



Additional evaluation report for comments respons

Test Report No.: 10759120Y-B-1

Applicant: OMRON Automotive Electronics Co. Ltd.
Type of Equipment: WIRELESS CHARGER
Model No.: GFM-H001
FCC ID: OUCGFM-H001
Test standard: FCC rule §1.1310

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above standard.
4. The test results in this test report are traceable to the national or international standards.
5. This test report covers EMC technical requirements. It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)

Date of test:

July 9, 2015

**Representative
test engineer:**

Hiroyuki Furutaka

Engineer

Consumer Technology Division

Approved by:

Tomoyuki Yamashita

Manager

Consumer Technology Division

UL Japan, Inc.

Yokowa EMC Lab.

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13-EM-F0429

CONTENTS

	PAGE
Section 1 : Customer information	4
Section 2 : Equipment under test (E.U.T.)	4
Section 3 : Test specification, procedures and results	5
Section 4 : Operation of E.U.T. during testing	6
Section 5 : FCC rule §1.1310	7
Appendix 1: Photographs of test setup	8
Appendix 2: Test data	9
Appendix 3: Test Instruements	13

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Section 1 : Customer information

Company Name : OMRON Automotive Electronics Co. Ltd.
Brand Name : OMRON
Address : 3-19-15 Motoimaizumi Utsunomiya, Tochigi-ken, 321-0954 Japan
Telephone Number : +81 28 634 6802
Facsimile Number : +81 28 634 6804
Contact Person : Takayuki Kamijima

Section 2 : Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of equipment : WIRELESS CHARGER
Trade name : OMRON
Model No. : GFM-H001
Serial No. : 2
Rating : DC 12 V
Country of Mass-production : Japan
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Size : 133 x 176 x 32 (Width x Length x Height (mm))
Receipt Date of Sample : April 21, 2015

2.2 Product description

Model: GFM-H001 (referred to as the EUT in this report) is a wireless charger in vehicle.
The clock frequencies used in the EUT: 8 MHz, 20 MHz

The power transfer frequency range used in the EUT is 111 kHz and 114.5 kHz.
Rated output power: 20 W

This product can charge with various mobile devices in the WPC compliant products.

This product does not have an aftermarket accessories.
This product is installed during the manufacturing a car.

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Section 3 : Test specification, procedures and results

3.1 Test specification

Title : FCC rule §1.1310 Radiofrequency radiation exposure limits

3.2 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k=2$.

Electromagnetic fields

The uncertainty of the applied Electromagnetic field is within the tolerance specified by the standard.

The error of test level for this test system is less than $\pm 0.95\%$ for the level of standard.

3.3 Test Location

UL Japan, Inc. Ise EMC Lab. *NVLAP Lab. code: 200572-0

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

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	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	N/A	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 m x 2.0 m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.4 Test setup & Test instruments

Refer to Appendix.

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Section 4 : Operation of E.U.T. during testing

4.1 Operating modes

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

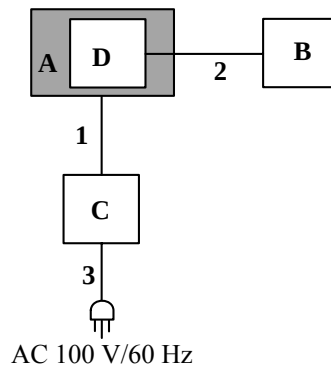
Test sequence is used: Charging (Operating Frequency: 111 kHz, 114.5 kHz)

* Operating condition:

Three coils do not transmit RF at the same time. One of three coils transmits RF after detecting the position signal.

Therefore, the radiation from one coil was measured in max load condition of normal use by a dummy load.

4.2 Configuration and peripherals



*Cabling and setup were taken into consideration and test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	WIRELESS CHARGER	GFM-H001	2	OMRON Automotive Electronics Co. Ltd.	EUT
B	Dummy Load	-	-	-	-
C	DC Power Supply	PAD55-20L	10041675	Kikusui	-
D	Wireless Receiver	HPA764 REV C	bp51013BEVM-764	Texas Instruments	-

List of cables used

No.	Name	Length (m)	Cable Shield	Connector Shield	Remark
1	DC Cable	1.3	Unshielded	Unshielded	-
2	DC Cable	0.12	Unshielded	Unshielded	-
3	AC Cable	3.0	Unshielded	Unshielded	3 wire

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Section 5: FCC rule §1.1310

5.1 Operating environment

This test was carried out in No.7 shielded room.

Date : July 9, 2015
Temperature : 24 deg.C
Humidity : 50% RH
Engineer : Hiroyuki Furutaka

5.2 Test configuration

The EUT was placed on a non-metallic of 0.8m above the reference ground plane.
Worst position is shown in the photos in Appendix 1.

5.3 Test conditions

EUT position : Table top

5.4 Test procedure

The test of the weighted result has been performed using time domain evaluation.
Sensor locations : Around from 0 cm to 10 cm (step 1 cm)

Normally, separation distance will be measured from the center of probe coil. Therefore 10 cm from the center of probe means 5cm between the probe surface and EUT.

5.5 Results

[Calculation example]

Test result of Magnetic density is 31.39% from measurement tool ELT-400.
This value was calculated by following formula.

$31.39\% = (\text{Actual magnetic density} \times 100) / 6.25$
(*Where the value 6.25 is decided IEC 62233:2005 Annex B Table B.2)

Actual magnetic density is 1.962 [μT]
Result of magnetic field strength is 1.561(A/m)

*Magnetic field strength [A/m] = Magnetic density / $4\pi \times 10^{-7} = 1.962 \times 10^{-6} / (1.257 \times 10^{-6}) = 1.561 \text{ (A/m)}$
*Electro-magnetic field strength[V/m] = Magnetic field strength * $120 \pi = 588.483 \text{ (V/m)}$

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Appendix 2: Test data

Note: Normally, separation distance will be measured from the center of probe coil. Therefore 10 cm from the center of probe means 5 cm between the probe surface and EUT.

Transmitte frequency: 111kHz

Top position of EUT

Measurement distance	Magnetic density[%]	measurement value [A/m]	measurement value [V/m]	Remarks
0cm (5cm from probe center point)	150.4	7.48	2819.89	NG*1
1cm (6cm from probe center poitn)	97.55	4.85	1828.41	NG*1
2cm (7cm from probe center point)	83.18	4.14	1560.74	NG*1
3cm (8cm from probe center poitn)	62.32	3.1	1168.67	NG*1
4cm (9cm from probe center point)	45	2.24	844.46	NG*1
5cm (10cm from probe center point defined distance)	30.94	1.54	580.57	OK
6cm (11cm from probe center poont defined distance)	27.1	1.35	508.94	OK
7cm (12cm from probe center point defined distance)	23.42	1.17	441.08	OK
8cm (13cm from probe center point defined distance)	18.67	0.93	350.60	OK
9cm (14cm from probe center point defined distance)	16.72	0.84	316.67	OK
10cm (15cm from probe center point defined distance)	15	0.75	282.74	OK

Front position of EUT

Measurement distance	Magnetic density[%]	measurement value [A/m]	measurement value [V/m]	Remarks
0cm (5cm from probe center point)	41.04	2.04	769.06	NG*1
1cm (6cm from probe center poitn)	23.75	1.18	444.85	OK
2cm (7cm from probe center point)	19.84	0.99	373.22	OK
3cm (8cm from probe center poitn)	13.33	0.67	252.58	OK
4cm (9cm from probe center point)	12.28	0.61	229.96	OK
5cm (10cm from probe center point defined distance)	9.438	0.47	177.19	OK
6cm (11cm from probe center poont defined distance)	7.829	0.39	147.03	OK
7cm (12cm from probe center point defined distance)	6.073	0.31	116.87	OK
8cm (13cm from probe center point defined distance)	3.482	0.18	67.86	OK
9cm (14cm from probe center point defined distance)	4.702	0.24	90.48	OK
10cm (15cm from probe center point defined distance)	4.019	0.2	75.40	OK

Right position of EUT

Measurement distance	Magnetic density[%]	measurement value [A/m]	measurement value [V/m]	Remarks
0cm (5cm from probe center point)	25.92	1.29	486.32	OK
1cm (6cm from probe center poitn)	18.24	0.91	343.06	OK
2cm (7cm from probe center point)	18.08	0.9	339.29	OK
3cm (8cm from probe center poitn)	13.35	0.67	252.58	OK
4cm (9cm from probe center point)	9.399	0.47	177.19	OK
5cm (10cm from probe center point defined distance)	7.842	0.39	147.03	OK
6cm (11cm from probe center poont defined distance)	6.698	0.34	128.18	OK
7cm (12cm from probe center point defined distance)	5.923	0.3	113.10	OK
8cm (13cm from probe center point defined distance)	4.894	0.25	94.25	OK
9cm (14cm from probe center point defined distance)	4.654	0.24	90.48	OK
10cm (15cm from probe center point defined distance)	4.138	0.21	79.17	OK

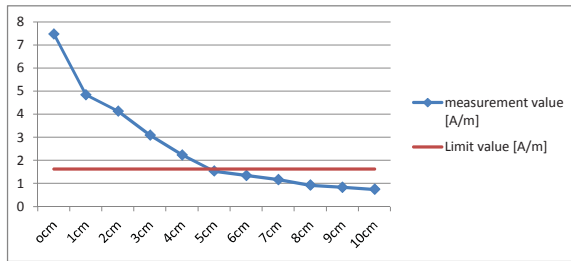
Rear position of EUT

Measurement distance	Magnetic density[%]	measurement value [A/m]	measurement value [V/m]	Remarks
0cm (5cm from probe center point)	81.77	4.06	1530.58	NG*1
1cm (6cm from probe center poitn)	35.8	1.78	671.04	NG*1
2cm (7cm from probe center point)	27.02	1.35	508.94	OK
3cm (8cm from probe center poitn)	19.36	0.97	365.68	OK
4cm (9cm from probe center point)	15.02	0.75	282.74	OK
5cm (10cm from probe center point defined distance)	10.38	0.52	196.04	OK
6cm (11cm from probe center poont defined distance)	7.345	0.37	139.49	OK
7cm (12cm from probe center point defined distance)	6.556	0.33	124.41	OK
8cm (13cm from probe center point defined distance)	5.659	0.29	109.33	OK
9cm (14cm from probe center point defined distance)	5.014	0.25	94.25	OK
10cm (15cm from probe center point defined distance)	4.539	0.23	86.71	OK

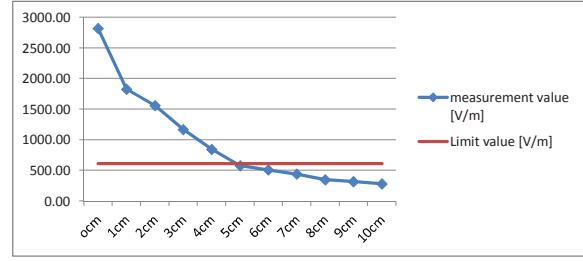
Left position of EUT

Measurement distance	Magnetic density[%]	measurement value [A/m]	measurement value [V/m]	Remarks
0cm (5cm from probe center point)	31.56	1.57	591.88	OK
1cm (6cm from probe center poitn)	18.89	0.94	354.37	OK
2cm (7cm from probe center point)	16.08	0.8	301.59	OK
3cm (8cm from probe center poitn)	12.77	0.64	241.27	OK
4cm (9cm from probe center point)	10.87	0.54	203.58	OK
5cm (10cm from probe center point defined distance)	9.556	0.48	180.96	OK
6cm (11cm from probe center poont defined distance)	7.733	0.39	147.03	OK
7cm (12cm from probe center point defined distance)	6.612	0.33	124.41	OK
8cm (13cm from probe center point defined distance)	5.907	0.3	113.10	OK
9cm (14cm from probe center point defined distance)	4.874	0.25	94.25	OK
10cm (15cm from probe center point defined distance)	4.428	0.22	82.94	OK

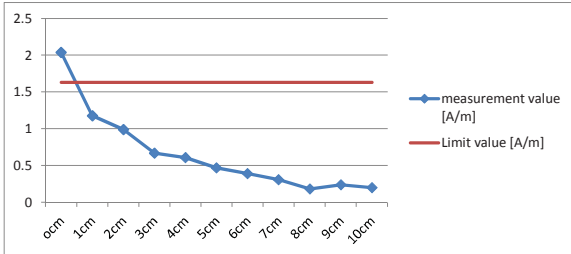
*1 It must be provided with transmitter operating conditions for satisfying RF exposure compliance to end-users and installers. See manual.



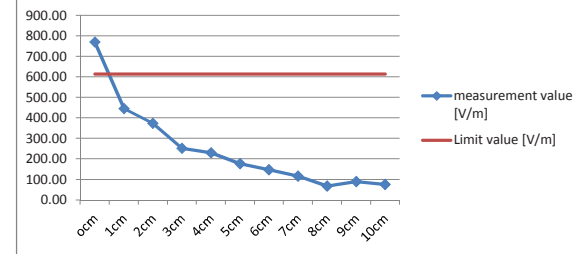
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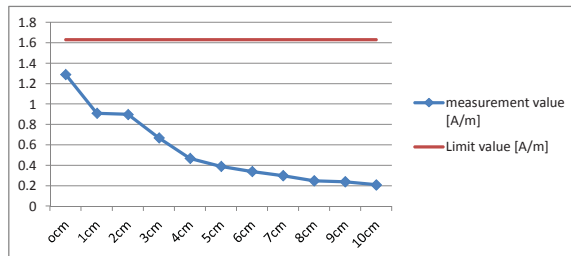
DATA of Top position for Voltage measurement



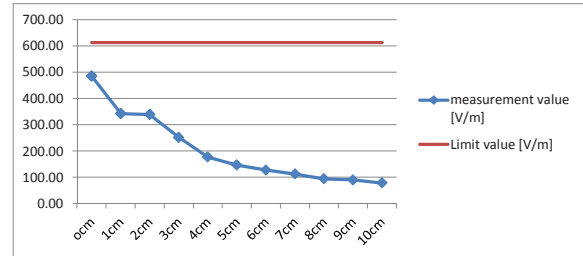
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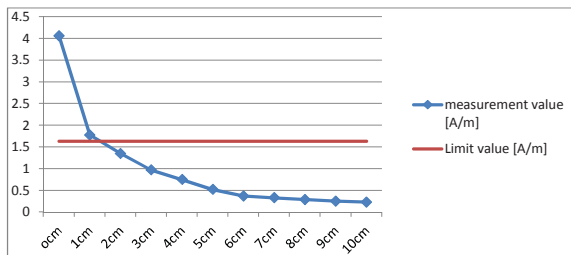
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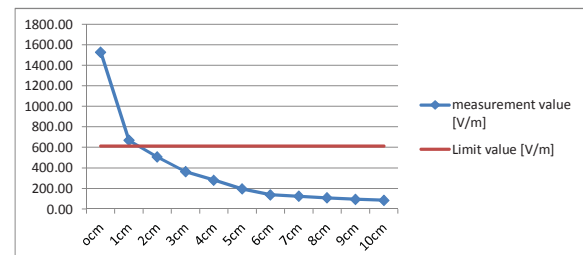
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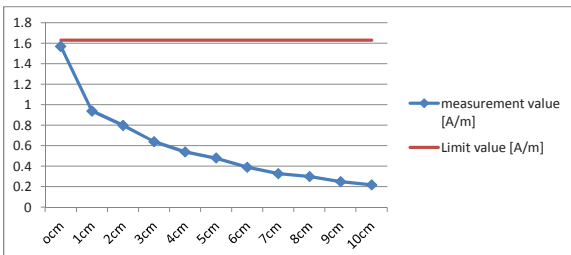
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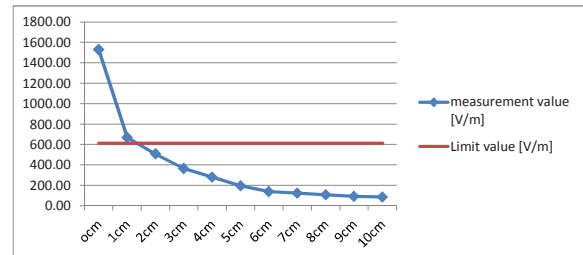
DATA of Rear position for Current measurement



DATA of Rear position for Voltage measurement



DATA of Left position for Current measurement



DATA of Left position for Voltage measurement

Transmitte frequency:114.5kHz
Top position of EUT

Measurement distance	Magnetic density[%]	Measurement value [A/m]	Measurement value [V/m]	Remarks
0cm (5cm from probe center point)	123.9	6.16	2322.27	NG*1
1cm (6cm from probe center poitn)	101.9	5.1	1922.65	NG*1
2cm (7cm from probe center point)	86.37	4.3	1621.06	NG*1
3cm (8cm from probe center poitn)	69.12	3.44	1296.85	NG*1
4cm (9cm from probe center point)	47.02	2.34	882.16	NG*1
5cm (10cm from probe center point defined distance)	30.75	1.53	576.80	OK
6cm (11cm from probe center poont defined distance)	27.58	1.38	520.25	OK
7cm (12cm from probe center point defined distance)	23.2	1.16	437.31	OK
8cm (13cm from probe center point defined distance)	18.97	0.95	358.14	OK
9cm (14cm from probe center point defined distance)	16.79	0.87	327.98	OK
10cm (15cm from probe center point defined distance)	15.07	0.75	282.74	OK

Front position of EUT

Measurement distance	Magnetic density[%]	measurement value [A/m]	Measurement value [V/m]	Remarks
0cm (5cm from probe center point)	42.69	4.29	1617.29	NG*1
1cm (6cm from probe center poitn)	27.56	2.35	885.93	NG*1
2cm (7cm from probe center point)	17.11	1.61	606.96	OK
3cm (8cm from probe center poitn)	13.65	1.21	456.16	OK
4cm (9cm from probe center point)	11.78	0.83	312.90	OK
5cm (10cm from probe center point defined distance)	9.31	0.72	271.43	OK
6cm (11cm from probe center poont defined distance)	8.19	0.51	192.27	OK
7cm (12cm from probe center point defined distance)	6.67	0.44	165.88	OK
8cm (13cm from probe center point defined distance)	5.84	0.38	143.26	OK
9cm (14cm from probe center point defined distance)	4.86	0.33	124.41	OK
10cm (15cm from probe center point defined distance)	4.12	0.27	101.79	OK

Right position of EUT

Measurement distance	Magnetic density[%]	measurement value [A/m]	Measurement value [V/m]	Remarks
0cm (5cm from probe center point)	28.08	1.4	527.79	OK
1cm (6cm from probe center poitn)	19.06	0.95	358.14	OK
2cm (7cm from probe center point)	17.64	0.88	331.75	OK
3cm (8cm from probe center poitn)	13.94	0.7	263.89	OK
4cm (9cm from probe center point)	9.49	0.48	180.96	OK
5cm (10cm from probe center point defined distance)	7.64	0.38	143.26	OK
6cm (11cm from probe center poont defined distance)	6.65	0.33	124.41	OK
7cm (12cm from probe center point defined distance)	5.88	0.3	113.10	OK
8cm (13cm from probe center point defined distance)	5.10	0.26	98.02	OK
9cm (14cm from probe center point defined distance)	4.61	0.23	86.71	OK
10cm (15cm from probe center point defined distance)	3.85	0.2	75.40	OK

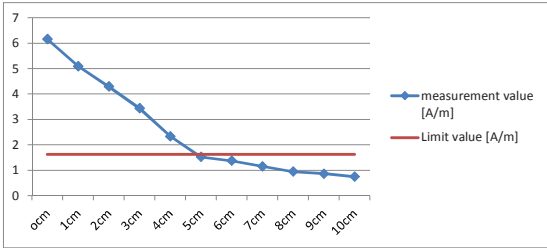
Rear position of EUT

Measurement distance	Magnetic density[%]	measurement value [A/m]	Measurement value [V/m]	Remarks
0cm (5cm from probe center point)	86.20	4.29	1617.29	NG*1
1cm (6cm from probe center poitn)	47.28	2.35	885.93	NG*1
2cm (7cm from probe center point)	32.26	1.61	606.96	OK
3cm (8cm from probe center poitn)	24.26	1.21	456.16	OK
4cm (9cm from probe center point)	16.70	0.83	312.90	OK
5cm (10cm from probe center point defined distance)	14.30	0.72	271.43	OK
6cm (11cm from probe center poont defined distance)	10.25	0.51	192.27	OK
7cm (12cm from probe center point defined distance)	8.67	0.44	165.88	OK
8cm (13cm from probe center point defined distance)	7.60	0.38	143.26	OK
9cm (14cm from probe center point defined distance)	6.54	0.33	124.41	OK
10cm (15cm from probe center point defined distance)	5.45	0.27	101.79	Ok

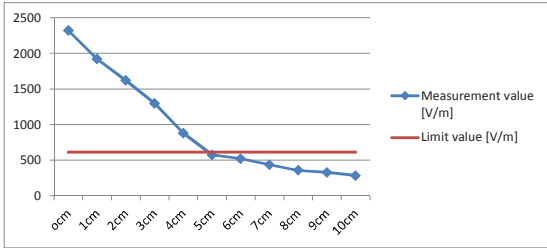
Left position of EUT

Measurement distance	Magnetic density[%]	measurement value [A/m]	Measurement value [V/m]	Remarks
0cm (5cm from probe center point)	32.78	1.63	614.50	NG*1
1cm (6cm from probe center poitn)	20.12	1	376.99	OK
2cm (7cm from probe center point)	16.03	0.8	301.59	OK
3cm (8cm from probe center poitn)	13.38	0.67	252.58	OK
4cm (9cm from probe center point)	11.69	0.59	222.42	OK
5cm (10cm from probe center point defined distance)	9.24	0.46	173.42	OK
6cm (11cm from probe center poont defined distance)	8.33	0.42	158.34	OK
7cm (12cm from probe center point defined distance)	7.13	0.36	135.72	OK
8cm (13cm from probe center point defined distance)	5.44	0.27	101.79	OK
9cm (14cm from probe center point defined distance)	5.06	0.26	98.02	OK
10cm (15cm from probe center point defined distance)	4.35	0.22	82.94	OK

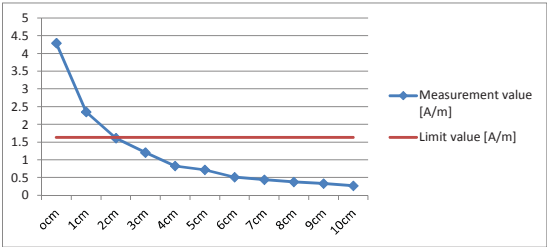
*1 It must be provided with transmitter operating conditions for satisfying RF exposure compliance to end-users and installers. See manual.



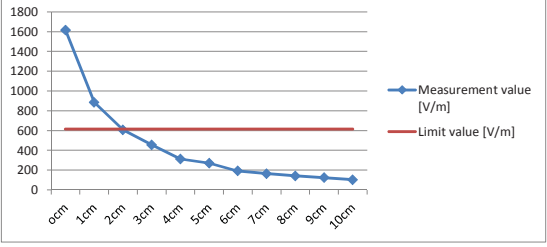
DATA of Top position for Current measurement



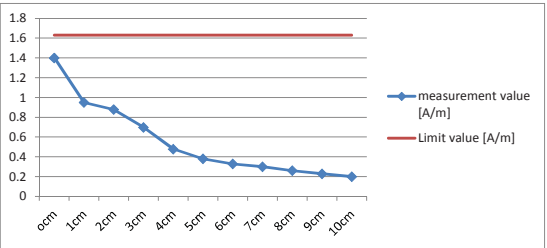
DATA of Top position for Volatge measurement



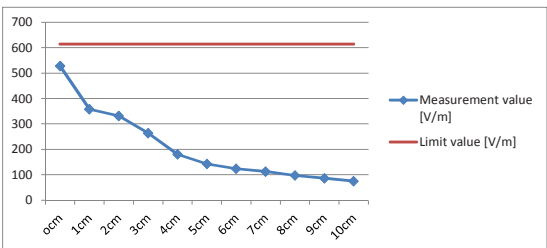
DATA of Front position for Current measurement



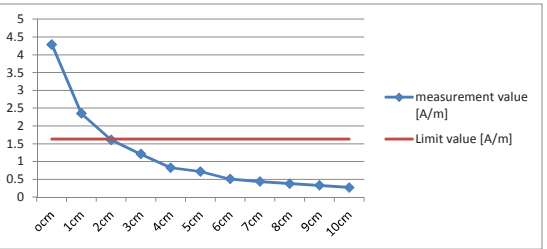
DATA of Front position for Voltage measurement



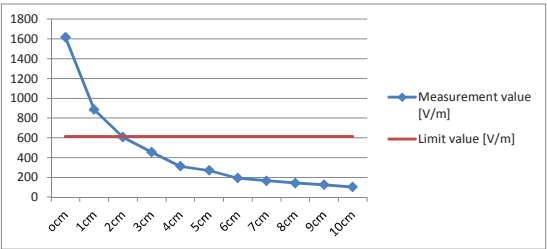
DATA of Right position for Current measurement



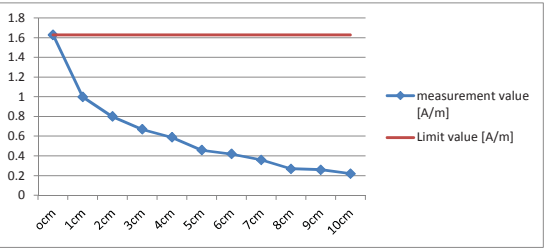
DATA of Right position for Voltage measurement



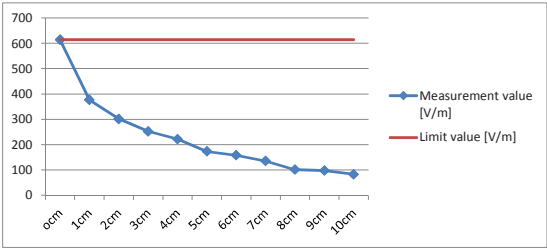
DATA of Rear position for Current measurement



DATA of Rear position for Volatge measurement



DATA of Left position for Current measurement



DATA of Left position for Voltage measurement

Test Report No : 10759120Y-B-1

Appendix 3 Test Instruments

EMF test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
ELT400	Exposure Level Tester	Narda	ELT-400	C-0002	EMF	2014/08/28 * 12
MOS-34	Thermo-Hygrometer	Custom	CTH-201	3401	EMF	2015/01/13 * 12
MBM-11	Barometer	Sunoh	SBR121	839	EMF	2013/12/17 * 36
MJM-04	Measure	PROMART	SEN1635	-	EMF	-
MMM-05	Digital Tester	Hioki	3244	030416616	EMF	2015/05/2012

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .

Test Item :

EMF: Electromagnetic fields

End of Report