Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

ilac-MRA

SWISS ACCREDITATION
sas.admin.ch SCS 0108

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client	**UL Korea** Gyeonggi-do, Republic of Korea	Certificate No.	**V-Coil350/85-1019_Oct24**

CALIBRATION CERTIFICATE

Object	V-Coil350/85V2 - SN: 1019
Calibration procedure(s)	QA CAL-47.v13 Calibration Procedure for WPT Verification & Validation Sources
Calibration date:	October 18, 2024

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
MAGPy-8H3D+E3D/DAS	SN: 3090/3078	22-Aug-24 (MAGPy-8H3D-3090_Aug24)	Aug-25

Secondary Standards	ID #	Check Date (in house)	Scheduled Check

	Name	Function	Signature
Calibrated by:	Jingtian Xi	Project Leader	
Approved by:	Sven Kühn	Technical Manager	i.A.

Issued: October 30, 2024

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Calibration Laboratory of
Schmid & Partner
  Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S   Schweizerischer Kalibrierdienst
C   Service suisse d'étalonnage
S   Servizio svizzero di taratura
S   Swiss Calibration Service

Glossary:
WPT   wireless power transfer
V&V   verification & validation

Calibration is Performed According to the Following Standards:
- Internal procedure QA CAL-47 Calibration procedure for WPT verification & validation sources from 3 kHz to 10 MHz
- IEC/IEEE 63164, "Assessment methods of the human exposure to electric and magnetic fields from wireless power transfer systems – Models, instrumentation, measurement and computational methods and procedures (Frequency range 3 kHz to 30 MHz)", draft standard, 2023

Additional Documentation:
a) cDASY6/DASY8 Module WPT Manual

Methods Applied and Interpretation of Parameters:
- *Measurement Conditions:* The V&V source is switched on for at least 30 minutes.
- *Source Positioning:* The V&V source is placed in the center of the UniPV1 phantom such that the source surface is parallel to phantom surface. The probe location used for DUT teaching is the top center of the coil (marked on the source casing). The probe distance is verified using mechanical gauges placed on the source surface.
- *H-field distribution:* H-field is measured in the volume above the V&V source in a rectilinear grid with a uniform grid step of 7.33 mm.

Calibrated Quantity
- Spatial peak of H-field (RMS value) at *d* mm from the DUT surface (extrapolated from measurements)

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

Software version	cDASY6 Module WPT	2.6.0.5002
	Notebook GUI	2.6.0.9
	Sim4Life	8.0.1
Scan setup	Grid dimensions	x: 477 mm, y: 389 mm, z: 36.7 mm
	Grid resolutions	dx, dy, dz: 7.33 mm
Nominal frequency	85 kHz	

Calibrated Quantities

Distance (relative to source surface) (mm)	Peak H-field (A/m)	Uncertainty (k=2) (dB)
0	217	1.13
2	198	1.13

Appendix (Additional assessments outside the scope of SCS 0108)

Peak values of induced fields[1]

Distance (relative to source surface) (mm)	Induced peak current density, 1cm^2 area avg. (A/m^2)	Induced peak E-field (V/m)			peak spatial SAR (mW/kg)	
		2mm cube avg.	Local	5mm line avg.	1g avg.	10g avg.
0	2.47	3.52	3.56	3.57	7.11	5.22
2	2.32	3.31	3.34	3.35	6.33	4.72

Voltage measurement

Total voltage (V)	Voltages at harmonics (dBc)
0.426	Highest harmonic: -47.0 2nd highest harmonic: -49.1

---

[1] determined for a virtual half-space phantom with tissue properties ε_r = 55, σ = 0.75 S/m, ρ=1000 kg/m^3 and a 2 mm thick phantom shell

Measurement report

cDASY6 Module WPT Measurement Report

Device under test

Info:
V-Coil350/85

Serial number:
1019

Scenario:
source calibration

Tool info

DASY software version:
cDASY6 Module WPT 2.6.0.5002

Probe model, serial no. and configuration date:
MAGPy-8H3D+E3Dv2, WP000230, 2024/08/23

Software version:
2.0.63, backend: 2.2.22

Scan info

Center location:
x: -48.07 mm, Y: -119.87 mm, z: 36.24 mm

Dimensions:
x: 477.0 mm, Y: 388.8 mm, z: 36.7 mm

Resolution:
x: 7.33 mm, Y: 7.33 mm, z: 7.33 mm

Completed on:
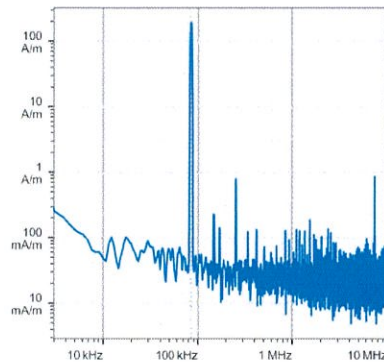2024/10/18 18:33:05

Measurement results

Maximum H-field [RMS]:
MAGNITUDE: 141.53 A/m
x: 122.22 A/m, Y: 32.50 A/m, z: 63.53 A/m

Maximum H-field location relative to DUT:
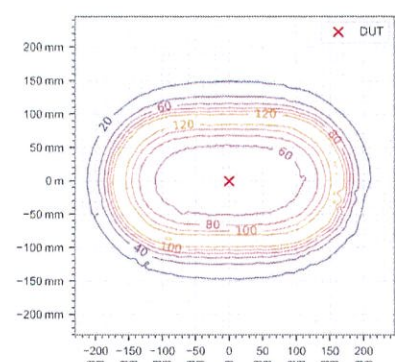x: 157.67 mm, Y: 25.67 mm, z: 8.50 mm

Distance to -20.0 dB boundary:
62.66 mm

Offset relative to DUT:
x: 0.00 m, Y: 0.00 m, z: 1.00 mm

H-field magnitude [RMS] at maximum location

H-field magnitude [RMS] at lowest plane

Incident fields and induced fields in the homogeous phantom at the peak frequency
(f = 85.00 kHz, σ = 0.750 S/m, tissue density = 1,000 kg/m³)

Distance [mm]	Peak incident fields [RMS] H_{inc} [A/m]	Peak $E_{ind.}$ [V/m, RMS] Cube avg.	Local	Line avg.	Peak J_{ind} [A/m², RMS] Surface avg.	psSAR [mW/kg] 1g avg.	10g avg.	H-field extent -20 dB radius [mm]	Sign	Vector potential	Warnings Boundary effect
0.00	217	3.52	3.56	3.57	2.47	7.11	5.22	181	1%	76%	35%
2.00	198	3.31	3.34	3.35	2.32	6.33	4.72	183	1%	76%	37%

Compliance evaluation (Field values at the peak frequency) *(f=85.00 kHz,)*

	ICNIRP 2010/2020			ICNIRP 1998			IEEE 2019			FCC			HC Code 6		
	RL [RMS]	BR [RMS]		RL [RMS]	BR [RMS]		ERL [RMS]	DRL [RMS]		MPE [RMS]	BR [RMS]		RL [RMS]	BR [RMS]	
Distance [mm]	pH_{inc} [A/m]	pE_{ind} [V/m]	psSAR [mW/kg]	pH_{inc} [A/m]	pJ_{ind} [A/m²]	psSAR [mW/kg]	pH_{inc} [A/m]	pE_{ind} [V/m]	psSAR [mW/kg]	pH_{inc} [A/m]	pE_{ind} [V/m]	psSAR [mW/kg]	pH_{inc} [A/m]	pE_{ind} [V/m]	psSAR [mW/kg]
0.00	217	3.52	5.22	217	2.47	5.22	217	3.57	5.22	217	N/A	7.11	217	3.56	7.11
2.00	198	3.31	4.72	198	2.32	4.72	198	3.35	4.72	198	N/A	6.33	198	3.34	6.33

Compliance evaluation (Exposure ratios) *(ratios in dB)*

	ICNIRP 2010/2020				ICNIRP 1998				IEEE 2019				FCC			HC Code 6			
	RL		BR		RL		BR		ERL		DRL		MPE	BR		RL		BR	
Distance [mm]	pH_{inc}		pE_{ind} psSAR		pH_{inc}	pJ_{ind} psSAR			pH_{inc}		pE_{ind} psSAR		pH_{inc}	pE_{ind} psSAR		pH_{inc}		pE_{ind} psSAR	
	NS	TH	NS	TH	N/A	NS	TH		NS	TH	NS	TH	N/A	N/A	TH	NS	TH	NS	TH
0.00	20.3	N/A	-10.3	N/A	32.8	23.2	N/A		2.5	N/A	-14.0	N/A	7.66	N/A	N/A	7.66	N/A	-10.2	N/A
2.00	19.5	N/A	-10.8	N/A	31.9	22.7	N/A		1.67	N/A	-14.5	N/A	6.83	N/A	N/A	6.83	N/A	-10.7	N/A

Document generated at 2024/10/18 18:41:34, simulation performed at 2024/10/18 18:39:01 using Sim4Life version 8.0.1.15446

Calibration Laboratory of

Schmid & Partner
 Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

ilac-MRA

SWISS ACCREDITATION
sas-admin.ch SCS 0108

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accreditation No.: **SCS 0108**

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Client **UL**
 Gyeonggi-do, Republic of Korea

Certificate No. **V-Coil350/85-1019_Aug25**

CALIBRATION CERTIFICATE

Object	V-Coil350/85V2 - SN: 1019
Calibration procedure(s)	**QA CAL-47.v13** **Calibration Procedure for WPT Verification & Validation Sources**
Calibration date:	**August 15, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
MAGPy-8H3D+E3D/DAS	SN: 3090/3078	22-Aug-24 (MAGPy-8H3D-3090_Aug24)	Aug-25

Secondary Standards	ID #	Check Date (in house)	Scheduled Check

	Name	Function	Signature
Calibrated by:	Jingtian Xi	Project Leader	
Approved by:	Sven Kühn	Technical Manager	

Issued: August 18, 2025

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

ilac-MRA

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Glossary:

WPT	wireless power transfer
V&V	verification & validation

Calibration is Performed According to the Following Standards:

- Internal procedure QA CAL-47 Calibration procedure for WPT verification & validation sources from 3 kHz to 10 MHz
- IEC/IEEE 63164, "Assessment methods of the human exposure to electric and magnetic fields from wireless power transfer systems – Models, instrumentation, measurement and computational methods and procedures (Frequency range 3 kHz to 30 MHz)", draft standard, 2023

Additional Documentation:

a) cDASY6/DASY8 Module WPT Manual

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* The V&V source is switched on for at least 30 minutes.
- *Source Positioning:* The V&V source is placed in the center of the UniPV1 phantom such that the source surface is parallel to phantom surface. The probe location used for DUT teaching is the top center of the coil (marked on the source casing). The probe distance is verified using mechanical gauges placed on the source surface.
- *H-field distribution:* H-field is measured in the volume above the V&V source in a rectilinear grid with a uniform grid step of 7.33 mm.

Calibrated Quantity

- Spatial peak of H-field (RMS value) at *d* mm from the DUT surface (extrapolated from measurements)

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

Software version	cDASY6 Module WPT	2.8.0.5184
	Notebook GUI	2.8.2.2
	Sim4Life	8.0.1
Scan setup	Grid dimensions	x: 477 mm, y: 389 mm, z: 36.7 mm
	Grid resolutions	dx, dy, dz: 7.33 mm
Nominal frequency	85 kHz	

Calibrated Quantities

Distance (relative to source surface) (mm)	Peak H-field (A/m)	Uncertainty (k=2) (dB)
0	220	1.13
2	200	1.13

Appendix (Additional assessments outside the scope of SCS 0108)

Peak values of induced fields[1]

Distance (relative to source surface) (mm)	Induced peak current density, 1cm^2 area avg. (A/m^2)	Induced peak E-field (V/m)			peak spatial SAR (mW/kg)	
		2mm cube avg.	Local	5mm line avg.	1g avg.	10g avg.
0	2.51	3.58	3.62	3.63	7.36	5.42
2	2.37	3.37	3.40	3.41	6.56	4.90

Voltage measurement

Total voltage (V)	Voltages at harmonics (dBc)
0.429	Highest harmonic: -47.0 2nd highest harmonic: -48.3

---

[1] determined for a virtual half-space phantom with tissue properties ε_r = 55, σ = 0.75 S/m, ρ=1000 kg/m^3 and a 2 mm thick phantom shell

Measurement report

cDASY6 Module WPT Measurement Report

Device under test

Info:
V-Coil350/85

Serial number:
1019

Scenario:
Source Calibration

Tool info

DASY software version:
cDASY6 Module WPT 2.8.0.5184

Probe model, serial no. and configuration date:
MAGPy-8H3D+E3Dv2, WP000230, 2024/08/23

Software version:
2.8.8, backend: 2.2.36

Scan info

Center location:
x: -48.07 mm, Y: -119.87 mm, z: 36.46 mm

Dimensions:
x: 477.0 mm, Y: 388.8 mm, z: 36.6 mm

Resolution:
x: 7.33 mm, Y: 7.33 mm, z: 7.33 mm

Completed on:
2025/08/15 15:48:20

Measurement results

Maximum H-field [RMS]:
MAGNITUDE: 142.89 A/m
x: 122.92 A/m, Y: 32.81 A/m, z: 65.05 A/m

Maximum H-field location relative to DUT:
x: 157.67 mm, Y: 25.67 mm, z: 8.50 mm

Distance to -20.0 dB boundary:
62.66 mm

Offset relative to DUT:
x: 0.00 m, Y: 0.00 m, z: 1.00 mm

H-field magnitude [RMS] at center location

H-field magnitude [RMS] at lowest plane

Incident fields and induced fields in the homogeous phantom at the peak frequency   *(f = 85.00 kHz, σ = 0.750 S/m, tissue density = 1,000 kg/m³)*

Distance [mm]	Peak incident fields [RMS] H_{inc} [A/m]	Peak E_{ind} [V/m, RMS] Cube avg.	Local	Line avg.	Peak J_{ind} [A/m², RMS] Surface avg.	psSAR [mW/kg] 1g avg.	10g avg.	H-field extent -20 dB radius [mm]	Sign	Vector potential	Warnings Boundary effect
0.00	220	3.58	3.62	3.63	2.51	7.36	5.42	181	1%	76%	35%
2.00	200	3.37	3.40	3.41	2.37	6.56	4.90	183	1%	76%	37%

Compliance evaluation (Field values at the peak frequency)   *(f=85.00 kHz,)*

Distance [mm]	ICNIRP 2010/2020 RL [RMS] pH_{inc} [A/m]	BR [RMS] pE_{ind} [V/m]	psSAR [mW/kg]	ICNIRP 1998 RL [RMS] pH_{inc} [A/m]	BR [RMS] pJ_{ind} [A/m²]	psSAR [mW/kg]	IEEE 2019 ERL [RMS] pH_{inc} [A/m]	DRL [RMS] pE_{ind} [V/m]	psSAR [mW/kg]	FCC MPE [RMS] pH_{inc} [A/m]	BR [RMS] pE_{ind} [V/m]	psSAR [mW/kg]	HC Code 6 RL [RMS] pH_{inc} [A/m]	BR [RMS] pE_{ind} [V/m]	psSAR [mW/kg]
0.00	220	3.58	5.42	220	2.51	5.42	220	3.63	5.42	220	N/A	7.36	220	3.62	7.36
2.00	200	3.37	4.90	200	2.37	4.90	200	3.41	4.90	200	N/A	6.56	200	3.40	6.56

Compliance evaluation (Exposure ratios)   *(ratios in dB)*

Distance [mm]	ICNIRP 2010/2020 RL pH_{inc} NS	TH	BR pE_{ind} NS	psSAR TH	ICNIRP 1998 RL pH_{inc} N/A	BR pJ_{ind} NS	psSAR TH	IEEE 2019 ERL pH_{inc} NS	TH	DRL pE_{ind} NS	psSAR TH	FCC MPE pH_{inc} N/A	BR pE_{ind} NS	psSAR N/A TH	HC Code 6 RL pH_{inc} NS	TH	BR pE_{ind} NS	psSAR TH
0.00	20.4	N/A	-10.1	N/A	32.9	23.4	N/A	2.62	N/A	-13.8	N/A	7.78	N/A	N/A	7.78	N/A	-10.0	N/A
2.00	19.6	N/A	-10.7	N/A	32.1	22.9	N/A	1.79	N/A	-14.3	N/A	6.95	N/A	N/A	6.95	N/A	-10.6	N/A

Document generated at 2025/08/15 17:00:15, simulation performed at 2025/08/15 15:55:38 using Sim4Life version 8.0.1.15737

1/1