The probe is connected with a phase and amplitude stable cable to a VNA which is then calibrated with Open, Short and a Liquid with well-known parameters.
All parts in the setup influencing the amplitude and phase of the signal are important and shall remain stable.

Handling of the item

Before usage, the active probe area has to be cleaned from any material residuals potentially contaminating the reference standards. The metal and dielectric surface must be protected to keep the precision of the critical mechanical dimensions. The connector and cable quality are critical; any movements between calibration and measurement shall be avoided.
The temperature must be stable and must not differ from the material temperature.

Methods Applied and Interpretation of Parameters

The calibration of the dielectric probe system is done in the steps described below for the desired frequency range and calibration package (SAR/MRI liquids, Semi-solid/solid material). Because the standard calibration in step 3 is critical for the results in steps 4 to 8, the sequence 3 to 8 is repeated 3 times. As a result, the result from these 3 sets is represented.

1. Configuration and mechanical / optical status.
2. Measurement resolution is 5 MHz from 10 to 300 MHz, 50 MHz from 300 to 6000 MHz and 250 MHz from 6 to 20 GHz.
3. Standard calibration uses Air / Short / Liquid. 1 liter liquid quantity is used to reduce the influence the reflections. The liquid type is selected depending on the lowest frequency and probe diameter:
   DAK-1.2, DAK-3.5, Agilent OCP: de-ionized water (approx. 22 °C)
   DAK-12: saline solution with static conductivity 1 S/m (approx. 22 °C)
   NPL OCP: pure ethanol (approx. 22 °C)
4. The cable used in the setup stays in a fixed position, i.e. the probe is fixed and measuring from the top in an angle of typ. 20° from the vertical axis. For DAK and Agilent probes, the refresh function (air standard) is used previous to the individual measurements in order to compensate for possible deviations from cable movements. After insertion of the probe into a liquid, the possible air bubbles are removed from the active surface.
5. Measurement of multiple shorts if not already available from the calibration in the previous step (NPL). Evaluation of the deviation from the previous calibration short with graphical representation of the complex quantities and magnitude over the frequency range. Probe specific short is used. This assessment shows ability to define a short circuit at the end of the probe for the VNA calibration in the setup which is essential at high frequencies and depends on the probe surface quality.
6. Measurement of validation liquids in a quantity of 1 liter at well defined temperature. Evaluation of the deviations from the target. The targets base on traceable data from reference sources. The deviation of the measurement is graphically presented for permittivity and conductivity (for lossy liquids) or loss tangent (for low losses at low frequencies).
7. Measurement of lossy liquids in a quantity of 1 liter at well defined temperature. Head tissue simulating liquid or saline solution with 0.5 S/m static conductivity are representative. The target data base on traceable data from reference sources or from multiple measurements with precision reference probes or different evaluations such as transmission line or slotted line methods. Evaluation of the deviation from the target and graphical representation for permittivity and conductivity over the frequency range
8. Semi-solid / solid material calibration:
   Measurements of an elastic lossy broadband semi-solid gel with parameters close to the head tissue target. Measurements of a planar very low loss solid microwave-substrate. The average of 4 measurements of the same sample at different location is shown as a single result. The deviation of the permittivity and conductivity from the reference data is evaluated.
   Measurements of a planar very low loss solid microwave-substrate. The average of 4 measurements of the same sample at different location is shown as a single result. The relative deviation of the permittivity and the absolute deviation of the loss tangent is evaluated.
   The targets base on multiple measurements (on the same material batch at identical temperature) on convex and planar surfaces with precision reference OCP.

The measurement on semi-solid / solid materials is sensitive to the quality and planarity of the probe contact area, such as air gaps due to imperfect probes (resulting lower permittivity values).

9. Table for the probe uncertainty: The uncertainty of the probe depending on probe type, size, material parameter range and frequency is given in a table. It represents the best measurement capability of the specific probe but does not include the material (deviation from the target values).
10. Appendix with detailed results of all measurements with the uncertainties for the specific measurement. In addition to the probe uncertainty (see above), it includes the uncertainty of the reference material used for the measurement. A set of results from independent calibrations represents the capability of the setup and the lossy materials used, including the precision of the measured material and the influence of temperature deviations. Temperature and operator influence was minimized and gives a good indication of the achievable repeatability of a measurement.
11. Summary assessment of the measured deviations and detailed comments if not typical for the probe type.

Dielectric probe identification and configuration data

Item description

Probe type	**OCP** Open-ended coaxial probe
Probe name	SPEAG Dielectric Assessment Kit DAK-3.5
Type No	**SM DAK 040 CA**
Serial No	**1363**
Description	Open-ended coaxial probe with flange Flange diameter: 19.0 mm Dielectric diameter: 3.5 mm Material: stainless steel
Connector 1	PC 3.5 pos.
Software version	**DAK Measurement Solver 3.0.6.34** Calibration Type: Air / short / water (set to measured water temp.) Probe type: "DAK3.5" (software setting)
Further settings	VNA bandwidth setting: 50 Hz

SCS 0108 Accessories used for customer probe calibration

Cable	Huber & Suhner Sucoflex 100, SN: 512046/126, length 1 m, PC3.5 neg. – PC3.5 neg.
Short	DAK-3.5 shorting block, type SM DAK 200 BA Contact area covered with cleaned Cu stripe

Additional items used during measurements

Adapter 1	PC3.5 pos. – PC1.85 (VNA side)
Adapter 2	PC3.5 pos. – PC3.5 neg. (probe side)

Notes

- Before the calibration, the connectors of the probe and cable were inspected and cleaned.
- Probe visual inspection: according to requirements
- Short inspection: according to the requirements

Probe Uncertainty

The following tables provide material and frequency specific uncertainties (k=2) for the dielectric probe. The values in the tables represent the measurement capability for the probe when measuring a material in the indicated parameter range. They include all uncertainties of

- probe system
- possible systematic errors due to the design
- calibration
- temperature differences during the calibration and measurements, as described,
- VNA noise

Apart from the material used for the calibration (de-ionized water), material uncertainties of the reference materials used during the measurement in Appendix A are not included in these tables.

DAK-3.5				
Permittivity range		Frequency range	(sigma / LT range)	Unc. (k=2)
	1 – 15	200 MHz - 3 GHz	LT < 0.1	2.4%
		3 GHz - 6 GHz	LT < 0.1	2.0%
		6 GHz - 20 GHz	LT < 0.1	2.1%
		6 GHz - 20 GHz	sigma > 1	3.5%
	10 – 40	200 MHz - 3 GHz	sigma : 1 – 10 S/m	1.9%
		3 GHz - 6 GHz	sigma : 1 – 10 S/m	2.3%
		6 GHz - 20 GHz	sigma > 10 S/m	3.5%
	35 – 100	200 MHz - 3 GHz	sigma : 1 – 10 S/m	1.8%
		3 GHz - 6 GHz	sigma : 1 – 10 S/m	1.9%
		6 GHz - 20 GHz	sigma > 10 S/m	2.4%
Conductivity range (S/m)		Frequency range	(epsilon / LT range)	Unc. (k=2)
	1 – 10	200 MHz - 3 GHz	eps : 35 - 100	2.7%
		3 GHz - 6 GHz	eps : 35 - 100	3.0%
		6 GHz - 20 GHz	eps : 10 - 40	3.0%
Loss tangent range		Frequency range	(epsilon / LT range)	Unc. (k=2)
	< 0.1	200 MHz - 3 GHz	eps : 1 - 15	0.03
		3 GHz - 6 GHz	eps : 1 - 15	0.03
		6 GHz - 20 GHz	eps : 1 - 15	0.03

Calibration Results

Uncertainty limits (k=2) for the material measurements in the figures of Appendix A are represented with red dashed lines. These uncertainties contain - in addition to probe uncertainty - the uncertainty of the material target parameter determination.
The measurements show the results obtained from independent calibrations for the same material. The differences between the individual measurement curves give therefore an indication for the obtainable repeatability and shall lie within the uncertainties stated in the tables.

Materials for DAK-3.5 calibration:
Appendix A with curves for Ethanol, HBBL, and 0.05 mol/L NaCl solution (200 MHz - 6 GHz, optional 20 GHz), HS gel and low loss solid substrate are optional.*

** Effective immediately, methanol will be replaced with the safer and more environmentally-friendly ethanol as the validation liquid. Each batch of ethanol is calibrated using a methanol reference, ensuring that the validation process is both traceable and consistent with prior measurements.*

Appendix A: Detailed Results

A.1 Probe appearance and calibration sequence

A.1.1 Appearance

The OCP appearance is fully according to the expectations:
- the flange surface is intact

A.1.2 Calibration sequence

The following sequence was repeated 3 times in the low frequency range from 200 – 300 MHz in 5 MHz steps and in the high frequency range from 300 to 6000 MHz in 50 MHz steps, and from 6 GHz to 20 GHz in 250 MHz steps.

- Air
- Short 1 short, then immediate verification with a second short (with eventual repetition)
- Water De-ionized water, temperature measured and set in the software (for DAK-12 0.1 mol/L saline solution, temperature measured and set in the software)
- Methanol Pure methanol, temperature measured and set in the software
- Ethanol Pure ethanol, temperature measured and set in the software
- Liquids Measurement of further liquids (e.g. Head tissue simulating liquid and 0.05 mol/l saline)
- Cleaning Probe washed with water and isopropanol at the end of the sequence.
- Shorts 4 additional separate short measurements to determine the deviation from the original
- Refresh Refresh with Air
- Solid 4 separate solid low loss planar substrate measurements to determine one average (optional)
- Semisolid 4 separate head gel measurements on fresh intact surface to determine one average (optional)
- Cleaning Probe washed with water and isopropanol at the end of the sequence

Evaluation of the additional shorts from the calibrated (ideal) short point at the left edge of the Smith Chart, represented as magnitude over the frequency range (fig. 2.1.x) and in polar representation (fig. 2.2.x).

Evaluation of the Liquid measurements and representation of the permittivity and conductivity deviation from their reference data at the measurement temperature. The results of each of the 3 calibrations is shown in the appendix for each material (fig. 3ff) in black, red, blue. The red dashed line shows the uncertainty of the reference material parameter determination.

Evaluation of the Semisolid measurements (optional) by representing the 3 average deviations (each resulting from the 4 separate measurements per set), equivalent to the liquid measurement. Representation of the permittivity and conductivity deviation from their reference data at the nominal temperature.

Evaluation of the Solid measurements (optional) by representing the 3 average deviations (each resulting from the 4 separate measurements per set), equivalent to the liquid measurement. Representation of the permittivity deviation from their reference data and the loss tangent at the nominal temperature.

A.2 Short residual magnitudes

After each of the 3 calibrations with a single short (as per the DAK software), 4 additional separate, short measurements were performed after the liquid measurements and evaluated from the S11 data. The residuals in the graphs represent the deviation from the ideal short point on the polar representation on the VNA screen.

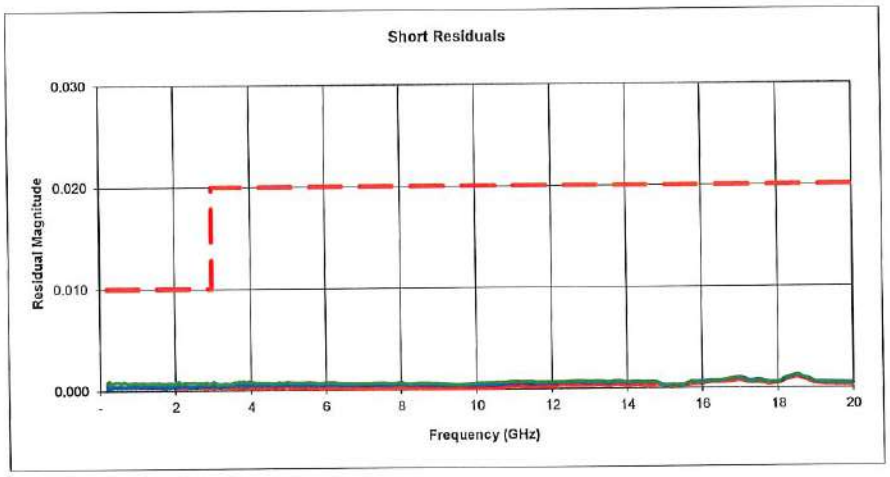

Fig. 2.1a Magnitude of the residual of the shorts, 200 MHz – 20 GHz, after calibration a)

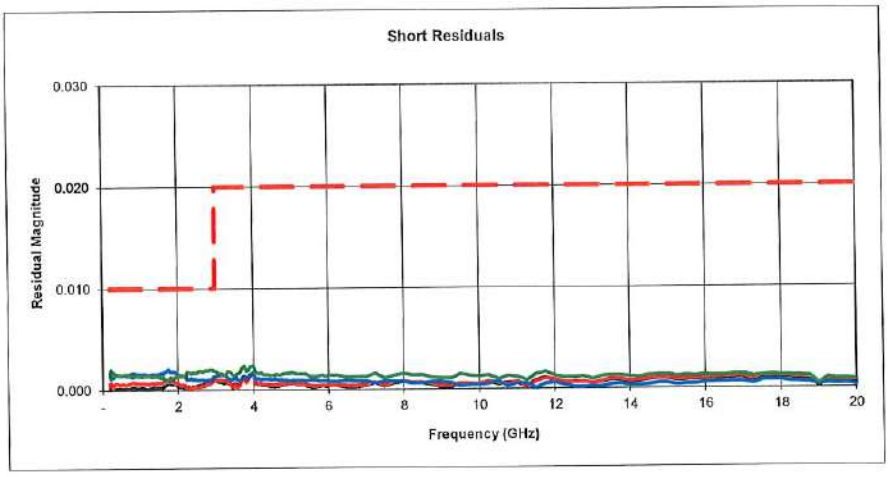

Fig. 2.1b Magnitude of the residual of the shorts, 200 MHz – 20 GHz, after calibration b)

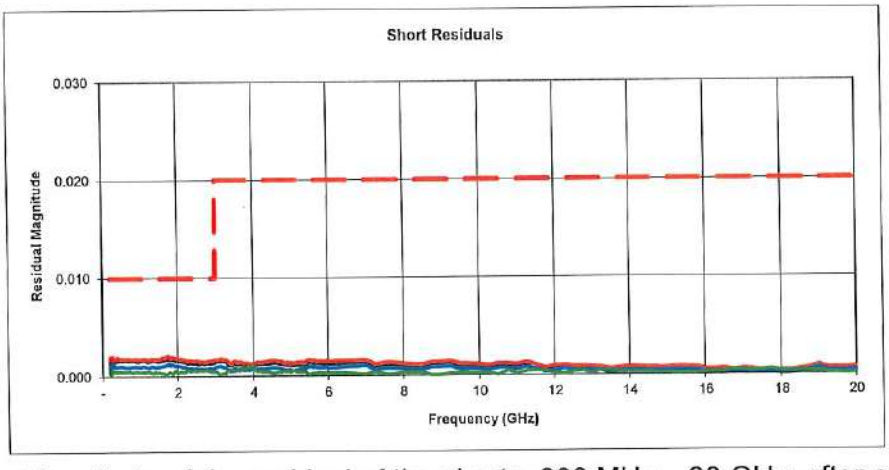

Fig. 2.1c Magnitude of the residual of the shorts, 200 MHz – 20 GHz, after calibration c)

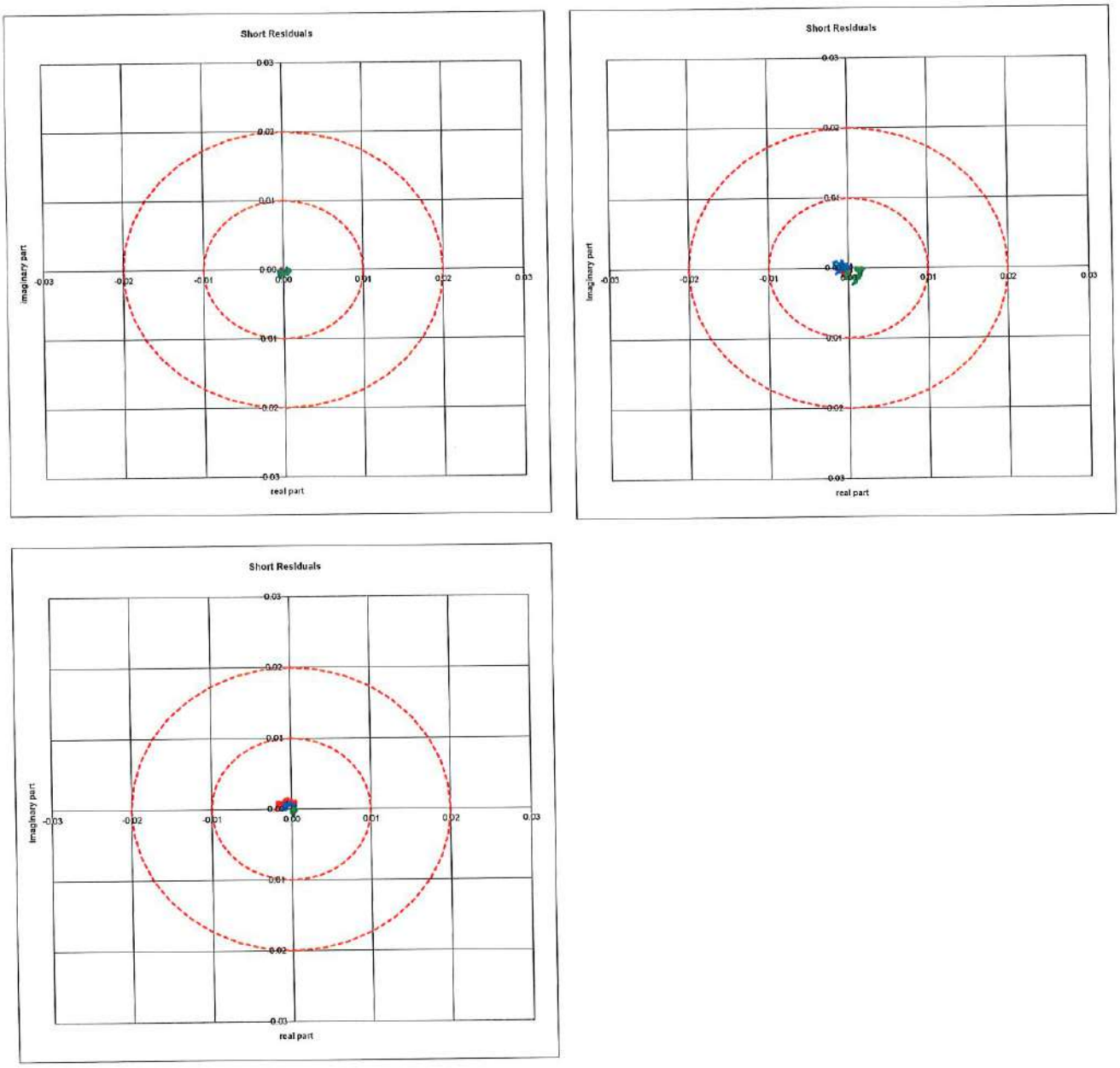

Fig. 2.2a-c Complex representation of the residuals of the shorts, 200 MHz - 20 GHz, after calibrations a)-b) in the top and c) in the bottom

All shorts have good quality. Some minor deviations might be visible from contact quality (left - right).

A.3 Ethanol

Ethanol (99.9% pure) was measured at a temperature of 22 +/- 2 °C. The liquid temperature was stabilized within 0.05 °C of the desired temperature. Deviations are presented relative to the reference data for this material. Those parameters have been evaluated from multiple measurements on the used bath with precision reference OCP and further methods. For the measurements the Noise Filter was activated in the software.

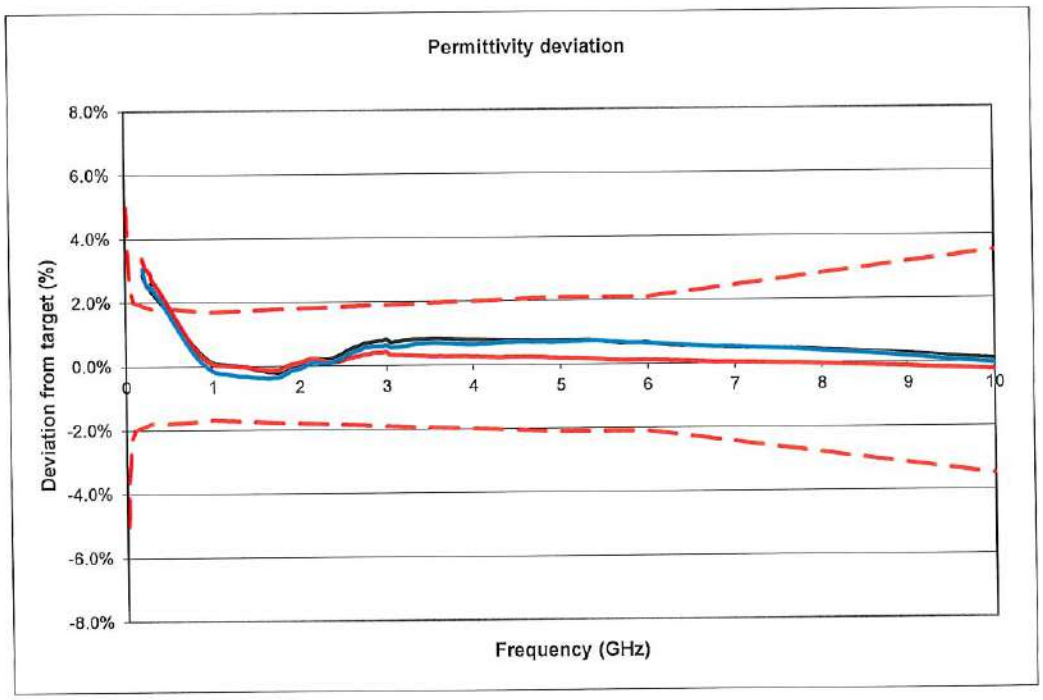

Fig. 3.1 Ethanol permittivity deviation from target, 200 MHz – 10 GHz

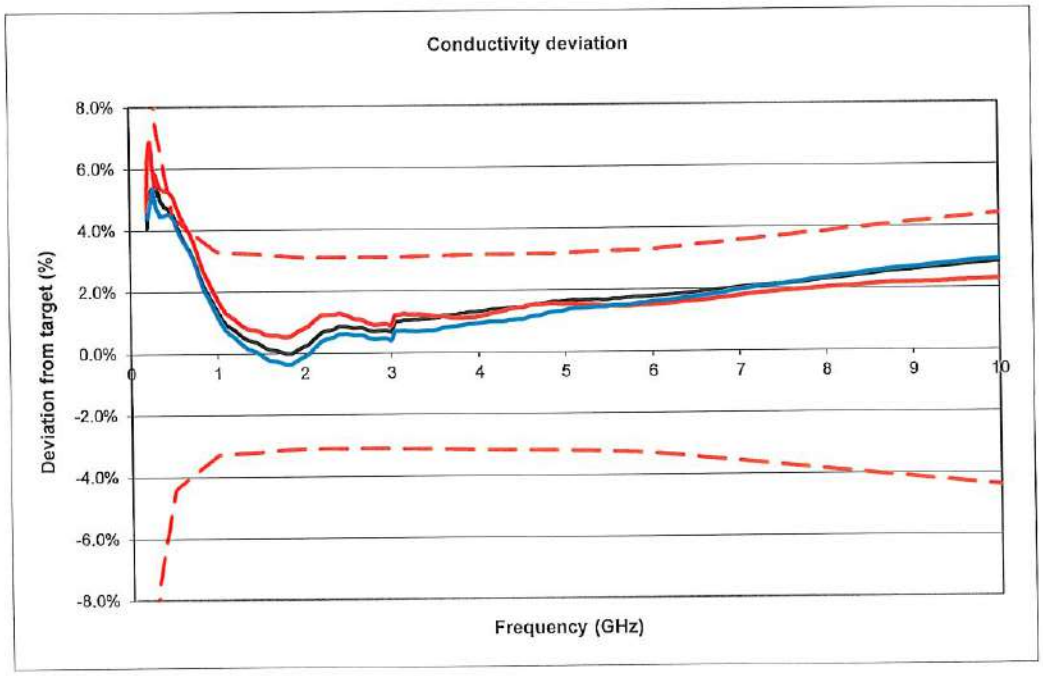

Fig. 3.2 Ethanol conductivity deviation from target, 200 MHz – 10 GHz

Note: Conductivity error can be high at low frequencies due to the low absolute conductivity values.

A.4 Head Tissue

Broadband head simulating liquid was measured at a temperature of 22 +/- 2 °C. The liquid temperature was stabilized within 0.05 °C of the desired temperature. Deviations are presented relative to the reference data for this material. Those parameters have been evaluated from multiple measurements on the used bath with precision reference OCP and further methods. For the measurements the Noise Filter was activated in the software.

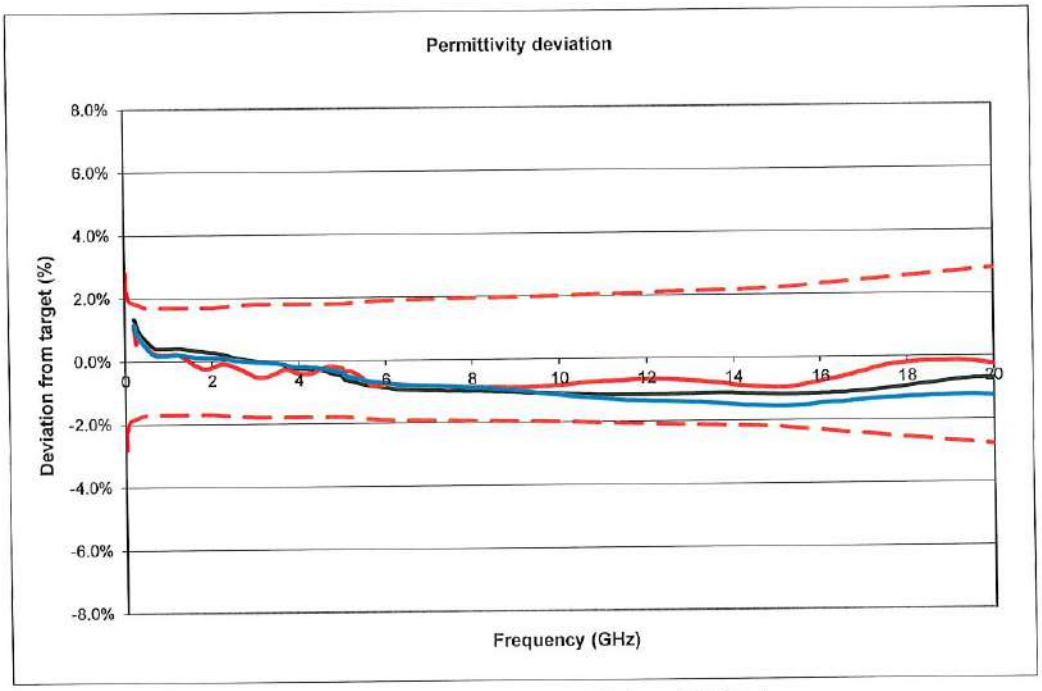

Fig. 4.1 HBBL permittivity deviation from target, 200 MHz – 20 GHz

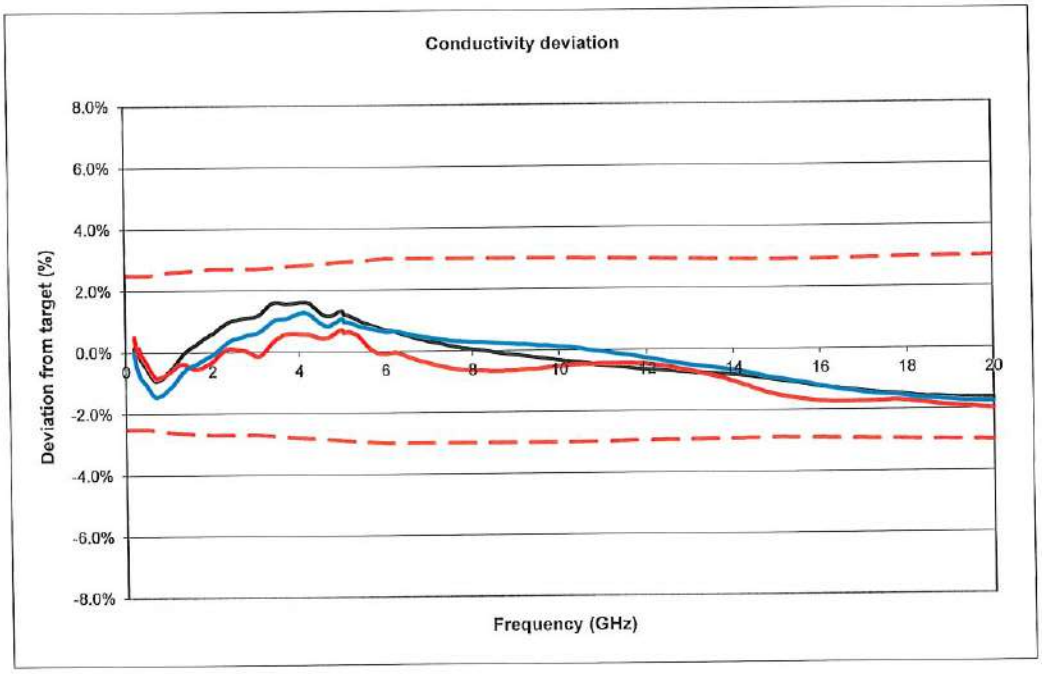

Fig. 4.2 HBBL conductivity deviation from target, 200 MHz – 20 GHz

A.5 0.05 mol/L NaCl solution

0.05 mol/L NaCl / water solution has a static conductivity of 0.5 S/m, similar to MRI HCL (High Conductivity Liquid). It was measured at a temperature of 22 +/- 2 °C. The liquid temperature was stabilized within 0.05 °C of the desired temperature. Deviations are presented relative to the reference data for this material. These parameters have been derived from the theoretical model according to [7], matched to the measurements from reference probes and other sources.
A quantity of 1 liter was used for the measurement. For the measurements the Noise Filter was activated in the software.

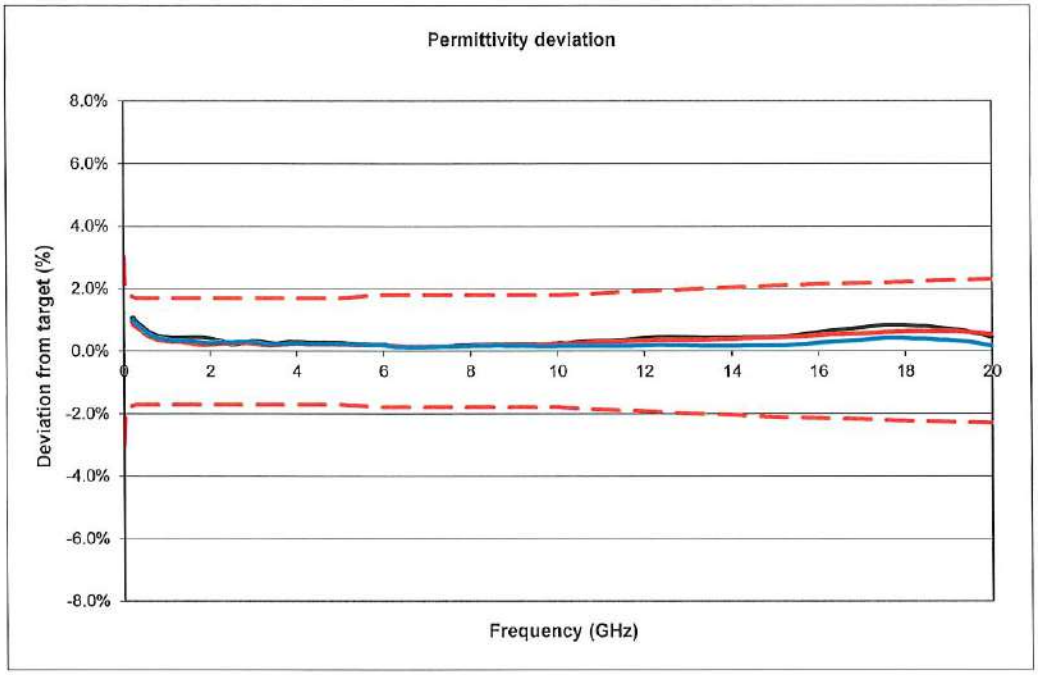

Fig. 5.1 0.05 mol/L solution permittivity deviation from target, 200 MHz – 20 GHz

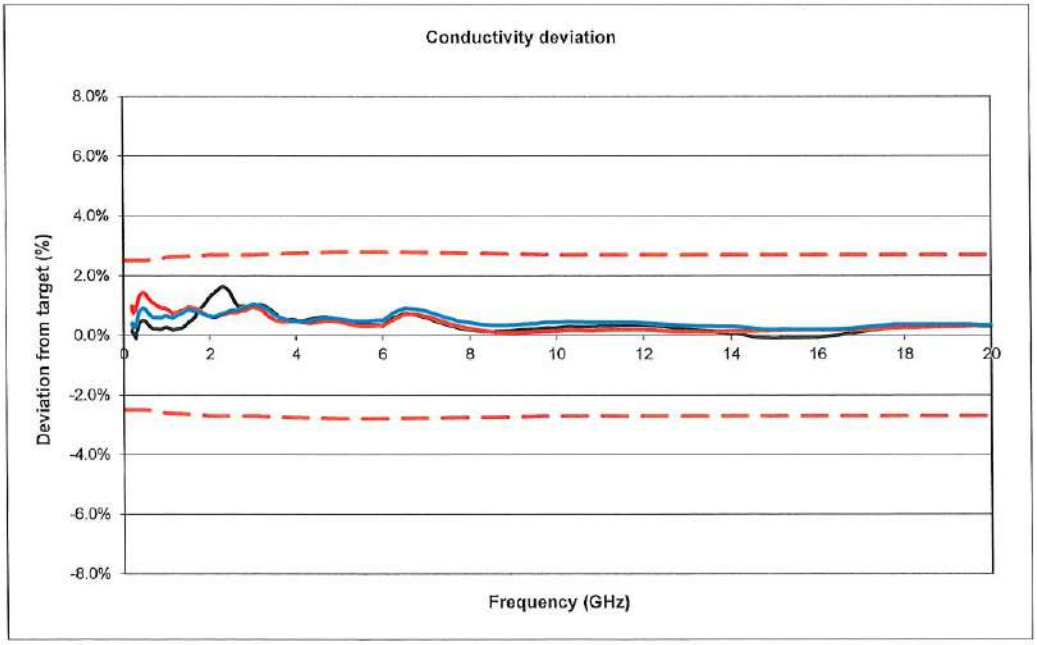

Fig. 5.2 0.05 mol/L solution conductivity deviation from target, 200 MHz – 20 GHz

Appendix B: Nominal parameters of reference materials used for calibration (additional assessments outside the scope of SCS0108)

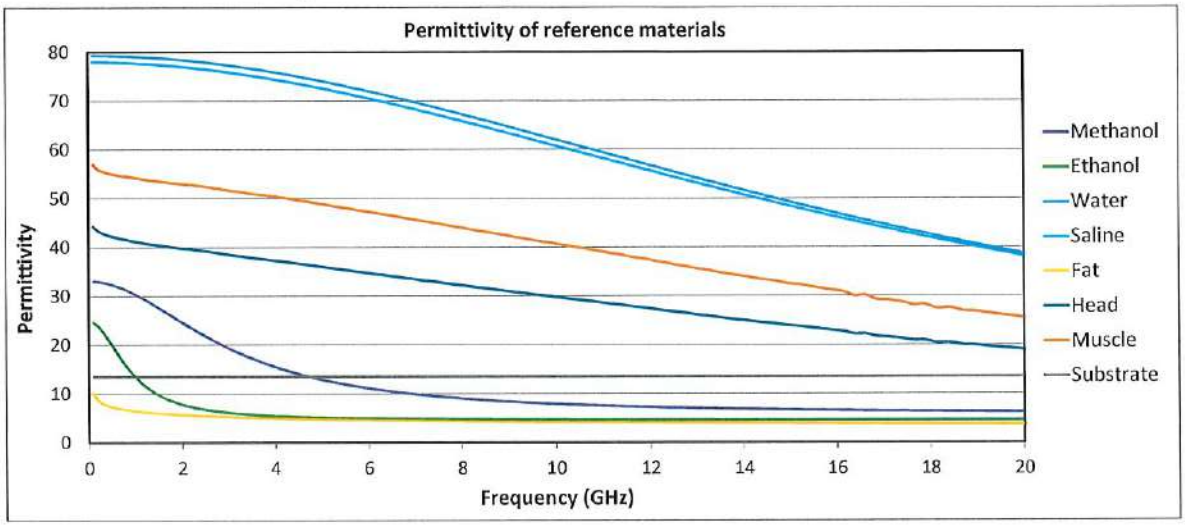

Fig. B.1 Permittivity of reference materials

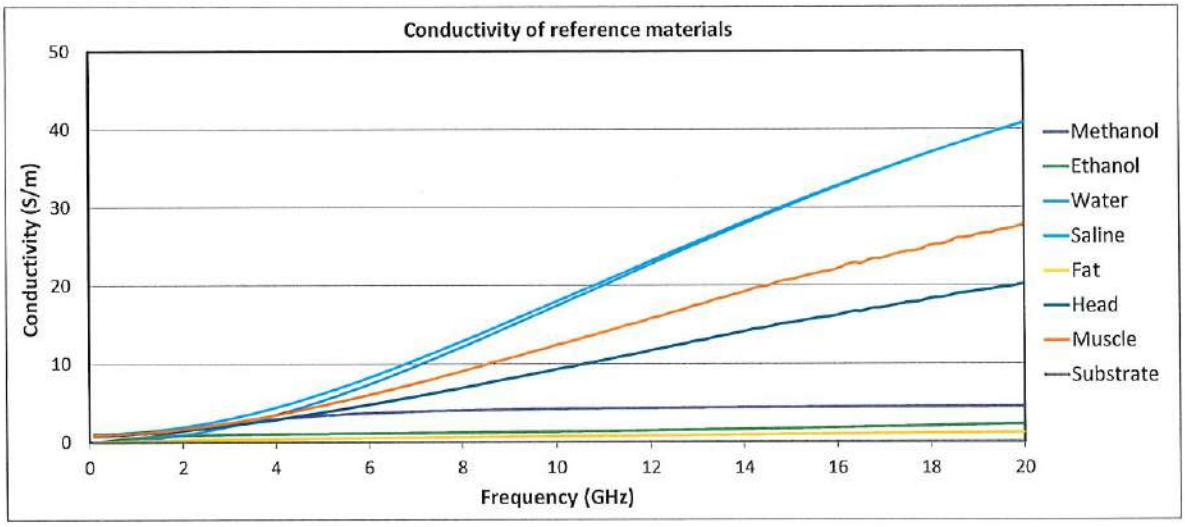

Fig. B.2 Conductivity of reference materials

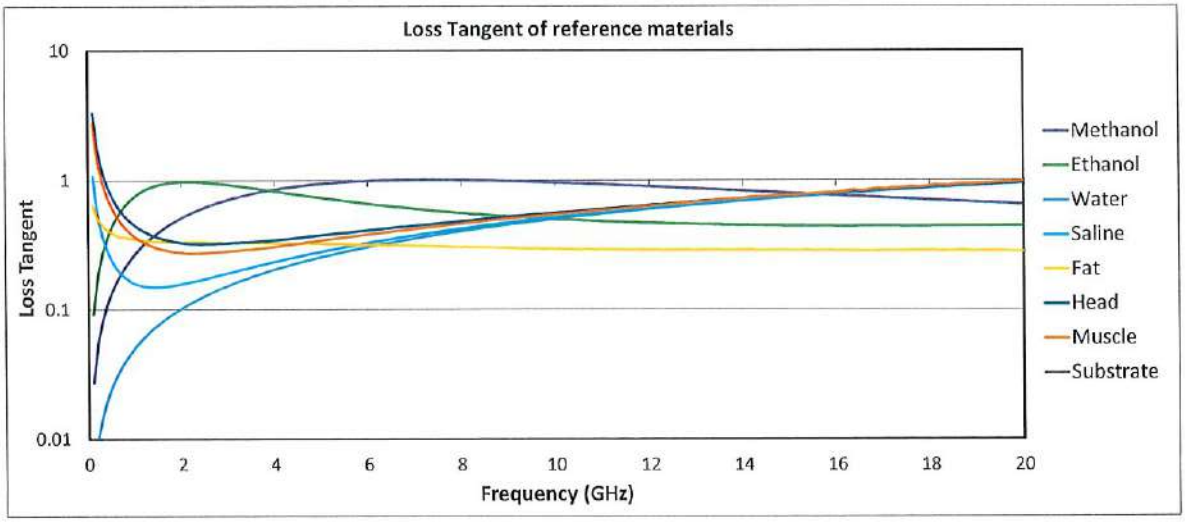

Fig. B.3 Loss tangent of reference materials

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

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 **WSCT**
Shenzhen

Certificate No. **MAGPy-8H3D-3087_Nov24**

CALIBRATION CERTIFICATE

Object	MAGPy-8H3D+E3DV2 SN:3087 MAGPy-DASV2 SN:3116
Calibration procedure(s)	QA CAL-46.v1 Calibration Procedure for MAGPy–8H3D+E3D Near-field Electric and Magnetic Field Sensor System
Calibration date	November 01, 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
Oscilloscope	SN: 110918	03-Sep-24 (No. 4030A315008835)	Sep-25
Reference 20 dB Attenuator	SN: CC2552 (20x)	26-Mar-24 (No. 217-04046)	Mar-25
Type-N mismatch	SN: 310982 / 06327	26-Mar-24 (No. 217-04047)	Mar-25

Secondary Standards	ID	Check Date (in house)	Scheduled Check
Network Analyzer E5061B	SN: MY49810822	In house check: Nov-23	In house check: Nov-24
TEM Cell	SN: S6029i	In house check: Nov-23	In house check: Nov-24
Plate Capacitor	SN: 6028i	In house check: Nov-23	In house check: Nov-24
Resonator (160kHz)	SN: 6030i	In house check: Nov-23	In house check: Nov-24

	Name	Function	Signature
Calibrated by	Aidonia Georgiadou	Laboratory Engineer	
Approved by	Sven Kühn	Technical Manager	

Issued: November 01, 2024

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

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Accreditation No.: SCS 0108

Glossary

MAGPy-8H3D-E3D	Magnetic Amplitude and Gradient Probe – Eight H-field Sensors, Single E-field sensor
MAGPy-DAS	Magnetic Amplitude and Gradient Data Acquisition System

Calibration is Performed According to the Following Standards:

a) IEEE Std 1309-2013, "IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", November 2013

Methods Applied and Interpretation of Parameters

- Calibration has been performed after the adjustment of the device.
- *Linearity*: Calibration of the linearity of the field reading over the specified dynamic range at 161.75 kHz. Influence of offset voltage is included in this measurement.
- *Frequency response*: Calibration of the field reading over the specified frequency range from 3.0 kHz to 10.0 MHz.
- Receiving Pattern: Assessed for H-field polarizations ϑ, and $\phi = 0° \ldots 360°$; $\vartheta = 90°$, and $\phi = 0° \ldots 360°$; for the XYZ sensors (in TEM-Cell at 4 kHz, 40 kHz, 400 kHz and 4 MHz).
- Receiving Pattern: Assessed for E-field polarizations ϑ, and $\phi = 0° \ldots 360°$; $\vartheta = 90°$, and $\phi = 0° \ldots 360°$; for the XYZ sensor (in parallel plate capacitor at 4 kHz, 40 kHz, 400 kHz and 4 MHz).

Calibration Uncertainty

The calibration uncertainty is 0.7 dB for the H-field readings and 1.06 dB for the E-field readings. The calibration uncertainty is specified over the frequency range from 3.0 kHz to 10.0 MHz and a dynamic range from 0.1 A/m to 3200 A/m and from 0.08 V/m to 2000 V/m respectively.

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

Unit Type	MAGPy–8H3D+E3DV2 (SP MGY 303 AA)	3087
	MAGPy–DASV2 (SE UMS 303 AF)	3116
	MAGPy FPGA Board	WP000270
Adjustment Date	Last MAGPy Adjustment	November 01, 2024
Firmware SW Version	MAGPy Firmware	Ver. 1.00
Backend SW Version	MAGPy Backend	Ver. 1.0.2
Calibration SW Version	MAGACAP	Ver. 1.0

Dynamic Range

Dynamic Range, H-field, Channel 0

H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			
x	y	z	x	y	z	x	y	z	Tolerance/(dB)
0.390	0.370	0.370	0.400	0.380	0.380	0.22	0.23	0.23	±1.00
0.520	0.510	0.500	0.530	0.510	0.520	0.17	0.00	0.34	±1.00
0.720	0.700	0.690	0.710	0.700	0.700	−0.12	0.00	0.12	±1.00
0.940	0.910	0.900	0.940	0.910	0.900	0.00	0.00	0.00	±1.00
1.28	1.24	1.22	1.28	1.25	1.20	0.00	0.07	−0.14	±1.00
1.75	1.70	1.67	1.75	1.69	1.66	0.00	−0.05	−0.05	±1.00
2.33	2.26	2.23	2.32	2.27	2.22	−0.04	0.04	−0.04	±0.20
3.12	3.02	2.97	3.11	3.03	2.95	−0.03	0.03	−0.06	±0.20
4.23	4.10	4.03	4.23	4.12	4.03	0.00	0.04	0.00	±0.20
5.73	5.55	5.46	5.72	5.60	5.46	−0.02	0.08	0.00	±0.20
7.69	7.46	7.34	7.69	7.53	7.34	0.00	0.08	0.00	±0.20
10.3	9.96	9.79	10.3	10.0	9.81	0.00	0.03	0.02	±0.20
13.9	13.5	13.2	13.8	13.5	13.2	−0.06	0.00	0.00	±0.20
18.7	18.2	17.8	18.7	18.2	17.9	0.00	0.00	0.05	±0.20
25.3	24.5	24.1	25.3	24.6	24.1	0.00	0.04	0.00	±0.20
33.8	32.8	32.2	33.9	32.9	32.4	0.03	0.03	0.05	±0.20
45.6	44.3	43.5	45.9	44.5	43.7	0.06	0.04	0.04	±0.20
62.0	60.1	59.0	62.2	60.3	59.3	0.03	0.03	0.04	±0.20
85.1	82.5	81.1	84.9	82.2	80.7	−0.02	−0.03	−0.04	±0.20
111	108	106	111	108	106	0.00	0.00	0.00	±0.20
153	148	146	153	148	145	0.00	0.00	−0.06	±0.20
212	206	202	212	205	202	0.00	−0.04	0.00	±0.20
294	285	280	296	280	274	0.06	−0.15	−0.19	±0.20
434	420	412	429	414	406	−0.10	−0.12	−0.13	±0.20
599	579	567	596	575	563	−0.04	−0.06	−0.06	±0.20
894	864	845	899	867	848	0.05	0.03	0.03	±0.20
1350	1310	1280	1380	1330	1300	0.19	0.13	0.13	±0.30
1840	1780	1740	1900	1830	1780	0.28	0.24	0.20	±0.30
3030	2920	2850	3150	3030	2950	0.34	0.32	0.30	±0.50
3690	3540	3450	3850	3700	3600	0.37	0.38	0.37	±0.50

SPEAG H-field linearity tolerance criteria[1]:
- ±1.0 dB for applied H-fields < 2.0 A/m
- ±0.2 dB for applied H-fields ≥ 2.0 A/m and < 1000 A/m
- ±0.3 dB for applied H-fields ≥ 1000 A/m and < 2000 A/m
- ±0.4 dB for applied H-fields ≥ 2000 A/m and < 3000 A/m
- ±0.5 dB for applied H-fields ≥ 3000 A/m

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

Dynamic Range, H-field, Channel 1

H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			
x	y	z	x	y	z	x	y	z	Tolerance/(dB)
0.390	0.380	0.380	0.400	0.400	0.390	0.22	0.45	0.23	±1.00
0.530	0.520	0.520	0.530	0.540	0.510	0.00	0.33	−0.17	±1.00
0.730	0.710	0.710	0.730	0.710	0.700	0.00	0.00	−0.12	±1.00
0.950	0.930	0.930	0.950	0.920	0.930	0.00	−0.09	0.00	±1.00
1.29	1.26	1.28	1.28	1.26	1.25	−0.07	0.00	−0.07	±1.00
1.76	1.72	1.73	1.79	1.71	1.72	0.15	−0.05	−0.05	±1.00
2.35	2.30	2.30	2.37	2.30	2.29	0.07	0.00	−0.04	±0.20
3.14	3.07	3.07	3.17	3.07	3.06	0.08	0.00	−0.03	±0.20
4.26	4.16	4.17	4.28	4.17	4.17	0.04	0.02	0.00	±0.20
5.77	5.64	5.64	5.78	5.64	5.65	0.02	0.00	0.02	±0.20
7.75	7.58	7.59	7.77	7.59	7.59	0.02	0.01	0.00	±0.20
10.4	10.1	10.1	10.4	10.1	10.2	0.00	0.00	0.09	±0.20
14.0	13.7	13.7	14.0	13.7	13.7	0.00	0.00	0.00	±0.20
18.9	18.4	18.4	18.9	18.5	18.5	0.00	0.05	0.05	±0.20
25.5	24.9	24.9	25.5	24.9	25.0	0.00	0.00	0.03	±0.20
34.1	33.3	33.3	34.2	33.5	33.5	0.03	0.05	0.05	±0.20
46.0	45.0	45.0	46.2	45.2	45.2	0.04	0.04	0.04	±0.20
62.5	61.0	61.0	62.7	61.3	61.3	0.03	0.04	0.04	±0.20
85.8	83.8	83.9	85.5	83.5	83.5	−0.03	−0.03	−0.04	±0.20
112	110	110	112	109	109	0.00	−0.08	−0.08	±0.20
154	151	151	154	150	150	0.00	−0.06	−0.06	±0.20
214	209	209	214	209	208	0.00	0.00	−0.04	±0.20
296	290	289	298	284	284	0.06	−0.18	−0.15	±0.20
438	427	426	432	421	421	−0.12	−0.12	−0.10	±0.20
603	588	587	600	584	583	−0.04	−0.06	−0.06	±0.20
901	877	874	905	879	878	0.04	0.02	0.04	±0.20
1360	1330	1320	1390	1350	1340	0.19	0.13	0.13	±0.30
1860	1800	1790	1910	1850	1850	0.23	0.24	0.29	±0.30
3050	2960	2940	3170	3070	3060	0.34	0.32	0.35	±0.50
3720	3600	3570	3880	3750	3730	0.37	0.35	0.38	±0.50

SPEAG H-field linearity tolerance criteria[1]:
- ±1.0dB for applied H-fields < 2.0A/m
- ±0.2dB for applied H-fields ≥ 2.0A/m and < 1000A/m
- ±0.3dB for applied H-fields ≥ 1000A/m and < 2000A/m
- ±0.4dB for applied H-fields ≥ 2000A/m and < 3000A/m
- ±0.5dB for applied H-fields ≥ 3000A/m

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

Dynamic Range, H-field, Channel 2

H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			
x	y	z	x	y	z	x	y	z	Tolerance/(dB)
0.380	0.380	0.380	0.400	0.400	0.400	0.45	0.45	0.45	±1.00
0.520	0.510	0.520	0.530	0.530	0.550	0.17	0.33	0.49	±1.00
0.710	0.710	0.710	0.690	0.710	0.730	−0.25	0.00	0.24	±1.00
0.930	0.920	0.930	0.920	0.910	0.930	−0.09	−0.09	0.00	±1.00
1.26	1.25	1.26	1.26	1.24	1.26	0.00	−0.07	0.00	±1.00
1.72	1.71	1.72	1.72	1.72	1.74	0.00	0.05	0.10	±1.00
2.30	2.29	2.30	2.30	2.27	2.31	0.00	−0.08	0.04	±0.20
3.07	3.05	3.07	3.08	3.04	3.08	0.03	−0.03	0.03	±0.20
4.16	4.14	4.17	4.19	4.16	4.18	0.06	0.04	0.02	±0.20
5.64	5.61	5.63	5.64	5.61	5.67	0.00	0.00	0.06	±0.20
7.57	7.54	7.58	7.58	7.55	7.62	0.01	0.01	0.05	±0.20
10.1	10.1	10.1	10.1	10.1	10.2	0.00	0.00	0.09	±0.20
13.7	13.6	13.7	13.7	13.6	13.7	0.00	0.00	0.00	±0.20
18.4	18.3	18.4	18.4	18.4	18.4	0.00	0.05	0.00	±0.20
24.9	24.8	24.9	24.9	24.8	24.9	0.00	0.00	0.00	±0.20
33.3	33.1	33.2	33.4	33.2	33.4	0.03	0.03	0.05	±0.20
44.9	44.7	44.9	45.2	45.0	45.1	0.06	0.06	0.04	±0.20
61.0	60.7	61.0	61.2	60.9	61.3	0.03	0.03	0.04	±0.20
83.8	83.4	83.8	83.5	83.1	83.4	−0.03	−0.03	−0.04	±0.20
110	109	110	109	109	109	−0.08	0.00	−0.08	±0.20
151	150	151	150	149	150	−0.06	−0.06	−0.06	±0.20
209	208	209	209	207	208	0.00	−0.04	−0.04	±0.20
290	288	289	291	283	283	0.03	−0.15	−0.18	±0.20
428	425	426	422	419	420	−0.12	−0.12	−0.12	±0.20
589	585	586	586	582	583	−0.04	−0.04	−0.04	±0.20
880	873	873	884	876	877	0.04	0.03	0.04	±0.20
1330	1320	1320	1350	1340	1340	0.13	0.13	0.13	±0.30
1810	1790	1790	1860	1840	1840	0.24	0.24	0.24	±0.30
2980	2950	2940	3100	3060	3050	0.34	0.32	0.32	±0.40
3630	3580	3570	3790	3740	3720	0.37	0.38	0.36	±0.50

SPEAG H-field linearity tolerance criteria[1]:
- ±1.0 dB for applied H-fields < 2.0 A/m
- ±0.2 dB for applied H-fields ≥ 2.0 A/m and < 1000 A/m
- ±0.3 dB for applied H-fields ≥ 1000 A/m and < 2000 A/m
- ±0.4 dB for applied H-fields ≥ 2000 A/m and < 3000 A/m
- ±0.5 dB for applied H-fields ≥ 3000 A/m

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

Dynamic Range, H-field, Channel 3

H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			
x	y	z	x	y	z	x	y	z	Tolerance/(dB)
0.380	0.380	0.380	0.420	0.400	0.350	0.87	0.45	−0.71	±1.00
0.520	0.510	0.510	0.550	0.540	0.500	0.49	0.50	−0.17	±1.00
0.710	0.710	0.710	0.730	0.720	0.700	0.24	0.12	−0.12	±1.00
0.930	0.920	0.920	0.950	0.920	0.930	0.18	0.00	0.09	±1.00
1.26	1.25	1.25	1.29	1.25	1.25	0.20	0.00	0.00	±1.00
1.72	1.71	1.71	1.75	1.73	1.70	0.15	0.10	−0.05	±1.00
2.30	2.28	2.28	2.31	2.29	2.28	0.04	0.04	0.00	±0.20
3.07	3.05	3.05	3.08	3.06	3.04	0.03	0.03	−0.03	±0.20
4.16	4.13	4.14	4.17	4.14	4.14	0.02	0.02	0.00	±0.20
5.64	5.60	5.60	5.65	5.61	5.60	0.02	0.02	0.00	±0.20
7.57	7.52	7.53	7.58	7.55	7.53	0.01	0.03	0.00	±0.20
10.1	10.0	10.0	10.1	10.1	10.1	0.00	0.09	0.09	±0.20
13.7	13.6	13.6	13.7	13.6	13.6	0.00	0.00	0.00	±0.20
18.4	18.3	18.3	18.4	18.3	18.4	0.00	0.00	0.05	±0.20
24.9	24.7	24.7	24.9	24.8	24.8	0.00	0.04	0.04	±0.20
33.3	33.0	33.0	33.4	33.2	33.2	0.03	0.05	0.05	±0.20
44.9	44.6	44.6	45.2	44.9	44.8	0.06	0.06	0.04	±0.20
61.0	60.6	60.6	61.2	60.8	60.9	0.03	0.03	0.04	±0.20
83.8	83.2	83.2	83.5	82.9	82.9	−0.03	−0.03	−0.03	±0.20
110	109	109	109	109	108	−0.08	0.00	−0.08	±0.20
151	150	150	150	149	149	−0.06	−0.06	−0.06	±0.20
209	207	207	209	207	207	0.00	0.00	0.00	±0.20
290	287	287	291	282	282	0.03	−0.15	−0.15	±0.20
427	424	423	422	418	417	−0.10	−0.12	−0.12	±0.20
589	584	582	586	580	579	−0.04	−0.06	−0.04	±0.20
880	871	867	883	873	871	0.03	0.02	0.04	±0.20
1330	1320	1310	1350	1340	1330	0.13	0.13	0.13	±0.30
1810	1790	1780	1860	1840	1830	0.24	0.24	0.24	±0.30
2980	2940	2920	3100	3030	3030	0.34	0.26	0.32	±0.40
3630	3570	3540	3790	3690	3700	0.37	0.29	0.38	±0.50

SPEAG H-field linearity tolerance criteria[1]:
- ±1.0 dB for applied H-fields < 2.0 A/m
- ±0.2 dB for applied H-fields ≥ 2.0 A/m and < 1000 A/m
- ±0.3 dB for applied H-fields ≥ 1000 A/m and < 2000 A/m
- ±0.4 dB for applied H-fields ≥ 2000 A/m and < 3000 A/m
- ±0.5 dB for applied H-fields ≥ 3000 A/m

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

Dynamic Range, H-field, Channel 4

H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			
x	y	z	x	y	z	x	y	z	Tolerance/(dB)
0.380	0.380	0.380	0.390	0.410	0.400	0.23	0.66	0.45	±1.00
0.510	0.520	0.520	0.540	0.530	0.530	0.50	0.17	0.17	±1.00
0.700	0.720	0.710	0.730	0.730	0.720	0.36	0.12	0.12	±1.00
0.920	0.940	0.930	0.940	0.940	0.930	0.19	0.00	0.00	±1.00
1.24	1.27	1.25	1.25	1.26	1.25	0.07	−0.07	0.00	±1.00
1.71	1.74	1.72	1.70	1.74	1.71	−0.05	0.00	−0.05	±1.00
2.28	2.32	2.30	2.28	2.31	2.30	0.00	−0.04	0.00	±0.20
3.04	3.10	3.07	3.06	3.09	3.07	0.06	−0.03	0.00	±0.20
4.13	4.21	4.16	4.13	4.22	4.17	0.00	0.02	0.02	±0.20
5.59	5.70	5.62	5.58	5.71	5.64	−0.02	0.02	0.03	±0.20
7.51	7.65	7.56	7.52	7.67	7.58	0.01	0.02	0.02	±0.20
10.0	10.2	10.1	10.1	10.2	10.1	0.09	0.00	0.00	±0.20
13.6	13.8	13.6	13.6	13.8	13.7	0.00	0.00	0.06	±0.20
18.3	18.6	18.4	18.4	18.7	18.4	0.05	0.05	0.00	±0.20
24.7	25.1	24.9	24.7	25.2	24.9	0.00	0.03	0.00	±0.20
33.0	33.6	33.2	33.1	33.8	33.4	0.03	0.05	0.05	±0.20
44.5	45.4	44.8	44.8	45.7	45.1	0.06	0.06	0.06	±0.20
60.5	61.6	60.9	60.7	61.9	61.2	0.03	0.04	0.04	±0.20
83.1	84.7	83.6	82.8	84.3	83.2	−0.03	−0.04	−0.04	±0.20
109	111	109	108	110	109	−0.08	−0.08	0.00	±0.20
149	152	150	149	152	150	0.00	0.00	0.00	±0.20
207	211	208	207	211	208	0.00	0.00	0.00	±0.20
287	292	288	289	287	283	0.06	−0.15	−0.15	±0.20
424	431	425	418	425	419	−0.12	−0.12	−0.12	±0.20
584	594	585	581	590	581	−0.04	−0.06	−0.06	±0.20
873	886	872	876	889	874	0.03	0.03	0.02	±0.20
1320	1340	1320	1340	1360	1340	0.13	0.13	0.13	±0.30
1800	1820	1790	1850	1870	1840	0.24	0.24	0.24	±0.30
2960	2990	2930	3070	3100	3050	0.32	0.31	0.35	±0.40
3600	3640	3560	3760	3790	3710	0.38	0.35	0.36	±0.50

SPEAG H-field linearity tolerance criteria[1]:
±1.0 dB for applied H-fields < 2.0 A/m
±0.2 dB for applied H-fields ≥ 2.0 A/m and < 1000 A/m
±0.3 dB for applied H-fields ≥ 1000 A/m and < 2000 A/m
±0.4 dB for applied H-fields ≥ 2000 A/m and < 3000 A/m
±0.5 dB for applied H-fields ≥ 3000 A/m

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

Dynamic Range, H-field, Channel 5

H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			
x	y	z	x	y	z	x	y	z	Tolerance/(dB)
0.380	0.390	0.390	0.400	0.410	0.390	0.45	0.43	0.00	±1.00
0.520	0.530	0.530	0.540	0.540	0.530	0.33	0.16	0.00	±1.00
0.720	0.720	0.730	0.720	0.710	0.720	0.00	−0.12	−0.12	±1.00
0.930	0.940	0.950	0.940	0.930	0.940	0.09	−0.09	−0.09	±1.00
1.27	1.28	1.28	1.26	1.28	1.28	−0.07	0.00	0.00	±1.00
1.74	1.76	1.76	1.73	1.77	1.75	−0.05	0.05	−0.05	±1.00
2.32	2.34	2.35	2.32	2.35	2.34	0.00	0.04	−0.04	±0.20
3.10	3.13	3.13	3.10	3.14	3.13	0.00	0.03	0.00	±0.20
4.20	4.24	4.25	4.21	4.26	4.24	0.02	0.04	−0.02	±0.20
5.69	5.74	5.75	5.71	5.75	5.75	0.03	0.02	0.00	±0.20
7.64	7.72	7.73	7.67	7.75	7.75	0.03	0.03	0.02	±0.20
10.2	10.3	10.3	10.2	10.3	10.3	0.00	0.00	0.00	±0.20
13.8	13.9	13.9	13.8	14.0	14.0	0.00	0.06	0.06	±0.20
18.6	18.8	18.8	18.7	18.8	18.8	0.05	0.00	0.00	±0.20
25.1	25.4	25.4	25.2	25.4	25.4	0.03	0.00	0.00	±0.20
33.6	33.9	33.9	33.7	34.1	34.1	0.03	0.05	0.05	±0.20
45.3	45.8	45.8	45.6	46.1	46.0	0.06	0.06	0.04	±0.20
61.5	62.2	62.2	61.8	62.4	62.5	0.04	0.03	0.04	±0.20
84.6	85.4	85.4	84.2	85.0	85.1	−0.04	−0.04	−0.03	±0.20
111	112	112	110	111	111	−0.08	−0.08	−0.08	±0.20
152	154	154	152	153	153	0.00	−0.06	−0.06	±0.20
211	213	213	211	212	212	0.00	−0.04	−0.04	±0.20
292	295	295	294	289	289	0.06	−0.18	−0.18	±0.20
431	435	434	425	429	428	−0.12	−0.12	−0.12	±0.20
595	599	598	591	595	594	−0.06	−0.06	−0.06	±0.20
888	894	890	891	896	894	0.03	0.02	0.04	±0.20
1340	1350	1340	1370	1370	1370	0.19	0.13	0.19	±0.30
1830	1840	1830	1880	1890	1880	0.23	0.23	0.23	±0.30
3010	3020	3000	3120	3130	3110	0.31	0.31	0.31	±0.50
3670	3670	3640	3820	3820	3800	0.35	0.35	0.37	±0.50

SPEAG H-field linearity tolerance criteria[1]:
- ±1.0dB for applied H-fields < 2.0A/m
- ±0.2dB for applied H-fields ≥ 2.0A/m and < 1000A/m
- ±0.3dB for applied H-fields ≥ 1000A/m and < 2000A/m
- ±0.4dB for applied H-fields ≥ 2000A/m and < 3000A/m
- ±0.5dB for applied H-fields ≥ 3000A/m

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

Dynamic Range, H-field, Channel 6

H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			
x	y	z	x	y	z	x	y	z	Tolerance/(dB)
0.390	0.390	0.380	0.400	0.400	0.390	0.22	0.22	0.23	±1.00
0.530	0.530	0.520	0.520	0.550	0.530	−0.17	0.32	0.17	±1.00
0.730	0.730	0.720	0.710	0.750	0.730	−0.24	0.23	0.12	±1.00
0.950	0.950	0.940	0.950	0.950	0.940	0.00	0.00	0.00	±1.00
1.28	1.28	1.27	1.29	1.28	1.27	0.07	0.00	0.00	±1.00
1.76	1.76	1.74	1.77	1.76	1.75	0.05	0.00	0.05	±1.00
2.35	2.34	2.32	2.34	2.36	2.33	−0.04	0.07	0.04	±0.20
3.14	3.13	3.10	3.14	3.14	3.11	0.00	0.03	0.03	±0.20
4.26	4.25	4.20	4.27	4.27	4.22	0.02	0.04	0.04	±0.20
5.77	5.75	5.68	5.76	5.78	5.70	−0.02	0.05	0.03	±0.20
7.74	7.73	7.64	7.76	7.76	7.67	0.02	0.03	0.03	±0.20
10.3	10.3	10.2	10.4	10.3	10.2	0.08	0.00	0.00	±0.20
14.0	13.9	13.8	14.0	14.0	13.8	0.00	0.06	0.00	±0.20
18.8	18.8	18.6	18.9	18.9	18.6	0.05	0.05	0.00	±0.20
25.4	25.4	25.1	25.4	25.4	25.1	0.00	0.00	0.00	±0.20
34.0	33.9	33.5	34.1	34.1	33.7	0.03	0.05	0.05	±0.20
45.9	45.9	45.3	46.2	46.1	45.5	0.06	0.04	0.04	±0.20
62.4	62.3	61.5	62.6	62.5	61.7	0.03	0.03	0.03	±0.20
85.7	85.5	84.4	85.4	85.2	84.1	−0.03	−0.03	−0.03	±0.20
112	112	110	112	112	110	0.00	0.00	0.00	±0.20
154	154	152	154	153	151	0.00	−0.06	−0.06	±0.20
214	213	210	213	213	210	−0.04	0.00	0.00	±0.20
296	295	291	298	290	286	0.06	−0.15	−0.15	±0.20
437	435	429	431	430	423	−0.12	−0.10	−0.12	±0.20
603	600	590	599	596	587	−0.06	−0.06	−0.04	±0.20
900	895	880	903	897	884	0.03	0.02	0.04	±0.20
1360	1350	1330	1380	1380	1350	0.13	0.19	0.13	±0.30
1850	1840	1810	1910	1890	1860	0.28	0.23	0.24	±0.30
3050	3020	2960	3170	3140	3080	0.34	0.34	0.35	±0.50
3710	3670	3590	3870	3830	3750	0.37	0.37	0.38	±0.50

SPEAG H-field linearity tolerance criteria[1]:
- ±1.0dB for applied H-fields < 2.0A/m
- ±0.2dB for applied H-fields ≥ 2.0A/m and < 1000A/m
- ±0.3dB for applied H-fields ≥ 1000A/m and < 2000A/m
- ±0.4dB for applied H-fields ≥ 2000A/m and < 3000A/m
- ±0.5dB for applied H-fields ≥ 3000A/m

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

Dynamic Range, H-field, Channel 7

H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			
x	y	z	x	y	z	x	y	z	Tolerance/(dB)
0.390	0.380	0.370	0.410	0.400	0.400	0.43	0.45	0.68	±1.00
0.530	0.510	0.510	0.530	0.520	0.540	0.00	0.17	0.50	±1.00
0.720	0.710	0.700	0.720	0.700	0.700	0.00	−0.12	0.00	±1.00
0.940	0.920	0.910	0.950	0.930	0.910	0.09	0.09	0.00	±1.00
1.28	1.25	1.24	1.28	1.28	1.25	0.00	0.21	0.07	±1.00
1.76	1.72	1.70	1.75	1.74	1.69	−0.05	0.10	−0.05	±1.00
2.34	2.29	2.26	2.34	2.33	2.27	0.00	0.15	0.04	±0.20
3.13	3.06	3.02	3.13	3.11	3.02	0.00	0.14	0.00	±0.20
4.24	4.15	4.10	4.26	4.20	4.10	0.04	0.10	0.00	±0.20
5.75	5.62	5.54	5.75	5.67	5.54	0.00	0.08	0.00	±0.20
7.72	7.55	7.46	7.72	7.60	7.45	0.00	0.06	−0.01	±0.20
10.3	10.1	9.95	10.3	10.1	10.0	0.00	0.00	0.04	±0.20
13.9	13.6	13.4	13.9	13.7	13.5	0.00	0.06	0.06	±0.20
18.8	18.4	18.1	18.8	18.4	18.2	0.00	0.00	0.05	±0.20
25.4	24.8	24.5	25.4	24.8	24.5	0.00	0.00	0.00	±0.20
33.9	33.1	32.7	34.0	33.3	32.9	0.03	0.05	0.05	±0.20
45.8	44.8	44.2	46.0	45.0	44.4	0.04	0.04	0.04	±0.20
62.2	60.8	60.0	62.4	61.0	60.3	0.03	0.03	0.04	±0.20
85.4	83.5	82.4	85.1	83.1	82.1	−0.03	−0.04	−0.03	±0.20
112	109	108	111	109	107	−0.08	0.00	−0.08	±0.20
154	150	148	153	150	148	−0.06	0.00	0.00	±0.20
213	208	205	213	208	205	0.00	0.00	0.00	±0.20
295	288	284	297	283	279	0.06	−0.15	−0.15	±0.20
436	425	419	430	419	413	−0.12	−0.12	−0.13	±0.20
601	586	576	597	582	572	−0.06	−0.06	−0.06	±0.20
897	874	859	900	876	862	0.03	0.02	0.03	±0.20
1360	1320	1300	1380	1340	1320	0.13	0.13	0.13	±0.30
1850	1800	1760	1900	1850	1810	0.23	0.24	0.24	±0.30
3040	2950	2890	3160	3060	3000	0.34	0.32	0.32	±0.50
3700	3580	3510	3860	3740	3660	0.37	0.38	0.36	±0.50

SPEAG H-field linearity tolerance criteria[1]:
- ±1.0dB for applied H-fields < 2.0A/m
- ±0.2dB for applied H-fields ≥ 2.0A/m and < 1000A/m
- ±0.3dB for applied H-fields ≥ 1000A/m and < 2000A/m
- ±0.4dB for applied H-fields ≥ 2000A/m and < 3000A/m
- ±0.5dB for applied H-fields ≥ 3000A/m

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

Dynamic Range, E-field, Channel 0

E-field/(V/m) Applied			E-field/(V/m) Reading			Difference/(dB)			Tolerance/(dB)		
x	y	z	x	y	z	x	y	z	x	y	z
0.330	0.200	0.090	0.340	0.210	0.070	0.26	0.42	−2.18	±5.00	±5.00	±5.00
0.440	0.280	0.120	0.450	0.290	0.140	0.20	0.30	1.34	±5.00	±5.00	±5.00
0.610	0.380	0.170	0.630	0.390	0.150	0.28	0.23	−1.09	±5.00	±5.00	±5.00
0.800	0.500	0.220	0.820	0.470	0.200	0.21	−0.54	−0.83	±5.00	±5.00	±5.00
1.08	0.670	0.300	1.08	0.670	0.310	0.00	0.00	0.28	±5.00	±5.00	±5.00
1.48	0.920	0.410	1.49	0.920	0.400	0.06	0.00	−0.21	±5.00	±5.00	±5.00
1.97	1.23	0.550	1.97	1.24	0.530	0.00	0.07	−0.32	±5.00	±5.00	±5.00
2.64	1.64	0.740	2.65	1.64	0.740	0.03	0.00	0.00	±1.00	±5.00	±5.00
3.58	2.22	1.00	3.59	2.22	0.970	0.02	0.00	−0.26	±1.00	±1.00	±5.00
4.84	3.01	1.35	4.85	2.99	1.30	0.02	−0.06	−0.33	±1.00	±1.00	±5.00
6.51	4.05	1.82	6.54	4.02	1.76	0.04	−0.06	−0.29	±1.00	±1.00	±5.00
8.68	5.40	2.43	8.72	5.38	2.39	0.04	−0.03	−0.14	±1.00	±1.00	±1.00
11.7	7.30	3.28	11.8	7.30	3.22	0.07	0.00	−0.16	±1.00	±1.00	±1.00
15.8	9.85	4.42	15.9	9.79	4.34	0.05	−0.05	−0.16	±1.00	±1.00	±1.00
21.4	13.3	5.97	21.5	13.2	5.85	0.04	−0.07	−0.18	±1.00	±1.00	±1.00
28.6	17.8	7.98	28.8	17.8	7.85	0.06	0.00	−0.14	±1.00	±1.00	±1.00
38.6	24.0	10.8	38.9	24.0	10.6	0.07	0.00	−0.16	±1.00	±1.00	±1.00
52.4	32.6	14.6	52.8	32.6	14.4	0.07	0.00	−0.12	±1.00	±1.00	±1.00
72.0	44.8	20.1	71.8	44.4	19.6	−0.02	−0.08	−0.22	±1.00	±1.00	±1.00
94.1	58.5	26.3	94.1	58.1	25.7	0.00	−0.06	−0.20	±1.00	±1.00	±1.00
129	80.5	36.2	129	79.9	35.4	0.00	−0.06	−0.19	±1.00	±1.00	±1.00
179	112	50.1	180	111	49.1	0.05	−0.08	−0.18	±1.00	±1.00	±1.00
249	155	69.5	251	155	68.6	0.07	0.00	−0.11	±1.00	±1.00	±1.00
366	228	103	356	218	102	−0.24	−0.39	−0.08	±1.00	±1.00	±1.00
505	314	141	495	304	141	−0.17	−0.28	0.00	±1.00	±1.00	±1.00
753	468	211	746	458	213	−0.08	−0.19	0.08	±1.00	±1.00	±1.00
1140	708	319	1140	702	327	0.00	−0.07	0.22	±1.00	±1.00	±1.00
1550	963	435	1580	966	451	0.17	0.03	0.31	±1.00	±1.00	±1.00
2540	1580	716	2620	1600	713	0.27	0.11	−0.04	±1.00	±1.00	±1.00
3090	1920	871	3200	1960	874	0.30	0.18	0.03	±1.00	±1.00	±1.00

SPEAG E-field linearity tolerance criteria[1]:
±5.0dB for applied E-field < 2V/m
±1.0dB for applied E-field ≥ 2V/m

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

Frequency Response

Frequency Response, H-field, Channel 0

f/(Hz)	H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			Tolerance/(dB)
	x	y	z	x	y	z	x	y	z	
3000	1.54	1.54	1.54	1.55	1.54	1.54	0.06	0.00	0.00	±0.3
3200	1.54	1.54	1.53	1.54	1.56	1.54	0.00	0.11	0.06	±0.3
4000	1.53	1.53	1.53	1.54	1.53	1.53	0.06	0.00	0.00	±0.3
5200	1.52	1.52	1.51	1.52	1.52	1.53	0.00	0.00	0.11	±0.3
6600	1.51	1.51	1.50	1.52	1.50	1.51	0.06	−0.06	0.06	±0.3
8200	1.50	1.50	1.49	1.51	1.49	1.50	0.06	−0.06	0.06	±0.3
9000	1.49	1.49	1.49	1.50	1.49	1.49	0.06	0.00	0.00	±0.3
10600	4.36	4.26	4.24	4.38	4.31	4.31	0.04	0.10	0.14	±0.3
13400	4.38	4.33	4.31	4.41	4.35	4.33	0.06	0.04	0.04	±0.3
17000	4.39	4.32	4.30	4.41	4.35	4.33	0.04	0.06	0.06	±0.3
21400	4.41	4.34	4.33	4.43	4.35	4.35	0.04	0.02	0.04	±0.3
27200	4.41	4.34	4.32	4.43	4.36	4.35	0.04	0.04	0.06	±0.3
34400	4.41	4.35	4.33	4.43	4.37	4.35	0.04	0.04	0.04	±0.3
40000	4.40	4.34	4.33	4.43	4.37	4.35	0.06	0.06	0.04	±0.3
43600	4.39	4.34	4.32	4.41	4.36	4.33	0.04	0.04	0.02	±0.3
55400	4.38	4.32	4.31	4.40	4.34	4.33	0.04	0.04	0.04	±0.3
70000	4.37	4.32	4.30	4.38	4.33	4.31	0.02	0.02	0.02	±0.3
88800	4.35	4.30	4.29	4.37	4.31	4.30	0.04	0.02	0.02	±0.3
112400	4.34	4.29	4.28	4.36	4.29	4.29	0.04	0.00	0.02	±0.3
142400	4.32	4.27	4.26	4.33	4.28	4.26	0.02	0.02	0.00	±0.3
161750	4.30	4.25	4.24	4.30	4.26	4.24	0.00	0.02	0.00	±0.3
180400	4.29	4.25	4.23	4.29	4.25	4.23	0.00	0.00	0.00	±0.3
228400	4.26	4.21	4.20	4.26	4.22	4.20	0.00	0.02	0.00	±0.3
289400	4.22	4.18	4.17	4.21	4.18	4.17	−0.02	0.00	0.00	±0.3
366400	4.18	4.14	4.13	4.18	4.14	4.13	0.00	0.00	0.00	±0.3
400000	4.16	4.12	4.11	4.16	4.12	4.11	0.00	0.00	0.00	±0.3
464000	4.13	4.09	4.08	4.13	4.10	4.08	0.00	0.02	0.00	±0.3
587800	4.09	4.05	4.04	4.09	4.05	4.04	0.00	0.00	0.00	±0.3
744200	4.03	4.00	3.99	4.03	4.00	3.99	0.00	0.00	0.00	±0.3
942600	4.02	3.99	3.98	4.02	3.99	3.98	0.00	0.00	0.00	±0.3
1193600	4.00	3.97	3.96	3.99	3.97	3.96	−0.02	0.00	0.00	±0.3
1511600	3.99	3.96	3.95	3.99	3.96	3.95	0.00	0.00	0.00	±0.3
1914400	3.98	3.94	3.94	3.97	3.95	3.93	−0.02	0.02	−0.02	±0.3
2424400	3.96	3.93	3.92	3.96	3.93	3.92	0.00	0.00	0.00	±0.3
3070200	3.94	3.90	3.89	3.94	3.90	3.89	0.00	0.00	0.00	±0.3
3888000	3.88	3.85	3.84	3.88	3.85	3.83	0.00	0.00	−0.02	±0.3
4000000	3.87	3.84	3.83	3.87	3.83	3.82	0.00	−0.02	−0.02	±0.3
4923800	3.81	3.78	3.77	3.80	3.77	3.77	−0.02	−0.02	0.00	±0.3
6235400	3.70	3.67	3.66	3.69	3.66	3.65	−0.02	−0.02	−0.02	±0.3
7896400	3.56	3.52	3.52	3.55	3.52	3.51	−0.02	0.00	−0.02	±0.3
10000000	3.41	3.38	3.38	3.41	3.38	3.35	0.00	0.00	−0.08	±0.3

SPEAG H-field frequency response tolerance criteria[1]:
±0.3dB for applied H-fields at calibration points from 3kHz to 10MHz

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

Frequency Response, H-field, Channel 1

f/(Hz)	H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			Tolerance/(dB)
	x	y	z	x	y	z	x	y	z	
3000	1.54	1.54	1.54	1.56	1.55	1.55	0.11	0.06	0.06	±0.3
3200	1.54	1.54	1.53	1.53	1.57	1.54	−0.06	0.17	0.06	±0.3
4000	1.53	1.53	1.53	1.54	1.53	1.54	0.06	0.00	0.06	±0.3
5200	1.52	1.52	1.51	1.53	1.52	1.53	0.06	0.00	0.11	±0.3
6600	1.51	1.51	1.50	1.53	1.51	1.51	0.11	0.00	0.06	±0.3
8200	1.50	1.50	1.49	1.51	1.50	1.50	0.06	0.00	0.06	±0.3
9000	1.49	1.49	1.49	1.50	1.50	1.50	0.06	0.06	0.06	±0.3
10600	4.36	4.26	4.24	4.38	4.27	4.31	0.04	0.02	0.14	±0.3
13400	4.38	4.33	4.31	4.42	4.34	4.34	0.08	0.02	0.06	±0.3
17000	4.39	4.32	4.30	4.41	4.34	4.33	0.04	0.04	0.06	±0.3
21400	4.41	4.34	4.33	4.44	4.37	4.36	0.06	0.06	0.06	±0.3
27200	4.41	4.34	4.32	4.43	4.36	4.34	0.04	0.04	0.04	±0.3
34400	4.41	4.35	4.33	4.42	4.37	4.36	0.02	0.04	0.06	±0.3
40000	4.40	4.34	4.33	4.42	4.36	4.35	0.04	0.04	0.04	±0.3
43600	4.39	4.34	4.32	4.41	4.36	4.33	0.04	0.04	0.02	±0.3
55400	4.38	4.32	4.31	4.39	4.34	4.33	0.02	0.04	0.04	±0.3
70000	4.37	4.32	4.30	4.39	4.33	4.31	0.04	0.02	0.02	±0.3
88800	4.35	4.30	4.29	4.36	4.32	4.30	0.02	0.04	0.02	±0.3
112400	4.34	4.29	4.28	4.35	4.30	4.29	0.02	0.02	0.02	±0.3
142400	4.32	4.27	4.26	4.33	4.27	4.27	0.02	0.00	0.02	±0.3
161750	4.30	4.25	4.24	4.31	4.26	4.25	0.02	0.02	0.02	±0.3
180400	4.29	4.25	4.23	4.29	4.24	4.24	0.00	−0.02	0.02	±0.3
228400	4.26	4.21	4.20	4.26	4.21	4.20	0.00	0.00	0.00	±0.3
289400	4.22	4.18	4.17	4.22	4.17	4.17	0.00	−0.02	0.00	±0.3
366400	4.18	4.14	4.13	4.18	4.12	4.13	0.00	−0.04	0.00	±0.3
400000	4.16	4.12	4.11	4.15	4.12	4.11	−0.02	0.00	0.00	±0.3
464000	4.13	4.09	4.08	4.12	4.09	4.09	−0.02	0.00	0.02	±0.3
587800	4.09	4.05	4.04	4.08	4.05	4.04	−0.02	0.00	0.00	±0.3
744200	4.03	4.00	3.99	4.03	3.99	4.00	0.00	−0.02	0.02	±0.3
942600	4.02	3.99	3.98	4.01	3.99	3.99	−0.02	0.00	0.02	±0.3
1193600	4.00	3.97	3.96	3.99	3.96	3.96	−0.02	−0.02	0.00	±0.3
1511600	3.99	3.96	3.95	3.99	3.96	3.96	0.00	0.00	0.02	±0.3
1914400	3.98	3.94	3.94	3.98	3.94	3.94	0.00	0.00	0.00	±0.3
2424400	3.96	3.93	3.92	3.96	3.92	3.92	0.00	−0.02	0.00	±0.3
3070200	3.94	3.90	3.89	3.93	3.90	3.89	−0.02	0.00	0.00	±0.3
3888000	3.88	3.85	3.84	3.88	3.84	3.84	0.00	−0.02	0.00	±0.3
4000000	3.87	3.84	3.83	3.87	3.83	3.83	0.00	−0.02	0.00	±0.3
4923800	3.81	3.78	3.77	3.80	3.77	3.77	−0.02	−0.02	0.00	±0.3
6235400	3.70	3.67	3.66	3.69	3.66	3.66	−0.02	−0.02	0.00	±0.3
7896400	3.56	3.52	3.52	3.55	3.52	3.51	−0.02	0.00	−0.02	±0.3
10000000	3.41	3.38	3.38	3.40	3.38	3.36	−0.03	0.00	−0.05	±0.3

SPEAG H-field frequency response tolerance criteria[1]:
±0.3dB for applied H-fields at calibration points from 3kHz to 10MHz

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

Frequency Response, H-field, Channel 2

	H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			
f/(Hz)	x	y	z	x	y	z	x	y	z	Tolerance/(dB)
3000	1.54	1.54	1.54	1.55	1.55	1.54	0.06	0.06	0.00	±0.3
3200	1.54	1.54	1.53	1.52	1.57	1.53	−0.11	0.17	0.00	±0.3
4000	1.53	1.53	1.53	1.54	1.54	1.53	0.06	0.06	0.00	±0.3
5200	1.52	1.52	1.51	1.52	1.52	1.52	0.00	0.00	0.06	±0.3
6600	1.51	1.51	1.50	1.52	1.51	1.51	0.06	0.00	0.06	±0.3
8200	1.50	1.50	1.49	1.50	1.49	1.50	0.00	−0.06	0.06	±0.3
9000	1.49	1.49	1.49	1.50	1.50	1.49	0.06	0.06	0.00	±0.3
10600	4.36	4.26	4.24	4.38	4.29	4.27	0.04	0.06	0.06	±0.3
13400	4.38	4.33	4.31	4.42	4.35	4.32	0.08	0.04	0.02	±0.3
17000	4.39	4.32	4.30	4.41	4.34	4.33	0.04	0.04	0.06	±0.3
21400	4.41	4.34	4.33	4.44	4.35	4.35	0.06	0.02	0.04	±0.3
27200	4.41	4.34	4.32	4.42	4.35	4.33	0.02	0.02	0.02	±0.3
34400	4.41	4.35	4.33	4.43	4.36	4.35	0.04	0.02	0.04	±0.3
40000	4.40	4.34	4.33	4.42	4.36	4.34	0.04	0.04	0.02	±0.3
43600	4.39	4.34	4.32	4.41	4.35	4.34	0.04	0.02	0.04	±0.3
55400	4.38	4.32	4.31	4.40	4.34	4.33	0.04	0.04	0.04	±0.3
70000	4.37	4.32	4.30	4.38	4.33	4.31	0.02	0.02	0.02	±0.3
88800	4.35	4.30	4.29	4.37	4.31	4.29	0.04	0.02	0.00	±0.3
112400	4.34	4.29	4.28	4.35	4.29	4.28	0.02	0.00	0.00	±0.3
142400	4.32	4.27	4.26	4.33	4.28	4.26	0.02	0.02	0.00	±0.3
161750	4.30	4.25	4.24	4.30	4.26	4.25	0.00	0.02	0.02	±0.3
180400	4.29	4.25	4.23	4.29	4.25	4.24	0.00	0.00	0.02	±0.3
228400	4.26	4.21	4.20	4.26	4.21	4.20	0.00	0.00	0.00	±0.3
289400	4.22	4.18	4.17	4.22	4.18	4.16	0.00	0.00	−0.02	±0.3
366400	4.18	4.14	4.13	4.18	4.14	4.12	0.00	0.00	−0.02	±0.3
400000	4.16	4.12	4.11	4.16	4.12	4.11	0.00	0.00	0.00	±0.3
464000	4.13	4.09	4.08	4.13	4.09	4.08	0.00	0.00	0.00	±0.3
587800	4.09	4.05	4.04	4.08	4.05	4.04	−0.02	0.00	0.00	±0.3
744200	4.03	4.00	3.99	4.03	4.00	4.00	0.00	0.00	0.02	±0.3
942600	4.02	3.99	3.98	4.01	3.99	3.98	−0.02	0.00	0.00	±0.3
1193600	4.00	3.97	3.96	3.99	3.96	3.96	−0.02	−0.02	0.00	±0.3
1511600	3.99	3.96	3.95	3.98	3.95	3.95	−0.02	−0.02	0.00	±0.3
1914400	3.98	3.94	3.94	3.97	3.94	3.93	−0.02	0.00	−0.02	±0.3
2424400	3.96	3.93	3.92	3.96	3.92	3.92	0.00	−0.02	0.00	±0.3
3070200	3.94	3.90	3.89	3.93	3.90	3.89	−0.02	0.00	0.00	±0.3
3888000	3.88	3.85	3.84	3.86	3.84	3.83	−0.04	−0.02	−0.02	±0.3
4000000	3.87	3.84	3.83	3.86	3.83	3.83	−0.02	−0.02	0.00	±0.3
4923800	3.81	3.78	3.77	3.80	3.76	3.77	−0.02	−0.05	0.00	±0.3
6235400	3.70	3.67	3.66	3.68	3.65	3.66	−0.05	−0.05	0.00	±0.3
7896400	3.56	3.52	3.52	3.54	3.52	3.52	−0.05	0.00	0.00	±0.3
10000000	3.41	3.38	3.38	3.40	3.37	3.38	−0.03	−0.03	0.00	±0.3

SPEAG H-field frequency response tolerance criteria[1]:
±0.3dB for applied H-fields at calibration points from 3kHz to 10MHz

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

Frequency Response, H-field, Channel 3

f/(Hz)	H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			Tolerance/(dB)
	x	y	z	x	y	z	x	y	z	
3000	1.54	1.54	1.54	1.55	1.56	1.55	0.06	0.11	0.06	±0.3
3200	1.54	1.54	1.53	1.52	1.56	1.54	−0.11	0.11	0.06	±0.3
4000	1.53	1.53	1.53	1.53	1.54	1.55	0.00	0.06	0.11	±0.3
5200	1.52	1.52	1.51	1.51	1.52	1.54	−0.06	0.00	0.17	±0.3
6600	1.51	1.51	1.50	1.51	1.51	1.52	0.00	0.00	0.12	±0.3
8200	1.50	1.50	1.49	1.50	1.50	1.50	0.00	0.00	0.06	±0.3
9000	1.49	1.49	1.49	1.49	1.50	1.50	0.00	0.06	0.06	±0.3
10600	4.36	4.26	4.24	4.41	4.28	4.30	0.10	0.04	0.12	±0.3
13400	4.38	4.33	4.31	4.41	4.36	4.33	0.06	0.06	0.04	±0.3
17000	4.39	4.32	4.30	4.42	4.34	4.32	0.06	0.04	0.04	±0.3
21400	4.41	4.34	4.33	4.44	4.37	4.36	0.06	0.06	0.06	±0.3
27200	4.41	4.34	4.32	4.44	4.37	4.34	0.06	0.06	0.04	±0.3
34400	4.41	4.35	4.33	4.42	4.38	4.36	0.02	0.06	0.06	±0.3
40000	4.40	4.34	4.33	4.42	4.37	4.36	0.04	0.06	0.06	±0.3
43600	4.39	4.34	4.32	4.43	4.35	4.34	0.08	0.02	0.04	±0.3
55400	4.38	4.32	4.31	4.40	4.34	4.33	0.04	0.04	0.04	±0.3
70000	4.37	4.32	4.30	4.38	4.33	4.32	0.02	0.02	0.04	±0.3
88800	4.35	4.30	4.29	4.36	4.31	4.31	0.02	0.02	0.04	±0.3
112400	4.34	4.29	4.28	4.34	4.30	4.29	0.00	0.02	0.02	±0.3
142400	4.32	4.27	4.26	4.33	4.30	4.27	0.02	0.06	0.02	±0.3
161750	4.30	4.25	4.24	4.31	4.26	4.25	0.02	0.02	0.02	±0.3
180400	4.29	4.25	4.23	4.29	4.25	4.24	0.00	0.00	0.02	±0.3
228400	4.26	4.21	4.20	4.24	4.22	4.21	−0.04	0.02	0.02	±0.3
289400	4.22	4.18	4.17	4.22	4.19	4.17	0.00	0.02	0.00	±0.3
366400	4.18	4.14	4.13	4.18	4.14	4.13	0.00	0.00	0.00	±0.3
400000	4.16	4.12	4.11	4.16	4.12	4.11	0.00	0.00	0.00	±0.3
464000	4.13	4.09	4.08	4.13	4.10	4.08	0.00	0.02	0.00	±0.3
587800	4.09	4.05	4.04	4.08	4.05	4.04	−0.02	0.00	0.00	±0.3
744200	4.03	4.00	3.99	4.03	4.01	4.00	0.00	0.02	0.02	±0.3
942600	4.02	3.99	3.98	4.01	3.99	3.99	−0.02	0.00	0.02	±0.3
1193600	4.00	3.97	3.96	4.00	3.97	3.96	0.00	0.00	0.00	±0.3
1511600	3.99	3.96	3.95	3.99	3.96	3.95	0.00	0.00	0.00	±0.3
1914400	3.98	3.94	3.94	3.97	3.95	3.94	−0.02	0.02	0.00	±0.3
2424400	3.96	3.93	3.92	3.95	3.93	3.92	−0.02	0.00	0.00	±0.3
3070200	3.94	3.90	3.89	3.92	3.91	3.89	−0.04	0.02	0.00	±0.3
3888000	3.88	3.85	3.84	3.88	3.85	3.84	0.00	0.00	0.00	±0.3
4000000	3.87	3.84	3.83	3.87	3.84	3.83	0.00	0.00	0.00	±0.3
4923800	3.81	3.78	3.77	3.80	3.79	3.77	−0.02	0.02	0.00	±0.3
6235400	3.70	3.67	3.66	3.68	3.66	3.66	−0.05	−0.02	0.00	±0.3
7896400	3.56	3.52	3.52	3.55	3.53	3.52	−0.02	0.02	0.00	±0.3
10000000	3.41	3.38	3.38	3.40	3.38	3.38	−0.03	0.00	0.00	±0.3

SPEAG H-field frequency response tolerance criteria[1]:
±0.3dB for applied H-fields at calibration points from 3kHz to 10MHz

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

Frequency Response, H-field, Channel 4

f/(Hz)	H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			Tolerance/(dB)
	x	y	z	x	y	z	x	y	z	
3000	1.54	1.54	1.54	1.56	1.55	1.55	0.11	0.06	0.06	±0.3
3200	1.54	1.54	1.53	1.53	1.57	1.54	−0.06	0.17	0.06	±0.3
4000	1.53	1.53	1.53	1.54	1.54	1.53	0.06	0.06	0.00	±0.3
5200	1.52	1.52	1.51	1.52	1.52	1.53	0.00	0.00	0.11	±0.3
6600	1.51	1.51	1.50	1.52	1.51	1.52	0.06	0.00	0.12	±0.3
8200	1.50	1.50	1.49	1.50	1.50	1.50	0.00	0.00	0.06	±0.3
9000	1.49	1.49	1.49	1.50	1.50	1.50	0.06	0.06	0.06	±0.3
10600	4.36	4.26	4.24	4.39	4.32	4.29	0.06	0.12	0.10	±0.3
13400	4.38	4.33	4.31	4.39	4.35	4.33	0.02	0.04	0.04	±0.3
17000	4.39	4.32	4.30	4.42	4.35	4.33	0.06	0.06	0.06	±0.3
21400	4.41	4.34	4.33	4.45	4.36	4.33	0.08	0.04	0.00	±0.3
27200	4.41	4.34	4.32	4.42	4.36	4.34	0.02	0.04	0.04	±0.3
34400	4.41	4.35	4.33	4.43	4.36	4.35	0.04	0.02	0.04	±0.3
40000	4.40	4.34	4.33	4.41	4.37	4.35	0.02	0.06	0.04	±0.3
43600	4.39	4.34	4.32	4.40	4.37	4.33	0.02	0.06	0.02	±0.3
55400	4.38	4.32	4.31	4.39	4.34	4.32	0.02	0.04	0.02	±0.3
70000	4.37	4.32	4.30	4.38	4.33	4.31	0.02	0.02	0.02	±0.3
88800	4.35	4.30	4.29	4.36	4.32	4.30	0.02	0.04	0.02	±0.3
112400	4.34	4.29	4.28	4.34	4.30	4.28	0.00	0.02	0.00	±0.3
142400	4.32	4.27	4.26	4.32	4.26	4.27	0.00	−0.02	0.02	±0.3
161750	4.30	4.25	4.24	4.30	4.26	4.25	0.00	0.02	0.02	±0.3
180400	4.29	4.25	4.23	4.28	4.25	4.23	−0.02	0.00	0.00	±0.3
228400	4.26	4.21	4.20	4.29	4.22	4.20	0.06	0.02	0.00	±0.3
289400	4.22	4.18	4.17	4.21	4.17	4.17	−0.02	−0.02	0.00	±0.3
366400	4.18	4.14	4.13	4.17	4.14	4.13	−0.02	0.00	0.00	±0.3
400000	4.16	4.12	4.11	4.15	4.12	4.11	−0.02	0.00	0.00	±0.3
464000	4.13	4.09	4.08	4.12	4.09	4.08	−0.02	0.00	0.00	±0.3
587800	4.09	4.05	4.04	4.08	4.05	4.04	−0.02	0.00	0.00	±0.3
744200	4.03	4.00	3.99	4.02	4.00	4.00	−0.02	0.00	0.02	±0.3
942600	4.02	3.99	3.98	4.01	3.99	3.98	−0.02	0.00	0.00	±0.3
1193600	4.00	3.97	3.96	3.98	3.96	3.96	−0.04	−0.02	0.00	±0.3
1511600	3.99	3.96	3.95	3.98	3.96	3.96	−0.02	0.00	0.02	±0.3
1914400	3.98	3.94	3.94	3.97	3.94	3.93	−0.02	0.00	−0.02	±0.3
2424400	3.96	3.93	3.92	3.95	3.93	3.91	−0.02	0.00	−0.02	±0.3
3070200	3.94	3.90	3.89	3.93	3.90	3.89	−0.02	0.00	0.00	±0.3
3888000	3.88	3.85	3.84	3.87	3.85	3.83	−0.02	0.00	−0.02	±0.3
4000000	3.87	3.84	3.83	3.86	3.83	3.82	−0.02	−0.02	−0.02	±0.3
4923800	3.81	3.78	3.77	3.79	3.77	3.77	−0.05	−0.02	0.00	±0.3
6235400	3.70	3.67	3.66	3.69	3.67	3.66	−0.02	0.00	0.00	±0.3
7896400	3.56	3.52	3.52	3.54	3.53	3.51	−0.05	0.02	−0.02	±0.3
10000000	3.41	3.38	3.38	3.38	3.38	3.38	−0.08	0.00	0.00	±0.3

SPEAG H-field frequency response tolerance criteria[1]:
±0.3dB for applied H-fields at calibration points from 3kHz to 10MHz

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

Frequency Response, H-field, Channel 5

f/(Hz)	H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			Tolerance/(dB)
	x	y	z	x	y	z	x	y	z	
3000	1.54	1.54	1.54	1.55	1.55	1.54	0.06	0.06	0.00	±0.3
3200	1.54	1.54	1.53	1.52	1.57	1.54	−0.11	0.17	0.06	±0.3
4000	1.53	1.53	1.53	1.53	1.53	1.54	0.00	0.00	0.06	±0.3
5200	1.52	1.52	1.51	1.53	1.52	1.53	0.06	0.00	0.11	±0.3
6600	1.51	1.51	1.50	1.52	1.51	1.51	0.06	0.00	0.06	±0.3
8200	1.50	1.50	1.49	1.51	1.50	1.50	0.06	0.00	0.06	±0.3
9000	1.49	1.49	1.49	1.49	1.50	1.50	0.00	0.06	0.06	±0.3
10600	4.36	4.26	4.24	4.39	4.28	4.29	0.06	0.04	0.10	±0.3
13400	4.38	4.33	4.31	4.41	4.33	4.33	0.06	0.00	0.04	±0.3
17000	4.39	4.32	4.30	4.42	4.35	4.33	0.06	0.06	0.06	±0.3
21400	4.41	4.34	4.33	4.42	4.38	4.34	0.02	0.08	0.02	±0.3
27200	4.41	4.34	4.32	4.44	4.36	4.34	0.06	0.04	0.04	±0.3
34400	4.41	4.35	4.33	4.43	4.37	4.35	0.04	0.04	0.04	±0.3
40000	4.40	4.34	4.33	4.43	4.37	4.34	0.06	0.06	0.02	±0.3
43600	4.39	4.34	4.32	4.42	4.36	4.35	0.06	0.04	0.06	±0.3
55400	4.38	4.32	4.31	4.39	4.34	4.32	0.02	0.04	0.02	±0.3
70000	4.37	4.32	4.30	4.39	4.33	4.31	0.04	0.02	0.02	±0.3
88800	4.35	4.30	4.29	4.37	4.31	4.29	0.04	0.02	0.00	±0.3
112400	4.34	4.29	4.28	4.35	4.29	4.29	0.02	0.00	0.02	±0.3
142400	4.32	4.27	4.26	4.33	4.27	4.26	0.02	0.00	0.00	±0.3
161750	4.30	4.25	4.24	4.31	4.26	4.25	0.02	0.02	0.02	±0.3
180400	4.29	4.25	4.23	4.29	4.25	4.24	0.00	0.00	0.02	±0.3
228400	4.26	4.21	4.20	4.27	4.21	4.20	0.02	0.00	0.00	±0.3
289400	4.22	4.18	4.17	4.22	4.18	4.17	0.00	0.00	0.00	±0.3
366400	4.18	4.14	4.13	4.17	4.13	4.13	−0.02	−0.02	0.00	±0.3
400000	4.16	4.12	4.11	4.16	4.12	4.11	0.00	0.00	0.00	±0.3
464000	4.13	4.09	4.08	4.13	4.09	4.08	0.00	0.00	0.00	±0.3
587800	4.09	4.05	4.04	4.08	4.05	4.04	−0.02	0.00	0.00	±0.3
744200	4.03	4.00	3.99	4.03	4.00	3.99	0.00	0.00	0.00	±0.3
942600	4.02	3.99	3.98	4.01	3.99	3.98	−0.02	0.00	0.00	±0.3
1193600	4.00	3.97	3.96	3.99	3.97	3.96	−0.02	0.00	0.00	±0.3
1511600	3.99	3.96	3.95	3.98	3.97	3.95	−0.02	0.02	0.00	±0.3
1914400	3.98	3.94	3.94	3.97	3.94	3.93	−0.02	0.00	−0.02	±0.3
2424400	3.96	3.93	3.92	3.96	3.92	3.92	0.00	−0.02	0.00	±0.3
3070200	3.94	3.90	3.89	3.93	3.90	3.89	−0.02	0.00	0.00	±0.3
3888000	3.88	3.85	3.84	3.88	3.85	3.83	0.00	0.00	−0.02	±0.3
4000000	3.87	3.84	3.83	3.87	3.84	3.83	0.00	0.00	0.00	±0.3
4923800	3.81	3.78	3.77	3.80	3.77	3.76	−0.02	−0.02	−0.02	±0.3
6235400	3.70	3.67	3.66	3.69	3.67	3.65	−0.02	0.00	−0.02	±0.3
7896400	3.56	3.52	3.52	3.55	3.52	3.51	−0.02	0.00	−0.02	±0.3
10000000	3.41	3.38	3.38	3.41	3.37	3.38	0.00	−0.03	0.00	±0.3

SPEAG H-field frequency response tolerance criteria[1]:
±0.3dB for applied H-fields at calibration points from 3kHz to 10MHz

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

Frequency Response, H-field, Channel 6

	H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			
f/(Hz)	x	y	z	x	y	z	x	y	z	Tolerance/(dB)
3000	1.54	1.54	1.54	1.55	1.55	1.55	0.06	0.06	0.06	±0.3
3200	1.54	1.54	1.53	1.52	1.57	1.54	−0.11	0.17	0.06	±0.3
4000	1.53	1.53	1.53	1.54	1.53	1.54	0.06	0.00	0.06	±0.3
5200	1.52	1.52	1.51	1.52	1.52	1.53	0.00	0.00	0.11	±0.3
6600	1.51	1.51	1.50	1.51	1.51	1.52	0.00	0.00	0.12	±0.3
8200	1.50	1.50	1.49	1.50	1.50	1.50	0.00	0.00	0.06	±0.3
9000	1.49	1.49	1.49	1.49	1.50	1.50	0.00	0.06	0.06	±0.3
10600	4.36	4.26	4.24	4.41	4.29	4.30	0.10	0.06	0.12	±0.3
13400	4.38	4.33	4.31	4.42	4.36	4.32	0.08	0.06	0.02	±0.3
17000	4.39	4.32	4.30	4.41	4.35	4.32	0.04	0.06	0.04	±0.3
21400	4.41	4.34	4.33	4.43	4.36	4.37	0.04	0.04	0.08	±0.3
27200	4.41	4.34	4.32	4.44	4.36	4.35	0.06	0.04	0.06	±0.3
34400	4.41	4.35	4.33	4.43	4.36	4.35	0.04	0.02	0.04	±0.3
40000	4.40	4.34	4.33	4.43	4.37	4.35	0.06	0.06	0.04	±0.3
43600	4.39	4.34	4.32	4.42	4.35	4.34	0.06	0.02	0.04	±0.3
55400	4.38	4.32	4.31	4.39	4.35	4.33	0.02	0.06	0.04	±0.3
70000	4.37	4.32	4.30	4.39	4.34	4.32	0.04	0.04	0.04	±0.3
88800	4.35	4.30	4.29	4.37	4.31	4.30	0.04	0.02	0.02	±0.3
112400	4.34	4.29	4.28	4.35	4.29	4.28	0.02	0.00	0.00	±0.3
142400	4.32	4.27	4.26	4.33	4.28	4.27	0.02	0.02	0.02	±0.3
161750	4.30	4.25	4.24	4.31	4.26	4.25	0.02	0.02	0.02	±0.3
180400	4.29	4.25	4.23	4.29	4.25	4.24	0.00	0.00	0.02	±0.3
228400	4.26	4.21	4.20	4.22	4.22	4.21	−0.08	0.02	0.02	±0.3
289400	4.22	4.18	4.17	4.22	4.18	4.17	0.00	0.00	0.00	±0.3
366400	4.18	4.14	4.13	4.18	4.14	4.13	0.00	0.00	0.00	±0.3
400000	4.16	4.12	4.11	4.16	4.12	4.11	0.00	0.00	0.00	±0.3
464000	4.13	4.09	4.08	4.13	4.09	4.08	0.00	0.00	0.00	±0.3
587800	4.09	4.05	4.04	4.09	4.05	4.04	0.00	0.00	0.00	±0.3
744200	4.03	4.00	3.99	4.03	4.00	3.99	0.00	0.00	0.00	±0.3
942600	4.02	3.99	3.98	4.02	3.98	3.98	0.00	−0.02	0.00	±0.3
1193600	4.00	3.97	3.96	3.99	3.96	3.96	−0.02	−0.02	0.00	±0.3
1511600	3.99	3.96	3.95	3.98	3.96	3.95	−0.02	0.00	0.00	±0.3
1914400	3.98	3.94	3.94	3.97	3.94	3.93	−0.02	0.00	−0.02	±0.3
2424400	3.96	3.93	3.92	3.96	3.93	3.92	0.00	0.00	0.00	±0.3
3070200	3.94	3.90	3.89	3.93	3.90	3.89	−0.02	0.00	0.00	±0.3
3888000	3.88	3.85	3.84	3.88	3.85	3.83	0.00	0.00	−0.02	±0.3
4000000	3.87	3.84	3.83	3.87	3.84	3.82	0.00	0.00	−0.02	±0.3
4923800	3.81	3.78	3.77	3.80	3.77	3.76	−0.02	−0.02	−0.02	±0.3
6235400	3.70	3.67	3.66	3.69	3.67	3.65	−0.02	0.00	−0.02	±0.3
7896400	3.56	3.52	3.52	3.55	3.50	3.51	−0.02	−0.05	−0.02	±0.3
10000000	3.41	3.38	3.38	3.40	3.38	3.37	−0.03	0.00	−0.03	±0.3

SPEAG H-field frequency response tolerance criteria[1]:
±0.3dB for applied H-fields at calibration points from 3kHz to 10MHz

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

Frequency Response, H-field, Channel 7

	H-field/(A/m) Applied			H-field/(A/m) Reading			Difference/(dB)			
f/(Hz)	x	y	z	x	y	z	x	y	z	Tolerance/(dB)
3000	1.54	1.54	1.54	1.55	1.55	1.54	0.06	0.06	0.00	±0.3
3200	1.54	1.54	1.53	1.53	1.57	1.54	−0.06	0.17	0.06	±0.3
4000	1.53	1.53	1.53	1.54	1.53	1.54	0.06	0.00	0.06	±0.3
5200	1.52	1.52	1.51	1.53	1.52	1.53	0.06	0.00	0.11	±0.3
6600	1.51	1.51	1.50	1.53	1.51	1.52	0.11	0.00	0.12	±0.3
8200	1.50	1.50	1.49	1.51	1.49	1.50	0.06	−0.06	0.06	±0.3
9000	1.49	1.49	1.49	1.50	1.50	1.50	0.06	0.06	0.06	±0.3
10600	4.36	4.26	4.24	4.40	4.27	4.30	0.08	0.02	0.12	±0.3
13400	4.38	4.33	4.31	4.42	4.35	4.34	0.08	0.04	0.06	±0.3
17000	4.39	4.32	4.30	4.41	4.36	4.34	0.04	0.08	0.08	±0.3
21400	4.41	4.34	4.33	4.42	4.37	4.36	0.02	0.06	0.06	±0.3
27200	4.41	4.34	4.32	4.43	4.37	4.34	0.04	0.06	0.04	±0.3
34400	4.41	4.35	4.33	4.42	4.36	4.35	0.02	0.02	0.04	±0.3
40000	4.40	4.34	4.33	4.43	4.37	4.35	0.06	0.06	0.04	±0.3
43600	4.39	4.34	4.32	4.42	4.36	4.34	0.06	0.04	0.04	±0.3
55400	4.38	4.32	4.31	4.40	4.34	4.33	0.04	0.04	0.04	±0.3
70000	4.37	4.32	4.30	4.39	4.33	4.31	0.04	0.02	0.02	±0.3
88800	4.35	4.30	4.29	4.37	4.31	4.30	0.04	0.02	0.02	±0.3
112400	4.34	4.29	4.28	4.34	4.29	4.29	0.00	0.00	0.02	±0.3
142400	4.32	4.27	4.26	4.33	4.27	4.27	0.02	0.00	0.02	±0.3
161750	4.30	4.25	4.24	4.30	4.26	4.25	0.00	0.02	0.02	±0.3
180400	4.29	4.25	4.23	4.29	4.25	4.23	0.00	0.00	0.00	±0.3
228400	4.26	4.21	4.20	4.27	4.21	4.21	0.02	0.00	0.02	±0.3
289400	4.22	4.18	4.17	4.21	4.18	4.17	−0.02	0.00	0.00	±0.3
366400	4.18	4.14	4.13	4.18	4.14	4.13	0.00	0.00	0.00	±0.3
400000	4.16	4.12	4.11	4.15	4.12	4.11	−0.02	0.00	0.00	±0.3
464000	4.13	4.09	4.08	4.13	4.09	4.08	0.00	0.00	0.00	±0.3
587800	4.09	4.05	4.04	4.08	4.05	4.04	−0.02	0.00	0.00	±0.3
744200	4.03	4.00	3.99	4.03	4.00	4.00	0.00	0.00	0.02	±0.3
942600	4.02	3.99	3.98	4.01	3.99	3.98	−0.02	0.00	0.00	±0.3
1193600	4.00	3.97	3.96	3.99	3.97	3.96	−0.02	0.00	0.00	±0.3
1511600	3.99	3.96	3.95	3.99	3.96	3.95	0.00	0.00	0.00	±0.3
1914400	3.98	3.94	3.94	3.98	3.94	3.93	0.00	0.00	−0.02	±0.3
2424400	3.96	3.93	3.92	3.96	3.93	3.92	0.00	0.00	0.00	±0.3
3070200	3.94	3.90	3.89	3.92	3.90	3.89	−0.04	0.00	0.00	±0.3
3888000	3.88	3.85	3.84	3.87	3.84	3.83	−0.02	−0.02	−0.02	±0.3
4000000	3.87	3.84	3.83	3.87	3.83	3.82	0.00	−0.02	−0.02	±0.3
4923800	3.81	3.78	3.77	3.80	3.77	3.76	−0.02	−0.02	−0.02	±0.3
6235400	3.70	3.67	3.66	3.69	3.67	3.65	−0.02	0.00	−0.02	±0.3
7896400	3.56	3.52	3.52	3.55	3.52	3.51	−0.02	0.00	−0.02	±0.3
10000000	3.41	3.38	3.38	3.40	3.37	3.40	−0.03	−0.03	0.05	±0.3

SPEAG H-field frequency response tolerance criteria[1]:
±0.3dB for applied H-fields at calibration points from 3kHz to 10MHz

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

Frequency Response, E-field, Channel 0

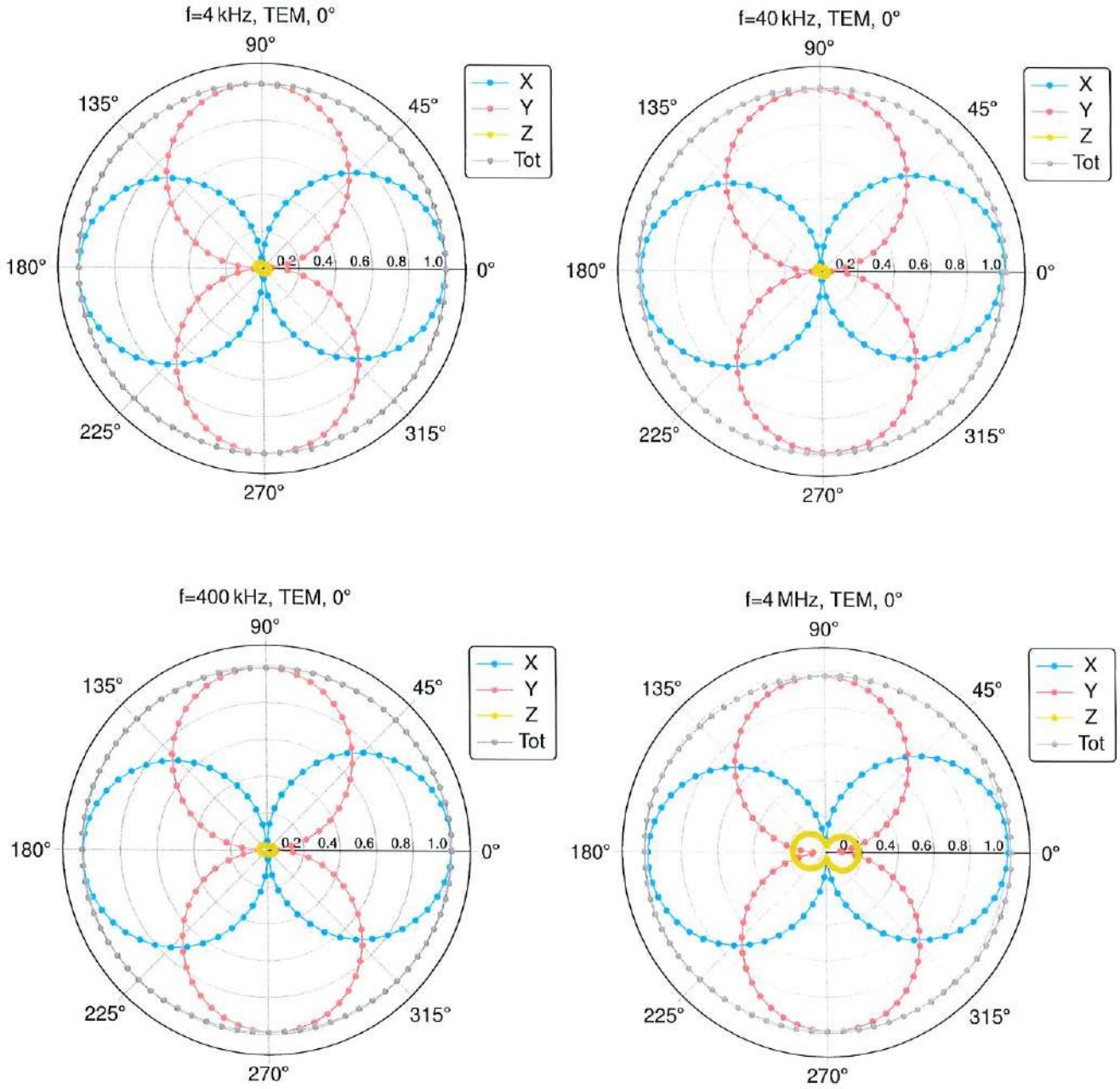
f/(Hz)	E-field/(V/m) Applied			E-field/(V/m) Reading			Difference/(dB)			Tolerance/(dB)
	x	y	z	x	y	z	x	y	z	
3000	82.8	82.8	83.7	82.7	82.8	83.7	−0.01	0.00	0.00	±0.3
3200	82.2	82.2	79.2	82.5	81.6	79.8	0.03	−0.06	0.07	±0.3
4000	85.7	85.7	82.9	85.7	85.6	82.9	0.00	−0.01	0.00	±0.3
5200	80.3	80.3	80.0	80.7	80.8	79.3	0.04	0.05	−0.08	±0.3
6600	80.0	80.0	78.3	80.1	80.2	78.4	0.01	0.02	0.01	±0.3
8200	79.5	79.5	77.6	79.8	79.1	77.7	0.03	−0.04	0.01	±0.3
9000	79.9	79.9	80.0	79.9	80.0	80.0	0.00	0.01	0.00	±0.3
10600	81.5	81.5	77.7	81.5	81.5	77.6	0.00	0.00	−0.01	±0.3
13400	80.1	80.1	79.2	80.1	80.1	79.1	0.00	0.00	−0.01	±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	77.6	0.00	0.00	−0.01	±0.3
27200	77.6	77.6	77.0	77.7	77.7	77.1	0.01	0.01	0.01	±0.3
34400	79.5	79.5	78.1	79.5	79.5	78.1	0.00	0.00	0.00	±0.3
40000	79.0	79.0	78.7	79.0	79.1	78.7	0.00	0.01	0.00	±0.3
43600	79.4	79.4	78.4	79.4	79.5	78.5	0.00	0.01	0.01	±0.3
55400	78.9	78.9	77.8	78.9	78.9	77.8	0.00	0.00	0.00	±0.3
70000	79.4	79.4	78.2	79.4	79.4	78.2	0.00	0.00	0.00	±0.3
88800	79.2	79.2	78.4	79.2	79.2	78.5	0.00	0.00	0.01	±0.3
112400	79.1	79.1	78.3	79.1	79.1	78.3	0.00	0.00	0.00	±0.3
142400	79.5	79.5	78.5	79.5	79.5	78.5	0.00	0.00	0.00	±0.3
161750	79.9	79.9	79.1	79.9	79.9	79.1	0.00	0.00	0.00	±0.3
180400	80.2	80.2	79.3	80.2	80.2	79.3	0.00	0.00	0.00	±0.3
228400	80.9	80.9	79.7	80.9	80.9	79.7	0.00	0.00	0.00	±0.3
289400	80.9	80.9	80.0	80.9	80.9	80.0	0.00	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	81.9	81.9	80.8	0.00	0.00	0.00	±0.3
587800	82.1	82.1	81.0	82.2	82.1	81.0	0.01	0.00	0.00	±0.3
744200	82.1	82.1	81.0	82.1	82.1	80.9	0.00	0.00	−0.01	±0.3
942600	82.2	82.2	81.1	82.2	82.2	81.1	0.00	0.00	0.00	±0.3
1193600	82.4	82.4	81.1	82.4	82.4	81.1	0.00	0.00	0.00	±0.3
1511600	82.0	82.0	81.0	82.0	82.0	80.9	0.00	0.00	−0.01	±0.3
1914400	81.7	81.7	80.7	81.7	81.7	80.7	0.00	0.00	0.00	±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	82.4	82.5	81.7	−0.01	0.00	0.00	±0.3
6235400	83.6	83.6	82.5	83.6	83.6	82.5	0.00	0.00	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	93.7	0.00	0.00	−0.01	±0.3

SPEAG E-field frequency response tolerance criteria[1]:
±0.3dB for applied E-fields at calibration points from 3kHz to 10MHz

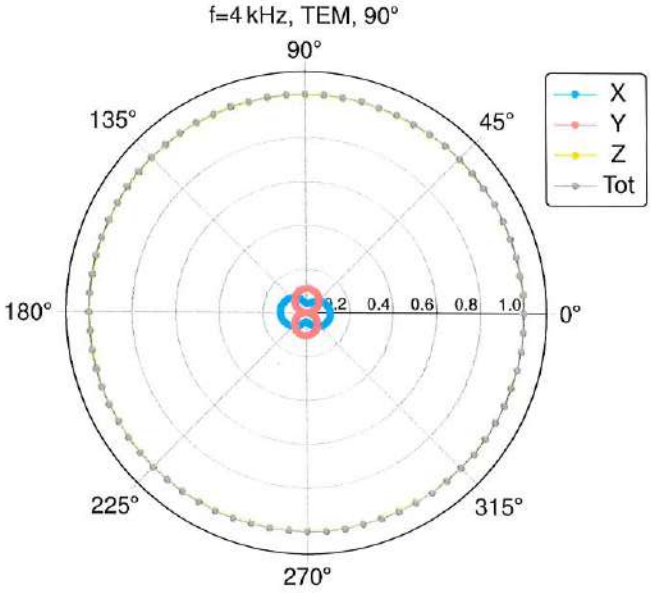
[1] Calibration uncertainty not taken into account (shared risk 50%).

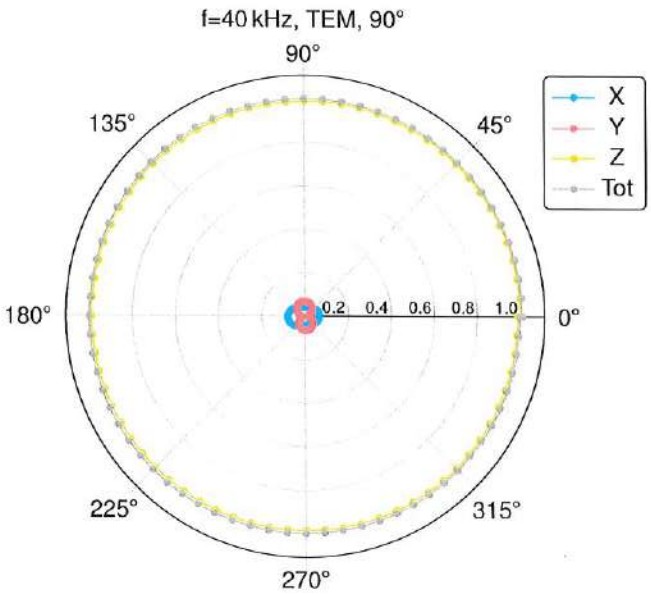
Isotropy H-Field

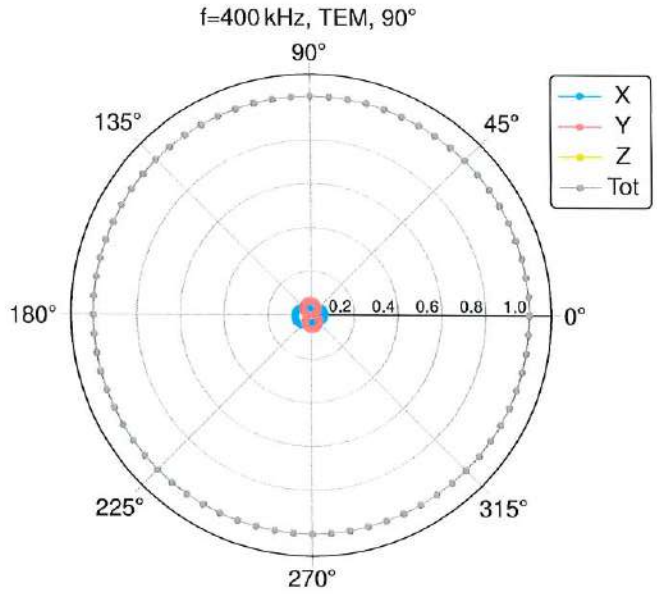
H-Field Receiving Pattern (ϕ), $\vartheta = 0°$

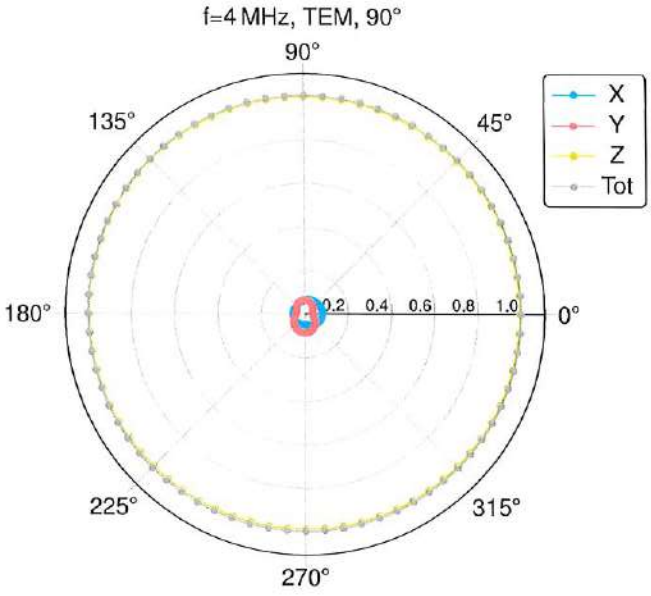


H-Field Receiving Pattern (ϕ), $\vartheta = 90°$

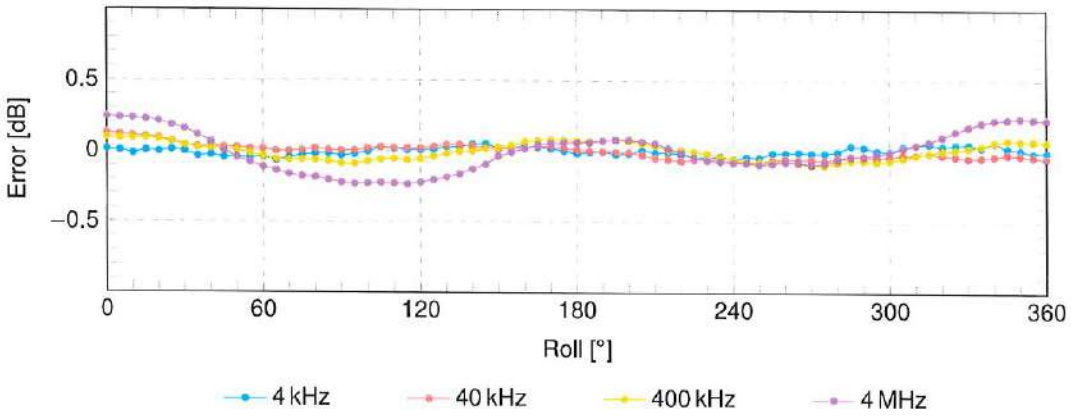




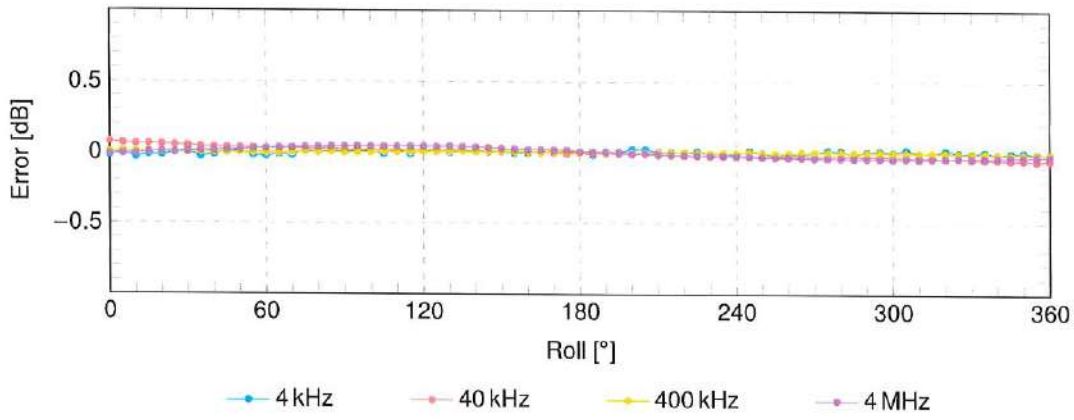




H-Field Receiving Pattern (ϕ), $\vartheta = 0°$



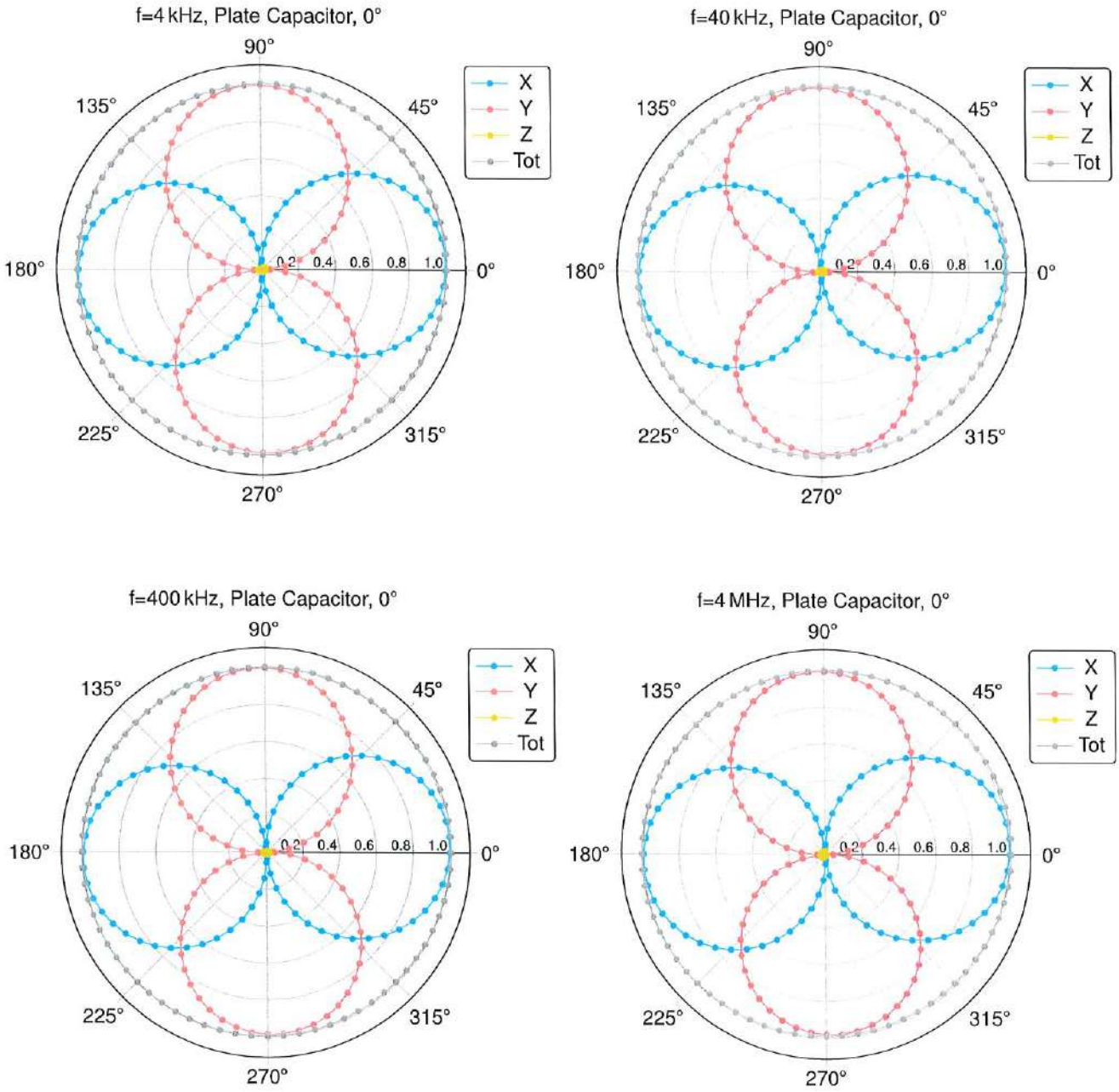
H-Field Receiving Pattern (ϕ), $\vartheta = 90°$



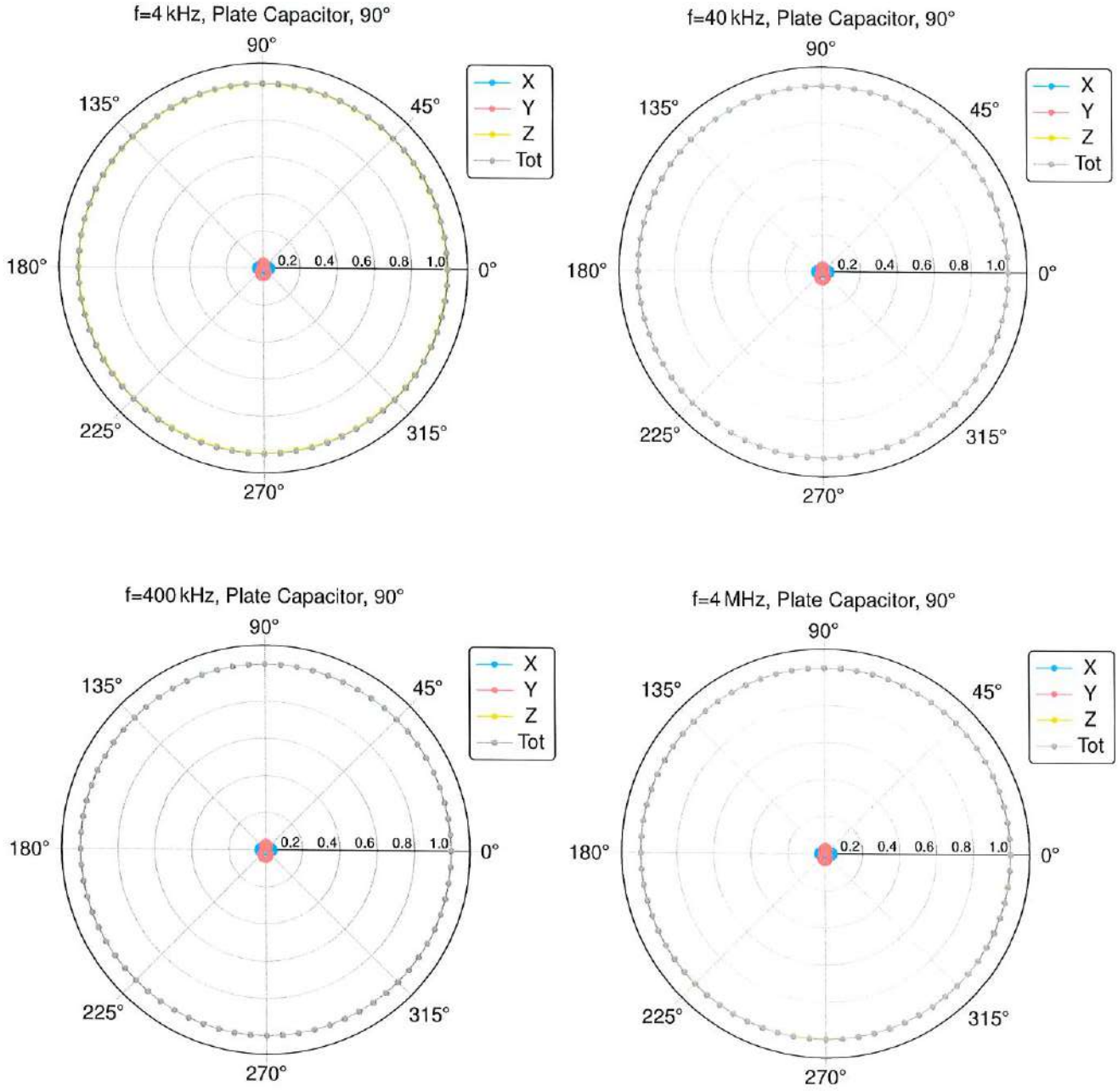
SPEAG axial deviation from the ideal response tolerance for H-field: ±0.6 dB

Isotropy E-Field

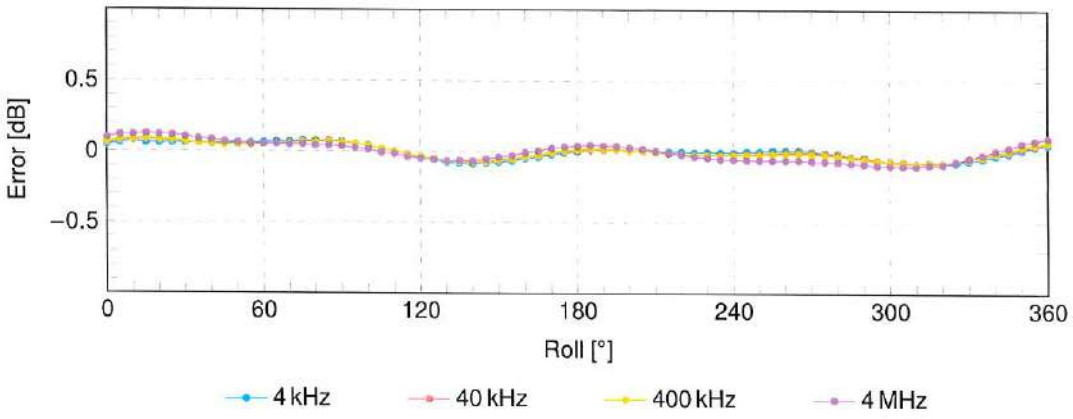
E-Field Receiving Pattern (ϕ), $\vartheta = 0°$



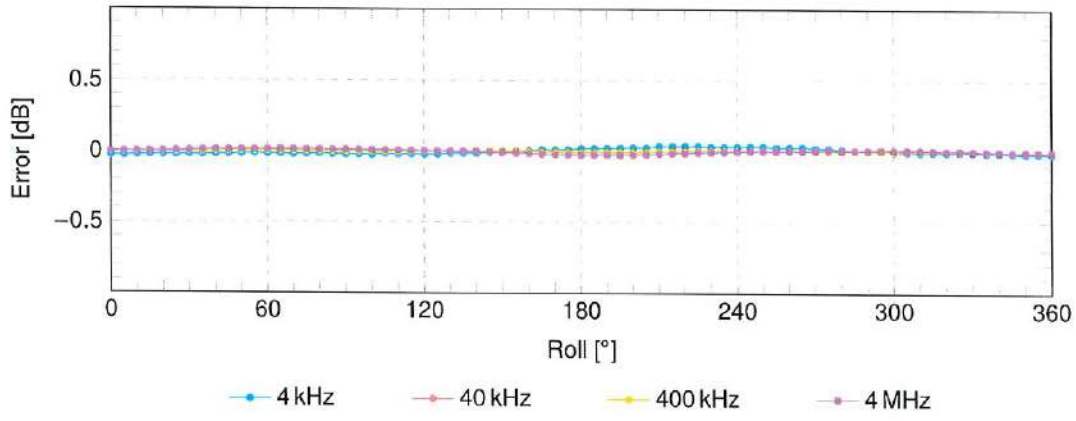
E-Field Receiving Pattern (ϕ), $\vartheta = 90°$



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



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



SPEAG axial deviation from the ideal response tolerance for E-field: ±0.8 dB

In Collaboration with
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CALIBRATION CNAS L0570

Client **WSCT** **Certificate No: 24J02Z000487**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN : 7391
Calibration Procedure(s)	FF-Z11-004-02 Calibration Procedures for Dosimetric E-field Probes
Calibration date:	August 29, 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(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	19-Oct-23(CTTL, No.J23X11026)	Oct-24
Power sensor NRP8S	104291	19-Oct-23(CTTL, No.J23X11026)	Oct-24
Power sensor NRP8S	104292	19-Oct-23(CTTL, No.J23X11026)	Oct-24
Reference 10dBAttenuator	18N50W-10dB	19-Jan-23(CTTL, No.J23X00212)	Jan-25
Reference 20dBAttenuator	18N50W-20dB	19-Jan-23(CTTL, No.J23X00211)	Jan-25
Reference Probe EX3DV4	SN 7307	28-May-24(SPEAG, No.EX-7307_May24)	May-25
DAE4	SN 771	19-Jan-24(SPEAG, No.DAE4-771_Jan24)	Jan-25
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
SignalGenerator MG3700A	6201052605	12-Jun-24(CTTL, No.24J02X005419)	Jun-25
SignalGenerator APSIN26G	181-33A6D0700-1959	26-Mar-24(CTTL, No.24J02X002468)	Mar-25
Network Analyzer E5071C	MY46110673	25-Dec-23(CTTL, No.J23X13425)	Dec-24
Reference 10dBAttenuator	BT0520	11-May-23(CTTL, No.J23X04061)	May-25
Reference 20dBAttenuator	BT0267	11-May-23(CTTL, No.J23X04062)	May-25
OCP DAK-12	SN 1174	25-Oct-23(SPEAG, No.OCP-DAK12-1174_Oct23)	Oct-24

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Jun	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: September 07, 2024

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Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,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 θ=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:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016

c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010

d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,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.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). 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.
- *Ax,y,z; Bx,y,z; Cx,y,z;VRx,y,z:*A,B,C 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≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,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±50MHz to±100MHz.
- *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 *NORMx* (no uncertainty required).

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7391

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (*k*=2)
Norm(μV/(V/m)²)[A]	0.35	0.32	0.34	±10.0%
DCP(mV)[B]	101.8	106.3	99.8	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max Dev.	Max Unc[E] (*k*=2)
0	CW	X	0.0	0.0	1.0	0.00	146.3	±2.7%	±4.7%
		Y	0.0	0.0	1.0		141.5		
		Z	0.0	0.0	1.0		143.2		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	1.32	60.00	4.99	10.00	60	±5.2%	±9.6%
		Y	1.47	60.85	6.63		60		
		Z	1.31	60.00	5.20		60		
10353-AAA	Pulse Waveform (200Hz, 20%)	X	36.00	72.00	7.00	6.99	80	±4.2%	±9.6%
		Y	0.82	60.00	4.99		80		
		Z	14.00	70.00	7.00		80		
10354-AAA	Pulse Waveform (200Hz, 40%)	X	0.00	69.19	37.94	3.98	95	±4.6%	±9.6%
		Y	0.05	60.00	100.00		95		
		Z	0.00	69.91	38.60		95		
10355-AAA	Pulse Waveform (200Hz, 60%)	X	0.00	92.27	100.00	2.22	120	±5.5%	±9.6%
		Y	0.02	60.00	100.00		120		
		Z	0.00	90.64	99.97		120		
10387-AAA	QPSK Waveform, 1 MHz	X	20.00	126.25	38.29	1.00	150	±3.6%	±9.6%
		Y	20.00	123.70	37.08		150		
		Z	20.00	132.56	41.66		150		
10388-AAA	QPSK Waveform, 10 MHz	X	20.00	118.30	36.15	0.00	150	±3.3%	±9.6%
		Y	20.00	116.69	35.33		150		
		Z	20.00	121.31	37.90		150		
10396-AAA	64-QAM Waveform, 100 kHz	X	10.12	112.49	39.41	3.01	150	±2.2%	±9.6%
		Y	6.92	101.30	35.39		150		
		Z	20.00	130.56	45.18		150		
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	5.24	69.75	18.68	0.00	150	±3.7%	±9.6%
		Y	5.14	69.21	18.25		150		
		Z	5.28	70.02	18.92		150		

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 E^2-field uncertainty inside TSL (see Page 5).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7391

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	31.12	230.42	36.27	4.26	0.00	4.90	0.00	0.17	1.02
Y	30.26	220.54	35.20	5.72	0.00	5.03	0.25	0.13	1.02
Z	30.51	224.99	36.20	5.41	0.00	4.93	0.28	0.15	1.02

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	118.6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:7391

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	41.9	0.89	10.72	10.72	10.72	0.13	1.32	±12.7%
900	41.5	0.97	10.22	10.22	10.22	0.15	1.39	±12.7%
1750	40.1	1.37	8.80	8.80	8.80	0.23	1.11	±12.7%
1900	40.0	1.40	8.50	8.50	8.50	0.24	1.07	±12.7%
2100	39.8	1.49	8.59	8.59	8.59	0.22	1.09	±12.7%
2300	39.5	1.67	8.33	8.33	8.33	0.45	0.74	±12.7%
2450	39.2	1.80	8.07	8.07	8.07	0.45	0.75	±12.7%
2600	39.0	1.96	7.90	7.90	7.90	0.53	0.70	±12.7%
3300	38.2	2.71	7.50	7.50	7.50	0.40	0.95	±13.9%
3500	37.9	2.91	7.30	7.30	7.30	0.40	1.00	±13.9%
3700	37.7	3.12	7.04	7.04	7.04	0.40	1.08	±13.9%
3900	37.5	3.32	7.00	7.00	7.00	0.30	1.50	±13.9%
4100	37.2	3.53	6.95	6.95	6.95	0.35	1.25	±13.9%
4400	36.9	3.84	6.75	6.75	6.75	0.30	1.52	±13.9%
4600	36.7	4.04	6.70	6.70	6.70	0.35	1.45	±13.9%
4800	36.4	4.25	6.65	6.65	6.65	0.35	1.50	±13.9%
4950	36.3	4.40	6.45	6.45	6.45	0.35	1.50	±13.9%
5200	36.0	4.66	5.95	5.95	5.95	0.40	1.40	±13.9%
5300	35.9	4.76	5.70	5.70	5.70	0.40	1.45	±13.9%
5500	35.6	4.96	5.32	5.32	5.32	0.40	1.45	±13.9%
5600	35.5	5.07	5.18	5.18	5.18	0.40	1.50	±13.9%
5800	35.3	5.27	5.25	5.25	5.25	0.40	1.50	±13.9%

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of 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. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequency up to 6 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[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 the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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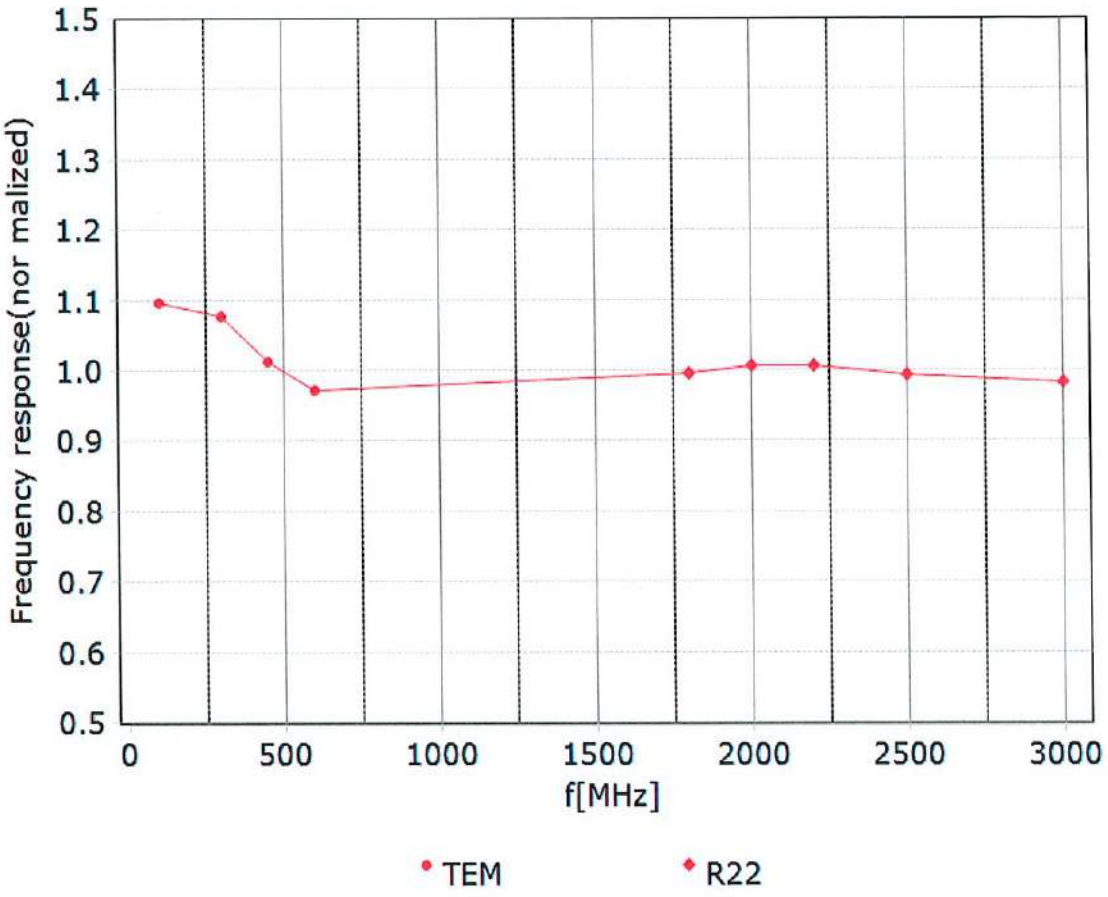
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.4% (*k*=2)

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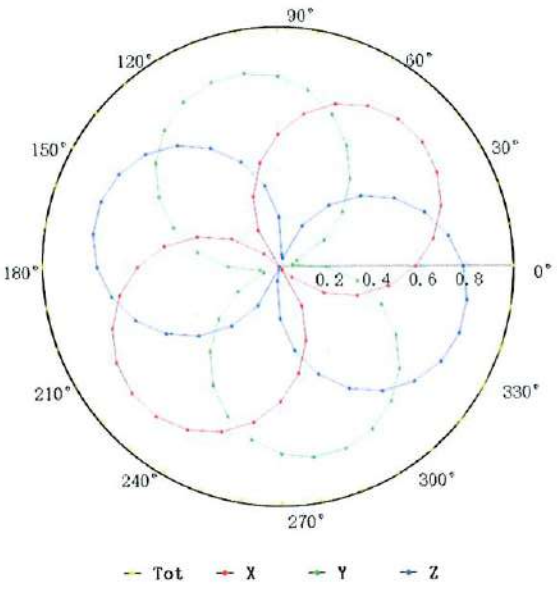
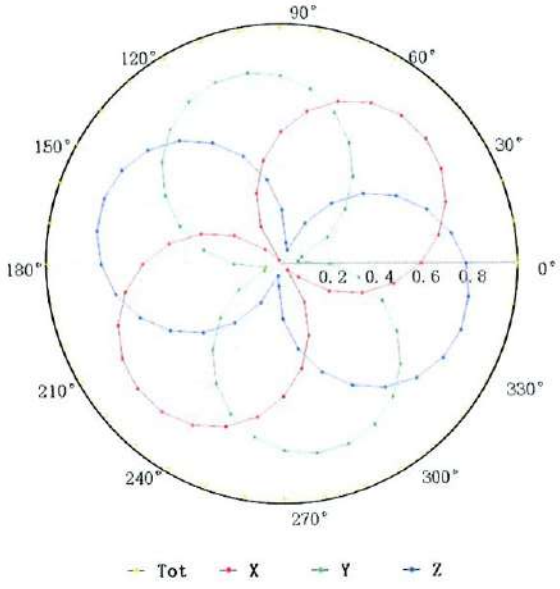
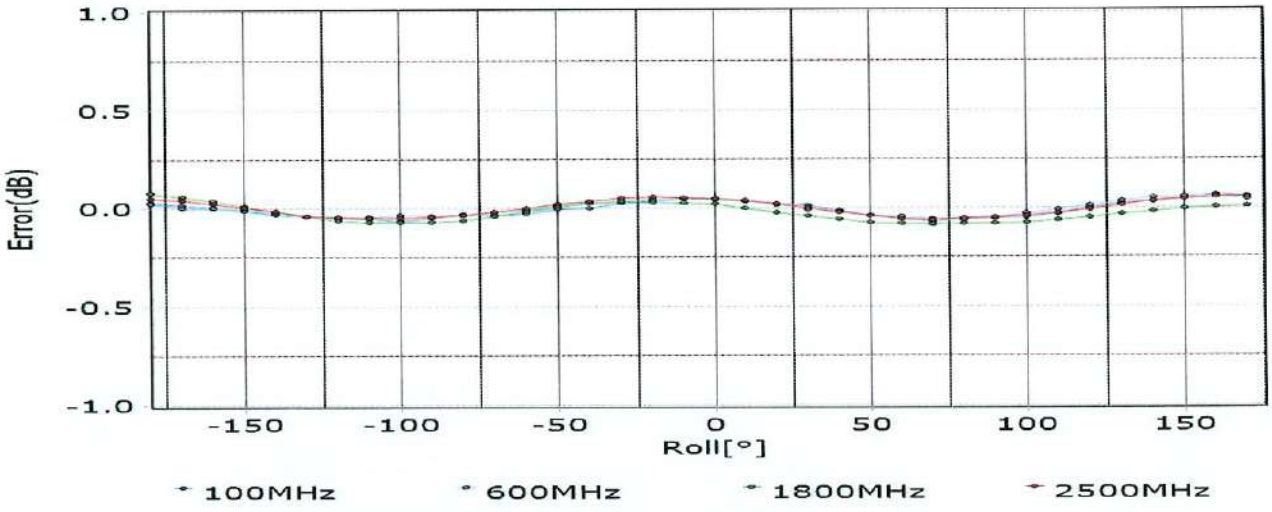
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





Uncertainty of Axial Isotropy Assessment: ±1.2% (*k*=2)

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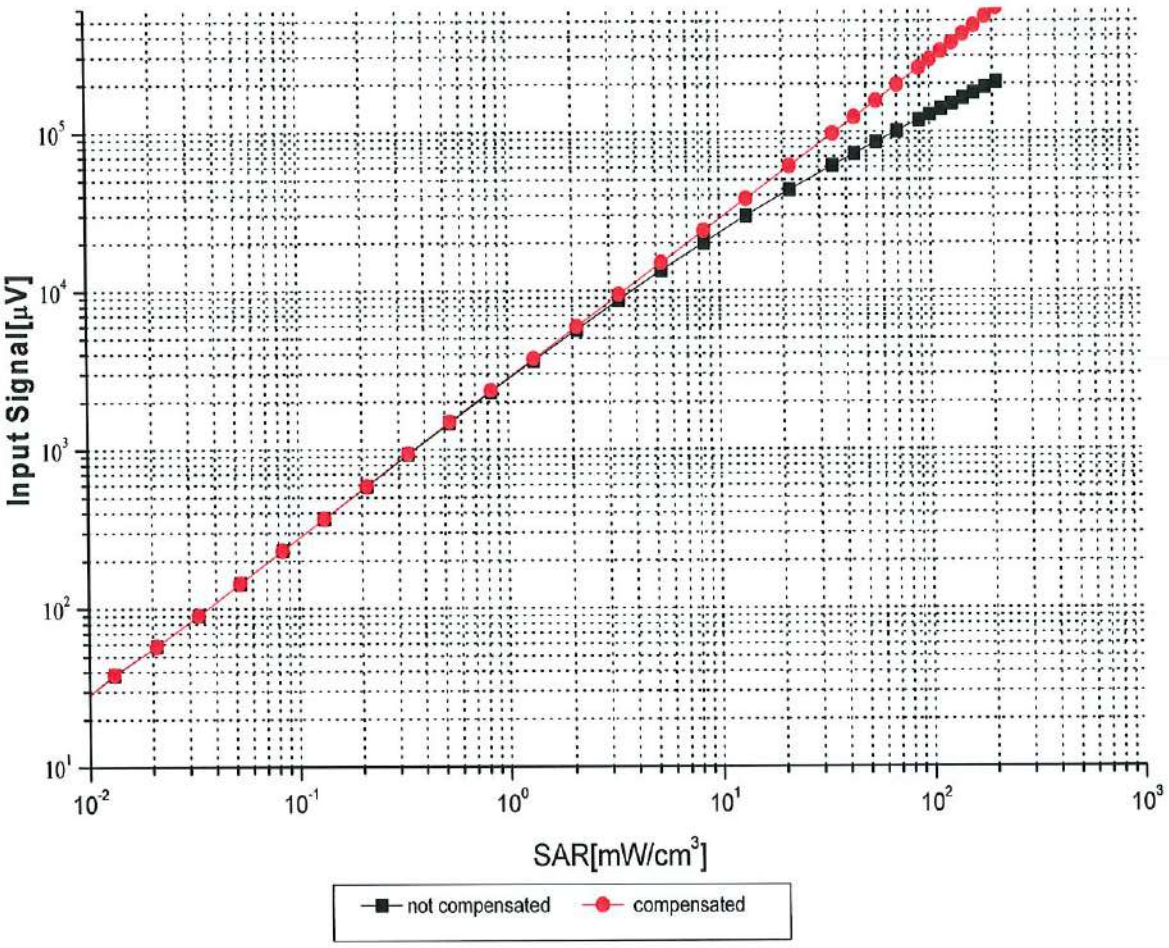
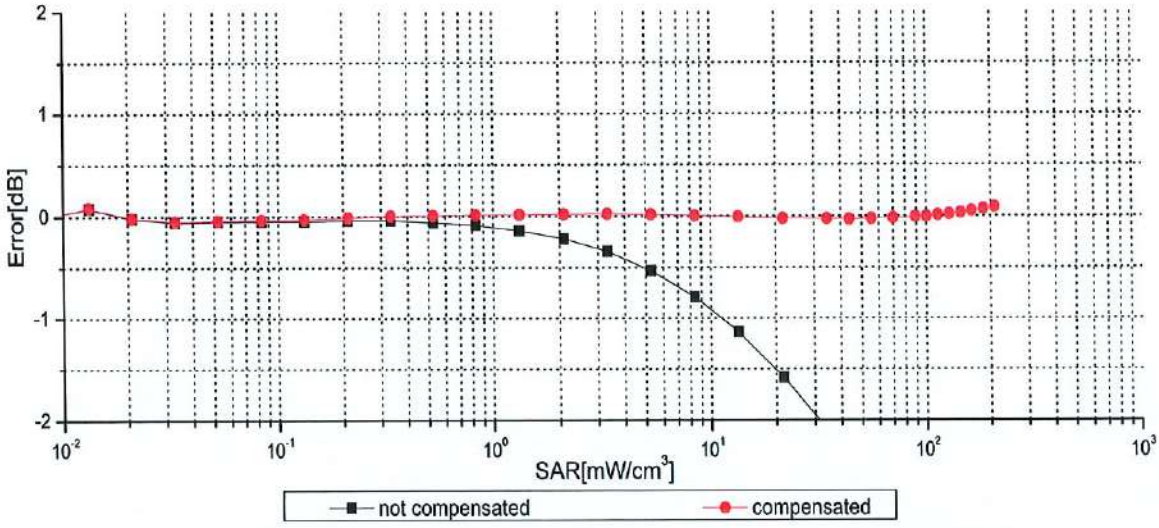
Dynamic Range f(SAR$_{head}$)
(TEM cell, f = 900 MHz)





Uncertainty of Linearity Assessment: ±0.9% (*k*=2)

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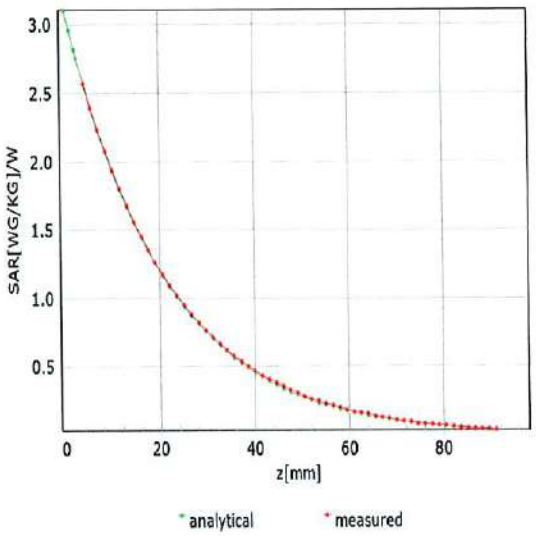
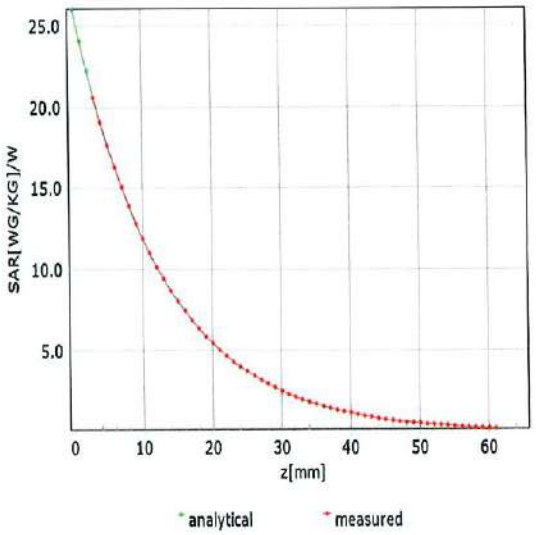
Conversion Factor Assessment

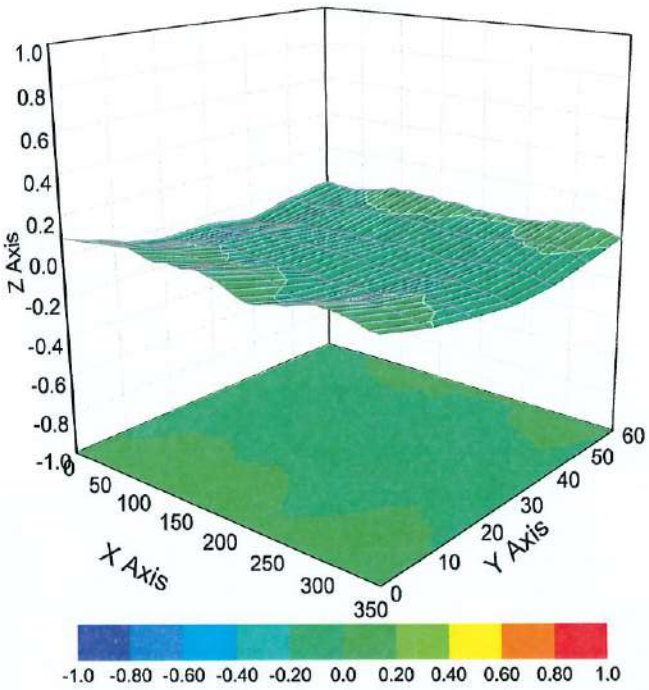
f=750 MHz,WGLS R9(H_convF)



f=1750 MHz,WGLS R22(H_convF)



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±3.2% (*k*=2)

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Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	UncE (*k*=2)
0		CW	CW	0.00	± 4.7 %
10010	CAA	SAR Validation (Square, 100ms, 10ms)	Test	10.00	± 9.6 %
10011	CAB	UMTS-FDD (WCDMA)	WCDMA	2.91	± 9.6 %
10012	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	WLAN	1.87	± 9.6 %
10013	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	WLAN	9.46	± 9.6 %
10021	DAC	GSM-FDD (TDMA, GMSK)	GSM	9.39	± 9.6 %
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	9.57	± 9.6 %
10024	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	6.56	± 9.6 %
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.62	± 9.6 %
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.55	± 9.6 %
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	4.80	± 9.6 %
10028	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	3.55	± 9.6 %
10029	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	7.78	± 9.6 %
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	Bluetooth	5.30	± 9.6 %
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	Bluetooth	1.87	± 9.6 %
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.16	± 9.6 %
10033	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	Bluetooth	7.74	± 9.6 %
10034	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	Bluetooth	4.53	± 9.6 %
10035	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	Bluetooth	3.83	± 9.6 %
10036	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	Bluetooth	8.01	± 9.6 %
10037	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	Bluetooth	4.77	± 9.6 %
10038	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	Bluetooth	4.10	± 9.6 %
10039	CAB	CDMA2000 (1xRTT, RC1)	CDMA2000	4.57	± 9.6 %
10042	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	AMPS	7.78	± 9.6 %
10044	CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	AMPS	0.00	± 9.6 %
10048	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	DECT	13.80	± 9.6 %
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	10.79	± 9.6 %
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	TD-SCDMA	11.01	± 9.6 %
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.52	± 9.6 %
10059	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	WLAN	2.12	± 9.6 %
10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	WLAN	2.83	± 9.6 %
10061	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	WLAN	3.60	± 9.6 %
10062	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	8.68	± 9.6 %
10063	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	± 9.6 %
10064	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	± 9.6 %
10065	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	± 9.6 %
10066	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.38	± 9.6 %
10067	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	± 9.6 %
10068	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	± 9.6 %
10069	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.56	± 9.6 %
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	WLAN	9.83	± 9.6 %
10072	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	WLAN	9.62	± 9.6 %
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	WLAN	9.94	± 9.6 %
10074	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	WLAN	10.30	± 9.6 %
10075	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	WLAN	10.77	± 9.6 %
10076	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	WLAN	10.94	± 9.6 %
10077	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	WLAN	11.00	± 9.6 %
10081	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	3.97	± 9.6 %
10082	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	AMPS	4.77	± 9.6 %
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	± 9.6 %
10097	CAC	UMTS-FDD (HSDPA)	WCDMA	3.98	± 9.6 %
10098	DAC	UMTS-FDD (HSUPA, Subtest 2)	WCDMA	3.98	± 9.6 %
10099	CAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	± 9.6 %
10100	CAC	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	± 9.6 %
10101	CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %

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10102	CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10103	DAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10104	CAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	± 9.6 %
10105	CAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	± 9.6 %
10108	CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.80	± 9.6 %
10109	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10110	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10111	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	6.44	± 9.6 %
10112	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	± 9.6 %
10113	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10114	CAG	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10115	CAG	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	± 9.6 %
10116	CAG	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	± 9.6 %
10117	CAG	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	± 9.6 %
10118	CAD	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	± 9.6 %
10119	CAD	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	± 9.6 %
10140	CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10141	CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	± 9.6 %
10142	CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10143	CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	± 9.6 %
10144	CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	± 9.6 %
10145	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	± 9.6 %
10146	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	± 9.6 %
10147	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	± 9.6 %
10149	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10150	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10151	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	± 9.6 %
10152	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10153	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	± 9.6 %
10154	CAF	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10155	CAF	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10156	CAF	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	± 9.6 %
10157	CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10158	CAE	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10159	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	± 9.6 %
10160	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	± 9.6 %
10161	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10162	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.58	± 9.6 %
10166	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	± 9.6 %
10167	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	± 9.6 %
10168	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.79	± 9.6 %
10169	CAG	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10170	CAG	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10171	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	± 9.6 %
10172	CAE	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10173	CAE	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10174	CAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10175	CAF	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10176	CAF	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10177	CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10178	CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10179	AAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10180	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10181	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10182	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10183	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10184	CAG	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10185	CAI	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	± 9.6 %
10186	CAG	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %

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10187	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10188	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10189	CAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10193	CAE	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.09	± 9.6 %
10194	AAD	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	8.12	± 9.6 %
10195	CAE	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	WLAN	8.21	± 9.6 %
10196	CAE	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10197	AAE	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10198	CAF	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10219	CAF	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	± 9.6 %
10220	AAF	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10221	CAC	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10222	CAC	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN	8.06	± 9.6 %
10223	CAD	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	WLAN	8.48	± 9.6 %
10224	CAD	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	WLAN	8.08	± 9.6 %
10225	CAD	UMTS-FDD (HSPA+)	WCDMA	5.97	± 9.6 %
10226	CAD	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.49	± 9.6 %
10227	CAD	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.26	± 9.6 %
10228	CAD	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-TDD	9.22	± 9.6 %
10229	DAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10230	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10231	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-TDD	9.19	± 9.6 %
10232	CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10233	CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10234	CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10235	CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10236	CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10237	CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10238	CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10239	CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10240	CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10241	CAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.82	± 9.6 %
10242	CAD	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-TDD	9.86	± 9.6 %
10243	CAD	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-TDD	9.46	± 9.6 %
10244	CAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10245	CAG	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-TDD	10.06	± 9.6 %
10246	CAG	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
10247	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-TDD	9.91	± 9.6 %
10248	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-TDD	10.09	± 9.6 %
10249	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10250	CAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-TDD	9.81	± 9.6 %
10251	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-TDD	10.17	± 9.6 %
10252	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-TDD	9.24	± 9.6 %
10253	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-TDD	9.90	± 9.6 %
10254	CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	± 9.6 %
10255	CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-TDD	9.20	± 9.6 %
10256	CAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.96	± 9.6 %
10257	CAD	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.08	± 9.6 %
10258	CAD	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-TDD	9.34	± 9.6 %
10259	CAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-TDD	9.98	± 9.6 %
10260	CAG	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	± 9.6 %
10261	CAG	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-TDD	9.24	± 9.6 %
10262	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-TDD	9.83	± 9.6 %
10263	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-TDD	10.16	± 9.6 %
10264	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-TDD	9.23	± 9.6 %
10265	CAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10266	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-TDD	10.07	± 9.6 %
10267	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
10268	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %