

Test Laboratory: SGS-SAR Lab

## System Performance Check D5.75GHz Head

**DUT: D5GHzV2; Type: D5GHzV2; Serial: 1165**

Communication System: UID 0, CW (0); Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: HSL5G; Medium parameters used:  $f = 5750$  MHz;  $\sigma = 5.329$  S/m;  $\epsilon_r = 34.695$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(5.05, 5.05, 5.05); Calibrated: 2018-01-11;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection),  $z = -2.0, 23.0$
- Electronics: DAE4 Sn1428; Calibrated: 2018-01-17
- Phantom: SAM 1; Type: SAM; Serial: 1912
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Body/d=10mm, Pin=100mW, f=5750 MHz/Area Scan (10x10x1):** Measurement grid:

$dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (measured) = 19.4 W/kg

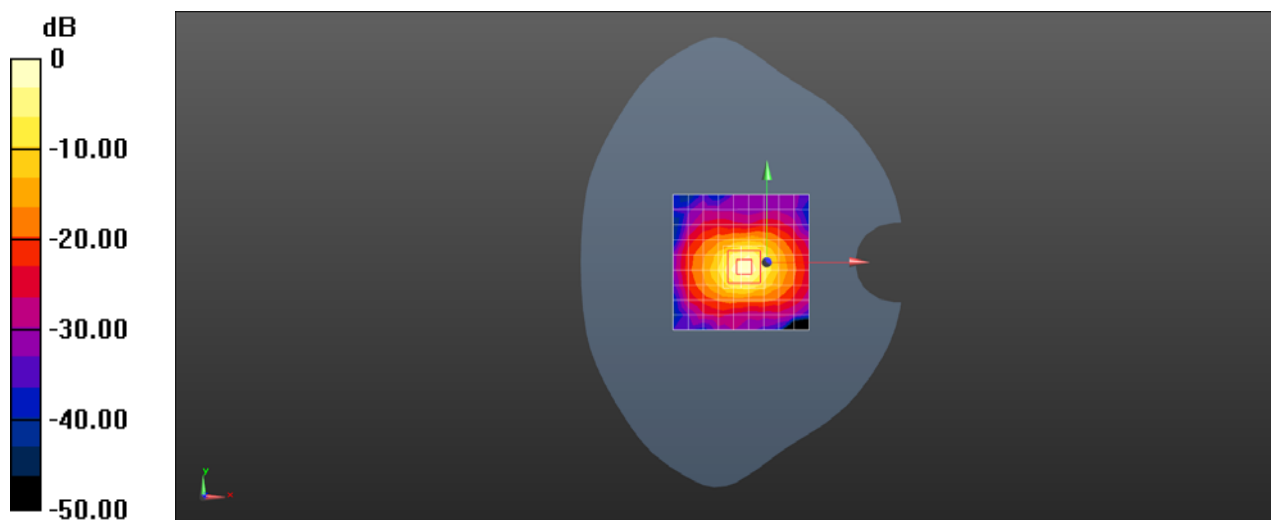
**Body/d=10mm, Pin=100mW, f=5750 MHz/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  $dz=1.4$ mm

Reference Value = 64.31 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 38.9 W/kg

**SAR(1 g) = 8.46 W/kg; SAR(10 g) = 2.41 W/kg**

Maximum value of SAR (measured) = 20.8 W/kg



0 dB = 20.8 W/kg = 13.18 dBW/kg

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## System Performance Check D5.75GHz Body

**DUT: D5GHzV2; Type: D5GHzV2; Serial: 1165**

Communication System: UID 0, CW (0); Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: MSL5G; Medium parameters used:  $f = 5750$  MHz;  $\sigma = 5.969$  S/m;  $\epsilon_r = 47.096$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(4.59, 4.59, 4.59); Calibrated: 2018-01-11;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection),  $z = -2.0, 23.0$
- Electronics: DAE4 Sn1428; Calibrated: 2018-01-17
- Phantom: SAM 2; Type: SAM V4.0; Serial: 1640
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Body/d=10mm, Pin=100mW, f=5750 MHz/Area Scan (10x10x1):** Measurement grid:

$dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (measured) = 16.7 W/kg

**Body/d=10mm, Pin=100mW, f=5750 MHz/Zoom Scan (4x4x1.4mm, graded),**

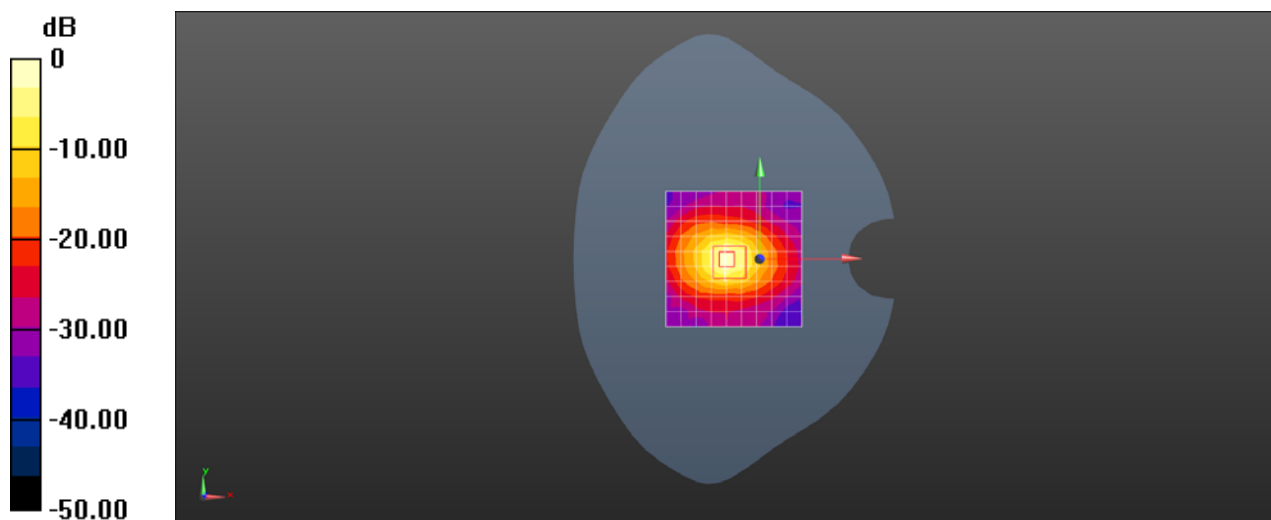
**dist=1.4mm (7x7x7)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  $dz=1.4$ mm

Reference Value = 60.28 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 37.7 W/kg

**SAR(1 g) = 8.03 W/kg; SAR(10 g) = 2.19 W/kg**

Maximum value of SAR (measured) = 20.5 W/kg



0 dB = 20.5 W/kg = 13.12 dBW/kg



# Appendix B

## Detailed Test Results

|                               |
|-------------------------------|
| 1. GSM                        |
| GSM850 for Head & Body        |
| GSM1900 for Head & Body       |
| 2. WCDMA                      |
| WCDMA Band II for Head & Body |
| WCDMA Band V for Head & Body  |
| 3.LTE                         |
| LTE Band 2 for Head & Body    |
| LTE Band 5 for Head & Body    |
| LTE Band 7 for Head & Body    |
| 4.WIFI                        |
| WIFI 2.4G for Head & Body     |
| WIFI 5G for Head & Body       |

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## SONY I4312 GSM850 251CH Right cheek

**DUT: I4312; Type: mobile phone; Serial: HQ689S1683**

Communication System: UID 0, GSM Only Communication System (0); Frequency: 848.6 MHz; Duty Cycle: 1:8.30042

Medium: HSL835; Medium parameters used:  $f = 849$  MHz;  $\sigma = 0.895$  S/m;  $\epsilon_r = 40.76$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(8.66, 8.66, 8.66); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM2; Type: SAM; Serial: 1913
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Head/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.232 W/kg

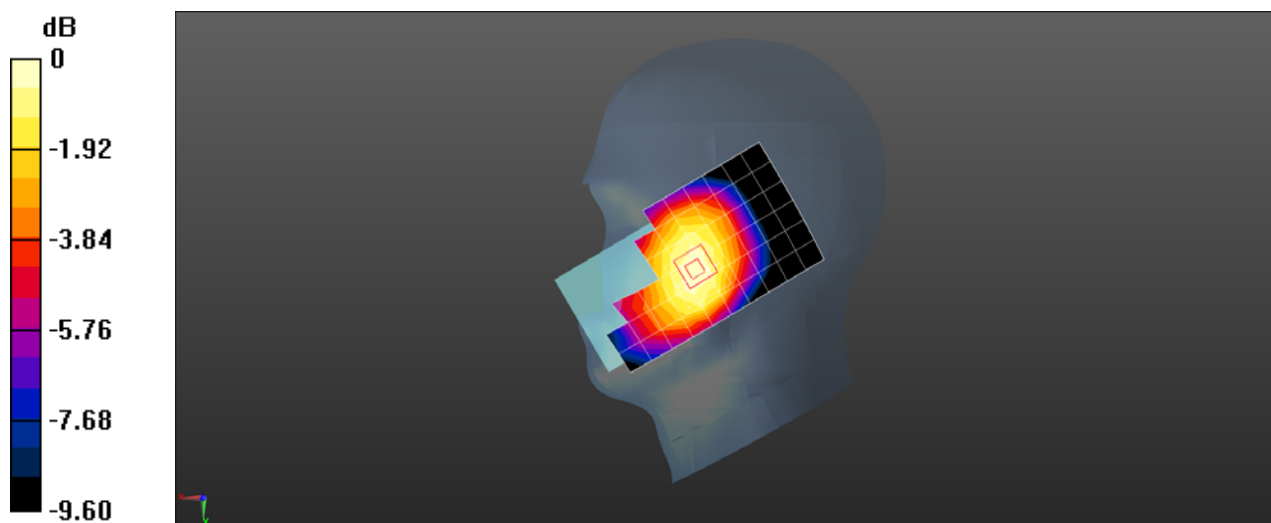
**Configuration/Head/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 4.328 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.270 W/kg

**SAR(1 g) = 0.210 W/kg; SAR(10 g) = 0.162 W/kg**

Maximum value of SAR (measured) = 0.242 W/kg



0 dB = 0.242 W/kg = -6.16 dBW/kg

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## SONY I4312 GSM850 GSM 128CH Back side 15mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S0774**

Communication System: UID 0, GSM Only Communication System (0); Frequency: 824.2 MHz; Duty Cycle: 1:8.30042

Medium: MSL835; Medium parameters used:  $f = 824.2$  MHz;  $\sigma = 1.001$  S/m;  $\epsilon_r = 54.584$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(8.84, 8.84, 8.84); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM2; Type: SAM; Serial: 1913
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.310 W/kg

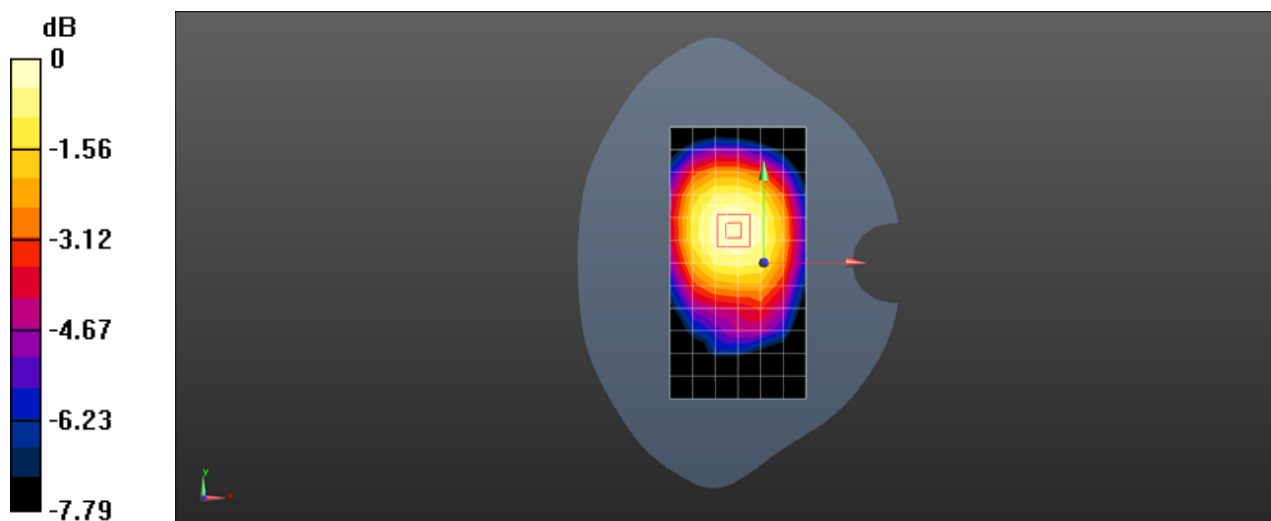
**Configuration/Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 15.68 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.350 W/kg

**SAR(1 g) = 0.279 W/kg; SAR(10 g) = 0.215 W/kg**

Maximum value of SAR (measured) = 0.319 W/kg



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## SONY I4312 GSM850 GPRS 4TS 190CH Back side 10mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S0774**

Communication System: UID 0, GPRS/EGPRS Mode(4up) Communication System (0); Frequency: 836.6 MHz; Duty Cycle: 1:2.0797

Medium: MSL835; Medium parameters used:  $f = 837$  MHz;  $\sigma = 1.01$  S/m;  $\epsilon_r = 54.523$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(8.84, 8.84, 8.84); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM2; Type: SAM; Serial: 1913
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.621 W/kg

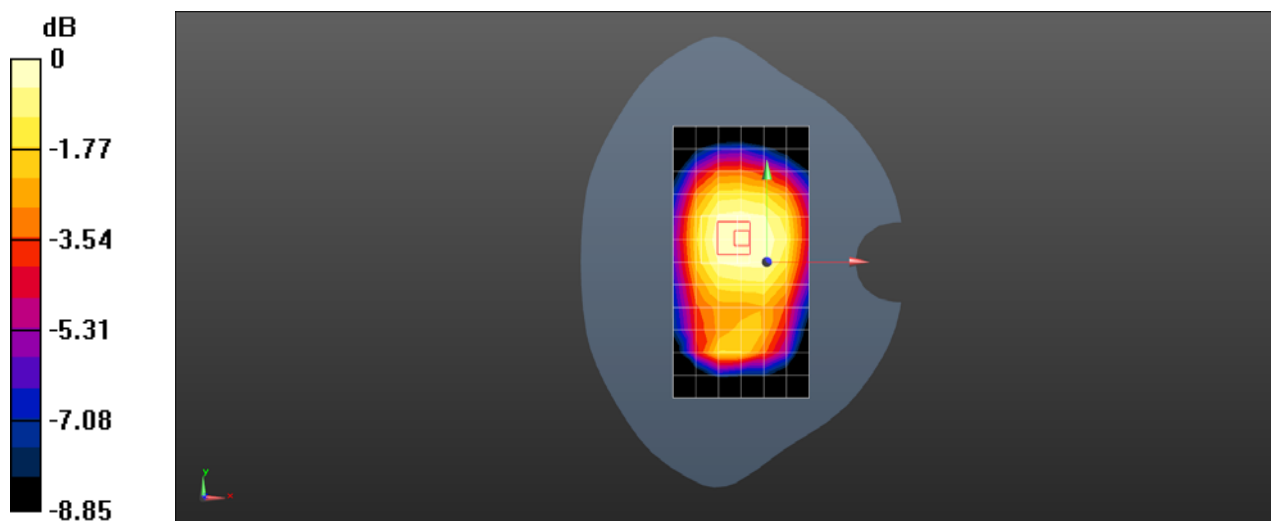
**Configuration/Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 22.86 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.690 W/kg

**SAR(1 g) = 0.542 W/kg; SAR(10 g) = 0.417 W/kg**

Maximum value of SAR (measured) = 0.620 W/kg



0 dB = 0.620 W/kg = -2.08 dBW/kg

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## SONY I4312 GSM1900 810CH Right cheek

**DUT: I4312; Type: mobile phone; Serial: HQ689S1683**

Communication System: UID 0, GSM Only Communication System (0); Frequency: 1909.8 MHz; Duty Cycle: 1:8.30042

Medium: HSL1900; Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.401$  S/m;  $\epsilon_r = 40.224$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(7.35, 7.35, 7.35); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM2; Type: SAM; Serial: 1913
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Head/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.132 W/kg

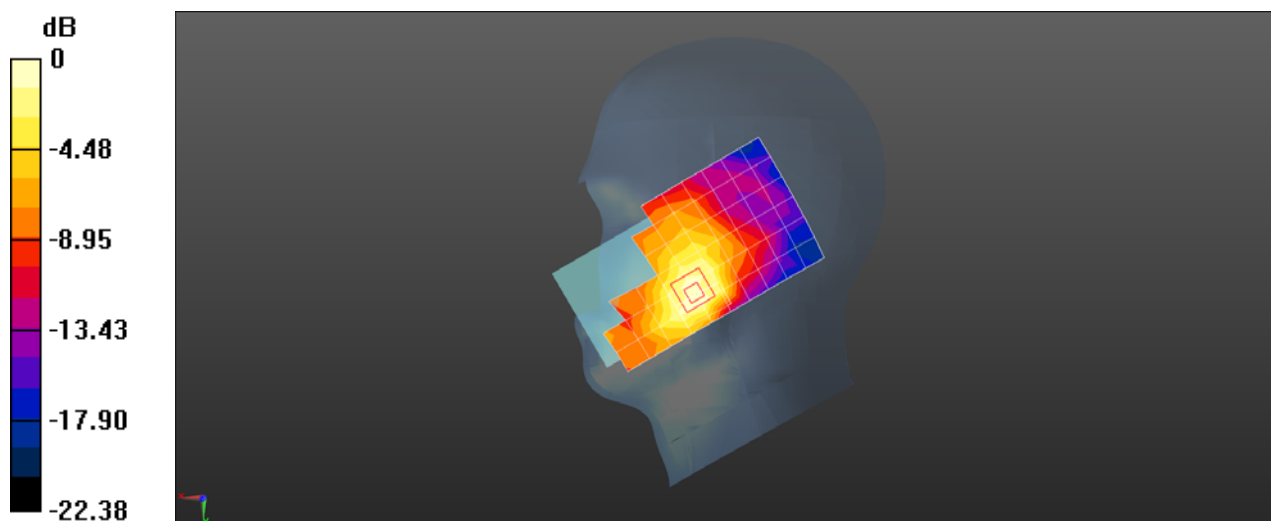
**Configuration/Head/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 2.177 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.167 W/kg

**SAR(1 g) = 0.113 W/kg; SAR(10 g) = 0.070 W/kg**

Maximum value of SAR (measured) = 0.142 W/kg



0 dB = 0.142 W/kg = -8.48 dBW/kg

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## SONY I4312 GSM1900 GSM 810CH Back side 15mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S0753**

Communication System: UID 0, GSM Only Communication System (0); Frequency: 1909.8 MHz; Duty Cycle: 1:8.30042

Medium: MSL1900; Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.517$  S/m;  $\epsilon_r = 53.098$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(8.09, 8.09, 8.09); Calibrated: 2018-01-11;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1428; Calibrated: 2018-01-17
- Phantom: SAM 2; Type: SAM V4.0; Serial: 1640
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.212 W/kg

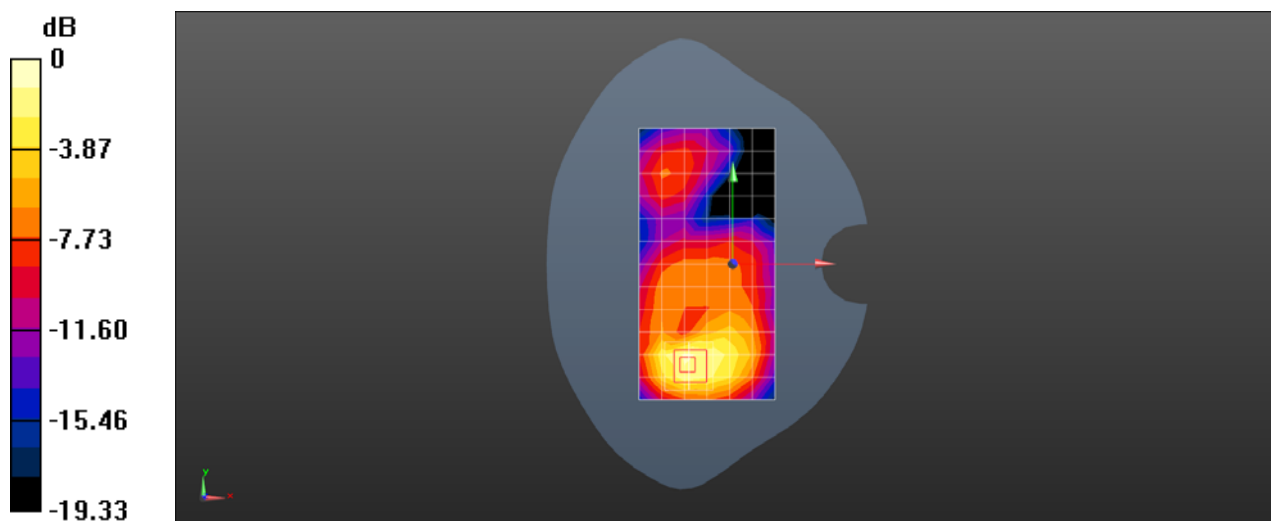
**Configuration/Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 5.324 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.327 W/kg

**SAR(1 g) = 0.204 W/kg; SAR(10 g) = 0.116 W/kg**

Maximum value of SAR (measured) = 0.270 W/kg



0 dB = 0.270 W/kg = -5.69 dBW/kg

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## SONY I4312 GSM1900 GPRS 4TS 661CH Back side 10mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S0753**

Communication System: UID 0, GPRS/EGPRS Mode(4up) Communication System (0); Frequency: 1880 MHz; Duty Cycle: 1:2.0797

Medium: MSL1900; Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.503$  S/m;  $\epsilon_r = 53.465$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(8.09, 8.09, 8.09); Calibrated: 2018-01-11;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1428; Calibrated: 2018-01-17
- Phantom: SAM 2; Type: SAM V4.0; Serial: 1640
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.963 W/kg

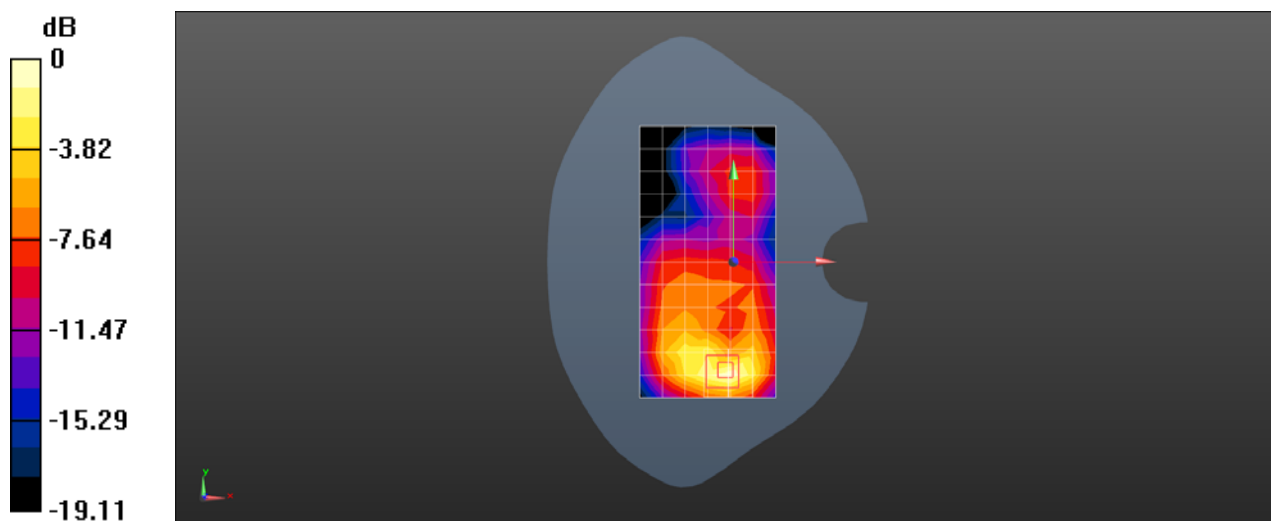
**Configuration/Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 5.911 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 1.19 W/kg

**SAR(1 g) = 0.706 W/kg; SAR(10 g) = 0.364 W/kg**

Maximum value of SAR (measured) = 0.952 W/kg



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## SONY I4312 WCDMA Band II 9538CH Right cheek

**DUT: I4312; Type: mobile phone; Serial: HQ689S1683**

Communication System: UID 0, WCDMA (0); Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: HSL1900; Medium parameters used:  $f = 1908$  MHz;  $\sigma = 1.4$  S/m;  $\epsilon_r = 40.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(7.35, 7.35, 7.35); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM2; Type: SAM; Serial: 1913
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Head/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.167 W/kg

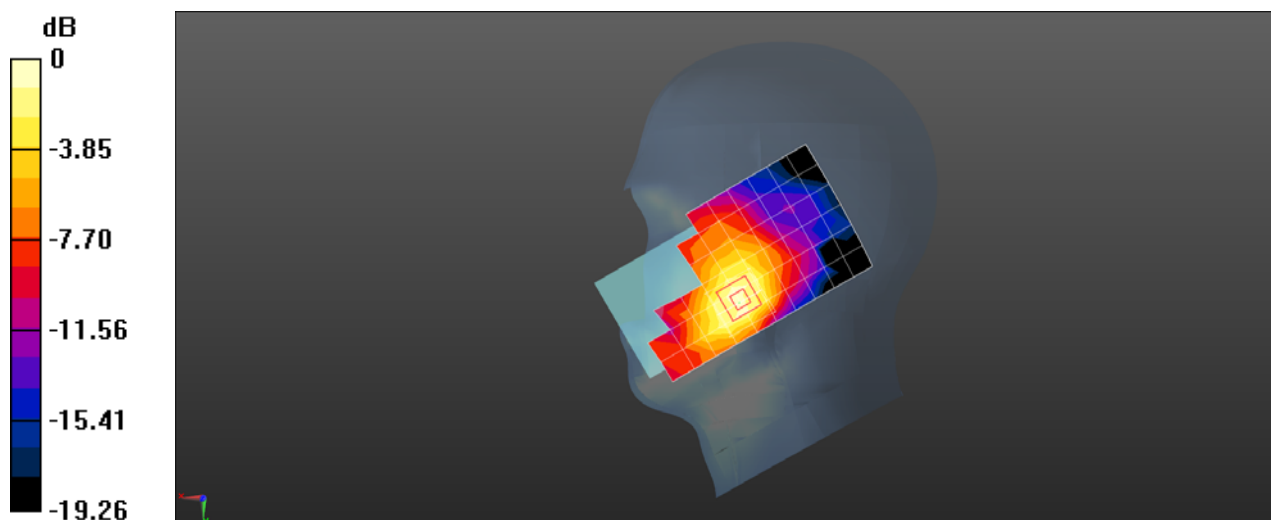
**Configuration/Head/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 2.486 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.224 W/kg

**SAR(1 g) = 0.147 W/kg; SAR(10 g) = 0.091 W/kg**

Maximum value of SAR (measured) = 0.188 W/kg



0 dB = 0.188 W/kg = -7.26 dBW/kg

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## SONY I4312 WCDMA Band II 9400CH Back side 15mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S0747**

Communication System: UID 0, WCDMA (0); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: MSL1900; Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.503$  S/m;  $\epsilon_r = 53.465$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(8.09, 8.09, 8.09); Calibrated: 2018-01-11;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1428; Calibrated: 2018-01-17
- Phantom: SAM 2; Type: SAM V4.0; Serial: 1640
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.391 W/kg

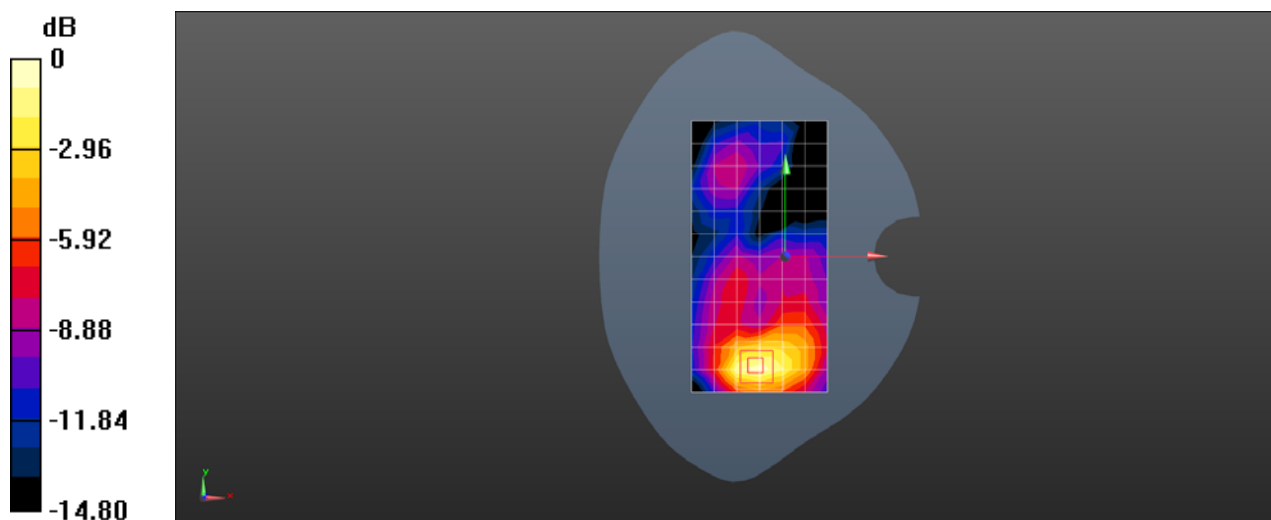
**Configuration/Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 5.060 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.518 W/kg

**SAR(1 g) = 0.331 W/kg; SAR(10 g) = 0.193 W/kg**

Maximum value of SAR (measured) = 0.423 W/kg



0 dB = 0.423 W/kg = -3.74 dBW/kg

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## SONY I4312 WCDMA Band II 9262CH Back side 10mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S0747**

Communication System: UID 0, WCDMA (0); Frequency: 1852.4 MHz; Duty Cycle: 1:1

Medium: MSL1900; Medium parameters used:  $f = 1852.4$  MHz;  $\sigma = 1.486$  S/m;  $\epsilon_r = 53.679$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(8.09, 8.09, 8.09); Calibrated: 2018-01-11;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1428; Calibrated: 2018-01-17
- Phantom: SAM 2; Type: SAM V4.0; Serial: 1640
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.795 W/kg

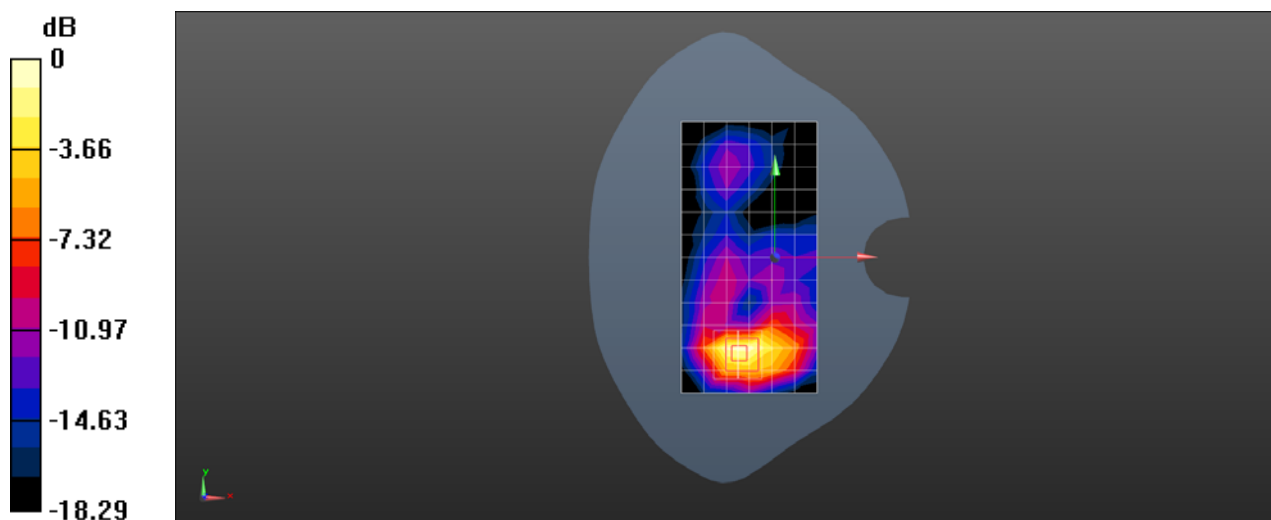
**Configuration/Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 5.450 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.12 W/kg

**SAR(1 g) = 0.671 W/kg; SAR(10 g) = 0.352 W/kg**

Maximum value of SAR (measured) = 0.904 W/kg



0 dB = 0.904 W/kg = -0.44 dBW/kg

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## SONY I4312 WCDMA Band V 4182CH Right cheek

**DUT: I4312; Type: mobile phone; Serial: HQ689S0747**

Communication System: UID 0, WCDMA (0); Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium: HSL835; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 0.887$  S/m;  $\epsilon_r = 40.84$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(8.66, 8.66, 8.66); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM2; Type: SAM; Serial: 1913
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

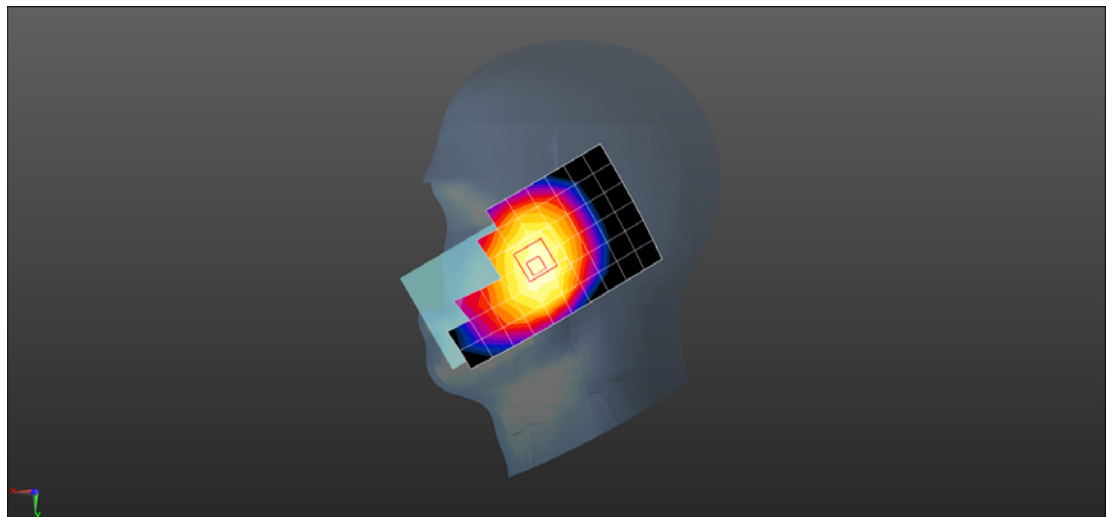
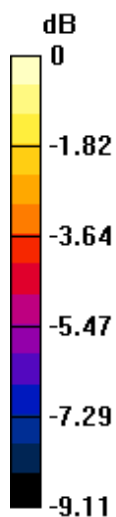
**Configuration/Head/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.215 W/kg

**Configuration/Head/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 4.886 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.241 W/kg

**SAR(1 g) = 0.189 W/kg; SAR(10 g) = 0.146 W/kg**



0 dB = 0.215 W/kg = -6.68 dBW/kg

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## SONY I4312 WCDMA Band V 4182CH Back side 15mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S0774**

Communication System: UID 0, WCDMA (0); Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium: MSL835; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 1.009$  S/m;  $\epsilon_r = 54.525$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(8.84, 8.84, 8.84); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM2; Type: SAM; Serial: 1913
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.304 W/kg

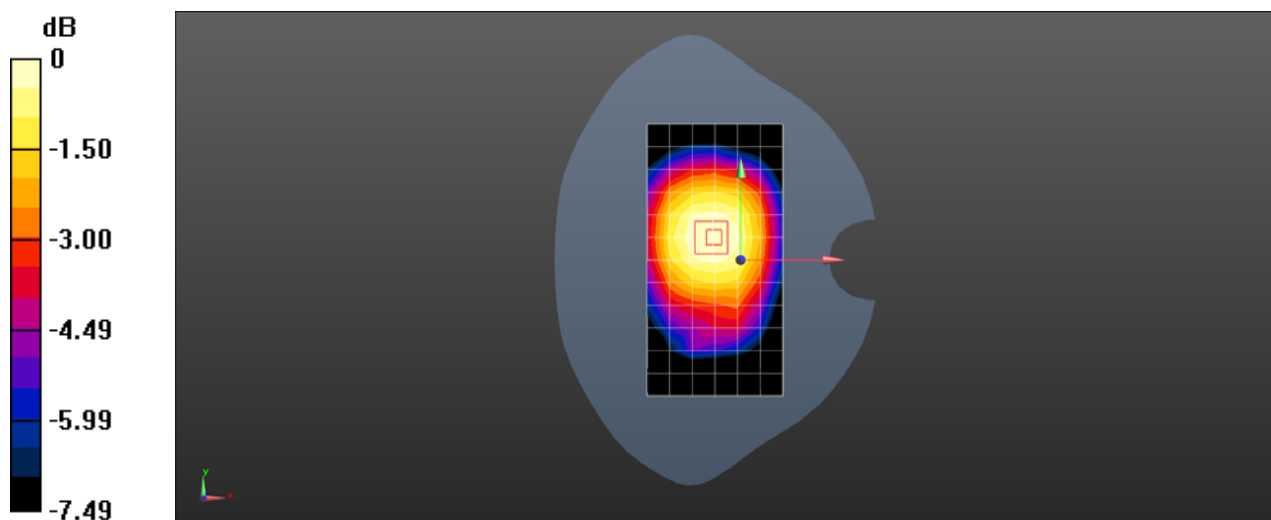
**Configuration/Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 15.97 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.337 W/kg

**SAR(1 g) = 0.265 W/kg; SAR(10 g) = 0.205 W/kg**

Maximum value of SAR (measured) = 0.305 W/kg



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## SONY I4312 WCDMA Band V 4182CH Back side 10mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S0774**

Communication System: UID 0, WCDMA (0); Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium: MSL835; Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 1.009$  S/m;  $\epsilon_r = 54.525$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(8.84, 8.84, 8.84); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM2; Type: SAM; Serial: 1913
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.367 W/kg

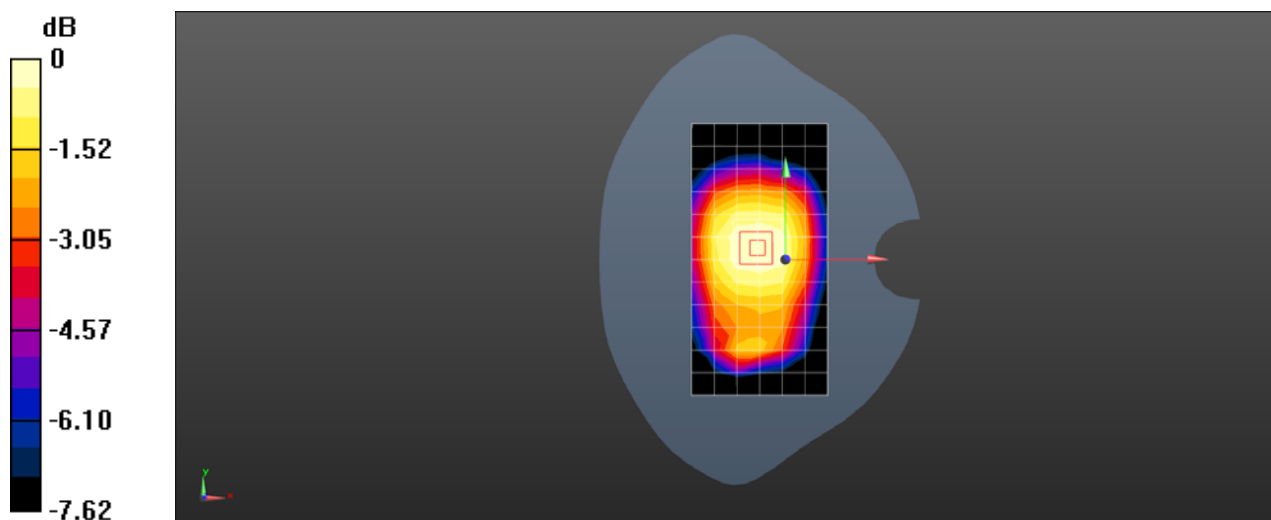
**Configuration/Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 18.24 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.411 W/kg

**SAR(1 g) = 0.325 W/kg; SAR(10 g) = 0.253 W/kg**

Maximum value of SAR (measured) = 0.371 W/kg



0 dB = 0.371 W/kg = -4.31 dBW/kg

Test Laboratory: SGS-SAR Lab

## SONY I4312 LTE Band 2 20M QPSK 1RB50 19100CH Right cheek

**DUT: I4312; Type: mobile phone; Serial: HQ689S1683**

Communication System: UID 0, LTE-FDD BW 20MHz (0); Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL1900; Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.389$  S/m;  $\epsilon_r = 40.284$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(7.35, 7.35, 7.35); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM2; Type: SAM; Serial: 1913
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Head/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm

Maximum value of SAR (measured) = 0.186 W/kg

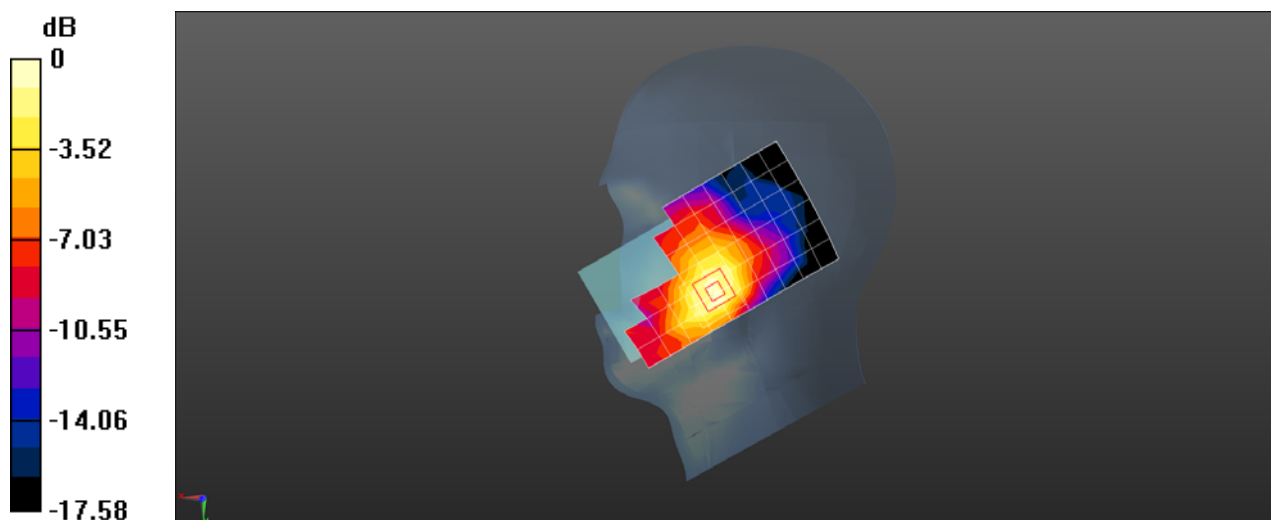
**Configuration/Head/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 2.998 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.255 W/kg

**SAR(1 g) = 0.171 W/kg; SAR(10 g) = 0.106 W/kg**

Maximum value of SAR (measured) = 0.214 W/kg



0 dB = 0.214 W/kg = -6.70 dBW/kg

Test Laboratory: SGS-SAR Lab

## SONY I4312 LTE Band 2 20M QPSK 1RB50 19100CH Back side 15mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S0747**

Communication System: UID 0, LTE-FDD BW 20MHz (0); Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL1900; Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.513$  S/m;  $\epsilon_r = 53.19$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(8.09, 8.09, 8.09); Calibrated: 2018-01-11;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1428; Calibrated: 2018-01-17
- Phantom: SAM 2; Type: SAM V4.0; Serial: 1640
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm

Maximum value of SAR (measured) = 0.457 W/kg

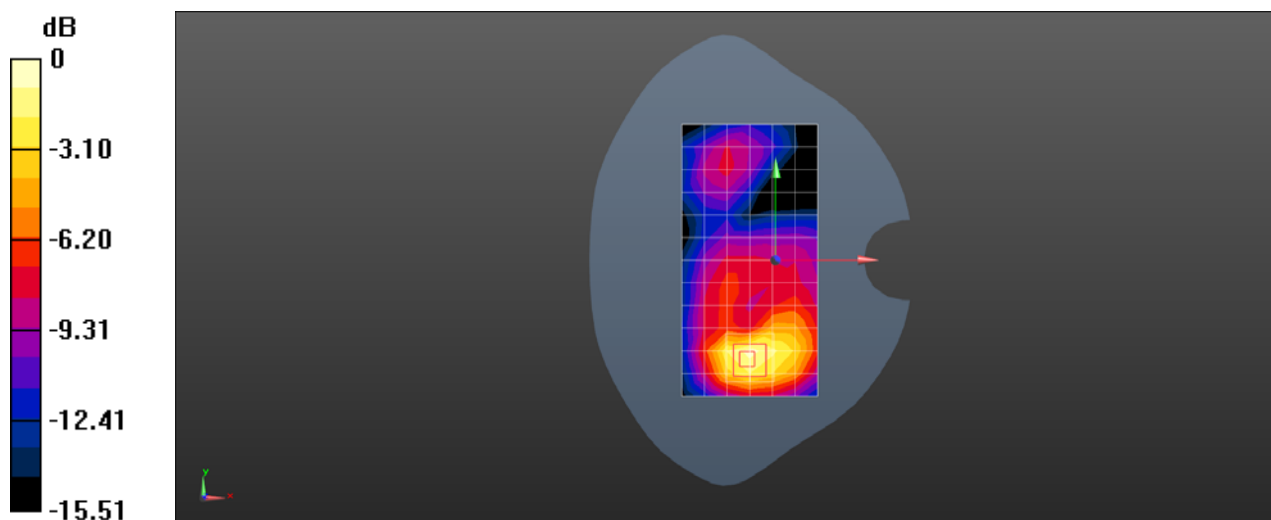
**Configuration/Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 7.177 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.613 W/kg

**SAR(1 g) = 0.392 W/kg; SAR(10 g) = 0.227 W/kg**

Maximum value of SAR (measured) = 0.515 W/kg



Test Laboratory: SGS-SAR Lab

## SONY I4312 LTE Band 2 20M QPSK 1RB50 18700CH Back side 10mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S0747**

Communication System: UID 0, LTE-FDD BW 20MHz (0); Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: MSL1900; Medium parameters used:  $f = 1860$  MHz;  $\sigma = 1.503$  S/m;  $\epsilon_r = 53.676$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(8.09, 8.09, 8.09); Calibrated: 2018-01-11;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1428; Calibrated: 2018-01-17
- Phantom: SAM 2; Type: SAM V4.0; Serial: 1640
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.979 W/kg

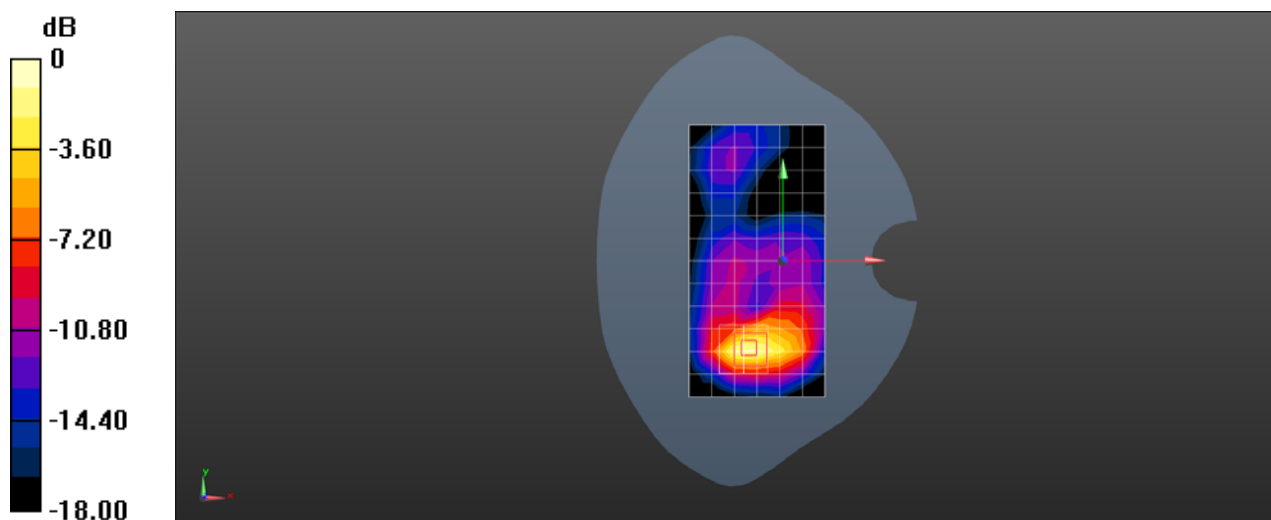
**Configuration/Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 7.352 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 1.48 W/kg

**SAR(1 g) = 0.861 W/kg; SAR(10 g) = 0.448 W/kg**

Maximum value of SAR (measured) = 1.16 W/kg



Test Laboratory: SGS-SAR Lab

## SONY I4312 LTE Band 5 10M QPSK 1RB25 20600CH Right cheek

**DUT: I4312; Type: mobile phone; Serial: HQ689S1683**

Communication System: UID 0, LTE-FDD BW 10MHZ (0); Frequency: 844 MHz; Duty Cycle: 1:1

Medium: HSL835; Medium parameters used:  $f = 844$  MHz;  $\sigma = 0.891$  S/m;  $\epsilon_r = 40.790$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(8.66, 8.66, 8.66); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM2; Type: SAM; Serial: 1913
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Head/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm

Maximum value of SAR (measured) = 0.207 W/kg

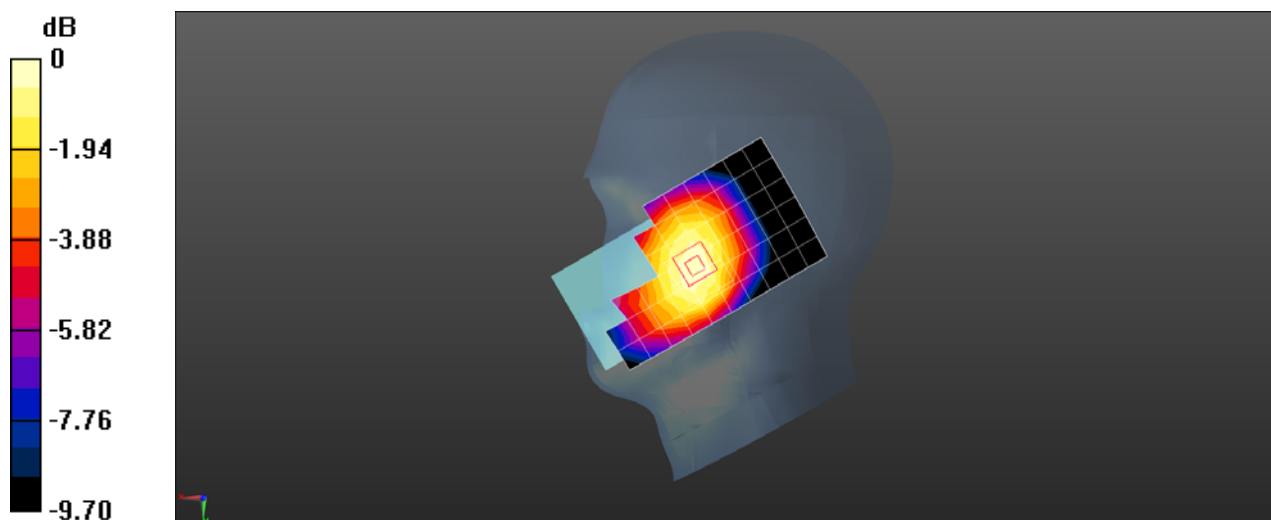
**Configuration/Head/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 4.294 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.239 W/kg

**SAR(1 g) = 0.187 W/kg; SAR(10 g) = 0.143 W/kg**

Maximum value of SAR (measured) = 0.214 W/kg



0 dB = 0.214 W/kg = -6.70 dBW/kg

Test Laboratory: SGS-SAR Lab

## SONY I4312 LTE Band 5 10M QPSK 1RB25 20600CH Back side 15mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S0774**

Communication System: UID 0, LTE-FDD BW 10MHZ (0); Frequency: 844 MHz; Duty Cycle: 1:1

Medium: MSL835; Medium parameters used:  $f = 844$  MHz;  $\sigma = 1.014$  S/m;  $\epsilon_r = 54.493$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(8.84, 8.84, 8.84); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM2; Type: SAM; Serial: 1913
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm

Maximum value of SAR (measured) = 0.327 W/kg

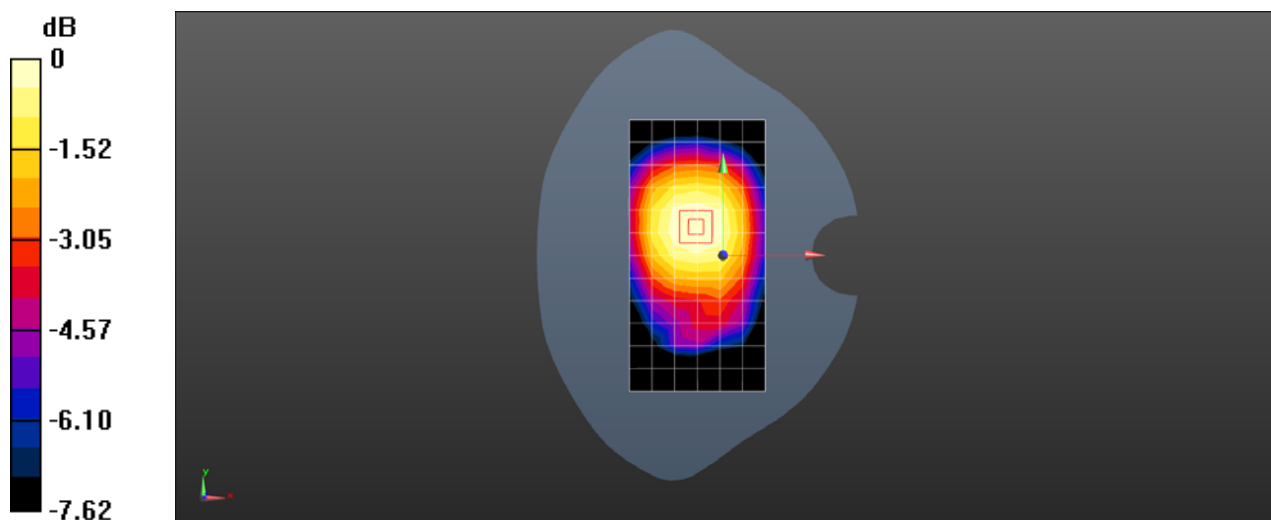
**Configuration/Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 16.09 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.359 W/kg

**SAR(1 g) = 0.284 W/kg; SAR(10 g) = 0.219 W/kg**

Maximum value of SAR (measured) = 0.326 W/kg



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

Test Laboratory: SGS-SAR Lab

## SONY I4312 LTE Band 5 10M QPSK 1RB25 20600CH Back side 10mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S0774**

Communication System: UID 0, LTE-FDD BW 10MHZ (0); Frequency: 844 MHz; Duty Cycle: 1:1

Medium: MSL835; Medium parameters used:  $f = 844$  MHz;  $\sigma = 1.014$  S/m;  $\epsilon_r = 54.493$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(8.84, 8.84, 8.84); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM2; Type: SAM; Serial: 1913
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (7x13x1):** Measurement grid:  $dx=15$ mm,  $dy=15$ mm  
Maximum value of SAR (measured) = 0.395 W/kg

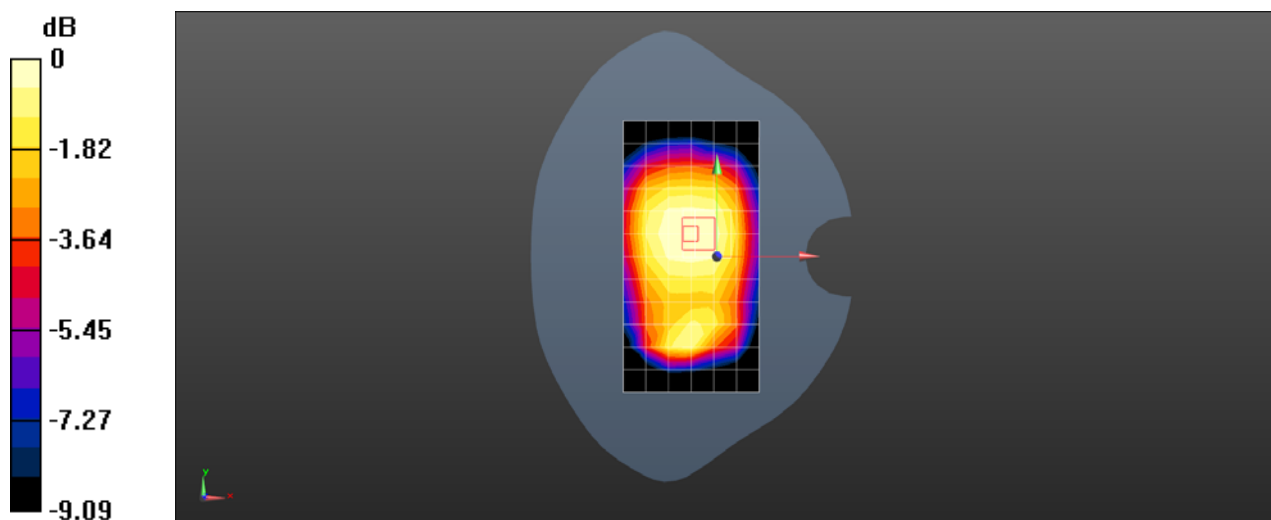
**Configuration/Body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 18.20 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.439 W/kg

**SAR(1 g) = 0.349 W/kg; SAR(10 g) = 0.267 W/kg**

Maximum value of SAR (measured) = 0.399 W/kg



Test Laboratory: SGS-SAR Lab

## SONY I4312 LTE Band 7 20M QPSK 1RB50 21350CH Left cheek

**DUT: I4312; Type: mobile phone; Serial: HQ689S0747**

Communication System: UID 0, LTE-FDD BW 20MHz (0); Frequency: 2560 MHz; Duty Cycle: 1:1

Medium: HSL2600; Medium parameters used:  $f = 2560$  MHz;  $\sigma = 1.943$  S/m;  $\epsilon_r = 38.776$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(7.52, 7.52, 7.52); Calibrated: 2018-01-11;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1428; Calibrated: 2018-01-17
- Phantom: SAM 1; Type: SAM; Serial: 1912
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Head/Area Scan (9x16x1):** Measurement grid:  $dx=12$ mm,  $dy=12$ mm  
Maximum value of SAR (measured) = 0.385 W/kg

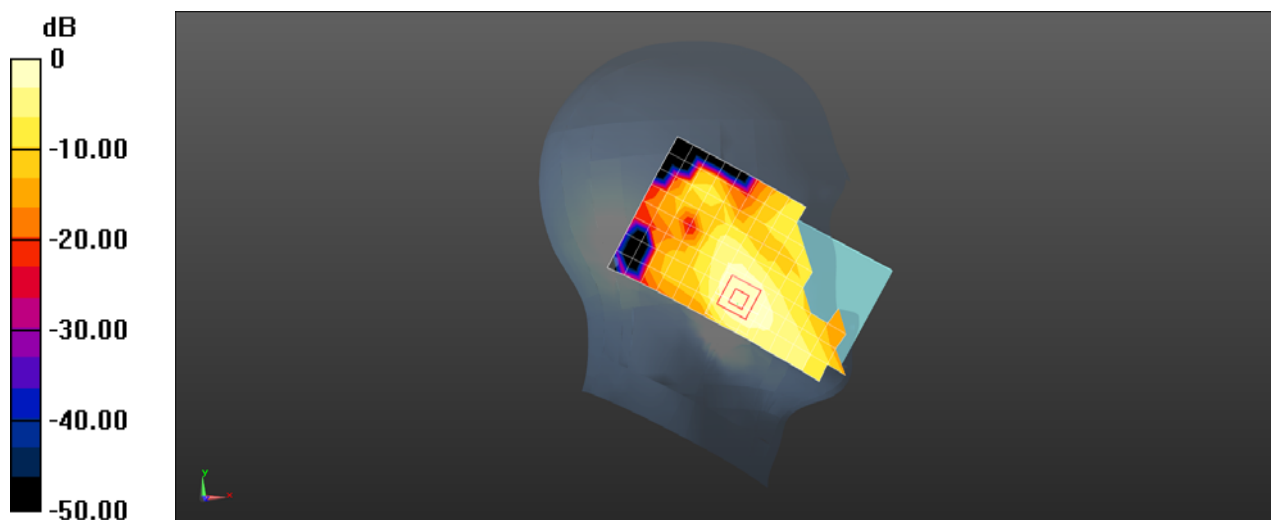
**Configuration/Head/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 2.904 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.520 W/kg

**SAR(1 g) = 0.302 W/kg; SAR(10 g) = 0.164 W/kg**

Maximum value of SAR (measured) = 0.409 W/kg



0 dB = 0.409 W/kg = -3.88 dBW/kg

Test Laboratory: SGS-SAR Lab

## SONY I4312 LTE Band 7 20M QPSK 1RB50 21350CH Back side 15mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S0774**

Communication System: UID 0, LTE-FDD BW 20MHz (0); Frequency: 2560 MHz; Duty Cycle: 1:1

Medium: MSL2600; Medium parameters used:  $f = 2560$  MHz;  $\sigma = 2.093$  S/m;  $\epsilon_r = 53.007$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(6.96, 6.96, 6.96); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (9x16x1):** Measurement grid:  $dx=12$ mm,  $dy=12$ mm

Maximum value of SAR (measured) = 0.709 W/kg

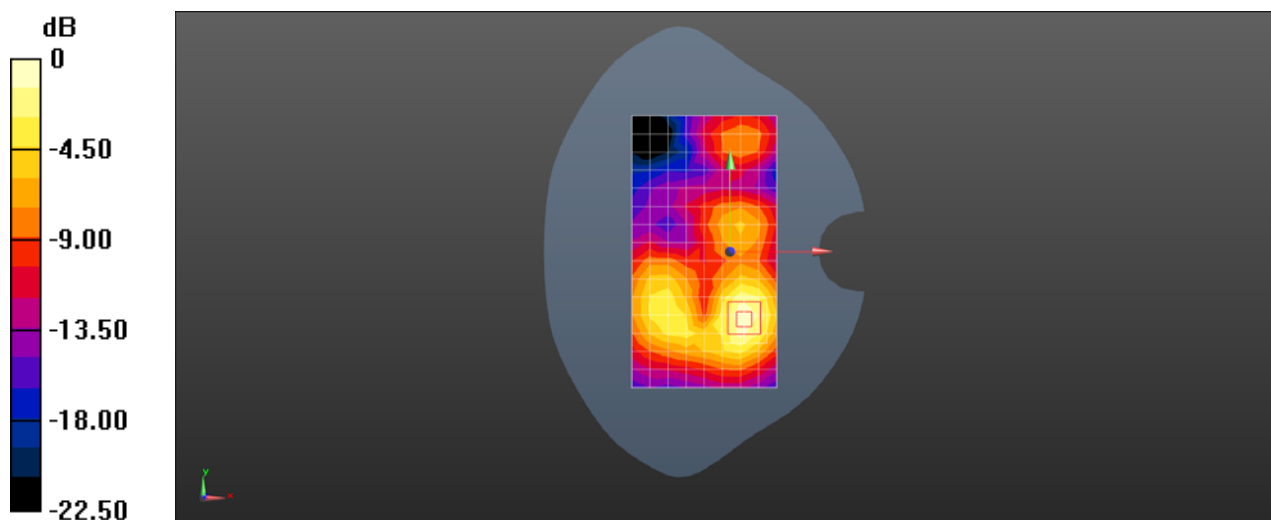
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 4.723 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 0.935 W/kg

**SAR(1 g) = 0.522 W/kg; SAR(10 g) = 0.274 W/kg**

Maximum value of SAR (measured) = 0.733 W/kg



0 dB = 0.733 W/kg = -1.35 dBW/kg

Test Laboratory: SGS-SAR Lab

## SONY I4312 LTE Band 7 20M QPSK 1RB50 21100CH Back side 10mm

**DUT: I4312; Type: mobile phone; Serial: HQ689S1683**

Communication System: UID 0, LTE-FDD BW 20MHz (0); Frequency: 2535 MHz; Duty Cycle: 1:1

Medium: MSL2600; Medium parameters used:  $f = 2535$  MHz;  $\sigma = 2.061$  S/m;  $\epsilon_r = 53.081$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(7.15, 7.15, 7.15); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (9x16x1):** Measurement grid:  $dx=12$ mm,  $dy=12$ mm  
Maximum value of SAR (measured) = 1.49 W/kg

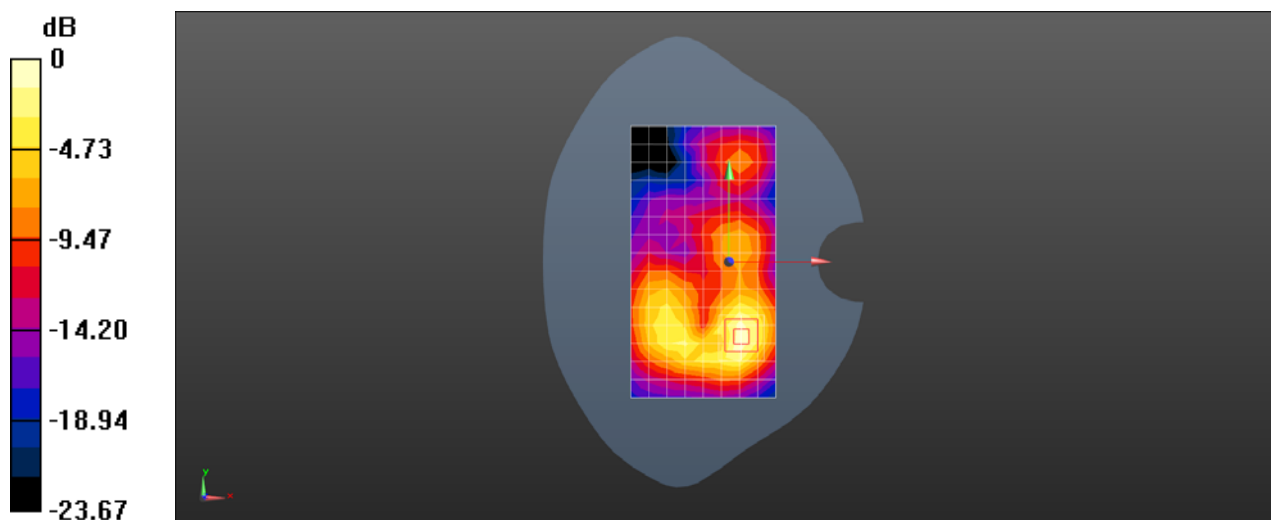
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 6.407 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 2.01 W/kg

**SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.536 W/kg**

Maximum value of SAR (measured) = 1.57 W/kg



0 dB = 1.57 W/kg = 1.96 dBW/kg

Test Laboratory: SGS-SAR Lab

## SONY I4312 WIFI 2.4G 802.11b 11CH Left tilted

**DUT: I4312; Type: mobile phone; Serial: HQ68AQ1472**

Communication System: UID 0, WI-FI(2.4GHz) (0); Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: HSL2450; Medium parameters used:  $f = 2462$  MHz;  $\sigma = 1.83$  S/m;  $\epsilon_r = 39.084$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(7.01, 7.01, 7.01); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM2; Type: SAM; Serial: 1913
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Head/Area Scan (9x16x1):** Measurement grid:  $dx=12$ mm,  $dy=12$ mm  
Maximum value of SAR (measured) = 1.60 W/kg

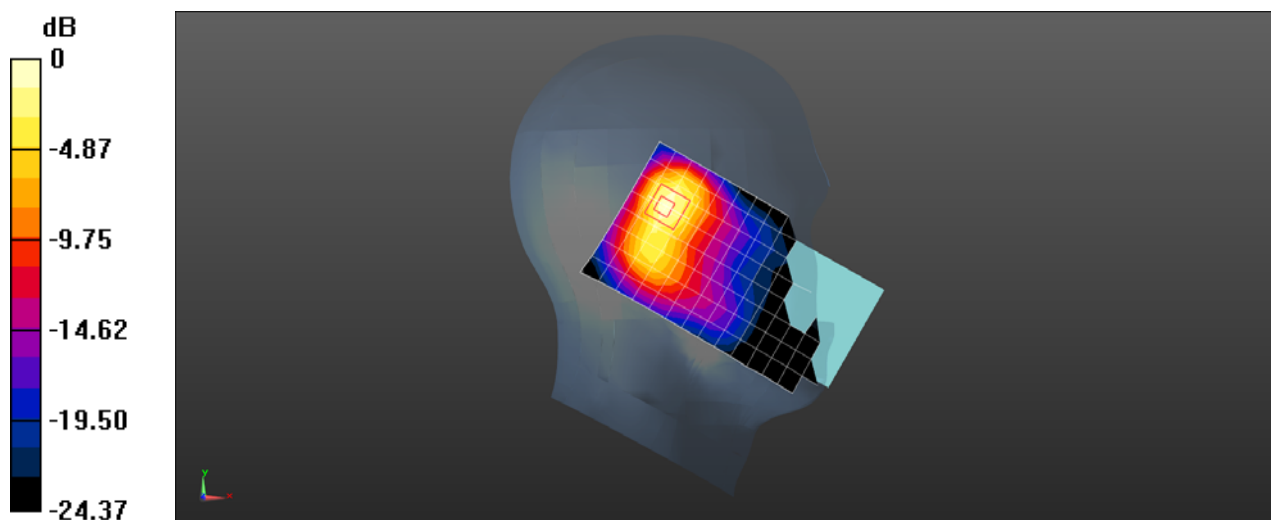
**Configuration/Head/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 19.11 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 2.36 W/kg

**SAR(1 g) = 0.973 W/kg; SAR(10 g) = 0.432 W/kg**

Maximum value of SAR (measured) = 1.54 W/kg



0 dB = 1.54 W/kg = 1.88 dBW/kg

Test Laboratory: SGS-SAR Lab

## SONY I4312 WIFI 2.4G 802.11b 1CH Back side 15mm

**DUT: I4312; Type: mobile phone; Serial: HQ68AQ1472**

Communication System: UID 0, WI-FI(2.4GHz) (0); Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: MSL2450; Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.917$  S/m;  $\epsilon_r = 53.484$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(7.15, 7.15, 7.15); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (9x16x1):** Measurement grid:  $dx=12$ mm,  $dy=12$ mm  
Maximum value of SAR (measured) = 0.239 W/kg

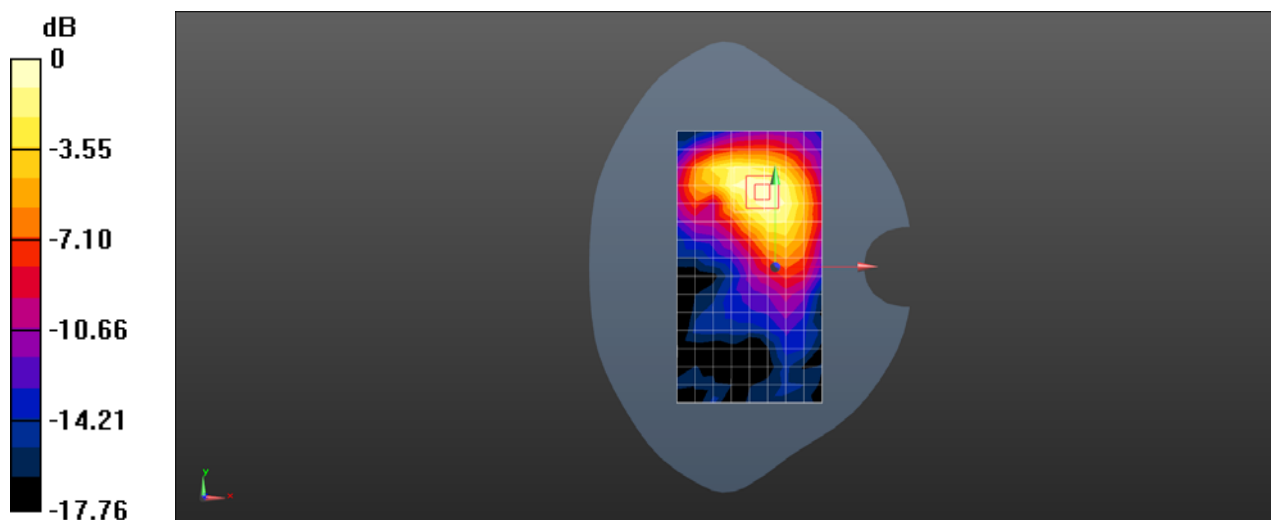
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 2.884 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.304 W/kg

**SAR(1 g) = 0.184 W/kg; SAR(10 g) = 0.109 W/kg**

Maximum value of SAR (measured) = 0.244 W/kg



Test Laboratory: SGS-SAR Lab

## SONY I4312 WIFI 2.4G 802.11b 1CH Back side 10mm

**DUT: I4312; Type: mobile phone; Serial: HQ68AQ1472**

Communication System: UID 0, WI-FI(2.4GHz) (0); Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: MSL2450; Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.917$  S/m;  $\epsilon_r = 53.484$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3789; ConvF(7.15, 7.15, 7.15); Calibrated: 2018-02-08;
- Sensor-Surface: 2mm (Mechanical Surface Detection),  $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017-11-28
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (9x16x1):** Measurement grid:  $dx=12$ mm,  $dy=12$ mm  
Maximum value of SAR (measured) = 0.436 W/kg

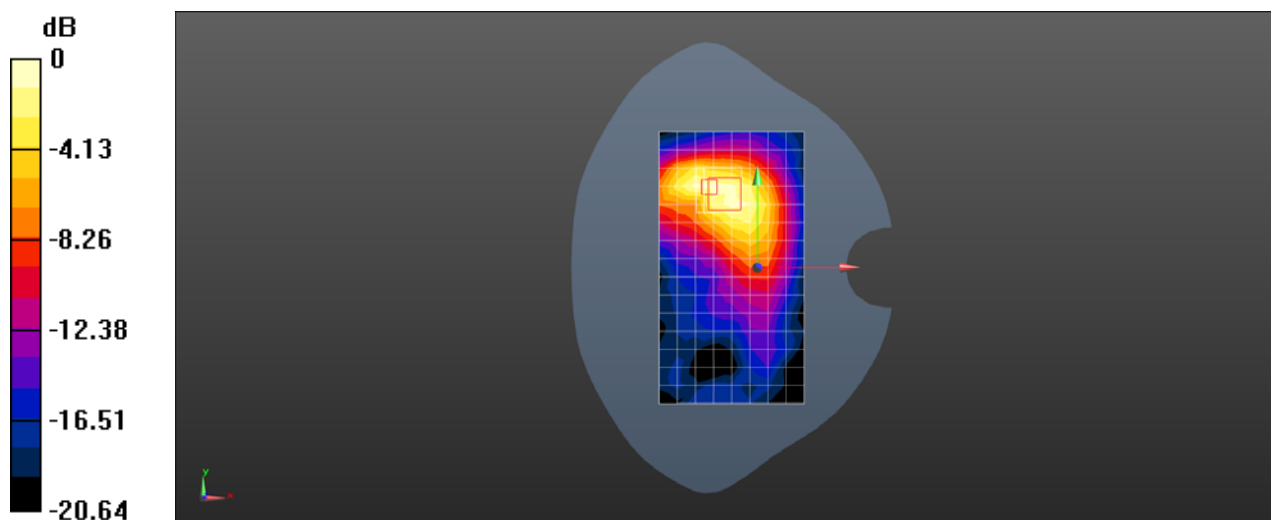
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 4.437 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.618 W/kg

**SAR(1 g) = 0.330 W/kg; SAR(10 g) = 0.184 W/kg**

Maximum value of SAR (measured) = 0.469 W/kg



Test Laboratory: SGS-SAR Lab

## SONY I4312 802.11a 165CH Left cheek

**DUT: I4312; Type: mobile phone; Serial: HQ68AQ1472**

Communication System: UID 0, WI-FI(5GHz) (0); Frequency: 5825 MHz; Duty Cycle: 1:1

Medium: HSL5G; Medium parameters used:  $f = 5825$  MHz;  $\sigma = 5.42$  S/m;  $\epsilon_r = 34.46$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(5.05, 5.05, 5.05); Calibrated: 2018-01-11;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection),  $z = -2.0, 23.0$
- Electronics: DAE4 Sn1428; Calibrated: 2018-01-17
- Phantom: SAM 1; Type: SAM; Serial: 1912
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Head/Area Scan (10x19x1):** Measurement grid:  $dx=10$ mm,  $dy=10$ mm  
Maximum value of SAR (measured) = 2.21 W/kg

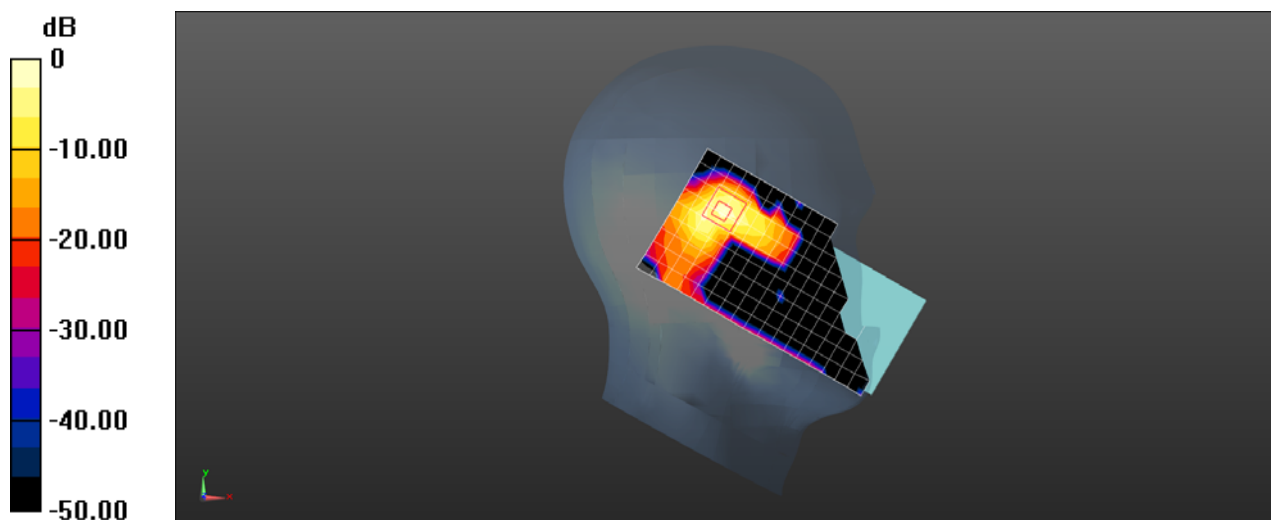
**Configuration/Head/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  $dz=2$ mm

Reference Value = 7.002 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 4.04 W/kg

**SAR(1 g) = 0.812 W/kg; SAR(10 g) = 0.226 W/kg**

Maximum value of SAR (measured) = 2.31 W/kg



0 dB = 2.31 W/kg = 3.64 dBW/kg

Test Laboratory: SGS-SAR Lab

## SONY I4312 802.11a 165CH Front side 15mm

**DUT: I4312; Type: mobile phone; Serial: HQ68AQ0298**

Communication System: UID 0, WI-FI(5GHz) (0); Frequency: 5825 MHz; Duty Cycle: 1:1

Medium: MSL5G; Medium parameters used:  $f = 5825$  MHz;  $\sigma = 6.043$  S/m;  $\epsilon_r = 46.769$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(4.59, 4.59, 4.59); Calibrated: 2018-01-11;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection),  $z = -2.0, 23.0$
- Electronics: DAE4 Sn1428; Calibrated: 2018-01-17
- Phantom: SAM 2; Type: SAM V4.0; Serial: 1640
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (10x19x1):** Measurement grid:  $dx=10$ mm,  $dy=10$ mm  
Maximum value of SAR (measured) = 0.132 W/kg

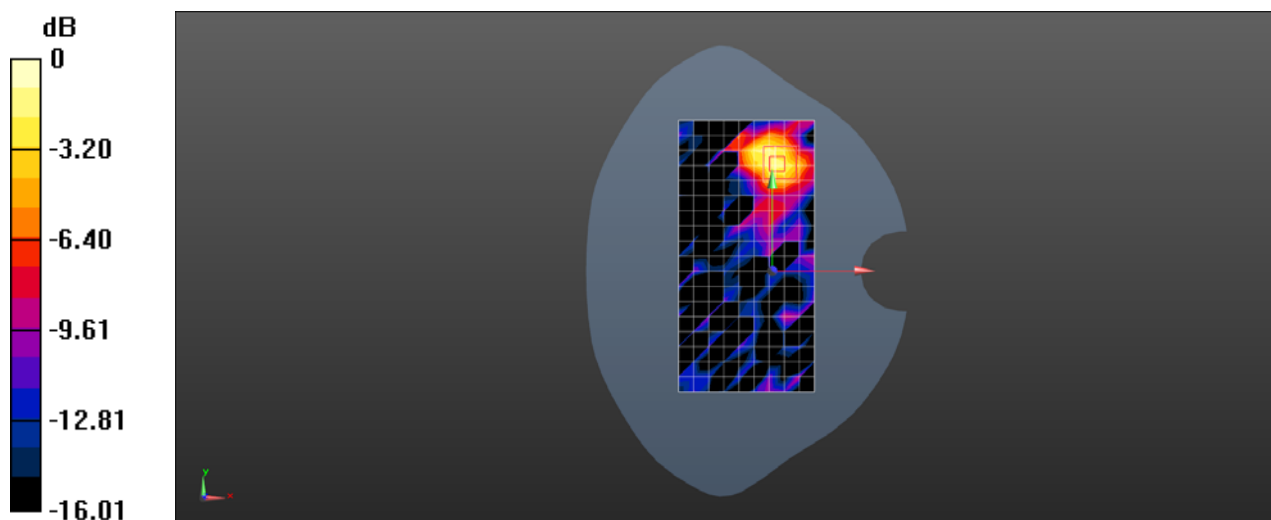
**Configuration/Body/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  $dz=2$ mm

Reference Value = 1.522 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.280 W/kg

**SAR(1 g) = 0.073 W/kg; SAR(10 g) = 0.032 W/kg**

Maximum value of SAR (measured) = 0.176 W/kg



0 dB = 0.176 W/kg = -7.54 dBW/kg

Test Laboratory: SGS-SAR Lab

## SONY I4312 802.11a 157CH Front side 10mm

**DUT: I4312; Type: mobile phone; Serial: HQ68AQ1472**

Communication System: UID 0, WI-FI(5GHz) (0); Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: MSL5G; Medium parameters used:  $f = 5785$  MHz;  $\sigma = 5.989$  S/m;  $\epsilon_r = 46.916$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(4.59, 4.59, 4.59); Calibrated: 2018-01-11;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection),  $z = -2.0, 23.0$
- Electronics: DAE4 Sn1428; Calibrated: 2018-01-17
- Phantom: SAM 2; Type: SAM V4.0; Serial: 1640
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (10x19x1):** Measurement grid:  $dx=10$ mm,  $dy=10$ mm  
Maximum value of SAR (measured) = 0.283 W/kg

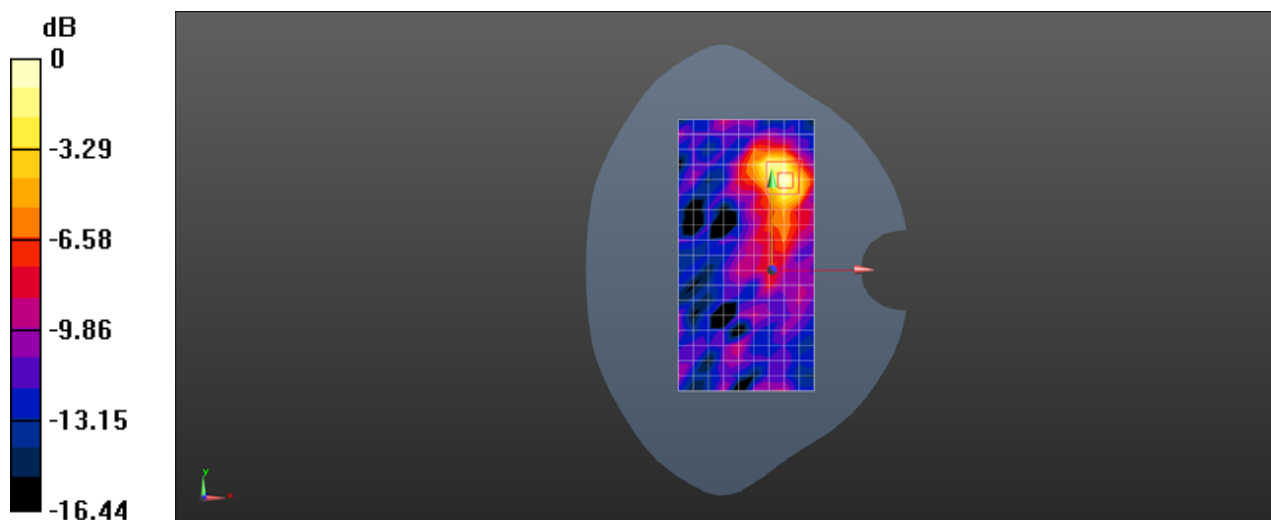
**Configuration/Body/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  $dz=2$ mm

Reference Value = 1.801 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.384 W/kg

**SAR(1 g) = 0.110 W/kg; SAR(10 g) = 0.046 W/kg**

Maximum value of SAR (measured) = 0.242 W/kg



0 dB = 0.242 W/kg = -6.16 dBW/kg

Test Laboratory: SGS-SAR Lab

## SONY I4312 802.11a 140CH Front side 0mm

**DUT: I4312; Type: mobile phone; Serial: HQ68AQ1472**

Communication System: UID 0, WI-FI(5GHz) (0); Frequency: 5700 MHz;Duty Cycle: 1:1

Medium: MSL5G;Medium parameters used:  $f = 5700$  MHz;  $\sigma = 5.916$  S/m;  $\epsilon_r = 47.339$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(4.45, 4.45, 4.45); Calibrated: 2018-01-11;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection),  $z = -2.0, 23.0$
- Electronics: DAE4 Sn1428; Calibrated: 2018-01-17
- Phantom: SAM 2; Type: SAM V4.0; Serial: 1640
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

**Configuration/Body/Area Scan (10x19x1):** Measurement grid:  $dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (measured) = 2.27 W/kg

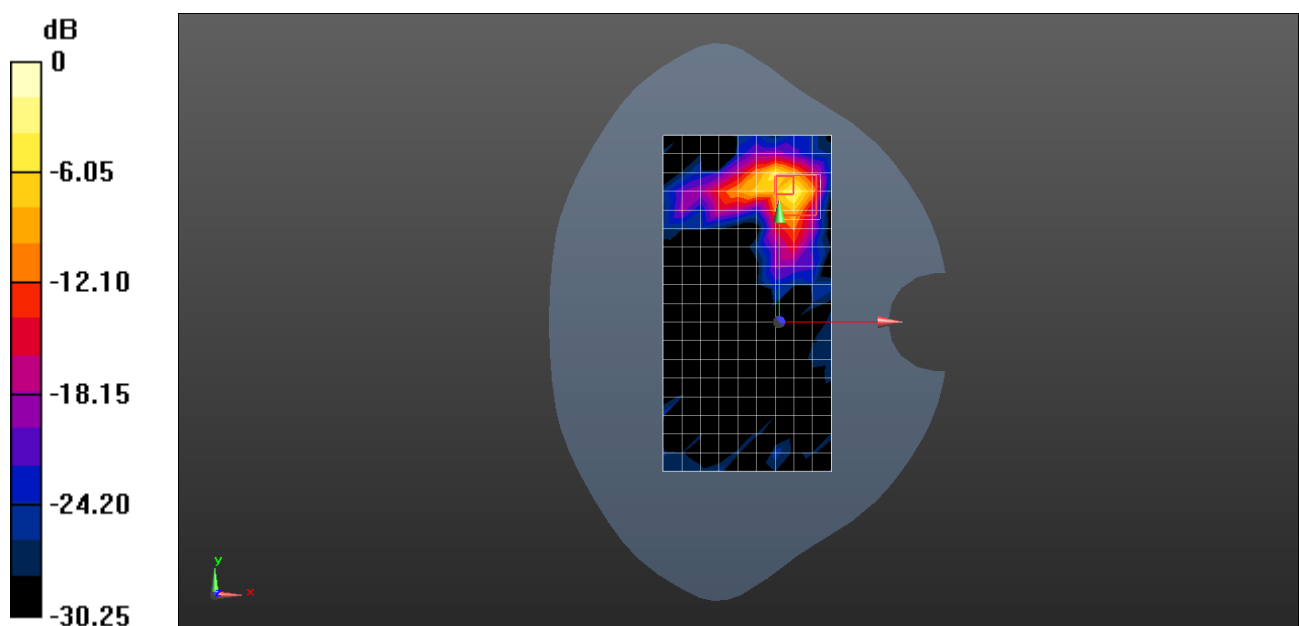
**Configuration/Body/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  $dz=2$ mm

Reference Value = 1.307 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 7.66 W/kg

**SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.277 W/kg**

Maximum value of SAR (measured) = 4.33 W/kg





# Appendix C

## Calibration certificate

|                                |
|--------------------------------|
| 1. Dipole                      |
| D835V2 - SN 4d105(2016-12-08)  |
| D1750V2 - SN 1149(2016-06-23)  |
| D1900V2 - SN 5d028(2016-12-07) |
| D2450V2 - SN 733(2016-12-07)   |
| D2600V2 - SN 1125(2016-06-22)  |
| D5GHzV2 - SN 1165(2016-12-13)  |
| 2. DAE                         |
| DAE4 - SN 1267(2017-11-28)     |
| DAE4 - SN 1428(2018-1-17)      |
| 3. Probe                       |
| EX3DV4 - SN 3962(2018-01-11)   |
| EX3DV4 - SN 3789(2018-02-08)   |



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Client

**SGS(Boce)**

Certificate No: **Z16-97239**

## CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d105**

Calibration Procedure(s) **FD-Z11-003-01**  
**Calibration Procedures for dipole validation kits**

Calibration date: **December 8, 2016**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature( $22\pm 3$ ) $^{\circ}\text{C}$  and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards       | ID #       | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
|-------------------------|------------|------------------------------------------|-----------------------|
| Power Meter NRP2        | 101919     | 27-Jun-16 (CTTL, No.J16X04777)           | Jun-17                |
| Power sensor NRP-Z91    | 101547     | 27-Jun-16 (CTTL, No.J16X04777)           | Jun-17                |
| Reference Probe EX3DV4  | SN 7433    | 26-Sep-16(SPEAG,No.EX3-7433_Sep16)       | Sep-17                |
| DAE4                    | SN 771     | 02-Feb-16(CTTL-SPEAG,No.Z16-97011)       | Feb-17                |
| Secondary Standards     | ID #       | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
| Signal Generator E4438C | MY49071430 | 01-Feb-16 (CTTL, No.J16X00893)           | Jan-17                |
| Network Analyzer E5071C | MY46110673 | 26-Jan-16 (CTTL, No.J16X00894)           | Jan-17                |

|                | Name        | Function                          | Signature |
|----------------|-------------|-----------------------------------|-----------|
| Calibrated by: | Zhao Jing   | SAR Test Engineer                 |           |
| Reviewed by:   | Qi Dianyuan | SAR Project Leader                |           |
| Approved by:   | Lu Bingsong | Deputy Director of the laboratory |           |

Issued: December 11, 2016

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



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### Glossary:

|       |                                            |
|-------|--------------------------------------------|
| TSL   | tissue simulating liquid                   |
| ConvF | sensitivity in TSL / NORM <sub>x,y,z</sub> |
| N/A   | not applicable or not measured             |

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

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) For hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005
- IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

### Additional Documentation:

- DASY4/5 System Handbook

### Methods Applied and Interpretation of Parameters:

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

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



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**Measurement Conditions**

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

|                                     |                          |             |
|-------------------------------------|--------------------------|-------------|
| <b>DASY Version</b>                 | DASY52                   | 52.8.8.1258 |
| <b>Extrapolation</b>                | Advanced Extrapolation   |             |
| <b>Phantom</b>                      | Triple Flat Phantom 5.1C |             |
| <b>Distance Dipole Center - TSL</b> | 15 mm                    | with Spacer |
| <b>Zoom Scan Resolution</b>         | dx, dy, dz = 5 mm        |             |
| <b>Frequency</b>                    | 835 MHz $\pm$ 1 MHz      |             |

**Head TSL parameters**

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Head TSL parameters</b>             | 22.0 °C             | 41.5           | 0.90 mho/m           |
| <b>Measured Head TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 40.8 $\pm$ 6 % | 0.91 mho/m $\pm$ 6 % |
| <b>Head TSL temperature change during test</b> | <1.0 °C             | ----           | ----                 |

**SAR result with Head TSL**

|                                                               |                    |                                                 |
|---------------------------------------------------------------|--------------------|-------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b>   | Condition          |                                                 |
| SAR measured                                                  | 250 mW input power | 2.43 mW / g                                     |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>9.59 mW /g <math>\pm</math> 20.8 % (k=2)</b> |
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b> | Condition          |                                                 |
| SAR measured                                                  | 250 mW input power | 1.59 mW / g                                     |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>6.29 mW /g <math>\pm</math> 20.4 % (k=2)</b> |

**Body TSL parameters**

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Body TSL parameters</b>             | 22.0 °C             | 55.2           | 0.97 mho/m           |
| <b>Measured Body TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 54.7 $\pm$ 6 % | 0.98 mho/m $\pm$ 6 % |
| <b>Body TSL temperature change during test</b> | <1.0 °C             | —              | —                    |

**SAR result with Body TSL**

|                                                               |                    |                                                 |
|---------------------------------------------------------------|--------------------|-------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Body TSL</b>   | Condition          |                                                 |
| SAR measured                                                  | 250 mW input power | 2.44 mW / g                                     |
| SAR for nominal Body TSL parameters                           | normalized to 1W   | <b>9.65 mW /g <math>\pm</math> 20.8 % (k=2)</b> |
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Body TSL</b> | Condition          |                                                 |
| SAR measured                                                  | 250 mW input power | 1.63 mW / g                                     |
| SAR for nominal Body TSL parameters                           | normalized to 1W   | <b>6.46 mW /g <math>\pm</math> 20.4 % (k=2)</b> |



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## Appendix

### Antenna Parameters with Head TSL

|                                      |               |
|--------------------------------------|---------------|
| Impedance, transformed to feed point | 49.2Ω- 3.41jΩ |
| Return Loss                          | - 29.1dB      |

### Antenna Parameters with Body TSL

|                                      |               |
|--------------------------------------|---------------|
| Impedance, transformed to feed point | 45.8Ω- 3.25jΩ |
| Return Loss                          | - 25.1dB      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.500 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 |
|-----------------|-------|



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## DASY5 Validation Report for Head TSL

Date: 12.08.2016

Test Laboratory: CTTL, Beijing, China

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d105**

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.912 \text{ S/m}$ ;  $\epsilon_r = 40.78$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Center Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(9.82, 9.82, 9.82); Calibrated: 9/26/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn771; Calibrated: 2/2/2016
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

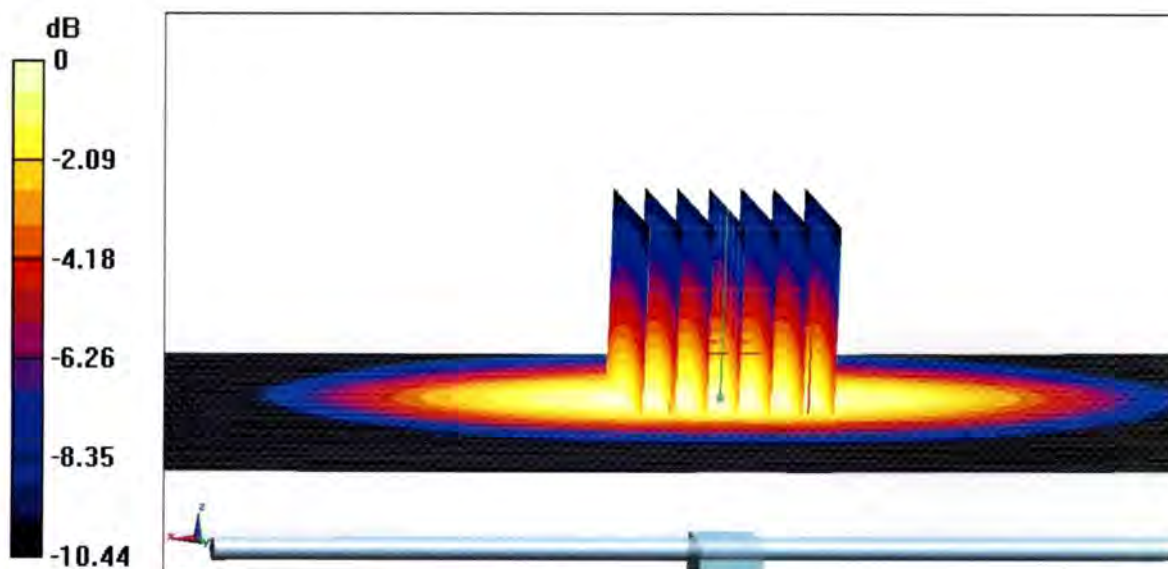
**Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 49.08V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 3.62 W/kg

**SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.59 W/kg**

Maximum value of SAR (measured) = 3.08 W/kg

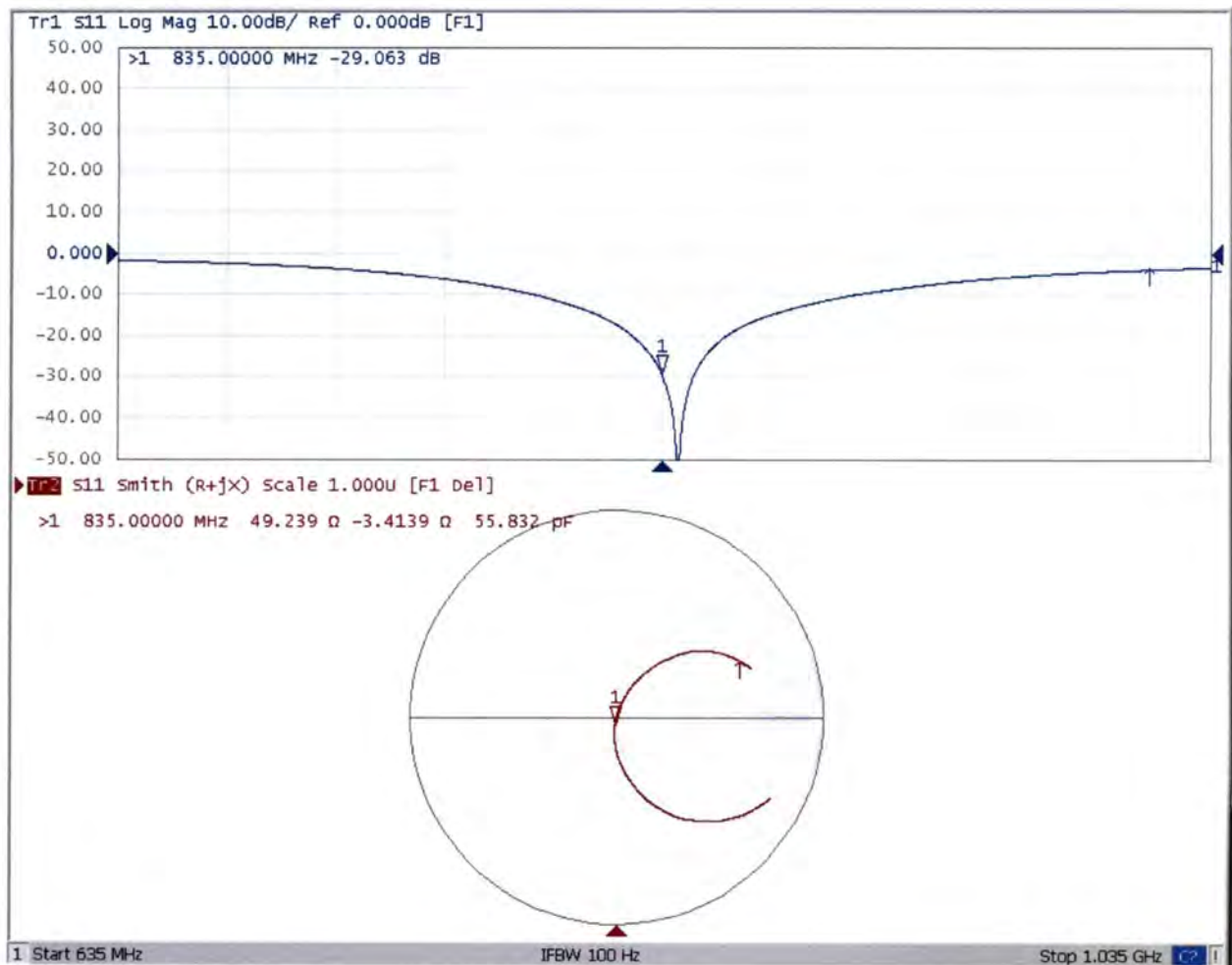


0 dB = 3.08 W/kg = 4.89 dBW/kg



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## Impedance Measurement Plot for Head TSL





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## DASY5 Validation Report for Body TSL

Date: 12.08.2016

Test Laboratory: CTTL, Beijing, China

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d105**

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.983$  S/m;  $\epsilon_r = 54.74$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(9.5,9.5, 9.5); Calibrated: 9/26/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn771; Calibrated: 2/2/2016
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

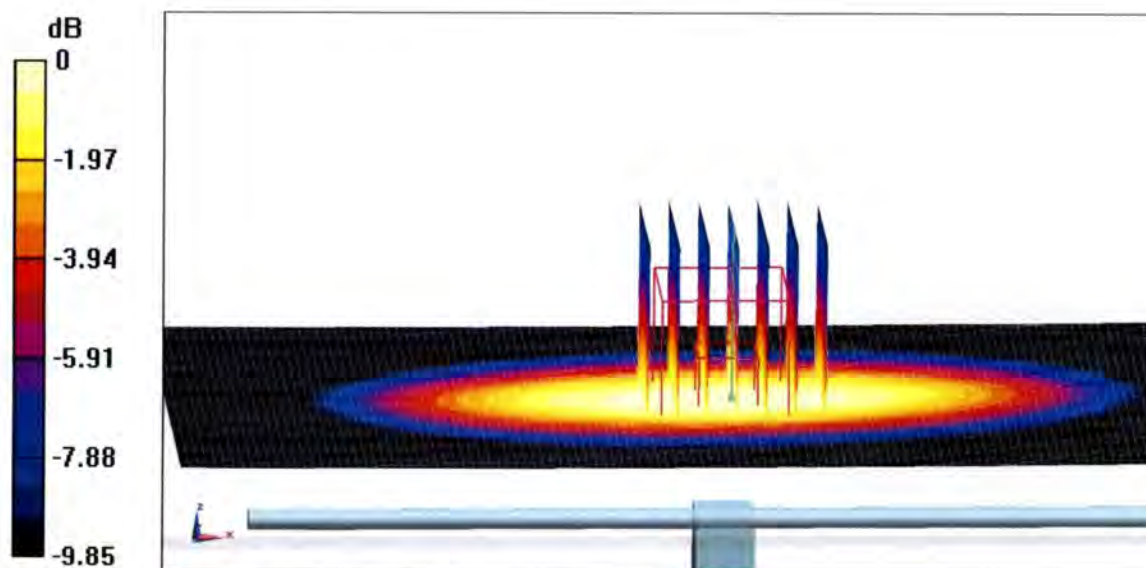
**Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.10 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.54 W/kg

**SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.63 W/kg**

Maximum value of SAR (measured) = 3.06 W/kg

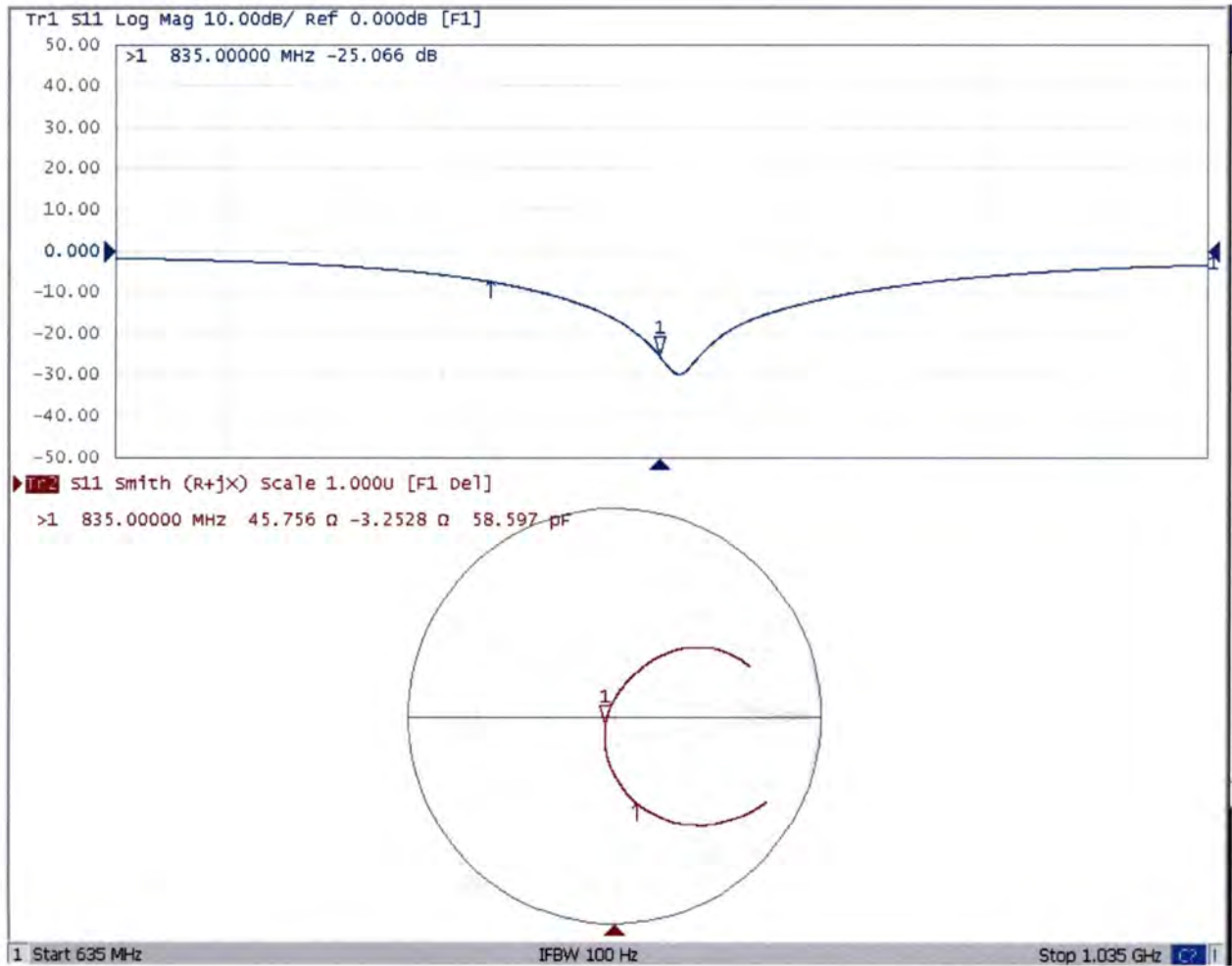


0 dB = 3.06 W/kg = 4.86 dBW/kg



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## Impedance Measurement Plot for Body TSL





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Accreditation No.: **SCS 0108**

Client **SGS-SZ (Auden)**

Certificate No: **D1750V2-1149\_Jun16**

## CALIBRATION CERTIFICATE

Object **D1750V2 - SN:1149**

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

Calibration date: **June 23, 2016**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature  $(22 \pm 3)^{\circ}\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards           | ID #               | Cal Date (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter NRP             | SN: 104778         | 06-Apr-16 (No. 217-02288/02289)   | Apr-17                 |
| Power sensor NRP-Z91        | SN: 103244         | 06-Apr-16 (No. 217-02288)         | Apr-17                 |
| Power sensor NRP-Z91        | SN: 103245         | 06-Apr-16 (No. 217-02289)         | Apr-17                 |
| Reference 20 dB Attenuator  | SN: 5058 (20k)     | 05-Apr-16 (No. 217-02292)         | Apr-17                 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 05-Apr-16 (No. 217-02295)         | Apr-17                 |
| Reference Probe EX3DV4      | SN: 7349           | 15-Jun-16 (No. EX3-7349_Jun16)    | Jun-17                 |
| DAE4                        | SN: 601            | 30-Dec-15 (No. DAE4-601_Dec15)    | Dec-16                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power meter EPM-442A        | SN: GB37480704     | 07-Oct-15 (No. 217-02222)         | In house check: Oct-16 |
| Power sensor HP 8481A       | SN: US37292783     | 07-Oct-15 (No. 217-02222)         | In house check: Oct-16 |
| Power sensor HP 8481A       | SN: MY41092317     | 07-Oct-15 (No. 217-02223)         | In house check: Oct-16 |
| RF generator R&S SMT-06     | SN: 100972         | 15-Jun-15 (in house check Jun-15) | In house check: Oct-16 |
| Network Analyzer HP 8753E   | SN: US37390585     | 18-Oct-01 (in house check Oct-15) | In house check: Oct-16 |

Calibrated by: **Michael Weber**      Function: **Laboratory Technician**

Signature

Approved by: **Katja Pokovic**      Technical Manager

Issued: June 28, 2016

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Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

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Multilateral Agreement for the recognition of calibration certificates

**Glossary:**

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

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

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

**Additional Documentation:**

- DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

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

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

## Measurement Conditions

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

|                              |                        |             |
|------------------------------|------------------------|-------------|
| DASY Version                 | DASY5                  | V52.8.8     |
| Extrapolation                | Advanced Extrapolation |             |
| Phantom                      | Modular Flat Phantom   |             |
| Distance Dipole Center - TSL | 10 mm                  | with Spacer |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm      |             |
| Frequency                    | 1750 MHz $\pm$ 1 MHz   |             |

## Head TSL parameters

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters             | 22.0 °C             | 40.1           | 1.37 mho/m           |
| Measured Head TSL parameters            | (22.0 $\pm$ 0.2) °C | 39.8 $\pm$ 6 % | 1.36 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | < 0.5 °C            | ----           | ----                 |

## SAR result with Head TSL

|                                                       |                    |                              |
|-------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                              |
| SAR measured                                          | 250 mW input power | 9.16 W/kg                    |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 36.7 W/kg $\pm$ 17.0 % (k=2) |

|                                                         |                    |                              |
|---------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                              |
| SAR measured                                            | 250 mW input power | 4.87 W/kg                    |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 19.5 W/kg $\pm$ 16.5 % (k=2) |

## Body TSL parameters

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Body TSL parameters             | 22.0 °C             | 53.4           | 1.49 mho/m           |
| Measured Body TSL parameters            | (22.0 $\pm$ 0.2) °C | 53.8 $\pm$ 6 % | 1.50 mho/m $\pm$ 6 % |
| Body TSL temperature change during test | < 0.5 °C            | ----           | ----                 |

## SAR result with Body TSL

|                                                       |                    |                              |
|-------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                              |
| SAR measured                                          | 250 mW input power | 9.27 W/kg                    |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 37.0 W/kg $\pm$ 17.0 % (k=2) |

|                                                         |                    |                              |
|---------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                              |
| SAR measured                                            | 250 mW input power | 4.93 W/kg                    |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 19.7 W/kg $\pm$ 16.5 % (k=2) |

## Appendix (Additional assessments outside the scope of SCS 0108)

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 49.0 $\Omega$ - 0.5 j $\Omega$ |
| Return Loss                          | - 38.7 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 43.6 $\Omega$ + 0.0 j $\Omega$ |
| Return Loss                          | - 23.3 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.213 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 | April 10, 2015 |

## DASY5 Validation Report for Head TSL

Date: 23.06.2016

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1149**

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used:  $f = 1750$  MHz;  $\sigma = 1.36$  S/m;  $\epsilon_r = 39.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.46, 8.46, 8.46); 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(1222); SEMCAD X 14.6.10(7372)

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

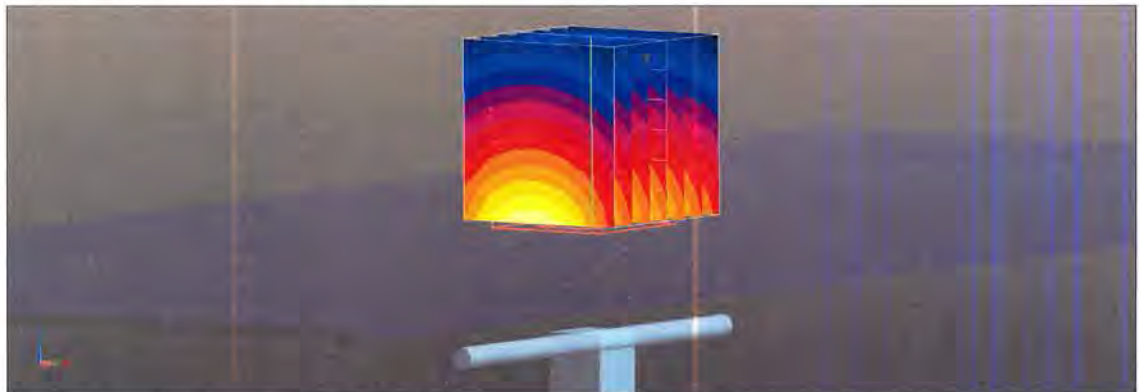
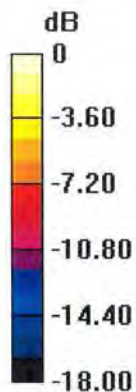
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 105.0 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 16.7 W/kg

**SAR(1 g) = 9.16 W/kg; SAR(10 g) = 4.87 W/kg**

Maximum value of SAR (measured) = 13.9 W/kg



0 dB = 13.9 W/kg = 11.43 dBW/kg

## Impedance Measurement Plot for Head TSL

CH1 S11 1 U FS 23 Jun 2016 10:05:27  
1: 48.973  $\Omega$  -511.72 m $\Omega$  177.73 pF 1 750.000 000 MHz

\*

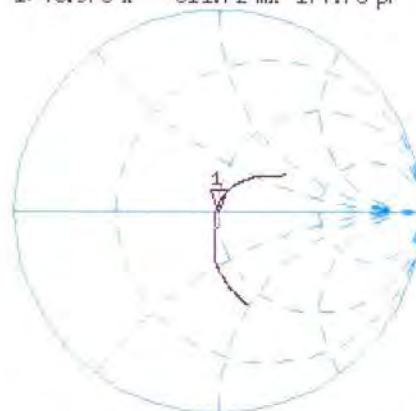
De1

CA

Avg

16

H1d



CH2 S11 LOG 5 dB/REF -20 dB 1: -38.724 dB 1 750.000 000 MHz

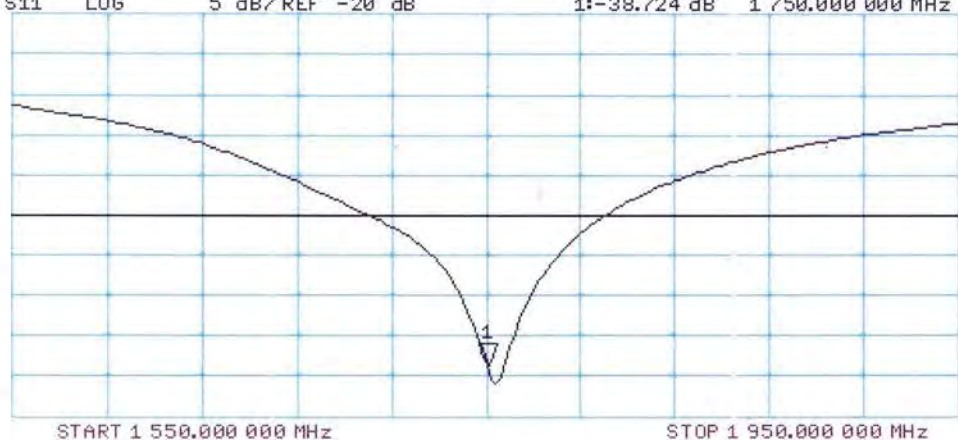
De1

CA

Avg

16

H1d



START 1 550.000 000 MHz

STOP 1 950.000 000 MHz

## DASY5 Validation Report for Body TSL

Date: 23.06.2016

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1149**

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used:  $f = 1750$  MHz;  $\sigma = 1.5$  S/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.25, 8.25, 8.25); 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:

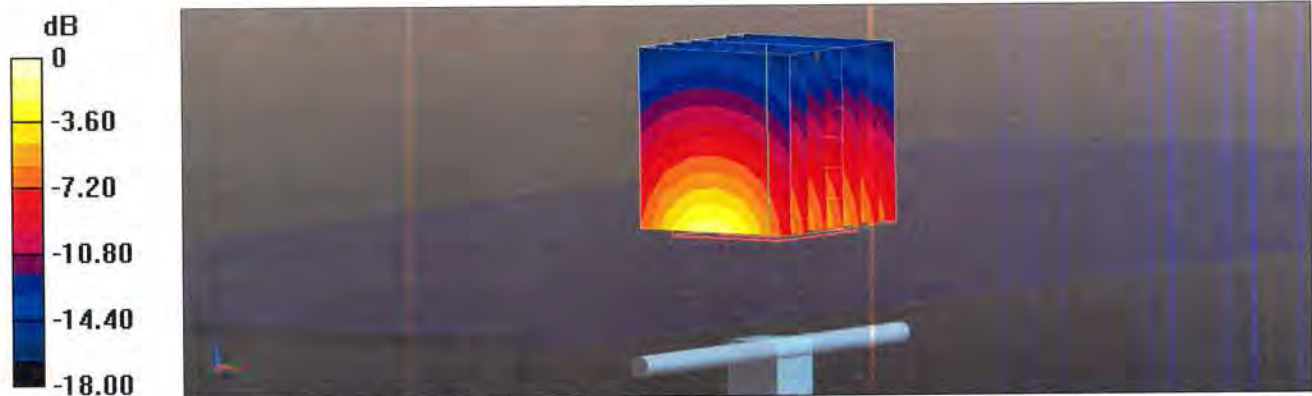
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 100.6 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 16.4 W/kg

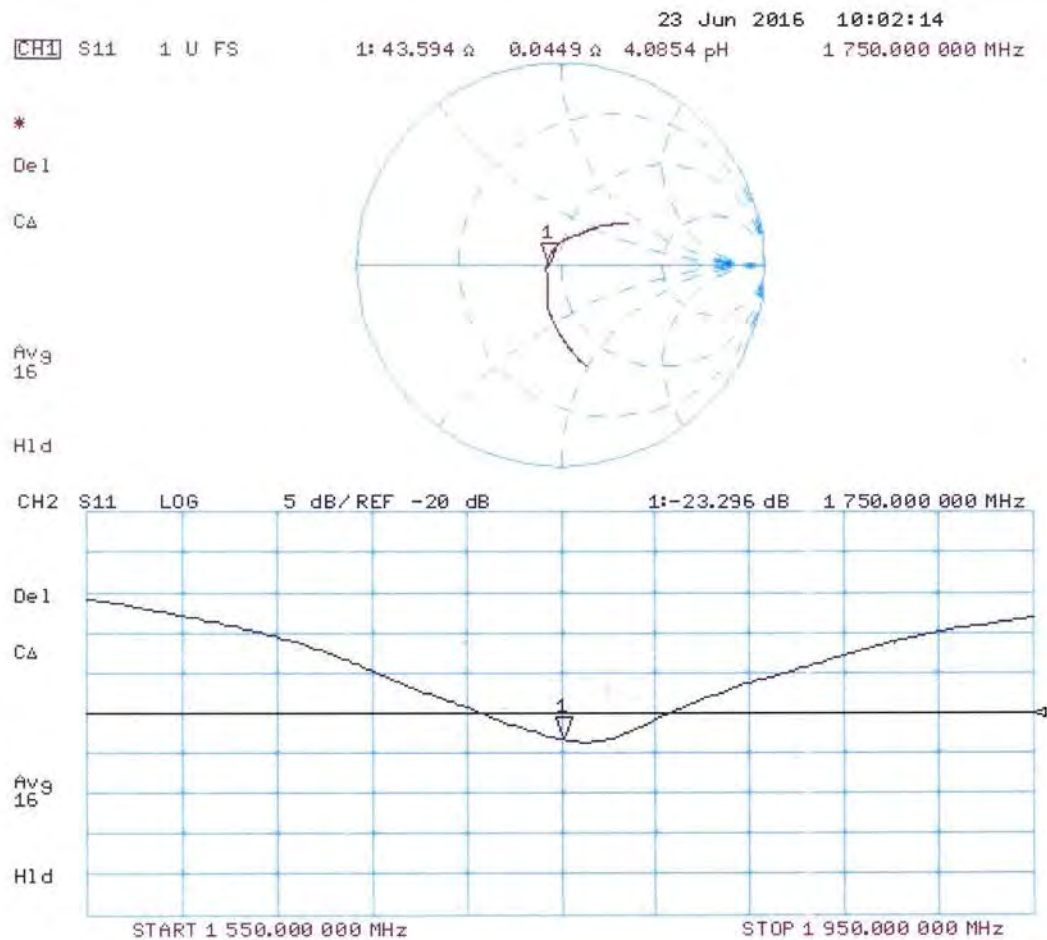
**SAR(1 g) = 9.27 W/kg; SAR(10 g) = 4.93 W/kg**

Maximum value of SAR (measured) = 13.9 W/kg



0 dB = 13.9 W/kg = 11.43 dBW/kg

Impedance Measurement Plot for Body TSL





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Client

**SGS(Boce)**

Certificate No: **Z16-97240**

## CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d028**

Calibration Procedure(s) **FD-Z11-003-01**  
**Calibration Procedures for dipole validation kits**

Calibration date: **December 7, 2016**

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards       | ID #       | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
|-------------------------|------------|------------------------------------------|-----------------------|
| Power Meter NRP2        | 101919     | 27-Jun-16 (CTTL, No.J16X04777)           | Jun-17                |
| Power sensor NRP-Z91    | 101547     | 27-Jun-16 (CTTL, No.J16X04777)           | Jun-17                |
| Reference Probe EX3DV4  | SN 7433    | 26-Sep-16(SPEAG,No.EX3-7433_Sep16)       | Sep-17                |
| DAE4                    | SN 771     | 02-Feb-16(CTTL-SPEAG,No.Z16-97011)       | Feb-17                |
| Secondary Standards     | ID #       | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
| Signal Generator E4438C | MY49071430 | 01-Feb-16 (CTTL, No.J16X00893)           | Jan-17                |
| Network Analyzer E5071C | MY46110673 | 26-Jan-16 (CTTL, No.J16X00894)           | Jan-17                |

|                | Name        | Function                          | Signature |
|----------------|-------------|-----------------------------------|-----------|
| Calibrated by: | Zhao Jing   | SAR Test Engineer                 |           |
| Reviewed by:   | Qi Dianyuan | SAR Project Leader                |           |
| Approved by:   | Lu Bingsong | Deputy Director of the laboratory |           |

Issued: December 11, 2016

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



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### Glossary:

|       |                                            |
|-------|--------------------------------------------|
| TSL   | tissue simulating liquid                   |
| ConvF | sensitivity in TSL / NORM <sub>x,y,z</sub> |
| N/A   | not applicable or not measured             |

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

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) For hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005
- IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

### Additional Documentation:

- DASY4/5 System Handbook

### Methods Applied and Interpretation of Parameters:

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

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



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**Measurement Conditions**

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

|                                     |                          |             |
|-------------------------------------|--------------------------|-------------|
| <b>DASY Version</b>                 | DASY52                   | 52.8.8.1258 |
| <b>Extrapolation</b>                | Advanced Extrapolation   |             |
| <b>Phantom</b>                      | Triple Flat Phantom 5.1C |             |
| <b>Distance Dipole Center - TSL</b> | 10 mm                    | with Spacer |
| <b>Zoom Scan Resolution</b>         | dx, dy, dz = 5 mm        |             |
| <b>Frequency</b>                    | 1900 MHz $\pm$ 1 MHz     |             |

**Head TSL parameters**

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Head TSL parameters</b>             | 22.0 °C             | 40.0           | 1.40 mho/m           |
| <b>Measured Head TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 40.2 $\pm$ 6 % | 1.38 mho/m $\pm$ 6 % |
| <b>Head TSL temperature change during test</b> | <1.0 °C             | ---            | ---                  |

**SAR result with Head TSL**

|                                                               |                    |                                                  |
|---------------------------------------------------------------|--------------------|--------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b>   | Condition          |                                                  |
| SAR measured                                                  | 250 mW input power | 10.1 mW / g                                      |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>40.7 mW / g <math>\pm</math> 20.8 % (k=2)</b> |
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b> | Condition          |                                                  |
| SAR measured                                                  | 250 mW input power | 5.24 mW / g                                      |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>21.1 mW / g <math>\pm</math> 20.4 % (k=2)</b> |

**Body TSL parameters**

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Body TSL parameters</b>             | 22.0 °C             | 53.3           | 1.52 mho/m           |
| <b>Measured Body TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 54.3 $\pm$ 6 % | 1.51 mho/m $\pm$ 6 % |
| <b>Body TSL temperature change during test</b> | <1.0 °C             | ---            | ---                  |

**SAR result with Body TSL**

|                                                               |                    |                                                  |
|---------------------------------------------------------------|--------------------|--------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Body TSL</b>   | Condition          |                                                  |
| SAR measured                                                  | 250 mW input power | 10.3 mW / g                                      |
| SAR for nominal Body TSL parameters                           | normalized to 1W   | <b>41.6 mW / g <math>\pm</math> 20.8 % (k=2)</b> |
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Body TSL</b> | Condition          |                                                  |
| SAR measured                                                  | 250 mW input power | 5.32 mW / g                                      |
| SAR for nominal Body TSL parameters                           | normalized to 1W   | <b>21.4 mW / g <math>\pm</math> 20.4 % (k=2)</b> |



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## Appendix

### Antenna Parameters with Head TSL

|                                      |                            |
|--------------------------------------|----------------------------|
| Impedance, transformed to feed point | $51.8\Omega + 5.90j\Omega$ |
| Return Loss                          | - 24.4dB                   |

### Antenna Parameters with Body TSL

|                                      |                            |
|--------------------------------------|----------------------------|
| Impedance, transformed to feed point | $48.1\Omega + 5.82j\Omega$ |
| Return Loss                          | - 24.1dB                   |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.306 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 |
|-----------------|-------|



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## DASY5 Validation Report for Head TSL

Date: 12.07.2016

Test Laboratory: CTTL, Beijing, China

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d028**

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.383$  S/m;  $\epsilon_r = 40.16$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Center Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(7.98, 7.98, 7.98); Calibrated: 9/26/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn771; Calibrated: 2/2/2016
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

**System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid:

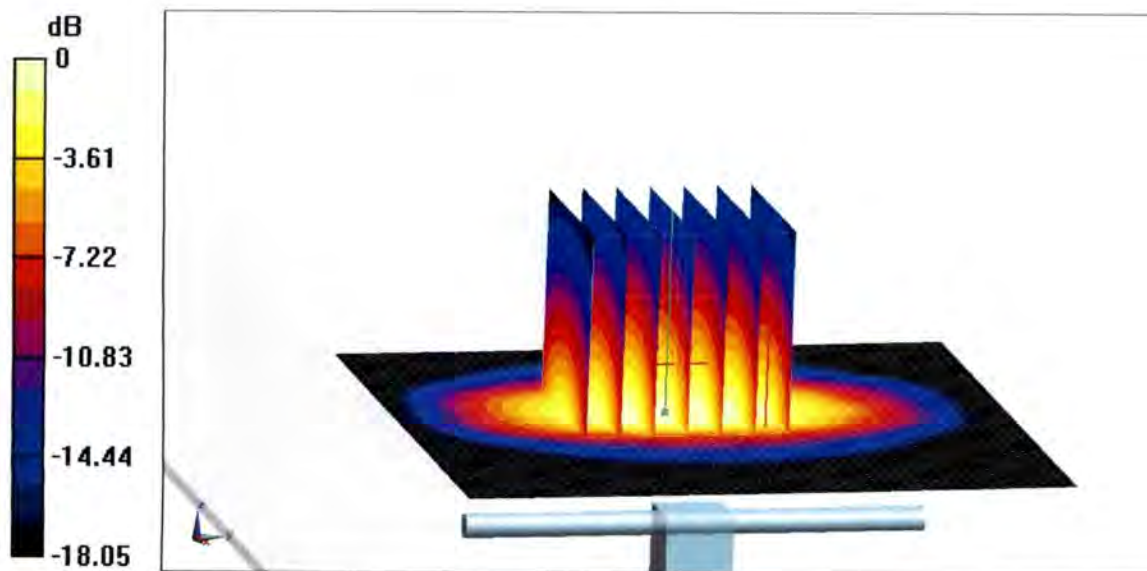
$dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 102.5 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 18.7 W/kg

**SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.24 W/kg**

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

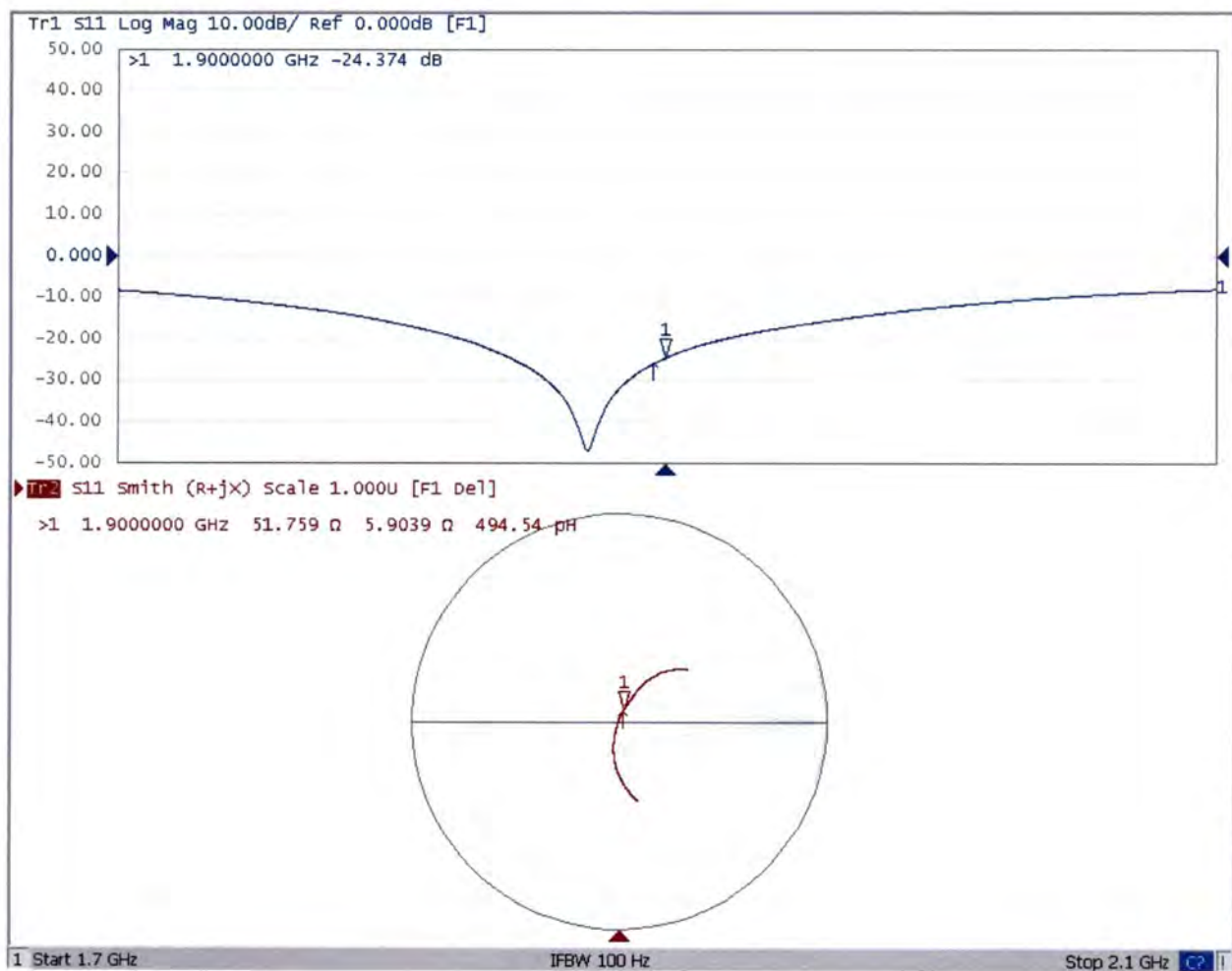


0 dB = 14.4 W/kg = 11.58 dBW/kg



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## Impedance Measurement Plot for Head TSL





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## DASY5 Validation Report for Body TSL

Date: 12.07.2016

Test Laboratory: CTTL, Beijing, China

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d028**

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.506$  S/m;  $\epsilon_r = 54.26$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(7.7, 7.7, 7.7); Calibrated: 9/26/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn771; Calibrated: 2/2/2016
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

**System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid:

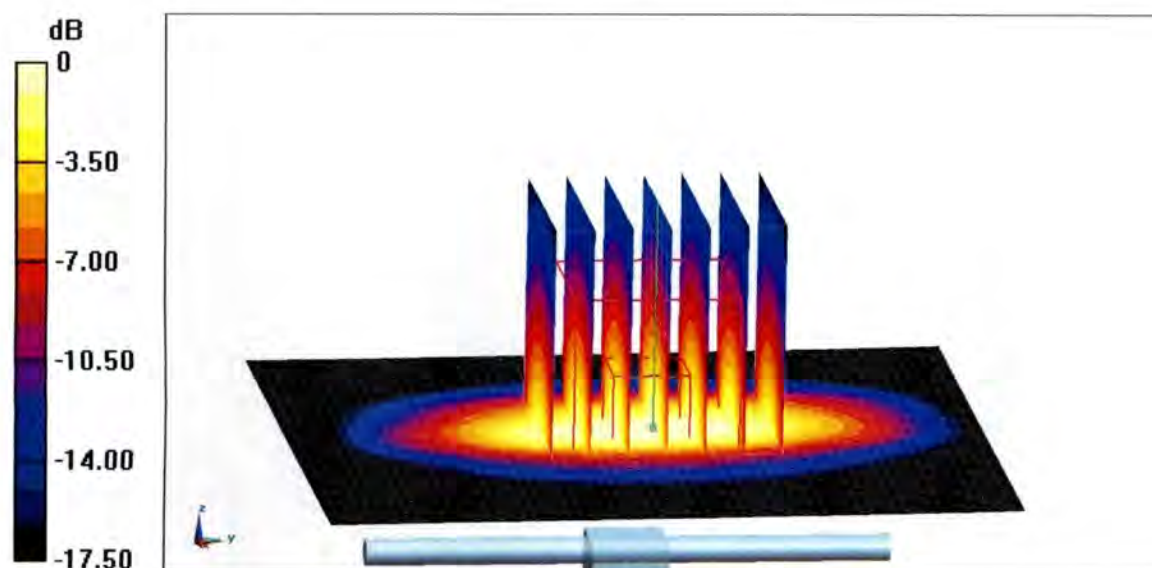
$dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 99.69 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 18.8 W/kg

**SAR(1 g) = 10.3 W/kg; SAR(10 g) = 5.32 W/kg**

Maximum value of SAR (measured) = 14.8 W/kg



**0 dB = 14.8 W/kg = 11.70 dBW/kg**



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## Impedance Measurement Plot for Body TSL

