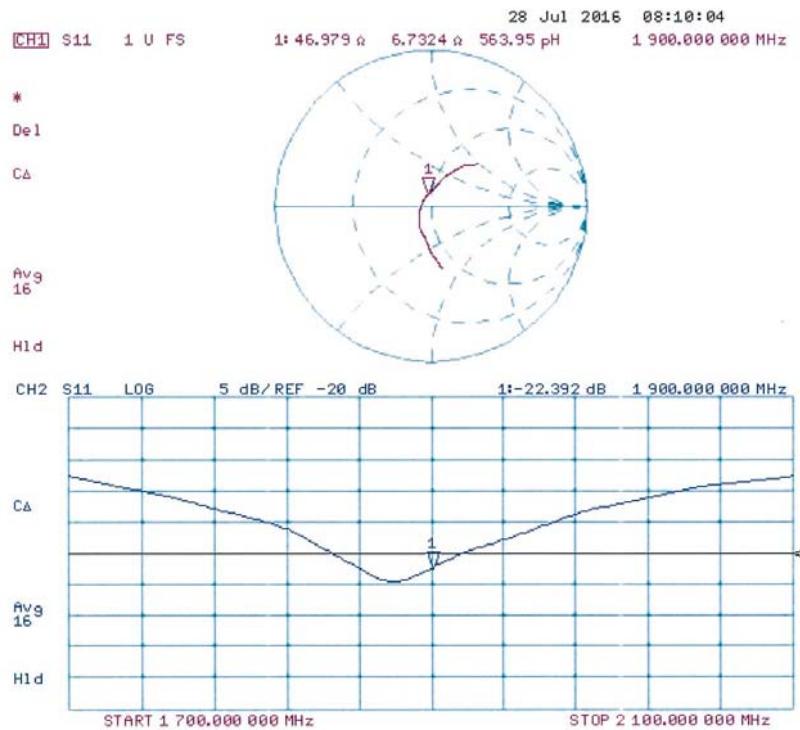


## Impedance Measurement Plot for Body TSL





## 2450 MHz 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)  
The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **CTTL-BJ (Auden)**

Certificate No: D2450V2-853\_Jul16

### CALIBRATION CERTIFICATE

Object	D2450V2 - SN:853					
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz					
Calibration date:	July 25, 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: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17			
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17			
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17			
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16			
Secondary Standards	ID #	Check Date (in house)	Scheduled Check			
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16			
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16			
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16			
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16			
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16			
Calibrated by:	Name Michael Weber	Function Laboratory Technician	Signature			
Approved by:	Katja Pokovic	Technical Manager				
Issued: July 26, 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:**

- a) 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
- b) 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
- c) 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
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- e) 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.

<b>DASY Version</b>	DASY5	V52.8.8
<b>Extrapolation</b>	Advanced Extrapolation	
<b>Phantom</b>	Modular Flat Phantom	
<b>Distance Dipole Center - TSL</b>	10 mm	with Spacer
<b>Zoom Scan Resolution</b>	dx, dy, dz = 5 mm	
<b>Frequency</b>	2450 MHz ± 1 MHz	

### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
<b>Nominal Head TSL parameters</b>	22.0 °C	39.2	1.80 mho/m
<b>Measured Head TSL parameters</b>	(22.0 ± 0.2) °C	38.0 ± 6 %	1.86 mho/m ± 6 %
<b>Head TSL temperature change during test</b>	< 0.5 °C	---	---

### SAR result with Head TSL

<b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b>	Condition	
SAR measured	250 mW input power	13.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.8 W/kg ± 17.0 % (k=2)

<b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b>	condition	
SAR measured	250 mW input power	6.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.6 W/kg ± 16.5 % (k=2)

### Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
<b>Nominal Body TSL parameters</b>	22.0 °C	52.7	1.95 mho/m
<b>Measured Body TSL parameters</b>	(22.0 ± 0.2) °C	51.8 ± 6 %	2.03 mho/m ± 6 %
<b>Body TSL temperature change during test</b>	< 0.5 °C	---	---

### SAR result with Body TSL

<b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Body TSL</b>	Condition	
SAR measured	250 mW input power	13.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	51.2 W/kg ± 17.0 % (k=2)

<b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Body TSL</b>	condition	
SAR measured	250 mW input power	6.10 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	24.1 W/kg ± 16.5 % (k=2)

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

Impedance, transformed to feed point	53.7 $\Omega$ + 5.1 $j\Omega$
Return Loss	- 24.3 dB

**Antenna Parameters with Body TSL**

Impedance, transformed to feed point	50.0 $\Omega$ + 4.5 $j\Omega$
Return Loss	- 27.0 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.162 ns
----------------------------------	----------

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	November 10, 2009

**DASY5 Validation Report for Head TSL**

Date: 25.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:853**

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used:  $f = 2450 \text{ MHz}$ ;  $\sigma = 1.86 \text{ S/m}$ ;  $\epsilon_r = 38$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.72, 7.72, 7.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

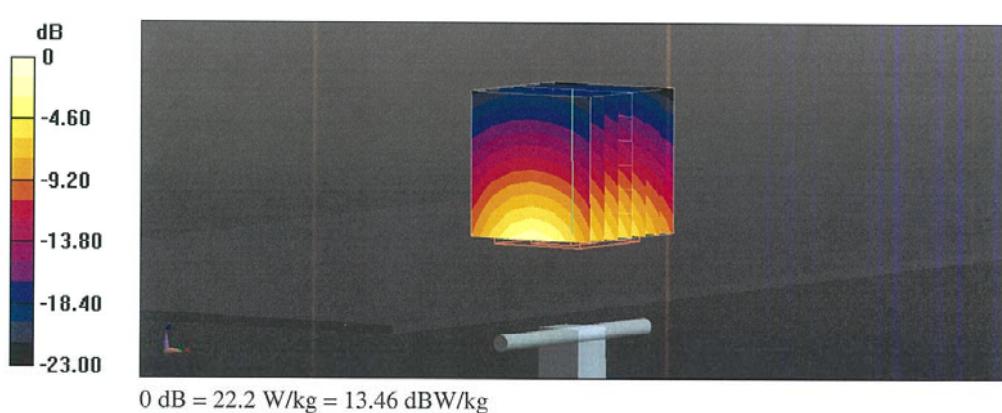
**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$ 

Reference Value = 115.0 V/m; Power Drift = 0.00 dB

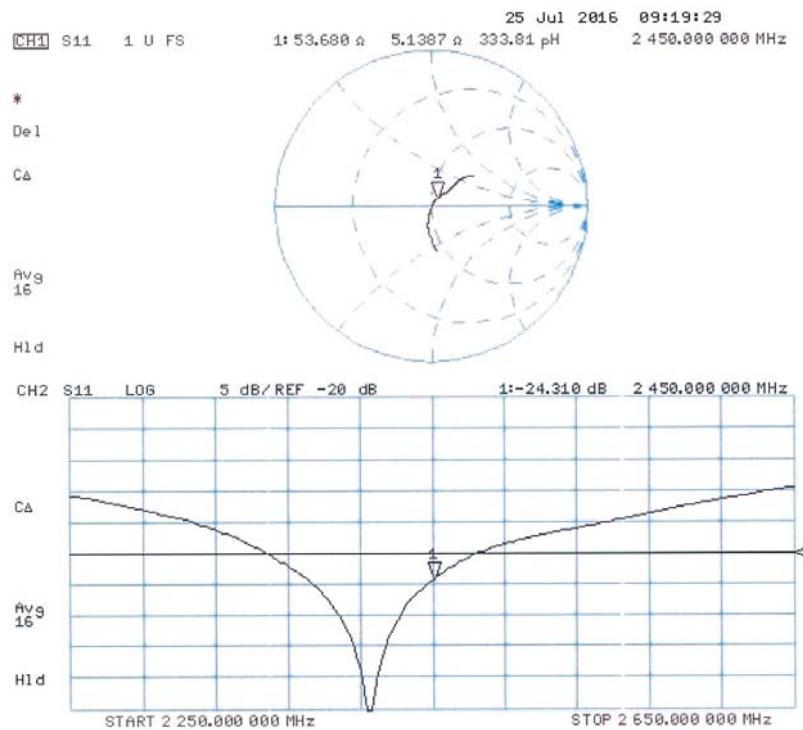
Peak SAR (extrapolated) = 27.5 W/kg

SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.23 W/kg

Maximum value of SAR (measured) = 22.2 W/kg



## Impedance Measurement Plot for Head TSL



**DASY5 Validation Report for Body TSL**

Date: 25.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:853**

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used:  $f = 2450 \text{ MHz}$ ;  $\sigma = 2.03 \text{ S/m}$ ;  $\epsilon_r = 51.8$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.79, 7.79, 7.79); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

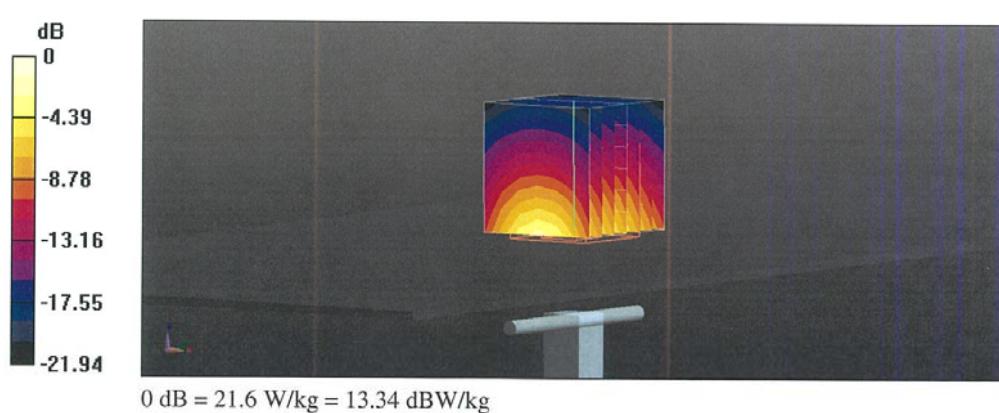
**Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$ 

Reference Value = 107.4 V/m; Power Drift = -0.02 dB

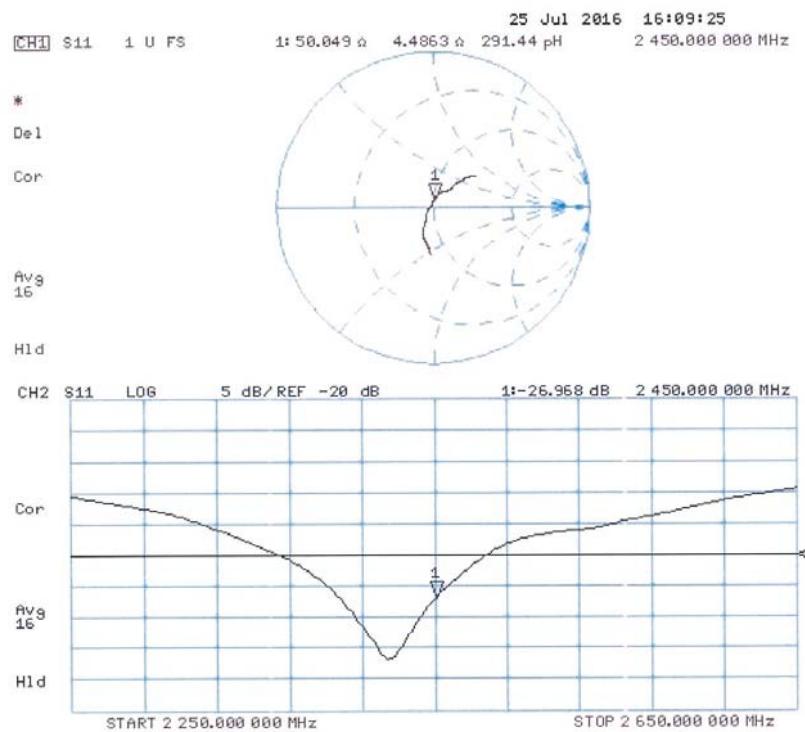
Peak SAR (extrapolated) = 26.3 W/kg

SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.1 W/kg

Maximum value of SAR (measured) = 21.6 W/kg



## Impedance Measurement Plot for Body TSL





## 2600 MHz 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)  
The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **CTTL-BJ (Auden)**

Certificate No: D2600V2-1012\_Jul16

### CALIBRATION CERTIFICATE

Object	D2600V2 - SN:1012					
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz					
Calibration date:	July 25, 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: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17			
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17			
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17			
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16			
Secondary Standards	ID #	Check Date (in house)	Scheduled Check			
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16			
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16			
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16			
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16			
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16			
Calibrated by:	Name Michael Weber	Function Laboratory Technician	Signature 			
Approved by:	Katja Pokovic	Technical Manager				
Issued: July 26, 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:**

- a) 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
- b) 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
- c) 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
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- e) 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.

<b>DASY Version</b>	DASY5	V52.8.8
<b>Extrapolation</b>	Advanced Extrapolation	
<b>Phantom</b>	Modular Flat Phantom	
<b>Distance Dipole Center - TSL</b>	10 mm	with Spacer
<b>Zoom Scan Resolution</b>	dx, dy, dz = 5 mm	
<b>Frequency</b>	2600 MHz ± 1 MHz	

### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
<b>Nominal Head TSL parameters</b>	22.0 °C	39.0	1.96 mho/m
<b>Measured Head TSL parameters</b>	(22.0 ± 0.2) °C	37.5 ± 6 %	2.02 mho/m ± 6 %
<b>Head TSL temperature change during test</b>	< 0.5 °C	---	---

### SAR result with Head TSL

<b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b>	Condition	
SAR measured	250 mW input power	14.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	56.7 W/kg ± 17.0 % (k=2)

<b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b>	condition	
SAR measured	250 mW input power	6.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	25.2 W/kg ± 16.5 % (k=2)

### Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
<b>Nominal Body TSL parameters</b>	22.0 °C	52.5	2.16 mho/m
<b>Measured Body TSL parameters</b>	(22.0 ± 0.2) °C	51.4 ± 6 %	2.20 mho/m ± 6 %
<b>Body TSL temperature change during test</b>	< 0.5 °C	---	---

### SAR result with Body TSL

<b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Body TSL</b>	Condition	
SAR measured	250 mW input power	14.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	55.3 W/kg ± 17.0 % (k=2)

<b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Body TSL</b>	condition	
SAR measured	250 mW input power	6.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	24.8 W/kg ± 16.5 % (k=2)

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

Impedance, transformed to feed point	46.8 $\Omega$ - 6.6 $j\Omega$
Return Loss	- 22.4 dB

**Antenna Parameters with Body TSL**

Impedance, transformed to feed point	44.1 $\Omega$ - 4.9 $j\Omega$
Return Loss	- 21.8 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.152 ns
----------------------------------	----------

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	October 30, 2007

**DASY5 Validation Report for Head TSL**

Date: 22.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2600 MHz D2600V2; Type: D2600V2; Serial: D2600V2 - SN:1012**

Communication System: UID 0 - CW; Frequency: 2600 MHz

Medium parameters used:  $f = 2600 \text{ MHz}$ ;  $\sigma = 2.02 \text{ S/m}$ ;  $\epsilon_r = 37.5$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.56, 7.56, 7.56); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

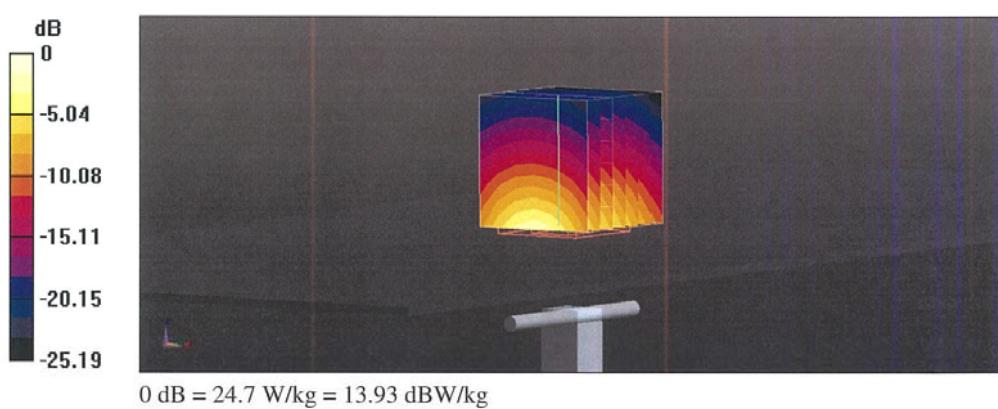
**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$ 

Reference Value = 115.3 V/m; Power Drift = -0.02 dB

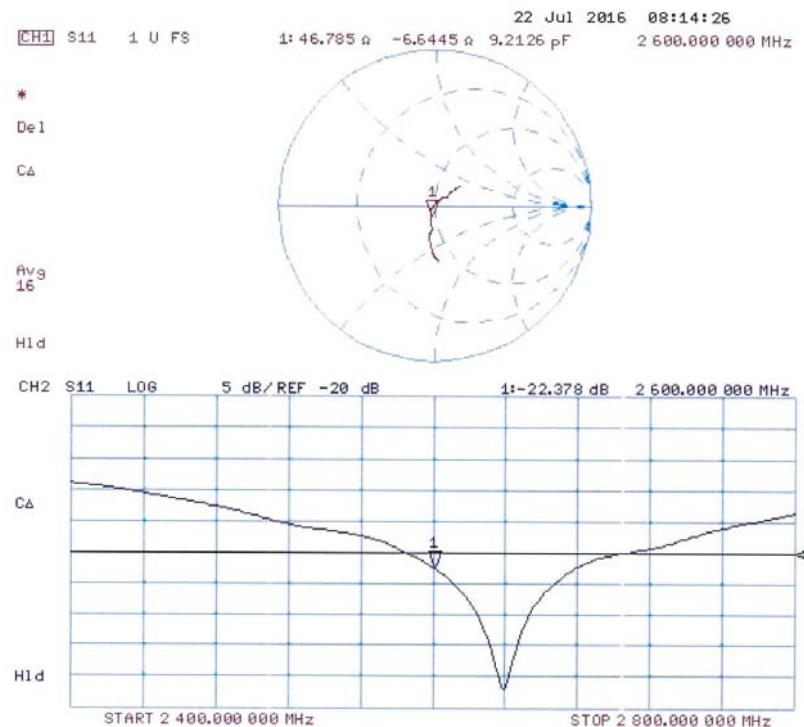
Peak SAR (extrapolated) = 30.9 W/kg

**SAR(1 g) = 14.5 W/kg; SAR(10 g) = 6.39 W/kg**

Maximum value of SAR (measured) = 24.7 W/kg



## Impedance Measurement Plot for Head TSL



**DASY5 Validation Report for Body TSL**

Date: 22.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2600 MHz D2600V2; Type: D2600V2; Serial: D2600V2 - SN:1012**

Communication System: UID 0 - CW; Frequency: 2600 MHz

Medium parameters used:  $f = 2600 \text{ MHz}$ ;  $\sigma = 2.2 \text{ S/m}$ ;  $\epsilon_r = 51.4$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.48, 7.48, 7.48); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

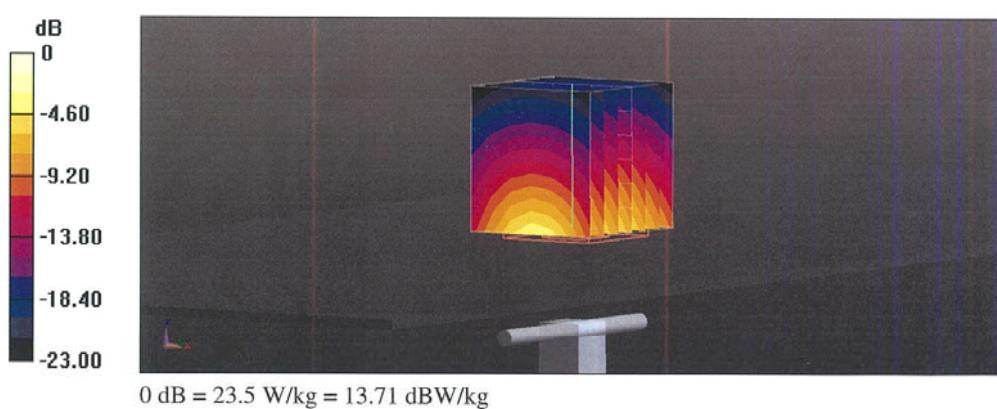
**Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$ 

Reference Value = 108.8 V/m; Power Drift = -0.03 dB

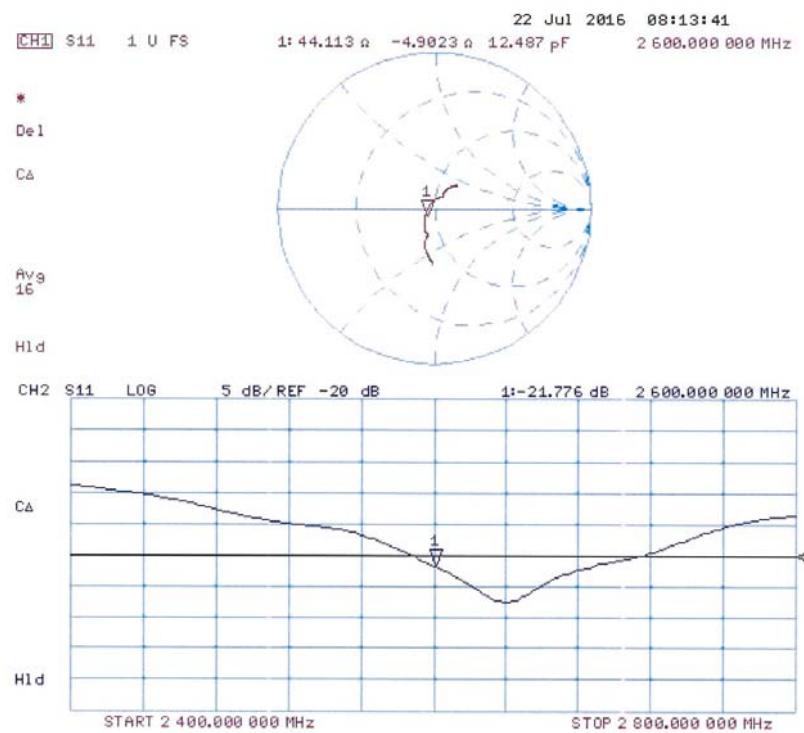
Peak SAR (extrapolated) = 28.9 W/kg

SAR(1 g) = 14 W/kg; SAR(10 g) = 6.25 W/kg

Maximum value of SAR (measured) = 23.5 W/kg



## Impedance Measurement Plot for Body TSL



## ANNEX I SPOT CHECK TEST

As the test lab for 4044M from TCL Communication Ltd, we, CTTL (Shouxiang), declare on our sole responsibility that, according to “Declaration of changes” provided by applicant, only the Spot check test should be performed. The test results are as below.

### I.1 Conducted power of selected case

**Table I.1-1: The conducted power measurement results for GSM850/1900**

GSM 850MHz	Conducted Power (dBm)		
	Channel 251(848.8MHz)	Channel 190(836.6MHz)	Channel 128(824.2MHz)
	32.61	32.50	32.72
GSM 1900MHz	Conducted Power (dBm)		
	Channel 810(1909.8MHz)	Channel 661(1880MHz)	Channel 512(1850.2MHz)
	29.96	29.86	29.71

**Table I.1-2: The conducted power measurement results for GPRS and EGPRS**

GSM 850 GPRS (GMSK)	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	251	190	128		251	190	128
2 Txslots	29.24	29.12	29.03	-6.02	23.22	23.10	23.01
PCS1900 GPRS (GMSK)	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	810	661	512		810	661	512
2 Txslots	27.22	27.17	27.11	-6.02	21.20	21.15	21.09

**Table I.1-3: The conducted Power for WCDMA**

Item	band	FDDV result		
	ARFCN	4132/4357	4182/4407	4233/4458
WCDMA	\	(826.4MHz)	(836.4MHz)	(846.6MHz)
		23.35	23.35	23.40
Item	band	FDDII result		
	ARFCN	9262/9662	9400/9800	9538/9938
WCDMA	\	(1852.4MHz)	(1880MHz)	(1907.6MHz)
		22.99	22.92	22.92
Item	band	FDDIV result		
	ARFCN	1312/1537	1412/1675	1513/1738
WCDMA	\	(1712.4MHz)	(1732.4MHz)	(1752.6MHz)
		23.37	23.33	23.29

**Table I.1-4: The conducted Power for LTE**

LTE Band2 20MHz	1RB-Low (0)	1900 (19100)	\
		1880 (18900)	\
		1860 (18700)	23.86
LTE Band4 20MHz	1RB-Low (0)	1745 (20300)	23.94
		1732.5 (20175)	\
		1720 (20050)	\
LTE Band5 10MHz	1RB-Middle (24)	844 (20600)	\
		836.5 (20525)	23.57
		829 (20450)	\
LTE Band7 20MHz	1RB-Low (0)	2560 (21350)	23.68
		2535 (21100)	\
		2510 (20850)	\
LTE Band12 10MHz	1RB-High (49)	711 (23130)	\
		707.5 (23095)	\
		704 (23060)	23.07

The output power of BT antenna is as following:

Mode	Conducted Power (dBm)		
	Channel 0 (2402MHz)	Channel 39 (2441MHz)	Channel 78 (2480MHz)
GFSK	10.01	9.89	8.52
EDR2M-4_DQPSK	11.03	10.46	9.34
EDR3M-8DPSK	10.54	10.05	8.86

The average conducted power for Wi-Fi is as following:

802.11b(dBm)				
Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps
1(2412MHz)	\	\	18.00	\
6(2437MHz)	\	\	18.88	\
11(2462MHz)	\	\	18.54	\

## I.2 Measurement results

Frequency Band	Channel Number	Frequency (MHz)	Test setup	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Power Drift	Figure
GSM850	251	848.8	Right Cheek	32.61	33.2	0.297	<b>0.34</b>	0.449	<b>0.51</b>	0.05	Figure I.1
GSM850	251	848.8	Rear GPRS 15mm Close	29.24	30.7	0.196	<b>0.27</b>	0.266	<b>0.37</b>	-0.17	Figure I.2
GSM1900	661	1880	Left Cheek	29.86	30.7	0.064	<b>0.08</b>	0.103	<b>0.12</b>	0.13	Figure I.3
GSM1900	512	1850.2	Rear GPRS 15mm Open	27.11	28.2	0.281	<b>0.36</b>	0.455	<b>0.58</b>	0.05	Figure I.4
WCDMA 850	4132	826.4	Right Cheek	23.35	24.2	0.293	<b>0.36</b>	0.443	<b>0.54</b>	0.02	Figure I.5
WCDMA 850	4132	826.4	Rear 15mm Close	23.35	24.2	0.196	<b>0.24</b>	0.276	<b>0.34</b>	-0.07	Figure I.6
WCDMA1700	1738	1752.6	Left Cheek	23.29	24.2	0.208	<b>0.26</b>	0.328	<b>0.40</b>	0.06	Figure I.7
WCDMA1700	1738	1752.6	Rear 15mm Open	23.29	24.2	0.510	<b>0.63</b>	0.812	<b>1.00</b>	0.06	Figure I.8
WCDMA1900	9800	1880	Left Cheek	22.92	24.2	0.122	<b>0.16</b>	0.198	<b>0.27</b>	-0.09	Figure I.9
WCDMA1900	9662	1852.4	Rear Open 15mm	22.99	24.2	0.529	<b>0.70</b>	0.853	<b>1.13</b>	0.13	Figure I.10
LTE Band2	18700	1860	1RB-Low Left Cheek	23.86	24.2	0.154	<b>0.17</b>	0.249	<b>0.27</b>	-0.07	Figure I.11
LTE Band2	18700	1860	1RB-Low Rear Close 15mm	23.86	24.2	0.378	<b>0.41</b>	0.619	<b>0.67</b>	-0.16	Figure I.12
LTE Band4	20300	1745	1RB-Low Left Cheek	23.94	24.2	0.222	<b>0.24</b>	0.350	<b>0.37</b>	0.03	Figure I.13
LTE Band4	20300	1745	1RB-Low Rear 15mm Open	23.94	24.2	0.596	<b>0.63</b>	0.965	<b>1.02</b>	-0.04	Figure I.14
LTE Band5	20525	836.4	1RB-Middle Rightt Cheek	23.57	24.2	0.303	<b>0.35</b>	0.461	<b>0.53</b>	-0.08	Figure I.15
LTE Band5	20525	836.4	1RB-Low Rear 15mm Close	23.57	24.2	0.213	<b>0.25</b>	0.295	<b>0.34</b>	0.01	Figure I.16
LTE Band7	21350	2560	1RB-Low Left Cheek	23.68	24.5	0.150	<b>0.18</b>	0.284	<b>0.34</b>	-0.04	Figure I.17
LTE Band7	21350	2560	1RB-Low Rear 15mm Close	23.68	24.5	0.240	<b>0.29</b>	0.459	<b>0.55</b>	-0.10	Figure I.18
LTE Band12	23060	704	1RB-High Left Cheek	23.07	24.2	0.182	<b>0.24</b>	0.255	<b>0.33</b>	0.04	Figure I.19
LTE Band12	23060	704	1RB-Low Rear 15mm Open	23.07	24.2	0.393	<b>0.51</b>	0.545	<b>0.71</b>	0.03	Figure I.20
Bluetooth	0	2402	Right Cheek	11.03	12	0.002	<b>0.00</b>	0.005	<b>0.01</b>	0.15	Figure I.21
WLAN	6	2437	Right Cheek	18.88	19.4	0.070	<b>0.08</b>	0.128	<b>0.14</b>	0.06	Figure I.22
WLAN	6	2437	Rear 15mm Open	18.88	19.4	0.019	<b>0.02</b>	0.046	<b>0.05</b>	0.07	Figure I.23