



In Collaboration with

s p e a g
CALIBRATION LABORATORY

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3578

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	9.72	9.72	9.72	0.30	0.80	± 12.1%
835	41.5	0.90	9.51	9.51	9.51	0.16	1.26	± 12.1%
900	41.5	0.97	9.64	9.64	9.64	0.18	1.29	± 12.1%
1750	40.1	1.37	8.37	8.37	8.37	0.21	1.09	± 12.1%
1900	40.0	1.40	7.94	7.94	7.94	0.20	1.13	± 12.1%
2000	40.0	1.40	7.99	7.99	7.99	0.22	1.10	± 12.1%
2300	39.5	1.67	7.71	7.71	7.71	0.47	0.77	± 12.1%
2450	39.2	1.80	7.44	7.44	7.44	0.52	0.76	± 12.1%
2600	39.0	1.96	7.31	7.31	7.31	0.57	0.73	± 12.1%
3500	37.9	2.91	7.05	7.05	7.05	0.52	0.87	± 13.3%
5250	35.9	4.71	5.29	5.29	5.29	0.40	1.25	± 13.3%
5600	35.5	5.07	4.76	4.76	4.76	0.40	1.50	± 13.3%
5750	35.4	5.22	4.79	4.79	4.79	0.40	1.50	± 13.3%

^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 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.

DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3578

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	9.77	9.77	9.77	0.30	0.90	± 12.1%
835	55.2	0.97	9.53	9.53	9.53	0.17	1.38	± 12.1%
900	55.0	1.05	9.58	9.58	9.58	0.24	1.14	± 12.1%
1750	53.4	1.49	8.08	8.08	8.08	0.21	1.14	± 12.1%
1900	53.3	1.52	7.79	7.79	7.79	0.17	1.33	± 12.1%
2000	53.3	1.52	7.78	7.78	7.78	0.20	1.28	± 12.1%
2300	52.9	1.81	7.67	7.67	7.67	0.37	1.03	± 12.1%
2450	52.7	1.95	7.43	7.43	7.43	0.31	1.30	± 12.1%
2600	52.5	2.16	7.27	7.27	7.27	0.35	1.14	± 12.1%
3500	51.3	3.31	6.50	6.50	6.50	0.57	0.94	± 13.3%
5250	48.9	5.36	4.98	4.98	4.98	0.40	1.65	± 13.3%
5600	48.5	5.77	4.30	4.30	4.30	0.45	1.75	± 13.3%
5750	48.3	5.94	4.48	4.48	4.48	0.45	1.95	± 13.3%

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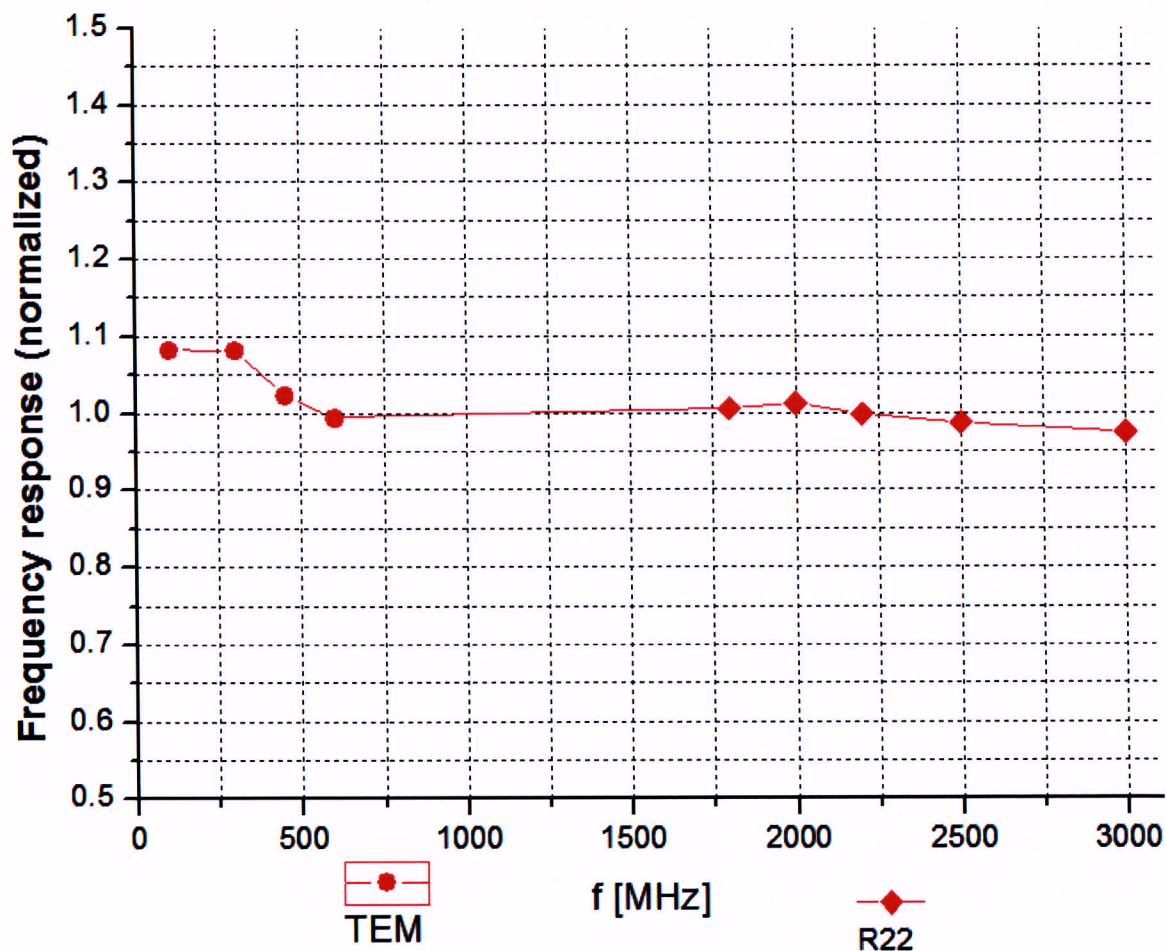
^F At frequency below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty 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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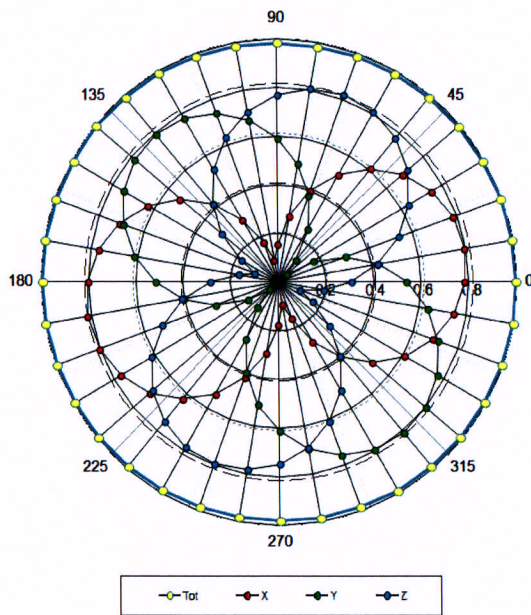
Frequency Response of E-Field (TEM-Cell: ifi110 EXX, Waveguide: R22)



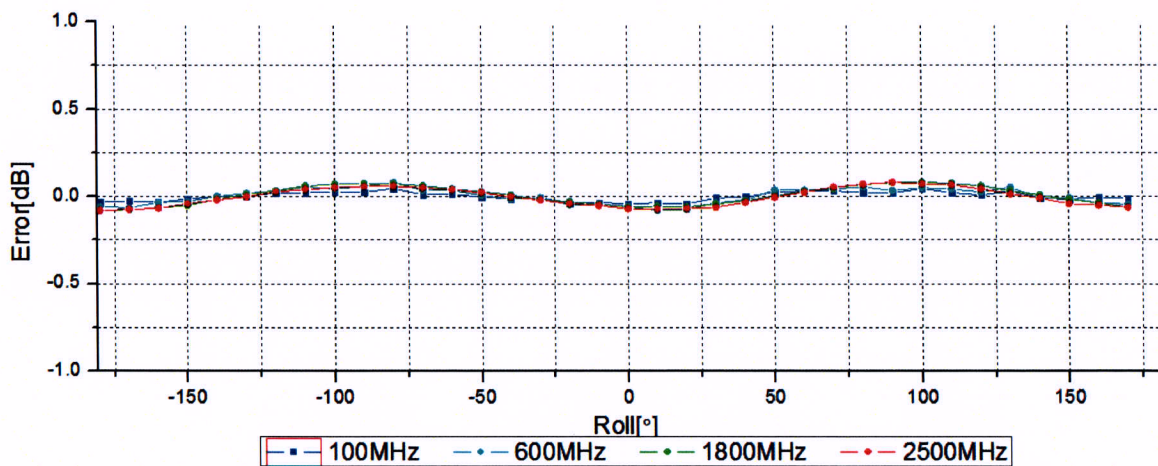
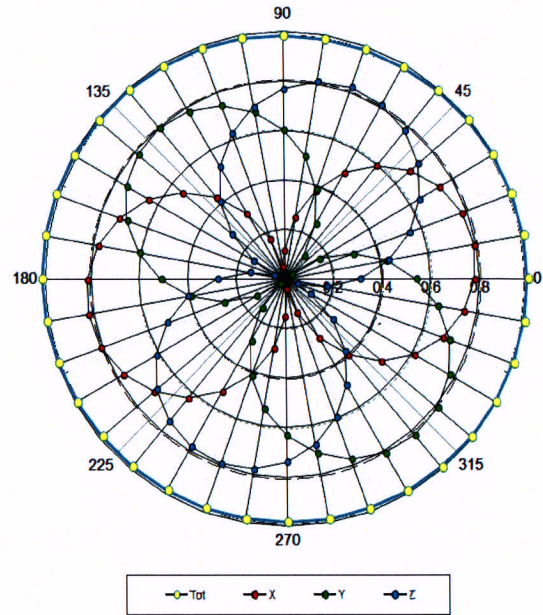
Uncertainty of Frequency Response of E-field: $\pm 7.4\%$ ($k=2$)

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

f=600 MHz, TEM



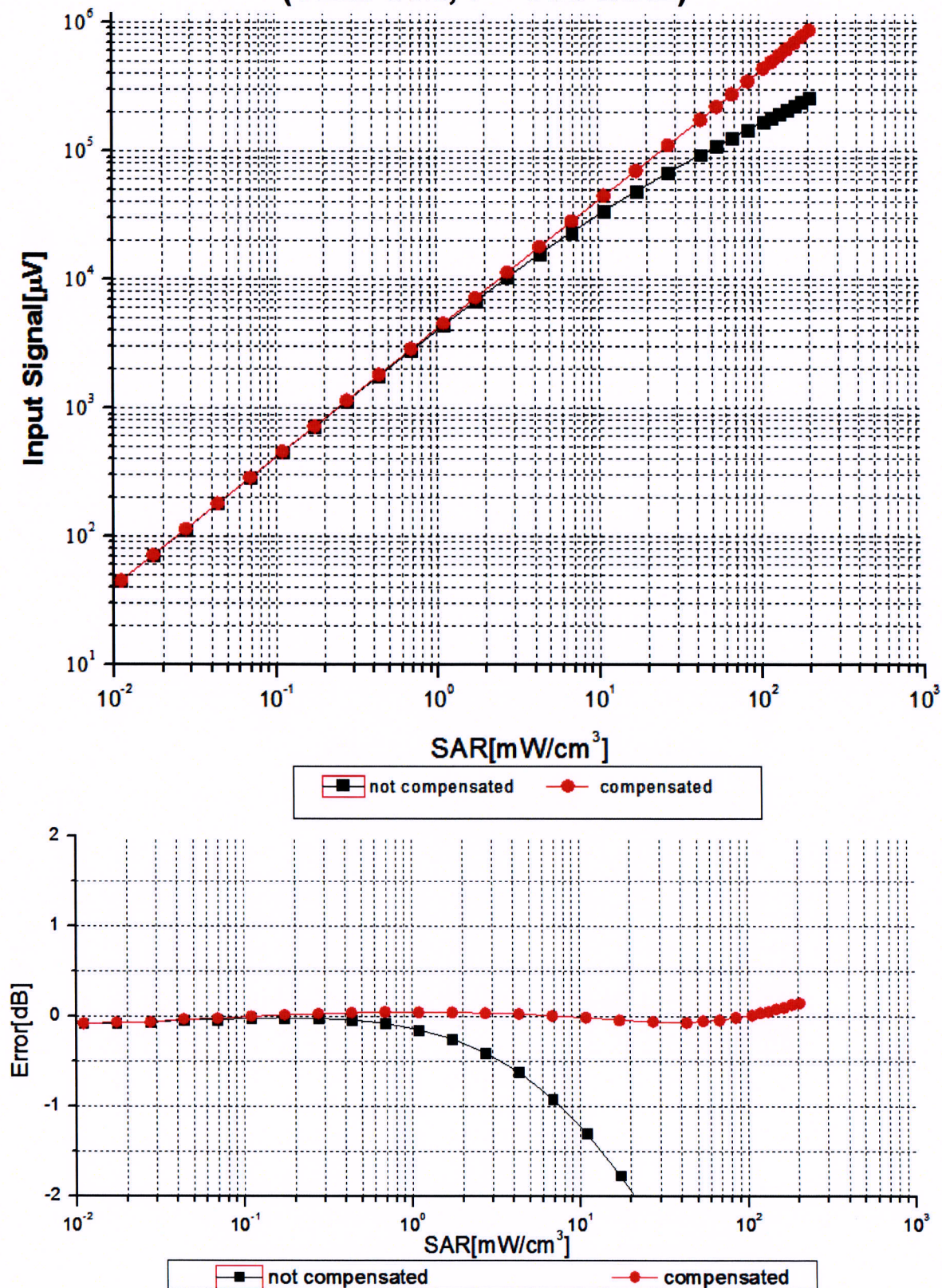
f=1800 MHz, R22



Uncertainty of Axial Isotropy Assessment: $\pm 1.2\%$ ($k=2$)



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

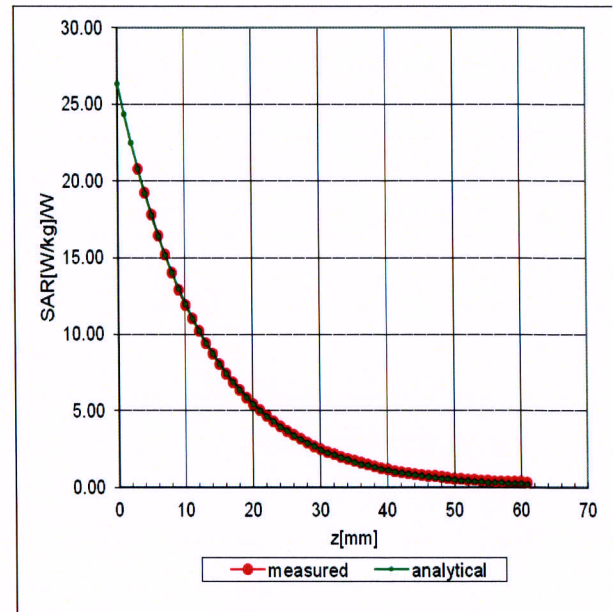
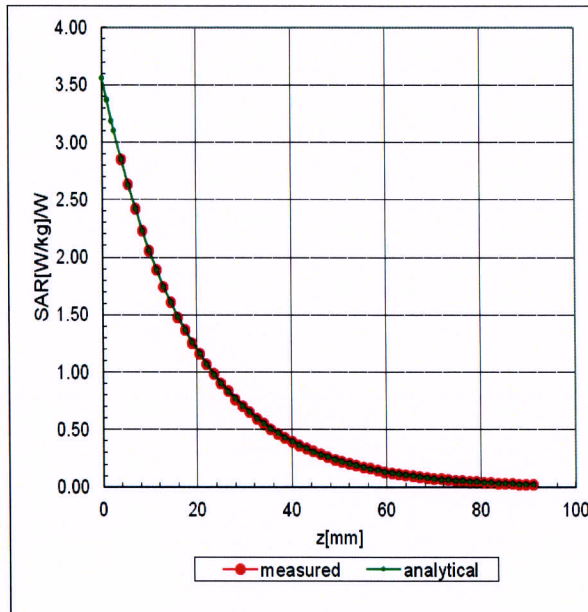


Uncertainty of Linearity Assessment: ±0.9% (k=2)

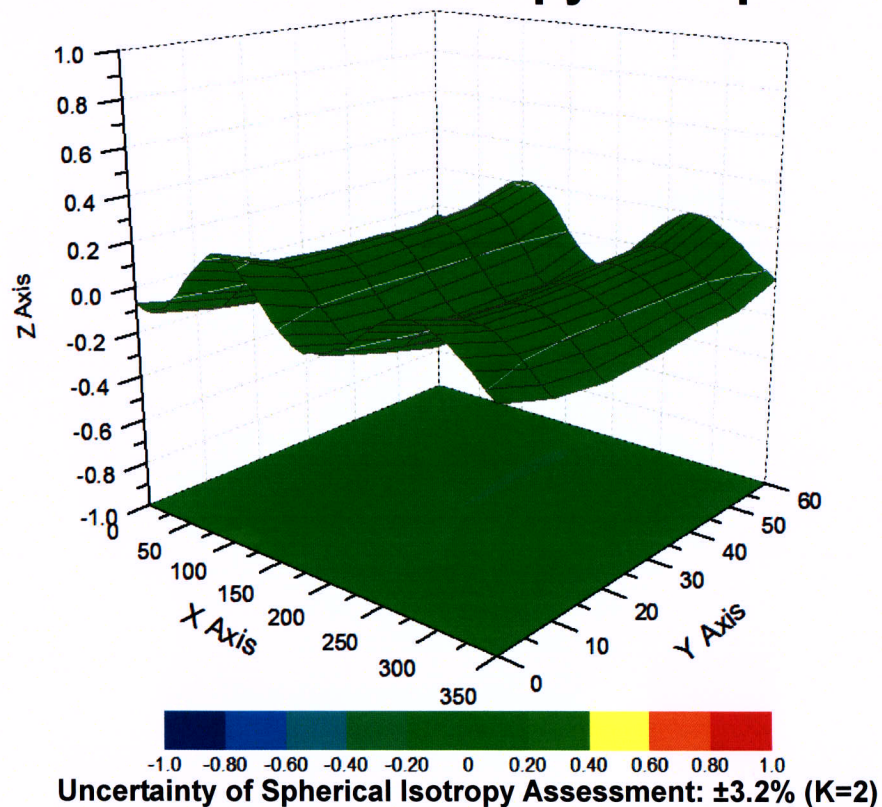
Conversion Factor Assessment

f=900 MHz, WGLS R9(H_convF)

f=1750 MHz, WGLS R22(H_convF)



Deviation from Isotropy in Liquid



DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3578

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	166.9
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

Appendix D. Photographs of EUT and Setup