



## DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3962

### 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)	Unct. (k=2)
750	41.9	0.89	10.19	10.19	10.19	0.40	0.75	± 12.1%
835	41.5	0.90	9.96	9.96	9.96	0.16	1.25	± 12.1%
1750	40.1	1.37	8.54	8.54	8.54	0.21	1.15	± 12.1%
1900	40.0	1.40	8.26	8.26	8.26	0.26	1.00	± 12.1%
2300	39.5	1.67	8.03	8.03	8.03	0.35	0.80	± 12.1%
2450	39.2	1.80	7.62	7.62	7.62	0.41	0.88	± 12.1%
2600	39.0	1.96	7.52	7.52	7.52	0.42	0.92	± 12.1%
5250	35.9	4.71	5.68	5.68	5.68	0.35	1.55	± 13.3%
5600	35.5	5.07	4.89	4.89	4.89	0.40	1.50	± 13.3%
5750	35.4	5.22	5.05	5.05	5.05	0.40	1.60	± 13.3%

<sup>C</sup> 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.

<sup>F</sup> At frequency 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 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: 3962

### 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)	Unct. (k=2)
750	55.5	0.96	10.37	10.37	10.37	0.40	0.85	± 12.1%
835	55.2	0.97	9.98	9.98	9.98	0.17	1.43	± 12.1%
1750	53.4	1.49	8.49	8.49	8.49	0.22	1.12	± 12.1%
1900	53.3	1.52	8.09	8.09	8.09	0.20	1.17	± 12.1%
2300	52.9	1.81	7.90	7.90	7.90	0.34	1.17	± 12.1%
2450	52.7	1.95	7.78	7.78	7.78	0.34	1.25	± 12.1%
2600	52.5	2.16	7.61	7.61	7.61	0.44	0.96	± 12.1%
5250	48.9	5.36	5.22	5.22	5.22	0.45	1.45	± 13.3%
5600	48.5	5.77	4.45	4.45	4.45	0.50	1.60	± 13.3%
5750	48.3	5.94	4.59	4.59	4.59	0.50	1.45	± 13.3%

<sup>C</sup> 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.

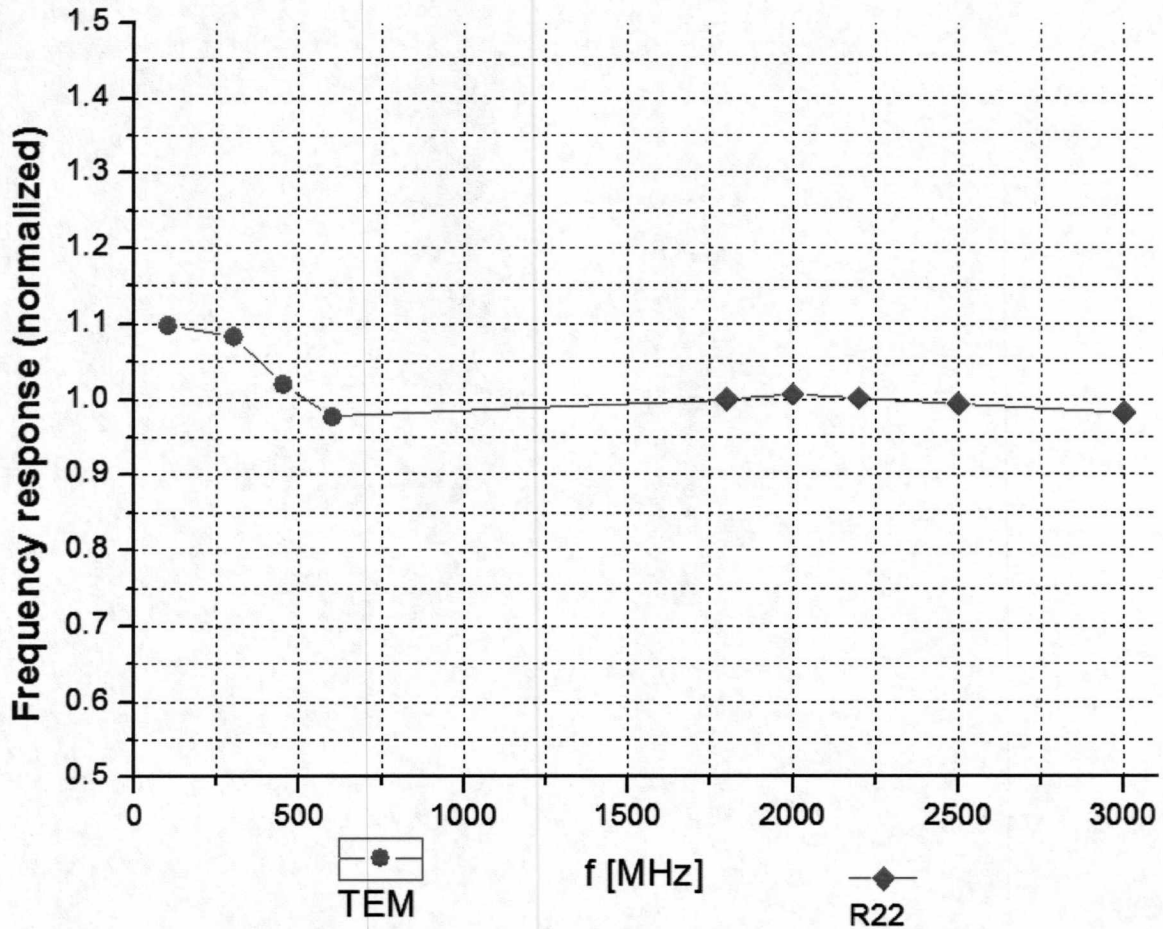
<sup>F</sup> At frequency below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to ±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 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:  $\pm 7.4\%$  ( $k=2$ )

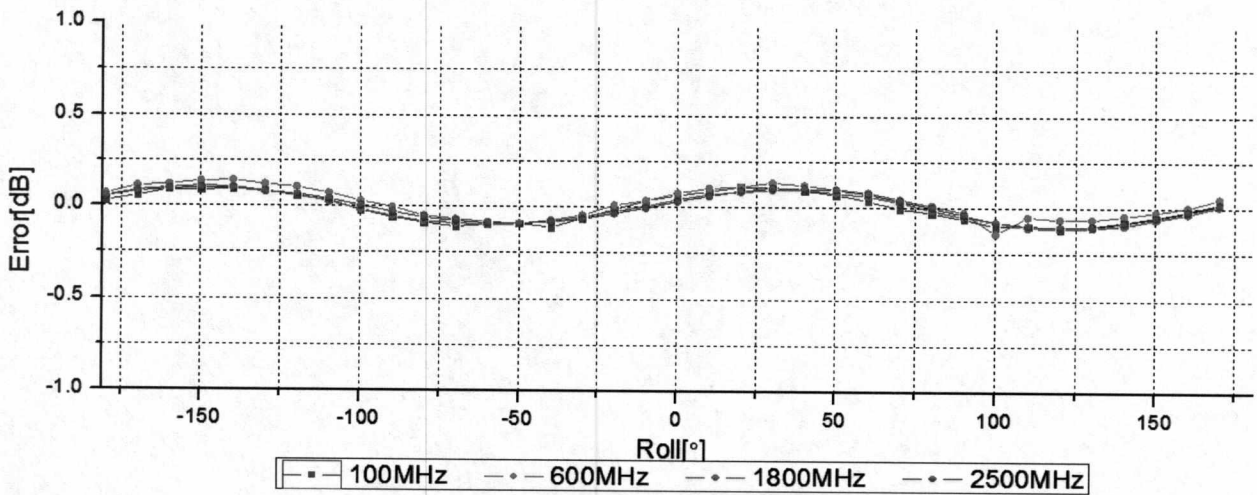
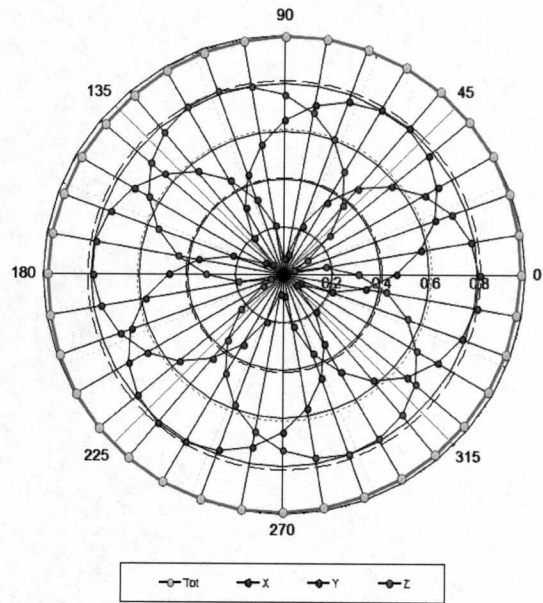
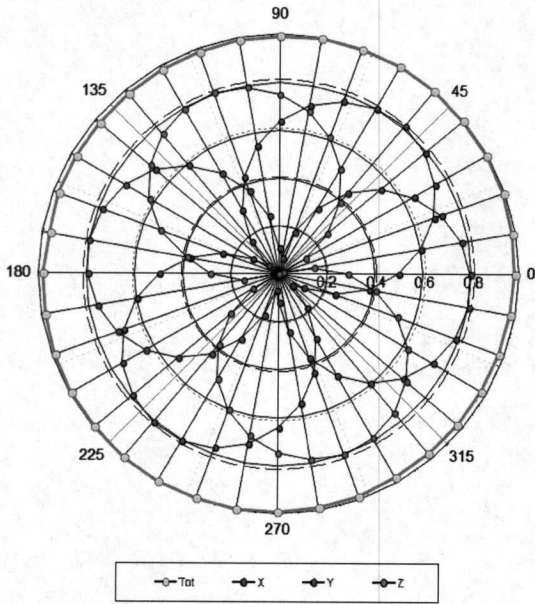


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## Receiving Pattern ( $\Phi$ ), $\theta=0^\circ$

**f=600 MHz, TEM**

**f=1800 MHz, R22**



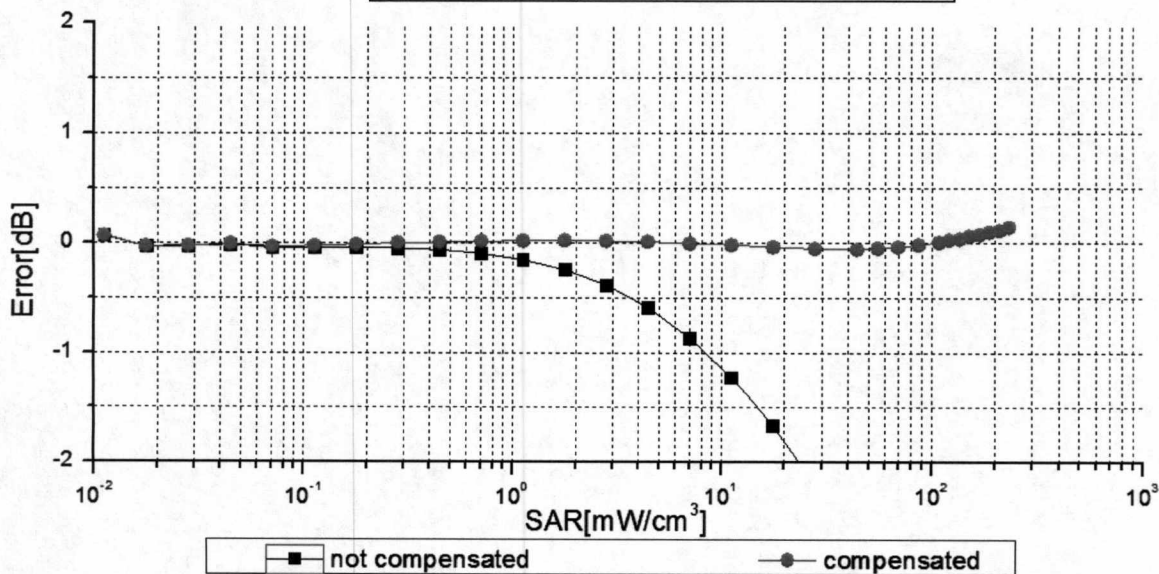
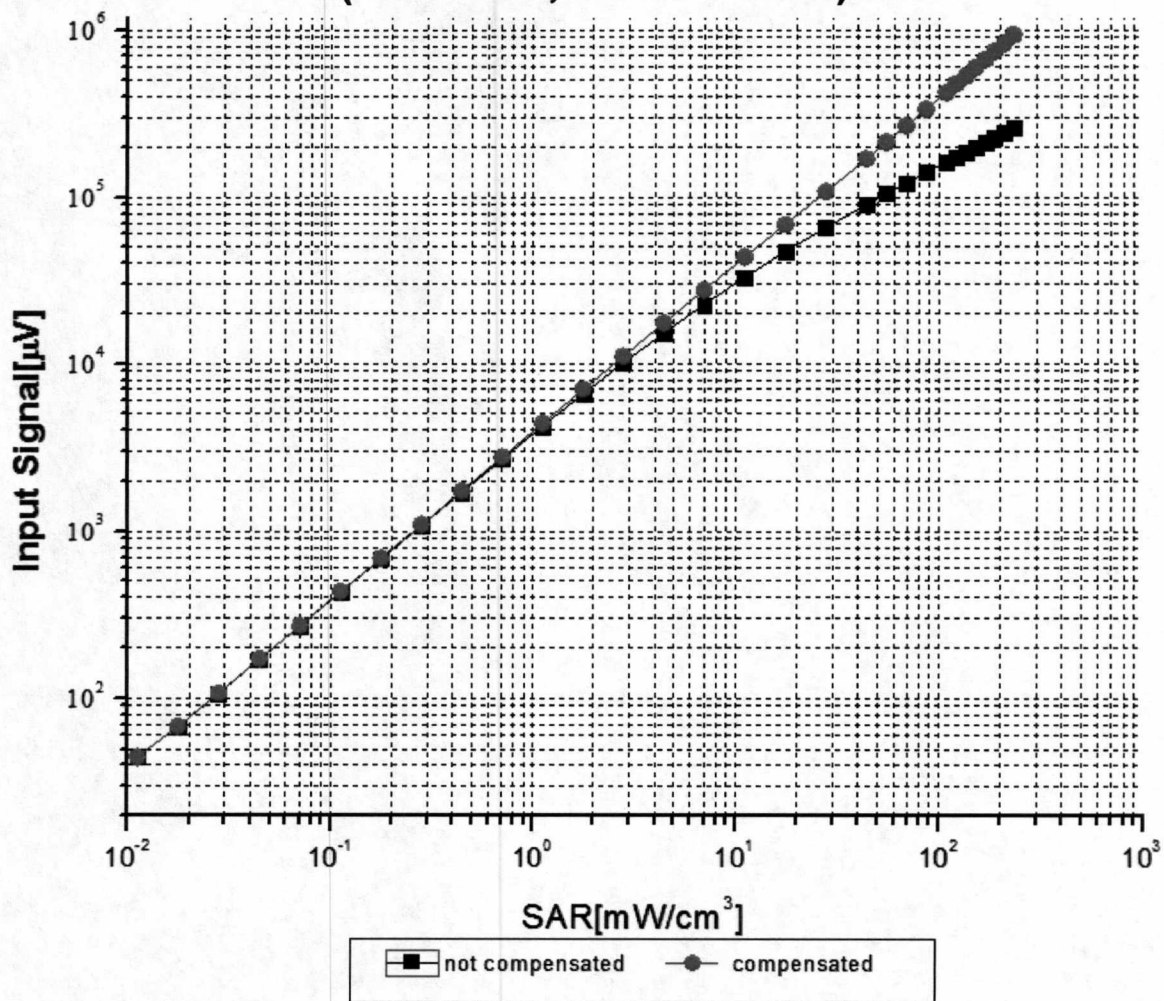
Legend: - - - 100MHz    - · - · - 600MHz    - · - · - 1800MHz    - · - · - 2500MHz  
**Uncertainty of Axial Isotropy Assessment:  $\pm 1.2\%$  ( $k=2$ )**





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## Dynamic Range f(SAR<sub>head</sub>) (TEM cell, f = 900 MHz)



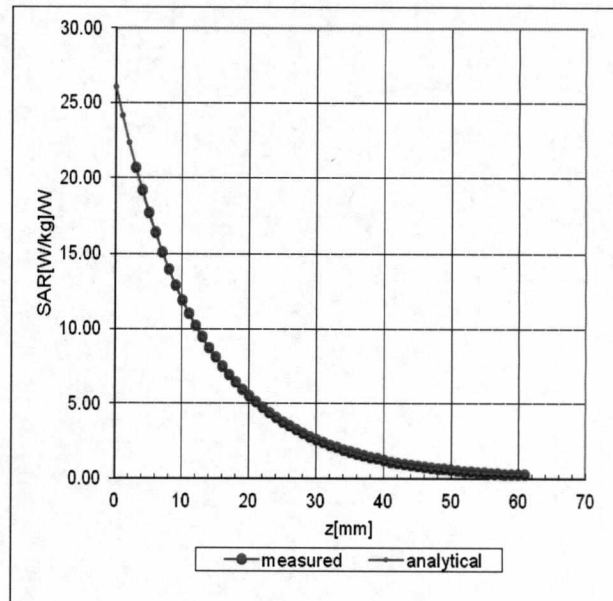
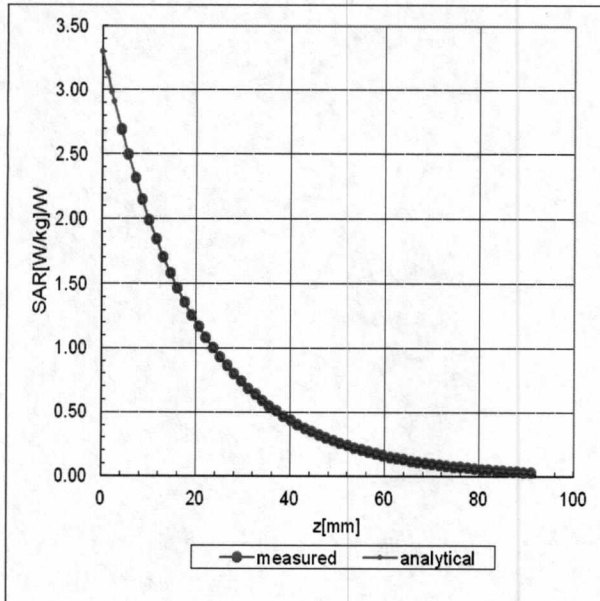
Uncertainty of Linearity Assessment: ±0.9% (k=2)



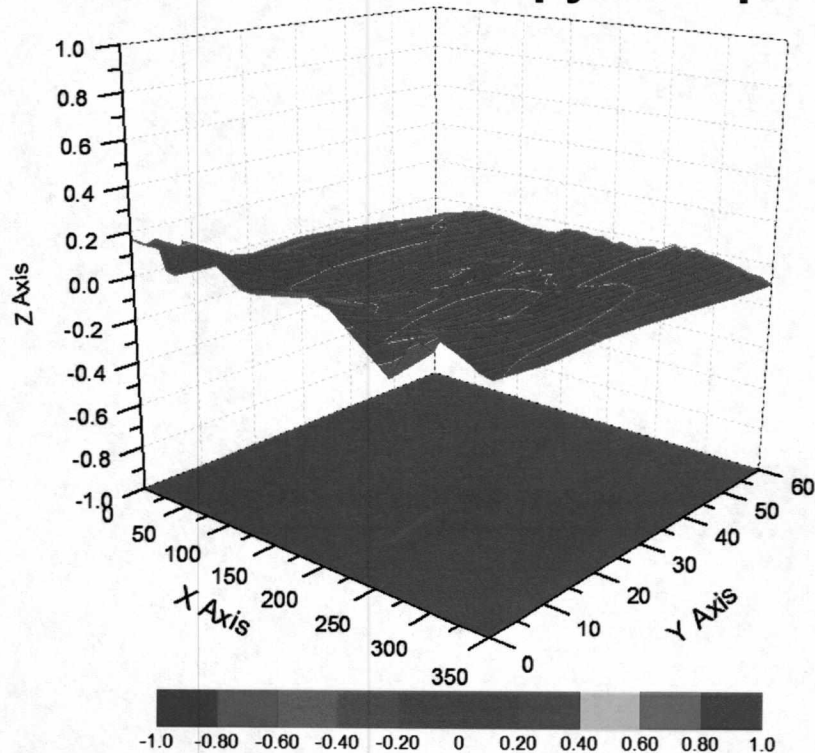
## Conversion Factor Assessment

f=835 MHz, WGLS R9(H\_convF)

f=1750 MHz, WGLS R22(H\_convF)



## Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment:  $\pm 3.2\%$  (K=2)



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## DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3962

### Other Probe Parameters

<b>Sensor Arrangement</b>	<b>Triangular</b>
<b>Connector Angle (°)</b>	<b>152.2</b>
<b>Mechanical Surface Detection Mode</b>	<b>enabled</b>
<b>Optical Surface Detection Mode</b>	<b>disable</b>
<b>Probe Overall Length</b>	<b>337mm</b>
<b>Probe Body Diameter</b>	<b>10mm</b>
<b>Tip Length</b>	<b>9mm</b>
<b>Tip Diameter</b>	<b>2.5mm</b>
<b>Probe Tip to Sensor X Calibration Point</b>	<b>1mm</b>
<b>Probe Tip to Sensor Y Calibration Point</b>	<b>1mm</b>
<b>Probe Tip to Sensor Z Calibration Point</b>	<b>1mm</b>
<b>Recommended Measurement Distance from Surface</b>	<b>1.4mm</b>

Dipole D750V3 SN 1160				
Head Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-06-22	-26.3	/	54.8	/
2017-06-21	-27.2	3.42%	57.1	2.3 $\Omega$
Body Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-06-22	-28.4	/	50.2	/
2017-06-21	-29.1	2.46%	51.7	1.5 $\Omega$

Dipole D835V2 SN 4d105				
Head Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-12-08	-29.1	/	49.2	/
2017-12-07	-29.7	2.06%	51.3	2.1 $\Omega$
Body Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-12-08	-25.1	/	45.8	/
2017-12-07	-25.5	1.59%	47.7	1.9 $\Omega$

Dipole D1750V2 SN 1149				
Head Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-06-23	-38.7	/	49	/
2017-06-22	-39.6	2.33%	52.2	3.2 $\Omega$
Body Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-06-23	-23.3	/	43.6	/
2017-06-22	-23.8	2.15%	46	2.4 $\Omega$



Dipole D1900V2 SN 5d028				
Head Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-12-07	-24.4	/	51.8	/
2017-12-06	-25.2	3.28%	53.6	1.8 $\Omega$
Body Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-12-07	-24.1	/	48.1	/
2017-12-06	-24.8	2.9%	49.6	1.5 $\Omega$

Dipole D2450V2 SN 733				
Head Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-12-07	-26.3	/	52.9	/
2017-12-06	-27.5	4.56%	56.1	3.2 $\Omega$
Body Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-12-07	-24.6	/	49.7	/
2017-12-06	-25.3	2.85%	51.8	2.1 $\Omega$

Dipole D5GHzV2 SN 1165				
5250MHz Head Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-12-13	-23.6	/	49.1	/
2017-12-12	-24.2	2.54%	51.7	2.6 $\Omega$
5250MHz Body Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-12-13	-24.2	/	45.7	/
2017-12-12	-24.7	2.07%	49.1	3.4 $\Omega$

Dipole D5GHzV2 SN 1165				
5600MHz Head Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-12-13	-27.5	/	54.1	/
2017-12-12	-28.3	2.91%	56.4	2.3 $\Omega$
5600MHz Body Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-12-13	-26.5	/	54.9	/
2017-12-12	-27.3	3.02%	58	3.1 $\Omega$

Dipole D5GHzV2 SN 1165				
5750MHz Head Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-12-13	-27.6	/	52.4	/
2017-12-12	-28.5	3.26%	54.1	1.7 $\Omega$
5750MHz Body Liquid				
Date of Measurement	Return Loss(dB)	$\Delta$ %	Impedance ( $\Omega$ )	$\Delta\Omega$
2016-12-13	-26.4	/	53.3	/
2017-12-12	-27.1	2.65%	55.9	2.6 $\Omega$