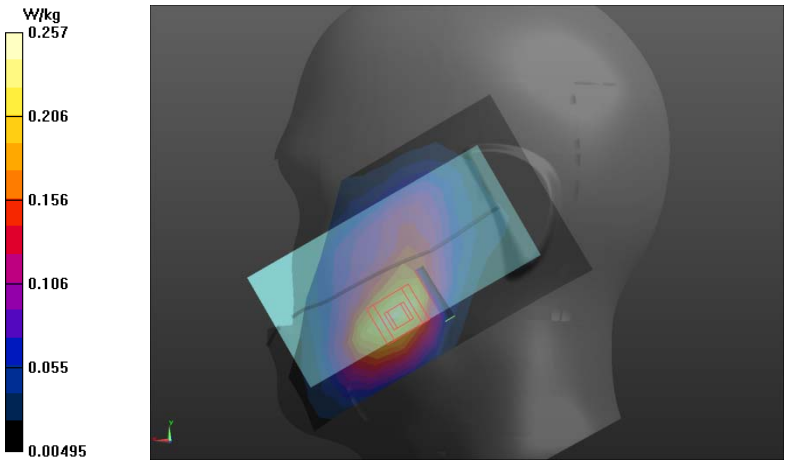
LTE (Band4 20BW)

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; σ = 1.363 S/m; ε_r = 40.678; ρ = 1000 kg/m^3
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

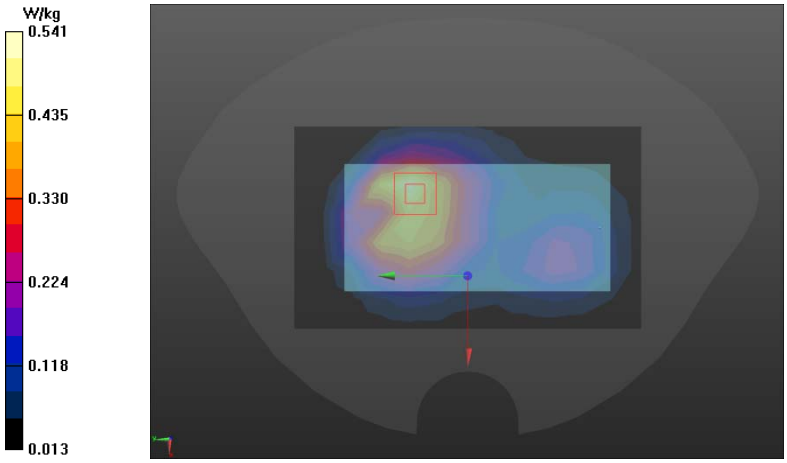


FLAT	Towards ground

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; σ = 1.468 S/m; ε_r = 52.935; ρ = 1000 kg/m^3
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



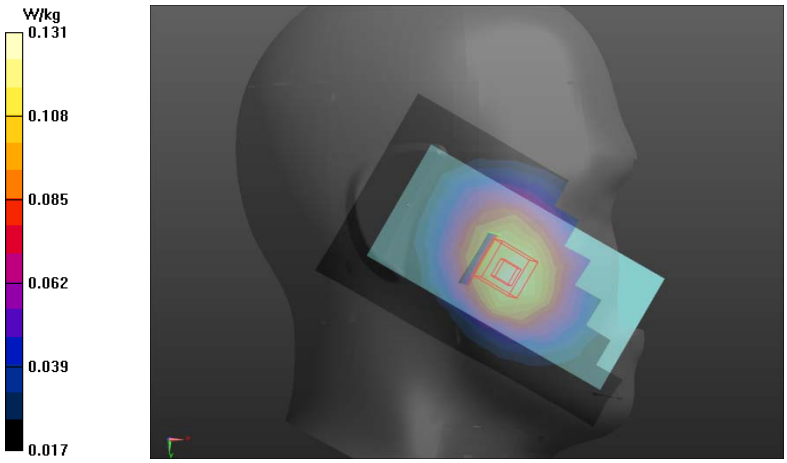
LTE (Band5 10BW)

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; σ = 0.913 S/m; ε_r = 42.521; ρ = 1000 kg/m^3
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

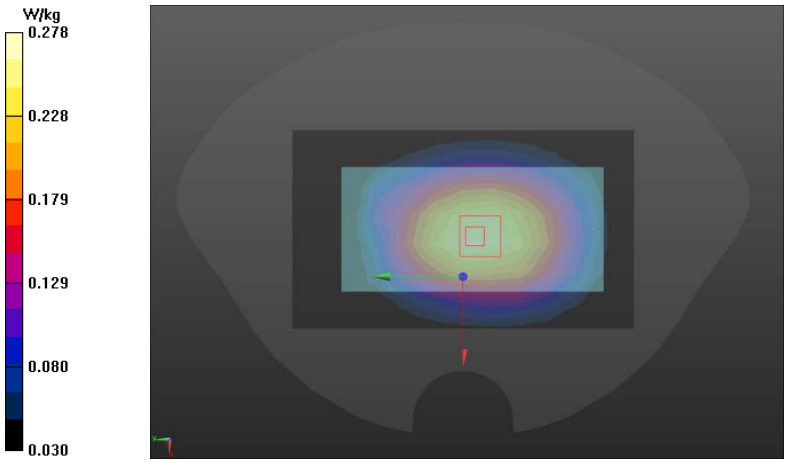


FLAT	Towards ground

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; σ = 0.975 S/m; ε_r = 54.535; ρ = 1000 kg/m^3
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



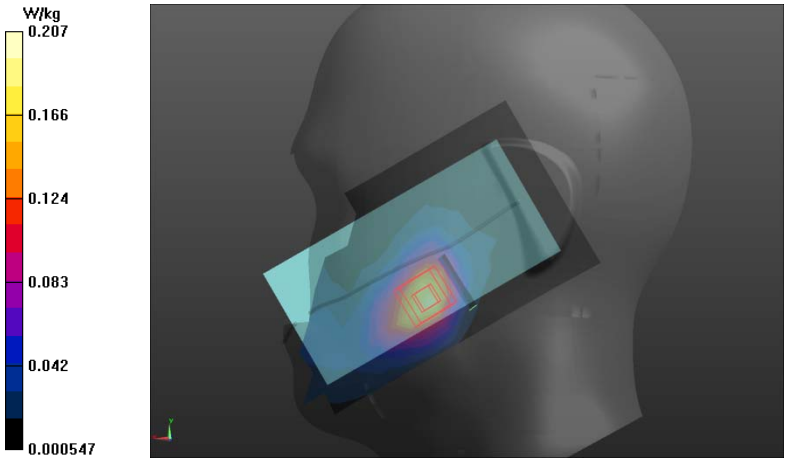
LTE (Band7 20BW)

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; σ = 1.951 S/m; ε_r = 39.388; ρ = 1000 kg/m^3
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

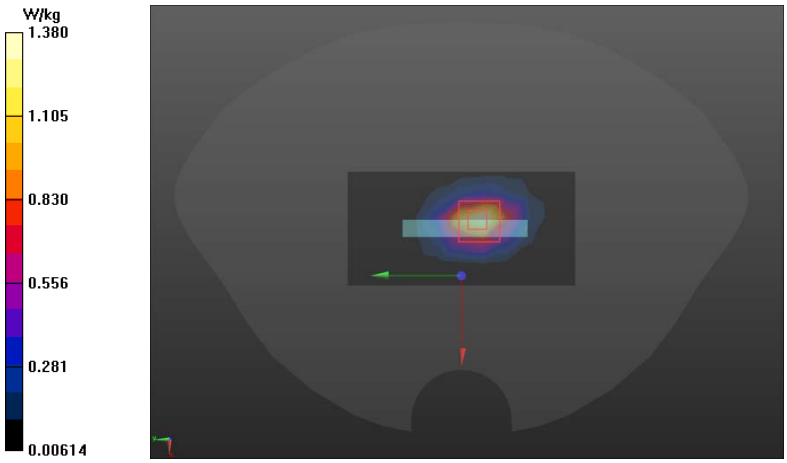


FLAT	Edge2

Communication System: UID 10169 - CAC, LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK);
Frequency: 2560 MHz
Medium parameters used (interpolated): f = 2560 MHz; σ = 2.165 S/m; ε_r = 51.736; ρ = 1000 kg/m^3
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



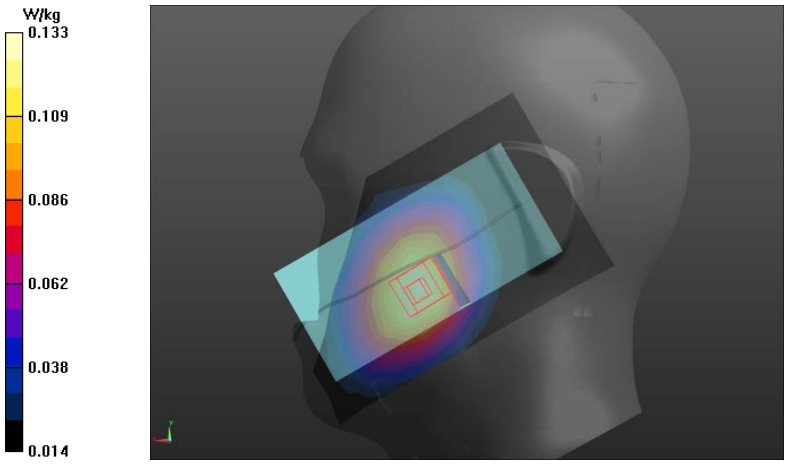
LTE (Band12 10BW)

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; σ = 0.865 S/m; ε_r = 42.969; ρ = 1000 kg/m^3
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

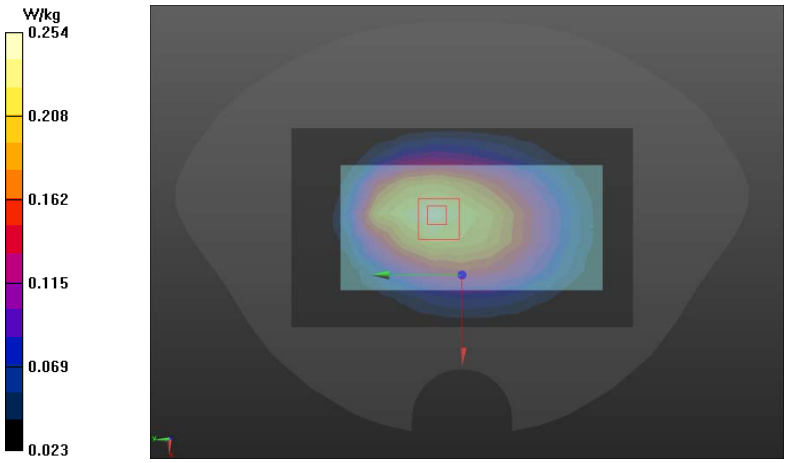


FLAT	Towards ground

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; σ = 0.929 S/m; ε_r = 54.923; ρ = 1000 kg/m^3
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



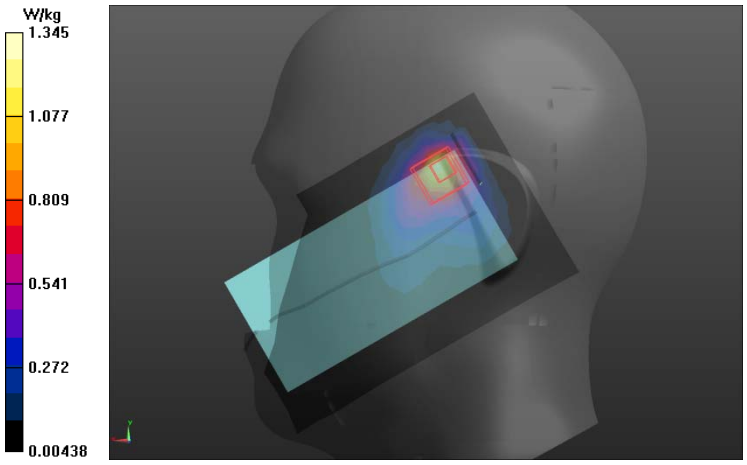
WLAN 2.4GHz

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; σ = 1.871 S/m; ε_r = 39.57; ρ = 1000 kg/m^3
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

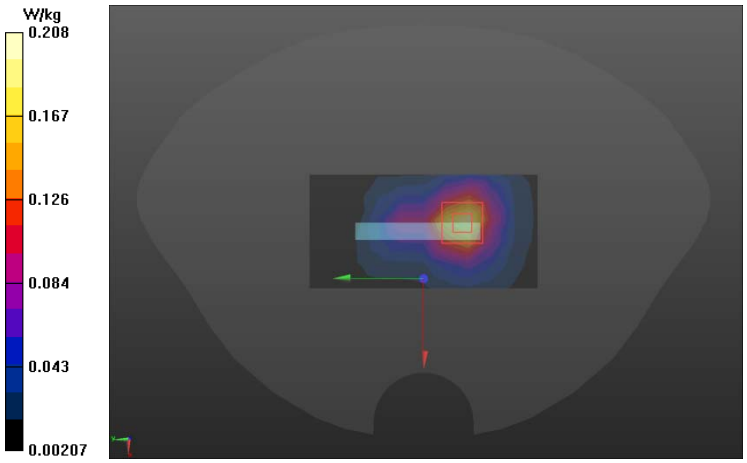


FLAT	EDGE1

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; σ = 2.053 S/m; ε_r = 51.97; ρ = 1000 kg/m^3
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



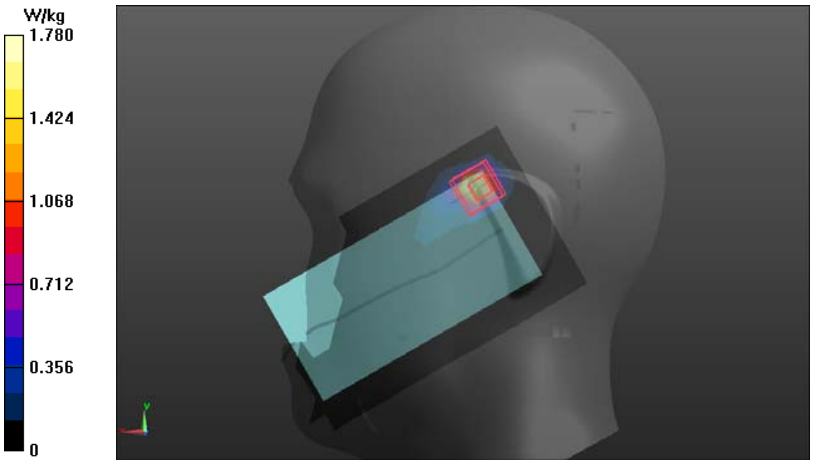
WLAN 5GHz (U-NII-1)

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; σ = 4.701 S/m; ε_r = 35.96; ρ = 1000 kg/m^3
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 (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=10mm, dy=10mm
  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=5mm, dy=5mm, dz=5mm
  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

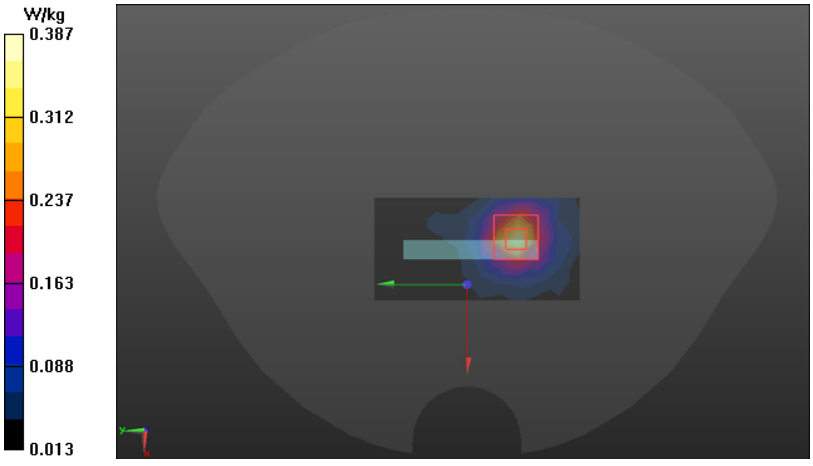


FLAT	EDGE1

Communication System: UID 10062 - CAB, IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps);
Frequency: 5200 MHz
Medium parameters used: f = 5200 MHz; σ = 5.355 S/m; ε_r = 49.035; ρ = 1000 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=10mm, dy=10mm
  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=5mm, dy=5mm, dz=5mm
  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



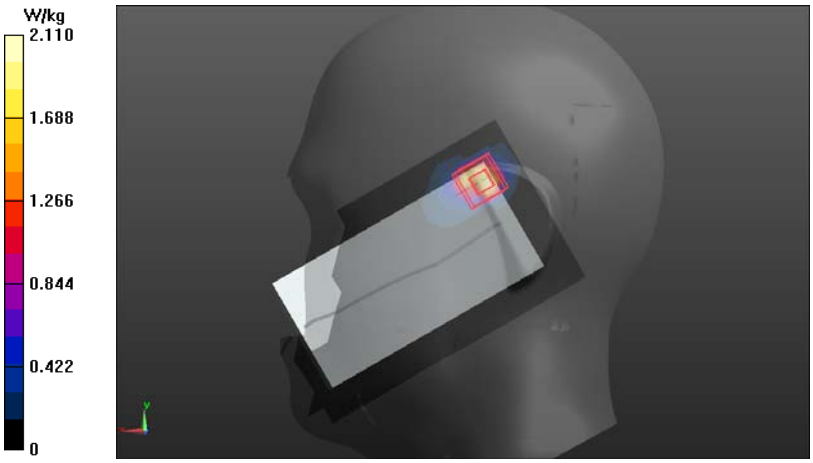
WLAN 5GHz (U-NII-3)

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; σ = 5.255 S/m; ε_r = 35.315; ρ = 1000 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 tilt M 5785/Area Scan (11x18x1):
  Measurement grid: dx=10mm, dy=10mm
  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=5mm, dy=5mm, dz=5mm
  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

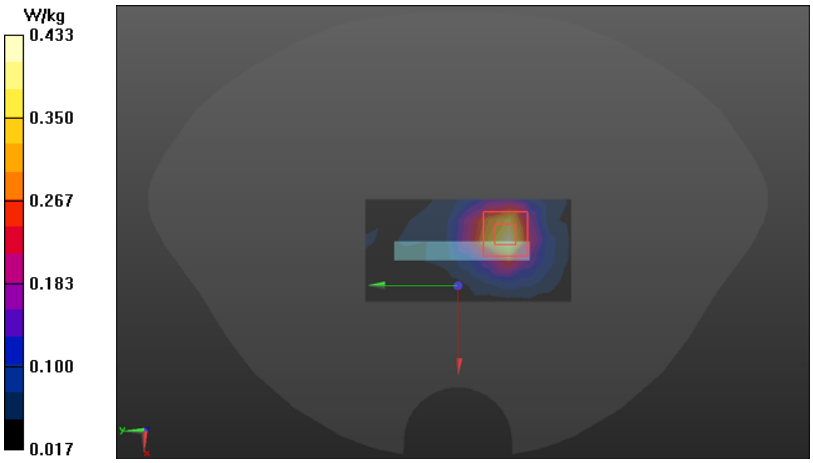


FLAT	EDGE1

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; σ = 5.984 S/m; ε_r = 48.221; ρ = 1000 kg/m^3
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=10mm, dy=10mm
  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=5mm, dy=5mm, dz=5mm
  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

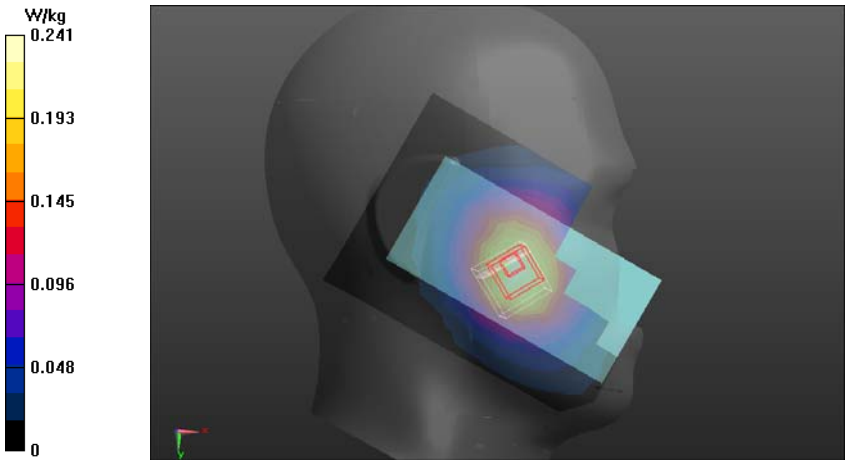
GSM 850MHz

Right Side	Cheek

Communication System: UID 0, Generic GSM (0); Frequency: 836.6 MHz
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.905 S/m; ε_r = 41.528; ρ = 1000 kg/m^3
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=15mm, dy=15mm
  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=5mm, dy=5mm, dz=5mm
  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

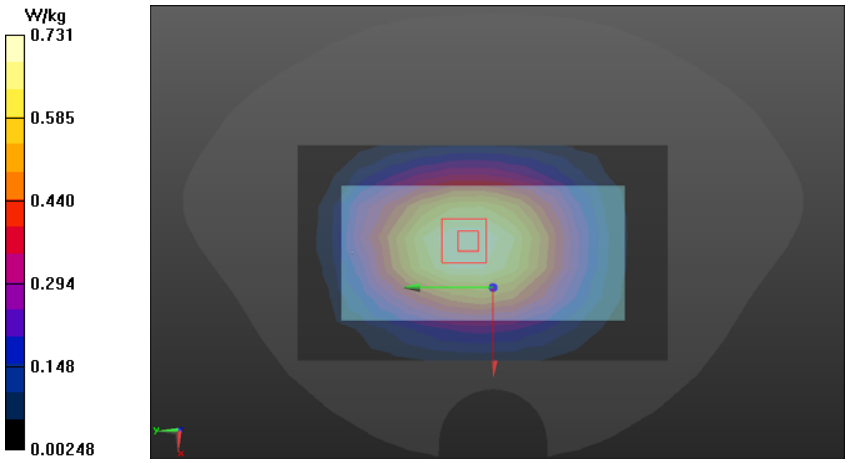


FLAT	Towards ground

Communication System: UID 10021 - DAB, GSM-FDD (TDMA, GMSK); Frequency: 836.6 MHz
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.976 S/m; ε_r = 54.535; ρ = 1000 kg/m^3
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



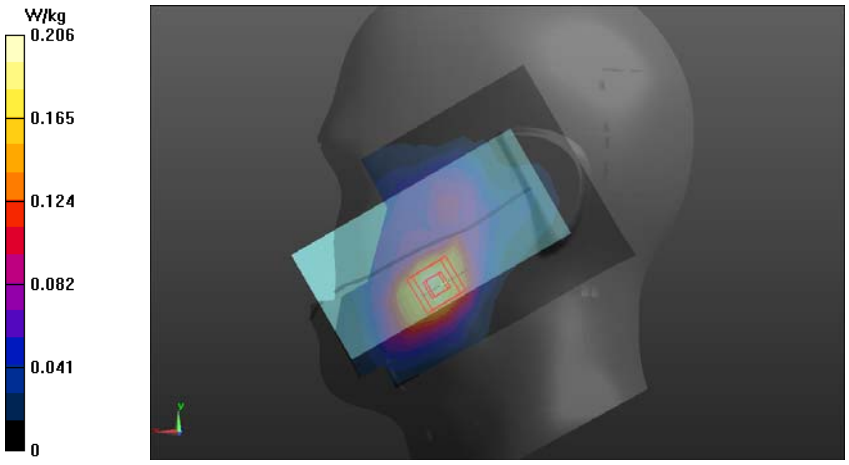
GSM 1900MHz

Left Side	Cheek

Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz
Medium parameters used (interpolated): f = 1880 MHz; σ = 1.4 S/m; ε_r = 40; ρ = 1000 kg/m^3
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=15mm, dy=15mm
  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=5mm, dy=5mm, dz=5mm
  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

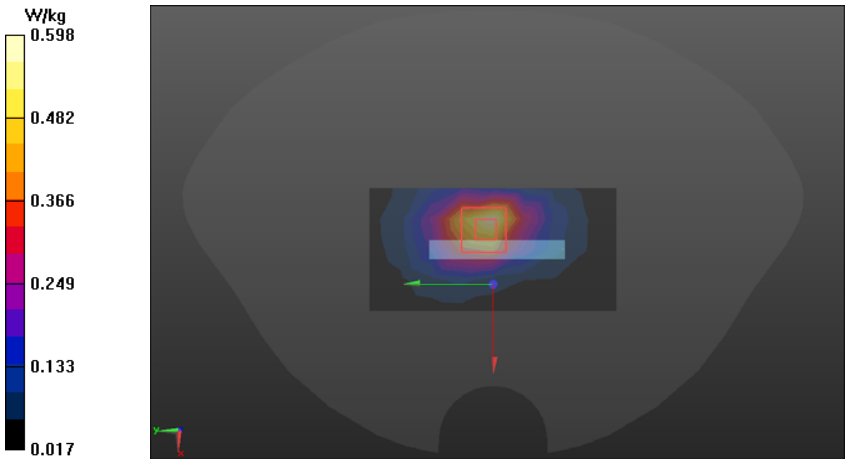


FLAT	EDGE2

Communication System: UID 10021 - DAB, GSM-FDD (TDMA, GMSK); Frequency: 1880 MHz
Medium parameters used (interpolated): f = 1880 MHz; σ = 1.538 S/m; ε_r = 52.717; ρ = 1000 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/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



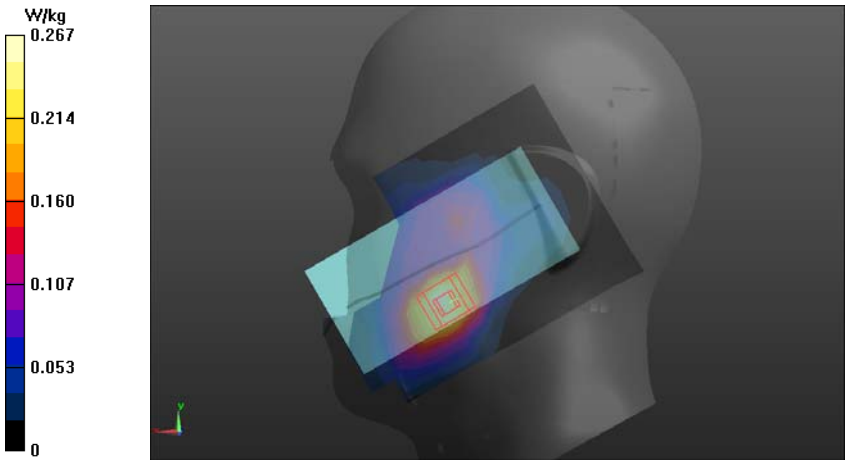
WCDMA Band 2

Left Side	Cheek

Communication System: UID 0, WCDMA BAND2 (0); Frequency: 1880 MHz
Medium parameters used (interpolated): f = 1880 MHz; σ = 1.4 S/m; ε_r = 40; ρ = 1000 kg/m^3
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 BAND2 HSL touch M/Area Scan (9x13x1):
  Measurement grid: dx=15mm, dy=15mm
  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=5mm, dy=5mm, dz=5mm
  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

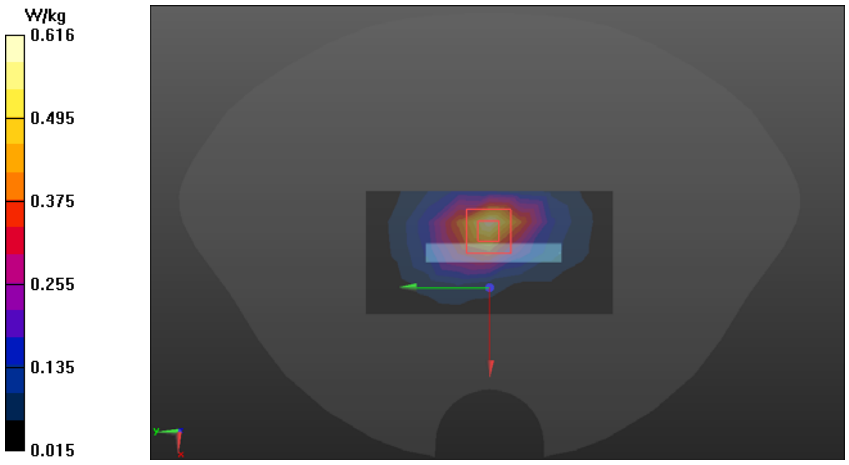


FLAT	EDGE2

Communication System: UID 10011 - CAB, UMTS-FDD (WCDMA); Frequency: 1880 MHz
Medium parameters used (interpolated): f = 1880 MHz; σ = 1.538 S/m; ε_r = 52.717; ρ = 1000 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=15mm, dy=15mm
  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=5mm, dy=5mm, dz=5mm
  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



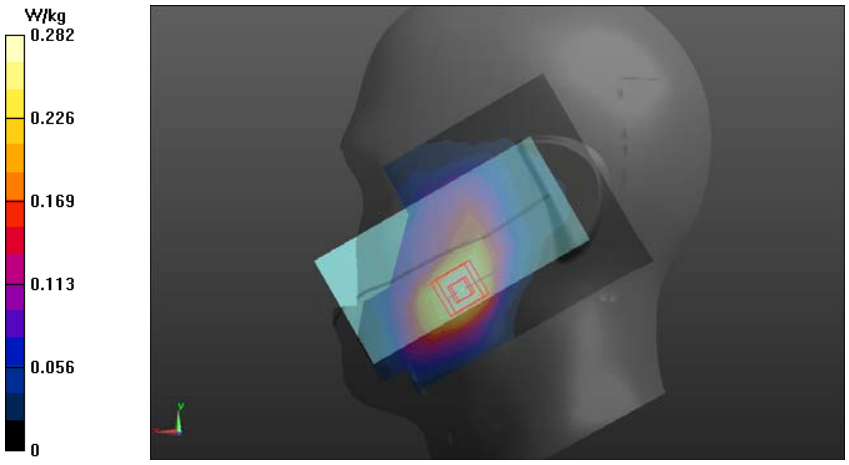
WCDMA Band 4

Left Side	Cheek

Communication System: UID 0, WCDMA BAND4 (0); Frequency: 1732.4 MHz
Medium parameters used (interpolated): f = 1732.4 MHz; σ = 1.375 S/m; ε_r = 40.07; ρ = 1000 kg/m^3
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=15mm, dy=15mm
  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=5mm, dy=5mm, dz=5mm
  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

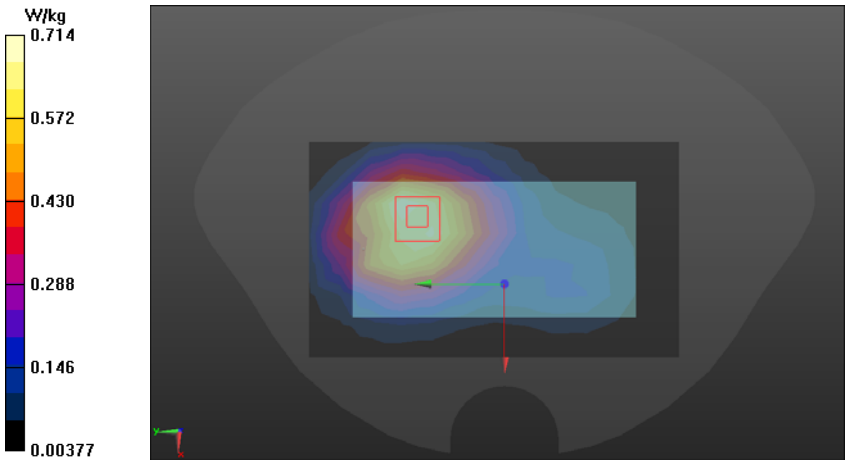


FLAT(VIOCE)	Towards ground

Communication System: UID 10011 - CAB, UMTS-FDD (WCDMA); Frequency: 1732.6 MHz
Medium parameters used (interpolated): f = 1732.6 MHz; σ = 1.468 S/m; ε_r = 52.935; ρ = 1000 kg/m^3
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



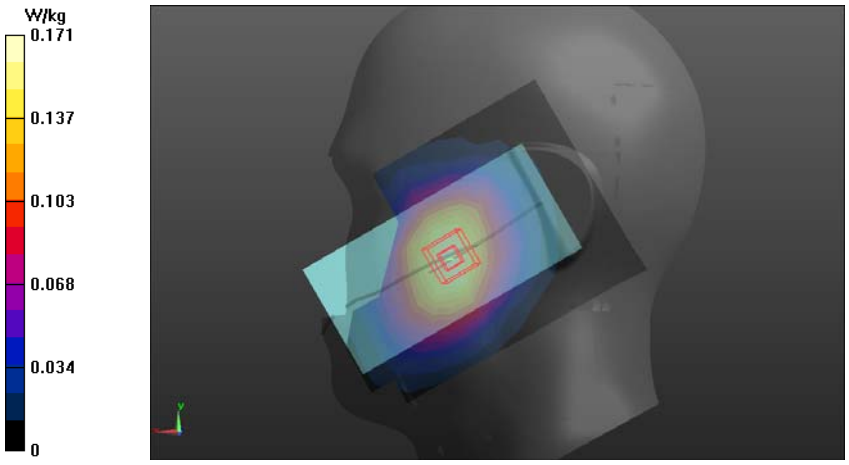
WCDMA Band 5

Left Side	Cheek

Communication System: UID 0, WCDMA BAND 5 (0); Frequency: 836.6 MHz
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.905 S/m; ε_r = 41.528; ρ = 1000 kg/m^3
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=15mm, dy=15mm
  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=5mm, dy=5mm, dz=5mm
  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

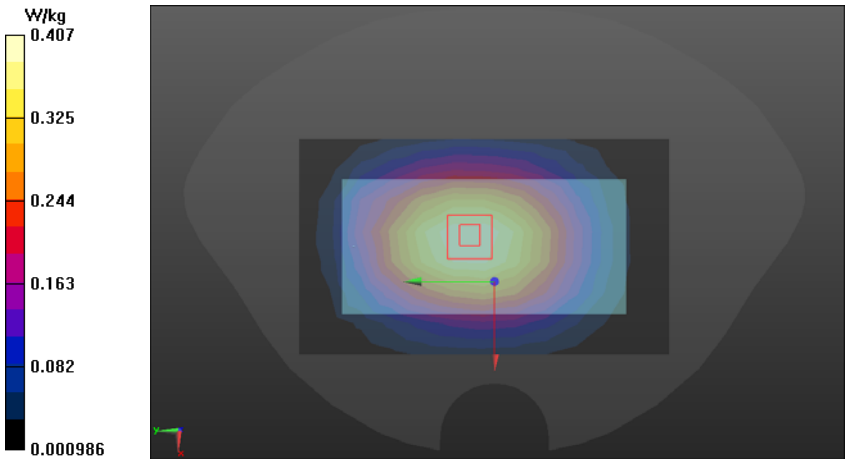


FLAT(DATA）	Towards ground

Communication System: UID 10011 - CAB, UMTS-FDD (WCDMA); Frequency: 836.6 MHz
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.976 S/m; ε_r = 54.535; ρ = 1000 kg/m^3
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



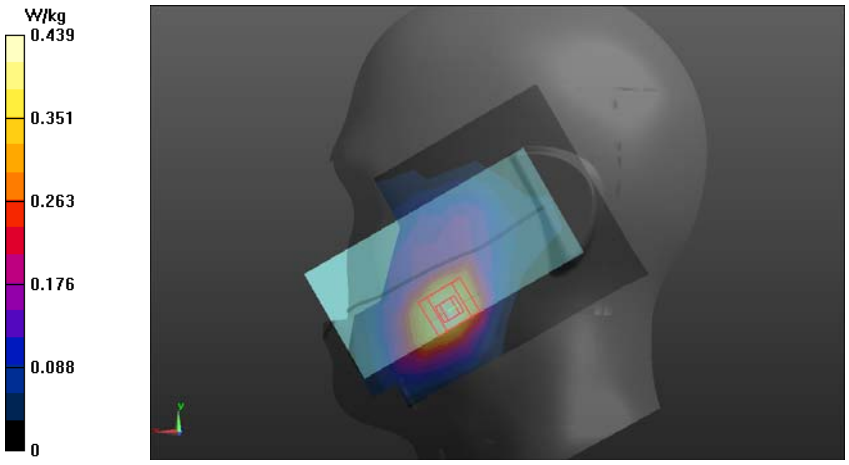
LTE (Band2 20BW)

Left Side	Cheek

Communication System: UID 0, LTE band 02 (0); Frequency: 1880 MHz
Medium parameters used (interpolated): f = 1880 MHz; σ = 1.4 S/m; ε_r = 40; ρ = 1000 kg/m^3
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=15mm, dy=15mm
  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=5mm, dy=5mm, dz=5mm
  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

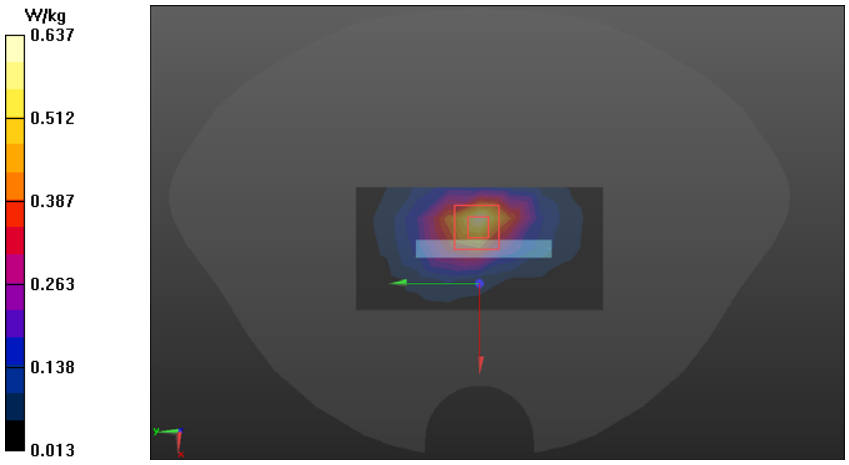


FLAT	EDGE2

Communication System: UID 0, LTE band 02 (0); Frequency: 1880 MHz
Medium parameters used (interpolated): f = 1880 MHz; σ = 1.538 S/m; ε_r = 52.717; ρ = 1000 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/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



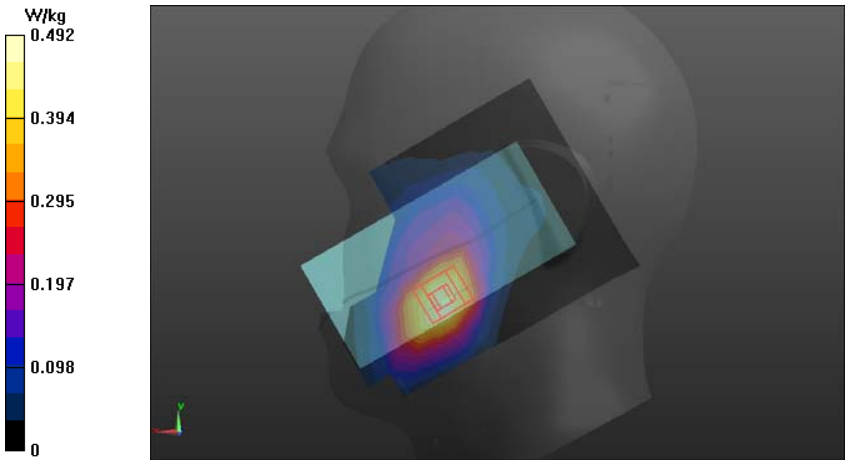
LTE (Band4 20BW)

Left Side	Cheek

Communication System: UID 0, LTE band 4 (0); Frequency: 1732.5 MHz
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.375 S/m; ε_r = 40.07; ρ = 1000 kg/m^3
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=15mm, dy=15mm
  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=5mm, dy=5mm, dz=5mm
  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

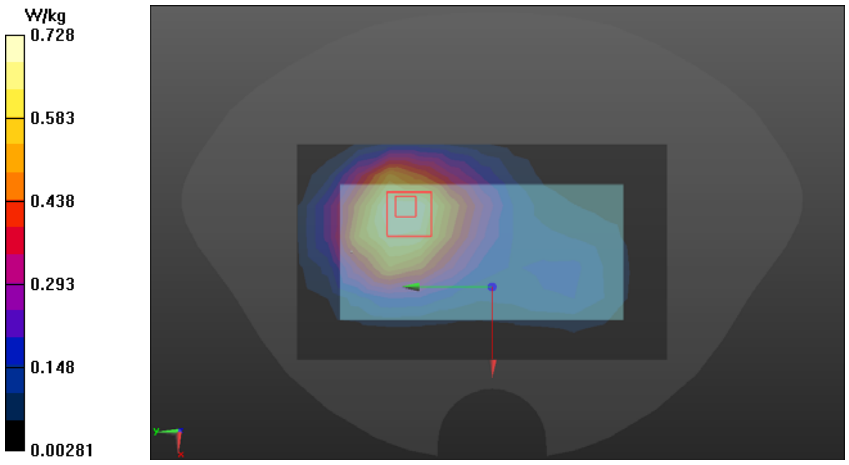


FLAT	Towards ground

Communication System: UID 0, LTE band 4 (0); Frequency: 1732.5 MHz
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.468 S/m; ε_r = 52.935; ρ = 1000 kg/m^3
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/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)

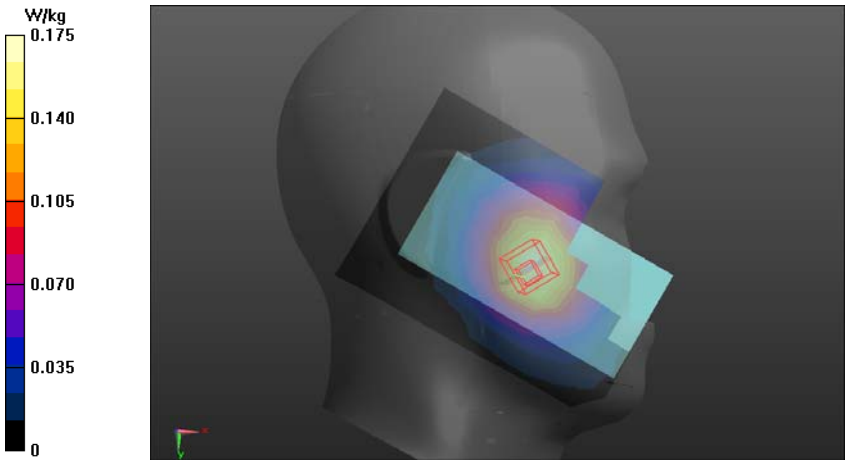
Right Side	Cheek

Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.905 S/m; ε_r = 41.528; ρ = 1000 kg/m^3
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=15mm, dy=15mm
  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=5mm, dy=5mm, dz=5mm
  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

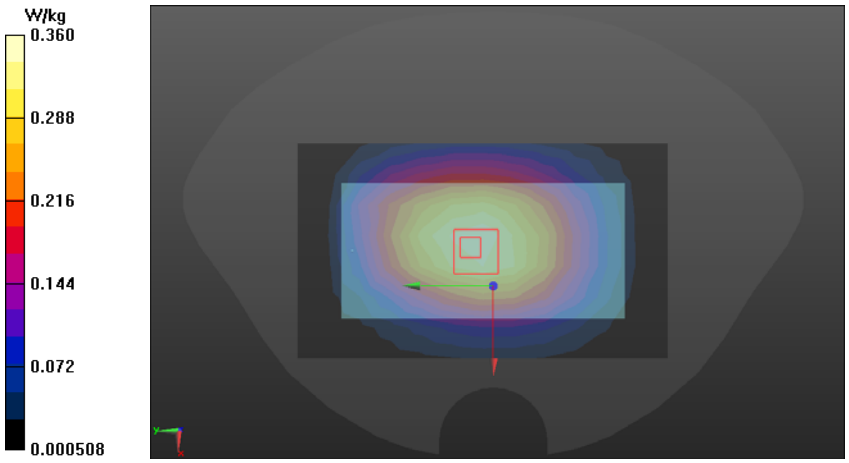


FLAT	Towards ground

Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.975 S/m; ε_r = 54.535; ρ = 1000 kg/m^3
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



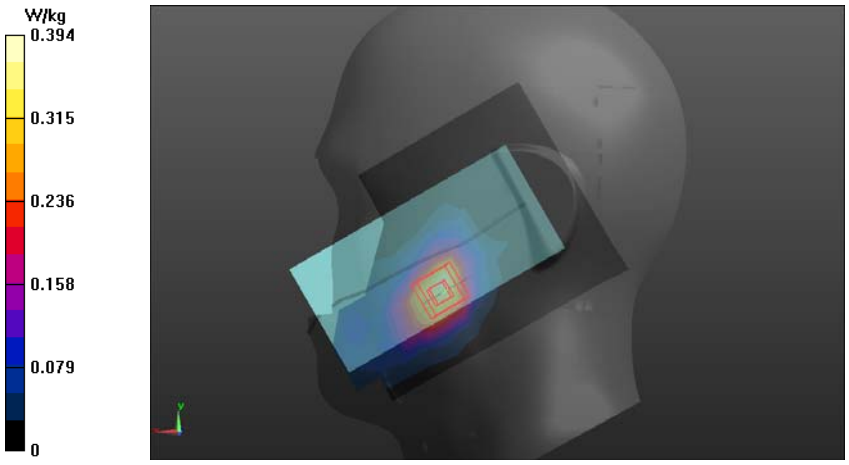
LTE (Band7 20BW)

Left Side	Cheek

Communication System: UID 0, LTE Band 7 (0); Frequency: 2535 MHz
Medium parameters used (interpolated): f = 2535 MHz; σ = 1.888 S/m; ε_r = 39.084; ρ = 1000 kg/m^3
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=15mm, dy=15mm
  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=5mm, dy=5mm, dz=5mm
  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

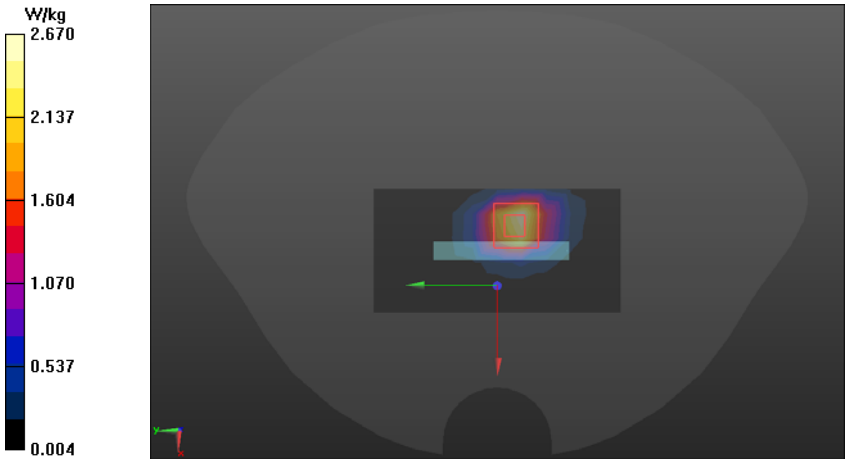


FLAT	Edge2

Communication System: UID 0, LTE Band 7 (0); Frequency: 2560 MHz
Medium parameters used (interpolated): f = 2560 MHz; σ = 2.065 S/m; ε_r = 51.736; ρ = 1000 kg/m^3
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=12mm, dy=12mm
  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=5mm, dy=5mm, dz=5mm
  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



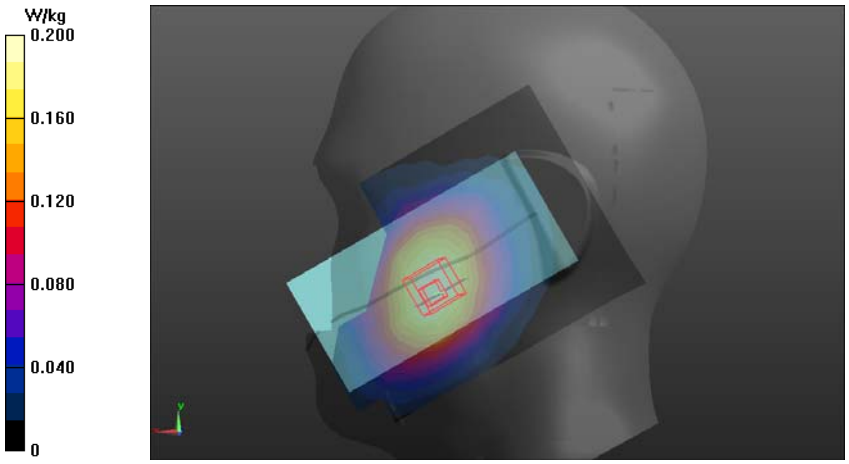
LTE (Band12 10BW)

Left Side	Cheek

Communication System: UID 0, LTE Band 12 (0); Frequency: 707.5 MHz
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.887 S/m; ε_r = 42.115; ρ = 1000 kg/m^3
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=15mm, dy=15mm
  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=5mm, dy=5mm, dz=5mm
  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

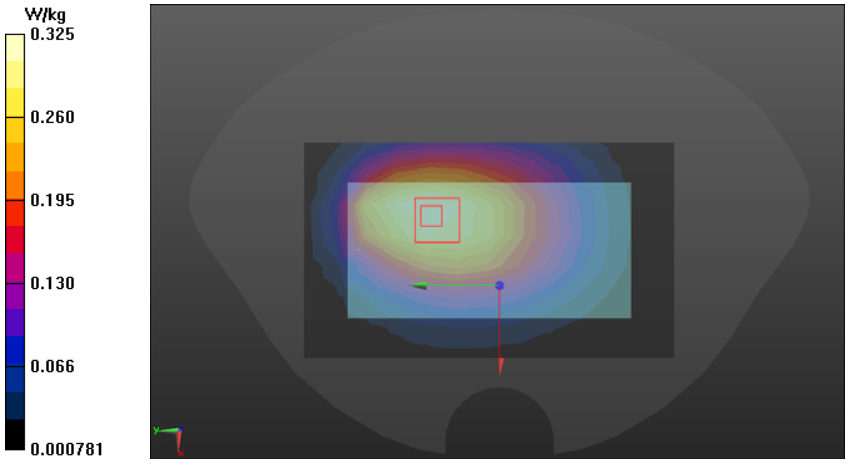


FLAT	Towards ground

Communication System: UID 0, LTE Band 12 (0); Frequency: 707.5 MHz
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.929 S/m; ε_r = 54.923; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (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=15mm, dy=15mm
  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=5mm, dy=5mm, dz=5mm
  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



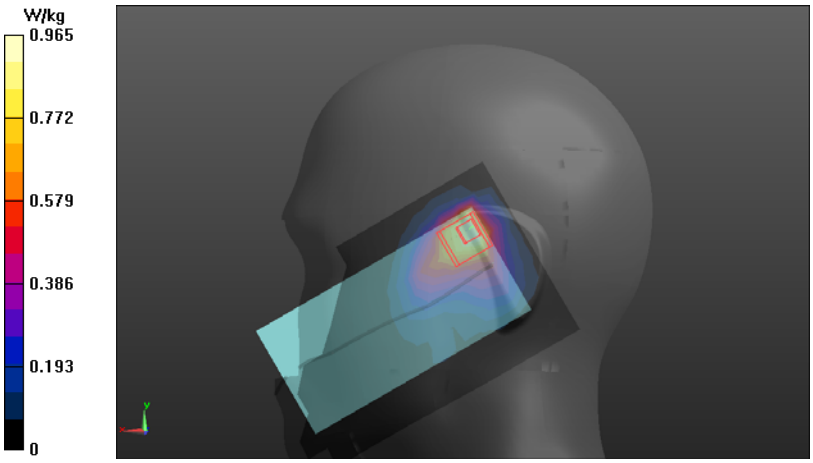
WLAN 2.4GHz

Left Side	Cheek

Communication System: UID 0, WIFI 2.4GHz (0); Frequency: 2437 MHz
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.788 S/m; ε_r = 39.219; ρ = 1000 kg/m^3
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=12mm, dy=12mm
  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=5mm, dy=5mm, dz=5mm
  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

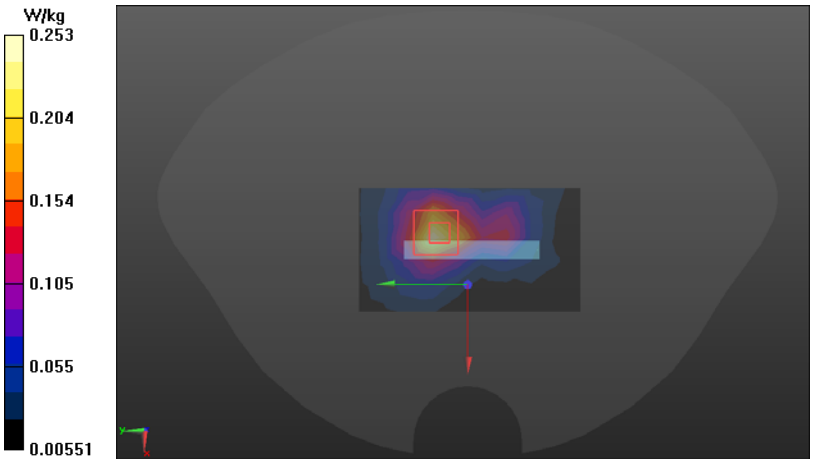


FLAT	EDGE1

Communication System: UID 0, WIFI 2.4GHz (0); Frequency: 2437 MHz
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.933 S/m; ε_r = 52.717; ρ = 1000 kg/m^3
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



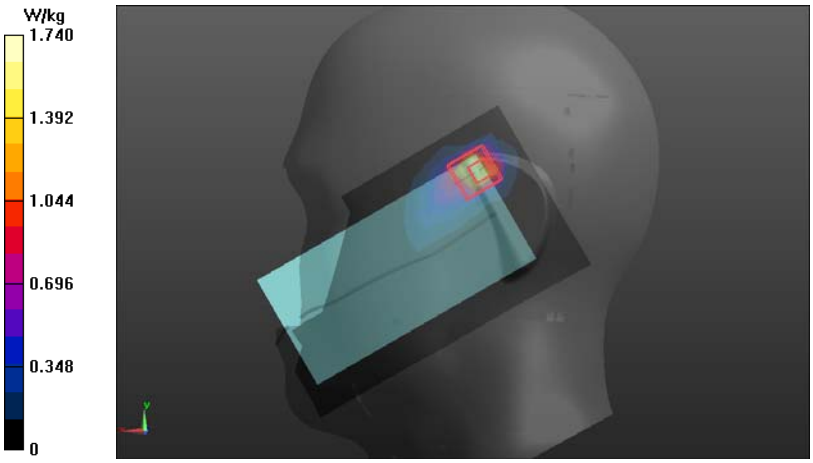
WLAN 5GHz (U-NII-1)

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; σ = 4.701 S/m; ε_r = 35.96; ρ = 1000 kg/m^3
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=10mm, dy=10mm
  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=5mm, dy=5mm, dz=5mm
  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

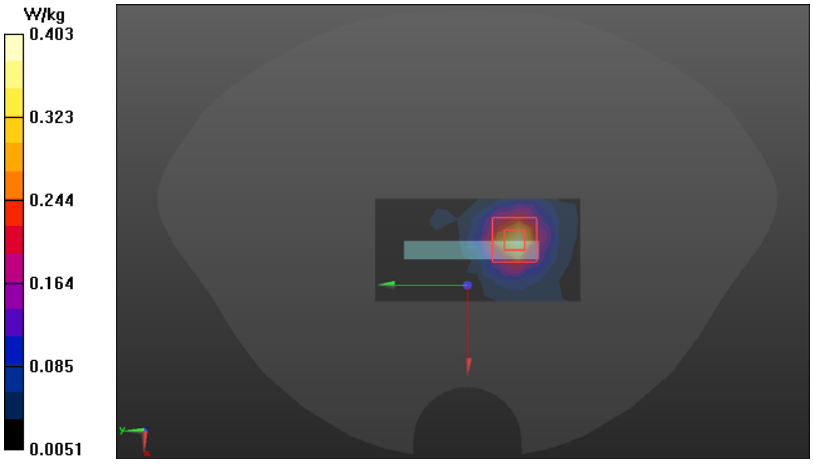


FLAT	EDGE1

Communication System: UID 10062 - CAB, IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps);
Frequency: 5200 MHz
Medium parameters used: f = 5200 MHz; σ = 5.355 S/m; ε_r = 49.035; ρ = 1000 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=10mm, dy=10mm
  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=5mm, dy=5mm, dz=5mm
  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



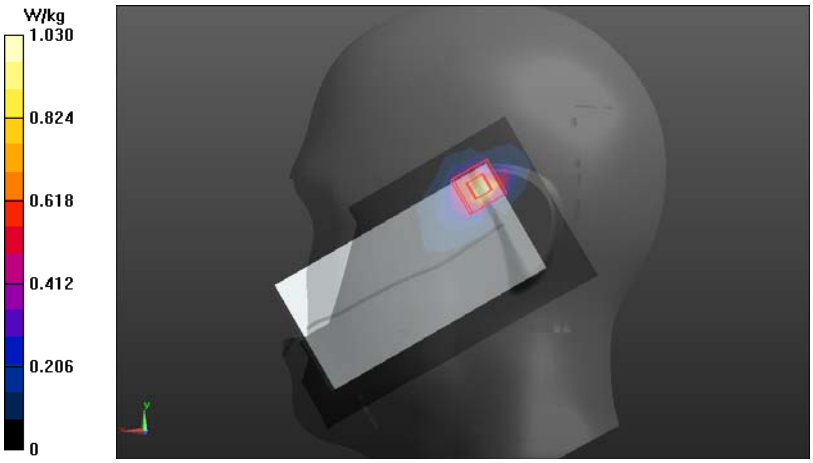
WLAN 5GHz (U-NII-3)

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 MHz; σ = 5.215 S/m; ε_r = 35.355; ρ = 1000 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=10mm, dy=10mm
  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=5mm, dy=5mm, dz=5mm
  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

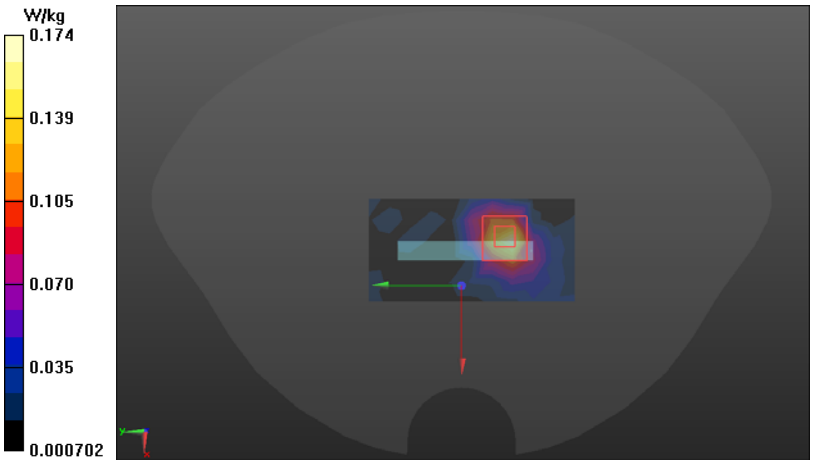


FLAT	EDGE1

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; σ = 5.984 S/m; ε_r = 48.221; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

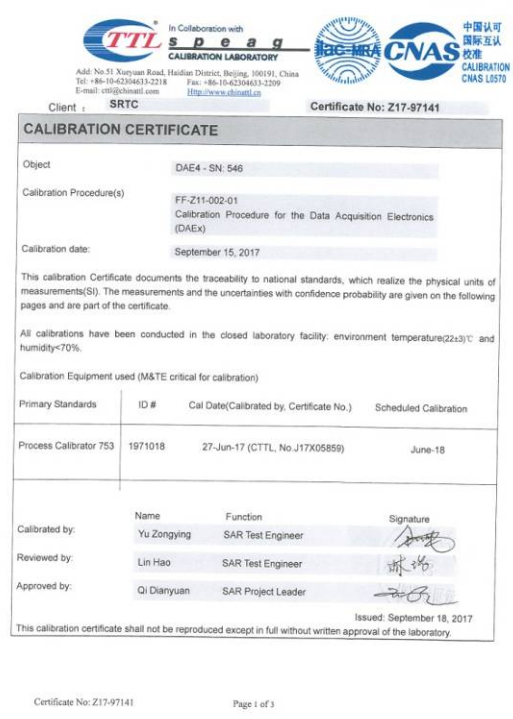
DASY Configuration:

- 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=10mm, dy=10mm
  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=5mm, dy=5mm, dz=5mm
  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



In Collaboration with TTL speag CALIBRATION LABORATORY

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

CNAS 中国认可 国际互认 校准 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.

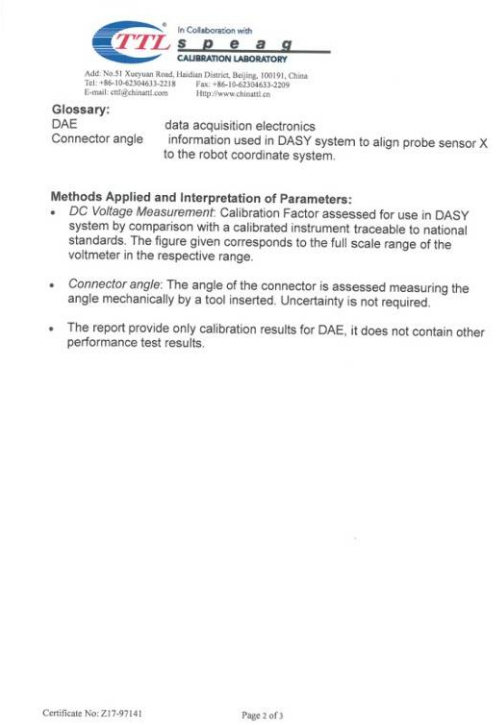
All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

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



In Collaboration with TTL speag CALIBRATION LABORATORY

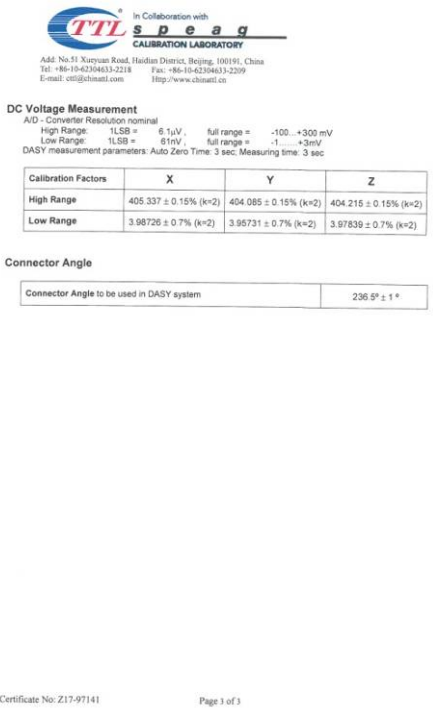
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: cttl@chinattl.com Http://www.chinattl.cn

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.



In Collaboration with TTL speag CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: cttl@chinattl.com Http://www.chinattl.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	3.98726 ± 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 °

DAE4 Sn:720

In Collaboration with 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: ctf@chinattl.com Http://www.chinattl.cn

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±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

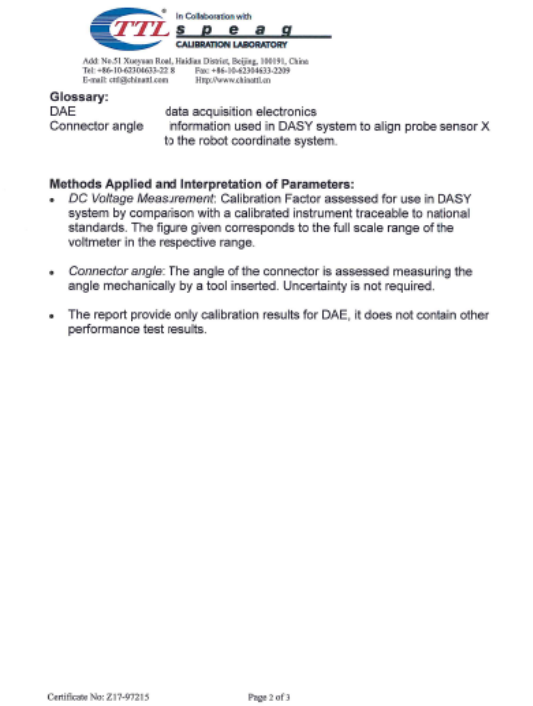
Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Process Calibrator 753	19710*8	27-Jun-17 (CTTL, No.J17X05859)	June-18

	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: 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 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: ctf@chinattl.com Http://www.chinattl.cn

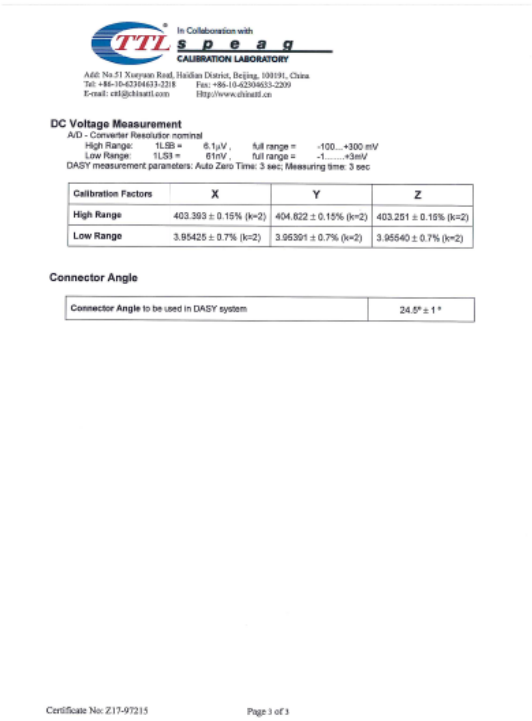
Glossary:

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 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: ctf@chinattl.com Http://www.chinattl.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	403.393 ± 0.15% (k=2)	404.622 ± 0.15% (k=2)	403.251 ± 0.15% (k=2)
Low Range	3.95425 ± 0.7% (k=2)	3.96391 ± 0.7% (k=2)	3.95540 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	24.5° ± 1 °

Certificate No: Z17-97215 Page 3 of 3

ES3DV3 Sn:3127

In Collaboration with 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: cttl@chinattl.com Http://www.chinattl.cn

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)℃ 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

	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: October 12, 2017

In Collaboration with 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: cttl@chinattl.com Http://www.chinattl.cn

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,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.e. θ=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 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization θ=0 (fs900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,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.
- *DCPx,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.
- *Ax,y,z; Bx,y,z; Cx,y,z; VRx,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. VR 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 fs800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. 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 NORMx,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±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 *NORMx* (no uncertainty required).

In Collaboration with 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: cttl@chinattl.com Http://www.chinattl.cn

Probe ES3DV3

SN: 3127

Calibrated: October 11, 2017

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

In Collaboration with 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: cttl@chinattl.com Http://www.chinattl.cn

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)²)[A]	1.28	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	VR mV	Unc[E] (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.
[E] Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

ES3DV3 Sn:3127

In Collaboration with 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: ctti@chinattl.com Http://www.chinattl.cn

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

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity[F]	Conductivity (S/m)[F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (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%

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

In Collaboration with 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: ctti@chinattl.com Http://www.chinattl.cn

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

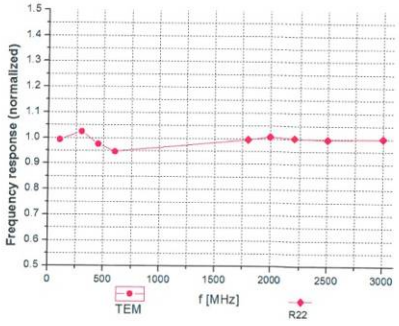
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity[F]	Conductivity (S/m)[F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	55.5	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	0.65	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%

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

In Collaboration with 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: ctti@chinattl.com Http://www.chinattl.cn

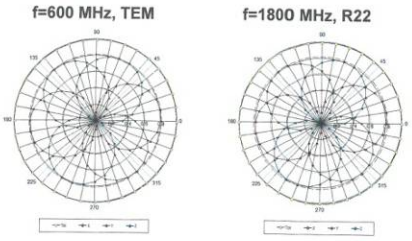
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)

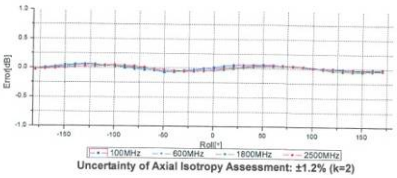


Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

In Collaboration with 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: ctti@chinattl.com Http://www.chinattl.cn

Receiving Pattern (Φ), θ=0°



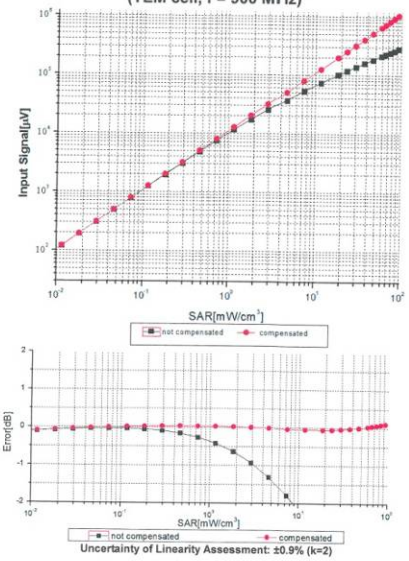


Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

ES3DV3 Sn:3127

In Collaboration with
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: ctt@chinattl.com Http://www.chinattl.cn

Dynamic Range f(SAR$_{head}$)
(TEM cell, f = 900 MHz)

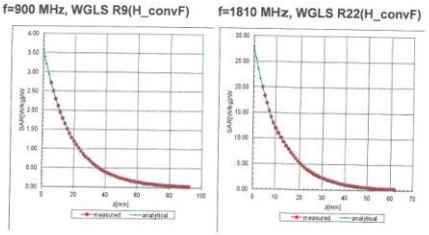


Uncertainty of Linearity Assessment: ±0.9% (k=2)

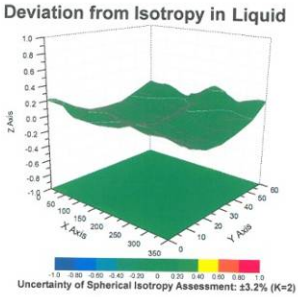
In Collaboration with
s p e a g
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: ctt@chinattl.com Http://www.chinattl.cn

Conversion Factor Assessment

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



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±3.2% (K=2)

In Collaboration with
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: ctt@chinattl.com Http://www.chinattl.cn

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

In Collaboration with
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: ctt@chinattl.com Http://www.chinattl.cn

Appendix: Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB·μV	C	VR mV	Unc[E] (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	

EX3DV4 Sn:3708

In Collaboration with
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: ctt@chinattl.com Http://www.chinattl.com

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 conduted 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
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	18N5IW-10dB	13-Mar-16(CTTL,No.J16X01547)	Mar-18
Reference20dBAttenuator	18N5IW-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	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan -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: November 09, 2017

In Collaboration with
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: ctt@chinattl.com Http://www.chinattl.com

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity n free space
ConvF	sensitivity n TSL / NORMx,y,z
DCP	diode comoression 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 θ=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 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization θ=0 (fs900MHz in TEM-cell; f<> 1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,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.
- *DCPx,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.
- *Ax,y,z; Bx,y,z; Cx,y,z; VRx,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. VR 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 f≤830MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. 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 NORMx,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±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 *NORMx* (no uncertainty required).

In Collaboration with
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: ctt@chinattl.com Http://www.chinattl.com

Probe EX3DV4

SN: 3708

Calibrated: November 07, 2017

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

In Collaboration with
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: ctt@chinattl.com Http://www.chinattl.com

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)²)[A]	0.19	0.36	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[E] (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.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

EX3DV4 Sn:3708

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: ctl@chinattl.com Http://www.chinattl.cn

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

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity[F]	Conductivity (S/m)[F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (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 ±100/MHz 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.
[F] 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.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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: ctl@chinattl.com Http://www.chinattl.cn

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

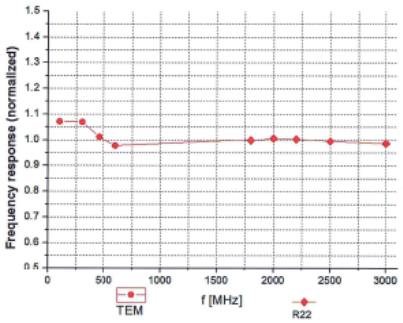
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity[F]	Conductivity (S/m)[F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
900	55.0	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 ±100/MHz 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.
[F] 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.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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: ctl@chinattl.com Http://www.chinattl.cn

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

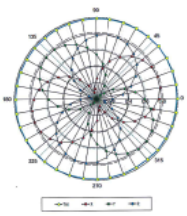


Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

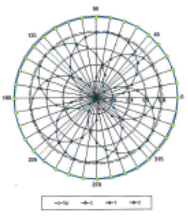
In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: ctl@chinattl.com Http://www.chinattl.cn

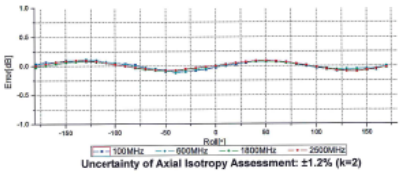
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22



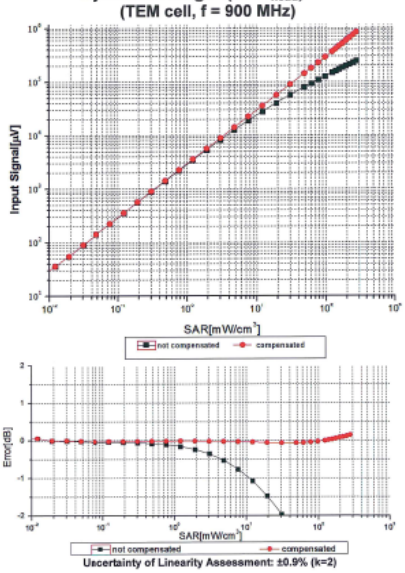


Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

EX3DV4 Sn:3708

In Collaboration with speag CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: ctt@chinattl.com Http://www.chinattl.cn

Dynamic Range f(SAR$_{head}$)
(TEM cell, f = 900 MHz)

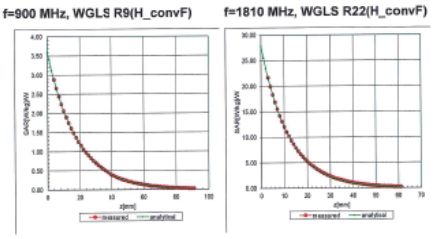


Uncertainty of Linearity Assessment: ±0.9% (k=2)

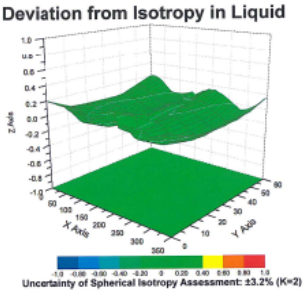
In Collaboration with speag CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: ctt@chinattl.com Http://www.chinattl.cn

Conversion Factor Assessment

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



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±3.2% (k=2)

In Collaboration with speag CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: ctt@chinattl.com Http://www.chinattl.cn

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

In Collaboration with speag CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: ctt@chinattl.com Http://www.chinattl.cn

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[E] (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/h WiFi 5 GHz (OFDM 6 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	

D750V3 Sn:1101

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctl@chinattl.com http://www.chinattl.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)℃ 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 NRV-Z5	100596	02-Mar-17 (CTTL, No.J17X01254)	Mar-18
Reference Probe EX3DV4	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.J17X00286)	Jan-18
Network Analyzer E5071C	MY46111013	13-Jan-17 (CTTL, No.J17X00285)	Jan-18

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

Issued: September 16, 2017

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctl@chinattl.com http://www.chinattl.cn

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) 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%.

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctl@chinattl.com http://www.chinattl.cn

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 ± 18.8 % (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)**

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctl@chinattl.com http://www.chinattl.cn

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.9Ω+ 0.24jΩ
Return Loss	- 28.4dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	52.0Ω- 2.22jΩ
Return Loss	- 30.6dB

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

Manufactured by	SPEAG

D750V3 Sn:1101

In Collaboration with s p e a g CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Head TSL Date: 09.13.2017

Test Laboratory: CTTL, Beijing, China

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

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: f = 750 MHz; σ = 0.879 S/m; ε_r = 41.54; ρ = 1000 kg/m^3

Phantom section: Left Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(10.01, 10.01, 10.01); 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)

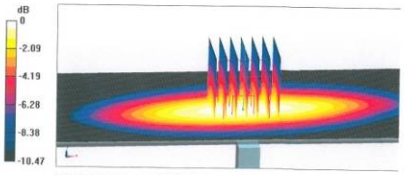
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.10 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 3.17 W/kg

SAR(1 g) = 2.05 W/kg; SAR(10 g) = 1.34 W/kg

Maximum value of SAR (measured) = 2.77 W/kg

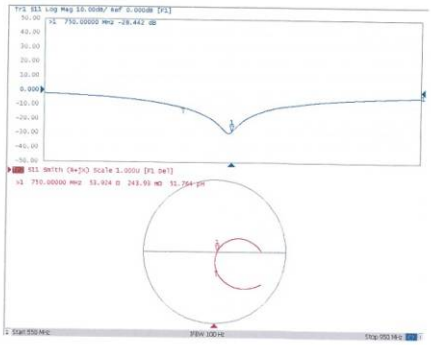


0 dB = 2.77 W/kg = 4.42 dBW/kg

In Collaboration with s p e a g CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Head TSL



In Collaboration with s p e a g CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Body TSL Date: 09.13.2017

Test Laboratory: CTTL, Beijing, China

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

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: f = 750 MHz; σ = 0.946 S/m; ε_r = 55.41; ρ = 1000 kg/m^3

Phantom section: Center Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(9.83, 9.83, 9.83); 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)

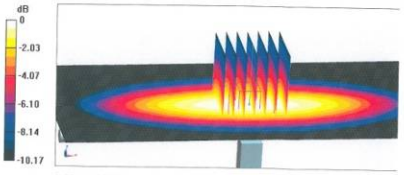
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.35 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.27 W/kg

SAR(1 g) = 2.15 W/kg; SAR(10 g) = 1.42 W/kg

Maximum value of SAR (measured) = 2.88 W/kg

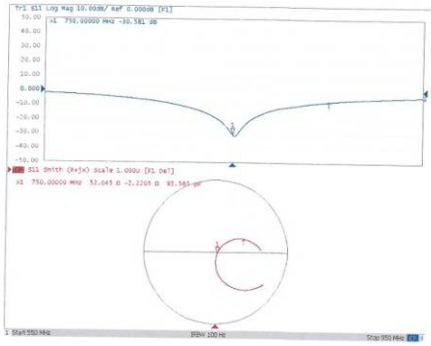


0 dB = 2.88 W/kg = 4.59 dBW/kg

In Collaboration with s p e a g CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Body TSL



D835V2 Sn:4d023

In Collaboration with
s p e a g
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

CNAS 中国认可 国际互认 检准 CALIBRATION CNAS L0570

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)℃ 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 NRV-Z5	100596	02-Mar-17 (CTTL, No.J17X01254)	Mar-18
Reference Probe EX3DV4	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.J17X00286)	Jan-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18

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

Issued: September 16, 2017

In Collaboration with
s p e a g
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

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) 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%.

In Collaboration with
s p e a g
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

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

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.35 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**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	1.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**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

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

In Collaboration with
s p e a g
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.0Ω- 2.79jΩ
Return Loss	- 30.7dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.6Ω- 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

Manufactured by	SPEAG

D835V2 Sn:4d023

In Collaboration with
s p e a g
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.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; σ = 0.903 S/m; ε_r = 41.34; ρ = 1000 kg/m^3

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)

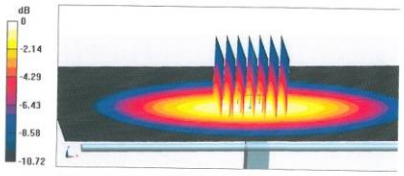
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.28V/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

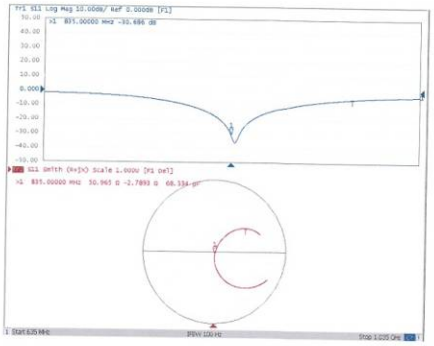
Maximum value of SAR (measured) = 3.21 W/kg



0 dB = 3.21 W/kg = 5.07 dBW/kg

In Collaboration with
s p e a g
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Head TSL



In Collaboration with
s p e a g
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.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; σ = 0.958 S/m; ε_r = 55.68; ρ = 1000 kg/m^3

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)

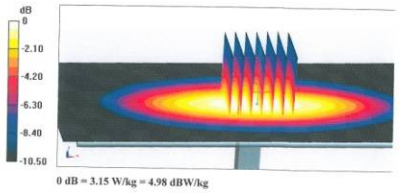
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

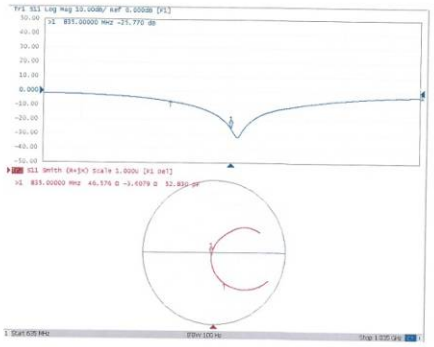
Maximum value of SAR (measured) = 3.15 W/kg



0 dB = 3.15 W/kg = 4.98 dBW/kg

In Collaboration with
s p e a g
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Body TSL



D1800V2 Sn:2d084

In Collaboration with s p e a g CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctti@chinattl.com http://www.chinattl.cn

CNAS 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 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
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 EX3DV4	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.J17X00286)	Jan-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18

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

Issued: September 18, 2017

In Collaboration with s p e a g CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctti@chinattl.com http://www.chinattl.cn

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, "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) 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%.

In Collaboration with s p e a g CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctti@chinattl.com http://www.chinattl.cn

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 cm^3 (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 cm^3 (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 cm^3 (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 cm^3 (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)**

In Collaboration with s p e a g CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctti@chinattl.com http://www.chinattl.cn

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 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

D1800V2 Sn:2d084

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Head TSL Date: 09.15.2017

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; σ = 1.423 S/m; ε_r = 40.37; ρ = 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)

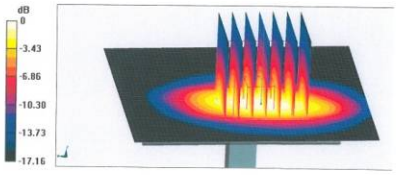
System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.90 V/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

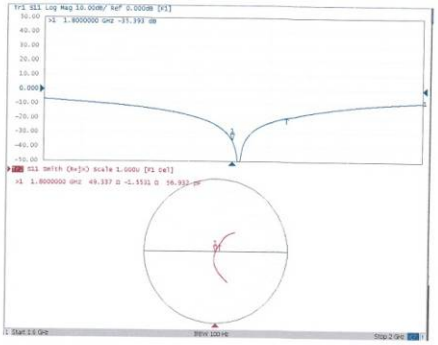
Maximum value of SAR (measured) = 15.5 W/kg



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

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Head TSL



In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Body TSL Date: 09.14.2017

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; σ = 1.503 S/m; ε_r = 53.79; ρ = 1000 kg/m^3

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)

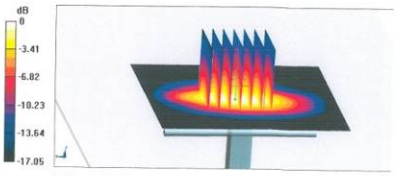
System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.57 V/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

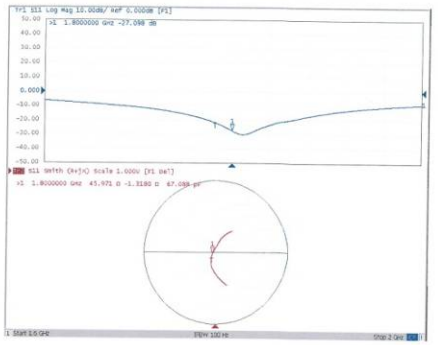
Maximum value of SAR (measured) = 15.2 W/kg



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

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Body TSL



D2450V2 Sn:738

In Collaboration with s p e a g CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctt@chinattl.com http://www.chinattl.cn

CNAS 中国认可 国际互认 校准 CALIBRATION CNAS L0570

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)℃ 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 NRV-Z5	100596	02-Mar-17 (CTTL, No.J17X01254)	Mar-18
Reference Probe EX3DV4	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.J17X00286)	Jan-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18

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

Issued: September 21, 2017

In Collaboration with s p e a g CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctt@chinattl.com http://www.chinattl.cn

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) 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%.

In Collaboration with s p e a g CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctt@chinattl.com http://www.chinattl.cn

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	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)**

In Collaboration with s p e a g CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctt@chinattl.com http://www.chinattl.cn

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.3Ω+ 5.92jΩ
Return Loss	- 24.5dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.6Ω+ 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

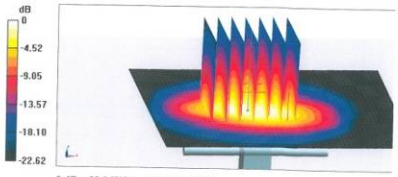
D2450V2 Sn:738

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Head TSL Date: 09.18.2017
Test Laboratory: CTTL, Beijing, China
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; σ = 1.788 S/m; ε_r = 38.67; ρ = 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: 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)

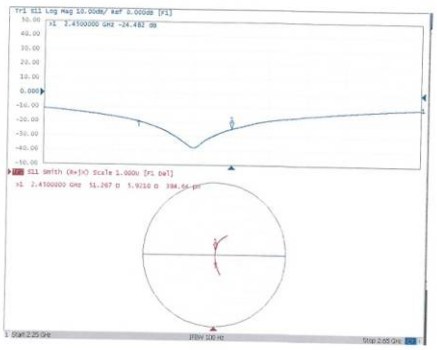
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.1 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 27.8 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.1 W/kg
Maximum value of SAR (measured) = 22.0 W/kg



0 dB = 22.0 W/kg = 13.42 dBW/kg

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Head TSL

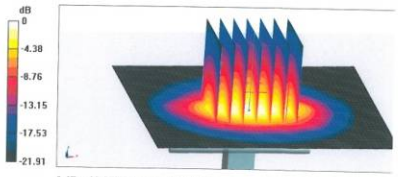


In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Body TSL Date: 09.18.2017
Test Laboratory: CTTL, Beijing, China
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; σ = 1.983 S/m; ε_r = 52.51; ρ = 1000 kg/m^3
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: 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)

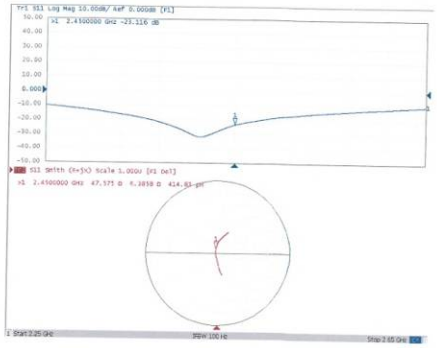
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.41 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 27.8 W/kg
SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.1 W/kg
Maximum value of SAR (measured) = 22.3 W/kg



0 dB = 22.3 W/kg = 13.48 dBW/kg

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Body TSL



D5GHzV2 Sn:1079

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

CALIBRATION CNAS L0570

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)℃ 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-Z91	100596	02-Mar-17 (CTTL, No.J17X01254)	Mar-18
ReferenceProbe EX3DV4	SN 3846	13-Jan-17(CTTL-SPEAG,No.Z16-97251)	Jan-18
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.J17X00286)	Jan-18
NetworkAnalyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18

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

Issued: September 28, 2017

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

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) 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%.

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

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	4.66 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

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)**

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

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	4.76 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

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	4.96 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

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	**23.8 mW /g ± 24.2 % (k=2)**

D5GHzV2 Sn:1079

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

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

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

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

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

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

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

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

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

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

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

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

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

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

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.73 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**77.6 mW /g ± 24.4 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.17 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.8 mW /g ± 24.2 % (k=2)**

D5GHzV2 Sn:1079

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

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 - 6.82jΩ
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 - 8.20jΩ
Return Loss	- 21.6dB

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

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	54.9Ω - 6.85jΩ
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	58.7Ω - 8.10jΩ
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

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

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: 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 = 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

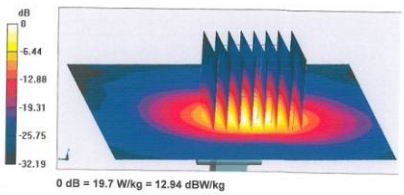
Dipole Calibration /Pin=100mW, d=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.19 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 33.7 W/kg
SAR(1 g) = 8.13 W/kg; SAR(10 g) = 2.32 W/kg
Maximum value of SAR (measured) = 19.3 W/kg

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

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

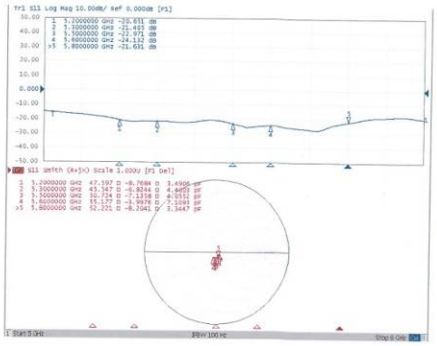


0 dB = 19.7 W/kg = 12.94 dBW/kg

D5GHzV2 Sn:1079

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Head TSL



In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Body TSL Date: 09.25.2017

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 = 5.382 mho/m; ε_r = 49.47; ρ = 1000 kg/m3, Medium parameters used: f = 5300 MHz; σ = 5.498 mho/m; ε_r = 49.21; ρ = 1000 kg/m3, Medium parameters used: f = 5500 MHz; σ = 5.722 mho/m; ε_r = 49.03; ρ = 1000 kg/m3, Medium parameters used: f = 5600 MHz; σ = 5.733 mho/m; ε_r = 48.37; ρ = 1000 kg/m3, Medium parameters used: f = 5800 MHz; σ = 5.935 mho/m; ε_r = 48.99; ρ = 1000 kg/m3,
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - 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

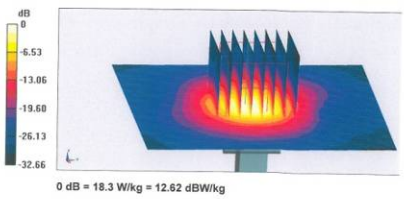
Dipole Calibration /Pin=100mW, d=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 53.94 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 31.9 W/kg
SAR(1 g) = 7.68 W/kg; SAR(10 g) = 2.18 W/kg
Maximum value of SAR (measured) = 18.3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

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

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) = 19.8 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

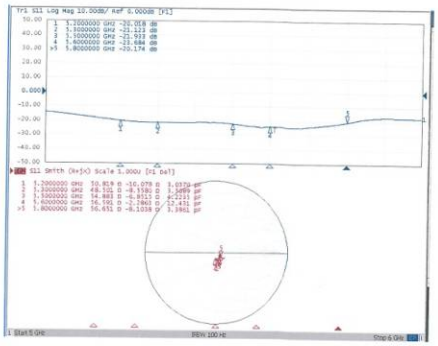
Dipole Calibration /Pin=100mW, d=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 68.20 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 33.3 W/kg
SAR(1 g) = 7.73 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 18.3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



0 dB = 18.3 W/kg = 12.62 dBW/kg

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Body TSL



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