Nemko TEST REPORT

Date:	**ESPOO 20.4.2013**	Page:	**1 (9)**
		Appendices	–

Number: No. 1 / 1

219872EMF

Date of handing in: 15.08.2012

Tested by:

Janne Nyman, Compliance Specialist

Reviewed by:

Timo Leismala, Test Manager

SORT OF EQUIPMENT:	**Wireless charging transmitter and receiver**
MARKETING NAME:	***Heart 2***
TYPE:	***PH2-B1***
MANUFACTURER:	***Powerkiss Oy, Finland***
SERIAL NUMBER:	**-**
CLIENT:	**Powerkiss Oy, Finland**
ADDRESS:	**Melkonkatu 24, FI – 00210 HELSINKI, FINLAND**
TELEPHONE:	**+358 44 720 7347**
TEST SPECIFICATION:	**OET BULLETIN 65, ED.97-01 + Supplement C ED. 01-01**

SUMMARY:

In regard to the performed tests the EUT fulfils the requirements defined in the test specification OET BULLETIN 65, ED.97-01, Table 1 (B) when using a minimum safety distance of 15 cm.

Measurement results have been compared directly with the limit values without considering measurement uncertainties.

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REVISIONS			
Initial report issue date		30.10.2012	
Revisions: 1.1		Powerkiss mode results added, measuring distance for Qi mode converted.	
Revision number	**Date**	**By**	**Description**
1.1	20.4.2013	JNm	
			.

DISTRIBUTION		
Copy number	**Date**	**Distribution**
1		Applicant original paper copy

GENERAL REMARKS

This report applies only to the sample(s) tested. It is the manufacturer's responsibility to assure the additional production units of this product are manufactured with identical electrical and mechanical components. The manufacturer is responsible to the Competent Authorities in Europe for any modifications made to the product, which result in non-compliance to the relevant regulations.

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CALIBRATION

All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Between calibrations all test set-ups are controlled and verified on a regular basis.

The instruments specified in immunity testing are subject to periodic calibration. Monthly controls ensure, with 95% confidence that the instruments remain within the calibrated levels.

MEASUREMENT UNCERTAINTY

Measurement uncertainties are calculated for all instruments and instrument set-ups used during the emission measurements. Uncertainty figures are informed in each test section in this report.
Note: Further information about measurement uncertainties will be given on request.

EVALUATION OF RESULTS

If not explicitly stated otherwise in the standard, the test is passed if the measurement value is equal to or below the limit line, regardless of the uncertainty of the measurement. If the measurement value is above the limit line, the test is not passed - ref. IECEE/CTL (Sec) 056/94 (CTL = Committee of Testing Laboratories).

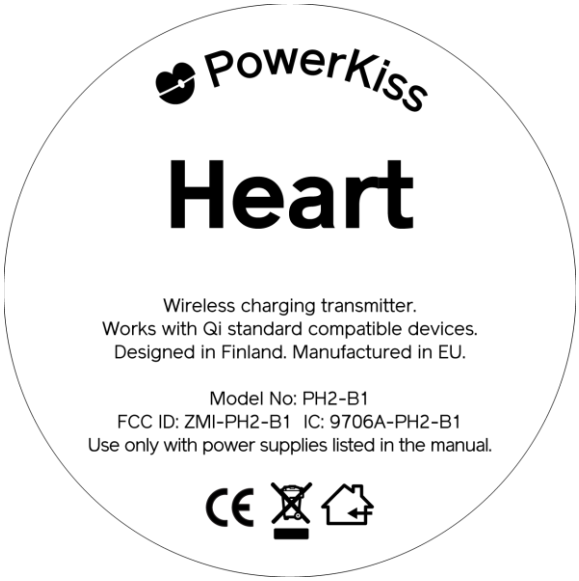
The instrumentation accuracy is within limits agreed by the IECEE/CTL (ref. Nemko proc. P226).

The argument for using this method is that it is commonly accepted that the limits have already taken into account the measurement uncertainties as long as the measurements are conducted according to a common good laboratory practice.

VERDICTS

Possible test case verdicts:
P = Pass, **F** = Fail, **N** = Not applicable, **—** = No verdict required. Placed in the column to the right (Verdict).

EQUIPMENT UNDER TEST (EUT)					
	Description of product	Wireless charging transmitter and receiver (fixed installation)			
	Modes of operation	A) Normal operating mode with a resistive 10 Ohm load B) Normal operating mode with sample mobile phone			
	System functional block diagram	No diagram available			
Note:					
	System Components	See table below			
SC no.	**Description**	**Manufacturer**	**Type**	**Serial No.**	
1	Wireless charging transmitter unit (Heart 2)	Powerkiss Oy, Finland	PH2-B1	-	
2	Receiving unit (Ring)	Powerkiss Oy, Finland	Qi	-	
3	Receiving unit (Ring)	Powerkiss Oy, Finland	Powerkiss	-	
4	External AC/DC Power Supply	Phihong	PSA30W-190A	-	
Note:					
	Cables	This product has been tested with the following cable types and cable configurations.			
CA No.	**Connection**	**Manufacturer**	**Type**	**Number of leads**	**Length**
1	AC/DC power supply - AC power supply network		AC cable, unshielded	3	4.0 m
2	EUT - AC/DC power supply		DC power cable with ferrite, unshielded	2	1.8 m
Note:					
	Product variants covered by this report	No product variants			
VA no.	**Variant**	**Description of deviation**			
1					
Note:					
	Additional information	Type plate			



Transmitter

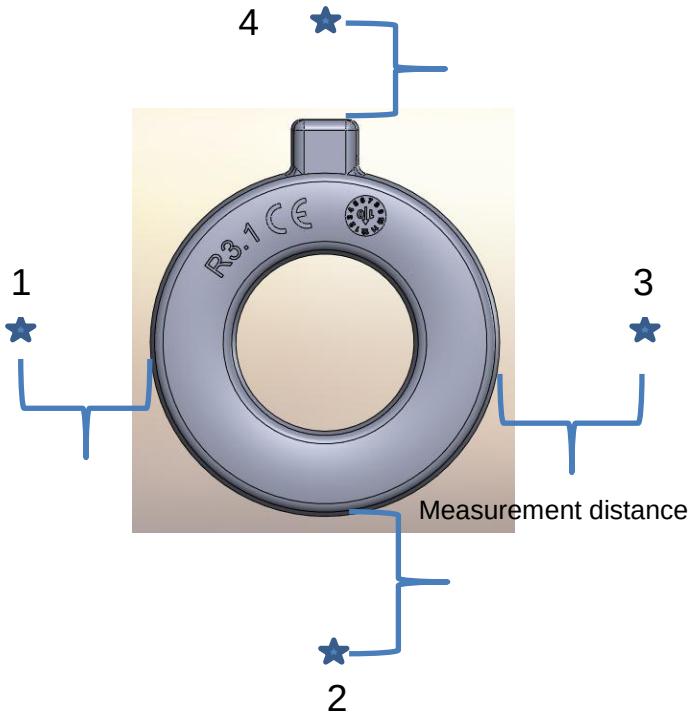
Powerkiss mode Receiver


Qi mode receiver

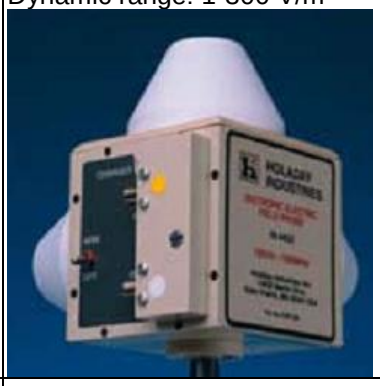
GENERAL TEST CONDITIONS		
	Location	
	Facilities	The tests documented in this report are all conducted in the facilities of Nemko Oy in Espoo, Finland
	Operating environment	All tests and measurements were performed in a normal room. Environment was measured to be suitable for the tests conducted.

	Power Supplied to EuT	
	General	AC electrical power was available for operation of EuT in all test areas.
	Voltage	97.7 - 132.3 V AC 60 Hz
	Type	AC
	Grounding	Grounded through its power connection

	Climatic Conditions	
	Ambient temperature	23 °C (accepted range: 15 - 25°C)
	Relative humidity	40 %
	Atmospheric pressure	1010 hPa

	Test positions	
		 5 Below the closest surface of the Heart unit 6 Above the closest surface of the ring unit

REQUIREMENTS			
Clause	**Requirement**	**Information**	**Verdict**
	OET BULLETIN 65, ED.97-01: Table 1 (B)	Magnetic and electric fields, general population / uncontrolled exposure	**-**

Clause	**Requirement**	**Information**	**Verdict**
	MEASURING METHODS		**-**
1	**ELECTRIC FIELDS**	Refer below:	**-**
	Measurement instrument: Holaday HI-4422 Isotropic E-field probe, S/N: 95835 Dynamic range: 1-300 V/m 	Frequency range: 10 kHz – 1 GHz Operating condition: See below Measuring distances: 5, 10, 15, 20 and 24 cm. Measuring distance was determined as follows: Above and aside the EUT the measuring distance was determined as a distance between the center point of E-field probe and the closest surface of a Ring. Below the EUT the measuring distance was determined as a distance between the center point of E-field probe and the closest point of the transmitter unit (Heart).	**-**
	Operating condition - Qi mode - Powerkiss mode	Measurements were performed in normal operating mode with a load. Two separate loads were used: a resistive load utilizing the maximum charging current and a typical mobile phone (Nokia Lumia 800).	**-**
	"Hot spot" location	Above and aside of the EUT: the closest surface of a Ring. Below the EUT: the closest point of the transmitting unit (Heart).	**-**

QI mode measurement Results (V/m):

Resistive 10 Ohm load:

Pos	Distance 5 cm	10 cm	15 cm	20 cm	24 cm
1	7,5	3,0	1,4	1,0	1,0
2	12,6	3,1	1,4	1,0	1,0
3	9,5	3,2	1,4	1,0	1,0
4	N/A	N/A	10,5	2,3	1,1
5	2,4	1,5	1,0	1,0	1,0
6	16,1	6,4	2,8	1,9	1,0

Qi mode measurement Results (V/m):

Typical load (Nokia Lumia 800):

Pos	Distance 5 cm	10 cm	15 cm	20 cm	24 cm
1	7,3	3,0	1,3	1,0	1,0
2	10,6	2,5	1,2	1,0	1,0
3	5,8	1,9	1,2	1,0	1,0
4	N/A	N/A	N/A	6,7 *	2,7 *
5	1,3	1,0	1,0	1,0	1,0
6	14,4	5,3	2,6	1,5	1,0

P
P
P

P
P
P

Powerkiss mode measurement Results (V/m):
Resistive 10 Ohm load:

Dist.	Positions					
cm	1	2	3	4	5	6
10	3,0	3,1	3,2	N/A	1,5	6,4

N/A: Measurement not possible due to load.
Limit: 614 V/m.

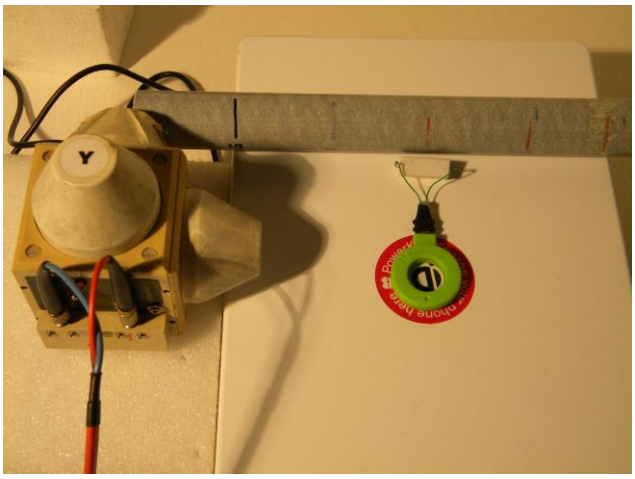
Powerkiss mode measurement Results (V/m):
Typical load (Nokia Lumia 800):

Dist.	Positions					
cm	1	2	3	4	5	6
10	3,0	2,5	1,9	N/A	1,0	5,3

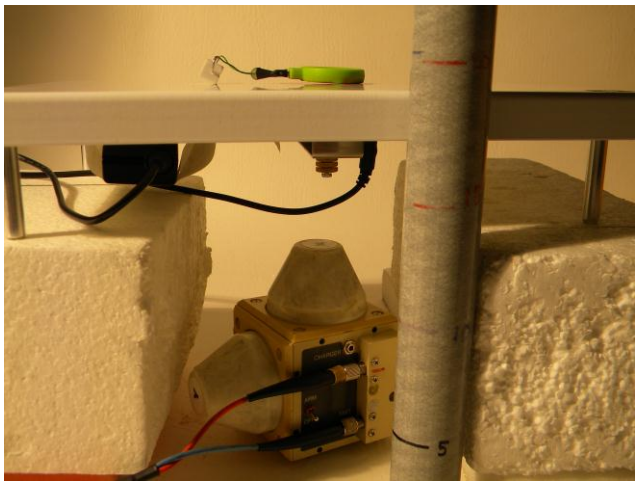
* The result was affected by the typical load.
N/A: Measurement not possible due to load.
Limit: 614 V/m.

P

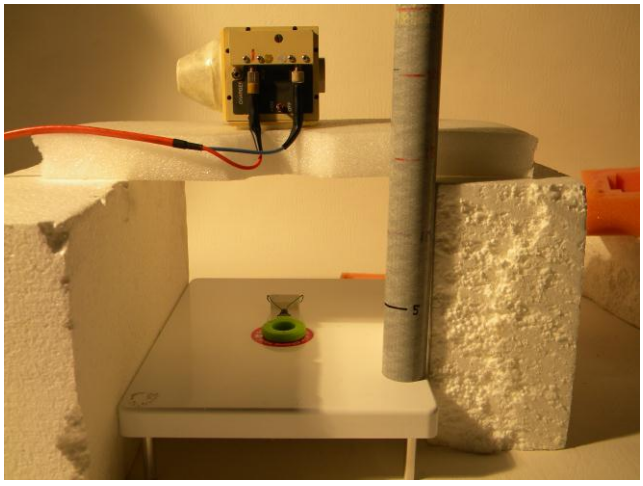
Photographs of the electric field measurements



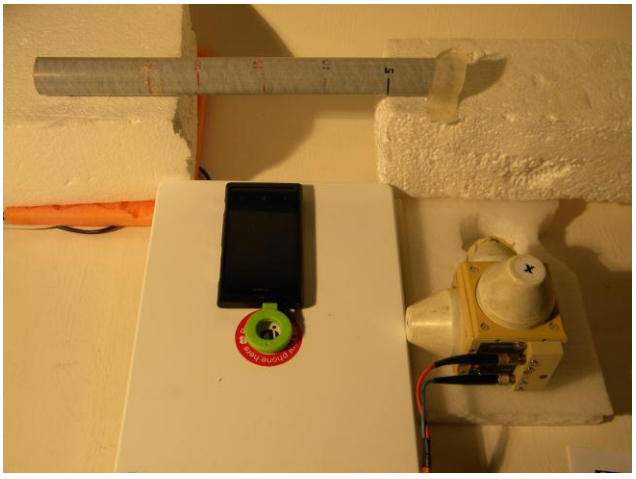
Electric field measurement, side position (1)



Electric field measurement, below position (5)



Electric field measurement, above position (6)



Typical load, Nokia Lumia 800 mobile phone

2	**MAGNETIC FIELDS**	Refer below:	**-**
	Measurement instrument: Narda ELT-400 Magnetic fields meter, S/N: E-0046 	Frequency range: 10Hz – 400kHz Operating condition: see below Measuring distances: 5, 10, 15, 20 and 24 cm. Measuring distance was determined as follows: Above and aside the EUT the measuring distance was determined as a distance between the center point of magnetic field meter antenna and the closest surface of a Ring. Below the EUT the measuring distance was determined as a distance between the center point of magnetic field meter antenna and the closest point of the transmitter unit (Heart).	
	Operating condition - Qi mode - Powerkiss mode	Measurements were performed in normal operating mode with a load. Two separate loads were used: a resistive load utilizing the maximum charging current and a typical mobile phone (Nokia Lumia 800).	**-**
	"Hot spot" location	Above and aside of the EUT: the closest surface of a Ring. below the EUT: the closest point of the transmitting unit (Heart).	**-**
	Measuring method applied	Time domain method	**-**
	Background noise level	< 2 % of recommended values.	**-**

Qi mode measurement Results (A/m):

Resistive 10 Ohm load:

Pos	Distance 5 cm	10 cm	15 cm	20 cm	24 cm
1	3,1	1,2	0,6	0,6	0,6
2	3,3	1,2	0,6	0,6	0,6
3	3,2	1,2	0,6	0,6	0,6
4	N/A	0,8	0,6	0,6	0,6
5	1,8	0,8	0,6	0,6	0,6
6	8,9	1,8	0,9	0,6	0,6

Powerkiss mode measurement Results (A/m):

Resistive 10 Ohm load:

Dist. cm	Positions 1	2	3	4	5	6
10	1,2	1,2	1,2	0,8	0,8	1,8

N/A: Measurement not possible due to load.
Limit: 1.63 A/m.

Qi mode measurement Results (A/m):

Typical load (Nokia Lumia 800):

Pos	Distance 5 cm	10 cm	15 cm	20 cm	24 cm	
1	3,2	1,3	0,8	0,6	0,6	**P**
2	3,1	1,3	0,6	0,6	0,6	**P**
3	2,6	1,2	0,6	0,6	0,6	**P**
4	N/A	N/A	N/A	0,6	0,6	**P**
5	1,8	0,8	0,6	0,6	0,6	**P**
6	8,9	2,3	0,9	0,6	0,6	**P**

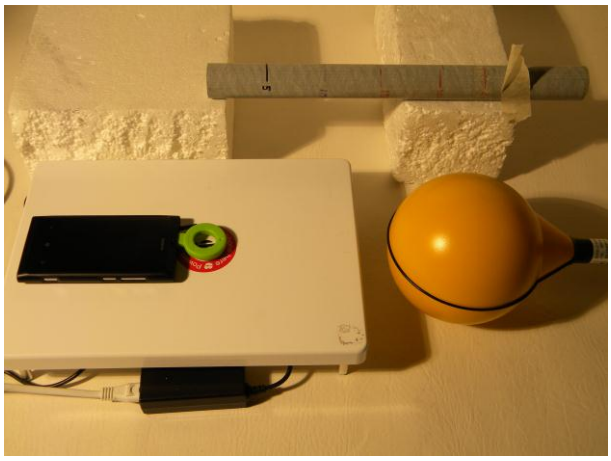
Powerkiss mode measurement Results (A/m):

Typical load (Nokia Lumia 800):

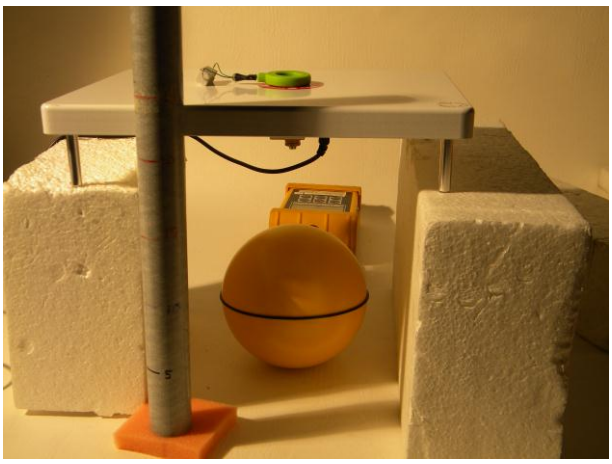
Dist. cm	Positions 1	2	3	4	5	6	
10	1,3	1,3	1,2	N/A	0,8	2,3	**P**

N/A: Measurement not possible due to load.
Limit: 1.63 A/m

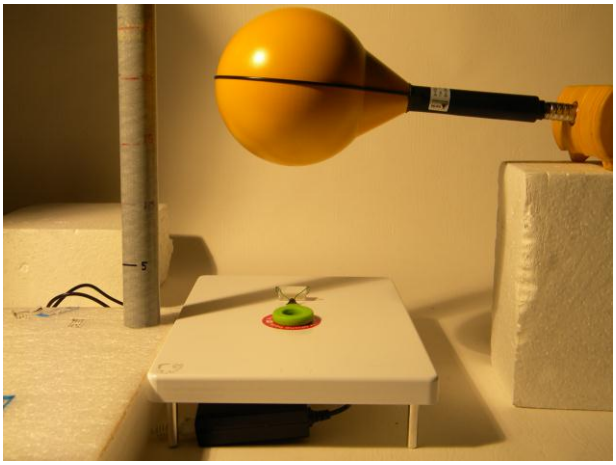
Photographs of the magnetic field measurements



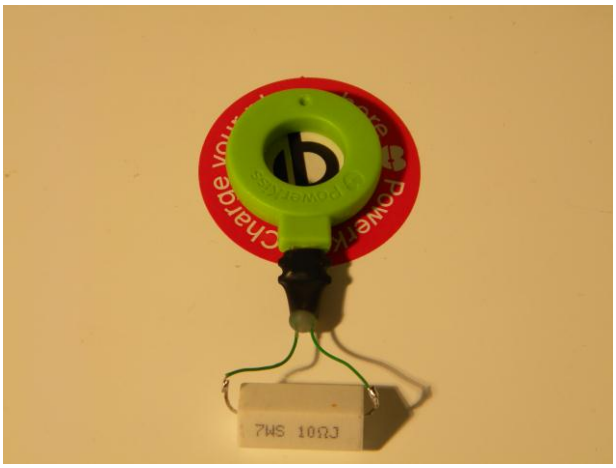
Magnetic field measurement, side position (2)



Magnetic field measurement, below position (5)



Magnetic field measurement, above position (6)



Resistive load

3	**MEASUREMENT UNCERTAINTY**		**-**
		Measurement uncertainties: Electric fields (HI-4422): - Frequency response 10 kHz-250 MHz: ±0.5dB 250 MHz-1 GHz: ±1.0dB - Isotropicity: ±0.5dB Magnetic fields (ELT-400): 4%	**-**