In Collaboration with
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CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
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E-mail: cttl@chinattl.com Http://www.chinattl.cn

DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3970

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)^2)^A	0.49	0.64	0.26	±10.0%
DCP(mV)^B	102.2	105.1	96.2	

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	176.2	±2.3%
		Y	0.0	0.0	1.0		211.5	
		Z	0.0	0.0	1.0		115.6	

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: 3970

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	10.41	10.41	10.41	0.30	0.80	±12.1%
835	41.5	0.90	10.03	10.03	10.03	0.16	1.26	±12.1%
900	41.5	0.97	10.05	10.05	10.05	0.14	1.46	±12.1%
1750	40.1	1.37	8.68	8.68	8.68	0.21	1.11	±12.1%
1900	40.0	1.40	8.25	8.25	8.25	0.24	1.00	±12.1%
2300	39.5	1.67	8.08	8.08	8.08	0.56	0.70	±12.1%
2450	39.2	1.80	7.91	7.91	7.91	0.55	0.73	±12.1%
2600	39.0	1.96	7.59	7.59	7.59	0.51	0.79	±12.1%
5200	36.0	4.66	5.92	5.92	5.92	0.35	1.50	±13.3%
5300	35.9	4.76	5.67	5.67	5.67	0.35	1.40	±13.3%
5500	35.6	4.96	5.22	5.22	5.22	0.35	1.45	±13.3%
5600	35.5	5.07	5.12	5.12	5.12	0.35	1.65	±13.3%
5800	35.3	5.27	5.21	5.21	5.21	0.40	1.35	±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: 3970

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	10.35	10.35	10.35	0.40	0.85	±12.1%
835	55.2	0.97	10.16	10.16	10.16	0.19	1.33	±12.1%
900	55.0	1.05	10.12	10.12	10.12	0.23	1.21	±12.1%
1750	53.4	1.49	8.32	8.32	8.32	0.25	1.04	±12.1%
1900	53.3	1.52	8.10	8.10	8.10	0.20	1.15	±12.1%
2300	52.9	1.81	7.80	7.80	7.80	0.54	0.79	±12.1%
2450	52.7	1.95	7.83	7.83	7.83	0.66	0.70	±12.1%
2600	52.5	2.16	7.49	7.49	7.49	0.54	0.78	±12.1%
5200	49.0	5.30	5.19	5.19	5.19	0.50	1.30	±13.3%
5300	48.9	5.42	4.73	4.73	4.73	0.50	1.36	±13.3%
5500	48.6	5.65	4.42	4.42	4.42	0.50	1.40	±13.3%
5600	48.5	5.77	4.31	4.31	4.31	0.50	1.60	±13.3%
5800	48.2	6.00	4.40	4.40	4.40	0.50	1.72	±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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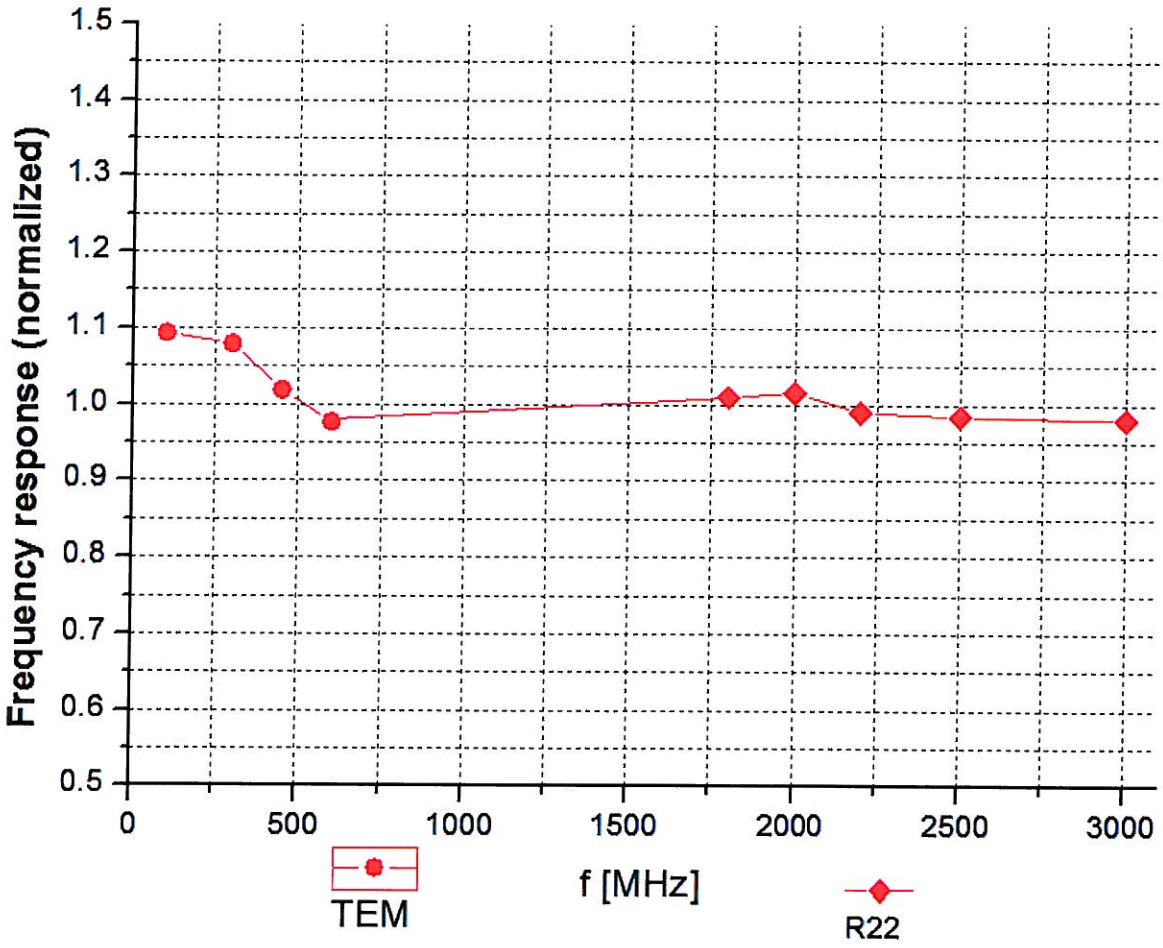
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



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

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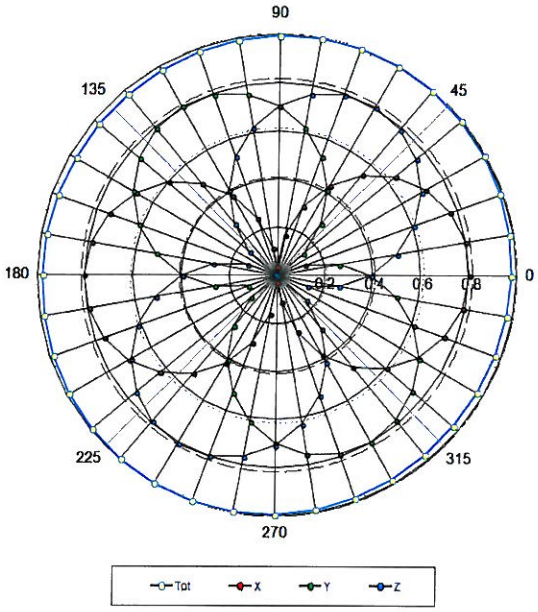
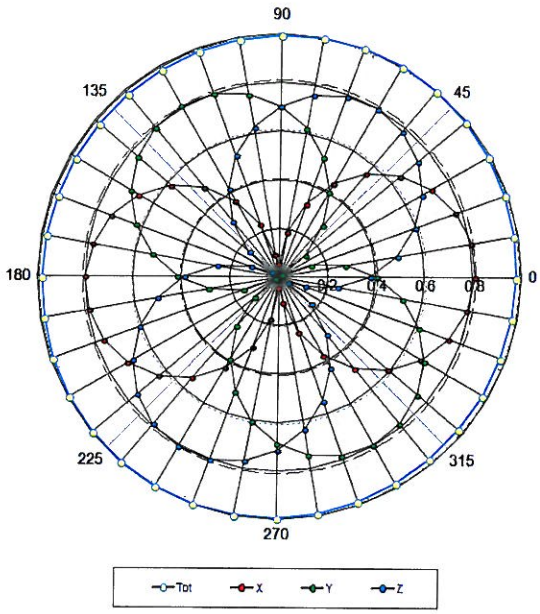
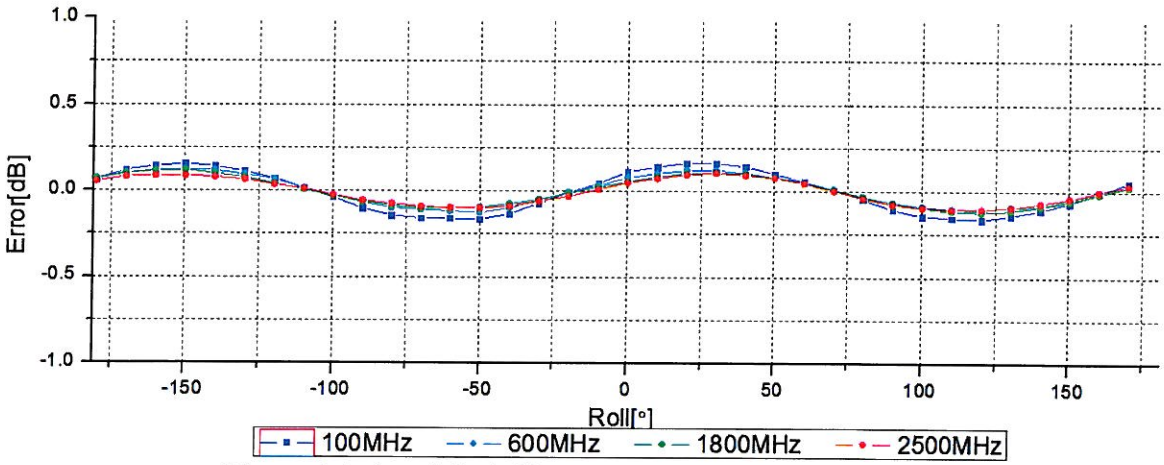
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





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

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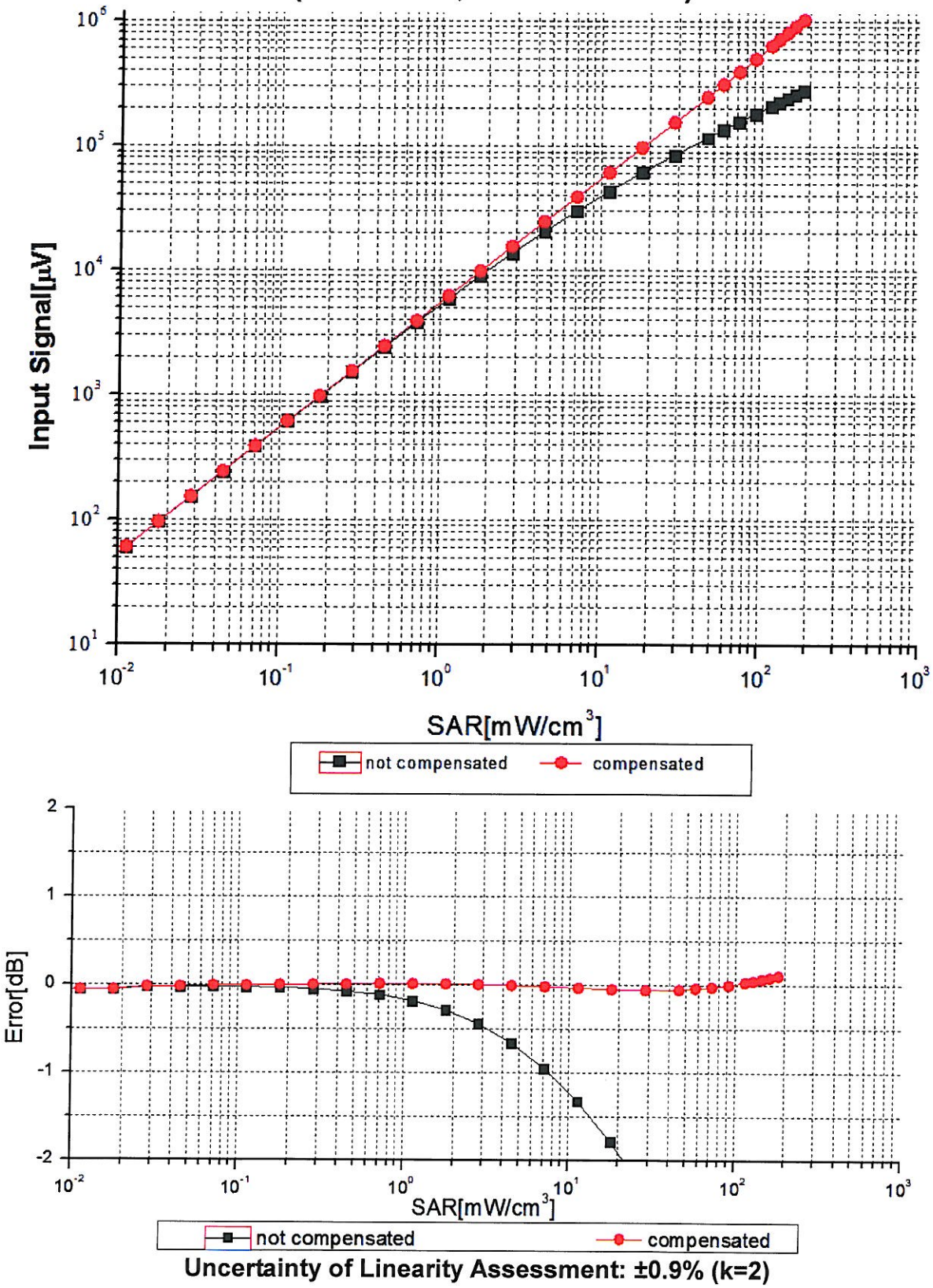
Dynamic Range f(SAR_{head})
(TEM cell, f = 900 MHz)



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

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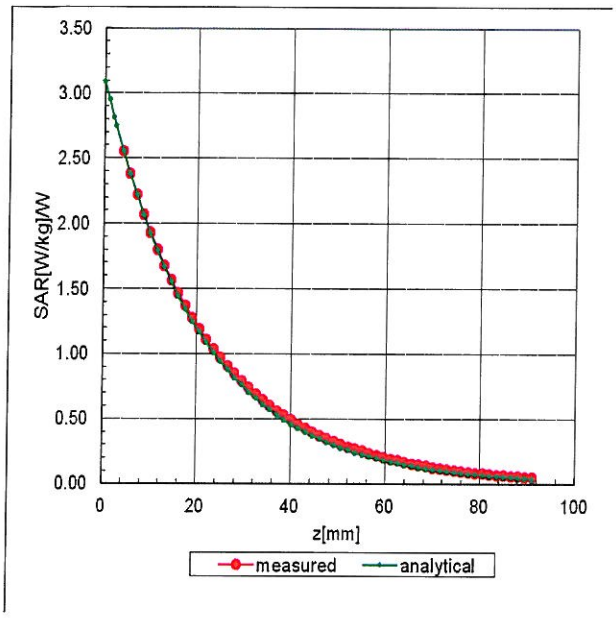
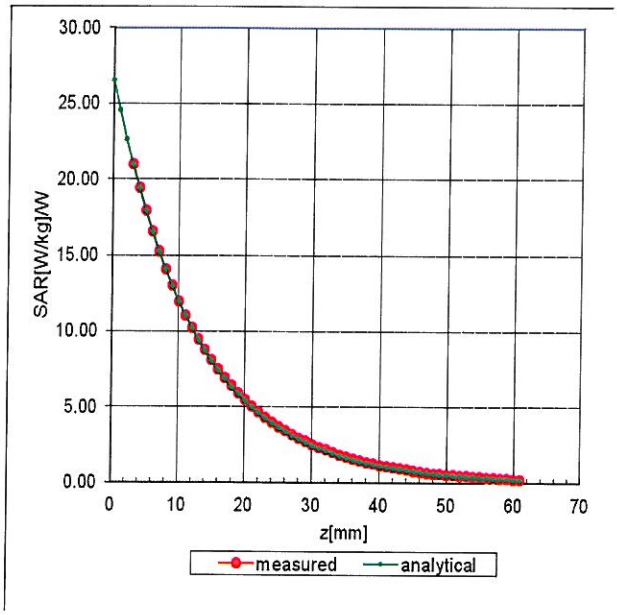
Conversion Factor Assessment

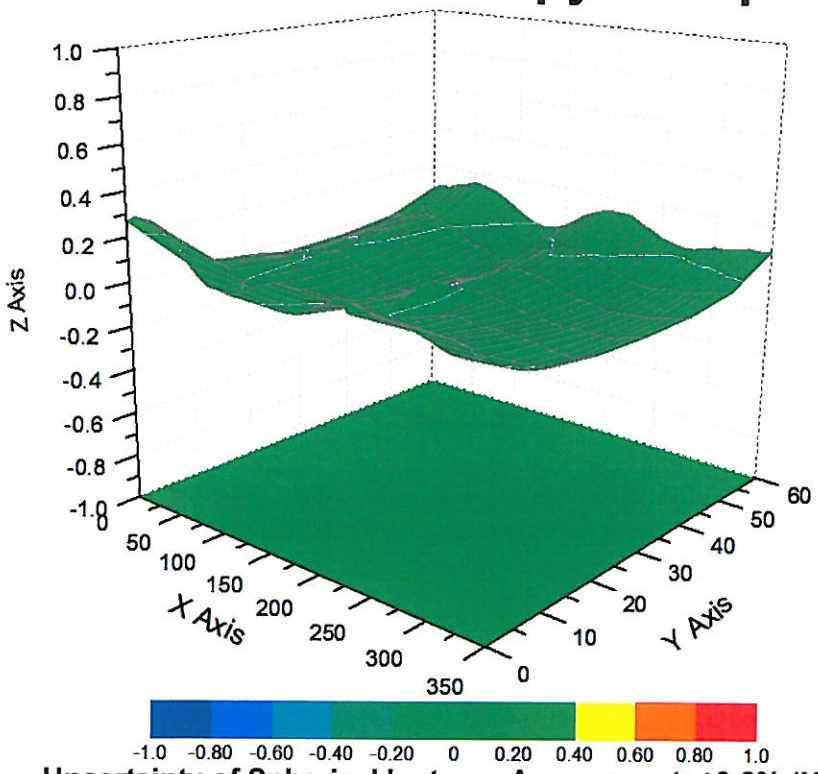
f=750 MHz, WGLS R9(H_convF)



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: 3970

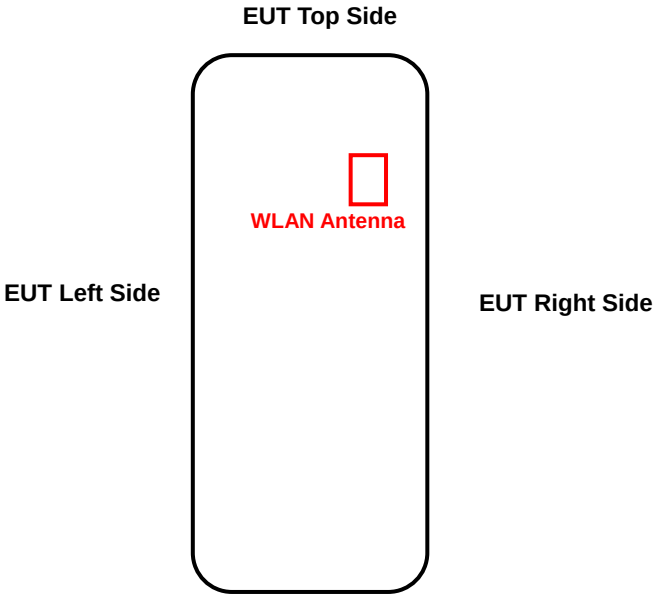
Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	160.2
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

Appendix B. Photographs of EUT and Setup

<Photographs of EUT>

<Antenna Location>

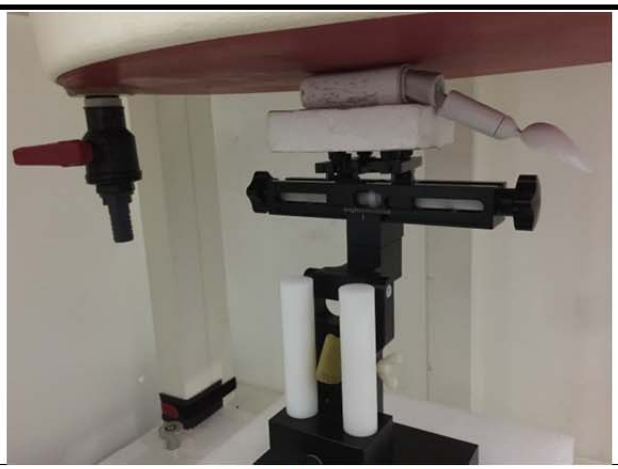
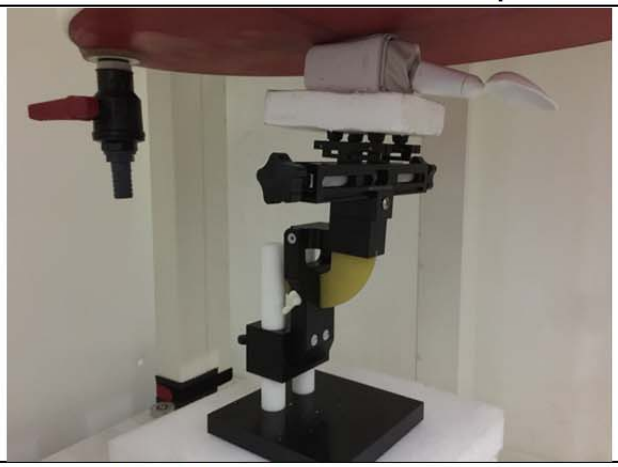


<EUT Front View>

The separation distance for antenna to edge:

Antenna	To Rear Side (mm)	To Front Side (mm)	To Right Side (mm)	To Left Side (mm)	To top Side (mm)
WWAN-0	12	18	15	35	50

<Photographs of SAR Setup>

	
Rear Face of EUT with 0 cm Gap	Front Face of EUT with 0cm Gap
	
Right Side of EUT with 0 cm Gap	