

ES3DV3– SN:3292

September 2, 2016

**DASY/EASY - Parameters of Probe: ES3DV3 - SN:3292****Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup>	0.94	0.95	0.93	± 10.1 %
DCP (mV) <sup>B</sup>	105.7	101.2	111.7	

**Modulation Calibration Parameters**

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc <sup>E</sup> (k=2)
0	CW	X	0.0	0.0	1.0	0.00	205.6	±3.5 %
		Y	0.0	0.0	1.0		212.6	
		Z	0.0	0.0	1.0		204.7	

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%.

<sup>A</sup> The uncertainties of Norm X,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

<sup>E</sup> Uncertainty 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: ES3DV3 - SN:3292

### 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)	Unc (k=2)
450	43.5	0.87	7.12	7.12	7.12	0.20	1.30	± 13.3 %
750	41.9	0.89	6.76	6.76	6.76	0.80	1.19	± 12.0 %
835	41.5	0.90	6.53	6.53	6.53	0.43	1.64	± 12.0 %
900	41.5	0.97	6.40	6.40	6.40	0.53	1.43	± 12.0 %
1750	40.1	1.37	5.54	5.54	5.54	0.80	1.15	± 12.0 %
1900	40.0	1.40	5.26	5.26	5.26	0.55	1.47	± 12.0 %
2450	39.2	1.80	4.97	4.97	4.97	0.64	1.41	± 12.0 %
2600	39.0	1.96	4.77	4.77	4.77	0.80	1.28	± 12.0 %

<sup>C</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the 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 frequencies 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 frequencies between 3-6 GHz at any distance larger than half the probe diameter from the boundary.

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## DASY/EASY - Parameters of Probe: ES3DV3 - SN:3292

### 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)	Unc (k=2)
450	56.7	0.94	7.33	7.33	7.33	0.13	1.50	± 13.3 %
750	55.5	0.96	6.25	6.25	6.25	0.38	1.66	± 12.0 %
835	55.2	0.97	6.27	6.27	6.27	0.47	1.56	± 12.0 %
900	55.0	1.05	6.16	6.16	6.16	0.80	1.15	± 12.0 %
1750	53.4	1.49	5.28	5.28	5.28	0.70	1.36	± 12.0 %
1900	53.3	1.52	5.05	5.05	5.05	0.64	1.44	± 12.0 %
2450	52.7	1.95	4.70	4.70	4.70	0.74	1.22	± 12.0 %
2600	52.5	2.16	4.52	4.52	4.52	0.80	1.13	± 12.0 %

<sup>C</sup> Frequency validity above 300 MHz of  $\pm 100$  MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to  $\pm 50$  MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is  $\pm 10$ , 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  $\pm 110$  MHz.

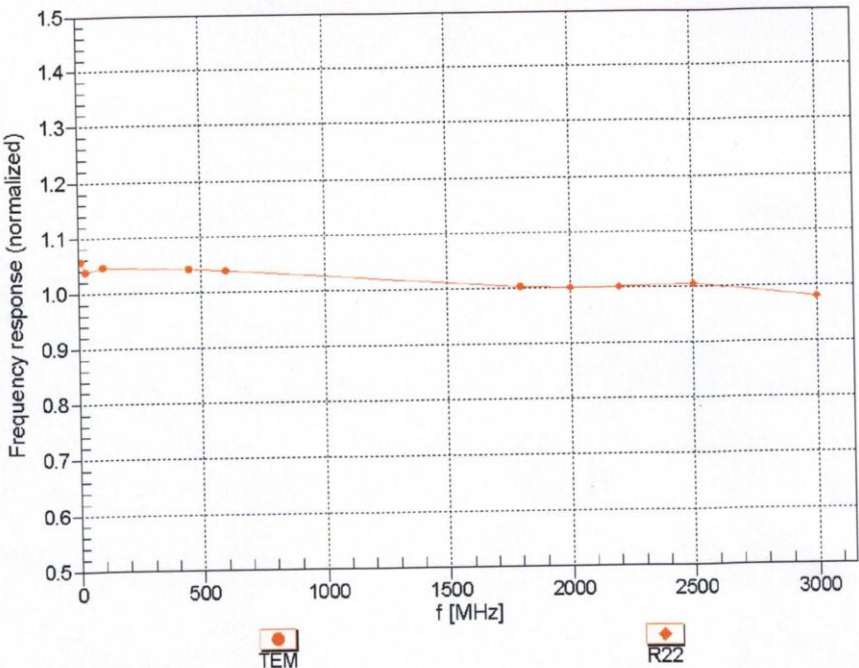
<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to  $\pm 10\%$  if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to  $\pm 5\%$ . 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  $\pm 1\%$  for frequencies below 3 GHz and below  $\pm 2\%$  for 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)

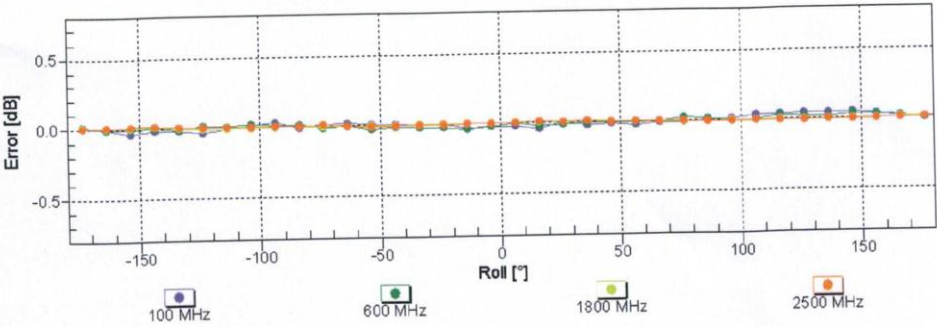
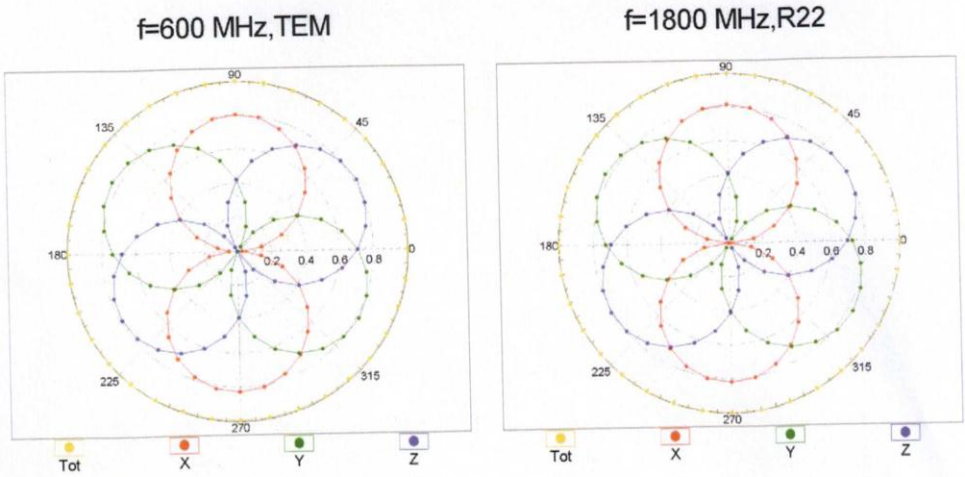


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

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

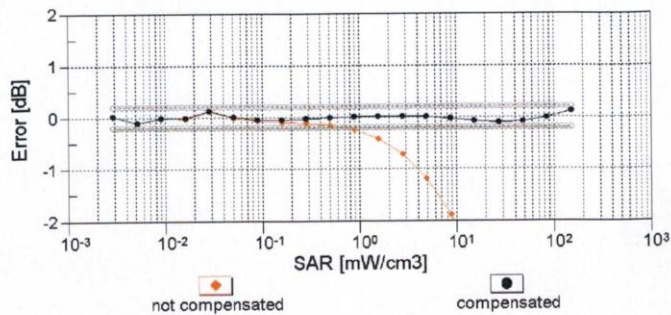
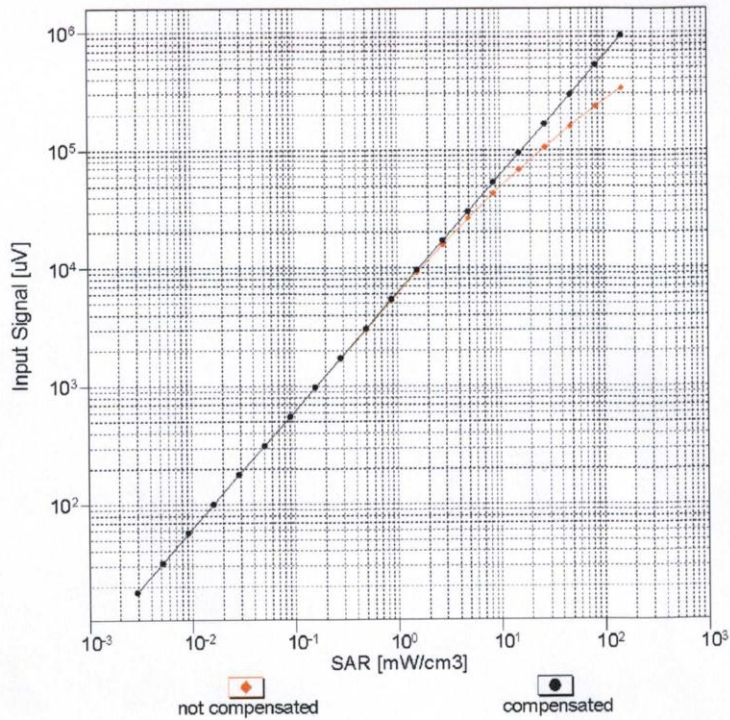


Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

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Dynamic Range f(SAR<sub>head</sub>)  
(TEM cell , f<sub>eval</sub>= 1900 MHz)

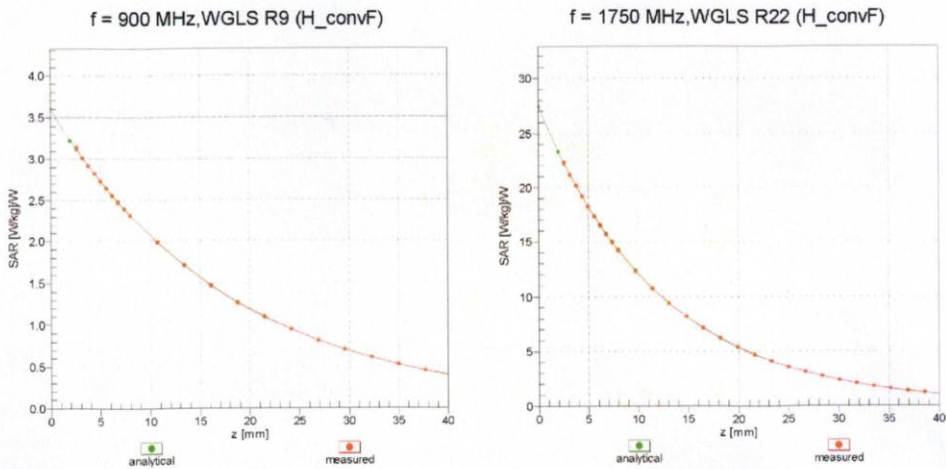


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

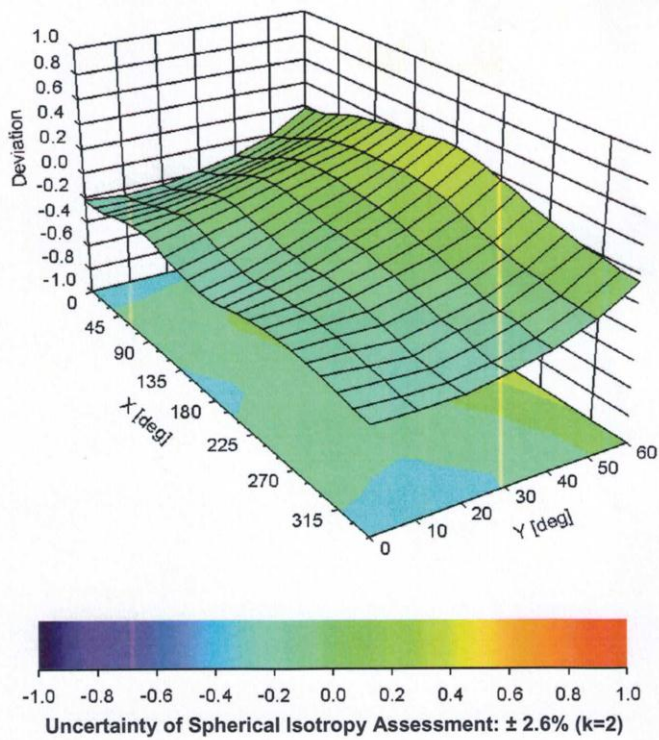
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Conversion Factor Assessment



Deviation from Isotropy in Liquid  
Error ( $\phi$ ,  $\theta$ ), f = 900 MHz



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**DASY/EASY - Parameters of Probe: ES3DV3 - SN:3292****Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle (°)	36.3
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

## 6.2. D450V3 Dipole Calibration Certificate

**Calibration Laboratory of**  
**Schmid & Partner**  
**Engineering AG**  
 Zeughausstrasse 43, 8004 Zurich, Switzerland



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Client **CIQ-SZ (Auden)**

Certificate No: **D450V3-1079\_Aug16**

### CALIBRATION CERTIFICATE

Object

D450V3 - SN: 1079

*SAR 13/15/8 (GOM)*  
*JP462*

Calibration procedure(s)

QA CAL-15.v8

Calibration procedure for dipole validation kits below 700 MHz

Calibration date:

August 29, 2016

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  $(22 \pm 3)^\circ\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5277 (20x)	05-Apr-16 (No. 217-02293)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe ET3DV6	SN: 1507	31-Dec-15 (No. ET3-1507_Dec15)	Dec-16
DAE4	SN: 654	12-Aug-16 (No. DAE4-654_Aug16)	Aug-17
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (No. 217-02285/02284)	In house check: Jun-18
Power sensor E4412A	SN: MY41498087	06-Apr-16 (No. 217-02285)	In house check: Jun-18
Power sensor E4412A	SN: 000110210	06-Apr-16 (No. 217-02284)	In house check: Jun-18
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-16)	In house check: Jun-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	<i>[Signature]</i>

	Name	Function
Approved by:	Katja Pokovic	Technical Manager

Issued: August 30, 2016

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

**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
Zeughausstrasse 43, 8004 Zurich, Switzerland



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

#### Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

#### Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Additional Documentation:

- DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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%.

### Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	ELI4 Flat Phantom	Shell thickness: $2 \pm 0.2$ mm
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	450 MHz $\pm$ 1 MHz	

### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	43.5	0.87 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	44.3 $\pm$ 6 %	0.89 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.16 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	4.58 W/kg $\pm$ 18.1 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	0.775 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	3.06 W/kg $\pm$ 17.6 % (k=2)

### Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	56.7	0.94 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	56.7 $\pm$ 6 %	0.95 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

### SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.16 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	4.60 W/kg $\pm$ 18.1 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	0.764 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	3.03 W/kg $\pm$ 17.6 % (k=2)

**Appendix (Additional assessments outside the scope of SCS 0108)****Antenna Parameters with Head TSL**

Impedance, transformed to feed point	58.0 $\Omega$ - 2.9 j $\Omega$
Return Loss	- 22.0 dB

**Antenna Parameters with Body TSL**

Impedance, transformed to feed point	56.1 $\Omega$ - 5.8 j $\Omega$
Return Loss	- -22.0 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.348 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

**Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	March 03, 2011

**DASY5 Validation Report for Head TSL**

Date: 29.08.2

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:  $f = 450 \text{ MHz}$ ;  $\sigma = 0.89 \text{ S/m}$ ;  $\epsilon_r = 44.3$ ;  $\rho = 1000 \text{ kg/m}^3$ 

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)

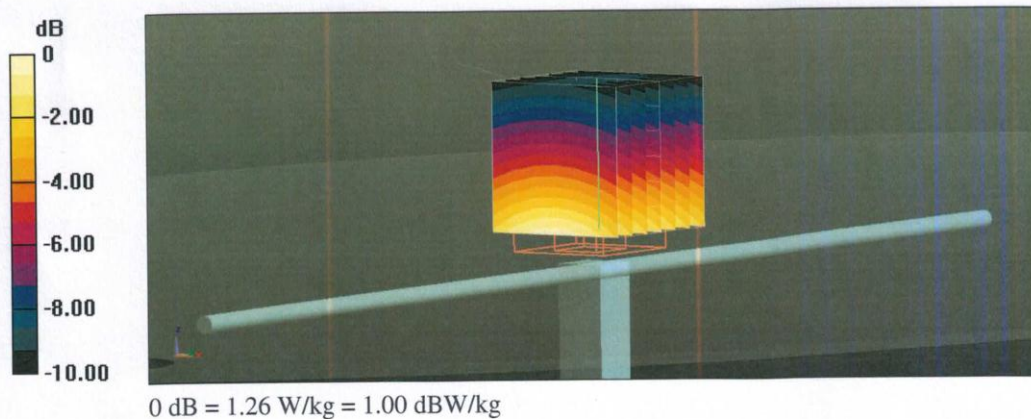
**Dipole Calibration for Head Tissue/d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:**Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$ 

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

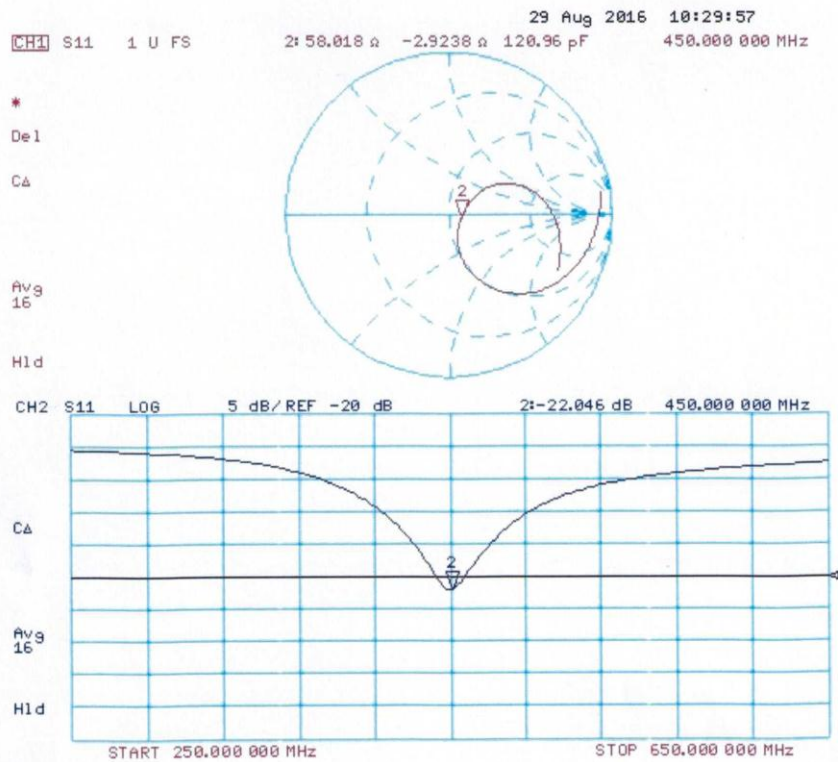
Peak SAR (extrapolated) = 1.69 W/kg

**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/m<sup>3</sup>

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:**

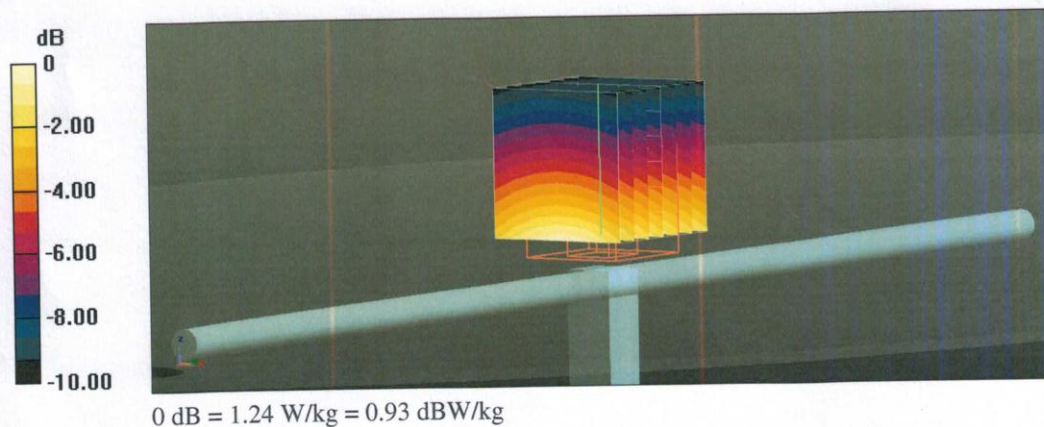
Measurement grid: dx=5mm, dy=5mm, dz=5mm

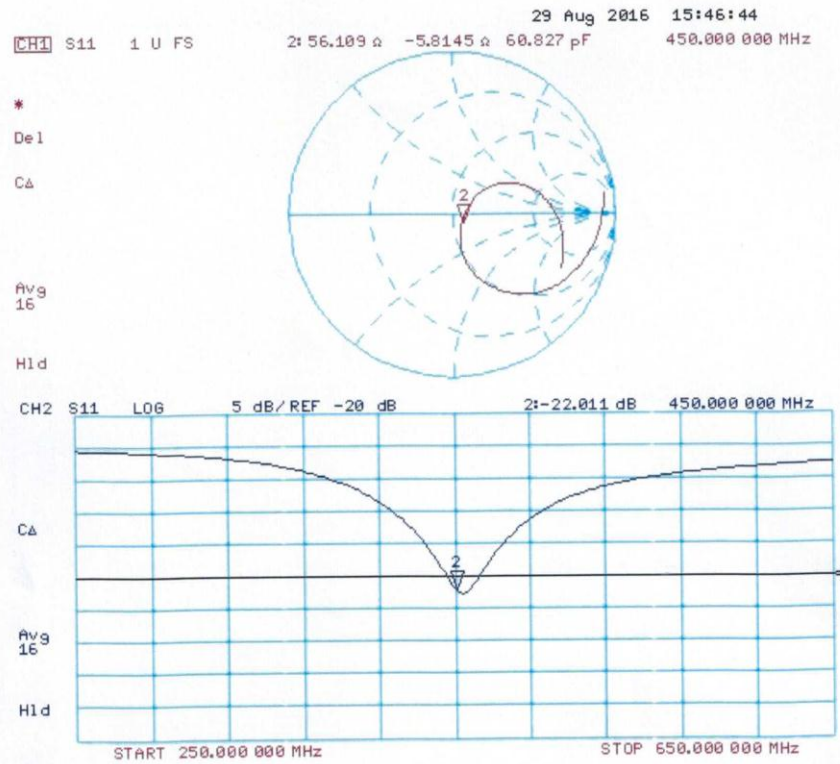
Reference Value = 37.17 V/m; Power Drift = -0.01 dB

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**

## 6.3. DAE4 Calibration Certificate






In Collaboration with  
**speag**  
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China  
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209  
E-mail: cttl@chinattl.com [Http://www.chinattl.cn](http://www.chinattl.cn)

中国  
国际互  
校准  
CNAS LO

Client : **CIQ(Shenzhen)** Certificate No: **Z16-97120**

### CALIBRATION CERTIFICATE

Object: **DAE4 - SN: 1315** *Jp462*

Calibration Procedure(s): **FD-Z11-2-002-01**  
Calibration Procedure for the Data Acquisition Electronics (DAEx)

Calibration date: **July 26, 2016**

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)°C 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-June-16 (CTTL, No:J16X04778)	June-17

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	<i>[Signature]</i>
Reviewed by:	Qi Dianyuan	SAR Project Leader	<i>[Signature]</i>
Approved by:	Lu Bingsong	Deputy Director of the laboratory	<i>[Signature]</i>

Issued: July 27, 2016

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



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China  
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209  
E-mail: cttl@chinattl.com Http://www.chinattl.cn

**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.



In Collaboration with  
**s p e a g**  
 CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China  
 Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209  
 E-mail: cttl@chinattl.com Http://www.chinattl.cn

### DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 $\mu$ 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	405.179 $\pm$ 0.15% (k=2)	405.018 $\pm$ 0.15% (k=2)	404.98 $\pm$ 0.15% (k=2)
Low Range	3.99015 $\pm$ 0.7% (k=2)	3.98549 $\pm$ 0.7% (k=2)	3.98861 $\pm$ 0.7% (k=2)

### Connector Angle

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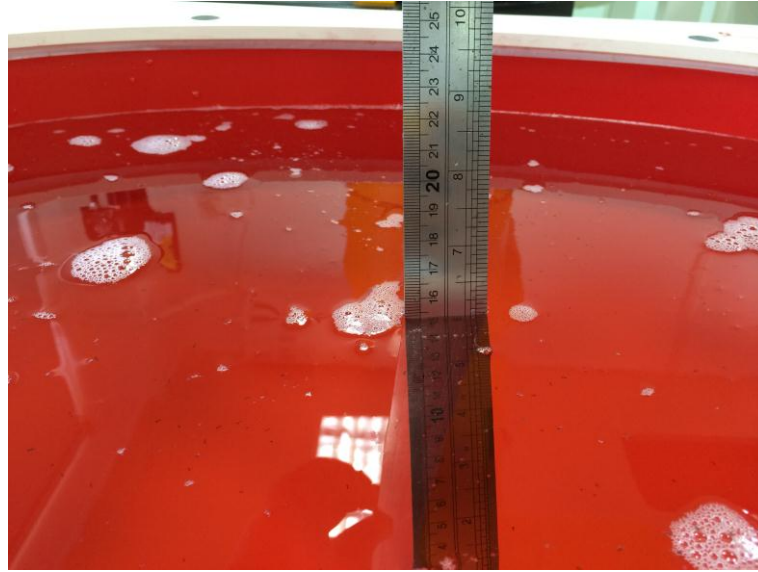


**Acceptable Conditions for SAR Measurements Using Probes and Dipoles  
Calibrated under the SPEAG-CTTL Dual-Logo Calibration Program to  
Support FCC Equipment Certification**

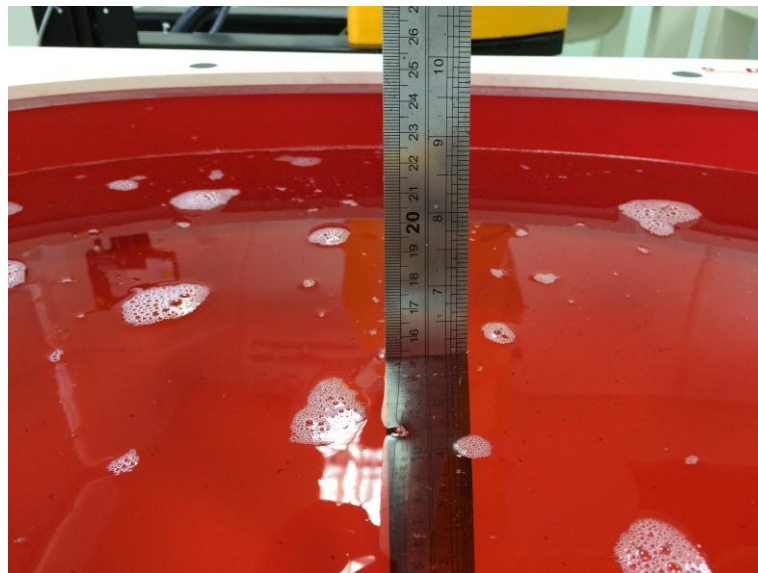
The acceptable conditions for SAR measurements using probes, dipoles and DAEs calibrated by CTTL (*China Telecommunication Technology Labs*), under the Dual-Logo Calibration Certificate program and quality assurance (QA) protocols established between SPEAG (*Schmid & Partner Engineering AG, Switzerland*) and CTTL, to support FCC (*U.S. Federal Communications Commission*) equipment certification are defined and described in the following. The conditions in this KDB are valid until December 31, 2015.

- 1) The agreement established between SPEAG and CTTL is only applicable to calibration services performed by CTTL where its clients (companies and divisions of such companies) are headquartered in the Greater China Region, including Taiwan and Hong Kong. CTTL shall inform the FCC of any changes or early termination to the agreement.
- 2) Only a subset of the calibration services specified in the SPEAG-CTTL agreement, while it remains valid, are applicable to SAR measurements performed using such equipment for supporting FCC equipment certification. These are identified in the following.
  - a) Calibration of dosimetric (SAR) probes EX3DVx, ET3DVx and ES3DVx.
    - i) Free-space E-field and H-field probes, including those used for HAC (hearing aid compatibility) evaluation, temperature probes, other probes or equipment not identified in this document, when calibrated by CTTL, are excluded and cannot be used for measurements to support FCC equipment certification.
    - ii) Signal specific and bundled probe calibrations based on PMR (probe modulation response) characteristics or probe sensor model based linearization methods that are not fully described in SAR standards are excluded and cannot be used for measurements to support FCC equipment certification.
  - b) Calibration of SAR system validation dipoles, excluding HAC dipoles.
  - c) Calibration of data acquisition electronics DAE3Vx, DAE4Vx and DAEasyVx.
  - d) For FCC equipment certification purposes, the frequency range of SAR probe and dipole calibrations is limited to 700 MHz - 6 GHz and provided it is supported by the equipment identified in the CTTL QA protocol (a separate attachment to this document).
  - e) The identical system and equipment setup, measurement configurations, hardware, evaluation algorithms, calibration and QA protocols, including the format of calibration certificates and reports used by SPEAG shall be applied by CTTL. Equivalent test equipment and measurement configurations may be considered only when agreed by both SPEAG and the FCC.
  - f) The calibrated items are only applicable to SPEAG DASY 4 and DASY 5 systems or higher version systems that satisfy the requirements of this KDB.
- 3) The SPEAG-CTTL agreement includes specific protocols identified in the following to ensure the quality of calibration services provided by CTTL under this SPEAG-

## **7. Test Setup Photos**



**Photograph of the depth in the Head Phantom (450MHz)**



**Photograph of the depth in the Body Phantom (450MHz)**



Face-held, the front of the EUT towards phantom

Antenna Distance (mm)

Antenna Type	Separation Distance (mm)		
	@ front surface of the EUT	@ antenna's base	@ antenna's tip
A1	25.0	29.1	29.8



Body-worn, the front of the EUT towards ground with A1, B1, BC1 and AC1

Antenna Distance (mm)

Antenna Type	Separation Distance (mm)		
	@ back surface of the EUT	@ antenna's base	@ antenna's tip
A1	4.3	8.8	8.2

## 8. External Photos of the EUT

### External Photos



B1- Battery, Alkaline battery



BC1- Belt clip



AC1- Audio Accessories Earset with on-mic PTT



.....End of Report.....