

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

Impedance, transformed to feed point	51.7 Ω + 5.8 $j\Omega$
Return Loss	- 24.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.2 Ω + 6.6 $j\Omega$
Return Loss	- 22.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 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 28, 2008

DASY5 Validation Report for Head TSL

Date: 26.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d101

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.39 \text{ S/m}$; $\epsilon_r = 40.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.43, 8.43, 8.43); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

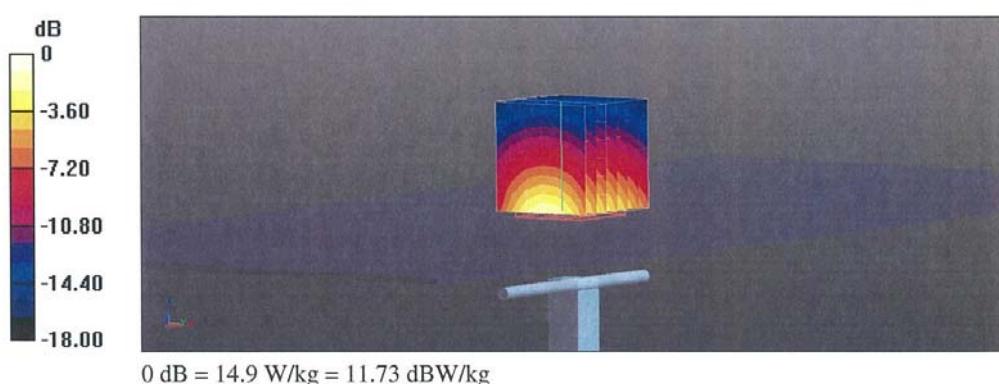
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 106.3 V/m; Power Drift = -0.04 dB

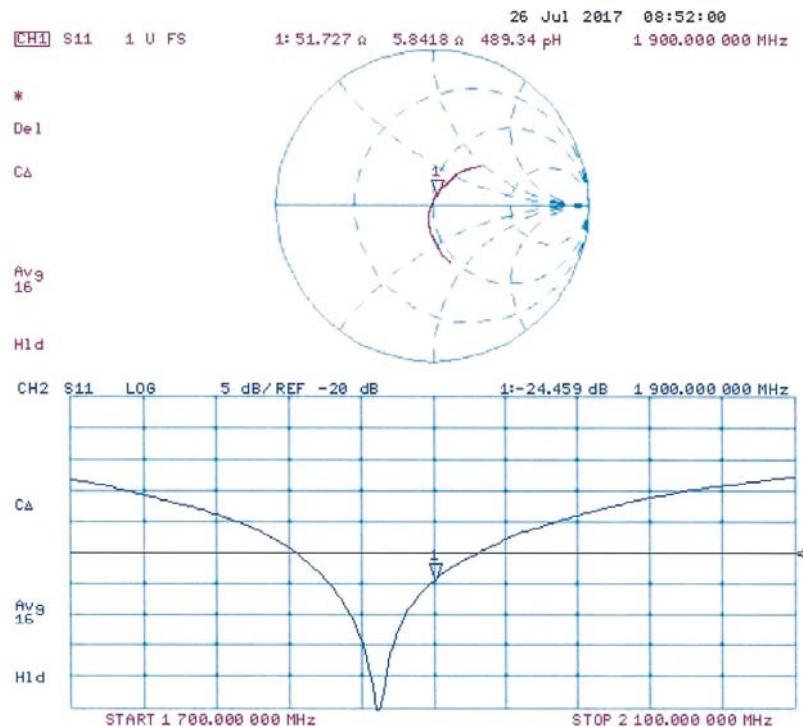
Peak SAR (extrapolated) = 18.4 W/kg

SAR(1 g) = 9.93 W/kg; SAR(10 g) = 5.23 W/kg

Maximum value of SAR (measured) = 14.9 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 26.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d101

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.5 \text{ S/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.2, 8.2, 8.2); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

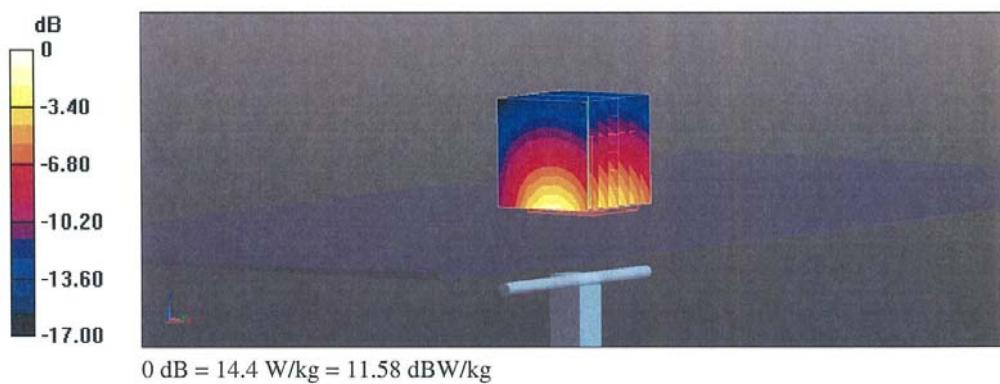
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 101.8 V/m; Power Drift = -0.09 dB

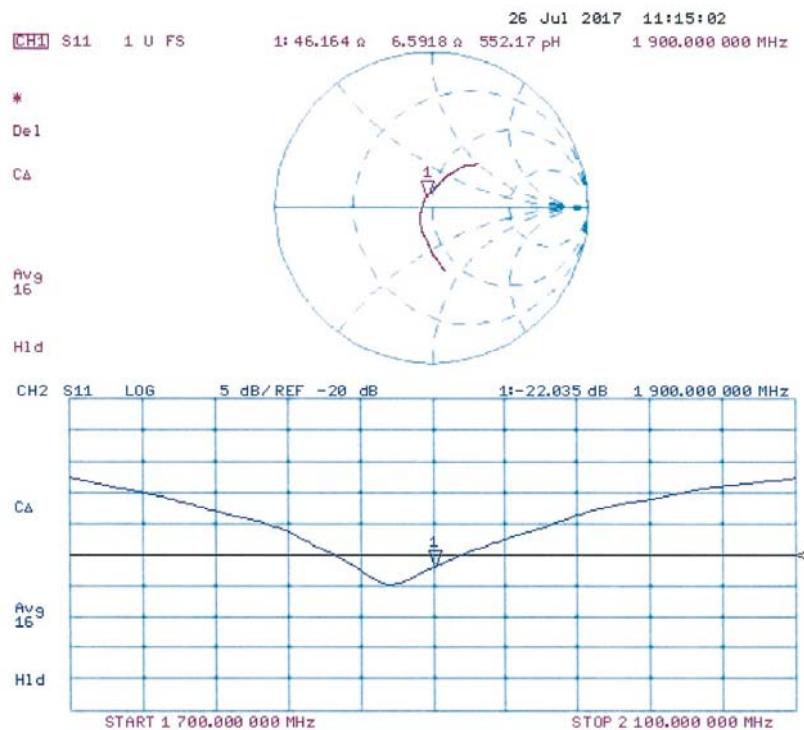
Peak SAR (extrapolated) = 17.6 W/kg

SAR(1 g) = 10 W/kg; SAR(10 g) = 5.33 W/kg

Maximum value of SAR (measured) = 14.4 W/kg



Impedance Measurement Plot for Body TSL





2450 MHz Dipole Calibration Certificate

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



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S Servizio svizzero di taratura
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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **CTTL-BJ (Auden)**

Certificate No: D2450V2-853_Jul17

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 21, 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 $(22 \pm 3)^\circ\text{C}$ 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	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

Calibrated by: Name Michael Weber Function Laboratory Technician Signature

Approved by: Name Katja Pokovic Function Technical Manager Signature

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

Issued: July 24, 2017

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



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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, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- 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.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	1.87 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.2 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.7 W/kg ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.1 ± 6 %	2.04 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.9 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	50.4 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.03 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	23.8 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	52.0 Ω + 5.0 $j\Omega$
Return Loss	- 25.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.6 Ω + 6.3 $j\Omega$
Return Loss	- 24.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.161 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	November 10, 2009

DASY5 Validation Report for Head TSL

Date: 20.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.87 \text{ S/m}$; $\epsilon_r = 37.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.12, 8.12, 8.12); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

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 = 112.7 V/m; Power Drift = -0.00 dB

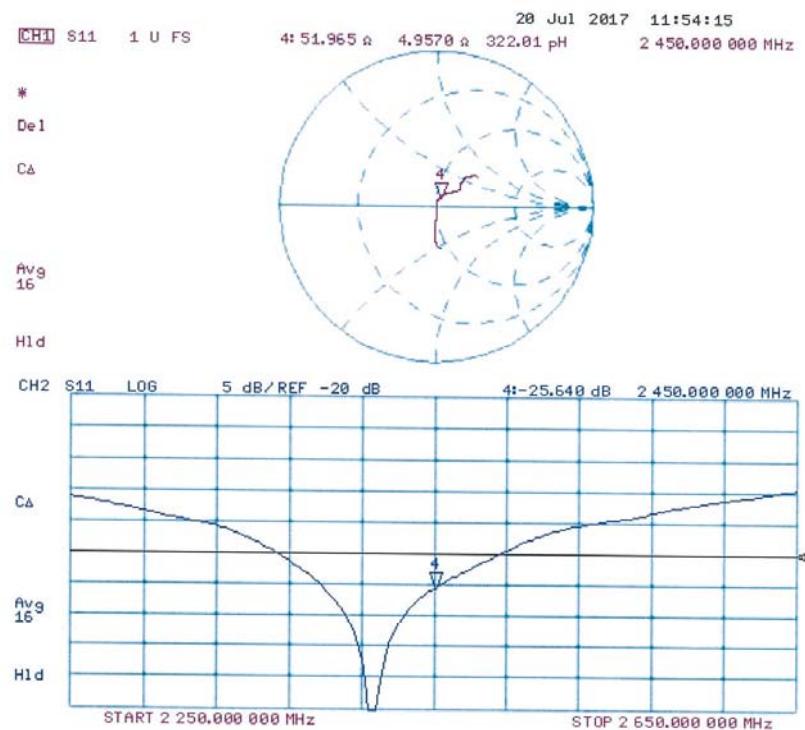
Peak SAR (extrapolated) = 27.0 W/kg

SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.26 W/kg

Maximum value of SAR (measured) = 21.5 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 21.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 2.04 \text{ S/m}$; $\epsilon_r = 52.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.1, 8.1, 8.1); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

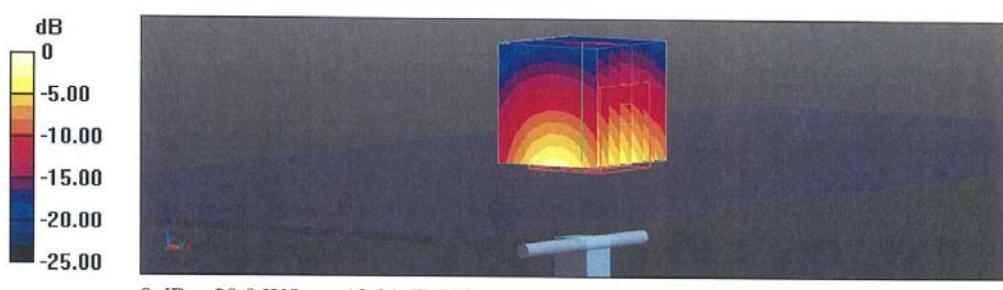
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 104.1 V/m; Power Drift = -0.09 dB

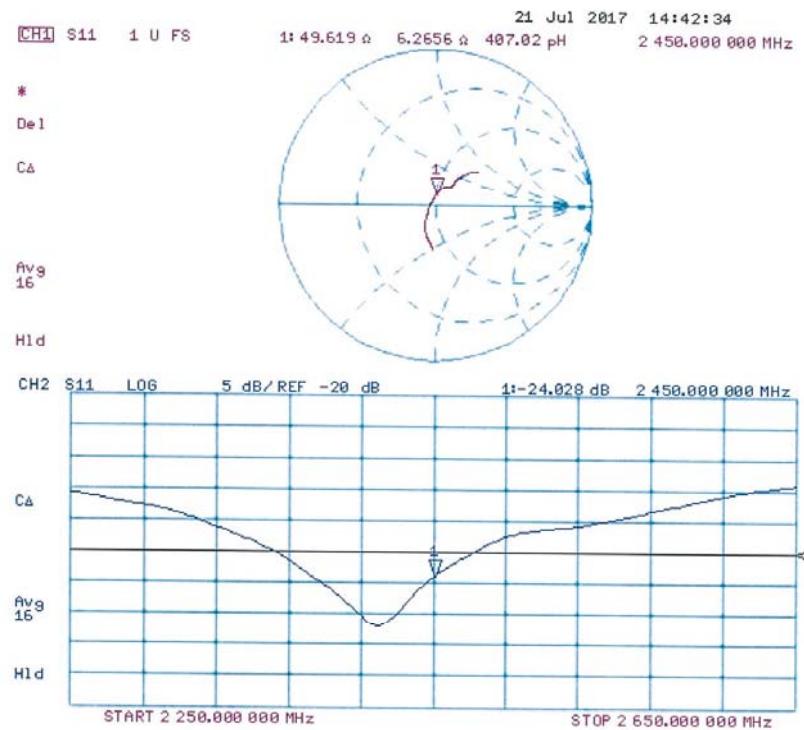
Peak SAR (extrapolated) = 25.5 W/kg

SAR(1 g) = 12.9 W/kg; SAR(10 g) = 6.03 W/kg

Maximum value of SAR (measured) = 20.0 W/kg



Impedance Measurement Plot for Body TSL





2600 MHz Dipole Calibration Certificate

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland



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Accreditation No.: SCS 0108

Client **CTTL-BJ (Auden)**

Certificate No: D2600V2-1012_Jul17

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 21, 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 $(22 \pm 3)^\circ\text{C}$ 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	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

Calibrated by:	Name	Function	Signature
	Michael Weber	Laboratory Technician	

Approved by:	Name	Function	Signature
	Katja Pokovic	Technical Manager	

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Issued: July 24, 2017

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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, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- 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.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.2 ± 6 %	2.04 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.9 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	57.9 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.57 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	25.8 W/kg ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.6 ± 6 %	2.22 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	14.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	55.5 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	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 Ω - 5.0 jΩ
Return Loss	- 24.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	43.5 Ω - 5.3 jΩ
Return Loss	- 21.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.151 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	October 30, 2007

DASY5 Validation Report for Head TSL

Date: 20.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium parameters used: $f = 2600 \text{ MHz}$; $\sigma = 2.04 \text{ S/m}$; $\epsilon_r = 37.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.96, 7.96, 7.96); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

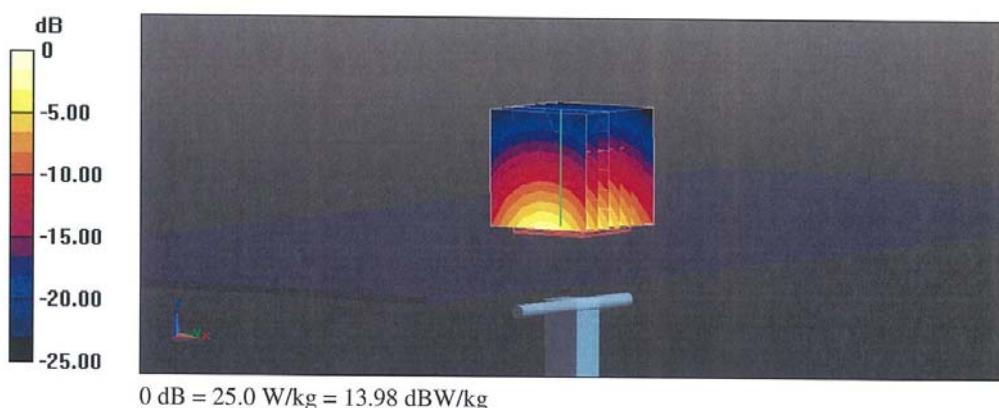
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 113.6 V/m; Power Drift = 0.05 dB

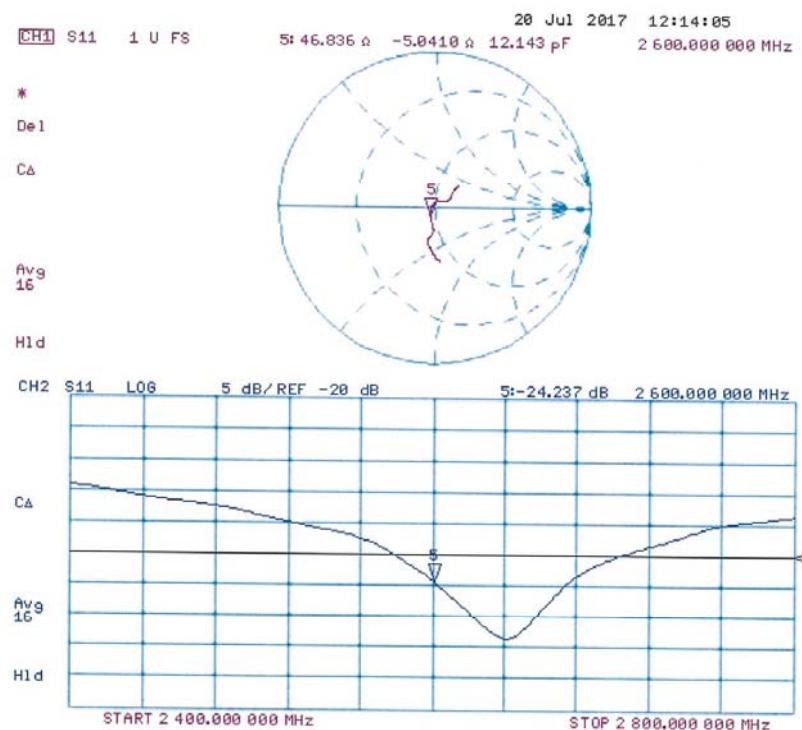
Peak SAR (extrapolated) = 32.3 W/kg

SAR(1 g) = 14.9 W/kg; SAR(10 g) = 6.57 W/kg

Maximum value of SAR (measured) = 25.0 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 21.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium parameters used: $f = 2600 \text{ MHz}$; $\sigma = 2.22 \text{ S/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.94, 7.94, 7.94); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

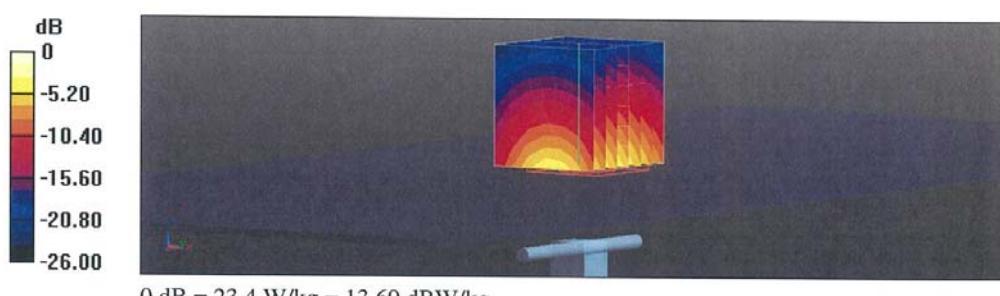
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 106.6 V/m; Power Drift = -0.07 dB

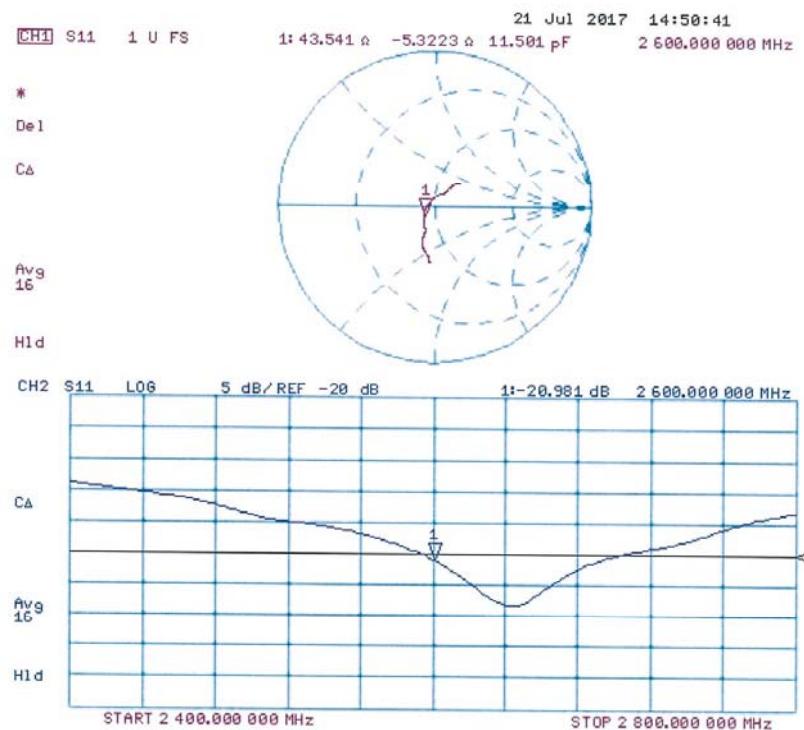
Peak SAR (extrapolated) = 30.1 W/kg

SAR(1 g) = 14.1 W/kg; SAR(10 g) = 6.25 W/kg

Maximum value of SAR (measured) = 23.4 W/kg



Impedance Measurement Plot for Body TSL



ANNEX I Spot Check

I.1 Conducted power of selected case

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

GSM 850MHz	Conducted Power (dBm)		
	CH251 848.8 MHz	CH190 836.6 MHz	CH128 824.2 MHz
Speech	32.90	33.12	33.09
GPRS	30.42	30.48	30.44
GSM 1900MHz	Conducted Power(dBm)		
	CH810 1909.8 MHz	CH661 1880 MHz	CH512 1850.2 MHz
Speech	30.26	30.30	30.29
GPRS	27.97	27.99	27.98

Table I.1-2: The conducted Power for WCDMA

Item	band	FDDV result		
	ARFCN	4233	4182	4132
WCDMA	\	(846.6MHz)	(836.4MHz)	(826.4MHz)
		22.97	23.02	22.96
Item	band	FDDII result		
	ARFCN	9538	9400	9262
WCDMA	\	(1907.6MHz)	(1880MHz)	(1852.4MHz)
		23.27	23.25	23.16

Table I.1-3: The conducted Power for LTE

LTE Band7	1RB-Mid	21350	23.77
	1RB-Mid	21100	23.72
	1RB-Mid	20850	23.86

Table I.1-4: The conducted Power for WLAN

WLAN2450						
Band	Mode	Channel	Frequency	Data Rate	Tune-up	Measured
WLAN 2.4G 20M	802.11b	11	2462 MHz	1Mbps	18.50	18.10
		6	2437 MHz		18.50	18.04
		1	2412 MHz		18.50	17.91

I.2 Measurement results

Test Band	Channel	Frequency	Tune-Up	Measured Power	Test Position	Measured 10g SAR	Measured 1g SAR	Reported 10g SAR	Reported 1g SAR	Power Drift	Figure
GSM850	251	848.8 MHz	33.3	32.90	Left Cheek	0.21	0.274	0.23	0.30	0.12	Fig I.1
GSM850	251	848.8 MHz	30.5	30.42	Rear	0.286	0.377	0.29	0.38	0.01	Fig I.2
PCS1900	661	1880 MHz	30.3	30.30	Left Cheek	0.26	0.419	0.26	0.42	-0.05	Fig I.3
PCS1900	512	1850.2 MHz	28	27.98	Rear	0.624	1.07	0.63	1.07	0.02	Fig I.4
WCDMA1900-BII	9400	1880 MHz	24	23.25	Left Cheek	0.408	0.662	0.48	0.79	0.01	Fig I.5
WCDMA1900-BII	9400	1880 MHz	24	23.25	Rear	0.606	1.08	0.72	1.28	-0.07	Fig I.6
WCDMA850-BV	4182	836.4 MHz	24	23.02	Left Cheek	0.275	0.358	0.34	0.45	0.03	Fig I.7
WCDMA850-BV	4233	846.6 MHz	24	22.97	Rear	0.346	0.453	0.44	0.57	0	Fig I.8
LTE2500-FDD7	21350	2560 MHz	24.5	23.77	Right Cheek	0.042	0.078	0.05	0.09	-0.02	Fig I.9
LTE2500-FDD7	21350	2560 MHz	24.5	23.72	Rear	0.402	0.849	0.48	1.02	-0.01	Fig I.10
WLAN2450	11	2462 MHz	18.5	18.10	Right Cheek	0.408	0.771	0.45	0.85	0.04	Fig I.11
WLAN2450	6	2437 MHz	18.5	18.04	Front	0.083	0.167	0.09	0.19	-0.14	Fig I.12

SIM 2

Test Band	Channel	Frequency	Tune-Up	Measured Power	Test Position	Measured 10g SAR	Measured 1g SAR	Reported 10g SAR	Reported 1g SAR	Power Drift
GSM850	251	848.8 MHz	33.3	32.90	Left Cheek	0.201	0.261	0.22	0.29	0.02
GSM850	251	848.8 MHz	30.5	30.42	Rear	0.271	0.361	0.28	0.37	0.05
PCS1900	661	1880 MHz	30.3	30.30	Left Cheek	0.251	0.405	0.25	0.41	0.09
PCS1900	512	1850.2 MHz	28	27.98	Rear	0.614	0.989	0.62	0.99	0.12
WCDMA1900-BII	9400	1880 MHz	24	23.25	Left Cheek	0.391	0.641	0.46	0.76	-0.03
WCDMA1900-BII	9400	1880 MHz	24	23.25	Rear	0.595	0.993	0.71	1.18	-0.05
WCDMA850-BV	4182	836.4 MHz	24	23.02	Left Cheek	0.269	0.349	0.34	0.44	0.06
WCDMA850-BV	4233	846.6 MHz	24	22.97	Rear	0.331	0.425	0.42	0.54	-0.04
LTE2500-FDD7	21350	2560 MHz	24.5	23.77	Right Cheek	0.036	0.066	0.04	0.08	-0.13
LTE2500-FDD7	21350	2560 MHz	24.5	23.72	Rear	0.391	0.831	0.47	0.99	0.07
WLAN2450	11	2462 MHz	18.5	18.10	Right Cheek	0.396	0.751	0.43	0.82	0.09
WLAN2450	6	2437 MHz	18.5	18.04	Front	0.075	0.155	0.08	0.17	0.03

I.3 Reported SAR Comparison

Exposure Configuration	Technology Band	Reported SAR 1g(W/kg) Original	Reported SAR 1g(W/kg) Spot check	Reported SAR 1g(W/kg) Final
Head (Separation Distance 0mm)	GSM 850	0.31	0.30	0.31
	PCS 1900	0.47	0.42	0.47
	UMTS FDD 2	0.78	0.79	0.79
	UMTS FDD 5	0.33	0.45	0.45
	LTE Band 7	0.32	0.09	0.32
	WLAN 2.4 GHz	1.21	0.85	1.21
Hotspot (Separation Distance 10mm)	GSM 850	0.26	0.38	0.38
	PCS 1900	1.17	1.07	1.17
	UMTS FDD 2	1.30	1.28	1.30
	UMTS FDD 5	0.42	0.57	0.57
	LTE Band 7	0.88	1.02	1.02
	WLAN 2.4 GHz	0.32	0.19	0.32

LTE2500-FDD7 #1 Body								
Ambient Temperature: 22.4				Liquid Temperature: 22.2				
Mode	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]		
			21350	21100	20850	21350		
20MHz QPSK1RB	Tune-up		24.50	24.50	24.50	Scaling factor*		
	Measured Power [dBm]		23.77	23.72	23.86	1.18	1.20	1.16
	Rear	1g SAR	0.819	0.849	0.828	0.97	1.02	0.96
		10g SAR	0.386	0.402	0.391	0.46	0.48	0.45
		Deviation	-0.06	-0.01	-0.06	-0.06	-0.01	-0.06

Note: The spot check results marked by blue are larger than the original result. So its replace the original result and others are shared.

I.4 Graph Results for Spot check

GSM850_CH251 Left Cheek

Date: 8/1/2018

Electronics: DAE4 Sn1525

Medium: head 835 MHz

Medium parameters used: $f = 848.8 \text{ MHz}$; $\sigma = 0.921 \text{ mho/m}$; $\epsilon_r = 41.24$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 22.4°C , Liquid Temperature: 22.2°C

Communication System: GSM850 848.8 MHz Duty Cycle: 1:8.3

Probe: EX3DV4 – SN7464 ConvF(10.28,10.28,10.28)

Area Scan (71x121x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.301 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 4.361 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.344 W/kg

SAR(1 g) = 0.274 W/kg; SAR(10 g) = 0.21 W/kg

Maximum value of SAR (measured) = 0.299 W/kg

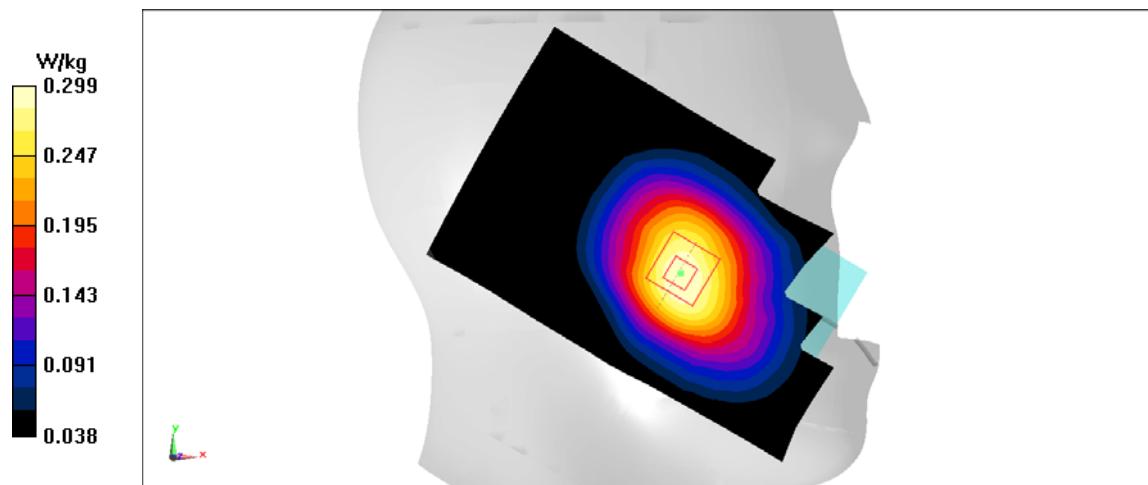


Fig I.1

GSM850_CH251 Rear

Date: 8/1/2018

Electronics: DAE4 Sn1525

Medium: body 835 MHz

Medium parameters used: $f = 848.8$ MHz; $\sigma = 0.974$ mho/m; $\epsilon_r = 55.03$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.4°C, Liquid Temperature: 22.2°C

Communication System: GSM850 848.8 MHz Duty Cycle: 1:4

Probe: EX3DV4 – SN7464 ConvF(10.21,10.21,10.21)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.413 W/kg

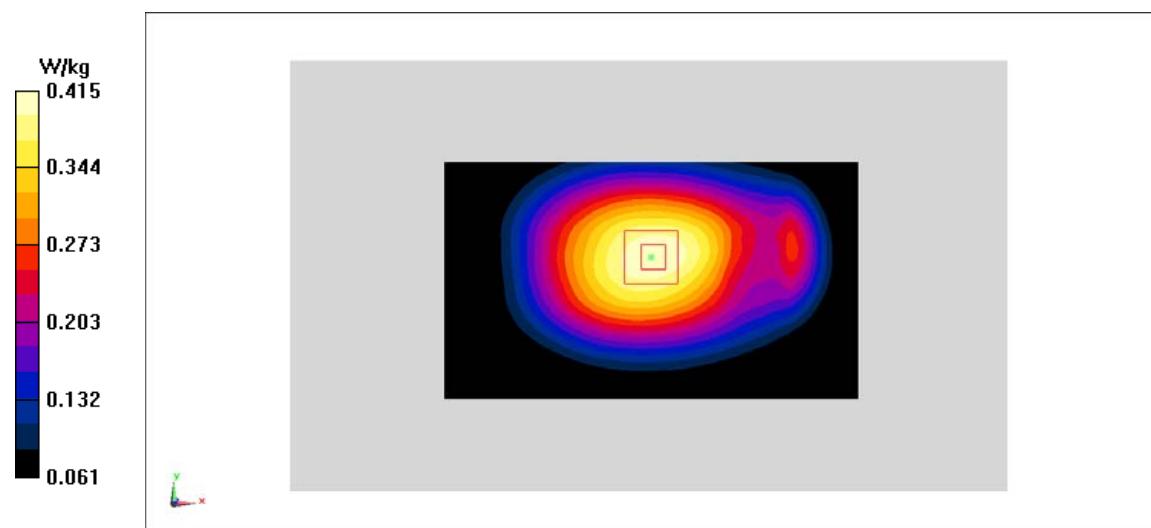
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 19.77 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.473 W/kg

SAR(1 g) = 0.377 W/kg; SAR(10 g) = 0.286 W/kg

Maximum value of SAR (measured) = 0.415 W/kg

**Fig I.2**

PCS1900_CH661 Left Cheek

Date: 8/2/2018

Electronics: DAE4 Sn1525

Medium: head 1900 MHz

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.382$ mho/m; $\epsilon_r = 40.11$; $\rho = 1000$ kg/m 3

Ambient Temperature: 22.4°C, Liquid Temperature: 22.2°C

Communication System: PCS1900 1880 MHz Duty Cycle: 1:8.3

Probe: EX3DV4 – SN7464 ConvF(8.39,8.39,8.39)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.542 W/kg

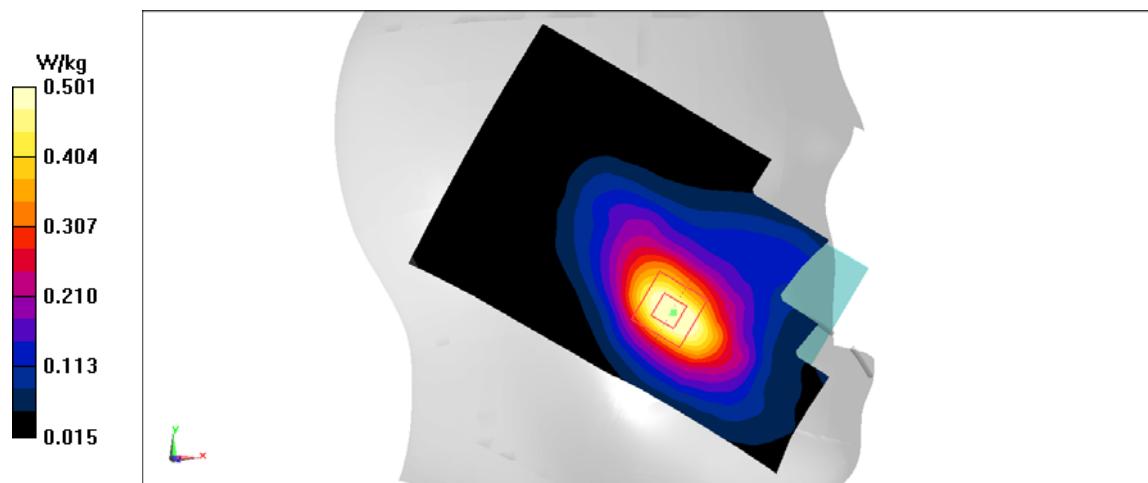
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.984 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.642 W/kg

SAR(1 g) = 0.419 W/kg; SAR(10 g) = 0.26 W/kg

Maximum value of SAR (measured) = 0.501 W/kg

**Fig I.3**

PCS1900_CH512 Rear

Date: 8/2/2018

Electronics: DAE4 Sn1525

Medium: body 1900 MHz

Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 54.23$; $\rho = 1000$ kg/m 3

Ambient Temperature: 22.4°C, Liquid Temperature: 22.2°C

Communication System: PCS1900 1850.2 MHz Duty Cycle: 1:4

Probe: EX3DV4 – SN7464 ConvF(8.32,8.32,8.32)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.28 W/kg

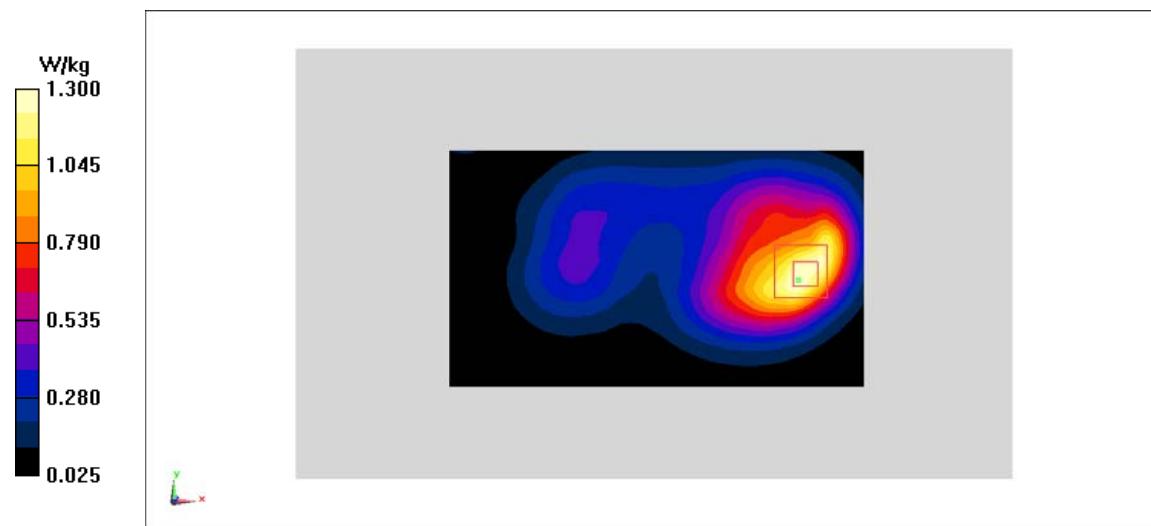
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.70 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.81 W/kg

SAR(1 g) = 1.07 W/kg; SAR(10 g) = 0.624 W/kg

Maximum value of SAR (measured) = 1.30 W/kg

**Fig I.4**

WCDMA1900-BII_CH9400 Left Cheek

Date: 8/2/2018

Electronics: DAE4 Sn1525

Medium: head 1900 MHz

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.382$ mho/m; $\epsilon_r = 40.11$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.4°C, Liquid Temperature: 22.2°C

Communication System: WCDMA1900-BII 1880 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN7464 ConvF(8.39,8.39,8.39)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.810 W/kg

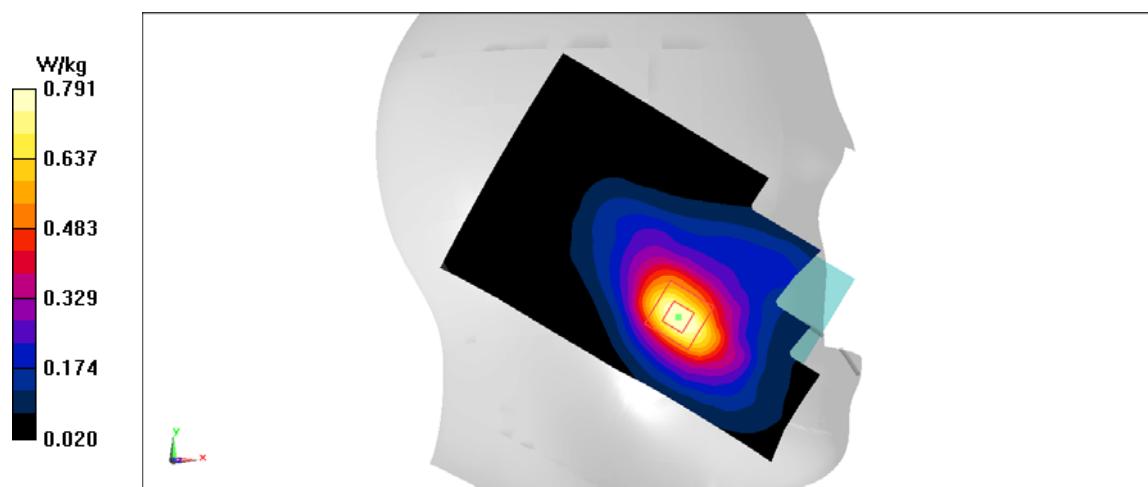
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.327 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.02 W/kg

SAR(1 g) = 0.662 W/kg; SAR(10 g) = 0.408 W/kg

Maximum value of SAR (measured) = 0.791 W/kg

**Fig I.5**

WCDMA1900-BII_CH9400 Rear

Date: 8/2/2018

Electronics: DAE4 Sn1525

Medium: body 1900 MHz

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.529$ mho/m; $\epsilon_r = 54.19$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.4°C, Liquid Temperature: 22.2°C

Communication System: WCDMA1900-BII 1880 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN7464 ConvF(8.32,8.32,8.32)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.33 W/kg

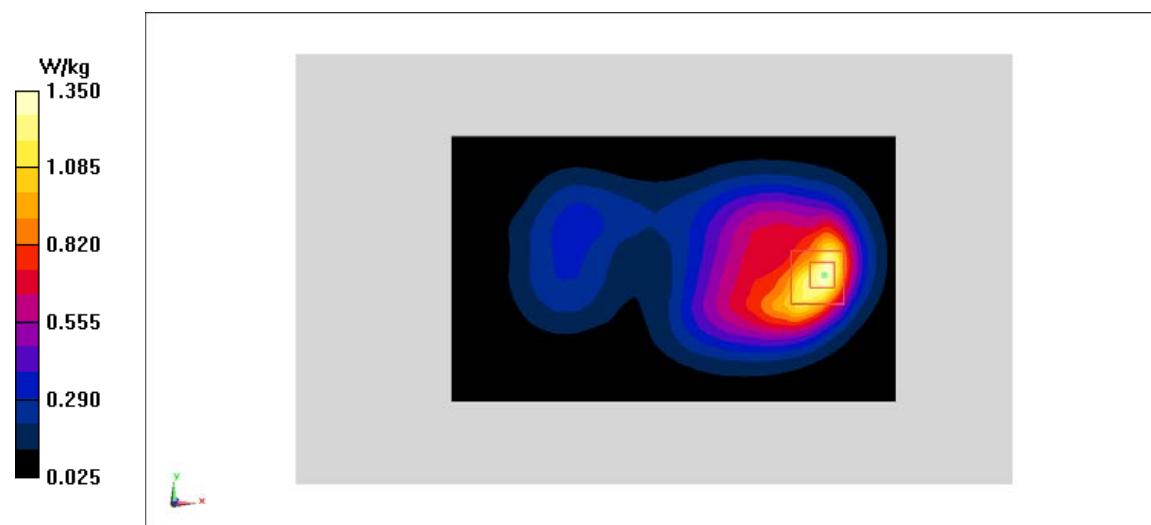
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.330 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 1.83 W/kg

SAR(1 g) = 1.08 W/kg; SAR(10 g) = 0.606 W/kg

Maximum value of SAR (measured) = 1.35 W/kg

**Fig I.6**

WCDMA850-BV_CH4182 Left Cheek

Date: 8/1/2018

Electronics: DAE4 Sn1525

Medium: head 835 MHz

Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.909$ mho/m; $\epsilon_r = 41.26$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.4°C, Liquid Temperature: 22.2°C

Communication System: WCDMA850-BV 836.4 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN7464 ConvF(10.28,10.28,10.28)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.301 W/kg

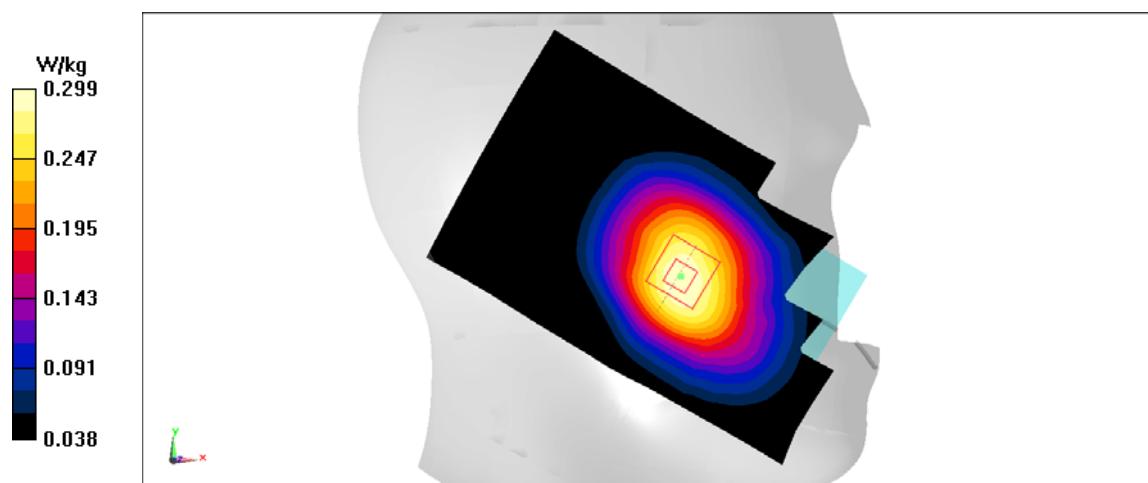
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.361 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.344 W/kg

SAR(1 g) = 0.358 W/kg; SAR(10 g) = 0.275 W/kg

Maximum value of SAR (measured) = 0.299 W/kg

**Fig I.7**

WCDMA850-BV_CH4233 Rear

Date: 8/1/2018

Electronics: DAE4 Sn1525

Medium: body 835 MHz

Medium parameters used: $f = 846.6$ MHz; $\sigma = 0.972$ mho/m; $\epsilon_r = 55.04$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.4°C, Liquid Temperature: 22.2°C

Communication System: WCDMA850-BV 846.6 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN7464 ConvF(10.21,10.21,10.21)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.497 W/kg

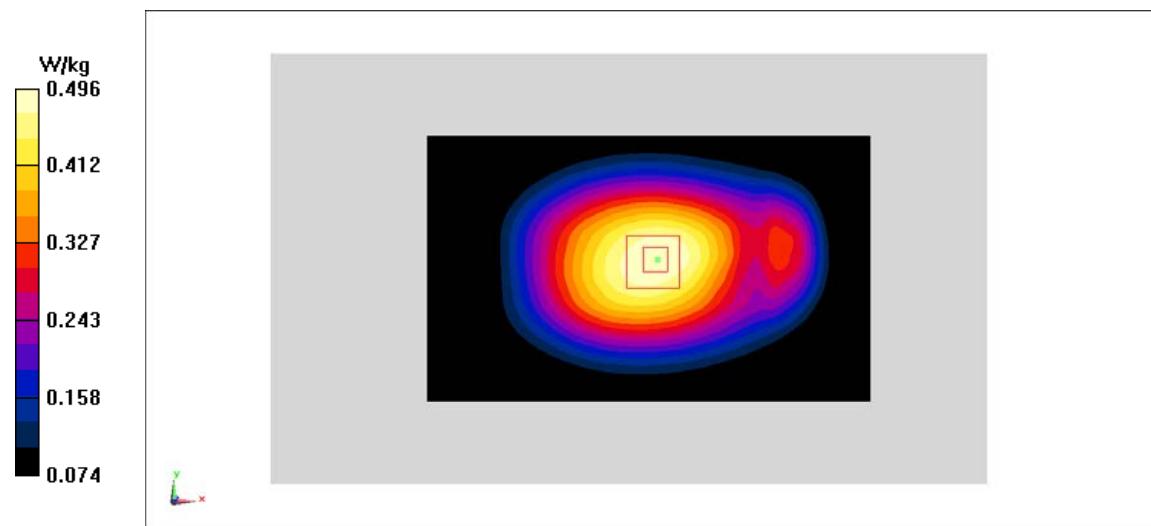
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 21.75 V/m; Power Drift = 0 dB

Peak SAR (extrapolated) = 0.561 W/kg

SAR(1 g) = 0.453 W/kg; SAR(10 g) = 0.346 W/kg

Maximum value of SAR (measured) = 0.496 W/kg

**Fig I.8**

LTE2500-FDD7_CH21350 Right Cheek

Date: 8/3/2018

Electronics: DAE4 Sn1525

Medium: head 2600 MHz

Medium parameters used: $f = 2560$ MHz; $\sigma = 1.908$ mho/m; $\epsilon_r = 38.62$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.4°C, Liquid Temperature: 22.2°C

Communication System: LTE2500-FDD7 2560 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN7464 ConvF(7.76,7.76,7.76)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.0967 W/kg

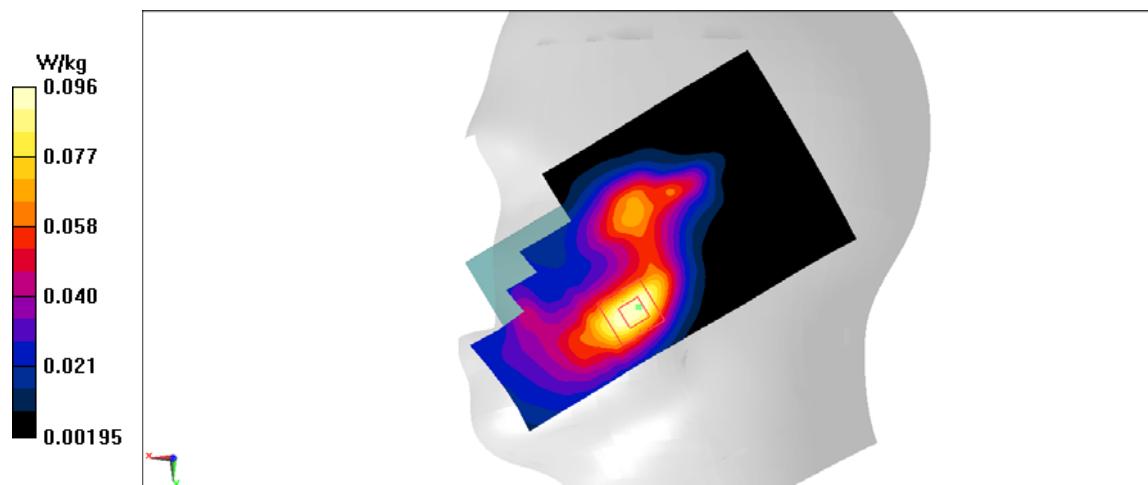
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.952 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.140 W/kg

SAR(1 g) = 0.078 W/kg; SAR(10 g) = 0.042 W/kg

Maximum value of SAR (measured) = 0.0959 W/kg

**Fig I.9**

LTE2500-FDD7_CH21350 Rear

Date: 8/3/2018

Electronics: DAE4 Sn1525

Medium: body 2600 MHz

Medium parameters used: $f = 2560$ MHz; $\sigma = 2.145$ mho/m; $\epsilon_r = 52.44$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.4°C, Liquid Temperature: 22.2°C

Communication System: LTE2500-FDD7 2560 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN7464 ConvF(7.84,7.84,7.84)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.13 W/kg

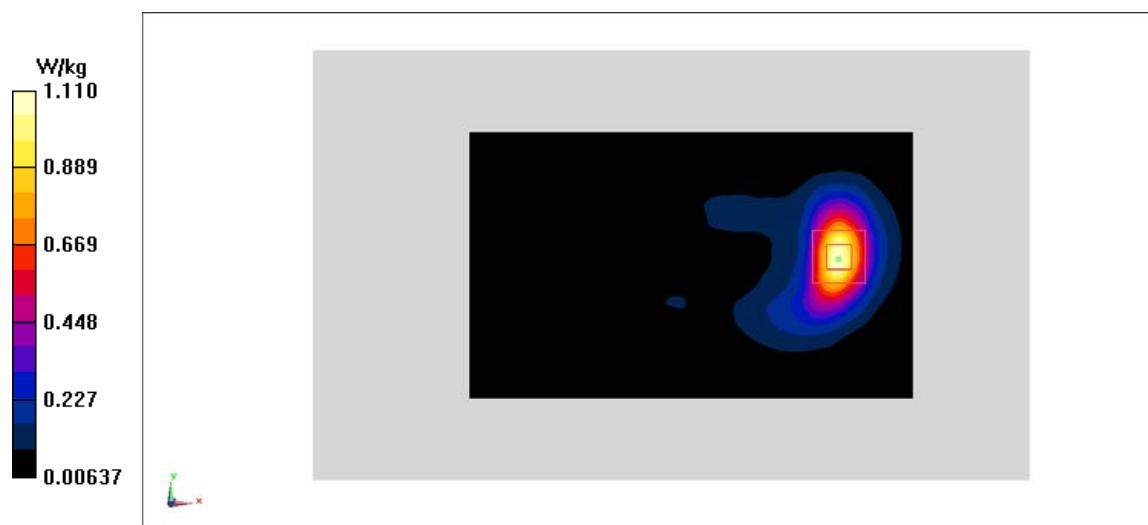
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.504 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.62 W/kg

SAR(1 g) = 0.849 W/kg; SAR(10 g) = 0.402 W/kg

Maximum value of SAR (measured) = 1.11 W/kg

**Fig I.10**

WLAN2450_CH11 Right Cheek

Date: 8/3/2018

Electronics: DAE4 Sn1525

Medium: head 2450 MHz

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.824$ mho/m; $\epsilon_r = 39.78$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.4°C, Liquid Temperature: 22.2°C

Communication System: WLAN2450 2462 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN7464 ConvF(7.89,7.89,7.89)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.07 W/kg

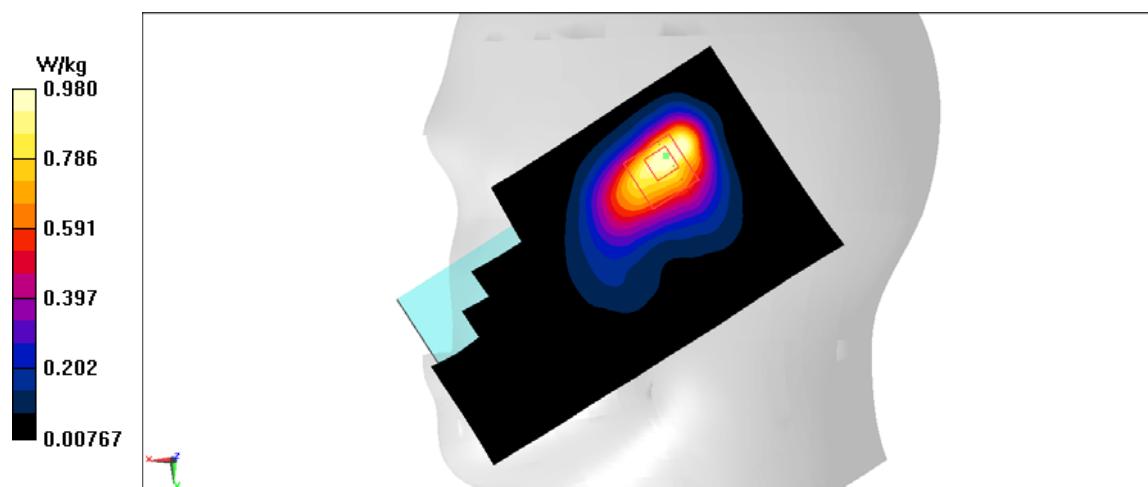
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.18 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 0.771 W/kg; SAR(10 g) = 0.408 W/kg

Maximum value of SAR (measured) = 0.980 W/kg

**Fig I.11**

WLAN2450_CH6 Front

Date: 8/3/2018

Electronics: DAE4 Sn1525

Medium: body 2450 MHz

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.97$ mho/m; $\epsilon_r = 52.54$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.4°C, Liquid Temperature: 22.2°C

Communication System: WLAN2450 2437 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN7464 ConvF(8.09,8.09,8.09)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.204 W/kg

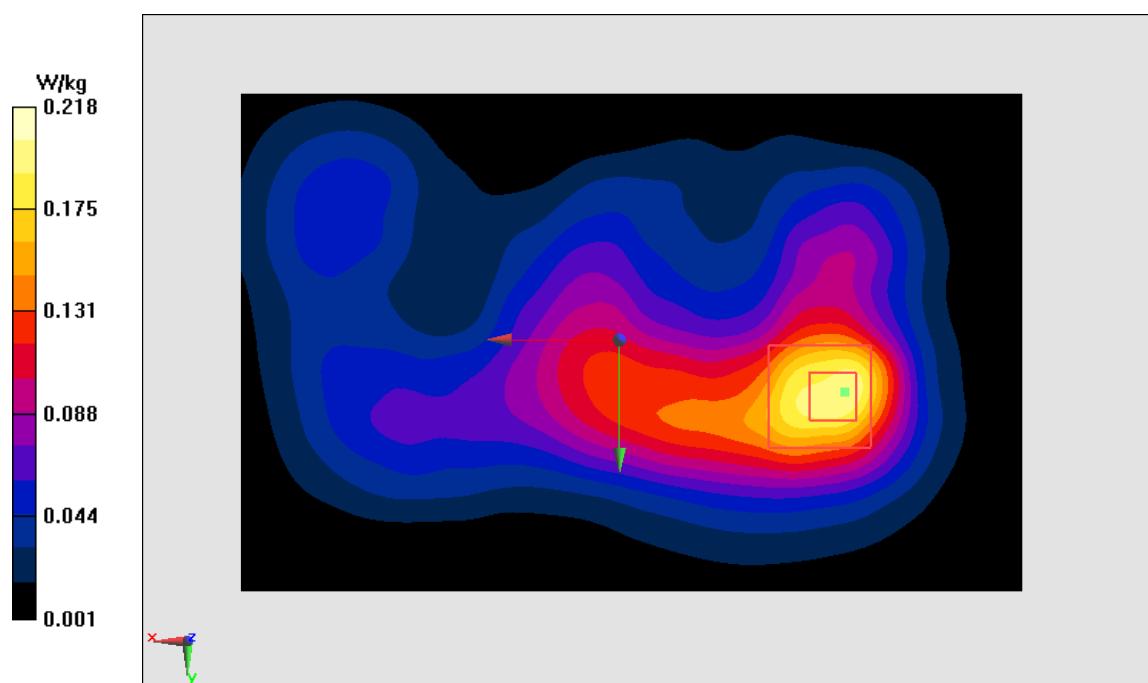
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.364 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 0.355 W/kg

SAR(1 g) = 0.167 W/kg; SAR(10 g) = 0.083 W/kg

Maximum value of SAR (measured) = 0.218 W/kg

**Fig I.12**

ANNEX J Extended Calibration SAR Dipole

Referring to KDB865664 D01, if dipoles are verified in return loss (<-20dBm, 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.

Justification of Extended Calibration SAR Dipole D835V2– serial no.4d069

Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2017-7-19	-32.4		52.1		-1.2	
2018-7-17	-30.3	6.5	53.0	1.1	-1.0	0.2

Body						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2017-7-19	-26.9		47.9		-3.9	
2018-7-17	-25.5	5.2	48.5	0.6	-5.0	-1.1

Justification of Extended Calibration SAR Dipole D1900V2– serial no.5d101

Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2017-7-26	-24.5		51.7		5.8	
2018-7-24	-22.9	6.5	50.6	-1.1	7.2	1.4

Body						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2017-7-26	-22.0		46.2		6.6	
2018-7-24	-21.4	2.7	46.4	0.2	7.4	0.8

Justification of Extended Calibration SAR Dipole D2450V2– serial no.853

Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2017-7-21	-25.6		52.0		5.0	
2018-7-19	-23.1	9.8	53.6	1.6	6.3	1.3

Body						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2017-7-21	-24.0		49.6		6.3	
2018-7-19	-22.0	8.3	50.4	0.8	8.0	1.7

Justification of Extended Calibration SAR Dipole D2600V2– serial no.1012

Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2017-7-21	-24.2		46.8		-5.0	
2018-7-19	-23.7	2.1	47.7	0.9	-5.9	-0.9

Body						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2017-7-21	-21.0		43.5		-5.3	
2018-7-19	-22.4	-6.7	44.4	0.9	-4.5	0.8



ANNEX K Accreditation Certificate

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 600118-0

Telecommunication Technology Labs, CAICT

Beijing
China

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

Electromagnetic Compatibility & Telecommunications

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).*

2017-08-22 through 2018-09-30

Effective Dates



For the National Voluntary Laboratory Accreditation Program