DEKRA Certification, Inc.
405 Glenn Dr. Suite 12,
Sterling, VA 20164
United States of America

Test report No:
4052ERM.003A2

Assessment report
RF EXPOSURE REPORT ACCORDING TO
IEEE Std C95.3-2002
FCC 47 CFR Part 2.1093
FCC 47 CFR Part 1.1307

(*) Identification of item tested	Qi 1.3 Wireless Charger with NFC
(*) Trademark	Panasonic
(*) Model and /or type reference tested	Qi 1.3 Wireless Charger with NFC
Other identification of the product	FCC: ACJ932A-WCPM2
(*) Features	Qi 1.3 and NFC
Manufacturer	PANASONIC AUTOMOTIVE 776 Hwy 74 South, Peachtree City, GA 30269 USA
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 2.1093. Radiofrequency radiation exposure evaluation: portable devices. FCC 47 CFR Part 1.1307: Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager  Digitally signed by Domingo Galvez DN: cn=Domingo Galvez, o=Dekra Certification Inc., ou=Regulatory Lab Manager, email=domingo.galvez@dekra.com, c=US
Date of issue	04-03-2024
Report template No	FERMUSA_199 (*) “Data provided by the client”

Index

Competences and guarantees

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

DEKRA Certification Inc. 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 Certification Inc. at the time of performance of the test.

DEKRA Certification Inc. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Assessment Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA Certification Inc.

General conditions

1. This report is only referred to the item that has undergone the assessment.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Certification Inc.
4. This assessment report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Certification Inc. and the Accreditation Bodies.

Uncertainties

Uncertainty (factor k=2) was calculated according to the DEKRA Certification internal document PODT000**.**

Frequency (MHz)	Uncertainty (dB)	Uncertainty	Field
0.03 – 0.09	3.87	1.56	Electric (V/m)
0.03 – 0.09	2.60	1.34	Magnetic (A/m)
0.09 - 10	0.85	1.10	Electric (V/m)
0.09 - 10	0.71	1.09	Magnetic (A/m)

Data provided by the client

The following data has been provided by the client:

The test sample consist of Qi 1.3 Wireless Charger with NFC.

DEKRA 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 S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
4052/07	Wireless charger	MY23	101577	5/26/2023
4052/17	Harness	-	-	5/26/2023
4052/18	Harness Value Can	-	-	5/26/2023
4052/19	Load	-	-	6/15/2023

1. Sample S/01 has undergone the test(s) specified in subclause “Test method requested”.

Identification of the client

PANASONIC AUTOMOTIVE

776 Hwy 74 South, Peachtree City

GA 30269.

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	06-23-2023
Date (finish)	09-21-2023

Document history

Report number	Date	Description
4052ERM.003	08-10-2023	First release
4052ERM.003A1	09-21-2023	Second release. Maximum Conducted Power value was updated in RF Exposure Assessment result and verdict section (Appendix A & B); Simultaneous transmission assessment section was removed from the report. The Remarks and comments section was updated. This modification of the test report cancels and replaces the test report 4052ERM.003.
4052ERM.003A2	04-02-2024	Third release. RF exposure for RSS was removed. Measurement at 0 and 2 cm was added for 127 KHz. Measurement at 0 to 10 cm was added for 135 KHz This modification of the test report cancels and replaces the test report 4052ERM.003A1.

General description of the device under evaluation

The test sample consist of Qi 1.3 Wireless Charger with NFC.

In order to perform the assessment for the Qi wireless technology a conservative evaluation distance <=10cm has been used.

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: Juliana Cherry and Lakshmi Gollamudi.

Testing verdicts

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

FCC 47 CFR § 2.1093 & ISED RSS 102 ISSUE 5 AMD 1 & ISED RSS 102-SPR-002 ISSUE 2	VERDICT			
	N/A	P	F	NM
NFC				NM(1)
Qi Wireless Charger		P		

1: Technology not subject to testing. Verdict has been determined through RF Exposure assessment (see Appendix A).

List of equipment used during the test

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1107	ETHERNET SNMP THERMOMETER	HW GROUP	HWg-STE Plain	2022/08	2024/08
1324	Narda EHP-200A E and H Field Analyzer	NARDA	EHP-200A	2020/09	2024/09

Appendix A: FCC RF Exposure Evaluation

RF Exposure Assessment result and verdict

According to the manufacturer, during its normal use, the separation distance between the radiating structures of the device and nearby users will be greater than 4.15 mm as the evaluated distance is 4.15mm, based on the 0mm distance is from the sensor of the probe to the edge. In order to perform the assessment a conservative evaluation distance of 0.5 cm has been used.

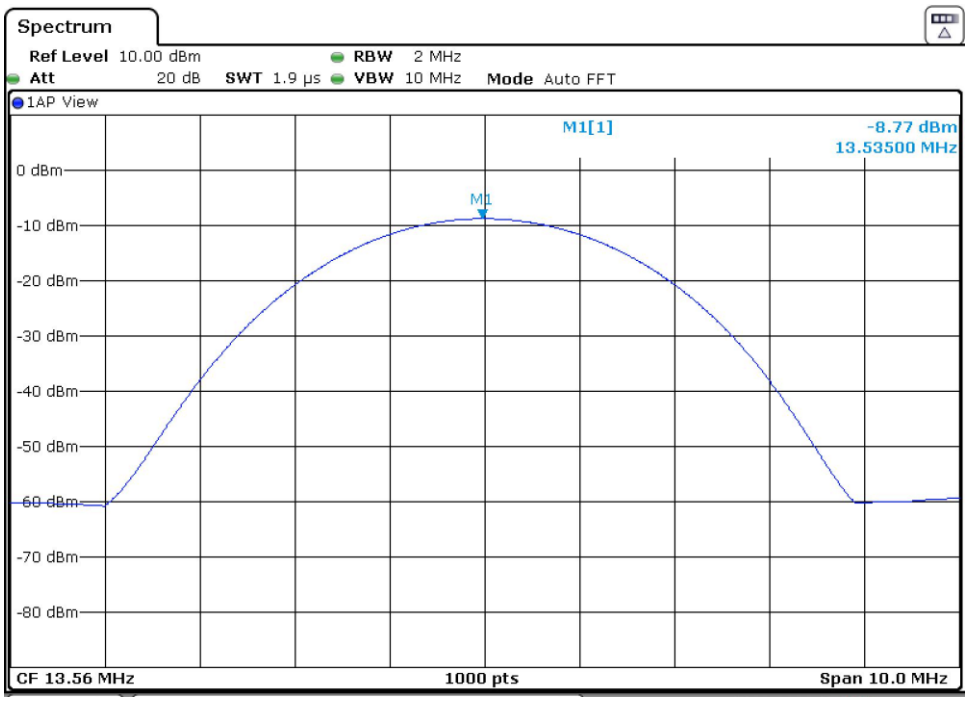
RF Exposure evaluation for the Qi wireless technology has been conducted through field measurements (see Qi Wireless Charger Evaluation section below).

NFC technology is not subjected to testing and verdict can be determined through RF Exposure assessment (see NFC RF Exposure Assessment section below).

Technology	Frequency (MHz)	Max. H-field (A/m)	Max. E-field (V/m)	Maximum Conducted Power (mW)	H-Field Limit (A/m)	E-Field Limit (V/m)	§1.1307(b)(3).i.(A) Exposure Limit (mW)	Verdict
NFC	13.56	-	-	0.13	-	-	1	PASS
Qi Charger	0.127	0.065	0.382	-	1.63	614	-	PASS
Qi Charger	0.135	0.060	0.379	-	1.63	614	-	PASS

Table 1: Assessment result and Verdict

NFC Maximum Conducted Power measurement results: -8.77 dBm (0.13 mW)

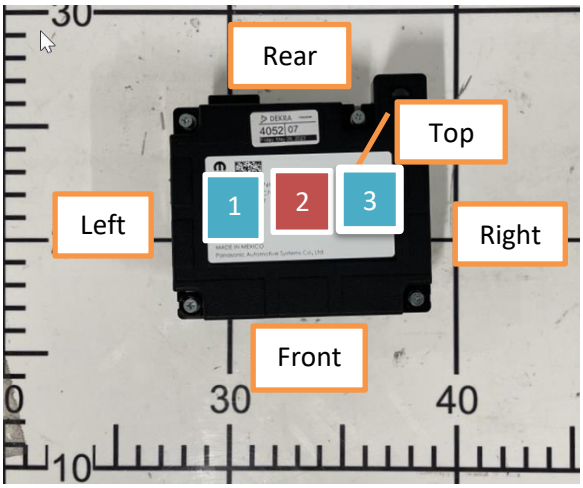


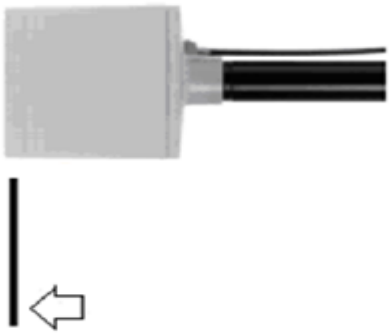
Qi Wireless Charger Evaluation

For low-power (<15W), in-vehicle applications perform H-field measurements for each edge/top surface of the host/client pair at every 2 cm, starting from as close as possible out to 10 cm. 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 <=10 cm measured from the center of the probe(s) to the edge of the device. 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

According to “FCC 47 CFR Part 2.1093”, portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in §1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

Limits for Maximum Permissible Exposure (MPE) to comply with FCC 47 CFR § 2.1091 are defined in “FCC 47 CFR Part 1.1310 Radiation Exposure limits, paragraph €”:





E Field = 0cm to 10 cm

H Field = 0cm to 10 cm

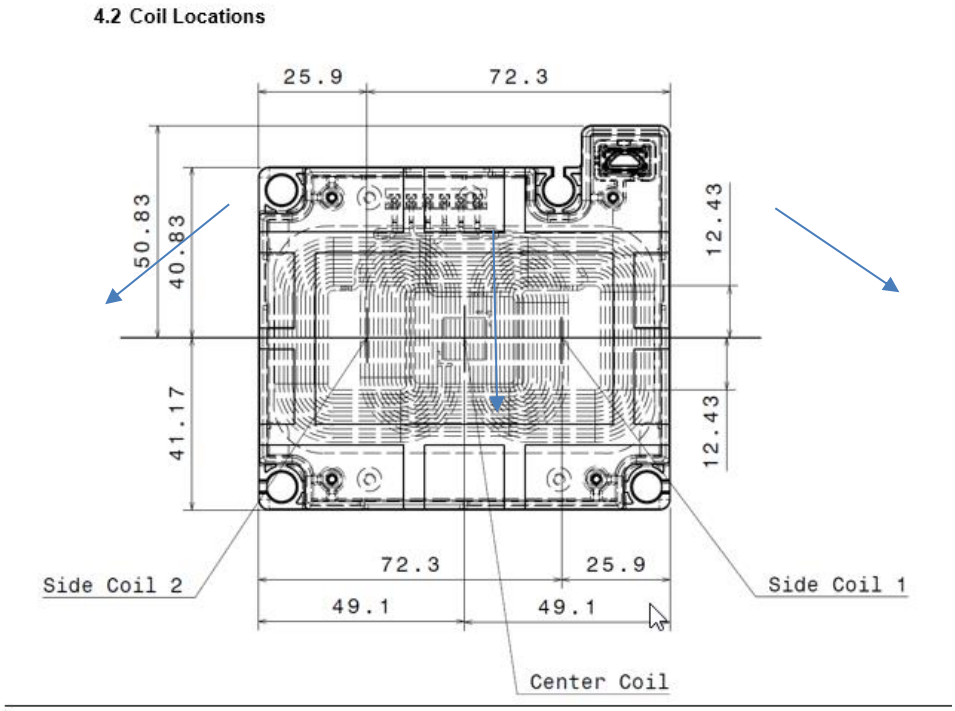


Figure 1: WPT measurement setup

The test sample Primary Coil is one from a linear array of partially overlapping Primary Coils, as appropriate for the position of the Power Receiver relative to the Primary Coils. Selection of the Primary Coil proceeds by the Power Transmitter attempting to establish communication with a Power Receiver using any of the Primary Coils. The array may consist of a single Primary Coil only.

The WPT device consists of different coils but only one coil will transmit based on the placement of load on charger.

The below testing setup has been measured in order to assess compliance for the device.

- Setup 1 – Charging setup with a Load

For the normal charging setup, measurements at every 2 cm starting from 0cm to 10 cm distance have been performed for all device sides, at different battery charge levels. With the customer provided load, measurements were performed on the 3 different coils by placing the load on each coil at different charging levels.

99% Battery Charge level for 127 KHz

Test Side	Distance to DUT (cm)	Frequency (kHz)	H- Field (A/m)	Limit (A/m)	% Limit	Verdict
Front 1	0	127	0.040	1.63	2.45	Pass
	2		0.032		1.96	Pass
	4		0.030		1.84	Pass
	6		0.033		2.02	Pass
	8		0.034		2.09	Pass
	10		0.035		2.15	Pass
Front 2	0		0.050		3.07	Pass
	2		0.047		2.88	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.046		2.82	Pass
	10		0.043		2.64	Pass
Front 3	0		0.052		3.19	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.043		2.61	Pass
	8		0.041		2.53	Pass
	10		0.042		2.58	Pass
Rear 1	0		0.049		3.01	Pass
	2		0.045		2.76	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.045		2.76	Pass
	10		0.044		2.70	Pass
Rear 2	0		0.049		3.01	Pass
	2		0.045		2.76	Pass
	4		0.044		2.70	Pass
	6		0.045		2.76	Pass
	8		0.043		2.64	Pass
	10		0.044		2.70	Pass
Rear 3	0		0.052		3.19	Pass
	2		0.047		2.88	Pass
	4		0.045		2.76	Pass
	6		0.046		2.82	Pass
	8		0.044		2.70	Pass
	10		0.043		2.64	Pass
Left	0		0.050		3.07	Pass
	2		0.046		2.82	Pass
	4		0.044		2.70	Pass
	6		0.045		2.76	Pass
	8		0.037		2.27	Pass

	10		0.033		2.02	Pass
Right	0		0.043		2.64	Pass
	2		0.038		2.33	Pass
	4		0.035		2.15	Pass
	6		0.037		2.27	Pass
	8		0.039		2.39	Pass
	10		0.041		2.52	Pass
Top 1	0		0.059		3.62	Pass
	2		0.053		3.25	Pass
	4		0.051		3.13	Pass
	6		0.049		3.01	Pass
	8		0.047		2.88	Pass
	10		0.043		2.64	Pass
Top 2	0		0.060		3.68	Pass
	2		0.054		3.31	Pass
	4		0.053		3.25	Pass
	6		0.048		2.94	Pass
	8		0.046		2.82	Pass
	10		0.044		2.70	Pass
Top 3	0		0.065		3.99	Pass
	2		0.055		3.37	Pass
	4		0.054		3.31	Pass
	6		0.044		2.70	Pass
	8		0.043		2.64	Pass
	10		0.037		2.27	Pass

Table 2: H-field measurement values

Test Side	Distance to DUT (cm)	Frequency (kHz)	E- Field (V/m)	Limit (V/m)	% Limit	Verdict
Front 1	0	127	0.373	614	0.06	Pass
	2		0.369		0.06	Pass
	4		0.367		0.06	Pass
	6		0.354		0.06	Pass
	8		0.353		0.06	Pass
	10		0.350		0.06	Pass
Front 2	0		0.356		0.06	Pass
	2		0.350		0.06	Pass
	4		0.349		0.06	Pass
	6		0.352		0.06	Pass
	8		0.361		0.06	Pass
	10		0.335		0.05	Pass
Front 3	0		0.357		0.06	Pass
	2		0.349		0.06	Pass
	4		0.348		0.06	Pass
	6		0.346		0.06	Pass
	8		0.354		0.06	Pass
	10		0.353		0.06	Pass
Rear 1	0		0.360		0.06	Pass
	2		0.353		0.06	Pass
	4		0.352		0.06	Pass
	6		0.352		0.06	Pass
	8		0.355		0.06	Pass
	10		0.334		0.05	Pass
Rear 2	0		0.355		0.06	Pass
	2		0.347		0.06	Pass
	4		0.346		0.06	Pass
	6		0.342		0.06	Pass
	8		0.347		0.06	Pass
	10		0.348		0.06	Pass
Rear 3	0		0.351		0.06	Pass
	2		0.345		0.06	Pass
	4		0.344		0.06	Pass
	6		0.345		0.06	Pass
	8		0.341		0.06	Pass
	10		0.342		0.06	Pass
Left	0		0.352		0.06	Pass
	2		0.345		0.06	Pass
	4		0.344		0.06	Pass
	6		0.339		0.06	Pass
	8		0.342		0.06	Pass
	10		0.337		0.05	Pass

Right	0		0.349		0.06	Pass
	2		0.343		0.06	Pass
	4		0.341		0.06	Pass
	6		0.330		0.05	Pass
	8		0.356		0.06	Pass
	10		0.334		0.05	Pass
Top 1	0		0.381		0.06	Pass
	2		0.373		0.06	Pass
	4		0.371		0.06	Pass
	6		0.357		0.06	Pass
	8		0.367		0.06	Pass
	10		0.363		0.06	Pass
Top 2	0		0.359		0.06	Pass
	2		0.351		0.06	Pass
	4		0.349		0.06	Pass
	6		0.352		0.06	Pass
	8		0.369		0.06	Pass
	10		0.359		0.06	Pass
Top 3	0		0.382		0.06	Pass
	2		0.374		0.06	Pass
	4		0.372		0.06	Pass
	6		0.365		0.06	Pass
	8		0.360		0.06	Pass
	10		0.350		0.06	Pass

Table 3: E-field measurement values

50% Battery Charge level for 127 KHz

Test Side	Distance to DUT (cm)	Frequency (kHz)	H- Field (A/m)	Limit (A/m)	% Limit	Verdict
Front 1	0	127	0.053	1.63	3.25	Pass
	2		0.046		2.82	Pass
	4		0.044		2.70	Pass
	6		0.045		2.76	Pass
	8		0.044		2.70	Pass
	10		0.045		2.76	Pass
Front 2	0		0.054		3.31	Pass
	2		0.045		2.76	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.046		2.82	Pass
	10		0.045		2.76	Pass
Front 3	0		0.049		3.01	Pass
	2		0.047		2.88	Pass
	4		0.046		2.82	Pass
	6		0.045		2.76	Pass
	8		0.044		2.70	Pass
	10		0.046		2.82	Pass
Rear 1	0		0.053		3.25	Pass
	2		0.048		2.94	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.045		2.76	Pass
	10		0.044		2.70	Pass
Rear 2	0		0.052		3.19	Pass
	2		0.046		2.82	Pass
	4		0.044		2.70	Pass
	6		0.045		2.76	Pass
	8		0.046		2.82	Pass
	10		0.044		2.70	Pass
Rear 3	0		0.051		3.13	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.046		2.82	Pass
	8		0.044		2.70	Pass
	10		0.045		2.76	Pass
Left	0		0.051		3.13	Pass
	2		0.047		2.88	Pass
	4		0.046		2.82	Pass

	6		0.045		2.76	Pass
	8		0.044		2.70	Pass
	10		0.044		2.70	Pass
Right	0		0.049		3.01	Pass
	2		0.048		2.94	Pass
	4		0.047		2.88	Pass
	6		0.044		2.70	Pass
	8		0.043		2.64	Pass
	10		0.030		1.84	Pass
Top 1	0		0.057		3.50	Pass
	2		0.049		3.01	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.046		2.82	Pass
	10		0.045		2.76	Pass
Top 2	0		0.055		3.37	Pass
	2		0.047		2.88	Pass
	4		0.046		2.82	Pass
	6		0.045		2.76	Pass
	8		0.044		2.70	Pass
	10		0.046		2.82	Pass
Top 3	0		0.053		3.25	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.045		2.76	Pass
	10		0.044		2.70	Pass

Table 4: H-field measurement values

Test Side	Distance to DUT (cm)	Frequency (kHz)	E- Field (V/m)	Limit (V/m)	% Limit	Verdict
Front 1	0	127	0.340	614	0.06	Pass
	2		0.337		0.05	Pass
	4		0.336		0.05	Pass
	6		0.341		0.06	Pass
	8		0.351		0.06	Pass
	10		0.361		0.06	Pass
Front 2	0		0.345		0.06	Pass
	2		0.338		0.06	Pass
	4		0.336		0.05	Pass
	6		0.364		0.06	Pass
	8		0.357		0.06	Pass
	10		0.336		0.05	Pass
Front 3	0		0.346		0.06	Pass
	2		0.342		0.06	Pass
	4		0.341		0.06	Pass
	6		0.335		0.05	Pass
	8		0.362		0.06	Pass
	10		0.344		0.06	Pass
Rear 1	0		0.371		0.06	Pass
	2		0.368		0.06	Pass
	4		0.367		0.06	Pass
	6		0.334		0.05	Pass
	8		0.351		0.06	Pass
	10		0.362		0.06	Pass
Rear 2	0		0.329		0.05	Pass
	2		0.325		0.05	Pass
	4		0.324		0.05	Pass
	6		0.345		0.06	Pass
	8		0.352		0.06	Pass
	10		0.337		0.05	Pass
Rear 3	0		0.340		0.06	Pass
	2		0.328		0.05	Pass
	4		0.327		0.05	Pass
	6		0.358		0.06	Pass
	8		0.349		0.06	Pass
	10		0.361		0.06	Pass
Left	0		0.360		0.06	Pass
	2		0.353		0.06	Pass
	4		0.351		0.06	Pass
	6		0.346		0.06	Pass
	8		0.344		0.06	Pass
	10		0.342		0.06	Pass

Right	0		0.369		0.06	Pass
	2		0.361		0.06	Pass
	4		0.359		0.06	Pass
	6		0.342		0.06	Pass
	8		0.334		0.05	Pass
	10		0.321		0.05	Pass
Top 1	0		0.369		0.06	Pass
	2		0.365		0.06	Pass
	4		0.364		0.06	Pass
	6		0.357		0.06	Pass
	8		0.345		0.06	Pass
	10		0.344		0.06	Pass
Top 2	0		0.373		0.06	Pass
	2		0.368		0.06	Pass
	4		0.367		0.06	Pass
	6		0.359		0.06	Pass
	8		0.344		0.06	Pass
	10		0.330		0.05	Pass
Top 3	0		0.379		0.06	Pass
	2		0.373		0.06	Pass
	4		0.371		0.06	Pass
	6		0.364		0.06	Pass
	8		0.356		0.06	Pass
	10		0.344		0.06	Pass

Table 5: E-field measurement values

1% Battery Charge level for 127 KHz

Test Side	Distance to DUT (cm)	Frequency (kHz)	H- Field (A/m)	Limit (A/m)	% Limit	Verdict
Front 1	0	127	0.051	1.63	3.13	Pass
	2		0.047		2.88	Pass
	4		0.046		2.82	Pass
	6		0.045		2.76	Pass
	8		0.044		2.70	Pass
	10		0.045		2.76	Pass
Front 2	0		0.051		3.13	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.046		2.82	Pass
	8		0.047		2.88	Pass
	10		0.045		2.76	Pass
Front 3	0		0.049		3.01	Pass
	2		0.045		2.76	Pass
	4		0.044		2.70	Pass
	6		0.045		2.76	Pass
	8		0.044		2.70	Pass
	10		0.045		2.76	Pass
Rear 1	0		0.052		3.19	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.046		2.82	Pass
	10		0.045		2.76	Pass
Rear 2	0		0.050		3.07	Pass
	2		0.047		2.88	Pass
	4		0.046		2.82	Pass
	6		0.045		2.76	Pass
	8		0.044		2.70	Pass
	10		0.046		2.82	Pass
Rear 3	0		0.053		3.25	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.045		2.76	Pass
	10		0.044		2.70	Pass
Left	0		0.049		3.01	Pass
	2		0.045		2.76	Pass
	4		0.044		2.70	Pass

	6		0.045		2.76	Pass
	8		0.046		2.82	Pass
	10		0.044		2.70	Pass
Right	0		0.048		2.94	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.046		2.82	Pass
	8		0.044		2.70	Pass
	10		0.045		2.76	Pass
Top 1	0		0.052		3.19	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.047		2.88	Pass
	8		0.047		2.88	Pass
	10		0.044		2.70	Pass
Top 2	0		0.051		3.13	Pass
	2		0.048		2.94	Pass
	4		0.047		2.88	Pass
	6		0.045		2.76	Pass
	8		0.046		2.82	Pass
	10		0.045		2.76	Pass
Top 3	0		0.048		2.94	Pass
	2		0.045		2.76	Pass
	4		0.044		2.70	Pass
	6		0.045		2.76	Pass
	8		0.045		2.76	Pass
	10		0.044		2.70	Pass

Table 6: H-field measurement values

Test Side	Distance to DUT (cm)	Frequency (kHz)	E- Field (V/m)	Limit (V/m)	% Limit	Verdict
Front 1	0	127	0.375	614	0.06	Pass
	2		0.372		0.06	Pass
	4		0.371		0.06	Pass
	6		0.368		0.06	Pass
	8		0.361		0.06	Pass
	10		0.359		0.06	Pass
Front 2	0		0.350		0.06	Pass
	2		0.346		0.06	Pass
	4		0.345		0.06	Pass
	6		0.349		0.06	Pass
	8		0.351		0.06	Pass
	10		0.345		0.06	Pass
Front 3	0		0.343		0.06	Pass
	2		0.338		0.06	Pass
	4		0.336		0.05	Pass
	6		0.341		0.06	Pass
	8		0.351		0.06	Pass
	10		0.361		0.06	Pass
Rear 1	0		0.341		0.06	Pass
	2		0.337		0.05	Pass
	4		0.336		0.05	Pass
	6		0.364		0.06	Pass
	8		0.357		0.06	Pass
	10		0.336		0.05	Pass
Rear 2	0		0.349		0.06	Pass
	2		0.345		0.06	Pass
	4		0.341		0.06	Pass
	6		0.335		0.05	Pass
	8		0.362		0.06	Pass
	10		0.344		0.06	Pass
Rear 3	0		0.372		0.06	Pass
	2		0.368		0.06	Pass
	4		0.367		0.06	Pass
	6		0.334		0.05	Pass
	8		0.351		0.06	Pass
	10		0.362		0.06	Pass
Left	0		0.330		0.05	Pass
	2		0.325		0.05	Pass
	4		0.324		0.05	Pass
	6		0.345		0.06	Pass

	8		0.352		0.06	Pass
	10		0.337		0.05	Pass
Right	0		0.332		0.05	Pass
	2		0.328		0.05	Pass
	4		0.327		0.05	Pass
	6		0.358		0.06	Pass
	8		0.349		0.06	Pass
	10		0.361		0.06	Pass
Top 1	0		0.361		0.06	Pass
	2		0.358		0.06	Pass
	4		0.357		0.06	Pass
	6		0.364		0.06	Pass
	8		0.371		0.06	Pass
	10		0.376		0.06	Pass
Top 2	0		0.357		0.06	Pass
	2		0.351		0.06	Pass
	4		0.350		0.06	Pass
	6		0.363		0.06	Pass
	8		0.354		0.06	Pass
	10		0.381		0.06	Pass
Top 3	0		0.363		0.06	Pass
	2		0.358		0.06	Pass
	4		0.357		0.06	Pass
	6		0.354		0.06	Pass
	8		0.350		0.06	Pass
	10		0.367		0.06	Pass

Table 7: E-field measurement values

99% Battery Charge level for 135 KHz

Test Side	Distance to DUT (cm)	Frequency (kHz)	H- Field (A/m)	Limit (A/m)	% Limit	Verdict
Front 1	0	135	0.040	1.63	2.45	Pass
	2		0.032		1.96	Pass
	4		0.030		1.84	Pass
	6		0.033		2.02	Pass
	8		0.034		2.09	Pass
	10		0.035		2.15	Pass
Front 2	0		0.050		3.07	Pass
	2		0.047		2.88	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.046		2.82	Pass
	10		0.043		2.64	Pass
Front 3	0		0.052		3.19	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.043		2.61	Pass
	8		0.041		2.53	Pass
	10		0.042		2.58	Pass
Rear 1	0		0.049		3.01	Pass
	2		0.045		2.76	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.045		2.76	Pass
	10		0.044		2.70	Pass
Rear 2	0		0.049		3.01	Pass
	2		0.045		2.76	Pass
	4		0.044		2.70	Pass
	6		0.045		2.76	Pass
	8		0.043		2.64	Pass
	10		0.044		2.70	Pass
Rear 3	0		0.052		3.19	Pass
	2		0.047		2.88	Pass
	4		0.045		2.76	Pass
	6		0.046		2.82	Pass
	8		0.044		2.70	Pass
	10		0.043		2.64	Pass
Left	0		0.050		3.07	Pass
	2		0.046		2.82	Pass
	4		0.044		2.70	Pass
	6		0.045		2.76	Pass
	8		0.037		2.27	Pass

	10		0.033		2.02	Pass
Right	0		0.043		2.64	Pass
	2		0.038		2.33	Pass
	4		0.035		2.15	Pass
	6		0.037		2.27	Pass
	8		0.039		2.39	Pass
	10		0.041		2.52	Pass
Top 1	0		0.059		3.62	Pass
	2		0.053		3.25	Pass
	4		0.051		3.13	Pass
	6		0.049		3.01	Pass
	8		0.047		2.88	Pass
	10		0.043		2.64	Pass
Top 2	0		0.060		3.68	Pass
	2		0.054		3.31	Pass
	4		0.053		3.25	Pass
	6		0.048		2.94	Pass
	8		0.046		2.82	Pass
	10		0.044		2.70	Pass
Top 3	0		0.060		3.68	Pass
	2		0.055		3.37	Pass
	4		0.054		3.31	Pass
	6		0.044		2.70	Pass
	8		0.043		2.64	Pass
	10		0.037		2.27	Pass

Table 8: H-field measurement values

Test Side	Distance to DUT (cm)	Frequency (kHz)	E- Field (V/m)	Limit (V/m)	% Limit	Verdict
Front 1	0	135	0.373	614	0.06	Pass
	2		0.369		0.06	Pass
	4		0.367		0.06	Pass
	6		0.354		0.06	Pass
	8		0.353		0.06	Pass
	10		0.350		0.06	Pass
Front 2	0		0.356		0.06	Pass
	2		0.350		0.06	Pass
	4		0.349		0.06	Pass
	6		0.352		0.06	Pass
	8		0.361		0.06	Pass
	10		0.335		0.05	Pass
Front 3	0		0.357		0.06	Pass
	2		0.349		0.06	Pass
	4		0.348		0.06	Pass
	6		0.346		0.06	Pass
	8		0.354		0.06	Pass
	10		0.353		0.06	Pass
Rear 1	0		0.360		0.06	Pass
	2		0.353		0.06	Pass
	4		0.352		0.06	Pass
	6		0.352		0.06	Pass
	8		0.355		0.06	Pass
	10		0.334		0.05	Pass
Rear 2	0		0.355		0.06	Pass
	2		0.347		0.06	Pass
	4		0.346		0.06	Pass
	6		0.342		0.06	Pass
	8		0.347		0.06	Pass
	10		0.348		0.06	Pass
Rear 3	0		0.351		0.06	Pass
	2		0.345		0.06	Pass
	4		0.344		0.06	Pass
	6		0.345		0.06	Pass
	8		0.341		0.06	Pass
	10		0.342		0.06	Pass
Left	0		0.352		0.06	Pass
	2		0.345		0.06	Pass
	4		0.344		0.06	Pass
	6		0.339		0.06	Pass
	8		0.342		0.06	Pass
	10		0.337		0.05	Pass
Right	0		0.349		0.06	Pass

	2		0.343		0.06	Pass
	4		0.341		0.06	Pass
	6		0.330		0.05	Pass
	8		0.356		0.06	Pass
	10		0.334		0.05	Pass
Top 1	0		0.381		0.06	Pass
	2		0.373		0.06	Pass
	4		0.371		0.06	Pass
	6		0.357		0.06	Pass
	8		0.367		0.06	Pass
	10		0.363		0.06	Pass
Top 2	0		0.359		0.06	Pass
	2		0.351		0.06	Pass
	4		0.349		0.06	Pass
	6		0.352		0.06	Pass
	8		0.369		0.06	Pass
	10		0.359		0.06	Pass
Top 3	0		0.379		0.06	Pass
	2		0.374		0.06	Pass
	4		0.372		0.06	Pass
	6		0.365		0.06	Pass
	8		0.360		0.06	Pass
	10		0.350		0.06	Pass

Table 9: E-field measurement values

50% Battery Charge level for 135 KHz

Test Side	Distance to DUT (cm)	Frequency (kHz)	H- Field (A/m)	Limit (A/m)	% Limit	Verdict
Front 1	0	135	0.053	1.63	3.25	Pass
	2		0.046		2.82	Pass
	4		0.044		2.70	Pass
	6		0.045		2.76	Pass
	8		0.044		2.70	Pass
	10		0.045		2.76	Pass
Front 2	0		0.054		3.31	Pass
	2		0.045		2.76	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.046		2.82	Pass
	10		0.045		2.76	Pass
Front 3	0		0.049		3.01	Pass
	2		0.047		2.88	Pass
	4		0.046		2.82	Pass
	6		0.045		2.76	Pass
	8		0.044		2.70	Pass
	10		0.046		2.82	Pass
Rear 1	0		0.053		3.25	Pass
	2		0.048		2.94	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.045		2.76	Pass
	10		0.044		2.70	Pass
Rear 2	0		0.052		3.19	Pass
	2		0.046		2.82	Pass
	4		0.044		2.70	Pass
	6		0.045		2.76	Pass
	8		0.046		2.82	Pass
	10		0.044		2.70	Pass
Rear 3	0		0.051		3.13	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.046		2.82	Pass
	8		0.044		2.70	Pass
	10		0.045		2.76	Pass
Left	0		0.051		3.13	Pass
	2		0.047		2.88	Pass
	4		0.046		2.82	Pass
	6		0.045		2.76	Pass
	8		0.044		2.70	Pass

	10		0.044		2.70	Pass
Right	0		0.049		3.01	Pass
	2		0.048		2.94	Pass
	4		0.047		2.88	Pass
	6		0.044		2.70	Pass
	8		0.043		2.64	Pass
	10		0.030		1.84	Pass
Top 1	0		0.057		3.50	Pass
	2		0.049		3.01	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.046		2.82	Pass
	10		0.045		2.76	Pass
Top 2	0		0.055		3.37	Pass
	2		0.047		2.88	Pass
	4		0.046		2.82	Pass
	6		0.045		2.76	Pass
	8		0.044		2.70	Pass
	10		0.046		2.82	Pass
Top 3	0		0.053		3.25	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.045		2.76	Pass
	10		0.044		2.70	Pass

Table 10: H-field measurement values

Test Side	Distance to DUT (cm)	Frequency (kHz)	E- Field (V/m)	Limit (V/m)	% Limit	Verdict
Front 1	0	135	0.340	614	0.06	Pass
	2		0.337		0.05	Pass
	4		0.336		0.05	Pass
	6		0.341		0.06	Pass
	8		0.351		0.06	Pass
	10		0.361		0.06	Pass
Front 2	0		0.345		0.06	Pass
	2		0.338		0.06	Pass
	4		0.336		0.05	Pass
	6		0.364		0.06	Pass
	8		0.357		0.06	Pass
	10		0.336		0.05	Pass
Front 3	0		0.346		0.06	Pass
	2		0.342		0.06	Pass
	4		0.341		0.06	Pass
	6		0.335		0.05	Pass
	8		0.362		0.06	Pass
	10		0.344		0.06	Pass
Rear 1	0		0.371		0.06	Pass
	2		0.368		0.06	Pass
	4		0.367		0.06	Pass
	6		0.334		0.05	Pass
	8		0.351		0.06	Pass
	10		0.362		0.06	Pass
Rear 2	0		0.329		0.05	Pass
	2		0.325		0.05	Pass
	4		0.324		0.05	Pass
	6		0.345		0.06	Pass
	8		0.352		0.06	Pass
	10		0.337		0.05	Pass
Rear 3	0		0.340		0.06	Pass
	2		0.328		0.05	Pass
	4		0.327		0.05	Pass
	6		0.358		0.06	Pass
	8		0.349		0.06	Pass
	10		0.361		0.06	Pass
Left	0		0.360		0.06	Pass
	2		0.353		0.06	Pass
	4		0.351		0.06	Pass
	6		0.346		0.06	Pass
	8		0.344		0.06	Pass
	10		0.342		0.06	Pass

Right	0		0.369		0.06	Pass
	2		0.361		0.06	Pass
	4		0.359		0.06	Pass
	6		0.342		0.06	Pass
	8		0.334		0.05	Pass
	10		0.321		0.05	Pass
Top 1	0		0.369		0.06	Pass
	2		0.365		0.06	Pass
	4		0.364		0.06	Pass
	6		0.357		0.06	Pass
	8		0.345		0.06	Pass
	10		0.344		0.06	Pass
Top 2	0		0.373		0.06	Pass
	2		0.368		0.06	Pass
	4		0.367		0.06	Pass
	6		0.359		0.06	Pass
	8		0.344		0.06	Pass
	10		0.330		0.05	Pass
Top 3	0		0.378		0.06	Pass
	2		0.373		0.06	Pass
	4		0.371		0.06	Pass
	6		0.364		0.06	Pass
	8		0.356		0.06	Pass
	10		0.344		0.06	Pass

Table 11: E-field measurement values

1% Battery Charge level for 135 KHz

Test Side	Distance to DUT (cm)	Frequency (kHz)	H- Field (A/m)	Limit (A/m)	% Limit	Verdict
Front 1	0	135	0.051	1.63	3.13	Pass
	2		0.047		2.88	Pass
	4		0.046		2.82	Pass
	6		0.045		2.76	Pass
	8		0.044		2.70	Pass
	10		0.045		2.76	Pass
Front 2	0		0.051		3.13	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.046		2.82	Pass
	8		0.047		2.88	Pass
	10		0.045		2.76	Pass
Front 3	0		0.049		3.01	Pass
	2		0.045		2.76	Pass
	4		0.044		2.70	Pass
	6		0.045		2.76	Pass
	8		0.044		2.70	Pass
	10		0.045		2.76	Pass
Rear 1	0		0.052		3.19	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.046		2.82	Pass
	10		0.045		2.76	Pass
Rear 2	0		0.050		3.07	Pass
	2		0.047		2.88	Pass
	4		0.046		2.82	Pass
	6		0.045		2.76	Pass
	8		0.044		2.70	Pass
	10		0.046		2.82	Pass
Rear 3	0		0.053		3.25	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.044		2.70	Pass
	8		0.045		2.76	Pass
	10		0.044		2.70	Pass
Left	0		0.049		3.01	Pass
	2		0.045		2.76	Pass
	4		0.044		2.70	Pass
	6		0.045		2.76	Pass
	8		0.046		2.82	Pass

	10		0.044		2.70	Pass
Right	0		0.048		2.94	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.046		2.82	Pass
	8		0.044		2.70	Pass
	10		0.045		2.76	Pass
Top 1	0		0.052		3.19	Pass
	2		0.046		2.82	Pass
	4		0.045		2.76	Pass
	6		0.047		2.88	Pass
	8		0.047		2.88	Pass
	10		0.044		2.70	Pass
Top 2	0		0.051		3.13	Pass
	2		0.048		2.94	Pass
	4		0.047		2.88	Pass
	6		0.045		2.76	Pass
	8		0.046		2.82	Pass
	10		0.045		2.76	Pass
Top 3	0		0.048		2.94	Pass
	2		0.045		2.76	Pass
	4		0.044		2.70	Pass
	6		0.045		2.76	Pass
	8		0.045		2.76	Pass
	10		0.044		2.70	Pass

Table 12: H-field measurement values

Test Side	Distance to DUT (cm)	Frequency (kHz)	E- Field (V/m)	Limit (V/m)	% Limit	Verdict
Front 1	0	135	0.375	614	0.06	Pass
	2		0.372		0.06	Pass
	4		0.371		0.06	Pass
	6		0.368		0.06	Pass
	8		0.361		0.06	Pass
	10		0.359		0.06	Pass
Front 2	0		0.350		0.06	Pass
	2		0.346		0.06	Pass
	4		0.345		0.06	Pass
	6		0.349		0.06	Pass
	8		0.351		0.06	Pass
	10		0.345		0.06	Pass
Front 3	0		0.343		0.06	Pass
	2		0.338		0.06	Pass
	4		0.336		0.05	Pass
	6		0.341		0.06	Pass
	8		0.351		0.06	Pass
	10		0.361		0.06	Pass
Rear 1	0		0.341		0.06	Pass
	2		0.337		0.05	Pass
	4		0.336		0.05	Pass
	6		0.364		0.06	Pass
	8		0.357		0.06	Pass
	10		0.336		0.05	Pass
Rear 2	0		0.349		0.06	Pass
	2		0.345		0.06	Pass
	4		0.341		0.06	Pass
	6		0.335		0.05	Pass
	8		0.362		0.06	Pass
	10		0.344		0.06	Pass
Rear 3	0		0.372		0.06	Pass
	2		0.368		0.06	Pass
	4		0.367		0.06	Pass
	6		0.334		0.05	Pass
	8		0.351		0.06	Pass
	10		0.362		0.06	Pass
Left	0		0.330		0.05	Pass
	2		0.325		0.05	Pass
	4		0.324		0.05	Pass
	6		0.345		0.06	Pass
	8		0.352		0.06	Pass
	10		0.337		0.05	Pass

Right	0		0.332		0.05	Pass
	2		0.328		0.05	Pass
	4		0.327		0.05	Pass
	6		0.358		0.06	Pass
	8		0.349		0.06	Pass
	10		0.361		0.06	Pass
Top 1	0		0.361		0.06	Pass
	2		0.358		0.06	Pass
	4		0.357		0.06	Pass
	6		0.364		0.06	Pass
	8		0.371		0.06	Pass
	10		0.376		0.06	Pass
Top 2	0		0.357		0.06	Pass
	2		0.351		0.06	Pass
	4		0.350		0.06	Pass
	6		0.363		0.06	Pass
	8		0.354		0.06	Pass
	10		0.364		0.06	Pass
Top 3	0		0.363		0.06	Pass
	2		0.358		0.06	Pass
	4		0.357		0.06	Pass
	6		0.354		0.06	Pass
	8		0.350		0.06	Pass
	10		0.367		0.06	Pass

Table 13: E-field measurement values

All E-Field and H-Field values are in compliance to values shown into “Table 1: Limits for Maximum Permissible Exposure (MPE)” for the frequency range used by the device.

Simultaneous transmission assessment:

The device under evaluation is able to transmit simultaneously using NFC and WPT transmitters, therefore the most conservative approach for the evaluation of the simultaneous transmission will be:

For 127 KHz:

Simultaneous technologies and modes	Result (∑ of Pout/Pmax ratios)	Verdict (∑ ≤ 1)
Qi Wireless Charging (H-Field + E-Field) + NFC	0.17	Pass

For 135 KHz:

Simultaneous technologies and modes	Result (∑ of Pout/Pmax ratios)	Verdict (∑ ≤ 1)
Qi Wireless Charging (H-Field + E-Field) + NFC	0.16	Pass

Appendix B: **FCC RF Exposure information**

FCC RF Exposure evaluation

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

Limits for Maximum Permissible Exposure (MPE) for RF sources are defined in FCC 47 CFR "§1.1310 Radiation Exposure limits, paragraph (e)":

TABLE 1 TO §1.1310(E)(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)
(i) 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
(ii) 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.

Each supported transmission technology will be evaluated to determine if it is in compliance with limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields.

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:

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

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)

$P_{E.I.R.P.}$ = P_T + G_T - L_C

Where:

P_T= transmitter time-averaged output power (including Duty Cycle and tune-up tolerance, if applicable)

G_T= gain of the transmitting antenna

L_C = signal attenuation in the connecting cable between the transmitter and the antenna if applicable

Simultaneous transmission assessment:

When multiple sources are introduced into an environment, it becomes necessary to address the sources interdependently, since each source will contribute some percentage of the maximum exposure toward the total exposure. The sum of the ratios of the exposure from each source to the corresponding maximum exposure for the frequency of each source must be evaluated.

The exposure complies with the maximum permissible exposure if the sum of the ratios is less than unity:

$$\sum_{i=1}^{n} \frac{Exp_i}{Limit_i} < 1$$

Where
Exp_i is the measured/calculated exposure value of each source;
$Limit_i$ is the applicable limit of each source.

Appendix C: Photographs

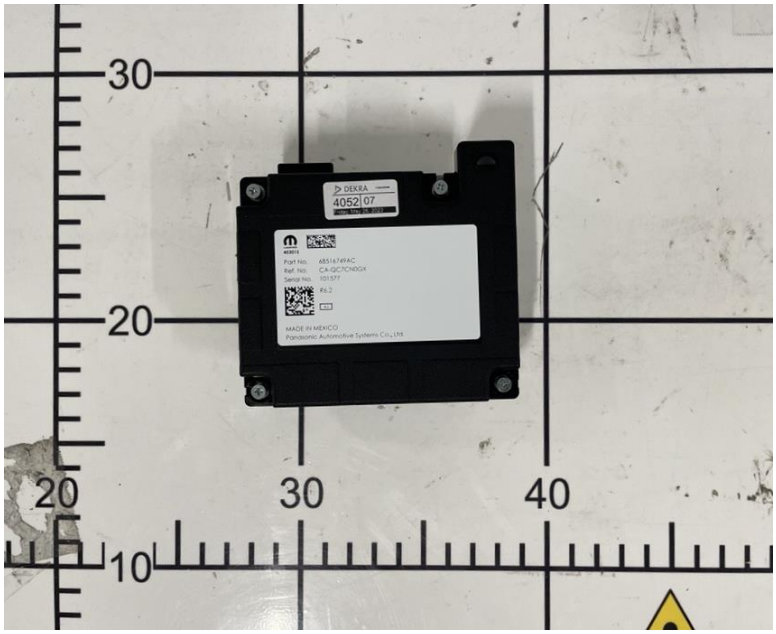


Figure C1. DUT Top view

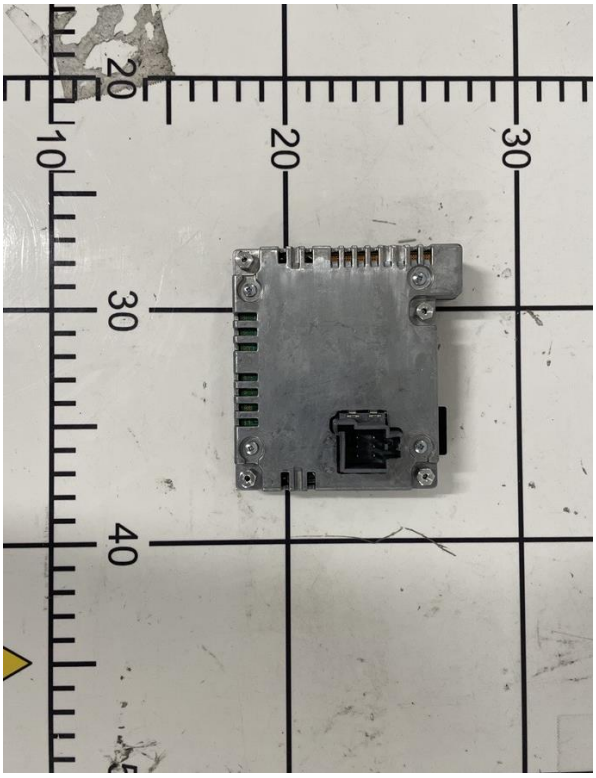


Figure C2. DUT rear view

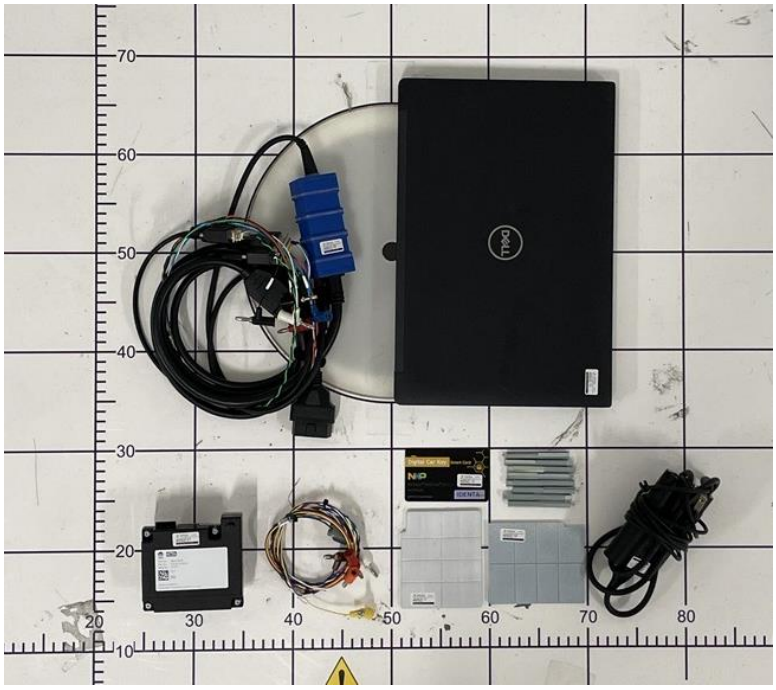


Figure C3. DUT with Accessories

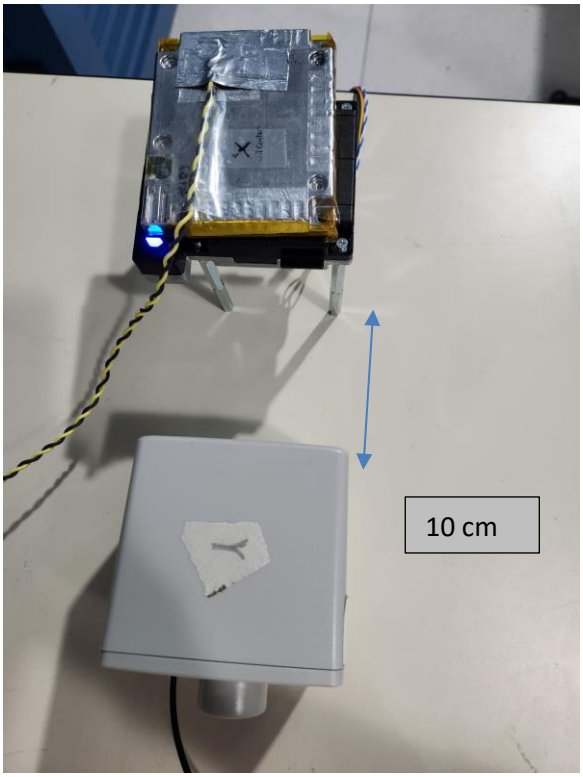


Figure C4. DUT Test setup 1

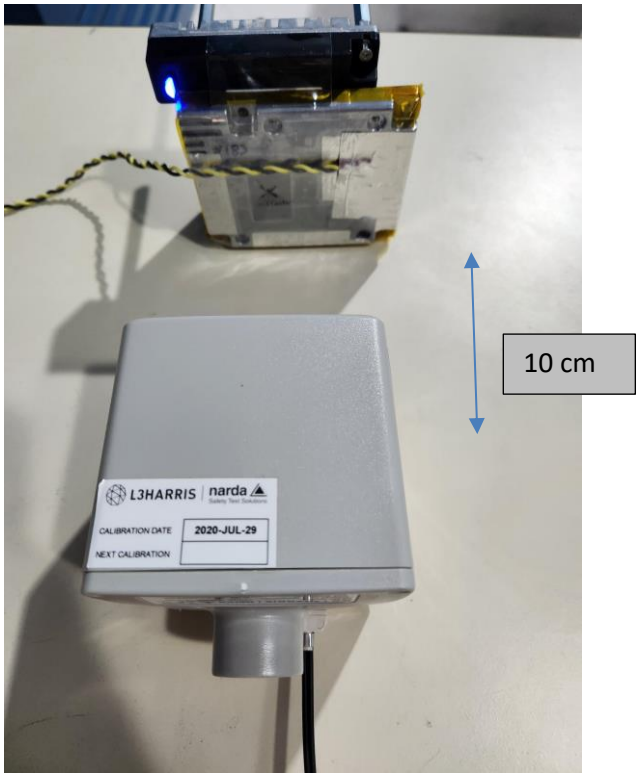


Figure C5. DUT Test setup 2

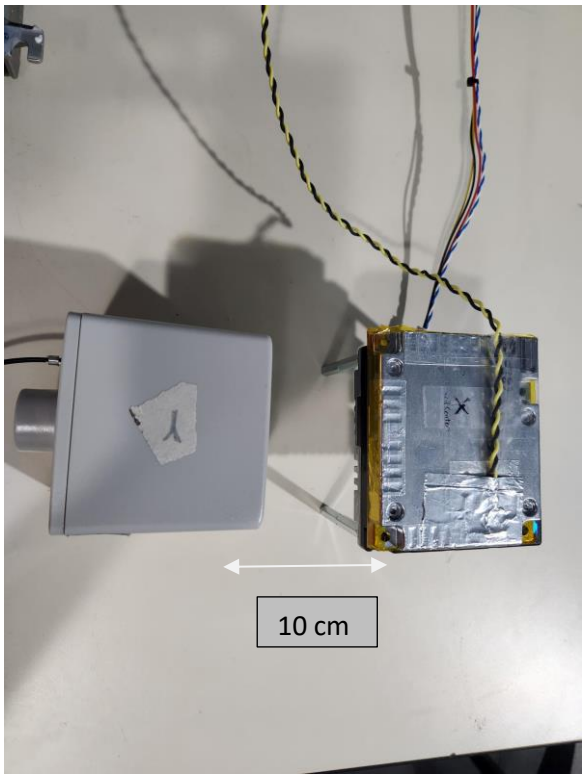


Figure C6. DUT Test setup 3

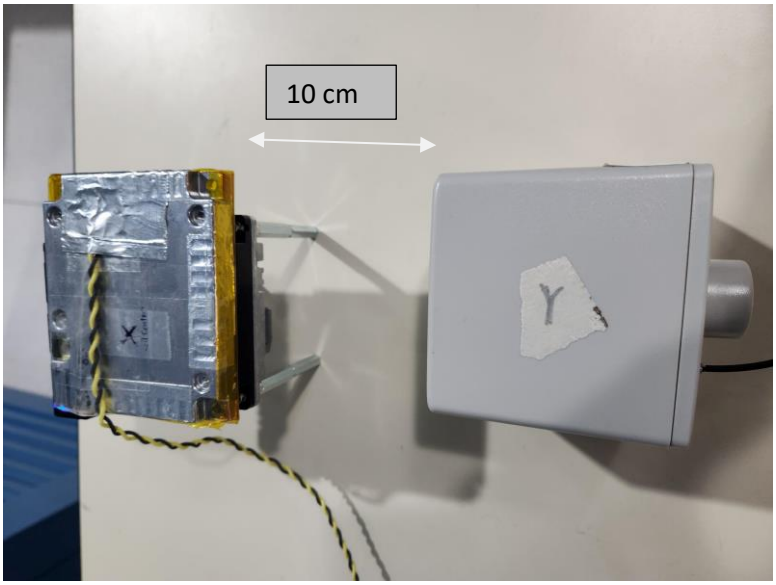


Figure C7. DUT Test setup 4

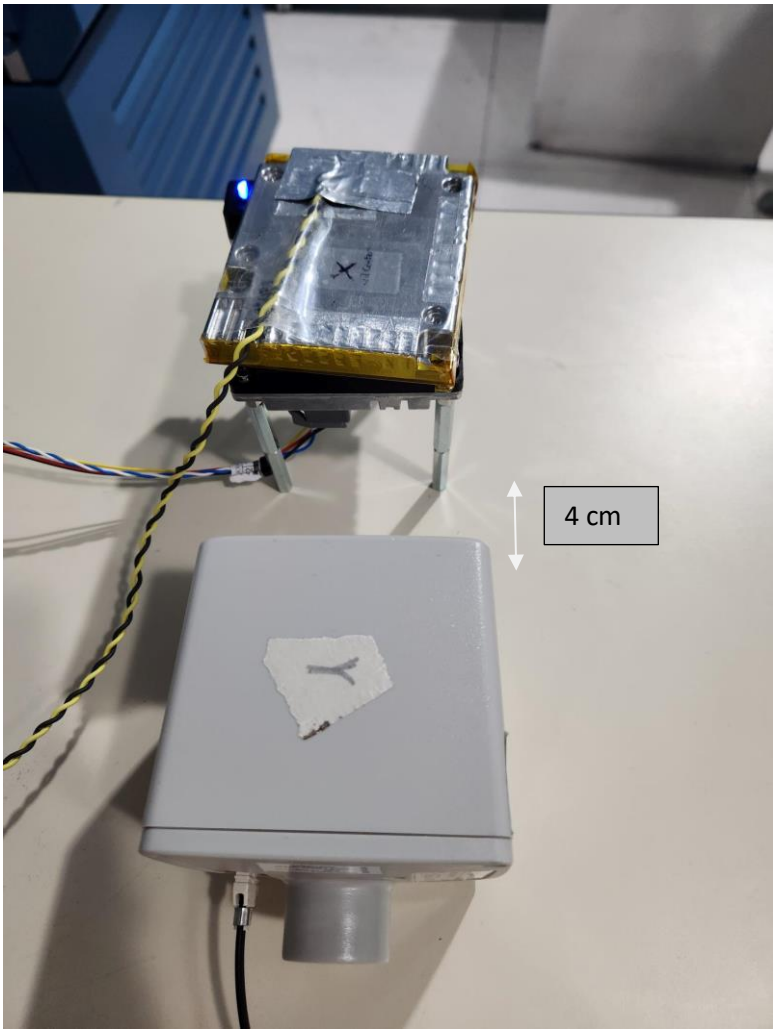


Figure C8. DUT Test setup 5