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

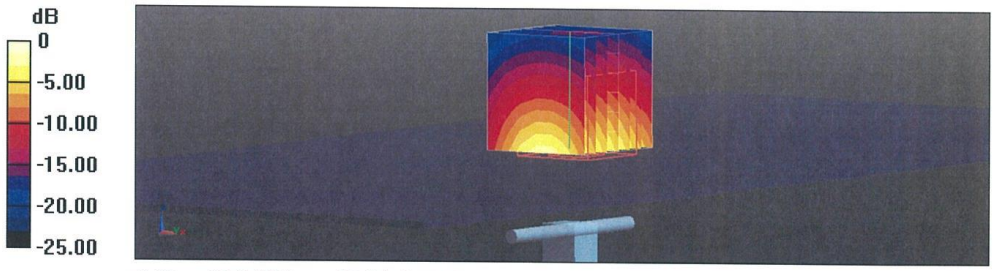
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.04 S/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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=5mm, dy=5mm, dz=5mm
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



0 dB = 20.0 W/kg = 13.01 dBW/kg

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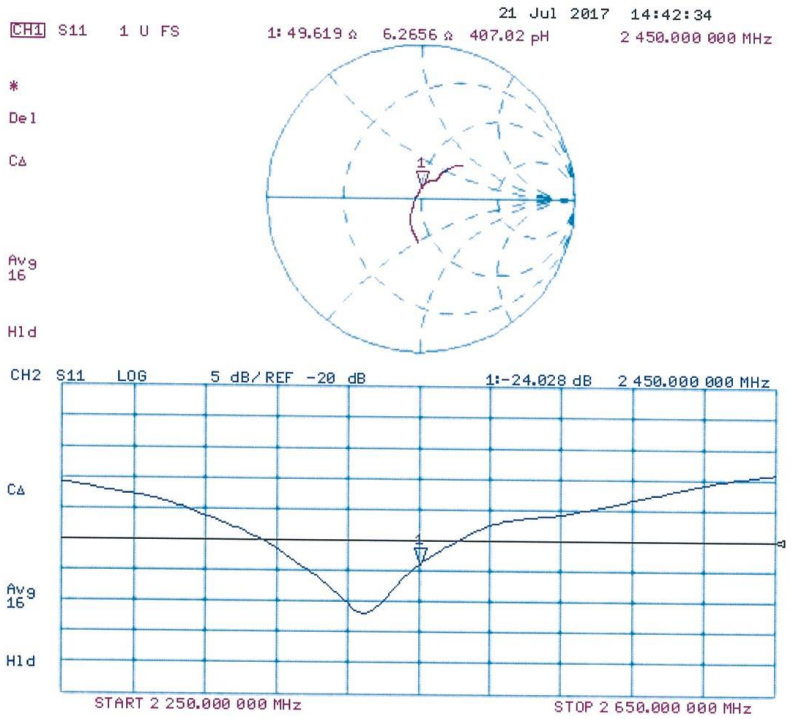
Impedance Measurement Plot for Body TSL



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2600 MHz Dipole Calibration Certificate

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

S Schweizerischer Kalibrierdienst
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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 ± 3)°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

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 24, 2017

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

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Calibration Laboratory of
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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%.

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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)**

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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

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

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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

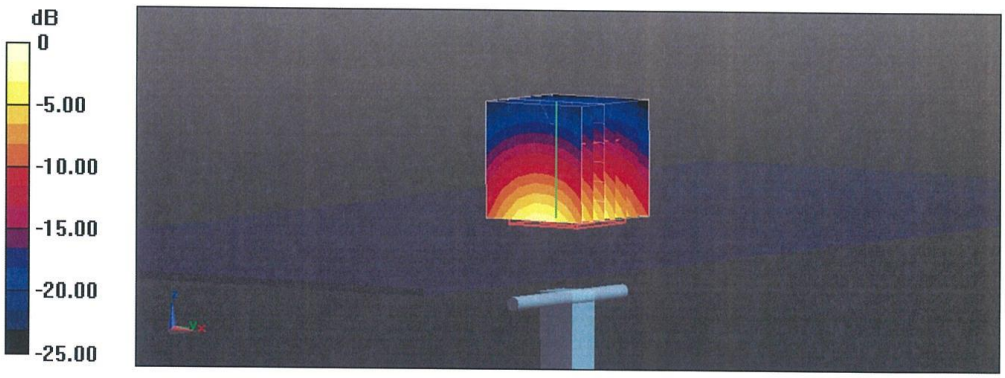
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.04 S/m; ε_r = 37.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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=5mm, dy=5mm, dz=5mm
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



0 dB = 25.0 W/kg = 13.98 dBW/kg

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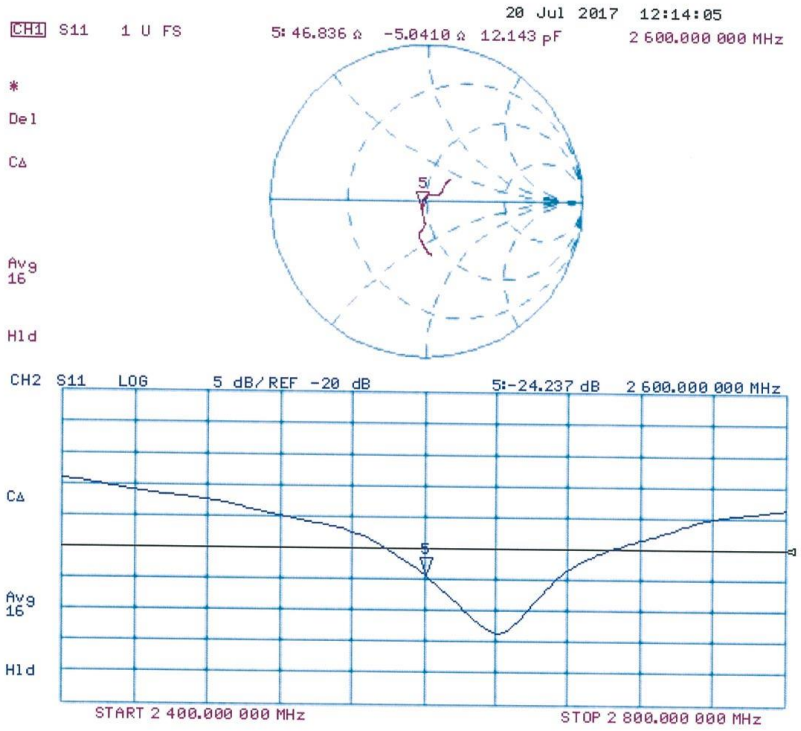
Impedance Measurement Plot for Head TSL



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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

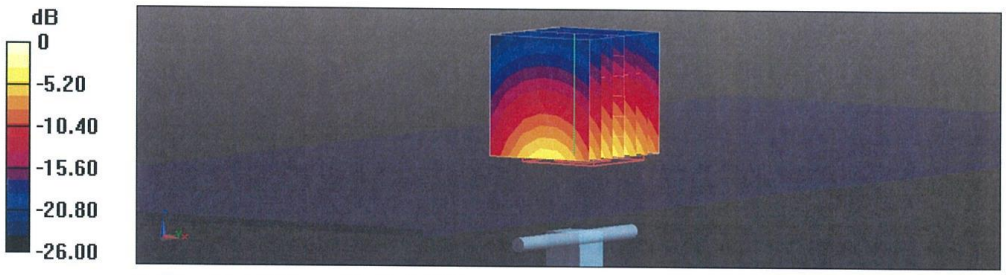
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.22 S/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 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=5mm, dy=5mm, dz=5mm
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



0 dB = 23.4 W/kg = 13.69 dBW/kg

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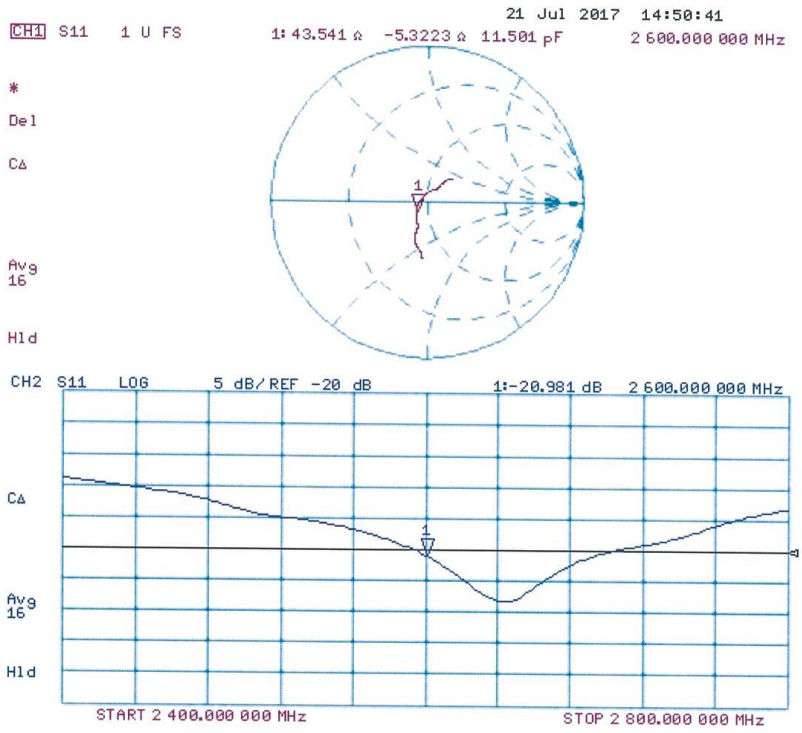
Impedance Measurement Plot for Body TSL



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ANNEX I SPOT CHECK FOR NEW BATTERY

I.1 Measurement results

Test Band	Mode	Channel	Frequency	Measured Power	Tune-Up	Test Position	Measured 10g SAR	Measured 1g SAR	Reported 10g SAR	Reported 1g SAR	Power Drift	Figure
GSM850	/	251	848.8	32.07	33.8	Right Cheek	0.201	0.264	0.30	**0.39**	-0.03	Fig I.1
GSM850	/	251	848.8	28.62	30	Rear	0.393	0.659	0.54	**0.91**	-0.03	Fig I.2
PCS1900	/	810	1909.8	29.04	30.3	Left Cheek	0.139	0.22	0.19	**0.29**	0.03	Fig I.3
PCS1900	/	810	1909.8	25.71	26.5	Front	0.373	0.656	0.45	**0.79**	-0.01	Fig I.4
WCDMA1900-BII	/	9800	1880	23.16	24	Left Cheek	0.309	0.485	0.37	**0.59**	-0.09	Fig I.5
WCDMA1900-BII	/	9800	1880	23.16	24	Front	0.331	0.582	0.40	**0.71**	-0.09	Fig I.6
WCDMA1700-BIV	/	1637	1732.4	22.6	24	Left Cheek	0.203	0.304	0.28	**0.42**	0.16	Fig I.7
WCDMA1700-BIV	/	1637	1732.4	22.6	24	Rear	0.265	0.379	0.37	**0.52**	-0.13	Fig I.8
WCDMA850-BV	/	4233	846.6	23.29	24.5	Right Cheek	0.186	0.246	0.25	**0.33**	0.15	Fig I.9
WCDMA850-BV	/	4233	846.6	23.29	24.5	Rear	0.208	0.287	0.27	**0.38**	0	Fig I.10
LTE1900-FDD2	1RB-Low	18900	1880	23.49	24	Left Cheek	0.404	0.639	0.45	**0.72**	0.15	Fig I.11
LTE1900-FDD2	1RB-Low	18900	1880	23.49	24	Front	0.453	0.808	0.51	**0.91**	-0.12	Fig I.12
LTE1700-FDD4	1RB-Low	20300	1745	23.59	24	Left Cheek	0.291	0.438	0.32	**0.48**	0.02	Fig I.13
LTE1700-FDD4	1RB-Low	20300	1745	23.59	24	Rear	0.377	0.55	0.41	**0.60**	0.07	Fig I.14
LTE850-FDD5	1RB-Mid	20600	844	23.47	24	Right Cheek	0.163	0.217	0.18	**0.25**	0.02	Fig I.15
LTE850-FDD5	1RB-Mid	20600	844	23.47	24	Rear	0.248	0.333	0.28	**0.38**	-0.03	Fig I.16
LTE2500-FDD7	1RB-High	21350	2560	23.43	24	Left Cheek	0.313	0.59	0.36	**0.67**	0.02	Fig I.17
LTE2500-FDD7	1RB-High	21350	2560	23.43	24	Rear	0.435	0.832	0.50	**0.95**	-0.1	Fig I.18
LTE700-FDD12	1RB-Low	23060	704	23.44	24	Left Cheek	0.072	0.088	0.08	**0.10**	0.02	Fig I.19
LTE700-FDD12	1RB-Low	23060	704	23.44	24	Rear	0.12	0.154	0.14	**0.18**	-0.01	Fig I.20
LTE750-FDD13	1RB-High	23230	782	23.13	24	Left Cheek	0.206	0.262	0.25	**0.32**	0.07	Fig I.21
LTE750-FDD13	1RB-High	23230	782	23.13	24	Rear	0.241	0.313	0.29	**0.38**	0.05	Fig I.22
WLAN2450	/	6	2437	18.24	19	Right Cheek	0.312	0.632	0.37	**0.75**	0.04	Fig I.23
WLAN2450	/	6	2437	18.24	19	Rear	0.06	0.122	0.07	**0.15**	0.09	Fig I.24

Table I-1: SAR Values (WLAN - Body) – 802.11b 1Mbps (Scaled Reported SAR)

Ambient Temperature: 22.2 °C		Liquid Temperature: 21.7 °C				
Frequency		Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g) (W/kg)	Scaled reported SAR (1g) (W/kg)
MHz	Ch.					
2437	6	Front	98.14%	100%	**0.15**	**0.15**

SAR is not required for OFDM because the 802.11b adjusted SAR ≤ 1.2 W/kg.

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I.2 Reported SAR Comparison

Exposure Configuration	Technology Band	Reported SAR 1g (W/Kg) : original	Reported SAR 1g (W/Kg)
Head	GSM850	0.42	0.39
	PCS1900	0.30	0.29
	WCDMA1900-BII	0.72	0.59
	WCDMA1700-BIV	0.46	0.42
	WCDMA850-BV	0.30	0.33
	LTE1900-FDD2	0.61	0.72
	LTE1700-FDD4	0.30	0.48
	LTE850-FDD5	0.24	0.25
	LTE2500-FDD7	0.94	0.67
	LTE700-FDD12	0.12	0.10
	LTE750-FDD13	0.14	0.32
	WLAN2450	0.79	0.75
Body	GSM850	0.73	0.91
	PCS1900	0.81	0.79
	WCDMA1900-BII	1.06	0.71
	WCDMA1700-BIV	0.58	0.52
	WCDMA850-BV	0.41	0.38
	LTE1900-FDD2	0.99	0.91
	LTE1700-FDD4	0.51	0.60
	LTE850-FDD5	0.32	0.38
	LTE2500-FDD7	1.07	0.95
	LTE700-FDD12	0.29	0.18
	LTE750-FDD13	0.38	0.38
	WLAN2450	0.16	0.15

Note: The spot check results of WCDMA850, LTE Band 2/4/5/13 for Head, and GSM850, LTE Band 4/5 for Body are higher than the original results, so these results replace the original data.

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GSM850_CH251 Right Cheek
Date: 9/19/2017
Electronics: DAE4 Sn1331
Medium: Head 835 MHz
Medium parameters used: f = 848.8 MHz; σ = 0.928 mho/m; εr = 41.73; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: GSM850 848.8 Duty Cycle: 1:8.3
Probe: EX3DV4 – SN3846 ConvF(9.33,9.33,9.33)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.294 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.071 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.347 W/kg
SAR(1 g) = 0.264 W/kg; SAR(10 g) = 0.201 W/kg
Maximum value of SAR (measured) = 0.29 W/kg

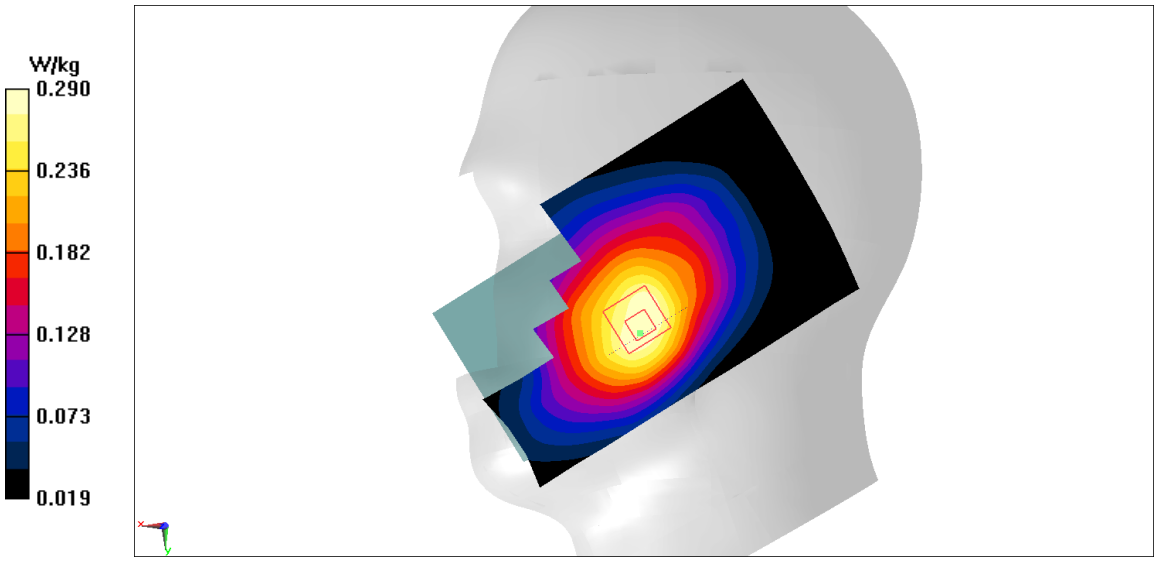

Fig I.1

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GSM850_CH251 Rear
Date: 9/19/2017
Electronics: DAE4 Sn1331
Medium: Head 835 MHz
Medium parameters used: f = 848.8 MHz; σ = 1 mho/m; εr = 54.11; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: GSM850 848.8 Duty Cycle: 1:2
Probe: EX3DV4 – SN3846 ConvF(9.52,9.52,9.52)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.844 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.82 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.16 W/kg
SAR(1 g) = 0.659 W/kg; SAR(10 g) = 0.393 W/kg
Maximum value of SAR (measured) = 0.799 W/kg

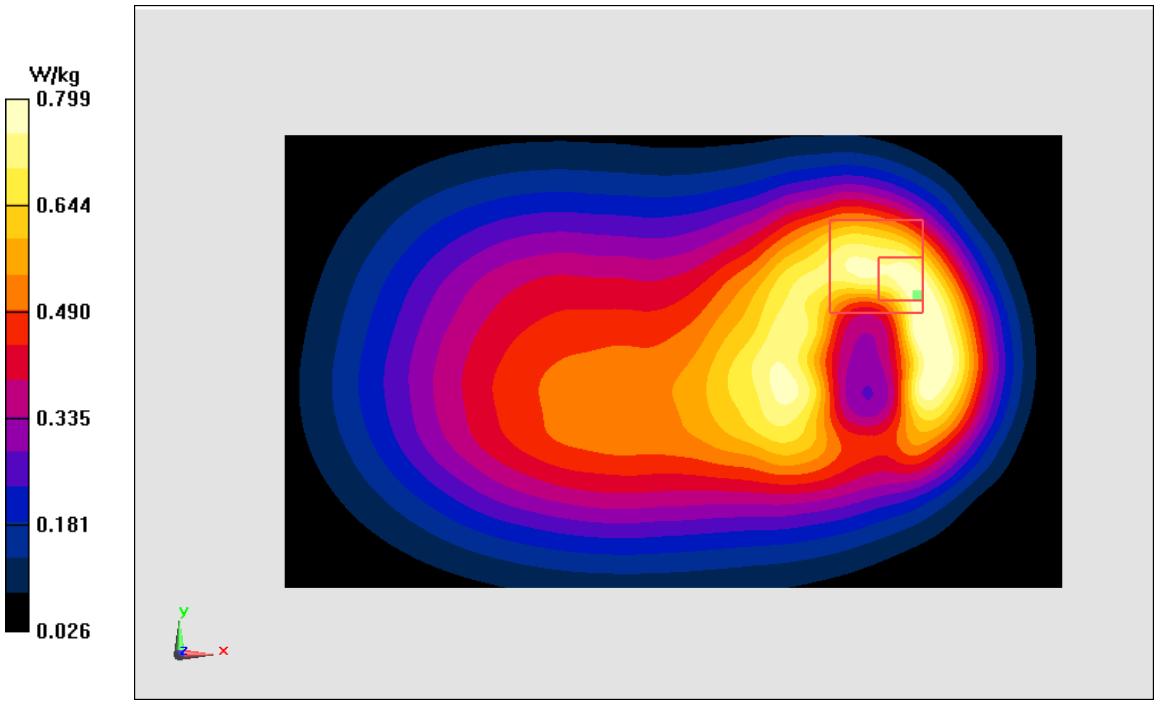

Fig I.2

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PCS1900_CH810 Left Cheek
Date: 9/21/2017
Electronics: DAE4 Sn1331
Medium: Head 1900 MHz
Medium parameters used: f = 1909.8 MHz; σ = 1.396 mho/m; εr = 40.25; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: PCS1900 1909.8 Duty Cycle: 1:8.3
Probe: EX3DV4 – SN3846 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) = 0.261 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.262 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.335 W/kg
SAR(1 g) = 0.22 W/kg; SAR(10 g) = 0.139 W/kg
Maximum value of SAR (measured) = 0.261 W/kg

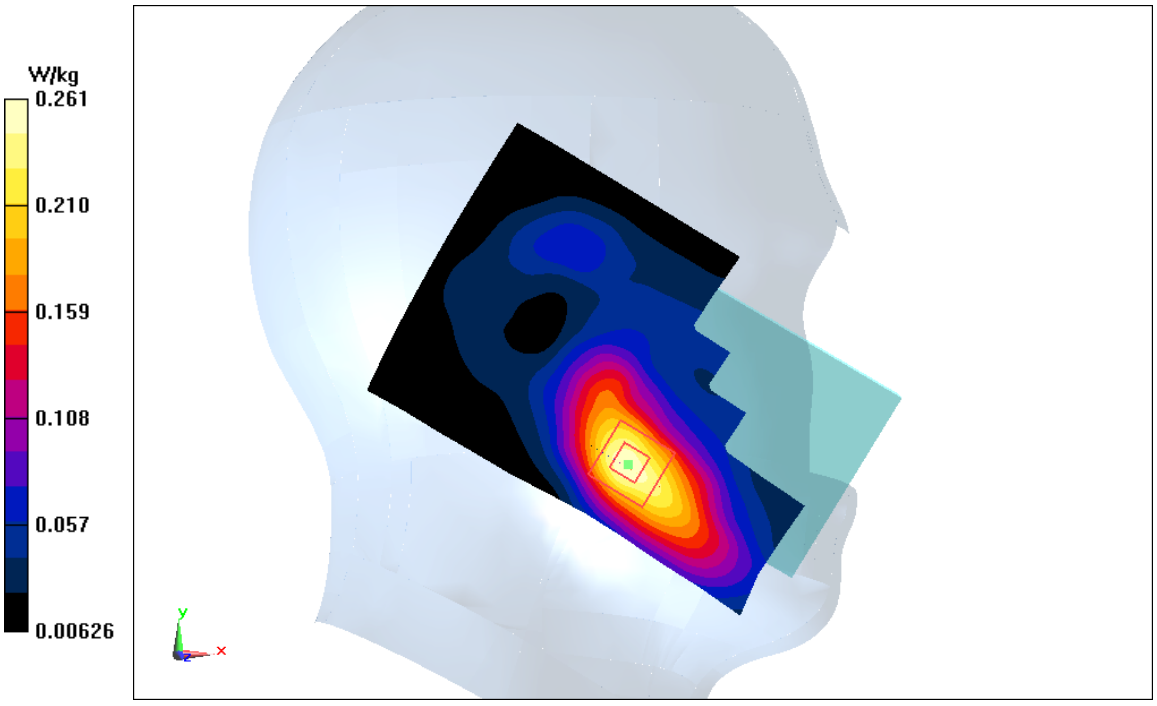

Fig I.3

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PCS1900_CH810 Front
Date: 9/21/2017
Electronics: DAE4 Sn1331
Medium: Head 1900 MHz
Medium parameters used: f = 1909.8 MHz; σ = 1.542 mho/m; εr = 53.87; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: PCS1900 1909.8 Duty Cycle: 1:2
Probe: EX3DV4 – SN3846 ConvF(7.57,7.57,7.57)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.808 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.23 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.656 W/kg; SAR(10 g) = 0.373 W/kg
Maximum value of SAR (measured) = 0.797 W/kg

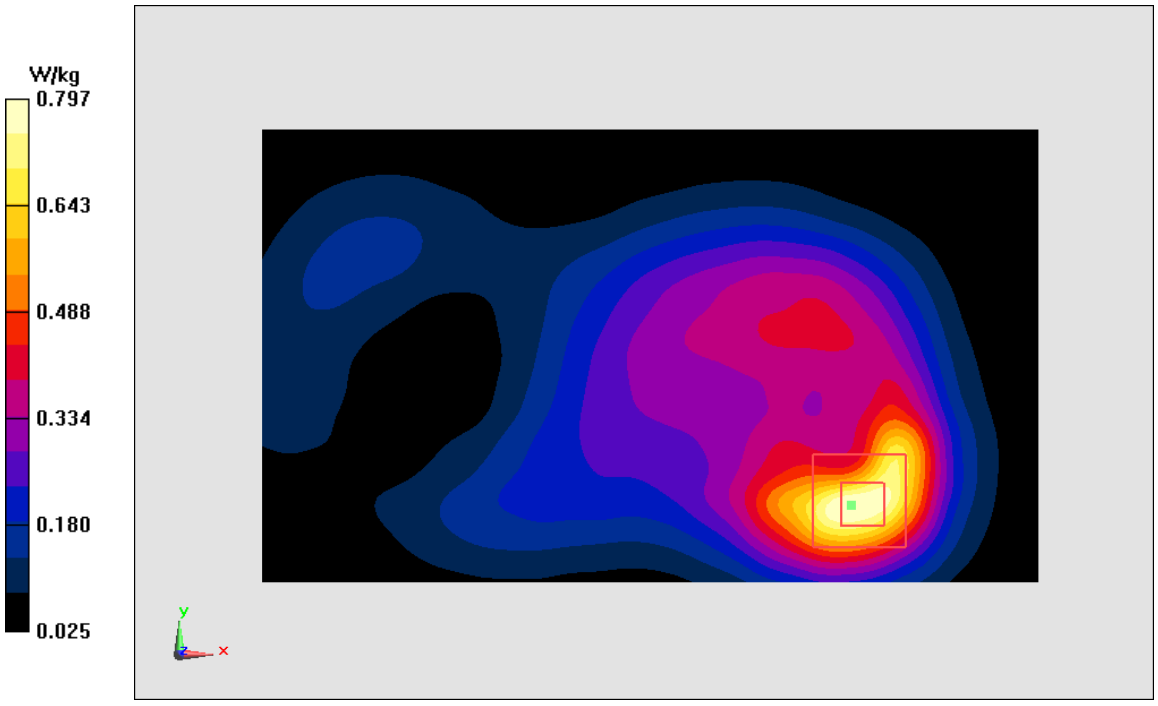

Fig I.4

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WCDMA1900-BII_CH9800 Left Cheek
Date: 9/21/2017
Electronics: DAE4 Sn1331
Medium: Head 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.367 mho/m; εr = 40.28; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: WCDMA1900-BII 1880 Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 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) = 0.573 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.805 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.728 W/kg
SAR(1 g) = 0.485 W/kg; SAR(10 g) = 0.309 W/kg
Maximum value of SAR (measured) = 0.571 W/kg

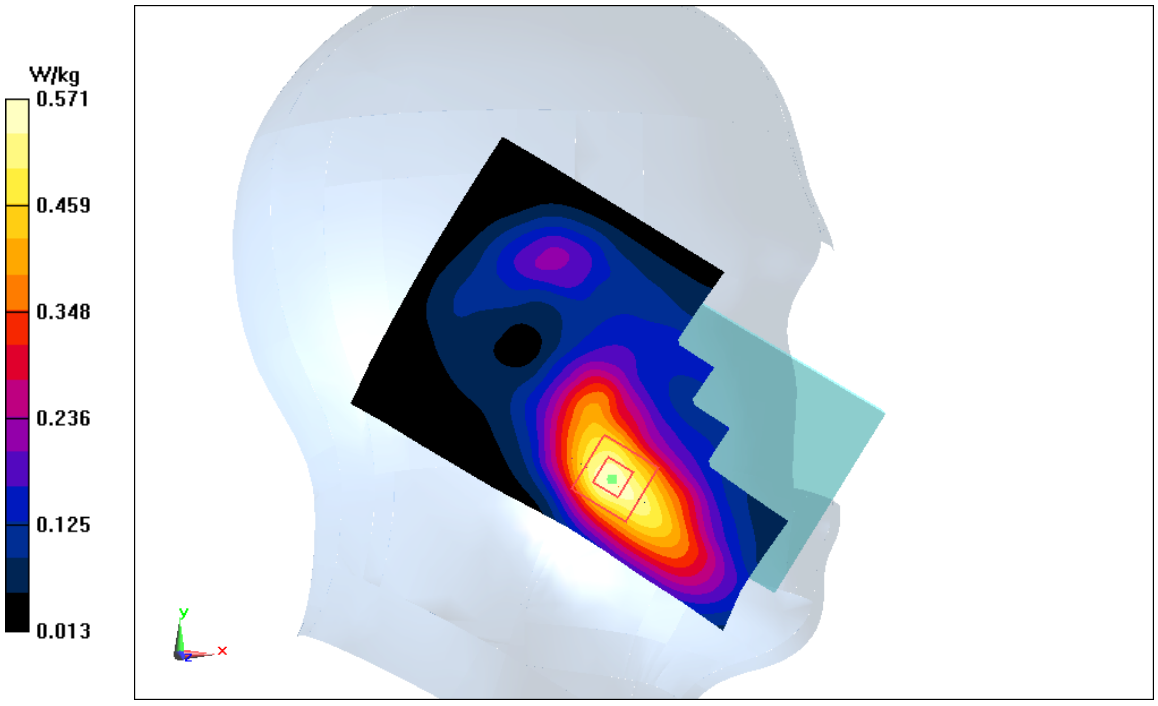

Fig I.5

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WCDMA1900-BII_CH9800 Front
Date: 9/21/2017
Electronics: DAE4 Sn1331
Medium: Head 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.514 mho/m; εr = 53.9; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: WCDMA1900-BII 1880 Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(7.57,7.57,7.57)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.776 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.88 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.996 W/kg
SAR(1 g) = 0.582 W/kg; SAR(10 g) = 0.331 W/kg
Maximum value of SAR (measured) = 0.703 W/kg

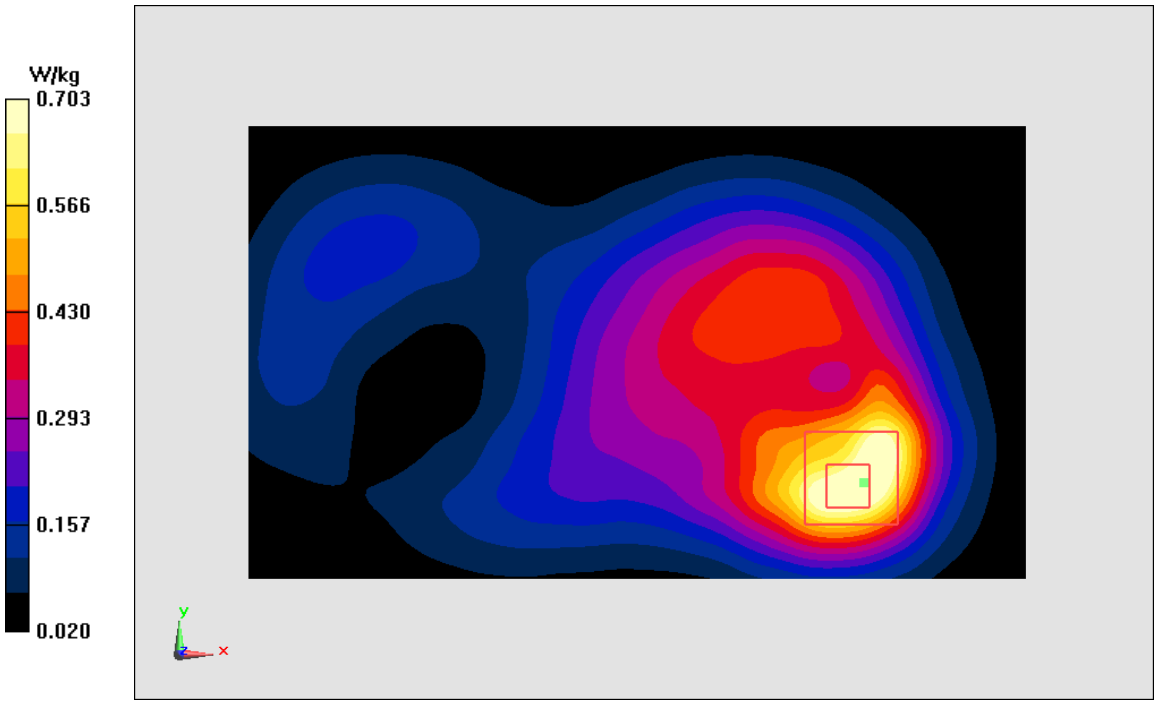

Fig I.6

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WCDMA1700-BIV_CH1637 Left Cheek
Date: 9/20/2017
Electronics: DAE4 Sn1331
Medium: Head 1750 MHz
Medium parameters used: f = 1732.4 MHz; σ = 1.348 mho/m; εr = 40.52; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: WCDMA1700-BIV 1732.4 Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(8.16,8.16,8.16)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.368 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.513 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.432 W/kg
SAR(1 g) = 0.304 W/kg; SAR(10 g) = 0.203 W/kg
Maximum value of SAR (measured) = 0.347 W/kg

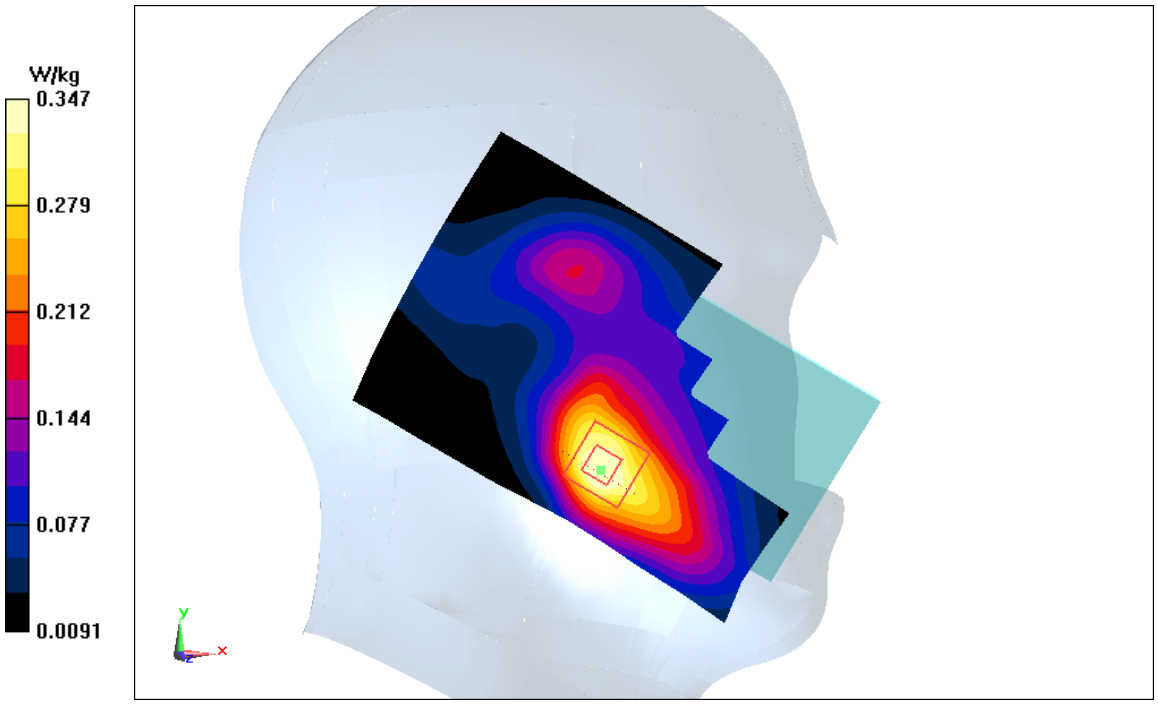

Fig I.7

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WCDMA1700-BIV_CH1637 Rear
Date: 9/20/2017
Electronics: DAE4 Sn1331
Medium: Head 1750 MHz
Medium parameters used: f = 1732.4 MHz; σ = 1.477 mho/m; εr = 53.59; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: WCDMA1700-BIV 1732.4 Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(7.9,7.9,7.9)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.468 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.41 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.61 W/kg
SAR(1 g) = 0.379 W/kg; SAR(10 g) = 0.265 W/kg
Maximum value of SAR (measured) = 0.453 W/kg

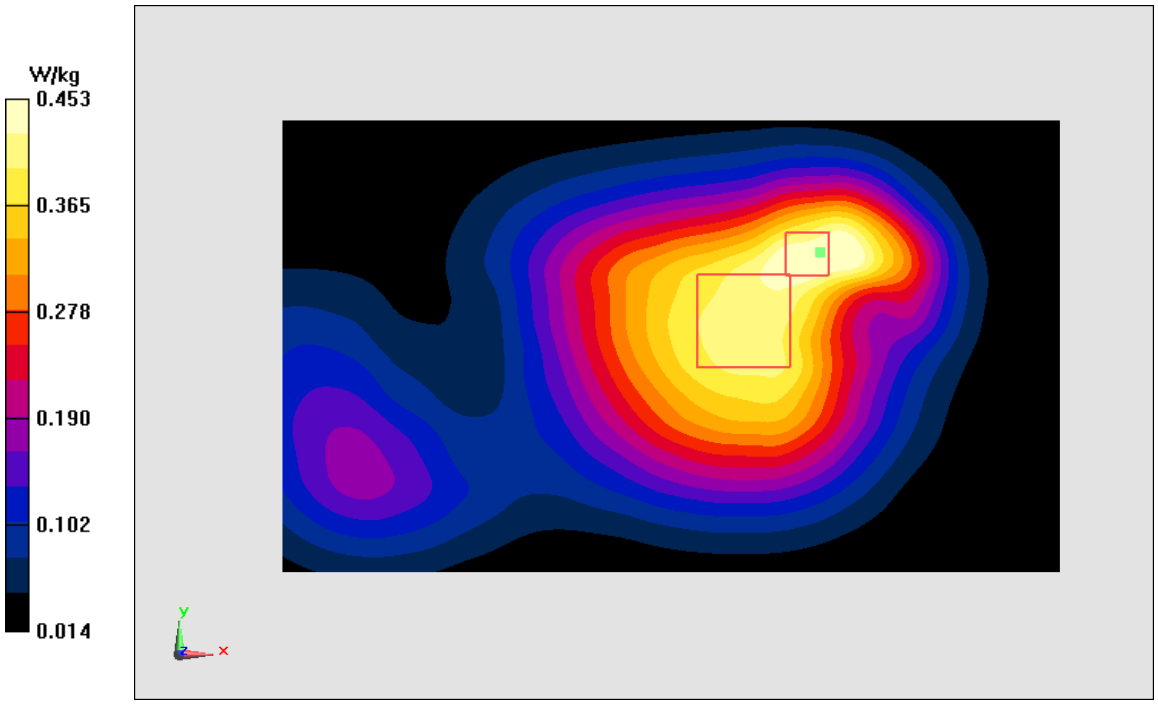

Fig I.8

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WCDMA850-BV_CH4233 Right Cheek
Date: 9/19/2017
Electronics: DAE4 Sn1331
Medium: Head 835 MHz
Medium parameters used: f = 846.6 MHz; σ = 0.926 mho/m; εr = 41.74; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: WCDMA850-BV 846.6 Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(9.33,9.33,9.33)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.273 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.211 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.326 W/kg
SAR(1 g) = 0.246 W/kg; SAR(10 g) = 0.186 W/kg
Maximum value of SAR (measured) = 0.27 W/kg

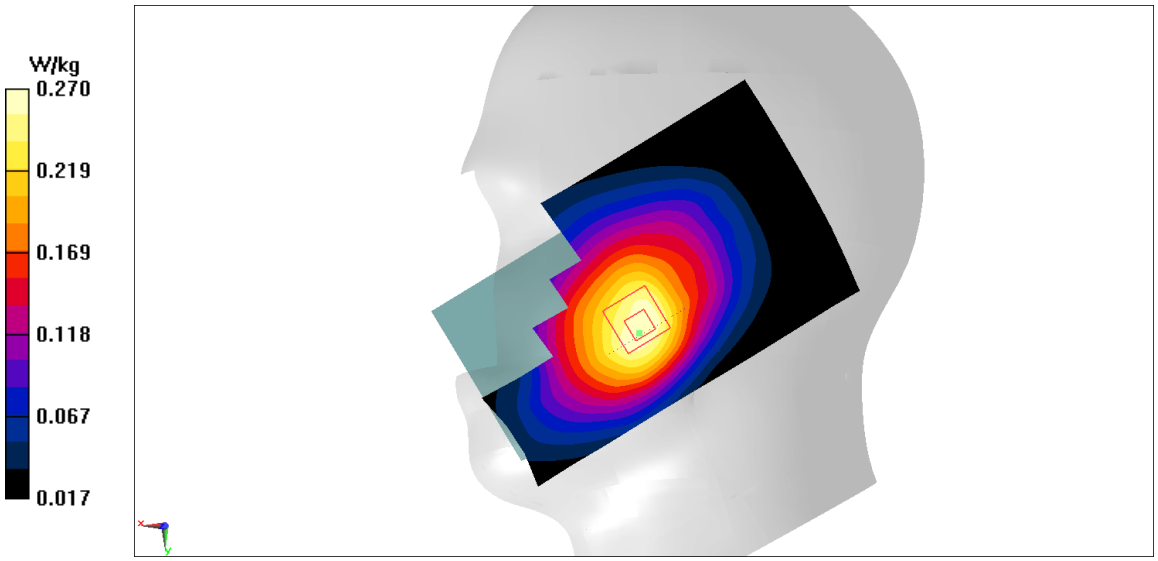

Fig I.9

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WCDMA850-BV_CH4233 Rear
Date: 9/19/2017
Electronics: DAE4 Sn1331
Medium: Head 835 MHz
Medium parameters used: f = 846.6 MHz; σ = 0.998 mho/m; εr = 54.12; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: WCDMA850-BV 846.6 Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(9.52,9.52,9.52)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.342 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.93 V/m; Power Drift = 0 dB
Peak SAR (extrapolated) = 0.46 W/kg
SAR(1 g) = 0.287 W/kg; SAR(10 g) = 0.208 W/kg
Maximum value of SAR (measured) = 0.33 W/kg

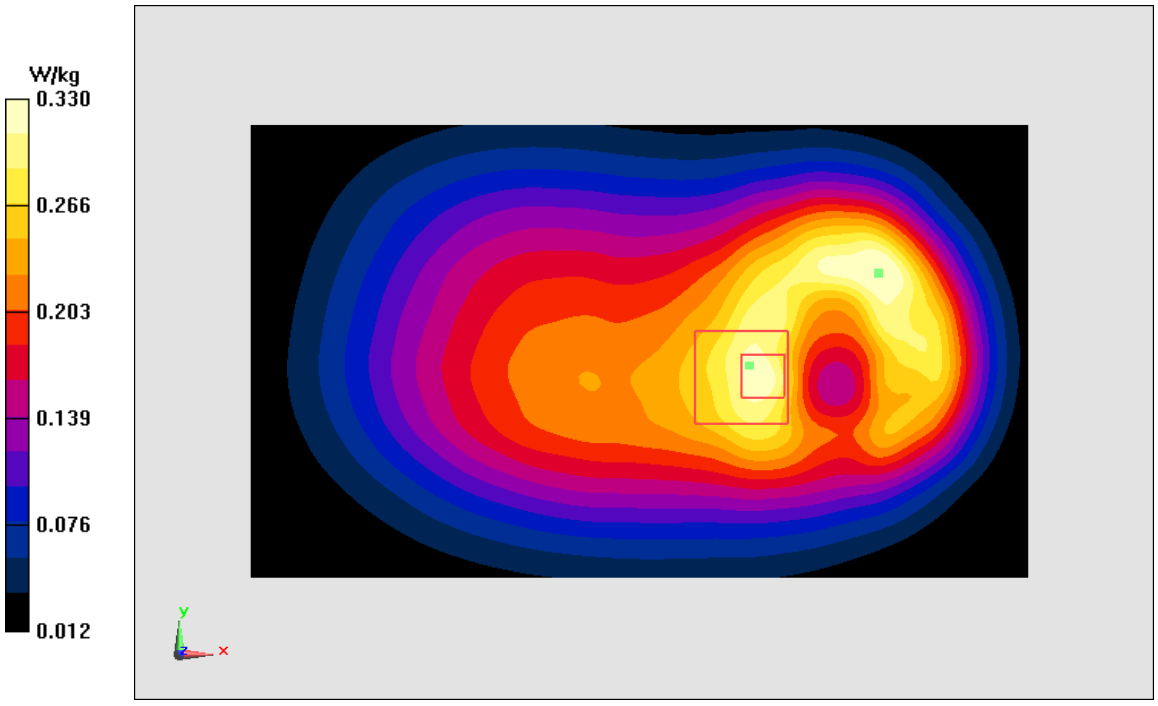

Fig I.10

©Copyright. All rights reserved by CTTL.

LTE1900-FDD2_CH18900 Left Cheek
Date: 9/21/2017
Electronics: DAE4 Sn1331
Medium: Head 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.367 mho/m; εr = 40.28; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: LTE1900-FDD2 1880 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 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) = 0.753 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.851 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.968 W/kg
SAR(1 g) = 0.639 W/kg; SAR(10 g) = 0.404 W/kg
Maximum value of SAR (measured) = 0.753 W/kg

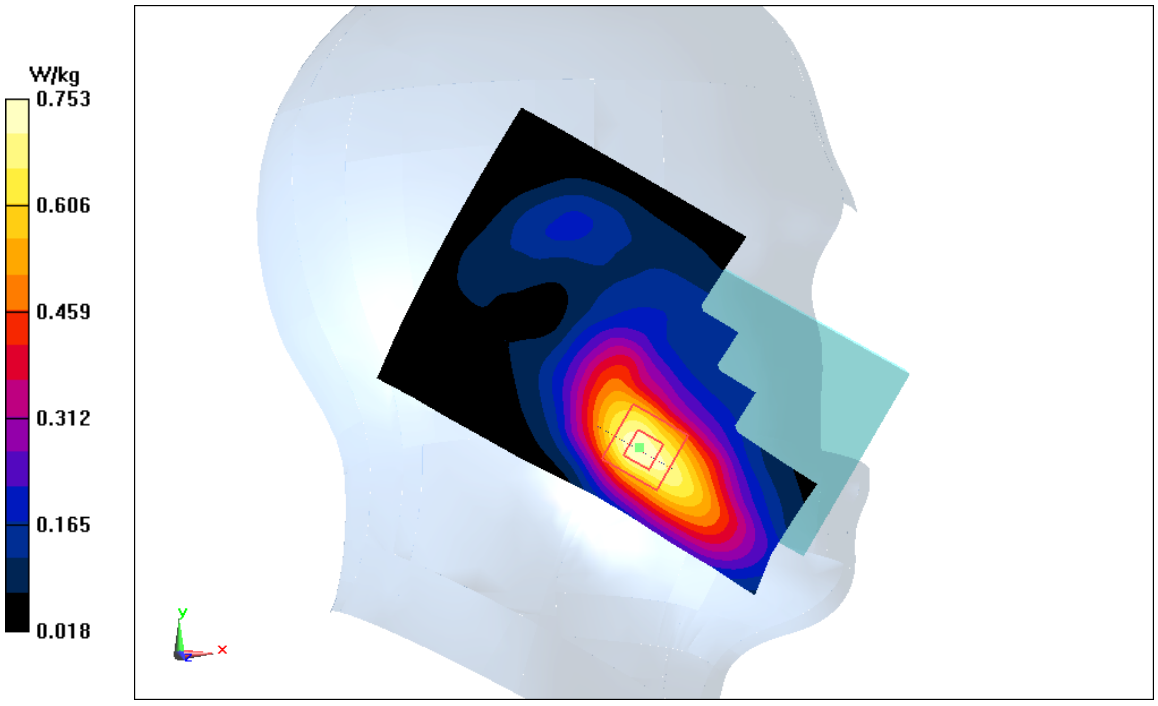

Fig I.11

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LTE1900-FDD2_CH18900 Front
Date: 9/21/2017
Electronics: DAE4 Sn1331
Medium: Head 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.514 mho/m; εr = 53.9; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: LTE1900-FDD2 1880 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(7.57,7.57,7.57)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.11 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.31 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.808 W/kg; SAR(10 g) = 0.453 W/kg
Maximum value of SAR (measured) = 1.07 W/kg

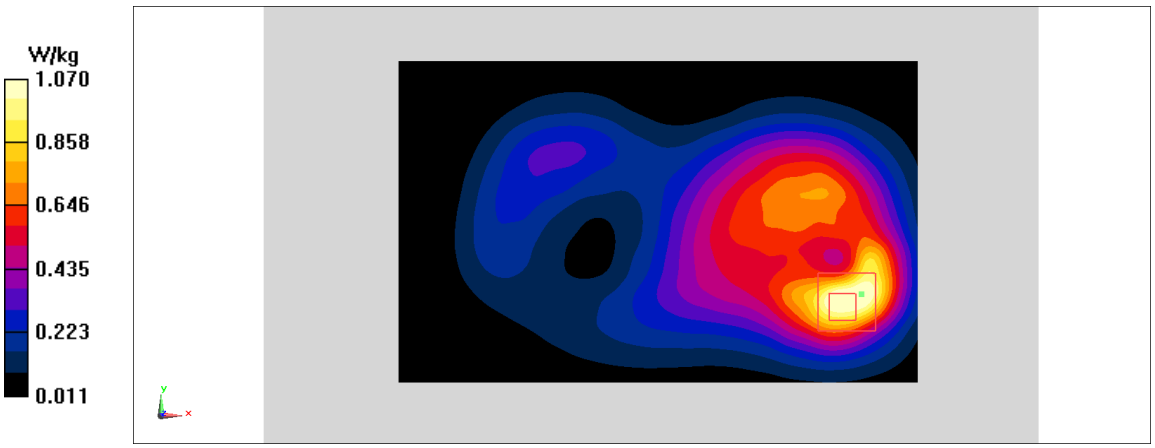

Fig I.12

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LTE1700-FDD4_CH20300 Left Cheek
Date: 9/20/2017
Electronics: DAE4 Sn1331
Medium: Head 1750 MHz
Medium parameters used: f = 1745 MHz; σ = 1.36 mho/m; εr = 40.51; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: LTE1700-FDD4 1745 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(8.16,8.16,8.16)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.512 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.123 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.623 W/kg
SAR(1 g) = 0.438 W/kg; SAR(10 g) = 0.291 W/kg
Maximum value of SAR (measured) = 0.493 W/kg

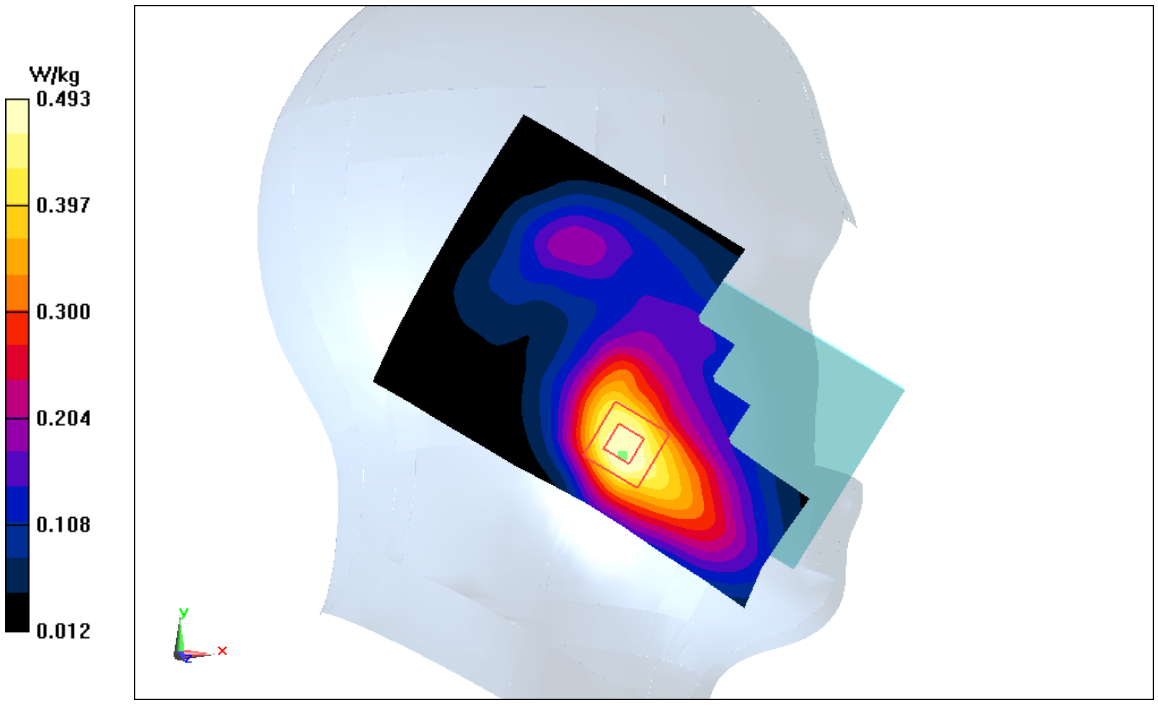

Fig I.13

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LTE1700-FDD4_CH20300 Rear
Date: 9/20/2017
Electronics: DAE4 Sn1331
Medium: Head 1750 MHz
Medium parameters used: f = 1745 MHz; σ = 1.489 mho/m; εr = 53.58; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: LTE1700-FDD4 1745 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(7.9,7.9,7.9)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.685 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.7 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.783 W/kg
SAR(1 g) = 0.55 W/kg; SAR(10 g) = 0.377 W/kg
Maximum value of SAR (measured) = 0.669 W/kg

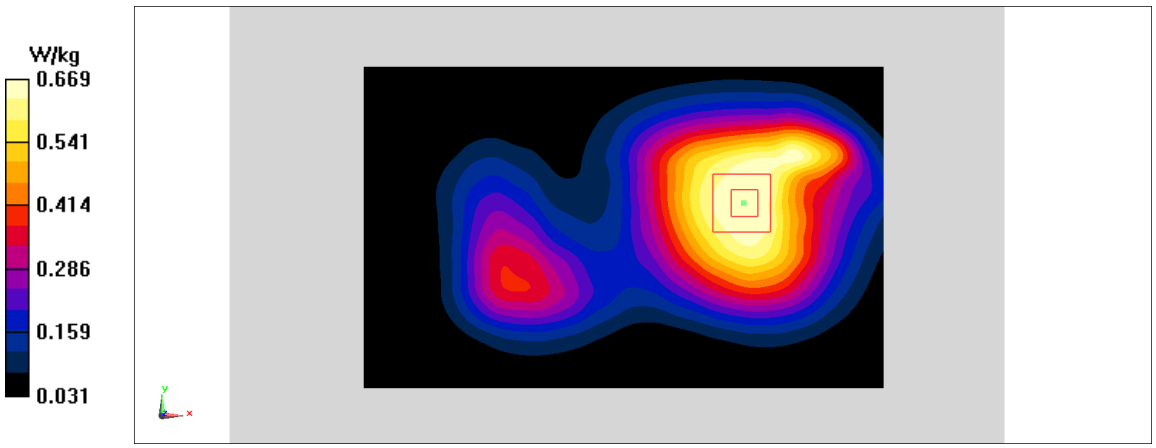

Fig I.14

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LTE850-FDD5_CH20600 Right Cheek
Date: 9/19/2017
Electronics: DAE4 Sn1331
Medium: Head 835 MHz
Medium parameters used: f = 844 MHz; σ = 0.924 mho/m; εr = 41.74; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: LTE850-FDD5 844 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(9.33,9.33,9.33)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.236 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.823 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.283 W/kg
SAR(1 g) = 0.217 W/kg; SAR(10 g) = 0.163 W/kg
Maximum value of SAR (measured) = 0.239 W/kg

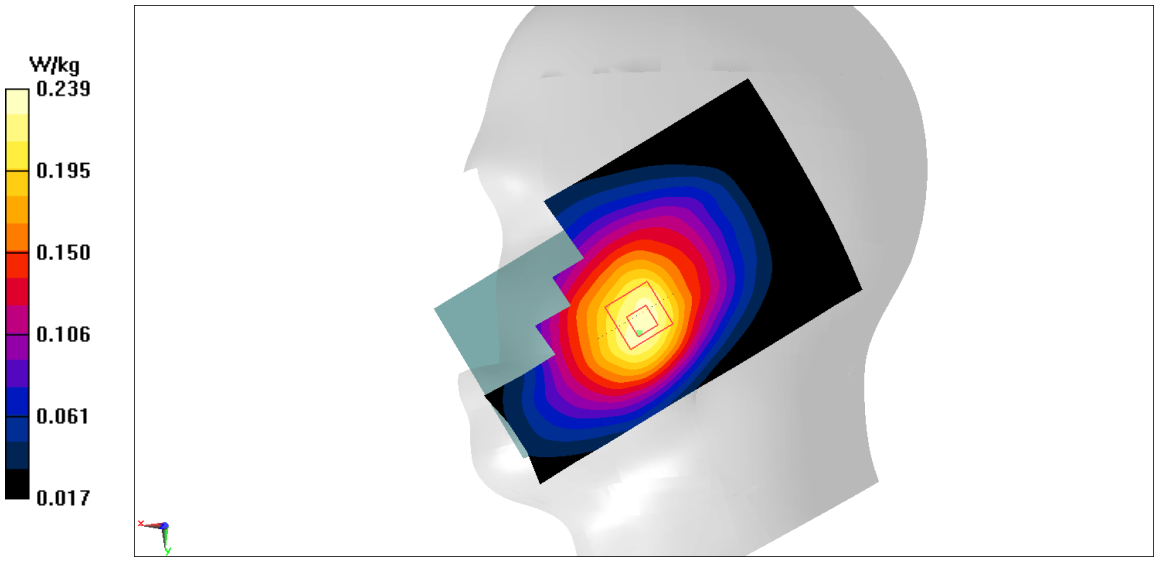

Fig I.15

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LTE850-FDD5_CH20600 Rear
Date: 9/19/2017
Electronics: DAE4 Sn1331
Medium: Head 835 MHz
Medium parameters used: f = 844 MHz; σ = 0.996 mho/m; εr = 54.12; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: LTE850-FDD5 844 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN3846 ConvF(9.52,9.52,9.52)

Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.398 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.09 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.445 W/kg
SAR(1 g) = 0.333 W/kg; SAR(10 g) = 0.248 W/kg
Maximum value of SAR (measured) = 0.384 W/kg

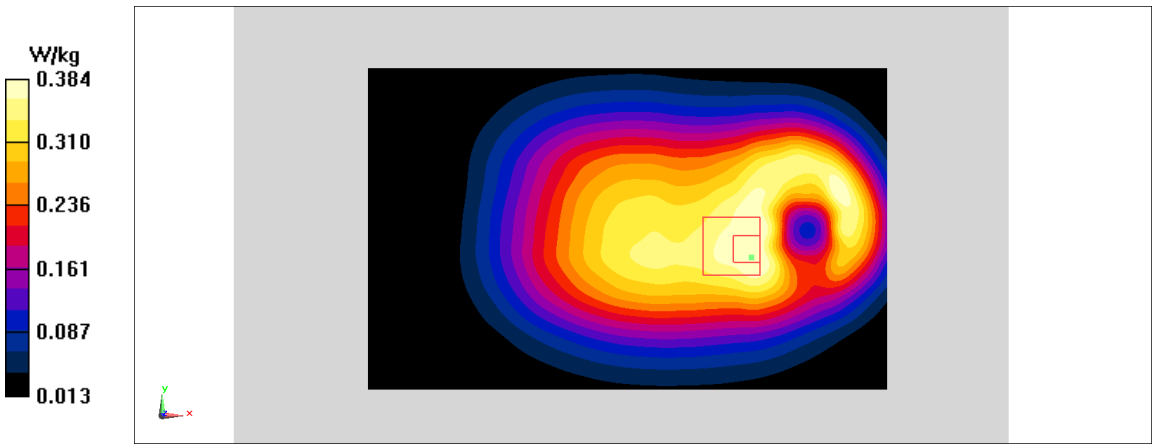

Fig I.16

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