

# Probe EX3DV4

## SN:3893

Manufactured: October 9, 2012  
Calibrated: September 20, 2018

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

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3893

### Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup>	0.55	0.41	0.32	$\pm 10.1\%$
DCP (mV) <sup>B</sup>	103.1	101.4	100.3	

### Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB/ $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc <sup>E</sup> (k=2)
0	CW	X	0.0	0.0	1.0	0.00	175.4	$\pm 3.3\%$
		Y	0.0	0.0	1.0		190.9	
		Z	0.0	0.0	1.0		196.1	

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%.

<sup>A</sup> The uncertainties of Norm X,Y,Z do not affect the  $E^2$ -field uncertainty inside TSL (see Pages 5 and 6).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

<sup>E</sup> 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:3893

### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k=2)
300	45.3	0.87	12.19	12.19	12.19	0.08	1.20	± 13.3 %
450	43.5	0.87	11.33	11.33	11.33	0.14	1.20	± 13.3 %
750	41.9	0.89	10.63	10.63	10.63	0.49	0.80	± 12.0 %
900	41.5	0.97	9.99	9.99	9.99	0.46	0.85	± 12.0 %
1750	40.1	1.37	9.08	9.08	9.08	0.35	0.88	± 12.0 %
1810	40.0	1.40	8.79	8.79	8.79	0.28	0.90	± 12.0 %
1950	40.0	1.40	8.35	8.35	8.35	0.35	0.84	± 12.0 %
2150	39.7	1.53	8.33	8.33	8.33	0.29	0.87	± 12.0 %
2450	39.2	1.80	7.49	7.49	7.49	0.38	0.84	± 12.0 %
2600	39.0	1.96	7.38	7.38	7.38	0.43	0.81	± 12.0 %
5200	36.0	4.66	5.19	5.19	5.19	0.40	1.80	± 13.1 %
5500	35.6	4.96	5.05	5.05	5.05	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.89	4.89	4.89	0.40	1.80	± 13.1 %

<sup>C</sup> 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.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

<sup>G</sup> 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:3893

## Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k=2)
300	58.2	0.92	11.71	11.71	11.71	0.05	1.20	± 13.3 %
450	56.7	0.94	11.55	11.55	11.55	0.08	1.20	± 13.3 %
750	55.5	0.96	10.54	10.54	10.54	0.39	0.93	± 12.0 %
900	55.0	1.05	10.17	10.17	10.17	0.41	0.90	± 12.0 %
1750	53.4	1.49	8.66	8.66	8.66	0.32	0.96	± 12.0 %
1810	53.3	1.52	8.47	8.47	8.47	0.33	0.98	± 12.0 %
1950	53.3	1.52	8.38	8.38	8.38	0.39	0.85	± 12.0 %
2150	53.1	1.66	8.20	8.20	8.20	0.40	0.85	± 12.0 %
2450	52.7	1.95	7.88	7.88	7.88	0.32	0.85	± 12.0 %
2600	52.5	2.16	7.55	7.55	7.55	0.31	0.97	± 12.0 %
5200	49.0	5.30	4.59	4.59	4.59	0.50	1.90	± 13.1 %
5500	48.6	5.65	4.15	4.15	4.15	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.23	4.23	4.23	0.50	1.90	± 13.1 %

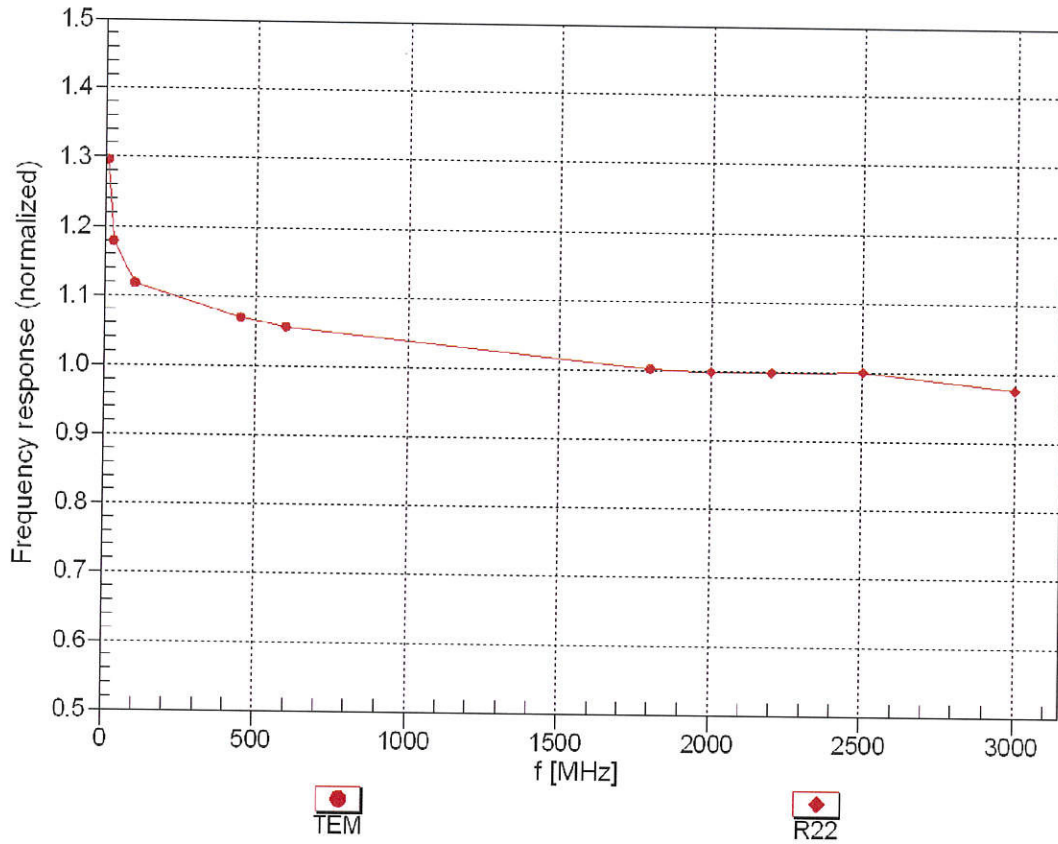
<sup>C</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 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.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

<sup>G</sup> 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.

# Frequency Response of E-Field

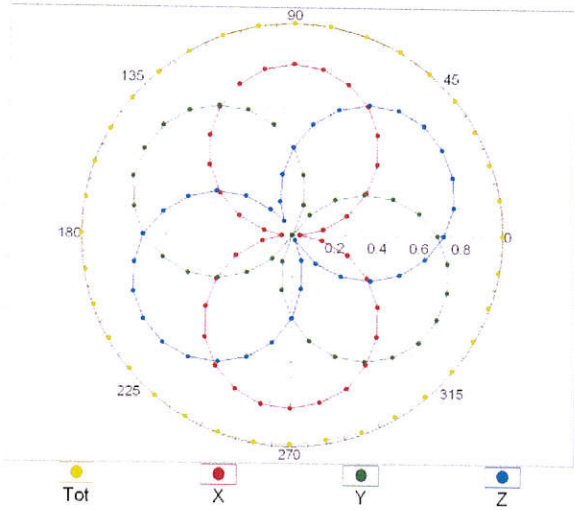
(TEM-Cell:ifi110 EXX, Waveguide: R22)



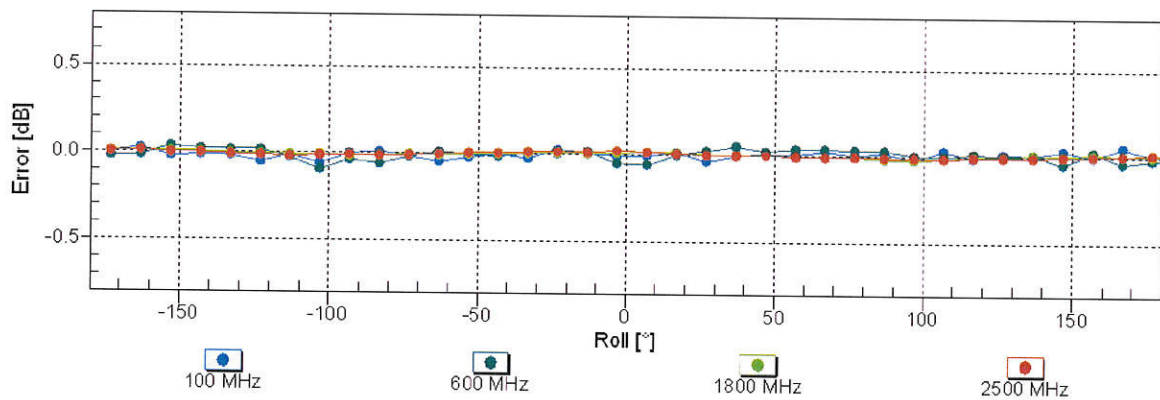
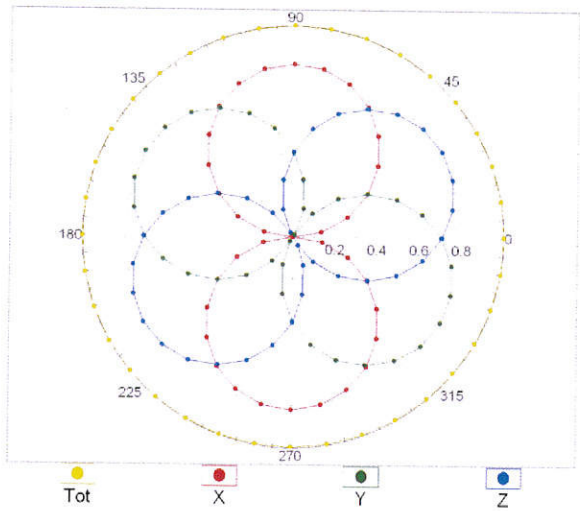
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

### Receiving Pattern ( $\phi$ ), $\vartheta = 0^\circ$

f=600 MHz,TEM

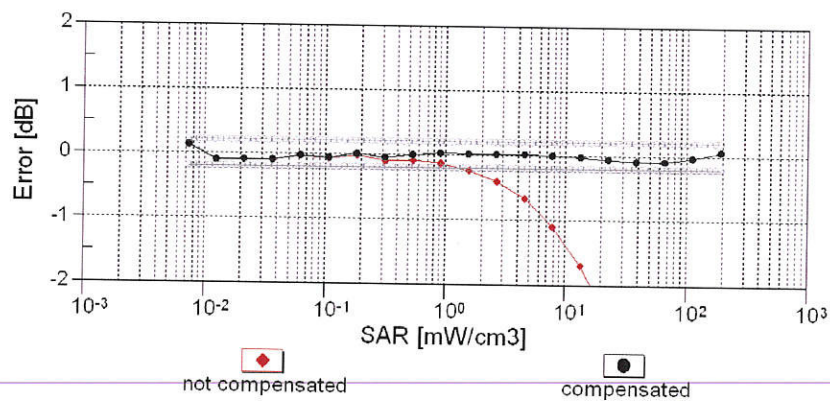
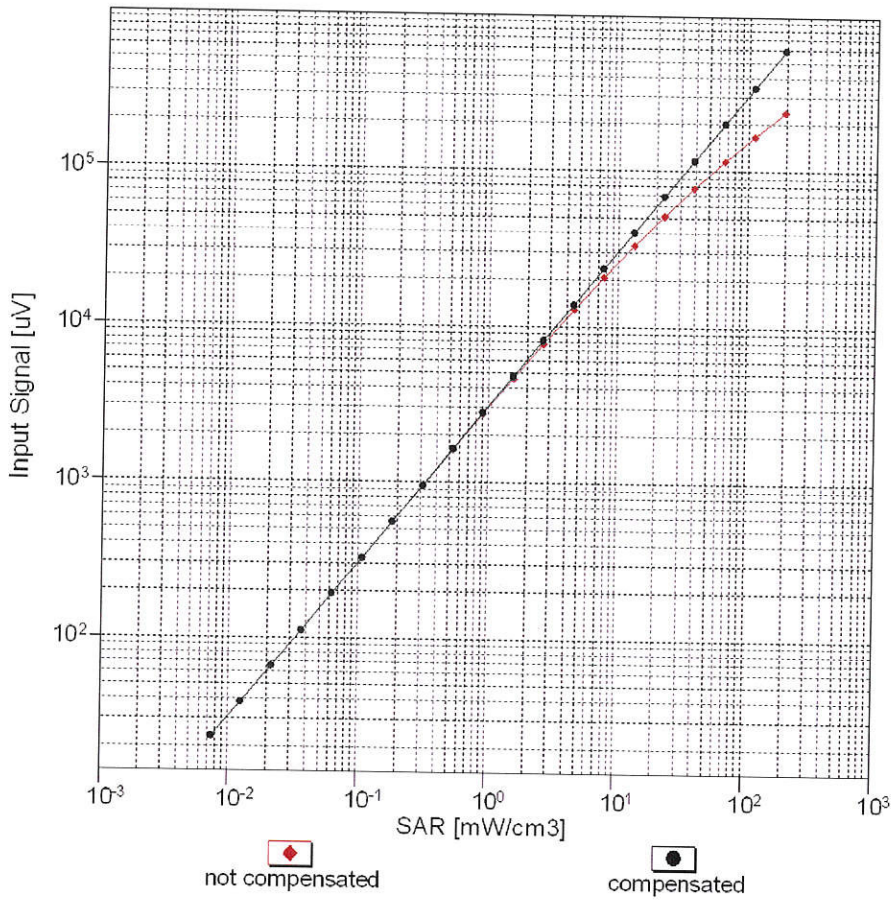


f=1800 MHz,R22



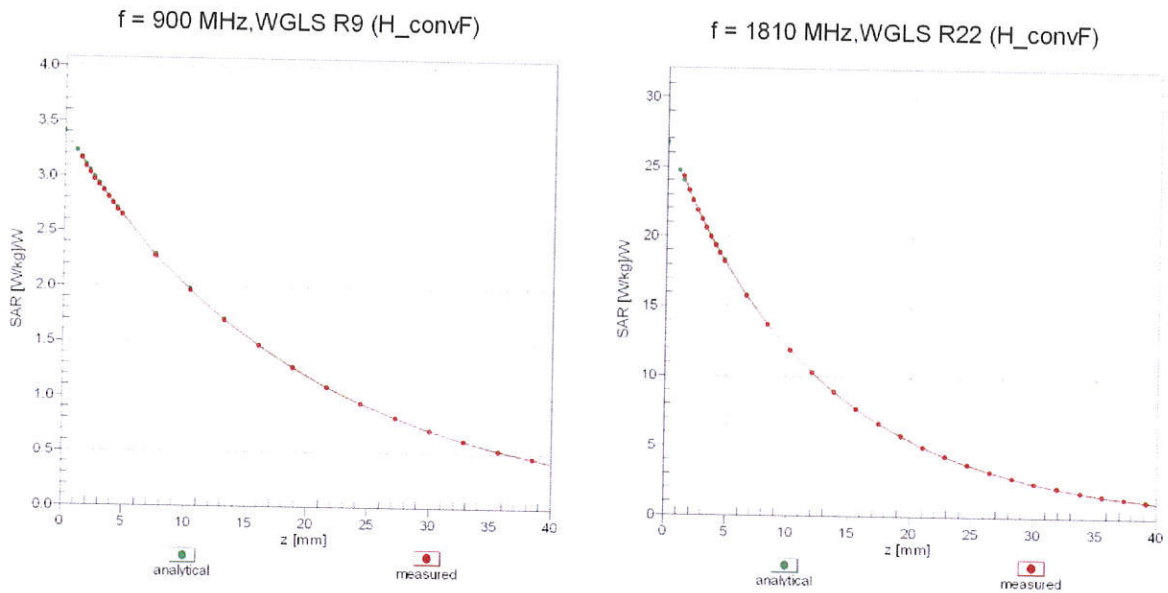
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

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

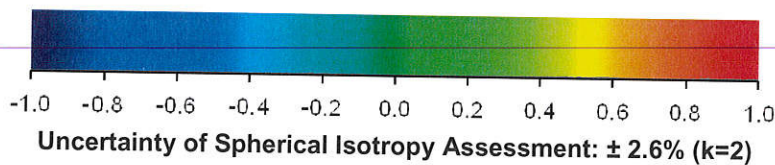
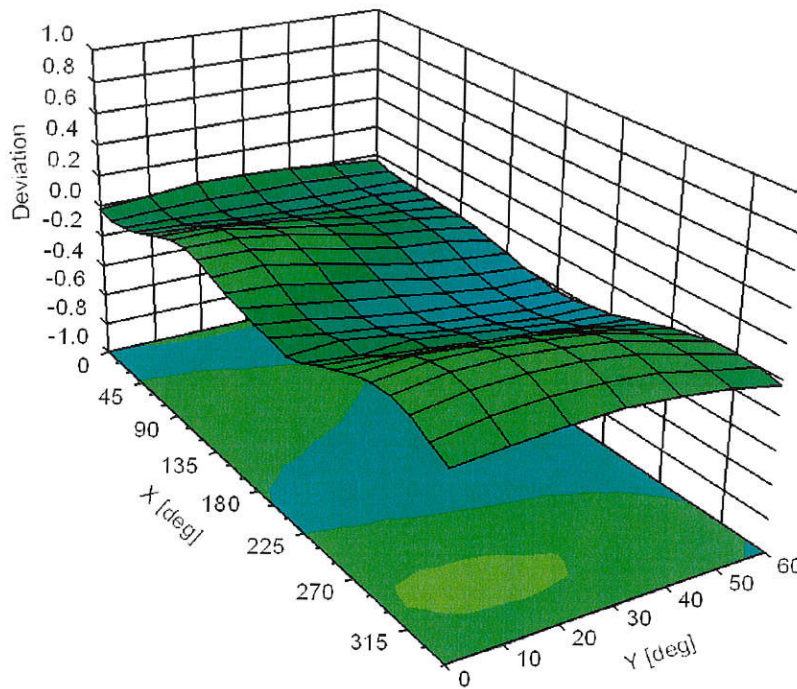


Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

# Conversion Factor Assessment



## Deviation from Isotropy in Liquid Error ( $\phi, \theta$ ), f = 900 MHz





## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3893

### Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-23.2
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