In Collaboration with
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CALIBRATION LABORATORY

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3789

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)^2)^A	0.44	0.50	0.52	±10.0%
DCP(mV)^B	103.9	102.7	101.0	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	152.1	±2.2%
		Y	0.0	0.0	1.0		164.8	
		Z	0.0	0.0	1.0		165.8	

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 Page 5 and Page 6).
^{B} Numerical linearization parameter: uncertainty not required.
^{E} Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3789

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	8.93	8.93	8.93	0.40	0.75	±12.1%
835	41.5	0.90	8.66	8.66	8.66	0.11	1.56	±12.1%
1750	40.1	1.37	7.67	7.67	7.67	0.25	1.02	±12.1%
1900	40.0	1.40	7.35	7.35	7.35	0.24	1.07	±12.1%
2300	39.5	1.67	7.48	7.48	7.48	0.50	0.75	±12.1%
2450	39.2	1.80	7.01	7.01	7.01	0.56	0.72	±12.1%
2600	39.0	1.96	6.89	6.89	6.89	0.63	0.69	±12.1%
3500	37.9	2.91	6.57	6.57	6.57	0.62	0.85	±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.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3789

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	9.27	9.27	9.27	0.40	0.80	±12.1%
835	55.2	0.97	8.84	8.84	8.84	0.17	1.46	±12.1%
1750	53.4	1.49	7.54	7.54	7.54	0.22	1.10	±12.1%
1900	53.3	1.52	7.28	7.28	7.28	0.20	1.21	±12.1%
2300	52.9	1.81	7.32	7.32	7.32	0.34	1.19	±12.1%
2450	52.7	1.95	7.15	7.15	7.15	0.37	1.08	±12.1%
2600	52.5	2.16	6.96	6.96	6.96	0.43	0.93	±12.1%
3500	51.3	3.31	6.24	6.24	6.24	0.63	0.90	±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.

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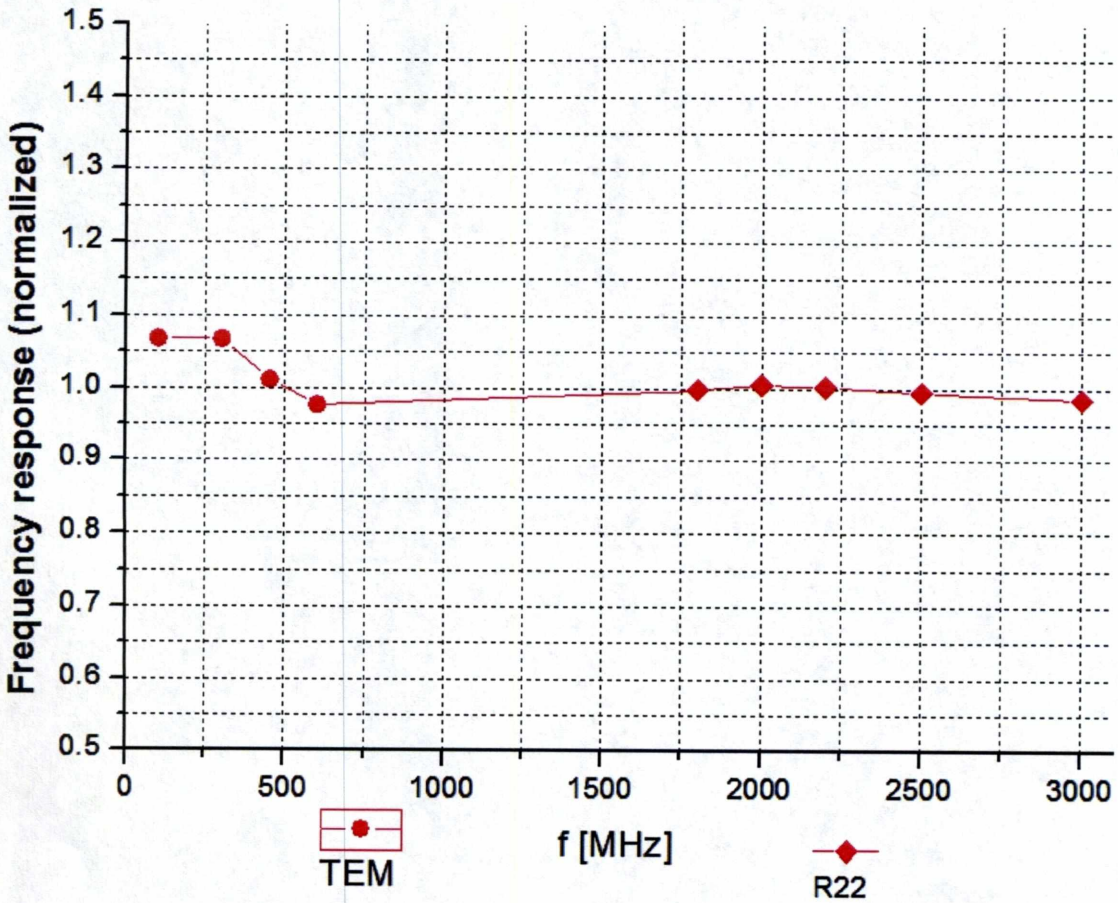
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

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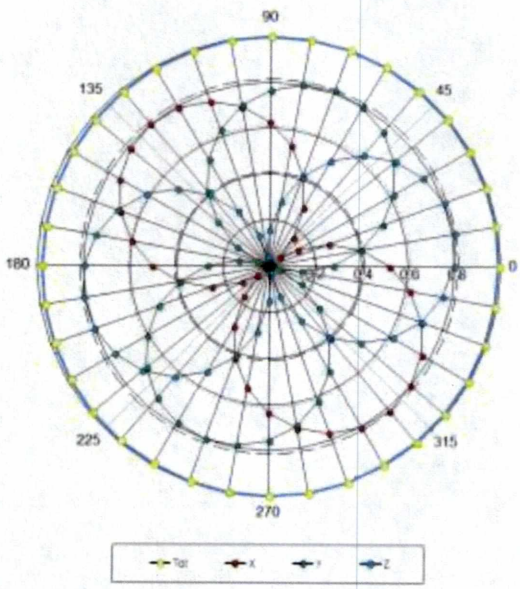
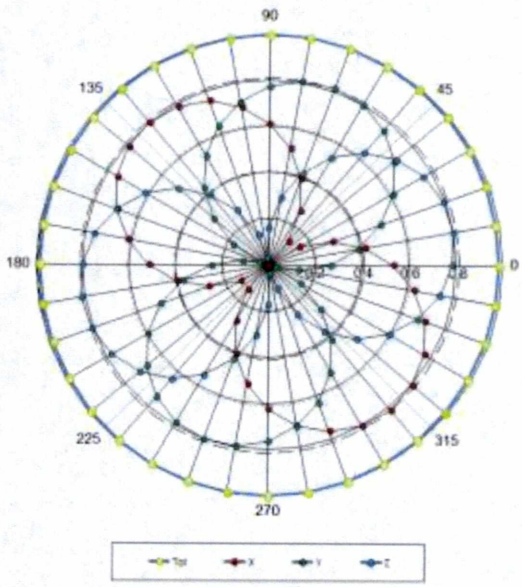
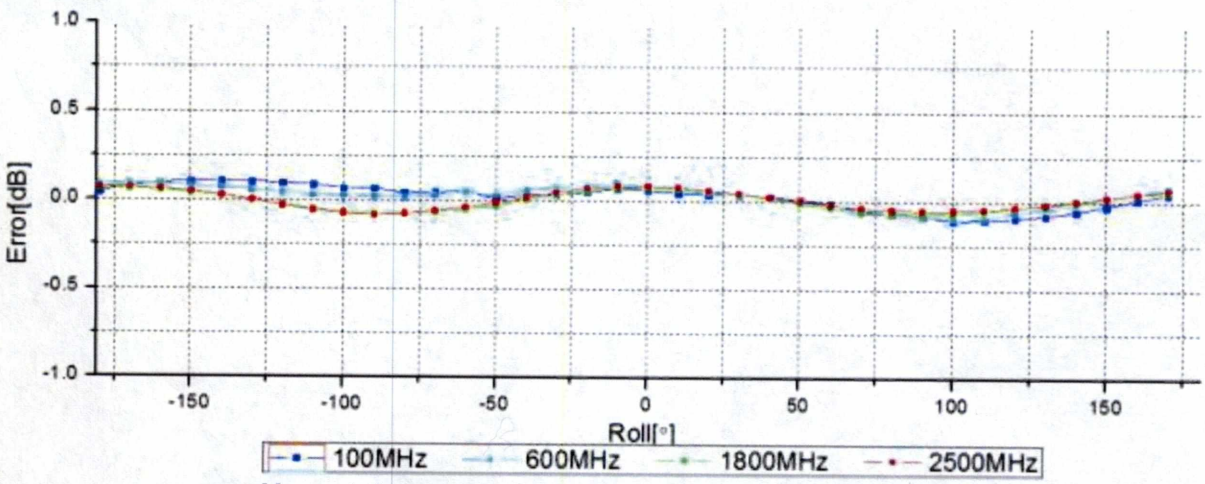
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

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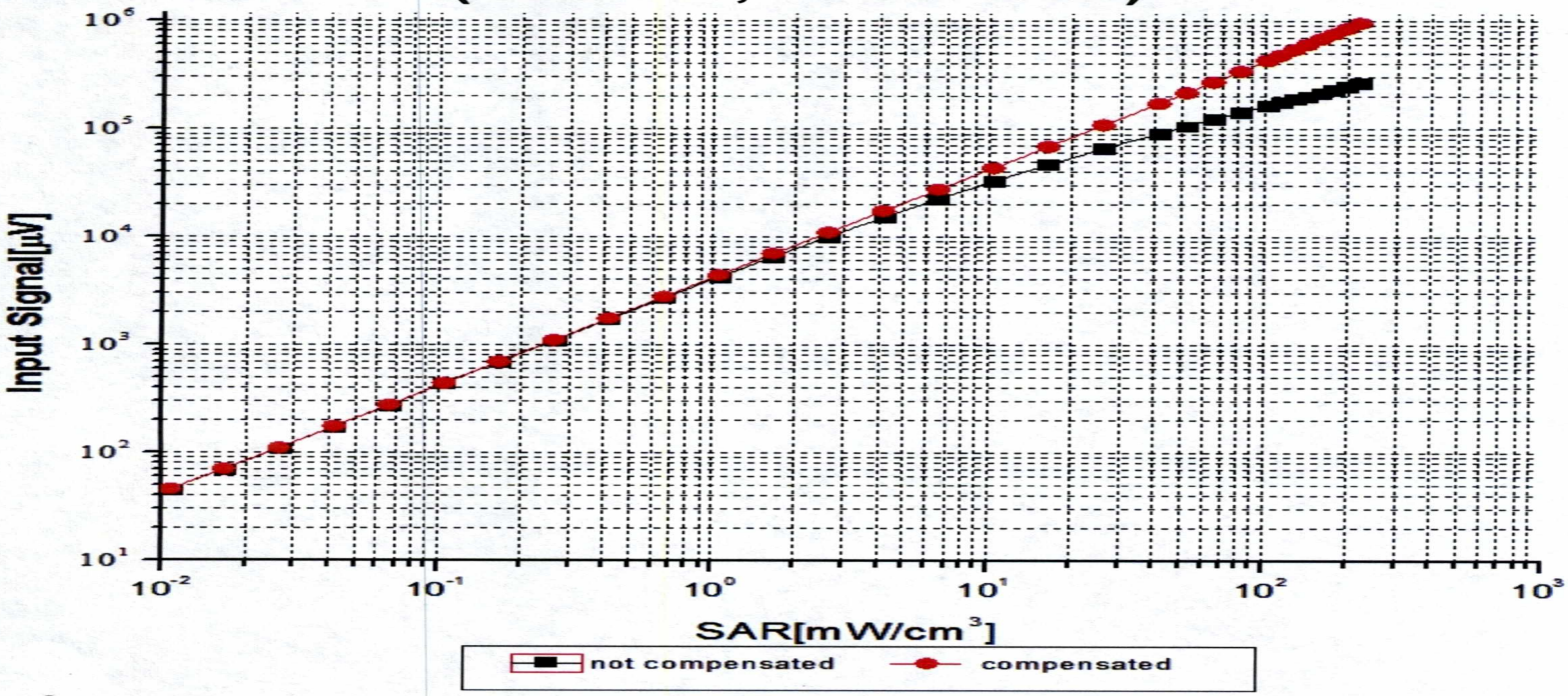
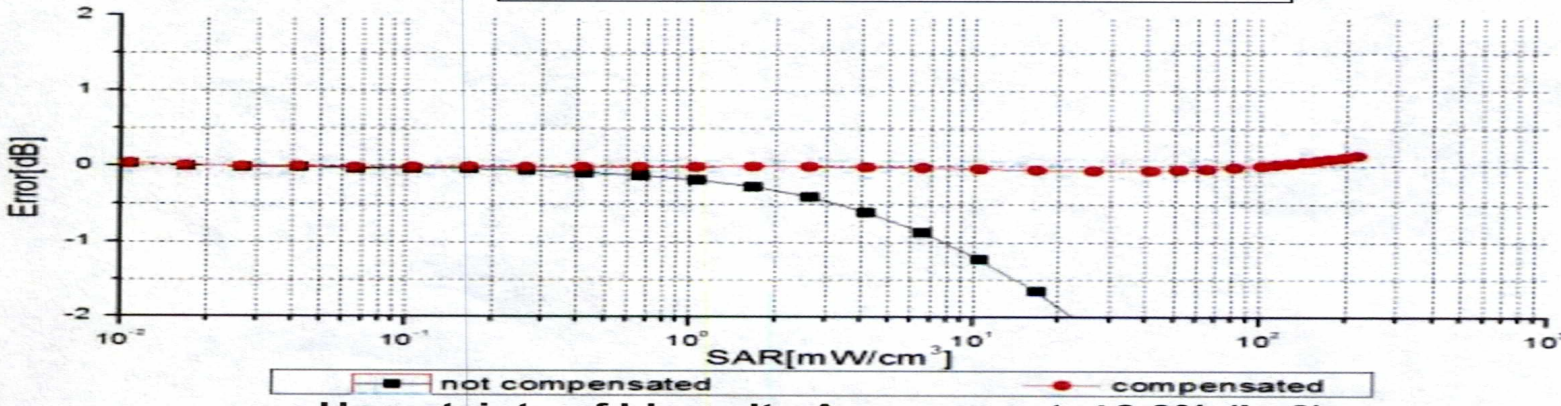
Dynamic Range f(SAR_{head})
(TEM cell, f = 900 MHz)





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

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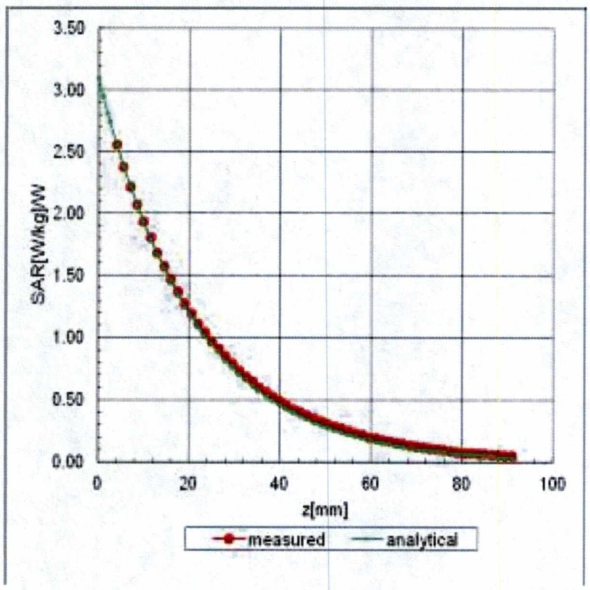
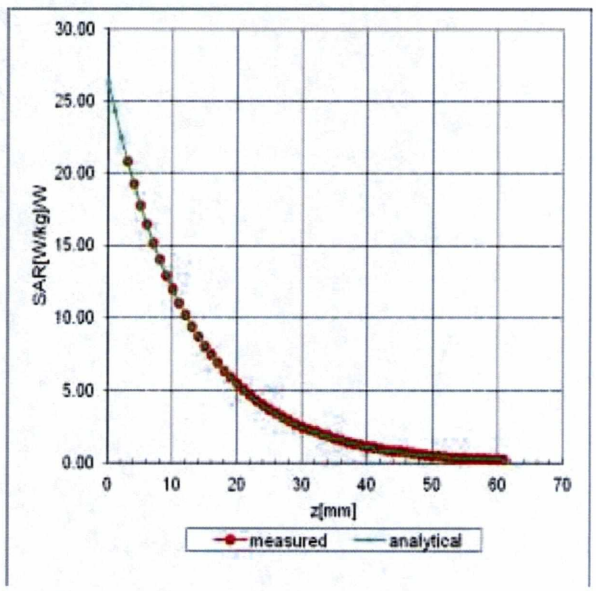
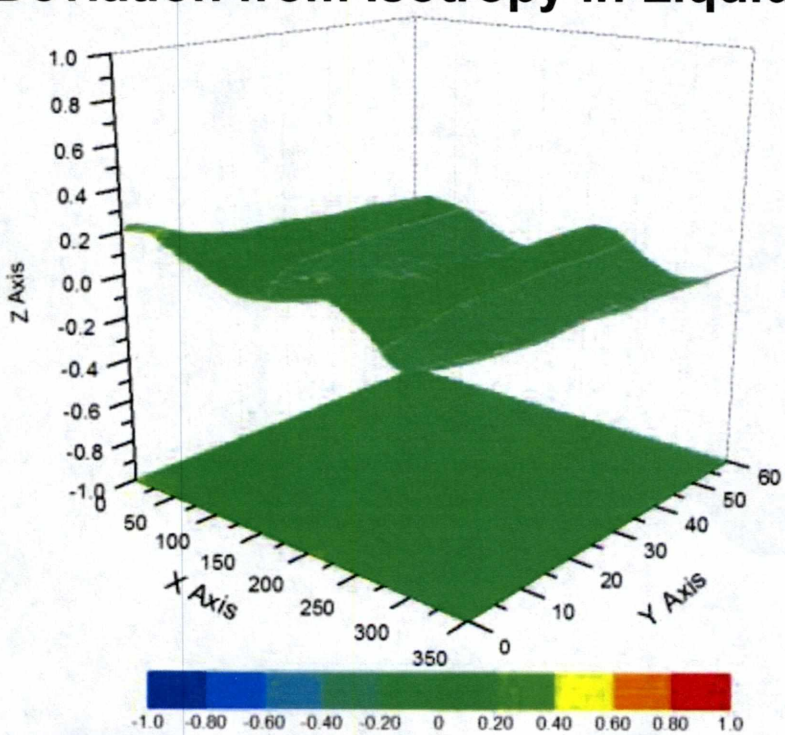
Conversion Factor Assessment

f=750 MHz, WGLS R9(H_convF) **f=1750 MHz, WGLS R22(H_convF)**





Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±3.2% (K=2)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3789

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	47.2
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

Dipole D750V3 SN 1160				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-06-22	-26.3	/	54.8	/
2017-06-21	-27.2	3.42%	57.1	2.3Ω
2018-06-20	-26.9	2.28%	56.2	1.4Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-06-22	-28.4	/	50.2	/
2017-06-21	-29.1	2.46%	51.7	1.5Ω
2018-06-20	-28.7	1.06%	51.1	0.9Ω

Dipole D835V2 SN 4d105				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-12-08	-29.1	/	49.2	/
2017-12-07	-29.7	2.06%	51.3	2.1Ω
2018-12-06	-29.5	1.03%	50.6	1.4
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-12-08	-25.1	/	45.8	/
2017-12-07	-25.5	1.59%	47.7	1.9Ω
2018-12-06	-25.3	0.80%	46.6	0.8

Dipole D1750V2 SN 1149				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-06-23	-38.7	/	49	/
2017-06-22	-39.6	2.33%	52.2	3.2Ω
2018-06-21	-38.9	0.52%	51.8	2.8Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-06-23	-23.3	/	43.6	/
2017-06-22	-23.8	2.15%	46	2.4Ω
2018-06-21	-23.9	2.57%	45.7	2.1Ω

Dipole D1900V2 SN 5d028				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-12-07	-24.4	/	51.8	/
2017-12-06	-25.2	3.28%	53.6	1.8Ω
2018-12-05	-24.8	1.64%	52.8	1.0Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-12-07	-24.1	/	48.1	/
2017-12-06	-24.8	2.90%	49.6	1.5Ω
2018-12-05	-25.1	4.15%	50.3	2.2Ω

Dipole D2450V2 SN 733				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-12-07	-26.3	/	52.9	/
2017-12-06	-27.5	4.56%	56.1	3.2Ω
2018-12-05	-27.1	3.04%	55.7	2.8Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-12-07	-24.6	/	49.7	/
2017-12-06	-25.3	2.85%	51.8	2.1Ω
2018-12-05	-25.1	2.03%	52.1	2.4Ω

Dipole D2600V2 SN 1125				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-06-22	-25.9	/	49	/
2017-06-21	-26.4	1.93%	50.9	1.9Ω
2018-06-20	-26.7	3.09%	51.3	2.3Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-06-22	-24.2	/	45.7	/
2017-06-21	-25.4	4.96%	48.2	2.5Ω
2018-06-20	-24.9	2.89%	47.5	1.8Ω

Dipole D5GHzV2 SN 1165				
5250MHz Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-12-13	-23.6	/	49.1	/
2017-12-12	-24.2	2.54%	51.7	2.6Ω
2018-12-11	-23.9	1.27%	51.1	2.0Ω
5250MHz Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-12-13	-24.2	/	45.7	/
2017-12-12	-24.7	2.07%	49.1	3.4Ω
2018-12-11	-24.9	2.89%	49.5	3.8Ω
5600MHz Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-12-13	-27.5	/	54.1	/
2017-12-12	-28.3	2.91%	56.4	2.3Ω
2018-12-11	-28.6	4.00%	56.7	2.6Ω
5600MHz Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-12-13	-26.5	/	54.9	/
2017-12-12	-27.3	3.02%	58	3.1Ω
2018-12-11	-27.6	4.15%	58.2	3.3Ω
5750MHz Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-12-13	-27.6	/	52.4	/
2017-12-12	-28.5	3.26%	54.1	1.7Ω
2018-12-11	-28.7	3.99%	54.6	2.2Ω
5750MHz Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2016-12-13	-26.4	/	53.3	/
2017-12-12	-27.1	2.65%	55.9	2.6Ω
2018-12-11	-27.5	4.17%	56.3	3.0Ω