

Probe EX3DV4

SN:7346

Manufactured:	October 13, 2014
Repaired:	September 29, 2017
Calibrated:	October 24, 2017

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7346

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.51	0.48	0.48	$\pm 10.1 \%$
DCP (mV) ^B	97.6	104.8	97.2	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc ^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	151.9	$\pm 3.3 \%$
		Y	0.0	0.0	1.0		153.7	
		Z	0.0	0.0	1.0		142.3	

Note: For details on UID parameters see Appendix.

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $\text{ms} \cdot \text{V}^{-2}$	T2 $\text{ms} \cdot \text{V}^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	52.55	394.8	36.05	14.53	0	5.1	0.189	0.490	1.007
Y	39.81	294.6	35.03	7.862	0	5.1	0.333	0.323	1.009
Z	50.90	382.7	36.16	13.91	0	5.1	1.163	0.327	1.011

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 Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7346

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)	Unc (k=2)
750	41.9	0.89	10.26	10.26	10.26	0.51	0.80	± 12.0 %
835	41.5	0.90	9.93	9.93	9.93	0.47	0.83	± 12.0 %
900	41.5	0.97	9.51	9.51	9.51	0.44	0.84	± 12.0 %
1450	40.5	1.20	8.85	8.85	8.85	0.40	0.86	± 12.0 %
1750	40.1	1.37	8.52	8.52	8.52	0.34	0.80	± 12.0 %
1900	40.0	1.40	8.21	8.21	8.21	0.33	0.80	± 12.0 %
2000	40.0	1.40	8.22	8.22	8.22	0.32	0.86	± 12.0 %
2300	39.5	1.67	7.80	7.80	7.80	0.37	0.80	± 12.0 %
2450	39.2	1.80	7.52	7.52	7.52	0.33	0.88	± 12.0 %
2600	39.0	1.96	7.35	7.35	7.35	0.38	0.83	± 12.0 %
3500	51.3	3.31	7.18	7.18	7.18	0.30	1.25	± 13.1 %
5250	48.9	5.36	4.40	4.40	4.40	0.35	1.80	± 13.1 %
5600	48.5	5.77	4.95	4.95	4.95	0.40	1.80	± 13.1 %
5750	48.3	5.94	5.30	5.30	5.30	0.40	1.80	± 13.1 %

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

^F At frequencies 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 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:7346

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)	Unc (k=2)
750	55.5	0.96	10.10	10.10	10.10	0.47	0.80	± 12.0 %
835	55.2	0.97	9.95	9.95	9.95	0.51	0.80	± 12.0 %
900	55.0	1.05	9.71	9.71	9.71	0.53	0.80	± 12.0 %
1450	54.0	1.30	8.86	8.86	8.86	0.36	0.80	± 12.0 %
1750	53.4	1.49	8.38	8.38	8.38	0.43	0.80	± 12.0 %
1900	53.3	1.52	8.01	8.01	8.01	0.35	0.92	± 12.0 %
2000	53.3	1.52	8.23	8.23	8.23	0.36	0.89	± 12.0 %
2300	52.9	1.81	7.86	7.86	7.86	0.43	0.83	± 12.0 %
2450	52.7	1.95	7.68	7.68	7.68	0.40	0.89	± 12.0 %
2600	52.5	2.16	7.44	7.44	7.44	0.31	0.95	± 12.0 %
3500	51.3	3.31	7.01	7.01	7.01	0.30	1.20	± 13.1 %
5250	48.9	5.36	5.18	5.18	5.18	0.40	1.90	± 13.1 %
5600	48.5	5.77	4.33	4.33	4.33	0.45	1.90	± 13.1 %
5750	48.3	5.94	4.69	4.69	4.69	0.45	1.90	± 13.1 %

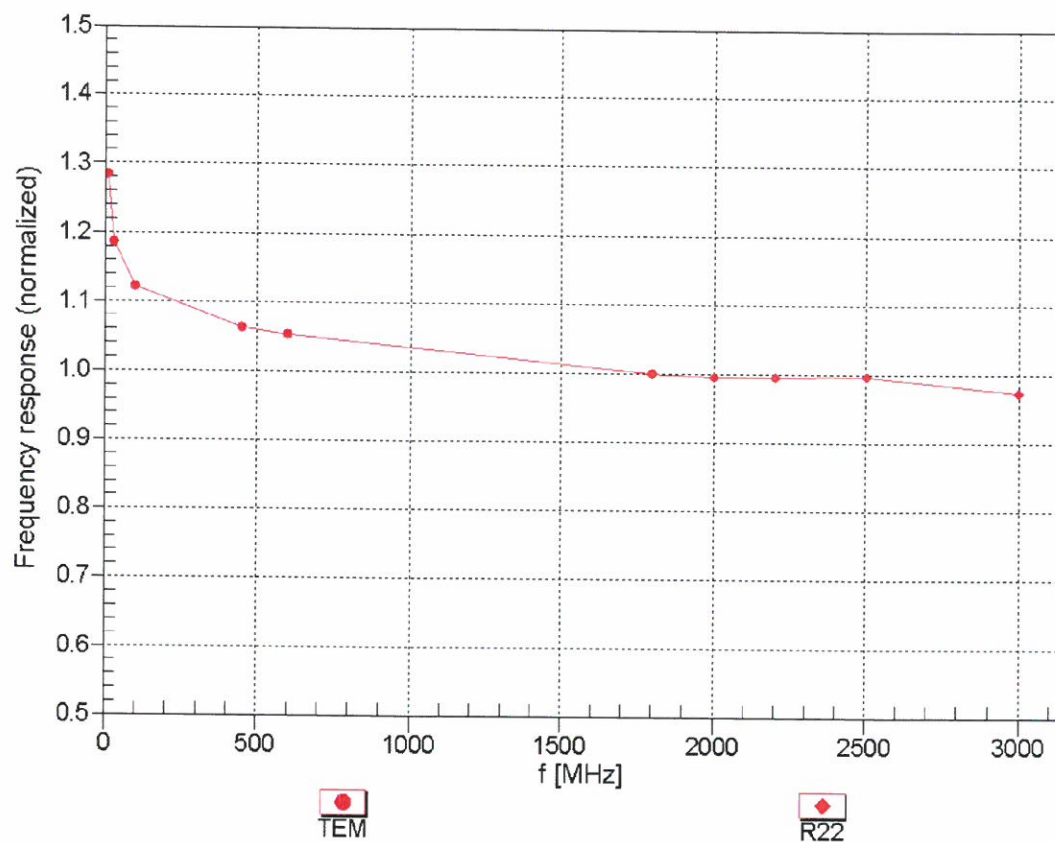
^C Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is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

^F At frequencies 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.

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Frequency Response of E-Field

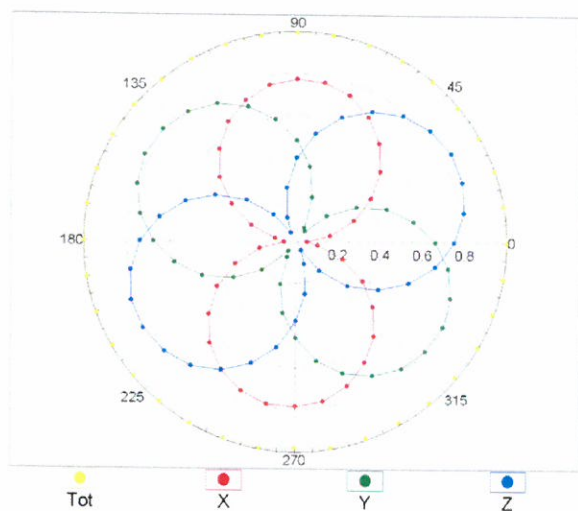
(TEM-Cell:ifi110 EXX, Waveguide: R22)



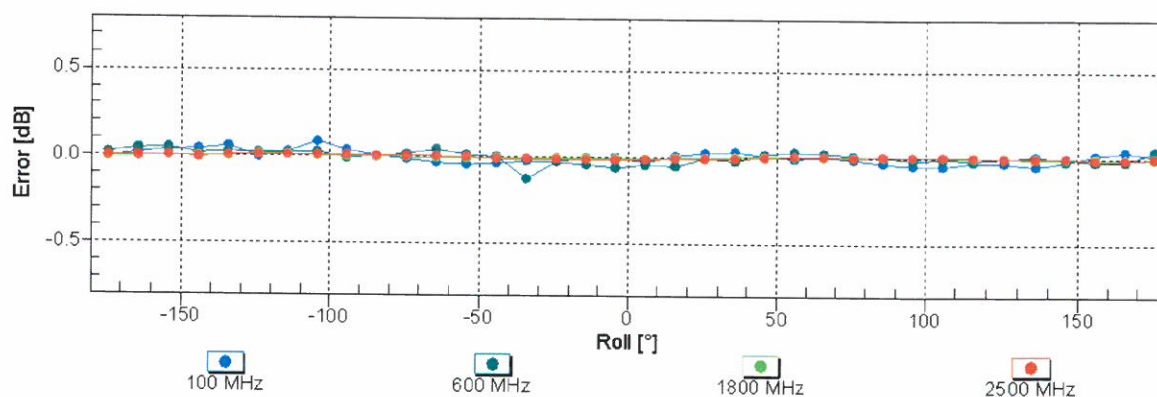
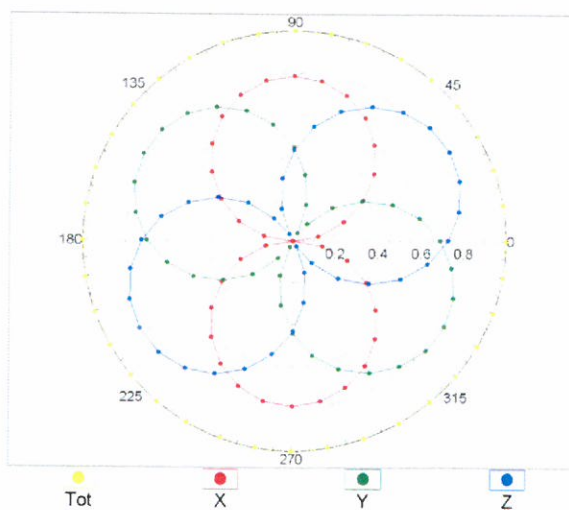
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

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

f=600 MHz,TEM

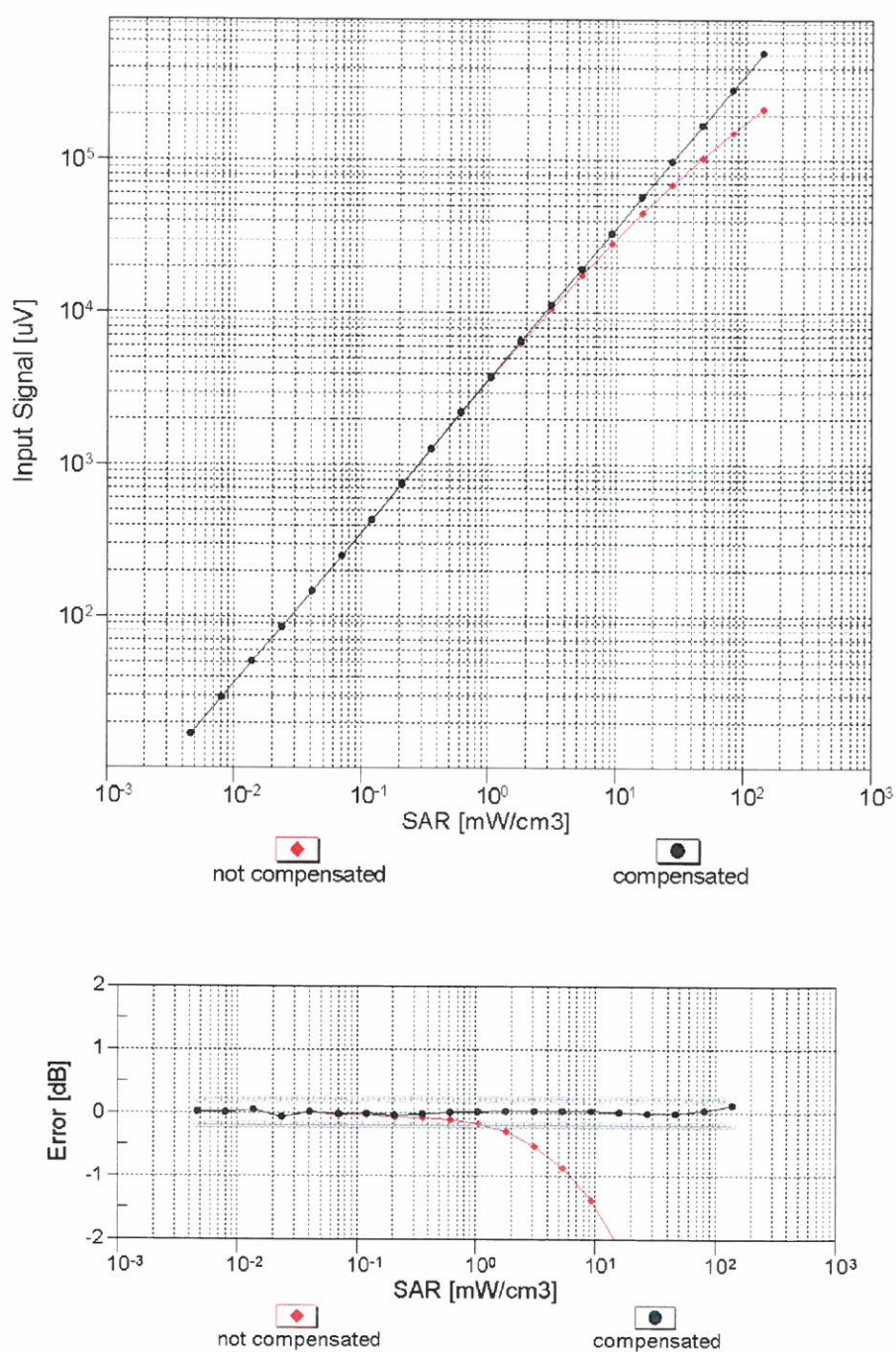


f=1800 MHz,R22



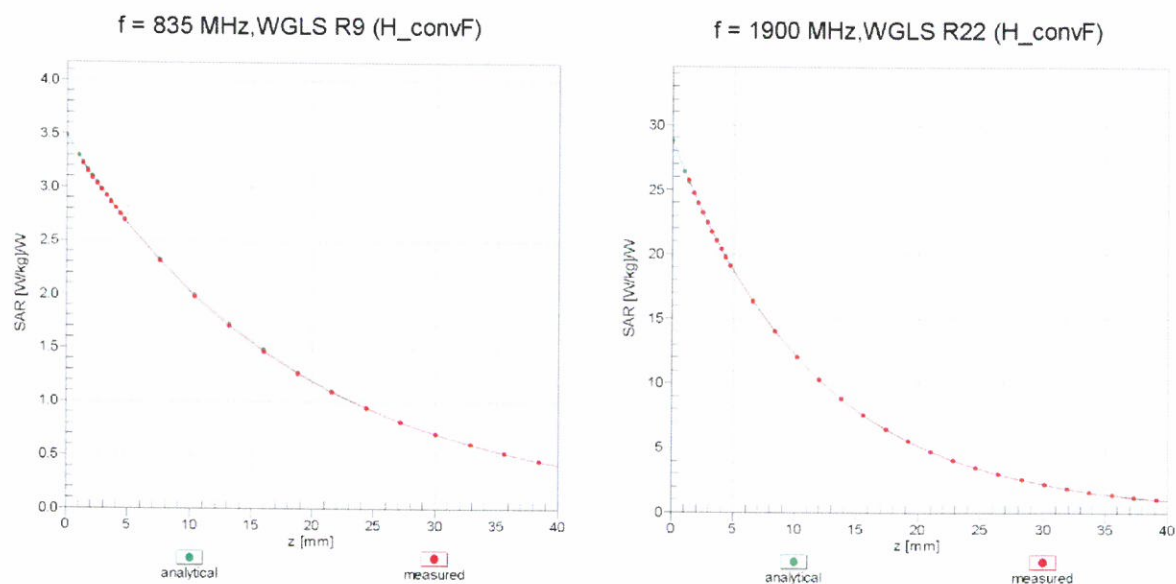
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell , $f_{\text{eval}} = 1900 \text{ MHz}$)



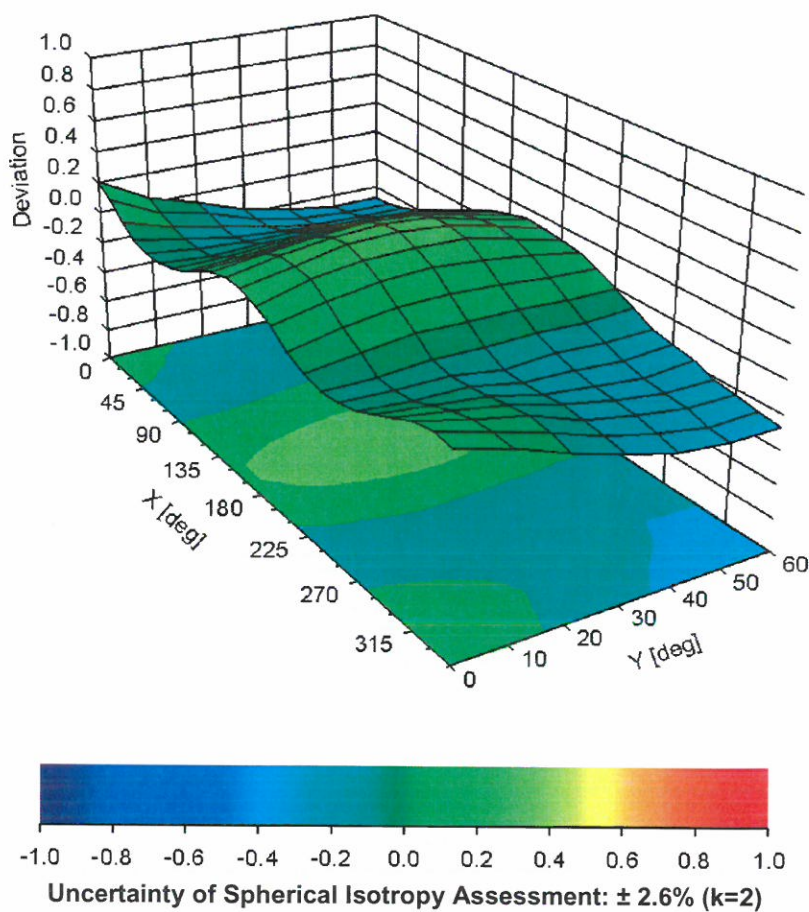
Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ , θ), $f = 900 \text{ MHz}$



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Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	55.7
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm