In Collaboration with
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CALIBRATION LABORATORY

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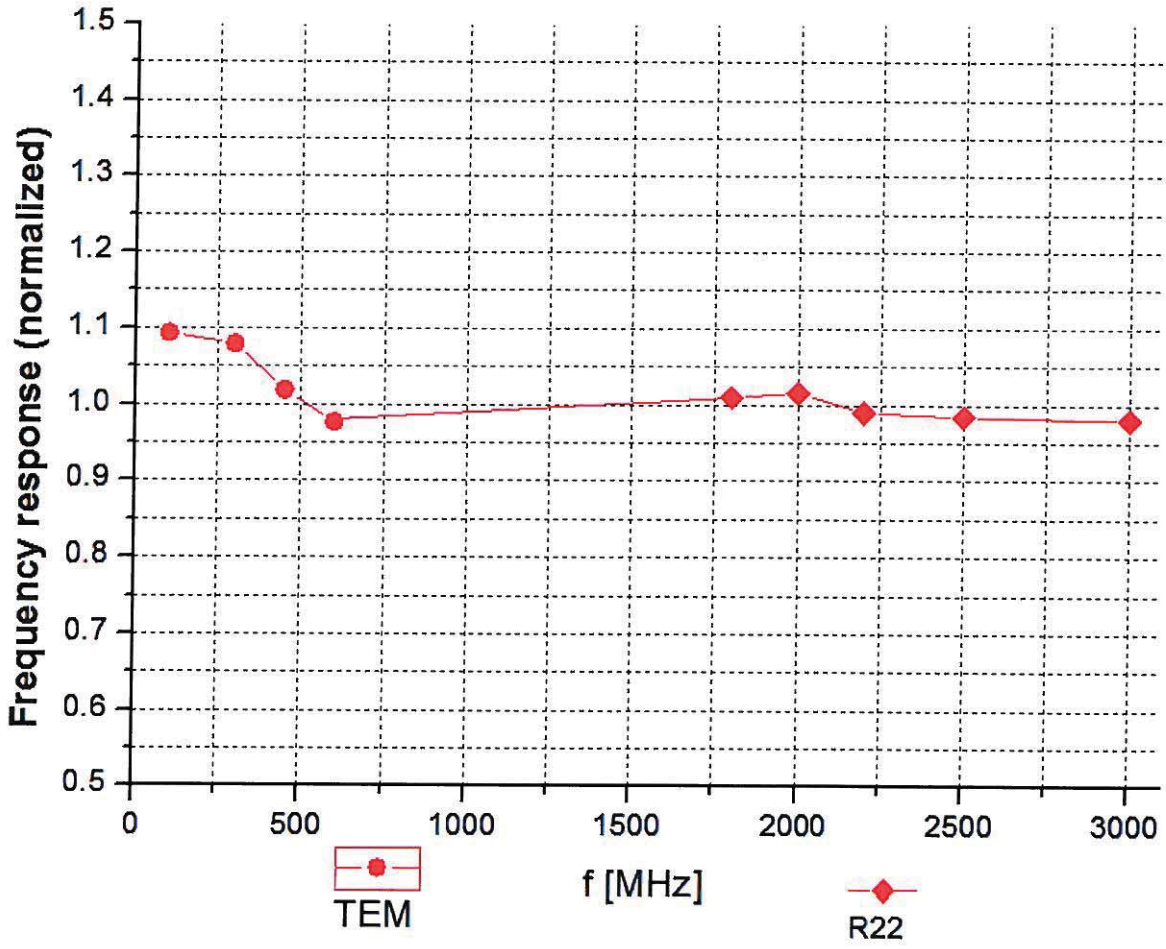
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



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

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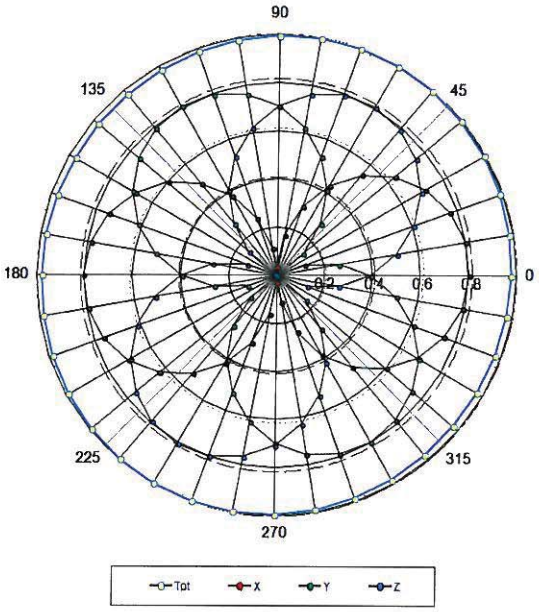
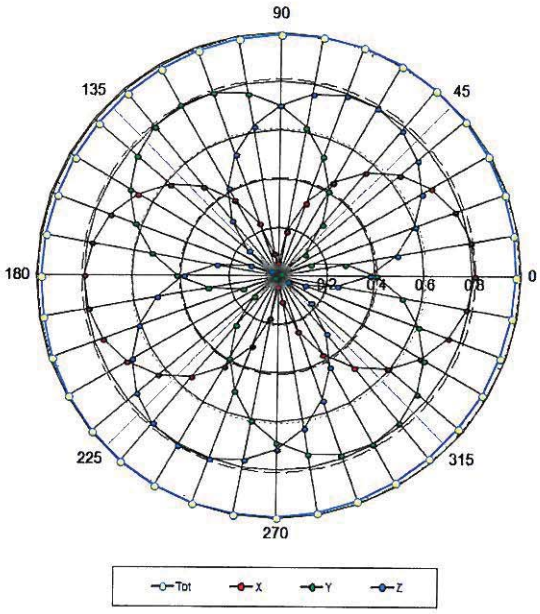
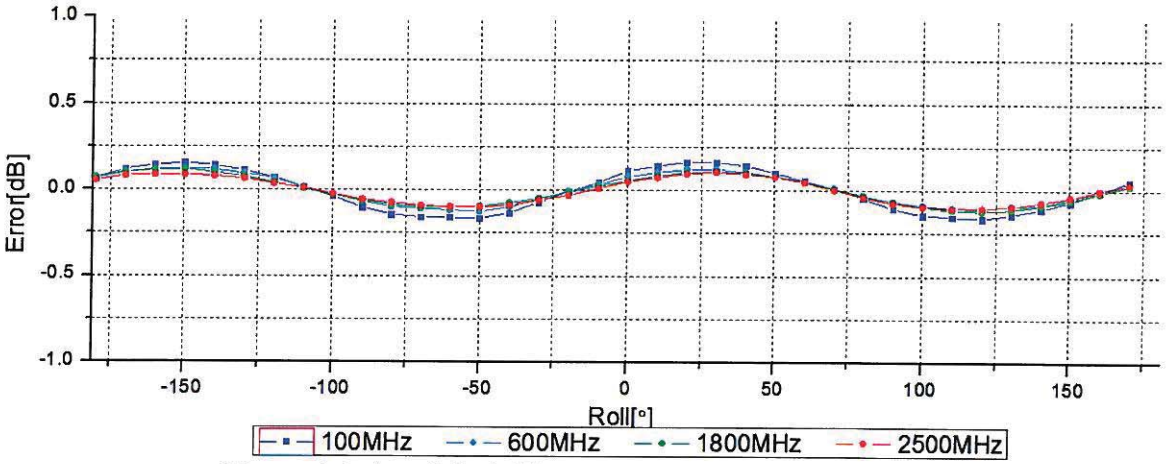
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





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

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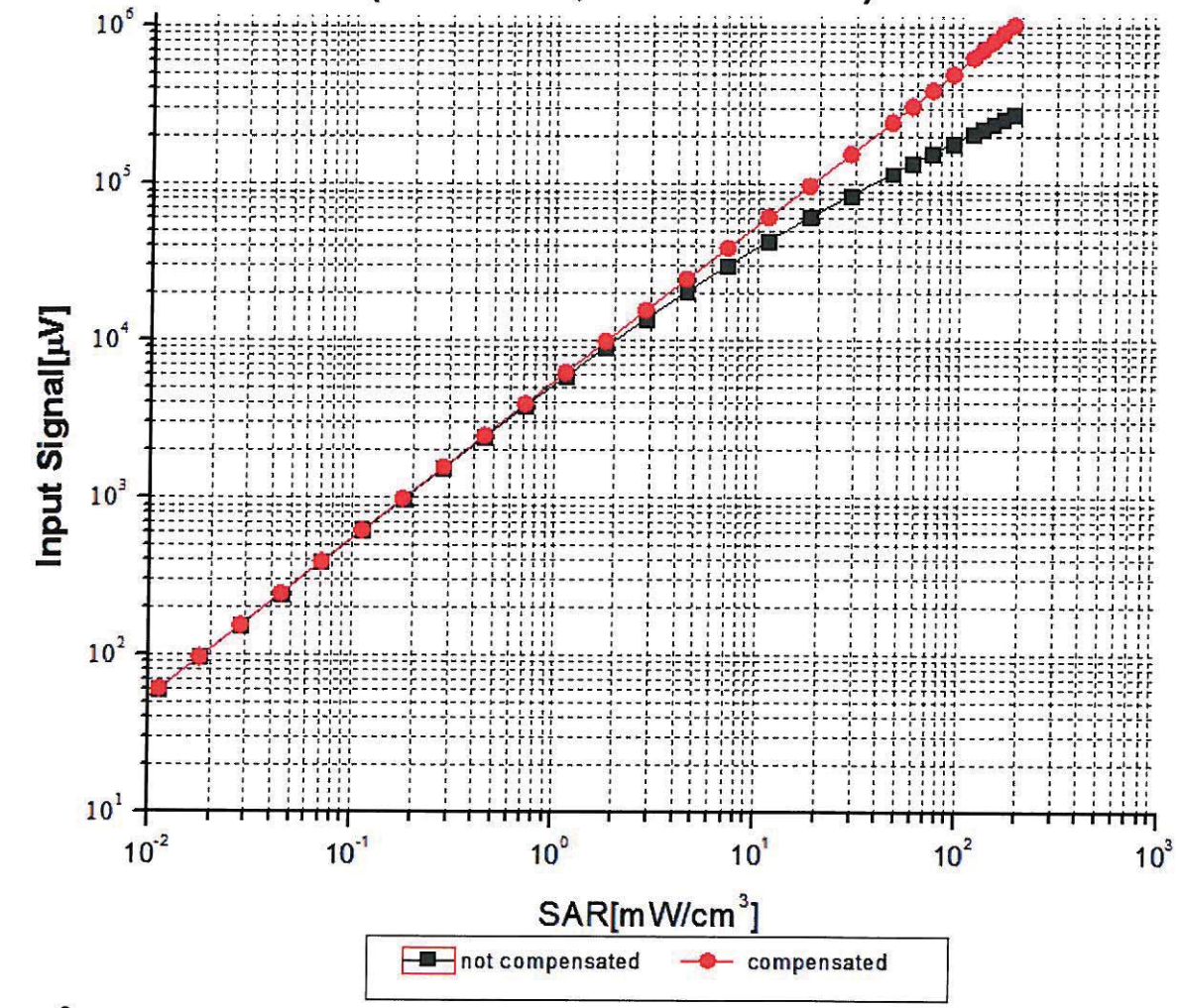
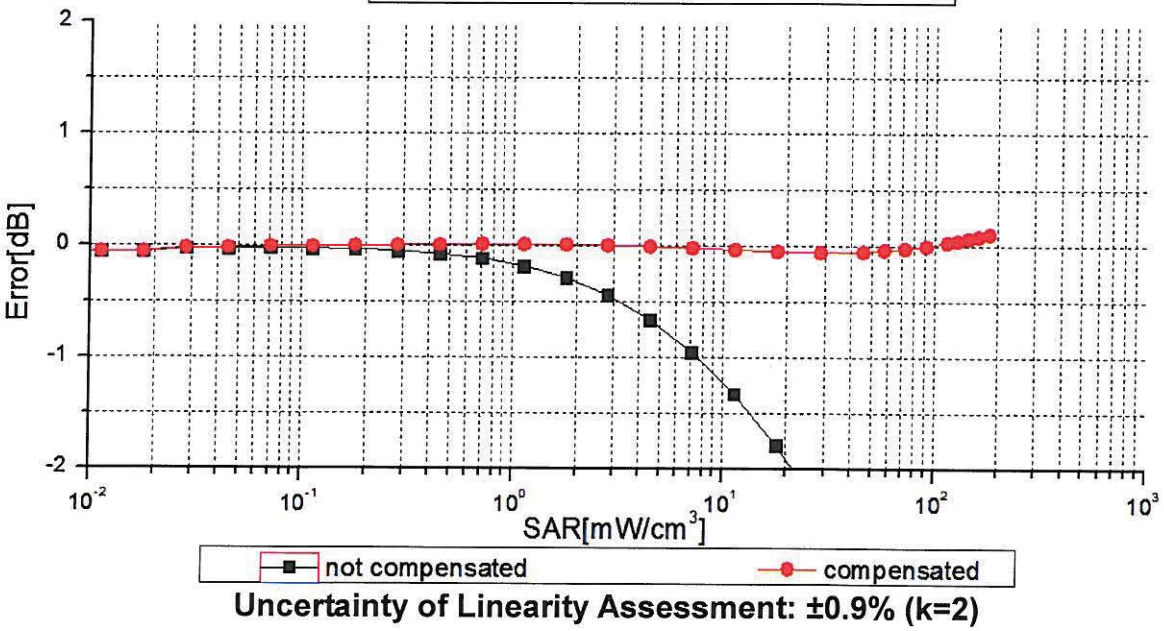
Dynamic Range f(SAR_{head})
(TEM cell, f = 900 MHz)





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

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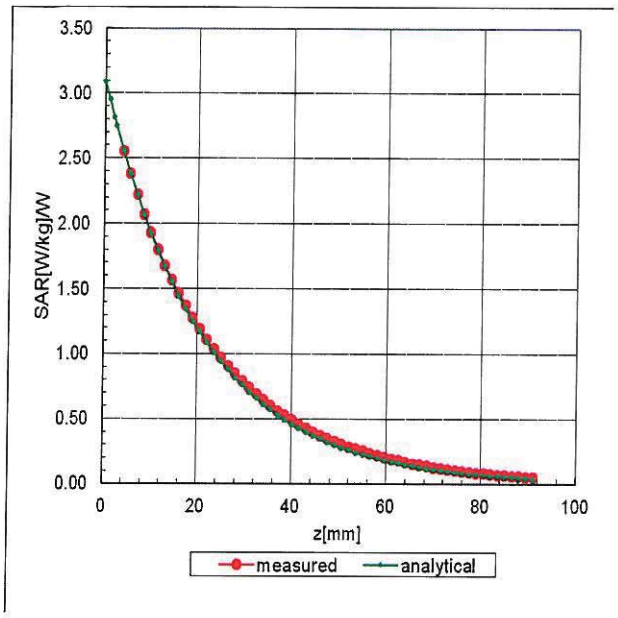
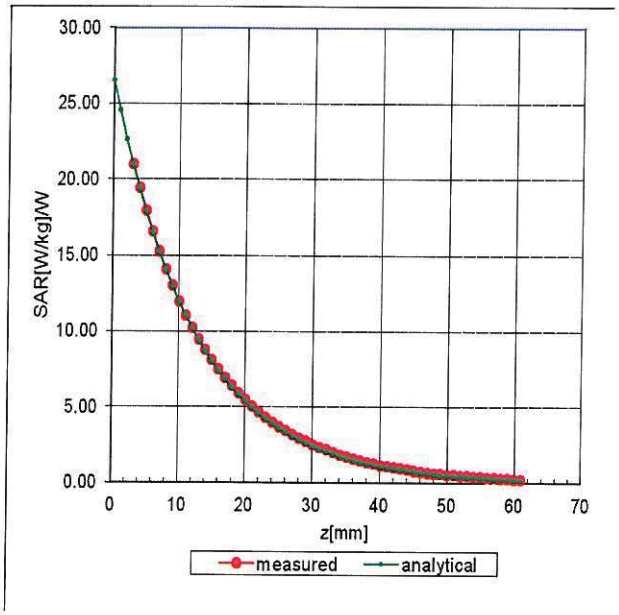
Conversion Factor Assessment

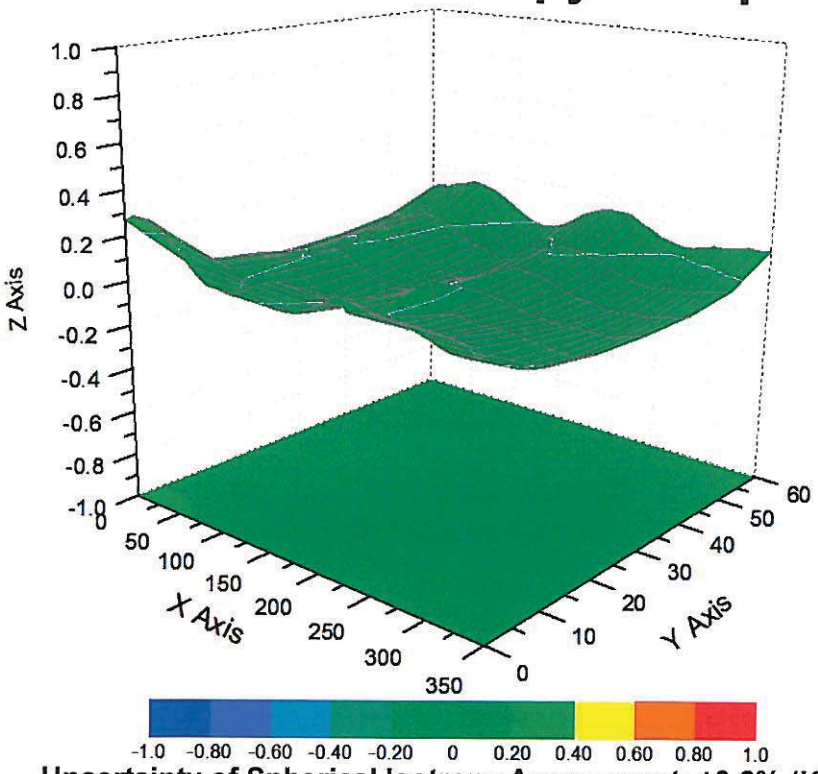
f=750 MHz, WGLS R9(H_convF)



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

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校准
CALIBRATION
CNAS L0570

Client : **Emtek(Shenzhen)** **Certificate No: Z17-97194**

CALIBRATION CERTIFICATE

Object	DAE4 - SN: 1418
Calibration Procedure(s)	FF-Z11-002-01 Calibration Procedure for the Data Acquisition Electronics (DAEx)
Calibration date:	October 09, 2017

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Process Calibrator 753	1971018	27-Jun-17 (CTTL, No.J17X05859)	June-18

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: October 09, 2017

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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Glossary:

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters:

- *DC Voltage Measurement*: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.

- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.

- The report provide only calibration results for DAE, it does not contain other performance test results.

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DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV
Low Range: 1LSB = 61nV , full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

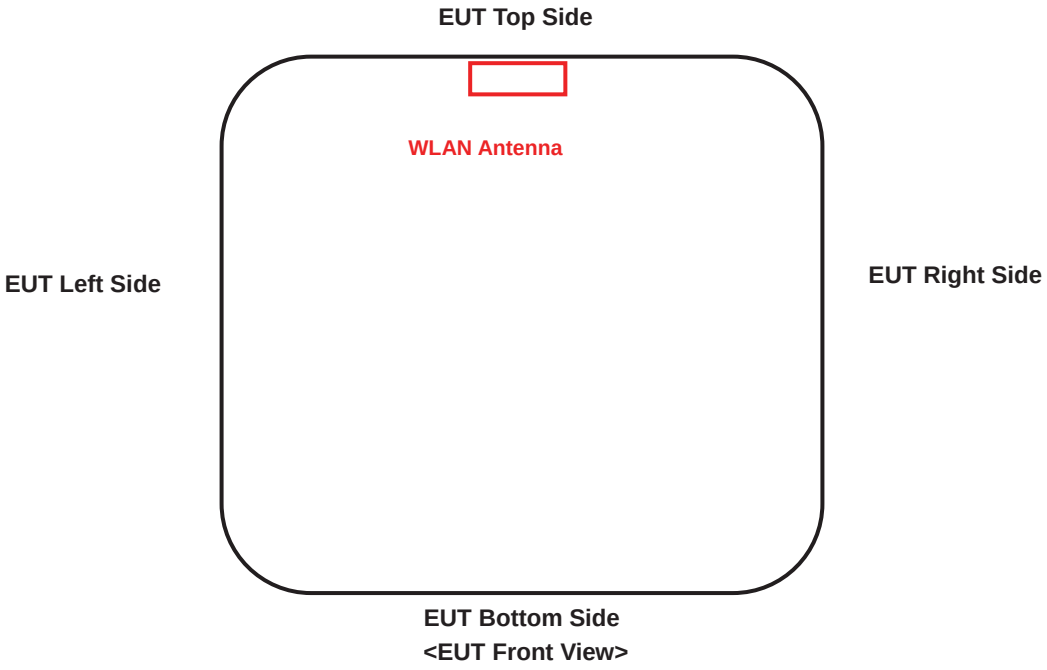
Calibration Factors	X	Y	Z
High Range	404.125 ± 0.15% (k=2)	404.667 ± 0.15% (k=2)	404.348 ± 0.15% (k=2)
Low Range	3.98970 ± 0.7% (k=2)	4.00074 ± 0.7% (k=2)	3.97649 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	153° ± 1 °

Appendix D. Photographs of EUT and Setup

<Antenna Location>



<EUT Front View>

The separation distance for antenna to edge:

Antenna	To Left Side (mm)	To Right Side (mm)	To Top Side (mm)	To Bottom Side (mm)
Wireless	28	28	0	50