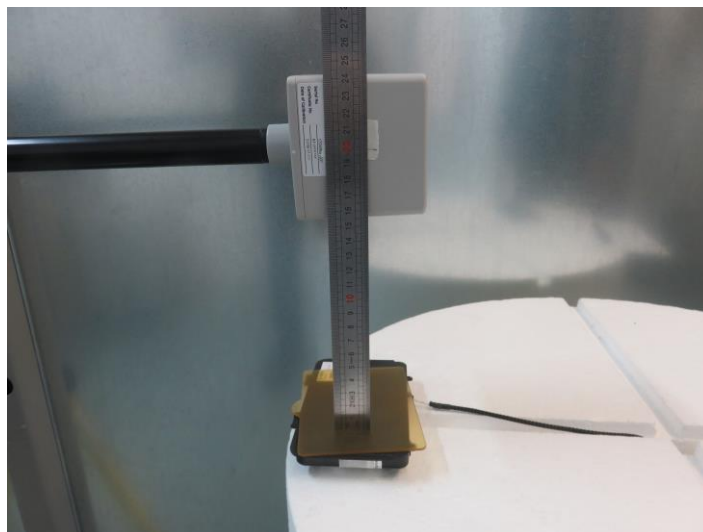


Side 4 – 15 cm

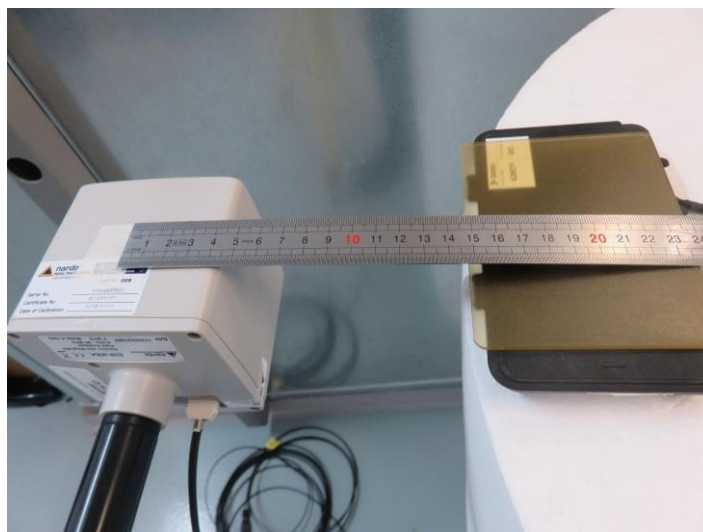


FCC H-Field and E-Field measurement setup 2 views

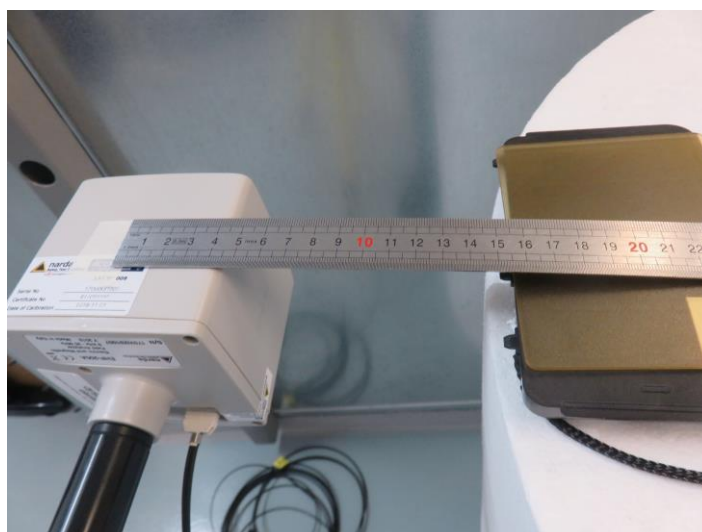
Top – 20 cm



Side 1 – 15 cm



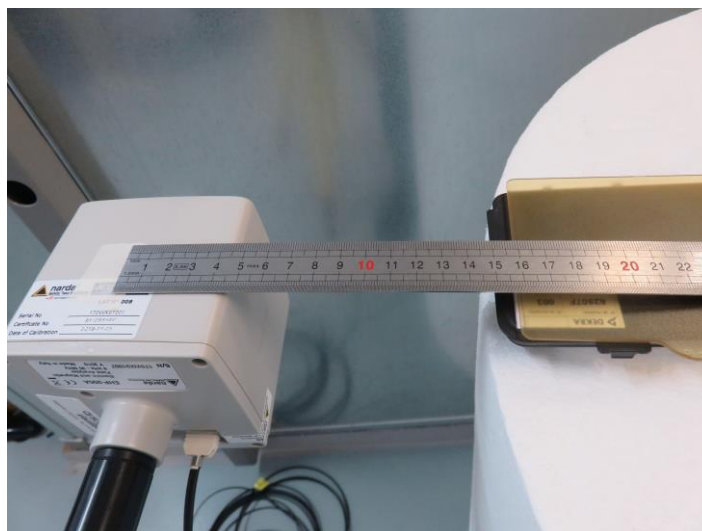
Side 2 – 15 cm



Side 3 – 15 cm



Side 4 – 15 cm



ISED H-Field measurement setup 1 views

Top – 10 cm



Side 1 – 10 cm



Side 2 – 10 cm



Side 3 – 10 cm



Side 4 – 10 cm

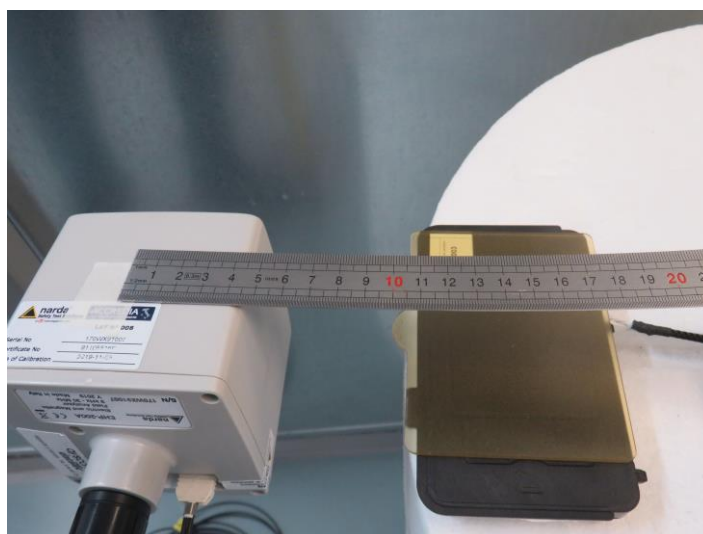


ISED H-Field measurement setup 2 views

Top – 10 cm



Side 1 – 10 cm



Side 2 – 10 cm



Side 3 – 10 cm



Side 4 – 10 cm

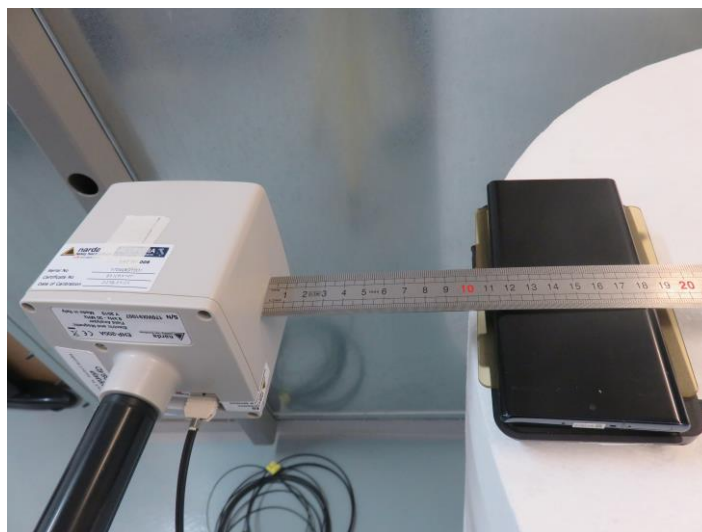


Nerve stimulation H-Field and E-Field measurement setup 1

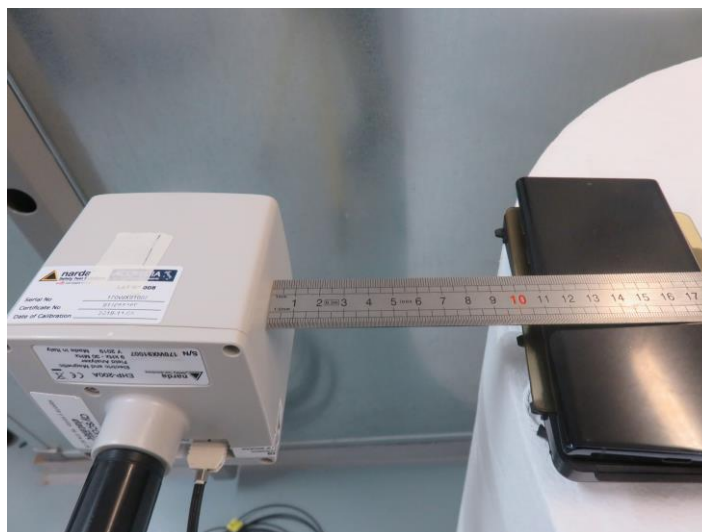
Top - 10 cm



Side 1 - 10 cm



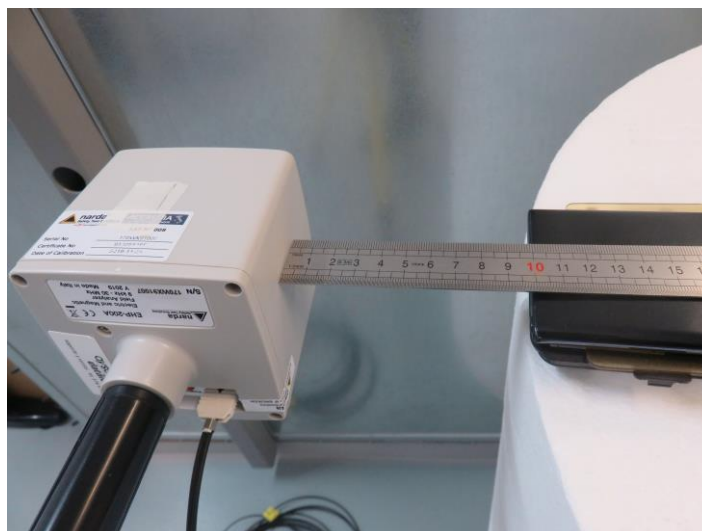
Side 2 - 10 cm



Side 3 - 10 cm

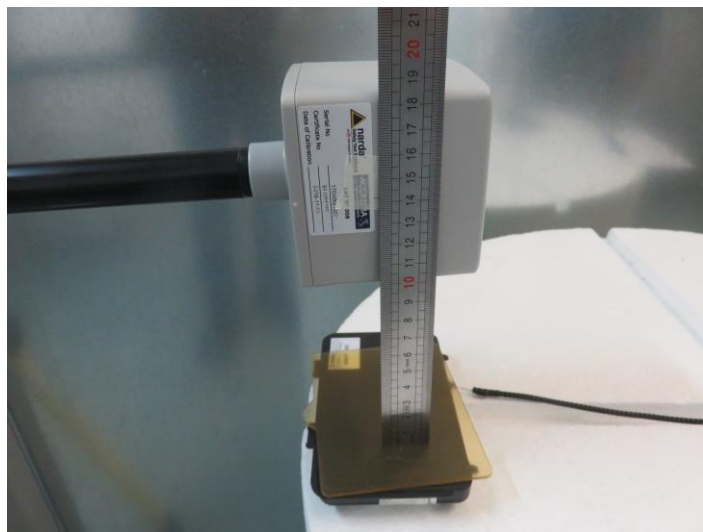


Side 4 - 10 cm

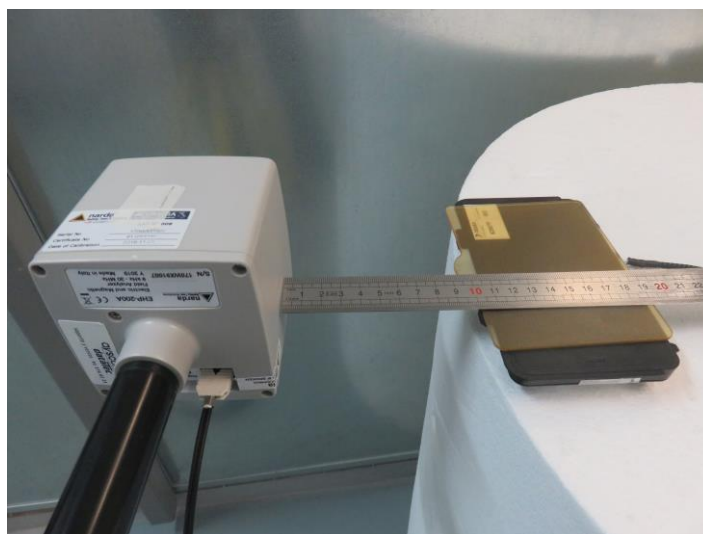


Nerve stimulation H-Field and E-Field measurement setup 2

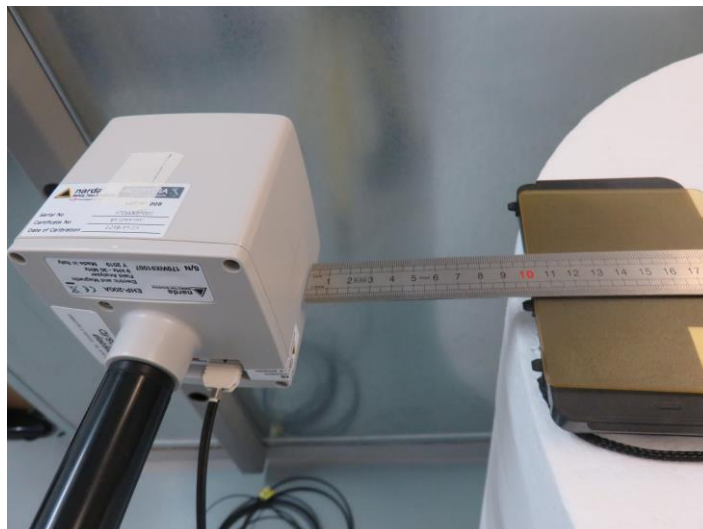
Top - 10 cm



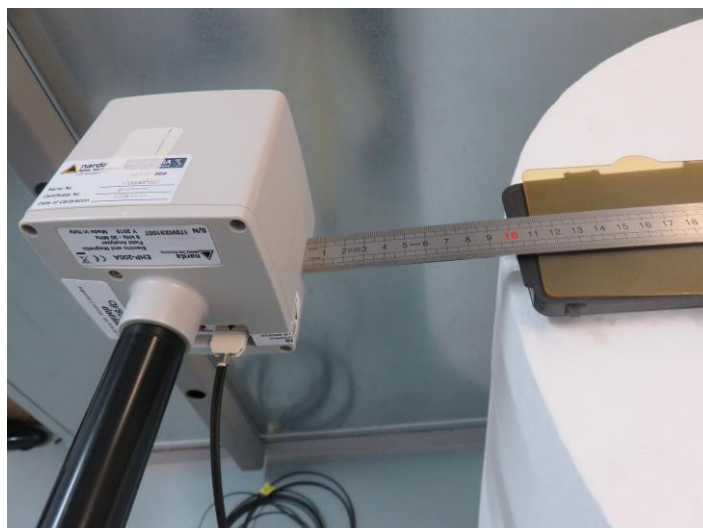
Side 1 - 10 cm



Side 2 - 10 cm



Side 3 - 10 cm



Side 4 - 10 cm

