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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3661

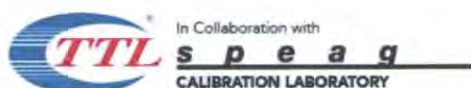
Calibration Parameter Determined in Head Tissue Simulating Media

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	9.71	9.71	9.71	0.12	1.00	± 12%
835	41.5	0.90	9.60	9.60	9.60	0.10	1.57	± 12%
900	41.5	0.97	9.37	9.37	9.37	0.11	1.49	± 12%
1450	40.5	1.20	8.76	8.76	8.76	0.07	1.88	± 12%
1750	40.1	1.37	8.43	8.43	8.43	0.13	1.73	± 12%
1900	40.0	1.40	7.94	7.94	7.94	0.20	1.11	± 12%
2000	40.0	1.40	7.74	7.74	7.74	0.21	1.12	± 12%
2450	39.2	1.80	7.17	7.17	7.17	0.22	1.85	± 12%
2600	39.0	1.96	7.10	7.10	7.10	0.26	1.38	± 12%
5200	36.0	4.66	5.47	5.47	5.47	0.47	1.22	± 13%
5300	35.9	4.76	5.17	5.17	5.17	0.49	1.14	± 13%
5500	35.6	4.96	5.02	5.02	5.02	0.50	1.16	± 13%
5600	35.5	5.07	4.96	4.96	4.96	0.50	1.15	± 13%
5800	35.3	5.27	4.78	4.78	4.78	0.49	1.20	± 13%

^C Frequency validity 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.

^F At frequency below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ±5%. 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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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3661

Calibration Parameter Determined in Body Tissue Simulating Media

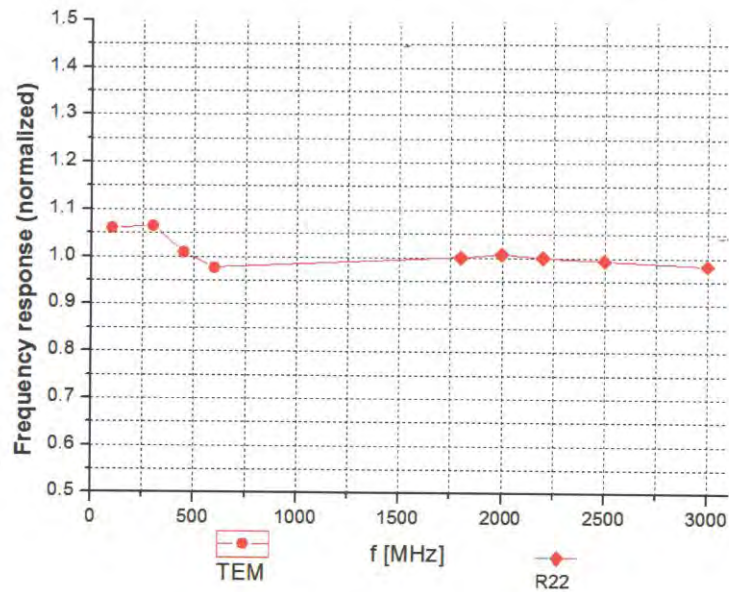
f [MHz] ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unct. (k=2)
750	55.5	0.96	9.72	9.72	9.72	0.15	1.25	± 12%
835	55.2	0.97	9.68	9.68	9.68	0.13	1.59	± 12%
900	55.0	1.05	9.37	9.37	9.37	0.21	1.18	± 12%
1450	54.0	1.30	8.23	8.23	8.23	0.14	1.34	± 12%
1750	53.4	1.49	7.92	7.92	7.92	0.15	1.56	± 12%
1900	53.3	1.52	8.08	8.08	8.08	0.14	1.93	± 12%
2000	53.3	1.52	7.68	7.68	7.68	0.15	2.17	± 12%
2450	52.7	1.95	7.31	7.31	7.31	0.27	1.42	± 12%
2600	52.5	2.16	7.24	7.24	7.24	0.29	1.20	± 12%
5200	49.0	5.30	4.92	4.92	4.92	0.54	0.99	± 13%
5300	48.9	5.42	4.64	4.64	4.64	0.55	0.90	± 13%
5500	48.6	5.65	4.33	4.33	4.33	0.50	1.30	± 13%
5600	48.5	5.77	4.26	4.26	4.26	0.49	1.43	± 13%
5800	48.2	6.00	4.35	4.35	4.35	0.50	1.67	± 13%

^C Frequency validity 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.

^F At frequency below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ±5%. 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.

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

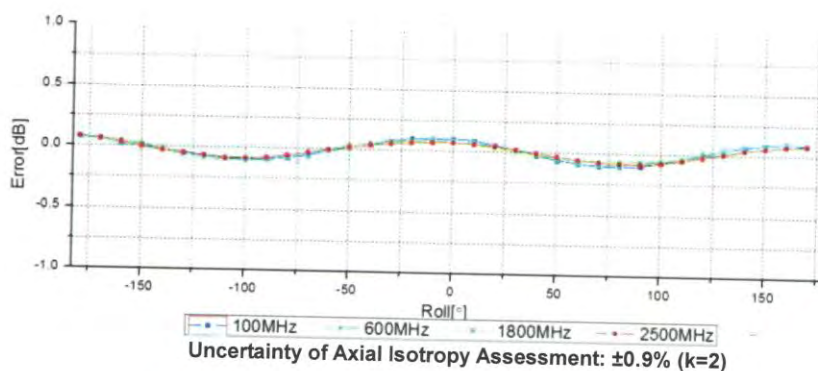
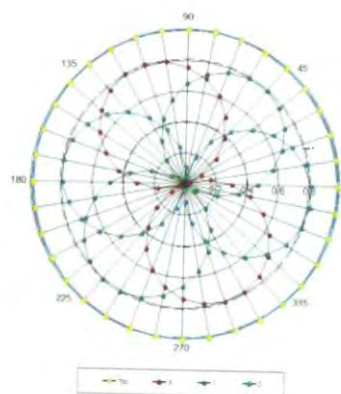
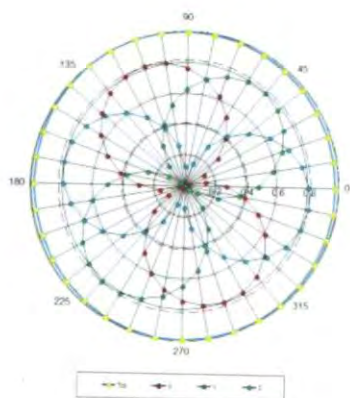


Uncertainty of Frequency Response of E-field: $\pm 7.5\%$ ($k=2$)

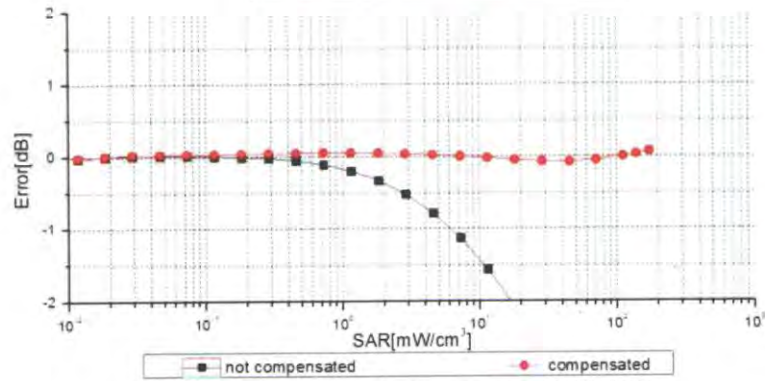
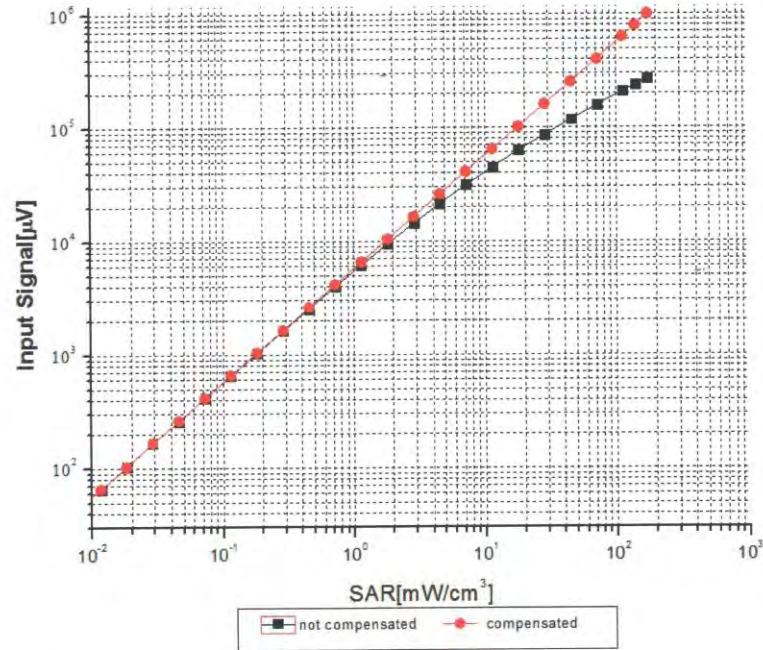
Receiving Pattern (Φ), $\theta=0^\circ$

f=600 MHz, TEM

f=1800 MHz, R22



Dynamic Range f(SAR_{head}) (TEM cell, f = 900 MHz)

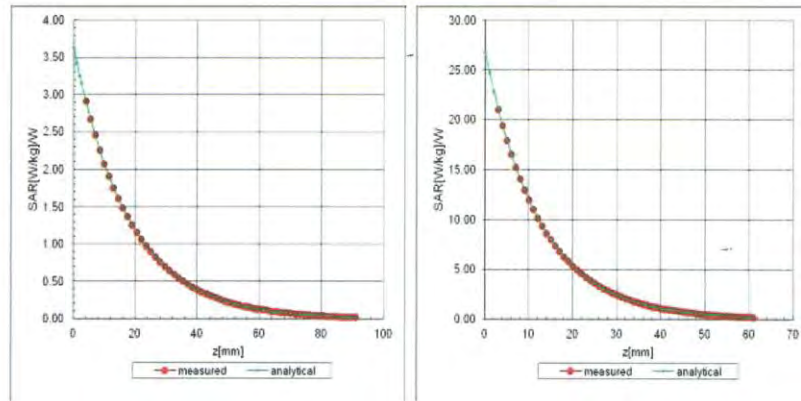


Uncertainty of Linearity Assessment: $\pm 0.9\%$ ($k=2$)

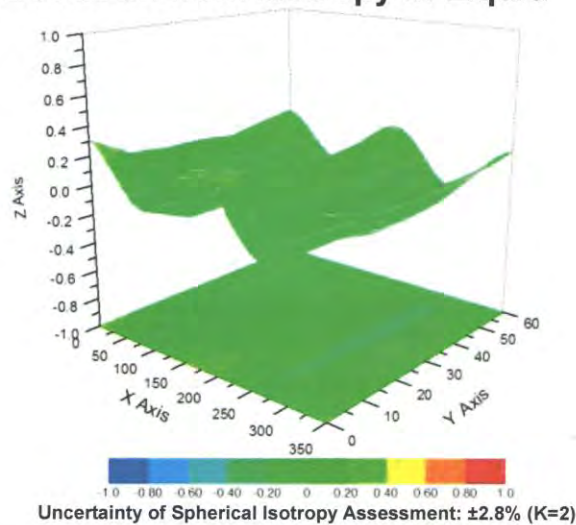
Conversion Factor Assessment

f=900 MHz, WGLS R9(H_convF)

f=1750 MHz, WGLS R22(H_convF)



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: $\pm 2.8\%$ (K=2)



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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3661

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	131.7
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



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 **BTL-CN (Auden)**

Certificate No: **D750V3-1095_Sep15**

CALIBRATION CERTIFICATE

Object **D750V3 - SN: 1095**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **September 30, 2015**

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 $(22 \pm 3)^{\circ}\text{C}$ and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe EX3DV4	SN: 7349	30-Dec-14 (No. EX3-7349_Dec14)	Dec-15
DAE4	SN: 601	17-Aug-15 (No. DAE4-601_Aug15)	Aug-16
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100972	15-Jun-15 (in house check Jun-15)	In house check: Jun-18
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by: **Leif Klysner** Name: **Leif Klysner** Function: **Laboratory Technician**

Approved by: **Katja Pokovic** Name: **Katja Pokovic** Technical Manager

Signature

Issued: October 1, 2015

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