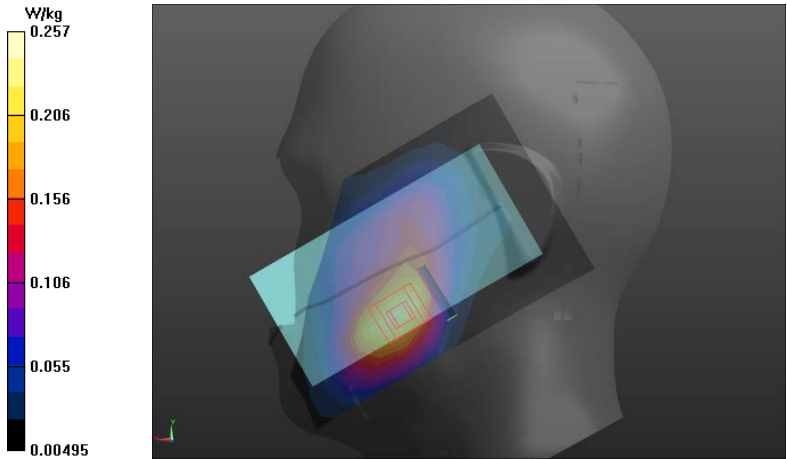
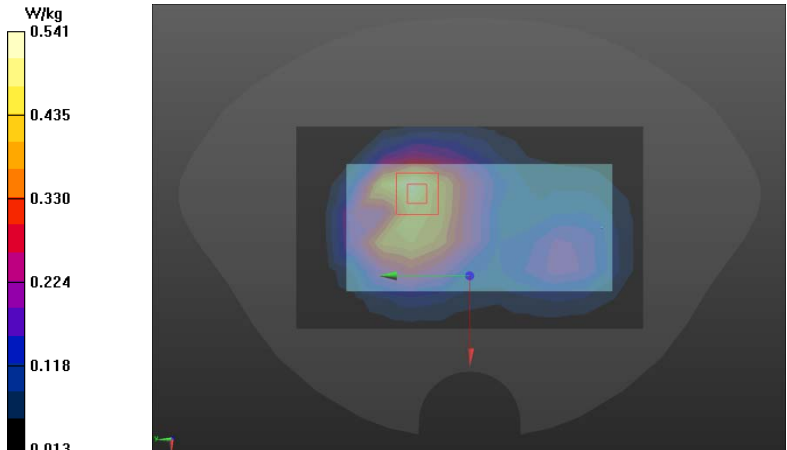
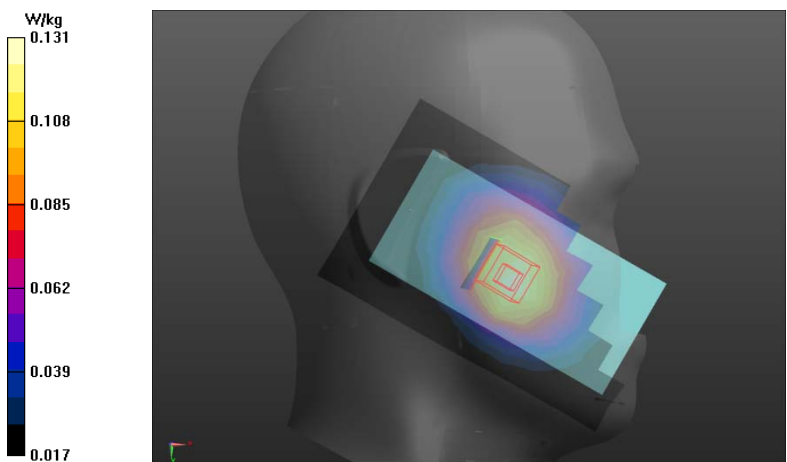


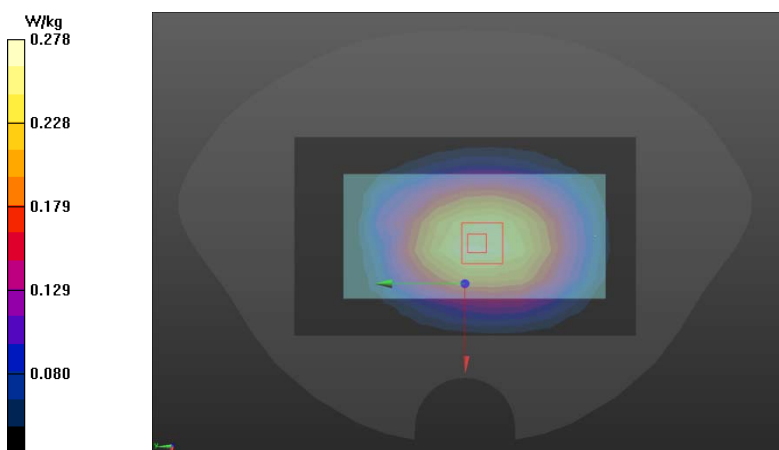
LTE (Band4 20BW)

Left Side	Cheek
Communication System: UID 10169 - CAC, LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 1732.5 MHz Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.363$ S/m; $\epsilon_r = 40.678$; $\rho = 1000$ kg/m³ Phantom section: Left Section DASY5 Configuration: - Probe: ES3DV3 - SN3127; ConvF(5.06, 5.06, 5.06); Calibrated: 10/11/2017, ConvF(5.06, 5.06, 5.06); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1559; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) LTE BAND4 LEFT/LTE BAND4 LC 1RB/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.249 W/kg LTE BAND4 LEFT/LTE BAND4 LC 1RB/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 4.793 V/m; Power Drift = 0.13 dB Peak SAR (extrapolated) = 0.338 W/kg SAR(1 g) = 0.219 W/kg; SAR(10 g) = 0.139 W/kg Maximum value of SAR (measured) = 0.257 W/kg	
	

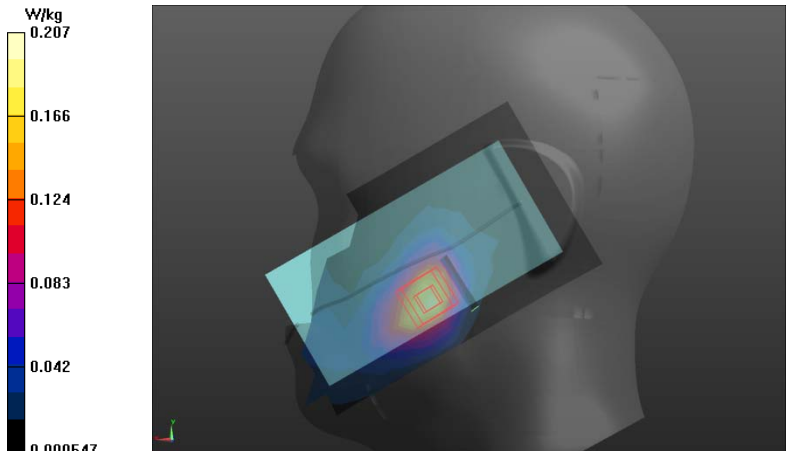
FLAT	Towards ground
Communication System: UID 10169 - CAC, LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 1732.5 MHz Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.468$ S/m; $\epsilon_r = 52.935$; $\rho = 1000$ kg/m³ Phantom section: Flat Section DASY5 Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.83, 4.83, 4.83); Calibrated: 10/11/2017, ConvF(4.83, 4.83, 4.83); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) LTE band4 TG/LTE band4 TG M 10mm 1RB/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.522 W/kg LTE band4 TG/LTE band4 TG M 10mm 1RB/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 13.25 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 0.710 W/kg SAR(1 g) = 0.434 W/kg; SAR(10 g) = 0.259 W/kg Maximum value of SAR (measured) = 0.541 W/kg 	

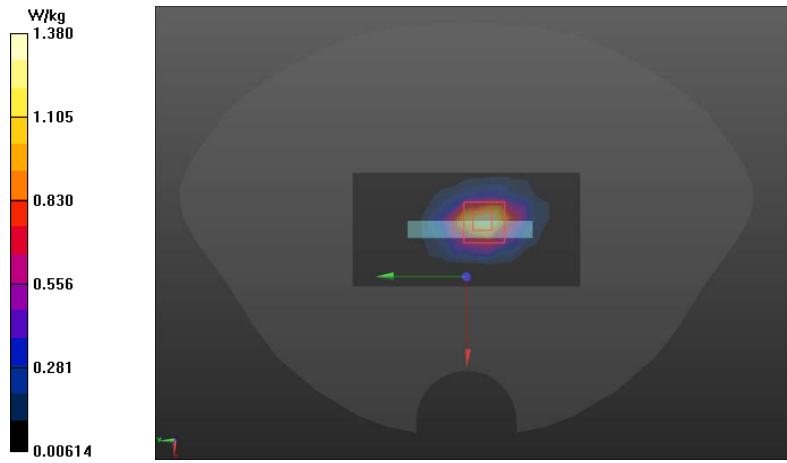
LTE (Band5 10BW)

Right Side	Cheek
Communication System: UID 10154 - CAD, LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK); Frequency: 836.5 MHz Medium parameters used (interpolated): $f = 836.5$ MHz; $\sigma = 0.913$ S/m; $\epsilon_r = 42.521$; $\rho = 1000$ kg/m³ Phantom section: Right Section DASY5 Configuration: - Probe: ES3DV3 - SN3127; ConvF(6.15, 6.15, 6.15); Calibrated: 10/11/2017, ConvF(6.15, 6.15, 6.15); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1559; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) LTE BAND5 RIGHT/LTE BAND5 RC 50%RB/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.133 W/kg LTE BAND5 RIGHT/LTE BAND5 RC 50%RB/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 4.446 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 0.151 W/kg SAR(1 g) = 0.120 W/kg; SAR(10 g) = 0.090 W/kg Maximum value of SAR (measured) = 0.131 W/kg 	

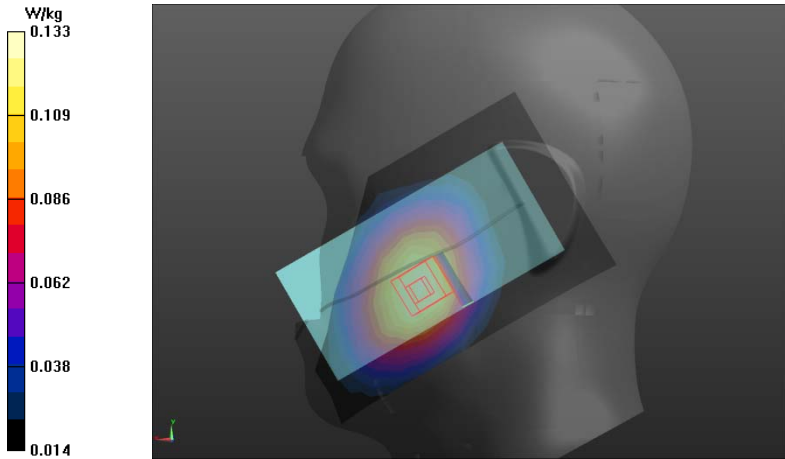
FLAT	Towards ground
Communication System: UID 10154 - CAD, LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK); Frequency: 836.5 MHz Medium parameters used (interpolated): $f = 836.5$ MHz; $\sigma = 0.975$ S/m; $\epsilon_r = 54.535$; $\rho = 1000$ kg/m³ Phantom section: Flat Section DASY5 Configuration: - Probe: ES3DV3 - SN3127; ConvF(6.06, 6.06, 6.06); Calibrated: 10/11/2017, ConvF(6.06, 6.06, 6.06); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) LTE band5 TG/LTE band5 TG M 10mm 50%RB/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.264 W/kg LTE band5 TG/LTE band5 TG M 10mm 50%RB/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 16.53 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 0.330 W/kg SAR(1 g) = 0.249 W/kg; SAR(10 g) = 0.183 W/kg Maximum value of SAR (measured) = 0.278 W/kg 	

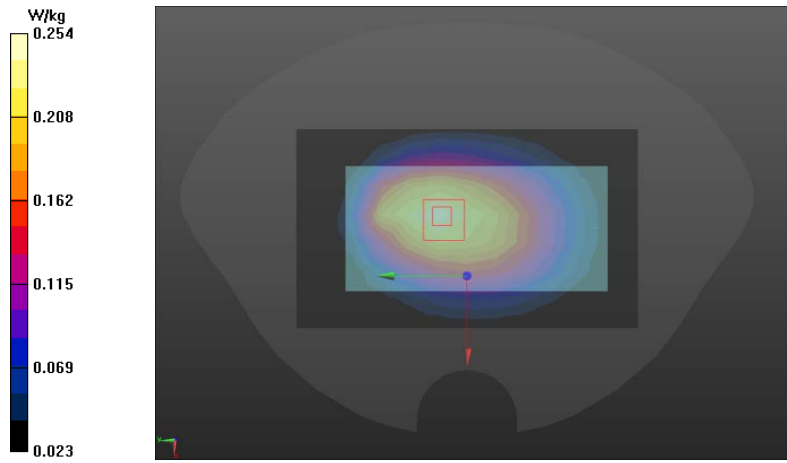
LTE (Band7 20BW)

Left Side	Cheek
Communication System: UID 10297 - AAB, LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK); Frequency: 2535 MHz Medium parameters used (interpolated): $f = 2535$ MHz; $\sigma = 1.951$ S/m; $\epsilon_r = 39.388$; $\rho = 1000$ kg/m³ Phantom section: Left Section DASY5 Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.32, 4.32, 4.32); Calibrated: 10/11/2017, ConvF(4.32, 4.32, 4.32); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1559; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) LTE BAND7 LEFT/LTE BAND7 LC 50%RB/Area Scan (9x15x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.189 W/kg LTE BAND7 LEFT/LTE BAND7 LC 50%RB/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 1.340 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 0.306 W/kg SAR(1 g) = 0.164 W/kg; SAR(10 g) = 0.085 W/kg Maximum value of SAR (measured) = 0.207 W/kg	
	

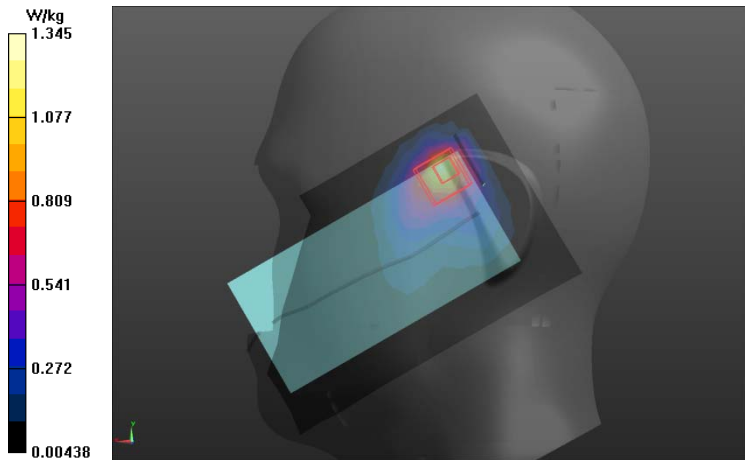
FLAT	Edge2
Communication System: UID 10169 - CAC, LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 2560 MHz Medium parameters used (interpolated): $f = 2560$ MHz; $\sigma = 2.165$ S/m; $\epsilon_r = 51.736$; $\rho = 1000$ kg/m³ Phantom section: Flat Section DASY5 Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.07, 4.07, 4.07); Calibrated: 10/11/2017, ConvF(4.07, 4.07, 4.07); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) LTE BAND7 HOT/LTE BAND7 M edge 2 1RB H 2/Area Scan (6x11x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 1.49 W/kg LTE BAND7 HOT/LTE BAND7 M edge 2 1RB H 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 23.00 V/m; Power Drift = -0.04 dB Peak SAR (extrapolated) = 2.16 W/kg SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.472 W/kg Maximum value of SAR (measured) = 1.38 W/kg 	

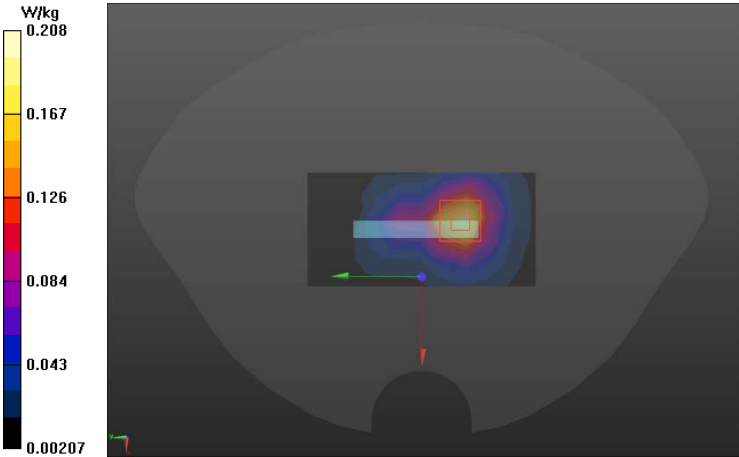
LTE (Band12 10BW)

Left Side	Cheek
Communication System: UID 10175 - CAD, LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK); Frequency: 707.5 MHz Medium parameters used (interpolated): $f = 707.5$ MHz; $\sigma = 0.865$ S/m; $\epsilon_r = 42.969$; $\rho = 1000$ kg/m³ Phantom section: Left Section DASY5 Configuration: - Probe: ES3DV3 - SN3127; ConvF(6.26, 6.26, 6.26); Calibrated: 10/11/2017, ConvF(6.26, 6.26, 6.26); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1559; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) LTE BAND12 LEFT/LTE BAND12 LC 50%RB/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.126 W/kg LTE BAND12 LEFT/LTE BAND12 LC 50%RB/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 2.757 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 0.159 W/kg SAR(1 g) = 0.120 W/kg; SAR(10 g) = 0.089 W/kg Maximum value of SAR (measured) = 0.133 W/kg 	

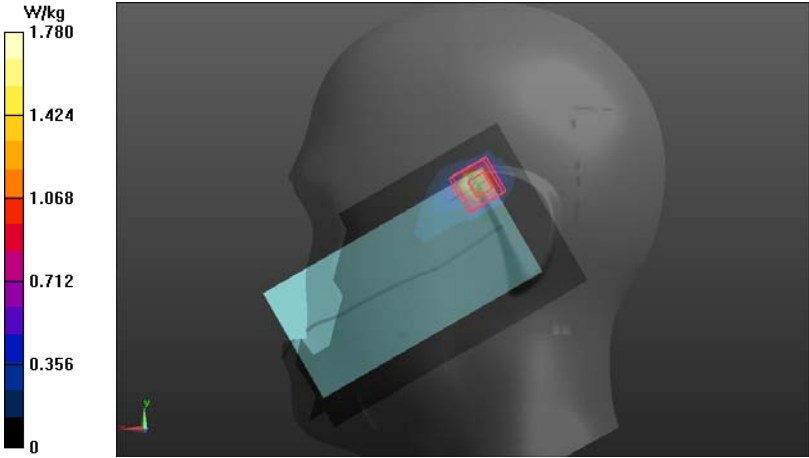
FLAT	Towards ground
Communication System: UID 10154 - CAD, LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK); Frequency: 707.5 MHz Medium parameters used (interpolated): $f = 707.5$ MHz; $\sigma = 0.929$ S/m; $\epsilon_r = 54.923$; $\rho = 1000$ kg/m³ Phantom section: Flat Section DASY5 Configuration: - Probe: ES3DV3 - SN3127; ConvF(6.18, 6.18, 6.18); Calibrated: 10/11/2017, ConvF(6.18, 6.18, 6.18); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) LTE band12 TG/LTE band12 TG M 10mm 50%RB/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.251 W/kg LTE band12 TG/LTE band12 TG M 10mm 50%RB/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 15.69 V/m; Power Drift = 0.08 dB Peak SAR (extrapolated) = 0.308 W/kg SAR(1 g) = 0.225 W/kg; SAR(10 g) = 0.161 W/kg Maximum value of SAR (measured) = 0.254 W/kg 	

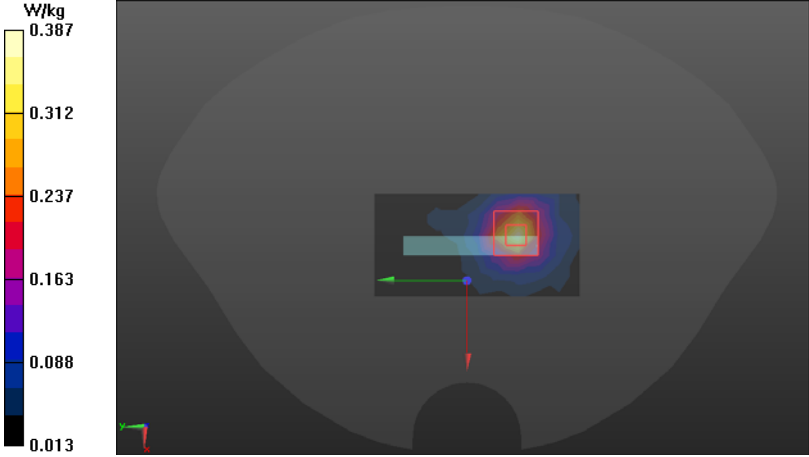
WLAN 2.4GHz

Left Side	Cheek
Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps); Frequency: 2437 MHz Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.871$ S/m; $\epsilon_r = 39.57$; $\rho = 1000$ kg/m³ Phantom section: Left Section DASY5 Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.58, 4.58, 4.58); Calibrated: 10/11/2017, ConvF(4.58, 4.58, 4.58); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1559; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) Head-Section HSL wifi Left Head/wifi HSL touch M/Area Scan (10x16x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 1.31 W/kg Head-Section HSL wifi Left Head/wifi HSL touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 14.94 V/m; Power Drift = -0.17 dB Peak SAR (extrapolated) = 2.34 W/kg SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.481 W/kg Maximum value of SAR (measured) = 1.34 W/kg	
	

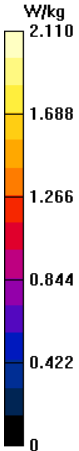
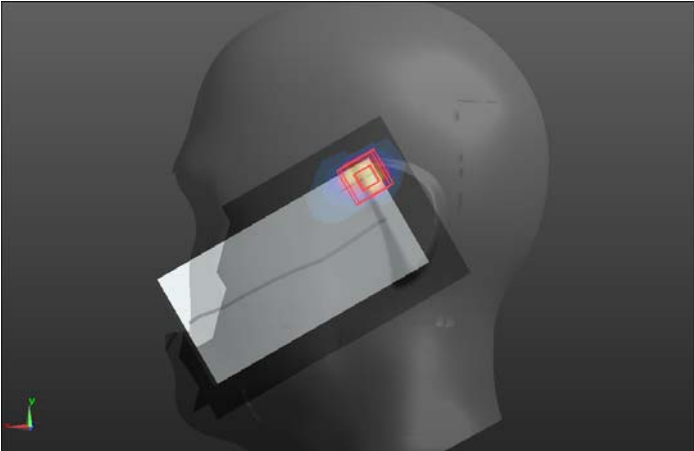
FLAT	EDGE1
Communication System: UID 10012 - CAB, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps); Frequency: 2437 MHz Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 2.053$ S/m; $\epsilon_r = 51.97$; $\rho = 1000$ kg/m³ Phantom section: Flat Section DASY5 Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.28, 4.28, 4.28); Calibrated: 10/11/2017, ConvF(4.28, 4.28, 4.28); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) Flat-Section MSL WIFI HOT/WIFI M edge 1/Area Scan (6x11x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.199 W/kg Flat-Section MSL WIFI HOT/WIFI M edge 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 6.641 V/m; Power Drift = -0.12 dB Peak SAR (extrapolated) = 0.299 W/kg SAR(1 g) = 0.166 W/kg; SAR(10 g) = 0.087 W/kg Maximum value of SAR (measured) = 0.208 W/kg	
	

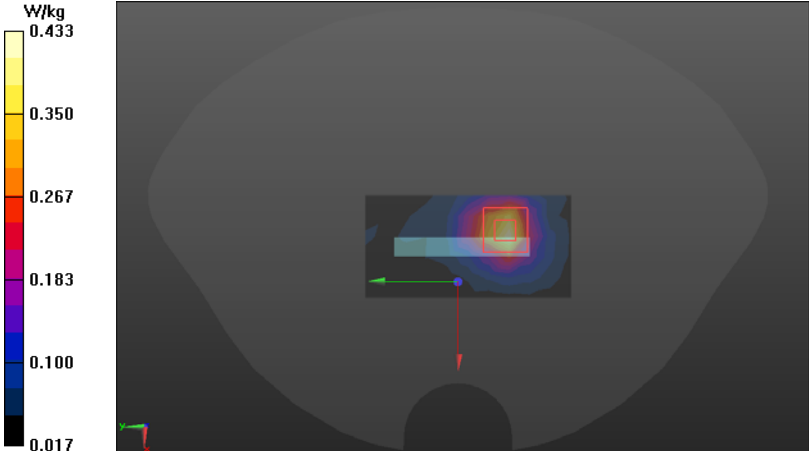
WLAN 5GHz (U-NII-1)

Left Side	Cheek
Communication System: UID 10062 - CAB, IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps); Frequency: 5240 MHz Medium parameters used (interpolated): $f = 5240$ MHz; $\sigma = 4.701$ S/m; $\epsilon_r = 35.96$; $\rho = 1000$ kg/m³ Phantom section: Left Section Measurement Standard: DAS5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: EX3DV4 - SN3708; ConvF(5.74, 5.74, 5.74); Calibrated: 2017/11/7; - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection), $z = 1.0, 31.0$ - Electronics: DAE4 Sn720; Calibrated: 2017/10/23 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL wifi Left Head/wifi HSL touch H 5240 2/Area Scan (11x18x1): Measurement grid: $dx=10$mm, $dy=10$mm Maximum value of SAR (measured) = 1.78 W/kg Head-Section HSL wifi Left Head/wifi HSL touch H 5240 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 1.296 V/m; Power Drift = -0.10 dB Peak SAR (extrapolated) = 5.03 W/kg SAR(1 g) = 1.12 W/kg; SAR(10 g) = 0.275 W/kg Maximum value of SAR (measured) = 2.99 W/kg	
	

FLAT	EDGE1
Communication System: UID 10062 - CAB, IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps); Frequency: 5200 MHz Medium parameters used: $f = 5200 \text{ MHz}$; $\sigma = 5.355 \text{ S/m}$; $\epsilon_r = 49.035$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY Configuration: - Probe: EX3DV4 - SN3708; ConvF(4.79, 4.79, 4.79); Calibrated: 2017/11/7; - Sensor-Surface: 3mm (Mechanical Surface Detection), $z = -4.0, 31.0$ - Electronics: DAE4 Sn720; Calibrated: 2017/10/23 - Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Flat-Section MSL WIFI HOT/WIFI M edge 1 5200/Area Scan (6x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$ Maximum value of SAR (measured) = 0.387 W/kg Flat-Section MSL WIFI HOT/WIFI M edge 1 5200/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 3.375 V/m; Power Drift = 0.00 dB Peak SAR (extrapolated) = 1.22 W/kg SAR(1 g) = 0.303 W/kg; SAR(10 g) = 0.115 W/kg Maximum value of SAR (measured) = 0.399 W/kg	
 The figure displays a color scale for SAR values in W/kg, ranging from 0.013 (dark blue) to 0.387 (yellow). To the right of the scale is a heatmap visualization of the measurement area, showing a central region of high SAR (yellow/orange) surrounded by lower values (blue/purple). A small inset shows a zoomed-in view of the central high-SAR region.	

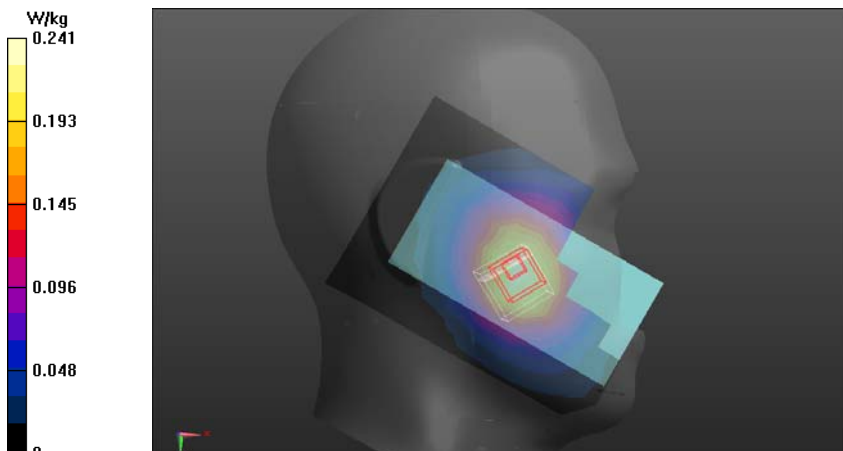
WLAN 5GHz (U-NII-3)

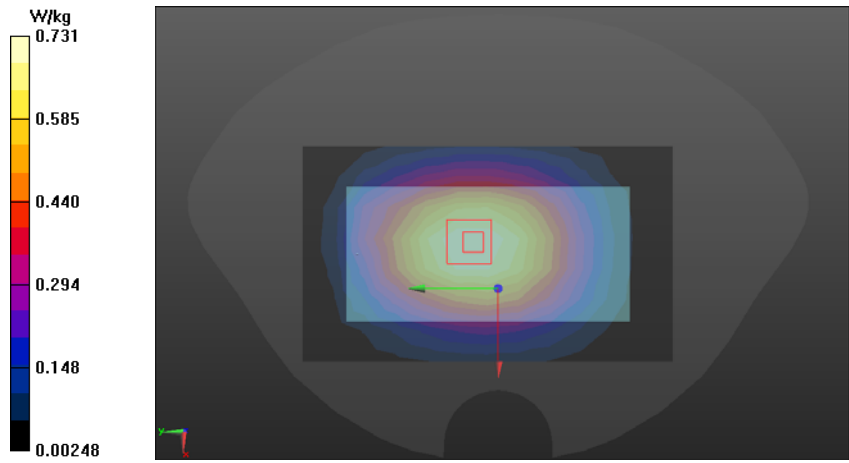
Left Side	Tilt
Communication System: UID 10062 - CAB, IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps); Frequency: 5785 MHz Medium parameters used (interpolated): $f = 5785$ MHz; $\sigma = 5.255$ S/m; $\epsilon_r = 35.315$; $\rho = 1000$ kg/m³ Phantom section: Left Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: EX3DV4 - SN3708; ConvF(5.03, 5.03, 5.03); Calibrated: 2017/11/7; - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection), $z = 1.0, 31.0$ - Electronics: DAE4 Sn720; Calibrated: 2017/10/23 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL wifi Left Head/wifi HSL tilt M 5785/Area Scan (11x18x1): Measurement grid: $dx=10$mm, $dy=10$mm Maximum value of SAR (measured) = 2.11 W/kg Head-Section HSL wifi Left Head/wifi HSL tilt M 5785/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 2.011 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 6.07 W/kg SAR(1 g) = 1.28 W/kg; SAR(10 g) = 0.324 W/kg Maximum value of SAR (measured) = 3.52 W/kg  	

FLAT	EDGE1
Communication System: UID 10062 - CAB, IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps); Frequency: 5785 MHz Medium parameters used (interpolated): $f = 5785$ MHz; $\sigma = 5.984$ S/m; $\epsilon_r = 48.221$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY Configuration: - Probe: EX3DV4 - SN3708; ConvF(4.19, 4.19, 4.19); Calibrated: 2017/11/7; - Sensor-Surface: 3mm (Mechanical Surface Detection), $z = -4.0, 31.0$ - Electronics: DAE4 Sn720; Calibrated: 2017/10/23 - Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Flat-Section MSL WIFI HOT/WIFI M edge 1 5785/Area Scan (6x11x1): Measurement grid: $dx=10$mm, $dy=10$mm Maximum value of SAR (measured) = 0.433 W/kg Flat-Section MSL WIFI HOT/WIFI M edge 1 5785/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 4.055 V/m; Power Drift = 0.03 dB Peak SAR (extrapolated) = 0.905 W/kg SAR(1 g) = 0.316 W/kg; SAR(10 g) = 0.127 W/kg Maximum value of SAR (measured) = 0.468 W/kg 	

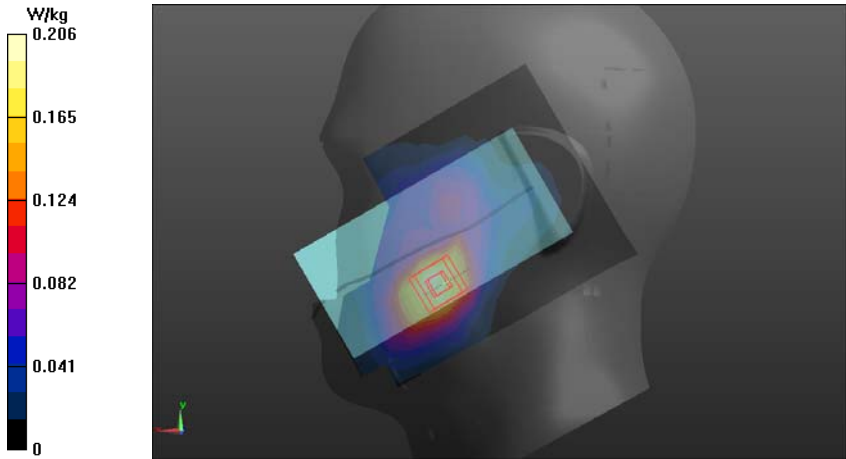
Second supply

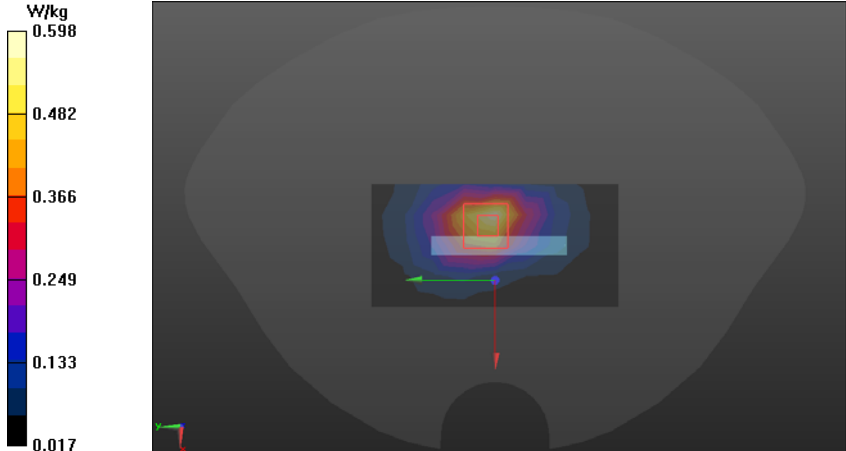
GSM 850MHz

Right Side	Cheek
Communication System: UID 0, Generic GSM (0); Frequency: 836.6 MHz Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.905$ S/m; $\epsilon_r = 41.528$; $\rho = 1000$ kg/m³ Phantom section: Right Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(6.15, 6.15, 6.15); Calibrated: 2017/10/11; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection), $z = 2.0, 32.0$ - Electronics: DAE4 Sn546; Calibrated: 2017/9/15 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL Right Head/GSM850 HSL touch M/Area Scan (9x13x1): Measurement grid: $dx=15$mm, $dy=15$mm Maximum value of SAR (measured) = 0.241 W/kg Head-Section HSL Right Head/GSM850 HSL touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 5.114 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 0.277 W/kg SAR(1 g) = 0.213 W/kg; SAR(10 g) = 0.154 W/kg Maximum value of SAR (measured) = 0.237 W/kg	
	

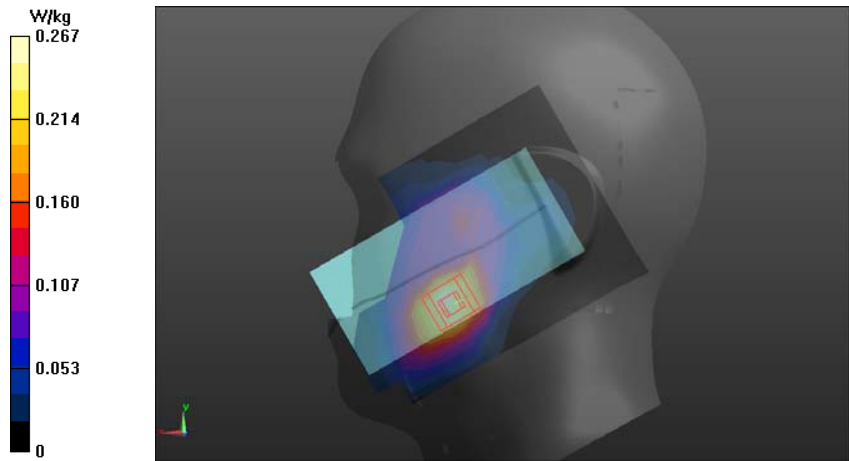
FLAT	Towards ground
Communication System: UID 10021 - DAB, GSM-FDD (TDMA, GMSK); Frequency: 836.6 MHz Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.976$ S/m; $\epsilon_r = 54.535$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(6.06, 6.06, 6.06); Calibrated: 10/11/2017, ConvF(6.06, 6.06, 6.06); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) Flat-Section MSL 234G BODY/GSM850 GPRS M TG/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.731 W/kg Flat-Section MSL 234G BODY/GSM850 GPRS M TG/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 26.70 V/m; Power Drift = -0.13 dB Peak SAR (extrapolated) = 0.907 W/kg SAR(1 g) = 0.605 W/kg; SAR(10 g) = 0.489 W/kg Maximum value of SAR (measured) = 0.757 W/kg	
	

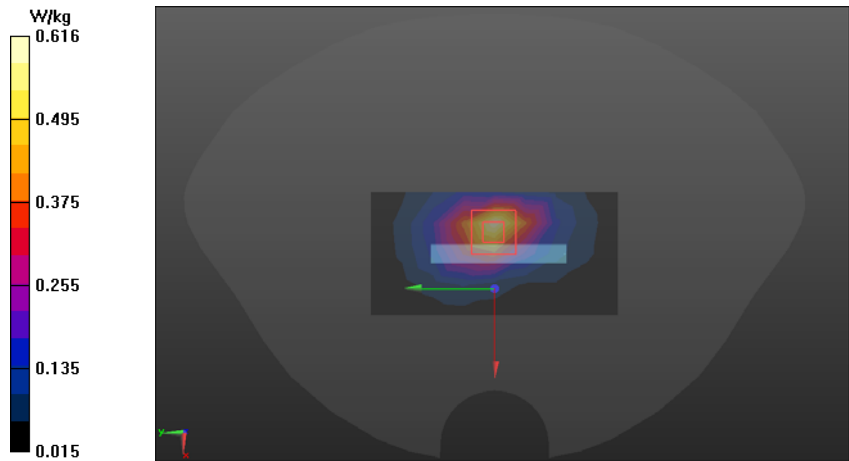
GSM 1900MHz

Left Side	Cheek
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.4$ S/m; $\epsilon_r = 40$; $\rho = 1000$ kg/m³ Phantom section: Left Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(5.06, 5.06, 5.06); Calibrated: 2017/10/11; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection), $z = 2.0, 32.0$ - Electronics: DAE4 Sn546; Calibrated: 2017/9/15 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL Left Head/GSM1900 HSL touch M/Area Scan (9x13x1): Measurement grid: $dx=15$mm, $dy=15$mm Maximum value of SAR (measured) = 0.206 W/kg Head-Section HSL Left Head/GSM1900 HSL touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 4.817 V/m; Power Drift = 0.06 dB Peak SAR (extrapolated) = 0.234 W/kg SAR(1 g) = 0.143 W/kg; SAR(10 g) = 0.097 W/kg Maximum value of SAR (measured) = 0.244 W/kg	
	

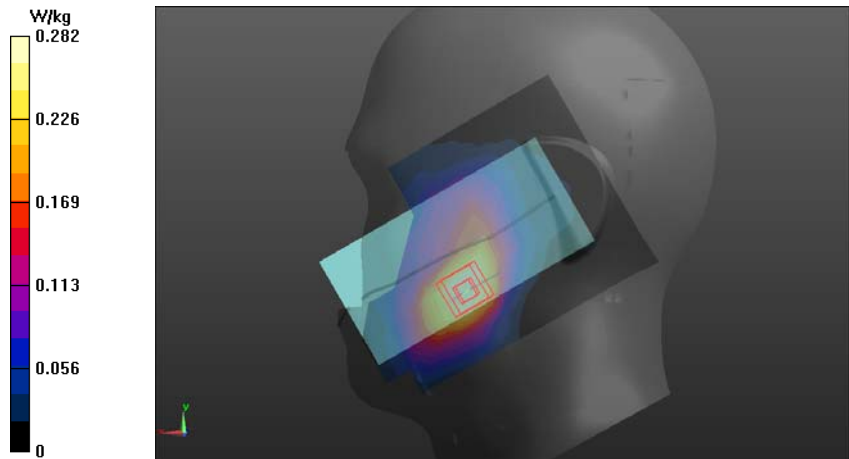
FLAT	EDGE2
Communication System: UID 10021 - DAB, GSM-FDD (TDMA, GMSK); Frequency: 1880 MHz Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.538$ S/m; $\epsilon_r = 52.717$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.83, 4.83, 4.83); Calibrated: 10/11/2017, ConvF(4.83, 4.83, 4.83); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASYS2, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) Flat-Section MSL 234G HOT/GSM1900 EGPRS M edge 2/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.598 W/kg Flat-Section MSL 234G HOT/GSM1900 EGPRS M edge 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 16.20 V/m; Power Drift = 0.00 dB Peak SAR (extrapolated) = 0.74 W/kg SAR(1 g) = 0.475 W/kg; SAR(10 g) = 0.295 W/kg Maximum value of SAR (measured) = 0.631 W/kg 	

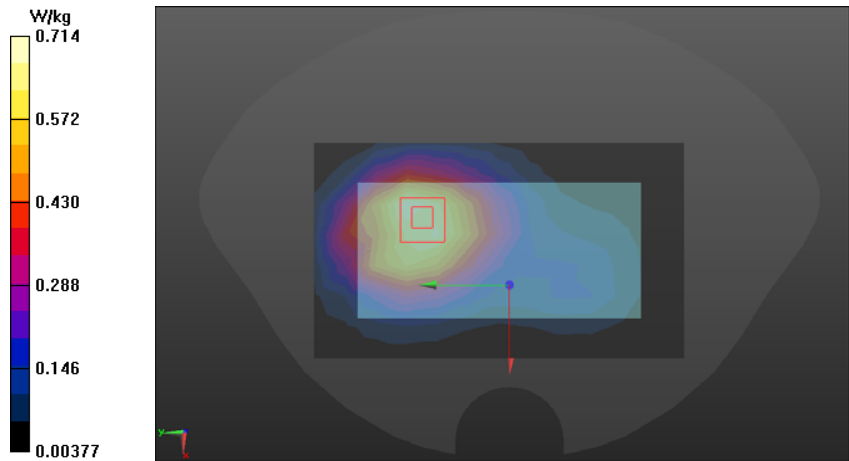
WCDMA Band 2

Left Side	Cheek
Communication System: UID 0, WCDMA BAND2 (0); Frequency: 1880 MHz Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.4$ S/m; $\epsilon_r = 40$; $\rho = 1000$ kg/m³ Phantom section: Left Section Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(5.06, 5.06, 5.06); Calibrated: 2017/10/11; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection), $z = 2.0, 32.0$ - Electronics: DAE4 Sn546; Calibrated: 2017/9/15 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL Left Head/WCDMA BAND2 HSL touch M/Area Scan (9x13x1): Measurement grid: $dx=15$mm, $dy=15$mm Maximum value of SAR (measured) = 0.267 W/kg Head-Section HSL Left Head/WCDMA BAND2 HSL touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 5.873 V/m; Power Drift = -0.04 dB Peak SAR (extrapolated) = 0.431 W/kg SAR(1 g) = 0.232 W/kg; SAR(10 g) = 0.152 W/kg Maximum value of SAR (measured) = 0.317 W/kg	
	

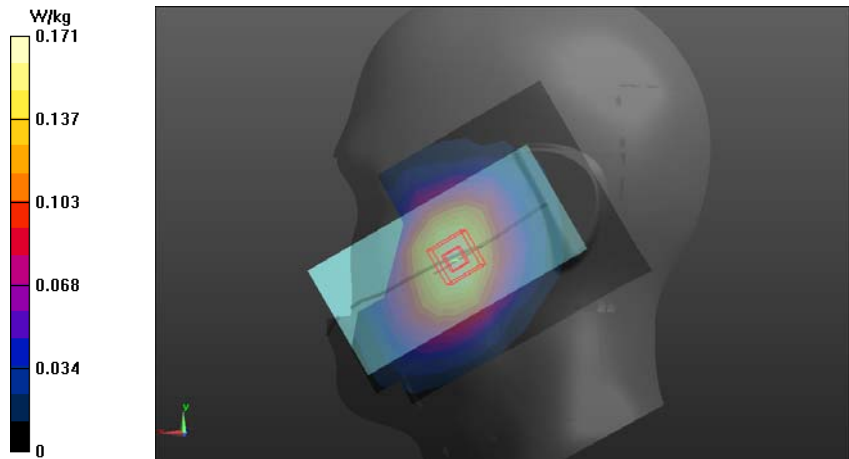
FLAT	EDGE2
Communication System: UID 10011 - CAB, UMTS-FDD (WCDMA); Frequency: 1880 MHz Medium parameters used (interpolated): $f = 1880 \text{ MHz}$; $\sigma = 1.538 \text{ S/m}$; $\epsilon_r = 52.717$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.83, 4.83, 4.83); Calibrated: 10/11/2017, ConvF(4.83, 4.83, 4.83); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) Flat-Section MSL 234G HOT/WCDMA BAND2 DATA M edge 2/Area Scan (5x9x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (measured) = 0.516 W/kg Flat-Section MSL 234G HOT/WCDMA BAND2 DATA M edge 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 15.07 V/m; Power Drift = 0.08 dB Peak SAR (extrapolated) = 0.773 W/kg SAR(1 g) = 0.452 W/kg; SAR(10 g) = 0.285 W/kg Maximum value of SAR (measured) = 0.602 W/kg	
	

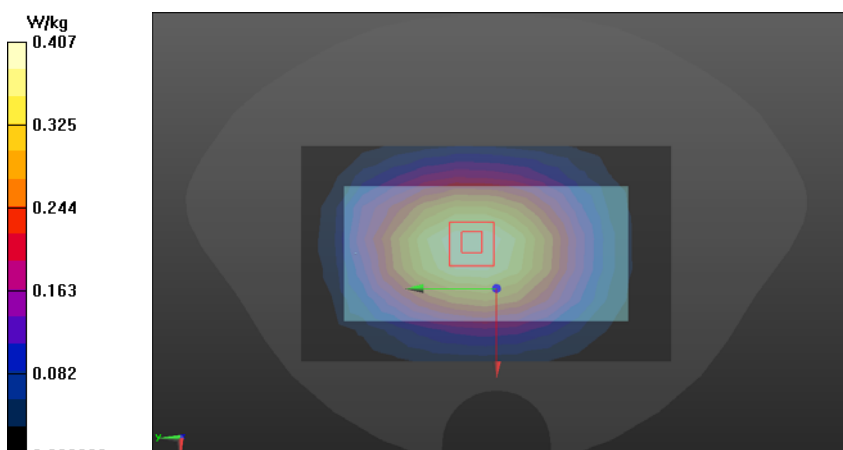
WCDMA Band 4

Left Side	Cheek
Communication System: UID 0, WCDMA BAND4 (0); Frequency: 1732.4 MHz Medium parameters used (interpolated): $f = 1732.4$ MHz; $\sigma = 1.375$ S/m; $\epsilon_r = 40.07$; $\rho = 1000$ kg/m³ Phantom section: Left Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(5.06, 5.06, 5.06); Calibrated: 2017/10/11; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection), $z = 2.0, 32.0$ - Electronics: DAE4 Sn546; Calibrated: 2017/9/15 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL Left Head/WCDMA BAND4 HSL touch M/Area Scan (9x13x1): Measurement grid: $dx=15$mm, $dy=15$mm Maximum value of SAR (measured) = 0.282 W/kg Head-Section HSL Left Head/WCDMA BAND4 HSL touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 4.870 V/m; Power Drift = 0.03 dB Peak SAR (extrapolated) = 0.339 W/kg SAR(1 g) = 0.206 W/kg; SAR(10 g) = 0.169 W/kg Maximum value of SAR (measured) = 0.328 W/kg	
	

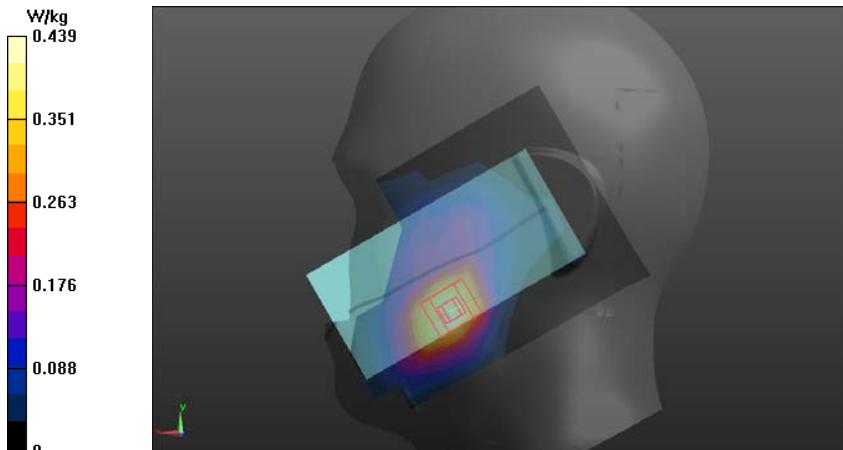
FLAT(VIOCE)	Towards ground
Communication System: UID 10011 - CAB, UMTS-FDD (WCDMA); Frequency: 1732.6 MHz Medium parameters used (interpolated): $f = 1732.6$ MHz; $\sigma = 1.468$ S/m; $\epsilon_r = 52.935$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.83, 4.83, 4.83); Calibrated: 10/11/2017, ConvF(4.83, 4.83, 4.83); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) Flat-Section MSL 234G BODY/WCDMA BAND4 M TG VOICE/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.714 W/kg Flat-Section MSL 234G BODY/WCDMA BAND4 M TG VOICE/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 12.04 V/m; Power Drift = 0.06 dB Peak SAR (extrapolated) = 0.986 W/kg SAR(1 g) = 0.524 W/kg; SAR(10 g) = 0.389 W/kg Maximum value of SAR (measured) = 0.741 W/kg 	

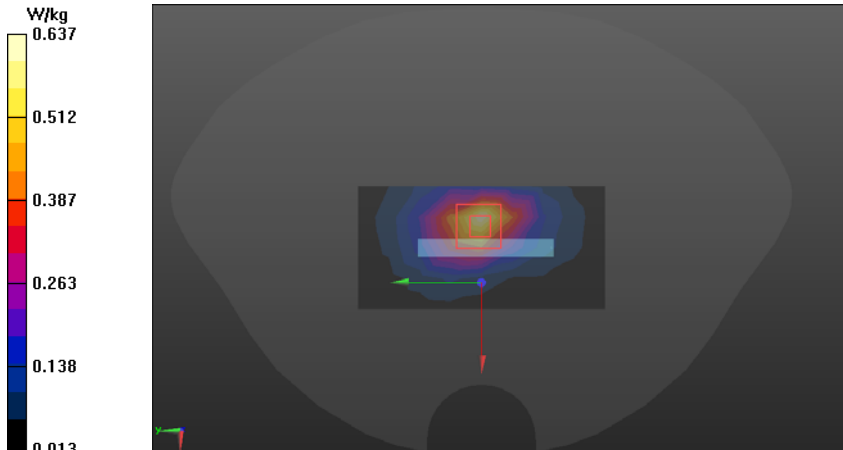
WCDMA Band 5

Left Side	Cheek
Communication System: UID 0, WCDMA BAND 5 (0); Frequency: 836.6 MHz Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.905$ S/m; $\epsilon_r = 41.528$; $\rho = 1000$ kg/m³ Phantom section: Left Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(6.15, 6.15, 6.15); Calibrated: 2017/10/11; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection), $z = 2.0, 32.0$ - Electronics: DAE4 Sn546; Calibrated: 2017/9/15 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL Left Head/WCDMA BAND5 HSL touch M/Area Scan (9x13x1): Measurement grid: $dx=15$mm, $dy=15$mm Maximum value of SAR (measured) = 0.171 W/kg Head-Section HSL Left Head/WCDMA BAND5 HSL touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 4.576 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 0.196 W/kg SAR(1 g) = 0.112 W/kg; SAR(10 g) = 0.082 W/kg Maximum value of SAR (measured) = 0.169 W/kg	
	

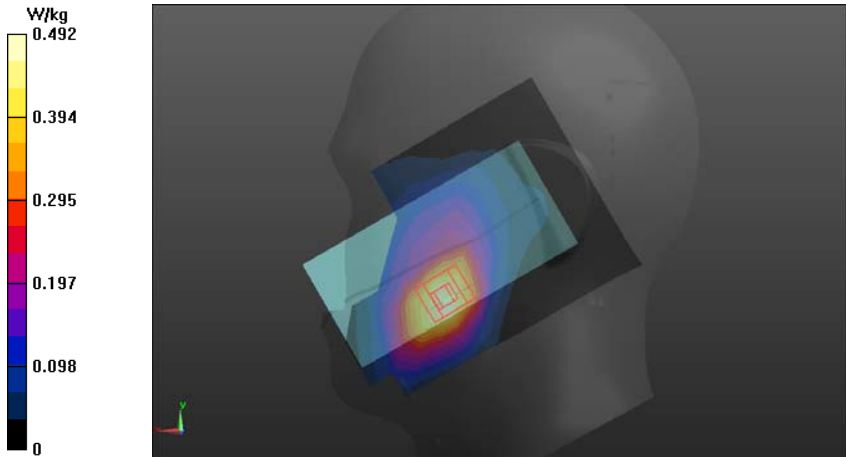
FLAT(DATA)	Towards ground
Communication System: UID 10011 - CAB, UMTS-FDD (WCDMA); Frequency: 836.6 MHz Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.976$ S/m; $\epsilon_r = 54.535$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(6.06, 6.06, 6.06); Calibrated: 10/11/2017, ConvF(6.06, 6.06, 6.06); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) Flat-Section MSL 234G BODY/WCDMA BAND5 M TG DATA/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.307 W/kg Flat-Section MSL 234G BODY/WCDMA BAND5 M TG DATA/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 10.23 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 0.402 W/kg SAR(1 g) = 0.237 W/kg; SAR(10 g) = 0.143 W/kg Maximum value of SAR (measured) = 0.324 W/kg 	

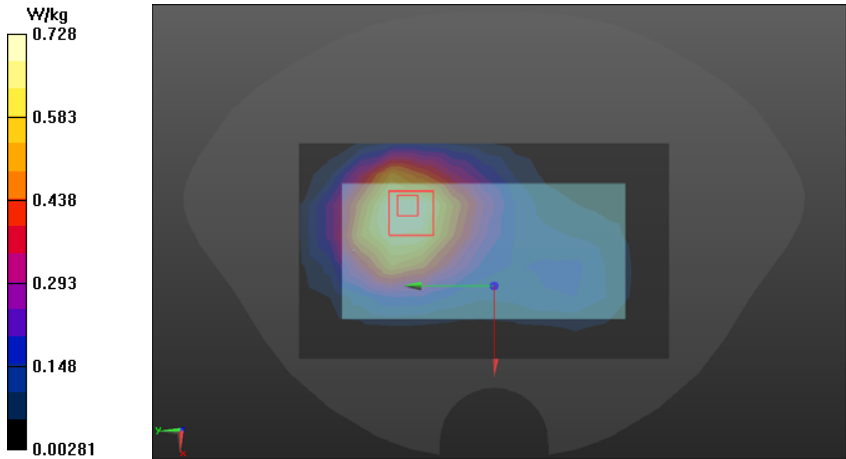
LTE (Band2 20BW)

Left Side	Cheek
Communication System: UID 0, LTE band 02 (0); Frequency: 1880 MHz Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.4$ S/m; $\epsilon_r = 40$; $\rho = 1000$ kg/m³ Phantom section: Left Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(5.06, 5.06, 5.06); Calibrated: 2017/10/11; - Sensor-Surface: 3mm (Mechanical Surface Detection), $z = 2.0, 32.0$ - Electronics: DAE4 Sn546; Calibrated: 2017/9/15 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL Left Head/LTE BAND2 HSL touch M/Area Scan (9x13x1): Measurement grid: $dx=15$mm, $dy=15$mm Maximum value of SAR (measured) = 0.439 W/kg Head-Section HSL Left Head/LTE BAND2 HSL touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 5.659 V/m; Power Drift = -0.04 dB Peak SAR (extrapolated) = 0.664 W/kg SAR(1 g) = 0.336 W/kg; SAR(10 g) = 0.238 W/kg Maximum value of SAR (measured) = 0.491 W/kg	
	

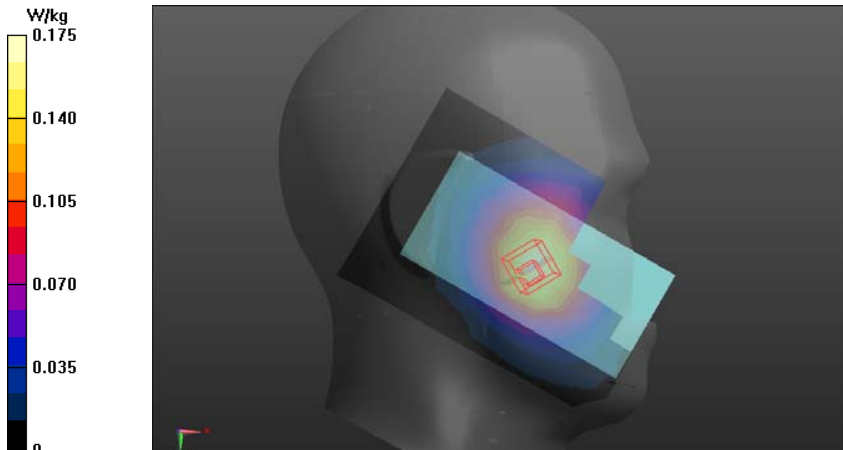
FLAT	EDGE2
Communication System: UID 0, LTE band 02 (0); Frequency: 1880 MHz Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.538$ S/m; $\epsilon_r = 52.717$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.83, 4.83, 4.83); Calibrated: 10/11/2017, ConvF(4.83, 4.83, 4.83); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASYS2, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) Flat-Section MSL 234G HOT/LTE BAND2 1RB M edge 2/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.637 W/kg Flat-Section MSL 234G HOT/LTE BAND2 1RB M edge 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 15.55 V/m; Power Drift = 0.03 dB Peak SAR (extrapolated) = 0.82 W/kg SAR(1 g) = 0.478 W/kg; SAR(10 g) = 0.298 W/kg Maximum value of SAR (measured) = 0.636 W/kg 	

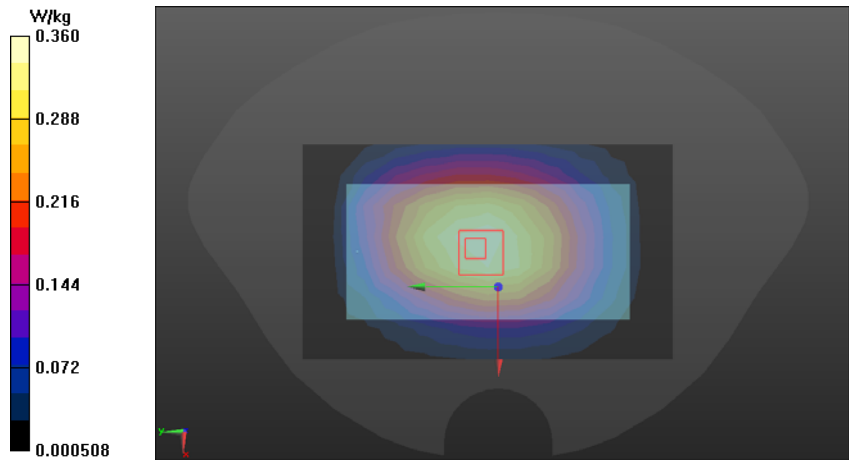
LTE (Band4 20BW)

Left Side	Cheek
Communication System: UID 0, LTE band 4 (0); Frequency: 1732.5 MHz Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.375$ S/m; $\epsilon_r = 40.07$; $\rho = 1000$ kg/m³ Phantom section: Left Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(5.06, 5.06, 5.06); Calibrated: 2017/10/11; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection), $z = 2.0, 32.0$ - Electronics: DAE4 Sn546; Calibrated: 2017/9/15 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL Left Head/LTE BAND4 HSL touch M/Area Scan (9x13x1): Measurement grid: $dx=15$mm, $dy=15$mm Maximum value of SAR (measured) = 0.292 W/kg Head-Section HSL Left Head/LTE BAND4 HSL touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 5.538 V/m; Power Drift = 0.20 dB Peak SAR (extrapolated) = 0.442 W/kg SAR(1 g) = 0.206 W/kg; SAR(10 g) = 0.078 W/kg Maximum value of SAR (measured) = 0.355 W/kg 	

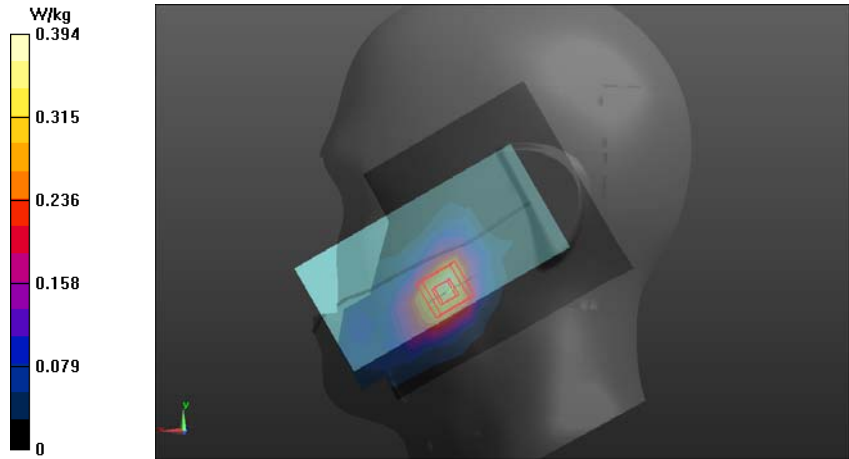
FLAT	Towards ground
Communication System: UID 0, LTE band 4 (0); Frequency: 1732.5 MHz Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.468$ S/m; $\epsilon_r = 52.935$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.83, 4.83, 4.83); Calibrated: 10/11/2017, ConvF(4.83, 4.83, 4.83); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASYS2, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) Flat-Section MSL 234G BODY/LTE BAND4 M TG 1RB/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.528 W/kg Flat-Section MSL 234G BODY/LTE BAND4 M TG 1RB/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 6.10 V/m; Power Drift = 0.08 dB Peak SAR (extrapolated) = 0.62 W/kg SAR(1 g) = 0.427 W/kg; SAR(10 g) = 0.209 W/kg Maximum value of SAR (measured) = 0.502 W/kg	
	

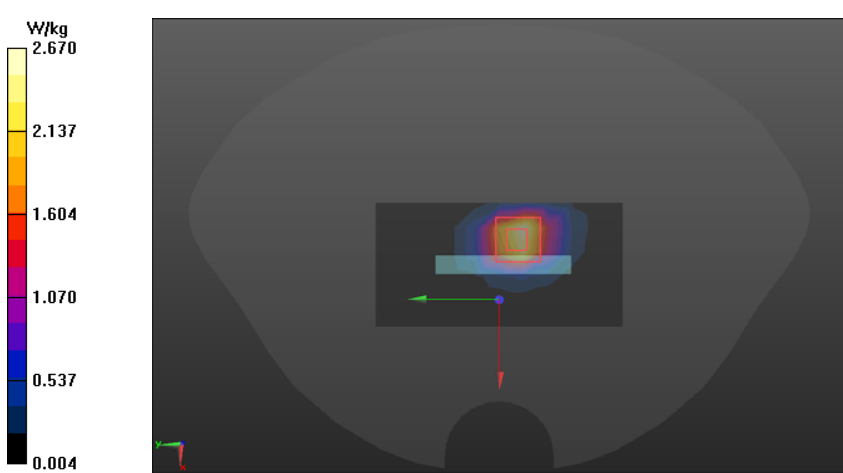
LTE (Band5 10BW)

Right Side	Cheek
Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz Medium parameters used (interpolated): $f = 836.5$ MHz; $\sigma = 0.905$ S/m; $\epsilon_r = 41.528$; $\rho = 1000$ kg/m³ Phantom section: Right Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(6.15, 6.15, 6.15); Calibrated: 2017/10/11; - Sensor-Surface: 3mm (Mechanical Surface Detection), $z = 2.0, 32.0$ - Electronics: DAE4 Sn546; Calibrated: 2017/9/15 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL Right Head/LTE BAND5 HSL touch M/Area Scan (9x13x1): Measurement grid: $dx=15$mm, $dy=15$mm Maximum value of SAR (measured) = 0.175 W/kg Head-Section HSL Right Head/LTE BAND5 HSL touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 4.406 V/m; Power Drift = 0.13 dB Peak SAR (extrapolated) = 0.207 W/kg SAR(1 g) = 0.108 W/kg; SAR(10 g) = 0.65 W/kg Maximum value of SAR (measured) = 0.202 W/kg	
	

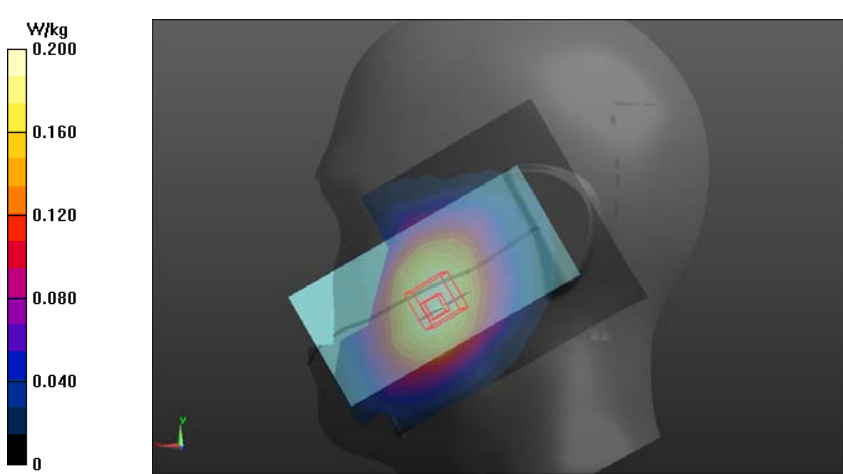
FLAT	Towards ground
Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz Medium parameters used (interpolated): $f = 836.5$ MHz; $\sigma = 0.975$ S/m; $\epsilon_r = 54.535$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(6.06, 6.06, 6.06); Calibrated: 10/11/2017, ConvF(6.06, 6.06, 6.06); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) Flat-Section MSL 234G BODY/LTE BAND5 M TG 50%RB/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.360 W/kg Flat-Section MSL 234G BODY/LTE BAND5 M TG 50%RB/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 18.64 V/m; Power Drift = -0.10 dB Peak SAR (extrapolated) = 0.384 W/kg SAR(1 g) = 0.244 W/kg; SAR(10 g) = 0.153 W/kg Maximum value of SAR (measured) = 0.329 W/kg 	

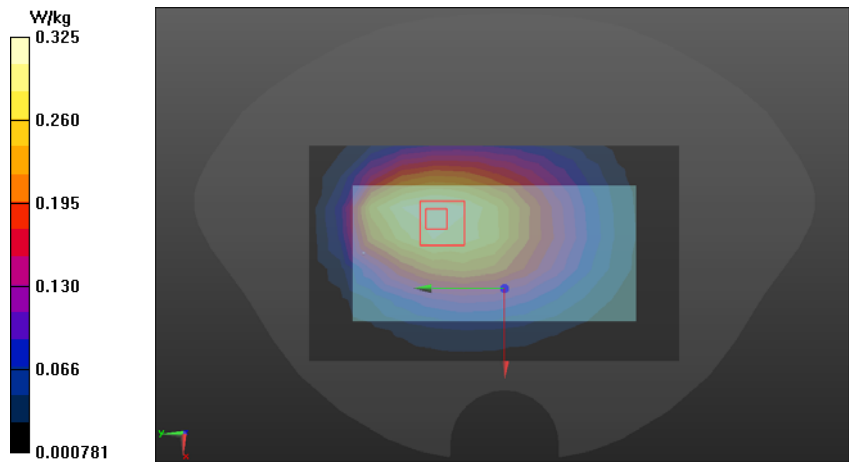
LTE (Band7 20BW)

Left Side	Cheek
Communication System: UID 0, LTE Band 7 (0); Frequency: 2535 MHz Medium parameters used (interpolated): $f = 2535$ MHz; $\sigma = 1.888$ S/m; $\epsilon_r = 39.084$; $\rho = 1000$ kg/m³ Phantom section: Left Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.32, 4.32, 4.32); Calibrated: 2017/10/11; - Sensor-Surface: 3mm (Mechanical Surface Detection), $z = 2.0, 32.0$ - Electronics: DAE4 Sn546; Calibrated: 2017/9/15 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL Left Head/LTE BAND7 HSL touch M/Area Scan (9x13x1): Measurement grid: $dx=15$mm, $dy=15$mm Maximum value of SAR (measured) = 0.294 W/kg Head-Section HSL Left Head/LTE BAND7 HSL touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 3.106 V/m; Power Drift = 0.06 dB Peak SAR (extrapolated) = 0.382 W/kg SAR(1 g) = 0.162 W/kg; SAR(10 g) = 0.187 W/kg Maximum value of SAR (measured) = 0.255 W/kg	
 The figure displays a color scale for SAR values in W/kg, ranging from 0 (black) to 0.394 (yellow). To the right is a 3D visualization of a human head phantom. A rectangular region on the left side of the head is highlighted with a color gradient, indicating the measured SAR distribution. The highest SAR values are concentrated in the center of this region, corresponding to the color yellow/orange.	

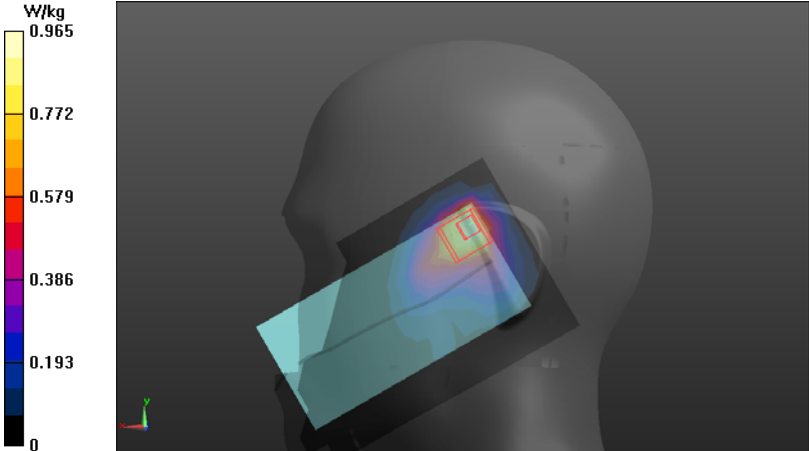
FLAT	Edge2
Communication System: UID 0, LTE Band 7 (0); Frequency: 2560 MHz Medium parameters used (interpolated): $f = 2560$ MHz; $\sigma = 2.065$ S/m; $\epsilon_r = 51.736$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.07, 4.07, 4.07); Calibrated: 2017/10/11; - Sensor-Surface: 3mm (Mechanical Surface Detection), $z = -3.0, 32.0$ - Electronics: DAE4 Sn546; Calibrated: 2017/9/15 - Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Flat-Section MSL 234G HOT/LTE BAND7 1RB M edge 2/Area Scan (6x11x1): Measurement grid: $dx=12$mm, $dy=12$mm Maximum value of SAR (measured) = 1.67 W/kg Flat-Section MSL 234G HOT/LTE BAND7 1RB M edge 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 10.43 V/m; Power Drift = 0.17 dB Peak SAR (extrapolated) = 2.66 W/kg SAR(1 g) = 0.963 W/kg; SAR(10 g) = 0.457 W/kg Maximum value of SAR (measured) = 1.58 W/kg 	

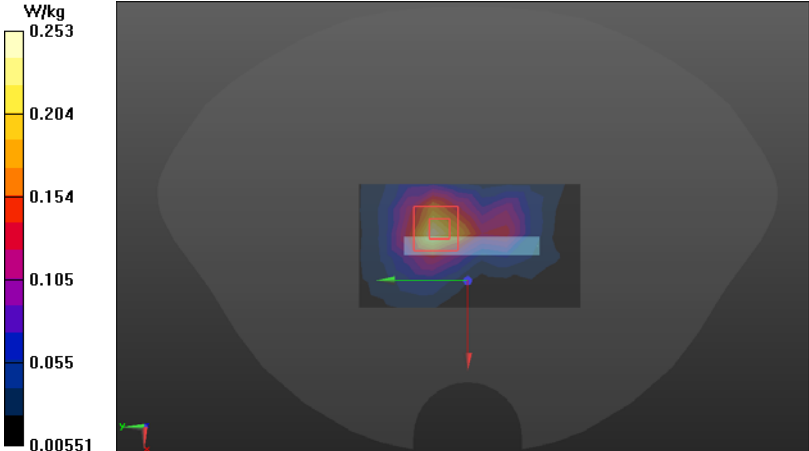
LTE (Band12 10BW)

Left Side	Cheek
Communication System: UID 0, LTE Band 12 (0); Frequency: 707.5 MHz Medium parameters used (interpolated): $f = 707.5$ MHz; $\sigma = 0.887$ S/m; $\epsilon_r = 42.115$; $\rho = 1000$ kg/m³ Phantom section: Left Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(6.26, 6.26, 6.26); Calibrated: 2017/10/11; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection), $z = 2.0, 32.0$ - Electronics: DAE4 Sn546; Calibrated: 2017/9/15 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL Left Head/LTE BAND12 HSL touch M/Area Scan (9x13x1): Measurement grid: $dx=15$mm, $dy=15$mm Maximum value of SAR (measured) = 0.162 W/kg Head-Section HSL Left Head/LTE BAND12 HSL touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 4.676 V/m; Power Drift = 0.03 dB Peak SAR (extrapolated) = 0.203 W/kg SAR(1 g) = 0.107 W/kg; SAR(10 g) = 0.078 W/kg Maximum value of SAR (measured) = 0.150 W/kg	
	

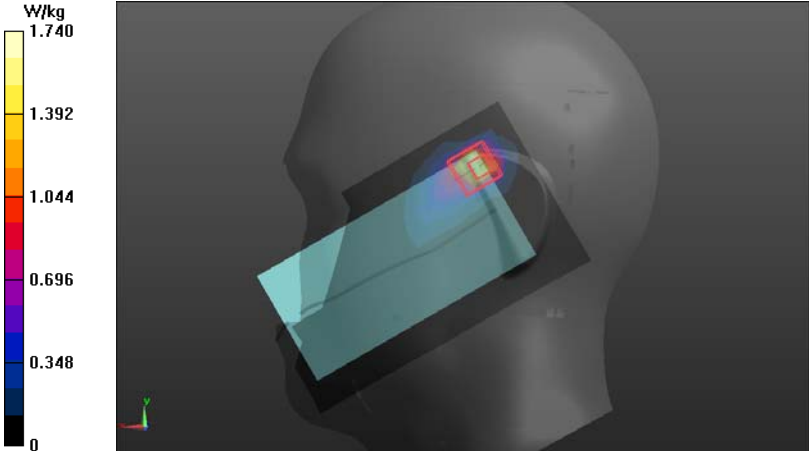
FLAT	Towards ground
Communication System: UID 0, LTE Band 12 (0); Frequency: 707.5 MHz Medium parameters used (interpolated): $f = 707.5$ MHz; $\sigma = 0.929$ S/m; $\epsilon_r = 54.923$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(6.18, 6.18, 6.18); Calibrated: 2017/10/11; - Sensor-Surface: 3mm (Mechanical Surface Detection), $z = -23.0, 32.0$ - Electronics: DAE4 Sn546; Calibrated: 2017/9/15 - Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Flat-Section MSL 234G BODY/LTE BAND12 M TG 50%RB/Area Scan (8x13x1): Measurement grid: $dx=15$mm, $dy=15$mm Maximum value of SAR (measured) = 0.305 W/kg Flat-Section MSL 234G BODY/LTE BAND12 M TG 50%RB/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 12.58 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 0.356 W/kg SAR(1 g) = 0.204 W/kg; SAR(10 g) = 0.149 W/kg Maximum value of SAR (measured) = 0.268 W/kg	
	

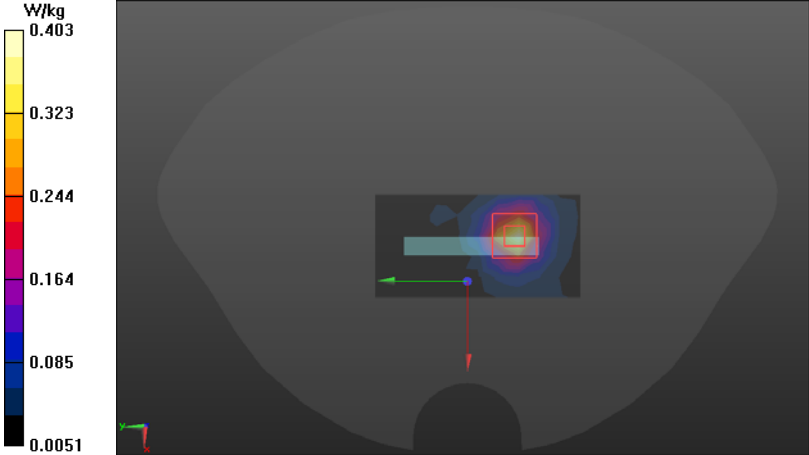
WLAN 2.4GHz

Left Side	Cheek
Communication System: UID 0, WIFI 2.4GHz (0); Frequency: 2437 MHz Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.788$ S/m; $\epsilon_r = 39.219$; $\rho = 1000$ kg/m³ Phantom section: Left Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.58, 4.58, 4.58); Calibrated: 2017/10/11; - Sensor-Surface: 3mm (Mechanical Surface Detection), $z = 2.0, 32.0$ - Electronics: DAE4 Sn546; Calibrated: 2017/9/15 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL wifi Left Head/wifi HSL touch M/Area Scan (10x15x1): Measurement grid: $dx=12$mm, $dy=12$mm Maximum value of SAR (measured) = 0.965 W/kg Head-Section HSL wifi Left Head/wifi HSL touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 17.09 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 2.13 W/kg SAR(1 g) = 0.896 W/kg; SAR(10 g) = 0.420 W/kg Maximum value of SAR (measured) = 1.18 W/kg	
	

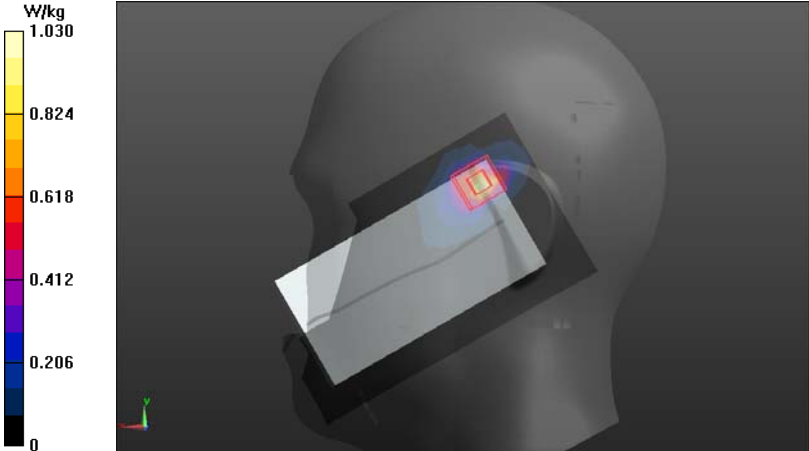
FLAT	EDGE1
Communication System: UID 0, WIFI 2.4GHz (0); Frequency: 2437 MHz Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.933$ S/m; $\epsilon_r = 52.717$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY Configuration: - Probe: ES3DV3 - SN3127; ConvF(4.28, 4.28, 4.28); Calibrated: 10/11/2017, ConvF(4.28, 4.28, 4.28); Calibrated: 10/11/2017; - Sensor-Surface: 3mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 9/15/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437) Flat-Section MSL WIFI HOT/WIFI M edge 1 2.4G/Area Scan (6x10x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.233 W/kg Flat-Section MSL WIFI HOT/WIFI M edge 1 2.4G/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 5.365 V/m; Power Drift = -0.02 dB Peak SAR (extrapolated) = 0.366 W/kg SAR(1 g) = 0.153 W/kg; SAR(10 g) = 0.106 W/kg Maximum value of SAR (measured) = 0.240 W/kg	
	

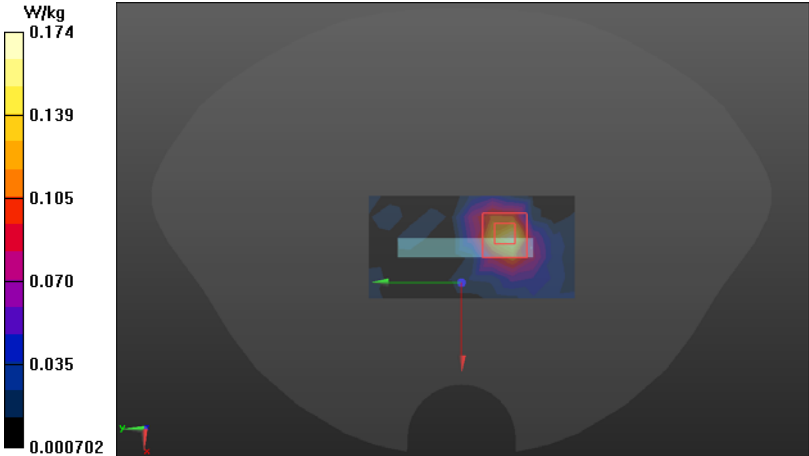
WLAN 5GHz (U-NII-1)

Left Side	Cheek
Communication System: UID 10062 - CAB, IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps); Frequency: 5240 MHz Medium parameters used (interpolated): $f = 5240$ MHz; $\sigma = 4.701$ S/m; $\epsilon_r = 35.96$; $\rho = 1000$ kg/m³ Phantom section: Left Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: EX3DV4 - SN3708; ConvF(5.74, 5.74, 5.74); Calibrated: 2017/11/7; - Sensor-Surface: 1.4mm (Mechanical Surface Detection), $z = 1.0, 31.0$ - Electronics: DAE4 Sn720; Calibrated: 2017/10/23 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL wifi Left Head/wifi HSL touch M 5200/Area Scan (11x18x1): Measurement grid: $dx=10$mm, $dy=10$mm Maximum value of SAR (measured) = 1.74 W/kg Head-Section HSL wifi Left Head/wifi HSL touch M 5200/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 2.796 V/m; Power Drift = 0.09 dB Peak SAR (extrapolated) = 4.81 W/kg SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.305 W/kg Maximum value of SAR (measured) = 2.89 W/kg	
	

FLAT	EDGE1
Communication System: UID 10062 - CAB, IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps); Frequency: 5200 MHz Medium parameters used: $f = 5200 \text{ MHz}$; $\sigma = 5.355 \text{ S/m}$; $\epsilon_r = 49.035$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY Configuration: - Probe: EX3DV4 - SN3708; ConvF(4.79, 4.79, 4.79); Calibrated: 2017/11/7; - Sensor-Surface: 1.4mm (Mechanical Surface Detection), $z = -4.0, 31.0$ - Electronics: DAE4 Sn720; Calibrated: 2017/10/23 - Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Flat-Section MSL WIFI HOT/WIFI M edge 1 5200/Area Scan (6x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$ Maximum value of SAR (measured) = 0.403 W/kg Flat-Section MSL WIFI HOT/WIFI M edge 1 5200/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 2.880 V/m; Power Drift = -0.10 dB Peak SAR (extrapolated) = 0.783 W/kg SAR(1 g) = 0.274 W/kg; SAR(10 g) = 0.104 W/kg Maximum value of SAR (measured) = 0.408 W/kg	
	

WLAN 5GHz (U-NII-3)

Left Side	Tilt
Communication System: UID 10062 - CAB, IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps); Frequency: 5785 MHz Medium parameters used (interpolated): $f = 5785 \text{ MHz}$; $\sigma = 5.215 \text{ S/m}$; $\epsilon_r = 35.355$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Left Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011) DASY Configuration: - Probe: EX3DV4 - SN3708; ConvF(5.03, 5.03, 5.03); Calibrated: 2017/11/7; - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection), $z = 1.0, 31.0$ - Electronics: DAE4 Sn720; Calibrated: 2017/10/23 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Head-Section HSL wifi Left Head/wifi HSL touch M 5785/Area Scan (11x18x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$ Maximum value of SAR (measured) = 1.23 W/kg Head-Section HSL wifi Left Head/wifi HSL touch M 5785/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 4.144 V/m; Power Drift = -0.09 dB Peak SAR (extrapolated) = 2.35 W/kg SAR(1 g) = 1.07 W/kg; SAR(10 g) = 0.341 W/kg Maximum value of SAR (measured) = 2.03 W/kg	
	

FLAT	EDGE1
Communication System: UID 10062 - CAB, IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps); Frequency: 5785 MHz Medium parameters used (interpolated): $f = 5785$ MHz; $\sigma = 5.984$ S/m; $\epsilon_r = 48.221$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY Configuration: - Probe: EX3DV4 - SN3708; ConvF(4.19, 4.19, 4.19); Calibrated: 2017/11/7; - Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection), $z = -4.0, 31.0$ - Electronics: DAE4 Sn720; Calibrated: 2017/10/23 - Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx - DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) Flat-Section MSL WIFI HOT/WIFI M edge 1 5785/Area Scan (6x11x1): Measurement grid: $dx=10$mm, $dy=10$mm Maximum value of SAR (measured) = 0.274 W/kg Flat-Section MSL WIFI HOT/WIFI M edge 1 5785/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$mm, $dy=5$mm, $dz=5$mm Reference Value = 3.247 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 0.423 W/kg SAR(1 g) = 0.227 W/kg; SAR(10 g) = 0.155 W/kg Maximum value of SAR (measured) = 0.277 W/kg 	

ANNEX B – RELEVANT PAGES FROM CALIBRATION REPORTS

DAE4 Sn:546

TTL s p e a g In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: cti@chinaatl.com Http://www.chinaatl.cn

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国际互认
CALIBRATION
CNAS L0570

Client: SRTC Certificate No: Z17-97141

CALIBRATION CERTIFICATE

Object: DAE4 - SN: 546

Calibration Procedure(s): FF-Z11-002-01
Calibration Procedure for the Data Acquisition Electronics (DAEx)

Calibration date: September 15, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by: Certificate No.)	Scheduled Calibration
Process Calibrator 753	1971018	27-Jun-17 (CTTL No J17X05859)	June-18

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: September 18, 2017
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: Z17-97141

Page 1 of 3

TTL s p e a g In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: cti@chinaatl.com Http://www.chinaatl.cn

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 report provide only calibration results for DAE, it does not contain other performance test results.

Certificate No: Z17-97141

Page 2 of 3

TTL s p e a g In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
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E-mail: cti@chinaatl.com Http://www.chinaatl.cn

DC Voltage Measurement
A/D - Converter Resolution nominal
High Range: 1LSB = 6.1μV full range = -100...+300 mV
Low Range: 1LSB = 61nV full range = -1...+3mV
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	405.337 ± 0.15% (k=2)	404.085 ± 0.15% (k=2)	404.215 ± 0.15% (k=2)
Low Range	3.98728 ± 0.7% (k=2)	3.95731 ± 0.7% (k=2)	3.97839 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	236.5° ± 1°
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Certificate No: Z17-97141

Page 3 of 3

DAE4 Sn:720

In Collaboration with
TTL **s p e a g**
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
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E-mail: csl@chinaeet.com Http://www.chinaeet.cn

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校准
CNAS 16570

Client: **SRTC** Certificate No: **Z17-97215**

CALIBRATION CERTIFICATE

Object: DAE4 - SN: 720

Calibration Procedure(s): FF-Z11-002-01
Calibration Procedure for the Data Acquisition Electronics (DAEx)

Calibration date: October 24, 2017

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

All calibrations have been conducted in the closed laboratory facility: environment temperature(22.5)°C and humidity<70%.

Calibration Equipment used (M&E critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Process Calibrator 753	19710-8	27-Jun-17 (CTTL, No.J17X05859)	June-18

Calibrated by: Name: Yu Zongying Function: SAR Test Engineer Signature: [Signature]

Reviewed by: Lin Hao SAR Test Engineer [Signature]

Approved by: Qi Qianyan SAR Project Leader [Signature]

Issued: October 26, 2017

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

Certificate No: Z17-97215

Page 1 of 3

In Collaboration with
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CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-42304633-2218 Fax: +86-10-42304633-2209
E-mail: csl@chinaeet.com Http://www.chinaeet.cn

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 report provide only calibration results for DAE, it does not contain other performance test results.

Certificate No: Z17-97215

Page 2 of 3

In Collaboration with
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CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-42304633-2218 Fax: +86-10-42304633-2209
E-mail: csl@chinaeet.com Http://www.chinaeet.cn

DC Voltage Measurement
A/D - Converter Resolution nominal
High Range: 1LSB = 6.1μV, Full range = -100...+300 mV
Low Range: 1LSB = 0.1mV, Full range = -1...+3mV
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	403.393 ± 0.15% (k=2)	404.822 ± 0.15% (k=2)	403.251 ± 0.15% (k=2)
Low Range	3.95426 ± 0.7% (k=2)	3.95391 ± 0.7% (k=2)	3.95540 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	24.5° ± 1°
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Certificate No: Z17-97215

Page 3 of 3

ES3DV3 Sn:3127

In Collaboration with
TTL **s p e a g**
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: cti@chinaetl.com http://www.chinaetl.com

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CALIBRATION
CNAS L0570

Client: **SRTC** Certificate No: **Z17-97142**

CALIBRATION CERTIFICATE

Object: **ES3DV3 - SN:3127**

Calibration Procedure(s): **FF-Z11-004-01**
Calibration Procedures for Dosimetric E-field Probes

Calibration date: **October 11, 2017**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-17 (CTTL No J17X05857)	Jun-18
Power sensor NRP-Z91	101547	27-Jun-17 (CTTL No J17X05857)	Jun-18
Power sensor NRP-Z91	101548	27-Jun-17 (CTTL No J17X05857)	Jun-18
Reference10dBAttenuator	18N50W-10dB	13-Mar-16(CTTL No J16X01547)	Mar-18
Reference20dBAttenuator	18N50W-20dB	13-Mar-16(CTTL No J16X01548)	Mar-18
Reference Probe EX3DV4	SN 7433	26-Sep-16(SPEAG No EX3-7433_Sep16)	Sep-17
DAE4	SN 549	13-Dec-16(SPEAG No DAE4-549_Dec16)	Dec-17

Secondary Standards	ID #	Cal Date(Calibrated by Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A	6201052605	27-Jun-17 (CTTL No J17X05858)	Jun-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL No J17X00285)	Jan-18

Calibrated by:	Name	Function	Signature
	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Danyuan	SAR Project Leader	

Issued: October 12, 2017

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

Certificate No: Z17-97142

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In Collaboration with
TTL **s p e a g**
CALIBRATION LABORATORY

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Glossary:

TSL: tissue simulating liquid
NORM_{x,y,z}: sensitivity in free space
ConvF: sensitivity in TSL / NORM_{x,y,z}
DCP: diode compression point
CF: crest factor (1/duty_cycle) of the RF signal
A,B,C,D: modulation dependent linearization parameters
Polarization Φ : Φ rotation around probe axis
Polarization θ : θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i
 $\theta=0$ is normal to probe axis
Connector Angle: information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013.
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016.
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010.
d) KDB 955664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}: Assessed for E-field polarization $\theta=0$ (fs900MHz in TEM-cell; $f>1800$ MHz: waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E^2 -field uncertainty inside TSL (see below ConvF).
- NORM_{x,y,z} = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; V_{Rx,y,z}; A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. V_R is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for fs600MHz) and inside waveguide using analytical field distributions based on power measurements for $f>600$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from 250MHz to 100MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORM_{x,y,z} (no uncertainty required).

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Probe ES3DV3

SN: 3127

Calibrated: October 11, 2017

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: Z17-97142

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm($\mu V/V_{im}$) ^A	1.28	1.29	1.22	±10.0%
DCP(mV) ^B	103.2	105.3	105.1	

Modulation Calibration Parameters

UID	Communication System Name	A dB	B dB μV	C	D dB	V _R mV	Unc ^C (k=2)
0	CW	X 0.0	0.0	1.0	0.00	282.3	±2.5%
		Y 0.0	0.0	1.0		280.9	
		Z 0.0	0.0	1.0		275.1	

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 Page 5 and Page 6).
^B Numerical linearization parameter: uncertainty not required.
^C 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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ES3DV3 Sn:3127



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

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz] ^①	Relative Permittivity ^②	Conductivity (S/m) ^②	ConvF X	ConvF Y	ConvF Z	Alpha ^③	Depth ^④ (mm)	Unc. (k=2)
750	41.9	0.89	6.26	6.26	6.26	0.60	1.20	±12.1%
900	41.5	0.97	6.15	6.15	6.15	0.37	1.62	±12.1%
1810	40.0	1.40	5.06	5.06	5.06	0.67	1.23	±12.1%
2000	40.0	1.40	4.88	4.88	4.88	0.67	1.23	±12.1%
2300	39.5	1.67	4.71	4.71	4.71	0.90	1.06	±12.1%
2450	39.2	1.80	4.58	4.58	4.58	0.90	1.10	±12.1%
2600	39.0	1.96	4.32	4.32	4.32	0.90	1.09	±12.1%

^① Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of 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.

^② At frequency 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.

^③ 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 the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz] ^①	Relative Permittivity ^②	Conductivity (S/m) ^②	ConvF X	ConvF Y	ConvF Z	Alpha ^③	Depth ^④ (mm)	Unc. (k=2)
750	55.9	0.96	6.18	6.18	6.18	0.45	1.45	±12.1%
900	55.0	1.05	6.06	6.06	6.06	0.48	1.48	±12.1%
1810	53.3	1.52	4.83	4.83	4.83	0.55	1.29	±12.1%
2000	53.3	1.52	4.69	4.69	4.69	0.44	1.69	±12.1%
2300	52.9	1.81	4.43	4.43	4.43	0.90	1.15	±12.1%
2450	52.7	1.95	4.28	4.28	4.28	0.72	1.34	±12.1%
2600	52.5	2.16	4.07	4.07	4.07	0.90	1.16	±12.1%

^① Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of 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.

^② At frequency 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.

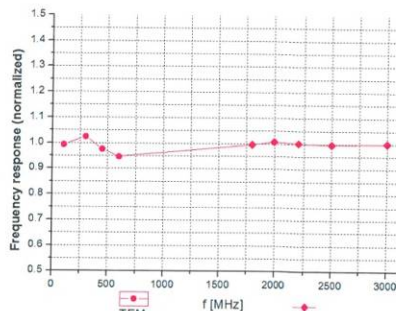
^③ Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz and below ±2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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Frequency Response of E-Field (TEM-Cell: ifi110 EXX, Waveguide: R22)



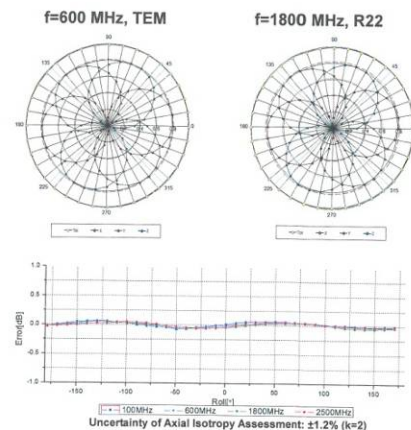
Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

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Receiving Pattern (Φ), θ=0°



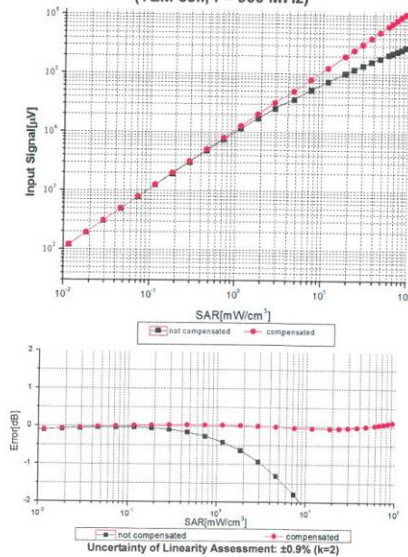
Certificate No: Z17-97142

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ES3DV3 Sn:3127



Dynamic Range f(SAR_{head}) (TEM cell, f = 900 MHz)



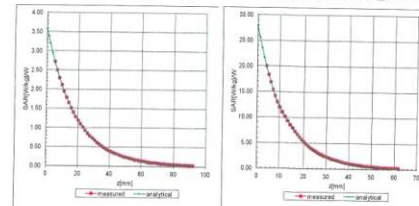
Certificate No: Z17-97142

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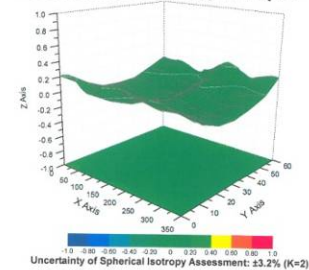


Conversion Factor Assessment

f=900 MHz, WGLS R9(H_convF) f=1810 MHz, WGLS R22(H_convF)



Deviation from Isotropy in Liquid



Certificate No: Z17-97142

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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	165.1
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	10mm
Tip Diameter	4mm
Probe Tip to Sensor X Calibration Point	2mm
Probe Tip to Sensor Y Calibration Point	2mm
Probe Tip to Sensor Z Calibration Point	2mm
Recommended Measurement Distance from Surface	3mm

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Appendix: Modulation Calibration Parameters

UID	Communication System Name	PAR	A dB	B dB-μV	C	VR mV	Unc ¹ (k=2)
0	CW	0.00	X 0.0	0.0	1.0	282.3	±2.5%
			Y 0.0	0.0	1.0	280.9	
			Z 0.0	0.0	1.0	275.1	
10012	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	1.87	X 2.77	68.02	18.46	143.0	±1.8%
			Y 2.75	68.05	18.52	145.0	
			Z 2.71	67.79	18.25	142.3	
10100	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	5.67	X 6.13	66.4	18.97	141.9	±1.9%
			Y 6.15	66.49	19.06	144.2	
			Z 6.09	66.32	18.90	140.9	
10108	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	5.80	X 6.09	66.24	19.07	139.5	±1.9%
			Y 6.10	66.33	19.15	141.5	
			Z 6.05	66.19	19.05	138.0	
10154	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	5.75	X 5.81	65.85	18.93	136.1	±1.9%
			Y 5.82	65.92	19.01	137.8	
			Z 5.79	65.89	18.97	134.7	
10169	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	5.73	X 4.84	65.92	19.20	130.8	±1.9%
			Y 4.82	65.98	19.27	131.3	
			Z 4.80	66.00	19.29	129.1	
10175	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	5.72	X 4.88	66.14	19.40	131.6	±1.9%
			Y 4.83	66.08	19.33	130.9	
			Z 4.79	66.02	19.29	129.3	
10297	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	5.81	X 6.19	66.61	19.42	141.9	±1.9%
			Y 6.13	66.43	19.26	140.7	
			Z 6.14	66.52	19.33	139.6	

Certificate No: Z17-97142

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EX3DV4 Sn:3708

Client SRTC **Certificate No:** Z17-97214

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3708

Calibration Procedure(s): FF-Z11-004-01
Calibration Procedures for Dosimetric E-field Probes

Calibration date: November 07, 2017

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

All calibrations have been conducted in the closed laboratory facility: environment temperature(23±3)°C and humidity<70%.

Calibration Equipment used (MATE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Power sensor NRP-291	101547	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Power sensor NRP-291	101548	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Reference10dBAttenuator	18N59A-10dB	13-Mar-16(CTTL, No.J16X01547)	Mar-18
Reference20dBAttenuator	18N59W-20dB	13-Mar-16(CTTL, No.J16X01548)	Mar-18
Reference Probe EX3DV4	SN 3617	23-Jan-17(SPEAG, No.EX3-3617_Jan17)	Jan-18
DAE4	SN 549	13-Dec-16(SPEAG, No.DAE4-549_Dec16)	Dec-17

Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A	6201052605	27-Jun-17 (CTTL, No.J17X05858)	Jun-18
Network Analyzer E5071C	MY48910673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18

Calibrated by: Yu Zongying SAR Test Engineer

Reviewed by: Lin Hui SAR Test Engineer

Approved by: Qi Diaryuan SAR Project Leader

Issued: November 09, 2017

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Glossary:

TSL: tissue simulating liquid
 NORM_{x,y,z}: sensitivity n free space
 ConvF: sensitivity n TSL / NORM_{x,y,z}
 DCP: diode compression point
 CF: crest factor (1/duty_cycle) of the RF signal
 A,B,C,D: modulation dependent linearization parameters
 Polarization Φ : Φ rotation around probe axis
 Polarization θ : θ rotation around an axis that is in the plane normal to probe axis (at measurement center, i
 $\theta=0$ is normal to probe axis
 Connector Angle: Information used in DASY system to align probe sensor X to the robot coordinate system
 Calibration is Performed According to the Following Standards:
 a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques" (June 2013)
 b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
 c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
 d) KDB 96556A, "SAR Measurement Requirements for 100 MHz to 6 GHz"
Methods Applied and Interpretation of Parameters:
 • NORM_{x,y,z}: Assessed for E-field polarization $\theta=0$ (fs900MHz in TEM-cell; f>1800MHz: waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E^2 field uncertainty inside TSL (see below ConvF).
 • NORM_{x,y,z} = NORM_{x,y,z} * ConvF, frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
 • DCP_{x,y,z}: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
 • PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
 • A_{x,y,z}, B_{x,y,z}, C_{x,y,z}, V_R, y,z,A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. V_R is the maximum calibration range expressed in RMS voltage across the diode.
 • ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for fs900MHz) and inside waveguide using analytical field distributions based on power measurements for f>900MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from 50MHz to 1000MHz.
 • Spherical isotropy (3D deviation from isotropy): In a field of low gradients realized using a flat phantom exposed by a patch antenna.
 • Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
 • Connector Angle: The angle is assessed using the information gained by determining the NORM_x (no uncertainty required).

Certificate No: Z17-97214

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Probe EX3DV4

SN: 3708

Calibrated: November 07, 2017

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system)

Certificate No: Z17-97214

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Add: No.51 Xueyuan Road, Iaidian District, Beijing, 100191, China
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DASY/EASY - Parameters of Probe: EX3DV4 - SN: 3708

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm($\mu V(V/m)^2$) ^A	0.19	0.38	0.44	±10.0%
DCP(mV) ^B	95.1	102.7	105.5	

Modulation Calibration Parameters

UID	Communication System Name	A dB	B dB/μV	C	D dB	VR mV	Unc ^C (k=2)
0	CW	X 0.0	0.0	1.0	0.00	95.9	±3.1%
		Y 0.0	0.0	1.0		149.0	
		Z 0.0	0.0	1.0		169.4	

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 Page 5 and Page 6).
^B Numerical linearization parameter: uncertainty not required.
^C 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: Z17-97214

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EX3DV4 Sn:3708



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

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Relative Permittivity ^c	Conductivity (S/m) ^c	ConvF X	ConvF Y	ConvF Z	Alpha ^d	Depth ^d (mm)	Unc. (k=2)
900	41.5	0.97	9.07	9.07	9.07	0.15	1.37	±12.1%
1810	40.0	1.40	7.77	7.77	7.77	0.24	1.04	±12.1%
2000	40.0	1.40	7.80	7.80	7.80	0.28	0.86	±12.1%
2450	39.2	1.80	7.19	7.19	7.19	0.34	1.03	±12.1%
5200	36.0	4.66	5.64	5.64	5.64	0.40	1.35	±13.3%
5300	35.9	4.76	5.43	5.43	5.43	0.40	1.35	±13.3%
5500	35.6	4.96	5.03	5.03	5.03	0.40	1.50	±13.3%
5600	35.5	5.07	4.89	4.89	4.89	0.40	1.60	±13.3%
5800	35.3	5.27	5.03	5.03	5.03	0.45	1.45	±13.3%

^c Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of 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.

^d At frequency below 3 GHz, the validity of tissue parameters (α 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 (α and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

^e 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 the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Certificate No: Z17-97214

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

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Relative Permittivity ^c	Conductivity (S/m) ^c	ConvF X	ConvF Y	ConvF Z	Alpha ^d	Depth ^d (mm)	Unc. (k=2)
900	56.0	1.05	9.16	9.16	9.16	0.17	1.40	±12.1%
1810	53.3	1.52	7.70	7.70	7.70	0.20	1.13	±12.1%
2000	53.3	1.52	7.76	7.76	7.76	0.14	1.60	±12.1%
2450	52.7	1.95	7.30	7.30	7.30	0.66	0.70	±12.1%
5200	49.0	5.30	4.79	4.79	4.79	0.45	1.80	±13.3%
5300	48.9	5.42	4.56	4.56	4.56	0.45	1.80	±13.3%
5500	48.6	5.65	4.17	4.17	4.17	0.50	1.75	±13.3%
5600	48.5	5.77	4.10	4.10	4.10	0.50	1.90	±13.3%
5800	48.2	6.00	4.19	4.19	4.19	0.55	1.85	±13.3%

^c Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of 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.

^d At frequency below 3 GHz, the validity of tissue parameters (α 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 (α and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

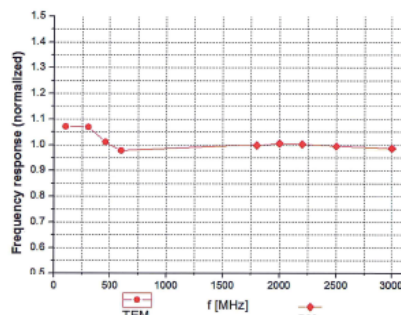
^e Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz and below ±2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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Frequency Response of E-Field (TEM-Cell: if110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

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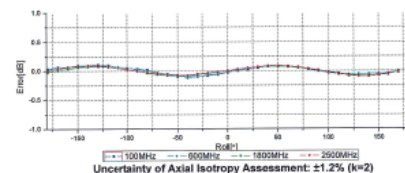
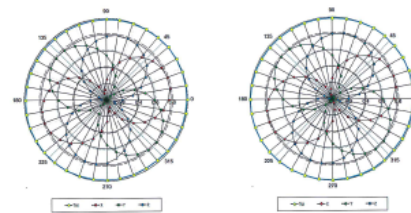
Page 7 of 12



Receiving Pattern (Φ, θ=0°)

f=600 MHz, TEM

f=1800 MHz, R22

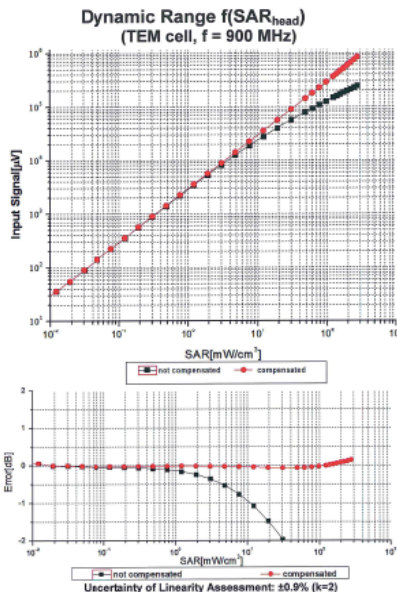


Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

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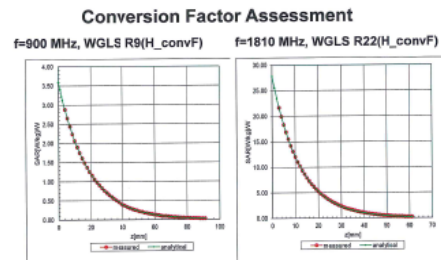
Page 8 of 12

EX3DV4 Sn:3708

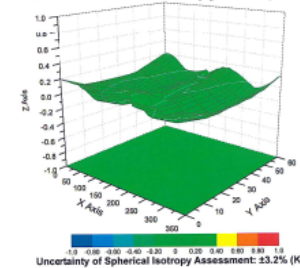


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Deviation from Isotropy in Liquid



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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	177.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

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Appendix (Additional assessments outside the scope of FCC approved dual-logo scope)

Modulation Calibration Parameters

UID	Communication System Name	PAR	A dB	B dB-μV	C	VR mV	Unc ¹ (k=2)
0	CW	0.00	X 0.0	0.0	1.0	95.9	±3.1%
			Y 0.0	0.0	1.0	149.0	
			Z 0.0	0.0	1.0	169.4	
10011	UMTS-FDD (WCDMA)	2.91	X 2.97	64.29	16.82	147.4	±1.8%
			Y 3.15	66.44	17.98	144.1	
			Z 3.21	67.23	18.44	141.7	
10021	GSM-FDD (TDMA GMSK)	9.39	X 0.95	57.62	9.60	48.2	±2.4%
			Y 1.22	59.57	9.93	44.1	
			Z 1.13	59.66	9.94	43.4	
10062	IEEE 802.11a/b WiFi 5 GHz (OFDM 5 Mbps)	8.68	X 9.01	65.22	19.38	92.1	±2.1%
			Y 8.26	63.95	18.73	71.9	
			Z 8.53	64.77	19.13	85.3	

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D750V3 Sn:1101

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E-mail: cti@chinaetl.com http://www.chinaetl.cn

Client: **SRTC** Certificate No: **Z17-97134**

CALIBRATION CERTIFICATE

Object: D750V3 - SN: 1101

Calibration Procedure(s): FF-Z11-003-01
Calibration Procedures for dipole validation kits

Calibration date: September 13, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVD	102196	02-Mar-17 (CTTL No J17X01254)	Mar-18
Power sensor NR-VZ5	100596	02-Mar-17 (CTTL No J17X01254)	Mar-18
Reference Probe EX3DV4	SN 7433	26-Sep-16(SPEAG No EX3-7433_Sep16)	Sep-17
D4E4	SN 1331	19-Jan-17(CTTL-SPEAG No Z17-97015)	Jan-18

Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL No J17X00286)	Jan-18
Network Analyzer E5071C	MY46111013	13-Jan-17 (CTTL No J17X00285)	Jan-18

Calibrated by: Name: Zhao Jing, Function: SAR Test Engineer, Signature: [Signature]

Reviewed by: Yu Zongying, SAR Test Engineer

Approved by: Qi Dianyuan, SAR Project Leader

Issued: September 16, 2017

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

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- c) 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
- d) KDB95664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:
e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY52	52.10.0.1446
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.5 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.05 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	8.26 mW / g ± 18.9 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.34 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	5.39 mW / g ± 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.4 ± 6 %	0.95 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.15 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	8.69 mW / g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.42 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	5.73 mW / g ± 18.7 % (k=2)

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.90 ± 0.24 Ω
Return Loss	- 28.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	52.00 ± 2.22 Ω
Return Loss	- 30.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.136 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.

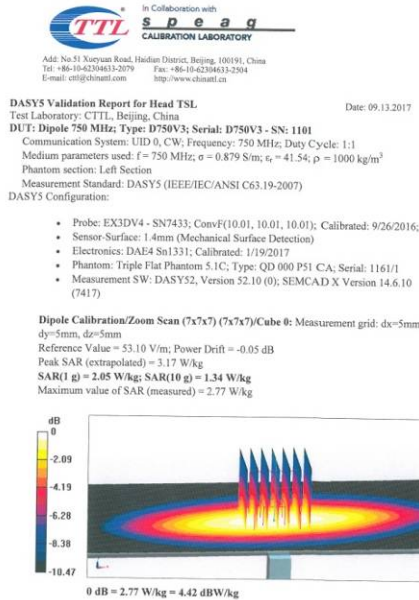
Additional EUT Data

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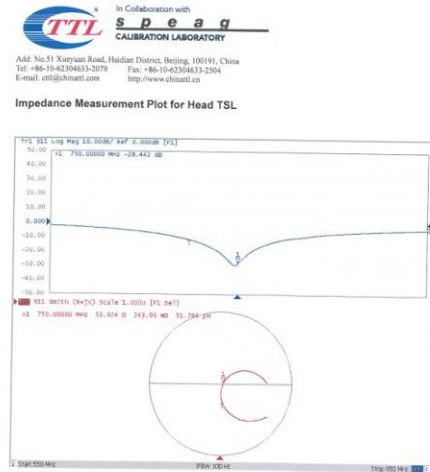
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D750V3 Sn:1101



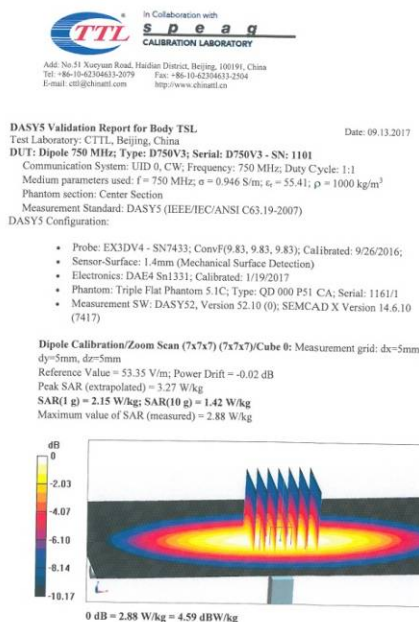
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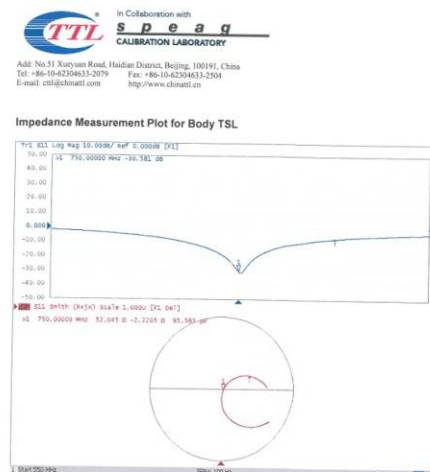
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D835V2 Sn:4d023

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Client: **SRTC** Certificate No: **Z17-97135**

CALIBRATION CERTIFICATE

Object: D835V2 - SN: 4d023

Calibration Procedure(s): FF-Z11-003-01
Calibration Procedures for dipole validation kits

Calibration date: September 13, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVO	102196	02-Mar-17 (CTTL No J17X01254)	Mar-18
Power sensor NRVS	100596	02-Mar-17 (CTTL No J17X01254)	Mar-18
Reference Probe EX30V4	SN 7433	28-Sep-16 (SPEAG No EX3-7433_Sep16)	Sep-17
D4E4	SN 1331	19-Jan-17 (CTTL-SPEAG No Z17-97015)	Jan-18

Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL No J17X00286)	Jan-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL No J17X00286)	Jan-18

Calibrated by: Zhao Jing SAR Test Engineer Signature: [Signature]

Reviewed by: Yu Zongying SAR Test Engineer Signature: [Signature]

Approved by: Qi Dianyuan SAR Project Leader Signature: [Signature]

Issued: September 16, 2017

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Glossary:

TSL: tissue simulating liquid
Con/F: sensitivity in TSL / NORMx,y,z
N/A: not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
c) 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
d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASYS System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY52	52.10.0.1446
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

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	41.3 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL

Condition	SAR
SAR averaged over 1 cm ³ (1 g) of Head TSL	250 mW input power
SAR measured	2.35 mW / g
SAR for nominal Head TSL parameters	normalized to 1W
SAR for nominal Head TSL parameters	9.37 mW / g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition
SAR measured	250 mW input power
SAR measured	1.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W
SAR for nominal Head TSL parameters	6.06 mW / g ± 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

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	55.7 ± 6 %	0.96 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	---	---

SAR result with Body TSL

Condition	SAR
SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition
SAR measured	250 mW input power
SAR measured	2.34 mW / g
SAR for nominal Body TSL parameters	normalized to 1W
SAR for nominal Body TSL parameters	9.47 mW / g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition
SAR measured	250 mW input power
SAR measured	1.53 mW / g
SAR for nominal Body TSL parameters	normalized to 1W
SAR for nominal Body TSL parameters	6.17 mW / g ± 18.7 % (k=2)

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.00-2.79jΩ
Return Loss	-30.7dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.60-3.61jΩ
Return Loss	-25.8dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.495 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

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D835V2 Sn:4d023

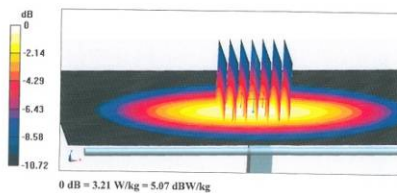
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E-mail: cti@china.ttl.com http://www.china.ttl.cn

DASY5 Validation Report for Head TSL Date: 09.13.2017
Test Laboratory: CTTL, Beijing, China
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d023
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835$ MHz; $\alpha = 0.903$ S/m; $\epsilon_r = 41.34$; $\rho = 1000$ kg/m³
Phantom section: Left 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: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7) Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.28 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.66 W/kg
SAR(1 g) = 2.35 W/kg; SAR(10 g) = 1.52 W/kg
Maximum value of SAR (measured) = 3.21 W/kg



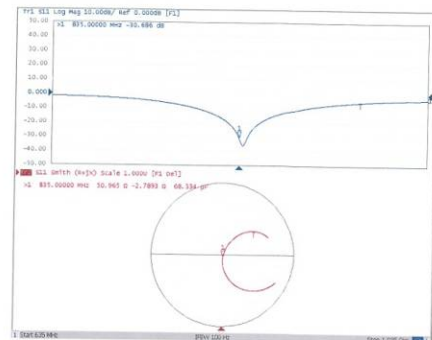
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Impedance Measurement Plot for Head TSL



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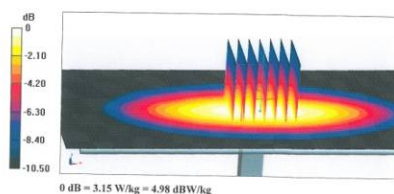
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E-mail: cti@china.ttl.com http://www.china.ttl.cn

DASY5 Validation Report for Body TSL Date: 09.13.2017
Test Laboratory: CTTL, Beijing, China
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d023
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835$ MHz; $\alpha = 0.958$ S/m; $\epsilon_r = 55.68$; $\rho = 1000$ kg/m³
Phantom section: Center 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: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7) Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.17 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.57 W/kg
SAR(1 g) = 2.34 W/kg; SAR(10 g) = 1.53 W/kg
Maximum value of SAR (measured) = 3.15 W/kg



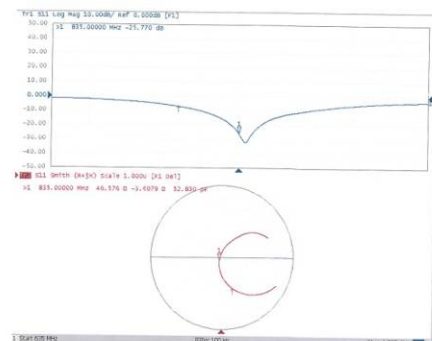
Certificate No: Z17-97135

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Impedance Measurement Plot for Body TSL



Certificate No: Z17-97135

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D1800V2 Sn:2d084

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CALIBRATION
CNAS L0570

Client: **SRTC** Certificate No: **Z17-97138**

CALIBRATION CERTIFICATE

Object: D1800V2 - SN: 2d084

Calibration Procedure(s): FF-Z11-003-01
Calibration Procedures for dipole validation kits

Calibration date: September 16, 2017

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

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

Calibration Equipment used (MATE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	102196	02-Mar-17 (CTTL No.J17X01254)	Mar-18
Power sensor NRP-Z91	100596	02-Mar-17 (CTTL No.J17X01254)	Mar-18
Reference Probe EX3D4	SN 7433	26-Sep-16(SPEAG No EX3-7433_Sep16)	Sep-17
DAE4	SN 1331	19-Jan-17(CTTL-SPEAG No Z17-97015)	Jan-18

Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL No.J17X00285)	Jan-18
Network Analyzer E5071C	MY49110673	13-Jan-17 (CTTL No.J17X00285)	Jan-18

Calibrated by:	Name	Function	Signature
	Zhao Jing	SAR Test Engineer	
Reviewed by:	Yu Zongying	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: September 18, 2017

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Certificate No: Z17-97138

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Glossary:
TSL: tissue simulating liquid
Con/F: sensitivity in TSL / NORMx,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 300MHz to 3GHz)", February 2005
c) 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
d) KDB865894, 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: Z17-97138

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

DASY Version	DASY52	52.10.0.1446
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 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	40.4 ± 6 %	1.42 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.79 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	38.9 mW / g ± 18.8 % (k=2)
SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.12 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	20.4 mW / g ± 18.7 % (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	53.8 ± 6 %	1.50 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.84 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	39.7 mW / g ± 18.8 % (k=2)
SAR averaged over 10 cm³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.18 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	20.8 mW / g ± 18.7 % (k=2)

Certificate No: Z17-97138

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.3Ω - 1.55jΩ
Return Loss	- 35.4dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.0Ω - 1.32jΩ
Return Loss	- 27.1dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.316 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

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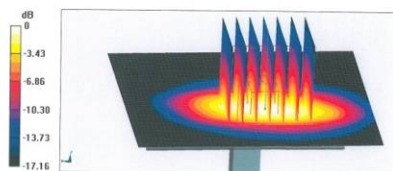
D1800V2 Sn:2d084



DASY5 Validation Report for Head TSL
Test Laboratory: CTTL, Beijing, China
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d084
Communication System: UID 0, CW; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1800$ MHz; $\sigma = 1.423$ S/m; $\epsilon_r = 40.37$; $\rho = 1000$ kg/m³
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(7.97, 7.97, 7.97); Calibrated: 9/26/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
 $dx=5$ mm, $dy=5$ mm, $dz=5$ mm
Reference Value = 93.90 W/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 18.7 W/kg
SAR(1 g) = 9.79 W/kg; SAR(10 g) = 5.12 W/kg
Maximum value of SAR (measured) = 15.5 W/kg



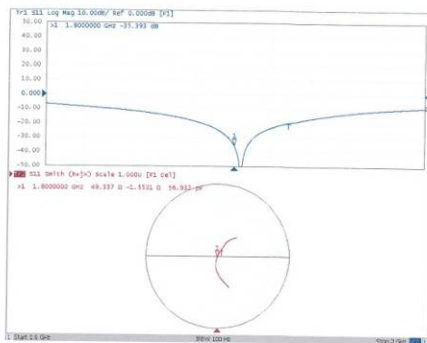
0 dB = 15.5 W/kg = 11.90 dBW/kg

Certificate No: Z17-97138

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Impedance Measurement Plot for Head TSL



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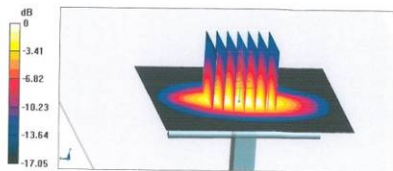
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DASY5 Validation Report for Body TSL
Test Laboratory: CTTL, Beijing, China
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d084
Communication System: UID 0, CW; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1800$ MHz; $\sigma = 1.503$ S/m; $\epsilon_r = 53.79$; $\rho = 1000$ kg/m³
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(7.75, 7.75, 7.75); Calibrated: 9/26/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7413)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
 $dx=5$ mm, $dy=5$ mm, $dz=5$ mm
Reference Value = 97.57 W/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 9.84 W/kg; SAR(10 g) = 5.18 W/kg
Maximum value of SAR (measured) = 15.2 W/kg



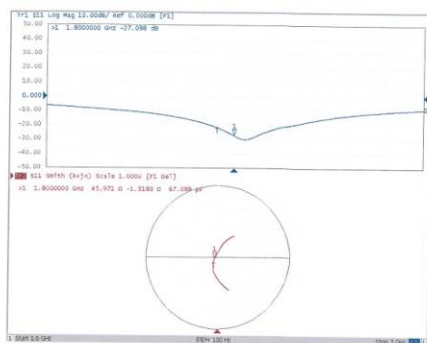
0 dB = 15.2 W/kg = 11.82 dBW/kg

Certificate No: Z17-97138

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Impedance Measurement Plot for Body TSL



Certificate No: Z17-97138

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D2450V2 Sn:738

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E-mail: cti@chinaetl.com http://www.chinaetl.cn

Client: **SRTC** Certificate No: **Z17-97140**

CALIBRATION CERTIFICATE

Object: D2450V2 - SN: 738

Calibration Procedure(s): FF-Z11-003.01
Calibration Procedures for dipole validation kits

Calibration date: September 18, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date/Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRV-D	102196	02-Mar-17 (CTTL No.J17X01254)	Mar-18
Power sensor NRV-Z5	100596	02-Mar-17 (CTTL No.J17X01254)	Mar-18
Reference Probe EX30V4	SN 7433	26-Sep-16(SPEAG No.EX3-7433_Sep16)	Sep-17
D4E4	SN 1331	19-Jan-17(CTTL-SPEAG No.Z17-97015)	Jan-18

Secondary Standards	ID #	Cal Date/Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL No.J17X00286)	Jan-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL No.J17X00285)	Jan-18

Calibrated by:	Name	Function	Signature
	Zhao Jing	SAR Test Engineer	
Reviewed by:	Yu Zongying	SAR Test Engineer	
Approved by:	Qi Dianyan	SAR Project Leader	

Issued: September 21, 2017

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Certificate No: Z17-97140

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Client: **SRTC** Certificate No: **Z17-97140**

Glossary:

TSL: tissue simulating liquid
ConvF: sensitivity in TSL / NORMx.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, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- 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
- KDB85664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

- DASY4/S System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY2	52.10.0.1446
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
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	38.7 ± 6 %	1.79 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.1 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	52.4 mW / g ± 18.8 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.10 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	24.4 mW / g ± 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.5 ± 6 %	1.98 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	52.3 mW / g ± 18.8 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	6.10 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	24.3 mW / g ± 18.7 % (k=2)

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.30 ± 5.92jΩ
Return Loss	- 24.5dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.62 ± 6.39jΩ
Return Loss	- 23.1dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.268 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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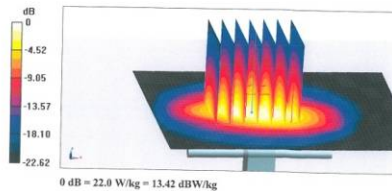
D2450V2 Sn:738



DASY5 Validation Report for Head TSL
Test Laboratory: CTTL, Beijing, China
Date: 09.18.2017
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 738
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2450$ MHz; $\sigma = 1.788$ S/m; $\epsilon_r = 38.67$; $\rho = 1000$ kg/m³
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(7.45, 7.45, 7.45); Calibrated: 9/26/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DA64 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $d_x=5$ mm, $d_y=5$ mm, $d_z=5$ mm
Reference Value = 102.1 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 27.8 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.1 W/kg
Maximum value of SAR (measured) = 22.0 W/kg

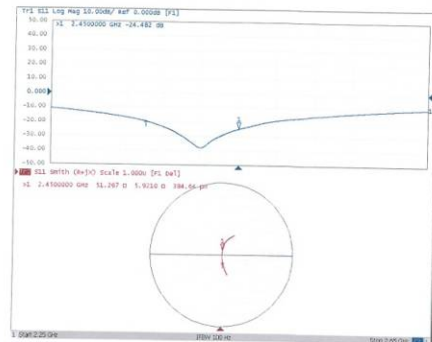


Certificate No: Z17-97140

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Impedance Measurement Plot for Head TSL



Certificate No: Z17-97140

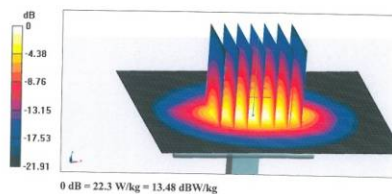
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DASY5 Validation Report for Body TSL
Test Laboratory: CTTL, Beijing, China
Date: 09.18.2017
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 738
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2450$ MHz; $\sigma = 1.983$ S/m; $\epsilon_r = 52.51$; $\rho = 1000$ kg/m³
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(7.46, 7.46, 7.46); Calibrated: 9/26/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DA64 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $d_x=5$ mm, $d_y=5$ mm, $d_z=5$ mm
Reference Value = 96.41 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 27.8 W/kg
SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.1 W/kg
Maximum value of SAR (measured) = 22.3 W/kg

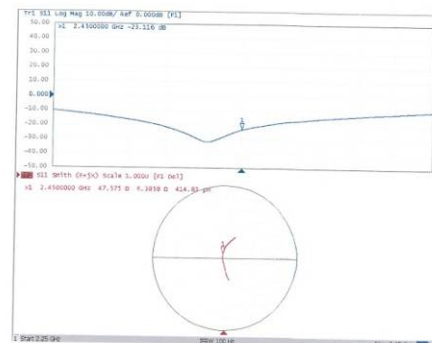


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Impedance Measurement Plot for Body TSL



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D5GHzV2 Sn:1079

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Client: **SRTC** Certificate No: **Z17-97133**

CALIBRATION CERTIFICATE

Object: **D5GHzV2 - SN: 1079**

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

Calibration date: **September 25, 2017**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by Certificate No.)	Scheduled Calibration
Power Meter NRP2	102196	02-Mar-17 (CTTL, No J17X01254)	Mar-18
Power sensor NRP-291	100596	02-Mar-17 (CTTL, No J17X01254)	Mar-18
ReferenceProbe EX3D/V4	SN 3846	13-Jan-17(CTTL-SPEAG, No Z16-97251)	Jan-18
D4E4	SN 1331	19-Jan-17(CTTL-SPEAG, No Z17-97015)	Jan-18
Secondary Standards	ID #	Cal Date(Calibrated by Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL, No J17X00286)	Jan-18
NetworkAnalyzer E5071C	MY46110673	13-Jan-17 (CTTL, No J17X00285)	Jan-18

Calibrated by: **Zhao Jing** Function: **SAR Test Engineer** Signature: *[Signature]*

Reviewed by: **Yu Zongying** Function: **SAR Test Engineer** Signature: *[Signature]*

Approved by: **Qi Dianyuan** Function: **SAR Project Leader** Signature: *[Signature]*

Issued: September 28, 2017

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
Con/F: sensitivity in TSL / NORMx,y,z
N/A: not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- c) 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
- d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

- e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY52	52.10.0.1446
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5300 MHz ± 1 MHz 5500 MHz ± 1 MHz 5600 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.7 ± 6 %	4.62 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL at 5200 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.77 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	77.6 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.24 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	22.3 mW / g ± 24.2 % (k=2)

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Head TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.78 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	36.1 ± 6 %	4.67 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL at 5300 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.13 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	81.3 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	23.2 mW / g ± 24.2 % (k=2)

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.98 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.9 ± 6 %	4.93 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL at 5500 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.24 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	82.5 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.37 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	23.6 mW / g ± 24.2 % (k=2)

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Head TSL parameters at 5600 MHz
The following parameters and calculations were applied:

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.7 ± 6 %	4.98 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5600 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Head TSL	100 mW input power	8.16 mW / g
SAR measured	normalized to 1W	81.6 mW / g ± 24.4 % (k=2)
SAR for nominal Head TSL parameters	Condition	
SAR averaged over 10 cm ³ (10 g) of Head TSL	100 mW input power	2.34 mW / g
SAR measured	normalized to 1W	23.4 mW / g ± 24.2 % (k=2)

Head TSL parameters at 5800 MHz
The following parameters and calculations were applied:

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.8 ± 6 %	5.16 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5800 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Head TSL	100 mW input power	7.85 mW / g
SAR measured	normalized to 1W	78.7 mW / g ± 24.4 % (k=2)
SAR for nominal Head TSL parameters	Condition	
SAR averaged over 10 cm ³ (10 g) of Head TSL	100 mW input power	2.25 mW / g
SAR measured	normalized to 1W	22.6 mW / g ± 24.2 % (k=2)

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Body TSL parameters at 5200 MHz
The following parameters and calculations were applied:

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	49.5 ± 6 %	5.38 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL at 5200 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Body TSL	100 mW input power	7.52 mW / g
SAR measured	normalized to 1W	75.4 mW / g ± 24.4 % (k=2)
SAR for nominal Body TSL parameters	Condition	
SAR averaged over 10 cm ³ (10 g) of Body TSL	100 mW input power	2.12 mW / g
SAR measured	normalized to 1W	21.3 mW / g ± 24.2 % (k=2)

Body TSL parameters at 5300 MHz
The following parameters and calculations were applied:

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.42 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	49.2 ± 6 %	5.50 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL at 5300 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Body TSL	100 mW input power	7.68 mW / g
SAR measured	normalized to 1W	76.9 mW / g ± 24.4 % (k=2)
SAR for nominal Body TSL parameters	Condition	
SAR averaged over 10 cm ³ (10 g) of Body TSL	100 mW input power	2.18 mW / g
SAR measured	normalized to 1W	21.9 mW / g ± 24.2 % (k=2)

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Body TSL parameters at 5500 MHz
The following parameters and calculations were applied:

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	49.0 ± 6 %	5.72 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL at 5500 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Body TSL	100 mW input power	8.22 mW / g
SAR measured	normalized to 1W	82.4 mW / g ± 24.4 % (k=2)
SAR for nominal Body TSL parameters	Condition	
SAR averaged over 10 cm ³ (10 g) of Body TSL	100 mW input power	2.35 mW / g
SAR measured	normalized to 1W	23.6 mW / g ± 24.2 % (k=2)

Body TSL parameters at 5600 MHz
The following parameters and calculations were applied:

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.4 ± 6 %	5.73 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL at 5600 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Body TSL	100 mW input power	8.08 mW / g
SAR measured	normalized to 1W	80.7 mW / g ± 24.4 % (k=2)
SAR for nominal Body TSL parameters	Condition	
SAR averaged over 10 cm ³ (10 g) of Body TSL	100 mW input power	2.30 mW / g
SAR measured	normalized to 1W	23.0 mW / g ± 24.2 % (k=2)

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Body TSL parameters at 5800 MHz
The following parameters and calculations were applied:

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	49.0 ± 6 %	5.94 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL at 5800 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Body TSL	100 mW input power	7.73 mW / g
SAR measured	normalized to 1W	77.5 mW / g ± 24.4 % (k=2)
SAR for nominal Body TSL parameters	Condition	
SAR averaged over 10 cm ³ (10 g) of Body TSL	100 mW input power	2.17 mW / g
SAR measured	normalized to 1W	21.8 mW / g ± 24.2 % (k=2)

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	47.6Ω - 8.77jΩ
Return Loss	- 20.7dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	45.5Ω - 8.82jΩ
Return Loss	- 21.4dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	50.7Ω - 7.14jΩ
Return Loss	- 23.0dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	55.2Ω - 4.00jΩ
Return Loss	- 24.1dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	52.2Ω - 8.29jΩ
Return Loss	- 21.8dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	50.8Ω - 10.1jΩ
Return Loss	- 20.0dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	48.5Ω - 8.56jΩ
Return Loss	- 21.1dB

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Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	54.9Ω - 8.85jΩ
Return Loss	- 21.9dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	56.6Ω - 2.29jΩ
Return Loss	- 23.7dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	56.7Ω - 8.19jΩ
Return Loss	- 20.2dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.313 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: 09.21.2017

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1079

Communication System: CW; Frequency: 5200 MHz; Frequency: 5300 MHz;

Frequency: 5500 MHz; Frequency: 5600 MHz; Frequency: 5800 MHz;

Medium parameters used: f = 5200 MHz; σ = 4.616 mho/m; εr = 35.72; ρ = 1000

kg/m3, Medium parameters used: f = 5300 MHz; σ = 4.668 mho/m; εr = 36.09; ρ =

1000 kg/m3, Medium parameters used: f = 5500 MHz; σ = 4.934 mho/m; εr = 35.92;

ρ = 1000 kg/m3, Medium parameters used: f = 5600 MHz; σ = 4.984 mho/m; εr =

35.73; ρ = 1000 kg/m3, Medium parameters used: f = 5800 MHz; σ = 5.159 mho/m;

εr = 35.83; ρ = 1000 kg/m3.

Phantom section: Left Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3846; ConvF(5.37,5.37,5.37); Calibrated: 1/13/2017,

- ConvF(5.37,5.37,5.37); Calibrated: 1/13/2017, ConvF(4.72,4.72,4.72);

- Calibrated: 1/13/2017, ConvF(4.72,4.72,4.72); Calibrated: 1/13/2017,

- ConvF(4.95,4.95,4.95); Calibrated: 1/13/2017,

- Sensor-Surface: 1.4mm (Mechanical Surface Detection)

- Electronics: DA64 Sn1331; Calibrated: 2017/1/19

- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/3

- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10

(7417)

Dipole Calibration /Pin=100mW, d=10mm, f=5200 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 58.81 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 30.8 W/kg

SAR(1 g) = 7.77 W/kg; SAR(10 g) = 2.24 W/kg

Maximum value of SAR (measured) = 18.2 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5300 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 65.19 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 33.7 W/kg

SAR(1 g) = 8.13 W/kg; SAR(10 g) = 2.32 W/kg

Maximum value of SAR (measured) = 19.3 W/kg

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Dipole Calibration /Pin=100mW, d=10mm, f=5500 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 57.80 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 34.3 W/kg

SAR(1 g) = 8.24 W/kg; SAR(10 g) = 2.37 W/kg

Maximum value of SAR (measured) = 19.6 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 57.89 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 35.7 W/kg

SAR(1 g) = 8.16 W/kg; SAR(10 g) = 2.34 W/kg

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

Dipole Calibration /Pin=100mW, d=10mm, f=5800 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 53.56 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 35.0 W/kg

SAR(1 g) = 7.85 W/kg; SAR(10 g) = 2.25 W/kg

Maximum value of SAR (measured) = 19.7 W/kg

0 dB = 19.7 W/kg = 12.94 dBW/kg

dB

6.44

12.88

19.31

25.75

32.19

0 dB = 19.7 W/kg = 12.94 dBW/kg

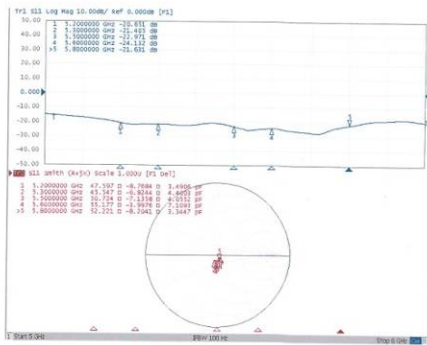
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Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Test Laboratory: CTTI, Beijing, China

Date: 09.25.2017

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1079

Communication System: CW; Frequency: 5200 MHz; Frequency: 5300 MHz; Frequency: 5500 MHz; Frequency: 5600 MHz; Frequency: 5800 MHz; Medium parameters used: $f = 5200$ MHz; $\sigma = 5.382$ mho/m; $\epsilon_r = 49.47$; $\rho = 1000$ kg/m³; Medium parameters used: $f = 5300$ MHz; $\sigma = 5.498$ mho/m; $\epsilon_r = 49.21$; $\rho = 1000$ kg/m³; Medium parameters used: $f = 5500$ MHz; $\sigma = 5.722$ mho/m; $\epsilon_r = 49.03$; $\rho = 1000$ kg/m³; Medium parameters used: $f = 5600$ MHz; $\sigma = 5.733$ mho/m; $\epsilon_r = 48.37$; $\rho = 1000$ kg/m³; Medium parameters used: $f = 5800$ MHz; $\sigma = 5.935$ mho/m; $\epsilon_r = 48.99$; $\rho = 1000$ kg/m³; Phantom section: Center Section; Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX30V4 - SN3846; ConvF(4.95, 4.95, 4.95); Calibrated: 1/13/2017; ConvF(4.95, 4.95, 4.95); Calibrated: 1/13/2017; ConvF(4.18, 4.18, 4.18); Calibrated: 1/13/2017; ConvF(4.18, 4.18, 4.18); Calibrated: 1/13/2017; ConvF(4.53, 4.53, 4.53); Calibrated: 1/13/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 2017/1/19
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/3
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Dipole Calibration /Pin=100mW, d=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 55.18 V/m; Power Drift = 0.01 dB; Peak SAR (extrapolated) = 30.0 W/kg; SAR(1 g) = 7.52 W/kg; SAR(10 g) = 2.12 W/kg; Maximum value of SAR (measured) = 18.2 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 53.94 V/m; Power Drift = 0.01 dB; Peak SAR (extrapolated) = 31.9 W/kg; SAR(1 g) = 7.68 W/kg; SAR(10 g) = 2.18 W/kg; Maximum value of SAR (measured) = 18.3 W/kg

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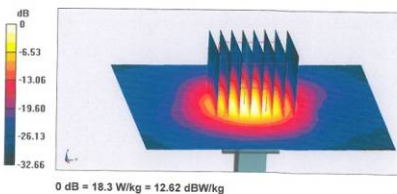
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Dipole Calibration /Pin=100mW, d=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 66.70 V/m; Power Drift = -0.03 dB; Peak SAR (extrapolated) = 33.7 W/kg; SAR(1 g) = 8.22 W/kg; SAR(10 g) = 2.35 W/kg; Maximum value of SAR (measured) = 19.3 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 67.75 V/m; Power Drift = 0.01 dB; Peak SAR (extrapolated) = 34.2 W/kg; SAR(1 g) = 8.08 W/kg; SAR(10 g) = 2.3 W/kg; Maximum value of SAR (measured) = 19.3 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 68.20 V/m; Power Drift = 0.05 dB; Peak SAR (extrapolated) = 33.3 W/kg; SAR(1 g) = 7.73 W/kg; SAR(10 g) = 2.17 W/kg; Maximum value of SAR (measured) = 18.3 W/kg

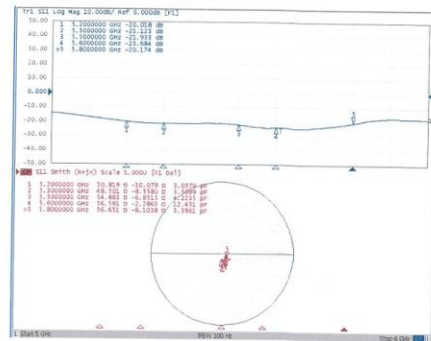


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Impedance Measurement Plot for Body TSL



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-----End of the test report-----