

DASY5 Validation Report for Head TSL

Date: 29.08.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 450 MHz; Type: D450V3; Serial: D450V3 - SN: 1079

Communication System: UID 0 - CW; Frequency: 450 MHz

Medium parameters used: $f = 450$ MHz; $\sigma = 0.89$ S/m; $\epsilon_r = 44.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.58, 6.58, 6.58); Calibrated: 31.12.2015;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 12.08.2016
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1003
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:

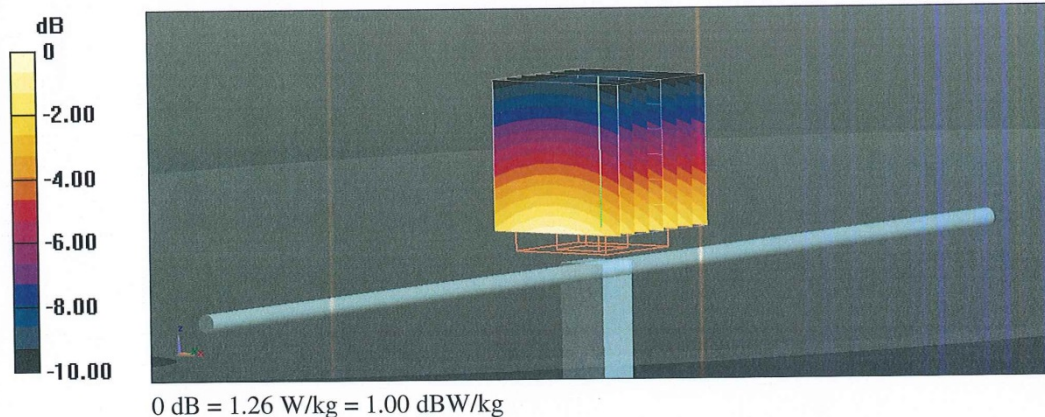
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 39.87 V/m; Power Drift = -0.05 dB

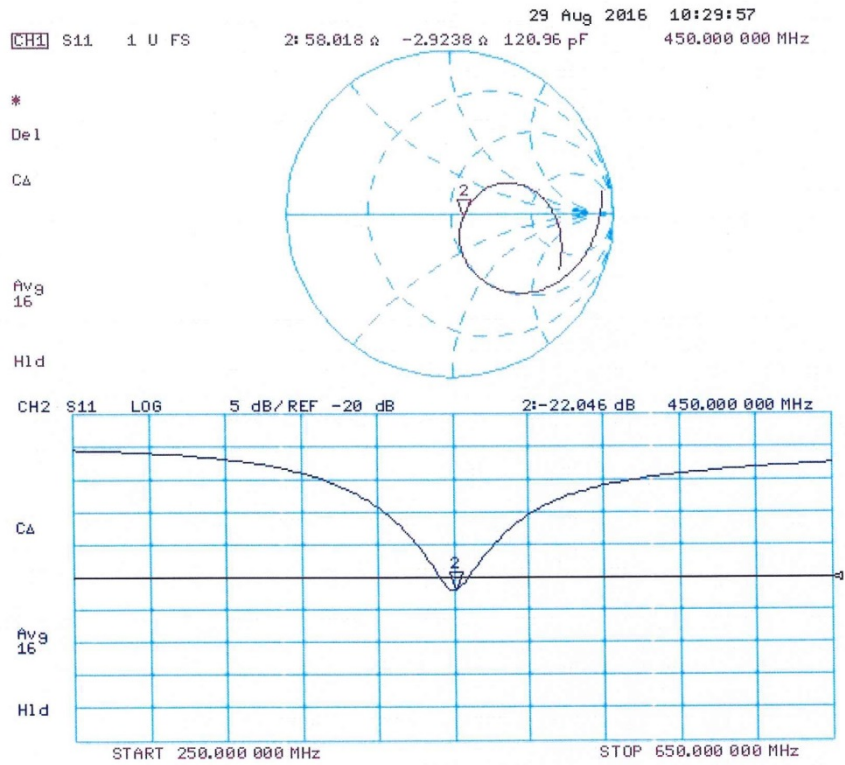
Peak SAR (extrapolated) = 1.69 W/kg

SAR(1 g) = 1.16 W/kg; SAR(10 g) = 0.775 W/kg

Maximum value of SAR (measured) = 1.26 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 29.08.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 450 MHz D450V3; Type: D450V3; Serial: D450V3 - SN:1079

Communication System: UID 0 - CW; Frequency: 450 MHz

Medium parameters used: $f = 450$ MHz; $\sigma = 0.95$ S/m; $\epsilon_r = 56.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.99, 6.99, 6.99); Calibrated: 31.12.2015;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 12.08.2016
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1003
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:

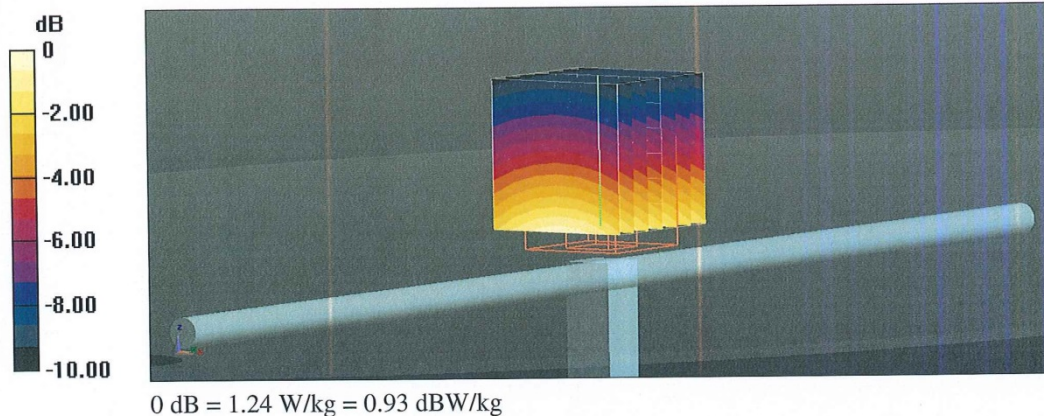
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 37.17 V/m; Power Drift = -0.01 dB

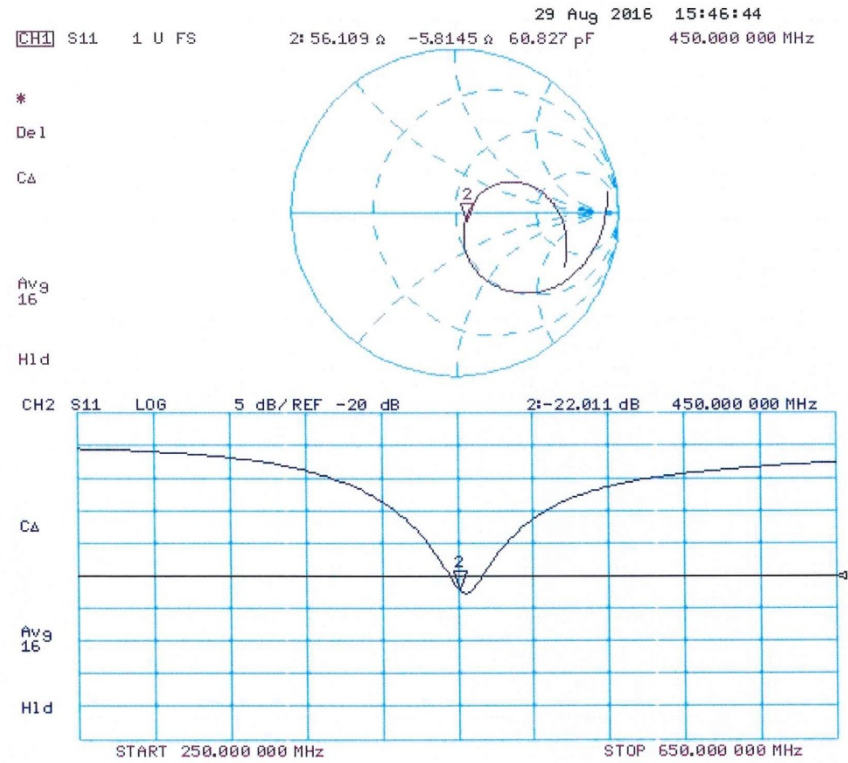
Peak SAR (extrapolated) = 1.82 W/kg

SAR(1 g) = 1.16 W/kg; SAR(10 g) = 0.764 W/kg

Maximum value of SAR (measured) = 1.24 W/kg



Impedance Measurement Plot for Body TSL



Extended Dipole Calibrations

Referring to KDB865664 D01, if dipoles are verified in return loss ($<-20\text{dB}$, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

Head						
Date of measurement	Return-loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary impedance (ohm)	Delta (ohm)
2016-02-03	-25.0		50.7		-5.6	
2017-02-01	-24.9	1.16	51.5	0.8	-5.2	0.4

Body						
Date of measurement	Return-loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary impedance (ohm)	Delta (ohm)
2016-02-03	-25.0		47.0		-4.5	
2017-02-01	-24.6	4.00	48.3	1.3	-4.0	0.5

The return loss is $<-20\text{dB}$, within 20% of prior calibration; the impedance is within 5ohm of prior calibration. Therefore the verification result should support extended calibration.

1.3. DAE4 Calibration Certificate



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中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
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E-mail: cttl@chinattl.com [Http://www.chinattl.cn](http://www.chinattl.cn)

Client : **CIQ(Shenzhen)**Certificate No: **Z17-97109****CALIBRATION CERTIFICATE**Object **DAE4 - SN: 1315**Calibration Procedure(s) **FF-Z11-002-01
Calibration Procedure for the Data Acquisition Electronics
(DAEx)**Calibration date: **August 15, 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: August 16, 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 = 6.1 μ V, 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	405.175 $\pm$ 0.15% (k=2)	405.013 $\pm$ 0.15% (k=2)	404.971 $\pm$ 0.15% (k=2)
Low Range	3.99087 $\pm$ 0.7% (k=2)	3.98644 $\pm$ 0.7% (k=2)	3.98913 $\pm$ 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	20.5° $\pm$ 1 °
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