FLAT	EDGE3

Communication System: UID 0, LTE Band 13 (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 782 MHz; σ = 0.926 S/m; ε_r = 41.412; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

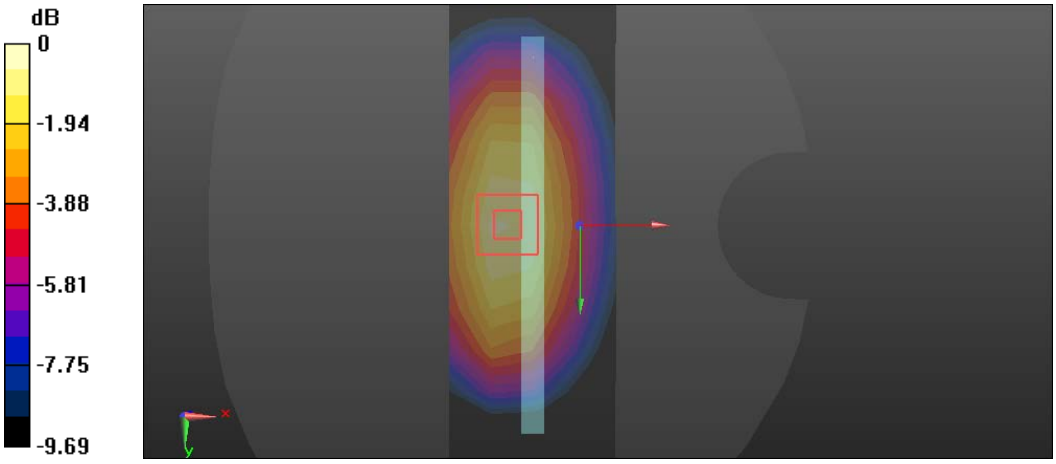
- Probe: ES3DV3 - SN3127; ConvF(6.55, 6.55, 6.55); Calibrated: 2016/8/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2016/8/22
- Phantom: Twin-SAM 1559; Type: QD 000 P40 CD; Serial: 1559
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)

Flat-Section MSL LTE band13 HOT/LTE Band13 edge3/Area Scan (5x13x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.149 W/kg

Flat-Section MSL LTE band13 HOT/LTE Band13 edge3/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.49 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.225 W/kg
SAR(1 g) = 0.153 W/kg; SAR(10 g) = 0.102 W/kg
Maximum value of SAR (measured) = 0.168 W/kg



0 dB = 0.168 W/kg = -7.75 dBW/kg

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FLAT	EDGE4

Communication System: UID 0, LTE Band 13 (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 782 MHz; σ = 0.926 S/m; ε_r = 41.412; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(6.55, 6.55, 6.55); Calibrated: 2016/8/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2016/8/22
- Phantom: Twin-SAM 1559; Type: QD 000 P40 CD; Serial: 1559
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)

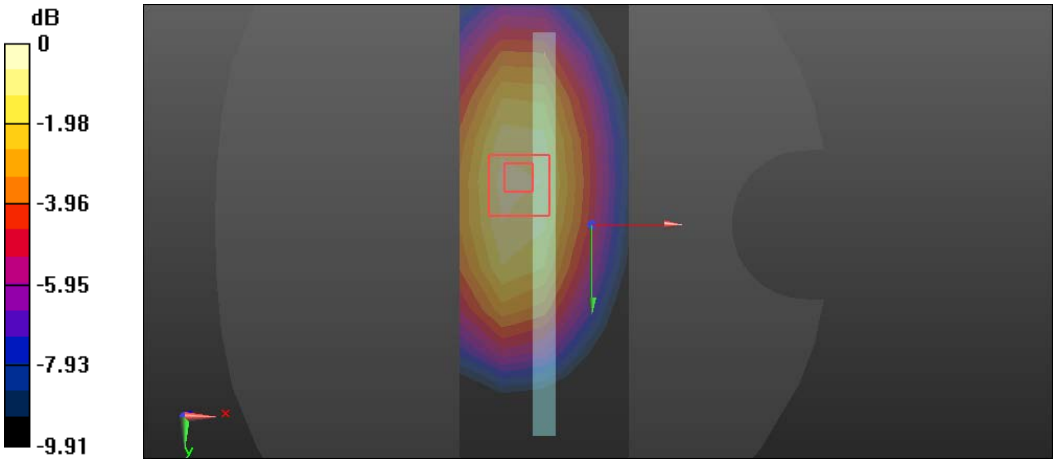
Flat-Section MSL LTE band13 HOT/LTE Band13 edge4/Area Scan (5x13x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0982 W/kg

Flat-Section MSL LTE band13 HOT/LTE Band13 edge4/Zoom Scan

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

Reference Value = 9.578 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.144 W/kg
SAR(1 g) = 0.099 W/kg; SAR(10 g) = 0.067 W/kg
Maximum value of SAR (measured) = 0.106 W/kg



0 dB = 0.106 W/kg = -9.75 dBW/kg

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WIFI (802.11B/Head)

Left Side	Cheek

Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps);
Frequency: 2412 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2412 MHz; σ = 1.738 S/m; ε_r = 39.289; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

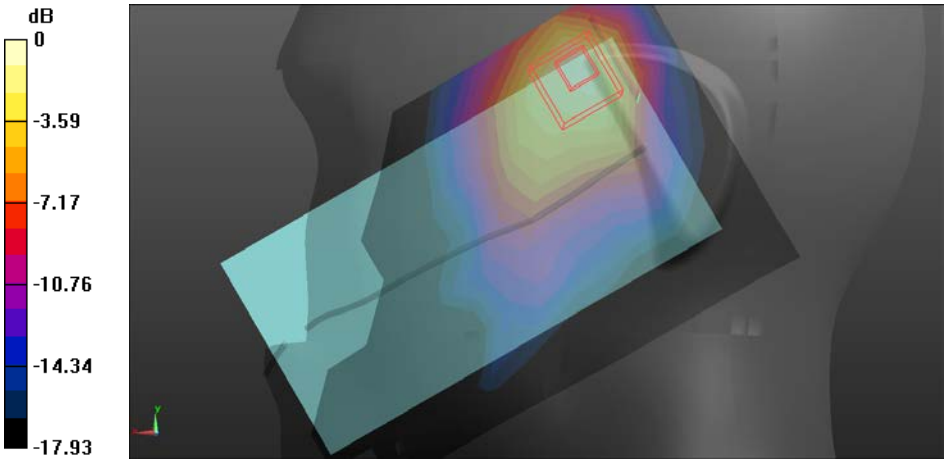
- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2016/8/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2016/8/22
- Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)

Head-Section Left HSL WIFI/WIFI touch L new 2/Area Scan (8x13x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.322 W/kg

Head-Section Left HSL WIFI/WIFI touch L new 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.819 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.638 W/kg
SAR(1 g) = 0.296 W/kg; SAR(10 g) = 0.148 W/kg
Maximum value of SAR (measured) = 0.321 W/kg



0 dB = 0.321 W/kg = -4.93 dBW/kg

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Left Side	Cheek

Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps); Frequency: 2437 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.782 S/m; ε_r = 39.236; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

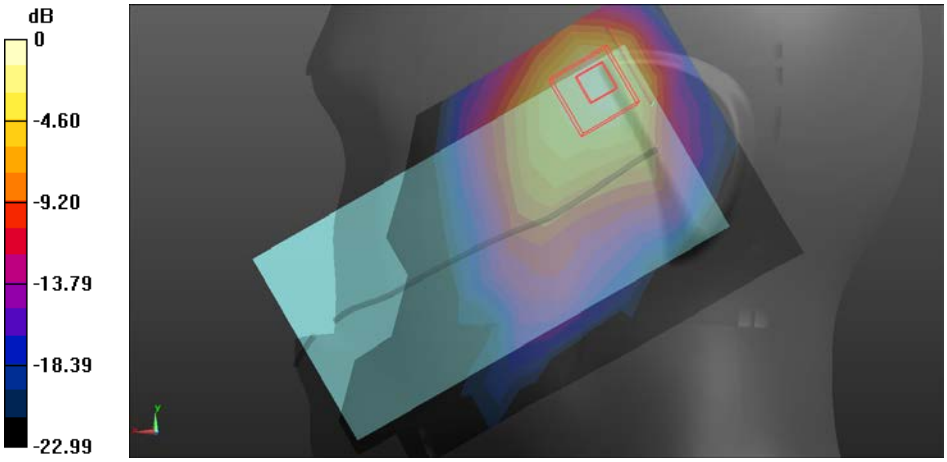
- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2016/8/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2016/8/22
- Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)

Head-Section Left HSL WIFI/WIFI touch M new/Area Scan (8x13x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.605 W/kg

Head-Section Left HSL WIFI/WIFI touch M new/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.959 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.603 W/kg; SAR(10 g) = 0.295 W/kg
Maximum value of SAR (measured) = 0.660 W/kg



0 dB = 0.660 W/kg = -1.80 dBW/kg

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Left Side	Cheek

Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps); Frequency: 2462 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.791 S/m; ε_r = 39.17; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

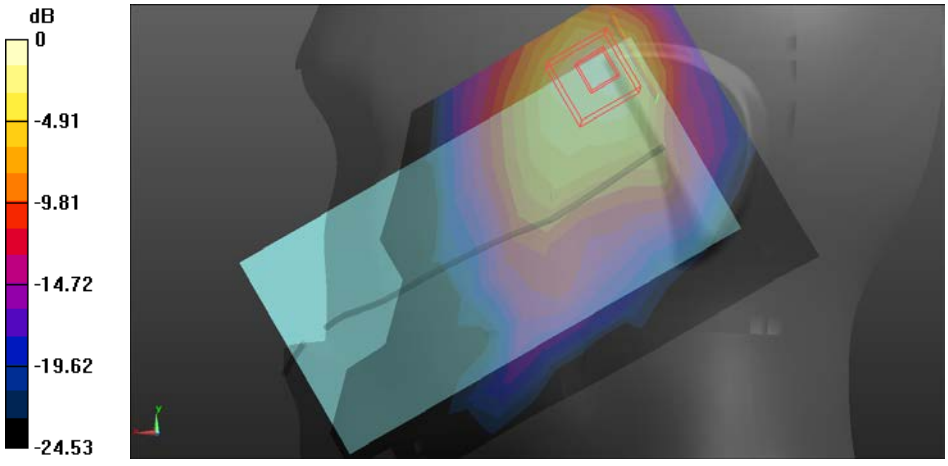
- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2016/8/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2016/8/22
- Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)

Head-Section Left HSL WIFI/WIFI touch H new 2 2/Area Scan (8x13x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.377 W/kg

Head-Section Left HSL WIFI/WIFI touch H new 2 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.133 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.782 W/kg
SAR(1 g) = 0.360 W/kg; SAR(10 g) = 0.176 W/kg
Maximum value of SAR (measured) = 0.394 W/kg



0 dB = 0.394 W/kg = -4.05 dBW/kg

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Left Side	Tilt

Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps); Frequency: 2437 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.782 S/m; ε_r = 39.236; ρ = 1000 kg/m^3
Phantom section: Left Section

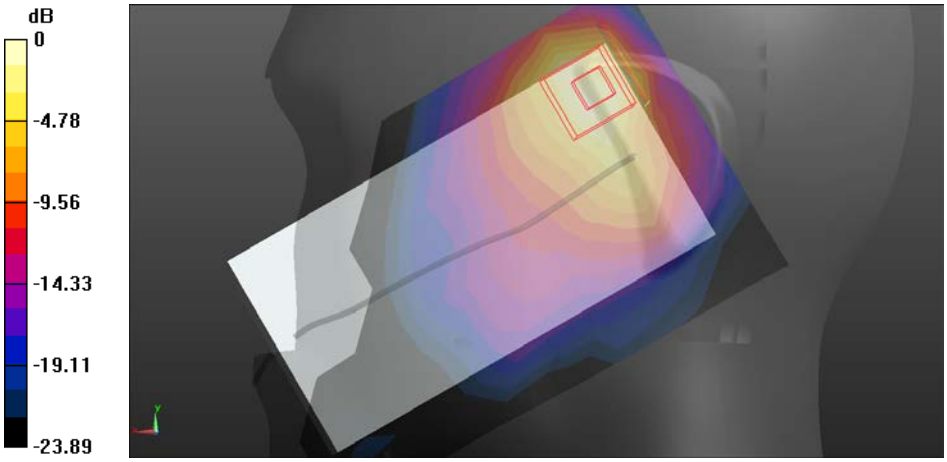
DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2016/8/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2016/8/22
- Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)

Head-Section Left HSL WIFI/WIFI tilt M/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.451 W/kg

Head-Section Left HSL WIFI/WIFI tilt M/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.44 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.517 W/kg; SAR(10 g) = 0.232 W/kg
Maximum value of SAR (measured) = 0.573 W/kg



0 dB = 0.573 W/kg = -2.42 dBW/kg

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Right Side	Cheek

Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps);
Frequency: 2437 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.782 S/m; ε_r = 39.236;
ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

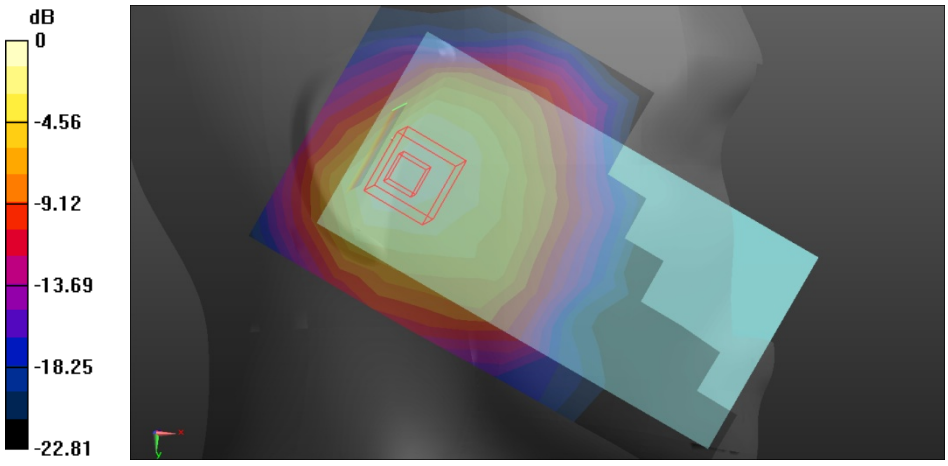
- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2016/8/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2016/8/22
- Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)

Head-Section Right HSL WIFI/WIFI touch M/Area Scan (8x13x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.315 W/kg

Head-Section Right HSL WIFI/WIFI touch M/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.55 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.618 W/kg
SAR(1 g) = 0.325 W/kg; SAR(10 g) = 0.172 W/kg
Maximum value of SAR (measured) = 0.359 W/kg



0 dB = 0.359 W/kg = -4.45 dBW/kg

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Right Side	Tilt

Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps);
Frequency: 2437 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.782 S/m; ε_r = 39.236; ρ = 1000 kg/m^3
Phantom section: Right Section

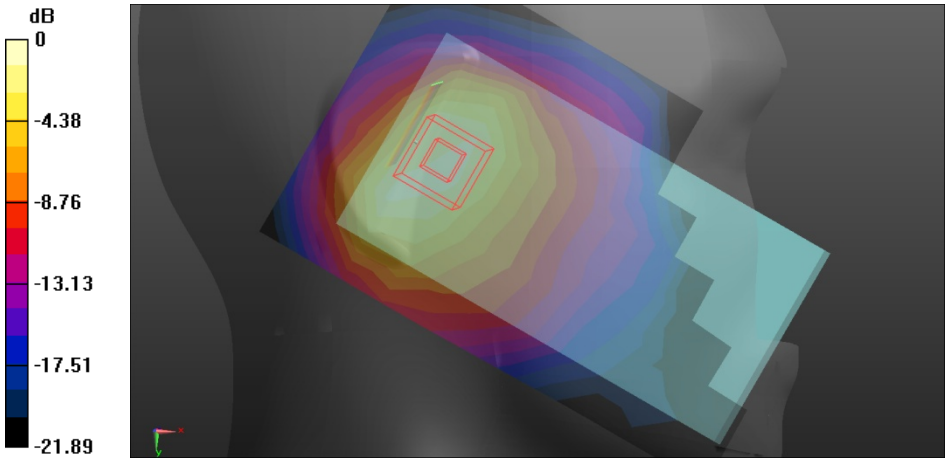
DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2016/8/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2016/8/22
- Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)

Head-Section Right HSL WIFI/WIFI tilt M/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.237 W/kg

Head-Section Right HSL WIFI/WIFI tilt M/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.00 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.530 W/kg
SAR(1 g) = 0.261 W/kg; SAR(10 g) = 0.133 W/kg
Maximum value of SAR (measured) = 0.292 W/kg



0 dB = 0.292 W/kg = -5.35 dBW/kg

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WIFI (802.11B/Flat)

FLAT	Towards phantom

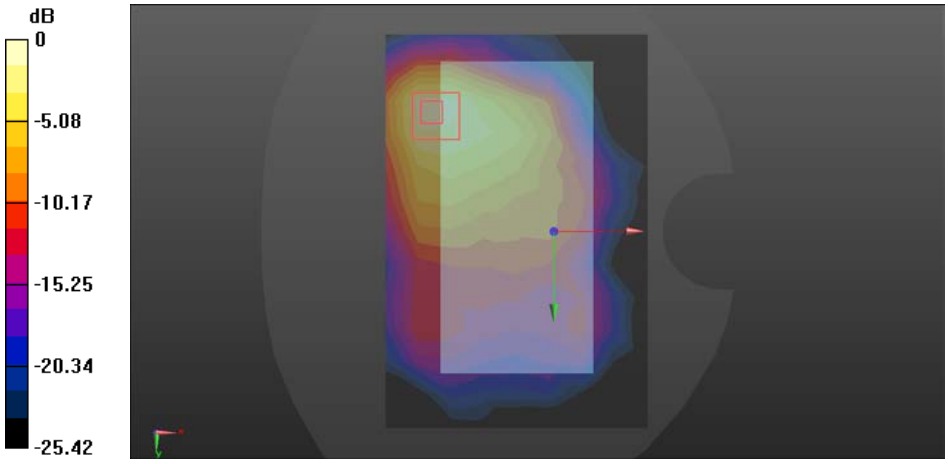
Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps); Frequency: 2437 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.883 S/m; ε_r = 38.021; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2016/8/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2016/8/22
- Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)

Flat-Section MSL WIFI TP/WIFI TP M/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.259 W/kg

Flat-Section MSL WIFI TP/WIFI TP M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.243 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.651 W/kg
SAR(1 g) = 0.297 W/kg; SAR(10 g) = 0.146 W/kg
Maximum value of SAR (measured) = 0.326 W/kg



0 dB = 0.326 W/kg = -4.87 dBW/kg

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FLAT	Towards ground

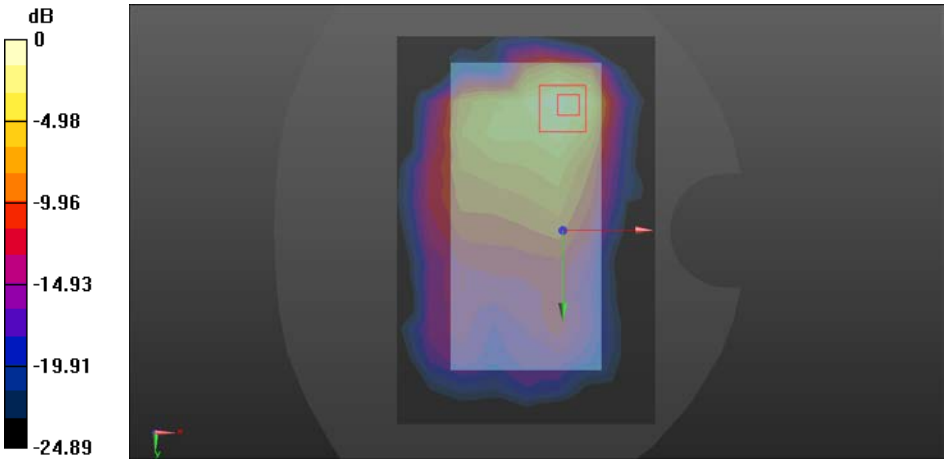
Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps);
Frequency: 2437 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.883 S/m; ε_r = 38.021; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2016/8/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2016/8/22
- Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)

Flat-Section MSLWIFI TG/WIF TG M/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.337 W/kg

Flat-Section MSLWIFI TG/WIF TG M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.549 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.846 W/kg
SAR(1 g) = 0.345 W/kg; SAR(10 g) = 0.153 W/kg
Maximum value of SAR (measured) = 0.385 W/kg



0 dB = 0.385 W/kg = -4.15 dBW/kg

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FLAT	EDGE1

Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps); Frequency: 2437 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.883 S/m; ε_r = 38.021; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

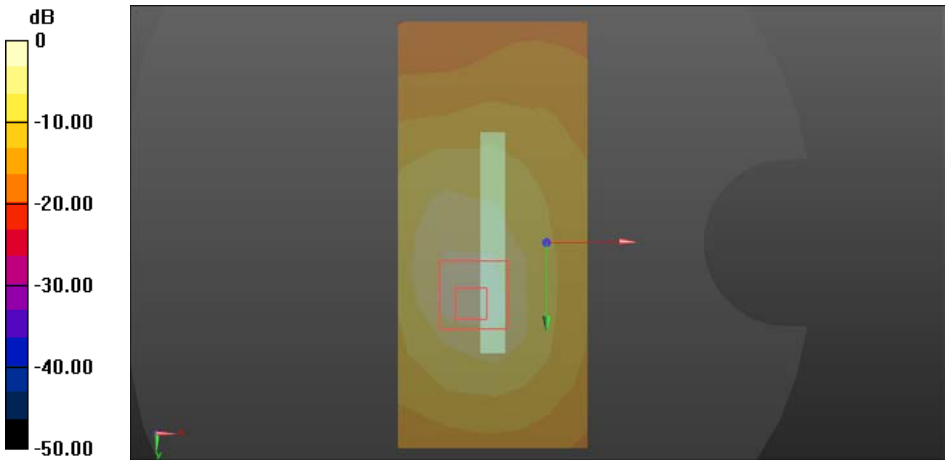
- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2016/8/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2016/8/22
- Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)

Flat-Section MSL WIFI HOTSPOT/WIF M edge 1/Area Scan (5x10x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.120 W/kg

Flat-Section MSL WIFI HOTSPOT/WIF M edge 1/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.704 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.315 W/kg
SAR(1 g) = 0.142 W/kg; SAR(10 g) = 0.064 W/kg
Maximum value of SAR (measured) = 0.162 W/kg



0 dB = 0.162 W/kg = -7.90 dBW/kg

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FLAT	EDGE4

Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps); Frequency: 2437 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.883 S/m; ε_r = 38.021; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

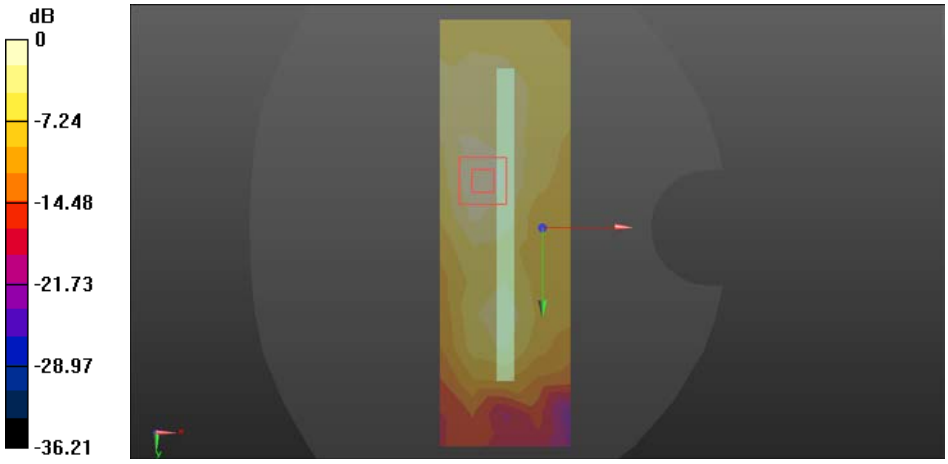
- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2016/8/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2016/8/22
- Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)

Flat-Section MSL WIFI HOTSPOT/WIF M edge 4/Area Scan (5x14x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0285 W/kg

Flat-Section MSL WIFI HOTSPOT/WIF M edge 4/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.570 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.0600 W/kg
SAR(1 g) = 0.029 W/kg; SAR(10 g) = 0.015 W/kg
Maximum value of SAR (measured) = 0.0327 W/kg



0 dB = 0.0327 W/kg = -14.85 dBW/kg

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ANNEX B - RELEVANT PAGES FROM CALIBRATION REPORTS

DAE4 Sn:546

Calibration Laboratory of
Schmid & Partner
Engineering AG

CALIBRATION CERTIFICATE

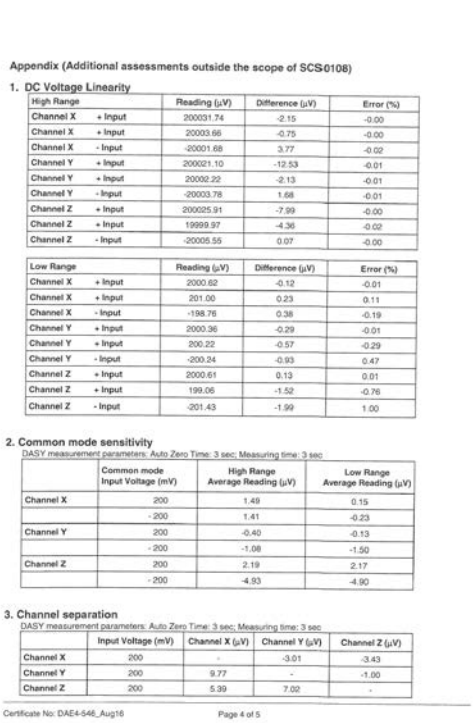
Calibration Laboratory of
Schmid & Partner
Engineering AG

Glossary

DAE data acquisition electronics
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- DC Voltage Measurement: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- Connector angle: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - DC Voltage Measurement Linearity: Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - Common mode sensitivity: Influence of a positive or negative common mode voltage on the differential measurement.
  - Channel separation: Influence of a voltage on the neighbor channels not subject to an input voltage.
  - AD Converter Values with inputs shorted: Values on the internal AD converter corresponding to zero input voltage
  - Input Offset Measurement: Output voltage and statistical results over a large number of zero voltage measurements.
  - Input Offset Current: Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - Input resistance: Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - Low Battery Alarm Voltage: Typical value for information. Below this voltage, a battery alarm signal is generated.
  - Power consumption: Typical value for information. Supply currents in various operating modes.



Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (µV)	Difference (µV)	Error (%)
Channel X	+ Input	200031.74	-2.15	-0.00
Channel X	+ Input	20003.66	-0.75	-0.00
Channel X	- Input	-20001.68	3.77	-0.02
Channel Y	+ Input	200021.10	-12.53	-0.01
Channel Y	+ Input	20002.22	-2.13	-0.01
Channel Y	- Input	-20003.78	1.68	-0.01
Channel Z	+ Input	200025.91	-7.99	-0.00
Channel Z	+ Input	19999.97	-4.36	-0.02
Channel Z	- Input	-20005.55	0.07	-0.00

Low Range		Reading (µV)	Difference (µV)	Error (%)
Channel X	+ Input	2000.62	-0.12	-0.01
Channel X	+ Input	201.00	0.23	0.11
Channel X	- Input	-198.76	0.38	-0.19
Channel Y	+ Input	2000.36	-0.29	-0.01
Channel Y	+ Input	200.22	-0.57	-0.29
Channel Y	- Input	-200.24	-0.93	0.47
Channel Z	+ Input	2000.61	0.13	0.01
Channel Z	+ Input	199.06	-1.52	-0.76
Channel Z	- Input	-201.43	-1.99	1.00

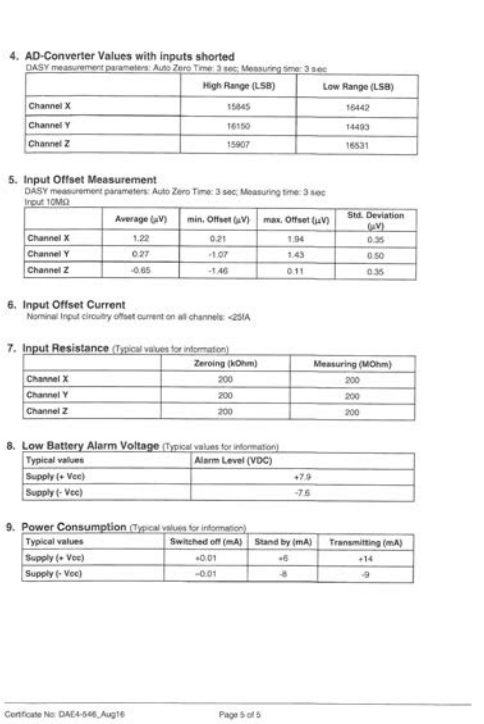
2. Common mode sensitivity
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (µV)	Low Range Average Reading (µV)
Channel X	200	1.49	0.15
	- 200	1.41	-0.23
Channel Y	200	-0.40	-0.13
	- 200	-1.08	-1.50
Channel Z	200	2.19	2.17
	- 200	-4.93	-4.90

3. Channel separation
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (µV)	Channel Y (µV)	Channel Z (µV)
Channel X	200	-	-3.01	-3.43
Channel Y	200	9.77	-	-1.00
Channel Z	200	5.39	7.02	-

Certificate No: DAE4-546_Aug16 Page 4 of 5



4. AD-Converter Values with inputs shorted
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15845	16442
Channel Y	16150	14493
Channel Z	15907	16531

5. Input Offset Measurement
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (µV)	min. Offset (µV)	max. Offset (µV)	Std. Deviation (µV)
Channel X	1.22	0.21	1.94	0.35
Channel Y	0.27	-1.07	1.43	0.50
Channel Z	-0.65	-1.46	0.11	0.35

6. Input Offset Current
Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9

Certificate No: DAE4-546_Aug16 Page 5 of 5

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DAE4 Sn:546

4. **AD-Converter Values with inputs shorted**
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15845	16442
Channel Y	16150	14493
Channel Z	15907	16531

5. **Input Offset Measurement**
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	1.22	0.21	1.94	0.35
Channel Y	0.27	-1.07	1.43	0.50
Channel Z	-0.65	-1.46	0.11	0.35

6. **Input Offset Current**
Nominal Input circuitry offset current on all channels: <25fA

7. **Input Resistance** (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. **Low Battery Alarm Voltage** (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. **Power Consumption** (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9

Certificate No: DAE4-546_Aug16 Page 5 of 5

DAE4 Sn:720

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CALIBRATION CERTIFICATE

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DAE4 Sn:720

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Glossary
DAE: data acquisition electronics
Connector angle: information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement*: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity*: Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity*: Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation*: Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted*: Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current*: Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance*: Typical value for information; DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage*: Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption*: Typical value for information. Supply currents in various operating modes.

Certificate No: DAE4-720_Oct16 Page 2 of 5

DC Voltage Measurement

Calibration Factor	X	Y	Z
High Range	403.250 ± 0.02% (k=2)	404.780 ± 0.02% (k=2)	403.256 ± 0.02% (k=2)
Low Range	3.46322 ± 1.00% (k=2)	3.89407 ± 1.00% (k=2)	3.98650 ± 1.00% (k=2)

Connector Angle

Connector Angle to be used in DASY system	33.0 ° ± 1 °

Certificate No: DAE4-720_Oct16 Page 3 of 5

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200030.00	-2.83	-0.00
Channel X	+ Input	20005.59	1.21	0.01
Channel X	- Input	-20002.63	2.74	-0.01
Channel Y	+ Input	200031.46	-1.44	-0.00
Channel Y	+ Input	20003.49	-0.90	-0.00
Channel Y	- Input	-20003.62	1.72	-0.01
Channel Z	+ Input	200030.86	-1.63	-0.00
Channel Z	+ Input	20001.58	-2.67	-0.01
Channel Z	- Input	-20009.93	-4.50	0.02

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	1999.86	-0.99	-0.05
Channel X	+ Input	200.42	-0.42	-0.21
Channel X	- Input	-199.45	-0.24	0.12
Channel Y	+ Input	2000.78	-0.01	-0.00
Channel Y	+ Input	200.66	-0.06	-0.03
Channel Y	- Input	-199.50	-0.28	0.14
Channel Z	+ Input	2000.45	-0.29	-0.01
Channel Z	+ Input	199.41	-1.33	-0.66
Channel Z	- Input	-200.21	-0.92	0.46

2. Common mode sensitivity
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-2.59	-3.72
	- 200	7.16	5.57
Channel Y	200	15.89	15.62
	- 200	-16.62	-17.01
Channel Z	200	-16.19	-16.08
	- 200	14.56	14.81

3. Channel separation
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	0.26	-3.89
Channel Y	200	8.74	-	0.77
Channel Z	200	6.36	7.07	-

Certificate No: DAE4-720_Oct16 Page 4 of 5

4. AD-Converter Values with inputs shorted
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16156	16521
Channel Y	16178	16048
Channel Z	16424	15774

5. Input Offset Measurement
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.75	-1.14	2.77	0.62
Channel Y	-0.03	-1.04	0.90	0.43
Channel Z	-0.18	-2.07	1.75	0.69

6. Input Offset Current
Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9

Certificate No: DAE4-720_Oct16 Page 5 of 5

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ES3DV3 Sn:3127

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CALIBRATION CERTIFICATE

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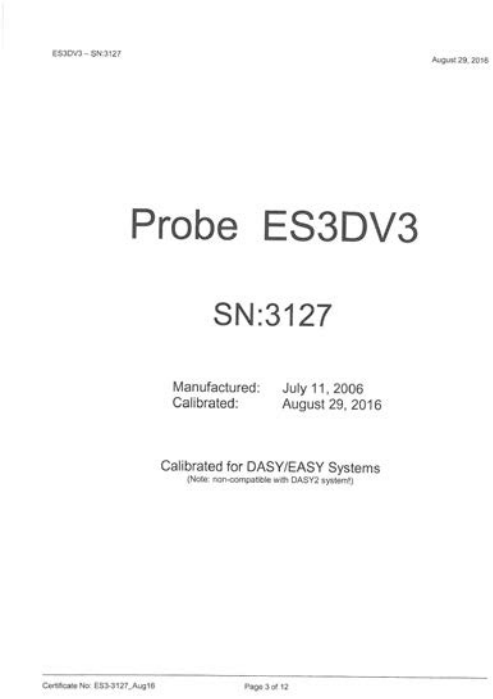
Glossary:

Calibration is Performed According to the Following Standards:

Methods Applied and Interpretation of Parameters:



ES3DV3 – SN:3127 August 29, 2016

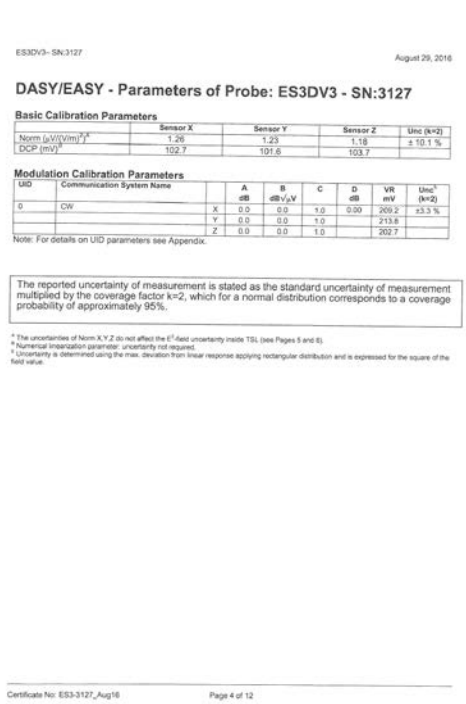
Probe ES3DV3

SN:3127

Manufactured: July 11, 2006
Calibrated: August 29, 2016

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

Certificate No: ES3-3127_Aug16 Page 3 of 12



ES3DV3– SN:3127 August 29, 2016

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3127

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m)^2)^A	1.26	1.23	1.18	± 10.1 %
DCP (mV)^B	102.7	101.6	103.7	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Unc^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	209.2	±3.3 %
		Y	0.0	0.0	1.0		213.8	
		Z	0.0	0.0	1.0		202.7	

Note: For details on UID parameters see Appendix.

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%.

A The uncertainties of Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
B Numerical linearization parameter: uncertainty not required.
E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Certificate No: ES3-3127_Aug16 Page 4 of 12

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ES3DV3 Sn:3127

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3127

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
450	43.5	0.87	6.74	6.74	6.74	0.21	2.30	± 13.3 %
750	41.9	0.89	6.55	6.55	6.55	0.62	1.37	± 12.0 %
900	41.5	0.97	6.20	6.20	6.20	0.54	1.41	± 12.0 %
1450	40.5	1.20	5.44	5.44	5.44	0.80	1.06	± 12.0 %
1810	40.0	1.40	5.15	5.15	5.15	0.80	1.16	± 12.0 %
2000	40.0	1.40	5.11	5.11	5.11	0.68	1.28	± 12.0 %
2300	39.5	1.67	4.83	4.83	4.83	0.80	1.19	± 12.0 %
2450	39.2	1.80	4.61	4.61	4.61	0.67	1.38	± 12.0 %
2600	39.0	1.96	4.40	4.40	4.40	0.70	1.36	± 12.0 %

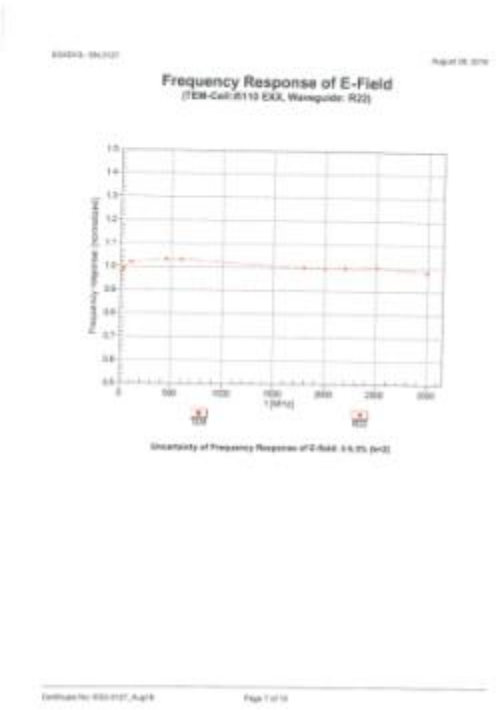
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

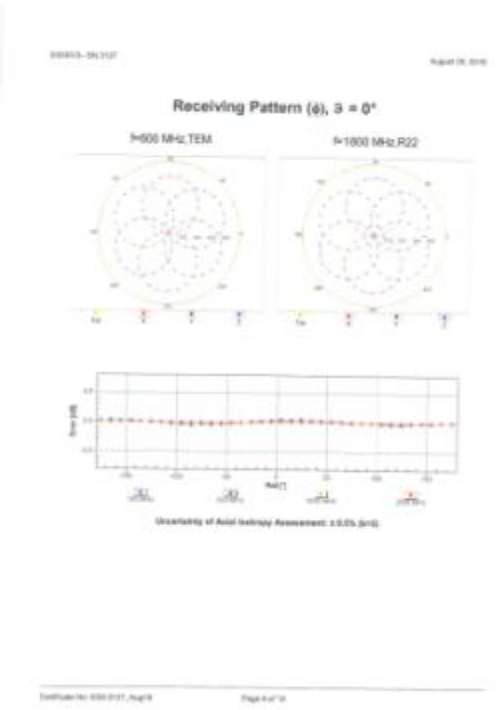
DASY/EASY - Parameters of Probe: ES3DV3 - SN:3127

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
450	56.7	0.94	6.99	6.99	6.99	0.12	2.10	± 13.3 %
750	55.5	0.96	6.12	6.12	6.12	0.80	1.14	± 12.0 %
900	55.0	1.05	6.16	6.16	6.16	0.46	1.53	± 12.0 %
1450	54.0	1.30	5.29	5.29	5.29	0.74	1.21	± 12.0 %
1810	53.3	1.52	4.90	4.90	4.90	0.43	1.69	± 12.0 %
2000	53.3	1.52	4.92	4.92	4.92	0.55	1.48	± 12.0 %
2300	52.9	1.81	4.63	4.63	4.63	0.80	1.24	± 12.0 %
2450	52.7	1.95	4.36	4.36	4.36	0.71	1.22	± 12.0 %
2600	52.5	2.16	4.17	4.17	4.17	0.80	1.11	± 12.0 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.





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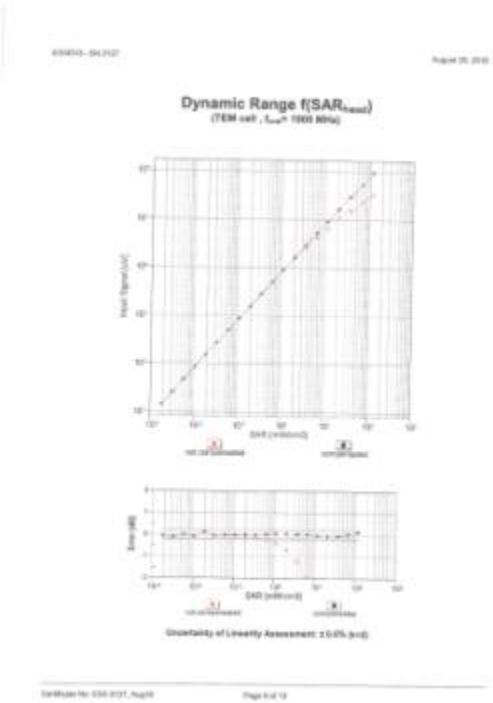
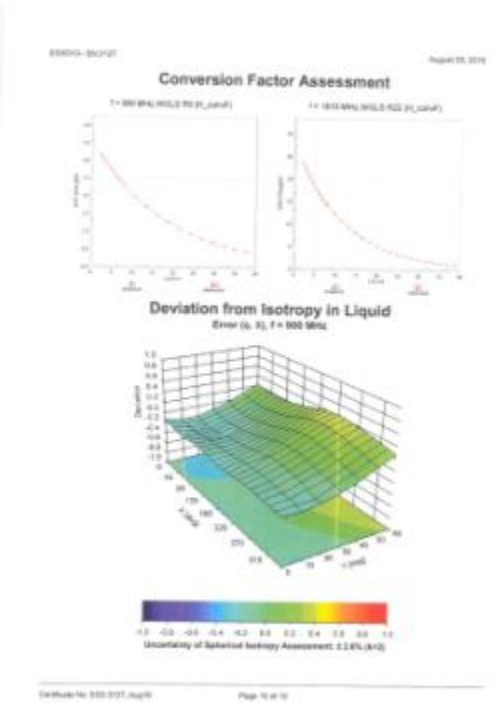
ES3DV3 Sn:3127

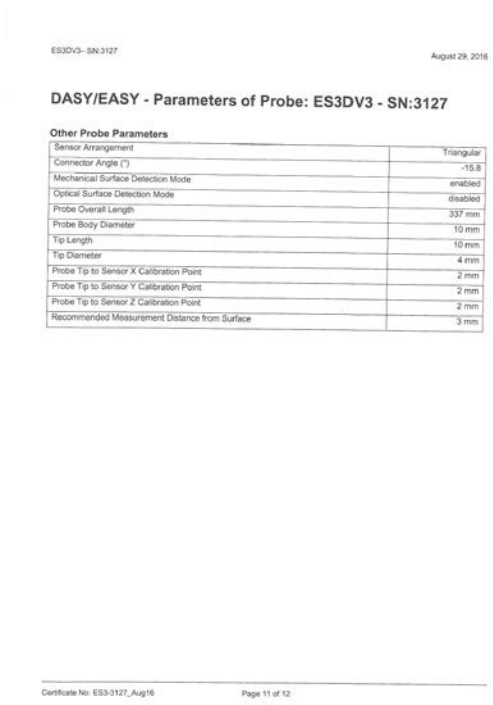


Dynamic Range f(SAR$_{head}$)
(TEM cell , f_{eval}= 1900 MHz)



Conversion Factor Assessment

Deviation from Isotropy in Liquid
Error (φ, θ), f = 900 MHz



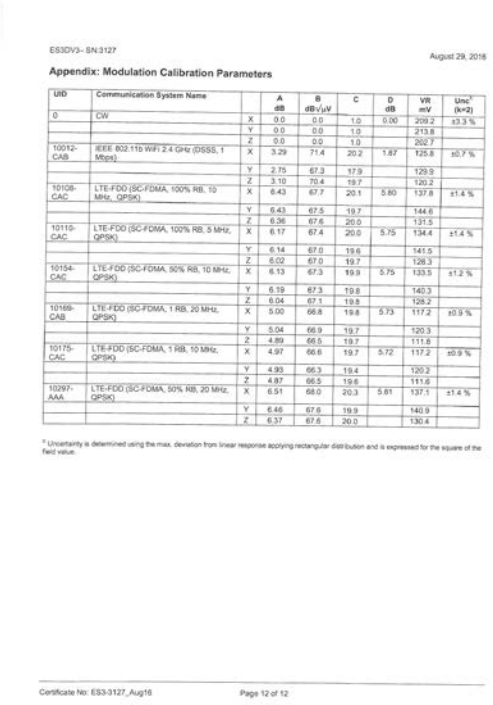
ES3DV3- SN:3127 August 29, 2016

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3127

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-15.8
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

Certificate No: ES3-3127_Aug16 Page 11 of 12



ES3DV3- SN:3127 August 29, 2016

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc* (k=2)
0	CW	X	0.0	0.0	1.0	0.00	209.2	±3.3 %
		Y	0.0	0.0	1.0		213.8	
		Z	0.0	0.0	1.0		202.7	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	3.29	71.4	20.2	1.87	125.8	±0.7 %
		Y	2.75	67.3	17.9		129.9	
		Z	3.10	70.4	19.7		120.2	
10108-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.43	67.7	20.1	5.80	137.8	±1.4 %
		Y	6.43	67.5	19.7		144.6	
		Z	6.36	67.6	20.0		131.5	
10110-CAC	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	6.17	67.4	20.0	5.75	134.4	±1.4 %
		Y	6.14	67.0	19.6		141.5	
		Z	6.02	67.0	19.7		128.3	
10154-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	6.13	67.3	19.9	5.75	133.5	±1.2 %
		Y	6.19	67.3	19.8		140.3	
		Z	6.04	67.1	19.8		128.2	
10169-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	5.00	66.8	19.8	5.73	117.2	±0.9 %
		Y	5.04	66.9	19.7		120.3	
		Z	4.89	66.5	19.7		111.8	
10175-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	4.97	66.6	19.7	5.72	117.2	±0.9 %
		Y	4.93	66.3	19.4		120.2	
		Z	4.87	66.5	19.6		111.6	
10297-AAA	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.51	68.0	20.3	5.81	137.1	±1.4 %
		Y	6.46	67.6	19.9		140.9	
		Z	6.37	67.6	20.0		130.4	

* Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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EX3DV4 Sn:3708

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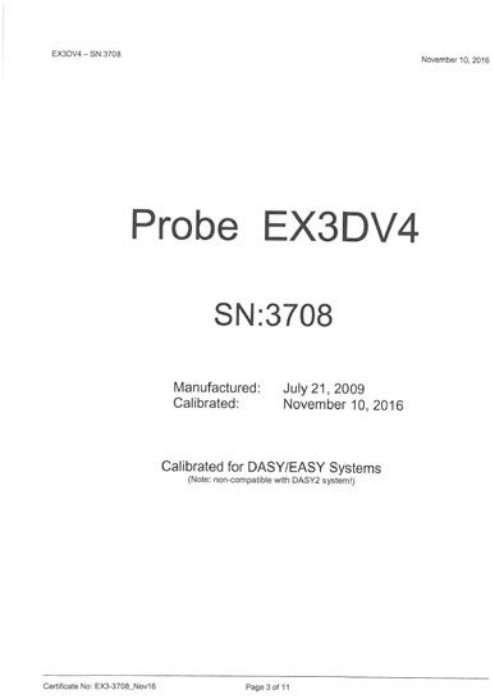
Glossary:

Calibration is Performed According to the Following Standards:

Methods Applied and Interpretation of Parameters:



EX3DV4 – SN:3708

November 10, 2016

Probe EX3DV4

SN:3708

Manufactured: July 21, 2009
Calibrated: November 10, 2016

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

Certificate No: EX3-3708_Nov16 Page 3 of 11

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Basic Calibration Parameters

Modulation Calibration Parameters

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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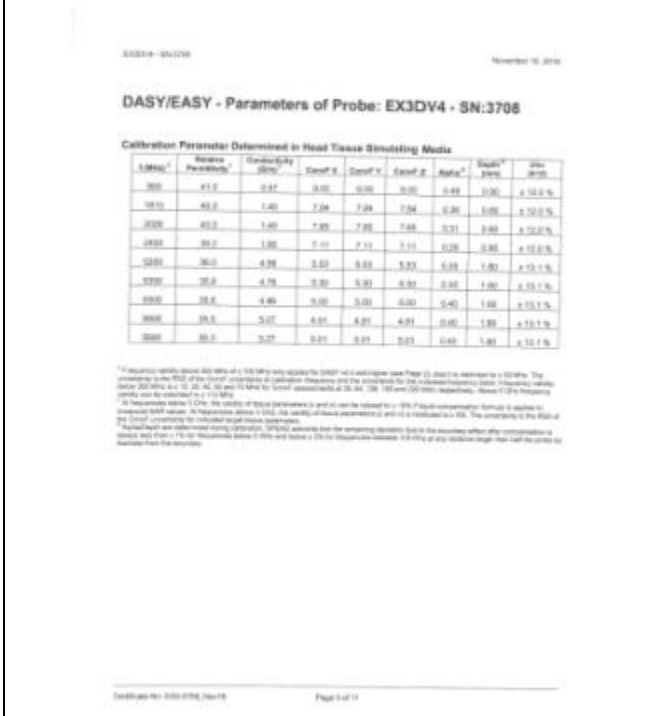
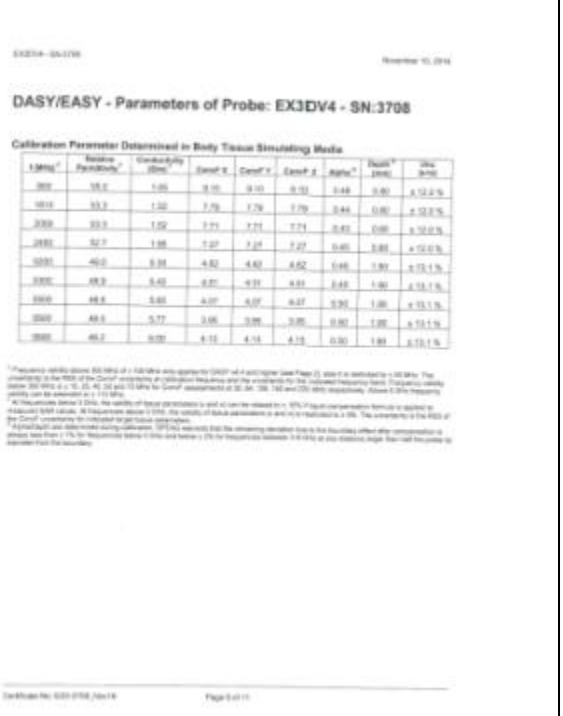
EX3DV4 Sn:3708



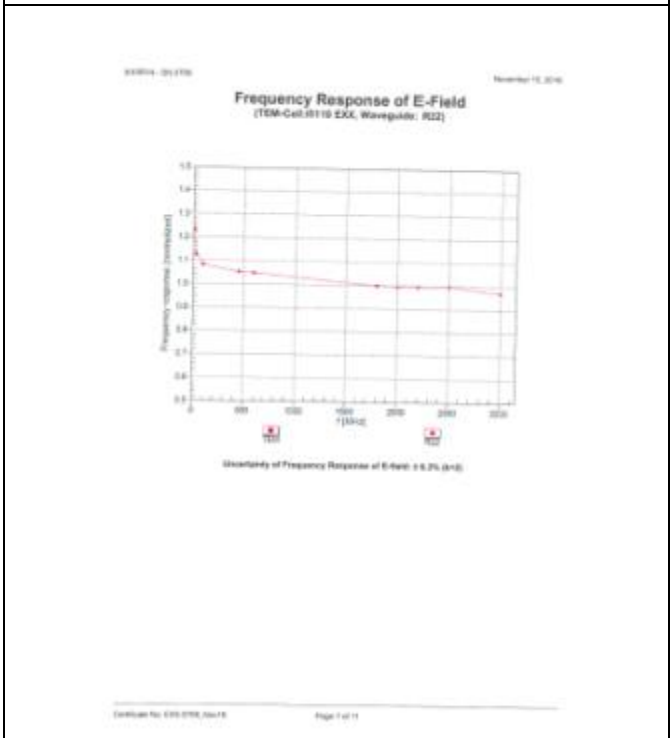
DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Calibration Parameter Determined in Head Tissue Simulating Media

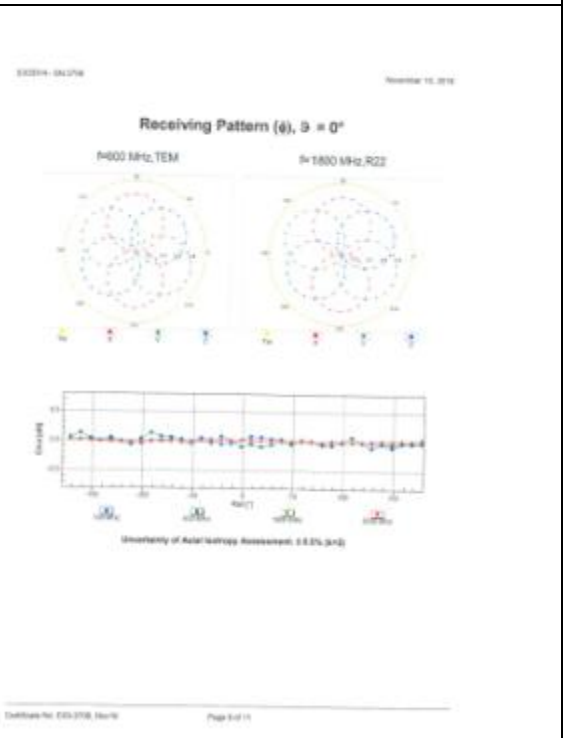


DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Calibration Parameter Determined in Body Tissue Simulating Media



Frequency Response of E-Field



Receiving Pattern (ϕ), ϑ = 0°

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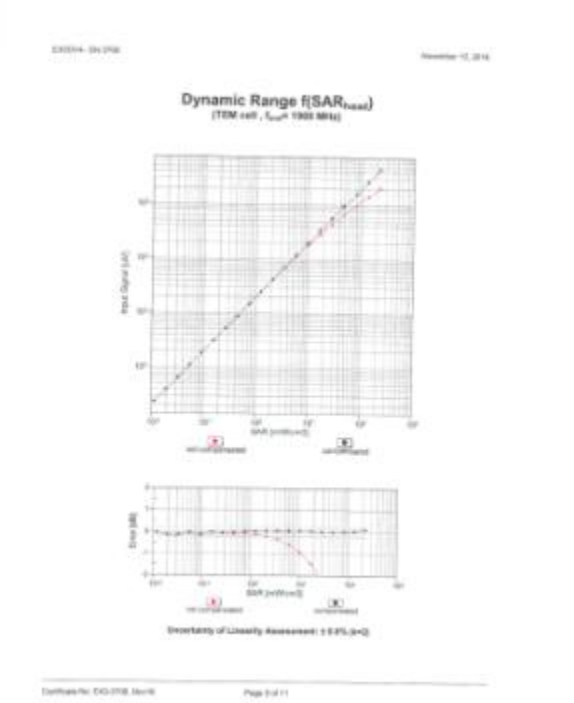
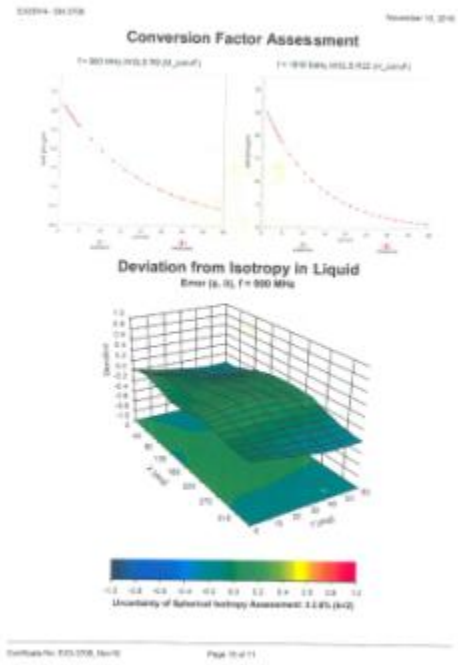
EX3DV4 Sn:3708





EX3DV4- SN:3708 November 10, 2016

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-1.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Certificate No: EX3-3708_Nov16 Page 11 of 11

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D750V3 Sn:1101

Calibration Laboratory of
Schmid & Partner
Engineering AG

CALIBRATION CERTIFICATE

Calibration Laboratory of
Schmid & Partner
Engineering AG

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:
a) 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

Head TSL parameters

SAR result with Head TSL

Body TSL parameters

SAR result with Body TSL

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Antenna Parameters with Body TSL

General Antenna Parameters and Design

Additional EUT Data

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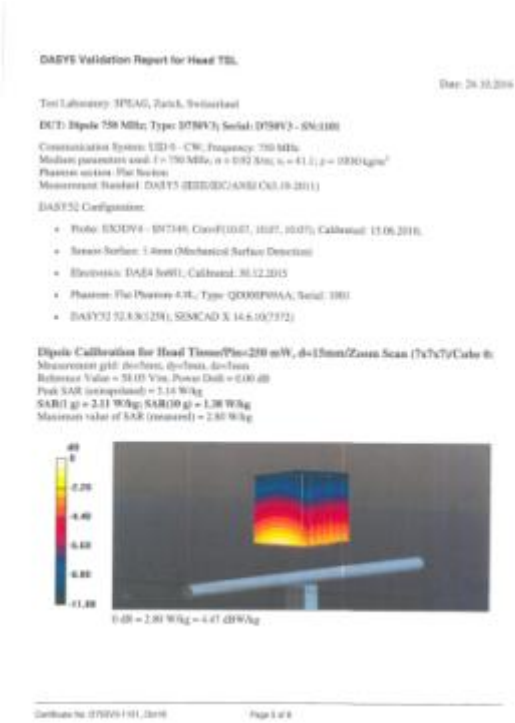
D750V3 Sn:1101



DASY5 Validation Report for Head TSL

Date: 24.10.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1101

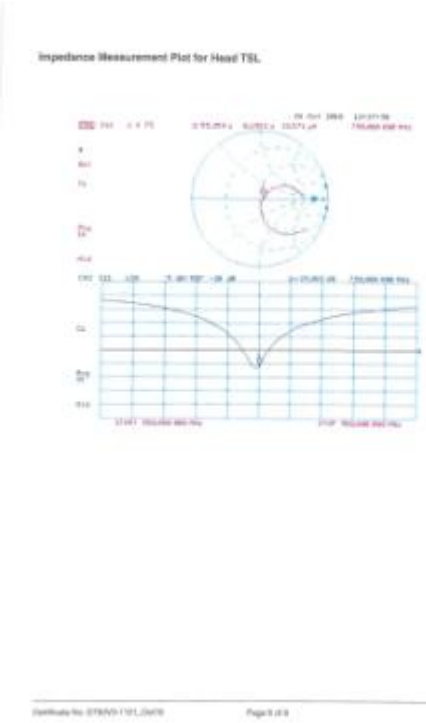
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.92 S/m; ε_r = 41.1; ρ = 1000 kg/m³
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

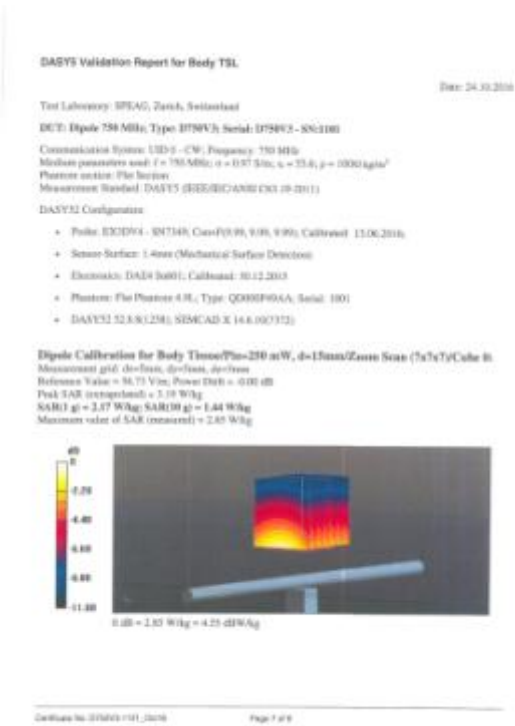
- Probe: EX3DV4 - SN7349; ConvF(10.07, 10.07, 10.07); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn901; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.05 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.14 W/kg
SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.38 W/kg
Maximum value of SAR (measured) = 2.80 W/kg

0 dB = 2.80 W/kg = 4.47 dBW/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 24.10.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1101

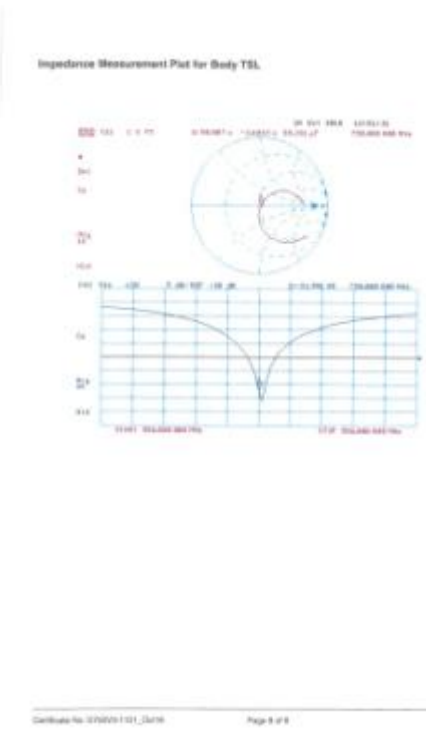
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.97 S/m; ε_r = 55.6; ρ = 1000 kg/m³
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.99, 9.99, 9.99); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn901; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.73 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 3.10 W/kg
SAR(1 g) = 2.17 W/kg; SAR(10 g) = 1.44 W/kg
Maximum value of SAR (measured) = 2.85 W/kg

0 dB = 2.85 W/kg = 4.55 dBW/kg



Impedance Measurement Plot for Body TSL

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D835V2 Sn:4d023

Calibration Laboratory of
Schmid & Partner
Engineering AG

Accreditation No.: SCS 0108

Client: SRTC (Wise)

Certificate No: D835V2-4d023_Oct16

CALIBRATION CERTIFICATE

Object: D835V2 - SN:4d023

Calibration procedure(s): QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: October 24, 2016

Calibration Laboratory of
Schmid & Partner
Engineering AG

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:

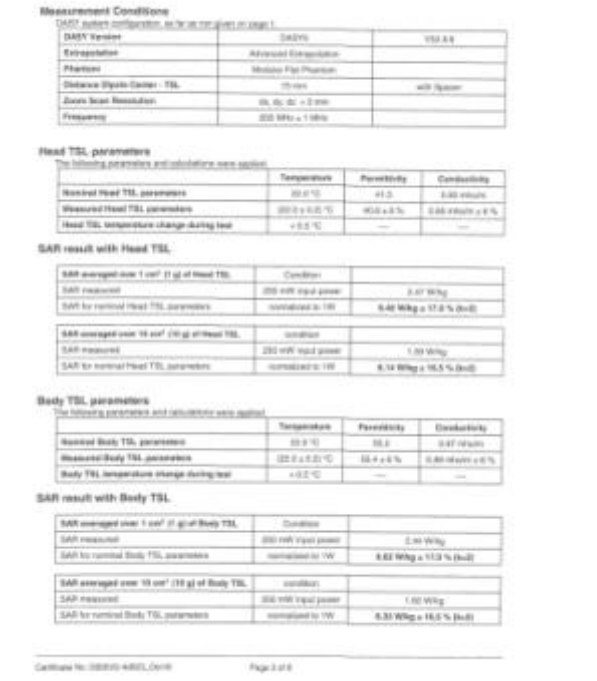
a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices 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) DASY/V8 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 Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.8 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

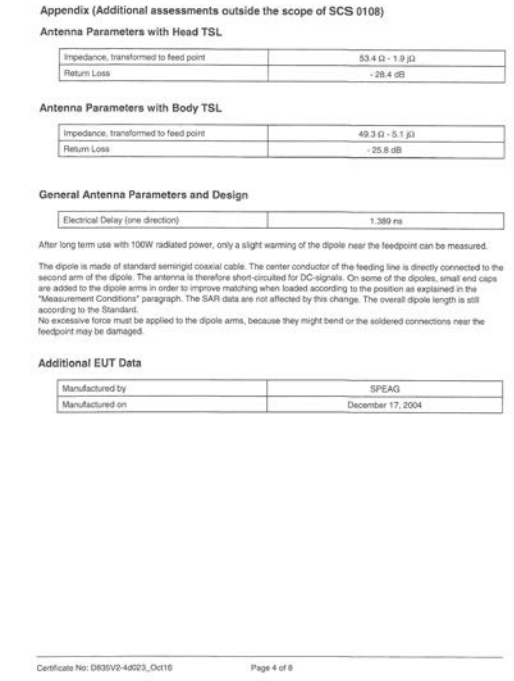
SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.48 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.59 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.14 W/kg ± 16.5 % (k=2)

Body TSL parameters

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.4 ± 6 %	0.99 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	2.44 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.62 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.33 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	53.4 Ω - 1.9 jΩ
Return Loss	- 28.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.3 Ω - 5.1 jΩ
Return Loss	- 25.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.389 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	December 17, 2004

Certificate No: D835V2-4d023_Oct16 Page 4 of 8

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D835V2 Sn:4d023

DASY5 Validation Report for Head TSL

Date: 24.10.2016

Test Laboratory: SPEAG, Zurich, Switzerland

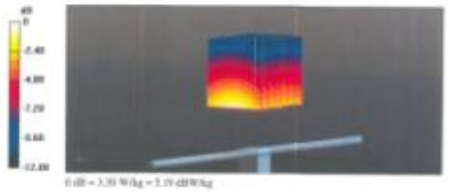
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d023

Communication System: UID 0 - CW; Frequency: 835 MHz;
Medium parameters used: f = 835 MHz; σ = 0.95 S/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

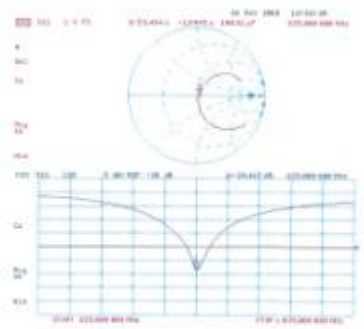
- Probe: EX3DV4 - SN7349; ConvF(9.72, 9.72, 9.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.72 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.72 W/kg
SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.59 W/kg
Maximum value of SAR (measured) = 3.30 W/kg



0 dB = 3.30 W/kg = 5.19 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 24.10.2016

Test Laboratory: SPEAG, Zurich, Switzerland

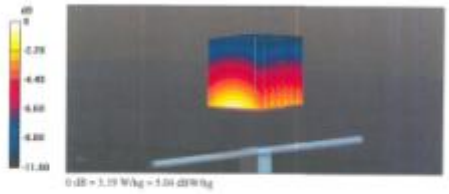
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d023

Communication System: UID 0 - CW; Frequency: 835 MHz;
Medium parameters used: f = 835 MHz; σ = 0.99 S/m; ε_r = 55.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

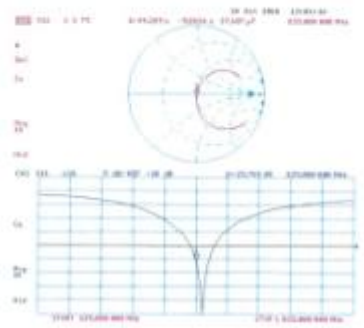
- Probe: EX3DV4 - SN7349; ConvF(9.73, 9.73, 9.73); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.07 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.59 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.6 W/kg
Maximum value of SAR (measured) = 3.19 W/kg



0 dB = 3.19 W/kg = 5.04 dBW/kg

Impedance Measurement Plot for Body TSL



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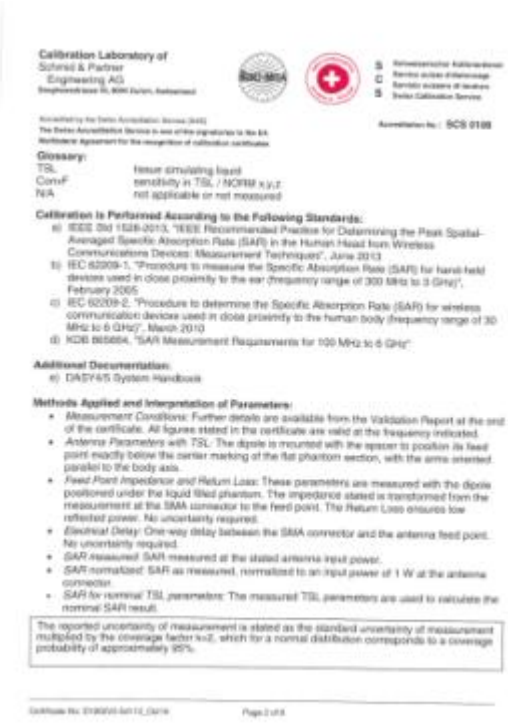
D1900V2 Sn:5d113

Calibration Laboratory of
Schmid & Partner
Engineering AG

CALIBRATION CERTIFICATE



Calibration Laboratory of
Schmid & Partner
Engineering AG

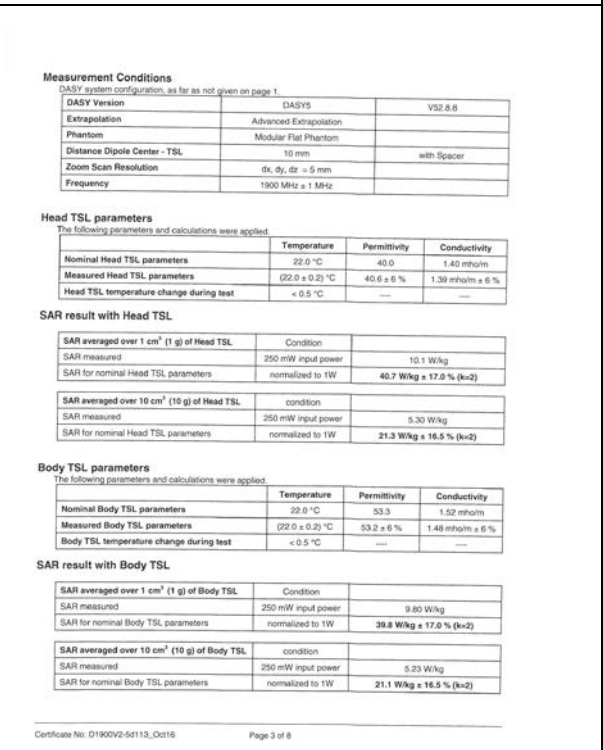
Glossary:
TSL tissue simulating liquid
ConvF sensitivity in TSL / NORM x,y,z
N/A not applicable or not measured

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.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters
The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.6 ± 6 %	1.39 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	10.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.7 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.3 W/kg ± 16.5 % (k=2)

Body TSL parameters
The following parameters and calculations were applied.

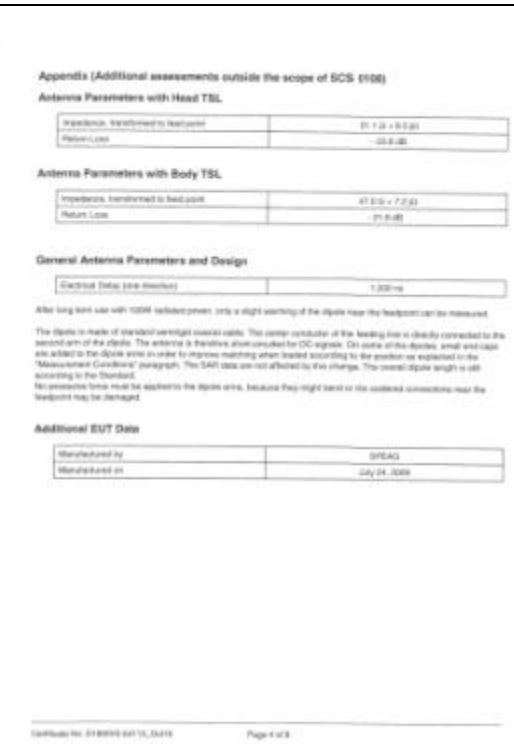
	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.2 ± 6 %	1.48 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.80 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	39.8 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.23 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.1 W/kg ± 16.5 % (k=2)

Certificate No: D1900V2-5d113_Oct16 Page 3 of 8



Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Antenna Parameters with Body TSL

General Antenna Parameters and Design

Additional EUT Data

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D1900V2 Sn:5d113

DASY5 Validation Report for Head TSL

Date: 31.10.2016

Test Laboratory: SPEAG, Zurich, Switzerland

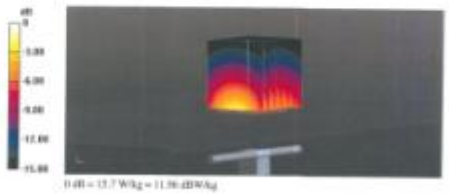
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d113

Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.39 S/m; ε_r = 40.0; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

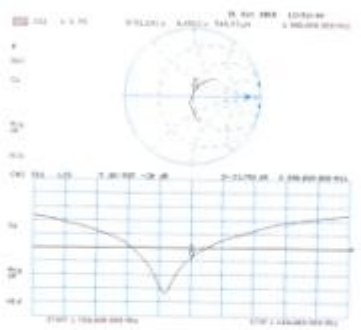
- Probe: EX3DV4 - SN7349; Conv(7.99, 7.99, 7.99); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 108.4 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 19.0 W/kg
SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.3 W/kg
Maximum value of SAR (measured) = 15.7 W/kg



0 dB = 15.7 W/kg = 11.96 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 31.10.2016

Test Laboratory: SPEAG, Zurich, Switzerland

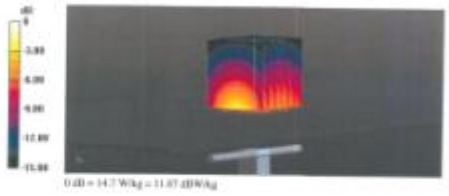
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d113

Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.48 S/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

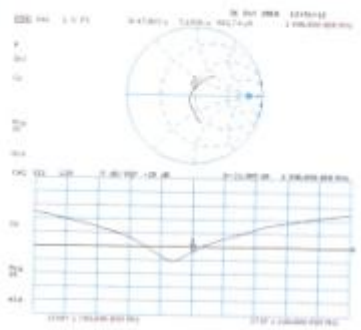
- Probe: EX3DV4 - SN7349; Conv(8.03, 8.03, 8.03); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.5 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 9.8 W/kg; SAR(10 g) = 5.23 W/kg
Maximum value of SAR (measured) = 14.7 W/kg



0 dB = 14.7 W/kg = 11.67 dBW/kg

Impedance Measurement Plot for Body TSL



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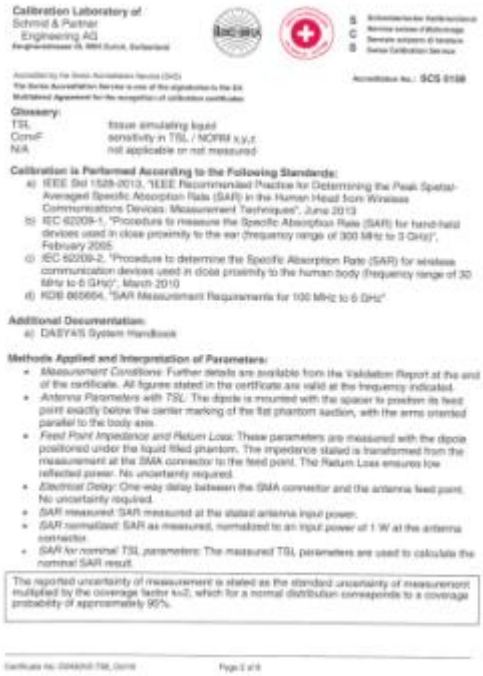
D2450V2 Sn:738

Calibration Laboratory of
Schmid & Partner
Engineering AG

CALIBRATION CERTIFICATE



Calibration Laboratory of
Schmid & Partner
Engineering AG

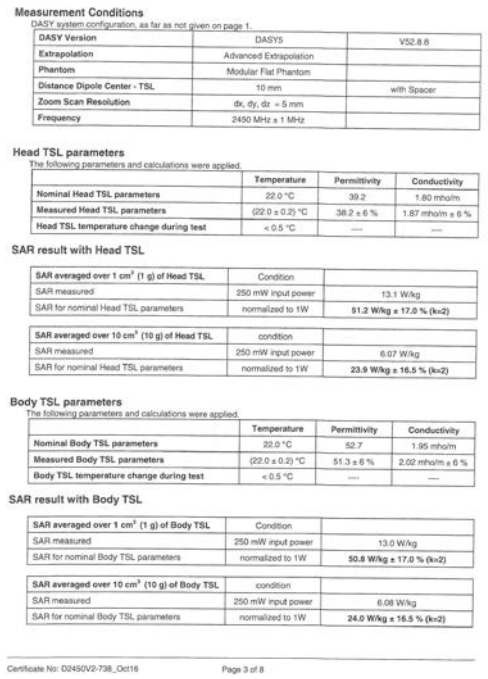
Glossary:
TSL tissue simulating liquid
ConvF sensitivity in TSL / NORM x,y,z
N/A not applicable or not measured

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:
a) DASY4/5 System Handbook

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

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.



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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	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	38.2 ± 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	13.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**51.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.9 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	51.3 ± 6 %	2.02 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	13.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.08 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.0 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Antenna Parameters with Body TSL

General Antenna Parameters and Design

Additional EUT Data

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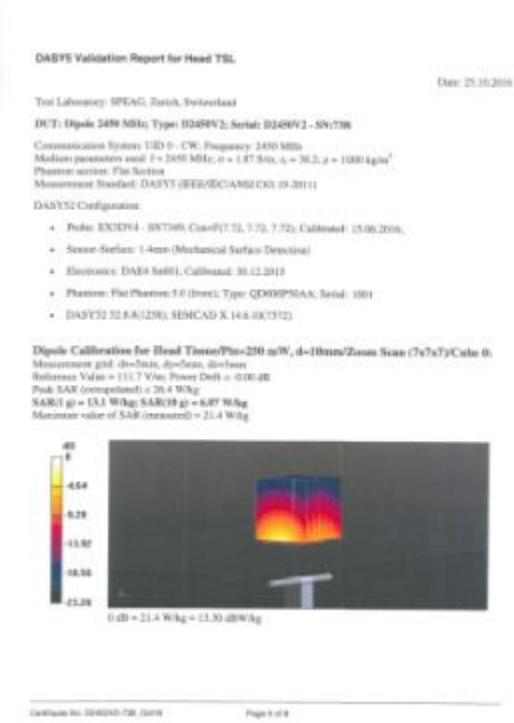
D2450V2 Sn:738



DASY5 Validation Report for Head TSL

Date: 25.10.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:738

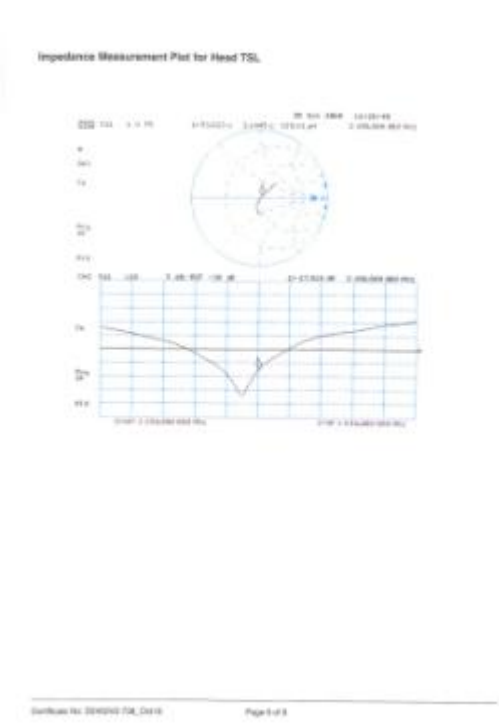
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameter used: f = 2450 MHz; σ = 1.87 S/m; ε_r = 38.2; ρ = 1000 kg/m³
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

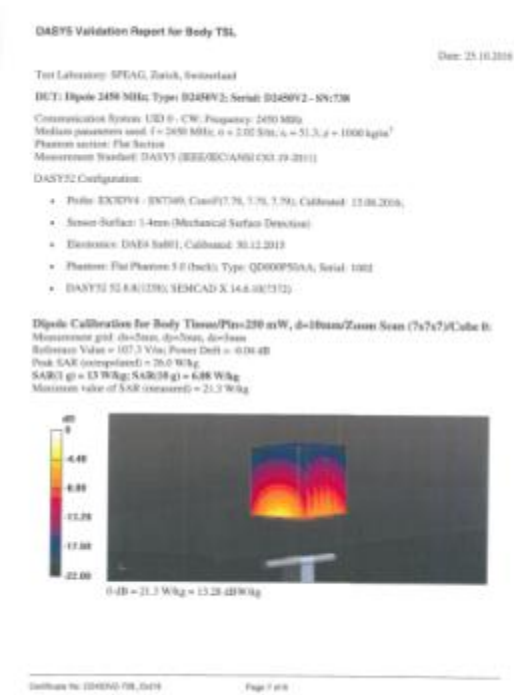
- Probe: EX3DV4 - SN7349; Conv(7.72, 7.72, 7.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn801; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 111.7 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 26.4 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.07 W/kg
Maximum value of SAR (measured) = 21.4 W/kg

0 dB = 21.4 W/kg = 13.30 dBW/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 25.10.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:738

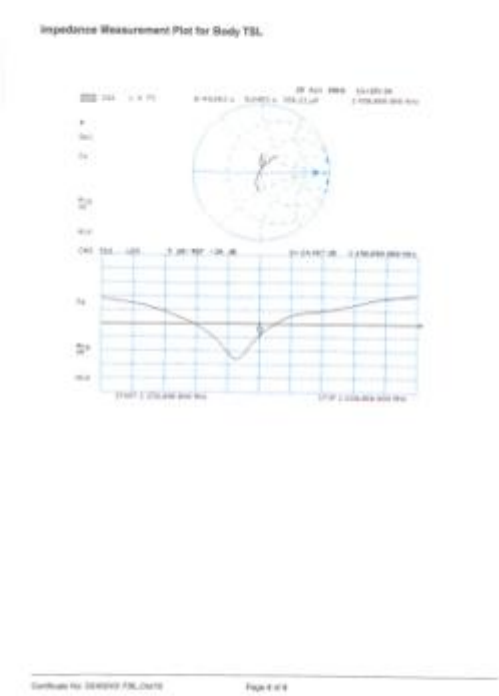
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameter used: f = 2450 MHz; σ = 2.02 S/m; ε_r = 51.3; ρ = 1000 kg/m³
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; Conv(7.79, 7.79, 7.79); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn801; 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=5mm, dy=5mm, dz=5mm
Reference Value = 107.3 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 26.0 W/kg
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.08 W/kg
Maximum value of SAR (measured) = 21.3 W/kg

0 dB = 21.3 W/kg = 13.28 dBW/kg



Impedance Measurement Plot for Body TSL

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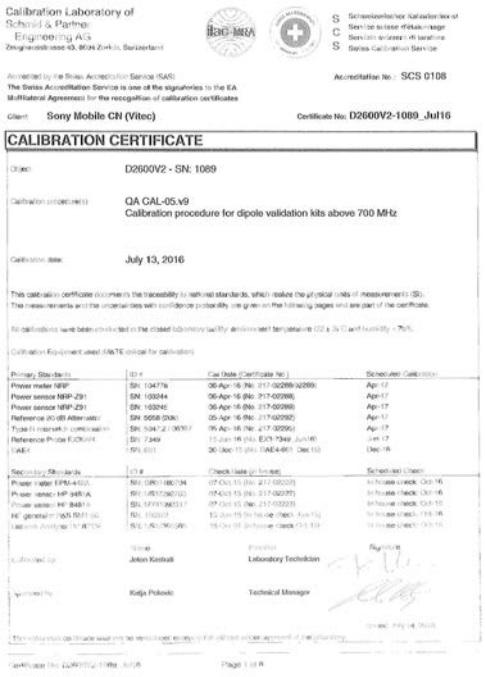
D2600V2 Sn:1089



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

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: Sony Mobile CN (Vitec)

Certificate No: D2600V2-1089_Jul16

CALIBRATION CERTIFICATE

Object: D2600V2 - SN: 1089

Calibration procedure(s): QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: July 13, 2016

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02289/02289)	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 / 06577	06-Apr-16 (No. 217-02295)	Apr-17
Reference Probe ES3DV3	SN: 3249	15-Jan-16 (No. ES3-3249_Jan16)	Jan-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

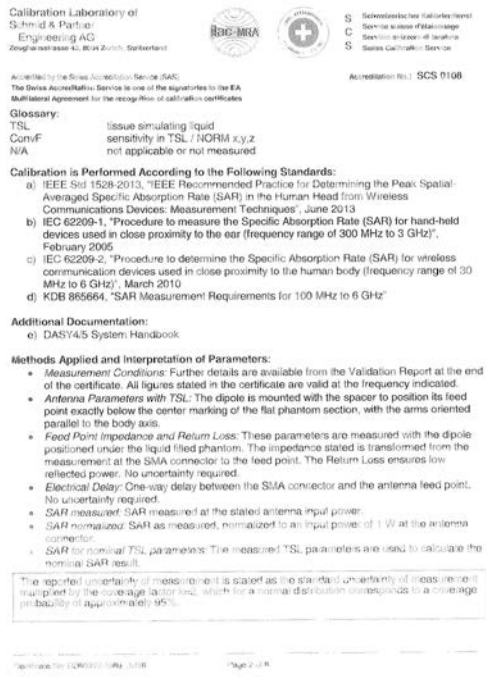
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02223)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator HP 8753E	SN: US38080477	29-Mar-16 (in house check Oct-16)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 14, 2016

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

Certificate No: D2600V2-1089_Jul16 Page 1 of 8



Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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:

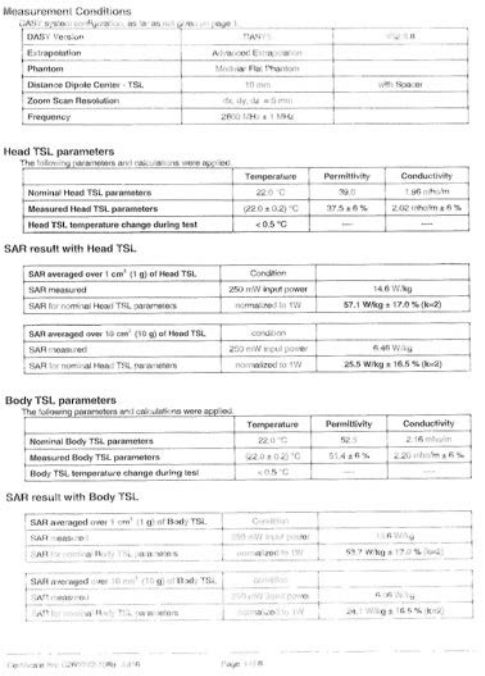
e) DASY4/5 System Handbook

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%.

Certificate No: D2600V2-1089_Jul16 Page 2 of 8



Measurement Conditions

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

DASY Version	DASY5	V52.8.8
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	37.5 ± 6 %	2.02 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	14.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	57.1 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.46 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	25.5 W/kg ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

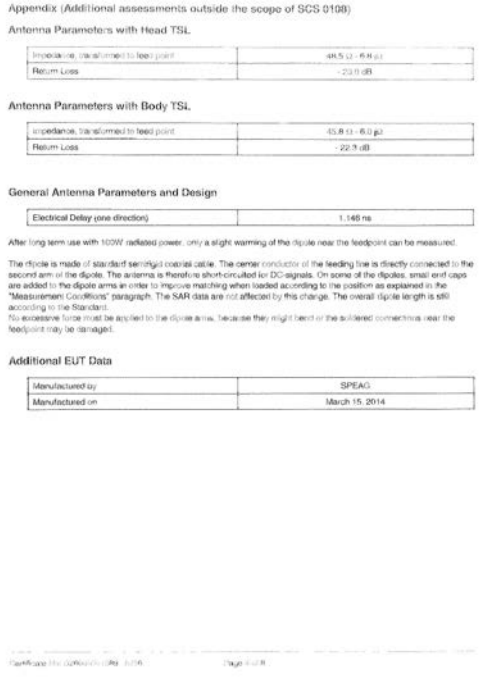
	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.4 ± 6 %	2.20 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.6 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	53.7 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.36 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	24.1 W/kg ± 16.5 % (k=2)

Certificate No: D2600V2-1089_Jul16 Page 3 of 8



Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.5 Ω - 6.8 jΩ
Return Loss	- 23.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.8 Ω - 6.0 jΩ
Return Loss	- 22.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.146 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 semi-rigid 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 15, 2014

Certificate No: D2600V2-1089_Jul16 Page 4 of 8

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D2600V2 Sn:1089

DASY5 Validation Report for Head TSL

Date: 13.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

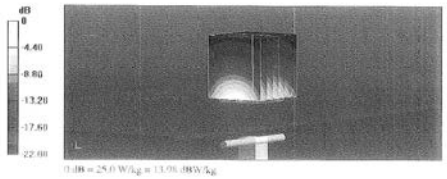
DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1089

Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.02 S/m; ε_r = 37.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

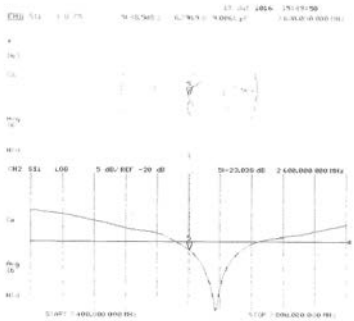
- Probe: EX3DV4 - SN7349; ConvF(7.56, 7.56, 7.56); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- **Electronics: DAE4 Sn601; Calibrated: 30.12.2015**
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 117.2 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 31.2 W/kg
SAR(1 g) = 14.6 W/kg; SAR(10 g) = 6.46 W/kg
Maximum value of SAR (measured) = 25.0 W/kg



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

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

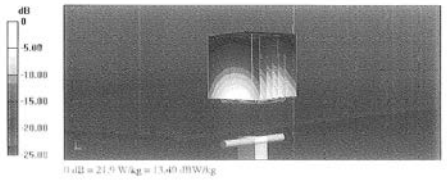
DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1089

Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.2 S/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

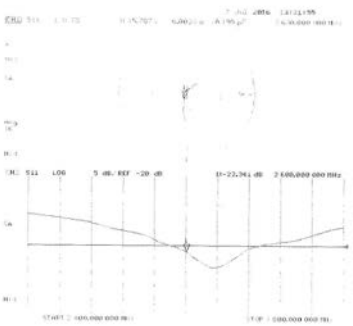
- Probe: EX3DV4 - SN7349; ConvF(7.48, 7.48, 7.48); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- **Electronics: DAE4 Sn601; Calibrated: 30.12.2015**
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.3 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 27.8 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.06 W/kg
Maximum value of SAR (measured) = 21.9 W/kg



0 dB = 21.9 W/kg = 13.40 dBW/kg

Impedance Measurement Plot for Body TSL



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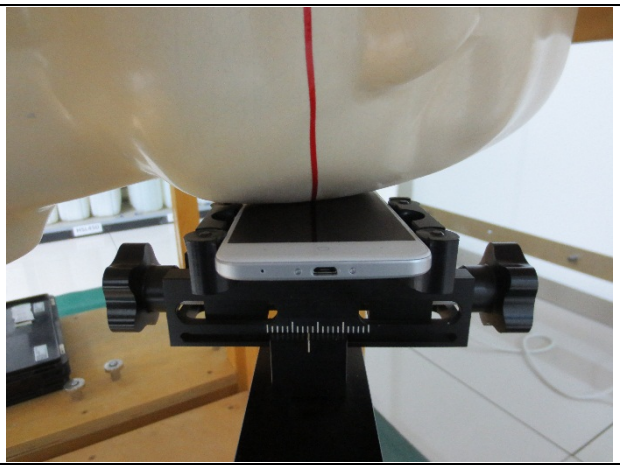
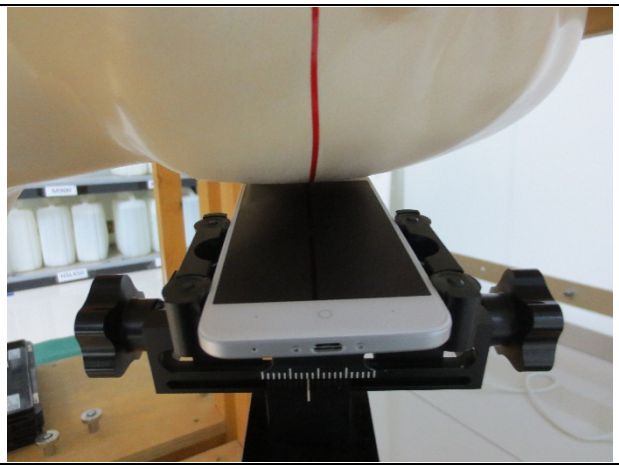
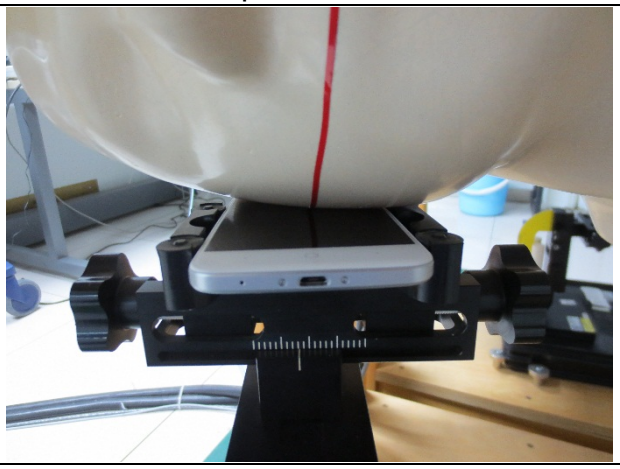
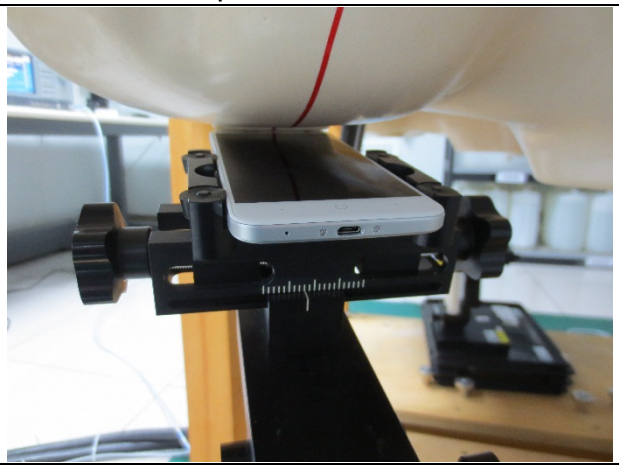
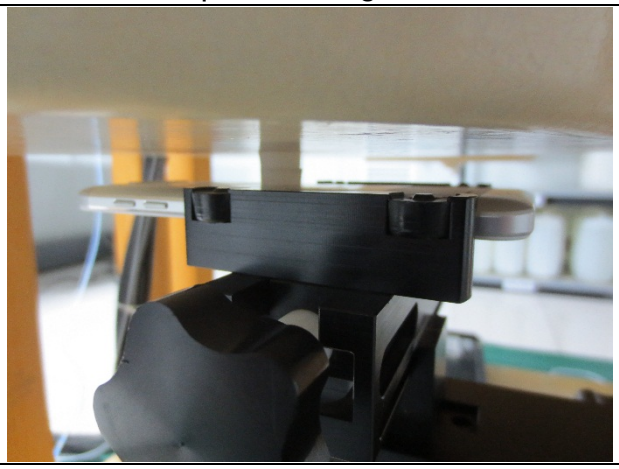
ANNEX C - PHOTOGRAPH

	
Cheek position, left side	Tilt position, left side
	
Cheek position, Right side	Tilt position, Right side
	
FLAT position, Towards phantom	FLAT position, Towards ground

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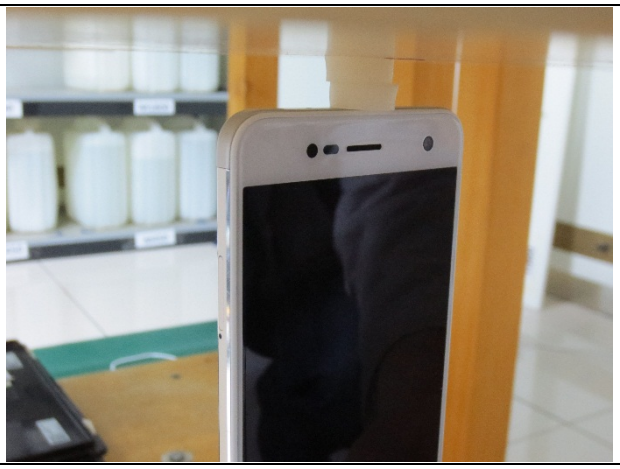
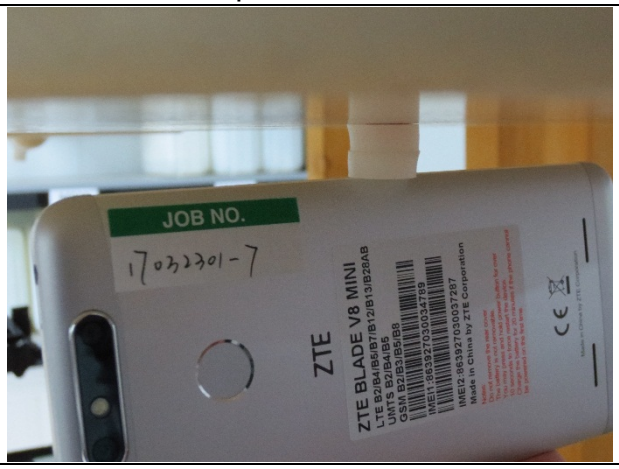
	
FLAT position, EDGE1	FLAT position, EDGE2
	
FLAT position, EDGE3	FLAT position, EDGE4
	
10mm Spacer	

---End of Test Report---

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