

Frequency Response, E-field, Channel 0

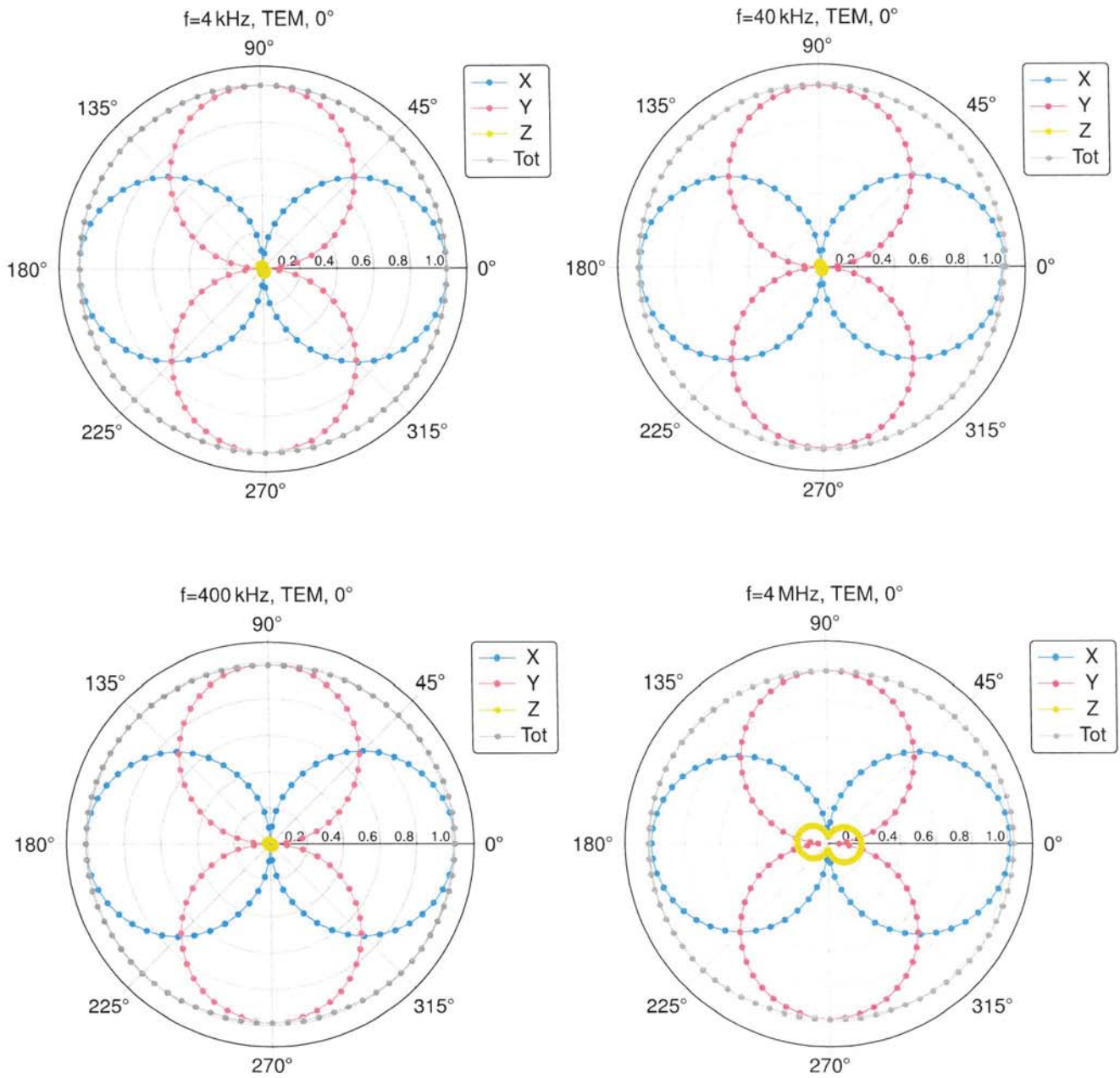
f/(Hz)	E-field/(V/m) Applied			E-field/(V/m) Reading			Difference/(dB)			Tolerance/(dB)
	x	y	z	x	y	z	x	y	z	
3000	82.8	82.8	83.7	82.8	82.8	83.8	0.00	0.00	0.01	±0.3
3200	82.2	82.2	79.2	83.3	82.6	78.9	0.12	0.04	-0.03	±0.3
4000	85.7	85.7	82.9	85.7	85.7	82.9	0.00	0.00	0.00	±0.3
5200	80.3	80.3	80.0	80.4	80.4	80.2	0.01	0.01	0.02	±0.3
6600	80.0	80.0	78.3	80.1	80.0	78.7	0.01	0.00	0.04	±0.3
8200	79.5	79.5	77.6	79.8	79.8	77.7	0.03	0.03	0.01	±0.3
9000	79.9	79.9	80.0	80.0	80.0	80.1	0.01	0.01	0.01	±0.3
10600	81.5	81.5	77.7	81.4	81.7	77.8	-0.01	0.02	0.01	±0.3
13400	80.1	80.1	79.2	80.2	80.0	79.4	0.01	-0.01	0.02	±0.3
17000	79.2	79.2	79.8	79.2	79.2	79.8	0.00	0.00	0.00	±0.3
21400	77.2	77.2	77.7	77.2	77.2	77.7	0.00	0.00	0.00	±0.3
27200	77.6	77.6	77.0	77.7	77.7	77.0	0.01	0.01	0.00	±0.3
34400	79.5	79.5	78.1	79.6	79.5	78.1	0.01	0.00	0.00	±0.3
40000	79.0	79.0	78.7	79.2	79.1	78.7	0.02	0.01	0.00	±0.3
43600	79.4	79.4	78.4	79.5	79.5	78.4	0.01	0.01	0.00	±0.3
55400	78.9	78.9	77.8	79.0	78.9	77.8	0.01	0.00	0.00	±0.3
70000	79.4	79.4	78.2	79.5	79.5	78.2	0.01	0.01	0.00	±0.3
88800	79.2	79.2	78.4	79.2	79.2	78.4	0.00	0.00	0.00	±0.3
112400	79.1	79.1	78.3	79.2	79.1	78.3	0.01	0.00	0.00	±0.3
142400	79.5	79.5	78.5	79.6	79.5	78.5	0.01	0.00	0.00	±0.3
161750	79.9	79.9	79.1	80.0	79.9	79.1	0.01	0.00	0.00	±0.3
180400	80.2	80.2	79.3	80.3	80.2	79.3	0.01	0.00	0.00	±0.3
228400	80.9	80.9	79.7	81.0	80.9	79.7	0.01	0.00	0.00	±0.3
289400	80.9	80.9	80.0	81.0	80.9	80.0	0.01	0.00	0.00	±0.3
366400	81.0	81.0	80.1	81.0	81.0	80.1	0.00	0.00	0.00	±0.3
400000	81.3	81.3	80.3	81.3	81.3	80.3	0.00	0.00	0.00	±0.3
464000	81.9	81.9	80.8	81.6	81.9	80.8	-0.03	0.00	0.00	±0.3
587800	82.1	82.1	81.0	82.1	82.2	81.0	0.00	0.01	0.00	±0.3
744200	82.1	82.1	81.0	82.0	82.1	81.0	-0.01	0.00	0.00	±0.3
942600	82.2	82.2	81.1	82.1	82.3	81.1	-0.01	0.01	0.00	±0.3
1193600	82.4	82.4	81.1	82.2	82.4	81.2	-0.02	0.00	0.01	±0.3
1511600	82.0	82.0	81.0	81.8	82.0	81.0	-0.02	0.00	0.00	±0.3
1914400	81.7	81.7	80.7	81.6	81.7	80.8	-0.01	0.00	0.01	±0.3
2424400	81.5	81.5	80.6	81.5	81.5	80.6	0.00	0.00	0.00	±0.3
3070200	81.6	81.6	80.8	81.6	81.6	80.8	0.00	0.00	0.00	±0.3
3888000	81.8	81.8	80.9	81.8	81.8	80.9	0.00	0.00	0.00	±0.3
4000000	81.9	81.9	81.1	81.9	81.9	81.1	0.00	0.00	0.00	±0.3
4923800	82.5	82.5	81.7	82.5	82.5	81.8	0.00	0.00	0.01	±0.3
6235400	83.6	83.6	82.5	83.7	83.7	82.5	0.01	0.01	0.00	±0.3
7896400	86.8	86.8	86.3	86.8	86.8	86.3	0.00	0.00	0.00	±0.3
10000000	94.4	94.4	93.8	94.4	94.4	93.8	0.00	0.00	0.00	±0.3

SPEAG E-field frequency response tolerance criteria¹:
±0.3dB for applied E-fields at calibration points from 3kHz to 10MHz

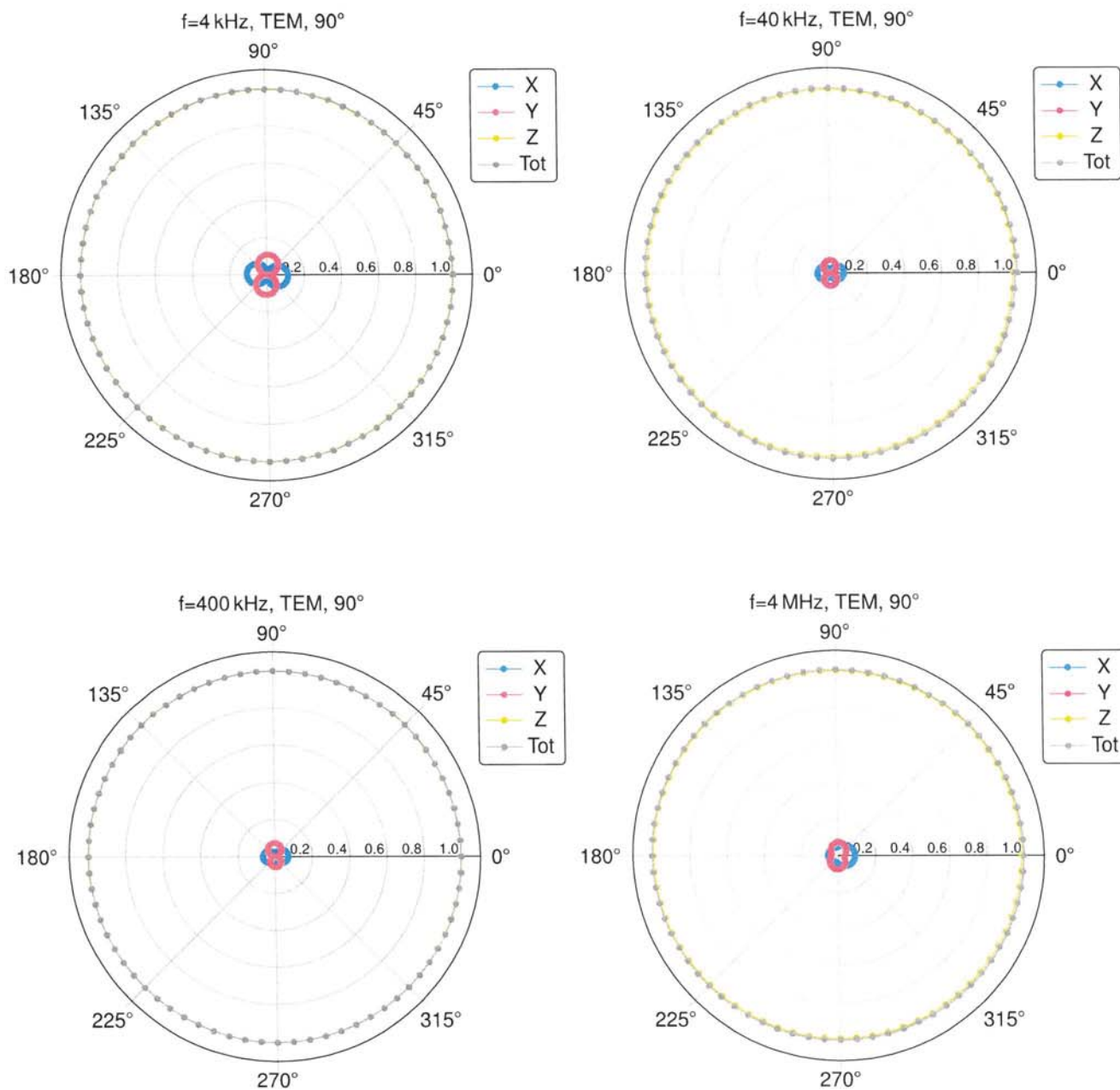
¹Calibration uncertainty not taken into account (shared risk 50%).

Isotropy H-Field

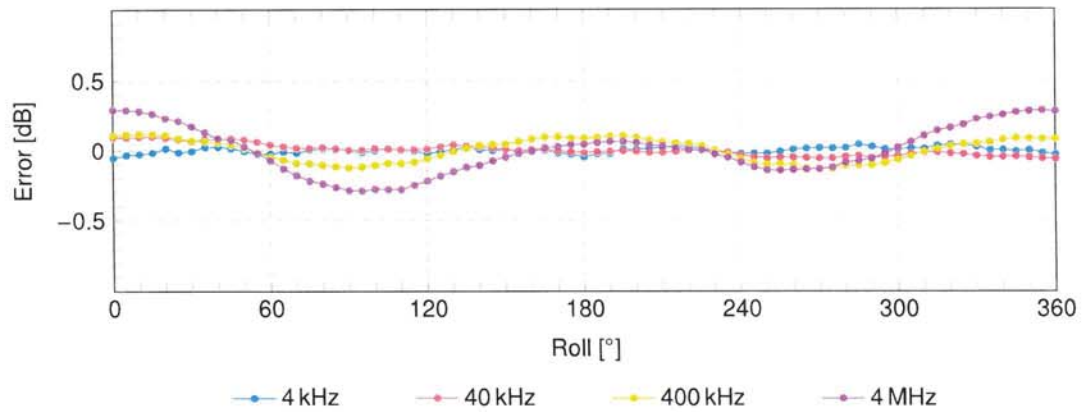
H-Field Receiving Pattern (ϕ), $\vartheta = 0^\circ$



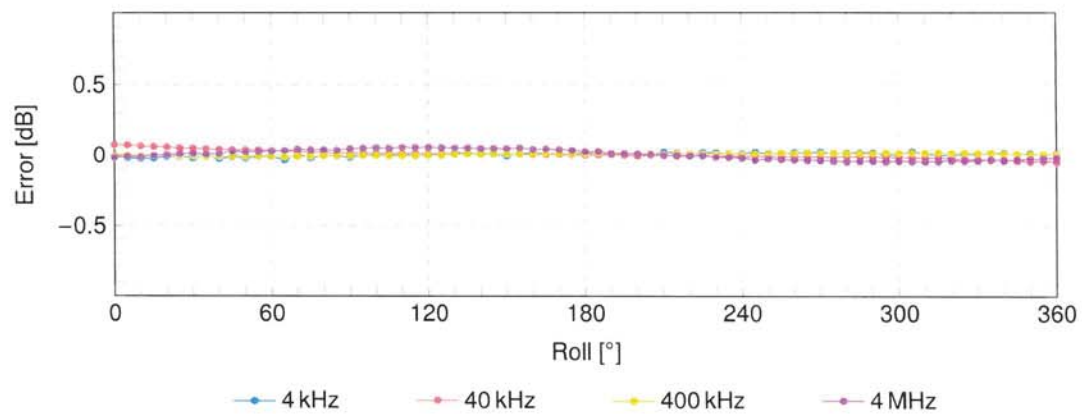
H-Field Receiving Pattern (ϕ), $\vartheta = 90^\circ$



H-Field Receiving Pattern (ϕ), $\vartheta = 0^\circ$



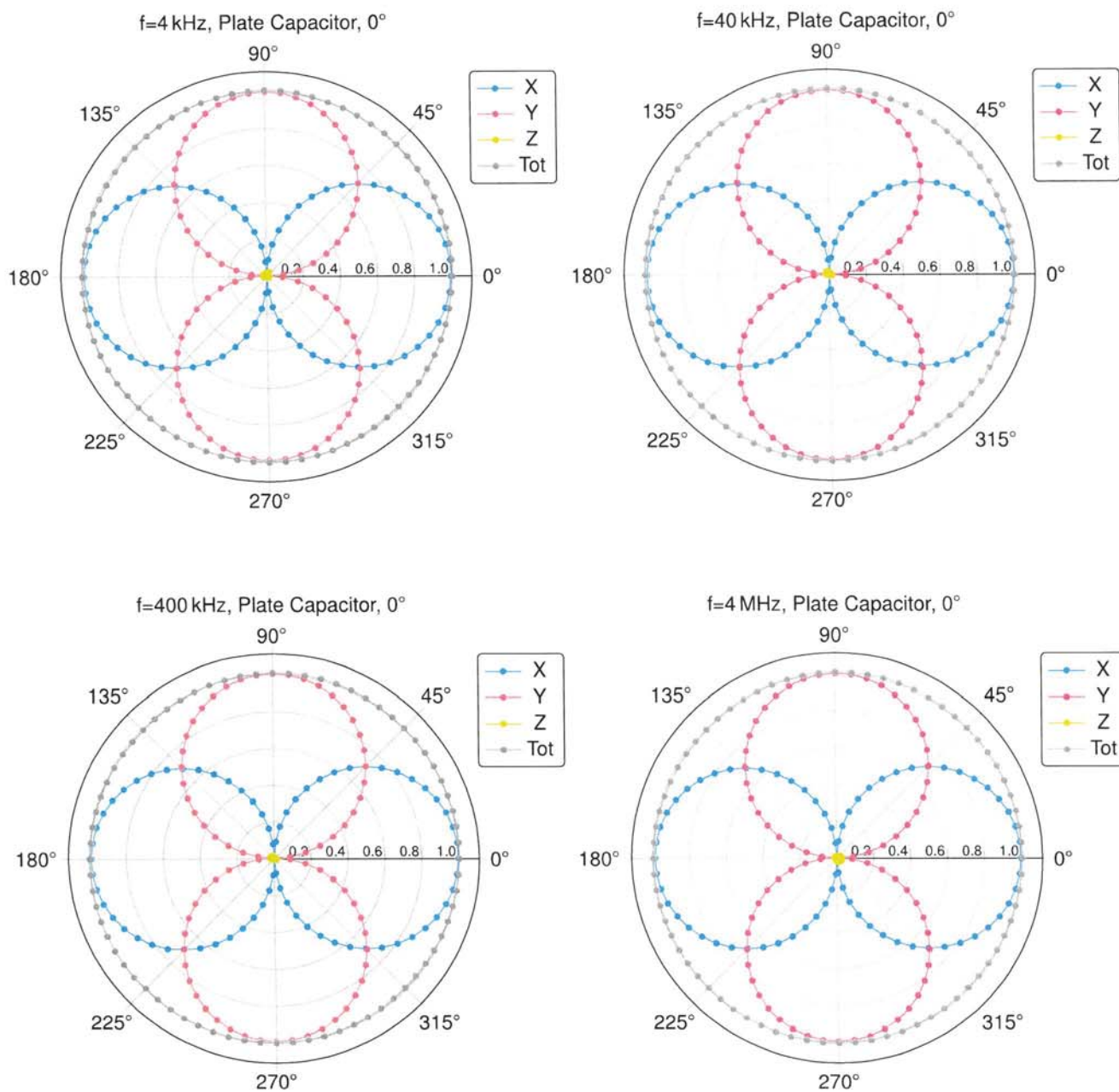
H-Field Receiving Pattern (ϕ), $\vartheta = 90^\circ$



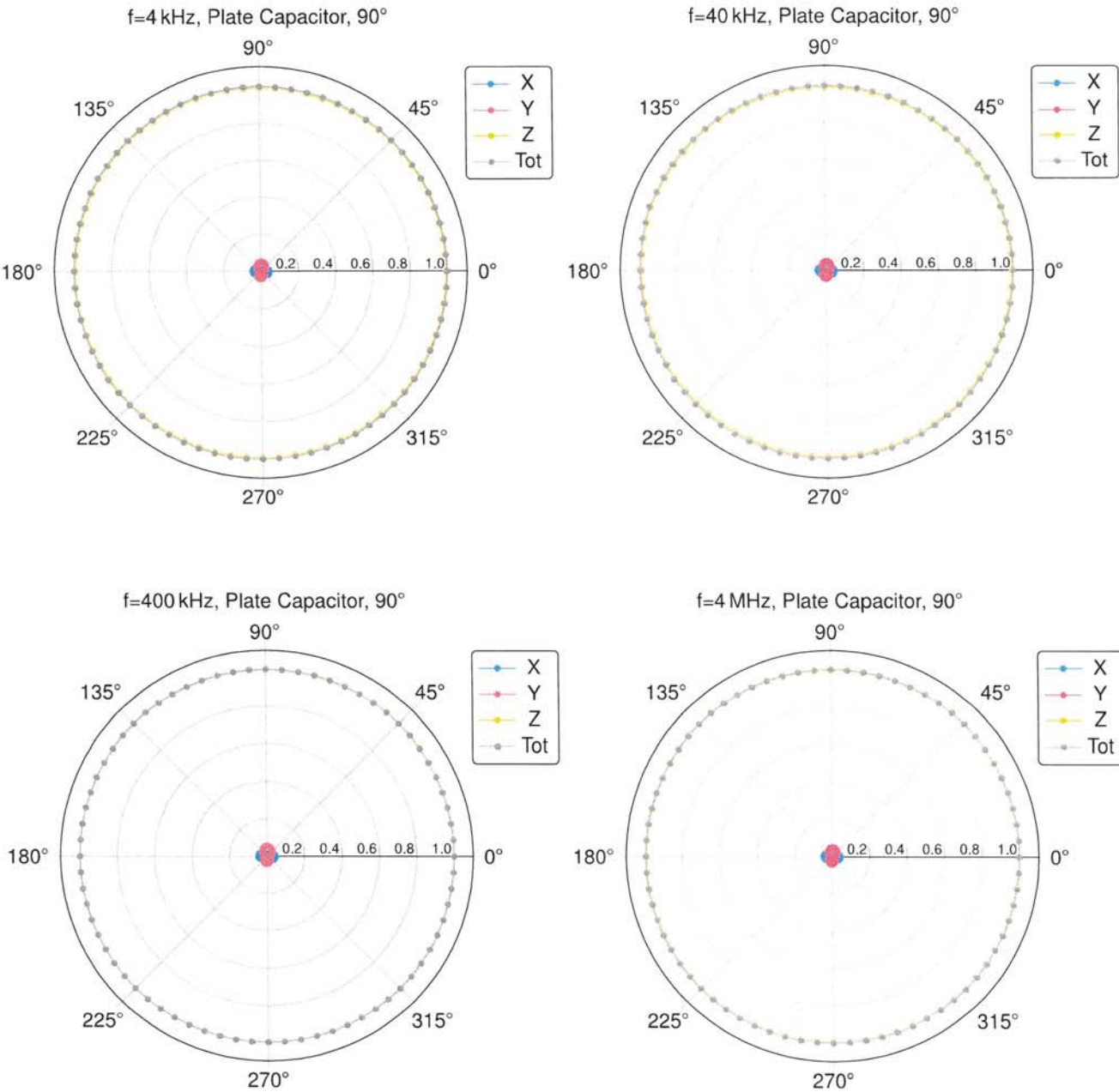
SPEAG axial deviation from the ideal response tolerance for H-field: ± 0.6 dB

Isotropy E-Field

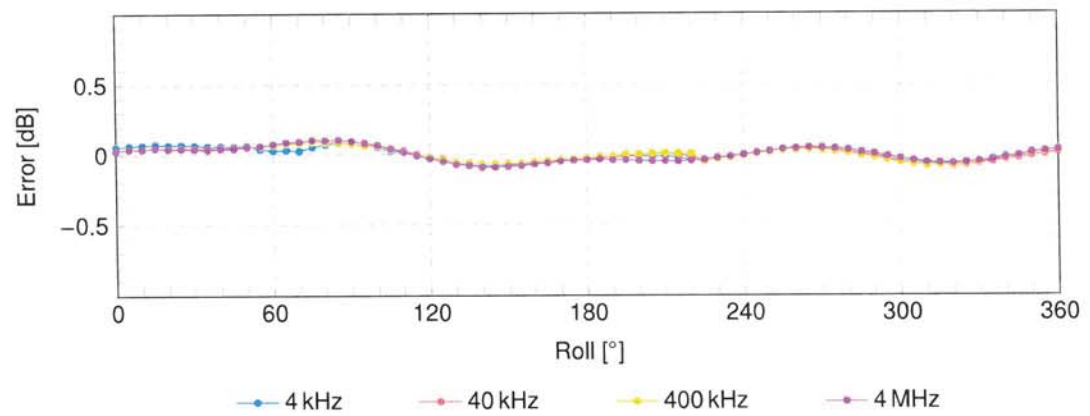
E-Field Receiving Pattern (ϕ), $\vartheta = 0^\circ$



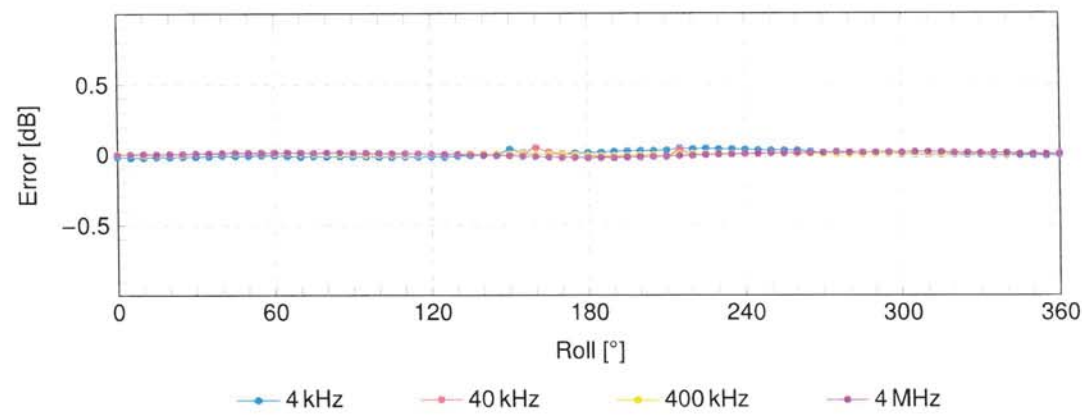
E-Field Receiving Pattern (ϕ), $\vartheta = 90^\circ$



E-Field Receiving Pattern (ϕ), $\vartheta = 0^\circ$



E-Field Receiving Pattern (ϕ), $\vartheta = 90^\circ$



SPEAG axial deviation from the ideal response tolerance for E-field: $\pm 0.8\text{dB}$



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **Cetecom Advanced**
Saarbrücken, Germany

Certificate No. **V-Coil50/400-1021_Oct24**

CALIBRATION CERTIFICATE

Object **V-Coil50/400V2 - SN: 1021**

Calibration procedure(s) **QA CAL-47.v13**
Calibration Procedure for WPT Verification & Validation Sources

Calibration date: **October 31, 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
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Calibrated by:	Name	Function	Signature
	Jingtian Xi	Project Leader	
Approved by:	Name	Function	Signature
	Sven Kühn	Technical Manager	

Issued: November 6, 2024

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



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Multilateral Agreement for the recognition of calibration certificates

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: 125 mm, y: 125 mm, z: 36.7 mm
	Grid resolutions	dx, dy, dz: 7.33 mm
Nominal frequency	400 kHz	

Calibrated Quantities

Distance (relative to source surface) (mm)	Peak H-field (A/m)	Uncertainty (k=2) (dB)
0	283	1.13
2	248	1.13

Appendix (Additional assessments outside the scope of SCS 0108)

Peak values of induced fields¹

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	2.84	4.48	4.60	4.59	7.95	3.96
2	2.42	3.88	4.00	3.99	5.82	2.94

Voltage measurement

Total voltage (V)	Voltages at harmonics (dBc)
0.413	Highest harmonic: -21.5 2 nd highest harmonic: -31.4

¹ determined for a virtual half-space phantom with tissue properties $\epsilon_r = 55$, $\sigma = 0.75$ S/m, $\rho = 1000$ kg/m³ and a 2 mm thick phantom shell

Measurement report

cDASY6 Module WPT Measurement Report

Device under test

Info:
V-Coil50/400

Serial number:
1021

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: -186.16 mm, y: -319.40 mm, z: 36.77 mm

Dimensions:
x: 125.0 mm, y: 124.0 mm, z: 36.6 mm

Resolution:
x: 7.33 mm, y: 7.33 mm, z: 7.33 mm

Completed on:
2024/10/31 14:36:18

Measurement results

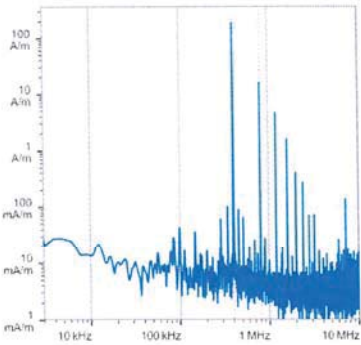
Maximum H-field [RMS]:
MAGNITUDE: 137.67 A/m
x: 29.15 A/m, y: 13.24 A/m, z: 133.90 A/m

Maximum H-field location relative to DUT:
x: -3.67 mm, y: 3.67 mm, z: 8.50 mm

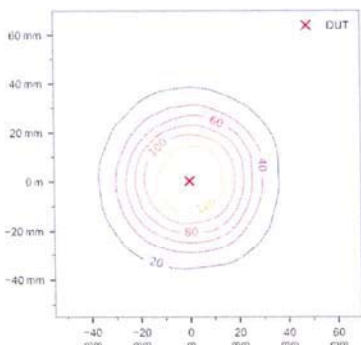
Distance to -20.0 dB boundary:
37.39 mm

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 homogeneous phantom at the peak frequency (f = 400.00 kHz, $\sigma = 0.750\text{ S/m}$, tissue density = 1.000 kg/m^3)

	Peak incident fields [RMS]	Peak E _{ind} [V/m, RMS]			Peak J _{ind} [A/m ² , RMS]	psSAR [mW/kg]		H-field extent	Warnings		
Distance [mm]	H _{inc} [A/m]	Cube avg.	Local	Line avg.	Surface avg.	1g avg.	10g avg.	-20 dB radius [mm]	Sign	Vector potential	Boundary effect
0.00	283	4.48	4.60	4.59	2.84	7.95	3.96	39.0	1%	7%	23%
2.00	248	3.88	4.00	3.99	2.42	5.82	2.94	39.2	1%	7%	26%

Compliance evaluation (Field values at the peak frequency) (f = 400.00 kHz,)

Distance [mm]	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]	
	pH _{inc} [A/m]	pE _{ind} [V/m]	psSAR [mW/kg]	pH _{inc} [A/m]	pJ _{ind} [A/m ²]	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	283	4.48	3.96	283	2.84	3.96	283	4.59	3.96	283	N/A	7.95	283	4.60	7.95
2.00	248	3.88	2.94	248	2.42	2.94	248	3.99	2.94	248	N/A	5.82	248	4.00	5.82

Compliance evaluation (Exposure ratios) (ratios in dB)

Distance [mm]	ICNIRP 2010/2020			ICNIRP 1998			IEEE 2019			FCC			HC Code 6		
	RL	BR		RL	BR		ERL	DRL		MPE	BR		RL	BR	
	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
0.00	NS	TH	NS	TH	NS	TH	NS	TH	NS	TH	NS	TH	NS	TH	NS
0.00	22.6	27.3	-21.6	-27.0	43.8	11.0	-27.0	4.79	9.85	-25.2	-27.0	44.8	N/A	-23.0	9.95
2.00	21.5	26.1	-22.9	-28.3	42.7	9.62	-28.3	3.65	8.71	-26.4	-28.3	43.7	N/A	-24.4	8.81

Document generated at 2024/10/31 15:05:37, simulation performed at 2024/10/31 14:39:20 using Sim4Life version 8.0.1.15446



Annex D

Appendix No.: 1-8140-24-01-05_TR2-A301-R01 – SAR 13 MHz

Testing Laboratory

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66117 Saarbruecken/Germany
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Fax: + 49 681 5 98 - 9075
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e-mail: mail@cetecomadvanced.com

Appendix with Calibration data, Phantom certificate and system check information

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2 Calibration report "Probe EX3DV4" – SN: 3944

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



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client: **Cetecom Advanced**
Saarbrücken, Germany

Certificate No. **EX-3944_May24**

CALIBRATION CERTIFICATE

Object: **EX3DV4 - SN:3944**

Calibration procedure(s): **QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6,
QA CAL-25.v8**
Calibration procedure for dosimetric E-field probes

Calibration date: **May 21, 2024**

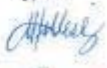
This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3) °C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	26-Mar-24 (No. 217-04036/04037)	Mar-25
Power sensor NRP-Z91	SN: 103244	26-Mar-24 (No. 217-04036)	Mar-25
OCP DAK 3.5 (weighed)	SN: 1249	05-Oct-23 (OCP-DAK3.5-1249_Oct23)	Oct-24
OCP DAK-12	SN: 1016	05-Oct-23 (OCP-DAK12-1016_Oct23)	Oct-24
Reference 20 dB Attenuator	SN: CC2552 (20x)	26-Mar-24 (No. 217-04046)	Mar-25
DAE4	SN: 660	23-Feb-24 (No. DAE4-660_Feb24)	Feb-25
Reference Probe EX3DV4	SN: 7349	03-Nov-23 (No. EX3-7349_Nov23)	Nov-24

Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
RF generator HP 8648C	SN: US3642U01790	04-Aug-99 (in house check Jun-22)	In house check: Jun-24
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by	Joanna Lleshaj	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			Issued: May 21, 2024

Certificate No: EX-3944_May24

Page 1 of 22

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



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S Swiss Calibration Service

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Accreditation No.: SCS 0108

Glossary

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\theta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices – Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,y,z}: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORM_x (no uncertainty required).

EX3DV4 - SN:3944

May 21, 2024

Parameters of Probe: EX3DV4 - SN:3944**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k = 2)
Norm ($\mu V/(V/m)^2$) ^A	0.56	0.61	0.42	$\pm 10.1\%$
DCP (mV) ^B	101.2	100.7	103.8	$\pm 4.7\%$

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB $\sqrt{\mu V}$	C	D dB	VR mV	Max dev.	Max Unc ^E k = 2
0	CW	X	0.00	0.00	1.00	0.00	120.8	$\pm 1.2\%$	$\pm 4.7\%$
		Y	0.00	0.00	1.00		140.7		
		Z	0.00	0.00	1.00		132.3		
10352	Pulse Waveform (200Hz, 10%)	X	20.00	92.22	21.58	10.00	60.0	$\pm 2.8\%$	$\pm 9.6\%$
		Y	20.00	95.34	24.11		60.0		
		Z	20.00	88.49	19.00		60.0		
10353	Pulse Waveform (200Hz, 20%)	X	20.00	93.54	21.35	6.99	80.0	$\pm 1.3\%$	$\pm 9.6\%$
		Y	20.00	96.76	23.72		80.0		
		Z	20.00	90.18	18.75		80.0		
10354	Pulse Waveform (200Hz, 40%)	X	20.00	97.85	22.29	3.98	95.0	$\pm 1.3\%$	$\pm 9.6\%$
		Y	20.00	100.95	24.31		95.0		
		Z	20.00	95.11	19.91		95.0		
10355	Pulse Waveform (200Hz, 60%)	X	20.00	104.86	24.40	2.22	120.0	$\pm 1.3\%$	$\pm 9.6\%$
		Y	20.00	107.27	25.87		120.0		
		Z	20.00	104.43	23.13		120.0		
10387	QPSK Waveform, 1 MHz	X	1.80	66.91	15.59	1.00	150.0	$\pm 1.7\%$	$\pm 9.6\%$
		Y	1.86	66.18	15.41		150.0		
		Z	1.74	67.60	15.67		150.0		
10388	QPSK Waveform, 10 MHz	X	2.40	69.03	16.30	0.00	150.0	$\pm 1.1\%$	$\pm 9.6\%$
		Y	2.48	68.88	16.09		150.0		
		Z	2.29	68.83	16.27		150.0		
10396	64-QAM Waveform, 100 kHz	X	2.88	70.10	18.58	3.01	150.0	$\pm 0.8\%$	$\pm 9.6\%$
		Y	3.44	71.76	19.29		150.0		
		Z	2.68	70.61	18.96		150.0		
10399	64-QAM Waveform, 40 MHz	X	3.50	67.04	15.80	0.00	150.0	$\pm 0.7\%$	$\pm 9.6\%$
		Y	3.56	67.02	15.73		150.0		
		Z	3.42	66.95	15.75		150.0		
10414	WLAN CCDF, 64-QAM, 40 MHz	X	4.84	65.46	15.46	0.00	150.0	$\pm 1.7\%$	$\pm 9.6\%$
		Y	4.98	65.49	15.44		150.0		
		Z	4.71	65.48	15.44		150.0		

Note: For details on UID parameters see Appendix

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%.

^A The uncertainties of Norm X,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

^B Linearization parameter uncertainty for maximum specified field strength.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

EX3DV4 - SN:3944

May 21, 2024

Parameters of Probe: EX3DV4 - SN:3944**Sensor Model Parameters**

	C1 fF	C2 fF	α V^{-1}	T1 $ms V^{-2}$	T2 $ms V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
x	48.0	354.19	34.89	21.26	0.00	5.10	0.82	0.29	1.00
y	60.0	446.35	35.30	22.00	0.60	5.10	1.36	0.38	1.01
z	38.9	283.55	34.06	12.14	0.00	5.03	1.54	0.02	1.00

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	-1.5°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Note: Measurement distance from surface can be increased to 3–4 mm for an Area Scan job.

EX3DV4 - SN:3944

May 21, 2024

Parameters of Probe: EX3DV4 - SN:3944**Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc (k = 2)
6	55.0	0.75	19.60	19.60	19.60	0.00	1.25	±13.3%
13	55.0	0.75	17.78	17.78	17.78	0.00	1.25	±13.3%
450	43.5	0.87	11.15	11.15	11.15	0.16	1.30	±13.3%
600	42.7	0.88	10.66	10.66	10.66	0.10	1.25	±13.3%
750	41.9	0.89	9.17	10.02	9.43	0.37	1.27	±11.0%
850	41.5	0.92	8.97	9.49	9.29	0.37	1.27	±11.0%
900	41.5	0.97	8.87	9.68	8.85	0.37	1.27	±11.0%
1450	40.5	1.20	8.07	8.52	8.27	0.35	1.27	±11.0%
1640	40.2	1.31	7.84	8.44	8.15	0.32	1.27	±11.0%
1750	40.1	1.37	7.79	8.41	8.04	0.25	1.27	±11.0%
1900	40.0	1.40	7.67	8.22	7.88	0.28	1.27	±11.0%
2150	39.7	1.53	7.51	8.03	7.70	0.29	1.27	±11.0%
2300	39.5	1.67	7.41	7.90	7.59	0.29	1.27	±11.0%
2450	39.2	1.80	7.33	7.85	7.49	0.29	1.27	±11.0%
2600	39.0	1.96	7.21	7.68	7.33	0.26	1.27	±11.0%
3300	38.2	2.71	6.67	7.09	6.76	0.34	1.27	±13.1%
3500	37.9	2.91	6.59	7.02	6.67	0.34	1.27	±13.1%
3700	37.7	3.12	6.52	6.94	6.61	0.35	1.27	±13.1%
5200	36.0	4.66	5.34	5.65	5.36	0.36	1.51	±13.1%
5300	35.9	4.76	5.20	5.41	5.09	0.39	1.55	±13.1%
5500	35.6	4.96	4.78	5.04	4.78	0.41	1.61	±13.1%
5600	35.5	5.07	4.62	4.88	4.61	0.39	1.73	±13.1%
5800	35.3	5.27	4.67	4.85	4.61	0.41	1.78	±13.1%

^C Frequency validity above 300 MHz of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ±10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4–9 MHz, and ConvF assessed at 13 MHz is 9–19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

^F The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10% if SAR correction is applied.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz and below ±2% for frequencies between 3–6 GHz at any distance larger than half the probe tip diameter from the boundary.

EX3DV4 - SN:3944

May 21, 2024

Parameters of Probe: EX3DV4 - SN:3944**Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc (k = 2)
6500	34.5	6.07	5.58	5.79	5.53	0.20	1.27	±18.6%

^C Frequency validity at 6.5 GHz is $-600/+700$ MHz, and ± 700 MHz at or above 7 GHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ' and σ by less than $\pm 10\%$ from the target values (typically better than $\pm 6\%$) and are valid for TSL with deviations of up to $\pm 10\%$.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than $\pm 1\%$ for frequencies below 3 GHz; below $\pm 2\%$ for frequencies between 3–6 GHz; and below $\pm 4\%$ for frequencies between 6–10 GHz at any distance larger than half the probe tip diameter from the boundary.